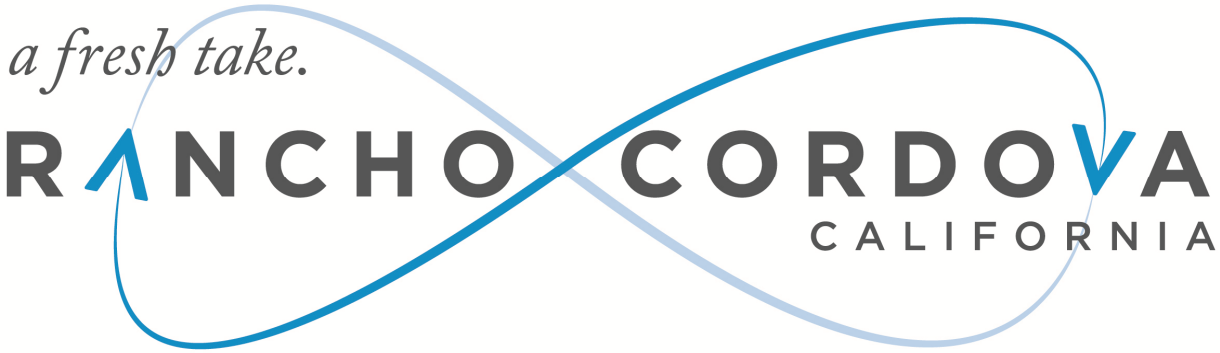
CITY OF RANCHO CORDOVA



CITY COUNCIL MEETING

Monday, October 15, 2018

5:30 PM – Regular Meeting

AGENDA

Linda Budge, Mayor

Robert J. McGarvey, Vice Mayor

David Sander, Council Member

Garrett Gatewood, Council Member

Donald Terry, Council Member

CITY OF RANCHO CORDOVA

CITY COUNCIL MEETING

City Hall
2729 Prospect Park Drive, Rancho Cordova

Monday, October 15, 2018

5:30 PM – Regular Meeting
David B. Roberts Council Chambers

AGENDA

1. REGULAR MEETING - CALL TO ORDER / ROLL CALL

Council Members Gatewood, McGarvey, Sander, Terry and Mayor Budge.

2. METRO CABLE TV TELEVISION ANNOUNCEMENT

The Clerk will announce the meetings video recording and playback schedules.

3. PLEDGE OF ALLEGIANCE

The Mayor will call on someone in attendance to lead the Pledge.

4. INVOCATION

Principal Amy Hale and Student Government President Charles Sander from St. John Vianney will give the invocation.

5. PRESENTATIONS

5.1 Introduction of New School Principals and Assistant Principals Serving the Rancho Cordova Community.

5.2 Proclamation recognizing Datacate for receiving Sacramento County's Sustainable Business Award.

5.3 Recognition of Council Member Gatewood's Birthday.

6. PUBLIC COMMENT

Citizens wishing to address the Council for any matter not on the agenda may do so at this time by completing and submitting a Speaker Card to the City Clerk. For items on the agenda, speakers will be called up to the podium by the Mayor at the point on the agenda when the item will be heard. Speakers are encouraged to keep comments to three minutes or less and to state name and community of residence.

Under the provisions of the California Government Code, the City Council is prohibited from discussing or taking immediate action on any item not on the agenda unless it can be demonstrated to be of an emergency nature or the need to take immediate action arose after the posting of the agenda.

7. COUNCIL REPORTS

8. CITY MANAGER'S REPORT

9. CONSENT CALENDAR ITEMS - ROLL CALL VOTE

9.1 **Subject:** Adopt Meeting Minutes of October 1, 2018 Regular and Special City Council Meetings.
Recommendation: Adopt Minutes.

9.2 **Subject:** Second Reading of an Ordinance of the City of Rancho Cordova Levying a Special Tax Within the City of Rancho Cordova Grantline 208 Community Facilities District 2018-1.
Recommendation: Waive the second reading and adopt the Ordinance.
Result of Recommended Action: Adoption of this Ordinance will allow the levy of a special tax within City of Rancho Cordova Grantline 208 Community Facilities District 2018-1 (the "CFD"), and, in each year hereafter, the process of determining the special taxes and processing the collection is done administratively by the Administrative Services Director (or a consultant) with no further Council action being needed.
Staff Report: Michelle Mingay, Senior Finance Analyst.
Advances Goal: 5.

9.3 **Subject:** Records and Information Management - Retention Schedule Update.
Recommendation: Adopt a Resolution approving updates to the City of Rancho Cordova City-Wide Records Retention Schedule.
Result of Recommended Action: Adoption of a new Retention Schedule will enable City Staff to facilitate the appropriate and efficient management and retention of City records in accordance with government regulations.
Staff Report: Stacy Leitner, City Clerk.
Advances Goals: 1 and 5.

9.4 **Subject:** Annexation of the Anthology Subdivision into the City of Rancho Cordova Community Facilities District No. 2013-2 (Police Services).
Recommendation: Adopt the Resolution.
Result of Recommended Action: Adoption of the Resolution approves Annexation Map No. 4 for the Anthology Subdivision to Community Facilities District No. 2013-2 (Police Services) (hereinafter "CFD No. 2013-2"), and approves the recording of the

Annexation Map and the Notice of Special Tax Lien.
Staff Report: Michelle Mingay, Senior Finance Analyst.
Advances Goal: 5.

9.5 **Subject:** A Resolution Authorizing the Public Works Director to Submit and Execute Application(s) and Documents for Calrecycle Grants.
Recommendation: Adopt the Resolution.
Result of Recommended Action: Adoption of this Resolution will authorize the City to submit application(s) to CalRecycle for all grants and designates the Public Works Director or his or her designee to execute all grant documents for a period of 5-years from the date of adoption.
Staff Report: Albert Stricker, Public Works Director and Quoc Nham, Associate Civil Engineer.
Advances Goals: 1 and 2.

9.6 **Subject:** Approve the Final Large Lot Map of Montelena Subdivision No. RC-04-132.0.
Recommendation: Approve Final Large Lot Map of Montelena Subdivision No. RC-04-132.0 located on the south side of Douglas Road, west side of Rancho Cordova Parkway and north and south of Chrysanthy Boulevard.
Result of Recommended Action: Approval of this recommended action will result in the recording of the final map creating 8 large lots and 19 miscellaneous lots.
Staff Report: Albert Stricker, Public Works Director and Marilyn Phelps, Assistant Land Surveyor.
Advances Goals: 1 and 2.

10. CONSENT PUBLIC HEARING ITEMS - ROLL CALL VOTE

10.1 **Subject:** First Amendment to the Development Agreement Relative to Anthology at Anatolia.
Recommendation: Introduce and waive the first reading of the Ordinance.
Result of Recommended Action: Adoption of the Ordinance would approve a first amendment to the Development Agreement relative to the Anthology at Anatolia residential project to adjust the park development and park renovation fees to current rates and extend the agreement term to December 31, 2028.
Staff Report: Elizabeth Sparkman, Community Development Director.
Advances Goals: 1, 2, and 5.

10.2 **Subject:** A Resolution Declaring a Protest Hearing and Authorizing the Mailing of Property Owner Ballot Relating to the Imposition of an Annual Stormwater Utility Fee for the European Parts Depot.
Recommendation: Adopt the Resolution.
Result of Recommended Action: Adoption of the Resolution will declare the results of the property owner protest and, if there exists less than a majority protest, authorize the mailing of a ballot to the property owner to approve the levy of the fee to pay for maintenance of storm drainage and flood protection systems for the European Parts Depot project. The action also sets 1:30 p.m. on November 8, 2018 in the office of the City Clerk, as the time and date for the ballot tabulation for the matter.
Staff Report: Elizabeth Sparkman, Community Development Director and Jeanette Cervantes, Management Technician.
Advances Goal: 5.

11. PUBLIC HEARING ITEMS

11.1 **Subject:** Actions Related to Approval of the South Sacramento Habitat Conservation Plan (SSHCP).

Recommendation:

1. Open the public hearing, hear staff presentation, take public testimony, and close the public hearing
2. Accept the certified SSHCP Environmental Impact Statement/Environmental Impact Report (SSHCP EIS/EIR) (Attachment 7, 8, and Attachments 9 through 19) and Adopt by Resolution the California Environmental Quality Act (CEQA), Findings of Fact, the Aquatic Resources Program (Attachment 5), the Nexus Study (Attachment 20) and the SSHCP (Attachments 2, 3, 4) (Exhibit A)
3. Introduce and waive first reading of the Aquatic Protection Ordinance adding Chapter 16.94, Sections 16.94.010 through Section 16.94.110 to Title 16 of the Rancho Cordova Municipal Code (Exhibit B)
4. Adopt the Implementing Resolution (Exhibit C) authorizing the City Manager to execute the Implementing Agreement (Attachment 21)
5. Introduce and waive first reading of the Fee Ordinance adding Chapter 22.45, Sections 22.45.010 through 22.45.201 to Title 22 of the Rancho Cordova Municipal Code related to SSHCP fees (Exhibit D)

Result of Recommended Action: Adoption of the SSHCP and its associated components by all Plan Permittees and the South Sacramento Conservation Agency (SSCA), will set the stage for issuance of a Federal Endangered Species Act Incidental Take Permit (ITP) by the United States Fish and Wildlife Service (USFWS), and a State Endangered Species Act Incidental Take Permit by the California Department of Fish and Wildlife (CDFW). It will also set the stage for issuance of a Clean Water Act Section 404 Programmatic Permit and Abbreviated Permit Strategy by the U.S Army Corps of Engineers (USACOE). This will establish a preserve system to protect habitat lands and aquatic resources within the Plan Area and also create a streamlined federal and state permitting process for development and infrastructure projects in the area.

Staff Report: Elizabeth Sparkman, Community Development Director and Darcy Goulart, Planning Manager.

Advances Goals: 1,2, and 5.

11.2 **Subject:** Woodside Homes Douglas 98 Subdivision Major Design Review and Special Development Permit;

PROJECT NO. DD9793 SEQUOIA AT CYPRESS
PROJECT NO. DD9794 MAGNOLIA AT CYPRESS
PROJECT NO. DD9795 COTTONWOOD AT CYPRESS
PROJECT NO. DD9796 EUCALYPTUS AT CYPRESS

Recommendation: That Council:

a) Determine the project Exempt per Section 15182, of the CEQA Guidelines; and
b) Adopt the Resolution for Douglas 98 Special Development Permit and Major Design Review.

Result of Recommended Action: Adoption of the above referenced Resolution would approve the Special Development Permit and Major Design Review to include 4 neighborhoods for 14 floor plans located within Douglas 98. Approval would allow the applicant to pursue necessary building permits for new construction.

Staff Report: June Cowles, Senior Planner and Nicholas Sosa, Assistant Planner.

Advances Goals: 1, 2, and 6.

11.3 **Subject:** Mather Field Chevron and Carwash Conditional Use Permit, Minor Design

Review, and Letter of Public Convenience and Necessity: Project No. DD9734 – Located at 2931 Mather Field Road.
Recommendation: 1) Determine the Project Exempt per Sections 15183 and 15332 of the CEQA Guidelines; 2) Adopt Resolution for Minor Design Review and Conditional Use Permit (CUP) for a Service Station and Car Wash; and 3) Adopt a Resolution denying a CUP request for alcoholic beverage sales and contingent Letter of Public Convenience and Necessity (PCN).
Result of Recommended Action: Adoption of the Resolution for the Minor Design Review and Conditional Use Permit for the Service Station would allow the applicant to submit for building permits to begin the demolition of the existing convenience store and allow for construction of a new convenience store with drive-thru self-serve carwash.
Staff Report: Nicholas Sosa, Assistant Planner.
Advances Goals: 2 and 6.

12. REGULAR CALENDAR ITEMS

12.1 **Subject:** APPOINTMENT OF LABOR NEGOTIATORS Pursuant to Government Code Section 54957.6. Agency Designated Representatives: Mayor Linda Budge and Adam Lindgren; Unrepresented employee: City Manager.

13. COUNCIL REQUESTS FOR FUTURE AGENDA ITEMS

14. ADJOURNMENT

Mayor Budge will adjourn the meeting to closed session in the Community Board Room.

15. CLOSED SESSION - CALL TO ORDER/ROLL CALL

Council Members Gatewood, McGarvey, Sander, Terry and Mayor Budge.

16. CLOSED SESSION

Council may adjourn to Closed Session to discuss the following item(s):

CONFERENCE WITH LABOR NEGOTIATORS Pursuant to Government Code Section 54957.6. Agency Designated Representatives: Mayor Linda Budge and Adam Lindgren; Unrepresented employee: City Manager.

17. OPEN SESSION - REPORT FROM CLOSED SESSION

The City Attorney will report on action taken in Closed Session.

18. ADJOURNMENT

ADDITIONAL INFORMATION

SPECIAL MEETINGS LISTED BELOW ARE SUBJECT TO CHANGE/CANCELLATION WITHOUT FURTHER NOTICE.

UNLESS THE COUNCIL ADOPTS A MOTION TO EXTEND THE MEETING, ANY ITEM THAT IS NOT INITIATED BEFORE 11:00 PM WILL BE CONTINUED TO THE NEXT DAY AT 5:30 PM OR SCHEDULED ON THE NEXT REGULAR MEETING AGENDA OF THE COUNCIL.

Public documents related to items on the open session portion of this agenda, which are distributed to the City Council less than 72 hours prior to the meeting, shall be available for public inspection at the time the documents are distributed to the Council. Documents are available for inspection at the City Clerk's office located in Rancho Cordova City Hall.

The agenda items are accessible on the City's website at www.cityofranchocordova.org on Thursdays or Fridays prior to the Regular City Council Meeting.

CITYWIDE GOALS - (Adopted March 27, 2012)	
1.	Promote the Positive Image of Rancho Cordova
2.	Ensure a Safe, Inviting and Livable Community
3.	Empower Responsible Citizenship
4.	Establish Logical City Boundaries that Provide Regional Leadership and Address Financial Challenges
5.	Ensure the Availability of the Best Public Services in the Region while Practicing Sound Fiscal Management
6.	Drive Diverse Economic Opportunities

UPCOMING MEETINGS	
Tuesday, October 23	5:30 PM Special Meeting/Closed Session for City Manager Evaluation – CANCELLED
Tuesday, October 30	CANCEL WORK SESSION
Monday, November 5	4:00 PM Special Meeting/Study Session 5:30 PM Regular Meeting
Monday, November 19	5:30 PM Regular Meeting
Tuesday, November 27	5:30 PM Special Meeting/Work Session
Monday, December 3	4:00 PM Special Meeting/Study Session 5:30 PM Regular Meeting
Tuesday, December 11	5:30 PM Special Meeting/Work Session
Monday, December 17	5:30 PM Regular Meeting

If you have any technical questions related to the agenda items, please contact the appropriate department as follows:

DEPARTMENTAL GENERAL TELEPHONE NUMBERS	
Building and Safety Division	(916) 851-8760
City Attorney's Office	(916) 556-1531
City Clerk's Department	(916) 851-8720
City Manager's Office	(916) 851-8800
Communications Department	(916) 851-8791
Economic Development Department	(916) 851-8780
Finance Department	(916) 851-8730
Housing Division	(916) 851-8784
Human Resources Department	(916) 851-8740
IT Department	(916) 851-8700
Neighborhood Services – Animal Services	(916) 851-8770
Parks & Recreation (Cordova Recreation & Park District)	(916) 362-1841
Planning Department	(916) 851-8750
Public Works Department	(916) 851-8710
Rancho Cordova Police Department	(916) 875-9600
Redevelopment Department	(916) 851-8780
Sac Metro Fire District	(916) 859-4300

The Rancho Cordova City Council meeting will be videotaped in its entirety and will be cablecast without interruption on Metro Cable 14, the Government Affairs Channel on the Comcast, Consolidated Communications and AT&T U-Verse Systems. Closed Captioning will be available on the playback cablecast. A DVD copy is available from the City Clerk's Department and a webcast of this meeting will be available for viewing via video streaming from the City's website within 48 hours of adjournment of this meeting.

In compliance with the Americans with Disabilities Act, if you need a disability-related modification or accommodation, including auxiliary aids or services, to participate in this meeting, please contact the City Clerk's Office at (916) 851-8720 at least 48 hours prior to the meeting.

CERTIFICATION OF POSTING OF AGENDA

I, Stacy Leitner, City Clerk for the City of Rancho Cordova, declare that the foregoing agenda for the Monday, October 15, 2018 Regular Meeting of the Rancho Cordova City Council was posted and available for review on October 12, 2018 at City Hall of the City of Rancho Cordova, 2729 Prospect Park Drive, Rancho Cordova, California, 95670. The agenda is also available on the city website at www.cityofranchocordova.org.

Signed October 12, 2018 at Rancho Cordova, California.

Stacy Leitner

Stacy Leitner, City Clerk

CITY COUNCIL MEETING

City Hall
2729 Prospect Park Drive, Rancho Cordova

Monday, October 01, 2018

4:00 PM – Special Meeting
American River Room North

5:30 PM – Regular Meeting
David B. Roberts Council Chambers

Special Meeting/Work Session to Follow the Regular Meeting

DRAFT MINUTES

1. SPECIAL MEETING - CALL TO ORDER/ROLL CALL

Mayor Budge called the Special meeting to order in the American River Room North at 4:05 PM.

Council Members Present: Gatewood, McGarvey, Sander, Terry, Budge.

Council Members Absent: Sander and Terry.

Staff Members Present: Abhar, Carr, Leitner, Lindgren, Siren, Weber.

2. PUBLIC COMMENT

Mayor Budge opened the public comment period. Seeing no speakers, Mayor Budge closed the public comment period.

3. SPECIAL MEETING ITEM

ACTION: Motion to continue the item to a later date when all Council Members can attend by Budge second by McGarvey; Motion passed with a 3:0 vote.

3.1 **Subject:** Discussion and Direction on Various Aspects of Signage Related to Community Events and Way-Finding Signage.
Recommendation: Receive report and direct staff on potential code amendments to address community event and way-finding signage.

Result of Recommended Action: No formal action is requested of Council at this time. Council insight and/or direction to City staff on various aspects of signage will assist staff with potential code amendments related to noncommercial, digital billboards, and way-finding signage.
Staff Report: Darcy Goulart, Planning Manager.
Advances Goals: 1, 2, and 6.

4. ADJOURNMENT OF SPECIAL MEETING

Mayor Budge adjourned to the Regular meeting in the David B. Roberts Council Chambers at 4:07 PM.

5. REGULAR MEETING - CALL TO ORDER / ROLL CALL

Mayor Budge called the Regular meeting to order in the David B. Roberts Council Chamber at 5:34 PM.

Council Members Present: Gatewood, McGarvey, Terry, Sander, Budge.

Council Members Absent: None.

Staff Members Present: Abhar, Boucher, Cook, Ducharme, Gonzalez, Goulart, Haven, Judish, Juran, Kniestedt, Lee, Leitner, Lindgren, Rodriguez, Simpson, Sparkman, Sparks, Stover, Stricker, Taylor, Weber.

6. METRO CABLE TV TELEVISION ANNOUNCEMENT

The City Clerk read the meetings recordings and playback schedules.

7. PLEDGE OF ALLEGIANCE

Assistant Police Chief Lewis, led the pledge.

8. INVOCATION

Anthony Telford, Anatolia Ward Bishopric Member, from Church of Jesus Christ of Latter-day Saints gave the invocation.

9. PRESENTATIONS

9.1 Proclamation Recognizing the Week of October 7-13, 2018 as Code Enforcement Officer Week for the City of Rancho Cordova.

9.2 Proclamation in Support of Manufacturing Awareness and Appreciation Month.

9.3 Vote Center and Ballot Drop off Location for the November 6, 2018 General Election.

10. PUBLIC COMMENT

Mayor Budge opened the public comment period. Seeing no speakers, Mayor Budge closed the public comment period.

11. COUNCIL REPORTS

Council reported on events since the last meeting.

12. CITY MANAGER'S REPORT

City Manager Cyrus Abhar gave his report.

13. CONSENT CALENDAR ITEMS - ROLL CALL VOTE

ACTION: Motion to approve items 13.1 through 13.8 by Terry second by Gatewood; Motion passed with a 5:0 vote.

13.1 **Subject:** Adopt Meeting Minutes from September 4, 2018, September 11, 2018, and September 17, 2018 Special and Regular City Council Meetings.
Recommendation: Adopt Minutes.

13.2 **Subject:** An Ordinance Levying a Special Tax Within Community Facilities District No. 2018-2 (Community Places and Neighborhood Greens).
Recommendation: Waive the second reading and adopt the Ordinance.
Result of Recommended Action: Approval of the Ordinance would authorize the levy of a special tax within CFD 2018-2 (Community Places and Neighborhood Greens) at the rate and in accordance with the rate and method of apportionment of special tax as set forth in the Resolution of Formation adopted by the Council.
Staff Report: Elizabeth Sparkman, Community Development Director.
Advances Goals: 1, 2, and 5.

13.3 **Subject:** Approval of the Annexation Boundary Map for the European Parts Depot Project and Annexation to the City of Rancho Cordova Community Facilities District No. 2008-1 (Street Lighting and Road Maintenance).
Recommendation: Adopt the Resolution.
Result of Recommended Action: Adoption of the Resolution approves Annexation Boundary Map No. 26 for the European Parts Depot Project and Annexation of the Property to Community Facilities District No. 2008-1 (Street Lighting and Road Maintenance, hereinafter "CFD No. 2008-1"). There is no financial impact to existing residents.
Staff Report: Elizabeth Sparkman, Community Development Director and Jeanette Cervantes, Management Technician.
Advances Goal: 5.

13.4 **Subject:** A Resolution Declaring the City's Intention to Impose an Annual Stormwater Utility Fee for the Maintenance of Storm Drainage and Flood Protection Systems for the European Parts Depot Project.
Recommendation: Adopt the Resolution designating a time and place for hearing protests in connection with the annual Stormwater Utility Fee for the European Parts Depot project.
Result of Recommended Action: Action on this item will declare the Council's

intention to impose the annual Stormwater Utility Fee for the maintenance of the storm drainage and flood protection system for the European Parts Depot project and sets a public hearing for October 15, 2018 on the matter.
Staff Report: Elizabeth Sparkman, Community Development Director and Jeanette Cervantes, Management Technician.
Advances Goal: 5.

13.5 **Subject:** A Resolution Declaring the Results of the Mail Ballot Election Relating to the Imposition of the Annual Stormwater Utility Fee on the Douglas 98 Project in the City of Rancho Cordova.
Recommendation: Adopt the Resolution declaring the results of the mail ballot election relating to the imposition of the annual Stormwater Utility Fee on the Douglas 98 Project.
Result of Recommended Action: Adoption of the Resolution will declare the results of the ballot tabulation in connection with the imposition of the annual Stormwater Utility Fee on the Douglas 98 Project. If majority approval exists, the City Council may impose the annual Stormwater Utility Fee on the Douglas 98 Project pursuant to the Fee Ordinance. If there is no majority approval, the Stormwater Utility Fee shall not be imposed for the project.
Staff Report: Elizabeth Sparkman, Community Development Director and Jeanette Cervantes, Management Technician.
Advances Goal: 5.

13.6 **Subject:** Biennial Review and Resolution Updating the Conflict of Interest Code for the City of Rancho Cordova Designated Employees.
Recommendation: Adopt the Resolution.
Result of Recommended Action: Adoption of the Resolution results in the City's compliance with Fair Political Practices Commission requirements.
Staff Report: Stacy Leitner, City Clerk.
Advances Goal: 5.

13.7 **Subject:** A Resolution Rejecting All Bids for On-Call Concrete Maintenance Services.
Recommendation: Adopt the Resolution.
Result of Recommended Action: Adoption of this Resolution will reject all bids received for on-call concrete maintenance services.
Staff Report: Albert Stricker, Public Works Director and Steve Harriman, Operations and Maintenance Division Manager.
Advances Goals: 1, 2 and 5.

13.8 **Subject:** An Ordinance Amending Chapter 17.04 of the Rancho Cordova Municipal Code Relating to the Adoption of State Fire Code with Local Amendments.
Recommendation: Introduce and waive the first reading of an Ordinance amending Chapter 17.04 of the Rancho Cordova Municipal Code, and adopting by reference the California F/ire Code, 2016 Edition, with amendments based upon local climatic, geological, and topographical conditions, and to set a Public Hearing on November 5, 2018 at 5:30 p.m.
Result of Recommended Action: This action adopts the State Fire Code with local amendments, as deemed appropriate by the Fire Marshall of the Sacramento Metropolitan Fire District, and the City Building & Safety Division, which will make the amended provisions of the State Fire Code specific for the needs of the Rancho Cordova community.
Staff Report: Joseph Cuffe, City Building Official.
Advances Goals: 2 and 5.

14. CONSENT PUBLIC HEARING ITEMS - ROLL CALL VOTE

14.1 **Subject:** A Resolution Creating Special Tax Area Zone 24 and an Ordinance Establishing a Special Tax for Transit-Related Services for the European Parts Depot Project.
Recommendation: Adopt a Resolution creating special tax area Zone 24; and introduce and waive first reading of an Ordinance, establishing a special tax for transit-related services for the European Parts Depot project.
Result of Recommended Action: Adoption of the Resolution and Ordinance will assist the City in meeting the costs of providing transit-related services by creating a special tax area zone and establishing a special tax for transit-related services for the European Parts Depot project.
Staff Report: Elizabeth Sparkman, Community Development Director and Jeanette Cervantes, Management Technician.
Advances Goal: 5.

ACTION: Motion to approve item 14.1 by Terry second by Gatewood; Motion passed with a 5:0 vote.

14.2 **Subject:** Action Items Related to the Formation of City of Rancho Cordova Grantline 208 Community Facilities District No. 2018-1.
Recommendation: Staff recommends that Council adopt the iollowing items:
1. Resolution Forming a Community Facilities District and Levying a Special Tax in City of Rancho Cordova Grantline 208 Community Facilities District 2018-1.
2. Resolution Deeming it Necessary to Incur Bonded Indebtedness in City of Rancho Cordova Grantline 208 Community Facilities District 2018-1.
3. Resolution Calling for a Special Election in City of Rancho Cordova Grantline 208 Community Facilities District 2018-1.
4. Resolution Declaring Election Results for City of Rancho Cordova Grantline 208 Community Facilities District 2018-1.
5. Waive First Reading and Introduce Ordinance Levying a Special Tax within City of Rancho Cordova Grantline 208 Community Facilities District 2018-1.
Result of Recommended Action: Adoption of these items will complete the formation of City of Rancho Cordova Grantline 208 Community Facilities District 2018-1 (the "CFD") and authorize a landowner vote which, if successfully passed, authorizes the levy of a special tax. The special tax levy associated with this CFD is for the purpose of financing the acquisition and construction of, and the payment of fees for, the public facilities in and for the Community Facilities District. There is no financial impact to existing residents.
Staff Report: Michelle Mingay, Sr. Finance Analyst.
Advances Goal: 5.

ACTION: Motion to approve items 14.2:

1. Resolution: McGarvey second by Gatewood; Motion passed with a 5:0 vote.
2. Resolution: Sander second by McGarvey; Motion passed with a 5:0 vote.
3. Resolution: Terry second by Gatewood; Motion passed with a 5:0 vote.
4. Resolution: Terry second by Gatewood; Motion passed with a 5:0 vote.
5. Ordinance: Gatewood second by McGarvey; Motion passed with a 5:0 vote.

15. PUBLIC HEARING ITEMS

16. REGULAR CALENDAR ITEMS

16.1 **Subject:** Fiscal Year 2017-18 Preliminary Year-End Financial Report and Budget Amendment.
Recommendation: That the City Council receive the Fiscal Year 2017-18 Preliminary Year-End Financial Report and Adopt a Resolution (Attachment 2) amending the Fiscal Year 2017-18 Budget.
Result of Recommended Action: The Fiscal Year 2017-18 Preliminary Year-End Financial Report provides the City Council with the City's unaudited financial performance for the most recent fiscal year prior to receiving the audited Comprehensive Annual Financial Report (CAFR) later in the year. It also provides the City Council with the opportunity to authorize the proposed budget amendments for the June 30, 2018 fiscal year. The proposed budget amendment would use General Fund surplus dollars to eliminate the interfund loan between the General Fund and the Local Housing Special Revenue Fund by $1,171,499.
Staff Report: Kim Juran-Karageorgiou, Administrative Services Director.
Advances Goal: 5.

ACTION: Motion to approve the item by Sander second by Gatewood; Motion passed with a 5:0 vote.

17. COUNCIL REQUESTS FOR FUTURE AGENDA ITEMS

18. ADJOURNMENT

Mayor Budge adjourned the meeting at 7:14 PM in honor of the Rancho Cordova Police Department and fallen Officer Mark Stasyuk.

_____
Stacy Leitner, City Clerk

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Michelle Mingay, Sr. Finance Analyst

SUBJECT: **SECOND READING OF AN ORDINANCE OF THE CITY OF RANCHO CORDOVA LEVYING A SPECIAL TAX WITHIN THE CITY OF RANCHO CORDOVA GRANTLINE 208 COMMUNITY FACILITIES DISTRCT 2018-1**

RECOMMENDATION

Waive the second reading and adopt the Ordinance.

RESULT OF RECOMMENDED ACTION

Adoption of this Ordinance will allow the levy of a special tax within City of Rancho Cordova Grantline 208 Community Facilities District 2018-1 (the "CFD"), and, in each year hereafter, the process of determining the special taxes and processing the collection is done administratively by the Administrative Services Director (or a consultant) with no further Council action being needed.

BACKGROUND

On October 1, 2018 the City Council waived the first reading and passed to a second reading the Ordinance levying a Special Tax within the CFD.

FISCAL IMPACT

This action established a special tax rate for the Grantline 208 project and has no fiscal impact to existing residents.

ATTACHMENT

1. Ordinance

ATTACHMENT 1

CITY OF RANCHO CORDOVA

ORDINANCE NO. XX-2018

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, LEVYING A SPECIAL TAX WITHIN CITY OF RANCHO CORDOVA GRANTLINE 208 COMMUNITY FACILITIES DISTRICT NO. 2018-1

The City of Rancho Cordova (the "City") ordains:

1. Pursuant to Government Code Sections 53328 and 53340, and in accordance with the Rate and Method of Apportionment of Special Tax (the "Special Tax Formula") as shown in Exhibit B to a resolution titled "A Resolution of the City Council of the City of Rancho Cordova to Form a Community Facilities District and to Levy a Special Tax in City of Rancho Cordova Grantline 208 Community Facilities District No. 2018-1" ("Resolution of Formation") adopted by this City Council on October 1, 2018, a special tax is hereby levied on all taxable parcels within City of Rancho Cordova Grantline 208 Community Facilities District No. 2018-1 (the "District") for the 2018-19 tax year and for all subsequent years of the authority to levy this special tax.

2. The Administrative Services Director of the City is directed, with the aid of the appropriate officers and agents of the City, to implement the provisions of the Special Tax Formula and to prepare each year, without further action of this City Council, the special tax roll for the District and to provide as necessary information to the Sacramento County Auditor in the form, and in the proper time, necessary to effect the proper billing and collection of the special tax on the secured property tax roll of the County, which may include a billing of the special tax for fiscal year 2018-19 without regard to the timing of the issuance of bonds for the District and the circumstance that bonds are not issued as of the date of submission to the County for billing; alternatively, pursuant to the Resolution of Formation, the special tax for fiscal year 2018-19 and subsequent years may, at the option of the City, be billed directly to owners of property in the District by the Administrative Services Director of the City or other official of the City and need not be collected on the County secured property tax roll.

3. The appropriate officers and agents of the City and of the County of Sacramento are authorized to make adjustments to the special tax roll prior to the final posting of the special taxes to the County tax roll each year, as may be necessary to achieve a correct match of the special tax levy with the assessor's parcel numbers finally utilized by the County in sending out property tax bills.

4. The City agrees that the County of Sacramento may deduct its reasonable and agreed charges for collecting the special tax from the amounts collected, prior to remitting the balance of the special tax collections to the City.

5. If for any cause any portion of this ordinance is found to be invalid, or if the special tax is found inapplicable to any particular parcel by a court of competent jurisdiction, the balance of this ordinance, and the application of the special tax to the remaining parcels, shall not be affected.

ATTACHMENT 1

6. The Mayor shall sign this Ordinance and the City Clerk shall cause the same to be published within fifteen (15) days after its passage at least once in a newspaper of general circulation published and circulated in the City.

7. This ordinance shall go into effect on the earliest day allowable by law.

THE FOREGOING ORDINANCE was adopted this ___ day of _____, 2018 by the following vote:

AYES:

NOES:

ABSTAIN:

ABSENT:

_____
Linda Budge, Mayor

Attest:

_____
Stacy Leitner, City Clerk

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Stacy Leitner, City Clerk

SUBJECT: **RECORDS AND INFORMATION MANAGEMENT - RETENTION SCHEDULE UPDATE**

RECOMMENDATION

Adopt a Resolution approving updates to the City of Rancho Cordova City-Wide Records Retention Schedule.

RESULT OF RECOMMENDED ACTION

Adoption of a new Retention Schedule will enable City staff to facilitate the appropriate and efficient management and retention of City records in accordance with government regulations.

BACKGROUND

The City of Rancho Cordova adopted a Records Retention Schedule by Resolution No. 2-2005 on January 18, 2005 and performed updates in 2014 and early 2018. As a result of working with each department to implement the Records and Information Management (RIM) program, staff identified another revision is needed to reflect the administrative, functional, historical, and legal needs of the city.

The updated Retention Schedule contains updates to record categories and example record types to reflect the current business of the City. It contains 101 record categories and can be used to assign accurate classifications in the electronic environment.

Adoption of a Citywide Records Retention Schedule will enable city staff to continue operating the Records Management Program and process routine records destruction adhering to federal, state, and local guidelines.

FISCAL IMPACT

None.

ATTACHMENTS

1. Resolution
2. Retention Schedule (Redline)

ATTACHMENT 1

CITY OF RANCHO CORDOVA

RESOLUTION NO. XX-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, UPDATING THE RETENTION SCHEDULE FOR THE RECORDS AND INFORMATION MANAGEMENT PROGRAM

WHEREAS, the City has an obligation to protect and consistently manage the records and information assets of the City in accordance with government regulations; and

WHEREAS, the City adopted the Retention Schedule on January 18, 2005 by Resolution No. 2-2005 and adopted revisions in 2014 and early 2018; and

WHEREAS, since that time, staff has identified the need for additional changes to the Retention Schedule record categories and types to reflect current City processes; and

WHEREAS, this Resolution is intended to adopt updates to the current Retention Schedule to facilitate the appropriate and efficient management and retention of City records in accordance with all laws and regulations including, Government Code Section 34090; and

WHEREAS, the Retention Schedule has been reviewed by Department Heads, the City Attorney, and the City Clerk.

NOW, THEREFORE, BE IT HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA THAT:

1. The Retention Schedule attached hereto as Attachment 3 is hereby approved and adopted.
2. The Retention Schedule shall go into effect immediately for the management of City records and information.

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the 15th day of October, 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____

Linda Budge, Mayor

ATTEST:

_____

Stacy Leitner, City Clerk

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
001	**Department Administration** General internal administrative records of City departments, including: - Documentation of department activities - Routine reports generated by the City - Information captured on a log or a list - Correspondence, memos, notes and emails that do not require acknowledgment and do not pertain to another category - Department projects	City Generated Routine Studies / Reports Department Administrative Documents (*calendars, committees, goals, objectives, meeting agendas, meeting minutes, meeting tapes/recording, plans*) Employee Communication Letters (*announcements, new programs, notices*) In-House Committees / Employee Committees Internal Controls Documentation (e.g., AP Edit Lists) Logs (*case number,subpoenas received*) Monthly and Periodic Reports of Building Activity (Dodge reports, etc.) Office Files, Office Manager Files Volunteer Programs Workpapers, Working Files	All Departments	2Y	CA - GOV 34090 - (2Y)
002	**Departmental Budget Management** Records and information relating to creating and implementing departmental budgets.	Budget Workpapers and supporting material (i.e. sales tax, property tax, TOT, etc.) GANN Limit Calculation Workpapers Budget Amendments	All Departments	4Y	CA - GOV 34090 - (2Y) US - 26 CFR 31.6001 (CY+3Y) US - 26 CFR 301.6501 - (CY+3Y)
003	**Employee Training** All documents related to general and specialized technical education and training taken by officials, paid employees and unpaid volunteers, including: - Ethics - Fire Extinguisher - First Aid/CPR - Privacy - Safety - Specialized Equipment - ~~Emergency FEMA~~ Safety Assessment Certifications	Certification Records Compliance Training Individual Education, Development Proof of Individual Attendance	All Departments	Termination + 5Y	CA - 8 CCR 3203 - (CU+1) CA - GOV 12946 - (T+2Y) CA - GOV 34090 - (2Y) CA - GOV 53235.2b - (5Y) US - 29 CFR 1602.14 - (FR+1Y) US - 29 CFR 1602.31 - (T+2Y)
004	**Employee Training Materials, Courses, Scheduling** Documentation regarding the content of courses and schedules for training offered to employees, officials and volunteers.	AB1234 Employee Development Presentation Materials PowerPoint Presentations Rosters Sign-in Sheets Testing Training Bulletins	All Departments	2Y	CA - GOV 34090 - (2Y) US - 29 CFR 1602.14 - (FR+1Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
005	**Historical Documents, Events, Memorabilia, Collections, Artifacts** Records and information documenting the history and significant milestones of the City as determined by the City Manager or City Clerk	Annual Historical Reports of Building Permit Activity Biographies of City Officials Census Information City Seal City Generated Historical Studies / Reports City Incorporation City Publications Demographics Elections (*historic, significant*) Executive, City Official Communications, Speeches, Videos Historic Districts Historical Events, Artifacts, Architecture, Designations, Projects Historical Parks, Facilities Media Releases, News, Press Releases Memorial Programs Newspaper Clippings Picture Collections Publicity Photographs Registered Logos Significant News Clippings, Releases	~~All Departments~~ City Manager Communications City Clerk	Permanent	CA - GOV 34090 - (2Y)
006	**Meetings - Audio/Video Records** Audio and Video Recordings of City Council, Commissions, City Committees, and their governing boards.	Audio and Video Recordings	All Departments	~~3 Months*~~ Permanent	CA - GOV 54953.5(b) - (30D) ~~* 3 months after adoption of the minutes to which the recording applies~~
007	**Organization Charts** Documents that depict the departmental and reporting structure of the City government.	Organization Charts/Trees Reporting Structure	~~All Departments~~ Finance	2Y	CA - GOV 34090 - (2Y)
008	**Policies, Procedures and Plans** All administrative documentation of City policies and procedures, including: - Crisis Communication Plan - Investment Policy - Administrative Policies - Finance Policies - Records Retention Schedule - Human Resources Policies	Administrative Policies Directives General Orders Guidelines Five-Year Plans Handbooks Policies Procedure Manuals Procedures Program / Initiative Plans Standards	All Departments	Superseded + 6Y	CA - GOV 34090 - (2Y) US - 26 CFR 31.6501 - (CU+3Y) US - 29 CFR 1602.14 - (FR+1Y) US - 29 CFR 1627.3 - (Termination of Plan+1Y) US - 45 CFR 164.530 (j) - (CU+6Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
009	**Procurement - Agreements and Contracts Not Awarded** Records and information created or retained in the preparation of purchasing or acquisition of goods and services, but where the purchase order, contract, or agreement was not awarded.	Bids, Awards (*unaccepted, rejected*) Exhibits Price Lists Quotations Requisitions Requests for Information (*RFI)* Requests for Proposal (*RFP*) Requests for Quote (*RFQ*) Scorecards Specifications	All Departments	2Y	CA - GOV 34090 - (2Y)
010	**Records, Information Management** Documentation of the compliance with Records and Information Management policy and procedures.	Certificates of Destruction Document Hold Notices, Updates Inactive Records Storage Information Lists of Stored / Destroyed Records Records Transfers (*to storage, to other depts.*)	All Departments	10Y	CA - CCP 315 - (LA10Y) CA - CCP 337 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y) US - 26 CFR 31.6001-1 - (CU+4Y) US - 26 CFR 301.6501 - (CU+3Y)
011	**Service Issues, Complaints** Documentation regarding department complaints and related requests for service.	Complaints Issues Log Online Citizen Reporting System Requests Trouble Reports	All Departments	2Y	CA - GOV 34090 - (2Y)
~~012~~	~~**Shipping and Receiving**~~ ~~Records related to the shipping and receiving of products.~~ **This number will be retired as no City department maintains these records**	~~Bills of Lading~~ ~~Freight Bills~~ ~~Manifests, Transfer Logs~~ ~~Waybills~~	~~All Departments~~	~~2Y~~	~~CA - GOV 34090 - (2Y)~~
013	**Vendor, Supplier Files** Records and information of suppliers and vendors to all City organizations created or retained in the purchasing or acquisition of goods and services.	Contractors - Vendor List Vendor Packets Vendor Applications, Profiles	All Departments	2Y	CA - GOV 34090 - (2Y)
014	**Animal Services** Records and information documenting activities of the Animal Services office.	Audio Recordings of Hearings Bite Records Case Files Photos Reporting	Animal Services	3Y	CA - CCP 340 - (LA1Y) CA - GOV 34090 - (2Y) CA - HSC 122331 - (MAINT) CA - PEN 802 - (1Y) Rancho Cordova - RCMC 8.09.050 - (3Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
015	**Building Codes and Permits** Records and information documenting all applications for building permits within the City and the permits issued.	Building Applications for Issued and Final Permits Building Code Board of Appeals Building Code Books Adopted by Ordinance (*California Building Code, California Residential Code, California Mechanical Code, etc.*) ~~Building Inspections~~ Building Permit Database Building Permits Certificates of Compliance Certificates of Occupancy Disability Access Board of Appeals	Building	Permanent	CA - CBC 107.5 - (180D) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)
016	**Building Codes, Building Permits - Complaints and Violations** Records and information documenting compliance with, and receipt, processing and resolution of associated complaints, with building codes violations and permits issued by the City.	Complaints Notices of Violation Stop Work Orders Violation Case Files	Building	Final Resolution + 2Y	CA - GOV 34090 - (2Y)
017	**Building Plans and Construction Documents - Approved Residential Master Plans** Records and information documenting the plans and construction-related documents associated with residential master plans.	Building Plans Construction Documents	Building	Permanent	CA - CBC 107.5 - (180D) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)
018	**Building Plans and Construction Documents - Finaled - Residential and Non-Residential Exception - All Other Projects (including but not limited to Accessory Structures)** Building plans and construction documents for all other construction projects and accessory structures, both residential and non-residential.	Building Plans Construction Documents	Building	Completion + 180 days	CA - CBC 107.5 - (180D)
019	**Building Plans and Construction Documents - Finaled Commercial Structures, Multi-Family Dwellings (3 or more units), and Places of Public Accommodation** Building plans and construction-related documents for residential commercial structures, multi-family dwellings, and places of public accommodation.	Building and Site Access Compliance Documentation (*CASp Reports, etc.*) Building Plans Construction Documents Hazardous Materials Questionnaires	Building	Life of Building or Facility	CA - CBC 107.5 - (180D) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
~~020~~	~~**Building Plans and Construction Documents - Finaled Residential Custom Homes (less than 3 units)**~~ ~~Building plans and construction documents associated with residential custom homes (less than 3 units).~~ **This Record No. is being retired as it was combined with Record No. 25**	~~Building Plans~~ ~~Construction Documents~~	~~Building~~	~~Completion + 180 days~~	~~CA - CBC 107.5 - (180D)~~
021	**Building Plans and Construction Documents - Finaled Residential Production Homes** Records and information documenting the plans and construction-related documents associated with residential production homes.	Plot Plans Floor Plans	Building	Life of the Building	CA - CBC 107.5 - (180D) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)
022	**Building Plans and Construction Documents - Finaled Structure Demolition** Records and information documenting the demolition of entire buildings.	Site/Plot Plans	Building	Permanent	CA - CBC 107.5 - (180D) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)
023	**Building Plans and Construction Documents - Plan Review Notes and Inspection Correction Notices for Residential and Non-Residential Projects** Records and information documenting plan review comments and inspection correction notices for residential and non-residential projects.	Plan Review Comment Letters Inspection Correction Notices	Building	Completion + 180 days	CA - CBC 107.5 - (180D)
024	**Building Plans and Construction Documents - Soil Reports** Soil reports associated with building plans and construction projects.	Soil Reports	Building	Permanent	CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)
025	~~**Floor Plans, Plot Plans and Elevation**~~ **Building Plans and Construction Documents - Finaled Residential Custom Homes (less than 3 units)** Floor plans, plot plans and elevation documents associated with residential custom homes (less than 3 units).	Floor Plans Plot Plans Selected Plan Elevations	Building	Life of the Building	CA - CBC 107.5 - (180D) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
026	~~Plot Plans and Site~~ Construction **Plans - Finaled - Residential and Non-Residential Exception - All Other Projects (including but not limited to Accessory Structures)** ~~Plot Plans and site~~ Construction plans for all other construction projects and accessory structures, both residential and non-residential.	~~Plot Plans~~ ~~Site Plans~~ Construction Plans	Building	Until Removed or Demolished	CA - CBC 107.5 - (180D) CA - HSC 19850 - (LI)
027	**Agreements, Contracts and Leases** Executed agreements, contracts, leases (which includes any type of contract, such as an agreement, franchise, purchase order, or lease) and associated ancillary documents, between the City and other parties.	Addendums and Amendments Attachments / Exhibits Certificates of Insurance Disclosures Leases, Attachments Letters of Intent License Agreements, Licenses Licensing, Licenses (*general*) Maintenance Agreements Memoranda of Agreement (*MOAs*) Memoranda of Understanding (*MOUs*) Real Estate Leases, Attachments Statements of Work (*SOWs*)	City Clerk	Closed + 10Y	CA - CCP 315 - (LA10Y) CA - CCP 337 - (LA4Y) CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - CCP 343 - (LA4Y) CA - GOV 34090 - (2Y) US - 26 CFR 31.6001-1 - (CU+4Y) US - 29 CFR 516.5 - (3Y) US - 40 CFR 70.6 - (CL+5Y) US - 40 CFR 122.21(p) - (3Y) US - 40 CFR 122.41(j) - (3Y)
028	**Appointments to Boards, Commissions and Committees** Staff records related to appointments made by authorized elected officials to councils, committees, boards, and commissions.	Applications (*appointed, unsuccessful*) Interview Notes Letters of Appointment Letters of Recommendation Oaths of Office Resumes Submitted Documents	City Clerk	Term of Office + 2Y	CA - GOV 34090 - (2Y)
029	**Cemetery Administration** Records and information documenting administration of the Matthew Kilgore Cemetery.	Graves Interment Maps of Gravesites Niches Owner Information	City Clerk Public Works	Permanent	CA - BPC 7685.5 - (LA3Y) CA - BPC 7711.2 - (LA3Y) CA - GOV 34090 - (2Y) CA - HSC 8110 - (MAINT)
030	**Claims by or Against the City** Records detailing claims lodged by and against the City.	Accident/Incident Reports Actuarial Reports Annual Audit of Open Claims Appraisals Claims By/Against the City Closing Letters Damage Estimate Reports Supporting Documentation Insurance Claims, Appraisals, Reports Investigations Liability Waivers Subrogation Claims	City Clerk Public Works (Corp Yard)	Final Resolution + 5Y	CA - CCP 337 - (LA5Y) CA - GOV 34090 - (2Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
031	**Election Records - Administrative Files** Documentation of the administration of City elections.	Correspondence Non-municipal election files Research Notes	City Clerk	2Y	CA - GOV 34090 - (2Y)
032	~~**Election Records**~~ **FPPC Election Forms- Candidates Elected** Records and information related to the filing of campaign and election documentation by candidates who are elected to City offices.	Campaign Disclosures: 410, 460, 462, 470, 496, 497, 501 ~~Nomination Papers~~ ~~Campaign Statements~~	City Clerk	Permanent	CA - GOV 81009(b) - (PR)
033	~~**Election Records**~~ **FPPC Election Forms- Candidates Not Elected** Records and information related to the filing of campaign and election documentation by candidates, but who are not elected.	Campaign Disclosures: 410, 460, 462, 470, 496, 497, 501~~Nomination Papers~~ ~~Campaign Statements~~	City Clerk	5Y	CA - GOV 81009(b) - (5Y)
034	**Election Records - Candidate Nomination Documents** Records and information related to the filing of nomination papers and petitions in lieu of filing fee.	Candidate Statements (*for sample ballot*) Nomination Papers Petitions in Lieu of Filing Fee Signatures in Lieu of Filing Fee Petitions Supplemental Nomination Papers	City Clerk	Term of Office + 4Y	CA - ELEC 17100(a) - (T+4Y)
035	**Final Budget** Records and information relating to final approved City budgets.	Final Budget Document ~~Gann Limit Annual Review~~ ~~Revenue/Expenditure Reports~~ ~~Trial Balance/Balance Sheets (Finals)~~	City Clerk	Permanent	CA - GOV 34090 - (2Y) US - 26 CFR 31.6001 (CY+3Y) US - 26 CFR 301.6501 - (CY+3Y)
036	**FPPC Forms - Local Ballot Measure Committees** Forms mandated by state law related to committees established to support local ballot initiatives.	Form 410 Form 460 Form 496 Form 497	City Clerk	AC*+4Y	CA - 2 CCAR 18401 - (4Y) CA - GOV 34090 - (2Y) * Remains active until committee is disbanded
037	**FPPC Forms - Mandated Reporting** Forms mandated by state law related to receipt and redistribution of gifts and honoraria, ceremonial roles, and holding of multiple positions for certain employees, elected or appointed officials, or consultants.	Form 801 Form 802 Form 806	City Clerk	2Y	CA - GOV 34090 - (2Y)
038	**FPPC Forms - Statements of Economic Interest** Statements of economic interest mandated by state law for certain employees, elected or appointed officials, or consultants.	Form 700	City Clerk	Term of Service or Termination of Employment + 7Y	CA - GOV 34090 - (2Y) CA - GOV 81009 - (7Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
039	**Insurance Coverage** Records detailing the City's general coverage against property damage and liability, whether self-funded or purchased, including renewal submission information, insurance quotes, & broker correspondence.	Binding Information Binders Broker Correspondence California Joint Powers Insurance Authority (*CJPIA*) Certificates of Insurance Completed Applications Flood Insurance Insurance Policies Insurance Quotes Insurance Submissions Liability Insurance Renewal Strategy	City Clerk Finance	Life of Policy + 5Y	CA - 22 CCR 3267-2 - (MAINT) CA - CCP 337 - (LA5Y) CA - GOV 34090 - (2Y)
040	**Internal Legal Advice and Opinions** Memoranda containing legal advice prepared by the City Attorney's for City departments.	Memos Opinions	City Clerk Finance/Risk Communications Human Resources Housing Planning Public Works Building City Manager	10Y	CA - GOV 34090 - (2Y)
041	~~**Legislative Affairs**~~ **Governing Councils, Boards, Agencies & Commissions - Legislative Affairs** Records of all actions taken by City legislative bodies, including City Council, City Commissions and Board, City Council Task Forces and City Council Committees taken during public and closed session meetings.	Agendas Agenda Packets (*includes staff reports*) Agenda Summary Reports Appeals City Codes City-wide Plans/Programs Adopted Commendations ~~Legislative Packets~~ Meeting Minutes Minute Books & Index Municipal Code ~~Opinions on Pending Legislation~~ Ordinances Petitions to Council Policy Resolutions Resolutions Summary of Actions, Statement of Actions (*SOAs*) Supplemental Communications Transcriptions of audio and video recordings of meetings	City Clerk	Permanent	CA - CCP 315 - (LA10Y) CA - CCP 321 - (LA5Y) CA - CCP 336 - (LA5Y) CA - CCP 336a - (LA6Y) CA - CCP 337 - (LA4Y) CA - CCP 337.5 - (LA10Y) CA - GOV 34090(e) - (PR)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
042	**Litigation and Third Party Claims** Records generated for or related to any case or action before a judicial, arbitral, or administrative officer or body.	Complaints Court Orders Discovery Exhibits Judgements Policies of Intent Pleadings Prosecution Recorded Instruments Related Correspondence Releases Settlement Agreements Subpoenas	City Clerk Human Resources	Final Resolution + 10Y	CA - 2 CCR 11013 - (AC+2Y) CA - 8 CCR 10102 - (5Y; CL+1Y) CA - 22 CCR 1085-2 - (CU+4Y) CA - CCP 315 - (LA10Y) CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y) CA - LAB 5410 - (LA5Y) CA - RTC 19704 - (LA6Y) CA - UIC 1132 - (LA3Y) US - 26 CFR 31.6001 (CU+4Y) US - 26 CFR 301.6501 - (3Y) US - 26 CFR 301.6532-1 - (LA2Y) US - 26 CFR 301.6532-2 - (LA5Y) US - 26 USC 6531 - (LA6Y) US - 26 USC 6532 - (LA2Y) US - 29 USC 255 - (LA2Y) US - 29 USC 626 (d) - (LA300D) US - 42 USC 2000e-5 (e) - (LA180D) US - 42 USC 2000e-5 (f) - (LA180D)
043	**Public Information Request** Records requested by the public, required for provision to the public, and related inquiries.	Collection Lists Formal Public Records Requests Inquiries Maddy Act Lists	City Clerk	2Y	CA - GOV 34090 - (2Y)
044	**Recorded Documents - Liens** Records of liens recorded on behalf of the City.	Liens	City Clerk	2Y	CA - GOV 34090 - (2Y)
045	**Public Notices** Records documenting compliance with laws requiring public notice of government activities. Subjects include assessments, elections, land use changes, public meetings and hearings, sale of property, and others.	Affadavits of Mailing Affidavits of Posting Affidavits of Publication/Legal Notices Public Hearing Notice Postcards (*mailed to property owners but returned as undeliverable*) Public Hearing Notices Public Meeting Notices	City Clerk Community Development Housing Planning Code Enforcement	4Y	CA - CCP 343 - (LA4Y) CA - GOV 34090 - (2Y)
046	**Municipal Code and Animal Services Compliance and Enforcement** Records and information documenting compliance with City codes, including violations.	Audio Recordings of Hearings Certificates of Nuisance and Abatement Citations Compliance with Conditions of Approval Inspections / Enforcement (*business, residential)* Investigations Lien Confirmation Hearing Records Notices of Violation Photographs Rental Registration Forms Service Authority Service Vehicle Agreement Vehicle Abatement (*abandoned vehicles*) Reporting	Code Enforcement and Animal Services Building	While Active + 3Y	CA - CCP 339 - (LA2Y) CA - CCP 340 - (LA1Y) CA - GOV 34090 - (2Y) CA - PEN 802 - (1Y) CA - Law Enforcement Evidence and Property Management Guide NOTES: 1) Records for repeat offenders may be retained longer to document a history of violations 2) Records associated with problem properties may be placed on hold.

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
047	**Communications** External-facing communications and advertising materials, including documentation of outreach activities/events held in cooperation or for the benefit of the local community.	Brochures FAQs Mailers Media Packets, Releases, Kits PowerPoint Presentations for Council Members Press Kits Public / Media Inquiries Outreach / Education Materials Publications Produced by the City (n*ewsletter, neighbor guide*) Publicity Files Videos Websites/Social Media City Surveys	Communications & Public Affairs Code Enforcement and Animal Services Building	4Y	CA - CCP 337 - (LA4Y) CA - GOV 34090 - (2Y)
048	**Community Development Block Grant Project Files** Records and information of CDBG projects.	Payroll (*certified, Davis Bacon*) Semi-annual Labor Reports	Community Development - Housing	While Active + 4Y	CA - GOV 34090 - (2Y) US - 2 CFR 200.333 - (AC+3Y) US - 24 CFR 570.502(a)(16) - (AC+4Y)
049	**Emergency Loan Program Files** Records and information regarding programs that provide assistance to home owners needed funds to respond to emergencies or perform need repairs.	Applications Correspondence Monitoring Files Notices	Community Development - Housing	While Active + 2Y	CA - 25 CCR 7721 - (MAINT) CA - GOV 34090 - (2Y) * Loan is active until fully paid
050	**Personnel Files** All documents related to paid employees (full and part-time), unpaid volunteers, and interns including but not limited to: - selection/hiring - assignments - promotion - demotion - transfer - layoff - termination / resignation - pay rates / other terms of compensation	Applications, Applicant Reference Verifications Awards, Rewards, Commendations, Certificates Background Checks, Investigations - candidates hired Complaints and Disciplinary Actions Drivers License Data - Class C Employee Policy Acknowledgements Individual Education, Development, Training Records Investigations Job Offer Letters Leave of Absence Documentation, FMLA Oaths of Office Performance Evaluations, Reviews or PIPs Recognition Volunteer Acknowledgements	Community ~~Development~~ Engagement Human Resources	Termination + 5Y	CA - 2 CCR 11013 - (FR+2) CA - GOV 12946 - (2Y; T+2Y) CA - GOV 34090 - (2Y) US - 26 CFR 301.6501 - (CU+3Y) US - 29 CFR 1602.14 - (FR+1Y) US - 29 CFR 1602.31 - (T+2Y) US - 29 CFR 1627.3 - (T+1Y) US - 29 USC 1059 - (T+1Y) US - 41 CFR 60-1.12 (a) - (T+2Y) US - 41 CFR 60-741.80 - (T+2Y)
051	**Community Engagement Records** Records and information regarding informational resources, programs and events for City neighborhoods.	Brochures Correspondence Events (*sign-in sheets*) Flyers Growing Strong Neighborhoods Rebuild Days Tree Planting/Arborist Programs: 1) Volunteer 2)Beautifcation: Tree Stump Removal, and Waterwise Landscaping, Chain Link Fence 3) Neighborhood Engagement	Communications & Public Affairs Public Works	2Y	CA - GOV 34090 - (2Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
052	**Economic Development Programs and Services** Records and information documenting the City's economic development programs including marketing, events and customer relationships management.	Brownfields Grant Business Incentive Programs (*grants, funding*) Business Recruitment Programs Community Activities Demographics Economic Development Programs Economic Development Strategy ~~Marketing (*website*)~~ ~~Newsletter (*electronic*)~~ ~~Outreach~~ Revolving Loan Program Signage and Facade Program	Economic Development	While Active + 4Y	CA - CCP 337 - (LA4) CA - GOV 34090 - (2Y) US - 2 CFR 200.333 - (CL+3Y)
053	**Building, Property Management** Records and information regarding the structure of City buildings.	As-Built Blueprints Construction Records Electrical Wiring Schematics Floor Plans Property Inventory Utility Consumption Tracking	Facilities Building	Life of Building or Facility + 10Y	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)
054	**Business Continuity Records - Facilities and Emergency Operations** All documentation for dealing with preparation for and responses to emergencies, disasters and/or system failures for City facilities. Includes the Emergency Operations Center.	After-Hours Binder Business Continuity Plans Disaster Recovery Plan Drill Records Emergency Contact Lists, Employee Lists, Roster of Workers Emergency Evacuation Procedures Emergency Operations Center Emergency Preparedness Emergency Response Evacuation Plans Fire Prevention Plan Telephone Trees	Facilities Human Resources City Manager Housing Finance Public Works	2Y	CA - GOV 34090 - (2Y)
055	**Facility Rentals** Records and information of the rental of rooms or areas within City facilities by others.	Applications Proof of Insurance	Facilities	While Active + 4Y	CA - CCP 337 - (LA4Y) CA - GOV 34090 - (2Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
056	**Maintenance Inspection Reports** Reports of inspections of maintenance performed on City facilities and infrastructure including: - Buildings - Changeable Message Signs (CMS) - Closed Circuit TVs (VVTVs) - Streets - Sidewalks - Signals and Bridges - Storm Drains - Streetlights - Trees	Air Quality Inspections Backflow Inspections Building/Site Inspection Log ~~Elevator Certificates~~ Elevator Permits Equipment Inspections ~~Facility Inspections~~ Fire Extinguisher Inspections ~~Fire Inspections~~ Hazardous Materials Inspections ~~Inventory of City Trees~~ Janitorial Inspections Landscape Inspection ~~Logs~~ ~~Reports~~ ~~Sidewalks~~ ~~Storm Drains~~ ~~Streetlights~~ ~~Streets~~ ~~Trees~~	Facilities	4Y	CA - CCP 337 - (LA4Y) CA - GOV 34090 - (2Y)
057	**Security, Access Operations** Records and information regarding physical access controls and protection for City buildings and facilities.	Access Controls Access Reports Badge Lists Daily Activity Logs Facility Key Lists Key Cards Transaction Logs	Facilities Human Resources ~~IT~~	2Y	CA - GOV 34090 - (2Y)
058	**Asset Management, Maintenance** Records related to the management and maintenance of City assets, including equipment, fleet vehicles, real property and infrastructure assets.	Air Quality Permits Equipment Certifications Equipment Accident Reports Irrigation Landscaping Maintenance and Repair Work Orders Maintenance Reports (*buildings, sidewalks*) Maintenance Timelines Roads Signals Storm Drains Street Sweeping Tree Service Vehicles/ Fleet	Facilities Public Works	Life of Asset + 4Y	CA - CCP 337 - (LA4Y) CA - GOV 34090 - (2Y) US - 26 CFR 31.6501 - (CU+3Y) US - 26 CFR 301.6501 - (CU+3Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
059	**Real Estate Transactions** Records and information related to the ownership, acquisition, disposition, transfer of, lease of, or improvement of real property, infrastructure and facilities including grant deeds, owned by or used by the City.	Acquisitions Attachments Buildings Capital Improvements Community Development Block Grant (*CDBG*) Property Acquisitions Deeds of Trust Dispositions Housing Authority Owned Properties Land Mortgages Possessory Interest Property Transaction (*DDA, DA, etc.*) Right of Way Sales Valuation Information	City Clerk Housing Public Works	Permanent	CA - CCP 337.15 - (LA10Y) CA - GOV 34090(a) - (PR)
060	**Accounts Payable and Receivable** Records and information related to the accounting of monies paid by the City including payment for financial obligation.	Aging Reports ~~Assessment District/Special District Payments~~ ~~Business License Fees~~ ~~Check Listing~~ ~~Credit Memos~~ ~~Employee Expense Reports, Reimbursements~~ Employee Project Billing Rates Form 1099 Records and Form W-9 Records Invoices and Vouchers (i.e. credit memos, EE expense reports, EE reimbursement, credit cards, refunds) Project/Developer Billing Packet (i.e. billing posting journals, reconciliations, etc.) Purchasing Card Expense Reconciliation/Allocations ~~Refunds~~ ~~Sales and Use Taxes Paid~~ ~~Tuition Reimbursements~~ ~~Cash Records~~ Deposits (*cash count reports, ~~cash flow book information~~, petty cash disbursement, cash register receipts, cash receipts*) ~~Fees and Taxes~~ ~~Public Safety Tax~~ Reconciliations ~~Tax Revenue (*card room taxes, gas taxes, property taxes, transient occupancy taxes, utility user taxes*)~~	Finance	6Y	CA - CCP 338 - (LA3Y) CA - GOV 34090 - (2Y) US - 26 CFR 31.6001 - (CU+4Y) US - 26 USC 6531 - (LA6Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
061	**Audits (Internal, External)** Records and information related to auditing activities, including reviewing and documenting operational, compliance, or financial information created as a part of an audit.	Annual Audit Reports (TDA, Finance Corp.) ~~Audit Files, Plans~~ ~~Audit, Auditors Reports~~ ~~Audit Schedules~~ ~~Audit Workpapers~~ ~~Comprehensive~~ Annual Financial Report (i.e. CAFR, Memorandum of Internal Control (MOIC), Single Audit) ~~General Purpose Financial Audits, Single Audits~~ ~~Improvement Plans~~ Investigations, ~~Workpapers~~ ~~Management Responses~~ ~~Observations~~ ~~Petty Cash Audits~~ ~~Recommendations~~ Remediation Plans / Results Responses Cal Pers Audit	Finance Human Resources	Permanent	CA - GOV 34090 - (2Y) US - 26 USC 6531 - (LA6Y)
062	**Bank Account Information** Records and information related to banking authorities, activities, transactions and correspondence. This category includes reconciliations.	Bank Account Administration Bank Statements (*all agencies*) Checks, Canceled ~~Check Copies~~ ~~Check Registers, Journals~~ ~~Corrections / Returns / Adjustments~~ ~~Deposit Permits, Deposits~~ ~~Electronic Banking Transactions~~ Reconciliations Signature Cards ~~Transfers~~ ~~Treasurer Receipts~~ ~~Credit Card Merchant Activity Statements~~	Finance	6Y	CA - GOV 34090 - (2Y)
063	**Business Licenses** Records and information documenting the issuance of City business licenses.	Annual Licenses (fireworks) Applications (new, renewal) Employee Permits General Business Licenses (~~*applications, financial history, reports*~~ *commercial, home based, rental property*) ~~Home Business Licenses~~ Special Licenses (~~*pesticides, applicators, painting*~~ *handyman, car parts, etc.*) ~~Taxis (*cabs, drivers*)~~ Tobacco License	Finance	5Y	CA - CCP 337 - (LA4Y) CA - GOV 34090 - (2Y) Rancho Cordova - RCMC 4.02.080 - (1Y) Rancho Cordova - RCMC 4.10.155 - (5Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
064	**Debt, ~~Investments~~** Records and information relating to analysis of City financing ~~and investment~~ activities.	Amortization Schedules Bonds (*continuing disclosures, bond rating reports, official statements*) ~~Certificates of Deposit (*CDs*)~~ ~~Direct Investments~~ ~~Financial Investment Planning~~ ~~Investment Reporting and Portfolio Management~~ Loans (*debt state loans, water (Alston & Imola)*) ~~Local Agency Investment Fund (*LAIF*)~~ ~~Payment History/Schedules~~ ~~Security Instruments~~ ~~Stock / Equity / Debt Issuance, Repurchase Records~~ ~~Trust Accounts~~	Finance	Maturity* + 10Y	CA - CCP 336 - (LA5Y) CA - CCP 337 - (LA4Y) CA - CCP 337.5 - (LA10Y) CA - CCP 338 - (LA3Y) CA - GOV 34090 - (2Y) US - 26 CFR 31.6001 - (CU+4Y) US - 26 CFR 301.6501 - (CU+3) * Maturity includes cancellation and redemption
065	**Financial Reporting - Annual, Official, Periodic** Issued and official periodic financial reports, whether required by regulations or generated to track financial transactions and achievements by the City.	~~Annual Report of Financial Transactions To State~~ ~~Annual State Controller Filings~~ Audit Files, Plans Audit Schedules Audit Workpapers ~~Audited Financial Statements/~~CAFR Workpapers Improvement Plans U.S. Equal Employment Opportunity Commission (*EEOC*) Reports PERS Reports Payroll Reports (*HRA, RMT, ICMA 457 accounts, Nationwide, deferred compensation)* Petty Cash Audits Possessory Interest Report (to County) Quarterly Investment Report/Treasurer's Report ~~Quarterly Police Department Financial Reports~~ ~~Revenue/Expenditures Reports~~ Self Insurance Reports Special District Administration Reports State Controller's Report (streets, financial transactions, financing corporation, employee compensation) Workers Compensation Reports	Finance/Risk Human Resources	6Y	CA - GOV 34090 - (2Y) US - 26 CFR 1.1461-2 - (CU+1Y) US - 26 USC 6531 - (LA6Y)
066	**Financial, Strategic Planning** Records and information relating to financial planning.	Business Plans Financial Plans Forecasts	Finance Communications & Public Affairs Human Resources	6Y	CA - GOV 34090 - (2Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
067	**Fixed Assets** Records and information related to the ownership, transfer, acquisition, disposition, capital leased, or improvement of fixed assets owned by or used by the City.	Acquisitions Amortization Asset Retirement Records Disposition/Sale Capital Asset Records Capital Improvements Depreciation Schedules ~~Equipment Rental/Usage Reports~~ ~~Fixed Asset Reports~~ ~~Fixed Asset Ledger~~ ~~Fixed/Capital Asset Accounting~~ ~~Possessory Interest~~ ~~Sales~~ Valuation Information	Finance	Life of Asset + 10Y	CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y)
068	**General Ledger, Journal Entries, ~~Budget Adjustments~~ Project Entries** Records and information related to the transfer of charges between accounts and summaries of account information, including year end summaries of general ledger transactions.	Account Ledgers/Sub-Ledgers ~~Budget Adjustments~~ Balance Sheets ~~Cash Journal Entries~~ Chart of Accounts ~~Downloads / Data Exports~~ ~~Expenditure Reports~~ General Ledger Inventory Transfers Journal Entries and Backup Documentation Miscellaneous Logs ~~Revenue~~ ~~Summary Reports~~ Trial Balance Year-End / Account Detail History Report	Finance	6Y	CA - GOV 34090 - (2Y) US - 26 CFR 31.6001 - (CU+4Y) US - 26 USC 6531 - (LA6Y)
069	**Payroll** Records and information related to the accounting of payroll earnings, deductions, and issuance. This also includes records and information reflecting all earnings and benefits paid to each employee, including: - Name, address, SSN - Total amount and date of payments - Period of service covered for each - Withholding - Tax collected	~~Benefit Payments~~ Deduction ~~Authorizations, Registers,~~ Reports (deferred compensation, pers, garnishment) ~~Deferred Compensation~~ ~~Employee Master Lists, Addresses~~ ~~Extra Help Reports~~ ~~Federal and State Tax~~ ~~P.E.R.S. Reporting~~ Payroll Checks, Copies, Stub Reports ~~Payroll Certifications, Controls, Earnings~~ Quarterly Payroll Taxes (941) ~~Processing Reports, Reports to Government~~ ~~Salary Schedules~~ Timekeeping Records W-2, W-4 ~~Wage Rate Tables~~ Bi-Weekly/Monthly Payroll Report Packets	Finance Human Resources	10Y	CA - 2 CCR 570.5 - (5Y) CA - 2 CCR 571(b)(1)(E) - (5Y) CA - 22 CCR 1085-2 (c) - (CU+4Y) CA - GOV 12946 - (2Y; T+2Y) CA - GOV 34090 - (2Y) CA - LAB 226a - (3Y) CA - LAB 1174 - (3Y) CA - LAB 1197.5 - (LA2Y, LA3Y) CA - UIC 1132 - (LA3Y) US - 26 CFR 31.6001 - (CU+4) US - 26 USC 6531 - (LA6Y) US - 29 CFR 516.5 - (3Y) US - 29 CFR 516.6 - (2Y) US - 29 CFR 1620.32 - (2Y) US - 29 CFR 1627.3 - (3Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
070	**Unclaimed Funds** Records and information pertaining to periodic publication of outstanding checks that are 3 years or older. After the City goes through its due diligence of trying to find the rightful owner, Finance returns any unclaimed funds to the City.	Uncashed Checks Unclaimed Funds	Finance	10Y	CA - CCP 1513 - (3Y) CA - GOV 34090 - (2Y) US - Uniform Unclaimed Property Act (1995), Section 3 - (10Y)
071	**Grants ~~and External~~ Funding Sources** Documents the application, evaluation, awarding, administration, monitoring, reporting, and status of grants and other funding sources in which a local government entity is the recipient, grantor, allocator, or administrator. Includes: - Community Development Block Grant (CDBG) - Combined Federal, State, Local Grants - Enterprise Funds (water, waste, housing) - Federal Grants - Local Grants - State Grants - Transportation Agency Funding	Applications (*including project proposals*) Audits Award Notification Grant Administration Grant Funding Grant Evaluations Program Rules, Regulations, Procedures Property Taxes Funding Reports to Funding Agencies	Finance Public Works Code Enforcement Facilities Housing	While Active + 3Y	CA - GOV 34090 - (2Y) US - 2 CFR 200.333 - (CL+3Y) * Unsuccessful applications are retained for 2 years. NOTE: If a grant requires longer retention, its specific requirements will take precedence.
072	**Background Checks - Personnel Not Hired** All documentation related to background checks for Applicants and unpaid volunteers that were not hired.		Human Resources	3Y	CA - GOV 12946 - (2Y) CA - GOV 34090 - (2Y) NOTE: Background checks for personnel hired are part of the personnel file.
073	**Benefit Plans** Plans established to provide employee benefits and associated administrative documents. Types of plans include: - Health - Dental - Vision - Flex Spending - Pension - Retirement	COBRA Rates, Records, Histories Deferred Conpensation (*457, 401K*) Employee Benefit Plans Excess Insurance Authority (*EIA*) Group Insurance Cost Data Life Insurance CalPERS Actuarial Reports CalPERS Retirement Plan Summary Plan Descriptions	Human Resources	Life of Plan or System + 6Y	CA - GOV 34090 - (2Y) US - 29 USC 1027 - (6Y) US - 29 USC 1059 - (T+1Y) US - 29 USC 1113 - (LA6Y) US - 29 USC 1451 - (LA6Y) US - 29 CFR 1627.3(b)(2) - (LI*+1Y) US - 29 CFR 4007.10 - (6Y) US - 29 CFR 4041.5 - (LI*+6Y) * Life of Plan

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
074	**Employee Benefit Files** Employee election (selection), enrollment or termination forms and related correspondence, including transmissions to carriers of additions, changes, claims and deletions (includes employee medical records subject to HIPAA requirements).	Benefit Files, Enrollments, Appeals Beneficiary Designations Death Claims, Life Event Documents Deferred Compensation Disability Claims Employee Cost-Sharing Amounts Employment Authorizations, Terminations, Confirmations, Status Changes, Coverage Changes Flexible Spending Enrollment Life Insurance Notification Letters/EOI Pension Plan Applications, Claims Premium Information Required Benefits Reporting Retirement Loans / Retirement Supplemental Forms	Human Resources	While Active + 6Y	CA - 22 CCR 1085-2 - (CU+4Y) CA - GOV 12946 - (2Y; T+2Y) CA - GOV 34090 - (2Y) US - 26 CFR 301.6501 - (CU+3Y) US - 29 CFR 825.500 - (3Y) US - 29 USC 1027 - (6Y) US - 29 USC 1059 - (T+1Y) US - 29 USC 1113 - (LA6Y) US - 29 USC 1451 - (LA6Y) US - 29 CFR 4007.10 - (6Y)
075	**Employee Medical Records** Documents pertaining to medical records of City employees, including workplace injuries, exposure to hazardous substances, drug screens, and workers' compensation (includes employee records subject to HIPAA requirements).	Drug Screening Employee Hazardous Chemical Exposure Personnel Files - Medical (includes hazardous exposure records) Toxic Substance Exposure Records Worker Compensation Vaccination Records	Human Resources	Termination + 30Y	CA - 8 CCR 10102 - (Injury+5Y or Closed+1Y) CA - 8 CCR 14300.33 - (5Y) CA - 8 CCR 3204 - (T+30Y) CA - CCP 338 - (LA3Y) CA - CCP 338.1 - (LA5Y) CA - GOV 12946 - (2Y; T+2Y) CA - GOV 34090 - (2Y) CA - 29 CFR 1904.33 - (CU+5Y) US - 29 CFR 1910.95 - (2Y) US - 29 CFR 1910.1020 - (30Y)
076	**Regulatory Reporting for Human Resources** Official non-financial Human Resources reports issued by City organizations to comply with regulatory requirements.	EEOC Reports Labor Reports OSHA 300 Reports	Human Resources	5Y	CA - GOV 34090 - (2Y) US - 29 CFR 405.9 - (5Y) US - 29 CFR 1602.14 - (FR+1Y) US - 29 CFR 1602.30 - (3Y)
077	**Salary, Compensation** Documentation of job classification compensation.	Classification Studies Compensation Plans, Planning, Analysis Cost of Living Adjustments Job Descriptions Job Evaluation Documentation Salary Range History Salary Surveys	Human Resources	3Y	CA - GOV 34090 - (2Y) US - 29 CFR 1602.14 - (FR+1Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
078	**Staffing** Records and information related to recruitment of qualified persons for both paid and unpaid position with the City, whether full time or temporary, including: - applications and related records of candidates interviewed but not hired or accepted - applications received but not acted upon.	Applications, CVs, Resumes (*rejected, unsolicited*) Applicant Tracking Records (*hired, rejected*) Background Checks, Investigations - candidates not hired/accepted Civil Service Examination Results and Rankings Drug Testing, Pre-Hire Screening - candidates not hired/accepted Interview Notes Job Descriptions Job Postings, Announcements Job Requisition Requests Position Information Temporary Intern Staffing Test Results (*non-hires*) Test and Examination Materials Unpaid Interns (*rejected*) Volunteers (*rejected*) Declined Offer Letters	Human Resources	3Y	CA - 2 CCR 11013(c)(2) - (2Y) CA - GOV 12946 - (2Y) CA - GOV 34090 - (2Y) US - 29 CFR 1602.31 - (T+2Y) US - 29 CFR 1627.3(b)(1) - (1Y)
079	**Work Authorizations and Supporting Documentation** Employment eligibility verification forms collected for active employees and supporting documentation regarding immigration status.	I-9 Documents and copies of associated documents Immigration Supporting Documentation	Human Resources	Termination + 3Y	CA - GOV 34090 - (2Y) US - 20 CFR 655.760 - (T+1Y) US - 8 CFR 274a.2 - (3Y or T+1Y, whichever is longer)
080	**Application, System Development and Maintenance** Technical documentation related to development of City technology processes, applications, or systems, as well as conversions, changes or modifications to existing applications or systems.	Business, Functional Requirements Change Requests Data Element Attribute Reports Data Migration Documentation Database Dictionary / Schema End User Documentation, User Manuals Hardware Configurations Joint Dispatch Center Network Circuits Inventories Network/Equipment Control Support Documentation Source Code System Documentation (c*odebooks, record layouts, reference guides, specifications*) System, Application Maintenance Documentation (*hardware/operating system requirements, monitoring logs, operating manuals*) GIS	Information Technology Public Works	Life of Application, System or Process	CA - GOV 34090 - (2Y)
081	**Business Continuity Records - Computing Equipment and Network Operations** All documentation for dealing with preparation for and responses to emergencies, disasters and/or system failures for City computing resources.	Business Continuity Plans Disaster Recovery Plan Emergency Response	Information Technology	2Y	CA - GOV 34090 - (2Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
082	**Technology Access and Security** Records and technical documentation of internal controls and system security. Includes data / information security breaches, notifications, and supporting documentation.	Annual Database & System Security Reviews Audit Trail Files Automated Logs Change Management Case Files Computer Usage Files Data Breach Notifications Data Breach Reports/Responses Data Sets, Extracted Data Summaries Hardcopy Publication, Printouts of Report Data Privileged Area Access Requests Security Access Request Forms Special Access Approvals Usage Reports (*summary, system*) User Access Records (*passwords, security logs, user accounts, log-in files, data entry logs, accounts*) User Incident, Response Files	Information Technology	3Y	CA - GOV 34090 - (2Y) CA - CIV 1798.27 - (3Y)
083	**Administrative Entitlement Decisions** Records and information pertaining to decisions on Administrative Entitlement requests.	Administrative Decisions Administrative Entitlements Administrative Meeting Minutes	Planning	Permanent	CA - GOV 12981 - (1Y) CA - GOV 34090 - (2Y)
084	**Planning and Zoning Services** Records and information pertaining to the activities of the planning division, including zoning. Includes Discretionary Entitlement (hearing required) records.	Appeals ABC Notifications for Liquor Licenses Below Market Rate Units / Affordable Housing Design Review and Appeals Development Regulations Discretionary Entitlements Downtown Parking Requirements E.I.R., Notice of Determination, Categorical General Plan Home Occupation Permits (*HOP*) Land Use Permits, Studies Parking Calculations Planned Unit Development (*PUD*) Planning Review Case Files (*notices, neighbor letters, plans, blueprints*) Public Use Summary of Actions Variances Zoning, Rezoning and Map Amendments	Planning	Permanent	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI*) * Life of the Building
085	**Assessment/Special Funding Districts** Records and information documenting the formation and operations of Special ~~Public Works~~ funding districts including those for: - Maintenance - Transit - Street Lighting - Landscaping - Police Tax - Mello-Roos	District Formation Documents	Public Works Finance Community Development	Permanent	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y) CA - GOV 60201 - (PR)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
086	**Encroachments** Records documenting encroachments upon City property, or by the City on the property of others.	Encroachment Permits, Certificates	Public Works	While Active + 10Y	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y)
087	**Hazardous Waste, Monitoring and Remediation** Planning, monitoring and contingency/emergency action plans for hazardous waste, emergency and spill response, natural and exposure emergencies, notifications and response; environmental action plans and supporting documentation; hazardous communications plans, including labeling, MSDS controls, training programs and procedures.	Emergency Response Programs Employee Hazardous Chemical Exposure Hazardous Material Incident Reports Hazardous Substances Shipping Manifests Hazardous Waste Material Safety Data Sheets (*MSDS*) Proposition 65 Monitoring Site Mitigation Toxic Substance Inventory	Public Works Facilities	While Active + 30Y	CA - 8 CCR 3204d - (CL+30Y) CA - CCP 338.1 - (LA5Y) CA - GOV 34090 - (2Y) US - 29 CFR 1910.1020 - (CL+30Y)
088	**Operational Maps** Informal maps and geographical information pertaining to City operations and services.	Sewer TV Surveys Street Sweeping Tree Trimming Trash Pick-up	Public Works	Superseded + 4Y	CA - CCP 337.1 - (LA4Y) CA - GOV 34090 - (2Y)
089	**Public Works Project Files - CIP Projects - Final Package** Records and information that comprise the final record of public works Capital Improvement (CIP) and related engineering projects for City facilities and infrastructure. Includes projects funded from various sources including bonds, grants, capital improvement and general fund.	Drainage Final Improvement Plans/~~As-Built Plans (*shop drawings*)~~ Record Drawing Improvement Plans, Drawings Project Plans Site Aerial Photos Specifications	Public Works	Permanent	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - 14 CCR 15095 - (Reasonable) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)* US - 40 CFR 122.21(p) - (3Y) US - 40 CFR 122.41(j) - (3Y) * Life of Building, Asset or Facility
090	**Public Works Project Files - CIP Projects - In Progress Records** Records and information related to the administration, analysis, design, development, planning, construction and maintenance of public works Capital Improvement (CIP) and related engineering projects for City facilities and infrastructure. Includes projects funded from various sources including bonds, grants, capital improvement and general fund.	Assessments Bridges and Creeks Inventories Calculations Capacity (*water, wastewater*) Fees Certificates of Compliance/Notice of Non-Compliance Change Orders Contractor Material Submittals Daily Inspections and Progress Meetings Drainage E.I.R., Notice of Determination, Categorical Exemptions Encroachment Permits, Certificates Field Inspections, Closures Improvement Plans, Drawings Photos/Pictures Project Schedules, Insurance, Permits Real Estate Appraisals Site Aerial Photos Studies and Surveys Underground Utilities Maps	Public Works	Life of Building or Facility + 10Y	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - 14 CCR 15095 - (Reasonable) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)* US - 40 CFR 122.21(p) - (3Y) US - 40 CFR 122.41(j) - (3Y) * Life of Building, Asset or Facility

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
091	**Public Works Project Files - Development Projects - Final Package** Records and information that comprise the final record of developer driven projects involving City infrastructure.	~~As-Built Plans~~ Record Drawing Drainage Final Improvement Plans Improvement Plans, Drawings Site Aerial Photos	Public Works	Permanent	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - 14 CCR 15095 - (Reasonable) CA - GOV 34090 - (2Y) US - 40 CFR 122.21(p) - (3Y) US - 40 CFR 122.41(j) - (3Y)
092	**Public Works Project Files - Development Projects - In Progress Records** Records and information related to the administration, analysis, design, development, planning, construction and maintenance of developer driven projects involving City infrastructure.	Assessments Certificates of Compliance/Notice of Non-Compliance Daily Inspections and Progress Meetings Development Fee Book Drainage E.I.R., Notice of Determination, Categorical Exemptions Encroachment Permits, Certificates Field Inspections, Closures Improvement Plans, Drawings Photos/Pictures Project Plans and Schedules, Insurance, Permits Site Aerial Photos Specifications, Calculations, Change Orders Street Address Files Studies and Surveys Underground Utilities Maps	Public Works	While Active + 10Y	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - 14 CCR 15095 - (Reasonable) CA - GOV 34090 - (2Y) US - 40 CFR 122.21(p) - (3Y) US - 40 CFR 122.41(j) - (3Y)
093	**Real Property Maps and Drawings** Final maps and geographical information pertaining to City properties.	~~Aerial Photos~~ ~~Assessor Parcel Maps~~ Annexations ~~Building Site Determination~~ ~~Drainage~~ ~~Geographic Information System (*GIS*)~~ ~~Improvement Plans, Drawings~~ Lot Line Adjustments ~~Lot Numbers~~ ~~Major Subdivisions (*SD*)~~ ~~Minor Subdivisions (*MS*)~~ Parcel Mergers Parcels, Plats ~~Rights of Way~~ Sphere of Influence ~~Street Address Files~~ Subdivisions ~~Tracts~~ Vellums/Mylars	Planning Public Works	Permanent	CA - CCP 337.15 - (LA10Y) CA - GOV 34090d - (2Y) CA - HSC 19850 - (LI*) * Life of Building, Asset or Facility

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
094	**Recorded Documents - Vital** Records and information pertaining to those original key documents recorded on behalf of the City.	Abandonments Address Records Affordable Housing Plans Annexations Certificate of Correction Conveyances from the City (*deeds, easements, abandonments/vacations*) Conveyances to the City (*deeds, easements, dedications*) Deeds Detachments Development Agreements Easements Grant Deeds Irrevocable Offers to Dedicate Notice of Completion Notice of Special Tax Lien Rights-of-Way Vacations	~~Public Works~~ City Clerk	Permanent	CA - GOV 34090(a) - (PR)
095	**Traffic, Traffic Control and Improvement and Transportation Planning** Records and information related to traffic engineering and transportation planning activities (including studies and surveys), and the City's efforts to manage and improve traffic and circulation.	ADA Compliance (*ramps, sidewalks*) Bicycles Enforcement Highway Corridors Impact Studies Investigations Signals Signs Speed Surveys Streets Street/Highway Studies/Surveys Temporary Street Closures Traffic Calming Traffic Counts Traffic Management Plans Transportation Planning	Public Works	2Y	CA - GOV 34090 - (2Y)
~~096~~	~~**Traffic Control and Improvement**~~ ~~Records and information related to the City's efforts to manage and improve traffic and circulation.~~ **Number 96 will be retired and the records combined into number 95**	~~Bicycles~~ ~~Enforcement~~ ~~Highway Corridors~~ ~~Impact Studies~~ ~~Investigations~~ ~~Signals~~ ~~Signs~~ ~~Streets~~ ~~Temporary Street Closures~~ ~~Traffic Calming~~	~~Public Works~~	~~2Y~~	~~CA - GOV 34090 - (2Y)~~

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
097	**Use Permits** Documentation of permits issued in the City for the use of City property and facilities.	Applications Block Parties ~~Candle Permits~~ Filming Permits Fireworks Stand Permits Notices Special Events Street Permits Tent Permits Transportation Permits (*oversize, overweight*) Tree Permit Temporary Use Permits	Public Works Planning Finance	4Y	CA - CCP 337 - (LA4Y) CA - GOV 34090 - (2Y)
098	**Water Drainage Management** Records and information documenting the operations and maintenance of the City's storm drains, pump stations and drainage ditches.	Drainage Ditches NPDES Permit Pump Stations Storm Drains	Public Works	4Y	CA - GOV 34090 - (2Y) CA - HSC 25244.19 - (4Y) US - 40 CFR 122.44 - (3Y)
099	**State & Federal Legislative Affairs**	Analysis of legislation affecting the City Council Letters of Support/Opposition Federal Legislative Update Legislative Platform State Legislative Update	Communications & Public Affairs	While Active* + 2Y	CA - GOV 34090 - (2Y) * Records associated with historically significant legislation may be directed to #005, Historical.
100	**Facilities Projects** Records and information related to the management of Facilities Projects and Maintenance	Repair and Maintenance Capital Improvement Project Tenant Improvement Professional Services	Facilities	Permanent	CA - CCP 337.1 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - 14 CCR 15095 - (Reasonable) CA - GOV 34090 - (2Y) CA - HSC 19850 - (LI)* US - 40 CFR 122.21(p) - (3Y) US - 40 CFR 122.41(j) - (3Y) * Life of Building, Asset or Facility
101	**Community Enhancement Fund** Records and information related to the management of Community Enhancement Fund Programs and Projects	Applications and supplemental materials received from prospective grantees Applications and guidelines for the grant process Reports received from grant recipients Annual Citizen Report	City Manager	While Active + 6Y	CA - CCP 337 - (LA4Y) CA - GOV 34090 - (2Y) US - 26 USC 6531 - (LA6Y)
102	**Community Enhancement Fund - Construction Related Funding** Records and information related to the management of Community Enhancement Fund Programs and Projects involving physical improvements or construction on privately owned property	Applications and supplemental materials received from prospective grantees Applications and guidelines for the grant process Reports received from grant recipients Labor Compliance Documents (Department of Industrial Relations)	City Manager	While Active + 10Y	CA - CCP 337 - (LA4Y) CA - CCP 337.15 - (LA10Y) CA - GOV 34090 - (2Y) US - 26 USC 6531 - (LA6Y)

ACRONYMS USED IN LEGAL CITATIONS

AC = While Active **CL** = Closed/Complete **CU** = Current Year **D** = Day **FR** = Final Resolution **LA** = Limitation on Action
LI = Life (of program, asset) **M** = Month **MA** = Maturity **MAINT** = Maintain Records **PR** = Permanent **S** = Superseded **T** = Termination **Y** = Year

Record No.	Record Name and Description	Example Records	Department/Office of Record	Retention	Legal Citations and Comments
103	**Investments** Records and information relating to analysis of City investment activities.	Certificates of Deposit (CDs) Direct Investments Local Agency Investment Fund (LAIF) Security Instruments Stock/Equity Trust Accounts	Finance	10Y	CA - CCP 337 - (LA4Y) CA - CCP 338 - (LA3Y) CA - GOV 34090 - (2Y) US - 26 CFR 31.6001 - (CU+4Y) US - 26 CFR 301.6501 - (CU+3)

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Michelle Mingay, Sr. Finance Analyst

SUBJECT: **ANNEXATION OF THE ANTHOLOGY SUBDIVISION INTO THE CITY OF RANCHO CORDOVA COMMUNITY FACILITIES DISTRICT NO. 2013-2 (POLICE SERVICES)**

RECOMMENDATION

Adopt the Resolution.

RESULT OF RECOMMENDED ACTIONS

Adoption of the Resolution approves Annexation Map No. 4 for the Anthology Subdivision to Community Facilities District No. 2013-2 (Police Services) (hereinafter "CFD No. 2013-2"), and approves the recording of the Annexation Map and the Notice of Special Tax Lien.

BACKGROUND

On December 17, 2012, the City adopted a Resolution of Intention to establish a Community Facilities District (CFD) and Future Annexation Area for Citywide police services. On January 22, 2013, the City adopted the Resolution forming CFD No. 2013-2 pursuant to the Mello-Roos Community Facilities Act of 1982 (State of California Government Code Section 5311 et seq.) (the "Act"). The action defining the Future Annexation Area for the District provided for a more efficient process for the annexation of property when the property owners have provided for their unanimous consent. Defining the Future Annexation Area provided the Resolution of Intention, noticing, and public hearing for the entire Future Annexation Area so these steps do not need to be repeated for each annexation.

The annexation process for projects within the Future Annexation Area has been simplified to receiving a petition and waiver from the property owner(s), the City Council approving the Annexation Boundary Map by Resolution, followed by the recording of the Annexation Map and Notice of Special Tax Lien by the City Clerk.

DISCUSSION

The project included in this action was conditioned to annex to provide funding for police services. While this did not occur for this project under the prior owner, the project has changed ownership and the new owners will satisfy this condition by annexation of their project into CFD No. 2013-2. In October 2018, the property owner signed a unanimous approval of the annexation to CFD No. 2013-2. Adoption of the attached Resolution approves Annexation Map No. 4 for the subdivision and directs the Clerk to execute and record the Map and Notice of Special Tax Lien for the project.

ATTACHMENTS

1. Resolution

2. Exhibit A to the Resolution
3. Exhibit B to the Resolution

ATTACHMENT 1

RESOLUTION NO. __-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, APPROVING THE BOUNDARY MAP FOR THE ANTHOLOGY SUBDIVISION ANNEXATION TO THE CITY OF RANCHO CORDOVA COMMUNITY FACILITIES DISTRICT NO. 2013-2 (POLICE SERVICES)

WHEREAS, the Conditions of Approval for the Anthology Subdivision requires the property owner/applicant to provide funding for police services; and

WHEREAS, on December 17, 2012, the City adopted Resolution No. 122-2012 declaring its intention to establish Community Facilities District No. 2013-2 (Police Services) (the "District") and Future Annexation Area. On January 22, 2013, the City adopted Resolution No. 10-2013 forming CFD No. 2013-2 pursuant to the Mello-Roos Community Facilities Act of 1982 (State of California Government Code Section 5311 et seq.) (the "Act"); and

WHEREAS, the action defining the Future Annexation Area for the District provided for a more efficient process for the annexation of property when the property owners have provided for their unanimous consent such that the annexation process for projects within the Future Annexation Area has been reduced to receiving a petition, consent and waiver from the property owner(s); and

WHEREAS, in October of 2018, the property owner executed a unanimous approval form which irrevocably consents to and votes in favor of the annexation of the property to the District and the levy of the special tax on the property to finance the services of the CFD in accordance with the Rate and Method of the District; and

WHEREAS, in the case of annexation proceedings, pursuant to Streets and Highways Code Section 3110.5 a separate map of the area proposed to be annexed is required to be prepared and adopted; and

WHEREAS, City staff has caused to be prepared Annexation Map No. 4 for the property known as the Anthology Subdivision, **EXHIBIT A** attached hereto, for the annexation of the property to CFD No. 2013-2 (Police Services).

NOW, THEREFORE, BE IT HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, as follows:

1. The Council so finds and determines the above recitals are true and correct.

2. Council approves Annexation Map No. 4 and finds and determines that the territory shown in the Annexation Map is hereby added to and made a part of the District with full legal effect.

3. The City Clerk is directed to execute and record Annexation Map No. 4 in the office of the County Recorder of Sacramento County not later than 15 days after the adoption of this Resolution.

4. The City Council finds and determines that a special tax shall be levied within the Territory to be annexed and which special tax shall be the same as the tax to be levied within the District. Collection of said tax shall commence as outlined in the

ATTACHMENT 1

rate and method of apportionment of said tax and shall be as set forth in the Resolution of Formation of the District.

5. The City Clerk is directed to execute and record a Notice of Special Tax Lien in substantially the same form as shown in **EXHIBIT B** attached hereto, in the office of the County Recorder of Sacramento County not later than 15 days after recordation of the Annexation Map No. 4.

6. The City Council finds and determines that adoption of this Resolution is not a "project" under the California Environmental Quality Act, because the Resolution does not involve any commitment to a specific project which may result in a potentially significant physical impact on the environment, as contemplated by Title 14, California Code of Regulations, Section 15378(b)(4).

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the 15th day of October, 2018, by the following vote of the City Council:

AYES:

NOES:

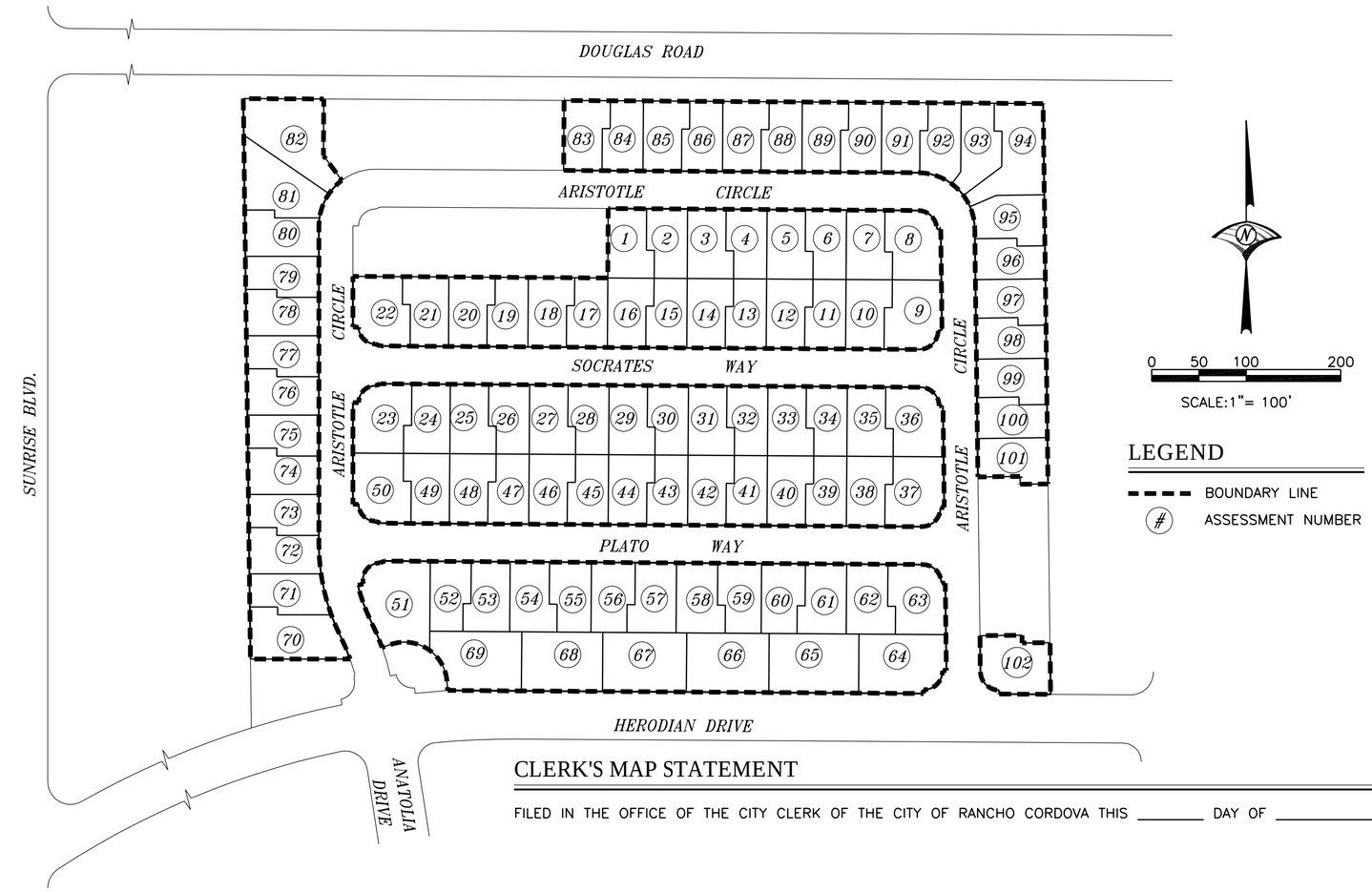
ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk



LEGEND

BOUNDARY LINE

(#) ASSESSMENT NUMBER

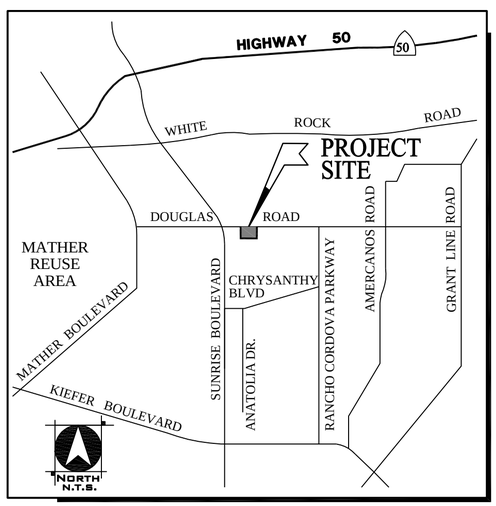
ASSESSMENT NUMBER	ASSESSOR PARCEL NUMBER
1	067-0920-007
2	067-0920-008
3	067-0920-009
4	067-0920-010
5	067-0920-011
6	067-0920-012
7	067-0920-013
8	067-0920-014
9	067-0920-015
10	067-0920-016
11	067-0920-017
12	067-0920-018
13	067-0920-019
14	067-0920-020
15	067-0920-021
16	067-0920-022
17	067-0920-023
18	067-0920-024
19	067-0920-025
20	067-0920-026
21	067-0920-027
22	067-0920-028
23	067-0920-029
24	067-0920-030
25	067-0920-031
26	067-0920-032
27	067-0920-033
28	067-0920-034
29	067-0920-035
30	067-0920-036
31	067-0920-037
32	067-0920-038
33	067-0920-039
34	067-0920-040
35	067-0920-041
36	067-0920-042
37	067-0920-043
38	067-0920-044
39	067-0920-045
40	067-0920-046
41	067-0920-047
42	067-0920-048
43	067-0920-049
44	067-0920-050
45	067-0920-051
46	067-0920-052
47	067-0920-053
48	067-0920-054
49	067-0920-055
50	067-0920-056
51	067-0920-057

ASSESSMENT NUMBER	ASSESSOR PARCEL NUMBER
52	067-0920-058
53	067-0920-059
54	067-0920-060
55	067-0920-061
56	067-0920-062
57	067-0920-063
58	067-0920-064
59	067-0920-065
60	067-0920-066
61	067-0920-067
62	067-0920-068
63	067-0920-069
64	067-0920-070
65	067-0920-071
66	067-0920-072
67	067-0920-073
68	067-0920-074
69	067-0920-075
70	067-0920-076
71	067-0920-077
72	067-0920-078
73	067-0920-079
74	067-0920-080
75	067-0920-081
76	067-0920-082
77	067-0920-083
78	067-0920-084
79	067-0920-085
80	067-0920-086
81	067-0920-087
82	067-0920-088
83	067-0920-095
84	067-0920-096
85	067-0920-097
86	067-0920-098
87	067-0920-099
88	067-0920-100
89	067-0920-101
90	067-0920-102
91	067-0920-103
92	067-0920-104
93	067-0920-105
94	067-0920-106
95	067-0920-107
96	067-0920-108
97	067-0920-109
98	067-0920-110
99	067-0920-111
100	067-0920-112
101	067-0920-113
102	067-0920-118

CLERK'S MAP STATEMENT

FILED IN THE OFFICE OF THE CITY CLERK OF THE CITY OF RANCHO CORDOVA THIS _____ DAY OF _____, 2018.

_____
CITY CLERK OF THE CITY OF RANCHO CORDOVA



VICINITY MAP

N.T.S.

CLERK'S MAP STATEMENT

I HEREBY CERTIFY THAT THE AREA SHOWN ON THIS MAP OF THE PROPOSED ANNEXATION 4 TO COMMUNITY FACILITIES DISTRICT NO. 2013-2, (POLICE SERVICES), CITY OF RANCHO CORDOVA, COUNTY OF SACRAMENTO, STATE OF CALIFORNIA, WAS APPROVED BY THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA AT A REGULARLY SCHEDULED MEETING THEREOF, HELD ON THE _____ DAY OF _____, 2018. BY ITS RESOLUTION NO. _____.

_____
CITY CLERK OF THE CITY OF RANCHO CORDOVA

COUNTY RECORDER'S FILING STATEMENT

FILED THIS _____ DAY OF _____, 2018. AT THE HOUR OF _____ O'CLOCK __.M. IN BOOK _____ OF MAPS OF ASSESSMENT AND COMMUNITY FACILITIES DISTRICTS PAGE NO. _____ IN THE OFFICE OF THE COUNTY RECORDER IN THE COUNTY OF SACRAMENTO, STATE OF CALIFORNIA.

DONNA ALLRED
COUNTY RECORDER OF THE COUNTY OF SACRAMENTO, CALIFORNIA

BY: _____
DEPUTY

FILE: _____

PROPOSED BOUNDARY OF ANNEXATION 4

COMMUNITY FACILITIES DISTRICT NO. 2013-2
(POLICE SERVICES)
COUNTY OF SACRAMENTO, STATE OF CALIFORNIA

SEPTEMBER 2018

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
3301 C St, Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

Sheet 1 of 1

1143.145

ATTACHMENT 3
Exhibit B to the Resolution

RECORDING REQUESTED BY AND
AFTER RECORDATION RETURN TO:

City Clerk
City of Rancho Cordova
2729 Prospect Park Drive
Rancho Cordova, CA 95670

AMENDMENT NO. 4 TO NOTICE OF SPECIAL TAX LIEN

CITY OF RANCHO CORDOVA
Community Facilities District No. 2013-2
(Police Services)

Annexation No. 4

Pursuant to the requirements of Section 3117.5 of the Streets and Highways Code of California and the Mello-Roos Community Facilities Act of 1982, as amended, section 53311, *et. seq*., of the California Government Code (the "Act"), the undersigned City Clerk of the City of Rancho Cordova (the "City"), County of Sacramento, State of California, hereby gives notice that a lien to secure payment of a special tax, which the City is authorized to levy, is hereby imposed on the property described herein. The special tax secured by this lien is authorized to be levied for the purpose of paying for certain municipal services set forth in that certain Notice of Special Tax Lien heretofore recorded in the Office of the County Recorder of the County of Sacramento, State of California on March 12, 2013 as Document No. 20130312 page 0318 to which recorded Notice of Special Tax Lien reference is hereby made and the provisions of which are hereby incorporated by this reference.

This Amendment No. 4 to Notice of Special Tax Lien amends the Notice of Special Tax Lien to add to the territory of the CFD. The territory and future annexation area included in the original CFD is set forth in the map of the CFD heretofore recorded in the Sacramento County Recorder's Office at Book 114 of Maps of Assessment and Community Facilities Districts at Page 18 as Document No. 20130102PG1208, (the "Original Boundary Map") to which map reference is hereby made. The territory to be added from the future annexation area is that certain real property identified in the map of the Annexed Territory recorded in the Sacramento County Recorder's Office at Book ____, at Page ____ as Document No. _____, which map together with the Original Boundary Map are now the final boundary maps of the CFD including the Annexed Territory.

This annexed property is placed in Tax Zone 1 for purposes of computation of the Special Tax.

ATTACHMENT 3
Exhibit B to the Resolution

The assessor's tax parcel(s) numbers of all parcels or any portion thereof which are included in this Amendment No. 4 to Notice of Special Tax Lien, together with the name(s) of the owner(s) thereof, as they appear on the latest secured assessment roll as of the date of recording hereof or as are otherwise known to the Authority are as set forth in Exhibit A hereto, and by such reference hereby made a part hereof. The levy is hereby imposed on the property described herein.

For further information concerning the current and estimated future tax liability of owners or purchasers of real property subject to this special tax lien, interested persons should contact the Finance Officer of the City of Rancho Cordova, 2729 Prospect Park Drive, Rancho Cordova, CA 95670 (telephone number: 916-851-8700).

Dated: As of _____, 2018

By: _____
Stacy Leitner, City Clerk
City of Rancho Cordova

ATTACHMENT 3
Exhibit B to the Resolution

EXHIBIT A

CITY OF RANCHO CORDOVA
Community Facilities District No. 2013-2
(Police Services)

Annexation No. 4

ASSESSOR'S PARCEL NUMBERS AND OWNERS OF LAND

Assessor's Parcel No	Name of Property Owner
067-0920-007	D.R. HORTON CA2, Inc.
067-0920-008	D.R. HORTON CA2, Inc.
067-0920-009	D.R. HORTON CA2, Inc.
067-0920-010	D.R. HORTON CA2, Inc.
067-0920-011	D.R. HORTON CA2, Inc.
067-0920-012	D.R. HORTON CA2, Inc.
067-0920-013	D.R. HORTON CA2, Inc.
067-0920-014	D.R. HORTON CA2, Inc.
067-0920-015	D.R. HORTON CA2, Inc.
067-0920-016	D.R. HORTON CA2, Inc.
067-0920-017	D.R. HORTON CA2, Inc.
067-0920-018	D.R. HORTON CA2, Inc.
067-0920-019	D.R. HORTON CA2, Inc.
067-0920-020	D.R. HORTON CA2, Inc.
067-0920-021	D.R. HORTON CA2, Inc.
067-0920-022	D.R. HORTON CA2, Inc.
067-0920-023	D.R. HORTON CA2, Inc.
067-0920-024	D.R. HORTON CA2, Inc.
067-0920-025	D.R. HORTON CA2, Inc.
067-0920-026	D.R. HORTON CA2, Inc.
067-0920-027	D.R. HORTON CA2, Inc.
067-0920-028	D.R. HORTON CA2, Inc.
067-0920-029	D.R. HORTON CA2, Inc.
067-0920-030	D.R. HORTON CA2, Inc.
067-0920-031	D.R. HORTON CA2, Inc.
067-0920-032	D.R. HORTON CA2, Inc.
067-0920-033	D.R. HORTON CA2, Inc.
067-0920-034	D.R. HORTON CA2, Inc.
067-0920-035	D.R. HORTON CA2, Inc.
067-0920-036	D.R. HORTON CA2, Inc.
067-0920-037	D.R. HORTON CA2, Inc.
067-0920-038	D.R. HORTON CA2, Inc.
067-0920-039	D.R. HORTON CA2, Inc.

Assessor's Parcel No	Name of Property Owner
067-0920-058	D.R. HORTON CA2, Inc.
067-0920-059	D.R. HORTON CA2, Inc.
067-0920-060	D.R. HORTON CA2, Inc.
067-0920-061	D.R. HORTON CA2, Inc.
067-0920-062	D.R. HORTON CA2, Inc.
067-0920-063	D.R. HORTON CA2, Inc.
067-0920-064	D.R. HORTON CA2, Inc.
067-0920-065	D.R. HORTON CA2, Inc.
067-0920-066	D.R. HORTON CA2, Inc.
067-0920-067	D.R. HORTON CA2, Inc.
067-0920-068	D.R. HORTON CA2, Inc.
067-0920-069	D.R. HORTON CA2, Inc.
067-0920-070	D.R. HORTON CA2, Inc.
067-0920-071	D.R. HORTON CA2, Inc.
067-0920-072	D.R. HORTON CA2, Inc.
067-0920-073	D.R. HORTON CA2, Inc.
067-0920-074	D.R. HORTON CA2, Inc.
067-0920-075	D.R. HORTON CA2, Inc.
067-0920-076	D.R. HORTON CA2, Inc.
067-0920-077	D.R. HORTON CA2, Inc.
067-0920-078	D.R. HORTON CA2, Inc.
067-0920-079	D.R. HORTON CA2, Inc.
067-0920-080	D.R. HORTON CA2, Inc.
067-0920-081	D.R. HORTON CA2, Inc.
067-0920-082	D.R. HORTON CA2, Inc.
067-0920-083	D.R. HORTON CA2, Inc.
067-0920-084	D.R. HORTON CA2, Inc.
067-0920-085	D.R. HORTON CA2, Inc.
067-0920-086	D.R. HORTON CA2, Inc.
067-0920-087	D.R. HORTON CA2, Inc.
067-0920-088	D.R. HORTON CA2, Inc.
067-0920-095	D.R. HORTON CA2, Inc.
067-0920-096	D.R. HORTON CA2, Inc.

ATTACHMENT 3
Exhibit B to the Resolution

CITY OF RANCHO CORDOVA
Community Facilities District No. 2013-2
(Police Services)

Annexation No. 4

ASSESSOR'S PARCEL NUMBERS AND OWNERS OF LAND, Continued

Assessor's Parcel No	Name of Property Owner
067-0920-040	D.R. HORTON CA2, Inc.
067-0920-041	D.R. HORTON CA2, Inc.
067-0920-042	D.R. HORTON CA2, Inc.
067-0920-043	D.R. HORTON CA2, Inc.
067-0920-044	D.R. HORTON CA2, Inc.
067-0920-045	D.R. HORTON CA2, Inc.
067-0920-046	D.R. HORTON CA2, Inc.
067-0920-047	D.R. HORTON CA2, Inc.
067-0920-048	D.R. HORTON CA2, Inc.
067-0920-049	D.R. HORTON CA2, Inc.
067-0920-050	D.R. HORTON CA2, Inc.
067-0920-051	D.R. HORTON CA2, Inc.
067-0920-052	D.R. HORTON CA2, Inc.
067-0920-053	D.R. HORTON CA2, Inc.
067-0920-054	D.R. HORTON CA2, Inc.
067-0920-055	D.R. HORTON CA2, Inc.
067-0920-056	D.R. HORTON CA2, Inc.
067-0920-057	D.R. HORTON CA2, Inc.

Assessor's Parcel No	Name of Property Owner
067-0920-097	D.R. HORTON CA2, Inc.
067-0920-098	D.R. HORTON CA2, Inc.
067-0920-099	D.R. HORTON CA2, Inc.
067-0920-100	D.R. HORTON CA2, Inc.
067-0920-101	D.R. HORTON CA2, Inc.
067-0920-102	D.R. HORTON CA2, Inc.
067-0920-103	D.R. HORTON CA2, Inc.
067-0920-104	D.R. HORTON CA2, Inc.
067-0920-105	D.R. HORTON CA2, Inc.
067-0920-106	D.R. HORTON CA2, Inc.
067-0920-107	D.R. HORTON CA2, Inc.
067-0920-108	D.R. HORTON CA2, Inc.
067-0920-109	D.R. HORTON CA2, Inc.
067-0920-110	D.R. HORTON CA2, Inc.
067-0920-111	D.R. HORTON CA2, Inc.
067-0920-112	D.R. HORTON CA2, Inc.
067-0920-113	D.R. HORTON CA2, Inc.
067-0920-118	D.R. HORTON CA2, Inc.

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Albert Stricker, Public Works Director and Quoc Nham, Associate Civil Engineer

SUBJECT: **A RESOLUTION AUTHORIZING THE PUBLIC WORKS DIRECTOR TO SUBMIT AND EXECUTE APPLICATION(S) AND DOCUMENTS FOR CALRECYCLE GRANTS**

RECOMMENDATION

Adopt the Resolution.

RESULT OF RECOMMENDED ACTION

Adoption of this Resolution will authorize the City to submit application(s) to CalRecycle for all grants and designates the Public Works Director or his or her designee to execute all grant documents for a period of 5-years from the date of adoption.

BACKGROUND

CalRecycle requires jurisdictions who wish to apply for grant funds to pass a Resolution that authorizes the submittal of the grant application(s) to CalRecycle and designates signing authority on behalf of the City of Rancho Cordova. CalRecycle allows this Resolution to remain effective for five (5) years. CalRecycle is authorized to administer various grant programs to further California's efforts to reduce, recycle, and reuse solid waste, in turn preserving landfill capacity and protecting public health, safety, and the environment.

The City of Rancho Cordova has identified Sunrise Boulevard Rehabilitation and Active Transportation Project (CP18-2187) as the latest project for construction that would benefit from the available CalRecycle Grant. The project will require approximately 7,000 tons of rubberized hot-mix asphalt to overlay Sunrise Boulevard from Folsom Boulevard to Folsom South Canal. Approximately $100,000 is eligible for reimbursement from CalRecycle's Rubberized Pavement Grant Program.

FISCAL IMPACT

There is no anticipated fiscal impact of the proposed action to the City's General Fund.

ATTACHMENT

1. Resolution

ATTACHMENT 1

CITY OF RANCHO CORDOVA

RESOLUTION NO. XXX-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, AUTHORIZING THE PUBLIC WORKS DIRECTOR TO SUBMIT AND EXECUTE APPLICATION(S) AND DOCUMENTS FOR CALRECYCLE GRANTS

WHEREAS, Public Resources Code sections 40000 et seq. authorizes the Department of Resources Recycling and Recovery (CalRecycle) to administer various grant programs (grants) in furtherance of the State of California's (state) efforts to reduce, recycle, and reuse solid waste generated in the state; thereby, preserving landfill capacity and protecting public health and safety and the environment; and

WHEREAS, in furtherance of this authority CalRecycle is required to establish procedures governing the application, awarding, and management of the grants; and

WHEREAS, CalRecycle's grant application procedures require, among other things, an applicant's governing body to declare by Resolution certain authorizations related to the administration of CalRecycle grants.

NOW, THEREFORE, BE IT HEREBY RESOLVED THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA does authorize:

1. The submittal of application(s) to CalRecycle for all grants for which the City of Rancho Cordova is eligible; and
2. The Public Works Director, or his/her designee, is hereby authorized and empowered to execute in the name of the City of Rancho Cordova all grant documents, including but not limited to: applications, agreements, amendments and requests for payment, necessary to secure grant funds and implement the approved grant project; and
3. These authorizations are effective for five (5) years from the date of adoption.

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the 15th day of October, 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Albert Stricker, Public Works Director and Marilyn Phelps, Assistant Land Surveyor

SUBJECT: **APPROVE THE FINAL LARGE LOT MAP OF MONTELENA SUBDIVISION NO. RC-04-132.0**

RECOMMENDATION

Approve Final Large Lot Map of Montelena Subdivision No. RC-04-132.0 located on the south side of Douglas Road, west side of Rancho Cordova Parkway and north and south of Chrysanthy Boulevard.

RESULT OF RECOMMENDED ACTION

Approval of this recommended action will result in the recording of the final map creating 8 large lots and 19 miscellaneous lots.

BACKGROUND

The map has been examined and checked for compliance with Title 22 of the City of Rancho Cordova Municipal code and the California Subdivision map Act. The City Council approved the Tentative Map on March 20, 2006. A copy of the final map **(Attachment 1)** and copy of the vicinity map **(Attachment 2)** are included with this letter.

There are no delinquent taxes against the property and the Tax Collector has so certified. The 2018/2019 estimated taxes have been secured with the Sacramento County Tax Collector.

FISCAL IMPACT

There is no fiscal impact to the City.

ATTACHMENTS

1. 8 ½" X 11" Copy of Final Map
2. Vicinity Map

OWNER'S STATEMENT

THE UNDERSIGNED HEREBY CONSENTS TO THE PREPARATION AND RECORDATION OF THIS FINAL MAP OF "SUBDIVISION NO. RC-04-132.0 LARGE LOT MAP OF MONTELENA" AND PURSUANT TO THE PROVISIONS OF SECTION 7050 OF THE GOVERNMENT CODE IRREVOCABLY OFFERS FOR DEDICATION TO THE CITY OF RANCHO CORDOVA FOR ANY PUBLIC PURPOSE THE RIGHT-OF-WAY ON, OVER, ACROSS AND UNDER THE STRIPS OF LAND SHOWN HEREON AND DESIGNATED AS "IRREVOCABLE OFFER OF DEDICATION," (I.O.D.) AND THE REAL PROPERTY DESCRIPTION BELOW IS DEDICATED AS AN EASEMENT FOR PUBLIC PURPOSES THE UNDERSIGNED OFFERS FOR DEDICATION AND DOES HEREBY DEDICATE TO ANY AND ALL PUBLIC USES DOUGLAS ROAD SHOWN HEREON, AND ALSO OFFERS FOR DEDICATION AND DOES HEREBY DEDICATE TO SPECIFIC PURPOSE THE FOLLOWING:

A. AN EASEMENT FOR CONSTRUCTING AND MAINTAINING CENTRALIZED MAIL DELIVERY BOXES, PEDESTALS AND SLABS, TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO, INCLUDING PEDESTRIAN ACCESS FOR DELIVERY AND RECEIPT OF MAIL ON, OVER, UNDER AND ACROSS STRIPS OF LAND FIVE (5.00) FEET IN WIDTH, LYING CONTIGUOUS TO THE IRREVOCABLE OFFERS OF DEDICATION SHOWN HEREON.

B. EASEMENTS FOR PLANTING AND MAINTAINING TREES, INSTALLATION AND MAINTENANCE OF ELECTROLIERS, TRAFFIC CONTROL DEVICES, WATER AND GAS PIPES, AND FOR OVERHEAD AND UNDERGROUND WIRES AND CONDUITS FOR ELECTRICAL, TELEPHONE AND TELEVISION SERVICES, TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO, ON, OVER, UNDER AND ACROSS LOTS L, N, O, P AND Q AND THOSE STRIPS OF LAND TWENTY- FIVE (25') FEET IN WIDTH AND CONTIGUOUS TO DOUGLAS ROAD AND RANCHO CORDOVA PARKWAY HEREON AND DESIGNATED "PUBLIC UTILITY EASEMENT" (P.U.E.).

C. EASEMENTS FOR PLANTING AND MAINTAINING TREES, INSTALLATION AND MAINTENANCE OF ELECTROLIERS, TRAFFIC CONTROL DEVICES, WATER AND GAS PIPES, AND FOR UNDERGROUND WIRES AND CONDUITS FOR ELECTRICAL, TELEPHONE AND TELEVISION SERVICES, TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO, ON, OVER, UNDER AND ACROSS LOTS B, D, G, H, I ,K AND S AND THOSE STRIPS OF LAND TWELVE AND ONE-HALF (12.5), FIFTEEN (15), SIXTEEN (16), SEVENTEEN (17), EIGHTEEN (18), TWENTY (20), TWENTY TWO AND ONE HALF(22.5), TWNETY THREE AND A HALF (23.5) AND TWENTY-FIVE (25) FEET IN WIDTH AND CONTIGUOUS TO THE IRREVOCABLE OFFERS OF DEDICATION SHOWN HEREON AND DESIGNATED "PUBLIC UTILITY EASEMENT" (P.U.E.).

D. AN EASEMENT FOR LANDSCAPING AND ALL APPURTENANCES APPERTAINING THERETO LYING ON, OVER AND ACROSS STRIPS OF LAND SHOWN HEREON AND DESIGNATED "LANDSCAPING EASEMENT," SAID STRIPS TO BE KEPT OPEN AND FREE FROM BUILDINGS. THE MAINTENANCE AND REPLANTING OF THE LANDSCAPING SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. (L.E.)

E. RIGHTS-OF-WAY AND EASEMENTS FOR THE INSTALLATION AND UNINTERUPTED USE OF A PEDESTRIAN WALKWAY, TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER, UNDER AND ACROSS THOSE STRIPS OF LAND SHOWN HEREON AND DESIGNATED "PEDESTRIAN EASEMENT." THE MAINTENANCE AND REPAIR OF THE WALKWAY SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. (P.E.)

F. A RIGHT-OF-WAY AND DRAINAGE EASEMENT FOR THE PURPOSE OF DIGGING, CONSTRUCTING, RECONSTRUCTING, REPAIRING, AND FOREVER MAINTAINING THEREON A DRAINAGE CANAL, DITCH, OR PIPELINE FOR DRAINAGE PURPOSES, TOGETHER WITH THE SPOIL BANKS AND APPURTENANT STRUCTURES THEREOF OVER LOTS E, F, J, M AND THAT CERTAIN REAL PROPERTY SHOWN HEREON AND DESIGNATED "DRAINAGE EASEMENT." (D.E.)

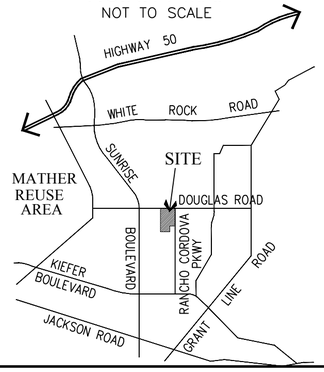
MONTELENA DOUGLAS, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY
BY: PILATUS PROPERTIES, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY
ITS: MANAGER

BY:_____
NAME: RONALD ALVARADO
TITLE: MANAGER

CHRYSANTHY ROAD INVESTMENT, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY
BY: PILATUS PROPERTIES, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY
ITS: MANAGER

BY:_____
NAME: RONALD ALVARADO
TITLE: MANAGER

VICINITY MAP
NOT TO SCALE



NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY OR VALIDITY OF THAT DOCUMENT.

STATE OF CALIFORNIA

COUNTY OF _____

ON_____ BEFORE ME,_____, A NOTARY PUBLIC

PERSONALLY APPEARED _____
WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND AND OFFICAL SEAL.

_____
SIGNATURE PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS _____COUNTY

MY COMMISSION EXPIRES: _____MY COMMISSION NUMBER: _____

SURVEYOR'S STATEMENT

THIS MAP WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCE AT THE REQUEST OF MONTELENA DOUGLAS, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY IN MARCH, 2014. I HEREBY STATE THAT ALL THE MONUMENTS ARE OF THE CHARACTER AND OCCUPY THE POSITION INDICATED OR THAT THEY WILL BE SET IN THOSE POSITIONS BEFORE DECEMBER 2020, AND THAT THE MONUMENTS ARE, OR WILL BE, SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED, AND THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS THE THE CONDITIONALLY APPROVED TENTATIVE MAP.

MACKAY & SOMPS CIVIL ENGINEERS, INC.



_____
ROBERT M. PLANK
P.L.S 5760 EXP. 06-30-20

DATE: _____

CITY ENGINEER'S STATEMENT

I, HEREBY STATE THAT I HAVE EXAMINED THIS PLAT OF "SUBDIVISION NO. RC-04-132.0 LARGE LOT MAP OF MONTELENA" AND FIND IT TO BE SUBSTANTIALLY THE SAME AS THE TENTATIVE MAP APPROVED BY THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, AND ANY APPROVED ALTERATIONS THEREOF; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL APPLICABLE CITY ORDINANCES HAVE BEEN COMPLIED WITH.



_____
CITY ENGINEER, ALBERT STRICKER
R.C.E. 64057
EXPIRATION DATE: 09/30/2018

DATE: _____

CITY SURVEYOR'S STATEMENT

I, HEREBY STATE THAT I AM SATISFIED THAT THIS FINAL MAP IS TECHNICALLY CORRECT.



_____
LAND SURVEYOR, CYRUS E. ABHAR
P.L.S. 7723
EXPIRATION DATE: 12/31/2019

DATE: _____

CITY CLERK'S STATEMENT

I, HEREBY STATE THAT THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA HAS APPROVED THIS "SUBDIVISION NO. RC-04-132.0 LARGE LOT MAP OF MONTELENA" AND CONSENTS TO THE IRREVOCABLE OFFERS OF DEDICATION AND HAS ACCEPTED ON BEHALF OF THE PUBLIC, ALL LANDS, EASEMENTS AND RIGHTS-OF-WAY SHOWN HEREON TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO, SUBJECT TO THE IMPROVEMENT THEREOF, AND DO HEREBY CERTIFY THE ABANDONMENTS.

_____
STACY LEITNER, CITY CLERK
CITY OF RANCHO CORDOVA, CALIFORNIA

DATE: _____

RECORDER'S STATEMENT

FILED THIS _____ DAY OF _____, 2018, AT _____ .M. IN BOOK _____ OF MAPS, AT PAGE _____ AT THE REQUEST OF MACKAY & SOMPS CIVIL ENGINEERS, INC. TITLE TO THE LAND INCLUDED IN THIS FINAL MAP BEING VESTED AS PER CERTIFICATE NO. _____ ON FILE IN THIS OFFICE.

_____ DOCUMENT NO.: _____
RECORDER OF SACRAMENTO COUNTY
STATE OF CALIFORNIA

BY:_____ FEE: $ _____
DEPUTY

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

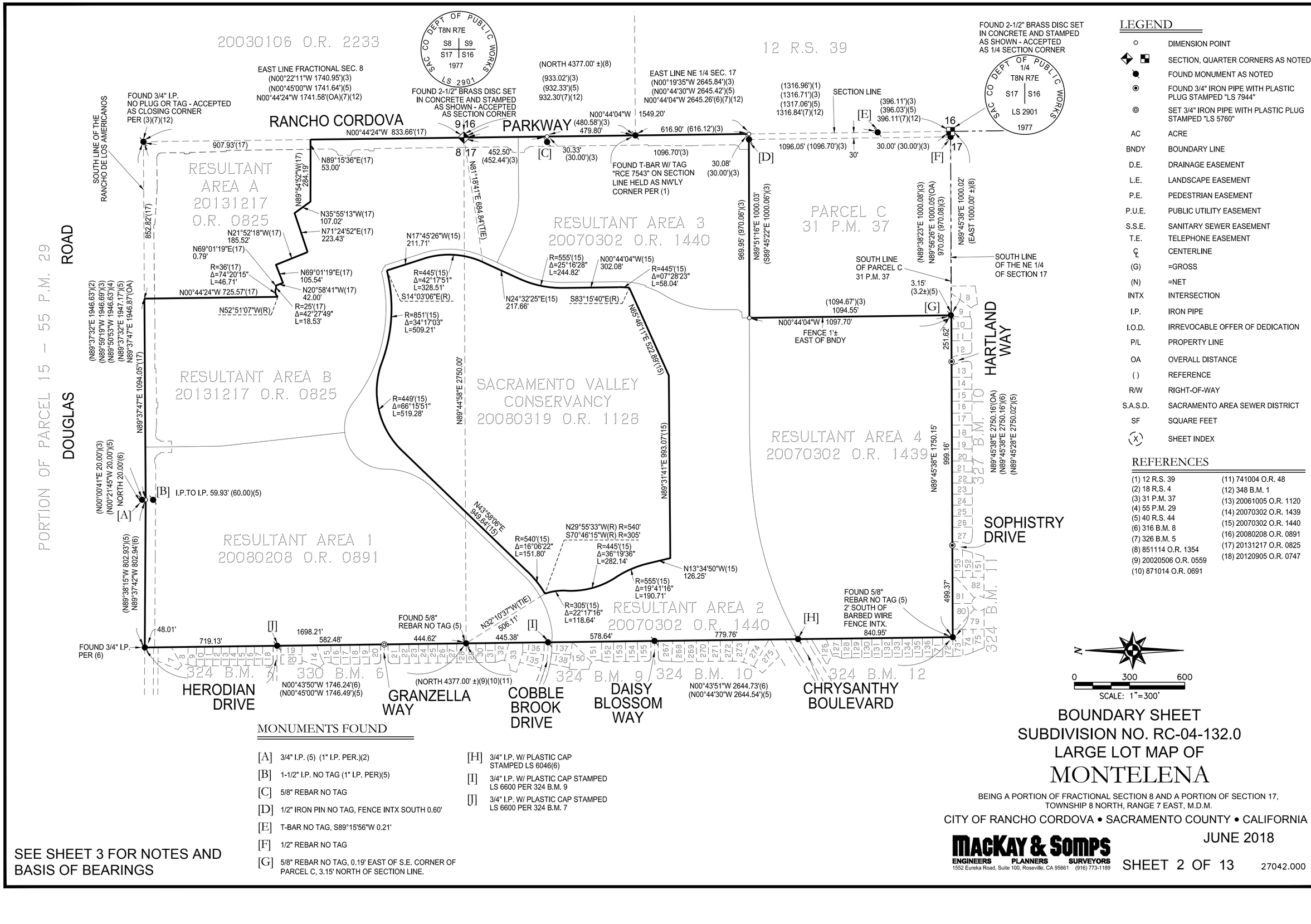
BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 1 OF 13 27042.000



LEGEND

○	DIMENSION POINT
◆ ■	SECTION, QUARTER CORNERS AS NOTED
●	FOUND MONUMENT AS NOTED
⊙	FOUND 3/4" IRON PIPE WITH PLASTIC PLUG STAMPED "LS 7944"
◎	SET 3/4" IRON PIPE WITH PLASTIC PLUG STAMPED "LS 5760"
AC	ACRE
BNDY	BOUNDARY LINE
D.E.	DRAINAGE EASEMENT
L.E.	LANDSCAPE EASEMENT
P.E.	PEDESTRIAN EASEMENT
P.U.E.	PUBLIC UTILITY EASEMENT
S.S.E.	SANITARY SEWER EASEMENT
T.E.	TELEPHONE EASEMENT
℄	CENTERLINE
(G)	=GROSS
(N)	=NET
INTX	INTERSECTION
I.P.	IRON PIPE
I.O.D.	IRREVOCABLE OFFER OF DEDICATION
P/L	PROPERTY LINE
OA	OVERALL DISTANCE
( )	REFERENCE
R/W	RIGHT-OF-WAY
S.A.S.D.	SACRAMENTO AREA SEWER DISTRICT
SF	SQUARE FEET
(X)	SHEET INDEX

REFERENCES

(1) 12 R.S. 39
(2) 18 R.S. 4
(3) 31 P.M. 37
(4) 55 P.M. 29
(5) 40 R.S. 44
(6) 316 B.M. 8
(7) 326 B.M. 5
(8) 851114 O.R. 1354
(9) 20020506 O.R. 0559
(10) 871014 O.R. 0691
(11) 741004 O.R. 48
(12) 348 B.M. 1
(13) 20061005 O.R. 1120
(14) 20070302 O.R. 1439
(15) 20070302 O.R. 1440
(16) 20080208 O.R. 0891
(17) 20131217 O.R. 0825
(18) 20120905 O.R. 0747

MONUMENTS FOUND

[A] 3/4" I.P. (5) (1" I.P. PER.)(2)
[B] 1-1/2" I.P. NO TAG (1" I.P. PER)(5)
[C] 5/8" REBAR NO TAG
[D] 1/2" IRON PIN NO TAG, FENCE INTX SOUTH 0.60'
[E] T-BAR NO TAG, S89°15'56"W 0.21'
[F] 1/2" REBAR NO TAG
[G] 5/8" REBAR NO TAG, 0.19' EAST OF S.E. CORNER OF PARCEL C, 3.15' NORTH OF SECTION LINE.
[H] 3/4" I.P. W/ PLASTIC CAP STAMPED LS 6046(6)
[I] 3/4" I.P. W/ PLASTIC CAP STAMPED LS 6600 PER 324 B.M. 9
[J] 3/4" I.P. W/ PLASTIC CAP STAMPED LS 6600 PER 324 B.M. 7

SEE SHEET 3 FOR NOTES AND BASIS OF BEARINGS

BOUNDARY SHEET
SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

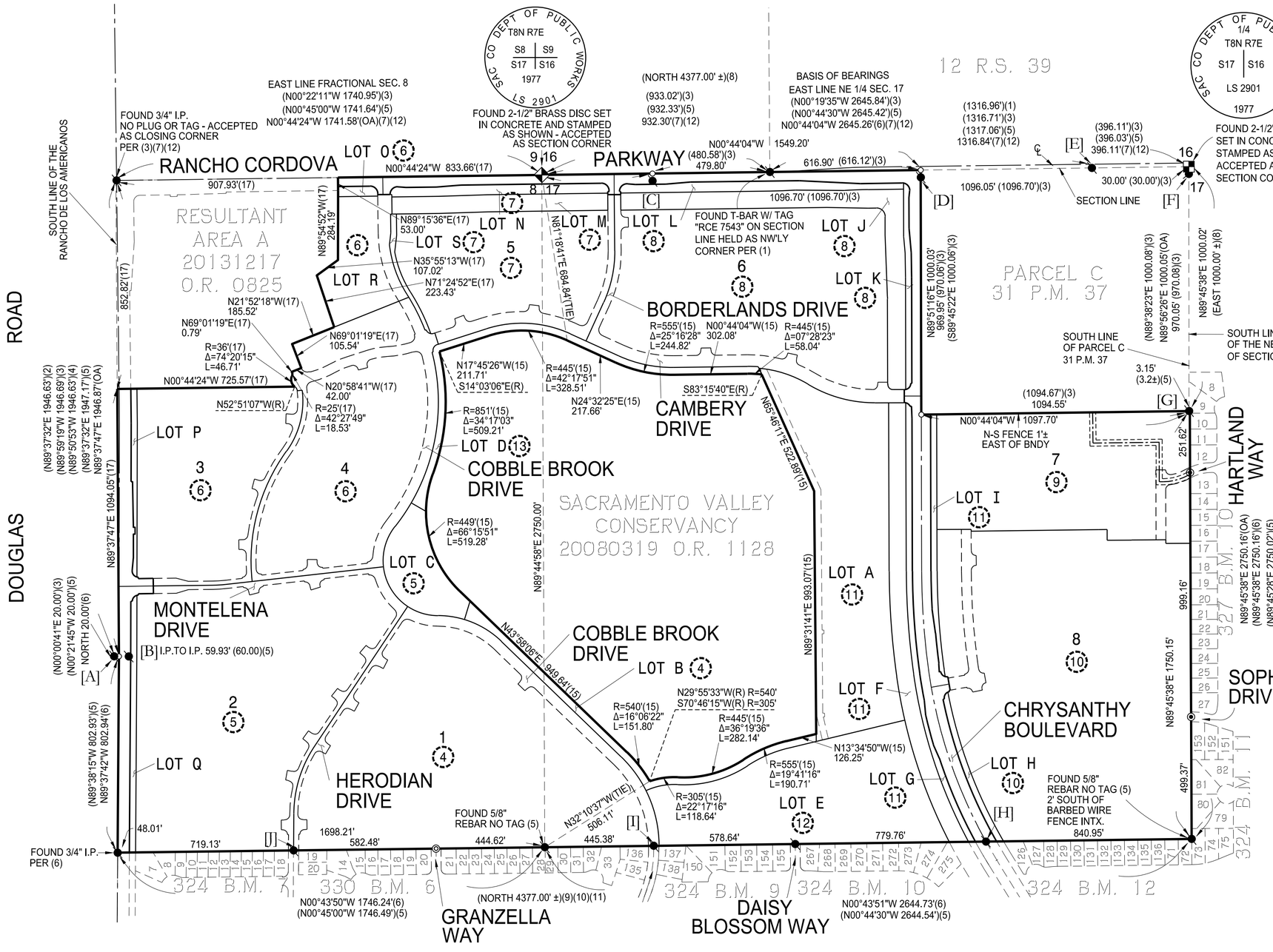
BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SEE SHEET 2 FOR FOUND MONUMENTS LEGEND AND REFERENCES



BASIS OF BEARINGS

THE BEARING NORTH 00°44'04" WEST AS SHOWN BETWEEN FOUND MONUMENTS ALONG THE EAST LINE OF THE NORTHEAST ONE-QUARTER OF SECTION 17 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SUNRIDGE PARK " FILED IN BOOK 326 OF MAPS, AT PAGE 5 SACRAMENTO COUNTY RECORDS. DISTANCES SHOWN HEREON ARE GROUND DISTANCES.

NOTES

1. ALL CURVE DIMENSIONS SHOWN ARE RADIUS, DELTA AND ARC LENGTH, ALL DISTANCES SHOWN ARE EXPRESSED IN FEET AND DECIMALS THEREOF.
2. TOTAL AREA OF THIS MAP IS 135.1 ± ACRES, CONSISTING OF 8 LARGE LOTS AND 19 MISCELLANEOUS LOTS.
3. A PRELIMINARY SOILS REPORT WAS PREPARED WALLACE-KUHL AND ASSOC., WKA NO. 6961.18, DATED DECEMBER 12, 2013. A COPY OF THIS REPORT IS AVAILABLE FOR PUBLIC INSPECTION AT THE CITY OF RANCHO CORDOVA BUILDING INSPECTION DEPARTMENT.
4. THERE SHALL BE A 12.5, 15, 16, 17, 18, 20, 22.5, 23.5 AND/OR 25 FOOT WIDE PUBLIC UTILITY EASEMENT WITHIN EACH LOT ALONG ALL PUBLIC RIGHTS-OF-WAY AND IRREVOCABLE OFFERS OF DEDICATION AS SHOWN HEREON.
5. LOTS A AND C SHALL BE GRANTED IN FEE SIMPLE TO THE CORDOVA RECREATION AND PARK DISTRICT FOR PARK PURPOSES BY SEPARATE DOCUMENT.
6. LOTS E, F, J AND M SHALL BE GRANTED IN FEE SIMPLE TO THE CITY OF RANCHO CORDOVA FOR DRAINAGE PURPOSES BY SEPARATE DOCUMENT.
7. LOTS B, D, G, H, I, K, L, N, O, P, Q AND S SHALL BE GRANTED IN FEE SIMPLE TO THE CITY OF RANCH CORDOVA FOR LANDSCAPE PURPOSES BY SEPARATE DOCUMENT.
8. LOT R SHALL BE GRANTED IN FEE SIMPLE TO THE CITY OF RANCHO CORDOVA FOR ANY USE.
9. A PORTION OF LOTS B & R WILL BE DEDICATED AS SEWER EASEMENTS TO S.A.S.D. BY SEPARATE DOCUMENTS.
10. THE LOTS DEPICTED ON THIS MAP ARE NOT DEVELOPABLE BUILDING SITES. THESE LOTS MAY ONLY BE DEVELOPED UPON APPROVAL OF FURTHER SUBDIVISION MAPS THEREFORE OR APPROVAL OF OTHER DISCRETIONARY ENTITLEMENTS THEREFORE BY THE CITY OF RANCHO CORDOVA.
11. PURSUANT TO SECTION 66499.20-1/2 OF THE GOVERNMENT CODE, THE LAND DESCRIBED IN THOSE CERTAIN BOUNDARY LINE ADJUSTMENTS 20070302 O.R. 1439, 20070302 O.R. 1140, 20080208 O.R. 0891 AND 20131217 O.R. 0825, ARE HEREBY MERGED AND RESUBDIVIDED. THE FOLLOWING PUBLIC EASEMENTS, RIGHTS-OF-WAY AND IRREVOCABLE OFFERS OF DEDICATIONS, NOT SHOWN HEREON, ARE HEREBY ABANDONED.
    - A. 770502 O.R. 534
    - B. 20050225 O.R. 1627
    - C. 20050225 O.R. 1628
    - D. 20050225 O.R. 1629
    - E. 20050428 O.R. 1758
    - F. 20050428 O.R. 1759
    - G. 20050428 O.R. 1760
    - H. 20050428 O.R. 1725
    - I. 20060725 O.R. 1379
    - J. 20060725 O.R. 1380

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

JUNE 2018

27042.000

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.

LOT C
SEE SHEET 5

2
SEE SHEET 5

LOT A
SEE SHEET 11

SACRAMENTO VALLEY
CONSERVANCY
20080319 O.R. 1128

COBBLE BROOK DRIVE

HERODIAN DRIVE

LOT B
L.E./P.E./P.U.E.
1.28± AC

LOT B
L.E./P.E./P.U.E.

LOT E
SEE SHEET 12

1
22.74± AC(G)
20.66± AC(N)

R=225'
Δ=33°25'32"
L=131.26'

43' I.O.D.

N73°01'39"W(R)
79.53'
Δ=16°44'34"
L=109.58'

R=375'

Δ=43°44'18"

L=176.69'
Δ=26°59.45"

R=332'

L=286.27'

L=253.44'

R=25'

R=268'

Δ=81°51'26"

L=35.72'

Δ=25°16'58"

L=118.26'

N56°20'41"W 142.42'

N61°10'08"W(R)
S60°24'03"E(R)

17' P.U.E.
11' P.E./L.E.
33' I.O.D.

R=20'

Δ=94°49'28"

L=33.10'

N38°10'30"E 5.40'
N61°50'15"W(R)

R=455'

Δ=01°14'27"

L=9.85'

N63°04'42"W 40.00'
N60°57'04"W(R)

R=496'

Δ=02°07'38"

L=18.38'

N17°27'16"E 4.86'

R=20'

Δ=85°56'37"

L=30.00'

N56°20'41"W 128.26'

N59°35'38"W(R)
S59°13'55"E(R)

N56°20'41"W 688.98'(R)

R=20'

Δ=93°14'57"

L=32.55'

N41°03'48"E 5.30'
N60°02'32"W(R)

R=665'

Δ=00°51'11"

L=9.90'

N60°53'43"W 40.00'
N59°37'07"W(R)

R=705'

Δ=01°16'37"

L=15.71'

N18°52'24"E 4.93'

R=20'

Δ=87°07'06"

L=30.41'

N56°20'41"W 128.14'

R=20'

Δ=92°26'58"

L=32.27'

N58°47'39"W(R)
N42°08'06"E 5.20'

R=875'

Δ=00°39'12"

L=9.98'

N59°07'42"W(R)
N59°46'54"W 40.00'

R=915'

Δ=00°52'03"

L=13.86'

N59°13'43"W(R)
N19°37'26"E 4.97'
S58°36'24"E(R)

R=20'

Δ=90°22'05"

L=31.54'

17' P.U.E.

R=483.50'

Δ=30°39'02"

L=258.65'

11' P.E./L.E.
33' I.O.D.
23.5' P.U.E.

R=20'

Δ=91°06'09"

L=31.80'

N89°16'09"E(R)
N00°43'51"W 11.96'
N89°16'09"E 40.00'
N00°43'51"W 10.00'

R=20'

Δ=88°53'51"

L=31.03'

N00°22'18"E 4.00'(R)
42' I.O.D.
N89°37'42"W 65.48'
16' P.U.E.

N89°37'42"W
3.83'

R=5.00'

Δ=33°17'01"

L=290.45'

N89°37'42"W 150.56'

N10°37'18"E 5.08'

10' L.E./P.E.
21.00'

N89°37'42"W
3.83'

582.48'

N00°43'50"W 1746.24'(6)
(N00°45'00"W 1746.49')(5)

N00°43'50"W 1027.10'

444.62'

FOUND 5/8" REBAR
NO TAG (5)

N00°43'51"W 466.38'(OA)
418.88'

N 00°43'51"W 2644.73' (6)
(N 00°44'30"W 2644.54')(5)

N84°07'36"E 5.58'

N85°35'19"W 5.58'

21.50'

21.00'

S00°43'51"E(R)

FOUND 3/4" I.P.
STAMPED L.S. 6600
PER 324 B.M 7

FOUND 3/4" I.P.
STAMPED L.S. 6600

330 B.M. 6

N43°58'06"E 949.64'(15)
890.23'

N43°58'06"E 680.45'

N43°58'06"E 449.50'

R=20'

Δ=90°00'00"

L=31.42'

S43°58'06"W(R)
N57°20'30"W 5.10'
N46°01'54"W 10.00'
N43°58'06"E 40.00'
N46°01'54"W 10.00'
N34°43'18"W 5.10'
N43°58'06"E(R)

R=20'

Δ=90°00'00"

L=31.42'

23.5' P.U.E.
11' P.E./L.E.
43' I.O.D.

11' P.E./L.E.
23.5' P.U.E.

R=540'(15)
Δ=16°06'22"
L=151.80'

S29°55'33"E(R) R=540'
N70°46'15"E(R) R=305'

R=305'(15)
Δ=22°17'16"
L=118.64'

L=172.50'
Δ=19°30'48"

R=506.50'

R=463.50'

Δ=45°18'03"

L=366.46'

Δ=25°47'15"

L=227.96'

Δ=45°18'03"

L=400.46'

S.A.S.D. EASEMENT BY
SEPARATE DOCUMENT

R=275'
Δ=27°50'55"
L=133.66'

S26°31'6"E(R) R=506.50'
N65°12'36"E(R) R=275'

23.5' P.U.E.

22.5' P.U.E.
10' L.E.

20' L.E./P.E./P.U.E.

R=445'(15)
Δ=36°19'36" L=282.14'

R=555'(15)
Δ=19°41'16" L=190.71'

N13°34'50"W(15)
126.25'

N89°31'41"E
30.80'

Δ=19°41'16" L=180.40'
R=525'

N13°34'50"W 119.27'

30' S.S.E.(13)

Δ=36°19'36" L=301.16'
R=475'

0 50 100 200
SCALE: 1"=100'

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF

MONTELENA

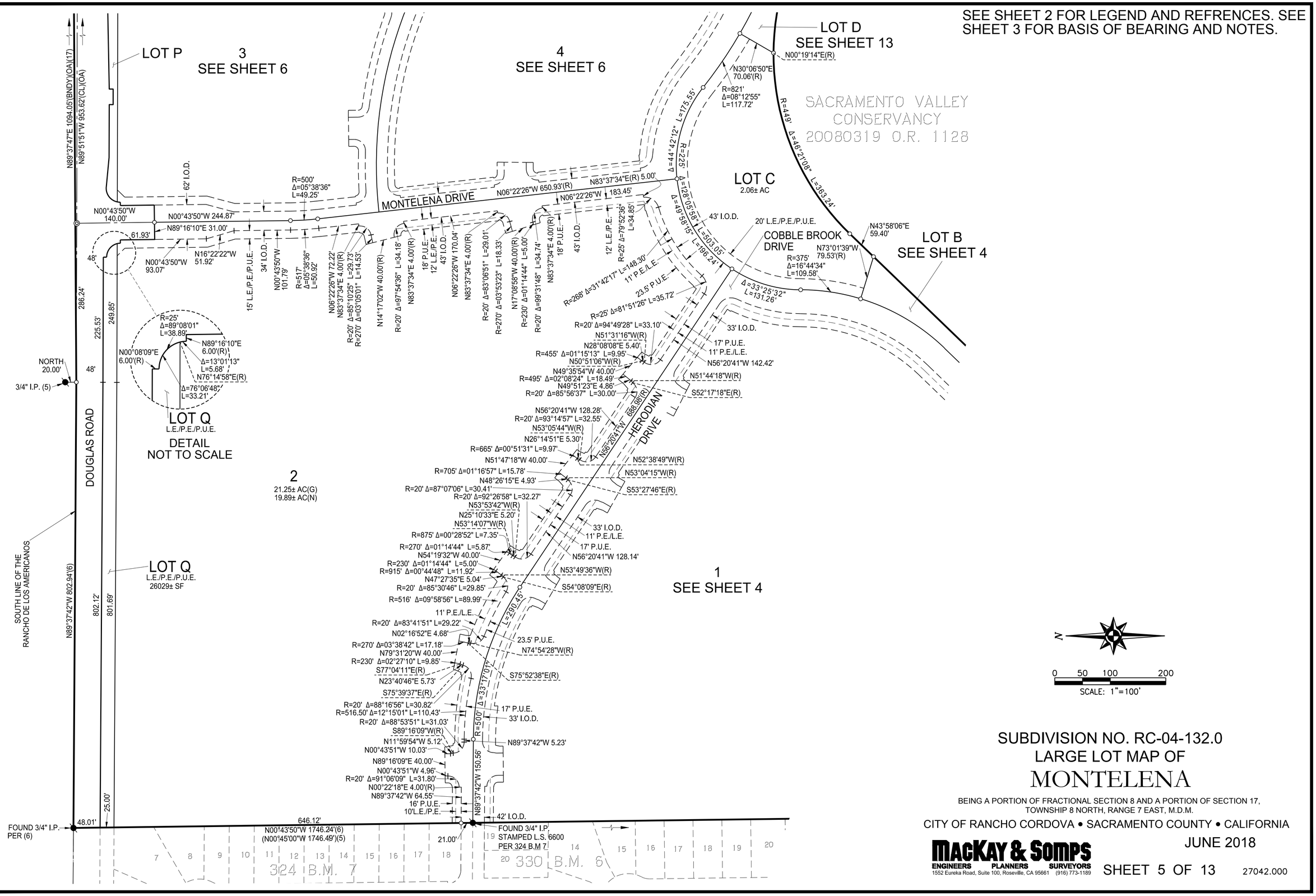
BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17,
TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.



SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 5 OF 13 27042.000

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.

(N89°37'32"E 1946.63')(2)
(N89°59'19"W 1946.69')(3)
(N89°50'53"W 1946.63')(4)
(N89°37'32"E 1947.17')(5)
N89°37'47"E 1946.87'(OA)

SOUTH LINE OF THE RANCHO DE LOS AMERICANOS

FOUND 3/4" I.P. NO PLUG OR TAG - ACCEPTED AS CLOSING CORNER PER (3)(7)(12)

N89°37'47"E 1094.05'(BNDY)(OA)(17)

7.64'

852.80'(17)

DOUGLAS ROAD

N84°35'54"W 53.33'
N89°51'51"W 95.32'
N00°08'09"E 7.00'
667.38'
N89°51'51"W 953.62'(CL)(OA)
239.53'
48'
N89°18'33"E 140.52'
48.00'
140.91'
N88°54'27"E 186.33'
25.00'
N89°51'51"W 629.21'
N00°08'09"E 6.01'
N89°18'33"E 141.11'
N89°51'51"W 28.00'
N00°43'50"W 140.00'
61.05'

LOT P
L.E./P.E./P.U.E.
15675± SF

N89°16'10"E 31.00'
N00°43'50"W 93.07'
62' I.O.D.
15' L.E./P.E/P.U.E
N00°43'50"W 244.87'
N14°54'42"E 51.92'

R=25'
Δ=96°07'55"
L=41.95'

Δ=83°43'44"
L=36.53'
N79°19'38"W(R)
LOT P
L.E./P.E./P.U.E.
Δ=12°24'12"
L=5.41'
N89°16'10"E 6.00'(R)

DETAIL
NOT TO SCALE

3
10.21± AC(G)
9.99± AC(N)

N00°43'50"W 101.79'
34' I.O.D.

644.94'
N00°44'24"W 725.57'(17)

RESULTANT AREA A
20131217 O.R. 0825

905.06'(17)

R=483' Δ=05°38'36" L=47.57'
R=500' Δ=05°38'36" L=49.25'
N06°22'26"W 71.97'
N83°37'34"E 4.00'(R)
R=20' Δ=87°04'50" L=30.40'
110.93'
L1 L2 L3
12.5' P.U.E.
C1 C2 C3 C4 C5 C6 C7 C8 C9

R=765' Δ=42°13'12" L=563.71'
R=745' Δ=38°37'18" L=502.19'
R=20' Δ=93°35'53" L=32.67'
N83°37'34"E 4.00'(R)
43' I.O.D.
18' P.U.E.
10' L.E./P.E.
MONTELENA DRIVE
N06°22'26"W 170.44'
N83°37'34"E 4.00'(R)
R=20' Δ=85°17'51" L=29.77'
R=535' Δ=02°11'39" L=20.49'
N00°31'22"E(R) 40.00'
40' I.O.D.
12.5' P.U.E.

C10 C11 C12 L5 C13 C14 C15 L6 C16 C17
R=350'
Δ=43°07'49" L=263.47'
R=370' Δ=43°48'55" L=282.95'

R=36'(17)
Δ=74°20'15"
L=46.71'
S52°51'07"E(R)
R=25' Δ=42°27'49" L=18.53'
N69°01'19"E 0.79'(17)
N20°58'41"W 42.00'(17)
N69°01'19"E 105.54'(17)

R=25' Δ=83°27'30" L=36.42'
N14°30'39"W 8.06'
R=370' Δ=14°38'36" L=94.56'
40' I.O.D.
12.5' P.U.E.
R=330' Δ=11°23'49" L=65.64'
N17°45'26"W 10.61'
R=20' Δ=92°20'04" L=32.23'
R=511' Δ=00°33'38" L=5.00'
N14°51'44"W 40.00'(R)
R=551' Δ=00°53'15" L=8.53'
R=20' Δ=88°16'57" L=30.82'
R=280' Δ=14°35'54" L=71.34'

R=25'
Δ=83°31'58"
L=36.45'
S75°29'21"W(R)
N01°17'49"W 8.75'
S75°29'21"W(R)
R=330'
Δ=14°38'36"
L=84.34'
R=370'
Δ=11°23'49"
L=73.60'
N17°45'26"W 89.35'
23' D.E.
12.5' P.U.E.
R=320'
Δ=14°53'18"
L=83.15'
R=380'
Δ=14°40'20"
L=97.31'
Δ=00°24'10"
L=5.47'
R=25'
Δ=93°23'33"
L=40.75'
Δ=11°06'02"
L=150.73'
R=420.00' Δ=14°13'49" L=104.31'
S72°54'03"W(R)
N05°43'52"W 4.93'
N17°45'26"W 2.18'
R=25.' Δ=93°46'09" L=40.91'

N21°52'18"W 185.52'(17)
N71°24'52"E 223.43'(17)
180.36'
N35°55'13"W(17) 107.02'
20.03'
20' S.A.S.D. EASEMENT BY SEPARATE DOCUMENT
23.04'
N21°52'18"W 513.72'
N21°52'18"W 284.56'
N21°52'18"W 275.50'
N21°52'18"W 279.28'

LOT R
2.87± AC(G)
2.38± AC(N)

LOT O
L.E./P.E./P.U.E.
6,886± SF

N89°15'36"E(17) 53.00'
25.01'
N89°54'52"W 284.19'(17)
N00°44'24"W 162.05'
37.00'
16.00'
10' T.E(18)
6.01'
4.00'
130.68'
183.18'
N00°44'24"W 1738.72'(CL)(OA)
N00°44'24"W 833.66'(17)
N00°44'24"W 1741.58'(OA)(7)(12)
(N00°45'00"W 1741.64')(5)
(N00°22'11"W 1740.95')(3)
EAST LINE FRACTIONAL SEC. 8
RANCHO CORDOVA PARKWAY

12' L.E./P.E.
51.5' I.O.D.
152.23'
R=31'
Δ=90°00'00"
L=48.69'
N89°15'36"E 158.23'
N83°26'03"W 48.55'
21.50'
57.5' I.O.D.
29.00'
N89°15'36"E 77.20'
18' P.U.E.
N89°15'36"E 72.00'
N00°44'24"W 50.50'(OA)
N00°44'24"W 7.00'
N89°15'36"E 80.00'
N00°44'24"W 6.00'

R=521.50'
Δ=31°41'49" L=288.50'
R=478.50'
Δ=26°02'42" L=217.51'
S06°23'31"E(R)
R=821'
Δ=00°56'25"
L=13.47'
S31°29'48"E(R)
43' I.O.D.

LOT S

LOT M

LOT N

20060106 O.R. 2233

LOT C

N14°23'20"W 5.00'(R)
N20°59'27"W 5.00'(R)
Δ=57°56'46"
L=25.28'
LOT S
Δ=28°49'14"
L=12.58'
R=25'
Δ=86°46'00"
L=37.86'
S78°56'13"E(R) R=25'
N19°32'31"W(R) R=838
N17°45'26"W 5.00'
R=25'
Δ=86°37'54"
L=37.80'
N17°45'26"W 5.12'
N72°14'34"E 48.00'

DETAIL A
NOT TO SCALE

N
0 50 100 200
SCALE: 1"=100'

2
SEE SHEET 5

4
13.80± AC(G)
9.76± AC(N)

R=225'
Δ=44°42'12" L=175.55'
43' I.O.D.
11' P.E./L.E.
23.5 P.U.E.
R=778'
Δ=52°19'03" L=710.40'
R=821'
Δ=52°43'06" L=755.41'

LOT C
SEE SHEET 5

LOT D
SEE SHEET 13

SEE DETAIL "A" THIS SHEET

N20°56'01"W 4.00'(R)

CAMBERY DRIVE

COBBLE BROOK DRIVE

5
SEE SHEET 7

SACRAMENTO VALLEY CONSERVANCY
20080319 O.R. 1128

LINE TABLE(1)

#	BEARING	LENGTH
L1	N00°44'24"W	10.00'
L2	N89°15'36"E	40.00'
L3	N00°44'24"W	13.73'
L4	N75°41'03"W(R)	40.00'
L5	N87°44'40"W(R)	40.00'
L6	N07°17'03"W(R)	20.00'

CURVE TABLE(1)

#	RADIUS	DELTA	LENGTH
C1	785'	05°17'50"	72.58'
C2	20'	92°34'58"	32.32'
C3	20'	82°36'01"	28.83'
C4	785'	12°17'15"	168.35'
C5	20'	93°02'35"	32.48'
C6	230'	02°29'29"	10.00'
C7	270'	04°07'23"	19.43'
C8	20'	82°52'14"	28.93'
C9	785'	10°16'39"	140.81'
C10	330'	14°35'59"	84.09'
C11	20'	106°29'58"	37.18'
C12	230'	02°29'29"	10.00'
C13	270'	04°59'31"	23.52'
C14	20'	90°57'48"	31.75'
C15	330'	13°34'07"	78.15'
C16	25'	46°12'05"	20.16'
C17	36'	00°38'02"	0.40'

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

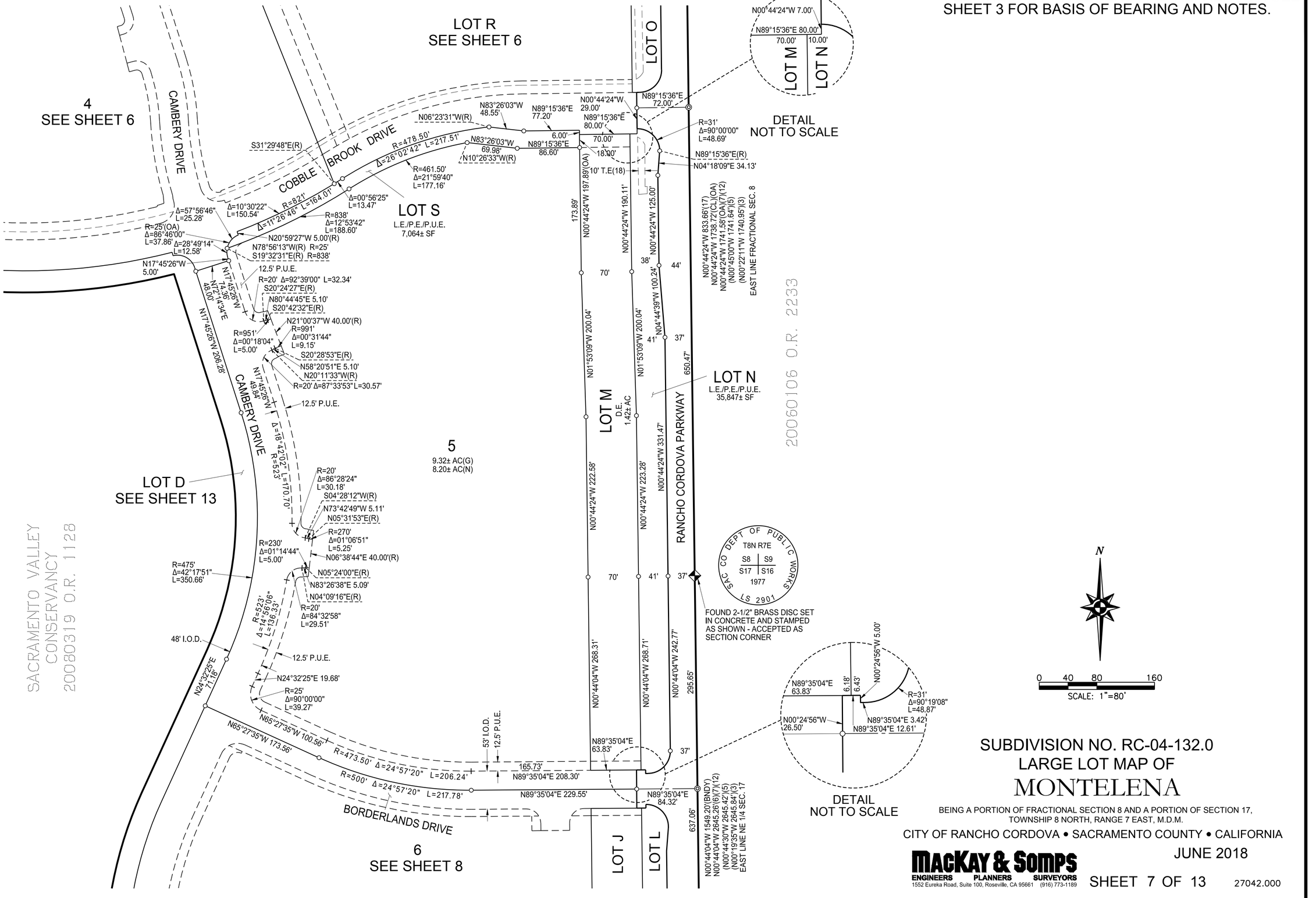
MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

JUNE 2018

SHEET 6 OF 13

27042.000

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.



SACRAMENTO VALLEY CONSERVANCY 20080319 O.R. 1128

20060106 O.R. 2233

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 7 OF 13 27042.000

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.

20060106 O.R. 2233

12 R.S. 39

FOUND T-BAR W/TAG "RCE 7543" ON SECTION LINE HELD AS NW'LY CORNER 12 R.S. 39

RANCHO CORDOVA PARKWAY

N00°44'04"W 1549.20'(OA)

637.06'

1253.15'

37'

S85°28'49"E(R)

295.65'

R=31' Δ=94°56'07" L=51.36'

N04°31'11"E 31.29'

N00°44'04"W 125.00'

N04°44'19"W 100.24'

N00°44'04"W 445.20'

N00°44'04"W 616.50' (616.12')(3)

N02°42'00"E 250.45'

S78°59'14"E(R) Δ=11°44'50" L=6.36'

N00°44'04"W 170.00'

R=31'(OA) Δ=90°35'14" L=49.01'

N89°47'10"E 30.09'(TIE)

FOUND 1/2" IRON PIN NO TAG

Δ=78°50'24" L=42.66'

24.35'

N00°44'04"W 616.50'(OA)

616.09'

0.41'

N89°47'10"E 30.09'(TIE)

DETAIL NOT TO SCALE

N89°51'10"E 1656.02' ℄ (OA)

N89°51'16"E 1000.03'(BNDY)(OA)

84.32'

N00°24'56"W 5.00'(R)

6.14'

N89°35'04"E 9.89'

N89°35'04"E 12.61'

6.47'

N00°24'56"W 26.50'

N89°35'04"E 63.53'

N00°44'04"W 610.49'

LOT L 40,960± SF L.E./P.E./P.U.E.

S86°25'13"W(R)

N86°22'49"E(R)

R=2078' Δ=02°50'43" L=103.20'

N00°24'15"E 200.50'

R=1908' Δ=02°53'07" L=96.09'

N00°44'04"W 145.64'

S00°08'50"E(R)

LOT J D.E. 3.18± AC

N00°44'04"W 33.50'

N00°44'04"W 842.76'

N00°58'06"E 168.36'

R=20' Δ=90°19'08" L=31.53'

N00°44'04"W 10.00'

N89°15'56"E 40.00'

N00°44'04"W 10.45'

R=35' Δ=90°35'14" L=55.34'

N89°51'10"E 75.58'

N89°51'10"E 218.87'(OA) 194.52'

N89°51'10"E 125.00'

N84°14'27"W 29.15'

48'

R=230' Δ=02°00'16" L=8.05'

N84°42'36"E 67.06'

N84°42'36"E 100.40'

N89°35'04"E 313.88'(OA)

N89°35'04"E 229.55'

N89°35'04"E 76.13'

R=20' Δ=89°40'52" L=31.30'

53' I.O.D.

10' L.E./P.E./ P.U.E.

5 SEE SHEET 7

6 18.08± AC(G) 16.03± AC(N)

BORDERLANDS DRIVE

R=500' Δ=24°57'20" L=217.78'

R=526.50' Δ=24°57'20" L=229.32'

N87°50'54"E 248.55'

N89°16'47"E 98.88'

N89°16'47"E 100.00'

38'

924.05'

PARCEL C 31 P.M. 37

LOT K L.E./P.E./P.U.E. 20,194± SF

R=270' Δ=02°00'16" L=9.45'

LOT J D.E.

N89°51'10"E 340.17'

N89°51'10"E 459.14'

N89°51'10"E 434.77'

CHRYSANTHY BOULEVARD

N89°51'16"E 1000.03'(OA) (S89°45'22"E 1000.06')(3)

N89°51'10"E 1656.02'(CL)(OA)

N00°08'50"W 5.00'(R)

N00°08'50"W 1.00'

Δ=11°32'13" L=5.03'

Δ=78°27'47" L=34.24'

R=25' Δ=90°00'00" L=39.27'

N89°51'10"E 26.50'

N78°18'57"E(R)

DETAIL NOT TO SCALE

N65°27'35"W 173.56'

N65°27'35"W 100.56'

R=25' Δ=90°00'00" L=39.27'

N24°32'25"E 94.98'

Δ=25°16'28" R=477' L=210.42'

N24°32'25"E 146.48'

R=525' Δ=25°16'28" L=231.59'

12.5' P.U.E.

N00°44'04"W 92.27'

R=20' Δ=90°00'00" L=31.42'

S00°44'04"E(R)

N79°25'28"W 5.10'

N89°15'56"E 5.00'

N00°44'04"W 40.00'

N89°15'56"E 5.00'

N77°57'21"E 5.10'

N00°44'04"W(R)

R=20' Δ=90°00'00" L=31.42'

N00°44'04"W 127.81'

R=523' Δ=15°15'07" L=139.22'

R=20' Δ=90°01'09" L=31.42'

S14°29'54"W(R)

N64°50'31"W 5.11'

S13°14'51"W(R)

R=230' Δ=01°14'24" L=4.98'

N12°00'27"E 40.00'(R)

R=270' Δ=02°39'48" L=12.55'

S14°40'15"W(R)

N86°07'49"W 5.09'

N15°43'41"E(R)

R=20' Δ=82°31'55" L=28.81'

CAMBERY DRIVE

N00°44'04"W 302.08'

48' I.O.D.

R=475' Δ=05°19'30" L=44.15'

R=523' Δ=07°50'12" L=71.53'

R=473.50' Δ=30°04'05" L=248.49'

R=469' Δ=26°02'17" L=213.14'

54' I.O.D.

R=527.50' Δ=31°10'49" L=287.06'

R=20' Δ=91°06'44" L=31.80'

S00°08'50"E(R)

N78°47'49"W 5.08'

N89°51'10"E 5.00'

N00°08'50"W 40.00'

N89°51'10"E 5.07'

N78°32'34"E 5.10'

N00°08'50"W(R)

R=20' Δ=90°00'00" L=31.42'

N00°08'50"W 47.00'

N89°51'10"E 54.00'

N00°08'50"W 120.20'

75.98'

LOT D SEE SHEET 13

SACRAMENTO VALLEY CONSERVANCY 20080319 O.R. 1128

LOT A SEE SHEET 11

LOT F

0.38'

69.38' TO BNDY.

69.00' TO ℄

DETAIL NOT TO SCALE

N

0 40 80 160

SCALE: 1"=80'

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 8 OF 13

27042.000

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.

PARCEL C
31 P.M. 37

SEE DETAIL "A"
SHEET 11

C 0.38' NORTH OF BNDY LINE

37.63' 25.00'

N00°44'04"W 1097.70'(OA)
1094.55' (1094.67')(3)

1035.07'

SOUTH LINE
OF PARCEL C
31 P.M. 37

SOUTH LINE
OF THE NE 1/4
OF SECTION 17

FOUND 5/8" REBAR
NO TAG 0.19' EAST
OF THE SOUTHEAST
CORNER PARCEL C

3.15'
(3.2±)(5)

LOT F
SEE SHEET 11

LOT G

CHRYSANTHY BOULEVARD

SEE SHEET 11

LOT I

N89°51'10"E 470.88'

38'

25' DRAINAGE EASEMENT
PER 20160113 O.R. 0698

12.5'
12.5'

229.61'

HARTLAND WAY

R=226'
Δ=05°28'15"
L=21.58'

R=186'
Δ=18°45'11"
L=60.88'

N00°14'22"W(R)
40.00'

N66°17'34"E(R)

22.01'
22.52'

R=20'
Δ=100°11'08"
L=34.97'

S60°49'19"W(R)

25' DRAINAGE EASEMENT
PER 20160113 O.R. 0698

R=226'
Δ=22°05'07"
L=87.11'

12.5' P.U.E

R=20'
Δ=83°08'48"
L=29.02'

N89°45'38"E 286.23'

12.5' P.U.E

MIRCADO WAY

N89°45'38"E 205.38'

40' I.O.D.

266.64'

N89°45'38"E 540.78'(OA)

7
11.76± AC(G)

N00°08'50"W 140.00'
100.00'

40.00'

N89°51'10"E 7.27'

N00°43'15"W 519.82'

N00°14'22"W
36.00'

N89°45'38"E
43.86'

12.5' P.U.E

12.5' P.U.E

40' I.O.D.

8
SEE SHEET 10

N00°14'22"W 100.00'

100.00'

40.00'

N00°14'22"W 140.00'(OA)

N89°45'38"E 14.80'

N00°14'22"W 100.00'

N89°45'38"E
0.84'

DETAIL
NOT TO SCALE

8 9 16 10 11 12 13 14 15 16 17

327 B.M. 10

N

0 30 60 120

SCALE: 1"=60'

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17,
TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 9 OF 13

27042.000

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.

LOT A
SEE SHEET 11

LOT I

N00°08'50"W 140.00'
100.00'
40.00'
N89°51'10"E 7.27'
12.5' P.U.E
79.80'
N89°51'10"E 170.75'
38'
38'
N89°51'10"E 1656.02'(OA)

7
SEE SHEET 9

N00°43'15"W 519.82'

N00°14'22"W
36.00'
N89°45'38"E
43.86'
N00°14'22"W
100.00'
MIRCADO WAY
12.5' P.U.E
40' I.O.D.
12.5' P.U.E
100.00'
40.00'
N00°14'22"W
140.00'(OA)
N89°45'38"E 14.80'
N00°14'22"W
100.00'

R=20'
Δ=90°34'25"
L=31.62'
N89°16'45"E 40.00'(R)
3.67'
N00°43'15"W 0.80'
R=20'
Δ=89°25'35"
L=31.22'
12.5' P.U.E
12.5' P.U.E
40' I.O.D.

N89°45'38"E
0.84'

DETAIL
NOT TO SCALE

LOT F

CHRYSANTHY BOULEVARD

R=2000', Δ=07°53'58", L=413.61'
R=2937' Δ=07°53'58" L=404.93'
R=2837' Δ=07°53'58" L=391.14'
R=2797' Δ=07°53'58" L=385.63'

Δ=01°48'04"
L=62.87'
R=1937'
Δ=00°48'56"
L=27.57'
N09°50'53"W
73.81'

SEE DETAIL "A"
THIS SHEET

8
27.79± AC(G)

LOT H
L.E./P.E./P.U.E.
16,015± SF
25'

LOT G
SEE SHEET 11

LOT E
SEE SHEET 12

R=2000', Δ=19°16'49" L=673.00'
Δ=21°04'53" L=735.88'
R=1962' Δ=18°13'12" L=623.91'
R=1937' Δ=19°20'59" L=654.15'

3/4" I.P. W/ PLASTIC CAP
STAMPED LS 6046(6)
N29°07'41"W(R)
N29°43'47"W(R)
N30°08'26"W(R)
28.64'
43.32'

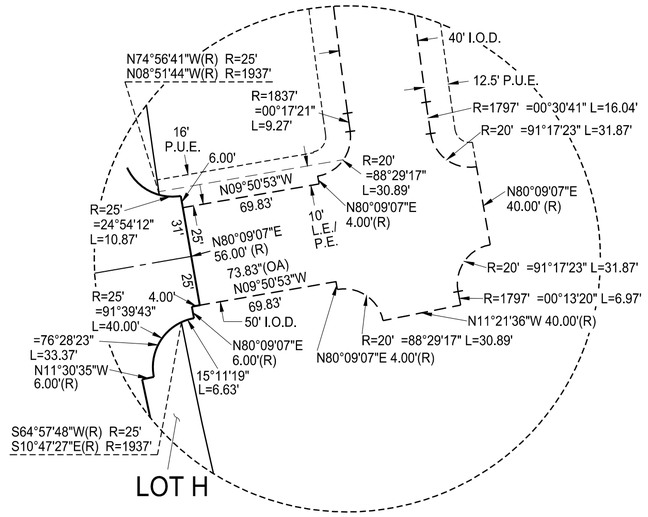
768.99'
N00°43'51"W 2644.73' (OA)(6)

FOUND 5/8"
REBAR NO TAG (5)
2' SOUTH OF
BARBED WIRE
FENCE INTX

710.00'
1209.37'(OA)
N89°45'38"E 1750.15'(OA)
499.37'

15 16 17 18 19 20 21 22 23 24 25 26 27
153 152 151 82 81 80 79 73 74 75
269 270 271 272 273 274 275 126 127 128 129 130 131 132 133 134 135 136 71 72

327 B.M. 10
324 B.M. 10
324 B.M. 12
324 B.M. 11



DETAIL A
NOT TO SCALE

N

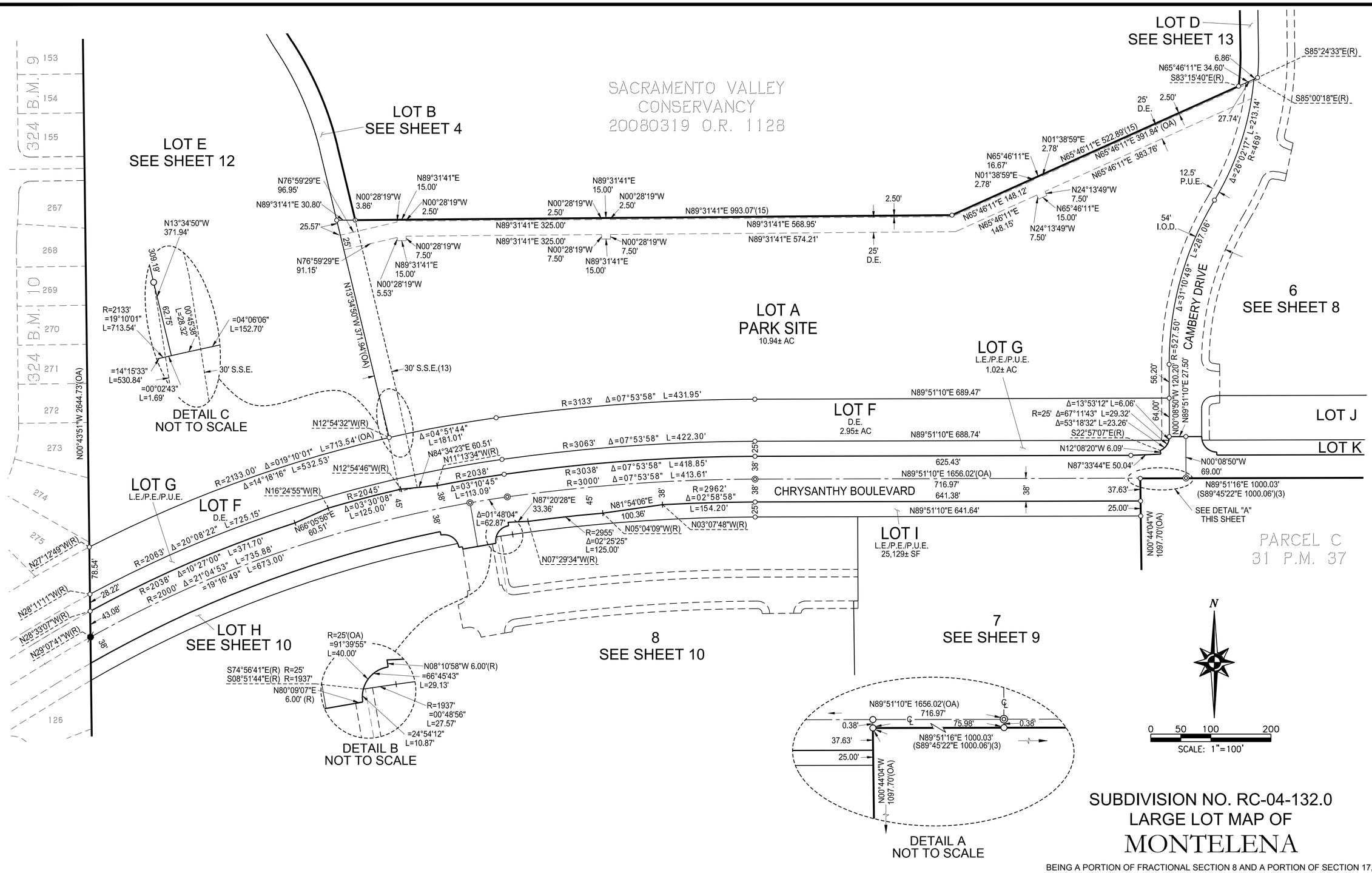
0 50 100 200
SCALE: 1"=100'

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17,
TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.
CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA
JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 10 OF 13 27042.000



SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.

LOT A
SEE SHEET 11

SEE DETAIL C
ON SHEET 11

8
SEE SHEET 10

SACRAMENTO VALLEY
CONSERVANCY
20080319 O.R. 1128

LOT B
SEE SHEET 4

N13°34'50"W 491.21'

N12°54'32"W(R)

R=525' Δ=19°41'16" L=180.40'

30' S.S.E.(13)

LOT B

R=475' Δ=36°19'36" L=301.16'

R=275'
Δ=27°50'55"
L=133.66'

S26°31'6"E(R) R=506.50'
N65°12'36"E(R) R=275'

LOT E
D.E.
9.49± AC

R=506.50' Δ=25°47'15" L=227.96'

20' L.E./P.E./P.U.E.

COBBLE BROOK DRIVE

SEE SHEET 4

LOT H SEE SHEET 10

CHRYSANTHY BOULEVARD

R=2133' Δ=14°18'16" L=532.53'

LOT F

LOT G SEE SHEET 11

SEE SHEET 11

3/4" I.P. WITH PLUG
STAMPED LS 6600

1187.56'(OA)

N27°12'49"W (R)

21.00'

N85°35'19"W 5.58'

557.64'

629.92'

N00°43'51"W 2644.73'(OA)(6)
N00°44'30"W 2644.54'(5)

36 137 138 150 151 152 153 154 155 267 268 269 270 271 272 273 274

324 B.M. 9

324 B.M. 10

DAISY BLOSSOM WAY

N

0 30 60 120
SCALE: 1"=60'

SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17,
TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

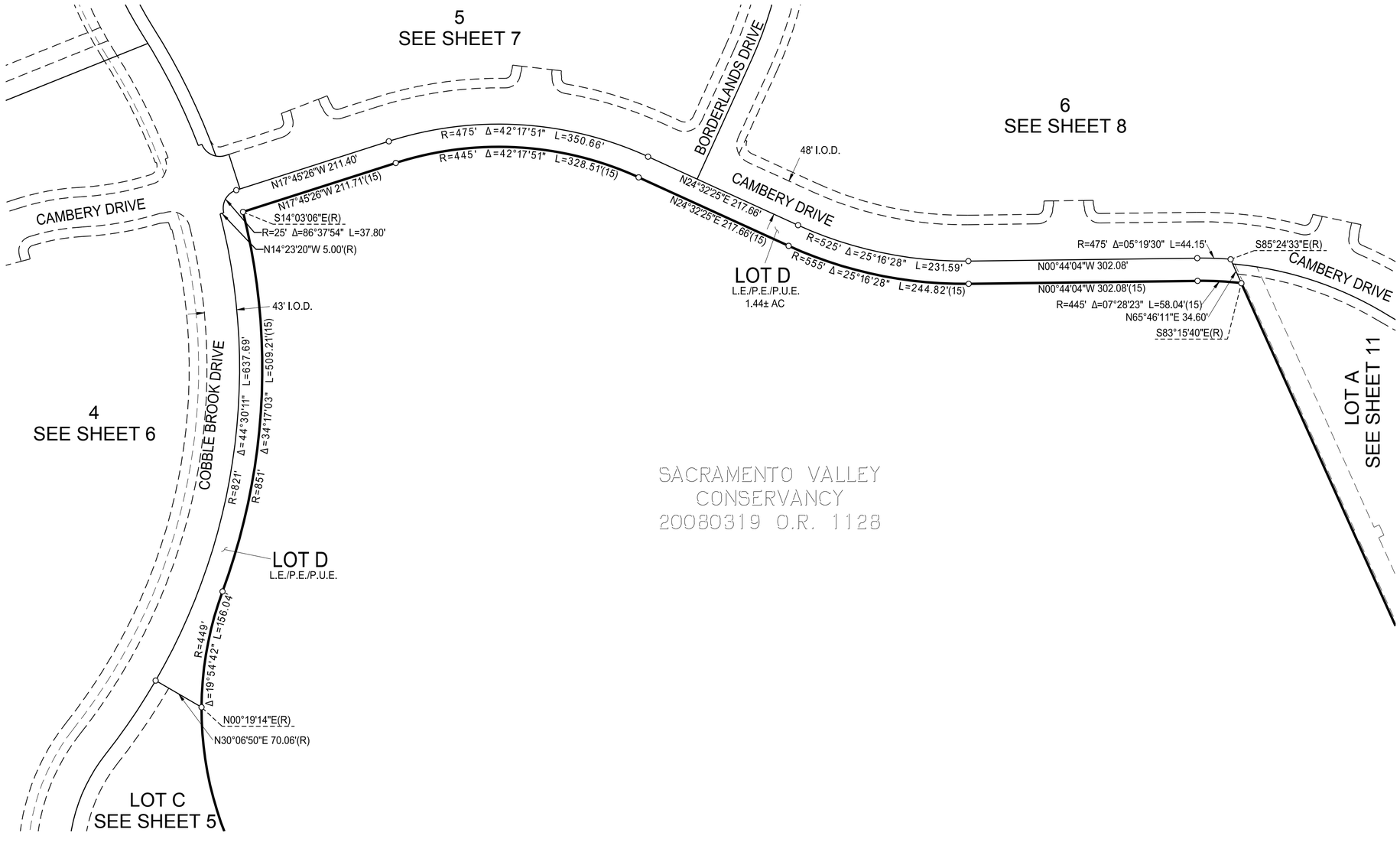
JUNE 2018

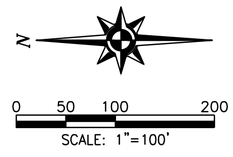
MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 12 OF 13

27042.000

SEE SHEET 2 FOR LEGEND AND REFRENCES. SEE SHEET 3 FOR BASIS OF BEARING AND NOTES.





SUBDIVISION NO. RC-04-132.0
LARGE LOT MAP OF
MONTELENA

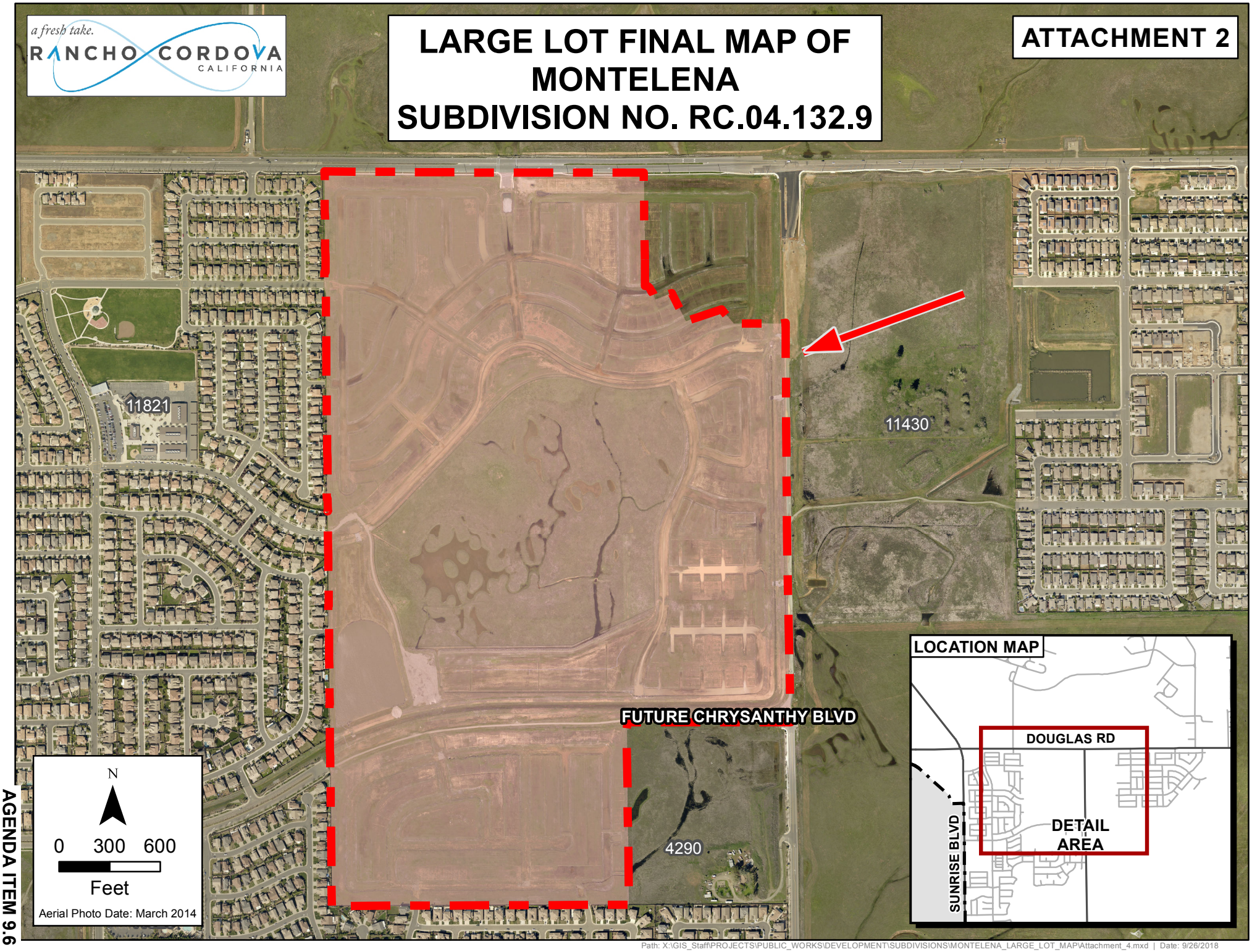
BEING A PORTION OF FRACTIONAL SECTION 8 AND A PORTION OF SECTION 17, TOWNSHIP 8 NORTH, RANGE 7 EAST, M.D.M.

CITY OF RANCHO CORDOVA • SACRAMENTO COUNTY • CALIFORNIA

JUNE 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

SHEET 13 OF 13 27042.000



Path: X:\GIS_Staff\PROJECTS\PUBLIC_WORKS\DEVELOPMENT\SUBDIVISIONS\MONTELENA_LARGE_LOT_MAP\Attachment_4.mxd | Date: 9/26/2018

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Elizabeth Sparkman, Community Development Director

SUBJECT: **FIRST AMENDMENT TO THE DEVELOPMENT AGREEMENT RELATIVE TO ANTHOLOGY AT ANATOLIA**

RECOMMENDATION

Introduce and waive the first reading of the Ordinance.

RESULT OF RECOMMENDED ACTION

Adoption of the Ordinance would approve a first amendment to the Development Agreement relative to the Anthology at Anatolia residential project to adjust the park development and park renovation fees to current rates and extend the agreement term to December 31, 2028.

BACKGROUND

The Development Agreement for the Anthology at Anatolia project was originally executed by and between the City and CH (ANATOLIA I) Relative to Anthology at Anatolia. The original Development Agreement was recorded against the property on August 23, 2006. This project for the construction of the remaining 102 single family homes located in the Sunridge Specific Plan has recently be purchased by D. R. Horton CA2, Inc. In November of 2013, the City updated the parks and open space standards.

The purpose of this First Amendment to the Development Agreement relative to Anthology at Anatolia is to adjust the park development and park renovation fees to reflect the fee levels associated with the revised standards and to extend the term to December 2028.

FISCAL IMPACT

There is no impact to the general fund.

ATTACHMENTS

1. Ordinance
2. First Amendment to the Development Agreement

DRAFT

ATTACHMENT 1

CITY OF RANCHO CORDOVA

ORDINANCE NO. XX-2018

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, APPROVING THE FIRST AMENDMENT TO THE DEVELOPMENT AGREEMENT RELATIVE TO ANTHOLOGY AT ANATOLIA

THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA DOES ORDAIN AS FOLLOWS:

Section 1. Purpose and Declarations.

WHEREAS, in order to strengthen the public planning process, encourage private participation in comprehensive planning and reduce the economic risk of development, the Legislature of the State of California adopted Section 65864, *et seq.*, of the Government Code (the "Development Agreement Statute"), authorizing the City, and any person having a legal or equitable interest in the real property, to enter into a development agreement and establish certain development rights in the property, which is the subject of the development project application. Pursuant to Government Code section 65868, Development Agreements may be amended by mutual assent of the parties; and

WHEREAS, in July 2006, the City and CH (ANATOLIA I) entered into a Development Agreement for the Anthology at Anatolia Project, consisting of residential development (Ordinance Number 39-2006); and

WHEREAS, the Anthology at Anatolia Project is within the SunRidge Specific Plan ("SDCP/SRSP") area. The SDCP/SRSP was approved by the County of Sacramento ("County") in July 2002. The County also prepared and certified an Environmental Impact Report ("EIR") (State Clearinghouse Number 97022055) for the SDCP/SRSP. In July 2003, the City of Rancho Cordova incorporated an area that included the SDCP and SRSP. In response to litigation involving the SDCP/SRSP EIR, the City subsequently rescinded approval of the SDCP/SRSP, yet the court held that the SDCP/SRSP is still in effect for projects that were already vested through a development agreement, such as this one. The Court and City allowed projects with development agreements to develop consistent with the Specific Plan which utilized County standards. On November 7, 2012, the City certified a partially Revised EIR for the SDCP/SRSP, however, at that time the City determined to carry out the projects within the SDCP/SRSP area without re-approving the SDCP/SRSP; and

WHEREAS, the Anthology at Anatolia project was analyzed within an earlier adopted Mitigated Negative Declaration (State Clearinghouse Number 2003042004) for Anatolia I, II and III by County of Sacramento Board of Supervisors in March 2003. Within the study of the environmental issues, aesthetics of the new development were identified and the implementation of the adopted design guidelines for the SunRidge Specific Plan, reduced the negative impacts of poor design to less than significant.

WHEREAS, in the previously adopted MND, the City concluded that the Project would not have a significant impact on the environment due to the mitigation measures adopted by the County in the SDCP/SRSP EIR and the MND. All environmental impacts were reviewed and addressed at the time the Project was approved. All recitals and findings of determination in Ordinance 39-2006, which adopted the Development Agreement, are still accurate and relevant to the Amendment; and these amendments, which will result in adjusted park fees and an

extension of the term of the Agreement, will not result in any new or significant impacts that were not previously identified and on this basis there is not substantial evidence that the project amendments will have a significant adverse impact on the environment; and

WHEREAS, pursuant to Government Code section 65868, City and Landowner, D.R. Horton CA2, Inc., now desire to modify the Development Agreement to reflect certain modifications to the obligations of the Landowner to pay certain fees for park renovations to existing City parks and improvements at new City parks, and to extend the term by ten (10) years, all as more fully set forth in the attached Development Agreement Amendment; and

WHEREAS, the City Council is the appropriate authority to hear and take action on this project; and

WHEREAS, the City Council of the City of Rancho Cordova has conducted a properly noticed public hearing pursuant to Government Code Section 65090 and has duly considered all written and verbal testimony presented during the hearing.

Section 2. Findings

The City Council hereby finds that:

A. **CEQA Compliance.** The Anthology at Anatolia Project is within the SunRidge Specific Plan ("SDCP/SRSP") area. The SDCP/SRSP was approved by the County of Sacramento ("County") in July 2002. The County also prepared and certified an Environmental Impact Report ("EIR") (State Clearinghouse Number 97022055) for the SDCP/SRSP. In July 2003, the City of Rancho Cordova incorporated an area that included the SDCP and SRSP. In response to litigation involving the SDCP/SRSP EIR, the City subsequently rescinded approval of the SDCP/SRSP, yet the court held that the SDCP/SRSP is still in effect for projects that were already vested through a development agreement, such as this one. The Court and City allowed projects with development agreements to develop consistent with the Specific Plan which utilized County standards. On November 7, 2012, the City certified a partially Revised EIR for the SDCP/SRSP, however, at that time the City determined to carry out the projects within the SDCP/SRSP area without re-approving the SDCP/SRSP. Additionally, in March, 2003, the County of Sacramento Board of Supervisors adopted the Mitigated Negative Declaration (State Clearinghouse Number 2003042004) for Anatolia I, II and III projects. The changes to the Development Agreement being made through this First Amendment do not require further CEQA review as they address park fees and the term of the Agreement only and do not contain any changes to the physical size or scope of the project that could result in any significant adverse impacts to the environment; and as such further CEQA review is exempt under CEQA Regulation section 15378 as the First Amendment does not meet the definition of a Project and pursuant to CEQA Regulation Section 15162-15164, as an EIR has been adopted for this Project and none of the conditions requiring a subsequent EIR, negative declaration, supplement to the EIR, or an addendum to the EIR have been met.

B. **Required Findings.** The attached Development Agreement Amendment is consistent with the following additional findings, as required by State law and Chapter 23.158 of the Rancho Cordova Municipal Code:

(1) The development agreement is consistent with the General Plan objectives, policies, land uses, and implementation programs and any other applicable Specific Plans.

The Development Agreement Amendment is consistent with the objectives, policies, general land uses and programs specified and contained in the City's General Plan, and in the Sunridge Specific Plan in that (a) the land use designation for the Anthology at Anatolia I site allows for the development of single family residential homes and the proposed project is to create 118 single family lots consistent with that land use, (b) the project is consistent with the fiscal policies of the General Plan and the Sunridge Specific Plan with respect to provision of infrastructure and public services, and (c) the Development Agreement and Amendment include provisions relating to financing, construction and maintenance of public facilities, park development fees and similar provisions set forth in the Sunridge Specific Plan.

(2) The Development Agreement Amendment is in conformance with the public convenience and general welfare of persons residing in the immediate area and will not be detrimental or injurious to property or persons in the general neighborhood or to the general welfare of the residents of the city as a whole.

The Development Agreement Amendment is in conformity with public convenience and general welfare of people residing in the immediate area and won't be detrimental or injurious to the property or people in the area or the city as a whole in that the Anthology at Anatolia I Project will implement land use guidelines set forth in the Sunridge Specific Plan and the General Plan, which have planned for residential uses at this location.

(3) The development agreement will promote the orderly development of property or the preservation of property values.

As described above, the Development Agreement and the project it allows for, including the amendments being made, are entirely consistent with the General Plan and Specific Plan for this site and therefore the development agreement promotes the orderly development of property as well as the preservation of property values, as area properties and their values would be, in part, based on this exact use occurring on this site in the future.

(4) The development agreement does not pertain to any property in the protected 200-year floodplain, unless the development agreement contains conditions that will provide an urban level of protection to the property consistent with California Government Code Section 65865.5.

The Development Agreement, including amendments being made, does not pertain to any property in the protected 200-year floodplain.

Section 3. Approval of the Development Agreement Amendment

The City Council hereby approves the Development Agreement Amendment, attached to this Ordinance and incorporated herein by reference as **Exhibit 1A**, and authorizes the City Manager to sign the Development Agreement Amendment after the effective date of this Ordinance.

Section 4. Severability

If any provision of this Ordinance or the application thereof to any person or circumstance, is held invalid, the remainder of the Ordinance, including the application of such part or provision to other persons or circumstances shall not be affected thereby and shall continue in full force and effect. To this end, provisions of this Ordinance are severable. The City Council hereby

DRAFT

ATTACHMENT 1

declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase hereof irrespective of the fact that any one or more sections, subsections, subdivisions, paragraphs, sentences, clauses, or phrases be held unconstitutional, invalid or unenforceable.

Section 5. Effective Date

Within fifteen (15) days after adoption, a Summary of this Ordinance shall be published once in the Grapevine Independent, or the Sacramento Bee, a newspaper of general circulation printed and published in Sacramento County and circulated in the City of Rancho Cordova, in accordance with Government Code Section 36933. This Ordinance shall take effect and be enforced thirty (30) days after its inception.

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the ____ day of _____ 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

3065879.1

DRAFT **ATTACHMENT 2**

OFFICIAL BUSINESS
Document entitled to free recording
Government Code Section 6103

RECORDING REQUESTED BY AND
WHEN RECORDED, MAIL TO:

City of Rancho Cordova
2729 Prospect Park Drive
Rancho Cordova, CA 95670
Attn: City Clerk

(SPACE ABOVE THIS LINE RESERVED FOR RECORDER'S USE)

FIRST AMENDMENT TO DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF RANCHO CORDOVA AND CH (ANATOLIA I), LP RELATIVE TO ANTHOLOGY AT ANATOLIA

This First Amendment to Development Agreement ("**Amendment**") is entered into this _____ day of _____, 2018, by and between the **CITY OF RANCHO CORDOVA**, a municipal corporation ("**City**"), and **D.R. HORTON CA2, Inc.**, a California corporation ("**Landowner**"). City and Landowner are hereinafter collectively referred to as the "**Parties**."

RECITALS

A. City and CH (ANATOLIA 1), LP entered into that certain Development Agreement dated JULY 5, 2006 ("**Agreement**" or **"Development Agreement"**) recorded on August 23, 2006, in the Office of the Sacramento County Recorder in Book 20060823, Page 2347, Official Records, which established certain development rights in certain real property located in the City of Rancho Cordova, California, as more particularly described in **Exhibit A-1**, **Exhibit A-2**, and **Exhibit A-3** of the Agreement (the "**Property**").

B. Following foreclosure of that certain Deed of Trust and Assignment of Rents securing a loan from Exchange Bank, recorded on June 24, 2005 in Book 20050624, Page 1536 of the Official Records of Sacramento County, the Property was transferred by Trustees Deed Upon Sale to Exchange Bank that was recorded on January 20, 2009, in the Official Records of Sacramento County, California, in Book 20090120, Page 0470.

C. The Property was again transferred through a Grant Deed from Exchange Bank to Joseph Mohamed Sr. and Shirley M. Mohamed that was recorded on April 28, 2009 in the Official Records of Sacramento County, California, in Book 20090428, Page 1305, and ultimately conveyed to Mohammed by Correctory Grant Deed that was recorded on May 23, 2017, in the Official Records of Sacramento County, California, in Book 20170523, Page 0857.

D. Joseph Mohamed Sr. and Shirley M. Mohamed Charitable Remainder Unitrust II conveyed the Property and Agreement to D.R. HORTON CA2, INC. via a grant deed recorded in the Office of the Sacramento County Recorder in Book 20180731, Page 0959, Official Records, and these parties also executed an Assignment and Assumption Agreement Relative to Anthology at Anatolia ("Assignment and Assumption Agreement") which assigned all rights and obligations under the Development Agreement to D.R. HORTON CA2, INC. and was recorded on July 31, 2018, in the Official Records of Sacramento County, California, in Book 20180731, Page 0960.

E. Pursuant to Government Code section 65868, City and Landowner now desire to modify and amend the Development Agreement to reflect the change in ownership of the Property and to reflect certain changes to Landowner's obligations to pay certain fees for park renovations at existing City parks and improvements at new City parks, and to make other revisions, all as more fully set forth below in this Amendment.

F. This Amendment amends certain provisions of the Agreement applicable to the entire Property, and was adopted by City Ordinance No. ___-2018 on _____, 2018. All capitalized terms used in this Amendment shall have the same meaning as set forth in the Agreement.

NOW, THEREFORE, in consideration of the foregoing recitals and the mutual covenants contained herein, the Parties hereby agree to amend the Agreement as follows:

AGREEMENT

1. Incorporation of Recitals. Recitals A through F are hereby incorporated herein, including the documents referenced in the Recitals.

2. Amendment of title of Agreement to reflect new Landowner. City and Landowner agree that the Agreement title is hereby amended to read as follows:

"DEVELOPMENT AGREEMENT BY AND BETWEEN CITY OF RANCHO CORDOVA AND D.R. HORTON CA2, INC. AS LANDOWNERS RELATIVE TO ANTHOLOGY AT ANATOLIA"

3. Additional amendments to reflect new Landowner. City and Landowner hereby agree that any and all references in the Agreement to "Landowner" shall mean, as of the date of this First Amendment, D.R. HORTON CA2, INC.

4. Amendment of Section 6 of the Recitals Concerning "Project Approvals." City and Landowner agree that Section 6.6 of the Recitals of the Agreement is hereby amended and restated to read as follows:

"**6.6** This Development Agreement, as adopted on July 5, 2006, by City Ordinance No. 39-2006 (the "**Adopting Ordinance**") as amended on _____, 2018 by City Ordinance No. __-2018 adopting the First Amendment to the Development Agreement."

5. **Amendment to Section 28 of Agreement, "Notices."** City and Landowner agree that the last portion of Section 28, "Notices," related to Landowner notice information on the top of page 17 shall be amended to read as follows:

"D.R. HORTON CA2, INC.

Attn: Forward Planning Department

2260 Douglas Boulevard, Suite 110

Roseville, CA 95661"

6. Amendment of Section 5.2 concerning the "Term." City and Landowner agree that Section 5.2 of the Agreement is hereby amended and restated to read as follows:

"**5.2 Term.** Upon the execution of the First Amendment, the term of this Agreement shall commence on the Effective Date and extend to December 31, 2028, unless said term is terminated, modified or extended by circumstances set forth in this Agreement. Following expiration of the term, this Agreement shall not affect any right or duty created by City approvals for the Property adopted prior to, concurrently with, or subsequent to the approval of this Agreement."

6. Amendment of Section 6.4.1 Concerning the "New Park Development Obligation." City and Landowner agree that Section 6.4.1 of the Agreement is hereby amended and restated to read as follows:

"6.4.1 Park Development Obligation.

(i) Dedication of Park Land, Open Space Land, and In Lieu Fee:

Landowner's obligation to dedicate park land pursuant to California Government Code Section 66477 (the "**Quimby Act**"), and and to dedicate open space land as required by the Rancho Cordova General Plan and Open Space Guidelines, to the Cordova Recreation and Park District (the "**Park District**") has been satisfied by Landowner's use of 2.44 acres of Quimby credits, granted for park land dedication within the Sunridge Specific Plan area pursuant to City of Rancho Cordova Municipal Code Chapter 22.40 and 22.40.045 in effect on the date of the original Development Agreement.

(ii) Park Development Impact Fee:

Landowner shall pay a park development impact fee for each single-family residential parcel or residential parcel equivalent on the Property to mitigate the costs for the Park District and the City to design, construct and install park improvements (the "**Park Development Impact Fee**"). The Park Development Impact Fee will be paid prior to issuance of each residential building permit within the Project. The Park Development Impact Fee will be Eleven Thousand One Hundred Twenty-nine Dollars and ninety-six cents ($11,129.96) for each single-family residential parcel or residential parcel equivalent. Of the Eleven Thousand One Hundred Twenty-nine Dollars and Ninety-six cents ($11,129.96) Park Development Impact Fee, Nine Thousand Seven Hundred Thirty-six Dollars and Sixty-four cents ($9,736.64) is for parks and One Thousand Three Hundred Ninety-three Dollars and thirty-two cents ($1,393.32) to the City is for neighborhood greens, trails, landscaping, community gathering places, and other type of open space improvements as determined appropriate by the City.

The Park Development Impact Fee shall be adjusted on January 1, 2019 and annually thereafter, no later than January 15th by the method provided in City Ordinance No. 05-2014 as follows:

(a) A "mean" index will be computed by averaging the index for 20 U.S. cities with the index for San Francisco by resort to the

most recent October issue of the Engineering News Record magazine Construction Cost Index.

(b) An adjustment factor shall be computed by dividing the "mean" index as calculated in subsection (a) of this Section by the "mean" index for the previous October.

(c) The adjusted Park Development Impact Fee shall be calculated by multiplying the adjustment factor, as calculated in subsection (b) of this Section, by the Park Development Impact Fee in place prior to the annual adjustment.

If and when the City adopts the Citywide Park Improvement Fee, or an Area-Wide Park Improvement Fee applicable to the Project, the Landowner and City agree to explore adjustments to the Park Development Impact Fee. Under no circumstances shall the Landowner be required to pay any new Citywide/ Area-Wide Park Improvement Fee in addition to the Park Development Impact Fee as set forth in this First Amendment."

5. Amendment of Section 6.4.3 Concerning the "In-fill Park and Open Space Renovation and Acquisition Fee." City and Landowner agree that Section 6.4.3 of the Agreement is hereby amended and restated to read as follows:

"6.4.3 In-fill Park and Open Space Renovation and Acquisition Fee. Landowner agrees that development of the Property shall be subject to the park renovation fee (the "Park Renovation Fee"). Landowner agrees that it shall pay City the total sum of One Thousand One Hundred Forty-three Dollars and Ninety-eight Cents ($1,143.98) for each residential parcel shown on the small lot final maps for the Property. Beginning January 1, 2019, the fee shall be adjusted annually on each January 1 based upon the percentage change in the United States Department of Labor Consumer Price Index for all Urban Consumers for the San Francisco-Oakland-San Jose area between August and August of each year. This fee shall be paid to City no later than prior to issuance of the building permit for each residential parcel for the Property. It shall be used by City, at its sole discretion, to acquire, renovate, repair, improve or maintain parks or open space in that portion of the City outlined in Exhibit C to the original Development Agreement. This payment is made voluntarily by Landowner. It is in addition to all other existing park fees, and construction and dedication obligations, including without limitation any fees paid pursuant to the Quimby Act. Landowner agrees that it shall not claim credit or right to reimbursement of any other existing park fees, and construction and dedication obligations, including Quimby Act fees, as a result of paying the Park Renovation Fee required under this Section 6.4.3. If and when the City reduces or eliminates the Park Renovation Fee on a Citywide basis (by adoption of a park tax, special sales tax or other measure), then the Park Renovation Fee under this Section 6.4.3 shall be automatically adjusted or eliminated to correspond to the new Citywide funding mechanism, provided that the Landowner does not challenge or oppose the approval or implementation of the new Citywide funding mechanism."

6. Deletion. City and Landowner agree that Section 10 of the Agreement is hereby deleted.

7. **All Other Terms in Force.** Except as amended by this Amendment, all terms and conditions of the Agreement remain in full force and effect.

8. **Recording.** Within ten (10) days after the Effective Date, City shall record this First Amendment with the Sacramento County Recorder's Office.

9. **Counterparts.** The Parties may execute this First Amendment in counterparts, each of which will be considered an original, but all of which will constitute the same instrument.

10. **Entire Agreement.** The Agreement and this First Amendment set forth the Parties' entire understanding regarding the matters set forth above. It supersedes all prior or contemporaneous agreements, representations, and negotiations regarding those matters (whether written, oral, express, or implied) and may be modified only by another written agreement signed by all Parties. This First Amendment will control if any conflict arises between it and the Agreement.

IN WITNESS WHEREOF, the City of Rancho Cordova, a municipal corporation, has authorized the execution of this Amendment in duplicate by its City Manager and attested to by its City Clerk under the authority of Ordinance No. __-2018, adopted by the Council of the City on the___ day of , 2018, and Landowner has caused this Amendment to be executed. This Ordinance shall take effect thirty (30) days after adoption.

"**CITY**"

CITY OF RANCHO CORDOVA,
a municipal corporation

By:_____

(Signatures continue on next page.)

Name:_____

Its:_____

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
Adam U. Lindgren
City Attorney

"**LANDOWNER**"

D.R. HORTON CA2, INC.,
a California corporation

By:_____

Name:_____

Its: _____

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Elizabeth Sparkman, Community Development Director
Jeanette Cervantes, Management Technician

SUBJECT: **A RESOLUTION DECLARING A PROTEST HEARING AND AUTHORIZING THE MAILING OF PROPERTY OWNER BALLOT RELATING TO THE IMPOSITION OF AN ANNUAL STORMWATER UTILITY FEE FOR THE EUROPEAN PARTS DEPOT PROJECT**

RECOMMENDATION

Adopt the Resolution.

RESULT OF RECOMMENDED ACTION

Adoption of the Resolution will declare the results of the property owner protest and, if there exists less than a majority protest, authorize the mailing of a ballot to the property owner to approve the levy of the fee to pay for maintenance of storm drainage and flood protection systems for the European Parts Depot project. The action also sets 1:30 p.m. on November 8, 2018 in the office of the City Clerk, as the time and date for the ballot tabulation for the matter.

BACKGROUND

The European Parts Depot project has a condition of approval which requires funding for operation and maintenance of the storm drainage system. This condition will be satisfied by the participation in the new Stormwater Utility Fee for storm drainage and flood protection services which is the subject of tonight's action.

The property owner of the European Parts Depot project has requested the City annex the project to the City's Stormwater Utility Fee pursuant to the California Health and Safety Code Section 5471 et seq. to provide the method of financing for the storm drainage and flood protection services required to meet the condition.

On October 1, 2018 Council adopted a Resolution which established Procedures for the Conduct of a Protest Hearing and Balloting Relating to a Stormwater Utility Fee (the "Procedures") and designated October 15, 2018 at 5:30 p.m. as the time and place for hearing protests in connection with the annual Stormwater Utility Fee for the European Parts Depot project.

DISCUSSION

The property owner has submitted a petition and waiver for the City to institute the proceedings to participate in the Stormwater Utility Fee. This annexation to the Stormwater Utility Fee will include the project generally known as the European Parts Depot project, see ATTACHMENT 2. The maintenance services to be funded include the furnishing of services and materials for the ordinary and usual operation, maintenance, and servicing of the storm drain and flood protection systems.

ATTACHMENT 1 is the Resolution declaring the results of the property owner protest and authorizing the mailing of the property owner ballot, as required by Article XIII D of the California Constitution (also known as Proposition 218). The Resolution sets forth the tabulation of ballots on November 8, 2018 at 1:30 p.m. in the office of the City Clerk. The results of the mailed ballot election will be presented to City Council at their regularly scheduled meeting November 19, 2018 and additional actions will be recommended based on the ballot results.

A "Rate Analysis Report" was approved by City Council on September 4, 2014 by Resolution 103-2014 setting Fiscal Year 2014/2015 maximum annual Stormwater Utility Fee amount for each parcel proportionate to the estimated stormwater runoff for each parcel, see ATTACHMENT 3. The maximum annual fee will increase each subsequent Fiscal Year by the annual change in the Consumer Price Index (CPI), during the preceding year, for All Urban Consumers, for the San Francisco-Oakland-San Jose areas, published by the United States Department of Labor, Bureau of Labor Statistics.

A sample of the Stormwater Utility Fees for Fiscal Year 2018/2019 are summarized in the following table:

Table 1

Land Use Description	Total Area (acres)	Sample Fee
Single Family Residential (SFR1)	0.16	$125.98
Single Family Residential (SFR2)	0.22	$138.57
Single Family Residential (SFR3)	0.30	$148.03
Single Family Residential (SFR4)	0.40	$157.46
Single Family Residential (SFR5)	1.00	$157.46
Multi-Family Residential (MFR1)	5.00	$1102.35
Commercial	1.00	$1181.10
Industrial	1.00	$1259.85
Schools	5.00	$787.40
Private Recreation	1.00	$393.69
Parks/Greenbelts	2.00	$157.46
Public Property (with structures)	2.00	$472.43

ATTACHMENTS

1. Resolution
2. Boundary Map
3. Rate Analysis Report

ATTACHMENT 1

CITY OF RANCHO CORDOVA

RESOLUTION XX-XXX

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, DECLARING THE RESULTS OF THE PROPERTY OWNER PROTEST AND AUTHORIZING THE MAILING OF A PROPERTY OWNER BALLOT RELATING TO THE IMPOSITON OF AN ANNUAL STORMWATER UTILITY FEE FOR THE EUROPEAN PARTS DEPOT PROJECT

WHEREAS, this Council has received petitions and waivers from the owners of not less than 100% of the area of land proposed to be annexed into the Stormwater Utility Fee; and

WHEREAS, on October 5, 2018 the City Clerk caused a notice of the time and place of the hearing thereon and on the proposed annexation to the Stormwater Utility Fee to be published and such public hearing was opened on October 15, 2018; and

WHEREAS, the Council adopted Resolution 103-2014 approving a written report entitled, "Rate Analysis Report", dated September 4, 2014 (the "Written Report") prepared by Harris & Associates and filed with the City Clerk containing a description of each parcel of real property within the City to which the Stormwater Utility Fee is applicable (collectively, the "Identified Parcels") and the amount of the Stormwater Utility Fee for each such Identified Parcel for Fiscal Year 2014-15. The Written Report is on file in the office of the City Clerk and is available for public inspection; and

WHEREAS, this Council adopted a Resolution which established Procedures for the Conduct of a Protest Hearing and Balloting Relating to a Stormwater Utility Fee (the "Procedures") and set the date of public hearing; and

WHEREAS, this Council has conducted the public hearing and all interested persons have been afforded the opportunity to be heard, and the City Council has considered all protests against the annexation to the Stormwater Utility Fee; and

WHEREAS, there was no majority protest of the owner of the Identified Parcel subject to the Proposed Stormwater Utility Fee.

NOW, THEREFORE, BE IT HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA:

1. The foregoing recitals are true and correct.

2. The City Clerk is hereby authorized and directed to mail a property owner ballot in accordance with law and the Procedures.

3. The date of the ballot tabulation shall be November 8, 2018 at 1:30 pm.

4. The date of the public hearing to report the results of the mailed ballot election shall be November 19, 2018 at 5:30 or as soon thereafter as the matter may be heard.

5. The City Council hereby designates Elizabeth Sparkman, Community Development Director, telephone number, (916) 851-8714 to answer inquiries regarding the ballot proceedings and procedural or technical matters.

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the 15th day of October, 2018, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

ATTACHMENT 2

CITY OF RANCHO CORDOVA
STORMWATER UTILITY FEE AREA
ANNEXATION 17
(EUROPEAN PART DEPOT PROJECT)



Harris & Associates SM

SHAPING THE FUTURE ONE PROJECT AT A TIME SM

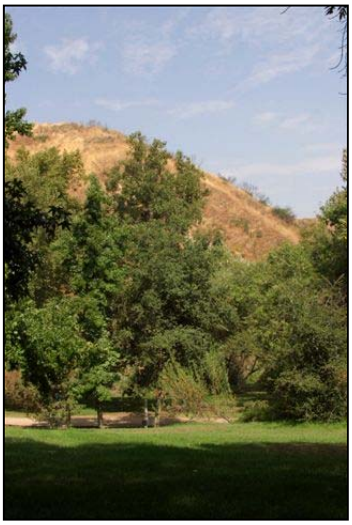
Rate Analysis Report

for the

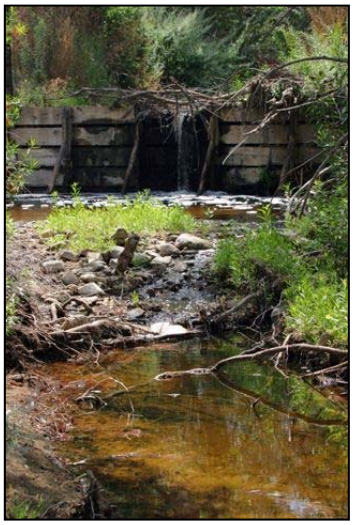
Stormwater Utility Fee

For the

City of Rancho Cordova







August 7, 2014

Introduction

The City of Rancho Cordova (City) is detaching from the County of Sacramento fee and is creating their own Stormwater Utility Fee, which is being levied per the California Health and Safety Code Section 5471 et seq.

The purpose of this Rate Analysis Report is to:

- Review the Stormwater Utility Fee and improvements to be funded.
- Review the requirements of Article XIIID of the State Constitution (Proposition 218) relating to requirements for apportioning the costs associated with the City's stormwater runoff system.
- Analyze and recommend an appropriate rate structure and provide estimated rates based on cost data information provided by the City.

Proposition 218 Requirements

This fee must comply with the provisions of Article XIIID of the California Constitution (Proposition 218). Section 6 of Proposition 218 has the following requirements for all "new, extended, imposed or increased" fees and charges:

1) "Revenues derived from the fee or charge shall not exceed the funds required to provide the property-related service."

2) "Revenues derived from the fee or charge shall not be used for any purpose other than that for which the fee or charge was imposed."

3) "The amount of a fee or charge imposed upon any parcel or person as an incident of property ownership shall not exceed the proportional cost of the service attributable to the parcel."

4) "No fee or charge may be imposed for a service unless that service is actually used by, or immediately available to, the owner of the property in question. Fees or charges based on potential or future use of service are not permitted. Standby charges, whether characterized as charges or assessments, shall be classified as assessments and shall not be imposed without compliance with [the assessment section of this code]."

5) "No fee or charge may be imposed for general governmental services including, but not limited to, police, fire, ambulance or library services where the service is available to the public at large in substantially the same manner as it is to property owners."

Background Information

In accordance with the Federal Clean Water Act of 1972, the United States Environmental Protection Agency (EPA) is required to establish regulations setting forth National Pollution Discharge Elimination System (NPDES) permit standards. The enactment of 1987 amendments to the Federal Clean Water Act (Act) of 1972 imposes permit requirements for discharge of storm waters. The Act allows the EPA to delegate its NPDES permitting authority to states with an approved environmental regulatory program. The State of California is one of the delegated states.

The responsibility for implementing various NPDES permits in the State of California has been delegated to the State Water Resources Control Board (SWRCB). The SWRCB administers NPDES authority through its nine Regional Boards. As an NPDES permittee, the City is required to manage stormwater pollution within its jurisdiction.

In order to provide for the safety of the residents of the City and protect property in the City from the damage associated with flooding and to meet the requirements of the NPDES permit, it is necessary to design, construct, operate, maintain, improve and replace storm drainage facilities which collect storm and surface water runoff and convey and treat such runoff in a safe manner to an acceptable point of discharge. It is also necessary to inspect, monitor, and take enforcement action related to illegal dumping, and illicit discharges. In order to properly fund such facilities and activities, the City has determined that it is necessary to impose on all developing properties in Rancho Cordova a user charge for storm drainage service.

Based on the 2030 General Plan and current specific plan areas, Rancho Cordova is expected to develop as shown in Table 1 below. The proposed boundary for the stormwater utility is shown in Appendix A.

Table 1 – Land Use

	Land Use/ Zoning Description	Total Acres	Total Units
Residential:			
LDR	SF (2.1-6.0 DU/AC)	2,635	13,156
	MD (6.1-12 DU/AC)	322	2,524
MDR	MD (6.1-18.0 DU/AC)	1,852	13,231
	MD (14.0-29.9 DU/AC)	60	885
HDR	HD (18.1-40.0 DU/AC)	192	4,372
	HD (30+ DU/AC)	30	825
	Residential Total	**5,090**	**34,993**
Non-Residential:			
VC	Village Commercial	202	
LTC	Local Town Center	134	
RTC	Regional Town Center	172	
BP	Business Park	158	
MP	Industrial Park	283	
Education:			
HS/MS	High School/Middle School	356	
MS	Middle School	20	
ES	Elementary School	102	
Open Space & Public:			
CP	Community Park	313	
P/QP	Public/Quasi Public	37	
NP	Neighborhood Park	194	
SWD	Storm Water Detention	186	
WP	Wetland Preserve	745	
DP	Drainage Parkway	270	
PR	Private Recreation	63	
OS	Open Space	168	
OS/P	Open Space/Preserve	279	
LC	Landscape Corridors	123	
GB	Green Belts	54	
ROW	Right-of-way	596	
BR/WP	Reservoir / Wetland Preserve	528	
S	Sewer Lift Station / Utility Substa	14	
	Vacant (unknown dev plan)	595	
	Total Non-residential	5,590	
	Total Residential & Non-Res	**10,680**	

A more detailed land use table by development area is shown in Appendix D.

This development is expected to require significant stormwater drainage and flood control facilities. Based on the development area and improvements that were required in four (4) recent developments

within the County of Sacramento, Table 2 summarizes the improvements that are expected once development is complete.

Table 2 – Expected Improvements

Infrastructure Type	Quantity	
Inlets	6,400	LF
Manholes	4,460	LF
66" Pipe	3,950	LF
60" Pipe	10,280	LF
54" Pipe	11,140	LF
48" Pipe	10,210	LF
42" Pipe	28,620	LF
36" Pipe	42,420	LF
30" Pipe	51,050	LF
27" Pipe	540	LF
24" Pipe	91,960	LF
21" Pipe	2,230	LF
18" Pipe	100,300	LF
15" Pipe	101,300	LF
12" Pipe	529,890	0
10" Pipe	4,170	0
Creeks and Channels	80	AC
Basins	320	AC

Services Funded

Expenditures from the revenue generated from the Stormwater Utility Fee are intended to comply with the requirements set forth in the NPDES permit. The activities and services funded by this fee include, but are not limited to:

1. Administration and oversight of the requirements set forth in the NPDES permit to City departments, developments, and local agencies.

2. Respond to and investigate incidents of illicit discharges and illegal connections to the storm drain system.

3. Periodically inspect facilities for proper handling of materials, chemicals, pollutants, garbage, waste, and debris and prevent any discharges to the storm drain system.

4. Regularly clean and maintain catch basins, the flowline, and storm drainage facilities.

5. Installation and maintenance of water quality devices required to keep pollutants out of the storm drain system.

6. Discourage illegal dumping or discharge of pollutants into the storm drain system by stenciling all City-owned catch basins with a "No Dumping" message.

7. Augment public education and outreach programs in regards to the proper use and function of the storm drainage system and the receiving waters.

8. Develop programs to promote, publicize, and facilitate public reporting of illicit discharges to the storm drain system.

9. Encourage the proper disposal of household hazardous waste (HHW) to prevent the improper disposal to the storm drain system or to the sewer system.

10. Discourage the improper disposal of litter, garden clippings, leaves, and pet waste into the street or the storm drain system.

11. Capital replacement of storm drainage and flood control improvements at the end of the expected useful life for such improvements.

Rate Structure Analysis

Section 6.b of Article XIIID of the State Constitution (Proposition 218) states that:

> "The amount of a fee or charge imposed upon any parcel or person as an incident of property ownership shall not exceed the proportional cost of the service attributable to the parcel."
>
> and
>
> "No fee or charge may be imposed for a service unless that service is actually used by, or immediately available to, the owner of the property in question."

By definition, all properties that shed stormwater into the City's stormwater drainage system use, or are served by, the City's stormwater drainage system. The amount of use attributed to each parcel is measurable by the amount of storm runoff contributed by the property, which is directly proportional to the amount of impervious area on a parcel (such as buildings and concrete). The more impervious area on a property, the more storm runoff the property generates, the more demand placed on the storm drain system.

The amount each parcel uses the stormwater drainage system is computed by the following formula:

(Parcel Area) x (Impervious Percentage) = Drainage Units

The typical percent impervious (% Impervious) for land uses in the City, have been applied for the purposes of estimating the runoff generated by each property. These are shown in Appendix B.

The more Drainage Units a parcel has, the more storm run-off it generates, and the more it uses and impacts the stormwater drainage system.

It is standard practice to relate other land uses to a developed single family residential (SFR) parcel, instead of working exclusively with drainage units. The median size of a SFR parcel will be approximately 0.16 acre. Therefore, it makes sense to relate all parcels to this median residential property. The runoff from a 0.16-acre SFR parcel is set equal to one Drainage Measurement Unit (DMU) and this base DMU is calculated as follows:

(0.16 acres of area) x 50% = 0.0800 Impervious Area = 1 DMU

Single Family Residential Parcels

As a SFR property increases in size over the median parcel size, the typical percentage of impervious area decreases, as shown in Appendix B. Conversely, as a SFR parcel decreases in size below the median parcel size, the typical percentage of impervious area increases, and such increase is typically proportional to the decrease in size. Therefore, SFR properties are separated into five (5) groups. The median parcel area for each group was used and their DMUs are calculated as follows:

SFR Category	DMU/ Formula
SFR1 – SFR parcels 0.16 acres or less	1.00 DMU
SFR2 – SFR parcels 0.17 - 0.25 acres	1.10 DMUs
SFR3 – SFR parcels 0.26 – 0.33 acres	1.175 DMUs
SFR4 – SFR parcels 0.34 – 0.50 acres	1.25 DMUs
SFR5 – SFR parcels greater than 0.50 acres	$1.25 + \frac{[(\text{acres} - 0.50) \times 5\%]}{0.0800} = \text{DMUs}$

Multi-Family Residential Parcels

Multi-Family Residential (MFR) units (including condominiums) are split into categories by the density, or number of dwelling units per acre (DU/Ac) as follows:

MFR Category	Density	% Impervious
MFR1 - High Density	Greater than 18 DU/Ac	75%
MFR 2 - Med Density	10 – 18 DU/Ac	70%

$$\frac{\text{Acreage} \times \%\text{Impervious}}{0.0800} = \text{DMUs}$$

Condominium unit parcel areas are calculated by dividing the total area of the condominium complex (which includes the common area) by the number of condominium units, and the total imperviousness of the entire complex is attributed to each individual condo parcel in the complex. (This divides the runoff of the entire complex to each of the individual units.) Because these condominium common areas are taken into consideration in this manner, they are exempt from the charge.

Non- Residential Parcels

All non-residential parcel DMUs will be based on the impervious area (runoff coefficient) table shown in Exhibit B, using the following formula:

$$\frac{\text{Acreage} \times \%\text{Impervious}}{0.0800} = \text{DMUs}$$

All parcels draining into Rancho Cordova Stormwater Utility Fee-maintained drainage infrastructure are proposed to be charged the same user fee rate per DMU for stormwater runoff treatment. The Rancho Cordova Stormwater Utility Fee is proposed in perpetuity.

For the purposes of this report, City-maintained drainage infrastructure includes streets, pipes, inlets, outlets, and natural drainage courses. Parcels related to these types of property uses are exempt from the runoff charge, as they are part of the infrastructure being funded. Also exempt from the runoff charge is Caltrans right-of-way, because Caltrans handles its own runoff under a separate NPDES permit.

Drainage units may be adjusted based on appeal from the property owner. See the Appeals Process below.

Table 3, below, provides a preliminary summary of DMUs for the various land uses in Rancho Cordova.

Table 3 – Drainage Measurement Unit Summary Table

Landuse Description	Number of Units	Total Area (acres)	Impervious Area (acres)	DMUs
SINGLE FAMILY RESIDENTIAL (SFR1)	15,107	2,028		15,107.00
SINGLE FAMILY RESIDENTIAL (SFR2)	13,790	2,776		15,169.00
SINGLE FAMILY RESIDENTIAL (SFR3)	14	4		16.45
SINGLE FAMILY RESIDENTIAL (SFR4)				-
SINGLE FAMILY RESIDENTIAL (SFR5)				-
MULTI-FAMILY RESIDENTIAL (MFR1)	6,082	282		2,639.06
COMMERCIAL		666	499	6,240.00
INDUSTRIAL		283	226	2,830.00
SCHOOLS		478	239	2,985.00
PRIVATE RECREATION		63	16	195.31
PARKS/GREENBELTS		561	140	1,752.47
PUBLIC		51	15	190.13
TOTAL	**34,993**	**7,190**		**47,124**

Cost Estimate

Table 4 below shows the estimated costs to maintain infrastructure in the developing areas. Unit costs for maintenance were derived using budget information provided by the County, since the County currently maintains the storm drainage system. The budget information is shown in Appendix C.

Table 4 – Estimated Costs

	Estimated Quantity	Unit	Cost ($/unit)	Frequency	Total Cost/Year
Maintenance Costs:					
Trunk Lines (larger than 24") - TV Lines	158210	LF	$ 7.50	25 years	$ 47,463.00
Drainage Lines 10"-24" Cleaning	829850	LF	$ 3.00	10 years	$ 248,955.00
Drainage Lines 10"-24" TV	829850	LF	$ 7.50	25 years	$ 248,955.00
Creek and Channel Maintenance and Repair	65070	LF	$ 0.75	1 year	$ 49,009.83
Pipe Repairs	998920	LF	$ 0.45	1 year	$ 451,380.43
Creeks and Channels Mowing	80	AC	$6,825	1 year	$ 546,000.00
Creeks and Channels Herbicides	80	AC	$680	1 year	$ 54,400.00
HydroMod Basin Maintenance	320	AC	$4,830	1 year	$ 1,545,600.00
Basin De-silt	320	AC	$1,000	25 years	$ 12,800.00
Basins Herbicides	320	AC	$761	1 year	$ 243,360.00
Replacement Costs:					
Inlets	6400	EA	$2,000	75 years	$170,667
Manholes	4460	EA	$3,500	75 years	$208,133
66" Pipe	3950	LF	$550	100 years	$21,725
60" Pipe	10280	LF	$475	100 years	$48,830
54" Pipe	11140	LF	$400	100 years	$44,560
48" Pipe	10210	LF	$325	100 years	$33,183
42" Pipe	28620	LF	$275	100 years	$78,705
36" Pipe	42420	LF	$225	100 years	$95,445
30" Pipe	51050	LF	$175	100 years	$89,338
27" Pipe	540	LF	$150	100 years	$810
24" Pipe	91960	LF	$125	100 years	$114,950
21" Pipe	2230	LF	$115	100 years	$2,565
18" Pipe	100300	LF	$105	100 years	$105,315
15" Pipe	101300	LF	$95	100 years	$96,235
12" Pipe	529890	LF	$85	100 years	$450,407
10" Pipe	4170	LF	$75	100 years	$3,128

Total:	$5,011,917
Annual Fee Administration:	$45,000
Operating (Cash Flow) Reserve (10% of Maintenance Costs):	$344,792
Estimated Total:	**$5,401,709**

Fee Calculations

The estimated annual costs for the proposed storm drain improvements are $5,401,709 as shown in Table 4 above. Dividing that by the total number of proposed DMU's in Rancho Cordova (47,124), the maximum estimated annual Stormwater Utility Fee rate is **$114.63 per DMU**.

This would be the proposed maximum fee rate for fiscal year 2014-15. The maximum rate will be increased each subsequent Fiscal Year by the annual change in the Consumer Price Index (CPI), during the preceding year, for All Urban Consumers, for the San Francisco-Oakland-San Jose areas, published by the United States Department of Labor, Bureau of Labor Statistics (or a reasonably equivalent index should the stated index be discontinued, as determined by the Director of Public Works).

The actual rate to be levied each year will be as approved by the City at a public hearing, after they consider an Annual Fee Report outlining the estimated annual costs of the program for the ensuing fiscal year.

Table 5 provides sample fee calculations for various land uses and parcel sizes.

Table 5 – Sample Calculations

Land Use Description	Total Area (acres)	Impervious Area (acres)	DMUs	Sample Fee
SINGLE FAMILY RESIDENTIAL (SFR1)	0.16		1.000	$ 114.63
SINGLE FAMILY RESIDENTIAL (SFR2)	0.22		1.100	$ 126.09
SINGLE FAMILY RESIDENTIAL (SFR3)	0.30		1.175	$ 134.69
SINGLE FAMILY RESIDENTIAL (SFR4)	0.40		1.250	$ 143.28
SINGLE FAMILY RESIDENTIAL (SFR5)	1.00		1.563	$ 179.10
MULTI-FAMILY RESIDENTIAL (MFR1)	5.00	3.75	46.875	$ 5,373.12
COMMERCIAL[1]	1.00	0.75	9.375	$ 1,074.62
INDUSTRIAL	1.00	0.80	10.000	$ 1,146.27
SCHOOLS	5.00	2.50	31.250	$ 3,582.08
PRIVATE RECREATION	1.00	0.25	3.125	$ 358.21
PARKS/GREENBELTS	2.00	0.20	2.500	$ 286.57
PUBLIC	2.00	0.60	7.500	$ 859.70

[1] Average of Downtown and Neighborhood Commercial as shown in Appendix B

The Preliminary Charge Roll, which is a listing of each parcel to be charged a fee and its proposed maximum fee for FY 2014-15, is on file in the office of the City Clerk.

Appeals Process

If a property owner disagrees with the calculation of his or her fee, based on the parcel area and estimated impervious percentage assigned to the property, then the property owner may appeal the calculation as follows:

1. Property owner must provide written documentation explaining the reason why the charge should be changed. This documentation must include:
    a. The name, phone number, mailing address, and email address, if available, of the property owner.
    b. The Assessor's Parcel Number (APN) of the property in question.
2. If additional documentation is required or insufficient documentation was submitted, a representative of the Department of Public Works (Staff) will notify the property owner in writing.
3. Once Staff has determined that sufficient documentation has been submitted, Staff will perform the initial review. Staff will notify the property owner in writing within four (4) weeks from the time sufficient documentation was submitted as to whether or not the fee amount will be changed.
    a. If the determination is to change the fee amount, then the new fee amount will be documented within the City's fee database.

b. If the determination is that the fee should not be changed, the property owner can appeal Staff's decision to the Director of Public Works. The appeal must be made in writing and returned no later than four (4) weeks from the date of mailing of Staff's initial review decision. The Director of Public Works will notify the property owner in writing within four (4) weeks from the date of receipt of the appeal as to whether or not the fee amount will be changed.

   If the owner of any parcel shall have reason to feel that the computation of the DMU for his/her parcel is not correct, that person may file an appeal with the Director of Public Works in the manner prescribed by the Director of Public Works. The Director of Public Works will consider all data provided by the appellant and shall render a decision in writing. The decision of the Director of Public Works will be final with respect to City action on the appeal.

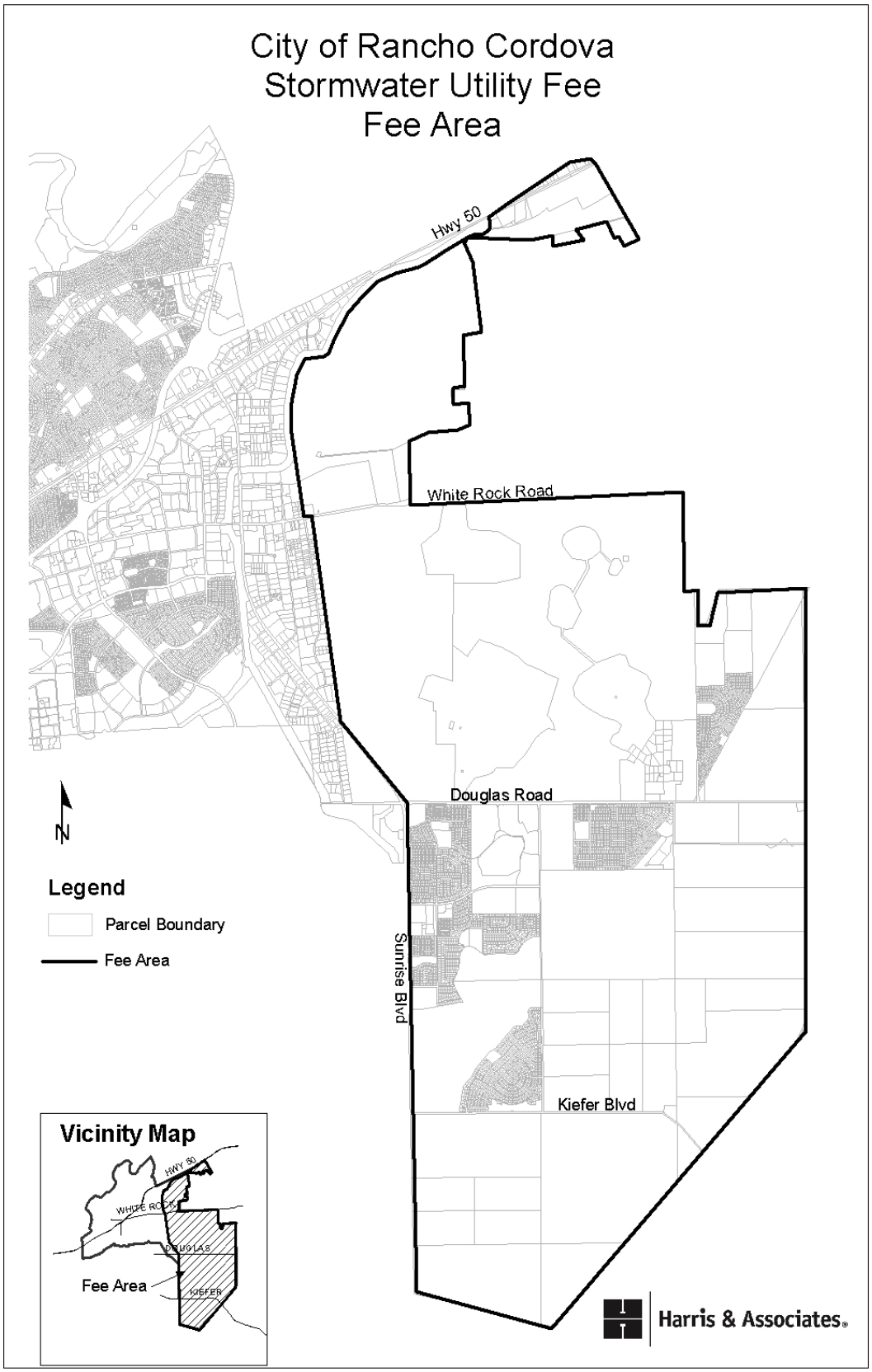
Appeals will be accepted annually up until June 30 for inclusion on the following fiscal year's property tax roll submittal. However, if an appeal is granted by Staff or the Director of Public Works that does not permit inclusion for the following fiscal year's property tax roll submittal, a reimbursement will be provided to the property owner by the City.

Respectfully submitted:

Harris & Associates

Dennis A. Anderson
Senior Project Manager

APPENDIX A


City of Rancho Cordova
Stormwater Utility Fee
Fee Area
Hwy 50
White Rock Road
Douglas Road
Sunrise Blvd
Kiefer Blvd
N
Legend
Parcel Boundary
Fee Area
Vicinity Map
HWY 50
WHITE ROCK
DOUGLAS
KIEFER
Fee Area
Harris & Associates

APPENDIX B

Runoff Coefficient

Land Use		Impervious
Single Family Residential	less than 0.166 acres	50%
Single Family Residential	0.166 acres to 0.250 acres	40%
Single Family Residential	0.251 acres to 0.330 acres	30%
Single Family Residential	0.331 acres to 0.500 acres	25%
Single Family Residential	Over 0.500 acres (excluding the first 0.500 acres)	5%
High-Density Residential (including Apartments and Mobile Home Parks)		75%
Condominiums		70%
Commercial Downtown Areas[1]		80%
Commercial Neighborhood Areas		70%
Industrial		80%
Schools		50%
Parks		25%
Greenbelts		10%

Footnotes:

[1] City of Rancho Cordova Municipal Code Chapter 15.

Sources:

1. Yolo County City/County Drainage Manual, February 2010.
2. Stormwater Quality Design Manual for the Sacramento and South Placer Regions, May 2007.

Appendix C

Cost Information

County of Sacramento/City of Rancho Cordova
Current Storm Drain Maintenance Costs

Pipe Repair Costs

Budget Classification		Repair Type	Actual Expenditures for FY 11/12	FY 13/14 Budget
County North	OCUO	Drain Line Upgrade or Repair	$ 630,912.90	$ 630,912.90
	OFFO	Fence Repair	$ 19,343.41	$ 19,343.41
	OHKO	Inlet Outfall Repair	$ 455,724.02	$ 455,724.02
	OMSO	Erosion Control	$ 26,189.60	$ 26,189.60
	OY8O	Manhole Repair	$ 63,362.44	$ 63,362.44
	RAMP	ADA Compliant Ramp	$ -	$ -
	Overhead	36.39%	$ 435,026.56	$ 435,026.56
		Total Budget=	**$ 1,630,558.93**	**$ 1,630,558.93**
County South	OCUO	Drain Line Upgrade or Repair	$ 105,317.24	$ 105,317.24
	OFFO	Fence Repair	$ 35,802.01	$ 35,802.01
	OHKO	Inlet Outfall Repair	$ 214,660.90	$ 214,660.90
	OMSO	Erosion Control	$ -	$ -
	OY8O	Manhole Repair	$ 8,585.40	$ 8,585.40
	RAMP	ADA Compliant Ramp	$ -	$ -
	Overhead	23.51%	$ 85,667.45	$ 85,667.45
		Total Budget=	**$ 450,033.00**	**$ 450,033.00**
Rancho Cordova	OCUO	Drain Line Upgrade or Repair	$ 222,809.74	$ 229,850.53
	OFFO	Fence Repair	$ 26,326.14	$ 27,158.05
	OHKO	Inlet Outfall Repair	$ 224,877.26	$ 231,983.38
	OMSO	Erosion Control	$ -	$ -
	OY8O	Manhole Repair	$ 4,498.84	$ 4,641.00
	RAMP	ADA Compliant Ramp	$ -	$ -
	Overhead	23.51%	$ 112,504.88	$ 116,060.03
		Total Budget=	**$ 591,016.86**	**$ 609,692.99**
Total LF of Pipes				
		County	7,865,755	7,865,755
		Rancho Cordova	1,349,271	1,349,271
Cost/LF of pipe for Repairs				
		County	**$ 0.26**	**$ 0.26**
		Rancho	**$ 0.44**	**$ 0.45**

* Costs were increased for 12/13 based on comparing actual expenditures in 11/12 with actual expenditures in 12/13.

County of Sacramento/City of Rancho Cordova
Current Storm Drain Maintenance Costs

Creek and Channel Cleaning

Budget Classification		Repair Type	Actual Expenditures FY 11/12	FY 13/14 Budget
County	OCCO	Inspect Channels	$ 149,684.06	$ 149,684.06
	ODSO	Clean, Inspect trach Racks and Box Culverts	$ 203,337.83	$ 203,337.83
	OF8O	Sandbag Distribution	$ 5,184.60	$ 5,184.60
	OFCO	Drainage Response	$ 82,451.66	$ 82,451.66
	OFDO	Concrete Channel Cleaning Bobcat	$ 552,150.54	$ 552,150.54
	OHWO	Vegetation Removal County Forces		
	OJZO	Clean and Inspect Outfall Structures	$ 191,840.84	$ 191,840.84
	OLCO	Access Road Maintenance	$ -	$ -
	OLDO	Mowing		
	OMPO	Expose Pipe End Mechanically	$ 2,720.90	$ 2,720.90
	OMRO	Channel Cleaning Mechanical	$ 49,087.50	$ 49,087.50
	OORC	Rodent Control	$ 32,695.06	$ 32,695.06
	OTVD	Tree Removal	$ 79,463.44	$ 79,463.44
	OVDO	Dry Spoil Dumping	$ 8,137.34	$ 8,137.34
	OWCO	Weed Control Chemical		
	Overhead	36.39%	$ 493,691.29	$ 493,691.29
		Total Budget=	**$ 1,850,445**	**$ 1,850,445**
County	OCCO	Inspect Channels	$ 1,797.15	$ 1,797.15
	ODSO	Clean, Inspect trach Racks and Box Culverts	$ -	$ -
	OF8O	Sandbag Distribution	$ 2,464.80	$ 2,464.80
	OFCO	Drainage Response	$ 1,293.11	$ 1,293.11
	OFDO	Concrete Channel Cleaning Bobcat	$ 144,294.58	$ 144,294.58
	OHWO	Vegetation Removal County Forces		
	OJZO	Clean and Inspect Outfall Structures	$ -	$ -
	OLCO	Access Road Maintenance	$ 57,345.54	$ 57,345.54
	OLDO	Mowing		
	OMPO	Expose Pipe End Mechanically	$ -	$ -
	OMRO	Channel Cleaning Mechanical	$ 32,935.75	$ 32,935.75
	OORC	Rodent Control	$ -	$ -
	OTVD	Tree Removal	$ 214,736.46	$ 214,736.46
	OVDO	Dry Spoil Dumping	$ -	$ -

Budget Classification		Repair Type	Actual Expenditures FY 11/12	FY 13/14 Budget
	OWCO	Weed Control Chemical		
	Overhead	23.51%	$ 106,945.71	$ 106,945.71
		Total Budget=	**$ 561,813**	**$ 561,813**
Rancho Cordova	OCCO	Inspect Channels	$ -	$ -
	ODSO	Clean, Inspect trach Racks and Box Culverts	$ 413.30	$ 413.30
	OF8O	Sandbag Distribution	$ -	$ -
	OFCO	Drainage Response	$ -	$ -
	OFDO	Concrete Channel Cleaning Bobcat	$ 65,905.39	$ 65,905.39
	OHWO	Vegetation Removal County Forces		
	OJZO	Clean and Inspect Outfall Structures	$ -	$ -
	OLCO	Access Road Maintenance	$ -	$ -
	OLDO	Mowing		
	OMPO	Expose Pipe End Mechanically	$ -	$ -
	OMRO	Channel Cleaning Mechanical	$ -	$ -
	OORC	Rodent Control	$ -	$ -
	OTVD	Tree Removal	$ -	$ -
	OVDO	Dry Spoil Dumping	$ -	$ -
	OWCO	Weed Control Chemical		
	Overhead	23.51%	$ 15,592.45	$ 15,592.45
		Total Budget=	**$ 81,911**	**$ 81,911**
Total LF of Channels				
		Rancho Cordova (unlined)	74,628	74,628
		Rancho Cordova (lined)	37,562	37,562
		Total Rancho Cordova	**112,189**	**112,189**
		County (unlined)	1,677,768	1,677,768
		County (lined)	216,153	216,153
		Total County	**1,893,920**	**1,893,920**
Cost/LF of Channel for Cleaning:				
		County	**$ 1.27**	**$ 1.27**
		Rancho	**$ 0.73**	**$ 0.75**

* Costs were increased for 12/13 based on comparing actual expenditures in 11/12 with actual expenditures in 12/13.

County of Sacramento/City of Rancho Cordova
Current Storm Drain Maintenance Costs

Activity	Size/Location	Cost/LF	Frequency	Notes
Pipes/Channels				
Hydro Cleaning	6"-24"	$ 3.00	10 years	
TV Lines	all	$ 7.50	25 years	
Creek and Channel Cleaning	Rancho	$ 0.75	each year	Within SWU Budget
	Sac County	$ 1.27		
Pump Mainteance	Covered within budget			Per County Staff Assume no pumps in new areas.
Repairs	2 crews year round	SWU funds support this		
Hydromod Basin		**cost/ac**		
Maintenance		$ 4,830.00	annul	see detailed estimate
Herbicides		$ 325.00	2 x's/year	
Additional costs				
Pesticide Control Advisor		$ 20,000.00	annually	
Engineering admin support with regulatory agencies		10%	of maint costs/year	
Supervisors and managers		5%	of maint costs/year	

Hydromod Basin Maintenance

Basin Maintenance Costs	Cost per Acre
Trash Clean-up and Disposal (4 x's/year)	$ 1,200
Mowing (2 x's/year)	$ 200
Inspection 4 x's/year	$ 1,600
Erosion Repair	$ 800
Vegetation and Landscape Maintenance	$ 800
Sub-total	**$ 4,600**
Over-head Mark-up (5%)	$ 230
Total Cost	**$ 4,830**

Inspection Includes: Examine gates, fences and access ramp for damage and overgrown vegetation, check basin slopes for erosion, excess vegetation, debris and animal burros, check flow line for excess vegetation and sediment, check for eriosion at water line, large/floating debris, and excess vegetation. Check for debris, creacks and instructure, and erosion at inlets and outlets. Also check access control racks for debris and to snrue they are locked and secured. Check riprap at inlet weir

Appendix D

Detailed Land Use Data

Storm Drain User Fee
City of Rancho Cordova
December 20, 2013

AC, Landuse & units derived from GIS/Aerials

		Arista Del Sol		Arboretum		Douglas 98		Douglas 103		Grantline 208		Montelena		Rio Del Oro		Suncreek		The Ranch (Sunridge)		Sunridge Lot J		Westborough		North Douglas II		Heritage Falls		Anatolia IV		Anatolia		Sunridge			
	Land Use/ Zoning Description	**AC**	**Units**	**AC**	**Units**	**AC**	**Units**	**AC**	**Units**	**AC**	**Units**	**AC 2012**	**Units 2012**	**AC**	**Units**	**AC 2013**	**Units 2012**	**AC 2013**	**Units 2012**	**Est.**	**Units 2013**	**AC**	**Units**	**AC**	**Units**	**AC**	**Units**	**AC**	**Units**	**GIS AC**	**GIS Units**	**GIS AC**	**GIS Units**	**Total Acres**	**Total Units**
Residential:																																			
LDR	SF (2.1-6.0 DU/AC)	35.3	176	144.8	698			3.7	14	44.7	276	71.4	388	1,518.5	7,593	179.4	899	142.3	694	35.8	179	347.2	1,580	17.70	153.00	72.20	303.00	21.60	203.00					2,635	13,156
	MD (6.1-12 DU/AC)															321.5	2,524																	322	2,524
MDR	MD (6.1-18.0 DU/AC)	83.8	556	290.0	2,334 [a]	94.2	528	28.2	287	42.8	227	54.4	402	256.0	2,048	43.7	286 [c]	105.4	685	17.5	192	146.8	1,389			92.10	525.00			450.8	2,831	146.4	941	1,852	13,231
	MD (14.0-29.9 DU/AC)			60.4	885																													60	885
HDR	HD (18.1-40.0 DU/AC)													98.0	1,960	44.2	980	12.2	378 *			30.4	922			6.80	132.00							192	4,372
	HD (30+ DU/AC)			29.5	825														* These may be Attached															30	825
	Residential Total	119.1	732	524.7	4,742	94.2	528	31.9	301	87.5	503	125.8	790	1,872.5	11,601	588.8	4,689	259.9	1,757	53.3	371	524.4	3,891	17.7	153	171	960	22	203	450.8	2,831	146.4	941	**5,090**	**34,993**
Non-Residential:																																			
VC	Village Commercial			16.9				19.5				16.6		20.0		22.0		13.5				93.3												202	
LTC	Local Town Center			30.4										20.0								83.5												134	
RTC	Regional Town Center			0.9										113.0		58.4																		172	
BP	Business Park	6.6		65.0										86.0																				158	
MP	Industrial Park													283.0																				283	
Education:																																			
HS/MS	High School/Middle School			72.6										78.0		110.9 [b]						94.0 [b]												356	
MS	Middle School													20.0																				20	
ES	Elementary School			21.2						10.6				54.0												5.50				10.8				102	
Open Space & Public:																																			
CP	Community Park	11.4		60.7						7.8				107.0		44.9		29.3				52.3												313	
P/QP	Public/Quasi Public			2.0								3.2		7.5		12.3						10.6								1.1				37	
NP	Neighborhood Park	3.1		3.8		8.2		5.2		3.4		20.8		67.5		17.0		8.6		6.4				0.71		17.20		3.70		21.2		7.0		194	
SWD	Storm Water Detention	4.0								15.0		9.6		39.0		53.5		24.3						4.00		17.40				9.5		9.6		186	
WP	Wetland Preserve	55.8						43.8		81.0		54.5		510.0																				745	
DP	Drainage Parkway													138.0		5.0						104.6				15.30						7.2		270	
PR	Private Recreation													54.0												4.20				4.3				63	
OS	Open Space			144.5										22.0										0.60		0.80								168	
OS/P	Open Space/Preserve													12.0		45.6		174.0				47.7												279	
LC	Landscape Corridors	1.1				2.8								82.0		19.2										2.70		1.30		13.4		0.7		123	
GB	Green Belts							2.6						51.0																				54	
ROW	Right-of-way	9.5		104.3				8.5		5.3		22.4		192.0		82.6		20.5		14.5		127.1				6.90		2.20						596	
BR/WP	Reservoir / Wetland Preserve			302.8												205.1								19.80										528	
S	Sewer Lift Station / Utility Substation			1.0																										6.6		6.4		14	
	Vacant (unknown dev plan)																													567.4		27.3		595	
	Total Non-residential	91.5		826.1		11.0		79.6		123.1		127.1		1,956.0		676.5		270.2		20.9		613.1		25.1	0.0	70.0	0.0	7.2	0.0	634.3		58.2		5,590	
	Total Residential & Non-Res	210.6	732.0	1,350.8	4,742.0	105.2	528.0	111.5	301.0	210.6	503.0	252.9	790.0	3,828.5	11,601.0	1,265.3	4,689.0	530.1	1,757.0	74.1	371.0	1,137.5	3,891.0	42.8	153.0	241.1	960.0	28.8	203.0	1,085.1	2,831.0	204.6	941.0	**10,680**	

Notes: All data is from recent plans received in Nov 2013 unless specified otherwise.

[a] Arboretum has 2 MD residential classifications. The first line is for 6.1-13.9 DU/AC (instead of 6.1-18)

[b] Acreage for all schools

[c] Suncreek has 2 MD residential classifications. The second line is for 12.1-18 DU/AC (instead of 6.1-18)

Includes April 2012 Amendment

AC estimated

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Elizabeth Sparkman, Community Development Director
Darcy Goulart, Planning Manager

SUBJECT: **ACTIONS RELATED TO APPROVAL OF THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN (SSHCP)**

RECOMMENDATION

1. Open the public hearing, hear staff presentation, take public testimony, and close the public hearing
2. Accept the certified SSHCP Environmental Impact Statement/Environmental Impact Report (SSHCP EIS/EIR) (Attachment 7, 8, and Attachments 9 through 19) and Adopt by Resolution the California Environmental Quality Act (CEQA), Findings of Fact, the Aquatic Resources Program (Attachment 5), the Nexus Study (Attachment 20) and the SSHCP (Attachments 2, 3, 4) (Exhibit A)
3. Introduce and waive first reading of the Aquatic Protection Ordinance adding Chapter 16.94, Sections 16.94.010 through Section 16.94.110 to Title 16 of the Rancho Cordova Municipal Code (Exhibit B)
4. Adopt the Implementing Resolution (Exhibit C) authorizing the City Manager to execute the Implementing Agreement (Attachment 21)
5. Introduce and waive first reading of the Fee Ordinance adding Chapter 22.45, Sections 22.45.010 through 22.45.201 to Title 22 of the Rancho Cordova Municipal Code related to SSHCP fees (Exhibit D)

RESULT OF RECOMMENDED ACTION

Adoption of the SSHCP and its associated components by all Plan Permittees and the South Sacramento Conservation Agency (SSCA), will set the stage for issuance of a Federal Endangered Species Act Incidental Take Permit (ITP) by the United States Fish and Wildlife Service (USFWS), and a State Endangered Species Act Incidental Take Permit by the California Department of Fish and Wildlife (CDFW). It will also set the stage for issuance of a Clean Water Act Section 404 Programmatic Permit and Abbreviated Permit Strategy by the U.S. Army Corps of Engineers (USACOE). This will establish a preserve system to protect habitat lands and aquatic resources within the Plan Area and also create a streamlined federal and state permitting process for development and infrastructure projects in the area.

BACKGROUND

The SSHCP area encompasses 317,656 acres in the southern portion of Sacramento County, including portions of unincorporated Sacramento County, Galt, and the southern half of Rancho Cordova ("Plan Area") (Attachment 1). The Plan Area is defined as the area in which all conservation actions will be

implemented and where all incidental take will occur. The SSHCP will allow Plan Permittees to receive an Incidental Take Permit (ITP) for activities and projects they conduct.Incidental take is generally defined as direct or indirect harm to a species, including habitat loss, which is incidental to an otherwise lawful activity (e.g., land development, improvements to public infrastructure).

The SSHCP (Attachments 2, 3 and 4) is a regional effort that provides development and infrastructure projects with streamlined, predictable federal and state permitting processes while creating a preserve system to protect habitat, open space, and agricultural lands. The SSHCP provides a more effective process for protecting natural resources as compared to the current process of project-by-project mitigation that often results in small and isolated preserves. The SSHCP will ensure the creation of large, interconnected preserves that are sustained in perpetuity by an adequately funded management program.

The SSHCP allows project proponents within the Plan Area to simplify and expedite the state and Endangered Species Act (ESA) permitting process. A separate but parallel multi-tiered permitting program has been developed to streamline the Clean Water Act Section 404 and 401 permitting process. The Aquatic Resources Program ("ARP") (Attachments 5 and 6) was developed to facilitate the Clean Water Act permitting process.

As the initial step in the process to implement the SSHCP, the County of Sacramento (the lead agency) certified the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) (Attachments 7, 8, and 9-19) on September 11, 2018, adopted the SSHCP, and took other actions necessary for implementation.

DISCUSSION

The SSHCP defines the six Plan Permittees as the County of Sacramento, the City of Rancho Cordova, the City of Galt, Sacramento County Water Agency, the Capital Southeast Connector Joint Powers Authority (Connector JPA), and the Implementing Entity. These Plan Permittees fall into two categories: (1) Land Use Authority Permittees and (2) Plan Partner Permittees. The Land Use Authority Permittees are the County of Sacramento, the City of Rancho Cordova, and the City of Galt. The Plan Partner Permittees are the Sacramento County Water Agency and the Connector JPA. The Implementing Entity is a JPA called the South Sacramento Conservation Agency (SSCA) which was formed by a Joint Powers Agreement entered into between the Land Use Authority Permittees.

The SSHCP is a coordinated effort of the five local agencies (Plan Permittees) led by Sacramento County. Development of the SSHCP was overseen by a Local Agency Working Group and included staff from each of the Plan Permittees. This group gave guidance and direction to consultants assisting with the preparation of the SSHCP document. An interdisciplinary Regulatory Agency Working Group that included staff from each Plan Permittee, United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), United States Environmental Protection Agency (EPA), Regional Water Quality Control Board (RWQCB), and the State Water Resources Control Board (SWRCB) reviewed SSHCP documents approved by the Local Agency Working Group. Coordination and management of SSHCP development was overseen by a dedicated project manager and staff from the County. In addition to the Plan Permittees, the SSHCP development was heavily influenced by local stakeholder groups representing varied interests.

The SSHCP Conservation Strategy will result in an interconnected preserve system totaling 36,282 acres. All SSHCP preserves will be preserved in perpetuity and would be acquired either in fee title or as conservation easements, although most of the preserve system will be acquired using conservation easements. As the SSHCP is implemented over the 50-year permit term, the new 36,282-acre SSHCP

preserve system will be established in a manner that supplements, complements, and links together many of the existing preserves within the Plan Area.

The SSHCP will allow Plan Permittees to receive an Incidental Take Permit (ITP) for activities and projects they conduct. Incidental take is generally defined as direct or indirect harm to a species, including habitat loss, which is incidental to an otherwise lawful activity (e.g., land development, improvements to public infrastructure). In addition, the three local Land Use Authority Permittees (County, Galt, Rancho Cordova), have the ability to extend incidental take coverage provided by the SSHCP to activities and projects implemented by third-party project proponents. This will allow third-party project proponents to avoid the extensive negotiation and processing currently required to obtain individual project permits under the California Endangered Species Act (CESA) from the CDFW and project ESA compliance from the USFWS. This will also require submittal of information and the analysis associated with the ITP to be conducted earlier in the process and as part of the initial planning entitlement review rather than separately and after that review.

The SSHCP also provides for compliance with two Biological Opinions (BOs) issued by the U.S. Fish and Wildlife Service (USFWS) in response to an Endangered Species Act (ESA) consultation regarding water contracts.

Environmental Review Process

A joint Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) for the SSHCP was prepared pursuant to both the National Environmental Policy Act (NEPA) and the CEQA. The USFWS is the lead agency under NEPA and the County is the lead agency under CEQA for this joint EIS and EIR (SSHCP EIS/EIR). Cooperating agencies are USACE, EPA, and CDFW.

The SSHCP EIS/EIR evaluated the potential environmental impacts from issuing federal and state endangered-species take permits and the implementation of a long-term habitat conservation plan in south Sacramento County. The Plan Permittees have applied for Incidental Take Permits (ITP) from the USFWS under section 10(a)(1)(B) the Federal Endangered Species Act (ESA section 10) and from the CDFW under section 2835 of the California Fish and Game Code.

The EIS/EIR evaluates the potential impacts of ITP issuance by the USFWS and CDFW, approval and execution of an Implementing Agreement (IA) for the SSHCP, approval and implementation of the SSHCP by Sacramento County and the other Plan Permittees, approval and implementation by USACE of a multilevel Clean Water Act (Section 404) permitting program for future SSHCP Covered Activity projects and activities, and approval and implementation of the SSHCP Aquatic Resources Program (ARP) by the Permit Applicants, as further discussed in EIS/EIR.

The purpose of the EIS component of the joint EIS/EIR is to inform USFWS decision-makers and the public of the effects on the human environment that would result from the issuance of the ITPs to these local and state entities and from the implementation of the proposed SSHCP or an alternative HCP within south Sacramento County. The USFWS will use the EIS/EIR to comply with NEPA for their issuance of ITPs to the Plan Permittees. The purpose of the EIR component of the joint EIS/EIR is to inform Plan Permittees decision-makers and the public of the anticipated significant environmental impacts of the SSHCP, measures to mitigate any significant impacts, and reasonable alternatives that could reduce any significant environmental impacts of the proposed project to a less-than-significant level. The EIR will be used by the Plan Permittees to approve the SSHCP in compliance with CEQA.

The County of Sacramento certified the Final EIS/EIR on September 11, 2018. The Southeast Connector JPA Board accepted the certified EIS/EIR and adopted the SSHCP on September 28, 2018. Now that the EIS/EIR has been adopted by the County, the City must consider and accept the certified Final EIS/EIR as a responsible agency for the project and adopt the CEQA Findings of Fact and the Plan (Exhibit A).

Implementation

As required and discussed in the Final EIS/EIR, an Aquatic Resources Program must be approved and implemented by the Plan Permittees. The purpose and intent of the Aquatic Protection Ordinance (Exhibit B) is to achieve no-net-loss of aquatic resources function and services and to enact efficient aquatic resource permitting consistent with the requirements of the federal Clean Water Act (Sections 404 and 401), California Fish and Game Code Section 1600 and the Porter-Cologne Water Quality Control Act (Porter-Cologne).

After CEQA review and adoption of the SSHCP, the next step in the implementation process is the execution of the Implementing Agreement, which is in Appendix C of the Final SSHCP and also attached for convenience (Attachment 21). The purpose of the SSHCP Implementing Agreement is to ensure that all parties understand their responsibilities. It specifies those responsibilities, how the Plan Permittees will ensure the SSHCP Conservation Strategy will be implemented, and various other provisions.

The City will also be adopting an Implementing Resolution (Exhibit C) which will formally incorporate the SSHCP, Implementing Agreement, and ESA and CESA Incidental Take Permits into project review and procedures.

Permit Term

The Permit Term defines the length of time in which ITPs issued by the Wildlife Agencies (USFWS and CDFW) can be used by the Plan Permittees, and the timeframe in which all conservation actions outlined in the SSHCP Conservation Strategy must be completed. The Plan Permittees are requesting a 50-year permit that authorizes incidental take of listed species under the federal ESA and a 50-year permit issued under Fish and Game Code Section 2081. The USFWS will provide “no surprises” assurances to the Plan Permittees, where the USFWS will not require the commitment of additional land, water, or financial compensation (or additional restrictions on the use of land, water, or other natural resources) for impacts to Covered Species beyond the level agreed upon and described in the SSHCP, as long as the Plan Permittees are adequately implementing the SSHCP. Compliance with the SSHCP will also satisfy CEQA mitigation requirements for impacts to the Covered Species. A 50-year permit term is needed to provide enough time to implement Covered Activities, the Conservation Strategy, the monitoring, and adaptive management program and the funding strategy. Each permit will be issued to all permittees collectively.

FINANCIAL ANALYSIS

The federal ESA requires that Plan Participants provide assurances that the SSHCP will be adequately funded over the proposed 50-year permit term. The Biological Goals and Measurable Objectives of the SSHCP cannot be attained without adequate funding. The SSHCP funding program is critical to the successful development, implementation, and viability of the SSHCP. Estimating the full costs of the operating SSHCP is an essential step to demonstrate adequate funding to meet regulatory requirements.

The economic analysis evaluates the many costs associated with the implementation of the SSHCP and identifies the funding mechanism(s) that will be used to pay for the SSHCP. To ensure enough funding, all costs associated with the Conservation Actions necessary to implement the SSHCP had to be identified. Because of the geographic scale of the SSHCP, the complexity of the Conservation Actions, and long-time frame over which these actions will occur, the cost-estimating process involves many assumptions. The costs are identified for planning purposes only to estimate funding levels needed to implement the SSHCP.

The total cost of implementing the SSHCP during the 50-year permit term is estimated at $766,948,000 for an average of approximately $15,339,000 annually. This includes the cost of land and easement acquisition; SSHCP administration; habitat management, monitoring, and adaptive management; addressing changed circumstances; habitat re-establishment/ establishment; recovery of SSHCP development costs; funding for an agricultural enhancement program; and an endowment. Contingency costs and costs for remedial measures are included in some of the cost categories mentioned above.

SSHCP costs were estimated from a detailed model of all expected cost components based on actual costs of tasks. Funding for the SSHCP is derived entirely from fees on private development and public infrastructure. This includes developer mitigation fees or developer land dedications in lieu of fees. A summary of the SSHCP costs is presented in Table 2.

Table 2
Summary of SSHCP Costs

Cost Category	Cost Estimate	Average Annual Cost	Distribution of Costs
Land and Easement Acquisition Costs	$427,854,000	$8,557,000	55.8%
Habitat Re-Establishment/Establishment	$183,098,000	$3,662,000	23.9%
Habitat Management, Monitoring, and Adaptive Management	$59,995,000	$1,200,000	7.8%
Changed Circumstances	$8,231,000	$165,000	1.1%
Agricultural Enhancement	$6,015,000	$120,000	0.8%
Plan Administration	$42,171,000	$843,000	5.5%
Endowment	$30,039,000	$601,000	3.9%
SSHCP Development	$9,547,000	$191,000	1.2%
Total	**$766,948,000**	**$15,339,000**	**100.0%**

The South Sacramento Conservation Agency (SSCA), a Joint Powers Authority will be responsible for implementing the SSHCP. The SSCA governing board is composed of elected representatives from the Sacramento County Board of Supervisors and the City Councils of Rancho Cordova and Galt, with technical support provided by an Executive Director and Technical Advisory Committee.

Mitigation fees are the source of financing to establish the preserve system. A Nexus Study (Attachment 20) was conducted to support the mitigation fee program. The mitigation fees developed in the SSHCP economic model are estimated to cover SSHCP implementation costs. The mitigation fees are expressed per acre of impact, on a gross acre basis by land cover type. The “per acre” basis for the fees ensures that fees for any project are directly tied to its impacts. The differentiation of fees by land cover type provides varied fee levels associated with differential mitigation requirements, including the re-establishment/establishment mitigation costs associated with impacts to aquatic resources.

The mitigation fees focus on mitigating for loss of habitat rather than mitigating for individual species. Revenue from the mitigation fees will be used to fund mitigation actions identified in the SSHCP. The revenue from the mitigation fees will be used to fund the necessary habitat acquisition, habitat re-establishment/establishment, habitat management and monitoring, and program administration costs. This includes the costs associated with the establishment of the non-depleting endowment as well as the SSHCP development costs.

The ESA requires that the Plan Permittees provide assurances that the SSHCP will be adequately funded. As a result, the funding program (mitigation fees) must ensure that the SSHCP remains viable in perpetuity. The mitigation fee schedule described in the Nexus Study (and in the SSHCP) is based on 2015 planning-level implementation cost estimates. Recognizing the fluctuations in implementation costs through time (e.g. land acquisition costs, re-establishment/ establishment costs etc.) due to real estate cycles and typical inflationary increases in costs, HCPs require a system for tracking implementation costs and adjusting mitigation fees as necessary. Similar to other regional, multi-species HCPs, the SSHCP includes automatic mitigation fee adjustments for inflation and periodic mitigation fee audits.

Included in tonight's actions are Council approval of the SSHCP Nexus Study (Attachment 20) and introduction of the Mitigation Fee Ordinance (Exhibit D). The amount of the fees will be approved at a later date by the SSCA and the Council will then adopt them by Resolution.

Covered Activities/Covered Species

Covered activities are projects or activities that are allowable under the SSHCP and thus can use the SSHCP to mitigate for project impacts. The SSHCP provides take authorization for 28 Covered Species, of which, 11 are currently listed as threatened or endangered under the CESA or the federal ESA. The SSHCP includes conservation actions to protect all 28 Covered Species whether or not they are currently listed. Additional information on covered activities and covered species is contained in Exhibit E for informational purposes only.

General Plan Consistency

The City's General Plan recognizes the importance of protecting and preserving diverse wildlife and plant habitat in that it contains goals, policies, and actions to participate in the development of a habitat conservation plan. The General Plan's Natural Resources Element Goal NR.1 is "protect and preserve diverse wildlife and plant habitats, including habitat for special status species." The following General Plan policies and action items support Goal NR.1 and reaffirm the City's desire to participate in the SSHCP.

Policy NR.1.6 – Participate in the development of a habitat conservation plan to address the unique biological resources in Rancho Cordova.

Policy NR.1.7 – Prior to project approval, the City shall require a biological resources evaluation for private and public development projects in areas identified to contain or possibly contain listed plant and/or wildlife species based upon the City's biological resource mapping provided in the General Plan EIR or other technical materials.

Action NR.1.7.1 - For those areas in which special status species are found or likely to occur, the City shall require feasible mitigation of impacts to those species that ensure that the project does not contribute to the decline of the affected species such that their decline would impact the viability of the species. Feasible mitigation shall be determined by the City after the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG)

are provided an opportunity to comment, and may emphasize a multi-species approach. This may include development or participation in a habitat conservation plan.

Measures/Evaluation

Compliance monitoring will be required to track and verify that the Plan Permittees are carrying out the terms of the SSHCP document, including financial responsibilities and obligations, and management responsibilities. Effectiveness monitoring will evaluate whether the effectiveness of the operating conservation program of the SSHCP is consistent with the assumptions and predictions made when the SSHCP was developed and determines whether the SSHCP is achieving the Biological Goals and Measurable Objectives. Implementation of the SSHCP will require Annual Reports that will provide a long-term administrative record documenting progress made toward achieving each SSHCP Biological Goals and Measurable Objectives.

Agency Governing Board/South Sacramento Conservation Agency

During the adoption of the Plan by the County, the Board of Supervisors made a request to add a fourth member representing the Sacramento County Board of Supervisors to the Governing Body. This type of change would require modification of the Joint Exercise of Powers Agreement (JPA Agreement) with approval by the County, the cities of Rancho Cordova and Galt, and submittal to the Secretary of State. Additionally, County staff recommended changes restructure the Implementation Review Committee to include stakeholder groups and to modify the Technical Advisory Committee to include Ad-Hoc subcommittees to research scientific issues as they arise.

The proposed governance changes are not part of tonight's actions and would require the jurisdictions to modify and re-adopt the JPA Agreement independently from SSHCP approval. Any proposed changes in governance will come back to the Council at a future date in the context of modification of the JPA Agreement.

ATTACHMENTS

1. EXHIBIT A – Resolution Adopting CEQA Findings of Fact, SSHCP, ARP, Nexus Study
2. EXHIBIT A, Attachment I – CEQA Findings of Fact
3. EXHIBIT B - Aquatic Resource Protection Ordinance
4. EXHIBIT B, Attachment I - Chapter 16.94, Aquatic Resource Protection
5. EXHIBIT C - Implementing Resolution
6. EXHIBIT D - Fee Ordinance
7. EXHIBIT D, Attachment I – Chapter 22.45, Establishment of Mitigation Fees for the SSHCP
8. EXHIBIT E – Covered Activities and Covered Species
9. ATTACHMENT 1 – Vicinity Map
10. ATTACHMENT 2 – Final SSHCP Sections 1-6
11. ATTACHMENT 3 – Final SSHCP Sections 7-13
12. ATTACHMENT 4 – Final SSHCP Appendices A – L
    - Appendix A - Glossary and Acronyms
    - Appendix B - Species Accounts
    - Appendix C - Implementing Agreement
    - Appendix D - Sample Easement
    - Appendix E - Land Cover Type Report/Vernal Pool Watershed Mapping

Appendix F - Preserve Documentation Report Template
Appendix G - Preserve Management and Monitoring Details
Appendix H - Implementation Ordinance/Resolution
Appendix I - SSHCP Economic Model
Appendix J - Voluntary Additional Conservation
Appendix K - Project-Specific Avoidance and Minimization Measures
Appendix L - SSHCP Preserve Design

13. ATTACHMENT 5 – Aquatic Resources Program
14. ATTACHMENT 6 – Aquatic Resources Program Appendices A – D
    Appendix A - Watershed Study
    Appendix B-1 - Vernal Pool Classifications
    Appendix B-2 - Addendum Vernal Pool Classifications
    Appendix C - Functional Assessment Report
    Appendix D - Re-establishment and Establishment Guidelines
15. ATTACHMENT 7 – SSHCP Final EIS/EIR Chapters 1-18
16. ATTACHMENT 8 – SSHCP Final EIS/EIR Chapter 19
17. ATTACHMENT 9 – SSHCP Final EIS/EIR Appendix A - USACE Cumulative Data
18. ATTACHMENT 10 – SSHCP Final EIS/EIR Appendix B1 - Summary of Process to Determine the Scope of the EIS-EIR Part 1 Pages 1-102
19. ATTACHMENT 11 – SSHCP Final EIS/EIR Appendix B1 - Summary of Process to Determine the Scope of the EIS-EIR Part 1 Pages 103-123
20. ATTACHMENT 12 – SSHCP Final EIS/EIR Appendix B1 - Summary of Process to Determine the Scope of the EIS-EIR 2008 Scoping Report
21. ATTACHMENT 13 – SSHCP Final EIS/EIR Appendix B2 - Summary of Process to Determine the Scope of the EIS-EIR Part 2
22. ATTACHMENT 14 – SSHCP Final EIS/EIR Appendices C - F
23. ATTACHMENT 15 – SSHCP Final EIS/EIR Appendix G - Biological Resources Supporting Information
24. ATTACHMENT 16 – SSHCP Final EIS/EIR Appendix H - Air Quality and Greenhouse Gas Data
25. ATTACHMENT 17 – SSHCP Final EIS/EIR Appendix I1 - Aquatic Resources Program Vol I
26. ATTACHMENT 18 – SSHCP Final EIS/EIR Appendix I2 - Aquatic Resources Program Vol II
27. ATTACHMENT 19 – SSHCP Final EIS/EIR Appendix J - Draft Aquatic Resources Protection Ordinance
28. ATTACHMENT 20 – Nexus Study
29. ATTACHMENT 21 – Implementing Agreement

EXHIBIT A

CITY OF RANCHO CORDOVA

RESOLUTION NO. XXX-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, ACCEPTING THE CERTIFIED ENVIRONMENTAL STATEMENT/ENVIRONMENTAL IMPACT REPORT, ADOPTING THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) FINDINGS OF FACT, ADOPTING THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN (SSHCP), AND ADOPTING THE SSHCP NEXUS STUDY

WHEREAS, the City Council of the City of Rancho Cordova finds that the ecosystems of the City of Rancho Cordova ("City") and/or southern Sacramento County and the vegetation communities and sensitive species they support are fragile, irreplaceable resources that are vital to the general welfare of all residents; these vegetation communities and natural areas contain habitat value which contributes to the region's environmental resources; and special protections for these vegetation communities and natural areas must be established to prevent future endangerment of the plant and animal species that are dependent upon them.

WHEREAS, the General Plan includes goals, policies and action items that support the preservation of vegetation communities and sensitive species through preservation and participation in the development of a habitat conservation plan, and;

WHEREAS, the South Sacramento Habitat Conservation Plan (SSHCP) will protect the City's and the region's biological resources, vegetation communities, and natural areas, and prevent their degradation and loss by guiding development outside of important resource areas, and by establishing mitigation standards which will be applied to development projects.

WHEREAS, an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was prepared for the SSHCP and circulated for public review pursuant to the National Environmental Protection Act and California Environmental Quality Act

WHEREAS, on September 11, 2018, the Sacramento County Board of Supervisors certified the EIS/EIR and adopted the CEQA Findings of Fact, and;

WHEREAS, adoption of the SSHCP will enable the City to achieve the conservation goals set forth in the SSHCP, to implement the Plan and to preserve the ability of affected property owners to make reasonable use of their land consistent with the requirements of the National Environmental Policy Act ("NEPA"), the California Environmental Quality Act ("CEQA"), the Federal Endangered Species Act ("FESA"), the California Endangered Species Act ("CESA"), the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act, California Fish and Game Code Section 1600, and other applicable laws.

NOW, THEREFORE, BE IT HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA accepts the Certified Environmental Impact Statement/Environmental Impact Report, adopts the CEQA Finding of Facts **(Attachment 1)**, adopts the Aquatic Resources Program, adopts the South Sacramento Habitat Conservation Plan, and adopts the SSHCP Nexus Study subject to the following findings:

EXHIBIT A

CEQA Findings

The CEQA findings are included in Attachment 1 of this Resolution.

Adoption of the SSHCP Findings

1. A purpose of the SSHCP is to comprehensively protect and conserve multiple Endangered Species Act and California Endangered Species Act listed species and other native species; to conserve, enhance, and restore the habitats and ecosystems upon which these native species depend, including aquatic resources and aquatic habitats; and to ensure the long-term survival of these species for the continuing benefit of the people in the City of Rancho Cordova. The City seeks to accommodate the population growth and associated planned housing, economic development, and infrastructure expected within the Plan Area, using a streamlined environmental permitting process, while maintaining the existing richness of native plant and animal species in the south Sacramento County Planning Area and the natural ecosystems and agricultural lands on which these species depend.

2. The SSHCP allows an adequate amount of urban development within the Cities of Rancho Cordova and Galt, and the currently adopted Urban Services Boundary (USB) for Sacramento County, to discourage expansion beyond these boundaries and maintain the sound land use planning principles these boundaries encourage (e.g., preventing sprawl outside the USB and leap-frog development; consolidating development to support the efficient provision of utilities and infrastructure; promoting compact mixed-use development that supports viable transit and walkable areas; creating communities with a variety of housing types that support different income levels and socioeconomic conditions; and maintaining compliance with air quality laws and regulations such as Assembly Bill 32, Senate Bill 375, and the Clean Air Act).

3. The SSHCP Supports the development and implementation of streamlined aquatic resource permitting programs under Clean Water Act section 404 and 401, Porter-Cologne, and Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) by the federal and state agencies with responsibility for implementing those statutes within the Plan Area.

4. The SSHCP achieves a no net loss of the existing functions and services of aquatic resources in the Plan Area. Methods used to achieve no net loss may include the re-establishment and establishment of vernal pools and other aquatic land cover types.

5. Include an interconnected preserve system throughout the Plan Area that is large enough to maintain in perpetuity each type of natural community that is native to the Plan Area, maintain in perpetuity each type of native plant and animal species present within the Plan Area, and maintain in perpetuity or expand the existing distribution of each native animal and plant species within the Plan Area.

EXHIBIT A

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the 15th day of October, 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

EXHIBIT A -
ATTACHMENT I

BEFORE THE BOARD OF SUPERVISORS
OF THE COUNTY OF SACRAMENTO

Control No. 2003-0637

Re: Adoption of the South Sacramento Habitat) Conservation Plan) **CEQA FINDINGS OF FACT**

CEQA FINDINGS OF FACT

I. INTRODUCTION

The Final Environmental Impact Statement-Environmental Impact Report (Final EIS-EIR) prepared for the South Sacramento Habitat Conservation Plan (SSHCP or Plan) addresses the environmental effects associated with the Plan. These Findings of Fact have been prepared to comply with the requirements of the California Environmental Quality Act ("CEQA") (Pub. Resources Code, § 21000 et seq.) and the CEQA Guidelines (Cal. Code Regs., tit. 14, §15000 et seq.).

II. DEFINITIONS

"Board" means the Board of Supervisors of the County of Sacramento.

"CEQA" means the California Environmental Quality Act.

"CESA" means California Endangered Species Act.

"Condition" means a condition of approval adopted by the County in connection with approval of the Project.

"County" means County of Sacramento.

"CPAC" means Community Planning Advisory Council.

"CWA" means Clean Water Act.

"EIR" means Environmental Impact Report. “EIS”

means Environmental Impact Statement

“Environmental Coordinator” means the Environmental Coordinator for the County of Sacramento.

“ESA” means Endangered Species Act.

“FEIR” or “Final EIR” means the Final Environmental Impact Report for the Project (November 2017).

“FR” means Federal Register

“General Plan” means the Sacramento County 2030 General Plan, adopted November 2011.

“NOA” means Notice of Availability.

“NOC” means Notice of Completion.

“NOI” means Notice of Intent.

“NOP” means Notice of Preparation.

“NAHC” means Native American Heritage Commission.

“NEPA” means National Environmental Policy Act.

“Planning and Environmental Review” means the County of Sacramento, Office of Planning and Environmental Review.

“Planning Commission” means the Planning Commission of the County of Sacramento.

“Staff Report” means the staff report for the Project and any subsequent addenda thereto.

“SOI” means sphere of influence.

“SSHCP” means South Sacramento Habitat Conservation Plan.

“UDA” means Urban Development Area.

“USFWS” means United States Fish and Wildlife Service
“USACOE” means United States Army Corps of Engineers

III. PROJECT DESCRIPTION

Project Location and Setting

The South Sacramento Habitat Conservation Plan Area encompasses approximately 317,655 acres within south Sacramento County. The Plan Area includes Galt and Galt's sphere of influence, and the portion of Rancho Cordova that is located south of U.S. Highway 50. The geographical boundaries of the Plan Area are U.S. Highway 50 and White Rock Road to the north, the Sacramento River levee and County Road J11 (Walnut Grove-Thornton Road) to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and with the San Joaquin County to the south. The Plan Area excludes the northern portion of Sacramento County, the portion of Rancho Cordova located north of U.S. Highway 50, the City of Sacramento, Elk Grove, Folsom, sovereign lands of the Miwok Tribe, and the Sacramento County community of Rancho Murieta. The SSHCP refers to the portion of the Plan Area where future urban development Covered Activities would occur as the "Urban Development Area" (the UDA). Sacramento County has previously adopted an Urban Service Boundary (USB) to demarcate the ultimate extent to which the County would provide future urban services, such as sanitary sewer and water supply. Consequently, the portion of Sacramento County USB that is within the Planning Area is part of the SSHCP's UDA. The portion of the Rancho Cordova's sphere of influence that is within the boundaries of the Plan Area is also part of the UDA. The UDA also includes all lands within Galt and within Galt's sphere of influence. Approximately 67,618 acres within the Plan Area are also within the UDA. The boundaries of the Plan Area also define the area evaluated in the EIS/EIR.

Project Description

The Final SSHCP describes a regional, multi-agency strategy to conserve 28 covered species and their habitats while providing a more streamlined and predictable process for both Federal and State ESA and CWA permitting of future urban development, transportation, and infrastructure covered-activities within a 317,656-acre plan area in south Sacramento County. The covered species include the federally endangered vernal pool tadpole shrimp, the threatened vernal pool fairy shrimp, the threatened Valley elderberry longhorn beetle, the threatened California tiger salamander, the threatened giant garter snake, the endangered Sacramento Orcutt grass, the threatened slender Orcutt grass, as well as 21 unlisted species that have potential to become listed during the proposed permit term.

The SSHCP covers certain categories of covered activities, including the construction and operation of new urban development and associated infrastructure within the County's existing Urban Services Boundary, surface mining within the Urban Services Boundary, specific rural transportation projects outside the Urban Services Boundary, flood control and storm water management activities within the Urban Services Boundary, and the construction and operation of a new recycled-water delivery project. In addition, actions related to preserve maintenance, habitat monitoring, and land management on proposed SSHCP preserves throughout the plan area are also SSHCP covered activities.

In total, the SSHCP covered activities could result in the development and loss of up to 33,497 acres of natural landcovers and species habitat within the plan area. These losses would be minimized and mitigated by the SSHCP conservation strategy, which includes the establishment of a 34,494-acre interconnected preserve system, and the re-establishment or establishment of at least 1,787 acres of aquatic habitat, to provide a total SSHCP Preserve System of 36,281 acres. The future SSHCP Preserve System would be preserved, monitored, and managed in perpetuity for the benefit of the covered species.

Project Objectives

Purpose

A purpose of the SSHCP is to comprehensively protect and conserve multiple ESA and CESA listed species and other native species; to conserve, enhance, and restore the habitats and ecosystems upon which these native species depend, including aquatic resources and aquatic habitats; and to ensure the long-term survival of these species for the continuing benefit of the people in Sacramento County. Sacramento County seeks to accommodate the population growth and associated planned housing, economic development, and infrastructure expected within the Plan Area, using a streamlined environmental permitting process, while maintaining the existing richness of native plant and animal species in the south Sacramento County Planning Area and the natural ecosystems and agricultural lands on which these species depend.

Objectives

The following 18 objectives were identified to meet the above-stated purpose:

1. Include an interconnected preserve system throughout the Planning Area that is large enough to maintain in perpetuity each type of natural community that is native to the Planning Area, maintain in perpetuity each type of native plant and animal species present within the Planning Area, and maintain in perpetuity or expand the existing distribution of each native animal and plant species within the Planning Area.

2. Locate preserves in areas that maximize protection of native plant and animal species and the ecosystems on which they depend.

3. Locate preserves in areas that maximize the protection of intact watersheds and watershed functions.

4. Protect large, contiguous blocks of species habitat. Provide habitat linkages between preserves that are wide enough to allow dispersal of individual native animals and plants and allow genetic exchange between species populations.

5. Protect sufficient cropland and irrigated pasture to provide important foraging habitat on which some native animal species now depend (e.g., Swainson's hawk, white-tailed kite).

6. Preserve adequate roosting and foraging habitat for the greater sandhill crane in the area between the existing Stone Lakes National Wildlife Refuge and the existing Cosumnes River Preserve, to maintain or increase the population of greater sandhill crane over-wintering within the Planning Area.

7. Protect the long-term viability of ranching and farming operations in the Planning Area (consistent with other objectives).

8. Protect all currently documented occurrences and any newly discovered occurrences of Sacramento Orcutt grass, slender Orcutt grass, and Ahart's dwarf rush in the Planning Area.

9. Avoid or minimize impacts to state and federally listed species and their habitats, to the maximum extent practicable.

10. Avoid or minimize impacts to the existing physical, chemical, and biological functions and services of wetlands and streams in the Planning Area to the maximum extent practicable.

11. Achieve no net loss of the existing functions and services of aquatic resources in the Planning Area. Methods used to achieve no net loss may include the re-establishment and establishment of vernal pools and other aquatic land cover types.

12. Include a long-term preserve monitoring and habitat management program sufficient to maintain or improve habitats of targeted native plant and animal species in perpetuity.

13. Support the development and implementation of streamlined aquatic resource permitting programs under CWA 404, CWA 401, Porter-Cologne, and Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) by the federal and state agencies with responsibility for implementing those statutes within the Planning Area.

14. Facilitate the recovery of federally listed species, and provide sufficient preservation of federally designated recovery areas within the Planning Area.

15. Include adequate amount of urban development with associated fees to meet Objectives 1 through 14. In addition, the associated mitigation-fee structure must be practicable, with fees that are analogous to fees collected under other Northern California permitted HCPs that have similar species habitats and similar impacts.

16. Allow an adequate amount of urban development within the currently adopted spheres of influence for Rancho Cordova and Galt, and the currently adopted USB for Sacramento County, to discourage expansion beyond these boundaries and maintain the sound land use planning principles these boundaries encourage (e.g., preventing sprawl outside the USB and leap-frog development; consolidating development to support the efficient provision of utilities and infrastructure; promoting compact mixed-use development that supports viable transit and walkable areas; creating communities with a variety of housing types that support different income levels and socioeconomic conditions; and maintaining compliance with air quality laws and regulations such as Assembly Bill 32, Senate Bill 375, and the Clean Air Act).

17. Include as Covered Activities the SSHCP Permit Applicant's transportation, utility, and other infrastructure activities and projects as described in the approved master plans of the SSHCP Permit Applicants (Sacramento County, Galt, Rancho Cordova, SCWA, and Connector JPA).

18. Rely on willing sellers for the purchase of land or easements when establishing habitat preserves; do not include condemnation or eminent domain to meet the project needs, purposes, and objectives.

IV. BACKGROUND

The Draft EIS/EIR and Draft SSHCP were released for concurrent public reviews on June 2, 2017, when the USFWS published a Notice of Availability (NOA) for both documents (82 FR 25612), and the County published an NOA and Notice of Completion (NOC) for the Draft EIS/EIR with the California State Clearinghouse (control number 2003-0637; State Clearing House # 20088062030). Separately, the U.S. Army Corps of Engineers (USACE) released its draft Clean Water Act (CWA) Permitting Strategy for the SSHCP.

Pursuant to ESA Section 10 policy, the USFWS provided a minimum 90-day public review and comment period for both draft documents, which ended on September 5, 2017. A total of 26 comment letters were received on the Draft EIS/EIR, the Draft SSHCP, and the CWA Permitting Strategy. During the 90-day comment period, the lead agencies and the SSHCP Plan Partners jointly conducted three public meetings in Wilton, Rancho Cordova, and Galt, to provide additional opportunities for the public to provide comments on the Draft SSHCP and the Draft EIS/EIR (see NOAs for locations). A total of two comment letters were submitted at these public meetings. An additional 24 comment letters were submitted to the lead agencies during the 90-day public comment period.

The lead agencies prepared responses to comments on the Draft EIS/EIR, and the Plan Partners prepared responses to comments on the Draft SSHCP in collaboration with the USFWS (see Final EIS/EIR Chapter 19). The USACE prepared the responses to comments on their Public Notice (Chapter 19). If a response to a comment on the Draft SSHCP resulted in changes to the Final SSHCP, those changes were carried into the project description of the Proposed Action/Proposed Project Alternative in the Final EIS/EIR. Likewise, if the response to comments on the USACE Public Notice resulted in changes to the proposed CWA Permit Strategy, those changes were copied into relevant sections of the Final SSHCP, and into the description of the Proposed Action/Proposed Project Alternative in the Final EIS/EIR, as needed. Using this process, the Proposed Action/Proposed Project Alternative that is described and studied in the Final EIS/EIR is consistent with the Final SSHCP. Overall, the environmental impacts of the Proposed Action/Proposed Project Alternative remained similar relative to the impacts described in the Draft EIS/EIR, because the scope of changes to the Proposed Action/Proposed Project Alternative was minimal.

Changes in the Final EIS/EIR are clearly marked. Changes from the Draft EIS/EIR resulting in added text are shown with bold underline. Changes from the Draft EIS/EIR resulting in deleted text are shown with strikethrough.

The Final Environmental Impact Statement and Environmental Impact Report (Final EIS/EIR) was prepared pursuant to the NEPA and the California Environmental Quality Act (CEQA), which assesses potential effects of issuing a single 50-year incidental take permit under the ESA (section 10(a)(B)) to five permit applicants for incidental take that would result from implementation of the covered activities described in the Final South

Sacramento Habitat Conservation Plan (Final SSHCP). The Final EIS/EIR and the Final SSHCP documents were available for a 30-day public review. A Notice of Availability of the Final EIS/EIR and Final SSHCP was published in the Federal Register as a required step in the NEPA process for the Service's permit decision. The commenters on the Draft EIS EIR were notified of the release of the Final EIS/EIR and Final SSHCP at least 10 days prior to certification of the Final EIS/EIR as required by CEQA. The Final EIS/EIR is available online; printed paper copies are available for review at the County Administration Building and Central Library.

The Final EIS/EIR and the Final SSHCP documents address public comments received during a 90-day public review of the Draft EIS/EIR and the Draft SSHCP documents, and a written response to each comment is presented in the Final EIS/EIR document. Revisions made in the Final EIS/EIR and the Final SSHCP to address public comments consist only of clarifications of text, and other minor changes. The descriptions and the analyses of the three SSHCP alternatives studied in the Final EIS/EIR generally remain the same as presented in the Draft EIS/EIR. This notice of availability provided an opportunity for the public to review the Service's and/or County's response to each public comment received and to review the minor changes in the Final SSHCP and the joint Final EIS/EIR documents, prior to the Service's permit decision and the County Board of Supervisors' approval of the SSHCP and certification of the Final EIS/EIR.

Early Public Scoping Notices and Meetings. In 2008, the scoping process began on June 10 with the publication of the NOI in the Federal Register (pursuant to NEPA) and submittal of the NOP to the State Clearinghouse (pursuant to CEQA). NOPs (and often NOIs for joint NEPA/CEQA documents) are provided to the State Clearinghouse as part of the CEQA review process, and the Clearinghouse distributes the NOPs to various California state agencies. The NOI and NOP notified the public and agencies of the SSHCP; the intent to prepare an EIS/EIR; and the time, date, and location of public scoping meetings. The public was also invited to participate in the scoping process through a variety of media, including e-mail and hard-copy mailers. USFWS, as the NEPA lead agency, and Sacramento County, as the CEQA lead agency, held four joint public scoping meetings in July 2008.

In 2013, the draft SSHCP had been further refined, some conditions had changed, and sufficient time had elapsed that the lead agencies felt that a second public scoping process was warranted. Public scoping began on October 28, 2013, with an NOP provided to the State Clearinghouse and on November 4, 2013, with the publication of a NOI in the Federal Register. The NOI and NOP notified the public and agencies of the SSHCP; the intent to prepare an EIS/EIR; the circumstances for initiating the second scoping process; and the time, date, and location of public scoping meetings. USFWS, as the NEPA lead agency, and Sacramento County, as the CEQA lead agency, held two joint public scoping meetings in November 2013.

For the two meetings, a total of 29 people signed in as meeting participants. Each meeting included a brief presentation and an open house forum where informational

poster boards were available for review and staff from the lead agencies were available to answer questions.

In 2008 and 2013, the lead agencies also contacted the Native American Heritage Commission (NAHC) to obtain a list of tribes, individuals, and organizations that may have knowledge of heritage lands or other resources of interest that could potentially be affected by implementation of an HCP in the Planning Area. The 2008 and 2013 NOIs and NOPs (EIS/EIR Appendix B) were sent to the NAHC through the standard distribution to state agencies via the California State Clearinghouse, and sent directly to the tribal contacts provided by the NAHC at that time. At the time of this writing, no comments on the NOI and NOP or requests for further consultation were received. The most recent list received in 2015 from the NAHC provided 19 tribal contacts for south Sacramento County. Copies of the draft EIS/EIR will be mailed directly to the tribal contacts provided by the NAHC. USFWS is conducting outreach to federally recognized tribes in the Planning Area during the EIS/EIR process. This process will be completed and tribal input considered before the USFWS prepares their Record of Decision. In addition, compliance with Section 106 of the National Historic Preservation Act (NHPA 106) may require USFWS to consult with the State Historic Preservation Officer.

V. RECORD OF PROCEEDINGS

The record of proceedings for the Board's decision on the Project consists of the following documents, at a minimum:

- The Final Environmental Impact Report/Environmental Impact Statement prepared for the Project (February 2018), including comments received on the Draft EIR/EIS and responses to those comments;

- Matters of common knowledge to the Board, including, but not limited to, the following:

    1) Federal, state, and local laws and regulations;
    2) The Sacramento County 2030 General Plan (2011);
    3) The Zoning Code of Sacramento County;
    4) The Sacramento County Code; and
    5) Other formally adopted policies and ordinances.

- Any documents expressly cited in these findings, in addition to those cited above; and

- Any other materials required for the record of proceedings by the Public Resources Code section 21167.6, subdivision (e).

The official custodian of the record is the Clerk of the Sacramento County Board of Supervisors, 700 H Street, Sacramento California 95814.

VI. FINDINGS REQUIRED UNDER CEQA

Public Resources Code section 21002 provides that "public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would *substantially lessen* the significant environmental effects of such projects[.]" (Emphasis added.) The same statute states that the procedures required by CEQA "are intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will *avoid* or *substantially lessen* such significant effects." (Emphasis added.) Section 21002 goes on to state that "in the event [that] specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof."

The mandate and principles announced in Public Resources Code section 21002 are implemented, in part, through the requirement that agencies must adopt findings before approving projects for which EIRs are required. (See Pub. Resources Code, § 21081, subd. (a); CEQA Guidelines, § 15091, subd. (a).) For each significant environmental effect identified in an EIR for a proposed project, the approving agency must issue a written finding reaching one or more of three permissible conclusions. The first such finding is that "[c]hanges or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR." (CEQA Guidelines, § 15091, subd. (a)(1).) The second permissible finding is that "[s]uch changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency." (CEQA Guidelines, §15091, subd. (a)(2).) The third potential conclusion is that "[s]pecific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR." (CEQA Guidelines, § 15091, subd. (a)(3).) Public Resources Code section 21061.1 defines "feasible" to mean "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors." CEQA Guidelines section 15364 adds another factor: "legal" considerations. (See also Citizens of Goleta Valley v. Board of Supervisors ("Goleta II") (1990) 52 Cal.3d 553, 565.)

The concept of "feasibility" also encompasses the question of whether a particular alternative or mitigation measure promotes the underlying goals and objectives of a project. (City of Del Mar v. City of San Diego (1982) 133 Cal.App.3d 410, 417.) "[F]easibility' under CEQA encompasses 'desirability' to the extent that desirability is based on reasonable balancing of the relevant economic, environmental, social, and

technological factors." (Id.; see also Sequoyah Hills Homeowners Assn. v. City of Oakland (1993) 23 Cal.App.4th 704, 715.)

The CEQA Guidelines do not define the difference between "avoiding" a significant environmental effect and merely "substantially lessening" such an effect. The County must therefore glean the meaning of these terms from the other contexts in which the terms are used. Public Resources Code section 21081, on which CEQA Guidelines section 15091 is based, uses the term "mitigate" rather than "substantially lessen." The CEQA Guidelines therefore equate "mitigating" with "substantially lessening." Such an understanding of the statutory term is consistent with the policies underlying CEQA, which include the policy that "public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." (Pub. Resources Code, § 21002.)

For purposes of these findings, the term "avoid" refers to the effectiveness of one or more mitigation measures to reduce an otherwise significant effect to a less than significant level. In contrast, the term "substantially lessen" refers to the effectiveness of such measure or measures to substantially reduce the severity of a significant effect, but not to reduce that effect to a less than significant level. These interpretations appear to be mandated by the holding in Laurel Hills Homeowners Association v. City Council (1978) 83 Cal.App.3d 515, 519-521, in which the Court of Appeal held that an agency had satisfied its obligation to substantially lessen or avoid significant effects by adopting numerous mitigation measures, not all of which rendered the significant impacts in question less than significant.

Although CEQA Guidelines section 15091 requires only that approving agencies specify that a particular significant effect is "avoid[ed] *or* substantially lessen[ed]," these findings, for purposes of clarity, in each case will specify whether the effect in question has been reduced to a less than significant level, or has simply been substantially lessened but remains significant. Moreover, although section 15091, read literally, does not require findings to address environmental effects that an EIR identifies as merely "potentially significant," these findings will nevertheless fully account for all such effects identified in the Final EIR.

CEQA requires that the lead agency adopt mitigation measures or alternatives, where feasible, to substantially lessen or avoid significant environmental impacts that would otherwise occur. Project modification or alternatives are not required, however, where such changes are infeasible or where the responsibility for modifying the project lies with some other agency. (CEQA Guidelines, § 15091, subd. (a), (b).)

With respect to a project for which significant impacts are not avoided or substantially lessened, a public agency, after adopting proper findings, may nevertheless approve the project if the agency first adopts a statement of overriding considerations setting forth the specific reasons why the agency found that the project's "benefits" rendered "acceptable" its "unavoidable adverse environmental effects." (CEQA

Guidelines, §§ 15093, 15043, subd. (b); see also Pub. Resources Code, § 21081, subd. (b).) The California Supreme Court stated, "[t]he wisdom of approving … any development project, a delicate task which requires a balancing of interests, is necessarily left to the sound discretion of the local officials and their constituents who are responsible for such decisions. The law as we interpret and apply it simply requires that those decisions be informed, and therefore balanced." (Goleta II, 52 Cal.3d at p. 576.).

These findings constitute the County's best efforts to set forth the evidentiary and policy bases for its decision to approve the Project in a manner consistent with the requirements of CEQA. To the extent that these findings conclude that various proposed mitigation measures outlined in the Final EIR are feasible and have not been modified, superseded or withdrawn, the County hereby binds itself to implement these measures. These findings, in other words, are not merely informational, but rather constitute a binding set of obligations that will come into effect when the Board approves the Project.

VII. MITIGATION MONITORING AND REPORTING PROGRAM

A Mitigation Monitoring and Reporting Program ("MMRP") was not prepared for the Project.

VIII. SIGNIFICANT EFFECTS AND MITIGATION MEASURES

These Findings do not address impacts that are considered less than significant or beneficial prior to mitigation. Therefore, there are no necessary Findings, since no significant impacts were identified in the Final EIR/EIS for the SSHCP.

Less-Than-Significant Impacts/No Impacts

The Project's impacts to all environmental issues are less than significant. Therefore, the EIR/EIS did not identify or require mitigation measures. Avoidance and minimization measures are part of the SSHCP project, rather than mitigation required pursuant to CEQA.

The plan area is 317,656 acres within south Sacramento County, including the city of Galt and most of the city of Rancho Cordova. Approximately 33,639 acres of natural land covers and species-habitat, including aquatic resources, would be directly and indirectly impacted over the 50-year permit term, primarily within the existing Urban Services Boundary. However, the south Sacramento Habitat Conservation Plan (SSHCP) conservation strategy includes the establishment of a 36,281-acre interconnected, regional preserve system that would be comprised of relatively large, contiguous blocks of natural land covers with species habitat and aquatic resources. All lands in the 36,281- acre preserve system would be permanently preserved, and would be monitored and managed in perpetuity; including 1,787 acres of aquatic resources that would be re-established or established to replace and mitigate aquatic resource functions and services directly impacted by covered activities. All SSHCP preserves will have endowments to cover long-term monitoring and management needs.

The SSHCP would not change current practices of private land changing hands through willing buyer/willing seller transactions for urban development activities, as well as creation of the 36,281-acre SSHCP Preserve System. The majority of the proposed 36,281-acre SSHCP Preserve System is outside of the Sacramento County Urban Services Boundary and would be established through conservation easements purchased by the SSHCP implementing entity from willing landowners. Lands under conservation easement would not be adversely affected because the lands would stay in private ownership and the existing ranching or farming operations would continue on the property under the agreement terms of the easement. Within the Sacramento County Urban Services Boundary, the SSHCP implementing entity would purchase land from willing sellers to be part of the SSHCP preserve system and hold those lands in fee title. The SSHCP implementing entity will not use condemnation or eminent domain to establish any part of the SSHCP Preserve System.

Each covered activity implemented under SSCHP will implement measures to avoid or minimize project impacts to covered species, to natural communities that provided habitat for these species, and to the aquatic resources at the project site. Species and habitat impacts that cannot be avoided will be offset by the preservation of high-quality habitat within a large and interconnected SSHCP Preserve System. The SSHCP Preserve System will protect terrestrial habitats, aquatic habitats, and species populations in perpetuity and will be managed and monitored in perpetuity to assure that biological goals and objectives of the SSHCP are met. In addition, the direct loss of aquatic resource functions and services will also be offset by the re-establishment or the establishment of aquatic resources within the SSHCP Preserve System.

Significant and Potentially Significant Impacts/Mitigation Required.

The EIR/EIS identified no significant or potentially significant environmental effects (or "impacts") that the Project will or may cause. No mitigation is required pursuant to CEQA.

IX. PROJECT ALTERNATIVES Proposed

Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described earlier in this document in Section III, Project Description.

Environmentally Superior Alternative

Based on the analysis in Chapters 4 through 16 and as summarized in Tables ES-1 and ES-2 of the Final EIS/EIR, the Proposed Action/Proposed Project Alternative was identified as the Environmentally Preferable Alternative and Environmentally Superior Alternative.

No Action/No Project

Under the No Action/No Project Alternative, an HCP for south Sacramento County would not be approved or implemented, and ITPs would not be issued to the Permit Applicants for species impacts from future development projects and activities within the Planning Area. Also, the Permit Applicants would not implement a local ARP or approve associated local aquatic resource protection ordinances. Therefore, the USACE would not develop a CWA 404 permitting strategy for future development

projects and activities. In addition, the CDFW would not develop a streamlined permit strategy for streambed impacts of future development projects and activities, and the CDFW would not issue a Master Streambed Alteration Agreement to the Permit Applicants.
Therefore, the No Action/No Project Alternative would continue the conventional project-by-project regulatory reviews in which individual project developers apply for necessary project permits with multiple state and federal resource agencies, and with permit application review proceeding without a systematic, comprehensive process.
Individual projects/actions in the Planning Area that require authorization under CWA 404 would continue to obtain USACE authorization through existing types of CWA 404 authorizations, and would continue to comply with requirements for providing compensatory mitigation.

The No Action/No Project Alternative assumes that all lands zoned or ultimately planned/contemplated for urban development in adopted General Plans that are not already currently developed would eventually become developed over the next 50 years. In association with the expected future urban development, the public infrastructure systems, such as water, wastewater, recycled water, stormwater, flood control, solid waste, and utility systems, as well as transportation systems, would be expanded or improved, as described in several local and regional infrastructure agency master plans and/or capital improvement programs.

Full buildout means all currently undeveloped lands that are zoned for, or are ultimately planned/contemplated for, future urban development (in the adopted general plans of the Permit Applicants) would become developed. However, full buildout will include some open space and conservation lands within the areas planned for urban development. This includes all lands within the Sacramento County USB that are within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), and all lands within Galt's city limits and within Galt's sphere of influence.
The Mather Core Recovery Area was defined in the 2005 Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.,

The vast majority of urban development under the No Action/No Project Alternative would occur within the UDA described in Section ES.2. However, the No Action/No Project Alternative also assumes that it will become increasingly more difficult for new projects to obtain authorizations under ESA or CWA within the area now designated as the Mather Core Recovery Area (MCRA) by the USACE.5 Consequently, No Action/No Project Alternative also assumes that not all urban development allowed under current zoning could be accommodated within the MCRA, and approximately 1,900 acres of future development could be "displaced" to locations outside the current USB for Sacramento County.

Reduced Permit Term Alternative
This alternative also includes a regional HCP for south Sacramento County, including an ARP; the issuance of 30-year ITPs by USFWS and CDFW; and development of a 30-year multi-level CWA permit strategy by the USACE for HCP Covered Activities. However, the ITPs and the expedited CWA permit strategy would end at year 30, which generally coincides with the durations of the adopted General Plans and reasonably foreseeable master plan projects for the local jurisdictions. Under the Reduced Permit

Term Alternative, the Permit Applicants would implement the same categories of Covered Activities, and request ESA and CESA take coverage for the same Covered Species.
Urban development would occur within the UDA (described in Section ES.2), with the only development Covered Activities outside the UDA being road and pipeline infrastructure projects.

The Reduced Permit Term Alternative would implement an HCP Conservation Strategy during the 30-year permit term, which would include the same Biological Goals for the Planning Area as the Proposed Action/Proposed Project Alternative. The Reduced Permit Term Alternative would implement the same Avoidance and Minimization Measures (AMMs) as the Proposed Action/Proposed Project Alternative and would provide additional avoidance measures not included in the No Action/No Project Alternative.

However, the acres of natural land covers, species habitats, and aquatic resources preserved under each of the Measurable Objectives would be less under the Reduced Permit Term Alternative‘s Conservation Strategy because less urban development would occur during the 30-year permit term of the Reduced Permit Term Alternative, so fewer development fees would be collected to acquire lands for a Preserve System.

SUMMARY OF CEQA FINDINGS OF FACT

- The final EIR has been completed in compliance with CEQA.
- The FEIR was presented to the Board of Supervisors and that the Board of Supervisors reviewed and considered the information contained in the FEIR.
- The FEIR reflects the Board of Supervisor’s independent judgment and analysis.

ADOPTION OF FINDINGS

The Council hereby recognizes and adopts the Findings of Fact for the Project.

EXHIBIT B

CITY OF RANCHO CORDOVA

ORDINANCE NO. XX-2018

AN ORDINANCE OF THE CITY COUNCIL OF RANCHO CORDOVA RELATING TO AQUATIC RESOURCES PROTECTION

THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA DOES ORDAIN AS FOLLOWS:

Section 1. Purpose and Declarations.

WHEREAS, the City Council recognizes that due to urban and agricultural development only a fraction of the aquatic resources that historically dominated the South Sacramento Habitat Conservation Plan's (SSHCP's) Plan Area landscape remains today, and;

WHEREAS, the City Council also recognizes that the avoidance, minimization and compensatory mitigation of aquatic resources provides several important functions and services, such as flood storage, wildlife habitat, mitigation of storm water and pollutants, filtration for drinking water, and prevention of storm damage to buildings and upland areas, and;

WHEREAS, the Aquatic Resources Program promotes a regional approach to balancing development and conservation of aquatic resources located within the SSHCP Plan Area, and;

WHEREAS, the Aquatic Resources Program supports the anticipated implementation of a parallel multi-tiered permitting program to streamline the Clean Water Act Section 404 and 401 permitting process, and;

WHEREAS, the Aquatic Resources Protection Ordinance implements the Aquatic Resources Program.

Section 2: Findings. The City Council hereby finds:

A. The Aquatic Protection Ordinance achieves no-net-loss of aquatic resource function and services and provides efficient aquatic resource permitting consistent with the requirements of the federal Clean Water Act (Sections 404 and 401), California Fish and Game Code Section 1600 and the Porter-Cologne Water Quality Control Act (Porter-Cologne). The ordinance regulates all aquatic resources within that portion of the incorporated boundaries of the City as depicted in the SSHCP.

B. The ordinance facilitates development consistent with the City's General Plan and ensures that there is enough mitigation available to accommodate aquatic

resource mitigation requirements and that habitat mitigation remains economically feasible within the region.

C. The application procedures will ensure that impacts to aquatic resources are avoided and minimized to the greatest extent practicable during implementation of future development.

D. The ordinance also implements aquatic resource avoidance, minimization and compensatory mitigation at a landscape level to protect largely intact watersheds in the Plan Area, including their associated aquatic resources. A primary goal of implementation is to achieve an overall no net loss of aquatic resources functions and services.

Section 3. Amendments to Rancho Cordova Municipal Code Title 16, "Buildings and Construction"

The City Council hereby adds Chapter 16.94, "Aquatic Resources Protection," to Title 16 of the Rancho Cordova Municipal Code (Buildings and Construction), as shown and incorporated in **Attachment 1** to this Ordinance.

Section 4. Severability

If any provision of this Ordinance or the application thereof to any person or circumstance, is held invalid, the remainder of the Ordinance, including the application of such part or provision to other persons or circumstances shall not be affected thereby and shall continue in full force and effect. To this end, provisions of this Ordinance are severable. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase hereof irrespective of the fact that any one or more sections, subsections, subdivisions, paragraphs, sentences, clauses, or phrases be held unconstitutional, invalid or unenforceable.

Section 5. Effective Date

Within fifteen (15) days after adoption, a Summary of this Ordinance shall be published once in the Grapevine Independent, or the Sacramento Bee, a newspaper of general circulation printed and published in Sacramento County and circulated in the City of Rancho Cordova, in accordance with Government Code Section 36933. This Ordinance shall take effect and be enforced thirty (30) days after its inception.

EXHIBIT B

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the _____ day of _____, 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

EXHIBIT B – ATTACHMENT I

CHAPTER 16.94

AQUATIC RESOURCES PROTECTION

Sections

16.94.010 Purpose.
16.94.020 Definition.
16.94.030 Applicability.
16.94.040 Aquatic Resource Impact Permits.
16.94.050 Aquatic Resources Delineation.
16.94.060 Avoidance, Minimization and Compensation Standards.
16.94.070 Compensatory Mitigation Standards.
16.94.080 Setback Standards.
16.94.090 Alternatives for Compliance.
16.94.100 Enforcement.
16.94.110 Severability.

16.94.10 Purpose and Intent.

A. The City Council finds that due to urban and agricultural development only a fraction of the aquatic resources that historically dominated the South Sacramento Habitat Conservation Plan's (SSHCP's) Plan Area landscape remains today and that a regional conservation approach is needed to protect existing aquatic resources within the SSHCP's Plan Area and to streamline the permitting processes for development and infrastructure projects in the Plan Area.

B. The City Council recognizes that the avoidance, minimization and compensatory mitigation of aquatic resources provides several important functions and services, such as flood storage, wildlife habitat, mitigation of storm water and pollutants, filtration for drinking water, and prevention of storm damage to buildings and upland areas.

C. The City Council wishes to avoid or minimize impacts of future activities on SSHCP Plan Area aquatic resources and to ensure "no-net-loss" of aquatic resources and aquatic functions by re-establishing or establishing aquatic resources within the Plan Area as compensatory mitigation when unavoidable impacts to aquatic resources occur.

D. The City Council wishes to facilitate development consistent with the City's General Plan and to ensure that there is enough mitigation available to accommodate aquatic resource mitigation requirements and to ensure that habitat mitigation remains economically feasible within the region.

E. The purpose and intent of this Chapter is to achieve no-net-loss of aquatic resource function and services and to enact efficient aquatic resource permitting consistent with the requirements of the federal Clean Water Act (Sections 404

and 401), California Fish and Game Code Section 1600 and the Porter-Cologne Water Quality Control Act (Porter-Cologne). This Chapter regulates all aquatic resources within that portion of the incorporated boundaries of the City as depicted in the SSHCP.

16.94.020 Definitions.

"Aquatic Resources" means wetland waters (i.e. vernal pools, swales, freshwater marsh, other seasonal wetlands, etc.) Non-wetland waters (i.e. ponds, lakes, streams, rivers, drainages, ditches, etc.), and riparian (i.e. mixed riparian scrub, mixed riparian woodland, etc.).

"Aquatic Resources Impact Permit" means a permit required for any activity permanently or temporarily impacting an Aquatic Resource.

"Avoidance" means avoiding the permanent and/or temporary impact altogether by not taking a certain action or parts of an action.

"Compensatory Mitigation" means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, of aquatic resources for the purposes of offsetting unavoidable adverse permanent and/or temporary impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

"Compensatory Mitigation Ratio" means the amount of Compensatory Mitigation that must be provided to offset an acre or fraction thereof of permanent and/or temporary impact.

"City" means the City of Rancho Cordova.

"Director" means the Community Development Director.

"Enhancement" means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

"Establishment" means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

"Habitat" means the place or environment where a plant or animal naturally lives and grows (a group of particular environmental conditions), and as defined in the South Sacramento Habitat Conservation Plan. Habitat may be occupied (i.e.

individuals or a population of species are or have recently been present) or unoccupied.

"Impact" – See "Permanent Impact" and "Temporary Impact."

"Minimization" means to reduce permanent and/or temporary impacts by limiting the degree or magnitude of the action and its implementation.
"Open Water" means a permanent water impoundment that is mostly free from masses of underwater vegetation at very shallow depths.

"Permanent Impact" means the permanent loss of an Aquatic Resource resulting from the adverse effects of grading, filling, excavation, dredging, or changing of drainage of an Aquatic Resource.

"Plan Area" means that portion of the incorporated boundaries of the City as depicted in the SSHCP.

"Re-establishment" means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

"Rehabilitation" means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

"Riparian" means a transitional area between terrestrial and aquatic ecosystems, which is distinguished by gradients in biophysical conditions, ecological processes, and biota, typically adjacent to perennial, intermittent and ephemeral streams, lakes, and estuarine-marine shorelines.

"Setback" means an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands and streams from disturbances associated with adjacent land uses.

"Stream" means a perennial, intermittent, or ephemeral course of water that has a bed and bank and with a definable ordinary high water mark.

"Temporary Impact" means the grading, filling, excavation, dredging, or changing of drainage of an Aquatic Resource where the Aquatic Resource is restored to pre-construction contours and elevations after construction, and revegetated, as appropriate.

"Vernal Pool" means a type of seasonal wetland habitat that is characterized by a specific set of physical parameters and a unique assemblage of highly specialized

endemic plants and animals; a seasonal body of standing water that typically forms in the spring from direct precipitation, with occasional contributions from other sources, dries out completely in the hotter months of summer, and refills in the autumn; pools free of fish that provide important breeding habitat for many terrestrial or semi-aquatic species such as Branchiopods, frogs, and salamanders.
"Watershed" means a drainage basin that is defined by a 10-digit hydrologic unit code as defined by the Federal Standard for Delineation of Hydrologic Unit Boundaries.

"Wetland" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include freshwater marsh, vernal pools, swales and similar areas.

16.135.030 Applicability.

All proposed projects within the Plan Area that permanently and/or temporarily impact an Aquatic Resource shall require an Aquatic Resources Impact Permit from the City. No person, company, or agency shall permanently or temporarily impact Aquatic Resources as set forth in this Section except as consistent with this Chapter.

A. An Aquatic Resources Impact Permit must be obtained:
   1. In conjunction with any City issued discretionary permit.

   2. Before an activity is performed that impacts Aquatic Resources, if no construction or building permit is required.

B. Exemptions. In general, this Chapter requires permits for permanent and temporary impacts to aquatic resources. However, certain activities are exempt from permit requirements. The following activities and associated uses shall be exempt from the provisions of this Chapter:
   1. Exempt Maintenance Activities.
      a. Maintenance of drainage ditches (does not include new construction of drainage ditches); construction and maintenance of irrigation ditches; maintenance of structures like dams, dikes and levees; and construction and maintenance of stock ponds or farm ponds.
      b. Discharges associated with facilities that are appurtenant and functionally related to irrigation ditches are included in the exemption (e.g. siphons, pumps, headgates, wingwalls, weirs, diversion structures, etc.).
      c. Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period

of time after damage occurs in order to qualify for this exemption.

d. If a maintenance activity would involve any modifications to the original fill design, including the location of the fill, the type of material to be used, the amount of material used, etc., then the activity does not qualify for the maintenance exemption.

2. Exempt Farming, Ranching, and Mining Activities.
   a. Established (ongoing) farming and ranching activities such as plowing, seeding, cultivating, minor drainage, and harvesting for the production of food, fiber, or upland soil and water conservation practices are exempt. This exemption pertains to "normal farming" and harvesting activities that are part of an established, ongoing farming operation. Examples of normal farming practices include but are not limited to planting different crops as part of an established rotation, introduction of a new cultivation technique such as discing between crop rows for weed control and discharges associated with ongoing rotations of rice. Activities that bring an Aquatic Resource into farm production where the Aquatic Resource has not previously been used for farming are not considered part of an established operation, and therefore are not exempted. An example includes the conversion of grazing land to cropland that results in impacts to Aquatic Resources.
   b. Construction and maintenance of permanent and temporary farm roads or temporary mining roads. Temporary roads must be constructed and maintained in accordance with best management practices to assure that flow and circulation patterns and chemical and biological characteristics of Aquatic Resources are not impaired and that the reach of the Aquatic Resources is not reduced, and that any adverse effect on the aquatic environment are minimized. These BMPs which must be applied to satisfy this provision shall include those detailed BMPs described in the State's approved program description pursuant to the requirements of 40 CFR 233.22(i)d.
      i. Roads established within farming or mining operations shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming or mining operations, and local topographic and climatic conditions;
      ii. Road fill shall be bridged, culverted or designed to prevent the restriction of expected flood flows;
      iii. The fill shall be properly stabilized and maintained during and following construction to prevent erosion;
      iv. Discharges shall be made in a manner that minimizes construction equipment in Aquatic Resources outside of the fill area;
      v. Vegetative disturbance shall be kept to a minimum;
      vi. Construction and maintenance of crossing shall not disrupt the migration or other movement of aquatic life;
      vii. Borrow material shall be taken from upland sources where feasible;
      viii. The discharge shall not take, or jeopardize the continued existence of,

a threatened or endangered species, or adversely modify or destroy the critical habitat of such species;

ix. Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and Aquatic Resources shall be avoided;

x. The discharge shall not be located in the proximity of a public water supply intake;

xi. The discharge shall not occur in a component of the National Wild and Scenic River System;

xii. The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts; and

xiii. All temporary fills shall be removed in their entirety and the area restored to its original elevation.

3. Construction of temporary sedimentation basins.
   a. This exemption applies to the construction of temporary sedimentation basins on a construction site which does not permanently impact Aquatic Resources.
   b. Construction site means any site involving the erection of buildings, roads, and other discrete structures and the installation of support facilities necessary for construction and utilization of the structures. Also includes any other land areas which involve land-disturbing excavation activities, including quarrying and other mining areas, where an increase in the runoff of sediment is controlled through the use of temporary sedimentation basins.

C. Interpretation.
   1. When there is a conflict between any provisions of this Chapter or any other regulations adopted by the City, that providing the most protection to aquatic resources shall apply.

   2. If there is any question as to whether a proposed activity qualifies for an exemption, coordination with the City shall occur and results documented in writing.

   3. Compliance with this Chapter does not constitute compliance with other federal, state and local regulations, and permit requirements (for example, Section 106 of the National Historic Preservation Act, USACE Section 404 permits, National Pollutant Discharge Elimination System (NPDES) permits, Section 401 Water Quality Certification, or Porter-Cologne Water Quality Control Act). The project proponent is responsible for complying with all requirements, apart from the provisions of this Chapter.

D. Recapture Provision.
   1. Exemptions do not apply when impacts related to activities change the use of the Aquatic Resource and reduce the reach, or impair the flow or circulation of Aquatic Resources. This "recapture" provision involves a two-part test that

results in an activity being considered not exempt when both parts are met:

a. Does the activity represent a "new use" of the Aquatic Resource; and
b. Would the activity result in a "reduction in reach/impairment of flow or circulation" of Aquatic Resources?
c. Consequently, any impact that results in the destruction of the Aquatic Resource character of an area (e.g., it converts to uplands due to new or expanded drainage) is considered a change in the Aquatic Resource, and by definition, a reduction of their reach and is not exempt.

16.135.040 Aquatic Resource Impact Permits.

A. General.
   1. An Aquatic Resource Impact Permit is required for any development activity that is not exempt pursuant to Section 16.135.030(B) and that permanently and/or temporarily impacts Aquatic Resources.

   2. All Aquatic Resource Impact Permits require approval of a compensatory mitigation plan in accordance with the provisions of Section 16.135.040(J) unless the compensatory mitigation plan requirement is waived under the provisions of Section 16.135.040(J)(3).

B. Standards. Aquatic Resource Impact Permit applications shall comply with all state, local and federal laws, including those related to sediment control, pollution control, floodplain restrictions, storm water management, and on-site wastewater disposal.

C. Pre-Permit Consultation. Any person applying for an Aquatic Resource Impact Permit is encouraged, but not required, to meet with the Director during the earliest possible stages of project planning in order to discuss Aquatic Resource impact avoidance, minimization, compensation, and the required contents of a compensatory mitigation plan before significant commitments have been made to a particular project design. Pre-permit consultations and planning will help project proponents create projects which will be more quickly and easily processed.

D. Permit Applications. Applications for Aquatic Resource Impact Permits shall be made to the Director on forms furnished by the Director. Unless the Director waives one (1) or more of the following information requirements, applications shall include:
   1. Aquatic Resources delineations and setback width designations pursuant to Sections 16.135.050 and 16.135.080;

   2. A site plan for the proposed activity overlaid on an aerial photograph at a scale no smaller than one inch equals one hundred feet (1" = 100', a scaling ratio of 1:1200) showing the location, width, depth and length of all existing and proposed structures, roads, storm water facilities, sewage treatment, installations, stockpiling areas and borrow sites;

3. The exact sites and specifications for all development activities proposed within Aquatic Resources and Setbacks, including:
   a. Timing of construction activity;
   b. Type of equipment;
   c. Type of fill material and cubic yards of each type of fill;
   d. Type and location of permanent and/or temporary impacts to Aquatic Resources.

4. A compensatory mitigation plan meeting the requirements of Section 16.135.040(J).

E. Permit Processing. To the extent practicable and feasible, the processing of Aquatic Resource Impact Permits will be consolidated with other City permits or approvals which affect activities in Aquatic Resources, such as subdivision, grading, site plan, and building permit approval, so as to provide a timely and coordinated permit process.

F. Permit Issuance. The Director shall issue final approval of the Aquatic Resource Impact Permit authorizing commencement of the activity subject to the following conditions:
   1. Submittal and approval of documentation for a project-scale assessment of the effects of a project on Aquatic Resources, including mapping (USACE-verified jurisdictional determination) and a description of the functions and services of the mapped areas' Aquatic Resources; and

   2. Submittal and approval of on-site project alternatives information demonstrating efforts that first avoid, and then minimize permanent and temporary effects to Aquatic Resources; and

   3. Submittal and approval of an alternative that minimizes permanent and temporary impacts to Aquatic Resources and associated functions and services to the greatest extent practicable, if a complete avoidance alternative is not practicable as determined by the Director, Documentation of this Determination of Environmentally Equivalent or Superior Alternative (DEESA) shall be recorded by the Director. See Section 16.135.60(A)(2) for DEESA procedure; and

   4. Submittal and approval of a determination of compliance with SSHCP terms and conditions; and

   5. If compensatory mitigation is required then the following conditions must also be met:
      a. Either the submittal and approval of a permittee-responsible compensatory mitigation plan pursuant to Section 16.135.040(J); and
      b. The recording of a conservation easement as required by Section

16.135.080(C)(2) and (4); and
c. The posting of financial assurance as required by Section 16.135.080(H); or
d. Proof of payment into an in-lieu fee program approved by the USACE and that contains the impact site within its service area; or
e. Proof of compensatory mitigation through payment into a conservation or mitigation bank approved by the USACE and that contains the impact site within its service area.

G. Permit Duration. The Aquatic Resource Impact Permit shall be valid for the period specified in the Aquatic Resource Impact Permit.

H. Aquatic Resource Impact Permit Financial Assurances.
1. Financial Assurance Estimates. The project proponent shall submit itemized cost estimates for the required financial assurances including cost estimates associated with performance assurance and maintenance assurance. The Director may adjust the estimates to ensure that adequate funds will be available to complete the specified compensatory mitigation upon forfeiture. In addition, the cost estimates must include a contingency as follows:
   a. Estimates for bonds shall be multiplied by one hundred fifty percent (150%);
   b. All other estimates shall be multiplied by one hundred ten percent (110%).

2. Waiver of Financial Assurances. The Director may waive the requirement for one or both financial assurances if:
   a. The project proponent demonstrates that it paid into an in-lieu fee program approved by the USACE that contains the impact site within its service area; or
   b. The project proponent used a conservation or mitigation bank that is approved by the USACE and that contains the impact site within its service area.

3. Types of Financial Assurances. The Director shall accept the following forms of financial assurances:
   a. An escrow account secured with an agreement approved by the Director;
   b. A bond provided by a surety for estimates that exceed five thousand dollars ($5,000);
   c. A deposit account with a financial institution secured with an agreement approved by the Director;
   d. A letter of commitment from a public agency; or
   e. Other forms of financial assurance determined to be acceptable by the Director.

4. Acceptance of Work and Release of Financial Assurances.
   a. Release of Performance Assurance. Upon request, the Director shall release the performance assurance when the following conditions are met:

i. Completion of construction and planting specified in the approved compensatory mitigation plan;
ii. Submittal of an as-built report documenting changes to the compensatory mitigation plan (if any) that occurred during construction;
iii. Field inspection of the completed site(s); and
iv. Provision of the required maintenance assurance.

b. Release of Maintenance Assurance. Upon request, the Director shall release the maintenance assurance when the following conditions are met:
i. Completion of the specified monitoring and maintenance program;
ii. Submittal of a final monitoring report demonstrating that the goals and objectives of the compensatory mitigation plan have been met.

c. Incremental Release of Financial Assurances. The Director may release financial assurances incrementally only if specific milestones and associated costs are specified in the approved compensatory mitigation plan and the document legally establishing the financial assurance.

5. Forfeiture. If the aquatic resource impact permit holder fails to perform or maintain compensatory mitigation in accordance with the approved aquatic resource impact permit, the Director may declare the corresponding financial assurance forfeit pursuant to the following process:
a. The Director shall, by registered mail, notify the aquatic resource impact permit holder/agent that is signatory to the financial assurance and the financial assurance holder, of non-performance with the terms of the approved aquatic resource impact permit;
b. The written notification shall cite a reasonable time for the aquatic resource impact permit holder, or legal successor, to either propose alternative compensatory mitigation or to comply with provisions of the aquatic resource impact permit and state the City's intent to forfeit the financial assurance should the required work not be completed in a timely manner.
c. Should the required work not be completed timely, the City shall declare the assurance forfeit.
d. Upon forfeiture of a financial assurance, the proceeds thereof shall be utilized either to correct the deficiencies which resulted in forfeiture or, if such correction is deemed by the Director to be impractical or ineffective, to enhance other aquatic resources in the same watershed or, if deemed impracticable to do so, contribute to an established cumulative effects fund for watershed-scale habitat and aquatic resource conservation.

I. Appeal Process. An Aquatic Resource Impact Permit decision may be appealed to the City Council.

J. Aquatic Resource Impact Permit Compensatory Mitigation Plans.
1. Compensatory mitigation plans are required for activities that permanently and/or temporally impact Aquatic Resources. Content requirements for the Plans that are not applicable to a project may be waived by the Director upon request of the project proponent.

2. The compensatory mitigation plan consists of two (2) parts: baseline information for the site and a conceptual compensatory mitigation plan. If off-site aquatic resource compensatory mitigation is proposed, baseline information for both the project site and mitigation site is required.
   a. Baseline information shall include:
      i. Aquatic Resources delineation as described in Section 16.135.050;
      ii. Description and maps of land cover types and vegetative conditions at the site;
      iii. Description and maps of hydrological conditions at the site;
      iv. Description of soil conditions at the site based on an on-site analysis and available soils information from online or published sources such as the Natural Resources Conservation Service's soils maps;
      v. A topographic map of the site; and
      vi. A functional assessment or condition of the existing aquatic resources.
   b. The contents of the compensatory mitigation plan shall be consistent with the USACE Regional Compensatory Mitigation and Monitoring Guidelines for the South Pacific Division (2015), Appendix D of the ARP, and include:
      i. Title page
      ii. Contributor page;
      iii. Distribution page;
      iv. Table of Contents;
      v. Brief description of proposed compensatory mitigation project and proposed source of compensatory mitigation;
      vi. Determination of goals and objectives of the proposed project. Specific criteria shall be provided for evaluating whether or not the goals and objectives of the compensatory mitigation project are being met. Such criteria may include water quality standards, survival rates of planted vegetation, species abundance and diversity targets, habitat diversity indices, or other ecological, geological or hydrological criteria;
      vii. A description of all permanent and temporary impacts (acreage and linear ft.) that require compensatory mitigation under this Chapter;
      viii. Description of site selection criteria such as watershed overview, landscape setting and position, and site specific information, including consistency with the site selection guidance provided in the ARP (Appendix D);
      ix. Other baseline information such as: map showing locations of permanent and/or temporary impact and compensatory mitigation sites; map showing proposed preserves and setbacks; delineation of Aquatic Resources; functional/condition assessment, if appropriate; species of concern (federal and/or state); cultural resources; existing and planned land uses within and surrounding the proposed compensatory mitigation sites(s); existing site topography/elevations; aerial photos, land uses, site changes (deep ripping, impoundments, channel straightening or realignment); interviews with adjacent landowners, ranchers, land managers regarding locations of seeps, observations of flood events, trespassing/vandalism, opportunities for

education and outreach.

x. Written specifications for the compensatory mitigation project shall be provided. The specifications shall include: the proposed construction sequence, grading and excavation details, water and nutrient requirements for planting, specification of substrate stockpiling techniques, and planting instructions, as appropriate. These written specifications shall be accompanied by detailed site diagrams, scaled cross-sectional drawings, topographic maps showing slope percentage and final grade elevations, and any other drawings appropriate to show construction techniques or anticipated final outcome;

xi. Discussion and map of plant material to be planted and planting densities;

xii. Preliminary drainage plan identifying location of proposed drainage facilities including detention structures and water quality features (e.g., swales);

xiii. Discussion of water sources for all aquatic resources on the site;

xiv. Project schedule;

xv. A monitoring and management program to measure the success of the compensatory mitigation project.

(a) The compensatory mitigation project shall be monitored for a period necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. Compensatory mitigation projects are required to have a minimum monitoring period of five years. For aquatic resources with slow development rates (e.g. vernal pools and riparian habitats) a monitoring period of more than five (5) years is required. Monitoring periods may be extended if performance standards are not being met. Before determining success there should be at least two consecutive annual monitoring reports where all the performance standards are met without human intervention (e.g., artificial irrigation).

(b) Monitoring shall be designed to measure the performance standards outlined in the compensatory mitigation plan.

(c) A monitoring protocol shall be included outlining how the monitoring data will be evaluated by agencies that are tracking the progress of the project.

(d) Monitoring reports shall be submitted annually, or on a pre-arranged alternate schedule, for the duration of monitoring period.

(e) Monitoring reports shall analyze the results of monitoring, documenting milestones, successes, problems, and recommendations for corrective and/or contingency actions to ensure success of the compensatory mitigation project.

xvi. A contingency plan that identifies potential courses of action, and any corrective measures to be taken when monitoring or evaluation indicates project performance standards are not being met.

xvii. A monitoring and management program to measure and maintain the

long-term sustainability of the compensatory mitigation project in perpetuity. Monitoring and management programs shall be consistent with established practices of the SSHCP and ARP and information collected in a manner that allows for seamless integration into the SSHCP database.

3. The preparation of a compensatory mitigation plan is not required if all required compensatory mitigation is achieved through the use of:
   a. A conservation or mitigation bank approved by the USACE that contains the impact site within its service area; or
   b. An in-lieu fee program approved by the USACE that contains the impact site within its service area.

16.135.050 Aquatic Resources Delineation.

A. Aquatic Resources Delineation Standards.
   1. In conjunction with the submittal of an application for a discretionary permit, the Director shall determine the probable existence of Aquatic Resources on the parcel involved in the development permit application. If Aquatic Resources are believed to exist on a parcel, project proponents for all projects subject to this Chapter must prepare a Verified Aquatic Resources Delineation. All Verified Aquatic Resources Delineations shall be performed in accordance with the minimum standards set forth by the Sacramento District USACE and State Water Quality Control Board at the time of the delineation. All Aquatic Resources Delineations shall be submitted to the Director. The Director will in turn submit the Aquatic Resources Delineation to the USACE for verification.

16.135.060 Avoidance, Minimization and Compensation Standards.

A. Avoidance, Minimization and Compensation. Documentation must demonstrate that the following hierarchy of avoidance and minimization has been considered as part of an Aquatic Resources Impact Permit:
   1. Avoid permanent and temporary impacts to Aquatic Resources. The proposed project shall first avoid, and then minimize, permanent and temporary impacts to Aquatic Resources to the greatest extent practicable. Those permanent and/or temporary impacts that are unavoidable shall be mitigated such that the lost functions and services are replaced as set forth under the DEESA described below.

   2. Minimize permanent and/or temporary impacts to Aquatic Resources if complete avoidance is infeasible. The Director must find that the project proponent has limited the degree or magnitude of impact to Aquatic Resources by using a site design that follows DEESA. The DEESA shall include the following information to be supplied by the applicant and reviewed by the Director:
      a. A defined project area boundary.
      b. A detailed project description that demonstrates: 1) why an avoidance

alternative is not practicable; and 2) that the project minimizes direct and indirect effects to Aquatic Resources to the greatest extent practicable. This description shall include information regarding any Aquatic Resources on site that are being avoided.

c. Amount (acres and linear feet (if applicable) and cubic yards) of unavoidable permanent and temporary impacts to Aquatic Resources associated with the project.
d. A detailed description of project design features and how the project complies with mitigation measures as described in Chapter 5 of the South Sacramento Habitat Conservation Plan that reduce permanent and/or temporary impacts, including but not limited to: impact minimization, on-site stream realignment, Best Management Practices, Low Impact Design and Avoidance and Minimization Measures.
e. A description and amount of proposed compensatory mitigation. Compensatory mitigation must conform to the minimum mitigation ratios required by Section 16.135.070.
f. An analysis that demonstrates that, although the proposed project would not completely avoid permanent and/or temporary impacts to Aquatic Resources within the area subject to this Chapter with proposed design and compensation measures, the project would be environmentally equivalent or superior to that which would occur under a complete avoidance alternative without these measures, based on one or more of the following factors:
    i. Effects on designated Critical Habitat and Core Recovery Areas.
    ii. Effects on the abundance of Aquatic Resources.
    iii. Effects on listed species.
    iv. Effects on the diversity of Aquatic Resources.
    v. Effects on habitat connectivity and functions.
    vi. Effects on the condition of Aquatic Resources.
g. Compensate for permanent and temporary impacts to Aquatic Resources that will occur, after efforts to avoid and minimize have been exhausted. The Director must find that:
    i. Unavoidable permanent and temporary impacts are compensated in accordance with Section 16.135.070; and
    ii. The required compensatory mitigation is monitored and remedial action is taken when necessary to ensure the success of mitigation activities.

16.135.070 Compensatory Mitigation Standards.

A. Compensatory mitigation for permanent and temporary impacts to Aquatic Resources is based on the following ratios:

Land Cover Type	Compensatory Mitigation Ratio (Re-Establishment/Establishment)
Vernal Pool	1:1
Swale	1:1
Stream/Creek (VPIH)	1:1
Seasonal wetland	1:1
Freshwater marsh	1:1
Open water	1:1
Riparian	1:1
Mine tailing riparian woodland	1:1

B. Compensatory Mitigation Prioritization. When considering options for successfully providing the required compensatory mitigation, the type and location options shall be considered in the order presented in the Department of the Army, Corps of Engineers' Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 33 C.F.R. Part 332 § 332.3, paragraphs (b)(2) through (b)(6). However the preference hierarchy may be overridden when the required compensatory mitigation involves: larger, more ecologically valuable parcels; is subject to more rigorous scientific and technical analysis, planning and implementation; involves advanced site identification and planning; and utilizes significant investment of financial resources, for sites located to successfully replace lost functions and services, taking into account such watershed-scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, trends in land use, ecological benefits, compatibility with adjacent land uses, and in general and when practicable to meet the aforementioned considerations, in the same watershed. Therefore, any ILF Program adopted by the City consistent with the SSHCP Conservation Strategy and the ARP and approved by the USACE can be the preferred option for successfully providing required compensatory mitigation.

C. Compensatory Mitigation. Allowable types of compensatory Aquatic Resource mitigation are listed below, in the general order of preference.
   1. Re-establishment
   2. Rehabilitation
   3. Establishment (Creation)
   4. Enhancement

16.135.080 Setback Standards.

A. Minimum Wetland and Stream Setback Standards.
   1. Refer to Chapter 5 of the South Sacramento Habitat Conservation Plan for minimum wetland and stream setback standards, which may be amended from time to time.

B. Stream Setback Exemptions. The setback standards of this Chapter do not apply where there is:
   1. An existing Drainage Master Plan that was adopted prior to adoption of this Chapter; or

   2. An existing Specific, Master, or Community Plan that was adopted prior to adoption of this Chapter.

C. Land Use Requirements within Wetland or Stream Setbacks.
   1. Any discretionary review of a proposed project must ensure that sufficient area exists outside of the Wetland or Stream Setback to accommodate primary and accessory structures, paved areas, septic systems, and other uses or activities that might adversely affect the functioning of the Wetland or stream.

   2. A conservation easement shall be recorded in a form approved by the Director as adequate to protect and maintain the Aquatic Resources and setback area consistent with the provisions of this Chapter. Conservation easements will run with the land in perpetuity and be binding on the property owner and successors.

   3. Any lands proposed for development that include all or a portion of a wetland or stream setback will, as a condition of any subdivision map, provide for vegetation or re-vegetation of any portions of the setback that are not vegetated at the time of the application or that were disturbed by prior land uses. Vegetation will include native or natural tree and plant species as deemed acceptable by the Director.

   4. For building lots that exist as of the date of adoption of this Chapter, but for which a building permit or a preliminary site plan approval has not been obtained or is no longer valid, the required minimum front, side, and rear structural setbacks may extend into the wetland or stream setback, provided that an easement is recorded that prohibits clearing or construction in the wetland or stream setback.

   5. A permanent physical demarcation along the upland boundary of the wetland or stream setback shall be installed and thereafter maintained. Such demarcation may consist of fencing or other prominent physical marking that does not impede flood flows and must be approved by the Director. Signs, approved by the Director, shall be posted at an interval of one (1) per one

hundred (100) feet, indicating that the setback area is a protected area. Signs must be perpetually maintained at locations along the outer perimeter of the wetland or stream setback.

D. Allowable Uses Within Wetland and Stream Setbacks:
   1. Refer to Chapter 5 of the South Sacramento Habitat Conservation Plan for allowable uses within stream and wetlands setbacks, which may be amended from time to time.

E. Wetland and Stream Setback Waivers. A waiver of wetland and stream setbacks may be granted by the Director under one of the following conditions:
   1. A lot existing as of the date this Chapter is effective for which there is insufficient room outside the wetland or stream setback for uses permitted by the underlying zoning and for which there is no other reasonable or prudent alternative to placement in the setback, including obtaining variances from setback or other requirements that would allow conformance with the setback requirements.

   2. An economic hardship whereby a project proponent demonstrates to the Director's satisfaction that the subject property is not capable of yielding an economic return as a result of unique circumstances specific to the subject property, as follows:
      a. An economic hardship related to or arising from the characteristics of the property due to the particular physical surroundings, shape, or topographical conditions of the property involved, rather than the personal situations of the project proponent or the result of any action or inaction by the project proponent or the owner or predecessors in title.
      b. The necessity of acquiring additional land to locate development outside the wetland or stream setback will not be considered an economic hardship unless the project proponent can demonstrate that there is no adjacent land that is reasonably available or could be obtained, used, expanded, or managed to fulfill the basic purpose of the proposed activity.
      c. The proposed project will serve an essential public health and safety need, as demonstrated to the satisfaction of the Director.

   3. A project proponent may submit a written request for a wetland or stream setback waiver to the Director. The written request must include specific reasons justifying the waiver and any other information necessary to evaluate the proposed waiver request. The Director may require an alternative analysis that clearly demonstrates that no other feasible alternatives exist and that minimal permanent and temporary impact would occur as a result of the project or development.
   4. In granting a request for a wetland or stream setback waiver, the Director may require project design features including site design, landscape planting, fencing, signs, and water quality best management practices to reduce adverse permanent and temporary impacts on wetlands and streams and

other sensitive resources.

F. Nonconforming Structures.
   1. Legally existing but nonconforming structures and uses of land within wetland or stream setbacks may be continued. Encroachment into the wetland or stream setback will only be allowed where previous allowable (i.e., permitted or otherwise legal) development or disturbance exists. Existing impervious surfaces within the wetland or stream setback that resulted from previous allowable disturbances or developments shall not be expanded. If a legally existing but nonconforming use has been discontinued for a period of more than 90 days, it shall not thereafter be re- established, with the exception of agricultural uses that are following prescribed best management practices for crop rotation. However, resumption of agricultural uses must be strictly confined to the extent of disturbance existing at the time of adoption of this Chapter.

   2. Activities that change the use of the Aquatic Resource and reduce the reach, or impair the flow or circulation of Aquatic Resources are required to obtain an Aquatic Resources Impact Permit. See Section 16.135.030(B)(3)(b).

16.135.090 Alternatives for Compliance.

A. All of the provisions of this Chapter can be met by complying with an approved permit that satisfies all state and federal Clean Water Act requirements and Porter-Cologne Water Quality Control Act requirements.
   1. The Permit must provide coverage within the Plan Area that is applicable to this Chapter; and

   2. The Permit must require compensatory mitigation ratios that are equal to or greater than the ratios presented in this Chapter 16.135.070(A).

16.135.100 Enforcement.

A. The City shall have jurisdiction to enjoin any activities in violation of this Chapter.

B. In the event of a violation of this Chapter, the City shall have the power to order restoration of Aquatic Resources. If the responsible person, entity, or agent does not complete such restoration within a reasonable time following the order, the City shall have the authority to restore the affected aquatic resources to their prior condition and the person, entity, or agent responsible for the violation shall be held liable to the City for the cost of restoration.

C. In addition to other remedies provided for elsewhere in this Chapter, the Director may suspend or revoke Aquatic Resource Impact Permit(s) issued in accordance with this Chapter and associated development permits if the project proponent or permittee has not complied with any or all of the conditions or limitations set forth

in the Aquatic Resource Impact Permit, has exceeded the scope of work set forth in the Aquatic Resource Impact Permit, or has failed to undertake the project in the manner set forth in the Aquatic Resource Impact Permit.

D. In the event that a violation of this Chapter occurs, the City will notify the US Army Corps of Engineers, US Environmental Protection Agency, US Fish and Wildlife Service, the Regional Water Quality Control Board, and California Department of Fish and Wildlife. Notification will be in the form of a one-page form that describes the nature and extent of the violation, with an aerial photo depicting the location of the violation.

16.135.110 Severability.

The City Council declares that should any section, paragraph, sentence, or word of this Chapter be declared for any reason to be invalid, it is the intent of the City Council that it would have passed all other portions of this Chapter, independent of the provision declared invalid.

EXHIBIT C

CITY OF RANCHO CORDOVA

RESOLUTION NO. XX-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA TO ESTABLISH PROCEDURES AND REQUREMENTS FOR IMPLEMENTATION OF THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

WHEREAS, the City Council of the City of Rancho Cordova finds that the ecosystems of the City of Rancho Cordova ("City") and/or southern Sacramento County and the vegetation communities and sensitive species they support are fragile, irreplaceable resources that are vital to the general welfare of all residents; these vegetation communities and natural areas contain habitat value which contributes to the region's environmental resources; and special protections for these vegetation communities and natural areas must be established to prevent future endangerment of the plant and animal species that are dependent upon them.

WHEREAS, this Resolution will protect the City's and the region's biological resources, vegetation communities, and natural areas, and prevent their degradation and loss by guiding development outside of important resource areas, and by establishing mitigation standards which will be applied to development projects.

WHEREAS, adoption and implementation of this Resolution will enable the City to achieve the conservation goals set forth in the South Sacramento Habitat Conservation Plan ("SSHCP"), to implement the associated Implementing Agreement approved by the City Council on October 15, 2018, and to preserve the ability of affected property owners to make reasonable use of their land consistent with the requirements of the National Environmental Policy Act ("NEPA"), the California Environmental Quality Act ("CEQA"), the Federal Endangered Species Act ("FESA"), the California Endangered Species Act ("CESA"), the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act, California Fish and Game Code Section 1600, and other applicable laws.

NOW, THEREFORE, BE IT HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA as follows:

SECTION I. APPLICATION OF REGULATIONS.

Except as provided in Section II, this Resolution shall apply to all land within the City shown on the SSHCP Plan Map, attached as Exhibit "1." Upon application to the City for a development project**,** an applicant shall be required to comply with the procedures set forth in this Resolution. Upon the City's initiation of a project that is subject to CEQA, the City shall be required to comply with the procedures set forth in this Resolution. No project requiring a discretionary permit or other approval that could have adverse

impacts to species covered under the SSHCP shall be approved by the City, and no City-initiated public project shall be undertaken, unless the project is consistent with the SSHCP and this Resolution.

SECTION II. EXEMPTIONS.

This Resolution shall not apply to the following:

A. The adoption or amendment of the City's General Plan.

B. The adoption or amendment of any land use or zoning ordinance.

C. Any project for which and to the extent that a vesting tentative map pursuant to the Subdivision Map Act, or a development agreement pursuant to Government Code sections 65864 et seq., approved or executed prior to adoption of this Resolution, confers vested rights under the City's ordinances or state law to proceed with the project notwithstanding the enactment of this Resolution.

Projects subject to this exemption must comply with all provisions of any applicable state and federal law.

D. Any project for which the City Council determines that application of this Resolution would result in the property owner being deprived of all reasonable economic use of the property in violation of federal or state constitutional prohibitions against the taking of property without just compensation.

SECTION III. PROCEDURES

A. The City will be responsible for ensuring that all activities that are covered by the SSHCP ("Covered Activities") that occur within its jurisdiction, including its own projects, complies with the SSHCP including the application processing procedures pursuant to Chapter 10 of the SSHCP. SSHCP Permit Applications are required for all Covered Activities including activities that may not result in project level Incidental Take; however, the covered activity contributes to the loss of land cover types upon which the SSHCP covered species depend.

B. Before extending Incidental Take coverage to a project, the City must receive confirmation in writing from the SSHCP Implementing Entity that the proposed species and habitat take is consistent with the SSHCP's "jump-start" and "stay-ahead" requirements pursuant to Chapter 9 of the SSHCP.

C. The City is responsible for ensuring that the proposed project's design and construction is in compliance with SSHCP requirements pursuant to Chapter 10 of the SSHCP, and for ensuring that monitoring of avoidance and minimization measures occur during construction pursuant to Chapter 8 of the SSHCP.

D. The City will collect all information required for the SSHCP annual report for each Covered Activity that it approves.

E. The City will pay SSHCP fees related to its own projects and collect SSHCP fees from third-party project proponents. If a third party project proponent proposes to provide land or a conservation easement instead of paying a fee to satisfy mitigation requirements, the SSHCP Implementing Entity must review the proposed land dedication or the conservation easement for consistency with the conservation strategy outlined in Chapter 7 of the SSHCP.

F. The City will provide the SSHCP Implementing Entity with copies of each approved project application package, whether it is its own application package or a third-party project proponent's.

G. The City will adopt the SSHCP fee as set by the SSHCP Implementing Entity.

H. The City will ensure that Covered Activities that they undertake and Covered Activities conducted by third-party project proponents are consistent with the requirements of the Aquatic Resources Plan.

SECTION IV. DEFINITIONS

For purposes of this Resolution, the following terms shall have the meaning set forth herein:

"Plan Area" means the area in which all conservation actions will be implemented and generally where the Plan Permittees have Taken Authorization for Covered Species and species habitat resulting from Covered Activities.

"SSHCP" means the South Sacramento Habitat Conservation Plan prepared by Plan Permittees.

"SSHCP Plan Map" means the map of the area encompassed by the SSHCP as set forth in the attached Exhibit "1."

"Project" means any action or activity that is subject to the City's discretionary approval, or any action or activity undertaken directly by the City, for the purpose of developing or improving real property, including, but not limited to, the following: the sale, purchase, or lease of City-owned property; the approval of a tentative subdivision map; the issuance of a license, permit, certificate, variance, or other entitlement for the development or improvement of real property, including the clearing or grading of real property (except for weed or fire hazard abatement); and the construction or improvement of streets, water, sewer, or other public facilities or publicworks.

SECTION V. IMPLEMENTING AGREEMENT

The City Manager is hereby authorized to execute the Implementing Agreement for the Habitat Conservation Plan for South Sacramento County (Attachment 4 – Appendix C)

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on

EXHIBIT C

the 15th day of October 2018, by the following vote of the City Council:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

EXHIBIT C

EXHIBIT "1" SSHCP PLAN MAP WHICH IS EXHIBIT "A" TO THE IMPLEMENTING AGREEMENT

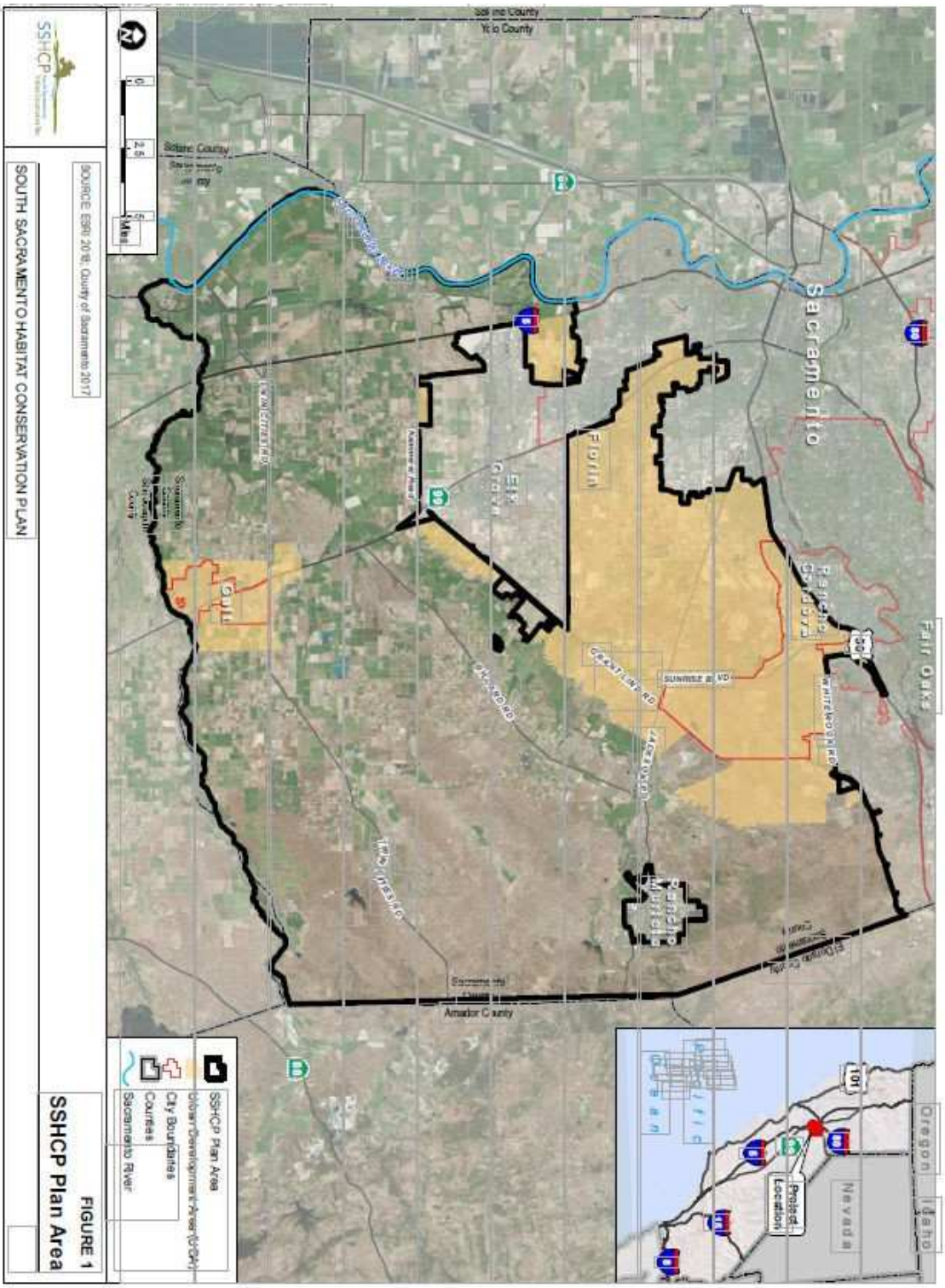


EXHIBIT D

CITY OF RANCHO CORDOVA

ORDINANCE NO. ___-2018

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA TO ESTABLISH THE SSHCP MITIGATION FEE FOR FUNDING THE PRESERVATION OF NATURAL ECOSYSTEMS IN ACCORDANCE WITH THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA DOES ORDAIN AS FOLLOWS:

Section 1. Purpose and Declarations.

WHEREAS, the South Sacramento Habitat Conservation Plan (SSHCP) area encompasses 317,656 acres in the southern portion of Sacramento County, including portions of unincorporated Sacramento County, Galt, and the southern half of Rancho Cordova (Plan Area); and

WHEREAS, the SSHCP is a regional effort that provides development and infrastructure projects with streamlined, predictable federal and state permitting processes while creating a preserve system to protect habitat, open space, and agricultural lands; and

WHEREAS, the SSHCP provides a more effective process for protecting natural resources as compared to the current project-by-project process of mitigation, that often results in small isolated preserves; and

WHEREAS, the SSHCP will help ensure the creation of large, interconnected preserves that are sustained in perpetuity by an adequately funded management program.

Section 2. Findings. The City Council hereby finds and determines as follows:

A. The preservation of vegetation communities and natural areas within the southern portion of Sacramento County which support species covered by the SSHCP is necessary to protect and promote the health, safety, and welfare of all the citizens of the City by reducing the adverse direct, indirect and cumulative effects of urbanization and development and providing for permanent conservation of habitat for species covered by the SSHCP.

B. It is necessary to establish a mitigation fee to ensure that all new development within the County pays its fair share of the costs of acquiring and preserving vegetation communities and natural areas within the City and the region which are known to support plant and wildlife species covered by the SSHCP.

C. A proper funding source to pay the costs associated with mitigating the direct, indirect and cumulative impacts of development to the natural ecosystems within the

City and the region, as identified in the SSHCP, is a development impact fee for residential, commercial, and industrial development. The amount of the fee is determined by the nature and extent of the impacts from the development to the identified natural ecosystems and or the relative cost of mitigating such impacts.

D. The SSHCP and the Nexus Study, a copy of which is on file in the City Clerk's office, provides a basis for the imposition of development impact fees on new construction.

E. The use of the development impact fees to mitigate the impacts to the City's and the region's natural ecosystems is reasonably related to the type and extent of impacts caused by development within the City.

F. The costs of funding the proper mitigation of natural ecosystems and biological resources impacted by development within the City and the region are apportioned relative to the type and extent of impacts caused by the development.

G. The facts and evidence provided to the County establish that there is a reasonable relationship between the need for preserving the natural ecosystems in the City and the region, as defined in the SSHCP, and the direct, indirect and cumulative impacts to such natural ecosystems and biological resources created by the types of development on which the fee will be imposed, and that there is a reasonable relationship between the fee's use and the types of development for which the fee is charged. This reasonable relationship is described in more detail in the SSHCP and the Nexus Study.

H. The cost estimates for mitigating the impact of development on the City's and the region's natural ecosystem and biological resources, as set forth in the SSHCP, are reasonable and will not exceed the reasonably estimated total of these costs.

I. The City Council finds that the benefit to each development project is greater than the amount of the fee to be paid by the project.

J. The fees collected pursuant to this Ordinance shall be used to finance the acquisition of the natural ecosystems and certain improvements described or identified in the SSHCP.

Section 3. CEQA Findings.

The City Council hereby finds that in accordance with CEQA and the State CEQA Guidelines the adoption of this Ordinance is exempt from CEQA pursuant to Section 21080(b)(8) of the California Public Resources Code and Sections 15273 and 15378(b)(4) of the State CEQA Guidelines.

Section 4. Amendment of Title 22 of the Rancho Cordova Municipal Code.

Chapter 22.45 is hereby added to the Rancho Cordova Municipal Code as shown and incorporated in **Attachment 1** of this ordinance.

Section 5. Severability.

EXHIBIT D

This Ordinance and the various parts, sections, and clauses thereof, are hereby declared to be severable. If any part, sentence, paragraph, section, or clause is adjudged unconstitutional or invalid, the remainder of this Ordinance shall be affected thereby. If any part, sentence, paragraph, section, or clause of this Ordinance, or its application to any person entity is adjudged unconstitutional or invalid, such unconstitutionality or invalidity shall affect only such part, sentence, paragraph, section, or clause of this Ordinance, or person or entity; and shall not affect or impair any of the remaining provision, parts, sentences, paragraphs, sections, or clauses of this Ordinance, or its application to other persons or entities. The City Council hereby declares that this Ordinance would have been adopted had such unconstitutional or invalid part, sentence, paragraph, section, or clause of this Ordinance not been included herein; or had such person or entity been expressly exempted from the application of this Ordinance.

Section 6. Effective Date.

This ordinance was introduced and the title thereof read at the regular meeting of the City Council on October 15, 2018. It was adopted on second reading on _____, 2018 and shall become effective 30 days thereafter.

Within fifteen (15) days after adoption, a Summary of this Ordinance shall be published once in the Grapevine Independent, or the Sacramento Bee, a newspaper of general circulation printed and published in Sacramento County and circulated in the City of Rancho Cordova, in accordance with Government Code Section 36933.

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the _____ day of _____, 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

EXHIBIT D
ATTACHMENT I

CHAPTER 22.45

ESTABLISHMENT OF MITIGATION FEES FOR THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Sections:
22.45.010 Purpose.
22.45.020 Administrative Responsibility.
22.45.030 Definitions.
22.45.040 SSHCP Mitigation Fee.
22.45.050 Imposition of the SSHCP Mitigation Fee.
22.45.060 Payment of the SSHCP Mitigation Fee.
22.45.070 Refunds.
22.45.080 Accounting and Disbursement of Collected SSHCP Mitigation Fees.
22.45.090 Exemptions.
22.45.100 Land Dedication in Lieu of Development Fees.

22.45.010 Purpose and Intent.

A. The purpose of the development fee is to cover the mitigation costs associated with new development in the South Sacramento Habitat Conservation Plan Area.

B. Collectively, the development fees will provide the funding required to implement the SSHCP, and as a result, justify and maintain the incidental take permits for new private and public development in the Plan Area under the Federal Endangered Species Acts to ensure that adequate funding for the plan will be provided.

C. The purpose of this chapter is to implement the SSHCP requirements set forth in subsections (A) and (B) of this section and to use the authority in Article XI, Section 7 of the California Constitution by imposing development fees to mitigate the impacts to the City's and the region's natural ecosystems, the need for which is directly or indirectly generated by the type and extent of development proposed in the City of Rancho Cordova on which the fees will be imposed.

22.45.020 Administrative Responsibility.

The South Sacramento Conservation Agency (SSCA) is hereby appointed as the Administrator of this Ordinance. SSCA is hereby authorized to receive all fees generated from the SSHCP Mitigation Fee within the City, and to invest, account for and expend such fees in accordance with the provisions of this Ordinance and the Mitigation Fee Act.

22.45.030 Definitions.

As used in this Ordinance, the following terms shall have the following meanings:

"City Council" means the City Council of the City of Rancho Cordova.

"City" means the City of Rancho Cordova.

"Development" means a human-created change to improved or unimproved real estate, including buildings or other structures, mining, dredging, filing, grading, paving, excavating, and drilling.

"Development Project" or "Project" means any project undertaken for the purpose of development pursuant to the issuance of a building permit by the County pursuant to all applicable ordinances, regulations, and rules of the County and state law.

"Accessory Dwelling Units" according to the State of California legal definition as following: 1) The second unit is not intended for sale and may be rented; 2) The lot is zoned for single-family dwellings; 3) The lot contains an existing single- family dwelling; 4) The second unit is either attached to the existing dwelling and located within the living area of the existing dwelling or detached from the existing dwelling and located on the same lot as the existing dwelling; and 5) Are ministerially amended by each jurisdiction's local codes.

"Ordinance" means this Ordinance of the City of Rancho Cordova.

"Revenue" or "Revenues" means any funds received by the City pursuant to the provisions of this Ordinance for the purpose of defraying all or a portion of the cost of acquiring and preserving vegetation communities and natural areas within the City and the region which are known to support threatened, endangered or key sensitive populations of plant and wildlife species.

"South Sacramento Conservation Agency" or "SSCA" means the governing body established pursuant to the SSHCP that is delegated the authority to oversee and implement the provisions of the SSHCP.

"South Sacramento Habitat Conservation Plan" or "SSHCP" means the South Sacramento Habitat Conservation Plan, adopted by the City of Rancho Cordova on October 15, 2018.

"SSHCP Mitigation Fee" or "Fee" means the development impact fee imposed pursuant to the provisions of this Ordinance.

Any capitalized term not otherwise defined herein shall carry the same meaning and definition as that term is used and defined in the SSHCP.

22.45.040SSHCP Mitigation Fee.

A. Adoption of SSHCP Mitigation Fee Schedule. The City Council shall adopt an applicable SSHCP Mitigation Fee schedule through a separate resolution, which may be amended from time to time.

B. Periodic Fee Adjustment. The fee schedule may be periodically reviewed and the amounts adjusted by the SSCA Governing Board. By amendment to the Resolution referenced in subsection A, above, the fees may be increased or decreased to reflect the changes in actual and estimated costs of the SSHCP including, but not limited to,

debt service, lease payments and acquisition costs. The adjustment of the fees may also reflect changes in the facilities required to be acquired, in estimated revenues received pursuant to this Ordinance, as well as the availability or lack thereof of other funds with which to implement the SSHCP.

C. Authority. SSCA shall have final determination regarding the appropriate methodology to calculate the fee based on the information provided.

22.45.050 Imposition of the SSHCP Mitigation Fee.

Notwithstanding any other provision of the Rancho Cordova Municipal Code, no permit shall be issued for any Development Project unless the SSHCP Mitigation Fee applicable to such Development Project has been paid.

22.45.060 Payment of SSHCP Mitigation Fee.

A. The SSHCP Mitigation Fee shall be paid in full in accordance with applicable law.

B. The SSHCP Mitigation Fee shall be assessed one time per lot or parcel, except when additional construction or improvement on the lot or parcel results in the disturbance of additional area.

C. The SSHCP Mitigation Fee required to be paid under this Ordinance shall be the fee in effect at the time the permit is issued for which the SSHCP Mitigation Fee is assessed.

D. Notwithstanding anything in the Rancho Cordova Municipal Code, or any other written documentation to the contrary, the SSHCP Mitigation Fee shall be paid whether or not the Development Project is subject to conditions of approval by the City imposing the requirement to pay the fee.

E. If all or part of the Development Project is sold prior to payment of the SSHCP Mitigation Fee, the Project shall continue to be subject to the requirement to pay the fee as provided herein.

22.45.070 Refunds.

There shall be no refund of all or part of any SSHCP Mitigation Fee paid under this Ordinance except in cases of miscalculation of the applicable fee. Only in cases of miscalculation of the fee will the person or entity that paid the SSHCP Mitigation Fee be entitled to a refund provided, however, that the deadlines set forth in Government Code section 66020(d) shall apply to any and all requests for refunds.

22.45.080 Accounting and Disbursement of Collected SSHCP Mitigation Fees.

A. All fees paid pursuant to this Ordinance shall be deposited, invested, accounted

for, and expended in accordance with Section 66006 of the Government Code and all other applicable provisions of law.

B. Subject to the provisions of this section, all fees collected pursuant to this Ordinance shall be remitted to the South Sacramento Conservation Agency at least quarterly.

22.45.090 Exemptions.

The following types of construction shall be exempt from the provisions of this Ordinance:

A. Reconstruction or improvements that are damaged or destroyed by fire or other natural causes, provided that the reconstruction or improvements do not result in additional usable square footage.

B. Rehabilitation or remodeling to an existing Development Project, provided that the rehabilitation or remodeling do not result in additional usable square footage.

C. Accessory Dwelling Units, constructed on developed residential property and meeting all state and County requirements for such units.

D. Existing improvements that are converted from an existing permitted use to a different permitted use, provided that no additional area of the property is disturbed as a result of such conversion.

E. Development Projects which are the subject of a development agreement entered into pursuant to Government Code section 65864 et seq., prior to the effective date this Ordinance wherein the imposition of new fees are expressly prohibited, provided that if the term of such a development agreement is extended by amendment or by any other manner after the effective date of this Ordinance, the SSHCP Fee shall be imposed.

22.45.100 Land Dedication in Lieu of Development Fees.

The implementation strategy outlined in Chapter 9 of the SSHCP describes a land dedication process where project proponents can dedicate land towards satisfying their mitigation requirements and thereby reduce their SSHCP mitigation fees. When the dedication of land is accepted into the SSHCP Preserve System, the SSHCP Mitigation Fee will be adjusted by excluding the appropriate portion of the land acquisition component of the SSHCP Mitigation Fee. The remaining components of the SSHCP Mitigation Fee (i.e., Re-establishment/Establishment, Endowment, and Other) will remain unchanged, as they are used to fund ongoing conservation activities that are required on all Preserve lands.

Covered Activities

Covered Activities are projects or activities that are allowable under the SSHCP and thus can use the SSHCP to mitigate for project impacts. Covered Activities within the Urban Development Area (UDA) include activities and projects related to urban development and associated infrastructure. Covered Activities outside of the UDA are limited to specific infrastructure projects related to roadway improvements and recycled water delivery. Covered Activities also include actions within the proposed SSHCP preserve system that are required to manage, monitor, enhance, and re-establish or establish habitat.

The SSHCP Covered Activities fall into eight general categories:

- Urban development in the UDA
- Mining in the UDA
- Rural transportation projects
- Recycled water projects
- Covered Activities in preserve setbacks in the UDA
- Covered Activities in stream setbacks in the UDA
- SSHCP preserve system covered activities
- Covered Activities in the Laguna Creek Wildlife Corridor of the preserve system

Each covered activity implemented under the SSCHP would implement measures to avoid or minimize project impacts to covered species, to natural communities that provide habitat for these species, and to the aquatic resources at the project site. Species and habitat impacts that cannot be avoided would be offset by the preservation of high-quality habitat within a large and interconnected SSHCP preserve system. The SSHCP preserve system would protect terrestrial habitats, aquatic habitats, and species populations in perpetuity and would be managed and monitored in perpetuity to assure that biological goals and objectives of the SSHCP are met. In addition, the direct loss of aquatic resource functions and services would also be offset by the re-establishment or the establishment of aquatic resources within the SSHCP preserve system.

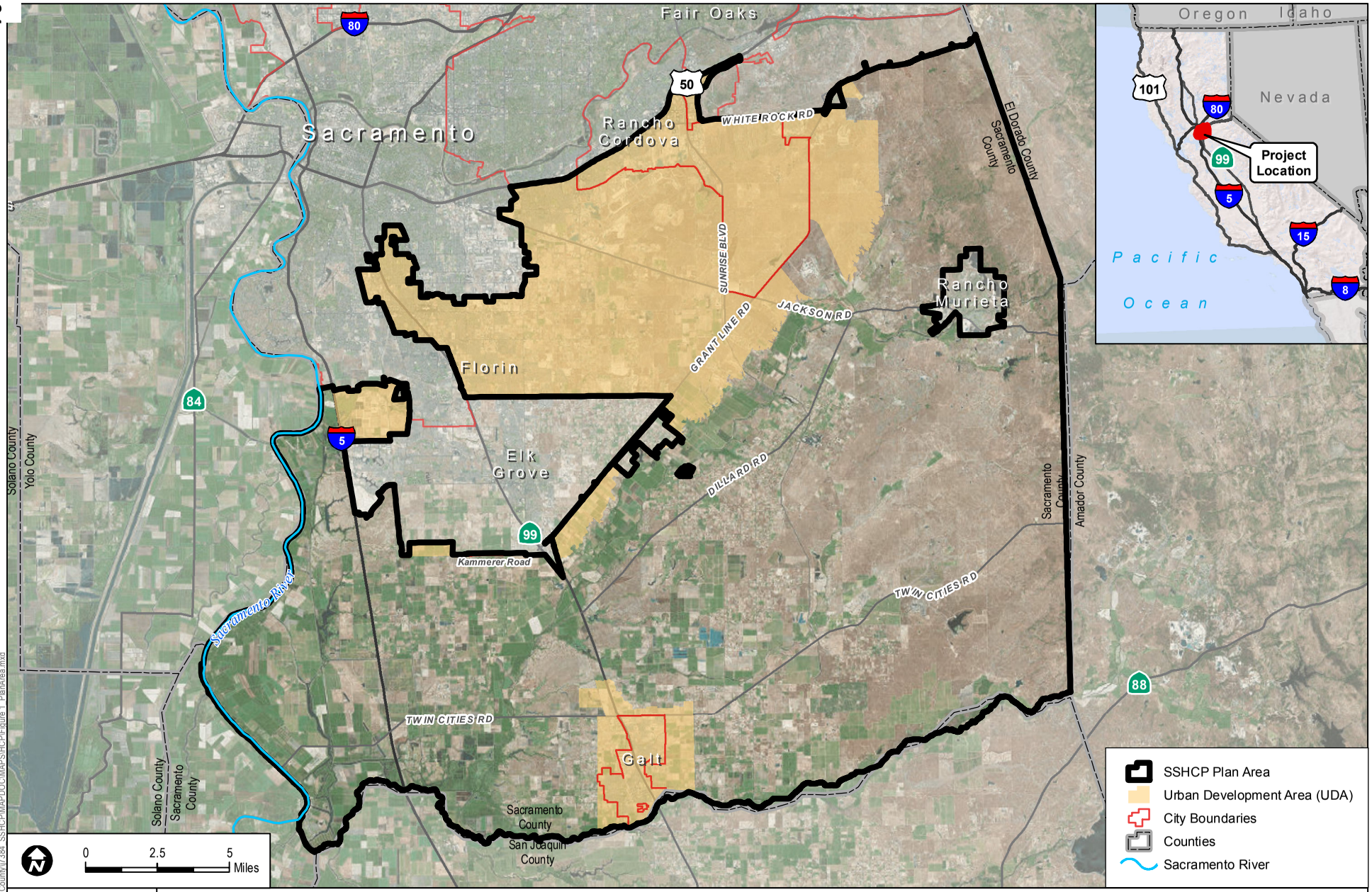
Covered Species

The SSHCP provides take authorization for 28 Covered Species, of which, 11 (shown in bold) are currently listed as threatened or endangered under the CESA or the federal ESA (Table 1). The SSHCP includes conservation actions to protect all 28 Covered Species whether or not they are currently listed. As SSHCP Covered Species, any currently non-listed species that is covered under the SSHCP will not require additional

conservation within the Plan Area should the species become listed under the federal ESA during the SSHCP permit term.

Table 1 - Covered Species

Invertebrates	**Mammals**
1. Vernal pool tadpole shrimp	19. Western red bat
2. Vernal pool fairy shrimp	20. American badger
3. Mid-valley fairy shrimp	
4. Valley elderberry longhorn beetle	**Plants**
5. Ricksecker's water scavenger beetle	21. Dwarf downingia
Amphibians	**22. Boggs Lake hedge-hyssop**
6. California tiger salamander	23. Ahart's dwarf rush
7. Western spadefoot	24. Legenere
Reptiles	25. Pincushion navarretia
8. Western pond turtle	**26. Slender Orcutt grass**
9. Giant garter snake	**27. Sacramento Orcutt grass**
Birds	28. Sanford's arrowhead
10. Cooper's hawk	
11. Tricolored blackbird	
12. Western burrowing owl	
13. Ferruginous hawk	
14. Swainson's hawk	
15. Northern harrier	
16. White-tailed kite	
17. Greater sandhill crane	
18. Loggerhead shrike	



SOURCE: ESRI 2018; County of Sacramento 2017

FIGURE 1

SSHCP Plan Area

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\SHCP\Figure 1_PlanArea.mxd

SSHCP South Sacramento Habitat Conservation Plan

FINAL SOUTH SACRAMENTO HABITAT CONSERVATION PLAN







PLAN PARTNERS

County of Sacramento

City of Rancho Cordova

City of Galt

Sacramento County Water Agency

Southeast Connector Joint Powers Authority

VOLUME I

February 2018

Final

South Sacramento Habitat Conservation Plan

February 2018

Prepared by:

County of Sacramento
City of Rancho Cordova
City of Galt
Sacramento County Water Agency
Southeast Connector Joint Powers Authority

With Assistance From:

Dudek
853 Lincoln Way, Suite 105
Auburn, CA 95603

Economic & Planning Systems
One Kaiser Plaza, Suite 1410
Oakland, CA 94612

Best, Best and Krieger
3390 University Avenue
5th Floor, PO Box 1028
Riverside, CA 92502

Citation:

County of Sacramento, City of Rancho Cordova, City of Galt, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Southeast Connector Joint Powers Authority. 2018. *Final South Sacramento Habitat Conservation Plan*. January 2018. Sacramento, CA.

ACKNOWLEDGEMENTS

Plan Partner Leadership

Nav Gill, Chief Executive Officer, Sacramento County
Rob Leonard, Chief Deputy County Executive, Sacramento County
Michael Penrose, Interim Community Development Director, Sacramento County
Cyrus Abhar, City Manager, City of Rancho Cordova
Eugene Palazzo, City Manager, City of Galt
Tom Zlotkowski, Executive Director, Southeast Connector Joint Powers Authority
Michael Peterson, Water Resources Director, Sacramento County
Prabhakar Somavarapu, District Engineer, Sacramento Regional County Sanitation District

The plan partner leadership committee wishes to thank the many individuals who have made significant contributions to development of earlier drafts of the South Sacramento Habitat Conservation Plan (SSHCP) over the years. The following list consists of those individuals who most recently provided significant input to the process or were directly involved in preparing this Draft SSHCP.

Plan Permittees

County of Sacramento

Leighann Moffitt
Rich Radmacher
Krista Whitman

City of Rancho Cordova

Aaron Bush
Paul Junker (Michael Baker)
Joyce Hunting (Hunting Environmental)

City of Galt

Chris Erias

Sacramento County Water Agency

Kerry Schmitz

Southeast Connector Joint Powers Authority

Derek Minnema

Program Manager

Bill Ziebron (Ziebron Group)

Local Partner

Sacramento Regional County Sanitation District

Steve Norris
Bryan Young

State and Federal Permitting Agencies

U.S. Fish and Wildlife Service

Jennifer Norris
Jan Knight
Nina Bicknese
Rick Kuyper

California Department of Fish and Wildlife

Jeff Drongesen
Todd Gardner
Jennifer Nguyen

U.S. Army Corps of Engineers

Mary Packenham-Walsh

Regional Water Quality Control Board

Elizabeth Lee

U.S. Environmental Protection Agency

Paul Jones

Consultants

Dudek

Sherri Miller
Mike Henry
Tyler Friesen

Economic & Planning Systems

Teifion Rice-Evans
Ben Sigman

Best, Best and Krieger

Michelle Ouellette

Stacey McKinley Consulting

Stacy McKinley

Endicott Communications

Gene Endicott

MMS Strategies

Michelle Smira-Bratmiller

Stakeholders

This project would not have been possible without the significant contributions of numerous individuals from the environmental, agricultural and development communities. Their investment of countless hours to review and comment on documents, meet with the project team, and provide feedback was invaluable in moving this complex process forward. We wish to express our gratitude to these committed stakeholders, whose important contributions are deeply appreciated.

INTENTIONALLY LEFT BLANK

Final South Sacramento Habitat Conservation Plan

TABLE OF CONTENTS

Section **Page No.**

EXECUTIVE SUMMARY ES-1
ES.1 Overview ES-1
ES.2 Geographic Scope ES-2
ES.3 Permit Term ES-2
ES.4 Covered Activities ES-2
ES.5 Covered Species ES-3
ES.6 Conservation Strategy ES-5
ES.7 Preserve System ES-6
ES.8 Habitat Re-Establishment/Establishment ES-7
ES.9 Monitoring and Management Programs ES-7
ES.10 Conditions on Covered Activities ES-8
ES.11 Implementation ES-9
ES.12 Cost and Funding ES-9

1 INTRODUCTION 1-1
1.1 Overview 1-1
1.1.1 SSHCP Mission Statement 1-3
1.1.2 Purpose and Benefits of the SSHCP 1-4
1.1.3 Background 1-6
1.2 Scope of the Habitat Plan 1-8
1.2.1 Geographic Scope of the Plan Area 1-8
1.2.2 Covered Activities 1-11
1.2.3 Permit Term 1-12
1.2.4 Covered Species 1-14
1.2.5 Areas Outside the UDA 1-18
1.3 Regulatory Setting 1-18
1.3.1 Federal and State Endangered Species Laws 1-19
1.3.2 Other Federal and State Wildlife Laws and Regulations 1-25
1.3.3 National Environmental Policy Act 1-27
1.3.4 California Environmental Quality Act 1-27
1.3.5 Federal and State Wetland Laws and Regulations 1-28
1.3.6 National Historic Preservation Act 1-30
1.4 Plan Development Process 1-30
1.4.1 Organization of the Planning Process 1-30
1.5 Document Organization 1-32

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

1.6 Appendices 1-33
1.7 References 1-34

2 PHYSICAL SETTING 2-1
2.1 Introduction 2-1
2.2 Physical Landscape 2-1
2.3 Geomorphology 2-1
2.3.1 Landforms 2-1
2.3.2 Geologic Formations 2-9
2.3.3 Soils 2-16
2.4 Atmospheric Conditions 2-23
2.5 Surface Waters 2-25
2.5.1 Important Rivers, Streams, and Creeks within the UDA 2-25
2.5.2 Important Rivers, Streams, and Creeks outside the UDA 2-30
2.5.3 Plan Area Watersheds 2-31
2.6 References 2-43

3 BIOLOGICAL RESOURCES SETTING 3-1
3.1 Introduction 3-1
3.2 SSHCP Land Cover Type Definitions 3-1
3.2.1 SSHCP Aquatic Land Cover Types 3-5
3.2.2 SSHCP Terrestrial Land Cover Types 3-15
3.2.3 SSHCP Vernal Pool Ecosystem 3-19
3.2.4 Developed and Other Non-Habitat Land Cover Types 3-21
3.3 Land Cover and Vernal Pool Watershed Mapping 3-23
3.3.1 Land Cover Mapping 3-23
3.3.2 Vernal Pool Mocro-Watershed Mapping 3-23
3.4 Covered Species Habitat Models 3-25
3.4.1 Plant Covered Species Habitat Models 3-30
3.4.2 Invertebrate Covered Species Modeled Habitat 3-55
3.4.3 Amphibians 3-73
3.4.4 Reptiles 3-81
3.4.5 Birds 3-89
3.4.6 Mammals 3-122
3.5 Existing Preserves in the Plan Area 3-128
3.6 SSHCP Covered Species Critical Habitat 3-131
3.6.1 Slender Orcutt Grass and Sacramento Orcutt Grass 3-131

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

3.6.2 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp 3-132
3.6.3 Valley Elderberry Longhorn Beetle 3-133
3.6.4 California Tiger Salamander 3-133
3.7 SSHCP Covered Species Recovery Plans 3-134
3.7.1 Vernal Pool Species 3-134
3.7.2 Giant Gartersnake 3-139
3.7.3 Valley Elderberry Longhorn Beetle 3-142
3.8 SSHCP Preserve Planning Units 3-144
3.9 References Cited 3-173

4 LAND USE 4-1
4.1 Introduction 4-1
4.2 Historical Land Use Conditions of the Plan Area 4-1
4.3 Existing and Planned Land Use by Jurisdiction 4-1
4.3.1 Sacramento County 4-2
4.3.2 Rancho Cordova 4-14
4.3.3 Galt 4-18
4.3.4 Existing and Proposed Extra-Territorial Spheres of Influence 4-24
4.4 Demographics of the Plan Area 4-25
4.5 References 4-27

5 COVERED ACTIVITIES 5-1
5.1 Introduction 5-1
5.2 Covered Activity Categories 5-3
5.2.1 Urban Development in the UDA 5-4
5.2.2 Mining in the UDA 5-23
5.2.3 Rural Transportation Projects 5-24
5.2.4 Recycled Water Projects 5-31
5.2.5 Covered Activities in Preserve Setbacks in the UDA 5-32
5.2.6 Covered Activities in Stream Setbacks in the UDA 5-43
5.2.7 SSHCP Preserve System Covered Activities 5-47
5.2.8 Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System 5-55
5.3 Activities and Actions Not Covered by the SSHCP Permits 5-61
5.4 Conditions on Covered Activities 5-65
5.4.1 General Avoidance and Minimization Measures 5-66
5.4.2 Covered Species Take Avoidance and Minimization Measures 5-91

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

5.5 How Conditions on Covered Activities are Applied to Various Urban Development Permit Types Approved by the Land Use Authority Permittees 5-113
5.5.1 Master Plans 5-114
5.5.2 Use Permits 5-114
5.5.3 Grading Permits 5-115
5.5.4 Building Permits 5-115
5.6 References Cited 5-118

6 EFFECTS ASSESSMENT AND LEVEL OF TAKE 6-1
6.1 Introduction 6-1
6.2 Species Effects Definitions 6-1
6.3 Environmental Stressors from Covered Activities 6-4
6.3.1 Permanent Environmental Stressors of Covered Activities 6-5
6.3.2 Temporary Environmental Stressors During Construction of Covered Activities 6-16
6.4 Methods to Assess Effects of Covered Activities 6-32
6.4.1 SSHCP Avoidance and Minimization Measures 6-33
6.4.2 GIS-Driven Calculation of Permanent Effects 6-55
6.4.3 Qualitative Analysis of Indirect Effects 6-63
6.5 Effects of Covered Activities on Land Cover Types 6-63
6.5.1 Permanent Effects on Land Cover Types 6-63
6.5.2 Temporary Effects on Land Cover Types 6-75
6.6 Effects of Covered Activities on Covered Species 6-77
6.6.1 Ahart's Dwarf Rush 6-77
6.6.2 Boggs Lake Hedge-Hyssop 6-87
6.6.3 Dwarf Downingia 6-97
6.6.4 Legenere 6-107
6.6.5 Pincushion Navarretia 6-117
6.6.6 Sacramento Orcutt Grass 6-127
6.6.7 Slender Orcutt Grass 6-141
6.6.8 Sanford's Arrowhead 6-155
6.6.9 Vernal Pool Fairy Shrimp 6-167
6.6.10 Mid-Valley Fairy Shrimp 6-181
6.6.11 Vernal Pool Tadpole Shrimp 6-190
6.6.12 Ricksecker's Water Scavenger Beetle 6-202

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

6.6.13 Valley Elderberry Longhorn Beetle 6-210
6.6.14 California Tiger Salamander 6-219
6.6.15 Western Spadefoot 6-235
6.6.16 Giant Gartersnake 6-251
6.6.17 Western Pond Turtle 6-263
6.6.18 Cooper's Hawk 6-275
6.6.19 Ferruginous Hawk 6-286
6.6.20 Swainson's Hawk 6-297
6.6.21 White-Tailed Kite 6-310
6.6.22 Northern Harrier 6-322
6.6.23 Western Burrowing Owl 6-334
6.6.24 Loggerhead Shrike 6-344
6.6.25 Greater Sandhill Crane 6-355
6.6.26 Tricolored Blackbird 6-368
6.6.27 American Badger 6-380
6.6.28 Western Red Bat 6-390
6.7 References Cited 6-400

7 CONSERVATION STRATEGY 7-1
7.1 Guiding Principles of the SSHCP Conservation Strategy 7-5
7.2 Information Relevant to Conservation Strategy Development 7-8
7.2.1 SSHCP GIS Database 7-10
7.2.2 SSHCP Preserve Categories 7-12
7.3 Biological Goals and Measurable Objectives 7-14
7.3.1 Identification of SSHCP Biological Goals and Measurable Objectives 7-14
7.3.2 SSHCP Biological Goals and Measurable Objectives 7-15
7.4 Development of the SSHCP Preserve System 7-55
7.4.1 Preserve System Assembly Process 7-55
7.4.2 Benefits to Non-Covered Species 7-65
7.4.3 Existing Preserves in the Plan Area 7-65
7.5 Description of the SSHCP Preserve System 7-66
7.5.1 Preserve System Inside the UDA by PPU 7-68
7.5.2 Preserve System Outside the UDA by PPU 7-87

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

7.5.3 Preserve Connectivity 7-92
7.5.4 Studies Required by SSHCP Biological Goals and Measurable Objectives 7-93
7.6 Conservation Analysis 7-94
7.6.1 Natural Land Cover Analysis 7-95
7.6.2 Covered Species 7-120
7.6.3 Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon 7-305
7.7 References Cited 7-310

8 SSHCP MONITORING AND MANAGEMENT PROGRAMS 8-1
8.1 Introduction 8-1
8.1.1 Regulatory Context 8-1
8.2 SSHCP Compliance and AMM Monitoring Program 8-4
8.2.1 SSHCP Compliance Monitoring 8-4
8.2.2 AMM Compliance Monitoring 8-61
8.2.3 AMM Effectiveness Monitoring 8-88
8.3 SSHCP Preserve System Monitoring and Management Program 8-107
8.3.1 Principles of SSHCP Preserve Monitoring and Management 8-107
8.3.2 Overview of the SSHCP Preserve System Monitoring and Management Program 8-110
8.3.3 Monitoring Effectiveness of the SSHCP Preserve System 8-111
8.3.4 SSHCP Preserve System Management 8-149
8.3.5 Monitoring and Management outside the Preserve System 8-153
8.4 Data Management and Reporting 8-153
8.4.1 Annual Reports 8-154
8.4.2 SSHCP Implementing Entity will Share SSHCP Preserve Monitoring Data with Other Programs 8-157
8.5 References Cited 8-159

9 IMPLEMENTATION 9-1
9.1 Introduction 9-1
9.2 Plan Permittees 9-1
9.2.1 Land Use Authority Permittees 9-2
9.2.2 Plan Partner Permittees 9-4
9.3 Implementation Structure 9-5
9.3.1 Implementing Entity 9-5

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

9.3.2 Wildlife Agencies 9-13
9.3.3 Other State and Federal Permitting Agencies 9-15
9.3.4 Technical Advisory Committee/Interagency Review Team 9-17
9.3.5 Public Input 9-19
9.3.6 Dispute Resolution 9-19
9.4 Preserve Acquisition 9-19
9.4.1 Willing Sellers 9-19
9.4.2 Process for Acquisition of Preserve Land 9-20
9.4.3 Conservation Easements 9-22
9.4.4 Land Dedication in Place of SSHCP Fees 9-24
9.4.5 Early Enrollment Program 9-26
9.4.6 Jump-Start and Stay-Ahead Provisions 9-27
9.4.7 Gifts of Land 9-32
9.4.8 Private Conservation or Mitigation Banks 9-32
9.4.9 Grazing Leases, Licenses, or Contracts within the Preserve System 9-33
9.5 Easements on Setbacks 9-34
9.5.1 Preserve Setbacks 9-34
9.5.2 Stream Setbacks 9-35
9.6 SSHCP Implementing Agreement 9-38
9.7 Ordinances and Resolutions 9-39
9.7.1 Implementing Ordinance or Resolution 9-39
9.7.2 Aquatic Resources Protection Ordinance 9-40
9.7.3 "Catch-Up Fee" Ordinance 9-40
9.8 Data Repository Development and Maintenance 9-40
9.9 Reporting 9-42
9.9.1 Annual and 5-Year Implementation Reports 9-42
9.9.2 20-Year Review 9-43
9.10 SSHCP Modifications and Amendments 9-43
9.10.1 Administrative Revisions 9-43
9.10.2 Minor Modifications 9-44
9.10.3 Amendments 9-46
9.10.4 Future Land Use Planning Changes 9-47
9.10.5 Permit Renewal 9-48
9.10.6 Permit Suspension or Revocation 9-48

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

9.11 Implementation Schedule and Deadlines 9-49
9.12 References 9-52

10 SSHCP PERMIT APPLICATION PROCESS 10-1
10.1 Introduction 10-1
10.2 Submittal of SSHCP Permit Applications 10-1
10.2.1 SSHCP Permit Applications for Third-Party Project Proponents 10-1
10.2.2 Pre-Application Procedures 10-3
10.2.3 SSHCP Permit Applications for Plan Permittees 10-3
10.2.4 SSHCP Permit Applications for Participating Special Entitles 10-4
10.3 Determining Master Plan Consistency with the SSHCP 10-4
10.4 SSHCP Permit Application Processing 10-5
10.4.1 Timing of SSHCP Permit Application Submittal 10-5
10.4.2 Components of the SSHCP Permit Application Package 10-5
10.5 Review for Completeness 10-10
10.6 Assessment of Impacts on SSHCP Land Cover Types 10-10
10.6.1 Method for Calculating Impacted Acreage 10-10
10.6.2 Appealing the Impact Assessment 10-11
10.7 SSHCP Development Fees and Land Dedication 10-11
10.7.1 SSHCP Development Fees 10-12
10.7.2 Land Dedication in Lieu of SSHCP Development Fees 10-12
10.8 SSHCP Permit Authorization Issuance 10-13

11 CHANGED AND UNFORESEEN CIRCUMSTANCES – ASSURANCES 11-1
11.1 Assurances for Private Landowners 11-1
11.1.1 Willing Sellers 11-1
11.1.2 Land or Easement Acquisition Pricing 11-1
11.1.3 No Use of Eminent Domain 11-2
11.1.4 No Change of Land Use or Zoning Designations 11-2
11.1.5 Good Neighbor Program 11-2
11.1.6 Public Notification of Land Acquisitions 11-4
11.1.7 Easement Acquisitions 11-5
11.1.8 No Public Access to Conservation Easements Held by Private Landowners 11-5
11.2 Assurances to the Permittees – The No Surprises Rule 11-5
11.2.1 Changed Circumstances 11-6
11.2.2 Unforeseen Circumstances 11-7

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

11.3 Climate Change 11-9
11.3.1 Projected Climate Change and Effects in California 11-9
11.3.2 Climate Change and SSHCP Covered Species 11-10
11.4 SSHCP Changed and Unforeseen Circumstances 11-25
11.4.1 Listing of Covered Species 11-25
11.4.2 Listing of New Species 11-26
11.4.3 Climate Change 11-27
11.5 References Cited 11-38

12 ECONOMICS ANALYSIS AND FUNDING PROGRAM 12-1
12.1 Overview 12-1
12.2 Cost Analysis Methodology and Data 12-1
12.3 Costs Associated with Implementation of the SSHCP 12-3
12.3.1 Land and Easement Acquisition Costs 12-3
12.3.2 Habitat Re-establishment/Establishment 12-7
12.3.3 Habitat Management, Monitoring, and Adaptive Management Costs 12-9
12.3.4 Cost of Remediating Changed Circumstances 12-12
12.3.5 Agricultural Enhancement Funding 12-13
12.3.6 SSHCP Administration Cost 12-13
12.3.7 Endowment 12-15
12.3.8 SSHCP Development and Preparation Cost Recovery 12-16
12.3.9 Summary of HCP Costs and Funding Requirements 12-16
12.4 SSHCP Funding Program (Sources and Assurances) 12-17
12.4.1 SSHCP Development Fee Concept 12-18
12.4.2 SSHCP Development Fee Structure 12-18
12.4.3 SSHCP Development Fee Program and Schedule 12-19
12.4.4 Funding Adequacy and Assurances 12-22

13 ALTERNATIVES TO AVOID OR REDUCE TAKE 13-1
13.1 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp 13-1
13.2 Valley Elderberry Longhorn Beetle 13-3
13.3 California Tiger Salamander 13-5
13.4 Giant Gartersnake 13-7
13.5 References Cited 13-8

TABLE OF CONTENTS (CONTINUED)

Page No.

APPENDICES

A Glossary and Acronyms
B Species Accounts
C Implementing Agreement
D Sample Easement
E Land Cover Type Report/Vernal Pool Watershed Mapping
F Preserve Documentation Report Template
G Preserve Management and Monitoring Details
H Implementation Ordinance/Resolution
I SSHCP Economic Model
J Voluntary Additional Conservation
K Project-Specific Avoidance and Minimization Measures
L SSHCP Preserve Design

FIGURES

1-1 SSHCP Plan Area 1-9
2-1 Physiographic Regions 2-3
2-2 Geographic Landforms 2-5
2-3 Geologic Formations 2-11
2-4 Watersheds 2-27
3-1 Plan Area Land Cover Types 3-3
3-2 Streams/Creeks Vernal Pool Invertebrate Habitat (VPIH) 3-11
3-3 Ahart's Dwarf Rush Modeled Habitat and Documented Occurrences 3-33
3-4 Boggs Lake Hedge-Hyssop Modeled Habitat and Documented Occurrences 3-35
3-5 Dwarf Downingia Modeled Habitat and Documented Occurrences 3-39
3-6 Legenere Modeled Habitat and Documented Occurrences 3-43
3-7 Pincusion Navarretia Modeled Habitat and Documented Occurrences 3-47
3-8 Sacramento Orcutt Grass Modeled Habitat and Documented Occurrences 3-49
3-9 Slender Orcutt Grass Modeled Habitat and Documented Occurrences 3-53
3-10 Sanford's Arrowhead Modeled Habitat and Documented Occurrences 3-57
3-11 Midvalley Fairy Shrimp Modeled Habitat and Documented Occurrences 3-61
3-12 Ricksecker's Water Scavenger Beetle Modeled Habitat and Documented Occurrences 3-63

TABLE OF CONTENTS (CONTINUED)

Page No.

3-13 Valley Elderberry Longhorn Beetle Modeled Habitat and Documented Occurrences 3-67
3-14 Vernal Pool Fairy Shrimp Modeled Habitat and Documented Occurrences 3-71
3-15 Vernal Pool Tadpole Shrimp Modeled Habitat and Documented Occurrences 3-75
3-16 California Tiger Salamander Modeled Habitat and Documented Occurrences 3-79
3-17 Western Spadefoot Modeled Habitat and Documented Occurrences 3-83
3-18 Giant Gartersnake Modeled Habitat and Documented Occurrences 3-87
3-19 Western Pond Turtle Modeled Habitat and Documented Occurrences 3-91
3-20 Cooper's Hawk Modeled Habitat and Documented Occurrences 3-95
3-21 Ferruginous Hawk Modeled Habitat and Documented Occurrences 3-97
3-22 Greater Sandhill Crane Modeled Habitat and Documented Occurrences 3-101
3-23 Loggerhead Shrike Modeled Habitat and Documented Occurrences 3-105
3-24 Northern Harrier Modeled Habitat and Documented Occurrences 3-109
3-25 Swainson's Hawk Modeled Habitat and Documented Occurrences 3-113
3-26 Tricolored Blackbird Modeled Habitat and Documented Occurrences 3-115
3-27 Western Burrowing Owl Modeled Habitat and Documented Occurrences 3-119
3-28 White-Tailed Kite Modeled Habitat and Documented Occurrences 3-123
3-29 American Badger Modeled Habitat and Documented Occurrences 3-125
3-30 Western Red Bat Modeled Habitat and Documented Occurrences 3-129
3-31 Preserve Planning Unit 1 – Inside UDA 3-149
3-32 Preserve Planning Unit 2 3-151
3-33 Preserve Planning Unit 3 3-153
3-34 Preserve Planning Unit 4 3-157
3-35 Preserve Planning Unit 8 3-159
3-36 Preserve Planning Unit 1 – Outside UDA 3-161
3-37 Preserve Planning Unit 5 3-163
3-38 Preserve Planning Unit 6 3-165
3-39 Preserve Planning Unit 7 3-169
3-40 Existing Conservation Sites Within the Plan Area 3-171
4-1 Jurisdictions of the SSHCP Plan Area 4-3
4-2 Sacramento County General Plan Land Uses 4-5
4-3 County Urban Policy Area and Urban Services Boundary 4-9
4-4 City of Rancho Cordova General Plan Land Uses 4-19
4-5 City of Galt General Plan Land Uses 4-21
5-1 Existing High-Voltage Transmission Lines 5-15

TABLE OF CONTENTS (CONTINUED)

Page No.

5-2 Wastewater Pipelines 5-17
5-3 Capital Southeast Connector Road Alignment 5-19
5-4 SSHCP Master Plan Areas 5-25
5-5 Rural Transportation Projects 5-27
5-6 Recycled Water Pipelines 5-33
5-7 Preserve Setback Residential Front-Loaded Street 5-35
5-8 Preserve Setback 5-37
5-9 Stream Setback 5-39
5-10 Wildlife Crossings 5-81
6-1 Critical Habitat for Sacramento Orcutt Grass 6-129
6-2 Critical Habitat for Slender Orcutt Grass 6-143
6-3 Critical Habitat for Vernal Pool Fairy Shrimp 6-169
6-4 Critical Habitat for Vernal Pool Tadpole Shrimp 6-191
6-5 Critical Habitat for California Tiger Salamander 6-221
7-1 Conservation Strategy Conceptual Diagram 7-3
7-2 Existing Preserves and SSHCP Planned Hardline Preserves 7-57
7-3 Existing Preserves and SSHCP Planned Hardline Preserves 7-59
7-4 Existing Preserve and SSHCP Planned Hardline Preserves 7-61
7-5 Existing Preserves and SSHCP Planned Hardline Preserves 7-63

TABLES

ES-1 SSHCP Covered Species and Current Listing Status ES-3
ES-2 Summary of Plan Costs ES-10
1-1 Local Planning Documents and Time Horizons Relevant to the Permit Term 1-12
1-2 SSHCP Covered Species and Their Current Listing Status 1-15
2-1 Summary of Watersheds in the Plan Area 31
3-1 SSHCP Land Cover Types within the Plan Area 3-1
3-2 SSHCP Covered Species/SSHCP Land Cover Relationships 3-27
3-3 Recovery Criteria for the Mather Core Recovery Area and Cosumnes/Rancho Seco Recovery Area 3-135
3-4 Summary of Existing Land Cover Types within the PPUs Inside the UDA (acres) 3-144
3-5 Summary of Existing Land Cover Types within the PPUs Outside the UDA (acres) 3-145
3-6 Summary of Covered Species Documented Occurrences in PPUs 3-146

TABLE OF CONTENTS (CONTINUED)

Page No.

4-1 Sacramento County General Plan Land Uses (2030) 4-2
4-2 City of Rancho Cordova General Plan Land Uses 4-15
4-3 City of Galt General Plan Land Uses 4-18
5-1 Stream Setback Minimum Requirements in the Urban Development Area 5-86
5-2 Summary of Actions Associated with Covered Activities 5-116
6-1 Environmental Stressors Associated with Covered Activities 6-20
6-2 Covered Species Vulnerability to Environmental Stressors 6-27
6-3 Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals 6-35
6-4 Permanent Direct and Indirect Effects on Natural Land Covers 6-64
6-5 Direct and Indirect Effects on the Vernal Pool Ecosystem 6-65
6-6 Permanent Indirect Effects on Natural Land Cover Types 6-67
6-7 Temporary Effects to Natural Land Cover Types 6-76
6-8 Ahart's Dwarf Rush Permanent Effects 6-79
6-9 Permanent Indirect Effects on Ahart's Dwarf Rush 6-81
6-10 Temporary Effects to Ahart's Dwarf Rush 6-85
6-11 Boggs Lake Hedge-Hyssop Permanent Effects 6-89
6-12 Permanent Indirect Effects on Boggs Lake Hedge-Hyssop 6-91
6-13 Temporary Effects to Boggs Lake Hedge-Hyssop 6-95
6-14 Dwarf Downingia Permanent Effects 6-99
6-15 Permanent Indirect Effects on Dwarf Downingia 6-101
6-16 Temporary Effects to Dwarf Downingia 6-105
6-17 Legenere Permanent Effects 6-109
6-18 Permanent Indirect Effects on Legenere 6-111
6-19 Temporary Effects to Legenere 6-115
6-20 Pincushion Navarretia Permanent Effects 6-119
6-21 Permanent Indirect Effects on Pincushion Navarretia 6-121
6-22 Temporary Effects to Pincushion Navarretia 6-125
6-23 Sacramento Orcutt Grass Permanent Effects 6-131
6-24 Sacramento Orcutt Grass Permanent Effects in Core Recovery Areas 6-131
6-25 Permanent Effects to Sacramento Orcutt Grass Critical Habitat 6-132
6-26 Permanent Indirect Effects on Sacramento Orcutt Grass 6-134
6-27 Temporary Effects to Sacramento Orcutt Grass 6-139
6-28 Slender Orcutt Grass Permanent Effects 6-145
6-29 Slender Orcutt Grass Permanent Effects in Core Recovery Areas 6-145

TABLE OF CONTENTS (CONTINUED)

Page No.

6-30 Permanent Effects to Slender Orcutt Grass Critical Habitat 6-146
6-31 Permanent Indirect Effects on Slender Orcutt Grass 6-148
6-32 Temporary Effects to Slender Orcutt Grass 6-153
6-33 Sanford's Arrowhead Permanent Effects 6-157
6-34 Permanent Indirect Effects on Sanford's Arrowhead 6-159
6-35 Temporary Effects to Sanford's Arrowhead 6-164
6-36 Vernal Pool Fairy Shrimp Permanent Effects 6-171
6-37 Vernal Pool Fairy Shrimp Permanent Effects in Core Recovery Areas 6-171
6-38 Permanent Effects to Vernal Pool Fairy Shrimp Critical Habitat 6-172
6-39 Permanent Indirect Effects on Vernal Pool Fairy Shrimp 6-174
6-40 Temporary Effects to Vernal Pool Fairy Shrimp 6-179
6-41 Mid-Valley Fairy Shrimp Permanent Effects 6-182
6-42 Mid-Valley Fairy Shrimp Permanent Effects in Core Recovery Areas 6-182
6-43 Permanent Indirect Effects on Mid-Valley Fairy Shrimp 6-185
6-44 Temporary Effects to Mid-Valley Fairy Shrimp 6-188
6-45 Vernal Pool Tadpole Shrimp Permanent Effects 6-193
6-46 Vernal Pool Tadpole Shrimp Permanent Effects in Core Recovery Areas 6-193
6-47 Permanent Effects to Vernal Pool Tadpole Shrimp Critical Habitat 6-194
6-48 Permanent Indirect Effects on Vernal Pool Tadpole Shrimp 6-197
6-49 Temporary Effects to Vernal Pool Tadpole Shrimp 6-200
6-50 Ricksecker's Water Scavenger Beetle Permanent Effects 6-204
6-51 Permanent Indirect Effects on Ricksecker's Water Scavenger Beetle 6-204
6-52 Temporary Effects to Ricksecker's Water Scavenger Beetle 6-208
6-53 Valley Elderberry Longhorn Beetle Permanent Effects 6-211
6-54 Permanent Indirect Effects on Valley Elderberry Longhorn Beetle 6-211
6-55 Temporary Effects to Valley Elderberry Longhorn Beetle 6-217
6-56 California Tiger Salamander Permanent Effects 6-223
6-57 California Tiger Salamander Permanent Effects in Core Recovery Areas 6-224
6-58 Permanent Effects to California Tiger Salamander Critical Habitat 6-224
6-59 Permanent Indirect Effects on California Tiger Salamander 6-226
6-60 Temporary Effects to California Tiger Salamander 6-232
6-61 Western Spadefoot Permanent Effects 6-237
6-62 Western Spadefoot Permanent Effects in Core Recovery Areas 6-238
6-63 Permanent Indirect Effects on Western Spadefoot 6-241
6-64 Temporary Effects to Western Spadefoot 6-248

TABLE OF CONTENTS (CONTINUED)

Page No.

6-65 Giant Gartersnake Permanent Effects (Includes Both High-Value and Non-High-Value Habitat) 6-253
6-66 Giant Gartersnake High-Value Habitat Permanent Effects 6-254
6-67 Permanent Indirect Effects on Giant Gartersnake 6-256
6-68 Temporary Effects to Giant Gartersnake 6-261
6-69 Western Pond Turtle Permanent Effects 6-265
6-70 Permanent Indirect Effects on Western Pond Turtle 6-267
6-71 Temporary Effects to Western Pond Turtle 6-272
6-72 Cooper's Hawk Permanent Effects 6-276
6-73 Permanent Indirect Effects on Cooper's Hawk 6-278
6-74 Temporary Effects to Cooper's Hawk 6-284
6-75 Ferruginous Hawk Permanent Effects 6-287
6-76 Permanent Indirect Effects on Ferruginous Hawk 6-289
6-77 Temporary Effects to Ferruginous Hawk 6-295
6-78 Swainson's Hawk Habitat Permanent Effects 6-299
6-79 Swainson's Hawk High-Value Habitat Permanent Effects 6-300
6-80 Permanent Indirect Effects on Swainson's Hawk 6-302
6-81 Temporary Effects to Swainson's Hawk 6-308
6-82 White-Tailed Kite Permanent Effects 6-311
6-83 Permanent Indirect Effects on White-Tailed Kite 6-313
6-84 Temporary Effects to White-Tailed Kite 6-320
6-85 Northern Harrier Permanent Effects 6-323
6-86 Permanent Indirect Effects on Northern Harrier 6-325
6-87 Temporary Effects to Northern Harrier 6-332
6-88 Western Burrowing Owl Permanent Effects 6-335
6-89 Permanent Indirect Effects on Western Burrowing Owl 6-335
6-90 Temporary Effects to Western Burrowing Owl 6-342
6-91 Loggerhead Shrike Permanent Effects 6-345
6-92 Permanent Indirect Effects on Loggerhead Shrike 6-347
6-93 Temporary Effects to Loggerhead Shrike 6-353
6-94 Greater Sandhill Crane Permanent Effects 6-357
6-95 Greater Sandhill Crane Permanent Effects on High-Value Habitat 6-358
6-96 Permanent Indirect Effects on Greater Sandhill Crane 6-358
6-97 Temporary Effects to Greater Sandhill Crane 6-365
6-98 Tricolored Blackbird Permanent Effects 6-370

TABLE OF CONTENTS (CONTINUED)

Page No.

6-99 Permanent Indirect Effects on Tricolored Blackbird 6-371
6-100 Temporary Effects to Tricolored Blackbird 6-378
6-101 American Badger Permanent Effects 6-381
6-102 Permanent Indirect Effects on American Badger 6-383
6-103 Temporary Effects to American Badger 6-388
6-104 Western Red Bat Permanent Effects 6-392
6-105 Permanent Indirect Effects on Western Red Bat 6-393
6-106 Temporary Effects to Western Red Bat 6-397
7-1 Biological Goals, Measurable Objectives, and Conservation Actions 7-17
7-2 Summary of SSHCP Preserve System and Existing Preserves by Preserve Planning Unit 7-65
7-3 Summary of Preservation of Existing Habitat within the SSHCP Preserve System 7-66
7-4 Summary of Re-established/Established Habitat within the SSHCP Preserve System 7-67
7-5 Preservation of Natural Land Cover Types in the Preserve System by PPU Inside the UDA 7-68
7-6 Preservation of Natural Land Cover Types in the Preserve System by PPU Outside the UDA 7-87
7-7 Studies Required by SSHCP Measurable Objectives 7-94
7-8a Permanent Effects and Conservation for the Vernal Pool Ecosystem 7-97
7-8b Permanent Effects and Conservation for the Vernal Pool Ecosystem Within the Mather Core Recovery Area 7-98
7-9 Biological Goals and Measurable Objectives Applicable to the Vernal Pool Ecosystem 7-100
7-10 Geologic Formations Supporting Vernal Pools in the SSHCP Preserve System 7-103
7-11 Soils Supporting Vernal Pools in the SSHCP Preserve System 7-103
7-12 Range of Vernal Pool Densities in the Preserve System 7-104
7-13 Permanent Effects and Conservation for Other Aquatic Land Covers 7-108
7-14 Biological Goals and Measurable Objectives Applicable to the Other Aquatic Land Covers 7-110
7-15 Permanent Effects and Conservation for Terrestrial Land Covers 7-115
7-16 Biological Goals and Measurable Objectives Applicable to the Terrestrial Land Covers 7-117
7-17 Permanent Effects and Conservation for Ahart's Dwarf Rush 7-121

TABLE OF CONTENTS (CONTINUED)

Page No.

7-18 Biological Goals and Measurable Objectives Applicable to Ahart's Dwarf Rush 7-122
7-19 Ahart's Dwarf Rush Effects and Conservation in Core Recovery Areas 7-128
7-20 Permanent Effects and Conservation for Boggs Lake Hedge-Hyssop 7-129
7-21 Biological Goals and Measurable Objectives Applicable to Boggs Lake Hedge-Hyssop 7-129
7-22 Boggs Lake Hedge-Hyssop Permanent Effects and Conservation in Core Recovery Areas 7-135
7-23 Permanent Effects and Conservation for Dwarf Downingia 7-136
7-24 Biological Goals and Measurable Objectives Applicable to Dwarf Downingia 7-136
7-25 Permanent Effects and Conservation for Legenere 7-142
7-26 Biological Goals and Measurable Objectives Applicable to Legenere 7-142
7-27 Legenere Permanent Effects and Conservation in Core Recovery Areas 7-148
7-28 Permanent Effects and Conservation for Pincushion Navarretia 7-149
7-29 Biological Goals and Measurable Objectives Applicable to Pincushion Navarretia 7-150
7-30 Permanent Effects and Conservation for Sacramento Orcutt Grass 7-156
7-31 Sacramento Orcutt Grass Permanent Effects and Conservation in Critical Habitat 7-156
7-32 Biological Goals and Measurable Objectives Applicable to Sacramento Orcutt Grass 7-156
7-33 Sacramento Orcutt Grass Permanent Effects and Conservation in Core Recovery Areas 7-163
7-34 Permanent Effects and Conservation for Slender Orcutt Grass 7-164
7-35 Slender Orcutt Grass Permanent Effects and Conservation in Critical Habitat 7-164
7-36 Biological Goals and Measurable Objectives Applicable to Slender Orcutt Grass 7-164
7-37 Slender Orcutt Grass Permanent Effects and Conservation in Core Recovery Areas 7-171
7-38 Permanent Habitat Impacts and Conservation for Sanford's Arrowhead 7-172
7-39 Biological Goals and Measurable Objectives Applicable to Sanford's Arrowhead 7-172
7-40 Permanent Effects and Conservation for Vernal Pool Fairy Shrimp 7-178
7-41 Permanent Effects and Preservation for Vernal Pool Fairy Shrimp Critical Habitat 7-178

TABLE OF CONTENTS (CONTINUED)

Page No.

7-42 Biological Goals and Measurable Objectives Applicable to Vernal Pool Fairy Shrimp 7-178
7-43 Permanent Effects and Conservation in Core Recovery Areas for Vernal Pool Fairy Shrimp 7-184
7-44 Permanent Effects and Conservation for Mid-Valley Fairy Shrimp 7-185
7-45 Biological Goals and Measurable Objectives Applicable to Mid-Valley Fairy Shrimp 7-185
7-46 Permanent Effects and Conservation in Core Recovery Areas for Mid-Valley Fairy Shrimp 7-191
7-47 Permanent Effects and Conservation for Vernal Pool Tadpole Shrimp 7-192
7-48 Permanent Effects and Preservation for Vernal Pool Tadpole Shrimp Critical Habitat 7-193
7-49 Biological Goals and Measurable Objectives Applicable to Vernal Pool Tadpole Shrimp 7-193
7-50 Permanent Effects and Conservation in Core Recovery Areas for Vernal Pool Tadpole Shrimp 7-198
7-51 Permanent Effects and Conservation for Ricksecker's Water Scavenger Beetle 7-199
7-52 Biological Goals and Measurable Objectives Applicable to Ricksecker's Water Scavenger Beetle 7-200
7-53 Permanent Effects and Conservation for Valley Elderberry Longhorn Beetle 7-205
7-54 Biological Goals and Measurable Objectives Applicable to Valley Elderberry Longhorn Beetle 7-206
7-55 Permanent Effects and Conservation for California Tiger Salamander 7-212
7-56 Permanent Effects and Preservation for California Tiger Salamander Critical Habitat 7-212
7-57 Biological Goals and Measurable Objectives Applicable to California Tiger Salamander 7-213
7-58 Permanent Effects and Conservation in Recovery Area for California Tiger Salamander 7-219
7-59 Permanent Effects and Conservation for Western Spadefoot 7-220
7-60 Biological Goals and Measurable Objectives Applicable to Western Spadefoot 7-221
7-61 Habitat Impacts and Conservation in Core Recovery Areas for Western Spadefoot 7-227
7-62 Permanent Effects and Conservation for Giant Gartersnake 7-229

TABLE OF CONTENTS (CONTINUED)

Page No.

7-63 Permanent Effects and Conservation for Giant Gartersnake High-Value Habitat 7-230
7-64 Biological Goals and Measurable Objectives Applicable to Giant Gartersnake 7-231
7-65 Permanent Effects and Conservation in Recovery Area for Giant Gartersnake 7-236
7-66 Permanent Effects and Conservation for Western Pond Turtle 7-238
7-67 Biological Goals and Measurable Objectives Applicable to Western Pond Turtle 7-238
7-68 Permanent Effects and Conservation for Cooper's Hawk 7-244
7-69 Biological Goals and Measurable Objectives Applicable to Cooper's Hawk 7-244
7-70 Permanent Effects and Conservation for Ferruginous Hawk 7-248
7-71 Biological Goals and Measurable Objectives Applicable to Ferruginous Hawk 7-248
7-72 Permanent Effects and Conservation for Swainson's Hawk 7-252
7-73 Permanent Effects and Conservation for Swainson's Hawk High-Value Habitat 7-253
7-74 Biological Goals and Measurable Objectives Applicable to Swainson's Hawk 7-253
7-75 Permanent Effects and Conservation for White-Tailed Kite 7-259
7-76 Biological Goals and Measurable Objectives Applicable to White-Tailed Kite 7-259
7-77 Permanent Effects and Conservation for Northern Harrier 7-265
7-78 Biological Goals and Measurable Objectives Applicable to Northern Harrier 7-265
7-79 Permanent Effects and Conservation for Western Burrowing Owl 7-270
7-80 Biological Goals and Measurable Objectives Applicable to Western Burrowing Owl 7-270
7-81 Permanent Effects and Conservation for Loggerhead Shrike 7-274
7-82 Biological Goals and Measurable Objectives Applicable to Loggerhead Shrike 7-275
7-83 Permanent Effects and Conservation for Greater Sandhill Crane 7-281
7-84 Permanent Effects and Conservation for Greater Sandhill Crane High Value Habitat 7-281
7-85 Biological Goals and Measurable Objectives Applicable to Greater Sandhill Crane 7-282
7-86 Permanent Effects and Conservation for Tricolored Blackbird 7-288
7-87 Biological Goals and Measurable Objectives Applicable to Tricolored Blackbird 7-288
7-88 Habitat Impacts and Conservation for American Badger 7-295
7-89 Biological Goals and Measurable Objectives Applicable to American Badger 7-296
7-90 Permanent Effects and Conservation for Western Red Bat 7-300

TABLE OF CONTENTS (CONTINUED)

Page No.

7-91 Biological Goals and Measurable Objectives Applicable to Western Red Bat 7-301
8-1 Framework for SSHCP Conservation Strategy Compliance Monitoring 8-7
8-2 Framework for SSHCP AMM Compliance Monitoring 8-62
8-3 Framework for SSHCP AMM Effectiveness Monitoring 8-89
8-4 Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy 8-112
8-5 Special Studies Known at the Time of SSHCP Preparation 8-148
9-1 Land Cover Types by Land Cover Category 9-29
9-2 Jump-Start Provision Acreage Requirements (at Permit Issuance) 9-30
9-3 Schedule for Major Implementation Tasks 9-50
11-1 Evaluation and Ranking of Covered Species Sensitivity to Climate Change 11-13
11-2 Plan Area Wildfire Burn Acreage and Fire Quantity, by Decade 11-32
12-1 Average Per-Acre Fee Title Land Value Assumptions 12-4
12-2 Average Per-Acre Conservation Easement Costs 12-5
12-3 Habitat Re-establishment/Establishment Costs 12-8
12-4 Summary of Plan Costs 12-17
12-5 Development Fees Used in the SSHCP Economic Model 12-20

EXECUTIVE SUMMARY

ES.1 Overview

The South Sacramento Habitat Conservation Plan (SSHCP or Plan) is a regional effort that will provide development and infrastructure projects with streamlined, predictable federal and state permitting processes while creating a Preserve System to protect habitat, open space, and agricultural lands. An approved SSHCP allows project proponents within the Plan Area to simplify and expedite the state and federal Endangered Species Act (ESA) permitting process. In addition to streamlining the ESA permitting processes, a separate but parallel multi-tiered permitting program has been developed to streamline Clean Water Act Section 404 and 401 permitting process (see SSHCP Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) Appendix C) and a Master Streambed Alternation Agreement will be prepared to address Section 1602 of the California Fish and Game Code. The SSHCP will allow the Sacramento County (the County), the City of Rancho Cordova, City of Galt, Sacramento County Water Agency, and the Southeast Connector Joint Powers Authority (collectively referred to as the Plan Permittees) to receive an Incidental Take Permit (ITP) for activities and projects they conduct. In addition, the three local Land Use Authority Permittees (the County, Galt, and Rancho Cordova) have the ability to extend incidental take coverage provided by the SSHCP ITPs to activities and projects implemented by Third-Party Project Proponents that are under the jurisdiction of that Land Use Authority Permittee. This will allow Third-Party Project Proponents to avoid the extensive negotiation and processing currently required to obtain individual project permits under the California Endangered Species Act (CESA) from the California Department of Fish and Wildlife (CDFW) and project ESA compliance from the U.S. Fish and Wildlife Service (USFWS).

The Plan Permittees are requesting a 50-year permit that authorizes incidental take of listed species under the federal ESA and a 50-year permit issued under Fish and Game Code Section 2081. The USFWS will provide “no surprises” assurances to the Plan Permittees, where the USFWS will not require the commitment of additional land, water, or financial compensation (or additional restrictions on the use of land, water, or other natural resources) for impacts to Covered Species beyond the level agreed upon and described in the Plan—as long as the Plan Permittees are adequately implementing the Plan. Compliance with the Plan will also satisfy California Environmental Quality Act (CEQA) mitigation requirements for impacts to biological resources.

The SSHCP was developed in coordination with the five Plan Permittees mentioned previously, the USFWS, CDFW, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, the Central Valley Regional Water Quality Control Board, a Steering Committee, and various other subcommittees that included a broad range of interests.

The SSHCP provides a more effective process for protecting natural resources as compared to the current process of project-by-project mitigation that often results in small and isolated

preserves. The SSHCP will ensure the creation of large, interconnected preserves that are sustained in perpetuity by an adequately funded management program. The SSHCP also supports the continued success of working landscapes, including certain farming and ranching practices that are integral to implementation of the SSHCP.

ES.2 Geographic Scope

The Plan Area (317,655~~6~~ acres) is located in the southern portion of Sacramento County. The Plan Area includes portions of unincorporated Sacramento County, Galt, and the southern half of Rancho Cordova (see Figure 1-1, SSHCP Plan Area). Parts of southern Sacramento County, including the community of Rancho Murieta, the sovereign lands of the Miwok Tribe, and a majority of the Delta are not included within the Plan Area. The Plan Area is defined as the area in which all conservation actions will be implemented and where all incidental take will occur. The boundary of the Plan Area was defined using political and ecological factors.

The Plan Area is divided into two components: inside and outside of an Urban Development Area (UDA) (see Figure 1-1). Inside the UDA is where all proposed urbanization will occur and there will also be some limited amount of habitat preservation focused mainly on the protection of vernal pools and streams. Geographically, the UDA is the portion of the Sacramento County Urban Services Boundary (USB), the incorporated Cities of Rancho Cordova and Galt, and Galt's Sphere of Influence that are also within the Plan Area. The area outside of the UDA is largely composed of rural communities and agricultural lands. Most of the habitat preservation proposed by the SSHCP will occur outside of the UDA.

ES.3 Permit Term

The Permit Term defines the length of time in which ITPs issued by the Wildlife Agencies (USFWS and CDFW) can be used by the Plan Permittees and the timeframe in which all conservation actions outlined in the SSHCP Conservation Strategy must be completed. The Plan Implementing Entity and the Plan Permittees are seeking ITPs that are valid for a term of 50 years. A 50-year Permit Term is needed to provide enough time to implement Covered Activities, the Conservation Strategy, the monitoring and adaptive management program, and the funding strategy. Each permit will be issued to all Permittees collectively.

ES.4 Covered Activities

Covered Activities are projects or activities that are allowable under the Plan's ITPs and thus can use the Plan to mitigate for impacts that result from implementation of the Covered Activity. Covered Activities within the UDA include activities and projects related to urban development and associated infrastructure. In-stream maintenance occurring within the UDA is also a Covered Activity. Covered Activities outside of the UDA are limited to specific infrastructure projects

related to roadway improvements and recycled water delivery. Covered Activities also include actions within the proposed SSHCP Preserve System that are required to manage, monitor, enhance, and re-establish or establish habitat.

The SSHCP Covered Activities fall into eight general categories:

- Urban development in the UDA
- Mining in the UDA
- Rural transportation projects
- Recycled water projects
- Covered Activities in Preserve Setbacks in the UDA
- Covered Activities in Stream Setbacks in the UDA
- SSHCP Preserve System Covered Activities
- Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System.

ES.5 Covered Species

The Plan provides take authorization for 28 Covered Species, of which, 11 are currently listed as threatened or endangered under the California ESA or the federal ESA (Table ES-1). The 28 species were identified through an evaluation process that began with a list of 90 species. Species were selected for coverage based on their potential to occur within the Plan Area, their potential to be adversely affected by Covered Activities in the Plan Area, the availability of information to adequately evaluate impacts to the species, and the ability to adequately protect the species. The Plan includes conservation actions to protect all 28 Covered Species whether or not they are currently listed. As SSHCP Covered Species, any currently non-listed species that is covered under the Plan will not require additional conservation within the Plan Area should the species become listed under the federal ESA during the Plan's Permit Term.

Table ES-1
SSHCP Covered Species and Current Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Invertebrates			
Lepidurus packardi Vernal pool tadpole shrimp	E*	—	—
Branchinecta lynchi Vernal pool fairy shrimp	T*	—	—

Table ES-1
SSHCP Covered Species and Current Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Branchinecta mesovallensis Mid-valley fairy shrimp	—	—	—
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	T	—	—
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	—	—	—
Amphibians			
Ambystoma californiense California tiger salamander, (Central Valley population)	T*	T	—
Spea hammondii Western spadefoot	—	CSC	—
Reptiles			
Actinemys marmorata Western pond turtle	—	CSC	—
Thamnophis gigas Giant gartersnake	T	T	—
Birds			
Accipiter cooperii Cooper's hawk	—	WL	—
Agelaius tricolor Tricolored blackbird	BCC	T (Emergency Listed)	—
Athene cunicularia hypugaea Western burrowing owl	BCC	CSC	—
Buteo regalis Ferruginous hawk	BCC	—	—
Buteo swainsoni Swainson's hawk	BCC	T	—
Circus cyaneus Northern harrier	—	CSC	—
Elanus leucurus White-tailed kite	—	CFP	—
Grus canadensis tabida Greater sandhill crane	—	T; CFP	—
Lanius ludovicianus Loggerhead shrike	BCC	CSC	—
Mammals			
Lasiurus blossevillii Western red bat	—	CSC	—
Taxidea taxus American badger	—	CSC	—
Plants			
Downingia pusilla Dwarf downingia	—	—	2.2
Gratiola heterosepala Boggs Lake hedge-hyssop	—	E	1B.2
Juncus leiospermus var. *ahartii* Ahart's dwarf rush	—	—	1B.2

Table ES-1
SSHCP Covered Species and Current Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Legenere limosa Legenere	—	—	1B.1
Navarretia myersii Pincushion navarretia	—	—	1B.1
Orcuttia tenuis Slender Orcutt grass	T*	E	1B.1
Orcuttia viscida Sacramento Orcutt grass	E*	E	1B.1
Sagittaria sanfordii Sanford's arrowhead	—	—	1B.2

Status Definitions
Federal:
E = Listed as endangered under the federal ESA
T = Listed as threatened under the federal ESA
* = Species has designated Critical Habitat located within the Plan Area.
— = No federal ESA listing
BCC = Bird of Conservation Concern, USFWS 2008.

State:
E = Listed as endangered under CESA
T = Listed as threatened under CESA
CFP = Fully protected under the California Fish and Game Code
CSC = Species of special concern in California
WL = Watch List
— = No state status

California Native Plant Society California Rare Plant Rank (CRPR)
1B = Rare, threatened, or endangered in California and elsewhere
2 = Rare, threatened, or endangered in California but more common elsewhere

CRPR Threat Ranks
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threat)

ES.6 Conservation Strategy

The SSHCP Conservation Strategy mitigates to the maximum extent practicable the impacts of Covered Activities, including all direct and indirect impacts on Covered Species and their habitats. The SSHCP Conservation Strategy provides for conservation of 28 Covered Species and 17 land cover types, avoids or minimizes impacts of Covered Activities, mitigates for the impacts of Covered Activities on the Covered Species and their habitats on the basis of species and habitat needs, provides a regional approach to the mitigation of impacts and the conservation of species and their habitats, protects wetlands and waters of the Plan Area, and conserves natural communities in the Plan Area.

The Conservation Strategy is based on a set of Biological Goals and Measurable Objectives developed specifically for the Plan. Conservation actions were then identified to achieve these goals and objectives. The SSHCP Conservation Strategy is focused on the following major components:

- Create an integrated Preserve System that conserves natural land covers, certain Cropland cover types, and Irrigated Pasture–Grassland in the Plan Area. The Preserve System will preserve at least 34,495 acres of existing habitat and re-establish or establish at least 1,787 acres of habitat for a total Preserve System of 36,282 acres. The Preserve System was developed for the benefit of SSHCP Covered Species, natural communities, biological diversity, and ecosystem functions of the Plan Area.
- Provide for the continued persistence of Covered Species in the Plan Area.
- Protect remaining natural segments of Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, Sun Creek, and their first- and second-order tributaries within the UDA portion of the Plan Area.
- Protect all of the Laguna Creek (North) Corridor within the Plan Area.
- Manage preserved lands to enhance populations of Covered Species and maintain biological diversity within the Preserve System.
- Maintain existing watershed functions in the Plan Area to benefit wetlands (aquatic land cover types) and to support aquatic Covered Species and their habitats.
- Re-establish or establish Vernal Pool land cover to ensure the Plan meets County, state, and federal requirements for "no-net-loss" of waters and wetlands and to offset impacts to vernal pool Covered Species.
- Re-establish or establish riparian and other aquatic land cover to ensure the Plan meets County, state, and federal requirements for "no-net-loss" of waters and wetlands and to offset impacts to riparian and aquatic Covered Species.

ES.7 Preserve System

The SSHCP Conservation Strategy will result in an interconnected Preserve System totaling 36,282 acres. All SSHCP Preserves will be preserved in perpetuity and would be acquired either as fee title or as conservation easements, although most of the Preserve System will be acquired using conservation easements. As the SSHCP is implemented over the 50-Year Permit Term, the new 36,282-acre SSHCP Preserve System will be established in a manner that supplements, complements, and links together many of the existing preserves within the Plan Area.

The SSHCP will preserve approximately 27,554 acres outside of the UDA, including a large 10,500-acre Vernal Pool Grassland Preserve that will be connected to already existing Preserves.

Several smaller Vernal Pool Grassland Preserves and Preserves established to protect other wetland land cover types will also be established outside of the UDA. Preserves that mainly comprise agricultural land will be preserved outside of the UDA in a matrix of open space, agricultural landscapes, and agricultural residential communities. Finally, several Linkage Preserves will be established outside of the UDA, mainly along riparian and stream corridors, to provide connectivity between Preserves.

The SSHCP will preserve approximately 6,941 acres within the UDA. Preserves that are established within the UDA will focus on preserving the Vernal Pool Ecosystem within the Mather Core Recovery Area. These Preserves will be established next to adjacent Preserves when possible and will be connected to one another and to Preserves outside of the UDA via the establishment of Linkage Preserves.

ES.8 Habitat Re-Establishment/Establishment

The SSHCP will re-establish/establish a total of approximately 1,787 acres of aquatic, riparian, and blue oak woodland habitat. Re-establishment/establishment projects will be strategically located within preserved areas where they would provide maximum functional gain. The SSHCP emphasizes re-establishment over establishment; however, limitations to the amount of acreage that can be re-established will necessitate that habitat is established to meet the SSHCP's minimum 1:1 compensatory mitigation ratio requirements.

The SSHCP provides guidelines for re-establishing and establishing aquatic resources within the Plan Area. These guidelines provide the outline (consistent with the U.S. Army Corps of Engineers, South Pacific Division's 2015 Regional Compensatory Mitigation and Monitoring Guidelines) for how compensatory mitigation projects would be planned, designed, implemented, and managed such that the projects would be viable into perpetuity and would adequately compensate for unavoidable impacts to aquatic resources. Construction of all habitat re-establishment/establishment projects will be completed by Year 45 of the Permit Term.

ES.9 Monitoring and Management Programs

The frameworks for two monitoring programs have been developed. The first framework is the "South Sacramento Habitat Conservation Plan (SSHCP) Compliance and Avoidance and Minimization Measure (AMM) Monitoring Program Framework." This monitoring program framework was developed to monitor compliance with the Plan requirements, the Implementing Agreement, and the permits. A second monitoring program framework, the "SSHCP Preserve System Monitoring and Management Program" was developed to monitor the effectiveness of the Plan in terms of protecting Covered Species, natural communities, and ecosystem processes within the SSHCP Preserve System and to evaluate the effects of preserve management actions.

The SSHCP Preserve System Monitoring and Management Program will integrate monitoring and adaptive management into one cohesive program where monitoring will inform and change management actions to continually improve outcomes for Covered Species and natural land cover types. The SSHCP Preserve System Monitoring and Management Program outlines the monitoring and management protocols and standards that the Implementing Entity will use to prepare individual Preserve Management Plans (PMPs) and SSHCP Annual Reports.

The technical details of the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program will be finalized by the Implementing Entity in the first 18 months after permit issuance.

ES.10 Conditions on Covered Activities

The SSHCP includes AMMs as conditions on Covered Activities. Each condition contains several AMMs that are intended to eliminate or reduce direct or indirect effects to species that could result from implementation of a Covered Activity. In addition, the SSHCP provides species-specific take and avoidance measures to avoid or minimize effects of Covered Activities on specific SSHCP Covered Species. Species-specific AMMs include species surveys, pre-construction surveys, and construction monitoring.

Conditions on Covered Activities are included that:

- Avoid and minimize urban development impacts to watershed hydrology and water quality
- Avoid and minimize urban development direct and indirect impacts to existing Preserves and SSHCP Preserves
- Require implementation of construction best management practices
- Avoid and minimize impacts that may result from implementation of transportation-related Covered Activities
- Avoid and minimize impacts that result from public use of low-impact nature trails in Preserves
- Avoid and minimize impacts to existing vernal pools when re-establishing or establishing vernal pool wetlands
- Avoid and minimize impacts to streams and creeks
- Avoid and minimize impacts to Covered Species from utility and utility maintenance Covered Activities
- Avoid and minimize impacts that might result from removing or breaching levees to establish or re-establish riparian habitat

- Avoid and minimize impacts that might result from potential residual contamination of Preserves and related exposure of people to such hazardous materials.

ES.11 Implementation

A new Joint Powers Authority called the South Sacramento Conservation Agency (SSCA) will be created to implement the SSHCP. The SSCA is responsible for ensuring compliance with the terms of the Plan, the Implementing Agreement, and the Permits. The SSCA will be governed by a Governing Board of elected officials from the County, Rancho Cordova, and Galt. An Implementing Commission consisting of a single representative from each of the Land Use Authority Permittees and Plan Partner Permittees will be formed to implement duties that the SSCA Board sees fit to assign to it. An Executive Director and staff will be hired to implement the day-to-day operations of the Plan. Staff for these positions may be hired by the Implementing Entity, or their functions can be contracted out to existing local agencies, nonprofit organizations, or private consultants. Staff or qualified consultants will be retained on an as-needed basis. The Implementing Entity will be advised by representatives of USFWS and CDFW and a technical advisory committee.

The Plan also includes a detailed process for land and easement acquisitions from willing sellers; a process for providing land dedications in lieu of fees; and provisions that prohibit the Plan from falling behind in its mitigation obligations.

ES.12 Cost and Funding

The federal ESA requires that the Plan Permittees provide assurances that the SSHCP will be adequately funded over the proposed 50-year Permit Term. The Biological Goals and Measurable Objectives of the SSHCP cannot be attained without adequate funding. The SSHCP funding program is critical to the successful development, implementation, and viability of the SSHCP. Estimating the full costs of the operating SSHCP is an essential step to demonstrate adequate funding to meet regulatory requirements.

The economic analysis evaluates the many costs associated with implementation of the SSHCP and identifies the funding mechanism(s) that will be used to pay for the SSHCP. In order to ensure enough funding, all costs associated with the Conservation Actions necessary to implement the SSHCP had to be identified. Because of the geographic scale of the Plan, the complexity of the Conservation Actions, and long-time frame over which these actions will occur, the cost-estimating process involves many assumptions. The costs are identified for planning purposes only to estimate funding levels needed to implement the Plan.

The total cost of implementing the SSHCP during the 50-year Permit Term is estimated at $857.6 million for an average of approximately $17.1 million annually. This includes the cost of

land and easement acquisition; Plan administration; habitat management, monitoring, and adaptive management; addressing changed circumstances; habitat re-establishment/ establishment; recovery of plan development costs; funding for an agricultural enhancement program; and an endowment. Contingency costs and costs for remedial measures are included in some of the cost categories mentioned above.

Plan costs were estimated from a detailed model of all expected cost components based on actual costs of tasks. Funding for this Plan is derived entirely from fees on private development and public infrastructure. This includes developer mitigation fees or developer land dedications in lieu of fees. A summary of the Plan costs is presented in Table ES-2.

Table ES-2
Summary of Plan Costs

Cost Category	Cost Estimate	Average Annual Cost	Distribution of Costs
Land and Easement Acquisition Costs	$487,238,000	$9,745,000	56.8%
Habitat Re-establishment/Establishment	$183,098,000	$3,662,000	21.3%
Habitat Management, Monitoring, and Adaptive Management	$61,730,000	$1,235,000	7.2%
Changed Circumstances	$8,404,000	$168,000	1.0%
Agricultural Enhancement	$6,015,000	$120,000	0.7%
Plan Administration	$66,009,000	$1,320,000	7.7%
Endowment	$35,578,000	$712,000	4.1%
SSHCP Development	$9,547,000	$191,000	1.1%
Total	**$857,617,000**	**$17,152,000**	**100.0%**

1 INTRODUCTION

1.1 Overview

The South Sacramento Habitat Conservation Plan (SSHCP or Plan) ensures preservation of species, natural communities, and aquatic resources in the Plan Area; while providing an improved environmental permitting process for Covered Activity projects that impact listed species, listed species habitats, or aquatic resources. The SSHCP is intended to preserve 28 species of plants and wildlife, including 11 that are listed as threatened or endangered under the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), or both. In addition, because so many of the Covered Species live part or all of their lives in water bodies, the SSHCP also provides additional avoidance and minimization of Covered Activity impacts to wetlands, streams, and other aquatic resources that are also subject to regulation under the federal Clean Water Act (CWA), the California Fish and Game Code, and California's Porter-Cologne Water Quality Control Act.

The SSHCP was prepared by five local agencies, including the County of Sacramento (County), City of Galt, City of Rancho Cordova, Sacramento County Water Agency (SCWA), and the Southeast Connector Joint Powers Authority (Connector JPA). These five local agencies, plus the future SSHCP Implementing Entity (to be named the South Sacramento Conservation Agency), are collectively applying for Incidental Take Permits (ITP) and are referred to as the "Plan Permittees" in this document.

The SSHCP Preserve System will conserve habitat that will be managed and monitored to demonstrate achievement of the Biological Goals and Measurable Objectives for Covered Species (see Chapter 7 for a complete discussion of the Plan's Conservation Strategy). In exchange for habitat conservation and other commitments, the United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) (the Wildlife Agencies) will each issue an ITP that grants take for Covered Species resulting from the implementation of Covered Activities, including urban development and infrastructure construction and maintenance activities (see Chapter 5 for a definition of the SSHCP Covered Activities). The entities that receive take coverage under the ITPs are exempt from take prohibitions of Section 9 of the federal ESA for "take" of Covered Species incidental to otherwise legal activities.

An important component of the SSHCP Conservation Strategy is an Aquatic Resources Program (ARP). As discussed in Chapter 7, the ARP (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report [EIS/EIR]) describes how the SSHCP strategy for the conservation of aquatic habitat in this Plan Area will avoid and minimize Covered Activity impacts on the Plan Area's aquatic resources, and provide adequate compensatory mitigation for unavoidable Covered Activity impacts. In exchange for conservation of wetlands streams, riparian, and other Plan Area aquatic resources, the United States Army Corps of Engineers (USACE) plans to develop a multi-level permitting strategy under Section 404 of the CWA

(CWA 404) for future Covered Activities that are consistent with all SSHCP requirements. This permit strategy is contained in Appendix C of the SSHCP EIS/EIR.

The Plan Permittees have requested that the Regional Water Quality Control Board (RWQCB) use the ARP document to develop a parallel program to issue Water Quality Certifications under Section 401 of the CWA (CWA 401), and a program to issue a Report of Waste Discharge under the California Porter-Cologne Water Quality Control Act. The Plan Permittees will also request that CDFW use the ARP document to develop a Master Streambed Alteration Agreement under Section 1600 of the California Fish and Game Code for Plan Permittee Covered Activities and to streamline permitting for all Covered Activities described with the SSHCP.

Shortly after the Natural Community Conservation Plan (NCCP) Act of 2003 was authorized by the state legislature, CDFW requested that the County convert the SSHCP from a stand-alone Habitat Conservation Plan (HCP) to a joint HCP/NCCP. Because the NCCP Act requires the protection of natural communities beyond what is required to mitigate species impacts, there were concerns that the preparation of a joint HCP/NCCP would not be feasible due to the Plan Area's already limited inventory of land available for mitigation. However, recognizing the benefits that the NCCP Act provides for protection of natural communities, the Plan Permittees elected to include additional voluntary conservation (Appendix J) as a supplement to the SSHCP Conservation Strategy that, where feasible, would encourage preservation of additional acreage of natural communities and species habitat beyond what is required to mitigate effects of the Covered Activities to the maximum extent practicable. In so doing, the SSHCP includes some of the beneficial properties of an NCCP. However, take under CESA will be issued under California Fish and Game Code Section 2081.

Three of the Plan Permittees are also local jurisdictions with authority to permit or approve projects and activities within their jurisdictional boundary. Under the Plan, the three local Land Use Authority Permittees (Sacramento County, the City of Galt, and the City of Rancho Cordova) have the ability to extend incidental take coverage provided by the SSHCP ITPs to Covered Activities implemented by Third-Party Project Proponents that are under the jurisdiction of that Land Use Authority Permittee. This will allow Third-Party Project Proponents to avoid the extensive negotiation and processing currently required to obtain individual project permits under CESA from CDFW and project ESA compliance from USFWS. As discussed in Chapter 9, Third-Party Project Proponents are private project applicants proposing to implement an SSHCP Covered Activity and are seeking ministerial[1] or discretionary[2] project permits from a Land Use Authority Permittee.

[1] A ministerial permit is a permit that requires little to no judgment on behalf of the Land Use Authority Permittee. An example of a ministerial permit is a building permit that states that, as long as a parcel is zoned to allow the building of a structure, the applicant only needs to follow building codes to construct their project.

In addition, Covered Activities implemented by Third-Party Project Proponents can avoid the extensive negotiation and processing currently required to obtain CWA 404 permits from the USACE and U.S. Environmental Protection Agency (USEPA), as well as extensive negotiation and processing currently required to obtain CWA 401 approvals from the RWQCB and to issue Reports of Waste Discharge under the California Porter-Cologne Act.

The future South Sacramento Conservation Agency (the SSHCP Implementing Entity) also has the ability to extend incidental take coverage provided by the ITPs to third-party Participating Special Entities. As discussed in Chapter 9, Participating Special Entities are third-party entities that may wish to implement a Covered Activity allowed by the SSHCP permits, but the entity is not under the jurisdiction of a Land Use Authority Permittee. Participating Special Entities might include school districts, reclamation districts, irrigation or water districts, utilities, or other organizations that are not subject to the regulatory authority of a local jurisdiction.

1.1.1 SSHCP Mission Statement

The Plan Permittees and key stakeholders, participating in a goal-setting process, developed a set of broad program goals that collectively serve as the mission statement for this Plan. The goals developed are to:

- Ensure long-term viability of Covered Species in the Plan Area by preserving an adequate quality and quantity of habitat in an integrated regional manner and further contribute to species recovery.
- Protect, maintain, and restore the functions and services of waters of the United States and maintain the integrity of watersheds throughout the Plan Area.
- Accommodate development in sites consistent with Land Use Authority Permittee plans (County and the Cities of Galt and Rancho Cordova) in exchange for payment of a development fee and other mitigation.
- Promote the long-term viability of agricultural uses consistent with the Plan, and ensure that agricultural lands and operations are not unduly impacted by the SSHCP's implementation.
- Promote awareness and appreciation of the Plan Area's natural history and provide environmental education opportunities for local residents.
- Create a standardized and predictable permitting process without unforeseen mitigation obligations.

[2] A discretionary permit is a permit that requires the use of judgement by a Land Use Permittee before the permit can be issued. An example of a discretionary permit is a permit for a general plan amendment.

- Provide a comprehensive framework for land use by linking plant and animal conservation with local land use programs, consistent with the goals and policies of each local Land Use Authority Permittee.
- Provide for stakeholder involvement and public input during the preparation of Plan documents.

1.1.2 Purpose and Benefits of the SSHCP

The purpose of the SSHCP is to ensure the long-term survival of the species covered in this Plan by preserving and establishing/re-establishing the habitats, natural communities, and ecosystem functions that they rely on, while allowing appropriate and compatible urban growth and development. The Plan also requires measures that will avoid, minimize, and mitigate impacts to the species, thereby addressing the permitting requirements relevant to these species for activities conducted by or under the jurisdiction of the Plan Permittees. These activities (i.e., the SSHCP Covered Activities, see Chapter 5) include urban development and infrastructure projects, such as roadway improvements and sewer and water line construction. The Plan also describes activities associated with operating and maintaining a new SSHCP Preserve System, which will be created to mitigate anticipated impacts resulting from urban development and infrastructure activities.

This Plan is an HCP intended to fulfill the requirements of CESA and the federal ESA. The Plan also addresses Covered Activity permitting requirements for the federal CWA, California's Porter-Cologne Water Quality Control Act, and Fish and Game Code streambed alternation agreement requirements. In addition to providing impact mitigation, this Plan is intended to aid in the recovery and possible delisting of listed species. The Plan's Conservation Strategy (Chapter 7) may help preclude the need to list additional species in the future through the preservation of habitat that benefits species.

The SSHCP will offer numerous benefits, including the following:

- Provides County, City of Galt, and City of Rancho Cordova residents with an interconnected Preserve System that maintains natural communities and species habitat at a regional scale including aquatic resources and other biological resources and maintains open space and intact watersheds for future generations.
- Conservation of native species that live in or move through the Plan Area.
- Offers protection for a broad range of native species and species habitats in a regionally coordinated manner to provide greater opportunity for long-term viability of native species populations; conserves and enhances ecosystem functions; and establishes a substantial system of interconnected Preserves that are located in areas with the highest-quality species habitat. The SSHCP will provide landscape-level Preserves and will

connect the existing patchwork of mostly small, isolated, and noncontiguous Preserves throughout the Plan Area that resulted from past project permitting.

- Provides for the protection and enhancement of stream, riparian, and aquatic resources, which are expected to help maintain water quality throughout the region.
- Re-establishes species habitat where habitat once occurred in the Plan Area.
- Affords an opportunity for landowners to voluntarily sell conservation easements that will preserve existing agricultural practices and uses for future generations.
- Allows for an expedited and predictable process for project permitting under the federal ESA, CESA, and 404 of the CWA. Because the requirements to obtain incidental take coverage are standardized in the SSHCP, the Plan makes the requirements and their associated costs more predictable.
- Allows for an expedited and predictable process for project permitting under Sections 401 of the CWA and Porter-Cologne Water Quality Control Act as well as Section 1600 of the California Fish and Game Code.
- Provides a means to preserve habitat resources that occur within designated Critical Habitat and Core Recovery Areas.
- Provides future incidental take authorization of currently non-listed federal species that may become listed during the Permit Term.
- Allows a reasonable amount of development to occur that supports economic growth.

Incidental take authorization will be granted to the Plan Permittees by the USFWS and CDFW ITPs. The Plan Permittees are asking the USFWS and CDFW to issue permits that allow incidental take of Covered Species when the take is consistent with the provisions of this Plan, the Implementing Agreement[3] (see Appendix C), and the terms and conditions of the ITPs. The Plan includes a Conservation Strategy to compensate for impacts to the Covered Species. The Conservation Strategy also provides for the conservation and management of Covered Species and their habitats.

It is expected that each of the Plan Permittees (including the Plan's future Implementing Entity) will be a permittee on the federal ESA Section 10(a)(1)(B) ITP and a permittee on the California Fish and Game Section 2081 ITP that will authorize species take that results from implementation of SSHCP Covered Activities (Chapter 5). The Plan Permittees will also receive a Master Streambed Alteration Agreement. Finally, the Plan will address federal CWA and California

[3] The purpose of an HCP Implementing Agreement, when used, is to ensure that each permittee and all other parties understand their roles and responsibilities under the HCP, the Endangered Species Act Section 10(a)(1)(B) ITP, and the California Endangered Species Act ITP and to provide remedies should any party fail to fulfill its obligations (USFWS and NOAA 1996).

Porter-Cologne Water Quality Control Act permitting requirements through an ARP and subsequent permitting strategy prepared by the USACE and RWQCB. While the Plan Permittees will not hold permits to address CWA and California Porter-Cologne Water Quality Control Act permitting requirements (with some exceptions as discussed in the ARP) the CWA and California Porter-Cologne Water Quality Control Act permitting strategy prepared by the USACE and RWQCB specifically for the SSHCP will significantly streamline the permitting process.

In addition to their own Covered Activities, the three local Land Use Authority Permittees (County, City of Galt, and City of Rancho Cordova) can also extend incidental take coverage provided by the ITPs to third-party projects that are Covered Activities and under their jurisdiction.[4] The USFWS will also provide "no surprises" assurances to the Plan Permittees, where the USFWS will not require the commitment of additional land, water, or financial compensation (or additional restrictions on the use of land, water, or other natural resources) for impacts to Covered Species beyond the level agreed upon and described in the Plan—as long as the Plan Permittees are adequately implementing the Plan (see Chapter 9). Compliance with the Plan will also satisfy CEQA mitigation requirements for impacts to biological resources.

It should be noted that the SSHCP is not a land use document. All land use decisions will continue to be made by the respective jurisdictions consistent with their existing authority, regulations, and policies. Neither implementation of the SSHCP nor issuance of the ITPs constitutes approval of the activities or projects that could obtain federal ESA and CESA coverage under the SSHCP permits. Such land use approvals can only be obtained from the relevant jurisdiction (the relevant Land Use Authority Permittee) through the existing land use approval processes.

1.1.3 Background

The SSHCP was first initiated to implement Sacramento County General Plan Policies that promote the protection of natural resources while providing an alternative means to comply with ESA permitting processes. In 2011, the County updated its General Plan and incorporated several policies designed to mirror objectives from the SSHCP. The SSHCP provides a means to implement several of those County policies (see Chapter 4, Land Use), including, but not limited to, Policy CO-58, which ensures no-net-loss of wetlands, riparian woodlands, and oak woodlands, and Policy CO-65, which requires the creation of a network of Preserves linked by Wildlife Movement Corridors.

[4] Note that the USFWS and CDFW permits will only authorize the incidental take of Covered Species. Most projects will also require additional local authorization (e.g., California Environmental Quality Act (CEQA)), and some projects will also require additional state or federal authorizations.

The SSHCP also provides a means to comply with two completed Biological Opinions (BOs) issued by the USFWS in response to an ESA consultation regarding water contracts for Sacramento County. In March of 1999, the Zone 40 BO (USFWS 1999) was issued by USFWS regarding water contracts for portions of Sacramento County under Public Law (P.L. 101-514). The Zone 40 BO requires U.S. Bureau of Reclamation, San Juan Water District (District), the County, and SCWA to implement various habitat conservation measures. One such measure requires the Bureau of Reclamation, District, County, and SCWA to identify goals for habitat conservation in their respective jurisdictions to conserve vernal pool species and associated upland habitats; a goal that could be achieved through the preparation of a regional HCP. The Zone 40 BO further specifies that the County shall diligently pursue completion of an HCP to obtain an ITP for indirect effects of the water contracts on federally listed species. In September of 2004, the County, SCWA, SRCSD, and USFWS signed a Memorandum of Agreement that set forth several agreements and courses of action that would allow projects in Sacramento County to proceed through construction permitting, including federal ESA Section 7 consultations, in a reasoned and legally permissible manner (County of Sacramento et al. 2004). The Memorandum of Agreement states that future development projects in Zone 40 will incur direct and indirect effects under the federal ESA, and further outlines the means by which those species effects could be addressed. The four parties agreed that the County will proceed with completion of the SSHCP as the most efficient means to address those future effects.

In December of 2004, the Freeport Regional Water Project BO was issued (USFWS 2004) to cover the Bureau of Reclamation's (1) authorization for East Bay Municipal Utility District (EBMUD) and SCWA to use the new water diversion facility on the Sacramento River at Freeport; (2) authorization for the Freeport Regional Water Agency and EBMUD to use the Folsom South Canal to convey EBMUD's Central Valley Project water; (3) fulfillment of EBMUD contract to complete federal ESA compliance before delivering any water to EBMUD; and (4) approval of an assignment of 30,000 acre-feet annually of water from Sacramento Municipal Utilities District to SCWA. The Freeport Regional Water Project Freeport Regional Water Project BO also reinitiated consultation on the Bureau of Reclamation's long-term Central Valley Project water contract with SCWA. The Freeport Regional Water Project BO heavily references both the Zone 40 BO and the County of Sacramento agencies Memorandum of Agreement (County of Sacramento et al. 2004), including County completion of a regional HCP. Future development projects that would receive water service provided through the new Freeport Regional Water Project facilities must comply with the federal ESA before receiving entitlements from the County, and before water can be delivered. Projects must first demonstrate compliance with the federal ESA or the County will withhold approval of final maps, improvement plans, or building permits, and the SCWA will not issue a will-serve letter. The County and SCWA have determined that the most efficient means to comply with the 2004 Memorandum of Agreement is through preparing and implementing the SSHCP.

1.2 Scope of the Habitat Plan

This section describes the Plan's geographic scope, Covered Activities, Permit Term, and Covered Species.

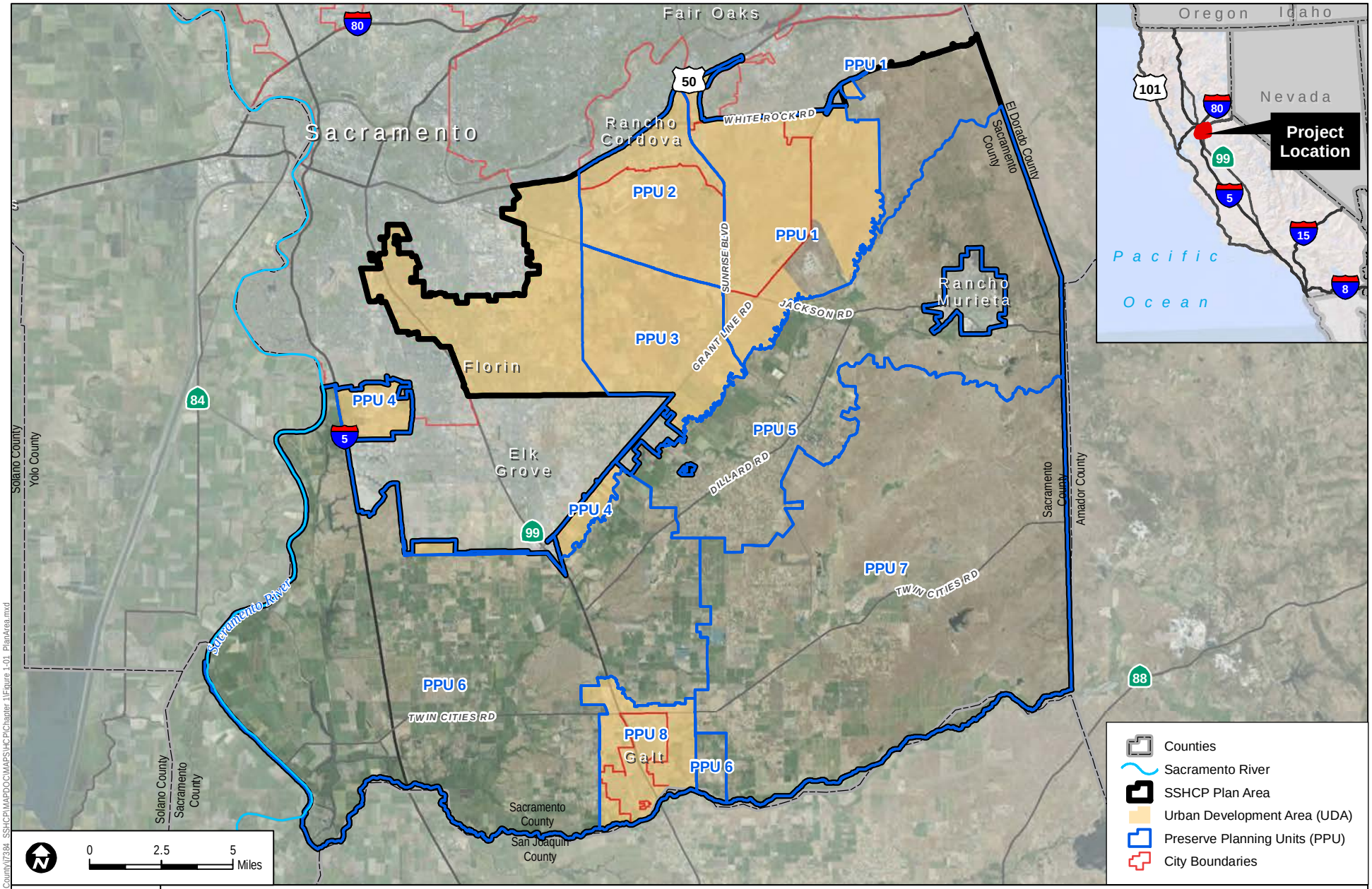
1.2.1 Geographic Scope of the Plan Area

The Plan Area includes 317,655 acres within south Sacramento County, including the City of Galt and most of the City of Rancho Cordova (see Figure 1-1, SSHCP Plan Area). The Plan Area is defined as the area in which all Conservation Actions will be implemented and where all incidental take will occur. The boundary of the Plan Area was defined using political and ecological factors. The geographical boundaries are U.S. Highway 50 to the north, the Sacramento River levee and County Road J11 (Walnut Grove-Thornton Road) to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and the San Joaquin County line to the south.

The Plan Area excludes the northern portion of Sacramento County, the northern portions of the City of Rancho Cordova, the City of Sacramento, the City of Elk Grove, the City of Folsom, the sovereign lands of the Miwok Tribe, and the Sacramento County community of Rancho Murieta (see Figure 1-1). These areas were excluded from the Plan Area because they were either significantly built out, would not use the SSHCP, or were not likely to benefit from the SSHCP due to the absence of listed species or their habitats. The sovereign lands of the Miwok Tribe are not included as the tribe is not a proposed Plan Permittee.

SSHCP Urban Development Area

The Plan Area is functionally divided into two components: inside and outside of an Urban Development Area (UDA). Inside the UDA is predominantly where development Covered Activities under this Plan will occur and, therefore, where most incidental take will occur. There will also be some habitat preservation within the UDA. The "inside the UDA" component totals 67,618 acres within the Plan Area. Geographically, the UDA is the portion of the Sacramento County Urban Services Boundary (USB), the incorporated Cities of Rancho Cordova and Galt, and Galt's Sphere of Influence that are also within the Plan Area (see Figure 1-1) because these are the Plan Partners for the SSHCP. The Plan Area component located outside of the UDA totals 250,038 acres. No urban development is covered under the SSHCP outside of the UDA. A limited amount of incidental take is requested for specific infrastructure projects and for species conservation activities proposed outside of the UDA. It should be noted that the SSHCP is not a land use plan and does not preclude non-SSHCP activities from occurring outside of the UDA.



SOURCE: ESRI, County of Sacramento 2014

FIGURE 1-1

SSHCP Plan Area

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\73384_SSHCP\MAPDOC\MAPS\HCP\Chapter 1\Figure 1-01_PlanArea.mxd

INTENTIONALLY LEFT BLANK

SSHCP Preserve Planning Units

To assist with development of the SSHCP Conservation Strategy, the Plan Area was further divided into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species resources are present, and where habitat preservation will be planned (see Figure 1-1). These eight SSHCP PPUs are geographic subdivisions of the Plan Area designed to ensure that adequate Biological Goals and Measurable Objectives (see Chapter 7) were developed for all biological resources located within the Plan Area.

PPUs were delineated to capture specific habitat or agricultural land cover types or areas identified as being important for a specific suite of species. For instance, PPU 7, which is located in the southeastern portion of the Plan Area, was delineated to encompass the vast majority of vernal pool grasslands remaining in the County. PPU 7 also contains the designated Cosumnes/Rancho-Seco Core Recovery Area (C/RS) (USFWS 2005). PPU 2 contains the designated Mather Core Recovery Area (USFWS 2005). PPU 6, located in the southwestern portion of the Plan Area, was delineated to encompass a vast majority of agricultural cover types that provide foraging habitat for many covered raptor species. While geopolitical or physical landmarks were used to delineate some PPU boundaries, this was done for ease of mapping and to make locating PPU boundaries in the field easier.

PPUs 1 through 4 and 8 are within the UDA. However, a small portion of PPU 1 (2,156 acres near the County landfill) is located outside of the UDA. PPUs 5, 6, and 7 are outside the UDA.

A portion of the Plan Area in the middle of the UDA (14,085 acres) and a small portion of the area outside of the UDA in the extreme northeastern portion of the Plan Area (9,245 acres) are not within a PPU (see Figure 1-1). A complete description of each PPU, including species occurrences and land cover types within each PPU, can be found in Chapter 3, Biological Resources Setting.

1.2.2 Covered Activities

As discussed in Chapter 5, SSHCP Covered Activities are projects or activities that were evaluated during development of the Plan and are allowable under the Plan's ITPs. The Covered Activities provide for the expansion of the urbanizing areas within the County's existing USB, within the current city limits of Galt and Rancho Cordova, and within the extra territorial Sphere of Influence for the City of Galt (i.e., within the SSHCP's UDA, as defined in Section 1.2.1). Covered Activities within the UDA include activities and projects related to urban development and associated infrastructure that are consistent with the General Plans of the three Land Use Authority Permittees, as well as specific activities and projects related to transportation, water, and wastewater development. In-stream maintenance occurring within the UDA (e.g., vegetation and sediment

removal) will also be a Covered Activity under the Plan. Covered Activities outside of the UDA are limited to specific infrastructure projects related to roadway improvements and recycled water delivery. The SSHCP Covered Activities also include actions within the proposed SSHCP Preserve System related to the management and monitoring of preserved habitats, the enhancement of habitat, and the re-establishment of habitat within the SSHCP Preserve System. Chapter 5, Covered Activities, describes the proposed Covered Activities by type, with lists of anticipated covered activities and projects, if currently known.

1.2.3 Permit Term

The Permit Term defines the length of time in which ITPs issued by the Wildlife Agencies (USFWS and CDFW) can be used by the Plan Permittees for incidental take resulting from Covered Activities, and the timeframe in which all Conservation Actions outlined in the SSHCP Conservation Strategy must be completed. The Plan Permittees are seeking ITPs that are valid for a term of 50 years. The Plan Permittees can request a permit extension upon or prior to expiration of the original permit by applying to the state and federal Wildlife Agencies. The ITP term is based on the projected timeframe for buildout to occur within the Plan's UDA, as well as the timeframe to complete proposed capital improvement projects. While it is difficult to predict trends in urban development beyond a 15- to 20-year timeframe, a 50-year permit is believed to be reasonable and necessary to provide sufficient time to implement Covered Activities and to complete the establishment of the Preserve System. For purposes of the SSHCP, the term "full buildout" is defined as the total development of the UDA, with the exception of planned UDA Preserves as described in Chapter 7.

A summary of major local planning documents and their respective time horizons is provided in Table 1-1. Urban development consistent with County and City General Plans accounts for a vast majority of the take that will occur from Covered Activities addressed under the Plan (City of Galt 2009; City of Rancho Cordova 2006; County of Sacramento 2011). The County has a designated USB that acts as a de-facto urban growth line. The County will not provide water or sewer services to projects located outside of the USB. The County predicts that the USB contains enough land to support at least 50 years of urban development (County of Sacramento 2011).

Table 1-1
Local Planning Documents and Time Horizons Relevant to the Permit Term

Document	Date Produced	Projection/Time Horizon	Plan Duration
City of Galt General Plan	2009	2030	16 years
City of Rancho Cordova General Plan	2006	2030/2050	16–36 years
County of Sacramento General Plan	1993; updated 2011	2030	16 years
County of Sacramento General Plan USB	1993	At least until 2060	46 years

Sources: City of Galt 2009; City of Rancho Cordova 2006; County of Sacramento 2011.

In addition, timelines for funding and completing capital improvement projects often extend for decades. A Permit Term that allows for the completion of Covered Activities that are associated with construction of planned capital improvement projects, such as the Southeast Connector and recycled water projects, will likely take more than four decades to complete. Other planned Covered Activity projects (see Chapter 5) may take several decades to receive the funding needed to implement them, such as safety improvements proposed for many roadways within the Plan Area.

Some Covered Activities are not expected to be implemented until later in the 50-year Permit Term. Such activities include the many bridge replacement projects and several road-widening projects, as described in Chapter 5. Therefore, a longer Permit Term is necessary to anticipate and adequately mitigate the impacts of these projects on the Covered Species.

Recurring maintenance activities are expected to continue in perpetuity; consequently, take authorization for these activities is needed for as long a period as is feasible. As described in Chapter 5, these recurring Covered Activities might affect the Covered Species throughout the proposed 50-year Permit Term. For example, road maintenance performed by the County occurs annually. Maintenance on rural roads might affect habitat for many Covered Species, including California tiger salamander (*Ambystoma californiense*), western spadefoot (*Spea hammondii*), western burrowing owl (*Athene cunicularia hypogea*), and many covered plant species. Similarly, recurring maintenance on flood control and storm drainage facilities by SCWA are covered in this Plan (see Chapter 5), and might affect aquatic Covered Species for the duration of the Permit Term. For example, maintenance of waterways has the potential to affect giant gartersnake (*Thamnophis gigas*) and western pond turtle (*Actinemys marmorata)*.

A 50-year Permit Term is also necessary to establish the operational SSHCP Preserve System described in Chapter 7, and to develop and test the Preserve System Management and Monitoring programs described in Chapter 8. Because the Plan only acquires conservation easements or land in fee title from willing sellers (see Chapter 9), it is anticipated that it could take several decades to acquire enough land to complete the SSHCP Preserve System. Many landowners, who may be interested in selling an easement or land, may not be willing to do so now for estate planning and/or tax purposes. A 50-year Permit Term provides adequate time for willing landowners to become available and for the Plan's Implementing Entity to negotiate fee title or conservation easement acquisitions.

Monitoring and assuring the success of habitat re-establishment/establishment actions (described in Chapter 8) is expected to take 5–10 years for each re-establishment/establishment project. Most habitat re-establishment/establishment actions cannot be initiated until land is acquired for the Preserve System. A Permit Term of 50 years is necessary to allow enough time to complete land acquisition with at least 5 years remaining on the permit in which to successfully initiate or complete (and possibly remediate if necessary) all re-establishment/establishment actions. The

Plan Permittees have committed to installing all habitat re-establishment/establishment projects by year 40. Therefore, a 50-year Permit Term is necessary to complete these actions and to leave sufficient time for monitoring the effectiveness of these actions before the Permit Term ends.

A 50-year Permit Term also allows sufficient time to generate the necessary funding for Plan implementation. As described in Chapter 12, Economic Analysis and Funding Program, the Plan will primarily be funded by development fees collected when Covered Activities and projects are approved by the Plan Permittees. Many of the Plan's Covered Activities will not occur for decades, as explained above. A 50-year Permit Term provides the time necessary to ensure adequate funding for Preserve acquisition and to establish the non-wasting endowment that is required to fund monitoring and management in perpetuity.

Based on the implementation horizon for Covered Activities, the recurring operation and maintenance activities, the need to acquire lands and develop a successful Preserve System, and the need for adequate funding, the Plan Permittees have determined that a 50-year Permit Term would best address regulatory and biological considerations. In summary, the 50-year Permit Term provides sufficient time to accomplish the following critical elements of the Plan:

- Fully implement the current general plans of the cities and the County;
- Fully implement the Plan Permittees' capital projects that are covered by the Plan;
- Implement the Plan Permittees' ongoing maintenance activities as long as feasible;
- Allow sufficient time to assemble the SSHCP Preserve System from willing sellers and partnerships with local agencies and private landowners;
- Secure all necessary funding for Plan implementation during the Permit Term and secure funds during the Permit Term to fund the Plan's Conservation Strategy in perpetuity;
- Develop an effective Preserve System maintenance, monitoring, and adaptive management program (Chapter 8) that will be implemented in perpetuity (as discussed in Chapter 8, an adaptive management program will be included in the SSHCP); and
- Provide sufficient incentive for the Plan Permittees to commit the substantial resources necessary to complete the SSHCP (i.e., the Permit Term covers enough projects and activities to make the large up-front investment in the Conservation Strategy cost-effective).

1.2.4 Covered Species

Covered Species are species that will be listed on the CESA and federal ESA ITPs issued by the two Wildlife Agencies (USFWS and CDFW). The Plan addresses 28 Covered Species (20 wildlife species and 8 plants), of which, 11 are currently listed as threatened or endangered under CESA or the federal ESA (see Table 1-2 for a complete list of species covered under this

Plan). The 28 species were identified through a species evaluation and selection process, as discussed below.

Table 1-2
SSHCP Covered Species and Their Current Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Invertebrates			
Lepidurus packardi Vernal pool tadpole shrimp	E*	—	—
Branchinecta lynchi Vernal pool fairy shrimp	T*	—	—
Branchinecta mesovallensis Mid-valley fairy shrimp	—	—	—
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	T	—	—
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	—	—	—
Amphibians			
Ambystoma californiense California tiger salamander, (Central Valley population)	T*	T	—
Spea hammondii Western spadefoot	—	CSC	—
Reptiles			
Actinemys marmorata Western pond turtle	—	CSC	—
Thamnophis gigas Giant gartersnake	T	T	—
Birds			
Accipiter cooperii Cooper's hawk	—	WL	—
Agelaius tricolor Tricolored blackbird	BCC	T (Emergency Listed)	—
Athene cunicularia hypugaea Western burrowing owl	BCC	CSC	—
Buteo regalis Ferruginous hawk	BCC	—	—
Buteo swainsoni Swainson's hawk	BCC	T	—
Circus cyaneus Northern harrier	—	CSC	—
Elanus leucurus White-tailed kite	—	CFP	—
Grus canadensis tabida Greater sandhill crane	—	T; CFP	—
Lanius ludovicianus Loggerhead shrike	BCC	CSC	—
Mammals			
Lasiurus blossevillii Western red bat	—	CSC	—

Table 1-2
SSHCP Covered Species and Their Current Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Taxidea taxus American badger	—	CSC	—
Plants			
Downingia pusilla Dwarf downingia	—	—	2.2
Gratiola heterosepala Boggs Lake hedge-hyssop	—	E	1B.2
Juncus leiospermus var. *ahartii* Ahart's dwarf rush	—	—	1B.2
Legenere limosa Legenere	—	—	1B.1
Navarretia myersii Pincushion navarretia	—	—	1B.1
Orcuttia tenuis Slender Orcutt grass	T*	E	1B.1
Orcuttia viscida Sacramento Orcutt grass	E*	E	1B.1
Sagittaria sanfordii Sanford's arrowhead	—	—	1B.2

Status Definitions

Federal:

E = Listed as endangered under the federal ESA
T = Listed as threatened under the federal ESA
* = Species has designated Critical Habitat located within the Plan Area.
— = No federal ESA listing
BCC = Bird of Conservation Concern, USFWS 2008.

State:

E = Listed as endangered under CESA
T = Listed as threatened under CESA
CFP = Fully protected under the California Fish and Game Code
CSC = Species of special concern in California
WL = Watch List
— = No state status

California Native Plant Society California Rare Plant Rank (CRPR)

1B = Rare, threatened, or endangered in California and elsewhere
2 = Rare, threatened, or endangered in California but more common elsewhere

CRPR Threat Ranks

0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Species Evaluation

A Technical Advisory Committee (TAC) composed of local species experts compiled an initial list of 90 species to be considered for coverage under the Plan. The TAC identified all special-status species that also had the potential to occur within the Plan Area using data from a variety of sources, including CDFW's California Natural Diversity Database (CNDDB), USFWS files and databases, California Native Plant Society (CNPS) plant inventories, Sacramento County Audubon files, and solicited opinions from local experts, university researchers, and resource agency staff.

The initial list of 90 special-status species was compiled for the Plan Area. "Special status" is defined using the following criteria:

- Listed as Threatened or Endangered by the USFWS (50 CFR 17.11 [listed animals] 50 CFR 17.12 [listed plants], and various notices in the Federal Register [proposed and candidate species]);
- Listed or candidate for listing as Rare, Threatened, or Endangered under CESA (14 California Code of Regulations [CCR] 670.5);
- Designated as a "bird species of concern" by the USFWS;
- Designated as a species of special concern by the CDFW;
- Subject to protection under California Fish and Game Code Section 3503.5 (breeding raptors);
- Designated as Fully Protected under California Fish and Game Code Section 3511(birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians);
- Determined to meet the definition of rare or endangered under CEQA (CEQA Guidelines, Section 15380);
- Designated as a California Rare Plant Rank (CRPR) 1B (rare, threatened, or endangered throughout its range) or CRPR 2 (rare, threatened, or endangered in California but more common elsewhere) in the CNPS inventory; or
- No special status but are believed by local experts to be rare enough to merit listing within the timeframe of this Plan.

The initial list of 90 species was eventually reduced to 28 proposed Covered Species (Table 1-2). Species were eliminated from consideration as Covered Species if the TAC determined the species would not be adversely affected by Covered Activities, if the TAC determined that there was not enough information available to adequately evaluate impacts to the species or to identify adequate conservation measures to offset those impacts.

The Plan includes Conservation Actions to protect all 28 Covered Species whether or not they are currently listed under the ESA or the CESA. As SSHCP Covered Species, any currently non-listed species that is covered under the Plan will not require additional conservation within the Plan Area should the species become listed under the federal ESA during the Plan's Permit Term. As discussed in Chapter 11, the USFWS ITP will include "no surprises" assurances to the Plan Permittees for all Covered Species, regardless of their ESA listing status (Chapter 11). However, Covered Species that are currently not listed but become listed under CESA will require an amendment to the CDFW ITP to be covered by CESA.

Owing to the rarity of slender Orcutt grass (*Orcuttia tenuis)* and Sacramento Orcutt grass (*Orcuttia viscida)*, the Plan Permittees are not requesting incidental take coverage for those Covered Species (see Chapter 5); rather the SSHCP Conservation Strategy (Chapter 7) will fully avoid and protect all slender Orcutt grass and Sacramento Orcutt grass occurrences within the Plan Area.

Two of the proposed SSHCP Covered Species (white-tailed kite [*Elanus leucurus*] and greater sandhill crane [*Grus canadensis tabida*]) are designated as Fully Protected Species under the California Fish and Game Code Section 3511 and thus direct injury or mortality of those Covered Species will not be included in the state or federal ITPs. Therefore, this Plan also includes Avoidance and Minimization Measures (AMMs) to avoid direct death or injury of white-tailed kite and greater sandhill crane during the implementation of any SSHCP Covered Activity.

1.2.5 Areas Outside the UDA

As discussed, the SSHCP provides a streamlined permitting process for Covered Activities identified in the Plan. This does not preclude activities from occurring outside the UDA, provided they obtain the legally required local, state, and federal permits and approvals otherwise and customarily required, including mitigation for impacts caused by those activities. The required mitigation should be crafted in consultation with the Implementing Entity, but the final decision will be made by the applicable lead agency pursuant to their thresholds and regulations.

1.3 Regulatory Setting

The Plan is designed to comply with the federal ESA and the CESA, as well as the federal CWA, the California Porter-Cologne Water Quality Control Act, and the California Fish and Game Code Sections 1600–1616. The Plan is also consistent with other federal and state wildlife and natural resource–related laws and regulations, listed here and described in greater detail below:

- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act

- California Fish and Game Code, Sections 3511, 4700, 5050, and 5515 (fully protected species)
- California Fish and Game Code, Section 3503 (bird nests)
- California Fish and Game Code, Section 3503.5 (birds of prey)
- National Environmental Policy Act of 1969 (NEPA)
- California Environmental Quality Act of 1970 (CEQA)
- National Historic Preservation Act (NHPA).

1.3.1 Federal and State Endangered Species Laws

Federal Endangered Species Act

USFWS and the National Marine Fisheries Service (NMFS) administer the federal ESA. The federal ESA requires USFWS and NMFS to maintain lists of threatened and endangered species and affords substantial protection to listed species. NMFS' jurisdiction under the ESA is limited to the protection of marine mammals, marine fishes, and anadromous fishes; all other listed species are subject to USFWS jurisdiction. USFWS and NMFS can list species as either endangered or threatened. An endangered species is at risk of extinction throughout all or a significant portion of its range (16 U.S.C. 1532). A threatened species is likely to become endangered within the foreseeable future (16 U.S.C. 1533). Seven SSHCP Covered Species are listed under the federal ESA: Sacramento Orcutt grass, slender Orcutt grass, vernal pool tadpole shrimp (*Lepidurus packardi*), vernal pool fairy shrimp (*Branchinecta lynchi*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California tiger salamander, and giant gartersnake (Table 1-2).

Section 9

Section 9 of the federal ESA prohibits the "take" of any fish or wildlife species listed under the ESA as endangered or threatened.[5] "Take," as defined by the federal ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 U.S.C. 1533). "Harm" in the definition of "Take" means "an act that kills or injures the species, including significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (50 CFR 17.3). "Harass" in the definition of "Take" means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by

[5] The protection of threatened species under Section 9 is discretionary through a rule issued under Section 4(d) of the federal ESA. By regulation, the USFWS automatically affords Section 9 protections to threatened species at the time of listing.

annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding, or sheltering" (50 CFR 17.3). Section 9 also prohibits the "removal or reduction to possession" of any listed plant species "under federal jurisdiction" (e.g., on federal land, where federal funding is provided, or where federal authorization is required). The take prohibition for listed plants is more limited than for listed fish and wildlife. Under Section 9(a)(2)(B) of the ESA, listed plants are protected from "removal, reduction to possession, and malicious damage or destruction" in areas that are under federal jurisdiction. Section 9(a)(2)(B) of the ESA also provides protection to plants from removal, cutting, digging up, damage, or destruction where the action takes place in knowing violation of any state law or regulation or in violation of a state criminal trespass law. Thus, the ESA does not prohibit the incidental take of federally listed plants on private or other nonfederal lands unless the action requires federal authorization or is in violation of state law or regulation.

Even though under the ESA there is limited prohibition for incidental take of plants on nonfederal lands, the SSHCP includes many plant Covered Species (see Table 1-2), and the Plan Permittees are requesting that the plant Covered Species be included on the ITPs when they are issued. Some plants are Covered Species to meet regulatory obligations under ESA Section 7—the USFWS must review the effects of its own actions on federally listed plants, even when those listed plants are found on private lands. Also, all plant species protected by state law (e.g., CESA) are also subject to the ESA Section 9 take prohibition. Incidental take authorization is also requested for the eight plant Covered Species to provide the Plan Permittees with ESA Section 10 "no surprises" assurances for the plant Covered Species.

The federal ESA includes mechanisms that provide exceptions to the Section 9 take prohibitions. These exemption mechanisms are addressed in Section 7 for federal actions and Section 10 for nonfederal actions.

Section 7

Section 7 of the federal ESA requires all federal agencies to ensure that any action they permit, authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of habitat critical to such species' survival. To ensure that its actions do not result in jeopardy to listed species or in the adverse modification of Critical Habitat,[6] each federal agency must consult with USFWS or NMFS or both regarding federal agency actions that may affect listed species. Consultation begins when the federal agency submits a written request for initiation to USFWS or NMFS, along with the

[6] Critical Habitat is defined as specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of listed species, and that have been formally described and designated in the Federal Register.

agency's biological assessment of its proposed action, and when USFWS or NMFS accepts that biological assessment as complete. If USFWS or NMFS concludes that the action is not likely to adversely affect a listed species, the action may be conducted without further review under the federal ESA. Otherwise, USFWS or NMFS must prepare a written BO under ESA Section 7 describing how the agency's action will affect the listed species and its Critical Habitat.

If a BO concludes that the proposed action would jeopardize the continued existence of a listed species or adversely modify its designated Critical Habitat, the opinion will suggest "reasonable and prudent alternatives" that would avoid that result. If a BO concludes that the proposed action would take a listed species but would not jeopardize its continued existence, the BO will include an incidental take statement. Incidental take is take that is "incidental to, and not intended as part of, an otherwise lawful activity" (50 CFR 402.02). The incidental take statement specifies an amount of species take that is allowed to occur as a result of the proposed action, and may require reasonable and prudent measures to minimize the impact of the take.

Projects with a federal lead agency or a federal nexus (e.g., requires a federal permit or federal funding, is carried out by a federal agency, or is a project on federal land) can obtain species take authorization through ESA Section 7 rather than ESA Section 10. The proposed issuance of an ITP by the USFWS for the SSHCP is a federal action, and therefore, requires the USFWS to consult under Section 7 of the ESA. To comply with Section 7 of the ESA, the USFWS Sacramento Field Office would conduct an internal Section 7 consultation with the USFWS Region 8 office concerning the region's decision to issue ITPs to the Plan. The results of this internal consultation would be documented in a BO, which would be prepared prior to the ITP decision for the SSHCP.

Section 10

Until 1982, state, local, and private entities had no means to acquire incidental take authorization as could federal agencies under Section 7. Private landowners and local and state agencies risked violation of the federal ESA no matter how carefully their projects were implemented. This statutory dilemma led Congress to amend Section 10 of the ESA in 1982 to authorize the issuance of an ITP to nonfederal project proponents upon completion of an approved conservation plan. The term "conservation plan" has evolved into "habitat conservation plan."

In cases where federal land, funding, or authorization is not required for an action by a nonfederal entity, the take of listed fish and wildlife species can be permitted by USFWS and/or NMFS through the Section 10 process. Private landowners, corporations, state agencies, local agencies, and other nonfederal entities must obtain a Section 10(a)(1)(B) ITP for "take" of federally listed fish and wildlife species "that is incidental to, but not the purpose of, otherwise lawful activities."

All HCPs must specify the following mandatory elements:

- The impact that will likely result from the taking of Covered Species;
- The steps the Plan Permittees will take to monitor, minimize, and mitigate such impacts to the maximum extent practicable;
- The funding that will be available to implement such steps;
- The procedures to be used to deal with unforeseen circumstances;[7]
- The alternative actions to such taking the Plan Permittees considered and the reasons why such alternatives are not proposed to be utilized; and
- Such other measures that the Director [of the Department of Interior or Commerce] may require as being necessary or appropriate for purposes of the plan (50 CFR 17.22[b]).

The SSHCP is intended to satisfy these requirements. To receive an ITP, Section 10(a)(2)(B) of the federal ESA and permit regulations 50 CFR 17.22(b)(2) and 17.32(b)(2) require that the following permit issuance criteria be met:

- The taking will be incidental to otherwise lawful activities;
- The Plan Permittees will minimize and mitigate the impacts of such taking to the maximum extent practicable;
- The Plan Permittees will ensure adequate funding for the HCP and for procedures to deal with changed and unforeseen circumstances;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild (i.e., will not cause jeopardy under Section 7(a)(2) of the ESA);
- The Plan Permittees will ensure that other measures that the USFWS may require as being necessary or appropriate will be provided; and
- The USFWS has received such other assurances as may be required that the HCP will be implemented.

Prior to the issuance of an ITP, USFWS is required to undertake an internal Section 7 consultation because issuance of an ITP is a federal action. [8] (See the prior discussion of ESA Section 7.) Elements specific to the Section 7 process that are not required under the Section 10

[7] "Unforeseen circumstances" are changes in circumstances affecting a Covered Species or geographic area covered by the HCP that could not reasonably have been anticipated by the plan developers, and that result in a substantial and adverse change in the status of a Covered Species.

[8] When USFWS issues a permit, they will consult with themselves and the National Marine Fisheries Service (NMFS), if necessary.

process (e.g., analysis of impacts on designated Critical Habitat, analysis of impacts on listed plant species, and analysis of indirect and cumulative impacts on listed species) are included in this Plan in part to meet the requirements of Section 7.

In June 2000, USFWS and NMFS adopted the "Five-Point Policy" designed to clarify elements of the national HCP program as it relates to biological goals, monitoring, adaptive management, permit duration, and public participation (USFWS and NOAA 2000). The Five-Point Policy directs that the following five elements be addressed in the development of all HCPs:

1. **Biological Goals and Measurable Objectives:** HCPs are required to define the Biological Goals and Measurable Objectives that the plan is intended to achieve. Biological Goals and Measurable Objectives clarify the purpose and direction of the plan's Conservation Strategy, including specific measurable targets that the plan is intended to meet. The Biological Goals and Measurable Objectives of the SSHCP are described in Chapter 7, Conservation Strategy.
2. **Monitoring:** Monitoring is a mandatory element of all HCPs. HCPs are required to include provisions for monitoring actual effects, monitoring to gauge the effectiveness of the plan in meeting the Biological Goals and Measurable Objectives, and verification that the terms and conditions of the plan are being implemented properly. Each HCP's monitoring program should be customized to reflect the biological goals, the scope, and the particular implementation tasks of the HCP. The project proponent should structure the monitoring methods and standards so results can be compared from one reporting period to another period, or to compare different areas. Monitoring protocols and units should reflect the biological objectives' measurable units, and be based on sound science. Standard survey or other previously established monitoring protocols should be used. The SSHCP monitoring plan is described in Chapter 8.
3. **Adaptive Management:** The Five-Point Policy encourages the inclusion of adaptive management strategies in HCPs in appropriate circumstances to address uncertainty about species covered by a plan. The USFWS describes adaptive management as a "method for examining alternative strategies for meeting Biological Goals and Measurable Objectives, and then, if necessary, adjusting future conservation management actions according to what is learned" (USFWS and NOAA 2000). As described in Chapter 8, the SSHCP will include an adaptive management plan as part of each Preserve Management Plan.
4. **Permit Duration:** Consistent with the Five-Point Policy, the USFWS considers several factors in determining the term of an ITP. For instance, the agency takes into account the expected duration of the activities proposed for coverage and the anticipated positive and negative effects on Covered Species that would likely occur during the course of Plan implementation. The agency also factors in the level of scientific and commercial data

underlying the proposed Conservation Strategy, the length of time necessary to implement and achieve the benefits of the Conservation Strategy, and the extent to which the program incorporates adaptive management strategies. As described in Section 1.2.3, the proposed duration of the SSHCP ITP is 50 years.

5. **Public Participation:** Under the Five-Point Policy, the USFWS and NOAA have sought to increase public participation in the HCP process, including greater opportunities for the public to assess, review, and analyze HCPs and associated NEPA documentation. As provided by the Five-Point Policy, a minimum 90-day public comment period is appropriate for large-scale, regional, or complex HCPs that include an Environmental Impact Statement (EIS). The Five-Point Policy also encourages applicants for large-scale regional HCP efforts to provide extensive opportunities for public involvement during the HCP planning and implementation processes. The Five-Point Policy encourages the integration of a science advisory committee and other stakeholders during the development and implementation of an HCP, especially HCPs that include an adaptive management strategy. Advisory committees can assist the USFWS and the applicants in identifying key components of uncertainty and determining alternative strategies for addressing that uncertainty. An applicant, with guidance from the USFWS, may seek independent scientific review of specific sections of an HCP and its operating Conservation Strategy to ensure the use of the best scientific information.

California Endangered Species Act

CESA (California Fish and Game Code, Section 2050 et seq.) prohibits the taking of species listed as threatened or endangered under that act, or candidates for listing, except as authorized by state law. "Take" is defined under the California Fish and Game Code (more narrowly than under ESA) as any action or attempt to "hunt, pursue, catch, capture, or kill." Therefore, take under CESA does not include "the taking of habitat alone or the impacts of the taking" rather, the courts have affirmed that under CESA, "taking involves mortality" (*Environmental Council of Sacramento v. City of Sacramento* 2006). In addition, "harass" in the federal ESA definition of "take" is not included in the CESA definition of "take."

Section 2081 of CESA states that the incidental take of an endangered, threatened, or candidate species may be authorized by the CDFW if the impacts of the take are incidental to an otherwise lawful activity, are "minimized and fully mitigated," and do not "jeopardize the continued existence of [the] species." Any mitigation measures imposed under CESA must be measures "roughly proportional in extent to the impact of the authorized taking on the species." The requirements of an application for incidental take under CESA are described in Section 2081 of the California Fish and Game Code.

Plant Covered Species within the Plan Area that are listed by the State of California as endangered are Sacramento Orcutt grass, and plant species listed as threatened are slender Orcutt grass and Boggs Lake hedge-hyssop (*Gratiola heterosepala*). Bird Covered Species protected under the CESA are the state-threatened greater sandhill crane and Swainson's hawk (*Buteo swainsoni*). Other CESA listed animal species in the Plan Area are the state-threatened California tiger salamander and the giant gartersnake (see Table 1-2).

1.3.2 Other Federal and State Wildlife Laws and Regulations

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful, as is taking of any parts, nests, or eggs of such birds (16 U.S.C. 703 et seq.). "Take" is defined more narrowly under the MBTA than under the federal ESA and includes only the death or injury of individuals of a migratory bird species or their eggs, or the removal of active nests. As such, take under the MBTA does not include the concepts of habitat modification/degradation or harassment as defined under ESA take. The MBTA defines migratory birds broadly; all bird Covered Species in this Plan are migratory birds under the MBTA.

The USFWS provides guidance regarding take of federally listed migratory birds (Appendix 5 in the HCP Handbook [USFWS 1996]). According to these guidelines, a federal ITP can function as a Special Purpose Permit under the MBTA (50 CFR 21.27) for the take of all ESA-listed bird Covered Species in the amount and/or number and subject to the terms and conditions specified in an HCP. Any such permitted incidental take will not be in violation of the MBTA (16 U.S.C. 703 et seq.). All bird species covered under this Plan are protected by the MBTA (Table 1-2).

Should any of the covered birds become listed under ESA during the Permit Term, the ESA ITP would constitute a Special Purpose Permit under the MBTA for that species for a 3-year term as specified under 50 CFR 21.27, subject to renewal by the Plan Permittees.

Non-listed bird Covered Species as well as other migratory birds not covered by the permit will benefit from seasonal restrictions on construction and other Covered Activity AMMs described in this Plan. The creation of the SSHCP Preserve System and subsequent habitat restoration and management of each preserve will also be a significant "benefit to the migratory bird resource," as required by the Special Purpose Permit. Compliance with the conditions on Covered Activities described in Chapter 5 is consistent with the requirements of the MBTA for the covered

migratory birds. As discussed in Chapter 9, it will remain the responsibility of individual Third-Party Project Proponents to fully comply with the MBTA for non-covered migratory birds.

California Fully Protected Species

In the 1960s, before CESA was enacted, the California legislature identified specific species for protection under the California Fish and Game Code. These fully protected species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of bird species for the protection of livestock. Fully protected species are described in Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code. These protections state that "…no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird], [mammal], [reptile or amphibian], [fish]." This Plan requires all Covered Activities to implement AMMs that avoid taking CESA fully protected species (see Chapter 5). Fully protected Covered Species are white-tailed kite and greater sandhill crane.

California Fish and Game Code, Section 3503

Section 3503 of the California Fish and Game Code makes it "unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Therefore, CDFW may issue permits authorizing take. The Plan contains conservation measures to avoid and minimize such take to the maximum extent practicable in order to comply with Section 3503. However, some take to covered birds may still occur; the 2081 permit will serve as the authorization for take of nests or eggs of covered birds pursuant to Section 3503.

California Fish and Game Code, Section 3503.5

Section 3503.5 of the California Fish and Game Code prohibits the take, possession, or destruction of any birds of prey or their nests or eggs "except as otherwise provided by this code or any regulation adopted pursuant thereto." CDFW may issue permits authorizing take of birds of prey or their nests or eggs pursuant to CESA. The Plan requires all Covered Activities to implement AMMs that avoid and minimize take of birds of prey and comply with Section 3503.5.

The 2081 permit will serve as the authorization for take of birds, eggs, or nests that cannot be avoided pursuant to Section 3503.5.

1.3.3 National Environmental Policy Act

NEPA requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and of possible alternatives, and ensure the environmental information is available to public officials and citizens before decisions are made and before actions are taken. Documentation of the environmental impact analysis and efforts to avoid or minimize the adverse effects of proposed actions must be made available for public notice and review. This analysis is documented in either an environmental assessment or an EIS. NEPA requires full disclosure of environmental effects. The issuance by USFWS of an ITP under Section 10 of the ESA constitutes a federal action. Therefore, a USFWS decision on the proposed SSHCP ITP must comply with NEPA.

NEPA regulations require, in part, that federal agencies eliminate duplication between NEPA and comparable state or local requirements (40 CFR 1500.4, 1506.2, and 43 CFR 46.430). These regulations require that federal agencies conduct: (1) joint planning processes; (2) joint environmental research and studies; (3) joint public meetings and hearings (except where otherwise provided by statute); (4) joint environmental analysis; and (5) to the fullest extent possible, preparation of joint environmental documents. In such cases, the federal agency and a state or local agency can be joint lead agencies on the environmental document. The USFWS and Sacramento County have prepared a joint EIS/EIR so that one environmental document will jointly comply with the federal NEPA and the state CEQA.

1.3.4 California Environmental Quality Act

CEQA requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to discretionary activities that may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment and that are proposed to be carried out or approved by a California public agency, including state, regional, county, or local agencies. Adoption of the Plan by the Plan Permittees is an activity that is subject to CEQA. The County of Sacramento will serve as the lead agency under CEQA. The County and USFWS will jointly prepare an EIS/EIR so that one environmental document will comply with both NEPA and CEQA. All of the Project Proponents are either a CEQA lead agency (Sacramento County) or CEQA responsible agencies (City of Galt, City of Rancho Cordova, the SCWA, and the Connector JPA), and all are responsible for discretionary approvals of the SSHCP and associated ordinances and would be responsible for the future implementation of the SSHCP.

1.3.5 Federal and State Wetland Laws and Regulations

Federal Clean Water Act, Section 404

The CWA is the primary federal law that protects the physical, chemical, and biological integrity of the nation's waters, including lakes, rivers, wetlands, and coastal waters. Programs conducted under the CWA are directed at both point source pollution (e.g., waste discharged from outfalls and filling of waters) and nonpoint source pollution (e.g., runoff from parking lots). Under the CWA, the USEPA and state agencies set effluent limitations and issue permits under CWA Section 402 governing point-source discharges of wastes to waters. The USACE, applying its regulations and guidelines issued by USEPA, issues permits under CWA Section 404 for discharges of dredged or fill material into waters of the U.S.

The USACE issues two types of permits under Section 404: general permits (either nationwide permits, regional general permits, or programmatic general permits) and individual permits (either letters of permission or standard permits). General permits are issued by the USACE to streamline the Section 404 process for activities that have minimal environmental impacts, individually and cumulatively. Individual permits are issued for activities that do not qualify for a general permit (i.e., that may have more than a minimal adverse environmental impacts).

The Sacramento District of the USACE is considering development of a Section 404 permitting strategy for future SSHCP Covered Activities (USACE 2015). It is likely that the Section 404 permitting strategy would include some type of general permit for Covered Activities with minimal impacts, and an individual permitting process for other proposed Covered Activities. The USACE's future CWA 404 permit decision for Covered Activities would benefit from the extensive analysis completed as part of the SSHCP and associated EIS/EIR.

When a Section 404 permitting strategy for the SSHCP is developed, the USACE would request a programmatic consultation with USFWS under Section 7 of the federal ESA for potential impacts of all Covered Activities permitted under a SSHCP permitting strategy. It is expected that USFWS will not require future Covered Activities to provide species or habitat avoidance, minimization, or compensatory mitigation beyond that already required by the SSHCP. The Conservation Actions required by the SSHCP to avoid, minimize, and mitigate Covered Activity impacts to aquatic habitat are expected to also satisfy CWA 404 requirements for aquatic resources avoidance, minimization, and mitigation.

State of California Porter-Cologne Water Quality Control Act

Under CWA Section 401, the State of California has been granted the authority to certify that proposed activities requiring federal permits for discharges to waters comply with state water quality standards. The USACE cannot issue a permit under CWA Section 404 if the state denies certification

under CWA Section 401. In California, the State Water Resources Control Board (SWRCB) and the RWQCBs are responsible for the review of applications for Section 401 certifications. The Central Valley RWQCB has jurisdiction over all watersheds within the Plan Area.

The Porter-Cologne Water Quality Control Act is the primary state law regulating water quality. It authorizes the SWRCB and RWQCBs to prepare management plans such as regional water quality plans to address the quality of groundwater and surface water. The Porter-Cologne Water Quality Control Act also authorizes the RWQCBs to issue waste discharge requirements defining limitations on allowable discharge to waters of the state. In addition to issuing Section 401 certifications on Section 404 applications to place fill-in waters, the RWQCBs may also issue waste discharge requirements for such activities. Because the authority for waste discharge requirements is derived from the state Porter-Cologne Water Quality Control Act and not the federal CWA, waste discharge requirements apply to somewhat different aquatic resources than does Section 404. Several recent court cases have resulted in restrictions on the USACE's jurisdiction under Section 404. Consequently, waters of the state, subject to Porter-Cologne, constitute a larger suite of aquatic resources, including groundwater, which is not regulated under the CWA. Moreover, some actions may require waste discharge requirements, but not authorization by Section 404. The Plan includes a process for projects that are also SSHCP Covered Activities to comply with Section 401 requirements and waste discharge requirements under the Porter-Cologne Water Quality Control Act.

Streambed Alteration Agreement

CDFW has jurisdictional authority over streams, lakes, and wetland resources associated with these aquatic systems under California Fish and Game Code Section 1600 et seq. California Fish and Game Code Section 1600 et seq. was repealed and replaced with new Sections 1600–1616 that took effect on January 1, 2004. CDFW has the authority to regulate work that will "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake." Activities of any person, state, or local governmental agency or public utility are regulated by CDFW under Section 1602 of the code. CDFW enters into a streambed or lakebed alteration agreement with the project proponent and can impose conditions on the agreement to ensure no net loss of values or acreage of the stream, lake, associated wetlands, and associated riparian habitat. The lake or streambed alteration agreement is not a permit, but rather a mutual agreement between CDFW and the project proponent. Because CDFW includes under its jurisdiction streamside habitats that may not qualify as wetlands under the CWA definition, CDFW jurisdiction may be broader than USACE jurisdiction. A project proponent must submit a notification of streambed alteration to CDFW before construction. The notification requires an application fee for streambed alteration agreements, with a specific fee

schedule to be determined by CDFW. Many of the concerns raised by CDFW during streambed alteration agreement negotiations are related to special-status species.

1.3.6 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq.), requires federal agencies to take into account the effects of their actions proposed on properties eligible for inclusion in the National Register of Historic Places. "Properties" are defined as "cultural resources," which includes prehistoric and historic sites, buildings, and structures that are listed on or eligible for listing on the National Register of Historic Places. An undertaking is defined by the NHPA as a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license, or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency.

The issuance of an ITP by the USFWS would be a federal undertaking subject to Section 106 of the NHPA. USACE approval of a Section 404 permitting strategy for future SSHCP Covered Activities is also a federal undertaking subject to Section 106 of the NHPA. The process by which the USFWS and USACE decisions on SSHCP permits would comply with the NHPA are discussed in detail in the SSHCP EIS/EIR.

1.4 Plan Development Process

1.4.1 Organization of the Planning Process

The SSHCP was a coordinated effort of six local agencies (i.e., the Plan Permittees) led by the County. Development of the SSHCP was overseen by a Local Agency Working Group that included staff from each of the Plan Permittees. The focus of this group was to guide work products and provide direction to consultants who were assisting with the preparation of the SSHCP document. An interdisciplinary Regulatory Agency Working Group that included staff from each Plan Permittee, USFWS, CDFW, USACE, USEPA, and the RWQCB reviewed SSHCP work products approved by the Local Agency Working Group. The focus of this group was to ensure that SSHCP components prepared at the direction of the Local Agency Working Group met the needs of the Permitting Agencies. Coordination and management of the Plan's development was overseen by a dedicated project manager and by staff from the County. In addition to the Plan Permittees and Permitting Agencies, Plan development was heavily influenced by local stakeholder groups representing varied interests. Several committees were formed to allow for stakeholder input, as described below. All SSHCP meetings were open to the public.

Steering Committee

The development of the SSHCP was assisted by a Steering Committee consisting of stakeholder representatives from the development, environmental, agricultural, landowner, and regulatory communities. While the Steering Committee was formed at the request of the Board of Supervisors, committee members did not have the authority to act on behalf of elected officials. The committee's primary responsibility was to review work products, plan elements, and provide advice to consultants and government agencies who were preparing the Plan. The committee was scheduled to meet monthly, but was convened only when work products needed review or when discussion was needed to resolve key issues. All meetings were open to the public and were often attended by interested parties. This committee was instrumental in crafting the Preliminary Draft HCP.

Biological Subcommittee

The Biological Subcommittee was formed to focus on review of scientifically rigorous documents that the Steering Committee felt were too technical for their review. The subcommittee was made up of members of the Steering Committee, and included biological experts specializing in local species or other biological sciences. These meetings, as with all SSHCP meetings, were open to the public.

Economic Subcommittee

Much like the Biological Subcommittee, the Economic Subcommittee was formed to address complex economic issues and report back to the Steering Committee with their findings.

Biological Advisory Committee

The Biological Advisory Committee was formed to evaluate and establish species lists, habitat cover types, and Biological Goals and Measurable Objectives. Members included professional scientists from relevant disciplines and resource agency specialists.

Science Advisors

Early in the process of crafting the SSHCP, the Steering Committee recognized the need for an independent scientific review of Plan documents. They recommended an approach that differs from "normal" HCP or NCCP Scientific Advisory Panels. Instead of hiring a group of scientists to craft a Preserve design strategy at the onset of Plan development and possibly provide generic guidelines not well tailored to the Plan Area, the County chose to use local experts with local knowledge as they were needed. This approach proved to be beneficial as it enabled consultants and planners to seek answers to specific questions regarding local habitats and species populations throughout the Plan development process.

Public Outreach

The Plan Permittees strived to ensure that the public were afforded every opportunity to be part of the SSHCP planning process and to provide comments and feedback as the SSHCP was developed. To ensure public participation, every meeting of the Steering Committee, Biological Subcommittee, and Economic Subcommittee was open to the public. The Plan Permittees maintained an email list of interested individuals and posted meeting notes and draft materials on a website that was dedicated to the SSHCP. The Plan Permittees also held a number of public outreach meetings and made presentations to organizations upon request. In addition, public scoping meetings were conducted by the Permitting Agencies and the Plan Permittees during the preparation of the draft EIS/EIR for the SSHCP, as required under NEPA, CEQA, and HCP regulations. Public scoping and outreach for the SSHCP EIS/EIR is summarized in the EIS/EIR document.

1.5 Document Organization

The SSHCP includes the following chapters and appendices:

Chapter 1: Introduction provides an overview of the SSHCP, the principles and goals used to guide Plan development, the process associated with preparing the document, and the regulatory setting.

Chapter 2: Physical Setting describes the geologic history and composition of the Plan Area, the natural resources, and associated environmental concerns.

Chapter 3: Biological Resources Setting describes the biological resources baseline condition of the Plan Area, including a description of land cover types in the Plan Area, description and maps of modeled habitat for each Covered Species and methodologies employed for establishing these baseline conditions.

Chapter 4: Land Use provides an overview of existing land use conditions and examines future trends in development that could occur over the next 50 years throughout the Plan Area.

Chapter 5: Covered Activities describes the activities for which authorization for the incidental take of SSHCP Covered Species is being sought through the issuance of an ESA Section 10(a)(1)(B) ITP and CESA Section 2081 (b) permit. Chapter 5 also presents conditions on the Covered Activities, including a description of each SSHCP AMM.

Chapter 6: Effects Assessment and Level of Take quantifies effects of the future Covered Activities on each SSHCP Land Cover Type, modeled habitat for each Covered Species, and designated Critical Habitat, and estimates expected take of each Covered Species.

Chapter 7: Conservation Strategy describes the SSHCP Biological Goals, and identifies measurable Biological Objectives and SSHCP Conservation Actions that will achieve each Biological Goal; also describes the proposed SSHCP Preserve System and the associated Preserve acquisition process.

Chapter 8: SSHCP Monitoring and Management Programs describes the required compliance and effectiveness monitoring, the SSHCP reporting schedule, and development of individual preserve management strategies.

Chapter 9: Implementation outlines the structure of the SSHCP Implementing Entity and processes by which the Plan Permittees will implement the SSHCP requirements.

Chapter 10: SSHCP Permit Application Process explains the future process for private (third-party) development or infrastructure Covered Activity projects to obtain project approvals from one of the Land Use Authority Permittees, explains the required components of the project application to a Land Use Authority Permittee, and explains conditions that must be met in order for a private project to be covered under the SSHCP ITPs.

Chapter 11: Changed and Unforeseen Circumstances – Assurances Describes procedures to deal with future Changed Circumstances. Chapter 11 also describes the No Surprises protections for Plan Permittees in the event of unforeseen circumstances. Chapter 11 includes a description of potential climate change effects on the Plan Area, and describes how the SSHCP Conservation Strategy accounts for these potential climate change effects.

Chapter 12: Economics Analysis and Funding Program presents the costs associated with Plan implementation and the various mechanisms for funding those costs, and provides assurances to the USFWS that they can provide adequate funding for the SSHCP Conservation Strategy over the term of the permit.

Chapter 13: Alternatives to Avoid or Reduce Take presents the required analysis of alternatives to the take of Covered Species presented in Chapter 5.

1.6 Appendices

Appendix A: Glossary and Acronyms
Appendix B: Species Accounts
Appendix C: Implementing Agreement
Appendix D: Sample Easement
Appendix E: Land Cover Type Report/Vernal Pool Watershed Mapping
Appendix F: Preserve Documentation Report Template
Appendix G: Preserve Management and Monitoring Details

Appendix H: Implementation Ordinance/Resolution
Appendix I: SSHCP Economic Model
Appendix J: Voluntary Additional Conservation
Appendix K: Project-Specific Avoidance and Minimization Measures
Appendix L: SSHCP Preserve Design

1.7 References

16 U.S.C. 470–470x-6. National Historic Preservation Act of 1966, as amended.

16 U.S.C. 703–712. Migratory Bird Treaty Act, as amended.

16 U.S.C. 1531–1544. Endangered Species Act of 1973, as amended.

50 CFR 17.1–17.108. Endangered and Threatened Wildlife and Plants.

50 CFR 402.1–402.48. Interagency Cooperation—Endangered Species Act of 1973, as amended.

City of Galt. 2009. *2030 Galt General Plan Policy Document*. Final. April 2009. Accessed February 11, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=13095.

City of Rancho Cordova. 2006. *Rancho Cordova General Plan*. Adopted June 26, 2006, Accessed February 11, 2015. http://www.cityofranchocordova.org/index.aspx?page=298.

County of Sacramento, Sacramento County Water Agency, Sacramento Regional County Sanitation District. 2004. "Memorandum of Agreement between County of Sacramento, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and U.S. Fish & Wildlife Service." September 2004.

County of Sacramento. 2011. *Sacramento County General Plan of 2005–2030*. Adopted November 9, 2011. Accessed February 11, 2015. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx.

Environmental Council of Sacramento v. *City of Sacramento*, 142 Cal.App.4th 1018 (2006).

USACE (U.S. Army Corps of Engineers). 2015. *CWA 404 Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan*. Sacramento, California: U.S. Army Corps of Engineers, Sacramento District. December 2015.

USFWS (U.S. Fish and Wildlife Service) and NOAA (National Oceanic and Atmospheric Administration). 2000. Notice of final policy: "Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process; Notice." June 1, 2000.

USFWS (U.S. Fish and Wildlife Service). 1996. *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*. November 4, 1996. Accessed February 12, 2015. http://www.fws.gov/endangered/esa-library/pdf/HCPBKTOC.PDF.

USFWS. 1999. *Formal Consultation on Water Service Contracts with Sacramento County Water Agency, San Juan Water District, and City of Folsom, Sacramento County, California*. 1-1-97-F-0161. Accessed February 12, 2015. http://www.waterresources.saccounty.net/Zone%2040/Z40%20Ap pdx%20E%20-%20Biological%20Opinion.pdf.

USFWS. 2004. *Freeport Regional Water Project Biological Opinion*.

USFWS. 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.* Portland, Oregon: USFWS. Approved December 15, 2005. Accessed February 6, 2012. http://ecos.fws.gov/docs/recovery_plan/060614.pdf.

INTENTIONALLY LEFT BLANK

2 PHYSICAL SETTING

2.1 Introduction

This chapter provides an overview of the existing physical conditions of the Plan Area that are used to inform the effects assessment (Chapter 6) and the development of the South Sacramento Habitat Conservation Plan (SSHCP or Plan) Conservation Strategy (Chapter 7). While the information provided in this chapter is central to understanding how the physical setting of the Plan Area informs certain aspects of the Conservation Strategy for each Covered Species, it is especially relevant for plant and animal species associated with vernal pools. As such, many of the sections in this chapter are focused on how the baseline physical setting is related to vernal pools and vernal pool species.

2.2 Physical Landscape

This section presents the physical landscape, including relief, landforms, geologic formation, and soils of the Plan Area. A clear understanding of the physical landscape of the Plan Area was used to help develop the SSHCP Conservation Strategy (see Chapter 7).

The Plan Area is made up of two physiographic regions (see Figure 2-1). The first is the lower Sacramento Valley, which extends through the western and central parts of the County from north to south. The lower Sacramento Valley region is the predominate region within the Plan Area and is characterized as nearly level to gently rolling, although some areas in the eastern part of the Plan Area are rolling to hilly and the relatively flat terrain is broken up by low and high terrace formations. The second region is the Sierra Nevada foothills, which are located along the northeast edge of the Plan Area. The terrain in this area is characterized as rolling to hilly.

2.3 Geomorphology

This section presents information on the landforms, geologic formations, and soils that characterize the Plan Area. A discussion regarding geomorphology is important as vernal pools in the Plan Area are largely characterized by these factors.

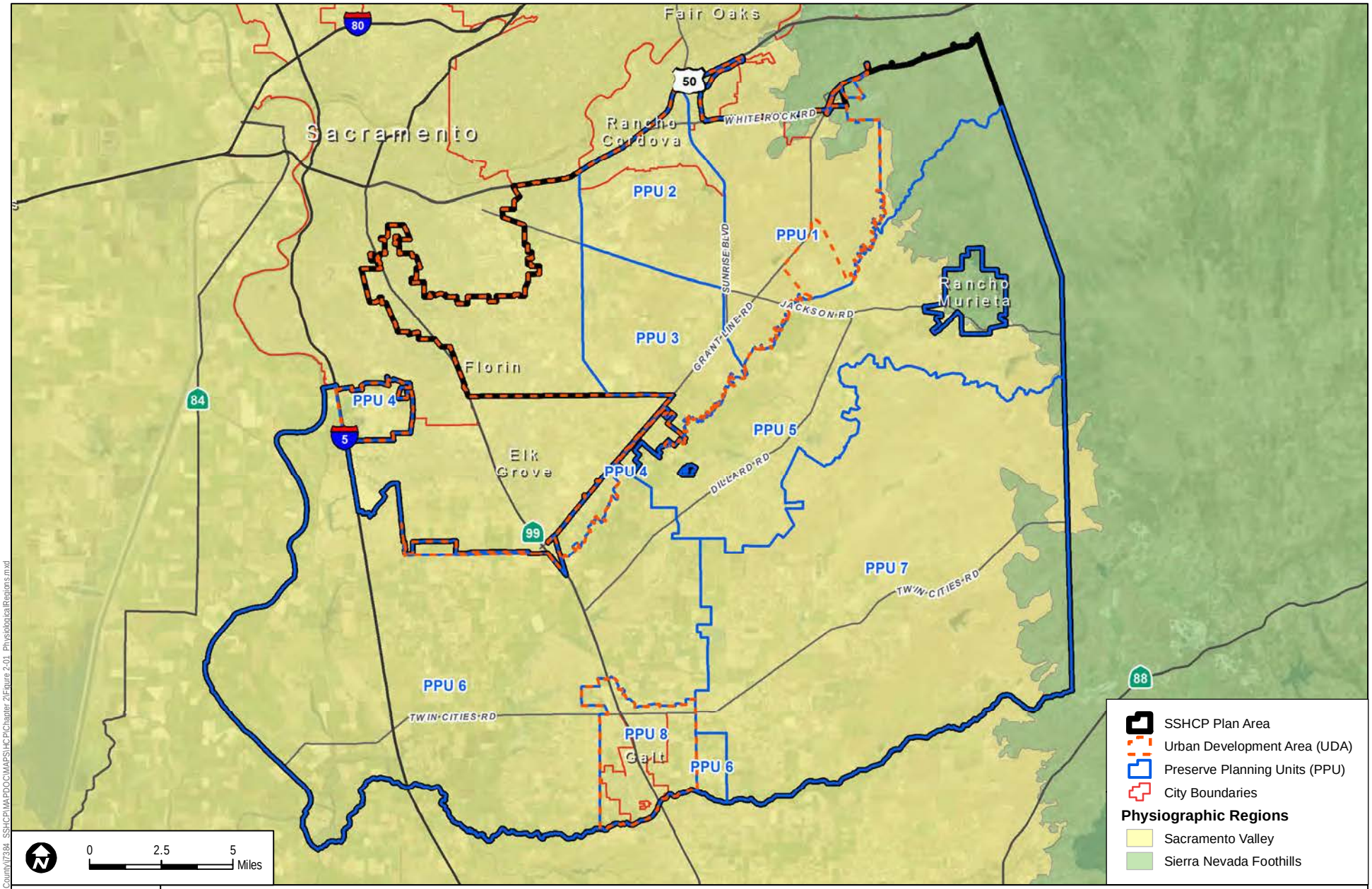
2.3.1 Landforms

A landform is a geomorphological unit, and is largely defined by its surface form and location in the landscape (Figure 2-2, Geologic Landforms). As part of the terrain, a landform is an element of topography. Landforms are categorized by characteristic physical attributes such as elevation, slope, orientation, stratification, rock exposure, and soil type. The development of the existing landforms in the Plan Area took place during the Pleistocene and Holocene Epochs. The predominant landforms in the Plan Area are low floodplain, high floodplain, drainageway, low

terrace, high terrace, mudflow, hills, and foothills (Jones and Stokes 1990; USDA NRCS 1993; Smith and Verrill 1998). Through a combination of erosion, alternating changes in climate, and pedogenic (soil-forming) processes, vernal pools originated on certain Central Valley landforms. Perhaps most significant in terms of the SSHCP Conservation Strategy are the low terrace and high terrace landforms that contain a majority of the vernal pools within the Plan Area. In an effort to maintain species heterogeneity and achieve the SSHCP Biological Goals and Objectives (see Chapter 7), the SSHCP Conservation Strategy seeks to preserve vernal pools on each landform.

2.3.1.1 Floodplain Landform (Low and High)

The youngest landform surface in the Plan Area consists of low floodplains. This is an active surface with component landforms that include nearly level tidal and freshwater marshes, natural levees, floodplain splays, and floodplains bordering the Sacramento, American, and Cosumnes Rivers and many smaller channels. Bar and channel topography is evident on the low floodplains along the American River and in a few small areas along the Cosumnes River. The low floodplains are frequently inundated unless they are protected by levees or upstream dams. The landscape is dynamic as new channels are formed and old channels become inactive. Alluvium moving downstream on the low floodplains in the Plan Area has buried older geomorphic surfaces. Upstream from areas where this alluvium is deposited on top of high floodplains, the low floodplains consist of riverwash or channels. Burial of the high floodplains by the low floodplains and the elevation at which the low and high floodplains converge are controlled by the competence and gradient of the stream. The low and high floodplains converge near Sacramento, in an area about 4 miles upstream from the confluence of the Sacramento and American Rivers. High floodplains are an active surface that is somewhat older than that of the low floodplains. Unless protected by levees or upstream dams, the floodplains and basins are occasionally flooded. The components of this surface include backswamps, the edges of backswamps; natural levees, backswamps, and floodplains along the Sacramento River; floodplains along the American and Cosumnes Rivers and other channels; and basins and basin rims in the American Basin. All of these components are nearly level (USDA NRCS 1993; Jones and Stokes 1990; Smith and Verrill 1998).



SOURCE: Bing Maps 2015, County of Sacramento 2014, Jepson 1998

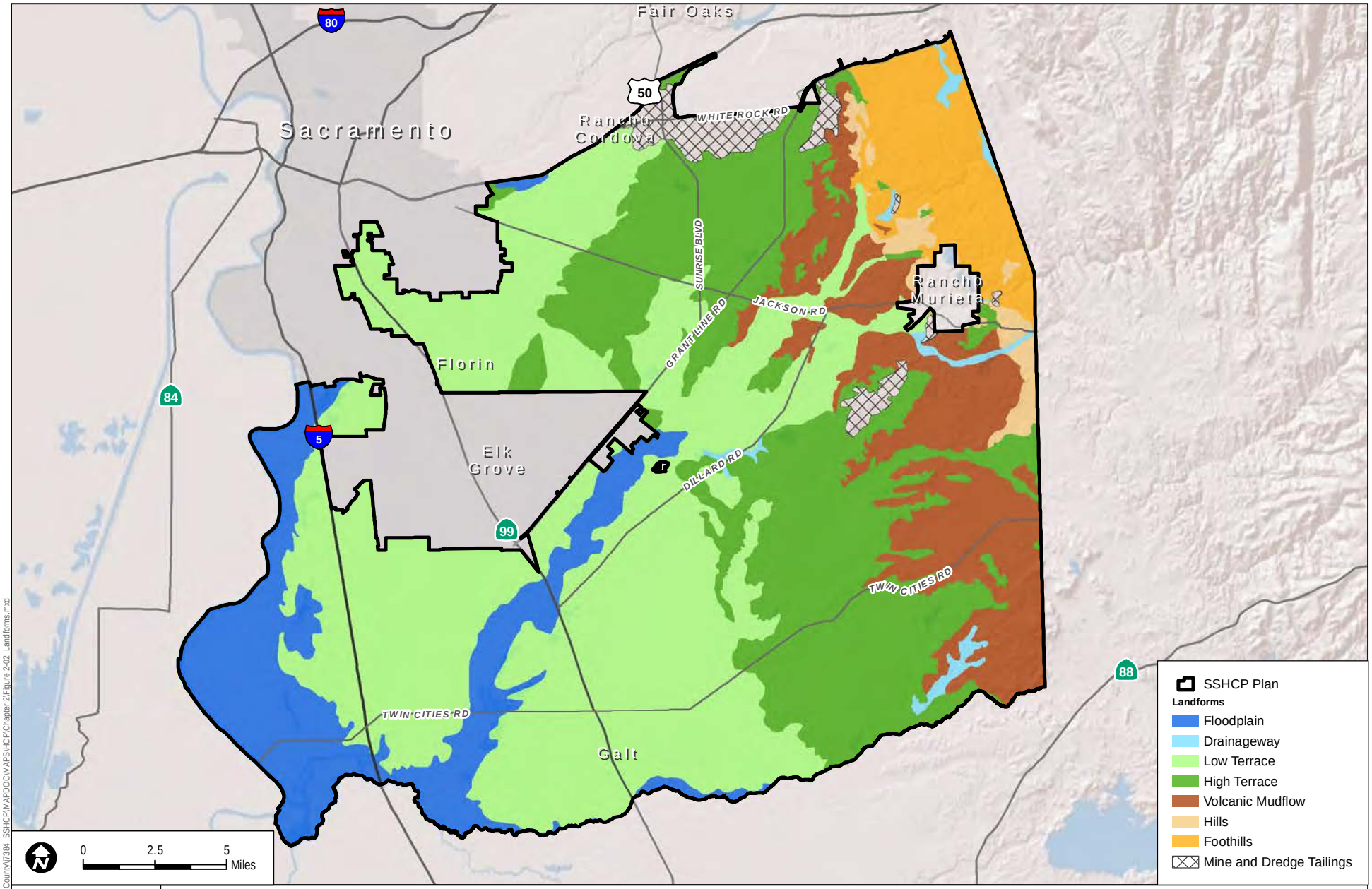
FIGURE 2-1

Physiographic Regions

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 2\Figure 2-01_PhysiologicalRegions.mxd

INTENTIONALLY LEFT BLANK



SOURCE: County of Sacramento 2014, CA Geologic Survey 1981

FIGURE 2-2

Geographic Landforms

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 2\Figure 2-02_Landforms.mxd

INTENTIONALLY LEFT BLANK

2.3.1.2 Drainageway Landform

The drainageway landform is composed of relatively recent alluvial deposits at the base of toe slopes and of stream terraces adjacent to incised channels of active waterways, and occur over other geologic formations. These are the second-youngest landform surfaces in the Plan Area, and are present where active streams, creeks, and rivers traverse the other geologic formations found in the Plan Area (discussed below). Consequently, vernal pools that formed on drainageway deposits are often associated with another vernal pool type on the adjacent higher ground and terraces (Jones and Stokes 1990). Because vernal pools on the drainageway landform are interspersed throughout other vernal pool types, they are difficult to map (Jones and Stokes 1990). In contrast to most vernal pools found on the low terrace, high terrace, and mudflow landforms, the vernal pools found on the drainageway landform fill and drain rapidly, and may depend more on overland runoff and direct precipitation to maintain their hydrology (Jones and Stokes 1990). Soils above the restricting claypan or hardpan layers in these pool types may be too deep for perched water tables to become exposed in shallow vernal pools. Additionally, the basins of these types of pools are often shallow, increasing susceptibility to evaporation, or slightly sloped, which encourages drainage.

2.3.1.3 Low Terrace Landform

Low terraces (also referred to as "young terrace"), are of relatively recent geologic origin (Jones and Stokes 1990). They contain late Pleistocene-age geomorphic surfaces that are underlain by stream alluvium. Low terrace landforms occur on the broad, nearly level plain of alluvial deposits that make up the Sacramento Valley floor. Low terrace landforms are relatively young (late Pleistocene, 100,000 years ago) when compared to the high terrace or the mudflow landforms (Smith and Verrill 1998). Low terrace soils are not as well developed when compared to high terrace landforms, but have been forming long enough to have undergone significant pedogenesis, and claypans and duripans are common. Vernal pools occur extensively in certain areas of the low terraces. Within the Plan Area, much of the low terrace landform has been converted to agriculture or developed for urban uses. As discussed in Chapter 3, low terrace soils commonly form seasonal "perched aquifers." Vernal pools found within the low terrace landforms do not exhibit the same richness of flora or specialized species when compared to vernal pools on high terrace landforms (Jones and Stokes 1990). Most young terrace sites have been plowed, graded, or heavily grazed because of their arable soils and proximity to reliable water; this and the relatively young age of the vernal pools may also account for their unspecialized flora in the Plan Area (Jones and Stokes 1990). Many low-terrace pools are shallow or have poorly defined basins. These pools support vernal pool species because they develop on heavy clay Galt soils that retain water in the soil profile for long periods after surface water evaporates (Jones and Stokes 1990).

2.3.1.4 High Terrace Landform

The high terrace landform (also referred to as "old terrace") is restricted to the east side of the Central Valley (Smith and Verrill 1998; Jones and Stokes 1990; Reiner and Swenson 2000). The high terrace landform was laid down from 600,000 to over 1 million years ago in the mid- to early Pleistocene to late Pliocene, and lies topographically above low terraces. In the Plan Area, high terraces are ancient deposits of the Pleistocene American River, which was located south of its present-day site (Jones and Stokes 1990). Very strong soil development has occurred in relatively flat areas on these terraces where the geomorphic surfaces are very old. The most pronounced erosion-induced mound-depression microrelief and vernal pool landscapes are found on the high terraces. The soils and vernal pools of the high terrace landform have essentially been developing for more than a half-million years. Consequently, the high terrace landform exhibit well-developed soils and floristically rich habitat. Similar to low terrace landform, perched aquifers are common in high terrace landform soils. Vernal pools on high terrace landforms typically support more specialized species than vernal pools found within any other landform (Jones and Stokes 1990). In the Plan Area, the high terrace landform supports the Laguna geological formation and Arroyo Seco gravels. Little of the Arroyo Seco gravels have been farmed because irrigation water is lacking and many sites are not arable. Consequently, vernal pools are abundant on level surfaces. Much of the area with high-terrace pools was dryland farmed in the past with wheat or oats. This activity appears to have had little effect on vernal pools in some areas, such as at the Sunrise-Douglas development area, while elsewhere plowing appears to have disrupted surface hydrology (Jones and Stokes 1990). Old-terrace pools are the oldest and most complex vernal pool type in Sacramento County and have developed a stable, predictable hydrology and flora over a long period.

2.3.1.5 Volcanic Mudflow Landform

The northern Sierra Nevada was covered by extensive volcanic mudflows believed to have arisen east of the sierra crest (Jones and Stokes 1990). These ancient mudflow formations were exposed at the base of the Sierra Nevada foothills, and then overlain by a thin soil derived from alluvial, colluvial material, and the residuum from the mudflow parent material (Jones and Stokes 1990). The mudflow landform ranges in age from early Pleistocene to Oligocene (Smith and Verrill 1998; Jones and Stokes 1990). The mudflow formation exists today as low, nearly level to gently sloping ridges and fans along the eastern edge of the Plan Area. The mudflow formation is characterized by a thin, shallow layer of soil (primarily formed from the parent mudflow material) over impermeable bedrock. In the Plan Area, areas of the mudflow landform support the Mehrten geological formation and the Valley Springs formation. Valley Springs formed in the Oligocene, and Mehrten formed in the Miocene or Pliocene (Jones and Stokes 1990). Soils on the mudflow formation are shallow, extremely rocky, excessively drained by surface runoff and high water infiltration rates, and underlain by impervious mudflow that impedes the

downward movement of water and upon which a perched aquifer periodically forms during the wet season (Jones and Stokes 1990).

2.3.1.6 Hill Landform

A hill landform has a raised surface above a surrounding level plain, is distinguished by its sloping sides, and defined peak. Hill landforms can be formed through the geologic processes of faulting and erosion. Within the Plan Area, both processes likely played a role in the formation of the hill landform, which is associated with the Pliocene (5 million years ago) uplift of the Sierra Nevada mountains to the east. These processes continue to shape the hill landform in the present. Within the Plan Area, the hill landform can be found in a narrow band immediately west of the foothills. It primarily comprises the Ione Formation, an Eocene-age (55- to 33-million-year-old) weathered sedimentary sequence (Smith and Verrill 1998; Creely and Force 2007).

2.3.1.7 Foothill Landform

The foothill landform is a surface defined by gradual increase in elevation at the base of a mountain range. They form the transition zone between hills and higher elevation mountains. Within the Plan Area, the foothills comprise the Salt Springs Slate, Copper Hill Volcanics and Gopher Ridge Volcanics geologic formations. The foothill landform is associated with the Pliocene (5 million years ago) uplift of the Sierra Nevada mountains to the east of the Plan Area and is found along the eastern margin of the Plan Area. Uplift from active geologic faults, erosion, and dissection by active stream channels draining the mountain range are the primary forces that shape this landform.

2.3.2 Geologic Formations

The landforms of the Central Valley and the Plan Area can be further subdivided by specific geologic surficial deposits (formations). A geologic formation is a geomorphic feature on the earth's surface representative of an episode of landscape development. Geologic formations are differentiated by various criteria, including age, lithology, strata, compaction, texture, depositional history, geomorphology, and soil-profile development (Smith and Verrill 1998). The geologic formations used in the SSHCP are derived from the Geologic Map of the Sacramento Quadrangle prepared by the California State Geological Survey (CGS 1981) (see Figure 2-3, Geologic Formations).

Of the 17 geologic formations that are found within the Plan Area, 15 are known to contain vernal pools. Of the 15 Plan Area geologic formations that contain vernal pools, there are 5 primary geologic formations that contain the majority of vernal pools in the Plan Area and are of particular importance to the development of the SSHCP Conservation Strategy (Chapter 7). They are the Laguna, Riverbank, Modesto-Riverbank, Mehrten, and Valley Springs Formations. The

five primary Plan Area vernal pool geologic formations are discussed in the sections that follow by vernal pool acres (the most to the least vernal pool acres).

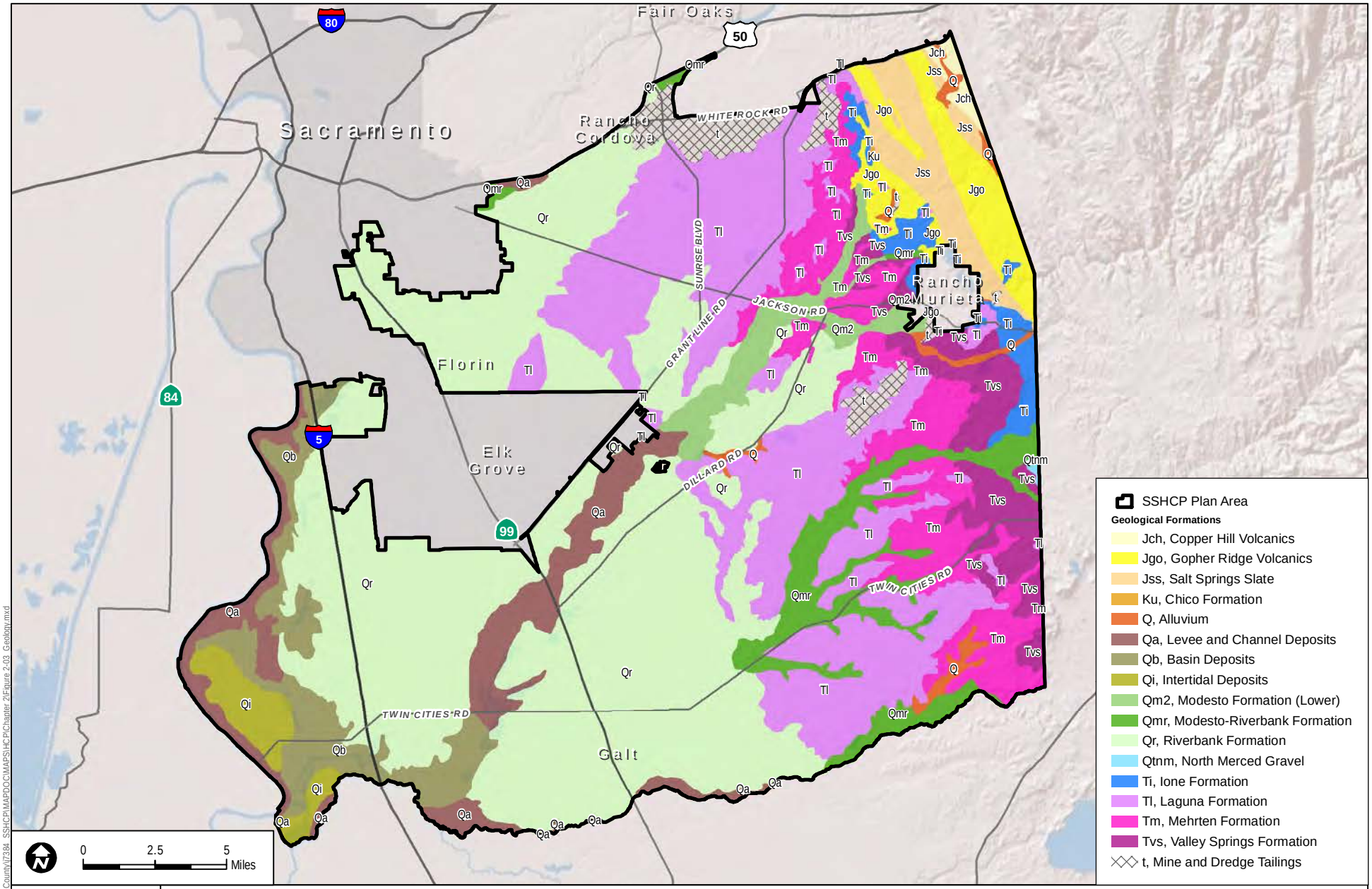
2.3.2.1 Laguna Formation

The Laguna Formation is part of the high terrace landform (Smith and Verrill 1998; Jones and Stokes 1990; Reiner and Swenson 2000). The Laguna Formation, ranging in age from late Miocene to early Pliocene, rests over the older Mehrten Formation. The Laguna Formation is composed of interbedded alluvial gravel, sand, and silt deposited from ancient river channels draining from the Sierra Nevada range, including the Feather, Yuba, American, Cosumnes, and Merced Rivers (Helley and Harwood 1985).

The Laguna Formation occurs in a band several miles wide running north to south along the eastern half of the Plan Area. The Laguna Formation is exposed in the eastern and central portions of the Plan Area. The formation's eastern outcrop extends northward from Dry Creek, where its area of exposure is about 6 miles wide, to its northernmost exposure along Meiss Road. Its central outcrop extends northward from Deer Creek to its northernmost exposure along U.S. 50. The Redding soil series and Red Bluff-Redding complex are the characteristic soil series associated with the Laguna Formation north of the Cosumnes River. South of the Cosumnes River to the headwaters of Badger Creek, the Redding series and Red Bluff-Redding complex are the main soils and they give way to Corning and Hadselville-Pentz south of Badger Creek to Dry Creek at the Sacramento–San Joaquin County line.

The Laguna Formation is the second-most extensive geologic formation in the Plan Area, totaling 61,282 acres (23,608 acres are inside the Urban Development Area (UDA) and 37,674 acres are outside the UDA). It comprises just over 19% of the total Plan Area.

The Laguna Formation encompasses 26,684 or 43% of the total number of vernal pools within the Plan Area. Of the 26,684 vernal pools occurring on this formation, 7,734 are located inside the UDA and 18,950 are outside the UDA. The Laguna Formation ranks first in importance in terms of total number of vernal pools. The Laguna Formation supports a wide variety of vernal pool sizes and densities, including some of the greatest vernal pool densities and most of the very large vernal pools remaining within the Plan Area, primarily within the UDA portion of the Plan Area (Dittes et al. 2007). Dittes et al. 2007 also found significantly lower density of vernal pools, smaller sizes of individual vernal pools, and a different category of "vernal pool complexes" on Laguna Formation soils located outside of the SSHCP UDA when compared to vernal pools on Laguna Formation soils inside the SSHCP UDA. Approximately 34% (1,554 acres) of the total vernal pool acreage within the entire Plan Area occurs on the Laguna Formation. There are 603 acres of vernal pool within the UDA and 951 acres outside the UDA.



SOURCE: County of Sacramento 2014, CA Geologic Survey 1981

FIGURE 2-3

Geologic Formations

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 2\Figure 2-03_Geology.mxd

INTENTIONALLY LEFT BLANK

2.3.2.2 Riverbank Formation

The Riverbank Formation is part of the low terrace landform. The Riverbank Formation was deposited on a plain of stream alluvium that has been partially dissected. The upper surface of this plain, in most places, represents the upper surface of the Riverbank Formation. The upper surface is characterized by a gently undulating surface. In the vicinity of Elk Grove, the Riverbank Formation is about 10 miles wide from west to east. To the east, it laps onto older materials composed of the Laguna Formation. To the west, it is in turn overlain by younger alluvial materials. Riverbank Formation is generally confined to the central and western portions of the Plan Area and occurs on either side of the Cosumnes River. Soils with claypans and duripans are common, as are vernal pools (Smith and Verrill 1998). The San Joaquin soil series is most closely associated with the Riverbank Formation. Other associated soil series in the Plan Area include Redding, Red Bluff, and Corning. Inclusions of Tehama soil with vernal pools on the low terrace landform are unusual; the only site in the study area, east and west of the intersection of Carbondale and Ione Roads and north of Willow Creek, is surrounded by old-terrace and mudflow pool areas (Jones and Stokes 1990).

The Riverbank Formation is the largest geologic formation in the Plan Area, with a total of 122,228 acres (35,401 acres inside the UDA and 86,827 acres outside the UDA). It comprises just over 38% of the total Plan Area. Although the Riverbank Formation dominates the Plan Area, large portions have been converted for agriculture or developed for urban uses because of their arable soils and proximity to reliable water. Consequently, young-terrace pools are not as common as the extent of the Riverbank Formation might suggest. In addition, most undeveloped portions of the Riverbank Formation were plowed or leveled in the past, further reducing the extent of intact young-terrace pools, and altering species composition and cover (Jones and Stokes 1990).

The Riverbank Formation encompasses 12,367 or 20% of the total number of vernal pools within the Plan Area. Of the 12,367 vernal pools occurring on this formation, 2,800 are located inside the UDA and 9,567 are outside the UDA. The Riverbank Formation ranks second in total number of Plan Area vernal pools.

Approximately 34% (1,533 acres) of the total vernal pool acreage within the entire Plan Area occurs on the Riverbank Formation. There are 289 acres of vernal pool within the UDA and 1,244 acres outside the UDA.

2.3.2.3 Mehrten Formation

The Mehrten Formation is part of the mudflow landform, and consists of eroded, high-standing remnants of andesitic volcanic mudflow fans that were deposited during the Pliocene and Miocene, 10–25 million years ago. Vernal pools tend to be located on the western edge of the

Mehrten Formation because the eastern portion increases in slope, precluding pool development (Smith and Verrill 1998). As discussed in Chapter 3, vernal pools classified as Northern Volcanic Mudflow Vernal Pools are often found on Mehrten Formation soils. Several outcrops of the Mehrten Formation are exposed in a discontinuous band that runs north–south in the eastern portion of the Plan Area in a stratum that underlies the Laguna Formation and overlies the Valley Springs Formation. The exposed band of Mehrten Formation extends from the south county boundary at Dry Creek, where it is about 4 miles wide, north to U.S. 50, where it is less than a mile wide. In the Plan Area, the Mehrten Formation is characterized by the mound-intermound soil series and complexes such as Hadselville-Pentz, Red Bluff-Redding, Corning-Redding, and Pardee-Rancho Seco soil complex. The Corning-Redding and Red Bluff-Redding complexes are predominant north of the Cosumnes River, while the Hadselvill-Pentz and Pardee-Rancho Seco complexes are predominant south of the Cosumnes River.

The Mehrten Formation is divided into two different layers. One is a sedimentary unit composed of gray to black andesitic sands, interbedded bouldery gravels, and blue to brown clay. Frequently laminated, the beds of black sand are commonly about 5 feet thick, although beds of up to 20 feet or more have been reported. Associated with the black sands are beds of stream gravel containing andesitic cobbles and boulders of up to several feet in diameter and beds of brown to blue clay and silt.

The second major unit of the Mehrten Formation is the tuff breccia. This rock is very dense and hard. It is composed of angular pieces and blocks of black, gray, and red fine-grained to porphyritic andesite, which range from less than an inch to over several feet in diameter. The tuff breccia was derived from andesitic eruptions to the east in the Sierra Nevada. During these eruptions, great quantities of highly mobile ash flowed west down the then-existing stream channels and picked up blocks of andesite debris, which were incorporated into the mass. The mass spread out over the westward-sloping plains and solidified as a pavement of hard, concrete-like rock, which ranged from only a few feet to over 30 feet in thickness. Flow patterns are readily evident where the upper surface of the tuff breccia is now exposed. On this surface, soil cover is scant, with the blocks of andesite standing out in bold relief, giving the appearance of a boulder-strewn field. Run-off from precipitation is nearly 100% due to the rocky surface.

The Mehrten Formation covers the third-largest geologic formation in the SSHCP, with a total of 26,459 acres (3,863 acres inside the UDA and 22,596 acres outside the UDA). It comprises just over 8% of the total Plan Area.

The Mehrten Formation encompasses 10,275 or about 17% of the total number of vernal pools within the Plan Area. Of the 10,275 vernal pools occurring on this formation, 648 are located inside the UDA and 9,627 are outside the UDA. The Mehrten Formation ranks third in importance in terms of total number of vernal pools.

Approximately 11% (478) of the total vernal pool acreage within the entire Plan Area occurs on the Mehrten Formation. There are 32 acres of vernal pool on the Mehrten Formation within the UDA and 446 acres on the Mehrten Formation outside the UDA.

2.3.2.4 Modesto-Riverbank Formations

The Modesto-Riverbank Formations are dominantly andesitic, late- to middle-Pleistocene alluvium composed of gravel, sand, silt, and clay derived from the Tuscan Formation via various streams (CGS 1981). The Modesto-Riverbank Formations are generally confined to the eastern portion of the Plan Area forming on either side of Laguna Creek (south) and its tributaries and on either side of Dry Creek. Widths vary from approximately a quarter of a mile wide along the tributaries of Laguna Creek (south) to about 1 mile wide along the main channel of Laguna Creek and Dry Creek. These formations extend west from the boundary with Amador County to a nondescript area east of the City of Galt. There are a number of soil series that are associated with the Modesto-Riverbank Formations, including, but not limited to, the Corning complex, Hicksville loam, Madera loam, Redding gravelly loam, and Tehama loam (CGS 1981).

The Modesto-Riverbank Formations cover the fifth-largest area in the SSHCP, with a total of 14,688 acres (567 acres inside the UDA and 14,121 acres outside the UDA). It comprises nearly 5% of the total Plan Area.

The Modesto-Riverbank Formations encompass 5,272 or about 9% of the total number of vernal pools within the Plan Area. All 5,272 vernal pools occurring on this formation are outside of the UDA. The Modesto-Riverbank Formations rank fourth in importance in terms of total number of vernal pools.

Approximately 11% (503 acres) of the total vernal pool acreage within the entire Plan Area occurs on the Modesto-Riverbank Formations. All 503 acres are found outside of the UDA.

2.3.2.5 Valley Springs Formation

The Valley Springs Formation is also part of the mudflow landform, but is slightly older than the Mehrten Formation. The Valley Springs Formation is made up of eroded, high-standing remnants of rhyolitic volcanic mudflow fans that were deposited 20–35 million years ago. Vernal pools tend to be located on the western edge of the formation because the eastern portion increases in slope, precluding pool development (Smith and Verrill 1998). The Valley Springs Formation is exposed along the southeastern portion of the Plan Area from the southeastern corner along Dry Creek, northward to the headwaters of Carson Creek. The formation is generally exposed over an area from 1 to 2 miles in width. Its widest exposure is along Arkansas Creek, where it is exposed for about 4 miles from east of Ione Road, west to the Cosumnes River. There may be expansible clays present, especially in fine-grained material. The Amador-

Gillender, Hadselville-Pentz, and Pardee-Rancho Seco soil complexes predominate on the Valley Springs Formation.

The Valley Springs Formation is the seventh-largest geologic formation exposed in the SSHCP, with a total of 13,690 acres (141 acres inside the UDA and 13,549 acres outside the UDA). It comprises just over 4% of the total Plan Area.

The Valley Springs Formation contains 4,139 vernal pools, or about 7% of the total number of vernal pools within the Plan Area. Of the 4,139 vernal pools occurring on this formation, 10 are located inside the UDA and 4,129 are outside the UDA. The Valley Springs Formation ranks fifth in importance in terms of total number of Plan Area vernal pools.

Approximately 6% (265 acres) of the total vernal pool acreage within the entire Plan Area occurs on the Valley Springs Formation. With the exception of 0.16 acre, almost all of the vernal pool acreage on this formation occurs outside of the UDA.

2.3.3 Soils

Many different kinds of soils are found within the Plan Area with a wide range of characteristics that influence flora and fauna habitat suitability, including soil wetness, depth to rock, the presence of hardpans, tight layers, erodibility, clay content, and soil slopes. Soils in the Plan Area vary from very deep, nearly level alluvial soils, to undulating shallow soils over restrictive duripans or clay-rich soil horizons, to shallow hilly soils overlying bedrock. These soils also vary from well-drained to poorly drained mineral soils and, to a lesser extent, organic soils. Individual soil units are organized into map units called soil associations, which consist of soil units of the same texture and composition that occur in a geographic position (USDA NRCS 1993). Soils data were used to help define Covered Species modeled habitat (Chapter 3). Soils series that contain vernal pools include an impermeable layer, which can be a claypan, a cemented hardpan (duripan), or rock (Solomeshch et al. 2007).

Soil series are commonly used as part of the name for an area shown on a soil survey map where that series is dominant. Certain soil series have been consistently mapped as the dominant soil in areas that coincide with the occurrence of vernal pools. Most of these soil series are associated one-to-one with geologic formations, although some series may occur on two or more formations. For example, the San Joaquin soil series, a Durixeralf that has been nominated as the California State Soil, is the most extensive soil series mapped in vernal pool areas, covering almost a half-million acres of low terraces on the east side of the Central Valley. The San Joaquin soil is the principal soil that defines the low terrace Riverbank Formation.

The Redding soil series, a more weathered and gravelly Durixeralf that is the second-most extensive soil series mapped in vernal pool terrain at almost 200,000 acres, primarily defines the Laguna

Formation on the eastside of the Central Valley. The Corning soil series is a Palexeralf associated with the Redding series on both the Laguna and Red Bluff Formations on high terraces.

A number of soil series occur as interwoven complexes in a landscape. In some mound-intermound vernal pool landscapes, soil series complexes are differentiated with one series on the mounds and the other in the intermounds. Examples are the mound Pentz soil series and the intermound Hadselville soil series (Smith and Verrill 1998).

The following provides a brief description of the six most prominent soil series within the Plan Area, organized by highest to lowest in elevation on the landscape.

2.3.3.1 Mudflow Soils

Hadselville

The Hadselville series consists of very shallow loamy, moderately well-drained intermound soils formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments primarily from the Mehrten Formation on exposed, upturned edges of mudflow formations at the base of the Sierra Nevada foothills (Jones and Stokes 1990). The Hadselville and Pentz soils are on hills with a mound-intermound microrelief topography. Hadselville soils are in the intermound position, and slopes are 2% to 30%.. Soil depth ranges from 4 to 10 inches. The restrictive layer is bedrock. The soil is dry at the bottom depth in most years for a period of 120 to 150 days from May 15 to October 1, moist in all parts for a period of 135 to 165 days from November 15 to April 15, and moist in some part the rest of the year. The mean annual soil temperature is 64°F to 67°F and the temperature remains above 47°F throughout the year. Organic matter content ranges from 1% to 2% throughout the profile and is higher than the underlying material. Hadselville soils are acidic (with a pH of 5–6.5), with a low cation exchange capacity leading to very poor soil nutrient conditions. This soil is influenced by small amounts of ash inherited from the parent material. Elevation is 110 to 350 feet above mean sea level (amsl). These soils formed in material weathered from consolidated tuffaceous sediments of the Mehrten Formation. The sediments are dominantly composed of basic andesitic sands that are stratified with conglomerate or andesite coarse fragments in some areas. Strongly consolidated strata may outcrop as bands across a hillslope.

The Hadselville soil is very shallow and moderately well drained. It formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments. Typically, the surface layer is grayish-brown sandy loam about 7 inches thick. Weakly consolidated tuffaceous sandstone is at a depth of about 7 inches. In some areas, the surface layer is gravelly sandy loam. In other areas, a thin hardpan caps the bedrock. Permeability is moderately rapid in the Hadselville soil. Available water capacity is very low. The effective rooting depth and the depth

to weakly consolidated bedrock are 4 to 10 inches. Runoff is very slow or medium. The hazard of water erosion is slight or moderate.

Pentz

The Pentz series consists of shallow loamy, well-drained soils formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments primarily from the Mehrten Formation on exposed, upturned edges of mudflow formations at the base of the Sierra Nevada foothills (Jones and Stokes 1990), and supporting primarily annual grassland that formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments. Pentz soils form mound, intermound microrelief and are found on hills and on backslopes of hills. Pentz soils are on the mound position. Slopes are 2% to 50%. Depth to paralithic contact and thickness of the solum is 10 to 20 inches. The restrictive layer is bedrock. The soil is dry between a depth of 8 inches and the paralithic contact in most years from May 15 to October 15 is moist in all parts from December 1 to May 1 and moist in some part the rest of the year. The mean annual soil temperature varies from 64°F to 67°F and the temperature remains above 47°F throughout the year. The weighted average clay content of the particle-size control section ranges from 10% to 20%. Coarse fragments are subrounded or rounded metamorphic rock, quartz, or quartzite. Content of coarse fragments is 0% to 35% with 0% to 25% cobbles or stones. Organic matter in the upper 7 inches mixed is 1% to 3%. Pentz soils are acidic (with a pH of 5–6.5) with a low cation exchange capacity leading to very poor soil nutrient conditions. This soil is influenced by small amounts of ash inherited from the parent material. Pentz soils are on undulating to hilly hills and on steep backslopes of hills, with mound-intermound microrelief. The microrelief is most strongly expressed on slopes of less than 20%. Slopes are convex or plane and are 2% to 50%. Elevation is 110 to 600 feet amsl. The soils formed in material weathered from consolidated tuffaceous sediments of the Mehrten Formation. The sediments are dominantly composed of basic andesitic sands that are stratified with conglomerate or andesitic coarse fragments in some areas. Strongly consolidated strata may outcrop as bands across a hill slope..

The Pentz soil is shallow and well drained. It formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments. Typically, the surface layer is brown fine sandy loam about 9 inches thick. The subsoil also is brown fine sandy loam. It is about 7 inches thick. Weakly consolidated tuffaceous sandstone is at a depth of about 16 inches. In some areas, the surface layer is gravelly sandy loam, sandy loam, or loam. In other areas, a thin hardpan caps the bedrock. Permeability is moderately rapid in the Pentz soil. Available water capacity is low. The effective rooting depth and the depth to weakly consolidated bedrock are 10 to 20 inches. Runoff is medium. The hazard of water erosion is slight or moderate.

2.3.3.2 Low Terrace Soils

San Joaquin

The San Joaquin soil series is the most extensive vernal pool soil. This series, plus others with which it is geographically associated (e.g., Fiddyment, Galt, Madera, and Rocklin), developed on Riverbank-age alluvial terraces along the eastern flank of the Central Valley (in the later Pleistocene, 100,000 to 200,000 years old). This soil series is the oldest continuously recognized soil series within the State of California, yet is the youngest of the Plan Area vernal pool soils geologically. These soils are used for irrigated crops, such as wheat, rice, figs, almonds, oranges, and grapes, and for pasture and urban development. San Joaquin soils formed in old alluvium on hummocky topography. A cemented hardpan (duripan) a few feet beneath the surface restricts roots and water percolation. San Joaquin soils are classified in U.S. Department of Agriculture (USDA) soil taxonomy as fine, mixed, active, thermic abruptic durixeralfs. The San Joaquin series is a loamy mineral soil supporting primarily annual grassland. The soil series consists of moderately deep to a duripan, well and moderately well-drained soils that formed in alluvium derived from mixed but dominantly granitic rock sources. They are on undulating low terraces with slopes of 0% to 9%. San Joaquin soils range from acidic (pH of 5) to mildly alkaline (pH of 8) with a low cation exchange capacity, resulting in generally nutrient-poor soil conditions. Some areas have been leveled. San Joaquin soils account for approximately 17% of soils within Sacramento County and San Joaquin soil complexes comprise an additional 8%, for a total of approximately 25% of Sacramento County. San Joaquin soils are the predominant soil series on the Riverbank Formation occurring on both the high floodplain and low terrace landforms in the County. San Joaquin soils occur in soil complexes with Galt soils, durixeralfs, xerarents, and urban land. San Joaquin soils and associated complexes all have a duripan ranging from 2 to 4 feet below soil surface. Vernal pools tend to form in mound-intermound areas and depressional features within these soil series. Together, the San Joaquin, Redding, and Corning soil series—durixeralfs and palexeralfs—are the core Northern Hardpan Vernal Pool soils. However, there are several dozen additional soil series (but of more limited distribution) that share the iron-silica-cemented duripan, reddish color, landscape position, and depleted nutrient status that characterize Northern Hardpan Vernal Pool soils (Solomeshch et al. 2007).

2.3.3.3 High Terrace Soils

Redding

Redding and Corning soil series developed on older, higher alluvial terrace landforms of the Laguna Formation (Pliocene to early-Pleistocene age). The Redding soil series is a well-drained, gravelly loam mineral soil that is moderately deep over a hardpan and supports primarily annual grassland. It formed in gravelly old valley fill from mixed sources but primarily derives from the

Laguna Formation. Typically, the surface layer is strong brown and yellowish-red gravelly loam and reddish-brown loam about 14 inches thick. The subsoil is dark reddish brown and reddish-brown clay. The hardpan ranges occur at a depth of 2 to 4 feet below surface level. Permeability is very slow. Redding soils are moderately acidic (pH 5–6.5) with a low cation exchange capacity resulting in generally nutrient-poor soil conditions. The available water capacity is 1.5 to 3.0 inches. The effective rooting depth is 20 to 34 inches. Most roots in the clay subsoil are along the faces of peds, which reduces the water available to plants. Surface runoff is slow or medium. The hazard of erosion is slight or moderate. After intense rainstorms, the soil is saturated for a short time. They are on nearly level or dissected and undulating to hilly high terraces. Slopes are 0% to 30%.

The soil between depths of 4 and 18 inches is usually dry all of the time from June until September or early October, and is moist in some or all parts the rest of the year. Weighted average clay content of the upper 20 inches of the argillic horizon is 35% to 60%. Redding soils are on nearly level or dissected and undulating to hilly high terraces. Microrelief may be hummocky. Gravel and cobbles tend to concentrate in the intermound in hummocky areas. Vernal pools with relief that is greater than the intermound are common in areas with slopes of 0% to 3%. Elevations are 40 to 2,000 feet amsl. The soils formed in stratified alluvium of mixed sediments that are gravelly or cobbly. These sediments vary considerably over short distances and may be unrelated to the overlying soil.

The Redding soil is moderately deep and moderately well drained. It formed in gravelly and cobbly alluvium derived from mixed rock sources. Typically, the surface layer is strong brown gravelly loam about 7 inches thick. The upper part of the subsoil is yellowish-red loam and gravelly loam. The lower part is a claypan of reddish brown and yellowish-red gravelly clay about 8 inches thick, at about 20 inches depth. Below this to a depth of 66 inches is a very gravelly hardpan that is strongly cemented with silica. Therefore, the Redding soil series restrictive layer is both claypan and hardpan. In some areas, the surface layer is gravelly sandy loam, loam, or sandy loam. Permeability is very slow in the Redding soil. Water is perched above the claypan/hardpan for short periods after heavy rainfall in winter and early spring. Available water capacity is low. The effective rooting depth is 20 to 40 inches, but roots are restricted to the cracks and faces of peds in the claypan, which is at a depth of 17 to 30 inches. The depth to a hardpan is 20 to 40 inches. The shrink–swell potential is high. Runoff is very slow or slow. The hazard of water erosion is slight. This soil is used as rangeland or for dryland crops, such as wheat. It may provide wetland functions and values. These should be considered when plans are made for enhancement of wildlife habitat or for land use conversion. Redding soils account for approximately 6% of Sacramento County, predominately in the eastern portion of the County. Redding soils are the predominate soil series occurring on the Laguna Formation on low and high terraces. Redding soils occur often in complexes with Red Bluff and Corning soils and

Xerarents. Together, the San Joaquin, Redding, and Corning soil series—durixeralfs and palexeralfs—are the core Northern Hardpan Vernal Pool soils (Solomeshch et al. 2007).

Red Bluff

The Red Bluff series consists of very deep, well-drained loamy mineral soils formed in high (older) terraces of the Laguna Formation. Red Bluff soils are on high terraces and have 0% to 9% slopes in elevations of 75 to 1,500 feet amsl. Thickness of the solum is over 60 inches and the percentage of clay decreases from the maximum amount at 60 inches by 3% to 10% absolute. The mean annual soil temperature is 62°F to 66°F and exceeds 41°F all year. The soil between a depth of 7 and 21 inches is dry in all parts from June to October and moist in some or all parts the rest of the year. The upper 20 inches of the argillic averages more than 35% clay and ranges from 27% to 60% clay. Base saturation (sum) ranges from 45% to 75% throughout the argillic horizon. Red Bluff soils are among the oldest soils in the County. Their base saturation is as low as 45% in the argillic horizon and is even lower in the surface layer. Parent materials for Red Bluff soils are gravelly and cobbly alluvium from mixed sources. The restrictive layer is claypan at a depth of approximately 35 inches (Jones and Stokes 1990). Paleoclimatic influence also is indicated by properties of the Red Bluff soils. A high content of clay, reddish color, low pH (5–6.5), and a significant amount of iron and manganese staining distinguish these soils from other soils in the Plan Area. Low to moderate cation exchange capacity leads to generally nutrient-poor soil conditions. Presumably, a warmer and perhaps wetter paleoclimate influenced the weathering of clay minerals in the Red Bluff soils to kaolinite. Good subsurface drainage and the parent material also were factors.

The well-drained Red Bluff soils are dominant on the high and intermediate terraces. These mature soils have a thick, deeply weathered argillic horizon and a low base saturation. They have a slightly higher reaction in the A and B horizons than is typical for the Red Bluff series, which generally consists of older soils on high terraces. The parent material of the Red Bluff soils is gravelly alluvium derived from fluvial and glacial sources and laid down by an ancestral channel of the American River. It consists of rounded pebbles and cobbles derived from mixed sources, including dark metamorphic, quartzitic, and andesitic rocks in a granitic sand matrix. These American River channel pebbles are approximately 600,000 years old, as regionally correlated from radiometrically dated sediments of a stratigraphic unit in the San Joaquin Valley. Consequently, they are of mid-Pleistocene age. Soils on hills in the eastern part of Sacramento County also are estimated to be of mid-Pleistocene age.

Corning

Corning soils are gravelly loam formed from the Laguna Formation and Arroyo Seco gravels on high terraces and terrace remnant landforms. Corning soils are characterized by mound-

intermound microrelief and on smooth terrace side slopes. They are very deep. They are well drained on the mounds and moderately well drained in the intermound areas. Typically, the surface layer is gravelly fine sandy loam. The restrictive layer is a claypan at approximately 28 inches depth (Jones and Stokes 1990). The substratum is stratified gravelly sandy clay loam and gravelly sandy loam. It formed in old valley fill from mixed sources. Typically, the surface layer is reddish-brown, yellowish-red, and red gravelly loam about 22 inches thick. The subsoil is red and dark red clay about 18 inches thick. The substratum to a depth of 60 inches is strong brown clay loam. Corning soils can range from acidic to mildly alkaline (pH of 5–8.5) with a low cation exchange capacity resulting in generally nutrient-poor soil conditions. Permeability is very slow. The available water capacity is 4.0 to 6.5 inches. The effective rooting depth is 60 inches or more, but most roots in the clay subsoil are along the faces of peds, which reduces the water available to plants. Surface runoff is slow or medium. The hazard of erosion is slight or moderate. After intense rainstorms, the soil is saturated for a short time. The Corning series consists of very deep, well, or moderately well-drained soils formed in gravelly alluvium weathered from mixed rock sources. Corning soils are on high terraces and show mound-intermound microrelief. Slopes are 0% to 30%. Solum thickness is 23 to 60 inches. Soil temperature is greater than 47°F throughout the year. Solum thickness differs over short distances because of hummocky microrelief. Elevations are 75 to 1,300 feet amsl. Slopes are 0% to 30%. The soils formed in gravelly alluvium derived from mixed rock sources.

The well-drained Corning soil is very deep. It formed in gravelly alluvium derived from mixed rock sources. Typically, the surface layer is about 28 inches of strong brown gravelly loam and yellowish-red loam. The subsoil is a claypan of yellowish-red gravelly clay loam about 19 inches thick. The substratum to a depth of 62 inches is yellowish red, stratified gravelly loamy coarse sand to gravelly sandy clay loam. In some areas, the surface layer is gravelly sandy loam, loam, or sandy loam. In other areas, the subsoil and substratum are very gravelly. In places, the subsoil is clay or clay loam. Permeability is very slow in the well-drained Corning soil. Water is perched above the claypan for very brief periods after heavy rainfall in winter and early spring and when the soil is over-irrigated. Runoff is medium. The hazard of water erosion is slight or moderate.

The moderately well-drained Corning soil is very deep. It formed in gravelly alluvium derived dominantly from mixed rock sources. Typically, the surface layer is brown gravelly fine sandy loam and reddish-brown, yellowish-red, and light-brown loam, which extends to a depth of about 20 inches. The subsoil is a claypan of yellowish-red clay about 12 inches thick. The substratum to a depth of 60 inches is yellowish-red, stratified gravelly sandy clay loam to gravelly sandy loam. In some areas, the surface layer is gravelly loam, sandy loam, or loam and the subsoil and substratum are very gravelly. In other areas, the subsoil does not have coarse fragments and is grayish-brown clay and clay loam. Available water capacity is low. The effective rooting depth is more than 60 inches, but roots are restricted to the cracks and faces of peds in the claypan,

which is at a depth of 15 to 30 inches. Together, the San Joaquin, Redding, and Corning soil series—durixeralfs and palexeralfs—are the core Northern Hardpan Vernal Pool soils (Solomeshch et al. 2007).

2.4 Atmospheric Conditions

The climate of the Sacramento region is generally described as being Mediterranean and subtropical. Mediterranean climates are characterized by hot, dry summers and cool, moist winters. The absence of any major physiographic variations within the Plan Area results in a nearly uniform climate for the entire area, with the exception of the Sacramento-San Joaquin Delta, where cooler ocean breezes keep summer temperatures lower than in the remainder of the County. It is this seasonal regime that allows vernal pools to persist within the Plan Area and provides a favorable environment for agriculture that supports many SSHCP bird Covered Species.

Temperatures and Growing Season

Temperatures in July vary from an approximate average daily high of 94°F to an average daily low of 60°F, while temperatures in January vary from an approximate average daily high of 54°F to an average daily low of 40°F. Extreme temperatures in Sacramento County have been recorded as low as 17°F in December of 1932 and as high as 114°F in July of 1925 (Masters-Bevan 2000).

Sacramento County has a long growing season. The growing season is that period of time when the temperature is above 32°F. The growing season in Sacramento County ranges from 250 days in or near the Sierra foothills to over 300 days near the City of Sacramento. Most of the lands being cultivated in the County enjoy a growing season of approximately 275 days a year.

Precipitation and Snowfall

Generally, summers in Sacramento County are dry and winters are moist. Total average rainfall in Sacramento County measures about 19 inches annually. Just over half of the total amount of yearly rainfall occurs during the winter rainy season, which is from November to February. During that period, measurable quantities of precipitation occur, on average, 10 days out of every month. Thunderstorms are rare, but when they do occur, it is usually in the fall, late spring, or late summer. Snowfall is also rare in Sacramento County, and when it does occur, the amount is small and melts quickly (Masters-Bevan 2000).

The County experiences a great deal of sunshine throughout the year. During the winter months, about 53% of the days have sunshine, while sunshine will prevail on about 95% of the days during the summer months. A typical year in Sacramento reports 188 clear days, 77 partly cloudy days, and 100 cloudy or foggy days (Masters-Bevan 2000).

Winds

Winds in Sacramento County are influenced in most instances by the cool marine air entering the Central Valley through the Carquinez Straits. Because of the north–south orientation of the Great California Valley, the winds advancing from the sea to the west, once in the valley, change direction and blow either north toward Sacramento County or south toward San Joaquin County, depending upon existing atmospheric pressures.

Southerly winds prevail in Sacramento County, with an average velocity of about 8 miles per hour. On occasion, this south wind does not extend across the entire valley floor but, instead, a light northerly counter-current may occur on the west side of the valley.

In winter, the wind directions are generally dependent upon the passage of frontal systems through the valley. Southeasterly winds generally occur as a front approaches, with a marked wind shift to the northwest or north after the front has passed. The strongest northerly winds occur after the front has passed, decreasing in speed over a period of a few days.

Air movement may stagnate between storms in winter, but the highest frequency of stagnation occurs in autumn, during the period after the characteristic summer flow ceases and before the season of winter storms has commenced. During any season, nighttime cold density flows may occur in the absence of strong barometric pressure gradients. These flows are most pronounced in sloping mountain valleys and tend to follow water drainage patterns.

These density flows lead to a pooling of cold air with a temperature inversion at the top of the pool; thus, any radiation inversion that might occur independently on the valley floor may be augmented by cold air flowing off of the sloping sides of the valley.

Humidity and Fog

Generally, summers in Sacramento County are dry and winters are moist. The relative humidity ranges from about 30% to 80% during summer months and 60% to 90% during winter months (Masters-Bevan 2000).

Heavy fog, locally called radiation fog or “tule fog,” is experienced in the Plan Area during the winter months, usually December to February, with a higher occurrence along waterways. Several conditions, occurring simultaneously, are conducive to the formation of radiation fog. These include the lack of strong storm systems, an intensifying nighttime inversion caused by cold down-slope drainage flows from the mountains, and short daylight hours. Radiation fog frequently occurs during the nights and mornings and ranges in thickness from 200 feet in lower elevations of the valley to just 10 feet at higher elevations. Fog may persist for periods of several days to 2 or 3 weeks in the absence of a strong weather system, or if solar radiation that normally

heats the ground is reflected back into the atmosphere by the fog itself. On average, fog occurs in Sacramento County 34 days per year (Cunningham 2003).

2.5 Surface Waters

As discussed in Section 2.3.1, Landforms, the easterly and center portion of the Plan Area has rolling terrain, resulting in reasonably well-defined stream channels and steep gradients. The westerly portion of the Plan Area, on the other hand, generally comprises landforms typical of the Central Valley floor with level terrain and poorly defined, meandering streams with gentle gradients. The general pattern of drainage, slope, and gradient in the Plan Area is from northeast to southwest.

Hydrologic conditions of most streams and rivers in the Plan Area are altered from historic conditions. Historically, the hydrology of most streams within the Plan Area was intermittent or ephemeral. The streams would flow in the winter and spring months when precipitation and groundwater conditions were suitable. Under current conditions, summer runoff from various land uses provides augmenting flows to many segments of Plan Area streams, sometimes creating perennial hydrology.

The Cosumnes River and the Mokelumne River are the only rivers within the Plan Area, though the southern border of the Plan Area is the centerline of the Mokelumne River and the western border of the Plan Area is adjacent to the Sacramento River (see a description of the Plan Area in Chapter 1 (Figure 1-1, SSHCP Plan Area)). The Cosumnes River receives flows from its contributing stream tributaries, and flow is also naturally augmented through connection to shallow groundwater basins.

Most of the perennial and larger intermittent streams, creeks, and rivers within the Plan Area are named flowline features. Although some riparian and adjacent wetland habitats are intact and/or being restored in certain locations, the dominant SSHCP land cover types (see Chapter 3) adjacent to named rivers and streams are Valley Grassland, Agricultural, and Non-Habitat land cover types associated with urban development. Some of these streams are channelized, rerouted around agricultural operations, and devoid of riparian areas as a result of agricultural and urban/suburban development.

2.5.1 Important Rivers, Streams, and Creeks within the UDA

The following describes specific rivers, streams, and creeks within the UDA that were studied for potential benefits to Covered Species or water quality should they be preserved under this Plan (see Figure 2-4, Watersheds).

2.5.1.1 Central Paseo

The headwaters to the Central Paseo are located in an undescribed portion of the Plan Area proximal to the northeast corner of the SSHCP's UDA. From its headwaters, the stream flows south through Valley Grassland land cover for approximately 36,160 feet within the Cordova Hills Master Plan Area before intersecting Deer Creek. As of the writing of this Plan, there are no portions of the Central Paseo within existing preserves.

2.5.1.2 Elder Creek

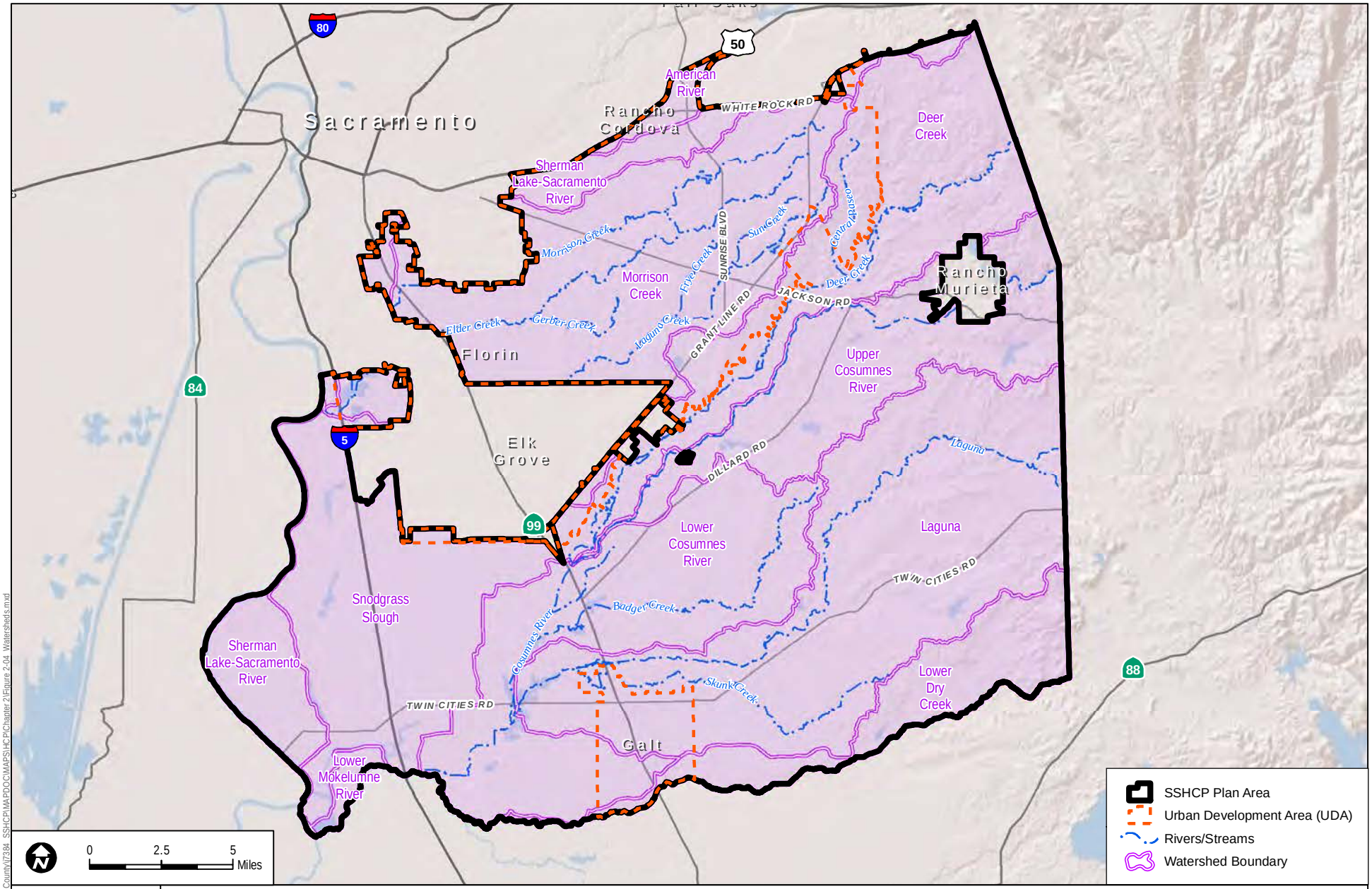
The headwaters to Elder Creek are located within the Jackson Township Master Plan Area near the intersection of Kiefer Road and Eagles Nest Road. From its headwaters, the stream flows southwest through a matrix of Valley Grassland and agricultural-residential development for approximately 44,560 feet until it reaches Elk Grove Florin Road. This section of the stream largely retains its natural meander, only occasionally being interrupted in small sections where it has been straightened and widened to accommodate agricultural operations, including a large nursery. From Elk Grove Florin Road, the stream continues for approximately 18,740 feet through an urbanized setting before leaving the Plan Area. The portion of Elder Creek that flows through this urban setting is concrete-lined or riprapped with little or no riparian vegetation remaining. As of the writing of this Plan, there are no portions of Elder Creek within existing preserves.

2.5.1.3 Frye Creek

The headwaters to Frye Creek are located within the New Bridge Master Plan Area proximal to the intersection of Kiefer Boulevard and Sunrise Boulevard. From its headwaters, the stream flows southwest through Valley Grassland and Agricultural lands for approximately 20,990 feet before intersecting Laguna Creek (north). Most of Frye Creek flows as a natural meandering stream with the exception of a small segment (2,580 feet) that has been straightened to accommodate agricultural operations. As of the writing of this Plan, approximately 7,370 feet of Frye Creek is within existing preserves.

2.5.1.4 Gerber Creek

The headwaters to Gerber Creek are located within the West Jackson Master Plan Area near the intersection of Excelsior Road and Florin Road. From its headwaters, the stream flows southwest through a patchwork of mostly Valley Grassland and agricultural-residential development for approximately 30,120 feet before intersecting Elder Creek. Some small segments (1,150 feet) of Gerber Creek are adjacent to urban development. As of the writing of this Plan, there are no portions of Gerber Creek within existing preserves.



SOURCE: County of Sacramento 2013, USGS 2012 NHD

FIGURE 2-4

Watersheds

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 2\Figure 2-04_Watersheds.mxd

INTENTIONALLY LEFT BLANK

2.5.1.5 Laguna Creek (north)

The headwaters to Laguna Creek (north) are located within the Cordova Hills Master Plan Area just south of Glory Lane. From its headwaters, the stream flows southwest through Valley Grassland for approximately 18,890 feet before being dammed and forming a small, privately owned reservoir (Blodget Reservoir). As the stream exits the reservoir it flows due west for approximately 13,060 feet through Valley Grassland and Agricultural lands until it reaches the intersection of Sunrise Boulevard and Jackson Highway. This section of the stream has been straightened and is deeply incised in some areas. Once past the intersection of Sunrise Boulevard and Jackson Highway, the stream runs southwest through a matrix of Agricultural lands and Valley Grassland for 47,230 feet until it exits the Plan Area at Calvin Road. This section of the stream largely retains its natural meander, only occasionally being interrupted in small sections where it has been straightened and widened to accommodate agricultural operations. Laguna Creek (north) reenters the Plan Area west of Franklin Boulevard and flows into the Regional Sanitation Buffer Lands, joins Morrison Creek, and enters the Stone Lakes National Wildlife Refuge. As of the writing of this Plan, approximately 18,450 feet of Laguna Creek (north) is within existing preserves.

2.5.1.6 Morrison Creek

The headwaters to Morrison Creek are located in an undescribed portion of the Plan Area proximal to the intersection of Grant Line Road and White Rock Road. From its headwaters, the stream flows southwest through Valley Grassland for 52,930 feet until it intersects Excelsior Road. A vast majority of this section of the stream (15,700 feet) travels through two master-planned communities that are not participating in the SSHCP (Rio Del Oro and Mather). From Excelsior Road, the stream continues southwest for approximately 17,410 feet through a series of gravel mines until it reaches Jackson Highway. A majority of the stream in this section has been relocated and widened, but has also been engineered to include a meander belt. Continuing southwest past Jackson Highway, the stream travels approximately 7,600 feet through Valley Grassland and a dense stand of Valley Oak Riparian habitat before intersecting Mayhew Road. With the exception of the headwaters east of Grant Line Road, this is the only other section of Morrison Creek within the Plan Area that has not been moved from its original location. Continuing southwest of Mayhew Road, the stream travels approximately 8,100 feet before exiting the Plan Area. The stream in this section travels through a network of gravel mines and has been relocated and widened, but has also been engineered to include a meander belt. Morrison Creek reenters the Plan Area west of Franklin Boulevard and flows into the Regional Sanitation Buffer Lands before entering the Stone Lakes National Wildlife Refuge. As of the writing of this Plan, approximately 21,980 feet of Morrison Creek is within existing preserves.

2.5.1.7 Sun Creek (a.k.a. Kite Creek)

The headwaters to Sun Creek are located within the SunRidge Master Plan Area. From its headwaters, the stream flows southwest through Valley Grassland for approximately 25,230 feet before intersecting Laguna Creek (north). Most of Sun Creek flows as a natural meandering stream with the exception of a small segment (2,190 feet) that has been straightened to accommodate development. As of the writing of this Plan, there are no portions of Sun Creek within existing preserves.

2.5.2 Important Rivers, Streams, and Creeks outside the UDA

The following describes rivers, streams, and creeks outside the UDA that were studied for potential benefits to Covered Species or water quality should they be preserved under this Plan (see Figure 2-4, Watersheds).

2.5.2.1 Cosumnes River

Outside the UDA, the Cosumnes River is the most prominent watercourse. The river originates in the Sierra Nevada, entering the Plan Area at the Sacramento–El Dorado County boundary. The river flows for approximately 212,630 feet through the Plan Area and eventually merges with the Mokelumne River and then drains into the Sacramento-San Joaquin Delta. As the Cosumnes River makes its way through the Plan Area, it passes through a patchwork of alternating Agricultural land cover types and Valley Grassland. The Cosumnes River supports some of the last major remnants of Riparian Oak Woodland within the region, including remnant stands of Valley Oak Riparian Woodland and stands of elderberry shrubs. The river also provides backwaters that support important breeding and roosting habitat for a number of SSHCP Covered Species.

2.5.2.2 Deer Creek

Just north of the Cosumnes River is Deer Creek, whose headwaters originate in western El Dorado County. Deer Creek flows for approximately 189,690 feet through a landscape of Valley Grassland, Blue Oak Woodland, and Agricultural lands before joining the Cosumnes River southeast of the City of Elk Grove. Much of the land between Deer Creek and the Cosumnes River includes a significant amount of vineyards. There is also the occasional remnant stand of Riparian Woodland.

2.5.2.3 Laguna (South), Skunk, Willow, and Badger Creeks

There are a number of streams located outside of the UDA that offer significant habitat value for a number of the Plan's Covered Species. Laguna (South), Skunk, Willow, and Badger Creeks

and their tributaries are all located outside of the UDA in the southern and eastern portions of the Plan Area. All of these creeks flow in a southwesterly direction through a patchwork of Valley Grassland and Agricultural land cover types before they merge with the Cosumnes River northwest of the City of Galt.

2.5.3 Plan Area Watersheds

A watershed is generally described as an area located within a basin that is entirely drained by a common watercourse. The Plan Area comprises a portion or the entirety of 10 watersheds based on 10-digit hydrologic units (HUC), as defined by the Federal Standard for Delineation of Hydrologic Unit Boundaries (USGS and USDA NRCS 2009). These watersheds are depicted on Figure 2-4.

Table 2-1 provides acreages of the 10 watershed areas and the portion of the watershed within the Plan Area.

Table 2-1
Summary of Watersheds in the Plan Area

Watershed	Acres of the Watershed in Plan Area	Total Watershed Acreage	Percent of Watershed in Plan Area	Cumulative Percentage of Watershed in Plan Area
Laguna Creek	73,976	96,788	76.4%	23.3%
Morrison Creek	42,926	69,540	61.7%	13.5%
Snodgrass Slough	40,426	51,616	78.3%	12.7%
Lower Cosumnes River	46,682	46,683	100.0%	14.7%
Deer Creek	43,803	81,504	53.7%	13.8%
Upper Cosumnes River	31,885	114,793	27.8%	10.0%
Lower Dry Creek	18,493	56,110	33.0%	5.8%
Sherman Lake-Sacramento River	13,987	121,608	11.5%	4.4%
American River	3,452	65,103	5.3%	1.0%
Lower Mokelumne River	2,019	141,965	1.4%	1.0%
Grand Total[1]	**317,655**	**845,709**	**28.5%**	**100.0%**

Note:
[1] The total does not include the approximately 268,589 acres of the Cache Slough watershed in the Plan Area, which is not discussed in this document.

Following are brief descriptions of the existing physical attributes and the acres of each SSHCP land cover type present in each of the 10 watersheds (10-digit HUC) within the Plan Area. The SSHCP defines 25 land cover types present in the Plan Area (see Section 3.2 and Table 3-1).

Eight of the SSHCP land cover types (Section 3.2) are classified by the SSHCP as "Developed or other Non-Habitat" (i.e., "Aqueduct," "Disturbed," "High-Density Development," "Low-Density

Development," "Roads," "Mine Tailings," "Recreation/Landscaped," and "Not Mapped"—see Section 3.2.4). The acres of existing Developed/Non-Habitat land covers are quantified below for each watershed within the Plan Area.

Seventeen of the SSHCP land cover types (Section 3.2) are classified by the SSHCP as "Natural Land Covers," which includes 10 Aquatic land cover types and 7 Terrestrial land cover types (see Table 3-1). Agricultural lands that provide Covered Species habitat are included in the "Natural Land Covers" grouping.

SSHCP land cover types that are assumed to be composed primarily of impervious surfaces include Aqueduct, High-Density Development, Major Road, and Mine Tailings.

2.5.3.1 American River Watershed

Approximately 3,452 acres, or about 5%, of the 65,103-acre American River watershed is located within the Plan Area. This watershed comprises 1% of the entire Plan Area and is located in the northern portion of the Plan Area (Figure 2-4).

Hydrology

According to the National Hydrography Dataset (NHD) flowline dataset, the American River watershed contains about 1% of the Plan Area's flowline features. Alder and Buffalo Creeks are the main water sources within this watershed, both of which are tributaries to the American River located north of the Plan Area. Artificial paths (48%) and streams/rivers (46%) account for most of the flowline features in the American River watershed.

Slope and Elevation

The entire American River watershed contains flat to gentle slopes (0%–20%). This watershed does not contain any lands above 20% slopes. Similarly, the majority of the watershed is between an elevation range of 0–500 feet, with only about 2% ranging from 500–1,000 feet.

Geological Formations

The majority of the American River watershed consists of Riverbank Formation, Laguna Formation, and Gopher Ridge volcanics (45%).

Soils

The majority of this watershed (59%) contains dredge tailings, pits, and other remnants from mining operations. The remaining acreage consists mostly of loam (35%) and gravelly loam (about 3%) soils.

SSHCP Land Cover Types

More than half of the American River watershed within the Plan Area is currently developed (2,024 acres), primarily by High-Density Development and by Recreation/Landscaped land covers. Impervious surfaces cover approximately 1,734 acres, or 50% of the 3,452 acres of this watershed located within the Plan Area. Similar to the Morrison Creek (16% impervious surfaces) and Sherman Lake-Sacramento River (24% impervious surfaces) watersheds discussed below, the American River watershed has one of the three highest percentages of impervious surfaces in the Plan Area.

The only Terrestrial land cover type remaining in the American River Watershed is 1,336 acres of Valley Grassland. Aquatic land cover types in the American River Watershed total approximately 91 acres in the Plan Area, with Mine Tailing Riparian Woodland (48 acres) and Seasonal Wetland (23 acres) the most prevalent Aquatic land covers remaining.

2.5.3.2 Sherman Lake-Sacramento River Watershed

The Sherman Lake-Sacramento River watershed is located in the extreme western portion of the Plan Area, with approximately 13,987 of 121,608 acres (12%) of the watershed located within the Plan Area. The watershed intersects the Plan Area in four separate locations that together comprise about 4% of the Plan Area, including a relatively large area along the northern portion of the Plan Area, a small area in the northwest corner of the Plan Area, and two small areas along the western portion of the Plan Area (Figure 2-4).

Hydrology

According to the NHD flowline dataset, the majority of the hydrologic features within this watershed are canal/ditch (70%). The high percentage of canal/ditch features mapped within the Sherman Lake-Sacramento River watershed is related to the large amount of agricultural land covers mapped in the watershed. Artificial path features account for 27% of the watershed, stream/river features total 3%, and the remaining 0.1% of the watershed consists of pipeline connector features. The Sacramento River and the Folsom Canal encompass the artificial path features mapped within this watershed.

Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0–500 feet.

Geological Formations

Geological formation data is only available for a little less than half of the Sherman Lake-Sacramento River watershed. Intertidal and levee and channel deposits dominate this watershed, with basin deposits making up most of the rest of the watershed.

Soils

The majority of the soils located in this watershed are loam subcategories (45%) and clay (12%). The remaining areas contain water (5%), mucky clay (26%), or are listed under the other category (12%). The majority of the other category is related to mining activities (dumps, pits, slickens, and Xerorthents, dredge tailings) or urban development.

SSHCP Land Cover Types

The Sherman Lake-Sacramento River watershed in the Plan Area is dominated by human activities. Impervious surfaces cover approximately 3,384 acres, or 24%, of the watershed, which is the highest percentage of impervious surfaces in any Plan Area watershed. Developed and Non-Habitat land cover types account for 5,064 acres, or 36%, of the watershed within the Plan Area. Of these, the High-Density Development land cover accounts for 3,049 acres, or 22%, of the total 13,987 acres of watershed within the Plan Area.

The Sherman Lake-Sacramento River watershed contains 262 acres of Aquatic land cover types, but generally in small amounts, from 1.4 acre of Swale up to 130 acres of Mixed Riparian Scrub. Terrestrial land cover types in this watershed are mostly agricultural lands, with 4,986 acres of Cropland, 1,749 acres of Orchards, and 1,260 acres of Vineyards. Valley Grassland covers only 665 acres of this watershed within the Plan Area.

2.5.3.3 Deer Creek Watershed

The Deer Creek watershed bisects the Plan Area, comprising 43,803 acres and extending from the northeastern edge to halfway into the center of the Plan Area (Figure 2-4).

Hydrology

Approximately 86% of the NHD data within the Deer Creek watershed contains streams and rivers. Deer Creek and its tributaries are the dominate feature of this watershed. Notable tributaries located within the watershed include Crevis Creek, Carson Creek, and Coyote Creek. The Cosumnes River separates the Deer Creek watershed from the Upper Cosumnes River watershed (Figure 2-4). Artificial paths account for about 6% of this watershed, with the majority related to the southern

extension of the Folsom South Canal. The remaining NHD features within the Deer Creek watershed are canal/ditch (7%), connector (less than 1%), and pipeline (less than 1%).

Slope and Elevation

The Deer Creek watershed contains slopes from 0% to greater than 40%, with the vast majority of the slopes (99%) within the 0%–20% category. Less than 1% is within the 20%–40% category and less than 1% is within the greater than 40% category. The majority of the steep slopes are concentrated along the portion of Deer Creek River located in the northeastern section of the watershed. Of all the watersheds, Deer Creek contains the highest percentage (3%) of acreage within an elevation range of 500–1,000 feet amsl. This acreage is concentrated along the eastern border of the Plan Area.

Geological Formations

Gopher Ridge volcanics, Mehrten Formation, and salt springs slate compose the majority of the Deer Creek watershed, accounting for about 48% of the surface acres within the Plan Area. Several other geological formations are exposed within this watershed and include the Laguna Formation, levee and channel deposits, Modesto Formation, and Riverbank Formation.

Soils

A wide variety of loam soil subcategories occur within this watershed: loam (26%), silt loam (25%), gravelly loam (17%), sandy loam (15%), fine sandy loam (10%), and sandy clay loam (3%). Additional soils include clay (1%) and soils listed in the other category (2%). A small percentage (less than 1%) includes areas covered in water.

SSHCP Land Cover Types

The large majority (94%) of the Deer Creek watershed in the Plan Area comprises Natural land cover types.

Terrestrial land cover types are present on 39,331 acres (71% of the watershed) and are primarily the Valley Grassland land cover (23,643 acres, or 54%, of the watershed). Other SSHCP Terrestrial land covers include Blue Oak Woodland (4,400 acres), Blue Oak Savanna (2,018 acres), Cropland (4,065 acres), and Vineyard (4,231 acres). Approximately 2,006 acres of the watershed consists of Aquatic land cover types such as Mixed Riparian Woodland (836 acres), Stream/Creek (228 acres), Open Water (200 acres), and Vernal Pool (274 acres).

Only 6% (2,467 acres) are Developed/Non-Habitat land covers. Impervious surfaces cover approximately 314 acres, or less than 1%, of the 43,803 acres of this watershed within the Plan Area.

2.5.3.4 Morrison Creek Watershed

The Morrison Creek watershed is located within the northern half of the Plan Area, and includes the town of Mather and the southern part of the City of Rancho Cordova. Of the 69,540 acres that comprise this watershed, 62%, or 42,926 acres, are located within the Plan Area, almost entirely inside the UDA (Figure 2-4).

Hydrology

The Morrison Creek watershed contains approximately 9% of the Plan Area's NHD flowline features. Approximately 83% of the flowline features are stream and river features, including Morrison Creek, Laguna Creek (north), Elder Creek, Strawberry Creek, Unionhouse (Beacon) Creek, and Frye Creek. Folsom South Canal accounts for the majority of the 72,483 linear feet of artificial path features. Canal/ditch features make up approximately 6% of the NHD flowline features within the Plan Area with connectors (1%) and pipeline (less than 1%) rounding out the remaining areas.

Slope and Elevation

The majority of the watershed is on flat to gentle slopes with elevations ranging from 0–500 feet. Only 2 acres of the watershed are within the 20%–40% slope range.

Geological Formations

The Laguna and Riverbank Formations comprise 97% of the acreage in the Morrison Creek watershed. The remaining prominent formations in the watershed include basin deposits and mine and dredge tailings.

Soils

Soils in the Morrison Creek watershed primarily contain loam subcategories such as silt loam, loam, and gravelly loam, which account for about 84% of the watershed. Approximately 50% of the loam soils are from the San Joaquin soil series. Other loam subcategories comprise 4% of the soils, water covers less than 1% of the watershed, and 7% of the soils are listed in the other category. Approximately 3% of the other category is related to mining activities (dumps, pits, slickens, and xerorthents, dredge tailings, 2% to 50% slopes) or urban development.

SSHCP Land Cover Types

The Morrison Creek watershed is located in the urbanizing portion of Sacramento County, and approximately 15,018 acres (35%) of the watershed is Developed/Non-Habitat, primarily the High-Density Development land cover type. Impervious surfaces cover approximately 6,982 acres, or 16%, of the 42,926 acres of this watershed in the Plan Area. Along with the American

River (50% impervious surfaces) and Sherman Lake-Sacramento River (24% impervious surfaces) watersheds, the Morrison Creek watershed has one of the three highest percentages of impervious surfaces in the Plan Area.

Terrestrial land cover types are present on about 25,485 acres (59%) of the Morrison Creek watershed within the Plan Area. Most of this is Valley Grassland (21,294 acres) but Cropland, Irrigated-Pasture Grassland, Orchards, and Vineyards are also present. This watershed includes each type of Aquatic land cover type, including approximately 765 acres of Vernal Pool, 359 acres of Swale, and 107 acres of Seasonal Wetland. Laguna Creek (north) is a significant east–west landscape feature, and is mapped as the Stream/Creek land cover (see Section 3.2).

2.5.3.5 Upper Cosumnes River Watershed

The Upper Cosumnes River watershed is located in the east-central portion of the Plan Area and comprises 31,885 acres within the Plan Area (Figure 2-4).

Hydrology

According to the NHD flowline dataset, approximately 62% of the Upper Cosumnes River watershed consists of stream/river features. The majority of stream/river features in the watershed are tributaries to the Cosumnes River, which is mapped as an artificial path. The river and the Folsom South Canal account for most of the artificial path features mapped in the watershed. Less than 10% of the flowline features within the watershed include canal/ditch and connector or pipeline features.

Slope and Elevation

While the majority of the Upper Cosumnes River watershed is on flat to gentle slopes with elevations ranging from 0–500 feet, a small percentage (0.4%) is located above 500 feet. This watershed contains the highest percentage of land with slopes between 20%–40% and greater than 40%. These areas occur along the eastern border of the Plan Area.

Geological Formations

The Upper Cosumnes River watershed contains a variety of geological formations. Two formations total about 44% of the watershed and include the Riverbank and Laguna Formations. Other prominent formations include Valley Springs, Mehrten, Gopher Ridge, and Modesto Formations.

Soils

The majority of the soils within this watershed are subcategories of loam (87%). Approximately 3% of the watershed contains water, 3% clay, and 7% falls within the other category. Most of the other category (6%) is related to mining activities (pits, slickens and Xerorthents, dredge tailings, 2% to 50% slopes).

SSHCP Land Cover Types

Approximately 31,885 acres, or about 28%, of the Upper Cosumnes River watershed are located in the Plan Area. The majority of the watershed in the Plan Area (23,601 acres, or 74%), consists of Terrestrial land cover types, including 17,530 acres of Valley Grassland and 1,951 acres of Blue Oak Woodland. Aquatic land covers comprise about 2,634 acres (8%) of the watershed in the Plan Area, with no one type dominant. Developed/Non-Habitat land covers, primarily the Low-Density Development land cover, comprise approximately 3,760 acres (12%) of the watershed area within the Plan Area. Impervious surfaces cover approximately 762 acres, or 2.4% of the 31,885 acres of this watershed in the Plan Area.

2.5.3.6 Laguna Creek Watershed

The Laguna Creek watershed is approximately 96,788 acres, of which 73,976 acres are within the Plan Area, and comprises 76% of the Plan Area. It is located in the southeastern portion of the Plan Area and extends from the County line on the east to the City of Galt on the west (Figure 2-4).

Hydrology

According to the NHD flowline dataset, the Laguna Creek watershed contains almost 26% of the flowline types in the Plan Area, which is slightly higher than its total proportion (20%) of the Plan Area. Reflecting the dominance of natural land cover types in the watershed, approximately 86% of the Laguna Creek watershed is stream/river, with artificial paths and canal/ditch accounting for almost all of the remaining 14%.

The main streams/rivers in the Laguna Creek watershed include Laguna Creek (south), which flows west from outside the Plan Area and drains to the Cosumnes River in the western portion of the watershed. Browns, Hadselville, Griffith, and Skunk Creeks all drain into Laguna Creek, with each having various tributaries creating a rich network of drainages in the watershed.

Slope and Elevation

The vast majority (more than 99%) of the Laguna Creek watershed is on flat to gentle slopes (0%–20%), with only 141 acres on 21%–40% slopes and 2 acres on slopes greater than 40%.

Likewise, the entire watershed is at an elevation less than 500 feet. In the Laguna Creek watershed, elevations range from about 250 feet amsl in the hillier areas in the eastern portion of the watershed to less than 15 feet amsl in the western portion of the watershed where Laguna Creek (south) drains into the Cosumnes River.

Geological Formations

The Laguna Creek watershed is underlain mostly by the Laguna and Riverbank Formations (56% of the watershed). Other prominent formations in the watershed include the Mehrten and Modesto-Riverbank Formations.

Soils

Approximately 95% of the soil types located within the Laguna Creek watershed are loam subcategories with the majority of the soil types consisting of gravelly loam, silt loam, loam, and fine sandy loam.

SSHCP Land Cover Types

The large majority (67,662 acres or 91%) of the Laguna Creek watershed is composed of Natural land covers. Combined, the Valley Grassland, Blue Oak Savanna, and Blue Oak Woodland land covers are approximately 46,092 acres (62% of the 73,976 acres of watershed in the Plan Area). Cropland, Irrigated Pasture-Grassland, Orchards, and Vineyards total approximately 17,444 acres (24% of the 73,976 acres of watershed within the Plan Area). The Laguna Creek watershed includes most of the SSHCP Aquatic land covers (see Table 3-1) except the Stream/Creek Vernal Pool Invertebrate Habitat (VPIH) land cover. The area of Laguna Creek watershed within the Plan Area has 2,764 acres of the Vernal Pool, Seasonal Wetland, and Swale land covers (combined); approximately 416 acres of the Stream/Creek land cover; and approximately 300 acres of the Open Water land cover.

There are 6,314 acres of Developed/Non-Habitat land covers (9% of the watershed within the Plan Area), dominated by the Low-Density Development land cover (4,284 acres). Impervious surfaces cover approximately 1,724 acres, or 2.3%, of the 73,976 acres of watershed within the Plan Area.

2.5.3.7 Lower Cosumnes River Watershed

The Lower Cosumnes River watershed is 46,683 acres. The entire watershed is located within the south-central portion of the Plan Area (Figure 2-4).

Hydrology

According to the NHD flowline dataset, the Lower Cosumnes River watershed consists primarily of stream/river (44%), canal/ditch (35%), and artificial path (22%). This watershed contains the lower portion of the Cosumnes River. The Cosumnes River and Badger Creek account for the majority of the stream/river and artificial path flowline data within this watershed. Agricultural areas are the largest land cover in this watershed, which is reflected by the high percentage of NHD flowline features categorized as canal/ditch.

Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0–500 feet amsl.

Geological Formations

Riverbank Formations account for approximately 69% of the Lower Cosumnes River watershed. Other important formations include basin deposits, Laguna Formation, and levee and channel deposits.

Soils

Approximately 65% of the soils within the Lower Cosumnes River watershed are silt loams with the majority falling within the San Joaquin soil series. The remaining soils are subcategories of loam (25%), clay (6%), water (1%), and other (2%).

SSHCP Land Cover Types

The Lower Cosumnes River watershed consists primarily of Terrestrial land covers, accounting for 35,747 acres, or 77%, of the watershed. Terrestrial land covers are dominated by the Valley Grassland land cover (14,593 acres) and Cropland (12,614 acres). Approximately 12% (5,745 acres) of the watershed is Aquatic land cover types, with Freshwater Marsh (1,127 acres) and Mixed Riparian Woodland (1,929 acres) the most prevalent Aquatic land covers.

Approximately 5,191 acres (11%) of the watershed is Developed/Non-Habitat land covers, primarily the Low-Density Development land cover (3,976 acres) and the High-Density Development land cover (667 acres). Impervious surfaces cover approximately 1,061 acres, or only 2.2%, of the 46,683 acres of this watershed.

2.5.3.8 Snodgrass Slough Watershed

Snodgrass Slough is the fifth-largest watershed in the Plan Area (behind the Laguna Creek, Lower Cosumnes, Deer Creek, and Morrison Creek watersheds), and approximately 40,426 of its 51,616 acres are located within the western portion of the Plan Area.

Hydrology

Reflecting the dominance of agricultural land covers within the watershed, approximately 72% of the NHD flowlines in the Snodgrass Slough are canal/ditch features. Artificial paths account for almost 21% of the watershed while stream/river features comprise 7% and connector features are less than 1% of the watershed.

Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0–500 feet.

Geological Formations

Geological formation data are available for approximately 60% of the Snodgrass Slough watershed. Almost the entire watershed consists of Riverbank Formations, which make up approximately 72% of the watershed. The remaining 1% of mapped geological data for the watershed consists of basin, intertidal, and levee and channel deposits.

Soils

The majority of the soils in the Snodgrass Slough watershed are subcategories of loam soils (60%). The largest acreage falls into the silt loam category (32%), most of which contains the San Joaquin soil series. Approximately 32% of the watershed contains clay soils with water (4%) and the other (1%) category rounding out the remaining acreage.

SSHCP Land Cover Types

About 31,729 acres (78%) of the watershed is Terrestrial land cover types, with 16,275 acres composed of Cropland. Other abundant Terrestrial land cover types include Valley Grassland (5,947 acres), Vineyards (5,560 acres), and Irrigated Pasture-Grassland (3,295 acres). Snodgrass Slough watershed has the highest acreage of Aquatic land cover types within the Plan Area, approximately 5,944 acres, 24% of the total Aquatic land cover acres present in the Plan Area. Developed/Non-Habitat lands, dominated by the Low-Density Development land cover type, account for only 2,753 acres, or 7%, of the watershed. Impervious surfaces cover approximately 1,124 acres, or 2.8%, of the 40,426 acres of this watershed in the Plan Area.

2.5.3.9 Lower Dry Creek Watershed

The Lower Dry Creek watershed is located along the southern edge of the Plan Area. Approximately 18,493 acres, or 33%, of the watershed is located within the Plan Area.

Hydrology

Approximately 87% of the flowlines within the Lower Dry Creek watershed are streams and rivers. Artificial path (about 6%), canal/ditch (7%), and connector (less than 1%) account for the remainder of the NHD flowline features in this watershed. This watershed encompasses Dry Creek, which is located along the southern boundary of the Plan Area. The watershed ends where Dry Creek terminates into Mokelumne River located to the west.

Slope and Elevation

The vast majority (99%) of the Lower Dry Creek watershed contains gentle slopes (i.e., 0%–20%) with a small fraction falling within the 20%–40% and >40% ranges. Similarly, most of the watershed is within the 0 to 500-foot elevation range. Only 40 acres (less than 1%), located along the eastern border of the Plan Area, is within the 500 to 1,000-foot elevation range.

Geological Formations

The Lower Dry Creek watershed consists of several different geological formations with the combined Riverbank, Laguna, and Mehrten Formations totaling approximately 67% of the watershed. Other formations include Valley Springs, alluvial deposit formations, and levee and channel deposits.

Soils

Approximately 91% of the watershed consists of fine sandy loam, gravelly loam, and sandy loam. The remaining soils are subcategories of loam (6%), other (2%), clay (less than 1%), and water (less than 1%).

SSHCP Land Cover Types

Of the 18,493 acres of the Lower Dry Creek watershed within the Plan Area, approximately 17,002 acres (92%) are Terrestrial land covers, with only 967 acres of Aquatic land cover types. The Valley Grassland land cover dominates the Upland resources in the watershed, covering 7,965 acres. Other dominant land covers in this watershed are Cropland (2,742 acres) and the Vineyard (3,821 acres) land cover types. Developed/Non-Habitat land covers are present on 524 acres. Impervious surfaces cover approximately 85 acres, or less than 1%, of the watershed within the Plan Area.

2.5.3.10 Lower Mokelumne River Watershed

Although the Lower Mokelumne River Watershed is more than 141,965 acres in size, only 3% of the watershed is located in the far southwest corner of the southern Plan Area. The Mokelumne River

watershed covers only 1% (2,019 acres) of the Plan Area. Due to its minor role in the Plan Area, the discussion in this section is abbreviated compared to the discussions for the other watersheds.

Hydrology

The portion of the Lower Mokelumne River watershed that occurs within the Plan Area contains only artificial path and canal/ditch NHD flowline features. The Mokelumne River, represented by the artificial path features, serves as a portion of the southern border for the Plan Area. This watershed extends to the west as a long sliver surrounding the Mokelumne River. The watershed ends where Lower Dry Creek terminates into the river. The canal and ditch flowline features, which account for 88% of the watershed, cross through the agricultural land covers, providing water to the area.

Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0 to 500 feet.

Geological Formations

Geological information is only available for the eastern sliver of the Lower Mokelumne River watershed. This portion of the watershed is dominated by intertidal deposits (53%), with basin deposits and levee and channel deposits accounting for the rest of the watershed.

Soils

The majority (59%) of the Lower Mokelumne River watershed consists of clay soils, specifically Egbert clay, partially drained, 0% to 2% slopes. The remaining soils are loam subcategories (36%) and water (5%).

SSHCP Land Cover Types

The 2,019 acres of this watershed located within the Plan Area are primarily Terrestrial land covers (1,680 acres), specifically the Cropland land cover type (1,671 acres). Aquatic land cover types total 290 acres, with notable land cover types being Mixed Riparian Woodland (196 acres) and Stream/Creek (67.4 acres). Developed/Non-Habitat land covers total 49.3 acres in this watershed in the Plan Area. Impervious surfaces cover approximately 30 acres, or 1.5%, of the 2,019 acres of this watershed within the Plan Area.

2.6 References

CGS (California Geological Survey). 1981. “Regional Geologic Map No. 1A, Sacramento” [map]. 1:250,000.

Creely, S. and E.R. Force. 2007. "Type Region of the Ione Formation (Eocene), Central California: Stratigraphy, Paleogeography, and Relation to Auriferous Gravels." USGS Open-File Report 2006-1378.

Cunningham, S.J. 2003. "WFO Sacramento County Warning Area Meteorology." Sacramento, California: National Weather Service Forecast Office. July 8, 2003. Accessed June 24, 2015. http://www.wrh.noaa.gov/sto/CWA.php.

Dittes, J.D., J.L. Guardino, and R.A. Radmacher. 2007. "A GIS-Based Vernal Wetland Acre/Density Index (VWADI) for Classification and Conservation of Vernal Pool/Annual Grassland Landscapes in California's Great Central Valley." In *Vernal Pool Landscapes: Studies from the Herbarium* 14 (125–141). R.A. Schising and D.R. Alexander (Editors). Chico, California: California State University.

Helley, E.J. and D.S. Harwood. 1985. "Geologic Map of Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1790" [map]. Five plates, 1:62,500. Accessed online June 24, 2015. http://pubs.usgs.gov/mf/1985/1790/.

Jones and Stokes. 1990. *Sacramento County Vernal Pools: Their Distribution, Classification, Ecology, and Management*. Prepared for the County of Sacramento, Planning and Community Department. Sacramento, California: Jones and Stokes.

Masters-Bevan, L. 2000. *Climate of Sacramento, California*. Sacramento: National Weather Service Office.

Reiner, R., and R. Swenson. 2000. "Saving Vernal Pools in the Cosumnes River Watershed." *Fremontia* 27:4(1).

Smith, D.W. and Verrill, W.L., 1998. "Vernal Pool-Soil-Landform Relationships in the Central Valley, California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*. C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Sacramento, California: California Native Plant Society.

Solomeshch, A.I., M.G. Barbour, and R.F. Holland. 2007. *Vernal Pools: Terrestrial Vegetation of Californi*a, 3rd ed. University of California Press, California. 394–424.

USDA NRCS (United States Department of Agriculture, Natural Resources Conservation Service). 1993. *Soil Survey of Sacramento County, California*. USDA Natural Resources Conservation Service in cooperation with the Regents of the University of California. April 1993. Accessed June 24, 2015. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA067/0/sacramento.pdf.

USGS (United States Geological Survey) and USDA NRCS. 2009. Federal Guidelines, Requirements, and Procedures for the National Watershed Boundary Dataset: U.S. Geological Survey Techniques and Methods 11–A3, 55 pp. Accessed June 24, 2015. http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/.

INTENTIONALLY LEFT BLANK

3 BIOLOGICAL RESOURCES SETTING

3.1 Introduction

This chapter summarizes the baseline condition of the biological resources in the Plan Area, including South Sacramento Habitat Conservation Plan (SSHCP or Plan) definitions and descriptions of land cover types in the Plan Area, species addressed by the SSHCP, and a description of species habitat models used to quantify impacts and to prepare the SSHCP Conservation Strategy. Methodologies used to map land cover baseline conditions and map species suitable habitat (habitat models) are also discussed in this chapter.

3.2 SSHCP Land Cover Type Definitions

The land cover classification system developed for the SSHCP is a modification of the California Natural Communities classification system developed by the California Department of Fish and Wildlife (CDFW) (Sayer and Keeler-Wolf 1995). See Section 3.3 for information on the process used to define and map the SSHCP land covers.

There are 24 SSHCP land cover types in the Plan Area. Seventeen land cover types are classified as "natural land covers," which includes native and naturalized environments and agricultural lands that have habitat value for SSHCP Covered Species (Sections 3.2.1 and 3.2.2). Seven SSHCP land cover types are classified as "developed/non-habitat land covers" and provide minimal habitat value for native species, including the SSHCP Covered Species (Section 3.2.3). Table 3-1 lists the SSHCP land cover types within the Plan Area. Figure 3-1 shows the distribution of SSHCP land cover types in the Plan Area. As discussed in Section 1.2.1, the Plan Permittees divided the Plan Area into eight geographic subdivisions called Preserve Planning Units (PPUs) to assist with their development of an adequate SSHCP Conservation Strategy. The acres of each SSHCP land cover type in each SSHCP PPU are outlined in

Table 3-1
SSHCP Land Cover Types within the Plan Area

SSHCP Land Cover Type	Area (Acres) in Plan Area	Percentage of Total Plan Area
Natural Land Cover Category (have habitat value)		
Wetland Waters		
Vernal Pool	4,536	1.4
Swale	1,252	0.4
Seasonal Wetland	2,600	0.8
Freshwater Marsh	2,954	0.9
Non-Wetland Waters		
Stream/Creek (Vernal Pool Invertebrate Habitat)*	73	0.02
Stream/Creek	2,778	0.9

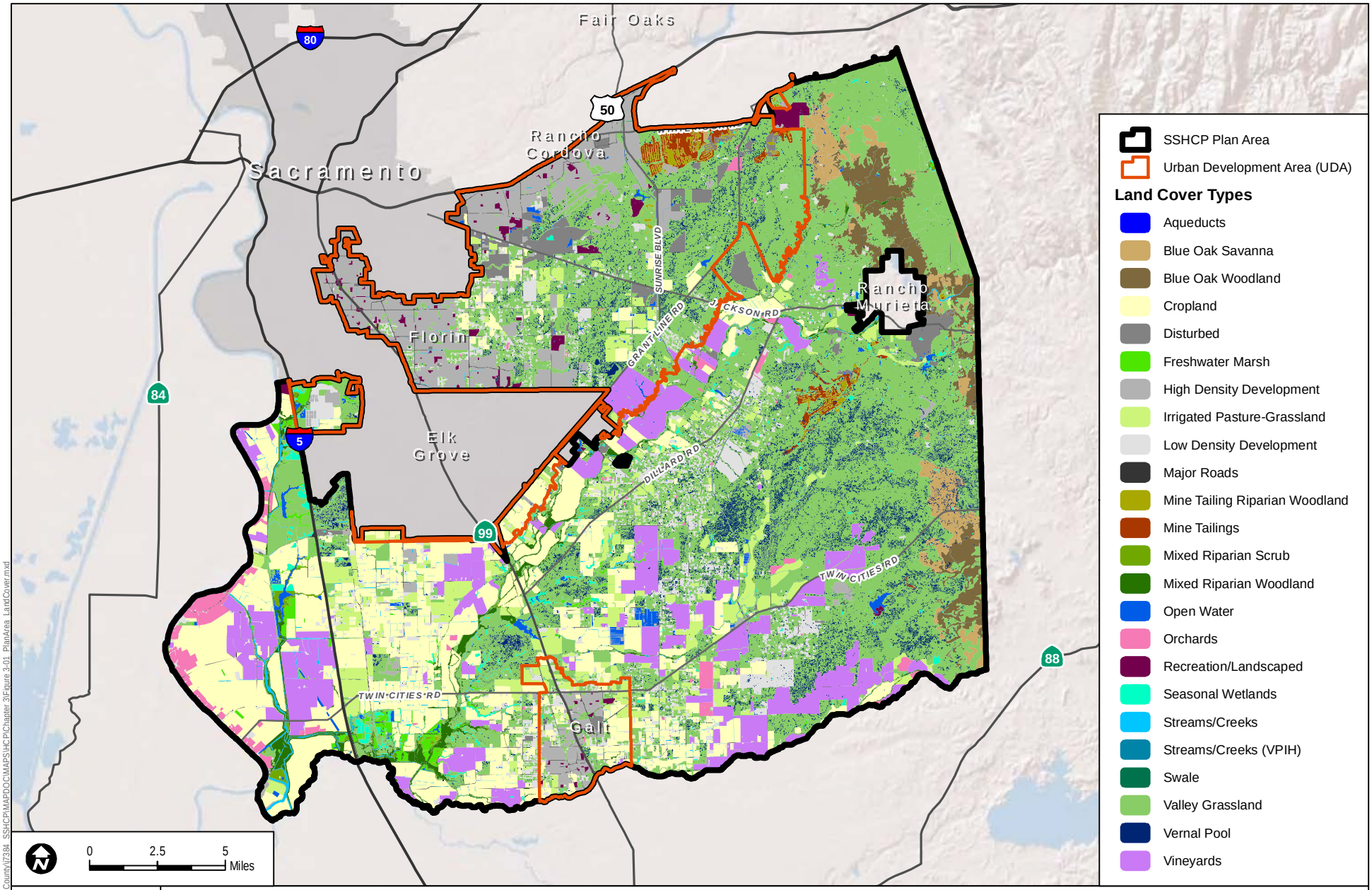
Table 3-1
SSHCP Land Cover Types within the Plan Area

SSHCP Land Cover Type	Area (Acres) in Plan Area	Percentage of Total Plan Area
Open Water	2,344	0.7
Riparian		
Mixed Riparian Woodland	5,856	0.2
Mixed Riparian Scrub	1,454	0.5
Mine Tailings Riparian Woodland	641	0.2
Terrestrial		
Valley Grassland	135,152	42.5
Blue Oak Savanna	5,637	1.8
Blue Oak Woodland	9,132	2.9
Cropland	51,829	16.3
Orchard	3,907	1.2
Vineyard	26,460	8.3
Irrigated Pasture	15,991	5.0
Developed / Non-Habitat		
Aqueduct	264	0.1
Disturbed	6,288	2.0
High-Density Development	13,073	4.1
Low-Density Development	18,608	5.9
Major Roads	2,764	0.9
Mine Tailings	1,098	0.3
Recreation/Landscaped	2,180	0.7
Not Mapped**	784	0.2
Total	**317,655**	**—**

Notes:

* Within the Urban Development Area portion of this Plan Area, occurrences of vernal pool tadpole shrimp (*Lepidurus packardi),* vernal pool fairy shrimp (*Branchinecta lynchi*), and mid-valley fairy shrimp (*Branchinecta mesovallensis*) have been found in certain intermittent streams, creek, and drainages. The SSHCP maps these streams, creeks, and drainages as Vernal Pool Invertebrate Habitat (VPIH).

Sections 3.2.1 and 3.2.2 present descriptions of each of the 17 SSHCP natural land cover types that provide habitat for SSHCP Covered Species and habitat for numerous other native species in the Plan Area.



SOURCE: USGS 2012; ESRI 2014; County of Sacramento 2014

FIGURE 3-1

Plan Area Land Cover Types

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-01_PlanArea_LandCover.mxd

INTENTIONALLY LEFT BLANK

3.2.1 SSHCP Aquatic Land Cover Types

Vernal Pool Land Cover

Vernal pools are seasonal ephemeral wetlands that fill and dry each year. In Central Valley annual grasslands, they form in shallow depressions that are underlain with a soil or a soil layer impermeable to water. In California's Mediterranean climate (rainy winter months followed by a hot, dry season), vernal pool soils typically become wetted in November. Water collects in the depressions and stands during late winter and early spring, then recedes as temperatures rise and rainfall diminishes. The soil, however, remains moist through April and May, then it desiccates and stays dry until the cycle begins again. The specific hydrological regime of vernal pool inundation—too short and unpredictable to support most aquatic species but long enough to eliminate upland species—is what characterizes vernal pools as ephemeral wetlands and differentiates them from other aquatic ecosystems such as alkali meadows and seasonally flooded emergent bulrush or tule marshes (Solomeshch et al. 2007).

Vernal pools support unique assemblages of highly specialized plants and animals that are adapted to the annual cycle of winter inundation and summer drought. Consequently, vernal pools are one of the few habitats in California still dominated by native plant and animal species (Rains et al. 2008). Many vernal pool plant genera and species are endemic to California, and their presence indicates the specific hydrology and water chemistry of the vernal pool. Vernal pools were once a very common element of the Central Valley landscape, but only a small portion has not been converted to agricultural and urban developments; consequently, many vernal pool taxa are now rare and endangered.

Vernal pools provide habitat for rare and endangered animals such as vernal pool tadpole shrimp (*Lepidurus packardi*), vernal pool fairy shrimp (*Branchinecta lynchi*), conservancy fairy shrimp, Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*), and several amphibians (e.g., western spadefoot toad (*Spea hammondii*), California tiger salamander (*Ambystoma californiense*)), and vernal pools support a number of migratory birds in the winter (Alexander 1976; Helm 1998; Silveira 1998; Solomeshch et al. 2007; USFWS 2004b). A specific group of plant taxa occupies vernal pools, most of which are annuals capable of slow underwater growth in winter and rapid development and reproduction in spring after the water is gone but before soils dry. Plant species are not distributed evenly through the pools, but grow in concentric zones that reflect different lengths of inundation as the pool dries (Solomeshch et al. 2007). As discussed in Chapter 2, Central Valley vernal pools occur on many geological surfaces, but in all cases, vernal pools are underlain by a low-permeability layer such as claypans, hardpans (e.g., silica-cemented duripans), mudflows, or bedrock (Rains et al. 2008). Because vernal pools are associated with specific landforms, geologic formations, and soils (Smith and Verrill 1998), vernal pools tend to be clustered at the landscape scale, forming vernal pool complexes (Rains et

al. 2006). Based on a vernal pool's landform, underlying geology, nature of the soil's water-restricting layer, frequency of ponding, and ponding duration, Sawyer and Keeler-Wolf (1995) have identified five vernal pool types in northern California. As discussed in Section 2.3, most vernal pools in the Plan Area are broadly classified as Northern Hardpan vernal pools and Northern Volcanic Mudflow vernal pools (Jones and Stokes 1990). In addition, a less specialized vernal pool type with generally lower species richness is found on Drainageway formation soils in the Plan Area.

Northern Volcanic Mudflow vernal pools occur on ancient mudflows called lahars (see Section 2.3). These pools are small, form in irregular depressions in gently sloping surfaces, and are often rocky and shallow. Water chemistry is mixo-saline, fresh (Sawyer and Keeler-Wolf 1995). In the Plan Area, Northern Volcanic Mudflow vernal pools are found on the Mehrten and Valley Springs formation in rocky soil series and complexes such as Hadselville-Pentz, Red Bluff-Redding, Corning-Redding, Amador-Gillender, and Pardee-Rancho Seco (Jones and Stokes 1990). Mudflow pools in the Plan Area are hydrologically complex; in some areas, vernal pools are in complex reticulated drainage networks with a high density of interconnected pools, swales, and ephemeral drainages (Jones and Stokes 1990). The seasonal hydrology of Northern Volcanic Mudflow vernal pools includes a perched water table (see Section 3.2.3), but pool hydrology is relatively "flashy" (i.e., pools fill and drain relatively rapidly). Northern Volcanic Mudflow vernal pools contain relatively rich flora that includes several vernal pool obligate species. The species richness and ecological complexity of Northern Mudflow pools in the Plan Area exceed that of the Young-Terrace Northern Hardpan pools and the Drainageway vernal pools in the Plan Area. Possible explanations of the rich (less specialized) flora of Northern Mudflow pools include the recent origin of the pools and their quickly changing or "flashy" hydrology. Mudflow pools fill and drain rapidly, and may be less stressful to most plant life than pools that remain flooded for extended periods, such as the Old-Terrace Northern Hardpan vernal pools (Jokerst 1990; Jones and Stokes 1990).

Northern Hardpan vernal pools form on alluvial terraces in old, acidic, nutrient-depleted soils with iron-silicate cemented soil layer. These soils often exhibit well-developed mound-intermound topography to form aggregations of pools and "mima mounds." Water chemistry is mixo-saline fresh (Sawyer and Keeler-Wolf 1995). Northern Hardpan vernal pools typically have a conductivity of 40 to 70 mhos per 1 centimeter, which is similar to an oligotrophic high Sierran lake (Keeley and Zedler 1998; Williamson et al. 2005). Water in hardpan vernal pools is not only low in dissolved salts, but also in dissolved nitrogen. For example, Rains et al. (2006) reported that, during the growing season, nitrate and phosphate concentrations were below detection limits (i.e., 0.006 milligrams per liter (mg/L) and 0.03 mg/L, respectively), and the amount of ammonium was negligible (0.1 mg/L). Within the Plan Area, Northern Hardpan vernal pools occur on the low (younger) terrace Riverbank Formation soil series (e.g., San Joaquin, Galt,

Madera, Tehama), as well as on the high (older) terrace Laguna Formation and Arroyo Seco gravels (e.g. Corning, Redding, Red Bluff, Mokelumne soil series). Vernal pools occur extensively on both landforms types (Jones and Stokes 1990).

The Plan Area's Low-Terrace Northern Hardpan vernal pools (e.g., on San Joaquin soils) are of recent geologic origin, which may explain their relatively unspecialized flora that often includes non-native plants, low species richness, scarcity of vernal pool obligates, and low numbers of special-status plants. Most young terrace sites in the Plan Area have been plowed, graded, or heavily grazed because of their arable soils and proximity to reliable water; this may also account for their less specialized flora. Low-Terrace Northern Hardpan vernal pools also serve an important function as habitat for shorebirds, waterfowl, and raptors because of their location in the central portion of the valley along the Sacramento River (Jones and Stokes 1990; Silveira 1998).

High-Terrace Northern Hardpan vernal pools (e.g., on Corning and Redding soil series) are the most complex type of vernal pool in the Plan Area because of their rich and varied flora, presence of special-status plant and invertebrate species, and complex hydrology, and because they often occur in areas with complex, highly convoluted interspersions of several soil types. Soils on high-terrace landform sites varies over short distances such that sites in proximity to each other may have entirely different restricting layer types, depth, and vernal pool plant community. High-Terrace Northern Hardpan vernal pools are floristically rich and dominated by vernal pool obligate plant species (true "specialists"), and typically support special-status species. The tremendous age and geographic location of High-Terrace Northern Hardpan pools may account for their rich and highly specialized flora (Jones and Stokes 1990). Little of the high-terrace landform has been farmed in the Plan Area because irrigation water is lacking and many sites are not arable. Some high-terrace vernal pool areas were dryland farmed in the past with wheat or oats; this type of farming appears to have had little effect on high-terrace vernal pools, while on other formations, this disrupted vernal pool surface hydrology. Consequently, High-Terrace Northern Hardpan vernal pools are relatively abundant in the Plan Area (Jones and Stokes 1990).

Drainageway vernal pools are located on no particular Plan Area geologic formation, but formed on recent alluvial deposits adjacent to the incised channels of active watercourses. Consequently, Drainageway vernal pools are interspersed throughout the other three vernal pool types present in the Plan Area. Drainageway vernal pools fill and drain rapidly, and may depend on overland runoff and direct precipitation to maintain their hydrology relative to the other vernal pool types (Jones and Stokes 1990). Additionally, the basins of Drainageway vernal pools are often shallow and susceptible to evaporation, or slightly sloped, which encourages drainage. Drainageway vernal pools have an unspecialized flora relative to the other three vernal pool types in the Plan Area (Jones and Stokes 1990).

The four types of vernal pools present in the Plan Area can be further classified by the presence or absence of certain dominant or less abundant vernal pool plant species (Sawyer et al. 2009). Vernal pool community structure (i.e., the type, number, and relative abundance of species) is largely determined by the pool's physical makeup (e.g., size, depth, substrate, water chemistry) and the pool's hydrology; different patterns of species dominance and the presence or absence of certain species can be indicative of physical and hydrology differences among vernal pools (Holland and Jain 1988). Vernal pools in the Plan Area exhibit a great variety of size, depth, soil, and water chemistry. Key physical parameters may include pool drainage area, slope, soil type, soil structure and depth, pool size and depth, timing of the pool hydrologic cycle, and pool interconnectivity. In particular, several SSHCP vernal pool Covered Species require large, deep pools that are long lasting to successfully complete their life cycles, including Boggs Lake hedge-hyssop (*Gratiola heterosepala*), Sacramento Orcutt grass (*Orcuttia viscida*), slender Orcutt grass (*Orcuttia tenuis*), vernal pool tadpole shrimp, California tiger salamander, and western spadefoot toad. Other vernal pool Covered Species are found in small to medium-sized "flashy" pools that dry out relatively quickly, but may inundate and dry out several times during the wet season, including Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*), dwarf downingia (*Downingia pusilla*), and pincushion navarretia (*Navarretia myersii*). For some plants in the latter category, the edges of larger vernal pools may provide conditions equivalent to the smaller, flashy pools. Other Covered Species associated with vernal pools include legenere (*Legenere limosa*), vernal pool fairy shrimp, Ricksecker's water scavenger beetle, most of the bird Covered Species (mostly as foraging habitat), American badger (*Taxidea taxus*), and western red bat (*Lasiurus blossevillii*) (see Table 3-2).

Preserving the full range of physical and hydrologic conditions found in Plan Area vernal pools is necessary to ensure that all vernal pool Covered Species and representative examples of the different Plan Area vernal pool types and existing variation in vernal pool plant and animal associations are considered and protected (Jones and Stokes 1990). By protecting the range of diversity in vernal pool types, the SSHCP can ensure that the entire range of known and unknown ecological and biological values is represented in a Preserve System, and that the intrinsic values of this facet of the region's natural heritage are considered. Preserving the range of plant and animal associations also provides natural laboratories to study the factors influencing the presence or absence of species, migration, and establishment of species, patterns of species dominance, and other phenomena (Jones and Stokes 1990).

Plan Area vernal pools occur in complexes of pools interconnected by intermittent surface swales and by the seasonal perched aquifer that forms between the soil surface and the sub-surface restricting layer. Consequently, the Vernal Pool land covers in the Plan Area cannot be described or analyzed in isolation of their ecologically and hydrologically connected SSHCP land covers of Swale, Valley Grassland, and Stream/Creek (Vernal Pool Invertebrate Habitat [VPIH]). Therefore, in addition to discussing the Vernal Pool land cover individually in SSHCP

Chapters 3, 6, and 7, the Plan Permittees also define and discuss an SSHCP Vernal Pool Ecosystem (see Section 3.2.3).

Seasonal Wetland Land Cover

Seasonal Wetland is a wetland that ponds for an extended period during a portion of the year. Seasonal Wetlands generally fill during the rainy winter season then dry relatively slowly, typically in the summer or early fall. Seasonal Wetlands tend to be isolated wetlands that occur within moderate to large depressional features along streams, creeks, and rivers; along the edges of open water, or scattered within the Valley Grassland land cover. In addition, some impounded drainages, excavated stock ponds, and graded or excavated former vernal pools can also be Seasonal Wetland. The Seasonal Wetland land cover is often characterized by herbaceous annual and perennial species such as curly dock (*Rumex crispus*), sedges (*Carex* spp.), nutsedges (*Cyperus* spp.), spikerushes (*Eleocharis* spp), and occasionally cattail (*Typha* spp.). Seasonal Wetland provides habitat for some Covered Species (Table 3-2). The SSHCP does not consider Seasonal Wetland to be suitable habitat for vernal pool crustaceans.

Covered Species associated with the Seasonal Wetland land cover include Boggs Lake hedge-hyssop, legenere, Sanford's arrowhead (*Sagittaria sanfordi*), California tiger salamander, western spadefoot, giant gartersnake (*Thamnophis gigas*), all of the bird Covered Species (mostly as foraging habitat) except Cooper's hawk (*Accipiter cooperii*), American badger, and western red bat.

Swale Land Cover

The movement of surface water between vernal pools can occur in a network of narrow and intermittent surface "swales" (Solomeshch et al. 2007). Swales are shallow ephemeral drainages found in flat to gently rolling Valley Grassland in association with vernal pool complexes, on soils with an impermeable layer (see Section 2.3). Swales convey runoff as shallow, gently sloping ephemeral wetlands during, and for short periods after, winter rainstorms. Soils within the Swale land cover type may remain saturated during the winter and early spring, but dry by summer. Swales are associated with vernal pools and provide intermittent conduits between vernal pools for movement of surface water and propagules of vernal pool plant and animal Covered Species (seeds, cysts, eggs, and spores), and movement of adult California tiger salamanders and western spadefoots. Swales support several native plant species commonly found in vernal pools. Swales also often include smaller shallow depressional features that may pond during the rainy season to provide suitable reproductive habitat for some vernal pool Covered Species, and may be considered vernal pools. Generally, the Swale land cover provides suitable habitat for portions or all of the life cycle of many of the Covered Species that occur in the Vernal Pool land cover types, including Ahart's dwarf rush, dwarf downingia, pincushion navarretia, mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, and western spadefoot. In

addition, all of the bird Covered Species (except Cooper's hawk and greater sandhill crane (*Grus canadensis tabida*)) use Swale land cover (primarily as foraging habitat), along with American badger and western red bat (see Table 3-2).

The Swale land cover type cannot be adequately described or analyzed separately or in isolation of other ecologically and hydrologically connected SSHCP land covers (i.e., Vernal Pool, Valley Grassland, and Stream/Creek VPIH). Therefore, in addition to discussing the Swale land cover individually in SSHCP Chapters 3, 6, and 7, the Plan Permittees also define, discuss, and analyze a combined SSHCP Vernal Pool Ecosystem (see Section 3.2.3).

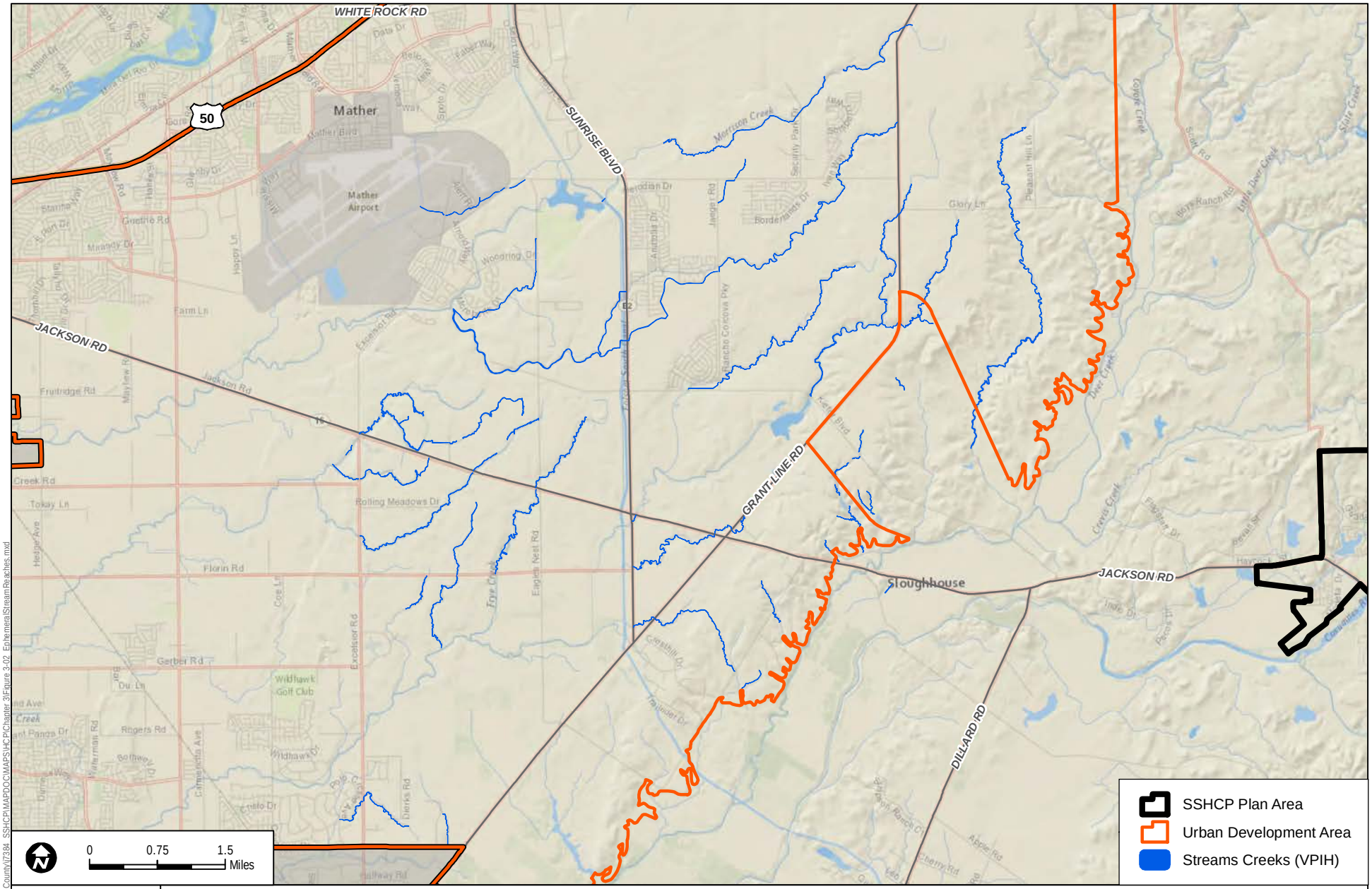
Stream/Creek Vernal Pool Invertebrate Habitat Land Cover

As discussed below, the larger SSHCP Stream/Creek land cover type includes intermittent and perennial linear water features such as rivers, streams, creeks, and drainages. The SSHCP Stream/Creek VPIH land cover type is typically an intermittent drainage that is vegetated with Valley Grassland plant species and conveys water after rain events (is ephemeral). Unlike the Swale land cover type, the Stream/Creek (VPIH) land cover is less likely to support vegetation characteristic of vernal pools, and the SSHCP does not consider the Stream/Creek (VPIH) land cover habitat for vernal pool plant Covered Species. However, the Stream/Creek (VPIH) land cover is known to provide movement corridors, and may provide suitable habitat for vernal pool crustaceans, including mid-valley fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp, within depressional features of the drainage that pond water between storm events. Western burrowing owl (*Athene cunicularia hypugaea*) may also use Stream/Creek (VPIH) habitat. See Figure 3-2 for locations of Stream/Creek (VPIH) habitat.

The Stream/Creek (VPIH) land cover cannot be adequately described or analyzed separately or in isolation of other ecologically and hydrologically connected SSHCP land covers (i.e., the Vernal Pool, Valley Grassland, and Swale land covers). Therefore, in addition to discussing Stream/Creek (VPIH) individually in SSHCP Chapters 3, 6, and 7, the Plan Permittees also define, discuss, and analyze a combined SSHCP Vernal Pool Ecosystem (see Section 3.2.3).

Freshwater Marsh Land Cover

Most of California's freshwater marshes occur in the Sacramento Valley and San Joaquin Delta regions. The majority of Freshwater Marsh in the Plan Area occurs along the perennial Cosumnes River and Deer Creek, and along the margins of streams and open water in the Plan Area. Freshwater Marsh is typically dominated by perennial herbaceous plant species such as cattails, tules (*Scirpus* spp.), and other emergent plant species, and is generally found along the edges of aquatic habitats such as ponds, lakes, and rivers. It is important habitat for western pond turtle (*Actinemys marmorata*), giant gartersnake, northern harrier (*Circus cyaneus*), tricolored blackbird (*Agelaius tricolor*), and western red bat (Table 3-2).



SOURCE: USGS 2012; ESRI 2013; County of Sacramento 2013

FIGURE 3-2

Streams/Creeks Vernal Pool Invertebrate Habitat (VPIH)

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-02_EphemeralStreamReaches.mxd

INTENTIONALLY LEFT BLANK

Open Water Land Cover

Open Water includes perennial or features, such as natural or built ponds, lakes, and reservoirs. Open Water may contain no vegetation, or non-rooted aquatic vegetation, such as algae, floating pondweeds, and other plants. Along shorelines, rooted, emergent vegetation may occur, forming Freshwater Marsh. Like Freshwater Marsh, Open Water habitat is used by numerous bird, mammal, amphibian, and reptile species, including several Covered Species, such as western pond turtle, giant gartersnake, tricolored blackbird, and western red bat. The marshy shorelines may be used by tricolored blackbird for nesting colonies (Table 3-2).

The Open Water land cover type is found throughout the SSHCP Plan Area. Open Water features are largely unnamed with the exception of Blodgett Reservoir located inside the Urban Development Area (UDA) and Rancho Seco Lake outside the UDA.

Stream/Creek Land Cover

Outside of the UDA, the Stream/Creek land cover type includes intermittent and perennial linear water features such as rivers, streams, creeks, drainages, and roadside and irrigation ditches. Within the UDA, this land cover type includes streams identified by the U.S. Army Corps of Engineers. A separate category was created for aqueducts throughout the Plan Area.

The SSHCP Stream/Creek land cover includes rivers such as the Cosumnes River, streams such as Laguna Creek, and smaller intermittent or perennial creeks. The Stream/Creek land cover type was mapped from aerial photographs. Where a river or stream channel was not discernable because of dense over story cover, the centerline of the channel has been approximated and buffered by a width of 6 feet. Polygons of the Stream and Creek land cover occur in Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, Agriculture, and Developed land cover types.

Covered species associated with the Stream/Creek land cover type include Sanford's arrowhead, giant gartersnake, western pond turtle, and western red bat (Table 3-2).

Mixed Riparian Woodland Land Cover

Riparian land covers are associated with Plan Area streams and creeks and typically occur in the zone between the active stream channel and adjacent upland land covers. While "riparian" has various definitions, the SSHCP uses the National Research Council's 2002 definition: "Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy

and matter with aquatic ecosystems (i.e., a zone of influence)." Riparian areas in the Plan Area are adjacent to perennial, intermittent, and ephemeral streams and lakes.

Riparian ecosystems are highly dependent on landscape setting and numerous physical and biotic interactions. Riparian ecosystems provide essential foraging, shelter, and breeding habitat for several of the Covered Species and other native plant and animal species, including both resident and migratory species.

The Mixed Riparian Woodland land cover type is distinguishable by an open canopy layer dominated by tall Fremont cottonwood trees. Beneath this open layer, a moderately dense mid-canopy layer is composed of tree species such as Oregon ash (*Fraxinus latifolia*), Goodding's willow (*Salix gooddingii*), walnut (*Juglans* spp.), valley oak (*Quercus lobata*), and box elder (*Acer negundo*). In some areas, a subcanopy of dense Riparian Scrub dominated by willow species, including arroyo willow and sandbar willow, is present. A discontinuous shrub layer is also present, particularly along the northern boundary of the Plan Area, and includes species such as blue elderberry, Himalayan blackberry, coyote-brush, wild rose, and wild grape. The ground layer is sparsely to densely vegetated with herbaceous species.

Included in the Mixed Riparian Woodland Land Cover Type are valley oak riparian woodlands. Although they are not a separate land cover type, owing to an inability to distinguish them from other riparian communities, valley oak riparian woodlands are notable as they were once a dominate community along waterways in the Plan Area. Valley oak riparian woodland intergrades with the Valley Grassland land cover type and wooded borders along streams and agricultural fields in the Plan Area. Tree associates in the Plan Area include California sycamore (*Platanus racemosa*), California black walnut, interior live oak (*Quercus wislizeni*), and box elder. The shrub understory includes western poison-oak, blue elderberry, California wild grape, and California blackberry (*Rubus ursinus*). Various grasses, including wild oats (*Avena* spp.), brome (*Bromus* spp.), barley (*Hordeum* spp.), and ryegrass (*Lolium* spp.), and other herbaceous, species may occur in the sparse to densely vegetated ground cover.

Covered species associated with the Mixed Riparian Woodland land cover type include valley elderberry longhorn beetle, western pond turtle, Cooper's hawk, Swainson's hawk, white-tailed kite, and western red bat (Table 3-2).

Mixed Riparian Scrub Land Cover

Mixed Riparian Scrub land cover type is interspersed with Mixed Riparian Woodland in the floodplains of waterways throughout Sacramento County. In the Plan Area, this land cover type consists of an open to dense shrubby thicket dominated by a mixture of sandbar willow (*Salix exigua*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), and immature stands of mixed

riparian woodland tree species (see description below). This plant community can also be a subcanopy community in Mixed Riparian Woodland. Though dense stands of Riparian Scrub in the Plan Area typically lack an understory, some of the more open canopy mixed Riparian Scrub stands do support an understory of native and non-native species, including wild rose (*Rosa californica*), wild grape (*Vitis californica*), perennial pepperweed (*Lepidium latifolium*), Himalayan blackberry (*Rubus discolor*), curly dock, and various non-native grasses.

Covered species associated with the Mixed Riparian Scrub land cover type include valley elderberry longhorn beetle, giant gartersnake, western pond turtle, Cooper's hawk, loggerhead shrike, Swainson's hawk, white-tailed kite, and western red bat (Table 3-2).

Mine Tailing Riparian Woodland Land Cover

The Mine Tailings Riparian Woodland land cover type is distributed in networks of relatively narrow linear areas that naturally established on abandoned mine tailing surface deposits in the Plan Area. This human-made land cover type contains species commonly found in Riparian Woodlands and Riparian Scrub habitats, such as Fremont cottonwood (*Populus fremontii*), blue elderberry (*Sambucus mexicana*), willow (*Salix* spp.), and coyote-brush (*Baccharis pilularis*). In the Plan Area, this land cover type can also intergrade with mixed riparian forest along bodies of water.

Covered species associated with the Mine Tailing Riparian Woodland land cover type include valley elderberry longhorn beetle, western pond turtle, Cooper's hawk, loggerhead shrike, white-tailed kite, and western red bat (Table 3-2).

3.2.2 SSHCP Terrestrial Land Cover Types

SSHCP includes seven terrestrial land cover types. One are dominated by herbaceous vegetation (Valley Grassland), two have oak trees (Blue Oak Woodland and Blue Oak Savanna), and four are farming land covers (Cropland, Irrigated Pasture-Grassland, Orchard, and Vineyard).

Valley Grassland Land Cover

Valley Grassland is by far the most common single land cover in the Plan Area. Including non-habitat land covers, it accounts for about 43% of the land covers in the Plan Area. Valley Grassland, being so widespread throughout the Plan Area, is essential for both the long-term survival of many of the Covered Species and for conserving ecological functions of other land cover types within the Plan Area.

Valley Grassland in the SSHCP Plan Area is an annual herbaceous plant community now characterized mostly by naturalized annual grasses. Generally, its composition in the Plan Area varies with geographic, and land use factors, such as rainfall, temperature, elevation, slope, aspect,

grazing, and other herbivory (e.g., livestock, wildlife, rodent, songbird, and insect use), and fire frequency and duration. In the Plan Area, Valley Grassland is dominated by naturalized herbaceous annual forbs, and includes patches with relatively high proportions of native grasses and forbs along the eastern border of the Plan Area. Naturalized annual grasses that dominate the Plan Area's Valley Grassland land cover include wild oats (*Avena fatua*), soft chess (*Bromus hordeaceus*), ripgut brome (*B. diandrus*), red brome (*B. madritensis* ssp. *rubens*), wild barley (*Hordeum* spp.), and foxtail fescue (*Vulpia myuros*). Common herbaceous forbs include the naturalized broadleaf filaree (*Erodium botrys*), redstem filaree (*E. cicutarium*), turkey mullein (*Eremocarpus setigerus*), true clovers (*Trifolium* spp.), and bur clover (*Medicago polymorpha*).

Valley Grassland in the Plan Area is associated with several natural communities, including vernal pools, and occurs as an understory within Valley Oak Riparian Woodland, Blue Oak Woodland, and Blue Oak Savanna. Valley Grassland also may occur as a co-dominant with perennial grasses within some of the areas mapped as Valley Grassland in the Plan Area. For example, purple needlegrass (*Stipa pulchra*) can be found as the dominant grass (i.e., comprising greater than 20% cover) in small patches along ridgetops of low-lying hills in the eastern portion of Sacramento County.

Valley Grassland supports numerous wildlife species, including several Covered Species. Covered Species associated with Valley Grassland included California tiger salamander, western spadefoot giant gartersnake, western pond turtle, all of the bird Covered Species (except Cooper's hawk), American badger, and western red bat (Table 3-2).

As a critical element of the Vernal Pool Ecosystem, much of the Valley Grassland land cover within the Plan Area also supports vernal wetlands (i.e., Vernal Pools, Swales, and Stream/Creek-VPIH), and vernal pool-dependent species (vernal pool crustaceans and plants) (see Section 3.2.3). Approximately 97,349 acres of the total 135,152 acres of Valley Grassland present within the Plan Area (approximately 72%) are believed to be ecologically and hydrologically associated with Vernal Pools, Swales, or Stream/Creek-VPIH land covers to comprise the Plan Area's Vernal Pool Ecosystem (see Section 3.2.3).

Cropland Land Cover (Row and Field Crops)

Most of the Plan Area's Cropland is concentrated in the western part of the Plan Area in the Sacramento River and Cosumnes River floodplains. Cropland includes annual row and field crops (e.g., small grains, corn, tomatoes, melons, peppers, safflower, sunflower) and short-term perennial crops (e.g., asparagus). Rice is a row crop grown in Sacramento County, but is seldom grown in the Plan Area. Small fields of rice have recently been planted on the existing Cosumnes River Preserve.

An important ecological function of Cropland in the Plan Area is to provide rodent and insect prey and plant material forage for a number of the bird Covered Species. Small rodents are important prey for raptors, such as Swainson's hawks, white-tailed kite, and Cooper's hawk. Western burrowing owls consume a mix of small rodents, arthropods, and other small animals. Loggerhead shrikes primarily prey on ground-dwelling insects but also take small rodents. Swainson's hawks switch to a diet of insects after the breeding season. Greater sandhill crane is a winter visitor to the Plan Area and forages for seeds and small animals. Tricolored blackbird forages on invertebrates during the nesting season and plant material during the non-nesting season (Table 3-2).

Irrigated Pasture-Grassland Land Cover

Irrigated Pasture-Grassland is fairly common, but occurs in a scattered distribution generally in the central portion of the Plan Area. The Irrigated Pasture-Grassland land cover includes hay production (alfalfa, clovers, and mixed grasses), seasonal summer pasture for livestock (primarily cattle), and year-round pasture for livestock (primarily cattle or horses). Seasonal pasture appears to be the most common use. Irrigated Pasture-Grassland is typically seeded, cut/grazed, and reseeded on a regular basis on an approximately 5- to 7-year cycle before the fields are left fallow to rest, and the cycle is started over again.

Within the Irrigated Pasture-Grassland land cover type, alfalfa fields provide by far the most productive foraging habitat for raptors and are used by other Covered Species, such as greater sandhill crane, and tricolored blackbird (Table 3-2). As a perennial crop grown for several years before removal and replacement, alfalfa provides good cover for rodents and time for establishment of a good prey base. Farming operations during the growing season consist of periodic flood irrigation and four to six mowings. Both types of operations result in temporary increases in prey availability.

Many of the Covered Species that use Cropland also use Irrigated Pasture-Grassland. Pasture is suitable tricolored blackbird foraging habitat if it is within two miles of a colony nesting site. Greater sandhill cranes use Irrigated Pasture-Grassland for roosting and foraging (Table 3-2).

Orchard Land Cover (Fruit and Nut Orchards)

Orchards are scattered throughout the Plan Area, with the largest concentration along the western boundary of the Plan Area. The Orchard land cover has limited wildlife habitat value (Table 3-2), but provides perches for raptors foraging in adjacent Cropland and Valley Grassland. In particular, larger nut trees and other trees at these edge areas may be used by "sight predators" such as Swainson's hawk for perches to find prey in adjacent fields. Western red bat is known to roost in orchards, including apricot, peach, pear, almond, walnut, and orange trees (Constantine 1959; Pierson et al. 2006) (Table 3-2).

Vineyard Land Cover

Vineyard land cover is located mostly in the southern portion of the Plan Area outside of the UDA. In Sacramento County, vineyards are primarily established for wine grape production, with some minor table grape producers. Vineyards are primarily "clean cultivated," meaning no other vegetation is allowed to grow between the rows or on the edges of fields and irrigation ditches. As such, vineyards typically provide only limited habitat for native plants and wildlife (Table 3-2). However, vineyards using "environmentally friendly" management practices may provide habitat value through use of bat boxes, raptor perches, and owl boxes to encourage presence of these species and reduce insect and predation damage.

Blue Oak Woodland Land Cover and Blue Oak Savanna Land Cover

Blue Oak Woodland and Blue Oak Savanna comprise approximately 5% of the Plan Area, a majority of which is located in the far eastern portion of the Plan Area.

Blue oaks are typically drought-tolerant, and unlike interior live oaks, are deciduous, dropping their leaves during periods of extreme moisture stress. This survival trait may explain the observed patterns of blue oak distribution, with blue oaks occupying drier, shallower, and well-drained soils than interior live oaks or valley oaks (McDonald 1985).

In general, the SSHCP differentiated and mapped Blue Oak Woodland land cover and Blue Oak Woodland Savanna by their tree-cover densities.

Blue Oak Woodland is characterized by greater than 10% tree cover formed primarily by blue oak with other foothill tree species mixed in. Blue Oak Woodland generally has a sparse shrub layer and well-developed Valley Grassland layer, sometimes including vernal pools and other wetland features. Other tree species that may occur in Blue Oak Woodland include foothill pine (*Pinus sabiniana*), interior live oak (*Quercus wislizenii*), valley oak (*Quercus lobata*), and California buckeye (*Aesculus californica*). The shrub layer, where present, only includes scattered individuals of poison oak (*Toxicodendron diversilobum*), and coyote brush (*Baccharis pilularis*). Blue Oak Woodland often has a relatively open canopy, when compared to the riparian land covers present in the Plan Area.

Blue Oak Savanna land cover type is characterized by a sparse (less than 10%) tree canopy structure that ranges from scattered blue oak trees and small clusters of blue oaks, to small areas of blue oak stands. Like Blue Oak Woodland, it generally has little to no shrub layer, but has a well-developed Valley Grassland layer. Blue Oak Savanna is typically transitional between Valley Grassland and Blue Oak Woodland.

Oak Woodland and Savanna provide important cover, nesting, and roosting sites for native bird species, as well as caching sites for acorn storage, for a variety of birds, mammals, and other native species. Covered Species that use Blue Oak Woodland and/or Savanna include American badger, western red bat, Cooper's hawk, western burrowing owl, and white-tailed kite. Where suitable aquatic land cover occurs in association with Blue Oak Woodland and Blue Oak Savanna land cover, California tiger salamander, western spadefoot, and western pond turtle may also occur. Old, large oak trees are of particular habitat value, providing an array of living and dead branches as sites for woodpeckers to excavate cavities and for insect-eaters to forage for larvae and adult insects. Dead branches and trunks are critically important for cavity nesting birds, for mammals as storage sites for acorns, and as perches for sight-dependent predators, such as raptors (Gutierrez and Koenig 1978). The fallen logs of dead oaks provide sustenance and cover for arthropods, fungi, and wildlife, and may potentially extend activity periods for these species in drier climates by retaining soil moisture and providing shade (Giusti et al. 2004).Oak trees produce a critically important food crop, acorns. Acorn production is typically episodic, some years with copious acorn production and other years with minimal acorn production. High yield acorn years appear critical in triggering pulses in invertebrate and vertebrate population sizes (McShea and Rappole 2000; McShea and Schwede 1993). Blue Oak Woodland and Blue Oak Savanna provide different habitat functions for some of the Covered Species. For example, western burrowing owl and American badger may occur in the open savannas but not denser woodlands. White-tailed kites may nest in woodlands and forage in savannas.

3.2.3 SSHCP Vernal Pool Ecosystem

One of the stated goals of the SSHCP is to protect several Plan Area vernal pool species (see Chapter 7). To accomplish protection of vernal pool species, the SSHCP focuses on the preservation of seasonal vernal-wetlands, such as Vernal Pools, Swales, and Streams/Creeks VPIH, where vernal pool invertebrates and plant species spend their entire life cycle and where amphibians such as California tiger salamander and spadefoot toad breed and forage. However, as discussed in Section 2.3.1, and in Section 3.2.1, these seasonal wetlands cannot exist absent the adjacent uplands. Essential vernal pool ecology and functions (such as the seasonal hydrologic cycle, nutrient cycling, water chemistry, and food chain support) are closely tied to the surrounding uplands. To ensure that the Plan achieves its goal of protecting vernal pool species, the Plan must protect both the vernal wetlands and the adjacent upland valley grassland that support and maintain the vernal wetlands. To that end, the SSHCP identified areas where the SSHCP vernal-wetland land cover types (i.e. Vernal Pool, Swale, and Stream/Creek-VPIH) are ecologically connected with the adjacent Valley Grassland land cover. Taken together, the Valley Grassland and Vernal Pool, Swale, and Stream/Creek VPIH land cover types in these areas comprise the Vernal Pool Ecosystem. This Vernal Pool Ecosystem approach allowed the

Plan Permittees to consider the ecological interconnectivity that occurs between Swale and Vernal Pool, between Valley Grassland and Vernal Pool, and between vernal pool complexes and adjacent Stream/Creek habitat. This ecosystem approach was used by the Plan Permittees when developing the SSHCP Conservation Strategy (see Chapter 7), and will be used to establish the SSHCP Preserve System (Chapter 7).

Hydrology

An intact vernal pool ecosystem is necessary to maintain the soil perched aquifer and hydrological functions of vernal wetlands. Plan Area vernal pools receive water from three sources: direct precipitation, water in the soil's sub-surface "perched aquifer," and intermittent flows in surface swales. As discussed in Section 2.3, the seasonal hydrology of the Plan Area vernal pools differs between the different geologic formations and associated soils, which determines vernal pool type, pool water chemistry, and affects the species community composition of the pool.

Hydrologic connectivity between individual vernal pools and between vernal pool complexes occurs from subsurface lateral flows where soil-restrictive layers form seasonal perched aquifers, and hydrologic connectivity occurs from surface flows through seasonal swales or seasonal drainages. In addition to its role in a seasonal wetland's hydrologic regime, hydrologic connectivity via surface swales and ephemeral drainages allow dispersal of vernal pool organisms between vernal pools and between vernal pool complexes, including several SSHCP plant and animal vernal pool Covered Species.

Hydrology studies conducted within the Plan Area indicate that Plan Area Vernal Pools receive winter rainwater from subsurface lateral flows (Hanes et al. 1990; Hanes and Stromberg 1998; Rains et al. 2006, 2008; Williamson et al. 2005). This occurs when a soil-restrictive layer prevents percolation of rainwater into the deeper groundwater aquifer, causing a seasonal sub-surface perched aquifer (a perched water table) to form. Once the soils that are above the soil-restrictive layer have become saturated, water moves laterally above the impervious restrictive layer from upland into vernal pools, causing the vernal pools to fill. Similarly, water moves laterally out of a vernal pool and into the surrounding uplands as the vernal pool dries. These lateral subsurface flows stabilize the water level of vernal pools and vernal pool complexes, causing Plan Area vernal pools to be inundated for much longer periods than would be the case if the vernal pools were recharged only by rainfall. Water held in the saturated perched aquifer of a single watershed may ultimately drain downslope to exit as late-season flow in a stream or creek (Hanes et al. 1990; Hanes and Stromberg 1998; Rains et al. 2006; Williamson et al. 2005). Within the Plan Area, the perched aquifer can supply as much as 60% or more of the water needed to fill a vernal pool completely (Williamson et al. 2005). However, individual Plan Area vernal pools display

different seasonal hydrology due to variations in topography and soil properties near each pool (Leibowitz and Brooks 2008).

The movement of winter rainwater between vernal pools also travels via surface swales, and in such a situation, the hydrologic connection between pools is obvious (Solomeshch et al. 2007). Plan Area surface swales typically flow during, and for short periods after, large winter rainstorms. When the upper soil layers are fully saturated and the subsurface perched water table has filled a vernal pool, the vernal pool then overflows into an adjacent surface swale. Rainwater infiltration into the upper layers of soils that include a hardpan/duripan is relatively rapid, so overland flow rarely occurs on the Plan Area's grassland landscapes, except for slow, intermittent flows through interconnecting surface swales from up-gradient vernal pools. In the vernal pool landscapes within the Plan Area, vernal pools overflow through seasonal swales to other vernal pools, which may then overflow into other swales and vernal pools or vernal pool complexes, and ultimately overflow to a swale that discharges to a seasonal stream or creek (Rains et al. 2006, 2008).

Water Chemistry and Other Abiotic Factors

An intact vernal pool ecosystem is also necessary to maintain water chemistry and other abiotic factors that support biodiversity and abundance of vernal pool aquatic plants and aquatic animals (Kneitel and Lessin 2010; Poirier 2012). Altered vernal pool watersheds may no longer have adequate rainwater infiltration and subsurface flows for the vernal pools to function adequately as suitable habitat for certain vernal pool species. In addition, where human activities have significantly affected upland watersheds, the vernal pool's abiotic aquatic habitat components that are determined by subsurface and surface flows through the watershed's soils (such as water chemistry and amounts of dissolved nutrients) will also be altered, further reducing suitability of the vernal pool to support certain vernal pool species (Rains et al. 2008). For example, permanently removing or truncating the associated upland watershed that forms the seasonal perched aquifer could convert the ecological functions and processes of a perched-aquifer vernal pool into that of a direct-precipitation/surface-runoff-driven vernal pool system. These indirectly impacted vernal pools may continue to pond water to some extent from the direct precipitation, but the vernal pool's normal hydrologic regime, natural water chemistry, and ecological functions would be fundamentally and permanently altered.

Ecological Interconnectivity

Ecological interconnectivity between pools and pool complexes is an important consideration for life-history needs and dispersal of covered vernal pool plant and animal species. Amphibians, including western spadefoot toad and California tiger salamander, require contiguous uplands for refugia and for terrestrial migration of adults between upland refugia habitat and wetland habitats

to maintain larger meta-populations. Plant seeds and invertebrate cysts and eggs may also be transported between vernal pools by animals that cross uplands. Solitary bees that are obligate vernal pool plant pollinators depend on the uplands surrounding vernal pools as well. To maintain adequate biological interconnectivity, the SSHCP must acquire enough Valley Grassland within the vernal pool ecosystem to support movement and dispersal of individuals between larger meta-populations, and to provide habitat needs for the entire life history of each vernal pool Covered Species.

3.2.4 Developed and Other Non-Habitat Land Cover Types

Seven SSHCP cover types provide little or no Covered Species habitat value, and are not a focus of the SSHCP Conservation Strategy (Chapter 7); these are: aqueducts, disturbed, low- and high-density development, major roads, mine tailings, and recreation/landscaped areas.

Aqueduct Land Cover

The aqueduct land cover type in the Plan Area is represented by the Folsom South Canal.

Disturbed Land Cover

The disturbed land cover type is defined as open-space areas that have been subject to previous or ongoing disturbances such as along roadsides, trails, and parking lots. Scraped or graded land, gravel mining, and waste disposal sites are included in this land cover type. Disturbed land cover type is vegetated with diverse weedy flora. These areas are of special concern as they tend to harbor and facilitate the spread of invasive plant species. Vascular plant species associated with the disturbed land cover typically include Johnson grass, Canadian horseweed (*Conyza canadensis*), milk thistle (*Silybum marianum*), yellow-star thistle (*Centaurea solstitialis*), stinkwort (*Dittrichia graveolens*) and field bindweed (*Convolvulus arvensis*).

High-Density Development Land Cover

The high-density development land cover type includes urban and suburban residential neighborhoods, urban centers, industrial areas, airports, and wastewater treatment plants. Most of this high-density development occurs in the SSHCP UDA in the northwestern portion of the Plan Area.

Low-Density Development Land Cover

The low-density development land cover type consists of relatively sparse residences and other structures, such as farm buildings, and small rural neighborhoods with large individual property sizes per house. Plant nurseries are also included in this category. While the majority of low-density development occurs outside of the UDA, it is found throughout the Plan Area.

Major Roads Land Cover

The major roads land cover type includes linear features with paved surfaces and can vary from large freeways to smaller arterial roads found within urban settings. Smaller roads not mapped as Major Roads were mapped as an element of High-Density or Low-Density Development.

Mine Tailings Land Cover

Mine Tailings Land Cover is defined by the large tailing piles that rise significantly above the surrounding landscape as a result of gold dredging occurring in the early 1900s through approximately 1960. The large tailing piles are composed almost entirely of rounded river rock that was excavated from ancient riverbeds. Most of the mine tailings are associated with historic gold mining are located in the northeastern portion of the Plan Area. Smaller outcroppings of tailings in are often the result of current and recent gravel mining activities. The mine tailings are unvegetated; the SSHCP mapped any woody vegetation observed between tailings piles as the Mine Tailing Riparian Woodland land cover type (see Section 3.2.1).

Recreation/Landscaped Land Cover

The recreation/landscaped land cover type includes gardens, parks, golf courses, off-highway vehicle (OHV) parks, and greenbelts. Most landscaped and recreation areas are planted with non-native grasses, shrubs, and trees. Species composition in urban habitats varies with planting design and climate. Monoculture is commonly observed in tree groves and street tree strips. For example, many of the windbreaks in south Sacramento County are planted with pure stands of eucalyptus, olive (*Olea europaea*) trees, or other hardwoods. Most recreation and landscaped areas are regularly maintained by irrigation, mowing, pruning, or other management techniques.

3.3 Land Cover and Vernal Pool Watershed Mapping

3.3.1 Land Cover Mapping

A principal component of the Plan Area biological resources baseline is the composition and distribution of the SSHCP land cover types throughout the Plan Area. SSHCP land cover types represent classifications of land surface interpreted from aerial photographic signatures. SSHCP land cover types generally represent vegetation associations, water, or specific human land uses.

SSHCP land cover mapping occurred in several stages. Vernal Pool and Swale land cover type mapping occurred early in the SSHCP planning process and was accomplished through interpretation of black-and-white aerial imagery dated March 2001 and mapped at a scale of 1 inch = 200 feet (1:2,400) and interpretation of color aerial imagery dated November 2002 and mapped at a scale of 1 inch = 400 feet (1:4,800). See Appendix E for more information on the

process used to map Vernal Pool and Swale in the Plan Area. The primary mapping of all other SSHCP land cover types was completed in 2004 and was developed from the interpretation of color aerial imagery dated November 2002 and mapped at a scale of 1 inch = 400 feet (1:4,800).

These initial mapping efforts were periodically updated and refined during the development of the SSHCP to reflect subsequent modifications of SSHCP land covers (such as land cover conversion), to expand the initial Plan Area boundaries, and to verify the original 2001 and 2004 aerial imagery interpretation based on field visits or other site specific information. The baseline SSHCP land cover map (Figure 3-1) also reflects final mapping refinements that occurred in 2012–2014 based on interpretations of various recent color aerial photos. See Appendix E for more information.

3.3.2 Vernal Pool Mocro-Watershed Mapping

As discussed in Sections 3.2.1 and 3.2.3, habitat for vernal pool plants and animals may be impacted if the adjacent upland and watershed of the individual vernal pool or the vernal pool complex is altered. For this reason, it is important to understand if a Covered Activity will directly or indirectly impact an individual vernal pool's watershed. Beginning is 2013, the SSHCP mapped the individual watershed of select vernal pools inside the UDA using the following five-step approach: (1) acquire high-resolution classified LIDAR data; (2) develop a digital terrain model (DTM) of the Urban Development Area (UDA); (3) use industry-standard hydrologic assessment tools to determine the hydrologic characteristics of the UDA; (4) divide the UDA into subareas to facilitate a faster model run time; and (5) identify the hydrologic boundaries of the contributing area for each vernal pool feature. These terms and the process used by the SSHCP to map of individual vernal pool watersheds are discussed in greater detail in Appendix E.

The maps of individual vernal pool watersheds were used in SSHCP Chapter 6 to estimate the total acres of Vernal Pool that could be indirectly impacted by implementing SSHCP Covered Activities over the proposed 50-year ITP permit term. In addition, the maps of each individual vernal pool watershed will be used during SSHCP implementation to help plan individual Covered Activities, and to help adjust any on-site SSHCP Preserve boundaries to reduce the Covered Activity's indirect impacts to vernal wetlands and vernal pool species. The individual vernal pool watershed maps will also be used during implementation of the SSHCP to determine if any indirect impacts will result from the construction and implementation of an individual Covered Activity project or activity.

As discussed in Appendix E, the digital terrain model was specifically designed only for use in the portion of the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf et al. 1998) that is located within south Sacramento County.

3.4 Covered Species Habitat Models

Habitat models were prepared for all 28 Covered Species to define suitable habitat and to map where suitable habitat for each Covered Species is likely to be present in the Plan Area. The species habitat models were used to map locations and to estimate total acres of suitable species habitat within the Plan Area.

In addition, the Covered Species habitat models were used by the Plan Permittees to estimate potential effects of all SSHCP Covered Activity projects and activities on each Covered Species (see Chapter 6), and were used by the Plan Permittees to develop the SSHCP Conservation Strategy (see Chapter 7).

The following section explains the process used to define and then delineate Covered Species modeled habitat within the Plan Area. Each species habitat discussion below includes a brief description of the available literature about habitat requirements of each Covered Species during each life history stage, followed by a list of SSHCP land cover types that are expected to provide life history habitat requirements for that species. Each species model discussion presents the number and locations of documented species occurrences within the Plan Area. In addition, any assumptions used by the Plan Permittees to define or map a Covered Species' habitat model for this Plan Area are discussed and explained.

Methodology Used to Create Each Covered Species Habitat Model

The Plan Permittees worked with local species experts and wildlife agency biologists to define and map Covered Species suitable habitat in this Plan Area by using the best available information about the life history and biology of each Covered Species and locations in the Plan Area known to support the species or where the species has been observed (see SSHCP Appendix B, Species Accounts).

Specifically, information concerning the species' needs for breeding, feeding, and sheltering at each life history stage; information from Plan Area species-surveys; documented species-occurrences within the Plan Area; and information on species range, including soil type associations and elevation limits were used to build the habitat models.

This information was compiled using GIS to generate a map-based model of suitable habitat within the Plan Area for each SSHCP Covered Species. Table 3-2 lists land cover types that are known to provide Covered Species' habitat. Note that Covered Species may associate with a land cover at varying degrees of frequency over its lifetime due to seasonal habitat changes (i.e., wet and dry season, crop rotations, irrigation/flooding, food availability), and seasonal changes in a Covered Species life history and habitat needs.

INTENTIONALLY LEFT BLANK

Table 3-2
SSHCP Covered Species/SSHCP Land Cover Relationships

SSHCP Natural Land Covers		Terrestrial Land Cover Types							Aquatic Land Cover Types								
Covered Species	*Habitat Use*	*Valley Grassland*	*Blue Oak Woodland*	*Blue Oak Savanna*	*Cropland*	*Vineyard*	*Orchard*	*Irrigated Pasture Grassland*	*Mine Tailing Riparian Woodland*	*Mixed Riparian Woodland*	*Mixed Riparian Scrub*	*Vernal Pool*	*Seasonal Wetland*	*Swale*	*Freshwater Marsh*	*Open Water*	*Stream/ Creek*	*Stream/ Creek (VPIH)*
Ahart's Dwarf Rush	Entire Lifecycle[1]											X		X				
Boggs Lake Hedge-Hyssop	Entire Lifecycle[2]											X	X					
Dwarf Downingia	Entire Lifecycle[3]											X		X				
Legenere	Entire Lifecycle[4,5]											X[i]	X[ii]					
Pincushion Navarretia	Entire Lifecycle[6]											X		X				
Sacramento Orcutt Grass	Entire Lifecycle[7]											X						
Slender Orcutt Grass	Entire Lifecycle[8]											X						
Sanford's Arrowhead	Entire Lifecycle[9]												X		X	X	X	
Mid-Valley Fairy Shrimp	Entire Lifecycle[10]											X		X				
Ricksecker's Water Scavenger Beetle	Entire Lifecycle[11]											X		X				
Valley Elderberry Longhorn Beetle	Entire Lifecycle[12]								X	X	X							
Vernal Pool Fairy Shrimp	Entire Lifecycle[13]											X		X				X
Vernal Pool Tadpole Shrimp	Entire Lifecycle[14]											X		X				X
California Tiger Salamander	Aquatic[15]											X	X					
	Upland[16]	X	X	X														
Western Spadefoot	Aquatic[17]											X	X	X		X	X[iii]	
	Upland[18]	X	X	X														
Giant Gartersnake	Aquatic[19]				X[iv]								X		X	X	X	
	Upland[20]	X									X							
Western Pond Turtle	Aquatic[21]														X	X	X	
	Upland[22]	X	X	X					X	X	X							
Cooper's Hawk	Foraging[23]		X	X					X	X	X							
	Nesting[24]		X						X	X	X							
Ferruginous Hawk	Foraging[25]	X						X				X	X	X				
Greater Sandhill Crane	Foraging[26]	X			X			X					X		X			
	Roosting[27]											X	X		X			
Loggerhead Shrike	Foraging[28]	X			X			X				X	X	X				
	Nesting[29]	X							X		X							
Northern Harrier	Foraging[30]	X			X			X				X	X	X	X			
	Nesting[31]	X			X			X										
Swainson's Hawk	Foraging[32]	X			X			X				X	X	X				
	Nesting[33]									X	X							
Tricolored Blackbird	Foraging[34]	X			X			X				X	X	X	X	X		
	Nesting[35]	X			X								X		X			
Western Burrowing Owl	Wintering[36]	X		X	X			X				X	X	X				X
	Nesting[37]				X			X										

Table 3-2
SSHCP Covered Species/SSHCP Land Cover Relationships

SSHCP Natural Land Covers		Terrestrial Land Cover Types							Aquatic Land Cover Types								
Covered Species	*Habitat Use*	*Valley Grassland*	*Blue Oak Woodland*	*Blue Oak Savanna*	*Cropland*	*Vineyard*	*Orchard*	*Irrigated Pasture Grassland*	*Mine Tailing Riparian Woodland*	*Mixed Riparian Woodland*	*Mixed Riparian Scrub*	*Vernal Pool*	*Seasonal Wetland*	*Swale*	*Freshwater Marsh*	*Open Water*	*Stream/ Creek*	*Stream/ Creek (VPIH)*
White-Tailed Kite	Foraging[38]	X		X	X			X			X	X	X	X				
	Nesting[39]		X						X	X	X							
American Badger	Entire Lifecycle[40]	X		X								X	X	X				
Western Red Bat	Foraging[41]	X	X	X			X		X	X	X	X	X	X	X	X	X	
	Roosting[42]		X	X			X		X	X								

VPIH = Vernal Pool Invertebrate Habitat

1 Ahart's Dwarf Rush – Dittes & Guardino Consulting, as cited in SSHCP Appendix B
2 Boggs Lake Hedge-Hyssop – Dittes & Guardino Consulting, as cited in SSHCP Appendix B; CNPS 2001
3 Dwarf Downingia – Dittes & Guardino Consulting, as cited in SSHCP Appendix B; CDFG 2002
4 Legenere – Dittes & Guardino Consulting, as cited in SSHCP Appendix B; Holland 1986
5 Legenere – Dittes & Guardino Consulting, as cited in SSHCP Appendix B; CDFG 2002
6 Pincushion Navarretia – Dittes & Guardino Consulting, as cited in SSHCP Appendix B
7 Sacramento Orcutt Grass – Dittes & Guardino Consulting, as cited in SSHCP Appendix B[8] Slender Orcutt Grass – Dittes & Guardino Consulting, as cited in SSHCP Appendix B
9 Sanford's Arrowhead – Dittes & Guardino Consulting, as cited in SSHCP Appendix B[10] Mid-Valley Fairy Shrimp – D.C. Rodgers, as cited in SSHCP Appendix B
11 Ricksecker's Hydrochara – D.C. Rodgers, as cited in SSHCP Appendix B
12 Valley Elderberry Longhorn Beetle – D.C. Rogers, as cited in SSHCP Appendix B; Barr 1991; Collinge et al. 2001; Eng 1984; Linsley & Chemsak 1972, 1997; USFWS 1999a
13 Vernal Pool Fairy Shrimp – D.C. Rodgers, as cited in SSHCP Appendix B
14 Vernal Pool Tadpole Shrimp – D.C. Rodgers, as cited in SSHCP Appendix B[15] California Tiger Salamander – Jamison Watts, as cited in SSHCP Appendix B; Bobzien 2003; CNDDB 2003; Jennings and Hayes 1994; Petranka 1998; Shaffer et al. 1993; Stebbins 1989, 2003; USFWS 2004a
16 California Tiger Salamander – Jamison Watts, as cited in SSHCP Appendix B; Bobzien 2003; CNDDB 2003; Jennings and Hayes 1994; Petranka 1998; Shaffer et al. 1993; Stebbins 1989, 2003; USFWS 2004a
17 Western Spadefoot Toad – Jamison Watts, as cited in SSHCP Appendix B; CNDDB 2004
18 Western Spadefoot Toad – Jamison Watts, as cited in SSHCP Appendix B; Stebbins 2003
19 Giant Garter Snake – Jamison Watts, as cited in SSHCP Appendix B; Hansen 1988; USFWS 1999b
20 Hansen 1988: Rice fields provide suitable foraging habitat for giant gartersnake within the Plan Area.
21 Western Pond Turtle – Jamison Watts, as cited in SSHCP Appendix B; Boyer 1965; Holland 1994; Reese and Welsh 1998a
22 Western Pond Turtle – Jamison Watts, as cited in SSHCP Appendix B; Holland 1994
23 Cooper's Hawk – Steve Henderson, as cited in SSHCP Appendix B
24 Cooper's Hawk – Steve Henderson, as cited in SSHCP Appendix B; Asay 1987
25 Ferruginous Hawk – Todd Sloat, as cited in SSHCP Appendix B[26] Greater Sandhill Crane – Todd Sloat, as cited in SSHCP Appendix B; Ivey and Herziger 2003; Littlefield and Ivey 2000
27 Greater Sandhill Crane – Todd Sloat, as cited in SSHCP Appendix B; Littlefield and Ivey 2000
28 Loggerhead Shrike – Steve Henderson, as cited in SSHCP Appendix B; Cade and Woods 1997; Yosef 1996
29 Loggerhead Shrike – Steve Henderson, as cited in SSHCP Appendix B; Cade and Woods 1997; Yosef 1996
30 Northern Harrier – Steve Henderson, as cited in SSHCP Appendix B; California Partners in Flight 2000
31 Northern Harrier – Steve Henderson, as cited in SSHCP Appendix B; California Partners in Flight 2000
32 Swainson's Hawk – Waldo Holt, as cited in SSHCP Appendix B; Estep 1989; Swolgaard 2004
33 Swainson's Hawk – Waldo Holt, as cited in SSHCP Appendix B; Bloom 1980; Schlorff and Bloom 1984; Estep 1989
34 Tricolored Blackbird – Todd Sloat, as cited in SSHCP Appendix B; Beedy and Hamilton 1997; DeHaven 2000
35 Tricolored Blackbird – Todd Sloat, as cited in SSHCP Appendix B; Beedy and Hamilton 1997, 1999; DeHaven et al. 1975; Hamilton et al. 1995; Neff 1937
36 Western Burrowing Owl – Steve Henderson, as cited in SSHCP Appendix B; Butts 1973; Coulombe 1971; Rosenberg et al. 1998
37 Western Burrowing Owl – Steve Henderson, as cited in SSHCP Appendix B; Butts 1973; Coulombe 1971; Rosenberg et al. 1998
38 White-tailed Kite – Todd Sloat, as cited in SSHCP Appendix B; Dunk 1995; Erichsen et al. 1994
39 White-tailed Kite – Todd Sloat, as cited in SSHCP Appendix B; CNDDB 2004; Dixon et al. 1957; Erichsen 1996; Hawbecker 1942; Pickwell 1930
40 American Badger – Steve Henderson, as cited in SSHCP Appendix B; Williams 1986
41 Western Red Bat – Heather Johnson, as cited in SSHCP Appendix B; Pierson et al. 1999, 2002
42 Western Red Bat – Heather Johnson, as cited in SSHCP Appendix B; Harvey et al. 1999; Pierson et al. 1999; WBWG 1998

The process to prepare each species habitat model was initiated with an in-depth literature review to determine specific life history needs for each species (e.g., peer-reviewed scientific literature, published species accounts, survey reports, and other environmental documents). The literature reviews focused on the identification of habitats in which the species has been documented over its range and habitat necessary for the species to complete its lifecycle. Plan Permittees, local species experts, and agency biologists then evaluated each SSHCP land cover type for meeting the habitat requirements of each Covered Species (see Table 3-2). Details on the biology of each Covered Species can be found in Appendix B (Species Accounts), including regulatory status, ecological information, range, threats, population trends, and conservation and management considerations.

After completing the literature review and defining which SSHCP land cover types could provide suitable habitat, the Plan Permittees, local species experts, and agency biologists used available Plan Area occurrence information for each Covered Species, including species survey information in agency files and survey results entered in CDFW's California Natural Diversity Database (CNDDB) to further refine the habitat models. For example, California tiger salamander is known to occupy vernal pool complexes within Valley Grassland. However, the species has never been recorded north of the Cosumnes River despite extensive surveys to locate the species in this part of the Plan Area. Therefore, habitat north of the Cosumnes River was not included in the SSHCP habitat model for this species.

For some Covered Species, especially the plant Covered Species, occurrence-location records in the CNDDB is the only species survey data available for this Plan Area. CNDDB data is based on voluntary submission of records by public and agency biologists. CNDDB survey data has the following limitations: (1) data is geographically biased toward areas that have received greater survey effort; (2) data is not confirmed by independent review and therefore is sometimes inaccurate; (3) data is often less well represented for very rare or cryptic species; and (4) mapping precision for species occurrences varies from specific (points within an 80-meter radius) to non-specific (point within an area defined by a radius between 0.1 and 1.0 mile).

For four Covered Species (giant gartersnake, western pond turtle, Swainson's hawk, and greater sandhill crane) the species modeled habitat also identifies "high-value" habitat within the Plan Area. High-value habitat is defined differently for each of the four species, but refers to areas in the Plan Area considered to be particularly important for that species. High-value habitat is considered in the effects analysis (Section 6) and in the SSHCP Conservation Strategy (Chapter 7).

Habitat models were prepared for each vernal pool plant Covered Species by the process described above; however soil units were also used to help further refine plant species habitat models. Numerous studies have correlated the distribution of vernal pools as well as vernal pool

endemic species with specific geologic surfaces and their associated soils (Helm and Vollmar 2002; Holland and Dains 1990; Metz 2001, as cited in Vollmar et al. 2013). Therefore, the Plan Permittees used soil unit maps from the Soil Survey Geologic Database (SSURGO) for Sacramento County (USDA 2014) to identify correlations between plant Covered Species documented occurrences and soils within the Plan Area. Only SSHCP land cover types that also occurred within a soil unit that is known to be occupied by the plant species, for which the model was being developed, were considered suitable habitat for the species. For instance, Ahart's dwarf rush in only known to occupy vernal pool land cover types that are within Red Bluff loam, Red Bluff-Redding complex and Redding gravelly Loam soil types. So only vernal pools within the Plan Area that occur on these three soil units were considered suitable habitat for Ahart's dwarf rush.

For each documented plant occurrence, the occurrence's "precision-code" size used by the CNDDB was also used to determine suitable modeled habitat. For instance, if a documented plant occurrence was cited by CNDDB to have a location accuracy of 1/10 of a mile, then any soil type within 0.10 mile of the occurrence polygon's "centroid" point was considered a potential suitable soil for the species.

3.4.1 Plant Covered Species Habitat Models

Ahart's Dwarf Rush (*Juncus leiospermus* var. *ahartii*)

Habitat Requirements

Ahart's dwarf rush occupies, shallow vernal pools, the margins of large vernal pools and swales (CDFG 2002; Dittes and Guardino pers. obs., as cited in SSHCP Appendix B). It is frequently associated with recent gopher mounds where, potentially, the lack of competition from other plants allows Ahart's dwarf rush to persist (Dittes and Guardino pers. obs., as cited in SSHCP Appendix B; CDFG 2010).

Plan Permittee analysis of documented occurrences suggests that in Sacramento County, Ahart's dwarf rush is associated with the Red Bluff loam, Red Bluff-Redding complex and Redding gravelly Loam soil types.

Land Cover Types Relevant to Habitat Requirements

SSHCP Land Cover types that provide suitable habitat based on life history descriptions are Vernal Pool and Swale. Vernal pools are their primary habitat in the Plan Area. Swales may also provide suitable habitat as Ahart's dwarf rush appears to prefer short inundation periods (see Table 3-2). Because Vernal Pools and Swales are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Documented Occurrences within the Plan Area

There are two documented occurrences of Ahart's dwarf rush within the Plan Area, one within PPU 1 and the other in PPU 2. Both are within the UDA.

Model Assumptions

- Soil types known to support the single documented occurrence of Ahart's dwarf rush in the Plan Area include Red Bluff loam, 0 to 2% slopes; Red Bluff-Redding complex 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes.
- Ahart's dwarf rush occupies shallow vernal pools, vernal pool margins, and swales (Dittes and Guardino pers. obs., as cited in SSHCP Appendix B; CDFG 2002).
- Valley Grasslands are necessary to support the Vernal Pool and Swale land cover types that Ahart's dwarf rush occupies.

Ahart's Dwarf Rush Modeled Habitat

Modeled habitat for Ahart's dwarf rush is all Vernal Pool, Swale, and Valley Grassland land covers on Fiddyment fine sandy loam, 1% to 8% slopes; Red Bluff-Redding complex, 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes.

Figure 3-3 illustrates the location of modeled habitat as well as the documented occurrences of Ahart's dwarf rush within the Plan Area.

Boggs Lake Hedge-Hyssop (*Gratiola heterosepala*)

Habitat Requirements

Boggs Lake hedge-hyssop is reported to grow in well-developed vernal pools, and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies (small lakes, reservoirs, stock ponds, seasonally saturated clay flats in meadows). Boggs Lake hedge-hyssop often grows in comparatively barren areas within deeper portions of vernal pools, sometimes in barren openings with common spikerush (*Eleocharis macrostachya*) (Dittes and Guardino, as cited in SSHCP Appendix B).

Plan Permittee analysis of documented occurrences suggests that in Sacramento County, known Boggs Lake hedge-hyssop occurrences are associated with Red Bluff loam, Red Bluff-Redding complex, Red Bluff-Xerarents complex, Redding gravelly loam, San Joaquin silt loam, San Joaquin-Durixeralfs complex, and Vleck gravelly loam soil types.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat based on life history descriptions are Vernal Pool and Seasonal Wetland (Table 3-2). Because Vernal Pools and Seasonal Wetlands are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are 31 documented occurrences of Boggs Lake hedge-hyssop within the Plan Area. Twenty occurrences are located within the UDA. Of the 20 occurrences within the UDA, 16 are in PPU 1 and there is one occurrence each in PPUs 2 and 3. Two occurrences are not within a PPU. Eleven occurrences are located outside the UDA, all in PPU 1.

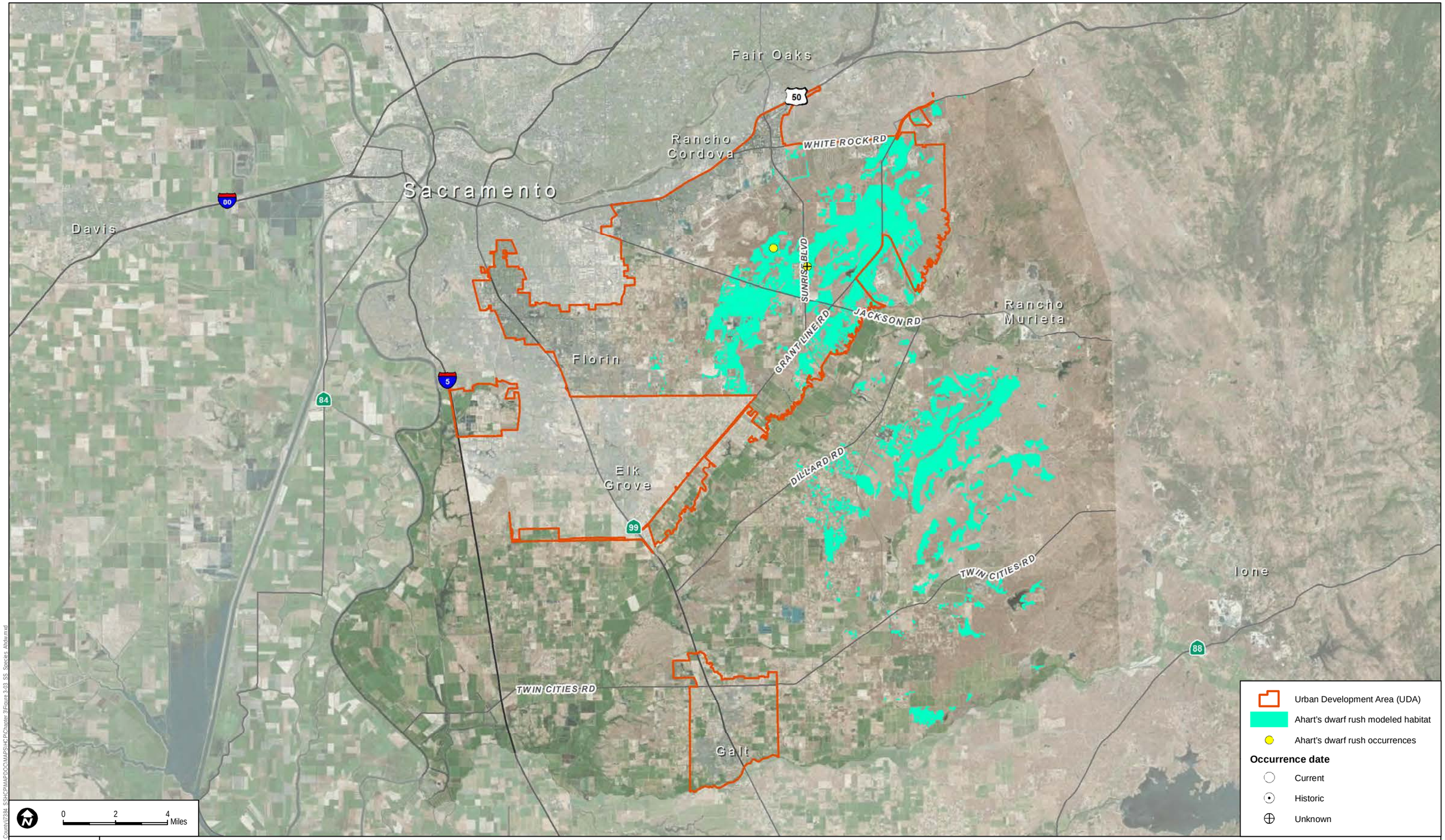
Model Assumptions

- Soil types known to support Boggs Lake hedge-hyssop in the Plan Area include Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Red Bluff-Xerarents complex, 0 to 2% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin-Durixeralfs complex, 0 to 1% slopes; and Vleck gravelly loam, 2% to 15% slopes.
- Boggs Lake hedge-hyssop is known to occupy well-developed vernal pools, and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies.
- Valley Grasslands are necessary to support the Vernal Pool and Seasonal Wetland land cover types that Boggs Lake hedge-hyssop occupies.

Boggs Lake Hedge-Hyssop Modeled Habitat

Modeled habitat for Boggs Lake hedge-hyssop is Vernal Pool, Seasonal Wetland, and Valley Grassland land cover types on Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Red Bluff-Xerarents complex, 0 to 2% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin-Durixeralfs complex, 0 to 1% slopes; Sailboat silt loam, drained, 0 to 2% slopes; occasionally flooded, and Vleck gravelly loam, 2% to 15% slopes.

Figure 3-4 illustrates the location of modeled habitat as well as documented occurrences of Boggs Lake hedge-hyssop within the Plan Area.



SOURCE: Bing Maps, County of Sacramento 2015, CNDDB 2012

FIGURE 3-3

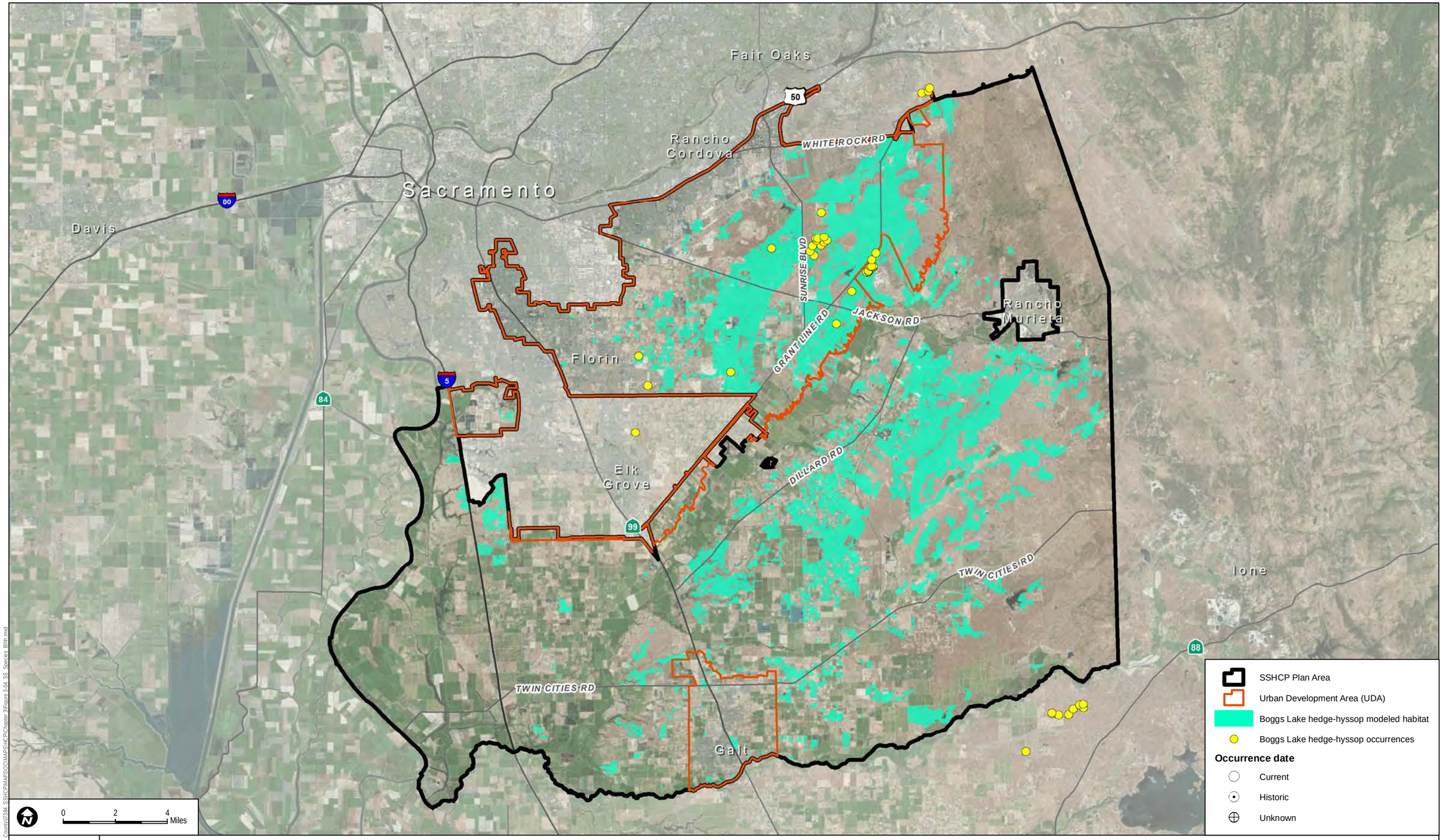
Ahart's Dwarf Rush Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2396 SSHCP\MAPDOCS\MAPS\HCP\Chapter 3\Figure 3-03_SS_Species Ahartmxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, CDFG 2012, Sugnet & Associates 1993, Jones & Stokes 2990

FIGURE 3-4

Boggs Lake Hedge-Hyssop Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2394 SSHCP\MAPS\CAD\MAPS\HCP\Chapter 3\Figure 3-04_SS_Species Blth.mxd

INTENTIONALLY LEFT BLANK

Dwarf Downingia (*Downingia pusilla*)

Habitat Requirements

Dwarf downingia occurrences are associated mainly with northern claypan vernal pools in central Sacramento County, with northern hardpan vernal pools in the foothills of the Sierra Nevada, and with vernal pools of the Interior Valleys of the Coast Range in Napa and Sonoma Counties (CDFG 2010). Dwarf downingia occupies more commonly occurring, smaller and/or shallower vernal pools with comparatively more "flashy" hydrology (CDFG 2010; Dittes pers. obs., as cited in SSHCP Appendix B). Dwarf downingia also grows along the margins of vernal pools as well as mesic sites within Valley Grassland (CNPS 2010).

Plan Permittee analysis of documented occurrences suggests that in Sacramento County, documented dwarf downingia occurrences are associated with Amador-Gillender complex, Clear Lake clay, Corning complex, Hadselville-Pentz complex, Redding gravelly loam, San Joaquin silt loam, and San Joaquin-Galt complex soil types.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat based on life history descriptions are Vernal Pool and Swale. Vernal pools are their primary habitat in the Plan Area. Swales may also provide suitable habitat as dwarf downingia prefers short periods of inundation (Table 3-2). Because Vernal Pools and Swales are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are 10 documented occurrences of dwarf downingia within the Plan Area. All occurrences are outside of the UDA, with eight occurrences in PPU 6 and two occurrences in PPU 7.

Model Assumptions

- Soil types known to support dwarf downingia in the Plan Area include Amador-Gillender complex, 2% to 15% slopes; Clear Lake clay, partially drained, 0 to 2% slopes, frequently flooded; Corning complex, 0 to 8% slopes; Hadselville-Pentz complex, 2% to 30% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.
- Dwarf downingia is known to occupy commonly occurring, smaller and/or shallower vernal pools but has also been found at the margins of larger or deeper vernal pools.

- Valley Grasslands are necessary to support the Vernal Pool and Swale land cover types that dwarf downingia occupies.

Dwarf Downingia Modeled Habitat:

Modeled habitat for dwarf downingia is considered to be all Vernal Pool, Swale, and Valley Grassland land cover on Amador-Gillender complex, 2% to 15% slopes; Clear Lake clay, partially drained, 0 to 2% slopes, frequently flooded; Corning complex, 0 to 8% slopes; Durixeralfs-Galt complex, 0 to 2% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.

Figure 3-5 illustrates the location of modeled habitat as well as documented occurrences of dwarf downingia within the Plan Area.

Legenere (*Legenere limosa*)

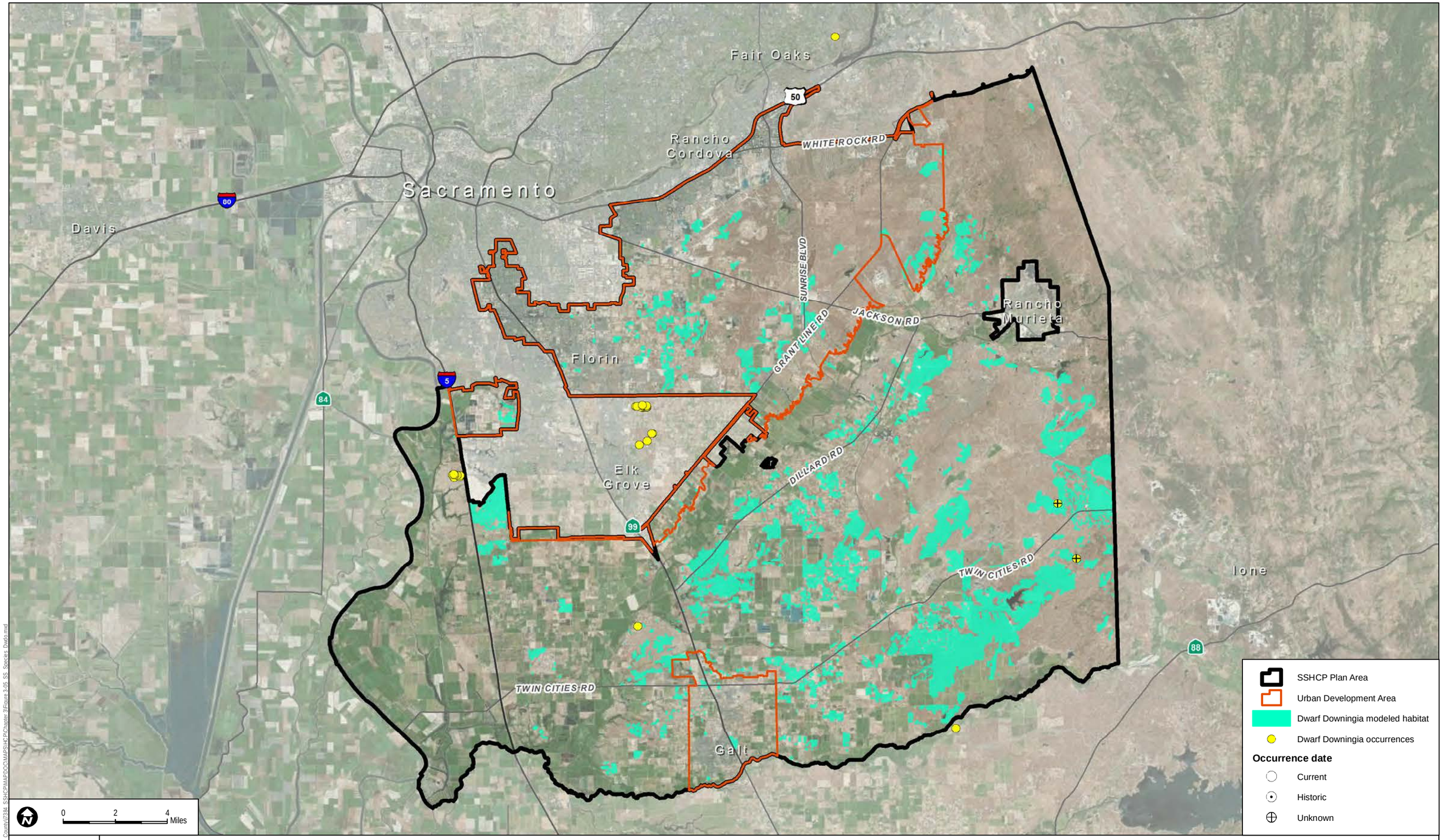
Habitat Requirements

Legenere grows in well-developed vernal pools and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies (small lakes, ponds, stock ponds), and basins within seasonal drainages (CDFG 2010; Holland 1983). Topographical position within pools and associated plant species indicate tolerance of, or preference for, the more extreme (longer-duration) inundation regimes encountered in vernal wetlands (Dittes and Guardino, as cited in SSHCP Appendix B).

Plan Permittee analysis of documented occurrences suggests that in Sacramento County, legenere documented occurrences are associated with Clear Lake clay, Corning complex, Creviscreek sandy loam, Dierssen sandy clay loam, Dierssen clay loam, Fiddyment fine sandy loam, Hadselville-Pentz complex, Hedge loam, Hicksville loam, Hicksville gravelly loam, Liveoak sandy clay loam, Madera loam, Natomas loam, Red Bluff loam, Red Bluff-Redding complex, Redding gravelly loam, San Joaquin silt loam, San Joaquin-Galt complex, Xerorthents, and dredge tailings.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat based on life history descriptions are Vernal Pool and Seasonal Wetland (Table 3-2). Because Vernal Pools and Seasonal Wetlands are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.



SOURCE: Bing Maps 2015, County of Sacramento 2015
CDFG 2012, Gibson & Skordal 1994, TNC

FIGURE 3-5

Dwarf Downingia Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2394 SSHCP\MAPS\HCP\Chapter 3\Figure 3-05_SS_Species_Dwrfn.mxd

INTENTIONALLY LEFT BLANK

Occurrences within the Plan Area

There are 62 documented occurrences of legenere in the Plan Area. Thirty-six are located within the UDA including 20 within PPU 1, seven in PPU 2, seven in PPU 3, one in PPU 4 and one is not within a PPU. There are 26 occurrences outside of the UDA, including 1 in PPU 5, 16 in PPU 6, and 9 in PPU 7.

Model Assumptions

- Soil types at documented legenere occurrences in the Plan Area include Clear Lake clay, partially drained, 0 to 2% slopes, frequently flooded; Corning complex, 0 to 8% slopes; Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Fiddyment fine sandy loam, 1% to 8% slopes; Hedge loam, 0 to 2% slopes; Madera-Galt complex, 0 to 2% slopes; Red Bluff loam, 0 to 2% slopes; Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.
- Legenere grows in well-developed vernal pools, as well as along the seasonally fluctuating margins of more permanent water bodies and basins within seasonal drainages (Holland 1983; CDFG 2010).
- Legenere has been reported to inhabit vernal wetlands ranging in size from 40 square feet to 100 acres (Holland 1983).
- Valley Grasslands are necessary to support the Vernal Pool and Seasonal Wetland land cover types that legenere occupies.

Legenere Modeled Habitat

Modeled habitat for legenere is considered to be all Vernal Pool, Seasonal Wetland, and Valley Grassland land cover types on Clear Lake clay, partially drained, 0 to 2% slopes; frequently flooded, Corning complex, 0 to 8% slopes; Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Fiddyment fine sandy loam, 1 to 8% slopes; Hedge loam, 0 to 2% slopes; Madera-Galt complex, 0 to 2% slopes; Red Bluff loam, 0 to 2% slopes; Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.

Figure 3-6 illustrates the location of modeled habitat as well as documented occurrences of legenere within the Plan Area.

Pincushion Navarretia (*Navarretia myersii*)

Habitat Requirements

Pincushion navarretia is a strict vernal pool endemic. Pincushion navarretia occupies more commonly occurring, smaller and/or shallower vernal pools with comparatively more "flashy" hydrology (Dittes and Guardino, as cited in SSHCP Appendix B).

Plan Permittee analysis of documented occurrences suggests that in Sacramento County, documented pincushion navarretia occurrences are associated with Amador-Gillender complex, Corning complex, Corning-Redding complex, Creviscreek sandy loam, Hadselville-Pentz complex, Hicksville sandy clay loam, Pardee-Rancho Seco complex, Pentz-Lithic Xerorthents complex, and Redding gravelly loam soil types.

Land Cover Types Relevant to Habitat Requirements

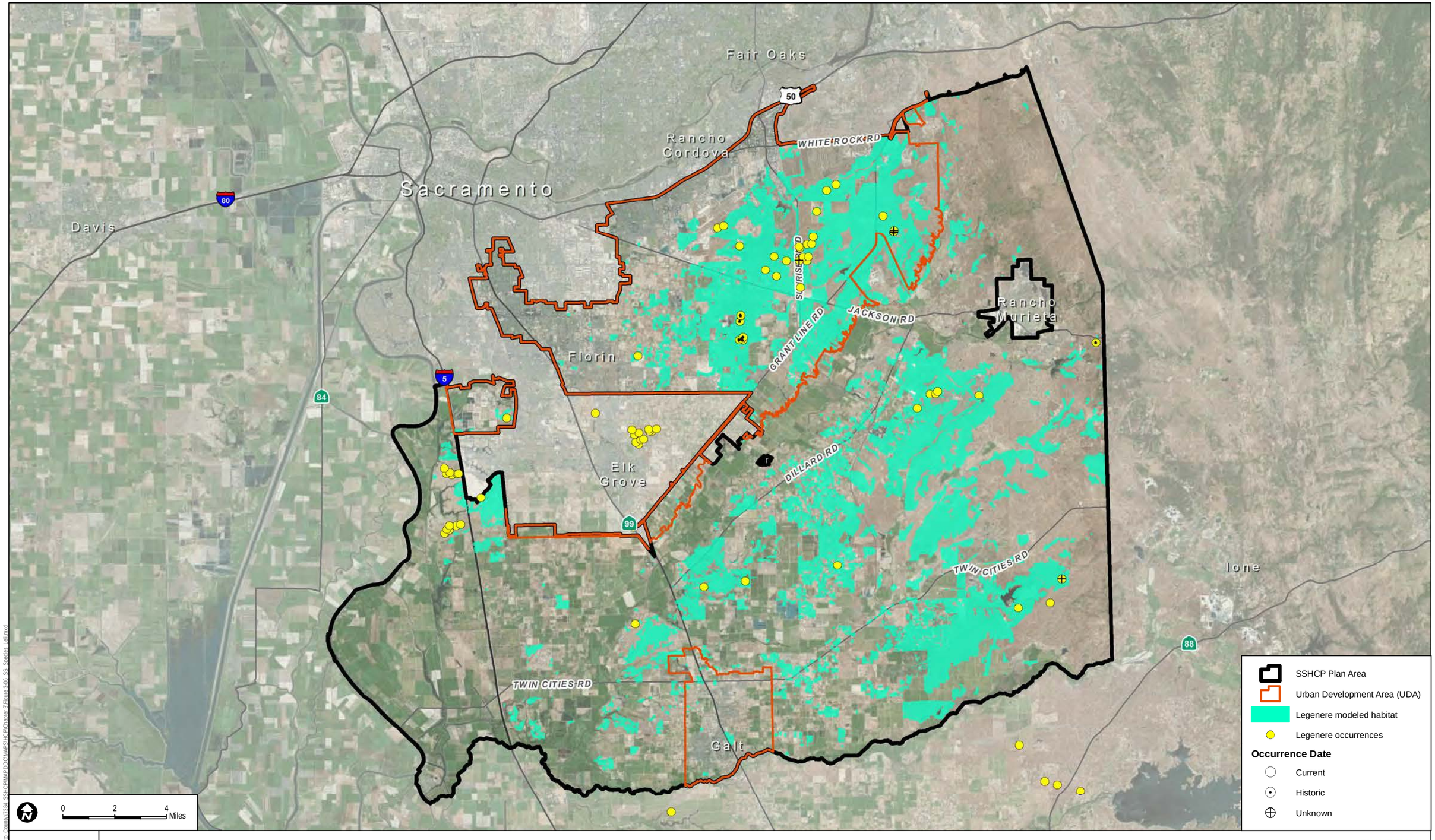
SSHCP land cover types that provide suitable habitat based on life history descriptions are Vernal Pool and Swale. Vernal pools are their primary habitat in the Plan Area. Swales may also provide suitable habitat as pincushion navarretia appears to prefer short inundation periods (Table 3-2). Because Vernal Pools and Swales are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are 48 documented occurrences of pincushion navarretia in the Plan Area. All 48 occurrences are located in PPU 7 outside of the UDA.

Model Assumptions

- Soil types known to support pincushion navarretia occurrences in the Plan Area include Amador-Gillender complex, 2% to 15% slopes; Corning complex, 0 to 8% slopes; Corning-Redding complex, 8 to 30% slopes; Creviscreek sandy loam, 0 to 3% slopes; Hadselville-Pentz complex, 2% to 30% slopes; Hicksville sandy clay loam, 0 to 2% slopes; occasionally flooded, Pardee-Rancho Seco complex, 3% to 15% slopes; Pentz-Lithic Xerorthents complex, 30% to 50% slopes; Peters clay, 1% to 8% slopes; and Redding gravelly loam, 0 to 8% slopes.
- Pincushion navarretia occupies small to medium size vernal pool types and the margins of larger and/or deeper pools.
- Valley Grasslands are necessary to support the Vernal Pool and Swale land cover types that pincushion navarretia occupies.



SOURCE: Bing Maps, County of Sacramento 2015, CDFG 2012

FIGURE 3-6

Legenere Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7206 SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-6 SS_Species_Lst.mxd

INTENTIONALLY LEFT BLANK

Pincushion Navarretia Modeled Habitat

Modeled habitat for pincushion navarretia is considered to be all Vernal Pool, Swale, and Valley Grassland land cover types on Amador-Gillender complex, 2% to 15% slopes; Corning complex, 0 to 8% slopes; Corning-Redding complex, 8% to 30% slopes; Creviscreek sandy loam, 0 to 3% slopes; Hadselville-Pentz complex, 2% to 30% slopes; Hicksville sandy clay loam 0 to 2% slopes; Pardee-Ranchoseco complex, 3% to 15% slopes; Pentz-Lithic Xerorthents complex, 30% to 50% slopes; and Redding gravelly loam, 0 to 8% slopes.

Figure 3-7 illustrates the location of modeled habitat as well as documented occurrences of pincushion navarretia within the Plan Area.

Sacramento Orcutt Grass (*Orcuttia viscida*)

Habitat Requirements

Sacramento Orcutt grass is a strict vernal pool endemic. Sacramento Orcutt grass appears to be the most specific of the genus Orcuttia with regard to niche breadth, as indicated by restriction to the largest of pools (Stone et al. 1988).

Plan Permittee analysis of documented occurrences suggests that in Sacramento County, Sacramento Orcutt grass is associated with Corning complex; Hicksville sandy clay loam; Red Bluff-Redding complex; and Redding gravelly loam soil types.

Land Cover Types Relevant to Habitat Requirements

The SSHCP land cover type that provides suitable habitat based on life history descriptions is vernal pool (Table 3-2). Because Vernal Pools are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are 40 documented occurrences of Sacramento Orcutt grass within the Plan Area. Of the 40 documented occurrences in the Plan Area, 10 are located within the UDA, including 8 within PPU 1 and 2 within PPU 3. Thirty are outside of the UDA, including 28 within PPU 1 and two within PPU 7.

Model Assumptions

- Soil types known to support Sacramento Orcutt grass occurrences in the Plan Area include Corning complex, 0 to 8% slopes; Hicksville sandy clay loam, 0 to 2% slopes; Red Bluff-Redding complex, 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes soil types.

- Sacramento Orcutt grass occupies medium to large size vernal pool types.
- Valley Grasslands are necessary to support the Vernal Pools that Sacramento Orcutt grass occupies.

Sacramento Orcutt Grass Modeled Habitat

Modeled habitat for Sacramento Orcutt grass is considered to be all Vernal Pools and Valley Grassland land cover types on Corning complex, 0 to 8% slopes; Hicksville sandy clay loam, 0 to 2% slopes; Red Bluff-Redding complex, 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes soil types.

Figure 3-8 illustrates the location of modeled habitat as well as documented occurrences of Sacramento Orcutt grass within the Plan Area.

Slender Orcutt Grass (*Orcuttia tenuis*)

Habitat Requirements

Slender Orcutt grass is a strict vernal pool endemic. It is strongly adapted to the hydrologic cycles encountered in the deeper spectrum of vernal pool types, e.g., they are typically associated with larger or deeper vernal pools that tend to possess more extreme regimes of inundation (Crampton 1959; Griggs 1974).

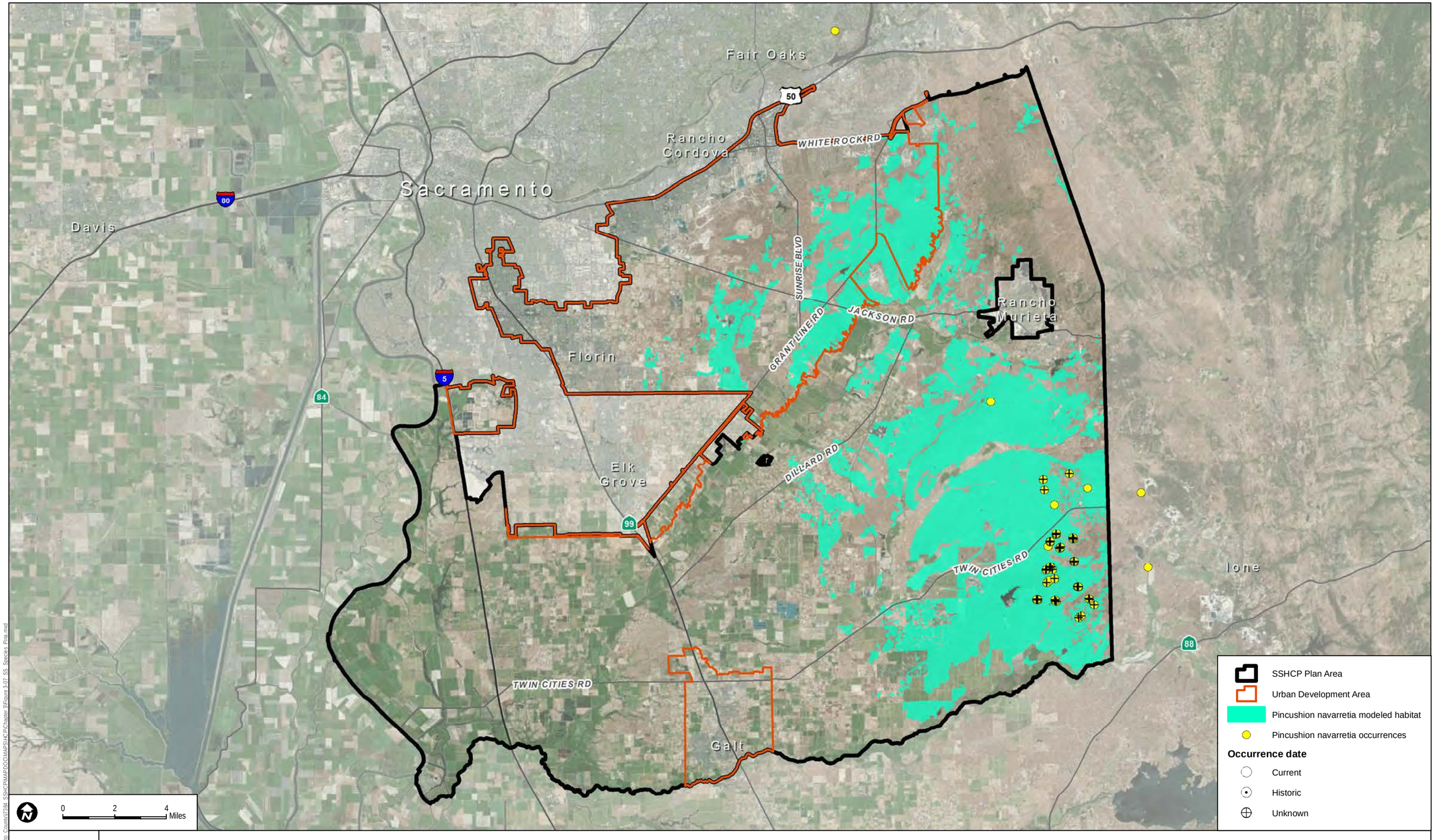
Plan Permittee analysis of documented occurrences suggests that in Sacramento County, documented occurrences of slender Orcutt grass are associated with Redding gravelly loam soil types.

Land Cover Types Relevant to Habitat Requirements

The SSHCP land cover type that provides suitable habitat based on life history descriptions is vernal pool (Table 3-2). Because Vernal Pools are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are four documented occurrences of slender Orcutt grass within the Plan Area. All four occurrences are in the UDA with one in PPU 1 and three in PPU 3.



SOURCE: Bing Maps, County of Sacramento 2015, CDFG 2012, TNC

FIGURE 3-7

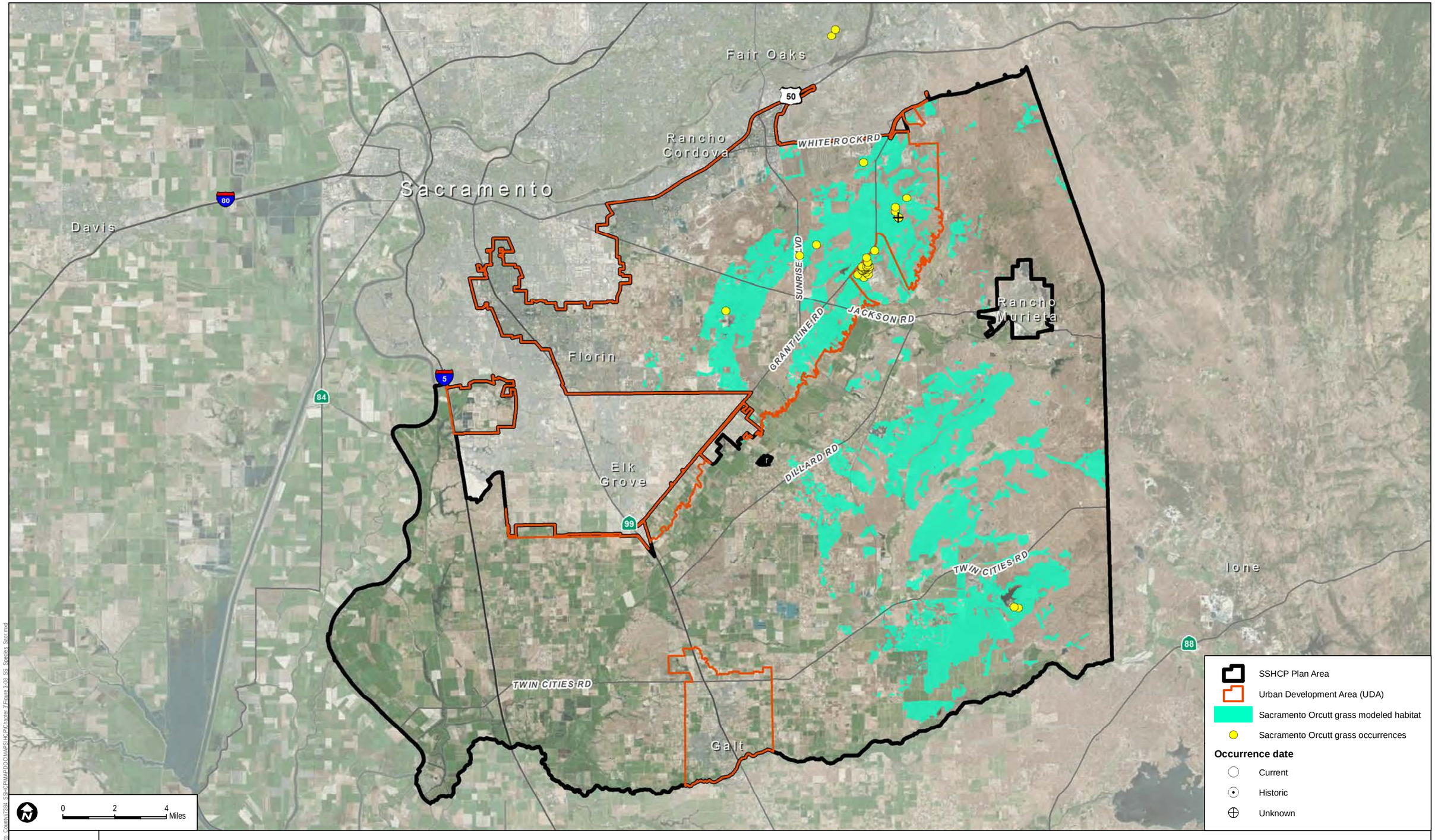
Pincushion Navarretia Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7208_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-07_SS_Species_Pins.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE 3-8

Sacramento Orcutt Grass Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7208 SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-08 SS Species Stsr.mxd

INTENTIONALLY LEFT BLANK

Model Assumptions

- Soil types known to support slender Orcutt grass in the Plan Area include Redding gravelly loam, 0 to 8% slopes.
- Slender Orcutt grass occupies medium to large size vernal pool types.
- Valley Grasslands are necessary to support the Vernal Pools that slender Orcutt grass occupies.

Slender Orcutt Grass Modeled Habitat

Modeled habitat for slender Orcutt grass is all Vernal Pool and Valley Grassland land cover types on Redding gravelly loam, 0 to 8% slopes.

Figure 3-9 illustrates the location of modeled habitat as well as documented occurrences of slender Orcutt grass within the Plan Area.

Sanford's Arrowhead (*Sagittaria sanfordi*)

Habitat Requirements

Sanford's arrowhead is associated with freshwater wetland hydrology. This includes emergent wetlands as well as the margins of rivers, streams, ponds, reservoirs, irrigation and drainage canals and ditches, and stock-ponds. Sanford's arrowhead is occasionally reported to occur in Seasonal Wetland with sufficient ponding period to support emergent wetland species. All freshwater emergent wetlands, natural, modified, and built/created, regardless of landform association, should be considered potentially suitable habitat for Sanford's arrowhead.

Land Cover Types Relevant to Habitat Requirements

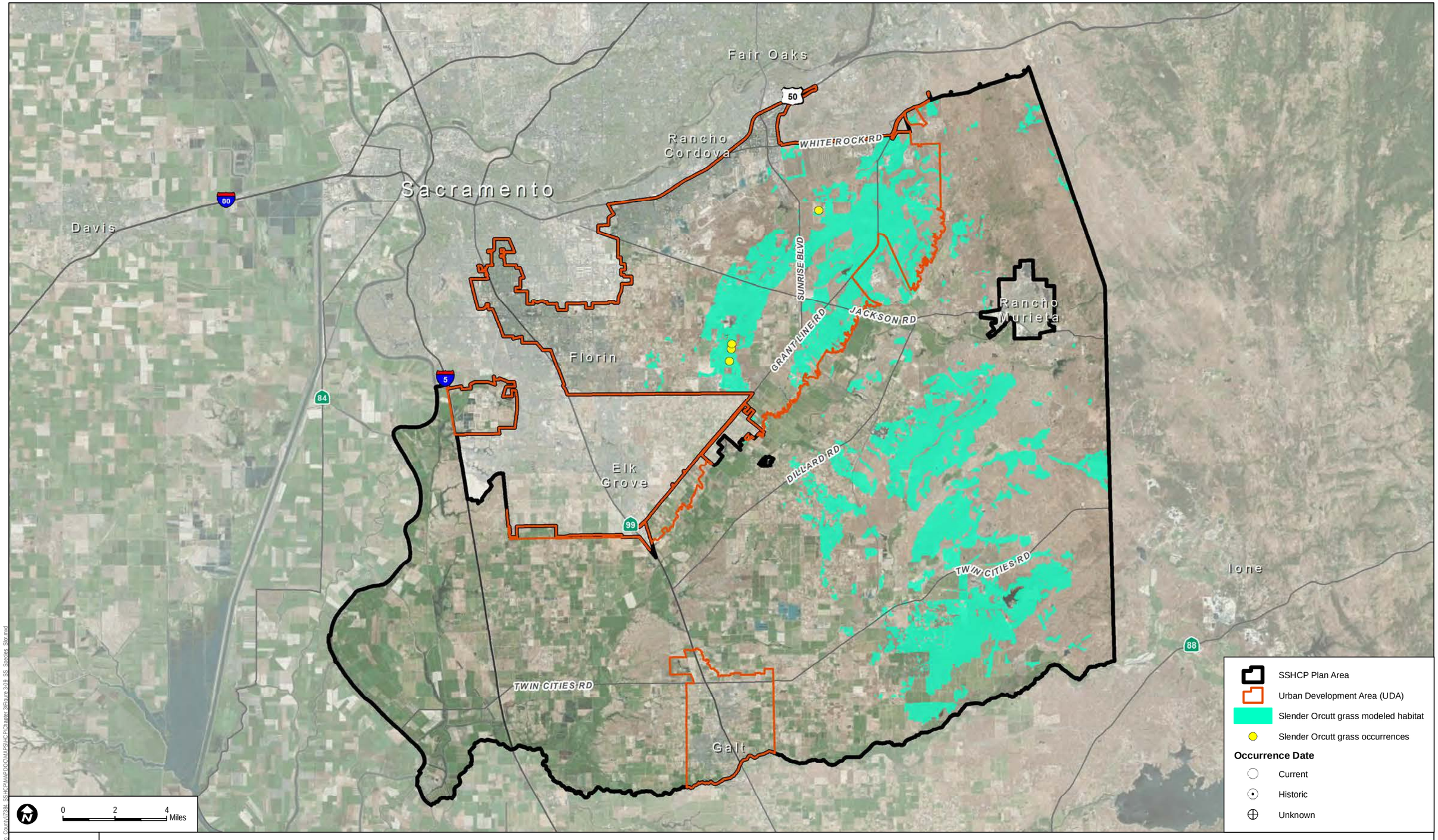
SSHCP land cover types that provide suitable habitat based on life history descriptions are Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek (Table 3-2). Because Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek land cover types are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are 64 documented occurrences of Sanford's arrowhead in the Plan Area. Fifteen occurrences are located in the UDA with three in PPU 2, two in PPU 3, one in PPU 4, and nine that are not within a PPU. Forty-nine occurrences are located outside of the UDA with three in PPU 5, 42 in PPU 6, three in PPU 7, and one that is not within a PPU.

Model Assumptions

- Soil types known to support Sanford's arrowhead in the Plan Area include Argonaut-Auburn complex, 3% to 8% slopes; Clear Lake clay, partially drained, 0 to 2% slopes frequently flooded; Columbia sandy loam, partially drained, 0 to 2% slopes; Columbia sandy loam, drained, 0 to 2% slopes, occasionally flooded; Cosumnes silt loam, drained, 0 to 2% slopes, occasionally flooded; Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Dierssen clay loam, deep, drained, 0 to 2% slopes; Durixeralfs, 0 to 1% slopes; Egbert clay, partially drained, 0 to 2% slopes; Egbert clay, partially drained, 0 to 2% slopes, frequently flooded; Fiddyment fine sandy loam, 1% to 8% slopes; Fluvaquents, 0 to 2% slopes, frequently flooded; Hedge loam, 0 to 2% slopes; Hicksville loam, 0 to 2% slopes, occasionally flooded; Hicksville gravelly loam, 0 to 2% slopes, occasionally flooded; Kimball-Urban land complex, 0 to 2% slopes; Liveoak sandy clay loam, 0 to 2% slopes, occasionally flooded; Madera loam, 2% to 8% slopes; Mokelumne-Pits mine complex, 15% to 50% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding loam, 2% to 8% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, leveled, 0 to 1% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin silt loam, 3% to 8% slopes; San Joaquin-Galt complex, leveled, 0 to 1% slopes; San Joaquin-Urban land complex, 0 to 2% slopes; San Joaquin-Xerarents complex, leveled, 0 to 1% slopes; Reiff fine sandy loam, 0 to 2% slopes, occasionally flooded; Scribner clay loam, partially drained, 0 to 2% slopes; and Tinnin loamy sand, 0 to 2% slopes.
- Sanford's arrowhead is strictly associated with wetland systems supporting emergent marsh vegetation, both naturally occurring and built/created.
- Valley Grasslands are necessary to support the Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek that Sanford's arrowhead occupies.



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE 3-9

Slender Orcutt Grass Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7295 SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-09 SS Species Slor.mxd

INTENTIONALLY LEFT BLANK

Sanford's Arrowhead Modeled Habitat

Modeled habitat for Sanford's arrowhead is all Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek associated with Argonaut-Auburn complex, 3% to 8% slopes; Clear Lake clay, partially drained, 0 to 2% slopes frequently flooded; Columbia sandy loam, partially drained, 0 to 2% slopes; Columbia sandy loam, drained, 0 to 2% slopes, occasionally flooded; Cosumnes silt loam, drained, 0 to 2% slopes, occasionally flooded; Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Dierssen clay loam, deep, drained, 0 to 2% slopes; Durixeralfs, 0 to 1% slopes; Egbert clay, partially drained, 0 to 2% slopes; Egbert clay, partially drained, 0 to 2% slopes, frequently flooded; Fiddyment fine sandy loam, 1% to 8% slopes; Fluvaquents, 0 to 2% slopes, frequently flooded; Hedge loam, 0 to 2% slopes; Hicksville loam, 0 to 2% slopes, occasionally flooded; Hicksville gravelly loam, 0 to 2% slopes, occasionally flooded; Kimball-Urban land complex, 0 to 2% slopes; Liveoak sandy clay loam, 0 to 2% slopes, occasionally flooded; Madera loam, 2% to 8% slopes; Mokelumne-Pits mine complex, 15% to 50% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding loam, 2% to 8% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, leveled, 0 to 1% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin silt loam, 3% to 8% slopes; San Joaquin-Galt complex, leveled, 0 to 1% slopes; San Joaquin-Urban land complex, 0 to 2% slopes; San Joaquin-Xerarents complex, leveled, 0 to 1% slopes; Reiff fine sandy loam, 0 to 2% slopes, occasionally flooded; Scribner clay loam, partially drained, 0 to 2% slopes; and Tinnin loamy sand, 0 to 2% slopes.

Figure 3-10 illustrates the location of modeled habitat as well as documented occurrences of Sanford's arrowhead within the Plan Area.

3.4.2 Invertebrate Covered Species Modeled Habitat

Mid-Valley Fairy Shrimp (*Branchinecta mesovallensis*)

Habitat Requirements

This small vernal pool crustacean is entirely dependent upon the aquatic environment provided by vernal pool ecosystems. Mid-valley fairy shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetland characteristics are dependent upon the surrounding uplands (Rogers, as cited in SSHCP Appendix B).

Mid-valley fairy shrimp are typically in Central Valley California floristic provinces below 300 meters in elevation. Typical habitat for mid-valley fairy shrimp in California includes vernal pools and seasonally ponded areas within vernal swales (Eng et al. 1990).

Optimal mid-valley fairy shrimp habitat tends to be small vernal pools, with an abbreviated hydroperiod, neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated

with vernal pool plants, and sustains a complex vernal pool crustacean community (Eriksen and Belk 1999; Rogers 1998).

Land Cover Types Relevant to Habitat Requirements

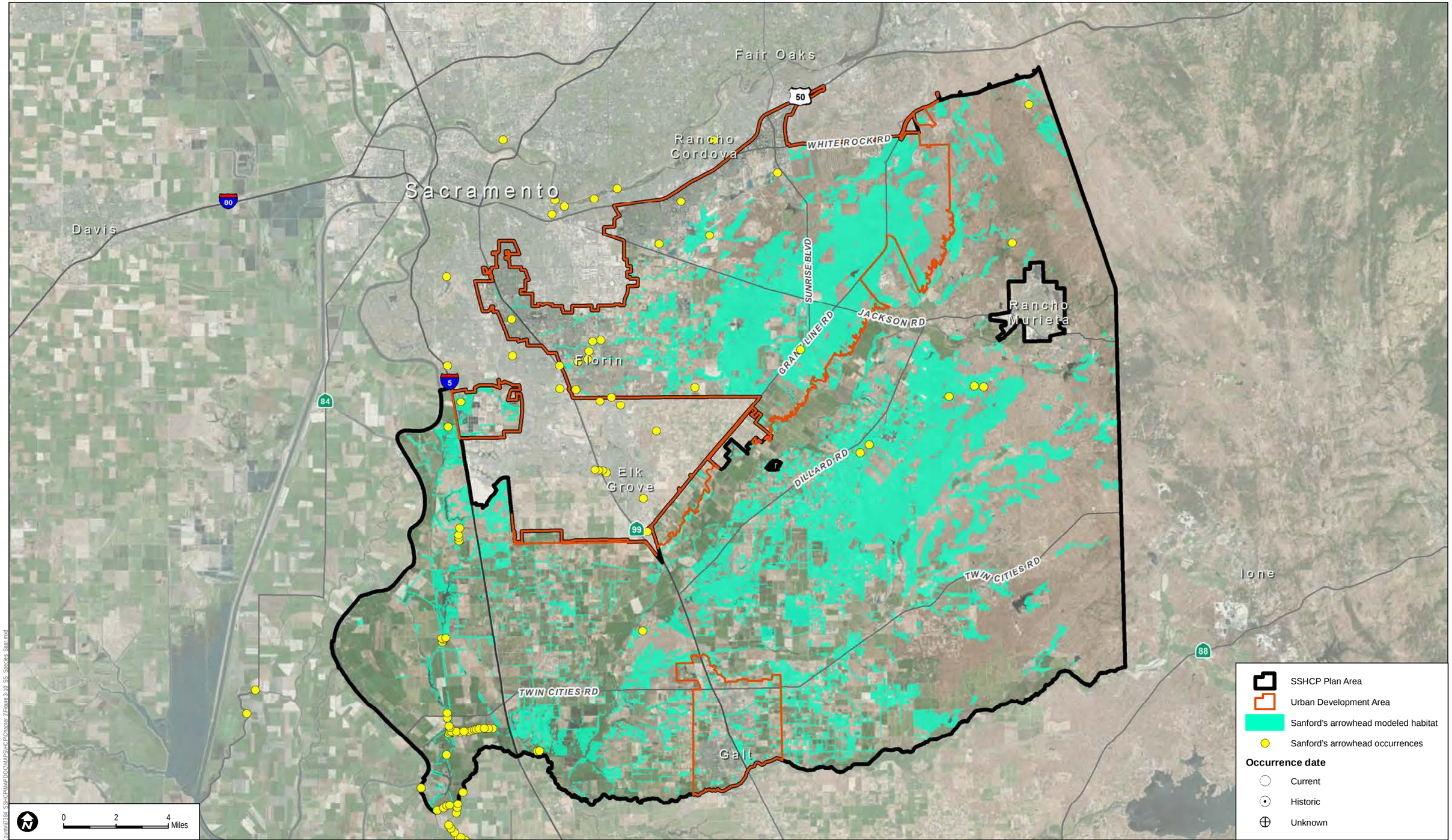
SSHCP land cover types that provide suitable habitat based on life history descriptions include Vernal Pool and Swale. Vernal pools are considered primary habitat in the Plan Area. Swales are considered suitable habitat as they provide connectivity between vernal pool cover types and facilitate the transport of genetic material from one location to another (Table 3-2).). Because Vernal Pools and Swales are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are 37 documented occurrences of mid-valley fairy shrimp located within the Plan Area. Twenty-two are located within the UDA including 10 in PPU 2, 9 in PPU 3, 2 in PPU 8, and 1 that is not within a PPU. Fifteen are located outside of the UDA, including nine in PPU 6 and six within PPU 7.

Model Assumptions

- Soil types known to support mid-valley fairy shrimp in the Plan Area include Bruella sandy loam, 0 to 2% slopes; Capay clay loam, 0 to 2% slopes, occasionally flooded; Clear Lake clay, hardpan substratum, drained, 0 to 1% slopes; Clear Lake clay, partially drained, 0 to 2% slopes; frequently flooded; Creviscreek sandy loam, 0 to 3% slopes; Durixeralfs-Gat complex, 0 to 2% slopes; Durixeralfs, 0 to 1% slopes; Fiddyment fine sandy loam, 1% to 8% slopes; Galt clay, 0 to 2% slopes; Hedge loam, 0 to 2% slopes; Hicksville loam, 0 to 2% slopes occasionally flooded; Kimball-silt loam, 0 to 2% slopes; Madera loam, 0% to 2% slopes; Natomas loam, 0 to 2 percent slopes; Red Bluff-Redding complex, 0 to 5% slopes; Red Bluff-Xerarents complex, 0 to 2% slopes; Red Bluff loam, 0 to 2% slopes; Red Bluff loam, 2 to 5% slopes; Redding gravelly loam, 0 to 8% slopes; Sailboat silt loam, drained, 0 to 2% slopes, occasionally flooded; San Joaquin-Durixeralfs complex, 0 to 1 percent slopes; San Joaquin-Galt complex, 0 to 3% slopes; San Joaquin-Galt complex, leveled, 0 to 1% slopes; San Joaquin-Xerarents complex, leveled, 0 to 1% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin silt loam, 3 to 8% slopes; San Joaquin silt loam, leveled, 0 to 1% slopes; Vleck gravelly loam, 2 to 15% slopes; Xerarents-Redding complex, 0 to 2% slopes; Xerarents-San Joaquin complex, 0 to 1% slopes.
- SSHCP land cover types that provide suitable habitat based on life history descriptions are all Vernal Pool and all Swale land cover.
- Valley Grasslands are necessary to support the Vernal Pool and Swale land cover types that mid-valley fairy shrimp occupies.



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE 3-10

Sanford's Arrowhead Modeled Habitat and Documented Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2304_SSHCP\MAPS\OLMAPS\HCP\Chapter 3\Figure 3-10_SS_Species_Stan.mxd

INTENTIONALLY LEFT BLANK

Mid-Valley Fairy Shrimp Modeled Habitat

Modeled habitat for mid-valley fairy shrimp is all Vernal Pool, Swale, and Valley Grassland land cover types associated with Bruella sandy loam, 0 to 2% slopes; Capay clay loam, 0 to 2% slopes, occasionally flooded; Clear Lake clay, hardpan substratum, drained, 0 to 1% slopes; Clear Lake clay, partially drained, 0 to 2% slopes; frequently flooded; Creviscreek sandy loam, 0 to 3% slopes; Durixeralfs-Gat complex, 0 to 2% slopes; Durixeralfs, 0 to 1% slopes; Fiddyment fine sandy loam, 1% to 8% slopes; Galt clay, 0 to 2% slopes; Hedge loam, 0 to 2% slopes; Hicksville loam, 0 to 2% slopes occasionally flooded; Kimball-silt loam, 0 to 2% slopes; Madera loam, 0% to 2% slopes; Natomas loam, 0 to 2 percent slopes; Red Bluff-Redding complex, 0 to 5% slopes; Red Bluff-Xerarents complex, 0 to 2% slopes; Red Bluff loam, 0 to 2% slopes; Red Bluff loam, 2 to 5% slopes; Redding gravelly loam, 0 to 8% slopes; Sailboat silt loam, drained, 0 to 2% slopes, occasionally flooded; San Joaquin-Durixeralfs complex, 0 to 1% slopes; San Joaquin-Galt complex, 0 to 3% slopes; San Joaquin-Galt complex, leveled, 0 to 1% slopes; San Joaquin-Xerarents complex, leveled, 0 to 1% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin silt loam, 3% to 8% slopes; San Joaquin silt loam, leveled, 0 to 1% slopes; Vleck gravelly loam, 2% to 15% slopes; Xerarents-Redding complex, 0 to 2% slopes; Xerarents-San Joaquin complex, 0 to 1% slopes throughout the Plan Area.

Figure 3-11 illustrates the location of modeled habitat as well as the documented occurrences of mid-valley fairy shrimp within the Plan Area.

Ricksecker's Water Scavenger Beetle (*Hydrochara rickseckeri*)

Habitat Requirements

This vernal pool insect is entirely dependent upon the aquatic environment provided by vernal pool. The Ricksecker's water scavenger beetle depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetland characteristics are dependent upon the surrounding uplands (Rogers, as cited in SSHCP Appendix B).

Vernal pools supporting Ricksecker's water scavenger beetle are typically in Central Valley California floristic provinces below 300 meters in elevation. Collection records suggest that the Ricksecker's water scavenger beetle is not sensitive to the size of vernal pools, and uses both vernal pools and swales, as well as constructed vernal pools (Rogers pers. obs., as cited in SSHCP Appendix B)

Optimal Ricksecker's water scavenger beetle habitat tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, sustaining a complex vernal pool crustacean community (Rogers 1998).

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat, based on life history descriptions are Vernal Pool and Swale land cover types (Table 3-2). Because Vernal Pools and Swales are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are eight documented occurrences of Ricksecker's water scavenger beetle in the Plan Area. Four occurrences are located inside the all in PPU 2 and four occurrences are located outside of the UDA including one in PPU 6 and three in PPU 7.

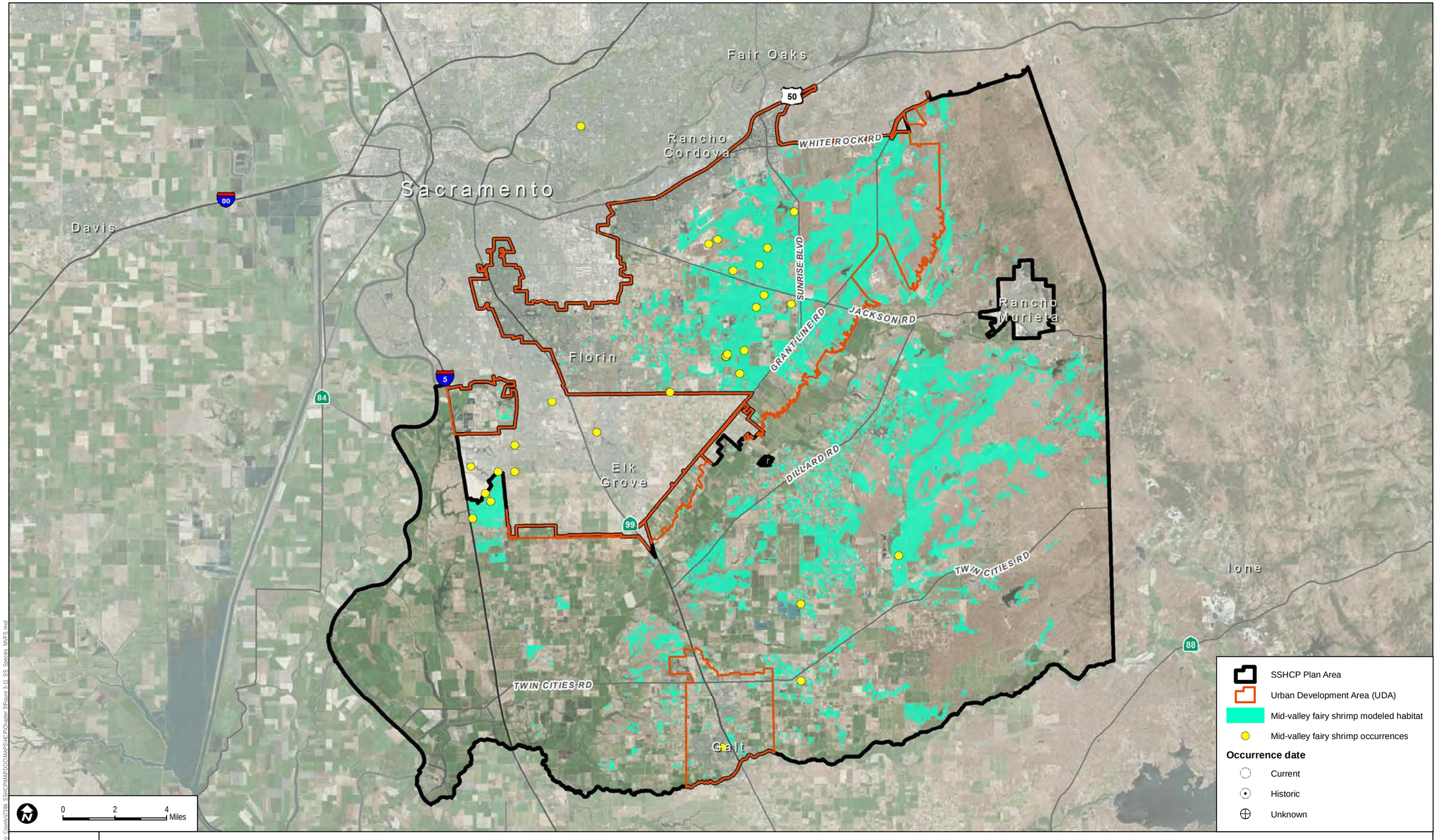
Model Assumptions

- Ricksecker's water scavenger beetle is not sensitive to the size of vernal pools or other aquatic habitats (Rogers pers. obs., as cited in SSHCP Appendix B).
- All Vernal Pool and Swale cover types are suitable habitat.
- Valley Grasslands are necessary to support the Vernal Pool and Swale land cover types that Ricksecker's water scavenger beetle occupies.

Ricksecker's Water Scavenger Beetle Modeled Habitat

Modeled habitat for Ricksecker's water scavenger beetle is all Vernal Pool, Swale, and Valley Grassland land cover types within the Plan Area.

Figure 3-12 illustrates the location of modeled habitat as well as the documented occurrences of Ricksecker's water scavenger beetle within the Plan Area.



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, Foothill Associates 2010, Kassis-Sylva 2011, Vollmar 2012

FIGURE 3-11

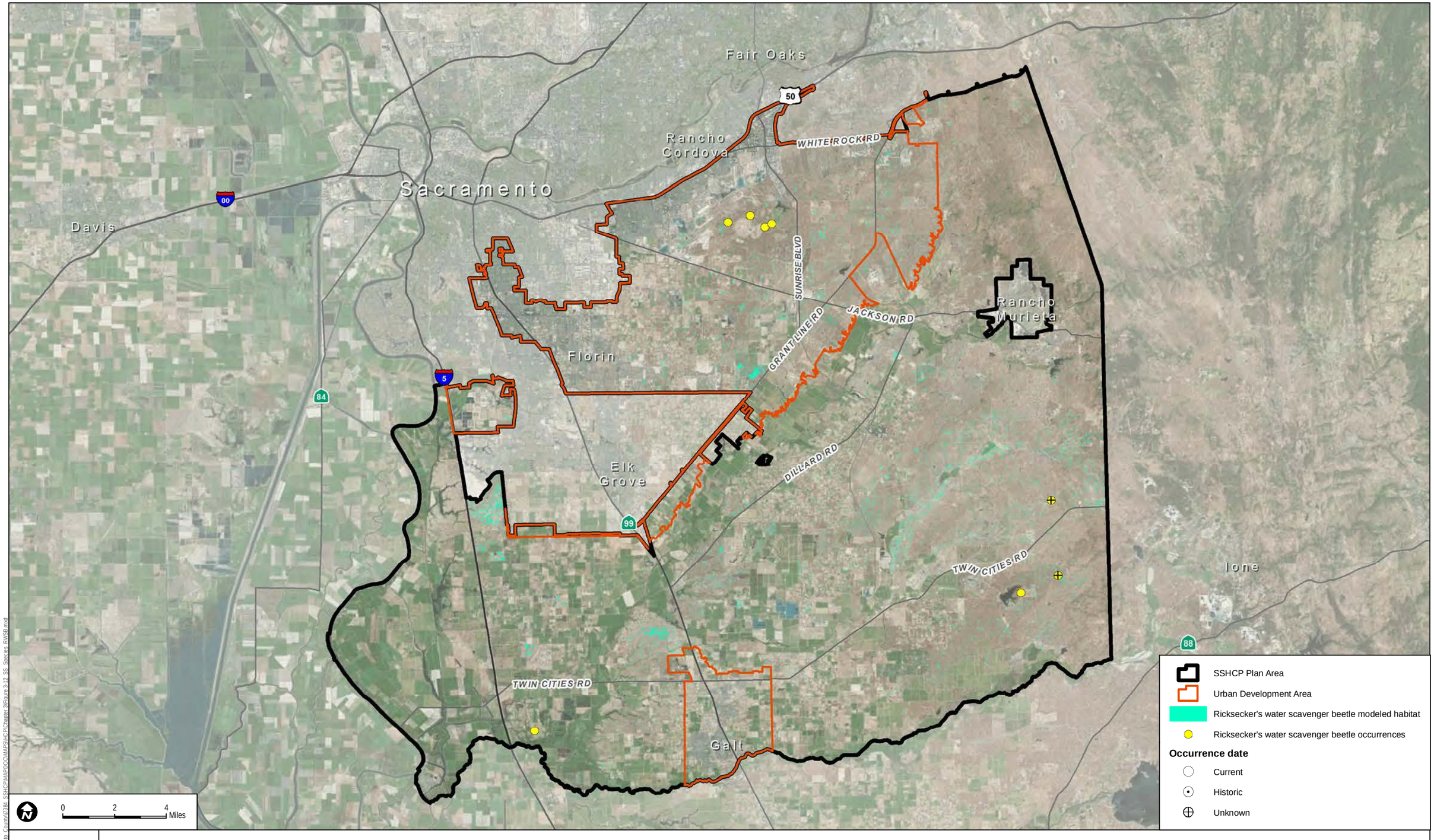
Midvalley Fairy Shrimp Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2794_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-11_SS_Species_MVFS.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, Chris Rogers 2000, TNC

FIGURE 3-12

Ricksecker's Water Scavenger Beetle Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-12_SS_Species_RWSB.mxd

INTENTIONALLY LEFT BLANK

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

Habitat Requirements

The valley elderberry longhorn beetle is completely dependent upon its host plant, the elderberry shrub, the only recorded larval host plant (*Sambucus glauca, S. mexicana, S. caerulea*) (Barr 1991; Collinge et al. 2001; Eng 1984; Linsley and Chemsak 1972, 1997). Valley elderberry longhorn beetle spends most of its life in the larval stage, living within the stems of the elderberry plant. Adults eat the elderberry foliage until about June when they mate. The females lay eggs in crevices in the bark. Upon hatching, the larvae then begin to tunnel into the elderberry shrub, where they will spend 1 to 2 years eating the interior wood, which is their sole food source. The U.S. Fish and Wildlife Service (USFWS) considers all elderberry shrubs 2.5 centimeters (1 inch) or greater diameter at ground level within the species' range to be potential habitat (USFWS 1999a). The elderberry shrub is a component of riparian forests throughout the Central Valley. Although this shrub occasionally occurs outside of riparian areas, shrubs supporting the greatest beetle densities are where the shrubs are abundant and interspersed among dense riparian forest (Barr 1991; Collinge et al. 2001; USFWS 1999a). Within the Plan Area elderberry shrubs are commonly found interspersed in Mine Tailing Riparian Woodland cover type, an important cover type for the species.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat based on life history descriptions are Mine Tailing Riparian Woodland, Mixed Riparian Woodland and Mixed Riparian Scrub (Table 3-2).

Occurrences within the Plan Area

There are 156 documented occurrences of valley elderberry longhorn beetle within the Plan Area. There is one occurrence within the UDA in PPU 1 and 155 occurrences outside the UDA including 154 within PPU 5 and one within PPU 6.

Model Assumptions

- The valley elderberry longhorn beetle is completely dependent upon the elderberry plant.
- The elderberry and the valley elderberry longhorn beetle are largely found within riparian ecosystems.
- Isolated elderberry shrubs separated from contiguous habitat provide limited habitat value.

Valley Elderberry Longhorn Beetle Modeled Habitat

Modeled habitat for valley elderberry longhorn beetle is Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Plan Area.

Figure 3-13 illustrates the location of modeled habitat as well as the documented occurrences for valley elderberry longhorn beetle within the Plan Area.

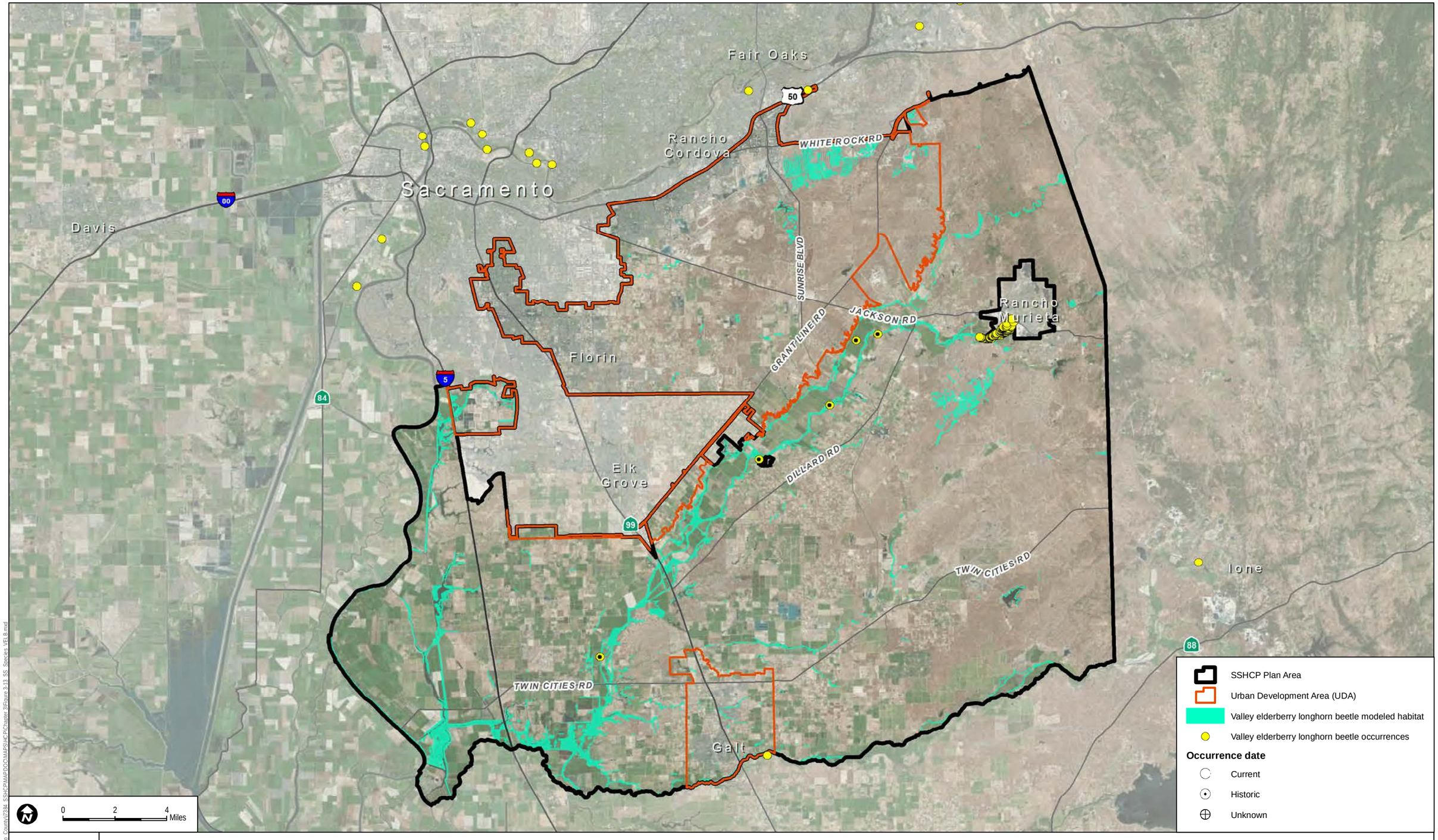
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Habitat Requirements

This small vernal pool crustacean is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. Vernal pool fairy shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer (Rogers, as cited in SSHCP Appendix B).

Habitats supporting the vernal pool fairy shrimp are typically in Central Valley California floristic provinces below 300 meters elevation. Typical habitat for vernal pool fairy shrimp in California include vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas, and alkali flats (Eng et al. 1990). Vernal pool fairy shrimp have also been found in water pooled in sandstone outcrops and in alkaline vernal pools.

Optimal habitat for vernal pool fairy shrimp tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal pool crustacean community (Eriksen and Belk 1999; Rogers 1998). Fairy shrimp occurs only in cool-water pools. Individuals hatch from cysts during cold-weather winter storms; they require water temperatures of 50^{o}F or lower to hatch (Eriksen and Belk 1999; Helm 1998). The time to maturity and reproduction is temperature-dependent, varying between 18 days and 147 days, with a mean of 40 days (Helm 1998). Pool volume is also important in determining potential shrimp habitat because deeper pools with a large surface area can more easily maintain their dissolved oxygen levels. Similarly, deeper pools will pond long enough to allow the shrimp to complete their life cycle (Rogers, as cited in SSHCP Appendix B).



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, T. Talley 2003

FIGURE 3-13

Valley Elderberry Longhorn Beetle Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2294_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-13_SS_Species_VELB.mxd

INTENTIONALLY LEFT BLANK

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat based on life history descriptions include Vernal Pool, Swale, and Stream/Creek (VPIH). Vernal pools are the species primary habitat in the Plan Area. Swales and Stream/Creek (VPIH) are considered suitable habitat as they provide connectivity between Vernal Pool cover types and facilitate the transport of genetic material from one location to another (Table 3-2). These specific vernal pool wetland characteristics are dependent on the surrounding uplands. Because Vernal Pools, Swales, and Stream/Creek (VPIH) are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.

Occurrences within the Plan Area

There are 581 documented occurrences of vernal pool fairy shrimp within the Plan Area. There are 193 located within the UDA including 30 in PPU 1, 48 in PPU 2, 95 in PPU 3, four in PPU 4, one in PPU 8, and 15 that are not within a PPU. There are 388 occurrences outside of the UDA including 26 in PPU 1, 11 in PPU 5, 26 in PPU 6, 324 in PPU 7, and one that is not within a PPU.

Model Assumptions

- Vernal pool fairy shrimp are widely distributed throughout the Plan Area, although they appear to be more abundant outside of the Urban Development Area (UDA) than inside the UDA.
- All Vernal Pool and Swale cover types are suitable habitat.
- A select group of ephemeral steams or portions of those streams in this Plan Area are considered suitable habitat.
- Valley Grasslands are necessary to support the Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types that vernal pool fairy shrimp occupies.

Vernal Pool Fairy Shrimp Modeled Habitat

Modeled habitat for vernal pool fairy shrimp is all vernal Pool, Swale, Stream/Creek (VPIH), and Valley Grassland throughout the Plan Area.

Figure 3-14 illustrates the location of modeled habitat as well as the documented occurrences of vernal pool fairy shrimp within the Plan Area.

Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

Habitat Requirements

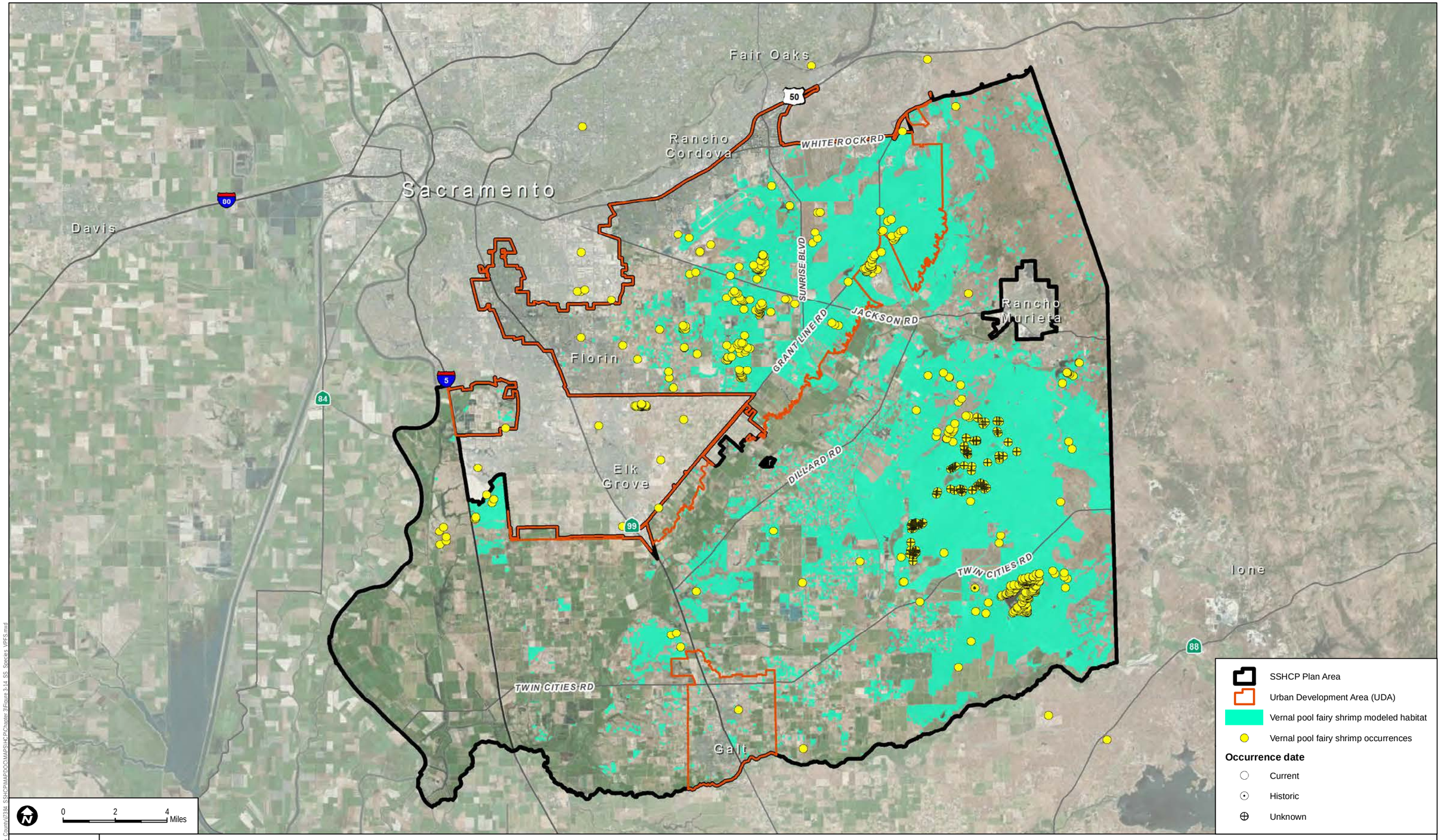
This small vernal pool crustacean is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. Vernal pool tadpole shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetland characteristics are dependent upon the surrounding uplands.

Habitats supporting the Vernal pool tadpole shrimp are typically in Central Valley California floristic provinces below 300 meters in elevation. Typical habitat for vernal pool tadpole shrimp in California includes vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas, and alkali flats (Eriksen and Belk 1999; Rogers 2001). Vernal pool tadpole shrimp have also been found in alkaline vernal pools.

Optimal habitat for vernal pool tadpole shrimp tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal pool crustacean community (Eriksen and Belk 1999). Pool volume is also important in determining potential shrimp habitat because deeper pools with a large surface area can more easily maintain their dissolved oxygen levels. Similarly, deeper pools will pond long enough to allow the shrimp to complete their life cycle. Occupied pools may have aquatic vegetation that may provide shelter from predators and range in size from 54 square feet to 84 acres (59 Federal Register 48136–48153). Although the tadpole shrimp is found on a variety of geologic formations and soil types, Helm (1998) found that, throughout the range, more than 50% of tadpole shrimp occurrences were on High Terrace, also known as old terrace landforms and Laguna Formation Redding and Corning soils. In the Plan Area, vernal pool tadpole shrimp has been observed in many of the vernal streams in the UDA (Adelsbach, pers. comm. 2013).These are mapped by the Permittees as the “Creek/Stream VPIH” land cover.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat based on life history descriptions include Vernal Pool, Swale, and Stream/Creek (VPIH). Vernal pools are considered the species primary habitat in the Plan Area. Swale and Stream/Creek (VPIH) land cover types are considered suitable habitat as they provide connectivity between the Vernal Pool land cover type and facilitate the transport of genetic material from one location to another (Table 3-2). These specific Vernal Pool Wetland characteristics are dependent on the surrounding uplands. Because Vernal Pools, Swales, and Stream/Creek (VPIH) are dependent on surrounding uplands, the Valley Grassland land cover type is also considered suitable habitat for this species.



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, ECORP 2009, EcoAnalysts 2008, Foothill Associates 2011, Helm 2007, Kassis-Sylva 2011, Gibson & Skordal 1994, Sugnet 1996, Richard Hill 1999 Kiefer 2011, LSA 2011, Vollmar 2011, USFWS 2014, Wildlands 2010

FIGURE 3-14

Vernal Pool Fairy Shrimp Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2394_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-14_SS_Species_VPFS.mxd

INTENTIONALLY LEFT BLANK

Occurrences within the Plan Area

There are 851 documented occurrences of vernal pool tadpole shrimp within the Plan Area. Of the 851 documented occurrences, 587 are within the UDA including 266 in PPU 1, 145 in PPU 2, 147 in PPU 3, six in PPU 4, four in PPU 8, and 19 that are not within a PPU. There are 264 occurrences outside of the UDA including 42 in PPU 1, 26 in PPU 6, 194 in PPU 7, and two that are not within a PPU.

Model Assumptions

- Vernal pool tadpole shrimp are widely distributed throughout the Plan Area, although they appear to be more abundant within the Urban Development Area (UDA) than outside the UDA.
- All Vernal Pool, Vernal Stream, and Swale cover types are suitable habitat.
- A select group of ephemeral steams or portions of those streams in the Plan Area are considered suitable habitat (classified as Stream/Creek (VPIH)).
- Valley Grasslands are necessary to support the Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types that vernal pool tadpole shrimp occupies.

Vernal Pool Tadpole Shrimp Modeled Habitat

Modeled habitat for vernal pool tadpole shrimp is all Vernal Pool, Swale, Stream/Creek (VPIH), and Valley Grassland land cover types throughout the Plan Area.

Figure 3-15 illustrates the location of modeled habitat as well as the documented occurrences of vernal pool tadpole shrimp within the Plan Area.

3.4.3 Amphibians

California Tiger Salamander (*Ambystoma californiense*)

Habitat Requirements

The upland component of California tiger salamander habitat typically consists of Grassland or Blue Oak Savanna (Shaffer et al. 1993; USFWS 2004a). California tiger salamander spends most of its life cycle underground in grassland habitat, primarily in rodent burrows. Breeding adults comprise approximately 30% of a California tiger salamander population, while approximately 70% consists of juveniles who have not yet reached sexual maturity. These juveniles remain underground in burrows year-round and typically do not return to breeding habitat during the winter. (Searcy, pers. comm. 2012). California tiger salamanders typically use underground

burrows constructed by ground squirrels or other fossorial animals in open grassland or under isolated oaks, and less commonly in woodlands (Shaffer et al. 1993). Adults are terrestrial outside of the breeding season, and have been known to inhabit rodent burrows located up to 1.3 miles from breeding ponds.

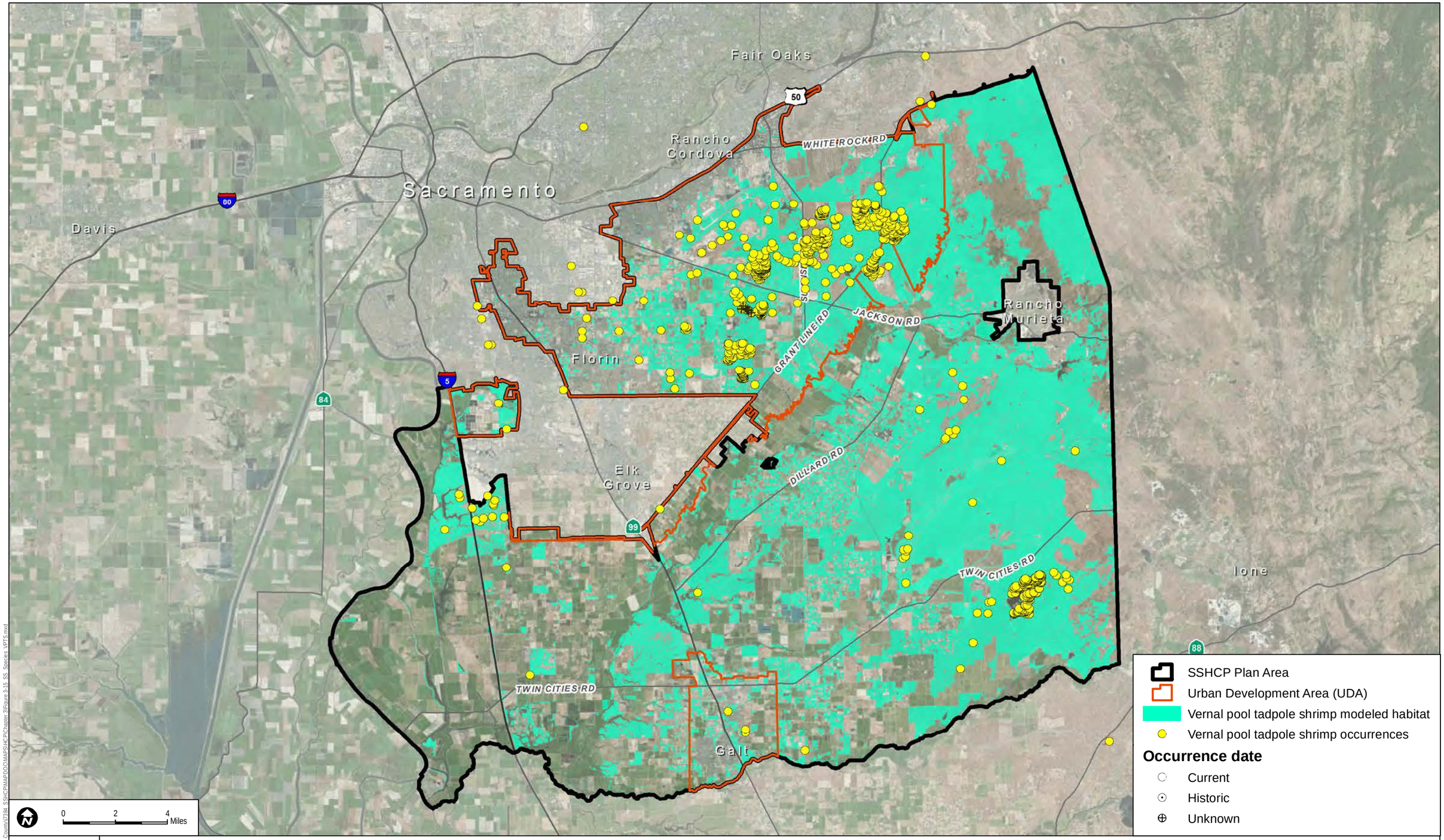
Once fall or winter rains begin, adult California tiger salamanders emerge from their upland refugia at night to migrate to breeding ponds (Stebbins 1985, 1989; Shaffer et al. 1993). Males remain at the breeding pools on average for 44.7 days and females averaged 11.8 days (Trenham et al. 2000). Historically, vernal pools and other natural seasonal ponds constituted primary breeding sites used by California tiger salamanders (Feaver 1971; Storer 1925; Trenham et al. 2000; Zeiner et al. 1988). In the absence of historical breeding ponds, stock ponds have become important aquatic habitats for the California tiger salamander throughout its range (USFWS 2004a). During this species' lifetime, individuals from sub-populations could migrate between aquatic and upland habitats, colonizing newly created and geographically isolated ponds provided the intervening habitat could be successfully traversed by dispersing individuals (USFWS 2004a).

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable aquatic habitat based on life history descriptions include Vernal Pool and Seasonal Wetland. Suitable habitat for upland refugia includes Valley Grassland, Blue Oak Woodland, and Blue Oak Savanna (Table 3-2).

Occurrences within the Plan Area

There are 31 documented occurrences of California tiger salamanders in the Plan Area. Two occurrences are located within the UDA in PPU 8 and 29 occurrences are outside of the UDA in PPU 7.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, C. Witham 2011, C. Little 2011,ECORP 2012, EcoAnalysts 2008, Foothill Associates 2011, Gibson & Skordal 2011, Helm 2011, Richard Hill 1999, Sugnet & Associated 1997, Kassiss-Sylva 2011, Kiefer 2011, LSA 2009, USFWS 2014, Vollmar 2011, Wildlands 2010

FIGURE 3-15

Vernal Pool Tadpole Shrimp Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2084 SSHCP\MAPPDOC\MAPS\HCP\Chapter 3\Figure 3-15_SS_Species_VPTS.mxd

INTENTIONALLY LEFT BLANK

Model Assumptions

- California tiger salamanders have not been recorded within the Sacramento County Urban Services Boundary or north of the Cosumnes River despite extensive surveys in very large areas with presumably suitable habitat including Mather Field, Sacramento Valley Conservancy's Vernal Pool Prairie Preserve, the Sunrise Douglas Area, Kiefer landfill, Rancho Murieta, and areas East of Grant Line Road.
- In a 5-year study, Orloff (2011) found the majority of California tiger salamanders migrated at least 0.5 mile (0.8 kilometer) from the breeding site. A smaller number of salamanders appeared to migrate even farther, traveling 0.75 mile (1.2 kilometer) to almost 1.3 miles (2.2 kilometers) to and from the breeding ponds and upland habitat on adjacent property.
- A study by Searcy and Shaffer (2011) found that California tiger salamanders are physiologically capable of migrating up to 2,484 meters (1.5 miles) each breeding season and that 95% of the population occurs in upland habitat within 1,867 meters of the breeding pond.
- Trenham et al. (2001) recommended that plans to maintain local populations of California tiger salamanders should include pond(s) surrounded by at least 173-meter (567-foot) wide buffers of terrestrial habitat occupied by burrowing mammals.

California Tiger Salamander Modeled Habitat

Modeled aquatic habitat for California tiger salamander is Vernal Pool and Seasonal Wetland land cover located south of the Cosumnes River. Modeled upland refugia habitat is all Blue Oak Woodland, Blue Oak Savanna, and Valley Grassland land cover located within 1.5 miles of modeled aquatic habitat (i.e., within 1.5 miles of any Vernal Pool or Seasonal Wetland that is south of the Cosumnes River).

Figure 3-16 illustrates the location of modeled habitat as well as the documented occurrences of California tiger salamander within the Plan Area.

Western Spadefoot (*Spea hammondii*)

Habitat Requirements

Western spadefoot primarily occurs in lowland habitats generally below 900 meters (3,000 feet) within or adjacent to washes, floodplains of rivers, alluvial fans, playas, and alkali flats. They also occur in the foothills and mountains (Stebbins 1985) up to 1,363 meters (4,500 feet) (Morey 1988). Associated vegetative communities include valley-foothill grassland, open chaparral, pine-oak woodland and lower montane conifer and mixed conifer forest within open areas comprised of short grasses and sandy or gravelly soil. Western spadefoots have two distinct habitat requirements including quiet streams (Stebbins 2003) or seasonal pools for breeding and uplands for foraging and dry-season aestivation. Western spadefoot eggs and larvae have been

observed in a variety of permanent and temporary wetlands including rivers, creeks, pools in intermittent streams, vernal pools, and temporary rain pools (CDFG 2010). They have also been found in altered wetlands including vernal pools that have been disturbed by activities such as earthmoving, disking, intensive livestock use, and off-road vehicle use, and created wetlands such as artificial ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits (Fisher and Shaffer 1996; CDFG 2010). Often undervalued in conservation planning, terrestrial habitats surrounding aquatic breeding sites are critical to the survival of many semiaquatic species that depend on mesic ecotones to complete their life cycles (Semlitsch and Bodie 2003).

Land Cover Types Relevant to Habitat Requirements

Suitable aquatic habitat based on life history descriptions includes Vernal Pool, Seasonal Wetland, Swale, Open Water, and Stream/Creek. Suitable habitat for upland foraging includes Blue Oak Woodland, Blue Oak Savanna, and Valley Grassland (Table 3-2).

Occurrences within the Plan Area

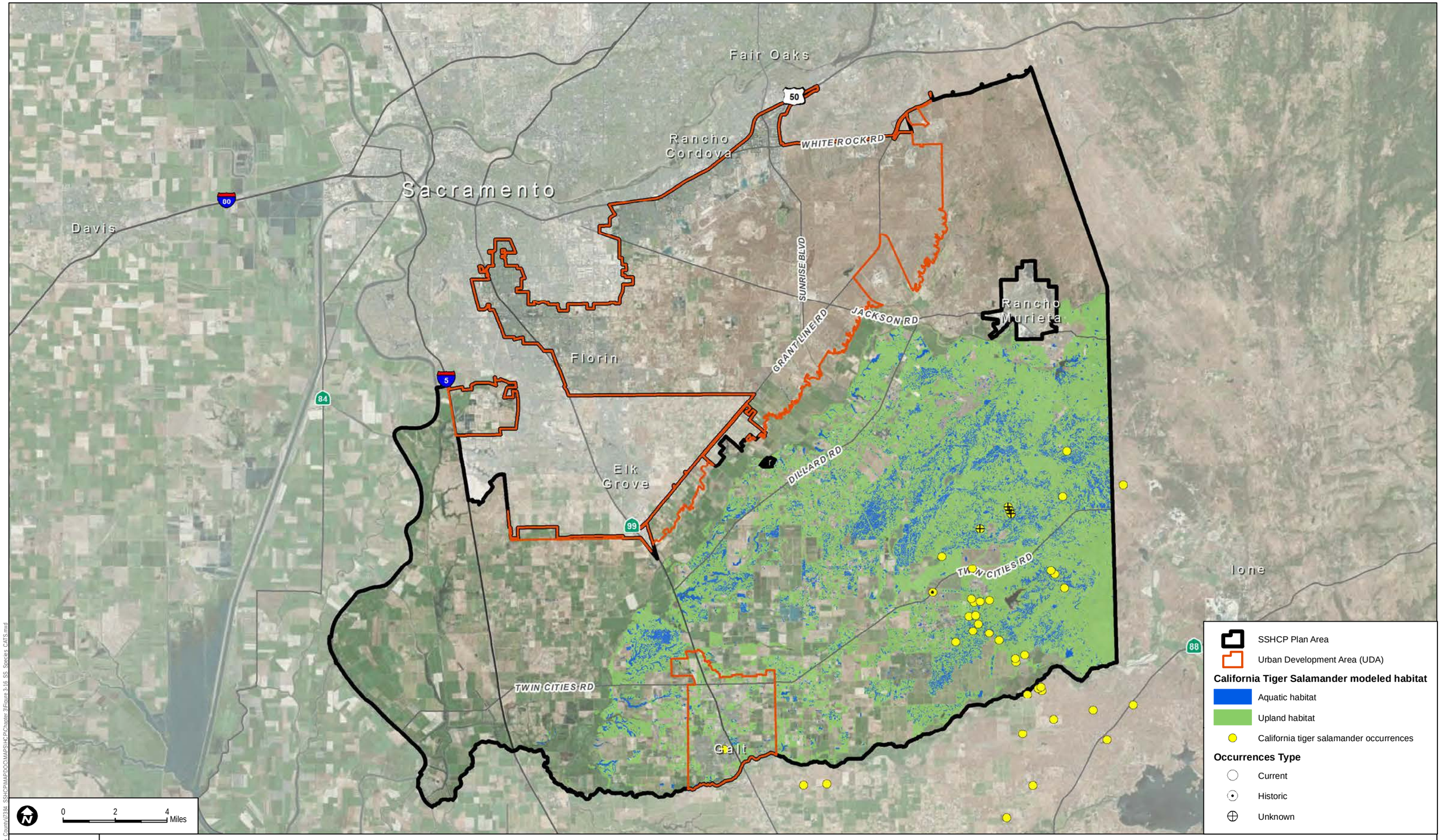
There are 41 documented occurrences of western spadefoot in the Plan Area. Twenty occurrences are inside the UDA with seven in PPU 1, 12 in PPU 2, and one in PPU 3. There are 21 occurrences outside of the UDA with two in PPU 5 and 19 in PPU 7.

Model Assumption

- Very little information is available regarding dispersal distances or minimum habitat size.
- Semlitsch and Brodie (2003) summarized data from the literature on the use of terrestrial habitats by 19 frog and 13 salamander species representing 1,363 individuals that are otherwise typically associated with wetlands. In general, plethodontid stream salamanders (e.g., *Desmognathus fuscus, Eurycea bislineata, Eurycea longicauda*), although migratory at some stage of their life cycle, remain close to the edges of ponds and streams and seldom move more than 20 to 30 meters from aquatic habitats. Alternatively, some species of frogs, toads and newts are highly mobile and move 1,000 to 1,600 meters (5,249 feet or about 1 mile) (e.g., *Bufo bufo, Rana catesbbeiana*, *Notophthalmus viridescens*). The majority of the remaining species occur at intermediate distances, where they emigrate to find suitable terrestrial habitat. The overall core terrestrial habitat ranged from 159 to 290 meters (522 to 951 feet) from the edge of aquatic breeding sites.

Western Spadefoot Modeled Habitat

Modeled aquatic habitat for western spadefoot is Vernal Pool, Seasonal Wetland, Swale, Open Water, and Stream/Creek land cover types in the Plan Area. Modeled upland habitat is Blue Oak Woodland, Blue Oak Savanna, and Valley Grassland within 1,600 meters (5,249 feet or approximately 1 mile) from modeled aquatic habitat.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012

FIGURE 3-16

California Tiger Salamander Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2394 SSHCP\MAPS\CM\MAPS\HCP\Chapter 3\Figure 3-16_SS_Species_CATS.mxd

INTENTIONALLY LEFT BLANK

Figure 3-17 illustrates the location of modeled habitat and the documented occurrences of western spadefoot within the Plan Area.

3.4.4 Reptiles

Giant Gartersnake (*Thamnophis gigas*)

Habitat Requirements

Endemic to valley floor wetlands in California's Central Valley, the giant gartersnake inhabits marshes, sloughs, low gradient streams, and other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields. Suitable habitat consists of (1) adequate water during the snake's active season (early spring through mid-fall) to provide food and cover, (2) emergent, herbaceous wetland vegetation, such as Scirpus and Typha spp. for escape cover and foraging habitat during the active season, (3) grassy banks and openings in waterside vegetation for basking, and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (Hansen 1988). Wylie et al. (2010) found that giant garter snakes will persist in areas dominated by rice, by foraging in flooded rice fields after the rice plants have grown sufficiently to provide cover from predators. It appears that giant garter snakes do not tolerate seasonal wetlands managed for waterfowl if there is no aquatic habitat available during the active summer season. A study of Body Condition Index (BCI) and population estimates strongly indicates that perennial marshes provide the highest quality giant garter snake habitat, rice agriculture is acceptable habitat, and seasonal winter wetlands provides the least suitable habitat of the three types (Wylie et al. 2010). Although rice fields are a key habitat for giant garter snakes throughout most of its range, there is no active rice cultivation within the Plan Area. The nearest region of rice production is the Natomas Basin located in northwest Sacramento County. Giant garter snakes are absent from larger rivers and other water bodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Brode 1988; Hansen 1980; Hansen 1988; Rossman and Stewart 1987). Riparian woodlands do not typically provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (Hansen 1980).

In addition to grassy banks, giant garter snakes will bask in bulrush, cattails, shrubs overhanging the water, patches of waterweed (*Ludwigia peploides*) and other floating vegetation. In the San Joaquin Valley, giant garter snakes also bask in openings within saltbush (*Atriplex* spp.) (Brode 1988; Van Denburgh and Slevin 1918). Riparian vegetation such as saltbush and willows (Salix spp.) provide cover from predation. Giant gartersnakes also bask in openings in vegetation created by rip-rap placed around water control structures. Giant garter snakes use small mammal burrows and other soil crevices above prevailing flood elevations during the winter (i.e., November to mid-March), typically with sunny exposures along south- and west-facing slopes (USFWS 1999b). During the active season, small mammal burrows, crayfish burrows, and soil crevices provide retreats from extreme heat (Hansen and Brode 1993).

Land Cover Types Relevant to Habitat Requirements

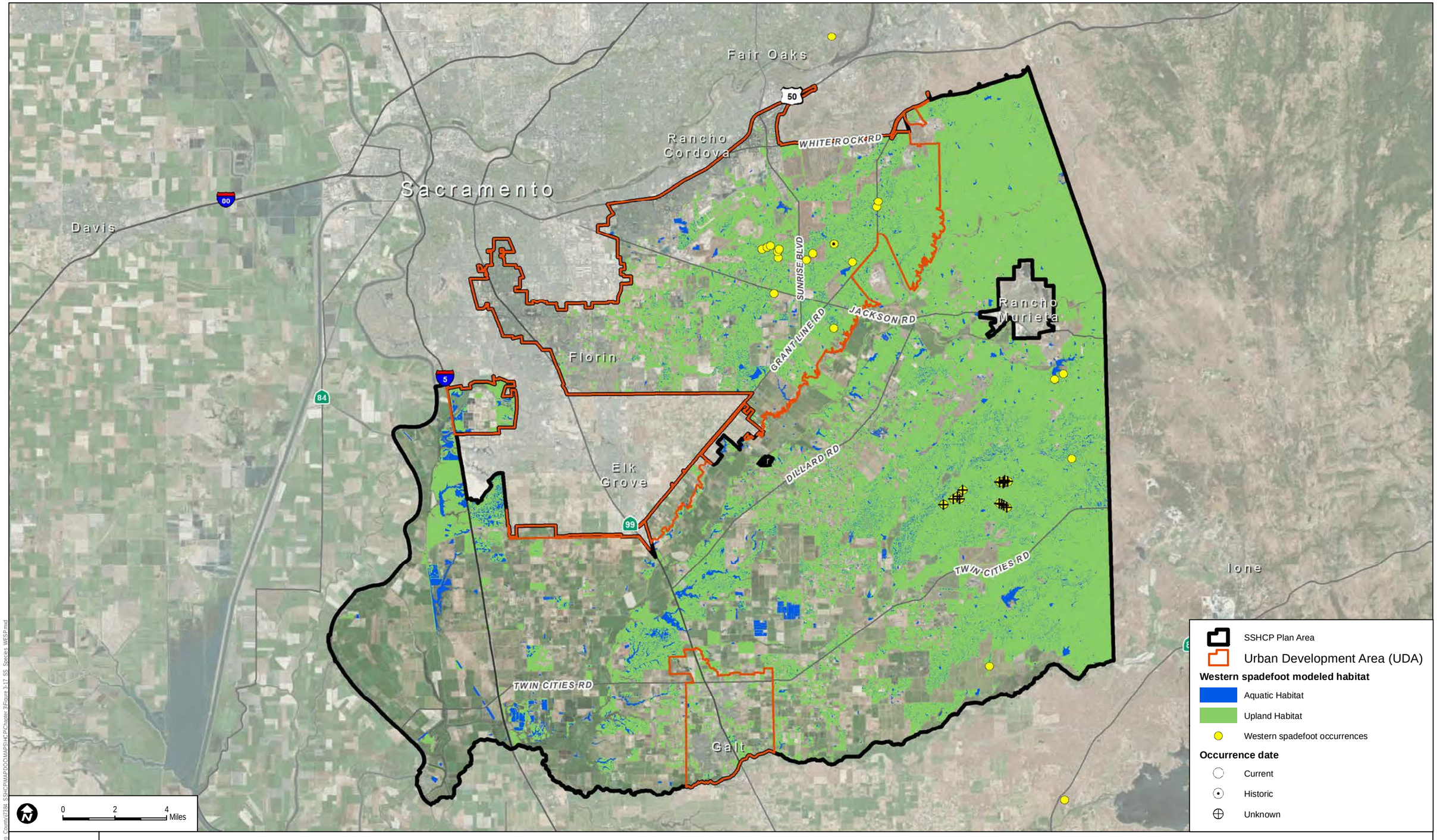
Suitable aquatic habitat for giant gartersnake based on life history descriptions include Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek. Suitable upland habitat includes Mixed Riparian Scrub and Valley Grassland (Table 3-2).

Occurrences within the Plan Area

There are 14 documented occurrences of giant gartersnake within the Plan Area. Two occurrences are within the UDA in PPU 2. Twelve occurrences are outside the UDA, including 11 in PPU 6 and one in PPU 7.

Model Assumptions

- Giant gartersnake occurrences have been documented along Plan Area stream reaches, primary in the southwestern portion of the Plan Area.
- The range of giant gartersnake within the Plan Area included the Central Valley great "tule" marsh (below 70 feet above sea level), and likely included emergent marsh areas along floodplains of streams and creeks up to an elevation of 230 feet above sea level.
- Stream reaches considered important suitable habitat owing to known use within the Plan Area include the following:
    - Elliot Mitigation site contains a prominent drainage that links to Stone Lakes and is wet year round.
    - Drainage canals south of Elk Grove have a past occurrence and link to Stone Lakes. The perennial segments of these canals are suitable habitat.
    - Badger Creek and all other creeks that drain into the marsh at the Cosumnes River Preserve is likely high-quality habitat due to its proximity and connectivity to a significant population of giant gartersnakes. The perennial segments of these creeks are suitable habitat.
    - The perennial segments of Laguna Creek (south) and tributaries are suitable habitat due to presence of Freshwater Marsh habitat and proximity to documented occurrences.
    - The perennial segments drainages and canals leading from the Cosumnes River Preserve including Deadman's Gulch.
- Giant gartersnakes use rice lands extensively and depend on them for habitat (Fuller, pers. comm. 2005)
- The average distance between upland, over wintering sites and aquatic breeding sites is thought to be approximately 150 meters, ranging from 50 to 400 meters (Wylie, pers. comm. 2005).
- Hansen and Brode (1993) also documented giant gartersnakes moving at least 400 meters (0.25 mile) between small lateral ditches and larger canals within the Natomas Basin.



SOURCE: Bing Maps, County of Sacramento 2014, CNDDB 2012, CNPS 1999

FIGURE 3-17

Western Spadefoot Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2784_SSHCP\MAPS\DOCMAPS\HCP\Chapter 3\Figure 3-17_SS_Species_WESP.mxd

INTENTIONALLY LEFT BLANK

Giant Garter Snake Modeled Habitat

The following streams, creeks or drainages are locations that are known to support giant gartersnakes within the Plan Area.

- A prominent drainageway on the Elliot mitigation site, which links to Stone Lakes National Wildlife Refuge (NWR) and is wet year-round.
- Drainage canals south of Elk Grove, which have a past occurrence and link to Stone Lakes NWR; the perennial segments of these canals are suitable habitat.
- Badger Creek and all other creeks that drain into the marsh at the Cosumnes River Preserve, which are likely high-quality habitat due to proximity and connectivity to a significant population of giant gartersnakes; the perennial segments of these creeks are suitable habitat.
- The perennial segments of Laguna Creek (south) and tributaries, which are suitable habitat due to presence of Freshwater Marsh habitat and proximity to documented occurrences.
- The perennial segments of drainages and canals leading from the Cosumnes River Preserve including Deadman's Gulch, which provides suitable habitat.

Giant gartersnake is known to occur at elevations of up to 230 feet above sea level and to travel up to 400 meters (0.25 mile) between aquatic and upland habitat. Therefore, the waterways described above plus Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland that are entirely or partially within 0.25 mile of the aforementioned waterways and are at or below 230 feet in elevation are modeled as high-value aquatic habitat. In addition to high-value aquatic habitat, non-high value aquatic habitat was defined as Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland that is up to 0.25 mile away from high-value habitat and is at or below 230 feet in elevation.

Upland habitat for giant gartersnake is Mixed Riparian Scrub and Valley Grassland within a distance of 0.25 mile from modeled aquatic habitat and is at or below an elevation of 230 feet. High-value upland habitat for giant gartersnake is defined as upland habitat within 200 feet of high-value aquatic giant gartersnake habitat (i.e., Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland) that is at or below 230 feet in elevation.

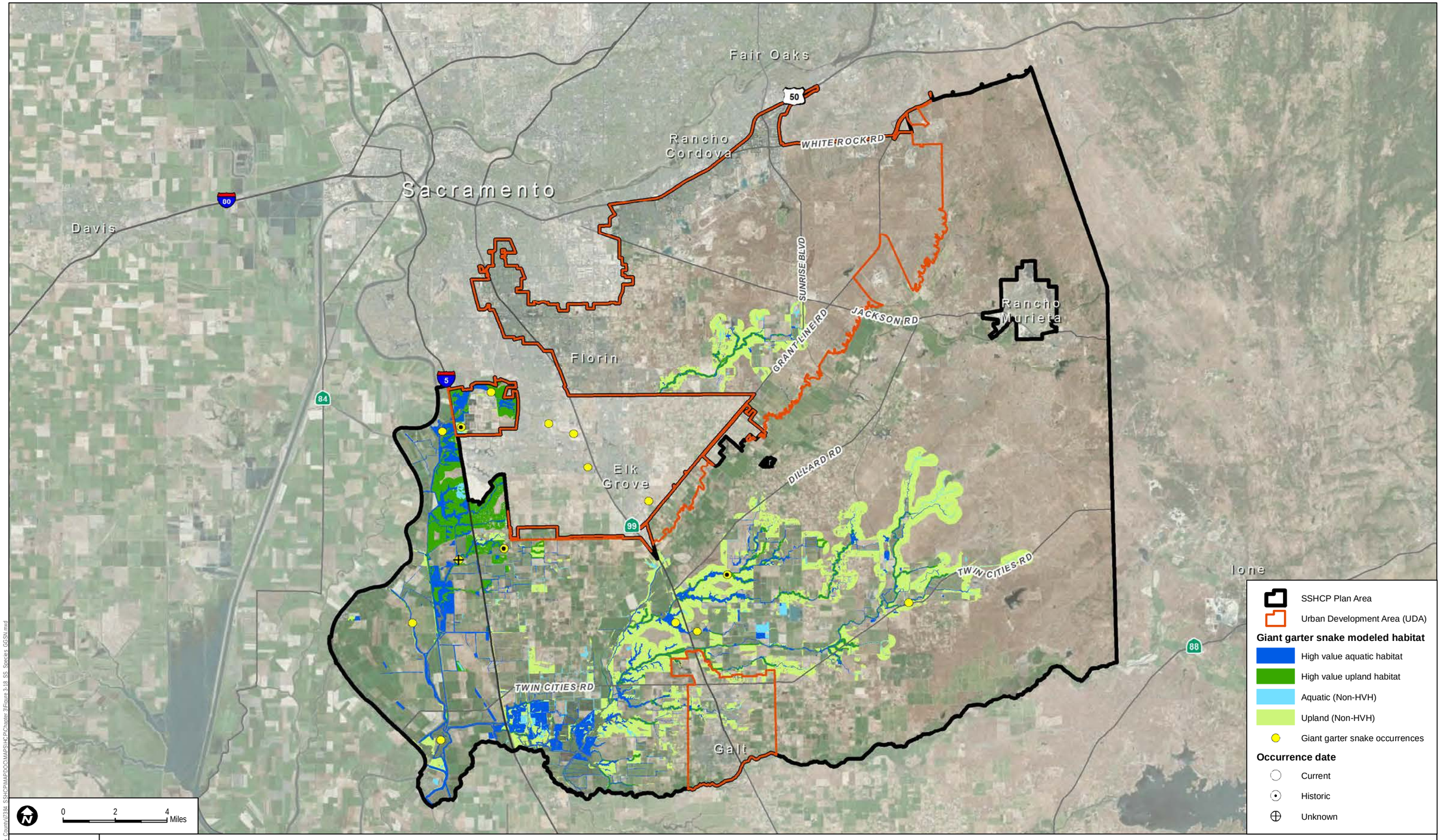
Figure 3-18 illustrates the location of modeled habitat as well as the documented occurrences of giant gartersnake within the Plan Area.

Western Pond Turtle (*Actinemys marmorata*)

Habitat Requirements

Western pond turtles inhabit a variety of aquatic habitats from sea level to elevations of 1,980 meters (6,500 feet). They are found in fresh to brackish aquatic habitats including marshes, rivers, ponds, and streams. Western pond turtles also may occur in created habitats such as irrigation ditches, reservoirs, and sewage and millponds. Preferred aquatic habitat is characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, partially submerged rocks and logs, open mud banks and matted floating vegetation for thermoregulatory basking. Western pond turtles use aquatic habitats primarily for foraging, thermoregulation, breeding, and avoidance of predators (Boyer 1965; Holland 1994; Reese and Welsh 1998a). Hatchling and young turtles (1 year) require shallow water areas (less than 30 centimeters [12 inches] deep) dominated primarily by emergent aquatic reeds (*Juncus* spp.) and sedges (Holland 1991), and have been observed to avoid areas of open water lacking these emergent plant species (Boyer 1965; Holland 1994; Hays et al. 1999; Reese and Welsh 1998a). Highly fluctuating flow rates associated with aquatic habitats may diminish habitat quality for western pond turtle (Reese and Welsh 1998b).

Western pond turtles "hibernate" in both aquatic and upland habitats. Aquatic hibernacula consist of rocks, logs, mud, and undercut areas along banks while upland hibernacula consist of burrows in leaf litter, heavy brush, or soil (Holland 1994). Western pond turtles are believed to hibernate between November 1 and March 1 (McDermott, pers. comm. 2015). In woodland and sage scrub habitats along coastal streams in central California, most western pond turtles leave the drying creeks in late summer and return after winter floods. Upland nesting sites must be dry and often have a high clay or silt component. Typically, western pond turtles dig nests in open sunny areas that are on slopes no steeper than 25 degrees, and typically within 300 feet of the aquatic habitat (McDermott, pers. comm. 2015).



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, CNPS 1999

FIGURE 3-18

Giant Gartersnake Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2394 SSHCP\MAPS\MXD\PC\Chapter 3\Figure 3-18_SS_Species_GGSN.mxd

INTENTIONALLY LEFT BLANK

Land Cover Types Relevant to Habitat Requirements

Based on life history descriptions aquatic land cover types that provide suitable habitat for western pond turtles include Freshwater Marsh, Open Water, and Stream/Creek. Land cover types that provide suitable upland habitat include Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland when these land covers are near suitable aquatic habitat (Table 3-2).

Occurrences within the Plan Area

There are 19 documented occurrences of western pond turtle within the Plan Area. Three occurrences are within the UDA including two in PPU 2 and one in PPU 4. Sixteen occurrences are outside of the UDA including one in PPU 5, seven in PPU 6, and eight in PPU 7.

Model Assumptions

- Western pound turtle has been recorded along creek and stream reaches throughout the Plan Area.
- Holland (1994) reported that in the fall and spring, hatchling turtles may move as far as 400 meters (0.25 mile) from their upland nest locations to aquatic sites nearby.

Western Pond Turtle Habitat Model

Western pond turtle modeled aquatic habitat include all Stream/Creek land cover that occurs throughout the Plan Area and Freshwater Marsh and Open Water land covers within 400 meters (0.25 mile) of all Stream/Creek land cover. Western pond turtle modeled upland habitat is Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland within 0.25 mile of modeled aquatic habitat.

Figure 3-19 illustrates the location of modeled habitat as well as the documented occurrences of western pond turtle within the Plan Area.

3.4.5 Birds

Cooper's Hawk (*Accipiter cooperii*)

Habitat Requirements

Throughout its range, the Cooper's hawk nests in a wide variety of woodland and forest habitats, including oak woodland, riparian woodland, coniferous, deciduous, and mixed forest, woodlots,

and suburban and urban areas. In much of California's lowland valley and foothill landscapes, including those within the Plan Area, this species appears strongly associated with live oak woodland (Asay 1987). Dense canopy closure is a consistent feature of most nest sites, and the tallest tree in the stand is often selected for nesting (Kennedy 1988). In a study of 77 Cooper's hawk nests in California, Asay (1987) found that nearly all nests (i.e., 75) were in live oak trees. The other two nests were in a blue oak and California sycamore; and these trees were in stands of live oak. Riparian woodlands also provide important habitat for Cooper's hawks in Sacramento County (Trochet, pers. comm. 2004).

Cooper's hawks also breed in urban and suburban areas. Several urban populations of Cooper's hawks have been well documented (Beebe 1974; Mannan et al. 2004; Murphy et al. 1988; Rosenfield et al. 1991; Stahlecker and Beach 1979). Cooper's hawks appear tolerant of habitat fragmentation and human disturbance near the nest (Beebe 1974; Murphy et al. 1988; Palmer 1988; Rosenfield et al. 1992). Urban nest sites have included isolated trees within 492 feet (150 meters) of commercial and recreational activities, and 66 to 98 feet (20 to 30 meters) of residential houses (Rosenfield and Bielefeldt 1993; Stahlecker and Beach 1979).

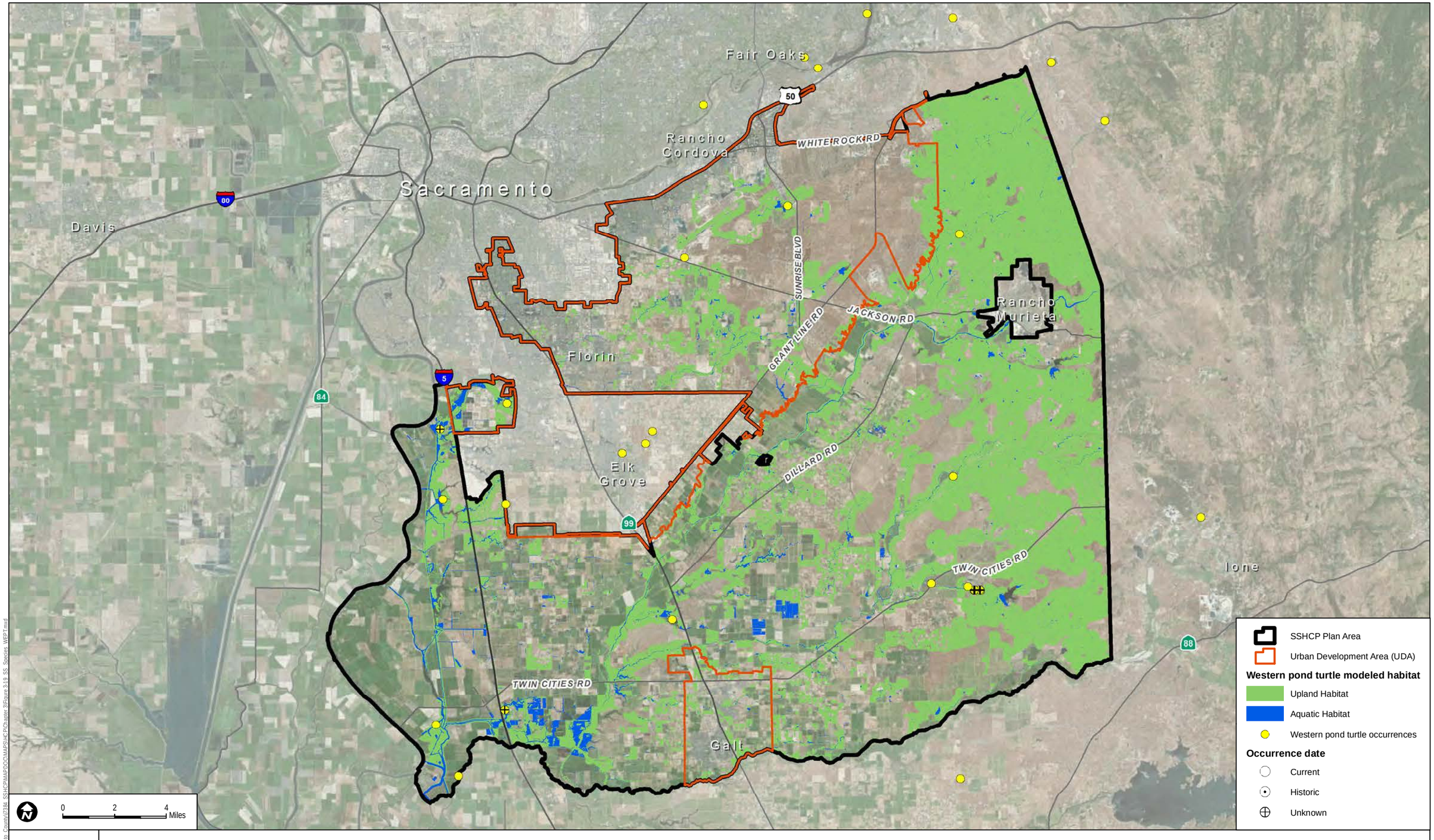
Cooper's hawks are considered aggressive ambush predators, using concealment to catch prey. Surprise attacks are often initiated at close range from behind an obstruction (Roth and Lima 2003). They often use a series of brief perch and scan episodes to locate and capture prey. In open habitats, Cooper's hawks occasionally hunt from the air, scanning the ground and stooping on prey (Rosenfield and Bielefeldt 1993). Cooper's hawks forage in structurally diverse woodland habitats that provide suitable prey abundance and diversity (i.e., medium-sized birds) and large numbers of sites within which to perch, scan, and launch attacks on potential prey.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub. Suitable habitat for nesting includes Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub (Table 3-2).

Occurrences within the Plan Area

There are 20 documented occurrences of Cooper's hawk within the Plan Area. Seven are within the UDA including one in PPU 1, two in PPU 2, one in PPU 3, two in PPU 4, and one that is not within a PPU. Thirteen occurrences are outside of the UDA including two in PPU 5, eight in PPU 6, two in PPU 7, and one that is not within a PPU.



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, CH2MHILL/Garcia & Associates, EIP Associates

FIGURE 3-19

Western Pond Turtle Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-19_SS_Species_WPT.mxd

INTENTIONALLY LEFT BLANK

Model Assumptions

- Overall distribution, abundance, and population structure for Cooper's hawk are not well known within the Plan area.
- In urban Tucson, Arizona, home range size for nine subadult Cooper's hawks during their first fall/winter averaged 1,905 acres (771 hectares) (Mannan et al. 2004).
- In Tucson, Mannan and Boal (2000) studied the movements of adult male Cooper's hawks in adjacent home ranges during the breeding season. Home range sizes for nine individuals ranged between 33 and 323 acres (13 and 131 hectares) and averaged 162 acres (66 hectares).
- In a study of nesting Cooper's hawks in the Sacramento area, the average distance between adjacent nests was 0.99 mile (1.6 kilometers) (Asay 1987).
- Most Cooper's hawks breeding in California are permanent, non-migratory residents; however, Cooper's hawks breeding in montane habitats may exhibit seasonal movements, moving to snow-free lower elevations during winter (Zeiner et al. 1990).

Cooper's Hawk Habitat Model

Modeled foraging habitat is Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Plan Area. Modeled nesting habitat is Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Plan Area.

Figure 3-20 illustrates the location of modeled habitat as well as the documented occurrences of Cooper's hawk within the Plan Area.

Ferruginous Hawk (*Buteo regalis*)

Habitat Requirements

The ferruginous hawk is considered an "open country" species that inhabits the grasslands, shrub steppes, and deserts of western North America. During the winter, ferruginous hawks use grasslands and arid areas, particularly where pocket gophers, ground squirrels, rabbits, or prairie dogs are abundant. Ferruginous hawks also winter near cultivated fields that support populations of pocket gophers (Bechard and Schmutz 1995), and are known to use urban open space grasslands as long as prey is available (Berry et al. 1998). Ferruginous hawks have been observed in open grassland habitats and non-vineyard agricultural areas in the Plan Area (Manolis, pers. comm. 2004). Characteristics of these grasslands and agricultural lands are that

they support abundant prey and include friable soils (for digging and burrowing), moderate to dense vegetative cover (particularly grasses), and some topographic variation.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Valley Grassland, Irrigated Pasture-Grassland, Vernal Pool, Seasonal Wetland, and Swale (Table 3-2).

Occurrences within the Plan Area

There are 26 documented occurrences of Ferruginous hawk within the Plan Area. Eight occurrences are within the UDA including seven in PPU 2 and one in PPU 4. Eighteen occurrences are outside of the UDA including six in PPU 5, four in PPU 6, seven in PPU 7, and one that in not within a PPU.

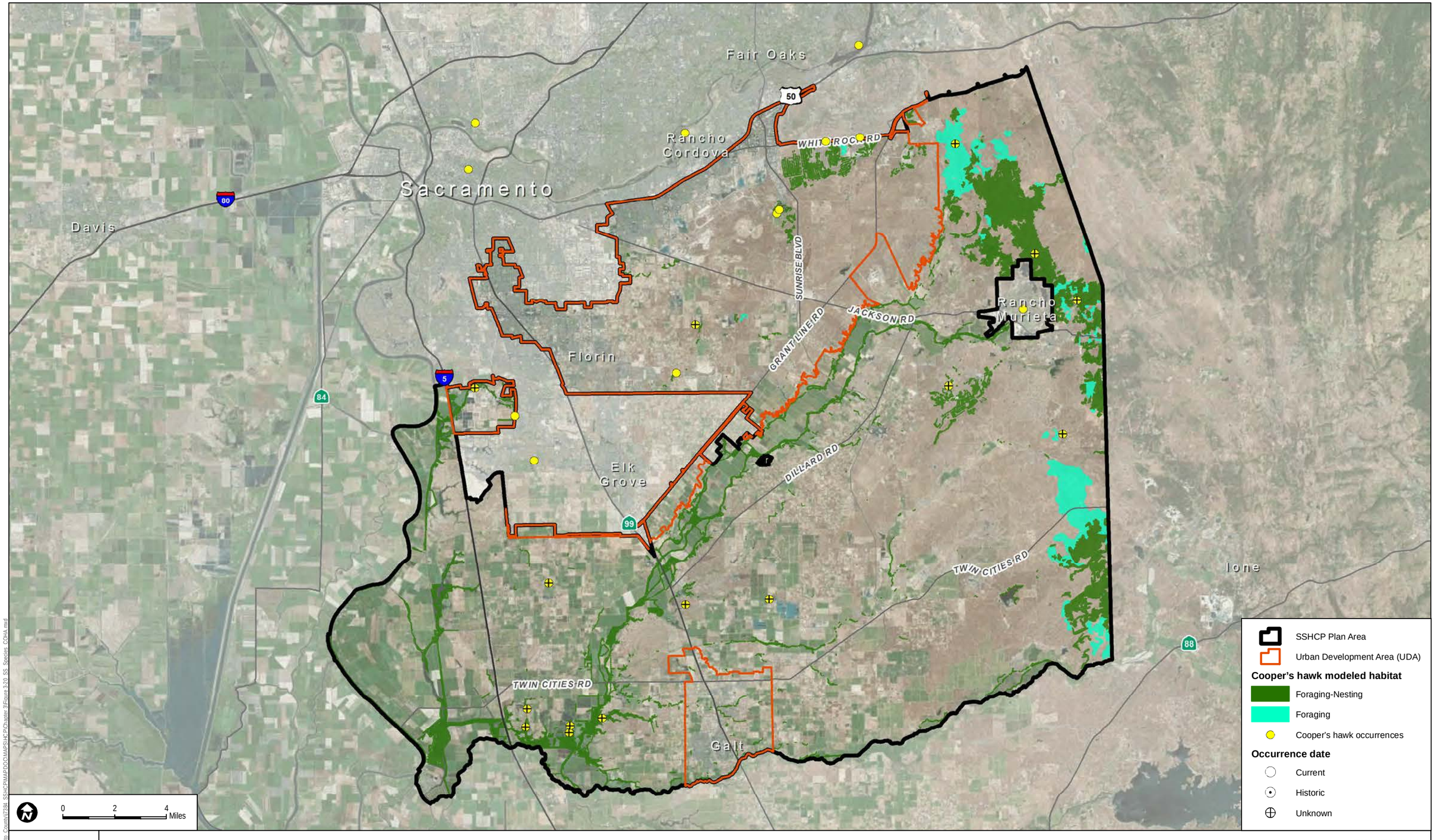
Model Assumptions

- Ferruginous hawks do not regularly breed in California, with the most recent breeding being recorded in 1989 in northeastern California (Harlow and Bloom 1989).
- Occurrence information is not well documented from within the Plan Area.
- The spatial requirements of ferruginous hawks during winter have not been widely reported (Bechard and Schmutz 1995) and what constitutes the minimum size of suitable winter foraging habitat is unknown for most areas.
- Bechard and Schmutz (1995) suggest the Ferruginous hawk may defend winter territories. Winter densities in Utah have been reported at one individual per 3.60 square miles (Smith and Murphy 1978), and Plumpton and Andersen (1997) found a mean daily Minimum Convex Polygon home range size of 1.36 square miles.

Ferruginous Hawk Habitat Model

Modeled foraging habitat is Valley Grassland, Irrigated Pasture-Grassland, Vernal Pool, Seasonal Wetland, and Swale land cover located anywhere in the Plan Area.

Figure 3-21 illustrates the location of modeled habitat as well as the documented occurrences of Ferruginous hawk within the Plan Area.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org

FIGURE 3-20

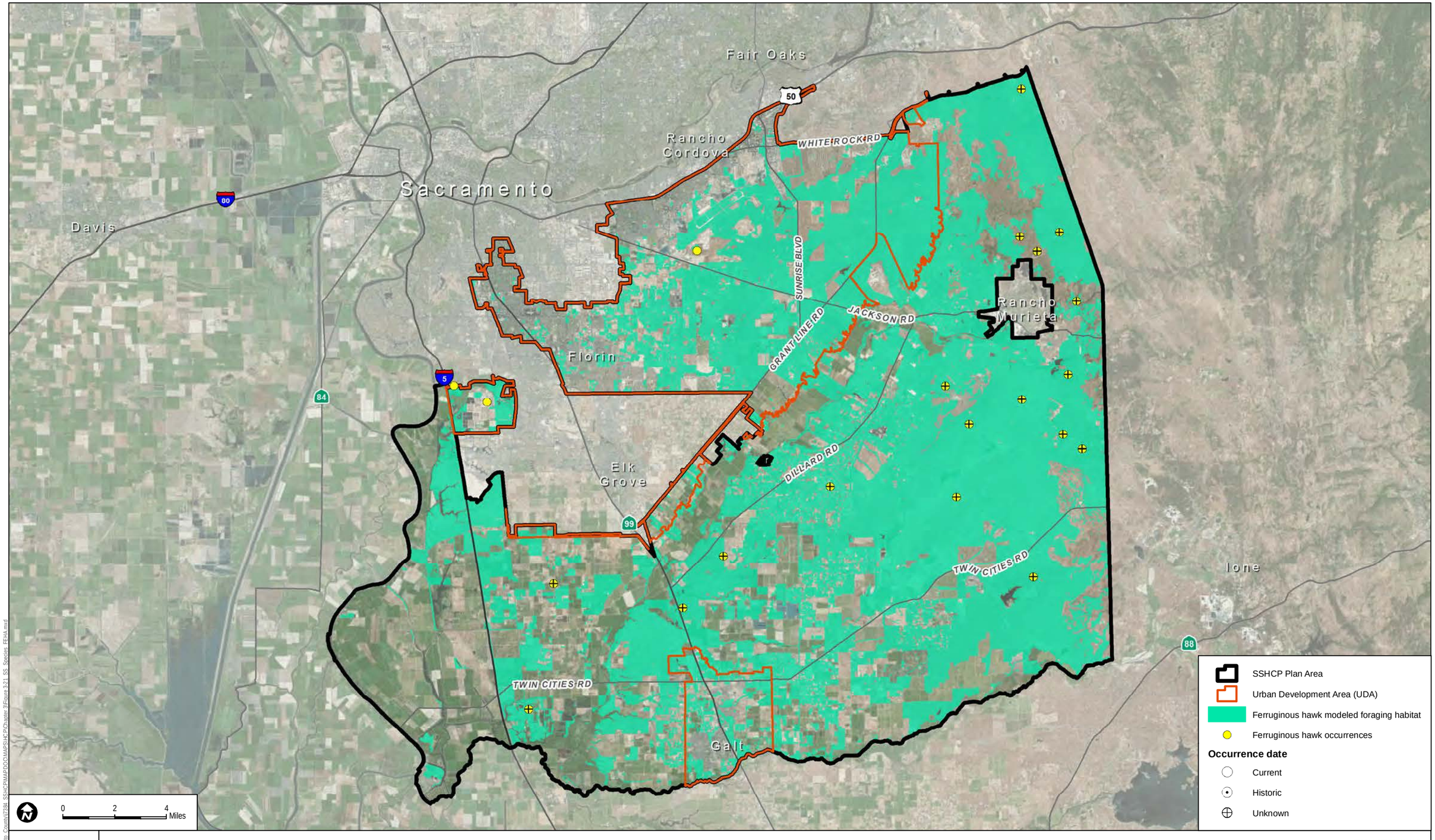
Cooper's Hawk Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7294 SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-20 SS Species COHA.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org

FIGURE 3-21

Ferruginous Hawk Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\239c SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-21 SS Species FEHA.mxd

INTENTIONALLY LEFT BLANK

Greater Sandhill Crane (*Grus canadensis tabida*)

Habitat Requirements

Greater sandhill cranes wintering in and adjacent to the Plan Area use open agricultural habitats, natural vegetation communities, and seasonally managed wetlands. After the onset of winter rains, Sandhill Cranes begin foraging for invertebrates by probing soils in grassland habitats and overturning cattle dung. They also hunt for mice in taller grassland vegetation (Littlefield and Ivey 2000). They appear to avoid grassland habitats when vegetation exceeds 10 inches (25 centimeters). Invertebrates are also consumed in natural and managed seasonal wetlands.

Grain is also an important component to the sandhill crane's diet and as such agricultural habitat types are frequently utilized as foraging habitat. Common habitat types used for foraging include pastures, alfalfa, corn (chopped, disked, flooded, and stubble), tomatoes (flooded, ripped), and wheat (disked, ripped, flooded, stubble) (Ivey and Herziger 2003). Ivey (pers. comm. 2004) rated agriculture crops in the Plan Area in order of importance. Rice and corn were rated the highest, followed by winter wheat and irrigated pasture. Alfalfa was the next highest rated crop, followed by hay, dryland pasture, and row crops. Sandhill Crane use in the above crop types occurs even though the crops are harvested for farming income.

Habitats also important for greater sandhill cranes include flooded fields for roosting and rocky uplands (e.g., dirt and gravel roads) for collecting "grit." Roosting areas are located in shallowly flooded areas where cranes loaf during the day and seek protection from terrestrial predators at night. Although they will select sites with emergent vegetation along the periphery of the wetland, they rarely use roosts with heavy emergent vegetation (Littlefield and Ivey 2000).

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Cropland, Irrigated Pasture-Grassland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh. Suitable habitat for night roosting include Vernal Pool, Seasonal Wetland, and Freshwater Marsh (Table 3-2).

Occurrences within the Plan Area

There are 210 documented occurrences of greater sandhill crane within the Plan Area. Eight are within the UDA including one in PPU 1, one in PPU 4, and six in PPU 8. Two hundred and two are outside the UDA, including 191 in PPU 6 and 11 in PPU 7.

Model Assumptions

- Greater sandhill cranes travel limited distances to foraging sites from night roost areas. The average distance traveled was 0.88 mile (range 0.17 to 1.89 miles) (Ivey and Herziger 2003) and 1.74 miles (Pogson 1990) between roost sites and foraging areas.
- The size of roost sites is variable. Sandhill cranes roosting in Oregon used sites between 1 and 300 acres (0.5 and 120 hectares).
- Littlefield (1993) recommended roost sites should be at least 20 acres (8 hectares).
- Greater sandhill crane use in the Plan Area principally occurs in the Cosumnes Floodplain (Sloat, as cited in SSHCP Appendix B).

Greater Sandhill Crane Habitat Model

Modeled night roosting habitat is Vernal Pool, Seasonal Wetland, and Freshwater Marsh within 2 miles of greater sandhill crane occurrences per discussion with USFWS staff and CDFW staff (Gardner, pers. comm. 2010; Adelsbach, pers. comm. 2010). This element of the species' model is consistent with the *Conservation Assessment for Greater Sandhill Cranes Wintering on the Cosumnes River Floodplain and Delta Regions of California* (Littlefield and Ivey 2000), although extends beyond the Cosumnes River Floodplain within the Plan Area. Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh within 1.75 miles of modeled roosting habitat.

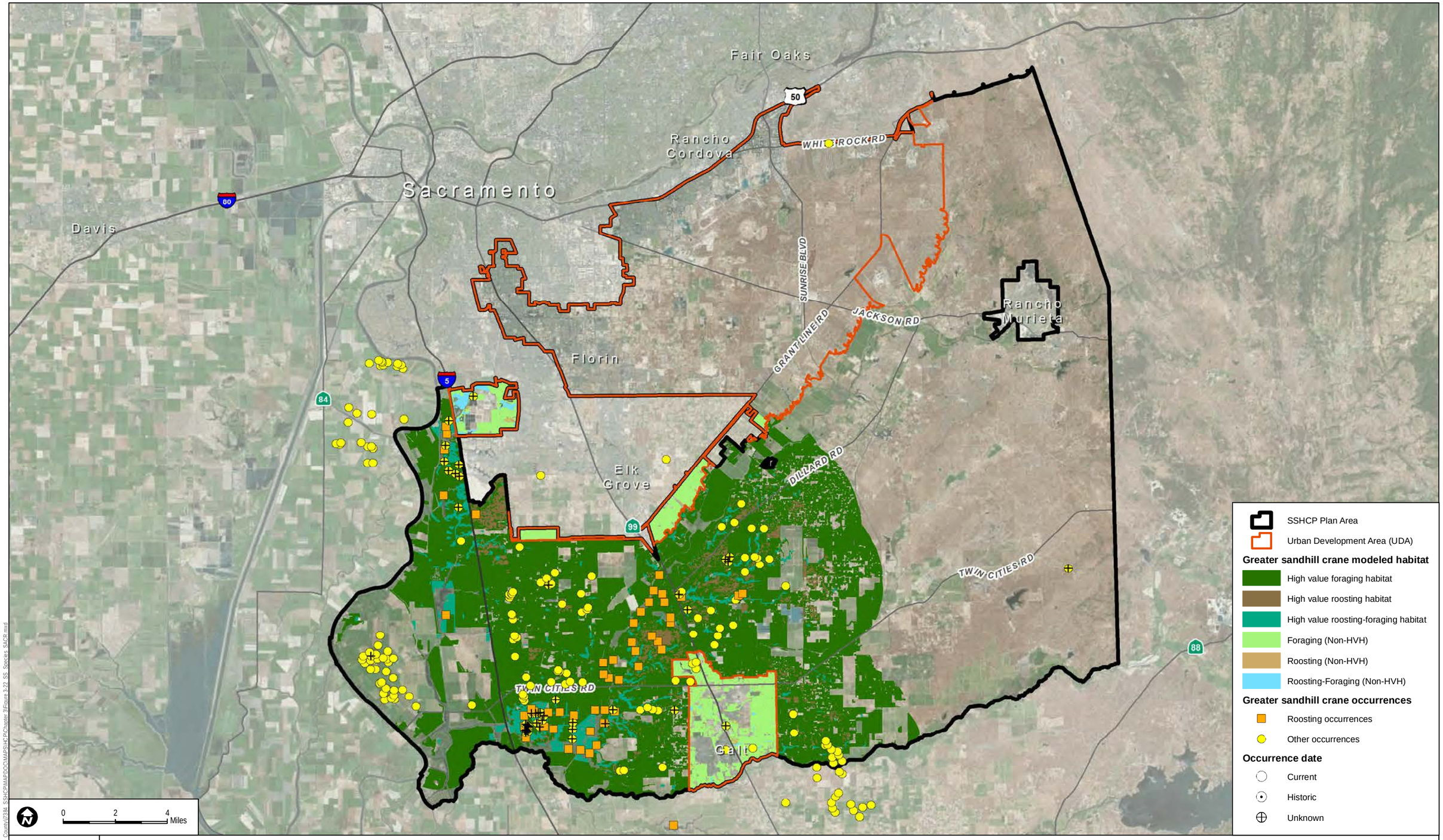
High-value habitat for greater sandhill crane is defined as modeled habitats above sea level and outside the UDA (i.e., modeled habitats within the UDA are excluded).

Figure 3-22 illustrates the location of modeled habitat as well as the documented occurrences of greater sandhill crane within the Plan Area.

Loggerhead Shrike (*Lanius ludovicianus*)

Habitat Requirements

Loggerhead shrikes occur in dry, open habitats including grasslands, pastures with fence rows, agricultural fields, open woodlands (savannas), scrub, and riparian areas. They inhabit open areas with clear visibility for hunting, perches for scanning, and scattered small trees and large shrubs for nesting. Loggerhead shrikes typically avoid completely treeless and shrubless areas (Cade and Woods 1997), as well as urbanized and densely wooded areas (Grinnell and Miller 1944). Winter foraging habitat is similar to summer breeding and foraging habitat, however, shrikes also use idle pastures and hayfields during the winter (Bartgis 1992).



SOURCE: Bing Maps, County of Sacramento 2014, TNC 2000, Ivey 2003, Pogson & Lindstedt 2005, ebird.org, ICF 2013

FIGURE 3-22

Greater Sandhill Crane Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2394_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-22_SS_Species_SACR.mxd

INTENTIONALLY LEFT BLANK

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale; suitable habitat for nesting include Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland (Table 3-2).

Occurrences within the Plan Area

There are 34 documented occurrences of loggerhead shrike within the Plan Area. Seven are within the UDA including two in PPU 1, one in PPU 2, two in PPU 3, one in PPU 4, and one in PPU 8. Twenty-seven occurrences are outside of the UDA, including three in PPU 5, 15 in PPU 6, seven in PPU 7, and two that are not within a PPU.

Model Assumptions

- In mainland California, the average size of territories averaged 21 acres (9 hectares) and ranged between 11 acres (4 hectares) and 40 acres (16 hectares) (Yosef 1996).
- Loggerhead shrikes occur year-round in suitable habitat throughout the Plan Area. They are probably regular breeders in the Plan Area in low densities (Trochet, pers. comm. 2004); however, their overall distribution, abundance, and population structure are not well known.

Loggerhead Shrike Habitat Model

Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale throughout the Plan Area. Modeled nesting habitat is Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland throughout the Plan Area.

Figure 3-23 illustrates the location of modeled habitat as well as the documented occurrences of loggerhead shrike within the Plan Area.

Northern Harrier (*Circus cyaneus*)

Habitat Requirements

Northern harrier breeds in a variety of open grassland, wetland, and agricultural habitats. Open wetland habitats used for breeding include marshy meadows, wet and lightly grazed pastures, and freshwater and brackish marshes. Northern Harrier breeding habitat also includes dry upland habitats, including grasslands, croplands, drained marshlands, and shrub-steppe in cold deserts.

Although Midwestern populations use wetland habitats more frequently, western populations tend to use upland habitats (e.g., grasslands) disproportionately. Northern harriers winter throughout California where suitable habitat occurs. Wintering habitat includes open areas dominated by herbaceous vegetation, including grasslands, pastures, croplands, coastal sand dunes, brackish and freshwater marsh, and estuaries. Northern harriers rarely occur in forested areas (Grinnel and Miller 1944; MacWhirter and Bildstein 1996; Martin 1987).

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Freshwater Marsh. Suitable habitat for nesting includes Cropland, Irrigated Pasture-Grassland, and Valley Grassland (Table 3-2).

Occurrences within the Plan Area

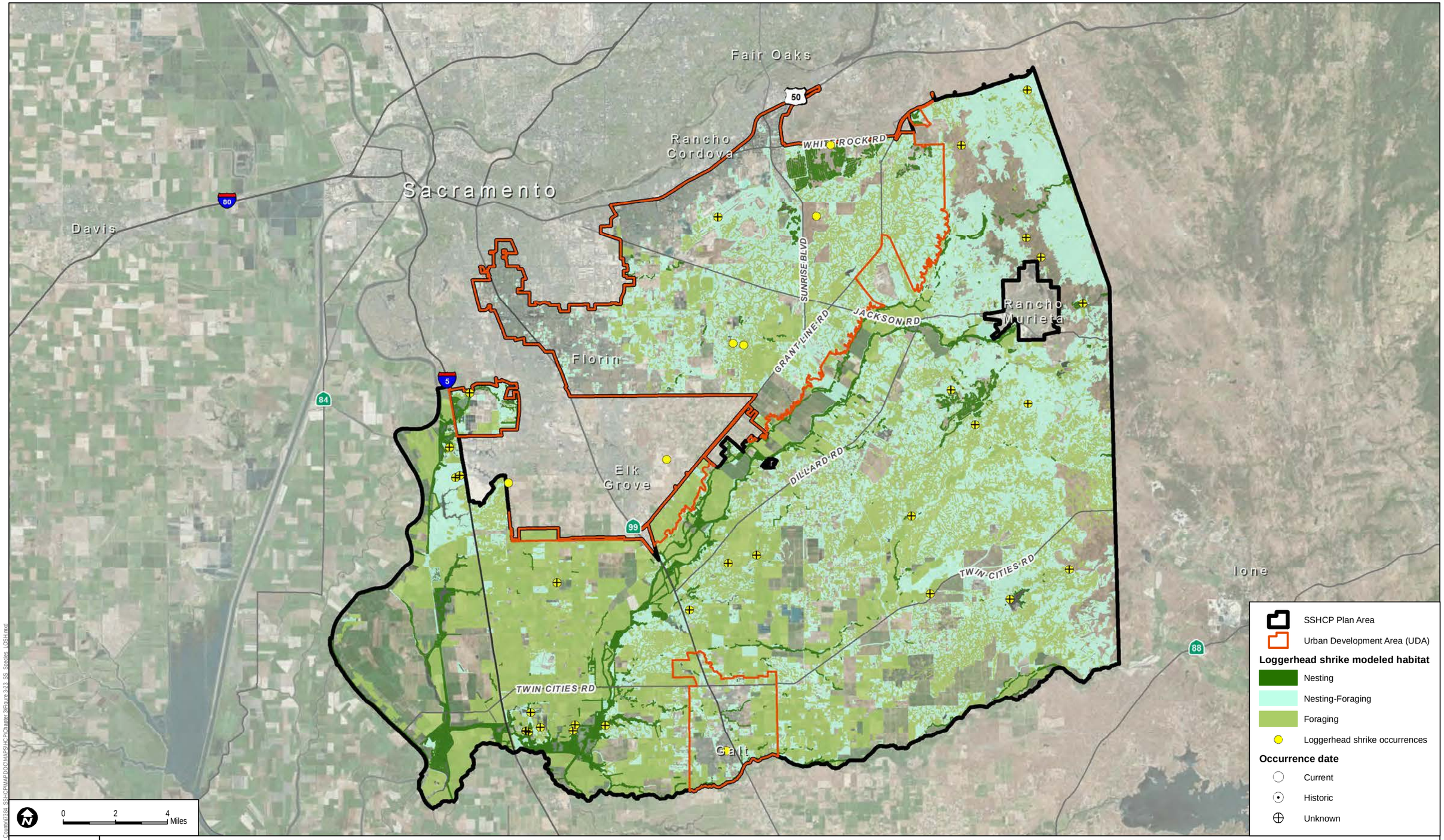
There are 70 documented occurrences of northern harrier within the Plan Area. Twelve are within the UDA including, four in PPU 1, two in PPU 2, two in PPU 3, two in PPU 4, and two in PPU 8. Fifty-eight occurrences are outside of the UDA, including five in PPU 5, 42 in PPU 6, seven in PPU 7, and four that are not within a PPU.

Model Assumptions

- Reported territory sizes for males range from 2 to 272 acres (0.8 to 110 hectares); females typically defend a smaller territory (Martin 1987; Simmons 1983).
- During the breeding season, reported average home range sizes from eight studies were 420 to 37,067 acres (170 to 15,000 hectares) (MacWhirter and Bildstein 1996).
- Males reportedly will hunt ≥10 kilometers (≥6 miles) from the nest (Barnard 1983; Thompson-Hanson 1984).
- Northern harriers occur in suitable habitat within the Plan Area and are probably regular breeders (Trochet, pers. comm. 2004); however, their overall range, abundance, and population structure are not well known.

Northern Harrier Habitat Model

Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Freshwater Marsh throughout the Plan Area. Modeled nesting habitat is Cropland, Irrigated Pasture-Grassland, and Valley Grassland throughout the Plan Area.



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE 3-23

Loggerhead Shrike Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2784_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-23_SS_Species_LOGSH.mxd

INTENTIONALLY LEFT BLANK

Figure 3-24 illustrates the location of modeled habitat as well as the documented occurrences of northern harrier within the Plan Area.

Swainson's Hawk (*Buteo swainsoni*)

Habitat Requirements

In the Central Valley of California, there are about 25 different tree species that have been utilized for nesting (CDFG 2010). The most common nest trees are Fremont's cottonwood (*Populus fremontii*), oaks (*Quercus* spp.), willows (*Salix* spp.), walnuts (*Juglans* spp.), eucalyptus (*Eucalyptus* spp.), pines (*Pinus* spp.), and Deodar cedar (*Cedrus deodara*). Most nest trees are associated with riparian systems. Schlorff and Bloom (1984) found 87% of all Swainson's hawk's nests in the Central Valley to be associated with riparian systems. Within his study area in parts of Yolo, Sacramento and San Joaquin Counties, Estep (1989) found 78% of nest trees to be in riparian systems. Swainson's hawk's nests are also found well away from waterways in lone trees in fields and pastures, in trees along roadside edges, in small groves, around farm buildings, and in some urban areas. Nest trees can also be found in proximity to farm buildings (Bloom 1980; Swolgaard 2004), often in large, well-established, exotic tree species or relict natives.

Nesting in completely urbanized areas is an unusual phenomenon that has recently been discovered in some particular urban settings: 1979 in Davis and 1983 in Stockton (D. Yee, pers. comm. 2004). Urban-nesting always occurs in association with suitable foraging habitat being relatively close to the nest (e.g., Stockton and Davis are surrounded in all directions by high-quality foraging habitat in suitable agricultural crops) (Holt pers. obs., as cited in SSHCP Appendix B).

Swainson's hawks forage successfully in a variety of farming habitats. Alfalfa is the crop that provides the highest foraging value due to high prey densities and regular harvesting and irrigation that make prey available for capture. However, a variety of suitable farming habitats also provide valuable foraging habitats at differing times and for different prey species during the period of time when Swainson's hawks are in the Plan Area. This mosaic of suitable foraging habitats provides the best opportunity for regular and successful hunting during the nesting season (Holt pers. obs., as cited in SSHCP Appendix B).

Dry pasture is largely comprised of annual grassland land covers and is grazed primarily by cattle during some part of the year. A large portion of the Swainson's hawk's historical habitat is believed to be similar to dry pasture, although the prey species, their abundance, and availability are likely quite different today as introduced grasses and forbs and introduced grazers now dominate this habitat (Holt pers. obs., as cited in SSHCP Appendix

B). Therefore, direct comparisons with historical conditions should be considered with caution. Swolgaard (2004) observed Swainson's hawks foraging in grassland habitats, but noted that its frequency of use was lower than expected based on its availability.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale. Suitable habitat for nesting includes mixed Riparian Woodland and Mixed Riparian Scrub (Table 3-2).

Occurrences within the Plan Area

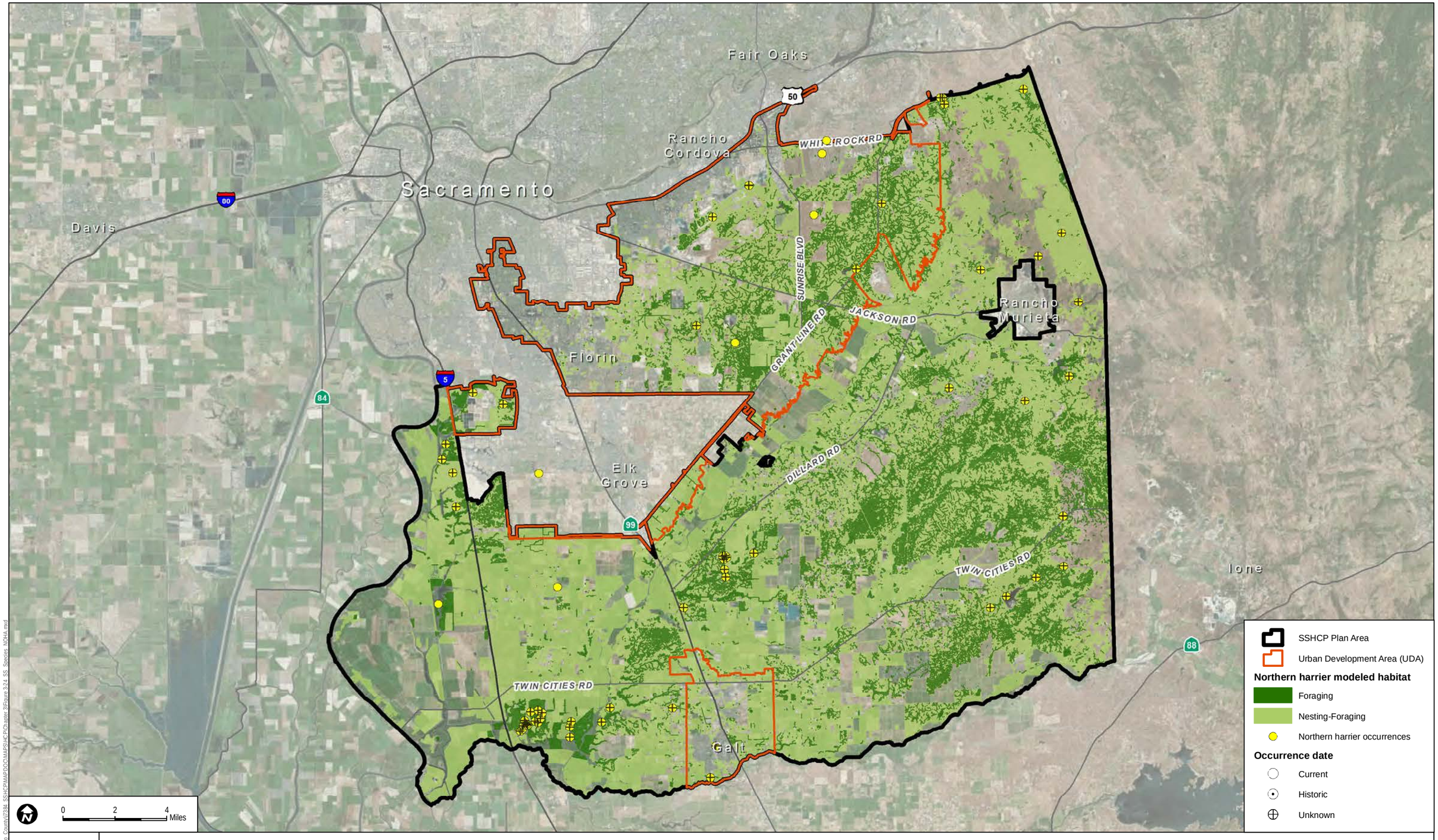
There are 410 documented occurrences of Swainson's hawk within the Plan Area. Sixty-two are within the UDA, including 10 within PPU 1, five in PPU 2, eight in PPU 3, 17 in PPU 4, 20 in PPU 8, and two that are not within a PPU. Three hundred and forty either are outside of the UDA, including 35 in PPU 5, 284 in PPU 6, 28 in PPU 8, and one that in not within a PPU.

Model Assumptions

- Radio-tagged male Swainson's hawks were recorded to travel as far as 17 miles (Estep 1989) and 18 miles (Babcock 1995) from a nest to exploit more favorable agricultural foraging opportunities.
- Estep (1989) found mean home ranges to be 6,818 acres. While Babcock (1995) plotted out 9,978 acres as the mean home range in his study area in eastern Yolo County.
- Swainson's hawks are typically not found at elevations above 500 feet in Sacramento County (Gifford et al. 2012).
- Swainson's hawk occurrences are recorded throughout the Plan Area (CDFG 2010; ebird.org 2005–2010; Estep 2006 and 2007; Gill Ranch Survey 2003).

Swainson's Hawk Habitat Model

Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale throughout the Plan Area at elevations below 500 feet. Modeled nesting habitat is mixed Riparian Woodland and Mixed Riparian Scrub throughout the Plan Area at elevations below 500 feet.



SOURCE: Bing Maps, County of Sacramento 2014, ebird.org

FIGURE 3-24

Northern Harrier Modeled Habitat and Documented Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2394 SSHCP\MAPS\CH\PCh\ater 3\Figure 3-24_SS_Species_NOHA.mxd

INTENTIONALLY LEFT BLANK

High-value habitat for Swainson's hawk is defined by the SSHCP as modeled foraging habitat occurring in the western portion of the Plan Area (within PPUs 4, 6, and 8).

Figure 3-25 illustrates the location of modeled habitat as well as the documented occurrences of Swainson's hawk within the Plan Area.

Tricolored Blackbird (*Agelaius tricolor*)

Habitat Requirements

During the breeding season, tricolored blackbirds typically nest in dense colonies (some estimated as having 200,000+ nests), with males defending small territories and mating with one to four females (Beedy and Hamilton 1999). They are also considered itinerant breeders, sometimes nesting more than once at different locations during the breeding season. Studies by Neff (1937) reported that nesting colonies are often located in seasonal wetlands with tules and cattails present. More recent studies indicate that nesting colonies are also regularly found in Himalayan blackberries (*Rubus discolor*) (Cook 1999) and grain fields (DeHaven 2000). Other substrates where they have been observed nesting include giant European reed (*Arundo donax*), safflower (*Carthamus tinctorius*) (DeHaven et al. 1975), tamarisk (*Tamarix* spp.), elderberry (*Sambucus* spp.), poison-oak (*Toxicodendron diversilobum*), and riparian scrublands and forests (e.g., *Salix, Populus*, and *Fraxinus* spp.) (American Birds file data).

Tricolored blackbird foraging habitats in all seasons include annual grasslands, wet and dry vernal pools and other seasonal wetlands, agricultural fields (such as large tracts of alfalfa and pastures with continuous haying schedules, and recently tilled fields), cattle feedlots, and dairies. They also forage occasionally in Mixed Riparian Scrub habitats along marsh borders. Weed-free row crops, intensively managed vineyards, and orchards do not serve as regular foraging sites (Beedy and Hamilton 1997, 1999; DeHaven 2000).

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, and Open Water. Suitable habitat for nesting includes Cropland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh (Table 3-2).

Occurrences within the Plan Area

There are 36 documented occurrences of tricolored blackbird within the Plan Area. Twenty-two occurrences are within the UDA, including three in PPU 2, 15 in PPU 3, one in PPU 4, and three

that are not within a PPU. Fourteen occurrences are outside of the UDA, including three in PPU 5, four in PPU 6, five in PPU 7, and two that are not within a PPU.

Model Assumptions

- Over the past couple of decades tricolored blackbird colony sites have been documented throughout the Plan Area.
- DeHaven et al. (1975) banded 33,058 nestlings and only 39% of band recoveries were re-located within 16 kilometers (10 miles) of natal colonies.
- Most tricolored blackbirds forage within five kilometers (three miles) of their colony sites (Orians 1961), but commute distances of up to 13 kilometers (8 miles) have been reported (Hamilton, pers. comm. 2004).

Tricolored Blackbird Habitat Model

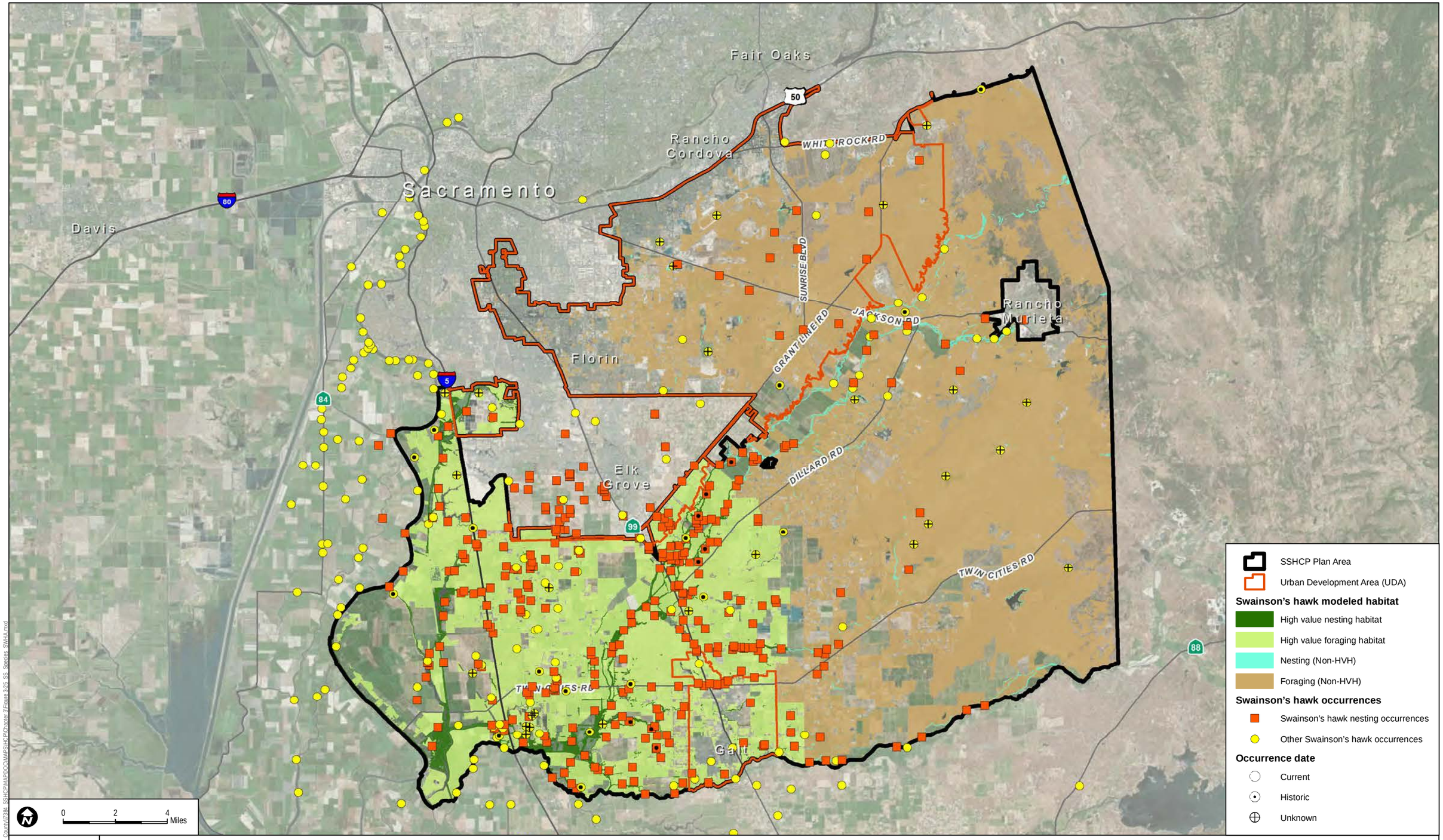
Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, and Open Water throughout the Plan Area. Modeled nesting habitat is Cropland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh throughout the Plan Area.

Figure 3-26 illustrates the location of modeled habitat as well as the documented occurrences of tricolored blackbird within the Plan Area.

Western Burrowing Owl (*Athene cunicularia hypugaea*)

Habitat Requirements

The most important habitat consideration for burrowing owls is the availability of underground burrows throughout their life cycle. Throughout their range, they use burrows excavated by fossorial mammals or reptiles (Karalus and Eckert 1987). Where the number and availability of natural burrows are limited, owls may occupy other natural and unnatural sites such as rock outcrops (Gleason and Johnson 1985; Rich 1986), concrete and asphalt (Trulio 1994), cavities under piles of rubble, drainage culverts, discarded pipe and other tunnel-like structures, and human-made artificial burrows (Collins and Landry 1977).



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, BIOS 2012, ESTEP Environmental 2006, ebird.org

FIGURE 3-25

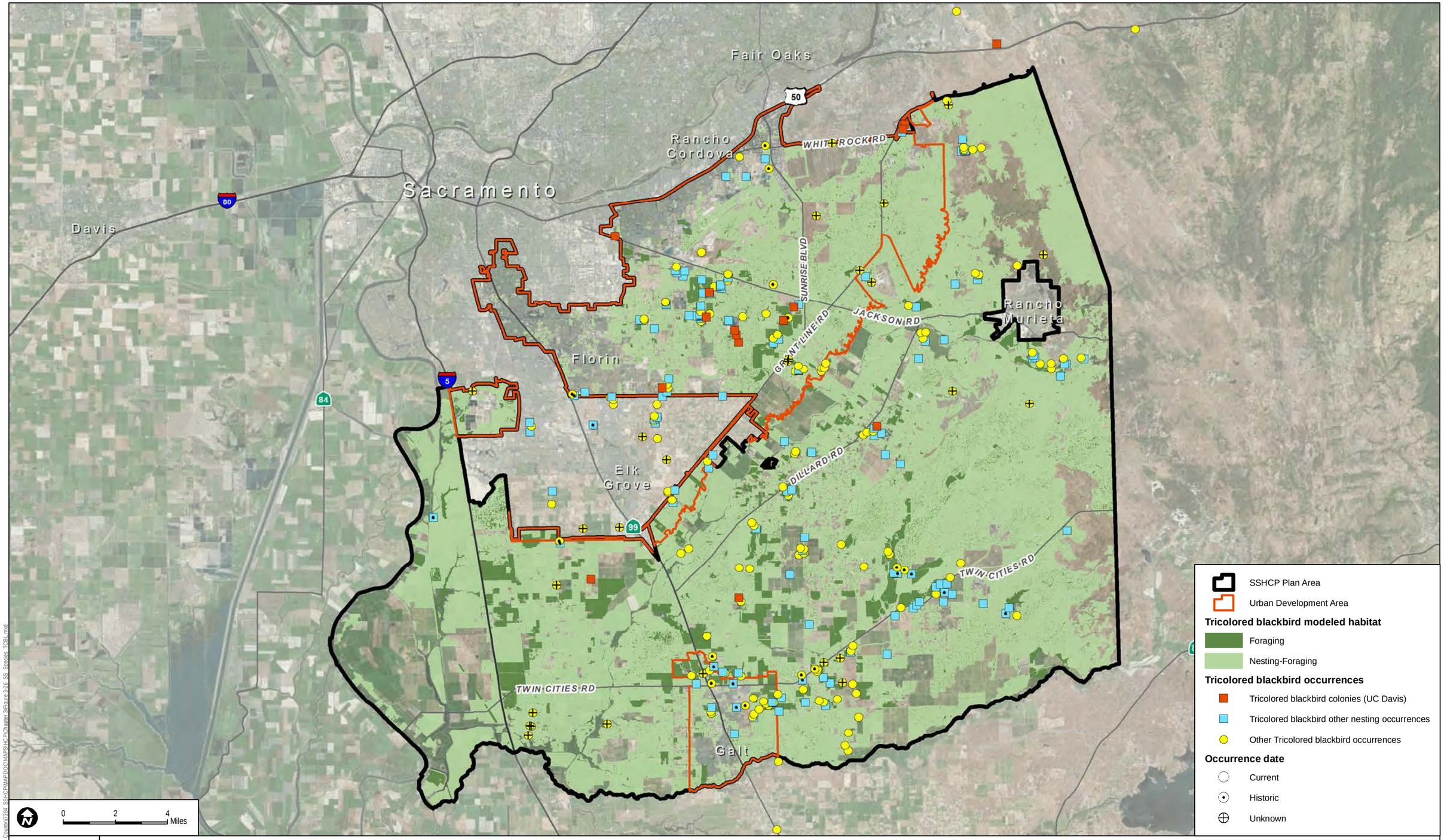
Swainson's Hawk Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2384 SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-25_SS_Species_SWHA.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, UC Davis 2014, CDFG 2012, BIOS 2012, Lizette Cook 1997, ebird.org

FIGURE 3-26

Tricolored Blackbird Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-26_SS_Species_TCBI.mxd

INTENTIONALLY LEFT BLANK

Over their range, burrowing owls inhabit grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of Cropland), earthen levees and berms, coastal uplands, and urban vacant lots, as well as the undeveloped margins of airports, golf courses, roads, and railroad beds. In California, the four cover types most frequently occupied by burrowing owls are: grasslands adjacent to intensive agriculture; intensive agriculture where owls nest along irrigation banks; large, unfragmented grasslands; and small grassland and ruderal patches surrounded by and adjacent to urban development (Rosenberg and DeSante 1997; Rosenberg and Haley 2004).

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable foraging habitat based on life history descriptions include Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Stream/Creek (VPIH); suitable habitat for nesting include Valley Grassland, Blue Oak Savanna, Cropland, and Irrigated Pasture-Grassland (Table 3-2).

Occurrences within the Plan Area

There are 97 documented occurrences of western burrowing owl within the Plan Area. Thirty-six are within the UDA, including two in PPU 1, 16 in PPU 2, two in PPU 3, 12 in PPU 4, and four that are not within a PPU. Sixty-one are outside of the UDA, including three in PPU 1, one in PPU 5, 30 in PPU 6, 23 in PPU 7, and four that are not within a PPU.

Model Assumptions

- During the breeding season, adult male Burrowing Owls have been documented foraging over a range of 0.8 to 1.2 square miles (2 to 3 square kilometers) (Haug and Oliphant 1987), and primarily within 0.4 mile (600 meters) of the nest burrow (Gervais et al. 2003; Rosenberg and Haley 2004).
- In two burrowing owl demography studies conducted in the San Francisco Bay Area, owls moved an average distance of 0.5 to 0.9 mile (0.8 to 1 kilometers) between breeding seasons. Of this sample population, 27% remained at the same nest site; 14% dispersed less than 265 feet (81 meters) away; 34% dispersed 0.05 to 0.5 mile (80 to 805 meters); 8% dispersed 0.5 to 1.0 mile (805 meters to 2 kilometers); 14% dispersed 1 to 5 mile (2 to 8 kilometers); and 2% moved 5 to 10 miles (8 to 16 kilometers) (Chromczak unpublished data, cited in CBD et al. 2003).
- Western burrowing owls occur in suitable habitat throughout the Plan Area; however, their overall distribution, abundance, and population structure are not well known.

- Although burrowing owl populations have declined or disappeared from much of their historical habitat, outlying areas of Sacramento County still provide suitable habitat for the species. Burrowing owls are known to occupy patches of habitat in the western part of the Plan Area that extend from the Sacramento Regional County Sanitation District Bufferlands (Jones, pers. comm. 2004) to The Nature Conservancy's Cosumnes River Preserve (Reiner, pers. comm. 2004), as well as patches of habitat in the rolling grasslands in eastern Sacramento County. The Meadowview and Pocket areas within the City of Sacramento (outside the Plan Area) support disjunct, isolated populations north to Florin Road.

Western Burrowing Owl Habitat Model

Modeled wintering habitat is Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Stream/Creek (VPIH) throughout the Plan Area. Modeled nesting habitat is Valley Grassland, Blue Oak Savanna, Cropland, and Irrigated Pasture-Grassland throughout the Plan Area.

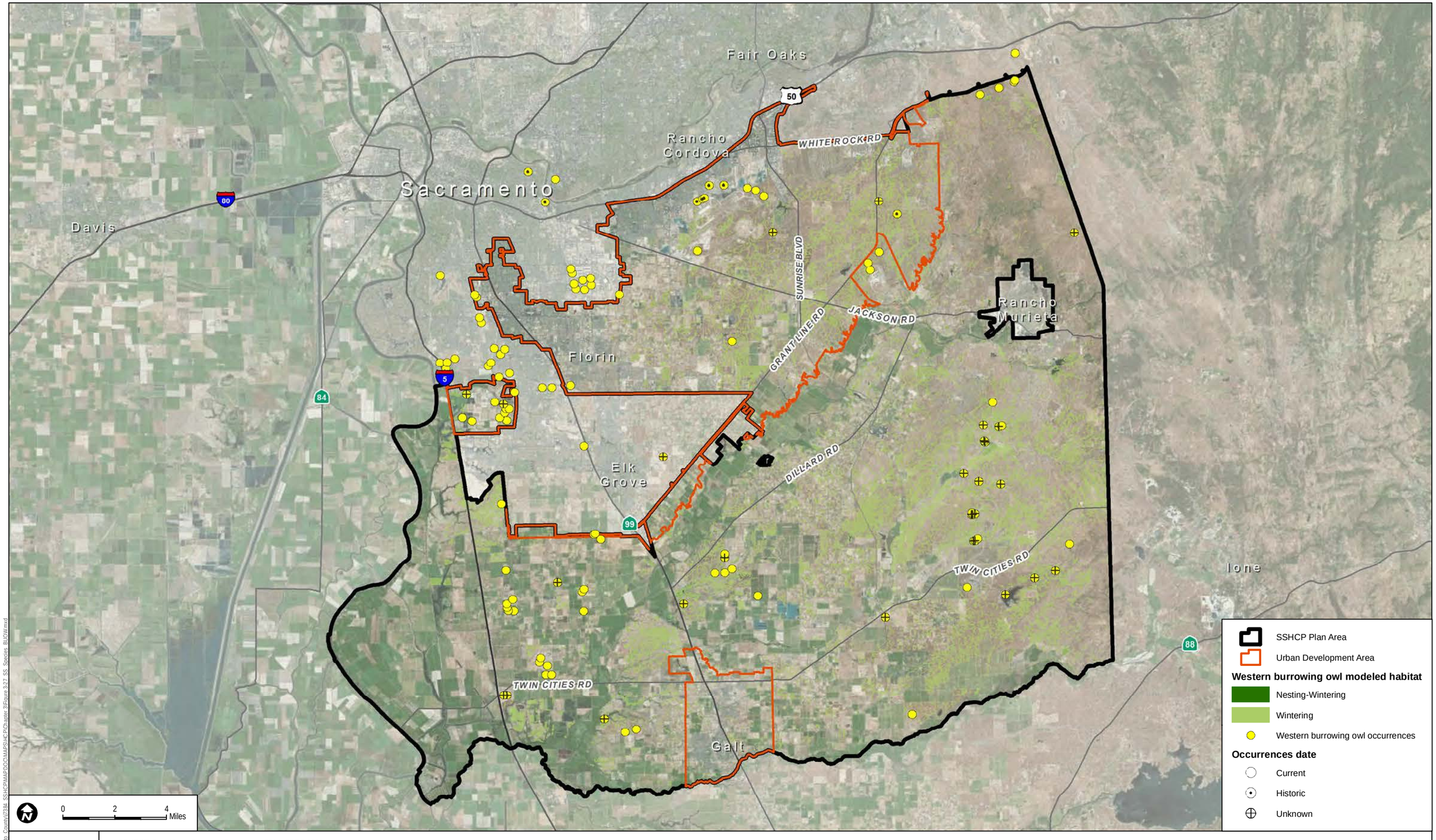
Figure 3-27 illustrates the location of modeled habitat as well as the documented occurrences of western burrowing owl within the Plan Area.

White-Tailed Kite (*Elanus leucurus*)

Habitat Requirements

White-tailed kites generally inhabit low-elevation grasslands, wetlands dominated by grasses, oak woodlands, and agricultural and riparian areas (Dunk 1995). Nest sites are rarely found in isolated trees. They are usually located on the edge of riparian habitats, or in hedgerows and groups of trees, and are commonly found adjacent to natural vegetation, pasture crops (alfalfa) and sugar beets (Sloat, as cited in SSHCP Appendix B).

White-tailed kites use a variety of habitat types for foraging and the importance of these habitats is dependent on vegetation structure and prey abundance. Lightly grazed or ungrazed grasslands/pastures support larger prey populations and are thus considered more suitable, although intensively cultivated areas are also used (Dunk 1995). In cultivated areas, perennial crops such as alfalfa and sugar beets tend to support higher prey numbers, and White-tailed kite nest densities have been highly correlated with these two crops (Erichsen et al. 1994). Warner and Rudd (1975) reported that foraging primarily occurred in two habitat types, riparian and irrigated cultivated land (e.g., alfalfa, tomatoes, sugar beets).



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, Chris Conrad 2004, Ebird.org, TNC

FIGURE 3-27

Western Burrowing Owl Modeled Habitat and Documented Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7285 SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-27 SS Species BUOW.mxd

INTENTIONALLY LEFT BLANK

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, and Swale. Suitable habitat for nesting include Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub (Table 3-2).

Occurrences within the Plan Area

There are 62 documented occurrences of white-tailed kite within the Plan Area. Twenty are within the UDA including two in PPU 1, seven in PPU 2, four in PPU 3, two in PPU 4, one in PPU 8, and four that are not within a PPU. Forty-two are outside the UDA, including five in PPU 5, 34 in PPU 6, and three that are not within a PPU.

Model Assumptions

- Territory sizes estimated along the south coast of California near Long Beach ranged from 22 to 128 acres (nine to 52 hectares) (Waian 1973) and near San Diego from 42 to 217 acres (17 to 88 hectares) (Henry 1983).
- During winter and the breeding season, Warner and Rudd (1975) found foraging from nest or perch sites extended up to 2 miles, but most were less than 0.6 mile.
- No regularly occurring surveys have been conducted throughout the SSHCP Study Area, however, White-tailed kites are known to nest or forage throughout the Study Area (Conard, pers. comm. 2004).

White-Tailed Kite Habitat Model

Modeled foraging habitat is Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, and Swale throughout the Plan Area. Modeled nesting habitat is Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Plan Area.

Figure 3-28 illustrates the location of modeled habitat as well as the documented occurrences of white-tailed kite within the Plan Area.

3.4.6 Mammals

American Badger (*Taxidea taxus*)

Habitat Requirements

American badger occurs in a variety of open habitats, including grasslands, shrublands, savannas, and meadows. The Plan Area is within American badger's range in California. American badgers have been documented in the northeastern portion of the Plan Area.

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat based on life history descriptions include Blue Oak Savanna, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale (Table 3-2).

Occurrences within the Plan Area

There are nine documented occurrences of American badger within the Plan Area. Eight are within the UDA, including one in PPU 1 and seven in PPU 2. One occurrence is outside of the UDA in PPU 1.

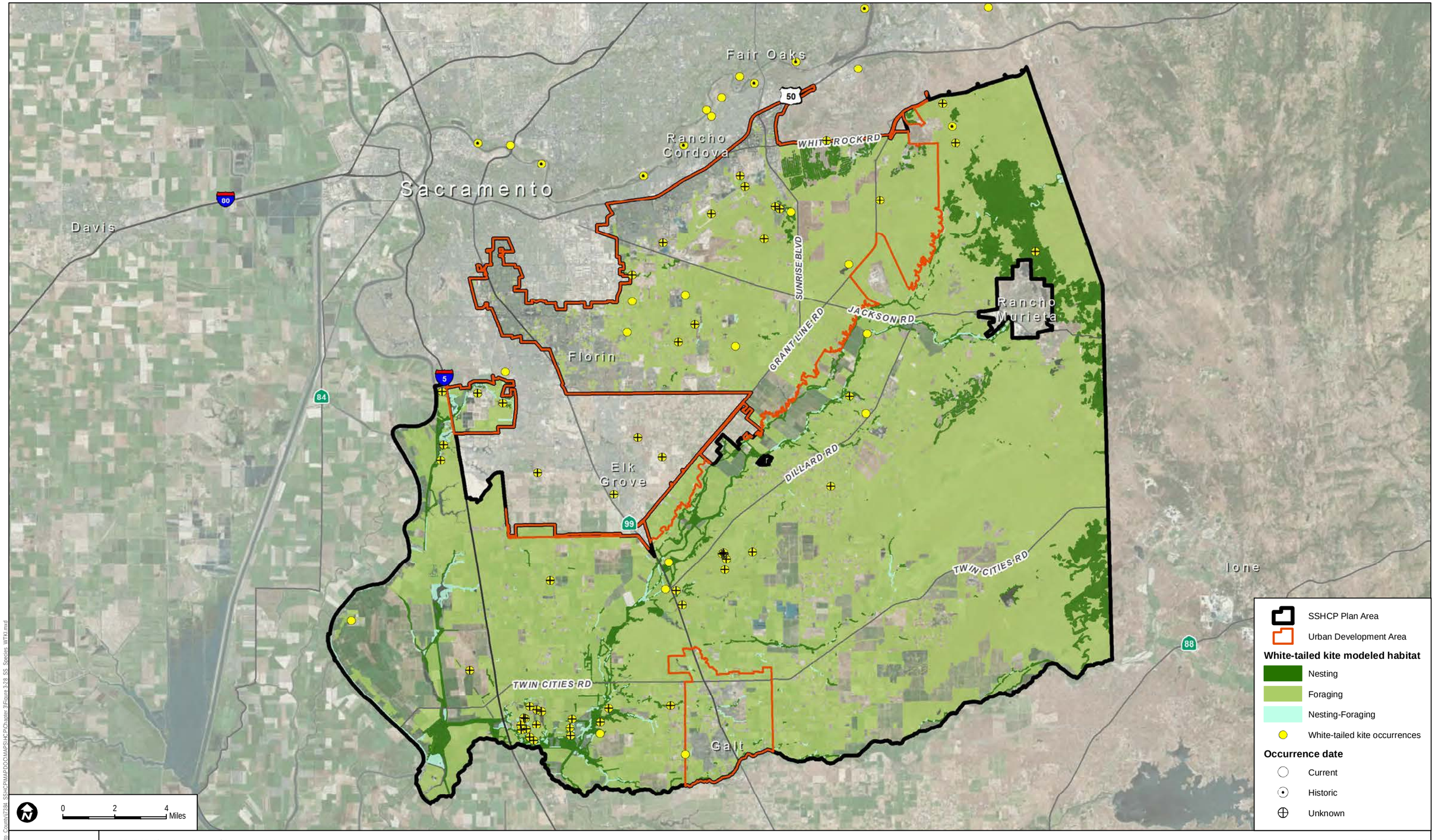
Model Assumptions

- Female and male home range sizes in Utah have been estimated at 338–751 acres and 1,327–1,549 acres, respectively (Lindzey 1978). In Idaho, female and male badger home ranges averaged 400 acres and 600 acres, respectively (Messick and Hornocker 1981).
- The SSHCP Study Area is positioned within American badger's California range; and Badgers have been documented in the northeastern portion of the Plan Area.
- Badgers require large relatively undisturbed areas; therefore, primary habitat occurs in the eastern grasslands and rangelands of the Plan Area.

American Badger Habitat Model

Modeled habitat is Blue Oak Savanna, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale within rural portions of the Plan Area.

Figure 3-29 illustrates the location of modeled habitat as well as the documented occurrences of American badger within the Plan Area.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ESTEP 2006, ebird.org

FIGURE 3-28

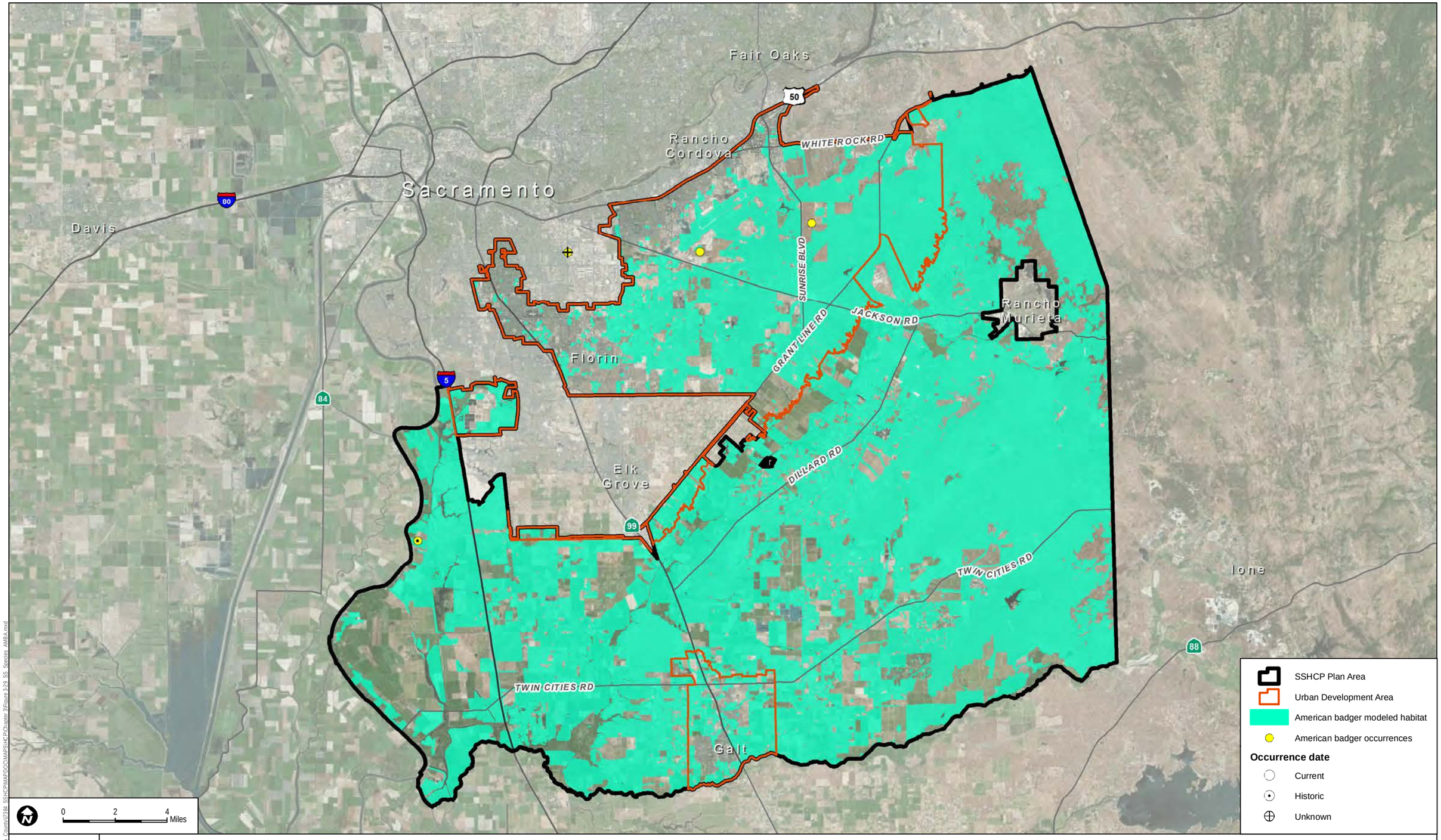
White-Tailed Kite Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7295_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-28_SS_Species_WTKI.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012

FIGURE 3-29

American Badger Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento County\2394 SSHCP\MAPS\CH3\Chapter 3\Figure 3-29 SS_Species_AMBA.mxd

INTENTIONALLY LEFT BLANK

Western Red Bat (*Lasiurus blossevillii*)

Habitat Requirements

Western red bat roosts in the foliage of large shrubs and trees in habitats bordering forests, rivers, agricultural areas, and urban areas (Harvey et al. 1999). Roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas with mature trees (Western Bat Working Group 1998). Pierson et al. (1999) describe roosting habitat as large diameter riparian cottonwoods and sycamores, and older orchard trees (particularly walnuts).

Foraging has been noted in habitats such as mature orchards, oak woodland, low elevation conifer forest, and non-native trees in urban and rural residential areas. In addition, this species may forage in habitats adjacent to streams and rivers that do not provide roosting habitat. Water features are a vital habitat component because bats often drink immediately after emergence and water is an important source of concentrated insects (Johnson, as cited in SSHCP Appendix B).

Land Cover Types Relevant to Habitat Requirements

SSHCP land cover types that provide suitable habitat for foraging based on life history descriptions include Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, Open Water, and Stream/Creek. Suitable habitat for roosting include Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, and Mixed Riparian Woodland (Table 3-2).

Occurrences within the Plan Area

There are seven documented occurrences of western red bat within the Plan Area. Five are within the UDA including one in PPU 2, one in PPU 8 and three that are not within a PPU. Two occurrences are outside of the UDA including one in PPU 5 and one in PPU 7.

Model Assumptions

- Data regarding reported territory sizes and distances traveled between roosting and foraging sites is not available.
- Fifty-six records for the western red bat (1977 to 2002) varied in location precision from "Sacramento County" to "Sacramento" to an actual address. Over 30 western red bats were from localities reported as the City of Sacramento, Folsom, Rancho Cordova, Wilton, Elk Grove, and Galt (Constantine, unpubl. data 2004).

Western Red Bat Habitat Model

Modeled foraging habitat is Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, Open Water, and Stream/Creek throughout the Plan Area. Modeled roosting habitat is Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, and Mixed Riparian Woodland throughout the Plan Area.

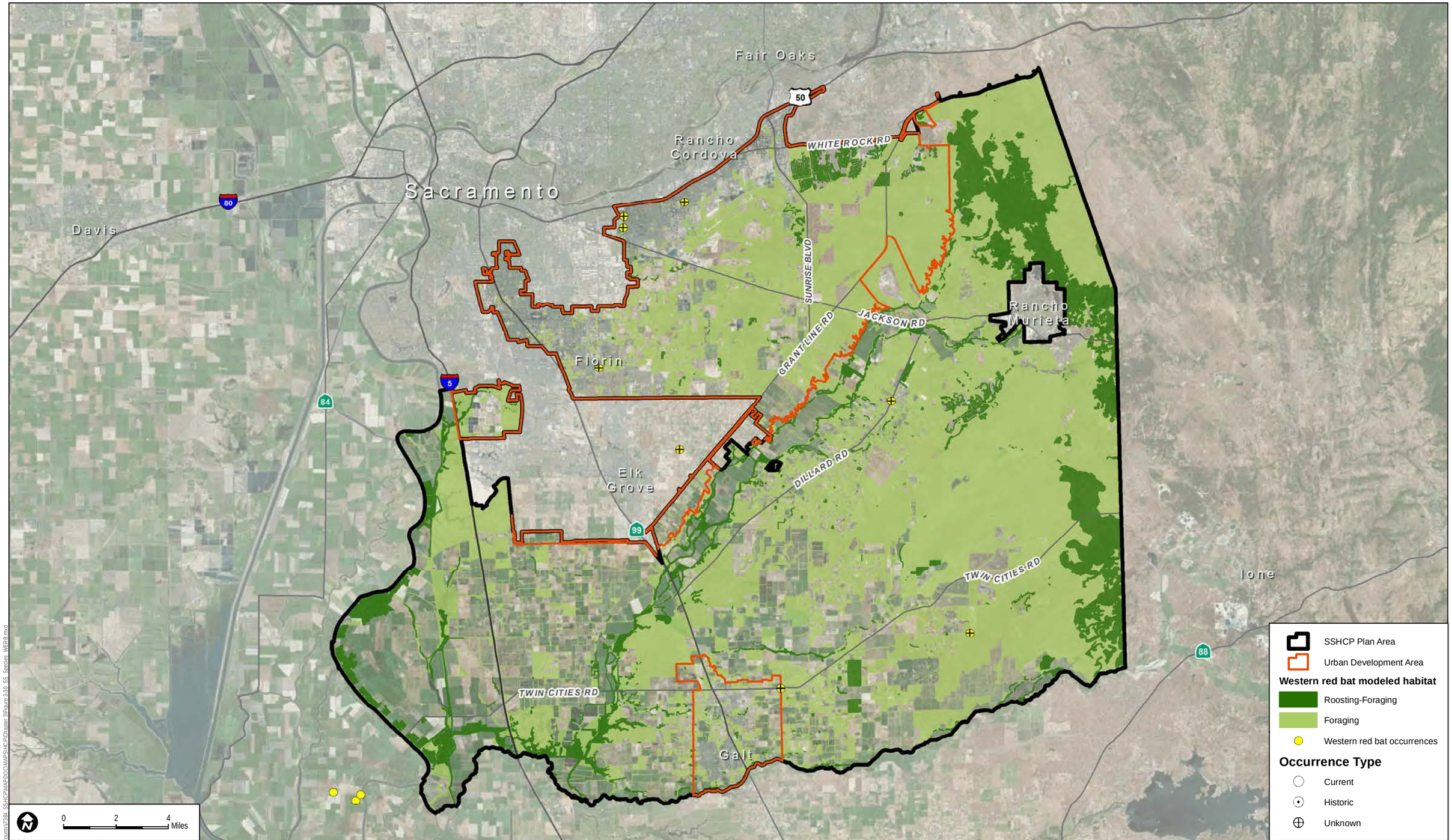
Figure 3-30 illustrates the location of modeled habitat as well as the documented occurrences of western red bat within the Plan Area.

3.5 Existing Preserves in the Plan Area

The Plan Area includes several established existing Preserves both inside and outside of the UDA. Existing Preserves within the Plan Area totals approximately 64,500 acres and includes wildlife refuges, nature preserves, lands under conservation easements, conservation/mitigation banks, and individual project mitigation sites. Of the approximately 64,500 acres of existing Preserve, approximately 3,170 acres are inside the UDA and about 61,330 acres are outside the UDA (Figure 3-40).

The largest grouping of existing Preserves inside the UDA occurs in the Sacramento Valley Vernal Pool Prairie Preserve area located south of Jackson Highway between Excelsior and Eagles Nest roads north of Grant Line Road in PPU 3. The Preserve area includes lands under conservation easement or owned by the Sacramento Valley Conservancy, two conservation or mitigation banks: Arroyo Seco, Bryte Ranch, and other mitigation sites. Other sites with permanent conservation easements are scattered throughout the UDA, with concentrations occurring along northern Laguna Creek, sites within the City of Rancho Cordova, at the Sacramento Regional County Sanitation District Bufferlands and at the Keifer Landfill Bufferlands. Preserved lands at the Sacramento Regional County Sanitation District Bufferlands are on termed easements.

Outside of the UDA, significant Preserves and conservation banks are established west of Interstate 5 (PPU 6), within the Cosumnes River floodplain (PPU 6), and in eastern Sacramento County (PPU 7). Major Preserves larger than 500 acres include the Stone Lakes National Wildlife Refuge, Deer Creek Hills, Chance Ranch, Borden Ranch, Snyder Preserve, Clay Station Conservation Bank, Laguna Terrace Conservation Bank, Gill Ranch Conservation Bank, Elliot mitigation site, Delta Meadows, Sacramento Municipal Utilities District (SMUD) mitigation site, and the Cosumnes River Preserve. Smaller conservation sites are distributed within the Cosumnes River and Deer Creek corridor, eastern Sacramento County grasslands, and agricultural lands west of State Route 99. In addition to established Preserves, the conservation network outside of the UDA includes conservation/mitigation banks with available conservation credits approved by USFWS and the U.S. Army Corps of Engineers.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012

FIGURE 3-30

Western Red Bat Modeled Habitat and Documented Occurrences

Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-30_SS_Species_WERB.mxd

INTENTIONALLY LEFT BLANK

Because existing Preserves generally are located in areas with high resource value, they will provide important existing "building blocks" that the SSHCP Plan Permittees considered during the development of the SSHCP Conservation Strategy, including the proposed SSHCP Preserve System. As discussed in Chapter 7, the SSHCP Conservation Strategy supplements, complements, and links together the existing Preserves by establishing new SSHCP Preserves adjacent to these existing Preserves. Although the Implementing Entity will use existing Preserves to build from, the SSHCP does not count acres of existing Preserves toward achieving the SSHCP Biological Goals and Objectives, and the SSHCP does not seek conservation "credits" for the existing Preserves. Nonetheless, the existing Preserves have conserved resources within the Plan Area, and help to inform the development of the SSHCP conservation strategy by providing building blocks from which the SSHCP Preserve System can grow.

3.6 SSHCP Covered Species Critical Habitat

Federal Critical Habitat has been designated for six of the SSHCP Covered Species: vernal pool species (slender Orcutt grass, Sacramento Orcutt grass, vernal pool fairy shrimp, and vernal pool tadpole shrimp), valley elderberry longhorn beetle, and California tiger salamander.

On August 11, 2005, the USFWS designated Critical Habitat units for four vernal pool crustaceans and 11 vernal pool species, including slender Orcutt grass, Sacramento Orcutt grass, vernal pool fairy shrimp, and vernal pool tadpole shrimp. On February 10, 2006, USFWS identified Critical Habitat units for each individual species identified in the 2005 final rule: 597,821 total acres of Critical Habitat for vernal pool fairy shrimp, 228,785 total acres of Critical Habitat for vernal pool tadpole shrimp, 33,273 total acres of Critical Habitat for Sacramento Orcutt grass, and 94,213 total acres of Critical Habitat for slender Orcutt grass (USFWS 2006).

3.6.1 Slender Orcutt Grass and Sacramento Orcutt Grass

USFWS has designated 33,273 acres of Critical Habitat for Sacramento Orcutt grass, and 94,213 acres of Critical Habitat for slender Orcutt grass (USFWS 2006).

Within the Plan Area, PPU 2 includes 527 acres of Critical Habitat for both slender Orcutt grass and Sacramento Orcutt grass. PPU 7 includes 9,587 acres of Critical Habitat for just Sacramento Orcutt grass. Of the 9,587 acres of Critical Habitat for Sacramento Orcutt grass within PPU 7, 4,444 acres occur within existing Preserves.

The primary constituent elements of Critical Habitat for Sacramento Orcutt grass (*Orcuttia viscida*) and slender Orcutt grass (*Orcuttia tenuis*) are as follows:

1. Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing

surface water in the depressional features including swales connecting the pools described in paragraph (c)(12)(ii) of this section, providing for dispersal and promoting hydroperiods of adequate length in the pools; and

2. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

3.6.2 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

As discussed above, USFWS designated 597,821 acres of Critical Habitat for vernal pool fairy shrimp and 228,785 acres of Critical Habitat for vernal pool tadpole shrimp (USFWS 2006).

Within the Plan Area, Critical Habitat for vernal pool fairy shrimp (13-Mather Unit, 14A and 14B-Cosumnes Unit) and vernal pool tadpole shrimp (8-Mather Unit, 9A and 9B-Cosumnes Unit) overlaps exactly and include 1,204 acres in PPU 2, 29,534 acres in PPU 7, and less than 0.1 acre in PPU 5. Of the 1,204 acres of Critical Habitat for within PPU 2, 7.3 acres of Critical Habitat occur within existing Preserves. Of the 29,534 acres of Critical Habitat within PPU 7, 13,223 acres of Critical Habitat occur within existing Preserves.

USFWS (2006) described the primary constituent elements for vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*) as follows:

1. Topographic features characterized by mounds, swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting vernal pools, providing for dispersal and promoting hydroperiods of adequate length in the pools.
2. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for species incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.
3. Sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within

the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding.

4. Structure within the pools described in paragraph (c)(3)(ii) of this section, consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter.

3.6.3 Valley Elderberry Longhorn Beetle

On August 8, 1980 (USFWS published the final rule listing the valley elderberry longhorn beetle as a threatened species, and designating Critical Habitat within two areas within Sacramento. The Critical Habitat was designated in two units: Sacramento Zone and American River Parkway Zone. These two units lie outside the Plan Area and are not considered further in the SSHCP.

3.6.4 California Tiger Salamander

On August 25, 2005, USFWS published the final rule designating Critical Habitat for the central population of the California tiger salamander, within 19 counties in California (USFWS 2005a). The USFWS Critical Habitat designation included 97,045 acres in the Central Valley, 20,293 acres in southern San Joaquin, 68,873 acres in the East Bay, and 12,898 acres in the Central Coast, totaling 199,109 acres.

The Plan Area includes 7,420 acres of California tiger salamander Critical Habitat within PPU 7 (designated as California tiger salamander Critical Habitat unit 3)., USFWS 2005a described the primary constituent elements for the central population of California tiger salamander as follows:

1. Standing bodies of fresh water (including natural and created (e.g., stock)) ponds, vernal pools, and other ephemeral or permanent water bodies, which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall.
2. Upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other underground habitat that California tiger salamander depend on for food, shelter, and protection from the elements and predation.
3. Accessible upland dispersal habitat between occupied locations that allow for movement between such sites.

Of the 7,420 acres of Critical Habitat for California tiger salamander within PPU 7, 3,436 acres of Critical Habitat occur within existing Preserves.

3.7 SSHCP Covered Species Recovery Plans

Federal recovery plans have been published for 12 SSHCP Covered Species including Ahart's dwarf rush, Boggs Lake hedge-hyssop, legenere, pincushion navarretia, slender Orcutt grass, Sacramento Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, western spadefoot, and valley elderberry longhorn beetle. In addition, a draft Recovery Plan has been published for giant gartersnake.

3.7.1 Vernal Pool Species

USFWS published the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon in 2005 for 33 species (20 listed species and 13 species of concern), including Ahart's dwarf rush, Boggs Lake hedge-hyssop, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, and western spadefoot (USFWS 2005b). It delineates two large core recovery areas in the Plan Area: (1) the Mather Core Recovery Area located within the UDA; and (2) the Cosumnes/Rancho Seco Core Recovery Area, located outside of the UDA. According to USFWS (2005c), the "core areas are the specific sites that are necessary to recover these endangered or threatened species or to conserve sites that are necessary to recover these endangered or threatened species or to conserve the species of concern addressed in this recovery plan." USFWS (2005c) also states that "the core areas were developed in part using critical habitat boundaries, but the two areas differ in that core areas not included in critical habitat have no legal mandate for protection under the Endangered Species Act and solely rely upon voluntary implementation." The Recovery Plan focuses on five elements: (1) habitat protection, (2) adaptive habitat management and monitoring, (3) status surveys, (4) research, and (5) public participation and outreach. The Recovery Plan establishes recovery criteria for these five elements (USFWS 2005b):

1. Habitat protection criteria:
    a. Suitable vernal pool habitat within each prioritized core area for the species is protected.
    b. Species occurrences distributed across the species' geographic and genetic range are protected. Protection of extreme edges of populations protects the genetic differences that occur there.
    c. Reintroductions and introductions must be carried out and meet success criteria established in action 2.5.3.7.
    d. Additional occurrences identified through future site assessments, GIS and other analyses, and status surveys that are determined essential to recovery are protected.

Any newly found occurrences may count towards recovery goals if the occurrences are permanently protected as described in this plan.

e. Habitat protection results in protection of hydrology essential to vernal pool ecosystem function, and monitoring indicates that hydrology that contributes to population viability has been maintained through at least one multi-year period that includes above average, average, and below average local rainfall as defined above, a multi-year drought, and a minimum of 5 years of post-drought monitoring (see Chapter 3).

Table 3-3 depicts the species-specific recovery criteria for the vernal pool species in the Mather Core Recovery Area. The Mather Core Recovery Area has been designated as Zone 1.[1]

Table 3-3
Recovery Criteria for the Mather Core Recovery Area and Cosumnes/Rancho Seco Recovery Area

Common Name	Percent Occurrences to Protect	Percent Suitable Habitat to Protect in Each Core Recovery Area	Reintroductions/ Introductions	Collection Sources
Boggs Lake hedge-hyssop	80% (to conserve)	**Mather Core** 95% (to conserve)	Reintroduce to vernal pool regions and soil types from which status surveys indicate species has been extirpated to conserve.	At least one population from each core area.
Ahart's dwarf rush	100% (to conserve)	**Mather Core** 95% (to conserve)	Reintroduce to vernal pool regions and soil types from which status surveys indicate species has been extirpated to conserve.	Each population.
Legenere	80% (to conserve)	**Mather Core** 95% (to conserve) **Cosumnes/Rancho Seco** 95% (to conserve)	Reintroduce to vernal pool regions and soil types from which status surveys indicate species has been extirpated to conserve.	At least one population from each core area.
Slender Orcutt grass	80% (to delist)	95% (to delist)	Reintroduce to vernal pool regions and soil types from which status surveys indicate species has been extirpated to delist.	Each vernal pool region. Mather Core Recovery Area contains small populations or few occurrences and should

[1] "Core areas were identified as Zone 1 in cases where they were occupied by very narrowly endemic species (with few populations and narrow or disjunct distributions that are known to be, or are likely to be, genetically or ecologically distinct) or where the core area supported a high diversity of the species covered by this recovery plan. Protection of Zone 1 core areas is necessary to prevent the extinction or irreversible decline of one or more species" (USFWS 2005b, p. III-118).

Table 3-3
Recovery Criteria for the Mather Core Recovery Area and Cosumnes/Rancho Seco Recovery Area

Common Name	Percent Occurrences to Protect	Percent Suitable Habitat to Protect in Each Core Recovery Area	Reintroductions/ Introductions	Collection Sources
				be a first source for seedbanking.
Sacramento Orcutt grass	100% (to delist/ downlist)	**Mather Core** 95% (to downlist) 100% (to delist) **Cosumnes/Rancho Seco** 95% (to downlist) 100% (to delist)	Reintroduce to appropriate soils in the Orangevale-Folsom area and Rancho Seco area to replace extirpated occurrences. Additional populations must be discovered or established in order to delist.	Each population.
Vernal pool fairy shrimp	80% (to delist)	**Mather Core** 85% (to delist) **Cosumnes/Rancho Seco** 85% (to delist)	Reintroduce to vernal pool regions and soil types from which status surveys indicate species has been extirpated to delist.	Not given.
Mid-valley fairy shrimp	80% (to delist)	**Mather Core** 95% (to conserve) **Cosumnes/Rancho Seco** 95% (to conserve)	Not given.	Not given.
Vernal tadpole shrimp	80% (to downlist) 100% of re-introduced populations (to delist)	**Mather Core** 95% (to downlist) **Cosumnes/Rancho Seco** 95% (to downlist)	Reintroduce to vernal pool regions and soil types from which status surveys indicate species has been extirpated to delist.	Not given.
Western spadefoot	80% (where it co-occurs with other vernal pool species) (to conserve)	**Mather Core** 85% (to conserve) **Cosumnes/Rancho Seco** 95% (to conserve)	Not given.	Not given.

2. Adaptive habitat management and monitoring criteria:

   a. Habitat management and monitoring plans that facilitate maintenance of vernal pool ecosystem function and population viability have been developed and implemented for all habitat protected in (1) A through E above. Plans must be developed and implemented within 5 years of protection of individual parcels/properties/areas to

ensure that populations are stable or increasing and progress toward reaching recovery goals is being made while additional habitat protections are being developed. Plans must include provisions for managing non-native and native competitors, appropriate grazing, fire or other management regimes, adaptive habitat management, incorporation of new information resulting from implementation of research actions, and addressing site-specific threats.

b. Mechanisms are in place to provide for management in perpetuity and long-term monitoring of (1) A through E above (e.g., funding, personnel).

c. Monitoring indicates ecosystem function has been maintained in the areas protected under (1) A through D for at least one multi-year period that includes above average, average, and below average local rainfall as defined above, a multi-year drought, and a minimum of 5 years of post-drought monitoring.

d. Seed banking actions have been completed for species that would require it as insurance against risk of stochastic extirpations or that will require reintroductions or introductions to contribute to meeting recovery criteria (see Table 3-3).

3. Status surveys criteria:

   a. Status surveys, 5-year status reviews, and population monitoring show populations within each vernal pool region where the species occur are viable (e.g., evidence of reproduction and recruitment) and have been maintained (stable or increasing) for at least one multi-year period that includes above average, average, and below average local rainfall as defined above, a multi-year drought, and a minimum of 5 years of post-drought monitoring. (Determining when this criterion is met may rely partly on completion of research actions to model population viability or development of standardized monitoring and survey protocols to determine appropriate parameters to measure during status surveys).

   b. Status surveys, status reviews, and habitat monitoring show that threats identified during and since the listing process have been ameliorated or eliminated. Site-specific threats identified through standardized site assessments and habitat management planning also must be ameliorated or eliminated (see Chapter 3).

4. Research criteria:

   a. Research actions necessary for recovery and conservation of the Covered Species have been identified (these are research actions that have not been specifically identified in the recovery actions but for which a process to develop them has been identified). Research actions (both specifically identified in the recovery actions and determined through the process) on species biology and ecology, habitat management and restoration, and methods to eliminate or ameliorate threats have been completed

and incorporated into habitat protection, habitat management and monitoring, and species monitoring plans, and refinement of recovery criteria and actions.

b. Research on genetic structure has been completed (for species where necessary for reintroduction and introduction, seed banking) and results incorporated into habitat protection plans to ensure that within and among population genetic variation is fully represented by populations protected in Habitat Protection (1) A through E above.

c. Research necessary to determine appropriate parameters to measure population viability for each species have been completed (see Chapter 3).

5. Public participation and outreach criteria:

   a. Recovery Implementation Team is established and functioning to oversee range-wide recovery efforts.

   b. Vernal Pool Region working groups are established and functioning to oversee regional recovery efforts.

   c. Participation plans for each Vernal Pool Region have been completed and implemented.

   d. Vernal Pool Region working groups have developed and implemented outreach and incentive programs that develop partnerships contributing to achieving recovery criteria 1-4 (see Chapter 3).

6. The Recovery Plan indicates that an HCP that addresses the species in the Vernal Pool Recovery Plan may be considered equivalent to the Vernal Pool Recovery Plan if the HCP addresses the six elements described below.

   a. Permanently protected Vernal Pool Preserves within the area covered by the Habitat Conservation Plan in large contiguous blocks of suitable habitat.

   b. Protection of the entire genetic range of each listed species within the area covered by the Habitat Conservation Plan.

   c. Protection of all populations of species with 25 or fewer total occurrences addressed in this plan within the area covered by the Habitat Conservation Plan.

   d. Connectivity with other Preserves within the area covered by the Habitat Conservation Plan.

   e. Adaptive management of the Preserves within the area covered by the Habitat Conservation Plan to support the species addressed in this Recovery Plan.

   f. Sufficient funding for management, maintenance and monitoring of the Preserves in perpetuity.

The recovery criteria for seven of the species listed in Table 3-3 include conservation of 95% of suitable habitat within each the Mather Core Recovery Area. The Plan Permittees recognize that protecting 95% of suitable species habitat in the Mather Core Recovery Area is not feasible because past land use decisions, developments, and agreements, approved by the regulatory agencies since 2005 have already precluded the preservation of that much suitable habitat in the Mather Core Recovery Area. The Recovery Plan does, in item 6 above, however, provide for alternative conservation mechanisms to be used in lieu of the Recovery Plan. One such mechanism is an HCP that takes a comprehensive approach to protecting large interconnected blocks of habitat to protect species (see Chapter 7 for the SSHCP Conservation Strategy).

3.7.2 Giant Gartersnake

USFWS published the *Draft Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*)* (USFWS 1999b). The Draft Recovery Plan sets forth recovery criteria for four recovery units in the Central Valley: Sacramento Valley, Mid-Valley, San Joaquin Valley, and South Valley (USFWS 1999b). The goal of the Draft Recovery Plan is to achieve recovery by 2028 and initiate delisting of the giant gartersnake. The SSHCP Plan Area is within the Mid-Valley recovery unit (see Figure 7 of the Draft Recovery Plan) and generally identifies giant gartersnake populations in the "Sacramento Area" (see Table 2 of the Draft Recovery Plan).

The Draft Recovery Plan recovery criteria for giant gartersnake are as follows (USFWS 1999b, p. v):

a. Monitoring shows that in 17 out of 20 years, 90% of the subpopulations in the four recovery units contain both adults and young
b. All extant populations within the recovery unit are protected from threats that limit populations
c. Supporting habitat within the recovery unit is adaptively managed and monitored
d. Subpopulations are well connected by corridors of suitable habitat
e. Repatriation (reintroduction) has been successful at a specified number of suitable sites

The recovery criteria for the Mid-Valley Recovery Unit are the same as listed above for the entire recovery area, except for "b," which states that "the six existing populations within the recovery unit are protected from threats that limit these populations" (USFWS 1999b, p. 47).

The Draft Recovery Plan identified six actions needed to achieve the recovery criteria (USFWS 1999b, p. v):

1. Protect existing populations and habitat
2. Restore populations to former habitat

3. Survey to determine species distributions
4. Monitor populations
5. Conduct necessary research, including studies on demographics, population genetics, and habitat use
6. Develop and implement incentive programs, and an outreach and education plan

The Draft Recovery Plan defines a "population" as "all the giant gartersnakes within a basin or area (e.g., Colusa Basin, American Basin, Mendota Area" and a subpopulation as "a cluster of locality records in a contiguous habitat area." The Sacramento Area, which includes the SSHCP Plan Area, therefore would support a population of giant gartersnake. The SSHCP Plan Area subpopulations would include clusters of occurrences in areas such as Cosumnes River, Morrison Creek, and Laguna Creek.

The Draft Recovery Plan provides more detailed step-down narratives of the six actions, including details for the Mid-Valley Recovery Unit that apply to the Plan Area.

1. Protect known populations of the giant gartersnake.

   1.1 Protect populations on private lands.

   This action focuses on protecting populations on private lands that are not already under protection by a public or conservation agency through acquisition, easement, or some other mechanism (USFWS 1999b). For the SSHCP Plan Area, the Draft Recovery Plan identifies Task 1.1.9 for the Stone/Beach Lakes area, including the Cosumnes River area (see Table 3 in Draft Recovery Plan). Task 1.1.9 refers to the SSHCP planning efforts, with mitigation on private lands to focus on areas east and west of Interstate 5, acquire lands and restore wetlands south of Lambert Road to connect the giant gartersnake population to the Badger Creek/Willow Creek population, and maintain compatible agricultural practices. These actions are Priority 1 actions in the Draft Recovery Plan, indicating that these actions are needed to prevent extinction or to present the species from declining irreversibly in the foreseeable future (USFWS 1999b).

   1.2 Develop or update management recommendations for giant gartersnake habitats.

   1.3 Develop, update, and implement management plans for populations on public and conservation lands.

   These actions focus on developing or periodically refining management recommendations for ricelands, ditch and canal maintenance, wetlands, and nonaquatic habitats based on new information and incorporating them into management plans for existing public and conservation lands. Where habitat

restoration is recommended as part of management, restoration guidelines should be include. Within the SSHCP Plan Area, management recommendations for these actions are included in Table 4 of the Draft Recovery Plan (USFWS 1999b). Task 1.3.5 states that the USFWS and County of Sacramento should incorporate giant gartersnake considerations into management guidelines, build refugia from flooding, and expand habitat at the Stone Lakes NWR.

Other protection actions that should generally be implemented and are applicable to the SSHCP include expediting permit approvals for levee repairs to protect adjacent giant gartersnake habitat (1.4), reviewing water efficiency measures (e.g., reduced agriculture runoff) that may conflict with management recommendations for giant gartersnake and its habitat (1.5), assurance of water delivery for giant gartersnake (1.6), and monitoring of existing populations (1.7).

2. Surveys for new populations of giant gartersnake.

   Action 2.3 includes surveys for giant gartersnake in the Mid-Valley Recovery Unit, especially because it is rapidly urbanizing. Such surveys will help establish appropriate mitigation.

3. Re-establish populations of giant gartersnakes to suitable habitat within former range.

   Action 3.1 is to identify suitable sites and conduct surveys for repatriation of giant gartersnakes. However, the Draft Recovery Plan does not identify any potential repatriation sites in the Mid-Valley Recovery Unit, so this action does not apply to the SSHCP.

4. Conduct necessary research on the giant gartersnake.

   This action includes: mark-recapture studies to understand demographics (mortality rates, fecundity, population size) (4.1), genetic studies to determine relatedness of different populations (4.2), radiotelemetry studies (4.3), population viability studies (4.4), developing guidelines for collecting giant gartersnake specimens for research (4.5), buffer/edge effects studies to determine appropriate buffer distances (4.6), studies of contaminant effects such as selenium (4.7), studies of health in selected populations (4.8), studies of effects of introduced predators and development and implementation of a management program (4.9), and studies of how quickly giant gartersnakes colonize new created marsh (4.10). Specific sites for these studies are not identified in the Draft Recovery Plan.

5. Develop and implement an outreach and education program.

   This action includes: developing guidelines for appropriate land use practices to distribute to landowners and agencies, including ditch and canal maintenance and rodenticide, herbicide and pesticide use (5.1) and developing and distributing

informational material to interested parties, including private and public landowners (5.2). Specific sites or areas for outreach and education are not identified in the Draft Recovery Plan.

6. Develop and implement economic and other incentives for conservation and recovery on private lands.

   This action focuses on creating incentives for landowners to maintain practices that benefit the giant gartersnake, including agricultural incentives (6.1), construction incentives for water districts and users (6.2), and promoting habitat conservation plans that are consistent with the Draft Recovery Plan (6.3).

3.7.3 Valley Elderberry Longhorn Beetle

USFWS published the *Valley Elderberry Longhorn Beetle Recovery Plan* in 1984. The Recovery Plan states that in order to recover the beetle, habitat must be protected along the several rivers, including the American, Sacramento, Feather, Stanislaus, Mokelumne, Calavera, Cosumnes, and San Joaquin. The Mokelumne and Cosumnes Rivers are located in the central and southern portions of the SSHCP Plan Area. The main components of the Valley Elderberry Longhorn Beetle Recovery Plan include: surveys for presence of the valley elderberry longhorn beetle; development of habitat protection plans, restoration of conserved sites (including exotics removal); and management and maintenance, including minimizing the use of herbicides and insecticides, preventing removal of riparian vegetation, and preventing riprapping of habitat sites. The Recovery Plan includes narratives for the following objectives (USFWS 1984).

1. Preserve and protect known habitat sites to provide adequate habitat conditions for valley elderberry longhorn beetle.

   The Recovery Plan identified occupied sites along three specific rivers for habitat preservation through long-term administrative actions: American River, Merced River, and Putah Creek (USFWS 1984, p. 22). The Mokelumne and Cosumnes Rivers within the SSHCP Plan Area are not specifically identified for protection in the Recovery Plan. The Recovery Plan has a specific objective (13) for developing management plans for protected sites.

2. Survey riparian forests of the Sacramento and San Joaquin Valleys for presence of valley elderberry longhorn beetle and incorporate findings into short-term and long-term management programs.

   This objective included surveys along the Mokelumne River from Comanche Reservoir Dam and along the Cosumnes River from Bridgehouse downstream to their confluences with the San Joaquin River.

3. Determine ecological requirements and management needs of valley elderberry longhorn beetle.

   This objective includes: field studies of the autecology of the species at known and newly discovered sites (31), laboratory studies on life history (32), field studies on potential management needs at certain sites (Goethe Park, Ancil Hoffman Park, American River Parkway, and Solano Lake Park) (33), studies of habitat rehabilitation methods for riparian areas and incorporate results into short- and long-term management programs (34), determination of population status and success of management (35), and determination of delisting criteria.

   With the exception of management needs at certain sites, these actions could be conducted throughout the Recovery Plan area.

4. Preserve and protect newly discovered valley elderberry longhorn beetle habitat to provide suitable habitat conditions for the species.

   This objective includes: minimizing further degradation, development, or modification of habitat (41); protecting newly discovered populations (42); minimizing use of insecticides, herbicides, and other toxic substances (43); and minimizing other activities that are incompatible with habitat maintenance (44).

5. Reestablish valley elderberry longhorn beetle at rehabilitated sites within the species' historical range.

   This objective includes: determining suitability of potential existing habitat and rehabilitation sites for reintroduction (51), protecting habitat sites (52), developing and implementing a management program for each site (53), and reintroducing valley elderberry longhorn beetle at selected sites (54).

6. Increase public awareness of valley elderberry longhorn beetle through education and information programs.

   This objective includes: signage at county parks (61); various audio-visual programs, publications, brochures, and press releases (62); and distribution of information to local parks, schools, newspapers, radio, and television (63). Specific site-specific actions for education are not identified in the Draft Recovery Plan. Also, because the Recovery Plan dates back to 1984, education actions will need to be update to take advantage of current information technologies (e.g., websites, social media).

7. Enforce law and regulation to protect valley elderberry longhorn beetle.

   This objective includes: informing local agencies about legal status of valley elderberry longhorn beetle, including applicable laws and regulations (71), eliminating illegal

collecting (72), and examining the effectiveness of existing laws and regulations and proposing changes as necessary (73).

3.8 SSHCP Preserve Planning Units

To assist with development of an adequate SSHCP Conservation Strategy, the Plan Area was divided into eight PPUs that encompass areas where important Covered Species resources are present, and where habitat preservation will be planned (see Section 1.2.1 and Figure 1-1). These eight SSHCP PPUs are geographic subdivisions of the Plan Area designed to ensure that adequate Biological Goals and Measurable Objectives (see Chapter 7) were developed for all biological resources located within the Plan Area.

PPUs were delineated to capture specific habitat or agricultural land cover types or areas identified as being important for a specific suite of species. For instance, PPU 7, which is located in the southeastern portion of the Plan Area, was delineated to encompass the vast majority of vernal pool grasslands remaining in the County. PPU 7 also contains the designated Cosumnes/Rancho-Seco Core Recovery Area (C/RS) (USFWS 2005b), which is considered an important area for protection of vernal pool species. This section describes the existing conditions within each PPU including natural land cover types and species occurrences within each PPU. Tables 3-4 and 3-5 provide a summary of the existing land cover types within each PPU and Table 3-6 provides a summary of the species occurrences within each PPU.

Table 3-4
Summary of Existing Land Cover Types within the PPUs Inside the UDA (acres)

Land Cover Type	PPU 1	PPU 2	PPU 3	PPU 4	PPU 8	Outside PPUs	Grand Total
Terrestrial							
Valley Grassland	13,377	3,589	7,072	1,168	1,488	3,650	30,344
Blue Oak Savanna	0	0	18	0	0	0	18
Blue Oak Woodland	0	0	0	0	0	0	0
Cropland	359	82	578	1,817	1,773	872	5,481
Orchard	164	0	13	0	13	22	212
Vineyard	15	0	1,341	1	19	0	1,376
Irrigated Pasture-Grassland	6	82	1,477	353	1,097	203	3,218
Aquatic							
Vernal Pool	389	70	341	21	36	77	934
Swale	193	40	167	12	7	42	461
Seasonal Wetland	17	29	8	78	27	3	162
Freshwater Marsh	19	14	62	266	10	21	392
Mixed Riparian Woodland	2	0	33	69	114	27	245
Mixed Riparian Scrub	3	0	18	185	35	1	242

Table 3-4
Summary of Existing Land Cover Types within the PPUs Inside the UDA (acres)

Land Cover Type	PPU 1	PPU 2	PPU 3	PPU 4	PPU 8	Outside PPUs	Grand Total
Mine Tailing Riparian Woodland	220	0	0	0	0	0	220
Stream/Creek (VPIH)	35	19	15	0	0	0	69
Stream/Creek	14	12	53	11	20	53	163
Open Water	83	10	116	10	2	16	237
Non-Habitat Land Cover Types							
Aqueducts	55	69	9	0	0	0	133
Disturbed	551	1,426	538	46	87	1,213	3,861
High Density Development	1,158	3,180	857	338	986	5,143	11,662
Low Density Development	401	239	1,312	784	991	1,505	5,232
Major Roads	157	181	130	90	241	428	1,227
Mine Tailings	345	0	0	0	0	0	345
Recreation/Landscaped	11	227	145	4	187	811	1,385
Not Mapped	0	0	0	0	0	0	0
Grand Total	**17,574**	**71**	**14,303**	**5,253**	**2**	**5**	**67,618**

Table 3-5
Summary of Existing Land Cover Types within the PPUs Outside the UDA (acres)

Land Cover Type	PPU 1	PPU 5	PPU 6	PPU 7	Outside PPUs	Grand Total
Terrestrial						
Valley Grassland	1,468	27,463	17,633	52,278	5,964	104,806
Blue Oak Savanna	-	692	-	3,080	1,847	5,619
Blue Oak Woodland	-	5,864	11	2,781	475	9,131
Cropland	53	2,549	39,102	4,644	-	46,348
Orchard	-	392	2,496	807	-	3,695
Vineyard	-	3,548	9,912	11,623	-	25,083
Irrigated Pasture-Grassland	2	2,203	6,948	3,621	-	12,774
Aquatic						
Vernal Pool	43	339	944	2,221	53	3,600
Swale	11	89	125	531	36	792
Seasonal Wetland	-	446	1,636	325	31	2,438
Freshwater Marsh	-	159	2230	170	4	2,563
Mixed Riparian Woodland	-	1,169	4,096	336	11	5,612
Mixed Riparian Scrub	-	173	984	53	4	1,214
Mine Tailing Riparian Woodland	-	59	17	345	-	421
Stream/Creek (VPIH)	4	-	-	-	-	4
Stream/Creek	1	481	1,639	432	63	2,616
Open Water	9	365	1,180	528	24	2,106

Table 3-5
Summary of Existing Land Cover Types within the PPUs Outside the UDA (acres)

Land Cover Type	PPU 1	PPU 5	PPU 6	PPU 7	Outside PPUs	Grand Total
Non-Habitat Land Cover Types						
Aqueducts	-	57	-	75	-	132
Disturbed	531	1,396	326	161	12	2,426
High Density Development	-	122	727	522	42	1,413
Low Density Development	22	4,553	3,436	5,306	60	13,377
Major Roads	12	277	863	358	28	1,538
Mine Tailings	-	76	-	664	13	753
Recreation/Landscaped	-	62	108	45	578	793
Not Mapped	-	-	784	-	-	784
Grand Total	**2,156**	**52,534**	**6**	**90,906**	**9,245**	**250,038**

Table 3-6
Summary of Covered Species Documented Occurrences in PPUs

Species	PPU 1	PPU 2	PPU 3	PPU 4	PPU 5	PPU 6	PPU 7	PPU 8	Outside PPUs	Grand Total
Plants										
Ahart's dwarf rush	1	1	—	—	—	—	—	—	—	2
Boggs Lake hedge-hyssop	27	1	1	—	—	—	—	—	2	31
Dwarf downingia	—	—	—	—	—	8	2	—	—	10
Legenere	20	7	7	1	1	16	9	—	1	62
Pincushion navarretia	—	—	—	—	—	—	48	—	—	48
Sacramento Orcutt grass	36	—	2	—	—	—	2	—	—	40
Sanford's arrowhead	—	3	2	1	3	42	3	—	10	64
Slender Orcutt grass	1	—	3	—	—	—	—	—	—	4
Invertebrates										
Mid-valley fairy shrimp	—	10	9	—	—	9	6	2	1	37
Ricksecker's water scavenger beetle	—	4	—	—	—	1	3	—	—	8
Valley elderberry longhorn beetle	1	—	—	—	154	1	—	—	—	156
Vernal pool fairy shrimp	56	48	95	4	11	26	324	1	16	581
vernal pool tadpole shrimp	308	145	147	6	—	26	194	4	21	851
Amphibians										
California tiger salamander	—	—	—	—	—	—	29	2	—	31
Western spadefoot	7	12	1	—	2	—	19	—	—	41
Reptiles										
Giant gartersnake	—	—	—	2	—	11	1	—	—	14
Western pond turtle	—	2	—	1	1	7	8	—	—	19

Table 3-6
Summary of Covered Species Documented Occurrences in PPUs

Species	PPU 1	PPU 2	PPU 3	PPU 4	PPU 5	PPU 6	PPU 7	PPU 8	Outside PPUs	Grand Total
Birds										
Burrowing owl	5	16	2	12	1	30	23	—	8	97
Cooper's hawk	1	2	1	2	2	8	2	—	2	20
Ferruginous hawk	—	7	—	1	6	4	7	—	1	26
Loggerhead shrike	2	1	2	1	3	15	7	1	2	34
Northern harrier	4	2	2	2	5	42	7	2	4	70
Greater sandhill crane	1	—	—	1	—	191	11	6	—	210
Swainson's hawk	10	5	8	17	35	284	28	20	3	410
Tricolored blackbird	—	3	15	1	3	4	5	—	5	36
White-tailed kite	2	7	4	2	5	34	—	1	7	62
Mammals										
American badger	1	7	—	—	—	1	—	—	—	9
Western red bat	—	1	—	—	1	—	1	1	3	7

Inside UDA Preserve Planning Units

PPU 1 encompasses approximately 19,729 acres located in the northern portion of the Plan Area of which about 17,573 acres are inside the UDA (see Figure 3-31). Although the large majority of PPU 1 is inside the UDA, about 2,156 acres of PPU 1 lie outside the UDA (see section describing Outside Preserve Planning Units below). PPU 1 is bordered by U.S. Highway 50 to the north, Prairie City Road to the northeast, the Deer Creek floodplain boundary to the southeast, Sloughhouse to the south, and Sunrise Boulevard to the west. The following describes that portion of the UDA that is within the UDA.

The dominant land cover in PPU 1 is Valley Grassland, which comprises approximately 13,378 acres of the unit. PPU 1 also contains the greatest amount of Vernal Pool (approximately 289 acres) and Swale (approximately 193 acres) acreage of any PPU within the UDA, making it an important PPU for preservation of vernal pool species. Some urbanization has already occurred in this PPU, south of U.S. Highway 50 and east of Sunrise Boulevard, with high-density development comprising approximately 1,158 acres of the unit. PPU 1 encompasses the City of Rancho Cordova in the Plan Area, as well as lands east of Rancho Cordova in unincorporated areas of the County. There are two Preserves within PPU 1 encompassing approximately 680 acres. They include the Sunrise-Douglas Conservation Bank and the Montolina Preserve. PPU 1 also contains 15,827 acres of the 24,245 acre Mather Core Recovery Area (USFWS 2005b).

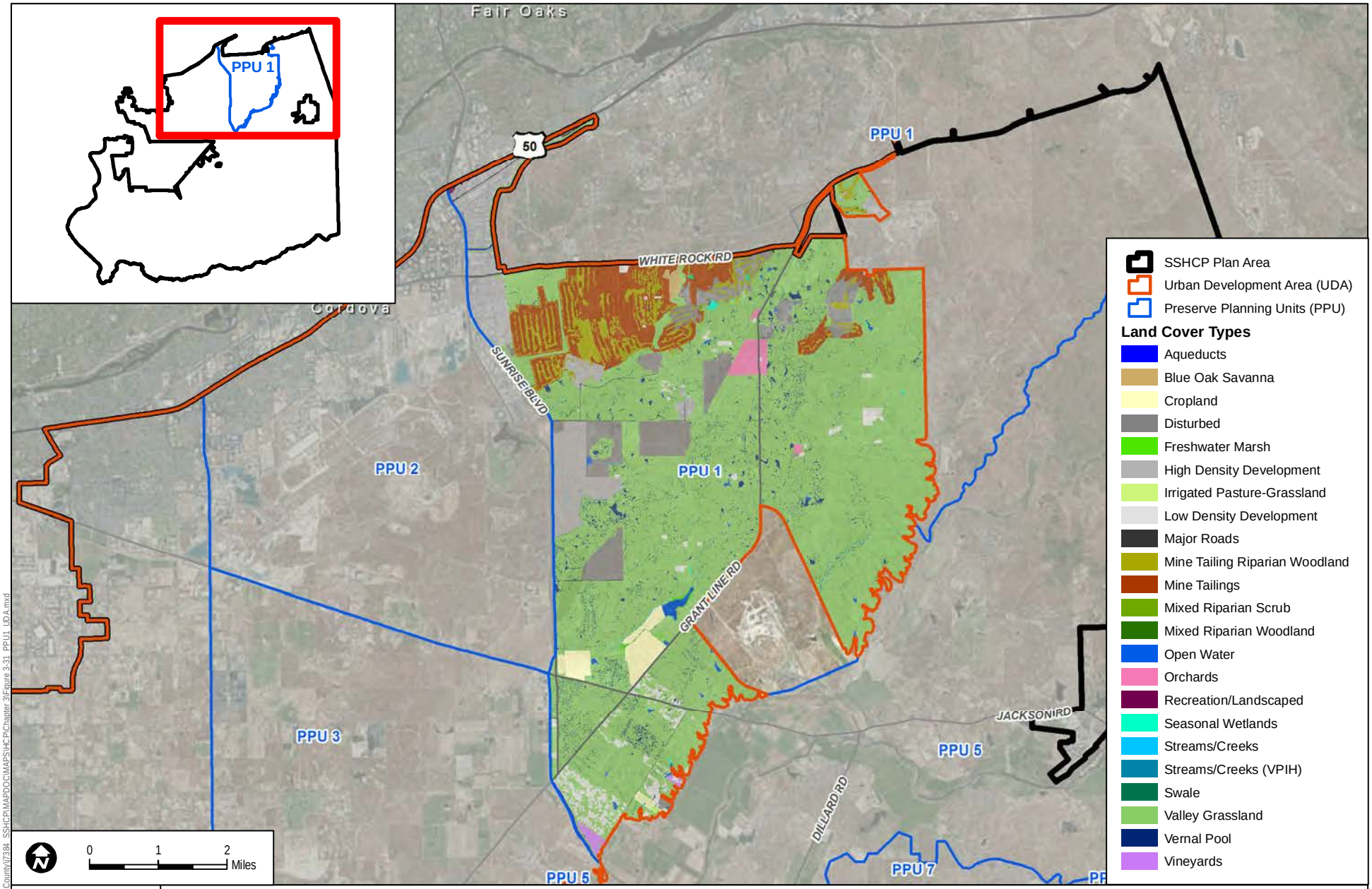
Species with documented occurrences within PPU 1 include Ahart's dwarf rush, Boggs Lake hedge-hyssop, legenere, Sacramento Orcutt grass, slender Orcutt grass, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, western spadefoot, American badger, and all of the bird Covered Species except ferruginous hawk and loggerhead shrike.

PPU 2 encompasses approximately 9,271 acres and is located in the northern portion of the Plan Area (Figure 3-32). PPU 2 is bordered on the north by U.S. Highway 50, on the east by Sunrise Boulevard, on the south by Jackson Highway, and on the west by Bradshaw Road.

A substantial portion of PPU 2 is developed, including Mather Field and urban development directly north and southeast of the airport. PPU 2 includes 3,180 acres of high-density development, 239 acres of low density development, and 1,426 acres of disturbed land covers. PPU 2 also includes 3,589 acres of Valley Grassland with 70 acres of Vernal Pool and 40 acres of Swale. There is approximately 30 acres of existing Preserve within PPU 2. PPU 2 also contains 3,081 acres of the 24,245 acre Mather Core Recovery Area (USFWS 2005b); all of Slender Orcutt Grass Critical Habitat Unit 6 (1,160 acres); all of Sacramento Orcutt Grass Critical Habitat Unit 2 (1,160 acres); all of Vernal Pool Fairy Shrimp Critical Habitat Unit 13 (2,450 acres); and all of Vernal Pool Tadpole Shrimp Critical Habitat Unit 8 (2,450 acres).

PPU 2 contains documented occurrences for many of the Covered Species, including occurrences of Ahart's dwarf rush, Boggs Lake hedge-hyssop, legenere, Sanford's arrowhead, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, western spadefoot, western pond turtle, American badger, western red bat and all of the bird Covered Species except greater sandhill crane.

PPU 3 encompasses approximately 14,303 acres located in the northwestern portion of the Plan Area (Figure 3-33). PPU 3 is bordered by Jackson Highway on the north, by Sunrise Boulevard on the east, by the Deer Creek and the Cosumnes River floodplain boundary on the south, the Central California Traction railroad line on the southeast, and by Bradshaw Road on the west.



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-31_PPU1_UDA.mxd

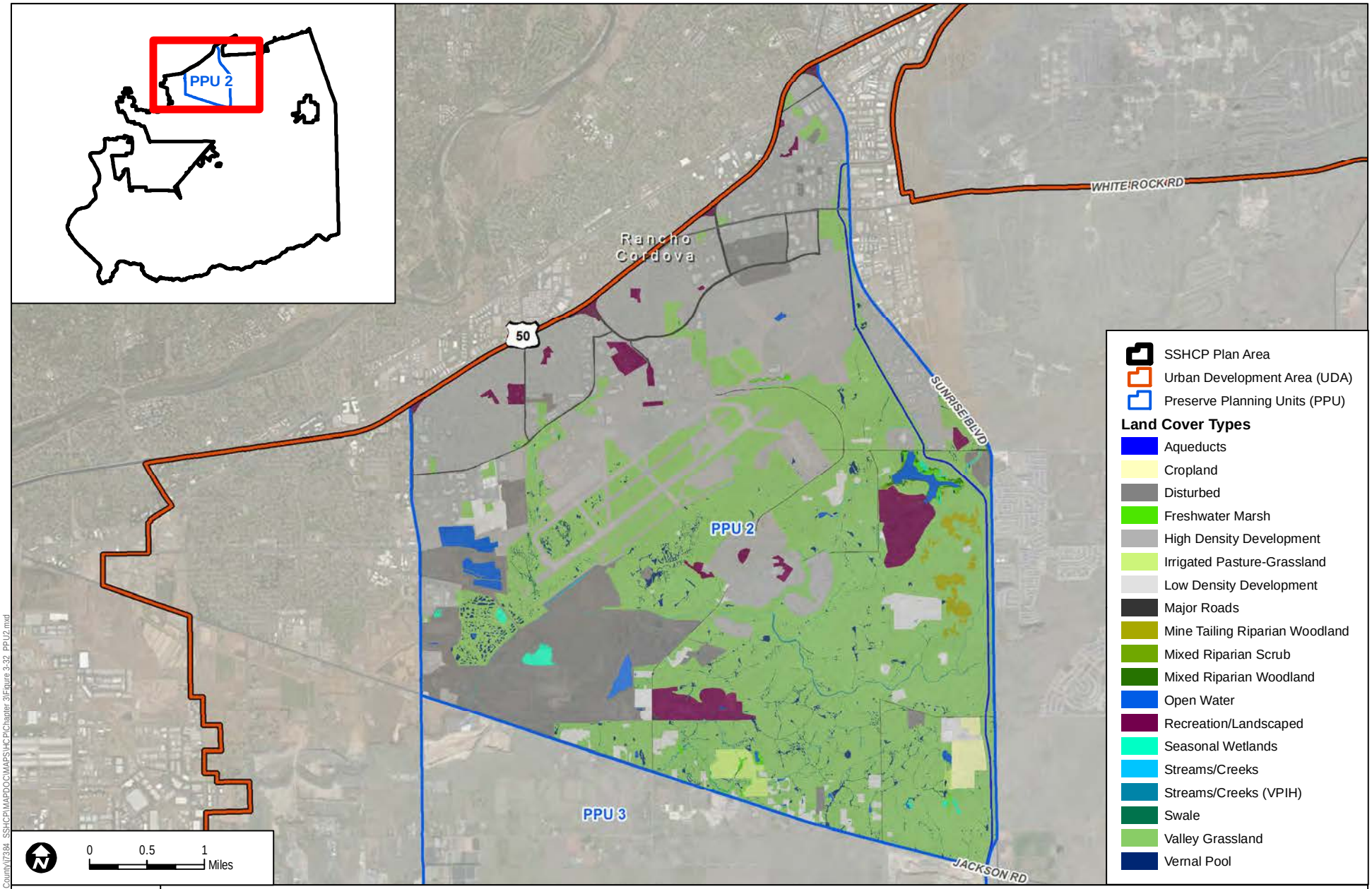
SOURCE: Bing 2015, County of Sacramento 2014

FIGURE 3-31

Preserve Planning Unit 1 - Inside UDA

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

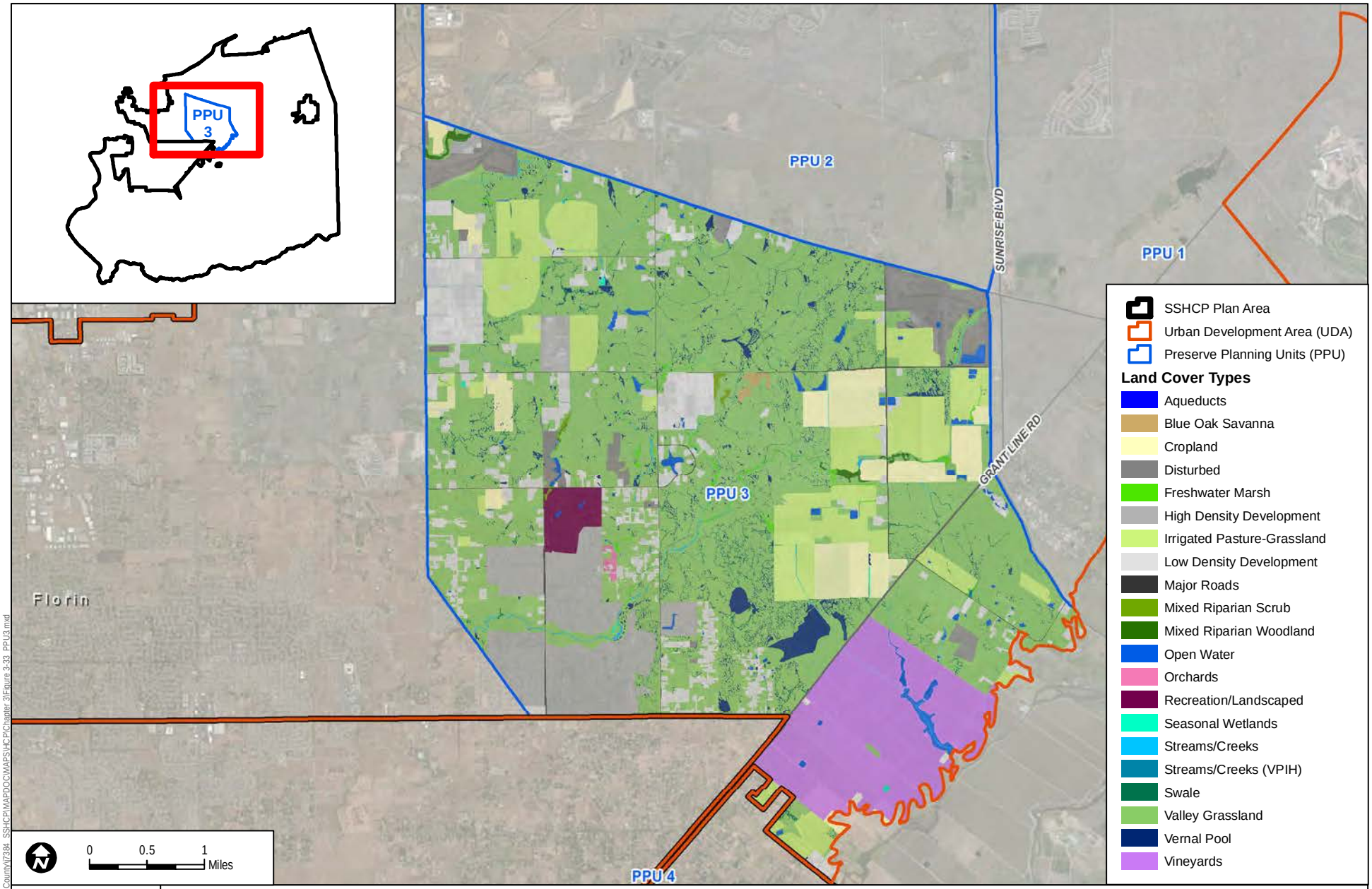
FIGURE 3-32

Preserve Planning Unit 2

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-32_PPU2.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-33_PPU3.mxd

SOURCE: Bing 2015, County of Sacramento 2014

FIGURE 3-33

Preserve Planning Unit 3

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK

The dominant land cover in PPU 3 is Valley Grassland, which makes up about 7,072 acres of the Unit. Valley Grassland supports about 341 acres of Vernal Pool and about 167 acres of Swale, making this unit particularly important for vernal pool species. PPU 3 contains substantial urban development with high- and low-density development together totaling about 2,169 acres of the unit. PPU 3 also contains substantial agriculture (Cropland, Irrigated Pasture-Grassland, Orchard, and Vineyard), totaling about 3,409 acres of the unit. Existing Preserve in PPU 3 totals approximately 2,200 acres. Most of the Preserve acres are located within the Vernal Pool Prairie Preserve Area, and includes several mitigation sites (e.g. Klotz Preserve, Were Preserve, Cook Preserve) and two conservation banks (Arroyo Seco Conservation Bank and Bryte Ranch Conservation Bank). This unit also contains Preserves established to protect Laguna Creek. PPU 3 also contains approximately 4,574 acres of the 24,245 acre Mather Core Recovery Area (USFWS 2005b).

PPU 3 contains documented occurrences for many of the Covered Species, including occurrences of Boggs Lake hedge-hyssop, legenere, Sacramento Orcutt grass, Sanford's arrowhead, slender Orcutt grass, mid-valley fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, western spadefoot, and all of the bird Covered Species except ferruginous hawk and greater sandhill crane.

PPU 4 encompasses approximately 5,253 acres and is located in the northwestern portion of the Plan Area (Figure 3-34). PPU 4 includes three disjunct areas that are within the UDA. These areas are physically separated from other locations within the UDA by the City of Elk, which is not participating in the Plan. PPU 4 is generally bordered by the Sacramento City limits to the north, Highway 99 to the east, Eschinger Road to the south and Interstate 5 to the west.

The dominant land cover in PPU 4 is Cropland, which occupies about 1,817 acres. PPU 4 also includes about 1,168 acres of Valley Grassland. There are no existing Preserves within PPU 4.

PPU 4 contains documented occurrences for many of the Covered Species, including legenere, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, giant gartersnake, western pond turtle, and all of the bird Covered Species.

PPU 8 encompasses approximately 7,132 acres and is located in the southern portion of the Plan Area. PPU 8 is entirely within Galt's sphere of influence (Figure 3-35). PPU 8 is bordered by the northern boundary of Galt's sphere of influence to the north, Cherokee Lane to the east, Dry Creek to the south and Sargent Avenue to the west.

PPU 8 is dominated by farmland land cover types, including about 1,773 acres of Cropland and 1,097 acres of Irrigated Pasture-Grassland. Other significant cover types within PPU 8 include approximately 1,488 acres of Valley Grassland and 986 acres of high density development and

1,097 acres of low density development. There is approximately 95 acres of existing Preserve within PPU 2 located mainly along Dry Creek and Deadman Gulch.

PPU 8 contains documented occurrences for several of the Covered Species, but does not support significant occurrence concentrations for any particular species with the exception of Swainson's hawk and greater sandhill crane.

Outside UDA Preserve Planning Units

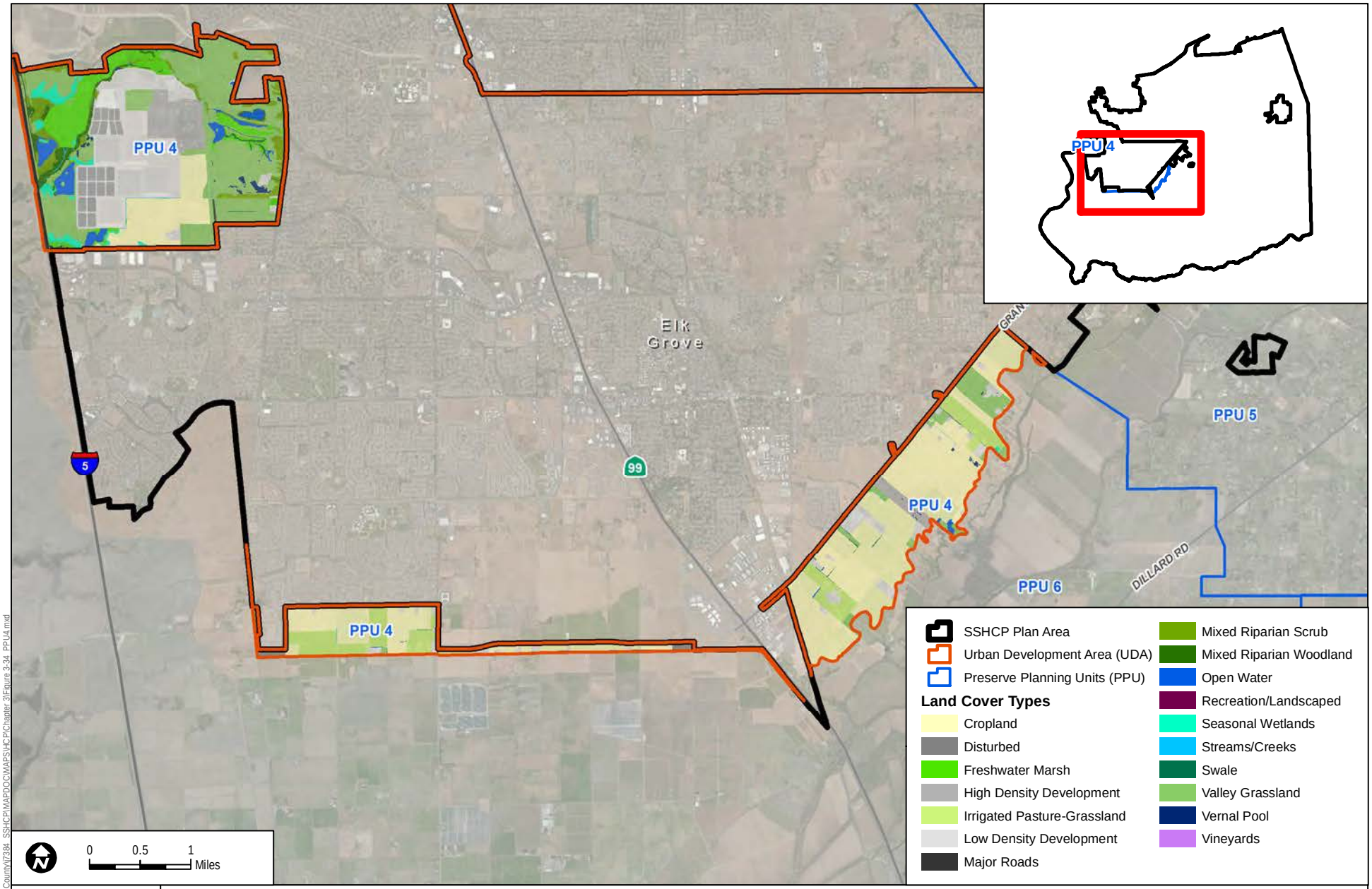
PPU 1 includes approximately 2,156 acres that are outside the UDA boundary (Figure 3-36). PPU 1 outside of the UDA is dominated by Valley Grassland (about 1,468 acres) and disturbed land cover (531 acres) associated with the Kiefer Landfill. There is approximately 500 acres of existing Preserve within PPU 1 including the Kiefer Landfill Preserve south of and adjacent to the UDA boundary at Grant Line Road.

PPU 1 outside of the UDA contains documented occurrences for several of the Covered Species, but does not support significant occurrence concentrations for any particular species with the exception of Sacramento Orcutt grass.

PPU 5 encompasses approximately 52,534 acres in the central-eastern portion of the Plan Area outside the UDA (Figure 3-37). PPU 5 is situated between PPU 7 to the south and the UDA part of PPU 1 to the north, and is bordered by the county line to the east. The dominant land cover in PPU 5 is Valley Grassland (about 27,540 acres). PPU 5 also includes approximately 1,169 acres of Mixed Riparian Woodland, making it import for species dependent on riparian land cover types. There are 6,500 acres of existing Preserves in PPU 5, including the Deer Creek Hills Preserve and several smaller, scattered Preserve sites. PPU 5 also contains 243 acres of the 24,245 acre Mather Core Recovery Area (USFWS 2005b).

PPU 5 contains documented occurrences for many of the Covered Species, including occurrences of legenere, vernal pool fairy shrimp, western spadefoot, western pond turtle and all of the bird Covered Species except greater sandhill crane. PPU 5 is most notable for encompassing most of the Plan Area documented occurrences for valley elderberry longhorn beetle clustered in a reach of the Cosumnes River extending approximately 2 miles west of Jackson.

PPU 6 encompasses approximately 95,196 acres located in the southwestern portion of the Plan Area (Figure 3-38). PPU 6 is generally bound on the west by State Highway 160 and the Sacramento River, on the north by Eschinger Road, on the south by the Mokelumne River west and just east of I-5, and by Dry Creek on the south from its confluence with the Mokelumne River to north-south alignment of Sargent Avenue, which defines its southeastern boundary.



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-34_PPU4.mxd

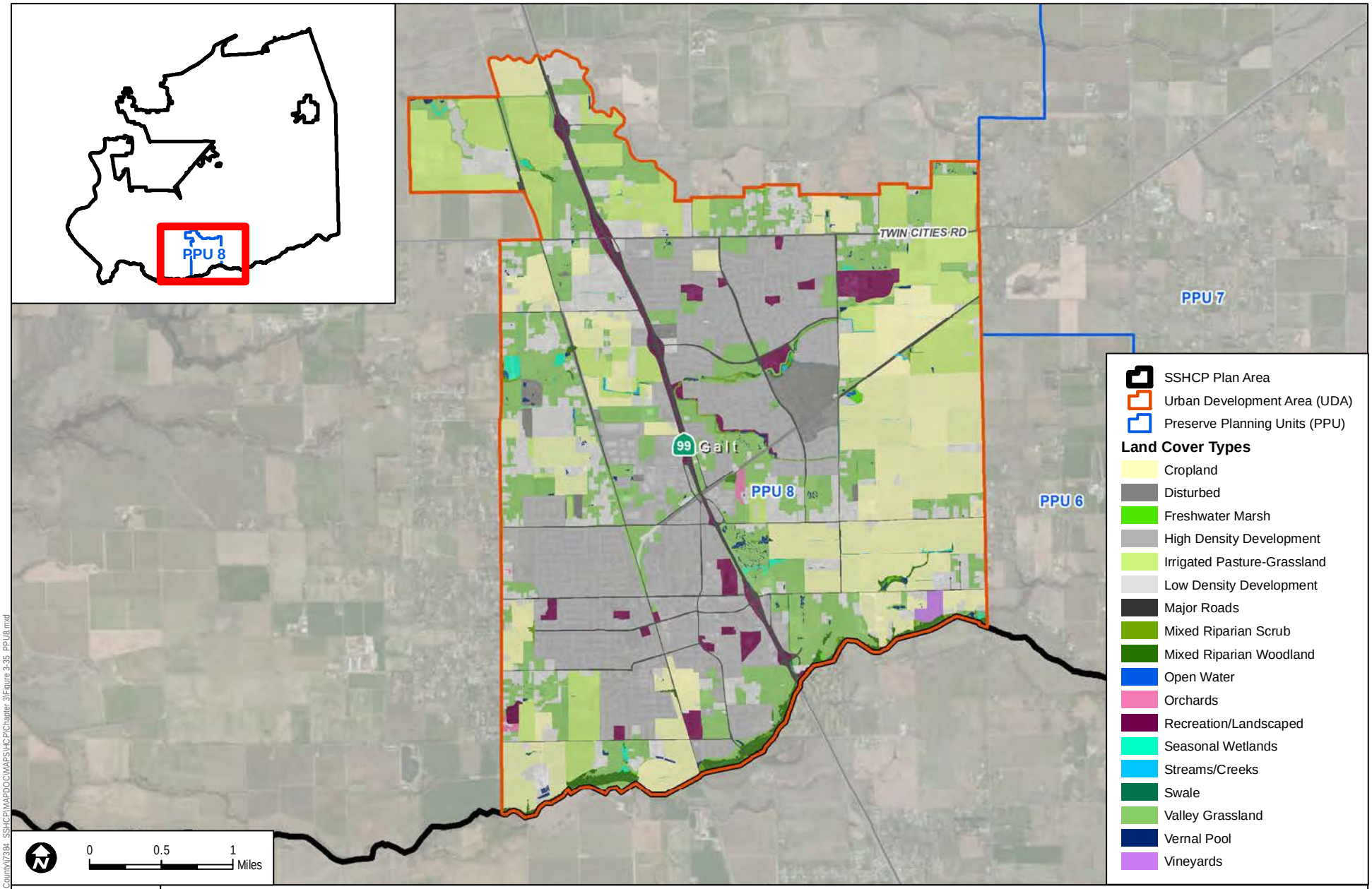
SOURCE: Bing 2015, County of Sacramento 2014

FIGURE 3-34

Preserve Planning Unit 4

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

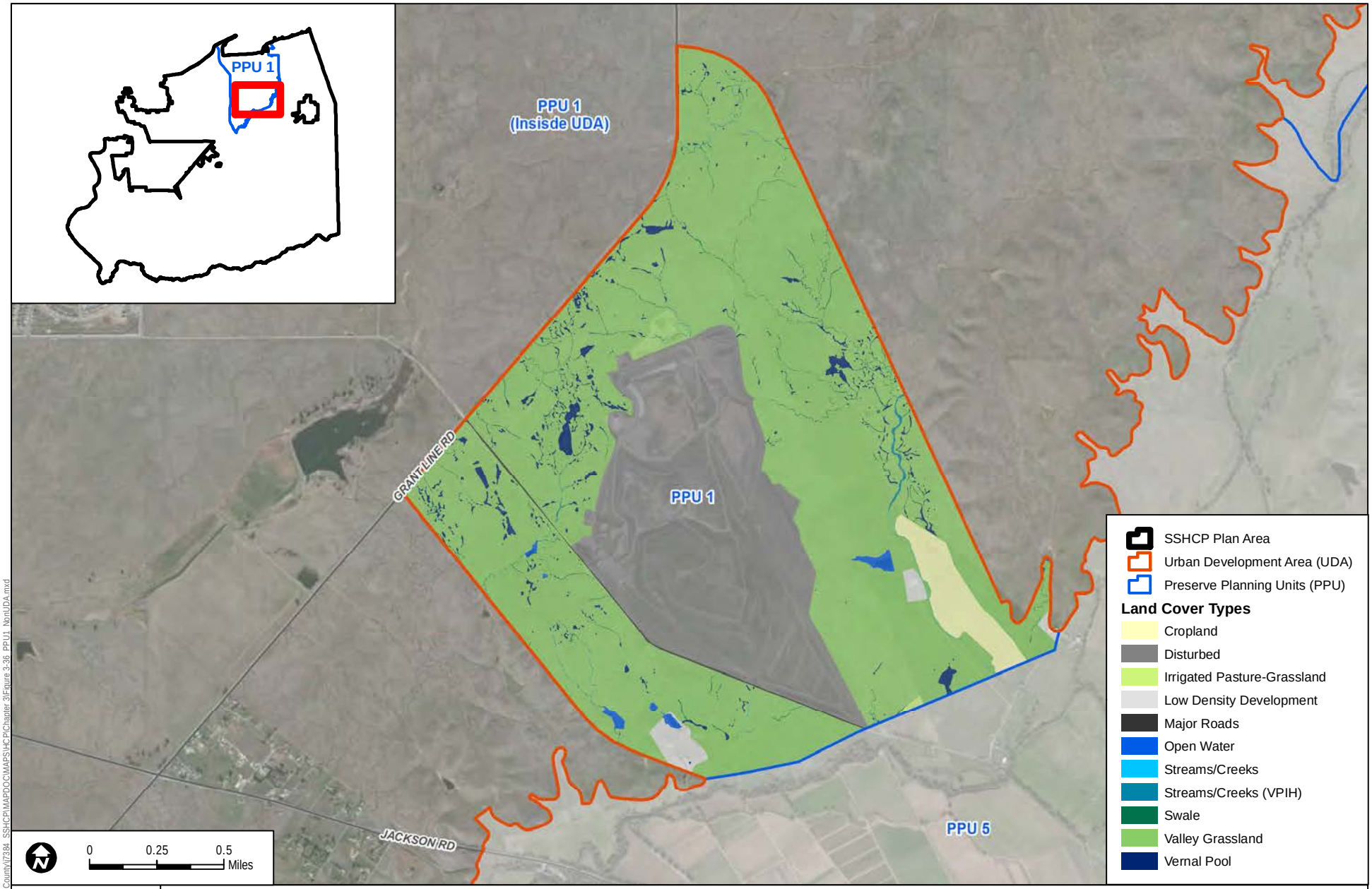
FIGURE 3-35

Preserve Planning Unit 8

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-35_PPU8.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

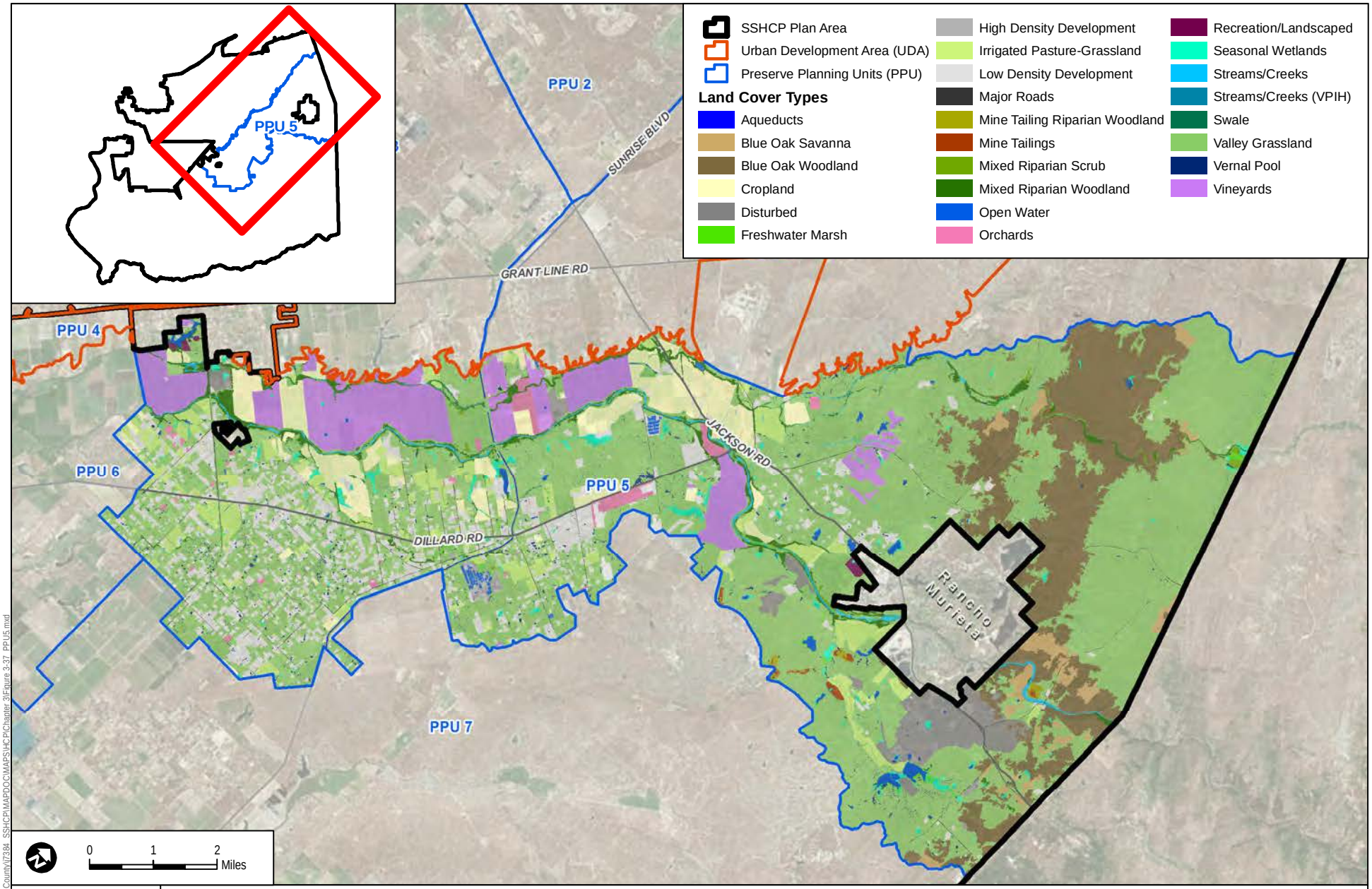
FIGURE 3-36

Preserve Planning Unit 1 - Outside UDA

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-36_PPU1_NonUDA.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

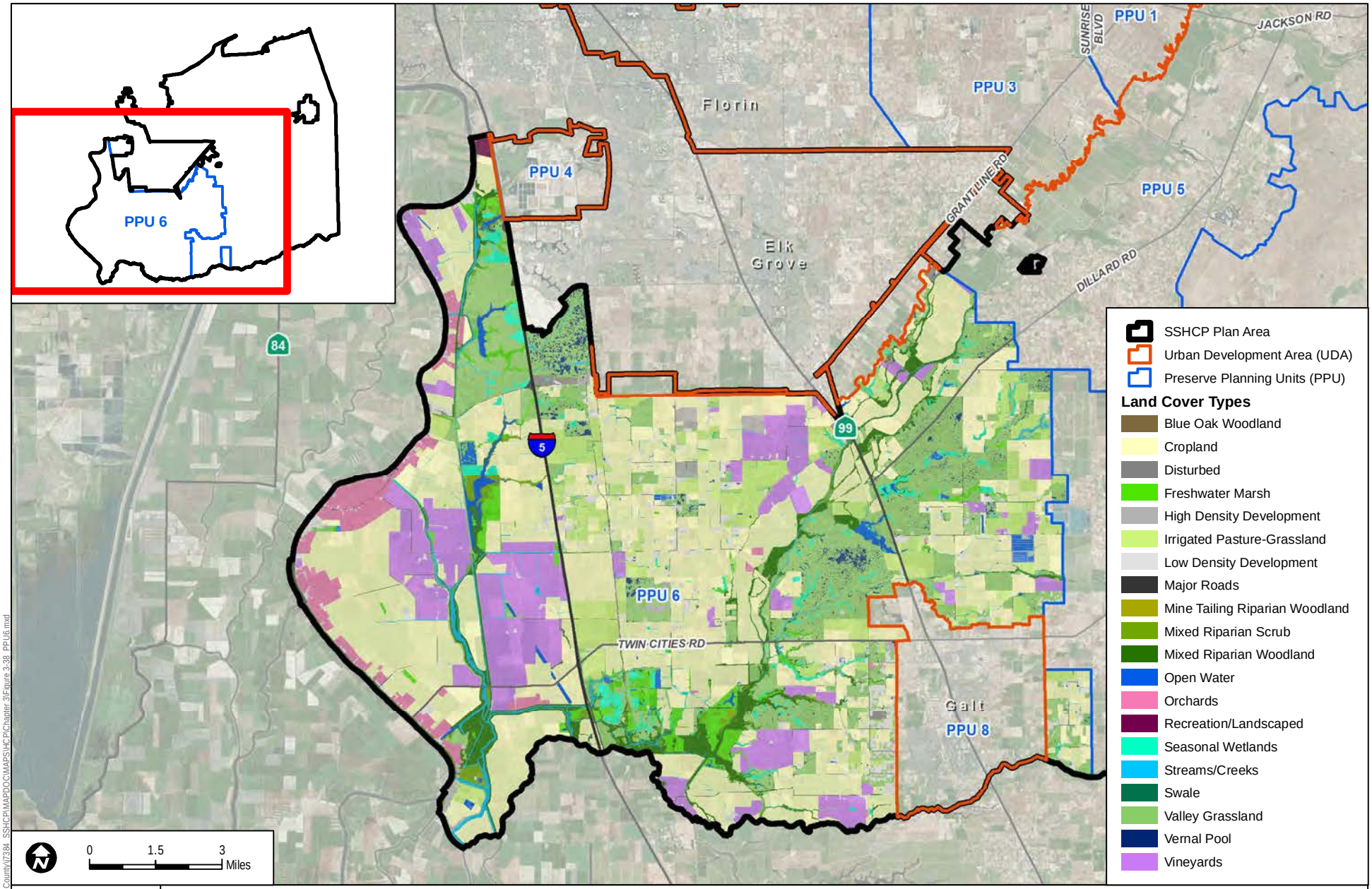
FIGURE 3-37

Preserve Planning Unit 5

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-37_PPU5.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-38_PPU6.mxd

SOURCE: Bing 2015, County of Sacramento 2014

FIGURE 3-38

Preserve Planning Unit 6

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK

The dominant land covers in PPU 6 are farmland with about 39,102 acres of Cropland, about 6,948 acres of Irrigated Pasture-Grassland about 2,496 acres of Orchard and about 9,912 acres of Vineyard. The unit also contains approximately 17,633 acres of Valley Grassland with about 944 acres of vernal pools. Notably, PPU 6 contains about 4,096 acres of Mixed Riparian Woodland and about 984 acres of Mixed Riparian Scrub. There are approximately 28,000 acres of existing Preserves in PPU 6. A majority of this acreage is part of the Cosumnes River Preserve and the Stone Lakes National Wildlife Refuge.

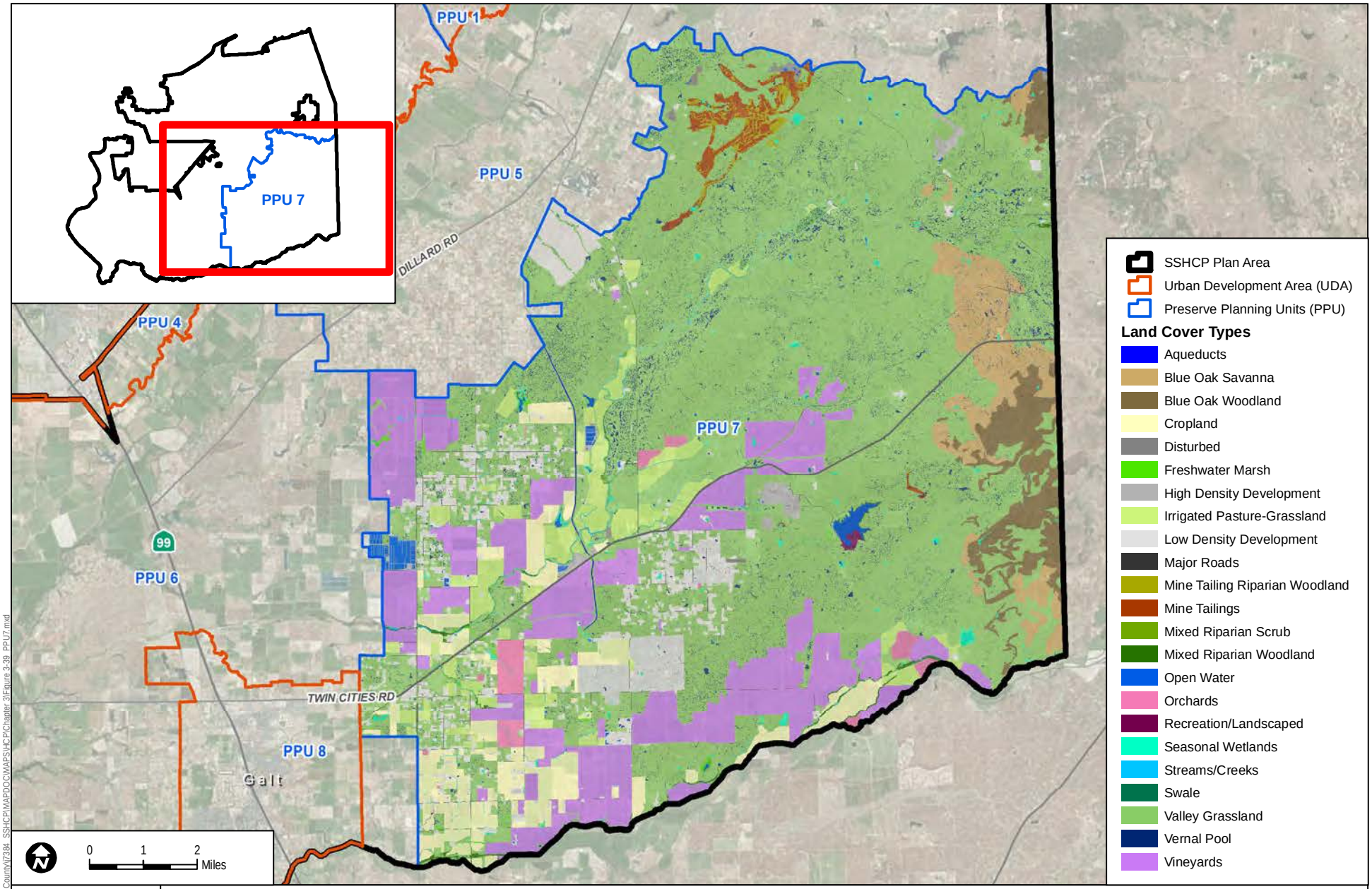
PPU 6 contains documented occurrences for many of the Covered Species, including occurrences of dwarf downingia, legenere, Sanford's arrowhead, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, giant gartersnake and western pond turtle. PPU 6 is most notable for the high number of bird Covered Species that populate this unit. This unit contains all bird Covered Species and an exceptionally high number of documented occurrences for Swainson's hawk, greater sandhill crane and northern harrier, white-tailed kite and burrowing owl.

PPU 7 encompasses approximately 90,906 acres in the southeastern portion of the Plan Area (Figure 3-39). PPU 7 is bordered by PPU 5 on the north, the county line and Dry Creek to the south, the county line on the east, and the north-south alignments of Cherokee Lane and Davis Road to the west. The dominant land cover in PPU 7 is Valley Grassland, which encompasses 52,278 acres. PPU 7 is most notable for the amount of Vernal Pool (about 2,221 acres) and Swale (531 acres) that it contains. There is also about 11,623 acre of Vineyard within this unit.

There are approximately 26,000 acres of existing Preserves in PPU 7. Preserve in PPU 7 include the Chance Ranch Preserve, Laguna Creek Conservation Bank, Gill Ranch Conservation Bank, Clay Station Conservation Bank, SMUD Preserve and several other smaller Preserve sites. PPU 7 also includes the entire 44,388 acre Rancho Seco Core Recovery Area; the entire California Tiger Salamander Critical Habitat Unit 3 (10,193 acres); the entire Vernal Pool Tadpole Shrimp Critical Habitat Unit 9A (96 acres); 34,880 acres of the 36,996 acre Vernal Pool Tadpole Shrimp Critical Habitat Unit 9B; 34,880 acres of the 36,996 acre Vernal Pool Fairy Shrimp Critical Habitat Unit 14A; the entire Vernal Pool Fairy Shrimp Critical Habitat Unit 14B (96 acres); and 29,870 acres of the 32,086 acre Sacramento Orcutt Grass Critical Habitat Unit 3.

PPU 7 contains documented occurrences for many of the Covered Species including dwarf downingia, legenere, Sacramento Orcutt grass, Sanford's arrowhead, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, western spadefoot, giant gartersnake, western pond turtle, western red bat and all of the bird Covered Species with the exception of the white-tailed kite. Most notable is that this is the only unit with pincushion navarretia and is the most important unit for California tiger salamander.

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

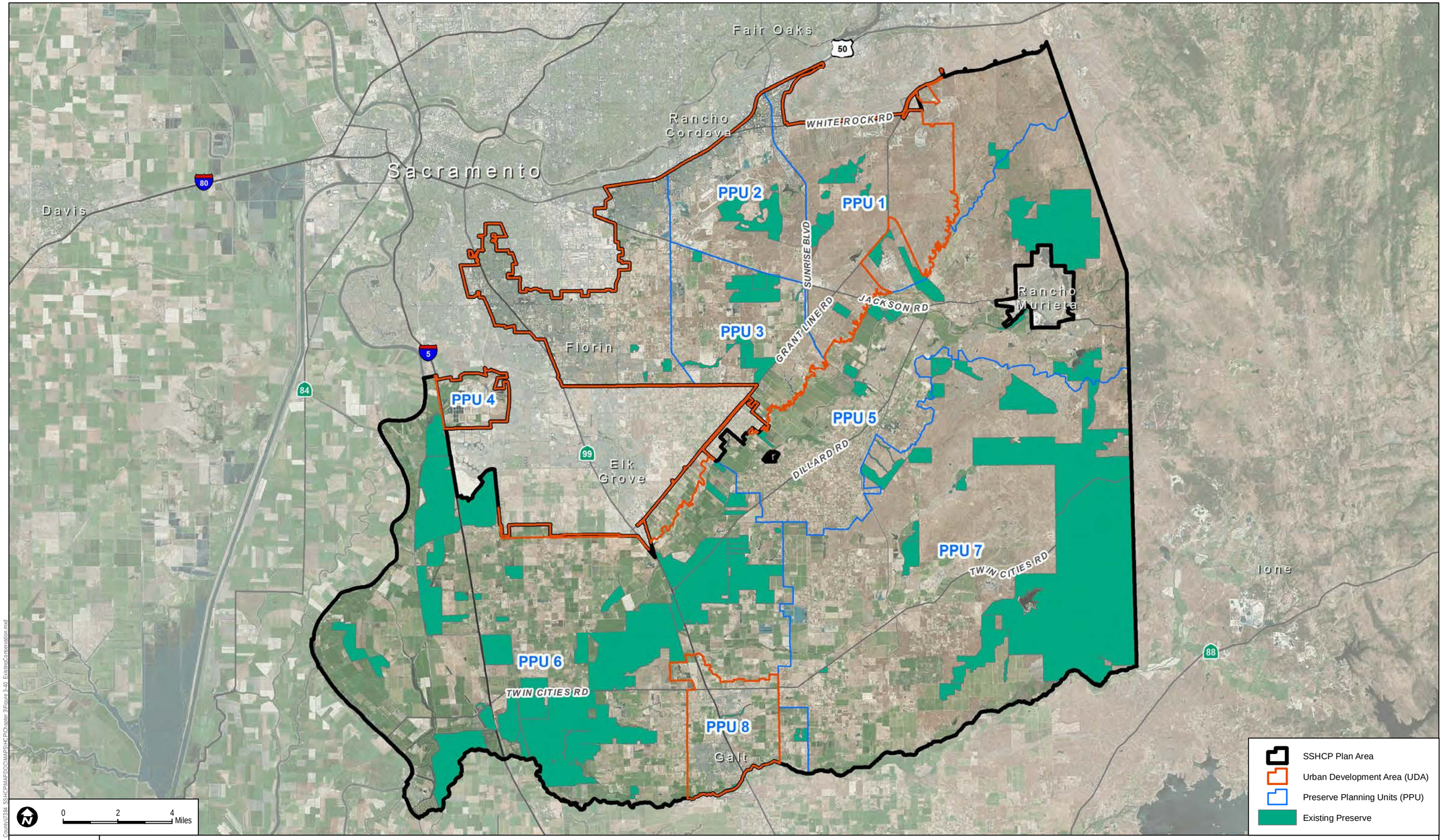
FIGURE 3-39

Preserve Planning Unit 7

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 3\Figure 3-39_PPU7.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014

FIGURE 3-41

Existing Conservation Sites Within the Plan Area

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento County\2384 SSHCP\MAPS\MXD\SSHCP\Chapter 3\Figure 3-40 ExistingConservation.mxd

INTENTIONALLY LEFT BLANK

3.9 References Cited

Adelsbach, T. 2010. Verbal communication from Terry Adelsbach, Senior Biologist of USFWS to R. Radmacher, Senior Planner, County of Sacramento. August 2010.

Adelsbach, T. 2013. Verbal communication from Terry Adelsbach, Senior Biologist USFWS, to R. Radmacher, Senior Planner, County of Sacramento. August 8, 2013.

Ahart, L. 2003. Thoughts on *Juncus leiospermus* var. *ahartii*. Unpublished note given to John Dittes.

Alexander, D. G. 1976. Ecological Aspects of Temporary Pool Fauna. In: S. Jain, (ed.). *Vernal Pools: Their Ecology and Conservation*. Institute of Ecology Publication Number 9. Davis, California.

Asay, C.E. 1987. Habitat and productivity of Cooper's hawks nesting in California. *California Fish and Game* 73:80–87.

Babcock, K.W. 1995. Home range and habitat use of breeding Swainson's Hawks in the Sacramento Valley of California. *Journal of Raptor Research*, 29: 193- 197.

Barnard, P.E. 1983. Foraging behaviour and endergetcs of Northern Harriers Circus cyaneus (L.). Honor's thesis, Acadia University, Wolfville, NS.

Barr. 1991.

Bartgis, R. 1992. Loggerhead Shrike. P. 281-297 in Migratory nongame birds of management concern in the northeast (K. J. Schneider and D. M. Pence, eds.). U.S. Fish and Wildlife Service, Region 5, Newton Corner, MA. Bechard and Schmutz 1995.

Beebe, F.L. 1974. Field studies of the Falconiformes of British Columbia. Brit. Col. Prov. Mus. Occas. Paper No. 17. 163 pp.

Beedy and Hamilton. 1997.

Beedy, E.C. and W.J. Hamilton III. 1999. Tricolored Blackbird (*Agelaius tricolor*) in A. Poole and F. Gill (eds.), The birds of North America, No. 423. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Berry, M.E., C.E. Bock, and S.L. Haire. 1998. Abundance of diurnal raptors on open space grasslands in an urbanized landscape. Condor 100: 601-608.

Bloom, P.H. 1980. The status of the Swainson's hawk in California, 1979. Final Report II-8.0, USDI Bureau Land Management and Federal Aid in Restoration, Project. W-54-R-12, California Department of Fish and Game, Sacramento, California.

Bobzien, S. 2003. East Bay Regional Park District Comments to the USFWS for the listing of the Central California Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*). Proposed Rule.

Boyer, D. R. 1965. Ecology of the basking habitat in turtles. *Ecology* 46:99-118.

Brode, J. 1988. Natural history of the Giant Garter Snake (*Thamnophis couchii gigas*). Pages 25-28, *In* Proceedings of the conference on California herpetology, H.F. DeListe, P.R. Brown, B. Kaufman, and B.M. McGurty (eds). Southwestern Herpetologists Society, Special Publication No. 4.

Butts, K.O. 1973. Life history and habitat requirements of Burrowing Owls in western Oklahoma. Master's thesis, Oklahoma State University, Stillwater. 188 pp.

Cade and Woods. 1997.

CBD (Center for Biological Diversity), Santa Clara Valley Audubon Society, Defenders of Wildlife, San Bernardino Valley Audubon Society, California State Park Rangers Association and Tri-County Conservation League. 2003. Petition to the State of California Fish and Game Commission and Supporting Information for Listing the California Population of the Western Burrowing Owl (*Athene cunicularia hypugaea*) as an Endangered or Threatened Species Under the California Endangered Species Act. Submitted April 7.

CDFG (California Department of Fish and Game). 2002. California Natural Diversity Database CNDDB). Rarefind. Sacramento, California: CDFG, Wildlife and Habitat Data Analysis Branch.

CDFG. 2003. "California Tiger Salamander." CNDDB. Sacramento, California: CDFG, Wildlife and Habitat Data Analysis Branch.

CDFG. 2010. Legenere. CNDDB. Rarefind Version 3.1.1. Commercial version dated February 28, 2010. Sacramento, California: CDFG, Wildlife and Habitat Data Analysis Branch.

CNPS (California Native Plant Society). 2001. *Inventory of Rare and Endangered Plants of California*. 6th ed. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, California: CNPS.

CNPS. 2010. *Inventory of Rare and Endangered Plants*. Online ed. Version 7-10b. Sacramento, California: CNPS. Accessed April 27, 2010. http://www.cnps.org/inventory.

Collins CT and RE Landry. 1977. "Artificial Nest Burrows for Burrowing Owls." *North American Bird Bander* 2:151-154.

Conard, C. 2004. Verbal communication from Chris Conard, Ornithologist. Sacramento Regional Wastewater Treatment Plant – Bufferlands. Elk Grove, CA to Todd Sloat of Todd Sloat Biological Consulting Inc. October 15, 2004.

Constantine, D.G. 1959. "Ecological observations on lasiurine bats in the north bay area of California." *Journal of Mammalogy* 40(1):13-15.

Cook, L. 1999. "Tricolored Blackbird (*Agelaius tricolor*) conservation plan for southern Sacramento County." Unpublished report submitted to Jones & Stokes, in cooperation with the southern Sacramento County Habitat Conservation Plan.

Coulombe, H.N. 1971. Behavior and population ecology of the burrowing owl, *Speotyto cunicularia*, in the Imperial Valley of California. *Condor* 73:162-176.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use—for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

DeHaven, R.W. 1975. Plumages of the Tricolored Blackbird. *Western Bird Bander,* 50:59-61.

Dittes, J. C., and J. L. Guardino. 2001. Chapter 3: Rare Plants. *In* Vollmar J. E. (ed.) 2002. Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting, Berkeley, California.

Dixon, J.B., R.E. Dixon, and J. E. Dixon. 1957. Natural history of the White-tailed Kite in San Diego County, California. *Condor* 59: 156-165.

Dunk, J.R. 1995. White-Tailed Kite (*Elanus leucurus*). In *The Birds of North America Online*, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. Accessed November 29, 2011. doi: 10.2173/bna.178.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, NY. Accessed online http://ebird.org/content/ebird.

Eng, L.L. 1984. Rare, threatened and endangered invertebrates in California riparian systems. In: California riparian systems ecology, conservation, and productive management. Ed. R.E. Warnter and K.M. Hendrix, Berkeley: University of California Press.

Eng, L., D. Belk, and C. Eriksen. 1990 Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.

Erichsen, A.L., K.S. Smallwood, A.C. Commandatore, B.W. Wilson, and D.M. Fry. 1996. White-tailed Kite Movement and Nesting Patterns in an Agricultural Landscape. *In*. Raptors in Human Landscapes. D. Bird and J.J. Negro eds. Academic Press, London. pp. 165-175.

Erichsen, A.L., K.S. Smallwod, N.D. Ottum, and D.M. Fry. 1994. The white-tailed kite: GIS analysis of habitat selection in the Sacramento Valley, California with implication for Conservation of wildlife in agricultural landscapes. Abstract. *Journal of Raptor Research* 28(1):46.

Eriksen, C. and D. Belk. 1999. *Fairy shrimps of California's pools, puddles, and playas*. Mad River Press, Eureka, California.

Estep, J.A. 1989. Biology, movements and habitat relationships of the Swainson's Hawk in the Central Valley of California, 1986-87. Calif. Dept. Fish and Game, Nongame Bird and Mammal Sec. Rep.

Estep, J. .2006. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Elk Grove Planning Area. Estep Environmental Consulting, Sacramento, California.

Estep, J. 2007. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Rancho Cordova Planning Area. Estep Environmental Consulting, Sacramento, California.

Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense* Gray, Hyla regilla Baird and Girard and *Scaphiopus hammondi hammondi* Girard. Master's thesis, Department of Biology, Fresno State College, Fresno California. 58pp.

Fisher, R.N., and H.B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley. *Conservation Biology* 10(5):1387-1397.

Fuller, Ken. 2005. Fish and Wildlife Biologist. US Fish and Wildlife Service. Sacramento, CA. March 2005.

Gardner, T. 2010. Verbal communication from Todd Gardner of CDFW to R. Radmacher, Senior Planner, County of Sacramento. August 2010.

Gervais, J.A., D.K. Rosenberg and R.G. Anthony. 2003. Burrowing Owl space use and pesticide exposure risk. *Journal of Wildlife Management* 67:155-64.

Gifford, D.L., P.S. Hofmann, A.A. Truex, and D.H. Wright. 2012. Monitoring Distribution and Abundance of Nesting Swainson's Hawks in the Sacramento Valley and Sacramento River Delta, California. California Fish and Game 98(1): 7–18.

Gill Ranch Survey. 2003. 135 Gill Ranch Survey, Sacramento County, California.

Gleason, R.S. and D.R. Johnson. 1985. Factors influencing nesting success of burrowing owls in southeastern Idaho. *Great Basin Naturalist* 45: 81-84.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Grinnell, J. and A.H. Miller. 1944. *The Distribution of the Birds of California*. Cooper Ornithological Club. Berkeley, California.

Gutierrez, R. J., and Walter D. Koenig. 1978. Characteristics of storage trees used by acorn woodpeckers in two California woodlands. J. of For. 76:162-164.

Hamilton, W. J. III. 2004. Verbal communication from Professor Hamilton, Division of Environmental Studies, University of California, Davis, California to Todd Sloat of Todd Sloat Biological Consulting Inc. 2004.

Hamilton, W.J. III, L. Cook, and R. Grey. 1995. Tricolored Blackbird project 1994. Unpublished report prepared for U.S. Fish and Wildlife Service, Portland, Oregon.

Hanes, W.T., B. Hecht, and L. Stromberg. 1990. Water Relationships of Vernal Pools in the Sacramento Region, California. Pages 49–60 *in:* D. Ikeda and R. A. Schlising (eds.), Vernal Pool Plants, their Habitat and Biology, Studies from the Herbarium, No. 8, CSU Chico, California.

Hanes, T., and L. Stromberg. 1998. Hydrology of Vernal Pools on Non-Volcanic Soils in Sacramento Valley. Pages 38–49 *in:* C.W. Witham et al. (eds.), *Ecology, Conservation, and Management of Vernal Pool Ecosystems*. CNPS, Sacramento, California.

Hansen, R.W. 1980. Western aquatic garter snakes in central California: an ecological and evolutionary perspective. Master's thesis, Department of Biology, California State University, Fresno. 78 pp.

Hansen, G.E. 1988. Review of the status of the GGS (*Thamnophis couchi gigas*) and its supporting habitat during 1986-1987. Final report for CDFG, Contract C-2060. Unpublished. 31 pp.

Hansen G.E., and J.M. Brode. 1993. Results of relocating canal habitat of the GGS (*Thamnophis gigas*) during widening of State Route 99/70 in Sacramento and Sutter counties, California. Final report for Caltrans Interagency Agreement 03E325 (FG7550) (FY 87/88-91-92). Unpublished. 36 pp.

Harlow, D.L., and P.H. Bloom. 1989. Buteos and the golden eagle. Pages 102-110 *in* B.G. Pendleton, ed. Proceedings of the western raptor management symposium and workshop. National Wildlife Federation Scientific and Technical Series No. 12. Washington, D.C.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. *Bats of the United States*. Arkansas Game and Fish Commission in cooperation with the U.S. Fish and Wildlife Service.

Haug, E. A., and L. W. Oliphant. 1987. Breeding biology of Burrowing Owls in Saskatchewan. Pages 269-271 *in* G. L. Holroyd, P. H. R. Stepney, G. C. Trottier, W. B. McGillivray, D. M. Ealey, and K. E. Eberhart, editors. Endangered species in the prairie provinces. Natural History Occasional Paper No. 9. Provincial Museum of Alberta, Edmonton, Alberta.

Hawbecker, A.C. 1942. A life history study of the White-tailed Kite. *Condor* 44: 267-276.

Hays, D.W., K.R. McAllister, S.A. Richardson, and D.W. Stinson. 1999. Washington State Recovery Plan for Western Pond Turtle. Washington Department of Fish and Wildlife, Olympia, Washington.

Helm, B. 1998. Biogeography of eight large branchiopods endemic to California. Pp. 124-139 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Vollmar, J.E. (Ed.). 2002. Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting, Berkeley, California.

Henry, M.E. 1983. Home range and territoriality in breeding White-tailed Kites. Master's thesis, San Diego State Univ., San Diego, California.

Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California.* Nongame-Heritage Program, California Department of Fish and Game. October 1986.

Holland, D. 1991. A synopsis of the ecology and status of the western pond turtle (*Clemmys marmorata)* in 1991. Unpublished report for the US Fish and Wildlife Service, San Simeon, California.

Holland, D.C. 1994. The Western Pond Turtle: Habitat and History. US Department of Energy, Bonneville Power Administration, Portland, Oregon. DOE/BP-62137-1.

Holland, R.F. and V.I. Dains. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Holland, R. F., and S. Jain. 1988. Vernal Pools. Pages 515–553 *in:* M.G. Barbour and J. Major (eds.), *Terrestrial Vegetation of California*, 2nd edition, CNPS, Sacramento, California.

Ivey, G. 2004. Verbal communication from Gary Ivey, ornithologist to Todd Sloat of Todd Sloat Biological Consulting Inc. October 2004, January 2005.

Ivey, G.L., C.P. Herziger. 2003. Sandhill Crane monitoring at Staten Island, San Joaquin County, California, 2002-03. A survey for The Nature Conservancy, Galt, California.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and reptile species of concern in California. California Department of Fish and Game technical report, Inland Fisheries Division, Rancho Cordova, California.

Johnson, H. L. 2000. Roosting and foraging ecology of bats in the Sutter Buttes, Sutter County, California. Unpublished Master's Thesis, California State University, Sacramento, 114 pp.

Jokerst, J. D. 1990. Floristic Analysis of Volcanic Mudflow Vernal Pools. Pages 1–30 *in:* D. Ikeda and R. A. Schlising (eds.), Vernal Pool Plants, their Habitat and Biology, Studies from the Herbarium, No. 8, CSU Chico, California.

Jones, R. 2004. Verbal communication from Roger Jones of the Sacramento Regional Wastewater Treatment Plant – Bufferlands. Elk Grove, CA. to Steve Henderson of Henderson Ecology and Planning. October 2004.

Jones and Stokes. 1990. Sacramento County Vernal Pools: Their Distribution, Classification, Ecology, and Management. Prepared for the County of Sacramento, Planning and Community Department, Sacramento, California.

Karalus, K. E. and A. W. Eckert. 1987. *The owls of North America*. Weathervane Books, New York, New York.

Keeler-Wolf, T., D.R. Elam, K. Lewis and S.A. Flint. 1998. California vernal pool assessment preliminary report. California Department of Fish and Game, Sacramento, California. 159 pages.

Keeley, J.E. and P.H. Zedler. 1998. Characterization and Global Distribution of Vernal Pools. Pp. 1-14 *in*: C.W. Whitham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California. 1998.

Kennedy, P.L. 1988. Habitat characteristics of Cooper's Hawks and Northern Goshawks nesting in New Mexico. Pp. 218-227 *in* Proc. Southwestern raptor management symposium (R. Glinski, B.G. Pendleton, M.B. Moss, B.A. Millsap, and S.W. Hoffman, Editors). Natl. Wildl. Fed. Sci. Tech. Ser. No. 11.

Kneitel JM, Lessin CL. 2010. Ecosystem-phase interactions: aquatic eutrophication decreases terrestrial plant diversity in California vernal pools. *Oecologia*. 163(2): 461-9.

Leibowitz, S.G., and R.T. Brooks. 2008. Hydrology and Landscape Connectivity of Vernal Pools. Pages 31–53 in A.J.K. Calhoun and P.G. deMaynadier, editors. *Science and Conservation of Vernal Pools in Northeastern North America*. CRC Press, Boca Raton, Florida. WED-06-129.

Lindzey, F.G. 1978. Movement patterns of badgers in northwestern Utah. *J. Wildl. Manage*. 42:418-422.

Linsley, E.G. and J. A. Chemsak. 1972. Cerambycidae of North America, Part VI, No.1. Taxonomy and Classification of the Subfamily Lepturinae. *University of California Publications in Entomology*, 69:1-138.

Linsley, E.G. and J. A. Chemsak. 1997. Cerambycidae of North America, Part VIII. Bibliography, Index and Host Plant Index. *University of California Publications in Entomology*, 117:1-534.

Littlefield, C.D. 1993. Annual assessment and monitoring report for Grater Sandhill cranes and other threatened and endangered species on the Little Dry Creek nit, California. California Dept. of Fish and Game, Rancho Cordova, California.

Littlefield, C.D., and G.L. Ivey. 2000. Conservation assessment for Greater Sandhill Cranes wintering on the Cosumnes River Floodplain and Delta Region of California. The Nature Conservancy.

MacWhirter, R.B., and K.L. Bildstein. 1996. Northern Harrier (*Circus cyaneus*) in A. Poole and F. Gill (eds.), The Birds of North America. The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

Mannan, R.W., and C.W. Boal. 2000. Home range characteristics of male Cooper's Hawks in an urban environment. *Wilson Bulletin* 112:21-27.

Mannan, R.W., W.A. Estes, and W.J. Matter. 2004. Movements and survival of fledgling Cooper's Hawks in an urban environment. *Journal of Raptor Research* 38:26-34.

Manolis, Tim. Ornithologist. Sacramento Audubon Society, Sacramento CA. Conversations with Ted Beedy in 1989-1996.

Martin, J.W. 1987. Behavior and habitat use of breeding Northern Harriers in southwestern Idaho. *Journal of Raptor Research,* 21:57-66.

McDermott, B. 2015. Personal communication (email) from B. McDermott, USFWS Sacramento Office, to Nina Bicknese and Jan Knight, USFWS Sacramento Office. April 30, 2015.

McDonald, Phillip M. 1985. (revised 1998). Distributional data on *Quercus douglasii* Hook & Arn. Fagaceae – Beech family. U.S. Department of Agriculture, Forest Service-Northeastern Area. St Paul. Mn. http://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/quercus/douglasii.htm.

McShea, W. J. and J. H. Rappole. 2000. Managing the abundance and diversity of breeding bird populations through manipulation of deer populations. Conservation Biology 14:1161-1170.

McShea, William J.; Schwede, Georg 1993. Variable Acorn Crops: Responses of White-Tailed Deer and Other Mast Consumers. J. Mamm. 74(4): 999-1006

Messick, J. P., and M. G. Hornocker. 1981. Ecology of the badger in southwestern Idaho. *Wildlife Monographs* 76:1-53.

Metz, J. 2001. Correlating vernal pool distribution patterns and geologic formations to inform conservation planning in East Merced County. Masters Thesis. University of California, Berkeley, California.

Murphy, R.K., M.W. Gratson, and R.N. Rosenfield. 1988. Activity and habitat use by a breeding male Cooper's hawk in a suburban area. *Journal of Raptor Research* 22: 97-100.

Neff, J.A. 1937. Nesting distribution of the Tricolored Red-Wing. *Condor,* 39:61-81.

O'Driscoll, M.A., and R.R. Parizek. 2008. Geological Controls on Seasonal Pool Hydroperiod in a Karst Setting. *Wetlands* Vol. 28, No. 4, December 2008, pp. 1004–1017.

Orians, G.H. 1961. Social stimulation within blackbird colonies. *Condor,* 63:330-337.

Orloff, S. 2011. Movement Patterns and Migration Distances in an Upland Population of California Tiger Salamander (Ambystoma Californiense). Herpetological *Conservation and Biology* 6(2):266–276.

Palmer, R. S., ed. 1988. Handbook of North American birds. Vol. 5. Yale Univ. Press, New Haven. 465 pp.

Petranka, J.W. 1998. *Salamanders of the United States and Canada*. Smithsonion Institution Press.

Pickwell. 1930.

Pierson, E.D., W.E. Rainey, and C. Corben. 1999. [Abs.]. The western red bat, *Lasiurus blossevillii* – implications of distribution for conservation. *Bat Research News* 40(4):187.

Pierson, E.D., P.W. Collins, W.E. Rainey, P.A. Heady, and C.J. Corben. 2002. Distribution, Status and Habitat Associations of Bat Species on Vandenberg Air Force Base, Santa Barbara County, California. Santa Barbara Museum of Natural History Technical Reports – No. 1.

Pierson, E.D., W.E. Rainey and C. Corben. 2006. Distribution and status of Western red bats (*Lasiurus blossevillii*) in California. Calif. Dept. Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report 2006-04, Sacramento, California. 45 pp.

Plumpton, D.L., and D.E. Andersen. 1997. Habitat use and time budgeting by wintering Ferruginous hawks. Condor 99:888-893.

Pogson, T.H. 1990. Distribution, abundance, and behavior of Greaer Sandhill Cranes, Grus Canadensis tabida, wintering in California's Central Valley. M.S. Thesis, University of Alaska, Fairbanks, Alaska.

Poirier, P. 2012. Physical and chemical correlates of Sacramento county vernal pool crustaceans. Master's Thesis. University of the Pacific, Stockton, California.

Rains, M.C., R.A. Dahlgren, G.E. Fogg, T. Harter, and R.J. Williamson. 2008. Geological Control of Physical and Chemical Hydrology in California Vernal Pools. *Wetlands* 28(2): 347–362.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. The Role of Perched Aquifers in Hydrological Conductivity and Biogeochemical Processes in Vernal Pool Landscapes. *Hydrological Processes* 20: 1157–1175.

Reese, D.A. and H.H. Welsh. 1998a. Habitat use by western pond turtles in the Trinity River, California. *Journal of Wildlife Management* 62:842-853.

Reese, D.A. and H.H. Welsh. 1998b. Comparative demography of *Clemmys marmorata* populations in the Trinity River of California in the context of dam-induced alterations. *Journal of Herpetology* 32(4):505-515.

Reiner, R. 2004. Verbal communication from Rich Reiner of The Nature Conservancy, Elk Grove, CA. to Steve Henderson of Henderson Ecology and Planning. October 2004.

Rich, T. 1986. Habitat and nest-site selection by Burrowing Owls in the sagebrush steppe of Idaho. *Journal of Wildlife Management* 50:548–555. CrossRef, CSA.

Rogers. 1998. Aquatic Macroinvertebrate Occurrences and Population Trends in Constructed and Natural Vernal Pools in Folsom, California. Pp. 224-235 *In*: Witham, C.W., E.T. Bauder, D. Belk, W.R. Ferrin Jr., and R. Orduff (eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems − Proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2001. Revision of the Nearctic Lepidurus (Notostraca). Journal of Crustacean Biology 21: 991 – 1006.

Rogers, D.C. *In prep*. Dispersal agents and speciation in the Branchiopoda (Crustacea).

Rosenberg D. K. and D. F. DeSante. 1997. Demographic characteristics of burrowing owl populations in California. Progress Report, September 1997. Institute for Bird Populations. Point Reyes Station, CA. Publication No. 95.

Rosenberg, D.K., J. Gervais, H. Ober and D. DeSante. 1998. An adaptive management plan for the burrowing owl population at Naval Air Station Lemoore, Lemoore, California. The Institute for Bird Populations. Point Reyes Station, California. Publication No. 95.

Rosenberg, D.K. and K.L. Haley. 2004. The ecology of burrowing owls in the agroecosystem of the Imperial Valley, California. Studies in Avian Biology 27:120-135.

Rosenfield, R.N., and J. Bielefeldt. 1993. Cooper's Hawk (*Accipiter cooperii*). *In* The Birds of North America, No. 75 (A. Poole and F. Gill, Editors). Philadelphia: The Academy of Natural Sciences, Washington, DC. The American Ornithologists' Union.

Rosenfield, R.N., J. Bielefeldt, R.K. Anderson, and J.M. Papp. 1991. Status Reports: accipiters. Pp. 42-49 *in* Proc. Midwest Raptor Management Symposium and Workshop. Natl. Wildl. Fed., Washington, D.C.

Rosenfield, R.N., C.M. Morasky, J. Bielefeldt, and W.L. Loope. 1992. Forest fragmentation and island biogeography, a summary and bibliography. USDI, National Park Service Technical Report 92/08.

Rossman, D., and G. Stewart. 1987. Taxonomic reevaluation of *Thamnophis couchii* (Serpentes: Colubridae). Occasional Papers of the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana. No. 63. 25 pp.

Roth, T. C. and S. L. Lima. 2003. Hunting behavior and diet of Cooper's Hawks: an urban view of the small-bird-in-winter paradigm. *Condor* 105:474–483.

Sawyer, J. O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society, Sacramento, California.

Sawyer, J. O, T. Keeler-Wolf, and J. Evens. 2009. *A Manual of California Vegetation*. California Native Plant Society, Sacramento, California.

Schlorff, R. and P.H. Bloom. 1984. "Importance of Riparian Systems to Nesting Swainson's Hawks in the Central Valley of California." In *California Riparian Systems: Ecology, Conservation, and Productive Management*. Eds. R.E. Warner and K.M. Hendrix. Berkeley, California: University of California Press.

Searcy, C.A. and H.B. Shaffer. 2011. Determining the migration distance of a vagile vernal pool specialist: How much land is required for conservation of California tiger salamanders? Pages 73-87 in D.G. Alexander and R.A. Schlising (Editors), Research and Recovery in Vernal Pool Landscapes. Studies from the Herbarium, Number 16. California State University, Chico, California.

Searcy, C. 2012. Personal communication (email) from Chris Searcy, UC Davis, to Rick Kuyper, USFWS Sacramento Office. September 28, 2012.

Semlitsch, R.D. and J.R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology* 17(5):1219-1228.

Shaffer, H.B., R.N. Fisher, and S.E. Stanley. 1993. Status report: the California tiger salamander (*Ambystoma californiense*). Final report for the California Department of Fish and Game. 36 pp. plus figures and tables.

Silveira, J.G. 1998. Avian Uses of Vernal Pools and Implications for Conservation Practice. Pages 92–106 *in:* C.W. Witham et al. (eds.), *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, CNPS, Sacramento, California.

Simmons, R.E. 1983. Polygyny, ecology and mate choice in the Northern Harrier *Circus cyaneus* (L.). Master's thesis, Acadia University, Wolfville, NS.

Smith, D.G., and J.R. Murphy. 1978. Biology of the Ferruginous Hawk in Central Utah. *Sociobiology* 3: 79-95.

Smith, D.W. and Verrill, W.L., 1998. "Vernal Pool-Soil-Landform Relationships in the Central Valley, California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*. C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Sacramento, California: California Native Plant Society.

Solomeshch, A.I., M.G. Barbour, and R.F. Holland. 2007. *Vernal Pools: Terrestrial Vegetation of Californi*a, 3rd ed. University of California Press, California. 394–424.

Stahlecker, D.W. and A. Beach. 1979. Successful nesting by Cooper's hawks in an urban environment. *Inland Bird Banding* 51:56-57.

Stebbins, R.C. 1985. *A field guide to western reptiles and amphibians*. Houghton Mifflin Co., New York. 336 pp.

Stebbins, R.C. 1989. Declaration of R. C. Stebbins in support of petition of writ of mandate. Sierra Club and Richard Pontuis v. Gilroy City Council, Shappell Industries et al. Santa Clara County Superior Court. March 16, 1989. 11 pp. plus exhibits.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians*, 3rd Edition. Houghton Mifflin Company. Boston, Massachusetts. 530 pp.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Storer, T.L. 1925. A synopsis of the amphibia of California. *University of California Publications in Zoology* 27:1-342.

Swolgaard, C., 2004. Nesting density and habitat use of Swainson's Hawk in a vineyard landscape in northern San Joaquin County, California. Master's Thesis, CSUS, Sacramento, California.

Thompson-Hanson, P.A. 1984. Nesting ecology of Northern Harriers on the Hanford site, south-central Washington. Master's thesis, Washington State University, Pullman.

Trenham, P.C., H. B. Shaffer, W. D. Koening and M. R. Stromberg. 2000. Life History and Demographic variation in the California Tiger Salamander (*Ambystoma californiense*). Copeia, 2000(2): 365-377.

Trochet, J. 2004. Personal communication from John Trochet of The Nature Conservancy, Elk Grove, California to Steve Henderson of Henderson Ecology and Planning. October and December 2004.

Trulio, L. A. 1994. The ecology of a population of burrowing owls at a naval air station in northern California. Dept. of the Navy. San Bruno, California.

USDA (U.S. Department of Agriculture). 2014. Soil Survey Geographic (SSURGO) Database. U.S. Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center. Digital data obtained through the USDA web portal: http://soils.usda.gov/survey/geography/ssurgo.

USFWS (U.S. Fish and Wildlife Service). 1984. *Valley Elderberry Longhorn Beetle Recovery Plan* . USFWS Region 1, Portland, Oregon. June 28, 1984. http://ecos.fws.gov/docs/recovery_plan/840628.pdf

USFWS. 1994. Final Rule: "Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Conservancy Fairy Shrimp, Longhorn Fairy Shrimp, and the Vernal Pool Tadpole Shrimp; and Threatened Status for the Vernal Pool Fairy Shrimp." September 19, 1994.USFWS. Federal Register (59): 48136-48153. http://ecos.fws.gov/ecp0/profile/speciesProfile?sId=2246

USFWS. 1999a. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.* Sacramento, California: USFWS. Sacramento Fish and Wildlife Office, 2800 Cottage Way, Sacramento Ca. July 9, 1999. http://www.fws.gov/sfbaydelta/documents/velb_conservation.pdf.

USFWS. 1999b. *Draft Recovery Plan for the GGS* (Thamnophis gigas). USFWS Region 1, Portland, Oregon.

USFWS. 2004a. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemption for Existing Routine Ranching Activities. Federal Register 69(149) 47212-47248.

USFWS. 2004b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population; Proposed Rule. Federal Register 69(153) 48570-48649.

USFWS. 2005a. Designation of Critical Habitat for the California Tiger Salamander, Central Population; Final Rule. Federal Register, Volume 70, pages 49380–49458.

USFWS. 2005b. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.* Portland, Oregon: USFWS. Approved December 15, 2005. Accessed February 6, 2012. http://ecos.fws.gov/docs/recovery_plan/060614.pdf.

USFWS. 2006. Final rule: "Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants." February 10, 2006. Federal Register, volume 71, pages 7118–7316.

Van Denburgh, J., and Slevin, J.R. 1918. The garter snakes of western North America. *Proceedings of California Academy of Sciences*, 8 (4):181-270.

Vollmar, J., J. Schweitzer, R. Holland, and C. Witham. 2013. Predictive Habitat Analysis and Mapping of Four Rare Vernal Pool Species in Merced, Sacramento, and Placer Counties. Prepared for CVPIA Habitat Restoration Program, USFWS, Pacific Southwest Region. January 2013.

Waian, L.B. 1973. The behavioral ecology of the North American White-tailed Kite (*Elanus leucurus majusculus*) of the Santa Barbara coastal plain. Ph.D. diss., Univ. of California, Santa Barbara.

Warner, J.S., and R.L. Rudd. 1975. Hunting by the White-tailed Kite. *Condor* 77: 226-230.

WBWG (Western Bat Working Group). 1998. Species accounts: ecology, conservation, and management of western bat species. Western Bat Working Group Workshop, February 9-13, 1998, Reno, Nevada.

Williams, D. F. 1986. Mammalian Species of Special Concern in California, American Badger. California Department of Fish and Game, Sacramento. Admin. Rep. 86-1. 112 pp.

Williamson, R.J., G.E. Fogg, M.C. Rains, and T.H. Harter. 2005. Hydrology of Vernal Pools at Three Sites, Southern Sacramento Valley. Report to California Department of Transportation. Project F 2001 IR 20. University of California, Davis. 88 pages. http://www. dot.ca.gov/research/environmental/docs/vernal_pools_report_fin al.pdf.

Wylie, G., and S. Barry. 2005. Verbal communication from Glen Wylie, Herpetologist. US Geologic Survey to Jamison Watts, Gallaway Consulting Inc. April, 2005.

Wylie, G.D., M. L. Casazza, C. J. Gregory, and B. J. Halstead. 2010. Abundance and Sex Size Dimorphism of the Giant Garter Snakes (*Thamnophis gigas*) in the Sacramento Valley of California. Journal of Herpetology 44(1):94-103.

Yee, D. 2004. Verbal communication from David Yee, Ornithologist, to Waldo Holt, 2004.

Yosef, R., 1996. Loggerhead Shrike (*Lanius ludovicianus*). In The Birds of North America, No. 231 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Zeiner, D.C., W. Laudenslayer, and K. Mayer. 1988. Tiger salamander *Ambystoma tigrinum*. Pages 2-3, in: California's Wildlife, Volume 1: Amphibians and Reptiles. The Resources Agency, California Department of Fish and Game.

Zeiner, D. C., W. F Laudenslayer Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife: volume II: birds. California Department of Fish and Game. Sacramento, California.

4 LAND USE

4.1 Introduction

This chapter provides an overview of historic, existing, planned, and projected long-term land use conditions in the Plan Area. This chapter also examines forecasted demands for housing, commercial goods, and services in the Plan Area over the next 50 years.

4.2 Historical Land Use Conditions of the Plan Area

During the early part of the 20th century, agricultural and grazing lands dominated the landscape of Sacramento County, interrupted only by small pockets of urbanization. In the 1940s, Sacramento County experienced a rapid increase in population with a majority of new growth occurring within or near the City of Sacramento and in smaller cities, such as Folsom, Galt, and Isleton. A second wave of growth occurred between 1950 and 1960 when Sacramento County's population grew by 81%, and the unincorporated county saw an expansion of urbanization to the south (Florin) and the east (Rancho Cordova). During the 1960s, 1970s, 1980s, and early 1990s, moderate but steady increases in population growth occurred along with an expansion of urban infrastructure farther into the southern and eastern portions of the county, resulting in conversion of grazing and croplands to urban uses.

In the early 1990s, a downturn in the housing market precipitated a sharp decrease in home sales, and a slowdown in urban expansion ensued. However, during the first 5 years of the 21st century, the entire region experienced explosive housing production and unprecedented urban sprawl as long-term interest rates reached historical lows, and jurisdictions struggled to keep up with housing demand. The housing market slowed and then softened considerably from 2007 to 2009 due to market contraction and asset value decline. Development slowed and home values dropped as housing supply exceeded demand for the first time in approximately 4 or 5 years.

4.3 Existing and Planned Land Use by Jurisdiction

The following section describes existing and planned land uses and General Plan policies related to the protection of natural resources by each jurisdiction located in the Plan Area. The majority of the information presented in this section is derived from the jurisdictions' adopted General Plans. General Plans are documents prepared and adopted by local land use authorities, usually a county or city, to guide the location of land uses within their planning boundaries for the life of the General Plan. Figure 4-1 illustrates the jurisdictional boundaries that lie within the Plan Area.

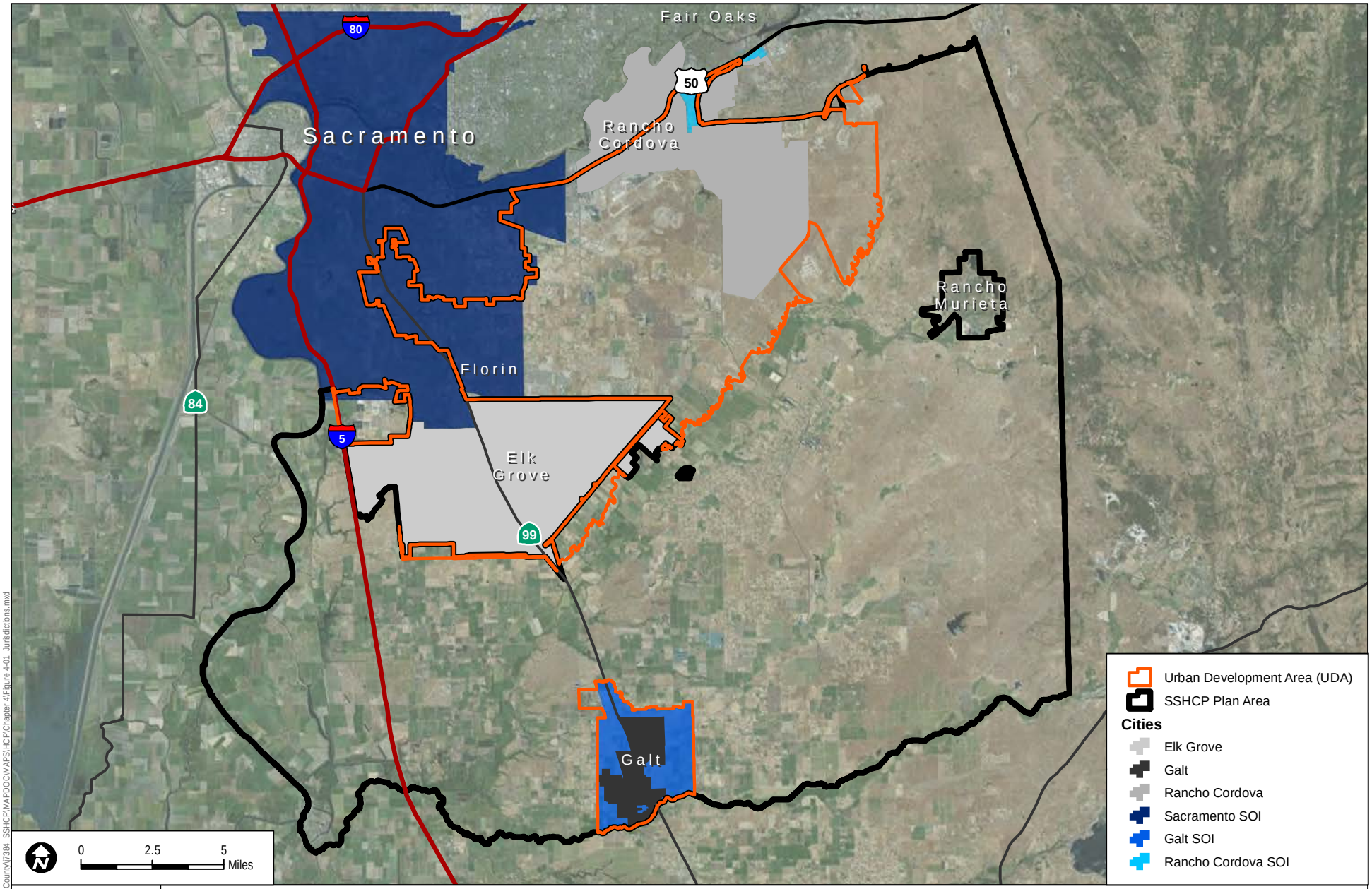
4.3.1 Sacramento County

The County of Sacramento's General Plan will guide development until the year 2030 (County of Sacramento 2011). Existing and planned land uses in the Plan Area located in the unincorporated county are summarized in Table 4-1 and depicted in Figure 4-2.

Table 4-1
Sacramento County General Plan Land Uses (2030)

General Plan Land Use Designation	
Land Use Component	*Acreage*
Agricultural Cropland	68,019
Agricultural Cropland (RCA)	15,166
Agricultural-Residential (1–10 du/ac)	25,540
Cemetery, Public, and Quasi-Public	7,308
Cemetery, Public, and Quasi-Public (RCA)	1,645
Commercial and Offices	1,371
Extensive Industrial	4,659
General Agriculture (20 ac)	39,157
General Agriculture (20 ac) (RCA)	6
General Agriculture (20 ac) (SM)	27
General Agriculture (80 ac)	87,087
General Agriculture (80 ac) (RCA)	21,628
High-Density Residential (31–50 du/ac)	16
Intensive Industrial	3,488
Low-Density Residential (1–12 du/ac)	11,890
Medium-Density Residential (13–30 du/ac)	724
Natural Preserve	18,021
Recreation	5,163
Recreation (RCA)	472
Urban Development Area	94
Urban Reserve	1,909
Urban-Transit-Oriented Development	223
Other	44
Total	**313,657**

Source: County of Sacramento 2011.
Note:
ac = acre
du = dwelling units
RCA = Resource Conservation Area
SM = Surface Mining



SOURCE: ESRI 2015, County of Sacramento 2015

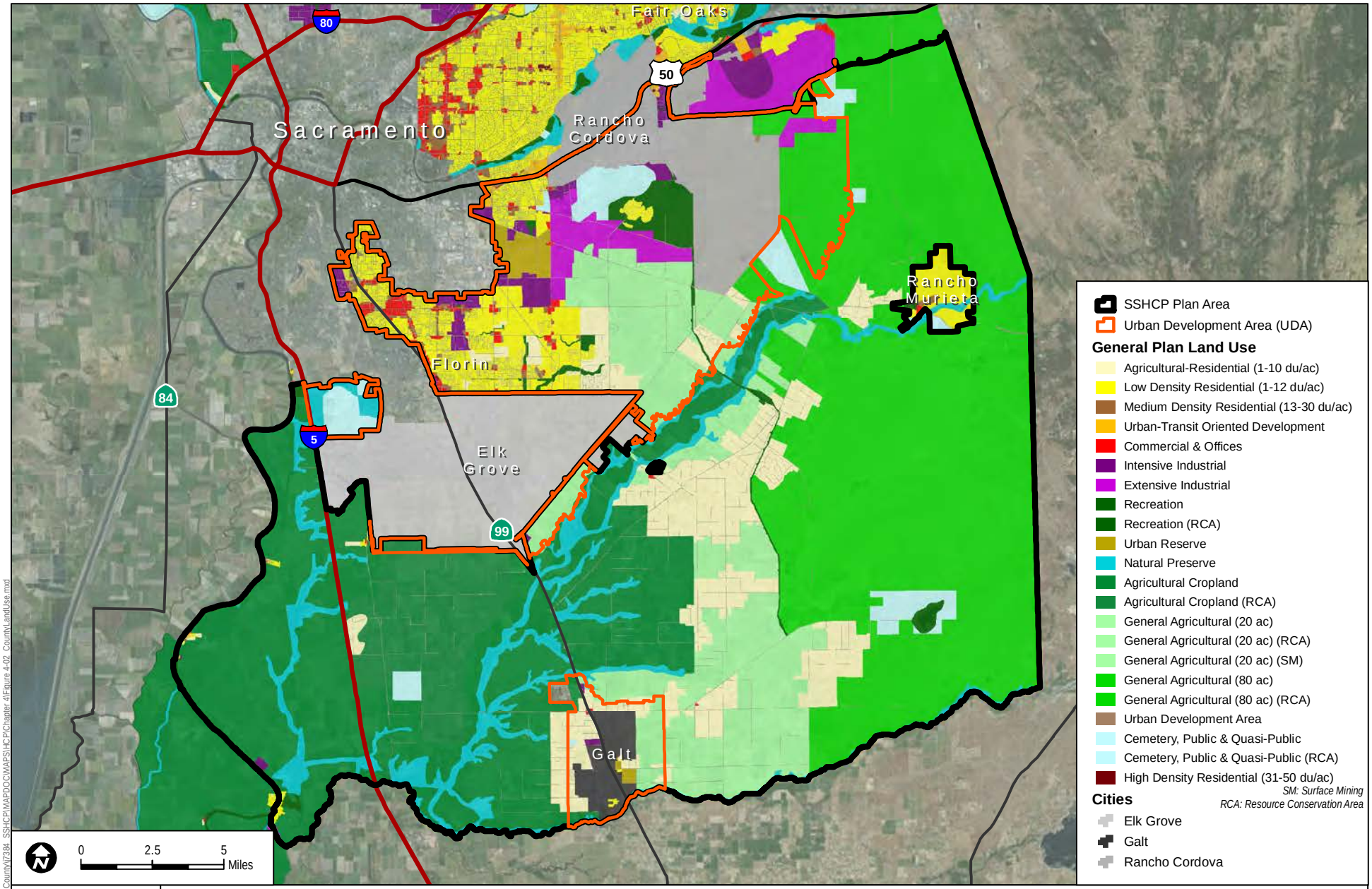
FIGURE 4-1

Jurisdictions of the SSHCP Plan Area

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\733d_SSHCP\MAPDOC\MAPS\HCP\Chapter 4\Figure 4-01_Jurisdictions.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\v7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 4\Figure 4-02_CountyLandUse.mxd

SOURCE: ESRI 2015, County of Sacramento 2015

FIGURE 4-2

Sacramento County General Plan Land Uses

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK

Urban Policy Area and Urban Services Boundary

Urbanization in the unincorporated county is largely shaped by the Urban Policy Area (UPA) and Urban Services Boundary (USB). The UPA for Sacramento County was established in 1993 and is still maintained pursuant to Policy LU-1 of the 2030 Sacramento County General Plan. The UPA identifies the area in the county that is capable of providing a 20-year supply of developable land sufficient to accommodate projected growth (Figure 4-3). The intent of the UPA is to direct growth in a logical manner and to identify areas where infrastructure requiring large capital investments will be needed in the near future.

The USB was established in 1993 and is still maintained pursuant to Policy LU-2 of the 2030 Sacramento County General Plan. The USB indicates the ultimate boundary of the urban area in the unincorporated county (beyond 25 years) (Figure 4-3). It is intended to be a permanent growth boundary not subject to modification except under extraordinary circumstances. Sacramento General Plan Policy LU-1 restricts the UPA from expanding beyond the USB except when the County determines it is necessary for health and safety purposes.

The UPA and USB are the backbone of Sacramento County's urban planning philosophy. These growth boundaries are intended to protect the county's natural resources from urban encroachment, as well as to limit costly sprawling development patterns. While the USB is intended to be a permanent boundary, the UPA is adjusted incrementally as needed to ensure that the county can accommodate anticipated growth over the next 25-year planning cycle. The area between the two lines is reserved for future urbanization and is only to be developed when lands within the existing UPA can no longer accommodate projected growth or the project meets expansion criteria pursuant to Policy LU-120. Note that the UPA and USB only apply to the unincorporated areas of Sacramento County.

A majority of the land within the UPA identified for urban residential and commercial use is located north of the City of Elk Grove and east of the City of Sacramento. Industrial land uses are located just south of Mather Field and on properties owned by Aerojet, immediately east of Rancho Cordova and south of U.S. 50. In addition, there are three master plans that have been initiated along the Jackson Highway corridor: New Bridge, West Jackson, and Jackson Township. All three propose to expand the UPA.

Unincorporated Sacramento County (Outside the USB)

Outside the Urban Development Area (UDA), the eastern portion of the county within the Plan Area consists of dry pastureland suitable for cattle grazing. The land use designations are for General Agriculture with a minimum parcel size of 80 acres. The central and western portions are suitable for growing a variety of crops, including row crops, orchards, vineyards, and some

irrigated pasture. These areas commonly also have General Agriculture land use designations, but with minimum parcel sizes of 20 or 40 acres. Scattered throughout the agricultural landscape are several agricultural-residential communities, including Alta Mesa (2,590 acres), Clay Station (3,095 acres), Herald (2,005 acres), Point Pleasant (471 acres), Sloughhouse (1,030 acres), and Wilton (9,785 acres).

Conservation and Open Space Policies

The Sacramento County General Plan includes several elements such as the agricultural, conservation, and open space elements that guide open space/agricultural resource management for areas within the unincorporated County. These elements provide a strategy for vegetation and wildlife conservation as well as protection of agricultural resources. The following is a list of policies from these elements that also support the SSHCP's goals and objectives (County of Sacramento 2011).

AG-1 The County shall protect prime, statewide importance, unique and local importance farmlands located outside of the USB from urban encroachment.

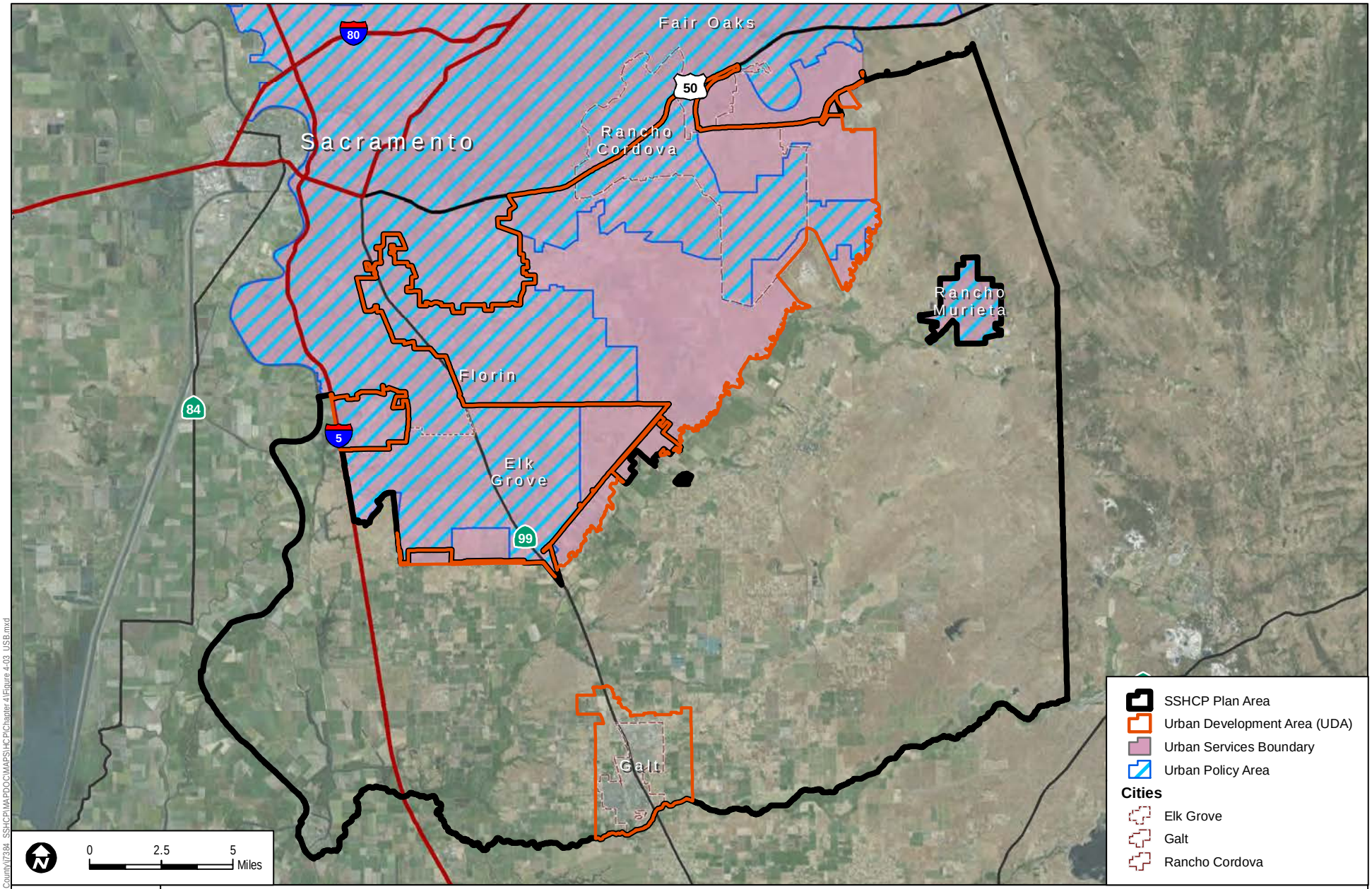
AG-5 Projects resulting in the conversion of more than fifty (50) acres of farmland shall be mitigated within Sacramento County, except as specified in the paragraph below, based on a 1:1 ratio, for the loss of the following farmland categories through the specific planning process or individual project entitlement requests to provide in-kind or similar resource value protection (such as easements for agricultural purposes):

- Prime, statewide importance, unique, local importance, and grazing farmlands located outside the USB;
- Prime, statewide importance, unique, and local importance farmlands located inside the USB.

The Board of Supervisors retains the authority to override impacts to Unique, Local, and Grazing farmlands, but not with respect to Prime and Statewide farmlands.

However, if that land is also required to provide mitigation pursuant to a Sacramento County endorsed or approved Habitat Conservation Plan (HCP), then the Board of Supervisors may consider the mitigation land provided in accordance with the HCP as meeting the requirements of this section including land outside of Sacramento County.

Note: This policy is not tied to any maps contained in the Agricultural Element. Instead, the most current Important Farmland map from the Department of Conservation should be used to calculate mitigation.



SOURCE: ESRI 2015, County of Sacramento 2015

FIGURE 4-3

County Urban Policy Area and Urban Services Boundary

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\73384_SSHCP\MAPDOC\MAPS\HCP\Chapter 4\Figure 4-03_USB.mxd

INTENTIONALLY LEFT BLANK

AG-12 The County will cooperate with landowners of agriculturally zoned properties to promote the placing of natural preserve/mitigation amenities on land, such as trees and other biota enhancing improvement, by making sure amenities are assets to both the natural preserve/mitigation areas and agriculture practices.

AG-15 The County shall pursue opportunities to create mitigation banks, environmental mitigation sites, wildlife refuges, or other natural resource preserves wherein substantial agricultural activities that are compatible with protection of high habitat values continue, but incompatible activities and conversion for development are precluded by conservation easements.

AG-16 Maintain private ownership by coordinating with non-profit organizations to acquire conservation easements for preserving farmlands.

AG-17 The establishment of conservation easements combining preservation of agricultural uses, habitat values, and open space on the same property should be encouraged where feasible.

AG-30 Provide a plan focused on noxious weed control in agricultural areas.

CO-24 Comply with the Sacramento Areawide National Pollutant Discharge Elimination System Municipal Stormwater Permit (NPDES Municipal Permit) or subsequent permits, issued by the Central Valley Regional Water Quality Control Board (RWQCB) to the County, and the Cities of Sacramento, Elk Grove, Citrus Heights, Folsom, Rancho Cordova, and Galt (collectively known as the Sacramento Stormwater Quality Partnership [SSQP]).

CO-25 Support the preservation, restoration, and creation of riparian corridors, wetlands, and buffer zones.

CO-26 Protect areas susceptible to erosion, natural water bodies, and natural drainage systems.

CO-58 Ensure no net loss of wetlands, riparian woodlands, and oak woodlands.

CO-59 Ensure mitigation occurs for any loss of or modification to the following types of acreage and habitat function:

- Vernal pools,
- Wetlands,
- Riparian,

- Native vegetative habitat, and
- Special-status species habitat.

CO-61 Mitigation should be consistent with Sacramento County-adopted habitat conservation plans.

CO-65 Create a network of preserves linked by wildlife corridors of sufficient size to facilitate the movement of species.

CO-66 Mitigation sites shall have a monitoring and management program including an adaptive management component including an established funding mechanism. The programs shall be consistent with Habitat Conservation Plans that have been adopted or are in draft format.

CO-67 Preserves and conservation areas should have an established funding mechanism, and where needed, an acquisition strategy for its operation and management in perpetuity. This includes existing preserves such as the American River Parkway, Dry Creek Parkway, Cosumnes River Preserve and other plans in progress for riparian areas like Laguna Creek.

CO-69 Avoid, to the extent possible, the placement of new major infrastructure through preserves unless located along disturbed areas, such as existing roadways.

CO-71 Development design shall help protect natural resources by:

- Minimizing total built development in the floodplain, while designing areas of less frequent use that can support inundation to be permitted in the floodplain,
- Ensuring development adjacent to stream corridors and vernal pools provide, where physically reasonable, a public street paralleling at least one side of the corridor with vertical curbs, gutters, foot path, street lighting, and post and cable barriers to prevent vehicular entry.
- Projects adjacent to rivers and streams shall integrate amenities, such as trail connectivity, that will serve as benefits to the community and ecological function.
- Siting of wetlands near residential and commercial areas should consider appropriate measures to minimize potential for mosquito habitation.
- Development adjacent to steam corridors and vernal pools shall be designed in such a manner as to prevent unauthorized vehicular entry into protected areas.

CO-73 Secure easement or fee title to open space lands within stream corridors as a condition of development approval.

CO-74 Evaluate feasible on-site alternatives early on in the planning process and prior to the environmental review process that reduce impacts on wetland and riparian habitat and provide effective on-site preservation in terms of minimum management requirements, effective size, and evaluation criteria.

CO-75 Maintain viable populations of special status species through the protection of habitat in preserves and linked with natural wildlife corridors.

CO-76 Habitat conservation plans shall be adopted by the County to provide a comprehensive strategy to protect and aid in the recovery of special status species.

CO-77 Development of open space acquisition programs within natural areas shall consider whether the area is occupied by special status species.

CO-78 Plans for urban development and flood control shall incorporate habitat corridors linking habitat sites for special status species. (Please also refer to the Open Space Element for related policies.)

CO-125 Restore concrete sections of rivers and streams to natural or naturalized channels, where feasible for increased flood or conveyance capacity and groundwater recharge.

CO-126 Prohibit obstruction or underground diversion of natural waterways.

CO-132 Protect native vegetative habitats from improper grazing regimes on public lands and inform private land operators of how they may minimize impacts to these habitats.

CO-133 Prohibit native vegetative habitat mitigation and/or other public plantings onto incompatible substrates i.e., tree planting in vernal pool hardpan.

CO-134 Maintain and establish a diversity of native vegetative species in Sacramento County.

CO-135 Protect the ecological integrity of California Prairie habitat.

CO-138 Protect and preserve non-oak native trees along riparian areas if used by Swainson's Hawk, as well as landmark and native oak trees measuring a minimum of 6 inches in diameter or 10 inches aggregate for multi-trunk trees at 4.5 feet above ground.

OS-1 Actively plan to protect, as open space, areas of natural resource value, which may include but are not limited to wetlands preserves, riparian corridors, woodlands, and floodplains associated with riparian drainages.

OS-2 Maintain open space and natural areas that are interconnected and of sufficient size to protect biodiversity, accommodate wildlife movement and sustain ecosystems.

Demographics

The County of Sacramento is approximately 994 square miles. As of 2013, the estimated population of Sacramento County was approximately 1,462,131 persons with a 2010 U.S. Census estimate base of 1,418,788 persons (U.S. Census Bureau 2014a). There are approximately 558,807 housing units in the County as of 2010 (U.S. Census Bureau 2014a).

4.3.2 Rancho Cordova

The City of Rancho Cordova is located in central Sacramento County. Rancho Cordova is bisected by U.S. 50 between Bradshaw Road and Sunrise Boulevard. Between those points, the city extends north to the American River and south to Old Placerville Road. The eastern part of the city continues south of Folsom Boulevard between Sunrise Boulevard and Grant Line Road to the west and east, respectively. The southeastern part of the city is defined by Grant Line Road and Jackson Highway (Figure 4-1). Rancho Cordova encompasses approximately 20,000 acres and has a population of approximately 65,000 people (U.S. Census Bureau 2010a). With approximately 15,179 acres located within the Plan Area, Rancho Cordova makes up approximately 4.5% of the entire Plan Area.

Rancho Cordova's General Plan will guide development until the year 2030 (City of Rancho Cordova 2006). The most prevalent planned land use within the City of Rancho Cordova, as identified by the City's General Plan, is residential (Table 4-2 and Figure 4-4). A majority of the existing urban residential land use designations are located in the northwestern portion of the city, while expanding, new residential land use designations are dominant in the southeastern half. Areas identified for industrial uses are prevalent along U.S. 50. Commercial land use designations are also located along U.S. 50 but additionally occur along commercial corridors like Sunrise Boulevard, Folsom Boulevard, and Coloma Road. Some infill in the form of residential and commercial land use is likely to occur within already established areas of the city; however, a majority of new development will occur in greenfield areas (undeveloped areas earmarked for future development) in southeastern Rancho Cordova.

Table 4-2
City of Rancho Cordova General Plan Land Uses

General Plan Land Use	
Land Use Component	*Acreage*
Low-Density Residential (2.1–6.0 du/ac)	1,055
Medium-Density Residential (6.1–18.0 du/ac)	564
High-Density Residential (18.1–40.0 du/ac)	127
Commercial Mixed-Use	122
Village Center Mixed-Use	12
Office Mixed-Use	1,003
Light Industry	252
Public/Quasi-Public	109
Parks and Open Space	347
Natural Resources	714
Special Planning Area/Specific Plan Area/Other	2,099
Total	**14,706**

Source: City of Rancho Cordova 2006, General Plan Land Use Diagram.
Note: du = dwelling unit; ac = acre

Conservation and Open Space Policies

The City of Rancho Cordova's General Plan includes several policies that provide for the conservation of natural resources for areas within the City. The following is a list of policies from the City of Rancho Cordova's General Plan that support the SSHCP's Conservation Strategy (City of Rancho Cordova 2006).

- Policy NR.1.1 – Protect rare, threatened, and endangered species and their habitats in accordance with state and federal law.
    - Action NR.1.1.1 – Incorporate large habitat preserves and interconnected wildlife corridors in new development areas to provide ample space for animal movement.
    - Action NR.1.1.2 – Review projects through the entitlement process and [California Environmental Quality Act] CEQA analysis to ensure that they comply with this policy if the site contains unique habitat, creeks, and/or wooded corridors.
    - Action NR.1.1.3 – As part of the consideration of development applications for individual Planning Areas containing habitats that support special-status plant and animal species that are planned to be preserved, the City shall require that these preserved habitats have interconnections with other habitat areas in order to maintain the viability of the preserved habitat to support the special-status species identified. The determination of the design and size of the "interconnections" shall be made by the City, as recommended

by a qualified professional, and will include consultation with the California Department of Fish and Game [Wildlife] and U.S. Fish and Wildlife Service.

  - Action NR.1.1.4 – Prior to the approval of any public or private development project in areas containing trees, the City shall require that a determinate survey be conducted during the nesting season (March 1 and August 31) to identify if active nesting by birds protected under the Migratory Bird Treaty Act (MBTA) is taking place. If all site disturbance is to occur outside this time, the actions described in this mitigation measure are not required. If nesting activity is observed, consultation with the City of Rancho Cordova Planning Department shall be conducted in order to determine the appropriate mitigation, if any, required to minimize impacts to nesting birds. No activity may occur within 100 feet of any nesting activity or as otherwise required following consultation with the California Department of Fish and Game [Wildlife].

- Policy NR.1.2 – Conserve Swainson's hawk habitat consistent with state policies and Department of Fish and Game [Wildlife] guidelines.
  - Action NR.1.2.1 – Establish a Swainson's Hawk Ordinance in coordination with the California Department of Fish and Game [Wildlife] to establish the process of mitigating for the loss of Swainson's hawk foraging habitat based on habitat value lost to development. The ordinance will set forth a process where habitat lost to development will be mitigated through the permanent protection of equivalent or better existing habitat conditions (referred to hereafter as "mitigation lands"). The specific required mitigation ratios (habitat acreage lost versus mitigation lands) and any other provisions to mitigation process shall be established through technical studies as part of the development of the ordinance and will take into account value of habitat to be converted in relation to habitat value of the mitigation lands (e.g., relation to nesting sites), proximity of the mitigation lands to adjacent conditions affecting habitat (e.g., nearby land uses and already permanently protected lands), and other relevant factors. The ordinance will also establish standards ensuring that mitigation land will be adequately protected and managed in perpetuity (e.g., via conservation easement, deed restriction or other appropriate method), and setting forth the timing of the required provision of mitigation lands in relation with the timing of the loss of habitat in the City (as its boundaries may be changed through subsequent annexations), such that mitigation lands shall be provided no later than prior to ground disturbance.
- Policy NR.1.4 – Discourage the planting of invasive species.
  - Action NR.1.4.1 – Create an educational leaflet that identifies common invasive species and recommends the planting of non-invasive species.
  - Action NR.1.4.2 – The City shall adopt and maintain a Noxious Weed Ordinance. The Noxious Weed Ordinance shall include regulatory standards for construction

activities that occur adjacent to natural areas to inhibit the establishment of noxious weeds through accidental seed import.

- Policy NR.1.6 – Participate in the development of a habitat conservation plan to address the unique biological resources in Rancho Cordova.
- Policy NR.1.8 – The City shall encourage creation of habitat preserves that are immediately adjacent to each other in order to provide interconnected open space areas for animal movement.
- Policy NR.1.9 – The City shall require that impacts to riparian habitats be mitigated at a no net loss of existing function and value based on field survey and analysis of the riparian habitat to be impacted. No net loss may be accomplished by avoidance of the habitat, restoration of existing habitat, or creation of new habitat, or through some combination of the above.
- Policy NR.1.10 – The City shall avoid the placement of new roadways within habitat preserves to the maximum extent feasible.
- Policy NR.1.11 – In such cases where habitat preserves are crossed by a roadway, or where two adjacent preserves are separated by a roadway, the roadway shall be designed or updated with wildlife passable fencing separating the roadway from the preserve and/or shall incorporate design features that allow for the movement of wildlife across or beneath the road without causing a hazard for vehicles and pedestrians on the roadway.
- Policy NR.2.1 – Require mitigation that provides for "no net loss" of wetlands consistent with current State and federal policies.
    - Action NR.2.1.1 – During the environmental review process, evaluate feasible on-site alternatives that will reduce impacts to wetland resources and effectively preserve these resources.
- Policy NR.2.2 – Ensure that direct and indirect effects to wetland habitats are minimized by environmentally sensitive project siting and design, to the maximum extent feasible.
- Policy NR.3.2 – In general, the City will encourage the preservation of existing location, topography, and meandering alignment of creeks. Where necessary, and if consistent with other City policies, the creation and realignment of creek corridors shall be constructed to recreate the character of the natural creek corridor. Channelization and the use of concrete within creek corridors shall not be supported.
    - Action NR.3.2.1 – Develop guidelines for channel creation or modification that will ensure channel meander, naturalized side slope, and varied channel bottom elevation are considered in design.
    - Action NR.3.2.2 – Adopt and implement improvement standards for soft bottom channels.

Demographics

The City of Rancho Cordova is approximately 34 square miles. As of 2013, the estimated population of Rancho Cordova was 67,911 persons with a 2010 U.S. Census estimate base of 64,805 persons (U.S. Census Bureau 2010a, 2014b). There were approximately 25,479 housing units in the City as of 2010 (U.S. Census Bureau 2014b).

4.3.3 Galt

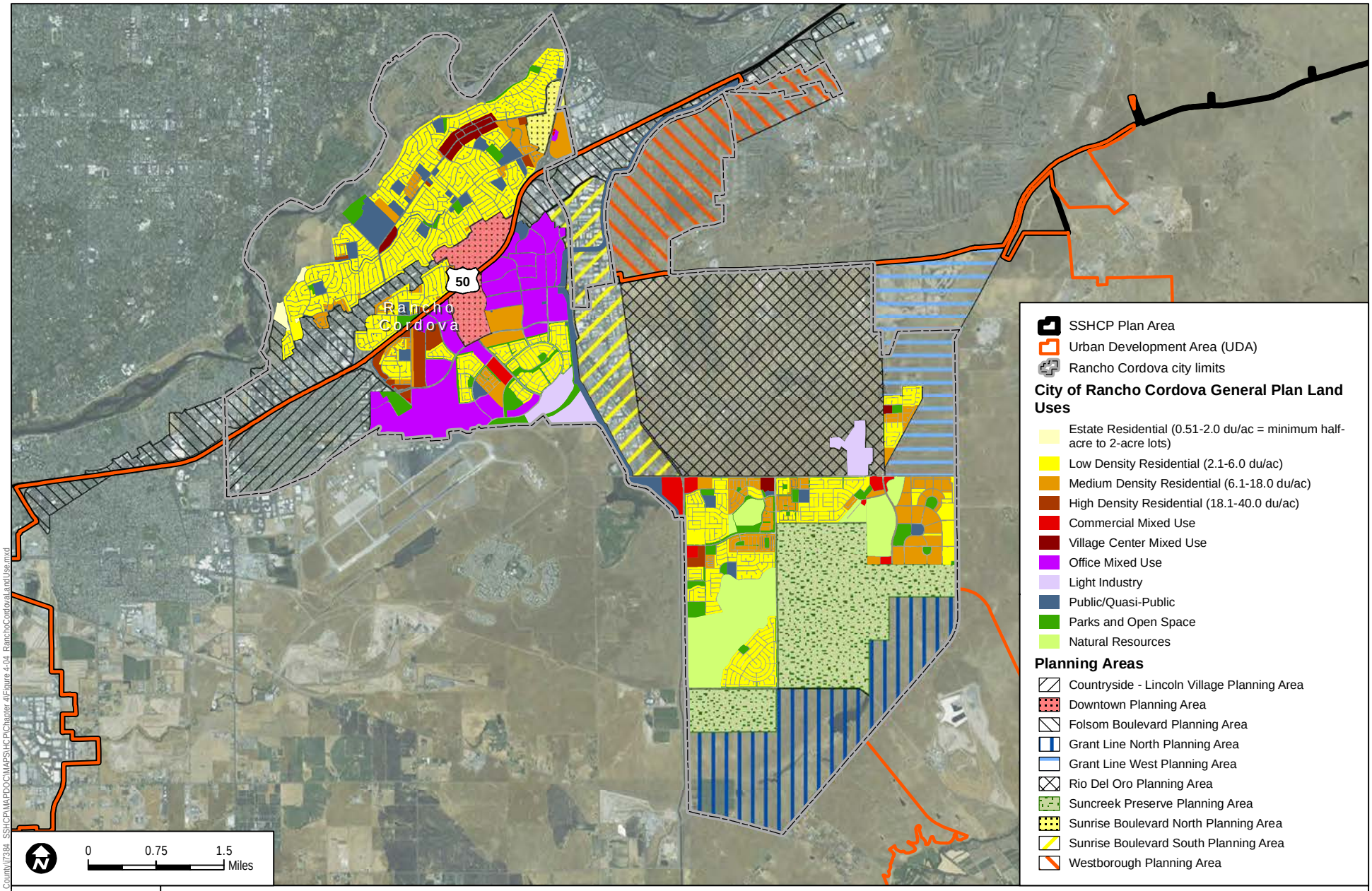
The City of Galt is located in southern Sacramento County and can be generally described as extending from Dry Creek on the south to Twin Cities Road on the north, and from McFarland Street/Sparrow Drive on the west to Marengo Road on the east (Figures 4-1 and 4-5). Galt encompasses approximately 3,760 acres of land and has a population of approximately 23,600 (U.S. Census Bureau 2010b).

Galt makes up approximately 1% of the Plan Area. Galt's 2030 General Plan will guide development until the year 2030 (City of Galt 2009). The most prevalent planned land use in Galt is low-density residential (Table 4-3).

Table 4-3
City of Galt General Plan Land Uses

General Plan Land Use	
Land Use Component	*Acreage*
Rural Residential	1
Low-Density Residential (0–6 du/ac)	1,401
Medium-Density Residential (5–8 du/ac)	216
High-Density Residential (14–24 du/ac)	140
Mixed-Use	5
Commercial	271
Office Professional	11
Light Industrial	284
Public/Quasi-Public	227
Parks	109
Open Space	153
Other	37
Total	**2,854**

Source: City of Galt 2009 (roads or other infrastructure not included).
Note: du = dwelling unit; ac = acre.



Path: Z:\Projects\Sacramento_County\73384_SSHCP\MAPDOC\MAPS\HCP\Chapter 4\Figure 4-04_RanchoCordovaLandUse.mxd

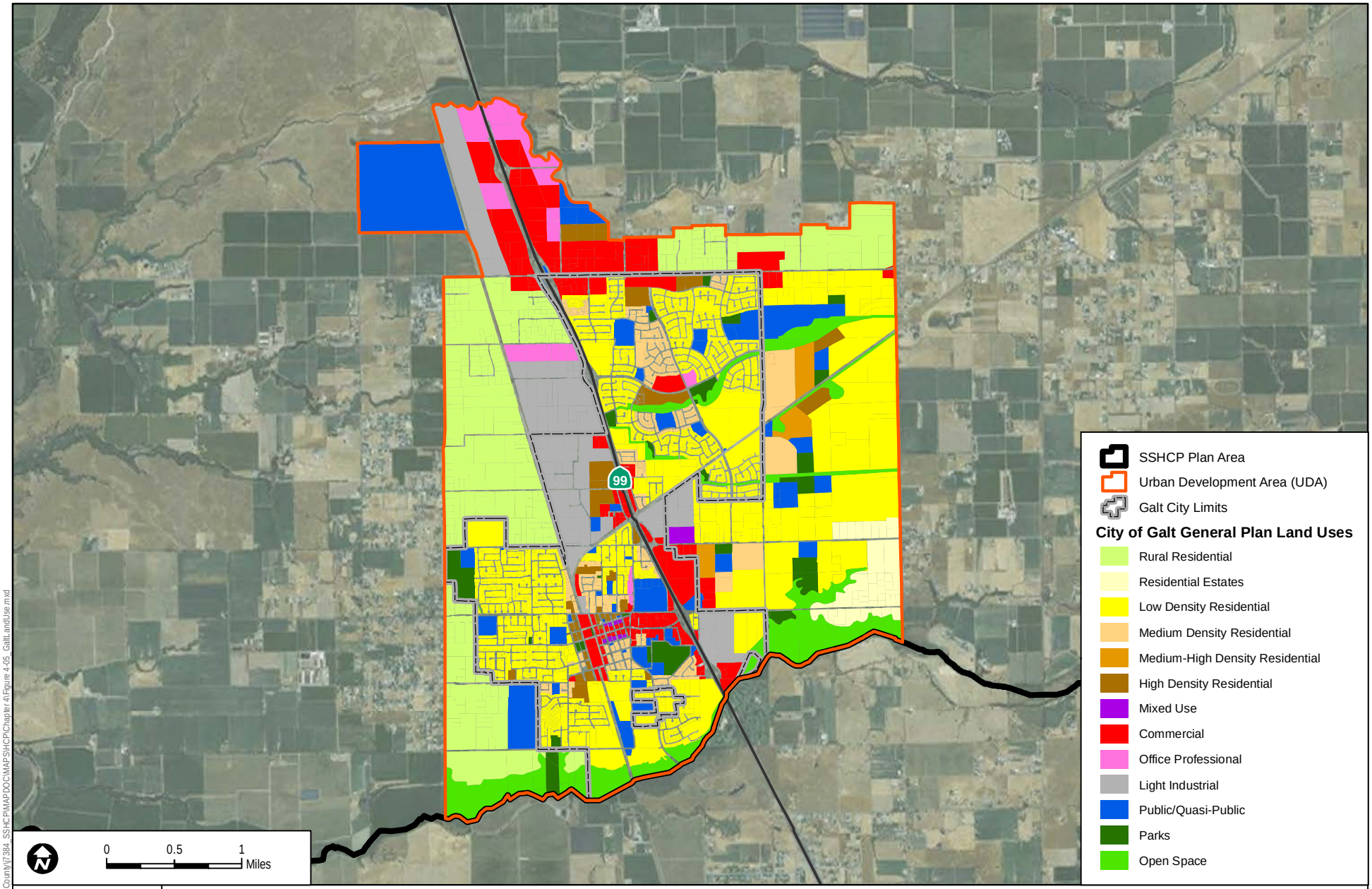
SOURCE: ESRI 2015, County of Sacramento 2015, City of Rancho Cordova 2013

FIGURE 4-4

City of Rancho Cordova General Plan Land Uses

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK



SOURCE: ESRI 2015, County of Sacramento 2015, City of Galt 2013

FIGURE 4-5

City of Galt General Plan Land Uses

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Land use designations outside of the City boundary are shown for illustrative purposes only. See the County of Sacramento's General Plan Land Use Diagram for current General Plan Uses within Galt's approved Sphere of Influence.

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 4\Figure 4-05_GaltLandUse.mxd

INTENTIONALLY LEFT BLANK

Conservation and Open Space Policies

The City of Galt General Plan includes several policies that provide for the conservation of natural resources for areas within the City. The following is a list of policies from the City of Galt's General Plan that support the SSHCP's Conservation Strategy (City of Galt 2009).

- **Policy COS-1.10: Ecological Features Retention.** The City shall retain to the extent feasible the ecological features of the creeks, sloughs, and rivers in their natural state.
- **Policy COS-1.11: Riparian Corridor Protection.** The City shall endeavor to protect, preserve, and improve riparian corridors.
- **Policy COS-1.13: No Net Loss of Wetlands.** The City shall review development proposals in accordance with applicable local, State, and Federal statues protecting jurisdictional wetlands (Section 404 of the Clean Water Act) and require that new developments have no net loss of existing wetland habitats.
- **Policy COS-2.1: Sensitive Species Protection.** The City should require minimization of impacts to protect mature trees, vernal pools, and any threatened endangered or other sensitive species when approving new development.
- **Policy COS-2.3: Biologically Sensitive Area Development.** The City should require new development in areas that are known to have particular value for biological resources to maximize preservation of sensitive vegetation and wildlife habitat.
- **Policy COS-2.4: Federal, State, and Local Statutes Compliance.** The City shall review development proposals in accordance with applicable Federal, State, and local statutes protecting special-status species and jurisdictional wetlands.
- **Policy COS-2.7: Regional Habitat Conservation Efforts Coordination.** The City shall continue to coordinate efforts with Sacramento County to develop the South Sacramento Habitat Conservation Plan.
- **Policy COS-3.1: Riparian Protection.** The City should require the protection of existing riparian vegetation along stream courses in the city.
- **Policy COS-3.2: Mature Tree and Woodland Preservation.** The City shall encourage retention of mature trees and woodlands to the maximum extent possible.
- **Policy COS-4.1: Prime Agricultural Land Preservation.** The City shall work to preserve prime agricultural lands surrounding the Planning Area from future development by creating a clear and sensitive urban transition to minimize land use conflicts and protect long-term agriculture.

- **Policy COS-4.4: Open Space Protection.** The City shall, where appropriate, permanently protect as open space areas of natural resource value, including wetlands preserves, riparian corridors, woodlands, and floodplains.
- **Policy COS-4.8: Open Space and Natural Area Connectivity.** The City shall maintain open space and natural areas that are interconnected and of sufficient size to protect biodiversity, accommodate wildlife movement, and to provide more sustainable ecosystems.
- **Policy COS-4.9: Open Space Preservation.** The City shall work to preserve open space that provides both habitat for wildlife and increases the quality of life for people. This can include maintaining areas for trails, bike and pedestrian paths, and open space buffers used as separators between neighborhoods to provide an identity and a sense of place.
- **Policy PFS-2.3: Surface Water Protection.** The City shall protect surface water resources, including rivers, creeks, streams, sloughs, and marshes, from development impacts.

Demographics

The City of Galt is approximately 6 square miles. As of 2013, the estimated population of Galt was approximately 24,472 persons with a 2010 U.S. Census estimate base of 23,647 persons (U.S. Census Bureau 2010b, 2014c). There are approximately 7,678 housing units in the City as of 2010 (U.S. Census Bureau 2014c).

4.3.4 Existing and Proposed Extra-Territorial Spheres of Influence

A sphere of influence (SOI) is "a plan for the probable physical boundaries and service area of a local government agency" (California Government Code, Section 56076). An SOI may reflect the limits of probable future growth of a jurisdiction. An extra-territorial SOI is one that extends beyond a local governmental jurisdiction's formal boundary. SOI applications are reviewed and approved by the Sacramento Local Agency Formation Commission (LAFCO). The following provides descriptions of extra-territorial and proposed SOI areas within the Plan Area. They are depicted in Figure 4-1.

City of Sacramento SOI

The City of Sacramento has four extra-territorial SOI areas that extend into the Plan Area. The largest is approximately 9,500 acres in size and includes the unincorporated South Sacramento area along Interstate 5 bounded to the east by Elk Grove Florin Road and to the south by Calvine Road. This area is largely developed but does have pockets of scattered open lands, particularly to the southeast along Elk Grove Florin Road. The second area extends 164 acres beyond the existing city limits to Hedge Avenue between Fruitridge Road and Elder Creek Road. It is characterized by scattered agricultural-residential development with several larger

open lots. The third area overlaps with the Plan Area by approximately 1,930 acres. The area that overlaps with the Plan Area is bounded by the Sacramento city limits to the west, U.S. 50 to the north, Bradshaw Road to the east, and Jackson Highway to the south. This area is also largely developed. The fourth SOI area overlaps with the Plan Area by approximately 700 acres located within the Beach Lake area. The land is owned by the Sacramento Regional County Sanitation District (SRCSD) south of the existing city limits between Interstate 5 and Franklin Boulevard and largely acts as a buffer to the existing wastewater treatment plant. Annexation of land from any of these areas to the City of Sacramento would transfer land use authority for the area to the city, replacing existing land use regulation by Sacramento County and the County's planning and zoning designations.

City of Galt SOI

The City of Galt's SOI encompasses roughly 4,500 acres of land to the west, east, and north of the existing city limits. The western portion of the SOI is formed by the Sacramento County line, Sargent Avenue, and Twin Cities Road. The eastern portion of the Galt SOI is bounded by the County line, Cherokee Lane, and Twin Cities Road. The northern portion of their SOI includes lands north of Twin Cities Road between Cherokee Lane on the east and the Union Pacific Railroad on the west, and then generally following Skunk Creek east and southwest of Highway 99, south to a point approximately one-third of a mile north of Twin Cities Road easterly to Cherokee Lane (see Figure 4-1). Much of the SOI area west and north of Galt is scattered agricultural-residential development, but larger intact cropland and pasture areas are still present, particularly toward the southern extent of the SOI where it borders Dry Creek. The eastern portion of the SOI exhibits some agricultural-residential development but is predominantly crop and pasture lands. Growth in the Galt SOI is proposed to be a mixture of residential, commercial, industrial, and office professional development, as well as some unspecified public and quasi-public land uses. Annexation of land from any of these areas to the City of Galt would transfer land use authority for the area from Sacramento County to the City, replacing existing County land use regulations and the County's planning and zoning designations.

4.4 Demographics of the Plan Area

General Projections

As coastal communities continue to build out and the cost of living in those communities steadily increases, new growth will continue to shift to inland regions, mimicking patterns of growth that were observed in Southern California during the 1980s and 1990s. Sacramento Area Council of Governments (SACOG) has forecast that Sacramento County will see an increase in population from 2,057,200 in 2005 to 2,519,947 by 2020 and over 3,000,000 by 2035 (SACOG 2005, 2012; County of Sacramento 2011). Population growth is not expected to slow much past 2025, and

current SACOG projections are that the population within the Sacramento region could swell to approximately 3,653,000 people by 2050. A large portion of this growth is expected to occur in southern Sacramento County within the Plan Area. Although Sacramento County's population and housing needs are clearly expected to grow over time, the rate of growth is not expected to be linear. SACOG estimates slower growth rates through 2020 followed by a period of higher growth to approximately 2035 (County of Sacramento 2013, Chapter 5). Population and housing projections have an inherent level of uncertainty; however, a population model such as SACOG's population synthesis process is a standard, widely accepted approach to developing population projections.

SACOG Blueprint Project

SACOG recognized that the pattern of growth in the six-county area of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties may lead to the loss of habitat, an increase in traffic congestion, an increase in pollution, and the loss of agricultural land and open space. The SACOG Blueprint Project set out to identify the region's housing/employment needs and to propose different scenarios for development to accommodate that need for the next 45 years. SACOG identified a "base-case scenario"[1] representing current development trends and made projections out to 2050. Alternative strategies were developed, each implementing differing levels of smart growth strategies. After extensive outreach and public involvement, the SACOG Board adopted its preferred scenario in December 2004. The preferred scenario represents a balanced approach that emphasizes infill and revitalization, and relies on smart growth principles to encourage development at higher densities, while offering a wider choice of housing options (SACOG 2010). It should be noted that the growth projections used to develop the blueprint are now viewed as being overly optimistic.

Both the blueprint base-case scenario and the blueprint preferred alternative identify urban development within the Plan Area. The preferred scenario in Rancho Cordova and eastern Sacramento County (within the USB) are identified for more compact development with almost twice the population of the base-case scenario, which slates the areas for continued low-density growth. The remaining portion of the Plan Area (i.e., the east, southeast, and south county outside the USB) would see limited development to the south of the City of Elk Grove and the City of Folsom under the preferred scenario, as opposed to the base-case scenario that shows significant growth into these rural areas.

[1] A projection of how the six-county Sacramento region would grow if recent development trends continued for the next 50 years.

4.5 References

California Government Code, Section 56076. General: Definitions.

City of Galt. 2009. *2030 General Plan Policy Document*. Final. April 2009. Accessed February, 11, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=13095.

City of Rancho Cordova. 2006. *Rancho Cordova General Plan.* Adopted June 26, 2006, Accessed February 11, 2015. http://www.cityofranchocordova.org/index.aspx?page=298.

County of Sacramento. 2011. *Sacramento County General Plan of 2005–2030*. Adopted November 9, 2011. Accessed February 11, 2015. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx.

County of Sacramento. 2013. *Sacramento County Housing Element of 2013–2021.* Sacramento, California: Sacramento County Department of Community Development. Adopted October 8, 2013. Accessed online June 17, 2015. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/HousingElementUpdate_HOME.aspx.

SACOG (Sacramento Area Council of Governments). 2005. "Projections of Employment, Population, Households, and Household Income in the SACOG Region for 2000–2050." Prepared for SACOG by the Center for Continuing Study of the California Economy and DB Consulting. September 15, 2005.

SACOG. 2010. *Sacramento Region Blueprint Transportation/Land Use Plan*. April 2010.

SACOG. 2012. *Metropolitan Transportation Plan/Sustainable Communities Strategy 2035*. April 19, 2012.

U.S. Census Bureau. 2010a. "2010 Demographic Profile: CA – Rancho Cordova City." Accessed February 16, 2015. http://www.census.gov/popfinder/.

U.S. Census Bureau. 2010b. "2010 Demographic Profile: CA – Galt City." Accessed February 16, 2015. http://www.census.gov/popfinder/.

U.S. Census Bureau. 2014a. "Sacramento County, California." State and County QuickFacts. Last updated December 2014. Accessed February 16, 2015. http://quickfacts.census.gov/qfd/states/06/06067.html.

U.S. Census Bureau. 2014b. "Rancho Cordova (City), California." State and County QuickFacts. Last updated December 2014. Accessed February 16, 2015. http://quickfacts.census.gov/qfd/states/06/0628112.html.

U.S. Census Bureau. 2014c. "Galt (City), California." State and County QuickFacts. Last updated December 2014. Accessed February 16, 2015.

5 COVERED ACTIVITIES

5.1 Introduction

This chapter describes specific categories of South Sacramento Habitat Conservation Plan (SSHCP or Plan) Covered Activities that may occur within the SSHCP Plan Area and for which incidental take authorization is requested by the Plan Permittees from the Wildlife Agencies. The Plan will provide avoidance, minimization, and compensation for impacts to SSHCP Covered Species and their habitats that result from implementation of SSHCP Covered Activities. Covered Activities are also referred to as "activities" or "projects" in this document. The Covered Activities described below are analyzed in Chapter 6, Effects Assessment and Level of Take.

The SSHCP Covered Activities described in this chapter will be implemented by the Plan Permittees and by third parties (e.g., project proponents or private developers) that are subject to the jurisdiction of a Plan Permittee. On occasion, Covered Activities may be implemented by a third party that is not subject to the jurisdiction of a Plan Permittee (see Participating Special Entity in Chapter 9). All Covered Activities described in Section 5.2 are eligible to be covered by a Plan Permittee's Incidental Take Permit (ITP), provided the activity or project can satisfy the application process described in Chapter 10.

The three Land Use Authority Permittees (the County of Sacramento and the Cities of Galt and Rancho Cordova) may extend incidental take coverage provided by the ITPs to Covered Activities proposed by third parties. The Implementing Entity may extend incidental take coverage provided by the ITPs to Covered Activities proposed by Participating Special Entities. All Third-Party Project Proponents seeking coverage for Covered Activities under the SSHCP permits must obtain approval from the Land Use Authority Permittee with jurisdiction over the activity or project. Where a Land Use Authority Permittee does not have approval authority over a Third-Party Project Proponent, the Third-Party Project Proponent will request approval authority from the Implementing Entity. See Chapter 9 for definitions of entities discussed in this Plan, and see Chapter 10 for a description of the third-party project approval process.

This Plan includes measures to avoid and minimize take of Covered Species. Section 5.4 describes conditions on the implementation of each Covered Activity that will avoid or minimize effects of that Covered Activity. All Covered Activities must incorporate the relevant Avoidance and Minimization Measures described in Section 5.4. The approval process for Covered Activities proposed by third parties seeking ITP coverage under the SSHCP permits includes demonstration that the required Avoidance and Minimization Measures have been properly incorporated or will be incorporated into the proposed Covered Activity or project.

Proposed projects or activities that do not fall clearly within the description of an SSHCP Covered Activity provided in this chapter will be evaluated on a case-by-case basis. If a Land

Use Authority Permittee or the Implementing Entity, in instances when a Participating Special Entity in involved, determines that a specific project or activity is not included within the Covered Activity descriptions in this chapter or is not covered as a new type of activity as described below, then the proposed project will not receive incidental take coverage under the SSHCP permits.

However, a new type of activity not specifically identified in Section 5.2 might be covered under the SSHCP ITP if the activity meets all of these criteria:

- The activity is (1) conducted by one of the Plan Permittees, (2) subject to the jurisdiction of one of the Plan Permittees, or (3) conducted by a Participating Special Entity under the purview of the Implementing Entity (see Chapter 10) for the process by which projects or activities proposed by a non-permittee (a Third-Party Project Proponent) could receive incidental take coverage under the SSHCP permits.
- The activity is not listed in Section 5.3, Activities and Actions Not Covered by the SSHCP Permits.
- The activity meets the requirements of the application process as described in Chapter 10.
- The activity does not preclude achieving any Biological Goal or Measurable Objective of the SSHCP (see Chapter 7, Conservation Strategy). The determination as to whether it would preclude achievement will be made in coordination with the Wildlife Agencies.
- The proposed activity does not result in any impacts to Covered Species or natural communities that were not quantified and analyzed in Chapter 6. The determination as to whether a proposed activity was analyzed adequately will be made in coordination with the Wildlife Agencies.
- The proposed activity does not result in any impacts that were not analyzed in the SSHCP Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The determination as to whether a proposed activity was analyzed adequately in the SSHCP EIS/EIR will be made in coordination with the Wildlife Agencies.
- Adequate take coverage as determined by the Implementing Entity remains available under the SSHCP ITPs.

Provided that proposed projects meet the criteria above, they may be covered by a Permittee's ITP. Identification as a Covered Activity, either in this chapter or through a future determination by the Implementing Entity, does not imply or grant entitlement for project implementation. Third-Party Project Proponents are required to gain other project approvals from local jurisdictions and other Permitting Agencies as necessary. All Covered Activities described in this

chapter are eligible to be covered by the two ITPs (federal Endangered Species Act (ESA) and California Endangered Species Act (CESA)) held by the Plan Permittee.

5.2 Covered Activity Categories

The majority of the SSHCP Covered Activities will be implemented within the region of the Plan Area designated as the Urban Development Area (UDA) (see Chapter 1, Figure 1-1). As discussed below, the Chapter 6 effects analysis assumes that all undeveloped parcels located within the UDA boundary will be developed during the 50-year SSHCP Permit Term, except for the following: (1) parcels that are an existing Preserve or permanently protected by a conservation easement, (2) parcels that are in the planned SSHCP Preserve System (see Chapter 7, Conservation Strategy), or (3) parcels that are the site of a proposed project with existing ESA Incidental Take authorization and other required entitlements.[1] Therefore, future Urban Development and associated infrastructure, as well as Mining Covered Activities, to be implemented within the UDA are broadly defined in this chapter, and information on the precise locations of most Covered Activities within the UDA is not presented. Two categories of Covered Activities (Rural Transportation Projects and Recycled Water Projects) will be constructed within the Plan Area outside the UDA (see Sections 5.2.3 and 5.2.4). Specific project details and locations of the rural road improvement and Recycled Water Project Covered Activities are provided in Sections 5.2.3 and 5.2.4.

Covered Activities related to the management and improvement of species habitats within the proposed SSHCP Preserve System will occur on Preserves located inside the UDA and outside the UDA (see Chapter 7, Conservation Strategy, for information on the SSHCP Preserve System). The Covered Activities described in Section 5.2.7, SSHCP Preserve System Covered Activities, are the responsibility of the Implementing Entity.

Descriptions in this chapter of Covered Activities and their construction methods are mostly qualitative. Additional quantitative assumptions of Covered Activity footprints and frequency of occurrence are described in the impact analysis methodology in Chapter 6.

The SSHCP Covered Activities fall into eight general categories:

- Urban Development in the UDA
- Mining in the UDA
- Rural Transportation Projects

[1] The Mather Field Specific Plan is still pursuing its own Endangered Species Act (ESA) consultation with the U.S. Fish and Wildlife Service and a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers; however, the SSHCP Chapter 6 effect analysis treats parcels within the boundary of the Mather Field Specific Plan the same as parcels with existing ESA incidental take authorization and other entitlements.

- Recycled Water Projects
- Covered Activities in Preserve Setbacks in the UDA
- Covered Activities in Stream Setbacks in the UDA
- SSHCP Preserve System Covered Activities
- Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System

Each of these categories of Covered Activities is described in further detail below. In some cases, specific activities or projects are discussed as examples to illustrate the Covered Activity category.

It is expected that the Permittees may identify additional Covered Activities over the 50-year SSHCP Permit Term. If an additional Covered Activity , as generally and qualitatively described below, meets all criteria in Section 5.1, which are not expressly limited by this chapter, and its environmental effects are adequately evaluated in Chapter 6 of this Plan and adequately evaluated in the EIS/EIR for the SSHCP, the additional Covered Activity will also be covered by the ITPs.

5.2.1 Urban Development in the UDA

This category includes all development projects and activities that occur inside the UDA (see Figure 1-1). The Covered Activities described under this category are defined broadly to include planned urban growth and all ground-disturbing activities associated with Urban Development. It includes construction of typical urban facilities, public and private, consistent with local general plans; master plans; and local, state, and federal laws; and the post-construction maintenance of those urban facilities.

This category of Covered Activities includes, but is not limited to, the construction, use, and maintenance of the following urban facilities:

- **Residential, Commercial, and Industrial Structures.** These include construction, use, and maintenance of residential, commercial, and industrial buildings, structures, and associated infrastructure. Residential development includes urban, suburban, and agricultural-residential housing (e.g., homes on 2- to 10-acre lots). Commercial and Industrial development includes construction of retail centers, office buildings, factories, and warehouses. This Covered Activity also includes construction of public service and cultural facilities, including new fire stations, police stations, community policing centers, communications facilities, public administration centers, convention centers, theatres, museums, community centers, community gardens, and concession buildings. Other public facilities include hospitals, other public health centers, schools, colleges, universities, libraries, maintenance facilities, parking lots, administration centers, and similar facilities, and funeral/interment facilities such as cemeteries, mortuaries,

crematorium, columbaria, and mausoleums. This category also includes removal of existing facilities and the use and maintenance of existing and new facilities. Long-term maintenance activities include, but are not limited to, the inspection, cleaning, rehabilitation, repair, and/or replacement of buildings, structures, and facilities.

- **Park and Recreation Facilities**. These include construction and maintenance of recreational facilities such as regional parks, neighborhood parks, dog parks, indoor and outdoor sports complexes, sports fields and facilities, recreation trails, community trails, equestrian trails, restrooms, trailheads, playgrounds, golf courses, racetracks, campgrounds, kiosks, nature centers, nature interpretation facilities, and associated infrastructure such as roads, bridges, parking areas, and restrooms.
- **Water Supply Facilities.** Water supply activities include the construction and installation of new potable and recycled water supply facilities, extension of existing facilities, and removal and maintenance of existing water supply facilities. Covered activities related to water supply include all activities that support production, conveyance, treatment, and storage of water. New water supply facilities include, but are not limited to, pumping stations, water treatment facilities, storage facilities, wells, pipelines, valves, gates, weirs, groundwater recharge and reclamation facilities (e.g., percolation ponds), other miscellaneous structures and equipment (e.g., power, control, diversion, discharge, junction, metering, telemetry), and access facilities (e.g., structures, vaults, maintenance holes, roads). All associated activities required to complete routine and emergency operations and maintenance work on water supply facilities, such as traffic control, are also Covered Activities.

  Construction actions related to water supply facilities generally include, but are not limited to, vegetation clearing, grading, trenching or excavation of soil, trenchless construction methods, staging equipment and materials, pouring of concrete or asphalt, compacting soil, and maintenance of water supply facilities and surrounding landscaping.

  Extension of existing water pipelines and installation of new pipelines typically require open cut trenching to place the pipeline 3 to 20 feet below ground level. Construction may require up to a 100-foot-wide temporary construction easement to accommodate staging of equipment and materials. Planned pipeline alignments will follow existing or new roadways to the extent feasible. Manhole access is needed at intervals of approximately 1,000 feet. In some instances, temporary dewatering of aquatic habitats may be required during pipeline construction to lower the groundwater level to at least 2 feet below the pipe installation depth. After construction, the water level is monitored to ensure that it returns to its pre-construction level. Where pipeline obstacles are confronted, such as a creek or railroad, trenchless construction methods may be used to install the new pipeline. During construction of infrastructure or public utilities, it may be

necessary to temporarily divert stream channels, using appropriate measures to avoid or minimize impacts to stream habitat. Refer to Condition 7 in Section 5.4 for Avoidance and Minimization Measures that are required when diverting stream channels.

Groundwater extraction wells are built in either one- or two-phase projects. In the two-phase projects, the well is drilled and equipped at separate times, often years apart. Extraction wells range from 400 to 1,500 feet in depth. Typically, the wells have a 3- to 4-foot-diameter hole at the surface, with a final pad that is approximately 6 by 6 feet. In two-phase projects, the pump casing is extended 24 inches above the ground and capped with a locking steel lid. Additional space needed for well equipment varies from site to site. The typical well site property is 100 by 100 feet. Typically during construction, the entire site is used for staging the pipe casings, construction equipment, and spoils, and for a laydown area for soil samples. Test pumping of the well requires discharge of significant amounts of water. In rare instances when there is no local source to discharge the test pumping waters, a temporary detention ditch may be constructed on an adjacent property. Typical complete well sites may include a 16- by 40-foot concrete block/steel roof well enclosure, on-site drainage systems, electrical transformer, shielded electrical control panels, access driveway, and perimeter fencing. Operation and maintenance actions on water supply facilities occur within existing rights-of-way (ROWs) or easements, and include the inspection, cleaning, rehabilitation, repair, and/or replacement of Sacramento County Water Agency facilities. These facilities include, but are not limited to, maintenance holes, access vaults, pipelines, force mains, pumping stations, booster pumps, valves, gates, weirs, flow monitoring equipment, telemetry equipment, electrical power and control equipment, storage tanks, access roads, and other miscellaneous structures. Over the 50-year Permit Term, some of these facilities will require replacement and may involve surface and subsurface construction activities, methods, and disturbances equivalent to new construction.

The Plan Permittees reviewed planning documents prepared by the Sacramento County Water Agency to identify the proposed locations of future water supply pipelines. The planned pipeline alignments were relocated to the maximum extent practicable so that the pipeline will be built within existing roadways or within areas that will not impact natural land covers and Covered Species habitat. There will likely be a limited number of locations where pipeline alignments will need to cross a Preserve where the location of that Preserve cannot be anticipated at this time. If this is necessary, direct and indirect impacts will be avoided or minimized by Condition 8, as listed in Section 5.4. The Plan Permittees estimate that up to 1,000 linear feet of new water supply pipeline may cross under planned Preserves.

Construction, operation, and maintenance of water supply facilities are Covered Activities. Entities that are not Plan Permittees that propose construction of water supply

projects may be treated by the Implementing Entity as a Participating Special Entity (see Chapter 9, Section 9.3.1).

- **Flood Control and Stormwater Management in the UDA.** Activities related to flood control and storm drainage include all activities that support flood control as described in water drainage, capital improvement, flood control, and storm drain master plans for the Land Use Authority Permittees (the County of Sacramento and the Cities of Rancho Cordova and Galt). This Covered Activity includes construction of new facilities and maintenance of new and existing facilities. Stormwater abatement and treatment facilities include, but are not limited to, detention basins, stormwater channels, weirs, stormwater pumping stations, pressure control structures, and natural or re-aligned stream channels.

  Operations and maintenance activities implemented under the oversight of Land Use Authority Permittees for flood control and stormwater management are also SSHCP Covered Activities. These activities include the following:

  - Vegetation Control: Operations and maintenance activities include aquatic and terrestrial vegetation control consistent with conditions in Sections 5.4.1 and 5.4.2 that may be performed with the use of mechanical devices or hand labor,[2] as follows:

    - Control of vegetation, including aquatic plants, weeds, grasses, shrubs, and woody growth, to remove obstructions to flow in both improved and unimproved channels.
    - Control of weeds and grasses on maintenance roads within the banks by mechanical means, hand labor, or chemical application[3] (see ROAD-3).
    - Control of the lower branches of woody growth less than 4 inches diameter at breast height, growing on lower streambanks from ground level to a distance of 6 feet above ground level.
    - Where appropriate, removal of non-native vegetation, including stump and root removal between creek banks.
    - Removal of debris, trash, rubbish, flood-deposited woody and herbaceous vegetation, fallen trees, dead trees that are in clear danger of falling in or across the channel, branches, and associated debris that noticeably reduces channel capacity, would result in accelerated erosion, and/or would cause pump damage. This category also includes mowing vegetation for fire abatement and beaver dam removal.

[2] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land-management tool, provided the pesticide application is otherwise legal and the application conforms to all conditions in Section 5.4.

[3] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided the pesticide application is otherwise legal and the application conforms to all conditions in Section 5.4.

- Removal or displacement of silt, sand, or sediment that obstructs flow in the immediate vicinity of bridges, concrete box culverts, culvert pipes, and outfall pipes.
- Erosion control through repair of failed rock, riprap, concrete, or gabion sections or culvert replacement. Maintenance activities will be confined to a failed section and immediately adjacent areas. These activities may require temporary diversion of water within the channel area (only as necessary to perform the maintenance) and/or temporary placement of sandbags or other appropriate best management practices (BMPs). Generally, small excavation equipment, small power tools, and hand labor will be used to perform this work.

  - Stream Bank Stabilization Projects: These include installation of in-stream structures for erosion control (e.g., appropriate bio-engineering methods).

- **Public and Private Utilities.** Includes construction, replacement, augmentation, and maintenance of electric transmission and distribution lines, electrical substations, telecommunications lines (aboveground and belowground), towers and related facilities, petroleum distribution pipelines (underground and aboveground), and natural gas distribution pipelines (underground and aboveground).

  During construction of public utilities, it may be necessary to temporarily divert stream channels to avoid or minimize impacts to stream habitat (refer to Condition 7 in Section 5.4).

  Operation and maintenance actions related to underground gas lines include, but are not limited to, hydrostatic testing, electronic telecommunications switching systems, cathode protection, pipeline coating, pipeline lowering or replacement, and access road maintenance.

  Urban solar energy projects and other energy-generating projects within the UDA may be Covered Activities, provided they meet all criteria in Section 5.1.

  The Plan Permittees estimate that there are approximately 70 miles of existing high-voltage transmission lines (18 miles within the UDA and 52 miles outside the UDA) in areas that are existing Preserves or may become SSHCP Preserves, and approximately 16 miles of existing natural gas pipeline (1 mile within the UDA and 15 miles outside the UDA) in areas that are in existing Preserves or may become SSHCP Preserves. Figure 5-1 illustrates the alignments of existing high-voltage electrical transmission lines in the Plan Area. The repair and maintenance of utility facilities within planned SSHCP Preserves are Covered Activities, consistent with the utility's existing ROW easements.

- **Solid Waste Management Facilities.** These include the expansion and decommissioning of existing landfills, construction and operation of new transfer stations, and construction and operation of new recycling stations within the UDA. Additionally, long-term operation and maintenance activities include inspection, cleaning, rehabilitation, repair, and/or replacement of these sanitation facilities.

Operation and maintenance of existing groundwater extraction and monitoring wells and associated groundwater treatment facilities at Kiefer Landfill, and construction, operation, and maintenance of new groundwater extraction and monitoring wells at Kiefer Landfill are SSHCP Covered Activities.

- **Wastewater (Sewer) Facilities**. Covered Activities related to wastewater facilities include all activities in the UDA that support the provision of wastewater services (e.g., collection, conveyance, diversion, delivery, storage, treatment, transmission, distribution, discharge). Covered Activities include construction, installation, operation, and maintenance of new wastewater facilities, as well as extension, removal, replacement, abandonment, operation, and maintenance of existing wastewater facilities. Wastewater facilities generally include, but are not limited to, pumping stations, booster pumps, wastewater and water treatment facilities (including satellite, scalping, and separation facilities), sewage force mains, gravity sewage pipelines (interceptor, trunk, collector pipelines), pressurized pipelines (water, gas, sludge, chemical), valves, gates, weirs, recharge ponds and spreading basins, small containment berms, groundwater wells, tanks, landscaped areas near facilities, storage facilities, other miscellaneous structures and equipment (power, control, diversion, discharge, junction, metering, telemetry), and access facilities (structures, vaults, maintenance holes, roads). Access structures for gravity pipelines (typically maintenance holes) are necessary for maintenance, inspection, and safety purposes at approximately 1,000-foot intervals for interceptors, approximately 500-foot intervals for trunks, and approximately 400-foot intervals for collectors.

  Construction of wastewater facilities generally includes, but is not limited to, vegetation clearing, grading, trenching, excavating soil, trenchless construction (including tunneling support activities), placing backfill material, compacting soil, staging equipment and materials, hauling equipment and material, installing underground sewage pipelines and structures, soil stabilization/improvement activities, drilling/boring activities, pouring concrete, stockpiling materials, installing linings or liner systems, and building above- and below-grade structures. Underground wastewater facilities typically use open cut construction and installation methods. However, as discussed below, sewage pipelines and force mains may also be installed using trenchless construction methods in areas where open cut construction is not practical (e.g., depth, obstacle, risk). Although trenchless construction methods may be used to avoid impacts to specific areas, they usually require additional temporary construction area (for shafts and at-grade support equipment) and extend for the duration of overall construction project.

  Extension of existing sewage pipelines and installation of new sewage pipelines and structures typically require open cut excavation to place the pipelines and structures 10 to 40 feet below ground level. Where construction of a new sewage pipeline or other underground wastewater facility crosses a creek or other body of water, temporary

diversion of the stream channel or dewatering aquatic habitats may be required during pipeline or structure construction to lower the groundwater level to at least 2 feet below the installation depth. After construction, the water level of the feature that was dewatered will be monitored to ensure that it returns to its pre-construction level.

All-weather access is typically required to access structures and manholes, which are typically spaced at intervals of approximately 1,000 feet for interceptors, 500 feet for trunks, and 400 feet for collectors. This access requires construction of a gravel access road to all access structures that do not have existing all-weather access roads. Construction of wastewater facilities may also require temporary construction easements with an average width of approximately 120 feet. Temporary staging areas for office trailers associated with construction (contractor's field office), equipment parking, and material storage are sometimes used and may require up to a 1-acre site adjacent to and/or within proximity to the project. When required, these sites are temporarily disturbed to provide an all-weather surface (top layer of soil sometimes removed and stored, typically with 12 to 18 inches of gravel placed on top of a layer of barrier fabric over the entire site). These sites will be restored to their pre-construction condition (when possible) after construction activities are complete.

Sewage pipelines may also be installed using trenchless construction methods in areas where open cut construction is not practical due to depth, where pipeline obstacles such as a creek or railroad are confronted, or to avoid direct or indirect effects on Covered Species and their habitats. Trenchless construction methods for large pipelines require launching and receiving shafts at each end of the tunneled section, usually several feet deeper than the tunnel invert. These shafts may involve large excavations up to 7,500 square feet to provide space for inserting the tunnel boring machine, trailing gear, and pipe segments; removing excavated tunnel material; and performing other tunneling support activities. Temporary construction staging areas (up to 2 acres) adjacent to and/or close to tunnel shafts are usually required to store tunnel lining material and pipe sections, support dewatering activities, and process tunnel muck. Depth of tunneled unpressurized pipelines is relatively consistent with the connecting open-cut sections (i.e., 10 to 40 feet below ground level), and cannot typically be adjusted to avoid mining through subsurface soil features. After the tunneling activity is completed, grout can be injected around the exterior of the tunnel lining or pipe to prevent water from migrating along the interface between the pipe exterior and the soil.

Covered Activities also include the routine operations and maintenance work that occurs on new and existing wastewater facilities. Operations and maintenance activities typically occur within existing ROWs or easements, and generally include inspection, cleaning, rehabilitation, repair, and/or replacement of aboveground and belowground wastewater facilities. These facilities include, but are not limited to, pumping stations, booster pumps,

wastewater and water treatment facilities (including satellite, scalping, and separation facilities), sewage force mains, gravity pipelines (e.g., interceptor, trunk, collector), pressurized pipelines (e.g., water, gas, sludge, chemical), valves, gates, weirs, groundwater recharge and reclamation facilities (including recharge ponds or spreading basins for indirect groundwater recharge purposes), small containment berms, groundwater wells, tanks, landscape areas, storage facilities, other miscellaneous structures and equipment (e.g., power, control, diversion, discharge, junction, metering, telemetry), and access facilities (e.g., structures, vaults, maintenance holes, roads). All associated activities required to complete routine and emergency operations and maintenance work are also included as Covered Activities. Over the 50-year Permit Term, some existing facilities will require replacement and may involve surface and subsurface construction activities, methods, and disturbances equivalent to new construction.

Operation and maintenance of existing wastewater projects required to provide sewer service to existing communities outside the UDA are also Covered Activities. These projects serve areas such as the rural communities of Walnut Grove and Courtland.

The Plan Permittees have reviewed planning documents prepared by the Sacramento Regional County Sanitation District to identify the proposed locations of future wastewater pipelines. The planned pipeline alignments were relocated, to the maximum extent practicable, so that the pipeline will be built within existing or planned roadways (Figure 5-2). There remains the possibility that some of the pipeline alignments will need to cross a Preserve where the location of that Preserve cannot be anticipated at this time. The Plan Permittees estimate that up to 1.5 miles of wastewater pipeline may cross existing or planned Preserves. The repair and maintenance of wastewater pipelines within planned and existing Preserves are Covered Activities. If this is necessary, impacts will be avoided or minimized to the maximum extent practicable by Condition 8, as listed in Section 5.4.

The construction, operation, and maintenance of wastewater facilities are Covered Activities. Entities that are not Plan Permittees that propose construction of wastewater projects may be treated by the Implementing Entity as a Participating Special Entity (see Chapter 9, Section 9.3.1).

- **Urban Transportation.** Urban Transportation includes construction, realignment, widening, extension, abandonment, and removal of public and private roadways (includes state-owned facilities such as State Route (SR-) 16 and U.S. Route 50), intersections, interchanges, culverts, bridges, light rail lines, railroads, bike and pedestrian paths, sidewalks, street lights, traffic signs, roadside drainages, public and private bus transit lines, and other activities and appurtenances necessary to implement adopted transportation or capital improvement plans of the three Land Use Authority Permittees (the County of Sacramento and Cities of Galt and Rancho Cordova).

Major roadways are proposed in the circulation/transportation elements of each Land Use Authority Permittee's general plan, and are classified (from larger to smaller) as expressways, thoroughfares, arterials, urban collectors, rural collectors, and streets. Roadway standards vary by jurisdiction and may change during the 50-year Permit Term because circulation elements and general plans are updated over time. Future changes to the circulation element or general plan with regard to specific transportation facilities are Covered Activities under this Plan. Covered Activities include in-stream activities for transportation improvements at stream/creek crossings, including bridges, culverts, or other stream-crossing facility construction, replacement, and repair. During the construction of transportation infrastructure, it may be necessary to temporarily divert stream channels using appropriate measures to avoid or minimize impacts to stream habitat (refer to Condition 7 in Section 5.4).

Urban Development road projects will be designed to avoid and minimize, to the extent feasible, direct and indirect effects to Covered Species, and maintain wildlife movement and dispersal through the SSHCP Preserve System in accordance with the Biological Goals and Measurable Objectives (Table 7-1), and may need to incorporate wildlife crossing structures (see Condition 4 in Section 5.4).

Most roadway projects will be constructed while maintaining existing vehicle access. Travel lanes will be narrowed and traffic will be shifted to one side of the existing roadway to construct improvements on the other side. Drainage facilities such as cross culverts and box culverts will be installed. Roadway and ditch excavation will follow with the removal of native soils to accommodate a new pavement structural section where the roadway is being widened. New roadside drainage ditches will also be excavated at this time. The new roadway section will be built up, usually consisting of aggregate base material and followed with asphalt concrete pavement. Upon completion of the improvements on one side, existing traffic will be shifted over onto the newly constructed roadway section, and a similar construction activity sequence will occur on the other side of the roadway. Improvements at intersections will also occur. If the project includes landscaped medians, installation of irrigation and landscaping components will follow roadway construction, with existing traffic shifted to the outsides of the widened roadway to allow construction access to the center median. These projects will be finished with a final asphalt concrete pavement overlay of the entire roadway section, followed by roadway striping and signing.

All routine road operation and maintenance activities conducted under the jurisdiction of Plan Permittees are Covered Activities. Road maintenance activities generally include, but are not limited to, signage maintenance or replacement; traffic control device maintenance or replacement; guardrail, fence, or crash cushion inspection, maintenance, and replacement; pavement maintenance and resurfacing, including replacing pavement

striping or markers; tree trimming and removal; collection and removal of debris from roads, including from road shoulders and trash racks; natural disaster, storm, and vehicle accident damage repair and cleanup; manual, mechanical, and chemical[4] weed control (see ROAD-3); mowing of medians and shoulders; grading shoulders and other areas within the ROW; grading existing dirt roadways; roadside ditch and irrigation ditch sediment removal; repair, replacement, and maintenance of retaining walls, curbs, gutters, sidewalks, culverts, and drop inlet structures; bridge repair and maintenance; ditch, catch basin, and hydrauger clearing; landscaping maintenance; and other routine road operation and maintenance activities.

The Plan Permittees have reviewed planning documents prepared by the Sacramento County Department of Transportation to identify the proposed locations of future roadways. The planned roadways were relocated to the maximum extent practicable so that the roadways will not impact planned Preserves. Potential impacts from all road construction will be avoided or minimized to the maximum extent by Condition 4 as listed in Section 5.4.

The County of Sacramento is a Plan Permittee and is one of the primary agencies responsible for the construction, operation, and maintenance of transportation projects in the Plan Area. However, construction and maintenance of transportation projects by other Plan Permittees are also Covered Activities. The future Implementing Entity and the three Land Use Authority Permittees (the County of Sacramento and the Cities of Galt and Rancho Cordova) may extend incidental take coverage provided by the ITPs to urban transportation Covered Activities proposed by third parties. All Third-Party Project Proponents (e.g., private developers) seeking coverage for urban transportation Covered Activities under the SSHCP permits must obtain approval from the Land Use Authority Permittee with jurisdiction over the activity or project. Entities that are not Plan Permittees that propose construction of transportation projects may be treated by the Implementing Entity as a Participating Special Entity (see Section 9.3.1).

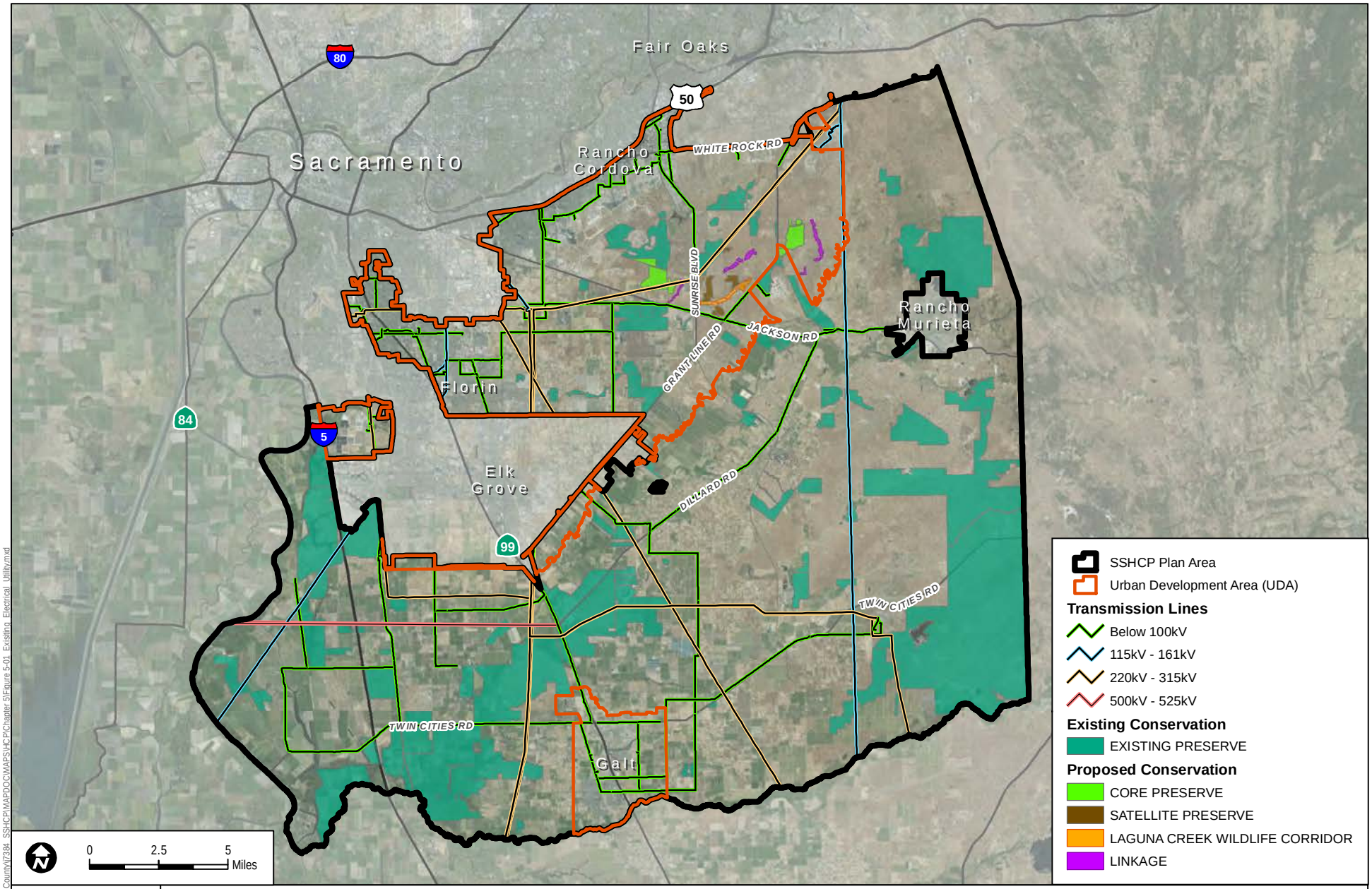
- **Stream Channel Modification.** This Covered Activity includes the permanent deepening, widening, or re-routing of existing stream channels during Urban Development. During construction of water supply, wastewater, and urban transportation infrastructure or public and private utilities, it may also be necessary to temporarily divert stream channels, using appropriate measures to avoid or minimize impacts to Stream habitat (refer to Condition 7 in Section 5.4).

[4] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land-management tool, provided the pesticide application is otherwise legal and the application conforms to all conditions in Section 5.4.

5.2.1.1 Capital Southeast Connector

In 2002, the Sacramento Area Council of Governments initiated the Capital Southeast Connector (formerly known as the Elk Grove–Rancho Cordova–El Dorado Connector Project) during preparation of Metropolitan Transportation Plan 2025 (SACOG 2002). The Capital Southeast Connector is a proposed 35-mile-long multi-modal transportation facility spanning from Interstate 5, south of Elk Grove, northeast through the SSHCP UDA, to U.S. Route 50 in El Dorado County (just east of El Dorado Hills, outside the Plan Area). The Capital Southeast Connector will link communities in El Dorado and Sacramento Counties and the Cities of Folsom, Rancho Cordova, and Elk Grove. (Those portions of the Capital Southeast Connector that are in El Dorado County are outside the Plan Area.) Approximately 26.5 linear miles of the proposed Capital Southeast Connector are within the Plan Area, with 17.3 of those miles inside the UDA and 9.2 miles outside the UDA (Figure 5-3). As discussed in Chapter 1, the Capital Southeast Connector Joint Powers Authority is an SSHCP Permittee.

Construction Covered Activities for the Capital Southeast Connector include, but are not limited to, initial vegetation clearing, grading of the project footprint, pouring of concrete or asphalt, excavating, staging of equipment and materials, compacting soil, and landscaping, as well as operation and maintenance. During construction of the Capital Southeast Connector, it may be necessary to temporarily divert stream channels, using appropriate measures to avoid or minimize impacts to Stream habitat (refer to Condition 7 in Section 5.4).



SOURCE: ESRI, County of Sacramento 2014, Platts 2013

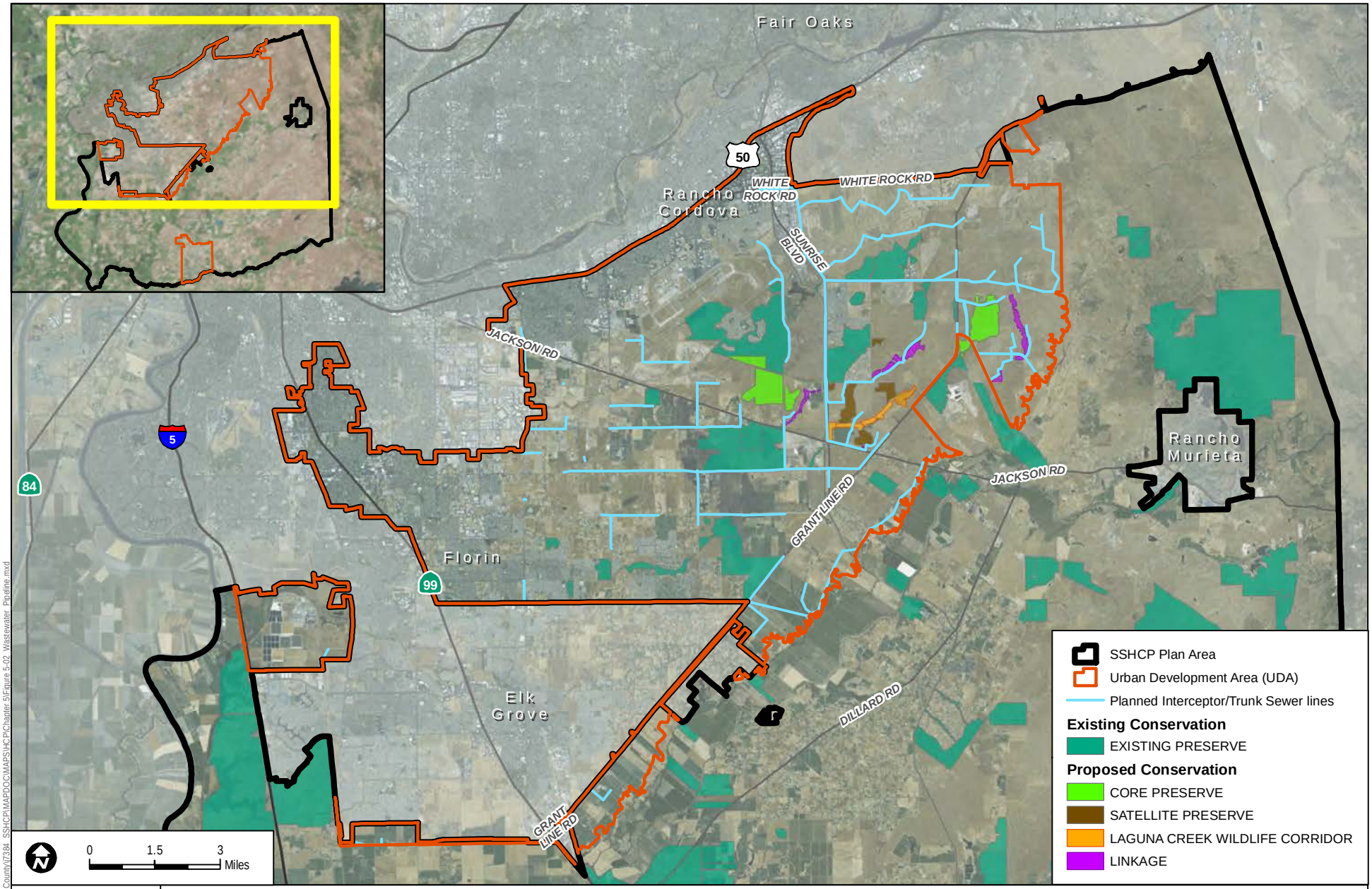
FIGURE 5-1

Existing High Voltage Transmission Lines

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 5\Figure 5-01_Existing_Electrical_Utility.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 5\Figure 5-02_Wastewater_Pipeline.mxd

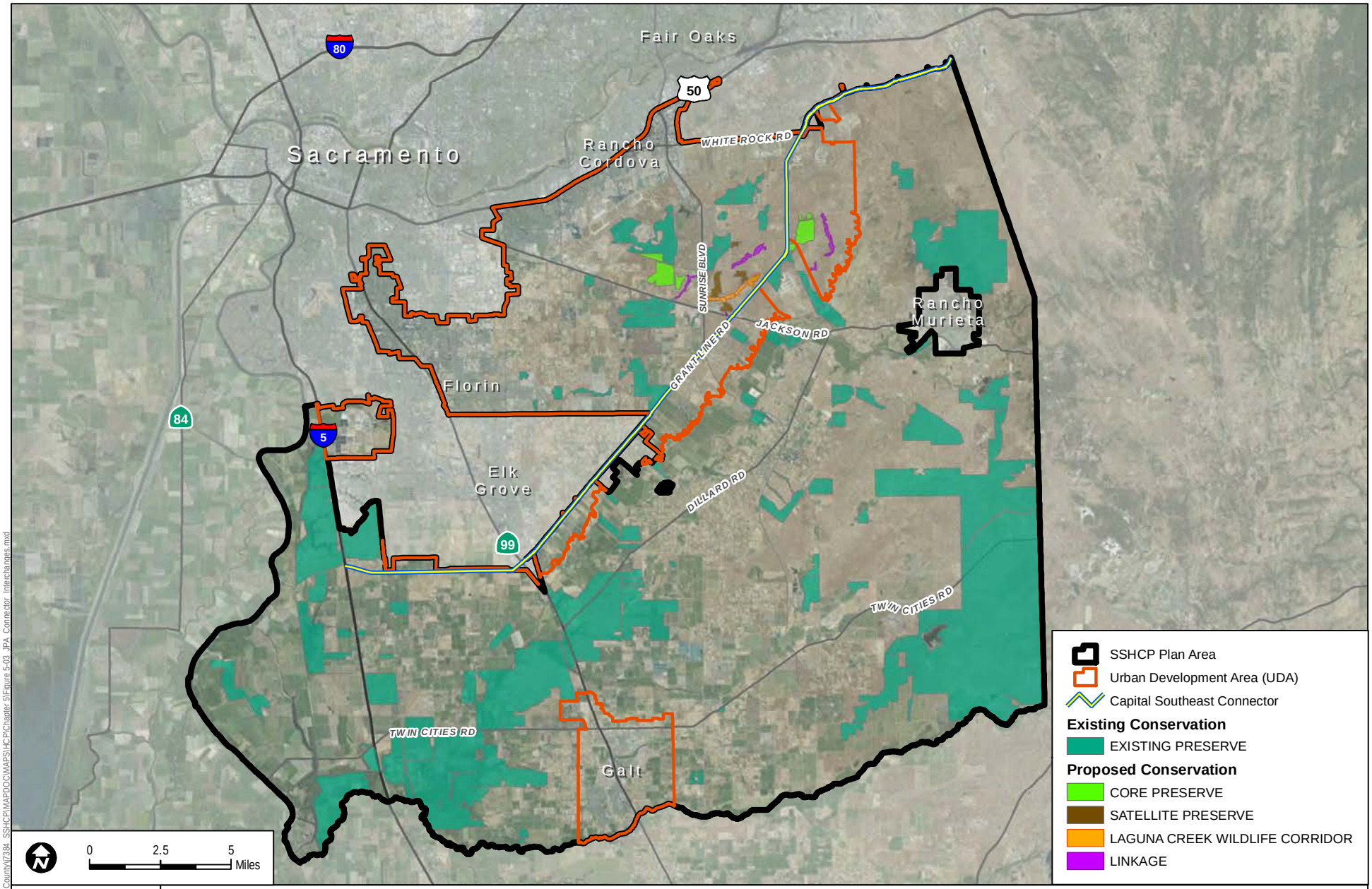
SOURCE: ESRI, County of Sacramento 2014

FIGURE 5-2

Wastewater Pipelines

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK



SOURCE: ESRI, County of Sacramento 2014, Capital Southeast JPA 2014

FIGURE 5-3

Capital Southeast Connector Road Alignment

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\v7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 5\Figure 5-03_JPA_Connector_Interchanges.mxd

INTENTIONALLY LEFT BLANK

In March 2012, the Board of Directors for the Capital Southeast Connector Joint Powers Authority certified a program-level EIR for the Capital Southeast Connector project under the California Environmental Quality Act (CEQA), and adopted a general alignment for the project (see Figure 5-3). Only the general alignment is described (Chapter 5) and analyzed (Chapter 6) in this SSHCP document. Generally, the Capital Southeast Connector includes the following project segments:

- A four-lane expressway segment from the Interstate 5/Hood-Franklin Road Interchange easterly along an extension of Kammerer Road to the existing Kammerer Road/ Bruceville Road intersection
- A four- to six-lane thoroughfare segment east of the Kammerer Road/Bruceville Road intersection along Kammerer Road, and then northeast on Grant Line Road to its intersection with Bond Road (note: this road segment is within the UDA)
- A four-lane limited access rural thoroughfare along Grant Line Road from the intersection of Bond Road, northeasterly to the intersection of Calvine Road (note: this road segment is within the UDA)
- A four- to six-lane expressway segment on Grant Line Road from its intersection with Calvine Road, northeasterly to the intersection of White Rock Road, and then on White Rock Road from its intersection with Grant Line Road easterly to the Sacramento County/El Dorado County Line
- A four- to six-lane thoroughfare segment on White Rock Road from the Sacramento County/El Dorado County line northeasterly to the intersection with U.S. Highway 50 at a future interchange at Silva Valley Parkway (note: this segment and interchange are outside of the Plan Area, so are not SSHCP Covered Activities or covered by the SSHCP permits)

Future vehicular access to and from the completed Capital Southeast Connector will be minimized and strictly controlled so as to allow through-travel mobility of the Capital Southeast Connector, consistent with the description of the general alignment. Access will be limited to grade-separated interchanges (either undercrossing or overcrossing), signalized intersections, and limited-access intersections. Other existing and future access not intended to have direct access to the Capital Southeast Connector may be consolidated and conveyed to appropriate interchanges, traffic signals, and/or limited-access intersections via a frontage roadway. At-grade signalized intersections and limited-access intersections may be converted to grade-separated interchanges as required by the future travel demand and level of service (LOS) conditions.

Within the expressway segments, the minimum interchange/traffic signal spacing will be 1 mile, with spacing less than 0.50 mile allowed only in unique situations and where an acceptable LOS and design speed can be maintained. Within the thoroughfare segments, the minimum

interchange/traffic signal spacing will be 0.50 mile, with 1-mile spacing preferred. Access planning and control must balance the need to maximize the Capital Southeast Connector's capacity with the need to accommodate local traffic, including that of residents and the need for access to accommodate agricultural and other business activity where appropriate. Vehicle access will be limited in the expressway portions of the Capital Southeast Connector to grade-separated interchanges (either undercrossing or overcrossing) or to signalized intersections where an acceptable LOS and design speed can be maintained. Existing and future access along the Capital Southeast Connector between grade-separated interchanges and/or at-grade signalized intersections will be consolidated and conveyed to appropriate interchange and/or traffic signals via a frontage roadway. At-grade signalized intersections may be converted to grade-separated interchanges as required by the future travel demand and LOS conditions.

The Capital Southeast Connector will also accommodate bicyclists, pedestrians, and equestrians. In the expressway segments, the Capital Southeast Connector will include a separated, 12-foot-wide Class I (multiuse) path with graded shoulders. Consideration will be given to providing either an undercrossing or overcrossing of the Class I path at grade-separated interchanges. The Class I path will also include some bicycle/pedestrian overcrossings/undercrossings at key locations between the interchange locations to provide bicycle and pedestrian connectivity to local development. Within the thoroughfare segment, bicyclists and pedestrians will be accommodated on a 10-foot-wide Class I path located on both sides of the Capital Southeast Connector. Bicyclists will also be accommodated with Class II bike lanes on the roadway. Within the four-lane limited access rural thoroughfare along Grant Line Road from the intersection of Bond Road, northeasterly to the intersection of Calvine Road, bicyclists, pedestrians, and equestrians will be accommodated on a 10-foot-wide separated Class I (multiuse) path and a Class III shoulder.

The majority of ground disturbance expected from construction of the Capital Southeast Connector will occur within the UDA. However, ground disturbance will also occur outside the UDA (see Figure 1-1). Activities related to segments of the connector alignment that are within the Plan Area will be SSHCP Covered Activities.

The Capital Southeast Connector is designed to avoid and minimize direct and indirect effects, and maintain existing wildlife movement and Preserve connectivity in accordance with the Biological Goals and Measurable Objectives (Table 7-1), and will incorporate wildlife crossing structures (refer to Condition 4 in Section 5.4).

The entire footprint of the Capital Southeast Connector within the boundaries of Sacramento County is included in the SSHCP Plan Area, and activities related to the connector are SSHCP Covered Activities.

Although the City of Folsom is not a Plan Permittee, the planned improvements to White Rock Road inside the Plan Area and the area needed for the expansion of White Rock Road as part of the Capital Southeast Connector or independently by a Plan Permittee are within the SSHCP Plan Area, and activities related to White Rock Road are SSHCP Covered Activities.

As discussed in Chapter 6, the SSHCP impact analysis assumes that 100 feet from the centerline of existing road segments (200-foot-wide ROW corridor) will be impacted for the Capital Southeast Connector. The methods for construction will be similar to those described under Urban Transportation, above.

5.2.1.2 Mather Airport Master Plan Development Projects

Mather Airport is located in Preserve Planning Unit (PPU) 2 inside the UDA. Covered Activities related to Mather Airport Master Plan development projects include maintenance of, replacement of, and improvements to existing airfields (e.g., runway extensions, new taxiways and aprons), aircraft storage facilities, aircraft maintenance facilitates, jet fuel storage and dispensary facilities, commercial facilities, and instrument landing systems,[5] and construction of new airfields.

5.2.1.3 Master Plans Known at Time of SSHCP Preparation

Five large Urban Development Master Plans (Arboretum, Cordova Hills, Jackson Township, NewBridge, and SunCreek) are proposed by Third-Party Project Proponents within the UDA (Figure 5-4). These master plans meet the definition of an Urban Development Covered Activity, and the Plan Permittees anticipate that these master plans or builders purchasing large lots from the master plan developer will use the SSHCP to obtain authorization for species incidental take under the ESA and CESA and to expedite their individual Clean Water Act permitting requirements. These five master plans were designed to comply with SSHCP requirements, including compliance with the Covered Activity descriptions and the SSHCP Avoidance and Minimization Measures (AMMs) listed in this chapter. See Appendix K for additional information on these five master plans and for any SSHCP AMMs that may be specific to these master plans.

5.2.2 Mining in the UDA

Mining includes the surface extraction of rock or mineral resources and construction of associated infrastructure, buildings, and facilities. Facilities may include surface mining pits, processing sites, and aggregate transfer systems such as conveyors and access roads and similar facilities. This Covered Activity includes construction and operation of detention basins to capture and reuse water on site.

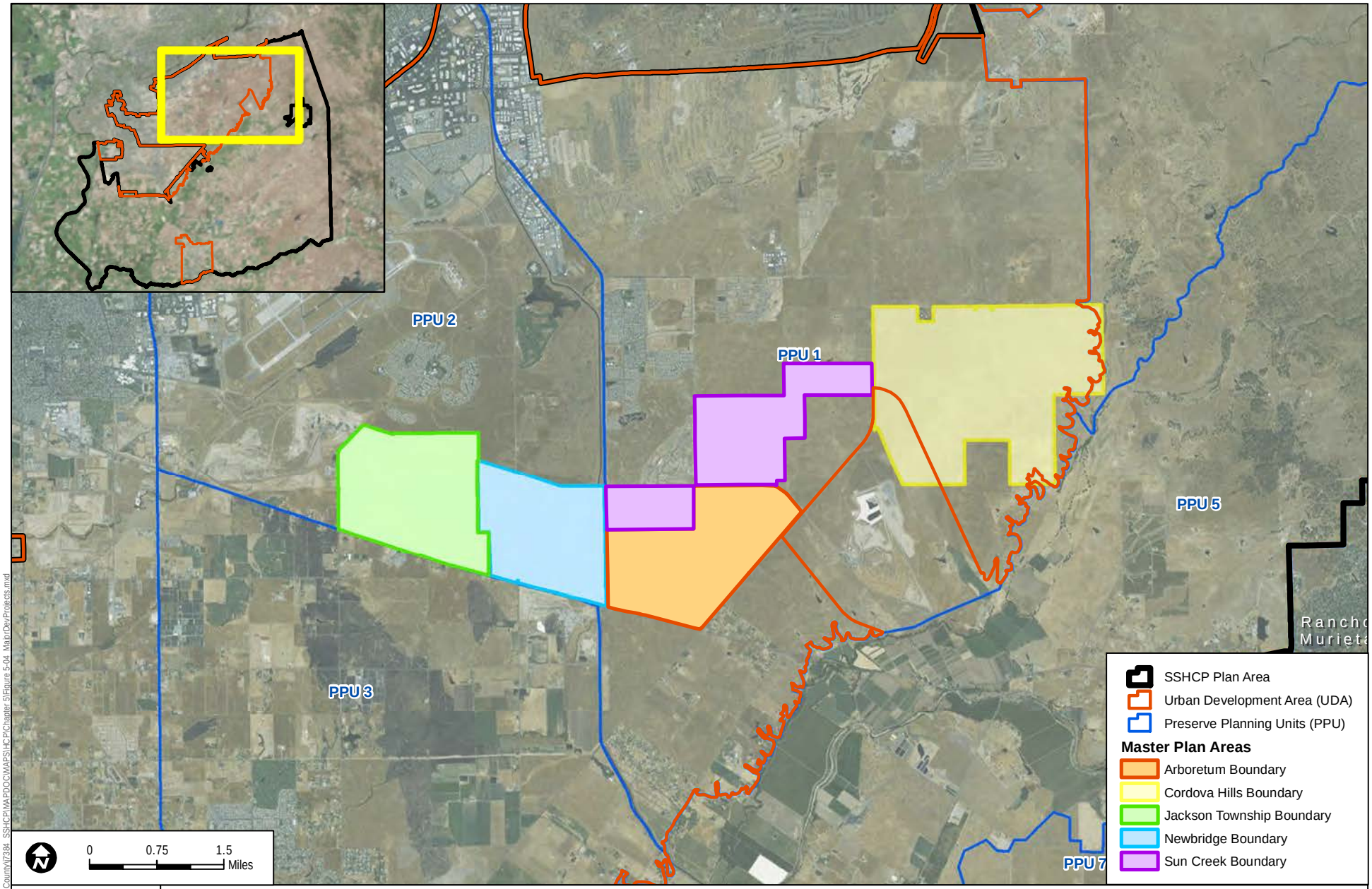
[5] This Covered Activity does not include development associated with the Mather Field Specific Plan, which is pursuing its own Endangered Species Act and Clean Water Act Section 404 permits.

The Plan Permittees estimate that up to five more surface mines totaling up to 500 acres will occur within the UDA during the 50-year Permit Term. These mines have a typical depth of 30 to 40 feet, but can be deeper depending on the location of the resource. These mines will be operated to extract alluvial sand and gravel deposits. They will be located within PPU 2 and/or PPU 3 (Figure 1-1). Covered Activities include the reclamation of previously mined land in accordance with the federal Surface Mining and Reclamation Act of 1977 and the California Surface Mining and Reclamation Act of 1975. Reclamation may include restoration of original topography, revegetation of mined areas, and other measures as would be included in a reclamation plan approved by the California Geological Survey.

5.2.3 Rural Transportation Projects

Rural Transportation Projects include transportation projects outside the UDA that are approved pursuant to the circulation element of Sacramento County's 2030 General Plan. Rural Transportation Projects that are SSHCP Covered Activities are designed to improve traffic circulation for existing communities, roadway alignments, and safety on public roadways. Roadways that are proposed in Sacramento County's General Plan circulation/transportation element are classified (from larger to smaller) as expressways, thoroughfares, arterials, urban collectors, and rural collectors. In some instances, the SSHCP proposes to shift roadway alignments from what is currently proposed in the General Plan circulation/transportation element to avoid impacts to aquatic resources. These shifts are very minor and do not alter the general alignment of Rural Transportation Projects depicted in the County's General Plan. The preliminary alignment for each Rural Transportation Project is shown in Figure 5-5.

Construction actions generally include, but are not limited to, initial vegetation clearing, grading, pouring concrete or asphalt, excavation, staging equipment and materials, compacting soil, landscaping, and maintenance. See Section 5.2.1, Urban Development in the UDA, for a more detailed description of roadway construction methods. Rural Transportation Covered Activities include up to 48 relatively small in-stream activities for transportation improvements at stream/creek crossings for bridge, culvert, or other stream crossing facility construction, replacement, and repair (Figure 5-5).



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 5\Figure 5-04_MasterDevProjects.mxd

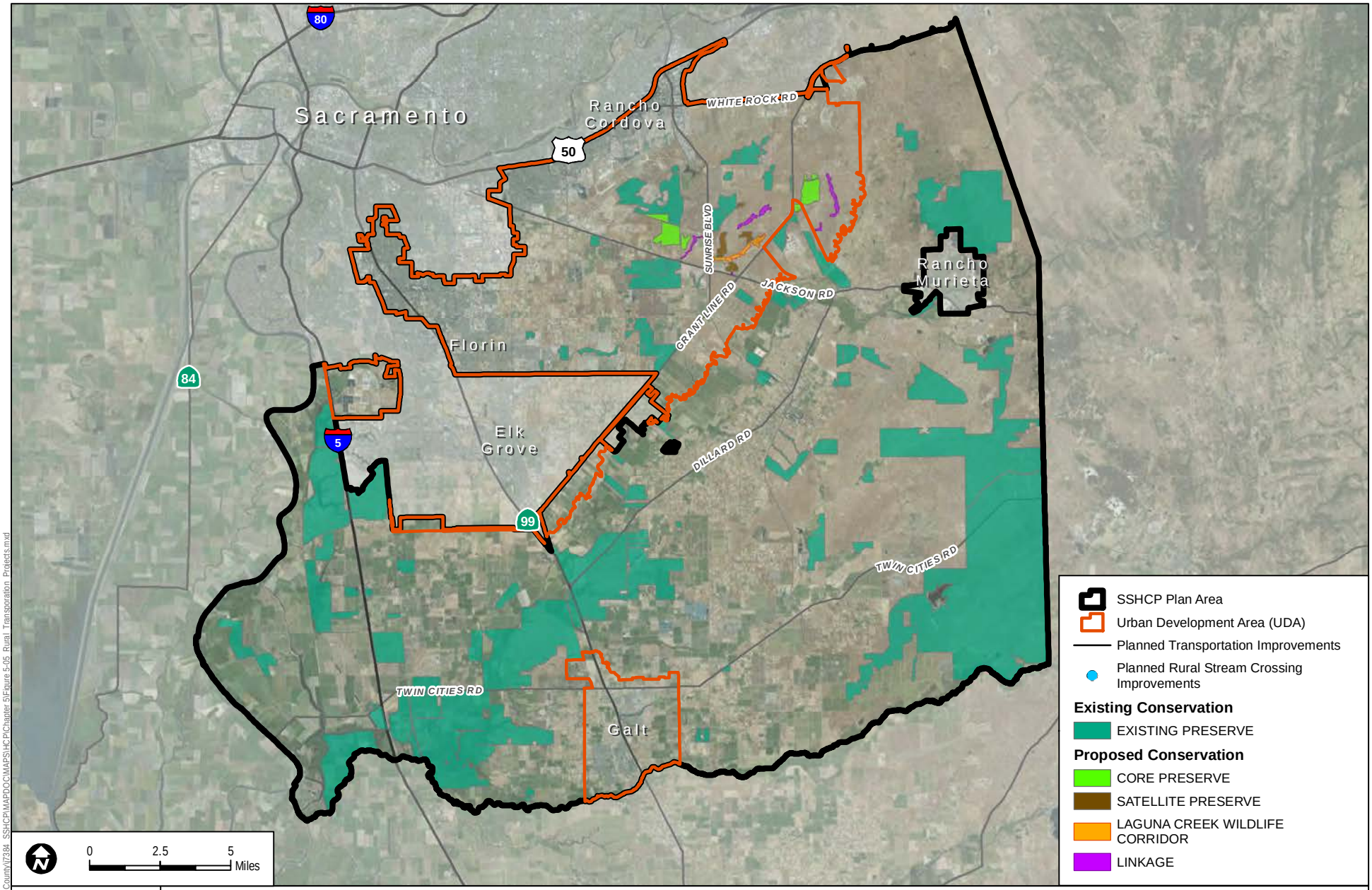
SOURCE: ESRI, County of Sacramento 2014

FIGURE 5-4

SSHCP Master Plan Areas

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK



SOURCE: ESRI, County of Sacramento 2014

FIGURE 5-5

Rural Transportation Projects

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\r2384_SSHCP\MAPDOC\MAPS\HCP\Chapter 5\Figure 5-05_Rural_Transporation_Projects.mxd

INTENTIONALLY LEFT BLANK

All routine rural road operations and regular maintenance are Covered Activities. Actions generally include, but are not limited to, signage maintenance and replacement; traffic control device maintenance and replacement; guardrail, fence, and crash cushion inspection, maintenance, and replacement; pavement maintenance and resurfacing, including replacing pavement striping and markers; tree trimming and removal; collection and removal of debris from roads and shoulders; natural disaster, storm, and vehicle accident damage repair and cleanup; weed control, mowing medians and shoulders, and grading shoulders and other areas within the ROW; grading existing dirt roadways; roadside ditch and irrigation ditch sediment removal; repair, replacement, and maintenance of retaining walls, curbs, gutters, sidewalks, culverts, and drop inlet structures; bridge repair and maintenance; ditch, catch basin, and hydrauger clearing; landscaping maintenance; and other routine road operation and maintenance activities. The construction of Rural Transportation Projects may temporarily divert stream channels, using appropriate measures to avoid or minimize impacts to Stream habitat (refer to Condition 7 in Section 5.4).

Rural Collector Road Improvements

Rural collectors are two-lane roads in rural areas. Improvements to these roadways include widening the pavement to add or increase the road shoulder and drainage improvements. The following rural collector road projects are Covered Activities that will occur outside the UDA. Estimated lengths of the road projects located outside the UDA are rounded to the nearest 0.5 mile.

- Scott Road between White Rock Road and Latrobe Road (8 miles)
- Latrobe Road between Scott Road and Stonehouse Road (less than 0.15 mile)
- Stonehouse Road between Latrobe Road and Jackson Highway (1.5 miles)
- Ione Road between Jackson Highway and the Sacramento County line (6 miles)
- Select stream crossings along Clay Station Road between Dillard Road and the Sacramento County line (less than 0.3 mile)
- Borden Road between Twin Cities Road and Clay Station Road (4.5 miles)
- Bruceville Road between Twin Cities Road and Kammerer Road (5.5 miles)
- Twin Cities Road between Interstate 5 and River Road (12.5 miles)

Arterial Road Improvements

Arterials provide a link between thoroughfares and collectors. Arterials are typically developed as four-lane roadways with a center two-way left-turn lane or a raised center median with adjacent Class I, Class II, or Class III bikeway facilities. The following arterial road widening projects are Covered Activities that will occur outside the UDA:

- Dillard Road between SR-99 and Jackson Highway (14.5 miles)

- Alta Mesa Road between Twin Cities Road and Dillard Road (8.5 miles)
- Valensin Road between Arno Road and Colony Road (3.5 miles)
- Arno/Riley Road between SR-99 and Valensin Road (3.3 miles)
- Franklin Boulevard between Kammerer Road and Twin Cities Road (6 miles)
- Twin Cities Road between SR-99 and Interstate 5 (8 miles)
- Green Road between Dillard Road and Wilton Road (2.5 miles)
- Wilton Road between Dillard Road and Grant Line Road (3 miles)
- Jackson Highway between Grant Line Road and Stonehouse Road (5.5 miles)

Road Realignment Projects

Road realignment projects entail rerouting existing roadways, generally to facilitate more direct or new road connections. Direct impacts associated with these projects will encompass the entire construction ROW on land that did not previously include a roadway. The following road construction project is a Covered Activity that will occur outside the UDA:

- Valensin Road will be extended 1 mile east from Colony Road to Alta Mesa Road.

Road Interchange Projects

The Sacramento County 2030 General Plan (SACOG 2011) indicates that four interchange projects are planned outside the UDA, located in PPU 6 and PPU 7. Capital Southeast Connector interchanges are also covered by the SSHCP, as discussed in Section 5.2.1.1.

Construction actions generally include, but are not limited to, initial vegetation clearing, grading, pouring concrete or asphalt, excavation, staging equipment and materials, compacting soil, landscaping, and maintenance. The following road interchange projects are Covered Activities:

- Modification of the interchange at Hood Franklin Road and Interstate 5 in coordination with expansion of the Capital Southeast Connector to a four-lane thoroughfare.
- Modification of the interchange at Twin Cities Road and Interstate 5 in coordination with expansion of Twin Cities Road to a four-lane arterial.
- Modification of the interchange at Arno Road and SR-99 in coordination with expansion of Arno Road to a four-lane arterial.
- Modification of the interchange at Dillard Road and SR-99 in coordination with expansion of Dillard Road to a four-lane arterial.

5.2.4 Recycled Water Projects

The SSHCP permits cover two Recycled Water Projects. The first is a small section of pipeline that will provide recycled water to the existing Bartley-Cavanaugh Golf Course, as described in the Sacramento Regional County Sanitation District/Special Plan Area/City of Sacramento Recycled Water Feasibility Study (SRCSD 2015a). The alignment of the first Recycled Water Project follows Freeport Boulevard south where it intersects the UDA for approximately 0.2 mile before turning east for an additional 0.4 mile, until it reenters the UDA (see Figure 5-6).

The second Covered Activity Recycled Water Project is the South Sacramento County Agriculture and Habitat Lands Recycled Water Project (South County Agricultural Program), which was initially identified in the Sacramento Regional County Sanitation District Water Recycling Opportunities Study (SRCSD 2007). In 2011, the Sacramento Regional County Sanitation District initiated the process to develop a more detailed feasibility study for the South County Agricultural Program (SRCSD 2015b). Through this updated feasibility study, the South County Agricultural Program expanded the potential uses of recycled water and the acreage of irrigated areas. The South County Agricultural Program will provide recycled water service from the existing Sacramento Regional Wastewater Treatment Plant to agriculture and habitat lands in the southwest portion of the Plan Area. Recycled water will be used to irrigate agricultural lands and improve aquatic and terrestrial habitat on existing and future conservation lands near the existing Cosumnes River Preserve. Recycled water may also be used to irrigate re-established/established wetlands and groundwater recharge basins.

A portion of the facilities (i.e., pumping and water transmission pipelines) associated with the South County Agricultural Program will be located within the UDA (approximately 4.3 linear miles), and the South County Agricultural Program will also include open cut trenching for approximately 41.1 linear miles of water distribution pipelines outside the UDA. The proposed transmission pipeline will leave the UDA at the intersection of Kammerer Road and Franklin Boulevard and continue south following the Franklin Boulevard corridor toward its terminus at Twin Cities Road (Figure 5-6). The pipeline footprint will generally follow existing roadways; however, pipelines will cross agricultural lands, including existing and planned Agricultural Preserves. The construction footprint of the water transmission pipeline is anticipated to require a 75-foot-wide ROW for the length of the pipeline, which may overlap the existing and/or future Franklin Boulevard ROW. In addition, approximately one recharge pond totaling approximately 560 acres will be constructed to operate the recycled water system.

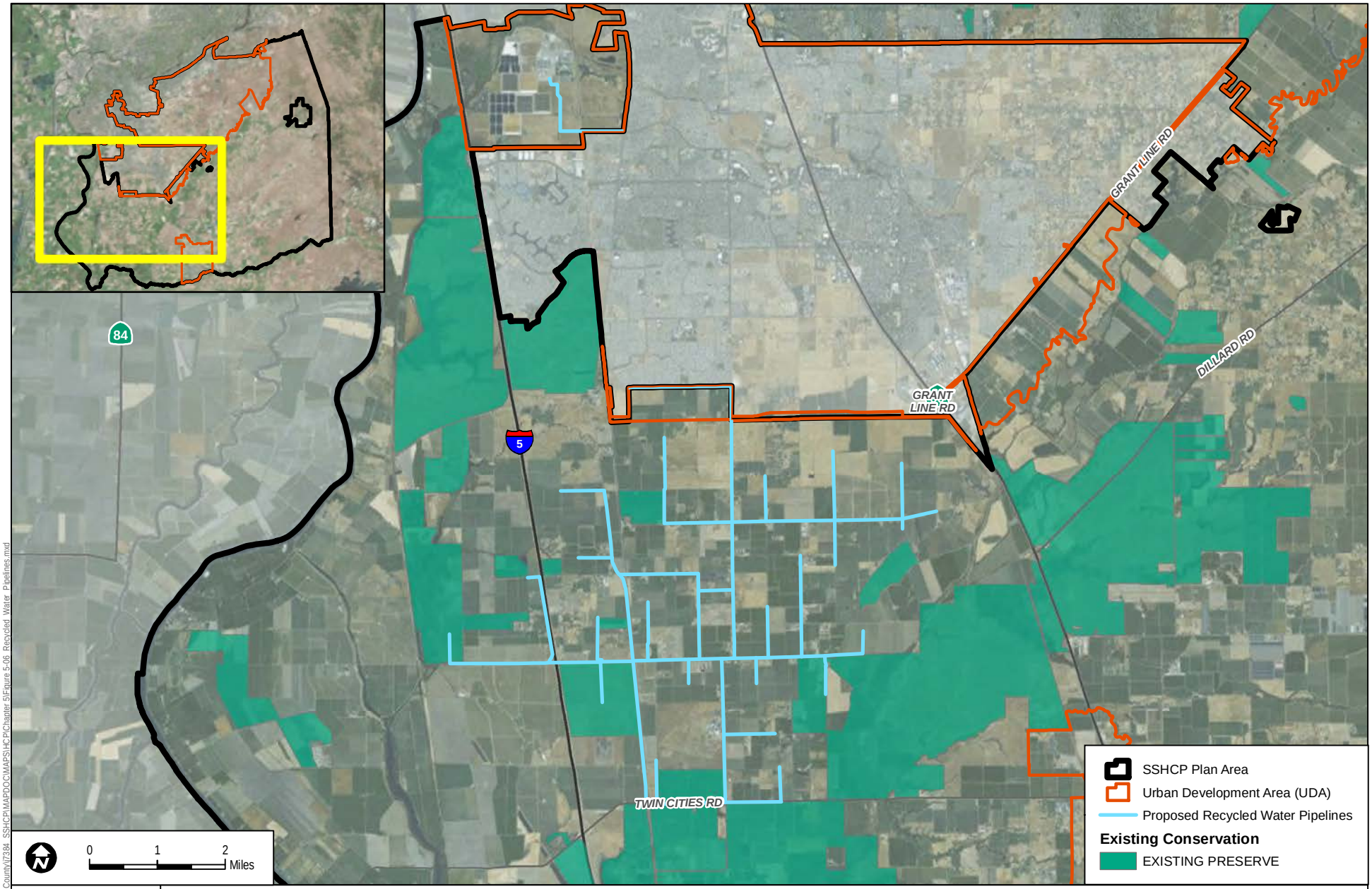
Construction and maintenance of facilities associated with the Recycled Water Projects are Covered Activities. Activities generally include, but are not limited to, inspection, cleaning, rehabilitation, repair, and/or replacement of aboveground and belowground recycled water facilities. These facilities include, but are not limited to, recycled water pipelines, pumping

stations, underground pressurized pipelines (e.g., water, recycled water, chemical), valves, gates, weirs, other groundwater recharge and reclamation facilities (including recharge ponds or spreading basins for indirect groundwater recharge purposes), other miscellaneous structures and equipment (e.g., power, control, diversion, discharge, junction, metering, telemetry), and access facilities (e.g., structures, vaults, maintenance holes, roads). All associated activities required to complete routine and emergency operations and maintenance work, such as traffic control, are also Covered Activities. Maintenance activities for recycled water facilities are Covered Activities and could include periodic vehicle trips to areas along pipeline corridors.[6] However, construction of new water diversions associated with Recycled Water Projects is not a Covered Activity and would require separate ESA consultation and permitting (see Section 5.3).

5.2.5 Covered Activities in Preserve Setbacks in the UDA

As discussed in Section 5.4, Conditions on Covered Activities, the AMM EDGE-3 requires that a setback of at least 50 feet be established outward from the boundary of any existing or planned Preserve within the UDA to reduce direct and indirect impacts that may result from adjacent Urban Development Covered Activities. The Plan Permittees estimate that approximately 625 acres of Preserve Setback along 105 linear miles will be established within the UDA, based on the perimeters of existing and planned Preserves. The minimum 50-foot-wide setback will remain in its natural state and function as a transition area between urban development and the Preserves. However, specific Covered Activities that entail minimum ground disturbance will be allowed to occur within an SSHCP Preserve Setback, as specified below. Although effects from the construction, use, and maintenance of Covered Activities inside the Preserve Setbacks are expected to be small, some permanent loss of habitat and take of individuals is expected. Figures 5-7 through 5-9 illustrate different applications of the Preserve Setback allowed under the SSHCP, and show minimum requirements of each application.

[6] Access roads will be limited to the pipeline right-of-way.



SOURCE: ESRI, County of Sacramento 2014, SRCSD 2015

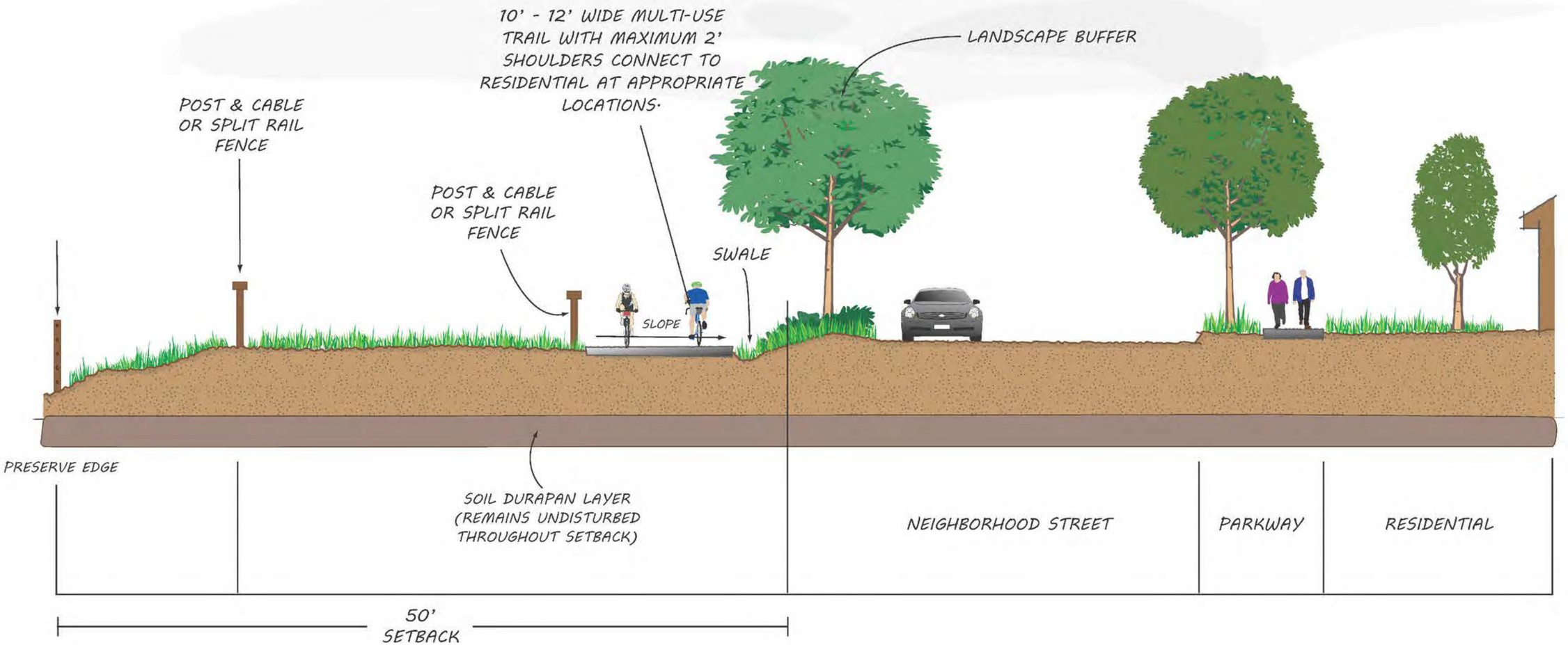
FIGURE 5-6

Recycled Water Pipelines

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 5\Figure 5-06_Recycled_Water_Pipelines.mxd

INTENTIONALLY LEFT BLANK



Not to scale.

SOURCE: ESRI, County of Sacramento 2014, USFWS 2015

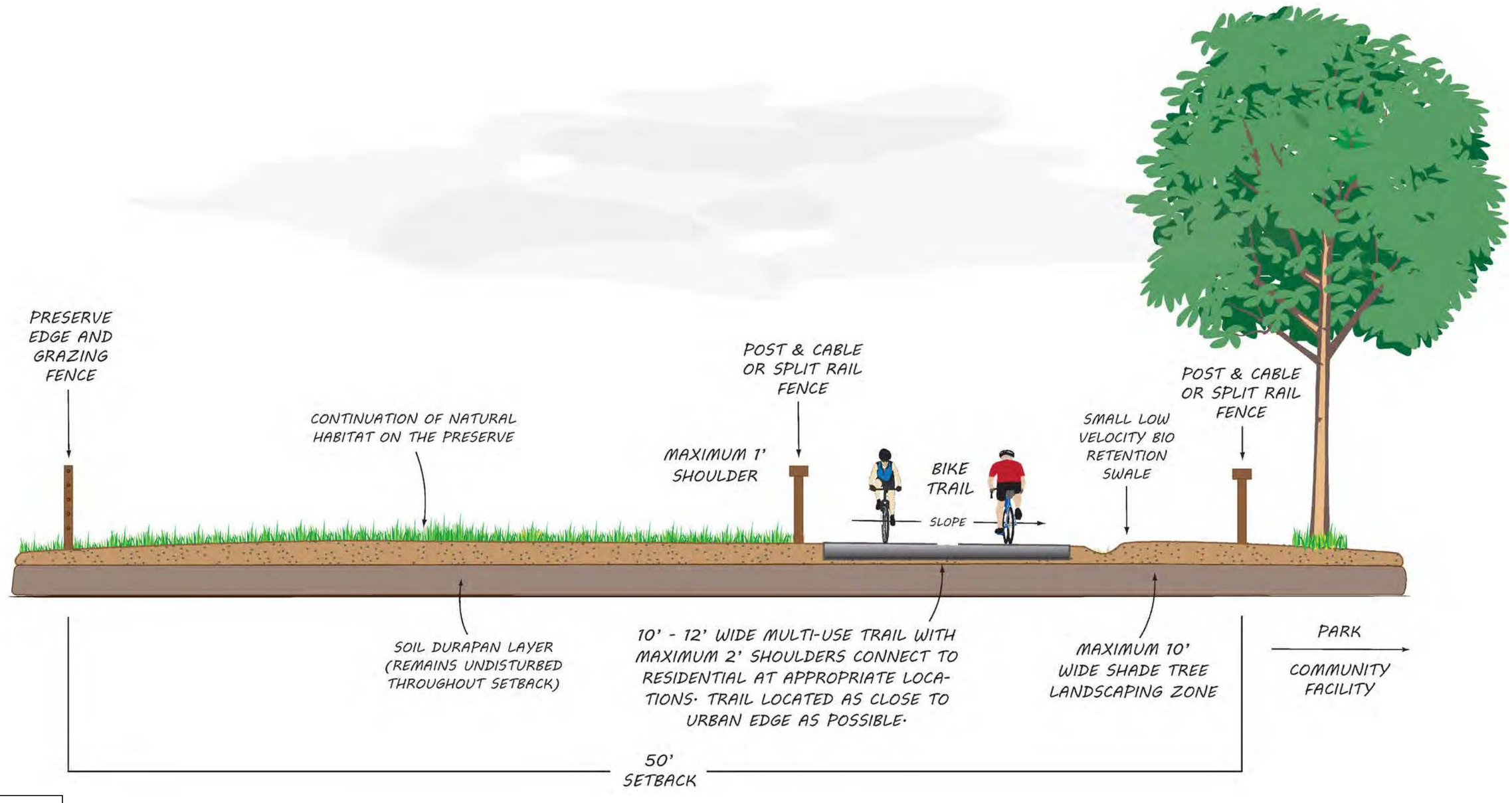
FIGURE 7

Preserve Setback Residential Front-Loaded Street

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

For illustration purposes only. See section 5.4 for AMM descriptions.

INTENTIONALLY LEFT BLANK



Not to scale.

SOURCE: ESRI, County of Sacramento 2014, USFWS 2015

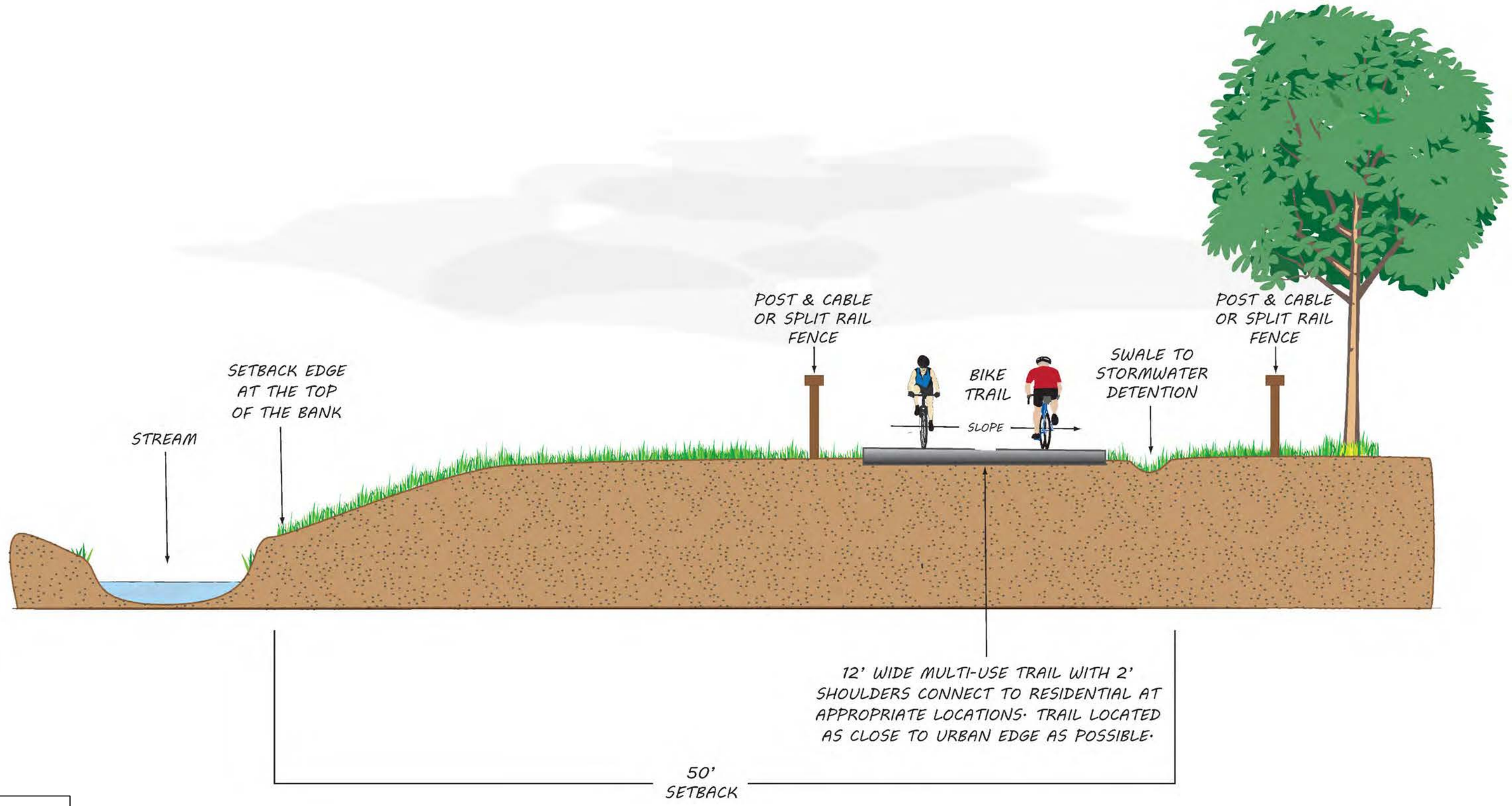
FIGURE 8

Preserve Setback

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

For illustration purposes only. See section 5.4 for AMM descriptions.

INTENTIONALLY LEFT BLANK



Not to scale.

SOURCE: ESRI, County of Sacramento 2014, USFWS 2015

FIGURE 9

Stream Setback

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

For illustration purposes only. See section 5.4 for AMM descriptions.

INTENTIONALLY LEFT BLANK

Where an existing or planned Preserve is adjacent to an existing roadway (e.g., rural collectors, arterials, thoroughfares), the 50-foot Preserve Setback will not be required. In addition, where a planned roadway crosses a planned or existing Preserve, no Preserve Setback will be required. In these two instances, any bicycle or pedestrian trail will be established in the road ROW. Many ground-disturbing Covered Activities will occur within a road or pipeline ROW (e.g., roads, sewer and water supply pipelines, and other underground utilities). Where planned Preserves, Preserve Setbacks, or Stream Setbacks are located adjacent to a ROW, Covered Activities necessary for construction, such as grading and equipment storage, will be allowed within the entire width of the ROW. Ground disturbance will be allowed up to the boundary of the Preserve or Preserve Setback, but not within the Preserve or Preserve Setback. All BMPs and other applicable SSHCP AMMs for the Covered Activity will be implemented.

Several entities may own or be responsible for land within Preserve Setbacks, including, but not limited to, Land Use Authority Permittees, parks and recreation districts, and community service districts. The entity that owns the property within a Preserve Setback will be responsible for managing and maintaining the habitat and developed features (e.g., firebreaks, trails, and bioswales) in the setback in accordance with this section and the conditions in Section 5.4. An easement will be granted to the Implementing Entity that gives the Implementing Entity the ability to enforce the conditions of the easement in perpetuity (see sample easements in Appendix D).

The primary vehicle for public interaction with the SSHCP Preserve System is the incorporation of optional trails within Preserve Setbacks (see Figures 5-7 through 5-9) potentially located around the perimeter of Preserves within the UDA. The public will be able to view and enjoy the Preserve System from trails in the Preserve Setbacks.

As discussed in Chapter 7, the main purpose of the SSHCP Preserve System is to preserve and enhance Plan Area biological resources to achieve the Biological Goals and Measurable Objectives of the SSHCP. The UDA's Preserve Setback trail system and environmental educational opportunities on certain UDA Preserves will provide indirect benefits to the SSHCP Covered Species through the following:

- Fostering public awareness and public support for the SSHCP Preserve System.
- Providing a general appreciation of Sacramento's natural history.
- Providing opportunities to view vernal pools (from the trail), birds, and other wildlife, and for recreation.

Covered Activities within an SSHCP Preserve Setback include the following, as allowed under each Preserve Setback easement:

- **Trails.** Construction and maintenance of permeable or semi-permeable hiking trails and paved community trails are Covered Activities in the UDA for Preserve Setbacks,

provided that they conform to AMM EDGE-3 described in Condition 2 (also see Figures 5-7 through 5-9). Use by pedestrians, bicycles, and domestic animals (including horses and leashed dogs) is a Covered Activity for trails within SSHCP Preserve Setbacks. The maximum trail width will be 16 feet, including 2-foot-wide shoulders. The Plan Permittees request that the SSHCP permits cover construction, operation, and maintenance of up to 105 linear miles of trails to be constructed within Preserve Setbacks located in the UDA.

- **Low-velocity bio-retention swales.** These swales will be designed to hold rainwater runoff from trails and prevent runoff entry into Preserves. These are typically small linear features that will be placed on one or both sides of trails within the setback (see Figures 5-7 through 5-9). Construction, operation, and maintenance of these swales are SSHCP Covered Activities and are covered by the SSHCP permits. Construction practices that cut into or disrupt the soil's hardpan or duripan will not be used to construct swales within setbacks (see EDGE-7). Any fill soil imported to construct the swale will be free of invasive species.
- **Fencing.** Post and cable, split rail, or other open fencing will be installed adjacent to Preserve Setback trails and are intended to keep pedestrians on the trail. Additional fencing at the Preserve boundary will also be necessary to keep livestock in the Preserve and out of the setback (see Figures 5-7 through 5-9**)**. The type of fencing required for livestock will be specified in the Preserve Management Plan (see Chapter 8, SSHCP Monitoring and Management Programs).
- **Firebreaks.** A firebreak is a gap in combustible material (vegetation) that acts to slow or stop the spread of a wildfire. Firebreaks will be allowed inside Preserve Setbacks when necessary. To maintain functionality of the soil perched aquifer, firebreaks allowed inside the setbacks must be created by methods that will not disturb the soil duripan layer, such as mowing, shallow tilling, and minor scraping of surface vegetation. If approved by the local authorities, the setback trail may also be used as a firebreak. The width of firebreaks must comply with applicable local codes.
- **Benches, shade structures, shade trees, and trash receptacles.** Benches, shade structures, shade trees, and trash receptacles will be allowed along trails in Preserve Setbacks. Shade trees, benches, shade structures, and trash receptacles must be located on the outer edge of the trail farthest from the Preserve. Shade tree species must be native trees that are found in California grasslands and that can survive on the Vernal Pool/Grassland border without long-term irrigation or fertilization (i.e., valley oak, black oak, blue oak, oracle oak). Irrigation will be allowed for a maximum of 5 years to establish saplings. The Implementing Entity has the discretion to allow irrigation to continue past 5 years if extenuating circumstances necessitate it (e.g., during a drought) and the continuance of irrigation does not affect the Preserve. Plantings in Preserve

Setbacks will not include invasive plant species listed on the California Invasive Plant Council's (Cal-IPC) California Invasive Plant Inventory Database or listed on the Cal-IPC California Invasive Plant Watch List.[7]

- **Interpretive signs and kiosks.** Signs and kiosks are intended to educate trail users about the benefits of the SSHCP Preserve System and the importance of the environmental resources that the Preserves are protecting. Safety and directional signs may also be installed. The construction, operation, and maintenance of these signs and kiosks are SSHCP Covered Activities covered by the SSHCP permits.
- **Outdoor Lighting.** Outdoor lighting in Preserve Setbacks may be allowed where a Land Use Authority Permittee determines lighting is necessary for public safety or security. Minimization measures may include light fixture placement (e.g., as low to the ground as possible), lamp designs (e.g., shielding, low glare, or no lighting), directing light away from Preserves, or other means to avoid or minimize light pollution.
- **Livestock Access to Preserves.** Access points and facilities for delivery and collection of grazing animals (livestock) will be permitted in Preserve Setbacks. The type of fencing required for livestock will be specified in the Preserve Management Plan (see Chapter 8, SSHCP Monitoring and Management Programs).

The Plan Permittees have not identified nonconforming uses or structures within setbacks of planned Preserves. If any nonconforming uses or structures in Preserve Setbacks are identified during SSHCP implementation, the Implementing Entity will coordinate with the Plan Permittee and the Wildlife Agencies to appropriately address the nonconforming use or structure.

5.2.6 Covered Activities in Stream Setbacks in the UDA

Stream Setbacks are an increasingly common tool employed to address disturbances to and management of streams and riparian zones and to reduce degradation of water quality. Research studying the effective widths of Stream Setbacks has appeared in the scientific literature since the mid-1960s (Robins 2002). Over the past 40 years, Stream Setbacks have become increasingly recognized for their benefit in controlling non-point- and point-source pollutants (Robins 2002; Semlitsch and Bodie 2003; Wenger 1999).

Urbanization adjacent to streams can adversely impact hydrologic functions and water quality. Potential impacts on streams from adjacent Covered Activities may include the following:

- Increased erosion and decreased transmittance of light through the water column due to sediment runoff into streams.

[7] http://www.cal-ipc.org/paf/

- Excessive nutrient loading into streams or water bodies that could raise nutrient concentrations above safe drinking water levels and cause eutrophication (depletion of oxygen in water).
- Introduction of fecal coliform into streams that contributes to nutrient loading and can introduce pathogenic organisms.
- Introduction of chemicals, pesticides,[8] and heavy metals into streams that may result in mortality of aquatic species.
- Modification of stream water temperature and stream microclimate that may damage the aquatic ecosystem.
- Modification of stream channel complexity that may reduce bank stabilization and increase erosion.

Condition 7 (Section 5.4.1) will be applied to all UDA Covered Activities to avoid or minimize potential indirect and direct impacts to streams and creeks by establishing minimum 100-foot-wide Stream Setbacks measured from the top of the bank on both sides of the following streams within the UDA: Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek (also see discussion of the Laguna Creek Wildlife Corridor in Section 5.2.8).

The primary purpose of a Stream Setback is to minimize indirect effects of adjacent Urban Development Covered Activities on Plan Area waterway hydrologic functions, including water quality, and to avoid or reduce other undesired disturbances to sensitive resources. However, the SSHCP Conservation Strategy (Chapter 7) does not count the avoided area within the Stream Setbacks to be mitigation for Covered Activity impacts on species. In addition, stream segments within an SSHCP Preserve do not require setbacks because the Preserve lands surrounding the stream segment will function to protect the stream. Under certain circumstances, the Stream Setback requirement can be waived for property owners of very small lots, as discussed in Section 9.5.2.

Several entities may own or be responsible for land within Stream Setbacks, including, but not limited to, Land Use Authority Permittees, parks and recreation districts, and community service districts. The entity that owns the property within a Stream Setbacks will be responsible for managing and maintaining the habitat and any constructed features (e.g., trails, bioswales) in the setback. An easement must be granted to the Implementing Entity that gives the Implementing Entity the ability to enforce the conditions of the easement in perpetuity (see sample easements in Appendix D).

[8] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided the pesticide application is otherwise legal and the application conforms to all conditions in Section 5.4.

Limited Covered Activities are allowed within Stream Setbacks. This section lists the allowed activities within Stream Setbacks. However, where the listed allowable Covered Activities conflict with other laws, regulations, and policies regarding streams, erodible soils, wetlands, floodplains, land disturbance activities, or other environmental protective measures, the more restrictive allowable use will apply. The listed allowable Covered Activities are not intended to supersede any previously issued active permits by Permitting Agencies. Where a permit has been issued, the existing permit conditions (including the terms and conditions of recorded conservation easements required as a permit condition) will supersede the allowable SSHCP Covered Activities. The following are allowed Covered Activities within SSHCP Stream Setbacks:

- **Trails.** Construction and maintenance of permeable or semi-permeable hiking trails and paved community trails are Covered Activities in the UDA for Stream Setbacks. Use by pedestrians, bicycles, and domestic animals (including horses and leashed dogs) is a Covered Activity for trails within SSHCP Stream Setbacks. The maximum trail width will be 16 feet, including 2-foot-wide shoulders. The Plan Permittees estimate that approximately 150 linear miles of trails will be built within Stream Setbacks located in the UDA.
- **Low-velocity bio-retention swales.** These swales will be designed to hold and remove runoff from trails and prevent runoff entry into Preserves. These will typically be small linear features that will be placed on one or both sides of trails within the setback or roadways adjacent to the setback (see Figures 5-7 through 5-9). Construction, operation, and maintenance of these swales are SSHCP Covered Activities, covered by the SSHCP permits. Any fill soil imported to construct the swale will be free of invasive species.
- **Crossings perpendicular to the stream**. Covered Activity crossings of new roads, bike or pedestrian trails, railroads, sewer lines, water lines, recycled water lines, or utility lines are allowed in SSHCP Stream Setbacks as long as they cross perpendicular to the stream. The Land Use Authority Permittees (County of Sacramento and Cities of Galt and Rancho Cordova) will ensure that Third-Party Project Proponents implementing the crossing correctly implement all applicable conditions and AMMs for the aquatic land cover types (see Section 5.4). The Land Use Authority Permittees will also review and approve crossing designs to ensure that the area of the crossing is stabilized (e.g., appropriate bio-engineering solutions) to prevent potential erosion due to its use as a crossing.
- **Stream bank stabilization projects**. As discussed in Section 5.2.1, stream bank stabilization projects include installation of in-stream structures for erosion control (e.g., appropriate bio-engineering methods). Plan Permittees will review and approve stabilization designs to ensure that they will avoid and minimize impacts to the aquatic land cover types.

- **Fencing**. Post and cable fencing, split rail, or other open fencing will be installed adjacent to trails and are intended to keep pedestrians on the trail.
- **Benches, shade structures, and shade trees.** Benches, shade structures, and trash receptacles will be allowed along trails in the SSHCP Stream Setbacks. Shade trees will be allowed at bench sites. Shade trees, benches, shade structures, and trash receptacles must be located on the outer edge of the trail farthest from the creek. Shade tree species must be native trees that are found in SSHCP Riparian land cover types (see Chapter 3) and that can survive in the planted location without long-term irrigation or fertilization. Irrigation will be allowed for a maximum of 5 years to establish saplings. The Implementing Entity has the discretion to allow irrigation to continue past 5 years if extenuating circumstances necessitate it (e.g., during a drought) and the continuance of irrigation does not affect the waterway. Invasive plant species listed on Cal-IPC's California Invasive Plant Inventory Database or listed on Cal-IPC's California Invasive Plant Watch List (see http://www.cal-ipc.org/paf/) will not be planted in Stream Setbacks.
- **Interpretive signs and kiosks.** Signs and kiosks are intended to educate trail users about the benefits of the SSHCP Preserve System and the importance of the environmental resources that the Preserves are protecting. Safety and directional signs may also be installed. The construction, operation, and maintenance of these signs and kiosks are SSHCP Covered Activities covered by the SSHCP permits.
- **Riparian habitat re-establishment or establishment.** Re-establishment or establishment[9] of riparian vegetation in Stream Setbacks may be desirable to minimize indirect effects of adjacent development or to enhance stream water quality. As discussed in Chapter 9, vegetation re-establishment or establishment plans must be reviewed and approved by the Implementing Entity and Permitting Agencies prior to implementation.
- **Outfalls.** Construction and operation of outfall structures that allow the discharge of stormwater into a stream from adjacent urban development areas are allowed in SSHCP Stream Setbacks. The Land Use Authority Permittees will review and approve outfall designs to ensure that they correctly apply all applicable design and construction AMMs (refer to Section 5.4).
- **Flood control structures and stormwater management**. As discussed in Section 5.2.1, flood control and stormwater structures include, but are not limited to, detention basins, bio-retention swales, and water quality facilities that are designed to be compatible with the habitat and wildlife values of the adjacent stream corridor. Land Use Authority Permittees will review and approve designs to ensure that they include all appropriate SSHCP design and construction AMMs (refer to Section 5.4).

[9] In the context of this Plan, the word "establish" is synonymous with "create."

Nonconforming[10] Structures and Uses

Existing nonconforming structures and nonconforming uses of land may be located within SSHCP Stream Setbacks. Existing nonconforming structures or uses are not Covered Activities, but are allowable activities within Stream Setbacks and are subject to the following requirements:

- Legally existing but nonconforming structures or uses may be continued.
- Existing impervious surfaces within the setbacks that resulted from previous allowable disturbances or developments will not be expanded.
- If a legally existing but nonconforming use has been discontinued for more than 90 days, re-establishment will be prohibited by the appropriate Land Use Authority Permittee, with the exception of agricultural uses that are following prescribed BMPs for crop rotation. However, resumption of agricultural uses must be strictly confined to the extent of disturbance existing at the time of adoption of the SSHCP.

Septic Systems

Subsurface sewage disposal systems that currently exist within an area that will become an SSHCP Stream Setback are not Covered Activities but will be "grandfathered" and allowed to remain in the SSHCP Stream Setback. Parcels entitled to install subsurface sewage disposal systems before or at the time of SSHCP permit issuance will also be allowed to install such systems within a Stream Setback, but the operation, maintenance, or replacement of entitled or currently existing subsurface sewage disposal systems are not Covered Activities.

5.2.7 SSHCP Preserve System Covered Activities

In addition to the activities and actions described above, the SSHCP permits will provide take authorization for activities and actions associated with implementation of the SSHCP Conservation Strategy described in detail in Chapter 7. Most of these activities and actions will take place within the SSHCP Preserve System assembled by the Plan. See Section 5.2.8 for Covered Activities allowed in the Laguna Creek Wildlife Corridor area of the Preserve System. All SSHCP Conservation Actions will take place within the SSHCP Plan Area (see Chapter 7 for a description of all SSHCP Conservation Actions).

As described in Chapter 7, the SSHCP Preserve System will benefit and protect Covered Species within the Plan Area and achieve the SSHCP's Biological Goals and Measurable Objectives. However, future land management, monitoring, habitat enhancement, habitat re-establishment, and maintenance activities on SSHCP Preserves have some potential to result

[10] Nonconforming structures or uses are structures and uses of land that lawfully existed before an amendment to a local land use authority's code made the structure or use non-conforming.

in adverse effects to Covered Species habitats and individuals. For that reason, Conservation Actions are also SSHCP Covered Activities and are covered by the SSHCP permits. As discussed in detail below, this Preserve System Covered Activity category includes all Plan Permittee actions that might be necessary to achieve the SSHCP Conservation Strategy, including the SSHCP Biological Goals and Measurable Objectives (see Chapter 7). Most of the Conservation Strategy Covered Activities will occur within the SSHCP Preserve System or on lands planned for inclusion in the Preserve System (see Chapter 7 for a description of all SSHCP Conservation Actions). The SSHCP Implementing Entity will oversee implementation of Preserve System Covered Activities, including management and monitoring of the SSHCP Preserve System.

Preserve Management and Monitoring

This category includes all Preserve System land management actions required by the Plan or other actions that might be necessary to achieve the SSHCP Biological Goals and Measurable Objectives (Chapter 7). Activities associated with management of the SSHCP Preserves have the potential to affect Covered Species. This category also includes construction, maintenance, and use of facilities needed to manage the SSHCP Preserve System, including, but not limited to, roads, bridges, culverts, fences, gates, wells, stock tanks, stock ponds, and livestock handling facilities (e.g., corrals, pens, and chutes). As much as possible, Preserve management structures (e.g., Preserve field offices, maintenance sheds, carports) will be located outside Preserve boundaries. Those accessing Preserves for management and monitoring will likely use all-terrain vehicles to the extent feasible, which do not require improved roads. However, access to some infrastructure may require establishment of new dirt roads. Roads, structures, and facilities existing at the time of land acquisition will be used whenever feasible to minimize impacts to species habitats in the Preserve. Where Preserve management structures or access roads must be constructed on Preserve lands, they must be identified in an approved Preserve Resources Management Plan (see Chapter 8) and will be sited to minimize direct and indirect impacts to Covered Species habitat.

Management and monitoring actions that will be used within the SSHCP Preserve System are described in detail in Chapter 8, SSHCP Monitoring and Management Programs. Preserve management activities and facility Covered Activities may include, but are not limited to, the following:

- Demolition or removal of structures, roads, or built livestock ponds to enhance or re-establish habitat.
- Hazardous materials remediation, such as appropriate closure of underground storage tanks, soil remediation, and cleanup of illegal dumping.

- Preserve vegetation management, including grazing of livestock, mowing, manual labor, and prescribed burns. See additional information under "Pesticide Use for Land Management," below.[11]
- Fire management, including prescribed burning and mowing.
- Fuel break establishment on Preserves outside the UDA.
- Vehicle and pedestrian travel, including by all-terrain vehicles or trucks, for inspecting or maintaining facilities, moving, or managing livestock and patrolling.
- Use of mechanized equipment for construction, maintenance, and resource management projects in the Preserve System (e.g., vehicles, weed trimmers, mowers).
- Restoration of historical hydrologic conditions through creation of berms, creation of channels and ditches, filling or plugging of channels and ditches, creation of swales, and demolition or removal of preexisting structures or roads.
- Installation and repair of fencing.
- Construction, rehabilitation, and maintenance of facilities (e.g., pens, corrals, gates, feed storage, wells, water delivery, and water storage) to support livestock grazing as a Covered Species management tool. See additional information under "Water Supply for Livestock," below.
- Construction, operation, and maintenance of recycled water pipelines providing irrigation to Cropland and Irrigated Pasture Preserves.
- Construction, operation, and maintenance of small solar photovoltaic panels to provide electricity for Preserve management.
- Actions to control non-native species (e.g., feral cats and dogs, red fox, non-native fish, bullfrogs).
- Actions to enhance or re-establish species habitat. See additional information under "Habitat Enhancement, Re-Establishment, and Establishment," below.
- Certain agricultural activities, such as tilling fields, harvesting crops, and grazing, when they are consistent with provisions of an SSHCP Conservation Easement (see Section 9.4.3) and are consistent with an SSHCP Preserve Management Plan (see Chapter 8).
- Modification and use of structures existing at the time of property acquisition for uses related to Preserve management or public education.

[11] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided the pesticide application is otherwise legal and the application conforms to all conditions in Section 5.4.

- Installation of monitoring and extraction wells for groundwater remediation at Kiefer Landfill. See additional information under "Groundwater Monitoring and Extraction Wells," below.
- Construction of new unpaved roads will likely be necessary to access areas of the Preserve System to implement management, monitoring, and restoration plans. Roads will be limited to the minimum width and distance necessary. The Plan Permittees request that the SSHCP permits cover construction, operation, and maintenance of up to 5 miles of new dirt road and up to 15 creek or swale crossings within the SSHCP Preserve System.
- Species and habitat surveys and monitoring. See additional information under "Species Surveys, Monitoring, Research, and Adaptive Management Activities," below.

Low-Impact Nature Trails

In addition to trails within Preserve Setbacks, the SSHCP permits will also cover creation of a limited number of low-impact nature trails within planned SSHCP Preserves. The Plan Permittees anticipate that these trails will primarily be located in UDA Preserves near urban development to promote awareness and appreciation of the Plan Area's natural history and provide environmental education opportunities. These trails will not traverse the entirety of a Preserve, but will be constructed as short segments or loops and will be identified in an approved Preserve Management Plan (see Chapter 8). These trails will not be located in SSHCP Preserves or conservation easements that are farmed or could be farmed in the future. Construction and maintenance of low-impact nature trails within Preserves will be SSHCP Covered Activities and covered on SSHCP permits. Construction of low-impact nature trails may impact natural resources within the Preserve System, including Covered Species and their habitats.

The Plan Permittees request that the ITPs cover construction, operation, and maintenance of low-impact nature trails installed within Landscape, Core, and Minor Preserves. Nature trails will be unpaved trails that will vary in width depending on terrain and existing constraints, but will never exceed 4 feet in width. Improvements include mowing vegetation to create or maintain a trail, minor grading to remove trip hazards, and signs providing directional and educational information. Where a trail crosses a swale, wooden walkways elevated to a height no greater than 2 feet will be installed. See Condition 5 for additional design and AMMs related to nature trails (Section 5.4.1).

Public education will be provided to enhance user awareness and understanding of the Preserve System and its natural resources in accordance with an approved Preserve Management Plan (Chapter 8). Public education will include the following:

- Online or printed trail maps, field guides, and information about Preserve species and habitat.

- Trail signage at appropriate locations.
- Interpretive signs at appropriate locations.

See Condition 5 for additional design and AMMs related to nature trails. Habitat Enhancement, Re-Establishment, and Establishment

Activities to enhance, re-establish, or establish species habitat may result in temporary and permanent effects to Covered Species. Enhancement is modifying an existing habitat to better suit species' needs. Enhancement actions may involve, but are not limited to, improving the hydrologic regime of a site to benefit Covered Species; managing vegetation; installing perching poles; and providing bat houses, burrows, or other nesting/roosting improvements. The types and amounts of habitat enhancement planned in the SSHCP Preserve System are discussed in Chapter 7.

Habitat re-establishment is defined as restoring species habitat where it previously existed but has been degraded or removed. Habitat establishment (creation) involves establishing species habitat in new sites where it historically did not exist. Of these two, the SSHCP Conservation Strategy (Chapter 7) emphasizes habitat re-establishment. However, because of incomplete information about the precise historical locations of some habitats (such as the historical location of each vernal pool on a restored landscape), habitat creation is included in the SSHCP Conservation Strategy (see Chapter 7). All activities related to habitat re-establishment and habitat establishment are SSHCP Covered Activities. SSHCP Conservation Strategy requirements for species habitat re-establishment are discussed in AMM RE-ESTABLISHMENT/ ESTABSLISHMENT-1, AMM RE-ESTABLISHMENT/ESTABSLISHMENT-2, and in Chapter 7. Habitat re-establishment and establishment generally include, but are not limited to, earth moving; regrading or recontouring a site; restoring the past hydrologic regime or creating a hydrologic regime; and seeding or planting herbaceous vegetation, trees, shrubs, grasses, or other vegetation. Habitat re-establishment and establishment will generally be disruptive in the short term because these activities may involve soil disturbance, removal of undesirable plants, and limited grading. All habitat restoration and creation is expected to result in a net long-term benefit for Covered Species and natural communities. However, these activities may have temporary or short-term adverse effects, and may result in limited take of Covered Species (see Chapter 6, Effects Assessment and Level of Take). Impacts to existing vernal pools from re-establishment and establishment activities will be avoided or minimized by implementing the AMMs discussed below under Condition 6.

Removal or Breaching of Farm Levees

The purpose of removing or breaching of farm levees is to facilitate the establishment or re-establishment of riparian habitat. Similar to activities to enhance, re-establish, or establish species habitat, the removal or breaching of farm levees may result in temporary and permanent effects to

Covered Species. Actions associated with the removal or breaching of farm levees may involve, but are not limited to, improving the hydrologic regime of a site to benefit Covered Species, managing vegetation, and introduction of riparian vegetation.

Removal or breaching of farm levees include, but are not limited to, earth-moving activities; re-grading or re-contouring a site; restoring the past hydrologic regime or creating a hydrologic regime; and seeding or planting herbaceous vegetation, trees, shrubs, grasses, or other vegetation. These actions would generally be disruptive in the short term because these activities may involve soil disturbance, limited grading, and short-term flooding of uninhabited land. Removal or breaching of farm levees is expected to result in a net long-term benefit for Covered Species and natural communities. However, these activities may have temporary or short-term adverse effects, and may result in limited take of Covered Species (see Chapter 6, Effects Assessment and Level of Take).

Species Surveys, Monitoring, Research, and Adaptive Management Activities

Species surveys will be conducted on SSHCP Preserves and on properties identified for potential acquisition as Preserves. Preserve surveys will be conducted regularly as part of the SSHCP monitoring and adaptive management program (Chapter 8). These surveys may require Covered Species to be handled, marked, measured, or inspected, which may result in species take under the ESA or CESA. Research conducted in support of the SSHCP is a Covered Activity when implemented in accordance with the SSHCP Conservation Strategy.

Species monitoring activities may include, but are not limited to, surveys for Covered Species. Surveys will use the most current species-specific survey methodology and protocols. Habitat monitoring may include establishing and walking line transects or quadrants. As discussed in Chapter 8, monitoring, land management, and research activities that require handling of listed species (e.g., translocation, banding, marking, measuring physical features) will be supervised by a Wildlife Agencies–approved biologist with a valid ESA Section 10(a)(1)(A) permit and/or state Scientific Collecting Permit that covers the specific activity and the specific species.

SSHCP Preserves will be managed by the SSHCP Implementing Entity using standard monitoring and adaptive management principles, where species and land management actions are adjusted in response to monitoring data collected as part of the SSHCP Monitoring Plan (see Chapter 8). In managing SSHCP Preserves and Preserve Setbacks, habitat management research or experiments may be undertaken for the benefit of a Covered Species. Adaptive management research trials or pilot studies conducted on SSHCP Preserves or Preserve Setbacks may require manipulation or intensive management of habitat. Examples may include implementing new grazing regimes with different animals, controlled burns, varying restoration techniques, cycling crop patterns, cycling harvest techniques/times, or any number of experimental operations.

These types of Preserve research and adaptive management activities are SSHCP Covered Activities covered by the SSHCP permits. These activities are intended to aid in the conservation of Covered Species, although they may adversely affect a small number of individuals. The intent of the research and adaptive management Covered Activities is to promote more informed and efficacious management of the SSHCP Preserve System to meet the stated SSHCP Biological Goals and Measurable Objectives (see Chapter 7).

Water Supply for Livestock

Preserves in the UDA are expected to need links to existing or future water infrastructure. Connection of a livestock water trough to existing or future water infrastructure will require installation of small-diameter pipelines. These will be sized and buried to the specification of the local jurisdiction; the relevant Preserve Management Plan (Section 7) will determine appropriate locations and specific design measures to minimize impacts to species habitat. Outside the UDA, new extraction wells may be needed on more remote Preserves to provide water for livestock that are used to manage vegetation as part of a Preserve Management Plan. Existing wells will be used whenever possible. New wells will be installed only as necessary for natural resource management purposes and when no alternative surface water supplies are available. If new wells are necessary, they will be sited to avoid direct and indirect impacts to vernal pools. Plan Permittees estimate that one new well will be needed for every 2,000 acres of Grassland Preserve outside the UDA. The Plan Permittees therefore request that the ITPs cover construction of up to 10 new wells. The Plan Permittees also request that the ITPs cover replacement of existing wells and operation and maintenance of all new and existing wells to support the Preserve System, as identified in an approved Preserve Management Plan. This Covered Activity will include construction and maintenance of a cement pad, well house covering, electrical equipment and connections, fencing around the well house, and other equipment necessary for operation of the wells. In addition, construction and maintenance of pipelines that may be necessary to transfer water from the new wells are Covered Activities.

Groundwater Monitoring and Extraction Wells

At the existing Kiefer Landfill in PPU 5 on land owned by the County of Sacramento, leachates from an older portion of the landfill are entering the aquifer and have contaminated the groundwater. To remediate this condition, the County of Sacramento is required to maintain several monitoring wells to test for contaminants and maintain several extraction wells to treat contaminated groundwater. Existing monitoring and extraction wells for testing and treating contaminated water, and new monitoring and extraction wells are Covered Activities on that portion of the Kiefer Landfill that is a planned SSHCP Preserve.

Pesticide Use for Land Management

Pesticide use for SSHCP Preserve management is covered under the CESA Incidental Take Permit, but not the ESA Incidental Take Permit.[12] Pesticide use is allowed only when necessary to achieve the SSHCP Biological Goals and Measurable Objectives (e.g., exotic plant or exotic animal control). When necessary, pesticide use is allowed within SSHCP Preserves, within Preserve Setbacks, and within road ROWs that border SSHCP Preserves. As discussed in Chapter 8, Preserve Management Plans will be prepared for each SSHCP Preserve. Each Preserve Management Plan will identify processes to identify, document, evaluate, and then control invasive and other exotic target species by combining biological, cultural, physical, and chemical tools in a way that will minimize environmental risks. Pesticide use as part of a Preserve management strategy is not expected to adversely affect Covered Species over the Permit Term because pesticide use will be limited, and pesticide use will strictly comply with the pesticide label and all other applicable federal, state, and local laws pertaining to the use, safety, storage, disposal, and reporting of pesticides.

Detention Basins

As discussed in Section 5.2.1, Urban Development can require construction of stormwater management facilities, including detention basins. Detention basins collect stormwater through gravity flow and gradually release the stormwater to a natural stream or waterway. The SSHCP requires Urban Development Covered Activities to direct stormwater flows away from existing or planned Preserves and into stormwater detention basins or other stormwater facilities inside the development footprint, consistent with the requirements of EDGE-4.

As discussed in Section 7.5, the SSHCP Preserve System includes Linkage Preserves in the UDA. Some of the UDA Linkage Preserves surround natural streams, creeks, or intermittent drainages that must receive stormwater from the adjacent urban development. Therefore, in limited situations, stormwater detention basins will be allowed on those SSHCP Linkage Preserves. The detention basins will capture storm flows and runoff, and discharge to stormwater facilities or bio-swales and through percolation and discharge to the perched aquifer. Detention basins can include emergent wetland vegetation or other biological measures to remove contaminants from stormwater, or other measures as specified by the most recent Stormwater Quality Design Manual for the Sacramento and South Placer Regions.

At the time of SSHCP preparation, the SSHCP Preserve System includes seven Linkage Preserves with natural drainages: L1, L2, L4, L7, L8, L9, and L10. A limited number of

[12] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided the pesticide application is otherwise legal and the application conforms to all conditions in Section 5.4.

detention basins will be allowed on Linkage Preserves with natural drainages, consistent with the requirements of EDGE-6. Also see project-specific measures in Appendix K.

Existing Utility Maintenance and Repair

Repair and maintenance of existing utility facilities within planned SSHCP Preserves, including electrical, natural gas, water, wastewater, and cell tower facilities, are SSHCP Covered Activities, when implemented consistent with the utility's existing ROW easements.

5.2.8 Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System

As discussed in Chapter 7, the Laguna Creek Wildlife Corridor is a component of the SSHCP Preserve System. The SSHCP permits will provide take authorization for activities and actions associated with management and monitoring of the wildlife corridor, as described in detail in Chapter 7 and summarized below.

Limited Covered Activities are allowed within the Laguna Creek Wildlife Corridor. However, where the listed allowable activities conflict with other laws, regulations, and policies regarding streams, erodible soils, wetlands, floodplains, land disturbance activities, or other environmental protective measures, the more restrictive allowable use will apply. The listed allowable activities are not intended to supersede any previously issued active permits by Permitting Agencies. Where a permit has been issued, the existing permit conditions will supersede the allowable SSHCP Covered Activities. Allowed activities within the Laguna Creek Wildlife Corridor include the following:

- **Trails.** Activities relating to permeable or semi-permeable hiking trails and paved community trails, and benches and trash receptacles along trails are Covered Activities for the Laguna Creek Wildlife Corridor. Use by pedestrians, bicycles, and domestic animals (including horses and leashed dogs) is a Covered Activity for trails within the Laguna Creek Wildlife Corridor. The maximum trail width will be 16 feet, with 12 feet of permeable, paved, or semi-permeable trail and 2-foot-wide shoulders on either side of the trail. Plan Permittees estimate that up to 20 miles of trails will be built within the Laguna Creek Wildlife Corridor.
- **Low-velocity bio-retention swales.** These swales will be designed to hold and remove runoff from trails and prevent runoff entry into Preserves. These are typically small linear features that will be placed on one or both sides of a trail within the setback or roadway adjacent to the setback (see Figures 5-7 through 5-9). The construction, operation, and maintenance of these swales are SSHCP Covered Activities and are covered by the SSHCP permits. Any fill soil imported to construct swales will be free of invasive species.

- **Fencing.** Post and cable, split rail, or other open fencing will be installed adjacent to trails and are intended to keep pedestrians on the trail. Additional fencing may also be necessary to keep livestock in the Preserve and out of the setback (see Section 5.4 and Figures 5-7 through 5-9**)**. The type of fencing required for livestock will be specified in the Preserve Management Plan.
- **Benches, shade structures, shade trees, and trash receptacles.** Benches, shade structures and trees, and trash receptacles will be allowed along trails in the Laguna Creek Wildlife Corridor. Planting of shade trees will be allowed at bench sites, if needed. Shade trees, benches, shade structures, and trash receptacles must be located on the outer edge of the trail farthest from the creek. Shade tree species must be native trees that are found in SSHCP Riparian land cover types (Chapter 3), and that can survive in the planted location without long-term irrigation or fertilization. Irrigation will be allowed for a maximum of 5 years to establish saplings. The Implementing Entity has the discretion to allow irrigation to continue past 5 years if extenuating circumstances necessitate it (e.g., during a drought) and the continuance of irrigation will not affect the waterway. Plantings in the Preserve Setback will not include invasive plant species listed on Cal-IPC's California Invasive Plant Inventory Database or listed on the Cal-IPC California Invasive Plant Watch List (see http://www.cal-ipc.org/paf/).
- **Crossings perpendicular to the stream**. Covered Activity crossings of new roads, bike or pedestrian trails, railroads, sewer lines, water lines, recycled water lines, or utility lines are allowed in the Laguna Creek Wildlife Corridor as long as they cross perpendicular to the stream. The Land Use Authority Permittees (County of Sacramento and City of Rancho Cordova) will ensure that Third-Party Project Proponents implementing the crossing correctly implement all applicable Conditions and AMMs for the aquatic land cover types (see Section 5.4).
- **Stream bank stabilization projects**. These include installation of in-stream structures for erosion control, as discussed in Section 5.2.1 (e.g., appropriate bio-engineering methods). Plan Permittees will review and approve stabilization designs to ensure that they will avoid and minimize impacts to the aquatic land cover types.
- **Interpretive signs and kiosks.** Signs and kiosks are intended to educate trail users about the benefits of the SSHCP Preserve System, including specifics about the Laguna Creek Wildlife Corridor and the importance of the environmental resources that the Preserves are protecting. Safety and directional signs may also be installed. The construction, operation, and maintenance of these signs and kiosks are SSHCP Covered Activities covered by the SSHCP permits.

- **Riparian habitat re-establishment or establishment.** Re-establishment or establishment[13] of riparian vegetation in the Laguna Creek Wildlife Corridor may be desirable to minimize indirect effects of adjacent development or enhance stream water quality. As discussed in Chapter 9, vegetation re-establishment or establishment plans must be reviewed and approved by the Implementing Entity and Permitting Agencies prior to implementation.
- **Outfalls.** Construction and operation of outfall structures that allow the discharge of stormwater into a stream from adjacent urban development areas are allowed in the Laguna Creek Wildlife Corridor. The Land Use Authority Permittees will review and approve outfall designs to ensure that they correctly apply all applicable design and construction AMMs.
- **Flood control structures and stormwater management**. As discussed in Section 5.2.1, Urban Development in the UDA, flood control and stormwater structures include, but are not limited to, detention basins, bio-retention swales, and water quality facilities that are designed to be compatible with the habitat and wildlife values of the Laguna Creek Wildlife Corridor. The Land Use Authority Permittees will review and approve designs to ensure that they include all appropriate SSHCP design and construction AMMs (refer to Section 5.4).

Nonconforming[14] Structures and Uses

Existing nonconforming structures and nonconforming uses of land may be located within the Laguna Creek Wildlife Corridor. Operation and maintenance of existing nonconforming structures or uses are not Covered Activities, but are allowable activities within the Laguna Creek Wildlife Corridor and are subject to the following requirements:

- Legally existing but nonconforming structures or uses may be continued.
- Existing impervious surfaces within Laguna Creek Wildlife Corridor that resulted from previous allowable disturbances or developments will not be expanded.
- If a legally existing but nonconforming use has been discontinued for more than 90 days, re-establishment will be prohibited by the appropriate Land Use Authority Permittee.

Existing Septic Systems

Subsurface sewage disposal systems that currently exist within the Laguna Creek Wildlife Corridor are not Covered Activities but will be "grandfathered" and allowed to remain in the

[13] In the context of this Plan, the word "establish" is synonymous with "create."

[14] Nonconforming structures or uses lawfully existed before an amendment to a local land use authority made the structure or use non-conforming.

Laguna Creek Wildlife Corridor once the corridor is established. Parcels already entitled for installation of subsurface sewage disposal systems at the time of permit issuance will be allowed such systems within the Laguna Creek Wildlife Corridor. Operation, maintenance, and replacement of existing and entitled subsurface sewage disposal systems are not Covered Activities but will be allowed within the Laguna Creek Wildlife Corridor.

Wildlife Corridor Management and Monitoring

Future land management, monitoring, habitat enhancement, habitat re-establishment, and maintenance activities in the Laguna Creek Wildlife Corridor have some potential to adversely affect Covered Species habitats and individuals. For that reason, Conservation Actions in the wildlife corridor are also SSHCP Covered Activities and are covered by the SSHCP permits. The SSHCP Implementing Entity will oversee implementation of Covered Activities in the wildlife corridor, including management and monitoring.

Management and monitoring actions that will be used in the Laguna Creek Wildlife Corridor are the same as those that will be used in the SSHCP Preserve System and are described in detail in Chapter 8, SSHCP Monitoring and Management Programs. A Preserve Management Plan will be developed for the Laguna Creek Wildlife Corridor (see Chapter 8). Management, monitoring, and maintenance Covered Activities may include, but are not limited to, the following:

- Demolition or removal of structures or roads to enhance or re-establish habitat.
- Remediation of hazardous materials such as soil remediation and cleanup of illegal dumping.
- Preserve vegetation management, including livestock grazing, mowing, manual labor, and prescribed burns. See additional information under "Pesticide Use for Land Management,"[15] below.
- Vehicle and pedestrian travel on trails, including by all-terrain vehicles or trucks, for purposes such as inspecting and maintaining facilities, moving and managing livestock, and patrolling.
- Use of mechanized equipment for construction, maintenance, and resource management projects in the Preserve System.
- Restoration of historical hydrologic conditions through installation of pumps, creation of berms, creation of channels and ditches, creation of swales, and demolition or removal of preexisting structures or roads.
- Installation and repair of fencing.

[15] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided pesticide application is otherwise legal and the application conforms to all restrictions in Section 5.4.

- Construction, rehabilitation, and maintenance of facilities (e.g., pens, corrals, gates, feed storage, and water storage) to support livestock grazing as a Covered Species management tool.
- Actions to control non-native species (e.g., feral cats and dogs, red fox, non-native fish, bullfrogs).
- Actions to enhance or re-establish species habitat. See additional information under "Habitat Enhancement, Re-Establishment, and Establishment," below.
- Modification and use of structures existing at the time of property acquisition for uses related to Preserve management or public education.
- Species and habitat surveys and monitoring. See additional information under "Species Surveys, Monitoring, Research, and Adaptive Management Activities," below.

Habitat Enhancement, Re-Establishment, and Establishment

Activities to enhance, re-establish, or establish species habitat may result in temporary and permanent effects to Covered Species. Enhancement is modifying an existing habitat to better suit species' needs. Enhancement actions may involve, but are not limited to, improving the hydrologic regime of a site to benefit Covered Species; managing vegetation; installing perching poles; and providing bat houses, burrows, or other nesting/roosting improvements. The types and amounts of habitat enhancement planned in the Laguna Creek Wildlife Corridor are discussed in Chapter 7.

Habitat re-establishment is defined as restoring species habitat where it previously existed but has been degraded or removed. Habitat establishment (creation) involves establishing species habitat in new sites where it historically did not exist. Of these two, the SSHCP Conservation Strategy (Chapter 7) emphasizes habitat re-establishment. However, because of incomplete information about the precise historical locations of some habitats, habitat creation is included in the SSHCP Conservation Strategy (see Chapter 7). All activities related to habitat re-establishment and habitat establishment are SSHCP Covered Activities. Requirements for habitat re-establishment are discussed in detail in AMM RE-ESTABLISHMENT/ESTABSLISHMENT-1, AMM RE-ESTABLISHMENT/ESTABSLISHMENT-2, and Chapter 7. Habitat re-establishment and establishment generally include, but are not limited to, earth moving; regrading or recontouring a site; restoring the past hydrologic regime or creating a hydrologic regime; and seeding or planting herbaceous vegetation, trees, shrubs, grasses, or other vegetation. Habitat re-establishment and establishment will generally be disruptive in the short term because these activities may involve soil disturbance, removal of undesirable plants, and limited grading. All habitat restoration and creation is expected to result in a net long-term benefit for Covered Species and natural communities. However, these activities

may have temporary or short-term adverse effects and may result in limited take of Covered Species (see Chapter 6).

Species Surveys, Monitoring, Research, and Adaptive Management Activities

Species surveys will be conducted in the Laguna Creek Wildlife Corridor. Preserve surveys will be conducted regularly as part of the SSHCP monitoring and adaptive management program (Chapter 8). These surveys may require that Covered Species are handled, marked, measured, and inspected, which may result in species take under ESA or CESA. Surveys for all Covered Species will be conducted by approved biologists, as defined in Chapters 7 and 8. Research conducted in support of the SSHCP is a Covered Activity when implemented in accordance with the SSHCP Conservation Strategy (see Chapter 7).

Species monitoring activities may include, but are not limited to, surveys for Covered Species. Surveys will use the most current species-specific survey methodology and protocols. Habitat monitoring may include establishing and walking line transects or quadrants. Monitoring, land management, and research activities that require handling listed species (e.g., translocating, banding, marking, measuring physical features) will be supervised by Wildlife Agencies–approved biologists with valid ESA Section 10(a)(1)(A) permits and/or state Scientific Collecting Permit that covers the specific activity and the specific species.

SSHCP Preserves, including the Laguna Creek Wildlife Corridor, will be managed by the SSHCP Implementing Entity using standard monitoring and adaptive management principles under which species and land management actions will be adjusted in response to monitoring data collected as part of the SSHCP Monitoring Plan (see Chapter 8). In managing the Laguna Creek Wildlife Corridor, habitat management research or experiments may be undertaken for the benefit of Covered Species. Adaptive management research trials or pilot studies conducted on SSHCP Preserves and Preserve Setbacks may require manipulation or intensive management of habitat. Examples include implementing new grazing regimes with different animals, varying restoration techniques, and other experimental operations.

These types of Preserve research and adaptive management activities are SSHCP Covered Activities covered by the SSHCP permits. These activities are intended to aid in the conservation of Covered Species, although they may adversely affect a small number of individuals. The intent of the research and adaptive management Covered Activities is to promote more informed and effective management of the SSHCP Preserve System to meet the stated SSHCP Biological Goals and Measurable Objectives (see Chapter 7).

Pesticide Use for Land Management

Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided the pesticide application is otherwise legal and the application conforms to all conditions in Section 5.4. Pesticide use for Preserve management, including in the Laguna Creek Wildlife Corridor, is covered under the CESA Incidental Take Permit, but not the ESA Incidental Take Permit. Pesticide use is allowed in Preserves only to achieve the SSHCP Biological Goals and Measurable Objectives (e.g., exotic plant or exotic animal control). Preserve Management Plans (see Chapter 8) will prescribe an integrated pesticide use process as a Preserve management tool, modeled after the California Department of Fish and Wildlife's pesticide use approval process (CDFW Forms 679 and 680). At a minimum, this will include compliance with pesticide label instructions and state and local laws. Use must also comply with existing injunctions related to the use of pesticides.

5.3 Activities and Actions Not Covered by the SSHCP Permits

The projects and activities listed below were considered but rejected for coverage under the SSHCP and SSHCP permits. Incidental take coverage for these activities, if needed, will require an amendment to the SSHCP and its permits, or require individually and independently acquired ITPs.

Agricultural Practices

All agricultural practices on public or private land inside or outside the UDA are not covered by the SSHCP permits unless such actions (1) occur on an SSHCP Preserve and are an SSHCP Covered Activity described in Section 5.2.7, SSHCP Preserve System Covered Activities, or (2) occur on a property under an SSHCP Conservation Easement and are an SSHCP Covered Activity described in Section 5.2.7.

Community of Rancho Murieta

The community of Rancho Murieta, which is within the County of Sacramento's Urban Service Boundary, is surrounded by, but not included in, the Plan Area (Figure 1-1). Projects and activities within the community of Rancho Murieta are not Covered Activities under the SSHCP permits.

Native American Tribal Lands

Projects and activities that occur on sovereign land owned or controlled by a recognized Native American tribe are not Covered Activities.

Agricultural-Residential Development Outside the UDA

Agricultural-residential development consists of homes on large lots from 2 to 10 acres that are generally not supported by municipal services such as sewer and water. Several agricultural-residential communities exist within the Plan Area outside the UDA. New agricultural-residential development located outside the UDA is not an SSHCP Covered Activity and is not covered by SSHCP permits. However, all development activities within the UDA, including agricultural-residential development within the UDA, are a Covered Activity and covered by the SSHCP permits.

Trail Systems Outside the UDA

Construction and operation of proposed trail systems outside the UDA (including the County of Sacramento's east county quarry trails) are not SSHCP Covered Activities and are not covered by the SSHCP permits. However, roadside community trails associated with any Rural Transportation Project Covered Activity described in Section 5.2.3 are SSHCP Covered Activities.

Airport Operations and Expansion Outside the UDA

Airport operations and expansions outside the UDA are not SSHCP Covered Activities and are not covered by the SSHCP permits. Due to Federal Aviation Administration regulations, the Sacramento County Airport System is compelled to actively discourage wildlife and wildlife attractants that are considered to be potentially hazardous to airport operations. Nothing within the SSHCP will preclude staff or agents of the Sacramento County Airport System from engaging in or conducting otherwise lawful wildlife abatement activities on properties owned by the Sacramento County Airport System.

Rural Infrastructure that Is Not Identified as a Covered Activity

New infrastructure projects (e.g., water supply, sewer, roadways) located outside the UDA are not covered by the SSHCP permits, unless the project is specifically identified in Section 5.2.3, Rural Transportation Projects, or Section 5.2.4, Recycled Water Projects.

Landfills

Construction of new landfills is not an SSHCP Covered Activity, and is not covered by the SSHCP permits. However, operation, maintenance, expansion, and decommissioning of existing landfills, as described in Section 5.2.1, is a Covered Activity.

Mining Outside of the UDA

Any current or future mining operations or mine reclamation projects located outside the UDA are not SSHCP Covered Activities and are not covered by the SSHCP permits.

Oil and Gas Extraction or Production

Any current or future construction, maintenance, or operations for oil and gas extraction or production in the Plan Area is not an SSHCP Covered Activity and is not covered by the SSHCP permits.

Projects Related to the Cosumnes River

Any alteration to, damming of, or new levee system on the Cosumnes River or other river within the Plan Area is not an SSHCP Covered Activity and is not covered by the SSHCP permits.

Projects Permitted in Advance of the SSHCP

There are development project sites within the Plan Area that already hold permits from the Permitting Agencies. Projects on these sites will follow their existing permit requirements. These permitted projects are not covered by the SSHCP permits.

Existing or Planned Preserves Not Under SSHCP Management

Land management and Preserve maintenance activities on existing Preserves inside and outside the UDA, as described in Chapter 3 and shown in Figure 3-40, are not under the jurisdiction of the SSHCP Plan Permittees and cannot be covered by the SSHCP permits.

Mitigation and Conservation Banking Operations

Permitted mitigation banks and permitted conservation banks are present inside the Plan Area (see Chapter 3 and Figure 3-40). As discussed in Chapter 9, these existing mitigation and conservation banks might be used by the Implementing Entity to meet certain Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy. However, the establishment of new management and operation of existing mitigation and conservation banks is not an SSHCP Covered Activity and is not covered by the SSHCP permits. Mitigation banks and conservation banks will continue to be operated and managed under their own agreements and permits from the Permitting Agencies.

Pesticide Use

Species take resulting from pesticide use in the Plan Area is not covered by the ESA Incidental Take Permit. However, limited pesticide use is covered by the CESA Incidental Take Permit for roadside ditch maintenance, stormwater channel maintenance, and SSHCP Preserve management. If the Implementing Entity determines that pesticide use is appropriate on an SSHCP Preserve parcel, it will include that allowance within a proposed Preserve Management Plan. The Preserve Management Plan is subject to review and approval by the Technical

Advisory Committee, which would include members from the environmental community and wildlife agencies (see Section 9.3.4, Technical Advisory Committee/Interagency Review Team). The Implementing Entity expects the use of pesticides will not be warranted or allowed on most SSHCP Preserves. However, to maintain a pool of willing sellers of conservation easements on agricultural lands, the Plan cannot completely prohibit their use within the SSHCP Preserve System. If the Technical Advisory Committee approves a Preserve Management Plan that includes the use of pesticides, the use would be subject to limitations in the Preserve Management on timing and area of application, amounts to be used, and acceptable pesticides. If appropriate, those restrictions could be incorporated into the conservation easement (Section 9.4.3).

Dam Construction or Removal

Dam construction, removal, or maintenance projects are not SSHCP Covered Activities and are not covered by the SSHCP permits.

Water Diversion

New water diversions or operation and maintenance of existing water diversions are not SSHCP Covered Activities and are not covered under the SSHCP permits.

Wind Energy

Construction and operation of wind turbines and other wind energy infrastructure are not SSHCP Covered Activities and are covered under the SSHCP permits.

Power Lines Outside the UDA

The SSHCP permits do not cover construction, operation, and maintenance of power lines located outside the UDA, with the exception of electrical distribution lines needed to support Preserve operation and management.

Emergency, Safety, and Police Services

Law enforcement, medical, rescue, firefighting, and other emergency service providers will be allowed access to SSHCP Preserves to carry out operations necessary for the health, safety, and welfare of the public. However, these operations are not under the control of any SSHCP Plan Permittee and, therefore, cannot be SSHCP Covered Activities.

Existing public infrastructure and utility facilities are currently located in areas anticipated to be incorporated into the SSHCP Preserve System. Emergency repairs may be required to public infrastructure facilities and utilities located on Preserves as necessary for the health, safety, and

welfare of the public. Although access to the Preserves will be allowed by the Implementing Entity and Wildlife Agencies, these emergency repairs are not covered by SSHCP permits.

The Permitting Agencies will not obstruct any emergency response decisions regarding Preserves made by the Implementing Entity. However, existing ESA consultation regulations will apply to all emergency activities (50 Code of Federal Regulations 402.05).

5.4 Conditions on Covered Activities

As required by the ESA (Section 10(a)(2)(A)(ii)) and Fish and Game Code Section 2081, this Plan includes measures to avoid and minimize take of Covered Species. This section describes the Avoidance and Minimization Measures that will be implemented as part of each SSHCP Covered Activity to avoid or minimize direct and indirect impacts to Covered Species and their habitats to the maximum extent, including species habitats that are also waters of the state and waters of the United States. AMMs are presented in this chapter as conditions on Covered Activities. Each condition contains several AMMs that are intended to eliminate or reduce direct or indirect effects to species that could result from implementation of a Covered Activity.

Third-Party Project Proponents are responsible for incorporating all SSHCP requirements (including appropriate AMMs) into their project design. The Land Use Authority Permittee with authority over a Covered Activity is responsible for reviewing and ensuring that all applicable AMMs are appropriately incorporated into project design, and is responsible for ensuring that the required AMMs are correctly applied by the Third-Party Project Proponent during implementation of the Covered Activity.

The CEQA process for individual Covered Activities may result in additional conditions for third-party projects that are not related to the ESA, CESA, or Clean Water Act. The SSHCP AMMs described in this chapter do not supersede requirements by other agencies and are not intended to provide a basis for non-compliance with other applicable design guidelines and avoidance measures required by federal, state, and local agencies. Compliance with the SSHCP does constitute full CEQA compliance with regard to mitigation of impacts to Covered Species. Ultimately, the Plan Permittees are responsible for ensuring that implementation of each SSHCP Covered Activity fully complies with the SSHCP, but it remains the Third-Party Project Proponent's responsibility to ensure project compliance with all applicable laws and regulations.

Before construction begins, the Third-Party Project Proponent must demonstrate to the Land Use Authority Permittee that all necessary AMMs will be fulfilled. This is accomplished by having pre-construction AMMs in place prior to construction and by having a plan that shows how all applicable post-construction AMMs will be addressed. During construction, it is the responsibility of the Land Use Authority Permittee to ensure that the AMMs are being

implemented. The Land Use Authority Permittee can compel a Third-Party Project Proponent to stop working if a project is not in compliance with all SSHCP AMMs.[16] Upon construction completion, the Land Use Authority Permittee will monitor and confirm that post-construction conditions are acceptable and consistent with the requirements of the SSHCP permits (e.g., revegetation, soil treatments).[17] Once the constructed project has received final clearance from the Land Use Authority, it is the responsibility of the Land Use Authority to monitor continued operation of installed AMMs (e.g., swales, retention basins) and to monitor compliance with AMMs required for future operations and maintenance of the Covered Activity. The Implementing Entity may also assist with and in some instances may assume responsibility for monitoring continued operation of installed AMMs when those AMMs are part of the Preserve System, Preserve Setbacks, or Stream Setbacks.

On occasion, a local Land Use Authority Permittee may not have authority over a Covered Activity proposed by a Third-Party Project Proponent. In that event, the SSHCP Implementing Entity may develop a Participating Special Entity agreement with the Third-Party Project Proponent (see Chapter 9). As a Participating Special Entity, the Third-Party Project Proponent will incorporate and implement all applicable design and construction AMMs. The Implementing Entity will ensure that AMMs specific to that SSHCP Covered Activity are included in the project's Participating Special Entity agreement and ensure that AMMs are being implemented during construction.

As the SSHCP will be implemented over a 50-year Permit Term, the results of construction monitoring may indicate that certain AMMs are ineffective. Should the Plan Permittees wish to modify or replace an SSHCP AMM, they will follow the modification process outlined in the Adaptive Management Program (see Chapter 8).

5.4.1 General Avoidance and Minimization Measures

General AMMs are designed to avoid or minimize effects of Covered Activities on SSHCP land cover types and Covered Species.

Condition 1. Avoid and Minimize Urban Development Impacts to Watershed Hydrology and Water Quality

National Pollution Discharge Elimination System permits are issued by the Regional Water Quality Control Board to jurisdictions in the region, including the jurisdictions that are also SSHCP Land Use Authority Permittees (i.e., County of Sacramento, and Cities of Rancho

[16] In a situation like this, the Local Land Use Authority Permittee will suspend one or more local permits (e.g., grading permit, building permit) until compliance with terms of all SSHCP requirements is demonstrated.

[17] Post-construction monitoring by the Land Use Authority Permittee could continue for several years.

Cordova and Galt). The National Pollution Discharge Elimination System permit is issued to each of the Land Use Authority Permittees every 5 years, and is referred to as the Municipal Separate Storm Sewer System (MS4) permit. MS4 permits contain specific design measures required for all projects constructed within the region. The Stormwater Quality Design Manual for the Sacramento and South Placer Regions (Stormwater Manual) outlines planning tools and requirements to reduce urban runoff from new development and redevelopment projects within the region (Sacramento Stormwater Quality Partnership 2007). The Stormwater Manual is used as a general guidance document to aid with the selection, siting, design, operation, and long-term maintenance of stormwater quality control measures. The Stormwater Manual contains control measures intended to meet the standard of "reducing pollutants in urban runoff to the maximum extent practicable" set forth in the local agencies' MS4 permits issued by the Central Valley Regional Water Quality Control Board. AMM LID-1 (see below) is designed to ensure compliance with MS4 requirements by requiring Third-Party Project Proponents to minimize increases of peak discharge of stormwater and to eliminate or reduce runoff of pollutants.

Development Covered Activities may adversely alter watershed hydrology and degrade water quality, which, in turn, could diminish or eliminate the conservation benefits provided by the SSHCP Preserve System. Condition 1 is designed to conserve and/or rehabilitate on-site natural creeks and streams. This condition will require the provision of BMPs and low-impact development (LID) drainage control measures to ensure that runoff from developed lands will closely mimic the pre-development hydrograph and retain most pre-development hydrologic functions. Condition 1 will accomplish the hydrograph and hydrologic objectives through application of the listed AMMs to all UDA Covered Activities that occur at the parcel, subdivision, or master plan scale.

LID-1 (Stormwater Quality): When the size of a Covered Activity project exceeds the thresholds established by the State Water Resources Control Board (SWRCB) (see the most recent Stormwater Quality Design Manual for the Sacramento and South Placer Regions, or future SWRCB-approved design manuals applicable to the Plan Area), incorporate stormwater management into site design to satisfy the requirements outlined in the most recent Stormwater Quality Design Manual for the Sacramento and South Placer Regions. Stormwater management may include groundwater recharge (LID-2) and natural site features (LID-3).

LID-2 (Groundwater Recharge): When siting SSHCP Preserves containing Riparian, Open Water, or Freshwater Marsh SSHCP land cover types, the Implementing Entity will prioritize locations that are suitable for groundwater recharge.

LID-3 (Natural Site Features): Incorporate preservation of a site's natural aquatic features (such as creeks and streams) into project design to retain natural hydrologic patterns and to retain habitat that might be used by Covered Species.

Condition 2. Avoid and Minimize Urban Development Direct and Indirect Impacts to Existing Preserves and SSHCP Preserves

Development Covered Activities adjacent to Preserves may adversely impact species that use the Preserve, and erode or eliminate the conservation benefits provided by the Preserve. Condition 2 seeks to avoid or minimize the following Covered Activity environmental stressors that may result in direct and indirect impacts to the SSHCP Preserve System:

- Alterations to landscape hydrology from new impervious surfaces may adversely affect natural communities in the lower watershed, the ecology of a Preserve, and/or downstream aquatic resources.
- Water runoff from development or from roadways directed into Preserves may introduce harmful substances into Preserves. Unseasonal and/or additional water entering a Preserve may eliminate vernal pools and other seasonal wetlands native to the region by converting them to low-functioning perennial wetlands.
- Development adjacent to Preserves may partially to fully remove the soil's "perched aquifer" (see Chapter 3) and reduce or eliminate the micro-watersheds that support the hydrology of vernal pools within the Preserve boundary. These changes may adversely affect the existing hydrologic regime of vernal pools by changing the timing, depth, and/or duration of vernal pool saturation and/or ponding, causing long-term changes to a suite of vernal pool functions. For example, changes to water chemistry could adversely affect species habitat. Although the vernal pools remain, the environmental conditions of the pools may no longer provide habitat for vernal pool Covered Species, or provide the benefit of other wetland functions (e.g., stormwater attenuation) compared to pre-project conditions.
- Introduction or proliferation of non-native or invasive plant and wildlife species may displace native species.
- Landscaping in the interface of a development and a Vernal Pool–Grassland Preserve often includes native or non-native trees and other plant species that are not found in California grasslands and, therefore, cannot survive on the Vernal Pool–Grassland Preserve border without intensive irrigation and cultivation. In addition to adverse effects from irrigation and landscape maintenance, adult trees may become landscape barriers that inhibit species movement and may act to isolate individual Preserves from the larger SSHCP Preserve System.
- Recreational use of Preserves near developed areas may compact soils, eliminate vegetation, impair hydrologic functions, introduce weeds or invasive plant species, and disturb plants and wildlife.

- Introduction of light, noise, or vibrations may disrupt normal nocturnal and diurnal cycles of native species.

AMMs associated with Condition 2 must be applied to all UDA Covered Activities that border an existing Preserve or planned SSHCP Preserve.

EDGE-1 (Compatible Land Uses): To the maximum extent practicable, development project Covered Activities will locate compatible land uses (e.g., designated open space such as parks and ball fields, detention basins, and other land uses with less-intensive human activity) in areas immediately adjacent to existing or planned Preserve boundaries. The compatible land use will provide additional buffering of Preserves from potential indirect effects of adjacent urban development. The soil surfaces in a compatible land use area may be re-contoured provided that the soil restrictive layer remains undamaged and most of the soil profile above the restrictive layer remains intact. The Land Use Authority will determine when it is not practicable to locate a compatible land use adjacent to existing or planned Preserve boundaries.

EDGE-2 (Single-Loaded Streets): To the maximum extent practicable, the design of Urban Development Covered Activities will locate single-loaded streets adjacent to existing or planned Preserve. The Land Use Authority will determine when single-loaded streets are not practicable.

EDGE-3 (Preserve Setbacks): Urban Development Covered Activities constructed adjacent to existing or planned Preserves must establish a minimum 50-foot-wide setback outward from the boundary of any existing Preserve or planned SSHCP Preserve. This minimum 50-foot-wide setback will function as a transition between Urban Development and the Preserve, and must be managed to maintain the natural community of vegetation present in the adjacent Preserve. As much of the setback as possible should remain in the same natural habitat as the Preserve.

However, as discussed in Section 5.2.5, Covered Activities in Preserve Setbacks in the UDA, where an existing or planned Preserve is adjacent to an existing roadway (e.g., collectors, arterials, thoroughfares), the 50-foot Preserve Setback will not be required, and any bicycle or pedestrian trail will be established in the road right-of-way. In addition, where a planned roadway crosses an existing or planned Preserve, no Preserve Setback will be required, and any bicycle or pedestrian trail will be established in the road right-of-way.

EDGE-3a (Setback Recreational Trails): Trails are best suited outside of the setback; however, certain types of recreational trails or facilities (e.g., benches, trash receptacles, shade structures, fencing) that can be constructed with minimum ground disturbance and in compliance with EDGE-7 may be allowed within a Preserve Setback, as specified in Section 5.2.5, Covered Activities in Preserve Setbacks in the UDA. Preserve Setback design must locate trails on the side nearest development, away from the Preserve boundary. Trails may be permeable or semi-permeable hiking trails or paved community trials. The maximum trail width will be 16 feet total, including 2-foot-wide shoulders. Post and cable fencing, split rail, or other open fencing will be installed adjacent to recreation trails to keep pedestrians on the trail.

EDGE-3b (Setback Firebreaks): If approved by the local authorities, the Preserve Setback trail may also be used as a firebreak. In instances where a trail cannot act as a firebreak, the firebreak will be located between the trail and the Preserve boundary (see Section 5.2.7). Firebreaks allowed inside the setbacks must be created by methods that will not disturb the soil's restrictive layer, such as mowing, minor scraping of surface vegetation, or shallow tilling, to comply with EDGE-7. Firebreak width within Preserve Setbacks is the minimum width needed to comply with applicable local codes.

EDGE-3c (Setback Shade Trees and Landscaping): To prevent potential impacts from irrigation water or from accumulation of leaf litter onto the grasslands or vernal pools of a Preserve, planting of shade trees or landscaping vegetation will be limited to the area of the Preserve Setback located between the recreation trail and the adjacent urban development (i.e., away from Preserves).

- Only drought-tolerant plant species will be planted. The planting pallet used for Preserve Setback landscaping will not include invasive plant species listed in the California Invasive Plant Council's (Cal-IPC) California Invasive Plant Inventory Database or listed in the Cal-IPC California Invasive Plant Watch List (see http://www.cal-ipc.org/paf/). Any shade trees planted along Preserve Setback trails will be native species that are found in California grasslands and that can survive in the Vernal Pool–Grassland border without long-term irrigation or fertilization (e.g., valley oak, black oak, blue oak, oracle oak). In general, no more than 30% of any 1,000-foot-long segment of a Preserve Setback trail will have canopy cover from tree plantings (to be consistent with maximum tree densities naturally found within native California grasslands and savanna).

- Drip irrigation will be allowed for a maximum of 5 years to establish shade trees or landscape vegetation between the recreation trail and adjacent urban development. The Implementing Entity has the discretion to allow irrigation to continue past 5 years if extenuating circumstances necessitate it (e.g., during a drought) and the continuance of irrigation will not affect the Preserve. Any irrigation systems located within Preserve Setbacks will be inspected quarterly to determine if such systems are affecting soils or vegetation not part of the intended plantings. Irrigation system repairs will be completed immediately if it is determined that the irrigation system is affecting vegetation or soil moisture not part of the intended tree planting.
- If, during annual monitoring of the adjacent Preserve (see Chapter 8), adverse indirect effects (e.g., leaf litter accumulation, irrigation runoff, plant encroachment) of the Preserve Setback's planted vegetation are detected, then the SSHCP Implementing Entity, the Preserve Manager, and the entity responsible for the Preserve Setback will identify appropriate adaptive management of the Preserve Setback tree or landscape plantings in accordance with the Preserve Setback Easement (see Section 5.2.5 and Chapter 9).

EDGE-4 (Locate Stormwater Control Outside Preserves): Roads, sidewalks, and other impermeable surfaces of Urban Development Covered Activities adjacent to existing or planned Preserves will slope away from Preserves and Preserve Setbacks or intercept drainage with swales or curbs and gutters to preclude drainage from entering Preserves and Preserve Setbacks. Stormwater flows must be directed away from Preserves and Preserve Setbacks and directed into stormwater control facilities inside the development (outside Preserves and Preserve Setbacks)[18] (see EDGE-6 for exception to EDGE-4 in certain SSHCP Linkage Preserves).

EDGE-5 (Stormwater Control in Preserve Setbacks): If trails are established in any Preserve Setback in compliance with EDGE-3, the trail must be sloped away from the Preserve, and rainwater leaving the trail surface must flow into an adjacent low-velocity bio-retention swale or cell to keep rainwater runoff and trail contaminants from entering the Preserve. Low-velocity bio-retention swales or cells are typically small linear features placed on one or both sides of a trail. As required by EDGE-3, trails and their adjacent bio-retention swales or cells must be located on the side of the Preserve Setback nearest development.

[18] Detention basins are allowed in some Linkage Preserves consistent with the requirements of EDGE-6. At the time of SSHCP preparation, seven Linkage Preserves with drainages are planned SSHCP Preserves: L1, L2, L4, L7, L8, L9, and L10 (see Section 5.2.7 and Section 7.5). Also see project-specific measures in Section 5.5.1.

EDGE-6 (Detention Basins in Linkage Preserves): Because planned SSHCP Linkage Preserves L1, L2, L4, L7, L8, L9, and L10 (see Section 7.5) surround natural creeks or streams that must receive stormwater from planned adjacent Urban Development Covered Activities, a limited number of stormwater detention basins will be allowed on those Linkage Preserves. Detention basins within Linkage Preserves (see Section 5.2.7) will be designed and constructed with fill material to build up the perimeter of the detention basin so as not to impact the soil restrictive layer (duripan or hardpan) and function of the soil perched aquifer. Detention basins within Linkage Preserves will capture stormwater flows and runoff, and will discharge water to the stream/creek or percolate collected water to the soil perched aquifer. Detention basin structures that collect stormwater entering the basin or convey stormwater leaving the basin must be designed to avoid and minimize effects to Covered Species habitat in the Linkage Preserve.

EDGE-7 (Hardpan/Duripan Protection): To protect the soil perched aquifer and the micro-watersheds supporting existing vernal pool hydrology, activities that have the potential to cut into, disrupt, or remove the soil's restrictive layer (hardpan or duripan) will not occur within Preserves or Preserve Setbacks. However, in certain circumstances, the Covered Activities defined in Section 5.2.6, Covered Activities in Stream Setbacks in the UDA, and Section 5.2.8, Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System, may result in punctures[19] or other minor disruptions of the soil hardpan or duripan if approved by the Implementing Entity and the Technical Advisory Committee according to the process described in Chapter 9 of the SSHCP. If a Covered Activity on a Preserve or Preserve Setback results in a puncture or other disruption to the soil hardpan or duripan, the puncture will be sealed using bentonite clay or other material that maintains the functionality of the soil's restrictive layer and associated perched aquifer.

EDGE-8 (Outdoor Lighting): All outdoor lighting in Urban Development Covered Activity projects will be designed to minimize light pollution into existing and planned Preserves, except where a Land Use Authority Permittee determines lighting is necessary for public safety or security. Minimization measures may include light fixture placement (e.g., as low to the ground as possible), lamp designs (e.g., shielding, low glare, or no lighting), directing light away from Preserves, or other means to avoid or minimize light pollution. The Third-Party Project Proponent will use the best information available at the time of project design to minimize effects of light pollution on target SSHCP Covered Species (e.g., western spadefoot (*Spea*

[19] Punctures may include small holes that penetrate the soil hardpan or duripan such as might occur when digging or drilling holes for the installation of fence posts, sign posts, or trees.

hammondii), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), and Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i)).

EDGE-9 (Livestock Access to Preserves): Urban Development Covered Activity projects that include on-site Preserves will include in their design an adequate number of access points and facilities for delivery and pick up of grazing animals (livestock), such that these activities will not significantly alter the Preserve's habitat and are consistent with the protection of livestock and protection of adjacent public property, and include adequate public safety measures.

EDGE-10 (Prevent Invasive Species Spread): Completed Covered Activities (including roads) will be maintained in a manner that avoids the spread of invasive species into Preserve and Open Space areas. Such maintenance measures will include the following:

- To prevent the transport of non-native invasive species onto Preserves, before bringing any equipment onto an SSHCP Preserve or Preserve Setback, equipment must be cleaned of mud, dirt, and plant material. Cleaning will occur in the infested area or another appropriate location as approved by a Plan Permittee.
- Mowing rotation will start in un-infested areas and move to infested areas.
- Invasive plant prevention techniques will be incorporated into maintenance plans.
- The SSHCP Implementing Entity will survey road shoulders, ditches, and rights-of-way that border SSHCP Preserves for invasive weeds or other exotic plant species. Where roadside weed infestations have reached a critical control point, the Implementing Entity or Land Use Authority Permittee will apply the appropriate manual, mechanical, or chemical treatment.

Condition 3. Implement Construction Best Management Practices

AMMs associated with Condition 3 must be applied to all UDA Covered Activities.

BMP-1 (Construction Fencing): Orange construction fencing will be installed to ensure that ground disturbance does not extend beyond the allowed construction footprint (i.e., the limit of project construction plus equipment staging areas and access roads). Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will mark the outer boundary of any Preserve Setback or Stream Setback adjacent to or within the project site with orange construction fencing prior to ground disturbance. This fencing will remain in place until project completion, as identified by the Plan Permittee.

BMP-2 (Erosion Control): Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will install temporary control measures for sediment, stormwater, and pollutant runoff as required by the Plan Permittee to protect water quality and species habitat. Silt fencing or other appropriate sediment control device(s) will be installed downslope of any Covered Activity that disturbs soils.

Fiber rolls and seed mixtures used for erosion control will be certified as free of viable noxious weed seed. As discussed in Section 5.4.2, Covered Species Take Avoidance and Minimization Measures, erosion controls installed in or adjacent to Plan Area modeled habitat for giant gartersnake (*Thamnophis gigas*), western pond turtle (*Actinemys marmorata*), California tiger salamander (*California tiger salamander*), or western spadefoot (see Chapter 3) must be of appropriate design and materials that will not entrap the species (e.g., not contain mesh netting). Regular monitoring and maintenance of the project's erosion control measures will be conducted until project completion to ensure effective operation of erosion control measures.

BMP-3 (Equipment Storage and Fueling): Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will ensure that equipment storage and staging will occur in the development footprint only (not sited in any existing on-site Preserve, planned on-site Preserve, Preserve Setback, Stream Setback, or aquatic land cover type). Fuel storage and equipment fueling will occur away from waterways, stream channels, stream banks, and other environmentally sensitive areas within the development footprint.

However, certain equipment storage and fueling activities can be allowed on Preserves within habitat re-establishment/establishment sites (refer to Section 5.2.7) if no location outside of the site is available. If a Covered Activity results in a spill of fuel, hydraulic fluid, lubricants, or other petroleum products, the spill will be absorbed and waste disposed of in a manner to prevent pollutants from entering a waterway, Preserve, Preserve Setback, or Stream Setback.

BMP-4 (Erodible Materials): Plan Permittees and Third-Party Project Proponents implementing Covered Activities must not deposit erodible materials into waterways. Vegetation clippings, brush, loose soils, or other debris material will not be stockpiled within stream channels or on adjacent banks. Erodible material must be disposed of such that it cannot enter a waterway, Preserve, Preserve Setback, Stream Setback, or aquatic land cover type. If water and sludge must be pumped from a subdrain or other structure, the material will be conveyed to a temporary settling basin to prevent sediment from entering a waterway.

BMP-5 (Dust Control): Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will water active construction sites regularly, if warranted, to avoid or minimize impacts from construction dust on adjacent vegetation and wildlife habitats. No surface water will be used from aquatic land covers; water will be obtained from a municipal source or existing groundwater well.

BMP-6 (Construction Lighting): Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will direct all temporary construction lighting (e.g., lighting used for security or nighttime equipment maintenance) away from adjacent natural habitats, and particularly Riparian and Wetland habitats and wildlife movement areas.

BMP-7 (Biological Monitor): If a Covered Activity includes ground disturbance within Covered Species modeled habitat, an approved biologist will be on site during the period of ground disturbance, and may need to be on site during other construction activities depending on the Covered Species affected. After ground-disturbing project activities are complete, the approved biologist will train an individual to act as the on-site construction monitor for the remainder of construction, with the concurrence of the Permitting Agencies. The on-site monitor will attend the training described in BMP-8. The approved biologist and the on-site monitor will have oversight over implementation of Avoidance and Minimization Measures, and will have the authority to stop activities if any of the requirements associated with those measures are not met. If the monitor requests that work be stopped, the Wildlife Agencies will be notified within one working day by email. The approved biologist and/or on-site monitor will record all observations of listed species on California Natural Diversity Database field sheets and submit them to the California Department of Fish and Wildlife. The approved biologist or on-site monitor will be the contact source for any employee or contractor who might inadvertently kill or injure a Covered Species or who finds a dead, injured or entrapped individual. The approved biologist and on-site monitor's names and telephone numbers will be provided to the Wildlife Agencies prior to the initiation of ground-disturbing activities. Refer to species-specific measures for details on requirements for biological monitors.

BMP-8 (Training of Construction Staff): A mandatory Worker Environmental Awareness Program will be conducted by an approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The training will include how to identify Covered Species that might enter the construction site, relevant life history information and habitats, SSHCP and

statutory requirements and the consequences of non-compliance, the boundaries of the construction area and permitted disturbance zones, litter control training (SPECIES-2), and appropriate protocols if a Covered Species is encountered. Supporting materials containing training information will be prepared and distributed by the approved biologist. When necessary, training and supporting materials will also be provided in Spanish. Upon completion of training, construction personnel will sign a form stating that they attended the training and understand all of the Avoidance and Minimization Measures. Written documentation of the training must be submitted to the Implementing Entity within 30 days of completion of the training, and the Implementing Entity will provide this information to the Wildlife Agencies.

BMP-9 (Soil Compaction): After construction is complete, all temporarily disturbed areas will be restored similar to pre-project conditions, including impacts relating to soil compaction, water infiltration capacity, and soil hydrologic characteristics.

BMP-10 (Revegetation): Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will revegetate any cut-and-fill slopes with native or existing non-invasive, non-native plants (e.g., non-native grasses) suitable for the altered soil conditions and in compliance with EDGE-2 and EDGE-8, if applicable.

BMP-11 (Speed Limit): Project-related vehicles will observe the posted speed limits on paved roads and a 10-mile-per-hour speed limit on unpaved roads and during travel in project areas. Construction crews will be given weekly tailgate instruction to travel only on designated and marked existing, cross-country, and project-only roads.

Condition 4. Avoid and Minimize Impacts that May Result from Implementation of Covered Transportation Projects

Urban Development transportation project and Rural Transportation Project Covered Activities, including bridge projects, can affect Covered Species. AMMs included for Condition 4 seek to avoid or minimize direct and indirect impacts that may result from construction of roadways or roadway improvements. Condition 4 applies to all transportation-related Covered Activities (see Sections 5.2.1 and 5.2.3).

Plan Permittees and Third-Party Project Proponents implementing Urban Development transportation or Rural Transportation Project Covered Activities must comply with the roadway siting, design, and construction AMMs described below.

ROAD-1 (Road Project Location): Road projects will be located in the least environmentally sensitive area to avoid, to the maximum extent practicable, impacts on Covered Species, Covered Species habitat, and waters of the United States. Road project alignments will follow existing roads, road easements, and rights-of-way, or be sited in disturbed areas to minimize habitat loss and additional habitat fragmentation.

ROAD-2 (Wildlife Crossing Structures): Road projects that are Urban Development Covered Activities (see Section 5.2.1) (including the Capital Southeast Connector, see Section 5.2.1.1) or are Rural Transportation Covered Activities (see Section 5.2.3) will include an adequate number of wildlife crossing structures, as depicted in Figure 5-10. An adequate number of wildlife crossing structures within the Urban Development Area (UDA) and outside the UDA will provide for continued dispersal and movement of native wildlife throughout the SSHCP Plan Area, as required by the SSHCP Biological Goals and Objectives (see Chapter 7).

The Plan defines "wildlife crossing structure" as a physical structure specifically designed or retrofitted to facilitate undercrossing for target wildlife species. The Plan further classifies wildlife crossings as hydrologic crossings and dry crossings. Hydrologic crossings are built where there is an existing stream, creek, or intermittent drainage to maintain existing hydrologic connectivity within the Plan Area. As described below, hydrologic crossings require specialized features to be built into the crossing structure, such as elevated platforms to allow wildlife to pass under a crossing structure when it is inundated with water. Dry wildlife crossings are built where there is no hydrologic feature but where a crossing is needed to provide for overland connectivity. SSHCP wildlife crossing structures may include structures such as bridges, arches, or box and pipe culverts.

Plan Permittees expect that future wildlife movement and dispersal within the UDA will occur almost entirely within the boundaries of the future interconnected SSHCP Preserve System (see Section 7.5). Therefore, wildlife crossings are needed wherever a roadway crosses (bisects) the conceptual SSHCP Preserve System (see Figure 5-10). Wildlife crossing structures inside the UDA will be sized to accommodate movement of a highly mobile native indicator species (i.e., coyote (*Canis latrans*)). By designing UDA wildlife crossing structures to meet the movement and dispersal requirements of coyote, the Plan Permittees anticipate that the crossing structure will also accommodate most native wildlife species that currently occupy the UDA (see Chapter 3).

The Plan Permittees expect that most of the Plan Area outside of the UDA will remain as Open Space over the 50-year Permit Term (see Chapter 4). Therefore,

the Plan Permittees expect that the Rural Transportation Project Covered Activities proposed outside the UDA will have a relatively small effect on the movement and dispersal of larger or more mobile native wildlife species, including coyote. Consequently, the Plan Permittees anticipate that the design of Rural Transportation Project Covered Activities outside the UDA will need to include wildlife crossing structures primarily where the Rural Transportation Project Covered Activities occur within California tiger salamander modeled habitat (see CTS-3 and also Chapter 3, Figure 3-16).

The design and location of wildlife crossing structures both inside the UDA and outside the UDA will be determined by collaboration between the Third-Party Project Proponent, the Land Use Authority, and the Implementing Entity. Crossing design will use the best available scientific and commercial information for the target species. The design of crossing structures will be based on demonstrated effectiveness of design for the target species when such information is available, or will be designed with a high level of certainty of success based on studies of similar taxa in similar environmental settings. The proposed wildlife crossing structures designs will be reviewed and approved by the Implementing Entity prior to final design.

The Implementing Entity will develop a Wildlife Crossing Maintenance Manual to be provided to the entity responsible for maintaining the wildlife crossing. The Wildlife Crossing Maintenance Manual will identify vegetation management, clearing of obstructions, and other techniques to maintain the desired movement and hydrologic connectivity, and to avoid effects to adjacent Preserves.

All SSHCP wildlife crossing structures in the UDA will include the following design elements:

- Open-bottom bridges or arches where the roadway crosses a river or stream. Where an open-bottom bridge or arch is used, the span of the crossing will be at least 1.2 times the bankfull width of the stream and span the banks to allow for dry wildlife passage along each side of the stream and to avoid or minimize piers or footings within the stream. (Bankfull width refers to the width of a stream channel at the point where over-bank flow begins during a flood event.)
- Any wildlife crossing structure that also maintains hydrologic connectivity will be designed to maintain pre-construction water capacity, depth, and velocity. The crossing structure will not restrict or impede normal flows or flood flows, unless a primary purpose of the structure is to manage such

flow(s). Wildlife crossing structures must be designed to provide a dry passage (e.g., a platform ledge) higher than flows for a 10-year storm event to allow wildlife to pass through an inundated crossing structure.

- Wildlife crossing structures in the UDA will be designed and sized to accommodate movement of at least medium-sized mammals (e.g., coyote). The opening must be at least 3 feet high and the crossing structure must have a minimum openness ratio of at least 0.4.
- Vegetation leading up to the entrance of a crossing structure and the substrate leading into and within the crossing structure will be natural and appropriate to provide for continuity of habitat, attract the target animal species for which the crossing is designed, and facilitate use of the crossing structure.
- A wildlife crossing under six-lane roads or larger will be designed to provide ambient light and temperature in the longer crossing structures (e.g., either by providing a larger opening or a grate at the top of the structure to improve the attractiveness of the crossing to certain Covered Species and wildlife that may hesitate to cross through dark, confined structures or one with a temperature gradient (Jackson and Griffin 2000)). If a road is less than six lanes in width, these designs will be optional.
- Lighting will not be placed at or near the entrance of a wildlife crossing structure to maintain natural ambient light conditions at night and to increase chances of wildlife use. However, a Land Use Authority Permittees may allow lighting if necessary for human health or safety.

Outside the UDA, wildlife crossing structures may be required for California tiger salamander (refer to CTS-1), and could also be required for other native species.

ROAD-3 (Roadside Pesticide Use[20]): If pesticide use is necessary along roadsides, the appropriate SSHCP Permittee will ensure that the pesticide application strictly complies with the pesticide label and all other applicable federal, state, and local authorities pertaining to the use, safety, storage, disposal, and reporting of the pesticide. Where roadside weed infestations have reached a critical control point, the Implementing Entity or a Land Use Authority Permittee will apply the appropriate manual, mechanical, or chemical treatment. In addition, the Implementing Entity or appropriate Land Use Authority Permittee will post signs along road shoulders adjacent to sensitive areas that are within the SSHCP

[20] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided the pesticide application is otherwise legal and conforms to all conditions in Section 5.4.

Preserve System (e.g., California tiger salamander breeding ponds, endemic plant populations, vertebrates that rely on insects for part of their diet). The signs will identify pesticide use restrictions or other roadside maintenance restrictions.

Condition 5. Avoid and Minimize Impacts that Result from Public Use of Low-Impact Nature Trails in Preserves

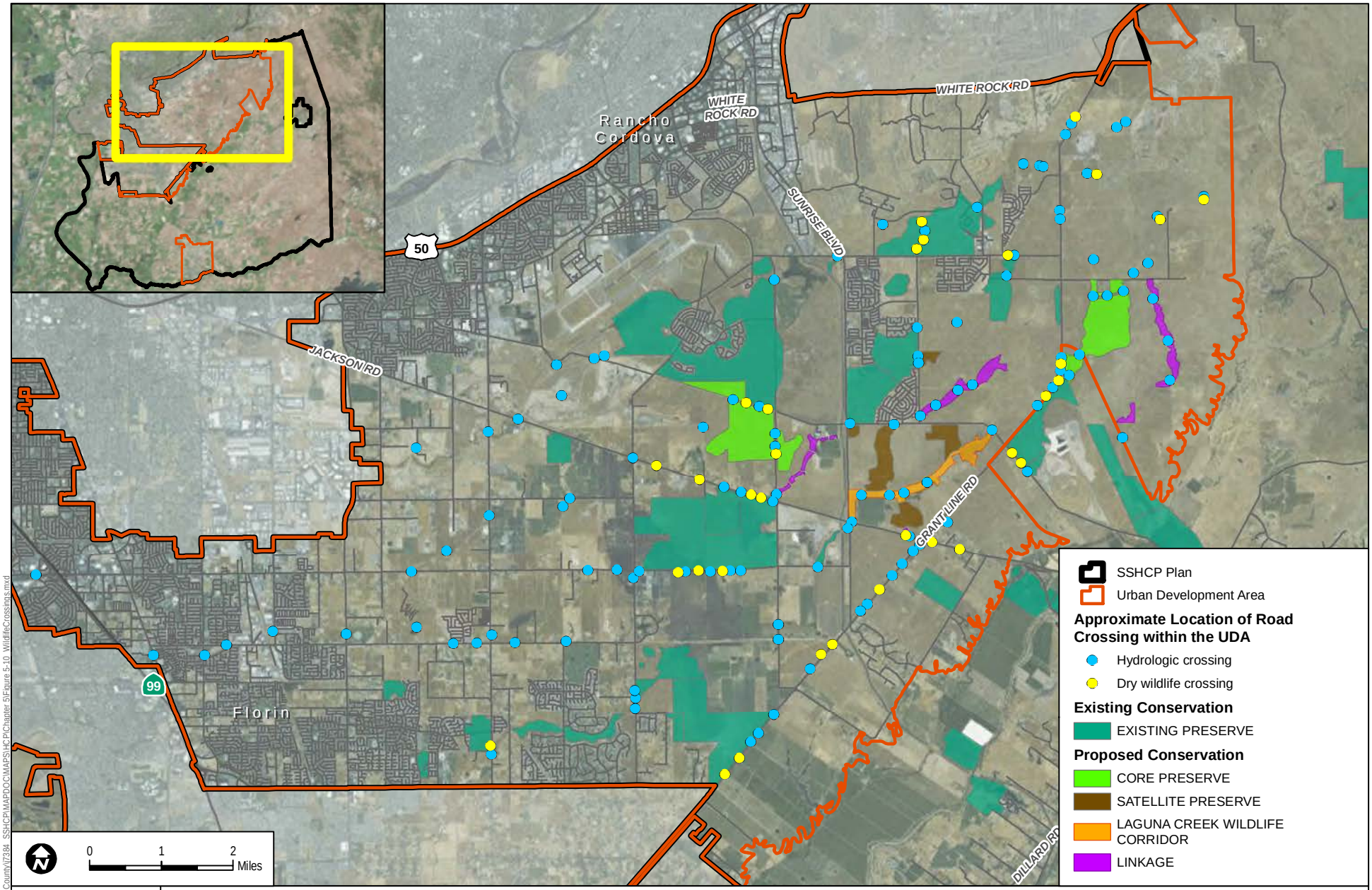
Preserves within the UDA are likely to be surrounded by urban development. As discussed in Section 5.2.7, allowing limited use of SSHCP Preserves will help to foster a sense of community ownership and will provide an opportunity to educate the community about the natural resources to be protected within the SSHCP Preserve System.

Low-impact nature trails will be designed following the AMMs outlined below.

NATURE TRAIL-1 (Nature Trail Plan): A nature trail plan must be prepared for each Preserve where a trail is allowed by the Preserve Management Plan. Nature trails will be unpaved trails that vary in width depending on terrain and existing constraints, but will never exceed 4 feet in width. Where a trail crosses a swale, wooden walkways elevated to a height no greater than 2 feet will be installed. Trail improvements may include mowing vegetation to create or maintain a trail, minor grading to remove trip hazards, and signs providing directional and educational information. Public access to land acquired for preservation will be prohibited until a trail plan can be prepared by the Implementing Entity and approved by the Permitting Agencies. A trail plan will include the following:

- Maps identifying areas that contain sensitive habitats or species occurrences.
- Maps that show the location and footprint of proposed trails.
- Methods used to control public access.
- Trail and use monitoring methods, schedules, and responsibilities.
- Trail operation and maintenance guidelines and responsibilities.
- Clear triggers for use restrictions or closure based on sensitive biological indicators (e.g., seasonal closures of some trails on the basis of activity periods of Covered Species or sensitive species).

NATURE TRAIL-2 (Nature Trail Protection of Duripan): Nature trails will be sited and constructed so as not to interfere with existing soil duripan and the perched aquifer that support the existing hydrologic regime of the Vernal Pool–Grassland, and will not interfere with existing pool hydrology. Trails within Preserves will not be paved.



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 5\Figure 5-10_WildlifeCrossings.mxd

SOURCE: ESRI, County of Sacramento 2014, USFWS 2015

FIGURE 5-10

Wildlife Crossings

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK

NATURE TRAIL-3 (Nature Trail Location): Nature trails will be located away from sensitive natural resources (e.g., vernal pools, riparian habitat, woodland habitat, Covered Species occurrences, raptor nesting sites, tricolored blackbird (*Agelaius tricolor*) colony sites). The Wildlife Agencies will determine the distance necessary to avoid impacts to sensitive natural resources.

NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design): Biological studies will be conducted within the area being considered for nature trail construction prior to project design. The studies will include land cover type mapping and focused species surveys and/or wetland delineations. The biological studies will include assessments of potential effects of trail construction on Preserve System resources, and recommendations for avoidance and minimization that may be incorporated into project siting, design, construction, and operation.

NATURE TRAIL-5 (Monitoring of Nature Trail Impacts): Impacts that could result from use of a nature trail within a Preserve will be monitored according to the Preserve Management Plan (Chapter 8) to ensure that uses do not conflict with the individual Preserve Management Plan. If use of a trail is found to conflict with the individual Preserve Management Plan, use of that trail will be discontinued until adjustments in the use can be made to reduce or eliminate conflicts. The Implementing Entity will make decisions about discontinuing or modifying use of a trail in consultation with the Preserve Manager or other applicable Preserve management agency or organization.

Condition 6. Avoid and Minimize Impacts When Re-Establishing or Establishing Wetlands

As discussed in Chapter 7, the Plan Permittees anticipate that 389 acres of Vernal Pool habitat will be re-established or established[21] within the Plan Area as part of the SSHCP Conservation Strategy. Although re-establishment or establishment of vernal pools is a Measurable Objective under this Plan, if not done correctly, the action could have an adverse impact on existing vernal pools.

RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool): Re-establish or establish Vernal Pool Wetland according to the following guidelines:

- Re-establishment will always take priority over establishment of vernal pools. Establishment will be permitted only after it has been determined that sites with the potential to re-establish vernal pools no longer exist in the Plan Area or cannot be acquired through a willing seller/buyer agreement.

[21] In the context of this Plan, "establish" is synonymous with "create."

- When possible, re-established or established sites will be located adjacent to an existing Preserve(s) to maximize connectivity and Preserve area.
- Re-establishment or establishment will not result in direct or indirect adverse impacts to the hydrologic regime of existing vernal pools. Vernal pool re-establishment or establishment actions will not remove more than 10% of any existing vernal pool watershed, as defined by the SSHCP LIDAR analysis (see Section 3.3 and Conservation Action VPI1.2 in Table 7.1).
- Vernal pool re-establishment will attempt to restore the historical density and range of vernal pool sizes to the maximum extent feasible using historical aerial photography of the site, if available. Where aerial photography of the site's historical conditions is not available, vernal pool re-establishment will include a range of pool sizes (area and depth) to accommodate the different habitat needs and life history characteristics of the vernal pool invertebrate Covered Species.
- Established vernal pools must be located on sites with vernal pool soils, defined as any Plan Area soil type where vernal pools currently exist.
- Established vernal pool sites will include a range of pool sizes to accommodate the different habitat needs and life history characteristics of the three vernal pool invertebrate Covered Species.
- The total density of vernal pools will not exceed 10% of the suitable soil areas in any vernal pool re-establishment and/or establishment site, unless it can be shown that the suitable areas of that site historically supported greater densities.
- Re-establishment or establishment may include inoculation when it is likely that no seed or cyst bank of vernal pool species remains at a site. Vernal Pool inocula will come from nearby vernal pools that are on the same geologic formation and soil type.

RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank): Vernal pool re-establishment or establishment may include "soil inoculation" when it is likely that no seed or cyst bank of vernal pool species remains at a re-establishment or establishment site.

- During conversion of Urban Development Area vernal pools to a developed land cover type, project proponents will excavate and retain soil from vernal pools following protocols developed by the SSHCP Technical Advisory Committee (Chapter 9).

- Inocula applied in re-established or established vernal pools must be harvested from a vernal pool that is on the same geologic formation and soil type shown on the County General Soil Map as the re-establishment/establishment site. Geologic formations and soil types will follow U.S. Department of Agriculture Soil Conservation Service's 1993 Soil Survey of Sacramento County, California. Proposed off-site inocula sources must be approved by the Wildlife Agencies.

RE-ESTABLISHMENT/ESTABLISHMENT-3 (Re-Establishment/Establishment of Freshwater Marsh or Open Water Near Airports): During review of proposed re-establishment/establishment projects for freshwater marsh or open water on SSHCP Preserves, the Implementing Entity shall consider the potential for the location of the re-establishment/establishment projects to increase the risk of wildlife strikes or generation of ground fog at airports. If a re-establishment/establishment project would result in (1) a net increase in open water or freshwater marsh acreage over baseline conditions[22] within 5 miles of Mather Field, Sacramento Executive Airport, or Franklin Field; or (2) replacement of open water/freshwater marsh habitat that is located 2 or more miles from Mather Field or Sacramento Executive Airport with open water/freshwater marsh habitat that is located less than 2 miles from those airports, a qualified biologist shall prepare a concise letter report. The letter report shall summarize the biologist's findings regarding (1) the species likely to use the re-established/established habitat, (2) a rough order of magnitude estimate on the peak number of birds that might use the re-established/established habitat, and (3) potential movement patterns for birds using the re-established/established habitat and whether they might cross through the airport safety zones (e.g., to reach foraging habitat or another wildlife attractant). The letter report will also provide recommendations to the Implementing Entity on how they could reduce any of the identified wildlife hazards if there are any feasible means to do so that would not conflict with the biological goals and measurable objectives of the Conservation Plan.

Condition 7. Avoid and Minimize Impacts to Streams and Creeks

AMMs associated with Condition 7 must be applied to all Covered Activities where a stream or creek is located within a project footprint.

[22] For purposes of establishing baseline conditions, Freshwater Marsh and Open Water acreages will be calculated using that version of the SSHCP Land Cover Type Map in existence as of the date that the SSHCP permit was issued to the Plan Permittees by the USFWS.

STREAM-1 (Laguna Creek Wildlife Corridor): A 150-foot setback measured from the top of the bank on both sides of the stream will be applied to Laguna Creek within the Urban Development Area (minimum 300-foot corridor width). If trails are located within the Laguna Creek Wildlife Corridor, the nearest edge of the trail will be located at least 80 feet from the top of the bank.

STREAM-2 (UDA Stream Setbacks): A 100-foot setback measured from the top of the bank on both sides of the stream channel will be applied to all streams listed in Table 5-1 (see also Figure 2-4). If a stream reach supports woody riparian vegetation, the setback will be equal to the riparian edge plus 25 feet or will be the setback defined above, whichever is greater. If trails are located within the Stream Setback, the nearest edge of the trail will be located at least 50 feet from the top of the bank.

Table 5-1
Stream Setback Minimum Requirements in the Urban Development Area

Stream	Minimum Setback (from the Top of Bank Measured in Aerial Perspective) on Both Sides of the Stream
Elder Creek	100 feet
Frye Creek	100 feet or as depicted as part of the NewBridge development project hardline Preserve (see Appendix K)
Gerber Creek	100 feet
Morrison Creek	100 feet
Central Paseo	100 feet or as depicted as part of the Cordova Hills development project hardline Preserve (Appendix K)
Sun Creek	100 feet or as depicted as part of the Sun Creek development project hardline Preserve (see Appendix K)

STREAM-3 (Minor Tributaries to UDA Streams): A 25-foot setback measured from the top of the bank on both sides of the stream channel will be applied to all avoided first and second order tributaries to the streams listed in Table 5-1 and Laguna Creek. Refer to Objective W6 in Chapter 7 (Table 7-1) regarding avoided first and second order tributaries. Trails are not permitted within headwater ephemeral Stream Setbacks.

STREAM-4 (Minimize Effects from Temporary Channel Re-Routing): When an Urban Development Covered Activity temporarily re-routes a stream, creek, or drainage, the re-routing will be completed in a manner that minimizes impacts to beneficial uses and habitat. The following measures will be employed to minimize disturbances that will adversely impact water quality:

- No equipment will be operated in areas of flowing or standing water.
- Construction materials and heavy equipment must be stored outside of the active flow of any waters.

- When work within waters is necessary, the entire stream flow will be diverted around the work area.
- In the event of rain, the disturbed in-water work area will be temporarily stabilized before water body flow exceeds the capacity of the diversion structure. The disturbed water body will be stabilized so that the disturbed areas will not come in contact with the flow.
- Once construction is complete, all project-introduced material (e.g., pipes, gravel, cofferdam, sandbags) must be removed, leaving the water as it was before construction. Excess materials will be disposed of at an appropriate disposal site.
- All work areas will be effectively isolated from stream flows using suitable control measures before commencement of any in-water work. The diverted stream flow will not be contaminated by construction activities. Structures for isolating the in-water work area and/or diverting the stream flow (e.g., cofferdam, geo-textile silt curtain) will not be removed until all disturbed areas are cleaned and stabilized.
- Any flow diversion used during construction will be designed in a manner to prevent pollution and minimize siltation, and will provide flows to downstream reaches. Flows will be maintained to support existing aquatic life, riparian wetlands, and habitat that may be located upstream and downstream from any temporary diversion.
- All surface waters, including ponded waters, will be diverted away from areas undergoing grading, construction, excavation, vegetation removal, and/or any other activity that may result in a discharge to waters.
- All temporary dewatering methods will be designed to have the minimum necessary impacts to waters to isolate the immediate work area. All dewatering methods will be installed such that natural flow is maintained upstream and downstream of the diversion area. Any temporary dams and diversions will be installed such that the diversion does not cause sedimentation, siltation, or erosion upstream or downstream of the diversion area. All dewatering methods will be removed immediately upon completion of diversion activities.
- A method of containment must be used below any bridge, boardwalk, and/or temporary crossing to prevent debris from falling into the waters through the entire duration of a project.

- If temporary surface water diversions and/or dewatering are anticipated, the Third-Party Project Proponent will develop and maintain on site a surface water diversion and/or dewatering plan. The plan(s) must be developed prior to initiation of any water diversions and will include the proposed method and duration of diversion activities. The plan(s) must be made available to Central Valley Water Board staff upon request.
- When work in a flowing stream is unavoidable and any dam or other artificial obstruction is being constructed, maintained, or placed in operation, sufficient water will be allowed at all times to pass downstream to maintain beneficial uses of waters below the dam. Construction, dewatering, and removal of temporary cofferdams will not violate the turbidity, settle-able matter, pH, temperature, or dissolved oxygen requirements of any Water Quality Control Plan.
- Any temporary dam or other artificial obstruction will only be built from clean materials such as sandbags, gravel bags, water dams, or clean/washed gravel that will cause little or no siltation. Stream flow will be temporarily diverted using gravity flow through temporary culverts or pipes, or pumped around the work site with the use of hoses.

STREAM-5 (Design for Stream Channel Re-Routing, Widening, or Deepening): When an Urban Development Covered Activity alters a stream, creek, or drainage by re-routing, widening, or deepening a channel, the project design will include the following:

- The main channel of a re-routed channel will be free to migrate laterally over its active and terrace floodplain.
- Channel geometry (plan, profile, and cross-section) of the site will be appropriate for the watershed location and physical/hydrologic condition.
- Local, native materials will be used as fill material to the extent practicable.
- Bioengineering techniques will be used for construction and maintenance of bank stabilization. Bioengineered bank stabilization structures will use vegetation in combination with bank reshaping; biodegradeable geotextile materials; and, in some cases, a minimal amount of rock or wood to the extent practicable to dissipate erosive energy. Third-Party Project Proponents will consult a professional engineer when considering using bioengineering techniques.
- All re-routed, widened, or deepened streams are required to establish Stream Setbacks with minimum widths required under STREAM-1, STREAM-2, or STREAM-3. All re-routed, widened, or deepened streams must re-establish/

establish and maintain native Woody Riparian land cover and/or native Grassland Riparian land cover in the entire Stream Setback.

Condition 8. Avoid and Minimize Impacts to Covered Species from Utility and Utility Maintenance Covered Activities

AMMs associated with Condition 8 must be applied to all Covered Activities associated with construction and maintenance of infrastructure projects.

UTILITY-1 (Avian Collision Avoidance): Installation of new, or relocation of existing, utility poles, lines, and cell towers located within the Preserve System or within 1,000 feet of a Preserve boundary will be coordinated with the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife. The applicant or relevant utility/service provider will install utility poles, lines, and cell towers in conformance with Avian Powerline Interaction Committee (APLIC) standards for collision-reducing techniques, as outlined in Reducing Avian Collisions with Power Lines: State of the Art in 2012 (APLIC 2012), or any superseding document issued by the APLIC.

UTILITY-2 (Utility Maintenance on Preserves): Utility maintenance inside SSHCP Preserves and SSHCP Preserve Setbacks containing vernal pools will occur only when vernal pools have been dry for 30 days, except in emergency situations related to human health and safety.

UTILITY-3 (Trenchless Construction Methods): Where a pipeline or conduit crosses an existing or planned Preserve or will be located between adjacent Preserves (e.g., under a roadway that has a Preserve on both sides), trenchless construction methods will be used to minimize impacts to the existing soil profile (including impacts to a hardpan or duripan) to maintain the perched aquifer in Vernal Pool Grassland land cover type.

UTILITY-4 (Siting of Entry and Exit Location): The entry and exit locations for the trenchless construction method (see Utility-3) will be sited to avoid impacts to vernal pools and Riparian Woodland, and to avoid direct take of SSHCP Covered Species.

Condition 9. Avoid and Minimize Impacts That Might Result From Removing or Breaching Levees to Establish or Re-establish Riparian Habitat

LEVEE-1 (Preparation of Hydrologic Analysis): Prior to approving a draft Preserve Management Plan that includes (1) modifying or breaching an existing levee, or (2) would place a potential impedance to high-water event flood-flows on the water side of an existing levee (including new riparian vegetation plantings or

other new Preserve facilities), a hydrologic analysis will be conducted. The Preserve activity will only be implemented if the hydrologic analysis concludes that the activity will not result in a substantial increase in flood stage elevations or flood risk on lands outside the Preserve.

Condition 10. Avoid and Minimize Impacts That Might Result From Potential Residual Contamination of Preserves and Related Exposure of People to Such Hazardous Materials

HAZARDOUS MATERIALS-1 (Preparation of Phase I Environmental Site Assessment): Prior to the acquisition of a preserve site or implementation of a stream or riparian restoration project, a Phase I Environmental Site Assessment shall be conducted in general accordance with the American Society for Testing and Materials Standard Practice E1527-05. The purpose of this Environmental Site Assessment is to identify, to the extent feasible pursuant to the American Society for Testing and Materials Standard, recognized environmental conditions in connection with the potential site. The term "recognized environmental condition" means the presence or likely presence of hazardous substances or petroleum products on the property under conditions that may indicate an existing release, a past release, or a material threat of release of these substances to the property. If the Phase 1 Environmental Site Assessment indicates the presence of a recognized environmental condition, the Implementing Entity shall consider the following options.

- Determine that the acquisition/project can proceed on the basis that the Habitat Plan goals and objectives can be met on the site even with the presence of a recognized environmental condition.
- Conduct a Phase II Environmental Site Assessment, including soil and groundwater testing, to further study the potential for contamination to limit the Implementing Entity's management activities.
- If the results of the Phase I (or Phase II) Environmental Site Assessment indicate that the Habitat Plan goals and objectives cannot be met on the site, the Implementing Entity should not acquire the site.

HAZARDOUS MATERIALS-2 (Contingency Plan): As part of each Preserve Management Plan or site restoration plan, a Contingency Plan shall be prepared to address the actions that would be taken during construction in the event that unexpected contaminated soil or groundwater is discovered. The Contingency Plan shall include health and safety considerations, handling and disposal of wastes, reporting requirements, and emergency procedures. The Contingency Plan shall include a requirement that if evidence of contaminated materials is encountered

during construction, construction would cease immediately and applicable requirements of the Comprehensive Environmental Release Compensation and Liability Act and the California Code of Regulations Title 22 regarding the disposal of waste would be implemented.

5.4.2 Covered Species Take Avoidance and Minimization Measures

The following section describes measures to avoid or minimize effects of Covered Activities on specific SSHCP Covered Species. Species-specific AMMs include species surveys, pre-construction surveys, and construction monitoring. Most species-specific AMMs require that species surveys be conducted if Covered Species modeled habitat is within the proposed Covered Activity footprint or within a specified distance of the proposed Covered Activity. Section 3.4 provides maps and descriptions of modeled habitat for each Covered Species. The AMMs described below apply to Covered Activities when Covered Species modeled habitat or a Covered Species occurrence are at a project site. The Implementing Entity and Wildlife Agencies may update specific SSHCP AMMs over the Permit Term to provide the best and most appropriate protective measures for a Covered Species.

General Covered Species Take Avoidance and Minimization Measures

The following AMMs will apply to all Covered Activities that are required to implement Covered Species take AMMs.

SPECIES-1 (Litter Removal Program): A litter control program will be instituted for the entire project site. All workers will ensure that their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. All garbage will be removed from the project site at the end of each work day, and construction personnel will not feed or otherwise attract wildlife to the area where construction activities are taking place.

SPECIES-2 (No Pets in Construction Areas): To avoid harm and harassment of native species, workers and visitors will not bring pets onto a project site.

SPECIES-3 (Take Report): If accidental injury or death of any Covered Species occurs, workers will immediately inform the approved biologist or on-site monitor and site supervisor. The approved biologist or on-site monitor will phone the appropriate contact person at the Implementing Entity. The Implementing Entity will immediately contact the Wildlife Agencies by telephone. A memorandum will be provided to the Implementing Entity and Wildlife Agencies within 1 working day of the incident. The report will provide the date and location of the incident, number of individuals taken,

the circumstances resulting in the take, and any corrective measures taken to prevent additional take.

SPECIES-4 (Post-Construction Compliance Report): A post-construction compliance report will be submitted to the SSHCP Implementing Entity within 30 calendar days of completion of construction activities or within 30 calendar days of any break in construction activity that lasts more than 30 days. The report will detail the construction start and completion dates, any information about meeting or failing to meet species take Avoidance and Minimization Measures (AMM), effectiveness of each AMM that was applied at the project site, and any known project effects to Covered Species.

Rare Plants

PLANT-1 (Rare Plant Surveys): If a Covered Activity project site contains modeled habitat for Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii)*, Bogg's Lake hedge-hyssop (*Gratiola heterosepala)*, dwarf downingia (*Downingia pusilla),* Legenere (*Legenere limosa*), pincushion navarretia (*Navarretia myersii),* or Sanford's arrowhead (*Sagittaria sanfordii*), the Covered Activity project site will be surveyed for the rare plant by an approved biologist and following the California Department of Fish and Wildlife (CDFW) rare plant survey protocols (CDFG 2009) or the most recent CDFW rare plant survey protocols. An approved biologist will conduct the field surveys and will identify and map plant species occurrences according to the protocols. See Chapter 10 for the process to submit survey information to the Plan Permittee and the Permitting Agencies.

PLANT-2 (Rare Plant Protection): If a rare plant listed in AMM PLANT-1 is detected within an area proposed to be disturbed by a Covered Activity or is detected within 250 feet of the area proposed to be disturbed by a Covered Activity, the Implementing Entity will assure one unprotected occurrence of the species is protected within a SSHCP Preserve before any ground disturbance occurs a the project site.

Sacramento and Slender Orcutt Grass

Sacramento Orcutt grass (*Orcuttia viscida*) is a federally and state endangered species and is ranked by the California Native Plant Society as a California Rare Plant Rank 1B.1 species. Slender Orcutt grass (*Orcuttia tenuis*) is a federally threatened and state endangered species and is ranked by the California Native Plant Society as a California Rare Plant Rank 1B.1 species. Both Orcutt grasses are very rare, and the likelihood of finding new occurrences within the Plan Area is low. Due to their rarity, take of either of these species is not permitted under the SSHCP, with the exception of take related to Preserve management and monitoring (see Section 5.2.7, SSHCP Preserve System Covered Activities).

ORCUTT-1 (Orcutt Grass Surveys): If a Covered Activity project site is located within 1 mile of the Mather Core Recovery Area and contains the Vernal Pool land cover type, the project site will be surveyed for Sacramento and slender Orcutt grass by an approved biologist following California Department of Fish and Wildlife (CDFW) rare plant survey protocols (CDFG 2009) or most recent CDFW guidelines to determine if Sacramento and/or slender Orcutt grass is present. An approved biologist will conduct the field investigation to identify and map occurrences. See Chapter 10 for the process to conduct and submit survey information.

ORCUTT-2 (Orcutt Grass Protection): Where known or new Sacramento or slender Orcutt grass occurrences are found, they will be protected within an SSHCP Preserve that is at least 50 acres. The occurrence will be located interior to the Preserve at a distance of no less than 300 feet from the edge of the Preserve boundary. If a Third-Party Project Proponent encounters a previously undiscovered occurrence of Sacramento or slender Orcutt grass on a Covered Activity project site, the Third-Party Project Proponent will contact the Implementing Entity or Land Use Authority Permittee with authority over the project, who will coordinate with the Wildlife Agencies for written concurrence of avoidance to ensure that the project does not cause take of the species.

California Tiger Salamander

To avoid direct and indirect effects of Covered Activities on California tiger salamander (*Ambystoma californiense*), the following AMMs will be implemented.

CTS-1 (California Tiger Salamander Daily Construction Schedule): Ground-disturbing Covered Activities within California tiger salamander modeled habitat (Figure 3-16) will occur outside the breeding and dispersal season (occur after July 31 and before October 15), to the maximum extent practicable. If Covered Activities must be implemented in modeled habitat (Figure 3-16) during the breeding and dispersal season (after October 15 and before July 31), construction activities will not start until 30 minutes after sunrise and must be complete 30 minutes prior to sunset.

CTS-2 (California Tiger Salamander Exclusion Fencing): If a Covered Activity must be implemented in modeled habitat (Figure 3-16) during the breeding and dispersal season (after October 15 and before July 31), exclusion fencing will be installed around the project footprint before October 15. Temporary high-visibility construction fencing will be installed along the edge of work areas, and exclusion fencing will be installed immediately outside of the temporary high-visibility construction fencing to exclude California tiger salamanders from entering the construction area or becoming entangled in the construction fencing. Exclusion fencing will be at least 1 foot tall and be buried

at least 6 inches below the ground to prevent salamanders from going under the fencing. Fencing will remain in place until all construction activities within the construction area are complete. No project activities will occur outside the delineated project footprint. An approved biologist must inspect the exclusion fencing and project site every morning before 7:00 a.m. for integrity and for any entrapped California tiger salamanders. If a California tiger salamander is encountered, refer to CTS-5, below. (However, the Implementing Entity may, with approval of the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW), determine that it is appropriate for a Covered Activity project to not implement CTS-2 for certain long and linear roadway Covered Activity projects if it appears that the exclusion fencing will likely trap individuals or cause more take of California tiger salamander than it would prevent.)

CTS-3 (California Tiger Salamander Monitoring): If Covered Activities must be implemented in modeled habitat (Figure 3-16), an approved biologist experienced with California tiger salamander identification and behavior will monitor the project site, including the integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place, and will inspect the project site for California tiger salamander every morning before 7:00 a.m., or prior to construction activities. As required by BMP-8 (Training of Construction Staff), the approved biologist will also train construction personnel on the required California tiger salamander avoidance procedures, exclusion fencing, and correct protocols in the event that a California tiger salamander enters an active construction zone. If a California tiger salamander is encountered, refer to CTS-5, below.

CTS-4 (Avoid California Tiger Salamander Entrapment): If Covered Activities must be implemented in modeled habitat, all excavated steep-walled holes or trenches more than 6 inches deep will be covered with plywood (or similar material) or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes or trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within California tiger salamander modeled habitat will be inspected for California tiger salamanders by the approved biologist prior to being moved. If a California tiger salamander is encountered, refer to CTS-5, below.

CTS-5 (California Tiger Salamander Encounter Protocol): If a California tiger salamander is encountered during construction activities, the approved biologist will notify the Wildlife Agencies immediately (California Department of Fish and Wildlife (CDFW)

and U.S. Fish and Wildlife Service (USFWS)). Construction activities will be suspended in a 100-foot radius of the animal until the animal is relocated by an approved biologist with appropriate handling permits from the Wildlife Agencies. Prior to relocation, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the salamander, within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to USFWS and CDFW immediately. Any worker who inadvertently injures or kills a California tiger salamander or who finds dead, injured, or entrapped California tiger salamander(s) must immediately report the incident to the approved biologist.

CTS-6 (Erosion Control Materials in California Tiger Salamander Habitat): If erosion control (BMP-2) is implemented within California tiger salamander modeled habitat (Figure 3-16), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure that salamanders are not trapped (no monofilament). Coconut coir matting and fiber rolls with burlap are examples of acceptable erosion control materials. This limitation will be communicated to the contractor through use of special provisions included in the bid solicitation package.

CTS-7 (Rodent Control): CTS-7 only applies to projects that are within California tiger salamander modeled habitat (Figure 3-16) and on Covered Activities. Rodent control will be allowed only in developed portions of a Covered Activity project site. Where rodent control is allowed, the method of rodent control will comply with the methods of rodent control discussed in the 4(d) Rule published in the U.S. Fish and Wildlife Service's (2004) final listing rule for tiger salamander.

Western Spadefoot

To avoid direct and indirect effects of Covered Activities on western spadefoot (*Spea hammondii*), the following AMMs will be implemented.

WS-1 (Western Spadefoot Work Window): Ground-disturbing Covered Activities within western spadefoot modeled habitat (Figure 3-17) will occur outside the breeding and dispersal season (after May 15 and before October 15), to the maximum extent practicable.

WS-2 (Western Spadefoot Exclusion Fencing): If Covered Activities must be implemented in modeled habitat (Figure 3-17) after October 15 and before May 15, exclusion fencing

will be installed around the project footprint before October 15, and the project site must be monitored by an approved biologist following rain events. Temporary high-visibility construction fencing will be installed along the edge of work areas, and silt fencing will be installed immediately behind the temporary high-visibility construction fencing to exclude western spadefoot from entering the construction area. Fencing will remain in place until all construction activities within the construction area are completed. No project activities will occur outside the delineated project footprint. If a western spadefoot is encountered, refer to WS-6, below.

WS-3 (Western Spadefoot Monitoring): If Covered Activities must be implemented in modeled habitat (Figure 3-17) in the breeding and dispersal season (after October 15 and before May 15), an approved biologist experienced with western spadefoot identification and behavior will monitor the project site, including the integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place, and will inspect the project site daily for western spadefoot prior to construction activities. The approved biologist will also train construction personnel on the required avoidance procedures, exclusion fencing, and protocols in the event that a western spadefoot enters an active construction zone (i.e., outside the buffer zone). If a western spadefoot is encountered, refer to WS-6, below.

WS-4 (Avoid Western Spadefoot Entrapment): If a Covered Activity occurs in western spadefoot modeled habitat (Figure 3-17), all excavated steep-walled holes and trenches more than 6 inches deep will be covered with plywood (or similar material) or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes and trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within western spadefoot modeled habitat will be inspected for western spadefoot by the approved biologist prior to being moved. If a western spadefoot is encountered, refer to WS-6, below.

WS-5 (Erosion Control Materials in Western Spadefoot Habitat): If erosion control (BMP-2) is implemented within western spadefoot modeled habitat (Figure 3-17), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure that western spadefoots are not trapped (no monofilament). Coconut coir matting and fiber rolls containing burlap are examples of acceptable erosion control materials.

WS-6 (Western Spadefoot Encounter Protocol): If Covered Activities must be implemented in modeled habitat (Figure 3-17) during the breeding and dispersal season (after October 15 and before May 15), and a western spadefoot is encountered during construction activities, the approved biologist will notify the Wildlife Agencies immediately. Construction activities will be suspended in a 100-foot radius of the animal until the animal leaves the project site on its own volition. If necessary, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the western spadefoot within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife immediately. Any worker who inadvertently injures or kills a western spadefoot or who finds dead, injured, or entrapped western spadefoot(s) must immediately report the incident to the approved biologist.

Giant Gartersnake

To avoid direct and indirect effects of Covered Activities on giant gartersnake (*Thamnophis gigas*), the following AMMs will be implemented.

GGS-1 (Giant Gartersnake Surveys): If the SSHCP giant gartersnake modeled habitat maps (Figure 3-18) show that modeled habitat for giant gartersnake is present within a Covered Activity's project footprint or within 300 feet of a project footprint, then an approved biologist will conduct a field investigation to delineate giant gartersnake aquatic habitat within the project footprint and adjacent areas within 300 feet of the project footprint. In addition to the SSHCP land cover types shown in Figure 3-18, giant gartersnake aquatic habitat includes, but is not limited to, low-gradient streams and creeks, open water, freshwater marsh, agricultural ditches, and rice fields. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. The Third-Party Project Proponent will map all existing or potential sites and provide these maps to the Local Land Use Permittees and the Implementing Entity. Locations of delineated giant gartersnake habitat must also be noted on plans that are submitted to a Local Land Use Permittee. The applicant will use this information to finalize project design. Covered Activities may occur throughout the year as long as giant gartersnake habitat is identified and fully avoided. Otherwise, Covered Activities must comply with GGS-2 through GGS-8, below. See Chapter 10 for the process to conduct and submit survey information.

GGS-2 (Giant Gartersnake Work Window): Covered Activities that do not fully avoid giant gartersnake modeled habitat (Figure 3-18) will be conducted during the snake's active

season. Construction and ground-disturbing activities will be initiated after May 1 and will end prior to September 15. If it appears that construction activities may go beyond September 15, the Third-Party Project Proponent or Plan Permittee will contact the Local Land Use Permittee and the Implementing Entity as soon as possible, but not later than September 1. The Local Land Use Permittee and the Implementing Entity will discuss with the Wildlife Agencies additional measures necessary to minimize take.

GGS-3 (Giant Gartersnake Monitoring): If a Covered Activity is occurring in giant gartersnake modeled habitat (Figure 3-18), an approved biologist experienced with giant gartersnake identification and behavior will monitor the project site, including the integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place in aquatic habitat or within 300 feet of aquatic habitat, and will inspect the project site daily for giant gartersnake prior to construction activities. If a giant gartersnake is encountered, refer to GGS-7. The approved biologist will also train construction personnel on the required avoidance procedures, exclusion fencing, and protocols in the event that a giant gartersnake enters an active construction zone (i.e., outside the buffer zone).

GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion): If construction activities will occur in giant gartersnake aquatic habitat, aquatic habitat will be dewatered and then remain dry and absent of aquatic prey (e.g., fish and tadpoles) for 15 days prior to initiation of construction activities. If complete dewatering is not possible, the Implementing Entity will be contacted to determine what additional measures may be necessary to minimize effects to giant gartersnake. After aquatic habitat has been dewatered 15 days prior to construction activities, exclusion fencing will be installed extending a minimum of 300 feet into adjacent uplands to isolate both the aquatic and adjacent upland habitat. Exclusionary fencing will be erected 36 inches above ground and buried at least 6 inches below the ground to prevent snakes from attempting to move under the fence into the construction area. In addition, high-visibility fencing will be erected to identify the construction limits and to protect adjacent habitat from encroachment of personnel and equipment. Giant gartersnake habitat outside construction fencing will be avoided by all construction personnel. The fencing and the work area will be inspected by the approved biologist to ensure that the fencing is intact and that no snakes have entered the work area before the start of each work day. The fencing will be maintained by the contractor until completion of the project. If giant gartersnake is encountered, refer to GGS-7, below.

GGS-5 (Avoid Giant Gartersnake Entrapment): If a Covered Activity occurs in giant gartersnake modeled habitat (Figure 3-18), all excavated steep-walled holes and trenches more than 6 inches deep will be covered with plywood (or similar material) or

provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes and trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within giant gartersnake modeled habitat will be inspected for giant gartersnake by the approved biologist prior to being moved. If a giant gartersnake is encountered, refer to GGS-7.

GGS-6 (Erosion Control Materials in Giant Gartersnake Habitat): If erosion control (BMP-2) is implemented within giant gartersnake modeled habitat (Figure 3-18), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure snakes are not trapped (no monofilament). Coconut coir matting and fiber rolls containing burlap are examples of acceptable erosion control materials.

GGS-7 (Giant Gartersnake Encounter Protocol): If a giant gartersnake is encountered during construction activities, the approved biologist will notify the Wildlife Agencies immediately. Construction activities will be suspended in a 100-foot radius of the animal until the animal leaves the project site on its own volition. If necessary, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the giant gartersnake within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to the U.S. Fish and Wildlife Service immediately. Any worker who inadvertently injures or kills a giant gartersnake or who finds one dead, injured, or entrapped must immediately report the incident to the approved biologist.

GGS-8 (Giant Gartersnake Post-Construction Restoration): After completion of ground-disturbing Covered Activities, the applicant will remove any temporary fill and construction debris and will restore temporarily disturbed areas to pre-project conditions. Restoration work includes such activities as re-vegetating the banks and active channels with a seed mix similar to pre-project conditions. Appropriate methods and plant species used to re-vegetate such areas will be determined on a site-specific basis in consultation with the Implementing Entity. Restoration work may include replanting emergent aquatic vegetation. Refer to the U.S. Fish and Wildlife Service's (USFWS) Guidelines for the Restoration and/or Replacement of Giant Gartersnake Habitat (USFWS 1997), or the most current USFWS guidelines at the time of the

activity. A photo documentation report showing pre- and post-project conditions will be submitted to the Implementing Entity 1 month after implementation of the restoration.

Western Pond Turtle

To avoid direct and indirect effects of Covered Activities on western pond turtle (*Actinemys marmorata*), the following AMMs will be implemented.

WPT-1 (Western Pond Turtle Surveys): If the SSHCP western pond turtle modeled habitat maps (Figure 3-19) show that modeled habitat for western pond turtle is present within a Covered Activity's project footprint or within 300 feet of a project footprint, then an approved biologist will conduct a field investigation to delineate western pond turtle aquatic habitat within the project footprint and within 300 feet of the project footprint. In addition to the SSHCP land cover types shown in Figure 3-19, western pond turtle aquatic habitat includes, but is not limited to, low-gradient streams and creeks, open water, freshwater marsh, and rice fields. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. The Third-Party Project Proponent will map all existing or potential sites and provide those maps to the Local Land Use Permittees and the Implementing Entity. Locations of delineated western pond turtle habitat must also be noted on plans that are submitted to a Local Land Use Permittee. The applicant will use this information to finalize project design. Covered Activities may occur throughout the year as long as western pond turtle habitat is identified and fully avoided. Otherwise, Covered Activities must comply with WPT-2 through WPT-9. See Chapter 10 for the process to conduct and submit survey information.

WPT-2 (Western Pond Turtle Work Window): Maintenance and improvements to existing structures may occur throughout the year as long as western pond turtle habitat is identified and avoided, and movement of equipment is confined to existing roads. Otherwise, construction and ground-disturbing Covered Activities must be conducted outside of western pond turtle's active season. Construction and ground-disturbing activities will be initiated after May 1 and will commence prior to September 15. If it appears that construction activities may go beyond September 15, the appropriate Plan Permittee will contact the Local Land Use Permittee and the Implementing Entity as soon as possible, but not later than September 1, to determine if additional measures are necessary to minimize take.

WPT-3 (Western Pond Turtle Monitoring): If a Covered Activity is occurring in western pond turtle modeled habitat (Figure 3-19), an approved biologist experienced with western pond turtle identification and behavior will monitor the project site, including the

integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place in aquatic habitat or within 300 feet of aquatic habitat, and will inspect the project site daily for western pond turtle prior to construction activities. The approved biologist will also training construction personnel on the required avoidance procedures, exclusion fencing, and protocols in the event that a western pond turtle enters an active construction zone (i.e., outside the buffer zone).

WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion): If construction activities will occur in western pond turtle aquatic habitat, aquatic habitat for the turtle will be dewatered and then remain dry and absent of aquatic prey (e.g., crustaceans and other aquatic invertebrates) for 15 days prior to the initiation of construction activities. If complete dewatering is not possible, the Implementing Entity will be contacted to determine what additional measures may be necessary to minimize effects to western pond turtle. After aquatic habitat has been dewatered 15 days prior to construction activities, exclusion fencing will be installed extending a minimum of 300 feet into adjacent uplands to isolate both the aquatic and adjacent upland habitat. Exclusionary fencing will be erected 36 inches above ground and buried at least 6 inches below the ground to prevent turtles from attempting to burrow or move under the fence into the construction area. In addition, high-visibility fencing will be erected to identify construction limits and to protect adjacent habitat from encroachment of personnel and equipment. Western pond turtle habitat outside construction fencing will be avoided by all construction personnel. The fencing and work area will be inspected by the approved biologist to ensure that the fencing is intact and that no turtles have entered the work area before the start of each work day. Fencing will be maintained by the contractor until completion of the project. If, after exclusion fencing and dewatering, western pond turtles are found within the project footprint or within 300 feet of the project footprint, the Third-Party Project Proponent will discuss the next best steps with the Implementing Entity and Wildlife Agencies.

WPT-5 (Avoid Western Pond Turtle Entrapment): If a Covered Activity occurs within western pond turtle modeled habitat (Figure 3-19), all excavated steep-walled holes and trenches more than 6 inches deep will be covered with plywood (or similar material) or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes and trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within western pond turtle modeled habitat will be inspected for western pond turtle by the approved biologist prior to being moved.

WPT-6 (Erosion Control Materials in Western Pond Turtle Habitat): If erosion control (BMP-2) is implemented within western pond turtle modeled habitat (Figure 3-19), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure that turtles are not trapped (no monofilament). Coconut coir matting and fiber rolls containing burlap are examples of acceptable erosion control materials.

WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit): Covered Activity construction and maintenance vehicles will observe a 20-mile-per-hour speed limit within western pond turtle modeled upland habitat (Figure 3-19).

WPT-8 (Western Pond Turtle Encounter Protocol): If a western pond turtle is encountered during construction activities, the approved biologist will notify the Wildlife Agencies immediately. Construction activities will be suspended in a 100-foot radius of the animal until the animal leaves the project site on its own volition. If necessary, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the turtle, within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to the U.S. Fish and Wildlife Service immediately. Any worker who inadvertently injures or kills a western pond turtle or who finds one dead, injured, or entrapped must immediately report the incident to the approved biologist.

WPT-9 (Western Pond Turtle Post-Construction Restoration): After completion of ground-disturbing Covered Activities, the applicant will remove any temporary fill and construction debris and will restore temporarily disturbed areas to pre-project conditions. Restoration work includes such activities as re-vegetating the banks and active channels with a seed mix similar to pre-project conditions. Appropriate methods and plant species used to re-vegetate such areas will be determined on a site-specific basis in consultation with the Implementing Entity. Restoration work may include replanting emergent aquatic vegetation and placing appropriate artificial or natural basking areas in waterways and wetlands. A photo documentation report showing pre- and post-project conditions will be submitted to the Implementing Entity 1 month after implementation of the restoration.

Tricolored Blackbird

To avoid direct and indirect effects of Covered Activities on tricolored blackbird (*Agelaius tricolor*), the following AMMs will be implemented.

TCB-1 (Tricolored Blackbird Surveys): If modeled habitat for tricolored blackbird is present within a Covered Activity's project footprint or within 500 feet of a project footprint, then an approved biologist will conduct a field investigation to determine if existing or potential nesting or foraging sites are present within the project footprint and adjacent areas within 500 feet of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. Within the Plan Area, potential tricolor blackbird nest sites are often associated with freshwater marsh and seasonal wetlands, or in thickets of willow, blackberry, wild rose, thistle, and other thorny vegetation. Tricolored blackbirds are also known to nest in crops associated with dairy farms. Foraging habitat is associated with annual grasslands, wet and dry vernal pools and other seasonal wetlands, agricultural fields (such as large tracts of alfalfa and pastures with continuous haying schedules and recently tilled fields), cattle feedlots, and dairies. The Third-Party Project Proponent will map all existing or potential nesting or foraging sites and provide these maps to the Local Land Use Permittees and Implementing Entity. Nesting sites must also be noted on plans that are submitted to a Local Land Use Permittee. See Chapter 10 for the process to conduct and submit survey information.

TCB-2 (Tricolored Blackbird Pre-Construction Surveys): Pre-construction surveys will be required to determine if active nests are present within a project footprint or within 500 feet of a project footprint if existing or potential nest sites were found during design surveys and construction activities will occur during the breeding season (March 1 through September 15). An approved biologist will conduct pre-construction surveys within 30 days and within 3 days of ground-disturbing activities, and within the proposed project footprint and 500 feet of the proposed project footprint to determine the presence of nesting tricolored blackbird. Pre-construction surveys will be conducted during the breeding season (March 1 through August 31). Surveys conducted in February (to meet pre-construction survey requirements for work starting in March) must be conducted within 14 days and 3 days in advance of ground-disturbing activities. If a nest is present, then TCB-3 and TCB-4 will be implemented. The approved biologist will inform the Land Use Authority Permittee and the Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

TCB-3 (Tricolored Blackbird Nest Buffer): If active nests are found within the project footprint or within 500 feet of any project-related Covered Activity, the Third-Party Project Proponent will establish a 500-foot temporary buffer around the active nest until the young have fledged.

TCB-4 (Tricolored Blackbird Nest Buffer Monitoring): If nesting tricolored blackbirds are present within the project footprint or within 500 feet of any project-related Covered

Activity, then an approved biologist experienced with tricolored blackbird behavior will be retained by the Third-Party Project Proponent to monitor the nest throughout the nesting season and to determine when the young have fledged. The approved biologist will be on site daily while construction-related activities are taking place near the disturbance buffer. Work within the nest disturbance buffer will not be permitted. If the approved biologist determines that tricolored blackbirds are exhibiting agitated behavior, construction will cease until the buffer size is increased to a distance necessary to result in no harm or harassment to the nesting tricolored blackbirds. If the biologist determines that the colonies are at risk, a meeting with the Third-Party Project Proponent, Implementing Entity, and Wildlife Agencies will be held to determine the best course of action to avoid nest abandonment or take of individuals. The approved biologist will also train construction personnel on the required avoidance procedures, buffer zones, and protocols in the event that a tricolored blackbird flies into an active construction zone (i.e., outside the buffer zone).

TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves): On SSHCP Agricultural Preserves, pesticides (including herbicides) will not be applied from January 1 through July 15.

Swainson's Hawk

To avoid direct and indirect effects of Covered Activities on Swainson's hawk (*Buteo swainsoni*), the following AMMs will be implemented.

SWHA-1 (Swainson's Hawk Surveys): If modeled habitat for Swainson's hawk (Figure 3-25) is present within a Covered Activity's project footprint or within 0.25 mile of a project footprint, then an approved biologist will conduct a survey to determine if existing or potential nesting sites are present within the project footprint and adjacent areas within 0.25 mile of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. Nest sites are often associated with Riparian land cover, but also include lone trees in fields, trees along roadways, and trees around structures. Nest trees may include, but are not limited to, Fremont's cottonwood (*Populus fremontii*), oaks (*Quercus* spp.), willows (*Salix* spp.), walnuts (*Juglans* spp.), eucalyptus (*Eucalyptus* spp.), pines (*Pinus* spp.), and Deodar cedar (*Cedrus deodara*). The Third-Party Project Proponent will map all existing and potential nesting sites and provide these maps to the Local Land Use Permittees and Implementing Entity. Nesting sites must also be noted on plans that are submitted to a Local Land Use Permittee. See Chapter 10 for the process to conduct and submit survey information.

SWHA-2 (Swainson's Hawk Pre-Construction Surveys): Pre-construction surveys will be required to determine if active nests are present within a project footprint or within 0.25 mile of a project footprint if existing or potential nest sites were found during initial surveys and construction activities will occur during the breeding season (March 1 through September 15). An approved biologist will conduct pre-construction surveys within 30 days and 3 days of ground-disturbing activities to determine presence of nesting Swainson's hawk. Pre-construction surveys will be conducted during the breeding season (March 1 through September 15). If a nest is present, then SWHA-3 and SWHA-4 will be implemented. The approved biologist will inform the Land Use Authority Permittee and Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

SWHA-3 (Swainson's Hawk Nest Buffer): If active nests are found within the project footprint or within 0.25 mile of any project-related Covered Activity, the Third-Party Project Proponent will establish a 0.25 mile disturbance buffer around the active nest until the young have fledged, with concurrence from the Wildlife Agencies.

SWHA-4 (Swainson's Hawk Nest Buffer Monitoring): If nesting Swainson's hawks are present within the project footprint or within 0.25 mile of any project-related Covered Activity, then an approved biologist experienced with Swainson's hawk behavior will be retained by the Third-Party Project Proponent to monitor the nest throughout the nesting season and to determine when the young have fledged. The approved biologist will be on site daily while construction-related activities are taking place within the buffer. Work within the temporary nest disturbance buffer can occur with the written permission of the Implementing Entity and Wildlife Agencies. If nesting Swainson's hawks begin to exhibit agitated behavior, such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, the approved biologist will have the authority to shut down construction activities. If agitated behavior is exhibited, the biologist, Third-Party Project Proponent, Implementing Entity, and Wildlife Agencies will meet to determine the best course of action to avoid nest abandonment or take of individuals. The approved biologist will also train construction personnel on the required avoidance procedures, buffer zones, and protocols in the event that a Swainson's hawk flies into an active construction zone (i.e., outside the buffer zone).

Greater Sandhill Crane

To avoid direct and indirect effects of Covered Activities on greater sandhill crane (*Grus canadensis*), the following AMMs will be implemented.

GSC-1 (Greater Sandhill Crane Surveys): If modeled habitat for greater sandhill crane (Figure 3-22) is present within a Covered Activity's project footprint or within 0.5 mile of a project footprint, then an approved biologist will conduct a field investigation to determine if existing or potential roosting sites are present within the project footprint and adjacent areas within 0.5 mile of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. Roosting sites within the Plan Area are often associated with flooded fields, seasonal wetlands, and freshwater marsh. The Third-Party Project Proponent will map all existing or potential roosting sites and provide these maps to the Local Land Use Permittees and Implementing Entity. Roosting sites must also be noted on plans that are submitted to a Local Land Use Permittee. See Chapter 10 for the process to conduct and submit survey information.

GSC-2 (Greater Sandhill Crane Pre-Construction Surveys): Pre-construction surveys will be required to determine if active roosting sites are present within a project footprint or within 0.5 mile of a project footprint if existing or potential roosting sites were found during initial surveys and construction activities will occur when wintering flocks are present within the Plan Area (September 1 through March 15). An approved biologist will conduct pre-construction surveys within 15 days of ground-disturbing activities, and within 0.5 mile of a project footprint, to determine presence of roosting greater sandhill cranes. Pre-construction surveys will be conducted September 1 through March 15, when wintering flocks are present within the Plan Area. If birds are present, then GSC-3, GSC-4, and GSC-5 will be implemented. The approved biologist will inform the Land Use Authority Permittee and Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

GSC-3 (Greater Sandhill Crane Roosting Buffer): If active roosting sites are found within the project footprint or within 0.5 mile of any project-related Covered Activity, the Third-Party Project Proponent will establish a 0.5 mile temporary roosting disturbance buffer around the roosting site until the cranes have left.

GSC-4 (Greater Sandhill Crane Visual Barrier): Greater sandhill cranes have low tolerance for human disturbance, and such disturbance has caused cranes to abandon foraging and roosting sites. Repeat disturbance affects their ability to feed and store energy needed for survival. If project-related activities occur within 0.5 mile of a known roosting site as identified by surveys conducted during implementation of GSC-1 or GSC-2, a visual barrier will be constructed.

GSC-5 (Greater Sandhill Crane Roosting Buffer Monitoring): If roosting sites are found within the project footprint or within 0.50 mile of any project-related Covered Activity, an

approved biologist experienced with greater sandhill crane behavior will be retained by the Third-Party Project Proponent to monitor the roosting site throughout the roosting season and to determine when the birds have left. The approved biologist will be on site daily while construction-related activities are taking place within the disturbance buffer. Work within the temporary disturbance buffer can only occur with the written permission of the Implementing Entity and Wildlife Agencies. If greater sandhill cranes are abandoning their roosting and/or forage sites, the approved biologist will have the authority to shut down construction activities. If roost abandonment occurs, the approved biologist, Third-Party Project Proponent, Implementing Entity, and Wildlife Agencies will meet to determine the best course of action to avoid harm and harassment of individuals. The approved biologist will also train construction personnel on the avoidance procedures, buffer zones, and protocols in the event that greater sandhill cranes move into an active construction zone (i.e., outside the buffer zone).

Western Burrowing Owl

To avoid direct and indirect effects of Covered Activities on western burrowing owl (*Athene cunicularia*), the following AMMs will be implemented.

WBO-1 (Western Burrowing Owl Surveys): Surveys within modeled habitat are required for both the breeding and non-breeding season. If the project site falls within modeled habitat, an approved biologist will survey the project site and map all burrows, noting any burrows that may be occupied. Occupied burrows are often (but not always) indicated by tracks, feathers, egg shell fragments, pellets, prey remains, and/or excrement. Surveying and mapping will be conducted by the approved biologist while walking transects throughout the entire project site plus all accessible areas within a 250-foot radius from the project site. The centerline of these transects will be no more than 50 feet apart and will vary in width to account for changes in terrain and vegetation that can preclude complete visual coverage of the area. For example, in hilly terrain with patches of tall grass, transects will be closer together, and in open areas with little vegetation, they can be 50 feet apart. This methodology is consistent with current survey protocols for this species (California Burrowing Owl Consortium 1993). Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. If suitable habitat is identified during the initial survey, and if the project does not fully avoid the habitat, pre-construction surveys will be required. Burrowing owl habitat is fully avoided if project-related activities do not impinge on a 250-foot buffer established by the approved biologist around suitable burrows. See Chapter 10 for the process to conduct and submit survey information.

WBO-2 (Western Burrowing Owl Pre-Construction Surveys): Prior to any Covered Activity ground disturbance, an approved biologist will conduct pre-construction surveys in all areas that were identified as suitable habitat during the initial surveys. The purpose of the pre-construction surveys is to document the presence or absence of burrowing owls on the project site, particularly in areas within 250 feet of construction activities. To maximize the likelihood of detecting owls, the pre-construction survey will last a minimum of 3 hours. The survey will begin 1 hour before sunrise and continue until 2 hours after sunrise (3 hours total), or begin 2 hours before sunset and continue until 1 hour after sunset. Additional time may be required for large project sites. A minimum of two pre-construction surveys will be conducted (if owls are detected on the first survey, a second survey is not needed). All owls observed will be counted and their location will be mapped. Surveys will conclude no more than 2 calendar days prior to construction. Therefore, the Third-Party Project Proponent must begin surveys no more than 4 days prior to construction (2 days of surveying plus up to 2 days between surveys and construction). To avoid last-minute changes in schedule or contracting that may occur if burrowing owls are found, the Third-Party Project Proponent may also conduct a preliminary survey up to 15 days before construction. This preliminary survey may count as the first of the two required surveys as long as the second survey concludes no more than 2 calendar days in advance of construction.

WBO-3 (Burrowing Owl Avoidance): If western burrowing owl or evidence of western burrowing owl is observed on the project site or within 250 feet of the project site during pre-construction surveys, then the following will occur:

During Breeding Season: If the approved biologist finds evidence of western burrowing owls within a project site during the breeding season (February 1 through August 31), all project-related activities will avoid nest sites during the remainder of the breeding season or while the nest remains occupied by adults or young (nest occupation includes individuals or family groups foraging on or near the site following fledging). Avoidance is establishment of a minimum 250-foot buffer zone around nests. Construction and other project-related activities may occur outside of the 250-foot buffer zone. Construction and other project-related activities may be allowed inside of the 250-foot non-disturbance buffer during the breeding season if the nest is not disturbed, and the Third-Party Project Proponent develops an avoidance, minimization, and monitoring plan that is approved by the Implementing Entity and Wildlife Agencies prior to project construction based on the following criteria:

- The Implementing Entity and Wildlife Agencies approve of the avoidance and minimization plan provided by the project applicant.

- An approved biologist monitors the owls for at least 3 days prior to construction to determine baseline nesting and foraging behavior (i.e., behavior without construction).
- The same approved biologist monitors the owls during construction and finds no change in owl nesting and foraging behavior in response to construction activities.

If there is any change in owl nesting and foraging behavior as a result of construction activities, the approved biologist will have authority to shut down activities within the 250-foot buffer. Construction cannot resume within the 250-foot buffer until any owls present are no longer affected by nearby construction activities, and with written concurrence from the Wildlife Agencies.

If monitoring by the approved biologist indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in use, the non-disturbance buffer zone may be removed if approved by the Wildlife Agencies. The approved biologist will excavate the burrow in accordance with the latest California Department of Fish and Wildlife guidelines for burrowing owl to prevent reoccupation after receiving approval from the Wildlife Agencies.

The Implementing Entity and Wildlife Agencies will respond to a request from the Third-Party Project Proponent to review the proposed construction monitoring plan within 21 days.

During Non-Breeding Season: During the non-breeding season (September 1 through January 31), the approved biologist will establish a minimum 250-foot non-disturbance buffer around occupied burrows. Construction activities outside of this 250-foot buffer will be allowed. Construction activities within the non-disturbance buffer will be allowed if the following criteria are met to prevent owls from abandoning over-wintering sites:

- An approved biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction).
- The same approved biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities.
- If there is any change in owl foraging behavior as a result of construction activities, the approved biologist will have authority to shut down activities within the 250-foot buffer.
- If the owls are gone for at least 1 week, the Third-Party Project Proponent may request approval from the Implementing Entity and Wildlife Agencies that an approved biologist excavate usable burrows and install one-way exclusionary

devices to prevent owls from re-occupying the site. After all usable burrows are excavated, the buffer zone will be removed and construction may continue.

Monitoring must continue as described above for the non-breeding season as long as the burrow remains active.

WBO-4 (Burrowing Owl Construction Monitoring): During construction of Covered Activities, 250-foot construction buffer zones will be established and maintained around any occupied burrow. An approved biologist will monitor the site to ensure that buffers are enforced and owls are not disturbed. The approved biologist will also train construction personnel on avoidance procedures, buffer zones, and protocols in the event that a burrowing owl flies into an active construction zone.

WBO-5 (Burrowing Owl Passive Relocation): Passive relocation is not allowed without the express written approval of the Wildlife Agencies. Passive owl relocation may be allowed on a case-by-case basis on project sites during the non-breeding season (September 1 through January 31) with the written approval of the Wildlife Agencies if the other measures described in this condition preclude work from continuing. Passive relocation must be done in accordance with the latest California Department of Fish and Wildlife guidelines for burrowing owl. Passive relocation will only be proposed if the burrow needing to be removed or with the potential to collapse from construction activities is the result of a Covered Activity. If passive relocation is approved by the Wildlife Agencies, an approved biologist can passively exclude birds from their burrows during the non-breeding season by installing one-way doors in burrow entrances. These doors will be in place for 48 hours to ensure that owls have left the burrow, and then the biologist will excavate the burrow to prevent reoccupation. Burrows will be excavated using hand tools only. During excavation, an escape route will be maintained at all times. This may include inserting an artificial structure into the burrow to avoid having materials collapse into the burrow and trap owls inside. Other methods of passive relocation, based on best available science, may be approved by the Wildlife Agencies over the 50-year Permit Term.

WBO-6 (Burrowing Owl Timing of Maintenance Activities): All activities adjacent to existing or planned Preserves, Preserve Setbacks, or Stream Setback areas will be seasonally timed, when safety permits, to avoid or minimize adverse effects on occupied burrows.

WBO-7 (Rodent Control): Rodent control will be allowed only in developed portions of a Covered Activity project site within western burrowing owl modeled habitat. Where rodent control is allowed, the method of rodent control will comply with the methods of

rodent control discussed in the 4(d) Rule published in the U.S. Fish and Wildlife Service's (2004) final listing rule for tiger salamander.

Covered Raptor Species

To avoid direct and indirect effects of Covered Activities on covered raptor species, the following AMMs will be implemented. This measure applies to Cooper's hawk (*Accipiter cooperii*), loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus cyaneus*), and white-tailed kite (*Elanus leucurus*). The following AMMs do not apply to ferruginous hawk (*Buteo regalis*), as they do not nest in the Plan Area. The following AMMs also do not apply to Swainson's hawk or burrowing owl, as specific AMMs have been developed for these covered raptor species.

RAPTOR-1 (Raptor Surveys): If modeled habitat for a covered raptor species (Figures 3-20, 3-23, 3-24, or 3-28) is present within a Covered Activity's project footprint or within 0.25 mile of a project footprint, then an approved biologist will conduct a field investigation to determine if existing or potential nesting sites are present within the project footprint and adjacent areas within 0.25 mile of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. The Third-Party Project Proponent will map all existing or potential nesting sites and provide these maps to the Local Land Use Permittees and Implementing Entity. Nesting sites must also be noted on plans that are submitted to a Local Land Use Permittee. See Chapter 10 for the process to conduct and submit survey information.

RAPTOR-2 (Raptor Pre-Construction Surveys): Pre-construction surveys will be required to determine if active nests are present with a project footprint or within 0.25 mile of a project footprint if existing or potential nest sites are found during initial surveys and construction activities will occur during the raptor breeding season. An approved biologist will conduct pre-construction surveys within 30 days and 3 days of ground-disturbing activities within the proposed project footprint and within 0.25 mile of the proposed project footprint to determine presence of nesting covered raptor species. Pre-construction surveys will be conducted during the raptor breeding season. If a nest is present, then RAPTOR-3 and RAPTOR-4 will be implemented. The approved biologist will inform the Land Use Authority Permittee and Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

RAPTOR-3 (Raptor Nest/Roost Buffer): If active nests are found within the project footprint or within 0.25 mile of any project-related Covered Activity, the Third-Party Project

Proponent will establish a 0.25 mile temporary nest disturbance buffer around the active nest until the young have fledged.

RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring): If project-related Covered Activities within the temporary nest disturbance buffer are determined to be necessary during the nesting season, then an approved biologist experienced with raptor behavior will be retained by the Third-Party Project Proponent to monitor the nest throughout the nesting season and to determine when the young have fledged. The approved biologist will be on site daily while construction-related activities are taking place within the disturbance buffer. Work within the temporary nest disturbance buffer can occur with the written permission of the Implementing Entity and Wildlife Agencies. If nesting raptors begin to exhibit agitated behavior, such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, the approved biologist/monitor will have the authority to shut down construction activities. If agitated behavior is exhibited, the biologist, Third-Party Project Proponent, Implementing Entity, and Wildlife Agencies will meet to determine the best course of action to avoid nest abandonment or take of individuals. The approved biologist will also train construction personnel on the required avoidance procedures, buffer zones, and protocols in the event that a covered raptor species flies into an active construction zone (i.e., outside the buffer zone).

Western Red Bat

To avoid direct and indirect effects of Covered Activities on western red bat (*Lasiurus blossevillii*), the following AMMs will be implemented.

BAT-1 (Winter Hibernaculum Surveys): If modeled habitat (Figure 3-30) for western red bat is present within 300 feet of a Covered Activity's project footprint, then an approved biologist will conduct a field investigation of the project footprint and adjacent areas within 300 feet of a project footprint to determine if a potential winter hibernaculum is present, and to identify and map potential hibernaculum sites. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. If potential hibernaculum sites are found, the Third-Party Project Proponent will note their locations on project designs and will design the project to avoid all areas within a 300-foot buffer around the potential hibernaculum sites. Winter hibernaculum habitat is fully avoided if project-related activities do not impinge on a 300-foot buffer established by the approved biologist around an existing or potential winter hibernaculum site. See Chapter 10 for the process to conduct and submit survey information.

BAT-2 (Winter Hibernaculum Pre-Construction Surveys): If the Third-Party Project Proponent elects not to avoid potential winter hibernaculum sites within the project footprint plus a 300-foot buffer, additional surveys are required. Prior to any ground disturbance related to Covered Activities, an approved biologist will conduct a pre-construction survey within 3 days of ground-disturbing activities within the project footprint and 300 feet of the project footprint to determine the presence of winter hibernaculum sites. Pre-construction surveys will be conducted during the winter hibernaculum season (November 1 through March 31). If a winter hibernaculum is present, then BAT-3 and BAT-4 will be implemented. The approved biologist will inform the Land Use Authority Permittee and Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

BAT-3 (Winter Hibernaculum Buffer): If active winter hibernaculum sites are found within the project footprint or within 300 feet of the project footprint, the Third-Party Project Proponent will establish a 300-foot temporary disturbance buffer around the active winter hibernaculum site until bats have vacated the hibernaculum and the Implementing Entity and Wildlife Agencies concur.

BAT-4 (Bat Eviction Methods): An approved biologist will determine if non-maternity and non-hibernaculum day and night roosts are present on the project site. If necessary, an approved biologist will use safe eviction methods to remove bats if direct impacts to non-maternity and non-hibernaculum day and night roosts cannot be avoided. If a winter hibernaculum site is present, Covered Activities will not occur until the hibernaculum is vacated, or, if necessary, safely evicted using methods acceptable to the Wildlife Agencies.

5.5 How Conditions on Covered Activities are Applied to Various Urban Development Permit Types Approved by the Land Use Authority Permittees

Covered Activities can be approved by Land Use Authority Permittees at different scales. For example, master plans (including specific plans, comprehensive plans, and special planning areas) generally include large areas of land, and other permit types (conditional use permits, grading permits, and building permits) can apply over a range of project footprints. The process that Land Use Authority Permittees will use to approve Covered Activities in these planning documents is described in Chapter 10. See Table 5-2 for a list of projects and activities that are considered Covered Activities.

5.5.1 Master Plans

A master plan is a document that broadly defines land use, circulation, and infrastructure for a specific area (Master Plan Area) and includes implementation measures that guide how development within the Master Plan Area will occur. The requirements for master plans can be fulfilled by a variety of planning tools, including specific plans, comprehensive plans, special planning areas, or any combination thereof. Preparation of a master plan can generally be dived into four phases: pre-application phase, initiation phase, plan preparation phase, and master plan hearing and adoption phase. Master plan proponents receive entitlements for large lot maps within the Master Plan Area, then sell those large lots to individual home, commercial, and industrial builders who then construct Urban Development Covered Activities in accordance with the master plan. Therefore, both master plan proponents and individual builders can be Third-Party Project Proponents under the SSHCP.

As discussed in Chapter 10, it is during the plan preparation phase that Local Land Use Permittees will work with Third-Party Project Proponents to prepare a master plan that includes SSHCP requirements, including specific AMMs. Incorporating SSHCP requirements into a master plan ensures that the Urban Development Covered Activities constructed under that master plan can be covered by SSHCP permits.

Each Land Use Authority Permittee will condition Third-Party Project Proponents constructing a Covered Activity within a Master Plan Area to comply with master plan's specific AMMs.

As discussed in Section 5.2.1.3, five master plans are currently under preparation or have recently been approved in the UDA (Figure 5-4). Appendix K provides further information on the five master plans, and discusses how each master plan will meet SSHCP requirements, including applicable Conditions and Covered Activity AMMs.

5.5.2 Use Permits

All property in the Plan Area is zoned for a specific land use by the local Land Use Authority Permittee. Each Land Use Authority Permittee has a zoning ordinance that lists land uses that are permitted by right in each zoning district. The zoning ordinance also lists uses on a property that may be allowed only under specified conditions, which trigger the requirement for a Third-Party Project Proponent to obtain a conditional use permit. Third-Party Project Proponents applying for a conditional use permit who seek coverage under the SSHCP permits must apply all SSHCP requirements, including AMMs, as conditions of Land Use Authority approval.

5.5.3 Grading Permits

Grading permits are issued by the Land Use Authority Permittees to authorize grading, filling, clearing, and grubbing operations, which can be Covered Activities. Grading permits can cover grading associated with multiple contiguous lots or individual lots. Land Use Authority Permittees do not require grading permits for agricultural ground disturbance or grading; refuse disposal sites; mining or quarry operations; underground utilities; or pools, basements, or footings of structures authorized by a building permit. The City of Rancho Cordova and the County of Sacramento require a grading permit when 350 cubic yards or more of soil or earthly material are graded, filled, excavated, stored, or disposed of, or when 1 acre or greater of land is cleared and grubbed. The City of Galt requires a grading permit for disturbance when the volume of material graded is more than 50 cubic yards or the depth of cut and fill is greater than 2 feet. Third-Party Project Proponents applying for a grading permit and who seek coverage under the SSHCP permits must apply all SSHCP requirements, including AMMs, as conditions of Land Use Authority approval.

5.5.4 Building Permits

Building permits are issued by Land Use Authority Permittees to authorize construction of new buildings or demolition or improvements to existing buildings. Third-Party Project Proponents applying for a building permit and who seek coverage under the SSHCP permits must apply all SSHCP requirements, including AMMs, as conditions of Land Use Authority approval.

Table 5-2
Summary of Actions Associated with Covered Activities

Action		Residential, Commercial, and Industrial Development	Water Delivery	Recycled Water and Wastewater Facilities	Flood Control and Storm Drainage	Energy and Other Utility Services	Park and Recreation Facilities	Transportation Facilities	Sanitation Facilities	Other Public Facilities	Mining	Roads Outside the UDA	Land Management and Monitoring	Habitat Enhancement, Restoration, and Creation
Initial Construction	*Vegetation clearing*	X	X	X	X	X	X	X	X		X	X	X	X
	Grading, earthmoving	X	X	X	X	X	X	X	X		X	X	X	X
	Excavating	X	X	X	X	X	X	X	X		X	X	X	X
	Trenching and tunneling	X	X	X	X	X	X	X	X			X		
	Compacting soils	X	X	X		X	X	X	X		X	X		
	Pouring concrete/asphalt	X	X	X	X	X	X	X	X			X		
	Landscaping	X		X	X	X	X	X	X		X	X		
	Culvert placement	X						X				X		
Operation	*Vehicular use*	X	X	X			X	X				X		
	Wastewater generation	X		X		X								
	Water consumption	X		X		X								
Main Initial Construction enhancement	*Vegetation removal*	X	X	X	X	X	X		X			X		X
	Beaver dam removal				X									X
	In-stream removal of detritus	X			X		X	X						X

Table 5-2
Summary of Actions Associated with Covered Activities

Action		Residential, Commercial, and Industrial Development	Water Delivery	Recycled Water and Wastewater Facilities	Flood Control and Storm Drainage	Energy and Other Utility Services	Park and Recreation Facilities	Transportation Facilities	Sanitation Facilities	Other Public Facilities	Mining	Roads Outside the UDA	Land Management and Monitoring	Habitat Enhancement, Restoration, and Creation
	Ditch maintenance	X			X									X
	Fence repair	X		X	X		X		X		X	X	X	X
	Culvert clean-out	X			X							X	X	X
	Repairing channel banks	X			X									
	Spill cleanup	X		X	X			X				X		
	Cleaning trash racks	X			X									
	Tree trimming	X		X	X	X	X	X				X		
	Culvert replacement	X						X				X	X	X
	Fire management	X											X	X
	Species monitoring												X	X

5.6 References Cited

APLIC (Avian Power Line Interaction Committee). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C. October 2012.

California Burrowing Owl Consortium. 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.

CDFG (California Department of Fish and Game). 2009. Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities. California Natural Resources Agency. November 24, 2009.

Jackson, S.D., and C.R. Griffin. 2000. A Strategy for Mitigating Highway Impacts on Wildlife. Pp. 143–159 In Messmer, T.A., and B. West, (eds) *Wildlife and Highways: Seeking Solutions to an Ecological and Socio-economic Dilemma*. The Wildlife Society.

Robins, J.D. 2002. Stream Setbacks Technical Memo. Prepared for the Napa County Conservation Development and Planning Department.

SACOG (Sacramento Area Council of Governments). 2002. *Metropolitan Transportation Plan 2025.*

SACOG. 2011. *Sacramento County General Plan of 2005–2030*. Amended November 9, 2011.

Sacramento Stormwater Quality Partnership. 2007. Stormwater Quality Design Manual for the Sacramento and South Placer Regions: Integrated Design Solutions for Urban Development Protecting Our Water Quality. May 2007.

Semlitsch, R.D., and J.R. Bodie. 2003. Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles. *Conservation Biology*, Volume 17, No. 5: 1219–1228.

SRCSD (Sacramento Regional County Sanitation District). 2007. *Water Recycling Opportunities Study*.

SRCSD. 2015a. Sacramento Regional County Sanitation District / Special Plan Area / City of Sacramento Recycled Water Feasibility Study. Prepared by RMC Water and Environment. January 2015.

SRCSD. 2015b. Sacramento Regional County Sanitation District's South County Ag Recycled Water Feasibility Study. Prepared by RMC Water and Environment. January 2015.

USFWS (U.S. Fish and Wildlife Service). 1997. Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat. Appendix A of Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California. November 13, 1997.

USFWS. 2004. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemption for Existing Routine Ranching Activities; Final Rule. 50 CFR 17. Federal Register, August 4, 2004.

Wenger, S. 1999. A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation. Prepared for the Office of Public Service and Outreach, Institute of Ecology, University of Georgia, Athens, Georgia.

INTENTIONALLY LEFT BLANK

6 EFFECTS ASSESSMENT AND LEVEL OF TAKE

6.1 Introduction

This chapter estimates and analyzes the effects of the South Sacramento Habitat Conservation Plan (SSHCP) Covered Activities (see Chapter 5) on land cover types and Covered Species and their habitats. The analysis presented in this chapter is programmatic to address all SSHCP Covered Activities that will be implemented within the SSHCP Plan Area over the proposed 50-year Permit Term. This chapter analyzes effects programmatically rather than with a site-specific approach. Consequently, the effects presented in this chapter represent the maximum effects of the SSHCP Covered Activities on land cover types, Covered Species, and their habitats. Therefore, the acres of land cover conversion presented in this chapter represent the total allowable under the Plan's permits.

This effects analysis includes the eight major categories of Covered Activities described in Section 5.2:

- Urban Development in the Urban Development Area (UDA)
- Mining in the UDA
- Rural Transportation Projects
- Recycled Water Projects
- Covered Activities in Preserve Setbacks in the UDA
- Covered Activities in Stream Setbacks in the UDA
- SSHCP Preserve System Covered Activities
- Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System.

6.2 Species Effects Definitions

Covered Activities result in environmental stressors (see Section 6.3) that affect Covered Species and species habitat. Species effects can be permanent or temporary.

Permanent Effects

Permanent effects can be direct or indirect. Direct effects are caused by the activity and occur at the same time and place (50 CFR 402.02). Indirect effects are those effects that are caused by or will result from the activity and are later in time, but are still reasonably certain to occur (50 CFR 402.02).

Environmental stressors resulting from Covered Activities can permanently affect species by directly harming, harassing, killing, or injuring an individual of any Covered Species, or by directly removing, modifying, or degrading a land cover type that provides habitat for a SSHCP Covered Species.

Environmental stressors resulting from Covered Activities can also indirectly affect species when they modify or degrade species habitat over time, eventually causing a significant modification fully removing the value of the habitat for breeding, feeding, or sheltering. While more difficult to quantify and track, indirect impacts can substantially affect species habitat, especially if multiple indirect or direct impacts work cumulatively to degrade the habitat. All indirect effects are permanent.

Temporary Effects

All temporary effects are direct (i.e., are caused by the Covered Activity and occur at the same time and place as the Covered Activity). Temporary effects alter a land cover or species habitat for less than 1 year, and the disturbed area recovers or is restored to pre-project habitat conditions within 1 year of completing the ground disturbance (e.g., prescribed burning, construction staging areas, and construction dust). Permanent effects analyzed include (1) effects from Covered Activities that have a duration exceeding 1 year, and (2) effects from ground-disturbing Covered Activities with a duration of less than 1 year but the disturbed land cover or species modeled habitat require more than 1 year to restore to pre-activity condition (restoration begins immediately following end of the ground disturbance).

Incidental Take

Direct and indirect effects of Covered Activities will result in the incidental take of Covered Species. “Incidental take” is the take of fish or wildlife species that results from, but is not the purpose of, carrying out otherwise lawful activity (50 CFR 17.3). The federal Endangered Species Act (ESA) defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 U.S.C. 1532(3)(9)). Take is defined under the California Endangered Species Act (CESA) as “to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (California Fish and Game Code Section 86). Unlike federal law, the CESA does not include “harm” or “harass” in the definition of take.

“Harm” in the federal ESA definition of “take” means an act that actually kills or injures wildlife. Such acts may include significant habitat modifications or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” in the ESA definition of “take” means an intentional or negligent act or omission that creates the likelihood of injury to wildlife by

annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). The effects analysis in this chapter considers a significant modification to be removal of an SSHCP natural land cover type and conversion to another land cover type; for example, vernal pool converted to a developed land cover type, cropland, or vineyard would be a significant modification. This effects analysis considers significant degradation to an SSHCP land cover type to be when the land cover type remains, but an ecological function is adversely affected to the extent that the land cover type is unlikely to provide modeled Covered Species habitat. For example, damage to a vernal pool micro-watershed can change filling, depth, water chemistry, and period of ponding of the vernal pool.

Section 6.3 discusses specific environmental stressors for each of the major categories of Covered Activities that will temporarily or permanently affect species and result in "take."

Effects on Critical Habitat

As discussed in Section 3.6, the U.S. Fish and Wildlife Service (USFWS) designates Critical Habitat in specific areas that are essential to the conservation of a listed species. In addition to regulating "take" of listed species, the ESA also prohibits the "destruction or adverse modification" of designated Critical Habitat. Section 3(5)(A) of the ESA defines "Critical Habitat," in part, as "the specific areas within the geographical area occupied by the species, at the time it is listed…, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection." ESA Critical Habitat rules use the term "constituent elements" of Critical Habitat to define features "that are essential to the conservation of the species," including, but not limited to, "roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types" (50 CFR 424.12). Thus, to issue an Incidental Take Permit (ITP), the USFWS must ensure that the constituent elements of designated Critical Habitat will not be altered or destroyed by HCP proposed activities to the extent that the species' designated Critical Habitat (range-wide) would no longer remain functional to service its intended recovery role. Therefore, all HCPs must be reviewed by the USFWS to determine whether they are likely to cause adverse modification to designated Critical Habitat. It is possible for the USFWS to permit an HCP that authorizes land use or development activities within an area designated as Critical Habitat, provided the HCP proposed activities will not appreciably diminish the capability of the designated Critical Habitat to fulfill its intended role in the recovery of listed species. As discussed in Section 3.6, six SSHCP Covered Species have one or more designated Critical Habitat units located within the SSHCP Plan Area. Therefore, this chapter also quantifies the acres of Critical Habitat affected by the proposed Covered Activities.

6.3 Environmental Stressors from Covered Activities

This section describes how environmental stressors resulting from a Covered Activity affect land covers, species habitat, and individuals of Covered Species. The effects of these environmental stressors on Covered Species, species habitat, and land covers are analyzed in Section 6.5 and in Section 6.6, which identifies the amount of take the Permittees are requesting under the ITPs. Twenty-four environmental stressors are described below, organized by: (1) environmental stressors that would occur on an ongoing and permanent basis during operation of a Covered Activity over the Permit Term, and (2) those that would be temporary and occur only during and immediately after construction of a Covered Activity.

Permanent Environmental Stressors of Covered Activities

- Loss of land covers and Covered Species habitat
- Permanent alterations to watershed hydrographs and downstream water quality effects
- Habitat fragmentation
- Increased wildfire
- Vernal pool hydrologic alterations
- Chronic ground vibration and noise
- Lighting
- Increased human activity
- Wildlife community alterations
- Invasive plants
- Invasive animals
- Mesopredators
- Wildlife disease
- Pesticides and fertilizers
- Vehicle and aircraft collisions with wildlife
- Aboveground electrical utilities collision and electrocution

Temporary Environmental Stressors during Construction of Covered Activities

- Temporary alterations to hydrographs and construction water quality effects
- Laydown or trampling of vegetation

- Construction noise
- Construction ground vibration
- Construction lighting
- Construction dust
- Increased human presence during construction
- Construction trash and debris.

Table 6-1 presents a matrix identifying which environmental stressors could result from the various categories of Covered Activities. Table 6-2 provides a matrix for which species are affected by each environmental stressor.

6.3.1 Permanent Environmental Stressors of Covered Activities

Loss of Land Covers and Covered Species Habitat

The major effect of new urban development, transportation, and utility projects is conversion from undeveloped to developed land cover types. In addition to the net loss of undeveloped land cover in the Plan Area, such conversion may further isolate remaining natural habitat rendering it less suitable or unsuitable for Covered Species.

Natural land covers would be permanently converted to developed uses from construction of residential, commercial, and industrial structures, park and recreation facilities, some public and private utilities, solid waste management facilities, urban and rural transportation, and wastewater facilities. Construction of the Capital Southeast Connector would result in permanent direct effects within its footprint, temporary direct effects during construction, and potential indirect effects on Covered Species by creating barriers or hazards to movement and dispersal and fragmenting habitat. The Capital Southeast Connector is described in Section 5.2.1.1.

Habitat Fragmentation

Fragmentation and isolation of plant and wildlife populations can affect wildlife movement and dispersal as well as seed dispersal and movement and dispersal of plant pollinators. These may cause extinction of local populations as a result of two processes: (1) reduction in total habitat area, which reduces effective population sizes; and (2) isolation of local populations, which affects dispersal and immigration rates (Wilcox and Murphy 1985; Wilcove et al. 1986). Because of complex community-level interactions (e.g., mutualistic species, habitat guilds, and keystone species), the loss of one or a few species from a habitat patch as a direct result of habitat fragmentation ("primary" extinctions) also may result in multiple "secondary" extinctions within

the habitat patch (Wilcox and Murphy 1985). At the larger landscape scale, change in regional abundance and distribution of habitat may change the migration and habitat use patterns of some wildlife species, which in turn affects the metapopulation dynamics of numerous organisms and alters multiple landscape-scale ecological functions. For example, many species will either not cross roads, drainages, disturbed lands, and urbanized areas or do so infrequently or unsuccessfully. The necessity of crossing roads also increases the risk of vehicle collisions, especially for small rodents, reptiles, amphibians, and low- or slow-flying birds. Roadway mortality or limitations on species movement leads to a variety of problems, including reduction and isolation of populations. As populations become isolated and smaller, they become particularly vulnerable to negative demographic trends, including genetic bottlenecks, genetic drift, and inbreeding depression. These changes in turn can affect ecological functions and the long-term viability of species, including those for which roads are not a major barrier, but which have important ecological relationships with high-risk species (e.g., predator/prey relationships, mutualisms such as burrow construction and use, pollination). This disruption may also affect vegetation communities if the spatial behavior of plant dispersers and pollinators is altered.

Fragmentation also decreases the functional size of conserved habitat patches. As remaining habitat areas diminish in size, the ratio of vulnerable edge to preserved interior area increases, especially with narrow or irregularly shaped habitat patches. Ecological consequences arise because, as this ratio increases, any given interior point (habitat or organism) is closer to potential threats existing outside the preserve boundary. Increased edge effects heighten species' vulnerability to stochastic disturbances, pollution, and invasion by non-native plant and animal species.

Fencing may inhibit the movement of some species that have large home ranges, such as badgers (*Taxidea taxus*), coyotes (*Canis latrans*), and mule deer (*Odocoileus hemionus*). Disrupting the ability of these species to move freely throughout their ranges may alter their foraging and social behavior, and may expose them to greater risks in other areas they may normally avoid or use less frequently due to lower habitat suitability, greater risks of predation, or greater risks of vehicle collisions.

Wildlife Community Alterations

Wildlife community alterations will occur in developed areas, and may occur along the open space–urban interface due to development-induced habitat degradation. Rottenborn (1999), for example, characterized wildlife species as being "tolerant" or "sensitive" to urbanization. The "tolerant" species include several birds that are commonly thought of as urban-related, such as pigeons (*Columbia livia*), mourning doves (*Zenaida macroura*), western scrub-jays (*Aphelocoma californica*), American crows (*Corvus brachyrhynchos*), northern mockingbirds (*Mimus polyglottos*), European starlings *(Sturnus vulgaris*), and bushtits (*Psaltriparus minimus*). Urban

"sensitive" species included both year-long resident species, such as California quail (*Callipepla californica*), acorn woodpecker (*Melanerpes formicivorus*), and Bewick's wren (*Thryomanes bewickii*), as well as migrants, such as willow flycatcher (*Empidonax traillii*) and yellow warbler (*Setophaga petechia*). Permeability to invasive or urban-tolerant species may be increased through reductions in plant structure and cover related to increased human activity in the area, and especially related to fuel-modification activities along habitat edges. These species may out-compete resident native species for resources (e.g., habitat, food, nesting locations) or directly prey on or parasitize the native residents. European starlings, for example, may directly compete with native cavity nesters for nest sites in urban settings.

Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects

By permanently increasing the extent of impermeable surfaces, urban development results in increased runoff, especially during storm events. Such increases can change the hydrograph of local creeks and streams, result in greater levels of scour and/or incision of local creeks, increased sediment loads downstream, alterations of downstream hydrology, and decreased groundwater recharge. Also, addition of new development may permanently increase the amount of pollutants such as grease, oil, and lawn pesticides in local creeks and streams transported from residences during wet weather. An increase in the quantity of pollutants reaching local creeks through higher runoff may affect the biological and physical characteristics of aquatic habitats. Pollutants can also enter groundwater when development occurs over percolation zones in streams, which can affect drinking water quality. However, Covered Activity AMMs (see Section 5.4) require construction in urban and rural areas to manage runoff so that existing runoff conditions and hydrograph (i.e., rate of runoff) are maintained and to reduce pollutants entering local streams. High runoff temperature may also result in an increase of in-stream water temperatures when runoff enters local streams. Permanent increases in impermeable surfaces or compaction of soils may also inhibit natural percolation of stormwater into groundwater basins, which may lead to a drawdown in groundwater levels.

Covered Activities could result in temporary hydrologic and water quality-related effects associated with construction, realignment, widening, extension, or abandonment and removal of culverts, bridges, or other stream-crossing facilities can have hydrologic effects to creeks and streams.

Covered Activities increase the potential for permanent ongoing discharge of point and non-point source pollutants to the natural landscape through surface and subterranean water flows, windblown trash accumulation, windblown dispersion of chemicals, and illegal dumping of industrial and household trash and garden waste in natural ecosystems. Pesticides, herbicides, and fertilizers may enter adjacent landscapes through runoff from irrigated landscapes or from storm events on a frequent basis. Contaminants from automobiles that collect on roadways, parking lots, and driveways and enter natural landscapes during storm events include oil, gas,

brake dust, and other fluids. Road materials, leaks, and spills also permanently adversely affect riparian, wetland, aquatic, and semiaquatic species by contaminating their habitats. Illegal dumping of unwanted items such as trash, tires, and appliances in vacant habitat areas also crush vegetation and restrict photosynthesis by blocking the sun. Discarded electronics (i.e., e-waste) can introduce various toxic chemicals into the environment, including heavy metals that may leach into soil and water. These waste materials may chronically disrupt natural hydrology by forming obstructions and blocking flows and may create permanent habitat for pest species, such as non-native rats.

Vernal Pool Hydrologic Alterations

Vernal pool ecosystems are especially vulnerable to hydrologic alteration, because the timing and period of inundation can dictate whether annual plants and invertebrates are able to reproduce. As discussed in Chapter 3, in addition to direct filling of vernal pools by rainfall, vernal pools in the Plan Area are supported by perched water tables (perched aquifers) resulting from an impervious rock and clay duripan (hardpan) in the soil profile. This impervious soil layer hydrologically connects Valley Grassland, Vernal Pool, Swale, and Stream/Creek (Vernal Pool Invertebrate Habitat (VPIH)) to form the Vernal Pool Ecosystem. Subsurface flows from perched water tables stabilize vernal pool water levels, causing them to be inundated for longer periods of time than would be the case if the vernal pools were recharged only by rainfall (Rains et al. 2006). During and after local storm events, up to 60% of the water entering a vernal pool does so from the perched water table (Rains et al. 2006). Urban development can affect vernal pool hydrology in three major ways: (1) by permanently interrupting connection to surface water flows from up-gradient swales; (2) by damaging or permanently interrupting hydrologic connections to the perched water table; and (3) by puncturing the duripan within the vernal pool's micro-watershed, permanently increasing rate of water loss from the vernal pool and its associated perched aquifer, and allowing that water to drain into deeper groundwater tables.

Invasive Plants

Development, including roads and utility corridors, can promote invasive, non-native plant species that negatively affect habitat in a variety of ways, ultimately changing ecological functions and adversely affecting native species. As new urban development and infrastructure encroach into natural landscapes, newly disturbed areas and/or the new interface between developed areas and native habitats provide an opportunity for invasive plant species to establish and eventually invade natural habitat settings, degrading habitat and potentially displacing native species. Ornamental plants and native cultivars may spread to adjacent protected habitats and outcompete and displace native plant species; they can also hybridize (interbreed) with local native plants and thereby disrupt the genetics of the native population. Such hybridization can cause a number of problems for the native plant population, including poor growth and reproduction.

According to the *Invasive Plants of California's Wildlands* (Bossard et al. 2000), non-native invasive plant species can alter ecosystem processes, such as nutrient cycling, hydrologic cycles, frequencies of wildfires, and erosion and sediment deposition. Invasive plants interfere in ecosystem functions by outcompeting and displacing native plants and wildlife by providing refuge for non-native animals and by hybridizing with native species (Bossard et al. 2000). Several organizations, such as the California Native Plant Society (CNPS) and the California Invasive Plant Council (Cal-IPC) (formerly known as the California Exotic Pest Plant Council), have provided detailed documentation regarding invasive plant species that threaten California's native plants and animals.

Invasive plant species, and especially upland species, are often identified as an indirect "edge effect" of new urban development because invasive plants generally colonize modified or otherwise disturbed zones between development and remaining natural areas. However, invasive species can colonize virtually any upland area that is subject to some kind of disturbance, such as road shoulders, cleared zones along railroad lines, clearings along utility easements, areas affected by fire, fire breaks, and grazed areas.

Future development in the Plan Area will likely increase local sources of nitrogenous air pollutants, primarily due to increased transportation and demand for electricity generation. Increased nitrogen deposition (N-deposition) facilitates the growth of non-native plant species, especially invasive annual grasses in low-biomass ecosystems. Increased abundance of non-native plants, and invasive annual grasses in particular, represents a potentially significant effect to native vegetation communities and wildlife habitat. Nitrogen deposition can be locally elevated near roadways, with nitrogen flux along busy roads up to four times above background levels (Redling et al. 2013). However, nitrogen deposition can also result from emissions within the greater air basin.

Broadleaved pepperweed (*Lepidium latifolium*), yellow star-thistle (*Centaurea solstitialis*), and medusahead (*Elymus caput-medusae*) are common invasive species in grasslands and/or along Plan Area roadsides (Kleinschmidt Associates 2008).

Riparian and wetland ecosystems are also extremely vulnerable to invasive plants because of the highly effective transport of invasive species along rivers and streams. Invasive species can dominate the biomass of riparian and wetland communities where they become established, virtually choking out the native vegetation. Invasive plants commonly found in wetlands, riparian systems, and/or waterways in the Plan Area include broadleaved pepperweed, common water hyacinth (*Eichhornia crassipes*), Brazilian waterweed (*Egeria densa*), and Himalayan blackberry (*Rubus armeniacus*) (Kleinschmidt Associates 2008). Several other invasive species potentially affecting vernal pools and associated watersheds have also been identified, including waxy mannagrass (*Glyceria declinata*), barbed goatgrass (*Aegilops triuncialis*), Italian thistle

(*Carduus pycnocephalus*), stinkwort (*Dittrichia graveolens*), Klamath weed (common St. Johnswort) (*Hypericum perforatum*), yellow glandweed (*Parentucellia viscosa*), and milk thistle (*Silybum marianum*) (Appendix B).

Invasive Animals

Human activities associated with urban development can exacerbate the introduction or spread of non-native animal species. Non-native aquatic wildlife is known to have serious effects on native amphibian populations, including California tiger salamander (*Ambystoma californiense*). For example, aquarium species released in the wild may introduce new diseases to wild amphibian or fish populations. Feral cats (*Felis catus*) are a serious threat to native birds, especially birds that nest on or near the ground, as well as native reptiles and amphibians. They can also cause a shift in small mammal populations from native to non-native species. An increase in year-round water availability due to irrigation and water features can result in increased abundance of bullfrogs.

Invasive wildlife can negatively affect extant native wildlife and plants in many ways. Common native wildlife (e.g., ravens (*Corvus corax*), crows, pigeons, raccoons (*Procyon lotor*), skunks (*Mephitis mephitis)*, and gopher snakes (*Pituophis catenifer*)) and non-native species (e.g., Argentine ants (*Linepithema humile*), European starlings, wild turkeys (*Meleagris gallopavo*), bullfrogs (*Rana catesbeiana*), opossums (*Didelphimorphia*), house mice (*Mus musculus*), rats (*Rattus* spp.), and feral cats and dogs (*Canis lupus familiaris*)) may thrive in disturbed or otherwise marginal habitats and can harm native species through predation, competition, and displacement. Some of these non-native species may also have the potential to spread diseases and parasites to other native wildlife, as discussed below.

Urban Development Covered Activities in the UDA will increase the number of pet cats and dogs, and increase the potential for stray and feral animals. Unconstrained pets at the interface between habitat preserves and residential development can have significant predation effects on native wildlife, including birds, rodents, reptiles, and amphibians (e.g., Churcher and Lawton 1987; Kelly and Rotenberry 1993). Lost or abandoned pets may penetrate even farther into open space areas in search of food or refugia, including native prey.

Also, as noted below in the discussion of disease, domestic cats and dogs may be vectors for diseases that affect native wildlife, such as feline immunodeficiency virus, feline leukemia virus, feline infectious peritonitis, feline and canine distemper, panleukopenia, and rabies (Foley et al. 1999; Florida Fish and Wildlife Conservation Commission 2003).

Mesopredators

A related indirect consequence of habitat fragmentation and isolation is an increase in urban-adapted or urban-tolerant mesopredators, such as raccoons, skunks, opossums, and foxes (*Vulpes*

spp.), in small habitat fragments where top predators, such as coyotes and bobcats (*Lynx rufus*), have been removed (i.e., the "mesopredator release" effect) (Crooks and Soulé 1999). Non-native mesopredators also may include free-roaming stray and feral cats and dogs, which can have the same effects as wild mesopredators. These species can out-compete smaller native species for available resources and increase predation rates, thus reducing the distribution and populations of vulnerable native species (Crooks and Soulé 1999). The increase in mesopredators in fragmented habitats is often considered an indirect edge effect, but because some of these species can penetrate long distances in natural habitats in the absence of top predators (e.g., coyotes, bobcats), they also have landscape-level ecosystem effects.

Pesticides and Fertilizers

Pesticide (including fungicide, herbicide, and rodenticide) and fertilizer use associated with urban development may affect vegetation communities and habitat quality, be directly toxic to species, or indirectly toxic through prey vectors, or reduce prey abundance. These substances may penetrate the open space–urban interface through urban runoff from residential and commercial landscape areas and golf courses, overspray, wind, direct application in interface areas, soil penetration, and wildlife vectors.

Pesticides, for example, can act in several ways. The original pesticide can be toxic, its decomposed elements can be even more toxic, and it can "bioaccumulate," whereby the contaminant concentrates further in each successive link of the food chain, and thus reaches higher concentrations at higher levels of the food chain. Dichlorodiphenyltrichloroethane (DDT) and other chlorinated hydrocarbon pesticides have been used worldwide to control crop pests and disease-carrying insects since the 1940s. DDT was banned in the United States by the U.S. Environmental Protection Agency (EPA) in 1972 because of unacceptable risks to the environment and potential harm to human health (EPA 1972). Long-term ecological exposure and accumulation resulted in eggshell thinning and loss of young in many raptorial bird species, resulting in serious declines in reproductive success (Terres 1980; Henny and Wight 1972).

In a similar manner, fertilizers can enter wetland and riparian systems and cause eutrophication (excessive nutrients in water bodies) and result in large algae blooms. They also can enhance growth of non-native species in edge areas.

Rodenticides may also affect wildlife in various ways. Rodenticides are directly toxic to rodents, but may also indirectly affect rodent predators, such as hawks and owls, coyotes, snakes, etc., either through loss or contamination of prey. Eradication of rodents can also affect habitat quality for other species, such as burrowing owls (*Athene cunicularia*) that use ground squirrel (*Otospermophilus beecheyi*) burrows and many species of reptiles, amphibians, and insects that use rodent burrows as refugia and aestivation and hibernation habitat.

Chronic Ground Vibration and Noise

Chronic increases in noise related to urban development primarily result from increased traffic volumes at all hours. Other sources of development-related increases in noise that may affect native wildlife include operation of landscape maintenance equipment and tools (e.g., mowers, blowers, trimmers, wood chippers), active recreation at parks (particularly at night), loud music from vehicles and residences, noise from aircraft operations at Mather Airport, and on-site heavy equipment and machinery use by commercial and industrial businesses.

Some of these noise sources, such as traffic noise, are relatively constant (although with daily cycles related to peak traffic periods), and some wildlife species may habituate and adapt to the chronic ambient noise levels, while others may avoid noisy areas. Other noise sources are more occasional or discrete and are more likely to startle wildlife and at least temporarily disrupt their behavior at the time. Noise may affect wildlife in several ways that disrupt both their behavior and physiology in complex and interactive ways, including startling or annoying, raising stress levels, interrupting sleep and rest, interfering with acoustic communications, interfering with prey detection, and in the case of loud abrupt noises, causing permanent injury to the auditory system (Dooling 2006; Barrass and Cohn 1984; Brattstrom and Bondello 1983).

Lighting

Ecological light pollution associated with “full-buildout of the UDA” will increase ambient light and direct glare from sky glare, lighted buildings, streetlights, and security lights, and would generally be chronic. Lighting from vehicles will be both chronic and unexpected.

Longcore and Rich (2004) address the ecological effects of light pollution at three levels: (1) behavioral and population ecology, (2) community ecology, and (3) large-scale ecosystem functions. Effects at the behavioral and population ecology level include orientation/ disorientation and attraction/repulsion, reproduction, and communication, and are the main effects of lighting related to construction activities. Orientation and disorientation are responses to ambient light levels, while attraction and repulsion are responses to the source of light (e.g., moths attracted to a light bulb). Orientation includes artificially expanding behavioral repertoires of normally diurnal (active during the day) or crepuscular (active during dawn or twilight hours) species, such as foraging or territorial advertisement or mate attraction (e.g., singing birds), into nighttime periods. Disorientation may occur in nocturnal species that normally orient during dark periods and whose visual systems are adapted to low light levels. Attraction to lights affects birds, which may suffer injury or mortality due to collisions with permanent lighted structures. Many insects are attracted to light sources, resulting in high numbers of prey being taken by nocturnal insectivores such as bats. Repulsion of nocturnal wildlife by lights is probably quite common and may cause them to avoid lighted areas in their normal home ranges.

Wildlife reproduction may be affected by lighting in various ways. Movement to breeding areas, chorus behavior, and mate selection by some amphibians may be affected (Longcore and Rich 2004). Lighting may disturb the nighttime rest and sleep periods of diurnal species, including most passerine (perching) birds, having effects similar to noise, including annoying individuals and causing them to abandon nests that are otherwise perfectly suitable. Nest site selection by some birds may be affected by light, with nests being established farther from light sources (Longcore and Rich 2004). Artificial light may simulate increased day length, affecting reproductive cycles by triggering premature reproductive activity at a time when environmental conditions are not conducive to successful reproduction (e.g., cold temperatures and/or poor food resources). Because light may interfere with sleep, it can be stressful and may disrupt normal biological rhythms and raise the level of stress hormones, which may in turn affect reproductive capacity.

At the level of community ecology, light pollution may affect competition and predation (Longcore and Rich 2004). Behavioral interactions by groups of species may be affected by lighting as species move into the "light niche" (Longcore and Rich 2004). Species groups that normally partition foraging periods in relation to ambient light levels may be in direct competition under artificial light conditions (e.g., some bats). Likewise, species that are adapted to higher light levels (e.g., crepuscular species) may out-compete strictly nocturnal species, which normally forage in the darkest part of the night.

Lighting may increase the risk of predation of both nocturnal and diurnal species because they may be more detectable to nocturnal predators. Some species, such as amphibians, may be attracted to light because insect prey may congregate around light sources, which may in turn increase the risk of the amphibians being preyed upon. Longcore and Rich (2004) characterize this as a tradeoff in the benefit of foraging longer (or at richer sources) with the cost of higher predation risk. Many small species, such as rodents, rabbits, snakes, and bats, actually forage at lower rates at high illumination levels (Longcore and Rich 2004), which may be a biological adaptation to high levels of moonlight. Chronic ecological light pollution may favor light-tolerant species over those that are dark-adapted (Longcore and Rich 2004).

Lighting can also indirectly affect vegetation communities, potentially by altering the behavior of seed dispersers (e.g., small rodents and ants); other potential plant dispersers, such as larger mammals and birds that transport seeds and plant parts over longer distances; and pollinators.

Increased Human Activity

Urban development results in permanent increases in human presence from adjacent development. Increased human presence near preserves will affect essential and normal behavioral patterns and physiology of wildlife. Similar to noise and lighting effects, permanent increases in human activity from adjacent urban development will disturb nocturnal animals

during their rest or sleep periods, annoying them and causing harm to them if they abandon nests or den sites, as well as harming them by disrupting their normal biological rhythms and raising the level of stress hormones. Abandonment (even temporary) of active nests or dens increases the risk to eggs, nestlings, fledglings, and other dependent young. Flushing animals from nests, dens, and other refuges also increases their risk of injury or mortality from collisions with vehicles, as well as predation. Human presence may also alter the spatial behavior of animals, causing them to avoid certain parts of their home range, which may prevent them from using critical resources such as water.

Increases in human activity along the open space–urban interface may also result in trampling of vegetation and compaction of soils, affecting the viability of vegetation communities, wildlife habitat quality, and species that are sensitive to habitat structure, such as shrub and herbaceous vegetation integrity, soil friability, and burrowing substrate quality (e.g., rodents, reptiles, amphibians, and invertebrates). Increased human activity near preserves will also increase the amount of trash and debris that enters preserves and natural communities. Trash and debris can degrade vegetation communities and wildlife habitat, and can attract nuisance and pest species. Trash and debris include discarded packaging materials, plastic bags, and plastic and other lighter materials may be dispersed into natural areas by wind or along creeks and streams.

Increased Wildfire

Increased human activity related to urban development Covered Activities can result in increased wildfires. These fires are a result of human activities at the habitat preserve–urban interface, including accidental ignitions from sparks from equipment (e.g., mowers striking rocks), cigarettes, children playing with matches, etc., as well as intentional ignitions (i.e., arson). However, fires also may be ignited by downed or arcing power lines or cars catching on fire along roadways.

In most cases, wildfires in the UDA would be quickly suppressed for public safety and to protect property, but in some cases wildfires become uncontrollable and catastrophic. Wildfire suppression activities (e.g., grading, fire line construction) can also affect plant and animals through ground disturbance.

Outside the UDA, Covered Activities would not result in increased frequency, duration, or intensity of wildfire in that portion of the Plan Area.

Wildlife Disease

The increased human and associated pet population can increase the risk of disease transmission to native wildlife in the Plan Area. For example, free-ranging domestic cats and dogs can transmit new diseases to wild animals. Native wildlife in the Plan Area, including American

badger, gray fox (*Urocyon cinereoargenteus*), and coyote, may be at risk of canine distemper (Deem et al. 2000). Diseases transmitted from humans and pets also may affect raptors, such as Cooper's hawk (*Accipiter cooperii*). Boal and Mannan (1999) found that mortality of nestling Cooper's hawks in urban settings primarily was from trichomoniasis, which is caused by the parasitic protozoan *Trichomonas gallinae* that occurs in the digestive and urogenital tracts of many animals and humans. This parasite causes lesions in the mouth, throat, and crop of birds and prevents infected individuals from eating. An important vector of trichomoniasis in urban areas may be domestic pigeons and potentially wild doves, which are preyed on by hawks and falcons. Stabler (1941), for example, found that of 242 pigeons originating from Pennsylvania, Maryland, and New Jersey, 64.5% were infected with *Trichomonas gallinae*. West Nile virus has been identified as a potential factor in loggerhead shrike (*Lanius ludovicianus*) declines in the Central Valley based on a correlation between higher infection rates of the virus and greater declines in shrike abundance in Central Valley counties compared to other counties (Pandolfino 2008). Chytrid fungus is implicated in the decline of several amphibian species, and can infect California tiger salamander. However, chytrid fungus has not been found to be responsible for California tiger salamander mortality in the lab or the field (CDFG 2010).

Vehicle and Aircraft Collisions with Wildlife

The increased capacity of roads in urban areas and increased capacity of roads from rural transportation projects likely will increase the risk of vehicle collisions where wildlife use or attempt to cross roadways, particularly in areas that were frequently used by wildlife before roads were constructed or improved and other development was built. Wildlife may be able to cross two-lane, low-density, and lower-speed roads in relative safety, but if roads are expanded to four and six lanes, and traffic densities and speeds increase, vehicle strikes can increase dramatically. Factors related to the number and types of species affected therefore include vehicle speeds, traffic volume, traffic pulses, accessibility of cover, structure of the road (e.g., whether the road is raised or at grade level with the surrounding environment), barrier walls to prevent access to a roadway, and availability of alternative crossings, such as bridges and culverts (Dodd et al. 2004).

Increased use of Mather Airport following proposed expansions will also result in increased chance of bird strikes; however, such strikes are relatively uncommon and are not included in take estimates for covered bird species.

Aboveground Utilities

Power lines, transmission towers, and utility poles can cause collisions, entanglements, and electrocution of birds, especially raptors (Franson et al. 1995; Lehman et al. 2007). Bird Covered Species known to be at particular risk of collisions with aboveground utilities include

ferruginous hawk (*Buteo regalis*) and greater sandhill crane (*Grus canadensis*), as discussed in more detail in Section 6.6.

6.3.2 Temporary Environmental Stressors During Construction of Covered Activities

Construction Noise

Temporary direct effects related to noise will be generated during Covered Activities construction, including vegetation clearing, grading and earthmoving, excavation, trenching and tunneling, pouring of concrete and asphalt, and vehicle use. Construction may affect normal or essential behavioral patterns of covered wildlife in several ways. Excessive noise may affect bird Covered Species, for example, in at least four ways: (1) noise may annoy and cause birds to abandon nests that are otherwise suitable; (2) noise can raise the level of stress hormones, interfering with sleep and other activities; (3) intense noise can cause permanent injury to the auditory system; and (4) noise can interfere with acoustic communication by masking important sounds or sound components (Dooling 2006). Similar effects may occur in other taxa. For example, noise may interfere with communication in toads and frogs that use calls to advertise their location and attract mates (e.g., Barrass and Cohn 1984). Loud noise, such as off-road vehicles, may damage the hearing of some terrestrial species (Berry 1980; Brattstrom and Bondello 1983).

Construction Ground Vibration

Ground vibration will be generated during Covered Activities construction, including grading and earthmoving, excavation, trenching, and tunneling. Vibration caused by construction equipment may affect normal and essential behavioral patterns and the habitat of wildlife in several ways. Vibration from equipment operating in or near vernal pools, creeks, and other aquatic habitats may affect semi-aquatic Covered Species, such as giant gartersnake (*Thamnophis gigas*), western pond turtle (*Actinemys marmorata*), western spadefoot (*Spea hammondii*), and California tiger salamander, possibly causing them to alter their behavior and potentially abandon areas. For example, vibration can cause western spadefoot to emerge from burrow sites at inappropriate times because vibration created by machinery and construction equipment can mimic the effect of rainfall, which triggers western spadefoot emergence (Dimmitt and Ruibal 1980). Vibration may also directly disturb fossorial species that occupy burrows, dens, and depressions, including the covered western burrowing owl and American badger, as well as rodents, coyotes, and lagomorphs (rabbits and hares), causing them to abandon these areas and increase predation and vehicle collision risks. Excessive vibration might also cause the collapse of burrow systems and dens of fossorial species in areas with highly friable soils.

Construction Lighting

Ecological light pollution directly associated with construction ultimately would be temporary, but it may be considered chronic to some extent in terms of effects on wildlife. For example, lighting for security and public safety in some construction areas may extend for several months or more, thus potentially disrupting critical phases of species' life cycles, such as reproduction, or causing animals to abandon lighted areas. Other lighting effects may be short term or unexpected. Lighting during Urban Development Covered Activity construction primarily would occur during concrete and asphalt pouring and from vehicular use (Table 5-2), but also may be used for security and public safety and off-hours equipment maintenance (e.g., at staging areas). Lighting for nighttime construction or maintenance of construction equipment typically involves high-intensity lighting systems that may have very wide lightsheds and high glare values. Vehicle ingress and egress at construction sites may occur during twilight or nighttime hours (especially during winter months), resulting in unexpected light changes.

Construction Dust

Fugitive dust generated by Covered Activity construction, especially vegetation clearing and grading and earthmoving, can decrease photosynthesis and can kill individual plants by blocking or reducing light and penetration as well as photosynthesis, respiration, and transpiration; increased penetration of phytotoxic gaseous pollutants; and increased incidence of pests and diseases. The loss of plant vigor and productivity can directly affect covered plant species and covered wildlife that depend on plants for food or refuge. Construction vehicle traffic can also result in construction dust.

Increased Human Presence During Construction

Covered Activity temporary construction effects include activity at the construction site and ingress and egress to and from the construction area. Increased human presence during construction will temporarily affect essential and normal behavioral patterns and physiology of wildlife. Similar to noise and lighting effects, temporary increased human activity during construction will disturb nocturnal animals during their rest or sleep periods, annoying them and causing harm to them if they abandon nests or den sites, as well as harming them by disrupting their normal biological rhythms and raising the level of stress hormones. Abandonment (even temporary) of active nests or dens increases the risk to eggs, nestlings, fledglings, and other dependent young. Flushing animals from nests, dens, and other refuges also increases their risk of injury or mortality from collisions with construction equipment and other vehicles, as well as predation. Human presence may also alter the spatial behavior of animals, causing them to avoid certain parts of their home range, which may prevent them

from using critical resources such as water. In addition, construction traffic can result in crushing or disturbance of animal and plant species in and near construction sites.

Laydown or Trampling of Vegetation

Trampling of vegetation communities and wildlife habitat in designated construction zones may occur during construction activities such as vegetation clearing, equipment storage, and vehicle use. Accidental trampling of vegetation communities and wildlife habitat may also occur outside designated construction zones. These effects may occur for various reasons, including incorrect construction plans, human error in interpreting plans, human error or accidents in operating construction equipment, and misunderstandings or disregard by construction personnel in adhering to construction plan requirements, including avoidance of natural resources.

Construction Trash and Debris

Covered Activity construction might cause trash and other non-toxic debris to enter species habitat. Trash and debris can degrade vegetation communities and wildlife habitat, and can attract nuisance and pest species. Trash and debris include discarded construction-related materials, such as packaging materials, plastic bags, and plastic sheeting that may be dispersed into natural areas by wind or along creeks and streams. Trash generated by construction personnel, such as food packaging and cigarette butts, also can be dispersed by wind and water into natural areas. Pest and predatory species, such as crows and ravens, gulls (*Laridae*), coyotes, skunks, and raccoons, may be attracted to discarded food. Certain kinds of construction debris, such as fiberglass insulation, can be directly dangerous to wildlife. Trash and debris may also blow into preserves from adjacent development and roadways.

Temporary Alterations to Hydrographs and Water Quality Effects

Covered Activity construction will result in temporary release of contaminants in uplands during activities such as vegetation clearing, grading and earthmoving, excavation, trenching and tunneling, pouring concrete or asphalt, and landscaping, and equipment and vehicle refueling and maintenance. Chemical and toxic compound pollution (fuel, oil, lubricants, paints, release agents, and other construction materials) may affect the health of upland vegetation communities, covered wildlife habitats, and covered wildlife species. Wildlife may be affected by contaminants through direct exposure (e.g., to the skin, fur, or feathers), through consumption of contaminated food, or by reduced habitat quality.

Temporary hydrologic alterations potentially occurring from construction of Covered Activities, including dewatering activities, include changes in flow rates and patterns in streams and rivers that may temporarily affect adjacent and downstream aquatic, wetland, and riparian vegetation communities, and aquatic species (e.g., fish), semi-aquatic species (including SSHCP covered

reptiles such as giant gartersnake and western pond turtle), and riparian nesting birds. Construction of some Covered Activities may require temporary diversions or impoundments of surface waters and thus remove or degrade wetland and aquatic habitats during the period of diversion or impoundment.

Temporary water temperature changes also may occur due to temporary Covered Activity changes in the active channel morphology, thus affecting Covered Species associated with aquatic habitats (such as giant gartersnake, western pond turtle, western spadefoot, and California tiger salamander) that may have specific thermal tolerances.

Table 6-1
Environmental Stressors Associated with Covered Activities

Covered Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Urban Development																								
Residential, Commercial and Industrial Structures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Park and Recreation Facilities	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Water Supply Facilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Flood Control and Urban Stormwater Management in the UDA	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X								
Stream Bank Stabilization Projects	X	X		X	X	X	X	X	X	X	X	X		X	X	X								
Public and Private Utilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X

Table 6-1
Environmental Stressors Associated with Covered Activities

Covered Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Solid Waste Management Facilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Wastewater Facilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Urban Transportation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Stream Channel Modification	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X							
Capital Southeast Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Mather Airport Development Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Third-Party Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mining in the UDA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rural Transportation Projects																								
Rural Collector Road Improvements	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Arterial Road Improvements	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Table 6-1
Environmental Stressors Associated with Covered Activities

Covered Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Road Realignment Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Road Interchange Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Recycled Water Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Covered Activities in Preserve Setbacks in the UDA																								
Trails	X	X		X	X	X	X	X	X	X	X	X	X	X		X				X				
Bioswales	X	X		X	X	X	X	X	X	X	X	X	X	X	X									
Fencing	X	X			X	X	X		X	X	X		X											
Fire Breaks	X	X		X	X	X	X	X	X	X	X	X		X		X	X			X				
Benches, Shade Structures, and Shade Trees	X	X		X	X	X	X		X					X		X				X				
Interpretive Signs and Kiosks	X	X		X	X	X	X		X				X											

Table 6-1
Environmental Stressors Associated with Covered Activities

Covered Activity	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Covered Activities in Stream Setbacks in the UDA																									
Trails	X	X		X	X	X	X	X	X	X	X	X	X	X		X				X					
Bioswales	X	X		X	X	X	X	X	X	X	X	X	X	X	X										
Crossings	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X			X		
Stream-bank Stabilization	X	X		X	X	X	X	X	X	X	X	X		X	X	X									
Fencing	X	X			X	X	X		X	X	X		X												
Benches, Shade Structures, and Shade Trees	X	X		X	X	X	X		X					X		X				X					
Interpretive Signs and Kiosks	X	X		X	X	X	X		X				X												
Riparian Re-establishment and Establishment	X	X		X	X	X	X	X	X		X	X													
Outfalls	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X								

Table 6-1
Environmental Stressors Associated with Covered Activities

Covered Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Flood Control Structures and Stormwater Management	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X								
SSHCP Preserve System Covered Activities																								
Preserve Management and Monitoring	X	X	X	X	X	X		X													X			
Low-Impact Nature Trails	X	X		X	X			X	X	X		X		X						X				
Habitat Re-establishment and Establishment	X	X		X	X	X	X	X	X		X	X												
Species Surveys, Monitoring, Research and Adaptive Management Activities					X															X				

Table 6-1
Environmental Stressors Associated with Covered Activities

Covered Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Water Supply for Livestock	X	X			X	X	X					X												
Groundwater Monitoring and Extraction Wells	X	X		X	X	X	X	X				X						X						
Detention Basins	X	X		X	X	X	X	X	X		X	X	X	X	X									
Utility Maintenance and Repair	X	X	X		X	X	X										X			X	X		X	
Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System																								
Trails	X	X		X	X	X	X	X	X	X	X	X	X	X		X				X				
Bioswales	X	X		X	X	X	X	X	X	X	X	X	X	X	X									
Crossings	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X			X	
Stream-bank Stabilization	X	X		X	X	X	X	X	X	X	X	X		X	X	X								
Fencing	X	X			X	X	X		X	X	X		X											
Benches, Shade Structures, and Shade Trees	X	X		X	X	X	X		X					X		X				X				

Table 6-1
Environmental Stressors Associated with Covered Activities

Covered Activity	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Interpretive Signs and Kiosks	X	X		X	X	X	X		X				X												
Riparian Re-establishment and Establishment	X	X		X	X	X	X	X	X		X	X													
Outfalls	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X								
Flood Control Structures and Stormwater Management	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X									

Table 6-2
Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Plants																								
Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Dwarf downingia (*Downingia pusilla)*			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Legenere (*Legenere limosa)*			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Pincushion navarretia (*Navarretia myersii)*			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Sacramento Orcutt grass (*Orcuttia viscida*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Slender Orcutt grass (*Orcuttia tenuis*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			

Table 6-2
Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Sanford's arrowhead (*Sagittaria sanfordii*)			X	X	X	X	X	X	X	X		X		X	X		X		X	X	X			
Invertebrates																									
Vernal pool fairy shrimp (*Branchinecta lynchi*)			X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X			
Midvalley fairy shrimp (*Branchinecta mesovallensis*)			X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X			
Vernal pool tadpole shrimp			X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X			
Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i)			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)			X	X	X	X	X	X	X	X	X	X		X	X		X		X	X	X			

Table 6-2
Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Reptiles and Amphibians																									
California tiger salamander (*Ambystoma californiense*)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Western spadefoot (*Spea hammondii*)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Giant gartersnake (*Thamnophis gigas*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Western pond turtle (*Actinemys marmorata*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Birds																									
Cooper's hawk (*Accipiter cooperii*)	X	X	X		X			X	X	X	X	X				X	X	X	X	X	X	X	X	X	X
Ferruginous hawk (*Buteo regalis*)					X			X	X	X	X	X					X			X	X	X	X	X	X

Table 6-2
Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Swainson's hawk (*Buteo swainsoni*)	X	X	X	X	X		X		X	X	X					X		X	X	X	X	X	X	X
White-tailed kite (*Elanus leucurus*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Northern harrier (*Circus cyaneus*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Western burrowing owl (*Athene cunicularia*)	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X
Loggerhead shrike (*Lanius ludovicianus*)	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X
Greater sandhill crane (*Grus canadensis*)	X	X	X	X	X	X	X	X	X	X		X					X	X	X	X	X	X	X	X
Tricolored blackbird (*Agelaius tricolor*)	X	X	X	X	X		X	X	X	X	X	X				X	X	X	X	X	X	X	X	X

Table 6-2
Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Mammals																									
American badger (*Taxidea taxus*)	X	X	X		X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X		
Western red bat (*Lasiurus blossevillii*)	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X		X	

6.4 Methods to Assess Effects of Covered Activities

Implementation of Covered Activities will result in incidental take of Covered Species and their modeled habitats. To meet regulatory requirements, properly mitigate effects, achieve the SSHCP Conservation Strategy (Chapter 7), and charge fees equitably (Chapter 9), the amount of species take must be quantified. Because of the broad geographic scope of the Plan, length of the proposed Permit Term, and because the details of many future activities and projects are not known at the time of SSHCP preparation, this effects assessment in is conducted at a programmatic level. The direct and indirect effects presented in this chapter reflect the maximum potential effects of the SSHCP Covered Activities on each land cover type and species modeled habitat. As discussed in Chapter 9, once these effect levels are reached, no further take is allowed under the SSHCP permits. The individual Covered Activity categories described in Chapter 5 do not have specific effect limits. This effects analysis assumes that all Covered Activities will effectively implement required SSHCP Avoidance and Minimization Measures (AMMs, described in Section 5.4 and summarized in Section 6.4.1) to assure effects are minimized to the maximum extent.

This effects analysis assumes that all currently undeveloped parcels located within the UDA boundary will be developed during the proposed 50-year SSHCP Permit Term, except for UDA parcels that are: (1) an existing preserve or permanently protected by a conservation easement (see Chapter 3), (2) are in the planned SSHCP Preserve System (see Chapter 7, Conservation Strategy), (3) within areas of Preserve Setbacks not altered through development of trails (Section 5.3), (4) within Non-Vernal Pool Ecosystem land cover types within Stream Setbacks that are not altered through development of trails[1] (Section 5.3), (5) within 8,660 acres of the approximately 9,160 acres of already subdivided parcels (defined as large lot sizes of 0.5 to 4.5 acres for the purposes of this effects analysis) primarily west of Excelsior Road in the UDA,[2] or (6) are the site of a proposed project with existing ESA incidental take authorization and other required entitlements.[3] Therefore,

1 All Vernal Pool, Swale, and Stream/Creek (VPIH) located within SSHCP Stream Setbacks were assumed to be permanently impacted.

2 Most of these 0.5- to 4.5-acre lots contain single-family dwellings in a matrix of agricultural uses or Valley Grassland (e.g., estate homes, hobby farms, or horse properties). Based on historical land use patterns and the expertise of County planners related to these areas, the Plan Permittees assume that these properties are likely to remain as single-family dwelling units and are unlikely to be further developed or significantly modified over the proposed 50-year Permit Term. Therefore, the SSHCP assumes that Urban Development Covered Activities occurring on these 0.5- to 4.5-acre lots mostly west of Excelsior Road will result in a maximum conversion of 500 acres over the Permit Term. These assumptions are used only to develop estimates of effects to Covered Species modeled habitats within the UDA.

3 The Mather Field Specific Plan is still pursuing its own ESA consultation with the USFWS and a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers; however, the SSHCP effect analysis treats parcels within the boundary of the Mather Field Specific Plan the same as parcels with existing ESA incidental take authorization and other entitlements.

future urban development and associated infrastructure as well as mining Covered Activities to be implemented within the UDA were broadly defined in Chapter 5, and information on the precise locations of most Covered Activities within the UDA is not presented. Consequently, this chapter's analysis of Covered Activity effects within the UDA did not attempt to discern the effect of individual, separate activities.

The species effects presented in this chapter are based on the best available information on extent and duration of effects for each SSHCP Covered Activity (Chapter 5) and the best available information on modeled habitat and occurrences for each SSHCP Covered Species (Chapter 3 and Appendix B). When available, project-specific geographic information system (GIS) layers for project footprints were used. Absent project-specific GIS layers, general plan designations were used to estimate projected development locations and boundaries. Further, the Permittees conducted an extensive review of Covered Species occurrences in the Plan Area (Appendix B), and updated the database of occurrences during SSHCP preparation as new information became available (e.g., tricolored blackbird counts conducted every three years). Therefore, this chapter presents valid estimates of the effects of the SSHCP Covered Activities on Covered Species and Covered Species modeled habitat.

6.4.1 SSHCP Avoidance and Minimization Measures

As described in Section 5.4, AMMs are required elements of all Covered Activity design or implementation. The impact calculations presented in this chapter assume full implementation and effectiveness of all SSHCP AMMs, including:

- Low-effect development measures (LIDs);
- Road design requirements;
- BMPs for road construction and maintenance;
- BMPs for construction adjacent to preserves, habitat linkages, and wetland/riparian areas;
- Post-construction BMPs adjacent to preserves, habitat linkages, and wetland/riparian areas;
- Design features and requirements for public access in the SSHCP Preserve System; and
- Species-specific measures.

The SSHCP Covered Activity AMMs are described in Section 5.4. Table 6-3 lists the general AMMs, Covered Species affected, and the environmental stressor that the measure reduces.

In analyzing effects of Covered Activities, the Permittees assumed that (1) the required AMMs will always be included and implemented along with each SSHCP Covered Activity (see Section 5.4), (2) the appropriate AMMs will always be correctly implemented by the Permittees and by

Third-Party Project Proponents implementing Covered Activities (see Chapter 9), and that (3) each AMM will be effective in avoiding or minimizing both direct and indirect effects to the maximum extent. The SSHCP assumes that AMM implementation will ensure that the actual acres of impact will not exceed the acres or locations of effects presented herein. The effectiveness of AMMs will be ensured through monitoring, as described in Chapter 8.

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
Condition 1. Avoid and Minimize Urban Development Impacts to Watershed Hydrology and Water Quality			
LID-1	Stormwater Quality	All	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Pesticides and Fertilizers.
LID-2	Groundwater Recharge	All	Permanent Alterations to Hydrographs and Downstream Water Quality Effects.
LID-3	Natural Site Features	All	Loss of Land Covers and Covered Species Habitat; Permanent Alterations to Hydrographs and Downstream Water Quality Effects.
Condition 2. Avoid and Minimize Urban Development Direct and Indirect Impacts to Existing Preserves and SSHCP Preserves			
EDGE-1	Compatible Land Uses	All	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Pesticides and Fertilizers; Vernal Pool Hydrologic Alterations; Invasive Plants; Invasive Animals; Chronic Ground Vibration and Noise; Lighting; Increased Human Activity; Increased Wildfire; Wildlife Disease; Vehicle and Aircraft Collisions with Wildlife.
EDGE-2	Single-Loaded Streets	All	Wildlife Community Alterations; Invasive Animals; Chronic Ground Vibration and Noise; Lighting; Increased Human Activity; Increased Wildfire; Wildlife Disease; Vehicle and Aircraft Collisions with Wildlife.
EDGE-3	Preserve Setbacks	All	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Pesticides and Fertilizers; Vernal Pool Hydrologic Alterations; Invasive Plants; Invasive Animals; Chronic Ground Vibration and Noise; Lighting; Increased Human Activity; Increased Wildfire; Wildlife Disease; Vehicle and Aircraft Collisions with Wildlife.

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
EDGE-4	Locate Stormwater Control Outside Preserves	All	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Vernal Pool Hydrologic Alterations; Pesticides and Fertilizers.
EDGE-5	Stormwater Control in Preserve Setbacks	All	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Pesticides and Fertilizers.
EDGE-6	Detention Basins in Linkage Preserves	All	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Vernal Pool Hydrologic Alterations; Pesticides and Fertilizers.
EDGE-7	Hardpan/Duripan Protection	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	Vernal Pool Hydrologic Alterations
EDGE-8	Outdoor Lighting	Ricksecker's water scavenger beetle ,valley elderberry longhorn beetle, California tiger salamander, western spadefoot, giant gartersnake, western pond turtle, Cooper's hawk, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	Lighting

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
EDGE-9	Livestock Access to Preserves	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Vernal Pool Hydrologic Alterations; Invasive Plants; Increased Human Activity; Vehicle and Aircraft Collisions with Wildlife.
EDGE-10	Prevent Invasive Species Spread	All	Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Pesticides and Fertilizers; Vernal Pool Hydrologic Alterations; Invasive Plants.
Condition 3. Implement Construction Best Management Practices (BMPs)			
BMP-1	Construction Fencing	All	Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
BMP-2	Erosion Control	All	Temporary Alterations to Hydrographs and Water Quality Effects
BMP-3	Equipment Storage and Fueling	All	Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects

AGENDA ITEM 11.1

657

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
BMP-4	Erodible Materials	All	Temporary Alterations to Hydrographs and Water Quality Effects
BMP-5	Dust Control	All	Construction Dust
BMP-6	Construction Lighting	Ricksecker's water scavenger beetle , valley elderberry longhorn beetle, California tiger salamander, western spadefoot, giant gartersnake, western pond turtle, Cooper's hawk, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat.	Construction Lighting
BMP-7	Biological Monitor	All	Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
BMP-8	Training of Construction Staff	All	Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
BMP-9	Soil Compaction	All	Temporary Alterations to Hydrographs and Water Quality Effects; Wildlife Community Alterations; Permanent Alterations to Hydrographs and Downstream Water Quality Effects; Invasive Plants.
BMP-10	Revegetation	All	Temporary Alterations to Hydrographs and Water Quality Effects; Wildlife Community Alterations; Laydown or

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
			Trampling of Vegetation.
BMP-11	Speed Limit	All	Construction Noise; Construction Ground Vibration; Construction Dust;
Condition 4. Avoid and Minimize Effects that May Result From Implementation of Covered Transportation Projects			
ROAD-1	Road Project Location	All	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations; Vernal Pool Hydrologic Alterations; Invasive Plants; Pesticides and Fertilizers; Chronic Ground Vibration and Noise; Lighting
ROAD-2	Wildlife Crossing Structures	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, American badger	Habitat Fragmentation; Wildlife Community Alterations; Mesopredators; Vehicle and Aircraft Collisions with Wildlife
ROAD-3	Roadside Pesticide Use	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot	Wildlife Community Alterations; Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants; Pesticides and Fertilizers
Condition 5. Avoid and Minimize Impacts that Result From Public Use of Low-Impact Nature Trails in Preserves			
NATURE TRAIL-1	Nature Trail Plan	All	Invasive Plants; Invasive Animals; Lighting; Increased Human Activity; Wildlife Disease
NATURE TRAIL-2	Nature Trail Protection of Duripan	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp,	Vernal Pool Hydrologic Alterations

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
		vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	
NATURE TRAIL-3	Nature Trail Location	All	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Increased Human Activity; Wildlife Disease
NATURE TRAIL-4	Biological Studies Prior to Nature Trail Design	All	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Increased Human Activity; Wildlife Disease
NATURE TRAIL-5	Monitoring of Nature Trail Impacts	All	Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants; Invasive Animals; Lighting; Increased Human Activity; Wildlife Disease
Condition 6. Avoid and Minimize Impacts to Existing Vernal Pools When Re-establishing or Establishing Vernal Pools Wetlands			
RE-ESTABLISHMENT/ ESTABLISHMENT-1	Vernal Pool	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	Vernal Pool Hydrologic Alterations

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
RE-ESTABLISHMENT/ ESTABLISHMENT-2	Vernal Pool Inocula Bank	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	Invasive Plants; Wildlife Community Alterations
Condition 7. Avoid and Minimize Impacts to Streams and Creeks			
STREAM-1	Laguna Creek Wildlife Corridor	Valley elderberry longhorn beetle, giant gartersnake, western pond turtle, Cooper's hawk, Swainson's hawk, white-tailed kite, western red bat	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations, Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants; Mesopredators; Pesticides and Fertilizers; Increased Human Activity; Chronic Ground Vibration and Noise; Lighting; Wildlife Disease; Vehicle and Aircraft Collisions with Wildlife
STREAM-2	UDA Stream Setbacks	Valley elderberry longhorn beetle, giant gartersnake, western pond turtle, Cooper's hawk, Swainson's hawk, white-tailed kite, western red bat	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations, Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants; Mesopredators; Pesticides and Fertilizers; Increased Human Activity; Chronic Ground Vibration and Noise; Lighting; Wildlife Disease; Vehicle and Aircraft Collisions with Wildlife
STREAM-3	Minor Tributaries to UDA Streams	Valley elderberry longhorn beetle, giant gartersnake, western pond turtle, Cooper's hawk, Swainson's hawk, white-tailed kite, western red bat	Loss of Land Covers and Covered Species Habitat; Wildlife Community Alterations, Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants; Pesticides and Fertilizers; Lighting

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
STREAM-4	Minimize Effects from Temporary Channel Re-Routing	Valley elderberry longhorn beetle, giant gartersnake, western pond turtle, Cooper's hawk, Swainson's hawk, white-tailed kite, western red bat	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations, Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants
STREAM-5	Design for Stream Channel Re-Routing, Widening, or Deepening	Valley elderberry longhorn beetle, giant gartersnake, western pond turtle, Cooper's hawk, Swainson's hawk, white-tailed kite, western red bat	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations, Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants
Condition 8. Avoid and Minimize Impacts to Covered Species from Utility and Utility Maintenance Covered Activities			
UTILITY-1	Avian Collision Avoidance	Ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird,	Aboveground Utilities
UTILITY-2	Utility Maintenance on Preserves	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	Laydown or Trampling of Vegetation; Temporary Alterations to Hydrographs and Water Quality Effects
UTILITY-3	Trenchless Construction Methods	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's	Construction Dust; Increased Human Presence; Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations; Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Vernal Pool Hydrologic Alterations; Invasive Plants

AGENDA ITEM 11.1

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
		hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat	
UTILITY-4	Siting of Entry and Exit Location	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, mid-valley fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, California tiger salamander, western spadefoot, ferruginous hawk, Swainson's hawk, white-tailed kite, northern harrier, western burrowing owl, loggerhead shrike, greater sandhill crane, tricolored blackbird, American badger, western red bat,	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations; Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Vernal Pool Hydrologic Alterations; Invasive Plants
Condition 9. Avoid and Minimize Impacts That Might Result From Removing or Breaching Levees to Establish or Re-establish Riparian Habitat			
LEVEE-1	Preparation of Hydrologic Analysis	All	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations; Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Vernal Pool Hydrologic Alterations
General Covered Species Take AMMs			
SPECIES-1	Litter Removal Program	All	Construction Trash and Debris
SPECIES-2	No Pets in Construction Areas	All	Increased Human Presence
SPECIES-3	Take Report	All	Take of Covered Species, Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations, Pesticides and Fertilizers; Increased Human Activity; Vehicle and Aircraft Collisions with Wildlife
SPECIES-4	Post-Construction Compliance Report	All	Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Wildlife Community Alterations,

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
			Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects; Invasive Plants; Mesopredators; Pesticides and Fertilizers; Increased Human Activity; Chronic Ground Vibration and Noise; Lighting; Wildlife Disease; Vehicle and Aircraft Collisions with Wildlife
Species Specific Measures			
PLANT-1	Rare Plant Surveys	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia , legenere, pincushion navarretia), Sanford's arrowhead	Take of Covered Species Occurrences, Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Dust; Laydown or Trampling of Vegetation; Increased Human Presence Near Construction Sites; Construction Trash and Debris
PLANT-2	Rare Plant Protection	Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia , legenere, pincushion navarretia), Sanford's arrowhead	Take of Covered Species Occurrences, Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Dust; Laydown or Trampling of Vegetation; Increased Human Presence Near Construction Sites; Construction Trash and Debris
ORCUTT-1	Orcutt Grass Surveys	Sacramento Orcutt Grass, Slender Orcutt Grass	Take of Covered Species Occurrences, Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Dust; Laydown or Trampling of Vegetation; Increased Human Presence Near Construction Sites; Construction Trash and Debris
ORCUTT-2	Orcutt Grass Protection	Sacramento Orcutt Grass, Slender Orcutt Grass	Take of Covered Species Occurrences, Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Dust; Laydown or Trampling of Vegetation; Increased Human Presence Near Construction Sites; Construction Trash and Debris
CTS-1	California Tiger Salamander Daily Construction Schedule	California tiger salamander	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
			During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
CTS-2	California Tiger Salamander Monitoring	California tiger salamander	Take of Covered Species Occurrences; Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
CTS-3	California Tiger Salamander Exclusion Fencing	California tiger salamander	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
CTS-4	Avoid California Tiger Salamander Entrapment	California tiger salamander	Take of Covered Species Occurrences
CTS-5	Erosion Control Materials in California Tiger Salamander Habitat	California tiger salamander	Take of Covered Species Occurrences
CTS-6	California Tiger Salamander Encounter Protocol	California tiger salamander	Take of Covered Species Occurrences; Increased Human Presence During Construction
CTS-7	Rodent Control	California tiger salamander	Take of Covered Species Occurrences; Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Temporary Alterations to Hydrographs and Water Quality Effects; Increased Human Presence During Construction; Pesticides and Fertilizers

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
WS-1	Western Spadefoot Surveys	Western spadefoot	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WS-2	Western Spadefoot Work Window	Western spadefoot	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WS-3	Western Spadefoot Monitoring	Western spadefoot	Take of Covered Species Occurrences; Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WS-4	Western Spadefoot Exclusion Fencing	Western spadefoot	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WS-5	Avoid Western Spadefoot Entrapment	Western spadefoot	Take of Covered Species Occurrences
WS-6	Erosion Controls in Western Spadefoot Habitat	Western spadefoot	Take of Covered Species Occurrences

AGENDA ITEM 11.1

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
WS-7	Western Spadefoot Encounter Protocol	Western spadefoot	Take of Covered Species Occurrences; Increased Human Presence During Construction
GGS-1	Giant Gartersnake Surveys	Giant gartersnake	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GGS-2	Giant Gartersnake Work Window	Giant gartersnake	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GGS-3	Giant Gartersnake Monitoring	Giant gartersnake	Take of Covered Species Occurrences; Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GGS-4	Giant Gartersnake Habitat Dewatering and Exclusion	Giant gartersnake	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GGS-5	Avoid Giant Gartersnake Entrapment	Giant gartersnake	Take of Covered Species Occurrences

AGENDA ITEM 11.1

667

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
GGS-6	Erosion Control Materials in Giant Gartersnake Habitat	Giant gartersnake	Take of Covered Species Occurrences
GGS-7	Giant Gartersnake Encounter Protocol	Giant gartersnake	Take of Covered Species Occurrences; Increased Human Presence During Construction
GGS-8	Giant Gartersnake Post-Construction Restoration	Giant gartersnake	Loss of Land Covers and Covered Species Habitat, Habitat Fragmentation; Wildlife Community Alterations; Permanent Alterations to Hydrographs and Water Quality Effects; Invasive Plants
WPT-1	Western Pond Turtle Surveys	Western pond turtle	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WPT-2	Western Pond Turtle Work Window	Western pond turtle	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WPT-3	Western Pond Turtle Monitoring	Western pond turtle	Take of Covered Species Occurrences; Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WPT-4	Western Pond Turtle Habitat Dewatering and Exclusion	Western pond turtle	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction

AGENDA ITEM 11.1

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
			Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WPT-5	Avoid Western Pond Turtle Entrapment	Western pond turtle	Take of Covered Species Occurrences
WPT-6	Erosion Controls in Western Pond Turtle Habitat	Western pond turtle	Take of Covered Species Occurrences
WPT-7	Western Pond Turtle Modeled Habitat Speed Limit	Western pond turtle	Take of Covered Species Occurrences; Increased Human Presence During Construction.
WPT-8	Western Pond Turtle Encounter Protocol	Western pond turtle	Take of Covered Species Occurrences; Increased Human Presence During Construction
WPT-9	Western Pond Turtle Post Construction Restoration	Western pond turtle	Loss of Land Covers and Covered Species Habitat, Habitat Fragmentation; Wildlife Community Alterations; Permanent Alterations to Hydrographs and Water Quality Effects; Invasive Plants
TCB-1	Tricolored Blackbird Surveys	Tricolored blackbird	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
TCB-2	Tricolored Blackbird Pre-Construction Surveys	Tricolored blackbird	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
TCB-3	Tricolored Blackbird Nest Buffer	Tricolored blackbird	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
			Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
TCB-4	Tricolored Blackbird Nest Buffer Monitoring	Tricolored blackbird	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
TCB-5	Timing of Pesticide Use and Harvest Timing on Agricultural Preserves	Tricolored blackbird	Take of Covered Species Occurrences; Increased Human Presence; Vehicle and Aircraft Collisions with Wildlife; Pesticides and Fertilizers
SWHA-1	Swainson's Hawk Surveys	Swainson's hawk	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
SWHA-2	Swainson's Hawk Pre-Construction Surveys	Swainson's hawk	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
SWHA-3	Swainson's Hawk Nest Buffer	Swainson's hawk	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
SWHA-4	Swainson's Hawk Nest Buffer Monitoring	Swainson's hawk	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GSC-1	Greater Sandhill Crane Surveys	Greater sandhill crane	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GSC-2	Greater Sandhill Crane Pre-Construction Surveys	Greater sandhill crane	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GSC-3	Greater Sandhill Crane Roost Buffer	Greater sandhill crane	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
GSC-4	Greater Sandhill Crane Visual Barrier	Greater sandhill crane	Take of Covered Species Occurrences; Construction Noise; Construction Lighting; Construction Dust; Increased Human Presence During Construction
GSC-5	Greater Sandhill Crane Roosting Buffer Monitoring	Greater sandhill crane	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
			Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
WBO-1	Burrowing Owl Surveys	Western burrowing owl	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris
WBO-2	Burrowing Owl Pre-Construction Survey	Western burrowing owl	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris
WBO-3	Burrowing Owl Avoidance	Western burrowing owl	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris
WBO-4	Burrowing Owl Construction Monitoring	Western burrowing owl	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris
WBO-5	Burrowing Owl Passive Relocation	Western burrowing owl	Take of Covered Species Occurrences; Increased Human Presence During Construction
WBO-6	Burrowing Owl Timing of Maintenance Activities	Western burrowing owl	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Construction Dust; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
WBO-7	Rodent Control	Western burrowing owl	Take of Covered Species Occurrences; Loss of Land Covers and Covered Species Habitat; Habitat Fragmentation; Temporary Alterations to Hydrographs and Water Quality Effects; Increased Human Presence During Construction; Pesticides and Fertilizers
RAPTOR-1	Raptor Surveys	Cooper's hawk, loggerhead shrike, northern harrier, and white-tailed kite	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris
RAPTOR-2	Raptor Pre-Construction Surveys	Cooper's hawk, loggerhead shrike, northern harrier, and white-tailed kite	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris
RAPTOR-3	Raptor Nest/Roost Buffer	Cooper's hawk, loggerhead shrike, northern harrier, and white-tailed kite	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris
RAPTOR-4	Raptor Nest/Roost Buffer Monitoring	Cooper's hawk, loggerhead shrike, northern harrier, and white-tailed kite	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris

Table 6-3
Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals

Measure	Title of Measure	Covered Species	Relevant Environmental Stressors
BAT-1	Winter Hibernaculum Surveys	Western red bat	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
BAT-2	Winter Hibernaculum Pre-Construction Surveys	Western red bat	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
BAT-3	Winter Hibernaculum Buffer	Western red bat	Take of Covered Species Occurrences; Construction Noise; Construction Ground Vibration; Construction Lighting; Increased Human Presence During Construction; Laydown or Trampling of Vegetation; Construction Trash and Debris; Temporary Alterations to Hydrographs and Water Quality Effects
BAT-4	Bat Eviction Methods	Western red bat	Take of Covered Species Occurrences; Increased Human Presence During Construction

6.4.2 GIS-Driven Calculation of Permanent Effects

The effects of Covered Activities on each SSHCP land cover and each Covered Species were quantified using a GIS. The Permittees used GIS to overlay an electronic map-layer of Covered Activity footprints onto an electronic map-layer of the Plan Area Land Cover Types baseline map (Figure 3-1) and quantified the acres of overlap to determine acres of direct impact to each SSHCP land cover type and each species modeled habitat.

This chapter's impact methodology assumes that all Covered Species modeled habitat currently existing within the UDA will be permanently removed, except:

- Within existing preserves,
- Within the areas proposed for the SSHCP Preserve System (Section 7.5),
- Within areas of Preserve Setbacks not altered through development of trails (Section 5.3),
- Non-Vernal Pool Ecosystem land cover types within Stream Setbacks that are not altered through development of trails[4] (Section 5.3);
- Sites of proposed projects with existing ESA incidental take authorization and other required entitlements;[5] and
- Within 8,660 acres of the approximately 9,160 acres of already-subdivided parcels (defined as large lot sizes of 0.5 to 4.5 acres for the purposes of this effect analysis) primarily west of Excelsior Road in the UDA[6]. As discussed in Chapter 5, only three categories of development Covered Activities (Rural Transportation Projects, Recycled water Projects, and operations/maintenance of flood control facilities) will be constructed within the Plan Area outside the UDA (see Figures 5-5 and 5-6). For Covered Activities outside the UDA, specific project details and planned locations are known at this time, and are presented in Sections 5.2.3 and 5.2.4.

---

4 All Vernal Pool, Swale, and Stream/Creek (VPIH) located within SSHCP Stream Setbacks were assumed to be permanently impacted.

5 The Mather Field Specific Plan is still pursuing its own ESA consultation with USFWS and a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers; however, the SSHCP effects analysis treats parcels within the boundary of the Mather Field Specific Plan the same as parcels with existing ESA incidental take authorization and other entitlements.

6 Most of these 0.5- to 4.5-acre lots contain single-family dwellings in a matrix of agricultural uses or Valley Grassland (e.g., estate homes, hobby farms, or horse properties). Based on historical land use patterns and the expertise of County planners related to these areas, the Plan Permittees assume that these properties are likely to remain as single-family dwelling units and are unlikely to be further developed or significantly modified over the proposed 50-year Permit Term. Therefore, the SSHCP assumes that Urban Development Covered Activities occurring on these 0.5- to 4.5-acre lots mostly west of Excelsior Road will result in a maximum conversion of 500 acres over the Permit Term. These assumptions are used only to develop estimates of effects to Covered Species modeled habitats within the UDA.

Effects of projects outside the UDA were estimated by overlaying an electronic GIS map of the maximum project footprints (including Construction Zones) onto the GIS maps of known species occurrences, Covered Species modeled habitats, and any designated species Critical Habitat. These effect footprints incorporate maximum estimated construction, grading, and staging areas associated with construction and operations activities. Habitats for covered vernal pool plants and invertebrates partially located within the effect footprint of a Covered Activity were assumed to be completely affected.

Buffers were applied using GIS to all transportation project Covered Activities outside the UDA to identify Construction Zones that enclose areas of direct and indirect effects:

- Thoroughfares (typically four to six lanes (see Section 5.2.3): Permittees used the GIS "buffer" tool to delineate a 80-foot distance on either side of the roadway's centerline to map the maximum 160-foot-wide Construction Zone for each Thoroughfare project described in Section 5.2.3. To accommodate new turn lanes at intersections, the Thoroughfare project maximum Construction Zone width was increased from 80 to 186 feet on both sides of an intersection, beginning 500 feet from the intersection center.
- Arterial roads (typically four-lane roadways with a center two-way left-turn lane or a raised center median): Permittees used the GIS "buffer" tool to delineate a 67-foot distance from the road centerline to create a 134-foot Construction Zone along road segments for each arterial road project described in Section 5.2.3.
- Collector roads (two-lane roads in rural areas): Permittees used the GIS "buffer" tool to delineate a 62-foot distance from the road centerline to create a 125-foot Construction Zone along road segments for each collector road project described in Section 5.2.3.
- Roads forming interchange overpass, on-ramps, and off-ramps for I-5 and SR-99: Permittees used the GIS "buffer" tool to delineate a 75-foot distance from the road centerline to create a 150-foot Construction Zone were buffered by 150 feet using GIS.
- Roads planned for re-aligning: Permittees used the GIS "buffer" tool to delineate a 200-foot distance from the road centerline to create a 400-foot Construction Zone along road segments planned for re-alignment. This 400-foot-wide Construction Zone is necessary because is many instances the final combination of alignments has not been determined, so a conservatively large Construction Zone ensures that any areas that might possibly be affected are included in calculations.
- In compliance with AMM ROAD-1 (Section 5.4), new Roadways that cross planned SSHCP preserves within the UDA will be designed by project proponents to avoid and minimize direct effects on vernal pools and other wetlands.

- GIS buffers were developed on a case-by-case basis for roads that are planned for widening adjacent to existing preserves, roads in areas where existing infrastructure or an abundance of wetland resources may limit expansion on one side of the road, and at right-angle turns. The Permittees used their professional judgment when reviewing aerial imagery and SSHCP land cover type mapping and applied GIS buffers to create Construction Zones that are appropriate for each individual situation.
- The Construction Zone is wider where any of the above roadways cross streams. In particular, larger roadway Construction Zones were mapped at stream crossings to allow for greater flexibility and movement of construction equipment. Section 5.2.3 identifies a total of 48 stream crossings of rural road improvements projects outside the UDA. At these 48 stream crossings, an additional 25-foot GIS buffer was applied on either side of the road Construction Zone to create a stream crossing Construction Zone 50 feet greater than the initial road Construction Zone. For example, if the initial road Construction Zone is 108 feet then the portion of that road that crosses a stream has a Construction Zone of 158 feet).

For the Capital Southeast Connector, the Southeast Connector Joint Powers Authority (Connector JPA) provided project-specific construction footprints (Section 5.2.1.1). Although the roadway widths along the Capital Southeast Connector would vary, the Permittees assumed the Construction Zone for the Capital Southeast Connector is 200 feet wide across the entire alignment, centered on the road centerline. This provides for a conservative estimate of permanent effect, considering that the Construction Zone for a thoroughfare is assumed to be only 160 feet wide. The one exception to this uniform 200-foot-wide Construction Area for the Capital Southeast Connector is at intersections, where the Construction Zone was determined on a case-by-case basis.

- Construction Zones for planned UDA pipelines (Section 5.2.1) that could affect existing preserves or SSHCP Preserves were determined in GIS as follows:
    - Planned UDA sewer lines were buffered in GIS by 30 feet to map a 60-foot Construction Zone.
    - Planned UDA water pipelines were buffered in GIS by 20 feet to map a 40-foot Construction Zone.
    - Planned UDA recycled water pipelines were buffered in GIS by 37.5 feet to map a 75-foot Construction Zone.
    - For UDA pipeline segments that are planned to be constructed using trenchless construction methods, permanent effects were mapped for a 12-foot-wide dirt access road along the trenchless pipeline alignment. The entry and exit locations were assumed to be located outside Preserves within the area of permanent effect in the

UDA. Access road alignments were adjusted in GIS to avoid effects on jurisdictional waters and wetlands.

Outside the UDA, the Permittees calculated the permanent effects of construction and ongoing maintenance and operations by applying GIS buffers to the footprints of proposed projects (i.e., roadways, recycled-water delivery projects). These footprints were obtained from the project proponents, including the Connector JPA, SRCSD, and others.

The Permittees assume in the land cover effect analysis in Section 6.5 and the Covered Species effects analysis in Section 6.6 that all temporary effects associated with Covered Activities will occur within the permanent effect footprint or would be contained through AMMs before entering preserves. The Permittees assume that Covered Activity temporary construction activities such as equipment and material staging will occur within the UDA permanently affected areas, or in the Construction Zones included as permanently effected outside the UDA. Therefore, temporary construction effects were not calculated separately. Similarly, the Permittees assume that most operation and maintenance will not result in additional effects to habitat because the analysis assumes full removal of natural land cover types within permanent effect footprints. Operations and maintenance activities could result in some recurring direct take of birds, which is discussed qualitatively for each species as appropriate in Section 6.6. In addition, flood control and stormwater management maintenance activities in the UDA will result in temporary loss of habitat for western pond turtle. However, these activities will not affect giant gartersnake because they will be limited to the UDA which does not contain modeled giant gartersnake habitat.

6.4.2.1 Determining Take of Covered Species and Removal of Modeled Habitat

As discussed in Chapter 3, maps were generated of each Covered Species' modeled habitat to show portions of the Plan Area that will be used for species breeding, feeding, roosting, sheltering, foraging, or other important life history activities (Section 3.4). The Covered Activity footprints described above were overlaid in GIS onto the maps of Covered Species modeled habitat, and wherever the two overlapped, Covered Species modeled habitat was considered removed. When Valley Grassland is converted to Vernal Pool or other wetland types as a result of re-establishment or establishment actions, the conversion is counted as a loss of Valley Grassland.

As discussed in Chapter 3, for giant gartersnake, Swainson's hawk, and greater sandhill crane, the SSHCP identified a subset of the Covered Species modeled habitat as "high-value" habitat for the species in this Plan Area. For each of these three Covered Species, high-value habitat and the methodology by which it was delineated is defined in Chapter 3. Effects on high-value habitat for these three species was calculated using the same GIS methods described above, but with the

habitat map restricted to only the high-value modeled habitat. These effects are presented separately from overall modeled habitat effects for these species in Section 6.6.

Generally, occurrence data for Covered Species in the Plan Area are incomplete. Comprehensive surveys for Covered Species have not been conducted to allow a reasonable level of confidence in estimates of individual take, with the exception of the Covered Species plants. For these plant species, the Plan Permittees calculated direct effects to the Covered Species by assuming that all occurrences located within the GIS-derived project footprint will be taken. For all other Covered Species, the SSHCP impact analysis uses the species modeled habitat as a "surrogate" for quantifying direct and indirect take of individuals. For vernal pool species, all modeled aquatic habitat (Vernal Pool, Swale, and Stream/Creek (VPIH)) were assumed to be occupied. This assumption is appropriate because Plan Area aquatic habitat is a more mature system than in other locations (e.g., Placer County), and surveys conducted within the Plan Area generally indicate that pools are occupied by one or more of the three covered branchiopods. By assuming that all pools are occupied, mitigation will balance out take of individual vernal pool Covered Species over time. The Plan Permittees also assumed that all known and unknown occurrences within that removed acreage will be taken.

Most indirect impacts will occur within the UDA, as that is where urban development will abut existing preserves and proposed preserves. Outside the UDA, indirect impacts will occur within zones along rural transportation Covered Activities. Most indirect effects do not disturb land cover types or Covered Species modeled habitat, and thus cannot be quantified using GIS-based methods. Therefore, indirect effects to Covered Species and Covered Species modeled habitat were assessed mostly qualitatively for the SSHCP. Indirect effects that were quantified using GIS are for micro-watershed effects on the Vernal Pool Ecosystem in planned and existing preserves, including effects on the Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types (Section 6.4.2.2).

6.4.2.2 Effects on the Vernal Pool Ecosystem

If a Covered Activity project footprint overlaid any portion of a Vernal Pool, Swale, or Stream/Creek (VPIH), that entire Vernal Pool, Swale, or Stream/Creek (VPIH) was assumed to be completely directly affected. All Vernal Pool Ecosystem aquatic land cover types located in planned Stream Setbacks and Preserve Setbacks were also assumed as permanently directly affected (see Sections 6.4.2.3 and 6.4.2.4).

As discussed in Section 6.3.1 (under the heading Vernal Pool Hydrologic Alterations), Covered Activities also have the potential to indirectly affect Vernal Pool, Swale, and Stream/Creek (VPIH) by disruption of soil duripan that supports the perched aquifer or disrupts the micro-watershed of the vernal pool. The surface watershed of vernal pools was modeled using data

gathered from Light Detection and Ranging (LIDAR) data (Appendix E). If more than 10% of a watershed of a Vernal Pool land cover type was removed, that Vernal Pool was considered indirectly affected. Indirect affects to stream/creeks (VPIH) were determined using a different methodology. When a Swale and Stream/Creek (VPIH) land cover type feature intersected a vernal pool that is directly affected, it is assumed that the Swale or Stream/Creek (VPIH) land cover type is indirectly affected.

The effects analysis for Covered Species assumes that indirectly affected vernal pools, swales, or Stream/Creek (VPIH) are no longer modeled Vernal Pool, Swale, or Stream/Creek (VPIH) habitat.

6.4.2.3 Effects on Preserve Setbacks

This chapter quantifies direct effects to SSHCP land covers within each proposed Preserve Setback by overlaying Preserve Setback Covered Activities footprints (e.g., trails, fire breaks). Where project-level information was not available, GIS layers from the County and City general plans were used to identify road crossing and trail locations within proposed setbacks. The impact methodology assumes that all Vernal Pool, Swale, and Stream/Creek (VPIH) land covers located in proposed Preserve Setbacks will be permanently affected. This is because trail construction. Bioswales, and other Covered Activities allowed in Preserve Setbacks cannot be guaranteed to avoid effects on Vernal Pool, Swale, or Stream/Creek (VPIH). Though this may overestimate actual effects to the Vernal Pool Ecosystem in Preserve Setbacks, it ensures that any effects will be mitigated. Other SSHCP land cover types in Preserve Setbacks were quantified as neither affected nor preserved. This assumption is intended to capture the future uses of the Preserve Setbacks and likely effects on non-Vernal Pool Ecosystem land cover types. These land cover types would generally remain in a natural state similar to that seen along the wider expanses of the American River Parkway, but will include enough development of trails and other infrastructure that they cannot be considered preserved.

6.4.2.4 Effects on Streams and Stream Setbacks

Effects on streams were calculated in GIS for all Covered Activities that may have in-stream effects. Examples of Covered Activities resulting in permanent effects to the natural structure or function of a wetland or stream include installing hardscape in the channel, creating a culvert through the channel, constructing a new bridge over the channel, or reducing channel complexity (e.g., removing riffle, runs, or pools).

This chapter quantified direct effects to SSHCP land covers within each planned Stream Setback by overlaying Stream Setback Covered Activities footprints (i.e., trails) or the footprints of other Covered Activities that enter Stream Setbacks. Where project-level information was not available, GIS layers from the County and City general plans were used to identify road crossing

and trail locations within proposed setbacks. The impact methodology assumes that any Vernal Pool, Swale, and Stream/Creek (VPIH) land covers located in proposed Stream Setbacks will be permanently affected. This is because trail construction, utility crossings, and road crossings allowed in Stream Setbacks cannot be guaranteed to avoid effects on Vernal Pool, Swale, or Stream/Creek (VPIH). Though this may overestimate actual effects to the Vernal Pool Ecosystem in Stream Setbacks, it ensures that any effects will be mitigated. Those portions of Stream Setbacks not directly or indirectly affected were considered neither affected nor preserved. These methods reflect that the Implementing Entity will not control public usage and habitat conditions within the Stream Setback in the same way as on SSHCP Preserves, and thus the Permittees are not requesting credit for this habitat as preserved. However, the land cover types and Covered Species modeled habitat present within the Stream Setback will generally remain undisturbed, so it is appropriate to consider it not affected.

6.4.2.5 Effects on Critical Habitat

As discussed in Chapter 3, vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp, Sacramento Orcutt grass, slender Orcutt grass, and California tiger salamander have designated Critical Habitat within the Plan Area. There are four Primary Constituent Elements (PCEs) for the Critical Habitat of the three vernal pool crustaceans (USFWS 2006):

1. Topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools described below in (2) providing for dispersal and promoting hydroperiods of adequate length in the pools;
2. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 41 days (VPTS) or 18 days (VPFS), in all but the driest years.
3. Sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves; and
4. Structure within the pools described above in (2), consisting of organic and inorganic materials that provide shelter.

Sacramento Orcutt grass and slender Orcutt grass Critical Habitat has two PCEs:

1. Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features, including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools; and

2. Depressional features, including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

California tiger salamander Critical Habitat has four PCEs:

1. Standing bodies of fresh water, including natural and man-made (e.g., stock) ponds, vernal pools, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a sufficient length of time necessary for the species to complete the aquatic portion of its life cycle.
2. Barrier-free upland habitats adjacent to breeding ponds that contain small mammal burrows.
3. Upland areas between occupied locations (PCE 1) and areas with small mammal burrows (PCE 2) that allow for dispersal among such sites.
4. The geographic, topographic, and edaphic features that support aggregations or systems of hydrologically interconnected pools, swales, and other ephemeral wetlands and depressions within a matrix of surrounding uplands, which together form hydrologically and ecologically functional units called vernal pool complexes.

Using the GIS methodology discussed in Section 6.4.2, acres of direct permanent loss in each Critical Habitat Unit were determined by overlaying the footprints of Covered Activities on the boundaries of each Critical Habitat unit located in the Plan Area. This method identified loss of PCEs 1 and 2 for the vernal pool crustaceans; PCEs 1 and 2 for Sacramento Orcutt grass and slender Orcutt grass; and PCEs 1, 2, and 3 for California tiger salamander.

The acreage of indirect effects on the Vernal Pool Ecosystem in Critical Habitat from adjacent development were calculated as discussed above. This chapter presents the acres of direct and indirect effects to SSHCP land cover types within each Critical Habitat Unit, including developed land covers. This method identified potential loss of biological function within vernal pools, corresponding to PCEs 3 and 4 for the vernal pool crustaceans, and interruption of hydrologic connection of the Vernal Pool Ecosystem, corresponding to PCE 4 for California tiger salamander. The USFWS will use those calculations and related maps when completing a Critical Habitat Adverse Modification Analysis under Section 7 of the ESA.

6.4.3 Qualitative Analysis of Indirect Effects

Most indirect effects are analyzed qualitatively in tables and in the narrative for each Covered Species and SSHCP land cover types. As discussed above, estimates of direct effects on land cover types and Covered Species modeled habitat have been quantified conservatively (i.e., somewhat overestimated). These conservative estimates are intended, in part, to incorporate many of the indirect effects of the environmental stressors described in Section 6.3 and ensure that the SSHCP Conservation Strategy provides enough conservation to offset these indirect effects.

6.5 Effects of Covered Activities on Land Cover Types

6.5.1 Permanent Effects on Land Cover Types

This section quantifies the estimated permanent direct effects of Covered Activities on land cover types within the Plan Area. As described in Section 3.2, Valley Grassland is categorized as those lands that are hydrologically connected to, or inside, the Vernal Pool Ecosystem and those that are not hydrologically connected to, or outside, the Vernal Pool Ecosystem. Of the total 135,152 acres of Valley Grassland within the Plan Area there are 97,349 acres that are part of the Vernal Pool Ecosystem and 37,803 acres that are outside of the Vernal Pool Ecosystem. In Table 6-4, the Valley Grassland in the Vernal Pool Ecosystem is categorized as aquatic and those areas that are outside the Vernal Pool Ecosystem are categorized as terrestrial.

Table 6-4 shows the permanent direct and indirect effects to natural land cover types within the Plan Area that will be affected by SSHCP Covered Activities. In total, approximately 33,497 acres, or 12%, of the 272,596 acres of natural land covers in the Plan Area would be removed over the proposed 50-year Permit Term. This includes the removal of approximately 32,054 acres of natural land covers inside the UDA and approximately 1,443 acres of natural land covers outside the UDA.

Approximately 65% of the permanent direct impacts to all natural land covers are to Valley Grassland, with approximately 22,014 acres of the 135,152 acres of Valley Grassland present in the Plan Area being removed. More specifically, of the 97,349 acres of Valley Grassland in the Vernal Pool Ecosystem, 16,472 acres will be removed, and of the 37,803 acres of Valley Grassland outside of the Vernal Pool Ecosystem, 5,542 acres will be removed. The next largest permanent direct impact (16%) is to Cropland; of the approximately 51,829 acres in the Plan Area, 5,285 acres of Cropland would be removed. Permanent direct impacts to 2,749 acres of the 15,991 acres of Irrigated Pasture–Grassland in the Plan Area and 1,455 acres of the 26,460 acres of Vineyard in the Plan Area represent approximately 8% and 4%, respectively, of the total permanent direct impacts to all land cover types. The remainder of the land covers represents 6% of the total permanent direct impacts. Similar to the Plan-wide impacts, permanent direct impacts to Valley Grassland, Cropland, Irrigated Pasture–Grassland, and Vineyard account for

approximately 94% of the total permanent direct impacts in the UDA and approximately 88% of total permanent direct impacts outside of the UDA.

With respect to the total acreage of the land cover type that will be removed compared to the acreage of that land cover type present in the Plan Area, the land covers that will be most affected are Mine Tailing Riparian Woodland and Stream/Creek (VPIH). Of the 641 acres of Mine Tailing Riparian Woodland in the Plan Area, 218 acres, or 34%, would be directly and permanently impacted. Also, SSHCP Covered Activities will permanently and directly impact 22 acres, or 30%, of the approximately 73 acres of Stream/Creek (VPIH) in the Plan Area. Permanent direct impacts to the remainder of the land cover types compared to the amount that exists in the Plan Area are less than 20% for each type, and the acreages are listed in Table 6-4. Because the majority of the SSHCP Covered Activities will be implemented within the UDA, for most of the land cover types, more than half of the land cover type present within the UDA will be permanently and directly impacted. Land cover types for which this is not true are Blue Oak Savanna, Freshwater Marsh, Stream/Creek (VPIH), and Vernal Pool. In contrast, outside of the UDA, no more than 1.2% of any one land cover type will be removed by SSHCP Covered Activities.

Table 6-4
Permanent Direct and Indirect Effects on Natural Land Covers

Land Cover	Direct Effects (acres)	Indirect Effects (acres)	Total Impacts (acres)	Total Available in Plan Area (acres)	Percent of Total in Plan Area Affected
Aquatic					
Vernal Pool	389	94	483	4,536	11%
Swale	234	44	278	1,252	22%
Seasonal Wetland	105	Qualitative[1]	105	2,600	4%
Freshwater Marsh	127	Qualitative	127	2,954	4%
Streams/Creeks (VPIH)	22	4	26	73	36%
Streams/Creeks	117	Qualitative	117	2,778	4%
Open Water	155	Qualitative	155	2,344	7%
Mixed Riparian Woodland	184	Qualitative	184	5,856	3%
Mixed Riparian Scrub	189	Qualitative	189	1,454	13%
Mine Tailing Riparian Woodland	218	Qualitative	218	641	34%
Valley Grassland (in Vernal Pool Ecosystem)	16,472	Qualitative	16,472	97,349	17%
Terrestrial					
Valley Grassland (Outside of Vernal Pool Ecosystem)	5,542	Qualitative	5,542	37,803	15%
Blue Oak Woodland	9	Qualitative	9	9,132	0.1%
Blue Oak Savanna	38	Qualitative	38	5,637	1%
Cropland	5,285	Qualitative	5,285	51,829	10%
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	15,991	17%

Table 6-4
Permanent Direct and Indirect Effects on Natural Land Covers

Land Cover	Direct Effects (acres)	Indirect Effects (acres)	Total Impacts (acres)	Total Available in Plan Area (acres)	Percent of Total in Plan Area Affected
Orchards	207	Qualitative	207	3,907	5%
Vineyards	1,455	Qualitative	1,455	26,460	6%
Grand Total	**33,497**	**142**	**33,639**	**272,596**	**12%**

1. Most indirect effects (Section 6.3) do not disturb land cover types or Covered Species modeled habitat, and thus cannot be quantified using the GIS-based methods. Therefore, most Covered Activity indirect effects to land cover types were assessed qualitatively for the SSHCP.

Permanent indirect effects from Covered Activities on the Vernal Pool Ecosystem include altered hydrology of vernal pools from removal or disturbance to their micro-watersheds. Indirect impacts are quantified for Vernal Pool, Swale, and Stream/Creek (VPIH) in Table 6-4 and also are quantified in Table 6-5 because these three land covers are components of the Vernal Pool Ecosystem. Valley Grassland that is hydrologically connected to the Vernal Pool Ecosystem is also a component of the Vernal Pool Ecosystem, but indirect impacts to this specific land cover are not quantified. In total, approximately 17,259 acres, or 17%, of the 103,210 acres of the Vernal Pool Ecosystem in the Plan Area would be removed or indirectly impacted over the proposed 50-year Permit Term; indirect impacts account for 142 acres of the total impact acreage. This includes the following impacts to the Vernal Pool Ecosystem: removal of 16,795 acres (64%) and indirect impacts to 132 acres (0.5%) of the 26,048 acres present inside the UDA; and removal of 322 acres (0.4%) and indirect impacts to 9.5 acres (0.01%) of 77,162 acres present outside the UDA.

Table 6-5
Direct and Indirect Effects on the Vernal Pool Ecosystem

Land Cover	Direct Effects (acres)	Indirect Effects (acres)	Total Impacts (acres)	Total Available in Plan Area (acres)	Percent of Total in Plan Area Affected
Valley Grassland (in Vernal Pool Ecosystem)	16,472	Qualitative	16,472.29	97,349	17%
Vernal Pool	389	944	483	4,536	11%
Swale	234	44	278	1,252	22%
Stream/Creek (VPIH)	22	4	26	73	34%
Grand Total	**17,116.39**	**141.54**	**17,258.93**	**103,210**	**17%**

Other than Vernal Pool, Swale, and Stream/Creek (VPIH) for which indirect effects were quantified, the permanent indirect effects of the remainder of the natural land covers are discussed

qualitatively and are summarized in Table 6-6. Indirect effects will be greatest within the UDA because most Covered Activities will occur within the UDA. The Plan Permittees expect that the indirect effects of Covered Activities on natural land covers will be minor outside the UDA because no Urban Development Covered Activities will occur outside, the UDA and indirect effects to natural land covers outside the UDA will be limited to those resulting from rural roadways and water pipeline projects. Additionally, since the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and proposed UDA preserves, edge effects of Covered Activities within Preserves will be less than those within the UDA. Permanent indirect effects of Covered Activities to natural land covers are described qualitatively in Table 6-6, along with AMMs that avoid and minimize these effects.

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 2, LID-2 (Groundwater Recharge) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams) Condition 7, STREAM-5 (Permanent Stream Channel Re-Establishment) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Absent AMMs, the close proximity of planned development and roads to natural land covers will increases the likelihood of hydromodification, such as impacting duripan or hardpan, increasing impermeable surfaces, and decreasing opportunities for groundwater recharge, and will result in the degradation of water quality through the release of pollutants and toxins. Directly impacting the upstream watershed or aquatic land covers, re-routing streams, and stabilizing stream banks using impervious materials will indirectly affect the hydrology of natural land covers. Edge effects such as irrigation overspray or faulty irrigation systems will alter hydrology, which can allow invasive species to establish or type-convert the land cover. Increased traffic resulting in the increased release of chemicals such as fuel, oils, and lubricants, improper management of stormwater and livestock, and the improper use of pesticides will degrade water quality. The adverse effects of altering the watershed hydrographs will be avoided and minimized through the implementations of AMMs such as: (1) the avoidance of direct impacts to streams and other natural land covers through, for example, siting and design and the use of trenchless technology; (2) the avoidance of impacts to duripan and hardpan; (3) requiring Preserve Setbacks; (4) the avoidance of impacts from irrigation in the Preserves by requiring landscaping adjacent to Preserves to be installed between trails and development (away from Preserves); requiring drought-tolerant landscaping to minimize the amount of water required to maintain the landscaping; limiting irrigation adjacent to Preserves to 5 years (temporary) and requiring the use of drip irrigation only to avoid overspray; and requiring monitoring of irrigation to ensure system is functioning properly to avoid leaks; (5) providing design criteria for re-routing streams, if re-routing cannot be avoided, that would minimize hydromodification, such as allowing the re-routed

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
		stream to migrate laterally over its active and terrace floodplain; (6) limiting utility maintenance in Preserves to periods when vernal pools are dry to avoid inadvertently modifying the hydrology (e.g., creating road ruts in wet soils conditions, etc.); and (7) treating all temporarily disturbed areas, after construction is completed, to remove soil compaction and restore water infiltration capacity and soil hydrologic characteristics similar to pre-project conditions. The degradation of water quality will be limited further through implementation of AMMs that require proper management of stormwater, pesticides, and livestock, such as: (1) requiring stormwater be managed consistent with the State Water Resources Control Board (SWRCB) regulations; (2) requiring stormwater from urban development be directed from Preserves and Preserve Setbacks; (3) requiring stormwater from trails, located in Preserve Setbacks, be directed into low-velocity bioretention swales outside of Preserves; (4) requiring application of roadside pesticides comply with applicable regulations and limiting the use of pesticides near sensitive areas; and (5) ensuring that livestock access points are planned to avoid impacts resulting from concentrating livestock in a limited number locations, which could modify hydrology and degrade water quality. Additionally, the degradation of water quality adjacent to Preserves will limited by requiring streets adjacent to the Preserve be single-loaded, to the maximum extent feasible, which would reduce the number of vehicles on the road and, thus, reduce potential for the release of chemicals such as fuel, oils, and lubricants by vehicles. Condition 1, LID-2, ensures prioritization of Preserves that are suitable for groundwater recharge; this AMM will ensure that the

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
		Preserves offset the decrease in groundwater recharge that would result from increasing impermeable surfaces associated with urban development.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP Preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	The Landscape Preserves established outside the UDA will primarily avoid effects of habitat fragmentation on natural land covers through maintaining large, interconnected Preserves. Implementation of AMMs will further reduce edge effects along Preserve boundaries outside of the UDA. Within the UDA, Preserves will be smaller and bordered by urban development, resulting in increased habitat fragmentation as development occurs. Implementation of AMMs will ameliorate the edge effects that can decrease the functionality of fragmented Preserves with a higher edge to preserved interior ratio. AMMs will prevent fragmentation of habitat within Preserves and/or setbacks, because these measures will: (1) require stormwater management facilities to be located outside of Preserves; (2) require avoidance of impacts to duripan and hardpan; (3) ensure that livestock access points are planned to avoid trampling vegetation; (4) require that trails are planned to avoid impacts to natural land covers; and (5) avoid the spread of invasive species by incorporating invasive plant prevention techniques into Preserve Maintenance Plans in addition to other AMMs. AMMs that site less-intensive land uses, such as parks, and single-loaded streets, adjacent to Preserves, and require appropriate setbacks from the Preserves, including a 50-foot setback from urban development, will minimize edge effects. The avoidance of direct impacts to natural features, such streams and providing appropriate setbacks throughout the Plan Area will

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
		provide linkages that connect Preserves and, thus, reduce habitat fragmentation.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA Covered Activities would not substantially affect wildfire frequency, duration, or intensity. Within the UDA, most wildfires will be quickly suppressed and the primary impacts to natural land covers will result from wildfire suppression activities, such as grading. Less often, if wildfires become uncontrollable, they can be catastrophic, especially if fuel loads have built up and fire intensity or fire frequency is high; these types of fire can prevent natural land covers from successfully recovering. Implementation of AMMs that reduce the potential ignition sources adjacent to the Preserves will reduce the risk of increased wildfire. Specifically, minimizing roads, except single-loaded streets, and urban development adjacent to Preserves and trail planning and monitoring to reduce and monitor potential ignition sources along trails will reduce the risk of increased fire. As discussed in Section 6.3, invasive plant species can alter natural frequencies of wildfires. Therefore, to avoid altering the frequency of wildfires, invasive plant prevention techniques will be incorporated into Preserve Maintenance Plans, along with other AMMs, will reduce the spread of invasive species. Also, effects of wildfire suppression on natural land covers will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memorandum of agreement with responsible fire agencies.

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 5, NATURE TRAIL-2 (Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Vernal pools, a component of the Vernal Pool Ecosystem, will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Additionally, indirect effects will occur to an estimated 142 acres of the Vernal Pool Ecosystem (Table 6-5). Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves because: (1) direct impacts to hardpan and duripan will be avoided and minimized through siting and design and the use of trenchless technology; (2) livestock access points will be planned to avoid soil compaction in vernal pools that could result from concentrating livestock in a limited number locations; and (3) roads adjacent to the Preserve will be minimized, which will reduce changes in hydrology. Additionally, vernal pools will be re-established or established in the Plan Area, as required by AMMs, which will improve hydrologic conditions of vernal pools. The Vernal Pool Ecosystem Conservation Strategy (Section 7.6.1.1.1) will offset unavoidable indirect impacts.
Chronic Ground Vibration and Noise	None required	Does not affect land cover types.
Lighting	None required	Does not affect land cover types.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Trail Plan) Condition 5, NATURE TRAIL-3 (Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Trail Impacts)	Increased human activity can adversely affect natural land covers due to impacts, such trampling of vegetation. Implementation of AMMs ensures that increased human activity in and near Preserves is limited and that it does not substantially affect natural land covers. Implementation of AMMs will minimize increased human activity adjacent to and within Preserves because: (1) land uses adjacent to the Preserves will be, to the maximum extent practicable, land uses with less intensive human activity and appropriate Preserve Setbacks will be established; (2)

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
	Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	roads adjacent to the Preserves will be single-loaded streets, which will result in less-intensive human activity as compared to a higher-use roads; (3) public access to trails will be monitored and managed in accordance with a trail plan and management actions, such as discontinuation of trail use, will be taken if adverse effects of human activity are occurring in the Preserves; and (4) trails will be sited away from sensitive natural land covers to limit the human activity to areas that are less sensitive. Within the UDA, increased human activity can adversely affect streams, which may contain aquatic natural land covers. However, the application of Stream Setbacks throughout the Plan Area would reduce the level of human activity adjacent to streams.
Wildlife Community Alterations	None required	Does not affect land cover types.
Invasive Plants	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 7, STREAM-5 (Permanent Stream Channel Re-Establishment) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Unmanaged trails and new disturbances in the Preserves and landscaping with invasive species adjacent to Preserves will encourage the spread invasive plants into adjacent habitat. Additionally, nitrogen deposition associated with increased vehicle emissions from vehicles associated with new urban development traveling along Plan Area rural roadway projects will also result in competitive advantages for non-native invasive plants. Unmanaged proliferation of invasive, non-native plants will adversely affect the composition of natural land covers by displacing native species and potentially converting the land type from natural to disturbed. Implementation of AMMs ensures that the spread of invasive plants in and near Preserves is limited and does not substantially affect natural land covers. Implementation of AMMs will minimize the spread of invasive, non-native plant species adjacent to and/or within Preserves because: (1) land uses adjacent to the Preserves will be, to the maximum extent practicable, land uses

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
		with less-intensive human activity and appropriate Preserve Setbacks will be established; (2) roads adjacent to the Preserves will be single-loaded streets, which will result in less vehicle emissions as compared to a higher-use roads; (3) landscaping adjacent to the Preserves will be limited to areas between trails and development (away from Preserves) with drought-tolerant species that are not included on the Cal-IPC list; (4) invasive plant prevention techniques will be incorporated into Preserve Maintenance Plans in addition to other AMMs; (5) trails will be planned to reduce the spread of invasive species, will be monitored for the establishment of invasive species along trail corridors, and will be managed to reduce the spread of invasive weeds; and (6) new disturbances within Preserves will be avoided through the use of trenchless technology and ensuring that livestock access points are planned to avoid impacts resulting from concentrating livestock in a limited number locations. Implementation of AMMs also will minimize the spread of invasive, non-native plants in the Plan Area through treating roadside weed infestations; requiring that local, native plants are used for re-routing streams; and retaining natural aquatic features, such as creeks and streams, into Preserve design in lieu of landscaping. Additionally, preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	None required	Does not affect land cover types.
Mesopredators	None required	Does not affect land cover types.
Wildlife Disease	None required	Does not affect land cover types.

Table 6-6
Permanent Indirect Effects on Natural Land Cover Types

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Natural Land Cover Types
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Pesticide and fertilizer use associated with urban development may affect the quality of natural land covers through the reduction of pollinators or exterminating or weakening native species and/or allowing establishment of non-native species. The adverse effects of pesticide and fertilizer use will be avoided and minimized through implementation of AMMs because: (1) land uses adjacent to the Preserves will be, to the maximum extent practicable, land uses with less intensive human activity (e.g., residential and commercial landscape area, golf courses, or single-loaded streets) and appropriate Preserve Setbacks will be established; (2) roads will be sited in less-sensitive areas, which will reduce the spread of invasive species and, thus, the need for pesticide use in sensitive natural land covers; (3) application of roadside pesticides will comply with applicable regulations and the use pesticides near sensitive areas will be limited; (4) the spread of invasive plants will be limited and managed such that pesticides are not necessary to treat weed infestations; and (5) stormwater will be directed from Preserves and Preserve Setbacks and will be managed consistent with the SWRCB regulations.
Vehicle and Aircraft Collisions with Wildlife	None required	Does not affect land cover types.
Aboveground Electrical Utilities Collision and Electrocution	None required	Does not affect land cover types.

6.5.2 Temporary Effects on Land Cover Types

Natural land covers near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to natural land covers. Generally, these temporary effects will occur within the project footprint or road right-of-way area, which are already quantified as permanently impacted as described in Section 6.5.1 and listed in Tables 6-4 and 6-5. Potential construction-related environmental stressors are described in Section 6.3.2, and their effects on natural land covers are qualitatively described in Table 6-7.

Table 6-7
Temporary Effects to Natural Land Cover Types

Environmental Stressor	Effect Reduced By	Potential Effect on Natural Land Cover Types
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single-Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into natural land covers will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of natural land covers will adversely affect the viability of vegetation communities. Implementation of AMMs ensures that trampling and compaction do not occur.
Construction Noise	None required	Does not affect land cover types.
Construction Ground Vibration	None required	Does not affect land cover types.
Construction Lighting	None required	Does not affect land cover types.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-10 (Revegetation) Condition 3, BMP-11 (Speed Limit)	The generation of fugitive dust during construction can decrease photosynthesis and can kill individual plants, and, thus, can degrade the viability of natural land covers. Implementation of AMMs ensures that dust is controlled and will not affect natural land covers.
Increased Human Presence during Construction	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Increased human activity can result in direct impacts, such as trampling of vegetation and compaction of soils, which can negatively affect the viability of natural land cover. Implementation of AMMs ensures that the adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Trash and debris will degrade the habitat value of natural land covers. Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6 Effects of Covered Activities on Covered Species

The direct effects analysis addresses permanent and temporary removal or degradation of modeled habitat that will reduce available habitat for important life history needs for Covered Species, including breeding, foraging, and cover. The direct effects analysis takes into consideration the anticipated direct effects resulting from the Covered Activities, including the following:

1. The likely placement of Covered Activities over the term of the permit (see Section 6.4, Methods to Assess Effects of Covered Activities)
2. Best information on the components or elements of each Covered Activity (i.e., construction, operation, and maintenance elements)
3. The likely environmental stressors associated with each element of a Covered Activity
4. Best information on the likely response of each Covered Species to the environmental stressors.

Direct effects are quantified as modeled habitat land cover conversion and removal of documented occurrences of the Covered Species. Indirect effects on documented occurrences and their modeled habitat are provided for vernal pool plant and invertebrate species.

6.6.1 Ahart's Dwarf Rush

Permanent Effects

Permanent direct and indirect effects of Covered Activities on Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*) will include removal, modification, or significant degradation of modeled habitat, as well as direct and indirect take of all individual Ahart's dwarf rush occupying removed, modified, or degraded habitat.

All modeled habitat for Ahart's dwarf rush is within the Vernal Pool Ecosystem, which includes Valley Grassland, Vernal Pool, and Swale (see Section 3.4.1, Plant Covered Species Habitat Models, and Figure 3-3). In addition to the direct removal, modification, or degradation of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds will remove part or all of the perched aquifer and existing hydrology that supports vernal pool and swale habitat. In addition, edge effects will heighten Ahart's dwarf rush's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of vernal pool and swale habitat. Effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for Ahart's dwarf rush.

These indirect effects on vernal pool and swale habitat are included in all permanent effects calculations presented in this section.

There is one documented occurrence of Ahart's dwarf rush in the Plan Area within the UDA in Preserve Planning Unit (PPU) 1. This occurrence will be preserved in a proposed preserve. This occurrence will not be directly or indirectly impacted. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 7,403 acres of Ahart's dwarf rush modeled habitat within the Plan Area (see Table 6-8), including 310 acres of Ahart's dwarf rush modeled aquatic habitats (i.e., vernal pools and swales) and 7,093 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on Ahart's dwarf rush modeled habitat will occur primarily inside the UDA, with approximately 7,340 acres of permanent effects on Vernal Pool Ecosystem in the UDA and approximately 63 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

Table 6-8
Ahart's Dwarf Rush Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	23,885	7,093	Qualitative	7,093	12,223	7,035	Qualitative	7,035	11,662	58	Qualitative	58
Vernal Pool	937	149	51	200	585	146	50	196	352	3	1	4
Swale	314	90	20	110	194	89	20	109	120	1	0	1
Vernal Pool Ecosystem	**25,136**	**7,332**	**71**	**7,403**	**13,002**	**7,270**	**70**	**7,340**	**12,134**	**62**	**1**	**63**

As shown in Table 6-8, approximately 71 acres of Ahart's dwarf rush modeled habitat will be indirectly affected in the Plan Area, 70 acres of which will occur in the UDA as a result of Urban Development Covered Activities. Outside the UDA, 1 acre of Ahart's dwarf rush modeled habitat will be indirectly affected. In addition to the 71 acres of indirect effects quantified in Table 6-8, Covered Activities in the Plan Area will cause other indirect effects to Ahart's dwarf rush that are not easily quantified (Table 6-9 and 6-10). These "other" indirect effects to Ahart's dwarf rush (Table 6-9) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the Ahart's dwarf rush present on existing preserves, future SSHCP proposed preserves (see Chapter 7, Conservation Strategy), and other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on Ahart's dwarf rush will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to Ahart's dwarf rush outside the UDA will occur to Ahart's dwarf rush habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, and pesticide use that will affect Ahart's dwarf rush habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing Ahart's dwarf rush habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-8). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on Ahart's dwarf rush that are not quantified are described qualitatively in Table 6-9, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect Ahart's dwarf rush. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-9
Permanent Indirect Effects on Ahart's Dwarf Rush

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to Ahart's dwarf rush habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats or the hardpan/duripan, avoidance and project design outside of sensitive habitats, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter Ahart's dwarf rush habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on Ahart's dwarf rush. Within the UDA, habitat fragmentation will affect Ahart's dwarf rush because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves will be reduced

Table 6-9
Permanent Indirect Effects on Ahart's Dwarf Rush

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on Ahart's dwarf rush.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-4 (Nature Trail Location) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on Ahart's dwarf rush habitat will result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on Ahart's dwarf rush will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Ahart's dwarf rush will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves, but indirect effects will occur to an estimated 67.3 acres of Ahart's dwarf rush modeled aquatic habitat (Table 6-8). However, the Ahart's dwarf rush Conservation Strategy (Section 7.6.2.1, Ahart's Dwarf Rush) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses)	No effects on Ahart's dwarf rush are expected from increased

AGENDA ITEM 11.1

702

Table 6-9
Permanent Indirect Effects on Ahart's Dwarf Rush

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	human activity on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and Ahart's dwarf rush modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter Ahart's dwarf rush aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in Ahart's dwarf rush habitat will not occur.

Table 6-9
Permanent Indirect Effects on Ahart's Dwarf Rush

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants within the Vernal Pool Ecosystem will introduce competition for resources along with affecting critical hydroperiods for supporting the Ahart's dwarf rush. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on Ahart's dwarf rush. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the Vernal Pool Ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	None required for this species.	No effect on this species.

Table 6-9
Permanent Indirect Effects on Ahart's Dwarf Rush

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on Ahart's dwarf rush or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-10
Temporary Effects to Ahart's Dwarf Rush

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling)	Runoff from construction activities into Ahart's dwarf rush habitat will be fully avoided through implementation of AMMs.

Table 6-10
Temporary Effects to Ahart's Dwarf Rush

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of Ahart's dwarf rush habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. Implementation of AMMs ensures that trampling and compaction will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction dust effects on Ahart's dwarf rush individuals, modeled habitat, and vernal pool water quality will reduce habitat quality for Ahart's dwarf rush. Implementation of AMMs will ensure that dust is controlled and will not affect Ahart's dwarf rush.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas)	Increased human activity in construction and maintenance areas will affect Ahart's dwarf rush habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets will access occupied pools causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect Ahart's dwarf rush habitat quality through direct effects on water quality. Implementation of AMMs will ensure that construction trash and debris are controlled.

Temporary Effects

Ahart's dwarf rush occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to Ahart's dwarf rush. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-8).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on Ahart's dwarf rush are qualitatively described in Table 6-10.

6.6.2 Boggs Lake Hedge-Hyssop

Permanent Effects

Permanent direct and indirect effects of Covered Activities on Boggs Lake hedge-hyssop (*Gratiola heterosepala*) will include removal, modification, or significant degradation of modeled habitat, as well as direct and indirect take of all individual Boggs Lake hedge-hyssop occupying removed, modified, or degraded habitat.

All modeled habitat for Boggs Lake hedge-hyssop is within seasonal wetlands and the Vernal Pool Ecosystem, which includes Valley Grassland and Vernal Pool (see Section 3.4.1, Plant Covered Species Habitat Models, and Figure 3-4). In addition to the direct removal, modification, or degradation of modeled habitat, edge effects on seasonal wetlands or vernal pool micro-watersheds will remove part or all of the perched aquifer and existing hydrology that supports Boggs Lake hedge-hyssop modeled habitat. In addition, edge effects will heighten Boggs Lake hedge-hyssop's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of modeled habitat. In particular, seasonal wetland ecosystems are extremely vulnerable to invasive plants because of the highly effective transport of invasive species along waterways. Invasive species can dominate the biomass of wetland communities where they become established, virtually choking out the native vegetation. In addition, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for Boggs Lake hedge-hyssop. These indirect effects on Boggs Lake hedge-hyssop modeled habitat are included in all permanent effects calculations presented in this section.

Of the 30 documented occurrences of Boggs Lake hedge-hyssop within the Plan Area, 19 are located within the UDA in PPU 1 and PPU 3 and 11 are located outside the UDA in PPU 1. One of the 30 occurrences of Boggs Lake hedge-hyssop will be preserved within a proposed preserve (inside the UDA in PPU 1). Seven of the documented occurrences will be directly impacted: 1 outside the PPUs, 5 in PPU 1, and 1 in PPU 3. No occurrences will be indirectly impacted. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 8,724 acres of Boggs Lake hedge-hyssop modeled habitat within the Plan Area (see Table 6-11), including approximately 292 acres of vernal pools, approximately 8,419 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the vernal pools, and 13 acres of seasonal wetlands. Covered Activity impacts on Boggs Lake hedge-hyssop modeled habitat will occur primarily inside the UDA, with approximately 8,584 acres of permanent effects on modeled habitat in the UDA and approximately 140 acres of permanent effects on modeled habitat outside the UDA.

Table 6-11
Boggs Lake Hedge-Hyssop Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	35,115	8,419	Qualitative	8,419	14,346	8,294	Qualitative	8,294	20,769	125	Qualitative	125
Vernal Pool	1,531	240	52	292	607	227	51	278	924	13	1	14
Subtotal Vernal Pool Ecosystem	*36,646*	*8,659*	*52*	*8,711*	*14,953*	*8,521*	*51*	*8,572*	*21,693*	*138*	*1*	*139*
Seasonal Wetland	354	13	Qualitative	13	18	12	Qualitative	12	336	1	Qualitative	1
GRAND TOTAL	**37,000**	**8,672**	**52**	**8,724**	**14,971**	**8,533**	**51**	**8,584**	**22,029**	**139**	**1**	**140**

As shown in Table 6-11, approximately 52 acres of Boggs Lake hedge-hyssop modeled habitat will be indirectly affected in the Plan Area, 51 acres of which will occur in the UDA as a result of Urban Development Covered Activities. Outside the UDA, 1 acre of Boggs Lake hedge-hyssop modeled habitat will be indirectly affected. In addition to the 52 acres of indirect effects quantified in Table 6-11, Covered Activities in the Plan Area will cause other permanent indirect effects to Boggs Lake hedge-hyssop that are not easily quantified (Table 6-12). These "other" indirect effects to Boggs Lake hedge-hyssop (Table 6-12) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the Boggs Lake hedge-hyssop present on existing preserves, on future SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on Boggs Lake hedge-hyssop will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to Boggs Lake hedge-hyssop outside the UDA will occur to Boggs Lake hedge-hyssop habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, etc., that will affect Boggs Lake hedge-hyssop habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing Boggs Lake hedge-hyssop habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to seasonal wetlands and Vernal Pool Ecosystem reported in Table 6-11). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on Boggs Lake hedge-hyssop that are not quantified are described qualitatively in Table 6-12, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect Boggs Lake hedge-hyssop. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-12
Permanent Indirect Effects on Boggs Lake Hedge-Hyssop

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to Boggs Lake hedge-hyssop habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents that will impact seasonal wetlands and the Vernal Pool Ecosystem. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats or the hardpan/duripan, avoidance and project design outside of sensitive habitats, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter Boggs Lake hedge-hyssop habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on Boggs Lake hedge-hyssop. Within the UDA, habitat fragmentation will affect Boggs Lake hedge-hyssop because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA

Table 6-12
Permanent Indirect Effects on Boggs Lake Hedge-Hyssop

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	Preserves will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on Boggs Lake hedge-hyssop.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on Boggs Lake hedge-hyssop habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on Boggs Lake hedge-hyssop will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Boggs Lake hedge-hyssop will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves, but indirect effects will occur to an estimated 52.4 acres of Boggs Lake hedge-hyssop modeled aquatic habitat (Table 6-11). However, the Boggs Lake hedge-hyssop Conservation Strategy (Section 7.6.2.2, Boggs Lake Hedge-Hyssop) will offset these unavoidable impacts.

Table 6-12
Permanent Indirect Effects on Boggs Lake Hedge-Hyssop

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on Boggs Lake hedge-hyssop are expected from increased human activity on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and Boggs Lake hedge-hyssop modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter Boggs Lake hedge-hyssop aquatic habitat, that water chemistry of modeled aquatic habitat will not be affected, and that resultant wildlife community alterations in Boggs Lake hedge-hyssop habitat will not occur.

Table 6-12
Permanent Indirect Effects on Boggs Lake Hedge-Hyssop

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants within seasonal wetlands and the Vernal Pool Ecosystem will introduce competition for resources along with affecting critical hydroperiods for supporting the Boggs Lake hedge-hyssop. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on Boggs Lake hedge-hyssop. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen

Table 6-12
Permanent Indirect Effects on Boggs Lake Hedge-Hyssop

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		deposition will be minimized through monitoring and adaptive management of seasonal wetlands and the Vernal Pool Ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on Boggs Lake hedge-hyssop, seasonal wetlands, or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-13
Temporary Effects to Boggs Lake Hedge-Hyssop

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	Runoff from construction activities into Boggs Lake hedge-hyssop habitat will be fully avoided through implementation of AMMs.

Table 6-13
Temporary Effects to Boggs Lake Hedge-Hyssop

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Water Quality Effects	Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of Boggs Lake hedge-hyssop habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. Implementation of AMMs ensures that trampling and compaction will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction dust effects on Boggs Lake hedge-hyssop individuals, modeled habitat, and vernal pool water quality will reduce habitat quality for Boggs Lake hedge-hyssop. Implementation of AMMs will ensure that dust is controlled and will not affect Boggs Lake hedge-hyssop.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas)	Increased human activity in construction and maintenance areas will affect Boggs Lake hedge-hyssop habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets will access occupied habitat causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect Boggs Lake hedge-hyssop habitat quality through direct effects on water quality. Implementation of AMMs will ensure that construction trash and debris are controlled.

Temporary Effects

Boggs Lake hedge-hyssop occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to Boggs Lake hedge-hyssop. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to seasonal wetlands and Vernal Pool Ecosystem reported in Table 6-11).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on Boggs Lake hedge-hyssop are qualitatively described in Table 6-13.

6.6.3 Dwarf Downingia

Permanent Effects

Permanent direct and indirect effects of Covered Activities on dwarf downingia (*Downingia pusilla*) will include removal, modification, or significant degradation of modeled habitat, as well as direct and indirect take of all individual dwarf downingia occupying removed, modified, or degraded habitat.

All modeled habitat for dwarf downingia is within the Vernal Pool Ecosystem, which includes Valley Grassland, Vernal Pool, and Swale (see Section 3.4.1, Plant Covered Species Habitat Models, and Figures 3-5). In addition to the direct removal, modification, or degradation of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds will remove part or all of the perched aquifer and existing hydrology that supports vernal pool and swale habitat. In addition, edge effects will heighten dwarf downingia's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of vernal pool and swale habitat. Effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for dwarf downingia. These indirect effects on vernal pool and swale habitat are included in all permanent effects calculations presented in this section.

Of the 10 documented dwarf downingia occurrences in the Plan Area, all are located outside the UDA: 8 in PPU 6 and 2 in PPU 7. Covered activities will not directly or indirectly impact any documented occurrence of dwarf downingia. Exhaustive surveys for dwarf downingia have not

been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 1,982 acres of dwarf downingia modeled habitat within the Plan Area (see Table 6-14), including 159 acres of dwarf downingia modeled aquatic habitats (i.e., vernal pools and swales) and 1,823 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on dwarf downingia modeled habitat will occur primarily inside the UDA, with approximately 1,900 acres of permanent effects on Vernal Pool Ecosystem in the UDA and approximately 82 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

Table 6-14
Dwarf Downingia Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	22,241	1,823	Qualitative	1,823	2,673	1,750	Qualitative	1,750	19,568	73	Qualitative	73
Vernal Pool	1,661	94	13	107	305	85	13	98	1,356	9	0	9
Swale	359	46	6	52	106	46	6	52	253	0	0	0
Vernal Pool Ecosystem	**24,261**	**1,963**	**19**	**1,982**	**3,084**	**1,881**	**19**	**1,900**	**21,177**	**82**	**0**	**82**

As shown in Table 6-14, approximately 19 acres of dwarf downingia modeled habitat will be indirectly affected in the Plan Area, all of which will occur in the UDA as a result of Urban Development Covered Activities. Outside the UDA, no dwarf downingia modeled habitat will be indirectly affected. In addition to the 19 acres of indirect effects quantified in Table 6-14, Covered Activities in the Plan Area will cause other permanent indirect effects to dwarf downingia that are not easily quantified (Table 6-15). These "other" indirect effects to dwarf downingia (Table 6-15) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the dwarf downingia present on existing preserves, on future SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on dwarf downingia will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to dwarf downingia outside the UDA will occur to dwarf downingia habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, etc., that will affect dwarf downingia habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing dwarf downingia habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-14). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on dwarf downingia that are not quantified are described qualitatively in Table 6-15, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect dwarf downingia. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-15
Permanent Indirect Effects on Dwarf Downingia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to dwarf downingia habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats or the hardpan/duripan, avoidance and project design outside of sensitive habitats, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter dwarf downingia habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on dwarf downingia. Within the UDA, habitat fragmentation will affect dwarf downingia because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves will be reduced through

Table 6-15
Permanent Indirect Effects on Dwarf Downingia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on dwarf downingia.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on dwarf downingia habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on dwarf downingia will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Dwarf downingia will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves, but indirect effects will occur to an estimated 19.4 acres of dwarf downingia modeled aquatic habitat (Table 6-14). However, the dwarf downingia Conservation Strategy (Section 7.6.2.3, Dwarf Downingia) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses)	No effects on dwarf downingia are expected from increased human

Table 6-15
Permanent Indirect Effects on Dwarf Downingia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	activity on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and dwarf downingia modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter dwarf downingia aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in dwarf downingia habitat will not occur.

Table 6-15
Permanent Indirect Effects on Dwarf Downingia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants within the Vernal Pool Ecosystem will introduce competition for resources along with affecting critical hydroperiods for supporting the dwarf downingia. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on dwarf downingia. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the Vernal Pool Ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	None required for this species.	No effect on this species.

Table 6-15
Permanent Indirect Effects on Dwarf Downingia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on dwarf downingia or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-16
Temporary Effects to Dwarf Downingia

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling)	Runoff from construction activities into dwarf downingia habitat will be fully avoided through implementation of AMMs.

Table 6-16
Temporary Effects to Dwarf Downingia

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of dwarf downingia habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. Implementation of AMMs ensures that trampling and compaction will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction dust effects on dwarf downingia individuals, modeled habitat, and vernal pool water quality will reduce habitat quality for dwarf downingia. Implementation of AMMs will ensure that dust is controlled and will not affect dwarf downingia.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas)	Increased human activity in construction and maintenance areas will affect dwarf downingia habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets will access occupied pools causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect dwarf downingia habitat quality through direct effects on water quality. Implementation of AMMs will ensure that construction trash and debris are controlled.

Temporary Effects

Dwarf downingia occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to dwarf downingia. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-14).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on dwarf downingia are qualitatively described in Table 6-16.

6.6.4 Legenere

Permanent Effects

Permanent direct and indirect effects of Covered Activities on legenere (*Legenere limosa*) will include removal, modification, or significant degradation of modeled habitat, as well as direct and indirect take of all individual legenere occupying removed, modified, or degraded habitat.

All modeled habitat for legenere is within seasonal wetlands and the Vernal Pool Ecosystem, which includes Valley Grassland and Vernal Pool (see Section 3.4.1, Plant Covered Species Habitat Models, and Figure 3-6). In addition to the direct removal, modification, or degradation of modeled habitat, edge effects on seasonal wetlands or vernal pool micro-watersheds will remove part or all of the perched aquifer and existing hydrology that supports legenere modeled habitat. In addition, edge effects will heighten legenere's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of modeled habitat. In particular, seasonal wetland ecosystems are extremely vulnerable to invasive plants because of the highly effective transport of invasive species along waterways. Invasive species can dominate the biomass of wetland communities where they become established, virtually choking out the native vegetation. In addition, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for legenere. These indirect effects on legenere modeled habitat are included in all permanent effects calculations presented in this section.

Of the 56 documented occurrences in the Plan Area, 30 are located within the UDA and 26 are outside the UDA. Covered activities will directly impact 2 documented occurrences within the UDA, including 1 in PPU 1 and 1 in PPU 3. Covered activities will indirectly impact 3

documented occurrences within the UDA in PPU 1 and 2 in PPU 3. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 10,778 acres of legenere modeled habitat within the Plan Area (see Table 6-17), including 341 acres of vernal pools, 10,401 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the vernal pools, and 36 acres of seasonal wetlands. Covered Activity impacts on legenere modeled habitat will occur primarily inside the UDA, with approximately 10,625 acres of permanent effects on modeled habitat in the UDA and approximately 153 acres of permanent effects on modeled habitat outside the UDA.

Table 6-17
Legenere Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	47,527	10,401	Qualitative	10,401	17,040	10,264	Qualitative	10,264	30,487	137	Qualitative	137
Vernal Pool	2,560	276	65	341	825	263	64	327	1,735	13	1	14
Subtotal Vernal Pool Ecosystem	*50,087*	*10,677*	*65*	*10,742*	*17,865*	*10,527*	*64*	*10,591*	*32,222*	*150*	*1*	*151*
Seasonal Wetland	886	36	Qualitative	36	59	34	Qualitative	34	827	2	Qualitative	2
GRAND TOTAL	**50,973**	**10,713**	**65**	**10,778**	**17,924**	**10,561**	**64**	**10,625**	**33,049**	**152**	**1**	**153**

As shown in Table 6-17, approximately 65 acres of legenere modeled habitat will be indirectly affected in the Plan Area, 64 acres of which will occur in the UDA as a result of Urban Development Covered Activities. Outside the UDA, 1 acre of legenere modeled habitat will be indirectly affected. In addition to the 65 acres of indirect effects quantified in Table 6-17, Covered Activities in the Plan Area will cause other permanent indirect effects to legenere that are not easily quantified (Table 6-18). These "other" indirect effects to legenere (Table 6-18) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the legenere present on existing preserves, on future SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on legenere will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to legenere outside the UDA will occur to legenere habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, etc., that will affect legenere habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing legenere habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to seasonal wetlands and Vernal Pool Ecosystem reported in Table 6-17). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on legenere that are not quantified are described qualitatively in Table 6-18, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect legenere. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-18
Permanent Indirect Effects on Legenere

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to legenere habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents that will impact seasonal wetlands and the Vernal Pool Ecosystem. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats or the hardpan/duripan, avoidance and project design outside of sensitive habitats, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter legenere habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on legenere. Within the UDA, habitat fragmentation will affect legenere because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves will be reduced through

Table 6-18
Permanent Indirect Effects on Legenere

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on legenere.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on legenere habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on legenere will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Legenere will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves, but indirect effects will occur to an estimated 65.5 acres of legenere modeled aquatic habitat (Table 6-17). However, the legenere Conservation Strategy (Section 7.6.2.4, Legenere) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses)	No effects on legenere are expected from increased human activity

Table 6-18
Permanent Indirect Effects on Legenere

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and legenere modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter legenere aquatic habitat, that water chemistry of modeled aquatic habitat will not be affected, and that resultant wildlife community alterations in legenere habitat will not occur.

Table 6-18
Permanent Indirect Effects on Legenere

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants within seasonal wetlands and the Vernal Pool Ecosystem will introduce competition for resources along with affecting critical hydroperiods for supporting the legenere. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on legenere. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of seasonal wetlands and the Vernal Pool Ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	None required for this species.	No effect on this species.

Table 6-18
Permanent Indirect Effects on Legenere

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on legenere, seasonal wetlands, or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-19
Temporary Effects to Legenere

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling)	Runoff from construction activities into legenere habitat will be fully avoided through implementation of AMMs.

Table 6-19
Temporary Effects to Legenere

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of legenere habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. Implementation of AMMs ensures that trampling and compaction will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction dust effects on legenere individuals, modeled habitat, and vernal pool water quality will reduce habitat quality for legenere. Implementation of AMMs will ensure that dust is controlled and will not affect legenere.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas)	Increased human activity in construction and maintenance areas will affect legenere habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets will access occupied habitat causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect legenere habitat quality through direct effects on water quality. Implementation of AMMs will ensure that construction trash and debris are controlled.

Temporary Effects

Legenere occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to legenere. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to seasonal wetlands and Vernal Pool Ecosystem reported in Table 6-17).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on legenere are qualitatively described in Table 6-19.

6.6.5 Pincushion Navarretia

Permanent Effects

Permanent direct and indirect effects of Covered Activities on pincushion navarretia (*Navarretia myersii*) will include removal, modification, or significant degradation of modeled habitat, as well as direct and indirect take of all individual pincushion navarretia occupying removed, modified, or degraded habitat.

All modeled habitat for pincushion navarretia is within the Vernal Pool Ecosystem, which includes Valley Grassland, Vernal Pool, and Swale (see Section 3.4.1, Plant Covered Species Habitat Models, and Figure 3-7). In addition to the direct removal, modification, or degradation of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds will remove part or all of the perched aquifer and existing hydrology that supports vernal pool and swale habitat. In addition, edge effects will heighten pincushion navarretia's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of vernal pool and swale habitat. Effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for pincushion navarretia. These indirect effects on vernal pool and swale habitat are included in all permanent effects calculations presented in this section.

Of the 48 documented occurrences of pincushion navarretia in the Plan Area, all are located outside the UDA in PPU 7. No documented occurrences of pincushion navarretia will be directly or indirectly impacted. Exhaustive surveys for pincushion navarretia have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 8,258 acres of pincushion navarretia modeled habitat within the Plan Area (see Table 6-20), including 271 acres of pincushion navarretia aquatic habitats (i.e., vernal pools and swales) and 7,987 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on pincushion navarretia modeled habitat will occur primarily inside the UDA, with approximately 8,175 acres of permanent effects on Vernal Pool Ecosystem in the UDA and approximately 83 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

Table 6-20
Pincushion Navarretia Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	54,967	7,987	Qualitative	7,987	11,440	7,910	Qualitative	7,910	43,527	77	Qualitative	77
Vernal Pool	1,844	118	36	154	475	114	35	149	1,369	4	1	5
Swale	627	96	21	117	186	95	21	116	441	1	0	1
Vernal Pool Ecosystem	**57,438**	**8,201**	**57**	**8,258**	**12,101**	**8,119**	**56**	**8,175**	**45,337**	**82**	**1**	**83**

As shown in Table 6-20, approximately 57 acres of pincushion navarretia modeled habitat will be indirectly affected in the Plan Area, 56 acres of which will occur in the UDA as a result of Urban Development Covered Activities. Outside the UDA, 1 acre of pincushion navarretia modeled habitat will be indirectly affected. In addition to the 57 acres of indirect effects quantified in Table 6-20, Covered Activities in the Plan Area will cause other permanent indirect effects to pincushion navarretia that are not easily quantified (Table 6-21). These "other" indirect effects to pincushion navarretia (Table 6-21) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the pincushion navarretia present on existing preserves, on future SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on pincushion navarretia will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to pincushion navarretia outside the UDA will occur to pincushion navarretia habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, etc., that will affect pincushion navarretia habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing pincushion navarretia habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-20). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on pincushion navarretia that are not quantified are described qualitatively in Table 6-21, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect pincushion navarretia. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-21
Permanent Indirect Effects on Pincushion Navarretia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to pincushion navarretia habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats or the hardpan/duripan, avoidance and project design outside of sensitive habitats, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter pincushion navarretia habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on pincushion navarretia. Within the UDA, habitat fragmentation will affect pincushion navarretia because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA

Table 6-21
Permanent Indirect Effects on Pincushion Navarretia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	Preserves will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on pincushion navarretia.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on pincushion navarretia habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on pincushion navarretia will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Pincushion navarretia will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves, but indirect effects will occur to an estimated 57.5 acres of pincushion navarretia modeled aquatic habitat (Table 6-20). However, the pincushion navarretia Conservation Strategy (Section 7.6.2.5, Pincushion Navarretia) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.

Table 6-21
Permanent Indirect Effects on Pincushion Navarretia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on pincushion navarretia are expected from increased human activity on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and pincushion navarretia modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter pincushion navarretia aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in pincushion navarretia habitat will not occur.

Table 6-21
Permanent Indirect Effects on Pincushion Navarretia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants within the Vernal Pool Ecosystem will introduce competition for resources along with affecting critical hydroperiods for supporting the pincushion navarretia. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on pincushion navarretia. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the Vernal Pool Ecosystem on Preserves and through AMMs related to invasive species.

Table 6-21
Permanent Indirect Effects on Pincushion Navarretia

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Animals	None required for this species.	No effect on this species. As described above in Wildlife Community Alterations, invasion by non-native plants will be avoided through preservation of existing vernal pool inundation period and water chemistry.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on pincushion navarretia or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-22
Temporary Effects to Pincushion Navarretia

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	Runoff from construction activities into pincushion navarretia habitat will be fully avoided through implementation of AMMs.

Table 6-22
Temporary Effects to Pincushion Navarretia

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of pincushion navarretia habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. Implementation of AMMs ensures that trampling and compaction will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction dust effects on pincushion navarretia individuals, modeled habitat, and vernal pool water quality will reduce habitat quality for pincushion navarretia. Implementation of AMMs will ensure that dust is controlled and will not affect pincushion navarretia.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas)	Increased human activity in construction and maintenance areas will affect pincushion navarretia habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets will access occupied pools causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect pincushion navarretia habitat quality through direct effects on water quality. Implementation of AMMs will ensure that construction trash and debris are controlled.

Temporary Effects

Pincushion navarretia occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to pincushion navarretia. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-20).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on pincushion navarretia are qualitatively described in Table 6-22.

6.6.6 Sacramento Orcutt Grass

Permanent Effects

Permanent direct and indirect effects of Covered Activities on Sacramento Orcutt grass (*Orcuttia viscida*) will include removal, modification, or significant degradation of modeled habitat. No individual Sacramento Orcutt grass occurrences will be removed.

All modeled habitat for Sacramento Orcutt grass is within the Vernal Pool Ecosystem, which includes Valley Grassland and Vernal Pool (see Section 3.4.1, Plant Covered Species Habitat Models, and Figure 3-8). In addition to the direct removal, modification, or degradation of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds will remove part or all of the perched aquifer and existing hydrology that supports vernal pool habitat. In addition, edge effects will heighten Sacramento Orcutt grass's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of vernal pool habitat. Effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for Sacramento Orcutt grass, or non-native species outcompeting Sacramento Orcutt grass. These indirect effects on vernal pool habitat are included in all permanent effects calculations presented in this section.

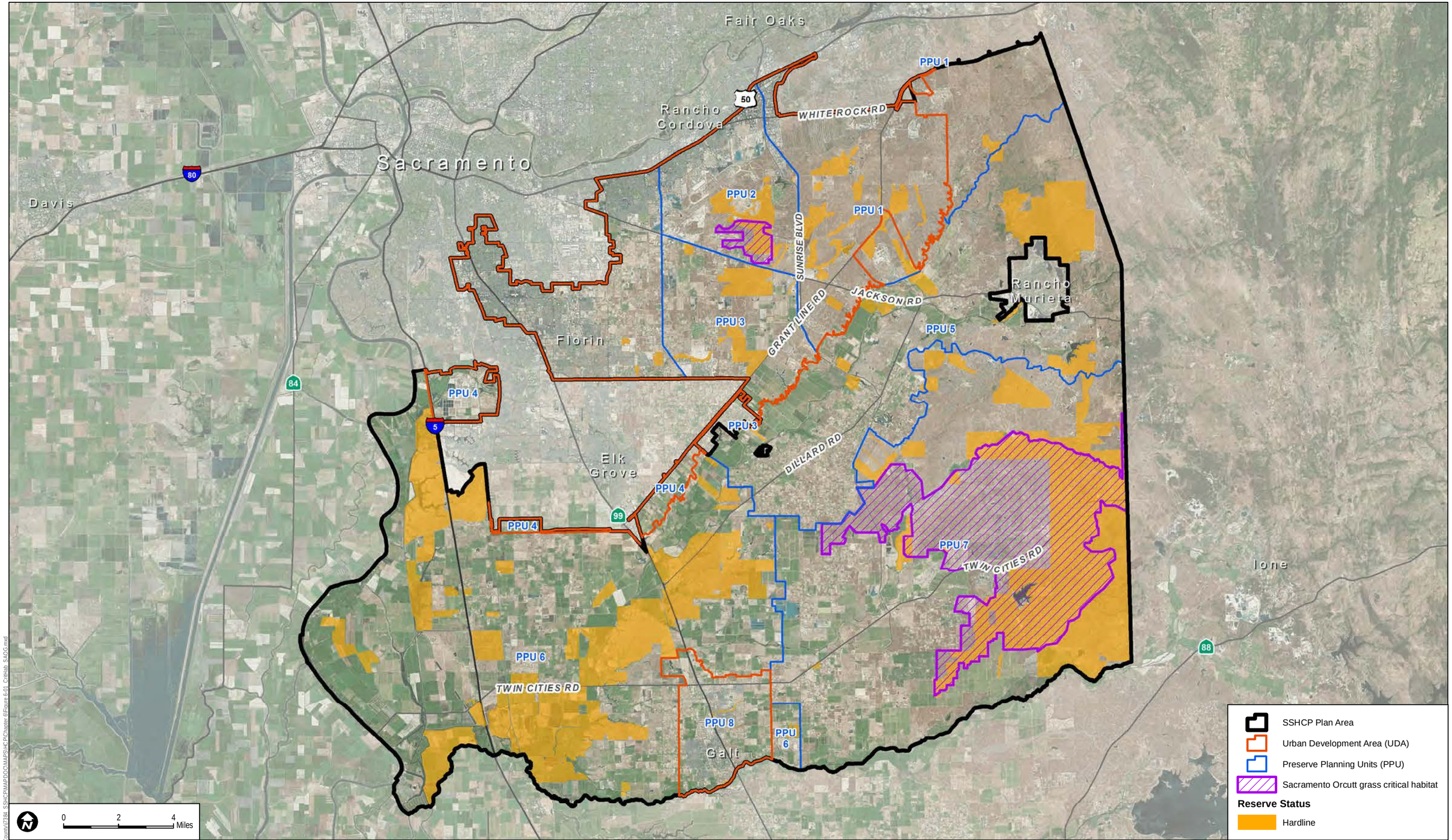
There are 40 documented occurrences of Sacramento Orcutt grass distributed in the Plan Area, 30 of which are outside the UDA, including 28 in PPU 1 and 2 in PPU 7. There are 10 occurrences in the UDA including 8 in PPU 1 and 2 in PPU 3. Covered activities will not directly impact any occurrences of this species. Exhaustive surveys for Sacramento Orcutt grass have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area; however, additional occurrences will be avoided. Due to its rarity,

take of this species is not permitted under the SSHCP with the exception of take related to Preserve management and monitoring.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 7,187 acres of Sacramento Orcutt grass modeled habitat within the Plan Area (see Table 6-23), including 196 acres of Sacramento Orcutt grass modeled aquatic habitats (i.e., vernal pools) and 6,991 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on Sacramento Orcutt grass will occur primarily inside the UDA, with approximately 7,116 acres of permanent effects on Vernal Pool Ecosystem in the UDA and approximately 70 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

The total 7,187 acres of permanent direct and indirect effects to Sacramento Orcutt grass modeled habitat includes removal of approximately 4,704 acres of Vernal Pool Ecosystem within the two Plan Area Core Recovery Areas (USFWS 2005). Effects inside the UDA include permanent effects to approximately 4,683 acres of Vernal Pool Ecosystem in the Mather Core Recovery Area (Table 6-24). Outside the UDA, 21 acres of Vernal Pool Ecosystem within the Cosumnes/Rancho-Seco Core Recovery Area will be affected by Covered Activities.

Permanent direct and indirect effects to Sacramento Orcutt grass modeled habitat include removal of approximately 248 acres of Vernal Pool Ecosystem in designated Critical Habitat (USFWS 2006) inside the UDA within Unit 2 and outside the UDA in Unit 3 (see Figure 6-1). Approximately 235 acres of Vernal Pool Ecosystem will be removed in Unit 2, including 12 acres of modeled aquatic habitat and 223 acres of supporting upland habitat. In Unit 3, a total of 13 acres of Vernal Pool Ecosystem will be removed (see Tables 6-23, 6-24, 6-25, and Figure 3-8).



SOURCE: Bing Maps, County of Sacramento 2014, USFWS 2012

FIGURE 6-1

Critical Habitat for Sacramento Orcutt grass

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\2094_SSHCP\MAPDOC\MAPS\HCP\Chapter 6\Figure 6-01_CritHab_SAGG.mxd

INTENTIONALLY LEFT BLANK

Table 6-23
Sacramento Orcutt Grass Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	33,265	6,991	Qualitative	6,991	11,971	6,925	Qualitative	6,925	21,294	66	Qualitative	66
Vernal Pool	1,227	148	48	196	456	144	47	191	771	4	1	5
Vernal Pool Ecosystem	**34,492**	**7,139**	**48**	**7,187**	**12,427**	**7,069**	**47**	**7,116**	**22,065**	**70**	**1**	**71**

Table 6-24
Sacramento Orcutt Grass Permanent Effects in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Areas (acres)				Mather Core Area (acres)				Cosumnes/Rancho-Seco Core Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	24,405	4,558	Qualitative	4,558	10,039	4,538	Qualitative	4,538	14,366	20	Qualitative	20
Vernal Pool	1,023	105	41	146	427	104	41	145	596	1	0	1
Vernal Pool Ecosystem	**25,428**	**4,663**	**41**	**4,704**	**10,466**	**4,642**	**41**	**4,683**	**14,962**	**21**	**0**	**21**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

Table 6-25
Permanent Effects to Sacramento Orcutt Grass Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)				Critical Habitat Unit 2 (acres)				Critical Habitat Unit 3 (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	9,695	236	Qualitative	236	505	223	Qualitative	223	9,190	13	Qualitative	13
Vernal Pool	419	11	1	12	22	11	1	12	397	0	0	0
Vernal Pool Ecosystem	**10,114**	**247**	**1**	**248**	**527**	**234**	**1**	**235**	**9,587**	**13**	**0**	**13**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

As shown in Table 6-23, approximately 48 acres of Sacramento Orcutt grass modeled habitat will be indirectly affected in the Plan Area, 47 acres of which will occur in the UDA as a result of Urban Development Covered Activities. Outside the UDA, 1 acre of Sacramento Orcutt grass modeled habitat will be indirectly affected. In addition to the 48acres of indirect effects quantified in Table 6-23, Covered Activities in the Plan Area will cause other permanent indirect effects to Sacramento Orcutt grass that are not easily quantified (Table 6-26). These "other" indirect effects to Sacramento Orcutt grass (Table 6-26) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the Sacramento Orcutt grass present on existing preserves, on future SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on Sacramento Orcutt grass will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to Sacramento Orcutt grass outside the UDA will occur to Sacramento Orcutt grass habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, etc., that will affect the Vernal Pool Ecosystem that provides Sacramento Orcutt grass habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing Sacramento Orcutt grass habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-23). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on Sacramento Orcutt grass that are not quantified are described qualitatively in Table 6-26, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect Sacramento Orcutt grass. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-26
Permanent Indirect Effects on Sacramento Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to Sacramento Orcutt grass habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats or the hardpan/duripan, avoidance and project design outside of sensitive habitats, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter Sacramento Orcutt grass habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	The Landscape Preserves established outside the UDA, including in the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on Sacramento Orcutt grass. Within the UDA, habitat fragmentation will affect Sacramento Orcutt grass because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of

Table 6-26
Permanent Indirect Effects on Sacramento Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	EDGE AMMs. The effects of roads fragmenting some UDA Preserves will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on the Sacramento Orcutt grass population in the Mather Core Recovery Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on Sacramento Orcutt grass habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on Sacramento Orcutt grass will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Sacramento Orcutt grass will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves, but indirect effects will occur to an estimated 47.9 acres of Sacramento Orcutt grass modeled aquatic habitat (Table 6-23). However, the Sacramento Orcutt grass Conservation Strategy (Section 7.6.2.6, Sacramento Orcutt Grass) will offset these unavoidable impacts.

Table 6-26
Permanent Indirect Effects on Sacramento Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on Sacramento Orcutt grass are expected from increased human activity on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and Sacramento Orcutt grass modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter Sacramento Orcutt grass aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in Sacramento Orcutt grass habitat will not occur.

Table 6-26
Permanent Indirect Effects on Sacramento Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants within the Vernal Pool Ecosystem will introduce competition for resources along with affecting critical hydroperiods for supporting the Sacramento Orcutt grass. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on Sacramento Orcutt grass. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and

Table 6-26
Permanent Indirect Effects on Sacramento Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		adaptive management of the Vernal Pool Ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on Sacramento Orcutt grass or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-27
Temporary Effects to Sacramento Orcutt Grass

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	Runoff from construction activities into Sacramento Orcutt grass habitat will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) ORCUTT-1 (Orcutt Grass Survey) ORCUTT-2 (Orcutt Grass Protection)	Inadvertent trampling and compaction of Sacramento Orcutt grass habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. In addition, if a Covered Activity is located within 1 mile of the Mather Core Recovery Area and contains the Vernal Pool land cover type, the project site will be surveyed for Sacramento Orcutt grass. Any occurrences detected will be protected within an SSHCP Preserve at least 50 acres in size. Implementation of AMMs ensures that trampling, compaction, and take of this species will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction dust effects on Sacramento Orcutt grass individuals, modeled habitat, and vernal pool water quality will reduce habitat quality for Sacramento Orcutt grass. Implementation of AMMs will ensure that dust is controlled and will not affect Sacramento Orcutt grass.

Table 6-27
Temporary Effects to Sacramento Orcutt Grass

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas)	Increased human activity in construction and maintenance areas will affect Sacramento Orcutt grass habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets will access occupied pools causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect Sacramento Orcutt grass habitat quality through direct effects on water quality. Implementation of AMMs will ensure that construction trash and debris are controlled.

Temporary Effects

Sacramento Orcutt grass occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to Sacramento Orcutt grass. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-23).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on Sacramento Orcutt grass are qualitatively described in Table 6-27.

6.6.7 Slender Orcutt Grass

Permanent Effects

Permanent direct and indirect effects of Covered Activities on slender Orcutt grass (*Orcuttia tenuis*) will include removal, modification, or significant degradation of modeled habitat. No individual slender Orcutt grass occurrences will be removed.

All modeled habitat for slender Orcutt grass is within the Vernal Pool Ecosystem, which includes Valley Grassland and Vernal Pool (see Section 3.4.1, Plant Covered Species Habitat Models, and Figure 3-9). In addition to the direct removal, modification, or degradation of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds will remove part or all of the perched aquifer and existing hydrology that supports vernal pool habitat. In addition, edge effects will heighten slender Orcutt grass's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of vernal pool habitat. Effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for slender Orcutt grass. These indirect effects on vernal pool habitat are included in all permanent effects calculations presented in this section.

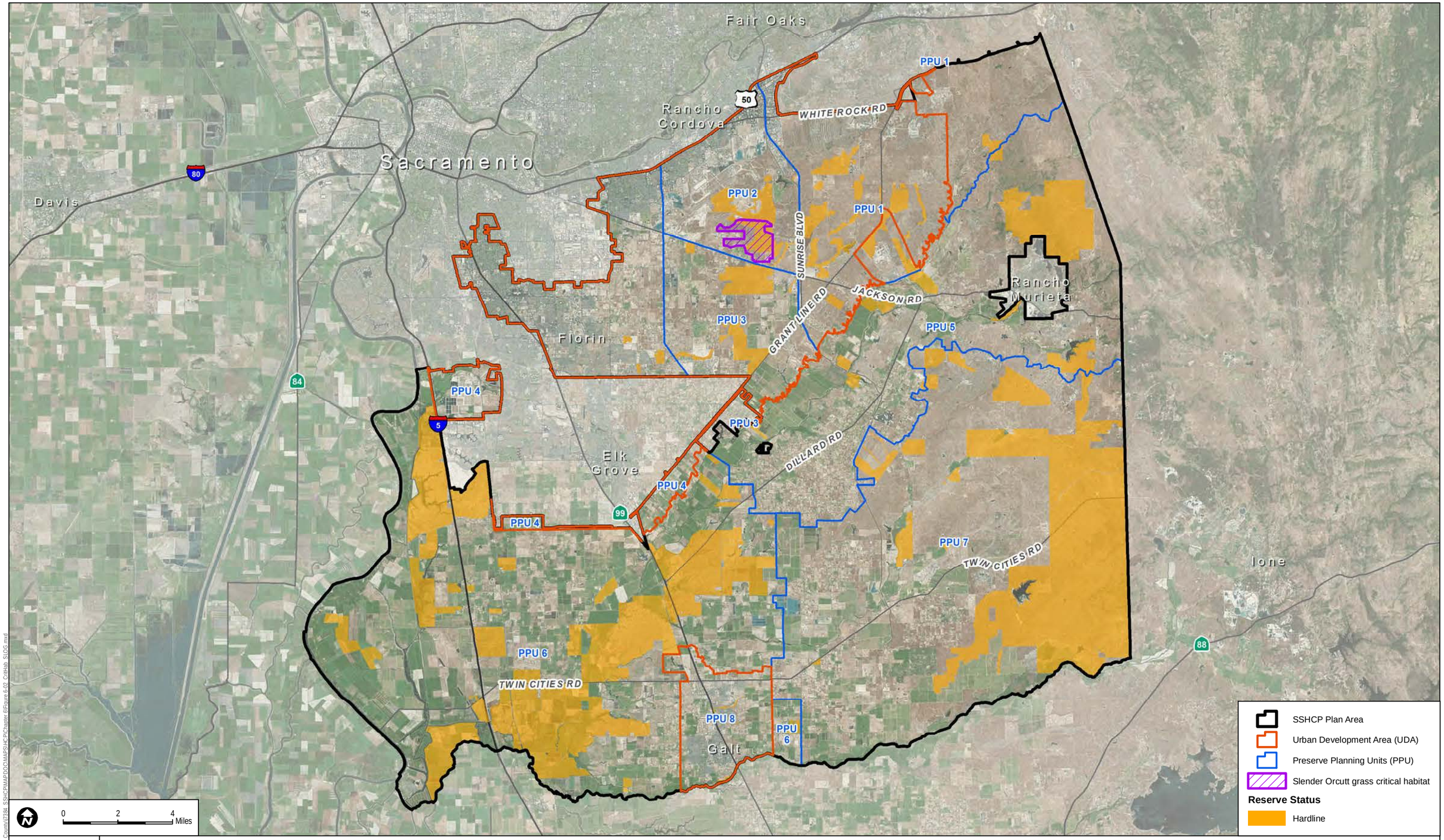
There are four documented occurrences of slender Orcutt grass distributed in the Plan Area, all within the UDA: one of the occurrences is in PPU 1 and three are in PPU 3. Three (75%) of the four occurrences will be preserved in a proposed preserve (all inside the UDA in PPU 3). Covered activities will not directly impact any occurrences of this species. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area; however, additional occurrences will be

avoided. Due to its rarity, take of this species is not permitted under the SSHCP with the exception of take related to Preserve management and monitoring.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 7,187 acres of slender Orcutt grass modeled habitat within the Plan Area (see Table 6-28), including 196 acres of slender Orcutt grass aquatic habitats (i.e., vernal pools) and 6,991 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on slender Orcutt grass modeled habitat will occur primarily inside the UDA, with approximately 7,116 acres of permanent effects on Vernal Pool Ecosystem in the UDA and approximately 71 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

The total 7,187 acres of permanent direct and indirect effects to slender Orcutt grass modeled habitat includes removal of approximately 4,704 acres of Vernal Pool Ecosystem within the two Plan Area Core Recovery Areas (USFWS 2005). Effects inside the UDA include permanent effects to approximately 4,683 acres of Vernal Pool Ecosystem in the Mather Core Recovery Area (Table 6-29). Outside the UDA, 21 acres of Vernal Pool Ecosystem within the Cosumnes/Rancho-Seco Core Recovery Area will be affected by Covered Activities.

Permanent direct and indirect effects include removal of approximately 235 acres of Vernal Pool Ecosystem in designated Critical Habitat (USFWS 2006) inside the UDA within Unit 6, including 12 acres of modeled aquatic habitat and approximately 223 acres of supporting upland habitat (see Tables 6-28, 6-29, 6-30, and Figures 3-9 and 6-2).



SOURCE: Bing Maps, County of Sacramento 2014, USFWS 2012

FIGURE 6-2

Critical Habitat for Slender Orcutt grass

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento County\2096 SSHCP\MAPDOCK\MAPS\HCP\Chapter 6\Figure 6-02_CritHab_SLOG.mxd

INTENTIONALLY LEFT BLANK

Table 6-28
Slender Orcutt Grass Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	33,265	6,991	Qualitative	6,991	11,971	6,925	Qualitative	6,925	21,294	66	Qualitative	66
Vernal Pool	1,227	148	48	196	456	144	47	191	771	4	1	5
Vernal Pool Ecosystem	**34,492**	**7,139**	**48**	**7,187**	**12,427**	**7,069**	**47**	**7,116**	**22,065**	**70**	**1**	**71**

Table 6-29
Slender Orcutt Grass Permanent Effects in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Areas (acres)				Mather Core Area (acres)				Cosumnes/Rancho-Seco Core Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	24,405	4,558	Qualitative	4,558	10,039	4,538	Qualitative	4,538	14,366	20	Qualitative	20
Vernal Pool	1,023	105	41	146	427	104	41	145	596	1	0	1
Vernal Pool Ecosystem	**25,428**	**4,663**	**41**	**4,704**	**10,466**	**4,642**	**41**	**4,683**	**14,962**	**21**	**0**	**21**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

Table 6-30
Permanent Effects to Slender Orcutt Grass Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)				Critical Habitat SLEND 6 (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	505	223	Qualitative	223	505	223	Qualitative	223
Vernal Pool	22	11	1	12	22	11	1	12
Vernal Pool Ecosystem	**527**	**234**	**1**	**235**	**527**	**234**	**1**	**235**

As shown in Table 6-28, approximately 48 acres of slender Orcutt grass modeled habitat will be indirectly affected in the Plan Area, 47 acres of which will occur in the UDA as a result of Urban Development Covered Activities. Outside the UDA, 1 acre of slender Orcutt grass modeled habitat will be indirectly affected. In addition to the 48 acres of indirect effects quantified in Table 6-28, Covered Activities in the Plan Area will cause other permanent indirect effects to slender Orcutt grass that are not easily quantified (Table 6-31). These "other" indirect effects to slender Orcutt grass (Table 6-31) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the slender Orcutt grass present on existing preserves, on future SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on slender Orcutt grass will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to slender Orcutt grass outside the UDA will occur to slender Orcutt grass habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, etc., that will affect slender Orcutt grass habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing slender Orcutt grass habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-28). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on slender Orcutt grass that are not quantified are described qualitatively in Table 6-31, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect slender Orcutt grass. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-31
Permanent Indirect Effects on Slender Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to slender Orcutt grass habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats or the hardpan/duripan, avoidance and project design outside of sensitive habitats, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter slender Orcutt grass habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets)	The Landscape Preserves established outside the UDA, including in the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on slender Orcutt grass. Within the UDA, habitat fragmentation will affect slender Orcutt grass because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The

Table 6-31
Permanent Indirect Effects on Slender Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	effects of roads fragmenting some UDA Preserves will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on the slender Orcutt grass population in the Mather Core Recovery Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on slender Orcutt grass habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on slender Orcutt grass will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Slender Orcutt grass will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and planned vernal pool Preserves, but indirect effects will occur to an estimated 47.9 acres of slender Orcutt grass modeled aquatic habitat (Table 6-28). However, the slender Orcutt grass Conservation Strategy (Section 7.6.2.7, Slender Orcutt Grass) will offset these unavoidable impacts.

Table 6-31
Permanent Indirect Effects on Slender Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on slender Orcutt grass are expected from increased human activity on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and slender Orcutt grass modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter slender Orcutt grass aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in slender Orcutt grass habitat will not occur.

Table 6-31
Permanent Indirect Effects on Slender Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants within the Vernal Pool Ecosystem will introduce competition for resources along with affecting critical hydroperiods for supporting the slender Orcutt grass. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on slender Orcutt grass. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the Vernal Pool Ecosystem on Preserves and through AMMs related to invasive species.

Table 6-31
Permanent Indirect Effects on Slender Orcutt Grass

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on slender Orcutt grass or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-32
Temporary Effects to Slender Orcutt Grass

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	Runoff from construction activities into slender Orcutt grass habitat will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) ORCUTT-1 (Orcutt Grass Survey) ORCUTT-2 (Orcutt Grass Protection)	Inadvertent trampling and compaction of slender Orcutt grass habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. In addition, if a Covered Activity is located within 1 mile of the Mather Core Recovery Area and contains the Vernal Pool land cover type, the project site will be surveyed for slender Orcutt grass. Any occurrences detected will be protected within an SSHCP Preserve at least 50 acres in size. Implementation of AMMs ensures that trampling, compaction, and take of this species will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction dust effects on slender Orcutt grass individuals, modeled habitat, and vernal pool water quality will reduce habitat quality for slender Orcutt grass. Implementation of AMMs will ensure that dust is controlled and will not affect slender Orcutt grass.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Increased human activity in construction and maintenance areas will affect slender Orcutt grass habitat quality through personnel

Table 6-32
Temporary Effects to Slender Orcutt Grass

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	SPECIES-2 (No Pets in Construction Areas)	bringing pets (e.g., dogs) to work sites. Pets will access occupied pools causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction)	Runoff from construction activities into slender Orcutt grass habitat will be fully avoided through implementation of AMMs.

Temporary Effects

Slender Orcutt grass occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to slender Orcutt grass. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool Ecosystem reported in Table 6-28).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on slender Orcutt grass are qualitatively described in Table 6-32.

6.6.8 Sanford's Arrowhead

Permanent Effects

Permanent direct and indirect effects of Covered Activities on Sanford's arrowhead (*Sagittaria sanfordii*) will include removal, modification, or significant degradation of modeled habitat, as well as direct and indirect take of all individual Sanford's arrowhead occupying removed, modified, or degraded habitat.

All modeled habitat for Sanford's arrowhead includes Freshwater Marsh, Open Water, Seasonal Wetland, Streams/Creek, and Valley Grassland that supports the hydrology and ecology of the aquatic habitats (see Section 3.4.1, Plant Covered Species Habitat Models, and Figure 3-10). In addition to the direct removal, modification, or degradation of modeled habitat, edge effects will heighten Sanford's arrowhead's vulnerability to stochastic disturbances, pollution, and invasion by non-native plants, which displace native species and adversely affect the composition of modeled habitat. By permanently increasing the extent of impermeable surfaces, urban development will result in increased runoff, which will change the hydrograph (i.e., rate of runoff) of creeks and streams, result in greater levels of scour and/or incision, increase sediment loads downstream, alter downstream hydrology, and decrease groundwater recharge. In addition, an increased quantity of pollutants will reach local creeks and affect the characteristics of Sanford's arrowhead modeled aquatic habitats. In addition, riparian and wetland ecosystems are extremely vulnerable to invasive plants because of the highly effective transport of invasive species along rivers and streams. Invasive species can dominate the biomass of riparian and wetland communities where they become established, virtually choking out the native vegetation. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for Sanford's arrowhead. These indirect effects on modeled habitat are included in all permanent effects calculations presented in this section.

Of the 63 documented occurrences of Sanford's arrowhead within the Plan Area, 14 are located inside the UDA and 49 are located outside the UDA. Twelve of the documented occurrences will be directly impacted, all of which are inside the UDA (7 outside of the PPUs, 3 in PPU 2, 1 in PPU 3, and 1 in PPU 4). No documented occurrences will be indirectly impacted. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 10,620 acres of Sanford's arrowhead modeled habitat within the Plan Area (see Table 6-33), including 103 acres of freshwater marsh, 68 acres of open water, 72 acres of seasonal wetlands, 83 acres of streams/creeks, and 10,294 acres of surrounding Valley Grassland that supports the hydrology and ecology of the aquatic habitats. Covered Activity impacts on Sanford's arrowhead will occur primarily inside the UDA, with approximately 10,397 acres of permanent effects on modeled habitat in the UDA and approximately 223 acres of permanent effects on modeled habitat outside the UDA.

Table 6-33
Sanford's Arrowhead Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Freshwater Marsh	2,044	103	Qualitative	103	350	99	Qualitative	99	1,694	4	Qualitative	4
Open Water	1,086	68	Qualitative	68	86	67	Qualitative	67	1,000	1	Qualitative	1
Seasonal Wetlands	1,425	72	Qualitative	72	117	70	Qualitative	70	1,308	2	Qualitative	2
Streams/Creeks	893	83	Qualitative	83	126	67	Qualitative	67	767	16	Qualitative	16
Valley Grassland	47,375	10,294	Qualitative	10,294	17,412	10,094	Qualitative	10,094	29,963	200	Qualitative	200
GRAND TOTAL	**52,823**	**10,620**	**Qualitative**	**10,620**	**18,091**	**10,397**	**Qualitative**	**10,397**	**34,732**	**223**	**Qualitative**	**223**

As shown in Table 6-33, Covered Activities in the Plan Area will cause permanent indirect effects to Sanford's arrowhead that are not easily quantified. These "other" indirect effects to Sanford's arrowhead (Table 6-33) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the Sanford's arrowhead present on existing preserves, on future SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will be avoided inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on Sanford's arrowhead will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and future SSHCP proposed preserves outside the UDA are much larger than the existing and planned UDA Preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the modeled habitat within Preserves.

Most indirect effects to Sanford's arrowhead outside the UDA will occur to Sanford's arrowhead habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, pesticide use, etc., that will affect Sanford's arrowhead habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing Sanford's arrowhead habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects reported in Table 6-33). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on Sanford's arrowhead that are not quantified are described qualitatively in Table 6-34, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect Sanford's arrowhead. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-34
Permanent Indirect Effects on Sanford's Arrowhead

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-2 (Groundwater Recharge) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams) Condition 7, STREAM-4 (Minimize Effects from Temporary Channel Re-routing) Condition 7, STREAM-5 (Design for Stream Channel Re-Routing) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	The close proximity of planned development and roads to Sanford's arrowhead habitat will increase hydrologic and water quality effects, including urban runoff that alter normal hydroperiods in occupied pools and contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Hydrologic factors are important in triggering germination and providing a suitable environment for completing the reproductive cycle (see Appendix B, Species Accounts, for more details). Implementation of AMMs such as those that require control of stormwater runoff, control of pollutants and toxins, protection of sensitive habitats, avoidance and project design outside of sensitive habitats, setbacks for streams/creeks, measures to minimize effects from channel re-routing, educational awareness for workers, and monitoring of biological resources will ensure pollutants will not enter Sanford's arrowhead modeled habitat and that water quality of modeled aquatic habitat will not be affected.

Table 6-34
Permanent Indirect Effects on Sanford's Arrowhead

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-4 (Nature Trail Location)	The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on Sanford's arrowhead. Within the UDA, habitat fragmentation will affect Sanford's arrowhead because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads and trails fragmenting some UDA Preserves will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on Sanford's arrowhead.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	As discussed in Section 6.3, Environmental Stressors from Covered Activities, Covered Activities outside the UDA would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on Sanford's arrowhead habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on Sanford's arrowhead will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memoranda of agreement with responsible fire agencies. In addition, the potential for increased wildfires will be minimized through the implementation of AMMs that reduce the open space–urban interface, require setbacks for streams/creeks, and control public access within the Preserve.
Vernal Pool Hydrologic Alterations	None required for this species.	No effect on this species.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.

Table 6-34
Permanent Indirect Effects on Sanford's Arrowhead

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 4, ROAD-1 (Road Project Location) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Outdoor lighting could indirectly affect the use of Sanford's arrowhead modeled habitat by potential pollinators (e.g., bees, flies, wasps; see Appendix B, Species Accounts, for more details) via behavioral disruptions due to night time light pollution. Implementation of AMMs will ensure that outdoor lighting effects on Sanford's arrowhead will be minimized.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	No effects on Sanford's arrowhead are expected from increased human activity on or near Preserves or Preserve Setbacks since access to the Preserves will be tightly controlled through implementation of NATURE TRAIL AMMs and an approved Preserve Management Plan.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection)	Wildlife community alterations in developed areas will facilitate the presence (and increase) of wildlife species that live and reproduce well in urban landscapes. Urban-tolerant species, such as squirrels and mice, will facilitate a shift in vegetation community structure and Sanford's arrowhead modeled habitat if their seed caches are placed within adjacent Preserves and consist of non-native or introduced plant species (see Invasive Plants below). Implementation of AMMs such as those that require control of stormwater runoff or non-native species will ensure pollution will not enter Sanford's arrowhead aquatic habitat, that water chemistry of

Table 6-34
Permanent Indirect Effects on Sanford's Arrowhead

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams) Condition 8, UTILITY-3 (Trenchless Construction Method) Condition 8, UTILITY-4 (Siting of Entry and Exit Locations)	vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in Sanford's arrowhead habitat will not occur.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control)	Unmanaged proliferation of non-native plants within Sanford's arrowhead modeled habitat will introduce competition for resources along with affecting modeled habitat soil and hydrologic characteristics for supporting the Sanford's arrowhead. Implementation of AMMs will minimize proliferation of invasive plants, and Preserve management for thatch such as grazing or prescribed fire will reduce biomass of upland non-native plants. In addition to implementation of AMMs, small infestations of invasive

Table 6-34
Permanent Indirect Effects on Sanford's Arrowhead

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	plants will be addressed on a case-by-case basis through Preserve management under a Preserve Management Plan. These will substantially reduce effects of non-native plants on Sanford's arrowhead. Effects of proliferation of non-native plants will be reduced under the SSHCP relative to existing unmanaged conditions (see Chapter 7, Conservation Strategy). New Urban Development Covered Activities and new rural roadway projects will result in additional vehicle trips in the Plan Area. Nitrogen deposition associated with increased vehicle emissions from these trips will result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of Sanford's arrowhead modeled habitat on Preserves and through AMMs related to invasive species.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Adverse effects on Sanford's arrowhead or modeled habitat plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs that limit edge effects, Stream/Creek setbacks, and monitoring and control of pesticide use near Preserves (Chapter 8, SSHCP Monitoring and Management Programs) will also reduce pesticide drift and limit pesticide effects.

Table 6-34
Permanent Indirect Effects on Sanford's Arrowhead

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-35
Temporary Effects to Sanford's Arrowhead

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 1, LID-2 (Groundwater Recharge) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Runoff from construction activities into Sanford's arrowhead habitat will be fully avoided through implementation of AMMs.

Table 6-35
Temporary Effects to Sanford's Arrowhead

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Inadvertent trampling and compaction of Sanford's arrowhead habitat will adversely affect the species propagation by damaging individuals or microhabitat nutrients and soil resources. Implementation of AMMs ensures that trampling and compaction will not occur.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	Condition 3, BMP-6 (Construction Lighting) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Construction lighting directed towards Sanford's arrowhead modeled habitat may temporarily affect the behavior of potential pollinators (e.g., bees, flies, wasps; see Appendix B, Species Accounts, for more details) via behavioral disruptions. Implementation of AMMs will minimize construction lighting effects on Sanford's arrowhead by ensuring that construction lighting is directed away from adjacent natural habitats.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Construction dust effects on Sanford's arrowhead individuals and/or modeled habitat will reduce habitat quality, including water quality, for Sanford's arrowhead. Implementation of AMMs will ensure that dust is controlled and will not affect Sanford's arrowhead.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Increased human activity in construction and maintenance areas will affect Sanford's arrowhead habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets will access occupied habitat causing general disturbance and affecting water quality. Implementation of AMMs ensures that these adverse effects of increased human presence will not occur.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Trash and debris will adversely affect Sanford's arrowhead habitat quality through direct effects on water quality. Implementation of

Table 6-35
Temporary Effects to Sanford's Arrowhead

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	SPECIES-1 (Litter Removal Program) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	AMMs will ensure that construction trash and debris are controlled.

Temporary Effects

Sanford's arrowhead occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2, Temporary Environmental Stressors During Construction of Covered Activities) that will result in additional disturbance to habitat or additional harm to Sanford's arrowhead. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Sanford's arrowhead modeled habitat reported in Table 6-33).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on Sanford's arrowhead are qualitatively described in Table 6-35.

6.6.9 Vernal Pool Fairy Shrimp

Permanent Effects

Permanent direct and indirect effects of Covered Activities on vernal pool fairy shrimp will include modification or significant degradation of modeled habitat and the direct and indirect take of all vernal pool fairy shrimp individuals occupying that modified or degraded habitat.

All modeled habitats for vernal pool fairy shrimp are within the Vernal Pool Ecosystem, which includes the Vernal Pool, Swale, Stream/Creek (VPIH) and hydrologically connected Valley Grassland land cover types (see Section 3.2 and Figure 3-14). In addition to direct removal of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds remove part or all of the perched aquifer, existing hydrology, and ecosystem that supports Vernal Pool, Swale, and Stream/Creek (VPIH) habitat. Over time, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for vernal pool fairy shrimp. These indirect effects on Vernal Pool, Swale, and Stream/Creek (VPIH) habitat are included in all permanent effects acreages presented in this section.

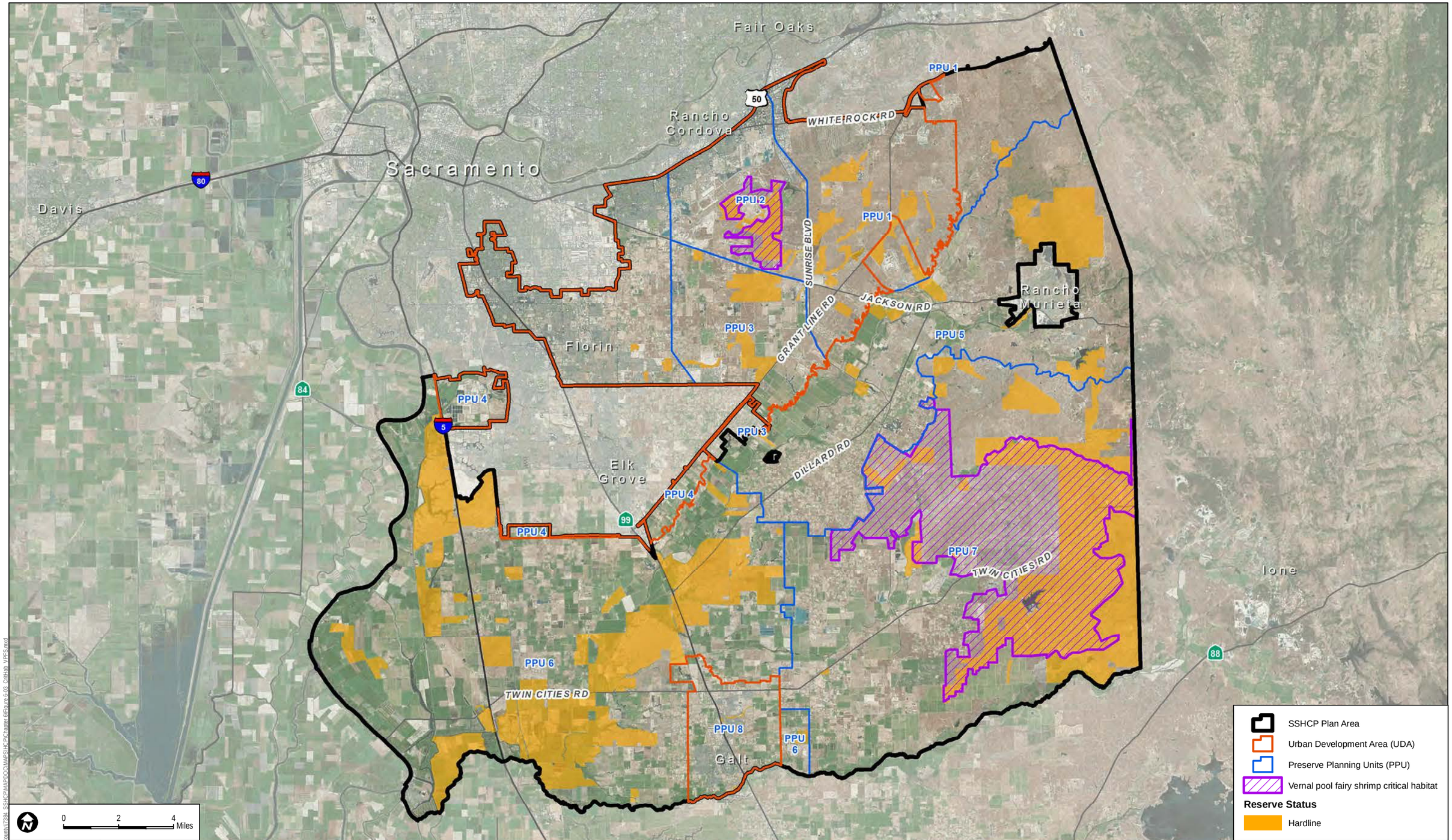
Vernal pool fairy shrimp historically occurred throughout the Plan Area; however, all of the extant occurrence records within the Plan Area (a total of 28) are located outside the UDA in PPU 7 (see Section 3.4).

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 17,259 acres of vernal pool fairy shrimp modeled habitat within the Plan Area (see Table 6-36), including 787 acres of vernal pool fairy shrimp modeled aquatic habitats (i.e., Vernal Pools, Swales, and Streams/Creeks (VPIH)) and 16,472 acres of surrounding Valley Grassland land cover

that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on vernal pool fairy shrimp modeled habitat will occur primarily inside the UDA, with approximately 16,927 acres of permanent effects on Vernal Pool Ecosystem in the UDA and a total of 332 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

The total 17,259 acres of permanent direct and indirect effects to vernal pool fairy shrimp modeled habitat includes removal of a total of 8,553 acres of Vernal Pool Ecosystem within the two Plan Area Core Recovery Areas (USFWS 2005). Effects inside the UDA include permanent effects to 8,500 acres of Vernal Pool Ecosystem in the Mather Core Recovery Area (Table 6-37). Outside the UDA, 53 acres within the Cosumnes/Rancho-Seco Core Recovery Area will be permanently affected.

Permanent direct and indirect effects include removal of approximately 746 acres of Vernal Pool Ecosystem in designated Critical Habitat (USFWS 2006) (see Figure 6-3). A total of 695 acres of Vernal Pool Ecosystem will be removed in Unit 13, including 32 acres of modeled aquatic habitat and 663 acres of supporting upland habitat. In Unit 14a, a total of 51 acres of Vernal Pool Ecosystem will be removed, including 7 acres of modeled aquatic habitat and 44 acres of supporting upland habitat (see Table 6-38 and Figure 3-14).



SOURCE: Bing Maps, County of Sacramento 2014, USFWS 2012

FIGURE 6-3

Critical Habitat for vernal pool fairy shrimp

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

INTENTIONALLY LEFT BLANK

Table 6-36
Vernal Pool Fairy Shrimp Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	97,349	16,472	Qualitative	16,472	24,584	16,186	Qualitative	16,186	72,765	286	Qualitative	286
Vernal Pool	4,536	389	94	483	935	355	85	440	3,601	34	9	43
Swale	1,252	234	44	278	461	232	43	275	791	2	1	3
Streams/Creeks (VPIH)	73	22	4	26	68	22	4	26	5	0	0	0
Vernal Pool Ecosystem	**103,210**	**17,117**	**142**	**17,259**	**26,048**	**16,795**	**132**	**16,927**	**77,162**	**322**	**10**	**332**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

Table 6-37
Vernal Pool Fairy Shrimp Permanent Effects in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)				Mather Core Recovery Area (acres)				Cosumnes/Rancho-Seco Core Recovery Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	53,367	8,164	Qualitative	8,164	17,023	8,118	Qualitative	8,118	36,344	46	Qualitative	46
Vernal Pool*	2,464	150	72	222	709	144	72	216	1,755	6	0	6
Swale	740	113	38	151	324	112	38	150	416	1	0	1
Streams/Creeks (VPIH)	61	13	3	16	61	13	3	16	0	0	0	0
Vernal Pool Ecosystem	**56,632**	**8,440**	**113**	**8,553**	**18,117**	**8,387**	**113**	**8,500**	**38,515**	**53**	**0**	**53**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively

Table 6-38
Permanent Effects to Vernal Pool Fairy Shrimp Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)				Critical Habitat Unit 13 (acres)				Critical Habitat Unit 14A (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	28,971	707	Qualitative	707	1,146	663	Qualitative	663	27,825	44	Qualitative	44
Vernal Pool	1,320	24	1	25	31	18	1	19	1,289	6	0	6
Swale	343	8	2	10	14	7	2	9	329	1	0	1
Streams/Creek (VPIH)	12	4	0	4	12	4	0	4	0	0	0	0
Vernal Pool Ecosystem	**30,646**	**743**	**3**	**746**	**1,203**	**692**	**3**	**695**	**29,443**	**51**	**0**	**51**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

As shown in Table 6-36, approximately 142 acres of vernal pool tadpole shrimp modeled aquatic habitat will be indirectly impacted in the Plan Area, most of which will occur in the UDA (132 acres) as a result of urban development Covered Activities. Outside the UDA, 10 acres of vernal pool tadpole shrimp modeled aquatic habitat will be indirectly impacted. In addition to the 142 acres of indirect effects quantified above in Table 6-36, Covered Activities in the Plan Area will cause other permanent indirect effects to vernal pool tadpole shrimp that are not easily quantified (Table 6-39).

The Plan Permittees expect that the indirect effects of Covered Activities on vernal pool fairy shrimp will be minor outside the UDA, based on two primary factors. First, no urban development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and SSHCP proposed preserves outside the UDA are much larger than the existing and proposed UDA preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to vernal pool fairy shrimp outside the UDA will occur to vernal pool fairy shrimp aquatic habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, pesticide use, etc. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing vernal pool fairy shrimp habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to vernal pool hydrology reported in Tables 6-36 through 6-38). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on vernal pool fairy shrimp that are not quantified are described qualitatively in Table 6-39, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or proposed SSHCP preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect vernal pool fairy shrimp. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-39
Permanent Indirect Effects on Vernal Pool Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality). Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to vernal pool fairy shrimp habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in occupied pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter vernal pool fairy shrimp aquatic habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	The Landscape Preserves established outside the UDA, including in the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on vernal pool fairy shrimp. Within the UDA, habitat fragmentation will affect vernal pool fairy shrimp because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2) will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on the vernal pool fairy shrimp population in the Mather Core Recovery Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Trail Impacts)	As discussed in Section 6.3, outside the UDA Covered Activities would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on vernal pool tadpole shrimp habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on vernal pool fairy shrimp will be minimized through implementation of the Preserve System Monitoring and Management Program,

Table 6-39
Permanent Indirect Effects on Vernal Pool Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		which will include a commitment to develop memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Vernal pool fairy shrimp will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs minimize hydrologic alterations to the micro-watersheds of existing and proposed vernal pool preserves, but indirect effects will occur to an estimated 142 acres of vernal pool fairy shrimp modeled aquatic habitat (Table 6-36). However, the vernal pool fairy shrimp Conservation Strategy (Chapter 7) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on vernal pool fairy shrimp are expected from increased human activity on Preserves or Preserve Setbacks. Implementation of AMMs ensures that increased human activity in and near Preserves is limited and that it does not substantially affect vernal pool fairy shrimp habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	Increases in inundation period may facilitate wildlife community alterations, including invasion by non-native predators of vernal pool fairy shrimp such as non-native fishes (e.g., mosquitofish (*Gambusia affinis*)) and American bullfrogs (Balfour and Morey 1999). Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter vernal pool fairy shrimp aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in vernal pool fairy shrimp habitat will not occur.

Table 6-39
Permanent Indirect Effects on Vernal Pool Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plant valley grasslands of the Vernal Pool Ecosystem will affect critical hydroperiods for supporting the vernal pool fairy shrimp's lifecycle. Implementation of AMMs will minimize proliferation of non-native plants, and preserve management for thatch, such as grazing or prescribed fire, will reduce biomass of upland non-native plants. These will substantially reduce effects of non-native plants on vernal pool fairy shrimp. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7). Nitrogen deposition associated with increased vehicle emissions from vehicles associated with new urban development traveling along Plan Area rural roadway projects will also result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the vernal pool ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described above in Wildlife Community Alterations, invasion by non-native predators of vernal pool fairy shrimp such as non-native fishes (e.g., mosquitofish) and bullfrogs (Balfour and Morey 1999) is avoided through preservation of existing vernal pool inundation period and water chemistry.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.

Table 6-39
Permanent Indirect Effects on Vernal Pool Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use	Adverse effects on vernal pool fairy shrimp or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Temporary Effects

Vernal pool fairy shrimp occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to vernal pool fairy shrimp. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool hydrology reported in Tables 6-36 through 6-38).

These potential construction-related environmental stressors were described above generally in Section 6.3.2, and their additional effects on vernal pool fairy shrimp are qualitatively described in Table 6-40.

Table 6-40
Temporary Effects to Vernal Pool Fairy Shrimp

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location). Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into vernal pool fairy shrimp habitat will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Inadvertent trampling and compaction of vernal pool vegetation will adversely affect vernal pool fairy shrimp propagation by damaging cysts. Implementation of AMMs ensures that trampling and compaction do not occur. No effect on vernal pool fairy shrimp.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control)	Construction dust effects on vernal pool vegetation communities and vernal pool water quality will reduce habitat quality for vernal pool fairy shrimp. Implementation of AMMs ensures that dust is controlled and will not affect vernal pool fairy shrimp.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Increased human activity in construction and maintenance areas would affect vernal pool habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets accessing occupied pools would cause general disturbance and affect water quality. Implementation of AMMs ensures that increased human presence does not occur. No effect on vernal pool fairy shrimp.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor)	Trash and debris would adversely affect vernal pool fairy shrimp habitat quality through direct effects on water quality and by

Table 6-40
Temporary Effects to Vernal Pool Fairy Shrimp

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-8 (Training of Construction Staff)	possibly attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled, and that no effect on vernal pool fairy shrimp will occur.

6.6.10 Mid-Valley Fairy Shrimp

Permanent Effects

Permanent direct and indirect effects of Covered Activities on mid-valley fairy shrimp will include modification or significant degradation of modeled habitat and the direct and indirect take of all mid-valley fairy shrimp individuals occupying that modified or degraded habitat.

All modeled habitats for mid-valley fairy shrimp are within the Vernal Pool Ecosystem, which includes the Vernal Pool, Swale, Stream/Creek (VPIH) and hydrologically connected Valley Grassland land cover types (see Section 3.2 and Figure 3-11). In addition to direct removal of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds remove part or all of the perched aquifer, existing hydrology, and ecosystem that supports Vernal Pool, Swale, and Stream/Creek (VPIH) habitat. Over time, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for mid-valley fairy shrimp. These indirect effects on Vernal Pool, Swale, and Stream/Creek (VPIH) habitat are included in all permanent effects acreages presented in this section.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 12,639 acres of mid-valley fairy shrimp modeled habitat within the Plan Area (see Table 6-41), including approximately 633 acres of mid-valley fairy shrimp aquatic habitats (i.e., Vernal Pools, Swales, and Streams/Creeks (VPIH)) and 12,006 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on mid-valley fairy shrimp will occur primarily inside the UDA, with a total of 12,402 acres of permanent effects on Vernal Pool Ecosystem in the UDA and a total of 237 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

The total 12,639 acres of permanent direct and indirect effects to mid-valley fairy shrimp modeled habitat includes removal of a total of 6,308 acres of Vernal Pool Ecosystem within the two Plan Area Core Recovery Areas (USFWS 2005). Effects inside the UDA include permanent effects to 6,267 acres of Vernal Pool Ecosystem in the Mather Core Recovery Area (Table 6-42). Outside the UDA, 41 acres within the Cosumnes/Rancho-Seco Core Recovery Area will be permanently affected.

Table 6-41
Mid-Valley Fairy Shrimp Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	50,061	12,006	Qualitative	12,006	19,269	11,799	Qualitative	11,799	30,792	207	Qualitative	207
Vernal Pool	2,818	337	71	408	860	312	69	381	1,958	25	2	27
Swale	759	190	35	225	393	188	34	222	366	2	1	3
Vernal Pool Ecosystem	**53,638**	**12,553**	**106**	**12,639**	**20,522**	**12,299**	**103**	**12,402**	**33,116**	**234**	**3**	**237**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

Table 6-42
Mid-Valley Fairy Shrimp Permanent Effects in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Areas (acres)				Mather Core Recovery Area (acres)				Cosumnes/Rancho Seco Core Recovery Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	24,081	6,009	Qualitative	6,009	13,405	5,975	Qualitative	5,975	10,676	34	Qualitative	34
Vernal Pool	1,259	130	52	182	642	124	52	176	617	6	0	6
Swale	404	86	31	117	270	85	31	116	134	1	0	1
Vernal Pool Ecosystem	**25,744**	**6,225**	**83**	**6,308**	**14,317**	**6,184**	**83**	**6,267**	**11,427**	**41**	**0**	**41**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

As shown in Table 6-41, approximately 106 acres of mid-valley fairy shrimp modeled aquatic habitat will be indirectly impacted in the Plan Area, most of which will occur in the UDA (103 acres) as a result of urban development Covered Activities. Outside the UDA, 3 acres of mid-valley fairy shrimp modeled aquatic habitat will be indirectly impacted. In addition to the 106 acres of indirect effects quantified in Table 6-41, Covered Activities in the Plan Area will cause other permanent indirect effects to mid-valley fairy shrimp that are not easily quantified (Table 6-43).

The Plan Permittees expect that the indirect effects of Covered Activities on mid-valley fairy shrimp will be minor outside the UDA, based on two primary factors. First, no urban development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and SSHCP proposed preserves outside the UDA are much larger than the existing and proposed UDA preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves.

Most indirect effects to mid-valley fairy shrimp outside the UDA will occur to mid-valley fairy shrimp aquatic habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, pesticide use, etc. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing mid-valley fairy shrimp habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to vernal pool hydrology reported in Tables 6-41 and 6-42). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on mid-valley fairy shrimp that are not quantified are described qualitatively in Table 6-43, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or proposed SSHCP preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect mid-valley fairy shrimp. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Temporary Effects

Mid-valley fairy shrimp occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to mid-valley fairy shrimp. Generally, these temporary effects will occur within the project footprint or road right-of-way

area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to vernal pool hydrology reported in Table 6-41).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on mid-valley fairy shrimp are qualitatively described in Table 6-44.

Table 6-43
Permanent Indirect Effects on Mid-Valley Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality). Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to mid-valley fairy shrimp habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in occupied pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter mid-valley fairy shrimp aquatic habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	The Landscape Preserves established outside the UDA, including in the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on mid-valley fairy shrimp. Within the UDA, habitat fragmentation will affect mid-valley fairy shrimp because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2) will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on the mid-valley fairy shrimp population in the Mather Core Recovery Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA Covered Activities would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on mid-valley fairy shrimp habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on mid-valley fairy shrimp will be minimized through implementation of the Preserve System Management Program, which will include a

Table 6-43
Permanent Indirect Effects on Mid-Valley Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		commitment to develop memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Mid-valley fairy shrimp will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs minimize hydrologic alterations to the micro-watersheds of existing and proposed vernal pool preserves, but indirect effects will occur to an estimated 142 acres of mid-valley fairy shrimp modeled aquatic habitat (Table 6-41). However, the mid-valley fairy shrimp Conservation Strategy (Chapter 7) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on mid-valley fairy shrimp are expected from increased human activity on Preserves or preserves setbacks. Implementation of AMMs ensures that increased human activity in and near Preserves is limited and that it does not substantially affect mid-valley fairy shrimp habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	Increases in inundation period may facilitate wildlife community alterations, including invasion by non-native predators of mid-valley fairy shrimp such as non-native fishes (e.g., mosquitofish) and American bullfrogs (Balfour and Morey 1999). Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter mid-valley fairy shrimp aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in mid-valley fairy shrimp habitat will not occur.

Table 6-43
Permanent Indirect Effects on Mid-Valley Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plant valley grasslands of the Vernal Pool Ecosystem will affect critical hydroperiods for supporting the mid-valley fairy shrimp's lifecycle. Implementation of AMMs will minimize proliferation of non-native plants, and preserve management for thatch, such as grazing or prescribed fire, will reduce biomass of upland non-native plants. These will substantially reduce effects of non-native plants on mid-valley fairy shrimp. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7). Nitrogen deposition associated with increased vehicle emissions from vehicles associated with new urban development traveling along Plan Area rural roadway projects will also result in competitive advantages for non-native invasive plants. The unavoidable effects of Nitrogen deposition will be minimized through monitoring and adaptive management of the vernal pool ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described above in Wildlife Community Alterations, invasion by non-native predators of mid-valley fairy shrimp such as non-native fishes (e.g., mosquitofish) and bullfrogs (Balfour and Morey 1999) is avoided through preservation of existing vernal pool inundation period and water chemistry.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.

Table 6-43
Permanent Indirect Effects on Mid-Valley Fairy Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use	Adverse effects on mid-valley fairy shrimp or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-44
Temporary Effects to Mid-Valley Fairy Shrimp

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location). Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials)	Runoff from construction activities into mid-valley fairy shrimp habitat will be fully avoided through implementation of AMMs.

Table 6-44
Temporary Effects to Mid-Valley Fairy Shrimp

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Inadvertent trampling and compaction of vernal pool vegetation will adversely affect mid-valley fairy shrimp propagation by damaging cysts. Implementation of AMMs ensures that trampling and compaction do not occur. No effect on mid-valley fairy shrimp.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control)	Construction dust effects on vernal pool vegetation communities and vernal pool water quality will reduce habitat quality for mid-valley fairy shrimp. Implementation of AMMs ensures that dust is controlled and will not affect mid-valley fairy shrimp.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Increased human activity in construction and maintenance areas would affect vernal pool habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets accessing occupied pools would cause general disturbance and affect water quality. Implementation of AMMs ensures that increased human presence does not occur. No effect on mid-valley fairy shrimp.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Trash and debris would adversely affect mid-valley fairy shrimp habitat quality through direct effects on water quality and by possibly attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled. No effect on mid-valley fairy shrimp.

6.6.11 Vernal Pool Tadpole Shrimp

Permanent Effects

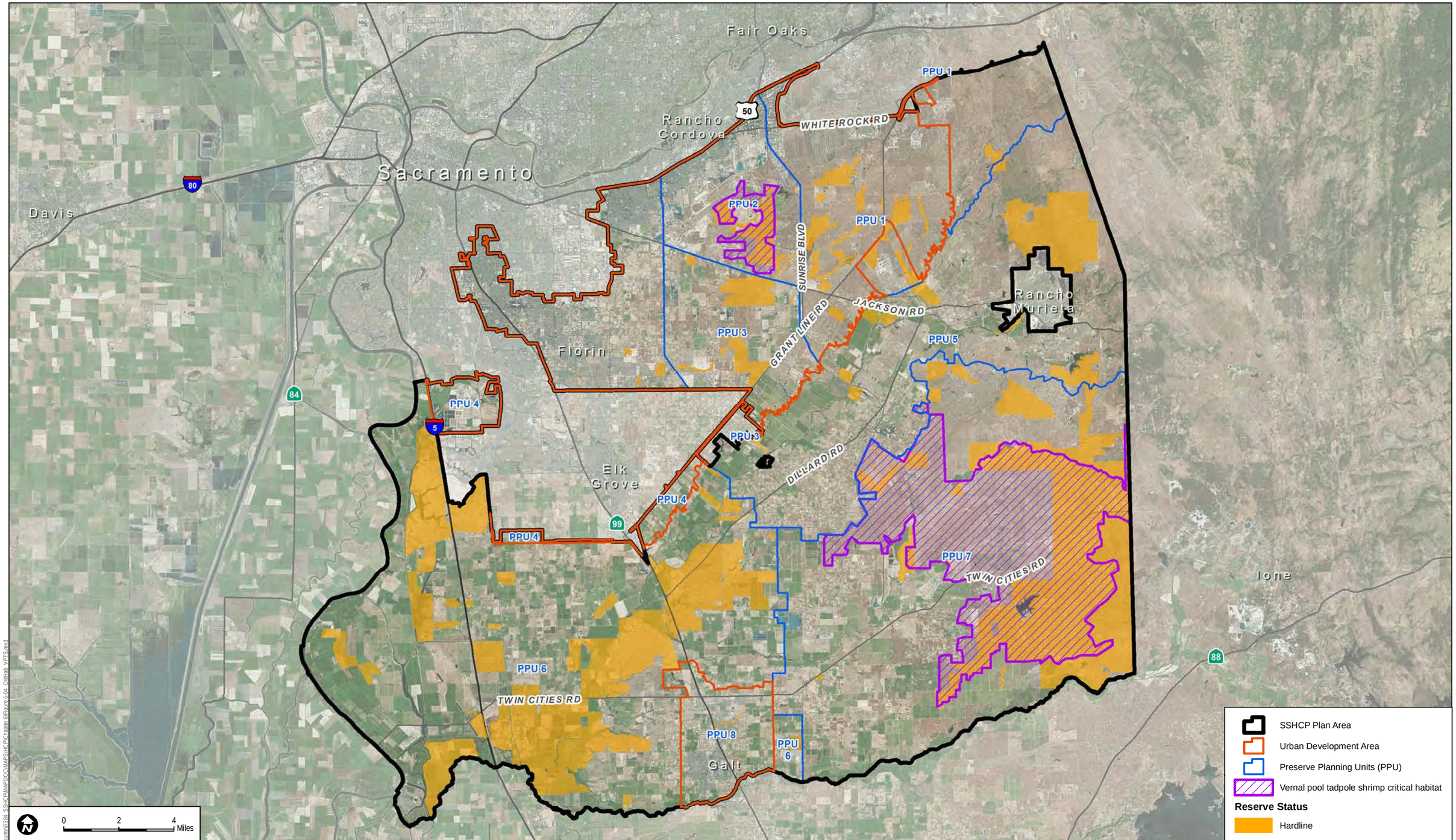
Permanent direct and indirect effects of Covered Activities on vernal pool tadpole shrimp will include modification or significant degradation of modeled habitat and the direct and indirect take of all vernal pool tadpole shrimp individuals occupying that modified or degraded habitat.

All modeled habitats for vernal pool tadpole shrimp are within the Vernal Pool Ecosystem, which includes the Vernal Pool, Swale, Stream/Creek (VPIH) and hydrologically connected Valley Grassland land cover types (see Section 3.2 and Figures 3-2 and 3-15). In addition to direct removal of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds remove part or all of the perched aquifer, existing hydrology, and ecosystem that supports Vernal Pool, Swale, and Stream/Creek (VPIH) habitat. Over time, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; and reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for vernal pool tadpole shrimp. These indirect effects on Vernal Pool, Swale and Stream/Creek (VPIH) habitat are included in all permanent effects acreages presented in this section.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 17,259 acres of vernal pool tadpole shrimp modeled habitat within the Plan Area (see Table 6-45), including 787 acres of vernal pool tadpole shrimp aquatic habitats (i.e., Vernal Pools, Swales, and Streams/Creeks (VPIH)) and 16,472 acres of surrounding Valley Grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on vernal pool tadpole shrimp modeled habitat will occur primarily inside the UDA, with a total 16,927 acres of permanent effects on Vernal Pool Ecosystem in the UDA and a total of 332 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

The total 17,259 acres of permanent direct and indirect effects to vernal pool tadpole shrimp modeled habitat includes removal of a total of 8,553 acres of Vernal Pool Ecosystem within the two Plan Area Core Recovery Areas (USFWS 2005). Effects inside the UDA include permanent effects to approximately 8,500 acres of Vernal Pool Ecosystem in the Mather Core Recovery Area (Table 6-46). Outside the UDA, 53 acres of Vernal Pool Ecosystem within the Cosumnes/Rancho-Seco Core Recovery Area will be affected by Covered Activities.

Permanent direct and indirect effects to vernal pool tadpole shrimp modeled habitat include removal of 746 acres of Vernal Pool Ecosystem in designated Critical Habitat (USFWS 2006) (see Figure 6-4). A total of 695 acres of Vernal Pool Ecosystem will be removed in Unit 8, including 32 acres of modeled aquatic habitat and 663 acres of supporting upland habitat. In Unit 9b, a total of 51 acres of Vernal Pool Ecosystem will be removed, including 7 acres of modeled aquatic habitat and 44 acres of supporting upland habitat (see Tables 6-45, 6-46, 6-47, and Figure 3-15).



SOURCE: Bing Maps, County of Sacramento 2014, USFWS 2012

FIGURE 6-4

Critical Habitat for vernal pool tadpole shrimp

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento County\7398 SSHCP\MAPDOC\MAPS\HCP\Chapter 6\Figure 6-04 CritHab VPTS.mxd

INTENTIONALLY LEFT BLANK

Table 6-45
Vernal Pool Tadpole Shrimp Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	97,349	16,472	Qualitative	16,472	24,584	16,186	Qualitative	16,186	72,765	286	Qualitative	286
Vernal Pool	4,536	389	94	483	935	355	85	440	3,601	34	9	43
Swale	1,252	234	44	278	461	232	43	275	791	2	1	3
Streams/Creeks (VPIH)	73	22	4	26	68	22	4	26	5	0	0	0
Vernal Pool Ecosystem	**103,210**	**17,117**	**142**	**17,259**	**26,048**	**16,795**	**132**	**16,927**	**77,162**	**322**	**10**	**332**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively

Table 6-46
Vernal Pool Tadpole Shrimp Permanent Effects in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)				Mather Core Recovery Area (acres)				Cosumnes/Rancho-Seco Core Recovery Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	53,367	8,164	Qualitative	8,164	17,023	8,118	Qualitative	8,118	36,344	46	Qualitative	46
Vernal Pool*	2,464	150	72	222	709	144	72	216	1,755	6	0	6
Swale	740	113	38	151	324	112	38	150	416	1	0	1
Streams/Creeks (VPIH)	61	13	3	16	61	13	3	16	0	0	0	0
Vernal Pool Ecosystem	**56,632**	**8,440**	**113**	**8,553**	**18,117**	**8,387**	**113**	**8,500**	**38,515**	**53**	**0**	**53**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

Table 6-47
Permanent Effects to Vernal Pool Tadpole Shrimp Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)				Critical Habitat Unit 8 (acres)				Critical Habitat Unit 9B (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	28,971	707	Qualitative	707	1,146	663	Qualitative	663	27,825	44	Qualitative	44
Vernal Pool	1,320	24	1	25	31	18	1	19	1,289	6	0	6
Swale	343	8	2	10	14	7	2	9	329	1	0	1
Streams/Creek (VPIH)	12	4	0	4	12	4	0	4	0	0	0	0
Vernal Pool Ecosystem	**30,646**	**743**	**3**	**746**	**1,203**	**692**	**3**	**695**	**29,443**	**51**	**0**	**51**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

As shown in Table 6-45, approximately 142 acres of vernal pool tadpole shrimp modeled aquatic habitat will be indirectly impacted in the Plan Area, most of which will occur in the UDA (132 acres) as a result of Urban Development Covered Activities. Outside the UDA, 10 acres of vernal pool tadpole shrimp modeled aquatic habitat will be indirectly impacted. In addition to the 142 acres of indirect effects quantified above in Table 6-45, Covered Activities in the Plan Area will cause other permanent indirect effects to vernal pool tadpole shrimp that are not easily quantified (Table 6-48).

As discussed previously for vernal pool fairy shrimp (see Section 6.6.9), these "other" indirect effects to vernal pool tadpole shrimp (Table 6-46) will be greatest within the UDA because most Covered Activities will occur within the UDA, resulting in extensive contact between new urban development and the vernal pool tadpole shrimp present on existing preserves, on SSHCP proposed preserves (see Chapter 7), and on other habitat areas that will remain inside the UDA.

The Plan Permittees expect that the indirect effects of Covered Activities on vernal pool tadpole shrimp will be minor outside the UDA, based on two primary factors. First, no Urban Development Covered Activities will occur outside the UDA, so indirect effects will be limited to those from rural roadways and water pipeline projects. Second, the existing preserves and SSHCP proposed preserves outside the UDA are much larger than the existing and proposed UDA preserves (see Chapter 7), which dramatically reduces edge effects of Covered Activities on the Vernal Pool Ecosystem within Preserves. Most indirect effects to vernal pool tadpole shrimp outside the UDA will occur to vernal pool tadpole shrimp aquatic habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which are expected to increase contaminants in road runoff, potential spread of invasive plants, pesticide use, etc. that will affect vernal pool tadpole shrimp habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing vernal pool tadpole shrimp habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to vernal pool hydrology reported in Table 6-45). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on vernal pool tadpole shrimp that are not quantified are described qualitatively in Table 6-48, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or proposed SSHCP preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect vernal pool tadpole shrimp. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Temporary Effects

Vernal pool tadpole shrimp occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to vernal pool tadpole shrimp. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to Vernal Pool hydrology reported in Table 6-45).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on vernal pool tadpole shrimp are qualitatively described in Table 6-49.

Table 6-48
Permanent Indirect Effects on Vernal Pool Tadpole Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality). Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to vernal pool tadpole shrimp habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in occupied pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter vernal pool tadpole shrimp aquatic habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP Preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	The Landscape Preserves established outside the UDA, including in the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on vernal pool tadpole shrimp. Within the UDA, habitat fragmentation will affect vernal pool tadpole shrimp because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2) will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on the vernal pool tadpole shrimp population in the Mather Core Recovery Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA Covered Activities would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on vernal pool tadpole shrimp habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on vernal pool tadpole shrimp will be minimized through implementation of the Preserve System Management Program,

Table 6-48
Permanent Indirect Effects on Vernal Pool Tadpole Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		which will include a commitment to develop memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Vernal pool tadpole shrimp will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs minimize hydrologic alterations to the micro-watersheds of existing and proposed vernal pool preserves, but indirect effects will occur to an estimated 142 acres of vernal pool tadpole shrimp modeled aquatic habitat (Table 6-45). However, the vernal pool tadpole shrimp Conservation Strategy (Chapter 7) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on vernal pool tadpole shrimp are expected from increased human activity on Preserves or preserves setbacks. Implementation of AMMs ensures that increased human activity in and near Preserves is limited and that it does not substantially affect vernal pool tadpole shrimp habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 5, NATURE TRAIL-6 (Nature Trail Public Education)	Increases in inundation period may facilitate wildlife community alterations, including invasion by non-native predators of vernal pool tadpole shrimp such as non-native fishes (e.g., mosquitofish) and bullfrogs (Balfour and Morey 1999). Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter vernal pool tadpole shrimp aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in vernal pool tadpole shrimp habitat will not occur.

Table 6-48
Permanent Indirect Effects on Vernal Pool Tadpole Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plant valley grasslands of the Vernal Pool Ecosystem will affect critical hydroperiods for supporting the vernal pool tadpole shrimp's lifecycle. Implementation of AMMs will minimize proliferation of non-native plants, and preserve management for thatch, such as grazing or prescribed fire, will reduce biomass of upland non-native plants. These will substantially reduce effects of non-native plants on vernal pool tadpole shrimp. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7). Nitrogen deposition associated with increased vehicle emissions from vehicles associated with new urban development traveling along Plan Area rural roadway projects will also result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the vernal pool ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 5, NATURE TRAIL-6 (Nature Trail Public Education)	As described in Wildlife Community Alterations, invasion by non-native predators of vernal pool tadpole shrimp such as non-native fishes (e.g., mosquitofish) and bullfrogs (Balfour and Morey 1999) is avoided through preservation of existing vernal pool inundation period and water chemistry.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.

Table 6-48
Permanent Indirect Effects on Vernal Pool Tadpole Shrimp

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use	Adverse effects on vernal pool tadpole shrimp or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-49
Temporary Effects to Vernal Pool Tadpole Shrimp

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials)	Runoff from construction activities into vernal pool tadpole shrimp habitat will be fully avoided through implementation of AMMs.

Table 6-49
Temporary Effects to Vernal Pool Tadpole Shrimp

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Inadvertent trampling and compaction of vernal pool vegetation will adversely affect tadpole shrimp propagation by damaging cysts. Implementation of AMMs ensures that trampling and compaction do not occur. No effect on vernal pool tadpole shrimp.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	Condition 3, BMP-5 (Dust Control)	Construction dust effects on vernal pool vegetation communities and vernal pool water quality will reduce habitat quality for vernal pool tadpole shrimp. Implementation of AMMs ensures that dust is controlled and will not affect vernal pool tadpole shrimp.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Increased human activity in construction and maintenance areas would affect vernal pool habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets accessing occupied pools would cause general disturbance and affect water quality. Implementation of AMMs ensures that increased human presence does not occur. No effect on vernal pool tadpole shrimp.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Trash and debris would adversely affect vernal pool tadpole habitat quality through direct effects on water quality and by possibly attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled. No effect on vernal pool tadpole shrimp.

6.6.12 Ricksecker's Water Scavenger Beetle

Permanent Effects

Permanent direct and indirect effects of Covered Activities on Ricksecker's water scavenger beetle will include modification or significant degradation of modeled habitat and the direct and indirect take of all Ricksecker's water scavenger beetle individuals occupying that modified or degraded habitat. Ricksecker's water scavenger beetle has not been documented within the UDA, but it is assumed to be present in all modeled habitat.

All modeled habitats for Ricksecker's water scavenger beetle are within the Vernal Pool Ecosystem, which includes the Vernal Pool, Swale, and hydrologically connected Valley Grassland land cover types (see Section 3.2 and Figures 3-2 and 3-12). In addition to direct removal of Vernal Pool Ecosystem land cover types, edge effects on vernal pool micro-watersheds remove part or all of the perched aquifer, existing hydrology, and ecosystem that supports vernal pool and swale habitat. Over time, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter the chemistry of the vernal pool; reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for Ricksecker's water scavenger beetle. These indirect effects on vernal pool and swale habitat are included in all permanent effects acreages presented in this section.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 17,233 acres of Ricksecker's water scavenger beetle modeled habitat within the Plan Area (see Table 6-50), including 761 acres of Ricksecker's water scavenger beetle aquatic habitats (i.e., vernal pools and swales) and 16,472 acres of surrounding valley grassland land cover that support the hydrology and ecology of the aquatic habitats. Covered Activity impacts on Ricksecker's water scavenger beetle modeled habitat will occur primarily inside the UDA, with a total 16,901 acres of permanent effects on Vernal Pool Ecosystem in the UDA and a total of 332 acres of permanent effects on Vernal Pool Ecosystem outside the UDA.

Relatively little is known about specific threats to Ricksecker's water scavenger beetle in the Plan Area other than removal and degradation of vernal pools. However, based on its known life history, it will be affected by several permanent indirect effects on modeled habitat (Table 6-51). Potential permanent indirect effects of the Covered Activities include habitat fragmentation and isolation, lighting, increased human activity (including collection by humans, recreation, and increased trash/debris), hydrologic alterations, pollutants and toxins, traffic and vehicle collisions, mesopredators, altered fire regime, invasive plant and animal species, and wildlife community alterations (including increased predation).

Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on Ricksecker's water scavenger beetle is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas and the requirement of extensive infrastructure. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities that increase the risk of accidental fire ignitions and other road-related effects (e.g., vehicle collisions, road runoff, potential spread of invasive plants, etc.) that will affect Ricksecker's water scavenger beetle individuals and habitat. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on Ricksecker's water scavenger beetle habitat (although some of these indirect effects are already accounted for in the indirect effect acreage reported in Table 6-50).

Management and monitoring activities in the Preserves and Preserve Setbacks have the potential to indirectly affect Ricksecker's water scavenger beetle. Vegetation management, for example, will include livestock grazing. While Ricksecker's water scavenger beetle benefits from some level of grazing, and which will be an important management tool (see Chapter 8), grazing management activities that affect stocking rates and distributional patterns (e.g., placement of water and mineral sources, fencing, handling facilities etc.) will also adversely affect Ricksecker's water scavenger beetle.

Temporary Effects

Ricksecker's water scavenger beetle occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to Ricksecker's water scavenger beetle. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects and the area of indirect impacts to vernal pool hydrology reported in Table 6-51).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on Ricksecker's water scavenger beetle are qualitatively described in Table 6-52.

Table 6-50
Ricksecker's Water Scavenger Beetle Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland*	97,349	16,472	Qualitative	16,472	24,584	16,186	Qualitative	16,186	72,765	286	Qualitative	286
Vernal Pool	4,536	389	94	483	935	355	85	440	3,601	34	9	43
Swale	1,252	234	44	278	461	232	43	275	791	2	1	3
Vernal Pool Ecosystem	**103,137**	**17,095**	**138**	**17,233**	**25,980**	**16,773**	**128**	**16,901**	**77,157**	**322**	**10**	**332**

* Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively.

Table 6-51
Permanent Indirect Effects on Ricksecker's Water Scavenger Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to Ricksecker's water scavenger beetle habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in occupied pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter Ricksecker's water scavenger beetle aquatic habitat and that water chemistry of vernal pool aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses)	The Landscape Preserves established outside the UDA, including in the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on Ricksecker's water scavenger beetle. Within the UDA, habitat fragmentation will affect Ricksecker's water scavenger beetle because all UDA Preserves will be bordered by urban development, which will be reduced

Table 6-51
Permanent Indirect Effects on Ricksecker's Water Scavenger Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2) will be reduced through EDGE AMMs and ROAD AMMs.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA Covered Activities would not affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on Ricksecker's water scavenger beetle habitat could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on Ricksecker's water scavenger beetle will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Ricksecker's water scavenger beetle will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs minimize hydrologic alterations to the micro-watersheds of existing and proposed vernal pool preserves, but indirect effects will occur to an estimated 138 acres of Ricksecker's water scavenger beetle modeled aquatic habitat (Table 6-5). However, the Ricksecker's water scavenger beetle Conservation Strategy (Chapter 7) will offset these unavoidable impacts.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks)	The use of outdoor lighting could affect Ricksecker's water scavenger beetle by causing mortality due to exhaustion, attraction of predators, or disruption of biological cycles.

Table 6-51
Permanent Indirect Effects on Ricksecker's Water Scavenger Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-8 (Outdoor Lighting) Condition 4, ROAD-1 (Road Project Location)	
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	No effects on Ricksecker's water scavenger beetle are expected from increased human activity on Preserves or Preserve Setbacks. Implementation of AMMs ensures that increased human activity in and near Preserves is limited and that it does not substantially affect Ricksecker's water scavenger beetle habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	Increases in inundation period may facilitate wildlife community alterations, including invasion by non-native predators of Ricksecker's water scavenger beetle such as non-native fishes (e.g., mosquitofish) and bullfrogs (Balfour and Morey 1999). Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter Ricksecker's water scavenger beetle aquatic habitat, that water chemistry of vernal pool aquatic habitat will not be affected, and that resultant wildlife community alterations in Ricksecker's water scavenger beetle habitat will not occur.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants in valley grasslands of the Vernal Pool Ecosystem will affect critical hydroperiods for supporting the Ricksecker's water scavenger beetle lifecycle. Implementation of AMMs will minimize proliferation of non-native plants, and preserve management for thatch, such as grazing or prescribed fire, will reduce biomass of upland non-native plants. These will substantially reduce effects on non-native plants on Ricksecker's water scavenger beetle. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).

Table 6-51
Permanent Indirect Effects on Ricksecker's Water Scavenger Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		Nitrogen deposition associated with increased vehicle emissions from vehicles associated with new urban development traveling along Plan Area rural roadway projects will also result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the vernal pool ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described in Wildlife Community Alterations, invasion by non-native predators of Ricksecker's water scavenger beetle such as non-native fishes (e.g., mosquitofish) and bullfrogs (Balfour and Morey 1999) is avoided through preservation of existing vernal pool inundation period and water chemistry.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	Adverse effects on Ricksecker's water scavenger beetle or the vernal pool plant and animal ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs.

Table 6-51
Permanent Indirect Effects on Ricksecker's Water Scavenger Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-3 (Roadside Pesticide Use	
Vehicle and Aircraft Collisions with Wildlife	None required for this species.	No effect on this species.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-52
Temporary Effects to Ricksecker's Water Scavenger Beetle

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into Ricksecker's water scavenger beetle habitat will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Inadvertent trampling and compaction of vernal pool vegetation will adversely affect Ricksecker's water scavenger beetle propagation by damaging eggs. Implementation of AMMs ensures that trampling and compaction do not occur. No effect on Ricksecker's water scavenger beetle.
Construction Noise	None required for this species.	No effect on this species.

Table 6-52
Temporary Effects to Ricksecker's Water Scavenger Beetle

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	Condition 3, BMP-6 (Construction Lighting) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction lighting directed toward Ricksecker's water scavenger beetle habitat can cause mortality to Ricksecker's water scavenger beetle due to exhaustion, attraction of predators, or disruption of biological cycles. Implementation of AMMs will minimize construction lighting effects on Ricksecker's water scavenger beetle by ensuring that construction lighting is directed away from adjacent natural habitats.
Construction Dust	Condition 3, BMP-5 (Dust Control)	Construction dust effects on vernal pool vegetation communities and vernal pool water quality will reduce habitat quality for Ricksecker's water scavenger beetle. Implementation of AMMs ensures that dust is controlled and will not affect Ricksecker's water scavenger beetle.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Increased human activity in construction and maintenance areas would affect vernal pool habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets accessing occupied pools would cause general disturbance and affect water quality. Implementation of AMMs ensures that increased human presence does not occur. No effect to Ricksecker's water scavenger beetle.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Trash and debris would adversely affect Ricksecker's water scavenger beetle habitat quality through direct effects on water quality and by possibly attracting nuisance pest species. Temporary fencing will also entrap some newly emerged adults as they fly to different vernal pools. Implementation of AMMs ensures that construction trash and debris will be controlled, and that there will be no substantial effect on Ricksecker's water scavenger beetle.

6.6.13 Valley Elderberry Longhorn Beetle

Permanent Effects

Permanent direct and indirect effects of Covered Activities on valley elderberry longhorn beetle will include modification or significant degradation of modeled habitat and the direct and indirect take of all valley elderberry longhorn beetle individuals occupying that modified or degraded habitat. Modeled habitats for valley elderberry longhorn beetle are limited to the three Riparian land cover types: Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 591 acres of modeled habitat for valley elderberry longhorn beetle within the Plan Area (see Table 6-53). Covered Activity impacts on valley elderberry longhorn beetle modeled habitat will occur primarily inside the UDA, with a total of approximately 550 acres of permanent effects in the UDA and a total of 41 acres of permanent effects outside the UDA.

The 218 acres of effects on Mine Tailing Riparian Woodland will account for 40% of the total effects on valley elderberry longhorn beetle modeled habitat within the Plan Area. A total of 184 acres of Mixed Riparian Scrub and 189 acres of Mixed Riparian Woodland will be directly affected.

Valley elderberry longhorn beetle in the Plan Area will be affected by several permanent indirect effects on modeled habitat (Table 6-54). Notable permanent indirect effects of the Covered Activities include habitat fragmentation and isolation, hydrologic alterations, pollutants and toxins, lighting, increased human activity (including recreation, risk of collection, and increased trash/debris), invasive plant and wildlife species, and wildlife community alterations (including increased predation).

Table 6-53
Valley Elderberry Longhorn Beetle Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Mine Tailing Riparian Woodland	641	218	Qualitative	218	220	218	Qualitative	218	421	0	Qualitative	0
Mixed Riparian Woodland	5,785	184	Qualitative	184	244	146	Qualitative	146	5,541	38	Qualitative	38
Mixed Riparian Scrub	1,451	189	Qualitative	189	241	186	Qualitative	186	1,210	3	Qualitative	3
TOTAL	**7,877**	**591**	**Qualitative**	**591**	**705**	**550**	**Qualitative**	**550**	**7,172**	**41**	**Qualitative**	**41**

Table 6-54
Permanent Indirect Effects on Valley Elderberry Longhorn Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality). Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	Valley elderberry longhorn beetle is sensitive to altered hydrology affecting the quality of riparian habitats, and particularly effects on its host plant, elderberry. Such changes will occur over the long term as a result of hydrologic alterations related to runoff regimes from irrigation and runoff from impervious surfaces (e.g., roads, parking lots, etc.). The close proximity of planned roads and development to habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters flows in riparian areas and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution does not enter valley elderberry longhorn beetle habitat and that the host plant is not affected.

Table 6-54
Permanent Indirect Effects on Valley Elderberry Longhorn Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams) Condition 8, UTILITY-2 (Utility Maintenance on Preserves)	
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams)	Covered Activities will result in fragmentation and isolation of modeled valley elderberry longhorn beetle habitat. After emergence from pupal cells, adults readily fly from shrub to shrub to feed on leaves and flowers, but their ability to fly between disjunct habitat patches is limited. The SSHCP Preserves large habitat blocks and ensures habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7.This, in concert with a range of AMMs that protect Preserves from edge effects, will maintain contiguous modeled habitat patches within drainages and minimize this effect.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread)	Covered Activities are expected to increase the frequency of fires in the Plan Area due to increased population and risk of ignitions. However, the beetle's host plant, blue elderberry (*Sambucus nigra* ssp. *cerulean*), is generally a fire-tolerant species and is able to

Table 6-54
Permanent Indirect Effects on Valley Elderberry Longhorn Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks)	regenerate by resprouting and seed germination following fire (Crane 1989). Severe fires that expose and kill the root system and stem buds from which resprouting occurs could affect existing plants, although seed viability appears to be unaffected (Crane 1989). Valley elderberry longhorn beetle will also be adversely affected when fires kill the aboveground part of the plant supporting individuals (Crane 1989). Combined with their limited dispersal capability, fires that extirpate isolated local populations will result in permanent loss of a local population due to a lack of recolonization. Wildfire is not expected to be common in the riparian habitats where valley elderberry longhorn beetle lives, however. If wildfire does occur, adverse effects of wildfire suppression will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	None required for this species.	No effect on this species.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 4, ROAD-1 (Road Project Location)	The use of outdoor lighting could affect valley elderberry longhorn beetle by causing mortality related to exhaustion, attraction of predators, or disruption of biological cycles.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-11 (Speed Limit) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan)	Increased human activity will indirectly affect riparian habitats through introduction of invasive plant species such as Himalayan blackberry, illegal dumping, accidental and intentional wildfire ignitions, and potentially collecting of adult beetles. Implementation of AMMs ensures that increased human activity in and near Preserves and Stream Setbacks is limited and that it does not substantially affect valley elderberry longhorn beetle habitat or individual beetles.

Table 6-54
Permanent Indirect Effects on Valley Elderberry Longhorn Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams)	
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor)	Altered hydrology related to Urban Development Covered Activities will facilitate invasion of Argentine ants, which prey on valley elderberry longhorn beetle larvae (Huxel 2000). AMMs that avoid changes to hydrology regimes and habitat will minimize effects on wildlife community structure. Further, implementation of EDGE measures and other measures that minimize habitat disturbance will allow native species to better compete with Argentine ants and limit invasions.

Table 6-54
Permanent Indirect Effects on Valley Elderberry Longhorn Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams)	
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams)	Covered Activities will increase human activity near riparian areas, which increases the risk of introduction and proliferation of invasive plant species, such as Himalayan blackberry, giant reed (*Arundo donax*), tamarisk (*Tamarix* spp.), and pampas grass (*Cortaderia* spp.). These species quickly take over riparian corridors and outcompete elderberry bushes for resources, including water and space. Implementation of AMMs, especially the EDGE measures and Stream Setbacks, will minimize invasive plant effects on valley elderberry longhorn beetle habitat in the Plan Area.
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-1 (Construction Fencing) Condition 4, ROAD-1 (Road Project Location) Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams)	Irrigation and urban runoff will increase populations of Argentine ant, which is a known predator of beetle larvae (Huxel 2000). As stated for Wildlife Community Alterations, AMMs that avoid changes to hydrology regimes and habitat will minimize effects on wildlife community structure. Further, implementation of EDGE measures and other measures that minimize habitat disturbance will allow native species to better compete with Argentine ants and limit invasions.
Mesopredators	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	Mesopredators prey on bird species that eat elderberries and disperse elderberry seeds. Therefore, an increase in mesopredators related to Covered Activities will adversely affect habitat availability for valley

Table 6-54
Permanent Indirect Effects on Valley Elderberry Longhorn Beetle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-2 (Wildlife Crossing Structures)	elderberry longhorn beetle. Implementation of AMMs will minimize increases in mesopredator abundance in Preserves and resultant effects on valley elderberry longhorn beetle habitat.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams)	Adverse effects on the valley elderberry longhorn beetle or its elderberry host plant from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-11 (Speed Limit) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 8, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 8, STREAM-2 (UDA Stream Setbacks) Condition 8, STREAM-3 (Minor Tributaries to UDA Streams)	Increased vehicle traffic associated with Urban Development Covered Activities and Rural Transportation Projects will result in increased vehicle strikes on adult valley elderberry longhorn beetles. This effect will be minimized through establishment of large, interconnected Preserves that are protected by EDGE measures and Stream Setbacks.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-55
Temporary Effects to Valley Elderberry Longhorn Beetle

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Runoff from construction activities into valley elderberry longhorn beetle habitat will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Inadvertent trampling and compaction of riparian vegetation could include damage to elderberry bushes. Implementation of AMMs ensures that trampling and compaction do not occur. No effect on valley elderberry longhorn beetle.
Construction Noise	None required for this species.	No effect on this species.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	Condition 3, BMP-6 (Construction Lighting) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Construction lighting directed toward valley elderberry longhorn beetle can cause mortality to valley elderberry longhorn beetle due to exhaustion, attraction of predators, or disruption of biological cycles. Implementation of AMMs will minimize construction lighting effects on valley elderberry longhorn beetle by ensuring that construction lighting is directed away from adjacent natural habitats.
Construction Dust	Condition 3, BMP-5 (Dust Control)	Construction dust effects on elderberry bushes and riparian water quality

Table 6-55
Temporary Effects to Valley Elderberry Longhorn Beetle

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	will reduce habitat quality for valley elderberry longhorn beetle. However, low to moderate levels of dust have been shown to not substantially affect elderberry density and condition, or beetle presence (Talley and Holyoak 2009). Implementation of AMMs ensures that dust is controlled and will not affect valley elderberry longhorn beetle.
Increased Human Presence during Construction	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Increased human activity in construction and maintenance areas would affect habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets disturb occupied elderberry bushes and would cause general disturbance water quality effects. Implementation of AMMs ensures that pets are not brought to construction sites. No effect on valley elderberry longhorn beetle.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	Trash and debris will adversely affect habitat through direct effects on water quality and by possibly attracting nuisance pest species, including Argentine ants. Implementation of AMMs ensures that construction trash and debris will be controlled and that there will be no substantial effect to Ricksecker's water scavenger beetle.

Temporary Effects

Valley elderberry longhorn beetle occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to valley elderberry longhorn beetle. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects reported in Table 6-53).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on valley elderberry longhorn beetle are qualitatively described in Table 6-55.

6.6.14 California Tiger Salamander

Permanent Effects

Permanent direct and indirect effects of Covered Activities on California tiger salamander will include modification or significant degradation of modeled aquatic and upland habitats (see Section 3.2 and Figures 3-2 and 3-16). Modeled species habitat for California tiger salamander includes aquatic habitat comprising Vernal Pools and Seasonal Wetlands, and upland habitat including Valley Grassland, Blue Oak Woodland, and Blue Oak Savanna habitat within 1.5 miles of modeled aquatic habitat. California tiger salamander historically occurred throughout the Plan Area; however, all of the extant occurrence records within the Plan Area (a total of 28) are located outside the UDA in PPU 7 (see Section 3.4.3).

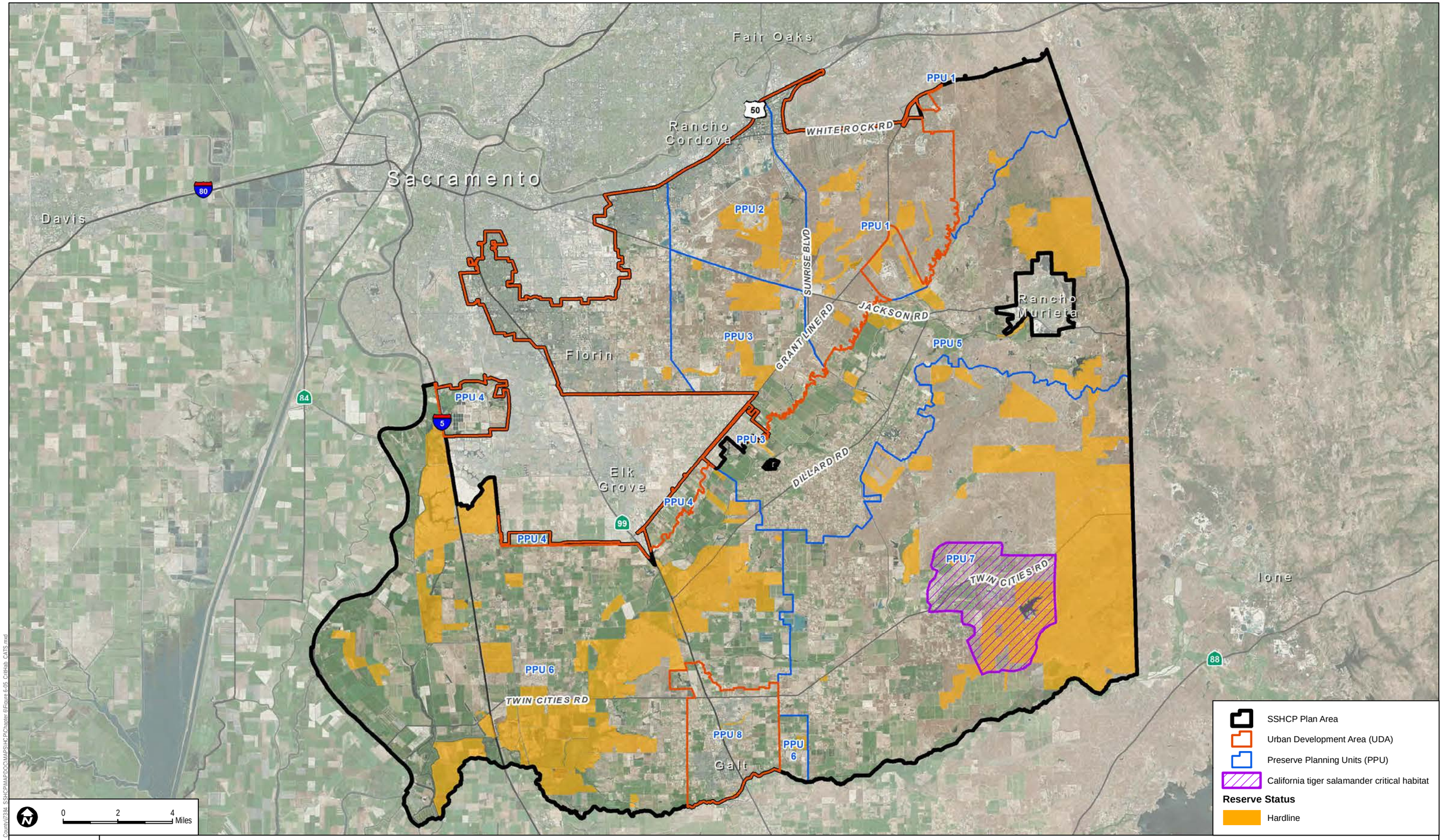
Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 1,757 acres (out of a total of 89,794 acres) of total modeled aquatic and upland habitats within the Plan Area (Table 6-56), including 80 acres (out of a total of 4,424 acres) of modeled aquatic habitat and approximately 1,677 acres (out of a total of 85,370) of modeled upland habitat. Effects of Covered Activities on modeled upland habitat will occur primarily inside the UDA, with a total of approximately 1,366 acres (out of a total of approximately 1,488 acres) of permanent effects inside the UDA and a total of approximately 311 acres (out of a total of approximately 83,882 acres) of permanent effects outside the UDA. Permanent effects of Covered Activities on modeled aquatic habitat will also occur primarily inside the UDA, with 55 acres (out of a total of approximately 63 acres) of permanent effects inside the UDA and a total of 23 acres (out of a total of approximately 4,361 acres) of permanent effects outside the UDA. No effects on documented occurrences within the Plan Area will occur as a result of Covered Activities. Although the majority of modeled habitats inside the UDA would be directly affected, the lack of any recent occurrences of California tiger salamander and the high existing level of

anthropogenic effects in this portion of the UDA indicates that these modeled habitat effects are unlikely to have substantial, if any, effects on extant California tiger salamander populations in the Plan Area.

Covered Activities will permanently affect approximately 80 acres of modeled aquatic habitat within the Plan Area including 59 acres of vernal pool habitat (out of a total of 3,033) and 21 acres of seasonal wetland (out of a total of 1,391 acres). Additionally, Covered Activities will also have permanent indirect effects on 2 acres of vernal pool habitat within the Plan Area, all of which will occur outside the UDA, as shown in Table 6-56. Covered Activities in the Plan Area will cause other permanent indirect effects to California tiger salamander that cannot be easily quantified.

The approximately 1,757 total acres of permanent effects to the California tiger salamander includes removal of a total of 52 acres of modeled upland and aquatic habitat within the Cosumnes/Rancho-Seco Core Recovery Area, outside the UDA. Of the 52 acres of permanent effects to modeled habitat within the Cosumnes/Rancho-Seco Core Recovery Area, 46 acres are modeled upland habitat and 6 acres are modeled aquatic habitat (Table 6-57).

The Plan Area also includes 7,420 acres of federally designated Critical Habitat (USFWS 2005) outside the UDA and south of the Cosumnes River. However, designated Critical Habitat will not be directly affected by Covered Activities within the Plan Area outside the UDA. The 7,420 acres of Critical Habitat for California tiger salamander occurs within Critical Habitat Unit 3, (Table 6-58 and Figure 6-5) and includes approximately 246 acres of modeled aquatic habitat and 7,174 acres of modeled upland habitat. Covered Activities will not affect either modeled upland or aquatic habitats within designated Critical Habitat. As a result, no direct or indirect effects to California tiger salamander Critical Habitat (upland and aquatic habitats) are expected to occur as a result of Covered Activities within the Plan Area. Additionally, Covered Activities will not affect any documented occurrences of the California tiger salamander in Critical Habitat.



SOURCE: Bing Maps, County of Sacramento 2014, USFWS 2012

FIGURE 6-5

Critical Habitat for California tiger salamander

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento County\07366 SSHCP\MAPS\CA\MAPS\HCP\Chapter 6\Figure 6-05_CritHab_CATS.mxd

INTENTIONALLY LEFT BLANK

Table 6-56
California Tiger Salamander Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Upland Habitat												
Blue Oak Savanna	3,322	0	Qualitative	0	0	0	Qualitative	0	3,322	0	Qualitative	0
Blue Oak Woodland	3,774	0	Qualitative	0	0	0	Qualitative	0	3,774	0	Qualitative	0
Valley Grassland	78,274	1,677	Qualitative	1,677	1,488	1,366	Qualitative	1,366	76,786	311	Qualitative	311
Total Upland Habitat	*85,370*	*1,677*	*Qualitative*	*1,677*	*1,488*	*1,366*	*Qualitative*	*1,366*	*83,882*	*311*	*Qualitative*	*311*
Aquatic Habitat												
Vernal Pool	3,033	57	2	59	36	34	0	34	2,997	23	2	25
Seasonal Wetland	1,391	21	Qualitative	21	27	21	Qualitative	21	1,364	0	Qualitative	0
Total Aquatic Habitat	*4,424*	*78*	*2*	*80*	*63*	*55*	*Qualitative*	*55*	*4,361*	*23*	*2*	*25*
GRAND TOTAL	**89,794**	**1,755**	**2**	**1,757**	**1551**	**1,421**	**0**	**1,421**	**88,243**	**334**	**2**	**336**

Table 6-57
California Tiger Salamander Permanent Effects in Core Recovery Areas

Habitat Model Land Cover Types	Cosumnes/Rancho-Seco Core Recovery Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*
Upland Habitat				
Blue Oak Savanna	2,067	0	Qualitative	0
Blue Oak Woodland	414	0	Qualitative	0
Valley Grassland*	36,298	46	Qualitative	46
Total Upland Habitat	*38,779*	*46*	*Qualitative*	*46*
Aquatic Habitat				
Vernal Pool	1,748	6	0	6
Seasonal Wetland	132	0	Qualitative	0
Total Aquatic Habitat	*1,880*	*6*	*0*	*6*
GRAND TOTAL	**40,659**	**52**	**0**	**52**

* Total effects to Valley Grassland include an unknown but small amount of effect that was analyzed qualitatively.

Table 6-58
Permanent Effects to California Tiger Salamander Critical Habitat

Habitat Model Land Cover Types	Critical Habitat Unit 3 (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*
Upland Habitat				
Blue Oak Savanna	0	0	Qualitative	0
Blue Oak Woodland	0	0	Qualitative	0
Valley Grassland*	7,174	0	Qualitative	0
Total Upland Habitat	*7,174*	*0*	*Qualitative*	*0*
Aquatic Habitat				
Vernal Pool	215	0	0	0
Seasonal Wetland	31	0	Qualitative	0
Total Aquatic Habitat	*246*	*0*	*0*	*0*
GRAND TOTAL	**7,420**	**0**	**0**	**0**

* Total effects to Valley Grassland include an unknown but small amount of effect that was analyzed qualitatively.

In addition to direct removal of modeled vernal pool habitat, vernal pools within Vernal Pool Ecosystem habitats will also be indirectly affected. Within the Plan Area, Covered Activities will indirectly affect 2 acres of aquatic habitat (out of a total of 4,361 acres) located outside the UDA. However, not all of the vernal pools modeled as habitat would actually provide suitable breeding habitat for California tiger salamanders since many of these pools may lack sufficient depth and inundation periods to support breeding. Edge effects on vernal pool micro-watersheds can remove part or all of the perched aquifer, existing hydrology, and ecosystem that supports vernal pool habitat. Over time, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter water chemistry of the vernal pool; and reduce the frequency of flows between swales

and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for breeding. In addition to the 2.1 acres of indirect effects quantified above in Table 6-56, Covered Activities in the Plan Area will cause other permanent indirect effects to California tiger salamander that are not easily quantified (Table 6-58).

Indirect effects to California tiger salamander modeled habitat inside the UDA will be higher than outside the UDA, because the majority of indirect effects to California tiger salamander modeled habitat resulting from Covered Activities (Urban Development) will occur inside the UDA. However, since extant California tiger salamander populations have not been documented inside the UDA, indirect environmental stressors will have negligible effects on this species or its remaining habitat (Table 6-59). Most indirect effects to California tiger salamander outside the UDA will occur to modeled aquatic habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which is expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, increased risk of accidental fire ignitions, and other road-related effects that will affect California tiger salamander habitat. As a result, indirect effects will likely be restricted to a fairly narrow linear area of varying length. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on existing California tiger salamander habitat within the project footprint. Some of these "other" indirect effects will occur within the road right-of-way area (already quantified as permanently affected in the direct effects and the area of indirect effects to vernal pool hydrology reported in Tables 6-56 through 6-58). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on California tiger salamander that are not quantified are described qualitatively in Table 6-59, along with AMMs that avoid and minimize these effects.

Based on the previously provided information, the Plan Permittees expect that the indirect effects of Covered Activities on California tiger salamander will be minor inside the UDA (due primarily to the lack of occurrences). Indirect effects of Covered Activities outside the UDA will also be minor since the amount of affected acreage is relatively small, and edge effects will be minimized by the establishment of large Preserves and the much lower development densities south of the Cosumnes River.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or proposed SSHCP preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect California tiger salamander. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-59
Permanent Indirect Effects on California Tiger Salamander

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Altered hydrology and water quality degradation will adversely affect the suitability of aquatic habitats to support successful reproduction for this species. Altered hydrology adversely affects vernal pools, seasonal wetlands, stock ponds, and California tiger salamanders by reducing pool water depths and altering the length of the inundation period which can affect the ability of larvae to complete metamorphosis prior to the pool drying, and by increasing the potential for predation due to shallower water depths. Water quality degradation including introduction of various pollutants, toxins, pesticides, and fertilizers, will adversely affect vernal pool communities and reproductive success of California tiger salamanders. The close proximity of planned roads and development to California tiger salamander habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution does not enter California tiger salamander aquatic habitat and that water chemistry of aquatic habitats will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks)	Habitat fragmentation and isolation should be a relatively minor effect to California tiger salamander aquatic habitat and to California tiger salamanders since this indirect effect was considered in the SSHCP preserve design strategy, including preserving large habitat blocks and ensuring habitat connectivity throughout the Preserve System. The Landscape Preserves established outside the UDA, including the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on California tiger salamander. The effects of roads fragmenting modeled habitat in Preserves outside the UDA will be reduced through implementation of EDGE and ROAD AMMs.

Table 6-59
Permanent Indirect Effects on California Tiger Salamander

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-8 (Outdoor Lighting) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location)	Within the UDA, habitat fragmentation will only affect a small amount of remaining modeled habitat; however, since this species has not been documented within the UDA and the remaining habitat is unoccupied, indirect effects will be minimal. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on the California tiger salamander population in the Cosumnes/Rancho-Seco Core Recovery Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Repeated wildfires could eliminate or reduce the quality of upland refugia and foraging habitat for California tiger salamanders by direct mortality to small mammal populations (primarily ground squirrels and pocket gophers (*Geomyidae* spp.)) and to available prey items. As discussed in Section 6.3, Covered Activities outside the UDA will not substantially affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on remaining California tiger salamander habitat will result from wildfire suppression (e.g., fire trucks, retardant, fire breaks); however, since this habitat is unoccupied and this species is not known to occur within the UDA, no effects will occur to California tiger salamanders. Effects of wildfire suppression on California tiger salamander habitat will be minimized through implementation of these AMMs and the Preserve System Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection)	Increased upland erosion, runoff, and subsequent sedimentation of vernal pools will also occur as a result of Covered Activities within the micro-watershed of vernal pool habitats. Erosion in the micro-watershed around individual vernal pools and seasonal wetlands will result in increased sedimentation of the pool, which will reduce water depths and shorten the inundation period ultimately affecting the suitability of the pool to support successful reproduction of

Table 6-59
Permanent Indirect Effects on California Tiger Salamander

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	California tiger salamanders. Vernal pool habitat that supports California tiger salamander will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and proposed vernal pool preserves.
Chronic Ground Vibration and Noise	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) CTS-1 (California Tiger Salamander Surveys)	Vibration and noise could indirectly affect the use of aquatic and upland habitats by California tiger salamanders (e.g., disruption of nocturnal movement patterns and diurnal cycles). As with many frogs and salamanders, California tiger salamanders are sensitive to vibration (especially when aestivating in underground refugia). Vibration can adversely affect California tiger salamanders by forcing them to leave existing underground refugia and move to other locations further away from the vibration source, which can make them more susceptible to predation and desiccation especially during the summer and fall months. Migrating California tiger salamanders and those in underground refugia sites will be indirectly affected by any activities that create chronic ground vibration and noise. Implementation of AMMs will minimize chronic ground vibration and noise in close proximity to California tiger salamander upland habitat.
Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks)	The use of outdoor lighting could indirectly affect the use of vernal pools and upland habitat by California tiger salamanders (e.g., disruption of nocturnal movement patters and diurnal cycles). As with many frogs and salamanders, California tiger salamanders are

Table 6-59
Permanent Indirect Effects on California Tiger Salamander

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-8 (Outdoor Lighting) Condition 4, ROAD-1 (Road Project Location)	sensitive to light (primarily when migrating to and from breeding locations). With the exception of wet periods when California tiger salamanders move aboveground during daylight, the majority of aboveground movement (primarily to and from breeding pools) occurs at night. The use of outdoor lighting in California tiger salamander upland habitat will indirectly affect California tiger salamanders primarily by restricting aboveground movement during the night when most migration occurs. Implementation of AMMs will ensure that outdoor lighting effects on California tiger salamander movement will be minimized.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design)	Increased human activity (including trash, debris, pets, off-highway vehicles (OHVs), and trampling) within the micro-watershed of vernal pool and seasonal wetland habitats will adversely affect these habitats and California tiger salamanders. The presence of trash in the vicinity of vernal pools and seasonal wetlands can attract predators. Additionally, pets also prey on California tiger salamanders but can also physically affect vernal pool habitats, and OHV use can disrupt soils and drainage pathways increasing erosion and introduce harmful substances to the micro-watershed. Access to the preserve will be allowed via low effect trails. Implementation of AMMs will ensure that increased human activity in and near Preserves is limited and that it does not substantially affect California tiger salamander aquatic habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks)	Vernal pool community alterations are most likely to affect California tiger salamanders through changes in prey availability as a result of habitat degradation, and through introduction of non-native aquatic species that predate on the eggs and larvae of California tiger salamanders. Wildlife community alterations that reduce the number and types of prey items and favor potential competitors such as bullfrogs, could adversely affect California tiger salamander breeding habitat. Increases in inundation period may facilitate wildlife community alterations, including invasion by

Table 6-59
Permanent Indirect Effects on California Tiger Salamander

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-8 (Outdoor Lighting) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location)	non-native predators of California tiger salamander such as American bullfrogs and non-native fishes including western mosquitofish. Implementation of EDGE and ROAD AMMs, including those that require control of stormwater runoff, will ensure pollution will not enter California tiger salamander aquatic habitat. Additionally, water chemistry of aquatic habitats will not be affected, invasive species spread will be controlled, and resultant wildlife community alterations will not occur.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank)	Unmanaged proliferation of non-native plant Valley Grasslands of the Vernal Pool Ecosystem will affect critical hydroperiods that support breeding by California tiger salamanders. Implementation of AMMs will minimize proliferation of non-native plants, and preserve management for thatch, such as grazing or prescribed fire, will reduce biomass of upland non-native plants. These will substantially reduce effects of non-native plants on California tiger salamander breeding habitat. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7). Implementation of AMMs will minimize the potential for indirect effects of invasive plants on California tiger salamander habitat. Nitrogen deposition associated with increased vehicle emissions from vehicles associated with new urban development traveling along Plan Area Rural roadway projects will also result in competitive advantages for non-native invasive plants. The unavoidable effects of Nitrogen deposition will be minimized through monitoring and adaptive management of the vernal pool ecosystem on Preserves and through AMMs related to invasive species.

Table 6-59
Permanent Indirect Effects on California Tiger Salamander

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	As described in Wildlife Community Alterations, invasion by non-native predators of California tiger salamander such as American bullfrogs and non-native fishes including western mosquitofish will be avoided through preservation of existing vernal pool inundation period and water chemistry. Implementation of AMMs will minimize the potential for indirect effects from invasive animals.
Mesopredators	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	Adverse effects on California tiger salamander juveniles and adults will occur as a result of the presence of mesopredators during periods of surface activity movement to and from breeding pools. Implementation of AMMs will minimize the potential for predation by mesopredators at road crossing locations.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread)	California tiger salamanders are susceptible to Ranavirus infection, specifically the *Ambystoma tigrinum* virus (ATV). Implementation of this AMM will minimize the potential for introduction of this virus into local California tiger salamander populations.
Pesticides and Fertilizers	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Indirect effects on California tiger salamander, vernal pool plant and animal ecosystem, and seasonal wetlands from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near Preserves will be avoided by implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks)	Vehicles can adversely affect California tiger salamanders, primarily by running them over during night-time migrations to and from breeding pools. The primary approach to reducing effects on roads due to vehicle collisions is to provide culvert undercrossings

Table 6-59
Permanent Indirect Effects on California Tiger Salamander

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	in areas where salamanders are moving across roads to and from breeding pools. Indirect effects on California tiger salamander associated with vehicle collisions will be avoided by locating planned road projects in the least environmentally sensitive location relative to California tiger salamander habitat. Additionally, installing wildlife crossing structures outside the UDA where California tiger salamanders are present will provide for continued dispersal and movement of this species throughout the SSHCP Plan Area, as required by the SSHCP Biological Goals and Measurable Objectives (see Chapter 7). Implementation of AMMs will minimize potential indirect effects associated with vehicle collisions.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-60
Temporary Effects to California Tiger Salamander

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 1, LID-1 (Stormwater Quality). Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control)	Potential erosion, runoff, and water quality effects on California tiger salamander aquatic habitat resulting from construction activities will be fully avoided through implementation of AMMs.

Table 6-60
Temporary Effects to California Tiger Salamander

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing) CTS-7 (Rodent Control)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing)	Inadvertent trampling of vernal pool vegetation will adversely affect California tiger salamander eggs and larvae. Implementation of AMMs ensures that trampling of vegetation outside the project footprint will not occur.
Construction Noise	Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-7 (Biological Monitor) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing)	Loud noise can affect California tiger salamanders when they are above ground. Implementation of AMMs will minimize construction noise effects in the vicinity of California tiger salamander habitat.
Construction Ground Vibration	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing)	Ground vibrations can force California tiger salamanders to leave underground refugia to move away from the vibration source, exposing them to potential predation by predators. Implementation of AMMs will minimize construction ground vibration effects near California tiger salamander habitat.
Construction Lighting	Condition 3, BMP-6 (Construction Lighting) Condition 3, BMP-7 (Biological Monitor)	Construction lighting directed towards California tiger salamander upland habitat can restrict the ability of California tiger salamanders

Table 6-60
Temporary Effects to California Tiger Salamander

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-8 (Training of Construction Staff) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing)	to move above ground (i.e., migrate to and from breeding pools). Implementation of AMMs will minimize construction lighting effects on California tiger salamander by ensuring that construction lighting is directed away from adjacent natural habitats.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing)	Construction dust effects on vernal pool vegetation communities and vernal pool and seasonal wetland water quality will reduce habitat quality for California tiger salamander. Implementation of AMMs ensures that dust is controlled.
Increased Human Presence during Construction	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing) CTS-6 (California Tiger Salamander Encounter Protocol) CTS-7 (Rodent Control)	Increased human activity in construction and maintenance areas would affect vernal pool and seasonal wetland habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets that access occupied pools would cause general disturbance and affect water quality. Implementation of AMMs ensures that increased human presence does not occur.
Construction Trash and Debris	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) CTS-1 (California Tiger Salamander Daily Construction Schedule) CTS-2 (California Tiger Salamander Monitoring) CTS-3 (California Tiger Salamander Exclusion Fencing)	Trash and debris would adversely affect California tiger salamanders by degrading water quality and by attracting nuisance pest species. Implementation of AMMs will ensure that construction trash and debris will be monitored and controlled.

Temporary Effects

California tiger salamander occurrences near proposed ground-disturbing Covered Activities (outside the UDA) will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to the California tiger salamander. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently affected in the direct effects and the area of indirect effects to Vernal Pool and Seasonal Wetland hydrology reported in Table 6-56). Specific AMMs have been developed to minimize potential effects on California tiger salamander, including CTS-1, daily construction schedule when Covered Activities occur during the breeding and dispersal season; CTS-2, monitoring requirements when Covered Activities occur during the breeding and dispersal season; CTS-3, use of exclusion fencing when Covered Activities occur during the breeding and dispersal season; CTS-4, procedures to avoid entrapment of California tiger salamanders when Covered Activities occur during the breeding and dispersal season; CTS-5, California tiger salamander encounter protocol when Covered Activities occur during the breeding and dispersal season; and CTS-6, the use of non-entangling erosion control materials.

These potential construction-related environmental stressors were generally described in Section 6.3.2, and their additional effects on California tiger salamander are qualitatively described in Table 6-60.

6.6.15 Western Spadefoot

Permanent Effects

Permanent direct and indirect effects of Covered Activities on western spadefoot will include modification or significant degradation of modeled aquatic and upland habitats (see Section 3.2 and Figure 3-17) and the direct and indirect take of western spadefoot individuals occupying that modified or degraded habitat.

Modeled species habitat for western spadefoot includes aquatic habitat comprising Seasonal Wetlands, Swale, Open Water, Streams/Creeks, and Streams/Creeks (VPIH), and upland habitat consisting of Valley Grassland, Blue Oak Woodland, and Blue Oak Savanna habitat within 1,600 meters (5,249 feet) of modeled aquatic habitat. However, the primary breeding habitats for western spadefoot usually include vernal pools, seasonal wetlands, and various depressional features (temporary rain pools) that remain inundated for a sufficient period (at least 30 days) to complete metamorphosis. Western spadefoots may also breed in pools in swales, various shallow open water habitats, streams/creeks, and a variety of other features including tire ruts, although use of these habitats may be sporadic. Western spadefoot occur throughout the Plan Area,

although the majority of the occurrence records (21 out of a total of 29 records within the Plan Area) are located outside the UDA, mostly within PPU 7 (see Section 3.4.3).

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 23,207 acres of total modeled aquatic and upland habitats within the Plan Area (Table 6-61), including 1,164 acres (out of a total of 13,479 acres) of modeled aquatic habitat and approximately 22,043 acres (out of a total of 149,603 acres) of modeled upland habitat. Permanent effects of Covered Activities on modeled upland habitat will occur primarily inside the UDA, with a total of approximately 21,329 acres (out of a total of 30,345 acres) of permanent effects inside the UDA and a total of approximately 714 acres outside the UDA. Covered Activity effects on modeled aquatic habitat will also occur primarily within the UDA, with approximately 1,089 acres (out of a total of approximately 2,026 acres) of permanent effects inside the UDA; and a total of 75 acres (out of a total of 11,453 acres) of permanent effects outside the UDA.

Aquatic and upland habitat within the two Core Recovery Areas is important for western spadefoot as evidenced by the 18 occurrences in the Cosumnes/Rancho-Seco Core Recovery Area and 8 occurrences in the Mather Core Recovery Area (Figure 3-17). Covered Activities within these two Core Recovery Areas will permanently affect approximately 8,600 acres (out of a total of 60,042 acres) of modeled upland and aquatic habitat (Table 6-62). Within the Mather Core Recovery Area, Covered Activities will permanently affect approximately 8,547 acres of habitat, including approximately 8,127 acres of upland habitat and 420 acres of aquatic habitat. Outside the UDA and within the Cosumnes/Rancho-Seco Core Recovery Area, Covered Activities will permanently affect approximately 53 acres of habitat including 46 acres of upland habitat and approximately 7 acres of aquatic habitat. Similar to other western spadefoot habitat within the Plan Area, the majority of indirect effects within the two Core Recovery Areas will occur within the UDA in the Mather Core Recovery Area.

Final South Sacramento Habitat Conservation Plan

Table 6-61

Western Spadefoot Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Upland Habitat												
Blue Oak Savanna	5,637	38	Qualitative	38	18	2	Qualitative	2	5,619	36	Qualitative	36
Blue Oak Woodland	9,132	9	Qualitative	9	0	0	Qualitative	0	9,132	9	Qualitative	9
Valley Grassland	135,094	21,996	Qualitative	21,996	30,327	21,327	Qualitative	21,327	104,767	669	Qualitative	669
Total Upland Habitat	*149,863*	*22,043*	*Qualitative*	*22,043*	*30,345*	*21,329*	*Qualitative*	*21,329*	*119,518*	*714*	*Qualitative*	*714*
Aquatic Habitat												
Vernal Pool	4,536	389	94	483	935	355	85	440	3,601	34	9	43
Swale	1,252	234	44	278	461	232	43	275	791	2	1	3
Seasonal Wetland	2,600	105	Qualitative	105	162	102	Qualitative	102	2,438	3	Qualitative	4
Open Water	2,344	155	Qualitative	155	237	154	Qualitative	154	2,107	1	Qualitative	1
Streams/Creeks	2,674	117	Qualitative	117	163	92	Qualitative	92	2,511	25	Qualitative	25
Streams/Creeks (VPIH)	73	22	4	26	68	22	4	26	5	0	0	0
Total Aquatic Habitat	*13,479*	*1,022*	*142*	*1,164*	*2,026*	*957*	*132*	*1,089*	*11,453*	*65*	*10*	*75*
GRAND TOTAL	**163,342**	**23,065**	**142**	**23,207**	**32,371**	**22,286**	**132**	**22,418**	**130,971**	**779**	**10**	**789**

Table 6-62
Western Spadefoot Permanent Effects in Core Recovery Areas

Habitat Model Land Cover Types	All Core Recovery Areas (acres)				Mather Core Recovery Area (acres)				Cosumnes/Rancho-Seco Core Recovery Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Upland Habitat												
Blue Oak Savanna	2386	9	Qualitative	9	319	9	Qualitative	9	2,067	0	Qualitative	0
Blue Oak Woodland	419	0	Qualitative	0	5	0	Qualitative	0	414	0	Qualitative	0
Valley Grassland	53,367	8,164	Qualitative	8,164	17,023	8,118	Qualitative	8,118	36,344	46	Qualitative	46
Total Upland Habitat	*56,172*	*8,173*	*Qualitative*	*8,173*	*17,347*	*8,127*	*Qualitative*	*8,127*	*38,825*	*46*	*Qualitative*	*46*
Aquatic Habitat												
Vernal Pool	2,464	150	72	222	709	144	72	216	1,755	6	0	6
Swale	740	113	38	151	324	112	38	150	416	1	0	1
Seasonal Wetland	139	6	Qualitative	6	7	6	Qualitative	6	132	0	Qualitative	0
Open Water	270	26	Qualitative	26	92	26	Qualitative	26	178	0	Qualitative	0
Streams/Creeks	196	6	Qualitative	6	28	6	Qualitative	6	168	0	Qualitative	0
Streams/Creeks (VPIH)	61	13	3	16	61	13	3	16	0	0	0	0
Total Aquatic Habitat	*3,870*	*314*	*113*	*427*	*1,221*	*307*	*113*	*420*	*2,649*	*7*	*0*	*7*
GRAND TOTAL	**60,042**	**8,487**	**113**	**8,600**	**18,568**	**8,434**	**113**	**8,547**	**41,474**	**53**	**0**	**53**

Western spadefoots in the Plan Area will be affected by permanent indirect effects to modeled habitat, as well as harm and harassment of individuals. Covered Activities will have permanent indirect effects on 142 acres of modeled aquatic habitat. Most of these permanent effects will occur primarily inside the UDA, with a total of approximately 132 acres (out of a total of 2,026 acres) of modeled aquatic habitat inside the UDA. Outside the UDA, approximately 10 acres of modeled aquatic habitat will be permanently affected.

However, not all of the modeled aquatic habitat would actually provide suitable breeding habitat for western spadefoot since many of these pools may lack sufficient depth and inundation periods to support breeding. Edge effects on vernal pool micro-watersheds can remove part or all of the perched aquifer, existing hydrology, and ecosystem that supports vernal pool habitat. Edge effects on vernal pool micro-watersheds remove part or all of the perched aquifer, existing hydrology, and ecosystem that supports Vernal Pool, Swale, and Stream/Creek (VPIH) habitat. Over time, effects on the micro-watersheds will indirectly change the timing, duration, and depth of vernal pool filling; alter water chemistry of the vernal pool; and reduce the frequency of flows between swales and vernal pools and connectivity between the pools. Collectively, these effects will result in the affected aquatic habitat becoming unsuitable for western spadefoot breeding. In addition to the 142 acres of indirect effects quantified in Table 6-61 and 6-62, Covered Activities in the Plan Area will cause other permanent indirect effects to western spadefoot that are not easily quantified (Table 6-63).

Although indirect effects will occur throughout the Plan Area, their potential to have substantial effects on western spadefoot is greatest within the UDA due to the closer and more extensive contact between urban development that will occur within the UDA and adjacent to preserved areas and the requirement of extensive infrastructure. It is expected that most of the indirect effects outside the UDA south of the Cosumnes River will be fairly minor since the amount of affected acreage is relatively small, and edge effects will be minimized by the establishment of large Preserves and the much lower development densities south of the Cosumnes River. Most indirect effects to western spadefoot outside the UDA will occur to modeled aquatic habitats located along Rural Transportation Projects, including improved roadways that will support higher traffic densities, which is expected to increase contaminants in road runoff, potential spread of invasive plants, increased pesticide use, increased risk of accidental fire ignitions, and other road-related effects that will affect western spadefoot habitat. As a result, indirect effects will likely be restricted to a fairly narrow linear area of varying length. In particular, improvement of Clay Station Road that passes through the Landscape Preserve in PPU 7 (see Chapter 7) will have permanent indirect effects on vernal pool habitat (although some of these indirect effects are already accounted for in the indirect effect acreage reported in Table 6-61). Some of these “other” indirect effects will occur within the road right-of-way area (already quantified as permanently affected in the direct effects and the area of indirect effects to vernal pool hydrology reported in

Table 6-61). Remaining indirect effects of Rural Transportation Projects and other Covered Activities on western spadefoot that are not quantified are described qualitatively in Table 6-63, along with AMMs that avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or proposed SSHCP preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect western spadefoot. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Table 6-63
Permanent Indirect Effects on Western Spadefoot

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location) WS-1 (Western Spadefoot Surveys)	Altered hydrology and water quality degradation will adversely affect the suitability of aquatic habitats to support successful reproduction for this species. Altered hydrology adversely affects vernal pools, seasonal wetlands, stock ponds, rain pools, and other suitable aquatic habitats and western spadefoots by reducing pool water depths and altering the length of the inundation period which can affect the ability of larvae to complete metamorphosis prior to the pool drying, and by increasing the potential for predation due to shallower water depths. Water quality degradation, including introduction of various pollutants, toxins, pesticides, and fertilizers. will adversely affect vernal pool communities and reproductive success of western spadefoots. The close proximity of planned roads and development to habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution does not enter western spadefoot aquatic habitat and that water chemistry of aquatic habitats will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside	Habitat fragmentation and isolation should be a relatively minor effect to western spadefoot aquatic habitat and to western spadefoots since this indirect affect was considered in the SSHCP preserve design strategy, including preserving large habitat blocks and ensuring habitat connectivity throughout the Preserve System. The Landscape Preserves established inside the UDA including the Mather Core Recovery Area, and outside the UDA including the Cosumnes/Rancho-Seco Core Recovery Area, will avoid effects of habitat fragmentation on western spadefoot. The effects of roads

Table 6-63
Permanent Indirect Effects on Western Spadefoot

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-8 (Outdoor Lighting) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) WS-1 (Western Spadefoot Surveys)	fragmenting modeled habitat in Preserves outside the UDA will be reduced through implementation of EDGE and ROAD AMMs. Within the UDA, habitat fragmentation will affect a small amount of remaining modeled habitat; however, since this species has not been documented within the UDA and the remaining habitat is unoccupied, indirect effects will be minimal. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on the western spadefoot population in both the Mather and Cosumnes/Rancho-Seco Core Recovery Areas.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Repeated wildfires could eliminate or reduce the quality of upland refugia and foraging habitat for western spadefoots by direct mortality to small mammal populations (primarily ground squirrels and pocket gophers) and to available prey items. As discussed in Section 6.3, Covered Activities outside the UDA will not substantially affect wildfire frequency, duration, or intensity. Within the UDA, potential effects of increased wildfire on western spadefoot habitat will result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on western spadefoot habitat will be minimized through implementation of AMMs and the Preserve System Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection)	Increased erosion, runoff, and subsequent sedimentation of vernal pools will also occur as a result of Covered Activities within the micro-watershed of vernal pool habitats. Erosion in the micro-watershed around individual vernal pools and seasonal wetlands will result in increased sedimentation of the pool, which will reduce water depths and shorten the inundation period, ultimately affecting the suitability of the pool to support successful reproduction of

Table 6-63
Permanent Indirect Effects on Western Spadefoot

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	western spadefoots. Vernal pool habitat that supports western spadefoot will be indirectly affected by any activities that interrupt the perched aquifer supporting vernal pool hydrology. Implementation of AMMs will minimize hydrologic alterations to the micro-watersheds of existing and proposed vernal pool preserves.
Chronic Ground Vibration and Noise	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) WS-1 (Western Spadefoot Surveys)	Vibration and noise could indirectly affect the use of aquatic and upland habitats by western spadefoot (e.g., disruption of nocturnal movement patters and diurnal cycles). As with many frogs and salamanders, western spadefoots are sensitive to vibration (especially when aestivating in underground refugia). Vibration can adversely affect western spadefoots by forcing them to leave existing underground refugia and move to other locations further away from the vibration source, which can make them more susceptible to predation and desiccation especially during the summer and fall months. Migrating western spadefoots and those in underground refugia sites will be indirectly affected by any activities that create chronic ground vibration and noise. Implementation of AMMs will minimize the effects of chronic ground vibration and noise in close proximity to western spadefoot upland habitat.

Table 6-63
Permanent Indirect Effects on Western Spadefoot

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 4, ROAD-1 (Road Project Location)	The use of outdoor lighting could indirectly affect the use of vernal pools and upland habitat by western spadefoots (e.g., disruption of nocturnal movement patterns and diurnal cycles). As with many frogs and salamanders, western spadefoots are sensitive to light (primarily when migrating to and from breeding locations). With the exception of wet periods when western spadefoots move aboveground during daylight, the majority of aboveground movement (primarily to and from breeding pools) occurs at night. The use of outdoor lighting in western spadefoot upland habitat will indirectly affect western spadefoots primarily by restricting aboveground movement during the night when most migration occurs. Implementation of AMMs will ensure that outdoor lighting effects on western spadefoot movement will be minimized.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Increased human activity (including trash, debris, pets, OHVs, and trampling) within the micro-watershed of vernal pool and seasonal wetland habitats will adversely affect these habitats and western spadefoots. The presence of trash in the vicinity of vernal pools and seasonal wetlands can attract predators. Additionally, pets also prey on western spadefoots but can also physically affect vernal pool habitats, and OHV use can disrupt soils and drainage pathways increasing erosion and introduce harmful substances to the micro-watershed. Access to the preserve will be allowed via low effect trails. Implementation of AMMs will ensure that increased human activity in and near Preserves is limited and that it does not substantially affect western spadefoot aquatic habitat.

Table 6-63
Permanent Indirect Effects on Western Spadefoot

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-9 (Soil Compaction Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location)	Vernal pool community alterations are most likely to affect western spadefoots through changes in prey availability as a result of habitat degradation, and through introduction of non-native aquatic species that predate on the eggs and larvae of western spadefoot. Wildlife community alterations that reduce the number and types of prey items and favor potential competitors such as bullfrogs, could adversely affect western spadefoot breeding habitat. Increases in inundation period may facilitate wildlife community alterations, including invasion by non-native predators of western spadefoot such as American bullfrogs and non-native fishes including western mosquitofish. Implementation of EDGE and ROAD AMMs, including those that require control of stormwater runoff, will ensure pollution will not enter western spadefoot aquatic habitat, water chemistry of aquatic habitats will not be affected, invasive species spread will be controlled, and resultant wildlife community alterations in western spadefoot aquatic habitat will not occur.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank)	Unmanaged proliferation of non-native plant Valley Grasslands of the Vernal Pool Ecosystem will affect critical hydroperiods that support breeding by western spadefoot. Implementation of AMMs will minimize proliferation of non-native plants, and preserve management for thatch, such as grazing or prescribed fire, will reduce biomass of upland non-native plants. These will substantially reduce effects of non-native plants on western spadefoot breeding habitat. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7). Nitrogen deposition associated with increased vehicle emissions

Table 6-63
Permanent Indirect Effects on Western Spadefoot

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		from vehicles associated with new urban development traveling along Plan Area rural roadway projects will also result in competitive advantages for non-native invasive plants. The unavoidable effects of nitrogen deposition will be minimized through monitoring and adaptive management of the vernal pool ecosystem on Preserves and through AMMs related to invasive species.
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	As described in Wildlife Community Alterations, invasion by non-native predators of western spadefoot such as American bullfrogs and non-native fishes including western mosquitofish will be avoided through preservation of existing vernal pool inundation period and water chemistry and implementation of AMMs.
Mesopredators	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	Adverse effects on western spadefoot juveniles and adults will occur as a result of the presence of some mesopredators during periods of surface activity movement to and from breeding pools. Larvae are consumed by several aquatic and terrestrial predators both native and introduced, including California tiger salamander larvae, American bullfrogs, and wading birds. However, post-metamorphic juveniles and adults produce skin secretions that may make them unpalatable to some predators. Mesopredators that have been documented predating on western spadefoot include raccoons and dabbling ducks (especially mallards (*Anas platyrhynchos*)). Implementation of AMMs will minimize the potential for predation by mesopredators at road crossing locations.
Wildlife Disease	None required for this species.	No effect on this species.

Table 6-63
Permanent Indirect Effects on Western Spadefoot

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Pesticides and Fertilizers	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Indirect effects on western spadefoot, vernal pool plant and animal ecosystem, and seasonal wetlands from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near Preserves will be avoided by implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	Vehicles can adversely affect western spadefoots, primarily by running them over during night-time migrations to and from breeding pools. The primary approach to reducing effects on roads due to vehicle collisions is to provide culvert undercrossings in areas where salamanders are moving across roads to and from breeding pools. Indirect effects on western spadefoot associated with vehicle collisions will be avoided by locating planned road projects in the least environmentally sensitive location relative to western spadefoot habitat. Additionally, installing wildlife crossing structures outside the UDA where western spadefoots are present will provide for continued dispersal and movement of this species throughout the SSHCP Plan Area, as required by the SSHCP Biological Goals and Measurable Objectives (see Chapter 7). Implementation of AMMs will minimize indirect effects associated with vehicle collisions.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-64
Temporary Effects to Western Spadefoot

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-3 (Trenchless Construction Methods) Condition 8, UTILITY-4 (Siting of Entry and Exit Location) WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing)	Potential erosion, runoff, and water quality effects on western spadefoot aquatic habitat resulting from construction activities will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing)	Inadvertent trampling of vernal pool vegetation will adversely affect western spadefoot eggs and larvae. Implementation of AMMs ensures that trampling of vegetation outside the project footprint will not occur.

Table 6-64
Temporary Effects to Western Spadefoot

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Construction Noise	Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-7 (Biological Monitor) WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing)	Loud noise can affect western spadefoot when they are aboveground. Implementation of AMMs will minimize construction noise effects in the vicinity of western spadefoot habitat.
Construction Ground Vibration	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing)	Ground vibrations can force western spadefoots to leave underground refugia to move away from the vibration source, exposing them to potential predation by predators. Implementation of AMMs will minimize construction ground vibration effects near western spadefoot habitat.
Construction Lighting	Condition 3, BMP-6 (Construction Lighting) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing)	Construction lighting directed towards western spadefoot upland habitat can restrict the ability of western spadefoots to move aboveground (i.e., migrate to and from breeding pools). Implementation of AMMs will minimize construction lighting effects on western spadefoot by ensuring that construction lighting is directed away from adjacent natural habitats.
Construction Dust	Condition 3, BMP-5 (Dust Control) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing)	Construction dust effects on vernal pool vegetation communities and vernal pool and seasonal wetland water quality will reduce habitat quality for western spadefoot. Implementation of AMMs ensures that dust is controlled.
Increased Human Presence during Construction	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff)	Increased human activity in construction and maintenance areas would affect vernal pool and seasonal wetland habitat quality through personnel bringing pets (e.g., dogs) to work sites. Pets that

Table 6-64
Temporary Effects to Western Spadefoot

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing) WS-7 (Western Spadefoot Encounter Protocol)	access occupied pools would cause general disturbance and affect water quality. Implementation of AMMs ensures that increased human presence does not occur.
Construction Trash and Debris	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WS-1 (Western Spadefoot Surveys) WS-2 (Western Spadefoot Work Window) WS-3 (Western Spadefoot Monitoring) WS-4 (Western Spadefoot Exclusion Fencing)	Trash and debris would adversely affect western spadefoot habitat by degrading water quality and by attracting nuisance pest species which could adversely affect this species. Implementation of AMMs will ensure that construction trash and debris will be monitored and controlled.

Temporary Effects

Western spadefoot occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to the western spadefoot. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently affected in the direct effects and the area of indirect effects to Vernal Pool and Seasonal Wetland hydrology reported in Table 6-61). Specific AMMs have been developed to minimize potential effects on western spadefoot including WS-1, work window outside the breeding and dispersal season; WS-2, monitoring requirements when Covered Activities occur during the breeding and dispersal season; WS-3, use of exclusion fencing when Covered Activities occur during the breeding and dispersal season; WS-4, procedures to avoid entrapment of western spadefoot when Covered Activities occur in western spadefoot modeled habitat; WS-5, use of non-entangling materials if erosion control BMP-2 is implemented; and WS-6, use of western spadefoot encounter protocol when Covered Activities occur during the breeding and dispersal season.

These potential construction-related environmental stressors were generally described in Section 6.3.2, and their additional effects on western spadefoot are qualitatively described in Table 6-64.

6.6.16 Giant Gartersnake

Permanent Effects

Permanent direct and indirect effects of Covered Activities on giant gartersnake will include modification or significant degradation of modeled aquatic and upland habitats (see Section 3.2 and Figures 3-2 and 3-18) and the direct and indirect take of giant gartersnake individuals occupying that modified or degraded habitat.

Modeled species habitat for giant gartersnake includes aquatic habitat comprising Seasonal Wetlands, Freshwater Marsh, Open Water (excluding ski lakes), and Streams/Creeks; and upland habitat that includes Valley Grassland and Mixed Riparian Scrub habitat within 820 feet of modeled aquatic habitat. Modeled aquatic and upland habitat for giant gartersnake within the Plan Area includes both high-value and non-high-value habitat (Figure 3-18), with the majority of high-value habitat located outside the UDA. Rice fields also provide potential habitat for giant gartersnake; however, since very little rice farming occurs within the Plan Area, impacts to crop land were not calculated. Giant gartersnakes occur throughout the Plan Area, although the majority of the occurrence records (9 out of a total of 11 records within the Plan Area) are located outside the UDA, mostly in PPU 6 (see Section 3.4.4).

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 2,358 acres of total modeled aquatic and upland habitats (which includes both high-value and non-high-value habitat) within the Plan Area (Table 6-65), including approximately 169 acres (out of a total of 7,290 acres) of modeled aquatic habitat and approximately 2,189 acres (out of a total of 27,868 acres) of modeled upland habitat. Covered Activity effects on modeled aquatic habitat will occur primarily within the UDA, with approximately 144 acres (out of a total of 483 acres) of permanent effects inside the UDA, and a total of approximately 25 acres (out of a total of 6,807 acres) of permanent effects outside the UDA. Permanent effects of Covered Activities on modeled upland habitat will also occur primarily inside the UDA, with a total of approximately 1,965 acres (out of a total of 4,053 acres) of permanent effects inside the UDA, and a total of approximately 224 acres (out of a total of 23,816 acres) outside the UDA. Covered Activities will not have a direct permanent effect on any giant gartersnake occurrence records within the Plan Area.

Covered Activities will permanently affect approximately 606 acres of high-value giant gartersnake habitat within the Plan Area (Table 6-66), including approximately 104 acres (out of a total of 3,628 acres) of modeled aquatic habitat and approximately 502 acres (out of a total of 6,853 acres) of modeled upland habitat. Permanent effects of Covered Activities on modeled upland habitat will also occur primarily inside the UDA, with a total of approximately 461 acres (out of a total of 1,056 acres) of permanent effects inside the UDA, and a total of approximately 41 acres (out of a total of 5,797 acres) outside the UDA (Table 6-66). High-value habitat also includes the Badger Creek and Stone Lakes National Wildlife Refuge (NWR) areas where known subpopulations of giant gartersnake have been documented in this portion of the Plan Area (see Section 3.4.4).

Table 6-65
Giant Gartersnake Permanent Effects (Includes Both High-Value and Non-High-Value Habitat)

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect in Plan Area*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect Inside UDA*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect Outside UDA*
Upland Habitat												
Mixed Riparian Scrub	1,044	135	Qualitative	135	171	132	Qualitative	132	873	3	Qualitative	3
Valley Grassland	26,825	2,054	Qualitative	2,054	3,882	1,833	Qualitative	1,833	22,943	221	Qualitative	221
Total Upland Habitat	*27,869*	*2,189*	*Qualitative*	*2,189*	*4,053*	*1,965*	*Qualitative*	*1,965*	*23,816*	*224*	*Qualitative*	*224*
Aquatic Habitat												
Seasonal Wetland	1,625	39	Qualitative	39	87	36	Qualitative	36	1,538	3	Qualitative	3
Freshwater Marsh	2,589	71	Qualitative	71	299	66	Qualitative	66	2,290	5	Qualitative	5
Open Water	1,282	25	Qualitative	25	43	25	Qualitative	25	1,239	0	Qualitative	0
Streams/Creeks	1,794	34	Qualitative	34	54	17	Qualitative	17	1,740	17	Qualitative	17
Total Aquatic Habitat	*7,290*	*169*	*Qualitative*	*169*	*483*	*144*	*Qualitative*	*144*	*6,807*	*25*	*Qualitative*	*25*
GRAND TOTAL	**35,159**	**2,358**	**Qualitative**	**2,358**	**4,536**	**2,109**	**Qualitative**	**2,109**	**30,623**	**249**	**Qualitative**	**249**

Table 6-66
Giant Gartersnake High-Value Habitat Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total*	*Direct Effect*	*Indirect Effect*	*Total Effect*
High-Value Upland Habitat												
Mixed Riparian Scrub	569	127	Qualitative	127	143	126	Qualitative	126	426	1	Qualitative	1
Valley Grassland	6,284	375	Qualitative	375	913	335	Qualitative	335	5,371	40	Qualitative	40
Total High-Value Upland Habitat	*6,853*	*502*	*Qualitative*	*502*	*1,056*	*461*	*Qualitative*	*461*	*5,797*	*41*	*Qualitative*	*41*
High-Value Aquatic Habitat												
Seasonal Wetland	741	27	Qualitative	27	57	24	Qualitative	24	684	3	Qualitative	3
Freshwater Marsh	1,195	58	Qualitative	58	273	55	Qualitative	55	922	3	Qualitative	3
Open Water	697	2	Qualitative	2	5	2	Qualitative	2	692	0	Qualitative	0
Streams/Creeks	995	17	Qualitative	17	34	7	Qualitative	7	961	10	Qualitative	10
Total High-Value Aquatic Habitat[1]	*3,628*	*104*	*Qualitative*	*104*	*369*	*88*	*Qualitative*	*88*	*3,259*	*16*	*Qualitative*	*16*
GRAND TOTAL	**10,481**	**606**	**Qualitative**	**606**	**1,425**	**549**	**Qualitative**	**549**	**9,056**	**57**	**Qualitative**	**57**

Covered Activities in the Plan Area will cause permanent indirect effects to giant gartersnake that are not easily quantified (Table 6-65). Giant gartersnakes in the Plan Area will be affected by permanent indirect effects to both aquatic and upland habitats, as well as harm and harassment of individuals. Indirect effects of the Covered Activities include management and monitoring; habitat fragmentation and isolation; altered hydrology and water quality degradation including introduction of pollutants, toxins, pesticides, and fertilizers; increased human activity (including trash, pets, debris, OHVs, and trampling); altered fire regime; aquatic community alterations (including increased predation); vibration and noise issues; and vehicle collisions.

Although indirect effects to giant gartersnake modeled habitat will occur throughout the Plan Area, their potential to have substantial effects on giant gartersnake is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, accidental fire ignitions, and other road-related effects (e.g., road runoff, potential spread of invasive plants, etc.). The potential permanent indirect effects of Covered Activities are described in Table 6-67, along with AMMs to avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or proposed SSHCP preserves, certain uses will be allowed inside Preserves and in Preserve Setbacks that may indirectly affect giant gartersnake. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize “other” indirect impacts.

Table 6-67
Permanent Indirect Effects on Giant Gartersnake

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 4, ROAD-1 (Road Project Location) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) GGS-8 (Giant Gartersnake Post-Construction Restoration)	Altered hydrology and water quality degradation will adversely affect the suitability of aquatic habitats to support foraging, movement pathways, and winter hibernacula sites for giant gartersnakes. Altered hydrology adversely affects giant gartersnakes by increasing water depths which will affect habitat by inundating small mammal burrows used as winter hibernacula and altering the length of the inundation period. Water quality degradation, including introduction of various pollutants, toxins, pesticides, and fertilizers, will have an adverse effect on giant gartersnakes, although this species has been observed in degraded water quality conditions. The close proximity of planned roads and development to habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution does not enter giant gartersnake aquatic habitat and that water chemistry of aquatic habitats will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves)	Habitat fragmentation and isolation will have several adverse effects on giant gartersnakes although this species can cross upland habitats (typically from 820 feet to 3.1 miles) to reach other suitable aquatic habitats even though they prefer to move along aquatic pathways. These adverse effects include: (1) exposing aquatic habitat located in close proximity to development and roads to disruptive urban edge effects such as altered hydrology (e.g., increased runoff), pollutants, toxins, and pesticides and fertilizers, and human activities (trampling, OHVs, pets, trash and debris, etc.), collisions with vehicles even though this species is not likely to cross paved roads, and urban-related predators; (2) increased vulnerability to negative demographic trends, including genetic bottlenecks, genetic drift, and inbreeding depression in areas

AGENDA ITEM 11.1
876

Table 6-67
Permanent Indirect Effects on Giant Gartersnake

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) GGS-8 (Giant Gartersnake Post-Construction Restoration)	where other aquatic habitats are not within approximately a mile of occupied aquatic habitat; and (3) disruption of natural interconnectivity of occupied aquatic habitats important for dispersal and colonization, thus reducing the natural genetic exchange of giant gartersnakes between aquatic habitats. Many effects of habitat fragmentation and isolation on giant gartersnakes, including most of the edge effects, are most likely to occur inside the UDA where the preserves will be bordered by urban development and roads are planned to cross some proposed preserves, such as the Core Preserve in PPU 3.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Altered fire regimes can have adverse effects on riparian vegetation by removing important cover and protection for giant gartersnakes. Repeated wildfires can affect upland habitat by eliminating or reducing the numbers of small fossorial mammals (primarily ground squirrels and pocket gophers) and associated burrows which provide winter aestivation habitat for giant gartersnake. Repeated fires in upland habitat can also alter watershed hydrology and adversely affect aquatic habitats. Effects of wildfire suppression on giant gartersnake habitat will be minimized through implementation of these AMMs and the Preserve System Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	None required for this species.	No effect on this species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) GGS-1 (Giant Gartersnake Surveys)	Vibration and noise issues will indirectly affect the use of upland habitats by giant gartersnake (e.g., disruption of movement patterns and diurnal cycles). As with many amphibians and reptiles, giant gartersnakes are sensitive to vibration (especially when aestivating in underground refugia) and noise. Vibration can adversely affect giant gartersnakes by forcing them to leave existing underground refugia, basking areas, and cover habitat, and to move to other locations further away from the vibration source,

Table 6-67
Permanent Indirect Effects on Giant Gartersnake

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		which can make them more susceptible to predation. Since giant gartersnakes are sensitive to disturbance and tend to remain hidden under cover while out of the water, noise can drive them from cover habitat and into open areas where they are more susceptible to predation. Implementation of these AMMs will minimize the potential for indirect effects from vibration and noise.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Increased human activity (including trash, debris, pets, OHVs, and trampling) in the vicinity of suitable aquatic habitats (Streams/Creeks, Freshwater Marshes, Seasonal Wetlands, and Open Water) and adjacent upland (aestivation) habitats will adversely affect the secretive giant gartersnake. The presence of trash in the vicinity of aquatic habitats can attract predators of giant gartersnake, and the presence of pets also results in predation of giant gartersnakes. OHV use can disrupt soils, runoff patterns, and small mammal activity and can affect drainage pathways, increasing erosion and introducing harmful substances to the watershed and aquatic habitats. Access to the preserve will be allowed via low effect trails. Implementation of AMMs will reduce potential effects of increased human activity within Preserves.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-9 (Soil Compaction)	Aquatic community alterations are most likely to affect giant gartersnakes through changes in prey base (which consists of amphibians, tadpoles, and small fish) resulting from habitat degradation, and through introduction or increases in the numbers of non-native aquatic predators, such as bullfrogs, that predate on young giant gartersnakes (neonates). Wildlife community alterations that reduce the number and types of prey items and favor potential competitors such as American bullfrogs, will adversely affect giant gartersnakes and associated aquatic habitat. Successful implementation of the Conservation Strategy described in Chapter 7 and the Monitoring and Management Program described in

AGENDA ITEM 11.1

Table 6-67
Permanent Indirect Effects on Giant Gartersnake

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) GGS-8 (Giant Gartersnake Post-Construction Restoration)	Chapter 8 will be key in addressing potential wildlife community alterations. Implementation of EDGE and ROAD AMMs, including those that require control of stormwater runoff, will ensure pollution will not enter giant gartersnake aquatic habitat, water chemistry of aquatic habitats will not be affected, invasive species spread will be controlled, and resultant wildlife community alterations in giant gartersnake aquatic habitat will not occur.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) GGS-8 (Giant Gartersnake Post-Construction Restoration)	Unmanaged proliferation of non-native aquatic vegetation will affect aquatic habitat for giant gartersnakes by outcompeting native vegetation and creating movement barriers for giant gartersnakes. Implementation of AMMs will minimize proliferation of non-native aquatic vegetation and reduce effects of non-native aquatic vegetation on giant gartersnake aquatic habitat relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	As described in Wildlife Community Alterations, invasion by non-native predators of giant garter snake such as American bullfrogs, non-native fishes including largemouth bass (*Micropterus salmoides*) and catfish (*Siluriformes* spp.), and the southern watersnake (*Nerodia fasciata*) can have adverse effects on aquatic communities and on the giant gartersnake. The introduction of predatory fish into giant gartersnake habitat generally results in eradication of giant gartersnakes. Additionally, invasive aquatic species typically consume the same aquatic organisms as the giant gartersnake which can substantially alter the prey base for giant gartersnakes. Indirect effects to giant gartersnakes and their habitat associated with invasive aquatic species will be minimized through the implementation of AMMs.

Table 6-67
Permanent Indirect Effects on Giant Gartersnake

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Mesopredators	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition, 4 ROAD-2 (Wildlife Crossing Structures)	Adverse effects on giant gartersnakes will occur as a result of the presence of mesopredators in aquatic habitats and during periods of upland movement and activity. Potential domestic and native mesopredators of giant gartersnake include domestic cats, river otters (*Lontra canadensis)*, raccoons, skunks, opossums, and foxes, as well as several bird species. Implementation of these AMMs will minimize the potential for predation by mesopredators.
Wildlife Disease	None required for this species.	No effect on this species.
Pesticides and Fertilizers	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Indirect effects on giant gartersnake and suitable aquatic habitats will occur from pesticides (such as glyphosate) and fertilizer runoff (by killing potential prey items) from agriculture and from new urban developments in or near Preserves. These will be avoided by implementation of these AMMs.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition, 4 ROAD-2 (Wildlife Crossing Structures) GGS-1 (Giant Gartersnake Surveys)	Even though giant gartersnakes tend to avoid roads (especially paved roads), vehicles can adversely affect this species, primarily by running them over during early morning periods or after leaving aestivation burrows when metabolic rates are low. Recent research indicates that wildlife crossing structures may be effective in reducing road mortality of some snakes, including giant garter snake. Implementation of AMMs will reduce the potential for vehicle collisions with giant gartersnake.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-68
Temporary Effects to Giant Gartersnake

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-4 (Siting of Entry and Exit Location) GGS-1 (Giant Gartersnake Surveys) GGS-2 (Giant Gartersnake Work Window) GGS-3 (Giant Gartersnake Monitoring) GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion)	Potential erosion, runoff, and water quality effects on giant gartersnake aquatic habitat resulting from construction activities will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) GGS-1 (Giant Gartersnake Surveys) GGS-2 (Giant Gartersnake Work Window) GGS-3 (Giant Gartersnake Monitoring) GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion)	Inadvertent trampling of vegetation can adversely affect cover habitat used by giant gartersnakes. Implementation of AMMs ensures that trampling of potential cover vegetation for giant gartersnakes will not occur.
Construction Noise	Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-7 (Biological Monitor) GGS-1 (Giant Gartersnake Surveys) GGS-2 (Giant Gartersnake Work Window) GGS-3 (Giant Gartersnake Monitoring) GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion)	Loud noise can potentially affect giant gartersnakes while aboveground and possibly in underground refugia by forcing them to leave the area. Implementation of AMMs will reduce construction noise effects in the vicinity of giant gartersnake habitat.

AGENDA ITEM 11.1

Table 6-68
Temporary Effects to Giant Gartersnake

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Construction Ground Vibration	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) GGS-1 (Giant Gartersnake Surveys) GGS-2 (Giant Gartersnake Work Window) GGS-3 (Giant Gartersnake Monitoring) GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion)	Ground vibration can force giant gartersnakes to leave underground refugia to move away from the vibration source, exposing them to potential predation. Implementation of AMMs will reduce ground vibration effects from construction activities near giant gartersnake habitat.
Construction Lighting	Condition 3, BMP-6 (Construction Lighting) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) GGS-1 (Giant Gartersnake Surveys) GGS-2 (Giant Gartersnake Work Window) GGS-3 (Giant Gartersnake Monitoring) GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion)	Construction lighting directed towards giant gartersnake upland habitat can restrict the ability of giant gartersnakes to forage aboveground during the night. Implementation of AMMs will minimize construction lighting effects on giant gartersnakes by ensuring that construction lighting is directed away from adjacent natural habitats.
Construction Dust	None required for this species.	No effect on this species.
Increased Human Presence during Construction	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) GGS-1 (Giant Gartersnake Surveys) GGS-2 (Giant Gartersnake Work Window) GGS-3 (Giant Gartersnake Monitoring) GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion) GGS-7 (Giant Gartersnake Encounter Protocol)	Due to the giant gartersnake's secretive nature and its sensitivity to human presence, increased human activity in construction and maintenance areas will affect the utilization of adjacent upland habitat by giant gartersnakes. Additionally, personnel bringing pets (e.g., dogs) to work sites could also adversely affect giant gartersnakes. Implementation of AMMs ensures that increased human presence does not occur.
Construction Trash and Debris	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) GGS-1 (Giant Gartersnake Surveys) GGS-2 (Giant Gartersnake Work Window) GGS-3 (Giant Gartersnake Monitoring) GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion)	Trash and debris would adversely affect giant gartersnakes by attracting nuisance pest species which could adversely affect this species. Implementation of AMMs will ensure that construction trash and debris will be monitored and controlled.

AGENDA ITEM 11.1

Temporary Effects

Giant gartersnake occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to the giant gartersnake. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently affected in the direct effects and the area of indirect effects to Seasonal Wetland, Freshwater Marsh, Open Water, and Streams/Creeks hydrology reported in Table 6-65). Specific AMMs have been developed to minimize potential effects on giant gartersnake including GGS-1, surveys to delineate aquatic habitat and adjacent areas within 300 feet of a project footprint; GGS-2, work window during the snake's active season; GGS-3, monitoring requirements when Covered Activities occur in giant gartersnake modeled habitat; GGS-4, habitat dewatering procedures and installation of exclusion fencing; GGS-5, procedures to avoid entrapment of giant gartersnake in modeled habitat; GGS-6, use of non-entangling erosion control material; GGS-7, giant gartersnake encounter protocol during construction activities; and GGS-8, post construction restoration of temporarily disturbed areas.

These potential construction-related environmental stressors were generally described in Section 6.3.2, and their additional effects on western spadefoot are qualitatively described in Table 6-68.

6.6.17 Western Pond Turtle

Permanent Effects

Permanent direct and indirect effects of Covered Activities on western pond turtle will include modification or significant degradation of modeled aquatic and upland habitats (see Section 3.2 and Figures 3-2 and 3-19) and the direct and indirect take of western pond turtle individuals occupying that modified or degraded habitat.

Modeled species habitat for western pond turtle includes aquatic habitat comprising Freshwater Marsh, Open Water, and Streams/Creeks; and upland habitat that includes Blue Oak Woodland, Blue Oak Savanna, Valley Grassland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub habitat. Western pond turtles occur throughout much of the Plan Area, although the majority of the occurrence records (14 out of a total of 16 records within the Plan Area) are located outside the UDA, primarily in PPUs 6 and 7 (Figure 3-19).

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 10,972 acres of total modeled aquatic and upland habitats within the Plan Area, including approximately 316 acres (out of a total of 6,355 acres) of modeled aquatic habitat and approximately 10,656 acres (out of a total of 110,846 acres) of modeled upland habitat (Table 6-69). Permanent effects of Covered Activities on modeled aquatic habitat will occur

primarily within the UDA, with approximately 282 acres (out of a total of 638 acres) of permanent effects inside the UDA, and a total of approximately 34 acres (out of a total of 5,717 acres) of permanent effects outside the UDA. Covered Activity effects on modeled upland habitat will also occur primarily inside the UDA, with a total of approximately 10,064 acres (out of a total of 13,503 acres) of permanent effects inside the UDA, and a total of approximately 592 acres (out of a total of 97,343 acres) outside the UDA. Although the majority of modeled habitats inside the UDA would be directly affected, the few occurrence records and the high existing level of anthropogenic effects in this portion of the UDA indicates that these modeled habitat effects are unlikely to have substantial, if any, effect on extant western pond turtle populations in the Plan Area.

Table 6-69
Western Pond Turtle Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Plan-Wide Upland Habitat												
Blue Oak Woodland	7,610	9	Qualitative	9	0	0	Qualitative	0	7,610	9	Qualitative	9
Blue Oak Savanna	4,825	35	Qualitative	35	0	0	Qualitative	0	4,825	35	Qualitative	35
Valley Grassland	91,580	10,256	Qualitative	10,256	13,034	9,747	Qualitative	9,747	78,546	509	Qualitative	509
Mine Tailing Riparian Woodland	306	41	Qualitative	41	41	41	Qualitative	41	265	0	Qualitative	0
Mixed Riparian Woodland	5,347	170	Qualitative	170	232	134	Qualitative	134	5,115	36	Qualitative	36
Mixed Riparian Scrub	1,178	145	Qualitative	145	196	142	Qualitative	142	982	3	Qualitative	3
Total Upland Habitat	*110,846*	*10,656*	*Qualitative*	*10,656*	*13,503*	*10,064*	*Qualitative*	*10,064*	*97,343*	*592*	*Qualitative*	*592*
Plan-Wide Aquatic Habitat												
Freshwater Marsh	2,240	95	Qualitative	95	327	87	Qualitative	87	1,913	8	Qualitative	8
Open Water	1,441	104	Qualitative	104	148	103	Qualitative	103	1,293	1	Qualitative	1
Stream/Creeks	2,674	117	Qualitative	117	163	92	Qualitative	92	2,511	25	Qualitative	25
Total Aquatic Habitat	*6,355*	*316*	*Qualitative*	*316*	*638*	*282*	*Qualitative*	*282*	*5,717*	*34*	*Qualitative*	*34*
GRAND TOTAL	**117,201**	**10,972**	**Qualitative**	**10,972**	**14,141**	**10,346**	**Qualitative**	**10,346**	**103,060**	**626**	**Qualitative**	**626**

Western pond turtles in the Plan Area will be affected by permanent indirect effects to both aquatic and upland habitats, as well as harm and harassment of individuals. Potential indirect effects of the Covered Activities include management and monitoring; habitat fragmentation and isolation; altered hydrology and water quality degradation including introduction of pollutants, toxins, pesticides, and fertilizers; increased human activity (including trash, pets, debris, OHVs, and trampling); altered fire regime; aquatic community alterations (including increased predation); vibration and noise issues; and vehicle collisions.

Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on western pond turtle is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be accidental fire ignitions and other road-related effects (e.g., road runoff, potential spread of invasive plants). The potential permanent indirect effects of Covered Activities are described in Table 6-70, along with AMMs to avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing preserves or proposed SSHCP preserves, certain uses will be allowed inside Preserve and in Preserve Setbacks that may indirectly affect western pond turtle. This effects analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize “other” indirect impacts.

Table 6-70
Permanent Indirect Effects on Western Pond Turtle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 4, ROAD-1 (Road Project Location) Condition 7, STREAM-1 (Laguna Creek Wildlife Corridor) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams) Condition 8, UTILITY-2 (Utility Maintenance on Preserves)	Altered hydrology and water quality degradation will adversely affect the suitability of aquatic habitats to support foraging and movement pathways. Altered hydrology will adversely affect western pond turtles by affecting water levels and movement through aquatic pathways to other aquatic habitats and dispersal of juvenile turtles to other habitats. Water quality degradation including introduction of various pollutants, toxins, pesticides, and fertilizers will have an adverse effect on western pond turtles (which prefer good water quality conditions), especially for developing hatchling turtles. The close proximity of planned roads and development to habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that alters normal hydroperiods in pools and contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution does not enter western pond turtle aquatic habitat and that water chemistry of aquatic habitats will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP Preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread)	Habitat fragmentation and isolation will have several adverse effects on western pond turtles although this species will move short distances through upland habitats to reach other suitable aquatic habitats, even though they prefer to move along aquatic pathways. These adverse effects include: (1) exposing aquatic habitat located close to development and roads to disruptive urban edge effects such as altered hydrology (e.g., increased runoff), pollutants, toxins, pesticides and fertilizers, and human activities (trampling, OHVs, pets, trash and debris, etc.); (2) collisions with vehicles when crossing paved roads; (3) interactions with urban-related predators; (4) increased vulnerability to negative demographic trends, including genetic bottlenecks, genetic drift, and inbreeding depression in areas where aquatic links to other occupied aquatic habitats are not available; and (5) disruption of

Table 6-70
Permanent Indirect Effects on Western Pond Turtle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 7, STREAM-2 (UDA Stream Setbacks) Condition 7, STREAM-3 (Minor Tributaries to UDA Streams)	natural interconnectivity of occupied aquatic habitats important for dispersal and colonization, thus reducing the natural exchange of western pond turtles between aquatic habitats. Many of the effects of habitat fragmentation and isolation on western pond turtles, including the majority of the edge effects, are most likely to occur inside the UDA where the Preserves will be bordered by urban development and roads are planned to cross some proposed preserves.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Altered fire regimes can have adverse effects on western pond turtles by removing riparian vegetation that provides important cover and protection adjacent to aquatic habitats and removing upland vegetation (shrubs, woodlands, etc.) used for cover. Increased fires could also adversely affect nest sites (where hatchlings may reside for several months following emergence) and upland overwintering sites (where they bury themselves in loose soil until the weather warms). Repeated fires in upland habitat can also alter watershed hydrology and adversely affect aquatic habitats. Effects of wildfire suppression on western pond turtle habitat will be minimized through implementation of these AMMs and the Preserve Management Plan, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	None required for this species.	No effect on this species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) WPT-1 (Western Pond Turtle Surveys)	As with many amphibians and reptiles, western pond turtles are sensitive to vibration and noise. Vibration and noise issues will indirectly affect the use of aquatic and upland habitats by western pond turtle (e.g., disruption of movement patterns and basking and foraging activities, disturbance of nest sites where hatchlings may reside for several months following emergence or abandonment of nest sites, and disturbance of upland overwintering sites (where they bury themselves in loose soil until the weather warms).

Table 6-70
Permanent Indirect Effects on Western Pond Turtle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		Depending on the proximity of the vibration source, western pond turtles may abandon sites and move further away from the vibration source, which can make them more susceptible to predation. Since western pond turtles are sensitive to disturbance, noise can disturb basking sites and potentially overwintering sites. Implementation of these AMMs will minimize the potential for indirect effects from vibration and noise.
Lighting	None required for this species.	No effect on this species.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Increased human activity (including trash, debris, pets, OHVs, trampling, and just the presence of humans) in the vicinity of suitable aquatic habitats (streams/creeks, freshwater marshes, and open water) and adjacent upland (aestivation) habitats will adversely affect western pond turtles. Since western pond turtles are very shy and cryptic, just the presence of humans and other activities near aquatic habitats can adversely affect western pond turtle foraging and basking activities. Increased human activity will also indirectly affect overwintering sites (where they bury themselves in loose soil until the weather warms) and nest sites (where hatchlings may reside for several months following emergence). The presence of trash in the vicinity of aquatic habitats can attract predators of western pond turtles, and the presence of pets can also result in predation of western pond turtles. Trash in the vicinity of aquatic habitats can attract predators of western pond turtles. OHV use can disrupt soils and runoff patterns, and western pond turtle aestivation sites and can affect drainage pathways, increasing erosion and introducing harmful substances to the watershed and aquatic habitats. Access to the Preserve will be allowed via low effect trails. Implementation of AMMs will reduce potential effects of increased human activity on western pond turtles in Preserves.

Table 6-70
Permanent Indirect Effects on Western Pond Turtle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location)	Aquatic community alterations are most likely to affect western pond turtles through changes in prey base (primarily larvae of aquatic insects, earthworms, mollusks, crustaceans, and vertebrates such as tadpoles, frogs, small fish, and various aquatic/emergent plants) resulting from habitat degradation, and through introduction or increases in the numbers of non-native aquatic predators, such as the American bullfrog and introduced warm freshwater fish, such as bass, which prey on small juvenile turtles and hatchlings. Wildlife community alterations that reduce the number and types of prey items and favor potential competitors such as American bullfrogs and warm water fish species will adversely affect western pond turtles and associated aquatic habitat. Successful implementation of the Conservation Strategy described in Chapter 7 and the Monitoring and Management Program described in Chapter 8 will be key in addressing potential wildlife community alterations. Implementation of EDGE and ROAD AMMs, including those that require control of stormwater runoff, will ensure pollution will not enter western pond turtle aquatic habitat, water chemistry of aquatic habitats will not be affected, invasive species spread will be controlled, and resultant wildlife community alterations in western pond turtle aquatic habitat will not occur.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native aquatic vegetation will affect shallow water areas which provide nursery habitat for hatchlings. Implementation of AMMs will minimize proliferation of non-native aquatic vegetation and reduce effects of non-native aquatic vegetation on hatchling nursery habitat relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses)	As described in Wildlife Community Alterations, the introduction of non-native predators can have adverse effects on aquatic

Table 6-70
Permanent Indirect Effects on Western Pond Turtle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	communities and on western pond turtle. Many species of animals are predators of western pond turtles, including most animals that are sufficiently large to consume either a hatchling or adult. Most mustelids inhabiting areas near aquatic habitats, including river otters and mink (*Mustelidae* spp.), are predators of adult western pond turtles. Many other mammals including canids and many bird species such as great blue herons (*Ardea herodias)*, may be an important predator of hatchlings. Introduced American bullfrogs, smallmouth bass (*Micropterus dolomieu*), and largemouth bass have been documented predating on hatchlings. Raccoons and striped skunks have been documented as nest predators. In human-altered landscapes, predation may be higher due to a greater abundance of medium-sized predators. Indirect effects to western pond turtles and their habitat associated with invasive aquatic species will be minimized through the implementation of AMMs.
Mesopredators	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition, 4 ROAD-2 (Wildlife Crossing Structures)	Adverse effects on western pond turtles will occur as a result of the presence of mesopredators in aquatic habitats and during periods of upland movement and activity. Potential domestic and native mesopredators of western pond turtles include river otters, raccoons, skunks, as well as several large bird species (e.g., great blue herons). Implementation of these AMMs will minimize the potential for predation by mesopredators.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread)	The pet trade also threatens western pond turtles through the release of non-native pet turtles into natural areas. This practice could increase competition for limited resources and introduce diseases to native turtles. Introduction of pet turtles, release of captive-reared turtles, and translocations from one location to another may increase the risk of disease transmission. Implementation of AMMs will reduce the potential for transmission of diseases from non-native turtles to western pond turtles.

Table 6-70
Permanent Indirect Effects on Western Pond Turtle

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Pesticides and Fertilizers	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Indirect effects on western pond turtles and suitable aquatic habitats that occur from pesticides (such as glyphosate) and fertilizer runoff (by killing potential prey items and potentially affecting hatchling turtles) from agriculture and from new urban developments in or near Preserves will be avoided by implementation of these AMMs.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) WPT-1 (Western Pond Turtle Surveys) WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit)	Even though western pond turtles tend to avoid roads (especially paved roads), vehicles can adversely affect this species, primarily by running them over during surface movements or after leaving nest sites. Road mortality is an important threat particularly in urban and recreational areas. Implementation of AMMs will reduce the potential for vehicle collisions with western pond turtles.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-71
Temporary Effects to Western Pond Turtle

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 3, BMP-2 (Erosion Control)	Potential erosion, runoff, and water quality effects on western pond turtle aquatic habitat resulting from construction activities will be fully avoided through implementation of AMMs.

AGENDA ITEM 11.1

Table 6-71
Temporary Effects to Western Pond Turtle

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location) Condition 8, UTILITY-2 (Utility Maintenance on Preserves) Condition 8, UTILITY-4 (Siting of Entry and Exit Location) WPT-1 (Western Pond Turtle Surveys) WPT-2 (Western Pond Turtle Work Window) WPT-3 (Western Pond Turtle Monitoring) WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WPT-1 (Western Pond Turtle Surveys) WPT-2 (Western Pond Turtle Work Window) WPT-3 (Western Pond Turtle Monitoring) WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	Inadvertent trampling of vegetation outside the project footprint can adversely affect overwintering sites (where they bury themselves in loose soil until the weather warms) and nest sites where hatchlings may reside for several months following emergence, and hatchlings using vegetation for cover or while moving to aquatic locations. Implementation of AMMs ensures that trampling of vegetation will not occur outside the project footprint.
Construction Noise	Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-7 (Biological Monitor) WPT-1 (Western Pond Turtle Surveys) WPT-2 (Western Pond Turtle Work Window) WPT-3 (Western Pond Turtle Monitoring) WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	Loud noise can potentially affect western pond turtles while basking at aquatic sites, at nest sites where hatchlings may reside for several months following emergence, and at overwintering sites (where they bury themselves in loose soil until the weather warms) by forcing them to leave the area. Implementation of AMMs will reduce construction noise effects in the vicinity of western pond turtle habitat.
Construction Ground Vibration	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WPT-1 (Western Pond Turtle Surveys) WPT-2 (Western Pond Turtle Work Window) WPT-3 (Western Pond Turtle Monitoring) WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	Ground vibration can force western pond turtles to leave shoreline basking sites, nest sites (where hatchlings may reside for several months following emergence), and upland overwintering sites (where they bury themselves in loose soil until the weather warms) and move to other locations away from the vibration source, exposing them to potential predation. Implementation of AMMs will

Table 6-71
Temporary Effects to Western Pond Turtle

Environmental Stressor	Effect Reduced By	Potential Effect on Species
		reduce ground vibration effects from construction activities near western pond turtle habitat.
Construction Lighting	None required for this species.	No effect on this species.
Construction Dust	None required for this species.	No effect on this species.
Increased Human Presence during Construction	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WPT-1 (Western Pond Turtle Surveys) WPT-2 (Western Pond Turtle Work Window) WPT-3 (Western Pond Turtle Monitoring) WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion) WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit) WPT-8 (Western Pond Turtle Encounter Protocol)	Due to the secretive and shy nature of the western pond turtle and its sensitivity to human presence, increased human activity in construction and maintenance areas will affect the use of basking sites and upland overwintering sites (where they bury themselves in loose soil until the weather warms). Additionally, personnel bringing pets (e.g., dogs) to work sites could also adversely affect western pond turtle hatchlings, juveniles, and adults. Implementation of AMMs ensures that increased human presence does not occur.
Construction Trash and Debris	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) WPT-1 (Western Pond Turtle Surveys) WPT-2 (Western Pond Turtle Work Window) WPT-3 (Western Pond Turtle Monitoring) WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	Trash and debris would adversely affect western pond turtles by attracting nuisance pest species which could adversely affect this species. Implementation of AMMs will ensure that construction trash and debris will be monitored and controlled.

Temporary Effects

Western pond turtle occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to the western pond turtle. Additionally, overwintering sites (where juveniles and adults bury themselves in loose soil) and nest sites where hatchlings may reside for several months following emergence, may also be temporarily affected by Covered Activities. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently affected in the direct effects and the area of indirect effects to freshwater marsh, open water, and stream/creek hydrology reported in Table 6-69). Specific AMMs have been developed to minimize potential effects on western pond turtles including WPT-2, western pond turtle surveys; WPT-2, work window outside western pond turtle's active season; WPT-3, monitoring requirements when Covered Activities occur; WPT-4, habitat dewatering and exclusion fencing when Covered Activities occur in aquatic habitat; WPT-5, procedures to avoid entrapment of western pond turtles when Covered Activities occur in modeled habitat; WPT-6, use of non-entangling materials if erosion control BMP-2 is implemented; WPT-7, modeled habitat speed limit; and WPT-9 western pond turtle encounter protocol when western pond turtles are encountered.

These potential construction-related environmental stressors were generally described in Section 6.3.2, and their additional effects on western pond turtle are qualitatively described in Table 6-71.

6.6.18 Cooper's Hawk

Permanent Effects

Permanent direct and indirect effects of Covered Activities on Cooper's hawk (*Accipiter cooperii*) will include modification or removal of modeled habitat, increased human activity, invasive plants and animals introduced into modeled habitat, vehicle and aircraft collisions with Cooper's hawk, and increased risk of wildlife disease.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 638 acres of modeled habitat for Cooper's hawk in the Plan Area out of a total of 22,646 acres available, including 600 acres of modeled nesting/foraging habitat and 38 acres of modeled foraging habitat (Table 6-72). The 98% of direct effects on modeled nesting/foraging habitat will occur inside the UDA. Nearly all modeled foraging habitat for Cooper's hawk is located outside the UDA in areas that will not be affected by Covered Activities. Overall, outside the UDA, 36 of 5,619 acres of foraging habitat and 50 of 16,304 acres of modeled nesting/foraging habitat will be directly affected. Inside the UDA, 550 of 705 acres of modeled nesting/foraging habitat and 2 acres of 18 acres of modeled foraging habitat will be directly affected.

Table 6-72
Cooper's Hawk Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Nesting/Foraging Habitat												
Blue Oak Woodland	9,132	9	Qualitative	9	0	0	Qualitative	0	9,132	9	Qualitative	9
Mixed Riparian Woodland	5,785	184	Qualitative	184	244	146	Qualitative	146	5,541	38	Qualitative	38
Mixed Riparian Scrub	1,451	189	Qualitative	189	241	186	Qualitative	186	1,210	3	Qualitative	3
Mine Tailing Riparian Woodland	641	218	Qualitative	218	220	218	Qualitative	218	421	0	Qualitative	0
Total Nesting/Foraging Habitat	*17,009*	*600*	*Qualitative*	*600*	*705*	*550*	*Qualitative*	*550*	*16,304*	*50*	*Qualitative*	*50*
Foraging Habitat												
Blue Oak Savanna	5,637	38	Qualitative	38	18	2	Qualitative	2	5,619	36	Qualitative	36
Total Foraging Habitat	*5,637*	*38*	*Qualitative*	*38*	*18*	*2*	*Qualitative*	*2*	*5,619*	*36*	*Qualitative*	*36*
GRAND TOTAL	**22,646**	**638**	**Qualitative**	**638**	**723**	**552**	**Qualitative**	**552**	**21,923**	**86**	**Qualitative**	**86**

In addition to the direct effects quantified in Table 6-72, Covered Activities will indirectly affect Cooper's hawk nesting/foraging and foraging habitats, and will also indirectly injure, kill, or harass individual Cooper's hawk in the Plan Area (Table 6-73). These effects will be reduced through implementation of the AMMs described in Table 6-73. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on Cooper's hawk is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, human activity, trash, and utility strikes.

In addition to the general AMMs (Section 5.4.1), raptor-specific measures (Section 5.4.2) will be implemented to minimize permanent direct and indirect effects on Cooper's hawk due to Covered Activities. Mortality and injury of individual Cooper's hawks will occur in the Plan Area due to Covered Activities; however, mortality and injury will be minimized through the implementation of AMMs. There is also a small risk of take in the form of harassment over the duration of the Permit Term (e.g., inhibiting individuals from nesting or foraging in some areas). Some nest sites will be directly affected by Covered Activities because Cooper's hawk is a nesting resident in the Plan Area.

Table 6-73
Permanent Indirect Effects on Cooper's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter waterways that run through riparian areas where Cooper's hawk prey could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) RAPTOR-1 (Raptor Surveys)	Although Cooper's hawks are highly mobile and able to fly over unsuitable landscapes, habitat fragmentation will have at least two adverse effects on the species: (1) potentially exposing suitable nesting habitat to urban edges, thus increasing the potential for disruptive effects, such as noise, lighting, human activities, and urban-related predators; and (2) forcing birds to fly farther to suitable foraging areas, thus increasing energetic demands and time away from the nest, thereby increasing the potential for egg and/or chick predation, as well as increasing other risks, such as collisions with vehicles and man-made structures. The Landscape Preserves established[7] outside the UDA will avoid effects of habitat fragmentation on Cooper's hawk. Within the UDA, habitat fragmentation will affect Cooper's hawk because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP

[7] Note that in the context of this Plan, the word "establish" is synonymous with "create."

Table 6-73
Permanent Indirect Effects on Cooper's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		Preserve System will minimize the effects of habitat fragmentation on Cooper's hawk in the Plan Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Within the UDA, wildfire can eliminate or reduce suitable nesting substrates for Cooper's hawk. Repeated or intense wildfires will also affect foraging habitat quality through direct mortality of prey (e.g., birds, small mammals, reptiles, and amphibians) and general habitat degradation. Effects of increased wildfire on Cooper's hawk habitat will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Does not apply to this species.	No effect on this species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Noise could indirectly affect the use of nesting and foraging habitat by Cooper's hawk. Implementation of these AMMs will minimize chronic noise in close proximity to Cooper's hawk habitat.
Lighting	EDGE-8 (Outdoor Lighting) RAPTOR-1 (Raptor Surveys)	Lighting will affect Cooper's hawks if it is near a nest (the lighted area will depend on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation), and will primarily act to disrupt normal nighttime rest and sleep patterns, and increase stress levels. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally active birds, causing them to abandon the nest and/or become disoriented. Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittee determines lighting is necessary for public safety or security. During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to Cooper's hawk.

Table 6-73
Permanent Indirect Effects on Cooper's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects on Cooper's hawk are expected from increased human activity on Preserves and Preserve Setbacks. Potential effects include nest disturbance, introduction of invasive species, and collisions with vehicles. Implementation of AMMs ensures that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect Cooper's hawks or their habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) RAPTOR-1 (Raptor Surveys)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community by increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Implementation of AMMs such as those that require Trail Public Education will ensure human activity will have minimal effects to the wildlife community within Cooper's hawk habitat. Competition from non-native predators (dogs, coyotes) on prey species, and invasive plant and animal species that either outcompete or create unsuitable habitat for prey could also affect Cooper's hawk.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within Cooper's hawk habitat in the Plan Area. A change in vegetation structure could have an effect on prey species use of habitat and also restrict maneuverability of Cooper's hawk through the forest. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).

Table 6-73
Permanent Indirect Effects on Cooper's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described previously in Wildlife Community Alterations, invasion by non-native predators of Cooper's hawk and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects to Cooper's hawk and its prey by mesopredators will be minimized by implementing AMMs that reduce interaction between Cooper's hawk and urban wildlife (raccoon, opossum, fox) and pets.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Diseases transmitted from humans and pets could affect Cooper's hawk, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. Cooper's hawk is susceptible to avian flu and the protozoan *Trichomonas gallinae*. The SSHCP will have little direct control over potential disease transmission from ingested prey, such as pigeons and doves, because active control of these well-established and very common species is not likely feasible and therefore would not be an effective management action. However, potential transmission of diseases from human and pets in Preserves will be minimized by controlling access to Preserves through Condition 2 and Condition 5. Implementation of these AMMs will minimize the potential for introduction of this virus into local Cooper's hawk populations.

Table 6-73
Permanent Indirect Effects on Cooper's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on Cooper's hawk or their modeled habitat from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided by the implementation of AMMs.
Vehicle and Aircraft Collisions With Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) RAPTOR-1 (Raptor Surveys)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by Cooper's hawks near heavily trafficked areas and in urbanized areas. Covered Activities will therefore increase the frequency of vehicle and window strikes by Cooper's hawks. Indirect effects on Cooper's hawk associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to Cooper's hawk habitat. Otherwise, Cooper's hawk will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7).
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) RAPTOR-1 (Raptor Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all raptors, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on Cooper's hawk by incorporating the most current practices for avoiding avian powerline collisions.

Temporary Effects

In addition to the permanent removal of habitat described previously, Cooper's hawk nesting/foraging habitat or nest sites within 500 feet of proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects that will result in additional disturbance to habitat or additional injury, mortality, or harassment of individual Cooper's hawks. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects reported in Table 6-72).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on Cooper's hawk are qualitatively described in Table 6-74.

Table 6-74
Temporary Effects to Cooper's Hawk

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into Cooper's hawk riparian habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	None required for this species.	No effect on this species.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Loud noise can affect Cooper's hawk foraging patterns. Implementation of AMMs will minimize construction noise effects in the vicinity of Cooper's hawk foraging habitat.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	BMP-6 (Construction Lighting) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to Cooper's hawk.
Construction Dust	None required for this species.	No effect on this species.
Increased Human Presence During Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff)	Ground-disturbing activities that could affect Cooper's hawk involving increased human presence will be reduced by

Table 6-74
Temporary Effects to Cooper's Hawk

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	SPECIES-2 (No Pets in Construction Areas) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring	implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring	Trash and debris would adversely affect Cooper's hawk habitat quality through direct effects, such as attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.19 Ferruginous Hawk

Permanent Effects

Permanent direct and indirect effects of Covered Activities on ferruginous hawk (*Buteo regalis*) will include modification or removal of modeled habitat, increased human activity, invasive plants and animals introduced into modeled habitat, vehicle and aircraft collisions with ferruginous hawk, and increased risk of wildlife disease.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 25,491 acres of modeled foraging habitat for ferruginous hawk in the Plan Area (Table 6-75). Most of the direct effects on modeled foraging habitat will occur inside the UDA. Overall, 863 acres of modeled foraging habitat for ferruginous hawk outside the UDA will be directly affected. Inside the UDA, 24,628 of 35,221 acres of modeled foraging habitat will be directly affected.

Table 6-75
Ferruginous Hawk Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect**	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect**	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect**	*Indirect Effect*	*Total Effect*
Valley Grassland	135,112	22,014	Qualitative	22,014	30,345	21,345	Qualitative	21,345	104,767	669	Qualitative	669
Irrigated Pasture-Grassland	15,991	2,749	Qualitative	2,749	3,218	2,594	Qualitative	2,594	12,773	155	Qualitative	155
Seasonal Wetland	2,600	105	Qualitative	105	162	102	Qualitative	102	2,438	3	Qualitative	3
Vernal Pool	4,536	389	0	389	935	355	0	355	3,601	34	0	34
Swale	1,252	234	0	234	461	232	0	232	791	2	0	2
Total Nesting/ Foraging Habitat	**159,491**	**25,491**	**0**	**25,491**	**35,121**	**24,628**	**0**	**24,628**	**124,370**	**863**	**0**	**863**

* Indirect effects to Vernal Pool and Swale are not presented for this species, as interruption of the supporting hydrology would result in conversion to Valley Grassland, which is assumed in the SSHCP to provide comparable foraging habitat.

In addition to the direct effects quantified in Table 6-75, Covered Activities will indirectly affect ferruginous hawk foraging habitats, and will also injure, kill, or harass ferruginous hawk individuals in the Plan Area (Table 6-76). These effects will be reduced through implementation of the AMMs described in Table 6-76. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on ferruginous hawk is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, human activity, trash, and utility strikes.

In addition to the general AMMs (Section 5.4.1), raptor-specific measures (Section 5.4.2) will be implemented to minimize permanent direct and indirect effects on ferruginous hawk due to Covered Activities. Mortality and injury of individual ferruginous hawks will occur in the Plan Area due to Covered Activities; however mortality and injury will be minimized through the implementation of AMMs. There is also a small risk of take in the form of harassment over the duration of the Permit Term (e.g., inhibiting individuals from foraging in some areas).

Table 6-76
Permanent Indirect Effects on Ferruginous Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter waterways that run through riparian areas where ferruginous hawk prey could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) RAPTOR-1 (Raptor Surveys)	Habitat fragmentation will have adverse effects on this species, forcing birds to fly farther to suitable foraging areas, thus increasing energetic demands, as well as increasing other risks, such as collisions with vehicles and man-made structures. The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on ferruginous hawk. Within the UDA, habitat fragmentation will affect ferruginous hawk because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on ferruginous hawk in the Plan Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Repeated or intense wildfires will affect foraging habitat quality through direct mortality of prey (e.g., birds, small mammals, reptiles, and amphibians) and general habitat degradation. Effects of increased wildfire on ferruginous hawk habitat will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.

Table 6-76
Permanent Indirect Effects on Ferruginous Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Effects on ferruginous hawks due to vernal pool hydrologic alterations are mainly associated with prey base. Hydrologic alterations could affect patterns of foraging for small mammals that make up the prey base for ferruginous hawks. Implementation of AMMs will significantly reduce effects of vernal pool hydrologic alterations on prey species.
Chronic Ground Vibration and Noise	Does not apply to this species. Noise would only affect nesting birds and ferruginous hawks are winter visitors to the Plan Area.	No effect on this species.
Lighting	EDGE-8 (Outdoor Lighting) BMP-6 (Construction Lighting) RAPTOR-1 (Raptor Surveys)	Lighting will mildly affect ferruginous hawks, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation, and will act primarily to disrupt normal nighttime rest and sleep patterns and increase stress levels. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally-active birds, causing them to become disoriented. Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittee determines lighting is necessary for public safety or security. During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to ferruginous hawk.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-11 (Speed Limit) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects on ferruginous hawk from increased human activity on Preserves and Preserve Setbacks are expected. Potential effects include introduction of invasive species and collisions with vehicles. Implementation of AMMs ensures that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect ferruginous hawks or their habitat.

Table 6-76
Permanent Indirect Effects on Ferruginous Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) RAPTOR-1 (Raptor Surveys)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community by increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Implementation of AMMs such as those that require Trail Public Education will ensure human activity will have minimal effects to the wildlife community within ferruginous hawk habitat. Competition from non-native predators (e.g., dogs, coyotes) on prey species, and invasive plant and animal species that either outcompete or create unsuitable habitat for prey could also affect ferruginous hawk.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within ferruginous hawk habitat in the Plan Area. A change in vegetation structure could have an effect on prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	As described previously in Wildlife Community Alterations, invasion by non-native predators of ferruginous hawk and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.

Table 6-76
Permanent Indirect Effects on Ferruginous Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects to ferruginous hawk and its prey by mesopredators will be minimized by implementing AMMs that reduce interaction between ferruginous hawk and urban wildlife (raccoon, opossum, fox) and pets.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	Diseases transmitted from humans and pets could affect ferruginous hawk and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. Ferruginous hawks are susceptible to avian flu and the protozoan *Trichomonas gallinae*. The SSHCP will have little direct control over potential disease transmission from ingested prey, such as pigeons and doves, because active control of these well-established and very common species is not likely feasible and therefore would not be an effective management action. However, potential transmission of diseases from human and pets in Preserves will be minimized by controlling access to Preserves through Conditions 2 and 5. Implementation of these AMMs will minimize the potential for introduction of these diseases into local ferruginous hawk populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on ferruginous hawk or the Valley Grassland Ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near the SSHCP Preserves will be avoided through the implementation of AMMs.

Table 6-76
Permanent Indirect Effects on Ferruginous Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Vehicle and Aircraft Collisions With Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures) RAPTOR-1 (Raptor Surveys)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by ferruginous hawks near heavily trafficked areas and in urbanized areas. Covered Activities will therefore increase the frequency of vehicle and window strikes by ferruginous hawks. Indirect effects on ferruginous hawk associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to ferruginous hawk habitat. Otherwise, ferruginous hawk will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7).
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) RAPTOR-1 (Raptor Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all raptors, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on ferruginous hawk by incorporating the most current practices for avoiding avian powerline collisions.

Temporary Effects

Ferruginous hawks wintering and foraging in the Plan Area will be affected by several temporary construction-related effects that could result in additional habitat disturbance or additional injury, mortality, or harassment of individual ferruginous hawks (Table 6-77). These potential construction-related effects were generally described in Section 6.3.2 and include dust; noise and ground vibration; general human activity; inadvertent grading, clearing, or trampling of habitat; and trash and debris.

Table 6-77
Temporary Effects to Ferruginous Hawk

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into ferruginous hawk riparian habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of vegetation could cause ferruginous hawk prey to avoid habitat. Implementation of AMMs ensures that trampling and compaction do not occur.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Loud noise can affect ferruginous hawk foraging patterns. Implementation of AMMs will minimize construction noise effects in the vicinity of ferruginous hawk foraging habitat.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	BMP-6 (Construction Lighting) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to ferruginous hawk.
Construction Dust	None required for this species.	No effect on this species.

Table 6-77
Temporary Effects to Ferruginous Hawk

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Increased Human Presence During Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Ground-disturbing activities that could affect ferruginous hawk involving increased human presence will be reduced by implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Trash and debris would adversely affect ferruginous hawk habitat quality through direct effects, such as attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled.

Temporary direct effects on ferruginous hawk will occur in two main ways: (1) directly inhibiting use of foraging sites, and (2) effects on foraging habitat quality. Ferruginous hawks could avoid foraging in areas near construction activities, especially those involving mass grading and noisy construction equipment and a high number of construction personnel and vehicles. Noise associated with large-scale construction activities, such as mass grading, as well as noisy maintenance Covered Activities, affects foraging by ferruginous hawks by causing them to avoid noisy areas. However, such noise effects will be temporary and limited to areas immediately adjacent to noisy Covered Activities and will not have a substantial adverse effect on ferruginous hawk foraging behavior, given the remaining large expanse of suitable foraging habitat in the SSHCP Preserve System and Plan Area in general (see Chapter 7).

Foraging habitat quality will be reduced in areas bordering construction sites, including degradation of vegetation communities from dust and the absence or reduced abundance of important prey, such as rabbits, California ground squirrels (*Otospermophilus beecheyi*), and pocket gophers (*Geomyidae* spp.). These prey species could actively avoid construction areas due to effects, such as noise, lighting, and human activity, or because forage quality (e.g., fresh herbaceous vegetation) in areas near construction has been degraded by dust or inadvertent grading, clearing, or trampling. In addition, trash and debris at construction sites will attract urban-tolerant species, such as coyotes, that will compete with ferruginous hawks for prey. A variety of design and setback requirements and construction-related AMMs will be implemented to address temporary direct effects on ferruginous hawk habitat and individuals.

6.6.20 Swainson's Hawk

Permanent Effects

Permanent direct and indirect effects of Covered Activities on Swainson's hawk (*Buteo swainsoni*) will include modification or removal of modeled habitat, increased human activity, invasive plants and animals introduced into modeled habitat, vehicle and aircraft collisions with Swainson's hawk, and increased risk of wildlife disease.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 31,112 acres of total modeled habitat for Swainson's hawk in the Plan Area, including 373 acres of modeled nesting habitat and 30,739 acres of modeled foraging habitat (Table 6-78). Of the 30,739 acres of effects to modeled foraging habitat, 7,413 acres are high-value foraging habitat (Table 6-79). The 7,413 acres of high-value habitat effects are out of a total of 70,127 acres of high-value habitat in the Plan Area. Therefore, Covered Activities will affect relatively less of the high-value habitat compared to the overall effects on modeled foraging habitat in the Plan. Most of the permanent effects on modeled nesting and foraging habitat will occur inside the UDA, including 332 acres out of a total of 486 acres of modeled nesting habitat and 29,550 acres out of a total of 40,602 acres of

modeled foraging habitat. Permanent effects on modeled nesting and foraging habitat that will occur outside of the UDA include impacts to 41 out of 6,748 acres of modeled nesting habitat, 1,189 out of 165,387 acres of modeled foraging habitat, and 659 out of 62,393 acres of high-value habitat.

Table 6-78
Swainson's Hawk Habitat Permanent Effects

Habitat Model Land Cover Types*	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect***	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect***	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect***	*Indirect Effect*	*Total Effect*
Nesting Habitat												
Mixed Riparian Woodland	5,785	184	Qualitative	184	244	146	Qualitative	146	5,541	38	Qualitative	38
Mixed Riparian Scrub	1,449	189	Qualitative	189	242	186	Qualitative	186	1,207	3	Qualitative	3
Total Nesting Habitat	**7,234**	**373**	**Qualitative**	**373**	**486**	**332**	**Qualitative**	**332**	**6,748**	**41**	**Qualitative**	**41**
Foraging Habitat												
Valley Grassland	133,705	21,977	Qualitative	21,977	30,345	21,345	Qualitative	21,345	103,360	632	Qualitative	632
Cropland	47,905	5,285	Qualitative	5,285	5,481	4,922	Qualitative	4,922	42,424	363	Qualitative	363
Irrigated Pasture-Grassland	15,991	2,749	Qualitative	2,749	3,218	2,594	Qualitative	2,594	12,773	155	Qualitative	155
Vernal Pool	4,536	389	0	389	935	355	0	355	3,601	34	0	34
Seasonal Wetland	2,600	105	Qualitative	105	162	102	Qualitative	102	2,438	3	Qualitative	3
Swale	1,252	234	0	234	461	232	0	232	791	2	0	2
Total Foraging Habitat	**205,989**	**30,739**	**0**	**30,739**	**40,602**	**29,550**	**0**	**29,550**	**165,387**	**1,189**	**0**	**1,189**
GRAND TOTAL	**213,223**	**31,112**	**0**	**31,112**	**41,088**	**29,882**	**0**	**29,882**	**172,135**	**1,230**	**0**	**1,230**

* The Swainson's hawk habitat model only includes land covers at elevations below 500 feet (see Section 3.4.5).

** Indirect effects to Vernal Pool and Swale are not presented for this species, as interruption of the supporting hydrology would result in conversion to Valley Grassland, which is assumed in the SSHCP to provide comparable foraging habitat.

Table 6-79
Swainson's Hawk High-Value Habitat Permanent Effects

Habitat Model Land Cover Types*	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect***	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect***	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect***	*Indirect Effect*	*Total Effect*
Foraging Habitat												
Cropland	38,669	3,648	Qualitative	3,648	3,491	3,313	Qualitative	3,313	35,178	335	Qualitative	335
Valley Grassland	20,190	2,269	Qualitative	2,269	2,627	2,060	Qualitative	2,060	17,563	209	Qualitative	209
Irrigated Pasture-Grassland	8,382	1,378	Qualitative	1,378	1,434	1,281	Qualitative	1,281	6,948	97	Qualitative	97
Vernal Pool	1,002	56	0	56	58	41	0	41	944	15	0	15
Seasonal Wetland	1,740	51	Qualitative	51	105	48	Qualitative	48	1,635	3	Qualitative	3
Swale	144	11	0	11	19	11	0	11	125	0	0	0
GRAND TOTAL	**70,127**	**7,413**	**0**	**7,413**	**7,734**	**6,754**	**0**	**6,754**	**62,393**	**659**	**0**	**659**

* High-value habitat for Swainson's hawk is modeled foraging habitat occurring in the western portion of the Plan Area (within PPUs 4, 6, and 8) (see Section 3.4.5). The Swainson's hawk habitat model only includes land covers at elevations below 500 feet (see Section 3.4.5).

** Indirect effects to Vernal Pool and Swale are not presented for this species, as interruption of the supporting hydrology would result in conversion to Valley Grassland, which is assumed in the SSHCP to provide comparable foraging habitat.

In addition to the direct effects quantified in Table 6-79, Covered Activities will indirectly affect Swainson's hawk nesting, foraging, and high-value habitats, and will also injure, kill, or harass Swainson's hawk individuals in the Plan Area (Table 6-80). These effects will be reduced through implementation of the AMMs described in Table 6-80. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on Swainson's hawk is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, human activity, trash, and utility strikes.

In addition to the general AMMs (Section 5.4.1), raptor-specific measures (Section 5.4.2) will be implemented to minimize permanent direct and indirect effects on Swainson's hawk due to Covered Activities. Mortality and injury of individual Swainson's hawks will occur in the Plan Area due to Covered Activities; however, mortality and injury will be minimized through the implementation of AMMs. There is also a small risk of take in the form of harassment over the duration of the Permit Term (e.g., inhibiting individuals from nesting or foraging in some areas). Some nest sites will be directly affected by Covered Activities because Swainson's hawk is a nesting resident in the Plan Area.

Table 6-80
Permanent Indirect Effects on Swainson's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Altered hydrology will adversely affect Swainson's hawks by reducing habitat quality of Mixed Riparian Woodland and Mixed Riparian Scrub land covers (nesting) and Vernal Pool and Valley-Grassland land covers (foraging). Riparian habitats are important nesting substrates for Swainson's hawks that will be degraded by altered hydrology, including significant increases or decreases in hydrology that will alter riparian community structure. Loss of riparian habitat is one of the factors contributing to the Swainson's hawk decline in the Central Valley (Bloom 1980; England et al. 1995). Altered hydrology will also affect foraging habitat. In particular, voles (*Muridae* ssp.), which are important prey for Swainson's hawk, occur in irrigated pastures, wet meadows, and dense grasslands that provide substantial cover and refugia. If these habitats become too dry and sparse, vole populations decline and will be replaced by less suitable prey. The close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter waterways that run through agricultural areas where Swainson's hawk prey could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control In Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) SWHA-1 (Swainson's Hawk Surveys)	Although Swainson's hawks are highly mobile and able to fly over unsuitable landscapes, habitat fragmentation and isolation will have at least two adverse effects on the species: (1) cause active nests to be close to habitat edges, thus exposing the nest to other disruptive edge effects, such as noise, lighting, and human activities; and (2) force birds to fly farther to suitable foraging areas, thus increasing energetic demands and time away from the nest and increasing the potential for egg and/or chick predation. Further, small, otherwise suitable, active nesting sites in fragmented habitat patches will be abandoned, functionally reducing the numbers of suitable nesting areas in the Plan Area. The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on Swainson's hawk. Within the UDA, habitat fragmentation will affect Swainson's hawk because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads

Table 6-80
Permanent Indirect Effects on Swainson's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on Swainson's hawk in the Plan Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring Of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Repeated or intense wildfires will affect foraging habitat quality through direct mortality of prey (e.g., insects, birds, small mammals, reptiles, and amphibians) and general habitat degradation. Effects of increased wildfire on Swainson's hawk habitat will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting Of Entry And Exit Location)	Effects on Swainson's hawks due to vernal pool hydrologic alterations are mainly associated with prey base. Hydrologic alterations could affect patterns of foraging for small mammals that make up the prey base for Swainson's hawks. Implementation of AMMs will significantly reduce effects of vernal pool hydrologic alterations on prey species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Noise could indirectly affect the use of nesting and foraging habitat by Swainson's hawk. Implementation of these AMMs will minimize chronic noise in close proximity to Swainson's hawk habitat.
Lighting	EDGE-8 (Outdoor Lighting) SWHA-1 (Swainson's Hawk Surveys)	Lighting could affect Swainson's hawks, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation, and will primarily act to disrupt normal nighttime rest and sleep patterns and increase stress levels. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally-active birds, causing them to become disoriented or leave a nest. Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittee determines lighting is necessary for public safety or security.

Table 6-80
Permanent Indirect Effects on Swainson's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to Swainson's hawk.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior To Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring Of Nature Trail Impacts)	Effects on Swainson's hawk are expected from increased human activity on Preserves and Preserve Setbacks. Potential effects include introduction of invasive species and collisions with vehicles. Implementation of AMMs ensures that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect Swainson's hawks or their habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control In Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access To Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring Of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) SWHA-1 (Swainson's Hawk Surveys)	Wildlife community alterations are most likely to affect Swainson's hawk through changes in prey availability as a result of habitat degradation. For example, voles in irrigated pastures, wet meadows, and dense grasslands may be replaced by less suitable prey, such as native and non-native mice and rats that occur in lower densities and are mostly active at night, if factors, such as altered hydrology and wildfire, degrade habitat for voles. Wildlife community alterations that favor potential competitors, such as red-tailed hawks (*Buteo jamaicensis*) and red-shouldered hawks (*Buteo lineatus*) (both of which are relatively urban-tolerant), and potential nest predators, such as great horned owl (*Bubo virginianus*), ravens, and American crows (*Corvus brachyrhynchos*), will also adversely affect Swainson's hawk. Implementation of AMMs such as those that require Trail Public Education will ensure human activity will have minimal effects to the wildlife community within Swainson's hawk habitat. Competition from non-native predators (e.g., dogs, coyotes) on prey species, and invasive plant and animal species that either outcompete or create unsuitable habitat for prey could also affect Swainson's hawk.

Table 6-80
Permanent Indirect Effects on Swainson's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring Of Nature Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within Swainson's hawk habitat in the Plan Area. A change in vegetation structure could have an effect on prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control In Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring Of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described previously in Wildlife Community Alterations, invasion by non-native predators of Swainson's hawk and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring Of Nature Trail Impacts)	Effects to Swainson's hawk and its prey by mesopredators will be minimized by implementing AMMs that reduce interaction between Swainson's hawk and urban wildlife (raccoon, opossum, fox) and pets.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks)	Diseases transmitted from humans and pets could affect Swainson's hawk, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. Swainson's hawks are susceptible to avian flu and the protozoan

Table 6-80
Permanent Indirect Effects on Swainson's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior To Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring Of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	*Trichomonas gallinae*. The SSHCP will have little direct control over potential disease transmission from ingested prey, such as pigeons and doves, because active control of these well-established and very common species is not likely feasible and therefore would not be an effective management action. However, potential transmission of diseases from human and pets in Preserves will be minimized by controlling access to Preserves through Conditions 2 and 5. Implementation of these AMMs will minimize the potential for introduction of these diseases into local Swainson's hawk populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control In Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins In Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on Swainson's hawk or the agriculture and Valley Grassland Ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments and Cropland in or near SSHCP Preserves will be avoided through the implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures) SWHA-1 (Swainson's Hawk Surveys)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by Swainson's hawks near heavily trafficked areas and in urbanized areas. Covered Activities will therefore increase the frequency of vehicle and window strikes by Swainson's hawks. The main approach to reducing the risk of vehicle collisions with Swainson's hawk is through an SSHCP Preserve System design that takes the existing spatial relationship between nesting and foraging areas into consideration (Chapter 3), such that the need to fly over or near heavily trafficked roads is reduced. This can be accomplished by ensuring close proximity of suitable nesting and foraging habitats in areas with few major roads. Indirect effects on Swainson's hawk associated with vehicle collisions and

Table 6-80
Permanent Indirect Effects on Swainson's Hawk

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to Swainson's hawk habitat. Otherwise, Swainson's hawk will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7).
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) SWHA-1 (Swainson's Hawk Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all raptors, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on Swainson's hawk by incorporating the most current practices for avoiding avian powerline collisions.

Temporary Direct Effects on Swainson's Hawk

In addition to the permanent removal of habitat and nest sites described previously, Swainson's hawk foraging habitat, nesting habitat, or nest sites located within 600 feet of proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects that could result in additional habitat disturbance or additional injury, mortality, or harassment of individual Swainson's hawks (Table 6-81). These potential construction-related effects were generally described in Section 6.3.2 and include dust; noise and ground vibration; construction lighting; general human activity; inadvertent grading, clearing, or trampling of habitat; and trash and debris. Design and setback requirements SWHA-1 (Swainson's Hawk Surveys), SWHA-2 (Swainson's Hawk Pre-Construction Surveys), SWHA-3 (Swainson's Hawk Nest Buffer), and SWHA-4 (Swainson's Hawk Nest Buffer Monitoring) will generally avoid potential adverse edge effects from development and roads listed previously by minimizing the contact zone between construction activities and habitat used for nesting and foraging by Swainson's hawk.

Table 6-81
Temporary Effects to Swainson's Hawk

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into Swainson's hawk nesting and foraging habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of vegetation could cause Swainson's hawk prey to avoid habitat. Implementation of AMMs ensures that trampling and compaction do not occur.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location)	Loud noise can affect nesting Swainson's hawk, potentially causing them to abandon the nest. Abandonment (even temporary) of active nests increases the risk to eggs, nestlings, fledglings, and other dependent young. Implementation of AMMs will minimize

Table 6-81
Temporary Effects to Swainson's Hawk

Environmental Stressor	Effect Reduced By	Potential Effect on Species
		construction noise effects in the vicinity of Swainson's hawk nesting habitat.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	BMP-6 (Construction Lighting) SWHA-1 (Swainson's Hawk Surveys) SWHA-2 (Swainson's Hawk Pre-Construction) Surveys SWHA-3 (Swainson's Hawk Nest Buffer) SWHA-4 (Swainson's Hawk Nest Buffer) Monitoring	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid abandonment of nests and disorienting effects to Swainson's hawk.
Construction Dust	Condition 3, BMP-5 (Dust Control)	Dust can affect foraging habitat and prey taken by Swainson's hawk. Excessive dust generated by construction can decrease the vigor and productivity of vegetation communities through effects on light penetration, as well as photosynthesis, respiration, and transpiration; increased penetration of phytotoxic gaseous pollutants; and increased incidence of pests and diseases. These effects reduce habitat quality for important small rodent prey, such as young ground squirrels, pocket gophers, deer mice (*Peromyscus* ssp.), and voles, as well insects, such as grasshoppers (*Orthoptera* ssp.) and crickets (*Gryllidae* ssp.).
Increased Human Presence During Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) SWHA-1 (Swainson's Hawk Surveys) SWHA-2 (Swainson's Hawk Pre-Construction) Surveys SWHA-3 (Swainson's Hawk Nest Buffer) SWHA-4 (Swainson's Hawk Nest Buffer)	Ground-disturbing activities that could affect Swainson's hawk involving increased human presence will be reduced by implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) SWHA-1 (Swainson's Hawk Surveys) SWHA-2 (Swainson's Hawk Pre-Construction) Surveys SWHA-3 (Swainson's Hawk Nest Buffer) SWHA-4 (Swainson's Hawk Nest Buffer)	Trash and debris would adversely affect Swainson's hawk habitat quality through direct effects, such as attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.21 White-Tailed Kite

Permanent Effects

Permanent direct and indirect effects of Covered Activities on white-tailed kite (*Elanus leucurus*) will include modification or removal of modeled habitat, increased human activity, invasive plant and animal introduction into modeled habitat, vehicle and aircraft collisions with white-tailed kite, and increased risk of wildlife disease.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 31,419 acres of total modeled habitat for white-tailed kite in the Plan Area (Table 6-82). Most of the direct effects on modeled foraging habitat will occur inside the UDA. Overall, 1,217 acres of modeled habitat for white-tailed kite outside the UDA will be directly affected. Inside the UDA, 31,102 of 41,325 acres of modeled habitat will be directly affected.

Table 6-82
White-Tailed Kite Permanent Effects

Habitat Model Land Cover Types*	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect***	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect***	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect***	*Indirect Effect*	*Total Effect*
Nesting Habitat												
Blue Oak Woodland	9,132	9	Qualitative	9	0	0	Qualitative	0	9,132	9	Qualitative	9
Mixed Riparian Woodland	5,785	149	Qualitative	149	244	146	Qualitative	146	5,541	3	Qualitative	3
Mine Tailing Riparian Woodland	641	218	Qualitative	218	220	218	Qualitative	218	421	0	Qualitative	0
Total Nesting Habitat	*15,558*	*376*	*Qualitative*	*376*	*464*	*364*	*Qualitative*	*364*	*15,094*	*12*	*Qualitative*	*12*
Nesting/Foraging Habitat												
Mixed Riparian Scrub	1,451	189	Qualitative	189	241	186	Qualitative	186	1,210	3	Qualitative	3
Total Nesting/Foraging Habitat	*1,451*	*189*	*Qualitative*	*189*	*241*	*186*	*Qualitative*	*186*	*1,210*	*3*	*Qualitative*	*3*
Foraging Habitat												
Valley Grassland	135,112	**21,954**	Qualitative	**21,954**	**30,345**	**21,345**	Qualitative	**21,345**	**104,767**	**609**	Qualitative	**609**
Cropland	47,905	**5,285**	Qualitative	**5,285**	**5,481**	**4,922**	Qualitative	**4,922**	**42,424**	**363**	Qualitative	**363**
Irrigated Pasture-Grassland	15,991	**2,749**	Qualitative	**2,749**	**3,218**	**2,594**	Qualitative	**2,594**	**12,773**	**155**	Qualitative	**155**
Blue Oak Savanna	5,637	**38**	Qualitative	**38**	**18**	**2**	Qualitative	**2**	**5,619**	**36**	Qualitative	**36**
Vernal Pool	4,536	**389**	**0**	**389**	**935**	**355**	**0**	**355**	**3,601**	**34**	**0**	**34**
Seasonal Wetland	2,600	**105**	Qualitative	**105**	**162**	**102**	Qualitative	**102**	**2,438**	**3**	Qualitative	**3**
Swale	1,252	**234**	**0**	**234**	**461**	**232**	**0**	**232**	**791**	**2**	**0**	**2**
Total Foraging Habitat	*213,033*	*30,754*	*0*	*30,754*	*40,620*	*29,552*	*0*	*29,552*	*172,413*	*1,202*	*0*	*1,202*
GRAND TOTAL	**230,042**	**31,319**	**0**	**31,319**	**41,325**	**30,102**	**0**	**30,102**	**188,717**	**1,217**	**0**	**1,217**

In addition to the direct effects quantified in Table 6-82, Covered Activities will indirectly affect white-tailed kite nesting, nesting/foraging, and foraging habitats, and will also injure, kill, or harass individuals in the Plan Area (Table 6-83). These effects will be reduced through implementation of the AMMs described in Table 6-83. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on white-tailed kite is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, human activity, trash, and utility strikes.

In addition to the general AMMs (Section 5.4.1), raptor-specific measures (Section 5.4.2) will be implemented to minimize permanent direct and indirect effects on white-tailed kite due to Covered Activities. Mortality and injury of individual white-tailed kite will occur in the Plan Area due to Covered Activities; however, mortality and injury will be minimized through the implementation of AMMs. There is also a small risk of take in the form of harassment over the duration of the Permit Term (e.g., inhibiting individuals from nesting or foraging in some areas). Some nest sites will be directly affected by Covered Activities because white-tailed kite is a nesting resident in the Plan Area.

Table 6-83
Permanent Indirect Effects on White-Tailed Kite

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter waterways that run through riparian areas where white-tailed kite prey could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) RAPTOR-1 (Raptor Surveys)	Habitat fragmentation will have adverse effects on this species forcing birds to fly farther to suitable foraging areas, thus increasing energetic demands, as well as increasing other risks, such as collisions with vehicles and man-made structures. The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on white-tailed kite. Within the UDA, habitat fragmentation will affect white-tailed kite because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on white-tailed kite in the Plan Area. White-tailed kites are more sensitive to habitat fragmentation and isolation than Cooper's hawk or Swainson's hawk during the nest season because white-tailed kites do most of their foraging within 0.5 mile of the

Table 6-83
Permanent Indirect Effects on White-Tailed Kite

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		nest site (Hawbecker 1942). Nest sites that do not have sufficient nearby foraging habitat due to habitat fragmentation will be abandoned or have reduced nest success. Further, potential permanent indirect effects on favored prey, such as voles, would be similar to those described previously for Swainson's hawk, including degradation of foraging habitat resulting from altered hydrology and wildfire regimes. AMMs in Condition 2 and in specific RAPTOR measures will reduce effects of habitat fragmentation on white-tailed kite.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Repeated or intense wildfires will affect foraging habitat quality through direct mortality of prey (e.g., birds, small mammals, reptiles, and amphibians) and general habitat degradation. Effects of increased wildfire on white-tailed kite habitat will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Effects on white-tailed kite due to vernal pool hydrologic alterations are mainly associated with prey base. Hydrologic alterations could affect patterns of foraging for small mammals that make up the prey base for white-tailed kite. Implementation of AMMs will significantly reduce effects of vernal pool hydrologic alterations on prey species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Noise could indirectly affect the use of nesting and foraging habitat by white-tailed kite. Implementation of these AMMs will minimize chronic noise in close proximity to white-tailed kite habitat.

Table 6-83
Permanent Indirect Effects on White-Tailed Kite

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Lighting	EDGE-8 (Outdoor Lighting) BMP-6 (Construction Lighting) RAPTOR-1 (Raptor Surveys)	Lighting will mildly affect white-tailed kite, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation, and will act primarily to disrupt normal nighttime rest and sleep patterns and increase stress levels. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally-active birds, potentially causing them to become disoriented. Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittee determines lighting is necessary for public safety or security. During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to white-tailed kite.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-11 (Speed Limit) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects on white-tailed kite are expected from increased human activity on Preserves and Preserve Setbacks. Potential effects include introduction of invasive species and collisions with vehicles. Implementation of AMMs ensures that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect white-tailed kite or their habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community by increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Implementation of AMMs such as those that require Trail Public Education will ensure human

Table 6-83
Permanent Indirect Effects on White-Tailed Kite

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) RAPTOR-1 (Raptor Surveys)	activity will have minimal effects to the wildlife community within white-tailed kite habitat. Competition from non-native predators (e.g., dogs, coyotes) on prey species, and invasive plant and animal species that either outcompete or create unsuitable habitat for prey could also affect white-tailed kite.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within white-tailed kite habitat in the Plan Area. A change in vegetation structure could have an effect on prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described previously in Wildlife Community Alterations, invasion by non-native predators of white-tailed kite and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects to white-tailed kite and its prey by mesopredators will be minimized by implementing AMMs that reduce interaction between white-tailed kite and urban wildlife (raccoon, opossum, fox) and pets.

Table 6-83
Permanent Indirect Effects on White-Tailed Kite

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	Diseases transmitted from humans and pets could affect white-tailed kite, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. White-tailed kite are susceptible to avian flu and the protozoan *Trichomonas gallinae*. The SSHCP will have little direct control over potential disease transmission from ingested prey, such as pigeons and doves, because active control of these well-established and very common species likely is not feasible and therefore would not be an effective management action. However, potential transmission of diseases from human and pets in Preserves will be minimized by controlling access to Preserves through Condition 2 and Condition 5. Implementation of these AMMs will minimize the potential for introduction of these diseases into local white-tailed kite populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on white-tailed kite or the Valley Grassland Ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided through the implementation of AMMs.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by white-tailed kite near heavily trafficked areas and in urbanized areas. Covered Activities will therefore increase the frequency of vehicle and window strikes by white-tailed kite. White-tailed kites foraging in fields near

Table 6-83
Permanent Indirect Effects on White-Tailed Kite

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	RAPTOR-1 (Raptor Surveys)	major roads or near development would be at higher risk of collisions. As described previously, increased collision risks are inevitable with urbanization and are difficult to predict or control directly because birds fly some distance between nesting locations and preferred foraging areas. Indirect effects on white-tailed kite associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to white-tailed kite habitat. Otherwise, white-tailed kite will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7).
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) RAPTOR-1 (Raptor Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all raptors, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on white-tailed kite by incorporating the most current practices for avoiding avian powerline collisions.

Temporary Effects

In addition to the permanent removal of habitat described previously, white-tailed kite foraging, nesting, and nesting/foraging habitats near proposed ground-disturbing Covered Activities be adversely affected by several temporary construction-related effects that will result in additional habitat disturbance or additional injury, mortality, or harassment of individual white-tailed kites (Table 6-84). These potential construction-related effects were generally described in Section 6.3.2 and include dust; noise; construction lighting; general human activity (including trash and debris); inadvertent grading, clearing, or trampling of habitat; and hydrologic alterations, such as increased runoff and associated pollutants and toxic compounds. Temporary direct effects on white-tailed kite will generally be similar to the temporary direct effects on Cooper's hawk described in Section 6.6.18. However, noise and ground vibration, lighting, and increased human activity in construction areas or during operations and maintenance activities will have a more pronounced effect on white-tailed kites at nest and roost sites than the more urban-tolerant Cooper's hawk. For example, human disturbance in urban areas has caused white-tailed kites to abandon some communal roost sites (Waian 1973; Dunk 1995), and it is reasonable to expect that large-scale construction activities or noisy operation and maintenance activities will have similar effects. On the other hand, white-tailed kites have established nest sites in areas such as parks and areas at the urban fringe (CDFG 2010; Whisler, pers. comm., as cited in Appendix B), although one nest site monitored by Erichsen (pers. comm., as cited in Appendix B) failed to produce young. White-tailed kites are often observed foraging in developed areas with high human, traffic, and noise levels, such as along the side of and in-between the Interstate 5 corridor and major arterial roadways and in agricultural and vacant fields adjacent to residential and commercial development (Behrends, pers. obs.). Therefore, foraging activities in areas bordering construction or operations and maintenance sites will not be substantially affected.

Table 6-84
Temporary Effects to White-Tailed Kite

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into white-tailed kite riparian nesting habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of vegetation could cause white-tailed kite prey to avoid habitat. Implementation of AMMs ensures that trampling and compaction do not occur.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Loud noise can affect nesting white-tailed kites, potentially causing them to abandon the nest. Implementation of AMMs will minimize construction noise effects in the vicinity of white-tailed kite nesting habitat.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	BMP-6 (Construction Lighting) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid abandonment of nests and disorienting effects to white-tailed kite.
Construction Dust	None required for this species.	No effect on this species.

AGENDA ITEM 11.1

Table 6-84
Temporary Effects to White-Tailed Kite

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Increased Human Presence during Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) RAPTOR-1 (Raptor Surveys) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Ground-disturbing activities that could affect white-tailed kite involving increased human presence will be reduced by implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Trash and debris would adversely affect white-tailed kite habitat quality through direct effects, such as attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.22 Northern Harrier

Permanent Effects

Permanent direct and indirect effects of Covered Activities on northern harrier (*Circus cyaneus*) will include modification or removal of modeled habitat, increased human activity, invasive plants and animals introduced into modeled habitat, vehicle and aircraft collisions with northern harrier, and increased risk of wildlife disease.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 30,903 acres of total modeled habitat for northern harrier in the Plan Area (Table 6-85). Most of the direct effects on modeled foraging habitat will occur inside the UDA. Overall, 47 acres of modeled foraging habitat for northern harrier outside the UDA will be directly affected. Inside the UDA, 808 of 1,950 acres of modeled foraging habitat will be directly affected. Most of the effects on modeled nesting/foraging habitat in the Plan Area (22,014 acres) will be to Valley Grassland. Of the 210,318 acres of modeled habitat in the Plan Area, total effects to nesting/foraging habitat will be to 30,048 acres, most of which will occur in the UDA.

Table 6-85
Northern Harrier Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Nesting/Foraging Habitat												
Valley Grassland	135,112	22,014	Qualitative	22,014	30,345	21,345	Qualitative	21,345	104,767	669	Qualitative	669
Cropland	47,905	5,285	Qualitative	5,285	5,481	4,922	Qualitative	4,922	42,424	363	Qualitative	363
Irrigated Pasture-Grassland	15,991	2,749	Qualitative	2,749	3,218	2,594	Qualitative	2,594	12,773	155	Qualitative	155
Total Nesting/Foraging Habitat	*199,008*	*30,048*	*Qualitative*	*30,048*	*39,044*	*28,861*	*Qualitative*	*28,861*	*159,964*	*1,187*	*Qualitative*	*1,187*
Foraging Habitat												
Vernal Pool	4,536	389	0	389	935	355	0	355	3,601	34	0	34
Seasonal Wetland	2,600	105	Qualitative	105	162	102	Qualitative	102	2,438	3	Qualitative	3
Freshwater Marsh	2,922	127	Qualitative	127	392	119	Qualitative	119	2,530	8	Qualitative	8
Swale	1,252	234	0	234	461	232	0	232	791	2	0	2
Total Foraging Habitat	*11,310*	*855*	*0*	*855*	*1,950*	*808*	*0*	*808*	*9,360*	*47*	*0*	*47*
GRAND TOTAL	**210,318**	**30,903**	**0**	**30,903**	**40,994**	**29,669**	**0**	**29,669**	**169,324**	**1,234**	**0**	**1,234**

In addition to the direct effects quantified in Table 6-85, Covered Activities will indirectly affect northern harrier nesting/foraging and foraging habitats, and will also injure, kill, or harass northern harrier individuals in the Plan Area (Table 6-86). These effects will be reduced through implementation of the AMMs described in Table 6-86. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on northern harrier is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, human activity, trash, and utility strikes.

In addition to the general AMMs (Section 5.4.1), raptor-specific measures (Section 5.4.2) will be implemented to minimize permanent direct and indirect effects on northern harrier due to Covered Activities. Mortality and injury of individual northern harrier will occur in the Plan Area due to Covered Activities; however, mortality and injury will be minimized through the implementation of AMMs. There is also a small risk of take in the form of harassment over the duration of the Permit Term (e.g., inhibiting individuals from nesting or foraging in some areas). Some nest sites will be directly affected by Covered Activities because northern harrier is a nesting resident in the Plan Area.

Table 6-86
Permanent Indirect Effects on Northern Harrier

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	The close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter waterways that run through vernal pools and wetlands where northern harrier forages and nests.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) RAPTOR-1 (Raptor Surveys)	Habitat fragmentation will have adverse effects on this species forcing birds to fly farther to suitable nesting and foraging areas, thus increasing energetic demands, as well as increasing other risks, such as collisions with vehicles and man-made structures. The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on northern harrier. Within the UDA, habitat fragmentation will affect northern harrier because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on northern harrier in the Plan Area. AMMs in Condition 2 and in specific RAPTOR measures will reduce effects of habitat fragmentation on northern harrier.

Table 6-86
Permanent Indirect Effects on Northern Harrier

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Repeated or intense wildfires will affect foraging habitat quality through direct mortality of prey (e.g., birds, small mammals, reptiles, and amphibians) and general habitat degradation, such as facilitating invasion by non-native exotic plant species. Increased wildfire can have similar effects to altered hydrology on nesting and foraging habitat for northern harriers. Repeated or intense wildfires will affect nesting habitat by removing vegetation cover and degrading hydrologic conditions. As with hydrologic effects, factors that degrade habitat for important prey would reduce foraging habitat quality for northern harrier. Effects of increased wildfire on northern harrier habitat will be minimized through implementation of the Preserve System Monitoring and Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Effects on northern harrier due to vernal pool hydrologic alterations are mainly associated with prey base. Hydrologic alterations could affect patterns of foraging for small mammals that make up the prey base for northern harrier. Implementation of AMMs will significantly reduce effects of vernal pool hydrologic alterations on prey species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Noise could indirectly affect the use of nesting and foraging habitat by northern harrier. Implementation of these AMMs will minimize chronic noise in close proximity to northern harrier habitat.

Table 6-86
Permanent Indirect Effects on Northern Harrier

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Lighting	EDGE-8 (Outdoor Lighting) RAPTOR-1 (Raptor Surveys)	Lighting will mildly affect northern harrier, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation, and will act primarily to disrupt normal nighttime rest and sleep patterns and increase stress levels. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally-active birds, potentially causing them to become disoriented. Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittee determines lighting is necessary for public safety or security. During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to northern harrier.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-11 (Speed Limit) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As a ground nester, northern harrier will be relatively more sensitive to edge effects, such as human disturbances (Davis and Niemela 2008) and urban-related predators. Given the high sensitivity of nesting northern harriers to human activities, nest sites that do not have sufficient buffers from adjacent land uses will be abandoned or have reduced nest success Further, potential permanent indirect effects on favored prey, such as voles, would include degradation of foraging habitat resulting from altered hydrology and increased wildfire. Effects on northern harrier are expected from increased human activity on Preserves and Preserve Setbacks. Potential effects include introduction of invasive species and collisions with vehicles. Implementation of AMMs ensures that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect northern harrier or their habitat.

Table 6-86
Permanent Indirect Effects on Northern Harrier

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) RAPTOR-1 (Raptor Surveys)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community by increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Implementation of AMMs such as those that require Trail Public Education will ensure human activity will have minimal effects to the wildlife community within northern harrier habitat. Competition from non-native predators (e.g., dogs, coyotes) on prey species, and invasive plant and animal species that either outcompete or create unsuitable habitat for prey could also affect northern harrier.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within northern harrier habitat in the Plan Area. A change in vegetation structure could have an effect on prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As a ground nester, northern harrier will be relatively more sensitive to edge effects, such as human disturbances (Davis and Niemela 2008) and urban-related predators. Given the high sensitivity of nesting northern harriers to human activities, nest sites that do not have sufficient buffers from adjacent land uses will be abandoned or have reduced nest success. Further, potential permanent indirect effects on favored prey, such as voles, would include degradation of foraging habitat resulting from altered hydrology and increased wildfire. As described previously in Wildlife Community Alterations, invasion by non-native

Table 6-86
Permanent Indirect Effects on Northern Harrier

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		predators of northern harrier and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects to northern harrier nests and its prey by mesopredators will be minimized by implementing AMMs that reduce interaction between northern harrier and urban wildlife (raccoon, opossum, fox) and pets.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	Diseases transmitted from humans and pets could affect northern harrier, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. Northern harriers are susceptible to avian flu and the protozoan *Trichomonas gallinae*. The SSHCP will have little direct control over potential disease transmission from ingested prey, such as pigeons and doves, because active control of these well-established and very common species likely is not feasible and therefore would not be an effective management action. However, potential transmission of diseases from human and pets in Preserves will be minimized by controlling access to Preserves through Conditions 2 and 5. Implementation of these AMMs will minimize the potential for introduction of these diseases into local northern harrier populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread)	Adverse effects on northern harrier or the Valley Grassland Ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided through the implementation of AMMs.

Table 6-86
Permanent Indirect Effects on Northern Harrier

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures) RAPTOR-1 (Raptor Surveys)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by northern harrier near heavily trafficked areas and in urbanized areas. Covered Activities will therefore increase the frequency of vehicle and window strikes by northern harrier. Northern harriers foraging in fields near major roads or near development would be at higher risk of collisions. Indirect effects on northern harrier associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to northern harrier habitat. Otherwise, northern harrier will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7).
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) RAPTOR-1 (Raptor Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all raptors, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on northern harrier by incorporating the most current practices for avoiding avian powerline collisions.

Temporary Effects

In addition to the permanent removal of habitat described previously, northern harrier nesting and foraging habitats near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects that will result in additional habitat disturbance or additional injury, mortality, or harassment of individual northern harriers (Table 6-87). These potential construction-related effects were generally described in Section 6.3.2 and include dust; noise and ground vibration; construction lighting; general human activity (including trash and debris); inadvertent grading, clearing, or trampling of habitat; and hydrologic alterations, such as increased runoff and associated pollutants and toxic compounds. Nests will be more exposed to disturbances related to Covered Activities because they are constructed on the ground in open, vegetated habitats, such as grasslands and agricultural fields, even though the nest itself is typically concealed in dense, tall vegetation. Because human activities, such as passive recreation (e.g., dog-walking) and off-road vehicle driving, near a nest can cause nest failure (Davis and Niemela 2008), it is expected that a construction-related Covered Activities and operations and maintenance involving human activities near nests will also result in nest failures. However, northern harrier foraging behavior will be less affected by construction activities near foraging areas, as they commonly forage for suitable prey, such as voles, brush rabbits (*Sylvilagus bachmani*), and small birds, such as blackbirds and sparrows, in Cropland and other Disturbed habitats near human activities and development.

Table 6-87
Temporary Effects to Northern Harrier

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into northern harrier wetland nesting habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of vegetation could cause northern harrier prey to avoid habitat. Implementation of AMMs ensures that trampling and compaction do not occur.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location)	Loud noise can affect nesting northern harriers, potentially causing them to abandon the nest. Implementation of AMMs will minimize construction noise effects in the vicinity of northern harrier nesting habitat.
Construction Ground Vibration	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Ground vibrations can force northern harriers to leave nests exposed to vibration, exposing them to potential predation by predators and failure of a nest. Implementation of AMMs will minimize construction ground vibration effects near northern harrier nesting habitat.
Construction Lighting	BMP-6 (Construction Lighting) RAPTOR-3 (Raptor Nest/Roost Buffer)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid abandonment of nests and disorienting effects to northern harrier.
Construction Dust	None required for this species.	No effect on this species.

Table 6-87
Temporary Effects to Northern Harrier

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Increased Human Presence during Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring	Ground-disturbing activities that could affect northern harrier involving increased human presence will be reduced by implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Trash and debris would adversely affect northern harrier habitat quality through direct effects, such as attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.23 Western Burrowing Owl

Permanent Effects

Permanent direct and indirect effects of Covered Activities on burrowing owl (*Athene cunicularia*) will include modification or removal of modeled habitat, increased human activity, invasive plants and animals introduced into modeled habitat, vehicle and aircraft collisions with burrowing owl, and increased risk of wildlife disease.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 30,086 acres of total modeled habitat for burrowing owl in the Plan Area. Most of the direct effects on modeled habitat will occur inside the UDA. Overall, 1,223 of 165,583 acres of modeled nesting/foraging habitat for burrowing owl outside the UDA will be directly affected. Inside the UDA, 28,863 of 39,062 acres of modeled nesting/foraging habitat will be directly affected. Most of the effects on modeled nesting/foraging habitat in the Plan Area (22,014 acres of the 204,645 acres of total effects) will be to Valley Grassland, which is the primary habitat used by burrowing owl.

In addition to the direct effects quantified in Table 6-88, Covered Activities will indirectly affect burrowing owl nesting/foraging, and will also injure, kill, or harass burrowing owl individuals in the Plan Area (Table 6-89). These effects will be reduced through implementation of the AMMs described in Table 6-89. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on burrowing owl is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, human activity, trash, and utility strikes.

In addition to the general AMMs (Section 5.4.1), raptor-specific measures (Section 5.4.2) will be implemented to minimize permanent direct and indirect effects on burrowing owl due to Covered Activities. Mortality and injury of individual burrowing owls will occur in the Plan Area due to Covered Activities; however, mortality and injury will be minimized through the implementation of AMMs. There is also a small risk of take in the form of harassment over the duration of the Permit Term (e.g., inhibiting individuals from nesting or foraging in some areas). Some nest sites will be directly affected by Covered Activities because burrowing owl is a nesting resident in the Plan Area.

Table 6-88
Western Burrowing Owl Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Wintering Habitat												
Valley Grassland	135,112	22,014	Qualitative	22,014	30,345	21,345	Qualitative	21,345	104,767	669	Qualitative	669
Blue Oak Savanna	5,637	38	Qualitative	38	18	2	Qualitative	2	5,619	36	Qualitative	36
Vernal Pool	4,536	389	94	483	935	355	85	440	3,601	34	9	43
Swale	1,252	234	44	278	461	232	43	275	791	2	1	3
Seasonal Wetland	2,600	105	0	105	162	102	0	102	2,438	3	0	3
Stream/Creek (VPIH)	73	22	4	26	68	22	4	26	5	0	0	0
Total Wintering Habitat	149,210	22,802	142	22,944	31,989	22,058	132	22,190	117,221	744	10	754
Wintering/Nesting Habitat												
Cropland	47,905	5,285	Qualitative	5,285	5,481	4,922	Qualitative	4,922	42,424	363	Qualitative	363
Irrigated Pasture-Grassland	15,991	2,749	Qualitative	2,749	3,218	2,594	Qualitative	2,594	12,773	155	Qualitative	155
Total Wintering/Nesting Habitat	63,896	8,034	0	8,034	8,699	7,516	0	7,516	55,197	518	0	518
GRAND TOTAL	**213,106**	**30,836**	**142**	**30,978**	**40,688**	**29,574**	**132**	**29,706**	**172,418**	**1,262**	**10**	**1,272**

Table 6-89
Permanent Indirect Effects on Western Burrowing Owl

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses)	The close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially

Table 6-89
Permanent Indirect Effects on Western Burrowing Owl

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter waterways that run through areas where burrowing owl prey could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) WBO-1 (Burrowing Owl Surveys) WBO-2 (Burrowing Owl Pre-Construction Survey) WBO-3 (Burrowing Owl Avoidance) WBO-4 (Burrowing Owl Construction Monitoring) WBO-5 (Burrowing Owl Passive Relocation) WBO-6 (Burrowing Owl Timing of Maintenance) Activities	Burrowing owls are somewhat less sensitive to habitat fragmentation and isolation compared the other wider-ranging covered raptors because most their foraging, at least during the nesting season, occurs in areas immediately surrounding their burrows; in agricultural areas in the San Joaquin and Imperial Valleys, approximately 80% of foraging during the nesting season was within approximately 1,970 feet (600 meters of the nest burrow) (Gervais et al. 2008), which equates to an approximately 280-acre circular foraging area around the nest. However, habitat fragmentation will have adverse effects on this species forcing birds to fly farther to suitable foraging areas, thus increasing energetic demands, as well as increasing other risks, such as collisions with vehicles and man-made structures. The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on burrowing owl. Within the UDA, habitat fragmentation will affect burrowing owl because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on burrowing owl in the Plan Area. Nest sites that do not have sufficient nearby foraging habitat due to habitat fragmentation could be abandoned or have reduced nest success. Further,

Table 6-89
Permanent Indirect Effects on Western Burrowing Owl

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		potential permanent indirect effects on favored prey, such as voles, would include degradation of foraging habitat resulting from altered hydrology and wildfire regimes. AMMs in Condition 2 and in specific RAPTOR measures will reduce effects of habitat fragmentation on burrowing owl.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Repeated or intense wildfires will affect foraging habitat quality through direct mortality of prey (e.g., small mammals, reptiles, and insects) and general habitat degradation. Effects of increased wildfire on burrowing owl habitat will be minimized through implementation of the Preserve System Monitoring and Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Effects on burrowing owl due to vernal pool hydrologic alterations are mainly associated with prey base. Hydrologic alterations could affect patterns of foraging for small mammals and insects that make up the prey base for burrowing owl. Implementation of AMMs will significantly reduce effects of vernal pool hydrologic alterations on prey species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Ground vibration and noise could indirectly affect the use of nesting habitat by burrowing owl. Implementation of these AMMs will minimize chronic noise in close proximity to burrowing owl habitat.

Table 6-89
Permanent Indirect Effects on Western Burrowing Owl

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Lighting	EDGE-8 (Outdoor Lighting) BMP-6 (Construction Lighting) WBO-1 (Burrowing Owl Surveys)	Lighting will mildly affect burrowing owl, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally crepuscular birds, potentially causing them to become disoriented. However, burrowing owls frequently forage near lights that attract large numbers of insects. Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittee determines lighting is necessary for public safety or security. During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to burrowing owl.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-11 (Speed Limit) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects on western burrowing owl are expected from increased human activity on Preserves and Preserve Setbacks. Potential effects include introduction of invasive species and collisions with vehicles. Implementation of AMMs ensures that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect western burrowing owl or their habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community by increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Implementation of AMMs such as those that require Trail Public Education will ensure human activity will have minimal effects to the wildlife community within burrowing owl habitat. Competition from non-native predators (e.g., dogs, coyotes) on western burrowing owls and prey species, and invasive plant and animal species that either

Table 6-89
Permanent Indirect Effects on Western Burrowing Owl

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) WBO-1 (Burrowing Owl Surveys)	outcompete or create unsuitable habitat for prey could also affect burrowing owl.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within burrowing owl habitat in the Plan Area. A change in vegetation structure could have an effect on prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of non-native plant proliferation will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described previously in Wildlife Community Alterations, invasion by non-native predators of burrowing owl and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects to burrowing owl and its prey by mesopredators will be minimized by implementing AMMs that reduce interaction between burrowing owl and urban wildlife (raccoon, opossum, fox) and pets.

Table 6-89
Permanent Indirect Effects on Western Burrowing Owl

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	Diseases transmitted from humans and pets could affect burrowing owl, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. Burrowing owls are susceptible to avian flu and the protozoan *Trichomonas gallinae*. The SSHCP will have little direct control over potential disease transmission from ingested prey, such as pigeons and doves, because active control of these well-established and very common species likely is not feasible and therefore would not be an effective management action. However, potential transmission of diseases from human and pets in Preserves will be minimized by controlling access to Preserves through Conditions 2 and 5. Implementation of these AMMs will minimize the potential for introduction of these diseases into local burrowing owl populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Adverse effects on burrowing owl or the Valley Grassland Ecosystem from pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided through the implementation of AMMs. Use of rodenticides on ground squirrel colonies could indirectly affect western burrowing owl through ingestion of the toxin or reduction of western burrowing owl prey. If the Technical Advisory Committee (Chapter 9) approves a Preserve Management Plan (Chapter 8) that includes use of rodenticides, that use would be subject to limitations in the Preserve Management Plan on timing and area of application, amounts to be used, and acceptable rodenticides. If appropriate, those restrictions could be incorporated into the conservation easement.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by burrowing owl near heavily trafficked areas and in urbanized areas. Burrowing owls will also be at relatively higher risk of vehicle collisions compared to the other covered raptors. Vehicular collisions, which accounted for

Table 6-89
Permanent Indirect Effects on Western Burrowing Owl

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	WBO-1 (Burrowing Owl Surveys)	25% to 60% of burrowing owl mortalities in three studies (Poulin et al. 2011), are a significant cause of mortality because burrowing owls habitually perch and hunt on roadways at night (Bent 1938; Poulin et al. 2011). As described for the other covered raptors, increased collision risks are inevitable with urbanization and are difficult to predict or control directly because birds fly some distance between nesting locations and preferred foraging areas (although less than the other covered raptors). For example, siting roads away from environmentally sensitive locations (ROAD-1) probably would not make a significant contribution to reducing collision risks because burrowing owls will be flying between nesting and foraging burrow locations and preferred foraging areas in unpredictable and uncontrollable patterns and frequencies. Covered Activities will therefore increase the frequency of vehicle and window strikes on burrowing owl. Burrowing owls foraging in fields near major roads or near development would be at higher risk of collisions. Increased collision risks are inevitable with urbanization and are difficult to predict or control directly because birds fly some distance between nesting locations and preferred foraging areas. Indirect effects on burrowing owl associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to burrowing owl habitat. Otherwise, burrowing owl will be preserved from collisions through establishing large, interconnected Preserves (Chapter 7).
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) WBO-1 (Burrowing Owl Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all raptors, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on burrowing owl by incorporating the most current practices for avoiding avian powerline collisions.

Temporary Effects

In addition to the permanent removal of habitat described previously, burrowing owl nesting and foraging habitats near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects that could result in additional habitat disturbance or additional injury, mortality, or harassment of individual burrowing owls (Table 6-90). These potential construction-related effects were generally described in Section 6.3.2 and include dust; noise and ground vibration; construction lighting; general human activity (including trash and debris); and inadvertent grading, clearing, or trampling of habitat. Burrowing owls are often drawn to construction sites, likely due to the availability of disturbed soils and mounds of dirt that make for easy burrowing. Active burrows will be more exposed to disturbances related to Covered Activities because they are typically located on the ground in exposed areas. It is therefore expected that construction-related Covered Activities involving human activities near occupied burrows will also result in burrow abandonment, including potential nest failures. On the other hand, many burrowing owl individuals are relatively tolerant of human activities near nest sites, given that the most productive nesting areas in California are in agricultural areas in the Central Valley and Imperial Valley, and the species persists at least in low numbers in some highly developed urban areas (Gervais et al. 2008). It is expected that different owl individuals would have different levels of tolerance to Covered Activities near nests and winter dens.

Table 6-90
Temporary Effects to Western Burrowing Owl

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into burrowing owl habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of vegetation could cause burrowing owl prey to avoid habitat. Implementation of AMMs ensures that trampling and compaction do not occur.

Table 6-90
Temporary Effects to Western Burrowing Owl

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location) WBO-1 (Burrowing Owl Surveys) WBO-2 (Burrowing Owl Pre-Construction Survey) WBO-3 (Burrowing Owl Avoidance) WBO-4 (Burrowing Owl Construction Monitoring) WBO-5 (Burrowing Owl Passive Relocation) WBO-6 (Burrowing Owl Timing of Maintenance)	Loud noise can affect nesting burrowing owls when they are above ground. Implementation of AMMs will minimize construction noise effects in the vicinity of burrowing owl habitat.
Construction Ground Vibration	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) WBO-1 (Burrowing Owl Surveys) WBO-2 (Burrowing Owl Pre-Construction Survey) WBO-3 (Burrowing Owl Avoidance) WBO-4 (Burrowing Owl Construction Monitoring) WBO-5 (Burrowing Owl Passive Relocation) WBO-6 (Burrowing Owl Timing of Maintenance)	Ground vibrations can force burrowing owls to leave underground burrows that could collapse due to vibration, exposing them to potential predation by predators and failure of a nest. Implementation of AMMs will minimize construction ground vibration effects near burrowing owl nesting habitat.
Construction Lighting	BMP-6 (Construction Lighting) WBO-1 (Burrowing Owl Surveys) WBO-2 (Burrowing Owl Pre-Construction Survey) WBO-3 (Burrowing Owl Avoidance) WBO-4 (Burrowing Owl Construction Monitoring) WBO-5 (Burrowing Owl Passive Relocation) WBO-6 (Burrowing Owl Timing of Maintenance)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid abandonment of nests and disorienting effects to burrowing owl.
Construction Dust	None required for this species.	No effect on this species.
Increased Human Presence during Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) WBO-1 (Burrowing Owl Surveys) WBO-2 (Burrowing Owl Pre-Construction Survey) WBO-3 (Burrowing Owl Avoidance) WBO-4 (Burrowing Owl Construction Monitoring) WBO-5 (Burrowing Owl Passive Relocation) WBO-6 (Burrowing Owl Timing of Maintenance)	Ground-disturbing activities that could affect burrowing owl involving increased human presence will be reduced by implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) WBO-1 (Burrowing Owl Surveys) WBO-2 (Burrowing Owl Pre-Construction Survey) WBO-3 (Burrowing Owl Avoidance) WBO-4 (Burrowing Owl Construction Monitoring) WBO-5 (Burrowing Owl Passive Relocation) WBO-6 (Burrowing Owl Timing of Maintenance)	Trash and debris would adversely affect burrowing owl habitat quality through direct effects, such as attracting nuisance pest species. Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.24 Loggerhead Shrike

Permanent Effects

Permanent direct and indirect effects of Covered Activities on loggerhead shrike will include modification or removal of modeled habitat, increased human activity, invasive animals introduced into modeled habitat, vehicle and aircraft collisions with loggerhead shrike, and increased risk of wildlife disease.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 31,367 acres of modeled habitat for loggerhead shrike in the Plan Area, including approximately 591 acres of nesting habitat, 22,014 acres of modeled nesting/foraging habitat, and 8,762 acres of modeled foraging habitat (Table 6-91). Most of the direct effects for loggerhead shrike, 30,100 acres (96%), will occur inside the UDA, including approximately 550 acres of nesting habitat, 21,345 acres of modeled nesting/foraging habitat, and 8,205 acres of modeled foraging habitat. Outside of the UDA, a total of approximately 1,267 acres of modeled habitat will be directly affected, including approximately 41 acres of nesting habitat, 669 acres of modeled nesting/foraging habitat and 557 acres of modeled foraging habitat. Permanent effects on specific nest sites are not analyzed because the SSHCP database does not contain any confirmed loggerhead shrike nest sites for the Plan Area (Section 3.4.5).

Table 6-91
Loggerhead Shrike Permanent Effects

Habitat Model Land Cover Types	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Nesting Habitat												
Mixed Riparian Woodland	5,785	184	Qualitative	184	244	146	Qualitative	146	5,541	38	Qualitative	38
Mixed Riparian Scrub	1,424	189	Qualitative	189	214	186	Qualitative	186	1,210	3	Qualitative	3
Mine Tailing Riparian Woodland	641	218	Qualitative	218	220	218	Qualitative	218	421	0	Qualitative	0
Total Nesting Habitat	*7,850*	*591*	*Qualitative*	*591*	*678*	*550*	*Qualitative*	*550*	*7,172*	*41*	*Qualitative*	*41*
Nesting/Foraging Habitat												
Valley Grassland	135,112	22,014	Qualitative	22,014	30,345	21,345	Qualitative	21,345	104,767	669	Qualitative	669
Total Nesting/ Foraging Habitat	*135,112*	*22,014*	*Qualitative*	*22,014*	*30,345*	*21,345*	*Qualitative*	*21,345*	*104,767*	*669*	*Qualitative*	*669*
Foraging Habitat												
Cropland	47,905	5,285	Qualitative	5,285	5,481	4,922	Qualitative	4,922	42,424	363	Qualitative	363
Irrigated Pasture-Grassland	15,991	2,749	Qualitative	2,749	3,218	2,594	Qualitative	2,594	12,773	155	Qualitative	155
Vernal Pool	4,536	389	0	389	935	355	0	355	3,601	34	0	34
Seasonal Wetland	2,600	105	Qualitative	105	162	102	Qualitative	102	2,438	3	Qualitative	3
Swale	1,252	234	0	234	461	232	0	232	791	2	0	2
Total Foraging Habitat	*72,284*	*8,762*	*0*	*8,762*	*10,257*	*8,205*	*0*	*8,205*	*62,027*	*557*	*0*	*557*
GRAND TOTAL	**215,246**	**31,367**	**0**	**31,367**	**41,280**	**30,100**	**0**	**30,100**	**173,966**	**1,267**	**0**	**1,267**

In addition to the direct effects quantified in Table 6-91, Covered Activities will indirectly affect loggerhead shrike nesting/foraging, and will also injure, kill, or harass individuals in the Plan Area (Table 6-92). These effects will be reduced through implementation of the AMMs described in Table 6-92. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on loggerhead shrike is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be associated with habitat fragmentation and isolation and areas along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, human activity, trash, and utility strikes, accidental fire ignitions, and potential spread of invasive plants.

In addition to the general AMMs (Section 5.4.1), raptor-specific measures (Section 5.4.2) will be implemented to avoid permanent direct and indirect effects on loggerhead shrike to Covered Activities. With implementation of the proposed AMMs, the proposed Covered Activities will not directly kill or injure individual loggerhead shrikes in the Plan Area. However, there is a small risk of take in the form of harassment over the duration of the permit (e.g., inhibiting individuals from nesting or foraging in some areas). Some nest sites will be directly affected by Covered Activities because suitable loggerhead shrike nesting habitat exists within the Plan Area.

Temporary Effects

In addition to the permanent removal of habitat described previously, loggerhead shrike nesting and foraging habitats near proposed ground-disturbing Covered Activities could be adversely affected by several temporary construction-related effects that would result in additional habitat disturbance or additional injury, mortality, or harassment of individual loggerhead shrikes. These potential construction-related effects include dust; noise and ground vibration; construction lighting; general human activity (including trash and debris); inadvertent grading, clearing, or trampling of habitat; and hydrologic alterations, such as increased runoff and associated pollutants and toxic compounds.

Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently impacted in the direct effects reported in Table 6-91).

These potential construction-related environmental stressors were described previously in Section 6.3.2, and their additional effects on loggerhead shrike are qualitatively described in Table 6-93.

Table 6-92
Permanent Indirect Effects on Loggerhead Shrike

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-2 (Groundwater Recharge) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-2 (Erosion Control) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Pesticide Use)	Long-term hydrologic alterations would degrade the quality of riparian scrub and woodland nesting habitat for loggerhead shrike, as well as alter water quality within the Plan Area. The close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including decreased groundwater recharge that supports riparian vegetation, urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that foster groundwater recharge and the control of pesticide use and stormwater runoff will ensure that riparian habitat does not degrade as a result of reduced groundwater levels and that pollution will not enter waterways that run through areas where loggerhead shrike prey could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 8, UTILITY-1 (Avian Collision Avoidance) RAPTOR-1 (Raptor Surveys)	Loggerhead shrikes are sensitive to habitat fragmentation and isolation because territories in mainland California have been estimated to range from approximately 11 acres to approximately 40 acres, and smaller habitat patches would not support viable nesting pairs. Habitat fragmentation reduces the amount of available foraging habitat near nest sites, potentially forcing birds to travel farther and reducing their fitness due to higher energy costs and reduced time at the nest. In addition, longer travel from nest sites to foraging areas increase their risk of collisions with man-made structures and vehicles, which has been shown to be a significant source of shrike mortality in Virginia and Texas (Humple 2008). The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on loggerhead shrike by preserving large habitat blocks and ensuring connectivity throughout the Preserve System. Within the UDA, habitat fragmentation will affect loggerhead shrike because all UDA Preserves will be bordered by urban

AGENDA ITEM 11.1
967

Table 6-92
Permanent Indirect Effects on Loggerhead Shrike

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		development, which will be reduced through implementation of EDGE and UTILITY AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs, UTILITY AMMs, and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on loggerhead shrike in the Plan Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Repeated or intense wildfires will affect foraging and nesting habitat quality and quantity through direct mortality of prey (e.g., small mammals, reptiles, and insects) and general habitat degradation. Because loggerhead shrikes hunt in open habitats characterized by short grasses, forbs, or bare ground, they may be particularly sensitive to habitat degradation resulting from increased wildfire that facilitate invasion by non-native grasses and weeds (Humple 2008); such invasions may reduce availability and detectability of prey, such as large, ground-dwelling insects, as well small mammals, reptiles, and amphibians. Effects of increased wildfire on loggerhead shrike habitat will be minimized through implementation of the Preserve System Monitoring and Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Effects on loggerhead shrike due to vernal pool hydrologic alterations are mainly associated with prey base. Hydrologic alterations could affect patterns of foraging for insects, small birds, and mammals that make up the prey base for loggerhead shrike. Implementation of AMMs will significantly reduce effects of vernal pool hydrologic alterations on prey species.

Table 6-92
Permanent Indirect Effects on Loggerhead Shrike

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Chronic Ground Vibration and Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Ground vibration and noise could indirectly affect the use of nesting habitat by loggerhead shrike. Implementation of these AMMs will minimize chronic noise in close proximity to loggerhead shrike habitat.
Lighting	EDGE-8 (Outdoor Lighting) BMP-6 (Construction Lighting) RAPTOR-1 (Raptor Surveys)	Lighting will mildly affect loggerhead shrike, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally active birds, potentially causing them to abandon nests and/or become disoriented. Lighting could also lure prey insects that the loggerhead shrike depend on, reducing their abundance within loggerhead shrike habitat preserves. Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittees determines lighting is necessary for public safety or security. During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid disorienting effects to loggerhead shrike.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-11 (Speed Limit) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Trail Impacts) Condition 8, UTILITY-1 (Avian Collision Avoidance) EDGE-8 (Outdoor Lighting)	Effects on loggerhead shrike are expected from increased human activity on Preserves and Preserve Setbacks. Potential effects include introduction of invasive species and collisions with vehicles and aboveground utilities. Implementation of AMMs ensures that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect loggerhead shrike or their habitat.

Table 6-92
Permanent Indirect Effects on Loggerhead Shrike

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) RAPTOR-1 (Raptor Surveys)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community by increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Implementation of AMMs such as those that require Trail Public Education will ensure human activity will have minimal effects to the wildlife community within loggerhead shrike habitat. Competition from non-native predators (e.g., cats, dogs, coyotes) on loggerhead shrike and their prey species, and invasive plant and animal species that either outcompete or create unsuitable habitat for prey species could also affect loggerhead shrike.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within loggerhead shrike habitat in the Plan Area. A change in vegetation structure could have an effect on prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	As described previously in Wildlife Community Alterations, invasion by non-native predators of loggerhead shrike and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.

Table 6-92
Permanent Indirect Effects on Loggerhead Shrike

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Effects to loggerhead shrike and its prey by mesopredators will be minimized by implementing AMMs that reduce interaction between loggerhead shrike and urban wildlife (raccoon, opossum, fox, feral cat) and pets.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	Diseases transmitted from humans and pets could affect loggerhead shrike, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. Loggerhead shrikes are susceptible to avian flu and the protozoan *Trichomonas gallinae*. Pandolfino (2008) showed that a decline in the winter abundance of loggerhead shrikes in the Central Valley in the 3 years following the summer of 2005 was correlated with elevated virus infection levels in the Central Valley compared to non-Central Valley Counties, and suggested that West Nile virus played a role in the decline. The SSHCP will have little direct control over potential disease transmission from ingested prey, such as small birds, which are used as prey during the winter months. However, potential transmission of diseases from human and pets in Preserves will be minimized by controlling access to Preserves through Conditions 2 and 5. Implementation of these AMMs will minimize the potential for introduction of these diseases into local loggerhead shrike populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves)	Loggerhead shrike and their prey are susceptible to adverse effects from pesticides as ingestion of pesticide-laden arthropods can lead to toxic effects on adults and in eggs, and it can significantly reduce the local availability of insects (especially grasshoppers). Adverse effects on loggerhead shrike, their prey, or the Valley Grassland Ecosystem from insecticides/pesticides (such

Table 6-92
Permanent Indirect Effects on Loggerhead Shrike

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be minimized through the implementation of AMMs. Specific restrictions on pesticide use in certain preserves may be included in Preserve Management Plans, further minimizing the effects of pesticides on the insect prey of loggerhead shrike.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures) RAPTOR-1 (Raptor Surveys)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by loggerhead shrike near heavily trafficked areas and in urbanized areas. As discussed in Humple (2008), collisions with vehicles are a significant source of loggerhead shrike mortality in Virginia and Texas. Consequently, loggerhead shrike will be at a relatively higher risk of vehicle collisions compared to the other Covered Species, as they use road margin habitat to hunt, as perches are abundant and there is a clear view of the surrounding landscape to visually search for prey. As described for the covered raptors, increased collision risks are inevitable with urbanization and are difficult to predict or control directly because birds fly some distance between nesting locations and preferred foraging areas (although less than the other covered raptors). For example, siting roads away from environmentally sensitive locations (ROAD-1) probably would not make a significant contribution to reducing collision risks because it would not remove the road margin habitat that is used for hunting. Covered Activities will therefore increase the frequency of vehicle and window strikes on loggerhead shrikes as the number roads in the Plan Area will be increased from existing conditions. Indirect effects on loggerhead shrike associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to burrowing owl habitat. Otherwise, loggerhead shrike will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7).

Table 6-92
Permanent Indirect Effects on Loggerhead Shrike

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Aboveground Electrical Utilities Collision And Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) RAPTOR-1 (Raptor Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all avian species, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on loggerhead shrike by incorporating the most current practices for avoiding avian powerline collisions.

Table 6-93
Temporary Effects to Loggerhead Shrike

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	Runoff from construction activities into loggerhead shrike habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit)	Inadvertent trampling and compaction of vegetation could cause loggerhead shrike prey to avoid habitat. Implementation of AMMs ensures that trampling and compaction do not occur.

Table 6-93
Temporary Effects to Loggerhead Shrike

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location)	Loud noise can affect nesting loggerhead shrikes. Implementation of AMMs will minimize construction noise effects in the vicinity of loggerhead shrike nesting habitat.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	BMP-6 (Construction Lighting) RAPTOR-3 (Raptor Nest/Roost Buffer)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid abandonment of nests and disorienting effects to loggerhead shrike. Lighting could also lure prey insects that the loggerhead shrike depend on, reducing their abundance within loggerhead shrike habitat preserves. By directing lighting away from preserves, this effect would be reduced but not eliminated.
Construction Dust	None required for this species.	No effect on this species.
Increased Human Presence During Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) RAPTOR-2 (Raptor Pre-Construction Surveys) RAPTOR-3 (Raptor Nest/Roost Buffer) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Effects associated with increased human presence during construction that could affect loggerhead shrike habitat and behavior will be reduced by implementing AMMs.
Construction Trash And Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Trash and debris would adversely affect loggerhead shrike habitat quality through direct effects, such as attracting nuisance pest species and potential predators (e.g., feral cats). Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.25 Greater Sandhill Crane

Permanent Effects

Permanent direct and indirect effects of Covered Activities on greater sandhill crane (*Grus canadensis*) will include modification or removal of modeled roosting/foraging habitat, modeled roosting habitat, and modeled foraging habitat, habitat fragmentation and isolation, noise, lighting, increased human activity (including trash and debris), altered hydrology, altered fire regime, vehicle collisions, electrocution and collisions associated with aboveground transmission lines, wildlife community alterations, disease, and pesticides.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 7,42 of the 89,765 acres of modeled habitat for greater sandhill crane in the Plan Area, including 124 of the 4,487 acres of modeled roosting/foraging habitat, 66 of the 1,156 acres of modeled roosting habitat, and 7,752 of the 84,122 acres of modeled foraging habitat (Table 6-94). Most of the direct effects for greater sandhill crane, approximately 7,115 acres , will occur inside the UDA, including approximately 115 acres of modeled roosting/foraging habitat, 47 acres of modeled roosting habitat, and 6,953 acres of modeled foraging habitat. Outside of the UDA, a total of approximately 827 acres of modeled habitat will be directly affected, including approximately 9 acres of modeled roosting/foraging habitat, 19 acres of modeled roosting habitat, and 799 acres of modeled foraging habitat.

Of the approximately 7,942 acres of total effects on modeled habitat for greater sandhill crane, approximately 820 acres (10%) are high-value foraging habitat (Table 6-95). The 820 acres of high-value habitat effects are 1% of the approximately 81,473 acres of high-value habitat in the Plan Area.

In addition to the direct effects quantified in Table 6-94 and 6-95, Covered Activities will indirectly affect greater sandhill crane roosting and foraging, and will also injure, kill, or harass individuals in the Plan Area (Table 6-96). Although most indirect effects are qualitatively assessed in Table 6-96, some indirect effects can be quantified (Table 6-94 and 6-95). These effects are specific to roosting habitat within Vernal Pool Ecosystems in that approximately 7 acres of Vernal Pool Ecosystem roosting habitat will be indirectly impacted in the Plan Area—6 acres within the UDA and 1 acre outside the UDA.

All permanent indirect effects (both qualitative and quantitative) to greater sandhill crane will be reduced through implementation of the AMMs described in Table 6-96. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on greater sandhill crane is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. As described in more detail in Table 6-96,

greater sandhill cranes are very sensitive to human activities. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that would increase the risk of vehicle collisions, accidental fire ignitions, and other road-related effects (e.g., traffic noise, road runoff, potential spread of invasive plants).

In addition to the general AMMs (Section 5.4.1), greater sandhill crane-specific measures (Section 5.4.2) will be implemented to avoid permanent direct and indirect effects on greater sandhill crane to Covered Activities. With implementation of the proposed AMMs, the proposed Covered Activities will result in a small risk of killing or injuring individual greater sandhill cranes in the Plan Area due to collisions with fixed structures or vehicles. Additionally, there is a small risk of take in the form of harassment over the duration of the permit (e.g., inhibiting individuals from roosting or foraging in some areas). This incrementally increased risk of take is mitigated through the SSHCP Conservation Strategy (Chapter 7).

Temporary Effects

In addition to the permanent removal of habitat described previously, greater sandhill crane roosting and foraging habitats near proposed ground-disturbing Covered Activities could be adversely affected by several temporary construction-related effects that will result in additional habitat disturbance or additional injury, mortality, or harassment of individual greater sandhill cranes (Table 6-97). These potential construction-related effects were generally described in Section 6.3.2 and include dust; noise and ground vibration; construction lighting; general human activity (including trash and debris); inadvertent grading, clearing, or trampling of habitat; and hydrologic alterations, such as increased runoff and associated pollutants and toxic compounds, as well as temporary fencing. Temporary fencing during construction is an additional potential temporary effect that is more specific to greater sandhill crane. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified, as permanently impacted in the direct effects reported in Table 6-94).

These potential construction-related environmental stressors were described generally in Section 6.3.2, and their additional effects on greater sandhill crane are qualitatively described in Table 6-96, as are AMMs that would avoid and/or minimize these temporary effects.

Table 6-94
Greater Sandhill Crane Permanent Effects

Habitat Model Land Cover Types	Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Roosting/Foraging Habitat[1]												
Seasonal Wetland	1,877	51	Qualitative	51	106	48	Qualitative	48	1,771	3	Qualitative	3
Freshwater Marsh	2,610	73	Qualitative	73	276	67	Qualitative	67	2,334	6	Qualitative	6
Total Roosting/ Foraging Habitat	*4,487*	*124*	*Qualitative*	*124*	*382*	*115*	*Qualitative*	*115*	*4,105*	*9*	*Qualitative*	*9*
Roosting Habitat												
Vernal Pool	1,156	59	7	66	58	41	6	47	1,098	18	1	19
Total Roosting Habitat	*1,156*	*59*	*7*	*66*	*58*	*41*	*6*	*47*	*1,098*	*18*	*1*	*19*
Foraging Habitat[2]												
Cropland	42,628	3,764	Qualitative	3,764	3,600	3,421	Qualitative	3,421	39,028	343	Qualitative	343
Valley Grassland	30,586	2,469	Qualitative	2,469	2,718	2,151	Qualitative	2,151	27,868	318	Qualitative	318
Irrigated Pasture-Grassland	10,908	1,519	Qualitative	1,519	1,534	1,381	Qualitative	1,381	9,374	138	Qualitative	138
Total Foraging Habitat	*84,122*	*7,752*	*Qualitative*	*7,752*	*7,852*	*6,953*	*Qualitative*	*6,953*	*76,270*	*799*	*Qualitative*	*799*
Grand Total	**89,765**	**7,935**	**7**	**7,942**	**8,292**	**7,109**	**6**	**7,115**	**81,473**	**826**	**1**	**827**

1 Modeled roosting habitat includes these communities within 2 miles of greater sandhill crane occurrences in the Plan Area.
2 Modeled foraging habitat includes these communities within 1.75 miles of modeled roosting habitat.

Table 6-95
Greater Sandhill Crane Permanent Effects on High-Value Habitat

High-Value Habitat Land Cover Types*	Plan Area (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*
Seasonal Wetland	1,771	1	Qualitative	1
Freshwater Marsh	2,334	1	Qualitative	1
Vernal Pool	1,098	18	1	19
Cropland	3,9028	343	Qualitative	343
Irrigated Pasture-Grassland	9,374	138	Qualitative	138
Valley Grassland	27,868	318	Qualitative	318
Total High-Value Habitat	**81,473**	**819**	**1**	**820**

* High-value habitat is all modeled roosting and foraging habitat above sea level and outside the floodplain and outside the UDA.

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-2 (Groundwater Recharge) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-2 (Erosion Control) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Pesticide Use)	Long-term hydrologic alterations could modify flooding and dewatering events and would degrade the quality of wetland roosting and foraging habitat for greater sandhill crane, as well as alter water quality within the Plan Area. For example, occupied night roosts in the Sacramento-San Joaquin Delta, including the Cosumnes River Preserve and Stone Lakes National Wildlife Refuge in the Plan Area, averaged approximately 3.9 inches (10 centimeters) water depth (range 1.2–8.3 inches [3–21 centimeters) (Ivey et al. 2015). Substantial deviations from these depths could reduce suitability and result in roost abandonment. In addition, the close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides,

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		pesticides, fuel, oil, lubricants, paints, and release agents. Specific effects of these chemicals and pollutants on greater sandhill cranes may have toxic effects either directly (e.g., dermal contact) or through ingestion of contaminated food sources, or may reduce prey/forage abundance. Further, water quality at foraging sites (e.g., Seasonal Wetland) may be an important factor and could be degraded by runoff from development and roads of various pollutants and chemicals, including fuel, oil, lubricants, paints, and release agents, and pesticides. Implementation of AMMs such as those that require control of stormwater runoff, restrict pesticide use, and reduce erosion will preserve roosting and foraging habitat from actions that can result in altered hydrology, and ensure pollution will not enter waterways that could degrade greater sandhill crane roosting and foraging habitat and wetland areas where greater sandhill crane prey and forage could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 8, UTILITY-1 (Avian Collision Avoidance) GSC-1 (Greater Sandhill Crane Surveys)	Greater sandhill cranes are sensitive to habitat fragmentation and isolation, especially between roosting and foraging sites. Habitat fragmentation reduces the size of available roosting sites and available foraging habitat near nest sites. Ivey et al. (2015) found that habitat fragmentation that reduced suitable roost sites to less than approximately 67 acres would not be viable roost sites, recommend roost site complexes of 247–2,470 acres (100–1,000 hectare), with an individual site at least 12.3 acres (5 hectares). Roost sites that do not have sufficient size to support greater sandhill cranes due to habitat fragmentation could be abandoned. Habitat fragmentation also reduces the amount of available foraging habitat near roost sites. Pogson (1990) and Ivey and Herziger (2003) observed distances between roosting and foraging

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		sites have averaged from approximately 0.9 mile to 1.7 miles. In addition, habitat fragmentation and longer travel to and from roost sites to foraging areas exacerbate the effects of other potential permanent indirect effects, including increased human activity, altered hydrology, increased wildfire, vehicle collisions, aboveground utilities, altered wildlife communities, and their risk of collisions with man-made structures and vehicles. The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on greater sandhill crane by preserving large habitat blocks and ensuring connectivity throughout the Preserve System. Within the UDA, habitat fragmentation will affect greater sandhill crane because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of GSC AMMs, EDGE AMMs, and UTILITY AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs, UTILITY AMMs, and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System, along with GSC-1, will minimize the effects of habitat fragmentation on greater sandhill crane in the Plan Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Increased wildfire can have similar effects to altered hydrology on foraging habitat for greater sandhill crane. While Cropland and Irrigated Pasture-Grassland are important foraging habitats for greater sandhill crane in the Plan Area and are less prone to wildfire effects, Valley Grassland and Vernal Pool Ecosystems are also a suitable foraging and roosting habitat. Repeated or intense wildfires could affect Valley Grassland and Vernal Pool Ecosystems foraging and roosting habitat by removing vegetation cover and facilitating invasion by non-native exotic plant species. As with hydrologic effects, factors that degrade habitat for

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		important prey and forage would reduce foraging habitat quality for greater sandhill crane. As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Effects of increased wildfire on greater sandhill crane habitat will be minimized through implementation of the Preserve System Monitoring and Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Effects on greater sandhill crane due to vernal pool hydrologic alterations are mainly associated with roosting habitat. Hydrologic alterations could affect patterns of roosting within Vernal Pool Ecosystems. Implementation of AMMs will significantly reduce effects of vernal pool hydrologic alterations on greater sandhill crane roosting habitat.
Chronic Ground Vibration And Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) GSC-1 (Greater Sandhill Crane Surveys) GSC-4 (Greater Sandhill Crane Visual Barrier)	Greater sandhill cranes are very sensitive to human disturbances and vibration and noise could indirectly affect the use of foraging and roosting habitat by greater sandhill crane. Implementation of these AMMs will minimize chronic noise in close proximity to greater sandhill crane roosting and foraging habitat.
Lighting	EDGE-8 (Outdoor Lighting) BMP-6 (Construction Lighting) GSC-1 (Greater Sandhill Crane Surveys) GSC-4 (Greater Sandhill Crane Visual Barrier)	Lighting will mildly affect greater sandhill crane, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally active birds, potentially causing them to abandon roosts and/or become disoriented. Implementation of these AMMs would ensure that Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittees determines lighting is necessary for public safety or security.

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-11 (Speed Limit) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-1 (Avian Collision Avoidance) EDGE-8 (Outdoor Lighting) GSC-1 (Greater Sandhill Crane Surveys) GSC-4 (Greater Sandhill Crane Visual Barrier)	Greater sandhill cranes are very sensitive to human disturbances, including even human presence and passive recreation activities, such as birding, walking, equestrian activities, bicycling, and boating (Ivey and Herziger 2003). Ivey et al. (2015) found that greater sandhill cranes tend to avoid roost sites in the Sacramento-San Joaquin Delta, which is used for waterfowl hunting. Littlefield and Ivey (2000) indicated that only one predawn disruption is usually necessary before cranes abandon a roosting site. Potential effects of increased human activity will be reduced through implementation of these AMMs, including GSC-1 and GSC-4 and Conditions 2 and 5, which will ensure that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect greater sandhill cranes or their habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) GSC-1 (Greater Sandhill Crane Surveys)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community through increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Competition and predation from non-native predators (cats, dogs, coyotes) on greater sandhill crane and their prey species, and invasive plant and animal species that either outcompete or create unsuitable habitat for prey or forage species, could also affect greater sandhill cranes. Implementation of AMMs such as those that require Trail Public Education, Preserve Setbacks, prevention invasive species spread, proper location of road projects, and greater sandhill crane surveys will ensure human activity will have minimal effects to the wildlife community within greater sandhill crane habitat.

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Unmanaged proliferation of non-native plants could affect species composition within greater sandhill crane habitat in the Plan Area. A change in vegetation structure could have an effect on forage habitat and prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described previously in Wildlife Community Alterations, invasion by non-native predators of greater sandhill crane and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.
Mesopredators	None required for this species.	No effect on this species.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	Greater sandhill crane may be vulnerable to disease transmitted from humans and pets, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. In areas where large numbers of greater sandhill cranes are forced to use limited roost areas, epizootic events, such as cholera, avian botulism, aspergillosis, salmonella, and avian tuberculosis, are likely to occur and are known to kill sandhill cranes (Tacha et al. 1992). Avian cholera has resulted in sandhill crane mortality in San Joaquin County (Lindstedt, pers. comm. n.d., as cited in Appendix B, Species Accounts). While these disease factors generally cannot be addressed wholly through specific AMMs, the SSHCP Conservation Strategy of preserving adequate roosting

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		habitat in several locations in the Preserve System will help reduce the risk of epizootic events related to increased contact between individuals. Implementation of these AMMs will also act to minimize the potential for introduction of these diseases into local greater sandhill crane populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) GSC-1 (Greater Sandhill Crane Surveys)	Greater sandhill cranes have been demonstrated to be sensitive to pesticides. Mortality of sandhill cranes has been attributed to anticholinesterase pesticides, which include organophosphorus and carbamate compounds, which may be ingested through contaminated water, seeds, foliage, invertebrates, and vertebrates or by dermal contact and inhalation (Fleischli et al. 2004). Harris and Mirande (2013) report crane deaths from chemicals (primarily pesticides) but do not provide specific information about these deaths. Adverse effects on greater sandhill crane, their prey/forage, or their roosting and foraging habitat from insecticides/pesticides (such as glyphosate) or fertilizers used in new urban developments in or near SSHCP Preserves will be avoided through the implementation of AMMs.
Vehicle and Aircraft Collisions With Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures) GSC-1 (Greater Sandhill Crane Surveys)	Greater sandhill cranes are highly vulnerable to collisions with structures that interfere with flight takeoff (Pogson and Lindstedt 1988). Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by greater sandhill crane near heavily trafficked areas and in urbanized areas. As described for the covered raptors, increased collision risks are inevitable with urbanization and are difficult to predict or control directly because birds fly some distance between roosting locations and preferred foraging areas. However, unlike many raptors, siting roads away from environmentally sensitive locations (ROAD-1) would provide some separation between roosting and foraging habitats and lessen collision risks because it would increase the distance between flight takeoff and landing and the roadways. Still, Covered Activities will increase the frequency of greater sandhill

Table 6-96
Permanent Indirect Effects on Greater Sandhill Crane

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		cranes with vehicle and windshield collisions as the amount of roadways within the Plan Area will be increased from existing conditions. Indirect effects on greater sandhill cranes associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to roosting and foraging habitat. Otherwise, greater sandhill cranes will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7) that will lessen roadway interaction.
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) GSC-1 (Greater Sandhill Crane Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all avian species, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Pogson and Lindstedt (1988) concluded that power line collisions seem to be the largest source of unnatural mortality of greater sandhill cranes in the Central Valley. Implementation of these AMMs will reduce effects of utility-related Covered Activities on greater sandhill cranes by incorporating the most current practices for avoiding avian power line collisions.

Table 6-97
Temporary Effects to Greater Sandhill Crane

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing)	Runoff from construction activities into greater sandhill crane habitat will be fully avoided through the implementation of AMMs.

Table 6-97
Temporary Effects to Greater Sandhill Crane

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation)	
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) GSC-2 (Greater Sandhill Crane Pre-Construction Surveys) GSC-3 (Greater Sandhill Crane Roosting Buffer) GSC-4 (Greater Sandhill Crane Visual Barrier) GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring)	Inadvertent trampling and compaction of vegetation could cause greater sandhill crane and their prey to avoid habitat. Implementation of AMMs ensures that trampling and compaction do not occur.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location) GSC-2 (Greater Sandhill Crane Pre-Construction Surveys) GSC-3 (Greater Sandhill Crane Roosting Buffer) GSC-4 (Greater Sandhill Crane Visual Barrier) GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring)	Loud noise can affect greater sandhill cranes and cause abandonment of roosting sites. Implementation of AMMs will minimize construction noise effects in the vicinity of greater sandhill crane roosting and foraging habitat.
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	BMP-6 (Construction Lighting) GSC-1 (Greater Sandhill Crane Surveys) GSC-2 (Greater Sandhill Crane Pre-Construction Surveys) GSC-3 (Greater Sandhill Crane Roosting Buffer) GSC-4 (Greater Sandhill Crane Visual Barrier) GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid abandonment of roosts and disorienting effects to greater sandhill crane.

Table 6-97
Temporary Effects to Greater Sandhill Crane

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Construction Dust	None required for this species.	No effect on this species.
Increased Human Presence during Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) GSC-1 (Greater Sandhill Crane Surveys) GSC-2 (Greater Sandhill Crane Pre-Construction Surveys) GSC-3 (Greater Sandhill Crane Roosting Buffer) GSC-4 (Greater Sandhill Crane Visual Barrier) GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring)	Effects associated with increased human presence during construction that could affect greater sandhill crane habitat and behavior will be reduced by implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) GSC-3 (Greater Sandhill Crane Roosting Buffer) GSC-4 (Greater Sandhill Crane Visual Barrier) GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring)	Trash and debris would adversely affect greater sandhill crane habitat quality through direct effects, such as attracting nuisance pest species and potential predators (e.g., feral cats). Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.26 Tricolored Blackbird

Permanent Effects

Permanent direct and indirect effects of Covered Activities on tricolored blackbird (*Agelaius tricolor*) will include modification or removal of modeled nesting/foraging habitat, modeled foraging habitat, habitat fragmentation and isolation, noise, lighting, increased human activity (including trash and debris), altered hydrology, altered fire regime, vehicle collisions, electrocution and collisions associated with aboveground transmission lines, wildlife community alterations, disease, and pesticides.

Over the proposed 50-year Permit Term, Covered Activities will directly affect approximately 31,058 of the 212,632 acres of modeled habitat for tricolored blackbird in the Plan Area, including approximately 27,531of the 188,539 acres of modeled nesting/foraging habitat and approximately 3,527 of the 24,093 acres of modeled foraging habitat (Table 6-98). Most of the direct effects for tricolored blackbird, approximately 29,823 acres (96%), will occur inside the UDA, including approximately 26,488 acres of modeled nesting/foraging habitat and 3,335 acres of modeled foraging habitat. Outside of the UDA, a total of approximately 1,235 acres of modeled habitat will be directly affected, including approximately 1,043 acres of modeled nesting/foraging habitat and 192 acres of modeled foraging habitat.

In addition to the direct effects quantified in Table 6-98, Covered Activities will indirectly affect tricolored blackbird modeled nesting and foraging habitat, and will also injure, kill, or harass individuals in the Plan Area (Table 6-99). All indirect effects (both qualitative and quantitative) to tricolored blackbird will be reduced through implementation of the AMMs described in Table 6-99. These potential indirect effects would be expected to generally affect tricolored blackbird in a similar manner to their effects on the other covered avian species, but some of the effects would have relatively greater effects on tricolored blackbird, as discussed in the following text. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on tricolored blackbird is greatest within the UDA because of the closer and more extensive contact between urban development and preserved areas. It is expected that most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA would be along improved roads supporting higher traffic densities and speeds that would increase the risk of vehicle collisions, accidental fire ignitions, and other road-related effects (e.g., traffic noise, road runoff, potential spread of invasive plants).

In addition to the general AMMs (Section 5.4.1), tricolor blackbird-specific measures (Section 5.4.2) will be implemented to avoid permanent direct and indirect effects on tricolor blackbird to Covered Activities. With implementation of the proposed AMMs, the proposed Covered

Activities will result in a small risk of killing or injuring individual tricolor blackbird in the Plan Area due to collisions with fixed structures or vehicles. Additionally, there is a small risk of take in the form of harassment over the duration of the permit (e.g., inhibiting individuals from roosting or foraging in some areas). This incrementally increased risk of take is mitigated through the SSHCP Conservation Strategy (Chapter 7).

Temporary Effects

In addition to the permanent removal of habitat described previously, tricolored blackbird nesting and foraging habitats near proposed ground-disturbing Covered Activities would be adversely affected by several temporary construction-related effects that could result in additional habitat disturbance or additional injury, mortality, or harassment of individual tricolored blackbirds. The various off-site direct effects that would affect tricolored blackbirds are generally described in Section 6.3.2 and include dust; noise and ground vibration; lighting; altered hydrology; chemicals and pollution; general human activity (including trash and debris); and inadvertent grading, clearing, or trampling of habitat.

These potential construction-related environmental stressors were described previously in Section 6.3.2, and their additional effects on tricolored blackbird are qualitatively described in Table 6-100, as are AMMs that would avoid and/or minimize these temporary effects.

Table 6-98
Tricolored Blackbird Permanent Effects

Land Cover Types[1]	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Nesting/Foraging Habitat												
Valley Grassland	135,112	22,014	Qualitative	22,014	30,345	21,345	Qualitative	21,345	104,767	669	Qualitative	669
Cropland	47,905	5,285	Qualitative	5,285	5,481	4,922	Qualitative	4,922	42,424	363	Qualitative	363
Seasonal Wetland	2,600	105	Qualitative	105	162	102	Qualitative	102	2,438	3	Qualitative	3
Freshwater Marsh	2,922	127	Qualitative	127	392	119	Qualitative	119	2,530	8	Qualitative	8
Total Nesting/ Foraging Habitat	*188,539*	*27,531*	*Qualitative*	*27,531*	*36,380*	*26,488*	*Qualitative*	*26,488*	*152,159*	*1,043*	*Qualitative*	*1,043*
Foraging Habitat												
Irrigated Pasture-Grassland	15,991	2,749	Qualitative	2,749	3,218	2,594	Qualitative	2,594	12,773	155	Qualitative	155
Vernal Pool	4,536	389	0	389	935	355	0	355	3,601	34	0	34
Swale	1,222	234	0	234	461	232	0	232	761	2	0	2
Open Water	2,344	155	Qualitative	155	237	154	Qualitative	154	2,107	1	Qualitative	1
Total Foraging Habitat	*24,093*	*3,527*	*0*	*3,527*	*4,851*	*3,335*	*0*	*3,335*	*19,242*	*192*	*0*	*192*
Grand Total	**212,632**	**31,058**	**0**	**31,058**	**41,231**	**29,823**	**0**	**29,823**	**171,401**	**1,235**	**0**	**1,235**

Table 6-99
Permanent Indirect Effects on Tricolored Blackbird

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-2 (Groundwater Recharge) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-2 (Erosion Control) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Pesticide Use) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	Long-term hydrologic alterations or reductions in water quality within the Plan Area would substantially affect tricolored blackbird nesting and foraging habitat, both in quantity and in quality. In addition, the colonial nature of this species and the close proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Specific effects of these chemicals and pollutants on tricolored blackbirds may be toxic either directly (e.g., dermal contact) or through ingestion of contaminated food sources (grain and invertebrates), or may reduce prey/forage abundance. Implementation of AMMs such TCB-5 and those that require control of stormwater runoff, restrict pesticide use, and reduce erosion will preserve nesting and foraging habitat from actions that can result in altered hydrology, and ensure pollution will not enter waterways that could degrade tricolored blackbirds nesting and foraging habitat areas and where their primary food sources could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 8, UTILITY-1 (Avian Collision Avoidance) TCB-1 (Tricolored Blackbird Surveys) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	Tricolored blackbirds are sensitive to habitat fragmentation and isolation. Habitat fragmentation will reduce relatively undisturbed nesting and foraging habitat patch sizes inside the UDA, increasing the chance that surrounding development will be closer to potential nest colonies and will potentially cause disturbance and possible abandonment of otherwise suitable colony sites. Additionally, habitat fragmentation would reduce available foraging habitat near nest colonies, forcing birds to travel farther and potentially reducing their fitness due to higher energy costs and reduced time at the nest. For example, during the breeding season, tricolored blackbirds do most of their foraging within approximately 3 miles of the nest colony, although they commute up to 8 miles (Beedy

Table 6-99
Permanent Indirect Effects on Tricolored Blackbird

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		2008). Habitat fragmentation would increase and exacerbate the effects of other potential permanent indirect effects to tricolored blackbird including increased human activity, altered hydrology, increased wildfire, vehicle collisions, aboveground utilities, altered wildlife communities, and risk of collisions with man-made structures and vehicles. The Landscape Preserves established outside the UDA will avoid effects of habitat fragmentation on tricolored blackbird by preserving large habitat blocks and ensuring connectivity throughout the Preserve System. Within the UDA, habitat fragmentation will affect tricolored blackbird because all UDA Preserves will be bordered by urban development, which will be reduced through implementation of TCB AMMs, EDGE AMMs, and UTILITY AMMs. The effects of roads fragmenting on some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2), will be reduced through EDGE AMMs, TCB AMMS, UTILITY AMMs, and ROAD AMMs. Overall, the large Core Preserves and connectivity provided by the SSHCP Preserve System, along with TCB-1, will minimize the effects of habitat fragmentation on tricolored blackbird in the Plan Area.
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Increased wildfire can have similar effects to altered hydrology on foraging and nesting habitat for tricolored blackbird. While Cropland and Irrigated Pasture-Grassland are important foraging habitats for tricolored blackbird in the Plan Area and are less prone to wildfire effects, Valley Grassland and Vernal Pool Ecosystems are also a suitable foraging and/or nesting habitat. Repeated or intense wildfires could affect Valley Grassland and Vernal Pool Ecosystems foraging and/or nesting habitat by removing vegetation cover and facilitating invasion by non-native exotic plant species. As with hydrologic effects, factors that degrade habitat for important food sources would reduce foraging habitat quality for

Table 6-99
Permanent Indirect Effects on Tricolored Blackbird

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		tricolored blackbird. As discussed in Section 6.3, outside the UDA, Covered Activities would not affect wildfire frequency, duration, or intensity. Effects of increased wildfire on tricolored blackbird habitat will be minimized through implementation of the Preserve System Monitoring and Management Program, which will include a commitment to develop a memorandum of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) Condition 8, UTILITY-4 (Siting of Entry and Exit Location)	Effects on tricolored blackbird due to Vernal Pool hydrologic alterations are mainly associated with foraging habitat. Hydrologic alterations could affect patterns of foraging (localized forage/prey abundance and quality) within Vernal Pool Ecosystems. Implementation of AMMs will significantly reduce effects of Vernal Pool hydrologic alterations on tricolored blackbird foraging habitat.
Chronic Ground Vibration and Noise	None required for this species.	No effect on this species.
Lighting	EDGE-8 (Outdoor Lighting) BMP-6 (Construction Lighting) TCB-1 (Tricolored Blackbird Surveys)	Lighting will mildly affect tricolored blackbird, depending on several factors, including light intensity, height of lighted structure, and physical shielding and vegetation. Sudden and unexpected onset of lighting (e.g., from vehicles) will also startle normally diurnally active birds, potentially causing them to abandon nests and/or become disoriented. Lighting could also lure prey insects that the tricolored blackbird depend on, reducing their abundance within tricolored blackbird habitat preserves. Implementation of these AMMs would ensure that Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittees determines lighting is necessary for public safety or security. By directing lighting away from preserves, this effect would be reduced but not eliminated.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread)	Tricolored blackbirds are sensitive to human disturbances, and nesting tricolored blackbirds are very sensitive to human disturbances, abandoning colonies with a single disturbance

Table 6-99
Permanent Indirect Effects on Tricolored Blackbird

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 3, BMP-11 (Speed Limit) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 8, UTILITY-1 (Avian Collision Avoidance) EDGE-8 (Outdoor Lighting) TCB-1 (Tricolored Blackbird Surveys) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	(Beedy and Hamilton 1999). Potential effects of increased human activity will be reduced through implementation of these AMMs, including TCB-1 and TCB-5 and Conditions 2, 3, 4, and 5, will ensure that increased human activity in and near Preserves is limited, that precautions are taken to minimize anthropogenic effects, and that effects are monitored so that human activity does not substantially affect tricolored blackbirds or their habitat.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education) TCB-1 (Tricolored Blackbird Surveys)	Covered Activities may facilitate wildlife community alterations by changing the structure of the wildlife community by increased human activity (and non-native predators, such as dogs), pesticides, livestock, and invasive species. Known nocturnal predators of tricolored blackbirds that would increase in urbanized and agricultural settings include opossum, skunk, raccoon, American crows, ravens, and cattle egrets (*Bubulcus ibis*) (Mailliard 1914; Meese 2011; Neff 1937), as well as cats (*Felis catus*) (Payne 1969). In the Central Valley, coyotes are also major predator of tricolored blackbird colonies, especially in silage field colonies and cattail colonies when water is withdrawn (Hamilton, pers. comm. n.d., as cited in Appendix B, Species Accounts.) Implementation of AMMs such as those require Trail Public Education and Preserve Setbacks prevent invasive species spread road project location and tricolored blackbird surveys will ensure human activity will have minimal effects to the wildlife community within tricolored blackbird habitat.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks)	Unmanaged proliferation of non-native plants could affect species composition within tricolored blackbird habitat in the Plan Area. A

Table 6-99
Permanent Indirect Effects on Tricolored Blackbird

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	change in vegetation structure could have an effect on forage habitat and prey species use of habitat. Implementation of AMMs will minimize proliferation of non-native plants. Effects of proliferation of non-native plants will be reduced relative to existing unmanaged conditions (see Chapter 7).
Invasive Animals	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, NATURE TRAIL-6 (Nature Trail Public Education)	As described previously in Wildlife Community Alterations, invasion by non-native predators of tricolored blackbird and its prey is avoided through AMMs such as Preserve Setbacks and Monitoring of Trail Impacts.
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 6, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) TCB-1 (Tricolored Blackbird Surveys)	Effects to tricolored blackbird by mesopredators will be minimized by implementing AMMs that reduce interaction between tricolored blackbird and urban wildlife (raccoon, opossum, fox) and pets.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 4, ROAD-3 (Roadside Pesticide Use)	No information on diseases directly affecting tricolored blackbird are available in literature published on the species. However, the West Nile virus has been documented in the closely related red-winged blackbird (*Agelaius phoeniceus*), as well as Brewer's blackbird (*Euphagus cyanocephalus*) and common grackle (*Quiscalus quiscula*) (Bernard et al. 2001; Komar 2003), and the virus has been implicated in the decline of at least one species in Central Valley—loggerhead shrike (Pandolfino 2008). The risk of

Table 6-99
Permanent Indirect Effects on Tricolored Blackbird

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	TCB-1 (Tricolored Blackbird Surveys) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	West Nile virus infections will be managed through vector control for public health and safety, such as through spraying with pesticides, but management will need to consider potential adverse effects to native wildlife, as spraying with mosquito abatement oil has resulted in mass mortality of tricolored blackbirds (Beedy and Hamilton 1999). While these disease factors generally cannot be addressed wholly through specific AMMs, the SSHCP Conservation Strategy of preserving adequate nesting and foraging habitat in several locations in the Preserve System will help reduce the risk of epizootic events related to increased contact between colonies. Implementation of these AMMs will also act to minimize the potential for introduction of these diseases into local tricolored blackbird populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use) TCB-1 (Tricolored Blackbird Surveys) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	Tricolored blackbirds have been demonstrated to be sensitive to pesticides and herbicides. For example, the application of herbicides and pesticides are known to affect the nesting success of colonies in agricultural areas (Beedy and Hamilton 1999). Various poisons and contaminants have also caused mass mortality, including poisoning by strychnine and selenium and spraying with mosquito abatement oil (McCabe 1932; Beedy and Hayworth 1992; Beedy and Hamilton 1999; Beedy 2008). Pesticides may also reduce the abundance of insect prey that tricolored blackbird depend on. Adverse effects on tricolored blackbird and/or their nesting and foraging habitat from insecticides/pesticides or fertilizers used in new urban developments in or near SSHCP Preserves will be minimized through the implementation of AMMs that will reduce and/or restrict the use of these chemicals in the Plan Area. Specific restrictions on pesticide use in certain preserves may be included in Preserve Management Plans, further minimizing the effects of pesticides on

Table 6-99
Permanent Indirect Effects on Tricolored Blackbird

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		tricolored blackbird nesting habitat and the insect prey of tricolored blackbird.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) ROAD-1 (Road Project Location) ROAD-2 (Wildlife Crossing Structures) TCB-1 (Tricolored Blackbird Surveys)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by tricolored blackbirds near heavily trafficked areas and in urbanized areas. As described for the covered raptors, increased collision risks are inevitable with urbanization and are difficult to predict or control directly because birds fly some distance between nesting locations and preferred foraging areas. Covered Activities will increase the frequency of tricolored blackbird vehicle and windshield collisions as the amount of roadways within the Plan Area will be increased from existing conditions. Indirect effects on tricolored blackbird associated with vehicle collisions and aircraft will be avoided by locating planned road projects in the least environmentally sensitive location relative to nesting and foraging habitat. Otherwise, tricolored blackbird will be preserved from collisions by establishment of large, interconnected Preserves (Chapter 7) that will lessen roadway interaction.
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance) TCB-1 (Tricolored Blackbird Surveys)	Aboveground utilities such as transmission towers, utility poles, and powerlines pose a general risk to all avian species, with mortalities and injuries from collisions (powerlines), entanglements, and electrocutions (Franson et al. 1995; Lehman et al. 2007). Implementation of these AMMs will reduce effects of utility-related Covered Activities on tricolored blackbirds by incorporating the most current practices for avoiding avian power line collisions.

Table 6-100
Temporary Effects to Tricolored Blackbird

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single Loaded Streets) Condition 4, ROAD-1 (Road Project Location) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	Runoff from construction activities into tricolored blackbird habitat will be fully avoided through the implementation of AMMs.
Laydown or Trampling of Vegetation	Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-11 (Speed Limit) TCB-1 (Tricolored Blackbird Surveys) TCB-2 (Tricolored Blackbird Pre-Construction Surveys) TCB-3 (Tricolored Blackbird Nest Buffer) TCB-4 (Tricolored Blackbird Nest Buffer Monitoring)	Inadvertent trampling and compaction of vegetation could cause tricolored blackbird to avoid habitat or reduce the quantity or quality of foraging and nesting habitat. Implementation of AMMs ensures that trampling and compaction will not occur.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location) TCB-1 (Tricolored Blackbird Surveys) TCB-2 (Tricolored Blackbird Pre-Construction Surveys) TCB-3 (Tricolored Blackbird Nest Buffer) TCB-4 (Tricolored Blackbird Nest Buffer Monitoring) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural	Loud noise can affect tricolored blackbird and cause abandonment of nesting sites. Implementation of AMMs will minimize construction noise effects in the vicinity of tricolored blackbird nesting and foraging habitat.

AGENDA ITEM 11.1

998

Table 6-100
Temporary Effects to Tricolored Blackbird

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	Preserves)	
Construction Ground Vibration	None required for this species.	No effect on this species.
Construction Lighting	BMP-6 (Construction Lighting) TCB-1 (Tricolored Blackbird Surveys) TCB-2 (Tricolored Blackbird Pre-Construction Surveys) TCB-3 (Tricolored Blackbird Nest Buffer) TCB-4 (Tricolored Blackbird Nest Buffer Monitoring) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	During construction periods, ground-disturbing Covered Activities will direct all temporary construction lighting away from adjacent natural habitats to avoid abandonment of nests and disorienting effects to tricolored blackbird. Lighting could also lure prey insects that the tricolored blackbird depend on, reducing their abundance within tricolored blackbird habitat preserves. By directing lighting away from preserves, this effect would be reduced but not eliminated.
Construction Dust	None required for this species.	No effect on this species.
Increased Human Presence during Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) TCB-1 (Tricolored Blackbird Surveys) TCB-2 (Tricolored Blackbird Pre-Construction Surveys) TCB-3 (Tricolored Blackbird Nest Buffer) TCB-4 (Tricolored Blackbird Nest Buffer Monitoring) TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves))	Effects associated with increased human presence during construction that could affect greater tricolored blackbird and behavior will be reduced by implementing AMMs.
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program) TCB-1 (Tricolored Blackbird Surveys) TCB-2 (Tricolored Blackbird Pre-Construction Surveys) TCB-3 (Tricolored Blackbird Nest Buffer) TCB-4 (Tricolored Blackbird Nest Buffer Monitoring)	Trash and debris would adversely affect tricolored blackbird habitat quality through direct effects, such as attracting nuisance pest species and potential predators (e.g., feral cats). Implementation of AMMs ensures that construction trash and debris will be controlled.

6.6.27 American Badger

Permanent Effects

Permanent direct and indirect effects of Covered Activities on American badger (*Taxidea taxus*) will include modification or significant degradation of modeled habitat and direct and indirect take of all American badger individuals occupying that modified or degraded habitat. Modeled habitats for American badger are Valley Grassland, Blue Oak Savanna, Vernal Pool, Seasonal Wetland, and Swale.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 22,780 acres of modeled habitat for American badger within the Plan Area (see Table 6-101). Covered Activity impacts on American badger will occur primarily inside the UDA, with approximately 22,036 acres of permanent effects in the UDA and 744 acres of permanent effects outside the UDA.

American badger in the Plan Area will be affected by several permanent indirect effects on habitats, as well as injury, mortality, or harassment of individuals (Table 6-102). Potential permanent indirect effects of the Covered Activities include habitat fragmentation and isolation, noise, lighting, increased human activity (including recreation and trash and debris), altered fire regime, vehicle collisions, wildlife community alterations, disease, and pesticides. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on American badger is greatest within the UDA because of the closer and more extensive contact between urban development and protected areas. It is expected that most of these indirect effects, with the exception of vehicle collisions, will be relatively minor outside the UDA because of the larger Preserves and much lower development densities. Most potential indirect effects outside the UDA will be along improved roads supporting higher traffic densities and speeds that increase the risk of vehicle collisions, accidental fire ignitions, and other road-related effects (e.g., traffic noise, potential spread of invasive plants). The potential permanent indirect effects of Covered Activities are described below, along with AMMs to avoid and minimize these effects.

Table 6-101
American Badger Permanent Effects

Land Cover Types[1]	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Valley Grassland	135,112	22,014	Qualitative	22,014	30,345	21,345	Qualitative	21,345	104,767	669	Qualitative	669
Blue Oak Savanna	5,637	38	Qualitative	38	18	2	Qualitative	2	5,619	36	Qualitative	36
Vernal Pool	4,536	389	0	389	935	355	0	355	3,601	34	0	34
Seasonal Wetland	2600	105	Qualitative	105	163	102	Qualitative	102	2,437	3	Qualitative	3
Swale	1,252	234	0	234	461	232	0	232	791	2	0	2
GRAND TOTAL	**149,137**	**22,780**	**0**	**22,780**	**31,922**	**22,036**	**0**	**22,036**	**117,215**	**744**	**0**	**744**

Temporary Effects

American badgers near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to American badger. Generally, these temporary effects will occur within the project footprint or road right-of-way area (already quantified as permanently affected in the direct effects reported in Table 6-101). These potential construction-related environmental stressors were generally described in Section 6.3.2, and their additional effects on American badger are qualitatively described in Table 6-103.

Table 6-102
Permanent Indirect Effects on American Badger

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 3, BMP-9 (Soil Compaction) Condition 4, ROAD-1 (Road Project Location)	Planned development and roads, both in the UDA and outside the UDA, would be located near American badger habitat. This development will result in hydrologic and water quality effects on this habitat, including urban runoff that alters normal hydroperiods in vernal pools and seasonal wetlands and that contains pollutants and toxins, including fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure pollution will not enter American badger habitat and that water chemistry of aquatic habitat will not be affected.
Habitat Fragmentation	Habitat fragmentation was minimized in the SSHCP Preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	Habitat fragmentation, especially in the UDA, will be the primary indirect effect on American badgers. American badger is a mobile species that often uses large areas within its home range (Lindzey 1978; Long 1973; Messick and Hornocker 1981; Minta 1993; Sargeant and Warner 1972). Minimum patch size is estimated to be approximately 25 acres (Laudenslayer and Parisi 2007). Young also may disperse long distances, with females moving more than 32 miles and males moving more than 63 miles (Messick and Hornocker 1981). These large home ranges and long-distance movements mean that fragmented habitats will expose badgers to various risks, including encounters with humans and dogs and vehicle collisions. Because badgers naturally occur in low population densities, additional effects from habitat fragmentation and isolation can quickly result in local extirpations, which have been observed in the Central Valley possibly more than in any other portion of California (Larsen 1987). Additionally, habitat fragmentation from Covered Activities will reduce habitat patch size and expose American badgers to adverse edge effects such as noise and lighting. Habitat fragmentation will be minimized in the UDA through establishment of large and interconnected Preserves.

Table 6-102
Permanent Indirect Effects on American Badger

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	As discussed in Section 6.3, Covered Activities outside the UDA will not affect wildfire frequency, duration, or intensity. Within the UDA, increased wildfire will cause direct mortality of American badger prey (e.g., ground squirrels, rabbits, other small rodents) and general habitat degradation that reduces prey abundances over time. Other adverse habitat effects could result from wildfire suppression (e.g., fire trucks, retardant, fire breaks). Effects of wildfire suppression on American badge will be minimized through implementation of the Preserve System Management Program, which will include a commitment to develop memorandums of agreement with responsible fire agencies.
Vernal Pool Hydrologic Alterations	None required for this species.	No effect on this species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	Increased vibration and noise levels in American badger habitat will degrade habitat quality for American badger, resulting in avoidance of high-noise areas such as roadways (Iglesias et al. 2012). Effects of noise on badgers will be minimized through EDGE AMMs, including establishment of Preserve Setbacks and design of compatible land uses near Preserves. Noise effects will also be considered in design of wildlife crossings (ROAD-2).
Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 4, ROAD-1 (Road Project Location)	American badger is primarily nocturnal, so lighting will have particularly adverse effects on this species, reducing habitat suitability near urban development and roads. Also, prey such as small rodents may avoid lighted areas, reducing prey resources in these areas. AMMs will minimize light pollution in Preserves in the UDA by requiring that lighting be shielded and directed away from adjacent natural habitats, establishing Preserve Setbacks, and ensuring that compatible land uses are placed adjacent to Preserves as much as possible.

AGENDA ITEM 11.1
1004

Table 6-102
Permanent Indirect Effects on American Badger

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Increased human activity related to public access in the Preserve System will disrupt essential American badger behaviors such as foraging, reproducing, and dispersing. In addition to effects such as inadvertent or intentional harassment of wildlife and habitat degradation (e.g., off-trail use), specific effects related to increased human activity are increased pets, trash, and debris. American badgers are especially susceptible to harassment by dogs. Potential effects of increased public access in the Preserve System will be addressed through Condition 5 AMMs.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location)	For American badgers, wildlife community alteration effects will occur as a result of changes in prey availability caused by habitat degradation and potentially increased competition for resources by mesopredators. As omnivores, badgers prey on a variety of native prey, including squirrels, rabbits, small rodents, birds (including eggs and nestlings) and snakes, and are sensitive to factors that alter predator/prey relationships. However, their omnivory also makes them resilient to changes in wildlife communities. This resilience, coupled with the minimization provided by the AMMs, will result in minimal effects on American badger.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves)	Invasion and proliferation of invasive plant species related to Covered Activities will adversely affect American badger through changes in rodent prey populations that eat native plant species.

AGENDA ITEM 11.1

1005

Table 6-102
Permanent Indirect Effects on American Badger

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 6, RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank)	Invasive plants will also adversely affect American badger by changing soil conditions and making it more difficult for badgers to dig burrows. Invasion and proliferation of invasive plant species will be controlled through implementation of AMMs that restrict development near Preserves, establish Preserve Setbacks, and control invasive species spread in Preserves and Preserve Setbacks.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	Because American badgers are mesopredators, an increase in the population of other mesopredators will increase competition for prey and habitat. Increases in mesopredator populations will be limited through AMMs that reduce interaction between badgers on Preserves and pets and urban-adapted wildlife (e.g., raccoon, opossum, fox).
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Urban development near existing and proposed Preserves will increase transmission of disease to American badgers. Quinn et al. (2012) found that American badgers near urban areas had been exposed to several bacterial infectious agents associated with pets and wildlife, and to canine distemper virus. The SSHCP will have little direct control over potential disease transmission from ingested prey such as rodents because active control of these well-established and very common species likely is not feasible. However, potential transmission of diseases from pets will be minimized by through EDGE measures and by restricting public access to Preserves.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside	Pesticides (including rodenticides) will enter American badger habitat through rodent control programs (e.g., ground squirrels), runoff from irrigated landscapes and from storm events, use during windy conditions, and from otherwise incorrect application methods resulting in problems such as drift and overspray into Preserves. Because badgers often prey on ground squirrels, rodent controls

AGENDA ITEM 11.1
1006

Table 6-102
Permanent Indirect Effects on American Badger

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	that reduce prey abundance and expose badgers to toxic chemicals will adversely affect the species in the Plan Area. Quinn et al. (2012) found badger tissue that contained anticoagulant rodenticides brodifacoum and bromadiolone, commonly used to control rodent pests.
Vehicle and Aircraft Collisions with Wildlife	Habitat fragmentation was minimized in the SSHCP Preserve design, including preserving large habitat blocks and habitat connectivity throughout the Preserve System, as discussed in detail in Chapter 7. Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-7 (Hardpan/Duripan Protection) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures)	Habitat fragmentation associated with Covered Activities, especially in the UDA, will increase the chance of vehicle collisions for badgers attempting to cross improved roads that have higher traffic densities and speeds. It is difficult to predict precise locations where collisions are most likely to occur because there are few known American badger occurrences in the Plan Area, and its spatial movement patterns are unknown. However, Condition 4 road project study requirements, wildlife crossings, and other AMMs to reduce the effects of habitat fragmentation on movement and associated increased collision risks will be implemented. These AMMs, in combination with establishment of large and interconnected Preserves, will help maintain American badger movement in the Plan Area and minimize the chances of death, injury, and harassment of American badger through vehicle collisions.
Aboveground Electrical Utilities Collision and Electrocution	None required for this species.	No effect on this species.

Table 6-103
Temporary Effects to American Badger

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single-Loaded Streets) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location)	Runoff from construction activities into American badger aquatic land cover types will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	None required for this species.	No effect on this species.
Construction Noise	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location)	Construction-related noise will degrade habitat quality for American badger, resulting in avoidance of the construction vicinity. Effects of noise on badgers will be minimized through BMPs and EDGE AMMs, including establishment of Preserve Setbacks and design of compatible land uses near Preserves.
Construction Ground Vibration	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 4, ROAD-1 (Road Project Location)	Construction-related vibration will degrade habitat quality for American badger, resulting in avoidance of the construction vicinity. Generally, non-disturbance setbacks for non-critical den use such as winter dens can be smaller (e.g., at least 50 feet), but need to be larger for maternity dens until young are mobile (e.g., at least 200 feet). Effects of vibration on badgers will be minimized through BMPs and EDGE AMMs, including establishment of Preserve Setbacks and design of compatible land uses near Preserves.
Construction Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-6 (Construction Lighting) Condition 4, ROAD-1 (Road Project Location)	American badgers are primarily nocturnal, so lighting will have particularly adverse effects on this species and reduce habitat suitability near urban development and roads. Also, prey such as small rodents may avoid lighted areas, reducing prey resources in these areas. AMMs will minimize light pollution into Preserves in the

AGENDA ITEM 11.1

1008

Table 6-103
Temporary Effects to American Badger

Environmental Stressor	Effect Reduced By	Potential Effect on Species
		UDA by requiring that lighting be shielded and directed away from adjacent natural habitats, establishing Preserve Setbacks, and ensuring that compatible land uses are placed adjacent to Preserves as much as possible.
Construction Dust	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-3 (Dust Control)	Dust will affect habitat and prey availability for American badger. Dust effects on vegetation communities will reduce habitat quality for important prey such as small mammals, reptiles, amphibians, and ground nesting birds. An AMM requiring control of construction dust will minimize this effect.
Increased Human Presence during Construction	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas)	Increased human activity in construction areas will disrupt essential American badger behaviors such as foraging, reproduction, and dispersal. In addition to effects such as inadvertent or intentional harassment of wildlife and habitat degradation, specific effects related to increased human activity are increased pets, trash, and debris. Badgers are especially susceptible to harassment by dogs. Potential effects of increased human presence in construction areas will be addressed through staff training.
Construction Trash and Debris	Condition 2, EDGE-3 (Preserve Setbacks) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect American badger habitat quality through direct effects such as attracting nuisance pest species and mesopredators, which could harass American badgers or compete with them for prey. Implementation of AMMs will ensure that construction trash and debris are controlled.

6.6.28 Western Red Bat

Permanent Effects

Permanent direct and indirect effects of Covered Activities on western red bat (*Lasiurus blossevillii*) will include modification or significant degradation of modeled habitat and the direct and indirect take of all roost sites in that modified or degraded habitat. The SSHCP database does not contain any confirmed western red bat roost sites in the Plan Area.

Over the proposed 50-year Permit Term, Covered Activities will permanently affect approximately 23,986 acres of western red bat modeled habitat within the Plan Area (see Table 6-16) consisting of 23,330 acres of foraging habitat and 656 acres of roosting/foraging habitat. Covered Activity impacts on western red bat modeled habitat will occur primarily inside the UDA, with approximately 23,142 acres of permanent effects on modeled habitat in the UDA and 844 acres of permanent effects on modeled habitat outside the UDA (Table 6-104).

Western red bat in the Plan Area will be affected by several permanent indirect effects on roosting/foraging and foraging habitats, and will be affected by injury, mortality, and harassment of individuals (Table 6-105). Western red bat is a tree-roosting species; individuals or small groups of reproductive females roost in the foliage of broadleaf trees such as cottonwoods (*Populus* spp.) and sycamores (*Platanus racemosa*), and also in orchards (often walnut (*Juglans* spp.)). Constantine (1959) reported that human activities in orchards caused bats to fly from the roosts, although they returned the next day. Human talking and walking around roost sites did not appear to substantially disturb bats, but any attempt to handle the bat did. Based on this, human activities associated with Covered Activities will affect roosting and reproduction, especially if pregnant and lactating females are roosting in areas subject to high levels of human activity during construction or operation. Although these indirect effects will occur throughout the Plan Area, their potential to have substantial effects on western red bat is greatest within the UDA because of the closer and more extensive contact between urban development and protected areas. Most of these indirect effects will be relatively minor outside the UDA because of the larger Preserves and much lower development densities, and the potential for human activities near roost sites. Most potential indirect effects outside the UDA would be to potential foraging habitat along improved roads supporting higher traffic densities that increase the risk of accidental fire ignitions and other road-related effects (e.g., traffic noise that will mask acoustic signals, road runoff, potential spread of invasive plants). The permanent indirect effects of Covered Activities on western red bat are described in Table 6-105, along with AMMs to avoid and minimize these effects.

In addition to indirect effects from Covered Activities near or adjoining existing Preserves or planned SSHCP Preserves, certain uses will be allowed inside Preserves and in Preserve

Setbacks that may indirectly affect western red bat. This impact analysis assumes that proper implementation of AMMs on Preserves and Preserve Setbacks over the Permit Term will avoid and minimize "other" indirect impacts.

Temporary Effects

Western red bat occurrences near proposed ground-disturbing Covered Activities will be adversely affected by several temporary construction-related effects (see Section 6.3.2) that will result in additional disturbance to habitat or additional harm to the species. Generally, these temporary effects will occur within the project footprint or road right-of-way area (quantified as permanently impacted in the direct effects reported in Table 6-104). These potential construction-related environmental stressors were described in Section 6.3.2, and their additional effects on western red bat are qualitatively described in Table 6-106.

Table 6-104
Western Red Bat Permanent Effects

Land Cover Types[1]	Total Plan Area (acres)				Inside UDA (acres)				Outside UDA (acres)			
	Total Available	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Total Available*	*Direct Effect*	*Indirect Effect*	*Total Effect*
Foraging Habitat												
Valley Grassland	135,112	22,014	Qualitative	22,014	30,345	21,345	Qualitative	21,345	104,767	669	Qualitative	669
Vernal Pool	4,536	389	0	389	935	355	0	355	3,601	34	0	34
Seasonal Wetlands	2,600	105	Qualitative	105	162	102	Qualitative	102	2,438	3	Qualitative	3
Freshwater Marsh	2,922	127	Qualitative	127	392	119	Qualitative	119	2,530	8	Qualitative	8
Streams/Creeks	2,674	117	Qualitative	117	163	92	Qualitative	92	2,511	25	Qualitative	25
Open Water	2,344	155	Qualitative	155	237	154	Qualitative	154	2,107	1	Qualitative	1
Mixed Riparian Scrub	1,451	189	Qualitative	189	241	186	Qualitative	186	1,210	3	Qualitative	3
Swale	1,252	234	0	234	461	232	0	232	791	2	0	2
Total Foraging Habitat	*152,891*	*23,330*	*0*	*23,330*	*32,936*	*22,585*	*0*	*22,585*	*119,955*	*745*	*0*	*745*
Roosting/Foraging Habitat												
Blue Oak Woodland	9,132	9	Qualitative	9	0	0	Qualitative	0	9,132	9	Qualitative	9
Mixed Riparian Woodland	5,785	184	Qualitative	184	244	146	Qualitative	146	5,541	38	Qualitative	38
Blue Oak Savanna	5,637	38	Qualitative	38	18	2	Qualitative	2	5,619	36	Qualitative	36
Orchards	3,646	207	Qualitative	207	212	191	Qualitative	191	3,434	16	Qualitative	16
Mine Tailing Riparian Woodland	641	218	Qualitative	218	220	218	Qualitative	218	421	0	Qualitative	0
Total Roosting/ Foraging Habitat	*24,841*	*656*	*Qualitative*	*656*	*694*	*557*	*Qualitative*	*557*	*24,147*	*99*	*Qualitative*	*99*
Grand Total	**177,732**	**23,986**	**Qualitative**	**23,986**	**33,630**	**23,142**	**Qualitative**	**23,142**	**144,102**	**844**	**Qualitative**	**844**

AGENDA ITEM 11.1

1012

Table 6-105
Permanent Indirect Effects on Western Red Bat

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	The proximity of planned development and roads to aquatic habitat increases the likelihood that hydrologic and water quality effects will occur, including urban runoff that could potentially contain pollutants and toxins such as fertilizers, herbicides, pesticides, fuel, oil, lubricants, paints, and release agents. Implementation of AMMs such as those that require control of stormwater runoff will ensure that pollution will not enter waterways that run through riparian areas and aquatic habitats where western red bat prey could be directly affected.
Habitat Fragmentation	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location)	Although western red bat are mobile and able to fly over unsuitable landscapes, habitat fragmentation will have at least two adverse effects on the species: (1) exposing suitable roosting sites to urban edges, thus increasing the potential for disruptive effects such as noise, lighting, human activities, and urban-related predators, and (2) forcing bats to fly farther to suitable foraging areas, thus increasing energetic demands and time away from the roost. Habitat fragmentation also increases other risks such as collisions with vehicles and human-built structures. The Landscape Preserves and agricultural Preserves established outside the UDA will avoid effects of habitat fragmentation on western red bat. Within the UDA, habitat fragmentation will affect western red bat because all UDA Preserves will be bordered by urban development; this will be reduced through implementation of EDGE AMMs. The effects of roads fragmenting some UDA Preserves, such as Core Preserve 1 in PPU 1 and Core Preserve 2 in PPU 2 (Chapter 7, Section 7.5.2) will be reduced through EDGE AMMs and ROAD AMMs. Overall, the large Preserves and connectivity provided by the SSHCP Preserve System will minimize the effects of habitat fragmentation on western red bat in the Plan Area.

Table 6-105
Permanent Indirect Effects on Western Red Bat

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
Increased Wildfire	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Increased wildfire can have similar effects as altered hydrology on riparian roosting and foraging habitat of western red bat. However, because western red bat depends on larger, mature trees such as Fremont's cottonwood, western sycamore, and valley oak in the Central Valley, it is sensitive to fire effects on mature trees. Implementation of AMMs under Conditions 2 and 5 will help reduce indirect effects to western red bat associated with increased wildfire.
Vernal Pool Hydrologic Alterations	None required for this species.	No effect on this species.
Chronic Ground Vibration and Noise	Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	The sensitivity of western red bats to noise and vibration is not well understood; however, they are likely sensitive to human disturbances, and vibration and noise could indirectly affect the use of foraging and roosting habitat for western red bat. Implementation of these AMMs will minimize chronic noise near western red bat roosting and foraging habitat.
Lighting	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-8 (Outdoor Lighting) Condition 4, ROAD-1 (Road Project Location)	Increased lighting will attract insects, and foraging Western red bats will be attracted to this lighting in urban development areas near Preserves. This effect will not necessarily be adverse, but exposure to urban development could increase lighting spillover onto Preserves. Lighting could also lure prey insects that the western red bat depend on, reducing their abundance within tricolored blackbird habitat preserves. Implementation of these AMMs would ensure that Covered Activities that require lighting in the UDA will minimize light pollution into Preserves, except where a Plan Permittee determines that lighting is necessary for public safety or security. By directing lighting away from preserves, this effect would be reduced but not eliminated.
Increased Human Activity	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-1 (Road Project Location)	Increased human activity related to public access in the Preserve System should have minimal effects on nocturnal foraging species like western red bat, but will potentially disrupt roosting. Potential effects on roosting from public access in the Preserve System will

Table 6-105
Permanent Indirect Effects on Western Red Bat

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
	Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Effects) Condition 5, NATURE TRAIL-6 (Nature Trail Public Education)	be addressed through Conditions 2, 4, and 5.
Wildlife Community Alterations	Condition 1, LID-1 (Stormwater Quality) Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts) Condition 5, NATURE TRAIL-6 (Nature Trail Public Education)	Wildlife community alterations will affect western red bat through changes in prey availability and exposure to urban-related competitors and predators. Roosting western red bats are vulnerable to urban-related predators, including skunks, opossums, cats, rats, and crows, as well as western scrub-jays.
Invasive Plants	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-3 (Roadside Pesticide Use) Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Invasion and proliferation of invasive plants can result in wildlife community alterations that result in reduced insect prey abundance for western red bat. These effects will be limited through implementation of AMMs.
Invasive Animals	None required for this species.	No effect on this species.
Mesopredators	Condition 1, LID-3 (Natural Site Features) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-2 (Wildlife Crossing Structures) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Several mesopredators prey on adult and juvenile western red bats, including Virginia opossum and domestic cats. Exposure of western red bats to these mesopredators will increase with urban development under the SSHCP. Effects to western red bat and its insect prey by mesopredators will be minimized by implementing AMMs that reduce interaction between western red bat and urban

Table 6-105
Permanent Indirect Effects on Western Red Bat

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		wildlife (raccoon, opossum, fox) and pets.
Wildlife Disease	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 4, ROAD-3- Roadside Pesticide Use Condition 5, NATURE TRAIL-1 (Nature Trail Plan) Condition 5, NATURE TRAIL-2 (Nature Trail Protection of Duripan) Condition 5, NATURE TRAIL-3 (Nature Trail Location) Condition 5, NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design) Condition 5, NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Although no diseases have been identified as affecting western red bat, the species has not been well studied. Diseases transmitted from humans and pets could affect western red bat, and the risk of such transmission is expected to increase in the Plan Area with buildout of the UDA. Condition 2 EDGE measures will minimize the interaction of western red bat with humans and pets. Transmission of diseases from humans and pets in Preserves will be minimized by controlling access to Preserves through Condition 2 and Condition 5. Implementation of these AMMs will minimize the potential for introduction of diseases into local western red bat populations.
Pesticides and Fertilizers	Condition 1, LID-1 (Stormwater Quality) Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-4 (Locate Stormwater Control Outside Preserves) Condition 2, EDGE-5 (Stormwater Control in Preserve Setbacks) Condition 2, EDGE-6 (Detention Basins in Linkage Preserves) Condition 2, EDGE-10 (Prevent Invasive Species Spread) Condition 4, ROAD-1 (Road Project Location) Condition 4, ROAD-3 (Roadside Pesticide Use)	Pesticides are of particular concern for western red bats because they roost in orchards. Pierson et al. (2006) expressed concern that pesticide use at occupied orchards could result in injury, mortality, and harassment of western red bats, either through direct poisoning or indirectly through effects on prey abundance, especially if the bats are using the orchards as compensation for the historical loss of native riparian habitats (particularly walnut orchards along the Sacramento River). Adverse effects on western red bat or their habitat from pesticides or fertilizers used in new urban developments and in or near SSHCP Preserves will be minimized by implementation of AMMs. Specific restrictions on pesticide use in certain preserves may be included in Preserve Management Plans, further minimizing the effects of pesticides on the insect prey of western red bat.
Vehicle and Aircraft Collisions with Wildlife	Condition 2, EDGE-1 (Compatible Land Use) Condition 2, EDGE-2 (Single-Loaded Streets) Condition 2, EDGE-3 (Preserve Setbacks) Condition 2, EDGE-9 (Livestock Access to Preserves) Condition 4, ROAD-1 (Road Project Location)	Buildout in the UDA will result in higher traffic densities and speeds on improved roads and more frequent flights by western red bats in heavily trafficked and urbanized areas. Covered Activities will increase the frequency of vehicle and window strikes by western red bats. Indirect effects on western red bat associated with vehicle collisions and aircraft will be avoided by locating road projects in the

Table 6-105
Permanent Indirect Effects on Western Red Bat

Environmental Stressor (Section 6.3)	Indirect Effect Reduced By	Potential Indirect Effect on Species
		least environmentally sensitive location relative to western red bat habitat. Western red bat will be protected from collisions by establishment of large, interconnected Preserves (Chapter 7).
Aboveground Electrical Utilities Collision and Electrocution	Condition 8, UTILITY-1 (Avian Collision Avoidance)	Although UTILITY-1 is designed to avoid collisions with raptors, the same design measures should also reduce the likelihood of collisions with western red bats.

Table 6-106
Temporary Effects to Western Red Bat

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Temporary Alterations to Hydrographs and Construction Water Quality Effects	Condition 2, EDGE-1 (Compatible Land Uses) Condition 2, EDGE-2 (Preserve Setbacks) Condition 2, EDGE-3 (Single-Loaded Streets) Condition 3, BMP-1 (Construction Fencing) Condition 3, BMP-2 (Erosion Control) Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-4 (Erodible Materials) Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) Condition 3, BMP-9 (Soil Compaction) Condition 3, BMP-10 (Revegetation) Condition 4, ROAD-1 (Road Project Location)	Runoff from construction activities into western red bat riparian and aquatic land cover types will be fully avoided through implementation of AMMs.
Laydown or Trampling of Vegetation	None required for this species.	No effect on this species.
Construction Noise	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) BAT-1 (Winter Hibernaculum Surveys) BAT-2 (Winter Hibernaculum Pre-Construction Surveys)	Construction-related noise near winter hibernacula will disrupt colonies, and could lead to roost abandonment (e.g., Constantine 1959). Noise disturbance of these bats will be avoided through implementation of AMMs, including species-specific measures that

AGENDA ITEM 11.1
1017

Table 6-106
Temporary Effects to Western Red Bat

Environmental Stressor	Effect Reduced By	Potential Effect on Species
	BAT-3 (Winter Hibernaculum Buffer) BAT-4 (Bat Eviction Methods)	require identification and avoidance of any roosts.
Construction Ground Vibration	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) BAT-1 (Winter Hibernaculum Surveys) BAT-2 (Winter Hibernaculum Pre-Construction Surveys) BAT-3 (Winter Hibernaculum Buffer) BAT-4 (Bat Eviction Methods)	Construction-related ground vibration near winter hibernacula will disrupt colonies, and could lead to roost abandonment (e.g., Constantine 1959). Vibration disturbance of these bats will be avoided through implementation of AMMs, including species-specific measures that require identification and avoidance of any roosts.
Construction Lighting	Condition 3, BMP-6 (Construction Lighting) BAT-1 (Winter Hibernaculum Surveys) BAT-2 (Winter Hibernaculum Pre-Construction Surveys) BAT-3 (Winter Hibernaculum Buffer) BAT-4 (Bat Eviction Methods)	Construction-related noise, vibration, and lighting near winter hibernacula will disrupt colonies, including abandonment (e.g., Constantine 1959). Nighttime lighting could disrupt foraging by this nocturnal species, altering behavior by their prey insects and requiring additional energy expenditure by the bats to find food. Lighting could also lure prey insects that the western red bat depend on, reducing their abundance within tricolored blackbird habitat preserves. These effects will be minimized through avoidance of nighttime lighting, and identification and buffering of occupied roosts.
Construction Dust	Condition 3, BMP-7 (Dust Control)	Dust will affect foraging habitat quality for western red bat by decreasing the vigor and productivity of vegetation communities and reducing habitat quality for important insect prey such as moths, beetles, grasshoppers, and crickets. This effect will be minimized by AMMs so that it does not substantially affect the species.
Increased Human Presence during Construction	Condition 3, BMP-3 (Equipment Storage and Fueling) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-2 (No Pets in Construction Areas) BAT-1 (Winter Hibernaculum Surveys) BAT-2 (Winter Hibernaculum Pre-Construction Surveys) BAT-3 (Winter Hibernaculum Buffer) BAT-4 (Bat Eviction Methods)	Increased human presence during construction near a winter hibernaculum will disrupt normal behavior and physiology. Disturbance of these bats will be avoided through implementation of AMMs, including species-specific measures that require identification and avoidance of any roosts.

Table 6-106
Temporary Effects to Western Red Bat

Environmental Stressor	Effect Reduced By	Potential Effect on Species
Construction Trash and Debris	Condition 3, BMP-7 (Biological Monitor) Condition 3, BMP-8 (Training of Construction Staff) SPECIES-1 (Litter Removal Program)	Trash and debris will adversely affect western red bat habitat quality through direct effects such as attracting nuisance pest species or mesopredators, which could prey on juvenile bats. Implementation of AMMs will ensure that construction trash and debris are controlled.

6.7 References Cited

Baker, M.D., M.J. Lacki, G.A. Falxa, P.L. Droppleman, R.A. Slack, and S.A. Slankard. 2008. "Habitat Use of Pallid Bats in Coniferous Forests of Northern California." *Northwest Science* 82(4):269–275.

Balfour, P.S. and S.R. Morey. 1999. "Prey Selection by Juvenile Bullfrogs in a Constructed Vernal Pool Complex." *Transactions of the Western Section of the Wildlife Society* 35: 34–40.

Barbour, R.W., and W.H. Davis. 1969. "*Yuma myotis.*" In *Bats of America*, 27–31. Lexington, Kentucky: University Press of Kentucky.

Barrass, A. and L. Cohn 1984. "Variation of the Spacing of Calling Male *Bufo woodhousii* and *Hyla cinerea* Near Highway Noise." *American Zoologist* 24(3): 15A.

Beedy, E.C. 2008. "Tricolored blackbird (*Agelaius tricolor*)." In *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies,* and Distinct Populations of Birds of Immediate Conservation Concern in California, edited by W.D. Shuford and T. Gardali, 437–443. Studies of Western Birds, no. 1. California: Western Field Ornithologists (Camarillo), and California Department of Fish and Game (Sacramento). 2008. Accessed January 2016. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=10506&inline.

Beedy, E.C. and A.M. Hayworth. 1992. "Tricolored Blackbird Nesting Failures in the Central Valley of California: General Trends or Isolated Phenomena." In *Endangered and Sensitive Species of the San Joaquin Valley, California,* edited by D.F. Williams, S. Byrne, and T.A. Rado, 33–46. Sacramento, California: California Energy Commission.

Beedy, E.C., and W.J. Hamilton III. 1999. "Tricolored Blackbird." *The Birds of North America Online*, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. Accessed November 25, 2009. doi: 10.2173/bna.423.

Behrends, P. 2015. Personal Observation by Phil Behrends.

Bent, A.C. 1938. "Life Histories of North American Birds of Prey (Part 2)." *U.S. National Museum Bulletin.* 170.

Bernard, K.A., J.G. Maffei, S.A. Jones, E.B. Kauffman, G.D. Ebel, A.P. Dupuis II, K.A. Ngo, D.C. Nicholas, D.M. Young, P. Shi, V.L. Kulasekera, M. Eidson, D.J. White, W.B. Stone, New York State West Nile Virus Surveillance Team 1, and L.D. Kramer. 2001. "West Nile Virus Infection in Birds and Mosquitoes, New York State, 2000." *Emerging Infectious Diseases* 7(4):679–685. Accessed July 17, 2014.

Berry, K.H. 1980. "A Review of the Effects of Off-Road Vehicles on Birds and Other Vertebrates." In *Workshop Proceedings: Management of Western Forests and Grasslands for Nongame Birds; February 11–14, 1980*; Salt Lake City, Utah, edited by R.M. DeGraff and N.G. Tilghman, 451–467. General Technical Report INT-86. Ogden, Utah: U.S. Forest Service.

Bloom, P.H. 1980. "The Status of the Swainson's Hawk in California, 1979." Wildlife Managment Branch, Nongame Wildlife Invest, Job II-8.0. Sacramento, California: California Department of Fish and Game.

Boal, C.W. and R.W. Mannan. 1999. "Comparative Breeding Ecology of Cooper's Hawks in Urban and Exurban Areas of Southeastern Arizona." *Journal of Wildlife Management* 63: 77–84.

Bossard, C.C., J.M. Randall, and M.C. Hoshovsky. 2000. *Invasive Plants of California's Wildlands*. Berkeley, California: University of California Press.

Brattstrom B.H. and M.C. Bondello. 1983. "Effects of Off-Road Vehicle Noise on Desert Vertebrates." In *Environmental Effects of Off-Road Vehicles: Impacts and Management in Arid Regions*, edited by R.H. Webb and H.G. Wilshire, 167–206. New York, New York: Springer-Verlag.

CDFG (California Department of Fish and Game). 2010. *Report to the Fish and Game Commission: A Status Review of the California Tiger Salamander* (Ambystoma californiense). January 11, 2010.

Churcher, P.B. and Lawton, J.H. 1987. "Predation by Domestic Cats in an English Village." *Journal of Zoology, London* 212: 439–455

Constantine, D.G. 1959. "Ecological Observations on Lasiurine Bats in the North Bay Area of California." *Journal of Mammalogy* 40:131–15.

Crane, M. F. 1989. "Sambucus nigra subsp. cerulea." In: *Fire Effects Information Syste*m, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Accessed September 23, 2014. http://www.fs.fed.us/database/feis/.

Crooks, K.R., and M.E. Soulé. 1999. "Mesopredator Release and Avifaunal Extinctions in a Fragmented System." *Nature* 400:563–566.

Dalquest, W.W. 1947. "Notes on the Natural History of the Bat *Myotis yumanensis* in California, with a Description of a New Race. *American Midland Naturalist* 38:224–247.

Davis, J.N. and C.A. Niemela. 2008. "Northern Harrier (*Circus cyaneus*)." In *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California*, edited by D. Shuford and T. Gardali. Studies of Western Birds, no. 1. California: Western Field Ornithologists (Camarillo), and California Department of Fish and Game (Sacramento).

Deem, S.L., L.H. Spelman, R.A. Yates, R.J. Montali. 2000. "Canine Distemper in Terrestrial Carnivores: A Review." *Journal of Zoo and Wildlife Medicine* 31(4).

Dimmitt, M.A. and R. Ruibal. 1980. "Exploitation of Food Resources by Spadefoot Toads (*Scaphiopus*)." *Copeia* 1980(4):854–862.

Dodd, C.K., Jr., W.J. Barichivich, and L.L. Smith. 2004. "Effectiveness of a Barrier Wall and Culverts in Reducing Wildlife Mortality on a Heavily Traveled Highway in Florida." *Biological Conservation* 118:619–631. Accessed July 7, 2008. doi: 10.1016/j.biocon.2003.10.011.

Dooling, R.J. 2006. "Estimating Effects of Highway Noise on the Avian Auditory System." In *Proceedings of the 2005 International Conference of Ecology and Transportation,* edited by C.L. Irwin, P. Garrett, and K.P. McDermott, 30–31. Raleigh, North Carolina: Center for Transportation and the Environment, North Carolina State University. Accessed August 13, 2012. http://escholarship.org/uc/item/60z8s62w.

Dunk, J.R. 1995. "White-Tailed Kite." *The Birds of North America Online*, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. Accessed November 29, 2011. doi: 10.2173/bna.178.

England S.A., J.A. Estep, and W.R. Holt. 1995. "Nest-Site Selection and Reproductive Performance of Urban Nesting Swainson's Hawks in the Central Valley of California." *Journal of Raptor Research* 29(3):179–186.

EPA (U.S. Environmental Protection Agency). 1972. "DDT Ban Takes Effect" [EPA press release]. December 31, 1972. Accessed online January 8, 2016. http://www.epa.gov/aboutepa/ddt-ban-takes-effect .

Fleischli, M.A., J.C. Franson, N.J. Thomas, D.L. Finley, and W. Riley Jr. 2004. "Avian Mortality Events in the United States Caused by Anticholinesterase Pesticides: A Retrospective Summary of National Wildlife Health Center Records from 1980 to 2000." *Archives of Environmental Contamination and Toxicology* 46:542–550. Accessed July 16, 2014. doi: 10.1007/s00244-003-3065-y.

Florida Fish and Wildlife Conservation Commission. 2003. Section 6.3.1.

Foley, J.E., P.F. Foley, and N.C. Pedersen. 1999. "The Persistence of a SIS Disease in a Metapopulation." *Journal of Applied Ecology* 36 (4). September 1999.

Franson J.C., L. Sileo, and N.J. Thomas. 1995. "Causes of Eagle Deaths." In *Our Living Resources: A Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems*, edited by E.T. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran, and M.J. Mac, 68. Washington, D.C.: U.S. Department of the Interior, National Biological Survey.

Gervais, J.A., D.K. Rosenberg, and L.A. Comrack. 2008. "Burrowing Owl (*Athene cunicularia*)." In *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California*, edited by W.D. Shuford and T. Gardali, 218–226. Studies of Western Birds, no. 1. California: Western Field Ornithologists (Camarillo), and California Department of Fish and Game (Sacramento). February 4, 2008. Accessed December 11, 2012. http://www.dfg.ca.gov/wildlife/nongame/ssc/birds.html.

Harris, J., and C. Mirande. 2013. "A Global Overview of Cranes: Status, Threats and Conservation Priorities." *Chinese Birds* 4(3):189–209. Accessed July 16, 2014. doi: 10.5122/cbirds.2013.0025.

Hawbecker, A.C. 1942. "A Life History of the White-Tailed Kite." *Condor* 44(6):267–276.

Henny, C.J. and H.M. Wight. 1972. Population Ecology and Environmental Pollution: Red-tailed and Cooper's Hawks." *Wildlife Research Report 2*. U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center. Section 6.3.1.

Hermanson, J.W., and T.J. O'Shea. 1983. "Antrozous pallidus." American Society of Mammalogists. Mammalian Species 213:1–8.

Hickey, M.B.C., L. Acharya, and S. Pennington. 1996. "Resource Partitioning by Two Species of Vespertilionid Bats (*Lasiurus cinereus* and *Lasiurus borealis*) Feeding around Street Lights." *Journal of Mammalogy* 77(2):325–334.

Humple, D. 2008. "Loggerhead shrike (*Lanius ludovicianus*)" In *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California*, edited by W.D. Shuford and T. Gardali, 271–277. Studies of Western Birds, no. 1. California: Western Field Ornithologists (Camarillo), and California Department of Fish and Game (Sacramento). 2008. Accessed January 2016. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=10413.

Huxel, G.R. 2000. "The Effect of the Argentine Ant on the Threatened Valley Elderberry Longhorn Beetle." *Biological Invasions* (2). 2000.

Iglesias, C., C. Mata, and J.E. Malo. 2012. "The Influence of Traffic Noise on Vertebrate Road Crossing Through Underpasses." *Ambio* 41(2): 193–201. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3357842.

Ivey, G.L. and C.P. Herziger. 2003. Sandhill Crane Monitoring at Staten Island, San Joaquin County, California, 2002–03. Unpublished report. Consumnes River Preserve, Galt, California.

Ivey, G.L., B.D. Dugger, C.Cp. Herziger, M.L. Casazza, and J.P. Fleskes. 2015. "Wintering Ecology of Sympatric Subspecies of Sandhill Crane: Correlations Between Body Size, Site Fidelity, and Movement Patterns." In The Condor: Ornithological Applications 117: 518–529.

Kelly, P. A. and J. T. Rotenberry. 1993. "Buffer Zones for Ecological Reserves in California: Replacing Guesswork with Science." In *Interface Between Ecology and Land Development in California*. J. E. Keeley, ed. Los Angeles, California: Southern California Academy of Sciences, pp 85–92.

Kleinschmidt Associates. 2008. *Cosumnes River Management Plan*. Prepared for Cosumnes River Preserve.

Komar, N. 2003. "West Nile Virus: Epidemiology and Ecology in North America." *Advances in Virus Research* 61:185–234. Accessed July 17, 2014.

Larsen, C.J. 1987. *Badger Distribution Study*. California Department of Fish and Game, Nongame Wildlife Investigations Report, Project W-65-R-4, Job I-11.

Laudenslayer, W.F., Jr., and M.D. Parisi. 2007. "Species Notes for American Badger (*Taxidea taxus*): California Wildlife Habitat Relationships (CWHR) System Level II Model Prototype." Accessed April 27, 2010. http://www.dfg.ca.gov/biogeodata/cwhr/downloads/Level_II/Notes/II_American_Badger.pdf. California Department of Fish and Game, California Interagency Wildlife Task Group. October 2007.

Lehman, R.N., P.L. Kennedy, and J.A. Savidge. 2007. "The State of the Art in Raptor Electrocution Research: A Global Review." *Biological Conservation* 136:159–174. Accessed July 30, 2012. doi:10.1016/j.biocon.2006.09.015.

Lindzey, F.G. 1978. "Movement Patterns of Badgers in Northwestern Utah." *Journal of Wildlife Management* 42:418–422.

Littlefield, C.D. and G.L. Ivey. 2000. "Conservation Assessment for Greater Sandhill Cranes Wintering on the Cosumnes River Floodplain and Delta Regions of California." Prepared for The Nature Conservancy, Cosumnes River Preserve. February 2000.

Long, C.A. 1973. "*Taxidea taxus*." *Mammalian Species* 26: 1–4. American Society of Mammalogists. June 13, 1973.

Longcore, T., and C. Rich. 2004. "Ecological Light Pollution." *Frontiers in Ecology and the Environment* 2:191–198.

Mailliard, J. 1914. "Notes on a Colony of Tri-colored Redwings." *Condor* 16:204–207.

McCabe, T.T. 1932. Wholesale poison for the Red-Wings. *Condor,* 34:49-50.

Meese, R.J. 2011. *Reproductive Success of Tricolored Blackbird Colonies in 2011 in the Central Valley of California*. Final report. Submitted to California Department of Fish and Game. Nongame Wildlife Program Report 2011-08. Davis, California: University of California at Davis, Department of Environmental Science and Policy. Accessed July 17, 2014.

Menke, S.B., and D.A. Holway. 2006. "Abiotic Factors Control Invasion by Argentine Ants at the Community Scale." *Journal of Animal Ecology* 75:368–376.

Messick, J.P., and M.G. Hornocker. 1981. "Ecology of the Badger in Southwestern Idaho." *Wildlife Monographs* 76:1–53.

Miner, K.L., and D.C. Stokes. 2005. "Bats in the South Coast Ecoregion: Status, Conservation Issues, and Research Needs." USDA Forest Service Gen. Tech. Rep. PSW-GTR-195:211–227.

Minta, S.C. 1993. "Sexual Differences in Spatio-Temporal Interaction among Badgers." *Oecologia* 96:402–409.

Neff, J.A. 1937. "Nesting Distribution of the Tri-Colored Red-Wing." *Condor* 39:61–81.

Pandolfino, E.R. 2008. "Population Trends of the Loggerhead Shrike in California: Possible Impact of West Nile Virus in the Central Valley." *CVBC Bulletin* 11(2):37–44. Accessed July 15, 2014.

Pandolfino, E.R. 2008. "Population Trends of the Loggerhead Shrike in California: Possible Impact of West Nile Virus in the Central Valley." *CVBC Bulletin*.

Payne, R. 1969. *Breeding Seasons and Reproductive Physiology of Tricolored Blackbirds and Redwinged Blackbirds*. University of California Publications in Zoology, vol. 90. Berkeley, California: University of California Press.

Pierson, E.D., W.E. Rainey, and C. Corben. 2006. "Distribution and Status of Western Red Bats (*Lasiurus blossevillii*) in California." California Department of Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report 2006-04, Sacramento, California.

Pogson, T.H. 1990. *Distribution, Abundance, and Behavior of Greater Sandhill Cranes,* Grus canadensis tabida, *Wintering in California's Central Valley.* Fairbanks, Alaska: University of Alaska, Fairbanks.

Pogson, T.H. and S.M. Lindstedt. 1988. "Abundance, Distribution, and Habitat of Central Valley Population of Greater Sandhill Cranes during Winter." *Biology and Wildlife, University of Alaska, Fairbanks.*

Poulin, R. R.A. Paterson, C.R. Townsend, D.M. Tompkins, and D.W. Kelly. 2011. "Biological Invasions and the Dynamics of Endemic Diseases in Freshwater Ecosystems." *Freshwater Biology* 56.

Quinn, J.H. Yvette A. Girard, Kirsten Gilardi, Yvette Hernandez, Robert Poppenga, Bruno B. Chomel, Janet E. Foley, and Christine K. Johnson. 2012. Pathogen and Rodenticide Exposure in American Badgers (Taxidea taxus) in California. *Journal of Wildlife Diseases*: April 2012, Vol. 48, No. 2, pp. 467–472.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. "The role of perched aquifers in hydrological connectivity and biogeochemical processes in vernal pool landscapes, Central Valley, California." *Hydrological Processes* (20) 5: 1157–1175.

Redling, K., E. Elliott, D. Bain, and J. Sherwell. 2013. "Highway contributions to reactive nitrogen deposition: tracing the fate of vehicular NOx using stable isotopes and plant biomonitors." *Biogeochemistry* 10.1007/s10533-013-9857-x.

Robins, J.D., and J.E. Vollmar. 2002. "Livestock Grazing and Vernal Pools." In *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland*. Berkeley, California: Vollmar Consulting.

Rottenborn, S.C. 1999. "Predicting the Impacts of Urbanization on Riparian Bird Communities." *Biological Conservation* 88(3), pp 289–299.

Sargeant, A.B., and D.W. Warner. 1972. "Movement and Denning Habits of a Badger." *Journal of Mammalogy* 53:207–210.

Saunders, D.A., H.J. Hobbs, and C.R. Margules. 1991. "Biological Consequences of Ecosystem Fragmentation: A Review." *Conservation Biology* 5:18–27

Stabler, M. 1941. "The Morphology of *Trichomonas gallinae* (= *columbae*)." *Journal of Morphology* 69, 501–515. November 1941.

Swainson's Hawk Technical Advisory Committee. 2000. Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley. 2000. Accessed online September 23, 2014. https://www.dfg.ca.gov/wildlife/nongame/raptors/swha/.

Tacha, T.C., S.A. Nesbitt, and P.A. Vohs. 1992. "Sandhill Crane." In *The Birds of North America,* no. 31, edited by A. Poole, P. Stettenheim, and F. Gill. Philadelphia, Pennsylvania: The Academy of Natural Sciences, and Washington D.C.: American Ornithologists Union.

Talley, T.S., and M. Holyoak. 2009. "The Effects of Highways and Highway Construction on Valley Elderberry Longhorn Beetle Habitat." Final Report FHWA/CA09-0925. Submitted to the California Department of Transportation.

Tatarian, G. 1999. "Use of Buildings and Tolerance of Disturbance by Pallid Bats *Antrozous pallidus*. *Bat Research News* 40(1):11–12.

Terres, J.K. 1980. "Eagle, Golden, *Aquila chrysaetos*." In *The Audubon Society Encyclopedia of North American Birds,* 477–478. New York, New York: Alfred A. Knopf.

USFS (U.S. Forest Service). 2008. "Species Accounts: Animals." http://www.fs.fed.us/r5/scfpr/projects/lmp/read.htm.

USFWS (United Stated Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland, Oregon: U.S. Fish and Wildlife Service, Region 1.

USFWS. 2006. Final rule: "Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants." February 10, 2006. Federal Register, volume 71, pages 7118–7316.

Waian, L. 1973. "The Behavioral Ecology of the North American White-Tailed Kite (*Elanus leucurus majusculus*) of the Santa Barbara Coastal Plain." PhD dissertation; University of California, Santa Barbara.

Wilcove, D.S., C.H. McLellan, and A.P. Dobson. 1986. "Habitat Fragmentation in the Temperate Zone." In *Conservation Biology: The Science of Scarcity and Diversity*, edited by M.E. Soulé, 237–256. Sunderland, Massachusetts: Sinauer Associates Inc.

Wilcox, B., and D. Murphy. 1985. "Conservation Strategy: The Effects of Fragmentation on Extinction." *American Naturalist* 125:879–887.

7 CONSERVATION STRATEGY

The South Sacramento Habitat Conservation Plan (SSHCP) Conservation Strategy includes the Avoidance and Minimization Measures (AMMs) (Section 5.4); the SSHCP Biological Goals and Measurable Objectives (Table 7-1), including the development of the Preserve System (Section 7.4); monitoring and adaptive management programs (Chapter 8), and an Aquatic Resources Program (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report). The SSHCP Conservation Strategy will meet the regulatory requirements of the federal Endangered Species Act (ESA) and California Endangered Species Act (CESA). In addition, as discussed in Chapter 1, the SSHCP Conservation Strategy will "streamline" compliance of third-party projects with Sections 401 and 404 of the Clean Water Act (CWA), with Section 1600 of the California Fish and Game Code, and the California's Porter-Cologne Water Quality Control Act (see Section 1.3.5).

The SSHCP Conservation Strategy mitigates to the maximum extent practicable the impacts of Covered Activities described in Chapter 6, Effects Assessment and Level of Take, including all direct and indirect impacts on Covered Species and their habitats. The SSHCP Conservation Strategy provides for conservation of 28 Covered Species and 17 land cover types; avoids or minimizes impacts of Covered Activities; mitigates for the impacts of Covered Activities on the Covered Species and their habitats on the basis of species and habitat needs; provides a regional approach to the mitigation of impacts and the conservation of species and their habitats; protects wetlands and waters of the Plan Area; and conserves natural communities in the Plan Area.

The SSHCP Conservation Strategy is based on the best scientific data available at the time of its preparation (see Chapter 3, Biological Resources Setting, and Appendix B, Species Accounts, as well as Figure 7-1, Conservation Strategy Conceptual Diagram). The components of the SSHCP Conservation Strategy include the Covered Activity impact AMMs described in Chapter 5; the Biological Goals and Measurable Objectives of the SSHCP described in Section 7.3; and the SSHCP Monitoring and Management Programs (Chapter 8), which includes preparing Preserve Management Plans for all SSHCP Preserve lands. All Preserve Management Plans will include monitoring of land management actions and adaptive management of each SSHCP Preserve.

To achieve the Biological Goals and Measurable Objectives, the SSHCP Conservation Strategy is focused on the following:

- Create an integrated Preserve System that conserves the natural land covers, certain Cropland, and Irrigated Pasture–Grassland in the Plan Area. The Preserve System will preserve at least 34,495 acres of existing habitat and re-establish or establish at least 1,787 acres of habitat for a total Preserve System of 36,282 acres. The Preserve System

was developed for the benefit of SSHCP Covered Species, natural communities, biological diversity, and ecosystem functions of the Plan Area.

- Provide for the continued persistence of Covered Species in the Plan Area.
- Protect remaining natural segments of Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, Sun Creek, and their first and second order tributaries within the Urban Development Area (UDA) portion of the Plan Area.
- Protect all of the Laguna Creek Corridor within the Plan Area.
- Manage preserved lands to enhance populations of Covered Species and maintain biological diversity within the Preserve System.
- Maintain existing watershed functions in the Plan Area to benefit wetlands (aquatic land cover types), and to support aquatic Covered Species and their habitats.
- Re-establish or establish Vernal Pool land cover to ensure the Plan meets County of Sacramento (County), state, and federal requirements for "no-net-loss" of waters and wetlands and to offset impacts to vernal pool Covered Species.
- Re-establish or establish riparian and other aquatic land cover to ensure the Plan meets County, state, and federal requirements for "no-net-loss" of waters and wetlands and to offset impacts to riparian Covered Species.

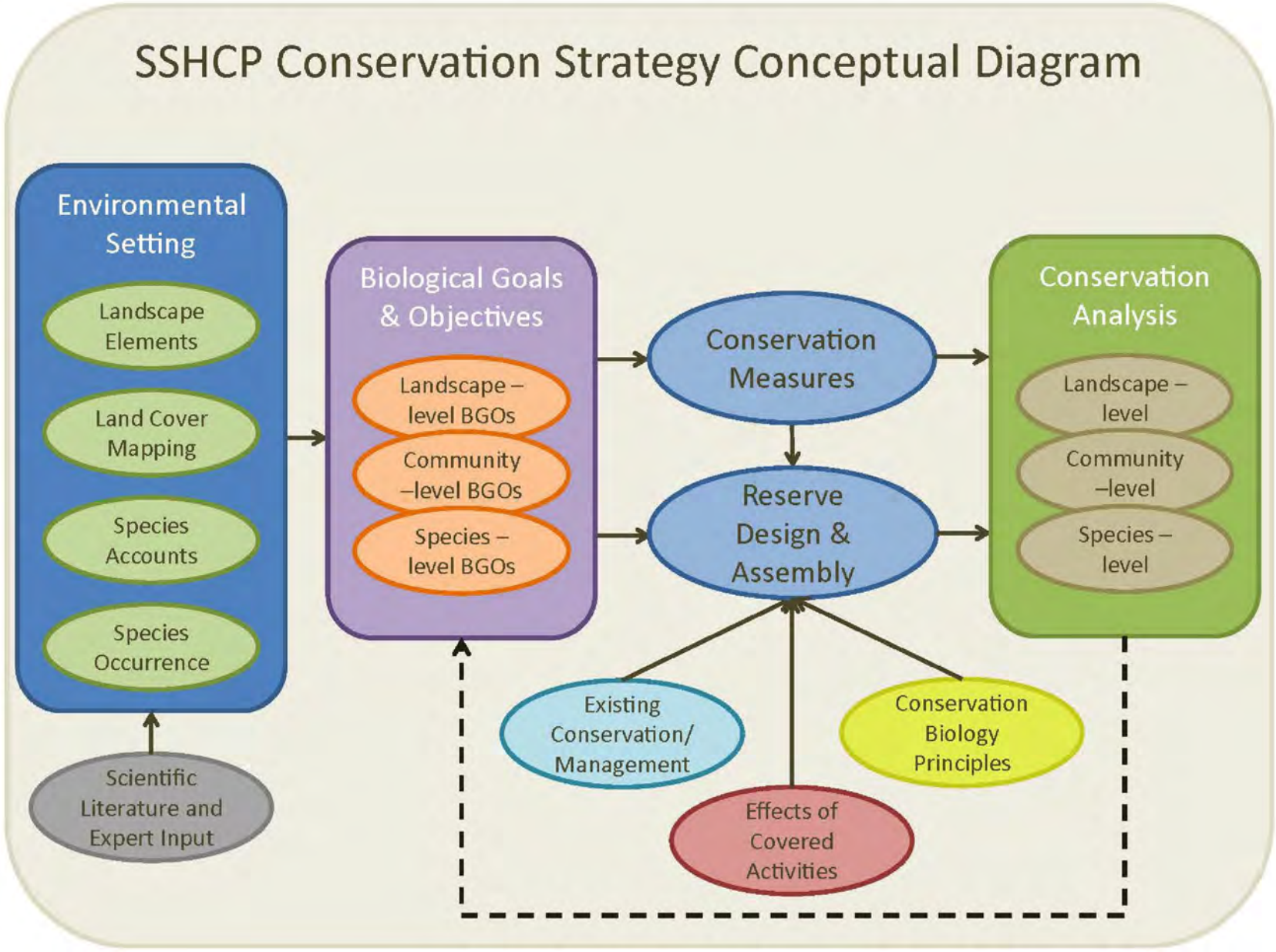


FIGURE 7-1

Conservation Strategy Conceptual Diagram

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Chapter 7\Figure 7-01_ConservationStrategy_Diagram.mxd

INTENTIONALLY LEFT BLANK

7.1 Guiding Principles of the SSHCP Conservation Strategy

The SSHCP Conservation Strategy is based on the principles of conservation biology and landscape ecology and the nature, quality, and geographical distribution of the resources in the Plan Area. The key principles of conservation biology that guide the Conservation Strategy include:

1. **Minimize Habitat Fragmentation.** Habitat fragmentation reduces in size and isolates areas of habitat for species. As habitats become increasingly isolated, species migration, immigration, and dispersal become less common or impossible, thereby limiting or preventing opportunities for populations to exchange individuals and genetic information, escape inhospitable habitats, and recolonize areas. Ultimately, these effects can result in extinction of the species in the fragmented habitat patches. Habitat fragmentation can also alter natural ecosystem functions as well as processes such as the effects of fires and flooding, timing of pollination, habitat recovery, and other stochastic environmental events (e.g., pest outbreaks) that species have adapted to over their evolutionary history. The SSHCP Conservation Strategy minimizes habitat fragmentation by focusing on the establishment of large Preserves, and by linking existing preserves and SSHCP Preserves together to allow wildlife movement:

    a. ***Form Large Preserves***. Larger preserves have several advantages over multiple smaller preserves, even if the total area preserved is the same. Larger preserves have a greater chance of preserving habitat diversity at all scales, support larger local populations, help maintain functioning metapopulations (partially isolated subpopulations of the same species that support immigration and emigration and provide for recolonizations following local extirpations), support greater species genetic diversity, and are more likely to maintain intact watershed functions. They also have less habitat fragmentation and provide greater protection from edge effects due to a larger area-to-perimeter ratio compared to smaller preserves. Additionally, large preserves usually facilitate more cost-effective land management, such as viable livestock grazing operations and controlled fire regimes that are better carried out on a landscape scale.

    b. ***Maintain Habitat Linkages Between Preserves.*** Natural land covers preserved as habitat linkages, including species upland habitats linkages and aquatic/riparian habitat linkages in streams, creeks, and unimproved water channels, should connect larger habitat tracts that would otherwise be isolated to movement of wildlife and movement of plant species pollinators between preserves (i.e., movement corridors). Movement corridors should be as wide, continuous, natural, and vegetatively diverse as practicable to accommodate as many species as possible and protect against adverse edge effects. Some smaller, less mobile species may actually reside in the linkage and larger and/or

more mobile species may only use each linkage as a movement corridor. Redundant or multiple habitat linkages between large blocks of preserved habitat are better than a single linkage, and linkages should ensure regional connectivity to natural habitats outside of the Plan Area, where biologically appropriate, and to the maximum extent practicable.

2. **Protect Watersheds and their Ecosystem Functions.** Watershed and sub-watershed functions are an important determinant for maintaining or enhancing habitat for certain stream- and wetland-dependent and wetland-associated plants and wildlife habitats. In addition, considering watersheds as part of an overall conservation strategy helps maintain ecosystem function and promotes avoidance and minimization of development-related impacts at larger scales. Sufficient sub-watershed areas should be preserved to maintain hydrologic functions such as recharge. Also, development-related increases in surface runoff and non-point source pollution (e.g., runoff from roads, roofs, paved surfaces, utility pipes, landscaped areas) can be addressed through watershed protection. Watershed protection also assists in the conservation of streams and their water quality. The SSHCP Conservation Strategy protects watersheds and their ecosystem functions through Stream Setbacks, preservation and re-establishment of riparian land cover types, and a range of water quality protection measures.

3. **Preserve Irreplaceable and Threatened Resources.** A site with high irreplaceability has unique species or natural communities that cannot be preserved or restored elsewhere. Examples of irreplaceable resources in the study area are slender Orcutt grass (*Orcuttia tenuis*) and Sacramento Orcutt grass (*Orcuttia viscida)*, which have very limited distribution, but occur within this Plan Area. Threatened resources are those most under threat from natural or anthropogenic (human-related) factors. The SSHCP Conservation Strategy will preserve irreplaceable and threatened resources such as slender Orcutt grass and Sacramento Orcutt grass by protecting all occurrences in the Plan Area. The Preserve System will protect biological diversity and natural communities that have a high level of irreplaceability and a high degree of threat.

4. **Minimize Edge Effects.** Edge effects occur at the interface between natural and developed areas. Examples of edge effects are light and noise pollution, vibration, altered surface and subsurface hydrology, runoff and water pollution, dumping of trash and other debris and toxic chemicals, spread of invasive non-native plants and animals, and presence of pets that may adversely affect native species (see Section 6.6 for discussions of indirect effects on Covered Species). Edge effects are most severe along the perimeter of a preserve within the urban boundary. The SSHCP Conservation Strategy addresses edge effects in several ways: during Preserve design by ensuring that SSHCP Preserves are large and minimize the amount of edge area; by providing setbacks between Preserves and development; by requiring development design features that reduce edge

effects (e.g., single-loaded streets, low-impact development measures); by implementing SSHCP Avoidance and Minimization Measures during Covered Activities to reduce or eliminate adverse effects of Covered Activities on adjacent biotic resources and the ecosystem processes that support them; and by monitoring Preserves for potential long-term edge effects that could not be completely eliminated by Preserve design and other Avoidance and Minimization Measures and adaptively managing to take corrective actions. Also see setbacks description (item five in this list).

5. **Utilize Setbacks.** Setbacks will be utilized between urban development and streams and between urban development and SSHCP Preserves or existing preserves. The purpose of the setbacks is to eliminate or reduce edge effects on Covered Species and natural communities, including waters and wetlands, from urban development. Setbacks provide important space between sensitive natural resources present in preserves or streams, and potential anthropogenic edge effects caused by lighting, noise, vibration, invasive species, pets, etc. By restricting the types of recreation facilities and loss of natural land covers within setbacks, the SSHCP setbacks may also provide additional habitat for some native wildlife species and beneficial insects (e.g., pollinators of native plants).

6. **Maintain Plan Area Land Cover Heterogeneity Within Preserves.** Heterogeneous natural communities generally contain greater biodiversity, are more likely to be ecologically complex, and may be more resilient over time when compared to more homogenous areas. Preserving the biotic and abiotic habitat heterogeneity of the Plan Area to the maximum extent practicable increases the likelihood of capturing the ecosystem functions and processes needed for the long-term conservation of Covered Species, their habitat, and overall biodiversity of the Plan Area. The Conservation Strategy is targeted toward maintaining existing heterogeneity of land covers inside and outside the UDA.

7. **Maintain or Increase Population Size.** Species populations with larger numbers of individuals are known to be more stable in the long term, less vulnerable to adverse demographic effects caused by environmental stochasticity (probabilistic events such as floods, fires, and disease), and less vulnerable to extirpation (extermination), when compared to smaller populations. Larger populations tend to possess higher genetic diversity, which can reduce the chance of genetic bottlenecks, genetic drift, and inbreeding depression. Larger populations better cope with and/or adapt to changing environmental conditions and local stochastic effects due to their greater number of individuals and likely greater genetic heterogeneity. For narrowly distributed species such as the Orcutt grasses, all existing occurrences will be preserved to maintain existing population sizes. The Conservation Strategy includes establishment of large and interconnected habitat Preserves that will be actively managed to improve the quality and extent of habitat for all Covered Species populations.

8. **Maintain Species Distribution in the Plan Area.** Maintaining population distributions over a landscape may limit the effects of stochastic disturbances to localized sub-populations (e.g., local extirpations). If populations persist in areas that escaped the stochastic disturbance, they may serve as sources for natural recolonizations of suitable habitat formerly occupied by the extirpated population. Maintaining population distributions also helps assure preservation of the species' genetic diversity, which may provide inherent resilience that would allow the species to adapt to changing environmental conditions. The Conservation Strategy includes establishment of large and interconnected habitat preserves throughout the Plan Area that will be actively managed to maintain viable populations of Covered Species consistent with their existing distribution in the Plan Area.

These guiding principles provided the conceptual foundation for the development of the Biological Goals and Measurable Objectives described in Section 7.3. Although the SSHCP is not a state Natural Community Conservation Plan (NCCP), the guiding principles of the SSHCP Conservation Strategy are consistent with six requirements of the NCCP Act (Fish and Game code 2820 (a)(4)]): (1) conserve, restore, and provide for the management of representative natural and semi-natural landscapes; (2) establish preserves that provide conservation of covered species within the Plan Area and linkages to adjacent habitat outside the Plan Area; (3) protect and maintain habitat areas that are large enough to support sustainable populations of covered species; (4) incorporate in the preserves a range of environmental gradients and high habitat diversity to provide for shifting species distributions in response to changing circumstances; (5) sustain the effective movement and interchange of organisms between habitat areas; and (6) contribute to species recovery to help to delist the listed species and prevent the listing of non-listed species through the protection, restoration, and enhancement of natural communities and species habitat. Although species recovery is not a statutory requirement of habitat conservation plans (HCPs), the SSHCP will provide additional habitat conservation for some amphibian, reptile, bird, and mammal Covered Species (beyond that required to mitigate impacts of Covered Activities, and the Conservation Strategy will conserve all Covered Species in the Plan Area. Further, the U.S. Fish and Wildlife Service (USFWS) recognizes that HCPs may present opportunities to conserve species habitat and meet the rationales for the species-specific recovery criteria (see Section 7.6.2.1).

7.2 Information Relevant to Conservation Strategy Development

The SSHCP Conservation Strategy was developed using a compilation of the best available scientific information, including the following:

- **Mapping of Land Covers within the Plan Area** – Color and black and white aerial photographs of the Plan Area spanning several years were reviewed and interpreted to identify the types and extent of Plan Area land covers (Section 3.2).

- **Existing Conditions of Species and Habitat at the Time of Plan Preparation** – The existing condition of the natural resources in the Plan Area (e.g., species occurrence data, topographic data, hydrologic unit code (HUC) 10 watersheds, soil types, existing preserves) was compiled, species accounts were developed for potential Covered Species (Appendix B), and SSHCP land cover types/natural communities were defined and described (Chapter 3). A vernal pool density analysis was conducted (Dittes et al. 2007). In 2014 and 2015, light detection and ranging (LIDAR) technology was used to further identify vernal pool complexes and define vernal pool micro-watersheds in the Plan Area (Section 3.2.3 and Appendix E).
- **Regional Threats and Environmental Stressors** – Stressors that might affect the persistence and population size of each Covered Species were considered when developing the Biological Goals and Measurable Objectives. Information in the most recent USFWS species 5-Year Reviews was used to identify threats and stressors for each federally listed Covered Species. Some of these threats are common across the range of each species (e.g., loss of vernal pools due to land conversion) and some are more Plan Area-specific (e.g., disturbance to particular creeks relied upon by giant gartersnake (*Thamnophis gigas*)). Biological Objectives (Table 7-1) were developed to completely avoid or to minimize the effects of these local stressors.
- **Recovery Plans and Reviews** – Existing conservation needs or management recommendations for covered species in state or federal recovery plans, federal 5-Year Reviews, or State Status Reviews, including the following:
    - *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005a), which describes conservation measures for most of the vernal pool plant and animal species that are Covered Species under the SSHCP
    - *Draft Recovery Plan for the Giant Garter Snake* (Thamnophis gigas) (USFWS 1999a)
    - *Valley Elderberry Longhorn Beetle Recovery Plan* (USFWS 1984)
    - Most recent USFWS 5-Year Reviews of each federally listed Covered Species:
        - *Slender Orcutt Grass (*Orcuttia tenuis*) 5-Year Review: Summary and Evaluation* (USFWS 2009)
        - *Orcuttia viscida (*Sacramento Orcutt Grass*) 5-Year Review: Summary and Evaluation* (USFWS 2008)
        - *California Tiger Salamander Central California Distinct Population Segment (*Ambystoma californiense*) 5-Year Review: Summary and Evaluation* (USFWS 2014)
        - *Giant Garter Snake* (Thamnophis gigas) *5-Year Review: Summary and Evaluation* (USFWS 2006a)

- *Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) 5-Year Review: Summary and Evaluation* (USFWS 2006b)
- *Vernal Pool Fairy Shrimp* (Branchinecta lynchi) *5-Year Review: Summary and Evaluation* (USFWS 2007a)
- *Vernal Pool Tadpole Shrimp* (Lepidurus packardi) *5-Year Review: Summary and Evaluation* (USFWS 2007b)

o *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States* (USFWS 2003)

o *A Status Review of the California Tiger Salamander* (Ambystoma californiense) (CDFG 2010).

As applicable, recovery needs for this region identified in the recovery plans and reviews informed and are incorporated into the SSHCP Conservation Strategy. Some of the Biological Goals and Measurable Objectives listed in Table 7-1 directly reflect recovery needs, such as Objective VP1, which requires preservation within or adjacent to the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Recovery Area.

- **Critical Habitat** – The Plan Area contains designated Critical Habitat for four federally listed vernal pool plants and animals (i.e., vernal pool tadpole shrimp, vernal pool fairy shrimp, Sacramento Orcutt grass, and slender Orcutt grass), as well as designated Critical Habitat for the federally listed California tiger salamander (USFWS 2005b). This Critical Habitat was identified as a priority for preservation, so Measurable Objectives were established that require preservation of a particular acreage of each Critical Habitat Unit (CHU) within the Plan Area.

Each of these elements was incorporated into an SSHCP geographic information system (GIS) database (Section 7.2.1) that was used to develop the SSHCP Biological Goals and Measurable Objectives (Section 7.3) and to inform the SSHCP Preserve System (Sections 7.4 and 7.5).

7.2.1 SSHCP GIS Database

Based on the best available scientific information identified above, the Plan Permittees developed a GIS spatial database including, but not limited to, maps of the following parameters:

- SSHCP land cover types for the Plan Area
- Preserve Planning Unit boundaries (see Section 7.2.1.1)
- Modeled habitat for each Covered Species, including high-value habitat (see Section 3.4)
- Infrastructure and urban development Covered Activity project footprints

- Areas of planned urban development in the UDA
- Existing preserves
- USFWS-designated Critical Habitat
- USFWS-designated Core Recovery Areas
- Watersheds, including large HUC-10 watersheds, and small micro-watersheds for individual vernal pools mapped by LIDAR technology (see Appendix E).

This GIS spatial database was used by the Plan Permittees to develop a Conservation Strategy, including Biological Goals and Measurable Objectives (Section 7.3), and to inform the Preserve System (Sections 7.4 and 7.5).

7.2.1.1 Plan Area Subdivisions

To assist with development of an adequate SSHCP Conservation Strategy, the Plan Area was further divided into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species resources are present and where habitat preservation would occur (see Figure 1-1). These eight SSHCP PPUs are geographic subdivisions of the Plan Area and were delineated to ensure that adequate Biological Goals and Measurable Objectives (Section 7.3) would be developed for biological resources in all parts of the Plan Area, including the location and implementation of the Preserve System.

PPUs were delineated to capture specific habitat or agricultural land cover types or areas identified as being important for a specific suite of species. For instance, PPU 7, which is located in the southeastern portion of the Plan Area, was delineated to encompass the vast majority of Valley Grassland in the Vernal Pool Ecosystem remaining in the County. PPU 7 also contains the designated Cosumnes/Rancho-Seco Core Recovery Area (USFWS 2005a). PPU 2 contains the designated Mather Core Recovery Area (USFWS 2005a). PPU 6, located in the southwestern portion of the Plan Area, was delineated to encompass a vast majority of agricultural land cover types that provide foraging habitat for many covered raptor species. Although geopolitical or physical landmarks were used to delineate some PPU boundaries, this was done for ease of mapping and to make locating PPU boundaries in the field easier.

PPUs 1 through 4 and PPU 8 are within the UDA. However, a small portion of PPU 1 (2,156 acres near the County landfill) is located outside of the UDA. PPUs 5, 6, and 7 are outside the UDA.

A portion of the Plan Area in the middle of the UDA (14,085 acres) and a small portion of the area outside of the UDA in the extreme northeastern portion of the Plan Area (9,245 acres) are not within a PPU (see Figure 1-1). These areas are not within a PPU as there are no resources identified for protection in these locations. A complete description of each PPU, including

species occurrences and land cover types within each PPU, can be found in Chapter 3, Biological Resources Setting. Section 7.5 describes the Conservation Strategy for each PPU.

7.2.1.2 SSHCP Covered Species Models

As described in Section 3.4, suitable Covered Species habitat within the Plan Area was modeled and then mapped for each Covered Species. Areas of modeled habitat for each Covered Species were used to guide development of Measurable Objectives.

Modeled habitat mapped for western pond turtle (*Actinemys marmorata*), giant gartersnake, Swainson's hawk (*Buteo swainsoni*), and greater sandhill crane (*Grus canadensis*) also include areas of "high-value habitat" for those species. High-value habitat is defined as an area/location of the Covered Species modeled habitat (Section 3.4) that is highly suitable for one or more biological needs of the Covered Species (e.g., nesting, roosting, or foraging). The habitat value of a particular area was determined by the Permittees, Wildlife Agencies, and species experts during their reviews of the best available information (summarized in Chapter 3 and the species accounts in Appendix B), information used to define and delineate Covered Species modeled habitat, and other factors, such as proximity to water sources, distance from development, and other relevant Plan Area factors.

7.2.2 SSHCP Preserve Categories

The SSHCP Permittees have identified seven categories of Preserves to help the SSHCP Conservation Strategy conform with the SSHCP mission statement (Section 1.1.1), and the SSHCP guiding principles (Section 7.1), and meet the Biological Goals and Measurable Objectives for the operating SSHCP (Section 7.3.2):

- **Landscape Preserve:** Preserves that are at least 10,500 acres in size and containing extensive areas of contiguous natural land covers where natural ecological functions can continue to operate, typically without extensive land management activities. Because existing development has already fragmented much of the remaining habitat within the UDA, the Landscape Preserve will be located outside the UDA.
- **Core Preserve:** Preserves that are at least 800 acres in size and contain extensive areas of contiguous habitat. Most Core Preserves will be located within the UDA.
- **Minor Preserve:** Preserves that are between 250 and 800 acres in size that contain populations that are important to the viability of a Covered Species, have unusually high biological diversity, and/or have a high concentration of sensitive biological resources. Minor Preserves will be required to connect to existing preserves and/or to the new SSHCP Core Preserves via Linkage Preserves. Most Minor Preserves will be located within the UDA.

- **Satellite Preserve:** Preserves that are smaller than Core and Minor Preserves (i.e., less than 250 acres), but contain populations that are important to the viability of a Covered Species in the Plan Area or have a particularly high concentration of sensitive biological resources. Satellite Preserves may not have the biological diversity of Core and Minor Preserves and may or may not be connected to other Preserves by habitat linkages due to other planning constraints (e.g., existing development, highly parcelized areas). Most Satellite Preserves will be located within the UDA.
- **Linkage Preserve:** Preserves that are generally more linear-shaped landscape features that connect large habitat blocks (e.g., Core and Minor Preserves) and are designed to provide for dispersal and movement of species between Preserve areas. Linkage Preserves have a minimum width of 600 feet.
- **Wildlife Movement Corridor:** There will be a minimum of two Wildlife Movement Corridors. The Laguna Creek Wildlife Movement Corridor is an important landscape feature in the Plan Area and will be an important component of the Preserve System for maintaining movement and resident habitat for wildlife, preserving riparian habitat, and maintaining hydrologic connections between preserves inside the UDA. Outside the UDA, the Cosumnes River/Deer Creek Wildlife Movement Corridor will serve a similar function.
- **Cropland Preserve:** Preserves consisting of existing agricultural lands mostly in PPU 6 that have been identified as uniquely important foraging and roosting habitat in the Plan Area for some Covered Species, including Swainson's hawk, white-tailed kite (*Elanus leucurus*), and greater sandhill crane. Cropland Preserves can be any acreage or shape.

In addition to these seven main Preserve categories, 500 acres of "flexible" Preserve are included in the SSHCP Conservation Strategy to assure that the operational Preserve System is providing the conservation benefits to the Vernal Pool Ecosystem within the Mather Core Recovery Area anticipated at the time of SSHCP preparation. Flexible Preserves can be of any SSHCP Preserve size category (Core, Minor, Satellite, Linkage) but must be within 1 mile of the Mather Core Recovery Area in PPUs 1, 2, or 3; and adjacent to a SSHCP Preserve or existing preserve. The 500 acres of Flexible Preserve is primarily intended to preserve existing Vernal Pool Ecosystem, but Flexible Preserve can also be used to preserve areas that previously supported vernal pools that can be used for vernal pool re-establishment/establishment. If Flexible Preserve is being used for re-establishment or establishment of vernal pools, the Flexible Preserve site must meet the requirements of AMM RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool) in Section 5.4. Flexible Preserves will complement the SSHCP Preserve System (Section 7.5) to ensure the Implementing Entity can meet all of the Biological Goals and Measurable Objectives for conservation of vernal pool species.

7.3 Biological Goals and Measurable Objectives

Biological Goals provide the broad guiding principles of an HCP's operating conservation strategy and are required to be included in all HCPs (USFWS and NOAA 2000). For more complex HCPs such as the SSHCP, Measurable Objectives are used to "step down" a Biological Goal to smaller, more understandable and directly measurable units. Measurable Objectives can be described as a condition to be met or a change to be achieved relative to the existing condition (USFWS and NOAA 2000). Measurable Objectives should include all of the following: species or habitat indicator, location, an action, a quantity/state, and the timeframe needed to meet the objective. Measurable Objectives are quantitative; they clearly state a desired result and will collectively achieve the Biological Goal (USFWS and NOAA 2000).

7.3.1 Identification of SSHCP Biological Goals and Measurable Objectives

The SSHCP Biological Goals and Measurable Objectives were developed by the Plan Permittees at a series of meetings with Plan Permittee staff, local species experts and stakeholders, and biologists and species experts familiar with the Plan Area, and with assistance from USFWS, the California Department of Fish and Wildlife (CDFW), and the U.S. Army Corps of Engineers.

Development of the Conservation Strategy began with a review of the Plan Area's natural communities and species, as described in Section 7.2, including key existing threats and ecological and conservation needs of Plan Area species. The Permittees articulated the SSHCP mission statement (Section 1.1.1), defined the SSHCP land cover types (Section 3.2), identified appropriate SSHCP Covered Species (Section 1.2.4), defined Covered Species modeled habitats (Section 3.4) and articulated the guiding principles of the SSHCP Conservation Strategy (Section 7.1) to clarify the purpose and direction of the operating SSHCP Conservation Strategy.

Permittees then identified broad Biological Goals at three spatial scales: landscape-level, natural-community-level (SSHCP Land Covers), and Covered-Species-level. The Permittees formulated manageable and Measurable Objectives that specify the different components needed to achieve each SSHCP Biological Goal. Discussions and revisions of each SSHCP Biological Goal and each Measurable Objective were iterative, and continued until the Plan Permittees and all participants were satisfied that the Biological Goals and Measurable Objectives were consistent with the SSHCP mission statement and guiding principles, and clearly defined the desired outcome of the operating SSHCP Conservation Strategy.

Because of the size and complexity of the SSHCP, each Measurable Objective was further "stepped down" into smaller "Conservation Actions" that provide requirements for implementing the Measurable Objective within the operating Conservation Strategy. These Conservation Actions include tools, strategies, comprehensive programs, and actions to protect natural communities, habitats, and landscape-level processes that would achieve that Measurable Objective. Because they

"tier" from the Biological Goals and Measurable Objectives, the Conservation Actions also occur at the landscape-level, natural-community-level, and species-level.

7.3.2 SSHCP Biological Goals and Measurable Objectives

The Biological Goals for the SSHCP include goals pertaining to the Plan Area's landscape functions, the Plan Area's natural communities (i.e., SSHCP land cover types), and the Plan's Covered Species, as follows:

- **Biological Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.**

  The intent of Biological Goal 1 is to maintain the existing heterogeneity of natural land covers (and their associated geologic formations and landforms) present within the Plan Area, minimize habitat fragmentation, and maintain landscape ecosystem functions by establishing a system of large and interconnected preserves. Biological Goal 1 is a landscape-level Biological Goal.

- **Biological Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.**

  The intent of Biological Goal 2 is to avoid or minimize impacts of future Covered Activities on Plan Area aquatic resources and to ensure "no net loss" of aquatic resources and aquatic functions by preserving existing aquatic resources and by re-establishing or establishing aquatic resources within the Plan Area. Biological Goal 2 is a landscape-level Biological Goal.

- **Biological Goal 3. Preserve, re-establish, and establish natural land covers (including cropland and irrigated pasture-grassland) that provide habitat for Covered Species.**

  The intent of Biological Goal 3 is to ensure that adequate acreage of each SSHCP natural land cover remains in the Plan Area to provide necessary breeding, foraging, and/or sheltering habitat for the Covered Species and other Plan Area native species that are associated with that land cover type. Biological Goal 3 is a Natural-Community-level Biological Goal.

- **Biological Goal 4. Maintain or improve habitat value of natural land covers (including cropland and irrigated pasture-grassland) that are preserved within the Plan Area.**

  Biological Goal 4 provides appropriate management and monitoring of lands preserved by the SSHCP to ensure that natural communities remain functional in perpetuity for the

benefit of Covered Species and other Plan Area native species. Biological Goal 4 is a Natural-Community-level Biological Goal.

- **Biological Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.**

  The intent of Biological Goal 5 is to ensure that each Covered Species persists within the Plan Area in perpetuity, and that unoccupied but suitable habitat for each Covered Species is preserved or re-established to provide for future Covered Species population growth and dispersal. Biological Goal 5 is a species-level Biological Goal.

For some Covered Species, the landscape- and/or natural community-level Measurable Objectives will be sufficient to achieve the SSHCP's Biological Goal for that species. For example, preserving and managing large amounts of the Valley Grassland land cover type within the Vernal Pool Ecosystem (Objective VG1 under Biological Goal 3) will also maintain winter foraging habitat for ferruginous hawk (*Buteo regalis*) (Objective FH1 under Biological Goal 5). However, where portions of the Plan Area are critical for conserving a particular Covered Species, then the Permittees identified species-specific Measurable Objectives for those areas. For example, for giant gartersnake, specific Plan Area creeks will be protected under Objective GGS1 to achieve Biological Goal 5 for this species.

The SSHCP landscape-level, natural-community-level, and Covered Species-level Biological Goals and Measurable Objectives are listed and described in Table 7-1 and Section 7.6. For each Biological Goal, there is a set of Measurable Objectives and Conservation Actions to achieve that goal.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	
Objective L1. Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or establishes 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment, at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.	L1.1. The minimum land acquisition required under the SSHCP for natural land cover types is 33,796 acres. Additional minimum land acquisition requirements will apply to some conservation analysis zones and for aquatic land cover types, as described below. Actual acquisition of some land cover types will likely be greater than the combined minimum requirements because parcel boundaries typically do not follow ecological boundaries, and the boundaries of acquired parcels will include land cover types that are not specified by acquisition requirements (e.g., minor roads, aqueducts). In addition, qualitative requirements for habitat connectivity or for preservation of plant occurrences could require additional acreage. All SSHCP land acquisitions must be accomplished by Year 45 of the Permit Term to ensure that all Preserve lands have at least 5 years to be managed, enhanced, and monitored according to the terms of the SSHCP. This time period will enable the Permitting Agencies to closely monitor the final land acquisitions to ensure that the Implementing Entity will complete the land acquisition strategy and achieve the final Biological Goals and Objectives. Management of these lands, however, will occur in perpetuity. Refer to Objectives under Goal 3 for minimum preservation and re-establishment/establishment requirements for individual SSHCP natural land cover types. Re-establishment/establishment requirements are separate and distinct from preservation requirements and cannot overlap. Acquisitions of land below sea level are prohibited.
Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).	L2.1. The Implementing Entity will acquire lands to link SSHCP Preserves and existing preserves in the Plan Area via Linkage Preserves. Linkage Preserves will have a minimum width of 600 feet. The Implementing Entity will select Linkage Preserve sites considering the following criteria: • Connects SSHCP Preserves together or connects SSHCP Preserve to existing preserves. • Provides known connectivity for Covered Species and other native terrestrial species. • Includes Covered Species modeled habitat.
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	
Objective W1. Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.	W1.1. Implement Stream Setback requirements in the UDA pursuant to Table 5-1.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective W2. Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (Low-Impact Development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)	W2.1. Each Urban Development Covered Activity will implement LID AMMs in accordance with Section 5.4.
	W2.2. Each ground-disturbing Covered Activity will implement BMP measures (see Section 5.4).
	W2.3. Each urban development road construction and rural transportation Covered Activity will implement ROAD and BMP measures for road siting, design, pre-construction, construction, post-construction, and maintenance requirements (see Section 5.4).
Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams, as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.	W3.1. Implement AMMs STREAM-1, STREAM-2, STREAM-3, and STREAM-4.
Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).	W4.1. The Implementing Entity will select Preserve sites for Valley Grassland within the Vernal Pool Ecosystem considering certain criteria, including the following: • Known to include herbaceous native plant species. • Includes Covered Species modeled habitat. • Adjacent to currently preserved lands. • On parcels 20 acres or greater and/or occurring within a larger open space area.
	W4.2. The Implementing Entity will select Preserve sites for Vernal Pool and Swale habitat considering certain criteria including, the following: • Includes Covered Species modeled habitat. • Has naturally occurring high densities of vernal pools. • Has heterogeneity in vernal pool size, depth, and density. • Contains large or deep vernal pools. • Adjacent to currently preserved lands.

AGENDA ITEM 11.1
1046

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	• Contains a soil type that is not currently preserved in the Plan Area or is underrepresented in the Preserve System; • On parcels 20 acres or greater and/or occur in larger, open space areas. • Can be managed to enhance or restore natural Vernal Pool Ecosystem processes.
	W4.3. The Implementing Entity will select Preserve sites for Seasonal Wetland and Stream/Creek (VPIH) habitat considering certain criteria, including the following: • Links preserved vernal pools. • Includes Covered Species modeled habitat. • On parcels 20 acres or greater and/or occur in larger, open space areas.
	W4.4. The Implementing Entity will select Preserve sites for Freshwater Marsh considering certain criteria, including the following: • Includes Covered Species modeled habitat. • Can be managed to enhance or restore natural Freshwater Marsh ecosystem processes.
	W4.5. The Implementing Entity will select Preserve sites for Stream/Creek considering certain criteria, including the following: • Located in modeled habitat for aquatic Covered Species (particularly giant gartersnake and western pond turtle). • Proximity to the mouth of the stream/creek to benefit giant gartersnake and western pond turtle. • Adjacent to an existing preserve. • Water present during early spring through mid-fall (April through October). • Can be managed to enhance or restore natural Stream and Creek Ecosystem processes.
	W4.6. The Implementing Entity will select Preserve sites for Open Water considering certain criteria, including the following: • Includes Covered Species modeled habitat. • Can be managed to enhance or restore natural Open Water Ecosystem processes.
	W4.7. The Implementing Entity will select Preserve sites for Riparian land cover types considering certain criteria, including the following: • Includes Covered Species modeled habitat. • Located within 3 miles of foraging habitat for bird Covered Species that use Riparian habitat for nesting and/or roosting. • Closed canopy consisting of multiple vegetation layers and includes mature trees. • Large, relatively unfragmented, and connected to Valley Grassland and Agriculture areas. • Can be managed to enhance or restore Riparian land cover type ecosystem processes.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective W5. Ensure that aquatic resources are re-established and/or established at a minimum 1:1 ratio during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in this table (see Objectives VP2, VP5, SW2, FWM2, OW2, RIP2, and RIP4).	Refer to Conservation Actions VP2.1, VP5.1, SW2.1, FWM 2.1, OW2.1, RIP2.1, and RIP4.1.
Objective W6. Covered Activities will avoid a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA.	W6.1. Required avoidance will comply with requirements of AMM STREAM-3.
Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment will occur within the Morrison Creek Watershed.	Refer to Conservation Actions VP2.1, VP5.1, and FWM 2.1,
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture/Grassland) that provide habitat for Covered Species.	
Aquatic	
Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	VG1.1. Prioritize selection of Preserve sites for Valley Grassland prioritized based on the following criteria: • Located in Vernal Pool Ecosystem. • Known to support native herbaceous plants in uplands. • Adjacent to currently preserved lands. • On parcels 20 acres or greater and/or occurring within larger open space area. • Management could enhance natural ecosystem processes of the Vernal Pool landscape.
Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area.	VP1a.1. Prioritize selection of Preserve sites for vernal pools based on the following criteria: • Includes modeled habitat for vernal pool Covered Species. • Ecosystem functions of the uplands, micro-watersheds, and perched aquifer surrounding the vernal pools are undisturbed.

AGENDA ITEM 11.1
1048

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	• Adjacent to currently preserved lands. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Can be managed to maintain natural Vernal Pool Ecosystem processes. • Depending on what is already preserved in the Plan Area, prioritize either naturally occurring high-density vernal pool complexes or more isolated pools to ensure heterogeneity of spatial patterns and connectivity. • Depending on what is already preserved in the Plan Area, prioritize preservation of pools with each of the different landforms, geologic formations, floristic assemblages, and vernal pool sizes/depths. • Has available water for grazing animals on Preserves.
Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area.	VP1b.1 Prioritize selection of Preserve sites for vernal pools in Recovery Areas based on the following criteria: • Is within the Mather Core Recovery Area or Cosumnes/Rancho-Seco Recovery Area. • If not within the recovery areas, is within 1 mile of one of the two recovery areas. • Includes modeled habitat for vernal pool Covered Species. • Ecosystem functions of the uplands, micro-watersheds, and perched aquifer surrounding the vernal pools are undisturbed. • Adjacent to currently preserved lands. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Can be managed to maintain natural Vernal Pool Ecosystem processes. • Depending on what is already preserved in the Plan Area, prioritize either naturally occurring high-density vernal pool complexes or more isolated pools to ensure heterogeneity of spatial patterns and connectivity. • Depending on what is already preserved in the Plan Area, prioritize preservation of pools with each of the different landforms, geologic formations, floristic assemblages, and vernal pool sizes/depths. • Has available water for grazing animals on Preserves.
Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area.	VP2.1. Implement vernal pool re-establishment and establishment consistent with the requirements of AMM RE-ESTABLISHMENT/ESTABLISHMENT-1 and -2. Adhere to specific protocols, described in detail in Appendix D of the Aquatic Resources Program, and outlined in 33 CFR Part 325 Sections 332.4(c)(2) through (c)(14) of the USACE's Mitigation Rule.
Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in this table and in	VP3.1. Prioritize selection of Preserve sites for Swale or Stream/Creek (Vernal Pool Invertebrate Habitat (VPIH)), based on the following criteria: • Located in Vernal Pool Ecosystem. • Links existing preserved Vernal Pool areas.

AGENDA ITEM 11.1

1049

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
accordance with Section 7.5.	• Includes Covered Species modeled habitat. • On parcels 20 acres or greater and/or occurs in larger, open space areas.
Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	VP4.1. Prioritize selection of Preserve sites for Swale or Stream/Creek (VPIH) based on the following criteria: • Located in Vernal Pool Ecosystem. • Swale preservation is preferred over preservation of Stream/Creek (VPIH). • Links existing preserved Vernal Pool areas. • Includes Covered Species modeled habitat. • On parcels 20 acres or greater and/or occurs in larger, open space areas.
Objective VP5. Re-establish and/or establish a minimum of 256 acres of Swale or vernal pool for impacts to the Swale and Stream/Creek (VPIH) land covers. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.	VP5.1. Prioritize selection of re-establishment/establishment sites for Swale based on the following criteria: • Located in Vernal Pool Ecosystem. • Links existing preserved Vernal Pool areas • Includes Covered Species modeled habitat. • On parcels 20 acres or greater and/or occurs in larger, open space areas.
Objective VP6. Re-establish and/or establish a minimum of 300 acres of functional Vernal Pool Ecosystem within or adjacent to (within 1 mile of) the Mather Core Recovery Area.	VP2.1. Implement vernal pool re-establishment and establishment consistent with the requirements of AMM RE-ESTABLISHMENT/ESTABLISHMENT-1 and -2. Adhere to specific protocols, described in detail in Appendix D of the Aquatic Resources Program, and outlined in 33 CFR Part 325 Sections 332.4(c)(2) through (c)(14) of the USACE's Mitigation Rule.
Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	SW1.1. Prioritize selection of Preserve sites for Seasonal Wetland based on the following criteria: • Includes Covered Species modeled habitat. • On parcels 20 acres or greater and/or occurs in larger, open space areas, to the maximum extent feasible.
Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.	SW2.1. Prioritize selection of re-establishment and/or establishment sites for Seasonal Wetland based on the following criteria: • Links existing preserved areas of Seasonal Wetland or other aquatic land cover types that provide modeled species habitat. • On parcels 20 acres or greater and/or occurs in larger, open space areas, to the maximum extent feasible. • Supports soils and topography modeled for re-establishing and/or establishing Seasonal Wetland.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	FWM1.1. Prioritize selection of Preserve sites for Freshwater Marsh based on the following criteria: • Includes Covered Species modeled habitat. • Currently exhibits hydrology sufficient to support perennial Freshwater Marsh habitat. • Currently supports emergent vegetation such as tules and cattails.
Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.	FWM2.1. Prioritize selection of re-establishment and/or establishment sites for Freshwater Marsh based on the following criteria: • Historically supported Freshwater Marsh habitat. • Has soils and topography consistent with the Freshwater Marsh land cover type modeled for re-establishment and/or establishment of Freshwater Marsh. • Site links existing preserve areas of Freshwater Marsh other aquatic land cover types that provide modeled species habitat. • After re-establishment and/or establishment, would provide Covered Species modeled habitat. • Has hydrology sufficient to support perennial Freshwater Marsh habitat or a water source to re-establish historical hydrology of the site.
Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	SC1.1. Prioritize selection of Preserve sites for Stream/Creek based on the following criteria: • Potential to support Covered Species (particularly giant gartersnake and western pond turtle). • Proximity to the mouth of the stream/creek. • Adjacent to an existing preserve. • Water present during early spring through mid-fall (April through October). • Management can be used to enhance natural stream and creek ecosystem processes.
Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.	SC2.1. Prioritize selection of re-establishment and/or establishment sites for Stream/Creek based on the following criteria: • Potential to support Covered Species (particularly giant gartersnake and western pond turtle). • Site links existing preserve areas of Aquatic land cover types that provide modeled species habitat. • Proximity to the mouth of the stream/creek. • Adjacent to an existing preserve. • Water present during early spring through mid-fall (April through October). • Management can be used to enhance natural stream and creek ecosystem processes.
Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of	OW1.1. Prioritize selection of Preserve sites for Open Water based on the following criteria: • Includes Covered Species modeled habitat. • Site links existing preserved land cover types that provide modeled species habitat.

AGENDA ITEM 11.1
1051

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Open Water, as determined by the Technical Advisory Committee (TAC)). The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	• Management can be used to enhance or restore natural ecosystem processes.
Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.	• OW2.1. Prioritize selection of re-establishment and/or establishment sites for Open Water based on the following criteria: Site links existing preserve areas of Aquatic land cover that provide Covered Species modeled habitat. • Management can be used to enhance or restore natural ecosystem processes.
Objective RIP1. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	RIP1.1. Prioritize selection of Preserve sites for Mixed Riparian Woodland or Mixed Riparian Scrub based on the following criteria: • Includes Covered Species modeled habitat. • Located within 3 miles of foraging habitat for Covered Species that use Riparian habitat for nesting and/or roosting. • Closed canopy consisting of multiple vegetation layers and includes mature trees. • Large, relatively unfragmented and connected to Valley Grassland and Agriculture areas. • Management can be used to enhance or restore natural ecosystem processes.
Objective RIP2. Re-establish and/or establish a minimum of 591 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.	• RIP2.1. Prioritize selection of re-establishment and/or establishment sites for Mixed Riparian Woodland or Mixed Riparian Scrub based on the following criteria: Potential re-establishment/establishment sites will fill gaps between existing Mixed Riparian Woodland or Mixed Riparian Scrub land cover sites, or establish a link between existing Riparian Woodland or Mixed Riparian Scrub land cover sites. • Includes Covered Species modeled habitat. • Located within 3 miles of foraging habitat for Covered Species that use Riparian habitat for nesting and/or roosting. • Closed canopy consisting of multiple vegetation layers, including mature trees. • Large, unfragmented and connected to Valley Grassland and Agriculture areas. • Management can be used to enhance or restore natural ecosystem processes.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	• Re-establishment sites will be located along existing Riparian corridors where habitat likely existed in the past, such as areas along the Cosumnes River, Deer Creek, South Laguna Creek, Willow Slough, North Badger Creek, South Badger Creek, Deadman's Gulch, or Skunk Creek. • Re-establishment will avoid locations preserved or restored for giant gartersnake. • Establishment of riparian communities will avoid locations that historically did not support Riparian vegetation. • Establishment of Riparian communities will avoid any existing Vernal Pool landscapes. • Re-establishment will use the historical signature of Riparian communities and aim to restore the historical conditions. • Re-establishment and establishment sites will be located within an SSHCP Preserve. • Re-establishment and establishment sites will support soils and topography modeled for re-establishment and/or establishment of Riparian communities. • Re-established and established Riparian communities will be designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat.
Terrestrial	
Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	BOW1.1. Prioritize selection of Preserve sites for Blue Oak Woodland/Savanna that expand on or link to the Deer Creek Hills Preserve to the maximum extent feasible.
Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.	BOW2.1. Prioritize selection of re-establishment/establishment sites for Blue Oak Woodland/Savanna that will expand the existing Deer Creek Hills Preserve to the maximum extent feasible, or will establish a habitat link between a SSHCP preserve and the existing Deer Creek Hills Preserve. Any potential re-establishment/establishment sites will fill gaps between existing preserved Mixed Blue Oak Woodland or Blue Oak Savanna land covers, or would link existing preserved Blue Oak Woodland or Blue Oak Savanna land covers. Re-establishment is preferred over establishment.

AGENDA ITEM 11.1
1053

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	AG1.1. The Implementing Entity will select Preserve sites with existing agriculture land covers considering certain criteria, including the following: • Contains margins that support suitable nesting trees and/or could support plantings of additional trees and shrubs for future use as nesting or perching habitat and/or habitat for prey. • Contains soils identified in the Soil Survey of Sacramento County as highly productive. • Has existing irrigation system that is engineered to provide for crop production. • The site supports high prey densities for avian Covered Species or is capable of supporting crops that support high prey densities. • Management can be used to enhance or restore natural ecosystem processes.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture/Grassland) that are preserved within the Plan Area.	
Objective HAB1. Develop Preserve Management Plans for the benefit of Covered Species.	HAB1.1. Prepare a Preserve Management Plan for each Preserve within 1 year of acquisition. The Preserve Management Plans will identify Preserve-specific preservation objectives for Covered Species and habitats, and will be consistent with the Preserve System Management Program.
Objective HAB2. Assess whether SSHCP Preserves are being managed and maintained for the benefit of Covered Species.	HAB2.1. Individual Preserve Management Plans will be reviewed periodically (e.g., every 3–5 years) after development in coordination with the Preserve System Management Program. If Preserve sites are not meeting habitat success standards as determined by the TAC, modifications such as remedial actions (e.g., adaptive management) or other additional preservation actions (e.g., adding acreage) will be implemented.
Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing Initial Preserve Management Plan (PMP).	HAB 3.1. Implementing Entity will interview individuals that have been involved in management of acquired parcels, to the maximum extent feasible. This could include landowners, property managers, ranch managers, and any others with management responsibility. For parcels that are part of a group (e.g., a ranch), separate reports for each parcel need not be prepared, but any variation in management treatment between the component parcels should be noted. To the maximum extent feasible, interviews will be audio or video recorded and summarized in a memorandum. Those memoranda will be reviewed, and any relevant information should be included as appendices in the Initial and Individual Preserve Management Plan. Preserve Managers will not change the management approach from existing management without a sound scientific basis for the change.
Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. The program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.	HAB4.1. Include invasive plant and wildlife control strategies in all Preserve Management Plans. These strategies may include site-specific grazing regimes, controlled burning protocols, and mowing/mechanical maintenance guidelines consistent with native plant re-establishment needs, invasive plant and wildlife removal, and consideration of endemic plant and wildlife species population needs.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter)	HAB5.1. Include in Preserve Management Plans a requirement to regularly monitor noise and light intensity, frequency and quantity of trash, qualitative hydrology changes, and other issues along a transect from the boundary toward the interior. Preserve Managers will include this information in annual reports, noting any changes in these attributes over time. Quantitative monitoring for edge effects will occur on the same Preserves hosting permanent plots for vernal pool plants and invertebrate species, and will be timed to allow for correlational analysis between edge effects and species presence or abundance over the long term.
Objective HAB6. Collect weather data throughout Sacramento County to assist in developing status and trends and tracking climate change and data.	HAB6.1. During assembly of the SSHCP Preserve System, install weather stations at selected Preserves for fine-scale monitoring of climate trends and combine with data from existing weather stations to provide a comprehensive weather dataset. Preserves will be selected to receive weather stations based on gaps in geographic coverage of existing weather stations in Sacramento County.
Objective HAB7. Monitor vegetation biomass within Grassland land covers.	HAB7.1. During assembly of all non-agricultural Preserves (Valley Grassland, Blue Oak Savanna, Valley Grassland), measure vegetation biomass. Measurement will be by releve, residual dry matter (RDM), or similar technique. Technique selected will be used consistently across Preserves on an annual basis at the end of the growing season (i.e., September or October).
Objective AG2. Of the 9,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as corn, alfalfa, or wheat) preferred by tricolored blackbird (*Agelaius tricolor*), greater sandhill crane (*Grus canadensis*), and the Covered raptor species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.	AG2.1. Maintain a minimum of 2,000 acres as food plots that are planted with crops preferred by avian Covered Species as foraging habitat such as corn, alfalfa, or wheat. Food plots will be distributed throughout PPUs 4, 5, or 6 at a minimum of 10 different locations, none of which will be less than 20 acres.
Objective AG3. Maintain or increase raptor prey availability and improve raptor foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species.	AG3.1. Plant 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other small prey (e.g., amphibians, reptiles) within and on the borders of Cropland Preserves within PPUs 4, 5, and/or 6 to increase prey availability for Covered avian species. One hundred linear feet of hedgerow will be planted each year until 5,000 linear feet is established within the Plan Area. Planting of hedgerows can be delayed for up to 5 years after issuance of permits to allow time to acquire Preserves where hedgerows can be planted. At least 1,000 feet must be planted within 10 years after issuance of permits. Acceptable hedgerow plants include native trees, shrubs, and grasses as approved by the TAC. Hedgerows must grow to be at least 5 feet in width and must be located on upland areas not prone to inundation from normal irrigation practices. Hedgerows that fail to establish or succumb to disease or other causes will be replaced within 1 year of removal or failure. Providing refuge habitat for prey species adjacent to agricultural settings will allow areas that have been harvested or with temporarily reduced or eliminated populations of prey to re-establish more quickly.

AGENDA ITEM 11.1
1055

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective RIP5. Monitor groundwater table as it relates to status and trends for Riparian habitat.	RIP5.1. During assembly of the SSHCP Preserve System, identify parcels that have existing water wells. To the maximum extent feasible, obtain history of depth to groundwater table from property owners or managers. During assembly of the SSHCP Preserve System, take a reading of depth to groundwater at each existing well. Repeat measurement annually at a consistent time of year to allow comparison between years, and monitor any groundwater depletion or recharge.
	RIP5.2. During assembly of the SSHCP Preserve System, ensure availability of water for grazing animals on Preserves, Cropland Preserves, and habitat restoration.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	
Plant Covered Species	
Objective VPP1. Protect the one currently documented unpreserved occurrence of Ahart's dwarf rush in the Plan Area. Prior to take of any occurrence of Ahart's dwarf rush (*Juncus leiospermus*), protect six currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrences of Ahart's dwarf rush within the Plan Area. After six currently unpreserved occurrences are protected, prior to take of an occurrence of Ahart's dwarf rush, protect one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of Ahart's dwarf rush within the Plan Area.	VPP1.1. Conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when Ahart's dwarf rush are observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of Ahart's dwarf rush, identify one unprotected occurrence of the species and protect within a new minimum satellite-sized Preserve.
Objective VPP2. Prior to take of any occurrence of Boggs Lake hedge-hyssop (*Gratiola heterosepala*), protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the	VPP2.1. Conduct surveys in modeled habitat (and suitable habitat identified by the approved biologist at the time of the survey) during the appropriate time of year when Boggs Lake hedge-hyssop are observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of Boggs Lake hedge-hyssop, identify one unprotected occurrence of the species and protect within a new minimum satellite-sized Preserve.

[1] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
TAC) occurrence of Boggs Lake hedge-hyssop within the Plan Area.	
Objective VPP3. Prior to take of any occurrence of dwarf downingia (*Downingia pusilla*), protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrence of dwarf downingia within the Plan Area.	VPP3.1. Conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when dwarf downingia are observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of dwarf downingia, identify one unprotected occurrence of the species and protect within a new minimum satellite-sized Preserve.
Objective VPP4. Protect and maintain in perpetuity a minimum of 15 occurrences of legenere (*Legenere limosa*) within the SSHCP Preserve System. Legenere occurrences will be preserved in accordance with the Conservation Actions described in this table. Prior to take of any occurrence of legenere, one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of legenere will be preserved and maintained within the Plan Area.	VPP4.1. Preserve and maintain in perpetuity at least 15 occurrences of legenere within the SSHCP Preserve System. The 15 occurrences will be preserved accordingly: (1) Conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when legenere are observable. (2) If detected in an area proposed to be disturbed by a Covered Activity, prior to take of legenere, identify one unprotected occurrence of the species and protect within a new minimum satellite-sized Preserve. By this process, at least 15 legenere occurrences will be protected in the SSHCP Preserves by the end of the Permit Term.
Objective VPP5. Prior to take of any occurrence of pincushion navarretia (*Navarretia myersii* ssp. *myersii*), protect one currently unpreserved[2] and "biologically equivalent or superior" (as defined by the TAC) occurrence of pincushion navarretia within the Plan Area.	VPP5.1. Conduct surveys in modeled habitat (and suitable habitat identified by the approved biologist at the time of the survey) during the appropriate time of year when pincushion navarretia are observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of pincushion navarretia, identify one unprotected occurrence of the species and protect within a new minimum satellite-sized Preserve.
Objective VPP6. Protect and maintain in perpetuity all known currently unprotected	VPP6.1. Preserve and maintain in perpetuity all known occurrences of Sacramento Orcutt grass in the Plan Area. Prior to proposed disturbance of a site associated with a Covered Activity, conduct surveys in modeled habitat (and suitable habitat

[2] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

AGENDA ITEM 11.1
1057

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
occurrences of Sacramento Orcutt grass (*Orcuttia viscida*) in the Plan Area to preserve existing distribution, and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.	identified by the approved project biologist at the time of the survey) during the appropriate time of year when Sacramento Orcutt grass are observable. Over the Permit Term, all plant surveys will comply with CDFW's most recent Survey Protocols for Sensitive Plants. If a species is found, the project proponent will protect the occurrence within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. Surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence.
Objective VPP7. Protect and maintain in perpetuity all known currently unprotected occurrences of slender Orcutt grass in the Plan Area to preserve existing distribution, and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.	VPP7.1. Preserve and maintain in perpetuity all known occurrences of slender Orcutt grass in the Plan Area. Prior to proposed disturbance of a site associated with a Covered Activity, conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when slender Orcutt grass are observable. Over the Permit Term, all plant surveys will comply with CDFW's most recent Survey Protocols for Sensitive Plants. If the species is found, the project proponent will protect the occurrence within a minimum satellite-sized Preserve that encloses the entire vernal pool micro-watershed. Surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence.
Objective SA1. Prior to take of an occurrence of Sanford's arrowhead (*Sagittaria sanfordii*), protect one currently unpreserved[3] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Sanford's arrowhead within the Plan Area.	SA1.1. Conduct surveys in modeled habitat (and suitable habitat identified by the approved biologist at the time of the survey) during the appropriate time of year when Sanford's arrowhead are observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of Sanford's arrowhead, identify one unprotected occurrence of the species and protect within a new minimum satellite-sized Preserve.
Objective SA2. During re-establishment and/or establishment of Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek, translocate impacted Sanford's arrowhead from other sites.	SA1.2. The Implementing Entity will select translocation sites for Sanford's arrowhead in emergent marsh vegetation, including the margins of rivers, streams, ponds, reservoirs, irrigation and drainage canals, ditches, and stock-ponds Freshwater Marsh considering certain criteria, including the following: • Known to support Sanford's arrowhead. • Proposed for re-establishment/establishment. • Area can be re-established to support Sanford's arrowhead populations and natural ecosystem processes.
Aquatic Animal Covered Species	
Objective VPI1. Protect and maintain in perpetuity 1,270 acres of Vernal Pool	VPI1.1. The Implementing Entity will select Preserve sites containing modeled habitat for vernal pool invertebrates considering certain criteria, including the following:

[3] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

AGENDA ITEM 11.1
1058

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
tadpole shrimp modeled aquatic habitat within the Plan Area to preserve existing distribution.	• Vernal pool complexes with known occurrences of Covered vernal pool invertebrates. • Represents diversity of vernal pool depth, size, density, geologic formations, and soil types within the Plan Area. • Vernal Pool habitats embedded in Valley Grassland within Vernal Wetland Acre/Density Index (VWADI) Category 1–3 land analysis units (LAUs) that provide high-quality Vernal Pool habitat. • Adjacency of other suitable habitat. • Modeled habitat within the USFWS Recovery Areas and Critical Habitat for vernal pool invertebrate species.
	VPI1.2. Preserve a minimum of 90% of the watershed of each preserved vernal pool and maintain a minimum 50-foot setback outside the Preserve boundary.
Objective VPI2. Protect and maintain in perpetuity 1,270 acres of Vernal Pool fairy shrimp (*Branchinecta lynchi*) modeled aquatic habitat within the Plan Area to preserve existing distribution.	See Conservation Actions VPI1.1 and VPI1.2.
Objective VPI3. Protect and maintain in perpetuity 1,059 acres of mid-valley fairy shrimp (*Branchinecta mesovallensis*) modeled aquatic habitat within the Plan Area to preserve existing distribution.	See Conservation Actions VPI1.1 and VPI1.2.
Objective VPI4. Protect and maintain in perpetuity 1,245 acres of Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i) modeled aquatic habitat within the Plan Area to preserve existing distribution.	See Conservation Actions VPI1.1 and VPI1.2.
Objective VPI5. Ensure that during implementation of Objective VP2, re-established or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/ establishment in accordance with the Conservation Actions in this table.	Implement vernal pool re-establishment and establishment consistent with the requirements of AMM RE-ESTABLISHMENT/ ESTABLISHMENT-1 and -2.

AGENDA ITEM 11.1
1059

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective CTS1. Preserve at least five occupied California tiger salamander breeding ponds.	CTS1.1. The Implementing Entity will select breeding ponds for preservation considering certain criteria, including the following: • Located within USFWS Critical Habitat. • Surveys indicate active use of breeding pond within each of prior 3 years. • Breeding pond can sustain inundation for a minimum of 70 days during an average rainfall year. • Surrounding uplands no more than 0.5 mile away contain Blue Oak Savanna, Blue Oak Woodland, and Valley Grassland with adequate burrows and refugia sites. • Predatory fish and bullfrogs (*Rana catesbeiana*) are absent.
Objective CTS2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for California tiger salamander is preserved. Minimum preservation will total • 141 acres of aquatic habitat and • 1,677 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within California tiger salamander Critical Habitat occurs within California tiger salamander Critical Habitat (see Objectives BOW1, VP1, SW1, and VG1).	CTS2.1. Preserve California tiger salamander aquatic habitat (Vernal Pool and Seasonal Wetland). The Implementing Entity will select Preserve sites considering certain criteria, including the following: • Modeled habitat within USFWS Critical Habitat. • Contain modeled wetlands and surrounding uplands no more than 0.5 mile from aquatic habitat. • Wetlands must be able to sustain inundation for a minimum of 70 days during an average rainfall year. • Permanent impoundments are appropriate as long as predatory fish and bullfrogs are absent.
	CTS2.2. Preserve California tiger salamander upland habitat (Blue Oak Woodland, Blue Oak Savanna, and Valley Grassland). The Implementing Entity will select Preserve sites considering certain criteria, including the following: • Modeled habitat within USFWS Critical Habitat. • Contains Blue Oak Savanna, Blue Oak Woodland, and Valley Grassland no more than 0.5 mile from known breeding pond. • Contains burrows that are dry during the summer and fall months in Open Grassland or under isolated oaks. • Supports fossorial mammals to create upland burrows. • Within 1.5 miles of Vernal Pool and Seasonal Wetland that are considered Aquatic habitat.
	CTS2.3. Preserve California tiger salamander aquatic or upland habitat at a ratio of 1 acre for every 1 acre that is lost (1:1) within PPU 7. Conduct surveys after the first year and every 5 years thereafter to monitor occupancy of habitat.
Objective CTS3. Rural transportation project Covered Activities within California tiger salamander modeled habitat will be designed to allow California tiger salamander movement across the roadway area.	CTS3.1. The Implementing Entity will retain an approved biologist to prepare targeted species mobility studies to determine if California tiger salamander mobility between breeding ponds or between breeding ponds and upland refugia will be affected by rural transportation Covered Activities within California tiger salamander modeled habitat. Data relevant to determining California tiger salamander movement must be collected for at least 3 years, and the study will be updated through new data collection and consultation with USFWS and CDFW every 10 years. The mobility study methodology will be prepared in consultation with USFWS and CDFW, and will need approval from USFWS and CDFW prior to implementation. The data will be used by the project proponent to select the most appropriate design requirements to maintain and facilitate California tiger salamander movement. Modeled habitat near each of the following roadways will be the subject of targeted species mobility studies for California tiger

AGENDA ITEM 11.1
1060

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	salamander: • Twin Cities Road east of State Route 99 • Ione Road within PPU 7 • Clay Station Road from Dillard Road south to Sacramento County line with San Joaquin County (Plan Area boundary) After construction is complete, California tiger salamander movement across and along the road will be monitored to assess how their movement changed in response to the project, and if additional design considerations will be used as future projects are implemented along the roadway.
Objective WS1. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for western spadefoot (*Spea hammondii*) is preserved. Minimum preservation will total: • 1,531 acres of aquatic habitat and • 22,044 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within the Mather Core or Cosumnes/Rancho-Seco Core Recovery Areas occurs within the Core Recovery Areas (see Objectives BOW1, VP1, VP3, SW1, SC1, OW1, and VG1).	WS1.1. The Implementing Entity will select Preserve sites for aquatic and adjacent upland habitat considering certain criteria, including the following: • Habitat is located in the Mather Core or Cosumnes/Rancho-Seco Core Recovery Areas. • Aquatic habitat will include temporary pools and drainages. • Quiet streams that form following winter or spring rains. • Upland habitat surrounding aquatic breeding sites. • Friable soils suitable for burrow creation. • Soils maintain some degree of moisture. • Located away from areas that are subject to vibrations that simulate rainfall such as roadways with heavy traffic.
Objective WS2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic habitat for western spadefoot is re-established and/or established. Minimum re-establishment and/or establishment will total 906 acres of aquatic habitat. Ensure that mitigation for modeled high-value habitat impacted within the Mather Core or Cosumnes/Rancho-Seco Core Recovery Areas occurs within the Core	WS2.1. The Implementing Entity will select re-establishment and establishment sites considering certain criteria, including the following: • Habitat is located in the Mather Core or Cosumnes/Rancho-Seco Core Recovery Areas. • Aquatic habitat will include temporary pools and drainages. • Quiet streams that form following winter or spring rains. • Upland habitat available no more than 500 feet away from preserved aquatic habitat. • Friable soils suitable for burrow creation. • Soils maintain some degree of moisture. • Site links existing natural land covers that provide Covered Species modeled habitat.

AGENDA ITEM 11.1
1061

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Recovery Areas (see Objectives VP2, SW2, and OW2).	• Located away from areas that are subject to vibrations that simulate rainfall such as roadways with heavy traffic. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment/establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective GGS1. During assembly of the SSHCP Preserve System, ensure that modeled habitats for giant gartersnake are preserved along the following creeks (or other creeks that are determined by the TAC to provide similar giant gartersnake habitat value): • Lower Laguna Creek, mainly between Twin Cities Road (State Route 104) and Miess Road; • Skunk Creek, which flows into the Cosumnes River northwest of the City of Galt; • the short Willow Creek and tributaries of Badger Creek, which are to the north of the lower Laguna Creek and west of the Folsom South Canal; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum preservation will total • 170 acres of giant gartersnake high-value aquatic habitat and • 2,323 acres of giant gartersnake high-value upland habitat. (See Objectives AG1, FWM1, SW1, SC1, OW1, RIP1, RIP3, and VG1.)	GGS1.1. The Implementing Entity will select Preserve sites for aquatic modeled habitat considering certain criteria, including the following: • Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland located entirely inside or within 0.25 mile of the following reaches: ○ A prominent drainageway on the Elliot mitigation site, which links to Stone Lakes National Wildlife Refuge (NWR) and is wet year-round. ○ Drainage canals south of Elk Grove, which have a past occurrence and link to Stone Lakes NWR; the perennial segments of these canals are suitable habitat. ○ Badger Creek and all other creeks that drain into the marsh at the Cosumnes River Preserve, which are likely high-quality habitat due to proximity and connectivity to a significant population of giant gartersnakes; the perennial segments of these creeks are suitable habitat. ○ The perennial segments of Laguna Creek (south) and tributaries are suitable habitat due to presence of freshwater marsh habitat and proximity to known documented occurrences. ○ The perennial segments of drainages and canals leading from the Cosumnes River Preserve, including Deadman's Gulch, which provides suitable habitat. • Contains adequate water during the snake's active season (early spring through mid-fall) to provide food and cover. • Emergent, herbaceous wetland vegetation for escape cover and foraging habitat during the active season. • Grassy banks and openings in waterside vegetation for basking.
	GGS1.2. The Implementing Entity will select Preserve sites with stream reaches that contain upland modeled habitat within 200 feet of the stream, including Mixed Riparian Scrub and Valley Grassland, considering the following criteria: • A stream reach at least 600 feet in length. • Near foraging and breeding habitat. • Support higher-elevation uplands for cover. • Provide refuge from flood waters during the snake's dormant season in the winter. • Upland habitat can link isolated and disjunct giant gartersnake aquatic habitat. • A minimum 300-foot setback on at least one side of stream reaches.

AGENDA ITEM 11.1
1062

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective GGS2. During assembly of the SSHCP Preserve System, ensure that modeled habitats for giant gartersnake are re-established and/or established along the following creeks (or other creeks that are determined by the TAC to provide similar habitat value): • Lower Laguna Creek, mainly between Twin Cities Road (State Route 104) and Miess Road; • Skunk Creek: this creek flows into the Cosumnes River northwest of the City of Galt; • north of Lower Laguna Creek and west of the Folsom South Canal are several small creeks—the short Willow Creek and tributaries of Badger Creek; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum re-establishment and/or establishment will total • 170 acres of high-value aquatic habitat and • 134 acres of high-value upland habitat. (See Objectives SW2, OW2, RIP2, and RIP4.)	GGS2.1. The Implementing Entity will select re-establishment and establishment sites for aquatic habitat that include Freshwater Marsh, Open Water, Stream/Creek, and Seasonal Wetland considering the following criteria: • Contains a supply of perennial water that can maintain emergent vegetation. • Sites near (within 250 meters) the mouth of stream/creeks that are near potential upland habitat and adjacent to existing modeled upland habitat. • Sites can link isolated and disjunct giant gartersnake habitat. • Re-established sites located along those portions of a stream corridor that have been identified as Preserves for giant gartersnake that provide upland habitat modeled for aestivation and/or basking at intervals no greater than 600 feet. Giant gartersnake habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled habitat, defined by the following criteria: • Located in intervals along the stream channel that are no closer to one another than 300 feet. • At least 0.2 acre at any given location along the stream channel, but not to exceed 1 acre. • Provides perennial aquatic habitat. • Provides emergent vegetation (i.e., tules and/or cattails). • Provides grassy banks and openings in the waterside vegetation (e.g., bulrush, cattails, waterweed, or other floating vegetation). • Supports soils and topography modeled for re-establishing target habitat. • Designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat. • Provides a minimum 300-foot setback on at least one side of re-established stream reaches. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment or establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment/establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
	GGS2.2. The Implementing Entity will select re-establishment or establishment sites for aquatic habitat that include Mixed Riparian Scrub and Valley Grassland considering the following criteria: • Directly connected to (and within 0.25 mile of) aquatic habitat. • Higher elevation uplands to provide refuge from flood waters during the snake's dormant season in the winter. • Sites can link isolated and disjunct giant gartersnake habitat. • Re-established sites located along those portions of a stream corridor that have been identified as Preserves for giant gartersnake that provide upland habitat modeled for aestivation and/or nesting. Giant gartersnake habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled

AGENDA ITEM 11.1
1063

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	habitat, defined by the following criteria: • Supports soils and topography modeled for restoring target habitat. • Designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the re-established or established habitat is not meeting re-establishment or establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment or establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective GGS3. Plan Permittees will conduct a study to establish hydrologic baseline conditions along Badger Creek to identify what level of hydrology is necessary to support giant gartersnake and acquire a water source to maintain the minimum level of hydrology during the summer months when agricultural runoff may wane.	GGS3.1. Measure hydrologic parameters (e.g., flow rate, temperature) within Badger Creek in locations known to be occupied by giant gartersnake. Three monthly hydrologic measurements will be made during the dry season of an average or better rainfall year. Each recording will occur over a full week to identify any regular interruptions in flow or changes in conditions due to diversions or inflows.
	GGS3.2. Acquire water rights adequate to maintain baseline dry season flows within Badger Creek, as determined during measurements obtained pursuant to Conservation Action GGS3.1.
Objective WPT1. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for western pond turtle (*Actinemys marmorata*) is preserved. Minimum preservation will total • 315.35 acres of aquatic habitat and • 10,971 acres of upland habitat. (See Objectives FWM1, OW1, RIP1, RIP3, VG1, BOW1, and SC1.)	WPT1.1. The Implementing Entity will select Preserve sites for aquatic habitat, including Freshwater Marsh, Open Water, and Stream/Creek considering the following criteria: • Contains slow-moving or quiet water with emergent aquatic vegetation and deep pools with undercut banks for refugia. • Contains basking sites such as rocks, logs, matted floating vegetation, terrestrial islands within the aquatic habitat, and human-made debris. • Will allow a minimum 300-foot setback on at least one side of stream reaches that are preserved for western pond turtle. • Where a stream reach is at least 600 feet in length.
	WPT1.2. The Implementing Entity will select Preserve sites for upland habitat, including Blue Oak Savanna, Blue Oak Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland considering the following criteria: • Allows for a 400-foot setback along both sides of stream reaches identified for western pond turtle outside of the UDA. • Allows for a 300-foot corridor along each side of North Laguna Creek to the maximum extent feasible, as measured from the Ordinary High Water Mark (OHWM) of the creek, with a minimum stream corridor width of 600 feet plus the width of the creek, with additional setbacks as defined by local government ordinances. • In segments of Laguna Creek where a 300-foot corridor on one side of the creek is not possible due to existing development and constraints, 300 feet may be used as an average for a defined length of the creek. However, the corridor on either side of Laguna Creek will be a minimum of the mapped Federal Emergency Management Agency (FEMA) 100-year floodplain of 2014.

AGENDA ITEM 11.1
1064

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective WPT2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic habitat for western pond turtle is re-established and/or established. Minimum re-establishment and/or establishment will total 315 acres of aquatic habitat. (See Objectives RIP2, FWM2, and OW2.)	WPT2.1. The Implementing Entity will select re-establishment and/or establishment sites for foraging and breeding habitat that includes Freshwater Marsh, Open Water, and Stream/Creek considering the following criteria: • Contains slow-moving or quiet water with emergent aquatic vegetation and deep pools with undercut banks for refugia. • Contains or has high potential to create basking sites such as rocks, logs, matted floating vegetation, terrestrial islands within the aquatic habitat, and human-made debris. Western pond turtle aquatic habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled habitat, defined by the following criteria: • Located in intervals along the stream channel that are no closer to one another than 300 feet. • Establishment or re-establishment site within modeled habitat area at least 600 feet in length. • At least 0.2 acre at any given location along the stream channel but will not exceed 1 acre. • Provides perennial aquatic habitat. • Provides emergent vegetation (i.e., tules and/or cattails). • Provides grassy banks and openings in the waterside vegetation (e.g., bulrush, cattails, waterweed, or other floating vegetation). • Supports soils and topography modeled for restoring target habitat. • Designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat. • Provides a minimum 300-foot setback on at least one side of restored stream reaches. • Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment/establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Terrestrial Invertebrate Covered Species	
Objective VELB1. Relocate or replace each impacted elderberry shrub (*Sambucus* spp.) according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999b). Mitigation will occur in locations that are not inundated for 2 continuous weeks, as determined by the TAC.	VELB1.1. Implement the following measures to avoid or minimize impacts to occupied valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) habitat: • Conduct protocol-level surveys for valley elderberry longhorn beetle if elderberry shrubs are located within 100 feet of construction activities. • Avoid direct impacts to occupied elderberry shrubs, defined as shrubs within 20 feet of construction. • Avoid indirect impacts of occupied elderberry shrubs, defined as shrubs between 20 and 100 feet of construction. • Compensate for direct loss of elderberry shrubs according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999b). • Conduct surveys after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	thereafter, the restored habitat is not meeting re-establishment criteria standards of 60% survivorship of occupied shrubs, the effort will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective VELB2. During implementation of Riparian habitat re-establishment and/or establishment, strategically include elderberry shrub in the planting palette (see Objectives RIP2 and RIP4).	VELB2.1. In Riparian habitat re-establishment and establishment sites that include modeled habitat for valley elderberry longhorn beetle (i.e., Mixed Riparian Woodland and Mixed Riparian Scrub or Valley Grassland with elderberry shrubs along a riparian corridor), include in plantings elderberry shrubs to create habitat characteristics associated with valley elderberry longhorn beetle occupancy. These characteristics include density of elderberry shrubs, shrub size, number of stems, and range of branch sizes (Talley et al. 2007).
Bird Covered Species	
Objective CH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 974 acres of modeled foraging and nesting habitat for Cooper's hawk (*Accipiter cooperii*) is preserved in accordance with the Conservation Actions described in this table (see Objectives RIP1, RIP3, and BOW1).	CH1.1. The Implementing Entity will select Preserve sites for nesting and foraging habitat considering certain criteria, including the following: • Blue oak woodland characterized by dense canopy closure (typically stands consisting of at least six trees with sparse ground cover). • Stands with trees approximately 26 to 49 feet high and 8 to 20 inches in diameter at breast height. • Proximity to foraging habitat with dense prey populations. • Located outside of the UDA.
Objective CH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 601 acres of modeled foraging and nesting habitat for Cooper's hawk is re-established and/or established (see Objectives RIP2 and RIP4).	CH2.1. Refer to Conservation Action RIP2.1. The Implementing Entity will select re-establishment or establishment sites for modeled foraging and nesting habitat considering certain criteria, including the following: • Near known nesting territories. • Connect disjunct segments of riparian habitats. • Proximity to modeled foraging areas with abundant prey populations. • Cooper's hawk Mixed Riparian Woodland and Mixed Riparian Scrub habitat establishment and re-establishment will occur only where a non-modeled land cover is converted to Mixed Riparian Woodland and Mixed Riparian Scrub. Establishment or re-establishment criteria for modeled Cooper's hawk habitat will also include the following: • Trees will be planted to encourage dense canopy closure of the mature stand. • Planting of 10 acorns for each tree to establish oak trees. • Survivorship of at least six trees pursuant to stand. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the established or re-established habitat is not meeting establishment or re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed establishment or re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective CH3. During assembly of the SSHCP Preserve System, ensure that a minimum of 38 acres of modeled foraging habitat for Cooper's hawk is preserved, in accordance with the Conservation Actions described in this table (see Objectives RIP1, RIP3, and BOW1).	CH3.1. The Implementing Entity will select Preserve sites for foraging habitat aquatic modeled habitat considering certain criteria, including the following: • Blue Oak Savannah containing trees approximately 26 to 49 feet high and 8 to 20 inches in diameter at breast height. • Presence of dense prey populations. • Located outside of the UDA.
Objective FH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 25,881 acres of modeled foraging habitat for ferruginous hawk is preserved, including 19,625 acres in PPUs 5 and/or 7 (see Objectives AG1, VG1, VP1, VP3, and SW1).	FH1.1. The Implementing Entity will select Preserve sites for foraging habitat considering certain criteria, including the following: • Known to already support populations of prey species, including rabbits, ground squirrels, and pocket gophers. • Moderate to dense vegetative cover (particularly grasses). • Topographic variation with shorter vegetation.
Objective FH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for ferruginous hawk is re-established and/or established (see Objectives VP2 and SW2).	FH2.1. The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Moderate to dense vegetative cover (particularly grasses). • Topographic variation with shorter vegetation.
Objective SH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 31,033 acres of modeled foraging habitat for Swainson's hawk is preserved (see Objectives AG1, AG2, SW1, VP1, VP3, and VG1). Ensure that mitigation for high-value modeled habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8.	SH1.1. The Implementing Entity will select Preserve sites that include foraging habitat considering certain criteria, including the following: • Presence of irrigation systems that are engineered to provide for alfalfa production. • Agricultural lands that have existing trees or could support plantings of additional trees for future use as Swainson's hawk nest trees. • Within 3 miles of active nest sites, where the record of the nest site is not older than 5 years, unless confirmed to be currently active by new surveys. • Proximity to large, contiguous area of open space that provides foraging habitat. • Proximity to stream riparian corridors containing large trees that potentially provide nesting habitat. • Preserves can include sites supporting vineyard and orchard as long as vines and trees are removed within 2 years of acquisition. • Preserves are not adjacent to wind energy facilities.
Objective SH2. At least 2,000 acres of cropland habitat within high-value habitat	SH2.1. Preserve 2,000 acres (1:1 ratio) of cropland habitat within 2 miles of at least two active nesting sites in fee title to ensure that intensive management actions can be taken that may be infeasible on Preserve easement lands. Land held in fee title will be

AGENDA ITEM 11.1
1067

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
within PPUs 4, 6, and 8 will be preserved in fee title to ensure that intensive management actions can be taken. Land held in fee title will be restricted to growing field or row crops. Fee title lands must maintain, at a minimum, an average of 50% of their crop cover-type in alfalfa. Other crop types or land covers may be substituted for alfalfa if the TAC determines that such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa.	restricted to growing fields or row crops. Fee title lands must maintain, at a minimum, an average of 50% of their crop cover-type in alfalfa over a period of 5 years. Other crop types or land covers may be substituted for alfalfa if a Swainson's hawk expert determines that such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa.
Objective SH3. During assembly of the SSHCP Preserve System, ensure a minimum of 746 acres of modeled nesting habitat for Swainson's hawk is preserved (see Objectives RIP1 and RIP3).	SH3.1. The Implementing Entity will select Preserve sites that contain modeled nesting habitat considering certain criteria, including the following: • Presently supports nesting activity. • Located within or near (preferably within 4.2 miles) productive foraging habitat such as Prime Farmland, Statewide Farmland (most productive), and current agriculture land cover types (i.e., alfalfa; other crop types or land covers may be substituted for alfalfa if the TAC determines that such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa). • Support large mature trees (e.g., taller than 50 feet) that are preferred nesting sites. • Located in rural areas unlikely to be affected by high levels of human activities. • Preserves are not adjacent to wind energy facilities.
Objective SH4. During assembly of the SSHCP Preserve System, ensure that a minimum of 373 acres of modeled riparian nesting habitat for Swainson's hawk is re-established and/or established. Ensure that mitigation for modeled nesting habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8 (see Objectives RIP2 and RIP4).	SH4.1. Re-establish or establish riparian habitat along stream or river channels near known nesting territories. Establishment and re-establishment will target areas that connect disjunct segments of riparian habitat to the maximum extent feasible. Surveys will be conducted periodically for 10 years to monitor success, including habitat quality and use by nesting Swainson's hawk. During the first year, established or re-established habitat will be monitored monthly, with more frequent monitoring during summer months or periods of drought to ensure that new plantings are kept moist. During the second and third years, habitat will be monitored quarterly. For the remainder of the monitoring period, restoration habitat will be monitored every 6 months. If there are extended periods of drought within the monitoring period, or if established or re-established habitat becomes flooded for an extended period during the monitoring period, the habitat will be monitored more frequently to assess the impacts of and remediate for these extreme weather conditions. If, after 10 years, the established or re-established habitat is not meeting establishment or re-establishment criteria standards in terms of modeled habitat quality, the efforts will be deemed to have failed. Absence of

AGENDA ITEM 11.1
1068

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	nesting Swainson's hawks over the 10-year period will not be a criterion for failure as long as the Riparian habitat has otherwise achieved the establishment or re-establishment standards. If, at any time during the monitoring period, restored habitat is declining beyond remediation, dying, or dead, efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective SH5. For each of the 36 known nesting trees within the UDA, plant 10 trees that are modeled for Swainson's hawk nesting within SSHCP Preserves. Plant nesting trees on properties protected by the SSHCP within PPUs 4, 6, and 8, and near protected foraging habitat. Tree species will be selected based on known suitability as nesting habitat for Swainson's hawk, and the planted trees must be maintained and/or replaced in perpetuity.	SH5.1. Plant nesting trees on properties protected by the SSHCP and within proximity to protected foraging habitat. Tree species will be selected based on known suitability as nesting habitat for Swainson's hawk. To minimize temporal loss, a mix of tree species will be planted at each site to include fast- and slow-growing species. Trees that are acceptable for planting include Fremont's cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), blue oak (*Q. douglasii*), interior live oak (*Q. wislizenii*), western sycamore (*Platanus racemosa*), red willow (*Salix laevigata*), and Northern California black walnut (*Juglans hindsii*). Clusters of five trees must be established and maintained for every 40 acres of agricultural cropland preserved, and must include at least two different species, one of which must be a fast-maturing tree such as Fremont's cottonwood or red willow. Trees will be placed at the edges of agricultural fields. To help ensure survivorship, acorns will be used to establish oak trees, and at least 10 acorns will be planted for each required tree (i.e., if a cluster is to be composed of two cottonwoods and three valley oaks, then 30 valley oak acorns must be planted).
Objective SH6. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for Swainson's hawk is re-established and/or established (see Objectives RIP2 and RIP4).	SH6.1. The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Presence of irrigation systems that are engineered to provide for alfalfa production. • Agricultural lands that could support plantings of additional trees for future use as Swainson's hawk nest trees. • Within 3 miles of active nest sites where the record of the nest site is not older than 5 years, unless confirmed to be currently active by new surveys. • Proximity to large, contiguous area of open space that provides foraging habitat. • Proximity to stream riparian corridors containing large trees that potentially provide nesting habitat. • Preserves are not adjacent to wind energy facilities.
Objective WK1. During assembly of the SSHCP Preserve System, ensure that a minimum of 31,205 acres of modeled foraging habitat for white-tailed kite is preserved (see Objectives VG1, AG1, RIP1, RIP3, SW1, VP1, VP3, and BOW1).	WK1.1. The Implementing Entity will select Preserve sites for foraging habitat considering certain criteria, including the following: • Agricultural lands that support perennial crops (e.g., alfalfa) rather than annual crops. • Known to be used by white-tailed kite for foraging. • On parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective WK2. During assembly of the SSHCP Preserve System, ensure that a minimum of 974 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is preserved (see Objectives RIP1, RIP3, and BOW1).	WK2.1. The Implementing Entity will select Preserve sites for nesting habitat, including Blue Oak Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub, considering certain criteria, including the following: • Large, unfragmented patches connected to Grassland and agriculture areas known to support high prey densities. • Closed canopy consisting of multiple vegetation layers, including mature trees. • Known to support nesting white-tailed kite. • On parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective WK3. During assembly of the SSHCP Preserve System, ensure a minimum of 767 acres of modeled foraging habitat for white-tailed kite is re-established and/or established (see Objectives VP2, RIP2, RIP4, and SW2).	WK3.1. Implement Conservation Actions VP2, RIP2, RIP4, and SW2. Foraging habitat re-establishment or establishment will involve establishing habitat, including vegetation structure modeled for voles (*Microtus californicus*) where it historically occurred but no longer exists due to loss of or changes in ecological factors. White-tailed kite foraging habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled habitat.
	WK3.2. Re-establish or establish nesting habitat in areas that have a range of riparian plant assemblages that include large trees such as cottonwood and valley oak, as well as an understory of Mixed Riparian Scrub. The Implementing Entity will select re-establishment/establishment sites for nesting habitat considering certain criteria, including the following: • Located along existing riparian corridors where nesting habitat likely existed in the past, such as along the Cosumnes River and Deer Creek. • Located within a new or existing preserve or habitat corridor. Created Riparian Woodland areas must be able to support a wide variety of species. • Located in areas within at least 0.5 mile of modeled foraging habitat. • Supports soil and topography modeled for restoring target habitat. • Located at least 500 feet from urban land uses, including structures and roads. • Avoidance of locations that historically did not support Riparian Woodland. • Avoidance of locations within the existing Vernal Pool landscape. Surveys will be conducted after 1 year and every 5 years thereafter to monitor prey abundance. If, after the first year or any 5-year interval thereafter, the re-established habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective WK4. During assembly of the SSHCP Preserve System, ensure that a minimum of 601 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is re-established and/or established (see Objectives RIP2 and RIP4).	See Conservation Action WK2.1.
Objective NH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,245 acres of modeled foraging habitat for northern harrier (*Circus cyaneus*) is preserved (see Objectives VG1, AG1, VP1, VP3, FWM1, and SW1).	NH1.1. The Implementing Entity will select Preserve sites for foraging habitat considering certain criteria, including the following: • Open habitats with dense, tall (12 to 38 inches) vegetation. • Known to support high prey densities (small mammals). • On parcels 20 acres or greater and/or occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially support other Covered Species. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective NH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 30,048 acres of modeled nesting/foraging habitat for northern harrier is preserved (see Objectives VG1 and AG1).	NH2.1. The Implementing Entity will select Preserve sites for nesting/foraging habitat considering the following criteria: • Open habitats with dense, tall (12 to 38 inches) vegetation. • Wet or moist sites for nesting. • Known to support high prey densities (small mammals). • On parcels 20 acres or greater and/or occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially support other Covered Species. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective NH3. During assembly of the SSHCP Preserve System, ensure that a minimum of 856 acres of modeled foraging habitat for northern harrier is re-established and/or established (see Objectives VP2, FWM2, and SW2).	NH3.1. The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Historically contained intact foraging habitat. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Could potentially support other Covered Species. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

AGENDA ITEM 11.1
1071

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective BO1. Preserve seven occupied western burrowing owl (*Athene cunicularia*) sites (commensurate with 20% of the estimated number of sites within the UDA as of 2014), preserve at least 200 acres of land surrounding each occupied burrow site, and maintain modeled habitat for western burrowing owl within 0.4 mile of breeding sites.	BO1.1. The Implementing Entity will select Preserve sites that include nesting habitat land cover types considering certain criteria, including the following: • Known to support breeding burrowing owls. • Located within 3 miles of a known nesting site or modeled nesting habitat. • Known to support high rodent populations during the breeding season. • Expand upon or link already preserved lands and will not be bisected by new roadways or incur impacts from any other infrastructure developments. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Potentially support other Covered Species. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
	BO1.2. Preserve modeled nesting habitat within PPUs 4, 6, and/or 8.

Objective BO2. For each burrowing owl or burrowing owl pair passively excluded, protect 200 acres of modeled habitat for western burrowing owl and establish a ground squirrel (*Spermophilus (Otospermophilus) beecheyi*) colony and augment with artificial burrows as appropriate (determined by TAC). Artificial burrows will be established at appropriate locations throughout the Preserve System pursuant to CDFW (CDFG 2012 guidelines) or as otherwise determined by the TAC.	BO2.1. Select Preserve sites in areas with known species occurrences and that contain modeled habitat. Manage these locations to maintain the following:
	• Open, well-drained terrain with low risk of flooding.
	• Short, sparse vegetation.
	• Underground burrows or burrow facsimiles.
	• Modeled foraging habitat within 0.4 mile of breeding sites.
	• Enhanced foraging habitat quality through
	  ○ Promoting fossorial mammal populations in areas that are modeled foraging habitat;
	  ○ Providing sentinel posts or mounds near burrows; and
	  ○ Creating rock piles near nest burrows.

Objective LS1. During assembly of the SSHCP Preserve System, ensure that a minimum of 9,152 acres of modeled foraging habitat for loggerhead shrike (*Lanius ludovicianus*) is preserved (see Objectives VG1, AG1, SW1, VP1, and VP3).	LS1.1. The Implementing Entity will select Preserve sites for foraging habitat considering certain criteria, including the following: • Lands that are open with sparse vegetation for foraging. • Available hunting perches with an open view. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Known to support loggerhead shrike and other Covered Species. • Linked or adjacent to currently preserved lands. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

AGENDA ITEM 11.1
1072

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective LS2. During assembly of the SSHCP Preserve System, ensure that a minimum of 22,014 acres of modeled nesting/foraging habitat for loggerhead shrike is preserved (see Objectives VG1, RIP1, and RIP3).	LS2.1. The Implementing Entity will select Preserve sites for nesting/foraging habitat considering certain criteria, including the following: • Lands that are open with sparse vegetation for foraging interspersed with scattered or isolated low trees or large shrubs for nest sites. • Available hunting perches with an open view. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Known to support loggerhead shrike and other Covered Species. • Linked or adjacent to currently preserved lands. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective LS3. During assembly of the SSHCP Preserve System, ensure that a minimum of 592 acres of modeled nesting habitat for loggerhead shrike is re-established and/or established (see Objectives RIP2 and RIP4).	LS3.1. The Implementing Entity will select re-establishment/establishment sites for nesting habitat considering certain criteria, including the following: • Lands that possess or can be planted with scattered or isolated low trees or large shrubs for nest sites. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Potential to support loggerhead shrike and other Covered Species after re-establishment and/or establishment. • Linked or adjacent to currently preserved lands. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Loggerhead shrike habitat re-establishment will only occur where habitat historically occurred but no longer exists due to loss of or changes in ecological factors.
Objective LS4. During assembly of the SSHCP Preserve System, ensure that a minimum of 965 acres of modeled nesting habitat for loggerhead shrike is preserved (see Objectives RIP2 and RIP4).	See Conservation Action LS2.1.
Objective LS5. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for loggerhead shrike is re-established and/or established (see Objective SW2).	LS5.1. The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • On parcels 20 acres or greater and/or occur in larger, open space areas. • Potential to support loggerhead shrike and other Covered Species after re-establishment and/or establishment. • Linked or adjacent to currently preserved lands. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Loggerhead shrike habitat re-establishment will only occur where habitat historically occurred but no longer exists due to loss of or changes in ecological factors.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objective GS1. During assembly of the SSHCP Preserve System, ensure that a minimum of 257 acres of modeled roosting or roosting/foraging habitat for greater sandhill crane is preserved. Roosting habitat will be preserved and maintained within PPUs 4, 6, and 8, with a minimum of 75% within PPU 6 (see Objectives VP1, SW1, and FWM1).	GS1.1. The Implementing Entity will select Preserve sites for roosting habitat considering certain criteria, including the following: • Known roost sites. • Located within 2 miles of modeled foraging habitat outside the UDA. • 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially support other Covered Species or where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species. • At least 1,000 feet from disturbances such as roads or other operations that may disturb roosting. • Free of fences and power lines. • Seasonal wetland present from September to mid-March. • Supports natural drainage inflows, or water delivery mimics natural hydrologic cycles. The Implementing Entity will also coordinate with relevant conservation entities and the Wildlife Agencies to determine the most effective preserve acquisitions to account for potential geographic shifts in the greater sandhill crane population within the SSHCP Plan Area in anticipation of, and as a result of, sea-level rise.
Objective GS2. During assembly of the SSHCP Preserve System, ensure that a minimum of 7,751 acres of modeled foraging habitat for greater sandhill crane is preserved (see Objectives AG1, AG2, and VG1).	GS2.1. The Implementing Entity will select Preserve sites for foraging habitat considering certain criteria, including the following: • Modeled foraging habitat located within 2 miles of known roost sites or modeled roosting habitat outside the UDA. • On parcels 20 acres or greater and/or that occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially support other Covered Species or where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species. • Free of fences and power lines. • Contain available sources of “grit,” including gravel and dirt roads or rocky uplands. The Implementing Entity will also coordinate with relevant conservation entities and the Wildlife Agencies to determine the most effective preserve acquisitions to account for potential geographic shifts in the greater sandhill crane population within the SSHCP Plan Area in anticipation of, and as a result of, sea-level rise.
Objective GS3. During assembly of the SSHCP Preserve System, ensure that a minimum of 184 acres of modeled roosting habitat or roosting/foraging habitat for greater sandhill crane is established and/or	GS3.1. Implement Conservation Actions for Objectives SW2 and FWM2. Select re-establishment or establishment sites outside the UDA based on the same criteria used for preservation sites in GS1.1 and GS2.1. Habitat re-establishment and establishment will only occur where it replaces low-quality foraging or roosting habitat, including the following features: • Replacement of unmodeled agriculture uses such as orchards and vineyards with habitats supporting high prey abundance (e.g., invertebrates), including Grassland, suitable Croplands, Irrigated Pasture, and Wet Meadow.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
re-established. Re-establish two new roost sites (minimum of 90 acres of Freshwater Marsh/Seasonal Wetland complex each) every 2 miles in the gap between the Cosumnes population and the Stone Lakes' population or other strategic locations if that gap is closed by another HCP or conservation project (see Objectives VP2, SW2, and FWM2).	• Removal of physical structures that can cause collisions during takeoff and flying, including fences, distribution lines, and other built structures. • Removal of human disturbances from otherwise modeled foraging and roosting habitat. • Establishment of suitable hydrologic regimes at roosting sites. • Grit sources near foraging areas.
Objective GS4. Create a visual screen of woody vegetation near human disturbances such as buildings, bridges, and paved roads from permanent roosting habitat within PPU 6. Screens should be located as appropriate to not interfere with habitat usage by greater sandhill crane.	GS4.1. Plant visual screens of woody vegetation in known and potential roosting sites within PPU 6 where there are nearby human disturbances, including roads, bridges, and dwellings.
Objective GS5. As part of the 2,000 acres preserved under Objective AG2, establish and maintain 10 food plots in strategic locations totaling a minimum of 200 acres within an agricultural setting for greater sandhill crane foraging habitat within PPU 6. Maintain the 200 acres among the 10 food plots as irrigated pasture or planted with crops preferred by greater sandhill crane as foraging habitat. Crops may include alfalfa, corn, wheat, or rice. Strategic placement of food plots will include locations for food plots in upland areas above the floodplain.	GS5.1. Maintain the 200 acres among the 10 food plots as irrigated pasture or planted with crops preferred by greater sandhill crane as foraging habitat. Crops may include alfalfa, corn, wheat, or rice. Preference shall be given to corn or rice. The 10 food plots will be distributed throughout PPU 6 at a minimum of five locations, each at least 20 acres. Food plots must be within 1.5 miles of irrigated pasture-grassland or other pasture, and within 2 miles of known roosting sites. Crops must not be harvested or removed until March. Crops such as corn should be knocked over at a height and as early as possible in the season to maximize the benefit and give access to greater sandhill cranes while still impeding geese from exploiting the resource.The Implementing Entity will also coordinate with relevant conservation entities and the Wildlife Agencies to determine the most effective preserve acquisitions to account for potential geographic shifts in the greater sandhill crane population within the SSHCP Plan Area in anticipation of, and as a result of, sea-level rise.
Objective GS6. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,000 acres of high-value	GS6.1. The Implementing Entity will select Preserve sites for high-value foraging habitat outside the 100-year floodplain considering certain criteria, including the following: • Modeled high-value foraging habitat that is located outside the 100-year floodplain.

AGENDA ITEM 11.1
1075

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
modeled foraging habitat for greater sandhill crane outside the 100-year floodplain is preserved (see Objectives VP1, SW1, and FWM1).	• Located within 2 miles of known roost sites or modeled roosting habitat outside the UDA. • On parcels 20 acres or greater and/or that occur in larger, open space areas. • Is recorded as supporting greater sandhill crane foraging during previous flood events. • Linked or adjacent to currently preserved lands. • Potentially support other Covered Species or where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species. • Free of fences and power lines. • Contain available sources of "grit," including gravel and dirt roads or rocky uplands. The Implementing Entity will also coordinate with relevant conservation entities and the Wildlife Agencies to determine the most effective preserve acquisitions to account for potential geographic shifts in the greater sandhill crane population within the SSHCP Plan Area in anticipation of, and as a result of, sea-level rise.
Objective TB1. During assembly of the SSHCP Preserve System, ensure that a minimum of 4,149 acres of modeled foraging habitat for tricolored blackbird is preserved (see Objectives AG1, AG2, FWM1, VG1, VP1, VP3, FWM1, OW1, and SW1).	TB1.1. The Implementing Entity will select Preserve sites for foraging habitat considering certain criteria, including the following: • Expand on or link already preserved lands and not bisected by new roadways or incur impacts from any other infrastructure developments. • Located within 1 mile of a known nesting site or modeled nesting habitat (note: intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat). • Contains vegetation with a potential for high insect populations during the breeding season (April through July). • On parcels 20 acres or greater and/or occur in larger, open space areas. • Where management can be used to enhance or re-establish natural ecosystem processes and attract tricolored blackbird.
Objective TB2. During assembly of the SSHCP Preserve System, ensure that a minimum of 27,532 acres of modeled nesting/foraging habitat for tricolored blackbird is preserved, including a minimum of 402 acres of Freshwater Marsh and Seasonal Wetland (see Objectives AG1, AG2, VG1, VG1, FWM1, and SW1).	TB2.1. The Implementing Entity will select Preserve sites for aquatic nesting/foraging habitat, including Seasonal Wetland and Freshwater Marsh land cover types considering certain criteria, including the following: • Has nesting substrate (e.g., tules, cattails) in an extensive area (minimum 2 acres) to accommodate large tricolored blackbird colonies. • Known to currently or historically support a tricolored blackbird colony. • Located within 3 miles of a known foraging site or modeled foraging habitat (note: intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat). • Open water (e.g., canal, lakeshore, or farm pond) within 1,640 feet of nesting substrate to provide a water source for nestlings. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Management for tricolored blackbird will include maintaining young, lush growth of emergent wetland (cattails or tules).

AGENDA ITEM 11.1
1076

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	TB2.2. The Implementing Entity will select Preserve sites for upland nesting/foraging habitat, including Cropland, Valley Seasonal Wetland, and Freshwater Marsh land cover types considering certain criteria, including the following: • Has upland nesting substrate (e.g., Himalayan blackberry thickets) in an extensive area (minimum 2 acres) to accommodate large tricolored blackbird colonies. • Known to currently or historically support a tricolored blackbird colony. • Located within 3 miles of a known foraging site or modeled foraging habitat (note: intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat). • Open water (e.g., canal, lakeshore, or farm pond) within 1,640 feet of nesting substrate to provide a water source for nestlings. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Management for tricolored blackbird will include maintaining young, lush growth of emergent wetland (cattails or tules).
Objective TB3. During assembly of the SSHCP Preserve System, ensure that a minimum of 917 acres of modeled foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2, SW2, OW2, and VP2).	TB3.1. Implement Conservation Actions FWM2.1, SW2.1, OW2.1, and VP2.1. The Implementing Entity will select re-establishment/establishment sites for aquatic modeled habitat considering certain criteria, including the following: • Occurs within 1,000 feet of a nesting colony, that is occupied at the time of re-establishment/establishment or that was recorded as an occupied nesting colony at any time since 2008. Sources for occupied nesting colonies are the California Natural Diversity Database (CNDDB), Tricolored Blackbird Portal, eBird, or other data sources approved by the Wildlife Agencies. • Includes all or a mix of Irrigated Pasture Grassland, Cropland, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, Open Water, and/or Valley Grassland, preferably situated within a mosaic of foraging habitat (as opposed to on the edge of foraging habitat) and providing adequate insect prey. • Tricolored blackbird habitat establishment/re-establishment will occur only where currently non-modeled habitat is converted to modeled habitat (e.g., conversion of a current non-wetland to a wetland). Modeled nesting substrate includes flooded, thorny, spiny, or "visually" but not actually spiny vegetation. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the established or re-established habitat is not meeting establishment or re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed establishment or re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective TB4. During assembly of the SSHCP Preserve System, ensure that a minimum of 232 acres of modeled nesting/foraging habitat for tricolored blackbird is re-established and/or	TB4.1. The Implementing Entity will select re-establishment/establishment sites for nesting/foraging habitat, including Valley Grassland, Seasonal Wetland, and Freshwater Marsh land cover types considering certain criteria, including the following: • Known to historically support a tricolored blackbird colony. • Located within 1 mile of a known foraging site or SSHCP land cover type that provides modeled nesting and foraging habitat (Valley Grassland, Freshwater Marsh, Seasonal Wetland (Section 3.4.5)). Intensive row crops, vineyards, and orchards generally

AGENDA ITEM 11.1
1077

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
established (see Objectives FWM2 and SW2).	do not provide modeled foraging habitat. • Open water (e.g., canal, lakeshore, or stock pond) to provide water for nestlings within 1,640 feet of area where upland nesting substrate can be re-established and/or established. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. • Management for tricolored blackbird will include maintaining young, lush growth of emergent wetland (cattails or tules) or for upland sites, blackberry bushes or other suitable spiny bushes.
Objective TB5. Provide mitigation for loss of any tricolored blackbird nesting colony site that is occupied at the time of Covered Activity implementation or was recorded as an occupied nesting colony at any time since 2008. Sources for occupied nesting colonies are the California Natural Diversity Database, Tricolored Blackbird Portal, eBird, or other data sources approved by the Wildlife Agencies. Minimum mitigation is to protect one extant unprotected occurrence of a nesting colony prior to take of one nesting colony of tricolored blackbird. Ensure that at least five extant tricolored blackbird colonies that were occupied in recent years are maintained and managed within the SSHCP Preserve System.	TB5.1. Protect at least one extant unprotected occurrence of a nesting colony prior to take of one nesting colony of tricolored blackbird. Each of the extant occurrences preserved will meet the following criteria: • Has supported a minimum of 200 individual tricolored blackbirds during one or both of the survey years preceding the project application. • A protected nesting substrate (including wetlands that are flooded March to July, and thorny, spiny, or "visually" but not actually spiny vegetation). • Open accessible water within 1,640 feet of the nesting substrate. • Located within 1 mile of at least 500 acres of a known foraging site or SSHCP land cover type that provides modeled nesting and foraging habitat (Valley Grassland, some Cropland, Freshwater Marsh, Seasonal Wetland (Section 3.4.5)). This requirement targets lands with adequate insect forage. Intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat. One or more of the three elements (nesting substrate, access to open water as a water source for nestlings, and modeled foraging habitat) may be provided through establishment or re-establishment through Conservation Action TB3.1. If re-establishment is included, surveys will be conducted the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective TB6. Conduct an experimental study to identify management actions to protect tricolored blackbird colonies (e.g., coarse netting to reduce nest predation or impact of pesticides).	TB6.1. Select one or more existing tricolored blackbird colonies as experimental populations. If a large colony is available, test several potential feasible management actions within that one colony. If results of experimental treatments indicate a measurable and biologically significant decrease in nest predation or increased fledgling success and that treatments are feasible, include these management actions within Preserve Management Plans for Preserves that include historic or current tricolored blackbird colonies.
Objective TB7. Ensure that at least one large tricolored blackbird colony (i.e., one that has historically (from 1950 onward)	TB7.1 Each of the large colonies preserved will meet the following criteria: • Has supported a minimum of 1,500 individual tricolored blackbirds during a survey year since 1950.

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
supported a minimum of 1,500 individuals) is protected.	• A protected nesting substrate (including flooded, thorny, spiny, or "visually" but not actually spiny vegetation). • Open accessible water to provide a water source for nestlings within 1,640 feet of the nesting substrate. • At least 500 acres of modeled foraging habitat (that may include any combination of Irrigated Pasture Alfalfa, Vernal Pool, Valley Grassland, Seasonal Wetland, Swale, and Freshwater Marsh) providing adequate insect prey within a 1-mile radius of the nesting colony. One or more of the three elements (nesting substrate, access to open water, and modeled foraging habitat) may be provided through establishment or re-establishment through Conservation Action TB3.1. If re-establishment is included, surveys will be conducted the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective TB8. For any tricolored blackbird nesting colony that is removed by a Covered Activity, re-establish and/or establish three new colonies within SSHCP Preserves. Re-established and/or established colonies can be in aquatic (freshwater marsh, seasonal wetland) or upland (annual grassland) habitat types, and must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands that provide adequate foraging opportunities.	TB8.1. When re-establishing and/or establishing aquatic nesting colony sites, the Implementing Entity will consider the following in their design: • Avoid management of properties for fall and winter waterfowl habitat. Maintain flooded marshes from spring into July through irrigation or impoundment (8–12 inches standing water through spring). As necessary, use graywater or recycled water sources for spring irrigation. • Plant mixture of cattails and tules (cattails more abundant) in seasonal wetlands and freshwater marshes if absent. Manage the wetlands for large patches of cattails (at least 100 feet in width), spaced away from the shoreline. Refresh cattails by mowing/disking or burning, not less than every 3 years in fall and winter. • Protect the colony site from encroachment by trees or high shrubs, to eliminate perching sites for avian nest predators. • Sites selected for re-establishment/establishment of aquatic nesting habitat must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands. Agricultural operations or grasslands should ideally be protected in SSHCP Preserves, but if not, must be free from pesticide use so that insect populations are not reduced. • Encourage cattle grazing near suitable breeding colony sites if possible. Grazing increases insect abundance and the short grass increases tricolored blackbird access to insects. As an alternative to cattle grazing, conduct prescribed burns every 5 years. The preferred grass height to maintain by grazing is less than 15 inches. • Near the aquatic nesting colony site, promote insect production in early spring through irrigation or other methods. Preferred insect prey include grasshoppers and caterpillars, but aquatic insect larvae can also provide food. • Tules or cattails will be cut down or removed after each season to allow for growth of new tules and cattails.
	TB8.2. When re-establishing and/or establishing upland nesting colony sites, the Implementing Entity will consider the following in their design: • Provide native spiny, thorny, thick substrate such as California blackberry (*Rubus ursinus*), prickly lettuce (*Lactuca serriola*),

AGENDA ITEM 11.1
1079

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
	nettles (*Urtica dioica*), California rose (*Rosa californica*), sandbar willow (*Salix exigua*), and mugwort (*Artemisia douglasiana*). • Protect existing patches of non-native Himalayan blackberry (*Rubus armeniacus*) and milk thistle (*Silybum marianum*) patches and allow planting in select areas. These provide superior upland habitat compared to native species as they are more thick and spiny. • Protect the colony site from encroachment by trees or high shrubs to eliminate perching sites for avian nest predators. Patches should remain in the open to avoid predator access from trees and shrubs. • Target establishment of high-density patches with height of 4 to 10 feet in existing pastureland and rangeland. Irrigating in March–April can help increase the height and density of the plants if the winter has been dry. • Do not prune or mow patches until after the nesting season. • Sites selected for re-establishment/establishment of upland nesting habitat must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands. Agricultural operations or grasslands should ideally be protected in SSHCP Preserves, but if not, must be free from pesticide use so that insect populations are not reduced. • Ensure a water source is available within 1,500 feet of a target upland colony site throughout the breeding season. Water sources can include ponds, marshes, canals, stock ponds, and streams.
Mammal Covered Species	
Objective AB1. During assembly of the SSHCP Preserve System, ensure that a minimum of 23,171 acres of modeled habitat for American badger (*Taxidea taxus*) is preserved (see Objectives BOW1, VG1, VP1, VP3, and SW1).	AB1.1. The Implementing Entity will select Preserve sites for modeled habitat considering certain criteria, including the following: • Large areas (e.g., relatively undisturbed by human activity). • Supporting friable soils. • Known to support high prey densities, particularly ground squirrels and pocket gophers. • Where management can be used to enhance or re-establish natural ecosystem processes.
Objective AB2. During Preserve Assembly, ensure that a minimum of 767 acres of modeled habitat for American badger is re-established and/or established (see Objectives VP2 and SW2).	AB2.1. The Implementing Entity will select re-establishment/establishment sites for modeled habitat considering certain criteria, including the following: • Large areas (e.g., relatively undisturbed by human activity). • Supporting friable soils. • Known to support high prey densities, particularly ground squirrels and pocket gophers. • Where management can be used to enhance or re-establish natural ecosystem processes.
Objective WR1. During Preserve Assembly, ensure that a minimum of 23,910 acres of modeled foraging habitat for western red bat (*Lasiurus blossevillii*) is preserved (see	WR1.1. The Implementing Entity will select Preserve sites for foraging habitat considering certain criteria, including the following: • Foraging areas known to be used by western red bats. • Located within 2–3 miles of permanent water.

AGENDA ITEM 11.1
1080

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
Objectives BOW1, RIP1, RIP3, AG1, VG1, VP1, VP3, SW1, OW1, FWM1, and SC1).	• Areas known or having potential to support high insect prey densities. • Few or no human disturbances. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absence of or few habitat-fragmenting features, including roads and other infrastructure. • Where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.
Objective WR2. During assembly of the SSHCP Preserve System, ensure that a minimum of 841 acres of modeled roosting/foraging habitat for western red bat is preserved (see Objectives BOW1, RIP1, and RIP3).	WR2.1. The Implementing Entity will select Preserve sites for roosting/foraging habitat considering certain criteria, including the following: • Active roosting sites, especially maternity sites (note that buildings, bridges, and other built structures may be used for roosting). • Located within 2–3 miles of foraging habitat and permanent water. • Foraging areas known to be used by western red bat. • Areas known or having potential to support high insect prey densities. • Few or no human disturbances. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absence of or few habitat-fragmenting features, including roads and other infrastructure. • Where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.
Objective WR3. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,317 acres of modeled foraging habitat for western red bat is re-established and/or established (see Objectives VP2, SW2, OW2, FWM2, RIP2, and RIP4).	WR3.1. The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Areas known or having potential to support high insect prey densities. • Located within 2–3 miles of permanent water. • Few or no human disturbances. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absence of or few habitat-fragmenting features, including roads and other infrastructure. • Where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.
Objective WR4. During assembly of the SSHCP Preserve System, ensure that a minimum of 450 acres of modeled	WR4.1. The Implementing Entity will select re-establishment/establishment sites for roosting/foraging habitat considering certain criteria, including the following: • Areas known or having potential to support high insect prey densities.

AGENDA ITEM 11.1
1081

Table 7-1
Biological Goals, Measurable Objectives, and Conservation Actions

Measurable Objectives	Conservation Actions
roosting/foraging habitat for western red bat is re-established and/or established (see Objectives RIP2 and RIP4).	• Located within 2–3 miles of foraging habitat and permanent water. • Few or no human disturbances. • On parcels 20 acres or greater and/or occur in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absence of or few habitat-fragmenting features, including roads and other infrastructure. • Where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.

7.4 Development of the SSHCP Preserve System

The Plan Permittees will use the key conservation biology principles described in Section 7.1 and the Biological Goals and Measurable Objectives (Section 7.3) to develop the SSHCP Preserve System.

7.4.1 Preserve System Assembly Process

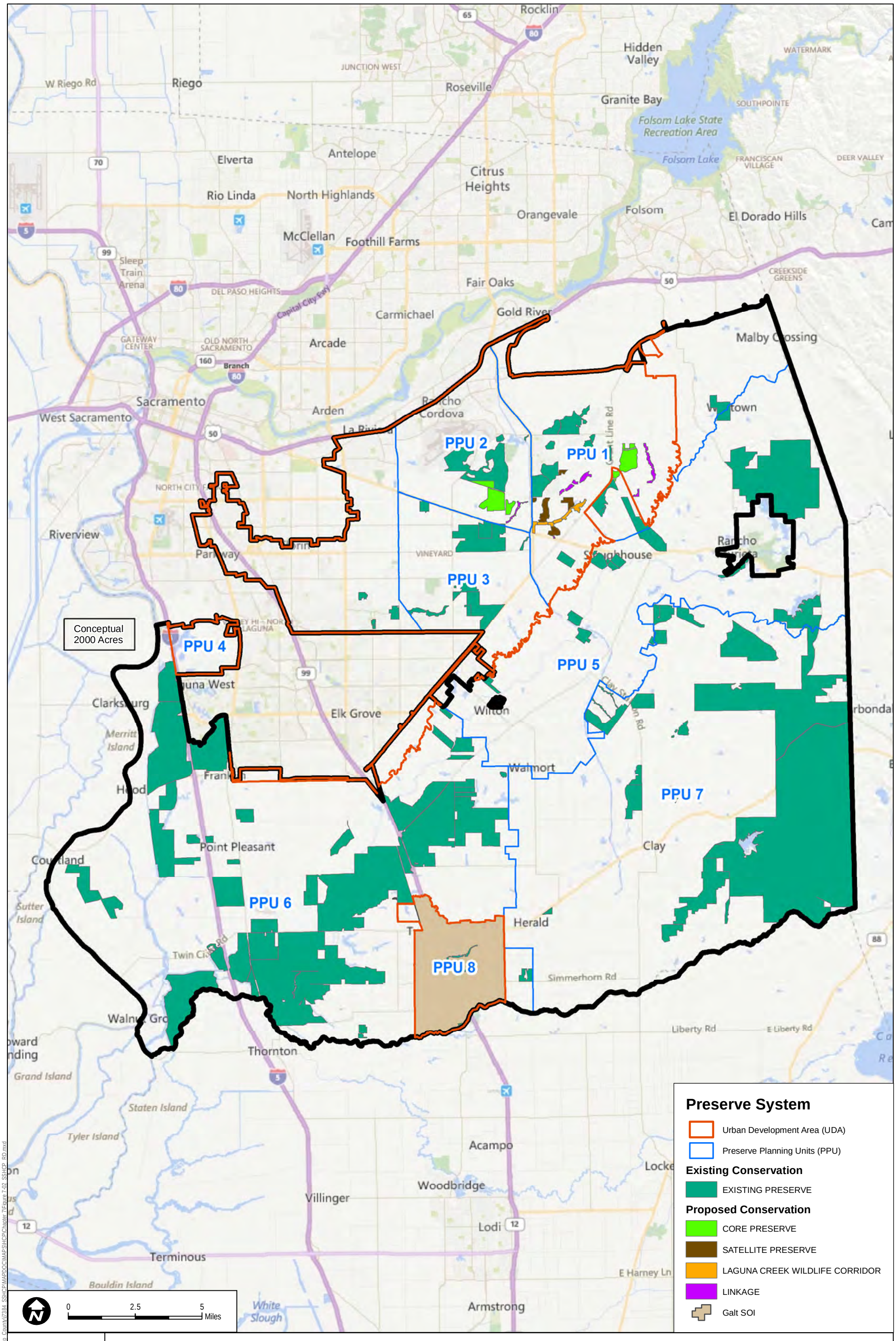
As described in Chapter 1, the Plan Area contains two regions: the UDA, where local jurisdictions anticipate urban growth, and lands outside the UDA, which are characterized by agricultural land uses and already include some large areas of conservation lands. Habitat preservation and management requirements in the UDA differ from those outside the UDA because these areas are subject to different land uses. Large SSHCP Preserves established outside of the UDA will occur in a matrix of open space and agricultural lands interspersed with agricultural residential communities; smaller SSHCP Preserves in the UDA will be surrounded by urban, suburban, industrial, and commercial land uses. Each Preserve in the SSHCP Preserve System will be established by one of two processes:

- **Hardline process**. This process is termed "hardline" because the exact locations and Preserve boundaries are known at the time of Plan preparation. Inside the UDA, some Preserves have already been proposed by willing landowners. These nine "hardline" Preserve locations are all within the UDA, and total approximately 1,800 acres (see Figures 7-2 through 7-5 and Section 7.5).
- **Criteria-based process.** These Preserves are "criteria-based," meaning the exact Preserve boundaries and locations are not known at the time of Plan preparation. Criteria-based Preserves will be located within the UDA and outside the UDA. The criteria-based Preserves will be located and established as described below (see Section 7.5).

The combined criteria-based and hardline preservation process will create an interconnected SSHCP Preserve System totaling 36,282 acres. All SSHCP Preserves will be preserved in perpetuity and would be acquired either as fee title or as conservation easements (see Chapter 9). As the SSHCP is implemented over the Permit Term, the new 36,282 acres SSHCP Preserve System will be established in a manner that supplements, complements, and links together many of the existing preserves[4] within the Plan Area (Section 3.5).

[4] Existing preserve acres are not included as part of the new 36,282 acre SSHCP Preserve System, and are not considered a part of the SSHCP Preserve System. Existing preserves do not count towards achieving any of the Biological Goals and Measurable Objectives described in this chapter or any other components of the SSHCP Conservation Strategy.

INTENTIONALLY LEFT BLANK



SOURCE: USGS 2012, County of Sacramento 2012

FIGURE 7-2

Existing Preserves and SSHCP Planned Hardline Preserves

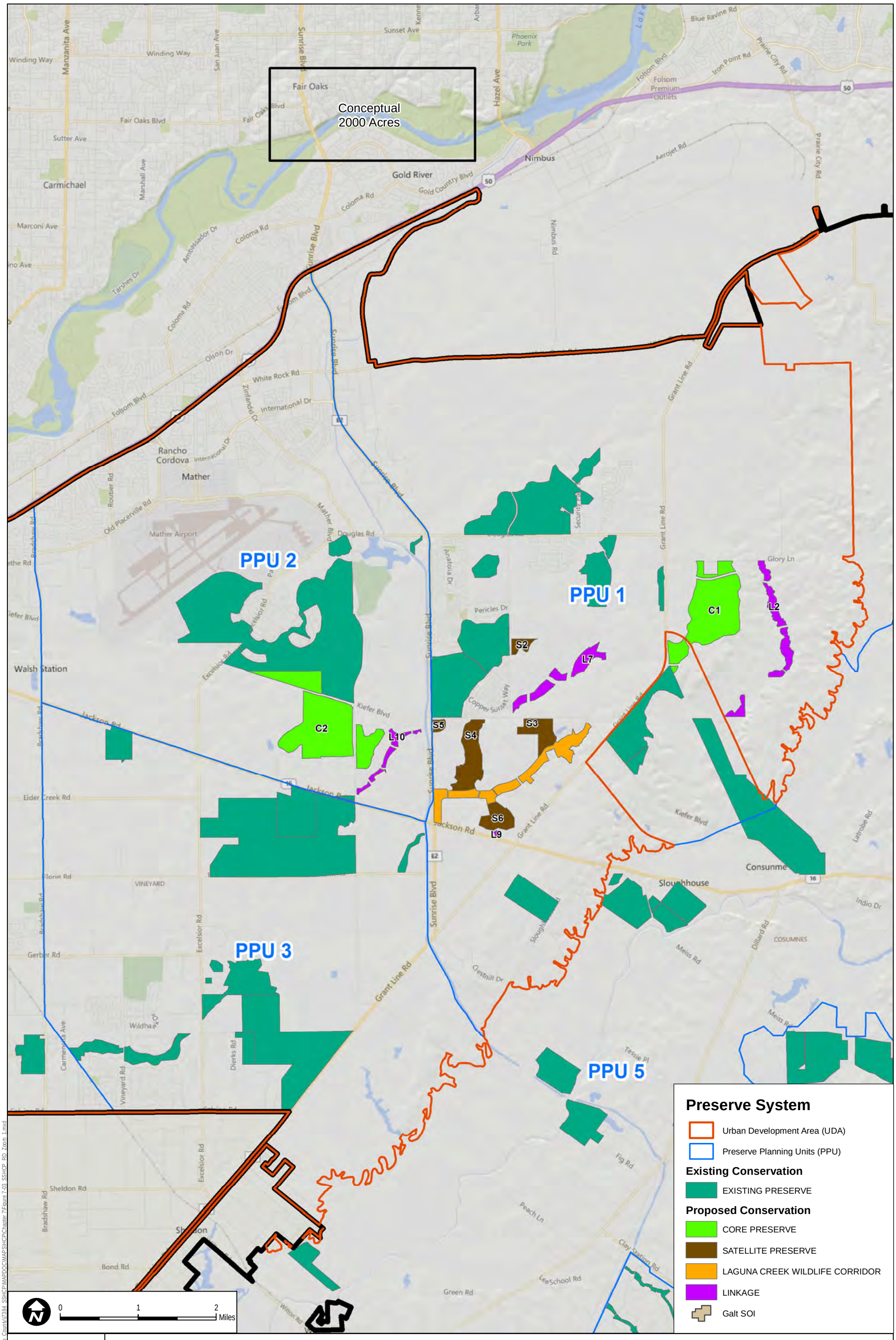
SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3.

Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPDOC\MAPS\HCP\Chapter_7\Figure 7-02_SSHCP_RD.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

FIGURE 7-3

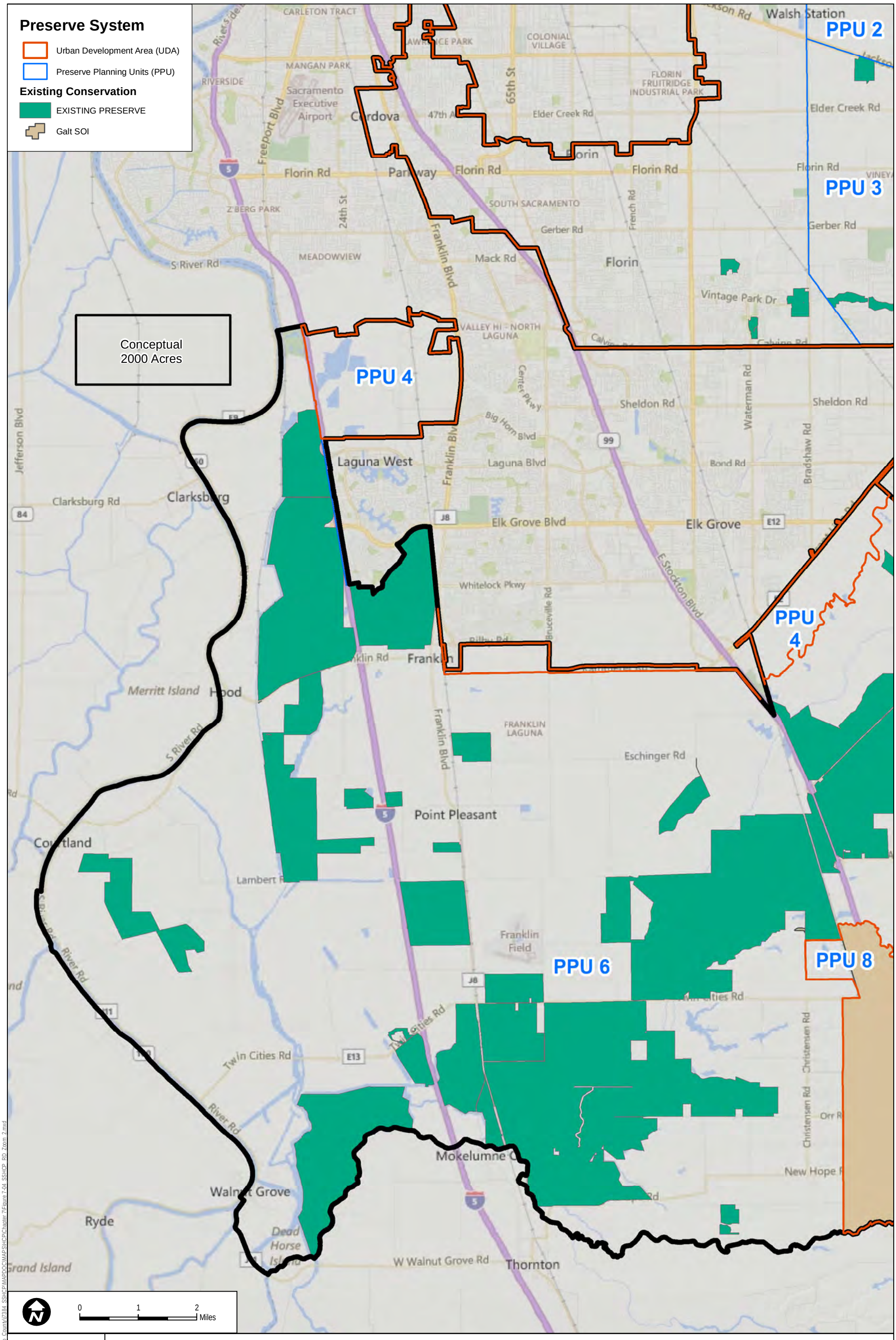
Existing Preserves and SSHCP Planned Hardline Preserves

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3.

Path: Z:\Projects\Sacramento County\2384 SSHCP\MAPDOC\MAP\SHCP\Chapter 7\Figure 7-03 SSHCP RD Zoom 1.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

FIGURE 7-4

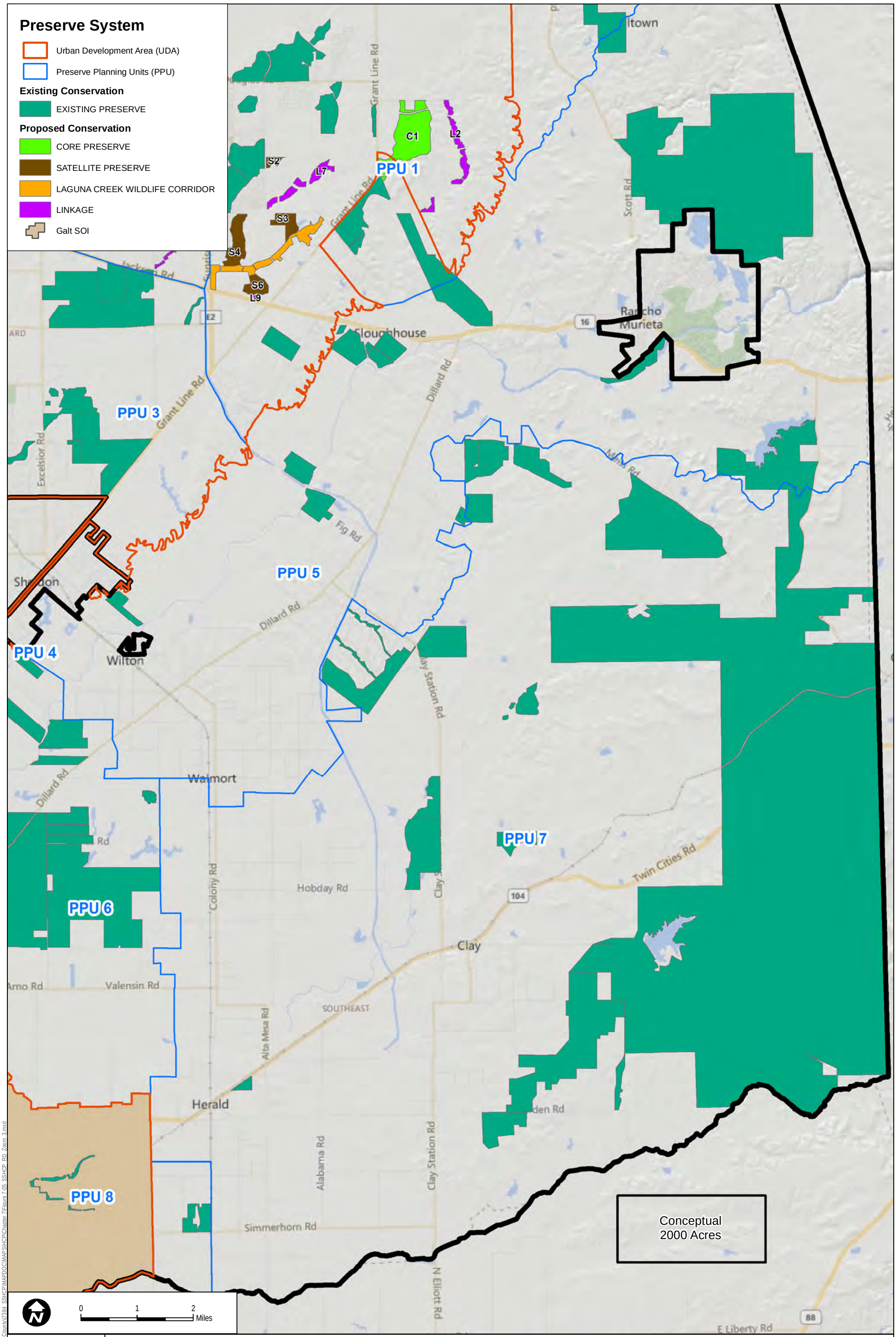
Existing Preserve and SSHCP Planned Hardline Preserves

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3.

Path: Z:\Projects\Sacramento County\7384 SSHCP\MAPDOC\MAP\SHCP\Chapter 7\Figure 7-04 SSHCP RD Zoom 2.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014

FIGURE 7-5

Existing Preserves and SSHCP Planned Hardline Preserves

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3.

Path: Z:\Projects\Sacramento County\Y2384 SSHCP\MAPDOC\MAP\SHCP\Chapter 7\Figure 7-05 SSHCP RD Zoom 3.mxd

INTENTIONALLY LEFT BLANK

7.4.2 Benefits to Non-Covered Species

Although the SSHCP Preserve System is designed to provide benefits to Covered Species, establishing, managing, and monitoring the SSHCP Preserve System will also benefit non-covered native species within the Plan Area. For example, preserved Valley Grassland will provide foraging habitat for a range of bird species, and preserved Riparian Woodland will provide breeding habitat for many bird species. Establishment of large, well-linked Preserves and establishment of wildlife crossings as part of Urban Transportation and Rural Transportation Covered Activities will maintain habitat connectivity and provide movement corridors for mobile species such as deer (*Odocoileus hemionus* or *Odocoileus hemionus columbianus*), coyotes (*Canis latrans*), foxes (*Urocyon cinereoargenteus*), and others.

7.4.3 Existing Preserves in the Plan Area

The SSHCP Preserve System will be designed to link and to complement existing preserves, which are widely scattered within the Plan Area (see Section 3.5). The biological resources, aquatic resources, and Covered Species within the Plan Area will benefit from a network of new SSHCP Preserves that are interconnected to existing preserves (refer to Section 7.5.3 and Table 7-2). Existing preserve acres are not considered a part of the SSHCP Preserve System and do not count towards achieving any of the Biological Goals and Measurable Objectives described in this chapter or any other components of the SSHCP Conservation Strategy.

Table 7-2
Summary of SSHCP Preserve System and Existing Preserves by Preserve Planning Unit

Preserve Planning Unit (PPU)	Total PPU Area (acres)	SSHCP Preserve (acres)	Existing Preserve (acres)	Total Preservation (acres)
Inside UDA				
1	17,574	3,537	683	4,220
2	9,271	584	33	617
3	14,303	1,815	2,191	4,006
4	5,253	527	0	527
8	7,133	415	95	510
Outside PPU	14,085	63	169	232
Total	*67,619*	*6,941*	*3,171*	*10,112*
Outside Urban Development Area				
1	2,156	219	495	714
5	52,534	1,691	6,534	8,225
6	95,196	9,750	28,076	37.826
7	90,906	15,894	26,079	41,973
Outside PPU	9,245	0	180	180
Total	*250,037*	*27,554*	*61,364*	*88,918*
Grand Total	**317,655**	**34,495**	**64,535**	99,030

7.5 Description of the SSHCP Preserve System

This section describes the SSHCP Preserve System, including a description of preservation inside and outside of the UDA by PPU and by preserve category. As the Preserve System is assembled, the spatial configuration may be somewhat different than the Preserve System described in this section. The requirement to acquire a minimum 36,282-acre preserve system, to acquire 6,941 acres of preserve within the UDA, and to establish preserves by preserve category (e.g., Landscape Preserve, Core Preserve, Minor Preserve, etc.) within each PPU as described below are firm commitments. In addition, the SSHCP is committing to the preservation of at least 6,065 acres of Valley Grassland and 210 acres of vernal pool within the UDA. While it is the intent of the SSHCP to generally adhere to the amount of preservation by land cover type assumed within and outside of the UDA, some flexibility is needed to ensure that the SSHCP is acquiring the best habitat available. Therefore, up to 15% of proposed preserve acreage that is assumed to occur outside of the UDA can be shifted to locations within the UDA. All candidate Preserves will be reviewed as described in Section 9.4. Section 7.6 presents the conservation analysis of the operating Conservation Strategy.

The SSHCP Preserve System will include 36,282 acres of SSHCP Preserve, the majority of which would be preserved by conservation easements. Table 7-3 provides a breakdown of land cover types by acreage of existing habitat that will be preserved under the SSHCP Preserve System. Table 7-4 provides a breakdown of land covers by acreage of re-established/established habitat that will be preserved under the SSHCP Preserve System. The total amount of each land cover type presented in Tables 7-3 and 7-4 must be preserved within the SSHCP Plan Area. A minimum of 50 acres of vernal pool, a minimum of 30 acres of swales, and a minimum of 300 acres of Vernal Pool Ecosystem must be re-established or established within the Mather Core Recovery Area. A minimum of 50 acres of Freshwater Marsh must be re-established or established within the UDA. The conservation analysis for land covers is provided in Section 7.6.1.

Table 7-3
Summary of Preservation of Existing Habitat within the SSHCP Preserve System

Land Cover	SSHCP Preserve System (acres)		
	Inside UDA	*Outside UDA*	*Total*
Wetland Waters			
Freshwater Marsh	54	73	127
Seasonal Wetland	12	93	105
Swales	92	186	278
Vernal Pools	210	756	966
Non-Wetland Waters			
Open Water	71	84	155
Streams/Creeks (Intermittent and Perennial)	29	88	117

Table 7-3
Summary of Preservation of Existing Habitat within the SSHCP Preserve System

Land Cover	SSHCP Preserve System (acres)		
	Inside UDA	*Outside UDA*	*Total*
Streams/Creeks VPIH (Ephemeral)	26	0	26
Riparian			
Mixed Riparian Scrub/ Mixed Riparian Woodland*	72	892	964
Terrestrial			
Blue Oak Woodland/Blue Oak Savanna**	0	47	47
Cropland/Irrigated-Pasture Grassland***	310	9,386	9,696
Valley Grassland	6,065	15,949	22,014
Total Preserve Area	**6,941**	**27,554**	**34,495**

* Impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland will be mitigated by preserving any combination of Mixed Riparian Scrub and Mixed Riparian Woodland.

** Impacts to Blue Oak Woodland and Blue Oak Savanna will be mitigated by preserving any combination of Blue Oak Woodland and Blue Oak Savanna.

*** Impacts to Cropland, Irrigated Pasture-Grasslands, Vineyard and Orchard will be mitigated by preserving any combination of Cropland and Irrigated Pasture Grassland.

Table 7-4
Summary of Re-established/Established Habitat within the SSHCP Preserve System

Land Cover	SSHCP Preserve System (acres)		
	Inside UDA	*Outside UDA*	*Total*
Wetland Waters			
Freshwater Marsh	50	77	127
Seasonal Wetland	0	105	105
Swales*	30	226	256
Vernal Pools	50	339	389
Non-Wetland Waters			
Open Water**	0	155	155
Streams/Creeks	0	117	117
Riparian			
Mixed Riparian Scrub/ Mixed Riparian Woodland***	0	591	591
Terrestrial			
Blue Oak Woodland/Blue Oak Savanna****	0	47	47
Total Preserve Area	**130**	**1,657**	**1,787**

* The acreage necessary to provide compensatory mitigation for impacts to Stream/Creek (VPIH) (22 acres) is assumed in the Swale land cover type category. However, compensatory mitigation for Swale and Stream/Creek (VPIH) land cover types can be achieved by re-establishing/establishing vernal pool land cover types.

** Compensatory Mitigation for Open Water can be achieved by re-establishing/establishing Open Water or an aquatic land cover type that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by TAC.

*** Compensatory Mitigation for Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland will be achieved by re-establishing/establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

**** Compensatory Mitigation for Blue Oak Woodland and Blue Oak Savanna will be achieved by re-establishing/establishing any combination of Blue Oak Woodland and Blue Oak Savanna.

7.5.1 Preserve System Inside the UDA by PPU

The following section summarizes the Preserve System inside the UDA in three ways:

- By PPU, broken out by SSHCP land cover types
- With regard to SSHCP Preserve categories (Landscape, Core, Minor, Satellite, Linkage, etc.)
- In relation to existing preserves

Subsections that follow provide more detailed commitments for SSHCP Preserves in each of the PPUs inside the UDA, as well as the portion of the Laguna Creek Wildlife Movement Corridor that is located outside the PPUs. Table 7-5 provides a summary of the acreage by SSHCP Land Cover Type in each PPU that is inside the UDA. SSHCP Preserves inside the UDA will account for approximately 20% of the Preserve System, most of which will be in PPUs 1, 3, and 4.

The following subsections also provide a general description for where criteria-based Preserves will be sited to meet Biological Goals and Measurable Objectives (Table 7-1). As described above, the final spatial configuration of the SSHCP Preserve System inside the UDA may differ somewhat from the details provided for each PPU below, but the assembled SSHCP Preserve System must meet the SSHCP Biological Goals and Measurable Objectives. While the exact preserve configuration may differ somewhat from the descriptions provided below, the preservation acreages to be acquired within each PPU (as illustrated in Table 7-5) and by preserve category (e.g., Landscape Preserve, Core Preserve, Minor Preserve, etc.) must be achieved. The following subsections also provide qualitative discussions of Covered Species preservation in each of the PPUs. The full conservation analysis for Covered Species is provided in Section 7.6.2.

Table 7-5
Preservation of Natural Land Cover Types in the Preserve System by PPU Inside the UDA

Land Cover Type	SSHCP Preserves (acres)						
	PPU 1	*PPU 2*	*PPU 3*	*PPU 4*	*PPU 8*	*Outside PPUs*	*Total*
Wetland Waters							
Freshwater Marsh	10	0	24	20	0	0	54
Seasonal Wetland	0	1	0	4	6	1	12
Swale	49	7	32	2	2	0	92
Vernal Pool	133	17	49	8	1	2	210
Non-Wetland Waters							
Open Water	51	2	14	4	0	0	71
Stream/Creek	10	2	10	2	0	5	29
Stream/Creek (VPIH)	17	6	3	0	0	0	26

Table 7-5
Preservation of Natural Land Cover Types in the Preserve System by PPU Inside the UDA

Land Cover Type	SSHCP Preserves (acres)						
	PPU 1	*PPU 2*	*PPU 3*	*PPU 4*	*PPU 8*	*Outside PPUs*	*Total*
Riparian							
Mixed Riparian Woodland/Mixed Riparian Scrub	0	0	24	42	0	6	72
Terrestrial							
Blue Oak Woodland/Blue Oak Savanna	0	0	0	0	0	0	0
Cropland/ Irrigated Pasture-Grassland	0	0	0	0	310	0	310
Valley Grassland	3,267	549	1,659	445	96	49	6,065
Total	**3,537**	**584**	**1,815**	**527**	**415**	**63**	**6,941**

7.5.1.1 PPU 1

That portion of PPU 1 that is inside the UDA[5] encompasses 17,574 acres and is bordered by U.S. Highway 50 to the north, Prairie City Road to the northeast, the Deer Creek floodplain boundary to the southeast, Sloughhouse to the south, and Sunrise Boulevard to the west. Land cover types in PPU 1 are summarized in Table 3-1. The dominant land cover in PPU 1 is Valley Grassland (within the Vernal Pool Ecosystem), which comprises 13,260 acres of the PPU. PPU 1 in the UDA also contains substantial amounts of Cropland (359 acres) and Mine Tailing Riparian Woodland (220 acres). PPU 1 also includes 389 acres of Vernal Pool that supports high-value vernal pool complexes, and 193 acres of Swale. Some urbanization has already occurred south of U.S. Highway 50 and east of Sunrise Boulevard, with High-Density Development comprising 1,158 acres of PPU 1 in the UDA. PPU 1 encompasses the City of Rancho Cordova in the Plan Area, and lands east of Rancho Cordova in unincorporated areas of the County. Because much of PPU 1 is located in Rancho Cordova's city limit and within the County's Urban Services Boundary, it is anticipated that much of PPU 1 within the UDA will eventually be urbanized.

PPU 1 contains documented occurrences for many SSHCP Covered Species (Figures 3-3 through 3-30), including 28 occurrences of Boggs Lake hedge-hyssop (*Gratiola heterosepala*) (89% of the total number of occurrences in the Plan Area) , 39 occurrences of Sacramento

[5] Note that a small portion of PPU 1 is also located outside of the UDA. The portion of PPU 1 that is located outside of the UDA is discussed in Section 7.5.2.

Orcutt grass (92% of the total number of occurrences in the Plan Area),53 occurrences of legenere (*Legenere limosa*) (30% of the total number of occurrences in the Plan Area), one of the four slender Orcutt grass occurrences that occur in the Plan Area, and 703 occurrences of vernal pool tadpole shrimp (34% of the total number of occurrences in the Plan Area). There are 53 occurrences of vernal pool fairy shrimp within PPU 1 out of a total of 533 occurrences Plan Area-wide, one occurrence of valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (on the northern boundary of the PPU), six occurrences for western spadefoot (*Spea hammondii*), and scattered occurrences for all of the bird Covered Species except ferruginous hawk. PPU 1 also includes the eastern segment of the County's designated Laguna Creek Wildlife Movement Corridor, which generally provides riparian, wetland, and aquatic habitats for several Covered Species, including western pond turtle, Sanford's arrowhead (*Sagittaria sanfordii*), and dwarf Downingia (*Downingia pusilla*). The riparian habitat in PPU 1 also provides potential roosting and/or foraging habitat for western red bat (*Lasiurus blossevillii*), although there are no documented occurrences of this species.

Overview of Conservation Strategy for PPU 1

In PPU 1 inside the UDA, approximately 3,537 acres will be preserved by the SSHCP. The Preserve design focus in PPU 1 includes establishing a Core Preserve, several smaller minor and Satellite Preserves, and providing Linkage Preserves between both existing preserves and SSHCP Preserves.

Core Preserve

A new Core Preserve (Core Preserve C-1) will total 839 acres, of which, 350 acres will be hardline Preserve (see Figure 7-3) and the remaining 489 acres will be criteria-based Preserve. The following provides a general description of Core Preserve C-1.

The northern boundary of Core Preserve C-1 will generally be defined by existing mining operations, mine tailings, and agricultural uses. Most of the land cover north of Core Preserve C-1 lacks wetland resources as a result of mining and agricultural uses, and it is expected that this area will continue to operate as a processing plant for aggregate material in the foreseeable future.

The eastern boundary of Core Preserve C-1 will generally be defined by a ridgeline that defines the eastern watershed boundary of the Preserve and where the terrain drops precipitously to the east. There are some vernal pool resources east of the ridgeline, but these are in low-density complexes spread across a large area and, thus, probably could not be efficiently aggregated into a Preserve. At full buildout of the UDA (see Chapter 5, Covered Activities), it is expected that the area east of Core Preserve C-1 will ultimately be residential and commercial development.

Similar to the eastern boundary, the southern boundary of Core Preserve C-1 will generally be defined by a ridgeline. The area south of this general boundary contains few wetland

resources and does not provide hydrological connection to Core Preserve C-1. Future land uses south of Core Preserve C-1 will likely be residential, public, or quasi-public.

The western boundary of the southern portion of Core Preserve C-1, generally south of Glory Lane (a maintained gravel road), will generally be defined by an unnamed tributary drainage to Laguna Creek. This drainage is at the lowest elevation in the basin and is important for maintaining the integrity of the Core Preserve C-1 watershed to the east of Grant Line Road and ensuring that the sub-watersheds surrounding vernal pool complexes in Core Preserve C-1 remain intact. Water entering the basin flows from the northeast to the southwest, or from the ridgeline that generally defines the eastern boundary of Core Preserve C-1.

The western boundary of the northern portion of Core Preserve C-1, generally north of Glory Lane, will generally follow a ridgeline that defines the western watershed boundary for Core Preserve C-1 and its wetland features. The area west of this ridgeline will likely consist of commercial and residential development at full buildout of the UDA.

It is estimated that Core Preserve C-1 will comprise approximately 752 acres of Valley Grassland and approximately 54 acres of Vernal Pool that are located on the Laguna land formation.

Based on documented occurrences, several known Covered Species will be protected in Core Preserve C-1, including vernal pool tadpole shrimp, vernal pool fairy shrimp, legenere, pincushion Navarretia (*Navarretia myersii* ssp. *myersii*), and Sacramento Orcutt grass. Valley Grassland and Vernal Pool will also provide modeled habitat for several other Covered Species. The conservation analysis for Covered Species is provided in Section 7.6.2.

Minor Preserves

At least three Minor Preserves will be established in the UDA in PPU 1, totaling 785 acres within the UDA and ranging from approximately 247 to 271 acres each. They will be provisionally called Minor Preserves M-1, M-2, and M-3 (the name and number of Minor Preserves could change as the Preserve System is assembled, pursuant to review and approval by the Permitting Agencies). These three Minor Preserves will be entirely criteria-based.

Preserve M-1 will be approximately 271 acres. The eastern boundary of Preserve M-1 will generally be adjacent to Grant Line Road. Most of the land east of Preserve M-1 is in existing preserves or is in the Preserve System as the Laguna Creek Wildlife Movement Corridor (see Figure 7-3). It is anticipated that lands east and north of Preserve M-1 will be urbanized at full buildout of the UDA.

The southern boundary of Preserve M-1 will be adjacent to existing preserve outside the UDA. The boundary will be established to provide an adequate setback to a swale that drains Preserve

M-1, and an adjacent existing preserve into Laguna Creek. Protecting this drainage will maintain the subwatersheds located inside Preserve M-1 and the hydrological connectivity between Preserve M-1 and the existing preserve to the south.

Preserve M-1 will be dominated by Valley Grassland, but will also contain Vernal Pool. Although focused species surveys have not been conducted in this area, it is likely that Preserve M-1 will contain vernal pool tadpole shrimp and vernal pool fairy shrimp, and it may also contain Sacramento Orcutt grass based on documented occurrences in the adjacent existing preserve. There is also a documented occurrence of western spadefoot in the area. Several other Covered Species have potential to occur on Preserve M-1 based on the presence of modeled habitat and proximity to Laguna Creek.

Preserve M-2 will be approximately 247 acres and will generally be bordered on the north by Grant Line Road and the UDA boundary. Preserve M-2 is intended to be linked directly to an existing preserve. The eastern boundary of Preserve M-2 will be established to ensure that wetlands within Preserve M-2 are provided an adequate setback and that the slopes of Preserve M-2's principle drainage are protected. It is anticipated that areas east of Preserve M-2 will be developed for industrial and possibly some recreational uses with full buildout of the UDA. The southern boundary of Preserve M-2 will generally be defined by the existing agricultural and residential lots to the south, which have relatively little resource value. It is anticipated that the area south of Preserve M-2 will remain in agricultural and residential land use for the foreseeable future. The western boundary of Preserve M-2 will be established to ensure that wetlands in the Preserve are at a higher elevation than areas to the west that are anticipated to be developed for commercial, residential, and possibly industrial uses at full buildout of the UDA. Having the Preserve M-2 boundary at a lower elevation than wetland resources within Preserve M-2 will ensure that the sub-watersheds surrounding protected wetland resources remain intact. A majority of the rainfall that enters Preserve M-2 will exit via small drainages and swales that flow to the east or west.

Preserve M-2 will largely consist of Valley Grassland, Vernal Pools, and Swales. An additional 98 acres of Preserve M-2 will extend outside the UDA. The vernal pools are on the Laguna land formation. Although focused species surveys have not been conducted in this area, it is likely that Preserve M-2 will contain vernal pool tadpole shrimp and vernal pool fairy shrimp, and possibly Sacramento Orcutt grass based on several documented occurrences on nearby existing preserves. Several other Covered Species have potential to occur on Preserve M-2 based on the presence of modeled habitat and proximity to Laguna Creek.

Preserve M-3 will be approximately 267 acres and will be bordered on the north by Jackson Highway. At full buildout of the UDA, lands north of Preserve M-3 will likely be developed for residential or commercial uses. The southeastern boundary of Preserve M-3 will generally

be adjacent to Grant Line Road. At full buildout of the UDA, property southeast of Preserve M-3 will likely be developed for residential or commercial uses, or could become agricultural-residential. The western boundary of Preserve M-3 will generally be adjacent to Sunrise Boulevard. At full buildout of the UDA, property west of Preserve M-3 will likely be developed for commercial uses.

Preserve M-3 will consist largely of Valley Grassland, Vernal Pools, and Swales. The vernal pools in Preserve M-3 occur on the Laguna, Riverbank Undivided, and Surficial Alluvial Undifferentiated Deposits land formations. Although focused species surveys have not been conducted in this area, Preserve M-3 is likely to contain vernal pool tadpole shrimp and vernal pool fairy shrimp. Several other Covered Species have potential to occur in Preserve M-3 based on the presence of species modeled habitat and proximity to Laguna Creek.

Satellite Preserves

The Preserve System includes seven Satellite Preserves in PPU 1, totaling approximately 596 acres and ranging from approximately 11 to 160 acres each. These are provisionally called Satellite Preserves S-1 through S-6 and S-8 (Satellite Preserve S-7 in PPU 1 is outside the UDA and is discussed in Section 7.5.2.1).

Satellite Preserve S-1 will be a criteria-based Preserve and will generally be located west of Grant Line Road northeast of existing preserve and northwest of the new Core Preserve C-1 described above. Satellite Preserve S-1 will be connected to existing preserve and Core Preserve C-1 via Linkage Preserves, discussed below. It is anticipated that Satellite Preserve S-1 will eventually be surrounded by residential or commercial development at full buildout of the UDA.

Satellite Preserve S-1 will be approximately 118 acres in size and consist of Valley Grassland, Vernal Pools, and Swales. Satellite Preserve S-1 was primarily identified to protect an occurrence of Sacramento Orcutt grass (for which all known and future occurrences subject to a Covered Activity will be protected pursuant to Objective VPP6), but also to protect vernal pools and the upper reaches of Morrison Creek. The vernal pools that support Sacramento Orcutt grass are located above the upper reaches of Morrison Creek. These pools will be provided an adequate setback from the Preserve edge. Adjacent lands outside of Satellite Preserve S-1 slope and drain away from Satellite Preserve S-1, ensuring that the sub-watershed for the vernal pools in Satellite Preserve S-1 will remain intact. The vernal pools north of Morrison Creek drain south and southeast into Morrison Creek. A setback south of Morrison Creek that is adequate to protect the integrity of the creek will be established and will incorporate wetland features that border the creek. In addition to Sacramento Orcutt grass, several other Covered Species have potential to occur on Satellite Preserve S-1 based on the presence of species modeled habitat.

Satellite Preserve S-2 will be a hardline Preserve that will add acreage to an existing preserve to the west (Anatolia Preserve). It will also be adjacent to an existing preserve on the north. The eastern and southern boundaries of Satellite Preserve S-2 will likely be adjacent to residential or commercial development at full buildout of the UDA. Satellite Preserve S-2 will be approximately 22 acres and consist largely of Valley Grassland, Vernal Pools, and Swales. Satellite Preserve S-2 will preserve several vernal pools and drainages from the two adjacent existing preserves, including vernal pools known to contain vernal pool tadpole shrimp and Boggs Lake hedge-hyssop. Several other Covered Species have potential to occur in Preserve S-2 based on the presence of modeled habitat.

Satellite Preserve S-3 will be a hardline Preserve generally bordered on the north by Kiefer Boulevard (see Figure 7-3). Except where Satellite Preserve S-3 will connect directly to the existing Laguna Creek Wildlife Movement Corridor directly to the south, it is anticipated that Satellite Preserve S-3 will be bordered by residential or commercial development at full buildout of the UDA. Satellite Preserve S-3 will be approximately 79 acres largely consisting of Valley Grassland, Vernal Pools, and Swales. Satellite Preserve S-3 was identified primarily to protect an area of high-density vernal pools on a plateau that flows into Laguna Creek. Several Covered Species have potential to occur in Satellite Preserve S-3 based on the presence of modeled habitat and proximity to Laguna Creek.

Satellite Preserve S-4 will be a hardline Preserve generally bordered on the north by Kiefer Boulevard and will be located east of Sunrise Boulevard (Figure 7-3). Except where Satellite Preserve S-4 will connect directly to the Laguna Creek Wildlife Movement Corridor, it is anticipated that Satellite Preserve S-4 will be bordered by residential or commercial development at full buildout of the UDA. Satellite Preserve S-4 will be approximately 135 acres and largely consist of Valley Grassland, Vernal Pools, and Swales. Satellite Preserve S-4 was identified primarily to protect vernal pools. In addition, Sun Creek, which drains into Laguna Creek, runs north–south through the central portion of Satellite Preserve S-4 and is situated between shallow slopes on both sides. Satellite Preserve S-4 will encompass the relatively flat terrace adjacent to Sun Creek and will be large enough to provide adequate setbacks for the vernal pools located on the terrace. Satellite Preserve S-4 is expected to support vernal pool tadpole shrimp and vernal pool fairy shrimp based on documented occurrences on nearby existing preserves. Several other Covered Species have potential to occur on Satellite Preserve S-4 based on the presence of modeled habitat and proximity to Laguna Creek.

Satellite Preserve S-5 will be a hardline Preserve adjacent to an existing preserve (Anatolia Preserve) to the north and bordered by Sunrise Boulevard on the west (Figure 7-3). It is anticipated that lands east and south of Satellite Preserve S-5 will be residential or commercial development at full buildout of the UDA. Satellite Preserve S-5 will be approximately 11 acres consisting mostly of Valley Grassland, Vernal Pools, and Swales. Satellite Preserve S-5 will protect the on-site vernal pools and the hydrology of the existing preserve to the north, which

supports vernal pools known to contain vernal pool tadpole shrimp and Boggs Lake hedge-hyssop. It is expected that the vernal pools in Satellite Preserve S-5 contain vernal pool tadpole shrimp and Ahart's dwarf rush (*Juncus leiospermus*). Several other Covered Species have potential to occur on Satellite Preserve S-5 based on the presence of modeled habitat and proximity to Laguna Creek.

Satellite Preserve S-6 will be a hardline Preserve generally located north of Jackson Highway, east of Sunrise Boulevard, and west of Grant Line Road (Figure 7-3). Except where Satellite Preserve S-6 connects to Laguna Creek to the north, it is anticipated that Satellite Preserve S-6 will be bordered by residential or commercial development at full buildout of the UDA. Satellite Preserve S-6 will be approximately 71 acres and consist largely of Valley Grassland, Vernal Pools, and Swales. Satellite Preserve S-6 was identified primarily to protect vernal pools and is located on a plateau that drains north into Laguna Creek. Several Covered Species have potential to occur in Satellite Preserve S-6 based on the presence of modeled habitat and proximity to Laguna Creek.

Satellite Preserve S-8 will be a criteria-based Preserve located southeast of the intersection of Jackson Highway and Grant Line Road, and will be bordered on the south by existing preserve. Satellite Preserve S-8 will be approximately 160 acres and consist largely of Valley Grassland, Vernal Pools, Swales, and Open Water. Satellite Preserve S-8 was identified primarily to protect vernal pools and to connect with an existing preserve. Several Covered Species have potential to occur on Satellite Preserve S-8 based on the presence of modeled habitat.

Linkage Preserves

Seven Linkage Preserves totaling approximately 924 acres will be established in the UDA in PPU 1, not including the area in the Laguna Creek Wildlife Movement Corridor or the Cosumnes/Deer Creek Wildlife Movement Corridor, which are discussed separately below. Approximately 721 acres of the Linkage Preserves will be criteria-based, so their final design has not been established. The Linkage Preserves will be designed to maintain connectivity between existing preserves and SSHCP Preserves, providing for wildlife movement and, in many cases, hydrological connections between Preserves. Their ultimate size and dimensions (i.e., width and length of the linkage) will depend on several factors, including habitat types in the linkage, the ecological function(s) the linkage is designed to serve (e.g., overland wildlife movement, drainage), and adjacent land uses. The Linkage Preserves will need to be wide enough to support the suite of species expected to use the linkage, including movement habitat for more mobile species and "live-in" habitat for more sedentary species, and to provide adequate setbacks from adjacent land uses and potential edge effects, including invasive species, runoff, pollutants, lighting, and noise (see discussion of permanent indirect effects in Chapter 6). Pursuant to Objective L2, the Linkage Preserves inside the UDA will have minimum widths of approximately 600 feet, except where this minimum width is not possible due existing physical

constraints such as adjacent existing land uses or ownership constraints. See Chapter 5 for more details on linkage design criteria (e.g., setbacks) and Avoidance and Minimization Measures.

Seven Linkage Preserves have been identified for PPU 1, provisionally referred to as Linkage Preserves L-1 through L-4, L-7, L-8, and L-9.

Linkage Preserve L-1 (Carson Creek Linkage) will be a criteria-based linkage approximately 2 miles long and will connect Preserve C-1 to undeveloped lands east of the UDA. It is anticipated that Preserve L-1 will be bordered by urban development with full buildout of the UDA. Preserve L-1 will be approximately 231 acres and largely consist of Valley Grassland, Vernal Pools, and Swales. The primary purpose of Linkage Preserve L-1 will be to facilitate wildlife movement in the northeastern portion of the Plan Area and to maintain a hydrological connection of an unnamed stream between Core Preserve C-1 and undeveloped lands located east of the UDA. Although focused species surveys have not been conducted in Linkage Preserve L-1, it is likely to support vernal pool fairy shrimp and possibly vernal pool tadpole shrimp. Linkage Preserve L-1 will also be designed to support a vernal pool with a known occurrence of Sacramento Orcutt grass, and this vernal pool will be protected from adjacent future development by an adequate setback (see discussion in Chapter 5). Linkage Preserve L-1 will also be designed to maintain the hydrology of wetlands contained within Linkage Preserve L-1 by incorporating the Avoidance and Minimization Measures described in Chapter 5. Because Linkage Preserve L-1 will be crossed by roads, additional design features and Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained.

Linkage Preserve L-2 (Deer Creek Linkage) will be approximately 2.5 miles long and designed to connect to Core Preserve C-1 via Linkage Preserve L-1 to criteria-based Preserve to the south outside the UDA. In the north, Linkage Preserve L-2 will connect directly to Linkage Preserve L-1 just north of Glory Lane and just south of where Linkage Preserve L-1 will connect to Core Preserve C-1. It is anticipated that Linkage Preserve L-2 will be bordered by urban development with full buildout of the UDA. Linkage Preserve L-2 will be approximately 158 acres and will mostly consist of Valley Grassland, Stream/Creek VPIH, Vernal Pools, and Swales. The primary purpose of Linkage Preserve L-2 will be to facilitate wildlife movement in the northeastern portion of the Plan Area and to maintain a hydrological connection of an unnamed stream between Core Preserve C-1 and existing preserves and SSHCP Preserves located south of the UDA. Although focused species surveys have not been conducted in Linkage Preserve L-2, it is likely to support vernal pool fairy shrimp and possibly vernal pool tadpole shrimp. Linkage Preserve L-2 will also be designed to maintain the hydrology of wetlands contained within Linkage Preserve L-2 by incorporating the Avoidance and Minimization Measures described in Chapter 5. Because Linkage Preserve L-2 is expected to be crossed by roads, additional design features and Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained.

Linkage Preserve L-3 (Heritage Falls Linkage) will be a criteria-based linkage approximately 2 miles long, designed to connect the northern end of Core Preserve C-1 to the eastern portion of Satellite Preserve S-1. Linkage Preserve L-3 will run east approximately 1 mile from Satellite Preserve S-1, north of a mining operation, then trend south approximately 1 mile to Core Preserve C-1. It is anticipated that Linkage Preserve L-3 will be bordered by urban development at full buildout of the UDA. Linkage Preserve L-3 will be approximately 272 acres mostly consisting of Valley Grassland, Vernal Pools, and smaller areas of Swale. The primary purpose of Linkage Preserve L-3 is to facilitate wildlife movement between Core Preserve C-1 and Satellite Preserve S-1. Although focused surveys have not been conducted in Linkage Preserve L-3, it is likely to support vernal pool fairy shrimp and possibly vernal pool tadpole shrimp. At a minimum, Linkage Preserve L-3 will need to cross Grant Line Road, so Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained (see Chapter 5).

Linkage Preserve L-4 (Sunrise Douglas Linkage) will be a criteria-based linkage approximately 1 mile long designed to connect Core Preserve C-1 with an existing preserve located just south of Douglas Road. Linkage Preserve L-4 will generally be bordered on the west by existing development, and it is anticipated that Linkage Preserve L-4 will be bordered by additional urban development with full buildout of the UDA. Linkage Preserve L-4 will be approximately 102 acres largely consist of Valley Grassland, Vernal Pools, Swales, and Stream/Creek (VPIH). The primary purpose of Linkage Preserve L-4 is to facilitate wildlife movement and maintain the hydrological connection of an unnamed stream that runs between Core Preserve C-1 and an existing preserve south of Douglas Road. Linkage Preserve L-4 contains documented occurrences of vernal pool tadpole shrimp and possibly also supports vernal pool fairy shrimp. Because Linkage Preserve L-4 will connect to Core Preserve C-1 at Grant Line Road on the east and to an existing preserve at Douglas Road on the south, Avoidance and Minimization Measures will be employed at the unnamed stream to ensure that habitat linkage functions are maintained (see Chapter 5).

Linkage Preserve L-7 (Sun Creek Linkage) will be approximately 1.3 miles long and designed to connect Minor Preserve M-1 to Satellite Preserve S-4. Linkage Preserve L-7 will be bordered by urban development with full buildout of the UDA. Linkage Preserve L-7 will be approximately 92 acres mostly consisting of Valley Grassland, Vernal Pools, Swales, and Stream/Creek (VPIH). The primary purpose of Linkage Preserve L-7 is to facilitate wildlife movement and maintain a hydrological connection of an unnamed stream between Minor Preserve M-1 and Satellite Preserve S-4. Although focused surveys have not been conducted in this linkage area, it is likely to support vernal pool fairy shrimp, western spadefoot, and possibly vernal pool tadpole shrimp. Linkage Preserve L-7 will be crossed by several roads. Therefore, additional design features and Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained (see Chapter 5).

Linkage Preserve L-8 (Rio Del Oro Linkage) will be a criteria-based linkage approximately 0.4 mile long designed to connect Satellite Preserve S-1 to an existing preserve to the west. Linkage Preserve L-8 will be adjacent to existing development on the south and it is anticipated that Linkage Preserve L-8 will be bordered by additional urban development with full buildout of the UDA. Linkage Preserve L-8 will be approximately 27 acres largely consisting of Valley Grassland, Vernal Pools, Swales, Stream/Creek (VPIH), and Open Water. The primary purpose of Linkage Preserve L-8 is to facilitate wildlife movement and maintain a hydrological connection of an unnamed stream between Satellite Preserve S-1 and an existing preserve. Although focused surveys have not been conducted in the Linkage Preserve L-8 area, it is expected to support vernal pool fairy shrimp and possibly vernal pool tadpole shrimp. Linkage Preserve L-8 will likely be crossed by roadways. Therefore, additional design features and Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained (see Chapter 5).

Linkage Preserve L-9 will be approximately 1.5 miles long designed to connect Minor Preserve M-2 and Minor Preserve M-3. Linkage L-9 will be approximately 42 acres mostly consisting of Valley Grassland, Vernal Pools, Swales, and Stream/Creek (VPIH). Linkage Preserve L-9 will consist primarily of criteria-based Preserve, but will also include a small amount of Hardline Preserve. Linkage L-9 generally will be located in the west, north, and east corners of Jackson Road and Grant Line Road. The primary purpose of Linkage Preserve L-9 is to facilitate wildlife movement and maintain the hydrological connection of an unnamed stream between Minor Preserve M-2 and Minor Preserve M-3. Although focused surveys have not been conducted in the Linkage Preserve L-9 area, it is expected to support vernal pool fairy shrimp and possibly vernal pool tadpole shrimp. Linkage Preserve L-9 will be crossed by Grant Line Road and Jackson Road. Therefore, additional design features and Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained (see Chapter 5).

Laguna Creek Wildlife Movement Corridor

The Laguna Creek Wildlife Movement Corridor in PPU 1 will be designed to connect Minor Preserve M-1 in the east to Minor Preserve M-3 and existing preserve in PPU 3 to the west. The Laguna Creek Wildlife Movement Corridor extends approximately 3 miles through PPU 1 between the western boundary of PPU 1 to Minor Preserve M-1. The westernmost segment of the Laguna Creek Wildlife Movement Corridor will be located between the PPU 1 western boundary and Sunrise Boulevard, where it will connect to the northwest corner of Minor Preserve M-3. It will extend north of Jackson Road east of and parallel to Sunrise Boulevard approximately 0.4 mile, where it will then trend east and northeast for approximately 2.2 miles to connect with Minor Preserve M-1. Along the east-northeast segment, it will connect Satellite Preserves S-3, S-4, and S-5. The Laguna Creek Wildlife Movement Corridor in PPU 1 will comprise mostly Valley Grassland, Open Water, and Cropland, but will also include smaller areas of Stream/Creek, Freshwater Marsh, Vernal Pool, and Swale. The Laguna Creek Wildlife

Movement Corridor in PPU 1 supports documented occurrences of vernal pool tadpole shrimp and legenere, and provides modeled habitat for Covered Species such as vernal pool fairy shrimp and western pond turtle.

The Laguna Creek Wildlife Movement Corridor within PPU 1 is approximately 192 acres.

Cosumnes River/Deer Creek Wildlife Movement Corridor

Approximately 69 acres of the Cosumnes River/Deer Creek Wildlife Movement Corridor crosses through PPU 1 in the UDA. This is part of the broad 1-mile long Corridor in PPU 5 that borders the UDA. This part of the Corridor is composed of almost all Valley Grassland in the Vernal Pool Ecosystem.

7.5.1.2 PPU 2

PPU 2 encompasses approximately 9,271 acres located in the northern portion of the Plan Area (see Figure 7-3). PPU 2 is bordered on the north by U.S. Highway 50, on the east by Sunrise Boulevard, on the south by Jackson Highway, and on the west by Bradshaw Road. A substantial portion of PPU 2 is already developed, including Mather Field and urban development directly north and southeast of Mather Field Airport. PPU 2 supports 3,180 acres of High-Density Development, 239 acres of Low-Density Development, 181 acres of Major Roads, and 1,426 acres of Disturbed land covers, which together account for 54% of the total land cover in PPU 2. The co-dominant land cover in PPU 2 is Valley Grassland, comprising 3,589 acres of PPU 2. PPU 2 also contains 36 acres of Open Water, Stream/Creek, and Freshwater Marsh (combined), and 70 acres of Vernal Pool. It is anticipated that a majority of PPU 2 will eventually be urbanized.

PPU 2 contains documented occurrences for many of the Covered Species, notably the only Ahart's dwarf rush documented occurrence in the Plan Area (Figure 3-3) and occurrences for vernal pool invertebrates such as vernal pool fairy shrimp (34 occurrences) and vernal pool tadpole shrimp (97 occurrences), but the occurrence numbers are smaller than in PPUs 1 and 3. All of the bird Covered Species have been documented in PPU 2 except greater sandhill crane.

Overview of Conservation Strategy for PPU 2

Approximately 584 total acres in PPU 2 will be preserved in the SSHCP Preserve System (Table 7-5). All of the SSHCP Preserves in PPU 2 will be connected. Core Preserve C-2 will connect to the existing Mather Field Preserve to enhance Preserve value. SSHCP Preserves in PPU 2 will also be directly connected to existing preserves within PPU 2, and in PPU 3 (Vernal Pool Prairie Preserve) to the south by Linkage Preserve L-5 (Jackson Linkage). This Preserve System connectivity in PPU 2 will, therefore, contribute to achieving Objective L2 (Table 7-1).

Core Preserve

The Preserve System in PPU 2 includes a new Core Preserve (Core Preserve C-2) of approximately 522 acres (Figure 7-3). Although this Preserve is not large enough to be considered a Core Preserve by itself, the Conservation Strategy treats Core Preserve C-2 as a Core Preserve because it will connect with the existing 1,270-acre Mather Field Preserve along its southern boundary to form a single large Core Preserve.

The eastern boundary of Core Preserve C-2 will generally be at Eagles Nest Road, an existing obstacle to species movement and dispersal and that eliminates hydrological connections via overland surface flow from wetland resources to the east. Further, most of the wetland resources east of Eagles Nest Road are largely degraded by overburden that was deposited during construction of Folsom South Canal or from agricultural and urban land uses; therefore, they are not targeted for preservation in this Plan. However, one area east of Eagles Nest Road supports high-quality vernal pool resources that warrant protection. This area contains high-density vernal pool complexes and is considered likely to contain covered vernal pool species. The southeastern portion of Core Preserve C-2 will preserve these resources. At full buildout of the UDA, a majority of the land east of Core Preserve C-2 will likely be residential, commercial, and/or quasi-public land use.

The southern boundary of Core Preserve C-2 will be approximately 0.5 mile north of Jackson Highway. The area between the southern boundary of Core Preserve C-2 and Jackson Highway supports vernal pools, but these are disturbed, not abundant, and fragmented by existing small-lot agricultural-residential land uses. Although Core Preserve C-2 will protect the hydrology of vernal pool complexes within the Preserve, achieving a functional hydrological connection to the existing preserve south of Jackson Road via the agricultural-residential parcels will be difficult. Many of the drainages have been bermed, redirected, or developed, or simply do not drain to the existing preserve to the south. Such land uses typically have lower preservation value as core habitat and lower potential for cost-effective remediation because the landscape is disturbed and fragmented. Future land uses south of Core Preserve C-2 may remain agricultural-residential or could become residential or commercial development at full buildout of the UDA. However, as described below, a habitat linkage (Linkage 5) will be established to connect Core Preserve C-2 with the existing preserve south of Jackson Highway.

The western boundary of Core Preserve C-2 is generally bordered by currently undeveloped land and small-lot agricultural-residential land uses, but it is anticipated that land uses west of Core Preserve C-2 will eventually be residential and commercial development at full buildout of the UDA. Areas west of Core Preserve C-2 are at a lower elevation than the interior of Core Preserve C-2 where the vernal pools are located. This will ensure that the sub-watersheds and

hydrology of protected vernal pool complexes within Core Preserve C-2 remain undisturbed by any development-related changes in hydrology and drainage that may occur west of the Preserve edge (e.g., runoff from developed areas will naturally drain away from the wetland resources in Core Preserve C-2).

Core Preserve C-2 largely consists of vernal pool invertebrate habitat (Vernal Pool, Swale, Stream/Creek (VPIH), and Valley Grassland). Protected vernal pools occur on the Laguna landform, Modesto Upper Unit Formation, Riverbank Middle Unit Formation, and South Fork Gravel Formation (Chapter 4).

Documented occurrences of Covered Species at the existing Mather Field Preserve include vernal pool tadpole shrimp, vernal pool fairy shrimp, mid-valley fairy shrimp, legenere, and burrowing owl (*Athene cunicularia*). These and several other Covered Species also have potential to occur in the Core Preserve C-2, based on the presence of modeled habitat.

Kiefer Boulevard currently separates the existing Mather Field Preserve from Core Preserve C-2 to the south. To minimize fragmentation and maintain connectivity of Core Preserve C-2 with Mather Field Preserve, and to reduce the chance of road kill in the area, a grade separation and road crossing at Morrison Creek will be constructed to the specifications outlined in the Avoidance and Minimization Measures discussed in Chapter 5. These Avoidance and Minimization Measures will facilitate movement of wildlife and maintain hydrological connectivity between Mather Field Preserve and Core Preserve C-2.

Linkage Preserves

Two hardline Linkage Preserves totaling approximately 62 acres will be established in PPU 2. Linkage Preserve L-5 will consist of approximately 23.4 acres in a north–south linkage between Core Preserve C-2 and the existing Vernal Pool Prairie Preserve south of Jackson Road in PPU 3. Linkage Preserve L-10 will consist of approximately 38.6 acres connecting existing preserves in PPUs 1 and 3.

Linkage Preserve L-5 (Jackson Linkage) will be approximately 0.5 mile long and designed to connect Core Preserve C-2 in the north to the existing preserve in the south. It is anticipated that Linkage Preserve L-5 will be bordered by urban development on the east and west, but it is possible that the area could remain agricultural-residential. Linkage Preserve L-5 will be approximately 23 acres consisting of Valley Grassland, Vernal Pools, and smaller areas of Swale and Stream/Creek (VPIH). The primary purpose of Linkage Preserve L-5 is to facilitate wildlife movement between Core Preserve C-2 and the existing preserve in the north and the existing preserve in the south. Although focused surveys have not been conducted, Linkage Preserve L-5 is likely to support vernal pool fairy shrimp and possibly vernal pool tadpole shrimp. Linkage

Preserve L-5 will be designed to maintain the hydrology of wetlands contained within the linkage by incorporating the Avoidance and Minimization Measures described in Chapter 5. Linkage Preserve L-5 will be crossed by Jackson Highway where it connects to the existing preserve in PPU 3 and possibly crossed by other new roads. Because Linkage Preserve L-5 will be crossed by roads, additional design features and Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained.

Linkage Preserve L-10 will be an approximately 39-acre Linkage Preserve that will generally run along the Frye Creek tributary to Laguna Creek approximately 1.5 miles southwest from Sunrise Boulevard, where it will connect to Satellite Preserve S-5 and existing preserve at Eagles Nest Road at the extreme northeast corner of an existing preserve in PPU 2/PPU 3. Linkage Preserve L-10 will consist of Valley Grassland, Cropland, and small areas of Open Water, Stream/Creek (VPIH), Seasonal Wetland, and Swale.

7.5.1.3 PPU 3

PPU 3 encompasses 14,303 acres located in the northwestern portion of the Plan Area (see Figure 7-3). PPU 3 is bordered by Jackson Highway on the north, Sunrise Boulevard on the east, Deer Creek and the Cosumnes River floodplain boundary on the south, the Central California Traction railroad line on the southwest, and Bradshaw Road on the west. The dominant land cover in PPU 3 is Valley Grassland, which comprises 7,072 acres (49%). PPU 3 supports substantial urban development in the southwestern portion; High- and Low-Density Development together totals 2,168 acres, or 15% of PPU 3. PPU 3 also contains substantial agriculture (Cropland, Irrigated Pasture-Grassland, Orchard, and Vineyard) totaling 3,410 acres, or 24% of PPU 3. Other natural land covers with substantial acreage in PPU 3 are Open Water, Stream/Creek (VPIH), and Freshwater Marsh, which together total 246 acres, and Vernal Pool and Swale, which together total 508 acres.

PPU 3 contains documented occurrences for many of the Covered Species, notably three of the slender Orcutt grass documented occurrences in the Plan Area, a substantial number of occurrences for vernal pool tadpole shrimp and vernal pool fairy shrimp, and all of the bird Covered Species except ferruginous hawk and greater sandhill crane (Figures 3-20 through 3-28). Occurrences of tricolored blackbird (*Agelaius tricolor*) are especially numerous in PPU 3, with 49 occurrences (19% of the total occurrences in the Plan Area).

Overview of Conservation Strategy for PPU 3

Approximately 1,815 acres in PPU 3 will be preserved under the SSHCP (Table 7-5). The Preserve design focus for PPU 3 is to connect two large existing preserves: the 1,160 acres of existing preserve in the north portion of PPU 3 and the 560 acres of existing preserve in the

central portion. This is accomplished by establishing a new Core Preserve (Core Preserve C-3), which will total approximately 1,046 acres. By linking preserves within PPU 3 and linking to other preserves in PPUs 2 and 4, the Preserve System in PPU 3 is consistent with the principle of establishing habitat linkages among Preserves and will contribute to achieving Objective L2 (Table 7-1).

Core Preserve

In PPU 3, a new Core Preserve (Core Preserve C-3) will total approximately 1,046 acres, all which will be criteria-based Preserve. Core Preserve C-3 will consist of five discrete areas located adjacent to existing preserves in a spatial configuration to fill in gaps between existing preserves. An approximately 770-acre area of Core Preserve C-3 will connect two large existing preserves and will be located between Florin Road on the north, Gerber Road on the south, and between Excelsior Road on the west and Eagles Nest Road on the east. The southwestern portion of this 770-acre Core Preserve C-3 area will include Laguna Creek.

The eastern and southern boundaries of Core Preserve C-3 generally connect to an existing preserve. The boundaries of Core Preserve C-3 will generally follow property lines that capture whole parcels supporting high-density wetland resources. Most of the areas immediately east of the Core Preserve C-3 boundary support agricultural uses and completely lack wetland resources. At full buildout of the UDA, the entire eastern border of Core Preserve C-3 may be adjacent to residential and commercial development, but could also remain in agriculture or be restored, as noted below.

The western boundary of Core Preserve C-3 in PPU 3 is generally defined by Excelsior Road. Wetland resources west of Excelsior Road tend to be scattered on small agricultural-residential parcels ranging in size from several acres to 30 acres. The value of remaining wetlands west of Excelsior Road is compromised by patches of existing development, which usually results in altered wetland hydrology and fragmented habitats. The western boundary of Core Preserve C-3 will likely be bordered by commercial and residential development at full buildout of the UDA, except for the Laguna Creek Wildlife Movement Corridor that trends to the southwest from Core Preserve C-3.

The approximately 1,046 acres of Core Preserve C-3 will mostly consist of Valley Grassland, Vernal Pool, and Swales. Vernal Pools occur on the Laguna and Riverbank Undivided land formations. Smaller acreages (i.e., less than 20 acres each) of other land covers in Core Preserve C-3 will include Blue Oak Savanna, Freshwater Marsh, Riparian, Open Water, and Stream/Creek. Core Preserve C-3 supports documented occurrences and modeled habitat for a number of Covered Species, including documented occurrences for vernal pool fairy shrimp,

burrowing owl, loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus cyaneus*), legenere, and slender Orcutt grass.

The hydrological flow across Core Preserve C-3 is generally from the northeast to the southwest. The area to the north of Core Preserve C-3 is hydrologically disconnected from the area to the south of Core Preserve C-3, except where Frye Creek and an unnamed drainage currently convey water from north to south via small pipe culverts. However, the wetland complexes within Core Preserve C-3 are largely intact and connected where pools at lower elevations receive water from pools at higher elevations. The Core Preserve C-3 boundaries will be established to ensure that sub-watersheds for preserved wetland resources are left intact and are capable of maintaining the natural hydrologic regime for those protected resources.

Water that enters Core Preserve C-3 from off-site areas primarily is collected via several drainages and swales that drain into Laguna Creek, which conveys water through the southern portion of Core Preserve C-3 from the northeast to the southwest.

Several properties adjacent to Core Preserve C-3 have habitat restoration potential. These properties are currently in agricultural production but, according to the property owners, have never been deep ripped (which will prevent vernal pool restoration because deep ripping disrupts the clay hardpan soil required to form vernal pools). Historical and current aerial photography reveal faint outlines of past vernal pool wetland signatures that could potentially be restored on these properties. If the vernal pool complexes on these properties are restored and added to Core Preserve C-3, they could add substantial suitable habitat for Covered Species and common species to the Preserve System.

Core Preserve C-3 will be bisected by Florin Road. A grade separation and road crossing where Frye Creek crosses Florin Road will be established to reduce habitat fragmentation, maintain connectivity within Core Preserve C-3, and minimize road kill (see Figure 5-10).

Satellite Preserves

Two Satellite Preserves will be established in PPU 3: Satellite Preserves S-7 and S-9.

Satellite Preserve S-7 will be a criteria-based Preserve adjacent to an existing preserve and generally located south of Florin Road and east of Eagles Nest Road. Satellite Preserve S-7 will be approximately 91 acres consisting mostly of Valley Grassland and Vernal Pool habitat. Satellite Preserve S-7 is primarily designed to protect a documented occurrence of tricolored blackbird and wetland resources. The site's hydrology currently is artificially impounded on the south by berms, creating large marsh areas that are suitable for tricolored blackbird nesting colonies. The eastern portion of Satellite Preserve S-7 connects directly to Laguna Creek, which

runs north–south in this area. Satellite Preserve S-7 is also adjacent to a potential vernal pool re-establishment/establishment site. If the re-establishment/establishment site is acceptable and the landowner agrees to protect the property as a vernal pool re-establishment/establishment site, that site will connect Satellite Preserve S-7 directly to Core Preserve C-3.

Satellite Preserve S-9 will be a criteria-based Preserve located southeast of the Laguna Creek Wildlife Movement Corridor and west of Excelsior Road. Satellite Preserve S-9 will be approximately 31 acres consisting mostly of Valley Grassland, Swale and Vernal Pool. The northwestern portion of Satellite Preserve S-9 will connect directly to Laguna Creek, which runs northeast–southwest in this area. The northeastern portion of Satellite Preserve S-9 will be diagonal from Core Preserve C-3, separated by Excelsior Road. Therefore, additional design features and Avoidance and Minimization Measures will be employed to ensure that habitat linkage functions are maintained (see AMM ROAD-2 and Figure 5-10).

Laguna Creek Wildlife Movement Corridor

Laguna Creek Wildlife Movement Corridor will connect south from Satellite Preserve S-7, trending due south approximately 0.75 mile to Gerber Road, where it will then trend due west for approximately 1 mile and connect to Core Preserve C-3 and an existing preserve. Within Core Preserve C-3 and the existing preserve, Laguna Creek trends southwest and exits an existing preserve at Excelsior Road, where it is again designated the Laguna Creek Wildlife Movement Corridor. It trends west–southwest approximately 2 miles as the Laguna Creek Wildlife Movement Corridor and existing preserve where it is bordered on both sides by the Wildhawk, Silver Springs, and Emerald Creek residential developments until it exits PPU 3 at the railroad line just east of Carmencita Avenue, where it continues southwest within the UDA but outside the PPUs. The minimum width of both the Laguna Creek Wildlife Movement Corridor and existing preserve between the residential developments is currently approximately 400 feet.

The Laguna Creek Wildlife Movement Corridor within PPU 3 is approximately 250 acres.

Linkage Preserves

An approximately 179-acre Linkage Preserve L-6 will connect to the Laguna Creek Wildlife Movement Corridor on the south where it exits Core Preserve C-3 at Excelsior Road. This parcel will add a setback between Laguna Creek and the Silver Springs and Dierks Ranch developments south of the creek.

7.5.1.4 PPU 4

PPU 4 encompasses 5,253 acres located in isolated areas in the northwestern portion of the Plan Area (see Figure 7-4). PPU 4 is generally bordered by the Sacramento City limits on the north,

Highway 99 on the east, Eschinger Road on the south, and Interstate 5 (I-5) on the west. Dominant land covers in PPU 4 are Cropland (1,817 acres), Valley Grassland (1,168 acres), and High- and Low-Density Development (1,122 acres combined). PPU 4 contains documented occurrences for many of the Covered Species, most notably two of the total 11 known occurrences for giant gartersnake (generally along Laguna Creek west of Highway 99), and occurrences for all of the covered bird species, including 17 occurrences for Swainson's hawk (Figure 3-25). Otherwise PPU 4 does not support large occurrence concentrations for any other particular species.

Overview of Conservation Strategy for PPU 4

Approximately 527 acres will be preserved in PPU 4 (Table 7-5).

Preserves in PPU 4 will focus primarily on preservation of Valley Grassland and Freshwater Marsh. These Preserves will connect to Preserves inside the UDA to the east of PPU 4, and will also connect to Cropland Preserve in PPU 6 to the south outside the UDA.

7.5.1.5 PPU 8

PPU 8 encompasses 7,133 acres located in the southern portion of the Plan Area, mostly within the city limits of Galt and Galt's sphere of influence (see Figures 7-4 and 7-5). PPU 8 is bordered by the northern boundary of Galt's sphere of influence on the north, Cherokee Lane on the east, Dry Creek on the south, and Sargent Avenue on the west. The dominant land cover in PPU 8 is Cropland, which occupies 1,773 acres (25%). PPU 8 also includes 986 acres of High-Density Development, 991 acres of Low-Density Development, 1,097 acres of Irrigated Pasture-Grassland, and 1,488 acres of Valley Grassland. Because the majority of PPU 8 is located within Galt's city limits or sphere of influence, it is anticipated that much of PPU 8 will eventually be urbanized.

PPU 8 contains documented occurrences of several Covered Species, including five occurrences of greater sandhill crane, 19 of Swainson's hawk, and a single occurrence of western red bat; otherwise, PPU 8 does not support occurrence concentrations of any particular species (Figures 3-3 through 3-30).

Overview of Conservation Strategy for PPU 8

The Preserve System in PPU 8 is limited to Cropland Preserve located in the northwest of the PPU and in the south of the PPU along Dry Creek. Preservation in PPU 8 focuses on high-value Swainson's hawk foraging habitat. This PPU also includes a greater sandhill crane roosting pond (Figure 3-22).

Cropland Preserve

PPU 8 will include 415 acres of Cropland Preserve composed mostly of Cropland and Irrigated Pasture-Grassland. Preservation will also include Valley Grassland, Seasonal Wetland, Swale, and Vernal Pool.

7.5.1.6 Outside PPUs

Laguna Creek Wildlife Movement Corridor Preserve

Laguna Creek runs west from PPU 3 southwest toward Elk Grove. Undeveloped lands and low-density residential occur along and immediately adjacent to the creek, but the area is urbanizing and beginning to develop the lands adjacent to the creek. An 82-acre portion of the Laguna Creek Wildlife Movement Corridor Preserve that is a criteria-based Preserve will extend southwest approximately 1.8 miles to Calvine Road.

7.5.2 Preserve System Outside the UDA by PPU

Table 7-6 provides a summary of the Preserve System outside the UDA by PPU, each of which is described in more detail in the following subsections. Preserve design outside the UDA is less constrained than in the UDA because it generally comprises rural land uses and large, undeveloped parcels. Therefore, the precise locations of SSHCP Preserves outside the UDA are less certain and are described with less detail than the Preserve System inside the UDA. Further, Covered Activities outside the UDA will have limited areas of effects because they are limited to linear road and infrastructure projects (Sections 5.2.3 and 5.2.4) and Preserve management activities (Section 5.2.7). Preserve design outside the UDA will also be guided by the Biological Goals and Measurable Objectives and the Conservation Actions in Table 7-1. As discussed in Chapter 9, SSHCP Preserve acquisitions proposed by the Implementing Entity will be reviewed and approved by the Permitting Agencies.

Table 7-6
Preservation of Natural Land Cover Types in the
Preserve System by PPU Outside the UDA

Land Cover Type	SSHCP Preserves (acres)					
	PPU 1	*PPU 5*	*PPU 6*	*PPU 7*	*Outside PPUs*	*Total*
Wetland Waters						
Freshwater Marsh	0	0	58	15	0	73
Seasonal Wetland	0	31	30	32	0	93
Swale	3	8	13	162	0	186
Vernal Pool	12	35	28	681	0	756

Table 7-6
Preservation of Natural Land Cover Types in the Preserve System by PPU Outside the UDA

Land Cover Type	SSHCP Preserves (acres)					
	PPU 1	*PPU 5*	*PPU 6*	*PPU 7*	*Outside PPUs*	*Total*
Non-Wetland Waters						
Open Water	0	6	45	33	0	84
Stream/Creek	0	33	41	14	0	88
Stream/Creek (VPIH)	0	0	0	0	0	0
Riparian						
Mixed Riparian Woodland/Mixed Riparian Scrub	0	440	447	5	0	892
Terrestrial						
Blue Oak Woodland/Blue Oak Savanna	0	0	0	47	0	47
Cropland/ Irrigated Pasture-Grassland	0	388	8,465	533	0	9,386
Valley Grassland	204	750	623	14,372	0	15,949
Total	**219**	**1,691**	**9,750**	**15,894**	**0**	**27,554**

The following subsections provide more detail for the Preserve System in each of the PPUs outside the UDA. This additional detail includes general descriptions for where criteria-based Preserves should be sited in order to meet the Biological Goals and Measurable Objectives. However, as is the case for the criteria-based preservation inside the UDA, the final spatial configuration of the SSHCP Preserve System outside the UDA may vary somewhat from that described in this section. While the exact Preserve configuration may differ somewhat from the descriptions provided below, the preservation acreages by Preserve category (e.g., Landscape Preserve, Core Preserve, Minor Preserve, etc.) must be achieved. Some shifting of Preserve acreages across PPUs that are located outside of the UDA and shifting of Preserve acres outside of the UDA to area within the UDA are allowable. To ensure that Preserve heterogeneity is maintained throughout the Plan Area, not more that 15% of the total Preserve acreage identified within each PPU can be shifted outside of that PPU (see Table 7-6). In addition, no more than 15% of the total Preserve acreage identified outside of the UDA can be shifted to locations inside of the UDA. The following subsections also provide qualitative discussions of Covered Species preservation in each PPU, as appropriate. The full conservation analysis for Covered Species is provided in Section 7.6.2.

7.5.2.1 PPU 1

Although PPU1 is mostly within the UDA, PPU1 also contains 2,156 acres outside the UDA (see Figures 1-1 and 7-3), of which 1,468 acres are Valley Grassland and 531 acres are Disturbed land cover.

Within PPU 1 outside the UDA, approximately 219 acres will be preserved overall (Table 7-6). The focus of the Preserve design for PPU 1 outside the UDA is to maintain connectivity with Linkage Preserve L-2 (Deer Creek Linkage) inside the UDA and to provide connectivity to an existing preserve both within and south of the UDA. This will be accomplished by establishing a Preserve in PPU 1 outside the UDA, which primarily will include Valley Grassland, as well as Vernal Pool Land Covers. Preservation in PPU 1 outside the UDA will contribute to achieving Objective L2 of Goal 1.

7.5.2.2 PPU 5

PPU 5 encompasses approximately 52,534 acres in the central–eastern portion of the Plan Area (see Figures 1-1 and 7-5). PPU 5 is situated between PPU 7 to the south and the UDA to the north (PPUs 1 and 3), and is bordered by the County line to the east. The dominant land cover in PPU 5 is Valley Grassland (27,463 acres). Blue Oak Woodland and Savanna (6,556 acres), agriculture (Cropland, Irrigated Pasture–Grassland, Orchards, and Vineyards; 8,692 acres), and non-habitat land cover types (Aqueducts, Disturbed, High-Density Development, Low-Density Development, Major Roads, Mine Tailing, Recreation/Landscaped; 6,542 acres) also comprise substantial areas of PPU 5. PPU 5 also has substantial acres of riparian land cover (Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland; 1,401 acres), Seasonal Wetland (446 acres), Stream/Creek (481 acres), Open Water (365 acres), Vernal Pool (339 acres), and Freshwater Marsh (159 acres).

PPU 5 contains documented occurrences for many of the Covered Species (Figures 3-3 through 3-30), most notably virtually all of the documented occurrences for valley elderberry longhorn beetle (154 of 156) clustered in a reach of the Cosumnes River extending approximately 1.6 miles west of Jackson Road. All of the covered bird species have been documented in PPU 5, except for greater sandhill crane.

Overview of Conservation Strategy for PPU 5

Approximately 1,691 acres in PPU 5 will be preserved by the SSHCP (Table 7-6). The Preserve design focus in PPU 5 is primarily to provide habitat linkages among Preserves both outside and inside the UDA, primarily along the Cosumnes River/Deer Creek Corridor. All Preserves in PPU 5 will be criteria-based Preserve. PPU 5 also includes the vast majority of documented occurrences for valley elderberry longhorn beetle in the Plan Area, which is sensitive to habitat fragmentation.

Cosumnes River/Deer Creek Wildlife Movement Corridor

Approximately 1,482 acres will be preserved in PPU 5 in the Cosumnes River/Deer Creek Wildlife Movement Corridor. Valley Grassland and Mixed Riparian Woodland are co-dominant in the portion of the corridor in PPU 5, with some Vernal Pool. Other land covers in the Cosumnes River/Deer Creek Corridor in PPU 5 include Stream/Creek, Cropland, and Mixed Riparian Scrub. Because it is outside the UDA, this corridor has no defined width, but will provide habitat connectivity and a movement corridor. The Permittees estimate that this corridor will be up to 17 miles in length within PPU 5.

Linkage Preserves

Linkage Preserve L-6 will connect the Laguna Creek Wildlife Movement Corridor Preserve from the northwest in PPU 3 to the Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve in PPU 5. Linkage Preserve L-6 will be mostly Valley Grassland . Linkage Preserve L-11 will connect Cosumnes River/Deer Creek Wildlife Movement Corridor to the large Landscape Preserve in PPU 7 to the southeast. The majority of Linkage Preserve L-11 will also be Valley Grassland, but may also include substantial areas of Cropland and Seasonal Wetland.

7.5.2.3 PPU 6

PPU 6 encompasses 95,196 acres outside the UDA in the southwestern portion of the Plan Area. PPU 6 is bisected by I-5. It is bordered on the west by the Sacramento River, on the south by the Mokelumne River, and by Dry Creek (Figures 1-1 and 7-4). The dominant land covers in PPU 6 are Agriculture (58,458 acres) and Valley Grassland (17,633 acres). PPU 6 contains 3,436 acres of Low-Density Development. Notably, PPU 6 contains much of the aquatic and riparian resources in the Plan Area, including 5,048 acres of non-vernal pool aquatic land cover types (Freshwater Marsh, Open Water, and Stream/Creek), which is 69% of these aquatic land covers in the Plan Area outside the UDA and 60% of these aquatic land covers in the entire Plan Area. The 5,097 acres of riparian land covers (Mine Tailing Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland) in PPU 6 account for 70% of the riparian land cover in the Plan Area outside the UDA and 52% of the riparian land covers in the entire Plan Area. Finally, Vernal Pool and Swale cover 1,068 acres in PPU 6.

Reflecting its large size, substantial riparian, aquatic, valley grassland, and agricultural habitats, and relative lack of development, PPU 6 contains documented occurrences for many of the Covered Species (Figures 3-3 through 3-30). PPU 6 is the most important PPU for the covered bird species. All of the covered birds have been documented in PPU 6, including 281 (71%) occurrences for Swainson's hawk, 190 (92%) occurrences for greater sandhill crane, and 55% or more of the occurrences for northern harrier and white-tailed kite. In addition, PPU 6 includes 8

of the 10 occurrences of dwarf downingia in the Plan Area, 15 of the 53 occurrences of legenere, and 41 of the 62 occurrences of Sanford's arrowhead.

Overview of Conservation Strategy in PPU 6

Approximately 9,750 acres will be preserved in PPU 6 (Table 7-6). The Preserve design focus is preserving existing agricultural lands that provide habitat for several of the broad-ranging Covered Species, most notably Swainson's hawk (see Objectives SH1, SH2, SH5 in Table 7-1) and greater sandhill crane (see Objectives GS2, GS4, and GS6 in Table 7-1).

Cropland Preserve

The SSHCP will establish approximately 8,465 acres of Cropland Preserve in PPU 6, consisting mostly of Cropland and Irrigated Pasture–Grassland land cover types. Other natural land covers are also present in this Cropland Preserve, but these agricultural lands will be preserved and managed primarily for the benefit of Covered Species that forage in row crops, and will generally be adjacent to existing cropland preserve.

Cosumnes River/Deer Creek Wildlife Movement Corridor

Approximately 812 acres of the Cosumnes River/Deer Creek Wildlife Movement Corridor will be preserved within PPU 6, connecting to the Preserves within PPU 5. The corridor will connect where it exits PPU 3 on the northeast corner of PPU 6. The portion of the corridor in PPU 6 is composed mostly of Mixed Riparian Woodland and Agricultural lands.

Satellite Preserve

Satellite Preserve S-10, which is mostly located in PPU 4, may also have acreage located in PPU 6. Land covers in this portion of Satellite S-10 will be mostly Cropland, Mixed Riparian Woodland, and Freshwater Marsh.

7.5.2.4 PPU 7

PPU 7 encompasses 90,906 acres in the southeastern portion of the Plan Area (see Figure 7-5). PPU 7 is bordered by PPU 5 on the north, the Sacramento County line and Dry Creek on the south, the county line on the east, and the north–south alignments of Cherokee Lane and Davis Road on the west. The dominant land covers in PPU 7 are Valley Grassland, which comprises 52,278 acres of the PPU, and Agriculture which comprises 20,695 acres (much of it Vineyard in the southern and western portions). Low-Density Development also accounts for 5,306 acres of PPU 7. PPU 7 contains a large proportion of the Blue Oak Woodland and Savanna in the Plan Area, which together comprise 5,861 acres or 40% of the total Blue Oak Woodland and Savanna

in the Plan Area (second only to PPU 5, which contains 6,556 acres of Blue Oak Woodland/Savanna). PPU 7 also contains by far the largest area of Vernal Pool, with 2,221 acres, or 49% of the Vernal Pool in the Plan Area.

Reflecting its large size, substantial valley grassland and vernal pool habitats, and relative lack of development, PPU 7 contains documented occurrences for many of the Covered Species (Figures 3-3 through 3-30). With more than half of the vernal pool acreage in the Plan Area, PPU 7 is extremely important for preservation of vernal pool species and contains 315 of 533 documented occurrences for vernal pool fairy shrimp, all 48 occurrences for pincushion navarretia, all 28 occurrences for California tiger salamander, and 19 of 29 occurrences for western spadefoot in the Plan Area. Further, all of the covered birds except white-tailed kite have been documented in PPU 7.

Overview of Conservation Strategy for PPU 7

Approximately 15,894 acres of the Preserve System will be located in PPU 7. SSHCP Preserves in PPU 7 will include a large Landscape Preserve and Linkage Preserves that will connect to the Cosumnes River/Deer Creek Wildlife Movement Corridor in PPU 5. The Preserve design focus in PPU 7 is landscape-scale preservation of the Vernal Pool Ecosystem, in areas that are adjacent to or near existing preserves, including the 12,500-acre Chance Ranch and other mitigation sites and mitigation banks in the area.

Landscape Preserves

The Landscape Preserve in PPU 7 must be at least 10,500 acres in size and will be located strategically to connect with existing preserves. The vast majority of this Landscape Preserve will be Valley Grassland. This Landscape Preserve will also contain Vernal Pool, Swale, Stream/Creek, Seasonal Wetland, and other land covers.

Linkage Preserves

A 314-acre portion of Preserve Linkage L-11 will cross over from PPU 5 into PPU 7. This segment completes the connection between the Cosumnes River/Deer Creek Wildlife Movement Corridor in PPU 5 and the large Landscape Preserve in PPU 7. This segment of Linkage Preserve L-11 is composed almost entirely of Valley Grassland, with some Vernal Pool.

7.5.3 Preserve Connectivity

Core and Minor Preserves established by the SSHCP will be connected by Linkage Preserves to other SSHCP Preserves and existing preserves within the Plan Area. SSHCP Linkage Preserves will be designed to maintain connectivity among the preserves, providing for wildlife movement and, in many cases, hydrologic connections between preserves (see Objective L2 in Table 7-1). The ultimate

size and dimensions of the Linkage Preserves (i.e., width and length) will depend on several factors, including habitat types in the linkage, the ecological function (or functions) the linkage is designed to serve (e.g., overland wildlife movement, drainage), and adjacent land uses.

The three Core Preserves inside the UDA (Section 7.5.1) will be linked by minimum 600-foot-wide Linkage Preserves (see Objective L2 in Table 7-1). These Linkage Preserves will follow stream channels, where possible, to maintain hydrologic connectivity. In addition to linking the three Core Preserves within the UDA, smaller minor and Satellite Preserves will also be connected for a total of 10 Linkage Preserves in the UDA.

The Landscape Preserve located outside of the UDA in PPU 7 and some Cropland Preserve in PPU 6[6] will also be connected to preserves inside the UDA by linkages, including the Cosumnes River Wildlife Movement Corridor, Preserve L-5, and SSHCP Preserves and existing preserves connecting PPU 5 to PPU 1.

All Linkage Preserves will meet the Landscape Preserve selection criteria listed in Table 7-1. In limited circumstances, a Satellite Preserve may need to be established to protect a species occurrence, and that Preserve may not be able to be connected to other Preserves due to existing and planned development patterns.

Additional connectivity in the Plan Area will be provided by some streams with associated Stream Setbacks that are not part of the SSHCP Preserve System (see AMMs STREAM-1, STREAM-2, and STREAM-3 in Section 5.4). Protection of streams and Stream Setbacks, including those within Linkage Preserves, will help to achieve several Measurable Objectives, including Objectives W1 and W2 (Stream Setbacks) and Objective W3 (design and avoidance measures). These Stream Setbacks are intended to protect water quality but will also facilitate wildlife movement and dispersal of seeds and cysts via wildlife or water flows in the SSHCP Preserve System.

7.5.4 Studies Required by SSHCP Biological Goals and Measurable Objectives

Several of the measurable objectives listed in Table 7-1 require that the Implementing Entity conduct discrete studies to determine how AMMs should be implemented, or to better understand the ecology of Covered Species in the Plan Area (Table 7-7). These studies are different from the special studies that will help the Implementing Entity to monitor effectiveness of the Conservation Strategy (Section 8.3.3.5).

[6] Note that most SSHCP Covered Species that will use cropland preserves are avian species and are capable of flying from one Preserve to the next. Therefore, linkage of agricultural preserves is not essential and may not occur in many instances.

Table 7-7
Studies Required by SSHCP Measurable Objectives

Description of Required Study	Timing for Study
In accordance with Objective CTS3, prepare targeted species mobility studies to determine if California tiger salamander mobility between breeding ponds or between breeding ponds and upland refugia will be affected by Rural Transportation Project Covered Activities within California tiger salamander modeled habitat. Data relevant to determining California tiger salamander movement must be collected for at least 3 years, and the study will be updated through new data collection and consultation with USFWS and CDFW every 10 years. The mobility study methodology will be prepared in consultation with USFWS and CDFW, and will need approval from USFWS and CDFW prior to implementation. The data will be used by the project proponent to select the most appropriate design requirements to maintain and facilitate California tiger salamander movement. Modeled habitat near each of the following roadways will be the subject of targeted species mobility studies for California tiger salamander: • Twin Cities Road east of State Route 99 • Ione Road within PPU 7 • Clay Station Road from Dillard Road south to Sacramento County line with San Joaquin County (Plan Area boundary) After construction is complete, California tiger salamander movement across and along the road will be monitored to assess how their movement changed in response to the project, and if additional design considerations will be used as future projects are implemented along the roadway.	Study initiated within 18 months of SSHCP permit issuance. Study duration at least 3 years, and updated every 10 years.
In accordance with Objective GGS 3, measure hydrologic parameters (flow rate, temperature, timing of flows) within Badger Creek in locations known to be occupied by giant gartersnake. Three monthly hydrologic measurements will be made during the dry season of an average or better rainfall year. Each recording will occur over a full week to identify any regular interruptions in flow or changes in conditions due to diversions or inflows. After determining the baseline hydrologic parameters for occupied giant garter-snake habitat along Badger Creek, identify water sources that could be used to supplement natural and agricultural flows in the future to maintain that hydrology throughout Badger Creek during the summer months when agricultural runoff may wane.	Study initiated within 2 years of SSHCP permit issuance.
In accordance with Objective TB6, conduct study to identify management actions to protect tricolored blackbird colonies from environmental stressors. Stressors to be studied for reduction include nest predation (e.g., coarse netting to reduce nest predation, reducing trees and bushes around colonies to reduce perches for predators, mesopredator trapping). Select one or more existing tricolored blackbird colonies as experimental populations. If a large colony is available, test several potential feasible management actions within that one colony. Experimental treatments will be evaluated as to whether they indicate a measurable and biologically significant decrease in nest predation or increased fledgling success. Treatments will also be evaluated for feasibility,	Study initiated within 2 years of SSHCP permit issuance, and completed within 5 years of SSHCP permit issuance.

7.6 Conservation Analysis

This section describes the beneficial effects of the Conservation Strategy and compares those to the adverse effects described in Chapter 6 to make conclusions about the expected

effectiveness of the Conservation Strategy in achieving the Biological Goals and Measurable Objectives (see Table 7-1).

7.6.1 Natural Land Cover Analysis

This section analyzes the adverse effects of the Covered Activities and the benefits of the SSHCP Conservation Strategy for the SSHCP natural land cover types:

- **Aquatic Natural Land Covers**
  - Vernal Pool Ecosystem
    - Valley Grassland (inside the Vernal Pool Ecosystem)
    - Vernal Pool and Swale
    - Stream/Creek (VPIH)
  - Other Aquatic Natural Land Covers
    - Seasonal Wetland
    - Freshwater Marsh
    - Stream/Creek
    - Open Water
    - Riparian
- **Terrestrial Natural Land Covers**
  - Blue Oak Woodland/Savanna
  - Agriculture[7]

Detailed descriptions for SSHCP natural land covers are provided in Chapter 3.

As described in Section 6.5, indirect impacts to natural land covers were qualitatively analyzed collectively. Qualitatively, permanent indirect effects to natural land covers, including a decrease in habitat functionality and viability, will result from the following environmental stressors in the absence of AMMs: (1) permanent alterations to watershed hydrographs and degradation of water quality; (2) habitat fragmentation; (3) increased risk of wildfire, which can result in increased thatch, and the impacts from fire suppression (i.e., grading); (4) alterations of vernal pool hydrology; (5) increased human activity, which can result in trampling of natural land covers or increased trash and debris; (6) invasive weeds, which can alter the composition and structure of

[7] Agriculture includes Cropland and Irrigated Pasture–Grassland.

natural land covers; and (7) pesticides and fertilizers, which can reduce pollinators or exterminate or weaken species that comprise the habitat. Additionally, temporary construction-related indirect effects (see Section 6.3.2) will result from the following stressors in the absence of AMMs: (1) temporary alterations to hydrographs and degradation of water quality during construction; (2) laydown or trampling of vegetation during construction; (3) construction dust; (4) increased human presence during construction; and (5) construction trash and debris. Indirect permanent impacts to vernal pool, swale, and stream/creek (VPIH) were quantified and are discussed further in Section 7.6.1.1.1.

The conservation analysis for natural land covers is broken down into aquatic (Section 7.6.1.1) and terrestrial natural (Section 7.6.1.2) land covers.

7.6.1.1 Aquatic Natural Land Covers

The conservation analysis for aquatic natural land covers is broken down into those that make up the Vernal Pool Ecosystem (Section 7.6.1.1.1) and other aquatic land covers (Section 7.6.1.1.2).

The Vernal Pool Ecosystem considers the interconnectivity between Swale, Stream/Creek (VPIH), Vernal Pool, and Valley Grassland. Vernal pools cannot persist absent surrounding uplands, and, thus, an ecosystem approach will be used when establishing the SSHCP Preserve System to ensure a properly functioning Vernal Pool Ecosystem. Therefore, the Vernal Pool Ecosystem is discussed separately from other aquatic land covers.

7.6.1.1.1 Vernal Pool Ecosystem

As described in Chapter 3, the Vernal Pool Ecosystem includes the following natural land cover types: Vernal Pool, Swale, Stream/Creek (VPIH), and Valley Grassland that are hydrologically connected. The Vernal Pool Ecosystem in the Plan Area provides the primary constituent elements described in the Federal Critical Habitat (USFWS 2006c) identified for four of the vernal pool SSHCP Covered Species, including slender Orcutt grass, Sacramento Orcutt grass, vernal pool fairy shrimp, and vernal pool tadpole shrimp. The primary constituent elements of these Covered Species are described in Section 3.6. In short, these primary constituent elements include: (1) topographic features within a matrix of uplands that result in continuously, or intermittently, flowing surface water in the depressional features that provide for dispersal and promote hydroperiods of adequate length in the pools for each of four vernal pool SSHCP Covered Species; (2) depressional features that become inundated during winter rains and that continuously hold water for a period long enough to provide adequate water for incubation, maturation, and reproduction for the crustaceans and to promote germination, flowering, and seed production of predominantly annual native wetland species for the grasses; (3) sources of food for the crustaceans; and (4) organic and inorganic materials that provide shelter for the crustaceans.

Indirect impacts to the Vernal Pool Ecosystem were partially quantified; indirect impacts to Vernal Pool, Swale, and Stream/Creek (VPIH) were quantified, but indirect impacts to Valley Grassland were not quantified. In total, approximately 17,259 acres, or 16%, of the 103,210 acres of the Vernal Pool Ecosystem in the Plan Area would be removed or indirectly impacted over the proposed 50-year Permit Term; indirect impacts account for 142 acres of the total impact acreage (Table 7-8a). This includes the following impacts to the Vernal Pool Ecosystem: removal of 16,794 acres (64%) and indirect impacts to 132 acres (0.5%) of the 26,048 acres present inside the UDA; and removal of 322 acres (0.4%) and indirect impacts to 9.5 acres (0.01%) of 77,162 acres present outside the UDA. Permanent indirect effects to natural land covers, include the Vernal Pool Ecosystem, are collectively and qualitatively analyzed in Section 7.6.1.

In total, approximately 8,500 acres of the Vernal Pool Ecosystem in the Mather Core Recovery Area would be removed or indirectly impacted over the proposed 50-year Permit Term; indirect impacts account for 113 acres of the total impact acreage (Table 7-8b). This includes the following impacts to the Vernal Pool Ecosystem: removal of 8,118 acres of Valley Grassland, removal of 144 acres, and indirect impacts to 72 acres of Vernal Pool, removal of 112 acres and indirect impacts to 38 acres of Swale, and removal of 13 acres and indirect impacts of 3 acres of Stream/Creek (VPIH).

Table 7-8a
Permanent Effects and Conservation for the Vernal Pool Ecosystem

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Direct and Indirect Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Plan Area-Wide					
Vernal Pool Ecosystem	**17,117**	**142**	**17,259[a]**	**23,284**	**645**
Valley Grassland[b]	16,472	Qualitative	16,472	22,014	0[c]
Vernal Pool	389	94	483	966	389
Swale	234	44	278	278	256[d]
Stream/Creek (VPIH)	22	4	26	26	0

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[b] Refers to Valley Grassland hydrologically connected to the Vernal Pool Ecosystem.
[c] Valley Grassland may be re-established/established at the same time as re-establishment/establishment of Vernal Pool and Swale to form a complete Vernal Pool Ecosystem. However, much of the 645 acres of re-established/established modeled areas will occur on existing Valley Grassland; thus, it is not possible to identify the amount of Valley Grassland re-established/established under the SSHCP.
[d] Re-establishment/establishment to mitigate effects to Stream/Creek (VPIH) is assumed to be in the form of Swale, which has been added to the 234 acres necessary to mitigate effects to swale. Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool.

Table 7-8b
Permanent Effects and Conservation for the Vernal Pool Ecosystem Within the Mather Core Recovery Area

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Direct and Indirect Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Plan Area-Wide					
Vernal Pool Ecosystem	**8,386**	**114**	**8,500[a]**	**5,493**	**50**
Valley Grassland[b]	8,118	Qualitative	8,118	5,155	0
Vernal Pool	144	72	216	213	50
Swale	112	38	150	90	0
Stream/Creek (VPIH)	13	3	16	26	0

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[b] Refers to Valley Grassland hydrologically connected to the Vernal Pool Ecosystem.

To mitigate 17,259 acres of Covered Activity impacts to the Vernal Pool Ecosystem, the SSHCP preserves 23,284 acres of Vernal Pool Ecosystem, including 966 acres of Vernal Pool, 278 acres of Swale, 26 acres of Stream/Creek (VPIH), and 22,014 acres of hydrologically connected Valley Grassland (Table 7-8a). Of the 23,284 acres of Vernal Pool Ecosystem to be preserved, 5,493 acres of Vernal Pool Ecosystem will be preserved within the Mather Core Recovery Area, including 213 acres of Vernal Pool, 90 acres of Swale, 26 acres of Stream/Creek (VPIH), and 5,155 acres of hydrologically connected Valley Grassland (Table 7-8b). The Conservation Strategy for the Vernal Pool Ecosystem is based on preservation of large assemblages of interconnected Vernal Pool, Swale, and Stream/Creek (VPIH) embedded in Valley Grassland, protecting perched aquifers and maintaining vernal pool hydrology, and maintaining water quality in vernal pool micro-watersheds. Finally, the SSHCP will also re-establish and/or establish components of the Vernal Pool Ecosystem including approximately 389 acres of Vernal Pool and 256 acres of Swale in the form of any combination of Swale or Vernal Pool. Valley Grassland may be re-established/established at the same time as re-establishment/establishment of vernal pools and swales to form a complete Vernal Pool Ecosystem.

Each component or natural land cover comprising the Vernal Pool Ecosystem is described separately below. The Biological Goals and Measurable Objectives applicable to the Vernal Pool Ecosystem are listed in Table 7-9.

Valley Grassland

As discussed in Section 6.5, effects on Valley Grassland hydrologically connected to the Vernal Pool Ecosystem within the Plan Area include direct impacts to 16,471 acres of 97,349 acres in the Plan Area, or 17%. This includes direct impacts to 16,185 acres (66%) of the 24,584 acres present inside the UDA and direct impacts to 286 acres (0.4%) of the 72,765 acres present

outside the UDA. Permanent indirect effects to natural land covers, including Valley Grassland in the Vernal Pool Ecosystem, are qualitatively analyzed in Section 7.6.1.

A total of 22,014 acres of Valley Grassland within the Vernal Pool Ecosystem will be preserved by the SSHCP, including approximately 6,065 acres inside the UDA (Table 7-5) and 15,949 acres outside the UDA (Table 7-6). Also see Section 7.6.1.2, Terrestrial Natural Land Covers, for additional discussion regarding Valley Grasslands.

Vernal Pool

As discussed in Section 6.5, approximately 483 acres, or 11%, of the 4,536 acres of the Vernal Pool in the Plan Area would be removed or indirectly impacted; indirect impacts account for 94 acres of the total impact acreage. More specifically, impacts to Vernal Pool include the removal of 355 acres (38%) and indirect impacts to 85 acres (9%) of the 935 acres present inside the UDA; and removal of 34 acres (0.9%) and indirect impacts to 9 acres (0.2%) of 3,601 acres present outside the UDA.

A total of 995 acres of Vernal Pool will be preserved by the SSHCP, including approximately 210 acres inside the UDA (Table 7-5) and 756 acres outside the UDA (Table 7-6). As discussed in Chapter 3, 1,983 acres of Vernal Pool are already protected in existing preserves in the Plan Area. The Conservation Strategy for the Vernal Pool Ecosystem is based on preservation of large assemblages of vernal pools within the UDA and outside the UDA (primarily in PPU 7),

protecting perched aquifers and maintaining vernal pool hydrology, and maintaining water quality in vernal pool micro-watersheds. Approximately 389 acres of Vernal Pool will be re-established and/or established under the SSHCP, with at least 50 acres within or adjacent to the Mather Core Recovery Area.

Swale

As discussed in Section 6.5, approximately 278 acres, or 22%, of the 1,252 acres of Swale in the Plan Area would be removed or indirectly impacted; indirect impacts account for 44 acres of the total impact acreage. More specifically, impacts to Swale include the removal of 232 acres (50%) and indirect impacts to 43 acres (9%) of the 461 acres present inside the UDA; and removal of 2 acres (0.2%) and indirect impacts to 1 acres (0.1%) of 791 acres present outside the UDA.

A total of 278 acres of Swale will be preserved by the SSHCP, including approximately 92 acres inside the UDA and 186 acres outside the UDA (see Tables 7-5 and 7-6). Approximately 256 acres of Swale will be re-established and/or established in the form of any combination of Swale or Vernal Pool.

Stream/Creek (VPIH)

Approximately 26 acres, or 36%, of the 73 acres of Stream/Creek (VPIH) in the Plan Area would be permanently removed or indirectly impacted; indirect impacts account for 4 acres of the total impact acreage. Of the 68 acres of Stream/Creek (VPIH) inside the UDA, 25 acres (37%) will be permanently impacted; of the 4.8 acres of stream/creek (VPIH) outside the UDA, 1 acre (1%) will be permanently impacted.

A total of 26 acres of Stream/Creek (VPIH) will be preserved by the SSHCP, including approximately 26 acres inside the UDA (see Tables 7-5). Re-establishment and/or establishment to mitigate effects on Stream/Creek (VPIH) will be in the form of any combination of Swale or Vernal Pool, which is included in the approximately 256 acres described above for swale.

Table 7-9
Biological Goals and Measurable Objectives Applicable to the Vernal Pool Ecosystem

Applicable Biological Goals	Related Measurable Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Objective L1. Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (Low-Impact Development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in this table (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50

Table 7-9
Biological Goals and Measurable Objectives Applicable to the Vernal Pool Ecosystem

Applicable Biological Goals	Related Measurable Objectives
	acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, and establish natural land covers, (including Cropland, and Irrigated Pasture–Grassland) that provide habitat for Covered Species.	**Objective VG1.** Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with Conservation Actions in Table 7-1 and in accordance with Section 7.5.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective VP5. Re-establish and/or establish a minimum of 256 acres of Swale or vernal pool for impacts to the Swale and Stream/Creek (VPIH) land covers. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.
	Objective VP6. Re-establish and/or establish a minimum of 300 acres of functional Vernal Pool Ecosystem within or adjacent to (within 1 mile of) the Mather Core Recovery Area.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture–Grassland) that are preserved within the Plan Area.	**Objective HAB3.** Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.

Analysis of Conservation of the Vernal Pool Ecosystem

The Biological Goals and Measurable Objectives that were developed in the SSHCP for Covered Species using the Vernal Pool Ecosystem land cover type will also ensure that the integrated hydrologic and ecological functions of the component land cover types are protected. To meet these Biological Goals and Measurable Objectives, the SSHCP Conservation Strategy will preserve and link approximately 23,284 acres of the highest-quality Vernal Pool Ecosystem in the Plan Area. This

will protect the hydrology and soil conditions necessary for persistence of Covered Species that use this ecosystem, including irreplaceable resources such as Sacramento Orcutt grass and a range of other Covered Species such as vernal pool fairy shrimp, mid-valley fairy shrimp, and California tiger salamander. In addition, the SSHCP Conservation Strategy will re-establish and/or establish approximately 645 acres of Swale and Vernal Pool to ensure adequate acreage remains for the persistence of Covered Species that rely on these land covers in the Plan Area. The SSHCP Preserve System targets preservation within the two vernal pool core recovery areas in the Plan Area. Most SSHCP Preserves containing the Vernal Pool Ecosystem will be entirely within or within 1 mile of the two core recovery areas. The Vernal Pool Ecosystem will be managed and monitored in perpetuity to ensure that the Vernal Pool Ecosystem remains functional over time.

To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves that are not part of the SSHCP Preserve System, thus making a larger-scale contiguous Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves. Large preserves will preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools. Large preserves will also protect subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer.

The SSHCP Preserve System will provide heterogeneity of the Vernal Pool Ecosystem by maintaining the existing ecosystem variability at three main spatial scales: (1) landscape heterogeneity (geologic formations, soils, location within the Plan Area) of preserved vernal pool complexes in the Plan Area; (2) heterogeneity of vernal pool types, spatial patterns, and connectivity within a Preserve; and (3) heterogeneity of individual pools, including sizes, water chemistry, and floristic components. A GIS exercise was conducted that analyzed one possible preserve scenario. From this exercise, Tables 7-10 and 7-11 were created that present the geologic formations and soil unit types that may compose the Preserve System, as compared to the composition of the Plan Area as a whole. These tables demonstrate that the Preserve System can comprise the full range and diversity of soil types and geologic formations associated with the Vernal Pool Ecosystem in the Plan Area. Table 7-12 similarly presents the variation in Vernal Wetland Acre/Density Index scores for the Preserve System, which demonstrates that the Preserve

System can generally maintain the diversity of vernal pool densities and pool sizes as compared to existing conditions in the Plan Area. The Preserve System would focus more on acquiring and preserving parcels with higher densities of pools or larger pools, as these tend to be more intact or more valuable as habitat for vernal pool species. However, large areas of less dense or smaller pools would also be acquired, retaining adequate distributions of these other Vernal Wetland Acre/Density Index (VWADI) categories for those species that preferentially occupy less dense or smaller pools. By preserving vernal pool heterogeneity at these three scales, the likelihood of capturing genetic diversity is increased, and preservation of biodiversity is better assured. By establishing Preserves on each of the geologic landforms throughout the Plan Area that currently support vernal pools, preserving the vernal pool heterogeneity as indicated by soil types and the VWADI index, and by ensuring connectivity among the existing and SSHCP Preserves in the Plan Area, the SSHCP will preserve a broad range of habitat types.

Table 7-10
Geologic Formations Supporting Vernal Pools in the SSHCP Preserve System

Geologic Formation	In Preserve System (acres)	% of Preserve System (acres)	In Plan Area (acres)	% of Plan Area
Laguna Formation	12,897	34.8%	61,282	19.3%
Mehrten Formation	6,138	16.6%	26,459	8.3%
Modesto-Riverbank Formation	2,236	6.0%	14,688	4.6%
Riverbank Formation	9,888	26.7%	122,228	38.5%
Valley Springs Formation	611	1.7%	13,690	4.3%
Total	**31,770**	**85.8%**	**238,347**	**75.0%**

Table 7-11
Soils Supporting Vernal Pools in the SSHCP Preserve System

Soil	In Preserve System (acres)	% of Preserve System	In Plan Area (acres)	% of Plan Area
Soils Supporting Vernal Pools				
Clear Lake clay, hardpan substratum, drained, 0 to 1 percent slopes	285	0.8%	3,294	1.0%
Clear Lake clay, partially drained, 0 to 2 percent slopes, frequently flooded	172	0.5%	1,956	0.6%
Corning-Redding complex, 8 to 30 percent slopes	473	1.3%	3,038	1.0%
Corning complex, 0 to 8 percent slopes	2,198	5.9%	14,481	4.6%
Durixeralfs, 0 to 1 percent slopes	117	0.3%	1,414	0.5%

Table 7-11
Soils Supporting Vernal Pools in the SSHCP Preserve System

Soil	In Preserve System (acres)	% of Preserve System	In Plan Area (acres)	% of Plan Area
Durixeralfs-Galt complex, 0 to 2 percent slopes	0	0%	306	0.1%
Red Bluff-Redding complex, 0 to 5 percent slopes	1,130	3.1%	4,799	1.5%
Redding gravelly loam, 0 to 8 percent slopes	6,446	17.4%	26,745	8.4%
Redding loam, 2 to 8 percent slopes	2,055	5.6%	6,396	2.0%
San Joaquin-Durixeralfs complex, 0 to 1 percent slopes	110	0.3%	2,888	0.9%
San Joaquin-Galt complex, 0 to 3 percent slopes	357	1.0%	3,081	1.0%
San Joaquin-Galt complex, leveled, 0 to 1 percent slopes	621	1.7%	5,917	1.9%
San Joaquin-Xerarents complex, leveled, 0 to 1 percent slopes	105	0.3%	4,067	1.3%
San Joaquin silt loam, 0 to 3 percent slopes	1,997	5.4%	21,883	6.9%
San Joaquin silt loam, 3 to 8 percent slopes	636	1.7%	7,749	2.4%
San Joaquin silt loam, leveled, 0 to 1 percent slopes	2,077	5.6%	39,516	12.4%
Xerarents-Redding complex, 0 to 2 percent slopes	167	0.5%	950	0.3%
Xerarents-San Joaquin complex, 0 to 1 percent slopes	71	0.2%	2,127	0.7%
Total	**19,017**	**51.6%**	**150,607**	**47.5%**

Table 7-12
Range of Vernal Pool Densities in the Preserve System

VWADI Class	In Preserve System (acres)	% of Preserve System (acres)	In Plan Area (acres)	% of Plan Area with VWADI Classes
VWADI Category 1 - most wetted acres with densest vernal pool complexes and largest number of large pools				
A5	445	1.2%	3,435	2.4%
B5	1,176	3.2%	6,322	4.4%
C5	2,170	5.9%	8,094	5.6%

Table 7-12
Range of Vernal Pool Densities in the Preserve System

VWADI Class	In Preserve System (acres)	% of Preserve System (acres)	In Plan Area (acres)	% of Plan Area with VWADI Classes
D5	2,403	6.5%	6,427	4.5%
D4	1,753	4.7%	3,818	2.7%
E5	885	2.4%	1,040	0.7%
E4	52	0.1%	120	0.1%
Subtotal	*8,884*	*24.0%*	*29,256*	*20.4%*
VWADI Category 2				
A4	107	0.3%	2,001	1.4%
B4	1,702	4.6%	5,150	3.6%
C4	2,113	5.7%	6,488	4.5%
D2	40	0.1%	80	0.1%
D3	264	0.7%	680	0.4%
Subtotal	*4,226*	*11.4%*	*14,399*	*10.0%*
VWADI Category 3				
A3	82	0.2%	2,159	1.5%
B3	1,373	3.7%	4,476	3.1%
C1	136	0.4%	280	0.2%
C2	1,218	3.3%	3,339	2.3%
C3	1,620	4.4%	4,904	3.4%
Subtotal	*4,429*	*12.0%*	*15,158*	*10.5%*
VWADI Category 4				
A2	558	1.5%	6,902	4.8%
B1	1,562	4.2%	9,825	6.8%
B2	1,724	4.7%	10,749	7.5%
Subtotal	*3,844*	*10.4%*	*27,476*	*19.1%*
VWADI Category 5 - least wetted acres, most isolated and smaller vernal pools				
A1	3,887	10.5%	57,717	40.1%
Total	**25,270**	**68.3%**	**144,006**	**100%**

The SSHCP recognizes that removal of 17,117 acres of the existing 103,210 acres of the Vernal Pool Ecosystem will result in the loss of habitat and cause habitat fragmentation. However, habitat fragmentation is less likely in the Plan Area than in other regions as connectivity of the Vernal Pool Ecosystem in the Plan Area will be maintained by establishing large preserves that augment or connect to existing preserves that are not part of the SSHCP Preserve System. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. The SSHCP Preserve System will preserve the upland land cover types that are connected to the

vernal pools both biologically and hydrologically. Burrowing animals and pollinators, for example, while not Covered Species, are essential components of the Vernal Pool Ecosystem and will be protected within Valley Grassland land covers in SSHCP Preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and habitat linkages between SSHCP Preserves and existing preserves would be minimal or would not occur at all.

In the Mather Core Recovery Area, the SSHCP will preserve at least 5,494 acres of the Vernal Pool Ecosystem. Approximately 2,300 of those 5,494 acres will be located within three Core Preserves, which, combined with 3 Minor Preserves, 9 Satellite Preserves, and 10 Linkage Preserves, are designed to connect to existing preserves and fill in the habitat gaps between preserves in the UDA.

Of the 23,284 acres of the Vernal Pool Ecosystem that will be preserved in the Plan Area, 15,578 acres (68%) will be conserved in PPU 7. This will include a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. This Landscape Preserve will encompass the full range of heterogeneity of natural land covers and soil types associated with the Vernal Pool Ecosystem in the Cosumnes/Rancho-Seco Core Recovery Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves are generally established without setbacks in developed areas and sacrifice a portion of the preserved lands to these edge effects, which may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual watersheds based on LIDAR–Preserve boundaries that were established outside the defined watershed, so even without a buffer, the perched aquifer and overland surface flow will not be impacted by adjacent activities. Using a rigorous Preserve Setback strategy and watershed protection in conjunction with low-impact and compatible uses in land planning, the Preserve will maintain existing functions and values of the Vernal Pool Ecosystem in the Preserve System.

In addition to preservation of the Vernal Pool Ecosystem, the Implementing Entity will also establish or re-establish approximately 645 acres of Vernal Pool and Swale in the Plan Area, with a priority on re-establishment before establishment. The SSHCP will prioritize re-establishment within areas that historically had vernal pools, and will limit the densities at which pools can be placed, especially where pools are being added to already functional vernal pool complexes. All re-establishment and establishment sites will be inoculated with inoculum from

the impact or other representative sites, which will assist in maintaining or re-establishing the historical distribution of the species that use the Vernal Pool Ecosystem in the Plan Area. The effectiveness of inoculation will be monitored through a special study, as described in Section 8.3.3.5. Re-establishing pools in historical vernal pool areas will further help to conserve the Vernal Pool Ecosystem by ensuring no net loss of the total acreage in the SSHCP Plan Area.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of the Vernal Pool Ecosystem protected in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 Objectives will benefit the Vernal Pool Ecosystem by preparing and implementing Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). These actions will improve habitat value of the Vernal Pool Ecosystem.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 Objectives will directly benefit the Vernal Pool Ecosystem by requiring that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), that Stream Setbacks be established, and that Avoidance and Minimization Measures be implemented (Objective W2, W3). Goal 3 Objectives will directly benefit the Vernal Pool Ecosystem by outlining Preserve selection and re-establishment/establishment criteria for Valley Grassland, Vernal Pool, and Swale that ensure that adequate acreage of each SSHCP natural land cover remains in the Plan Area to provide necessary breeding, foraging, or sheltering habitat for Covered Species and other Plan Area native species (Objective VG1, VP1, VP2, VP3, VP4, VP5).

As Preserve Management Plans are implemented, grazing will be managed for the benefit of Covered Species habitat, including the Vernal Pool Ecosystem, by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the soil profile and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing condition.

7.6.1.1.2 Other Aquatic Land Covers

Other than the Vernal Pool Ecosystem, described in Section 7.6.1.1.1, which is categorized as an aquatic land cover, the remaining aquatic land covers include Seasonal Wetland; Freshwater Marsh; Stream/Creek; Open Water; and Riparian, which includes Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland. These aquatic natural land covers are referred to in this section as "other" aquatic land covers, which excludes the Vernal

Pool Ecosystem; the use of the term is intended to differentiate these resources from all aquatic natural land covers, which does include the Vernal Pool Ecosystem.

In total, approximately 1,095 acres, or 6%, of the 18,628 acres of the other aquatic land covers in the Plan Area would be removed over the proposed 50-year Permit Term (Table 7-13). This includes the removal of 1, 017 acres (64%) of the 1,660 acres present inside the UDA and removal of 78 acres (0.4%) of 16,968 acres present outside the UDA. Permanent indirect effects to natural land covers are collectively and qualitatively analyzed in Section 7.6.1. The only indirect effect to natural land covers analyzed that does not directly apply to other aquatic land covers is the alteration of vernal pool hydrology, which specifically applies to the Vernal Pool Ecosystem.

Table 7-13
Permanent Effects and Conservation for Other Aquatic Land Covers

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Direct and Indirect Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Plan Area-Wide					
Other Aquatic Land Covers	**1,095**	**Qualitative**	**1,095**	**1,468**	**1,095**
Seasonal Wetlands	105	Qualitative	105	105	105
Freshwater Marsh	127	Qualitative	127	127	127
Stream/Creeks	117	Qualitative	117	117	117
Open Water	155	Qualitative	155	155	155
Riparian[a]	591	Qualitative	591	964	591

[a] Approximately 591 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub will be re-established and/or established; of the 591 acres, 218 acres of the re-establishment or establishment will be for impacts to Mine Tailing Riparian Woodland.

To mitigate 1,095 acres of impacts to the other aquatic land covers, the SSHCP preserves 1,468 acres of these land covers, including 105 acres of Seasonal Wetland, 127 acres of Freshwater Marsh, 117 acres of Stream/Creek, 155 acres of Open Water, and 964 acres of Riparian. The SSHCP will also re-establish and/or establish 1,095 acres of other aquatic land covers, including 105 acres of Seasonal Wetland, 127 acres of Freshwater Marsh, 117 acres of Stream/Creek, 155 acres of Open Water, and 591 acres of Riparian (Table 7-13).

Each component, or natural land cover, that comprises the other aquatic land covers is described separately below. The Biological Goals and Measurable Objectives applicable to these other aquatic land covers are listed in Table 7-14.

Seasonal Wetland

Approximately 105 acres, or 4%, of the 2,600 acres of Seasonal Wetland in the Plan Area would be removed. More specifically, of the 163 acres of Seasonal Wetland in the UDA, approximately

102 acres, or 63% will be removed, and of the 2,438 acres of Seasonal Wetland outside of the UDA, approximately 3 acres, or 0.2%, will be removed.

A total of 105 acres of Seasonal Wetland will be preserved by the SSHCP, including approximately 12 acres inside the UDA (Table 7-5) and approximately 93 acres outside the UDA (Table 7-6). Preserve sites for Seasonal Wetland will be selected in areas that are modeled habitat for Covered Species and, at a minimum, on parcels that are 20 acres or greater. Approximately 105 acres of Seasonal Wetland will be re-established and/or established under the SSHCP.

Freshwater Marsh

Approximately 127 acres, or 4%, of the 2,954 acres of freshwater marsh in the Plan Area would be removed. This direct permanent impact includes the removal of approximately 119 acres, or 30%, of the 392 acres of Freshwater Marsh in the UDA and the removal of approximately 8 acres, or 0.3%, of the 2,562 acres of Freshwater Marsh outside of the UDA.

A total of 127 acres of Freshwater Marsh will be preserved by the SSHCP, including approximately 54 acres inside the UDA (Table 7-5) and approximately 73 acres outside the UDA (Table 7-6). Preserve sites for Freshwater Marsh will be selected in areas that are modeled habitat for Covered Species and that currently support emergent vegetation and that exhibit hydrology that can support Freshwater Marsh. Approximately 127 acres of Freshwater Marsh will be re-established and/or established under the SSHCP.

Stream/Creek

Approximately 117 acres, or 4%, of the 2,778 acres of Stream/Creek in the Plan Area would be removed. More specifically, of the 163 acres of Stream/Creek in the UDA, approximately 92 acres, or 56%, will be removed; of the 2,615 acres of Stream/Creek outside of the UDA, approximately 25 acres, or 1.0%, will be removed.

A total of 117 acres of Stream/Creek will be preserved by the SSHCP, including approximately 29 acres inside the UDA (Table 7-5) and approximately 88 acres outside the UDA (Table 7-6). Preserve sites for Stream/Creek will be selected in areas that have the potential to support Covered Species, are in proximity to the mouth of the Stream/Creek, support water during early spring to mid-fall, are adjacent to existing preserves that are not part of the SSHCP Preserve System, and can be enhanced through management. Approximately, 117 acres of Stream/Creek will be re-established and/or established under the SSHCP.

Open Water

Approximately 155 acres, or 7%, of the 2,344 acres of Open Water in the Plan Area would be removed. This direct permanent impact includes the removal of approximately 154 acres, or 65%, of the 237 acres of Open Water in the UDA and the removal of approximately 1 acre, or 0.03%, of the 2,107 acres of open water outside of the UDA.

A total of 155 acres of Open Water will be preserved by the SSHCP, including approximately 71 acres inside the UDA (Table 7-5) and approximately 84 acres outside the UDA (Table 7-6). Preserve sites for Open Water will be selected in areas that are and link to modeled habitat for Covered Species and can be enhanced through management. Approximately 155 acres of Open Water will be re-established and/or established under the SSHCP.

Riparian

Riparian includes the following land covers: Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland. Approximately 591 acres, or 7%, of the 7,952 acres of Riparian in the Plan Area would be removed. Of the 705 acres of Riparian in the UDA, approximately 551 acres, or 78% will be removed and of the 7,246 acres of Riparian outside of the UDA, approximately 40 acres, or 0.6%, will be removed.

A total of 964 acres of Riparian will be preserved by the SSHCP, including approximately 72 acres inside the UDA (Table 7-5) and approximately 892 acres outside the UDA (Table 7-6). Preserve sites for Riparian will be selected in areas that are modeled habitat for Covered Species; are located within 3 miles of foraging habitat for Covered Species that use riparian habitat for nesting and/or roosting; are multilayered and have a closed canopy structure; are large; and can be enhanced through management. Approximately 591 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub will be re-established and/or established; of the 591 acres, 218 acres of the re-establishment or establishment will be for impacts to Mine Tailing Riparian Woodland.

Table 7-14
Biological Goals and Measurable Objectives Applicable to the Other Aquatic Land Covers

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5.

Table 7-14
Biological Goals and Measurable Objectives Applicable to the Other Aquatic Land Covers

Applicable Biological Goals	Related Biological Objectives
	(minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W1**. Ensure that during implementation of Objective L2 (establishing a minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.
	Objective W2. Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (Low-Impact Development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W6. Covered Activities will avoid a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA.
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, and establish natural land covers, (including Cropland and Irrigated Pasture–Grassland) that provide habitat for Covered Species.	**Objective SW1.** Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.
	Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.

Table 7-14
Biological Goals and Measurable Objectives Applicable to the Other Aquatic Land Covers

Applicable Biological Goals	Related Biological Objectives
	Objective OW1. Preserve a minimum of acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by TAC). The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.
	Objective RIP1. Objective RIP1. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective RIP2. Re-establish and/or establish a minimum of 591 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture–Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.

Analysis of Conservation of Other Aquatic Land Covers

The SSHCP Conservation Strategy for other aquatic land covers is similar to that of the Vernal Pool Ecosystem, described in Section 7.6.1.1.1; refer to this section for additional details on the SSHCP Conservation Strategy. Preservation of these other aquatic land covers will be consistent with the Conservation Strategy guiding principles (Section 7.1) because it will protect watersheds and their ecosystem functions, and maintain Plan Area land cover heterogeneity between preserves. Protecting and re-establishing and/or establishing the other aquatic land covers in SSHCP Preserves will assist in achieving Goal 2 of the Conservation Strategy to avoid or minimize impacts of future Covered Activities on Plan Area aquatic resources and to ensure "no net loss" of

aquatic resources and aquatic functions within the Plan Area. The Conservation Strategy for aquatic land covers is closely tied to the Aquatic Resources Program (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report), which includes a process to assess and mitigate the effects of Covered Activities on watershed functions and conditions, and an alternatives analysis that would incentivize avoidance of on-site aquatic land covers.

Throughout the Plan Area, the SSHCP Conservation Strategy will preserve and link together the highest-quality aquatic resources, including approximately 1,468 acres of other aquatic land covers. The Preserve System will protect the hydrology and soil conditions necessary for persistence of Covered Species that use these aquatic resources, such as giant gartersnake and western pond turtle. In addition, the SSHCP Conservation Strategy will re-establish and/or establish approximately 1,095 acres of other aquatic land covers to ensure adequate acreage of these resources remain for the persistence of Covered Species that rely on them in the Plan Area. The aquatic land covers will be managed and monitored in perpetuity to ensure that they remain functional over time.

Preservation outside of the UDA will focus on the formation of large landscape-scale Preserves that connect to and augment existing preserve that is not part of the SSHCP Preserve System, which has direct ecological benefits to Covered Species, but also practical benefits, such as facilitation of land management, that result in ecological benefits. In the UDA, three Core Preserves, up to three Minor Preserves, and seven Satellite Preserves will be established and linked together within the UDA. Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves.

Another benefit of the SSHCP over project-by-project permitting is the strict requirements for the 50-foot Preserve Setbacks. The AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Stream and Preserve setbacks will be monitored by the Implementing Entity, easement held by the HCP Agency to ensure that they function as intended. Project-by-project permitting does not provide this level of guarantee for functionality of setbacks. Using a rigorous Preserve Setback strategy and watershed protection in conjunction with low-impact and compatible uses in land

planning, the Preserve will maintain existing functions and values of the other aquatic land cover types in the Preserve System.

While approximately 1,095 acres, or 6%, of the 18,628 acres of the other aquatic land covers in the Plan Area would be removed, resulting in habitat loss, the Implementing Entity will establish or re-establish 1,095 acres of other aquatic land covers ensuring that there would be no net loss of acreage (Table 7-13). Re-establishment and establishment sites will be selected based on the criteria outlined in the Conservation Actions for each Measurable Objective (Table 7-1) to maximize success. Species such as giant gartersnake, western pond turtle, and tricolored blackbird that are dependent on these other aquatic land cover types will benefit from these re-establishment/establishment efforts and this could assist in maintaining their distributions in the Plan Area. The Conservation Actions for each aquatic land cover type varies, but in general, re-establishment and/or establishment sites will be selected based on the following criteria: (1) the sites will link to aquatic land cover types that provide modeled Covered Species habitat or after re-establishment and/or establishment qualify as modeled Covered Species habitat; (2) there is sufficient hydrology on site or it can be re-established on site; (3) the site has appropriate soils and topography; and/or (4) management can be used to enhance or restore natural ecosystems. Additionally, Conservation Action SW2.1 ensures that sites for seasonal wetlands are re-established and/or established on parcels 20 acres or greater in size and/or occur in larger, open space areas, to the maximum extent feasible; Conservation Action FWM2.1 includes selecting sites that historically supported freshwater marsh; and Conservation Action SC2.1 includes selecting sites that are adjacent to an existing preserve and within proximity to the mouth of the stream/bank. Conservation Action RIP2.1 includes more detailed criteria for selecting re-establishment/establishment sites for Mixed Riparian Woodland and Mixed Riparian Scrub beyond those generally described for all other aquatic land cover types including selecting areas: (1) that are located within 3 miles of foraging habitat for Covered Species that use riparian habitat for nesting and/or roosting; (2) that have a multilayered and closed-canopy structure; (2) that are large, unfragmented, and connected to Valley Grassland and Agricultural areas; (3) that are located within a SSHCP Preserve; (4) that would avoid impacts to existing vernal pool landscapes, preserved or restored giant gartersnake habitat, and to existing functioning habitat; and (5) for establishment, did not historically support riparian vegetation, and for re-establishment, did historically support riparian vegetation.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of lands protected in the Preserve System will ensure that aquatic land covers are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 Objectives will benefit aquatic land covers by preparing and implementing Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4).

7.6.1.2 Terrestrial Natural Land Covers

The terrestrial natural land covers in the SSHCP Plan Area include: Valley Grassland that is not within the Vernal Pool Ecosystem; Blue Oak Woodland and Savanna; and Agriculture, which includes Cropland, Irrigated Pasture–Grassland, Orchard, and Vineyard.

In total, approximately 15,285 acres, or 10%, of the 150,758 acres of the terrestrial natural land covers in the Plan Area would be removed over the proposed 50-year Permit Term. This includes the removal of 14,244 acres (89%) of the 16,066 acres present inside the UDA and removal of 1,042 acres (0.8%) of 134,692 acres present outside the UDA. The only indirect effect to natural land covers analyzed that does not directly apply to terrestrial land covers is the alteration of vernal pool hydrology, which applies to the Vernal Pool Ecosystem. Additionally, while alterations to watershed hydrographs and degradation of water quality can indirectly impact terrestrial land covers, this particular stressor has a greater impact on aquatic natural land covers, including the Vernal Pool Ecosystem.

To mitigate impacts to terrestrial land covers, the SSHCP preserves 15,285 acres of these terrestrial land covers, including 5,542 acres of Valley Grassland that is not within the Vernal Pool Ecosystem, 47 acres of Blue Oak Woodland/Savanna, and 9,696 acres of Cropland and/or Irrigated Pasture–Grassland. The SSHCP will also re-establish and/ or establish 47 acres of Blue Oak Woodland/Savanna (Table 7-15).

Table 7-15
Permanent Effects and Conservation for Terrestrial Land Covers

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Direct and Indirect Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Plan Area-Wide					
Terrestrial Land Covers	**15,285**	**Qualitative**	**15,285**	**15,285**	**47**
Valley Grassland (Outside of Vernal Pool Ecosystem)	5,542	Qualitative	5,542	0[a]	—
Blue Oak Woodland/Savanna	47	Qualitative	47	47[b]	47[c]
Agriculture	9,696	Qualitative	9,696	9,696[d]	—

[a] Impacts to Valley Grasslsnds will be mitigated by preserving Valley Grasslsnds that are within the Vernal Pool Ecosystem.
[b] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.
[c] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.
[d] Impacts to Cropland, Irrigated Pasture-Grassland, orchards and vineyards can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.

Each component, or natural land cover, that comprises the terrestrial natural land covers is described separately below. The Biological Goals and Measurable Objectives applicable to these terrestrial natural land covers are listed in Table 7-16.

Valley Grassland

Approximately 5,542 acres, or 4%, of the 150,758 acres of Valley Grassland that are not within the Vernal Pool Ecosystem in the Plan Area would be removed. More specifically, of the 5,716 acres present in the UDA, 5,159 acres, or 90%, will be removed, and of the 32,042 acres present outside of the UDA, 383 acres, or 1.2%, will be removed.

A total of 5,542 acres of Valley Grassland that are not within the Vernal Pool Ecosystem will be preserved by the SSHCP, including approximately 6,065 acres inside the UDA (Table 7-5) and 15,949 acres outside the UDA (Table 7-6).

Blue Oak Woodland/Savanna

Approximately 47 acres, or 0.3%, of the 14,769 acres of Blue Oak Woodland/Savanna in the Plan Area would be removed. This direct permanent impact includes the removal 3 acres, 14%, of the 18 acres of Blue Oak Woodland/Savanna in the UDA, and the removal of 45 acres, or 0.3%, of the 14,751 acres of Blue Oak/Savanna outside of the UDA.

A total of 47 acres of Blue Oak Woodland/Savanna will be preserved by the SSHCP, all located outside the of the UDA (Table 7-6). Preserve sites for Blue Oak Woodland/Savanna will be selected in areas that expand upon or link to the Deer Creek Hills Preserve to the maximum extent feasible, as the limited amount of Blue Oak Woodland/Savanna preservation in the SSHCP will be most effective when linked to that large existing expanse of Blue Oak Woodland/Savanna. Blue Oak Woodland/Savanna will be re-established and/or established under the SSHCP, including approximately 47 acres in areas that expand upon or link to the Deer Creek Hills Preserve, to the maximum extent feasible.

Agriculture

Agriculture includes the following land covers: Cropland, Irrigated Pasture–Grassland, Orchard, and Vineyard. Approximately 9,696 acres, or 10%, of the 98,187 acres of agriculture in the Plan Area would be removed. Of the 10,287 acres of agriculture in the UDA, 9,082 acres, or 88% will be removed and of the 87,899 acres of agriculture outside of the UDA, 614 acres, or 0.7%, will be removed.

A total of 9,696 acres of agriculture will be preserved by the SSHCP, all located outside of the UDA (Table 7-6). Of the 9,696 total acres of preservation, 1,000 acres will be outside the 100-

year floodplain to provide a refuge for giant gartersnakes from flood waters during the snake's dormant season in winter (see Table 7-1 for Objective GGS1.2). Preserve sites for Cropland and Irrigated Pasture–Grassland will be selected to maximize their benefit to foraging habitat for avian Covered Species and their value for agriculture production including sites: (1) containing soils that are highly productive for agricultural resources and that have irrigation systems for crop production; (2) supporting or capable of supporting high prey densities for avian Covered Species; (3) supporting or capable of supporting nesting or perching habitat for avian Covered Species; and (4) can be enhanced or restored through management.

Table 7-16
Biological Goals and Measurable Objectives Applicable to the Terrestrial Land Covers

Applicable Biological Goals	Related Measurable Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 3. Preserve, re-establish, and establish natural land covers, (including Cropland and Irrigated Pasture–Grassland) that provide habitat for Covered Species.	**Objective BOW1**. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this table.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture–Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).

Table 7-16
Biological Goals and Measurable Objectives Applicable to the Terrestrial Land Covers

Applicable Biological Goals	Related Measurable Objectives
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
	Objective AG2. Of the 9,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as corn, alfalfa, or wheat) preferred by tricolored blackbird (*Agelaius tricolor*), greater sandhill crane (*Grus canadensis*), and the Covered raptor species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective AG3. Maintain or increase raptor prey availability and improve raptor foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species.

Analysis of Conservation of Terrestrial Natural Land Covers

The focus of the Conservation Strategy for terrestrial natural land cover types is mostly outside the UDA, where a large landscape-scale Preserve will connect to and augment existing preserve that is not part of the SSHCP Preserve System. The large size of this preserve would be consistent with the guiding principle (Section 7.1) to minimize habitat fragmentation, protect watersheds and their ecosystem functions, and minimize edge effects. Establishing large preserves also benefits preserve management as a single PMP can guide management of a large area in a coordinated fashion and minimize environmental stressors such as habitat fragmentation. Also, there are practical benefits for Preserve management, such as grazing herds could be used across large landscapes and less perimeter fencing is required than on multiple smaller preserves. The Conservation Strategy for Valley Grassland Blue Oak Woodland/ Savanna, and Agriculture are described in more detail in the following paragraphs.

The Conservation Strategy for Valley Grassland was discussed in Section 7.6.1.1.1 and emphasizes establishment of Preserves in areas that are adjacent or in proximity to existing preserves and where Valley Grasslands can be located in areas that provide benefits to the Vernal Pool Ecosystem. By adding on to existing preserves, the Preserve System will maximize overall size of preserved areas and habitat connectivity, and minimize the amount of edge exposed to urban development and other environmental stressors.

Blue Oak Woodland/Savanna composes a relatively small portion (4%) of the Plan Area land cover, mostly along its eastern edge, and none of the Covered Species are entirely dependent on these communities for the species to persist within the Plan Area. Nonetheless, Blue Oak Woodland/Savanna in the Plan Area provide valuable wildlife habitat and serve other ecological

functions that will contribute to the preservation of Covered Species, particularly in the eastern portion of the Plan Area in PPUs 5 and 7 where they are dominant habitat types. Of the 47 acres of Blue Oak Woodland/Savanna that will be preserved, all will be conserved in PPU 7. PPU 7 contains a large proportion of the Blue Oak Woodland and Savanna in the Plan Area, which comprise 5,861 acres or 40% of the total Blue Oak Woodland and Savanna in the Plan Area.

Agricultural uses are cyclical in nature (e.g., crop rotation) and interact with the foraging and other life history needs of SSHCP Covered Species. Therefore, the Conservation Strategy is designed to maintain a mosaic of agricultural crop types distributed throughout the main agricultural area of the Plan Area and is considered an ecologically sound method of preserving agricultural habitats that benefit the Covered Species. PPU 6 Preserves are where the majority of agriculture (8,465 acres, 82%, of 9,462 acres) will be conserved. The Preserve design focus for PPU 6 is preserving existing agricultural lands that provide habitat for several of the broad-ranging Covered Species, most notably Swainson's hawk and greater sandhill crane, as well as several occurrences for burrowing owl and white-tailed kite. The Cropland Preserve will allow for variation in crop types from year to year in specific fields, but overall will maintain important habitat functions that benefit SSHCP Covered Species that depend on Agriculture land covers. The Cropland Preserves established in the western portion of PPU 6 will also provide connectivity between the Cosumnes River floodplain and Stone Lakes National Wildlife Refuge (NWR), where greater sandhill crane populations are regularly observed.

In the UDA, three Core Preserves, up to three Minor Preserves, and seven Satellite Preserves will be established and linked together within the UDA. Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves.

Another benefit of the SSHCP over project-by-project permitting is the strict requirements for the 50-foot Preserve Setbacks. The AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Using a rigorous Preserve Setback strategy and watershed protection in conjunction with low-impact and compatible uses in land planning, the Preserve will maintain existing functions and values of the terrestrial land cover types in the Preserve System.

While approximately 47 acres, or 0.3%, of the 14,769 acres of Blue Oak Woodland/Savanna in the Plan Area would be removed, resulting in habitat loss, the Implementing Entity will establish or re-establish 47 acres of Blue Oak Woodland/Savanna ensuring that there would be no net loss of acreage (Table 7-15). Re-establishment and/or establishment for Blue Oak Woodland/Savanna will be selected in areas that expand upon or link to the Deer Creek Hills Preserve, to the maximum extent feasible, and any potential re-establishment/ establishment sites would fill gaps in existing mixed Blue Oak Woodland or Blue Oak Savanna land covers, or would link existing Blue Oak Woodland or Blue Oak Savanna land covers. The Implementing Entity will also establish 300 acres of Vernal Pool Ecosystem, much of which will consist of Valley Grassland. This will be accomplished by converting agricultural land or disturbed areas within the UDA to Valley Grassland, Vernal Pools, and Swales. While there are no re-establishment/establishment objectives for Agriculture, the SSHCP Conservation Strategy minimizes habitat fragmentation by focusing on the establishment of large Preserves, and by linking SSHCP Preserves and existing preserves together. For example, PPU 7 encompasses 90,906 acres, and the dominant land covers in PPU 7 are Valley Grassland, which comprises 52,278 acres of the PPU, and Agriculture, which comprises 20,695 acres. Similarly, PPU 6 encompasses 95,196 acres the dominant land covers in PPU 6 are Agriculture (58,458 acres) and Valley Grassland (17,633 acres).

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of lands protected in the Preserve System will ensure that terrestrial natural land covers are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will benefit terrestrial natural land covers by preparing and implementing Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4).

7.6.2 Covered Species

This section provides the conservation analysis for the 28 Covered Species of the SSHCP. For each of the Covered Species, the following is provided:

- A summary of impacts to habitat and the proposed level of preservation of documented occurrences (as applicable) and modeled habitat;
- Analysis of the SSHCP Conservation Strategy for the species, including:
    - Analysis of how relevant Biological Goals and Measurable Objectives will directly or indirectly benefit the species, and quantitative or qualitative description of the benefits;
    - Summary of how any Avoidance and Minimization Measures (AMMs) will benefit this species, especially species-specific AMMs; and

- Summaries of conservation for each Core Recovery Area and for each separate CHU for every Covered Species that was included in any Recovery Plan.

7.6.2.1 Ahart's Dwarf Rush

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 7,403 acres of Ahart's dwarf rush modeled habitat in the Plan Area. All impacted modeled habitat for Ahart's dwarf rush is within the Vernal Pool Ecosystem, comprising approximately 310 acres of Ahart's dwarf rush modeled aquatic habitat and approximately 7,093 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-17).

To mitigate these impacts to Ahart's dwarf rush modeled habitats and the take of all Ahart's dwarf rush occupying that habitat, the SSHCP will preserve approximately 12,592 acres of Vernal Pool Ecosystem, including 478 acres of Vernal Pool, 165 acres of Swale, and 11,949 acres of Valley Grassland (Table 7-17). The SSHCP will also re-establish and/or establish approximately 239 acres of Ahart's dwarf rush modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-18).

Table 7-17
Permanent Effects and Conservation for Ahart's Dwarf Rush

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Direct and Indirect Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	7,093	Qualitative	7,093[a]	11,949	0
Vernal Pool	149	51	200	478	149
Swale	90	20	110	165	90[b]
Vernal Pool Ecosystem	**7,332**	**71**	**7,403**	**12,592**	**239**

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[b] Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool

Table 7-18
Biological Goals and Measurable Objectives Applicable to Ahart's Dwarf Rush

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, and establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.

Table 7-18
Biological Goals and Measurable Objectives Applicable to Ahart's Dwarf Rush

Applicable Biological Goals	Related Biological Objectives
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPP1.** Protect the one currently documented unpreserved occurrence of Ahart's dwarf rush in the Plan Area. Prior to take of any occurrence of Ahart's dwarf rush (*Juncus leiospermus*), protect six currently unpreserved[8] and "biologically equivalent or superior" (as defined by the TAC) occurrences of Ahart's dwarf rush within the Plan Area. After six currently unpreserved occurrences are protected, prior to take of an occurrence of Ahart's dwarf rush, protect one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of Ahart's dwarf rush within the Plan Area.

Analysis of Species Conservation

There is one documented occurrence of Ahart's dwarf rush in the Plan Area, which will be preserved in a 15-acre Satellite Preserve in PPU 1. This occurrence will not be directly or indirectly impacted. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area. With implementation of the SSHCP under Objective VPP1, prior to take of any occurrence of Ahart's dwarf rush, six currently unpreserved[9] and "biologically equivalent or superior" (as defined by the Technical Advisory Committee (TAC)) occurrences of Ahart's dwarf rush within the Plan Area will be preserved. After six currently unpreserved occurrences

[8] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

[9] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

are protected, prior to take of an occurrence of Ahart's dwarf rush, one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of Ahart's dwarf rush within the Plan Area will be preserved. Preserved occurrences will be located within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for Ahart's dwarf rush is on preserving known occurrences, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur, or become established in the future. The SSHCP Conservation Strategy will preserve and link approximately 12,592 acres of modeled habitat for Ahart's dwarf rush in the Plan Area. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in or near these Core Recovery Areas, focusing conservation in the areas important for recovery of this species. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves, including spread of non-native plant species or degradation of water quality. Large preserves will protect the subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. Large preserves will also preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools.

By preserving existing populations and modeled habitat of Ahart's dwarf rush in large, interconnected Preserves that are protected from edge effects, the species will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow via interconnected systems of vernal pools and swales. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of Ahart's dwarf rush habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

Three Core Preserves, each including more than 300 acres of Ahart's dwarf rush modeled habitat (with a combined total of 1,867 acres), will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP

Preserves. For example, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

Although there are no known occurrences of Ahart's dwarf rush outside the UDA, modeled habitat in the Cosumnes/Rancho-Seco Core Recovery Area where the species might occur would be protected within the large landscape-scale Preserve (at least 10,500 acres) established in PPU 7. The Landscape Preserve will be established through land acquisitions that are targeted to (1) preserve modeled Ahart's dwarf rush habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase Preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other. The preservation of known occurrences and modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the SSHCP Conservation Strategy will also establish or re-establish approximately 239 acres of Ahart's dwarf rush modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. The re-established and/or established Ahart's dwarf rush modeled aquatic habitat will be provided appropriate management and monitoring of lands to ensure that habitat remains functional in perpetuity for Ahart's dwarf rush. This will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System.

The SSHCP Preserve System will link SSHCP Preserves and existing preserves that have modeled Ahart's dwarf rush modeled habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of seeds through surface flows, predator wastes, wind, and mud carried on the feet of animals). The SSHCP Preserve System will maintain the Ahart's dwarf rush at its current

distribution, and the re-establishment and establishment of additional habitat will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The SSHCP Preserve will establish Core Preserves and Linkage Preserves that will maintain connectivity between existing occurrences and modeled habitat in other SSHCP Preserves and existing preserves in the Plan Area. By establishing large Preserves, the SSHCP will also ensure that connectivity between vernal pools within SSHCP Preserves is maintained.

The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer. However, grazing is not always compatible with success of Ahart's dwarf rush; therefore, those preserved populations of Ahart's dwarf rush may need to be protected from grazing. Detailed prescriptions for grazing in these preserves would be included in Preserve Management Plans (see Section 8.3.4.2).

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 7,403 acres of the existing 25,136 acres of Ahart's dwarf rush modeled habitat (the Vernal Pool Ecosystem) may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated Ahart's dwarf rush populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area Vernal Pools remains relatively good. Those Vernal Pools in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve Ahart's dwarf rush modeled habitat with a range of vernal pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem. By preserving a range of Ahart's dwarf rush habitats in the Plan Area, the SSHCP will help Ahart's dwarf rush persist during expected climate change effects on precipitation and temperature.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of Ahart's dwarf rush modeled habitat in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit Ahart's dwarf rush habitat from the

preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing conditions. These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2 (SSHCP Biological Goals and Measurable Objectives), Goal 2 objectives will directly benefit Ahart's dwarf rush by requiring that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), establishing Stream Setbacks, and requiring implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit Ahart's dwarf rush by ensuring there are selection criteria and re-establishment/establishment criteria for Valley Grassland, Vernal Pool, and Swale (Objective VG1, VP1, VP2, VP3, VP4, VP5). Further, Objective VPP1 (Goal 5) will assure the preservation of Ahart's dwarf rush occurrences and distribution within the Plan Area.

Recovery Plan

As discussed in Section 7.6.3, the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Recovery Plan), includes recovery criteria for Ahart's dwarf rush (USFWS 2005a). To conserve this species, the Recovery Plan prioritizes preservation of Vernal Pool Ecosystem within several core areas, including the Mather Core Recovery Area and the Cosumnes/Rancho Seco Core Recovery Area in the Plan Area. SSHCP Covered Activities are anticipated to impact up to approximately 5,045 acres of Ahart's dwarf rush modeled habitat in the Mather Core Recovery Area and 18 acres in the Cosumnes/Rancho Seco Core Recovery Area (Table 7-19). Total impacts to Core Recovery Areas within the Plan Area are 5,062 acres. The SSHCP Conservation Strategy will preserve and link approximately 3,530 acres of modeled habitat for Ahart's dwarf rush in the Mather Core Recovery Area and approximately 3,771 acres within the Cosumnes/Rancho Seco Core Recovery Area. Total preservation within Core Recovery Areas within the Plan Area is 7,301 acres.

Table 7-19
Ahart's Dwarf Rush Effects and Conservation in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	4,825	6,802	4,809	3,291	16	3,511
Vernal Pool	148	401	147	185	0.8	215
Swale	89	98	88	54	1	44
Vernal Pool Ecosystem	**5,062**	**7,301**	**5,045**	**3,530**	**18**	**3,771**

See Section 7.6.3 for a detailed description of how the SSHCP's Conservation Actions carried out to meet SSHCP Biological Goals and Measurable Objectives will incorporate, or be consistent with, many of the species-specific recovery criteria for the nine Covered Species addressed in the Recovery Plan. The SSHCP provides an alternative Conservation Strategy for preserving vernal pool species habitat and meeting the six recovery criteria listed (see Section 7.6.3).

Although less than 100% of Ahart's dwarf rush occurrences may be preserved within the Plan Area, the SSHCP Conservation Strategy is the equivalent of the Recovery Plan's Species-Specific Recovery Criteria for each Core Area located inside the Plan Area (USFWS 2005a), as described in Section 7.6.3.

7.6.2.2 Boggs Lake Hedge-Hyssop

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 8,724 acres of Boggs Lake hedge-hyssop modeled habitat in the Plan Area. Total impacts to modeled Boggs Lake hedge-hyssop Vernal Pool Ecosystem are 8,711 acres, comprising 292 acres of Boggs Lake hedge-hyssop modeled aquatic habitat and 8,419 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-20). In addition, the SSHCP will impact approximately 13 acres of Seasonal Wetland in the Plan Area. In all, 98% of impacts to the Vernal Pool Ecosystem and 91% to Seasonal Wetland will occur in the UDA.

To mitigate these impacts to Boggs Lake hedge-hyssop modeled habitats and the take of all Boggs Lake hedge-hyssop occupying that habitat, the SSHCP will preserve approximately 9,074 acres of modeled habitat, including 9,039 acres of Vernal Pool Ecosystem (i.e., 382 acres of Vernal Pool and 8,657 acres of Valley Grassland) and 35 acres of Seasonal Wetland (see Table 7-20). The SSHCP will also re-establish and/or establish approximately 252 acres of Boggs Lake

hedge-hyssop modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-21).

Table 7-20
Permanent Effects and Conservation for Boggs Lake Hedge-Hyssop

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	8,419	Qualitative	8,419[a]	8,657	0
Vernal Pool	240	52	292	382	239
Subtotal Vernal Pool Ecosystem	*8,659*	*52*	*8,711*	*9,039*	*239*
Seasonal Wetland	13	Qualitative	13[a]	35	13
GRAND TOTAL	**8,672**	**52**	**8,724**	**9,074**	**252**

[a] Total impacts to Valley Grassland and Seasonal Wetland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-21
Biological Goals and Measurable Objectives Applicable to Boggs Lake Hedge-Hyssop

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in

Table 7-21
Biological Goals and Measurable Objectives Applicable to Boggs Lake Hedge-Hyssop

Applicable Biological Goals	Related Biological Objectives
	Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, and establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPP2.** Prior to take of any occurrence of Boggs Lake hedge-hyssop (*Gratiola heterosepala*), preserve one currently unpreserved[10] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Boggs Lake hedge-hyssop within the Plan Area.

[10] Includes occurrences in the SSHCP geographic information system (GIS) database (January 2014) and any future occurrences found in the Plan Area.

Analysis of Species Conservation

Of the 30 known occurrences of Boggs Lake hedge-hyssop in the Plan Area, one falls within an SSHCP Preserve, and four will be impacted. With implementation of the SSHCP under Objective VPP2, prior to take of any occurrence of Boggs Lake hedge-hyssop, one currently unpreserved[11] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Boggs Lake hedge-hyssop within the Plan Area will be preserved. Therefore, if more than one occurrence is to be impacted the Implementing Entity will ensure that additional occurrences are protected in SSHCP Preserves. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area. Preserved occurrences will be located within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for Boggs Lake hedge hyssop is on preserving known occurrences, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur, established in the future. The SSHCP Conservation Strategy will preserve and link approximately 9,074 acres of the highest-quality Seasonal Wetland and Vernal Pool Ecosystem for Boggs Lake hedge-hyssop in the Plan Area. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in or near these Core Recovery Areas, focusing conservation in the areas important for recovery of this species. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves, including spread of non-native plant species or degradation of water quality. Large preserves will protect the subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. Large preserves will also preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools.

By preserving existing populations and modeled habitat of Boggs Lake hedge hyssop in large, interconnected Preserves that are protected from edge effects, the species will be less affected by

[11] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow via interconnected systems of vernal pools and swales. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of Boggs Lake hedge hyssop habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

As discussed in Section 7.5, the conservation focus for Boggs Lake hedge-hyssop is focused in PPU 1 and PPU 3 where documented occurrences occur. Three Core Preserves, each including more than 450 acres of Boggs Lake hedge-hyssop modeled habitat (with a combined total of approximately 2,058 acres), will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

The conservation focus outside the UDA is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. The Landscape Preserve will be established through land acquisitions that are targeted to (1) preserve modeled Boggs Lake hedge-hyssop habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase Preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish approximately 252 acres of Boggs Lake hedge-hyssop modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. Re-establishing pools in historical vernal pool areas will further help to conserve Boggs Lake hedge-hyssop by ensuring no net loss of the total acreage of Boggs Lake hedge-hyssop habitat in the SSHCP Plan Area. All re-establishment and/or established sites for seasonal wetlands will link existing areas of seasonal wetlands and support soils and topography modeled for re-establishing and/or establishing seasonal

wetlands. The SSHCP will also preserve a minimum of approximately 105 acres of seasonal wetlands on parcels 20 acres or greater in size and/or sites that occur in larger, open space areas, to the maximum extent feasible.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. The SSHCP Preserve System will link SSHCP Preserves and existing preserves that have modeled Boggs Lake hedge-hyssop modeled habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of seeds through surface flows, predator wastes, wind, and mud carried on the feet of animals). The SSHCP Preserve System will maintain the Boggs Lake hedge-hyssop at its current distribution, and the re-establishment and establishment of additional habitat will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The SSHCP Preserve will establish Core Preserves and Linkage Preserves that will maintain connectivity between existing occurrences and modeled habitat in other SSHCP Preserves and existing preserves in the Plan Area. By establishing large Preserves, the SSHCP will also ensure that connectivity between pools within SSHCP Preserves is maintained.

The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 8,724 acres of the existing 37,000 acres of Boggs Lake hedge-hyssop modeled habitat (i.e., seasonal wetlands and the Vernal Pool Ecosystem) may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated Boggs Lake hedge-hyssop populations that are not preserved under the SSHCP may contain genetic diversity of

conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area pools and seasonal wetlands remains relatively good. Those pools and seasonal wetlands in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve Boggs Lake hedge-hyssop modeled habitat with a range of vernal pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem. By preserving a range of Boggs Lake hedge-hyssop habitats in the Plan Area, the SSHCP will help Boggs Lake hedge-hyssop persist during expected climate change effects on precipitation and temperature.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of Boggs Lake hedge-hyssop modeled habitat in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit Boggs Lake hedge-hyssop habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing conditions. These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 objectives will directly benefit Boggs Lake hedge-hyssop from the requirement that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), Stream Setbacks and implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit Boggs Lake hedge-hyssop by ensuring there are selection criteria and re-establishment/establishment criteria for Valley Grassland, Vernal Pool, and Seasonal Wetland (Objective VG1, VP1, VP2, VP3, VP4, VP5, SW1, SW2). Further, Objective VPP2 (Goal 5) will assure the preservation of Boggs Lake hedge-hyssop occurrences and distribution within the Plan Area.

Recovery Plans

As discussed in Section 7.6.3, the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Recovery Plan) includes recovery criteria for Bogg's Lake hedge-hyssop (USFWS 2005a). To conserve this species, the Recovery Plan prioritizes preservation of Vernal

Pool Ecosystem within several core areas, including the Mather Core Recovery Area and the Cosumnes/Rancho Seco Core Recovery Area in the Plan Area. SSHCP Covered Activities are anticipated to impact up to approximately 5,005 acres of Bogg's Lake hedge-hyssop modeled habitat in the Mather Core Recovery Area and 20 acres in the Cosumnes/Rancho Seco Core Recovery Area (Table 7-22). Total impacts to Core Recovery Areas within the Plan Area are 5,024 acres. The SSHCP Conservation Strategy will preserve and link approximately 3,853 acres of modeled habitat for Bogg's Lake hedge-hyssop in the Mather Core Recovery Area and approximately 4,450 acres within the Cosumnes/Rancho Seco Core Recovery Area. Total preservation within Core Recovery Areas within the Plan Area is 8,303 acres.

Table 7-22
Boggs Lake Hedge-Hyssop Permanent Effects and Conservation in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	4,867	7,931	4,848	3,686	19	4,245
Vernal Pool	155	357	154	167	1	191
Vernal Pool Ecosystem	**5,022**	**8,288**	**5,003**	**3,853**	**20**	**4,436**
Seasonal Wetland	1.9	14	1.9	**0**	0	14
Grand Total	**5,024**	**8,303**	**5,005**	**3,853**	**20**	**4,450**

See Section 7.6.3 for a detailed description of how the SSHCP's Conservation Actions carried out to meet SSHCP Biological Goals and Measurable Objectives will incorporate, or be consistent with, many of the species-specific recovery criteria for the nine Covered Species addressed in the Recovery Plan. The SSHCP provides an alternative Conservation Strategy for preserving vernal pool species habitat and meeting the six recovery criteria listed (see Section 7.6.3).

7.6.2.3 Dwarf Downingia

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 1,982 acres of dwarf downingia modeled habitat in the Plan Area. All impacted modeled habitat for dwarf downingia is within the Vernal Pool Ecosystem, comprising approximately 159 acres of dwarf downingia modeled aquatic habitat and 1,823 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-23). In all, 98% of impacts to the Vernal Pool Ecosystem will occur in the UDA.

To mitigate these impacts to dwarf downingia modeled habitats (i.e., the Vernal Pool Ecosystem) and the take of all dwarf downingia occupying that habitat, the SSHCP will preserve approximately 3,975 acres of Vernal Pool Ecosystem, including 186 acres of Vernal Pool, 56 acres of Swale, and 3,733 acres of Valley Grassland (Table 7-23). The SSHCP will also re-establish and/or establish approximately 141 acres of dwarf downingia modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-24).

Table 7-23
Permanent Effects and Conservation for Dwarf Downingia

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	1,823	Qualitative	1,823[a]	3,733	0
Vernal Pool	94	13	107	186	95
Swale	46	6	52	56	46[b]
Vernal Pool Ecosystem	**1,963**	**19**	**1,982**	**3,975**	**141**

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[b] Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool.

Table 7-24
Biological Goals and Measurable Objectives Applicable to Dwarf Downingia

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.

Table 7-24
Biological Goals and Measurable Objectives Applicable to Dwarf Downingia

Applicable Biological Goals	Related Biological Objectives
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, and establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).

Table 7-24
Biological Goals and Measurable Objectives Applicable to Dwarf Downingia

Applicable Biological Goals	Related Biological Objectives
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPP3.** Prior to take of any occurrence of Dwarf downingia (*Downingia pusilla*), preserve one currently unpreserved[12] and "biologically equivalent or superior" (as defined by the TAC) occurrence of dwarf downingia within the Plan Area.

Analysis of Species Conservation

None of the 10 occurrences of dwarf downingia in the Plan Area will be enclosed within the Preserve System. However, Covered Activities are not projected to impact any documented occurrences of dwarf downingia. Exhaustive surveys for dwarf downingia have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area. Implementation of Objective VPP3 will require that, prior to take of any occurrence of dwarf downingia, one currently unpreserved[13] and "biologically equivalent or superior" (as defined by the TAC) occurrence of dwarf downingia within the Plan Area will be preserved. Preserved occurrences will be located within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for dwarf downingia is on preserving known occurrences, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur, or become established in the future. The SSHCP Conservation Strategy will preserve and link approximately 3,975 acres of modeled habitat for dwarf downingia in the Plan Area. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in or near these Core Recovery Areas, focusing conservation in the areas important for recovery of this species. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation

[12] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

[13] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

Strategy will minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves, including spread of non-native plant species or degradation of water quality. Large preserves will protect the subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. Large preserves will also preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools.

By preserving existing populations and modeled habitat of dwarf downingia in large, interconnected Preserves that are protected from edge effects, the species will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow via interconnected systems of vernal pools and swales. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of dwarf downingia habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

The habitat conservation focus for dwarf downingia is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. The Landscape Preserve will be established through land acquisitions that are targeted to (1) preserve modeled dwarf downingia habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase Preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish approximately 141 acres of dwarf downingia modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. Re-establishing pools in historical vernal pool areas will further help to conserve dwarf downingia by ensuring no net loss of the total acreage of dwarf downingia habitat in the SSHCP Plan Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. The SSHCP Preserve System will link SSHCP Preserves and existing preserves that have modeled dwarf downingia modeled habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of seeds through surface flows, predator wastes, wind, and mud carried on the feet of animals). The SSHCP Preserve System will maintain the dwarf downingia at its current distribution, and the re-establishment and establishment of additional habitat will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The SSHCP Preserve will establish Core Preserves and Linkage Preserves that will maintain connectivity between existing occurrences and modeled habitat in other SSHCP Preserves and existing preserves in the Plan Area. By establishing large Preserves, the SSHCP will also ensure that connectivity between pools within SSHCP Preserves is maintained.

The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 1,982 acres of the existing 24,261 acres of dwarf downingia modeled habitat (i.e., the Vernal Pool Ecosystem) may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated dwarf downingia populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area pools and seasonal wetlands remains relatively good. Those pools and seasonal wetlands in the

Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve dwarf downingia modeled habitat with a range of vernal pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem. By preserving a range of dwarf downingia habitats in the Plan Area, the SSHCP will help dwarf downingia persist during expected climate change effects on precipitation and temperature.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of dwarf downingia modeled habitat in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit dwarf downingia habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing conditions. These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 objectives will directly benefit dwarf downingia from the requirement that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), Stream Setbacks and implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit dwarf downingia by ensuring there are selection criteria and re-establishment/establishment criteria for Valley Grassland, Vernal Pool, and Swale (Objective VG1, VP1, VP2, VP3, VP4, VP5). Further, Objective VPP2 (Goal 5) will assure the preservation of dwarf downingia occurrences and distribution within the Plan Area.

7.6.2.4 Legenere

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 10,778 acres of legenere modeled habitat in the Plan Area. Total impacts to modeled legenere Vernal Pool Ecosystem are approximately 10,742 acres, comprising approximately 341 acres

of legenere modeled aquatic habitat and 10,401 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-25). In addition, the SSHCP will impact approximately 36 acres of Seasonal Wetland in the Plan Area. In all, 98% of impacts to the Vernal Pool Ecosystem and 95% to Seasonal Wetland will occur in the UDA.

To mitigate these impacts to legenere modeled habitats and the take of all legenere occupying that habitat, the SSHCP will preserve approximately 11,615 acres of modeled habitat including 11,573 acres of Vernal Pool Ecosystem (i.e., 512 acres of Vernal Pool and 11,061 acres of Valley Grassland) and 42 acres of Seasonal Wetland (Table 7-25). The SSHCP will also re-establish and/or establish approximately 130 acres of legenere modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-26).

Table 7-25
Permanent Effects and Conservation for Legenere

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	10,401	Qualitative	10,401[a]	11,061	0
Vernal Pool	276	65	341	512	95
Subtotal Vernal Pool Ecosystem	**10,677**	**65**	**10,742**	**11,573**	**95**
Seasonal Wetland	36	Qualitative	36[a]	42	35
GRAND TOTAL	**10,713**	**65**	**10,778**	**11,615**	**130**

[a] Total impacts to Valley Grassland and Seasonal Wetland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-26
Biological Goals and Measurable Objectives Applicable to Legenere

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in

Table 7-26
Biological Goals and Measurable Objectives Applicable to Legenere

Applicable Biological Goals	Related Biological Objectives
	accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, and establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are

Table 7-26
Biological Goals and Measurable Objectives Applicable to Legenere

Applicable Biological Goals	Related Biological Objectives
	obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPP4.** Protect and maintain in perpetuity a minimum of 14 occurrences of legenere (*Legenere limosa*) within the SSHCP Preserve System. Legenere occurrences will be preserved in accordance with the Conservation Actions in Table 7-1. Prior to take of any occurrence of legenere, one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of legenere will be preserved and maintained within the Plan Area.

Analysis of Species Conservation

Of the 56 occurrences of legenere, 15 will be preserved in SSHCP Preserves, with 14 inside the UDA (in PPU 1, PPU 2, PPU 3, PP 4) and 1 outside the UDA (PPU 7). Covered Activities will impact 5 documented occurrences, only within the UDA. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area. With implementation of the SSHCP, a minimum of seven occurrences of legenere within the hardline Preserve areas in the UDA (see Section 7.4) will be preserved and maintained in perpetuity; a minimum of seven additional occurrences within the criteria-based Preserve areas in the UDA (in accordance with the Conservation Actions described in Table 7-1) will be preserved and maintained in perpetuity; and prior to take of any occurrence of legenere, one currently unpreserved[14] and "biologically equivalent or superior" (as defined by the TAC) occurrence of legenere will be preserved and maintained within the Plan Area. Preserved occurrences will be located within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If

[14] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for legenere is on preserving known occurrences, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur, or become established in the future. The SSHCP Conservation Strategy will preserve and link approximately 11,615 acres of the highest-quality Seasonal Wetland and Vernal Pool Ecosystem habitat for legenere in the Plan Area. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in or near these Core Recovery Areas, focusing conservation in the areas important for recovery of this species. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves, including spread of non-native plant species or degradation of water quality. Large preserves will protect the subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. Large preserves will also preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools.

By preserving existing populations and modeled habitat of legenere in large, interconnected Preserves that are protected from edge effects, the species will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow via interconnected systems of vernal pools and swales. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of legenere habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

The conservation focus for legenere is focused in PPU 1 and PPU 3 where documented occurrences occur. Three Core Preserves, each including more than 500 acres of legenere modeled habitat (with a combined total of 2,203 acres), will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of

SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

The conservation focus outside the UDA is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. The Landscape Preserve will be established through land acquisitions that are targeted to (1) preserve modeled legenere habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase Preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish approximately 130 acres of legenere modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. Re-establishing pools in historical vernal pool areas will further help to conserve legenere by ensuring no net loss of the total acreage of legenere habitat in the SSHCP Plan Area. All re-establishment and/or established sites for seasonal wetlands will link existing areas of seasonal wetlands and support soils and topography modeled for re-establishing and/or establishing seasonal wetlands. The SSHCP will also preserve a minimum of approximately 105 acres of seasonal wetlands on parcels 20 acres or greater in size and/or sites that occur in larger, open space areas, to the maximum extent feasible.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. The SSHCP Preserve System will link SSHCP Preserves and existing preserves that have modeled legenere modeled habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of seeds through surface flows, predator wastes, wind, and mud carried on the feet of animals). The SSHCP Preserve System will maintain the legenere at its current distribution, and the re-establishment and establishment of additional habitat will assist in maintaining or re-establishing the historical distribution of the

species in the Plan Area. The SSHCP Preserve will establish Core Preserves and Linkage Preserves that will maintain connectivity between existing occurrences and modeled habitat in other SSHCP Preserves and existing preserves in the Plan Area. By establishing large Preserves, the SSHCP will also ensure that connectivity between pools within SSHCP Preserves is maintained.

The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 10,778 acres of the existing 50,973 acres of legenere modeled habitat (i.e., seasonal wetlands and the Vernal Pool Ecosystem) may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated legenere populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area pools and seasonal wetlands remains relatively good. Those pools and seasonal wetlands in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve legenere modeled habitat with a range of vernal pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem. By preserving a range of legenere habitats in the Plan Area, the SSHCP will help legenere persist during expected climate change effects on precipitation and temperature.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of legenere modeled habitat in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit legenere habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the

perched aquifer and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing conditions. These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 objectives will directly benefit legenere from the requirement that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), Stream Setbacks and implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit legenere by ensuring there are selection criteria and re-establishment/establishment criteria for Valley Grassland, Vernal Pool, and Seasonal Wetland (Objective VG1, VP1, VP2, VP3, VP4, VP5, SW1, SW2). Further, Objective VPP2 (Goal 5) will assure the preservation of Boggs Lake hedge-hyssop occurrences and distribution within the Plan Area.

Recovery Plan

As discussed in Section 7.6.3, the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Recovery Plan) includes recovery criteria for Legenere (USFWS 2005a). To conserve this species, the Recovery Plan prioritizes preservation of Vernal Pool Ecosystem within several core areas, including the Mather Core Recovery Area and the Cosumnes/Rancho Seco Core Recovery Area in the Plan Area. SSHCP Covered Activities are anticipated to impact up to approximately 5,913 acres of legenere modeled habitat in the Mather Core Recovery Area and 23 acres in the Cosumnes/Rancho Seco Core Recovery Area (Table 7-27). Total impacts to Core Recovery Areas within the Plan Area are 5,936 acres. The SSHCP Conservation Strategy will preserve and link approximately 4,275 acres of modeled habitat for legenere in the Mather Core Recovery Area and approximately 6,503 acres within the Cosumnes/Rancho Seco Core Recovery Area. Total preservation within Core Recovery Areas within the Plan Area is 10,777 acres.

Table 7-27
Legenere Permanent Effects and Conservation in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	5,756	10,288	5,734	4,087	22	6,201
Vernal Pool	174	473	173	187	1.1	286
Vernal Pool Ecosystem	**5,930**	**10,761**	**5,930**	**4,274**	**23**	**6,487**
Seasonal Wetland	5.5	16	5.5	0.9	0	16
Grand Total	**5,936**	**10,777**	**5,913**	**4,275**	**23**	**6,503**

See Section 7.6.3 for a detailed description of how the SSHCP's Conservation Actions carried out to meet SSHCP Biological Goals and Measurable Objectives will incorporate, or be consistent with, many of the species-specific recovery criteria for the nine Covered Species addressed in the Recovery Plan. The SSHCP provides an alternative Conservation Strategy for preserving vernal pool species habitat and meeting the six recovery criteria listed (see Section 7.6.3).

7.6.2.5 Pincushion Navarretia

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 8,258 acres of pincushion navarretia modeled habitat in the Plan Area. All impacted modeled habitat for pincushion navarretia is within the Vernal Pool Ecosystem, comprising approximately 271 acres of pincushion navarretia modeled aquatic habitat and approximately 7,987 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-28). In all, 98% of impacts to the Vernal Pool Ecosystem will occur in the UDA.

To mitigate these impacts to pincushion navarretia modeled habitats (i.e., the Vernal Pool Ecosystem) and the take of all pincushion navarretia occupying that habitat, the SSHCP will preserve approximately 14,642 acres of Vernal Pool Ecosystem, including 514 acres of Vernal Pool, 183 acres of Swale, and 13,945 acres of Valley Grassland (Table 7-28). The SSHCP will also re-establish and/or establish approximately 141 acres of pincushion navarretia modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-29).

Table 7-28
Permanent Effects and Conservation for Pincushion Navarretia

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	7,987	Qualitative	7,987[a]	13,945	0
Vernal Pool	118	36	154	514	95
Swale	96	21	117	183	46[b]
Vernal Pool Ecosystem	**8,201**	**57**	**8,258**	**14,642**	**141**

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[b] Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool.

Table 7-29
Biological Goals and Measurable Objectives Applicable to Pincushion Navarretia

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, and establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.

Table 7-29
Biological Goals and Measurable Objectives Applicable to Pincushion Navarretia

Applicable Biological Goals	Related Biological Objectives
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPP5.** Prior to take of any occurrence of pincushion navarretia (*Navarretia myersii* ssp. *myersii*), preserve one currently unpreserved[15] and "biologically equivalent or superior" (as defined by the TAC) occurrence of pincushion navarretia within the Plan Area.

Analysis of Species Conservation

Of the 48 documented occurrences of pincushion navarretia in the Plan Area, all are located outside the UDA in PPU 7. No known occurrences of pincushion navarretia are enclosed in the Preserve System, but no known occurrences will be impacted by Covered Activities. Exhaustive surveys for pincushion navarretia have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area. With implementation of the SSHCP under Objective VPP5, prior to take of any

[15] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

occurrence of pincushion navarretia, one currently unpreserved[16] and "biologically equivalent or superior" (as defined by the TAC) occurrence of pincushion navarretia within the Plan Area will be preserved. Preserved occurrences will be located within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for pincushion navarretia is on preserving occurrences as they are discovered, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur, or become established in the future. The SSHCP Conservation Strategy will preserve and link approximately 14,642 acres of the highest-quality habitat for pincushion navarretia in the Plan Area. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in or near these Core Recovery Areas, focusing conservation in the areas important for recovery of this species. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves, including spread of non-native plant species or degradation of water quality. Large preserves will protect the subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. Large preserves will also preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools.

By preserving existing populations and modeled habitat of pincushion navarretia in large, interconnected Preserves that are protected from edge effects, the species will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow via interconnected systems of vernal pools and swales. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of pincushion navarretia habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

[16] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

Three Core Preserves that include a combined total of approximately 1,099 acres of pincushion navarretia modeled habitat will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked within the UDA. However, as discussed in Section 7.5, the conservation focus for pincushion navarretia is focused outside the UDA in PPU 7 where documented occurrences occur. A large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area will connect to and augment existing preserve that is not part of the SSHCP Preserve System. The Landscape Preserve will be established through land acquisitions that are targeted to (1) preserve modeled pincushion navarretia habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase Preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish approximately 141 acres pincushion navarretia modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. Re-establishing vernal pools and swales in historical vernal pool areas will further help to conserve pincushion navarretia by ensuring no net loss of the total acreage of pincushion navarretia habitat in the SSHCP Plan Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning,

the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System.

The SSHCP Preserve System will link SSHCP Preserves and existing preserves that have modeled pincushion navarretia modeled habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of seeds through surface flows, predator wastes, wind, and mud carried on the feet of animals). The SSHCP Preserve System will maintain the pincushion navarretia at its current distribution, and the re-establishment and establishment of additional habitat will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The SSHCP Preserve will establish Core Preserves and Linkage Preserves that will maintain connectivity between existing occurrences and modeled habitat in other SSHCP Preserves and existing preserves in the Plan Area. By establishing large Preserves, the SSHCP will also ensure that connectivity between pools within SSHCP Preserves is maintained.

The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 8,258 acres of the existing 57,438 acres of pincushion navarretia modeled habitat (i.e., the Vernal Pool Ecosystem) may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated pincushion navarretia populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area pools and seasonal wetlands remains relatively good. Those pools and seasonal wetlands in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve pincushion navarretia modeled habitat with a range of vernal pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem. By preserving a range of pincushion navarretia habitats in the Plan Area, the SSHCP will help pincushion navarretia persist during expected climate change effects on precipitation and temperature.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of pincushion navarretia modeled habitat in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit pincushion navarretia habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing conditions. These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 objectives will directly benefit pincushion navarretia from the requirement that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), Stream Setbacks and implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit pincushion navarretia by ensuring there are selection criteria and re-establishment/establishment criteria for Valley Grassland, Vernal Pool, and Swale (Objective VG1, VP1, VP2, VP3, VP4, VP5). Further, Objective VPP2 (Goal 5) will assure the preservation of pincushion navarretia occurrences and distribution within the Plan Area.

7.6.2.6 Sacramento Orcutt Grass

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 7,187 acres of Sacramento Orcutt grass modeled habitat in the Plan Area. All impacted modeled habitat for Sacramento Orcutt grass is within the Vernal Pool Ecosystem, comprising 196 acres of Sacramento Orcutt grass modeled aquatic habitat and 6,991 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-30). These impacts include direct and indirect effects to up to approximately 248 acres of Vernal Pool Ecosystem within Sacramento Orcutt grass Critical Habitat. In all, 98% of impacts to the Vernal Pool Ecosystem will occur in the UDA, including approximately 191 acres of impact to Sacramento Orcutt grass modeled habitat and 6,925 acres of impact to supporting uplands.

To mitigate these impacts to Sacramento Orcutt grass modeled habitats and the take of all Sacramento Orcutt grass occupying that habitat, the SSHCP will preserve approximately 14,459 acres of Vernal Pool Ecosystem, including 514 acres of Vernal Pool and 13,945 acres of Valley Grassland (Table 7-30). The approximately 14,459 acres of preserved Vernal Pool Ecosystem includes 4,001 acres of preservation of Vernal Pool Ecosystem within Sacramento Orcutt grass Critical Habitat (Table 7-31).

Finally, the SSHCP will also re-establish and/or establish approximately 148 acres of Sacramento Orcutt grass modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-32).

Table 7-30
Permanent Effects and Conservation for Sacramento Orcutt Grass

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	6,991	Qualitative	6,991[a]	13,945	0
Vernal Pool	148	48	196	514	148
Vernal Pool Ecosystem	**7,139**	**48**	**7,187**	**14,459**	**148**

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-31
Sacramento Orcutt Grass Permanent Effects and Conservation in Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)		Critical Habitat Unit 2 (acres)		Critical Habitat Unit 3 (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	236	3,867	223	276	13	3,591
Vernal Pool	12	134	12	11	0	123
Vernal Pool Ecosystem	**248**	**4,001**	**235**	**287**	**13**	**3,714**

Table 7-32
Biological Goals and Measurable Objectives Applicable to Sacramento Orcutt Grass

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will

Table 7-32
Biological Goals and Measurable Objectives Applicable to Sacramento Orcutt Grass

Applicable Biological Goals	Related Biological Objectives
	be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.

Table 7-32
Biological Goals and Measurable Objectives Applicable to Sacramento Orcutt Grass

Applicable Biological Goals	Related Biological Objectives
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPP6**. Preserve and maintain in perpetuity all known currently unpreserved occurrences of Sacramento Orcutt grass (*Orcuttia viscida*) in the Plan Area to preserve existing distribution, and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.

Analysis of Species Conservation

There are 40 documented occurrences of Sacramento Orcutt grass distributed in the Plan Area, 30 of which are outside the UDA. Of the 40 occurrences of Sacramento Orcutt grass, 6 will be protected in an SSHCP Preserve. Objective VPP6 requires that all occurrences be preserved; this is a species for which no take of occurrences is allowed so project proponents would be required to avoid occurrences and they would not be impacted. Exhaustive surveys for Sacramento Orcutt grass have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area; however, additional occurrences will be avoided. Before a site is disturbed by a Covered Activity, surveys will be conducted in modeled habitat during the appropriate time of year when Sacramento Orcutt grass is observable. Any occurrences will be preserved by the Project Proponent within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for Sacramento Orcutt grass is on preserving known occurrences, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur or become established in the future. The SSHCP Conservation Strategy will preserve and link approximately 14,459 acres of modeled habitat for

Sacramento Orcutt grass in the Plan Area. In particular, preservation of the Vernal Pool Ecosystem will protect the hydrology and soil conditions necessary for persistence of preserved Sacramento Orcutt grass aquatic habitat. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in or near these Core Recovery Areas, focusing conservation in the areas important for recovery of this species. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves, including spread of non-native plant species or degradation of water quality. Large preserves will protect the subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. Large preserves will also preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools.

By preserving existing populations and modeled habitat of Sacramento Orcutt grass in large, interconnected Preserves that are protected from edge effects, the species will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow via interconnected systems of vernal pools and swales. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of Sacramento Orcutt grass habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

As discussed in Section 7.5, the conservation focus for Sacramento Orcutt grass is focused inside PPU 1, PPU 3, and PPU 7 where documented occurrences occur. Three Core Preserves, each including more than 300 acres of Sacramento Orcutt grass modeled habitat (with a combined total of 1,733 acres), will be established in PPU 1 and PPU 3. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. For example, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

The conservation focus in PPU 7 is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserves that is not part of the SSHCP Preserve System. The Landscape Preserve will be established through land acquisitions that are targeted to (1) preserve occupied Sacramento Orcutt grass habitat, (2) capture desired vernal pool types and supporting uplands, (3) add parcels onto existing preserves that increase Preserve size and minimize habitat fragmentation and edge effects, and (4) provide connections to existing preserves that are currently isolated from each other.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 7,187 acres of the existing 34,492 acres of Sacramento Orcutt grass modeled habitat (i.e., Vernal Pool Ecosystem) may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated Sacramento Orcutt grass populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area pools remains relatively good. Those pools in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve Sacramento Orcutt grass modeled habitat with a range of pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem. By preserving a range of Sacramento Orcutt grass habitats in the Plan Area, the SSHCP will help Sacramento Orcutt grass persist during expected climate change effects on precipitation and temperature.

The preservation of known occurrences and modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish approximately 148 acres of

Sacramento Orcutt grass modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. The re-established and/or established Sacramento Orcutt grass modeled aquatic habitat will be provided appropriate management and monitoring of lands to ensure that habitat remains functional in perpetuity for Sacramento Orcutt grass. This will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area.

The SSHCP Preserve System will link SSHCP Preserves and existing preserves that have Sacramento Orcutt grass modeled habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of seeds through surface flows, predator wastes, wind, and mud carried on the feet of animals). The SSHCP Preserve System will maintain the Sacramento Orcutt grass at its current distribution, and the re-establishment and establishment of additional habitat will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The SSHCP Preserve will establish Core Preserves and Linkage Preserves that will maintain connectivity between these existing occurrences and modeled habitat in other SSHCP Preserves and existing preserves in the Plan Area. By establishing large Preserves, the SSHCP will also ensure that connectivity between vernal pools within SSHCP Preserves is maintained. The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of habitat for Sacramento Orcutt grass protected in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit Sacramento Orcutt grass habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing conditions. These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 objectives will directly benefit Sacramento Orcutt grass from the requirement that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), Stream Setbacks and implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit Sacramento Orcutt grass by ensuring there are selection criteria and re-establishment/establishment criteria for Valley Grassland, Vernal Pool, and Swale (Objective VG1, VP1, VP2, VP3, VP4, VP5). Further, Objective VPP6 (Goal 5) will assure the protection of Sacramento Orcutt grass occurrences and distribution within the Plan Area.

Critical Habitat

As defined in Section 3.6.1, the Vernal Pool Ecosystem includes Valley Grassland and Vernal Pool land cover types, each of which include one or more Primary Constituent Elements (PCEs) that have been defined for Sacramento Orcutt grass (USFWS 2006c). To compensate for impacts to 248 acres of Vernal Pool Ecosystem within Sacramento Orcutt grass Critical Habitat, the SSHCP Conservation Strategy will preserve a total of approximately 4,001 acres of Vernal Pool Ecosystem within Sacramento Orcutt grass Critical Habitat. Of this preservation, 287 acres of Vernal Pool Ecosystem will be preserved in CHU 2 and 3,714 acres in CHU 3. Monitoring and adaptive management under the SSHCP will ensure that the PCEs for Sacramento Orcutt grass are maintained within these CHUs and allow the PCEs to provide their intended conservation function for the species.

Recovery Plan

The SSHCP will be consistent with the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005a), which recommends preserving 100% of documented occurrences. And the SSHCP Conservation Strategy is the equivalent of the Recovery Plan's Species Specific Recovery Criteria for each Core Recovery Area located inside the Plan Area (USFWS 2005a), as described below. Where occurrences exist in locations still suitable for a functioning Core Preserve, these locations will be prioritized for preservation to achieve SSHCP and USFWS (2005a) Recovery Plan conservation goals.

SSHCP Covered Activities are anticipated to impact up to approximately 5,913 acres of Sacramento Orcutt grass modeled habitat in the Mather Core Recovery Area, and approximately 23 acres in the Cosumnes/Rancho Seco Core Recovery Area. To conserve this species, a total of approximately 6,503 acres of Vernal Pool Ecosystem will be preserved within the Cosumnes/Rancho Seco Core Recovery Area and a total of approximately 4,275 acres will be preserved within the Mather Core Recovery Area (Table 7-33). When combined with existing preserves, 80% of the modeled Sacramento Orcutt grass habitat in the Cosumnes/Rancho-Seco Core Recovery Area will be preserved. Although this is less than the 95% habitat preservation

target of the 2005 Recovery Plan, this large preservation area combined with the other elements of the SSHCP Conservation Strategy (e.g., monitoring and adaptive management, preservation of all occurrences) will allow consistency with the 2005 Recovery Plan. When combined with existing preserves, 50% of the modeled Sacramento Orcutt grass habitat in the Mather Core Recovery Area will be preserved.

Table 7-33
Sacramento Orcutt Grass Permanent Effects and Conservation in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	4,558	9,063	4,538	3,273	20	5,790
Vernal Pool	146	374	145	147	1	227
Vernal Pool Ecosystem	**4,704**	**9,437**	**4,683**	**3,420**	**21**	**6,017**

The SSHCP Conservation Strategy is equivalent to implementation of the 2005 Recovery Plan for the Plan Area because it provides an alternative Conservation Strategy for conserving Sacramento Orcutt grass and contains the six elements of recovery. The manner in which the SSHCP achieves this consistency for Sacramento Orcutt grass is discussed in detail in Section 7.6.3.

7.6.2.7 Slender Orcutt Grass

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 7,187 acres of slender Orcutt grass modeled habitat in the Plan Area. All impacted modeled habitat for slender Orcutt grass is within the Vernal Pool Ecosystem, comprising 196 acres of slender Orcutt grass modeled aquatic habitat and 6,991 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-34). These impacts include direct and indirect effects to up to approximately 235 acres of Vernal Pool Ecosystem within slender Orcutt grass Critical Habitat. In all, 98% of impacts to the Vernal Pool Ecosystem will occur in the UDA, including approximately 191 acres of impact to slender Orcutt grass modeled habitat and 6,925 acres of impact to supporting uplands.

To mitigate these impacts to slender Orcutt grass modeled habitats and the take of all slender Orcutt grass occupying that habitat, the SSHCP will preserve approximately 9,710 acres of Vernal Pool Ecosystem, including 378 acres of Vernal Pool and 9,332 acres of Valley Grassland

(Table 7-34). The 9,710 acres of preserved Vernal Pool Ecosystem includes 287 acres of preservation of Vernal Pool Ecosystem within slender Orcutt grass Critical Habitat (Table 7-35).

Finally, the SSHCP will also re-establish and/or establish approximately 148 acres of slender Orcutt grass modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-36).

Table 7-34
Permanent Effects and Conservation for Slender Orcutt Grass

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	6,991	Qualitative	6,991[a]	9,332	0
Vernal Pool	148	48	196	378	148
Vernal Pool Ecosystem	**7,139**	**48**	**7,187**	**9,710**	**148**

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-35
Slender Orcutt Grass Permanent Effects and Conservation in Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)		Critical Habitat Unit 6 (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	223	276	223	276
Vernal Pool	12	11	12	11
Vernal Pool Ecosystem	**235**	**287**	**235**	**287**

Table 7-36
Biological Goals and Measurable Objectives Applicable to Slender Orcutt Grass

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).

Table 7-36
Biological Goals and Measurable Objectives Applicable to Slender Orcutt Grass

Applicable Biological Goals	Related Biological Objectives
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).

Table 7-36
Biological Goals and Measurable Objectives Applicable to Slender Orcutt Grass

Applicable Biological Goals	Related Biological Objectives
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPP7.** Preserve and maintain in perpetuity all known currently unpreserved occurrences of slender Orcutt grass in the Plan Area to preserve existing distribution, and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.

Analysis of Species Conservation

There are four documented occurrences of slender Orcutt grass distributed in the Plan Area, all within the UDA. Three (75%) of the four occurrences will be preserved in an SSHCP Preserve (all inside the UDA in PPU 3). No documented occurrences of slender Orcutt grass will be impacted by currently known Covered Activity project footprints. Further, Objective VPP7 requires that all occurrences of slender Orcutt grass be preserved; this is a species for which no take of occurrences is allowed. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area; however, additional occurrences will be avoided. Before a site is disturbed by a Covered Activity, surveys will be conducted in modeled habitat during the appropriate time of year when slender Orcutt grass is observable. Any occurrences will be preserved by the Project Proponent within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for slender Orcutt grass is on preserving known occurrences, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur, or become established in the future. The SSHCP Conservation Strategy will preserve and link approximately 9,710 acres of modeled habitat for slender Orcutt grass in the Plan Area. In particular, preservation of the Vernal Pool Ecosystem will protect the hydrology and soil conditions necessary for persistence of preserved slender Orcutt grass aquatic habitat. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in or near these Core Recovery Areas, focusing conservation in the areas important for recovery of this species. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will

minimize indirect effects of urban development on the Vernal Pool Ecosystem within Preserves, including spread of non-native plant species or degradation of water quality. Large preserves will protect the subsurface hydrology that supports the Vernal Pool Ecosystem by protecting the perched aquifer from punctures or disruption related to grading and other surface-disturbing activities. Large preserves will also preserve vernal pool surface hydrology by maintaining the connections between swales and vernal pools.

By preserving existing populations and modeled habitat of slender Orcutt grass in large, interconnected Preserves that are protected from edge effects, the species will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow via interconnected systems of vernal pools and swales. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of slender Orcutt grass habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

As discussed in Section 7.5, the conservation focus for slender Orcutt grass is focused inside PPU 1, and PPU 3, where documented occurrences occur. Three Core Preserves, each including more than 300 acres of slender Orcutt grass modeled habitat (with a combined total of 1,733 acres), will be established in PPU 1 and PPU 3. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. For example, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

Although there are no known occurrences of slender Orcutt grass outside the UDA, modeled habitat in the Cosumnes/Rancho-Seco Core Recovery Area where the species might occur would be protected within the large landscape-scale Preserve (at least 10,500 acres) established in PPU 7. The Landscape Preserve will be established through land acquisitions that are targeted to (1) preserve modeled slender Orcutt grass habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase Preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 7,187 acres of the existing 34,492 acres of slender Orcutt grass modeled habitat (i.e., Vernal Pool Ecosystem) may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated slender Orcutt grass populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area pools remains relatively good. Those pools in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve slender Orcutt grass modeled habitat with a range of pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem. By preserving a range of slender Orcutt grass habitats in the Plan Area, the SSHCP will help slender Orcutt grass persist during expected climate change effects on precipitation and temperature.

The preservation of known occurrences and modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish approximately 148 acres of slender Orcutt grass modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. The re-established and/or established slender Orcutt grass modeled aquatic habitat will be provided appropriate management and monitoring of lands to ensure that habitat remains functional in perpetuity for slender Orcutt grass. This will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area.

The SSHCP Preserve System will link SSHCP Preserves and existing preserves that have slender Orcutt grass modeled habitat to help maintain dispersal between vernal pool complexes (e.g.,

dispersal of seeds through surface flows, predator wastes, wind, and mud carried on the feet of animals). The SSHCP Preserve System will maintain the slender Orcutt grass at its current distribution, and the re-establishment and establishment of additional habitat will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The SSHCP Preserve will establish Core Preserves and Linkage Preserves that will maintain connectivity between these existing occurrences and modeled habitat in other SSHCP Preserves and existing preserves in the Plan Area. By establishing large Preserves, the SSHCP will also ensure that connectivity between vernal pools within SSHCP Preserves is maintained. The larger Preserves (Core and Landscape) will facilitate appropriate vegetation management activities that improve functionality of the Vernal Pool Ecosystem as habitat, such as prescribed livestock grazing and prescribed burning. Large preserves make grazing more feasible by not requiring grazing operators to constantly shuttle livestock between disjunct preserve areas, and allow use of prescribed burning by establishing large separations between burn areas inside the preserve and developed areas outside the preserve. Grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' competition with native vernal pool plants and limit their use of water from the perched aquifer.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of habitat for slender Orcutt grass protected in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit slender Orcutt grass habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools and allow filling from surface flows if present. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing conditions. These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 objectives will directly benefit slender Orcutt grass from the requirement that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), Stream Setbacks, and implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit slender Orcutt grass by ensuring there are selection criteria and re-establishment/ establishment criteria for Valley Grassland, Vernal Pool, and Swale (Objective VG1, VP1, VP2, VP3, VP4, VP5).

Further, Objective VPP6 (Goal 5) will assure the protection of slender Orcutt grass occurrences and distribution within the Plan Area.

Critical Habitat

As defined in Section 3.6.1, the Vernal Pool Ecosystem includes Valley Grassland and Vernal Pool land cover types, each of which include one or more PCEs that have been defined for slender Orcutt grass (USFWS 2006c). To compensate for impacts to 235 acres of Vernal Pool Ecosystem within slender Orcutt grass Critical Habitat, the SSHCP Conservation Strategy will preserve a total of approximately 287 acres of Vernal Pool Ecosystem within slender Orcutt grass Critical Habitat, all of which will be preserved in CHU 6. Monitoring and adaptive management under the SSHCP will ensure that the PCEs for slender Orcutt grass are maintained within this CHU, and allow the PCEs to provide their intended conservation function for the species.

Recovery Plan

The SSHCP will be consistent with the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005a), which recommends preserving 100% of documented occurrences. The SSHCP Conservation Strategy is the equivalent of the Recovery Plan's Species-Specific Recovery Criteria for each Core Recovery Area located inside the Plan Area (USFWS 2005a), as described below. Where occurrences exist in locations still suitable for a functioning Core Preserve, these locations will be prioritized for preservation to achieve SSHCP and USFWS (2005a) Recovery Plan conservation goals.

SSHCP Covered Activities are anticipated to impact up to approximately 4,683 acres of slender Orcutt grass modeled habitat in the Mather Core Recovery Area, and approximately 21 acres in the Cosumnes/Rancho Seco Core Recovery Area. To conserve this species, a total of approximately 6,017 acres of Vernal Pool Ecosystem will be preserved within the Cosumnes/Rancho Seco Core Recovery Area and a total of approximately 3,420 acres will be preserved within the Mather Core Recovery Area (Table 7-37). When combined with existing preserves, 80% of the modeled slender Orcutt grass habitat in the Cosumnes/Rancho Seco Core Recovery Area will be preserved. Although this is less than the 95% habitat preservation target of the 2005 Recovery Plan, this large preservation area combined with the other elements of the SSHCP Conservation Strategy (e.g., monitoring and adaptive management, preservation of all occurrences) will allow consistency with the 2005 Recovery Plan. When combined with existing preserves, 50% of the modeled slender Orcutt grass habitat in the Mather Core Recovery Area will be preserved.

Table 7-37
Slender Orcutt Grass Permanent Effects and Conservation in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho-Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	4,558	9,063	4,538	3,273	20	5,790
Vernal Pool	146	374	145	147	1	227
Vernal Pool Ecosystem	**4,704**	**9,437**	**4,683**	**3,420**	**21**	**6,017**

The SSHCP Conservation Strategy is equivalent to implementation of the 2005 Recovery Plan for the Plan Area because it provides an alternative Conservation Strategy for conserving slender Orcutt grass and contains the six elements of recovery. The manner in which the SSHCP achieves this consistency for slender Orcutt grass is discussed in detail in Section 7.6.2.1, Ahart's Dwarf Rush, Recovery Plans.

7.6.2.8 Sanford's Arrowhead

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 10,620 acres of the Sanford's arrowhead modeled habitat in the Plan Area, comprising 103 acres of Freshwater Marsh, 68 acres of Open Water, 72 acres of Seasonal Wetland, 83 acres of Stream/Creek, and 10,294 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-38). In all, 98% of impacts to Sanford's arrowhead modeled habitat will occur in the UDA.

To mitigate these impacts to Sanford's arrowhead modeled habitats and the take of all Sanford's arrowhead occupying that habitat, the SSHCP will preserve approximately 12,089 acres of modeled habitat, including 127 acres of Freshwater Marsh, 23 acres of Open Water, 87 acres of Seasonal Wetland, 117 acres of Stream/Creek, and 11,735 acres of Valley Grassland (Table 7-38). The SSHCP will also re-establish and/or establish approximately 326 acres of Sanford's arrowhead modeled habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-39).

Final South Sacramento Habitat Conservation Plan

Table 7-38
Permanent Habitat Impacts and Conservation for Sanford's Arrowhead

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Freshwater Marsh	103	Qualitative	103	127	103
Open Water	68	Qualitative	68	23[a]	68[b]
Seasonal Wetland	72	Qualitative	72	87	72
Streams/Creeks	83	Qualitative	83	117	83
Valley Grassland	10,294	Qualitative	10,294[c]	11,735	0
GRAND TOTAL	**10,620**	**Qualitative**	**10,620**	**12,089**	**326**

[a] Preservation of Open Water can be achieved by preserving any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

[b] Re-establishment and/or establishment of Open Water can be achieved by re-establishing and/or establishing any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-39
Biological Goals and Measurable Objectives Applicable to Sanford's Arrowhead

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (low-impact development (LID) and ROAD AMMs) • Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).

Table 7-39
Biological Goals and Measurable Objectives Applicable to Sanford's Arrowhead

Applicable Biological Goals	Related Biological Objectives
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W6. Covered Activities will avoid a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA.
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by the Technical Advisory Committee (TAC)). The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.

Table 7-39
Biological Goals and Measurable Objectives Applicable to Sanford's Arrowhead

Applicable Biological Goals	Related Biological Objectives
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective SA1.** Prior to take of an occurrence of Sanford's arrowhead (*Sagittaria sanfordii*), protect one currently unpreserved[17] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Sanford's arrowhead within the Plan Area.
	Objective SA2. During re-establishment and/or establishment of Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek, translocate impacted Sanford's arrowhead (*Sagittaria sanfordii*) from other sites.

Analysis of Species Conservation

Of the 63 documented occurrences of Sanford's arrowhead within the Plan Area, 14 are located inside the UDA and 49 occurrences are located outside the UDA. One of the 63 occurrences of Sanford's arrowhead will be protected in an SSHCP Preserve, and 12 of the documented occurrences will be impacted by UDA Covered Activities. Implementation of Objective SA1 will require that, prior to take of any occurrence of Sanford's arrowhead, one currently unpreserved[18] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Sanford's arrowhead within the Plan Area will be preserved. Exhaustive surveys for this species have not been conducted in the Plan Area or region, and it is likely that additional occurrences will be found in the future in the Plan Area. Preserved occurrences will be located within a minimum satellite-sized Preserve that encloses the entire vernal pool watershed. In addition, surveys will be conducted after the first year of preservation and every 5 years thereafter to

[17] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

[18] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Plan Area.

monitor persistence. If monitoring indicates that the preserved population is not persisting, the Implementing Entity will conduct remediation efforts.

Although the conservation focus for Sanford's arrowhead is on preserving known occurrences, the Preserve System could also benefit this species by preserving modeled habitat where previously unknown occurrences occur, or become established in the future. The SSHCP Conservation Strategy will preserve and link approximately 12,089 acres of modeled habitat for Sanford's arrowhead in the Plan Area. In particular, preservation of Valley Grassland will protect the hydrology and soil conditions necessary for persistence of preserved Sanford's arrowhead aquatic habitat. To the extent possible, SSHCP Preserves will be adjacent to and contiguous with existing preserves, increasing the effective size of the Preserve System. By ensuring SSHCP Preserves are large and/or connected to existing preserves, the Conservation Strategy will minimize indirect effects of urban development on the modeled habitat within Preserves, including spread of non-native plant species or degradation of water quality.

Sanford's arrowhead conservation will focus on preservation/re-establishment/establishment sites that will provide the necessary hydrologic parameters, seed, tuber/rhizome fragment dispersal, and colonization of available now-unoccupied emergent marsh sites. Sanford's arrowhead preservation inside the UDA will focus on areas along the Laguna Creek Wildlife Movement Corridor. Except where prevented by existing development, the Laguna Creek Wildlife Movement Corridor will have on average a minimum width of 600 feet. This stream riparian corridor will include preserved freshwater marsh as well as mixed riparian scrub and mixed riparian woodland. In addition to preserving existing Sanford's arrowhead populations, the stream riparian corridor will include re-establishment and/or establishment of these habitats at a 1:1 ratio along reaches with suitable soils and landforms. Areas targeted for re-establishment/establishment will include Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek that provide opportunities for establishing new occurrences of Sanford's arrowhead, as well as opportunities for dispersal and colonization of nearby modeled habitat.

Conservation of Sanford's arrowhead habitat outside the UDA will focus on areas in stream riparian corridors, marshes, and other areas that are modeled habitat for this species. Areas that will be the focus of habitat Preserves include Cosumnes River, Deer Creek, Badger Creek, Willow Creek, Laguna Creek south, Brown Creek, and Skunk Creek. Select portions of Bear Slough, Cosumnes Slough, Deadman's Gulch, Griffith Creek, Hadselville Creek, North Fork Badger Creek, Rolling Draw Creek, Windmill Creek, and unnamed creeks and drainage canals also will be considered. The goal within Sanford's arrowhead habitat will be to maintain, on average, a minimum stream riparian corridor width of 600 feet with, on average, 300 feet on both sides of the stream. A corridor width of this size is expected to protect streams and associated habitats from adverse effects by adjacent land uses. Stream reaches that currently support associated Freshwater Marsh or that could be restored to this habitat type will be the focus of

preservation efforts. Through management and monitoring, the Preserve will continue to provide existing functions and values and may exceed the existing condition.

By preserving existing populations and modeled habitat of Sanford's arrowhead in large, interconnected Preserves that are protected from edge effects, the species will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via pollinators and inadvertent tracking of seeds through water flow. The larger Preserves will also facilitate appropriate vegetation management activities that improve functionality of Sanford's arrowhead habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish approximately 326 acres of Sanford's arrowhead modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of approximately 10,620 acres of the existing 52,823 acres of Sanford's arrowhead modeled habitat may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated Sanford's arrowhead populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance. This is less likely in the Plan Area than in other regions because connectivity within Plan Area modeled habitat remains relatively good. Those areas in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic

diversity and species distribution, the SSHCP will preserve Sanford's arrowhead modeled habitat with a range of modeled habitat types within the Plan Area.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of habitat for Sanford's arrowhead protected in the Preserve System will ensure that modeled habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit Sanford's arrowhead habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3), monitoring objectives (HAB5, HAB7), and invasive species eradication on Preserves (Objective HAB4). These actions will result in higher overall reproductive success and productivity of the Plan Area population.

In addition, as discussed in Section 7.3.2, SSHCP Biological Goals and Measurable Objectives, Goal 2 objectives will directly benefit Sanford's arrowhead from the requirement that aquatic resources are re-established/established or preserved and managed in perpetuity (Objective W4, W5), Stream Setbacks and implementation of AMMs (Objective W2, W3). Goal 3 objectives will directly benefit Sanford's arrowhead by ensuring there are selection criteria and re-establishment/ establishment criteria for Valley Grassland, Freshwater Marsh, Seasonal Wetland, Open Water, and Stream/Creek (Objective VG1, FWM1, FWM2, SW1, SW2, OW1, OW2, SC1, SC2). Further, Objective SA1 (Goal 5) will assure the preservation of Sanford's arrowhead occurrences and distribution within the Plan Area.

7.6.2.9 Vernal Pool Fairy Shrimp

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 17,259 acres of vernal pool fairy shrimp modeled habitat in in the Plan Area. All impacted modeled habitat for vernal pool fairy shrimp is within the Vernal Pool Ecosystem, comprising 787 acres of vernal pool fairy shrimp modeled aquatic habitat and 16,472 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-40). These impacts include direct and indirect effects to up to 746 acres of Vernal Pool Ecosystem within vernal pool fairy shrimp Critical Habitat. The majority of impacts to the Vernal Pool Ecosystem (98%) occur in the UDA, including 741 acres of impact to vernal pool fairy shrimp modeled aquatic habitat and 16,186 acres of impact to supporting uplands. The SSHCP assumes that all modeled aquatic habitat is occupied by vernal pool fairy shrimp, and thus impacts to known occurrences are not analyzed.

To mitigate these impacts to vernal pool fairy shrimp modeled habitats and the take of all vernal pool fairy shrimp occupying that habitat, the SSHCP preserves 23,284 acres of Vernal Pool Ecosystem, including 966 acres of Vernal Pool, 278 acres of Swale, 26 acres of Stream/Creek

(VPIH) and 22,014 acres of Valley Grassland (Table 7-40). The 22,414 acres of preserved Vernal Pool Ecosystem includes 11,920 acres of preservation that will occur within the Vernal Pool Ecosystem that is within vernal pool fairy shrimp Critical Habitat (Table 7-41).

Finally, the SSHCP will also re-establish and/or establish 645 acres of vernal pool fairy shrimp modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-42).

Table 7-40
Permanent Effects and Conservation for Vernal Pool Fairy Shrimp

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	16,472	Qualitative	16,472 [a]	22,014	0
Vernal Pool	389	94	483	966	389
Swale	234	44	278	278	256[b]
Stream/Creek(VPIH)	22	4	26	26	0[c]
Vernal Pool Ecosystem	**17,117**	**142**	**17,259**	**23,284**	**645**

[a] Total impacts to Valley Grassland include an unknown but small amount of indirect impact that was analyzed qualitatively in Chapter 6.
[b] Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool.
[c] Re-establishment/establishment to mitigate direct effects to 22 acres of Stream/Creek (VPIH) will be in the form of Swale, which has been added to the 234 acres necessary to mitigate direct effects to swale.

Table 7-41
Permanent Effects and Preservation for Vernal Pool Fairy Shrimp Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)		Critical Habitat Unit 13 (acres)		Critical Habitat Unit 14a (acres)		Critical Habitat Unit 14b (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	707	11,219	663	439	44	10,775	0	5
Vernal Pool	25	539	19	12	6	527	0	0
Swale	10	155	9	6	1	149	0	0
Stream/Creek (VPIH)	4	7	4	7	0	0	0	0
Vernal Pool Ecosystem	**746**	**11,920**	**695**	**464**	**51**	**11,451**	**0**	**5**

Table 7-42
Biological Goals and Measurable Objectives Applicable to Vernal Pool Fairy Shrimp

Applicable Biological Goals	Related Biological Measurable Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of

Table 7-42
Biological Goals and Measurable Objectives Applicable to Vernal Pool Fairy Shrimp

Applicable Biological Goals	Related Biological Measurable Objectives
Covered Species within the Plan Area.	the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4 • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.

Table 7-42
Biological Goals and Measurable Objectives Applicable to Vernal Pool Fairy Shrimp

Applicable Biological Goals	Related Biological Measurable Objectives
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland, and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPI2.** Protect and maintain in perpetuity 1,270 acres of vernal pool fairy shrimp *(Branchinecta lynchi)* modeled aquatic habitat within the Plan Area to preserve existing distribution.
	Objective VPI5. Ensure that during implementation of Objective VP2, re-established and/or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/establishment, in accordance with Conservation Actions in Table 7-1.

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link 23,284 acres of the highest-quality habitat for vernal pool fairy shrimp in the Plan Area. In particular, preservation of the Vernal Pool Ecosystem will protect the hydrology and soil conditions necessary for persistence of preserved vernal pool fairy shrimp aquatic habitat.

The Conservation Strategy for vernal pool fairy shrimp targets preservation of vernal pool fairy shrimp habitat within Core Recovery Areas and Critical Habitat. These areas have been identified by the Wildlife Agencies as having the highest priority for preservation. Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho- Seco Core Recovery Area will be mitigated through preservation in these Core Recovery Areas. In addition, many impacts occurring outside the Core Recovery Areas will be mitigated within or near the Core Recovery Areas. This mitigation focus will provide improved conservation for the species as compared to the existing project-by-project permitting.

As discussed in Section 7.5, the conservation focus outside the UDA is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. This Landscape Preserve will encompass a heterogeneous range of natural land covers and soil types associated with the Vernal Pool Ecosystem in the Plan Area. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves. Required selection criteria for vernal pool fairy shrimp preserved habitat are listed in Conservation Action VPI1.1 and VPI1.2, and will assure that appropriate vernal pool densities, soil types, geology, adjacent modeled habitat, and other factors are included in the SSHCP Preserve System. By preserving a range of vernal pool fairy shrimp aquatic habitats in the Plan Area, the SSHCP will help vernal pool fairy shrimp persist during expected climate change effects on precipitation and temperature.

The Landscape Preserve will be established through land acquisitions that are targeted to (1) protect occupied vernal pool fairy shrimp habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

Three Core Preserves, each including more than 500 acres of modeled vernal pool fairy shrimp habitat, will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked together within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. Further, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from locating new SSHCP Preserves next to existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between SSHCP Preserves and existing preserves would be minimal or would not occur at all.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. By preserving existing populations of vernal pool fairy shrimp in large, interconnected Preserves that are protected from edge effects, the shrimp will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via inadvertent tracking of cysts and through water flow via interconnected systems of vernal pool, swale, and stream/creek (VPIH). The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of vernal pool fairy shrimp habitat, like prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of 17,259 acres of the existing 103,210 acres of vernal pool fairy shrimp modeled habitat (i.e., Vernal Pool Ecosystem), especially the removal or modification of 8,500 acres within the Mather Core Recovery Area, may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated vernal pool fairy shrimp populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance (Simovich 1998). This is less likely in the Plan Area than in other regions as connectivity within Plan Area pools remains relatively good. Those pools in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve vernal pool fairy shrimp modeled habitat with a range of pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish 645 acres of vernal pool fairy shrimp

modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. All re-establishment and establishment sites will be inoculated with inoculum from the impact or other representative sites, which will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The effectiveness of inoculation will be monitored through a special study, as described in Section 8.3.3.5. Re-establishing pools in historical vernal pool areas will further help to conserve vernal pool fairy shrimp by ensuring no net loss of the total acreage of vernal pool fairy shrimp aquatic habitat in the Plan Area.

The SSHCP Preserve System will link together SSHCP Preserves and existing preserves that have modeled vernal pool fairy shrimp habitat, to help maintain dispersal between vernal pool complexes (e.g., dispersal of cysts through surface flows, predator wastes, wind, and mud carried on the feet of animals). For example, 12 documented occurrences for vernal pool fairy shrimp are located in existing preserves in PPU 1, which would be linked together under the SSHCP by Core Preserves, Linkage Preserves, and Satellite Preserves to other existing preserves in PPUs 1, 2, and 3. By establishing large Preserves, the SSHCP will also ensure that connectivity between pools within Preserves is maintained.

As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for vernal pool fairy shrimp protected in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit vernal pool fairy shrimp habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3, HAB5) and invasive species eradication on Preserves (Objective HAB4). Further, effectiveness monitoring of the Conservation Strategy for vernal pool fairy shrimp will include a special study to investigate indirect effects of development on vernal pool crustaceans. The results of that study will inform adaptive management of SSHCP Condition 2 AMMs, as well as adaptive management of SSHCP Preserves. As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool fairy shrimp habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools, and allow filling from surface flows if present.

Critical Habitat

As defined in Section 3.2.3, the Vernal Pool Ecosystem includes Valley Grassland, Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types, each of which include one or more PCEs that have been defined for vernal pool fairy shrimp (USFWS 2006c). The SSHCP Conservation Strategy will preserve a total of 11,920 acres of Vernal Pool Ecosystem within vernal pool fairy shrimp Critical Habitat. Of this preservation, 464 acres of Vernal Pool Ecosystem will be

preserved in CHU 13, 11,451 acres in CHU 14a, and 5 acres in CHU 14b. Monitoring and adaptive management under the SSHCP will ensure that the PCEs for vernal pool fairy shrimp are maintained within these CHUs, and allow the PCEs to provide their intended conservation function for the species.

Recovery Plan

SSHCP Covered Activities are anticipated to impact up to approximately 8,500 acres of vernal pool fairy shrimp modeled habitat in the Mather Core Recovery Area, and approximately 53 acres in the Cosumnes/Rancho Seco Core Recovery Area. To conserve this species, a total of approximately 15,294 acres of Vernal Pool Ecosystem will be preserved within the Cosumnes/Rancho Seco Core Recovery Area and a total of approximately 5,484 acres will be preserved within the Mather Core Recovery Area (Table 7-43). When combined with existing preserves that are not part of the SSHCP Preserve System, more than 99% of the modeled vernal pool fairy shrimp habitat in the Cosumnes/Rancho Seco Core Recovery Area will be preserved, consistent with the 80% target of the 2005 Recovery Plan. When combined with existing preserves that are not part of the SSHCP Preserve System, 48% of the modeled vernal pool fairy shrimp habitat in the Mather Core Recovery Area will be preserved.

Table 7-43
Permanent Effects and Conservation in Core Recovery Areas for Vernal Pool Fairy Shrimp

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	8,164	19,557	8,118	5,155	46	14,402
Vernal Pool	222	916	216	213	6	703
Swale	151	279	150	90	1	189
Stream/Creek (VPIH)	16	26	16	26	0	0
Vernal Pool Ecosystem	**8,553**	**20,778**	**8,500**	**5,484**	**53**	**15,294**

The SSHCP Conservation Strategy is equivalent to implementation of the 2005 Recovery Plan for the Plan Area because it provides an alternative conservation strategy for conserving vernal pool fairy shrimp and contains the six elements of Recovery. The manner in which the SSHCP achieves this consistency for vernal pool fairy shrimp is discussed in detail in Section 7.6.3.

7.6.2.10 Mid-Valley Fairy Shrimp

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 12,639 acres of mid-valley fairy shrimp modeled habitat in the Plan Area. All impacted modeled habitat for mid-valley fairy shrimp is within the Vernal Pool Ecosystem, comprising 633 acres of mid-valley fairy shrimp modeled aquatic habitat and 12,006 acres of surrounding uplands (valley grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-44). The majority of impacts to the Vernal Pool Ecosystem (98%) occur in the UDA, including 625 acres of impact to mid-valley fairy shrimp modeled aquatic habitat and 11,799 acres of impact to supporting uplands. The SSHCP assumes that all modeled aquatic habitat is occupied by mid-valley fairy shrimp, and thus impacts to known occurrences are not analyzed.

To mitigate these impacts to mid-valley fairy shrimp modeled habitats and the take of all mid-valley fairy shrimp occupying that habitat, the SSHCP preserves 11,297 acres of Vernal Pool Ecosystem, including 603 acres of Vernal Pool, 201 acres of Swale, and 10,493 acres of Valley Grassland (Table 7-44).

Finally, the SSHCP will also re-establish and/or establish 546 acres of mid-valley fairy shrimp modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-45).

Table 7-44
Permanent Effects and Conservation for Mid-Valley Fairy Shrimp

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	12,006	Qualitative	12,006 [a]	10,493	0
Vernal Pool	337	71	408	603	336
Swale	190	35	225	201	210[b]
Vernal Pool Ecosystem	**12,533**	**106**	**12,639**	**11,297**	**546**

[a] Total impacts to Valley Grassland include an unknown but small amount of indirect impact that was analyzed qualitatively in Chapter 6.
[b] Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool.
[c] Re-establishment/establishment to mitigate direct effects to 20 acres of Stream/Creek (VPIH) will be in the form of Swale, which has been added to the 190 acres necessary to mitigate direct effects to swale.

Table 7-45
Biological Goals and Measurable Objectives Applicable to Mid-Valley Fairy Shrimp

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes

Table 7-45
Biological Goals and Measurable Objectives Applicable to Mid-Valley Fairy Shrimp

Applicable Biological Goals	Related Biological Objectives
Species within the Plan Area.	or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the

Table 7-45
Biological Goals and Measurable Objectives Applicable to Mid-Valley Fairy Shrimp

Applicable Biological Goals	Related Biological Objectives
	Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPI3.** Protect and maintain in perpetuity 1,059 acres of mid-valley fairy shrimp (*Branchinecta mesovallensis*) modeled aquatic habitat within the Plan Area to preserve existing distribution.
	Objective VPI5. Ensure that during implementation of Objective VP2, re-established and/or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/establishment, in accordance with Conservation Actions in Table 7-1.

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link 11,397 acres of the highest-quality habitat for mid-valley fairy shrimp in the Plan Area. In particular, preservation of the Vernal Pool Ecosystem will protect the hydrology and soil conditions necessary for persistence of preserved mid-valley fairy shrimp aquatic habitat.

The Conservation Strategy for mid-valley fairy shrimp targets preservation of mid-valley fairy shrimp habitat within Core Recovery Areas. These areas have been identified by the Wildlife Agencies as having the highest priority for preservation. Impacts to mid-valley fairy shrimp occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in these Core Recovery Areas, providing improved conservation for the species as compared to the existing project-by-project permitting.

As discussed in Section 7.5, the conservation focus outside the UDA is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. This Landscape Preserve will encompass a heterogeneous range of natural land covers and soil types associated with the Vernal Pool Ecosystem in the Plan Area. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves. Required selection criteria for mid-valley fairy shrimp preserved habitat are listed in Conservation Action VPI1.1, and will assure that appropriate vernal pool densities, soil types, geology, adjacent modeled habitat, and other factors are included in the SSHCP Preserve System. By preserving a range of mid-valley fairy shrimp aquatic habitats in the Plan Area, the SSHCP will help mid-valley fairy shrimp persist during expected climate change effects on precipitation and temperature.

The Landscape Preserve will be established through land acquisitions that are targeted to (1) protect occupied mid-valley fairy shrimp habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

Three Core Preserves, each including more than 500 acres of modeled mid-valley fairy shrimp habitat, will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked together within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. Further, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved

vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs, in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. By preserving existing populations of mid-valley fairy shrimp in large, interconnected Preserves that are protected from edge effects, the shrimp will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via inadvertent tracking of cysts and through water flow via interconnected systems of vernal pool, swale, and stream/creek (VPIH). The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of mid-valley fairy shrimp habitat, such as prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of 12,639 acres of the existing 53,698 acres of mid-valley fairy shrimp modeled habitat (i.e. Vernal Pool Ecosystem), especially the removal or modification of 6,280 acres within the Mather Core Recovery Area, may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated mid-valley fairy shrimp populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance (Simovich 1998). This is less likely in the Plan Area than in other regions as connectivity within Plan Area pools remains relatively good. Those pools in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve mid-valley fairy shrimp modeled habitat with a range of pool sizes, soil types, geologic landforms, and

locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish 546 acres of mid-valley fairy shrimp modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. All re-establishment and establishment sites will be inoculated with inoculum from the impact or other representative sites, which will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The effectiveness of inoculation will be monitored through a special study, as described in Section 8.3.3.5. Re-establishing pools in historical vernal pool areas will further help to conserve mid-valley fairy shrimp by ensuring no net loss of the total acreage of mid-valley fairy shrimp aquatic habitat in the Plan Area.

The SSHCP Preserve System will link together SSHCP Preserves and existing preserves that have modeled mid-valley fairy shrimp habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of cysts through surface flows, predator wastes, wind, and mud carried on the feet of animals). For example, seven documented occurrences for mid-valley fairy shrimp are located in existing preserves in PPU 3, which would be linked together under the SSHCP by Core Preserves and Linkage Preserves to other existing preserves in PPU 2. By establishing large Preserves, the SSHCP will also ensure that connectivity between pools within Preserves is maintained.

As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for mid-valley fairy shrimp protected in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit mid-valley fairy shrimp habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3, HAB5) and invasive species eradication on Preserves (Objective HAB4). Further, effectiveness monitoring of the Conservation Strategy for mid-valley fairy shrimp will include a special study to investigate indirect effects of development on vernal pool crustaceans. The results of that study will inform adaptive management of SSHCP Condition 2 AMMs, as well as adaptive management of SSHCP Preserves. As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools, and allow filling from surface flows if present.

Recovery Plan

SSHCP Covered Activities are anticipated to impact up to approximately 6,280 acres of mid-valley fairy shrimp modeled habitat in the Mather Core Recovery Area, and approximately 41 acres in the Cosumnes/Rancho Seco Core Recovery Area. To conserve this species, a total of approximately 5,392 acres of Vernal Pool Ecosystem will be preserved within the Cosumnes/Rancho Seco Core Recovery Area and a total of approximately 4,737 acres will be preserved within the Mather Core Recovery Area (Table 7-46). When combined with existing preserves that are not part of the SSHCP Preserve System, 77% of the modeled mid-valley fairy shrimp habitat in the Cosumnes/Rancho Seco Core Recovery Area will be preserved, nearly reaching the 80% target of the 2005 Recovery Plan. When combined with existing preserves that are not part of the SSHCP Preserve System, 52% of the modeled mid-valley fairy shrimp habitat in the Mather Core Recovery Area will be preserved.

Table 7-46
Permanent Effects and Conservation in Core Recovery Areas for Mid-Valley Fairy Shrimp

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	6,009	9,388	5,975	4,352	34	5,036
Vernal Pool	182	535	176	250	6	285
Swale	117	177	116	106	1	71
Stream/Creek (VPIH)	13	29	13	29	0	0
Vernal Pool Ecosystem	**6,321**	**10,129**	**6,280**	**4,737**	**41**	**5,392**

The SSHCP Conservation Strategy is equivalent to implementation of the 2005 Recovery Plan for the Plan Area because it provides an alternative conservation strategy for conserving mid-valley fairy shrimp and contains the six elements of recovery. The manner in which the SSHCP achieves this consistency for mid-valley fairy shrimp is discussed in detail in Section 7.6.3.

7.6.2.11 Vernal Pool Tadpole Shrimp

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 17,259 acres of vernal pool tadpole shrimp modeled habitat in the Plan Area. All impacted modeled habitat for vernal pool tadpole shrimp is within the Vernal Pool Ecosystem, comprising 787 acres of vernal pool tadpole shrimp modeled aquatic habitat and 16,472 acres of surrounding uplands (Valley Grassland) needed to support continued habitat

functions and values of the aquatic habitats (Table 7-47). These impacts include direct and indirect effects to approximately 746 acres of Vernal Pool Ecosystem within vernal pool tadpole shrimp Critical Habitat. The majority of impacts to the Vernal Pool Ecosystem (98%) occur in the UDA, including 741 acres of impact to vernal pool fairy shrimp modeled aquatic habitat and 16,186 acres of impact to supporting uplands. The SSHCP assumes that all modeled aquatic habitat is occupied by vernal pool tadpole shrimp, and thus impacts to known occurrences are not analyzed.

To mitigate these impacts to vernal pool tadpole shrimp modeled habitats and the take of all vernal pool tadpole shrimp occupying that habitat, the SSHCP preserves 23,284 acres of Vernal Pool Ecosystem, including 966 acres of Vernal Pool, 278 acres of Swale, 26 acres of Stream/Creek (VPIH), and 22,014 acres of Valley Grassland (Table 7-47). The 23,284 acres of preserved Vernal Pool Ecosystem includes 11,920 acres of preservation of Vernal Pool Ecosystem within vernal pool tadpole shrimp Critical Habitat (Table 7-48).

Finally, the SSHCP will also re-establish and/or establish 645 acres of vernal pool tadpole shrimp modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-49).

Table 7-47
Permanent Effects and Conservation for Vernal Pool Tadpole Shrimp

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	16,472	Qualitative	16,472[a]	22,014	0
Vernal Pool	389	94	483	966	389
Swale	234	44	278	278	256[b]
Stream/Creek (VPIH)	22	4	26	26	0[c]
Vernal Pool Ecosystem	**17,117**	**142**	**17,259**	**23,284**	**645**

[a] Total impacts to Valley Grassland include an unknown but small amount of indirect impact that was analyzed qualitatively in Chapter 6.
[b] Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool.
[c] Re-establishment/establishment to mitigate direct effects to 22 acres of Stream/Creek (VPIH) will be in the form of Swale, which has been added to the 234 acres necessary to mitigate direct effects to Swale.

Table 7-48
Permanent Effects and Preservation for Vernal Pool Tadpole Shrimp Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)		Critical Habitat Unit 8 (acres)		Critical Habitat Unit 9a (acres)		Critical Habitat Unit 9b (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	707	11,219	663	439	0	5	44	10,775
Vernal Pool	25	539	19	12	0	0	6	527
Swale	10	155	9	6	0	0	1	149
Stream/Creek (VPIH)	4	7	4	7	0	0	0	0
Vernal Pool Ecosystem	**746**	**11,920**	**695**	**464**	**0**	**5**	**51**	**11,451**

Table 7-49
Biological Goals and Measurable Objectives Applicable to Vernal Pool Tadpole Shrimp

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of

Table 7-49
Biological Goals and Measurable Objectives Applicable to Vernal Pool Tadpole Shrimp

Applicable Biological Goals	Related Biological Objectives
	freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland, and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPI1.** Protect and maintain in perpetuity 1,270 acres of vernal pool tadpole shrimp modeled aquatic habitat within the Plan Area to preserve existing distribution.
	Objective VPI5. Ensure that during implementation of Objective VP2, re-established and/or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/establishment, in accordance with Conservation Actions in Table 7-1.

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link 23,284 acres of the highest-quality habitat for vernal pool tadpole shrimp in the Plan Area. In particular, preservation of the Vernal Pool Ecosystem will protect the hydrology and soil conditions necessary for persistence of preserved vernal pool tadpole shrimp aquatic habitat.

The Conservation Strategy for vernal pool tadpole shrimp targets preservation of vernal pool tadpole shrimp habitat within Core Recovery Areas and Critical Habitat. These areas have been identified by the Wildlife Agencies as having the highest priority for preservation.

Objective VP1b requires that impacts occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in these Core Recovery Areas, providing improved conservation for the species as compared to the existing project-by-project permitting.

As discussed in Section 7.5, the conservation focus outside the UDA is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. This Landscape Preserve will encompass a heterogeneous range of natural land covers and soil types associated with the Vernal Pool Ecosystem in the Plan Area. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, thus making a larger-scale contiguous Preserve System. Required selection criteria for vernal pool tadpole shrimp preserved habitat are listed in Conservation Action VPI1.1, and will ensure that appropriate vernal pool densities, soil types, geology, adjacent modeled habitat, and other factors are included in the SSHCP Preserve System. By preserving a range of vernal pool tadpole shrimp aquatic habitats in the Plan Area, the SSHCP will help vernal pool tadpole shrimp persist during expected climate change effects on precipitation and temperature.

The Landscape Preserve will be established through land acquisitions that are targeted to (1) protect occupied vernal pool tadpole shrimp habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

Three Core Preserves, each including more than 500 acres of modeled vernal pool tadpole shrimp habitat, will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked together within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves will be

adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. Further, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. By preserving existing populations of vernal pool tadpole shrimp in large, interconnected Preserves that are protected from edge effects, the shrimp will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via inadvertent tracking of cysts and through water flow via interconnected systems of vernal pool, swale, and stream/creek (VPIH). The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of vernal pool tadpole shrimp habitat, such as prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of 17,259 acres of the existing 103,210 acres of vernal pool tadpole shrimp modeled habitat (i.e., Vernal Pool Ecosystem), especially the removal or modification of 8,500 acres within the Mather Core Recovery Area may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated vernal pool tadpole shrimp populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance (Simovich 1998). This is less likely in the Plan Area than in other regions as connectivity within Plan Area pools remains relatively good. Those pools in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve

vernal pool tadpole shrimp modeled habitat with a range of pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish 645 acres of vernal pool tadpole shrimp modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. All re-establishment and establishment sites will be inoculated with inoculum from the impact or other representative sites, which will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The effectiveness of inoculation will be monitored through a special study, as described in Section 8.3.3.5.

The SSHCP Preserve System will link together SSHCP Preserves and existing preserves that have modeled vernal pool tadpole shrimp habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of cysts through surface flows, predator wastes, wind, and mud carried on the feet of animals). For example, 21 known occurrences for vernal pool tadpole shrimp are located in existing preserves in PPU 2, which would be linked together under the SSHCP by Core Preserves and Linkage Preserves to other existing preserves in PPU 3. By establishing large Preserves, the SSHCP will also ensure that connectivity between vernal pools within SSHCP Preserves is maintained.

As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for vernal pool tadpole shrimp protected in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit vernal pool tadpole shrimp habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3, HAB5), and invasive species eradication on Preserves (Objective HAB4). Further, effectiveness monitoring of the Conservation Strategy for vernal pool tadpole shrimp will include a special study to investigate indirect effects of development on vernal pool crustaceans. The results of that study will inform adaptive management of SSHCP Condition 2 AMMs, as well as adaptive management of SSHCP Preserves. As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools, and allow filling from surface flows if present.

Critical Habitat

As defined in Section 3.2.3, the Vernal Pool Ecosystem includes Valley Grassland, Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types, each of which include one or more PCEs that have been defined for vernal pool tadpole shrimp (USFWS 2006c). The SSHCP Conservation Strategy will preserve a total of 11,920 acres of Vernal Pool Ecosystem within vernal pool tadpole shrimp Critical Habitat. Of this preservation, 464 acres of Vernal Pool Ecosystem will be preserved in CHU 8, 5 acres in CHU 9a, and 11,451 acres in CHU 9b. Monitoring and adaptive management under the SSHCP will ensure that the PCEs for vernal pool tadpole shrimp are maintained within these CHUs, and allow the PCEs to provide their intended conservation function for the species.

Recovery Plan

SSHCP Covered Activities are anticipated to impact up to approximately 8,500 acres of vernal pool tadpole shrimp modeled habitat in the Mather Core Recovery Area, and approximately 53 acres in the Cosumnes/Rancho Seco Core Recovery Area. To conserve this species, a total of approximately 15,294 acres of Vernal Pool Ecosystem will be preserved within the Cosumnes/Rancho Seco Core Recovery Area and a total of approximately 5,484 acres will be preserved within the Mather Core Recovery Area (Table 7-50). When combined with existing preserves that are not part of the SSHCP Preserve System, 83% of the modeled vernal pool tadpole shrimp habitat in the Cosumnes/Rancho Seco Core Recovery Area will be preserved, consistent with the 80% target of the 2005 Recovery Plan. When combined with existing preserves that are not part of the SSHCP Preserve System, 46% of the modeled vernal pool tadpole shrimp habitat in the Mather Core Recovery Area will be preserved.

Table 7-50
Permanent Effects and Conservation in Core Recovery Areas for Vernal Pool Tadpole Shrimp

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)		Mather Core Area (acres)		Cosumnes/Rancho-Seco Core Area (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Valley Grassland	8,164	19,557	8,118	5,155	46	14,402
Vernal Pool	222	916	216	213	6	703
Swale	151	279	150	90	1	189
Stream/Creek (VPIH)	16	26	16	26	0	0
Vernal Pool Ecosystem	**8,553**	**20,778**	**8,500**	**5,484**	**53**	**15,294**

The SSHCP Conservation Strategy is an acceptable alternative to implementation of the 2005 Recovery Plan (refer to Section 7.6.3).

7.6.2.12 Ricksecker's Water Scavenger Beetle

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 17, 233 acres of Ricksecker's water scavenger beetle modeled habitat in the Plan Area. All impacted modeled habitat for Ricksecker's water scavenger beetle is within the Vernal Pool Ecosystem, comprising 761 acres of Ricksecker's water scavenger beetle modeled aquatic habitat and 16,472 acres of surrounding uplands (Valley Grassland) needed to support continued habitat functions and values of the aquatic habitats (Table 7-51). The majority of impacts to the Vernal Pool Ecosystem (98%) occur in the UDA, including 715 acres of impact to Ricksecker's water scavenger beetle modeled aquatic habitat and 16,186 acres of impact to supporting uplands. The SSHCP assumes that all modeled aquatic habitat is occupied by Ricksecker's water scavenger beetle, and thus impacts to known occurrences are not analyzed.

To mitigate these impacts to Ricksecker's water scavenger beetle modeled habitats and the take of all Ricksecker's water scavenger beetle occupying that habitat, the SSHCP preserves approximately 23,258 acres of Vernal Pool Ecosystem, including 966 acres of Vernal Pool, 278 acres of Swale, and 22,014 acres of Valley Grassland (Table 7-51).

Finally, the SSHCP will also re-establish and/or establish 623 acres of Ricksecker's water scavenger beetle modeled aquatic habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-52).

Table 7-51
Permanent Effects and Conservation for Ricksecker's Water Scavenger Beetle

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	16,472	Qualitative	16,472 [a]	22,014	0
Vernal Pool	389	94	483	966	389
Swale	234	44	278	278	234[b]
Vernal Pool Ecosystem	**17,095**	**138**	**17,233**	**23,258**	**623**

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[b] Swale re-establishment/establishment may occur in the form of any combination of Swale or Vernal Pool.

Table 7-52
Biological Goals and Measurable Objectives Applicable to Ricksecker's Water Scavenger Beetle

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the

Table 7-52
Biological Goals and Measurable Objectives Applicable to Ricksecker's Water Scavenger Beetle

Applicable Biological Goals	Related Biological Objectives
	Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VPI4.** Protect and maintain in perpetuity 1,245 acres of Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i) modeled aquatic habitat within the Plan Area to preserve existing distribution.
	Objective VPI5. Ensure that during implementation of Objective VP2, re-established and/or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/establishment, in accordance with Conservation Actions in Table 7-1.

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link 23,258 acres of the highest-quality habitat for Ricksecker's water scavenger beetle in the Plan Area. In particular, preservation of the Vernal Pool Ecosystem will protect the hydrology and soil conditions necessary for persistence of preserved Ricksecker's water scavenger beetle aquatic habitat.

Although the *Recovery Plan for Vernal Pool Ecosystems* does not include Ricksecker's water scavenger beetle, the Core Recovery Areas designated in the Recovery Plan represent the highest-quality intact habitat available in the Plan Area. Therefore, the Conservation Strategy for Ricksecker's water scavenger beetle targets preservation of Ricksecker's water scavenger beetle habitat within Core Recovery Areas. Impacts to Ricksecker's water scavenger beetle occurring within or near the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in these Core Recovery areas, providing improved conservation for the species as compared to the existing project-by-project permitting.

As discussed in Section 7.5, the conservation focus outside the UDA is on formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserve that is not part of the SSHCP Preserve System. This Landscape Preserve will encompass a heterogeneous range of natural land covers and soil types associated with the Vernal Pool Ecosystem in the Plan Area. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, thus making a larger-scale contiguous Preserve System. Required selection criteria for Ricksecker's water scavenger beetle preserved habitat (see Conservation Actions for Objective VPI4) will ensure that appropriate vernal pool densities, soil types, geology, adjacent modeled habitat, and other factors are included in the SSHCP Preserve System. By preserving a range of Ricksecker's water scavenger beetle aquatic habitats in the Plan Area, the SSHCP will help Ricksecker's water scavenger beetle persist during expected climate change effects on precipitation and temperature.

The Landscape Preserve will be established through land acquisitions that are targeted to (1) protect occupied Ricksecker's water scavenger beetle habitat; (2) capture desired vernal pool types, swales, and supporting uplands; (3) add parcels onto existing preserves that increase preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

Three Core Preserves, each including more than 500 acres of modeled Ricksecker's water scavenger beetle habitat, will be established in the UDA. In addition to the three Core Preserves, up to three Minor Preserves and seven Satellite Preserves will be established and linked together within the UDA. The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. Further, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land

preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and linkages between preserves would be minimal or would not occur at all.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. By preserving existing populations of Ricksecker's water scavenger beetle in large, interconnected Preserves that are protected from edge effects, the beetle will be less affected by future stochastic events and more likely to exchange genetic material among adjacent populations via inadvertent tracking of eggs and through water flow via interconnected systems of vernal pool and swale. The larger Preserves will also facilitate appropriate vernal pool vegetation management activities that improve functionality of Ricksecker's water scavenger beetle habitat, such as prescribed livestock grazing and prescribed burning. For example, grazing, fire, and other land management actions will reduce aboveground biomass and control non-native grasses' use of water from the perched aquifer.

Despite the establishment of the Preserve System, the SSHCP recognizes that removal or modification of 17,233 acres of the existing 102,676 acres of Ricksecker's water scavenger beetle modeled habitat (i.e., Vernal Pool Ecosystem), especially the removal or modification of 16,901 acres within the UDA, may result in some loss of species genetic diversity. The SSHCP further recognizes that small, isolated Ricksecker's water scavenger beetle populations that are not preserved under the SSHCP may contain genetic diversity of conservation importance (Simovich 1998). This is less likely in the Plan Area than in other regions as connectivity within Plan Area pools remains relatively good. Those pools in the Plan Area that are isolated have become so relatively recently, thus limiting the amount of genetic divergence from non-isolated populations. Nonetheless, to maximize preservation of genetic diversity and species distribution, the SSHCP will preserve Ricksecker's water scavenger beetle modeled habitat with a range of pool sizes, soil types, geologic landforms, and locations within the Plan Area. Refer to Section 7.6.1.1.1 for a discussion of how the Preserve System maintains the heterogeneity of the Vernal Pool Ecosystem.

The preservation of modeled habitat under the Conservation Strategy represents mitigation to the maximum extent possible. However, to maximize beneficial effects on the species, the Implementing Entity will also establish or re-establish 623 acres of Ricksecker's water scavenger beetle modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. All re-establishment and establishment sites will be inoculated with inoculum from the impact or other representative sites, which will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. The effectiveness of inoculation will be monitored through a special study, as described in Section 8.3.3.5. Re-establishing pools in historical vernal pool areas will further help to conserve Ricksecker's water scavenger beetle by ensuring no net loss of the total acreage of Ricksecker's water scavenger beetle aquatic habitat in the Plan Area.

The SSHCP Preserve System will link together SSHCP Preserves and existing preserves that have modeled Ricksecker's water scavenger beetle habitat to help maintain dispersal between vernal pool complexes (e.g., dispersal of eggs through surface flows, predator wastes, and mud carried on the feet of animals such as waterfowl). For example, four known occurrences for Ricksecker's water scavenger beetle are located in existing preserves in PPU 2. The SSHCP will establish Core Preserves and Linkage Preserves that will maintain connectivity between these existing occurrences and modeled habitat in other SSHCP Preserves or existing preserves. By establishing large Preserves, the SSHCP will also ensure that connectivity between vernal pools within SSHCP Preserves is maintained.

As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for Ricksecker's water scavenger beetle protected in the Preserve System will ensure that vernal pool hydrology, vegetation, and other vernal pool habitat characteristics within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives (Table 7-49) will directly benefit Ricksecker's water scavenger beetle habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, HAB3, HAB5) and invasive species eradication on Preserves (Objective HAB4). Further, effectiveness monitoring of the Conservation Strategy for Ricksecker's water scavenger beetle will include a special study to investigate indirect effects of development on vernal pool crustaceans. The results of that study will inform adaptive management of SSHCP Condition 2 AMMs, as well as adaptive management of SSHCP Preserves. As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species habitat by reducing residual dry matter in pools and density of non-native grasses in the surrounding uplands, which will reduce grasses' water consumption from the perched aquifer and pools and allow filling from surface flows if present.

7.6.2.13 Valley Elderberry Longhorn Beetle

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 591 acres of modeled habitat for valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) in the Plan Area, all of which is located in Riparian land cover types (Table 7-53). The majority of impacts (550 acres) to the modeled valley elderberry longhorn beetle habitat will occur in the UDA, including 218 acres of impact to Mine Tailing Riparian Woodland, 186 acres of impact to Mixed Riparian Scrub, and 146 acres of impact to Mixed Riparian Woodland. The SSHCP assumes that all modeled habitat is occupied by valley elderberry longhorn beetle, and thus impacts to known occurrences are not analyzed.

To mitigate these impacts to valley elderberry longhorn beetle modeled habitat and the take of all valley elderberry longhorn beetles occupying that habitat, the SSHCP preserves 964 acres of modeled habitat for valley elderberry longhorn beetle. Preservation of the 964 acres of valley elderberry longhorn beetle modeled habitat includes the preservation of any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.(Table 7-53). Most of the preserved land is likely to occur in the Cosumnes River and Deer Creek areas that provide excellent habitat for valley elderberry longhorn beetle. Conservation actions for the valley elderberry longhorn beetle are consistent with the Biological Goals and Measurable Objectives for this species (Table 7-54).

Table 7-53
Permanent Effects and Conservation for Valley Elderberry Longhorn Beetle

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Mine Tailing Riparian Woodland	218	Qualitative	218	218 [a]	218 [b]
Mixed Riparian Woodland	184	Qualitative	184	368 [c]	184 [d]
Mixed Riparian Scrub	189	Qualitative	189	378 [c]	189 [d]
GRAND TOTAL	**591**	Qualitative	**591**	**964**	**591**

[a] Impacts to Mine Tailing Riparian Woodland will be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[b] Impacts to Mine Tailing Riparian Woodland will be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[c] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[d] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

Table 7-54
Biological Goals and Measurable Objectives Applicable to Valley Elderberry Longhorn Beetle

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective RIP1**. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Re-establish and/or establish a minimum of 591 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species

Table 7-54
Biological Goals and Measurable Objectives Applicable to
Valley Elderberry Longhorn Beetle

Applicable Biological Goals	Related Biological Objectives
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective VELB1**. Relocate or replace each impacted elderberry shrub (*Sambucus* spp.) according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999b). Mitigation will occur in locations that are not inundated for 2 continuous weeks, as determined by the TAC.
	Objective VELB2. During implementation of riparian habitat re-establishment and/or establishment, strategically include elderberry shrub in the planting palette (see Objectives RIP2 and RIP4).

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link 964 acres of the highest-quality riparian habitat for valley elderberry longhorn beetle in the Plan Area. The SSHCP conservation focus for valley elderberry longhorn beetle is outside the UDA in PPU 5 and PPU 6, which encompass the Cosumnes River and Deer Creek areas. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, thus making a larger-scale contiguous Preserve System. By preserving a range of valley elderberry longhorn beetle habitats in the Plan Area, the SSHCP will help valley elderberry longhorn beetle persist during expected climate change effects on precipitation and temperature.

Preserves benefiting valley elderberry longhorn beetle will be established through land acquisitions that are targeted to (1) protect occupied valley elderberry longhorn beetle habitat; (2) capture long stretches of desired Riparian land cover types; (3) add parcels onto existing preserves that increase preserve size and minimize habitat fragmentation and edge effects; and (4) provide connections to existing preserves that are currently isolated from each other.

The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves that include riparian habitat

for valley elderberry longhorn beetle will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and preservation of long stretches of intact riparian habitat would not occur.

Another benefit of the SSHCP that would not occur on a project-by-project basis is the requirement for Preserve Setbacks, which will establish a minimum 50-foot buffer between Urban Development Covered Activities and SSHCP Preserves or existing preserves. Stream Setbacks will also protect riparian areas that are not part of Preserves. These setbacks will ensure that Preserves and avoided streams are protected from edge effects such as urban runoff, proliferation of non-native plants, light and noise exposure, and other environmental stressors. Under existing project-by-project mitigation, Preserves are generally established without setbacks in developed areas and sacrifice a portion of the preserved lands to these edge effects, reducing the effective preservation area. By preserving existing populations of valley elderberry longhorn beetle in long, interconnected riparian areas that are protected from edge effects, the beetle will be less affected by future stochastic events and more likely to exchange genetic material between more remote populations.

In addition to modeled habitat preservation, the Implementing Entity will also re-establish and/or establish 591 acres of valley elderberry longhorn beetle modeled habitat in the Plan Area, with a priority on re-establishment before establishment. Under Objective VELB-2, re-establishment/establishment of riparian habitat will include planting of elderberry, further ensuring no net loss of the total acreage of valley elderberry longhorn beetle habitat in the Plan Area.

Objective VELB-1 will also require that any elderberry shrubs impacted by Covered Activities will be relocated or replaced in a suitable location identified by the TAC. This, coupled with the above described re-establishment and/or establishment of modeled habitat, will ensure no net loss of habitat for valley elderberry longhorn beetle. Relocation or replacement of elderberry shrubs will be implemented according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999b).

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed

of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs, in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for valley elderberry longhorn beetle protected in the Preserve System will ensure that elderberry plants and other habitat requirements within the SSHCP Preserve System are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Measurable objectives (Table 7-51) that in particular will directly benefit valley elderberry longhorn beetle are those designed to maintain and enhance habitat, including Preserve Management Plans (Objectives HAB1 and HAB2), consideration of management history (Objective HAB3), invasive species eradication program (Objective HAB4), collecting weather data to develop status and trends (Objective HAB6), and monitoring the groundwater table as it relates to status and trends for riparian habitat (Objective RIP5). Permanent indirect effects on modeled habitat, such as weeds, litter, and hydrologic alterations will be addressed by Objective HAB5. These actions should result in higher overall reproductive success and productivity of the Plan Area population.

Covered Activities will directly affect one documented occurrence within the UDA (within PPU 1) and no documented occurrences outside the UDA, out of a total of 156 occurrences in the Plan Area. Covered activities are not expected to indirectly affect any occurrences. At least one of the 156 occurrences will be protected in an SSHCP preserve in PPU 5, and another 111 of the 156 occurrences are already protected in existing preserves.

Recovery Plans

The USFWS published the *Valley Elderberry Longhorn Beetle Recovery Plan* in 1984. The Recovery Plan states that in order to recover the beetle, habitat must be protected along the several rivers, including the American, Sacramento, Feather, Stanislaus, Mokelumne, Calavera, Cosumnes, and San Joaquin. The Mokelumne and Cosumnes Rivers are located in the central and southern portions of the Plan Area. The main components of the Recovery Plan include: surveys for presence of the valley elderberry longhorn beetle; development of habitat protection plans; restoration of preserved sites (including exotics removal); and management and maintenance, including minimizing the use of herbicides and insecticides, preventing removal of riparian vegetation, and preventing riprapping of habitat sites. The Recovery Plan includes narratives for the following objectives (USFWS 1984).

1. *Preserve and protect known habitat sites to provide adequate habitat conditions for valley elderberry longhorn beetle.*

   The Recovery Plan identified occupied sites along three specific rivers for habitat preservation through long-term administrative actions: American River, Merced River, and

Putah Creek (USFWS 1984, p. 22). The Mokelumne and Cosumnes Rivers within the Plan Area are not specifically identified for protection in the Recovery Plan. The Recovery Plan has a specific objective for developing management plans for protected sites.

2. *Survey riparian forests of the Sacramento and San Joaquin valleys for presence of valley elderberry longhorn beetle and incorporate findings into short-term and long-term management programs.*

   This objective includes surveys along the Mokelume River from Comanche Reservoir Dam and along the Cosumnes River from Bridgehouse downstream to their confluences with the San Joaquin River.

3. *Determine ecological requirements and management needs of valley elderberry longhorn beetle.*

   This objective includes field studies of the autecology of the species at known and newly discovered sites; laboratory studies on life history; field studies on potential management needs at certain sites (Goethe Park, Ancil Hoffman Park, American River Parkway, and Solano Lake Park); studies of habitat rehabilitation methods for riparian areas and incorporation of results into short- and long-term management programs; determination of population status and success of management; and determination of delisting criteria.

   With the exception of management needs at certain sites, these actions could be conducted throughout the Plan Area, and so including one or more of these studies as part of the SSHCP Monitoring and Management Program will be determined as the Monitoring and Management Program is developed in the early years of implementation (see Chapter 8).

4. *Preserve and protect newly discovered valley elderberry longhorn beetle habitat to provide suitable habitat conditions for the species.*

   This objective includes minimizing further degradation, development, or modification of habitat (41); protecting newly discovered populations; minimizing use of insecticides, herbicides, and other toxic substances; and minimizing other activities that are incompatible with habitat maintenance. These actions are all general conservation actions that will be incorporated into the SSHCP.

5. *Re-establish valley elderberry longhorn beetle at rehabilitated sites within the species' historical range.*

   This objective includes determining suitability of potential existing habitat and rehabilitation sites for reintroduction; protecting habitat sites; developing and implementing a management program for each site; and reintroducing valley elderberry

longhorn beetle at selected sites. These actions are all general conservation actions that will be incorporated into the SSHCP.

6. *Increase public awareness of valley elderberry longhorn beetle through education and information programs.*

   This objective includes signage at county parks; various audio-visual programs, publications, brochures, and press releases; and distribution of information to local parks, schools, newspapers, radio, and television. Specific site-specific actions for education are not identified in the Recovery Plan, but the Preserve System Monitoring and Management Program will include this action as appropriate (see Chapter 8). Also, because the Recovery Plan dates back to 1984, education actions will need to be updated to take advantage of current information technologies (e.g., websites, social media).

7. *Enforce law and regulation to protect valley elderberry longhorn beetle.*

   This objective includes informing local agencies about legal status of valley elderberry longhorn beetle, including applicable laws and regulations; eliminating illegal collecting; and examining the effectiveness of existing laws and regulations and proposing changes as necessary. The SSHCP itself is a means to inform local agencies about the species, and the other actions are addressed though implementation of the SSHCP, such as management of the Preserve System and any changes in local ordinances that relate to protection and management of the Preserve System.

Critical Habitat

Critical Habitat designated for the valley elderberry longhorn beetle does not occur within the Plan Area. Critical Habitat is located north of the Plan Area along the American River.

7.6.2.14 California Tiger Salamander

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 1,757 acres of modeled habitat for California tiger salamander within the Plan Area. The SSHCP will impact up to approximately 80 acres of modeled aquatic breeding and foraging habitat and up to approximately 1,677 acres of modeled upland habitat within the Plan Area (Table 7-55). The majority of impacts to modeled habitat (81%) occur inside the UDA, including 1,366 acres of modeled upland habitat and 55 acres of modeled aquatic habitat. Covered Activities outside the UDA will directly impact 311 acres of modeled upland habitat and 25 acres of modeled aquatic habitat. SSHCP Covered Activities will not impact aquatic or upland habitat within California tiger salamander Critical Habitat (Table 7-56).

To mitigate these impacts, the SSHCP will preserve a total of 17,062 acres of California tiger salamander modeled habitat, including 885 acres of modeled aquatic habitat (Vernal Pool and Seasonal Wetland) and 16,177 acres of modeled upland habitat (Blue Oak Savanna and Valley Grassland). Of the preserved habitat, 1,872 acres will be in Critical Habitat in PPU 7, including 61 acres of modeled aquatic habitat and 1,811 acres of modeled upland habitat. The SSHCP will also re-establish and/or establish 79 acres of modeled aquatic habitat within the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-57).

Table 7-55
Permanent Effects and Conservation for California Tiger Salamander

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Upland Habitat					
Blue Oak Savanna	0	Qualitative	0	33 [a]	0
Valley Grassland	1,677	Qualitative	1,677 [b]	16,144	0
Total Upland Habitat	**1,677**	**Qualitative**	**1,677**	**16,177**	**0**
Aquatic Habitat					
Vernal Pool	57	2	59	762	58
Seasonal Wetland	21	Qualitative	21	123	21
Total Aquatic Habitat	**78**	**2**	**80**	**885**	**79**
Total Plan-Wide Habitat	**1,755**	**2**	**1,757**	**17,062**	**79**

[a] Impacts to Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.
[b] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-56
Permanent Effects and Preservation for California Tiger Salamander Critical Habitat

Habitat Model Land Cover Types	Total Critical Habitat (acres)		Critical Habitat Unit 3 (acres)	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Upland Habitat				
Blue Oak Savanna	0	0	0	0
Valley Grassland	0	1,811	0	1,811
Total Upland Habitat	**0**	**1,811**	**0**	**1,811**
Aquatic Habitat				
Vernal Pool	0	58	0	58
Seasonal Wetland	0	3	0	3
Total Aquatic Habitat	**0**	**61**	**0**	**61**
Total in Critical Habitat Area	**0**	**1,872**	**0**	**1,872**

Table 7-57
Biological Goals and Measurable Objectives Applicable to California Tiger Salamander

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1

Table 7-57
Biological Goals and Measurable Objectives Applicable to California Tiger Salamander

Applicable Biological Goals	Related Biological Objectives
	mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether preserves are being managed and maintained for the benefit of Covered Species
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective CTS1.** Preserve at least five occupied California tiger salamander breeding ponds.
	Objective CTS2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for California tiger salamander is preserved. Minimum preservation will total: • 141 acres of aquatic habitat • 1,677 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within California tiger salamander Critical Habitat occurs within California tiger salamander Critical Habitat (see Objectives BOW1, VP1, SW1, and VG1).
	Objective CTS3. Rural Transportation Project Covered Activities within California tiger salamander modeled habitat will be designed to allow California tiger salamander movement across the roadway area.

Table 7-57
Biological Goals and Measurable Objectives Applicable to California Tiger Salamander

Applicable Biological Goals	Related Biological Objectives
	Objective VPI5. Ensure that during implementation of Objective VP2, re-established and/or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/establishment, in accordance with Conservation Actions in Table 7-1.

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link a total of 17,062 acres of California tiger salamander modeled habitat Plan-wide, including 16,177 acres of modeled upland habitat and 885 acres of modeled aquatic habitat (Table 7-52). Additionally, the preservation of Vernal Pool Ecosystem (including pools that provide modeled breeding habitat for California tiger salamander) will protect the hydrology and soil conditions necessary for persistence of preserved California tiger salamander aquatic habitat.

Objective VP1b requires that impacts occurring within or near the Cosumnes/Rancho Seco Core Recovery Area will be mitigated through preservation in this Core Recovery Area, providing improved conservation for the species as compared to the existing project-by-project permitting.

As discussed in Section 7.5, the primary conservation focus for California tiger salamander in the Plan Area is on the formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserves that are not part of the SSHCP Preserve System. This Landscape Preserve will encompass a heterogeneous range of natural land covers and soil types associated with California tiger salamander modeled habitat and the Vernal Pool Ecosystem in the Plan Area. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, resulting in a larger-scale contiguous Preserve System.

Of the 17,062 acres of California tiger salamander modeled habitat to be preserved in the Plan Area, virtually all of this preservation will occur outside the UDA, and the majority of this preservation will occur in PPU 7. The preserve design focus in PPU 7 is primarily landscape-scale preservation of natural land covers, targeting Vernal Pool and Valley Grassland in areas that are adjacent, or in proximity, to existing preserves, including other mitigation sites and mitigation banks in the area. The SSHCP Preserves in PPU 7 will be consolidated with the 12,500-acre Chance Ranch, providing continuous aquatic and upland habitat that will meet the life history needs of the California tiger salamander.

Most of the SSHCP Preserve in PPU 7 will be located within the Cosumnes/Rancho-Seco Core Recovery Area, including 752 acres of modeled aquatic habitat and 14,434 acres of modeled upland habitat (Table 7-53). Since only approximately 52 acres of California tiger salamander modeled habitat will be affected within the Cosumnes/Rancho Seco Core Area, this preservation will more than compensate for the loss.

The SSHCP Preserve System will link together SSHCP Preserves and existing preserves that have modeled California tiger salamander habitat, to help maintain dispersal between breeding sites and modeled upland habitat. For example, there are 14 known occurrences for California tiger salamander in existing preserves and 6 known occurrences in SSHCP Preserves outside the UDA in PPU 7. The SSHCP Preserves in PPU 7 will, in most cases, directly abut existing preserves, providing seamless continuity of modeled habitat. The Preserve System also includes 312 acres of Linkage Preserve that will connect from the Landscape Preserve in PPU 7 to the Cosumnes River corridor located in PPU 5. By establishing large Preserves, the SSHCP will also ensure that connectivity between breeding pools within SSHCP Preserves is maintained.

To ensure that California tiger salamander populations are protected and continue to expand within the Plan Area, several species-specific objectives (CTS1 – CTS3) will be implemented as part of the Conservation Strategy (Table 7-54). Objective CTS1 will benefit California tiger salamander by preserving at least five occupied breeding ponds within the SSHCP Preserve System. The conservation actions for this objective also identify the necessary criteria for selecting the location and suitability of California tiger salamander breeding ponds, as well as associated upland habitats. As a result, both occupied breeding ponds and additional aquatic and upland habitat for California tiger salamander will be preserved and maintained within the Plan Area, which would not occur on a project-by-project basis. Improved management and monitoring under the SSHCP will also allow for expansion of California tiger salamander into areas not currently used by the species.

Objective CTS2 benefits California tiger salamander by requiring preservation of modeled aquatic and upland California tiger salamander habitat in SSHCP Preserves, as described above. This objective ensures that selected preserve sites contain both modeled aquatic (breeding) habitat and upland habitat (that supports fossorial mammals and occurs within 1.5 miles of aquatic habitat) for California tiger salamander. By preserving a range of California tiger salamander aquatic habitats in the Plan Area, the SSHCP will help California tiger salamander persist during expected climate change effects on precipitation and temperature.

Objective CTS3 will also benefit California tiger salamander occurring near rural transportation projects by requiring that these Covered Activities allow safe California tiger salamander movement across the roadway. This objective requires targeted species mobility studies to determine if movement between breeding ponds or between breeding ponds and upland refugia

will be affected by rural transportation Covered Activities within California tiger salamander modeled habitat. This information will be used to determine if culvert under-crossings are needed and the appropriate locations for these structures. This objective will minimize or eliminate ongoing take of California tiger salamander from vehicles traveling on the roadways.

In addition to modeled habitat preservation, the Implementing Entity will also re-establish and/or establish 79 acres of California tiger salamander modeled aquatic habitat in the Plan Area, with a priority on re-establishment before establishment. Re-established and/or established aquatic habitat will be located no more than 0.5 mile from preserved aquatic habitat to increase the likelihood that the re-established and/or established aquatic habitat will be occupied by California tiger salamander in the future, which will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. Re-establishing and/or establishing breeding pools will also ensure no net loss of the acreage of California tiger salamander aquatic habitat in the Plan Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for California tiger salamander protected in the Preserve System will ensure that vernal pool and seasonal wetland hydrology, vegetation, and other vernal pool and seasonal wetland habitat characteristics within the SSHCP Preserve System are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit California tiger salamander habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, and HAB4) designed to maintain and enhance aquatic habitat, including early detection and eradication of invasive species such as American bullfrogs (*Lithobates catesbeianus*) and crayfish (*Procambarus* sp.) in Preserves. Additionally, Objective HAB7 will include monitoring of vegetation height, management of which will benefit California tiger salamander since this species has difficulty migrating across areas with tall or dense vegetation. Monitoring and managing grazing practices in grassland habitats can

help to maintain migration pathways between upland sites and aquatic locations. These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population. Permanent indirect effects on aquatic habitats such as hydrologic alterations will be tracked through studies of edge effects at Preserve boundaries, as directed by Objective HAB5. This information will feed into adaptive management of vernal pools and will benefit the California tiger salamander using that habitat.

Further, effectiveness monitoring of the Conservation Strategy for California tiger salamander will include a special study to investigate indirect effects of development on the Vernal Pool Ecosystem. The results of that study will inform adaptive management of SSHCP Condition 2 AMMs, as well as adaptive management of SSHCP Preserves. As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species and California tiger salamander by reducing the density of non-native grasses in the surrounding uplands, which will not only improve the ability of California tiger salamander to move through upland habitat, but will also reduce water consumption from the perched aquifer and pools and allow filling from surface flows if present.

Critical Habitat

The California tiger salamander primary Critical Habitat constituent elements (USFWS 2005b) are described in a similar manner as the SSHCP aquatic (Vernal Pool and Seasonal Wetland) and terrestrial upland (Blue Oak Savanna, Blue Oak Woodland, and Valley Grassland) land cover types located anywhere within designated Critical Habitat.

The SSHCP Conservation Strategy will preserve a total of 1,872 acres of modeled aquatic and upland habitat within California tiger salamander CHU 3. SSHCP Covered Activities will not impact aquatic or upland habitat within California tiger salamander Critical Habitat. Monitoring and adaptive management under the SSHCP will ensure that the PCEs for California tiger salamander are maintained within the CHU, and allow the PCEs to provide their intended conservation function for the species.

Recovery Plan

USFWS has prepared a *Draft Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamande*r (Ambystoma californiense) (USFWS 2016). The Draft Recovery Plan includes three recovery objectives for the species:

1. Secure self-sustaining populations of Central California tiger salamander throughout the full range of the Distinct Population Segment, ensuring conservation of genetic variability and diverse habitat types (e.g., across elevation and precipitation gradients).

2. Ameliorate or eliminate the threats that caused the species to be listed, and any future threats.
3. Restore and conserve a healthy ecosystem supportive of Central California tiger salamander populations.

The Plan Area is located within the Central Valley Recovery Unit of the Draft Recovery Plan, and contains approximately 62,937 acres of the 207,100-acre Rancho Seco Management Unit. SSHCP Covered Activities would impact up to 45 acres of modeled upland habitat and 6 acres of modeled aquatic habitat in the Rancho Seco Management Unit of the Central Valley Recovery Unit (Table 7-58).

Table 7-58
Permanent Effects and Conservation in Recovery Area for California Tiger Salamander

Habitat Model Land Cover Types	Rancho Seco Management Unit	
	Total Effect	*Total Habitat Preservation*
Upland Habitat		
Blue Oak Savanna	0	33
Valley Grassland	45	14,530
Total Upland Habitat	*45*	*14,563*
Aquatic Habitat		
Vernal Pool	6	697
Seasonal Wetland	0	47
Total Aquatic Habitat	*6*	*744*
Total in Management Unit	**51**	**15,308**

The Draft Recovery Plan stipulates that preserves in the Central Valley Recovery Unit must be at least 3,398 acres in size to allow for sufficient upland and breeding habitat. The target number of preserves for the Rancho Seco Management Unit is 5, with a total area of 16,990. The SSHCP would create approximately 15,308 acres of preserve in the Rancho Seco Management Unit, including a Landscape Preserve of greater than 10,000 acres. Many of the recovery actions identified in the Draft Recovery Plan are included in the SSHCP, including locating preserves where fossorial mammals create adequate burrow habitat (Objective CTS2), removal of non-native invasive vegetation and invasive wildlife (Objective HAB4), maintaining linkages between preserves (Objective L2), design undercrossings to minimize road mortality of California tiger salamanders (Objective CTS3), and ensure long-term monitoring and management of preserve sites in perpetuity (refer to Chapter 8).

7.6.2.15 Western Spadefoot

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 23,207 acres of modeled habitat for western spadefoot within the Plan Area. The SSHCP will impact up to approximately 1,164 acres of modeled aquatic breeding and foraging habitat, which includes Vernal Pool, Swale, Seasonal Wetland, Open Water, Stream/Creek, and Stream/Creek (VPIH); and up to approximately 22,043 acres of modeled upland habitat, which includes Blue Oak Savanna, Blue Oak Woodland, and Valley Grassland within the Plan Area (Table 7-59). The majority of impacts to modeled habitat (97%) will occur inside the UDA, including 21,329 acres of modeled upland habitat and 1,089 acres of modeled aquatic habitat.

To mitigate these impacts, the SSHCP will preserve a total of approximately 23,708 acres of western spadefoot modeled habitat, including approximately 1,647 acres of modeled aquatic habitat (vernal pool, swale, seasonal wetland, open water, stream/creek, and stream/creek [VPIH]) and approximately 22,061 acres of modeled upland habitat (blue oak savanna and valley grassland). The SSHCP will also re-establish and/or establish 1,022 acres of modeled aquatic habitat and 47 acres of modeled upland habitat within the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-60).

Table 7-59
Permanent Effects and Conservation for Western Spadefoot

Land Cover Types	Direct Effects (acres)	Indirect Effects (Acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Upland Habitat					
Blue Oak Savanna	38	Qualitative	38	38[a]	38[b]
Blue Oak Woodland	9	Qualitative	9	9[a]	9[b]
Valley Grassland	21,996	Qualitative	21,996[c]	22,014	0
Total Upland Habitat	*22,043*	*Qualitative*	*22,043*	*22,061*	*47*
Aquatic Habitat					
Vernal Pool	389	94	483	966	389
Swale	234	44	278	278	256
Seasonal Wetland	105	Qualitative	105	105	105
Open Water	155	Qualitative	155	155	155[d]
Stream/Creek	117	Qualitative	117	117	117

Table 7-59
Permanent Effects and Conservation for Western Spadefoot

Land Cover Types	Direct Effects (acres)	Indirect Effects (Acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Stream/Creek (VPIH)	22	4	26	26	0[e]
Total Aquatic Habitat	*1,022*	*142*	*1,164*	*1,647*	*1,022*
Total Plan-Wide Habitat	**23,065**	**142**	**23,207**	**23,708**	**1,069**

[a] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.
[b] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.
[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[d] Re-establishment and/or establishment of Open Water can be achieved by re-establishing and/or establishing an aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.
[e] Re-establishment/establishment to mitigate effects to Stream/Creek (VPIH) will be in the form of Swale, which has been added to the 234 acres necessary to mitigate effects to Swale.

Table 7-60
Biological Goals and Measurable Objectives Applicable to Western Spadefoot

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).

Table 7-60
Biological Goals and Measurable Objectives Applicable to Western Spadefoot

Applicable Biological Goals	Related Biological Objectives
	Objective W5. Ensure that aquatic resources are re-established and/or established or during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W7. Ensure that when re-establishing/establishing vernal pools, swales, and freshwater marsh that a minimum of 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment occur within the Morrison Creek Watershed.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.

Table 7-60
Biological Goals and Measurable Objectives Applicable to Western Spadefoot

Applicable Biological Goals	Related Biological Objectives
	Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by the Technical Advisory Committee (TAC)). The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective WS1.** During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for western spadefoot (*Spea hammondii*) is preserved. Minimum preservation will total: • 1,531 acres of aquatic habitat • 22,044 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within the Mather Core or Cosumnes/Rancho-Seco Core Recovery Areas occurs within the Core Recovery Areas (see Objectives BOW1, VP1, VP3, SW1, SC1, OW1, and VG1).
	Objective WS2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic habitat for western spadefoot is re-established and/or established. Minimum re-establishment and/or establishment will total 906 acres of aquatic habitat.

Table 7-60
Biological Goals and Measurable Objectives Applicable to Western Spadefoot

Applicable Biological Goals	Related Biological Objectives
	Ensure that mitigation for modeled high-value habitat impacted within the Mather Core or Cosumnes/Rancho-Seco Core Recovery Areas occurs within the Core Recovery Areas (see Objectives VP2, SW2, and OW2).

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link a minimum of 1,647 acres of modeled aquatic habitat in the Plan Area, including 1,534 acres of aquatic habitat in the Mather and Cosumnes/Rancho-Seco Core Recovery Areas, which will provide adequate aquatic habitat for western spadefoot in the Plan Area. In addition, through ensuring that a minimum of 22,061 acres of modeled upland habitat for western spadefoot is preserved in the Plan Area including 19,610 acres of upland habitat within the Mather and Cosumnes/Rancho-Seco Core Recovery Areas, western spadefoot will have adequate upland habitat in the Plan Area. Additionally, the preservation of Vernal Pool Ecosystem (including pools that provide modeled breeding habitat for western spadefoot) will protect the hydrology and soil conditions necessary for persistence of preserved western spadefoot aquatic habitat.

Objective VP1b requires that impacts occurring within the Mather and Cosumnes/Rancho Seco Core Recovery Areas will be mitigated through preservation in these Core Recovery Areas, providing improved conservation for the species as compared to the existing project-by-project permitting.

As discussed in Section 7.5, the primary conservation focus for western spadefoot in the Plan Area is on the formation of a large landscape-scale Preserve (at least 10,500 acres) in the Cosumnes/Rancho-Seco Core Recovery Area that connects to and augments existing preserves that are not part of the SSHCP Preserve System. This Landscape Preserve will encompass a heterogeneous range of natural land covers and soil types associated with western spadefoot modeled habitat and the Vernal Pool Ecosystem in the Plan Area. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, resulting in a larger-scale contiguous Preserve System.

The majority of the preservation will occur outside the UDA, and most of this preservation will occur in the Cosumnes/Rancho Seco Core Recovery Area (in PPU 7) and in a small portion of the Mather Core Recovery Area. The preserve design focus outside the UDA is primarily landscape-scale preservation of natural land covers, targeting Vernal Pool and Valley Grassland in areas that are adjacent, or in proximity, to existing preserves, including other mitigation sites and mitigation

banks in the area. The SSHCP Preserve in PPU 7 will be consolidated with the 12,500-acre Chance Ranch, providing continuous aquatic and upland habitat that will meet the life history needs of the western spadefoot. Inside the UDA, a total of 6,380 acres will be preserved. Even though a large landscape-scale Preserve was not possible inside the UDA due to development and numerous additional constraints, large connected Preserves is still a primary goal.

The SSHCP Preserve System will link together SSHCP Preserves and existing preserves that have modeled western spadefoot habitat to help maintain dispersal between breeding sites and modeled upland habitat. For example, there are three known occurrences for western spadefoot in existing preservation outside the UDA in PPUs 5 and 7, and seven known occurrences in SSHCP Preserves in PPU 7. The SSHCP Preserves in PPU 7 will in most cases directly abut existing preserves, providing seamless continuity of modeled habitat. The Preserve System also includes a Linkage Preserve that will connect from the Landscape Preserve in PPU 7 to the Cosumnes River/Deer Creek Wildlife Movement Corridor located in PPU 5. Inside the UDA, there are two known occurrences of western spadefoot in existing preserves in PPUs 1 and 3, and two occurrences in SSHCP Preserves in PPUs 1 and 2. The Preserve System also includes a Linkage Preserve that will connect SSHCP Preserves and existing preserves in PPU 1. As a result, aquatic and upland habitat for western spadefoot will be preserved and maintained within the Plan Area, which would not occur on a project-by-project basis. Improved management and monitoring under the SSHCP will also allow for expansion of western spadefoot into areas not currently used by the species.

To ensure that western spadefoot populations are protected and continue to expand within the Plan Area, two species-specific objectives (WS1 and WS2) will be implemented as part of the Conservation Strategy. Objective WS1 will benefit western spadefoot during assembly of the SSHCP Preserve System, by ensuring that modeled aquatic and upland habitat for western spadefoot is preserved. The conservation actions for this objective also identify minimum preservation acreages for both modeled aquatic and modeled upland habitats. By preserving a range of western spadefoot aquatic habitats in the Plan Area, the SSHCP will help western spadefoot persist during expected climate change effects on precipitation and temperature.

Objective WS2 will also benefit western spadefoot during assembly of the SSHCP Preserve System, by ensuring that modeled aquatic habitat for western spadefoot is re-established and/or established. The conservation action for this objective also identifies the minimum acreage for re-establishment and/or establishment of aquatic habitat. Additionally, this objective will ensure that any re-established or established aquatic habitat is located no more than 500 feet from preserved aquatic habitat. This requirement will increase the likelihood that the re-established or established aquatic habitat will be occupied by western spadefoot in the future, which will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. Re-establishing and/or establishing breeding pools will also ensure no net loss of western spadefoot aquatic habitat in the Plan Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries that would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for western spadefoot protected in the Preserve System will ensure that vernal pool and seasonal wetland hydrology, vegetation, and other vernal pool and seasonal wetland habitat characteristics within the SSHCP Preserve System are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit western spadefoot habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, and HAB4) designed to maintain and enhance aquatic habitat, including early detection and eradication of invasive species such as American bullfrogs and crayfish in Preserves (Table 7-57). Additionally, Objective HAB7 will include monitoring of vegetation height, management of which will benefit western spadefoot since this species has difficulty moving through areas with tall or dense vegetation. Monitoring and managing grazing practices in grassland habitats can help to maintain movement pathways between upland sites and aquatic locations. These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population. Permanent indirect effects on aquatic habitats such as hydrologic alterations will be tracked through studies of edge effects at Preserve boundaries, as directed by Objective HAB5. This information will feed into adaptive management of vernal pools and will benefit western spadefoot using that habitat.

Further, effectiveness monitoring of the Conservation Strategy for western spadefoot will include a special study to investigate indirect effects of development on the Vernal Pool Ecosystem. The results of that study will inform adaptive management of SSHCP Condition 2 AMMs, as well as adaptive management of SSHCP Preserves. As Preserve Management Plans are implemented, grazing will be managed for the benefit of vernal pool Covered Species and western spadefoot by reducing the density of non-native grasses in the surrounding uplands, which will not only improve the ability of western spadefoot to move through upland habitat, but also reduce water consumption from the perched aquifer and pools and allow filling from surface flows if present.

Recovery Plans

To conserve this species, the Recovery Plan prioritizes preservation of Vernal Pool Ecosystem within several core areas, including the Mather Core Recovery Area and the Cosumnes/Rancho Seco Core Recovery Area in the Plan Area. SSHCP Covered Activities are anticipated to impact up to approximately 8,600 acres of western spadefoot modeled habitat in the Recovery Areas (Table 7-61).

The SSHCP Conservation Strategy will preserve and link approximately 21,144 acres of modeled habitat for western spadefoot in the Recovery Areas. The SSHCP especially focuses conservation for the western spadefoot on the large areas of intact habitat present in the Cosumnes/Rancho Seco Core Recovery Area. A total of 15,299 acres of Vernal Pool Ecosystem will be preserved there, including 897 acres of aquatic habitat and 14,402 acres of valley grassland in hydrologically connected uplands (Table 7-61). When combined with existing preserves, 83% of the modeled western spadefoot habitat in the Cosumnes/Rancho Seco Core Recovery Area will be preserved, consistent with the 80% target of the 2005 Recovery Plan.

Within the Mather Core Recovery Area, existing and planned development constrains the inventory of western spadefoot habitat that is available for preservation. Therefore, the SSHCP preserves a total of 5,601 acres of Vernal Pool Ecosystem in the Mather Core Recovery Area, including 440 acres of aquatic habitat and 5,161 acres of valley grassland in hydrologically connected uplands. When combined with existing preserves, 46% of the modeled western spadefoot habitat in the Mather Core Recovery Area will be preserved.

Table 7-61
Habitat Impacts and Conservation in Core Recovery Areas for Western Spadefoot

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)
Mather Core Recovery Area				
Upland Habitat				
Blue Oak Savanna	9	Qualitative	9	15
Blue Oak Woodland	0	Qualitative	0	0
Valley Grassland	8,118	Qualitative	8,118	5,161
Total Upland Habitat	*8,127*	*Qualitative*	*8,127*	*5,176*
Aquatic Habitat				
Vernal Pool	144	72	216	288
Swale	112	38	150	126
Seasonal Wetland	6	Qualitative	6	1
Open Water	26	Qualitative	26	56
Stream/Creek	6	Qualitative	6	11

Table 7-61
Habitat Impacts and Conservation in Core Recovery Areas for Western Spadefoot

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)
Stream/Creek (VPIH)	13	3	16	26
Total Aquatic Habitat	*307*	*113*	*420*	*508*
Total in Core Recovery Area	**8,434**	**113**	**8,547**	**5,684**
Cosumnes/Rancho-Seco Core Recovery Area				
Upland Habitat				
Blue Oak Savanna	0	Qualitative	0	33
Valley Grassland	46	Qualitative	46	14,402
Total Upland Habitat	*46*	*Qualitative*	*46*	*14,435*
Aquatic Habitat				
Vernal Pool	6	0	6	708
Swale	1	0	1	189
Seasonal Wetland	0	Qualitative	0	50
Open Water	0	Qualitative	0	4
Stream/Creek	0	Qualitative	0	62
Stream/Creek (VPIH)	0	0	0	0
Total Aquatic Habitat	*7*	*0*	*7*	*1,013*
Total in Core Recovery Area	**53**	**0**	**53**	**15,448**
Total Core Recovery Area				
Upland Habitat				
Blue Oak Savanna	9	Qualitative	9	47
Valley Grassland	8,164	Qualitative	8,164	19,563
Total Upland Habitat	*8,173*	*Qualitative*	*8,173*	*19,610*
Aquatic Habitat				
Vernal Pool	150	72	222	996
Swale	113	38	151	315
Seasonal Wetland	6	Qualitative	6	51
Open Water	26	Qualitative	26	61
Streams/Creeks	6	Qualitative	6	73
Streams/Creeks (VPIH)	13	3	16	38
Total Aquatic Habitat	*314*	*113*	*427*	*1,534*
Total in Core Recovery Areas	**8,487**	**113**	**8,600**	**21,144**

The SSHCP Conservation Strategy is equivalent to implementation of the 2005 Recovery Plan for the Plan Area because it provides an alternative Conservation Strategy for conserving western spadefoot and contains the six elements of recovery. The manner in which the SSHCP achieves this consistency for western spadefoot is discussed in detail in Section 7.6.3.

7.6.2.16 Giant Gartersnake

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 2,358 acres of modeled habitat for giant gartersnake within the Plan Area (Table 7-62). The SSHCP will impact up to approximately 169 acres of modeled aquatic habitat (core and peripheral) and up to approximately 2,189 acres of modeled upland habitat within the Plan Area (Table 7-62). The majority of impacts to modeled habitat (89%) occur inside the UDA, including 144 acres of modeled aquatic habitat and 1,965 acres of modeled upland habitat. Covered Activities outside the UDA will directly impact approximately 25 acres of modeled aquatic habitat and 224 acres of modeled upland habitat.

To mitigate these impacts, the SSHCP will preserve a total of 5,524 acres of giant gartersnake modeled habitat within the Plan Area, including 406 acres of modeled aquatic habitat and 5,118 acres of modeled upland habitat (Table 7-58). Most of this preservation will occur outside the UDA in PPU 7. Of the preserved habitat, 996 acres will be in high-value habitat, including 325 acres of modeled aquatic habitat and 671 acres of modeled upland habitat (Table 6-63). High-value habitat is specifically limited to modeled habitat within the Badger Creek and Stone Lakes NWR areas where there are known subpopulations of giant gartersnake. The SSHCP will also re-establish and/or establish 303 acres of modeled habitat within the Plan Area, including 169 acres of modeled aquatic habitat and 134 acres of modeled upland habitat. Approximately 232 acres of the 303 acres to be re-established and/or established will be in high-value habitat (Table 6-63). All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-64).

Table 7-62
Permanent Effects and Conservation for Giant Gartersnake

Land Cover Types	Direct Effects (acres)	Indirect Effects (Acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Plan-Wide Habitat (includes High-Value Habitat[a])					
Seasonal Wetland	39	Qualitative	39	100	39
Freshwater Marsh	71	Qualitative	71	127	71
Open Water	25	Qualitative	25	62[b]	25[c]
Streams/Creeks	34	Qualitative	34	117	34
Total Aquatic Habitat	**169**	**Qualitative**	**169**	**406**	**169**
Mixed Riparian Scrub	135	Qualitative	135	105[d]	134[e]

Table 7-62
Permanent Effects and Conservation for Giant Gartersnake

Land Cover Types	Direct Effects (acres)	Indirect Effects (Acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	2,054	Qualitative	2,054	5,013[f]	0
Total Upland Habitat	**2,189**	**Qualitative**	**2,189**	**5,118**	**134**
Total Plan-Wide Habitat	**2,358**	**Qualitative**	**2,358**	**5,524**	**303**

[a] High-value habitat is specifically limited to the Badger Creek and Stone Lakes NWR areas where there are known subpopulations of giant gartersnake. High-value habitat for giant gartersnake includes Freshwater Marsh, Stream/Creek, Open Water (excluding ski lakes), Seasonal Wetland, Mixed Riparian Scrub, and Valley Grassland land cover types in these areas.
[b] Preservation of Open Water can be achieved by preserving any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.
[c] Re-establishment and/or establishment of Open Water can be achieved by re-establishing and/or establishing any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.
[d] Impacts to Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[e] Impacts to Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub or any combination of the two.
[f] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-63
Permanent Effects and Conservation for Giant Gartersnake High-Value Habitat

Land Cover Types	Direct Effects (acres)	Indirect Effects (Acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
High-Value Habitat[a]					
Seasonal Wetland	27	Qualitative	27	67	27
Freshwater Marsh	58	Qualitative	58	127	58
Open Water	2	Qualitative	2	31[b]	2[c]
Stream/Creek	17	Qualitative	17	100	17
Total High-Value Aquatic Habitat	**104**	**Qualitative**	**104**	**325**	**104**
Mixed Riparian Scrub	127	Qualitative	127	47[d]	128[e]
Valley Grassland	375	Qualitative	375	624[f]	0
Total High-Value Upland Habitat	**502**	**Qualitative**	**502**	**671**	**128**
Total High-Value Habitat	**606**	**Qualitative**	**606**	**996**	**232**

[a] High-value habitat is specifically limited to the Badger Creek and Stone Lakes NWR areas where there are known subpopulations of giant gartersnake. High-value habitat for giant gartersnake includes Freshwater Marsh, Stream/Creek, Open Water (excluding ski lakes), Seasonal Wetland, Mixed Riparian Scrub, and Valley Grassland land cover types in these areas.
[b] Preservation of Open Water can be achieved by preserving any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.
[c] Re-establishment and/or establishment of Open Water can be achieved by re-establishing and/or establishing any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.
[d] Impacts to Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[e] Impacts to Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[f] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter

Table 7-64
Biological Goals and Measurable Objectives Applicable to Giant Gartersnake

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W1.** Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.
	Objective W2. Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP1. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed

Table 7-64
Biological Goals and Measurable Objectives Applicable to Giant Gartersnake

Applicable Biological Goals	Related Biological Objectives
	Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by the Technical Advisory Committee (TAC)). The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).

Table 7-64
Biological Goals and Measurable Objectives Applicable to Giant Gartersnake

Applicable Biological Goals	Related Biological Objectives
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective GGS1**. During assembly of the SSHCP Preserve System, ensure that modeled habitats for giant gartersnake are preserved along the following creeks (or other creeks that are determined by the TAC to provide similar giant gartersnake habitat value): • Lower Laguna Creek, mainly between Twin Cities Road (State Route 104) and Miess Road; • Skunk Creek, which flows into the Cosumnes River northwest of the City of Galt; • the short Willow Creek and tributaries of Badger Creek, which are to the north of the lower Laguna Creek and west of the Folsom South Canal; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum preservation will total • 170 acres of giant gartersnake high-value aquatic habitat and • 2,323 acres of giant gartersnake high-value upland habitat. (See Objectives AG1, FWM1, SW1, SC1, OW1, RIP1, RIP3, and VG1.)
	Objective GGS2. During assembly of the SSHCP Preserve System, ensure that modeled habitats for giant gartersnake are re-established and/or established along the following creeks (or other creeks that are determined by the TAC to provide similar habitat value): • Lower Laguna Creek, mainly between Twin Cities Road (State Route 104) and Miess Road; • Skunk Creek: this creek flows into the Cosumnes River northwest of the City of Galt; • north of Lower Laguna Creek and west of the Folsom South Canal are several small creeks—the short Willow Creek and tributaries of Badger Creek; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum re-establishment and/or establishment will total • 170 acres of high-value aquatic habitat and • 134 acres of high-value upland habitat. (See Objectives SW2, OW2, RIP2, and RIP4.)
	Objective GGS3. Plan Permittees will conduct a study to establish hydrologic baseline conditions along Badger Creek to identify what level of hydrology is necessary to support giant gartersnake and acquire a water source to maintain the minimum level of hydrology during the summer months when agricultural runoff may wane.

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link a minimum of 406 acres of modeled aquatic habitat in the Plan Area including 325 acres of high-value aquatic habitat in the Badger Creek and Stone Lakes NWR areas, which will provide adequate aquatic habitat for giant gartersnake in the Plan Area. In addition, through ensuring that a minimum of 5,118 acres of modeled upland habitat for giant gartersnake is preserved in the Plan Area, including 671 acres of high-value upland habitat within the Badger Creek and Stone Lakes NWR areas, giant gartersnake will have adequate upland habitat in the Plan Area. Plan Area streams and creeks will be protected from direct and indirect effects of urban development through Stream Setbacks, as described in AMM STREAM-1 and STREAM-2.

Objective GGS1 requires that impacts occurring within or near the Badger Creek and Stone Lakes NWR high-value habitat areas will be mitigated through preservation in these core aquatic habitat areas, providing improved conservation for the species as compared to the existing project-by-project permitting.

A total of 5,524 acres of giant gartersnake modeled habitat will be preserved Plan-wide, including 406 acres of modeled aquatic habitat and 5,118 acres of modeled upland habitat. Most of this preservation will occur outside the UDA.

The Preserve System will link together SSHCP Preserves and existing preserves that have modeled giant gartersnake habitat to help maintain dispersal between breeding sites and modeled upland habitat. For example, there are two known occurrences for giant gartersnake in existing preservation and two known occurrences in SSHCP Preserves outside the UDA in PPU 6. Most of the occurrences (8 of 11 occurrences) of giant gartersnake within the Plan Area are in PPU 6 in the Badger Creek and Stone Lakes NWR areas. As a result, both occupied habitat and additional modeled aquatic and upland habitat for giant gartersnake will be preserved and maintained within the Plan Area, which would not occur on a project-by-project basis. Improved management and monitoring under the SSHCP will also allow for expansion of giant gartersnake into areas not currently used by the species.

To ensure that giant gartersnake populations are protected and continue to expand within the Plan Area, three species-specific objectives (GGS1 – GGS3) will be implemented as part of the Conservation Strategy (Table 7-64). Objective GGS1 will benefit giant gartersnake during Preserve Assembly by ensuring that modeled habitats for giant gartersnake are preserved along specified creeks that provide giant gartersnake habitat value as identified in the Conservation Actions for this objective. By preserving a range of giant gartersnake aquatic and upland habitats in the Plan Area and providing Stream Setbacks which minimize impacts of urban development,

the SSHCP will help giant gartersnakes persist during expected climate change effects on precipitation and temperature.

Objective GGS2 will benefit giant gartersnake during Preserve Assembly by ensuring that modeled habitats for giant gartersnake are re-established and/or established along specified creeks that provide giant gartersnake habitat value as identified in the Conservation Actions for this objective. Objective GGS3 will also benefit giant gartersnake by establishing baseline hydrologic conditions along Badger Creek to identify the level of hydrology necessary to support giant gartersnake and by acquiring water sources to maintain the minimum level of hydrology during the summer months when agricultural runoff may diminish.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries that would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for giant gartersnake protected in the Preserve System will ensure that freshwater marsh, seasonal wetland, open water, and stream/creek hydrology, vegetation, and other wetland habitat characteristics within the SSHCP Preserve System are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit giant gartersnake habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, and HAB4) designed to maintain and enhance aquatic habitat, including early detection and eradication of invasive species such as American bullfrogs in Preserves. These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population. Permanent indirect effects on aquatic habitats such as hydrologic alterations will be tracked through studies of edge effects at Preserve boundaries, as directed by Objective HAB5.

Recovery Plan

The overall objective of the *Revised Draft Recovery Plan for the Giant Garter Snake* (Thamnophis gigas) (USFWS 2015a) is to delist the giant gartersnake, with the interim goals

being (1) stabilizing and protecting existing populations, and (2) conducting research necessary to further refine recovery criteria.

Recovery tasks emphasized in this plan are (1) habitat protection; (2) public participation, outreach, and education; (3) habitat management and restoration; (4) surveying and monitoring; and (5) research.

The Plan Area is located within the Cosumnes/Mokelumne Watershed Recovery Unit and the Delta Basin Recovery Unit of the Draft Recovery Plan. The Plan Area contains approximately 140,871 acres of the 235,002-acre Cosumnes-Mokelumne Watershed Recovery Unit, and 33,467 acres of the 699,859-acre Delta Basin Recovery Unit. SSHCP Covered Activities would impact up to 1,887 acres of modeled upland habitat and 131 acres of modeled aquatic habitat in the Cosumnes/Mokelumne Watershed Recovery Unit (Table 7-65). Covered Activities would also impact up to 60 acres of modeled upland habitat and 13 acres of modeled aquatic habitat in the Delta Basin Recovery Unit.

Table 7-65
Permanent Effects and Conservation in Recovery Area for Giant Gartersnake

Habitat Model Land Cover Types	Cosumnes-Mokelumne Watershed Recovery Unit		Delta Basin Recovery Unit		All Recovery Units	
	Total Effect	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*	*Total Effect*	*Total Habitat Preservation*
Aquatic Habitat						
Seasonal Wetland	38	94	2	5	40	99
Freshwater Marsh	66	127	3	26	69	153
Open Water	3	17	0	23	3	40
Stream/Creek	24	106	8	24	32	130
Total Aquatic Habitat	*131*	*344*	*13*	*78*	*144*	*422*
Upland Habitat						
Mixed Riparian Scrub	134	63	0	33	134	96
Valley Grassland	1,753	1,795	60	16	1,813	1,811
Total Upland Habitat	*1,887*	*1,858*	*60*	*49*	*1,947*	*1,907*
Total in Core Recovery Area	**2,018**	**2,202**	**73**	**127**	**2,091**	**2,329**

To offset these impacts, the SSHCP Conservation Strategy for giant gartersnake will preserve 49 acres of modeled upland habitat and 78 acres of modeled aquatic habitat in the Delta Basin Recovery Unit and will preserve 1,858 acres of modeled upland habitat and 344 acres of modeled aquatic habitat in the Cosumnes-Mokelumne Watershed Recovery Unit. The total impacts to giant gartersnake modeled habitat that is within recovery units that are within the

SSHCP Plan Area will be 2,901 acres. These impacts will be offset by preserving a total of 2,329 acres of giant gartersnake modeled habitat within recovery units that are within the SSHCP Plan Area.

The SSHCP Conservation Strategy will also help fulfill the objectives in the draft recovery plan by preserving and protecting the existing Cosumnes-Mokelumne Recovery Unit subpopulation in the Badger Creek/Willow Creek area and in the Delta Basin Recovery Unit, as well as monitoring and managing these habitats in perpetuity. By preserving habitat in these areas, the SSHCP will ensure that ample movement and dispersal habitat for giant gartersnake remains in these Recovery Units. The Preserve System will also include connections to adjacent large blocks of existing preserved habitat associated with the Stone Lakes NWR and the Cosumnes River Preserve that also provides habitat for giant gartersnake that is within giant gartersnake Recovery Units.

7.6.2.17 Western Pond Turtle

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 10,972 acres of modeled habitat for western pond turtle within the Plan Area (Table 7-66). The SSHCP will impact up to approximately 316 acres of modeled aquatic habitat, consisting of freshwater marsh, open water, and stream/creek and up to approximately 10,656 acres of modeled upland habitat which includes blue oak woodland, blue oak savanna, valley grassland, mine tailing riparian woodland, mixed riparian woodland, and mixed riparian scrub within the Plan Area. The majority of impacts to modeled habitat (94%) occur inside the UDA, including 282 acres of modeled aquatic habitat and 10,064 acres of modeled upland habitat. Covered Activities outside the UDA will directly impact approximately 34 acres of modeled aquatic habitat and 592 acres of modeled upland habitat.

To mitigate these impacts, the SSHCP will preserve a total of 13,102 acres of western pond turtle modeled habitat within the Plan Area, including 330 acres of modeled aquatic habitat and 12,772 acres of modeled upland habitat (Table 7-66). Most of this preservation will occur outside the UDA in PPU 7. The SSHCP will also re-establish and/or establish 716 acres of modeled habitat within the Plan Area, including 316 acres of modeled aquatic habitat and 400 acres of modeled upland habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-67).

Table 7-66
Permanent Effects and Conservation for Western Pond Turtle

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/ or Establishment (acres)
Upland Habitat					
Blue Oak Woodland	9	Qualitative	9	0 [a]	9 [b]
Blue Oak Savanna	35	Qualitative	35	34[a]	35[b]
Valley Grassland	10,256	Qualitative	10,256	12,319[c]	0
Mine Tailing Riparian Woodland	41	Qualitative	41	37[d]	41[e]
Mixed Riparian Woodland	170	Qualitative	170	368[f]	170[g]
Mixed Riparian Scrub	145	Qualitative	145	14 [f]	145[g]
Total Upland Habitat	*10,656*	*Qualitative*	*10,656*	*12,772*	*400*
Aquatic Habitat					
Freshwater Marsh	95	Qualitative	95	127	95
Open Water	104	Qualitative	104	86[h]	104[i]
Stream/Creeks	117	Qualitative	117	117	117
Total Aquatic Habitat	*316*	*Qualitative*	*316*	*330*	*316*
Total Plan-Wide Habitat	**10,972**	**Qualitative**	**10,972**	**13,102**	**716**

[a] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.

[b] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.

[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

[d] Impacts to Mine Tailing Riparian Woodland will be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian.

[e] Impacts to Mine Tailing Riparian Woodland will be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[f] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[g] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[h] Preservation of Open Water can be achieved by preserving any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

[i] Re-establishment and/or establishment of Open Water can be achieved by re-establishing and/or establishing any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

Table 7-67
Biological Goals and Measurable Objectives Applicable to Western Pond Turtle

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.

Table 7-67
Biological Goals and Measurable Objectives Applicable to Western Pond Turtle

Applicable Biological Goals	Related Biological Objectives
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W1.** Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.
	Objective W2. Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (low-impact development (LID) and ROAD AMMs) • Ground disturbance Avoidance and Minimization Measures (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
	Objective W6. Covered Activities will avoid a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective RIP1. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian

Table 7-67
Biological Goals and Measurable Objectives Applicable to Western Pond Turtle

Applicable Biological Goals	Related Biological Objectives
	Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by the Technical Advisory Committee (TAC)). The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether preserves are being managed and maintained for the benefit of Covered Species
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective WPT1**. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for western pond turtle (*Actinemys marmorata*) is preserved. Minimum preservation will total • 315.35 acres of aquatic habitat and • 10,971 acres of upland habitat.

Table 7-67
Biological Goals and Measurable Objectives Applicable to Western Pond Turtle

Applicable Biological Goals	Related Biological Objectives
	(See Objectives FWM1, OW1, RIP1, RIP3, VG1, BOW1, and SC1.)
	Objective WPT2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic habitat for western pond turtle is re-established and/or established. Minimum re-establishment and/or establishment will total 315 acres of aquatic habitat. (See Objectives RIP2, FWM2, and OW2.)

Analysis of Western Pond Turtle Conservation

The SSHCP Conservation Strategy will preserve and link a minimum of 330 acres of modeled aquatic habitat in the Plan Area, which will provide adequate aquatic habitat for western pond turtle in the Plan Area. In addition, through ensuring that a minimum of 12,772 acres of modeled upland habitat for western pond turtle is preserved in the Plan Area, western pond turtle will have adequate upland habitat in the Plan Area. Plan Area streams and creeks will be protected from direct and indirect effects of urban development through Stream Setbacks, as described in AMMs STREAM-1 and STREAM-2.

Objective VP1b requires that impacts occurring within or near the Cosumnes/Rancho-Seco Core Recovery Area will be mitigated through preservation in this Core Recovery Area, providing improved conservation for the species as compared to the existing project-by-project permitting.

As discussed in Section 7.5, the primary conservation focus for western pond turtle in the Plan Area is on the formation of a large landscape-scale Preserve (at least 10,500 acres) outside the UDA that connects to and augments existing preserves that are not part of the SSHCP Preserve System. This Landscape Preserve will encompass a heterogeneous range of natural land covers and soil types associated with western pond turtle modeled habitat in the Plan Area. Additionally, conservation is also focused on preservation of modeled habitat in the Cosumnes River/Deer Creek Corridor and the Laguna Creek Wildlife Movement Corridor. To the extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, resulting in a larger-scale contiguous Preserve System.

A total of 13,102 acres of western pond turtle modeled habitat will be preserved Plan-wide, including 330 acres of modeled aquatic habitat and 12,772 acres of modeled upland habitat (Table 7-66). Most of this preservation will occur outside the UDA, and the majority of this preservation will occur in PPU 7. The Preserve System in PPU 7 includes approximately 101 acres of modeled aquatic habitat and 8,879 acres of modeled upland habitat. The SSHCP Preserves in PPU 7 will be

consolidated with the 12,500-acre Chance Ranch, providing continuous aquatic and upland habitat that will meet the life history needs of the western pond turtle.

The Preserve System links together SSHCP Preserves and existing preserves that have modeled western pond turtle habitat to help maintain dispersal between breeding sites and modeled upland habitat. For example, there are four known occurrences for western pond turtle in existing preserves outside the UDA in PPU 6, and five known occurrences in SSHCP Preserves in PPU 7. Most of the occurrences of western pond turtle within the Plan Area (13 of 16) are outside the UDA in PPU 6 and in PPU 7 in the Cosumnes/Rancho-Seco Core Area. As a result, both occupied habitat and additional modeled aquatic and upland habitat for western pond turtle will be preserved and maintained within the Plan Area, which would not occur on a project-by-project basis. Improved management and monitoring under the SSHCP will also allow for expansion of western pond turtle into areas not currently used by the species.

To ensure that western pond turtle populations are protected and continue to expand within the Plan Area, two species-specific objectives (WPT1 and WPT2) will be implemented as part of the Conservation Strategy (Table 7-67). Objective WPT1 will benefit western pond turtle during assembly of the SSHCP Preserve System, by ensuring that modeled aquatic and upland habitat for western pond turtle is preserved. The conservation actions for this objective also identify minimum preservation acreages for both modeled aquatic and modeled upland habitats. By preserving a range of western pond turtle aquatic habitats in the Plan Area, the SSHCP will help western pond turtles persist during expected climate change effects on precipitation and temperature.

Objective WPT2 will also benefit western pond turtles during Preserve Assembly, by ensuring that modeled aquatic habitat for western pond turtle is re-established and/or established. The conservation action for this objective also identifies the minimum acreage for re-establishment and/or establishment of aquatic habitat. Additionally, this objective will ensure that any re-established and/or established aquatic habitat is located no more than 500 feet from preserved aquatic habitat. This requirement will increase the likelihood that the re-established or established aquatic habitat will be occupied by western pond turtle in the future, which will assist in maintaining or re-establishing the historical distribution of the species in the Plan Area. Re-establishing and/or establishing aquatic habitat will also ensure no net loss of western pond turtle aquatic habitat in the Plan Area.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow

for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. As discussed in Chapter 8, preserve land management techniques, monitoring, and adaptive management of habitat for western pond turtle protected in the Preserve System will ensure that freshwater marsh, open water, and stream/creek hydrology, vegetation, and other wetland habitat characteristics within the SSHCP Preserve System are not degraded, and will improve under SSHCP management as compared to existing habitat conditions. Goal 4 objectives will directly benefit western pond turtle habitat from the preparation and implementation of Preserve Management Plans (Objectives HAB1, HAB2, and HAB4) designed to maintain and enhance aquatic habitat, including early detection and eradication of invasive species such as American bullfrogs and introduced bass species (*Micropterus* spp. and *Morone saxatilis*) in Preserves. These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population. Permanent indirect effects on aquatic habitats such as hydrologic alterations will be tracked through studies of edge effects at Preserve boundaries, as directed by Objective HAB5.

7.6.2.18 Cooper's Hawk

Estimated Levels of Impact, Preservation, Re-Establishment and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 638 acres of modeled nesting/foraging habitat and modeled foraging habitat for Cooper's hawk (*Accipiter cooperii*) (Table 7-68). These impacts include direct effects to 600 acres of nesting/foraging habitat (including Blue Oak Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland) and 38 acres of foraging habitat (Blue Oak Savanna). The majority of impacts to Cooper's hawk nesting and foraging habitat (76%) will be inside the UDA.

To mitigate impacts to Cooper's hawk, the SSHCP will preserve approximately 1,011 acres of modeled habitat, including 964 acres of modeled nesting/foraging habitat and 47 acres of modeled foraging habitat throughout the Plan Area.

Additionally, the SSHCP will re-establish or establish 638 acres of modeled habitat, most of which will be Mixed Riparian Woodland and Mixed Riparian Scrub nesting/foraging habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-69).

Table 7-68
Permanent Effects and Conservation for Cooper's Hawk

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Nesting/Foraging Habitat					
Blue Oak Woodland	9	Qualitative	9	0	9[a]
Mixed Riparian Woodland	184	Qualitative	184	368[b]	184[c]
Mixed Riparian Scrub	189	Qualitative	189	378[b]	189[c]
Mine Tailing Riparian Woodland	218	Qualitative	218	218[d]	218[e]
Total Nesting/Foraging Habitat	*600*	*Qualitative*	*600*	*964*	*600*
Foraging Habitat					
Blue Oak Savanna	38	Qualitative	38	47[f]	38[a]
Total Foraging Habitat	*38*	*Qualitative*	*38*	*47*	*38*
Grand Total	**638**	Qualitative	**638**	**1,011**	**638**

[a] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.
[b] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[c] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[d] Impacts to Mine Tailing Riparian Woodland will be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[e] Impacts to Mine Tailing Riparian Woodland will be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[f] Impacts to Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.

Table 7-69
Biological Goals and Measurable Objectives Applicable to Cooper's Hawk

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and

Table 7-69
Biological Goals and Measurable Objectives Applicable to Cooper's Hawk

Applicable Biological Goals	Related Biological Objectives
	ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective RIP1**. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in

Table 7-69
Biological Goals and Measurable Objectives Applicable to Cooper's Hawk

Applicable Biological Goals	Related Biological Objectives
	developing status and trends and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective CH1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 974 acres of modeled foraging and nesting habitat for Cooper's hawk (*Accipiter cooperii*) is preserved in accordance with the Conservation Actions described Table 7-1 (see Objectives RIP1, RIP3, and BOW1).
	Objective CH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 601 acres of modeled foraging and nesting habitat for Cooper's hawk is re-established and/or established (see Objectives RIP2 and RIP4).
	Objective CH3. During assembly of the SSHCP Preserve System, ensure that a minimum of 38 acres of modeled foraging habitat for Cooper's hawk is preserved, in accordance with the Conservation Actions described in Table 7-1 (see Objectives RIP1, RIP3, and BOW1).

Analysis of Species Conservation

The SSHCP will preserve 1,011 acres of modeled nesting/foraging and foraging habitat for Cooper's hawk, which will ensure that the species has adequate nesting and foraging habitat in the Plan Area. In addition, the SSHCP will re-establish/establish 638 acres of modeled nesting/foraging habitat for Cooper's hawk in the Preserve System. Conservation of modeled nesting/foraging habitat will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized, and in combination with implementation of a comprehensive Monitoring and Management Program within the Preserve System, will continue to support Cooper's hawk.

Sites selected for preservation of nesting and foraging habitat will include Mixed Riparian Woodland, Mixed Riparian Scrub, and Blue Oak Woodland/Savanna. Pursuant to Conservation Action CH1.1, selection of Preserve sites supporting nesting and foraging habitat will be prioritized based on the availability of dense Blue Oak Woodland with trees approximately 26 to 49 feet high and in close proximity to foraging habitat with dense prey populations, all of which are located outside the UDA. The SSHCP will provide a well-designed system of large, interconnected Preserves to minimize the effects of habitat fragmentation. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to Cooper's hawk.

Establishment or re-establishment of areas for Cooper's hawk nesting and foraging habitat will be prioritized pursuant to Conservation Action CH2.1, which means they will be located near known nesting territories, connect disjunct segments or riparian habitat, and provide close proximity to modeled foraging areas with abundant prey populations. Cooper's hawk Mixed

Riparian Woodland and Mixed Riparian Scrub habitat establishment and re-establishment will occur only where a non-modeled land cover is converted to Mixed Riparian Woodland and Mixed Riparian Scrub. In addition, trees will be planted to encourage dense canopy closure of the mature stand, and survivorship of at least six trees pursuant to a stand is a success criterion.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Using a Stream Setback strategy in conjunction with low-impact and compatible uses in land planning, the Preserve System will maintain existing functions and values of Blue Oak Woodland and riparian nesting and foraging habitat in the Preserve System and minimize edge-effect disturbances to nesting Cooper's hawk (e.g., lighting, noise, human activity). Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

Additionally, improvements in nesting and foraging habitat quantity and quality with management and monitoring will support expansion of nesting and foraging activities into areas not currently used by Cooper's hawk. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Through proper land management techniques and continued monitoring of nesting and foraging habitat for Cooper's hawk preserved in the Preserve System, the SSHCP will ensure that habitat functions and values remain the same as the time of acquisition or improve with proper management. Management objectives that will, in particular, benefit Cooper's hawk are those designed to maintain and enhance nesting and foraging habitat, include monitoring the groundwater table as it relates to the health of riparian habitat (Objective RIP5) and ensuring that adverse edge effects, such as weeds, noise, hydrologic effects, trash, and litter, are avoided and minimized (Objectives HAB4 and HAB5). This careful management and monitoring, coupled with the extensive preservation of modeled habitat in large Preserves, ensures that the Conservation Strategy is consistent with Guiding Principle 7 to maintain or increase the number of Cooper's hawk present in the Plan Area. Similarly, the establishment of SSHCP Preserves in modeled Cooper's hawk habitat throughout the Plan Area means the Conservation Strategy is consistent with Guiding Principle 8, ensuring that Cooper's hawk are distributed throughout the Plan Area to limit the effects of stochastic disturbances to local subpopulations.

7.6.2.19 Ferruginous Hawk

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 25,491 acres of modeled foraging habitat for ferruginous hawk (*Buteo regalis*) (Table 7-70). These impacts include direct effects to 22,014 acres of Valley Grassland, 389 acres of Vernal Pool, 105 acres of Seasonal Wetland, 234 acres of Swale, and 2,749 acres of Irrigated Pasture Grassland. The majority of impacts to ferruginous hawk nesting and foraging habitat (70%) will be inside the UDA.

To mitigate impacts to ferruginous hawk, the SSHCP will preserve 26,112 acres of modeled foraging habitat, including 22, 014 acres of modeled Valley Grassland, 966 acres of Vernal Pool, 105 acres of Seasonal Wetland, 234 acres of Swale, and 2,749 acres of Irrigated Pasture-Grassland in the Plan Area. Most preservation will occur outside the UDA, largely in PPU 7.

Additionally, the SSHCP will re-establish or establish 728 acres of modeled habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-71).

Table 7-70
Permanent Effects and Conservation for Ferruginous Hawk

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Valley Grassland	22,014	Qualitative	22,014 [a]	22,014	0
Vernal Pool	389	0	389	966	389
Seasonal Wetland	105	Qualitative	105	105	105
Swale	234	0	234	278	234
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	2,749[b]	0
GRAND TOTAL	**25,491**	**0**	**25,491**	**26,112**	**728**

[a] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[b] Impacts to Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.

Table 7-71
Biological Goals and Measurable Objectives Applicable to Ferruginous Hawk

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.

Table 7-71
Biological Goals and Measurable Objectives Applicable to Ferruginous Hawk

Applicable Biological Goals	Related Biological Objectives
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams, as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA, as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.

Table 7-71
Biological Goals and Measurable Objectives Applicable to Ferruginous Hawk

Applicable Biological Goals	Related Biological Objectives
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective FH1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 25,881 acres of modeled foraging habitat for ferruginous hawk is preserved, including 19,625 acres in PPUs 5 and/or 7 (see Objectives AG1, VG1, VP1, VP3, and SW1).
	Objective FH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for ferruginous hawk is re-established and/or established (see Objectives VP2 and SW2).

Analysis of Species Conservation

The SSHCP will preserve 26,112 acres of modeled foraging habitat for ferruginous hawk, which will ensure that the species has adequate foraging habitat in the Plan Area. In addition, the SSHCP will re-establish/establish 728 acres of modeled foraging habitat for ferruginous hawk in the Preserve System. Conservation of modeled foraging habitat will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized, and in combination with implementation

of a comprehensive Monitoring and Management Program within the Preserve System, will continue to support ferruginous hawk.

Sites selected for preservation of foraging habitat or re-establishment and/or establishment will be prioritized, pursuant to Conservation Action FH1.1, and will include sites that have moderate to dense short vegetative cover with topographic variation, and are known to already support populations of prey species. The SSHCP will provide a well-designed system of large-scale landscape-level Preserves to minimize the effects of habitat fragmentation. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to ferruginous hawk.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Using a Stream Setback strategy in conjunction with low-impact and compatible uses in land planning, the Preserves will maintain existing functions and values of Vernal Pool, Irrigated Pasture-Grassland, and Valley Grassland foraging habitat in the Preserve System and minimize edge-effect disturbances to foraging ferruginous hawk (e.g., lighting, noise, human activity). Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

Additionally, improvements in foraging habitat quantity and quality with management and monitoring will possibly contribute to expansion of foraging activities into areas not currently used by ferruginous hawk. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Through proper land management techniques and continued monitoring of foraging habitat for ferruginous hawk preserved in the Preserve System, the SSHCP will ensure that habitat functions and values remain the same as the time of acquisition or improve with proper management. Management objectives that will, in particular, benefit ferruginous hawk are those designed to maintain and enhance foraging habitat, including monitoring the vegetation biomass within grassland land covers (HAB 7) and ensuring that adverse edge effects, such as weeds, noise, hydrologic effects, trash, and litter, are avoided and minimized (Objectives HAB4 and HAB5). This careful management and monitoring, coupled with the extensive preservation of modeled habitat in large Preserves, ensures that the Conservation Strategy is consistent with Guiding Principle 7 to maintain or increase the number of ferruginous hawk present in Plan Area. Similarly, the establishment of SSHCP Preserves in modeled ferruginous hawk habitat throughout the Plan Area means the Conservation Strategy is consistent with Guiding Principle

8, ensuring that ferruginous hawks are distributed throughout the Plan Area to limit the effects of stochastic disturbances to local subpopulations.

7.6.2.20 Swainson's Hawk

Estimated Levels of Impact, Preservation, Re-Establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 31,112 acres of modeled nesting and modeled foraging habitat for Swainson's hawk (*Buteo swainsoni*) (Table 7-72). These impacts include direct effects to 373 acres of modeled nesting habitat (including Mixed Riparian Woodland and Mixed Riparian Scrub) and 30,739 acres of modeled foraging habitat (Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale). Of the 31,112 acres of impacts to modeled habitat, 7,413 acres are within an area designated as high-value habitat for Swainson's hawk (Table 7-73). The majority of impacts to Swainson's hawk nesting and foraging habitat (73%) will be inside the UDA.

To mitigate impacts to Swainson's hawk, the SSHCP will preserve 33,805 acres of modeled nesting and foraging habitat that includes 8,158 acres of modeled high-value habitat. A majority of Swainson's hawk modeled habitat will be preserved outside the UDA, within PPUs 5 and 7.

Additionally, the SSHCP will re-establish or establish 1,101 acres of modeled nesting and foraging habitat, including 118 acres of modeled high-value habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-74).

Table 7-72
Permanent Effects and Conservation for Swainson's Hawk

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
Nesting Habitat					
Mixed Riparian Woodland	184	Qualitative	184	368[a]	184[b]
Mixed Riparian Scrub	189	Qualitative	189	378[a]	189[b]
Total Nesting Habitat	*373*	*Qualitative*	*373*	*746*	*373*
Foraging Habitat					
Cropland	5,285	Qualitative	5,285	6,947[c]	0
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	2,749[c]	0
Valley Grassland	21,977	Qualitative	21,977[d]	22,014	0
Vernal Pool	389	0	389	966	389
Seasonal Wetland	105	Qualitative	105	105	105

Final South Sacramento Habitat Conservation Plan

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
Swale	234	0	234	278	234
Total Foraging Habitat	*30,739*	*0*	*30,739*	*33,059*	*728*
Total Plan Habitat	**31,112**	**0**	**31,112**	**33,805**	**1,101**

[a] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[b] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[c] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.
[d] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-73
Permanent Effects and Conservation for Swainson's Hawk High-Value Habitat

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
High-Value Habitat[a](Foraging)					
Cropland	3,648	Qualitative	3,648	5,285[b]	0
Irrigated Pasture-Grassland	1,378	Qualitative	1,378	1,571[b]	0
Valley Grassland	2,269	Qualitative	2,269	1,143[c]	0
Vernal Pool	56	0	56	37	56
Seasonal Wetland	51	Qualitative	51	105	51
Swale	11	0	11	17	11
Total High-Value Habitat	**7,413**	**0**	**7,413**	**8,158**	**118**

[a] High-value habitat for Swainson's hawk is modeled foraging habitat occurring in the western portion of the Plan Area (within PPUs 4, 6, and 8). Acreages presented for high-value habitat are a subset of modeled nesting and foraging habitat and are not in addition to modeled nesting and foraging habitat.
[b] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.
[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-74
Biological Goals and Measurable Objectives Applicable to Swainson's Hawk

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).

Table 7-74
Biological Goals and Measurable Objectives Applicable to Swainson's Hawk

Applicable Biological Goals	Related Biological Objectives
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W1.** Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.
	Objective W2. Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams, as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA, as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective RIP1**. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.

Table 7-74
Biological Goals and Measurable Objectives Applicable to Swainson's Hawk

Applicable Biological Goals	Related Biological Objectives
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective SH1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 31,033 acres of modeled foraging habitat for Swainson's hawk is preserved (see Objectives AG1, AG2, SW1, VP1, VP3, and VG1). Ensure that mitigation for high-value modeled habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8.
	Objective SH2. At least 2,000 acres of Cropland habitat within high-value habitat within PPUs 4, 6, and 8 will be preserved in fee title to ensure that intensive management actions can be taken. Land held in fee title will be restricted to growing field or row crops. Fee title lands must maintain, at a minimum, an average of 50% of their crop cover-type in alfalfa (*Medicago sativa*). Other crop types or land covers may be substituted for alfalfa if the TAC determines that

Table 7-74
Biological Goals and Measurable Objectives Applicable to Swainson's Hawk

Applicable Biological Goals	Related Biological Objectives
	such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa.
	Objective SH3. During assembly of the SSHCP Preserve System, ensure a minimum of 746 acres of modeled nesting habitat for Swainson's hawk is preserved (see Objectives RIP1 and RIP3).
	Objective SH4. During assembly of the SSHCP Preserve System, ensure that a minimum of 373 acres of modeled riparian nesting habitat for Swainson's hawk is re-established and/or established. Ensure that mitigation for modeled nesting habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8 (see Objectives RIP2 and RIP4).
	Objective SH5. For each of the 36 known nesting trees within the UDA, plant 10 trees that are modeled for Swainson's hawk nesting within SSHCP Preserves. Plant nesting trees on properties preserved by the SSHCP within PPUs 4, 6, and 8, and near preserved foraging habitat. Tree species will be selected based on known suitability as nesting habitat for Swainson's hawk, and the planted trees must be maintained and/or replaced in perpetuity.
	Objective SH6. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for Swainson's hawk is re-established and/or established (see Objectives RIP2 and RIP4).

Analysis of Species Conservation

The SSHCP will preserve 33,805 acres of modeled nesting and modeled foraging habitat that includes 8,158 acres of modeled high-value habitat for Swainson's hawk, which will ensure that the species has adequate nesting, foraging, and high value habitat in the Plan Area. In addition, the SSHCP will re-establish/establish 1,101 acres of modeled foraging habitat that includes 118 acres of high-value habitat for Swainson's hawk in the Preserve System (SH4 through SH6).

Sites selected for preservation of nesting, foraging, and high-value habitat will include sites that are set up for alfalfa or other suitable agricultural production within 3 miles of active nest sites that are in close proximity to large areas of open space to provide foraging habitat and with existing large mature trees that will provide nesting habitat. Re-establishment and/or establishment will focus on similar criteria but will establish riparian habitat along streams or river channels within known nesting territories and plant suitable nesting trees on SSHCP Preserves near preserved foraging habitat. The SSHCP will be consistent with Guiding Principle 1 (Section 7.1) by providing a well-designed system of large-scale landscape-level Preserves to minimize the effects of habitat fragmentation. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to Swainson's hawk.

Implementation of Goal 3 and its related measurable objectives for modeled nesting and foraging habitat (Objectives RIP1 through RIP4, VG1, VP1 through VP5, SW1 and SW2, and AG1) will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized and, in combination with implementation of a comprehensive Preserve System Monitoring and Management Program, will continue to support Swainson's hawk.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Using a Stream Setback strategy in conjunction with low-impact and compatible uses in land planning, the Preserves will maintain existing functions and values of Riparian, Vernal Pool, Irrigated Pasture-Grassland, Valley Grassland, and other modeled nesting and foraging habitat in the Preserve System, and minimize edge-effect disturbances to nesting and foraging Swainson's hawk (e.g., lighting, noise, human activity). Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

Additionally, improvements in nesting and foraging habitat quantity and quality with management and monitoring will possibly contribute to expansion of nesting and foraging activities into areas not currently used by Swainson's hawk. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Through proper land management techniques and continued monitoring of foraging habitat for Swainson's hawk preserved in the Preserve System, the SSHCP will ensure that habitat functions and values remain the same as the time of acquisition or improve with proper management. Management objectives that will, in particular, directly benefit Swainson's hawk are those designed to maintain and enhance foraging habitat. The Conservation Strategy for Swainson's hawk requires cultivation of alfalfa, rice, and dryland grains close to known Swainson's hawk nest sites and modeled nesting habitat; planting of trees in agricultural settings; and planting of hedgerows along the borders of agricultural fields. Alfalfa, rice, and dryland grains are modeled habitats for Swainson's hawk prey and provide high productivity foraging habitats. Cultivating these crops and managing them for the benefit of Swainson's hawk will increase prey availability and should improve foraging success for the hawk. Similarly, planting trees in agricultural settings should increase the number of suitable nest sites in Swainson's hawk preferred foraging habitats, and planting hedgerows should increase habitat for prey species and prey availability. The SSHCP will preserve large expanses of Valley Grassland and agricultural landscapes outside the UDA, many of which would contain existing or suitable Swainson's hawk nest trees. Although preservation of nest trees outside the UDA is not a measurable objective, many nest trees outside the UDA will be

preserved indirectly through this process.In addition, the mitigation for Swainson's hawk nesting tree removal in the UDA would be to plant replacement nesting trees outside the UDA in SSHCP Preserves. Monitoring vegetation height in grasslands (Objective HAB7) should help maintain foraging habitat quality by improving habitat suitability for prey and increasing prey detectability (i.e., by controlling dense thatch). This careful management and monitoring, coupled with the extensive preservation of modeled habitat in large Preserves, ensure that the Conservation Strategy is consistent with Guiding Principle 7 to maintain or increase the number of Swainson's hawk present in Plan Area. Similarly, the establishment of SSHCP Preserves in modeled Swainson's hawk habitat throughout the Plan Area means the Conservation Strategy is consistent with Guiding Principle 8, ensuring that Swainson's hawks are distributed throughout the Plan Area to limit the effects of stochastic disturbances to local subpopulations. The sum total of these efforts will ensure that impacts to Swainson's hawk from SSHCP Covered Activities are mitigated to the maximum extent practicable.

7.6.2.21 White-Tailed Kite

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 31,319 acres of modeled nesting, nesting/foraging and foraging habitat for white-tailed kite (*Elanus leucurus*) (Table 7-75). These impacts include direct effects to 376 acres of nesting habitat (including Blue Oak Woodland, Mixed Riparian Woodland, and Mine Tailing Riparian Woodland), 189 acres of nesting/foraging habitat (Mixed Riparian Scrub), and 31,319 acres of foraging habitat (Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale). The majority of impacts to white-tailed kite nesting and foraging habitat (73%) will be inside the UDA.

To mitigate impacts to white-tailed kite, the SSHCP will preserve 32,175 acres of modeled habitat, including 586 acres of modeled nesting habitat, 189 acres of modeled nesting/foraging habitat, and 31,400 acres of modeled foraging habitat throughout the Plan Area. Most preservation will occur outside the UDA, with most of this preservation occurring in Valley Grassland habitat in PPU7.

Additionally, the SSHCP will re-establish or establish 1,365 acres of modeled habitat, of which approximately half will be foraging habitat and half will be nesting and nesting/foraging habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-76).

Table 7-75
Permanent Effects and Conservation for White-Tailed Kite

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-establishment and/or Establishment (acres)
Nesting Habitat					
Blue Oak Woodland	9	Qualitative	9	0	9[a]
Mixed Riparian Woodland	149	Qualitative	149	368[b]	184[c]
Mine Tailing Riparian Woodland	218	Qualitative	218	218[d]	218[e]
Total Nesting Habitat	*376*	*Qualitative*	*376*	*586*	*411*
Nesting/Foraging Habitat					
Mixed Riparian Scrub	189	Qualitative	189	169[b]	189[c]
Total Nesting/Foraging Habitat	*189*	*Qualitative*	*189*	*169*	*189*
Foraging Habitat					
Blue Oak Savanna	38	Qualitative	38	47[f]	37[a]
Cropland	5,285	Qualitative	5,285	5,285[g]	0
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	2,749[g]	0
Valley Grassland	21,954	Qualitative	21,954	22,014[h]	0
Vernal Pool	389	0	389	966	389
Seasonal Wetland	105	Qualitative	105	105	105
Swale	234	0	234	278	234
Total Foraging Habitat	*30,754*	*0*	*30,754*	*31,444*	*765*
Grand Total	**31,319**	**0**	**31,319**	**32,199**	**1,365**

[a] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.
[b] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[c] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[d] Impacts to Mine Tailing Riparian Woodland will be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[e] Impacts to Mine Tailing Riparian Woodland will be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[f] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.
[g] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.
[h] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-76
Biological Goals and Measurable Objectives Applicable to White-Tailed Kite

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787

Table 7-76
Biological Goals and Measurable Objectives Applicable to White-Tailed Kite

Applicable Biological Goals	Related Biological Objectives
Covered Species within the Plan Area.	acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W1**. Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.
	Objective W2. Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams, as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA, as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective RIP1**. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.

Table 7-76
Biological Goals and Measurable Objectives Applicable to White-Tailed Kite

Applicable Biological Goals	Related Biological Objectives
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective AG2. Of the 9,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as corn (*Zea mays*), alfalfa, or wheat (*Triticum*)) preferred by tricolored blackbird, greater sandhill crane, and the covered raptor species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective AG3. Maintain or increase raptor prey availability and improve raptor foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak

Table 7-76
Biological Goals and Measurable Objectives Applicable to White-Tailed Kite

Applicable Biological Goals	Related Biological Objectives
	Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
	Objective AG3. Maintain or increase raptor prey availability and improve raptor foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective WK1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 31,205 acres of modeled foraging habitat for white-tailed kite is preserved (see Objectives VG1, AG1, RIP1, RIP3, SW1, VP1, VP3, and BOW1).
	Objective WK2. During assembly of the SSHCP Preserve System, ensure that a minimum of 974 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is preserved (see Objectives RIP1, RIP3, and BOW1).
	Objective WK3. During assembly of the SSHCP Preserve System, ensure a minimum of 767 acres of modeled foraging habitat for white-tailed kite is re-established and/or established (see Objectives VP2, RIP2, RIP4, and SW2).
	Objective WK4. During assembly of the SSHCP Preserve System, ensure that a minimum of 601 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is re-established and/or established (see Objectives RIP2 and RIP4).

Analysis of Species Conservation

The SSHCP will preserve 32,175 acres of modeled nesting, modeled nesting/foraging and modeled foraging habitat for white-tailed kite, which will ensure that the species has adequate nesting, nesting/foraging, and foraging habitat in the Plan Area. In addition, the SSHCP will re-establish/establish 1, 365 acres of modeled nesting, nesting/foraging and foraging habitat for white-tailed kite in the Preserve System.

Sites selected for preservation of nesting, nesting/foraging, and foraging habitat will include sites that are set up for agriculture that support perennial crops, that are known to be used by white-tailed kite for foraging, and that occur in larger open space areas. They will include large, unfragmented patches of land with dense canopy cover for nesting that are connected to grasslands and agricultural areas known to support high prey densities. Re-establishment and/or establishment will include sites located along existing riparian corridors where nesting habitat likely existed in the past and sites within a new or existing preserve or habitat corridor in areas within at least 0.5 mile of modeled foraging habitat at least 500 feet from urban land uses. Areas that did not historically support riparian woodlands or that are within the existing Vernal Pool Ecosystem will be avoided. The SSHCP will be consistent with Guiding Principles 1 and 4 (Section 7.1) by providing a well-designed system of large landscape-level Preserves to minimize the effects of habitat fragmentation and edge effects. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to white-tailed kite.

Implementation of Goal 3 and its related measurable objectives for modeled nesting and foraging habitat (Objectives RIP1 through RIP4, VG1, VP1 through VP5, SW1 and SW2, AG1, and BOW1 and BOW2) will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized, and in combination with implementation of a comprehensive Monitoring and Management Program within the Preserve System, will continue to support white-tailed kite. Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Using a Stream Setback strategy in conjunction with low-impact and compatible uses in land planning, the Preserves will maintain existing functions and values of Blue Oak Woodland, Mixed Riparian Woodland, Mine Tailing Riparian Woodland, Vernal Pool, Irrigated Pasture-Grassland, Cropland, Seasonal Wetland, Valley Grassland, and other modeled nesting and foraging habitat in the Preserve System, and minimize edge-effect disturbances to nesting and foraging white-tailed kite (e.g., lighting, noise, human activity). Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

Additionally, improvements in nesting and foraging habitat quantity and quality with management and monitoring will contribute to expansion of nesting and foraging activities into areas not currently used by white-tailed kite. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Through proper land management techniques and continued monitoring of foraging habitat for white-tailed kite preserved in the Preserve System,

the SSHCP will ensure that habitat functions and values remain the same as the time of acquisition or improve with proper management. Management objectives that will, in particular, directly benefit white-tailed kite are those designed to maintain and enhance foraging habitat, including ensuring Cropland and Irrigated Pasture-Grassland (Objective AG1). The Conservation Strategy for white-tailed kite requires cultivation of alfalfa, rice, and dryland grains close to modeled nesting habitat; planting of trees in agricultural settings; and planting of hedgerows along the borders of agricultural fields. Alfalfa, rice, and dryland grains are modeled habitats for white-tailed kite prey and provide high-productivity foraging habitats. Cultivating these crops and managing them for the benefit of white-tailed kite will increase prey availability and should improve foraging success for the white-tailed kite. Similarly, planting trees in agricultural settings should increase the number of suitable nest and perching sites near foraging habitats, and planting hedgerows should increase habitat for prey species and prey availability. Additionally, if large trees are planted in hedgerows, they will provide white-tailed kite nesting habitat in addition to increased prey habitat values. Monitoring vegetation height in grasslands (Objective HAB7) should help maintain foraging habitat quality by improving habitat suitability for prey and increasing prey detectability (e.g., by controlling dense thatch). These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population. This careful management and monitoring, coupled with the extensive preservation of modeled habitat in large Preserves, ensures that the Conservation Strategy is consistent with Guiding Principle 7 to maintain or increase the number of white-tailed kites present in Plan Area. Similarly, the establishment of SSHCP Preserves in modeled white-tailed kite habitat throughout the Plan Area means the Conservation Strategy is consistent with Guiding Principle 8, ensuring that white-tailed kites are distributed throughout the Plan Area to limit the effects of stochastic disturbances to local subpopulations.

7.6.2.22 Northern Harrier

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 30,903 acres of modeled nesting/foraging habitat and foraging habitat for northern harrier (*Circus cyaneus*) (Table 7-77). These impacts include direct effects to 30,048 acres of nesting/foraging habitat (including Cropland, Irrigated Pasture-Grassland, and Valley Grassland) and 855 acres of foraging habitat (including Vernal Pool, Seasonal Wetland, Swale, and Freshwater Marsh). The majority of impacts to northern harrier nesting and foraging habitat (72%) will be inside the UDA.

To mitigate impacts to northern harrier, the SSHCP will preserve 33,186 acres of modeled habitat, including 31,710 acres of modeled nesting/foraging habitat and 1,476 acres of modeled foraging habitat throughout the Plan Area. A majority of preservation will occur outside the UDA, with most of this preservation split between PPUs 6 and 7.

Additionally, the SSHCP will re-establish or establish 855 acres of modeled foraging habitat, most of which will be Vernal Pool habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-78).

Table 7-77
Permanent Effects and Conservation for Northern Harrier

Land Cover Types	Direct Effects (acres)	Indirect Effects	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
Nesting/Foraging Habitat					
Cropland	5,285	Qualitative	5,285	6,947[a]	0
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	2,749[a]	0
Valley Grassland	22,014	Qualitative	22,014[b]	22,014	0
Total Nesting/ Foraging Habitat	*30,048*	*Qualitative*	*30,048*	*31,710*	*0*
Foraging Habitat					
Vernal Pool	389	0	389	966	389
Seasonal Wetland	105	Qualitative	105	105	105
Swale	234	0	234	278	234
Freshwater Marsh	127	Qualitative	127	127	127
Total Foraging Habitat	*855*	*0*	*855*	*1,476*	*855*
Grand Total	**30,903**	**0**	**30,903**	**33,186**	**855**

[a] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.
[b] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-78
Biological Goals and Measurable Objectives Applicable to Northern Harrier

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).

Table 7-78
Biological Goals and Measurable Objectives Applicable to Northern Harrier

Applicable Biological Goals	Related Biological Objectives
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.

Table 7-78
Biological Goals and Measurable Objectives Applicable to Northern Harrier

Applicable Biological Goals	Related Biological Objectives
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective NH1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 1,245 acres of modeled foraging habitat for northern harrier (*Circus cyaneus*) is preserved (see Objectives VG1, AG1, VP1, VP3, FWM1, and SW1).
	Objective NH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 30,048 acres of modeled nesting/foraging habitat for northern harrier is preserved (see Objectives VG1 and AG1).
	Objective NH3. During assembly of the SSHCP Preserve System, ensure that a minimum of 856 acres of modeled foraging habitat for northern harrier is re-established and/or established (see Objectives VP2, FWM2, and SW2).

Analysis of Species Conservation

The SSHCP will preserve 33,186 acres of modeled nesting/foraging and modeled foraging habitat for northern harrier (NH1 and NH2), which will ensure that the species has adequate nesting/foraging and foraging habitat in the Plan Area. In addition, the SSHCP will re-

establish/establish 855 acres of modeled nesting/foraging and foraging habitat for northern harrier in the Preserve System (NH3).

Sites selected for preservation of nesting/foraging and foraging habitat will include large, open sites with dense, tall vegetation known to support high prey densities linked or adjacent to currently preserved lands. Preserved sites will include wet or moist sites for nesting, in large open space areas that potentially support other Covered Species. Re-establishment and/or establishment will include sites with historically contained intact foraging habitat in large, open space areas where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species. The SSHCP will be consistent with Guiding Principles 1 and 4 (Section 7.1) by providing a well-designed system of large-scale landscape-level Preserves to minimize the effects of habitat fragmentation and edge effects. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to northern harrier.

Implementation of Goal 3 and its related measurable objectives for modeled nesting and foraging habitat (Objectives VG1, VP1 through VP5, SW1 and SW2, FWM1 and FWM2, and AG1) will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized, and in combination with implementation of a comprehensive Monitoring and Management Program within the Preserve System, will continue to support northern harrier.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Using a Stream Setback strategy in conjunction with low-impact and compatible uses in land planning, the Preserves will maintain existing functions and values of Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Freshwater Marsh, and other modeled nesting and foraging habitat in the Preserve System, and minimize edge-effect disturbances to nesting and foraging northern harrier (e.g., lighting, noise, human activity). Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

Additionally, improvements in nesting and foraging habitat quantity and quality with management and monitoring will possibly contribute to expansion of nesting and foraging activities into areas not currently used by northern harrier. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Through proper land management

techniques and continued monitoring of foraging habitat for northern harrier preserved in the Preserve System, the SSHCP will ensure that habitat functions and values remain the same as the time of acquisition or improve with proper management. Management objectives that will, in particular, directly benefit northern harrier are those designed to maintain and enhance foraging habitat, including ensuring Cropland and Irrigated Pasture-Grassland are available for foraging (Objective AG1). The Conservation Strategy for northern harrier includes cultivation of alfalfa, rice, and dryland grains close to modeled nesting habitat; planting of trees in agricultural settings; and planting of hedgerows along the borders of agricultural fields. Monitoring vegetation height in grasslands (Objective HAB7) should help maintain foraging habitat quality by improving habitat suitability for prey and increasing prey detectability (e.g., by controlling dense thatch). These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population. This careful management and monitoring, coupled with the extensive preservation of modeled habitat in large Preserves, ensures that the Conservation Strategy is consistent with Guiding Principle 7 to maintain or increase the number of northern harriers present in Plan Area. Similarly, the establishment of SSHCP Preserves in modeled northern harrier habitat throughout the Plan Area means the Conservation Strategy is consistent with Guiding Principle 8, ensuring that northern harrier are distributed throughout the Plan Area to limit the effects of stochastic disturbances to local subpopulations.

7.6.2.23 Western Burrowing Owl

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 30,836 acres of modeled wintering/nesting habitat for western burrowing owl (*Athene cunicularia*) (Table 7-79). These impacts include direct effects to 22,014 acres of Valley Grassland, 5,285 acres of Cropland, 2,749 acres of Irrigated Pasture-Grassland, 38 acres of Blue Oak Savanna, 389 acres of Vernal Pool, 105 acres of Seasonal Wetlands, 234 acres of Swale, and 22 acres of Stream/Creek (VPIH). The majority of impacts to western burrowing owl nesting/foraging habitat (74%) will be inside the UDA.

To mitigate impacts to western burrowing owl, the SSHCP will preserve approximately 33,132 acres of modeled wintering/nesting habitat, including 22,014 acres of Valley Grassland, 6,947 acres of Cropland, 2,749 acres of Irrigated Pasture-Grassland, 47 acres of Blue Oak Savanna, 966 acres of Vernal Pool, 105 acres of Seasonal Wetlands, 278 acres of Swale, and 26 acres of Stream/Creek (VPIH) throughout the Plan Area. A majority of this preservation will occur outside the UDA.

Additionally, the SSHCP will re-establish or establish 38 acres of modeled Blue Oak Savanna wintering nesting habitat, which is the only re-establishment or establishment planned for

western burrowing owl. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-80).

Table 7-79
Permanent Effects and Conservation for Western Burrowing Owl

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
Wintering Habitat					
Blue Oak Savanna	38	Qualitative	38	47[a]	38[b]
Valley Grassland	22,014	Qualitative	22,014[c]	22,014	0
Vernal Pool	389	94	483	966	0
Seasonal Wetland	105	Qualitative	105	105	0
Swale	234	44	278	278	0
Stream/Creek (VPIH)	22	4	26	26	0
Total Wintering Habitat	*22,802*	*142*	*22,944*	*23,436*	*38*
Wintering/Nesting Habitat					
Cropland	5,285	Qualitative	5,285	6,947[d]	0
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	2,749[d]	0
Total Nesting/Foraging Habitat	*8,034*	*0*	*8,034*	*9,696*	*0*
Grand Total	**30,836**	**142**	**30,978**	**33,132**	**38**

[a] Impacts to Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.
[b] Impacts to Blue Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.
[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[d] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.

Table 7-80
Biological Goals and Measurable Objectives Applicable to Western Burrowing Owl

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic	**Objective W2.** Covered Activities will implement the following, as outlined in Section 5.4.2:

Table 7-80
Biological Goals and Measurable Objectives Applicable to Western Burrowing Owl

Applicable Biological Goals	Related Biological Objectives
resources within the Plan Area.	• Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends and to track climate change.

Table 7-80
Biological Goals and Measurable Objectives Applicable to Western Burrowing Owl

Applicable Biological Goals	Related Biological Objectives
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective BO1.** Preserve seven occupied western burrowing owl (*Athene cunicularia*) sites (commensurate with 20% of the estimated number of sites within the UDA as of 2014), preserve at least 200 acres of land surrounding each occupied burrow site, and maintain modeled habitat for western burrowing owl within 0.4 mile of breeding sites.
	Objective BO2. For each western burrowing owl or western burrowing owl pair passively excluded, preserve 200 acres of modeled habitat for western burrowing owl, and establish a California ground squirrel (*Spermophilus (Otospermophilus) beecheyi*) colony, and augment with artificial burrows as appropriate (determined by TAC). Artificial burrows will be established at appropriate locations throughout the Preserve System pursuant to CDFW (CDFG 2012 guidelines) or as otherwise determined by the TAC.

Analysis of Species Conservation

The SSHCP will preserve 33,132 acres of modeled nesting/foraging habitat for western burrowing owl. Additionally, 7 occupied western burrowing owl sites and at least 200 acres of land surrounding each burrow site will be preserved under the SSHCP. Modeled habitat within 0.4 miles of breeding sites will be maintained under this objective and will ensure that the species has adequate nesting/foraging habitat in the Plan Area. Furthermore, the SSHCP will preserve 200 acres of modeled habitat for every western burrowing owl or western burrowing owl pair passively relocated, and establish a ground squirrel colony and augment with artificial burrows as appropriate.

Sites selected for preservation of nesting/foraging habitat and occupied western burrowing owl sites will include sites known to support breeding western burrowing owls, located within 3 miles of a known nesting site or modeled nesting habitat, that support high rodent populations during the breeding season and expand upon or link already preserved lands that will not be bisected by new roadways or incur impacts from any other infrastructure developments. Sites selected for preservation will include large (over 20 acres) sites that are open, with well-drained terrain and a low risk of flooding that has short, sparse vegetation with underground burrows that have modeled foraging habitat within 0.4 mile of breeding sites. Foraging habitat will be enhanced by promoting fossorial mammal populations in areas that are modeled foraging habitat and provide sentinel posts or mounds near burrows. The SSHCP will provide a well-designed system of large-scale landscape-level Preserves to minimize the effects of habitat fragmentation and edge effects. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to western burrowing owl.

Conservation of modeled nesting/foraging habitat will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized, and in combination with implementation of a comprehensive Preserve System Monitoring and Management Program, will continue to support western burrowing owl. Using a Stream Setback strategy in conjunction with low-impact and compatible uses in land planning, the Preserves will maintain existing functions and values of Cropland, Irrigated Pasture-Grassland, Valley Grassland, and Blue Oak Savanna in the Preserve System, and minimize edge-effect disturbances to nesting/foraging western burrowing owl (e.g., lighting, noise, human activity).

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

Additionally, improvements in nesting and foraging habitat quantity and quality with management and monitoring will possibly contribute to expansion of nesting and foraging activities into areas not currently used by western burrowing owl. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Through proper land management techniques and continued monitoring of foraging habitat for western burrowing owl preserved in the Preserve System, the SSHCP will ensure that habitat functions and values remain the same as the time of acquisition or improve with proper management. Management objectives that will, in particular, directly benefit western burrowing owl are those designed to maintain and enhance foraging habitat, include ensuring Cropland and Irrigated Pasture-Grassland is available for foraging. The Conservation Strategy that will benefit western burrowing owl includes managing large, open Preserves that contain small mammal burrows (such as California ground squirrel) with an active small mammal population. Areas with sentinel posts and/or mounds that are located within 0.4 mile of active breeding sites with well-drained soils will be prioritized for the benefit of western burrowing owl. These sites will increase prey availability and should improve nesting and foraging success for the owl. Monitoring vegetation height in grasslands (Objective HAB7) should help maintain foraging habitat quality by improving habitat suitability for prey and increasing prey detectability (e.g., by controlling dense thatch). These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population. Similarly, the establishment of SSHCP Preserves in modeled western burrowing owl habitat throughout the Plan Area means the Conservation Strategy is consistent with Guiding Principle 8, ensuring that western burrowing owls are distributed throughout the Plan Area to limit the effects of stochastic disturbances to local subpopulations.

7.6.2.24 Loggerhead Shrike

Estimated Levels of Impact, Preservation, Re-Establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 31,367 acres of modeled habitat for loggerhead shrike (*Lanius ludovicianus*) in the Plan Area (Table 7-81). This would include approximately 591 acres of nesting habitat (Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland), 22,014 acres of modeled nesting/foraging habitat (Valley Grassland), and 8,762 acres of modeled foraging habitat (Cropland, Irrigated Pasture-Grassland, Vernal Pool, Seasonal Wetland, Swale). (Table 7-81). The majority of the direct and indirect effects to loggerhead shrike nesting and foraging habitat will occur inside the UDA, although permanent effects on specific nest sites are not analyzed in Chapter 6 because the SSHCP database does not contain any confirmed loggerhead shrike nest sites for the Plan Area (Section 3.3.3).

To mitigate impacts to loggerhead shrike, the SSHCP will preserve approximately 34,023 acres of modeled habitat, including 964 acres of modeled nesting habitat, 22,014 acres of modeled nesting/foraging habitat and 11,045 acres of modeled foraging habitat throughout the Plan Area. A majority of preservation will occur outside the UDA, with most of this preservation occurring in PPUs 6 and 7 in Valley Grassland habitat.

Additionally, the SSHCP will re-establish or establish approximately 1,319 acres of modeled habitat, including 591 acres of modeled nesting habitat and 728 acres of modeled foraging habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-82).

Table 7-81
Permanent Effects and Conservation for Loggerhead Shrike

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
Nesting Habitat					
Mixed Riparian Woodland	184	Qualitative	184	368[a]	184[b]
Mixed Riparian Scrub	189	Qualitative	189	378[a]	189[b]
Mine Tailing Riparian Woodland	218	Qualitative	218	218[c]	218[d]
Total Nesting Habitat	*591*	*Qualitative*	*591*	*964*	*591*

Table 7-81
Permanent Effects and Conservation for Loggerhead Shrike

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
Nesting/Foraging Habitat					
Valley Grassland	22,014	Qualitative	22,014[e]	22,014	0
Total Nesting/ Foraging Habitat	*22,014*	*Qualitative*	*22,014*	*22,014*	*0*
Foraging Habitat					
Cropland	5,285	Qualitative	5,285	6,947[f]	0
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	2,749[f]	0
Vernal Pool	389	0	389	966	389
Seasonal Wetland	105	Qualitative	105	105	105
Swale	234	0	234	278	234
Total Foraging Habitat	*8,762*	*0*	*8,762*	*11,045*	*728*
Grand Total	**31,367**	**0**	**31,367**	**34,023**	**1,319**

[a] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[b] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[c] Impacts to Mine Tailing Riparian Woodland will be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[d] Impacts to Mine Tailing Riparian Woodland will be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.
[e] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[f] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.

Table 7-82
Biological Goals and Measurable Objectives Applicable to Loggerhead Shrike

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).

Table 7-82
Biological Goals and Measurable Objectives Applicable to Loggerhead Shrike

Applicable Biological Goals	Related Biological Objectives
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W1**. Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.
	Objective W2. Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish Irrigated Pasture-Grassland that provide habitat for Covered Species.	**Objective RIP1**. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will

Final South Sacramento Habitat Conservation Plan

Table 7-82
Biological Goals and Measurable Objectives Applicable to Loggerhead Shrike

Applicable Biological Goals	Related Biological Objectives
	be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends, and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
	Objective AG2. Of the 10,3779,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as corn (*Zea mays*), alfalfa, or wheat (*Triticum*)) preferred by tricolored blackbird, greater sandhill crane, and the covered raptor species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective LS1**. During assembly of the SSHCP Preserve System, ensure that a minimum of 9,152 acres of modeled foraging habitat for loggerhead shrike (*Lanius ludovicianus*) is preserved (see Objectives VG1, AG1, SW1, VP1, and VP3).
	Objective LS2. During assembly of the SSHCP Preserve System, ensure that a minimum of 22,014 acres of modeled nesting/foraging habitat for loggerhead shrike is preserved (see Objectives VG1, RIP1, and RIP3).

Table 7-82
Biological Goals and Measurable Objectives Applicable to Loggerhead Shrike

Applicable Biological Goals	Related Biological Objectives
	Objective LS3. During assembly of the SSHCP Preserve System, ensure that a minimum of 592 acres of modeled nesting habitat for loggerhead shrike is re-established and/or established (see Objectives RIP2 and RIP4).
	Objective LS4. During assembly of the SSHCP Preserve System, ensure that a minimum of 965 acres of modeled nesting habitat for loggerhead shrike is preserved (see Objectives RIP2 and RIP4).
	Objective LS5. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for loggerhead shrike is re-established and/or established (see Objective SW2).

Analysis of Species Conservation

The SSHCP will preserve approximately 34,023 acres of modeled habitat, including 964 acres of modeled nesting habitat, 22,014 acres of modeled nesting/foraging habitat, and 11,045 acres of modeled foraging habitat, throughout the Plan Area (Objectives LS1, LS2, and LS4). In addition, the SSHCP will re-establish or establish approximately 1,319 acres of modeled habitat for the loggerhead shrike in the Preserve System.

Sites selected for preservation of nesting, nesting/foraging, and foraging habitat will be prioritized pursuant to Conservation Actions LS1.1 and LS2.1, and will include sites that are Cropland, Irrigated Pasture-Grassland, Vernal Pool, Seasonal Wetland, Swale, Valley Grassland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland. The sites will include parcels that are greater than 20 acres in size and that are open with sparse vegetation for foraging, as these areas are known to support high prey densities. The sites would also be interspersed with scattered or isolated low trees or large shrubs that would be suitable for loggerhead shrike nest sites to enhance reproduction opportunities for this species. The areas would provide hunting perches with an open view to provide better foraging opportunities, and the areas would be either linked or adjacent to currently preserved lands to maintain and/or enhance connectivity between habitat patches. They would be in areas known to support loggerhead shrike and other Covered Species, and would be able to be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

Pursuant to Conservation Action LS3.1 and LS5.1, re-establishment and/or establishment will be prioritized on parcels that are 20 acres or greater in size and/or occur in larger, open space areas and that possess or can be planted with scattered or isolated low trees or large shrubs for nest sites. These sites would need to have the potential to support loggerhead shrike and other Covered Species after re-establishment and/or establishment, and would be linked or adjacent to

currently preserved lands to increase and ensure connectivity between Preserves and habitat patches. They would be located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Loggerhead shrike habitat re-establishment will only occur where habitat historically occurred but no longer exists due to loss of or changes in ecological factors.

The SSHCP will provide a well-designed system of large Preserves that are linked and designed to minimize the effects of habitat fragmentation and edge effects. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to loggerhead shrike.

Conservation of modeled nesting/foraging habitat will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized, and in combination with implementation of a comprehensive Preserve System Monitoring and Management Program within the Preserve System, will continue to support loggerhead shrike nesting and foraging habitat. Although Goal 2 addresses aquatic resources, some of the land covers included in the objectives for this goal are modeled nesting habitat (i.e., Mixed Riparian Scrub) and modeled foraging habitat (Vernal Pool, Seasonal Wetland, and Swale) for loggerhead shrike.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Using a Stream Setback strategy in conjunction with low impact and compatible uses in land planning the Preserve System will maintain existing functions and values of nesting habitat and minimize edge-effect disturbances to nesting loggerhead shrike (e.g., lighting, noise, human activity) and functions and values of foraging habitat. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Additionally, improvements in nesting and foraging habitat quantity and quality with management and monitoring will possibly contribute to expansion of nesting and foraging activities into areas not currently used by loggerhead shrike. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Implementation of Goal 3 and Goal 4 will directly benefit loggerhead shrike by maintaining and enhancing foraging habitat. Measurable Objectives under Goals 3 and 4 will ensure planting of Croplands (Objective AG1 and AG2) and provide cover and refugia to attract prey species (Objective HAB1, HAB2 and HAB 7). The Conservation Strategy for loggerhead shrike includes cultivation of alfalfa, rice, and dryland grains close to modeled nesting and perching habitat; planting of trees in agricultural settings; and planting of hedgerows along the borders of agricultural fields. Alfalfa, rice, and dryland grains are modeled habitats for loggerhead shrike prey and provide high

productivity foraging habitats. Cultivating these crops and managing them for the benefit of loggerhead shrike will increase prey availability and should improve foraging success for the shrike. Similarly, planting trees in agricultural settings should increase the number of suitable hunting perches and potentially nesting sites near foraging habitats. Planting hedgerows should increase habitat for prey species and prey availability. Additionally, if trees are planted in hedgerows, they can provide loggerhead shrike hunting perches and potentially nesting habitat, in addition to increased prey habitat values. Monitoring vegetation height in grasslands (Objective HAB7) should help maintain foraging habitat quality by improving habitat suitability for prey and increasing prey detectability (e.g., by controlling dense thatch). These actions should result in higher overall reproductive success and productivity of the Plan Area breeding population, and ensure that the Conservation Strategy is consistent with Guiding Principle 7 to maintain or increase the number of loggerhead shrike present in Plan Area. Similarly, the establishment of SSHCP Preserves in modeled loggerhead shrike foraging and nesting habitat throughout the Plan Area means the Conservation Strategy is consistent with Guiding Principle 8 by ensuring that, should a localized population become extirpated from a particular habitat patch, individual loggerhead shrikes from nearby modeled habitat in other preserves would repopulate vacant habitat and thus limit the effects of stochastic disturbances to local subpopulations.

7.6.2.25 Greater Sandhill Crane

Estimated Levels of Impact, Preservation, Re-establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact approximately 7,942 acres of modeled greater sandhill crane (*Grus canadensis*) roosting and foraging habitat of the Plan, including 124 acres of modeled roosting/foraging habitat (Seasonal Wetland and Freshwater Marsh), 66 acres of modeled roosting habitat (Vernal Pool), and 7,752 acres of modeled foraging habitat (Cropland, Irrigated Pasture-Grassland, and Valley Grassland) (Table 7-83). This includes 820 acres of impact to modeled high-value habitat Seasonal Wetland, Freshwater Marsh, Vernal Pool, Cropland, Irrigated Pasture-Grassland, and Valley Grassland). The majority of the direct effects for greater sandhill crane will occur inside the UDA.

To mitigate impacts to greater sandhill crane, the SSHCP will preserve approximately 10,320 acres of modeled habitat, that includes 232 acres of modeled roosting/foraging habitat, 37 acres of modeled roosting habitat, and 10,051 acres of modeled foraging habitat throughout the Plan Area (Table 7-83). Of the preserved modeled habitat, 9,399 acres of high-value habitat will be preserved (Table 7-84). A majority of preserved modeled habitat will occur outside the UDA, most of which will be in PPU 6.

Additionally, the SSHCP will re-establish or establish 184 acres of modeled habitat of the Plan, including 125 acres of modeled roosting/foraging habitat and 59 acres of modeled roosting

habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-85).

Table 7-83
Permanent Effects and Conservation for Greater Sandhill Crane

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
Roosting/Foraging Habitat[a]					
Seasonal Wetland	51	Qualitative	51	105	52
Freshwater Marsh	73	Qualitative	73	127	73
Total Roosting/ Foraging Habitat	*124*	*Qualitative*	*124*	*232*	*125*
Roosting Habitat					
Vernal Pool	59	7	66	37	59
Total Roosting Habitat	*59*	*7*	*66*	*37*	*59*
Foraging Habitat[b]					
Cropland	3,764	Qualitative	3,764	6,700[c]	0
Irrigated Pasture-Grassland	1,519	Qualitative	1,519	1,671[c]	0
Valley Grassland	2,469	Qualitative	2,469[d]	1,680	0
Total Foraging Habitat	*7,752*	*Qualitative*	*7,752*	*10,051*	*0*
GRAND TOTAL	**7,935**	**7**	**7,942**	**10,320**	**184**

[a] Modeled roosting habitat includes Seasonal Wetlands and Freshwater Marsh within 2 miles of greater sandhill crane occurrences in the Plan Area.
[b] Modeled foraging habitat includes Cropland, Irrigated Pasture-Grassland and Valley Grassland within 1.75 miles of modeled roosting habitat.
[c] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.
[d] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-84
Permanent Effects and Conservation for Greater Sandhill Crane High-Value Habitat

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Re-Establishment and/or Establishment (acres)
High-Value Habitat[a]					
Seasonal Wetland	1	Qualitative	1	74	0
Freshwater Marsh	1	Qualitative	1	96	1
Vernal Pool	18	1	19	28	18
Cropland	343	Qualitative	343	6,522[b]	0
Irrigated Pasture-Grassland	138	Qualitative	138	1,518[b]	0
Valley Grassland	318	Qualitative	318[c]	1,161	0
Total High-Value Habitat	**819**	**1**	**820**	**9,399**	**19**

[a] High-value habitat is all modeled roosting and foraging habitat above sea level and outside the floodplain and outside the UDA.
[b] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.
[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-85
Biological Goals and Measurable Objectives Applicable to Greater Sandhill Crane

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs) • Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.

Table 7-85
Biological Goals and Measurable Objectives Applicable to Greater Sandhill Crane

Applicable Biological Goals	Related Biological Objectives
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
	Objective AG2. Of the 10,3779,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as corn, alfalfa, or wheat) preferred by tricolored blackbird, greater sandhill crane, and the covered raptor species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.

Table 7-85
Biological Goals and Measurable Objectives Applicable to Greater Sandhill Crane

Applicable Biological Goals	Related Biological Objectives
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective GS1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 257 acres of modeled roosting or roosting/foraging habitat for greater sandhill crane is preserved. Roosting habitat will be preserved and maintained within PPUs 4, 6, and 8, with a minimum of 75% within PPU 6 (see Objectives VP1, SW1, and FWM1).
	Objective GS2. During assembly of the SSHCP Preserve System, ensure that a minimum of 7,751 acres of modeled foraging habitat for greater sandhill crane is preserved (see Objectives AG1, AG2, and VG1).
	Objective GS3. During assembly of the SSHCP Preserve System, ensure that a minimum of 184 acres of modeled roosting habitat or roosting/foraging habitat for greater sandhill crane is established and/or re-established. Re-establish two new roost sites (minimum of 90 acres of Freshwater Marsh/Seasonal Wetland complex each) every 2 miles in the gap between the Cosumnes population and the Stone Lakes' population or other strategic locations if that gap is closed by another HCP or conservation project (see Objectives VP2, SW2, and FWM2).
	Objective GS4. Create a visual screen of woody vegetation near human disturbances such as buildings, bridges, and paved roads from permanent roosting habitat within PPU 6. Screens should be located as appropriate to not interfere with habitat usage by greater sandhill cranes.
	Objective GS5. As part of the 2,000 acres preserved under Objective AG2, establish and maintain 10 food plots in strategic locations totaling a minimum of 200 acres within an agricultural setting for greater sandhill crane foraging habitat within PPU 6. Maintain the 200 acres among the 10 food plots as irrigated pasture or planted with crops preferred by greater sandhill crane as foraging habitat. Crops may include alfalfa, corn, wheat, or rice. Strategic placement of food plots will include locations for food plots in upland areas above the floodplain.
	Objective GS6. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,000 acres of high-value modeled foraging habitat for greater sandhill crane outside the 100-year floodplain is preserved (see Objectives VP1, SW1, and FWM1).

Analysis of Species Conservation

The SSHCP will preserve approximately 10,320 acres of modeled roosting and foraging habitat, including 232 acres of modeled roosting/foraging habitat, 37 acres of modeled roosting habitat, and 10,051 acres of modeled foraging habitat throughout the Plan Area. In addition, the SSHCP will re-establish two new roost sites (minimum of 90 acres of Freshwater Marsh/Seasonal Wetland complex each) every 2 miles in the gap between the Cosumnes population and the Stone Lakes' population.

The SSHCP provides a well-designed system of large Preserves that are linked and designed to minimize the effects of habitat fragmentation and edge effects. To the maximum extent possible,

newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to greater sandhill crane. By preserving 10,051 acres of modeled foraging habitat, the SSHCP will ensure that greater sandhill crane will have adequate foraging habitat in the Plan Area. In addition, the SSHCP will establish and maintain 10 food plots in strategic locations totaling a minimum of 200 acres within an agricultural setting that will ensure that foraging habitat is provided near important roosting areas in the Cosumnes River floodplain. Further, providing visual screens between roosting sites and human disturbances in PPU 6 will increase the chance that viable roosting sites will be maintained in the Preserve System.

Sites selected for preservation of roosting/foraging and roosting habitat will be prioritized pursuant to Conservation Action GS1.1 and will include sites that are known roost sites that are 20 acres or greater in size and/or that occur in larger, open space areas. They would be open space areas that are free of fences and powerlines, located within 2 miles of modeled foraging habitat outside the UDA, and linked or adjacent to currently preserved lands that are least 1,000 feet from disturbances, such as roads or other operations that may disturb roosting. The areas would support natural drainage inflows or water delivery that mimics natural hydrologic cycles and have Seasonal Wetland present from September to mid-March. Lastly, they potentially support other Covered Species or where management will be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.

Sites selected for preservation of foraging habitat will be prioritized pursuant to Conservation Action GS2.1 and will include sites that are known roost sites that are 20 acres or greater in size and/or that occur in larger, open space areas. They would be modeled foraging habitat that are free of fences and powerlines, located within 2 miles of known roost sites or modeled roosting habitat outside the UDA. The areas would be linked or adjacent to currently preserved lands, contain available sources of “grit,” including gravel and dirt roads or rocky uplands, and potentially support other Covered Species or where management will be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.

Re-establishment and/or establishment will be prioritized pursuant to Conservation Action GS3.1 in that it would select re-establishment or establishment sites outside the UDA, based on the same criteria used for preservation sites in GS1.1 and GS2.1, and will only occur where it replaces low-quality foraging or roosting habitat. Specifically, it will replace unmodeled agriculture uses, such as orchards and vineyards, with habitats supporting high prey abundance (e.g., invertebrates), removal of physical structures that can cause collisions during takeoff and flying, removal of human disturbances from otherwise modeled foraging and roosting habitat, and establishment of suitable hydrologic regimes at roosting sites. Also, it would contain grit sources near foraging areas.

The impacts on modeled roosting and foraging habitat loss and conversion and lack of habitat management may be significantly affecting the greater sandhill crane in the Plan Area. Conservation of modeled roosting and foraging habitat will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized. Although Goal 2 addresses aquatic resources, some of the land covers included in the objectives for this goal are modeled roosting/foraging habitat (i.e., Seasonal Wetland and Freshwater Marsh) and modeled roosting habitat (Vernal Pool) for greater sandhill crane. Using a Stream Setback strategy in conjunction with low impact and compatible uses in land planning the Preserve System will maintain existing functions and values of roosting and foraging habitat and minimize edge-effect disturbances to roosting and foraging greater sandhill crane (e.g., lighting, noise, human activity). Implementation of Goal 2 and its related measurable objectives for roosting/foraging habitat and roosting habitat will help ensure that the adverse effects of Covered Activities on these habitats will be minimized, and in combination with implementation of a comprehensive management and monitoring program within the Preserve System, will continue to support greater sandhill crane. Additionally, improvements in roosting and foraging habitat quantity and quality with management and monitoring will possibly contribute to expansion of roosting and foraging activities into areas not currently used by greater sandhill crane.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

Improvements in roosting and foraging habitat quantity and quality with management and monitoring will possibly contribute to expansion of roosting and foraging activities into areas not currently used by greater sandhill crane. Continued monitoring (Chapter 8) will track the amount of habitat lost and the amount preserved, and ensure the Plan is in overall compliance with get-ahead, stay-ahead requirements. Implementation of Goal 3 and Goal 4 will directly benefit greater sandhill crane by maintaining and enhancing foraging habitat. Measurable Objectives under Goals 3 and 4 will ensure planting of Croplands (Objectives AG1 and AG2) and provide cover and refugia to attract prey species (Objectives HAB1, HAB2, and HAB 7). The Conservation Strategy for greater sandhill crane includes cultivation of alfalfa, rice, and dryland grains close to roosting habitat. Alfalfa, rice, and dryland grains are modeled habitats for greater sandhill crane animal prey and other foods (e.g., waste grains) and provide high-productivity foraging habitats. Cultivating these crops and managing them for the benefit of greater sandhill crane will increase food availability and should improve foraging success for the crane.

Monitoring vegetation height in grasslands (Objective HAB7) should help maintain foraging habitat quality by improving access to waste grains, as well as habitat suitability for prey and increasing prey detectability (e.g., by controlling dense thatch). The effects of noise and hydrologic alterations will be addressed by Objective HAB5. This careful management and monitoring, coupled with the extensive preservation of modeled habitat in large Preserves, ensures that the Conservation Strategy is consistent with Guiding Principle 7 (Section 7.1) to maintain or increase the number of and carrying capacity for wintering greater sandhill cranes present in Plan Area. Similarly, the establishment of SSHCP Preserves in modeled greater sandhill crane foraging and roosting habitat throughout the Plan Area means the Conservation Strategy will ensure that, should a localized population become extirpated from a particular habitat patch, individual greater sandhill cranes from nearby modeled habitat in other preserves would repopulate vacant habitat and thus limit the effects of stochastic disturbances to local subpopulations.

7.6.2.26 Tricolored Blackbird

Estimated Levels of Impact, Preservation, Re-Establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to approximately 31,058 acres of modeled habitat for tricolored blackbird (*Agelaius tricolor*) in the Plan Area. As detailed in Table 7-78, this would include approximately 27,531 acres of nesting/foraging habitat (Cropland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh) and 3,527 acres of modeled foraging habitat (Irrigated Pasture-Grassland, Vernal Pool, Swale and Open Water) (Table 7-86). The majority of the direct and indirect effects for tricolored blackbird (96%) will occur inside the UDA.

To mitigate impacts to tricolored blackbird, the SSHCP will preserve approximately 33,297 acres of modeled habitat (Table 7-86), including 29,193 acres of modeled nesting/foraging habitat and 4,104 acres of modeled foraging habitat throughout the Plan Area. A majority of preservation for this species will be in PPUs 6 and 7.

Additionally, the SSHCP will re-establish or establish approximately 1,010 acres of modeled habitat, including 232 acres of modeled nesting/foraging habitat and 778 acres of modeled foraging habitat. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-87).

Final South Sacramento Habitat Conservation Plan

Table 7-86
Permanent Effects and Conservation for Tricolored Blackbird

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (Acres)	Total Habitat Preservation (acres)	Total Habitat Establishment and/or Re-Establishment (acres)
Nesting/Foraging Habitat					
Cropland	5,285	Qualitative	5,285	6,947[a]	0
Valley Grassland	22,014	Qualitative	22,014	22,014[b]	0
Seasonal Wetland	105	Qualitative	105	105	105
Freshwater Marsh	127	Qualitative	127	127	127
Total Nesting/ Foraging Habitat	*27,531*	*Qualitative*	*27,531*	*29,193*	*232*
Foraging Habitat					
Irrigated Pasture-Grassland	2,749	Qualitative	2,749	2,749[a]	0
Vernal Pool	389	0	389	966	389
Swale	234	0	234	278	234
Open Water	155	Qualitative	155	155[c]	155[d]
Total Foraging Habitat	*3,527*	*0*	*3,527*	*4,148*	*778*
Grand Total	**31,058**	**0**	**31,058**	**33,341**	**1,010**

[a] Impacts to Cropland or Irrigated Pasture-Grassland can be mitigated by preserving a combination of Cropland and Irrigated Pasture-Grassland.
[b] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.
[c] Preservation of Open Water can be achieved by preserving any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.
[d] Re-establishment and/or establishment of Open Water can be achieved by re-establishing and/or establishing any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

Table 7-87
Biological Goals and Measurable Objectives Applicable to Tricolored Blackbird

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design AMMs (Low-Impact Development (LID) and ROAD AMMs)

Table 7-87
Biological Goals and Measurable Objectives Applicable to Tricolored Blackbird

Applicable Biological Goals	Related Biological Objectives
	• Ground-disturbance AMMs (Best Management Practices (BMPs) and ROAD AMMs)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.

Table 7-87
Biological Goals and Measurable Objectives Applicable to Tricolored Blackbird

Applicable Biological Goals	Related Biological Objectives
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by the Technical Advisory Committee (TAC)). The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends and to track climate change.
	Objective HAB7. Monitor vegetation biomass within grassland land covers.
	Objective AG2. Of the 10,3779,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as corn, alfalfa, or wheat) preferred by tricolored blackbird, greater sandhill crane, and the covered raptor species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective TB1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 4,149 acres of modeled foraging habitat for tricolored blackbird is preserved (see Objectives AG1, AG2, FWM1, VG1, VP1, VP3, FWM1, OW1, and SW1).
	Objective TB2. During assembly of the SSHCP Preserve System, ensure that a minimum of 27,532 acres of modeled nesting/foraging habitat for tricolored

Table 7-87
Biological Goals and Measurable Objectives Applicable to Tricolored Blackbird

Applicable Biological Goals	Related Biological Objectives
	blackbird is preserved, including a minimum of 402 acres of Freshwater Marsh and Seasonal Wetland (see Objectives AG1, AG2, VG1, VG1, FWM1, and SW1).
	Objective TB3. During assembly of the SSHCP Preserve System, ensure that a minimum of 917 acres of modeled foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2, SW2, OW2, and VP2).
	Objective TB4. During assembly of the SSHCP Preserve System, ensure that a minimum of 232 acres of modeled nesting/foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2 and SW2).
	Objective TB5. Provide mitigation for loss of any tricolored blackbird nesting colony site that is occupied at the time of Covered Activity implementation or was recorded as an occupied nesting colony at any time since 2008. Sources for occupied nesting colonies are the CNDDB, Tricolored Blackbird Portal, eBird, or other data sources approved by the Wildlife Agencies. Minimum mitigation is to preserve one extant unpreserved occurrence of a nesting colony prior to take of one nesting colony of tricolored blackbirds. Ensure that at least five extant tricolored blackbird colonies that were occupied in recent years are maintained and managed within the SSHCP Preserve System.
	Objective TB6. Conduct an experimental study to identify management actions to preserve tricolored blackbird colonies (e.g., coarse netting to reduce nest predation or impact of pesticides).
	Objective TB7. Ensure that at least one large tricolored blackbird colony (i.e., one that has historically (from 1950 on) supported a minimum of 1,500 individuals) is preserved.
	Objective TB8. For any tricolored blackbird nesting colony that is removed by a Covered Activity, re-establish and/or establish three new colonies within SSHCP Preserves. Re-established and/or established colonies can be in aquatic (freshwater marsh, seasonal wetland) or upland (annual grassland) habitat types, and must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands that provide adequate foraging opportunities.

Analysis of Species Conservation

The SSHCP will preserve approximately 33,297 acres of modeled nesting and foraging habitat. This would include approximately 29,193 acres of modeled nesting/foraging habitat and 4,104 acres of modeled foraging habitat throughout the Plan Area. The SSHCP will provide a system of large-scale landscape-level Preserves that are linked and designed to minimize the effects of habitat fragmentation and edge effects. To the maximum extent possible, newly preserved lands acquired by the SSHCP will be adjacent to and contiguous with existing preserves, enhancing the ecological value of SSHCP Preserves to tricolored blackbird.

By ensuring that 4,104 acres of modeled foraging habitat and 29,193 acres of modeled nesting/foraging habitat is preserved, and a minimum of 778 acres of foraging habitat and 232

acres of modeled nesting/foraging habitat is established or re-established in the Plan Area, as well as managing the habitat value of Croplands in the Preserve System, tricolored blackbirds will have adequate foraging habitat in the Plan Area. In addition, the 1,010 acres of re-established and/or established modeled foraging habitat and 232 acres of re-established and/or established nesting/foraging habitat will ensure that tricolored blackbird have adequate quality nesting/foraging habitat in the Plan Area.

Sites selected for preservation of foraging habitat will be prioritized pursuant to Conservation Action TB1.1 and be within 3 miles of a known nesting site or modeled nesting/foraging habitat on parcels 20 acres or greater in size and/or occur in larger, open space areas. They will be known to support high insect populations during the breeding season (April through July), will expand on or link already preserved lands, and will not be bisected by new roadways or incur impacts from any other infrastructure developments. Lastly they will be located where management will be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

Sites selected for preservation of nesting/foraging habitat will be prioritized pursuant to Conservation Actions TB2.1 and TB2.2 and will be located where management will be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

Preserve sites for aquatic nesting/foraging habitat will be within 3 miles of a known foraging site (intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat) or modeled nesting habitat on parcels 20 acres or greater in size and/or occur in larger, open space areas. They will be known to currently or historically support a tricolored blackbird colony, have nesting substrate (e.g., tules, cattails) in an extensive area (minimum 2 acres) to accommodate large tricolored blackbird colonies, and have Open Water (e.g., canal, lakeshore, or farm pond) within 1,640 feet (500 meters) of nesting substrate to provide a water source for nestlings. Management of this preserved aquatic nesting/foraging habitat will include periodic thinning or removal of tules or cattails after the nesting season to allow for growth of new tules and cattails, which are strongly preferred by nesting blackbirds. In addition, trees and other potential perching sites within 50 feet of this aquatic nesting/foraging habitat will be removed as necessary to prevent predators from taking eggs or nestlings from active colonies.

Preserve sites for upland nesting/foraging habitat will be within 3 miles of a known foraging site (intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat) or modeled nesting habitat on parcels 20 acres or greater in size and/or occur in larger, open space areas. They will be known to currently or historically support a tricolored blackbird colony, have nesting substrate (e.g., Himalayan blackberry) thickets in an extensive area (minimum 2 acres) to accommodate large tricolored blackbird colonies, and have Open Water

(e.g., canal, lakeshore, or farm pond) within 1,640 feet (500 meters) of nesting substrate to provide a water source for nestlings. Management of this upland nesting/foraging habitat will include maintaining these dense thickets of blackberry.

Sites for re-establishment and/or establishment of foraging habitat will be prioritized based on the criteria in Conservation Action TB3.1 (Table 7-1). Re-establishment and/or establishment will occur only where currently non-modeled habitat is converted to modeled habitat, and will be located where management will be used to enhance or re-establish natural ecosystem processes and attract Covered Species. The areas will occur within 3 miles of at least 1,000 acres of open space that includes all or a mix of Irrigated Pasture-Grassland, Cropland, Vernal Pool, Seasonal Wetlands, Swale, Freshwater Marsh, Open Water, and/or Valley Grassland that will provide adequate insect prey for nestlings. Surveys will be conducted in the re-establishment areas after the first year and every 5 years thereafter to monitor success and provide for remediation of failed re-establishment areas within 1 year after efforts are deemed unsuccessful.

Sites selected for re-establishment and/or establishment of nesting/foraging habitat will be prioritized pursuant to Conservation Action TB4.1, and will be known to historically support a tricolored black bird colony. They will be located on parcels 20 acres or greater in size and/or occur in larger, open space areas within 1 mile of a known foraging site or SSHCP land cover type that provides modeled nesting and foraging habitat. Lastly, it will have Open Water to provide water for nestlings within 1,640 feet (500 meters) of area where upland nesting substrate can be re-established and/or established.

Implementation of Objectives TB3 and TB4 and their accompanying Conservation Actions will ensure that tricolored blackbird will have new areas of preserved and managed quality nesting and nesting/foraging habitat in the Plan Area. Improvements in nesting and foraging habitat quantity and quality with management and monitoring will contribute to the potential expansion of nesting and foraging activities into areas not currently used by tricolored blackbird.

Ongoing impacts on modeled nesting and foraging habitat loss and conversion and lack of habitat management may already be significantly affecting the tricolored blackbird in the Plan Area. Implementation of Goal 2 and its related measurable objectives for modeled nesting and foraging habitat (Objectives W2 through W5) will help ensure that the adverse impacts of Covered Activities on these habitats will be minimized. Although Goal 2 addresses aquatic resources, some of the land covers included in the objectives for this goal are modeled nesting and foraging habitat (i.e., Seasonal Wetland, Freshwater Marsh, Vernal Pool, Open Water, and Swale) for tricolored blackbird. Using a Stream Setback strategy in conjunction with low-impact and compatible uses in land planning the Preserve System will maintain existing functions and values of nesting and foraging habitat and minimize edge-effect disturbances to tricolored blackbird colonies (e.g., lighting, noise, human activity).

The SSHCP Conservation Strategy ensures that the most current distribution of nesting colonies is considered during Plan implementation. Objective TB5 requires preservation and management of at least five nesting colonies that were recently active prior to the effective date of the permit (based on the last two statewide surveys). In addition, prior to take of a nesting colony, one extant and unprotected colony must be preserved. To meet Objective TB5, Conservation Action TB5.1 will be implemented and will provide a preserved nesting substrate (including flooded, thorny, spiny, or "visually" but not actually spiny vegetation) with open accessible water within 1,640 feet (500 meters) of the nesting substrate with at least 1,000 acres of modeled foraging habitat. Objective TB6 require a study of potential management actions to reduce permanent indirect effects to nest colonies, such as predation and pesticides. Objective TB7 requires that at least one large colony that has historically (since 1950) supported at least 1,500 individuals be preserved. According to Conservation Action TB7-1, that large colony must have preserved nesting habitat and at least 500 acres of modeled foraging habitat within a 1-mile radius of the colony.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands. Further, the SSHCP Conservation Strategy protects individual vernal pool watersheds–SSHCP Preserve boundaries would be established outside the micro-watershed of preserved vernal pools. Using rigorous Preserve Setback AMMs and watershed protection AMMs in conjunction with low-impact AMMs and compatible-use AMMs in project planning, the Preserve will maintain existing ecosystem functions and habitat values of the Vernal Pool Ecosystem within the Preserve System. Through proper land management techniques and continued monitoring of nesting and foraging habitat for tricolored blackbird preserved in the Preserve System, the SSHCP will ensure that habitat functions and values remain the same as the time of acquisition or improve with proper management (HAB1 through HAB7). Management objectives that will, in particular, directly benefit tricolored blackbird are those designed to maintain and enhance nesting and foraging habitat, such as those that ensure planting of Croplands (Objectives AG1 and AG2) and provision of cover and refugia that will attract prey species (Objectives AG1 and AG2). The Conservation Strategy for tricolored blackbird includes cultivation of alfalfa, rice, and dryland grains close to modeled nesting habitat and planting of hedgerows along the borders of agricultural fields. Alfalfa, rice, and dryland grains are modeled habitats for tricolored blackbird and provide high productivity foraging habitats that provide both insect prey that is important during the nesting season and plant matter that is important during the winter (Crase and DeHaven 1978). Cultivating these crops and managing them for the benefit

of tricolored blackbird will increase prey availability and should improve nesting and foraging success for the blackbird. This careful management and monitoring, coupled with the extensive preservation of modeled habitat in large Preserves throughout the Plan Area, means the Conservation Strategy is consistent with Guiding Principle 8 by ensuring that, should a localized population become extirpated from a particular habitat patch, individual tricolored blackbirds from nearby modeled habitat or colonies in other preserves would be able to recolonize vacant habitat and thus limit the effects of stochastic disturbances to local subpopulations.

7.6.2.27 American Badger

Estimated Levels of Impact, Preservation, Re-Establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 22,780 acres of American badger (*Taxidea taxus*) modeled habitat in the Plan Area (Table 7-88), including 389 acres of impacts to Vernal Pool, 234 acres of impacts to Swale, 105 acres of impacts to Seasonal Wetland, 38 acres of impacts to Blue Oak Savanna, and 22,014 acres of impacts to Valley Grassland. Occurrences of this highly mobile species have been documented in PPUs 1, 2, and 6 (Figure 3-29), but it is likely that the species is more widely distributed and will be affected by Covered Activities throughout the Plan Area.

To mitigate these impacts to American badger modeled habitat, the SSHCP will preserve 23,401 acres of American badger modeled habitat, including 966 acres of Vernal Pools, 278 acres of Swale, 105 acres of Seasonal Wetland, 38 acres of Blue Oak Savanna, and 22,014 acres of Valley Grassland (Table 7-88).

The SSHCP will also re-establish and/or establish 766 acres of American badger modeled habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-89).

Table 7-88
Habitat Impacts and Conservation for American Badger

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Establishment/ Re-Establishment (acres)
Blue Oak Savanna	38	Qualitative	38	38[a]	38[b]
Valley Grassland	22,014	Qualitative	22,014[c]	22,014	0
Vernal Pool	389	0	389	966	389
Seasonal Wetlands	105	Qualitative	105	105	105
Swale	234	0	234	278	234
GRAND TOTAL	**22,780**	**0**	**22,780**	**23,401**	**766**

[a] Impacts to Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.
[b] Impacts to Blue Oak Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.
[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

Table 7-89
Biological Goals and Measurable Objectives Applicable to American Badger

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W2.** Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design avoidance and minimization measures (Low-Impact Development (LID) and ROAD Measures) • Ground disturbance avoidance and minimization measures (Best Management Practices (BMPs) and ROAD Measures)
	Objective W3. Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish natural land covers (including cropland and irrigated pasture-grassland) that provide habitat for Covered Species.	**Objective VG1**. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.

Table 7-89
Biological Goals and Measurable Objectives Applicable to American Badger

Applicable Biological Goals	Related Biological Objectives
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including cropland and irrigated pasture-grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. Program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends, tracking climate change, and other related tasks.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective AB1.** During assembly of the SSHCP Preserve System, ensure that a minimum of 23,171 acres of modeled habitat for American badger (Taxidea taxus) is preserved (see Objectives BOW1, VG1, VP1, VP3, and SW1).
	Objective AB2. During Preserve assembly, ensure that a minimum of 767 acres of modeled habitat for American badger is re-established and/or established (see Objectives VP2 and SW2).

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link 23,401 acres of the highest-quality habitat for American badger in the Plan Area. Because the range of American badger in the Plan Area is not well understood and observations are generally older, the Conservation Strategy does not target the areas where occurrences have been recorded. Rather, the SSHCP targets preservation of large, connected Preserves that can best support this highly mobile species. In particular, American badger modeled habitat preserved by the SSHCP in PPU 7 could support several badger territory/home ranges, which can range from approximately 340 acres to more than 1,500 acres (Lindzey 1982; Messick 1987; Minta 1993).

Preserves benefiting American badger will be established through land acquisitions that are targeted to (1) capture large continuous areas of American badger modeled habitat, (2) include a diversity of land cover types that provide American badger modeled habitat, (3) add parcels onto existing preserves that increase preserve size and minimize habitat fragmentation and edge effects, and (4) provide connections to existing preserves that are currently isolated from each other.

The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves that include American badger modeled habitat will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. Further, under Conservation Action VPI1.2 at least 90% of the watershed for each preserved vernal pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In these ways, SSHCP Preserves protect riparian and wetland areas and will contribute to the persistence of American badger in the Plan Area. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and preservation of large areas of intact habitat would not occur.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

In addition to modeled habitat preservation, the Implementing Entity will establish or re-establish 766 acres of American badger modeled habitat in the Plan Area, with a priority on re-establishment before establishment.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of habitat for American badger protected in the Preserve System will ensure that American badger habitat requirements within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Management objectives that will directly benefit American badger are those designed to maintain and enhance habitat, including Preserve Management Plans (Objectives HAB1 and HAB2), consideration of management history (Objective HAB3), an invasive species eradication program (Objective HAB4), and monitoring vegetation height in grasslands (Objective HAB7) to improve habitat suitability for important prey and increase prey detectability. Permanent indirect effects on modeled habitat such as increased weeds, litter, and hydrological alterations will be addressed by Objective HAB5 (Table 7-89). These actions should result in higher overall reproductive success and productivity of the Plan Area population, and may allow expansion of American badger into areas not currently used by this species.

7.6.2.28 Western Red Bat

Estimated Levels of Impact, Preservation, Re-Establishment, and Establishment

As discussed in Chapter 6, SSHCP Covered Activities are anticipated to impact up to 23,986 acres of western red bat (*Lasiurus blossevillii*) modeled habitat in the Plan Area (Table 7-90). The majority of impacts to western red bat modeled habitat (97%) occur in the UDA.

The range for western red bat includes the entire Plan Area. There are eight documented occurrences for western red bat in the SSHCP GIS database, and several records from county rabies testing that were not able to be geo-referenced (refer to Section 3.4.6). In addition, a bat monitoring station at the Cosumnes River Preserve has detected western red bats. Due to the apparent widespread distribution of the species in the Plan Area, the conservation analysis is primarily based on modeled foraging and roosting habitat under the assumption that western red bat could use these modeled habitats throughout the Plan Area.

To mitigate impacts to western red bat modeled habitat and to preserve or improve the species' abundance and distribution in the Plan Area, the SSHCP will preserve 24,697 acres of western red bat modeled habitat, consisting of 839 acres of modeled roosting/foraging habitat (Blue Oak Woodland and Savanna, Mixed Riparian Woodland) and 23,858 acres of modeled foraging habitat (Valley Grassland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, Open Water, and Streams/Creek) (Table 7-90).

The SSHCP will also re-establish and/or establish 1,765 acres of western red bat modeled habitat in the Plan Area. All preservation, re-establishment, and/or establishment will be consistent with the Biological Goals and Measurable Objectives for this species (Table 7-91).

Table 7-90
Permanent Effects and Conservation for Western Red Bat

Land Cover Types	Direct Effects (acres)	Indirect Effects (acres)	Total Effects (acres)	Total Habitat Preservation (acres)	Total Habitat Establishment/ Re-Establishment (acres)
Foraging					
Mixed Riparian Scrub	189	Qualitative	189	378 [a]	189 [b]
Valley Grassland	22,014	Qualitative	22,014 [c]	22,014	0
Vernal Pool	389	0	389	966	389
Seasonal Wetlands	105	Qualitative	105	105	105
Swale	234	0	234	278	234
Freshwater Marsh	127	Qualitative	127	127	127
Open Water	155	Qualitative	155	155 [d]	155 [e]
Streams/Creeks	117	Qualitative	117	117	117
Total Foraging Habitat	*23,330*	*0*	*23,330*	*24,140*	*1,316*
Roosting/Foraging					
Blue Oak Woodland	9	Qualitative	9	0 [f]	9 [g]
Blue Oak Savanna	38	Qualitative	38	47 [f]	38 [g]
Mine Tailing Riparian Woodland	218	Qualitative	218	218 [h]	218 [i]
Mixed Riparian Woodland	184	Qualitative	184	368 [a]	184 [b]
Orchards	207	Qualitative	207	207 [j]	0
Total Roosting/Foraging Habitat	*656*	*Qualitative*	*656*	*840*	*449*
GRAND TOTAL	**23,986**	**0**	**23,986**	**24,980**	**1,765**

[a] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[b] Impacts to Mixed Riparian Woodland or Mixed Riparian Scrub can be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[c] Total impacts to Valley Grassland include an unknown but small amount of impact that was analyzed qualitatively in Chapter 6.

[d] Preservation of Open Water can be achieved by preserving any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

[e] Re-establishment and/or establishment of Open Water can be achieved by re-establishing and/or establishing any aquatic land cover type that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

[f] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by preserving any combination of Blue Oak Savanna and Blue Oak Woodland.

[g] Impacts to Blue Oak Woodland or Blue Oak Savanna can be mitigated by re-establishing or establishing any combination of Blue Oak Woodland and Blue Oak Savanna.

[h] Impacts to Mine Tailing Riparian Woodland will be mitigated by preserving any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[i] Impacts to Mine Tailing Riparian Woodland will be mitigated by re-establishing or establishing any combination of Mixed Riparian Woodland and Mixed Riparian Scrub.

[j] Impacts to Orchards will be mitigated by preserving any combination of Cropland and Irrigated Pasture-Grassland.

Table 7-91
Biological Goals and Measurable Objectives Applicable to Western Red Bat

Applicable Biological Goals	Related Biological Objectives
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.	**Objective L1.** Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or established 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the Conservation Actions in this table.
	Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10).
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	**Objective W1.** Ensure that during implementation of Objective L2 (establishing a minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.
	Objective W2. Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP design avoidance and minimization measures (Low-Impact Development (LID) and ROAD Measures) • Ground disturbance avoidance and minimization measures (Best Management Practices (BMPs) and ROAD Measures)
	Objective W3. Covered Activities will implement stream setback requirements in the UDA for creeks and streams, as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA, as described in AMM EDGE-3.
	Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).
	Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with Conservation Actions listed in Table 7-1 (see Objectives SW2, FWM2, OW2, RIP2, and RIP4).
Goal 3. Preserve, re-establish, or establish, natural land covers (including cropland and irrigated pasture-grassland) that provide habitat for Covered Species.	**Objective RIP1**. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective RIP2. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak

Table 7-91
Biological Goals and Measurable Objectives Applicable to Western Red Bat

Applicable Biological Goals	Related Biological Objectives
	Savanna. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP1a. Preserve a minimum of 966 acres of Vernal Pool in the Plan Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP1b. Impacts to Vernal Pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho-Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and/or Cosumnes/Rancho-Seco Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area in accordance with the Conservation Actions in Table 7-1.
	Objective VP3. Preserve a minimum of 278 acres of Swale. The Preserves will be assembled in accordance with the Conservation Actions in table 7-1.
	Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective VP5. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in this Table 7-1.
	Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
	Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.

Table 7-91
Biological Goals and Measurable Objectives Applicable to Western Red Bat

Applicable Biological Goals	Related Biological Objectives
	Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by the Technical Advisory Committee (TAC)). The Preserves will be assembled in accordance with the Conservation Actions in this table and in accordance with Section 7.5.
	Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with the Conservation Actions in Table 7-1.
	Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The Preserves will be assembled in accordance with the Conservation Actions in Table 7-1.
Goal 4. Maintain or improve habitat value of natural land covers (including cropland and irrigated pasture-grassland) that are preserved within the Plan Area.	**Objective HAB1.** Develop Preserve Management Plans for the benefit of Covered Species.
	Objective HAB2. Assess whether Preserves are being managed and maintained for the benefit of Covered Species.
	Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing the initial Preserve Management Plan (PMP).
	Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. The program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training road crews to identify and report weeds.
	Objective HAB5. Monitor Preserves for edge effects (e.g., weeds, noise, hydrology, litter).
	Objective HAB6. Collect weather data throughout the county to assist in developing status and trends, track climate change, and other actions.
	Objective HAB7. Monitor vegetation biomass within Grassland land covers.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.	**Objective WR1**. During Preserve assembly, ensure that a minimum of 23,910 acres of modeled foraging habitat for western red bat (*Lasiurus blossevillii*) is preserved (see Objectives BOW1, RIP1, RIP3, AG1, VG1, VP1, VP3, SW1, OW1, FWM1, and SC1).
	Objective WR2. During assembly of the SSHCP Preserve System, ensure that a minimum of 841 acres of modeled roosting/foraging habitat for western red bat is preserved (see Objectives BOW1, RIP1, and RIP3).
	Objective WR3. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,317 acres of modeled foraging habitat for western red bat is re-established and/or established (see Objectives VP2, SW2, OW2, FWM2, RIP2, and RIP4).
	Objective WR4. During assembly of the SSHCP Preserve System, ensure that a minimum of 450 acres of modeled roosting/foraging habitat for western red bat is re-established and/or established (see Objectives RIP2 and RIP4).

Analysis of Species Conservation

The SSHCP Conservation Strategy will preserve and link 24,697 acres of the highest-quality habitat for western red bat in the Plan Area. Because the range of western red bat in the Plan Area is not well understood and observations have generally been based on vector control records, the Conservation Strategy does not target the areas where occurrences have been recorded; rather, the SSHCP targets preservation of large, connected Preserves that can best support this highly mobile species. In particular, the western red bat modeled habitat preserved by the SSHCP in PPU 7 will support extensive foraging habitat for the species. Preservation of riparian woodland roosting habitat and re-establishment/establishment of additional riparian woodland roosting habitat will potentially improve reproductive success of this species.

Most of the modeled foraging and roosting habitat preserved under the SSHCP will be outside the UDA and concentrated in PPUs 5, 6, and 7. PPUs 5 and 6 include the Cosumnes River and Deer Creek areas, which contain the riparian habitat known to support western red bat. The SSHCP also includes planned riparian re-establishment/establishment for the Cosumnes River in PPUs 5 and 6, which is expected to improve and expand roosting habitat for western red bat along the river.

Preserves benefiting western red bat will be established through land acquisitions that are targeted to capture large continuous areas of modeled habitat; include a diversity of land cover types; add parcels onto existing preserves that increase preserve size and minimize habitat fragmentation and edge effects; and provide connections to existing preserves that are currently isolated from each other.

The size and shape of all Preserves in the UDA are constrained by existing land use and zoning designations. However, to the extent possible, SSHCP Preserves that include western red bat modeled habitat will be adjacent to compatible land uses or existing preserves to reduce edge effects related to encroaching urban development. Further, under Conservation Action VPI1.2, at least 90% of the watershed for each preserved Vernal Pool will also be preserved. Refer to Section 7.4.3 for descriptions of the functional size of preserved areas that will result from the combination of SSHCP Preserves with existing preserves. In these ways, SSHCP Preserves will protect riparian and wetland areas, and will contribute to the persistence of western red bat in the Plan Area. In the absence of the SSHCP, land preservation for project-by-project mitigation would not be located in this coordinated and strategic way, and preservation of large areas of intact habitat would not occur.

Implementation of Conservation Actions (Table 7-1) and AMMs (Section 5.4) will avoid and minimize potential edge effects (Section 6.3) on SSHCP Preserves. For example, the AMMs established for Preserve Setbacks under the SSHCP would make setbacks as effective as possible to buffer preserves from edge effects and other environmental stressors associated with urban

development. Under existing project-by-project mitigation, setbacks around preserves may allow for activities and encroachments that reduce the effective preservation area and allow indirect effects to preserved lands.

In addition to modeled habitat preservation, the Implementing Entity will also establish or re-establish 1,765 acres of western red bat modeled habitat in the Plan Area, with a priority on re-establishment before establishment.

As discussed in Chapter 8, Preserve land management techniques, monitoring, and adaptive management of habitat for western red bat protected in the Preserve System will ensure that western red bat habitat requirements within the SSHCP Preserve System are not degraded and will improve under SSHCP management as compared to existing habitat conditions. Management objectives (Table 7-91) that will, in particular, directly benefit western red bat are those designed to maintain and enhance foraging habitat and monitor edge effects of noise. Excessive noise from surrounding developments could interfere with echolocation and reduce foraging success. Monitoring vegetation height in grasslands (Objective HAB7) should help maintain foraging habitat quality by improving habitat suitability for prey and increasing prey detectability for nocturnal predators (e.g., by controlling dense thatch). These actions should result in higher overall reproductive success and productivity of the Plan Area population, and may allow expansion of western red bat into areas not currently used by this species.

7.6.3 Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon

The USFWS published the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* in 2005 for 33 species (20 listed species and 13 species of concern). Generally, the Recovery Plan addresses 16 vernal pool regions, with a focus on species-specific recovery actions within important Core Recovery Areas in each region. The Plan Area is within the Southeastern Sacramento Valley Vernal Pool Region. The Plan Area includes two Core Recovery Areas: the Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area, discussed in more detail below. The Mather Core Recovery Area and the Cosumnes/Rancho-Seco Core Recovery Area were designated by USFWS (2005a) as Zone 1 Core Areas, the highest priority ranking for preservation.

The Recovery Plan includes four listed SSHCP Covered Species: Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, and vernal pool tadpole shrimp (USFWS 2005a). The Recovery Plan also addresses five non-listed “species of concern” that are SSHCP Covered Species: Ahart’s dwarf rush, Boggs Lake hedge-hyssop, legenere, mid-valley fairy shrimp, and western spadefoot (USFWS 2005a).

The Recovery Plan identifies general and species-specific recovery criteria for five recovery and long-term conservation actions (USFWS 2005a, p. III-93 to III-120 and Table III-1). However, USFWS (2005a) also states that alternative strategies, such as development of HCPs or other site-specific planning methods, may present opportunities to conserve species habitat and meet the rationales for the species-specific recovery criteria. HCPs that cover species and vernal pool habitat may be deemed equivalent to implementation of the 2005 Recovery Plan for the covered area if they contain the six elements of the Recovery Plan discussed below.

The SSHCP will preserve large, interconnected blocks of habitat, and the Conservation Actions carried out to meet SSHCP Biological Goals and Measurable Objectives will incorporate, or be consistent with, many of the species-specific recovery criteria for nine Covered Species addressed in the Recovery Plan. Therefore, the SSHCP provides an alternative Conservation Strategy for preserving vernal pool species habitat and meeting the six recovery criteria listed on page III-120 of the 2005 Recovery Plan, as described below.

1. *Permanently protected vernal pool preserves within the area covered by an HCP in large contiguous blocks of suitable habitat.*

   The goals of the SSHCP include protecting the populations of 13 covered vernal pool species in Preserves large enough to maintain and enhance population viability and protect vernal pool and valley grassland landscape functions (Table 7-1). This will be accomplished by protecting approximately 22,907 acres of Vernal Pool Ecosystem, including 995 acres of existing Vernal Pool, 309 acres of Swale, 35.3 acres of Stream/Creek (VPIH), and 21,568 acres of hydrologically connected Valley Grassland. Finally, the SSHCP will also re-establish and/or establish components of the Vernal Pool Ecosystem, including approximately 389 acres of Vernal Pool and 256 acres of Swale. Valley Grassland may be re-established/established at the same time as re-establishment/establishment of vernal pools and swales to form a complete Vernal Pool Ecosystem.

   In the Mather Core Recovery Area, the SSHCP will preserve 5,494 acres of Vernal Pool Ecosystem, including 213 acres of Vernal Pool, 90 acres of Swale, and 5,155 acres of hydrologically connected Valley Grassland. In the Cosumnes/Rancho Seco Recovery Area, the SSHCP will preserve 15,293 acres of Vernal Pool Ecosystem, including 703 acres of Vernal Pool, 189 acres of Swale, and 14,402 acres of hydrologically connected Valley Grassland. Vernal Pools and Valley Grassland will be preserved in four types of vernal pool Preserves throughout the Plan Area:

   - Three Core Preserves will be established within the UDA. These Preserves are within the Mather Core Recovery Area and will provide protection of documented occurrences of Covered Species, protect adjacent suitable vernal pools, and protect the ecological functions of the vernal pool and valley grassland complexes.

- In addition to the Core Preserves, at least 3 Minor Preserves totaling approximately 813 acres and 10 Satellite Preserves totaling approximately 1,508 acres will also be established within the UDA. Within the UDA, the size and shape of minor and Satellite Preserves are substantially constrained by existing land use and zoning designations. However, these Preserves are necessary to provide protection for documented occurrences of Covered Species or areas with high-quality vernal pool habitat.
- A Landscape Preserve, including approximately 10,500 acres of land preservation, will be established outside the UDA within PPU 7. This Landscape Preserve is within the Cosumnes/Rancho-Seco Core Recovery Area and will encompass a wide variety of vernal pool types and Preserve habitat heterogeneity associated with vernal pools and valley grassland in the Plan Area. The Landscape Preserve will be established through land acquisitions that are targeted (1) to establish core areas, (2) to add parcels onto existing preserve lands (e.g., Chance [Howard] Ranch) to increase their size and avoid habitat fragmentation, and (3) to provide connections to existing preserves and/or Preserve areas.

2. *Protection of the entire genetic range of each listed species within the area covered by the HCP.*

The SSHCP Preserve System is designed to maintain or expand the existing distribution of each Covered Species within the Plan Area, pursuant to Goal 5. This will contribute toward preserving the genetic range of the covered vernal pool species throughout the Plan Area. In addition, the SSHCP will ensure that a broad range of habitat types and geographic locations are preserved in the Preserve System. Heterogeneous habitat types and areas generally support greater biodiversity, including genetic diversity within and among populations. They also are more likely to be ecologically complex, and at least some may be more resilient over time than homogeneous habitat areas.

Vernal pool heterogeneity is provided in the Preserve System at three spatial scales: (1) landscape heterogeneity (geologic formations, soils, location within the Plan Area) of preserved vernal pool complexes in the Plan Area; (2) heterogeneity of vernal pool types, spatial patterns, and connectivity within a Preserve; and (3) heterogeneity of individual pools, including sizes, water chemistry, and floristic components. Tables 7-10 and 7-11 in Section 7.6.1.1.1 present the geologic formations and soil types that compose the Preserve System, as compared to the composition of the Plan Area as a whole. Table 7-12 similarly presents the VWADI scores of the Preserve System as compared to the Plan Area. VWADI categorizes vernal pool complexes by the size and density of pools, which captures heterogeneity at both scale 2 and scale 3. By preserving vernal pool heterogeneity at these three scales, the likelihood of capturing genetic diversity is increased, and preservation of biodiversity is better assured.

For vernal pools in the SSHCP Preserve System, primary parameters used to define habitat heterogeneity include the number of different geological formations and soil associations encompassed, and the Vernal Wetland Acre/Density Index, which indicates the variance in the size and density of vernal pools present in different locations of the Plan Area. By establishing Preserves on each of the geologic landforms throughout the Plan Area that currently support vernal pools, preserving the vernal pool heterogeneity as defined above, and ensuring connectivity among the existing and SSHCP preserves in the Plan Area, the SSHCP will preserve a broad range of habitat types. The SSHCP Preserve System includes preservation and species-specific measures distributed within each PPU, rather than allowing conservation to be focused within limited portions of the Plan Area. In addition, the SSHCP targets preservation of occurrences of Sacramento Orcutt grass, slender Orcutt grass, Ahart's dwarf rush, and other endemic vernal pool plants. Preserves will be established to protect these very rare plant species where needed. This targeted preservation will help ensure that the Preserve System contributes to preserving the genetic range of these species, thus helping to preserve their genetic diversity within the Plan Area.

3. *Protection of all populations of species with 25 or fewer total occurrences addressed in this plan within the area covered by the HCP.*

   Three extremely endangered plant species (slender Orcutt grass, Sacramento Orcutt grass, and Ahart's dwarf rush) are present in the Plan Area. The SSHCP will protect all populations of these three species within the Plan Area. The SSHCP will also protect all newly discovered occurrences of slender Orcutt grass and Sacramento Orcutt grass that are found within the Plan Area. Furthermore, to protect these species from population declines and possible extirpation from the Plan Area, the USFWS, CDFW, and Partner Agency Permittees have determined it necessary to preserve occurrences within Minor or Satellite Preserves with minimum 300-foot setbacks around the plant populations. Many of these occurrences are already adversely indirectly affected by adjacent existing development, or could be indirectly affected by adjacent land use designations. These adjacent conditions restricted the ability of the SSHCP to protect these extremely endangered plant occurrences within a larger SSHCP Preserve type (e.g., Core Preserves or Landscape Preserves). Where the extremely endangered plant species are present in Plan Area locations that are suitable for a functioning Core Preserve, those locations will be prioritized for preservation to achieve SSHCP Biological Goals and the USFWS Recovery Plan (2005a) conservation goals for the species (see Conservation Actions for VPP1, VPP6, and VPP7).

4. *Connectivity with other preserves within the area covered by the HCP.*

   Core and Minor Preserves established by the SSHCP contain many of the vernal pool resources within the UDA, and will be connected by Linkage Preserves to other Preserves within the Plan Area. SSHCP Linkage Preserves will be designed to maintain

connectivity among the Preserves, providing for wildlife movement and, in many cases, hydrologic connections between Preserves (see Objective L2 in Table 7-1). Connectivity with other Preserves could allow for movement of cysts between different pools, facilitating genetic exchange. For vernal pool plants, maintaining a linkage of undeveloped habitat improves the chances that pollinators will locate the isolated and ephemeral flowers. Hydrologic connectivity will benefit vernal pools and any linkage or connection to other preserves reduces the chances for disruption of perched aquifers that support vernal pools. The ultimate size and dimensions of the Linkage Preserves will depend on several factors, including habitat types in the linkage, the ecological function(s) the linkage is designed to serve (e.g., overland wildlife movement, drainage), and adjacent land uses. Additional linkage function will be provided by some stream and riparian corridors not specifically identified as Linkage Preserves. Stream and riparian corridors are described in Section 7.6.1.1.2. While these corridors will preserve riparian, stream, and creek habitats, they may also serve to connect vernal pool and valley grassland resources in the SSHCP Preserve System (e.g., by facilitating dispersal of seeds and cysts via wildlife or water flows).

The three Core Preserves inside the UDA will be linked by minimum 600-foot-wide Linkage Preserves (with some minor allowable variation due to physical constraints; see Objective L2). These Linkage Preserves will follow stream channels, where possible, to maintain hydrologic connectivity. In addition to linking the three Core Preserves within the UDA, smaller Minor and Satellite Preserves (where possible considering existing development and infrastructure) will also be connected by Linkage Preserves.

The Landscape Preserves located outside of the UDA in PPU 7 will be connected to existing preserve within the Cosumnes/Rancho Seco Recovery Area.

5. *Adaptive management of the preserves within the area covered by the HCP to support the species addressed in the Recovery Plan*.

   Many of the SSHCP Biological Goals and Measurable Objectives presented in Table 7-1 include in objective language "protect and maintain in perpetuity" Covered Species and their habitats, as well as re-establishment and/or establishment of their habitat, in the Plan Area. These Conservation Actions also require an effectiveness monitoring component for management activities. Management, including adaptive management, for the SSHCP is discussed in Chapter 8.

6. *Sufficient funding for management, maintenance and monitoring of the preserves in perpetuity.*

   Funding for the SSHCP is discussed in Chapter 12.

7.7 References Cited

CDFG (California Department of Fish and Game). 2012. *Staff Report on Burrowing Owl Mitigation*. March 7, 2012. Accessed online September 12, 2014. http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html.

Crase, F.T. and R.W. DeHaven. 1978. "Food Selection by Five Sympatric California Blackbird Species." *California Fish and Game* 64:255–267.

Dittes, J.C., J.L. Guardino, and R.A. Radmacher. 2007. "A GIS-Based Vernal Wetland Acre/Density Index (VWADI) for Classification and Conservation of Vernal Pool/Annual Grassland Landscapes in California's Great Central Valley." In *Vernal Pool Landscapes*, edited by R.A. Schlising and D.G. Alexander, 125–141. *Studies from the Herbarium 14.* Chico, California: California State University.

Lindzey, F. 1982. "North American Badger." In *Wild Mammals of North America: Biology, Management, and Economics,* edited by J.A. Chapman and G.A. Feldhammer, 653–663. Baltimore, Maryland: Johns Hopkins University Press.

Messick, J. P. 1987. "North American Badger." In *Wild Furbearer Management and Conservation in North America*. Eds. M. Novak, J.A. Baker, M.E. Obbard, and B. Malloch. Ontario, Canada: Ontario Ministry of Natural Resources.

Minta, S.C. 1993. "Sexual Differences in Spatio-Temporal Interaction Among Badgers." *Oecologia* 96:402–409.

Simovich, M.A. 1998. "Crustacean Biodiversity and Endemism in California's Ephemeral Wetlands." In Ecology, Conservation, and Management of Vernal Pool Ecosystems, edited by C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff, 107–118. Proceedings from a 1996 conference. Sacramento, California: California Native Plant Society.

Talley, T.S., E. Fleishman, M. Holyoak, D. Murphy, and A. Ballard. 2007. Rethinking a Rare-Species Conservation Strategy in an Urbanizing Landscape: The Case of the Valley Elderberry Longhorn Beetle." *Biological Conservation* 135:21–32.

USFWS (U.S. Fish and Wildlife Service). 1984. *Valley Elderberry Longhorn Beetle Recovery Plan.* Portland, Oregon: USFWS. Approved June 28, 1984. Accessed December 5, 2011. http://ecos.fws.gov/docs/recovery_plan/840628.pdf.

USFWS. 1999a. *Draft Recovery Plan for the Giant Garter Snake* (Thamnophis gigas). Portland, Oregon: USFWS.

USFWS. 1999b. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.* Sacramento, California: USFWS. July 9, 1999. Accessed January 13, 2010. http://www.fws.gov/sacramento/es/documents/velb_conservation.pdf.

USFWS. 2005a. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.* Portland, Oregon: USFWS. Approved December 15, 2005. Accessed February 6, 2012. http://ecos.fws.gov/docs/recovery_plan/060614.pdf.

USFWS. 2005b. Final rule: "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population." August 23, 2005. Federal Register, volume 70, pages 49380–49458.

USFWS. 2006a. *Giant Garter Snake* (Thamnophis gigas) *5-Year Review: Summary and Evaluation.*

USFWS. 2006b. *Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) 5-Year Review: Summary and Evaluation.*

USFWS. 2006c. Final rule: "Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants." February 10, 2006. Federal Register, volume 71, pages 7118–7316.

USFWS. 2014. *California Tiger Salamander Central California Distinct Population Segment (*Ambystoma californiense*) 5-Year Review: Summary and Evaluation.*

USFWS. 2015. *Revised Draft Recovery Plan for the Giant Garter Snake* (Thamnophis gigas). Sacramento, California: USFWS, Region 8, Pacific Southwest Region. Accessed February 6, 2017. http://ecos.fws.gov/docs/recovery_plan/20151211_GGS%20Revised%20Draft%20Recovery%20Plan.pdf.

USFWS. 2016. *Draft Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamande*r (Ambystoma californiense). Sacramento, California: USFWS, Region 8, Pacific Southwest Region. Accessed February 6, 2017. https://www.fws.gov/sacramento/outreach/2016/3-11/docs/DRAFT_RP_CTS-20160113.pdf.

USFWS and NOAA (U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration). 2000. Notice of final policy: "Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process; Notice." June 1, 2000. Federal Register, volume 65, pages 35242–35257.

INTENTIONALLY LEFT BLANK

8 SSHCP MONITORING AND MANAGEMENT PROGRAMS

8.1 Introduction

This chapter describes the framework of the South Sacramento Habitat Conservation Plan (SSHCP) Compliance and Avoidance and Minimization Measure (AMM) Monitoring Program (Section 8.2) and the framework of the SSHCP Preserve System Monitoring and Management Program (Section 8.3). The purposes of these programs are to ensure compliance with all requirements of the SSHCP, the Implementing Agreement (IA), and the Permits; to assess the status of the Covered Species, natural communities, and ecosystem processes within the SSHCP Preserve System; and to evaluate the effects of preserve management actions such that the SSHCP Conservation Strategy, including each of the SSHCP Biological Goals and Measurable Objectives (Table 7-1), is achieved. The SSHCP Preserve System Monitoring and Management Program will integrate monitoring and adaptive management into one cohesive program where monitoring will inform and change management actions to continually improve outcomes for Covered Species and natural land cover types.

As the framework for the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program, this chapter outlines the monitoring and management protocols and standards that the Implementing Entity will use to prepare Individual Preserve Management Plans (PMPs) and SSHCP Annual Reports. The technical details of the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program will be finalized by the Implementing Entity in the first 18 months after permit issuance, and two separate documents will be prepared for each of these programs based on the frameworks presented in Sections 8.2 and 8.3. Development of the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program during that 18-month period will involve coordination by the SSHCP Implementing Entity, Plan Permittees, the Permitting Agencies, and the future SSHCP Technical Advisory Committee (TAC) (see Section 9.3.4). This will be done in an open, public process with full engagement of the TAC, made up of Plan Permittees, agency representatives, and stakeholders, including the environmental, landowner, and development community. Further, the programs and procedures will undergo public disclosure and adoption by the Implementation Committee. All meetings of the Implementation Committee will be called, noticed, held, and conducted in compliance with the provisions of the Ralph M. Brown Act (California Government Code, Section 54950 et seq.).

8.1.1 Regulatory Context

By regulation, all incidental take permits (ITPs) require monitoring of mitigation measures and the response of Covered Species to these measures (50 CFR 17.22(b)(1)(iii)). The “Five-Point

Policy" established additional policy guidance for HCP monitoring (USFWS and NOAA 2000). The Five-Point Policy distinguishes between compliance and effectiveness monitoring.

Compliance monitoring (also known as implementation monitoring) tracks and verifies whether the Permittees are carrying out the terms of the SSHCP document, the ITPs, and the IA—including financial responsibilities and obligations, management responsibilities, and other aspects of the ITP, the HCP, and the IA; tracks the level of incidental take of Covered Species and confirms that the species effects of the permitted Covered Activities are consistent with the assumptions and predictions used when the HCP was developed and approved (see Section 8.2.1).

Effectiveness monitoring evaluates whether the effectiveness of the operating conservation program of the HCP is consistent with the assumptions and predictions made when the HCP was developed and approved; in other words, is the HCP achieving the Biological Goals and Measureable Objectives? Effectiveness monitoring measures the biological conditions resulting from the operating conservation program (e.g., change in species status, or change in habitat condition) (see Section 8.2.2).

The Five-Point Policy goes on to say:

- The scope of an HCP monitoring program should be commensurate with the scope and duration of the operating Conservation Strategy and the scope and duration of the Covered Activity effects.
- The HCP's Biological Goals and Measurable Objectives provide a framework for developing a monitoring program, and the monitoring program should measure progress toward meeting those goals and objectives. The monitoring program should reflect the Biological Goals and Measureable Objectives.
- The appropriate unit of measure in a monitoring program depends on the specific effects, the operating conservation program, and the units used in the biological objectives' measurable units (e.g., if the biological objective is for numbers of individuals, the monitoring program should measure the number of individuals).
- Any methodology and techniques involved in biological aspects of monitoring should be based on sound science. Standard survey or other previously-established monitoring protocols should be used.
- The monitoring program should provide the information needed to implement an adaptive management program.
- The monitoring program should be flexible so that it can be modified, if necessary, based on the need for additional information.

Adaptive Management

The Five-Point Policy defines adaptive management as "an integrated method for addressing uncertainty in natural resource management." While adaptive management is not always required in an HCP, the Five-Point Policy indicates that adaptive management is necessary for HCPs that would otherwise pose a significant risk to species at the time the ITP is issued, due to data or information gaps regarding factors such as the ecology of the species or its habitat, the effectiveness of the management methods, or the effects of the Covered Activities on the Covered Species. These criteria generally apply to the SSHCP. Identifying the uncertainty to be addressed is the foundation of an HCP adaptive management strategy. Whenever an adaptive management strategy is used, the approved HCP must outline the agreed-upon future changes to the operating conservation program.

The Five-Point Policy identified four main elements of an HCP adaptive management strategy as follows:

1. Identify the uncertainty and the questions that need to be addressed to resolve the uncertainty;
2. Develop alternative strategies and determine which experimental strategies to implement;
3. Integrate a monitoring program that is able to detect the necessary information for strategy evaluation; and
4. Incorporate feedback loops that link implementation and monitoring to a decision-making process (which may be similar to a dispute-resolution process) that result in appropriate changes in management.

Annual Reporting

Regulations at 50 CFR 13.45 provide the authority for the USFWS to require periodic reports of the activities conducted under the permit. The Five-Point Policy specified specific information needed in HCP annual monitoring reports.

The SSHCP Annual Reports will help the USFWS determine whether the Permittees are properly implementing the terms and conditions of the SSHCP, its ITP, and the IA, and will provide a long-term administrative record documenting progress made toward achieving each SSHCP Biological Goals and Measurable Objectives.

The SSHCP Compliance and AMM Monitoring Program, SSHCP Preserve System Monitoring and Management Program, and SSHCP Annual Reports will comply with the requirements of the Five-Point Policy.

8.2 SSHCP Compliance and AMM Monitoring Program

The SSHCP Compliance and AMM Monitoring Program tracks three requirements of the Five-Point Policy: (1) Are Measurable Objectives (Table 7-1) being implemented as required in the HCP, Permits, and IA; (2) are AMMs described in Section 5.4 being implemented as required in the HCP, Permits, and IA; and (3) are AMMs fully effective in reducing the effects of environmental stressors as was assumed in Chapter 6 of the HCP. The other Five-Point Policy requirement to track the effectiveness of the operating Conservation Strategy is monitored through the SSHCP Preserve System Monitoring and Management Program (Section 8.3). This section presents a framework for the SSHCP Compliance and AMM Monitoring Program.

8.2.1 SSHCP Compliance Monitoring

As discussed in Section 8.1, compliance monitoring tracks the status of the SSHCP implementation and documents that all requirements are being met. Compliance monitoring verifies that the Plan Permittees are carrying out the terms of the SSHCP, the ITPs, and the SSHCP IA.

Table 8-1 lists each SSHCP Measurable Objective or Conservation Strategy commitment, identifies what we need to know to determine compliance, specifies a monitoring approach to address each monitoring question, identifies the timing and frequency of the specified monitoring, and identifies what additional information will need to be provided in the full SSHCP Compliance and AMM Monitoring Program.

SSHCP compliance monitoring will include the components listed below:

- Track the type, number, and location of each Covered Activity implemented (see Chapter 5) that year, along with the acres of ground disturbance for each Covered Activity implemented that year.
- Track acres of permanent and temporary impacts to each SSHCP land cover type that year, track the total SSHCP permanent and temporary impacts to each land cover type (total since permit issuance), and compare to SSHCP impact analysis (Chapter 6).
- Track the number and locations of each SSHCP AMM (see Section 5.4) applied at each Covered Activity implemented that year, track total number of each AMM implemented (total since permit issuance), and report on the effectiveness of each AMM in avoiding effects to Covered Species (as compared to assumptions made during SSHCP development) (see Section 8.2.3).
- Track locations and quantify acres of direct impacts to each Covered Species modeled habitat and Critical Habitat (Table 3-2) that year, and track the total SSHCP direct

impacts to each Covered Species modeled habitat and Critical Habitat (total since permit issuance).

- Track the locations and quantify acres of indirect impacts to Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types, and track the total SSHCP indirect impacts to Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types (total since permit issuance).
- Track the number and acres of direct and indirect impacts to occurrences of plant Covered Species that year, and track the total SSHCP impacts to occurrences of plant Covered Species (total since permit issuance).
- Track the location and the acres of each SSHCP land cover type permanently preserved that year (by fee-title and by conservation easement), and track the total SSHCP preservation of that land cover type (total since permit issuance).
- Track location and acres of each Covered Species modeled habitat (Table 3-2) on the lands preserved that year (including breakdowns for Critical Habitat preserved and modeled habitat preserved in a Recovery Area or within 1 mile of Recovery Areas), and track the total SSHCP preservation of each Covered Species modeled habitat (total since permit issuance).
- Track location and acres of each SSHCP land cover type or Covered Species habitat that is re-established or established[1] that year, including breakdowns for within 1 mile of Recovery Areas, and track the total SSHCP acres of each re-established or established (total since permit issuance).
- Track the location and acres of direct and indirect impacts within each Critical Habitat Unit located in the Plan Area, and track the total since permit issuance of direct and indirect impacts to each Critical Habitat Unit located in the Plan Area.
- Track, describe, and provide copies of recorded conservation easements, titles of lands acquired in fee title, interagency memorandums of agreement, or any other agreements entered into by the Implementing Entity or other Plan Permittee for the purposes of protecting, establishing or re-establishing Covered Species habitat.
- Track acres of each habitat land cover type that is potentially available for preservation.[2]

The Implementing Entity will be responsible for collecting and compiling required compliance monitoring information for inclusion in the SSHCP Annual Report (see Section 8.4.1).

[1] Note that in the context of this Plan, the word "establish" is synonymous with "create."

[2] Land cover types that are potentially available for preservation are those lands that are not encumbered by some form of protection like a conservation easement, have not been used for mitigation, and are not planned for development.

The compliance monitoring approaches proposed in Table 8-1 are subject to change based on outcomes of adaptive management, as directed in the Five-Point Policy: "An effective monitoring program is flexible enough to allow modifications, if necessary, to obtain the appropriate information."

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
SSHCP Commitments in the Conservation Strategy (other than Measurable Objectives)				
The maximum acres of take of each SSHCP land cover type (Table 6-4).	How many acres of land cover types have been impacted by Covered Activities?	Map impacted areas and quantify acres of disturbance. Ensure that impacts do not exceed authorized take. Input impacts into tools such as the Project Tracking System in EcoAtlas.	Project-by-project tracking Annual reporting	Implementing Entity to specify in first 18 months external tracking system to input data into (e.g., EcoAtlas).
The maximum acres of take of modeled Covered Species habitat (Table 6-4).	How many acres of modeled Covered Species habitat have been impacted by Covered Activities?	Review project-level impact reports. Map impacted areas, intersect with maps of species habitat models, and quantify acres of disturbance. Track land cover conversion outside the Urban Development Area (UDA) separately. Ensure that impacts do not exceed authorized take.	Project-by-project tracking Annual reporting	Implementing Entity to develop an Annual Report format in first 12 months.
The maximum take of Covered Species (Table 6-4).	How many individuals, occurrences, colonies, or nests of Covered Species have been taken by Covered Activities?	Prepare annual reports that compile project-level impact reports and field-verify reports are consistent with conditions. Ensure that impacts do not exceed authorized take.	Annual reports	Implementing Entity to develop an Annual Report format in first 12 months.
Assembly of Preserve System in the UDA as described in Section 7.5.	How many acres of Core, Minor, Satellite, and Wildlife Corridor Preserves have been established by the SSHCP? Are the preserved acreages consistent with the locations	Track acquired Preserve lands and verify that the Preserve System is being designed according to Section 7.5.	As individual Preserves are acquired for the Preserve System Annual reporting	Implementing Entity to Identify in first 18 months triggers for when SSHCP preserve assembly is not following Section 7.5 (e.g., how to distinguish between normal variability in

AGENDA ITEM 11.1

1347

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	described in Section 7.5 of the SSHCP?			acquisition and a potential shortfall).
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.				
Objective L1. Establish a minimum Preserve System of 33,796 acres of natural land covers that preserves habitat for Covered Species and other native biota as a component of the Preserve System. Of the 33,796 acres, 7,560 acres will be within the UDA and 26,236 acres will be outside the UDA. Preserves will be assembled in accordance with Conservation Actions in Table 7-1.	Are the habitat acquisition requirements being met?	Map the preserves, mitigation areas, and natural land cover types. Map conversion of land cover inventory within the Plan Area.	Land cover mapping at time of preserve acquisition Maps and tables included with Annual Reports	Implementing Entity to develop format for maps and tables to be included in Annual Report in first 12 months.
Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves and existing Preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (Minor variations on minimum width may be allowed by the Plan where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10)	Are all the preserve linkages being established between larger preserves?	Map the preserves. Compare geographic information system (GIS) mapping against the Conceptual Preserve System design.	Maps and tables included with Annual Reports	Implementing Entity to develop format for maps and tables to be included in Annual Report in first 12 months.
	Do linkages include appropriate widths of natural or naturalized habitat between parcels?	Review current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Compare GIS mapping against minimum width of 600 feet.	Maps and tables included with Annual Reports	Implementing Entity to develop format for maps and tables to be included in Annual Report in first 12 months.

AGENDA ITEM 11.1

1348

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.				
Objective W1. Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves), the Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.	Are linkage creeks and streams being adequately set back?	Map the preserves, (with particular attention to set back widths from streams and creeks). Compare GIS mapping against minimum setback width.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective W2. Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP design avoidance and minimization measures (low-impact development (LID) and ROAD AMMs)	Are avoidance and minimization measures for design being incorporated in design?	Project design review and comparison with checklist of avoidance and minimization measures.	Checklist review whenever project design is submitted to a Land Use Authority Permittee (see Section 9.2.1).	Implementing Entity to develop in first 6 months a checklist for AMM compliance.
Ground disturbance avoidance and minimization measures (Best Management Practices (BMPs) and ROAD AMMs)	Are ground disturbance avoidance and minimization measures being implemented during construction?	Field verification by permit compliance staff of relevant jurisdiction.	Construction monitoring frequency consistent with Land Use Authority Permittee conditions of project approval	Implementing Entity to specify in first 6 months procedures for permit compliance staff to verify correct implementation of BMPs and ROAD AMMs.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement preserve setback requirements in the UDA as described in AMM EDGE-3.	Does design include appropriate setbacks?	Review project design and compare with Project Review checklist (see Section 10.5) to confirm that project meets setback requirements.	Review project design against checklist when a project is submitted to a Land Use Authority Permittee (see Section 9.2.1).	Implementing Entity to develop in first 6 months a checklist to be provided to Land Use Authority Permittees when evaluating project designs.
	Are required setbacks being established?	Compare aerial photography after project completion against minimum setback widths (Section 8.4.1).	Annual aerial photography review of land cover type conversion	Implementing Entity to develop in first 18 months GIS methodology for comparing aerials taken after project completion against Stream Setback requirements.
Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VPG1, VPG2, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).	Are preserved acreage goals/requirements being met? Are aquatic resources abundance, diversity, and condition being maintained or improved within the Preserve System as the SSHCP is implemented?	Map preserves, mitigation areas, and natural land cover types. Mapping of conversion of land cover inventory within the Plan Area. Monitor and track overall aquatic resource abundance and diversity in perpetuity. Implement random or probabilistic sampling design at recommended intervals to track trends in condition; likely incorporating California Rapid Assessment Method (CRAM).	Mapping at time of acquisition Maps and tables of compensatory mitigation included with Annual Report. Sampling at intervals to be determined by Preserve System Monitoring and Management Program.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports. Implementing Entity to prepare a Preserve System Monitoring and Management Program in first 18 months that identifies intervals for random sampling of aquatic resources to determine condition, and specify methodology for sampling.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective W5. Ensure that aquatic resources are re-established or established within the Preserve System, in accordance with Conservation Actions in Table 7-1 (see Objectives VP2, SW2, FWM2, OW2, RIP2, and RIP4).	Are re-established and/or established aquatic resources acreage requirements being met? Are aquatic resources abundance and diversity (defined for the SSHCP as amount and type of aquatic land cover types) being maintained or improved within the Plan Area as the SSHCP is implemented?	Map the extent and distribution of re-established and/ or established aquatic resources. SSHCP Annual Reports prepared by Implementing Entity, specifying locations and amounts of compensatory mitigation implemented. Monitor and track the overall aquatic resource abundance and diversity (defined for the SSHCP as amount and type of aquatic land cover types). Implement random or probabilistic sampling design at recommended intervals to track trends in condition of re-established and established pools; likely incorporating CRAM.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.				
Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of Valley Grassland within the Vernal Pool Ecosystem have we preserved?	Map Vernal Pool Ecosystem in preserves, mitigation areas, and natural land cover types. Map conversion of land cover inventory within the Plan Area. Break down acreage within and outside the UDA and evaluate consistency with Conservation Actions and	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
		descriptions of preserves by Preserve Planning Unit (PPU).		
Objective VP1. Preserve a minimum of 967 acres of vernal pool in the Plan Area. Impacts to vernal pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho Seco Recovery Area.	How many acres of vernal pool have we preserved? Are the habitat acquisition and mitigation goals being met specific to protecting and restoring vernal pool resources in the Mather Core Recovery Area and the Cosumnes Rancho Seco Core Recovery Area?	Map Vernal Pool Ecosystem in preserves, mitigation areas, and natural land cover types. Map conversion of land cover inventory within the Plan Area. Break out mapping of Vernal Pool Ecosystem into Vernal Pool wetted surface acres, Valley Grassland, Swale, and Stream/Creek (VPIH).	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional vernal pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area. Impacts to vernal pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and the Cosumnes/Rancho Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and the Cosumnes/Rancho Seco Recovery Area.	How many acres of vernal pools have we re-established and/ or established in the Mather Core Recovery Area and the Cosumnes Rancho Seco Core Recovery Area?	Map re-established and established vernal pools in and within 1 mile of the Core Recovery Areas. Check re-established and/or established for consistency with success criteria, Conservation Actions in Table 7-1, and the conceptual preserve system design in Section 7.5.	Maps and tables included with Annual Reports	Implementing Entity to develop success criteria for re-established/established vernal pools in cooperation with the TAC in the first 18 months. Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective VP3. Preserve a minimum of 278 acres of Swale. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of Swale have we preserved?	Quantify acres and map the extent and distribution of preserved Swale; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve system design in Section 7.5.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective VP4. Preserve a minimum of 25 acres of Swale or Stream/Creek (Vernal Pool Invertebrate Habitat (VPIH)) land cover type for impacts to the Stream/Creek (VPIH) land cover The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of Swale or Stream/Creek (VPIH) have we preserved?	Quantify acres and map the extent and distribution of preserved Swale or Stream/Creek (VPIH); cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve system design in Section 7.5.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective VP5. Re-establish and/or establish a minimum of 256 acres of Swale for impacts to the Swale or the Stream/Creek (VPIH) land covers. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	How many acres of Swale have we re-established and/or established?	Quantify acres and map the extent of re-established and established swale in the Preserve System. Review of aerial photography and GIS mapping after construction. Check re-established and/or established for consistency with success criteria, Conservation Actions in Table 7-1, and the conceptual preserve system design in Section 7.5.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective SW1. Preserve a minimum of 105 acres of seasonal wetlands. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of seasonal wetland have we preserved?	Quantify acres and map the extent of preserved seasonal wetland. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of preserved seasonal wetland and does it correspond with the Conservation Actions in Table 7-1	Map distribution of preserved seasonal wetland; cross check for consistency with Conservation Actions in Table 7-1 and the	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	and the conceptual preserve design in Section 7.5?	conceptual preserve system design in Section 7.5.		Reports.
Objective SW2. Re-establish and/or establish a minimum of 105 acres of seasonal wetlands. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	How many acres of seasonal wetland have we re-established and/or established?	Quantify acres and map the extent of re-established and established freshwater marsh in the Preserve System. Review of aerial photography and GIS mapping after construction.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective FWM1. Preserve a minimum of 127 acres of freshwater marsh. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of freshwater marsh have we preserved?	Quantify acres and map the extent of preserved freshwater marsh. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of preserved freshwater marsh and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Map the distribution of preserved freshwater marsh; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional freshwater marsh. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	How many acres of freshwater marsh have we re-established and/ or established?	Quantify acres and map the extent of re-established and established freshwater marsh in the Preserve System. Review of aerial photography and GIS mapping after construction.	Mapping at time of establishment/re-establishment, Annual review of aerial photography. Include maps and tables with Annual Reports.	None.

AGENDA ITEM 11.1

1354

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	What is the distribution of re-established and/ or established freshwater marsh and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Map the distribution of re-established and established freshwater marsh; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports. Report	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek (VPIH) land cover. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of streams/creeks have we preserved?	Quantify acres and map the extent of preserved streams/creeks. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Maps and tables included with Annual Reports.	None.
	What is the distribution of preserved Stream/Creek (VPIH) and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Map the distribution of preserved Stream/Creek (VPIH); cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek (VPIH) land cover. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	How many acres of Stream/Creek (VPIH) have we re-established and/ or established?	Quantify acres and map the extent of re-established and established Stream/Creek (VPIH). Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Mapping at time of establishment/re-establishment, include maps and tables with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of re-established and/ or established	Map the distribution of created and restored freshwater marsh; cross	Maps and tables included with	Implementing Entity to develop in first 12 months

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	freshwater marsh and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Annual Reports.	format for maps and tables to be included in Annual Reports.
Objective OW1. Preserve a minimum of 311 acres of open water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of open water, as determined by the TAC). The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of open water or other habitat of equivalent or better ecological function have we preserved? What is the distribution of preserved open water and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Quantify acres and map the extent of preserved open water in the Preserve System. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types. Cross check preserved Open Water for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective OW2. Re-establish and/or establish a minimum of 155 acres of open water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of open water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	How many acres of open water or other habitat of equivalent or better ecological function have we re-established and/or established?	Quantify acres and map the extent of established and re-established open water in the Preserve System. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Mapping at time of establishment/re-establishment, include maps and tables with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of re-established and/or established open water and does it correspond with the Conservation	Map the distribution of established and re-established open water; cross check for consistency with Conservation Actions in Table 7-1	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	and the conceptual preserve design in Section 7.5.		Reports.
Objective RIP1. Preserve a minimum of 373 acres of mixed riparian woodland and/or mixed riparian scrub. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of mixed riparian woodland/mixed riparian scrub have we preserved?	Quantify acres and map the extent of preserved mixed riparian woodland/mixed riparian scrub. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of preserved riparian woodland/mixed riparian scrub and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Map the distribution of preserved mixed riparian woodland/mixed riparian scrub; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective RIP2. Re-establish and/or establish a minimum of 373 acres of mixed riparian woodland and/or mixed riparian scrub. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	How many acres of mixed riparian woodland/mixed riparian scrub have we re-established and/ or established?	Quantify acres and map the extent of re-established and/ or established mixed riparian woodland/mixed riparian scrub in the Preserve System. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Mapping at time of establishment/re-establishment, include maps and tables with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of re-established and/ or established	Map the distribution of re-established and/ or established	Maps and tables included with	Implementing Entity to develop in first 12 months

AGENDA ITEM 11.1
1357

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	mixed riparian woodland/mixed riparian scrub and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	mixed riparian woodland/mixed riparian scrub; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Annual Reports.	format for maps and tables to be included in Annual Reports.
Objective RIP3. Preserve a minimum of 218 acres of mixed riparian woodland and/or mixed riparian scrub for impacts to mine tailings riparian woodland. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of mixed riparian woodland/mixed riparian scrub have we preserved as mitigation for impacts to mine tailings riparian woodland?	Quantify acres and, map the extent and distribution of preserved mixed riparian woodland/mixed riparian scrub. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of preserved riparian woodland/mixed riparian scrub and does it correspond with the Conservation Actions in Table 7-1?	Map the distribution of created and restored mixed riparian woodland/mixed riparian scrub; cross check for consistency with Conservation Actions in Table 7-1.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective RIP4. Re-establish and/or establish a minimum of 218 acres of mixed riparian woodland and/or mixed riparian scrub for impacts to mine tailings riparian woodland. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	How many acres of mixed riparian woodland/mixed riparian scrub have we re-established and/ or established as mitigation for impacts to mine tailing riparian woodland?	Quantify acres and map the extent of established and re-established mixed riparian woodland/mixed riparian scrub in the Preserve System. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Mapping at time of establishment/re-establishment, include maps and tables with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1358

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	What is the distribution of re-established and/ or established mixed riparian woodland/mixed riparian scrub and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Map the distribution of established and re-established mixed riparian woodland/mixed riparian scrub; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective BOW1. Preserve a minimum of 48 acres of blue oak woodland/savanna for direct impacts to blue oak woodland/savanna. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of blue oak woodland/savanna have we preserved?	Quantify acres and map the extent of preserved blue oak woodland/savanna. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of preserved blue oak woodland/savanna and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Map the distribution of preserved blue oak woodland/savanna; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Map included with Annual Report	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective BOW2. Re-establish and/or establish a minimum of 48 acres of blue oak woodland/savanna for direct impacts to blue oak woodland/savanna. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1	How many acres of blue oak woodland/savanna have we re-established and/ or established?	Quantify acres and map the extent of established and re-established blue oak woodland/savanna in the preserve system Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Mapping at time of establishment/re-establishment, include maps and tables with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1359

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	What is the distribution of re-established and/ or established blue oak woodland/savanna and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5?	Map the distribution of established and re-established blue oak woodland/savanna; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective AG1. Preserve a minimum of 9,696 acres of Cropland and Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	How many acres of Cropland and Irrigated Pasture-Grassland have we preserved?	Quantify acres and map the extent of preserved Cropland and Irrigated Pasture-Grassland. Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	What is the distribution of preserved Cropland and Irrigated Pasture-Grassland and does it correspond with the Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Map the distribution of preserved Cropland and Irrigated Pasture-Grassland; cross check for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland, and Irrigated Pasture-Grassland) that are preserved within the Plan Area.				
Objective HAB1. Develop Preserve Management Plans (PMPs) for the benefit of Covered Species.	Are PMPs being prepared for each acquisition, according to timing and standards described in the HCP?	Agency and TAC review of PMPs prior to approval.	As plans are prepared	Implementing Entity to develop checklist for PMP requirements in first 18 months.
Objective HAB2. Assess whether SSHCP Preserves are being managed and	Are the physical conditions on the preserves meeting the needs of	Rapid monitoring (CRAM or similar) for subset of preserves, visited on	Quarterly	Implementing Entity to specify in first 18 months the

AGENDA ITEM 11.1
1360

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
maintained for the benefit of Covered Species.	Covered Species?	regular basis, compared against reference sites		methodology by which management will be assessed for each Covered Species.
Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing initial preserve management approach.	Is existing management/ management history being recorded for each parcel or parcel group as they are obtained?	Implementing Entity confirmation that history is being recorded.	As parcels are acquired.	None.
	Are the management histories incorporated into the Initial and Individual PMPs? Does the management directed in the PMP account for past management actions?	Permitting Agency review of PMPs prior to approval.	As plans are prepared.	None.
Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. The program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.	Where are non-native weeds occurring, and what species? Has an early detection and eradication program been prepared and implemented?	Regular weed assessment and mapping within the UDA. Wildlife Agency review of Invasive Species Monitoring and Eradication Program.	Quarterly weed assessment on preserves, with other opportunistic assessment.	Implementing Entity to develop Invasive Species Monitoring and Eradication Program in first 18 months.
	Are we eradicating them in a timely fashion?	Annual review of weed assessments and eradication efforts by Implementing Entity. Summary of weed eradication efforts included in Annual Reports.	Annual	Implementing Entity to include in Invasive Species Monitoring and Eradication Program eradication or reduction targets; and a hierarchy of response methods to eradicate or reduce non-native plant populations.

AGENDA ITEM 11.1
1361

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	Are we updating the Program to account for changed conditions?	TAC Review of the Program every 5 years.	Program review every 5 years.	None.
Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.)	Are preserves being monitored for edge effects?	Prepare summary of monitoring, include in Annual Reports.	Include in Annual Reports.	None.
Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.	What are the regional and local trends for temperature, rainfall and other weather parameters? How do they vary within the Plan Area?	Install weather stations within selected preserves, collect and periodically analyze data and use in multivariate analyses of species occurrence and abundance.	Ongoing, annual data analysis or as needed for other studies.	Implementing Entity to specify in the first 18 months methodology for weather data analysis and how to use it for monitoring and adaptive management.
Objective HAB7. Monitor vegetation biomass within grassland land covers.	What is the height of vegetation within Vernal Pool Grasslands, Valley Grasslands, Blue Oak Savanna, and other relevant land cover types?	Conduct monitoring using RDM or another rapid assessment technique.	After the growing season, annual.	Implementing Entity to identity in first 12 months acceptable rapid assessment techniques for vegetation biomass.
Objective VP4. Investigate indirect effects of development on vernal pool crustaceans over the short term and the long term.	Have vernal pool crustaceans been studied for indirect effects from development?	Review annual reports and study reports.	As determined by study designs.	None.
Objective AG2. Of the 9,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as, but not limited to, corn, alfalfa, or wheat) preferred by tricolored blackbird (*Agelaius tricolor*), greater sandhill crane (*Grus canadensis*), and the covered raptor species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6	What is the current inventory of Cropland that can be acquired?	Analyze extant inventory to ensure availability of suitable acreage for future mitigation and to determine actions for current Cropland preserve management.	Map extant inventory immediately, update annually.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	How many acres of Cropland have we preserved?	Quantify acres and map the extent and distribution of preserved Cropland. Annual (or some agreed upon time interval) review of current	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual

AGENDA ITEM 11.1
1362

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
in plots of 20 acres or more. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.		aerial imagery and SSHCP GIS database of land cover types. Cross check preserved cropland for consistency with Conservation Actions in Table 7-1 and the conceptual preserve design in Section 7.5.		Reports.
Objective AG3. Maintain or increase prey availability and improve foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species.	How much hedgerow is being planted?	Quantify linear feet and map the extent of planted hedgerows in SSHCP preserves.	Maps and tables included with Annual Reports.	Implementing Entity to develop a list in first 12 months of acceptable plant species for planted hedgerows.
	Are plants still alive?	Field verification of plant condition.	Annual	Implementing Entity to develop in first 18 months methodology for evaluating plant condition and fossorial mammal habitat suitability.
Objective RIP5. Monitor groundwater table as it relates to status and trends for riparian habitat.	What is the groundwater table depth and how is it changing?	Annually measure depth to water table on Preserve parcels with existing wells.	Annual at a consistent time of year	Implementing Entity to develop in first 18 months methodology for groundwater study, how to establish trend for groundwater level, and thresholds for concern.
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.				
Objective VPP1. Prior to take of any occurrence of Ahart's dwarf rush (*Juncus*	Are we ensuring that any take of Ahart's dwarf rush is offset by	Conduct a population study of take and newly preserved Ahart's dwarf	Annual within study plots for 10 years,	Implementing Entity to describe in first 12 months a

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
leiospermus), protect one currently unpreserved[3] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Ahart's dwarf rush within the Plan Area.	protection of another unprotected Ahart's dwarf rush?	rush.	every 5 years after trend established	protocol for the Ahart's dwarf rush population study, and provide definition of take for this species.
Objective VPP2. Prior to take of any occurrence of Boggs Lake hedge-hyssop (*Gratiola heterosepala)*, protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Boggs Lake hedge-hyssop within the Plan Area.	Are we ensuring that any take of Boggs Lake hedge-hyssop is offset by protection of another unprotected Boggs Lake hedge-hyssop?	Conduct a population study of take and newly preserved Boggs Lake hedge-hyssop.	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the Bogg's lake hedge-hyssop population study, and provide definition of take for this species.
Objective VPP3. Prior to take of any occurrence of dwarf downingia (*Downingia pusilla*), protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrence of dwarf downingia within the Plan Area.	Are we ensuring that any take of currently unknown dwarf downingia is offset by protection of another currently unknown dwarf downingia?	Conduct a population study of take and newly preserved dwarf downingia.	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the dwarf downingia population study, and provide definition of take for this species.
Objective VPP4. Protect and maintain in perpetuity a minimum of 15 occurrences of legenere (*Legenere limosa*) within the SSHCP Preserve System. Legenere occurrences will be preserved in accordance with the Conservation Actions described in this table. Prior to take of any occurrence of legenere, one currently unpreserved and	Are we protecting the known occurrences of legenere? Are we ensuring that any take of currently unknown legenere is offset by protection of another currently unknown legenere?	Conduct a population study of take and newly preserved legenere.	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the legenere population study, and provide definition of take for this species.

[3] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
"biologically equivalent or superior" (as defined by the TAC) occurrence of legenere will be preserved and maintained within the Plan Area.				
Objective VPP5. Prior to take of any occurrence of pincushion navarretia (*Navarretia myersii* ssp. *myersii*), protect one currently unpreserved[4] and "biologically equivalent or superior" (as defined by the TAC) occurrence of pincushion navarretia within the Plan Area.	Are we ensuring that any take of pincushion navarretia is offset by protection of another currently unknown pincushion navarretia?	Conduct a population study of take and newly preserved pincushion navarretia.	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the pincushion navarretia population study, and provide definition of take for this species.
Objective VPP6. Protect and maintain in perpetuity all known currently unprotected occurrences of Sacramento Orcutt grass (*Orcuttia viscida*) in the Plan Area to preserve existing distribution, and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.	Are we protecting the known occurrences of Sacramento Orcutt grass? Are we ensuring that any take of currently unknown Sacramento Orcutt grass is offset by protection of another currently unknown Sacramento Orcutt grass?	Conduct a population study of take and newly preserved Sacramento Orcutt grass.	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the Sacramento Orcutt grass population study, and provide definition of take for this species.
Objective VPP7. Protect and maintain in perpetuity all known currently unprotected occurrences of slender Orcutt grass in the Plan Area to preserve existing distribution, and any currently unknown sites discovered	Are we protecting the known occurrences of slender Orcutt grass? Are we ensuring that any take of currently unknown slender Orcutt grass is offset by protection	Conduct a population study of take and newly preserved slender Orcutt grass.	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the slender Orcutt grass population study, and provide definition

[4] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

AGENDA ITEM 11.1
1365

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
in locations subject to an SSHCP Covered Activity.	of another currently unknown slender Orcutt grass?			of take for this species.
Objective SA1. During re-establishment and/or establishment of seasonal wetlands, freshwater marsh, open water, and stream/ creek, translocate impacted Sanford's arrowhead (*Sagittaria sanfordii*) from other sites. Prior to take of an occurrence of Sanford's arrowhead, protect one additional occurrence of Sanford's arrowhead within the Plan Area.	Are we protecting the known occurrences of Sanford's arrowhead? Are we ensuring that any take of currently unknown Sanford's arrowhead is offset by protection of another currently unknown Sanford's arrowhead?	Conduct a population study of take, newly preserved Sanford's arrowhead, and re-established/ established Sanford's arrowhead .	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the Sanford's arrowhead population study, and provide definition of take for this species.
Objective VPI1. Protect and maintain in perpetuity 1,270 acres of vernal pool tadpole shrimp modeled aquatic habitat within the Plan Area to preserve existing distribution.	Is existing vernal pool tadpole shrimp modeled habitat being preserved?	Review map of Vernal Pool, Swale, and Stream/Creek (VPIH) in the Plan Area. Use GIS to compare preserved Vernal Pool, Swale, and Stream/Creek (VPIH) against inventory.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective VPI2. Protect and maintain in perpetuity 1,270 acres of vernal pool fairy shrimp (*Branchinecta lynchi*) modeled aquatic habitat within the Plan Area to preserve existing distribution.	Is existing vernal pool fairy shrimp modeled habitat being preserved?	Review map of Vernal Pool, Swale, and Stream/Creek (VPIH) in the Plan Area. Use GIS to compare preserved Vernal Pool, Swale, and Stream/Creek (VPIH) against inventory.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective VPI3. Protect and maintain in perpetuity 1,059 acres of mid-valley fairy shrimp (*Branchinecta mesovallensis*) modeled aquatic habitat within the Plan Area to preserve existing distribution.	Is existing mid-valley fairy shrimp modeled habitat being preserved?	Review map of Vernal Pool, Swale, and Stream/Creek (VPIH) in the Plan Area. Use GIS to compare preserved Vernal Pool, Swale, and Stream/Creek (VPIH) against inventory.	Map and tables included with Annual Report	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective VPI4. Protect and maintain in perpetuity 1,245 acres of Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i) modeled aquatic habitat within the Plan Area to preserve existing distribution.	Is existing Ricksecker's water scavenger beetle modeled habitat being preserved?	Review map of Vernal Pool, Swale, and Stream/Creek (VPIH) in the Plan Area. Use GIS to compare preserved Vernal Pool, Swale, and Stream/Creek (VPIH) against inventory.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective VPI5. Ensure that during implementation of Objective VP2, re-established or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/ establishment, in accordance with Conservation Actions in Table 7-1.	Are re-established and/ or established vernal pools being inoculated with the appropriate soils?	Reporting by biologist conducting establishment/re-establishment to confirm origin of soils.	Biologist to confirm suitability of inocula before use in re-establishment/establishment. Reporting submitted within 1 month of inoculation	Implementing Entity to develop criteria for inoculation of vernal pool re-establishment/ creation within the first 12 months.
Objective CTS1. Preserve at least 5 occupied California tiger salamander breeding ponds.	Where are existing occupied breeding ponds within California tiger salamander critical habitat?	Conduct survey for occupied California tiger salamander breeding ponds in the Plan Area.	Survey for occupied ponds in first HCP year	Implementing Entity to develop in first 12 months the survey methodology to locate occupied California tiger salamander breeding ponds.
	Are the required number of existing occupied California tiger salamander breeding ponds being preserved?	Map extent and distribution of California tiger salamander breeding ponds and field verification of pond preservation.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1

1367

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective CTS2. During preserve assembly, ensure that modeled aquatic and upland habitat for California tiger salamander is preserved. Minimum preservation will total: • 141 acres of aquatic habitat • 1,677 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within California tiger salamander Critical Habitat occurs within California tiger salamander Critical Habitat (see Objectives BOW1, VPG1, VP1, SW1, and VG1).	What is the current inventory of habitat for California tiger salamander?	Quantify acres and map the extent and distribution of California tiger salamander aquatic and upland habitat in the Plan Area.	Maps and tables included with Annual Reports.	None.
	Are necessary acres of aquatic and upland habitat preserved? Is mitigation for modeled high value habitat impacted within California tiger salamander Critical Habitat occurring within California tiger salamander Critical Habitat?	Review map of Vernal Pool, Swale, Blue Oak Woodland, and Valley Grassland in the Plan Area. Use GIS to compare preserved Vernal Pool, Swale, and Stream/Creek (VPIH) against inventory. Outputs are maps and tabular presentation of data showing acres of habitat preserved compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed for California tiger salamander?	Compliance monitoring summary included in Annual Reports submitted by implementing entity. Field verification of compliance by Implementing Entity or designee	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for California tiger salamander, and provide compliance checklist in first 18 months.
Objective CTS3. Rural transportation project Covered Activities within CTS modeled habitat will be designed to allow California tiger salamander movement across the roadway area.	Are required wildlife crossings included in designs for rural transportation Covered Activities implemented in CTS modeled habitat?	Design review by Wildlife Agencies and Implementing Entity, considering site-specific conditions and local CTS movement.	On project application	Implementing Entity to develop in first 12 months formal criteria to evaluate wildlife crossings for CTS use.
	Are required CTS crossings being constructed?	Compliance monitoring reports submitted by implementing entity. Field verification by implementing entity or designee	During project construction and at project completion	None.

AGENDA ITEM 11.1
1368

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective WS1. During preserve assembly, ensure that modeled aquatic and upland habitat for western spadefoot (*Spea hammondii*) is preserved. Minimum preservation will total: • 1,531 acres of aquatic habitat • 22,044 acres of upland habitat. Ensure that mitigation for modeled habitat impacted within the Mather Core or Cosumnes/Rancho Seco Core Recovery Areas occurs within the Core Recovery Areas (see Objectives BOW1, VP1, VP3, SW1, SC1, OW1, and VG1).	What is the current inventory of aquatic and upland habitat for western spadefoot in the Plan Area?	Quantify acres and map the extent and distribution of western spadefoot aquatic and upland habitat in the Plan Area.	Maps and tables included with Annual Report.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are required acres of aquatic and upland habitat preserved? Is mitigation for modeled habitat impacted within the Mather Core Recovery Area and/or Cosumnes/Rancho Seco Core Recovery Area occurring within the Mather Core Recovery Area and/or Cosumnes/Rancho Seco Core Recovery Area?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by implementing entity. Field verification of compliance by Implementing Entity or designee	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for western spadefoot, and provide compliance checklist in first 18 months.
Objective WS2. During preserve assembly, ensure that modeled aquatic habitat for western spadefoot is re-established and/or established. Minimum re-establishment and/or establishment will total: • 906 acres of aquatic habitat.	Are necessary acres of aquatic habitat being re-established and/ or established? Is compensatory mitigation for modeled habitat impacted within the Mather Core Recovery Area and/or Cosumnes/Rancho Seco Core	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1369

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Ensure that mitigation for modeled habitat impacted within the Mather Core or Cosumnes/Rancho Seco Core Recovery Areas occurs within the Core Recovery Areas (see Objectives VP2, SW2, and OW2).	Recovery Area being constructed within the Mather Core Recovery Area and/or Cosumnes/Rancho Seco Core Recovery Area?	to targets.		
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by implementing entity. Field verification of compliance by Implementing Entity or designee	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for western spadefoot, and provide compliance checklist in first 18 months.
Objective WPT1. During preserve assembly, ensure that modeled aquatic and upland habitat for western pond turtle (*Actinemys marmorata*) is preserved. Minimum preservation will total: • 315.35 acres of aquatic habitat • 10,971 acres of upland habitat. (See Objectives FWM1, OW1, VPG1, RIP1, RIP3, VG1, BOW1, and SC1).	What is the current inventory of habitat for western pond turtle in the Plan Area?	Map the extent and distribution of western pond turtle aquatic and upland habitat.	Map and tables included with Annual Report	None.
	Are necessary acres of aquatic and upland habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by implementing entity. Field verification of compliance by Implementing Entity or designee	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for western pond turtle, and provide compliance checklist in first 18 months.

AGENDA ITEM 11.1
1370

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective WPT2. During preserve assembly, ensure that modeled aquatic habitat for western pond turtle is re-established and/or established. Minimum re-establishment and/or establishment will total: • 315 acres of aquatic habitat. (See Objectives RIP2, FWM2, and OW2.)	Are necessary acres of aquatic habitat being re-established and/or established?	Annual review of habitat re-establishment and establishment projects, including GIS mapping. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by implementing entity. Field verification of compliance by Implementing Entity or designee	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for western pond turtle, and provide compliance checklist in first 18 months.
Objective GGS1. During preserve assembly, ensure that modeled habitats for giant gartersnake are preserved along the following creeks (or other creeks that are determined by the TAC to provide similar GGS habitat value): • The lower Laguna Creek, mainly between Twin Cities Road (State Route (SR) 104) and Miess Road; • Skunk Creek, which flows into the Cosumnes River northwest of the City of Galt; • the short Willow Creek and tributaries of Badger Creek, which are to the north of the lower Laguna Creek and west of the	What is the current inventory of habitat for giant gartersnake in the Plan Area?	Map the extent and distribution of giant gartersnake high-value habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of high-value aquatic and upland habitat being preserved? Is the preserved habitat located within the areas designated in the objective?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports	Summary included with Annual	Implementing Entity to define what appropriate

AGENDA ITEM 11.1
1371

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Folsom South Canal; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum preservation will total: • 170 acres of Giant Garter Snake high-value aquatic habitat • 2,323 acres of Giant Garter Snake high-value upland habitat. (See Objectives AG1, FWM1, SW1, SC1, OW1, VPG1, RIP1, RIP3, and VG1).		submitted by implementing entity. Field verification of compliance by Implementing Entity or designee.	Reports.	maintenance/ management is for giant gartersnake, and provide compliance checklist in first 18 months.
Objective GGS2. During preserve assembly, ensure that modeled habitats for giant gartersnake are re-established and/or established along the following creeks (or other creeks that are determined by the TAC to provide similar habitat value): • The lower Laguna Creek, mainly between Twin Cities Road (SR 104) and Miess Road; • Skunk Creek: this creek flows into the Cosumnes River northwest of the City of Galt; • To the north of the lower Laguna Creek and west of the Folsom South Canal are several small creeks—the short Willow Creek and	Are necessary acres of high value aquatic and upland habitat being re-established and/ or established? Is the re-established and/ or established habitat located within the areas designated in the objective?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for giant gartersnake, and provide compliance checklist in first 18 months.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
tributaries of Badger Creek; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum re-establishment and/or establishment will total: • 170 acres of high-value aquatic habitat • 134 acres of high-value upland habitat. (See Objectives SW2, OW2, RIP2, and RIP4.)				
Objective GGS3. Plan Permittees will conduct a study to establish hydrologic baseline conditions along Badger Creek to identify what level of hydrology is necessary to support giant gartersnake and acquire a water source to maintain the minimum level of hydrology during the summer months when agricultural runoff may wane.	What is the hydrologic condition along Badger Creek? How much supplemental water would be required to maintain baseline conditions during summer?	Conduct hydrologic study for Badger Creek.	Within two years of HCP implementation	Implementing Entity to fully define in first 18 months what the hydrologic study will entail for inclusion in bid package.
Objective VELB1. Relocate or replace each impacted elderberry shrub (*Sambucus* spp.) according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999). Mitigation will occur in locations that are not inundated for 2 continuous weeks, as determined by the TAC.	How many shrubs are being impacted? Are impacted shrubs being relocated or replaced in appropriate locations?	Review mitigation proposed for each project, including location for replacement.	Project-by-project basis	Implementing Entity to develop methodology in first 18 months for determining inundation period of potential elderberry shrub mitigation sites.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective VELB2. During implementation of riparian habitat re-establishment and/or establishment, strategically include elderberry shrub in the planting palette (see Objectives RIP2 and RIP4).	Is elderberry shrub being used appropriately during riparian habitat re-establishment and/ or establishment?	Review of planting plans for proposed re-establishment/ establishment projects, comparison against Conservation Actions in Table 7-1, field inspection of in-progress and completed re-establishment/ establishment projects.	Project-by-project basis	Implementing Entity to develop in first 12 months a checklist for review of riparian re-establishment/ establishment planting plans.
Objective CH1. During preserve assembly, ensure that a minimum of 974 acres of modeled nesting/foraging habitat for Cooper's hawk (*Accipiter cooperii*) is preserved, in accordance with Conservation Actions described in Table 7-1 (see Objectives RIP1, RIP3, and BOW1).	What is the current inventory of nesting/foraging habitat for Cooper's hawks in the Plan Area?	Map the extent and distribution of Cooper's hawk nesting/foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of nesting/foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Cooper's hawk, and provide compliance checklist in first 18 months.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective CH2. During preserve assembly, ensure that a minimum of 601 acres of modeled nesting/foraging habitat for Cooper's hawk is re-established and/or established (see Objectives RIP2 and RIP4).	Are necessary acres of nesting/foraging habitat being re-established and/ or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Cooper's hawk, and provide compliance checklist in first 18 months.
Objective CH3. During preserve assembly, ensure that a minimum of 38 acres of modeled foraging habitat for Cooper's hawk is preserved, in accordance with Conservation Actions described in Table 7-1 (see Objectives RIP1, RIP3, and BOW1).	What is the current inventory of foraging habitat for Cooper's hawks in the Plan Area?	Map the extent and distribution of Cooper's hawk foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1375

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Cooper's hawk, and provide compliance checklist in first 18 months.
Objective TB1. During preserve assembly, ensure that a minimum of 4,149 acres of modeled foraging habitat for tricolored blackbird is preserved (see Objectives AG1, AG2, FWM1, VG1, VPG1, VP1, VP3, FWM1, OW1, and SW1).	What is the current inventory of habitat for tricolored blackbirds?	Map the extent and distribution of tricolored blackbirds foraging habitat.	Map and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for tricolored blackbird, and provide compliance checklist in first 18 months.

AGENDA ITEM 11.1
1376

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective TB2. During preserve assembly, ensure that a minimum of 27,532 acres of modeled nesting/foraging habitat for tricolored blackbird is preserved, including a minimum of 402 acres of freshwater marsh and seasonal wetland (see Objectives AG1, AG2, VG1, VPG1, FWM1, and SW1).	What is the current inventory of habitat for tricolored blackbirds?	Map the extent and distribution of tricolored blackbirds nesting habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of nesting habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for tricolored blackbird, and provide compliance checklist in first 18 months.
Objective TB3. During preserve assembly, ensure that a minimum of 917 acres of modeled foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2, SW2, OW2, and VP2).	Are necessary acres of foraging habitat being re-established and/or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1377

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	Is re-established and/or established habitat being maintained/managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/management is for tricolored blackbird, and provide compliance checklist in first 18 months.
Objective TB4. During preserve assembly, ensure that a minimum of 232 acres of modeled nesting/foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2 and SW2).	Are necessary acres of nesting habitat being re-established and/or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/or established habitat being maintained/managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/management is for tricolored blackbird, and provide compliance checklist in first 18 months.
Objective TB5. Provide mitigation for loss of any tricolored blackbird nesting colony site that is occupied at the time of Covered Activity implementation or was recorded as an occupied nesting colony at any time since 2008. Sources for occupied nesting colonies are the CNDDB, Tricolored Blackbird Portal, eBird, or other data sources approved by the Wildlife Agencies. Minimum mitigation is to	Where are colonies of tricolored blackbirds located, historically and at present?	Map historic and existing tricolored blackbird nesting colony sites.	Maps and tables included with Annual Report	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are sufficient colonies being preserved?	Annual (or some agreed upon time interval) review of current SSHCP GIS database of colony sites and modeled foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1378

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
protect one extant unprotected occurrence of a nesting colony prior to take of one nesting colony of tricolored blackbirds. Ensure that at least five extant tricolored blackbird colonies that were occupied in recent years are maintained and managed within the SSHCP Preserve System.	Are preserved colonies being maintained/managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for tricolored blackbird, and provide compliance checklist in first 18 months.
Objective TB6. Conduct an experimental study to identify management actions to protect tricolored blackbird colonies (e.g., coarse netting to reduce nest predation or impact of pesticides).	How many birds successfully fledge?	Nest census to quantify successful fledging.	Once each season that study is ongoing, coordinated with study timing.	Implementing Entity to develop in the first 18 months a methodology for tricolored blackbird nest census.
	What techniques best exclude predators?	Conduct pilot study for exclusion techniques.	Study initiated within 2 years of HCP implementation; completed within 5 years of HCP implementation.	Implementing Entity to develop in first 18 months a pilot study design for management techniques to benefit tricolored blackbird, including exclusion techniques to be tested, how to determine success or failure of techniques.
Objective TB7. Ensure that at least one large tricolored blackbird colony (i.e., one that has historically [from 1950 onward] supported a minimum of 1,500 individuals) is protected.	Where are large colonies of tricolored blackbirds located, historically and at present?	Map historic and existing tricolored blackbird nesting colony sites.	Maps and tables included with Annual Report	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is the appropriately sized colony being preserved?	Annual (or some agreed upon time interval) review of current SSHCP GIS database of colony sites.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
				be included in Annual Reports.
	Is preserved colony being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for tricolored blackbird, and provide compliance checklist in first 18 months.
Objective TB8. For any tricolored blackbird nesting colony that is removed by a Covered Activity, re-establish and/or establish three new colonies within SSHCP Preserves. Re-established and/or established colonies can be in aquatic (freshwater marsh, seasonal wetland) or upland (annual grassland) habitat types, and must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands that provide adequate foraging opportunities.	For each impacted colony site, are three potential colony sites being re-established or established?	Annual (or some agreed upon time interval) review of current SSHCP GIS database of colony sites, and re-established/established colony sites.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are re-established/established colony sites being maintained and managed to encourage colonization?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for tricolored blackbird, and provide compliance checklist in first 18 months.
Objective BO1. Preserve 7 occupied western burrowing owl (*Athene cunicularia*) sites (commensurate with 20% of the estimated number of sites within the UDA as of 2014), preserve at least 200 acres of land surrounding each occupied burrow site, and maintain modeled habitat for western burrowing owl within 0.4 mile of breeding sites.	Where are occupied burrowing owl sites?	Map burrowing owl sites and modeled burrowing owl foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are the occupied burrowing owl sites and associated modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current SSHCP GIS database of colony sites.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are preserved sites being	Compliance monitoring summary	Summary included	Implementing Entity to define

AGENDA ITEM 11.1
1380

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	maintained/ managed?	included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	with Annual Reports.	what appropriate maintenance/ management is for burrowing owl, and provide compliance checklist in first 18 months.
Objective BO2. For each burrowing owl or burrowing owl pair passively excluded, protect 200 acres of modeled habitat for western burrowing owl, and establish a ground squirrel (*Spermophilus (Otospermophilus) beecheyi*) colony and augment with artificial burrows as appropriate (determined by TAC). Artificial burrows will be established at appropriate locations throughout the Preserve System pursuant to CDFW (CDFG 2012 guidelines) or as otherwise determined by the TAC.	How many burrowing owls are being passively excluded?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are requisite number of acres of modeled habitat for burrowing owl being preserved and augmented with ground squirrels and artificial burrows?	Map burrowing owl sites and modeled burrowing owl foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop format for annual summary maps in first 12 months.
	Are preserved sites being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for burrowing owl, and provide compliance checklist in first 18 months.
Objective FH1. During preserve assembly, ensure that a minimum of 25,881 acres of modeled foraging habitat for ferruginous hawk is preserved, including 19,625 acres in PPUs 5 and 7 (see Objectives AG1, VG1, VP1, VP3, VPG1, and SW1).	What is the current inventory of habitat for ferruginous hawks?	Map the extent and distribution of ferruginous hawk foraging habitat.	Maps and tables included with Annual Report	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial	Maps and tables included with	Implementing Entity to develop in first 12 months

AGENDA ITEM 11.1
1381

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
		imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Annual Reports.	format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for ferruginous hawk, and provide compliance checklist in first 18 months.
Objective FH2. During preserve assembly, ensure that a minimum of 729 acres of modeled foraging habitat for ferruginous hawk is re-established and/or established (see Objectives VP2 and SW2).	Are necessary acres of modeled foraging habitat being re-established and/or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/or established habitat being maintained/managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for ferruginous hawk, and provide compliance checklist in first 18 months.
Objective SH1. During preserve assembly, ensure that a minimum of 31,033 acres of	What is the current inventory of habitat for Swainson's hawk?	Map the extent and distribution of Swainson's hawk foraging habitat.	Maps and tables included with	Implementing Entity to develop in first 12 months

AGENDA ITEM 11.1
1382

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
modeled foraging habitat for Swainson's hawk is preserved (see Objectives AG1, AG2, SW1, VP1, VP3, VG1). Ensure that mitigation for high-value modeled habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8.			Annual Reports.	format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled foraging habitat being preserved? Is modeled high value habitat that is impacted within PPUs 4, 6, or 8 being mitigated within those same PPUs?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Swainson's hawk, and provide compliance checklist in first 18 months.
Objective SH2. At least 2,000 acres of Cropland habitat within high-value habitat within PPUs 4, 6, and 8 will be preserved in fee title to ensure that intensive management actions can be taken. Land held in fee title will be restricted to growing field or row crops. Fee title lands must maintain, at a minimum, an average of 50% of their crop cover-type in alfalfa. Other crop types or land covers may be substituted for alfalfa if the TAC determines that such other crop types or land	What is the current inventory of habitat for Swainson's hawk?	Map the extent and distribution of Swainson's hawk foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
cover types are of the same or better quality foraging habitat as alfalfa.		showing acres of habitat compared to targets.		
	Is preserved habitat being maintained/ managed? Are the crop restrictions on the Cropland habitat within high value habitat being followed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Swainson's hawk, and provide compliance checklist in first 18 months, including list of crop restrictions.
Objective SH3. During preserve assembly, ensure a minimum of 746 acres of modeled nesting habitat for Swainson's hawk is preserved (see Objectives RIP1 and RIP3).	What is the current inventory of habitat for Swainson's hawk?	Map the extent and distribution of Swainson's hawk nesting habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled nesting habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Swainson's hawk, and provide compliance checklist in first 18 months.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective SH4. During preserve assembly, ensure that a minimum of 373 acres of modeled riparian nesting habitat for Swainson's hawk is re-established and/or established. Ensure that mitigation for modeled nesting habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8 (see Objectives RIP2 and RIP4).	Are necessary acres of modeled riparian nesting habitat being re-established and/or established? Is mitigation occurring in the correct PPUs according to the Objective?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Swainson's hawk, and provide compliance checklist in first 18 months.
Objective SH5. For each of the 36 known nesting trees within the UDA, plant 10 trees that are modeled for Swainson's hawk nesting within SSHCP preserves. Plant nesting trees on properties protected by the SSHCP within PPUs 4, 6, and 8, and near protected foraging habitat. Tree species will be selected based on known suitability as nesting habitat for Swainson's hawk, and the planted trees must be maintained and/or replaced in perpetuity.	Which trees are to be impacted?	Map the locations of impacted trees.	Upon project application	None.
	Are we planting the appropriate number of trees, in the appropriate locations, with the appropriate timing?	Map the locations of planted trees and compare against Conservation Actions in Table 7-1. Field inspection by implementing entity or designee.	Annual mapping and field verification, compliance monitoring. Maps and tables included in Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
Objective SH6. During preserve assembly, ensure that a minimum of 729 acres of modeled foraging habitat for Swainson's hawk is re-established and/or established (see	Are necessary acres of modeled foraging habitat being re-established and/or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objectives RIP2 and RIP4).		Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.		Reports.
	Is re-established and/or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for Swainson's hawk, and provide compliance checklist in first 18 months.
Objective NH1. During preserve assembly, ensure that a minimum of 1,245 acres of modeled foraging habitat for northern harrier is preserved (see Objectives VG1, AG1, VPG1, VP1, VP3, FWM1, and SW1).	What is the current inventory of habitat for northern harrier?	Map the extent and distribution of northern harrier foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for northern harrier, and provide compliance checklist in first 18 months.

AGENDA ITEM 11.1
1386

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective NH2. During preserve assembly, ensure that a minimum of 30,048 acres of modeled nesting/foraging habitat for northern harrier is preserved (see Objectives VG1 and AG1).	What is the current inventory of nesting habitat for northern harrier?	Map the extent and distribution of northern harrier nesting habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled nesting habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for northern harrier, and provide compliance checklist in first 18 months.
Objective NH3. During preserve assembly, ensure that a minimum of 856 acres of modeled foraging habitat for northern harrier is re-established and/or established (see Objectives VP2, FWM2, and SW2).	Are necessary acres of modeled foraging habitat being re-established and/ or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1387

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for northern harrier, and provide compliance checklist in first 18 months.
Objective WK1. During preserve assembly, ensure that a minimum of 31,205 acres of modeled foraging habitat for white-tailed kite is preserved (see Objectives VG1, AG1, RIP1, RIP3, VPG1, SW1, VP1, VP3, and BOW1).	What is the current inventory of habitat for white-tailed kite?	Map the extent and distribution of white-tailed kite foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what maintenance/ management is appropriate for white-tailed kite, and provide compliance checklist in first 18 months.

AGENDA ITEM 11.1
1388

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective WK2. During preserve assembly, ensure that a minimum of 974 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is preserved (see Objectives RIP1, RIP3, and BOW1).	What is the current inventory of habitat for white-tailed kite?	Map the extent and distribution of white-tailed kite nesting habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled nesting habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/management is for white-tailed kite, and provide compliance checklist in first 18 months.
Objective WK3. During preserve assembly, ensure a minimum of 767 acres of modeled foraging habitat for white-tailed kite is re-established and/or established (see Objectives VP2, RIP2, RIP4, and SW2).	Are necessary acres of modeled foraging habitat being re-established and/or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

AGENDA ITEM 11.1
1389

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	Is re-established and/or established habitat being maintained/managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for white-tailed kite, and provide compliance checklist in first 18 months.
Objective WK4. During preserve assembly, ensure that a minimum of 601 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is re-established and/or established (see Objectives RIP2 and RIP4).	Are necessary acres of modeled nesting habitat being re-established and/ or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for white-tailed kite, and provide compliance checklist in first 18 months.
Objective GS1. During preserve assembly, ensure that a minimum of 257 acres of modeled roosting or roosting/foraging habitat for greater sandhill crane is preserved. Roosting habitat will be preserved and maintained within PPUs 4, 6, and 8, with a minimum of 75% within PPU 6 (see Objectives VP1, SW1, and FWM1).	What is the current inventory of habitat for greater sandhill cranes?	Map the extent and distribution of greater sandhill crane modeled foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled roosting habitat being preserved? Does the preservation occur in	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of	Map and tables included with Annual Report.	Implementing Entity to develop in first 12 months format for maps and tables to

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	PPU 4, 6, and 8, with at least 193 acres in PPU 6?	land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.		be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for greater sandhill crane, and provide compliance checklist in first 18 months.
Objective GS2. During preserve assembly, ensure that a minimum of 7,751 acres of modeled foraging habitat for greater sandhill crane is preserved (see Objectives AG1, AG2, and VG1).	What is the current inventory of habitat for greater sandhill cranes?	Map the extent and distribution of greater sandhill crane modeled foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Map and tables included with Annual Report.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for greater sandhill crane, and provide compliance checklist in first 18 months.

AGENDA ITEM 11.1
1391

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective GS3. During preserve assembly, ensure that a minimum of 184 acres of modeled roosting habitat or roosting/foraging habitat for greater sandhill crane is re-established and/or established. Re-establish two new roost sites (minimum of 90 acres of freshwater marsh/seasonal wetland complex each) every 2 miles in the gap between the Cosumnes population and the Stone Lakes' population or other strategic locations if that gap is closed by another HCP or conservation project (see Objectives VP2, SW2 and FWM2).	Are necessary acres of modeled roosting and roosting/foraging habitat being re-established and/ or established? Are new roost sites located as directed in the objective?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types, modeled habitat, and roost sites. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/ or established habitat or roost sites being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for greater sandhill crane, and provide compliance checklist in first 18 months.
Objective GS4. Create a visual screen of woody vegetation near human disturbances such as buildings, bridges, and paved roads from permanent roosting habitat within PPU 6. Screens should be located as appropriate to not interfere with habitat usage by greater sandhill cranes.	Where is permanent roosting habitat that would benefit from a visual screen?	Map the extent and distribution of roosting habitat that is near locations frequented by humans (e.g., roads, rivers, etc.).	Map habitat suitable for screening immediately	Implementing Entity to develop a method in the first 18 months to prioritize sites for visual screening to benefit greater sandhill crane.
	Are visual screens being planted appropriately?	Map planted screens and inspect height and condition in field to ensure no interference with habitat use by greater sandhill cranes.	Annual mapping and field verification of screen conditions	Implementing Entity, in consultation with the TAC, to identify in the first 18 months the ideal height and other parameters for screen function to benefit greater sandhill crane.

AGENDA ITEM 11.1
1392

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective GS5. As part of the 2,000 acres preserved under Objective AG2, establish and maintain 10 food plots in strategic locations totaling a minimum of 200 acres within an agricultural setting for greater sandhill crane foraging habitat within PPU 6. Maintain the 200 acres among the 10 food plots as irrigated pasture or planted with crops preferred by greater sandhill crane as foraging habitat. Crops may include, but are not limited to, alfalfa, corn, wheat, or rice. Strategic placement of food plots will include locations for food plots in upland areas above the floodplain.	How many acres of greater sandhill crane food plots have we established?	Map the extent and distribution of greater sandhill crane food plots.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are the food plots being acquired, planted, and managed according to the conservation strategy for greater sandhill crane?	Cross check for consistency with greater sandhill crane modeled species habitat.	Summary of consistency included with Annual Reports.	Implementing Entity to develop in first 12 months format for summary to be included in Annual Reports.
Objective GS6. During preserve assembly, ensure that a minimum of 1,000 acres of high-value modeled foraging habitat for greater sandhill crane outside the 100-year floodplain is preserved (see Objectives VP1, SW1, and FWM1).	Are the necessary acres of high-value modeled foraging habitat being preserved outside the 100-year floodplain?	Map the extent and distribution of greater sandhill crane foraging habitat. Ensure that an appropriate proportion of foraging habitat preservation is located outside the 100-year floodplain. Cross-check for consistency with greater sandhill crane modeled species habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is the high-value modeled foraging habitat outside the 100-year floodplain being managed for the benefit of greater sandhill crane according to the SSHCP Conservation Strategy?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for greater sandhill crane, and provide compliance checklist in first 18 months.

AGENDA ITEM 11.1

1393

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective LS1. During preserve assembly, ensure that a minimum of 9,152 acres of modeled foraging habitat for loggerhead shrike (*Lanius ludovicianus*) is preserved (see Objectives VG1, AG1, VPG1, SW1, VP1, and VP3).	What is the current inventory of habitat for loggerhead shrike?	Map the extent and distribution of loggerhead shrike modeled foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports.	Implementing Entity to define what appropriate maintenance/ management is for loggerhead shrike, and provide compliance checklist in first 18 months.
Objective LS2. During preserve assembly, ensure that a minimum of 22,014 acres of modeled nesting/foraging habitat for loggerhead shrike is preserved (see Objectives VG1, RIP1, and RIP3).	What is the current inventory of habitat for loggerhead shrike?	Map the extent and distribution of loggerhead shrike modeled nesting habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled nesting/foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
		habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.		Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for loggerhead shrike, and provide compliance checklist in first 18 months.
Objective LS3. During preserve assembly, ensure that a minimum of 592 acres of modeled nesting habitat for loggerhead shrike is re-established and/or established (see Objectives RIP2 and RIP4).	Are necessary acres of modeled nesting habitat being re-established and/ or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for loggerhead shrike, and provide compliance checklist in first 18 months.
Objective LS4. During preserve assembly, ensure that a minimum of 965 acres of modeled nesting habitat for loggerhead shrike is preserved (see Objectives RIP2 and RIP4).	What is the current inventory of habitat for loggerhead shrike?	Map the extent and distribution of loggerhead shrike modeled nesting habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
	Are necessary acres of modeled nesting habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for loggerhead shrike, and provide compliance checklist in first 18 months.
Objective LS5. During preserve assembly, ensure that a minimum of 729 acres of modeled foraging habitat for loggerhead shrike is re-established and/or established (see Objective SW2).	Are necessary acres of modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for loggerhead shrike, and provide compliance checklist in first 18 months.

AGENDA ITEM 11.1
1396

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective WR1. During preserve assembly, ensure that a minimum of 23,910 acres of modeled foraging habitat for western red bat (*Lasiurus blossevillii*) is preserved (see Objectives BOW1, RIP1, RIP3, AG1, VPG1, VG1, VP1, VP3, SW1, OW1, FWM1, and SC1).	What is the current inventory of foraging habitat for western red bat?	Map the extent and distribution of western red bat modeled foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for western red bat, and provide compliance checklist in first 18 months.
Objective WR2. During preserve assembly, ensure that a minimum of 841 acres of modeled roosting/foraging habitat for western red bat is preserved (see Objectives BOW1, RIP1, and RIP3).	What is the current inventory of habitat for western red bat?	Map the extent and distribution of western red bat modeled roosting/foraging habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of modeled roosting/foraging habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
		habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.		Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for western red bat, and provide compliance checklist in first 18 months.
Objective WR3. During preserve assembly, ensure that a minimum of 1,317 acres of modeled foraging habitat for western red bat is re-established and/or established (see Objectives VP2, SW2, OW2, FWM2, RIP2, and RIP4).	Are necessary acres of modeled foraging habitat being re-established and/ or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for western red bat, and provide compliance checklist in first 18 months.

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
Objective WR4. During preserve assembly, ensure that a minimum of 450 acres of modeled roosting/foraging habitat for western red bat is re-established and/or established (see Objectives RIP2 and RIP4).	Are necessary acres of modeled roosting habitat being re-established and/ or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for western red bat, and provide compliance checklist in first 18 months.
Objective AB1. During preserve assembly, ensure that a minimum of 23,171 acres of modeled habitat for American badger (*Taxidea taxus*) is preserved (see Objectives BOW1, VG1, VP1, VP3, VPG1, and SW1).	What is the current inventory of habitat for American badger?	Map the extent and distribution of American badger habitat.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Are necessary acres of habitat being preserved?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is preserved habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports	Summary included with Annual Reports	Implementing Entity to define what appropriate

AGENDA ITEM 11.1
1399

Table 8-1
Framework for SSHCP Conservation Strategy Compliance Monitoring

Measurable Objective or SSHCP Commitment	What do we need to know to assess compliance?	How do we monitor what we need to know?	How often?	What needs to be developed in the first 18 months for the SSHCP Compliance and AMM Monitoring Program?
		submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.		maintenance/ management is for American badger, and provide compliance checklist in first 18 months.
Objective AB2. During preserve assembly, ensure that a minimum of 767 acres of modeled habitat for American badger is re-established and/or established (see Objectives VP2 and SW2).	Are necessary acres of habitat being re-established and/ or established?	Annual (or some agreed upon time interval) review of current aerial imagery and SSHCP GIS database of land cover types and modeled habitat. Outputs are maps and tabular presentation of data in acres showing acres of habitat compared to targets.	Maps and tables included with Annual Reports.	Implementing Entity to develop in first 12 months format for maps and tables to be included in Annual Reports.
	Is re-established and/ or established habitat being maintained/ managed?	Compliance monitoring summary included in Annual Reports submitted by Implementing Entity. Field verification of compliance by Implementing Entity or designee.	Summary included with Annual Reports	Implementing Entity to define what appropriate maintenance/ management is for American badger, and provide compliance checklist in first 18 months.

8.2.2 AMM Compliance Monitoring

The SSHCP Compliance and AMM Monitoring Program will ensure required AMMs are implemented at Covered Activity project sites, and are implemented correctly (Table 8-2).

The ways in which SSHCP AMM compliance will be assured by the Plan Permittees is provided in Table 8-2. For many Covered Activity projects, the Land Use Authority Permittees will include appropriate SSHCP AMMs in Mitigation Monitoring and Reporting Plans that they prepare under the California Environmental Quality Act for Covered Activities implemented by third-parties, prior to Land Use Authority Permittee approval. The AMM compliance monitoring approaches and timing included in Table 8-2 will be incorporated into these Mitigation Monitoring and Reporting Plans, implementation of which will be conditions of project approval.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
LID-1 (Stormwater Quality)	Are projects incorporating appropriate stormwater management into designs to satisfy the requirements outlined in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions?	Design review by Land Use Authority Permittee.	During design review	None.
LID-2 (Groundwater Recharge)	Has the proponent identified areas in the project site that could be appropriate for groundwater recharge? Has the drainage design incorporated groundwater recharge to the maximum extent feasible?	Design review by Land Use Authority Permittee.	During design review	None.
LID-3 (Natural Site Features):	Has the proponent identified important natural site features within the project site? Has the project design avoided or preserved these natural site features to the maximum extent feasible?	Design review by Land Use Authority Permittee.	During design review and after project completion	Implementing Entity to define "natural site features" in first 12 months for use by Land Use Authority Permittee.
EDGE-1 (Compatible Land Uses)	Has the proponent located compatible land uses adjacent to preserves or preserve setbacks to the maximum extent feasible?	Design review by Land Use Authority Permittee. Field verification of land uses by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	Implementing Entity to develop final list of compatible land uses in first 12 months for use by Land Use Authority Permittee.
EDGE-2 (Single-Loaded Streets)	Has the proponent located single loaded streets adjacent to preserves or preserve setbacks to the maximum extent feasible?	Design review by Land Use Authority Permittee. Field verification of land uses by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	None.
EDGE-3 (Preserve Setbacks)	Has the required minimum width of each preserve setback been established?	Design review by Land Use Authority Permittee. Field verification of setback	During design review and after project completion.	Implementing Entity to develop checklist for design

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
		conditions by Land Use Authority Permittee or Implementing Entity.		and monitoring of each Covered Activity allowed in the Preserve Setbacks in first 12 months.
EDGE-3a (Setback Recreational Trails)	If trails or other allowed facilities are proposed in Preserve Setbacks, do they meet size and l placement requirements of EDGE-3a?	Design review by Land Use Authority Permittee. Field verification of setback conditions by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	Implementing Entity to develop checklist for design and monitoring of each Covered Activity allowed in the Preserve Setbacks in first 12 months.
EDGE-3b (Setback Firebreaks)	If firebreaks are proposed in Preserve Setbacks, do they meet size and l placement requirements of EDGE-3b?	Design review by Land Use Authority Permittee. Field verification of setback conditions by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	Implementing Entity to develop checklist for design and monitoring of each Covered Activity allowed in the Preserve Setbacks in first 12 months.
EDGE-3c (Setback Shade Trees and Landscaping)	If the landscaping planting Covered Activity is proposed in a Preserve Setback, are the plantings consistent with restrictions of EDGE-3c?	Design review by Land Use Authority Permittee. Monitoring of drip irrigation for maximum of 5 years after planting. Field verification of setback conditions by Land Use Authority Permittee or Implementing Entity. Periodic inspection of landscaping and other preserve setback conditions by Implementing Entity to ensure ongoing compliance in perpetuity. Annual monitoring of potential indirect effects from Setback landscaping (i.e., leaf	During design review and after project completion. Annual inspection in perpetuity.	Implementing Entity to develop checklist for acceptable planting methods, appropriate shade trees and landscaping species, and acceptable placement within the Preserve Setback in first 12 months, including landscaping.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
		litter accumulation, irrigation runoff, plant encroachment)		
EDGE-4 (Locate Stormwater Control Outside Preserves)	Are stormwater flows directed away from preserves and captured within the development?	Design review by Land Use Authority Permittee. Field verification of stormwater system functional compliance by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	Implementing Entity to develop checklist in first 12 months for use by Land Use Authority Permittees.
EDGE-5 (Stormwater Control in Preserve Setbacks)	If trails are established in a preserve setback, was the trail designed to slope away from the preserve, and will rain water leaving the trail collected in an adjacent a low-velocity bioswale?	Design review by Land Use Authority Permittee. Field verification of trail and bioswale design and placement in the Preserve Setback, by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	Implementing Entity to develop checklist for acceptable trail and bioswale designs and placement.
EDGE-6 (Detention Basins in Linkage Preserves)	Are detention basins proposed only in Linkage Preserves L1, L2, L4, L7, L8, L9, and L10? Are the detention basins designed to avoid soil excavation and associated effects to the soil's hardpan/duripan and perched aquifer?	Design review by Land Use Authority Permittee. Field inspection of completed detention basin by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	Implementing Entity to develop in first 18 months criteria and checklist for acceptable detention basin designs within Linkage Preserves.
EDGE-7 (Hardpan/Duripan Protection)	Are proponent s avoiding ground disturbing activities inside preserves and inside preserve setbacks that could cut into, disrupt, or remove the soil's restrictive layer (hardpan or duripan)? If a minor puncture of the soil restrictive layer (e.g., from installing a post) is approved by the Implementing Entity and	Design review by Land Use Authority Permittee to determine whether an activity could damage the duripan. Review of repair designs by the Implementing Entity and the TAC. Field inspection of repairs by Land Use Authority Permittee or Implementing Entity.	During design review and after project completion.	Implementing Entity to identify forbidden activities that could cut into, disrupt, or remove the soil's restrictive layer. Implementing Entity to develop list of potentially acceptable activities that might cause minor

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
	the TAC, was the puncture sealed using bentonite clay or other material?			punctures the duripan, and specify appropriate materials and methods for sealing punctures or minor disruptions to the soil restrictive layer, both in first 12 months.
EDGE-8 (Outdoor Lighting)	Is the project proponent using best information available at the time of project design to minimize effects of light pollution from new urban development on target species (e.g., western spadefoot, Ricksecker's water scavenger beetle)?	Land Use Authority Permittee review of proponent plans for AMM implementation; review field implementation and compare to current best practices.	During design review. Update best practices for lighting as new information is available.	Implementing Entity, in consultation with the TAC, to identify in first 18 months lighting best practices. Provide updates to Land Use Authority Permittees as new information is available.
EDGE-9 (Livestock Access to Preserves)	Has the project proponent provided adequate number of l access areas for livestock delivery to and pickup from on-site or adjacent preserves in their project design, if applicable?	Land Use Authority Permittee review of proponent plans for adequate livestock access areas, if applicable.	During design review.	Implementing Entity, in consultation with the TAC, to develop in first 18 months a checklist for livestock access to be used by Land Use Authority Permittees when reviewing projects.
EDGE-10 (Prevent Invasive Species Spread)	Is equipment cleaned of mud and plant material before entering a preserve setback or a preserve? Are mowing activities beginning in non-infested areas before moving on to infested areas? Do maintenance plans for preserve setbacks or preserves include	Implementing Entity review of maintenance plans for preserve setbacks and preserves. Periodic review of maintenance activities for compliance with maintenance plans	During design review. Annual inspection in perpetuity.	Implementing Entity to develop measures to be included in maintenance plans in first 6 months.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
	techniques to avoid spread of invasive plants? Are setback and preserve maintenance activities consistent with these plans?			
BMP-1 (Construction Fencing)	Is the project proponent installing and maintaining construction fencing at the outer boundary of any Preserve Setback or Stream Setback to reduce disturbance to the maximum extent feasible?	Review of construction fencing by Permit Compliance staff or by Biological Monitor, if present.	During construction, monthly inspection.	None.
BMP-2 (Erosion Control)	Are control measures for erosion installed according to project plans? Are the appropriate materials used in Covered Species habitat for giant gartersnake, western pond turtle, California tiger salamander, or western spadefoot to avoid entrapment?	Review of erosion control materials by Land Use Authority Permittee Permit Compliance staff and/or by Biological Monitor, if present.	During construction, monthly inspection.	Implementing Entity to develop list in first 6 months of appropriate erosion control materials for use in modeled habitat for giant gartersnake, western pond turtle, California tiger salamander, or western spadefoot to avoid entrapment.
BMP-3 (Equipment Storage and Fueling)	Has the proponent identified designated equipment storage and fueling locations on project plans? During project construction, is storage and fueling occurring in the designated location?	Review of project plans by Land Use Authority Permittee. Inspection of project site by Land Use Authority Permittee Permit Compliance staff to verify use of appropriate storage and fueling locations.	During design review. During construction, monthly inspection.	None.
BMP-4 (Erodible Materials)	Has the proponent clearly indicated requirements for placement of erodible materials on project plans? Are erodible	Review of project plans by Land Use Authority. Inspection of project site by Permit Compliance staff to confirm that	During design review. During construction, monthly inspection.	None.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
	materials being placed in the appropriate locations?	erodible materials are being placed properly.		
BMP-5 (Dust Control)	Are proponents watering active construction sites, if necessary, to reduce dust effects on adjacent vegetation and wildlife habitat? Is the water being sourced from municipal sources or existing groundwater wells?	Review of project plans by Land Use Authority Permittee to confirm that dust control notes are present. Land Use Authority Permittee Permit Compliance staff to confirm that dust is being controlled appropriately and that water is sourced from municipal supplies or existing groundwater wells.	During design review. During construction, monthly inspection.	None.
BMP-6 (Construction Lighting)	Is the proponent using best information available at the time to minimize effects of light pollution on target species (e.g., western spadefoot, Ricksecker's water scavenger beetle)?	Land Use Authority Permittee review of proponent plans for AMM implementation. Land Use Authority Permittee or Implementing Entity review of field implementation and compare to current best practices.	During design review. During construction, monthly inspection.	Implementing Entity, in consultation with the TAC, to compile in first 12 months guidance related to light pollution and minimization measures for use by Land Use Authority Permittee. Implementing Entity to update every 5 years as necessary.
BMP-7 (Biological Monitor)	Is an approved biological monitor present on the project site during the required times? Have work stoppages been reported to the Wildlife Agencies? Have observations of listed species been reported to CDFW?	Periodic inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm presence of biological monitor. Review of monitoring reports submitted by biological monitor.	Monthly during construction.	Implementing Entity to develop checklist of qualifications for Approved Biologist in first 6 months, in coordination with the Wildlife Agencies.
BMP-8 (Training of Construction Staff)	Are construction staff being trained by an Approved Biologist regarding all	Implementing Entity review of documentation submitted that confirms	Monthly during construction.	Implementing Entity to describe contents of required

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
	requirements listed in the AMM? Has required documentation been submitted to the Implementing Entity?	every member of the construction staff has received the required training.		training of construction staff by Approved Biologist in first 6 months, in coordination with the Wildlife Agencies.
BMP-9 (Soil Compaction)	Did the proponent treat compacted soils after construction to restore water infiltration and soil hydrology to pre-project conditions?	Post-construction inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm that soil compaction treatments were applied.	Within one month after finishing restoration work.	Implementing Entity to develop in first 6 months requirements for compaction treatments of temporarily disturbed sites.
BMP-10 (Revegetation)	Did the proponent revegetate cut and fill slopes as required?	Post-construction inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm revegetation was done, and that it persists.	Within one month after finishing restoration work.	Implementing Entity to develop in first 6 months requirements for revegetation or restoration of temporarily disturbed sites.
BMP-11 (Speed Limit)	Are project-related vehicles observing the appropriate speed limits in the Plan Area?	Land Use Authority Permittee coordination with any biological monitors to ensure speed limit is being followed.	Monthly during construction.	None.
ROAD-1 (Road Project Location)	Did the project proponent avoid environmentally sensitive area to the maximum extent possible when selecting the location for a road project?	Land Use Authority Permittee will review project plans to determine that road projects have avoided sensitive environmental resources to the maximum extent feasible.	During design review.	None.
ROAD-2 (Wildlife Crossing Structures)	Does the design of the road project include wildlife crossing structures at required locations, and does the design	Land Use Authority Permittee will review project plans to determine that road projects have included wildlife	During design review, and post-construction.	Implementing Entity to develop in first 12 months detailed requirements for dry

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
	of the wildlife crossing meet all requirements for the targeted species?	crossing structures at all required locations. Land Use Authority Permittee, Implementing Entity and the TAC will approve final wildlife crossing designs		wildlife crossings and wildlife crossing that also provide hydrologic connectivity.
ROAD-3 (Roadside Pesticide Use)	For entities conducting roadside pesticide use, are label requirements being followed and are signs identifying restricted areas (e.g., California tiger salamander breeding ponds) placed?	Land Use Authority Permittee will coordinate with Approved Biologist to confirm label requirements are being followed and will post signs on road shoulders. Implementing Entity will confirm placement of road signs in sensitive areas.	Monthly during construction.	Implementing Entity to determine sign wording and designs in first 18 months so that they are consistent within the Plan Area.
NATURE TRAIL-1 (Nature Trail Plan)	Has a nature trail plan been prepared for each preserve that allows public access on a nature trail in the PMP? Does the trail plan meet requirements listed in the AMM?	Implementing Entity and Wildlife Agency review of trail plans. Public access not allowed without an approved trail plan.	During preparation of PMPs.	Implementing Entity to develop in first 18 months an outline for trail plans and required contents.
NATURE TRAIL-2 (Nature Trail Protection of Duripan)	Are trails in preserves avoiding impacts to the soil hardpan/duripan? Are trails remaining unpaved?	Implementing Entity field verification of trail locations and unpaved status.	During construction of nature trails.	None.
NATURE TRAIL-3 (Nature Trail Location)	Are trails in preserve avoiding impacts to sensitive resources?	Implementing Entity field verification of trail locations as they relate to sensitive resources.	During construction of nature trails.	Implementing Entity to develop in first 18 months a list of sensitive resources to be avoided by nature trails on Preserves.
NATURE TRAIL-4 (Biological Studies Prior to	Have biological studies been conducted during preparation of the trail plan? Do	Implementing Entity review of the trail plan and supporting documentation.	During preparation of PMPs.	Implementing Entity to develop in first 18 months a

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
Nature Trail Design)	they identify appropriate avoidance and minimization measures for trail construction and operation?			listing of required biological studies for trail plans.
NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Are nature trail impacts being monitored according to the PMP for that preserve? If monitoring indicates impacts, has use of the trail been discontinued?	Implementing Entity review of trail effects monitoring and coordination with Preserve Manager.	Monthly.	Implementing Entity to develop in first 18 months examples of thresholds for closure of nature trail, to be included in trail plans.
RE-ESTABLISHMENT/ ESTABLISHMENT-1 (Vernal Pool)	Are entities conducting SSHCP vernal pool re-establishment/establishment following the requirements identified in the AMM?	Implementing Entity review of vernal pool re-establishment/establishment plans. Field verification by Implementing Entity of vernal pool conditions and consistency with stated guidelines and plans.	During planning and design of re-establishment/ establishment activities, and during construction.	Implementing Entity to develop in first 6 months the outline and required contents of vernal pool re-establishment/establishment plans.
RE-ESTABLISHMENT/ ESTABLISHMENT-2 (Vernal Pool Inocula Bank)	Are soils from converted vernal pools being excavated and stored using the appropriate protocols? Are inocula soils placed in re-established and/ or established pools being sourced from the appropriate geologic formation and soil type?	Land Use Authority Permittee review of plans for projects converting vernal pools to ensure that they clearly state the disposition of vernal pool soils. Implementing Entity coordination with staff or contractors re-establishing or establishing vernal pools on preserves to ensure that inocula are correct.	During design review, and during implementation of re-establishment/ establishment plans.	Implementing Entity to develop in first 6 months plans for inocula banking (e.g., how long will inocula be considered viable, how will viability be confirmed, how will inocula from different sources be organized).
STREAM-1 (Laguna Creek Wildlife Corridor)	Are proponents establishing the appropriate size setback on Laguna Creek? Are trails being placed in the correct location within the setbacks?	Review of project plans by Land Use Authority to confirm that Laguna Creek setbacks are designed according to requirements, including locations of trails. Field verification by Land Use	During design review, and after implementation.	None.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
		Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established.		
STREAM-2 (UDA Stream Setbacks)	Are proponents establishing appropriate setbacks on Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek? Are trails being placed in the correct location within the setbacks?	Review of project plans by Land Use Authority Permittee to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established.	During design review, and after implementation.	None.
STREAM-3 (Minor Tributaries to UDA Streams)	Are proponents establishing appropriate setbacks on first and second order tributaries that are credited as avoided? Are trails being placed in the setbacks?	Review of project plans by Land Use Authority Permittee to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established.	During design review, and after implementation.	None.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
STREAM-4 (Minimize Effects from Temporary Channel Re-routing)	If stream channels are being re-routed during construction, are the measures identified in the AMM being implemented to avoid hydrological impacts?	Local Land Use Authority Permittee or Implementing Entity review of plans for temporary stream channel re-routing. Periodic inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm required measures are being implemented and maintained.	During design review, and monthly inspection.	None.
STREAM-5 (Design for Stream Channel Re-Routing)	Do designs for stream channel re-routing include the considerations outlined in the AMM?	Local Land Use Authority Permittee or Implementing Entity review of plans for stream channel re-routing. Local Land Use Authority Permittee or Implementing Entity field verification of project implementation.	During design review, and after implementation.	None.
UTILITY-1 (Avian Collision Avoidance)	Are new or relocated utility poles, lines and cell towers being designed in conformance with APLIC standards, as required under the AMM?	Local Land Use Authority Permittee or Implementing Entity review of plans for new or relocated utility poles, lines and cell towers.	During design review.	None.
UTILITY-2 (Utility Maintenance on Preserves)	When utility maintenance must occur on preserves with vernal pools, are the utilities adhering to AMM requirements on timing?	Preserve Manager will report to Implementing Entity on utility maintenance access and timing.	Monthly.	None.
UTILITY-3 (Trenchless Construction Methods)	Are trenchless construction methods being used in the locations required in the AMM?	Local Land Use Authority Permittee or Implementing Entity review of pipeline or conduit projects to confirm that trenchless construction methods have been specified in the required locations.	During design review.	None.

AGENDA ITEM 11.1

1412

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
UTILITY-4 (Siting of Entry and Exit Location)	When trenchless construction methods are used, are the entry and exit locations being sited to avoid vernal pools and riparian woodland.	Local Land Use Authority Permittee or Implementing Entity review of pipeline or conduit projects to confirm that trenchless construction entry and exit locations avoid vernal pools and riparian woodland.	During design review.	None.
LEVEE-1 (Preparation of Hydrologic Analysis)	If a PMP includes modification or breaching of an existing levee, or impeding flows on the water side of an existing levee, has a hydrologic analysis been conducted? If so and the analysis indicates that the activity would substantially increase flood stage elevations or flood risk outside the Preserve, has the levee activity been not implemented?	Implementing Entity review and approval of Draft Individual PMPs. Implementing Entity annual reporting of Preserve System activities.	Reporting included in Annual Reports.	None.
SPECIES-1 (Litter Removal Program)	Has a Litter Removal Program been prepared for each Covered Activity that implements Covered Species AMMs?	Review of Litter Removal Program by the Land Use Authority Permittee or Implementing Entity. Periodic inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm required measures are being implemented and maintained.	During design review, and monthly inspection.	Implementing Entity to provide in first 6 months a checklist for required contents of a litter removal program for use by Land Use Authority Permittee.
SPECIES-2 (No Pets in Construction Areas)	Have construction workers been informed that pets are not allowed on construction sites if a Covered Activity must implement Covered Species	Land Use Authority Permittee or Implementing Entity review of documentation that workers have received notification. Periodic	Monthly inspection.	None.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
	AMMs? Are pets present on construction sites where they are not allowed?	inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm pets are not present.		
SPECIES-3 (Take Report)	Is required reporting of take of Covered Species occurring?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure take is not unreported.	Monthly	Implementing Entity to develop in first 6 months the required contents of take report.
SPECIES-4 (Post Construction Compliance Report)	Did a completed Covered Activity submit its post-construction compliance report as required?	Land Use Authority Permittee or Implementing Entity review of post-construction compliance report.	Post-construction	Implementing Entity to develop in first 12 months the required contents of post-construction compliance report.
PLANT-1 (Rare Plant Surveys)	Are required surveys being conducted?	Land Use Authority or Implementing Entity review of application packages.	During project design.	Implementing Entity to develop in first 12 months protocols for Orcutt grass surveys in consultation with the TAC.
PLANT-2 (Rare Plant Protection	Are occurrences being protected as required?	If surveys indicate occurrences are present, Implementing Entity to work with project proponent to establish preserve.	Prior to project construction.	None.
ORCUTT-1 (Orcutt Grass Surveys)	Are required surveys being conducted?	Land Use Authority or Implementing Entity review of application packages.	During project design.	Implementing Entity to develop in first 12 months protocols for Orcutt grass surveys, in consultation with the TAC.

AGENDA ITEM 11.1

1414

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
ORCUTT-2 (Orcutt Grass Protection)	Are occurrences of Sacramento or slender Orcutt grass being protected as required?	If surveys indicate occurrences are present, Implementing Entity to work with project proponent to establish preserve.	Prior to project construction.	None.
CTS-1 (California Tiger Salamander Daily Construction Schedule)	Are construction activities in California tiger salamander modeled habitat restricted as required in the AMM?	Implementing Entity coordination with any biological monitors to ensure daily construction schedule is being followed.	Monthly during construction.	None.
CTS-2 (California Tiger Salamander Exclusion Fencing)	If construction activities are occurring in modeled habitat between October 15 and July 15, is required exclusion fencing being installed, inspected, and maintained?	Implementing Entity coordination with Approved Biologist is on-site to confirm exclusion fencing is installed, maintained, and is being inspected by the Approved Biologist.	Monthly during construction.	None.
CTS-3 (California Tiger Salamander Monitoring)	If construction activities are occurring in modeled habitat between October 15 and July 15, is an Approved Biologist on-site?	Implementing Entity coordination with any biological monitors to ensure an Approved Biologist is on-site.	Monthly during construction.	Implementing Entity to develop checklist of qualifications for Approved Biologist in first 6 months, in coordination with the Wildlife Agencies.
CTS-4 (Avoid California Tiger Salamander Entrapment)	If construction activities are occurring in modeled habitat between October 15 and July 15, are required steps being taken to avoid California tiger salamander entrapment?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.
CTS-5 (California Tiger Salamander Encounter Protocol)	If construction activities are occurring in modeled habitat between October 15 and July 15, are required encounter protocols being followed?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
CTS-6 (Erosion Control Materials in California Tiger Salamander Habitat)	If erosion control is implemented in California tiger salamander modeled habitat, does it adhere to the requirements of the AMM?	Review of erosion control materials by Land Use Authority Permittee, Permit Compliance staff and/or by Biological Monitor, if present.	Monthly during construction.	None.
	Have the requirements been included in the bid solicitation package for the contractor?	Land Use Authority Permittee review of bid solicitation package.	Before project proponent issues bid solicitation package.	None.
CTS-7 (Rodent Control)	If rodent control is used on a Covered Activity project site, is it restricted to the developed portion of the project site	Implementing Entity coordination with any biological monitors to ensure rodent control use is appropriately restricted.	Monthly during construction.	Implementing Entity to define "developed portion of site" for use by biological monitors, and describe any additional restrictions on types of allowable rodent control, both in first 6 months.
WS-1 (Western Spadefoot Work Window)	Are Covered Activities within western spadefoot modeled habitat occurring between May 15 and October 15 only?	Land Use Authority Permittee review of construction plans, confirmation of construction timing by Permit Compliance staff.	During plan check and monthly during construction.	None.
WS-2 (Western Spadefoot Exclusion Fencing)	If construction activities are occurring in modeled habitat between October 15 and May 15, is required exclusion fencing being installed, inspected, and maintained?	Implementing Entity coordination with Approved Biologist is on-site to confirm exclusion fencing is installed, maintained, and is being inspected by the Approved Biologist.	Monthly during construction.	None.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
WS-3 (Western Spadefoot Monitoring)	If construction activities are occurring in modeled habitat between October 15 and May 15, is an Approved Biologist on-site?	Implementing Entity coordination with any biological monitors to ensure an Approved Biologist is on-site.	Monthly during construction.	Implementing Entity to develop checklist of qualifications for Approved Biologist in first 6 months, in coordination with the Wildlife Agencies.
WS-4 (Avoid Western Spadefoot Entrapment)	If construction activities are occurring in modeled habitat between October 15 and May 15, are required steps being taken to avoid western spadefoot entrapment?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.
WS-5 (Erosion Control Materials in Western Spadefoot Habitat)	If erosion control is implemented in western spadefoot modeled habitat, does it adhere to the requirements of the AMM?	Review of erosion control materials by Land Use Authority Permittee, Permit Compliance staff and/or by Biological Monitor, if present.	Monthly during construction.	None.
	Have the requirements been included in the bid solicitation package for the contractor?	Land Use Authority Permittee review of bid solicitation package.	Before project proponent issues bid solicitation package.	None.
WS-6 (Western Spadefoot Encounter Protocol)	If construction activities are occurring in modeled habitat between October 15 and May 15, are required encounter protocols being followed?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.
GGS-1 (Giant Garter Snake Surveys)	Are planning surveys being conducted for Covered Activities occurring in giant gartersnake modeled habitat? Are areas of giant gartersnake habitat on the project site delineated and avoided?	Land Use Authority Permittee review of planning surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months protocol for giant gartersnake planning surveys.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
GGS-2 (Giant Garter Snake Work Window)	Are Covered Activities within giant gartersnake modeled habitat occurring between May 1 and September 15 only?	Land Use Authority Permittee review of construction plans, confirmation of construction timing by Permit Compliance staff.	During plan check and monthly during construction.	None.
GGS-3 (Giant Gartersnake Monitoring)	If construction activities are occurring in modeled habitat between September 15 and May 1, is an Approved Biologist on-site?	Implementing Entity coordination with any biological monitors to ensure an Approved Biologist is on-site.	Monthly during construction.	Implementing Entity to develop checklist of qualifications for Approved Biologist in first 6 months, in coordination with the Wildlife Agencies.
GGS-4 (Giant Garter Snake Habitat Dewatering and Exclusion)	If construction activities are occurring in modeled habitat between September 15 and May 1, was the habitat dewatered and has required exclusion fencing being installed, inspected, and maintained?	Implementing Entity coordination with Approved Biologist is on-site to confirm dewatering has occurred and that exclusion fencing is installed, maintained, and is being inspected by the Approved Biologist.	Monthly during construction.	Implementing Entity to develop in first 12 months requirements for dewatering plans.
GGS-5 (Avoid Giant Gartersnake Entrapment)	If construction activities are occurring in modeled habitat between September 15 and May 1, are required steps being taken to avoid giant gartersnake entrapment?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.
GGS-6 (Erosion Control Materials in Giant Gartersnake Habitat)	If erosion control is implemented in giant gartersnake modeled habitat, does it adhere to the requirements of the AMM?	Review of erosion control materials by Land Use Authority Permittee, Permit Compliance staff and/or by Biological Monitor, if present.	Monthly during construction.	None.
	Have the requirements been included in the bid solicitation package for the contractor?	Land Use Authority Permittee review of bid solicitation package.	Before project proponent issues bid solicitation package.	None.

AGENDA ITEM 11.1

1418

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
GGS-7 (Giant Gartersnake Encounter Protocol)	If construction activities are occurring in modeled habitat between September 15 and May 1, are required encounter protocols being followed?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.
GGS-8 (Giant Gartersnake Post Construction Restoration)	Have temporarily disturbed areas been revegetated or otherwise restored to pre-project conditions?	Implementing Entity review of photodocumentation submitted by project proponent.	Photodocumentation submitted one month after finishing restoration work.	Implementing Entity to develop list of requirements for revegetation or restoration of temporarily disturbed sites.
WPT-1 (Western Pond Turtle Surveys)	Are planning surveys being conducted for Covered Activities occurring in western pond turtle modeled habitat? Are areas of western pond turtle habitat on the project site delineated and avoided?	Land Use Authority Permittee review of planning surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months a protocol for planning surveys for western pond turtle.
WPT-2 (Western Pond Turtle Work Window)	Are Covered Activities within giant gartersnake modeled habitat occurring between May 1 and September 15 only?	Land Use Authority Permittee review of construction plans, confirmation of construction timing by Permit Compliance staff.	During plan check and monthly during construction.	None.
WPT-3 (Western Pond Turtle Monitoring)	If construction activities are occurring in modeled habitat between September 15 and May 1, is an Approved Biologist on-site?	Implementing Entity coordination with any biological monitors to ensure an Approved Biologist is on-site.	Monthly during construction.	Implementing Entity to develop checklist of qualifications for Approved Biologist in first 6 months, in coordination with the Wildlife Agencies.
WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	If construction activities are occurring in modeled habitat between September 15 and May 1, was the habitat dewatered	Implementing Entity coordination with Approved Biologist is on-site to confirm dewatering has occurred and that	Monthly during construction.	Implementing Entity to develop in first 12 months requirements for dewatering

AGENDA ITEM 11.1
1419

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
	and has required exclusion fencing being installed, inspected, and maintained?	exclusion fencing is installed, maintained, and is being inspected by the Approved Biologist.		plans.
WPT-5 (Avoid Western Pond Turtle Entrapment)	If construction activities are occurring in modeled habitat between September 15 and May 1, are required steps being taken to avoid giant gartersnake entrapment?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.
WPT-6 (Erosion Control Materials in Western Pond Turtle Habitat)	If erosion control is implemented in western pond turtle modeled habitat, does it adhere to the requirements of the AMM?	Review of erosion control materials by Land Use Authority Permittee, Permit Compliance staff and/or by Biological Monitor, if present.	Monthly during construction.	None.
	Have the requirements been included in the bid solicitation package for the contractor?	Land Use Authority Permittee review of bid solicitation package.	Before project proponent issues bid solicitation package.	None.
WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit)	Is the project proponent complying with the required speed limit, if a Covered Activity is located in western pond turtle modeled habitat?	Land Use Authority Permittee coordination with any biological monitors to ensure speed limit is being followed.	Monthly during construction.	None.
WPT-8 (Western Pond Turtle Encounter Protocol)	If construction activities are occurring in modeled habitat between September 15 and May 1, are required encounter protocols being followed?	Implementing Entity review of Take Reports, and coordination with any biological monitors to ensure proper protocols are being used.	Monthly during construction.	None.
WPT-9 (Western Pond Turtle Post Construction Restoration)	Have temporarily disturbed areas been revegetated or otherwise restored to pre-project conditions?	Implementing Entity review of photodocumentation submitted by project proponent.	Photodocumentation submitted one month after finishing restoration work.	Implementing Entity to develop list of requirements for revegetation or restoration of temporarily disturbed sites.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
TCB-1 (Tricolored Blackbird Surveys)	Are planning surveys being conducted for Covered Activities occurring in tricolored blackbird modeled habitat? Are known tricolored blackbird nesting colonies on the project site delineated and avoided during nesting?	Land Use Authority Permittee review of design surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months a protocol for design surveys for tricolored blackbird.
TCB-2 (Tricolored Blackbird Pre-Construction Surveys)	Are pre-construction surveys being conducted?	Land Use Authority Permittee review of pre-construction surveys.	Prior to construction.	Implementing Entity to develop in first 6 months protocol for tricolored blackbird pre-construction surveys.
TCB-3 (Tricolored Blackbird Nest Setback)	If a nest is present on the Covered Activity Project site, has a 500-foot nest setback been established?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding setback. Confirmation of avoidance by Permit Compliance staff.	During construction, weekly contact with Approved Biologist.	None.
TCB-4 (Tricolored Blackbird Nest Setback Monitoring)	If a nest setback has been established, is the Approved Biologist monitoring behavior of the tricolored blackbirds to ensure they are not disturbed by the Covered Activities occurring within the setback?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding setback. Review of monitoring reports submitted by Approved Biologist.	Monthly.	Implementing Entity to develop in first 6 months a monitoring protocol for tricolored blackbird nest setbacks.
TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	Are the restrictions on harvest timing and pesticide use being complied with?	Implementing Entity periodic inspection of Cropland preserve to confirm compliance.	Monthly between January 1 and June 30.	Implementing Entity to develop in first 12 months, in coordination with the TAC details on pesticide use timing and harvest timing to avoid take of nesting tricolored blackbirds.

AGENDA ITEM 11.1
1421

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
SWHA-1 (Swainson's Hawk Surveys)	Are planning surveys being conducted for Covered Activities occurring in Swainson's hawk modeled habitat? Are areas of Swainson's hawk habitat on the project site delineated and avoided?	Land Use Authority Permittee review of planning surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months a protocol for planning surveys for Swainson's hawk.
SWHA-2 (Swainson's Hawk Pre-Construction Surveys)	Are pre-construction surveys being conducted?	Land Use Authority Permittee review of pre-construction surveys.	Prior to construction.	Implementing Entity to develop in first 6 months a protocol for Swainson's hawk pre-construction surveys.
SWHA-3 (Swainson's Hawk Nest Buffer)	If a nest is present on the Covered Activity Project site, has a 0.25-mile nest buffer been established?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding nest buffer. Confirmation of avoidance by Permit Compliance staff.	During construction, weekly contact with Approved Biologist.	None.
SWHA-4 (Swainson's Hawk Nest Buffer Monitoring)	If a nest buffer has been established, is the Approved Biologist monitoring behavior of the Swainson's hawks within the nest buffer to ensure they are not disturbed by the Covered Activity?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding nest buffer. Review of monitoring reports submitted by Approved Biologist.	Monthly.	Implementing Entity to develop in first 6 months a monitoring protocol for Swainson's hawk nest buffer.
GSC-1 (Greater Sandhill Crane Surveys)	Are planning surveys being conducted for Covered Activities occurring in greater sandhill crane modeled habitat? Are areas of greater sandhill crane habitat on the project site delineated and avoided?	Land Use Authority Permittee review of planning surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months a protocol for planning surveys for greater sandhill crane.

AGENDA ITEM 11.1

1422

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
GSC-2 (Greater Sandhill Crane Pre-Construction Surveys)	Are pre-construction surveys being conducted?	Land Use Authority Permittee review of pre-construction surveys.	Prior to construction.	Implementing Entity to develop in first 6 months a protocol for greater sandhill crane pre-construction surveys.
GSC-3 (Greater Sandhill Crane Roost Buffer)	If a roost is present on the Covered Activity Project site, has a 0.5-mile roosting setback been established?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding roost buffer. Confirmation of avoidance by Permit Compliance staff.	During construction, weekly contact with Approved Biologist.	None.
GSC-4 (Greater Sandhill Crane Visual Barrier)	If project-related activities occur within the 0.5-mile roosting buffer, has a visual barrier been constructed according to requirements?	Land Use Authority Permittee review of construction plans to ensure visual barrier is included, confirmation of appropriate visual barrier by Permit Compliance staff.	Project-specific	Implementing Entity to develop in first 18 months specifications for visual barrier to protect greater sandhill crane.
GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring)	If a roost buffer has been established and project activities are occurring within the roost buffer, is the Approved Biologist monitoring behavior of the greater sandhill crane to ensure they are not disturbed by the Covered Activity?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding roost buffer. Review of monitoring reports submitted by Approved Biologist.	Monthly.	Implementing Entity to develop in first 6 months a monitoring protocol for greater sandhill crane roost buffers.
WBO-1 (Western Burrowing Owl Surveys)	Are planning surveys being conducted for Covered Activities occurring in western burrowing owl modeled habitat? Are areas of western burrowing owl habitat on the project site delineated and avoided?	Land Use Authority Permittee review of planning surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months a protocol for planning surveys for western burrowing owl.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
WBO-2 (Western Burrowing Owl Preconstruction Surveys)	Are pre-construction surveys being conducted?	Land Use Authority Permittee review of pre-construction surveys.	Prior to construction.	Implementing Entity to develop in first 6 months a protocol for western burrowing owl pre-construction surveys.
WBO-3 (Burrowing Owl Avoidance)	If burrowing owls are present within the project site during the breeding season, are they being avoided? If construction must occur inside the 250-foot setback, has an avoidance and minimization plan been prepared and implemented? If during the non-breeding season, are owls being avoided, or have unoccupied burrows been excavated?	Land Use Authority Permittee and/or Implementing Entity and Wildlife Agency review of avoidance and minimization plan. Periodic inspection of project site to verify compliance with approved plan. Is behavior of burrowing owls being monitored by an Approved Biologist?	Prior to construction, monitoring during construction.	Implementing Entity to develop in first 6 months requirements for burrowing owl avoidance and minimization plans.
WBO-4 (Burrowing Owl Construction Monitoring)	If a setback has been established, is the Approved Biologist monitoring compliance with the setback and behavior of the western burrowing owls to ensure they are not disturbed by the Covered Activity?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding setback. Review of monitoring reports submitted by Approved Biologist.	Monthly.	Implementing Entity to develop in first 6 months a monitoring protocol for western burrowing owl nest setbacks.
WBO-5 (Burrowing Owl Passive Relocation)	Is passive relocation restricted to only instances where it is expressly approved by the Wildlife Agencies, and conducted according to the requirements of the measure?	Wildlife Agency review of passive relocation requests. Review of monitoring reports submitted by Approved Biologist.	Project-by-project	None.

AGENDA ITEM 11.1

1424

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
WBO-6 (Burrowing Owl Timing of Maintenance Activities)	Are activities near preserves, preserve setbacks, or Stream Setbacks timed to avoid effects on occupied burrows of western burrowing owls?	Case-by-case review by the Implementing Entity of activities occurring in preserves and setbacks.	Ongoing, as new activities are proposed	None
WBO-7 (Rodent Control)	If rodent control is used on a Covered Activity project site, is it restricted to the developed portion of the project site	Implementing Entity coordination with any biological monitors to ensure rodent control use is appropriately restricted.	Monthly during construction.	Implementing Entity to define "developed portion of site" for use by biological monitors, and describe any additional restrictions on types of allowable rodent control, both in first 6 months.
RAPTOR-1 (Raptor Surveys)	Are planning surveys being conducted for Covered Activities occurring in raptor Covered Species modeled habitat? Are areas of raptor habitat on the project site delineated and avoided?	Land Use Authority Permittee review of planning surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months a protocol for planning surveys for northern harrier, ferruginous hawk, white-tailed kite and Cooper's hawk.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
RAPTOR-2 (Raptor Pre-Construction Surveys)	Are pre-construction surveys being conducted?	Land Use Authority Permittee review of pre-construction surveys.	Prior to construction.	Implementing Entity to develop in first 6 months a protocol for pre-construction surveys for northern harrier, ferruginous hawk, white-tailed kite and Cooper's hawk.
RAPTOR-3 (Raptor Nest/Roost Buffer)	If a nest or roost is present on the Covered Activity project site, has a 0.25-mile nest/roost buffer been established?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding nest/roost buffer. Confirmation of avoidance by Permit Compliance staff.	During construction, weekly contact with Approved Biologist.	None.
RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	If a nest/roost buffer has been established, is the Approved Biologist monitoring behavior of raptor Covered Species within the setback to ensure they are not disturbed by the Covered Activity?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding nest/roost buffers. Review of monitoring reports submitted by Approved Biologist.	Monthly.	Implementing Entity to develop in first 6 months a monitoring protocol for nest/roost buffers for northern harrier, ferruginous hawk, white-tailed kite and Cooper's hawk.
BAT-1 (Winter Hibernaculum Surveys)	Are planning surveys being conducted for Covered Activities occurring in western red bat modeled habitat? Are winter hibernacula on the project site delineated and avoided?	Land Use Authority Permittee review of planning surveys and construction plans, confirmation of avoidance by Permit Compliance staff.	During plan check and monthly during construction.	Implementing Entity to develop in first 6 months a protocol for western red bat winter hibernaculum planning surveys.
BAT-2 (Winter Hibernaculum Pre-Construction Surveys)	Are pre-construction surveys being conducted?	Land Use Authority Permittee review of pre-construction surveys.	Prior to construction.	Implementing Entity to develop in first 6 months a protocol for western red bat pre-construction surveys.

Table 8-2
Framework for SSHCP AMM Compliance Monitoring

AMM	What do we need to know to assess compliance?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program
BAT-3 (Winter Hibernaculum Buffer)	If a winter hibernaculum is present on the Covered Activity Project site, has a 300-foot winter hibernaculum buffer been established?	Implementing Entity and/or Land Use Authority Permittee coordination with Approved Biologist regarding winter hibernaculum buffer. Confirmation of avoidance by Permit Compliance staff.	During construction, weekly contact with Approved Biologist.	None.
BAT-4 (Bat Eviction Methods)	If direct effects to a non-maternity roost cannot be avoided on a Covered Activity project site, is an Approved Biologist using safe eviction methods to remove bats?	Implementing Entity and Wildlife Agency coordination with Approved Biologist regarding non-maternity roosts and eviction techniques. Review of monitoring reports submitted by Approved Biologist.	During construction, as-needed contact with Approved Biologist	Implementing Entity to develop in first 12 months a protocol for safe eviction of western burrowing owl.

.

8.2.3 AMM Effectiveness Monitoring

In addition to monitoring compliance with SSHCP AMM requirements, the SSHCP Compliance and AMM Monitoring Program will monitor the effectiveness of each SSHCP AMM to assure that each AMM is avoiding or minimizing effects of Covered Activities on Covered Species and SSHCP natural land cover types to the extent assumed during the preparation of the SSHCP Conservation Strategy, and as assumed by the SSHCP impact analysis (Chapter 6). The results of AMM effectiveness monitoring will be used to adaptively modify an AMM, if that is necessary to reduce adverse effects to Covered Species and SSHCP natural land cover types. The effectiveness of the operational Conservation Strategy will be monitored through the SSHCP Preserve System Monitoring and Management Program, as described in Section 8.3.

The effectiveness of each SSHCP AMM will be monitored by the methods and processes summarized in Table 8-3.

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
LID-1 (Stormwater Quality)	Are stormwater quality measures preventing effects to Preserves?	Special study for pre- and post-project edge conditions on Preserves (Section 8.3.3.5).	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.
LID-2 (Groundwater Recharge)	Only compliance monitoring required (Table 8-2).			
LID-3 (Natural Site Features)	No effectiveness monitoring required.			
EDGE-1 (Compatible Land Uses):	Are compatible land uses minimizing indirect effects to Preserves and Covered Species on Preserves?	Special study for pre- and post-project edge conditions (e.g., noise, ground vibration, light, hydrology, non-native species) on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.
EDGE-2 (Single-Loaded Streets)	Are single-loaded streets minimizing indirect effects to Preserves and Covered Species on Preserves?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.

AGENDA ITEM 11.1
1429

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
EDGE-3 (Preserve Setbacks)	Are Preserve Setbacks minimizing indirect effects to Preserves and Covered Species on Preserves?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.
EDGE-3a (Setback Recreational Trails)	Are trails or other allowed facilities in Preserve Setbacks designed according to the requirements of EDGE-3a preventing direct and indirect effects to Covered Species and Covered Species modeled habitat on Preserves?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.
EDGE-3b (Setback Firebreaks)	Are firebreaks in Preserve Setbacks designed according to the requirements of EDGE-3b preventing direct and indirect effects to Covered Species and Covered Species modeled habitat on Preserves?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.

AGENDA ITEM 11.1

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
EDGE-3c (Setback Shade Trees and Landscaping)	Are shade trees and landscaping in Preserve Setbacks designed according to the requirements of EDGE-3c preventing direct and indirect effects to Covered Species and Covered Species modeled habitat on Preserves?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.
EDGE-4 (Locate Stormwater Control Outside Preserves)	Only compliance monitoring required (Table 8-2).			
EDGE-5 (Stormwater Control in Preserve Setbacks)	Is trail runoff within Preserve Setbacks being collected and prevented from entering Preserves?	Implementing Entity inspection of Preserve Setbacks during rain events.	Annually during rain events	Implementing Entity to develop methodology to be used to evaluate effectiveness of stormwater control in first 18 months after permit issuance.
EDGE-6 (Detention Basins in Linkage Preserves)	Is the detention basin causing adverse effects to the surrounding Preserve?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5.	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.
EDGE-7 (Hardpan/Duripan Protection)	If the hardpan/duripan has been repaired, did the repair restore the perched aquifer?	Periodic inspection of vernal pools around the repair area to	Annually after spring filling of pools.	Implementing Entity to develop within first 18

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
		determine whether subsurface hydrology is intact.		months the methods for assessing success of hardpan/duripan repairs.
EDGE-8 (Outdoor Lighting)	Is lighting being controlled so that it does not spill onto Preserves and affect Covered Species in the Preserves?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, periodic post-project studies beginning no less than 5 years after project completion, as described in Section 8.3.3.5	Implementing Entity to develop prior to SSHCP permit issuance a methodology for special study for pre-project edge conditions on Preserves. Same methodology will be used for post-project conditions.
EDGE-9 (Livestock Access to Preserves)	Is the designated livestock access point functioning to minimize effects to the preserve?	Implementing Entity inspection of the livestock access point for vegetation damage and area of effects.	Annually in spring.	None.
EDGE-10 (Prevent Invasive Species Spread)	Are invasive species being controlled before entering Preserves?	Implementing Entity implements Invasive Species Monitoring and Eradication Program.	Quarterly weed assessment on preserves, with other opportunistic assessment.	Implementing Entity to develop Invasive Species Monitoring and Eradication Program in first 18 months.
BMP-1 (Construction Fencing)	Are construction activities occurring only within the construction fencing?	Inspection of the project site by Implementing Entity or Land Use Authority Permittee.	Monthly during construction.	None.
BMP-2 (Erosion Control)	Are temporary erosion control measures working to prevent sediment, stormwater, and pollutant runoff?	Inspection of the project site by Implementing Entity or Land Use Authority Permittee.	Monthly during construction.	None.
BMP-3 (Equipment Storage and Fueling)	Is the designated storage and fueling area preventing ground disturbance and	Inspection of the project site by Implementing Entity or Land	Monthly during construction.	None.

AGENDA ITEM 11.1
1432

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
	discharge of hazardous materials outside the development footprint?	Use Authority Permittee.		
BMP-4 (Erodible Materials)	Are erodible materials from the project site entering waterways?	Inspection of the project site by Implementing Entity or Land Use Authority Permittee.	Monthly during construction.	None.
BMP-5 (Dust Control)	Is dust control effective in minimizing effects on Preserves?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
BMP-6 (Construction Lighting)	Are lighting restrictions minimizing effects on light-sensitive Covered Species?	Inspection of any night operations at the project site by Implementing Entity or Land Use Authority Permittee.	Project-by-project, depends on if night construction is occurring.	None.
BMP-7 (Biological Monitor)	Is the biological monitor responding appropriately when Covered Species are detected on the Project Site, or when they determine that Covered Species are being harmed/harassed by construction activities?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
BMP-8 (Training of Construction Staff)	Are construction staff demonstrating that they understand the required AMMs and are implementing them appropriately?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
BMP-9 (Soil Compaction)	Is the soil after compaction treatment allowing infiltration?	Inspection of the project site by Implementing Entity or Land Use Authority Permittee.	One post-construction inspection during a rain event.	None.
BMP-10 (Revegetation)	Is the revegetated slope preventing erosion and runoff into SSHCP Preserves, Preserve Setbacks, or Stream Setbacks?	Inspection of the project site by Implementing Entity or Land Use Authority Permittee.	Post-construction, annual inspection during a rain event.	None.

AGENDA ITEM 11.1

1433

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
BMP-11 (Speed Limit)	Is the speed limit in modeled habitat eliminating collisions with Covered Species?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
ROAD-1 (Road Project Location)	Are the selected road project locations minimizing edge effects on adjacent Preserves?	Special study for pre- and post-project edge conditions on Preserves, as described in Section 8.3.3.5.	Pre-project study before development occurs, post-project study no less than 5 years after project completion.	Implementing Entity to develop before SSHCP permit issuance a preliminary methodology for a special study on baseline edge effects from road projects.
ROAD-2 (Wildlife Crossing Structures)	Are wildlife using the wildlife crossing structures?	Special study for wildlife use of crossings, as described in Section 8.3.3.5.	Study conducted after at least half of crossings are constructed.	Implementing Entity to develop in first 18 months the preliminary methodology for special study to determine wildlife use of wildlife crossing structures, including deployment of cameras or survey for sign (e.g., tracks, scat).
ROAD-3 (Roadside Pesticide Use)	Is the weed removal protocol and signage along roadways effective in removing weed infestations and protecting Covered Species habitat?	Inspections for non-native plant infestations as directed under Objective HAB-4.	As directed by Objective HAB-4 and related Conservation Actions.	Implementing Entity to develop in first 18 months a protocol for determining whether control measures are working on non-native plant infestations.
NATURE TRAIL-1 (Nature Trail Plan)	Are the management techniques outlined in the Trail Plan preventing impacts from trail use?	Monitoring of persistent disturbance on and near nature trails, including vegetation loss, trash, soil disturbance.	Periodic observations by Preserve staff, summary of observations in Annual Reports.	None.

AGENDA ITEM 11.1
1434

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
NATURE TRAIL-2 (Nature Trail Protection of Duripan)	Only compliance monitoring required (Table 8-2).			
NATURE TRAIL-3 (Nature Trail Location)	Only compliance monitoring required (Table 8-2).			
NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design)	Only compliance monitoring required (Table 8-2).			
NATURE TRAIL-5 (Monitoring of Nature Trail Impacts)	Only compliance monitoring required (Table 8-2).			
RE-ESTABLISHMENT/ ESTABLISHMENT-1 (Vernal Pool)	Does the re-established and/ or established vernal pool meet success criteria, as approved by the Permitting Agencies in the SSHCP Preserve System Monitoring and Management Program?	Monitor attainment of success criteria as described in the SSHCP Preserve System Monitoring and Management Program.	Starting one year after re-establishment/establishment, repeated annually.	In first 18 months, Implementing Entity to develop success criteria for re-established/established vernal pool in consultation with the TAC and Permitting Agencies.
RE-ESTABLISHMENT/ ESTABLISHMENT-2 (Vernal Pool Inocula Bank)	Is the vernal pool inocula bank preserving viable inocula, and is it proving functional for vernal pool re-establishment/ establishment efforts?	Implementing Entity sampling of vernal pool inocula banks and sampling for cysts/seeds. Review of success criteria. Conduct a special study on long-term effectiveness of the inocula bank.	Annual inspection of inocula banks. Annual review of success criteria	Implementing Entity to develop in first 6 months plans for inocula banking (e.g., how long will inocula be considered viable, how will viability be confirmed, how will inocula from different sources be organized). Implementing Entity to develop in first 18 months a special study methodology to study the effectiveness of inoculation.

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
STREAM-1 (Laguna Creek Wildlife Corridor)	Are the setbacks adequate to minimize direct and indirect effects to Laguna Creek, and to allow wildlife movement through the Wildlife Corridor?	Periodic inspection of setbacks by Implementing Entity or Land Use Authority Permittee, using checklist. Special study to evaluate wildlife use of corridor.	Quarterly inspections, and special study as described in Section 8.3.3.5.	Implementing Entity to develop in first 18 months a checklist for evaluating condition of setback (e.g., trash, light pollution, non-native species, removal of land cover types). Implementing Entity to develop in first 18 months a preliminary design for a special study examining wildlife usage of the Laguna Creek Wildlife Corridor.
STREAM-2 (UDA Stream Setbacks)	Are the setbacks adequate to minimize direct and indirect effects to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Central Paseo, and Sun Creek?	Periodic inspection of setbacks by Implementing Entity or Land Use Authority Permittee, using checklist.	Quarterly	Implementing Entity to develop in first 18 months a checklist for evaluating condition of setback (e.g., trash, light pollution, non-native species, removal of land cover types).
STREAM-3 (Minor Tributaries to UDA Streams)	Are the 25-foot setbacks adequate to minimize direct and indirect effects to minor tributaries?	Periodic inspection of setback by Implementing Entity or Land Use Authority Permittee, using checklist.	Quarterly	Implementing Entity to develop in first 18 months a checklist for evaluating condition of setback (e.g., trash, light pollution, non-native species, removal of land cover types).

AGENDA ITEM 11.1

1436

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
STREAM-4 (Minimize Effects from Temporary Channel Re-routing)	Is implementation of the required measures avoiding adverse effects to water quality?	Implementing Entity visual inspection of the Project Site, Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	Monthly visual inspection, post-construction review of report.	None.
STREAM-5 (Design for Stream Channel Re-Routing)	Is the re-routed stream channel providing modeled habitat for aquatic Covered Species?	Implementing Entity inspection of the project site.	Every 5 years, starting 5 years after completion of re-establishment/establishment.	None.
UTILITY-1 (Avian Collision Avoidance)	How many Covered Species bird collisions or electrocutions are occurring on Plan Area utility lines?	Implementing Entity review of take reports submitted by Plan Area utility companies.	As reports are available.	None.
UTILITY-2 (Utility Maintenance on Preserves)	Is the restriction on timing for maintenance near vernal pools in SSHCP Preserves or Preserve Setbacks preventing effects to vernal pools?	Implementing Entity inspection of maintenance sites after utility work has been completed.	As needed	None.
UTILITY-3 (Trenchless Construction Methods)	Only compliance monitoring required (Table 8-2).			
UTILITY-4 (Siting of Entry and Exit Location)	Only compliance monitoring required (Table 8-2).			
LEVEE-1 (Preparation of Hydrologic Analysis)	Are activities allowed under an approved PMP resulting in increased flood stage elevations or flood risk outside the Preserves?			

AGENDA ITEM 11.1

1437

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
SPECIES-1 (Litter Removal Program)	Is implementation of the Litter Removal Program preventing effects on Covered Species habitat?	Periodic inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to determine effectiveness of the Program.	Monthly	None.
SPECIES-2 (No Pets in Construction Areas)	Only compliance monitoring required (Table 8-2).			
SPECIES-3 (Take Report)	Only compliance monitoring required (Table 8-2).			
SPECIES-4 (Post Construction Compliance Report)	Only compliance monitoring required (Table 8-2).			
PLANT-1 (Rare Plant Surveys)	Only compliance monitoring required (Table 8-2).			
PLANT-2 (Rare Plant Protection	Is the preserve established for the occurrence providing sufficient protection from direct and indirect effects?	Conduct a population study of preserved species. For study plots, also monitor hydrology and non-native species to correlate changes in environmental conditions with population data.	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the plant population study.
ORCUTT-1 (Orcutt Grass Surveys)	Only compliance monitoring required (Table 8-2).			
ORCUTT-2 (Orcutt Grass Protection)	Is the Preserve established for the Orcutt grass occurrence providing sufficient protection from direct and indirect effects?	Conduct a population study of preserved Orcutt grasses. For study plots, also monitor hydrology and non-native species to correlate changes in	Annual within study plots for 10 years, every 5 years after trend established	Implementing Entity to describe in first 12 months a protocol for the Sacramento Orcutt grass population study.

AGENDA ITEM 11.1
1438

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
		environmental conditions with population data.		
CTS-1 (California Tiger Salamander Daily Construction Schedule)	Is the daily construction schedule avoiding the California tiger salamander's active period of day?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	None.
CTS-2 (California Tiger Salamander Exclusion Fencing)	Is exclusion fencing preventing California tiger salamander from entering the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
CTS-3 (California Tiger Salamander Monitoring)	Is the biological monitor responding appropriately when California tiger salamander are found in or near the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
CTS-4 (Avoid California Tiger Salamander Entrapment)	Are any California tiger salamanders being entrapped in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
CTS-5 (California Tiger Salamander Encounter Protocol)	Is the encounter protocol minimizing effects to California tiger salamanders found in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
CTS-6 (Erosion Control Materials in California Tiger Salamander Habitat)	Are any California tiger salamanders being entrapped in erosion control materials?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
CTS-7 (Rodent Control)	Only compliance monitoring required (Table 8-2).			
WS-1 (Western Spadefoot Work Window)	Is the work window fully avoiding the active season of western spadefoot?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.

AGENDA ITEM 11.1
1439

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
WS-2 (Western Spadefoot Exclusion Fencing)	Is exclusion fencing preventing western spadefoot from entering the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WS-3 (Western Spadefoot Monitoring)	Is the biological monitor responding appropriately when western spadefoot are found in or near the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WS-4 (Avoid Western Spadefoot Entrapment)	Are any western spadefoot being entrapped in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WS-5 (Erosion Control Materials in Western Spadefoot Habitat)	Are any western spadefoot being entrapped in erosion control materials?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WS-6 (Western Spadefoot Encounter Protocol)	Is the encounter protocol minimizing effects to western spadefoot found in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
GGS-1 (Giant Gartersnake Surveys)	No effectiveness monitoring required.			
GGS-2 (Giant Gartersnake Work Window)	Is the work window fully avoiding the active season of giant gartersnake?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
GGS-3 (Giant Gartersnake Monitoring)	Is the biological monitor responding appropriately when giant gartersnake are found in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion)	Is dewatering and exclusion preventing giant gartersnakes from entering the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.

AGENDA ITEM 11.1

1440

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
GGS-5 (Avoid Giant Gartersnake Entrapment)	Are any giant gartersnakes being entrapped in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
GGS-6 (Erosion Control Materials in Giant Gartersnake Habitat)	Are any giant gartersnakes being entrapped in erosion control materials?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
GGS-7 (Giant Gartersnake Encounter Protocol)	Is the encounter protocol minimizing effects to giant gartersnakes found in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
GGS-8 (Giant Gartersnake Post Construction Restoration)	Is the specified restoration resulting in suitable habitat for giant gartersnake?	Implementing Entity or Land Use Authority Permittee inspection of restoration area.	Immediately post-restoration; repeat inspection after 1 year and 5 years.	Implementing Entity to develop in first 12 months a checklist to be used in the field when evaluating the restoration effort.
WPT-1 (Western Pond Turtle Surveys)	Only compliance monitoring required (Table 8-2).			
WPT-2 (Western Pond Turtle Work Window)	Is the work window fully avoiding the active season of western pond turtle?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WPT-3 (Western Pond Turtle Monitoring)	Is the biological monitor responding appropriately when western pond turtle are found in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	Is dewatering and exclusion fencing preventing western pond turtle from entering the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.

AGENDA ITEM 11.1

1441

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
WPT-5 (Western Pond Turtle Entrapment)	Are any western pond turtle entrapped in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WPT-6 (Erosion Control Materials in Western Pond Turtle Habitat)	Are any giant gartersnakes entrapped in erosion control materials?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit)	Is the speed limit in western pond turtle modeled habitat eliminating collisions with western pond turtle?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WPT-8 (Western Pond Turtle Encounter Protocol)	Is the encounter protocol minimizing effects to western pond turtle found in the construction footprint?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WPT-9 (Western Pond Turtle Post Construction Restoration)	Is the specified restoration resulting in suitable habitat for giant gartersnake?	Implementing Entity or Land Use Authority Permittee inspection of restoration area.	Immediately post-restoration; repeat inspection after 1 year and 5 years.	Implementing Entity to develop in first 12 months a checklist to be used in the field when evaluating the restoration effort.
TCB-1 (Tricolored Blackbird Surveys)	Only compliance monitoring required (Table 8-2).			
TCB-2 (Tricolored Blackbird Pre-Construction Surveys)	Are pre-construction surveys detecting tricolored blackbird nests that are present on project sites?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	None.

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
TCB-3 (Tricolored Blackbird Nest Buffer)	Are the nest buffers adequate to avoid disturbance of nesting tricolored blackbird? Are construction activities avoiding the nest buffers?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
TCB-4 (Tricolored Blackbird Nest Buffer Monitoring)	Is the biological monitor responding appropriately when construction activities result in disturbance of nesting tricolored blackbird?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	Is the timing of pesticide use and harvest timing resulting in reduced effects to tricolored blackbird from these activities?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	Implementing Entity to develop in first 12 months, in coordination with the TAC details on pesticide use timing and harvest timing to avoid take of nesting tricolored blackbirds.
SWHA-1 (Swainson's Hawk Surveys)	Only compliance monitoring required (Table 8-2).			
SWHA-2 (Swainson's Hawk Pre-Construction Surveys)	Are pre-construction surveys detecting Swainson's hawk nests that are present on project sites?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	None.
SWHA-3 (Swainson's Hawk Nest Buffers)	Are the nest buffers adequate to avoid disturbance of nesting Swainson's hawk? Are construction activities avoiding the nest buffers?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
SWHA-4 (Swainson's Hawk Nest Buffer Monitoring)	Is the biological monitor responding appropriately when construction activities result in disturbance of nesting Swainson's hawk?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
GSC-1 (Greater Sandhill Crane Surveys)	Only compliance monitoring required (Table 8-2).			
GSC-2 (Greater Sandhill Crane Pre-Construction Surveys)	Are pre-construction surveys detecting greater sandhill crane roosts that are present on project sites?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	None.
GSC-3 (Greater Sandhill Crane Roost Buffer)	Are the roost buffers adequate to avoid disturbance of roosting greater sandhill cranes? Are construction activities avoiding the setback?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
GSC-4 (Greater Sandhill Crane Visual Barrier)	Are the visual barriers adequate to avoid disturbance of roosting greater sandhill crane?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction when construction occurs inside 0.5 mile of a roosting site.	Implementing Entity to develop in the first 12 months specifications for visual barrier.
GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring)	Is the biological monitor responding appropriately when construction activities result in disturbance of roosting greater sandhill crane?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WBO-1 (Western Burrowing Owl Surveys)	Only compliance monitoring required (Table 8-2).			
WBO-2 (Western Burrowing Owl Preconstruction Surveys)	Are pre-construction surveys detecting western burrowing owl nests that are present on project sites?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	None.

AGENDA ITEM 11.1

1444

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
WBO-3 (Burrowing Owl Avoidance)	Is the required avoidance eliminating construction effects on western burrowing owl?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WBO-4 (Burrowing Owl Construction Monitoring)	Is the biological monitor responding appropriately when construction activities result in disturbance of nesting western burrowing owls?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WBO-5 (Burrowing Owl Passive Relocation)	How often is passive relocation of western burrowing owl occurring despite the prohibition? Are the case-by-case allowances for passive relocation only being granted when no other practicable alternative is available?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
WBO-6 (Burrowing Owl Timing of Maintenance Activities)	Only compliance monitoring required (Table 8-2).			
WBO-7 (Rodent Control)	Only compliance monitoring required (Table 8-2).			
RAPTOR-1 (Raptor Surveys)	No effectiveness monitoring required.			
RAPTOR-2 (Raptor Pre-Construction Surveys)	Are pre-construction surveys detecting Covered Species raptor nests that are present on project sites?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	None.
RAPTOR-3 (Raptor Nest/Roost Buffer)	Are the nest/roost buffers adequate to avoid disturbance of nesting/roosting raptors? Are construction activities avoiding the nest/roost buffers?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.

Table 8-3
Framework for SSHCP AMM Effectiveness Monitoring

AMM	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the SSHCP Compliance and AMM Monitoring Program?
RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring)	Is the biological monitor responding appropriately when construction activities result in disturbance of nesting Covered Species raptors?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
BAT-1 (Winter Hibernaculum Surveys)	No effectiveness monitoring required.			
BAT-2 (Winter Hibernaculum Pre-Construction Surveys)	Are pre-construction surveys detecting western red bat winter hibernacula that are present on project sites?	Implementing Entity review of Post-Construction Compliance Report from Approved Biologist as directed by AMM SPECIES-4.	After construction.	None.
BAT-3 (Winter Hibernaculum Buffer)	Are the winter hibernaculum buffers adequate to avoid disturbance of overwintering western red bats? Are construction activities avoiding the buffer?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.
BAT-4 (Bat Eviction Methods)	Are eviction methods being applied only to non-maternity roosts, and in a way that does not result in injury to the animals?	Implementing Entity review of compliance reports submitted by Approved Biologist.	Monthly during construction.	None.

8.3 SSHCP Preserve System Monitoring and Management Program

The effectiveness of the Measureable Objectives and the rest of the Conservation Strategy in achieving each of the broad Biological Goals for this Plan Area is intrinsically difficult to quantify. The effectiveness will be qualitatively assessed over the Permit Term, and the effectiveness of the operational SSHCP Conservation Strategy will be considered and discussed periodically in the Annual Reports (Section 8.4.1).

8.3.1 Principles of SSHCP Preserve Monitoring and Management

The monitoring and management framework presented in this section is based on the professional knowledge and experience of the species experts, experienced habitat-management experts, the Permitting Agencies, and others who were involved in preparation of the SSHCP. The biological principles that guide the SSHCP Preserve System Monitoring and Management Program included the following:

1. **Preserve Management Changes (Adaptive Management) Must Have a Valid and Site-Specific Scientific Basis**

Before making any changes to management of a Preserve, preserve managers must have a comprehensive understanding of the resources available, the effects of past management practices, and any other site-specific constraints. The SSHCP is consistent with this principle in the following ways:

- An Initial PMP (Section 8.3.4.2) will be prepared by the Implementing Entity upon acquisition of each Preserve parcel or group of parcels. The Initial PMP will document the management history for each parcel (via records, interviews of ranch managers or landowners, etc.) as directed under Objective HAB1.
- Under the Initial PMP, a Preserve Manager (refer to Section 9.3.1) will continue the existing land management approach (on each parcel acquired, until an Individual PMP (Section 8.3.4.2) is prepared for the Preserve or Preserve parcel.
- Preserve Managers and Permitting Agencies will be very cautious about changing management on a Preserve or a Preserve parcel based on a study conducted in another location, because the other location may have different soils, geologic formations, vegetation, or different species.

2. Preserve Monitoring and Management is Most Effective and Efficient When it is More Intensive on Smaller Preserves, and Less Intensive on Larger Preserves

As explained in Chapter 6, permanent indirect effects of Covered Activities are especially relevant on smaller preserves because smaller preserves have more "edge" relative to acres of interior habitat. Conversely, larger preserves are more insulated from the effects of most environmental stressors (Section 6.3). Therefore, these different size classes call for different approaches for both monitoring and Preserve management. The SSHCP is consistent with this principle in the following ways:

- Monitoring of environmental stressors along edges (Section 6.3) as required under Objective HAB3 will be more intensive on smaller SSHCP preserves that border urban development (i.e., the UDA Satellite Preserves, Linkage Preserves, Minor Preserves), and well as on Core Preserves that are divided by roadways or community trails.
- Preserve Managers will consider how preserve size determines what land-management methods/techniques from the SSHCP Preserve Management and Monitoring Details (see Appendix G) should or should not be done, and tailor the Individual PMP to best track the benefits of conservation actions within each preserve.

3. Preserve Monitoring for Abundance of Annually Variable Species (i.e., Vernal Pool Plants and Invertebrates) Must Use Fine-Scale Temporal Analyses to Monitor Species Status and Trends

Use of a single-year baseline "snapshot in time" is not appropriate for plants and animals with an "annual" life cycle,[5] as the number of individuals in a population may change dramatically from year to year, in response to fluctuations in weather or other environmental conditions. Effective monitoring of annually variable species requires ongoing sampling and identification of trends across several years to separate out the effects of climatic effects or stochastic variables. The SSHCP is consistent with this principle in the following ways:

- SSCHP monitoring will include ongoing status monitoring and conduct trends analysis for annual plant and invertebrate Covered Species to track abundance within years and between years.
- Reference monitoring sites will be used as the "basis of comparison" when reporting status and trends for the "annual" Covered Species and habitats on individual SSHCP Preserves, or in the SSHCP Preserve System. The reference sites will include permanent and rotating plots.

[5] Plant or animal species that grow to maturity and reproduce within one growing season. Example is vernal pool crustaceans.

4. Preserve Monitoring and Management on Cropland or Irrigated-Pasture Preserves Must Be Integrated with the Agricultural Operations

On Cropland and Irrigated-Pasture Preserves (see Chapter 7), management for species habitat must be balanced with the agricultural land uses to achieve the Conservation Strategy for several Covered Species, (i.e., Swainson's hawk, greater sandhill crane, and giant gartersnake). In addition, most Preserves with Vernal Pool Ecosystem will use grazing animals to manage biomass within the Valley Grassland. These agricultural operations must be economically sustainable, but must also be compatible with the Conservation Strategy.

- The potential conflicts and synergies between agricultural land uses and the habitat needs of SSHCP Covered Species (e.g., harvest timing, pesticide use, crop rotations) will be identified in each Individual PMP, which will also specify actions to reduce or eliminate conflicts.
- The animals used in grazing and the timing or patterns of grazing on Preserves will be managed based on monitoring results. The requirements of the Conservation Strategy will be included in conservation easements and/or contracts with agricultural operators.

5. Preserve Monitoring and Management Must Account For the Land Uses Surrounding a Preserve

Because Preserves will be managed in perpetuity for the benefit of Covered Species, management must take into account the activities and land uses that are occurring on lands surrounding the Preserve. For instance, development of a sports field near a Preserve may result in additional light pollution, or agricultural operations near a Preserve could draw from groundwater supplies that sustain habitat on the Preserve. The SSHCP is consistent with this principle in the following ways:

- Individual PMPs must take into account existing land-use and future land use surrounding the Preserve, including effects to surface water availability or changes to the perched aquifer within vernal pool soils that might indirectly affect species habitats within the preserve boundaries. Changes in off-site land use near a SSHCP preserve will be documented in annual reports and considered when updating Individual PMPs. Edge effects of surrounding land uses will also be monitored.

6. Consider Beneficial and Adverse Effects on Non-Covered Species

Although the focus of the SSHCP is on Covered Species, management of Preserves must also take into account any beneficial or adverse effects of Preserve management on non-covered native species. Conferring benefits to non-covered species is one of the listed purposes and

benefits of the HCP as presented in Section 1.1.2. The SSHCP is consistent with this principle in the following ways:

- Where it is feasible and will not reduce the value of the Preserve's habitat for Covered Species, Individual PMPs will include management actions that also provide benefits for other native species. Beneficial and adverse effects of Preserve System Covered Activities to Plan Area non-covered native species will be monitored and tracked as information allows in Annual Reports, but separate monitoring on non-Covered Species is not proposed under the SSHCP.

8.3.2 Overview of the SSHCP Preserve System Monitoring and Management Program

As required by the Five-Point Policy, the Biological Goals and Measurable Objectives of the SSHCP (Table 7-1 in Chapter 7) provide a foundation for the SSHCP Preserve System Monitoring and Management Program. They indicate what species, land cover or community indicators need to be monitored (e.g., natural communities, species, and specify the monitoring units (quantity or state), and the location(s) of the monitoring (e.g., monitoring animal movement along the Laguna Creek Wildlife Corridor).

The Preserve System will comprise many individual parcels and groups of parcels that will function interrelatedly, but must be managed separately because of differences in soils, species present, historic land uses, and other factors. The SSHCP Preserve System Monitoring and Management Program will provide commonality for the management of these different Preserves by providing a single "framework" document, from which the Implementing Entity will develop Initial PMPs and Individual PMPs. The SSHCP Preserve System Monitoring and Management Program document will be fully developed by the Implementing Entity within 18 months of permit issuance.

The SSHCP Preserve System Monitoring and Management Program document will:

- Provide a template to be used by the Implementing Entity to prepare Initial PMP (Section 8.3.4.3, Appendix G) that must be approved by the TAC upon acquisition of a Preserve parcel to address immediate short-term management needs such as trash removal, fence repair, and invasive species control.
- Provide Preserve Managers a template for preparing Individual PMPs (Section 8.3.4.3). Each PMP will include a "decision tree" for using preserve monitoring data to adjust management actions on that individual preserve.
- Provide the comprehensive habitat monitoring and management "toolbox" for managing he different land covers and habitats in the Plan Area (Appendix G), to be used by the

Preserve Manager in preparing Individual PMPs. The toolbox includes adaptive management methods that can be employed (Section 8.3.4.2), and routine facility management actions and activities that could be required for any SSHCP preserves, including regular patrols, trash removal, fence/gate installation and repairs, and other maintenance activities (Sections 8.3.4.1 and 5.2.7).

- Describe the entity that makes management decisions for each SSHCP Preserve .
- Describe the mechanisms by which the Changed Circumstances provided for in the SSHCP (Chapter 11) are addressed.

8.3.3 Monitoring Effectiveness of the SSHCP Preserve System

Table 8-4 lists each SSHCP Measurable Objective, identifies what we need to know to determine effectiveness, specifies an approach to address each monitoring question, identifies the timing and frequency of the specified monitoring, and identifies what additional information will need to be provided in the full SSHCP Preserve System Monitoring and Management Program.

The approach to monitoring proposed in Table 8-4 is subject to change as directed in the Five-Point Policy: "An effective monitoring program is flexible enough to allow modifications, if necessary, to obtain the appropriate information."

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Goal 1. Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Plan Area.				
Objective L1. Establish a minimum Preserve System of 33,796 acres of natural land covers that preserves habitat for Covered Species and other native biota as a component of the Preserve System. Of the 33,796 acres, 7,560 acres will be within the UDA and 26,236 acres will be outside the UDA. Preserves will be assembled in accordance with Conservation Actions in Table 7-1.	Refer to effectiveness monitoring presented below for each land cover type under Goal 3, and for each Covered Species under Goal 5.			
Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves and existing Preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (Minor variations on minimum width may be allowed by the Plan where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10)	Are mobile Covered Species using the Linkage Preserves to travel between SSHCP preserves and/or existing preserves?	Special study that sets up motion activated cameras at particular locations within each Linkage Preserve, as described in Section 8.3.3.5. Use results for mobile species as a proxy for non-mobile species.	Special study to commence within 5 years of establishment of at least 5 Linkage Preserves and intact Laguna Creek Wildlife Corridor. Repeat study every 5 years.	Implementing Entity to develop in first 18 months a preliminary design for the special study. One year before study commences Implementing Entity to work with special study investigator to Identify locations for camera placement, duration of camera deployment, procedures for deploying, maintaining, and processing the data from the cameras.
Goal 2. Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.				
Objective W1. Ensure that during implementation of Objective L2 (establishing 11 Linkage Preserves), the Linkage Preserves	Are the Linkage Preserves surrounding creeks wide enough to allow function as linkages?	Monitor Linkage Preserves for edge effects, including noise and light intensity, frequency of trash,	At establishment of first Linkage Preserve, repeat	In first 18 months, Implementing Entity to compile list of edge effects to

AGENDA ITEM 11.1
1452

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek, in accordance with the process outlined in Section 5.4.		qualitative hydrology changes, etc. along a transect from the boundary toward interior of the Preserve parcel. Compile observations from Implementing Entity staff during Preserve management efforts. Compare annual reports over time.	annually.	be monitored, and specify protocols for consistently measuring the edge effects.
Objective W2. Covered Activities shall implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design avoidance and minimization measures (LID and ROAD AMMs) Ground disturbance avoidance and minimization measures (BMPs and ROAD AMMs)	Effectiveness of AMMs will be monitored as described in Table 8-3.			
Objective W3. Covered Activities shall implement Stream Setback requirements in the UDA for creeks and streams as described in AMM STREAM-1, STREAM-2, and STREAM-3. Covered Activities shall implement preserve setback requirements in the UDA as described in AMM EDGE-3.	Effectiveness of AMMs will be monitored as described in Table 8-3.			
Objective W4. Ensure that aquatic resources are preserved during preserve assembly and managed in perpetuity (see Objectives VPG1, VPG2, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).	What is the overall abundance and diversity of preserved aquatic resources in the Preserve System? Refer also to list of effectiveness monitoring listed for each aquatic land cover type under Goal 5.	Implement random or probabilistic sampling design for preserved aquatic resources throughout Preserve System at recommended intervals over the life of the SSHCP to track trends in condition; using	Annual	Implementing Entity to determine in first 18 months the necessary intervals for sampling.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
		Functional or Condition Assessment Methods (FCAM) and/or California Rapid Assessment Method (CRAM). Refer to the Aquatic Resources Program (ARP, Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report) for more details on these methods. FCAM should be rerun until enough CRAM data is available to assess the condition at a watershed scale with CRAM data. When enough CRAM data is available, a comparison should be made between FCAM and CRAM and any discrepancies should be explained. If FCAM varies significantly from CRAM then the watershed studies using FCAM analysis should be reexamined.		
Objective W5. Ensure that aquatic resources are re-established or established within the Preserve System, in accordance with Conservation Actions in Table 7-1 (see Objectives VP2, SW2, FWM2, OW2, RIP2, and RIP4).	What is the overall abundance and diversity of res-established and/or established aquatic resources in the Preserve System? Refer also to list of effectiveness monitoring listed for each aquatic land cover type under Goal 3.	Implement random or probabilistic sampling design for re-established/established aquatic resources throughout Preserve System at recommended intervals over the life of the SSHCP to track trends in condition; using Functional or Condition Assessment Methods	Annual	Implementing Entity to determine in first 18 months the necessary intervals for sampling.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
		(FCAM) and/or California Rapid Assessment Method (CRAM). Refer to the Aquatic Resources Program (ARP, Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report) for more details on these methods. FCAM should be rerun until enough CRAM data is available to assess the condition at a watershed scale with CRAM data. When enough CRAM data is available, a comparison should be made between FCAM and CRAM and any discrepancies should be explained. If FCAM varies significantly from CRAM then the watershed studies using FCAM analysis should be reexamined.		
Goal 3. Preserve, re-establish, or establish, natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.				
Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			
Objective VP1. Preserve a minimum of 967 acres of vernal pool in the Plan Area. Impacts to vernal pool within or adjacent to (within 1	See effectiveness monitoring under Goal 5 for each species using this habitat.			

AGENDA ITEM 11.1
1455

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
mile of) the Mather Core Recovery Area and Cosumnes/Rancho Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and Cosumnes/Rancho Seco Recovery Area.				
Objective VP2. Re-establish and/or establish a minimum of 389 acres of vernal pool, including at least 50 acres within or adjacent to (within 1 mile of) the Mather Core Recovery Area. Impacts to vernal pool within or adjacent to (within 1 mile of) the Mather Core Recovery Area and the Cosumnes/Rancho Seco Recovery Area will be mitigated within or adjacent to (within 1 mile of) the Mather Core Recovery Area and the Cosumnes/Rancho Seco Recovery Area.	Does the re-established and/ or established vernal pool meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established vernal pool, as described in the final SSHCP Preserve System Monitoring and Management Program.	Starting one year after re-establishment/establishment, repeated annually.	In first 18 months, Implementing Entity to develop success criteria for re-established/established vernal pool in consultation with the TAC and Permitting Agencies.
Objective VP3. Preserve a minimum of 278 acres of Swale. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			
Objective VP4. Preserve a minimum of 25 acres of Swale or Stream/Creek (VPIH) for impacts to the Stream/Creek (VPIH) land cover The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective VP5. Re-establish and/or establish a minimum of 256 acres of Swale for impacts to the Swale or the Stream/Creek (VPIH) land covers. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	Does the re-established and/ or established Swale meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established swale, as described in the final SSHCP Preserve System Monitoring and Management Program.	Starting one year after re-establishment/establishment, repeated annually.	In first 18 months, Implementing Entity to develop success criteria for re-established/established Swale in consultation with the TAC and Permitting Agencies.
Objective SW1. Preserve a minimum of 105 acres of seasonal wetland. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			
Objective SW2. Re-establish and/or establish a minimum of 105 acres of seasonal wetland. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	Does the re-established and/ or established seasonal wetland meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established seasonal wetland, as described in the final SSHCP Preserve System Monitoring and Management Program.	Starting one year after re-establishment/establishment, repeated annually.	In first 18 months, Implementing Entity to develop success criteria for re-established/established seasonal wetland in consultation with the TAC and Permitting Agencies.
Objective FWM1. Preserve a minimum of 127 acres of freshwater marsh. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional freshwater marsh. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	Does the re-established and/ or established freshwater marsh meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established freshwater marsh, as described in the final SSHCP Preserve System Monitoring and Management Program.	Starting one year after re-establishment/establishment, repeated annually.	In first 18 months, Implementing Entity to develop success criteria for re-established/established freshwater marsh in consultation with the TAC and Permitting Agencies.
Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek (VPIH) land cover. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			
Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek (VPIH) land cover. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	Does the re-established and/ or established Stream/Creek (VPIH) meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established Stream/Creek (VPIH), as described in the final SSHCP Preserve System Monitoring and Management Program.	Starting one year after re-establishment/establishment, repeated annually.	In first 18 months, Implementing Entity to develop success criteria for re-established/established Stream/Creek (VPIH) in consultation with the TAC and Permitting Agencies.
Objective OW1. Preserve a minimum of 311 acres of open water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of open water, as determined by the TAC). The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective OW2. Re-establish and/or establish a minimum of 155 acres of open water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of open water, as determined by the TAC). Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	Does the re-established and/ or established Open Water (or equivalent land cover type) meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established open water area, as described in the final SSHCP Preserve System Monitoring and Management Program.	Annual	In first 18 months, Implementing Entity to develop success criteria for re-established/established open water (or other land cover type deemed equivalent) in consultation with the TAC and Permitting Agencies.
Objective RIP1. Preserve a minimum of 373 acres of mixed riparian woodland and/or mixed riparian scrub. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			
Objective RIP2. Re-establish and/or establish a minimum of 373 acres of mixed riparian woodland and/or mixed riparian scrub. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	Does the re-established and/ or established mixed riparian woodland and/or mixed riparian scrub meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established mixed riparian woodland/mixed riparian scrub area, as described in the final SSHCP Preserve System Monitoring and Management Program.	Annual	In first 18 months, Implementing Entity to develop success criteria for re-established/established mixed riparian woodland and/or mixed riparian scrub in consultation with the TAC and Permitting Agencies.
Objective RIP3. Preserve a minimum of 218 acres of mixed riparian woodland and/or mixed riparian scrub for impacts to mine tailings riparian woodland. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective RIP4. Re-establish and/or establish a minimum of 218 acres of mixed riparian woodland and/or mixed riparian scrub for impacts to mine tailings riparian woodland. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1.	Does the re-established and/ or established mixed riparian woodland and/or mixed riparian scrub meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established mixed riparian woodland/mixed riparian scrub, as described in the final SSHCP Preserve System Monitoring and Management Program.	Annual	In first 18 months, Implementing Entity to develop success criteria for re-established/established mixed riparian woodland and/or mixed riparian scrub in consultation with the TAC and Permitting Agencies.
Objective BOW1. Preserve a minimum of 48 acres of blue oak woodland/savanna for direct impacts to blue oak woodland/savanna. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.	See effectiveness monitoring under Goal 5 for each species using this habitat.			
Objective BOW2. Re-establish and/or establish a minimum of 48 acres of blue oak woodland/savanna for direct impacts to blue oak woodland/savanna. Re-establishment and/or establishment will occur in accordance with Conservation Actions in Table 7-1	Does the re-established and/ or established blue oak woodland/savanna meet success criteria approved by the Permitting Agencies and described in the final SSHCP Preserve System Monitoring and Management Program (Section 8.3.2)?	Monitor attainment of success criteria for each re-established and/or established blue oak woodland/savanna area, as described in the final SSHCP Preserve System Monitoring and Management Program.	Annual	In first 18 months, Implementing Entity to develop success criteria for re-established/established blue oak woodland/savanna in consultation with the TAC and Permitting Agencies.
Objective AG1. Preserve a minimum of 9,696 acres of Cropland and Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The preserves will be	See effectiveness monitoring under Goal 5 for each species using this habitat.			

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
assembled in accordance with Conservation Actions in Table 7-1.				
Goal 4. Maintain or improve habitat value of natural land covers (including Cropland, and Irrigated Pasture-Grassland) that are preserved within the Plan Area.				
Objective HAB1. Develop PMPs for the benefit of Covered Species.	Only compliance monitoring required (Table 8-1).			
Objective HAB2. Assess whether SSHCP Preserves are being managed and maintained for the benefit of Covered Species.	Are the physical conditions on the preserves meeting the needs of Covered Species?	Rapid monitoring of a range of physical variables, including vegetation types, thatch density, ponded water present, and other factors for subset of preserves, visited on regular basis, compared against reference sites.	Quarterly	In first 18 months, Implementing Entity will develop guidelines for which rapid monitoring techniques to use for different land cover types, how to use the rapid monitoring results to determine if conditions are appropriate to Covered Species modeled habitat, and what reference sites will be used.
Objective HAB3. Record management history for Preserve parcels as they are obtained. Consider management history when developing Initial Preserve Management Plan (PMP).	Only compliance monitoring required (Table 8-1).			
Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Plan Area. The program will include regular weed assessment and mapping within the UDA, and a comprehensive weed detection and abatement plan for the Plan Area, including training of road crews to identify and report weeds.	Are we eradicating invasive species in a timely fashion? Are we updating the Early Detection and Eradication Program to account for changed conditions?	Weed assessment on SSHCP Preserves. Reporting of weed eradication efforts. Recurring TAC Review of the invasive species monitoring and eradication program.	Quarterly weed assessment on preserves, with other opportunistic assessment. Annual reporting. Program review every 5 years.	Develop monitoring methods and schedule for invasive species.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter, etc.)	What are the levels of certain edge effects observed along a transect from the boundary of the parcel toward the middle? Are edge effects changing over time?	Measure noise and light intensity, frequency of trash, qualitative hydrology changes, etc. along a transect from the boundary toward interior of the Preserve parcel. Compare annual reports over time.	Annual	Compile list of edge effects to be monitored. Specify methodologies for consistently measuring the edge effects.
Objective HAB6. Collect weather data throughout the County to assist in developing status and trends, track climate change, etc.	Only compliance monitoring required (Table 8-1).			
Objective HAB7. Monitor vegetation biomass within grassland land covers.	Is vegetation biomass within Vernal Pool Grasslands, Valley Grasslands, Blue Oak Savanna, and other relevant land cover types being managed for the benefit of Covered Species?	Conduct monitoring using RDM or another rapid assessment technique.	After the growing season, Annual.	Identify the biomass levels or other indicators (e.g., thatch density, grass height, etc.) that predict habitat quality for Covered Species. Specify the monitoring techniques to be used for each indicator.
Objective VP4. Investigate indirect effects of development on vernal pool crustaceans over the short term and the long term.	Is there evidence for indirect effects of development on occupancy of vernal pools near development?	Special study on variation in occupancy of pools from zone of indirect effect along transect from edge toward interior, as described in Section 8.3.3.5.	Repeat study after development has been in place for long term (~15 years)	Develop study methodology, including number of vernal pools, reference sites, techniques to parse out different indirect effects.
Objective AG2. Of the 9,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as, but not limited to, corn, alfalfa, or wheat) preferred by tricolored blackbird (*Agelaius tricolor*), greater sandhill crane (*Grus canadensis*), and the covered raptor	Are the habitat goals for tricolored blackbirds, greater sandhill crane, and covered raptor species benefiting those species and meeting Goal 5?	Monitor performance criteria for habitat for tricolored blackbirds, greater sandhill crane, and covered raptor species as described in the final SSHCP Preserve System Monitoring and Management Program .	Annual	In first 18 months, Implementing Entity to develop success criteria for planted food plots as habitat for tricolored blackbirds, greater sandhill crane, and covered raptor species in

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
species. The 2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The preserves will be assembled in accordance with Conservation Actions in Table 7-1.				consultation with the TAC.
Objective AG3. Maintain or increase raptor prey availability and improve raptor foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species.	Are planted hedgerows providing fossorial mammal habitat?	Field evaluation of habitat value of hedgerows.	Annual	Develop methodology for determining habitat quality for fossorial mammals.
Objective RIP5. Monitor groundwater table as it relates to status and trends for riparian habitat.	Only compliance monitoring required (Table 8-1).			
Goal 5. Maintain or expand the existing distribution of each Covered Species within the Plan Area.				
Objective VPP1. Protect the one currently documented occurrence of Ahart's dwarf rush in the Plan Area. Prior to take of any occurrence of Ahart's dwarf rush (*Juncus leiospermus*), protect six currently unpreserved[6] and "biologically equivalent or superior" (as defined by the TAC) occurrences of Ahart's dwarf rush within the Plan Area. After six currently unpreserved occurrences are protected, prior to take of an occurrence of Ahart's dwarf rush, protect one	Are the preserved occurrences persisting at their existing distribution/abundance, or increasing in their distribution/abundance?	Conduct a population study of preserved Ahart's dwarf rush within the Preserve System.	Every 5 years during flowering.	Sampling methodology for vernal pool species, including identification of reference sites if appropriate.

[6] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrences of Ahart's dwarf rush within the Plan Area.				
Objective VPP2. Prior to take of any occurrence of Boggs Lake hedge-hyssop (*Gratiola heterosepala)*, protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Boggs Lake hedge-hyssop within the Plan Area.	Are the preserved occurrences persisting at their existing distribution/abundance, or increasing in their distribution/abundance?	Conduct a population study of preserved Bogg's Lake hedge-hyssop within the Preserve System.	Every 5 years during flowering.	Sampling methodology for vernal pool species, including identification of reference sites if appropriate.
Objective VPP3. Prior to take of any occurrence of dwarf downingia (*Downingia pusilla*), protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrence of dwarf downingia within the Plan Area.	Are the preserved occurrences persisting at their existing distribution/abundance, or increasing in their distribution/abundance?	Conduct a population study of preserved dwarf downingia within the Preserve System.	Every 5 years during flowering.	Sampling methodology for vernal pool species, including identification of reference sites if appropriate.
Objective VPP4. Protect and maintain in perpetuity a minimum of fourteen occurrences of legenere (*Legenere limosa)* within the hardline preserve areas in the SSHCP Preserve System. Legenere occurrences will be preserved in accordance with the Conservation Actions described in Table 7-1. Prior to take of any occurrence of legenere, one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of legenere will be preserved and maintained within the Plan Area.	Are the preserved occurrences persisting at their existing distribution/abundance, or increasing in their distribution/abundance?	Conduct a population study of preserved legenere within the Preserve System.	Every 5 years during flowering.	Sampling methodology for vernal pool species, including identification of reference sites if appropriate.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective VPP5. Prior to take of any occurrence of pincushion navarretia (*Navarretia myersii* ssp. *myersii*), protect one currently unpreserved[7] and "biologically equivalent or superior" (as defined by the TAC) occurrence of pincushion navarretia within the Plan Area.	Are the preserved occurrences persisting at their existing distribution/abundance, or increasing in their distribution/abundance?	Conduct a population study of preserved pincushion navarretia within the Preserve System.	Every 5 years during flowering.	Sampling methodology for vernal pool species, including identification of reference sites if appropriate.
Objective VPP6. Protect and maintain in perpetuity all known currently unprotected occurrences of Sacramento Orcutt grass (*Orcuttia viscida*) in the Plan Area to preserve existing distribution, and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.	Are the preserved occurrences persisting at their existing distribution/abundance, or increasing in their distribution/abundance?	Conduct a population study of preserved Sacramento Orcutt grass within the Preserve System.	Every 5 years during flowering.	Sampling methodology for vernal pool species, including identification of reference sites if appropriate.
Objective VPP7. Protect and maintain in perpetuity all known currently unprotected occurrences of slender Orcutt grass in the Plan Area to preserve existing distribution, and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.	Are the preserved occurrences persisting at their existing distribution/abundance, or increasing in their distribution/abundance?	Conduct a population study of preserved slender Orcutt grass within the Preserve System.	Every 5 years during flowering.	Sampling methodology for vernal pool species, including identification of reference sites if appropriate.
Objective SA1. During re-establishment and/or establishment of seasonal wetlands, freshwater marsh, open water, and stream/ creek, translocate impacted Sanford's arrowhead (*Sagittaria sanfordii*) from other	Are transplanted Sanford's arrowhead individuals persisting in the re-established/established habitat?	Field inspection of quantity and state of Sanford's arrowhead that have been transplanted.	Annual	Requirements for survey timing.

[7] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Plan Area.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
sites. Prior to take of an occurrence of Sanford's arrowhead, protect one additional occurrence of Sanford's arrowhead within the Plan Area.				
Objective VPI1. Protect and maintain in perpetuity 1,270 acres of vernal pool tadpole shrimp modeled aquatic habitat within the Plan Area to preserve existing distribution.	Are protected pools being occupied by vernal pool tadpole shrimp?	Statistically valid sampling of pools for occupancy.	Annual	Sampling methodology for vernal pool species, including identification of reference sites. Refer to Appendix G for draft survey methodology to be incorporated into Preserve System Monitoring and Management Program.
Objective VPI2. Protect and maintain in perpetuity 1,270 acres of vernal pool fairy shrimp (*Branchinecta lynchi*) modeled aquatic habitat within the Plan Area to preserve existing distribution.	Are protected pools being occupied by vernal pool fairy shrimp?	Statistically valid sampling of pools for occupancy.	Annual	Sampling methodology for vernal pool species, including identification of reference sites. Refer to Appendix G for draft survey methodology to be incorporated into Preserve System Monitoring and Management Program.
Objective VPI3. Protect and maintain in perpetuity 1,059 acres of mid-valley fairy shrimp (*Branchinecta mesovallensis*) modeled aquatic habitat within the Plan Area to preserve existing distribution.	Are protected pools being occupied by mid-valley fairy shrimp?	Statistically valid sampling of pools for occupancy.	Annual	Sampling methodology for vernal pool species, including identification of reference sites. Refer to Appendix G for draft survey methodology to be incorporated into Preserve System Monitoring and Management Program.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective VPI4. Protect and maintain in perpetuity 1,245 acres of Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i) modeled aquatic habitat within the Plan Area to preserve existing distribution.	Are protected pools being occupied by Ricksecker's water scavenger beetle?	Statistically valid sampling of pools for occupancy.	Annual	Sampling methodology for vernal pool species, including identification of reference sites. Refer to Appendix G for draft survey methodology to be incorporated into Preserve System Monitoring and Management Program.
Objective VPI5. Ensure that during implementation of Objective VP2, re-established or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/ establishment, in accordance with Conservation Actions in Table 7-1.	Is inoculation successful in increasing the pace of occupancy of re-established and/or established vernal pools?	Statistically valid sampling of pools for occupancy where inoculation has occurred; comparison to reference pools.	Annual after inoculation	Sampling methodology for vernal pool species, including identification of reference sites. Refer to Appendix G for draft survey methodology to be incorporated into Preserve System Monitoring and Management Program.
Objective CTS1. Preserve at least 5 occupied California tiger salamander breeding ponds.	Are preserved breeding ponds continuing to be used by California tiger salamander?	Occupancy survey of breeding pools (e.g., dip netting).	Every 2 years	Survey methodology for California tiger salamander, including identification of reference sites.
Objective CTS2. During preserve assembly, ensure that modeled aquatic and upland habitat for California tiger salamander is preserved. Minimum preservation will total: • 141 acres of aquatic habitat • 1,677 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within California tiger	Are California tiger salamander using the preserved habitat?	Occupancy survey of subset of breeding pools (e.g., dip netting) and upland habitat (e.g., drift fences and pitfall traps).	Every 5 years.	Survey methodology for California tiger salamander aquatic and upland habitats, including identification of reference sites and necessary subset for statistically valid results.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
salamander Critical Habitat occurs within California tiger salamander Critical Habitat (see Objectives BOW1, VPG1, VP1, SW1, and VG1).				
Objective CTS3. Rural transportation project Covered Activities within California tiger salamander modeled habitat will be designed to allow California tiger salamander movement across the roadway area.	Are California tiger salamanders using the crossings?	Drift fencing and pitfall traps deployed at each crossing. Review of any collisions reported with California tiger salamanders on rural transportation project Covered Activities.	Once, 5 years after crossing construction. Annual review of collisions.	Survey methodology for California tiger salamander at crossings.
Objective WS1. During preserve assembly, ensure that modeled aquatic and upland habitat for western spadefoot (*Spea hammondii*) is preserved. Minimum preservation will total: • 1,531 acres of aquatic habitat • 22,044 acres of upland habitat. Ensure that mitigation for modeled habitat impacted within the Mather Core or Cosumnes/Rancho Seco Core Recovery Areas occurs within the Core Recovery Areas (see Objectives BOW1, VP1, VP3, SW1, SC1, OW1, and VG1).	Are western spadefoot using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for western spadefoot, including identification of reference sites.
Objective WS2. During preserve assembly, ensure that modeled aquatic habitat for western spadefoot is re-established and/or established. Minimum re-establishment and/or establishment will total:	Are western spadefoot using the re-established and/ or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for western spadefoot, including identification of reference sites.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
• 906 acres of aquatic habitat. Ensure that mitigation for modeled habitat impacted within the Mather Core or Cosumnes/Rancho Seco Core Recovery Areas occurs within the Core Recovery Areas (see Objectives VP2, SW2, and OW2).				
Objective WPT1. During preserve assembly, ensure that modeled aquatic and upland habitat for western pond turtle (*Actinemys marmorata*) is preserved. Minimum preservation will total: • 315.35 acres of aquatic habitat • 10,971 acres of upland habitat. (See Objectives FWM1, OW1, VPG1, RIP1, RIP3, VG1, BOW1, and SC1).	Are western pond turtles using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for western pond turtle, including identification of reference sites.
Objective WPT2. During preserve assembly, ensure that modeled aquatic habitat for western pond turtle is re-established and/or established. Minimum re-establishment and/or establishment will total: • 315 acres of aquatic habitat. (See Objectives RIP2, FWM2, and OW2.)	Are western pond turtles using the re-established and/or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for western pond turtle, including identification of reference sites.
Objective GGS1. During preserve assembly, ensure that modeled habitats for giant gartersnake are preserved along the following creeks (or other creeks that are determined by the TAC to provide similar GGS habitat value):	Are giant gartersnakes using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for giant gartersnake, including identification of reference sites if appropriate.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
• The lower Laguna Creek, mainly between Twin Cities Road (State Route (SR) 104) and Miess Road; • Skunk Creek, which flows into the Cosumnes River northwest of the City of Galt; • the short Willow Creek and tributaries of Badger Creek, which are to the north of the lower Laguna Creek and west of the Folsom South Canal; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum preservation will total: • 170 acres of Giant Garter Snake high-value aquatic habitat • 2,323 acres of Giant Garter Snake high-value upland habitat. (See Objectives AG1, FWM1, SW1, SC1, OW1, VPG1, RIP1, RIP3, and VG1).				
Objective GGS2. During preserve assembly, ensure that modeled habitats for giant gartersnake are re-established and/or established along the following creeks (or other creeks that are determined by the TAC to provide similar habitat value):	Are giant gartersnakes using the re-established and/ or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for giant gartersnake, including identification of reference sites if appropriate.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
• The lower Laguna Creek, mainly between Twin Cities Road (SR 104) and Miess Road; • Skunk Creek: this creek flows into the Cosumnes River northwest of the City of Galt; • To the north of the lower Laguna Creek and west of the Folsom South Canal are several small creeks—the short Willow Creek and tributaries of Badger Creek; and • Badger Marsh. Mitigation for impacts to modeled habitats for giant gartersnake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum re-establishment and/or establishment will total: • 170 acres of high-value aquatic habitat • 134 acres of high-value upland habitat. (See Objectives SW2, OW2, RIP2, and RIP4.)				
Objective GGS3. Plan Permittees will conduct a study to establish hydrologic baseline conditions along Badger Creek to identify what level of hydrology is necessary to support giant gartersnake and acquire a water source to maintain the minimum level of hydrology during the summer months when	What is the hydrologic condition along Badger Creek? How much supplemental water would be required to maintain baseline conditions during summer?	Conduct hydrologic study	Hydrologic study within two years of SSHCP implementation	Detail the methodology for the hydrologic study.
	Is the supplemental water maintaining appropriate hydrologic	Annually review aerial imagery of Badger Creek to observe the ratio of	Annual review of aerial imagery.	Establish appropriate monitoring protocol for

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
agricultural runoff may wane.	conditions in perpetuity?	open water and emergent vegetation. Investigate in the field hydrologic conditions every 5 years to ensure continued habitat suitability for giant gartersnake.	Field investigation of conditions every 5 years	hydrologic conditions along Badger Creek.
Objective VELB1. Relocate or replace each impacted elderberry shrub (*Sambucus* spp.) according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999). Mitigation will occur in locations that are not inundated for 2 continuous weeks, as determined by the TAC.	Are USFWS success criteria being met at mitigation sites?	Monitor attainment of success criteria as described in the SSHCP Preserve System Monitoring and Management Program.	Annual for first 5 years after planting. After 5 years post-planting, inspection every 5 years.	Define success criteria for relocation or replacement, based on USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle.
Objective VELB2. During implementation of riparian habitat re-establishment and/or establishment, strategically include elderberry shrub in the planting palette (see Objectives RIP2 and RIP4).	Is elderberry shrub being used appropriately during riparian habitat re-establishment and/ or establishment?	Review of planting plans for proposed restoration projects, field inspection of in-progress and completed restoration projects	Project-by-project basis	Checklist for appropriate use of elderberry shrub to be used by Land Use Authority Permittee staff during project review.
Objective CH1. During preserve assembly, ensure that a minimum of 974 acres of modeled nesting/foraging habitat for Cooper's hawk (*Accipiter cooperii*) is preserved, in accordance with Conservation Actions described in Table 7-1 (see Objectives RIP1, RIP3, and BOW1).	Are Cooper's hawks using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for Cooper's hawk, including identification of reference sites if appropriate.
Objective CH2. During preserve assembly, ensure that a minimum of 601 acres of modeled nesting/foraging habitat for Cooper's	Are Cooper's hawks using the re-established and/ or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations	Survey methodology for Cooper's hawk, including identification of reference

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
hawk is re-established and/or established (see Objectives RIP2 and RIP4).			in Annual Report.	sites if appropriate.
Objective CH3. During preserve assembly, ensure that a minimum of 38 acres of modeled foraging habitat for Cooper's hawk is preserved, in accordance with Conservation Actions described in Table 7-1 (see Objectives RIP1, RIP3, and BOW1).	Are Cooper's hawks using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for Cooper's hawk, including identification of reference sites if appropriate.
Objective TB1. During preserve assembly, ensure that a minimum of 4,149 acres of modeled foraging habitat for tricolored blackbird is preserved (see Objectives AG1, AG2, FWM1, VG1, VPG1, VP1, VP3, FWM1, OW1, and SW1).	Are tricolored blackbirds using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for tricolored blackbird. Methodology should be coordinated with the Statewide survey.
Objective TB2. During preserve assembly, ensure that a minimum of 27,532 acres of modeled nesting/foraging habitat for tricolored blackbird is preserved, including a minimum of 402 acres of freshwater marsh and seasonal wetland (see Objectives AG1, AG2, VG1, VPG1, FWM1, and SW1).	Are tricolored blackbirds using the preserved habitat? Is there a positive correlation between use of conserved nesting and foraging sites?	Conduct occupancy surveys, review observations made by Implementing Entity staff. Compare survey results at preserved SSHCP nesting and foraging sites to sites that do not receive SSHCP management and monitoring efforts.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for tricolored blackbird. Methodology should be coordinated with the Statewide survey.
Objective TB3. During preserve assembly, ensure that a minimum of 917 acres of modeled foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2, SW2, OW2, and VP2).	Are tricolored blackbirds using the re-established and/or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for tricolored blackbird. Methodology should be coordinated with the Statewide survey.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective TB4. During preserve assembly, ensure that a minimum of 232 acres of modeled nesting/foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2 and SW2).	Are tricolored blackbirds using the re-established and/or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff. If colonies present, count number of individuals at each colony.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for tricolored blackbird. Methodology should be coordinated with the Statewide survey.
Objective TB5. Provide mitigation for loss of any tricolored blackbird nesting colony site that is occupied at the time of Covered Activity implementation or was recorded as an occupied nesting colony at any time since 2008. Sources for occupied nesting colonies are the CNDDB, Tricolored Blackbird Portal, eBird, or other data sources approved by the Wildlife Agencies. Minimum mitigation is to protect one extant unprotected occurrence of a nesting colony prior to take of one nesting colony of tricolored blackbirds. Ensure that at least five extant tricolored blackbird colonies that were occupied in recent years are maintained and managed within the SSHCP Preserve System.	Are tricolored blackbirds continuing to use the preserved colonies?	Colony occupancy survey to count number of individuals at each preserved colony.	Every 3 years. If regional count becomes more frequent, coordinate timing with regional program.	Survey methodology for tricolored blackbird. Methodology should be coordinated with the Statewide survey.
Objective TB6. Conduct an experimental study to identify management actions to protect tricolored blackbird colonies (e.g., coarse netting to reduce nest predation or impact of pesticides).	How many birds successfully fledge?	Nest census to quantify successful fledging.	Once each season that study is ongoing, coordinated with study timing.	Nest census methodology for tricolored blackbird.
	What techniques best exclude predators?	Conduct pilot study for exclusion techniques.	Study initiated within 2 years of	Pilot study design, including exclusion techniques to be

AGENDA ITEM 11.1
1474

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
			HCP implementation; completed within 5 years of HCP implementation	tested, how to determine success or failure of techniques.
Objective TB7. Ensure that at least one large tricolored blackbird colony (i.e., one that has historically [from 1950 onward] supported a minimum of 1,500 individuals) is protected.	Are tricolored blackbirds continuing to use the colony?	Conduct occupancy surveys, review observations made by Implementing Entity staff. If colonies present, count number of individuals at each colony.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for tricolored blackbird. Methodology should be coordinated with the Statewide survey
Objective TB8. For any tricolored blackbird nesting colony that is removed by a Covered Activity, re-establish and/or establish three new colonies within SSHCP Preserves. Re-established and/or established colonies can be in aquatic (freshwater marsh, seasonal wetland) or upland (annual grassland) habitat types, and must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands that provide adequate foraging opportunities.	Are re-established and/or established colony sites being used by tricolored blackbird nesting colonies?	Conduct occupancy surveys, review observations made by Implementing Entity staff. If colonies present, count number of individuals at each colony.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for tricolored blackbird. Methodology should be coordinated with the Statewide survey
	Are nestlings within re-established and/or established colony sites fledging successfully? What is the fledgling success rate?	Nest census to quantify successful fledging.	Once each season that study is ongoing, coordinated with study timing.	Nest census methodology for tricolored blackbird.
Objective BO1. Preserve 7 occupied western burrowing owl (*Athene cunicularia*) sites (commensurate with 20% of the estimated number of sites within the UDA as of 2014), preserve at least 200 acres of land surrounding each occupied burrow site, and maintain modeled habitat for western	Are burrowing owls using the sites?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for burrowing owl, including identification of reference sites if appropriate.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
burrowing owl within 0.4 mile of breeding sites.				
Objective BO2. For each burrowing owl or burrowing owl pair passively excluded, protect 200 acres of modeled habitat for western burrowing owl, and establish a ground squirrel (*Spermophilus (Otospermophilus) beecheyi*) colony and augment with artificial burrows as appropriate (determined by TAC). Artificial burrows will be established at appropriate locations throughout the Preserve System pursuant to CDFW (CDFG 2012 guidelines) or as otherwise determined by the TAC.	Are ground squirrels occupying the site? Are burrowing owls using the squirrel burrows or the artificial burrows?	Conduct surveys for ground squirrels or other fossorial mammals. Review observations made by Implementing Entity staff. When recording occupancy survey data for burrowing owl under Objective BO1, note whether burrows are natural or artificial.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for ground squirrel, including identification of reference sites if appropriate.
Objective FH1. During preserve assembly, ensure that a minimum of 25,881 acres of modeled foraging habitat for ferruginous hawk is preserved, including 19,625 acres in PPUs 5 and 7 (see Objectives AG1, VG1, VP1, VP3, VPG1, and SW1).	Are ferruginous hawks using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for ferruginous hawk, including identification of reference sites if appropriate.
Objective FH2. During preserve assembly, ensure that a minimum of 729 acres of modeled foraging habitat for ferruginous hawk is re-established and/or established (see Objectives VP2 and SW2).	Are ferruginous hawks using the re-established and/or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for ferruginous hawk, including identification of reference sites if appropriate.
Objective SH1. During preserve assembly, ensure that a minimum of 31,033 acres of modeled foraging habitat for Swainson's	Are Swainson's hawks using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations	Survey methodology for Swainson's hawk, including identification of reference

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
hawk is preserved (see Objectives AG1, AG2, SW1, VP1, VP3, VG1). Ensure that mitigation for high-value modeled habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8.			in Annual Report.	sites if appropriate.
Objective SH2. At least 2,000 acres of Cropland habitat within high-value habitat within PPUs 4, 6, and 8 will be preserved in fee title to ensure that intensive management actions can be taken. Land held in fee title will be restricted to growing field or row crops. Fee title lands must maintain, at a minimum, an average of 50% of their crop cover-type in alfalfa. Other crop types or land covers may be substituted for alfalfa if the TAC determines that such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa.	Are Swainson's hawks using the preserved habitat? Which crops are they most commonly observed foraging in?	Conduct occupancy surveys, review observations made by Implementing Entity staff. Record crop types when conducting surveys or making observations. Include crop types in all survey reports or compilations of observations, to the extent possible.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for Swainson's hawk, including identification of reference sites if appropriate.
Objective SH3. During preserve assembly, ensure a minimum of 746 acres of modeled nesting habitat for Swainson's hawk is preserved (see Objectives RIP1 and RIP3).	Are Swainson's hawks using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for Swainson's hawk, including identification of reference sites if appropriate.
Objective SH4. During preserve assembly, ensure that a minimum of 373 acres of modeled riparian nesting habitat for Swainson's hawk is re-established and/or established. Ensure that mitigation for modeled nesting habitat impacted within	Are Swainson's hawks using the re-established and/or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for Swainson's hawk, including identification of reference sites if appropriate.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8 (see Objectives RIP2 and RIP4).				
Objective SH5. For each of the 36 known nesting trees within the UDA, plant 10 trees that are modeled for Swainson's hawk nesting within SSHCP preserves. Plant nesting trees on properties protected by the SSHCP within PPUs 4, 6, and 8, and near protected foraging habitat. Tree species will be selected based on known suitability as nesting habitat for Swainson's hawk, and the planted trees must be maintained and/or replaced in perpetuity.	Are the planted trees healthy?	Inspection of planted trees for size and health	Annual: Inspection of planted trees for size and health.	Checklist of factors to check on planted nest trees for health and condition.
	Are Swainson's hawks nesting in the planted trees?	Swainson's hawk nesting surveys	Annual starting at 10 years post-planting: Swainson's hawk presence/ absence surveys	Survey methodology for nesting Swainson's hawk, including identification of reference sites if appropriate.
Objective SH6. During preserve assembly, ensure that a minimum of 729 acres of modeled foraging habitat for Swainson's hawk is re-established and/or established (see Objectives RIP2 and RIP4).	Are Swainson's hawks using the re-established and/or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for Swainson's hawk, including identification of reference sites if appropriate.
Objective NH1. During preserve assembly, ensure that a minimum of 1,245 acres of modeled foraging habitat for northern harrier is preserved (see Objectives VG1, AG1, VPG1, VP1, VP3, FWM1, and SW1).	Are northern harriers using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for northern harrier, including identification of reference sites if appropriate.
Objective NH2. During preserve assembly, ensure that a minimum of 30,048 acres of modeled nesting/foraging habitat for northern harrier is preserved (see Objectives VG1 and AG1).	Are northern harriers nesting in the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for northern harrier, including identification of reference sites if appropriate.

AGENDA ITEM 11.1
1478

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective NH3. During preserve assembly, ensure that a minimum of 856 acres of modeled foraging habitat for northern harrier is re-established and/or established (see Objectives VP2, FWM2, and SW2).	Are northern harriers using the re-established and/ or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for northern harrier, including identification of reference sites if appropriate
Objective WK1. During preserve assembly, ensure that a minimum of 31,205 acres of modeled foraging habitat for white-tailed kite is preserved (see Objectives VG1, AG1, RIP1, RIP3, VPG1, SW1, VP1, VP3, and BOW1).	Are white-tailed kites using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for white-tailed kite, including identification of reference sites if appropriate.
Objective WK2. During preserve assembly, ensure that a minimum of 974 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is preserved (see Objectives RIP1, RIP3, and BOW1).	Are white-tailed kites using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for white-tailed kite, including identification of reference sites if appropriate.
Objective WK3. During preserve assembly, ensure a minimum of 767 acres of modeled foraging habitat for white-tailed kite is re-established and/or established (see Objectives VP2, RIP2, RIP4, and SW2).	Are white-tailed kites using the re-established and/ or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for white-tailed kite, including identification of reference sites if appropriate.
Objective WK4. During preserve assembly, ensure that a minimum of 601 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is re-established and/or established (see Objectives RIP2 and RIP4).	Are white-tailed kites using the re-established and/ or established habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for white-tailed kite, including identification of reference sites if appropriate.
Objective GS1. During preserve assembly, ensure that a minimum of 257 acres of	Are greater sandhill cranes using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing	5 years for surveys, include	Survey methodology for roosting greater sandhill

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
modeled roosting or roosting/foraging habitat for greater sandhill crane is preserved. Roosting habitat will be preserved and maintained within PPUs 4, 6, and 8, with a minimum of 75% within PPU 6 (see Objectives VP1, SW1, and FWM1).		Entity staff.	staff observations in Annual Report.	crane, including identification of reference sites if appropriate.
Objective GS2. During preserve assembly, ensure that a minimum of 7,751 acres of modeled foraging habitat for greater sandhill crane is preserved (see Objectives AG1, AG2, and VG1).	Are greater sandhill cranes using the preserved habitat?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for greater sandhill crane, including identification of reference sites if appropriate.
Objective GS3. During preserve assembly, ensure that a minimum of 184 acres of modeled roosting habitat or roosting/foraging habitat for greater sandhill crane is re-established and/or established. Re-establish two new roost sites (minimum of 90 acres of freshwater marsh/seasonal wetland complex each) every 2 miles in the gap between the Cosumnes population and the Stone Lakes' population or other strategic locations if that gap is closed by another HCP or conservation project (see Objectives VP2, SW2 and FWM2).	Are greater sandhill cranes using the re-established and/ or established habitat or roost sites?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for roosting greater sandhill crane, including identification of reference sites if appropriate.
Objective GS4. Create a visual screen of woody vegetation near human disturbances such as buildings, bridges, and paved roads from permanent roosting habitat within PPU	Is roosting habitat located behind planted screens being occupied by greater sandhill cranes?	Conduct occupancy surveys, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for roosting greater sandhill crane, including identification of reference sites if

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
6. Screens should be located as appropriate to not interfere with habitat usage by greater sandhill cranes.				appropriate.
Objective GS5. As part of the 2,000 acres preserved under Objective AG2, establish and maintain 10 food plots in strategic locations totaling a minimum of 200 acres within an agricultural setting for greater sandhill crane foraging habitat within PPU 6. Maintain the 200 acres among the 10 food plots as irrigated pasture or planted with crops preferred by greater sandhill crane as foraging habitat. Crops may include, but are not limited to, alfalfa, corn, wheat, or rice. Strategic placement of food plots will include locations for food plots in upland areas above the floodplain.	Are food plots being used by greater sandhill cranes?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for greater sandhill crane, including identification of reference sites if appropriate.
Objective GS6. During preserve assembly, ensure that a minimum of 1,000 acres of high-value modeled foraging habitat for greater sandhill crane outside the 100-year floodplain is preserved (see Objectives VP1, SW1, and FWM1).	Are greater sandhill cranes using the preserved habitat? Is their usage of the habitat limited to periods of flooding?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff. Conduct special study of the habitat during and immediately following a 10-year flood or greater, as described in Section 8.3.3.5.	5 years: Occupancy surveys. Targeted surveys during flood events.	Survey methodology for greater sandhill crane, including identification of reference sites if appropriate.
Objective LS1. During preserve assembly, ensure that a minimum of 9,152 acres of modeled foraging habitat for loggerhead shrike (*Lanius ludovicianus*) is preserved (see	Are loggerhead shrikes using the preserved habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for loggerhead shrike, including identification of reference sites if appropriate.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objectives VG1, AG1, VPG1, SW1, VP1, and VP3).				
Objective LS2. During preserve assembly, ensure that a minimum of 22,014 acres of modeled nesting/foraging habitat for loggerhead shrike is preserved (see Objectives VG1, RIP1, and RIP3).	Are loggerhead shrikes using the preserved habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for loggerhead shrike, including identification of reference sites if appropriate.
Objective LS3. During preserve assembly, ensure that a minimum of 592 acres of modeled nesting habitat for loggerhead shrike is re-established and/or established (see Objectives RIP2 and RIP4).	Are loggerhead shrikes using the established and re-established habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for nesting loggerhead shrike, including identification of reference sites if appropriate.
Objective LS4. During preserve assembly, ensure that a minimum of 965 acres of modeled nesting habitat for loggerhead shrike is preserved (see Objectives RIP2 and RIP4).	Are loggerhead shrikes using the preserved habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for nesting loggerhead shrike, including identification of reference sites if appropriate.
Objective LS5. During preserve assembly, ensure that a minimum of 729 acres of modeled foraging habitat for loggerhead shrike is re-established and/or established (see Objective SW2).	Are loggerhead shrike using the preserved habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology for loggerhead shrike, including identification of reference sites if appropriate.
Objective WR1. During preserve assembly, ensure that a minimum of 23,910 acres of modeled foraging habitat for western red bat (*Lasiurus blossevillii*) is preserved (see Objectives BOW1, RIP1, RIP3, AG1, VPG1, VG1, VP1, VP3, SW1, OW1, FWM1, and SC1).	Are western red bat using the preserved habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology, potentially passive acoustic monitoring.

Table 8-4
Framework for Monitoring Effectiveness of the SSHCP Conservation Strategy

Measurable Objective	What do we need to know to assess effectiveness?	How do we monitor what we need to know?	When and how often?	What protocols and methods need to be developed in the Preserve System Monitoring and Management Program?
Objective WR2. During preserve assembly, ensure that a minimum of 841 acres of modeled roosting/foraging habitat for western red bat is preserved (see Objectives BOW1, RIP1, and RIP3).	Are western red bat using the preserved habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology, potentially passive acoustic monitoring.
Objective WR3. During preserve assembly, ensure that a minimum of 1,317 acres of modeled foraging habitat for western red bat is re-established and/or established (see Objectives VP2, SW2, OW2, FWM2, RIP2, and RIP4).	Are western red bat using the re-established and/ or established habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology, potentially passive acoustic monitoring.
Objective WR4. During preserve assembly, ensure that a minimum of 450 acres of modeled roosting/foraging habitat for western red bat is re-established and/or established (see Objectives RIP2 and RIP4).	Are western red bat using the re-established and/ or established habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology, potentially passive acoustic monitoring.
Objective AB1. During preserve assembly, ensure that a minimum of 23,171 acres of modeled habitat for American badger (*Taxidea taxus*) is preserved (see Objectives BOW1, VG1, VP1, VP3, VPG1, and SW1).	Are American badgers using the preserved habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology, potentially deployment of wildlife cameras.
Objective AB2. During preserve assembly, ensure that a minimum of 767 acres of modeled habitat for American badger is re-established and/or established (see Objectives VP2 and SW2).	Are American badgers using the re-established and/ or established habitat?	Conduct occupancy surveys at food plots, review observations made by Implementing Entity staff.	5 years for surveys, include staff observations in Annual Report.	Survey methodology, potentially deployment of wildlife cameras.

8.3.3.1 Phases of Monitoring

Preserve System management (see Section 8.3.4) will be conducted on all SSHCP Preserves during all three phases of the Permit Term. Preserve management decisions will be directed from the results of the Preserve monitoring.

Phase 1 – Develop and Test Monitoring Protocols

During Phase 1 – Develop and Test Monitoring Protocols, the proposed monitoring techniques for each land cover type and Covered Species will be further developed and tested in the field at least once. During this phase of refining the monitoring protocols, statistical methods to be used to analyze the monitoring data will also be developed and key statistical parameters, such as detection probabilities, will be identified and estimated.

Phase 2 – Intensive Monitoring Period

The second phase in the SSHCP Preserve System Monitoring and Management Program involves an intensive monitoring period in which Effectiveness Monitoring is conducted every year for the first 10 years. The purpose of a more intensive monitoring period is to further test and evaluate the effectiveness of survey protocols and to begin to establish statistically valid baseline data (e.g., population estimate or population index value) for the development of biologically meaningful significance thresholds. Since the Preserve System will continue to grow throughout Plan implementation, not all areas in the Preserve System will be included in this intensive monitoring phase. The intent of the data collected during this period is not designed to be Preserve-specific, but rather to inform the nature of variation within the biological system (e.g., population levels of Covered Species or composition of the natural community) intended to be preserved and managed. The 10-year time frame of intense monitoring should also allow sufficient time to experience a range of climatic conditions, typically one drought and one wet rainy season cycle, plus variations in timing and duration. This should provide a reasonable assessment of the annual population fluctuations for Covered Species and Natural Community-level variables to develop more biologically meaningful management thresholds and comparisons to interpret data during the long-term monitoring phase.

Phase 3 - Long-Term Monitoring

This phase involves implementation of the long-term monitoring program, which consists of a continuation of the monitoring protocols developed during Phase 1 and further refinement during Phase 2, only conducted at 3-year or 5-year intervals instead of every year as in Phase 2.

Programmatic Review of Monitoring and Adaptive Management Program

This additional component of the SSHCP Preserve System Monitoring and Management Program involves a programmatic review of the monitoring techniques, assessment of reserve management practices and an overall assessment of the effectiveness of the operating Conservation Program. Each review will assess the effectiveness of the Plan in achieving all of the Biological Goals and Measureable Objectives. These reviews are integral to the process of adaptive management. A programmatic review will occur every 5 years for the permit duration (i.e., 50 years) coinciding with the 5-year Annual Report (Section 8.4.1) and every 10 years after that in perpetuity. The first review will assess the results of the initial tests of the monitoring protocols, use these results to modify monitoring as necessary in Phase 2, and further define biologically meaningful performance criteria and significance thresholds. Data from the intensive monitoring during reviews in years 10 and 15 will be used to further refine performance criteria and significance thresholds. The final review in year 45 will assess the effectiveness of the Plan in achieving all of the Biological Goals and Measureable Objectives. After this review, review frequency will decrease to every 10 years in perpetuity. This frequency will allow for three monitoring cycles during the Long-Term Monitoring Phase. All reviews will summarize the results of special studies and incorporate results into the Preserve System Monitoring and Management Program.

8.3.3.2 Monitoring Status and Trends of Covered Species

Several of the Biological Measurable Objectives will require the Implementing Entity to monitor the status of the species in the Plan Area and identify trends in abundance and distribution on individual Preserves and across the Preserve System. Methods to monitor Covered Species status and trends to comply with the Covered Species objectives will be developed by the Implementing Entity with input from the TAC.

Potential ways to monitor status and trends include presence/absence data (CDFW 2009) or the Proportion of Area Occupied (PAO) (MacKenzie et al. 2003). Presence/absence surveys in a representative subset of vernal pools will be used for the vernal pool invertebrate species. This methodology is appropriate because determining abundance can be very damaging to the vernal pool community, and determining presence/absence in all vernal pools within the Preserve System would be extremely time consuming and costly.

The PAO may be appropriate for amphibian and reptile Covered Species and is becoming a widely used, useful, cost-effective metric for large-area monitoring programs. For example, PAO has been adopted by the Amphibian Research and Monitoring Initiative as the metric by which many amphibian populations nationwide will be measured. The PAO statistical approach evaluates the fraction of the landscape that is occupied by a species of interest, but not the actual

abundance of the population across the landscape. This is useful for more cryptic species, such as amphibians or reptiles, where actual abundance estimates are more difficult and costly to obtain. The PAO methodology

However, for certain Covered Species, such as plants, additional data may be collected on densities. In addition to presence/absence or PAO, data may also be collected to assess the overall health and status of these occurrences to see if their population levels and distribution are actually increasing throughout the Plan Area. There are two main methods for assessing population status and trends: (1) complete periodic censuses of the Covered Species in the Plan Area; and (2) sampling methods that allow for statistical estimates of some population parameter (e.g., population size, population density, occupancy rates, etc.).

Complete periodic censuses may have several advantages, including full information for the particular response variable and elimination of sampling error. Complete censuses provide more powerful data for assessing trends (i.e., an observed increase or decrease is real, although the difference may not be biologically significant). For example, if a 20% population decline (e.g., number of individuals, number of occupied sites) is the threshold for triggering management), a decline from 100 to 79 would trigger management. However, the census approach can be very costly, and the detection probability of any given survey has to be 1.0, or virtually 1.0, which is seldom the case for most species. For example, highly mobile birds or bats may simply be absent from a site at the time the survey is conducted even though they normally frequent the site, or nesting birds that are present may not be calling to advertise or defend their territories. Similarly, the reptiles and amphibians may be underground or otherwise cryptic and hard to detect during surveys. Studies that use trapping also seldom trap all individuals in a population due to factors such as limited encounter rates with traps and trap shyness (i.e., not all individuals are trappable).

For these reasons, the SSHCP will generally rely on the numerous sampling methods that have been developed for the Covered Species. Such methods generate population status information ranging from simple presence/absence or indices such as relative abundance (i.e., there is no population or other parameter estimate) to statistically-estimated occupancy rates or population sizes and/or densities using sophisticated mathematical formulations (see MacKenzie et al. 2006). The usual drawback of the statistical estimates is that minimum necessary samples sizes for making reasonably precise population estimates are often prohibitively large. In some cases, the minimum sample sizes (e.g., nest pairs of a species) may be larger than the entire population of a study area. In addition, determining adequate sample sizes and/or intensity of sampling at each site for species often requires substantial pilot testing because minimum sample size and sample effort is affected by factors such as rarity or commonness of the species, detection probabilities (e.g., samples sizes can be smaller or fewer sites need sampling with species that are reliably detected) and the inherent variability of a species population (which increases sampling error).

8.3.3.3 Success Criteria

The function of re-established or established habitat will be evaluated through monitoring of success criteria tailored to each particular site. The minimum success criteria will be developed during the 18-month preparation of the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program. The Implementing Entity will be advised by the TAC and the Permitting Agencies on the best available science regarding success criteria, and the Permitting Agencies must approve the success criteria as part of the two programs. Success criteria for new re-establishment/establishment sites may be updated over the duration of the permit to ensure that the best available science is being applied. The exact monitoring effort for each site will be site-specific. Monitoring of the success criteria must include, at a minimum, occupancy status and population trends of the target Covered Species at the habitat re-establishment/establishment site. If monitoring indicates that success criteria are not being met at any time in perpetuity, the Implementing Entity will take remedial action until success criteria are met and the re-established/established land cover type is providing the required Covered Species habitat.

8.3.3.4 Reference Sites

The Implementing Entity, in coordination with the Wildlife Agencies and TAC, will identify reference sites to compare with Covered Activity sites. This will allow the Implementing Entity to better separate regional effects from those caused by Preserve Management Covered Activities. Reference sites will include permanent and impermanent plots. Reference sites for vernal pools should be located as far away from human disturbance as feasible. Vernal pool reference sites for the SSHCP Preserve System must include plots both within and outside the UDA because of soils, geologic formations, vernal pool type, species distributions and weather patterns differ in the Plan Area between the UDA and the Plan Area south of the Cosumnes River (see Chapters 2, 3, and 4).

For plant monitoring, reference sites will be established (nearby accessible occurrences of the plants) and used to determine whether those species are identifiable at the time of the survey and to obtain a visual image of the target species, associated habitat, and associated natural community.

8.3.3.5 Special Studies to Evaluate Effectiveness

Monitoring effectiveness of AMMs and biological measurable objectives will require several in-depth investigations, which the SSHCP terms Special Studies. Special Studies differ from regular Preserve Monitoring because they will pose a hypothesis, and then test that hypothesis. The SSHCP will use the results of Special Studies for effectiveness monitoring and to inform Preserve adaptive management. Depending on the monitoring need, Special

Studies may be conducted once or regularly repeated throughout the Permit Term to inform preserve management decisions. Preserve Managers and the Implementing Entity will carry out Special Studies to gain insights into key questions identified in the SSHCP Preserve System Monitoring and Management Program (Table 8-5) and questions that arise during SSHCP implementation. The details of special studies, including methods and timing, will be developed by the Implementing Entity in coordination with the TAC.

Table 8-5
Special Studies Known at the Time of SSHCP Preparation

Special Study Topic	Preliminary Special Study Timing
Conduct a study on Ahart's dwarf rush and other vernal pool plants to determine population responses to SSHCP Preserve management methods.	Collect baseline data on Ahart's dwarf rush and other vernal pool plants in SSHCP Preserves as Preserves are acquired. Timing for experiments to test the effects of management methods to be determined through the TAC.
Conduct a special study on indirect effects on vernal pools in a SSHCP Preserve that abuts a development area. Measure vernal pool crustacean occupation of pools and other potential habitat covariates such as water chemistry and presence of invasive species from the zone of indirect effects along a transect from the edge toward the interior. Evaluate the effectiveness of EDGE AMMs in avoiding or reducing the edge effects of adjacent development on Preserves.	Special study to include a pre-project study and repeating post-project studies. Pre-project study to be conducted as soon as possible before one of the five master plan projects (Section 5.2.1.3) begins construction. First post-project study to be conducted no less than 5 years after completion of at least 25% of master plan project. Repeat study at several time intervals (e.g., 4 to 5 years) until development has been in place for the long term (approximately 15 years).
Special study on effectiveness of inoculation and inocula banking. Test different methods for storage of inocula soils and the storage method's effects on cyst and seed viability. Evaluate the success rate of vernal pools that have been inoculated compared with ones that have not been inoculated.	Evaluations of inocula banking techniques to begin with first deposition of vernal pool soils within the inocula bank. Schedule for sampling of inocula bank to be determined by the Implementing Entity in first 6 months after permit issuance, in collaboration with the TAC. Study ongoing for at least 10 years after commencement of inocula banking.
Investigate what types and abundances of wildlife travel through Linkage Preserves and Wildlife Corridors, and identify any seasonal differences in wildlife using the corridors.	Implementing Entity to develop in first 18 months a preliminary design for the special study. Special study to commence within 5 years of establishment of at least 5 Linkage Preserves and intact Laguna Creek Wildlife Corridor. 1 year before study commences Implementing Entity to work with directed study investigator to Identify locations for camera placement, duration of camera deployment, procedures for deploying, maintaining, and processing the data from the cameras. Repeat the study every 5 years.
Conduct a study of greater sandhill crane use of upland foraging habitat during and immediately following a 10-year flood or greater. This study would demonstrate the value of the upland foraging habitat that is required to be preserved under the Conservation Strategy and ensure that effects on this species are being mitigated to the maximum extent possible.	Design for special study developed within 18 months of SSHCP permit issuance; study conducted only after preservation of at least 500 acres of upland foraging habitat, and conducted during and immediately following 10-year flood or greater flood event.

Additional needs for Special Studies will be identified by the Preserve Managers, Implementing Entity, and TAC. The Permittees expect that many Special Studies will be

conducted by the Preserve Managers and Implementing Entity or by consulting scientists hired by the Implementing Entity. Special Studies that are identified as necessary during Plan implementation will likely be conducted by or in partnership with outside scientists from academic institutions, consulting firms, and nonprofit organizations.

As discussed in Chapter 12, Economics Analysis and Funding Program, the Permittees anticipate that funding provided by the Implementing Entity for Special Studies could be matched or supplemented by other entities. In addition to the Special Studies undertaken to answer Preserve management uncertainties (Table 8-5), the Permittees expect that the Implementing Entity will develop partnerships with academic institutions (e.g., undergraduate student projects, Masters theses, Ph.D. dissertations) to study the SSHCP Preserve System. These academic partnerships and studies will inform and improve SSHCP Preserve management and monitoring techniques.

8.3.4 SSHCP Preserve System Management

Typical Preserve System facility activities include controlling public access to sensitive areas, fencing construction and/or repairs of existing fences, signage placement and/or repairs, trash removal, and patrols would typically not require effectiveness monitoring or adaptive management. Where there is little uncertainty in a management outcome, an adaptive management approach usually is not necessary. For more information on Preserve management, refer to Appendix G-3 (Preserve Management Toolbox).

However, even common activities such as fencing may be part of a preserve habitat-restoration effort to preclude human or animal disturbance while the restored site is recovering, and monitoring the effectiveness of the fencing (or different kinds of fencing) may be of interest. Similarly, grazing to control thatch will be included in most Individual PMPs. Different methods of thatch control (e.g., grazing, weed-whacking, fire, or herbicides), or different timing of controls and/or intensity of controls will be monitored for effectiveness in meeting management goals defined by the Individual PMP and management may be adjusted accordingly.

8.3.4.1 Summary of SSHCP Preserve Adaptive Management Tasks

The following will be elements of the SSHCP Preserve System Monitoring and Management Program:

- Incorporate hypothesis testing and experimental land-management to address key uncertainties about response of natural resources to management methods, and to improve monitoring methods. The SSHCP may address uncertainties through the completion of special studies (Section 8.3.3.5)

- Evaluate monitoring protocols. For example, the frequency of vernal pool crustacean monitoring may need to be adjusted if it is not providing adequate information to gauge status and trends at an individual Preserve or across the Preserve System.
- Incorporate new and best available scientific information into the SSHCP Preserve System Monitoring and Management Program. The Implementing Entity will regularly review scientific literature and consult with the TAC and the Wildlife Agencies to ensure that new information about species and/or monitoring approaches is incorporated into the into the SSHCP Preserve System Management Program. For example, use of wildlife crossings and mobility across the landscape is not well known for SSHCP species. As the Preserves are studied, new information may indicate that linkages should be expanded and wildlife crossings relocated or enlarged.
- Refine existing Chapter 3 maps of each Covered Species habitat locations in the Plan Area. As more Preserve monitoring data becomes available (e.g., annual bird surveys) and as new scientific information results in changed assumptions, the maps should reflect new information to continue to provide guidance for prioritization of Preserve land acquisitions.
- Review all results of Preserve monitoring and directed studies. Examine unexpected results to understand the reason. Further adjust Preserve management actions and monitor the results of those adjustments.
- Refine success criteria for re-established and established land cover types during Phase 1 of monitoring. Minimum success criteria will be developed by the TAC and approved by the Permitting Agencies as part of the SSHCP Preserve System Monitoring and Management Program. As part of adaptive management, these minimum success criteria for re-established species habitat may be adjusted if monitoring demonstrates they are inappropriate indicators of functional habitat.

Proposed changes to Preserve monitoring and success criteria will not implemented by the Implementing Entity until approved by the Permitting Agencies.

8.3.4.2 Preserve Management Plans

As directed by measureable Objective HAB1, all lands preserved by the SSHCP shall have a PMP, which is prepared by the Implementing Entity and approved by the Wildlife Agencies. The following describes the process for PMP development and the minimum requirements for PMPs.

Initial PMP

The Implementing Entity will compile the history of management on each parcel or group of parcels (as appropriate) from available records and interviews with current and past land managers. These historical land use and management practices, combined with other information compiled in the

Preserve Documentation Report (PDR) (Chapter 9), will form the basis for an Initial PMP (refer to Conservation Action HAB 3.1). Pursuant to the principles described in Section 8.3.2, the Initial PMP will describe continuation of existing preserve land management until results of SSHCP Preserve System effectiveness monitoring (Section 8.3.3) demonstrate that land management type, intensity, or frequency should be changed by the Implementing Entity.

Individual PMP

After parcel acquisition, the Implementing Entity will prepare an Individual PMP for each preserve (or preserve-parcel) within 18 months of acquisition, using the Preserve Management "toolbox" that is outlined in Appendix G-3. The Individual PMP will identify necessary routine management and routine preserve monitoring, building on the Initial PMP as appropriate. If appropriate, Individual PMPs may include separate discussions for each Preserve unit – a parcel or group of parcels within a Preserve subject to the same management regime.

Each Individual PMP will clearly identify maintenance and repair responsibilities for infrastructure that borders Preserves, such as Preserve fencing that borders Preserve setbacks. The Individual PMP will also specify the mechanisms by which the Changed Circumstances provided for in the SSHCP (Chapter 11) are addressed

The Implementing Entity will ensure that the Individual PMPs are prepared by a qualified person(s) experienced in the monitoring and management of Plan Area natural communities, and qualified in planning and implementation of habitat restoration, if appropriate for the Preserve site. Draft Individual PMPs will be reviewed and approved by the Permitting Agencies (including Wildlife Agencies) prior to final Implementing Entity approval and implementation. Individual Preserve Management Plans will also be developed in coordination with the TAC.

SSHCP Individual PMPs will have this minimum framework:

- A prioritized list of environmental stressors (see Section 6.3) specific to the natural communities present in the Preserve or the Preserve parcel that must be addressed by PMP actions.
- Step-down each Biological Goal and Measureable Objective to Preserve unit level (i.e., Preserve-level goals and objectives)
- Prescribe necessary fire or grazing regimes, or other standard mechanisms of vegetation control
- All PMPs will include monitoring for invasive weeds, and prescribe measures for control of invasive weeds selected from the Preserve Management Toolbox (Appendix G-3). Preserve monitoring and management, including the weed-control programs shall be

conducted in perpetuity on each preserve. Each PMP shall include at least annual surveys to visually monitor extent of weed infestations and an IPM decision tree to select appropriate weed-control measures.

- When indicated by Preserve monitoring, Individual PMPs will be revised to include control measures for any destructive non-native animal species (e.g., bullfrogs). These measures shall be conducted in perpetuity on each SSHCP preserve, and shall include at least annual surveys to visually assess and identify new invasions.
- Identify and prioritize opportunities for habitat re-establishment and establishment
- Monitoring to document the status and continued persistence of Covered Species and presence of Covered Species modeled habitat.
- Facility maintenance schedules and requirements (e.g., fencing, trails)
- Responsibilities for implementation of the monitoring, PMP, interim and long-term ownership and/or management of the Preserve parcels.
- Process for annual monitoring of individual Preserves, management of the data, compilation and analysis of the monitoring data, and submittal to the Implementing Entity.

Individual PMPs for Cropland and Irrigated-Pasture Preserves

The primary purpose of the SSHCP Cropland and Irrigated-Pasture Preserves is to provide foraging habitat for certain bird Covered Species (e.g., greater sandhill crane, Swainson's hawk) while allowing viable agricultural operations to continue on the property (see Chapter 7). The Individual PMP will reflect the conditions required on the property by the conservation easement (Section 9.4.3). The Individual PMP for Cropland and Irrigated-Pasture Preserves will include at a minimum the following required components:

- Invasive species control;
- Pesticide/herbicide restrictions;
- Crop selection to enhance value of habitat or food plots for Covered Species;
- Erosion and runoff controls;
- Strategic planting or maintenance of existing trees and shrubs for perching, roosting, nesting, and refuge habitat; and
- If appropriate, planting of hedgerows (Objective AG3) to provide foraging habitat and/or screen food plots and other species-habitats from roads and other human travel corridors.

Additional management would be selected from the Preserve System Monitoring and Management Program for each individual Cropland or Irrigated-Pasture PMP depending on the conditions and conservation targets associated with each Preserve or Preserve parcel.

Habitat Re-Establishment/Establishment Plans

A stand-alone Habitat Re-Establishment/Establishment Plan will be developed by the Implementing Entity for a newly acquired parcel or an existing Preserve where habitat re-establishment and/or establishment is desired. The Habitat Re-Establishment/Establishment Plan will include detailed information on habitat design, including earthmoving, species inoculation, and planting palette, and will be consistent with the requirements of the ARP (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report). Individual PMPs will be updated by the Implementing Entity to include the monitoring and management requirements of the re-established/established habitat.

8.3.5 Monitoring and Management outside the Preserve System

The SSHCP Preserve System Monitoring and Management Program will include direction to Implementing Entity for any monitoring or management occurring outside individual Preserves. At the time of SSHCP preparation this is limited to two potential efforts: (1) monitoring and management of road shoulders, ditches, ROW areas, trails, Preserve Setbacks, and Stream Setbacks that border SSHCP Preserves for invasive weeds or other exotic plant species; and (2) monitoring of reference sites located outside the SSHCP Preserve System (Section 8.3.3.4). Invasive weed and exotic plant removal-protocols will be coordinated with those of other local entities to ensure consistency with these programs and facilitate the sharing of weed-removal monitoring results. This monitoring information will be used to determine the need to adapt management actions for controlling the spread of existing invasive plant infestations as well as potential future invasions. The monitoring results will be reviewed to assess the effectiveness of control method used. This weed removal monitoring information, along with all SSHCP monitoring results, will be shared with state and local land management agencies charged with the control of invasive plants, including the Sacramento River Watershed Program (www.sacriver.org) and the California Invasive Plant Council (www.cal-ipc.org), as well as with managers of other regional HCPs and adjacent public lands.

8.4 Data Management and Reporting

Proper data management, analysis, and reporting are critical to the success of the SSHCP Compliance and AMM Monitoring Program (Section 8.2) and the SSHCP Preserve System Monitoring and Management Program (Section 8.3). Data on monitoring methods, results, and analysis of results must be managed, stored, and made available to Implementing Entity staff,

decision makers, scientific advisors, the Permitting Agencies, and other appropriate persons. A database and clear reporting procedure are also required for permit compliance. Details regarding the scope and maintenance of the Data Repository, maintenance, and data reporting for monitoring are described in Section 9.8, Data Repository Development and Maintenance.

8.4.1 Annual Reports

This section describes the contents of the Annual Reports, which must be prepared by the Implementing Entity and submitted to the Permitting Agencies. Use of the Annual Reports in SSHCP implementation is described in Chapter 9.

At a minimum, all SSHCP Annual Reports will include the following information.

- Number and acreage of each Covered Activity implemented during the reporting period categorized by Covered Activity type (per Chapter 5). Reporting will include a map of Covered Activity locations.
- A year-to-date and cumulative summary (i.e., from the start of the Permit Term) of permanent and temporary impacts on all SSHCP land cover types. Impacts to riparian and wetland land cover types will also be reported by watersheds. Reporting will include a map of impacted locations.
- A year-to-date and cumulative summary of impacts to modeled habitat of Covered Species. Reporting will include a map of impacted areas.
- A year-to-date and cumulative summary of the total impacts to Critical Habitat of vernal pool fairy shrimp, vernal pool tadpole shrimp, Sacramento Orcutt grass, slender Orcutt grass, and California tiger salamander, and to Covered Species plant occurrences. Reporting will include a map of Critical Habitat impacts.
- A year-to-date and cumulative summary of impacts associated with projects exempt from fees and/or conditions of the SSHCP.
- An accounting of all conditions on Covered Activities applied to these activities (see Chapter 5).
- A list of all Stream Setback exceptions and any other exceptions granted each calendar year (Chapter 5).
- A description of all re-establishment and establishment implemented during the reporting period. Riparian and wetland re-establishment and establishment will also be reported by the watersheds shown in Figure 3-1 to facilitate regional coordination of wetland mitigation for the U.S. Army Corps of Engineers (USACE), State Water Resources

Control Board (SWRCB), and Regional Water Quality Control Board (RWQCB). Reporting will include a map of re-establishment/establishment project locations.

- A year-to-date and cumulative summary of the acreage of SSHCP land cover types preserved, re-established, and/or established. The success rate for re-establishment and establishment projects will also be documented. For each Preserve parcel acquired, document whether it was purchased in fee title or protected under a conservation easement. If conservation easements were used, the report will describe who holds the easements. Maps and GIS shapefiles will be provided identifying which parcels have been acquired and whether acquisition was via fee title or easement.
- A year-to-date and cumulative summary of the extent of modeled habitat for Covered Species preserved. This will be calculated by overlaying the most current species habitat models. Reporting will include a map of modeled habitat preservation for each Covered Species.
- A copy of all easements recorded during the reporting year. Reporting will include a map of easements.
- An assessment of the progress toward all preserve acquisition requirements, including SSHCP land cover types, Covered Species colony or breeding sites, plant Covered Species occurrences, and wetland protection. This assessment will include evaluation of compliance with the preserve designs in Chapter 7 (e.g., minimizing edge).
- An assessment of compliance with the Jump-Start and Stay-Ahead provisions (Section 9.4.6) to assure that some elements of the SSHCP Preserve System are in place before the permit is issued (Jump-Start) and that mitigation requirements of the Conservation Strategy stay ahead of Covered Activity impacts (Stay-Ahead).
- An accounting of all revenues received, by type (e.g., development fees, wetland fees, grants) and an assessment of progress towards total revenue goals. Funding from local, state, and federal sources must be tracked separately. Any fee adjustments must also be reported.
- A summary of monitoring results, including species status and trends.
- A description of the adaptive management process utilized during the reporting period.
- A summary of the recommendations or advice provided by the Wildlife Agencies and TAC regarding adaptive management and monitoring.

Every 5 years, the Annual Report will include more detailed analysis of progress and effectiveness of the Conservation Strategy. The following information will be provided in the 5-year Annual Report, in addition to the information required above for all Annual Reports:

- A summary of all land and water management activities undertaken on and off the preserves and a discussion of the management issues facing the Implementing Entity.
- An evaluation of the economic assumptions on which the SSHCP was based (e.g., SSHCP costs, revenue rates and grant funding projections).
- An assessment of progress toward a complete funding strategy for implementation after the Permit Term (Chapter 12).
- An assessment of the efficacy of the SSHCP Preserve System Monitoring and Management Program, including lessons learned from Individual PMPs and recommended changes to the SSHCP Preserve System Monitoring and Management Program based on interpretation of monitoring results and research findings.
- An assessment of the efficacy of habitat re-establishment and/or establishment methods in achieving performance objectives (if applicable) and recommended changes to improve the efficacy of the methods.
- A description of all SSHCP special studies undertaken during the reporting period; a summary of study results; and a description of integration with monitoring, assessment, and compliance elements.
- An assessment of the appropriateness of any performance indicators and objectives based on the results of effectiveness monitoring, and recommended changes to performance indicators and objectives.
- A description of any actions taken or expected regarding changed circumstances, including remedial actions.
- A description of any unforeseen circumstances that arose and responses taken.
- A summary of any administrative changes, minor modifications, or major amendments proposed or approved during the reporting year.

Electronic copies of the following data will be provided upon request to the Wildlife Agencies and to the public:

- Copies of all non-confidential, non-proprietary portions of the database that track Covered Activities and land acquisition in the possession and control of the Implementing Entity in its current state.
- Copies of all relevant GIS data in possession and control of the Implementing Entity in its current state, including land cover, the location of Covered Activities, and the boundaries of the current SSHCP Preserve System.

- Copies of all non-confidential, non-proprietary financial data in possession and control of the Implementing Entity in its current state.

8.4.2 SSHCP Implementing Entity will Share SSHCP Preserve Monitoring Data with Other Programs

The Implementing Entity will coordinate and share the results of monitoring and directed studies, as appropriate, with other regional restoration and management programs and the Wildlife Agencies. This sharing will enable the Implementing Entity and others to measure and evaluate change in resources and threats within individual preserves, across the entire Plan Area, and throughout the southern Sacramento Valley and northern San Joaquin Valley.

Environmental monitoring already occurs throughout the Plan Area to varying degrees on some of the existing public and private preserves (see Chapter 3 discussion of existing preserves). The SSHCP Preserve System Monitoring and Management Program will borrow methodologies from these existing preserve monitoring programs where appropriate. The Implementing Entity will confer with the existing Plans during the preparation of the SSHCP Preserve System Monitoring and Management Program to determine what aspects of their monitoring are compatible with SSHCP monitoring requirements. There may also be opportunities to conduct joint monitoring efforts to meet the needs of both entities.

Other opportunities for cooperation and collaboration are the other HCPs being implemented or are under preparation in the Sacramento region. Conservation plans approved or underway in the Southern Sacramento Valley and northern San Joaquin Valley include:

- Natomas Basin Habitat Conservation Plan (HCP)
  - Approved, applies to the 53,341-acre interior of the Natomas Basin, located in the northern portion of Sacramento County and the southern portion of Sutter County.
- Pacific Gas & Electric (PG&E) San Joaquin Valley Operations and Maintenance HCP
  - Approved, covers PG&E operations and maintenance within nine San Joaquin Valley counties.
- Sacramento Municipal Utilities District (SMUD) HCP (Limited Effect HCP)
  - In process, covers SMUD operations, maintenance, and minor construction actions on transmission and gas line corridors inside SMUD's 571,909-acre service area within Sacramento County and small portions of Placer and Yolo Counties.
- Butte Regional Conservation Plan (HCP/Natural Community Conservation Plan (NCCP))
  - In process, this plan covers regional development. Preliminary draft November 2012. Plan area includes approximately the western half of Butte County, and includes the entire extent of vernal pool landscapes within Butte County.

- Placer County Conservation Plan (HCP/NCCP)
  - In process, this plan covers regional development. Preliminary draft January 2011. Plan area includes approximately 201,000 acres of western Placer County.
- Yolo County (HCP/NCCP)
  - In process, this plan covers regional development. Preliminary draft May 2015. Plan area includes all of Yolo County, approximately 654,000 acres.
- Feather River HCP
  - In process, this plan covers flood control projects in a plan area along Feather River, Bear River, and other tributaries within five counties.
- Solano HCP
  - In process, preliminary draft published October 2012. Covers activities related to continued delivery of Solano project water, including delivery, operations, and maintenance within 585,000 acres mostly in Solano County.
- Yuba-Sutter NCCP/HCP
  - In process, this plan covers regional development. Plan area totals approximately 469,000 acres encompassing the valley floors of Yuba and Sutter Counties.
- San Joaquin County Multi-Species Habitat Conservation and Open Space Plan
  - Approved, this plan covers regional development. Plan area includes all lands in San Joaquin County except for federally owned lands and select project areas that are not covered by the plan.

In addition to coordination with the above-listed programs, the Implementing Entity will acquire data to the extent feasible and useful from other conservation monitoring programs within the Plan Area (e.g., existing preserves and established mitigation and conservation banks within the Plan Area) to improve the quality of the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring.

While the SSHCP will seek opportunities to establish and improve cross-compatibility of monitoring data sets between these various regional conservation plans, requiring such compatibility could impede SSHCP implementation because each program will have its own unique monitoring and data collection requirements. Therefore, as the various HCPs and NCCPs are approved and implemented, means to coordinate efforts will be investigated and implemented by the various implementing entities and agencies involved.

8.5 References Cited

California Government Code, Sections 54950– 54963. Title 5: Local Agencies; Division 2: Cities, Counties, and Other Agencies; Part 1: Powers and Duties Common to Cities, Counties, and Other Agencies; Chapter 9: Meetings.

CDFW (California Department of Fish and Wildlife). 2009. "Protocols for surveying and evaluating impacts to special status native plant populations and natural communities." Accessed January 12, 2016. https://www.dfg.ca.gov/biogeodata/cnddb/pdfs/Protocols_for_Surveying_and_Evaluating_Impacts.pdf.

MacKenzie, D.I., J.D. Nichols, J.E. Hines, M.G. Knutson, and A.B. Franklin. 2003. "Estimating Site Occupancy, Colonization, and Local Extinction Probabilities when a Species is Detected Imperfectly." *Ecology* 84:2200–2207.

MacKenzie, D.I., J.D. Nichols, J.A. Royle, K.H. Pollock, L.A. Bailey, and J.E. Hines. 2006. *Occupancy Estimation and Modeling*. San Diego, California: Elsevier.

USFWS (U.S. Fish and Wildlife Service). 1999. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.* Sacramento, California: USFWS, Sacramento Fish and Wildlife Office. July 9, 1999.

USFWS and NOAA (U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Association). 2000. Notice of final policy: "Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." June 1, 2000. Federal Register, Volume 65, pages 35242–35257.

INTENTIONALLY LEFT BLANK

9 IMPLEMENTATION

9.1 Introduction

As summarized in Chapter 1, five local government entities developed the South Sacramento Habitat Conservation Plan (SSHCP or Plan) to apply for federal Endangered Species Act (ESA) and California Endangered Species Act (CESA) Incidental Take Permits from the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). These five local government entities and the future SSHCP Implementing Entity are permit applicants and will become the Plan Permittees. One CESA and one federal ESA Incidental Take Permit will be issued to the six Plan Permittees. The ESA and CESA Incidental Take Permits are not severable, meaning that the six Plan Permittees will share a single state Incidental Take Permit and a single federal Incidental Take Permit. Upon issuance of the Incidental Take Permits, the Plan Permittees will be responsible for implementation of the SSHCP. Successful implementation will require participation and coordination among the Plan Permittees (both the Land Use Authority Permittees and the Plan Partner Permittees), the Implementing Entity, the Permitting Agencies (including the Wildlife Agencies [USFWS and CDFW]), the Technical Advisory Committee (TAC) and other advisory committees formed under this Plan, private-sector organizations, and the general public.

The SSHCP Plan Permittees also requested that the United States Army Corps of Engineers (USACE) develop a permitting process to expedite permits issued under Section 404 of the Clean Water Act (CWA), a process from the Regional Water Quality Control Board (RWQCB) for Water Quality Certification under Section 401 of the CWA, and a process to issue Reports of Waste Discharge under the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The Plan Permittees also seek a process to obtain Streambed Alteration Agreements from CDFW under the California Fish and Game Code.

This chapter provides a detailed overview for how the SSHCP will be implemented, including descriptions of each entity involved with Plan implementation, a description of the duties and responsibilities for each of those entities, organizational structures, the administration and day-to-day operations required to implement the Plan, willing seller Preserve acquisition process and rules, and annual reporting responsibilities and reporting protocols.

9.2 Plan Permittees

The six Plan Permittees are the County of Sacramento, City of Galt, City of Rancho Cordova, Sacramento County Water Agency (SCWA), Capital Southeast Connector Joint Powers Authority (Connector JPA), and the Implementing Entity. Each of these agencies will be a Permittee on the ESA and CESA Incidental Take Permits that will provide authorization for

species take that results from Covered Activities that are implemented by the Plan Permittee, from Covered Activities implemented by third parties under the jurisdiction of a Land Use Authority Permittee (i.e., Sacramento County, City of Rancho Cordova, and City of Galt), or Covered Activities implemented by a Participating Special Entity under the jurisdiction of the SSHCP Implementing Entity.

As discussed below, each Plan Permittee will also be a signatory to the SSHCP Implementing Agreement (see Section 9.6), and will adopt an Implementation Ordinance or resolution (see Section 9.7.1). To implement the Plan, the Plan Permittees will form an Implementing Entity, as described in Section 9.3.1.

The six Plan Permittees are divided into three categories: Land Use Authority Permittees, Plan Partner Permittees, and the Implementing Entity. The roles and responsibilities for Land Use Authority Permittees and Plan Partner Permittees are defined in Sections 9.2.1 and 9.2.2, and the structure, roles, and responsibilities for the Implementing Entity are described in Section 9.3.1.

9.2.1 Land Use Authority Permittees

The three Land Use Authority Permittees are the County of Sacramento, City of Galt, and City of Rancho Cordova. Upon approval of the SSHCP by the Wildlife Permitting Agencies, the Plan Permittees will be issued ESA and CESA Incidental Take Permits for incidental take of Covered Species.

For Covered Activities conducted by a Land Use Authority Permittee, the Land Use Authority Permittee will be responsible for ensuring that the Covered Activity conforms to the requirements of the SSHCP and the ITPs, following the process for using take authorization as described in Chapter 10, SSHCP Permit Application Process).

The Land Use Authority Permittee will be responsible for determining when a Covered Activity that occurs within its jurisdiction, including one of its own projects, is eligible to use the SSHCP. If the Land Use Authority Permittee determines that a Covered Activity is eligible to use the SSHCP, the Land Use Authority Permittee can extend incidental take coverage provided by the Plan's ESA and CESA Incidental Take Permits to the Covered Activity within its jurisdiction, as part of the Land Use Authority Permittee's normal project-review process (e.g., grading permit issuance, California Environmental Quality Act (CEQA) certification).

Before extending Incidental Take Permit coverage to a Covered Activity, the Land Use Authority Permittee must receive confirmation in writing from the Implementing Entity that the project's proposed species and habitat take is consistent with the SSHCP "jump-start" and "stay-ahead" requirements (Section 9.4.6). Each Land Use Authority Permittee is also responsible for ensuring that the proposed project's design and construction is in compliance with all SSHCP requirements (see Chapter 10), and for ensuring that monitoring of required

SSHCP Avoidance and Minimization Measures (AMMs) (see Chapter 5, Covered Activities) occurs during project construction.

For each Covered Activity they approve, the Land Use Authority Permittee will be responsible for collecting all project information required for the SSHCP annual report (see Chapter 8, SSHCP Monitoring and Management Programs) and providing that information to the Implementing Entity.

Land Use Authority Permittees will be responsible for paying development fees related to their own projects and for approving Covered Activity projects and collecting development fees from Third-Party Project Proponents. As discussed in Section 1.1, Third-Party Project Proponents are private project applicants proposing to implement an SSHCP Covered Activity and seeking ministerial[1] or discretionary[2] project permits from one of the three Land Use Authority Permittees. See Chapter 12, Economics Analysis and Funding Program, for a description of the SSHCP development fee schedule.

Land Use Authority Permittees will provide the Implementing Entity copies of each approved project application package, whether it is their own application package or a Third-Party Project Proponent's application, for entry into the SSHCP Data Repository (see Section 9.8) and to provide information needed to prepare the required SSHCP annual report to the Permitting Agencies (Section 9.9).

Each Land Use Authority Permittee will adopt the SSHCP development fees as set by the SSHCP Implementing Entity (see Section 9.3.1). Each Land Use Authority Permittee will also be responsible for transferring to the Implementing Entity SSHCP development fees that are collected from Third-Party Project Proponents, and development fees will be collected for the Covered Activities they directly implement.

Land Use Authority Permittees will also have a special responsibility to assist with implementation of the SSHCP because of their authorities as land use agencies and as members of the Joint Exercise of Powers Authority (JPA) Governing Board (JPA Board) of the SSHCP Implementing Entity (see Section 9.3.1).

As discussed in Section 9.1 and described in detail in the Aquatic Resources Program (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report), the Land Use Authority Permittees have requested that USACE develop a multi-level CWA 404 permitting

[1] A ministerial permit is a permit that requires little to no judgment on behalf of the Land Use Authority Permittee. An example of a ministerial permit is a building permit where as long as a parcel is zoned to allow the building of a structure, the applicant only needs to follow building codes to construct their project.

[2] A discretionary permit is a permit that requires the use of judgment by a Land Use Permittee before the permit can be issued. An example of a discretionary permit is a permit for a general plan amendment.

process for Covered Activities. The Land Use Authority Permittees have also requested that RWQCB develop a process for Covered Activities to obtain Water Quality Certification under CWA 401 and to issue Reports of Waste Discharge under the California Porter-Cologne Act. In addition, the Land Use Authority Permittees have requested a master or a programmatic Streambed Alteration Agreement from CDFW for future Covered Activities that alter stream channels within the Plan Area.

The Land Use Authority Permittees will ensure that Covered Activities that they undertake and Covered Activities conducted by Third-Party Project Proponents are always consistent with the requirements of the SSHCP and the requirements of the Aquatic Resources Program. As discussed in the Aquatic Resources Program, the Land Use Authority Permittees will assist Third-Party Project Proponents in determining which CWA 404 permit vehicle can be used for each proposed Covered Activity.

Land Use Authority Permittees Responsibilities in Reviewing Third-Party Requests for Take Authorization

The Land Use Authority Permittees may extend Permit coverage to Third-Party Project Proponents who are proposing Covered Activities within their jurisdiction, provided that the projects or activities are designed and executed in accordance with all requirements of the SSHCP, the SSHCP Implementing Agreement, the terms and conditions of the Incidental Take Permits, the SSHCP Aquatic Resources Program, the proposed multi-level CWA 404 and CWA 401 permitting agreements for Covered Activities, and the Covered Activity Master Streambed Alteration Agreement proposed to CDFW. To use take authorization provided by the ESA and CESA Incidental Take Permits and the authorizations provided by the other SSHCP regulatory permits and agreements, a Third-Party Project Proponent must apply to the Land Use Authority Permittee with jurisdiction over the project (i.e., the City of Rancho Cordova, City of Galt, or County of Sacramento) as discussed in Chapter 10.

Each Land Use Authority Permittee will designate staff to assist Third-Party Project Proponents with questions regarding SSHCP requirements and the permit application process (see Chapter 10).

9.2.2 Plan Partner Permittees

The Sacramento County Water Agency and the Capital Southeast Connector Joint Powers Authority are the two "Plan Partner Permittees." The two Plan Partner Permittees are public agencies that participated in developing the SSHCP and will be permittees on the ESA and CESA Incidental Take Permits, but they do not have land use approval authority in the Plan Area. (The Incidental Take Permits will provide incidental take authorization directly to the Plan Partner Permittees. This means that these Plan Partner Permittees will not have to apply to the

County of Sacramento, the cities, or the Implementing Entity before they implement SSHCP Covered Activities.)

The Plan Partner Permittees cannot extend their take coverage to Third-Party Project Proponents or any other entity wishing to implement an SSHCP Covered Activity. Before implementing a Covered Activity, the Plan Partner Permittee must receive confirmation in writing from the Implementing Entity that the proposed species and habitat take is consistent with the SSHCP's jump-start and stay-ahead requirements (see Section 9.4.6). The Plan Partner Permittees will be responsible for transferring SSHCP fees for the Covered Activities they implement to the Implementing Entity.

Plan Partner Permittees will prepare and provide the Implementing Entity with copies of each project application package for projects that they implement for (1) review of species and habitat take amounts, (2) entry into the SSHCP Data Repository, and (3) preparing annual reports to the Permitting Agencies. Plan Partner Permittees will also be responsible for ensuring that the project design and construction fully complies with the Conservation Strategy (Chapter 7), monitoring all SSHCP avoidance and minimization requirements (see Chapter 5), and paying fees related to their own projects.

Plan Partner Permittees will also be eligible to use the proposed multi-level CWA 404 permitting process described in the Aquatic Resources Program to receive permit authorization to impact federal and state aquatic resources under Section 404 of the CWA and the CWA 401 permit strategy for Water Quality Certification, and to issue Reports of Waste Discharge under the California Porter-Cologne Act. In addition, Covered Activities implemented by a Plan Partner Permittee are eligible to use the proposed Master Streambed Alteration Agreement for SSHCP Covered Activities.

9.3 Implementation Structure

This section identifies all of the participants involved in implementation of the SSHCP, and provides an overview of each participant's responsibilities and duties.

9.3.1 Implementing Entity

The SSHCP Implementing Entity is a JPA called the South Sacramento Conservation Agency (Agency). The Joint Exercise of Powers Agreement that will form the Agency will be executed by the County of Sacramento, City of Galt, and City of Rancho Cordova (the Land Use Authority Permittees). The Agency is a distinct entity from its member authorities. See the Joint Exercise of Powers Agreement Creating the South Sacramento Conservation Agency.

The Implementing Entity oversees implementation of the SSHCP. The Implementing Entity will ensure that enough qualified staff is retained to accomplish all of the Implementing Entity's

responsibilities and duties. Staff for these positions may be hired by the Implementing Entity, or their functions can be contracted out to existing local agencies, nonprofit organizations, or private consultants. Staff or qualified consultants will be retained on an as-needed basis.

The Implementing Entity will hold title to Preserve lands or conservation easements it purchases, and will oversee any cooperative agreements with other entities that own and/or manage Preserves or conservation easements for the Implementing Entity as part of the SSHCP Preserve System. The Implementing Entity will provide funds for Preserve management and monitoring to those agencies and organizations with whom it contracts for such services.

The Implementing Entity will be a Permittee on the ESA and CESA Incidental Take Permits, and can use the Incidental Take Permits to implement its own Covered Activities. The Implementing Entity can also extend incidental take coverage to the Covered Activities proposed by Participating Special Entities. The Implementing Entity is the only Plan Permittee that can extend take coverage to Participating Special Entities. Participating Special Entities are defined in this section under the heading "Implementing Entity Responsibility in Reviewing Participating Special Entities Requests for Take Authorization."

The Implementing Entity cannot extend incidental take coverage to third-party projects that are under the jurisdiction of a Land Use Authority Permittee; all Third-Party Project Proponents seeking incidental take coverage must obtain approvals from the Land Use Authority Permittee with jurisdiction over that activity or project.

As with the other Plan Permittees, the Implementing Entity may use the proposed multi-level CWA 404 permitting process described in the Aquatic Resources Program (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report) to obtain CWA 404 permits authorizing impacts to federal and state aquatic resources and may use the agreement with RWQCB for Water Quality Certification under CWA 401 and issuance of Reports of Waste Discharge under the California Porter-Cologne Act, and may use the CDFW Master Streambed Alteration Agreement for future Covered Activities.

The Implementing Entity is composed of a JPA Board, an Implementation Committee, an Executive Director, and staff and/or outside consultants to help with day-to-day implementation of the Plan. The JPA Board is limited to the three Land Use Authority Permittees because only these three entities can exercise powers to levy land-use-related fees. The JPA Board will be subject to the requirements of the Ralph M. Brown Act and the Public Records Act.

The JPA Governing Board

The structure of the SSHCP Implementing Entity includes a JPA Board composed of three elected officials from the County of Sacramento, two elected officials from the City of Rancho Cordova, and one elected official from the City of Galt, for a total of six members. The JPA

Board may delegate its authority to administer the Plan to the Implementation Committee or to the Executive Director. However, the establishment or modification of development fees, hiring of the Executive Director, approval of the Implementing Entity's annual budget and annual report, approval of the purchase of easements or other interests in land to form the SSHCP Preserve System, and the resolution of disputes among Plan Permittees regarding implementation of the Plan or disputes with Third-Party Project Proponents must remain the responsibility of the JPA Board and cannot be delegated to others. The JPA Board will also act as the arbitrator should decisions made by the Implementation Committee or Executive Director be challenged.

The Implementation Committee

The Implementation Committee will assist the JPA Board with any implementation duties that the JPA Board sees fit to assign to it. Each Plan Permittee will select a member to represent them on the Implementation Committee. Members will include a single representative from each of the three Land Use Authority Permittees and the two Plan Partner Permittees, for a total of five members. The Implementation Committee will meet at least once every 2 months.

The Implementation Committee is responsible for, but not limited to, the following actions:

- Making recommendations to the JPA Board regarding the adoption or modification of SSHCP development fees
- Making recommendations to the JPA Board of annual operating and capital budgets of the Implementing Entity
- Making recommendations regarding hiring the Executive Director
- Approving, acquiring, selling, or exchanging interests in land or easements that are owned by the SSHCP Agency
- Approving modifications to the SSHCP Preserve Resource Management Plan
- Approving applications submitted by Participating Special Entities for coverage under the Plan Permits[3]
- Approving annual reports prior to submittal to the JPA Board
- Establishing committees or subcommittees to help implement the Plan

[3] The Implementing Entity will only approve applications submitted by Participating Special Entities. As described in more detail under the heading "Implementing Entity Responsibility in Reviewing Participating Special Entities Requests for Take Authorization," Participating Special Entities are organizations that do not require permits from Land Use Authority Permittees, such as school districts, reclamation districts, irrigation or water districts, sewer districts, utilities, other land use jurisdictions that are not local Land Use Authority Permittees (e.g. City of Elk Grove), etc. When a Land Use Authority Permittee has jurisdiction over a project, that project must be processed through the appropriate Land Use Authority Permittee.

The Implementation Committee will seek input from the TAC (see Section 9.3.4) through the Executive Director prior to approving SSHCP land management and monitoring plans.

The Executive Director and Plan Staff

An Executive Director and Plan staff will oversee day-to-day implementation of the SSHCP. However, many of the tasks necessary to implement the SSHCP can be contracted to outside parties such as consultants, nonprofit organizations, and contract agencies that specialize in certain functions that are required to be performed as part of Plan or permit requirements. Staff and/or contractors will be hired on an as-needed basis. The Executive Director will seek input from the TAC (see Section 9.3.4) prior to approving land or easement acquisitions.

The Implementing Entity will use specialists as needed to ensure proper implementation of the tasks listed below. It is anticipated that the Implementing Entity will employ staff or contract with consultants to fill the following Plan implementation roles:

- **An Executive Director** dedicated to Plan implementation and directs all the activities of the Implementing Entity. The Executive Director will ensure that all the tasks listed previously under "The Implementation Committee" are implemented, and will report to the JPA Board. The Executive Director will also oversee Plan Permittees to ensure compliance with the SSHCP requirements, the terms of the permits, and the Implementing Agreement on behalf of all Plan Permittees. Finally, the Executive Director will serve as the primary link between the JPA Board, the Implementing Committee, Implementing Entity staff, Plan Permittees, each Permitting Agency, and the general public.
- **A Program Manager** with biological resource expertise will help direct all natural resource aspects of Plan implementation, including land and aquatic resource management, monitoring, and the adaptive management program. The Program Manager or designees will collect and analyze species and environmental data as required by the Plan, stay informed of current scientific methods and concepts, and provide continuous oversight of the monitoring and adaptive management program (e.g., monitoring methods, study designs) to ensure that the Preserve System incorporates the most appropriate strategies with the latest technology and best management practices. The Program Manager will oversee the work products of consultants or outside entities that are employed to help with implementing the SSHCP. The Program Manager will oversee Preserve Managers and be responsible for communication with external scientists, including Wildlife Agency scientists and the larger conservation science community. The Program Manager will also encourage relationships with Wildlife Agency and academic scientists to facilitate collaborations that will contribute to implementation of the SSHCP

Conservation Strategy. During the early stages of SSHCP implementation, the Program Manager may also function as the Preserve Manager.

- **One or more Preserve Managers** may provide on-site management of individual SSHCP Preserves to implement individual Preserve Management Plans. Each Preserve Manager will be a qualified biologist with resource management experience. A Preserve Manager may be assigned to a region of the SSHCP Preserve System and may oversee multiple individual Preserves or Preserve parcels.
- **A real estate specialist** will be needed as the Implementing Entity conducts financial and legal analyses to guide selection of parcels for the Preserve System, and conducts or manages appraisals and transactions. The real estate specialist will have expertise in real estate law, zoning, and local regulations to fulfill the fiduciary duties of the Implementing Entity for its properties. The Implementing Entity may work with real estate specialists from other local organizations to acquire land to fulfill the Conservation Strategy. Also, Plan Permittees may already have staff with these skills; the Implementing Entity could partner with other Plan Permittees to obtain these real estate skills.
- **An accountant** will be responsible for developing and monitoring budgets, processing invoices, managing financial reserves, identifying cost savings, and managing administrative contracts (e.g., liability insurance). The Implementing Entity must also track expenditures and cash flow and establish and maintain an internal accounting system and procedures. Plan Permittees may already have staff with these skills and could partner with the Implementing Entity to manage the SSHCP budget.
- **A GIS specialist** will use GIS or other equivalent spatially explicit database systems to collect, store, and use relevant spatial data necessary for Plan implementation. The GIS specialist will also maintain the database to track compliance and guide Preserve design, monitoring, and adaptive management programs. For example, the Implementing Entity must be able to query the database to summarize take and conservation by year and cumulatively. The Implementing Entity will track all data related to the progress of meeting Plan goals and objectives.
- **A database specialist** will maintain the SSHCP Data Repository (Section 9.8 and Chapter 8). The database specialist will have a background in biometrics and statistics, and will participate in the development of the Preserve System Management Program and the SSHCP Monitoring Program.
- **Legal counsel** will provide guidance during Plan implementation on an as-needed basis for drafting and reviewing conservation easements, reviewing land purchases, assisting with land transaction negotiations, assisting with legal challenges, and assisting with easement violations if they occur. To the extent possible, in-house attorneys for the Plan Permittees may provide legal counsel to the Implementing Entity. However, certain

circumstances may require specialized third-party legal assistance. Financial analysis assistance will be required periodically to review the program's cost/revenue balance and ensure that SSHCP fees are adjusted with changing land costs and inflation.

Tasks associated with Plan implementation by the Executive Director and Plan staff will include the following:

- Identifying parcels suitable for SSHCP land acquisition or conservation easements
- Preparing SSHCP Preserve land or easement acquisition proposals
- With the approval of the JPA Board, executing acquisitions of SSHCP Preserve lands or easements
- Approving requests by permittees Third-Party Project Proponents, or Participating Special Entities to provide mitigation in lieu of fees[4]
- Approving re-establishment/establishment of wetland sites
- Monitoring and enforcing the conditions of SSHCP conservation easements established on private lands
- Preparing the Preserve Resource Management Program, including the land management toolbox described in Chapter 8, for approval by the Implementation Committee
- Preparing and implementing individual SSHCP Preserve Management Plans consistent with the Preserve Resource Management Program
- Implementing SSHCP Resource Management Programs that have been approved by the Implementation Committee
- Identifying needs for adaptive management actions and implementing as necessary, and monitoring the effects of adaptive management actions, as described in Chapter 8
- Preparing proposals for re-establishment and establishment of species habitat and aquatic resources for approval by the Permitting Agencies, and implementing re-establishment and establishment Covered Activities
- Tracking take of species, species habitat, and loss of aquatic resources caused by implementation of Covered Activities
- Tracking preservation of species occurrences, species habitat, and aquatic resources to establish the SSHCP Preserve System in the Plan Area

[4] There are five projects within the Urban Development Area (UDA) where hard line preserves have been identified and are assumed as part of the SSHCP conservation strategy. These preserves are considered pre-approved under the SSHCP (see Appendix K) and therefore do not require approval by the Implementing Entity other than to ensure that the preserve boundaries and other SSHCP requirements are consistent with the SSHCP.

- Maintaining a data repository of the monitoring data described in Chapter 8 and other relevant information
- Monitoring actions of Plan Permittees, Third-Party Project Proponents Covered Activities, and Participating Special Entities to ensure compliance with the SSHCP, Implementing Agreement, and permits, and notifying Plan Permittees if actions are not in compliance
- Collecting SSHCP development fees from Participating Special Entities and Plan Permittees
- Managing and tracking SSHCP development fees received from Participating Special Entities and Plan Permittees
- Managing the non-wasting SSHCP endowment or contract for management of the endowment (see Chapter 12)
- Managing and tracking Preserve monitoring and management costs and other Plan implementation costs
- Tracking impacts of all Covered Activities in a way that detects when any impact-cap or other Permit limit is being approached
- Tracking that the 2% "stay-ahead" requirement (see Section 9.4.6) is being met for all seven land cover type groupings and reviewing project application packages before approving take for each Covered Activity and Covered Activity project
- Managing and tracking information as required by the SSHCP's In-Lieu Fee Program (see Section 9.3.3)
- Preparing permit compliance, effects, and effectiveness monitoring reports that compile and analyze annual information from all Plan Permittees, and providing these to Permitting Agencies on schedule
- Developing agreements or contracts with parties for Implementation Committee approval to acquire Preserve land, conservation easements, or mitigation or conservation bank credits
- Developing agreements or contracts with parties for Implementation Committee approval to assist in SSHCP Preserve management
- Entering into contracts and agreements with owners and operators of existing mitigation banks or conservation banks
- Entering into contracts with consultants, non-profit organizations, and other entities to assist in implementation of the SSHCP
- Reviewing design surveys and pre-construction surveys of third-party projects by Plan Permittees (see Chapter 5 and Chapter 10)

- Assisting the other five Plan Permittees with questions regarding SSHCP requirements
- Creating tools for Plan Permittees to use in their application review and project assessment process (e.g., checklists, template planning survey report, fee calculator)
- Collaborating and exchanging information with the committees formed under this Plan

Implementing Entity Responsibilities in Reviewing Third-Party Requests for Take Authorization

The Implementing Entity's primary role for projects proposed by Third-Party Project Proponents under the jurisdiction of Land Use Authority Permittees will be to ensure that take availability remaining on the Incidental Take Permits is sufficient to permit that project, to review surveys that are required by the third-party project, and to approve dedications in lieu of paying SSHCP fees. The Implementing Entity will not be involved in processing third-party requests for take authorization. Requests for third-party take authorization will be the sole responsibility of the Land Use Authority Permittee that has jurisdiction over the project. The Implementing Entity will provide tools for Plan Permittees to use in their application review and project assessment process (e.g., checklists, template planning survey report, and fee calculator). However, when a Land Use Authority Permittee does not have land use authority over a Third-Party Project Proponent, the Implementing Entity will be responsible for reviewing SSHCP applications and approving third-party project proposals.

The Implementing Entity will also track the amount of take by land cover type resulting from all Covered Activities, including third-party Covered Activities approved by Land Use Authority Permittees. The Implementing Entity must track impacts of all Covered Activities in a way that detects when a permit impact cap is being approached. This includes permit caps on habitat impacts or take of species occurrences, as well as tracking the amount of impact relative to the amounts of jump-start and stay-ahead mitigation that is already established in the SSHCP Preserve System (see Section 9.4.6). The Implementing Entity will notify all Plan Permittees when any impact cap is imminent and what procedures should be followed to ensure that each cap is not exceeded. In addition, the Implementing Entity will provide advice, upon request, to the Land Use Authority Permittees (cities and the County of Sacramento) as they process third-party applications for take, and will promote coordination among Plan Permittees to ensure that the Plan is being implemented consistently and effectively.

Implementing Entity and Permitting Agency Coordination when Reviewing Third-Party Requests for Take Authorization

The Implementing Entity will coordinate with the Permitting Agencies concerning the following:

- Approval of Preserve land in lieu of paying SSHCP fees (Section 9.4.4, Land Dedication In Place of SSHCP Fees). The Land Use Authority Permittees must forward such offers

to the Implementing Entity. If the Implementing Entity approves, then the Implementing Entity will forward the offer to the Permitting Agencies for review and approval.

- Approval of re-establishment/establishment of wetlands in lieu of paying development fees. The Land Use Authority Permittees must forward such offers to the Implementing Entity for review and approval. If the Implementing Entity approves, then the Implementing Entity will forward the offer to the Permitting Agencies for review and approval.
- Review and approval, of all Stream and/or Preserve Setback modifications or exceptions. The Land Use Authority Permittees must request setback modifications or exceptions from the Permitting Agencies. Third-Party Project Proponents must request setback modifications or exceptions from a Land Use Authority Permittee.

Implementing Entity Responsibility in Reviewing Participating Special Entities Requests for Take Authorization

Entities that are not subject to the regulatory authority of a local Land Use Authority Permittee (e.g., school districts, reclamation districts, irrigation or water districts, sewer districts, utilities, other land use jurisdictions that are not local Land Use Authority Permittees) may wish to receive incidental take coverage under the Plan. The Implementing Entity may extend incidental take authorization to these Participating Special Entities if the proposed project or activity is an SSHCP Covered Activity defined in Section 5.2 or is an activity that meets the criteria for Covered Activities in Section 5.1, and the project or activity is consistent with all of the requirements of the SSHCP. Participating Special Entities will enter into an agreement with the Implementing Entity that conditions the project or activity to all terms and conditions of the SSHCP and the Implementing Agreement.

To use the SSHCP permits, a Participating Special Entity must file an application with the Implementing Entity in a form requested by the Implementing Entity (see Chapter 10). The Participating Special Entity applicant will be responsible for all costs associated with processing the application and any costs of the Implementing Entity in administering, monitoring, and enforcing the terms of the agreement.

9.3.2 Wildlife Agencies

As discussed in Chapter 1, USFWS and CDFW (collectively, the Wildlife Agencies) are responsible for issuing ESA and CESA Incidental Take Permits.

The role of the Wildlife Agencies is to monitor Plan compliance and notify the Implementing Entity as soon as possible if the Plan is not being implemented in compliance with the Incidental Take Permit, Implementing Agreement, or the SSHCP (Section 9.10.6).

The responsibilities and duties of the Wildlife Agencies include the following:

- Participating on the SSHCP TAC/Interagency Review Team (IRT) (see Sections 9.3.3 and 9.3.4)
- Reviewing and approving SSHCP monitoring protocols
- Reviewing and approving any modifications to SSHCP AMMs
- Reviewing and approving SSHCP habitat re-establishment/establishment plans
- Reviewing and approving SSHCP monitoring plans
- Reviewing and approving SSHCP Preserve Management Plans
- Reviewing and approving SSHCP adaptive land management actions
- Reviewing and approving SSHCP proposed land dedications[5]
- Reviewing SSHCP proposed land and easement acquisitions, land dedications,[6] and acquisition of mitigation or conservation bank credits

Ongoing communication and coordination between the Implementing Entity and the Wildlife Agencies will be essential to ensure proper implementation of the SSHCP. The Wildlife Agencies may attend meetings of the JPA Board or the Implementation Committee, and will be a sitting member on the TAC (see Section 9.3.4). Additional coordination meetings between Wildlife Agency staff and Implementing Entity staff and/or Plan Permittee staff may also be necessary to address any issues that may arise concerning implementation of the Plan, and to keep the Wildlife Agencies informed of progress related to various requirements of Plan implementation. These meetings will be held on an as-needed basis.

The Wildlife Agencies will review each SSHCP annual report prepared by the Implementing Entity to confirm compliance with all requirements of the SSHCP, Implementing Agreement, and the Incidental Take Permits or other agreements. During this review, the Wildlife Agencies will also evaluate and determine how to respond to activities or adaptive management proposed by the Implementing Entity for the next year (see discussion of SSHCP annual reports in Section 9.9).

Role of Wildlife Agencies in Reviewing Third-Party Requests for Take Authorization

The Wildlife Agencies will not be involved in approving individual Covered Activities, including Covered Activities proposed by Third-Party Project Proponents. The Plan Permittees are not required to transmit copies of third-party project application packages (Chapter 10) to the

[5] There are five projects within the UDA where hard line preserves have been identified and are assumed as part of the SSHCP conservation strategy. These preserves are considered pre-approved under the SSHCP (see Appendix K) and therefore do not require approval by the Wildlife Agencies other than to ensure that the preserve boundaries are consistent with the SSHCP Conservation Strategy.

[6] See preceding note.

Wildlife Agencies prior to approval of the project by Plan Permittees. However, individual project application packages will be provided to the Wildlife Agencies at their request.

In compliance with the Incidental Take Permit terms and conditions, the Plan Permittees and the Third-Party Project Proponents will ensure that Wildlife Agency personnel are given appropriate access to any Covered Activity project site, any mitigation site, or other areas where Covered Activities are conducted, and will allow Wildlife Agency staff to verify compliance with SSHCP requirements.

The Wildlife Agencies may want to review project application packages prior to Plan Permittee approvals for projects that border an existing Preserve or border an SSHCP planned Preserve, or projects that include a wildlife crossing structure. In addition, the Wildlife Agencies may wish to review master plan documents (see Section 5.5.1) for consistency with the SSHCP. The review can be conducted at TAC meetings or separately. The Wildlife Agencies will review these projects in accordance with time limits applicable to each Land Use Authority Permittee.

9.3.3 Other State and Federal Permitting Agencies

As discussed in Chapter 1, USACE is proposing a multi-level permitting process under CWA 404 for future SSHCP Covered Activities. RWQCB would also develop a process to issue a Water Quality Certification under CWA 401 and a program to issue a Report of Waste Discharge under the California Porter-Cologne Act for future SSHCP Covered Activities. The SSHCP will also seek a master Streambed Alteration Agreement from CDFW under the California Fish and Game Code, Section 1600 et seq., for future SSHCP Covered Activities.

The role of these state and federal Permitting Agencies is to monitor compliance with aspects of the SSHCP related to the Aquatic Resources Program (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report) and to notify the Implementing Entity as soon as possible if implementation is not in compliance with the aquatic resources permitting strategy prepared for the SSHCP (Section 9.10.6).

The responsibilities and duties of the aforementioned state and federal Permitting Agencies differ based on their permitting processes, but generally include the following:

- Participating on the TAC/IRT (see below)
- Reviewing and approving all SSHCP aquatic habitat re-establishment/establishment plans
- Reviewing and approving SSHCP monitoring protocols related to aquatic habitat re-establishment/establishment

- Reviewing and approving modifications to SSHCP AMMs related to aquatic habitat re-establishment/establishment
- Reviewing and approving SSHCP monitoring plans related to aquatic resources re-establishment/establishment
- Reviewing SSHCP adaptive land management actions related to aquatic resources re-establishment/establishment

Ongoing communication and coordination between the Implementing Entity and all Permitting Agencies will be essential to ensure proper implementation of the permitting process. The Permitting Agencies may attend meetings of the JPA Board or the Implementation Committee and will be a permanent member on the TAC (see Section 9.3.4).

Additional coordination meetings between Permitting Agency staff and Implementing Entity staff and/or Plan Permittee staff may also be necessary to address any issues that arise concerning implementation of the Aquatic Resources Program, and to keep the Permitting Agencies informed of progress related to various requirements of Plan implementation. These meetings will be held on an as-needed basis.

As discussed in Chapter 1, one of the benefits of the SSHCP is to provide "one stop shopping" that allows a Third-Party Project Proponent to pay one fee that will fund multiple permitting processes for their Covered Activity project (see Chapter 12 for a discussion of SSHCP fees). To allow the Land Use Authority Permittees to collect a fee to compensate for impacts to aquatic resources, the Plan Permittees elected to establish, as a component of the SSHCP fee structure, an In-Lieu Fee Program pursuant to the Federal Mitigation Rule (33 CFR 332). The In-Lieu Fee Program will ensure proper implementation, tracking, and reporting of fees collected to implement CWA 404 compensatory mitigation projects (i.e., aquatic resources re-establishment and establishment). Aquatic resource re-establishment and establishment projects will be paid for through development fees that the Land Use Authority Permittees Implementing Entity will collect from qualifying Third-Party Project Proponents that implement a Covered Activity. The Implementing Entity is responsible for ensuring that the compensatory mitigation requirements associated with Covered Activities are implemented.

Pursuant to the 2008 USACE Final Mitigation Rule, an Interagency Review Team (IRT) must be established to direct the implementation of compensatory mitigation projects, including compensatory mitigation site selection, project prioritization, and project execution. As discussed in Section 9.3.4, the TAC will function as the SSHCP IRT. The role of the TAC/IRT is to review and approve compensatory mitigation projects that re-establish or establish aquatic resources. The TAC/IRT includes standing members who participate in discussions about all compensatory mitigation projects. The Plan Permittees propose that the TAC function as the

IRT. As such, participation by USACE, U.S. Environmental Protection Agency, and RWQCB at the TAC is necessary when the meeting agenda includes discussion of compensatory mitigation projects.

Deadlines for Permitting Agencies to review compensatory mitigation projects are necessary to ensure that the process occurs in a timely manner; otherwise, significant delays could jeopardize these projects and ultimately the ability of the Implementing Entity to implement the Conservation Strategy. The Permitting Agencies will review compensatory mitigation projects and provide comments to the Implementing Entity within 30 days of their receipt. The Implementing Entity will incorporate changes to the proposals based on comments received by the Permitting Agencies and provide copies of the final proposal to the Permitting Agencies within 15 days.

The Permitting Agencies will review each SSHCP annual report prepared by the Implementing Entity and other Plan Permittees to confirm compliance with all requirements of the SSHCP, Implementing Agreement, and Incidental Take Permits or other agreements. During this review the Permitting Agencies will also evaluate and determine how to respond to activities or adaptive management proposed by the Implementing Entity for the next year (see discussion of SSHCP annual reports in Section 9.9).

Role of Permitting Agencies in Reviewing Third-Party Requests for Take Authorization

The Permitting Agencies will not be involved in approving individual Covered Activities, including most Covered Activities proposed by Third-Party Project Proponents. The Plan Permittees are not required to transmit copies of most third-party project application packages (Chapter 10) to the Permitting Agencies prior to approval of the project by Plan Permittees. However, individual project application packages will be provided to the Permitting Agencies at their request. In compliance with the Incidental Take Permit's terms and conditions, the Plan Permittees and the Third-Party Project Proponent will ensure that Permitting Agency personnel are given appropriate access to any Covered Activity project site or other areas where Covered Activities are conducted, and will allow Permitting Agency staff to verify compliance with SSHCP AMMs or other SSHCP requirements.

9.3.4 Technical Advisory Committee/Interagency Review Team

A TAC/IRT will be formed to provide a forum for the Plan Permittees, the Executive Director, and the Permitting Agencies to discuss and review specific components of Plan implementation.

The responsibilities and duties of the TAC/IRT include the following:

- Reviewing and approving SSHCP Preserve Monitoring Plans

- Reviewing and approving SSHCP Preserve Management Plans
- Reviewing and approving SSHCP property transactions for satisfying the Conservation Strategy such as land or easement acquisitions, purchase of conservation or mitigation bank credits, land dedications, and gifts of land
- Reviewing and approving SSHCP habitat re-establishment/establishment plans
- Reviewing and approving SSHCP success criteria for habitat and wetland re-establishment/ establishment projects
- Reviewing and approving SSHCP species monitoring protocols, including appropriate reference sites
- Reviewing and approving SSHCP adaptive land management actions
- Reviewing and approving modifications to SSHCP AMMs
- Ranking land or easement acquisitions for priority
- Reviewing relevant new scientific studies and reports for applicability in preserve management
- Advising on other scientific issues as identified by the Executive Director

As discussed previously in Section 9.3.1, the JPA Board or Implementation Committee is ultimately responsible for approving the aforementioned plans and actions, and the Permitting Agencies will have approval authority over those plans and actions. Plans or actions not approved by the Permitting Agencies will not be submitted by the Executive Director to the Implementation Committee or the JPA Board for approval.

The TAC will be composed of Implementing Entity staff, including the Executive Director, one member from each of the Plan Permittees, and one member from each of the Permitting Agencies. Other entities with expertise in any of the topics to be discussed by the TAC, including representatives of the building industry, the agricultural community, the scientific community, and the environmental community, will also be invited to participate in TAC meetings. In addition, there are several conservancies and resource protection agencies that operate within the Plan Area and are implementing plans with similar objectives to the SSHCP. Individuals from these organizations will likely be able to provide guidance and expertise based on their experiences monitoring and managing similar landscapes.

The Implementation Committee will form the TAC within 6 months of the SSHCP permit issuance. TAC meetings will be determined by the Executive Director based on the needs of the Plan.

9.3.5 Public Input

Successful implementation of the SSHCP depends on continued public support. It is the intent of the Plan Permittees to provide ample opportunities for public participation in and input on implementation of the SSHCP. Meetings of the JPA Board and the Implementation Committee will be open to the public, and comments will be solicited at these meetings. The public is also welcome to contact the Implementing Entity for information concerning implementation and operation of the SSHCP. In addition, the Implementing Entity will maintain a website to provide the public with information about SSHCP implementation. The SSHCP document and appendices, Implementing Agreement, Incidental Take Permits, and other permits and agreements will be available on the public website. In addition, each SSHCP annual report will be posted to the Implementing Entity's website.

Annual Public Workshops

The Implementing Entity will host an annual public workshop on the status of SSHCP implementation. That year's annual report will serve as the foundation for each public workshop. The workshop is an opportunity to examine how SSHCP implementation is functioning from various perspectives, including progress toward each SSHCP biological objective and goal and the financial status of the Plan. The workshop will provide the public with the opportunity to ask questions and to provide input to the Implementing Entity.

9.3.6 Dispute Resolution

All parties involved in implementation of the SSHCP are obligated to work together to ensure efficient and effective implementation of the SSHCP. However, should the Implementing Entity and the Permitting Agencies disagree on how to implement the SSHCP, the Implementing Entity will follow the dispute resolution process outlined in the Implementing Agreement (Appendix C).

9.4 Preserve Acquisition

This section describes the process that the Implementing Entity will use to acquire properties or easements to implement the SSHCP Preserve System described in Chapter 7. Many criteria will be considered when making land or easement acquisition decisions. Some of the key criteria for land or easement acquisitions, such as price and availability, will vary as the SSHCP Preserve System develops and as other circumstances change.

9.4.1 Willing Sellers

Land will only be acquired by the Implementing Entity for the SSHCP Preserve System from willing sellers. At no time will the Implementing Entity use condemnation or eminent domain to require landowners to sell their property to fulfill the SSHCP Conservation Strategy. In addition,

the Implementing Entity will not support or enter into any agreements or contracts where condemnation will be or has been used by another party to acquire land or easements.

It is possible that one or several landowners who own key resources of interest to the Implementing Entity will refuse to sell, or that negotiations to sell will fail. It is impossible to predict where this may occur and in what context it will occur (e.g., how much of the Preserve System has been acquired, the extent of resources remaining to protect). This situation, if it occurs, is only expected to occur near the end of the Permit Term, when most or all of the development impacts will likely have occurred; consequently, any delays in land acquisition associated with a lack of willing sellers will affect few Covered Activities. This situation can be avoided if the Implementing Entity begins negotiations with key landowners early in the SSHCP Permit Term. A review of progress toward land acquisition goals will take place at least annually with each annual report submitted to the Permitting Agencies.

9.4.2 Process for Acquisition of Preserve Land

The Implementing Entity will acquire properties within the Plan Area by fee title or by conservation easement to preserve species habitat consistent with the requirements in Chapter 7. Prior to the acceptance or purchase of Preserve land, the Implementing Entity will determine the land's suitability for meeting the biological goals and objectives of the SSHCP and for advancing the Conservation Strategy. Lands acquired must do the following:

- Contribute to meeting one or more Biological Goals and Measurable Objectives of the Plan and the overall Biological Goals of the SSHCP Conservation Strategy, as described in Chapter 7.
- Contain biological functions and values that when protected will contribute to meeting the Conservation Strategy of the SSHCP. Permanent protection must be ensured through a conservation easement consistent with the requirements of Section 9.4.3 by some other permanent dedication of land to the Preserve System.
- Be managed in perpetuity according to a Preserve Management Plan as described in Chapter 8. Land acquisitions may be counted toward meeting the obligations of the Plan before a Preserve Management Plan has been completed if the Implementing Entity owns the land, or if the property owner is bound by a conservation easement or other agreement that requires preparation of a land management plan consistent with the requirements described in Chapter 8. Management in perpetuity will be ensured through the conservation easement or title record.
- Not be below sea level.
- Not be an existing preservation site already being used for mitigation.

The Implementing Entity will take the following steps when reviewing and considering any fee title or conservation easement acquisition, in addition to any steps required to comply with applicable federal and state laws governing real estate transactions:

1. The Implementing Entity will determine landowner interest in selling an easement or selling in fee title and will approach the property owner with a proposal to acquire land through conservation easement or fee title.
2. The Implementing Entity will obtain a title report to determine if there are encumbrances that might exclude property from acquisition. Properties with encumbered water rights or surface mineral rights that cannot be subordinated to a conservation easement or habitat protection interest will be excluded from acquisition unless these encumbrances do not influence the integrity of the proposed Preserve. A Phase I survey with an environmental determination document for the presence of hazardous materials will be included with the title report.
3. The Implementing Entity will examine any existing leases on the property for compatibility with the land management and Biological Goals and Measurable Objectives of the SSHCP, including water and surface mining rights. Inconsistent leases must be terminated or modified to conform to the Plan.
4. The Implementing Entity will conduct an appraisal.
5. The Implementing Entity will prepare a Pre-Acquisition Preserve Documentation Report (PDR) (see Appendix G, Preserve Management and Monitoring Details) for the Pre-Acquisition PDR template. The Pre-Acquisition PDR will assess the baseline inventory of SSHCP land cover types (see Chapter 10), species known occurrences, availability of water for future Preserve maintenance, existing and historical management practices on the property, and general ecological health and functions of the property.
6. The Implementing Entity will identify and rank property acquisitions, via the TAC. Ranking will be based on the potential to achieve targeted SSHCP objectives and meet Preserve acquisition criteria (see Section 7.5, Description of the Conceptual SSHCP Preserve System), and based on cost relative to the parcel's ability to meet the SSHCP Biological Goals and Measurable Objectives. Properties that fulfill more difficult-to-achieve Biological Goals and Measurable Objectives will receive higher priority, such as a property that will provide Preserve linkages, has known occurrences of a plant Covered Species, or supports an important SSHCP land cover type with limited available inventory.
7. The Implementing Entity will prepare a land acquisition proposal.
8. The Implementing Entity will prepare an easement document (for conservation easements) or a deed (for acquisitions in fee title).

9. The Implementing Entity will prepare an offer for the landowner's consideration and negotiate the terms of the acquisition.
10. The Implementing Entity will record a conservation easement on the acquired property.
11. The Implementing Entity will prepare an Initial Preserve Management Plan (see Chapter 8). The Initial Preserve Management Plan will incorporate the existing management methods of the acquired property, ensuring that changes to preserve management are not made without cause.

As described in Chapter 7, it will be necessary for the Implementing Entity to purchase some lands in fee title. Fee title ownership allows more intensive habitat management than would otherwise be possible on lands held under a conservation easement. Fee title acquisition is preferred for SSHCP Preserves within the Urban Development Area (UDA) to allow for more intensive management of those Preserves, given their proximity to threats from existing and planned future development. As discussed below, all interests in land owned in fee title by the Implementing Entity and all conservation easements will be protected in perpetuity.

9.4.3 Conservation Easements

All lands acquired for the SSHCP Preserve System will need a conservation easement, even lands that are held in fee title by the Implementing Entity. Within the UDA, most of the SSHCP Preserve System is expected to be held in fee title by the Implementing Entity. Outside the UDA, the Implementing Entity intends to minimize the amount of fee title acquisition for the SSHCP Preserve System. Therefore, most of the SSHCP Preserve System outside the UDA will be in the form of conservation easements where the land is not owned by the Implementing Entity. Easement acquisition offers advantages over fee title acquisition in that it promotes partnerships between private landowners and the SSHCP, continues beneficial ranching and farming operations in the Plan Area, keeps land in private ownership, and generally costs less to acquire.

Conservation easements will be negotiated individually between willing sellers and the Implementing Entity. The terms of the easement and prices paid for easements will be variable depending on the purpose of the easement and the degree to which the easement restricts land uses.

The Implementing Entity will hold in perpetuity all conservation easements it purchases or accepts from a landowner. In addition, all conservation easements will have a third-party enforcement beneficiary (CDFW and/or USFWS). Conservation easements will contain provisions that allow the Implementing Entity to manage the encumbered property if it becomes necessary, such as if a property is abandoned by the owner. On lands owned in fee title by the Implementing Entity, conservation easements will be held by an SSHCP Permitting Agency such as CDFW or USFWS.

All conservation easements acquired by the SSHCP Implementing Entity will be in accordance with California Civil Code Sections 815 et seq. All conservation easements will follow the easement templates found in Appendix D, including restrictions on use. The SSHCP will include at least two types of conservation easements: one for Rangeland and one for Cropland/Irrigated Pasture. Reasonable variations from the template may be allowed to address site-specific constraints. CDFW and USFWS, along with the Implementing Entity, must review and approve any modifications to the template easement.

All conservation easements shall exclude the area already encumbered by right-of-way easements and public utility easements and the area necessary to implement future roadway widening or new roadways, along with all appurtenances consistent with the current General Plans of the Land Use Authority Permittees. The conservation easement should also consider the appropriate setbacks from the future right-of-way/public utility easement to maintain the integrity of a Preserve.

Reselling Acquired Lands after Establishing Conservation Easements

The Implementing Entity expects to purchase a maximum of 15% of the Preserve System located outside of the UDA in fee title and the remaining approximately 85% of the Preserve System located outside the UDA in easements. However, if conservation easements are not available, but fee title option are, the Implementing Entity may purchase more than 15% of the lands needed to establish the Preserve System outside the UDA in fee title. If more than 15% of the Preserve System is acquired in fee title, the Implementing Entity will eventually attempt to sell properties to private landowners until fee title holdings amount to no more than 15%. Properties sold to privative landowners will be encumbered with a conservation easement.

Easements on Public Lands

Several publicly owned parcels within the Plan Area offer the potential to contribute to implementation of the SSHCP Preserve System. Should a public entity decide to encumber all or a portion of its properties with an SSHCP conservation easement, land dedication credits will be granted to that public entity in accordance with Section 9.4.4. Land dedication credits will be granted once sites on existing public lands are placed under a conservation easement that is consistent with the easement requirements described in this chapter.

Agricultural Enhancements on Easements

Landowners who sell easements on lands that become part of the Preserve System and who engage in farming activities are eligible for monetary payments for the purpose of agricultural enhancement. These payments can only be used to improve the property that is under conservation easement and must be shown to provide a beneficial use to Covered Species.

Examples of what the payments can be used for include the installation or repair of wells, fences, barns, drainage/irrigation systems; demolition of structures, and clearing of land that does not impact wetland or riparian resources. To be eligible for the Agricultural Enhancement Program the easement must include the terms of using the monetary payments and will include a list of all improvements that are approved for the property. The list of improvements can be amended from time to time with the approval of all signatories to the easement.

9.4.4 Land Dedication in Place of SSHCP Fees

A Third-Party Project Proponent may wish to dedicate land to the Implementing Entity for inclusion in the SSHCP Preserve System to satisfy the land acquisition component or re-establishment/ establishment component of the project's SSHCP development fee requirements (see Chapter 12 regarding fees). If a Third-Party Project Proponent wishes to dedicate Preserve land (to meet either the land preservation or re-establishment/establishment measures of the Plan) and the Implementing Entity and the Permitting Agencies determine that the proposed land dedication is consistent with the SSHCP Conservation Strategy, then this land dedication can offset all or part of the SSHCP land acquisition or re-establishment/establishment fees required. SSHCP fees not associated with land acquisition (e.g., administration and land management fees) are still required and must be paid by the Third-Party Project Proponent. Likewise, if a Third-Party Project Proponent wishes to dedicate land to satisfy re-establishment/establishment measures, then the re-establishment/establishment fee component, with the exception of monitoring and management costs, will be waived.

Lands proposed for dedication must comply with the SSHCP Conservation Strategy. In addition, land cannot be integrated into the SSHCP Preserve System unless adequate water rights and all surface mining rights can be secured. Surface mining is not compatible with the objectives of the SSHCP, and sufficient water for conservation/natural preserve purposes is necessary to implement management actions required under the SSHCP. The Implementing Entity and the Permitting Agencies will evaluate each property proposed for dedication on a case-by-case basis, as follows:

- Third-Party Project Proponents will prepare a Pre-Acquisition PDR (see Chapter 10), including a biological letter report (see Chapter 10). Third-Party Project Proponents will pay the cost of preparing the Pre-Acquisition PDR, including a Phase I site assessment, appraisal, and title search. If the Third-Party Project Proponent wishes to use the property for re-establishment/establishment, it must prepare a re-establishment/establishment plan (Chapter 8) for review and approval by the Implementing Entity and Permitting Agencies.
- The Implementing Entity will determine whether the proposed land dedication and any re-establishment/establishment plan meets the SSHCP's Conservation Strategy described in Chapter 7. Third-Party Project Proponents must provide the Implementing Entity and

the Permitting Agencies access to the proposed dedication property to survey the site and verify its biological value to the SSHCP Conservation Strategy.

- The Implementing Entity will use the Pre-Acquisition PDR to determine the acreage of SSHCP land cover types present on the subject property, and the suitability of the land cover types and property for inclusion in the SSHCP Preserve System.
- The Implementing Entity will use the re-establishment/establishment plan to determine compliance with the SSHCP Conservation Strategy, including AMMs and conservation action selection criteria.
- The Implementing Entity will evaluate whether the acres of SSHCP land cover types present on the subject property is less than, equal to, or in excess of required mitigation (see SSHCP Land Cover Credits) for the Third-Party Project Proponent's Covered Activities.
- For re-establishment/establishment proposals, the Third-Party Project Proponent will monitor and manage the re-established/established site to ensure that the habitat meets minimum success criteria, as determined by the TAC (Chapter 8). The Implementing Entity and Permitting Agencies will evaluate the performance of the re-established/ established land cover type to determine if the property can be used to satisfy the SSHCP Conservation Strategy requirements.

SSHCP Land Cover Credits

SSHCP Land Cover Credits are acres of land dedicated by project proponents that are in excess of the land acquisition or re-establishment/establishment acres required for mitigation for project impacts. Land Cover Credits shall be generated only when the Implementing Entity makes a written determination that the land proposed to be dedicated is consistent with the SSHCP's Conservation Strategy and suitable for assembly into the Preserve System. Fee credits shall accrue on an acre-for-acre basis by land cover type, with one fee credit or fraction thereof allowed for each acre of land cover type that is dedicated to the Preserve System. Land Cover Credits will be counted toward the stay-ahead provision of the Conservation Strategy (Section 9.4.6).[7]

Before a property is dedicated by fee title or by conservation easement, the Implementing Entity will provide the project proponent with a statement of the acres and types of SSHCP land covers, if any, the Implementing Entity determines can be SSHCP Land Cover Credits. Within 10 business days after acceptance of the property and recordation of an easement to the satisfaction of the Implementing Entity, the Implementing Entity will issue a dated SSHCP Land Cover

[7] Re-established/established acreage can only be counted toward the "stay-ahead" provision after the re-established/established habitat has met SSHCP success criteria.

Credit Certificate to the project proponent that sets forth the acres of each SSHCP Land Cover Credit in the rest of the property.

Future Uses of Land Cover Credits

Project proponents can use SSHCP Land Cover Credits for their future Covered Activities in the Plan Area. Impacts to a specific SSHCP land cover type can only be offset using credits of the same SSHCP land cover type. Mitigation requirements for re-establishment/establishment of an SSHCP land cover type can only be offset with SSHCP Land Cover Credits for re-establishment/establishment of the impacted land cover type. If project proponents wish, they can sell their SSHCP Land Cover Credits to the Implementing Entity or another project proponent wishing to implement a Covered Activity in the Plan Area. However, SSHCP Land Cover Credits may only be used to offset the land acquisition component or re-establishment/establishment component of the SSHCP fee payment, and the project will still be required to pay all other applicable SSHCP fees (Chapter 12).

9.4.5 Early Enrollment Program

Under the Early Enrollment Program, the Implementing Entity will broker agreements with willing landowners to place a temporary easement to encumber properties needed for the SSHCP Preserve System. The Implementing Entity will pay landowners for the easement or fee-title acquisition at a future date as development fees are available. The process for evaluating properties for easements or future fee-title acquisition is described in Section 9.4.3. Early enrollment properties will be prioritized based first on the Implementing Entity's need for the property at the time (e.g., contains land cover types or modeled species habitat that is in short supply, is needed to create a linkage between other Preserve parcels), and second on the order in which the property was enrolled in the program. The temporary easements will become permanent easements when the property is added to the SSHCP Preserve System. The use of temporary easements to protect properties provides the landowner with assurances that, should the property not be needed by the SSHCP, the easement can be extinguished. The Plan Permittees anticipate that all properties enrolled in the Early Enrollment Program will become part of the Preserve System and will consist of permanent easements. Early enrollment properties can be used by the Implementing Entity to satisfy the stay-ahead provision (Section 9.4.6).

Properties that are brought into the Early Enrollment Program will continue to be managed by the landowner to maintain the habitat value of the property. The Implementing Entity will take responsibility for managing and monitoring these lands once the property is placed under a permanent conservation easement.

Basic components of the Early Enrollment Program are as follows:

1. ***Land Preserve.*** Property owners who enter the Early Enrollment Program must agree to land use restrictions that preserve the subject property's habitat values. The property owner will also agree to make the property available to the Implementing Entity in the future for acquisition in fee title or conservation easement.
2. ***Early Enrollment Program Documents.*** Three documents will be required to enroll properties in the program:
    a. ***Preserve Documentation Report.*** Because lands brought into the Early Enrollment Program are intended to become part of the Preserve System, the Implementing Entity will prepare a Pre-Acquisition PDR, including a Biological Letter Report (see Section 10.4.3, Components of the SSHCP Project Application Package), Phase I site assessment, appraisal, and title search. The Implementing Entity will evaluate each property to ensure that it is consistent with the Conservation Strategy described in Chapter 7.
    b. ***Option to Purchase or Use as Mitigation.*** The landowner will grant the Implementing Entity an option agreement on the land that will allow its acquisition in fee title or conservation easement.
    c. ***Temporary Easement.*** Land will be secured under a temporary easement that requires the landowner to maintain the habitat values of the property until the Implementing Entity has purchased a permanent easement on the property.
3. ***Purchase of Early Enrollment Properties by the Implementing Entity.*** The Implementing Entity will acquire the property (or buy a permanent easement) when SSHCP fees become available. The price paid for a property cannot exceed available SSHCP fees.
4. ***Final Disposition of Preserve Lands.*** Any lands that have not been purchased to fulfill mitigation requirements may be purchased by the Implementing Entity at the end of the option agreement term.

9.4.6 Jump-Start and Stay-Ahead Provisions

The SSHCP requires and the Implementing Entity will ensure that progress toward assembling the SSHCP Preserve System will always stay ahead of Covered Activity impacts. This will ensure that Preserve assembly will keep pace with development and that the Implementing Entity is making steady progress toward assembling the entire SSHCP Preserve System. This will satisfy California Fish and Game Code Section 2081(b), which requires that impacts to state-listed species be fully mitigated in advance of the impacts. This will also satisfy the federal ESA,

which requires that Habitat Conservation Plans (HCPs) minimize and mitigate the impacts of taking "to the maximum extent practicable," and requires that the taking "will not appreciably reduce the likelihood of the survival and recovery of any Covered Species in the wild" (ESA Section 10(a)(2)(B)(ii)). In preparing permit decision documents, USFWS will consider whether the mitigation proposed under the SSHCP is scientifically and rationally related to the impacts of the proposed taking, and will consider temporal losses resulting from the time of impacts relative to the time that the conservation benefits of the mitigation are in place.

HCPs that are also Natural Community Conservation Plans must follow the rough step requirement, which can allow land acquisition to fall behind the pace of impacts. The SSHCP improves upon that process by implementing two provisions: the "jump-start" and "stay ahead" provisions. Prior to implementation of SSHCP Covered Activities, the Implementing Entity will protect SSHCP land cover types and Covered Species habitat in advance of impacts, called the jump-start provision (Section 9.4.6.2). The jump-start provision will ensure that there is enough Preserve area and habitat benefits to fully offset the initial habitat loss and species take expected when the Plan is first implemented. The jump-start provision will apply to all SSHCP land cover types.

Over the term of the permit, the Implementing Entity will maintain a "cushion" of mitigation that is established in advance of impacts, called the stay-ahead provision (Section 9.4.6.3). The stay-ahead provision includes maintaining a cushion that provides species habitat and known occurrences and nest sites for certain species. The stay-ahead provision will avoid temporal impacts to Covered Species that occur when mitigation is delayed from the time that impacts occur to when the associated mitigation benefits are available to the species (e.g., environmental benefits resulting from Preserve management, habitat enhancement, and habitat re-establishment activities).

9.4.6.1 Land Cover Type Groupings for Jump-Start and Stay-Ahead Provisions

The jump-start and stay-ahead provisions will place the 17 SSHCP "natural" land cover types (see Chapter 3, Biological Resources Setting) into seven groups (Table 9-1). By grouping SSHCP land cover types, the Implementing Entity is afforded the flexibility to meet the stay-ahead provision based on the best easement/land acquisition opportunities available rather than being limited by separate acreage goals for each of the 17 land cover types. Land cover types were grouped based on species habitat needs.

Table 9-1
Land Cover Types by Land Cover Category

Land Cover Grouping	Land Cover Types in the Grouping	Land Cover Types Acceptable for Acquisition to Meet Jump-Start-Stay Ahead Provision
Valley Grassland	Valley Grassland	Valley Grassland Valley Grassland (Vernal Pool Ecosystem)
Vernal Pool	Vernal Pool	Vernal Pool
Other Vernal Pool Invertebrate Habitat	Swale Stream/Creek (Vernal Pool Invertebrate Habitat)	Swale Stream/Creek (Vernal Pool Invertebrate Habitat)
Other Wetland	Seasonal Wetland Freshwater Marsh Stream/Creek Open Water	Seasonal Wetland Freshwater Marsh Stream/Creek Open Water
Riparian	Mixed Riparian Woodland Mixed Riparian Scrub Mine Tailing Riparian Woodland	Mixed Riparian Woodland Mixed Riparian Scrub
Agricultural	Cropland Irrigated Pasture-Grassland Orchard Vineyard	Cropland Irrigated Pasture-Grassland
Oak Woodland	Blue Oak Woodland Blue Oak Savanna	Blue Oak Woodland Blue Oak Savanna

The acres of land cover mitigation and acres of species modeled habitat mitigation specified in the Conservation Strategy (Chapter 7) will not be affected by the groupings. All of the mitigation acres identified in Chapter 7 will eventually be obtained by the Implementing Entity before the end of the Permit Term and regardless of the stay-ahead provisions or use of these land cover groups to measure compliance with the SSHCP jump-start and stay-ahead provisions.

The jump-start and stay-ahead provisions of the SSHCP Conservation Strategy can be achieved in whole or in part by the dedication of land or acquisition of fee title or easements (Sections 9.4.2, 9.4.3, 9.4.4), or the acquisition of credits from a Permitting Agency–approved conservation bank or mitigation bank (Section 9.4.8).

Temporary easements can be counted toward the jump-start and stay-ahead provisions; however, in the event that the temporary easement expires, that land can no longer be counted toward satisfying these provisions.

9.4.6.2 The Jump-Start Provision

To eliminate the chances of mitigation falling behind impacts at the outset of Plan implementation, the Implementing Entity will acquire at least 5% of the preservation required for each land cover by the SSHCP Conservation Strategy before Incidental Take Permits are issued by the Wildlife Agencies. See Table 9-2 for the total acres that must be acquired per grouping before Incidental Take Permits are issued.

For example, the Conservation Strategy requires preservation of 22,014 acres of Valley Grassland land cover type over the term of the permits. Before the Incidental Take Permits are issued, the SSHCP Implementing Entity will preserve at least 5% of 22,014 acres, or 1,100 acres, of Vernal Pool Grassland land cover to meet the jump-start provision.

The Implementing Entity will acquire the minimum acreage of each land cover grouping as prescribed in Table 9-2.

Table 9-2
Jump-Start Provision Acreage Requirements (at Permit Issuance)

Land Cover Grouping	Total Acres of Required Preservation by Land Cover Grouping[a]	Initial Acreage Required (before Permit Issuance) to Meet Jump-Start Provision (i.e., 5% of Required Preservation)
Valley Grassland	22,014	1,100[b]
Vernal Pool	966	48
Other Vernal Pool Invertebrate Wetland Habitat[c]	304	15
Other Wetland[d]	504	25
Agricultural	9,696	484
Riparian	964	48
Oak Woodland	47	2

[a] Based on the sum of required preservation for each land cover type (refer to Table 7-2) that is comprised by the land cover grouping.
[b] This 1,100 acres must be preserved within the Vernal Pool Ecosystem (Chapter 3, Section 3.2.3).
[c] Includes all Swale and Stream/Creek (Vernal Pool Invertebrate Habitat) habitat that is considered invertebrate habitat.
[d] Includes Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water.

9.4.6.3 The Stay-Ahead Provision

Over the 50-year Permit Term, the stay-ahead provision will maintain a "cushion" of preserved Covered Species modeled habitat and re-established/established modeled habitat for the SSHCP vernal pool invertebrate Covered Species. The stay-ahead provision requires that the Implementing Entity maintain enough Preserve land to be at least 2% ahead of the remaining preservation required for each SSHCP land cover grouping by the SSHCP Conservation Strategy at all times. This means that each project proposing to use the SSHCP must be checked against the stay-ahead provision prior to issuing Incidental Take Permits to

ensure that the project does not result in stay-ahead preserve land dropping below the 2% threshold. The Early Enrollment Program will provide a mechanism for the Implementing Entity to implement the stay-ahead provision.

For example, if half of the Incidental Take Permit's 22,014-acre maximum impact cap on Valley Grassland cover type has been used by Covered Activities, 11,007 acres of impact to Valley Grassland can still occur. At this stage of implementation, 11,007 acres of Valley Grassland would be required to mitigate the remaining 11,007 acres of impact (1:1 ratio). In this case, 2% of 11,007 acres, or approximately 220 acres, of Valley Grassland habitat must be preserved in advance of impacts to maintain the stay-ahead provision before any additional impacts to Valley Grassland habitat is allowed.

The status of the stay-ahead requirements for each land cover grouping will be discussed in each SSHCP annual report (see Section 9.9, Reporting). On an ongoing basis, the Implementing Entity will determine if at least 2% of the remaining mitigation requirements for each of the seven habitat categories is preserved ahead of impacts.

The stay-ahead provision also applies to colonies of tricolored blackbird (*Agelaius tricolor*) occurrences and the five plant Covered Species: Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), dwarf downingia (*Downingia pusilla*), legenere (*Legenere limosa*), pincushion navarretia (*Navarretia myersii*), and Sanford's arrowhead (*Sagittaria sanfordii* Green). As discussed in Chapter 7, prior to impact to an occurrence of a plant Covered Species, at least one occurrence of the same species must be preserved.

9.4.6.4 Process if the Stay-Ahead Provision Is Not Being Met

The Implementing Entity is responsible for monitoring compliance with the stay-ahead provision on an ongoing basis as take coverage is extended to Covered Activities. As discussed in Section 9.2.1, the Plan Permittees will provide the Implementing Entity with information from each project application package, including the projected acres of impacts that are expected to occur to each land cover type and species modeled habitat if a project were to be implemented.

Because the Implementing Entity will be monitoring compliance with the stay-ahead provision as information from each project application is submitted, it is unlikely that the Plan will ever drop below the 2% threshold for any land cover type group. However, if the Implementing Entity determines that the amount of impact that is anticipated to occur will exceed the stay-ahead provision's 2% threshold for any land cover group, then the Implementing Entity will notify the Plan Permittees that SSHCP fee payments cannot be accepted out of concern that the 2% threshold will be exceeded, and immediately notify the Permitting Agencies. The Implementing Entity will convene a meeting with Plan Permittees and Permitting Agencies to discuss strategies to stay in

compliance with the stay-ahead provision, including the acquisition of additional Preserve land. The fee suspension will be lifted as soon as the Implementing Entity and the Permitting Agencies agree that the SSHCP is no longer at risk of noncompliance with the stay-ahead provision.

While SSHCP fee payments are suspended, take coverage can still be extended to Covered Activities if the Plan Permittees or Third-Party Project Proponents dedicate land in lieu of fees, or show proof of acquisition of appropriate conservation or mitigation bank credits within the Plan Area (see Section 9.4.8).

The status of the stay-ahead provision will be addressed in each annual report (see Chapter 8). See Section 9.10.6 and the SSHCP Implementation Agreement for more information regarding the process to remedy potential noncompliance with the SSHCP and the permit terms and conditions.

9.4.7 Gifts of Land

In the event that property is donated or gifted to the SSHCP Implementing Entity by another entity or an estate, the Implementing Entity will determine if the land is consistent with the SSHCP Conservation Strategy. If it is consistent, the property will be added to the SSHCP Preserve System.

If the property is determined to not be consistent with the SSHCP Conservation Strategy, the Implementing Entity will discuss with the donor if the land can be sold and the proceeds used to implement the SSHCP Conservation Strategy. If the land does not meet the SSHCP Conservation Strategy and its sale is restricted or prohibited, then the Implementing Entity will not accept the property.

Gifted properties must be monitored and managed consistent with the SSHCP monitoring and management guidelines and protocols as discussed in Chapter 8 of this document. While gifted lands can be used to satisfy the SSHCP Conservation Strategy, they will not be used to satisfy the mitigation needs of any project. Gifted lands should also be considered in the context of Appendix J, Voluntary Additional Conservation. Prior to accepting gifts of land, the Implementing Entity must identify a source of funding to pay for the long-term endowment that is necessary to monitor and manage the property.

9.4.8 Private Conservation or Mitigation Banks

A conservation or mitigation bank is privately or publicly owned land that is permanently protected and managed for its natural resource values. The Implementing Entity may choose to purchase credits from a conservation or mitigation bank located within the Plan Area to satisfy the requirements of the SSHCP Conservation Strategy, including the jump-start and stay-ahead provisions. Conservation and mitigation banks used for the SSHCP must be approved by

USFWS and/or CDFW (and USACE if the bank is also selling jurisdictional wetland credits). The Implementing Entity will establish agreements with Plan Area conservation and mitigation banks to expedite use of the banks for SSHCP purposes. Banks that are physically located outside of the Plan Area, but where the bank's service area extends into the Plan Area, cannot be used to mitigate for Covered Activities under the Plan. Banks used for the SSHCP must meet all requirements of the SSHCP Conservation Strategy, Monitoring Plan, and Management Program as determined by the Implementing Entity and the Permitting Agencies.

Nothing within the SSHCP prohibits the creation of new conservation or mitigation banks in the Plan Area. The SSHCP also does not prohibit existing Plan Area conservation or mitigation banks from selling credits to projects located inside or outside the Plan Area.

9.4.9 Grazing Leases, Licenses, or Contracts within the Preserve System

As discussed in Chapter 8, livestock grazing will be used to help manage Covered Species habitat on several SSHCP land cover types in the Preserve System. Existing grazing leases or licenses on properties that are acquired as part of the Preserve System will remain in effect, and the current grazing regime will be continued until a Preserve Management Plan can be prepared and approved by the Implementing Entity and Wildlife Agencies (Chapter 8). Once a Preserve Management Plan has been approved, the Implementing Entity will review the terms of the existing grazing lease or license for consistency with the Preserve Management Plan. If deemed necessary by the Implementing Entity, the existing lease or license will be made consistent with the Preserve Management Plan until the end of the lease or license period to the extent feasible.

When properties are acquired without a preexisting grazing lease or license and an approved Preserve Management Plan calls for grazing, the Executive Director will enter into a lease agreement or license with a livestock operator that includes the requirements of the Preserve Management Plan. As discussed in Chapter 8, the Preserve Management Plan will specify the timing, stocking rates, duration of grazing, and residual dry matter standards. The Preserve Management Plan will be reviewed annually with the livestock operator. In some instances, a livestock operator may not realize an economic benefit from grazing on the land, and compensation to the livestock operator may be necessary.

The Preserve Management Plan will also identify the responsibilities of each party in terms of maintaining Preserve infrastructures (e.g., fences), controlling weeds and pests, and reporting. The Preserve Management Plan will include the following conditions of agricultural use and covenants to be incorporated by reference into contracts, leases, and licenses to protect resources:

- Grazing capacity and stocking rates
- Evaluation of fencing of riparian areas

- Residual dry matter guidelines
- Conditions under which the desired stocking rate can be changed or exceeded (e.g., seasonal adjustments to maintain habitat quality and annual adjustments in response to rainfall)
- Grazing and livestock practices
- Pest control restrictions
- Reporting requirements

9.5 Easements on Setbacks

9.5.1 Preserve Setbacks

As required by AMM EDGE-3, projects that occur adjacent to existing and planned Preserves in the UDA are required to establish minimum Preserve Setbacks to protect Covered Species habitat and occurrences. Preserve Setbacks will be established concurrent with issuance of development permits for projects adjacent to planned or existing Preserves (Section 9.5.1). Refer to Chapter 5, Section 5.2.5, for Covered Activities allowed in Preserve Setbacks.

Setback Requirements for Proposed Projects Adjacent to Existing or Planned Preserves

The following lists the land use requirements for projects adjacent to Preserve Setbacks. Compliance with each requirement will be enforced by the Land Use Authority Permittee with jurisdiction over the proposed project.

- Each Preserve Setback will be encumbered by a Preserve Setback easement that gives the Implementing Entity the ability to enforce restrictions on Covered Activities within the Preserve Setback in perpetuity (refer to Section 5.2.5 and Appendix D, Sample Easement). The Preserve Setback easement will require development of a Preserve Setback Management Plan by the Implementing Entity in cooperation with the project proponent and the TAC. The Preserve Setback Management Plan will be compatible with the Preserve Management Plan for the adjacent Preserve (Chapter 8).
- Any discretionary review of a proposed project by a Land Use Authority Permittee, including rezones, conditional use permits, variances, parcel and subdivision maps, boundary line adjustments, development plan review, and design review, will ensure that sufficient area exists outside of the minimum 50-foot-wide Preserve Setback to accommodate primary and accessory structures, paved areas, septic systems, and other uses or activities that might affect the Preserve Setback.
- Any new lot created that contains land within an existing Preserve Setback must be conditioned as follows: The portion of the lot within the Preserve Setback must be

permanently restricted by an easement (Appendix D) held by the SSHCP Implementing Entity or another approved public or private land conservation organization that has the ability to provide adequate protection and prevent adverse impacts within the Preserve Setback. The final map will not be recorded, and no activity, including issuance of grading permits for ground disturbance and/or construction, will be allowed prior to providing proof of an easement to the Land Use Authority. Easements will remain tied to the land, and will move from deed to deed as the land is transferred from one owner to another.

- For building lots that exist as of the date of the issuance of SSHCP Incidental Take Permits, but for which a building permit or a preliminary site plan approval has not been obtained or is no longer valid, the required minimum front, side, and rear structural setbacks may extend into the Preserve Setback, provided that an easement is applied that prohibits clearing or construction in the Preserve Setback.

Preserve Setback Fee Calculations

The area within a Preserve Setback will not be counted when calculating SSHCP fees for project impacts, except where allowed Preserve Setback Covered Activities (e.g., bike paths) occur. Preserve Setbacks will not be used to mitigate impacts to SSHCP Covered Species modeled habitat.

9.5.2 Stream Setbacks

As required by AMM STREAM-1, AMM STREAM-2, and AMM STREAM-3, projects that occur adjacent to certain stream corridors are required to establish minimum setbacks to protect riparian ecological functions and maintain water quality. Land that is set aside to satisfy these setbacks cannot be used to offset SSHCP fees, but will not be assessed fees (unless a Covered Activity is allowed to occur within the setback) (see Chapter 5, Section 5.2.6, for Covered Activities allowed in Stream Setbacks). Refer to AMM STREAM-1, AMM STREAM-2, and AMM STREAM-3 in Section 5.4.1 for minimum Stream Setback requirements.

Nonconforming Structures and Uses within Stream Setbacks

Legally existing but nonconforming structures and uses of land within Stream Setbacks may be continued. Encroachment into the setback will only be allowed where previous allowable (i.e., permitted or otherwise legal) development or disturbance exists. Existing impervious surfaces within the setbacks that resulted from previous allowable disturbances or developments will not be expanded. If a legally existing but nonconforming use has been discontinued for a period of more than 90 days, it will not thereafter be re-established, with the exception of agricultural uses that are following prescribed best management practices for crop rotation. However, resumption of agricultural uses must be strictly confined to the extent of disturbance existing at the time of adoption of the SSHCP.

Land Use Requirements for Covered Activities within Stream Setbacks

The following lists the land use requirement for Covered Activities within Stream Setbacks (Chapter 5, Section 5.2.6).

- Any discretionary review of a proposed project by a Land Use Authority Permittee, including rezones, conditional use permits, variances, parcel and subdivision maps, boundary line adjustments, development plan review, and design review, will ensure that sufficient area exists outside of the Stream Setback to accommodate primary and accessory structures, paved areas, septic systems, and other uses or activities that might interfere with the functioning of the stream.
- Any new lot created that contains land within a setback must be conditioned as follows: The portion of the lot within the setback must be permanently restricted by an easement (Appendix D) held by the SSHCP Implementing Entity or another approved public or private land conservation organization that has the ability to provide adequate protection and to prevent adverse impacts within the setback. The final map will not be recorded, and no activity, including issuance of grading permits for ground disturbance and/or construction, will be allowed prior to submittal of easement to the Land Use Authority. Easements will run with the land and be binding on the property owner and successors.
- Any lands proposed for development in the UDA that include all or a portion of a Stream Setback will, as a condition of any major subdivision or major site plan approval, provide for vegetation or re-vegetation of any portions of the setback that are not vegetated at the time of the application or that were disturbed by prior land uses. Vegetation will include native or natural tree and plant species for that SSHCP land cover type, consistent with the AMMs in Section 5.4.1 (e.g., trees will not be planted in Grassland land covers).
- For building lots that exist as of the date of adoption of the SSHCP, but for which a building permit or a preliminary site plan approval has not been obtained or is no longer valid, the required minimum front, side, and rear structural setbacks will extend into the Stream Setback, provided that an easement is applied that prohibits clearing or construction in the Stream Setback.
- Roads and road crossings that must run through the Stream Setback will be designed consistent with the road design AMMs found in Section 5.4.1. An analysis will be conducted by Third-Party Project Proponents and approved by the Implementing Entity or Land Use Authority Permittee to ensure that no economically feasible alternative to locating the road in the Stream Setback is available.

Small Lot Waivers for Stream Setbacks

Waivers are primarily intended to provide relief to property owners of small lots (10 acres or smaller) where setback conditions may constrain the use of their property to a point that it is not usable consistent with existing land use entitlements.

A waiver for the Stream Setback may be granted by the Land Use Authority Permittee and with the consent of the Implementing Entity under the following conditions:

- A preexisting lot (defined as existing as of the date the SSHCP is formally adopted) for which there is insufficient room outside the Stream Setback for uses permitted by the underlying zoning and for which there is no other reasonable or prudent alternative to placement in the setback, including obtaining variances from setback or other requirements that would allow conformance with the setback requirements
- An economic hardship whereby an applicant demonstrates to the Land Use Authority Permittee's satisfaction that the subject property is not capable of yielding a reasonable economic return as a result of unique circumstances specific to the subject property, as follows:
    - An economic hardship related to or arising from the characteristics of the property due to the particular physical surroundings, shape, or topographical conditions of the property involved, rather than the personal situations of the applicant or the result of any action or inaction by the applicant or the owner or predecessors in title
    - The necessity of acquiring additional land to locate development outside the Stream Setback will not be considered an economic hardship unless the applicant can demonstrate that there is no adjacent land that is reasonably available or could be obtained, used, expanded, or managed to fulfill the basic purpose of the proposed activity
- For reasons of public health and safety, if the following is demonstrated to the satisfaction of the Land Use Authority Permittee:
    - The proposed project will serve an essential public health or safety need or
    - The proposed use is required to serve an existing public health or safety need, and
    - There is no alternative available to meet the established public health or safety need
- Those developments that have had setbacks applied in conformance with previously issued requirements

A Stream Setback waiver will only be granted if it is shown that the activity is in conformance with all applicable local, state, and federal regulations, and that the waiver granted is the minimum relief necessary to relieve the hardship.

The Third-Party Project Proponent will submit a written request for a Stream Setback waiver to the Land Use Authority Permittee or Implementing Entity if a Land Use Authority Permittee does not have oversight of the project or if the project is to be implemented by one of the Plan Permittees. The written request will include specific reasons justifying the waiver and any other information necessary to evaluate the proposed waiver request. The Land Use Authority Permittee or Implementing Entity may require an alternative analysis that clearly demonstrates that no other feasible alternatives exist and that minimal impact would occur as a result of the project or development.

In granting a request for a Stream Setback waiver, the Land Use Authority Permittee or the Implementing Entity may require project design features in addition to the applicable AMMs, including site design, landscape planting, fencing, signs, and water quality best management practices to reduce adverse impacts on water quality, streams, vernal pools and other wetlands, floodplains, and other sensitive resources.

All Stream Setback waivers that have been approved by a Land Use Authority Permittee will be subject to review and comment by the Implementing Entity and Permitting Agencies. The Implementing Entity and Permitting Agencies will have 30 days to respond in writing to a complete request for a waiver. If the Implementing Entity or Permitting Agencies do not agree with the granting of a waiver by the Land Use Authority Permittee, a meeting will be convened to discuss options that are available to the Third-Party Project Proponent.

Fees for Impacts in Stream Setbacks

The area within a Stream Setback will not be counted as impacted when calculating SSHCP fees for project impacts, except where allowed Stream Setback Covered Activities (e.g., bike paths) occur. Stream Setbacks will not be used to mitigate impacts to SSHCP Covered Species modeled habitat.

9.6 SSHCP Implementing Agreement

Implementing Agreements are recommended by USFWS for large-scale HCPs that address significant portions of a species range, for HCPs with long-term mitigation and monitoring programs, and for HCPs that include complicated conservation programs.

The purpose of the SSHCP Implementing Agreement is to ensure that all parties understand their roles and responsibilities under the HCP, the Endangered Species Act Section 10(a)(1)(B) Incidental Take Permit, and the California Endangered Species Act Incidental Take Permit, and to provide remedies should any party fail to fulfill its obligations. Accordingly, an Implementing Agreement was prepared for the SSHCP (Appendix C). This Implementing Agreement specifies the responsibilities of each party, how the Plan Permittees will ensure that the SSHCP

Conservation Strategy will be implemented, how reporting and enforcement procedures will be implemented, and various other provisions agreed to by the parties.

The Implementing Agreement references material already presented in the SSHCP document. As a result, the SSHCP and the Implementing Agreement have been made as consistent as possible. In the unlikely event that there are questions on the requirements of the SSHCP during Plan implementation, the content of permits prevail first, then the content of the Implementing Agreement, and finally the content of SSHCP document, as described in the Implementing Agreement (Appendix C). The Implementing Agreement may have to be amended to accommodate amendments to the SSHCP. Modifications to the Implementing Agreement would be made by agreement of the signatories in accordance with the terms of the Implementing Agreement.

9.7 Ordinances and Resolutions

9.7.1 Implementing Ordinance or Resolution

Each Plan Permittee, including the Implementing Entity, must adopt an implementing ordinance or resolution to formally incorporate the SSHCP, Implementing Agreement, and ESA and CESA Incidental Take Permits into its project review and approval procedures (see Appendix H). The ordinance or resolution will help ensure consistent implementation of the SSHCP, Implementing Agreement, and permits, and will provide the primary legal mechanism through which the Plan Permittees will implement the SSHCP.

The implementing ordinance or resolution must be adopted by each Plan Permittee before any Covered Activities occur, or before take coverage can be extended to Covered Activities proposed by third parties. The format and adoption process for the implementing ordinance or resolution can conform to the needs of the individual jurisdictions, and there may be terms of the ordinance or resolution that reflect the jurisdiction-specific terms of the SSHCP and Implementing Agreement. However, the implementing ordinances or resolutions will contain common required language to ensure consistent implementation of the SSHCP. The ESA and CESA Incidental Take Permits will be contingent upon adoption of local implementing ordinances or resolutions by the Plan Permittees. The Implementing Agreement and the permit terms and conditions will specify that the Incidental Take Permits are contingent upon the adoption of these implementing ordinances or resolutions. This will allow the Permitting Agencies to make a finding that the SSHCP will be implemented as described in the SSHCP document, and will be adequately funded in perpetuity, contingent upon the adoption of the implementing ordinances or resolutions.

9.7.2 Aquatic Resources Protection Ordinance

Each Plan Permittee, including the Implementing Entity, must adopt a Wetland Protection Ordinance. The purpose of the ordinance is to ensure compliance with the Aquatic Resources Program (Appendix I of the SSHCP Environmental Impact Statement/Environmental Impact Report) prepared as part of the SSHCP. The ordinance will also assure, through its enforcement provisions, no-net-loss of aquatic function and services; streamline aquatic resource permitting in a coordinated fashion; and satisfy the requirements of the federal CWA (Sections 404 and 401), California Fish and Game Code Section 1600, and the Porter-Cologne Act.

This Wetland Protection Ordinance will regulate all aquatic resources within the SSHCP Plan Area as defined by the Aquatic Resources Program for the SSHCP. The ordinance must be adopted by each Plan Permittee before any Covered Activities or fill of wetlands occur. The format and adoption process for the Wetland Protection Ordinance can conform to the needs of the individual jurisdictions. However, the ordinances will contain common required language to ensure consistent implementation of the Aquatic Resources Program prepared as part of the SSHCP.

9.7.3 "Catch-Up Fee" Ordinance

Each Land Use Authority Permittee will adopt a catch-up-fee ordinance that addresses the unusual circumstance when a Third-Party Project Proponent pays required SSHCP development fees prior to Land Use Authority Permittee issuance of an SSHCP permit, and the SSHCP development fee is thereafter increased. If this occurs, the Third-Party Project Proponent will be required to pay a "catch-up" fee to ensure that the fee paid is consistent with the fee structure at the time of SSHCP permit issuance.

Third-Party Project Proponents will be notified of the need to pay the catch-up fee by the appropriate Land Use Authority Permittee, or by the Implementing Entity when a Land Use Authority Permittee does not have jurisdiction over the project. It is the Implementing Entity's responsibility to notify Land Use Authorities of pending fee increases.

9.8 Data Repository Development and Maintenance

The Implementing Entity will develop and maintain a comprehensive SSHCP data repository to track permit compliance and all other aspects of the SSHCP, including results of land management and monitoring. The data repository will group and search separate SSHCP databases that contain all monitoring data (Chapter 8) and project-specific data. It will allow the Implementing Entity to query data from different databases from a central interface and more easily prepare SSHCP annual reports (Chapter 8). The initial data repository will be operating within 12 months to track permit compliance after all local implementing ordinances or resolutions take effect. The data repository will be structured by the Implementing Entity

Database Specialist (Section 9.3.1) to be "user friendly," such that a trained staffer (as opposed to a technician or programmer) can enter data. Additionally, the data repository will allow for future expansion and integration with an external database (e.g., linkage to agency or other GIS map libraries). Outside users may contact the Implementing Entity with data requests. The Implementing Entity expects to develop a simple form that can be completed for each request and sent electronically to the Implementing Entity. Depending on the request, access could be granted to the data repository, or data from a specific time period could be provided. The data repository will be structured to facilitate the following requirements:

- Data documentation such that future users can determine why, how, and where data were collected (documentation standards (i.e., metadata about the data) should be consistent for all types of monitoring and over time; adequate documentation will facilitate the future use of monitoring data)
- Quality assurance and quality control of the data
- Access and use of the most current information in assessment and decision making (the database will allow repeated access to current and past information over time)
- Storage of spatial information in a GIS-linked or similar database
- Data queries and reports

The types of information for which the data repository will be developed and maintained include the following:

- Status of Covered Activities, including implementation and impacts on Covered Species
- Status of SSHCP preservation/establishment/re-establishment measures
- SSHCP funding and expenditures
- SSHCP Baseline Land Cover Map
- Inventory of available SSHCP land cover types
- AMM implementation and monitoring
- Preserve monitoring, including species surveys and monitoring the results of adaptive management decisions
- Compliance with the stay-ahead provision (Section 9.4.6.3)
- Adopted changes to the SSHCP document, including administrative changes, minor amendments, and major amendments
- All reports and documents generated by the Implementing Entity or the Plan Permittees related to the SSHCP

After the first year of implementation, the data repository will support as many of the components listed above as will be needed to prepare the initial SSHCP annual report. For example, funding and expenditures will begin in the first year, but the results of some monitoring will not be available for several more years.

The Implementing Entity will comply with the data-sharing requirements of the Implementing Agreement. If the Implementing Entity allows additional access to the data repository, such access will require strict controls and monitoring to ensure that the integrity of the data repository is maintained (e.g., use of passwords to limit access of a particular entity to selected data repository functions, and sampling data entry forms to ensure that entered information is complete, compatible, and accurate).

9.9 Reporting

9.9.1 Annual and 5-Year Implementation Reports

The Implementing Entity will prepare an annual report summarizing the previous year's activities and a summary of all activities that have been implemented since permit issuance, including the acreage of habitat impacted (effects) from each SSHCP Covered Activity, information on direct harm or harassment of individuals of each Covered Species, acreage of modeled habitat protected under the SSHCP, Preserve land management actions implemented, monitoring results, adaptive management protocols implemented that year, habitat re-establishment/establishment, and status toward fulfillment of each Biological Goal and Measurable Objective presented in Chapter 7. Details regarding the content of the annual report are provided in Section 8.4.1, Annual Reports.

Final reports are due to the Permitting Agencies by January 31 following the end of the previous year's reporting cycle. The reporting cycle is October 1 of one year through September 30 of the following year. No annual report will be required for the first partial fiscal year. A due date of January 31 will allow time for the data from the previous fiscal year to be assembled, analyzed, and presented.

The purpose of the annual report is to provide each Permitting Agency, each Plan Permittee, the TAC, and other stakeholders with an accounting of actions taken by all permittees and to provide verification that the SSHCP permits and the Implementing Agreement are being implemented properly. The annual report will also identify areas where implementation has been ineffective and needs to be modified. The goals of the annual report are as follows:

- Provide the information and data necessary for the Plan Permittees to demonstrate to the Permitting Agencies and the public that the Plan is being implemented properly and as anticipated.
- Disclose any problems with Plan implementation so they can be corrected.

- Document issues with Plan implementation that may require coordination with the Permitting Agencies.
- Identify administrative or minor changes to Plan components required to increase the success of the Plan.

Every fifth year after initial implementation, the SSHCP annual report will also contain an audit of Plan implementation. The audit will be conducted by a panel of experts approved by the Wildlife Agencies. The panel will include persons with expertise in fields related to habitat management and monitoring.

Reports will be reviewed by the Implementation Committee and JPA Board prior to submittal to designated representatives of the Permitting Agencies, Plan Permittees, and the TAC. Annual reports will be made available to the public via posting on the SSHCP website. The Permitting Agencies and the TAC will use results presented in the annual reports and other available information to assess success of the SSHCP in meeting the Biological Goals and Measurable Objectives, and to formulate recommendations to the Implementing Entity for Plan implementation in the next year.

Each year, no more than 30 days after receiving the annual report, the TAC will convene to review report results to assess success of the SSHCP and to formulate recommendations to the Implementing Entity for Plan implementation in the next year.

9.9.2 20-Year Review

Twenty years after permit issuance, the Plan Permittees and Permitting Agencies will conduct a comprehensive review of progress toward achieving the SSHCP Conservation Strategy. The Implementing Entity will prepare a summary progress report and provide the report to the Permitting Agencies for review and comment.

9.10 SSHCP Modifications and Amendments

A modification to the SSHCP can be requested by a Plan Permittee or a Permitting Agency at any time. Requests for Plan modification must be made in accordance with the Implementation Agreement. SSHCP modifications are not anticipated to occur on a regular basis. Three categories of modifications will be recognized. In order of significance, they are as follows: administrative revisions, minor modifications, and permit amendments. This section defines the categories and provides examples for each.

9.10.1 Administrative Revisions

Administrative revisions are non-substantive changes or corrections to the Plan that do not require approval from the Permitting Agencies. These changes are clerical (e.g., correcting

obvious errors in text) or other non-substantive changes that clarify inconsistencies or ambiguities in the SSHCP (e.g., reconciling slightly different descriptions of the same monitoring protocol). Administrative changes will not result in any changes to the impacts analysis, conservation strategy, or decision documents. Administrative changes will be made in writing, documented by the Executive Director, and summarized in each annual report. The Implementation Committee will make the final decision on administrative revisions. The following are examples of administrative revisions:

- Making corrections of typographical, grammatical, and similar editing errors that do not change intended meanings or obligations
- Making corrections of any maps or exhibits to correct insignificant errors
- Making day-to-day implementation decisions such as modifying irrigation schedules for created/restored habitats on the basis of observed water needs of planted vegetation
- Conducting additional monitoring surveys
- Modifying SSHCP monitoring protocols to align with Permitting Agency monitoring protocols that may be modified
- Adopting new monitoring protocols that may be promulgated by the Permitting Agencies in the future
- Making annual adjustments to the SSHCP fees to keep pace with the inflation of land values, consistent with the SSHCP fee ordinance
- Making changes to the membership of the JPA Board, Implementation Committee, TAC, or any advisory committees to the JPA Board without changing the representation of the permittees, agencies, or organizations

9.10.2 Minor Modifications

Minor modifications to the Plan are changes that do not adversely affect the impact assessments or conservation strategy described in the SSHCP, and do not adversely affect the ability of the Implementing Entity to achieve the Conservation Strategy commitments of the SSHCP. In addition, minor modifications will not change the scope or nature of the Covered Activities, and will not trigger new National Environmental Policy Act (NEPA) analysis. Therefore, minor modifications are changes to the SSHCP that will not require amendments to the permits or Implementing Agreement. The following are examples of minor modifications:

- Updates to the land cover map or to species occurrence data that are consistent with the predictions and expectations of the SSHCP

- Minor changes to the Biological Goals and Measurable Objectives in response to monitoring results or adaptive management
- Minor changes to survey or monitoring protocols that are not proposed in response to adaptive management
- Modification of monitoring protocols for SSHCP effectiveness not in response to changes in standardized monitoring protocols from the Permitting Agencies
- Modification of existing or adoption of additional Preserve assembly requirements that improve the likelihood of achieving a Covered Species Biological Goal or Measurable Objective
- Revisions to the Preserve Management Program
- Discontinuation of ineffective Preserve assembly requirements and adoption of new Preserve assembly requirements that improve the likelihood of achieving the Conservation Strategy
- Modification of existing or adoption of new habitat re-establishment/establishment success criteria if results of monitoring and research or new information indicate that the initial success criteria need revision
- Modification of existing or adoption of additional Measurable Objectives where such changes more effectively achieve an SSHCP Biological Goal
- Modification of conditions on Covered Activities in response to AMM monitoring results or new technology
- Minor changes to the annual reporting protocols
- Other changes that do not result in adverse effects on Covered Species beyond those analyzed in the SSHCP (Chapter 6, Effects Assessment and Level of Take), the associated biological opinion, or the associated NEPA and CEQA document, and do not limit the ability of the Implementing Entity to achieve the Biological Goals and Measurable Objectives of the SSHCP

Minor modifications may be proposed by any Plan Permittee or the Permitting Agencies. The modification proposal must detail the nature of the proposed modification, provide a rationale for why it would not change the impact analysis, and describe how it would be consistent with the SSHCP Conservation Strategy. The other parties will use reasonable efforts to respond to proposed modifications within 30 days of receipt of such notice. Proposed modifications will become effective upon the other parties' written approval or shall be deemed approved by a party if no response is received within 30 days of receipt of such notice. If the Permitting Agencies feel that the proposal lacks specific information, the Permitting Agencies may request additional

information to authorize or deny the modification. If the Permitting Agencies deny the modification, they will provide an explanation for the denial.

The Permitting Agencies will not approve minor modifications to the Plan if they determine that the modifications would result in adverse effects on Covered Species or natural communities that are substantially different from those analyzed in the SSHCP. If any Permitting Agency denies a proposed modification, it may be proposed as a permit amendment as described below.

9.10.3 Amendments

Amendments are revisions to the SSHCP or the Implementing Agreement that may affect an impact analysis and so would require a corresponding amendment to one or all of the SSHCP permits. Amendments to the SSHCP and the Incidental Take Permits would follow the same formal review process as the original Plan and permits, including a NEPA/CEQA review, Federal Register notices, a new internal Section 7 consultation with USFWS, and new findings prepared by CDFW and USFWS.

Amendments must be approved by all Plan Permittees according to processes established in their regulations. Amendments may be proposed by any of the Plan Permittees. The proposal must detail the nature of the proposed amendment, its rationale, and any documentation needed to process it, including any required environmental studies. The Implementing Entity's Implementation Committee will submit a proposed amendment to the Permitting Agencies in a report that includes a description of the need for the amendment, an assessment of its impacts, and any alternatives by which the objectives of the proposal might be achieved.

The following are examples of changes that would require an amendment:

- Adjustment to the Plan Area or permit area boundary that could allow or could result in additional incidental take of a Covered Species or habitat, or that could exceed permitted take amounts
- The addition of a Covered Species
- The addition of a Covered Activity that could result in additional significant impacts not considered in the previous impact analysis or not already covered by the SSHCP permits
- An increase in the allowable take limit of existing Covered Activities or addition of new Covered Activities to the Plan
- Modifications of any important action or component of the SSHCP Conservation Strategy, including funding, that may substantially affect levels of covered take, effects of the Covered Activities, or the nature or scope of the Conservation Strategy—this

includes a reduction in the Conservation Strategy in the event that Covered Activities and fee funding do not occur as expected (see below for additional explanation)

- A major change in a Biological Goal or Biological Measurable Objective if monitoring or research indicates that they are not attainable because technologies to attain them are either unavailable or infeasible
- An increase in land acquisition requirements in excess of 5% of the original acreage requirements
- Addition of a new Plan Permittee

It is possible that, even over the full 50-year term of the Incidental Take Permits, Covered Activities and covered take might not occur to the extent projected in Chapter 6. If this occurs, fee revenues would likely fall short of projections. A shortfall of fee revenues could make it difficult or impossible for the Implementing Entity to complete the Preserve System and other components of the Conservation Strategy. If this situation appears likely, the Plan Permittees and the Permitting Agencies will develop mutually agreeable terms, which could include the following:

- Extending the term of the permits to allow completion of the Conservation Strategy
- Reducing the amount of take covered and accordingly reducing the conservation obligations of the Plan Permittees

Amendment Process for Endangered Species Act Section 10(a)(1)(B) Permit

To amend the Section 10(a)(1)(B) permit, the JPA Board will submit a formal application to USFWS. This application must include a revised HCP, a permit application form, any required fees, a revised Implementing Agreement, and the required compliance document under NEPA. The appropriate NEPA compliance process and document will depend on the nature of the amendment being proposed. A new scoping process may be required, dependent on the nature of the amendment. If additional scoping is deemed appropriate and necessary, USFWS will publish a Notice of Intent in the Federal Register to initiate the scoping process. Upon submission of a completed application package, USFWS will publish a notice of the application in the Federal Register, initiating the NEPA and HCP amendment review process. After public comment, USFWS may approve or deny the permit amendment application.

9.10.4 Future Land Use Planning Changes

The Plan Permittees acknowledge that the adoption and amendment of general plans, specific plans, community plans, zoning ordinances, and similar land use regulations; the granting of land use entitlements by the Land Use Authority Permittees (the County of Sacramento and the cities); and

annexations by the cities are matters within the sole discretion of the applicable land use jurisdiction. Changes in land use designations or regulations would not trigger preparation of a minor modification or an amendment to the SSHCP if the changes would not result in additional impacts to SSHCP Covered Species or affect completion of the SSHCP Conservation Strategy. The TAC will be responsible for deciding when changes in land use designations or regulations would result in additional impacts to SSHCP Covered Species or when changes in land use designations or regulations would affect completion of the SSHCP Conservation Strategy.

9.10.5 Permit Renewal

A Plan Permittee may apply for renewal of Incidental Take Permits no less than 120 days prior to the expiration of the Incidental Take Permits.

If a request for renewal is filed 120 days prior to expiration of the Incidental Take Permits, the Incidental Take Permits will remain valid through the renewal period. However, no additional take of Covered Species, beyond the level specified in the Incidental Take Permits, may occur.

9.10.6 Permit Suspension or Revocation

The Permitting Agencies have the ability, in accordance with applicable state and federal law, to suspend or revoke all or part of the permits in the event that any of the Plan Permittees are out of compliance with the Plan, the Implementing Agreement, or the permits. USFWS has the ability to suspend or revoke Incidental Take Permits if continuation of Covered Activities appreciably reduces the likelihood of the survival and recovery of the species in the wild (USFWS and NMFS 1998). CDFW has the ability to suspend or terminate all or part of an Incidental Take Permit if revocation or termination is required to avoid jeopardizing the continued existence of that portion of a Covered Species' range that occurs within the Plan Area and to fulfill a legal obligation of CDFW.

As discussed in Section 9.3.6, Dispute Resolution, and in the Implementation Agreement, the Permitting Agencies and the Plan Permittees will meet to remedy non-compliance with stated SSHCP goals and objectives or to resolve differences. If the Permitting Agencies should determine that permit revocation or suspension is necessary, they will notify the Implementing Entity and other Plan Permittees. The notification will explain the rationale for the suspension or revocation, and, where applicable, will provide any additional actions that the Plan Permittees can take to maintain the permits.

If one or more of the permits are revoked, the Plan Permittees have the obligation to fulfill all outstanding mitigation requirements, including management and monitoring of the Preserve System in perpetuity, for any take that occurred prior to the revocation. For example, if the Plan Permittees are behind on compliance with the stay-ahead provision for land acquisition or

restoration, they will be required to meet this obligation. See the Implementing Agreement (Appendix C) for additional details.

9.11 Implementation Schedule and Deadlines

To ensure that the SSHCP is successful, the Implementing Entity will make progress on a variety of tasks simultaneously. Tasks during the first several years of implementation will be particularly important to ensure positive momentum and early compliance with SSHCP terms and conditions. Schedule guidelines and major deadlines for Plan implementation are presented in Table 9-3. The Implementing Agreement will establish deadlines for certain tasks.

Table 9-3 lists those key implementation tasks with deadlines that are tied to permit compliance. As described in the table, these deadlines have various levels of flexibility depending on the circumstances. Implementation deadlines are important to establish a mutual understanding among the Plan Permittees and the Permitting Agencies about how the Plan will be implemented over time and to ensure that the Plan will be implemented in a timely manner. However, the Plan Permittees and the Permit Agencies recognize that, under certain circumstances, modifications to the deadlines beyond the flexibility provided in Table 9-3 could be reasonable and appropriate. The Implementing Entity may modify the deadlines through minor modifications to the Plan.

Before permits are issued, the Plan Permittees will set the groundwork for Plan implementation by establishing an implementation organization. Land acquisition and training of Plan Permittee staff may also commence before permit issuance. Prior to issuance of ESA and CESA Permits, the SSHCP Land Cover Baseline Map and local ordinances or resolutions required to fund and implement the Plan will be finalized. During the first 6 months of the Permit Term, emphasis will be placed on hiring key staff for the Implementing Entity (or contracting out their functions), establishing the TAC, and developing implementation tools (Table 9-3). Within the first year, the Implementation Entity will secure necessary staff and contract resources; create a Plan implementation website; establish the required data repository; and investigate habitat preservation, establishment, and re-establishment opportunities.

Over the next 5 years, additional Preserve staff will be hired or contracted, and more specific Preserve Management Plans will be created to guide management and monitoring of the expanding Preserve System. Environmental compliance and design for wetland re-establishment and establishment will be initiated. Beginning with this period and extending throughout the remaining Permit Term, SSHCP fees will be updated and adjusted on a regular basis. In addition, hiring and contracting staff will be completed to manage the Preserve System and implement the SSHCP. Habitat preservation, establishment and re-establishment, and design will continue, as will adaptive management and monitoring of biological resources.

Between Years 6 and 50, the Implementing Entity will continue to implement the Conservation Strategy, implement monitoring and adaptive management, and refine these programs as monitoring and other data are collected. Land acquisition must be completed by Year 50, and construction of all restoration and creation projects must be completed by Year 45 of the Permit Term (see Chapter 12 for a discussion of funding adequacy to meet these deadlines).

Before the end of the Permit Term, the Implementing Entity will determine the administrative structure necessary to continue management of the Preserve System in perpetuity. For example, management responsibility may be delegated to one of the Plan Permittees to oversee in perpetuity. Alternatively, the JPA may extend its term to continue to oversee implementation of the SSHCP.

Table 9-3
Schedule for Major Implementation Tasks

Time Period	Tasks and Milestones	Responsible Party
Prior to Permit		
Prior to Permit	Complete final versions of Implementing Agreement, Joint Exercise of Powers Agreement, and Plan Permittee ordinances in preparation for permit issuance and Implementing Entity formation.	Plan Permittees
Prior to Permit	Establish Implementing Entity through execution of the Joint Exercise of Powers Agreement. File with state Secretary of State within 30 days of its effective date.	Plan Permittees
Prior to Permit	In accordance with the Implementing Agreement and Joint Exercise of Powers Agreement, establish SSHCP implementation organizational structure (i.e., JPA Board and Implementation Committee).	Plan Permittees
Prior to Permit	Conduct fee nexus study and establish the SSHCP fee structure.	Plan Permittees
Prior to Permit	Establish separate accounts to isolate SSHCP fees from all other fees.	Plan Permittees
Prior to Permit	Determine schedule for transfer of development fees collected by the Plan Permittees to the Implementing Entity.	Plan Permittees
Prior to Permit	Finalize the SSHCP Land Cover Baseline Map.	Implementing Entity
Prior to Permit	Develop template SSHCP project application package for use by Third-Party Project Proponents and Plan Permittees that includes all items required in Chapter 10.	Plan Permittees
Prior to Permit	Develop a checklist prior to the first ordinance taking effect for local planners to evaluate the SSHCP project application package (Chapter 10). The checklist must include a statement of certification that Third-Party Project Proponents meet the relevant terms of the SSHCP.	Plan Permittees
Prior to Permit	Provide additional tools for Plan Permittees to use in their application review and project assessment process (e.g., template planning survey report, fee calculator).	Implementing Entity
Prior to Permit	Establish the process by which Land Use Authority Permittees will notify the Implementing Entity of any proposed incidental take and the process to receive confirmation in writing from the Implementing Entity that the proposed take is consistent with the SSHCP's permits, and that an adequate amount of jump-start and stay-ahead mitigation is in place to address that amount of incidental take proposed by the project.	Plan Permittees

Table 9-3
Schedule for Major Implementation Tasks

Time Period	Tasks and Milestones	Responsible Party
Prior to Permit	Provide each Plan Permittee with SSHCP maps (e.g., SSHCP Baseline Land Cover Map, Covered Species modeled habitat maps) to allow Land Use Authority Permittee staff to process and evaluate applications for SSHCP coverage or evaluate their own projects under the Plan.	Plan Permittees
Prior to Permit	Train Land Use Authority Permittee staff to prepare, review, and process SSHCP applications. This task will be ongoing through the 50-year permit term.	Plan Permittees, with ongoing assistance from Implementing Entity
Prior to Permit	Commence the recruitment process for the Implementing Entity Executive Director and key staff (if possible, to allow early implementation).	Plan Permittees
Prior to Permit	Prepare initial budget for Implementing Entity.	Plan Permittees
Prior to Permit	Acquire lands and commence re-establishment/establishment projects to comply with the jump-start provision.	Pre-Acquisition
0 to 6 Months After Permit		
Begin 0–6 Months after Permit	Hire Implementing Entity Executive Director and key staff (if not completed prior to permit issuance).	Implementing Entity
Begin 0–6 Months after Permit	Hire key staff of Implementing Entity or secure agreements or contracts with other organizations to fulfill these roles. Continue to hire or contract out Implementing Entity technical and operational staff as Preserve System expands (Chapter 9).	Implementing Entity, Plan Permittees
Begin 0–6 Months after Permit	Develop the SSHCP data repository. Develop processes for tracking collected fees, land acquisition, and SSHCP impacts. This task will be ongoing.	Implementing Entity, Plan Permittees
Begin 0–6 Months after Permit	Establish SSHCP implementation website.	Implementing Entity
Begin 0–6 Months after Permit	Develop a set of biologist qualifications and establish a pre-approved list of biologists for Covered Activity construction monitoring, Preserve monitoring, and Preserve management. This task will be ongoing.	Implementing Entity
Begin 0–6 Months after Permit	Develop a template for pre-acquisition assessment and protocols prior to the first land acquisition.	Implementing Entity
Begin 0–6 Months after Permit	Establish the Technical Advisory Committee.	Implementing Entity
Begin 0–6 Months after Permit	Determine the date by which the annual automatic update of SSHCP fees will occur (Chapter 12).	Implementing Entity
Begin 0–6 Months after Permit	Prepare the Preserve System Monitoring and Management Program, including the management toolbox described in Chapter 8. Complete within 18 months of Incidental Take Permit issuance.	Implementing Entity

Table 9-3
Schedule for Major Implementation Tasks

Time Period	Tasks and Milestones	Responsible Party
6 Months and Beyond After Permit		
Begin 6 Months to 1 Year after Permit	Investigate establishment and re-establishment opportunities on existing open space and SSHCP Preserve land. This task will be ongoing (Chapter 7).	Implementing Entity, Plan Permittees
Begin 1 year after Permit	Update SSHCP fees annually. Provide new fee schedule to Permittees. This task will be ongoing (Chapter 12).	Implementing Entity, Land Use Authority Permittees
During lifespan of Permit	At intervals specified in Chapter 12, perform financial assessment. This task will be ongoing.	Implementing Entity
Begin 1 year after Permit	Prepare and submit annual report to the Permitting Agencies. This task will be performed on an annual basis by March 15 of every year for the previous fiscal year (July 1 through June 30).	Implementing Entity
Begin 1 year after Permit	Conduct an annual public workshop to report on implementation progress of the SSHCP. This task will be ongoing.	Implementing Entity
Years 0–45 after Permit	Implement establishment and re-establishment projects. This task will be ongoing; however, construction of all habitat re-establishment/establishment projects must be completed by Year 45.	Implementing Entity
Begin 3 Years after Permit	A comprehensive development fee audit will be completed at least every 3 years for the first 15 years of the Plan (i.e., years 3, 6, 9, 12, and 15) and at least every 5 years thereafter (i.e., years 20, 25, 30, 35, 40, and 45), where year 1 is the first full calendar year of SSHCP implementation.	
Begin 5 Years after Permit	Use recent aerial photographs (at least every 5 years) to track and map land cover conversions, especially conversion of vernal pools. This task will be ongoing.	Implementing Entity
20 Years after Permit	In Year 20 of implementation, work with the Permitting Agencies to conduct a formal and complete review of progress toward building the Preserve System and achieving each Biological Goal and Measurable Objective.	Implementing Entity
Prior to Permit Expiration	Finalize an implementation structure for continued monitoring and management of the Preserve System after permit expiration.	Implementing Entity
After Permit Expiration in Perpetuity	Continue adaptive management and limited monitoring of Preserve System biological resources to ensure that management actions are working (Chapter 8).	Implementing Entity

9.12 References

USFWS and NMFS (U.S. Fish and Wildlife Service and National Marine Fisheries Service). 1998. *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act.* Final. March 1998.

10 SSHCP PERMIT APPLICATION PROCESS

10.1 Introduction

This chapter explains the South Sacramento Habitat Conservation Plan (SSHCP or Plan) permit application process and provides an overview of how Land Use Authority Permittees can extend Incidental Take Permit (ITP) coverage to Third-Party Project Proponents and how the Implementing Entity can extend ITP coverage to Participating Special Entities (each of these project proponents is explained in more detail in Chapter 9, Implementation).

This chapter also describes the SSHCP permit application process for Plan Permittees, an explanation of specific requirements that must be satisfied by a project proponent prior to receiving permit coverage under the SSHCP, and SSHCP development fee or land dedication requirements.

10.2 Submittal of SSHCP Permit Applications

This section describes the process for submitting SSHCP permit applications by Third-Party Project Proponents, by Plan Permittees for their own Covered Activities, and by Participating Special Entities.

10.2.1 SSHCP Permit Applications for Third-Party Project Proponents

Third-Party Project Proponents are private project applicants proposing to implement an SSHCP Covered Activity and seeking local land use approval permits (ministerial[1] or discretionary[2] permits) from a Land Use Authority Permittee. The Land Use Authority Permittees have the ability to extend incidental take coverage provided by their SSHCP ITP to a Covered Activity implemented within their jurisdictions by a third party. Third-Party Project Proponents shall submit their SSHCP permit application package to the Land Use Authority Permittee that has land use jurisdiction over their proposed project. Only the Land Use Authority Permittee with land use jurisdiction over a proposed project may extend ITP coverage to that project. For example, a project proposed by a Third-Party Project Proponent within the city limits of Rancho Cordova may only be extended ITP coverage by the City of Rancho Cordova. The Land Use Authority Permittee will review the SSHCP permit application for consistency with all of the SSHCP requirements that are described in this chapter and will provide the Implementing Entity with a copy of the SSHCP requirements for tracking purposes, as discussed in Chapter 9. Should a Third-Party Project Proponent propose to provide land in fee title or provide a conservation easement in lieu of paying all or part of the required SSHCP development fees, then the

[1] A ministerial permit is a permit that requires little to no judgment on behalf of the Land Use Authority Permittee. An example of a ministerial permit is a building permit where as long as a parcel is zoned to allow the building of a structure, the applicant only needs to follow building codes to construct their project.

[2] A discretionary permit is a permit that requires the use of judgment by a Land Use Permittee before the permit can be issued. An example of a discretionary permit is a permit for a general plan amendment.

Implementing Entity must also review the proposed land dedication or the easement to ensure that it is consistent with the SSHCP Conservation Strategy (Chapter 7, Conservation Strategy).

Land Use Authority Permittees issue land use approval permits for a wide range of projects, not all of which are SSHCP Covered Activities (Chapter 5, Covered Activities). Customers typically approach the information desk of the local jurisdiction (Land Use Authority Permittee) to inquire about land use approval permit requirements for their activity and the Land Use Authority Permittee will direct the customer to prepare the appropriate application. The Land Use Authority Permittee will review all applications to determine whether an activity is a Covered Activity eligible to use the SSHCP.

The Land Use Authority Permittee granting land use approval is not responsible for ensuring that a Third-Party Project Proponent complies with federal Endangered Species Act (ESA) or California Endangered Species Act (CESA) regulations. Instead, it is the responsibility of the Third-Party Project Proponent that is undertaking the Covered Activity to ensure that they have satisfied all legal requirements associated with the ESA and CESA. Many Third-Party Project Proponents implementing a covered activity may be unaware of the need to comply with ESA and CESA regulations. To ensure that Third-Party Project Proponents understand their legal obligations to comply with the ESA and CESA, each Land Use Authority Permittee will provide literature to a Third-Party Project Proponent that explains ESA and CESA regulations and how to satisfy those regulations. To use the SSHCP, the Third-Party Project Proponent must follow the SSHCP permit application process as explained in this chapter (Section 10.4, SSHCP Permit Application Processing).

CEQA Review

Many private Third-Party Project Proponent Covered Activities will require a land use approval and be subject to the California Environmental Quality Act (CEQA).[3] For such Covered Activities, review of SSHCP permit applications should generally be undertaken concurrently with the CEQA environmental review. To facilitate this approach, the Land Use Authority Permittee should generally request that Third-Party Project Proponents submit an SSHCP permit application package as part of the land use approval application and CEQA process.

There are many benefits to preparing the SSHCP permit application package early in the planning process. First, submitting an SSHCP permit application package during the land use approval/CEQA process will illustrate the various requirements of the SSHCP on the proposed project, and provide time for the project proponent to change the project description or to identify alternatives for CEQA analysis. Second, it will enable the CEQA document to refer to the project-specific requirements as identified in the SSHCP permit application. Finally, it will enable the local jurisdiction to provide early review of the SSHCP permit application for

[3] Some projects may also be subject to consistency with the Delta Plan if they fall within the Delta Plan area. Their consistency with the Delta Plan would be determined during CEQA review.

completeness. Based on a review of this initial information and a determination of SSHCP requirements, the Land Use Authority Permittee can establish conditions of approval specifying SSHCP conditions and SSHCP development fee requirements.

Each Land Use Authority Permittee is responsible for ensuring that Covered Activities, upon issuance of a take permit, fully comply with the terms of the Plan.

10.2.2 Pre-Application Procedures

Prior to submitting an SSHCP permit application package, Third-Party Project Proponents are encouraged to meet with their appropriate Land Use Authority Permittee or, if the applicant is a Participating Special Entity, the Implementing Entity. The purpose of the pre-submittal meeting is to allow the Land Use Authority Permittees to explain what information must be assembled for a specific project in support of the SSHCP permit application.

Pre-application meetings are also recommended if an applicant is proposing land dedication to offset all or a portion of their mitigation requirements. The SSHCP has strict criteria for siting Preserves, and not all land within the SSHCP Plan Area is suitable for establishing SSHCP Preserves. In addition, SSHCP Preserves must be designed so that they comply with SSHCP Avoidance and Minimization Measures (AMMs). Meeting early in the application process to discuss these criteria is strongly recommended to avoid delays in project approvals should land dedications not meet the criteria set forth in the SSHCP. A Land Use Authority Permittee or the Implementing Entity may require a fee for these pre-submittal meetings and/or pre-submitted project proposal review.

10.2.3 SSHCP Permit Applications for Plan Permittees

As discussed in Chapter 1, Introduction, and Chapter 9, the Plan Permittees are the County of Sacramento, City of Galt, City of Rancho Cordova, Sacramento County Water Agency, the Capital Southeast Connector Joint Powers Authority, and the Implementing Entity. The Plan Permittees can use SSHCP ITPs for Covered Activity public projects that they implement. A Plan Permittee is responsible for ensuring compliance with all elements of the Plan and will complete an SSHCP permit application package following the SSHCP permit application process explained in this chapter (Section 10.4). Each Plan Permittee will need to establish an internal process for ensuring that their projects are in compliance with the elements of the Plan.[4] Because each Plan Permittee conducts project design and review differently, the SSHCP does not propose a single process that must be followed by all Plan Permittees. The completed SSHCP permit application package will be submitted to the Implementing Entity so that the project can be tracked for compliance monitoring purposes. Because each Plan Permittee is a signatory to the

[4] Plan Permittee projects will also have to comply with CEQA, which could include individual project-level environmental documents and determinations of consistency with regional plans, such as the Delta Plan.

SSHCP ITP, they have incidental take coverage for their own Covered Activity projects and do not need to request ITP coverage from the Implementing Entity. However, the Implementing Entity will review Plan Permittee SSHCP permit application packages for consistency with the Plan and may provide comments if necessary.

10.2.4 SSHCP Permit Applications for Participating Special Entitles

Incidental take coverage may be extended to Participating Special Entities as defined in Chapter 9. Participating Special Entities include but are not limited to special districts, utilities, and land use jurisdictions that are not Plan Permittees. Participating Special Entities that desire incidental take coverage under the SSHCP ITPs must submit an SSHCP permit application package to the Implementing Entity for processing and approval following the SSHCP permit application process explained in this chapter (Section 10.4).

10.3 Determining Master Plan Consistency with the SSHCP

Due to the large area that a master plan[5] encompasses, Third-Party Project Proponents initiating master plans are required to consult with their respective Land Use Authority Permittee about SSHCP requirements early in the master plan process. Ensuring that the master plan complies with the requirements and provisions of the SSHCP will reduce the likelihood of project delays. In order for a master plan to use the local Land Use Authority's SSHCP ITPs to satisfy ESA and CESA requirements, a master plan must be designed to comply with the requirements of the SSHCP.

Early consultation with the Land Use Authority Permittee and Implementing Entity will:

- Ensure that all SSHCP AMMs are addressed by the master plan.
- Ensure that on-site avoidance areas and Preserves are planned in appropriate locations to satisfy SSHCP Conservation Strategy requirements.

Master Plan Area Specific Avoidance and Minimization Measures

Third-Party Project Proponents undertaking a Covered Activity that occurs within a proposed master planned area will follow the same SSHCP permit application process outlined in this chapter for Third-Party Project Proponents. It should be noted that some master plans have specific avoidance and minimization measures that apply only to that master plan area (see Appendix K). These avoidance and minimization measures must be addressed in the SSHCP permit application.

[5] A master plan is a document that broadly defines land use, circulation, and infrastructure for a specific area (master plan area) and includes implementation measures that guide how development within the master plan area will occur. The requirements for master plans can be fulfilled by a variety of planning tools, including specific plans, comprehensive plans, special planning areas, or any combination thereof.

10.4 SSHCP Permit Application Processing

The applicant will submit an SSHCP permit application package for review and approval by the Land Use Authority Permittee or Implementing Entity, depending on what type of applicant is submitting the application, following the process described in this section.

10.4.1 Timing of SSHCP Permit Application Submittal

All applicants seeking ITP coverage under the SSHCP must obtain that coverage prior to any ground-disturbing activity; however, they can also obtain coverage earlier by the following means:

a. In conjunction with any Plan Permittee discretionary review

b. For ministerial projects, prior to the issuance of any building or grading permit

c. In the absence of building or grading permits, prior to the Covered Activity being performed

10.4.2 Components of the SSHCP Permit Application Package

Applicants must include the data, documentation, and/or exhibits as described in this section as part of the SSHCP permit application package. Land Use Authority Permittees designate, and may amend, the form and timing in which the following information must be provided; however, the required content of the SSHCP permit application package will remain the same for all Land Use Authority Permittees. Land Use Authority Permittees may charge a fee to recover costs associated with review and processing of the SSHCP permit application. Applicants are responsible for the costs associated with preparation of the SSHCP permit application, including surveys. Forms for the SSHCP permit application package will be made available by the Land Use Authority Permittees or the Implementing Entity. The SSHCP permit application includes the components specified in the following subsections.

10.4.2.1 Applicant Information

This part of the application should include the applicant's name and contact information, property owner's name and contact information, and names and contact information for any consultants preparing materials in support of the SSHCP permit application.

10.4.2.2 Project Description and Map

The project description must include a written description of the location of the project site, including Assessor's Parcel Number(s), as well as a written description of all activities proposed within the project site, specifying which of the activities are thought to be Covered Activities under the SSHCP. Include a map illustrating the exact location of the project site, location of

proposed Covered Activities, and location of avoidance areas or on-site Preserves, if applicable, within the project site.

10.4.2.3 Land Cover Type Map, Wetlands Delineation, and Modeled Species Habitat Map

Applicants will submit an SSHCP land cover type map, wetland delineation (if applicable; see Step 2), and a map depicting modeled species habitat found on the project site (if applicable; see Step 3). Applicants may request that the SSHCP Land Cover Type and modeled species habitat maps be prepared by the Land Use Authority Permittee or the Implementing Entity for the project site using the SSHCP Land Cover Baseline Map and the modeled species habitat maps. The Land Use Authority Permittee or the Implementing Entity may require a fee for this service. Wetland delineations must be prepared by an individual or firm qualified to prepare them. All maps will be prepared using geographic information system (GIS) technology and all shapefiles will be provided to the Land Use Authority Permittee or the Implementing Entity for tracking purposes. These maps will be prepared according to the following steps:

- **Step 1** – A map of SSHCP land cover types for the project site will be generated using the SSHCP Land Cover Baseline Map. This is accomplished by placing the project boundary over the SSHCP Land Cover Baseline Map. If the SSHCP Baseline Land Cover Map shows an SSHCP aquatic land cover type (see Chapter 3, Biological Resources Setting, Table 3-1, SSHCP Land Cover Types within the Plan Area) present on the project site, the process proceeds to Step 2. If the SSHCP Baseline Land Cover Map does not show an SSHCP aquatic land cover type present on the project site, then the process proceeds to Step 3.
- **Step 2** – If SSHCP aquatic land cover types are present on the project site, then a wetland delineation and report will be prepared. When a U.S. Army Corps of Engineers (USACE)-verified and valid (i.e., non-expired) delineation for a project site already exists, that delineation can be used. Waters[6] (including wetlands) found to be present on site must be classified using the nomenclature system developed for the SSHCP (see Appendix E). The wetland delineation will follow the minimum standards set forth by the Sacramento District USACE and State Water Quality Control Board at the time of the delineation. The wetland delineation and report will map and quantify all SSHCP aquatic land cover types on the project site, which will then be used to help prepare a biological letter report (see paragraphs following Step 4).
- **Step 3** – A map of modeled species habitat for the project site will be generated using the modeled species habitat maps found in Chapter 3, Section 3.4, Covered Species Habitat Models. This is accomplished by placing the project boundary over each of the modeled

[6] As defined in 33 CFR 328 or 40 CFR 230.2(s).

species habitat maps. If modeled species habitat is present on the project site, the process proceeds to Step 4.

Maps of modeled species habitat will need to be prepared only for the following species:

- Giant gartersnake (*Thamnophis gigas*)
- Western pond turtle (*Actinemys marmorata*)
- California tiger salamander (*Ambystoma californiense*)
- Western spadefoot (*Spea hammondii*)
- Tricolored blackbird (*Agelaius tricolor)*
- Swainson's hawk (*Buteo swainsoni*)
- Greater sandhill crane (*Grus canadensis*)
- Western burrowing owl (*Athene cunicularia*)
- Cooper's hawk (*Accipiter cooperii*)
- Loggerhead shrike (*Lanius ludovicianus*)
- Northern harrier (*Circus cyaneus*)
- White-tailed kite (*Elanus leucurus*)
- Western red bat (*Lasiurus blossevillii*)

- **Step 4 –** Provide results of species surveys. If modeled species habitat is found on the project site for any of the species listed in Step 3, then species surveys must be conducted consistent with the procedures described in Chapter 5, Section 5.4.2, Covered Species Take Avoidance and Minimization Measures, unless that section does not require surveys for the species. Species surveys are also required for all SSHCP covered plant species as described in Chapter 5, Section 5.4.2, if wetlands are present on the project site.

The Land Use Authority Permittee or Implementing Entity will prepare a biological letter report that quantifies the current terrestrial and aquatic SSHCP land cover acreages and compares them to the SSHCP Land Cover Baseline Map. The biological letter report will also document acreage of modeled species habitat for each species and will document the results of species surveys.

The Land Use Authority Permittee or the Implementing Entity will use these reports to finalize the site-specific land cover type map to be used for calculating impacts to SSHCP land cover types and for calculating SSHCP development fees (refer to Section 10.7, SSHCP Development Fees and Land Dedication). Note that USACE wetland delineations may not map some aquatic habitat features that are considered aquatic habitat for endangered species (i.e., swales). Aquatic features

not delineated on wetland delineations but present on the project site as verified by aerial photos or on-the-ground surveys will be included in the final site-specific land cover type maps that will be used when calculating impacts and preservation. Any aquatic habitat features not identified by the USACE wetland delineation will not be subject to compensatory mitigation (e.g., re-establishment/ establishment) objectives or measures of this Plan.

The Local Land Use Authority Permittee or the Implementing Entity will also determine whether anthropogenic[7] land cover type conversion has occurred since baseline[8] conditions were established. If anthropogenic land cover type conversion has occurred, SSHCP development fees shall be based on impacts to the land covers described on the SSHCP Land Cover Baseline Map. This step will also include a determination of whether reclamation of a disturbed site (e.g., mine site reclamation) has occurred since the SSHCP Land Cover Baseline Map was documented. In that case, SSHCP development fees will be based on impacts to the reclaimed land cover.

10.4.2.4 Proposed Land Dedication Map and Report

If an applicant is proposing land dedication to offset all or a portion of their development fees, the Implementing Entity must determine whether the proposed land dedication is consistent with SSHCP AMMs described in Chapter 5, Section 5.4, Conditions on Covered Activities, and with the biological goals and objectives described in Chapter 7 (Table 7-1, Biological Goals, Measurable Objectives, and Conservation Actions). It should be noted that the SSHCP has fairly strict criteria that must be adhered to when siting Preserves, and it is possible that a site proposed for land dedication will not meet the criteria for an SSHCP Preserve. If it is determined that a land dedication proposal is not consistent with the requirements of the SSHCP, the applicant may wish to work with the Implementing Entity to find alternative sites that will support the SSHCP conservation strategy.

An applicant must provide the following information in support of a land dedication proposal:

1. An exhibit(s) showing the proposed location of the Preserve(s) as well as existing and potential Preserves on adjacent parcels (the Implementing Entity or Land Use Authority Permittee can provide information concerning existing and potential Preserves);
2. A report describing each land cover type using the nomenclature system developed for the SSHCP (see Appendix E) and the acres of each land cover type; and

[7] Of, relating to, or resulting from the influence of human beings on nature.

[8] To establish baseline conditions, acreages will be calculated using that version of the SSHCP Land Cover Type Map in existence as of the date the SSHCP permit was issued to the Plan Permittees by the U.S. Fish and Wildlife Service. See Chapter 3 for a description of the SSHCP Land Cover Type Map.

3. A written explanation as to how the proposed Preserve is consistent with SSHCP AMMs described in Chapter 5, Section 5.4, and the biological goals and objectives described in Chapter 7 (Table 7-1).

In addition, the applicant must execute an agreement with the Implementing Entity that gives the Implementing Entity or its contractors permission to access the site and to conduct any additional fieldwork necessary to evaluate the site for its suitability as a Preserve. The Implementing Entity may charge a fee to conduct any fieldwork necessary to evaluate the site.

10.4.2.5 Description of How the Project Complies with SSHCP Avoidance and Minimization Measures

The project proponent shall document how the proposed project will comply with SSHCP AMMs described in Chapter 5, Section 5.4. See the SSHCP AMMs worksheet attached to the SSHCP permit application package.

10.4.2.6 Proposed Mitigation

The project proponent will state how they intend to mitigate for impacts that result from their project (i.e., on-site preservation, off-site land dedication, payment of an SSHCP development fee, proof of mitigation bank credits, or some combination thereof).

10.4.2.7 Description of How the Project Complies with Requirements for Protection of Cultural Resources and Tribal Consultation

USACE, SHPO, and ACHP may potentially develop a cultural resources management plan as a basis for establishing a programmatic memorandum of agreement for compliance with the requirements of the NHPA Section 106 process. Compliance with such a plan would ensure that no NRHP-listed eligible or potentially eligible resources would be affected by Covered Activities subject to CWA Section 404 permits. If that plan is not developed, or for Covered Activities that are not subject to CWA 404 permitting requirements, a project proponent of a ground-disturbing activity, including habitat re-establishment or establishment in the Preserve System, must ensure that cultural resources potentially occurring in these areas are properly evaluated and protected. In consultation with the Implementing Entity, the project proponent will prepare a Cultural Resources Management Plan to ensure that implementation of the Covered Activity would not result in significant impacts to historic properties, cultural resources, or tribal resources. This plan could be prepared as part of the CEQA review for a Covered Activity, or as a separate plan for Covered Activities that are not subject to CEQA review. The plan would consist of the following:

1. Establishment of an Area of Potential Effect for the proposed Covered Activity.

2. A summary of known resources in the Area of Potential Effect that are currently listed in the National Register of Historic Places, California Register of Historic Places, or local historic registries.
3. Identification of areas of cultural sensitivity in the Area of Potential Effect based on consultation with the Native American Heritage Commission (Sacred Lands file check) and potentially affected tribes (identified by the Native American Heritage Commission).

10.5 Review for Completeness

The Land Use Authority Permittee will compare the Project Application Package against a Project Review Checklist, to confirm that all SSHCP requirements have been met, including requirements such as setbacks and other AMMs. The Land Use Authority Permittee's review process may be subject to the processing time and requirements of the Permit Streamlining Act (Government Code Section 65920 et seq.). For most projects, the Land Use Authority Permittee or Implementing Entity will review the SSHCP permit application package for completeness within 30 days of receipt of a complete SSHCP permit application package. The Land Use Authority Permittee or Implementing Entity may extend the review period for large or potentially complex projects up to an additional 30 days by providing written notice to the applicant. The Land Use Authority Permittee or Implementing Entity may continue to extend the review period after written notice until the Land Use Authority Permittee or Implementing Entity deems that an SSHCP permit application package is complete.

The Land Use Authority Permittee or Implementing Entity is also authorized to close SSHCP permit applications when they determine that the applicant has failed to provide requested information within a reasonable period. In such an event, the Land Use Authority Permittee or Implementing Entity shall provide written notice that the SSHCP permit application will be closed within 30 days unless all required materials are submitted.

10.6 Assessment of Impacts on SSHCP Land Cover Types

After a complete SSHCP permit application has been submitted, the involved Land Use Authority Permittee or the Implementing Entity shall prepare an assessment of SSHCP natural land cover type impacts that would result from the project.

10.6.1 Method for Calculating Impacted Acreage

The Land Use Authority Permittee or Implementing Entity will prepare an impact assessment that identifies the location and amount of each SSHCP natural land cover type that will be directly or indirectly impacted as a result of implementing a Covered Activity. Direct impacts will be calculated by overlaying the Covered Activities map generated as described in Section 10.4.2.2, Project Description and Map, onto the finalized site-specific land cover type map

generated as described in Section 10.4.2.3, Land Cover Type Map, Wetlands Delineation, and Modeled Species Habitat Map.

Indirect impacts are only calculated for three SSHCP land cover types: Vernal Pool, Swale, and Stream/Creek Vernal Pool Invertebrate Habitat (VPIH) (see Chapter 6, Effects Assessment and Level of Take, Section 6.5, Effects of Covered Activities on Land Cover Types). A Vernal Pool is considered indirectly impacted if more than 10% of its watershed is removed. Swales and Streams/Creeks (VPIH) are considered indirectly impacted when a Swale or Stream/Creek (VPIH) land cover type feature intersects a vernal pool that is directly impacted. Note that if any portion of a wetland land cover type is directly impacted, then the entire feature is considered to be directly impacted. Vernal Pool watershed maps prepared by the SSHCP will be used to determine when an indirect impact has occurred. Indirect impacts will be calculated by overlaying the map of Covered Activities onto the SSHCP watershed map.

The impact assessment will include both a map depicting the area of impact and table(s) quantifying the acres of impact to each land cover type. The results will be used to determine the required mitigation to offset impacts.

10.6.2 Appealing the Impact Assessment

An applicant has the right to appeal the impacts assessment made by a Land Use Authority Permittee or the Implementing Entity. Written objections must be filed with the Land Use Authority Permittee or the Implementing Entity within 30 calendar days of receiving the initial impact assessment, and must be accompanied by data supporting the appeal, such as surveys, aerial photos, maps, or resource agency-verified delineations. The Land Use Authority Permittee or the Implementing Entity has 30 calendar days from the receipt of the appeal to respond. Disagreements that cannot be resolved between the Land Use Authority Permittee staff or the Implementing Entity staff and applicants will be decided by the Land Use Authority Permittee's planning director or the executive director of the Implementing Entity.

10.7 SSHCP Development Fees and Land Dedication

Once a project receives a draft compliance determination letter, the Plan Permittee (or, if the applicant is a Participating Special Entity, the Implementing Entity) will calculate SSHCP development fees based on the project impacts (see Section 10.6, Assessment of Impacts on SSHCP Land Cover Types). Once impacts are calculated they must be reported to the Implementing Entity so they can be tracked for compliance with the Plan's stay-ahead provision (see Chapter 9, Section 9.4.6.1, Land Cover Type Groupings for Jump-Start and Stay-Ahead Provisions). SSHCP development fees are subject to automatic adjustments (see Chapter 12, Economics Analysis and Funding Program, Section 12.4.3.2, Development Fee Adjustment Program) to allow for fluctuating land values and other mitigation-related costs. Annual adjustments will be made on or before March 15 of each calendar year, and other adjustments

may be made during periodic audits. Table 12-5, Development Fees Used in the SSHCP Economic Model, in Chapter 12 sets forth the initial SSHCP development fee structure.

10.7.1 SSHCP Development Fees

SSHCP Development Fee Payment Timing

Mitigation for Covered Activity project impacts, whether through payment of the SSHCP development fee or land dedication, must occur prior to land disturbance. For master planned projects, an applicant can chose to pay SSHCP development fees for a unit of land to be impacted (a phase or portion of a larger project) rather than paying SSHCP development fees for the full project area at one time. Project proponents that pay SSHCP development fees in advance of issuance of SSHCP permits are subject to provisions of the "catch-up fee ordinance" as described in Chapter 9, Section 9.7.3, "Catch-Up Fee" Ordinance. This ordinance states that if a project proponent pays SSHCP development fees prior to issuance of an SSHCP permit and SSHCP development fees increase before the SSHCP permit is issued, the project proponent will pay the difference between what was originally paid and the amount of the SSHCP development fee increase. Fee payments are final and nonrefundable and remove any need for land dedication in lieu of SSHCP development fees.

10.7.2 Land Dedication in Lieu of SSHCP Development Fees

As described in Chapter 9, Section 9.4.4, Land Dedication in Place of SSHCP Fees, applicants will be allowed to dedicate land or easements instead of paying SSHCP development fees. If an applicant proposes to dedicate land or an easement and the Implement Entity determines that a proposed land dedication is acceptable for incorporation into the Preserve System, then the "land purchase" component of the SSHCP development fee can be reduced at a 1:1 ratio (see Chapter 12 for a complete breakdown of SSHCP development fee components). The remaining components of the SSHCP development fee will remain unchanged, as they are used to fund management and monitoring, Plan administration, and other features of the Plan. Land dedication in lieu of paying the land purchase component of the SSHCP development fee is only awarded after the Implementing Entity has approved of the land dedication and recordation of a conservation easement or transfer of fee title to the Implementing Entity has occurred.

The Implementing Entity will calculate the amount of habitat land cover type that can be used to reduce the SSHCP development fee commensurate with the land cover types found on the proposed dedication site. Applicants must follow the process for land dedication as described in Section 10.4.2.4, Proposed Land Dedication Map and Report.

Dedication of Land in Excess of Required Mitigation

If more land is dedicated than is required to offset impacts, an SSHCP Land Cover Credit can be generated. For a description of how SSHCP Land Cover Credits are generated, see Chapter 9, Section 9.4.4.

10.8 SSHCP Permit Authorization Issuance

Depending on the type of applicant, the Land Use Authority Permittee or the Implementing Entity will issue written authorization allowing them to engage in Covered Activities once all required SSHCP development fees have been paid, land dedications or easements have been received (if applicable), and conditions or mitigation terms have been satisfied. The Land Use Authority Permittee shall provide a copy of the project material for all projects it approves to the Implementing Entity for entry into the SSHCP database.

INTENTIONALLY LEFT BLANK

11 CHANGED AND UNFORESEEN CIRCUMSTANCES – ASSURANCES

This chapter discusses the assurances requested by the Permittees that will accompany the federal Endangered Species Act (ESA) Section 10(a)(1)(B) permits issued by the U.S. Fish and Wildlife Service (USFWS) and assurances that will be provided to private landowners within the Plan Area. This chapter also provides a discussion of projected effects of climate change in California, qualitatively assesses the relative vulnerability of the South Sacramento Habitat Conservation Plan (SSHCP) Covered Species to climate change in the Plan Area, and discusses how climate change was considered in the Conservation Strategy.

11.1 Assurances for Private Landowners

11.1.1 Willing Sellers

As discussed in Chapter 9, land will only be acquired by the Implementing Entity for the SSHCP Preserve System from willing sellers. The SSHCP Preserve System has enough flexibility that any one parcel of land is not required to satisfy the SSHCP Conservation Strategy.

The SSHCP Plan Permittees may enter into option agreements with key landowners to ensure that large tracts of land can be acquired that fulfil the SSHCP Conservation Strategy, including Preserve acquisitions for the "jump-start" and "stay-ahead" provisions. In the unlikely event that there are no willing sellers, the SSHCP Implementing Entity will consider amending the SSHCP, adjusting the development fees, or modifying other aspects of the SSHCP, as described in Chapter 9. The SSHCP cannot be amended to eliminate this willing sellers' clause or do anything that would force or otherwise require a landowner to sell land or easements to the SSHCP Implementing Entity.

11.1.2 Land or Easement Acquisition Pricing

The acquisition costs for land of a particular cover type will reflect the going market rate based on comparable lands. The SSHCP development fees that are collected will reflect the current market rate for land with similar habitat values needed for mitigation. Covered Activity development fees will be sufficient to purchase the needed Preserve land at the market rate. It is recognized, however, that development fees may not always be adequate at the time land is available for purchase. The SSHCP has provisions to address this issue, should it arise, including the jump-start and stay-ahead provisions (Chapter 10). In the unlikely event that there are no willing sellers, the SSHCP Implementing Entity will consider amending the SSHCP, adjusting the development fees, or modifying other aspects of the SSHCP, as described in Chapter 9.

11.1.3 No Use of Eminent Domain

As discussed in Chapter 9, the Implementing Entity will not use condemnation or eminent domain to acquire property.

11.1.4 No Change of Land Use or Zoning Designations

The SSHCP cannot require the local Land Use Authority Permittees to change land use or zoning designations to accommodate the SSHCP Conservation Strategy. Under the SSHCP, all landowners retain the right to apply for permits, rezones, or any other entitlements allowed under the local jurisdiction's policies and regulations.

11.1.5 Good Neighbor Program

The SSHCP requires the acquisition, preservation, re-establishment/establishment, and management of species habitat. Such actions may result in the expansion (colonization or increased numbers) of some Covered Species populations on private property adjacent to Preserves, potentially restricting the activities or increasing management costs for adjacent landowners. In recognition of this potential effect, the SSHCP offers a Good Neighbor Program that allows the SSHCP Implementing Entity to extend incidental take coverage to landowners that are adjacent to SSHCP Preserves and meet certain conditions as described in this section.

The SSHCP Good Neighbor Program extends Incidental Take Permit (ITP) coverage for willing participants on an "opt-in" basis for all agricultural lands within 0.5 mile of any land or property acquired as part of the SSHCP Preserve System. This opt-in approach allows for landowners to willingly participate in the Good Neighbor Program. Landowners that do not seek to participate in the program will not be required to do so. Incidental take coverage can only be extended to eligible parcels or portions of parcels within the Plan Area. The program does not provide for incidental take of existing populations of Covered Species prior to the establishment of a Preserve.

The Good Neighbor Program is described as follows:

- Agricultural lands within 0.5 mile of SSHCP Preserve boundaries can apply to the Implementing Entity for incidental take of federally listed Covered Species under the SSHCP's Section 10(a)(1)(B) ITP if such lands become inhabited by SSHCP Covered Species as a result of implementing the SSHCP, the land owner has applied for inclusion in the Good Neighbor Program, and the incidental take is in compliance with other applicable state and federal regulations (e.g., Migratory Bird Treaty Act, Clean Water Act, California Fish and Game Code).

- Incidental take coverage will be offered to neighboring land owners that are in active agricultural production, including ranching, at the time that an SSHCP Preserve is established and only on lands that are within the Plan Area. Incidental take coverage will not be offered to lands devoted to non-farmland or ranching purposes at the time the nearby Preserve is established.
- For purposes of the SSHCP, agricultural activities include crop production, animal production, forage production, and ranching activities in which usual and customary agricultural practices are occurring at the time the neighboring SSHCP Preserve is established. If agricultural lands used for crop production lie fallow in accordance with normal crop rotation practices at the time the neighboring Preserve is established, those lands will be considered to be actively used for agricultural purposes. Incidental take coverage shall continue, subject to the terms and conditions of the SSHCP, the Implementing Agreement, and the ITPs, for as long as the neighboring lands are actively used for agricultural purposes as defined here and the SSHCP ITPs remain in effect. Take coverage does not include conversion of agriculture to other land uses.
- Upon establishment of an SSHCP Preserve, the Implementing Entity will send a letter to each neighboring landowner with property that is located within 0.5 mile of the Preserve boundary and are actively used for agricultural purposes as defined in this section. The letter will explain the SSHCP Good Neighbor Program, including the landowner's potential eligibility for incidental take coverage under the program. Landowners who are interested in receiving incidental take coverage shall respond to the Implementing Entity and request coverage within 30 days of confirmed receipt of the notification.
- Prior to extending incidental take coverage, the Implementing Entity will determine the baseline conditions of the property by conducting a survey of the property. Upon completion of the surveys, a biological report will be prepared that documents the areas and resources of the property that are eligible for incidental take coverage under the program. Costs to prepare surveys and the biological report are the responsibility of the landowner. Biological reports will be reviewed by the Implementing Entity and the USFWS for adequacy.
- A change of ownership of land enrolled in the Good Neighbor Program requires the new landowner to notify the Implementing Entity and to sign a Certificate of Inclusion in order to continue coverage. No new surveys are required as long as the original agricultural practices described in the original Certificate of Inclusion are maintained by the new landowner.

Incidental take coverage ends when the SSHCP Permit Term expires. The Implementing Entity will maintain a record of all correspondence and Certificates of Inclusion sent to neighboring landowners under this policy, as well as signed Certificates of Inclusion returned by landowners.

On an annual schedule, the Implementing Entity will notify the USFWS of the number, location, and size of neighboring lands entered into the Good Neighbor Program. Copies of the Certificates of Inclusion will be provided to the Wildlife Agencies upon request.

Process for Entering Into the Good Neighbor Program

Generally, the steps are as follows:

1. The landowner contacts the Implementing Entity to express interest.
2. The Implementing Entity, with the aid of the property owner, collects information, including but not limited to a map of the property, proposed activities on the property, a description of the possible incidental take that may be caused by the landowners activities, and any other pertinent information.
3. The Implementing Entity conducts species surveys and land cover type surveys for the property.
4. The Implementing Entity prepares a biological report that describes the baseline conditions for the property to be enrolled in the Good Neighbor Program. Baseline conditions include a description of habitat for Covered Species (extent and quality), records of Covered Species on the subject property, and observations of Covered Species on the property.
5. Based on the information provided by the property owner and information gathered during site visits, the Implementing Entity develops a draft Good Neighbor Agreement.
6. Once the Good Neighbor Agreement is finalized, the property owner is issued a Certificate of Inclusion, and incidental take coverage will be extended to the qualifying landowner.

11.1.6 Public Notification of Land Acquisitions

All landowners within 0.5 miles of a property that is being proposed for preservation by the SSHCP must be notified of the impeding action to preserve the property. The notice must be sent at least 15 days prior to the Implementing Entity's Board meeting at which the proposal to preserve the property is being heard. At a minimum, the notice must include the date, time, and location of the Implementing Entity's Board hearing and a map that shows the proposed Preserve in relation to properties that are within 0.5 miles of the proposed Preserve property.

SSHCP Preserve acquisitions in fee title and easement are privately negotiated between landowners and the SSHCP Implementing Entity. The parties will privately settle on appropriate terms of a fee title or conservation easement acquisition, continued management of the property, possible improvements to the property, and any potential issues associated with the property title

among other procedural steps necessary for a transaction. Once terms have been agreed to between the parties, the Technical Advisory Committee must approve the transaction (see Chapter 9, Section 9.3.4).

11.1.7 Easement Acquisitions

The acquisition of easements is the preferred method for establishing the SSHCP Preserve system outside of the Urban Development Area (UDA). As described in Chapter 9, 85% of the Preserve system outside of the UDA will be established via easement acquisitions. Easement acquisitions are preferred by the Implementing Entity because easements maintain private ownership of lands and generally cost less to acquire. Fee title acquisitions will be allowed if there are no willing sellers of an easement. However, property purchased in fee title due to the unavailability of easement options may be sold back to a private landowner after an easement is established.

11.1.8 No Public Access to Conservation Easements Held by Private Landowners

It is not the intent of the Implementing Entity to allow general public access on conservation easements that are part of the SSHCP Preserve System. Public access to private lands managed under the SSHCP could conflict with ongoing agricultural or other operations and could pose a safety risk to the public. Public access to lands under conservation easements could also pose a risk of unwanted trespass onto adjacent privately held lands. Generally, the Implementing Entity will leave decisions regarding public access up to the landowner but will restrict access through the conservation easement where that access may conflict with the conservation goals of the site. All conservation easements will provide access for the Wildlife Agencies' and Implementing Entity's biologists to conduct management and biological monitoring necessary for compliance with the SSHCP's Monitoring Program and Preserve System Management Program.

11.2 Assurances to the Permittees – The No Surprises Rule

The federal No Surprises Regulation was established by the Secretary of the Interior on March 25, 1998. It provides assurances to Section 10 permit holders that no additional money, commitments, or restrictions of land or water will be required should unforeseen circumstances requiring additional mitigation arise once the permit is in place. The No Surprises Regulation states that if a Permittee is properly implementing an HCP that has been approved by USFWS, no additional commitment of resources, beyond that already specified in the plan, will be required. The Permittees request regulatory assurances (No Surprises) for all Covered Species in the Plan.

The federal No Surprises Rule (63 FR 8859) and associated amendments to federal regulations (50 CFR 17.3, 17.22, and 17.32) refined the concepts of "changed and unforeseen

circumstances" in HCPs, and describe potential future responsibilities based on whether changes in circumstances could have reasonably been foreseen and addressed by an HCP.

11.2.1 Changed Circumstances

Changed circumstances are defined under the federal "No Surprises" Rule (63 FR 8859) and at 50 CFR 17.3 as:

> "Changed circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the USFWS and that can be planned for (e.g., the listing of a new species, fire, flood, or other natural catastrophic event in areas prone to such events)."

Accordingly, these regulations require that potential changed circumstances be identified in the Plan along with remedial measures that would be taken to address these changes. The changed circumstances that could arise in the Plan Area have been identified and are described below.

A changed circumstance is a change in the circumstances affecting a Covered Species or their habitats that can be reasonably anticipated and that allows a plan to be developed in advance to accommodate the change. Changed circumstances are identified and planned for by the Plan Permittees. Anticipating and addressing these changed circumstances adds to the conservation value of the SSHCP by reducing the potential risks associated with the changed circumstance and will ensure that the Plan's Biological Goals and Measurable Objectives will be met (Chapter 7). It also provides the Permitting Agencies with assurance that the Implementing Entity is prepared to take certain remedial actions to address a changed circumstance if such an event occurs, and provides assurances to the Permitting Agencies that the SSHCP economic analysis and funding program (Chapter 12) includes adequate funding to deal with the identified changed circumstances.

If a changed circumstance occurs within the Plan Area as defined by these sections, the Implementing Entity will convene the Technical Advisory Committee (TAC) to discuss the changed circumstance if necessary. The Implementing Entity will remediate the effects of the changed circumstances, as described for each changed circumstance in Sections 11.2.2 to 11.2.9, and will report to the TAC on its actions. As necessary, the Implementing Entity will begin implementing a remediation action without awaiting notice from the TAC.

Pursuant to the No Surprises Rule, if such changed circumstances were provided for in the SSHCP and they occur during the Permit Term, implementation of their remedial measures is required. If additional conservation and mitigation measures are deemed necessary to

respond to changed circumstances and were provided for in the Plan's operating conservation program,[1] the Permittees will implement the measures specified in the SSHCP (50 CFR 17.22 and 17.32). The Implementing Entity will maintain sufficient financial reserves to fund all remedial actions as they arise.

If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the Plan's operating conservation program, the USFWS will not require any conservation and mitigation measures in addition to those provided for in the Plan, without the consent of the Permittees, as long as the Plan is found to be properly implemented[2] (50 CFR 17.22 and 17.32).

11.2.2 Unforeseen Circumstances

Unforeseen circumstances are also defined under the federal "No Surprises" Rule (63 FR 8859) and at 50 CFR 17.3 as follows:

> "Unforeseen circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Service at the time of the conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of the covered species."

Unforeseen circumstances are events affecting a species or geographic area covered by the SSHCP that could not reasonably have been anticipated by the participants during the development of the SSHCP and that result in a substantial and adverse change in the status of a Covered Species.

If unforeseen circumstances do arise during the SSHCP Permit Term, and if additional conservation and mitigation measures are deemed necessary to respond to the unforeseen circumstance, the USFWS and the Implementing Entity would work together to identify opportunities to address the unforeseen circumstance. The USFWS "may require additional measures of the Permittees where the Plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, or to the Plan's operating conservation program[3] for the affected species, and the additional measures maintain the original terms of the conservation plan to the maximum extent possible. However, any additional conservation and mitigation measures required by the

[1] Operating Conservation Program means any conservation plan, Implementing Agreement, and permit whose commitments and provisions have been or are being fully implemented by the Permittee (50 CFR 17.3)

[2] A "*properly implemented conservation plan"* means all SSHCP, Implementing Agreement, and permit commitments and provisions have been and are being fully implemented by the Permittees (50 CFR 17.3).

[3] An "*operating conservation program"* means those conservation management activities that are expressly agreed upon and described in the Plan or its Implementing Agreement, if any, and which are to be undertaken for the affected species when implementing an approved conservation plan, including measures to respond to changed circumstances.

USFWS to address unforeseen circumstances will not involve the commitment of additional land, water, or financial compensation, and will not require additional restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the Plan unless the Implementing Entity consents" (see the No Surprises Rule and permit regulations 50 CFR 17.22(b)(5) and 17.32(b)(5).

The USFWS will "have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available." A finding of unforeseen circumstances must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of species affected by the unforeseen circumstances. The USFWS will consider, but not be limited to, the following factors:

- Size of the current range of the affected covered species;
- Percentage of range adversely affected by the Plan;
- Percentage of range conserved by the Plan;
- Ecological significance of that portion of the range affected by the Plan;
- Level of knowledge about the affected covered species and the degree of specificity of the species' conservation program under the Plan; and
- Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

If a finding of unforeseen circumstances is made by the USFWS and additional conservation and mitigation measures are required, the Implementing Entity will work with the TAC to appropriately redirect SSHCP resources to address the unforeseen circumstances, consistent with 50 CFR 17.22(b)(5)(iii)(B) and with 50 CFR 17.22(b)(5)(iii)(B).

The No Surprises Rule "does not limit or constrain the USFWS, or any other Federal, State, local, or Tribal government agency, or any private entity, from taking additional actions at its own expense to protect or conserve a SSHCP Covered Species." This means the USFWS or other entities can intervene on behalf of a species at their own expense at any time and be consistent with the assurances provided to the Permittees under the No Surprises Rule.

Also, "nothing in the No Surprises Rule prevents the USFWS from asking the Permittees to voluntarily undertake additional mitigation on behalf of the affected species." If unforeseen circumstances do arise during the SSHCP Permit Term and the Permittees would like to undertake additional conservation and mitigation measures to respond to the unforeseen circumstance (e.g., human zombie apocalypse destroys Implementing Entity staff), the Permittees may request an amendment to the Plan (see Chapter 9).

11.3 Climate Change

Effective HCPs must anticipate and mitigate a wide range of current and potential threats to species. A growing body of research describes the potential effects of climate change on species and ecosystems. Because HCPs are tasked with the conservation of U.S. endangered species over significant time horizons (often in perpetuity), the effectiveness of HCPs may be reduced if plans do not account for climate change. The No Surprises clause that precludes the retroactive adjustment of HCP conservation commitments (USFWS and NOAA 1998) makes the consideration of climate change in HCP development critical (Bernazzani et al. 2012).

11.3.1 Projected Climate Change and Effects in California

The SSHCP Conservation Strategy was developed with consideration of projected future effects of climate change as identified in the *2009 California Climate Adaptation Strategy* (CAS) (California Natural Resources Agency 2009), Our Changing Climate (California Energy Commission and California Natural Resources Agency 2012), Safeguarding California: Reducing Climate Risk (California Natural Resources Agency 2014), the U.S. Bureau of Reclamation (2014), and the Capital Region Climate Readiness Collaborative (2014). The physical effects of climate change identified in these resources include the following, which are assumed as changed circumstances in the SSHCP:

- Temperature rise:
  - 2.1 degrees Fahrenheit (°F) to 4.5°F by 2050; 3.6°F to 7.8°F by 2100
  - More pronounced warming in summer than winter
  - More pronounced warming inland than in coastal areas
  - All models predict increased temperatures, with level of greenhouse gas emissions the biggest uncertainty.
- Extreme weather events:
  - More frequent and longer heat waves
  - More frequent and more intense wildfires
  - Prolonged drought
  - Increased winter and spring flooding due to more rain relative to snow, and earlier snowmelt.

- Precipitation changes:
  - 12% to 35% reduction by 2050
  - High uncertainty due to different models of where and how much snowfall and rain patterns will change
    - 11 of 12 precipitation models show overall decreases in rainfall in Northern California (12% to 35%)
    - More water will fall as rain than as snow, affecting runoff patterns (earlier snowmelt).
- Earlier spring and summer seasons, later fall and winter seasons
- Sea level rise:
  - 12 to 18 inches by 2050; 21 to 55 inches by 2100
- Generally hotter and drier conditions.

Potential future climate change impacts in the Plan Area include warmer temperatures, altered precipitation (changes in the timing, intensity, location, amount, and variability of precipitation); reduction of average annual snowpack and changes in the timing of snowmelt; seasonal shifts and lengthening of the growing season; and long-term changes in watershed vegetation. The potential effects of such changes, both directly from climate change and indirectly from more frequent and intense wildfires, include alterations in runoff patterns, hydrology, vegetation communities, microclimates, and microhabitats. Although these types of impacts are expected to occur, the existing climate change models require further calibration to estimate local impacts, determine variability of precipitation, and predict timing of extreme events. The changing patterns of rain and snowfall, however, are difficult to predict at a local or regional level due to natural variability and complex climatic and non-climatic interactions of temperature, wind, evapotranspiration rates, and other factors. However, the present state of knowledge can inform that future temperatures and precipitation may look very different from the past, even with little change in total annual precipitation levels in the six-county Sacramento region. It is important to note that yearly temperature and precipitation estimates conceal precipitation events that will vary throughout the year (Phurisamban 2014).

11.3.2 Climate Change and SSHCP Covered Species

The SSHCP Conservation Strategy and Preserve System Management and Monitoring Program were designed to provide assurances that Biological Goals and Measurable Objectives for Covered Species will be achieved under climate change changed circumstances (Section 11.4.4). To accomplish this, the Permittees first identified the Covered Species most at risk from climate change. Information compiled in the species accounts (Appendix B), as well as the best available climate change literature for the Sacramento Valley, was evaluated in the context of several

factors to assess the relative sensitivity of the Covered Species to climate change in the SSHCP. Factors considered generally following Gardali et al. (2012) and include the following:

- Habitat specialization and changes in habitat suitability: Species with generalized habitat requirements are more likely to tolerate a greater degree of climate change-induced habitat alterations than habitat specialists, and especially specialists occupying habitats most likely to be affected by climate change (e.g., riparian and wetland systems).
- Physiological tolerances: Species with high sensitivity to temperature, precipitation, moisture, or other climatic variables are more likely to be affected by climate change.
- Migratory status: Migratory species that depend on seasonally appropriate environmental conditions (e.g., environmental cues or triggers) are sensitive to factors that can affect survival and reproduction, such as food availability and temperature regimes.
- Dispersal ability: Species with limited dispersal capabilities, such as speed and distance of dispersal movements, are less likely to adapt to rapidly changing environmental changes.
- Changes in food availability: Species that depend heavily on seasonally or environmentally determined food resources or predator–prey relations (e.g., insect blooms tied to temperature) are more likely to be affected by climate change.
- Changes in extreme weather: Species sensitive to weather extremes such as prolonged drought or unusually high temperatures that affect both habitat and/or individuals directly (i.e., physiological tolerances) are more likely to be affected by climate change.

The results of this evaluation are summarized in Table 11-1. For each of the factors in the table, a general sensitivity ranking of Low, Medium, or High is assigned, or NA (not applicable) is assigned if the factor does not apply to the species. Available information for the species to support the rankings is provided. A general conclusion about the species' likely overall sensitivity to climate change in the Plan Area is also provided. The context of the Table 11-1 analysis is primarily the Plan Area and not the species' range-wide distributions.

For example, species that use oak woodlands, such as Cooper's hawk (*Accipiter cooperii*), may be considered vulnerable to climate change if wildfires become more frequent and intense and degrade or eliminate woodlands in the Plan Area. However, some climate models predict overall increases in oak woodlands in other areas of California, so at a statewide level, woodland species would not be as vulnerable to climate change, even though species distributions may change. So while a species such as Cooper's hawk may not be considered vulnerable statewide, its occurrence and distribution in the Plan Area could be adversely affected by consequences of future climate change. Consequently, some of the sensitivity conclusions for certain avian species in the Plan Area may not agree with statewide vulnerability assessments for birds made by Gardali et al. (2012). For example, of the 128 avian taxa Gardali et al. (2012) identified as vulnerable to climate

change in California, the only SSHCP avian Covered Species on the list is Swainson's hawk (*Buteo swainsoni*)—a Climate Priority 2 species according to Gardali et al. (2012). This species was ranked as having low–medium sensitivity in Table 11-1. Overall, six of the nine avian Covered Species in the Plan Area were ranked by the Permittees as having at least a low–medium sensitivity to climate change. Also, Gardali et al. (2012) note that their assessment was scaled to California and may not identify vulnerable taxa at a smaller scale.

More complex interactions or indirect relationships between climate change and other threats and stressors generally are not considered in the Table 11-1 analysis because they are often speculative. For example, severe drought may reduce the need for mosquito controls, which may reduce the proliferation of mosquitofish, which is a predator of fairy and tadpole shrimp (*Branchinecta lynchi* and *Lepidurus packardi)*, western spadefoot (*Spea hammondii*), and California tiger salamander (*Ambystoma californiense*), or the use of insecticides, which can adversely impact water quality, prey, or have direct toxic effects on wildlife.

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
Ahart's dwarf rush	High Sensitivity: Vernal pools and swales. Habitat could be hydrologically altered by climate change.	Medium Sensitivity: as annual it can tolerate periods of drought. Environmental conditions for germination (e.g., water temperature) unknown.	NA	Medium Sensitivity: natural seed dispersal likely via flowing water, waterfowl, hooves and legs of livestock but also found to colonize artificial features including created vernal pools, stock pond and reservoir margins, ditches, and other excavated or scraped depressions. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	High Sensitivity: sensitive to prolonged drought or altered precipitation patterns that could affect hydrology.	Medium-High
Boggs Lake hedge-hyssop	Medium Sensitivity: Vernal pools and seasonal wetlands. Could be hydrologically altered by climate change.	Medium Sensitivity: as annual it can tolerate periods of drought. Environmental conditions for germination (e.g., water temperature) unknown.	NA	Medium Sensitivity: natural seed dispersal likely via flowing water, waterfowl, hooves and legs of livestock but also found to colonize artificial features including created vernal pools, stock pond and reservoir margins, ditches, and other excavated or scraped depressions. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	Medium Sensitivity: may be sensitive to prolonged drought but also occurs in artificial habitats including created vernal pools, stock pond and reservoir margins, ditches, and other excavated or scraped depressions.	Medium
Dwarf downingia	Medium Sensitivity: Vernal pools and swales. Margins of larger or deeper vernal pools and the seasonally fluctuating vernal pool-like edges of more severely inundated systems. Habitat could be hydrologically altered by climate change.	Medium Sensitivity: as annual it can tolerate periods of drought. Environmental conditions for germination (e.g., water temperature) unknown.	NA	Medium Sensitivity: natural seed dispersal likely via flowing water, waterfowl, hooves and legs of livestock. Evidence of long distance dispersal in the species. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	Medium Sensitivity: may be sensitive to prolonged drought but also occurs in artificial habitats such as stock ponds and more severely inundated systems.	Medium
Legenere	Medium Sensitivity: Vernal pool and seasonal wetlands. Strict endemic of the vernal pool hydrologic cycle in well-developed vernal pools.. Habitat could be hydrologically altered by climate change.	Medium Sensitivity: as annual it can tolerate periods of drought. Environmental conditions for germination (e.g., water temperature) unknown.	NA	Medium Sensitivity: natural seed dispersal likely via flowing water, waterfowl, hooves and legs of livestock. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	Medium Sensitivity: may be sensitive to prolonged drought but also occurs in artificial habitats such as stock ponds and along margins of more permanent water bodies.	Medium
Pincushion navarretia	High Sensitivity: Vernal pools and swales. Habitat could be hydrologically altered by climate change.	Medium Sensitivity: as annual it can tolerate periods of drought. Environmental conditions for germination (e.g., water temperature) unknown.	NA	Medium Sensitivity: natural seed dispersal likely via flowing water, waterfowl, hooves and legs of livestock. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	High Sensitivity: sensitive to prolonged drought or altered precipitation patterns that could affect hydrology.	Medium-High
Sacramento Orcutt grass	Medium Sensitivity: Vernal pools; larger, deeper pools with more extreme inundation regimes. May germinate in years of marginal precipitation. Habitat could be hydrologically altered by climate change.	Medium Sensitivity: sensitive to temperature regime. Germination requires cold stratification followed by increasingly warm fluctuating diurnal temperatures and the presence of symbiotic aquatic fungi (*Alternaria* sp., *Curvilaria* sp.). However, matures in hotter and drier late spring and summer and possesses the C4 photosynthetic pathway and Krantz Anatomy which allows it to exchange atmospheric gasses with increased efficiency and concomitant reduction in water loss to evaporative transpiration.	NA	Medium Sensitivity: low natural dispersal capability but may be transported by livestock. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	High Sensitivity: one of the more specifically adapted Orcutt species, inhabiting the more well-developed of vernal pools, and one of the least likely to germinate during years with marginal precipitation.	Medium-High

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
Slender Orcutt grass	Medium Sensitivity: Vernal pools; larger, deeper pools with more extreme inundation regimes. May germinate in years of marginal precipitation. Habitat could be hydrologically altered by climate change.	Medium Sensitivity: sensitive to temperature regime. Germination requires cold stratification followed by increasingly warm fluctuating diurnal temperatures and the presence of symbiotic aquatic fungi (*Alternaria* sp., *Curvilaria* sp.). However, matures in hotter and drier late spring and summer and possesses the C4 photosynthetic pathway and Krantz Anatomy which allows it to exchange atmospheric gasses with increased efficiency and concomitant reduction in water loss to evaporative transpiration.	NA	Medium Sensitivity: low natural dispersal capability but may be transported by livestock. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	Medium Sensitivity: adapted to more extreme inundation regimes and may germinate in years with marginal precipitation.	Medium
Ricksecker's water scavenger beetle	High Sensitivity: Vernal pool and swale with sufficient hydroperiod to support lifecycle (minimum 18 days). Habitat could be hydrologically altered by climate change.	Medium Sensitivity: late instar larvae leave pool when temperatures increase and construct burrows in moist habitat for 2-4 day pupation period, depending on temperature. Then fly to different vernal pool for mating.	NA	High Sensitivity: adults fly to different vernal pools for mating and likely sensitive to habitat fragmentation. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	Medium Sensitivity: predatory as larvae and omnivorous as adults, with larvae indiscriminately attack anything their size or smaller. Adults feed on common frog-fruit (*Phyla nodiflora*), and dead insects and tadpoles.	Medium Sensitivity: eggs may be desiccation-resistant and lay dormant in the pool bottom. Need at least 18-day hydroperiod, but may be able to withstand drought periods.	Medium-High
Mid-valley fairy shrimp	Medium Sensitivity: Vernal pool and swale. Require cold winter waters for hatching and growth, typically appearing after the first frosts; optimal habitat includes abbreviated hydroperiod. Habitat could be hydrologically altered by climate change.	High Sensitivity: requires cold winter waters for hatching and growth; maturity rate related to temperature. May be sensitive to shifting/rising temperature patterns; e.g., warmer temperatures in late winter/early spring.	NA	Medium Sensitivity: cysts may be dispersed through predator wastes, wind, and mud carried on feet of animals, including livestock. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	Low Sensitivity: omnivorous, indiscriminately filters particles from the water column, including bacteria, unicellular algae, and micrometazoa. Also rasps periphyton from sticks, stems and slender leaves.	Medium Sensitivity: survive as cysts during dry periods and droughts. Can reach maturity in as little has 4 days, indicating relatively less sensitivity to drought conditions.	Medium
Vernal pool fairy shrimp	Medium Sensitivity: Vernal pool and swale vernal swale. Require cold winter waters for hatching and growth. Habitat could be hydrologically altered by climate change.	High Sensitivity: requires cold winter waters for hatching and growth; maturity rate related to temperature. May be sensitive to shifting/rising temperature patterns; e.g., warmer temperatures in late winter/early spring.	NA	Medium Sensitivity: cysts may be dispersed through predator wastes, wind, and mud carried on feet of animals, including livestock. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	Low Sensitivity: omnivorous, indiscriminately filters particles from the water column, including bacteria, unicellular algae, and micrometazoa. Also rasps periphyton from sticks, stems and slender leaves.	Medium Sensitivity: survive as cysts during dry periods and droughts. Can reach maturity in as little has 6 days under high temperatures, indicating relatively less sensitivity to drought conditions.	Medium
Vernal pool tadpole shrimp	High Sensitivity Vernal pool and swale; typically larger, deeper pools. Habitat could be hydrologically altered by climate change.	High Sensitivity: requires cold winter waters for hatching and growth; maturity rate related to temperature. May be sensitive to shifting/rising temperature patterns; e.g., warmer temperatures in late winter/early spring.	NA	Medium Sensitivity: cysts may be dispersed through predator wastes, wind, and mud carried on feet of animals, including livestock. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	Low Sensitivity: omnivorous, consuming live invertebrates, amphibian larvae, or carrion. Also filter detritus for micrometazoa.	High Sensitivity: survive as cysts during dry periods and droughts. Require at least 19 days to reach maturity so may be more vulnerable to shortened hydroperiods resulting from less rainfall and/or increased temperatures.	Medium-High

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
Sanford's arrowhead	Medium Sensitivity: Seasonal wetlands, freshwater marsh, open water, streams and creeks; includes man-made marsh habitats; observed water depths of 4 inches to 2 feet; potential preference for relatively shallow margins of deeper marsh systems. Habitat could be hydrologically altered by climate change.	Medium Sensitivity: dormant rhizome and associated tubers/corms allow it to persist within the submersed substrate through the dormant winter season; seed ecology, germination or seedling growth and vegetation growth unknown.	NA	Medium Sensitivity: have a wide distribution and capable of long-distance dispersal via water courses (e.g., floodwaters carrying tubers, rhizomes, fruits and seeds), migratory waterfowl, muskrats, and beavers. Ability to disperse could be limited by loss and fragmentation of suitable habitat.	NA	Low Sensitivity: occurs in relatively broad range of wetland habitats and is able withstand drought periods and occurs in seasonal and perennial wetlands and artificial or otherwise maintained irrigation, drainage, or flood control conveyances. Can be an aggressive spreader under good growing conditions.	Medium
Valley elderberry longhorn beetle	Medium Sensitivity: Depends on host plant elderberry (*Sambucus* spp.) for life cycle. General habitats include mine tailing riparian woodland, valley oak riparian woodland, mixed riparian woodland, and mixed riparian scrub where elderberry occurs. Although associated with moist habitats, elderberry is not an obligate wetland species and can tolerate drier conditions. However, suitable beetle habitat still requires that host plants are within matrix of other continuous to semi-continuous riparian vegetation. Habitat therefore could be hydrologically altered by climate change.	Unknown.	NA	High Sensitivity: very limited dispersal capability. Adults move less than 164 feet (50 meters) from emergence sites. Limited ability to shift range in response to climate change, particularly if suitable elderberry patches were reduced in size and amount and separated by longer distances.	High Sensitivity: timing of adult emergence closely to elderberry flowering between March and mid-May. Adults live only for a few days to a few weeks, mating and feeding on elderberry leaves, flowers, and nectar. Tight coupling between adult emergence and flowering of elderberry indicates that any asynchrony of this relationship due to climate change could adversely affect reproduction by species.	High Sensitivity: extreme weather conditions may disrupt synchrony of emergence and flowering of host plant.	High
California tiger salamander	High Sensitivity: Foraging – Vernal pool, seasonal wetlands and streams/creeks. Breeding – vernal pool and seasonal wetlands, that require inundation of 60–94 days after eggs hatch to complete metamorphosis; larvae develop faster in smaller, more rapidly drying pools. However, strong positive correlation between inundation period and total number of metamorphosing juveniles. Larvae die if pool dries before completion of metamorphosis. Generally reproductive output for species is low. Breeding habitat therefore could be hydrologically altered by climate change. Aestivation – blue oak woodland and savanna, and valley grassland that is less likely to be affected by climate change.	Medium Sensitivity: no specific information for species, but eggs subject to desiccation.	Low Sensitivity: short-distance breeding migrations occur between breeding sites and adjacent upland areas. These short-distance migrations are unlikely to be affected by climate change.	Medium Sensitivity: post-metamorphic dispersers may move to different ponds and may be sensitive to habitat fragmentation and isolation exacerbated by climate change.	Low Sensitivity: larvae omnivorous, feeding feed on zooplankton, small crustaceans, and aquatic insects. Post-metamorphs and adults prey on earthworms, snails, insects, fish, and even small mammals.	High Sensitivity: adults may forego breeding in drought years. During drier years males and female spend less time at breeding sites. Also, reproductive output and juvenile recruitment is naturally low, so likely sensitive to environmental stochasticity and potential extirpations at isolated sites.	Medium-High
Western spadefoot	High Sensitivity: Breeding – Vernal pool, swale, seasonal wetlands, open water, and streams/creeks that require at least 21 days of inundation for metamorphosis; reduced	High Sensitivity: reproduction strongly tied to water temperature. Water temperatures must be 48-86 degrees F before oviposition occurs. Eggs hatch 0.6-6 days	Low Sensitivity: short-distance breeding migrations occur	Medium Sensitivity: post-metamorphic dispersers may move to different breeding sites and may be sensitive to habitat fragmentation and isolation exacerbated by climate change. However,	Medium Sensitivity: rate of larval maturity related to food sources. Feed on a variety of insects, worms, and other	High Sensitivity: precipitation levels positively correlated with annual reproductive success. Forego reproduction in drought	Medium-High

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
	water volume and hotter temperatures may reduce reproductive output. Longer persisting pools allow longer larval development, and larger juveniles with greater fat reserves at metamorphosis. Foraging – Blue oak savanna, blue oak woodland, valley grassland, vernal pool, swale, seasonal wetlands, open water, and streams/creeks. Aestivation – valley grasslands and blue oak woodland and savanna. Foraging and aestivation habitat less likely to be affected by climate change.	depending on water temperature. At water temperatures greater than 70 degrees F egg failure may occur. Larval develop in 3 to 11 weeks depending on food resources and water temperature, but must be complete before pools dry. High mortality rates in prematurely drying pools (e.g., pools lasting less than 5 weeks).	between breeding sites and adjacent upland areas. These short-distance migrations are unlikely to be affected by climate change.	dispersal movements between breeding sites unknown. Species has broad geographic range in California, suggesting some capacity to disperse over relatively long distances.	invertebrates. Large juveniles have greater fat reserves, greater survival and greater reproductive fitness.	years and remain dormant in burrows.	
Western pond turtle	Medium Sensitivity: Breeding and foraging – Streams/creeks, open water, and freshwater marshes that contain slow-moving, deep water habitat and emergent woody debris, rocks, or other similar features used for basking. Perennial water sources at breeding and foraging sites are probably less prone to fluctuations related to climate change than ephemeral wetlands. However, sites with fluctuating water levels are less suitable and turtles may abandon sites that dry out. Nesting and aestivation – Blue oak woodland and savanna, valley grassland, mine tailing riparian woodland, valley oak riparian woodland, mixed riparian woodland, and mixed riparian scrub. Nesting and aestivation habitat less likely to be affected by climate change.	High Sensitivity: reproduction related to climate conditions. Have temperature-related sex determination, with males produced at lower incubation temperatures and females at high temperatures; temperature threshold is about 86 degrees F. Although eggs are laid in dry soils, may have greater risk of desiccation with hotter and drier conditions. Hatchlings may not leave the eggs when temperature exceeds 81 degrees F to avoid dehydration. Occupied aquatic habitats have water temperature range of about 34-102 degrees F, but appear to be more active in waters at least 60 degrees F. Bask to regulate body temperature between 75-90 degrees F.	Low Sensitivity: short-distance migrations occur between aquatic sites and adjacent upland nesting/aestivation areas; usually upland nesting/aestivation sites are within several hundred feet of aquatic sites, but females may move along streams more than 1 mile to find suitable nesting sites. These short-distance migrations are unlikely to be affected by climate change.	Medium Sensitivity: capable of long distance within-stream and overland movements (at least 8 miles). Climate change, however, may increase isolation and fragmentation of suitable aquatic sites.	Low Sensitivity: opportunistic predators and scavengers, feeding on crustaceans, arthropods, and sometimes carrion. Also feed on submergent vegetation mats, as well as willow, alder, and other plant types. Young feed on mosquito larvae and other aquatic invertebrates, and nekton (aggregates of actively swimming organisms.). Food sources are unlikely to be limited by climate change.	Medium Sensitivity: inhabit perennial aquatic sites, but may abandon sites that have fluctuating water levels or that dry out, suggesting sensitivity to prolonged drought or high seasonal variability in water levels.	Medium
Giant gartersnake	Medium Sensitivity: Breeding – Seasonal wetlands, freshwater marsh, open water, and streams/creeks. Foraging – Breeding habitats and croplands (restricted to rice fields). Hotter and drier climate may adversely affect breeding and foraging habitat because adequate water during the active season (early spring through mid-fall) is important. Nesting and aestivation – Mixed riparian scrub and valley grassland less likely to be affected by climate change.	Medium Sensitivity: early winter foraging and other activities are temperature dependent, but unclear that climate change would substantially affect these activities. May be active on surface in winter when temperature is and least 59 degrees F but timing of spring emergence is variable. Use burrows to escape summer heat and become less active. Bask to bring body temperature up to activity levels. May shift daily activity patterns in response to temperature (e.g., more nocturnal in hotter months).	Low Sensitivity: short-distance migrations between wetlands and adjacent upland areas up to several hundred feet from wetlands. These short-distance migrations are unlikely to be affected by	Medium Sensitivity: capable of long distance movements over short time periods (up to 5 miles in 2 days), suggesting ability to respond to climate-related changes in habitat availability. However, due to its restricted and fragmented geographic range and distribution, it's unlikely it could make substantial latitudinal or elevational shifts in its range in response to climate change.	Medium Sensitivity: prey on aquatic species including small fish and amphibians. Reduction in perennial water sources related to climate change could affect prey availability.	High Sensitivity: inhabit perennial aquatic sites, but capable of relocating to more suitable sites if a site is temporarily degraded by extreme weather events, including drought or floods. Main requirement is that suitable alternative habitat is available. However, water management during drought periods (e.g., less water for rice fields) may reduce suitable	Medium

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
			climate change.			alternative wetlands. Also excessive flood events could be adverse due to loss of upland refuge habitat combined with inherently small, fragmented populations, thus increasing chances of extirpations.	
Cooper's hawk	Medium Sensitivity: Nesting – Blue oak woodland, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, and mixed riparian scrub; dense canopy structure for nesting; nest sites usually in trees groves (often highest tree), but also in solitary trees. Foraging – Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, mixed riparian scrub, and valley grasslands. Climate change, including increased fire frequency and intensity, could reduce or degrade suitable nesting and foraging habitat.	Low Sensitivity: eggs and nestlings could be adversely affected by increased temperatures, but thermoregulation likely more under behavioral control of adults than ambient conditions. Species also nests in a wide variety of climatic conditions in North America from southern Canada to northern Mexico so local temperature changes likely would have small effect.	Low Sensitivity: most Cooper's hawks in California are non-migratory breeding residents, but seasonal movements by montane individuals to lower elevations may occur. No substantial adverse effects on seasonal movements by climate change are expected.	Medium Sensitivity: strong adult fidelity to nesting areas, so loss or degradation of nesting site could reduce reproductive success. Juveniles are capable of long distance dispersal from natal nest sites (at least several miles). Dispersal limited by available nest sites/territories, which could be affected by climate change.	Low Sensitivity: prey on a variety of avian and mammal prey that are available year round in a broad range of climatic conditions, including ubiquitous mourning doves, pigeons, crows, starlings, house sparrows, ground squirrels, and deer mice. Climate change is unlikely to substantially affect food availability.	Low Sensitivity: as relatively long-lived species (9 years for breeding birds) unlikely to be substantially affected by extreme weather events (e.g., disruption of a breeding season) as long as nesting habitat integrity is maintained.	Low-Medium
Tricolored blackbird	Medium Sensitivity: Nesting – Cropland, valley grassland, seasonal wetlands, and freshwater marsh, typically supporting tules and cattails, but also more recently in Himalayan blackberries, thistle, silage and grain fields. Nesting habitat typically supporting tules and cattails may be altered as a result of climate change. Available breeding habitat may be reduced and result in fewer and smaller nesting colonies, exacerbating the current declining population trend. Foraging – Cropland, irrigated pasture-grassland, valley grassland, vernal pool, swale, seasonal wetlands, freshwater marsh, and open water; most foraging is within 3 miles of their colony sites, but may commute up to 8 miles. Climate change could affect suitability of foraging sites, forcing birds to commute farther distances to productive foraging sites.	Low Sensitivity: eggs and nestlings could be adversely affected by increased temperatures, but thermoregulation likely more under behavioral control of adults than ambient conditions. Species also nests in a wide variety of climatic conditions in California, including the Mojave Desert.	Low Sensitivity: not migratory, but nomadic, with an unpredictable, but apparently flexible pattern. No substantial adverse effects on nomadic movements by climate change are expected.	Medium Sensitivity: due to its restricted range, it is unlikely that it could significantly shift its range in response to climate change, and it is possible that its range could contract with the loss of suitable nesting habitat.	Medium Sensitivity: rely on concentrations of insects and seeds within commuting distance (typically less than 3 miles) from nesting colonies. Could be adversely affected if climate change resulting in reduced food availability in areas near nesting colonies.	Medium Sensitivity: breeding sites may be affected by extreme weather conditions, including drought and flooding.	Low-Medium

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
Western burrowing owl	Low Sensitivity: Wintering – Blue oak savanna, cropland, irrigated pasture-grassland, valley grassland, vernal pool, seasonal wetlands, swale, streams/creeks. Nesting – Cropland, irrigated pasture-grassland, stream/creeks; nest substrates include excavated burrows (primarily ground squirrel) or similar cavities, such as pipes, culverts, rubble piles, and other debris. These habitats unlikely to be substantially affected by climate change and may actually be increased by hotter and drier conditions and associated increases in fire frequency and intensity.	Low Sensitivity: broods are raised in underground burrows where microclimate conditions are affected by site-specific physical factors such as soil type, entrance aspect, slope, burrow depth, and convection. Nests in a broad range of climate regions (including Imperial Valley in California), suggesting that surface temperatures and other climate factors are not particularly critical limits on nesting activities.	Low Sensitivity: California supports both year-round resident burrowing owls (especially in central and Southern California) and over-wintering migrants. Climate change in California should not affect migratory and other seasonal movement patterns because there would be relatively little impact on suitable habitat and prey.	Low Sensitivity: climate change itself unlikely to affect habitat availability so dispersal ability not directly related to climate change; e.g., the need to shift range in response to climate change.	Low Sensitivity: prey includes insects, small mammals, reptiles, birds, and carrion. Any climate-related changes to a prey type (e.g., altered timing of insect blooms) could be compensated for by switching to alternate prey.	Low Sensitivity: as relatively long-lived species (at least 8 years) unlikely to be substantially affected by extreme weather events (e.g., disruption of a breeding season) as long as long-term habitat values are maintained.	Low
Ferruginous hawk	Low Sensitivity: Foraging (winter) – valley grassland, vernal pool, swale, seasonal wetland, and irrigated-pasture where rodents such as ground squirrels, gophers, and rabbits are abundant. Habitat quality, as defined by openness and prey availability likely has little sensitivity to climate change.	Low Sensitivity: as related to wintering activities, there are no evident consequences of climate change. It can be assumed that individuals would use behavioral responses to respond to climate effects.	Medium Sensitivity: Spring migration and initiation and support of breeding activity may be affected by climate change if predator-prey relations at nesting sites are altered (e.g., timing and or abundance of prey).	NA	Low Sensitivity: opportunistic selection of available prey, including ground squirrels, gophers, and rabbits that are unlikely to be substantially affected by climate change, although short-term temporal losses of prey may occur in some areas due to intense fires.	Low Sensitivity: no apparent substantial effects of extreme weather on prey or wintering habitat. Prey are available year round in the Plan Area regardless of weather conditions, although abundance may vary from year to year in relation to local weather conditions.	Low
Swainson's hawk	Medium Sensitivity: Nesting – Blue oak savanna, blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, mixed riparian woodland, and mixed riparian scrub. May nest in isolated trees and nest site selection may relate more to territory quality than tree characteristic. Foraging (year-round) – Blue oak savanna, cropland, irrigated pasture-grassland, valley grassland, vernal pool, swale, and seasonal wetlands. High quality	Low Sensitivity: eggs and nestlings could be adversely affected by increased temperatures, but thermoregulation likely more under behavioral control of adults than ambient conditions. Species nest in hot climates in California, including the western Mojave Desert.	Medium Sensitivity: arrival and departure times for migration could be disrupted by climate change, especially if timing of predator-prey relations are altered, including insect prey. Birds	Low Sensitivity: species is highly mobile and no impacts of climate change related to dispersal ability are anticipated.	Medium Sensitivity: depend on abundant food sources near nest sites. Forages for both insects and vertebrates (e.g., during breeding season) and may be sensitive to disruptions of predator-prey timing related to climate change.	Low Sensitivity: as a long-lived species (more than 20 years) unlikely to be substantially affected by extreme weather events (e.g., disruption of a breeding season) as long as long-term habitat values are maintained.	Low-Medium

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
	foraging habitats support vertebrate prey (e.g., California voles, ground squirrels, gophers) during breeding season. Voles tend to occur in areas of high grass cover and wet meadows. Drier and hotter conditions and/or water management during drought reducing irrigation in agriculture could adversely affect foraging habitat quality and therefore reduce territory quality.		may fast during migration, reaching destinations undernourished and therefore adequate prey at destination important.				
Northern harrier	Medium Sensitivity: Nesting – Cropland, irrigated pasture-grassland, and valley grassland; Nesting habitat at ground level at the margin of wetlands, but also grassland and agriculture in dense, tall vegetation. Foraging - Cropland, irrigated pasture-grassland, valley grassland, vernal pool, swale, seasonal wetlands, and freshwater marsh. High quality foraging habitat for males supports high California vole densities which occur in areas with high grass cover and wet meadows. Drier and hotter conditions and/or water management during drought could reduce nesting and foraging habitat availability and quality.	Low Sensitivity: eggs and nestlings could be adversely affected by increased temperatures, but thermoregulation likely more under behavioral control of adults than ambient conditions	Low Sensitivity: most breeders in California are non-migratory, but rather nomadic in response to prey availability. Nomadic behavior unlikely to be substantially affected by climate change.	Low Sensitivity: species is highly mobile with low fidelity to nest sites. No anticipated impact of climate change related to dispersal ability are anticipated because individuals should be able to respond to changing habitat conditions.	Medium Sensitivity: California voles are a primary prey that occur in dense grasses and wet meadows. Vole habitat quality could be affected directly by climate change and/or water management during drought. Also, voles exhibit population cycles that may be affected by climate change. However, harriers can switch prey in relation to availability. Foraging also tied to small passerine nesting periods, which could be altered by climate change.	Low Sensitivity: as a long-lived species (more than 16 years) unlikely to be substantially affected by extreme weather events (e.g., disruption of a breeding season) as long as long-term habitat values are maintained.	Low-Medium
White-tailed kite	Medium Sensitivity: Nesting – Blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, mixed riparian woodland, and mixed riparian scrub that may be sensitive to extended drought conditions and lack of regeneration/recruitment, as well as more frequent and intense wildfires. Foraging – Blue oak savanna, mixed riparian scrub, cropland, irrigated pasture-grassland, valley grassland, vernal pool, swale, and seasonal wetlands; foraging habitat includes grasslands, lightly grazed pasture, wet meadows, and agricultural areas. Most foraging during breeding season is within about 0.5 mile of nest site. Drier and hotter conditions and/or water management during drought could reduce foraging habitat availability and quality.	Low Sensitivity: eggs and nestlings could be adversely affected by increased temperatures, but thermoregulation likely more under behavioral control of adults than ambient conditions. Nest failures related to weather conditions have been observed, but capable of two broods when prey are abundant.	Low Sensitivity: most breeders in California are non-migratory, but exhibit rather nomadic behavior in response to prey availability. Nomadic behavior not expected to be substantially affected by climate change.	Low Sensitivity: species is highly mobile with apparent low fidelity to nest sites. No anticipated impact of climate change related to dispersal ability because individuals should be able to respond to changing habitat conditions.	High Sensitivity: reproduction highly related to prey availability. As a small mammal specialist, sensitive to fluctuations in prey density (e.g., voles). Several years of poor prey availability (potentially exceeding its life span of less than 6 years) could substantially affect this species' productivity and recruitment. Also most foraging during breeding season is within 0.5 mile of nest, so sensitive to distribution of prey in relation to suitable nesting habitat that could be affected by climate change.	High Sensitivity: a relatively short-lived raptor (less than 6 years) and mortality has been attributed to inclement weather. Also sensitive to prey fluctuations that could be affected by weather extremes.	Medium-High
Greater sandhill crane	High Sensitivity: Roosting (winter only) – Vernal pool, seasonal wetlands, and freshwater marsh; use rocky uplands and dirt and gravel roads to obtain "grit," which	Unknown. Does not nest in Plan Area so local climate change should not directly affect reproductive success.	Medium Sensitivity: individuals likely would be sensitive	Medium Sensitivity: species is highly mobile but extremely philopatric to its roosting and foraging habitat. Climate change would not affect their dispersal ability, but they may not be able to	Low Sensitivity: omnivorous, feeding on cultivated grains, berries, small mammals, insects, snails, reptiles,	Low Sensitivity: as a long-lived species (more than 20 years) with high annual survival rates, unlikely to be substantially	High

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
	is important when diet is seeds. Foraging (winter only) - Cropland, irrigated pasture-grassland, valley grassland, freshwater marsh, and seasonal wetlands. Drier and hotter conditions and/or water management September-March could reduce both roosting and foraging habitat availability and quality. Reduced availability of suitable roosting areas could also increase distances between roosting and foraging sites, resulting in greater energy expenditure and greater chance of collisions with structures. Limited roost areas also may increase bird densities and increase susceptibility to epizootic events such as cholera, avian botulism, aspergillosis, salmonella, and avian tuberculosis.		to roosting and foraging habitat conditions upon arrival on winter grounds in the fall, which may be adversely affected by hotter and drier climate and water management.	locate suitable alternative habitat to which they can disperse.	amphibians, nestling birds, and seeds. Foraging for invertebrates in grassland and pastures occurs at onset of winter rains by probing soils in and overturning cattle dung. Altered precipitation may affect access to this food source. Has become accustomed to abundant waste grains from agriculture, which could become more limited with loss of agricultural lands from sea-level rise.	affected by extreme weather events (e.g., disruption of a breeding season) as long as long as long-term habitat values are maintained. However, collisions with transmission lines are increased during windy and foggy conditions.	
Loggerhead shrike	Low Sensitivity: Nesting – Mine tailing riparian woodlands, mixed riparian scrub, and valley grassland. habitat generally include grasslands, pastures with fence rows, agricultural fields, woodland savannas, scrub, and riparian. Foraging – Cropland, irrigated pasture-grassland, valley grassland, vernal pool, seasonal wetlands, and swale; important habitat features include short, sparse vegetation, scattered or isolated low trees or large shrubs for nest sites, available hunting perches with an open view. Except for riparian, these habitats likely are not highly sensitive to climate change.	Low Sensitivity: eggs and nestlings could be adversely affected by increased temperatures, but thermoregulation likely more under behavioral control of adults than ambient conditions.	Low Sensitivity: while some northern populations of shrikes are migratory, it is assumed that shrikes in the Plan Area are breeding residents and non-migratory.	Low Sensitivity: species is mobile and widely distributed in arid portions of the western North America. Juveniles capable of long dispersal movements (typically several miles and documented as far 43 miles). Should be capable of any necessary dispersal and range shift in response to climate change.	Low Sensitivity: forage primarily on large ground-dwelling insects that require little to no water. Also opportunistic predator on birds, amphibians, reptiles, and small mammals. Also eat road kill and carrion. Climate change unlikely to substantially availability of food sources.	Low Sensitivity: There is no information for shrike suggesting that it might be sensitive to changes in extreme weather.	Low
Western red bat	Medium Sensitivity: Roosting – Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, and orchards; roosting habitat is primarily low and middle elevation broadleaf tree communities, including cottonwood, sycamore and orchards (often walnut); generally roosts solitarily in the foliage of trees or shrubs, but reproductive females may roost together in small groups; roosts commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas with mature trees; generally forages in same areas as roosts. Roosting habitat could be degraded	High Sensitivity: has high energy requirements and enters torpor during the day to conserve energy during colder, inactive periods. Increased temperatures, along with habitat effects, could disrupt thermoregulation and energy budgets. Become active at temperatures of about 68 degrees F, but have been observed flying at temperatures as low as 45 degrees F. Reduced free water available for lactating females could affect reproductive success.	High Sensitivity: makes seasonal north-south migrations which could be disrupted by phenological changes from climate change, including disruptions in predator-prey relationships.	Low Sensitivity: species is highly mobile and roosts in suitable tree habitats; therefore should have the ability to disperse and respond to climate change through range shifts if necessary.	Medium Sensitivity: has high energetic demands. Sensitive to a potential disruption in predator-prey relations by climate change, especially during reproductive season. However, takes a variety of prey, including moths, cicadas, leaf hoppers, beetles, wasps, flies, crickets, and grasshoppers so a particular type of available prey probably not critical.	Medium Sensitivity: as a tree rooster, this species is more exposed to ambient weather conditions than crevice/cave roosting bats. However, red bat has adaptations to cold weather, including thicker fur and rounder ears to prevent heat loss. Longevity in the wild is unknown and may be sensitive to extreme weather events that reduce reproductive success and recruitment.	Medium-High

Table 11-1
Evaluation and Ranking of Covered Species Sensitivity to Climate Change

Covered Species	Habitat Specialization/Habitat Changes	Physiological Tolerance	Migratory Status	Dispersal Ability	Changes in Food Availability	Changes in Extreme Weather	Overall Sensitivity Ranking
	by hotter and drier conditions, as well as increased frequency and intensity of wildfires that affect habitat structure. Foraging – Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, mixed riparian scrub, orchards, valley grassland, vernal pool, swale, seasonal wetlands, freshwater marsh, open water, and streams/creeks. Climate change may affect predator-prey relations by altering the abundance or distribution of insect prey.						
American badger	Low Sensitivity: Open habitats, including blue oak savanna, valley grassland, vernal pool, swale, and seasonal wetlands; habitat with friable soils and available of prey such as ground squirrel. Generally found in arid, open habitats that likely are not highly sensitive to climate change. These kinds of habitats may increase in California with a hotter drier climate.	Low Sensitivity: badgers are adapted to a broad range of climate conditions in North America and likely responds to local climate conditions behaviorally and physiologically. Can reduce activity and metabolism in response to severe cold and reduced food availability characteristic of northern latitudes within its range. Could be some effect of climate change on patterns of torpor and reproductive activity, but unlikely to be substantial.	NA	Low Sensitivity: capable of making long dispersal movements (females more than 30 miles and males more than 60 miles) and its range includes a broad range of habitat conditions. Should be able to shift range both latitudinally and in elevation in response to climate change if necessary.	Low Sensitivity: opportunistic predator and adapted to conditions with seasonally low prey availability.	Low Sensitivity: its range includes regions subject to extreme weather events. Can respond both behaviorally (denning and reduced activity) and physiologically (reduced metabolism). Also long-lived (up to 15 years) and able to withstand years with poor conditions for reproduction.	Low

INTENTIONALLY LEFT BLANK

The climate change sensitivities identified in Table 11-1 were used to refine the SSHCP Covered Species list (Chapter 3), Biological Goals and Measurable Objectives (Chapter 7), Preserve System design (Chapter 7), Preserve System Monitoring and Management Program framework (Chapter 8), and Changed Circumstances (Section 11.4).

Implementing the Conservation Strategy will protect and enhance a range of Plan Area natural communities, species habitat types, and water sources; and conserving environmental gradients (e.g., altitude, aspect, slope) that will be important to species as climate change affects timing and availability of resources and habitat types in the Plan Area. This will allow many Covered Species to emigrate and disperse to the portions of the Plan Area that continue to provide suitable habitat. The SSHCP Preserve System will provide habitat connectivity for northward and upslope movement of Covered Species, by conserving and restoring habitat linkages (Section 7.5), and reducing habitat fragmentation. The Conservation Strategy also requires redundant habitat linkages to ensure effective connectivity (Section 7.5). As a result of this habitat preservation and connectivity, the distribution of Covered Species and natural land cover types in the Plan Area will be able to shift response to climate change and maintain or expand their distributions as required under Biological Goal 5. As described in Chapter 7, habitat re-establishment and establishment are included in the SSHCP Conservation Strategy to increase the resilience of Covered Species by improving quality and quantity of modeled habitat.

At the species level, the Plan Permittees developed biological goals, measurable objectives, Conservation Actions, and monitoring to ensure the life history needs of Covered Species are provided for in the SSHCP Preserve System. These species-specific measurable objectives and Conservation Actions will ensure shifts of species range, distribution, and abundance driven by climate change do not affect the species' persistence in the Plan Area, by protecting and enhancing individuals, populations, and groups of populations. The SSHCP Covered Species list includes all species with a possibility of being listed during the Permit Term, using the best information available at the time of Plan preparation. This information included the climate change sensitivities in Table 11-1, which emphasizes coverage of unlisted species with restricted distributions, small population sizes, habitat specialization, and those that depend on habitat most likely to be affected by climate change.

The climate change sensitivities of Covered Species identified in Table 11-1 were considered when developing the Conservation Strategy, including the Biological Goals and Measurable Objectives. Examples of ways in which the Conservation Strategy ensures that the species-level goal can be achieved, even with projected climate change, include the following:

- Measurable Objective GS-6 preserves upland forage areas for greater sandhill crane that can be used during flood events.

- Measurable Objective GGS1 and GGS2 for giant gartersnake targets Preserve lands in the Badger Creek watershed, which based on its elevation and position within the watershed, the Permittees assume is not vulnerable to sea level rise-related flooding. Therefore, the Permittees assume that suitable upland habitat will remain available to support overwintering giant gartersnakes in these Preserves, even during flood events.
- The SSHCP provides several dry crossings (AMM ROAD-2) where roadways cross a SSHCP Preserve or directly abut a SSHCP Preserve. These dry crossings will be sized to accommodate a minimum of medium-sized mammals (e.g., coyote) and will provide overland connectivity between Preserve lands during flooding events.
- Vernal pool species also have a limited potential to shift upslope in response to climate change because the vernal pool habitat is restricted to particular soil types that are only present in valley floors and limited portions of foothills. Therefore, the Preserve System will protect more than 23,000 acres of the Vernal Pool Ecosystem across a range of soil types, hydrologies, and locations within the Plan Area. This will provide the best feasible scenario for persistence of the vernal pool species with the effects of climate change.

The relative potential sensitivities of the Covered Species to climate change presented in Table 11-1 will help the Permittees to develop the SSHCP Preserve Monitoring and Management Program. Examples of how the SSHCP Preserve System Management and Monitoring Program framework accounts for future climate change include the following:

- The vernal pool Covered Species are considered to have a medium to medium-high sensitivity to climate change and therefore climate change effects will be closely tracked for the vernal pool Covered Species (see Section 8.3.4.4).
- During drought periods, the Implementing Entity will use adaptive management of Preserves to reduce biomass of annual grasses in the Vernal Pool Ecosystem, to help extend vernal pool ponding by reducing water uptake (Chapter 8). The Implementing Entity will also increase monitoring and management of invasive plant species that may have competitive advantages in drought.
- The effects of wildfire on Covered Species and the Preserve System will be minimized through adaptive management. Changed circumstances for wildfire (Section 11.4.6) will be addressed through the SSHCP Preserve System Monitoring and Management Program.
- The Implementing Entity will provide supplemental water at re-establishment/ establishment sites if needed.
- Preserve monitoring will track the status of Covered Species and allow for early identification of Preserve System occupancy trends, which will serve as an early warning

for the possible effects of climate change and will allow for adaptive management within the Preserve System to ensure species persistence in the Plan Area.

Collectively, these and other monitoring and management efforts will allow the Implementing Entity to detect and respond to the effects of climate change on Covered Species to ensure effective implementation of the SSHCP Conservation Strategy.

11.4 SSHCP Changed and Unforeseen Circumstances

The Plan Permittees have identified nine changed circumstances likely in this Plan Area during the Permit Term that can reasonably be anticipated by the Permittees and the USFWS, and that can be planned for. Specific remedial measures or procedures within the SSHCP to address nine changed circumstances are described. In addition, the Plan Permittees identify at what level or extent each of the nine circumstances would be addressed as unforeseen circumstances under the No Surprises Rule.

11.4.1 Listing of Covered Species

Changed Circumstances: The 28 SSHCP Covered Species (Table 1-2) include 21 plants and animal species that are not currently listed as threatened or endangered under the federal ESA:

- Mid-valley fairy shrimp
- Ricksecker's water scavenger beetle
- Western spadefoot
- Western pond turtle
- Cooper's hawk
- Tricolored blackbird
- Western burrowing owl
- Ferruginous hawk
- Swainson's hawk
- Northern harrier
- White-tailed kite
- Greater sandhill crane
- Loggerhead shrike
- Western red bat
- American badger
- Dwarf downingia
- Boggs Lake hedge-hyssop
- Ahart's dwarf rush
- Legenere
- Pincushion navarretia
- Sanford's arrowhead

However, non-listed SSHCP Covered Species are addressed in the SSHCP impact analysis and the SSHCP Conservation Strategy as if they are listed species. All SSHCP Covered Species, including the plant species and federally unlisted species, will receive No Surprises assurances under USFWS' No Surprises Rule (USFWS and NOAA 1998).

Therefore, if any of the non-listed Covered Species become listed during the 50-year SSHCP Permit Term, the federal ITP will immediately become effective for that species, once the USFWS' Conference Opinion for that species is converted to a Biological Opinion. The Permittees will not be required to change SSHCP Conservation Strategy, the Implementing Agreement, or the terms and conditions of the permit.

Unforeseen Circumstances: There are no unforeseen circumstances associated with the listing of Covered Species.

11.4.2 Listing of New Species

As described in Chapter 1, the SSHCP Covered Species list includes all species with a possibility of being listed during the Permit Term, using the best information available at the time of Plan preparation. However, the possibility remains that a new species could be listed in the Plan Area during the Permit Term and this possibility can be planned for.

Changed Circumstances: If a species not covered by the SSHCP becomes listed, or is proposed for listing as endangered or threatened under the federal ESA or California Endangered Species Act (CESA) during the Permit Term, and Plan implementation could adversely affect the newly listed species, a changed circumstance will have occurred. The USFWS and California Department of Fish and Wildlife (CDFW) will notify the Implementing Entity of any findings that a species is warranted for listing under the ESA or is a candidate for listing under the CESA. This notification will ensure that the Permittees can begin planning changes to the Plan or Plan implementation to conserve the species, and to ensure that the operating Conservation Strategy does not foreclose opportunities for species conservation. As a first step after notification, the Implementing Entity will map and quantify species suitable habitat present in the Plan Area to determine conservation needs of the newly listed species.

If the new species does become listed and the SSHCP has not been amended to address the newly listed species, the Plan Permittees will implement the following remedial measures:

- Plan Permittees will work with the Wildlife Agencies to develop measures to avoid take during implementation of Covered Activities. Permittees and Third-Party Project Proponents will implement the avoidance measures.
- Any parts of a Covered Activity that cannot fully avoid effects to the newly listed species or its habitat shall not proceed until the species is added to the SSHCP ITPs.
- The Implementing Entity will use SSHCP impact methodology to quantify Covered Activity impacts to the species modeled habitat.

- The Plan Permittees will work with the Wildlife Agencies to address the newly listed species in an SSHCP amendment. The Plan Permittees will submit application packages to amend the existing ITPs to add the newly listed species as a Covered Species (see Chapter 9 for Plan amendment process).
- Alternatively, the Plan Permittees or Third-Party Project Proponents could apply for individual take coverage under the ESA and CESA for the project and activities.

Unforeseen Circumstances: There are no unforeseen circumstances associated with the listing of new species.

11.4.3 Climate Change

Changed Circumstance: As discussed in Section 11.3.1**,** several physical climate change effects are currently occurring in California, including shifts in precipitation patterns (changes in the timing, location, amount, and variability of precipitation), reduction of average annual snowpack and changes in the timing of snowmelt and runoff patterns, and increased average temperature and seasonal shifts that lengthen the growing season. Potential physical and biological effects of those changes include increased number and intensity of winter floods; increased number and length of droughts; more frequent and intense wildfires; changes to natural community composition; more invasive species; and increases in wildlife disease.

Although climate change is reasonably foreseeable over the SSHCP 50-year Permit Term, it is not within the scope of the Plan to respond directly to air temperature increases or changes in regional precipitation patterns. Additionally, it will not be possible to determine when a Plan Area change over the 50-year Permit Term is the result of climate change or other non-climate factors. Because of the high level of uncertainty of how natural communities and species will respond to changes in temperature, precipitation patterns, or other climate factors, SSHCP remedial actions to address future climate change would be implemented primarily through the SSHCP Preserve Monitoring and Management Program, as described and provided for in SSHCP Chapter 8.

The SSHCP response to climate change, and therefore the delineation of Changed Circumstances for climate change, is most appropriately gauged by the character and magnitude of the physical and biological changes that may occur within the Plan Area and can reasonably be anticipated and planned for, including floods, wildfires, drought, invasive species, and disease.

Unforeseen Circumstances: The following sections for flood, wildfire, drought, invasive plant species, invasive animal species, and disease address unforeseen circumstances related to climate change.

11.4.3.1 Floods

Changed Circumstances: A flood event occurs when a waterway's capacity to hold water is exceeded by high-water flows and results in water overtopping the stream bank and entering the floodplain. The term *flood* can also apply to localized flooding events caused by levee breaks, pipeline breaks, dam breaks, drainage blockages, and equipment failure.

Flooding is common in some portions of the Plan Area. The primary reason for this history of flooding is the Plan Area's natural topographic position in the Central Valley, including flatness in the valley and high tributary mountain watersheds (Lund 2012). Within the Sacramento Valley, major flooding has occurred from rainstorms or snowmelt that quickly inundate slow-draining populated and agricultural areas (Lund 2012). Low-lying parts of the Plan Area, including the portion in the Sacramento-San Joaquin Delta are flood-prone because they are below sea level and protected only by relatively weak levees (Lund 2012).

Some SSHCP land cover types support plant and animal species with adaptations to periodic flood disturbances, and those land covers and species (e.g., vernal pool invertebrates) may actually benefit from flooding. Generally, flooding can deposit soils rich in nutrients and biological materials, which can enhance habitat, temporarily expand an aquatic species' range, and even increase stream and riparian biological functions over time. Most flood events that occur in the Plan Area) (i.e., excluding major or catastrophic events) are expected to have minimal negative impacts, and in many cases positive effects, on Covered Species or their habitats. For example, flooding increases use by waterbirds such as greater sandhill cranes that forage and roost in shallow flooded habitat (Silveira 1998). Moderate seasonal flooding in broad, shallow flood basins provides expansive areas of giant gartersnake habitat (Hinds 1952). Flooding will not adversely affect the Vernal Pool Ecosystem (Vernal Pool, Swale, Stream/Creek (VPIH) and hydrologically connected valley grassland). Flooding that temporarily connects normally isolated vernal pools can facilitate dispersal by vernal pool invertebrates.

However, extreme or extended flooding could impact Preserves and destroy newly established habitat re-establishment and/or establishment sites by depositing debris or sedimentation, downing trees, and scouring vegetation from stream banks. Plant and animal communities, which may benefit by moderate flooding, may also shift or be eliminated in response to extended flooding, including fairy shrimp (Silveira 1998). According to the USFWS (1993), most or all giant gartersnake populations are vulnerable to adverse effects from extensive flooding, and a 100-year flood event has the potential of extirpating all remaining populations of giant gartersnake due to loss of winter refugia over the species' range. The severity of impacts caused by flooding will vary depending on several factors, including flood duration, intensity, the type of habitat that is affected, and the amount of upland habitat available in the vicinity.

Based on flood flow forecast models, Willis et al. (2011) identified some main effects of future temperature increase scenarios as a result of climate change on river hydrologic regimes and flood control operations in the Sacramento Basin. In particular, flows will change even with small temperature increases causing more rainfall runoff. Willis et al. (2011) found that with either increased or reduced precipitation intensities, temperature increases are expected to increase runoff volumes and flood risks in the Sacramento Basin. In contrast, the U.S. Bureau of Reclamation (2014) found that projected increases in early season runoff will contribute to flood control releases earlier in the year, providing more flood storage capacity. For example, they estimate that storage volumes at Folsom Lake will decrease by up to 12% by the year 2070. However, that study did not consider the effects of peak flows that could contribute to a higher risk of flooding due to climate change.

The SSHCP assumes that climate change will result in sea level rise and lands in the Plan Area located below sea level have a reasonable chance of being inundated. The SSHCP Conservation Strategy accounts for projected sea level rise in its acquisition of Preserve lands to meet the measurable objectives for greater sandhill crane by excluding lands from modeled habitat that are located below sea level. If sea level rise and flooding exceeds SSHCP projections such that preserved lands acquired for benefit of greater sandhill crane can no longer provide suitable roosting habitat for greater sandhill cranes, that sea-level rise or flooding would constitute an unforeseen circumstance. The SSHCP accounts for this changed circumstance by providing suitable refuge foraging habitat for greater sandhill cranes outside the Cosumnes floodplain for use when flooding precludes use of typical foraging habitat.

The Conservation Strategy for giant gartersnake targets Preserve lands in the Badger Creek watershed, which based on its elevation and position within the watershed, the Permittees assume is not vulnerable to sea level rise-related flooding. Therefore, the Permittees assume that suitable upland habitat will remain available to support overwintering giant gartersnakes in these Preserves, even during flood events. However, if a massive flood event occurs in the Badger Creek watershed that results in the drowning of a large proportion of the overwintering giant gartersnake population, that would be an unforeseen circumstance.

For other Covered Species, the SSHCP provides several dry crossings (AMM ROAD-2) where roadways cross a SSHCP Preserve or directly abut a SSHCP Preserve. These dry crossings will be sized to accommodate a minimum of medium-sized mammals (e.g., coyote) and will provide overland connectivity between Preserve lands during flooding events.

Should flooding occur that potentially damages or destroys SSHCP Preserves, re-establishment/establishment sites, or enhancement sites, the following actions shall be taken by the Implementing Entity to deal with the changed circumstance:

- Within 48 hours of determining that a flood event has caused damage, the Preserve Manager will begin inspections of the Preserve to determine if adverse effects occurred

to Covered Species or their habitats within the Preserve. The Preserve Manager will conduct site reconnaissance, sampling, or surveying, as deemed appropriate, and prepare a brief disturbance assessment report that will be provided to the Implementing Entity. Specific issues to be considered in the disturbance assessment report will include, but not be limited to:

  - Damage to Preserve irrigation, pumping, or security equipment;
  - Direct mortality of species;
  - Damage to re-established/established riparian sites, including loss of plantings, damage to irrigation equipment, and erosion of graded banks;
  - Long-term flooding of land cover types that result in conversion of the land cover type to open water or freshwater marsh;
  - Erosive forces and materials deposition including sand, gravel, or invasive species (especially floating-type seeds or plants); and
  - Non-organic debris (e.g., shopping carts, clothing, vehicles, building materials, etc.).

- The Preserve Manager will initiate protective measures where appropriate and repair structures necessary to secure and maintain the affected site, such as fences and irrigation facilities.
- If necessary, the Implementing Entity will convene the TAC to develop measures that address immediate recovery of the affected site(s). Actions that could be recommended by the TAC include additional remediation measures (e.g., erosion control) or reseeding the area to prevent the establishment of invasive species.
- Within 1 year after the changed circumstance occurs, the Preserve Manager will prepare a disturbance assessment report to determine if natural processes at the affected site(s) are acting to resolve the problem. If not, the Preserve Manager will develop appropriate response measures to remediate the disturbance.
- After reviewing the disturbance assessment report, the Implementing Entity will determine whether habitat re-establishment is necessary. A re-establishment plan and a reasonable timeframe shall be established in coordination with the TAC (Chapter 9).
- The Implementing Entity will set up proper monitoring protocols for the affected site(s) in accordance with the SSHCP Preserve System Monitoring and Management Program described in Chapter 8, if re-establishment is necessary.

Unforeseen Circumstances: Flooding will be considered a changed circumstance until such time as two 100-year flood events occur within a 5-year period. According to the Federal Emergency Management Agency (FEMA), a "100-year flood" is the flood elevation that has a 1% chance of being equaled or exceeded each year. Two 100-year floods within a 5-year period

are not expected based in the historical data of five 100-year floods over 46 years and would be considered an unforeseen event.

11.4.3.2 Wildfire

Wildfire was a common historical occurrence within the Plan Area. Native vegetation communities that evolved in a setting with periodic natural fires typically are well adapted to such fire events. Fire presence and absence at varying cycles or regimes affects vegetation community composition and succession, or the natural sequential replacement of vegetation types over time. For California's valley grasslands, which dominate the Plan Area, native species are tolerant of fire within its natural regime of frequency and season (Brooks et al. 2004) and occasional fires have little permanent effect (Bartolome et al. 2007). However, altered fire regimes, in combination with naturalized non-native grasses and livestock grazing, have complex effects on grassland structure and composition (D'Antonio et al 2000) and have contributed significantly to the conversion of native valley grasslands to non-native annual grasslands (Brooks et al. 2004). Since the introduction of non-native Mediterranean grasses and other exotic weeds by European settlers, wildfire has helped control the buildup of non-native grass thatch (Brooks et al. 2004; Bartolome et al. 2007).

Wildfires, especially grassland fires, occur frequently in the Plan Area. Fires in the Plan Area since 2000 generally were nearer urban areas or along other highly traveled roadways (which facilitated quick reporting and response), were constrained by barriers to fire spread (e.g., roads, irrigated agricultural land), or burned early in the year when fuel moisture levels typically are higher. However, fire suppression can allow thatch and woody materials to build up over time, thereby increasing fuel loads. Because the fuel loads in the Plan Area are limited mostly to grasses, the Permittees assume that these large fires will not burn at the temperatures that would cause irreversible effects to grassland or woodland ecosystems in the Plan Area. Fire frequency will also be limited by re-growth of grasses, as several years will have to pass before grassland fuel loads recover from a fire.

A total of 32 fires were recorded in the Plan Area between 1950 and 2011 with sizes ranging from 10.9 to 14,125.6 acres (FRAP 2012). Of these, 27 burned at least 100 acres, 16 burned at least 500 acres, and 6 burned at least 1,000 acres. Only two fires (the 1981 Meiss Fire and the 1996 Scott Fire) burned in excess of 5,000 acres, considered Class G Fires (NWCG 2014). As presented in Table 11-2, the trend over the past decade (2000–2009) is a higher number of smaller fires, although the capacity of Plan Area vegetation to fuel large (Class G 5,000 acre) fires does exist. Over a 60-year period from 1950 through 2009 the average number of fires in the Plan Area per year is 0.516 and the average fire size is 1,255 acres. Increased average temperatures related to climate change will increase fire frequency and fire size, and are forecast to have a greater influence on fire frequency and fire size than any increased population or urbanization in the Plan Area (Baltar et al. 2014; Hurteau et al. 2014).

Table 11-2
Plan Area Wildfire Burn Acreage and Fire Quantity, by Decade

Decade	Total Acreage Burned	Number of Fires by Decade
1950–1959	1,217	2
1960–1969	4,532	3
1970–1979	2,016	4
1980–1989	18,982	10
1990–1999	10,006	2
2000–2009	3,415	11

Wildfire will damage SSHCP Preserve System infrastructure such as fences, buildings, and water supply pipelines. Damage to any SSHCP Preserve System infrastructure will be covered by insurance and will be repaired by the Implementing Entity. Any fires in the SSHCP Preserve System substantially affecting enhancement, re-establishment or establishment sites, regardless of the number of burned acres, will be remediated by the Implementing Entity as a changed circumstance. Prescribed fires were not included in the definition of changed circumstances, unless the prescribed fire accidentally escapes the planned perimeter. Based on historical fire data and weather patterns for the Plan Area and the expected climate change discussed in Section 11.3, wildfire occurrence is most likely during the warm, dry summer months (June through September). However, given the high ignition potential for grasslands and the proximity of potential ignition sources (roadways), wildfires may occur outside of this period under appropriate weather conditions.

Individual Preserve Management Plans will identify fire prevention and habitat protection actions consistent with the California Board of Forestry and Fire Protection 1994 Joint Policy on Pre, During, and Post Fire Activities and Wildlife Habitat.[4] Such actions may include identification and installation/maintenance of fuel breaks, prescribed fire, pre-incident planning, and public education campaigns. Prescribed burning to control buildup of thatch and woody debris, plus control invasive species, is an important tool for ecosystem management, including reducing the chances of fires, and will be considered in the individual management plans. In addition, preventive measures such as fuel breaks will be included as best management practices (BMPs).

Preventative actions include, but are not limited to:

- Each Preserve Manager will create or redesign fuel breaks as appropriate to limit fire spread.
- As allowed and consistent with the Preserve Management Plan, the Preserve Manager will use low-intensity prescribed fires to encourage growth of fire-adapted native plants and discourage growth of non-fire-adapted invasive plants.

[4] http://www.bof.fire.ca.gov/board_joint_policies/joint_policies/pre.pdf

- The Implementing Entity will develop Memoranda of Understanding with all applicable fire agencies to be included with each Preserve Management Plan that identifies appropriate response and fire suppression techniques, including access points, priority locations for fire camps, firebreak construction, water uptake, use of chemical retardants, heavy equipment operation, and post-fire cleanup.
- The Implementing Entity will incorporate public-awareness programs into Preserve Management Plans. This includes public outreach to neighboring lands to minimize fire risk.

Should a wildfire occur in a SSHCP Preserve, the following remedial actions shall be undertaken:

- Each Preserve Manager will work closely with responding fire agencies to ensure fire response and suppression is consistent with the Memorandum of Understanding described above to minimize impacts to sensitive ecological areas;
- Within 48 hours of learning of a Preserve wildfire, the Preserve Manager will begin inspections of the Preserve to determine adverse effects occurred to Covered Species or their habitats within the Preserve. The Preserve Manager will conduct site reconnaissance, sampling, or surveying, as deemed appropriate, and prepare a brief disturbance assessment report that will be provided to the Implementing Entity. Specific issues to be considered in the disturbance assessment report will include, but not be limited to:
    - GPS mapping of boundaries and calculation of acreages of SSHCP land covers burned or disturbed;
    - Qualitative description of ground disturbances specifically created during fire-fighting effort (e.g., access points, fire lines);
    - Damage to irrigation, pumping, fencing or other Preserve facilities;
    - Direct mortality of species;
    - Responses to control erosion, invasive plants, and identify needs for repair or replacement of Preserve facilities; and
    - Analysis of effectiveness of AMMs and consistency with the fire agencies MOU listed in the Preserve Management Plan.
- If necessary, Preserve Staff will initiate erosion control measures where appropriate consistent with Section 5.4, and repair structures necessary to secure and maintain the Preserve such as fences and irrigation facilities.
- The Implementing Entity will set up proper post-fire monitoring protocols for the site in accordance with the SSHCP Monitoring Program and Preserve System Management Program approach described Chapter 8.

- After reviewing the disturbance assessment report, the Implementing Entity will determine whether habitat re-establishment is necessary. A re-establishment plan and a reasonable timeframe shall be established in coordination with the TAC (Chapter 9).

Unforeseen Circumstances: The Permittees assume that wildfire will not cause permanent conversion of land cover types within the Preserve System. If wildfire in the Preserve System is sufficiently intense to fully remove a land cover type and damage soils so that they no longer support the pre-existing land cover type that represents an unforeseen circumstance. Further, if a wildfire occurs in the Preserve System of such a size or intensity that aerial application of chemical fire retardants is used, that is also an unforeseen circumstance.

11.4.3.3 Drought

Changed Circumstances: Drought is a natural, cyclical weather phenomenon that generally occurs over a period of several years. There is no universal definition of when a drought begins or ends. A drought is declared by a statewide drought emergency proclamation. Droughts lasting more than 3 years are relatively rare in Northern California (DWR 2015). Over the past century there have been eight multi-year drought events, five of which lasted 3 to 5 years and two of which lasted 6 years (DWR 2015).

Given that drought is a naturally recurring environmental condition in California, many plants and animals are adapted to natural drought cycles. However, the negative effects of natural drought cycles have been exacerbated by anthropogenic factors, including climate change, that have disturbed the native California landscape, including increased competition from invasive plant and animal species, habitat conversion, intensive water uses for agriculture and urban development, air and water pollution, and climate change. The natural adaptations and resiliency to drought by the Covered Species and their habitats in the Plan Area may not be adequate to respond to drought in the future.

If adverse effects related to drought are observed but vernal pools still support vernal pool species, the following actions shall be taken:

- The Implementing Entity will use adaptive management of Preserves to reduce biomass of annual grasses in the Vernal Pool Ecosystem, to help extend vernal pool ponding by reducing water uptake.
- The Implementing Entity will increase monitoring and management of invasive plant species that may have competitive advantages in drought.
- The Implementing Entity will provide supplemental water at re-establishment/ establishment sites if needed.

- The Implementing Entity will implement other measures through the Monitoring Program and Preserve System Management Program (Chapter 8) in ways consistent with permit obligations and with the consent of the Implementing Entity.

Unforeseen Circumstances: If drought occurs in the Plan Area over enough years that the wetted area of vernal pools no longer support vernal pool species and converts to a terrestrial land cover type, that will be an unforeseen circumstance. In that circumstance, the USFWS will extend the No Surprises assurances to the Plan Permittees for all SSHCP aquatic Covered Species. If drought occurs in the Plan Area over enough years that farmers on SSHCP conservation easements have no irrigation water sources, the USFWS will extend the No Surprises assurances to the Plan Permittees for all SSHCP Covered Species that require Cropland, Irrigated-Pasture Grassland, Orchard, or Vineyard.

11.4.3.4 Invasive Plant Species

Changed Circumstances: A number of plant invasive species are already present and common within the Plan Area (see Section 6.6.1), and it is unlikely that many of these species can be wholly eradicated in the future. As several invasive plant species are likely to be present in SSHCP Preserves now or in the future, the SSHCP requires an invasive species management component for each Preserve Management Plan. The SSHCP Conservation Strategy also includes roadside monitoring and removal of invasive plants in the Plan Area (Measurable Objective HAB 4). New invasive plant species or expanded invasive plant species distributions are considered a changed circumstance from baseline conditions. Invasive plant species baseline conditions in the SSHCP Preserve System will be established for each SSHCP Preserve parcel as it is acquired for the Preserve System.

In the event that a new invasive plant species becomes established or an existing invasive species exhibits substantial or unexpected expansion in the SSHCP Preserve System, the following actions shall be taken:

- Within 30 days of discovery or notification of a new invasive species or substantial or unexpected expansion of an existing invasive species, the Implementing Entity will meet with the TAC to determine appropriate eradication efforts consistent with the PMP and Measurable Objective HAB4.
- The Implementing Entity will conduct expedited monitoring for invasive plant species according to the SSHCP Preserve System Monitoring and Management Program on all SSHCP Preserves. If the invasive plant species is found on additional SSHCP Preserves, eradication efforts will be implemented consistent with each PMP to control or eliminate the invasive plant species threat.

- If eradication efforts result in a need to re-establish habitat in a Preserve, the re-establishment will be completed within 2 years of the eradication.
- The Implementing Entity will set up proper long-term monitoring protocols for the site in accordance with the SSHCP Preserve System Monitoring and Management Program described in Chapter 8 if restoration is necessary.

Unforeseen Circumstances: There is no unforeseen circumstance for invasive plant species; the Plan Permittees will treat any invasive plant species establishment or expansion with adaptive management.

11.4.3.5 Invasive Animal Species

Changed Circumstances: A number of animal invasive species are already present and common within the Plan Area (see Section 6.6.1), and it is unlikely that many of these species can be wholly eradicated in the future. As several invasive animal species are likely to be present in SSHCP Preserves now or in the future, the SSHCP requires an invasive species management component for each Preserve Management Plan. New invasive species or expanded invasive species distributions are considered a changed circumstance from baseline conditions. Invasive species baseline conditions in the SSHCP Preserve System will be established for each SSHCP Preserve parcel as it is acquired.

Examples of invasive animal species that are harmful to Covered Species and could become established or expand their range in the Plan Area include bullfrogs, which could invade California tiger salamander breeding ponds and prey on tadpoles; and hybrid California tiger salamander, which interbreed with native California tiger salamander and dilute the genetic diversity of the native species.

General

In the event that a new invasive species becomes established or an existing invasive species exhibits substantial or unexpected expansion in the SSHCP Preserve System, the following actions shall be taken:

- Within 30 days of discovery or notification of a new invasive animal species or substantial or unexpected expansion of an existing invasive animal species, the Implementing Entity will meet with the TAC to determine appropriate eradication efforts consistent with the PMP.
- Monitoring protocols for the invasive animal species will be implemented on all SSHCP Preserves. If the invasive animal species is found on additional preserves, eradication efforts will be implemented consistent with each PMP to control or eliminate the invasive species threat.

Hybrid California Tiger Salamander

In the event that hybrid California tiger salamanders are found in SSHCP Preserves, the following actions will be taken:

- The Implementing Entity will contract with species experts to help identify potential remediation measures for the hybrid California tiger salamander. The Implementing Entity will meet with Wildlife Agencies, the TAC, and the contracted species experts to develop a plan for selection and implementation of the remediation measures in the Preserve System.
- The Implementing Entity will work with the Wildlife Agencies to develop a plan to eradicate hybrid California tiger salamander, or take other actions, up to the limits described under the No Surprises Rule.

Unforeseen Circumstance: If hybrid California tiger salamanders eliminate the native California tiger salamanders in the Plan Area that will constitute an unforeseen circumstance.

11.4.3.6 Disease

Changed Circumstances

Under historical circumstances, Covered Species populations in the Plan Area probably either occurred in equilibrium with disease (i.e., the population was maintained by balance of births and deaths of immigration and emigration) and/or had the resiliency to recover from severe outbreaks. Even if some populations historically experienced local, and occasionally severe, disease-related reductions in numbers or local extirpations, over the long term these impacts probably were not substantial enough to result in extinctions due to adequate suitable habitat and movement corridors to allow repopulations. However, given the current level of habitat fragmentation due to agricultural and urban development in the region (i.e., including the Central Valley), and environmental stressors related to climate change in the Plan Area, unusual outbreaks or introductions of new diseases could adversely, and potentially irreversibly, affect the populations of some Covered Species.

Should a disease or vector organism adversely impact a Covered Species, the following actions shall be taken:

- The Implementing Entity will contract with species experts to help identify potential remediation measures for the Covered Species disease infestation. The Implementing Entity will meet with Wildlife Agencies, the TAC, and the contracted species experts to

develop a plan for selection and implementation of the remediation measures in the Preserve System.

- The Implementing Entity will set up proper disease monitoring protocols in the Preserve System, and potentially outside the Preserve System, in accordance with the SSHCP Monitoring Program and Preserve System Management Program described in Chapter 8.

Unforeseen Circumstances: If a disease results in the extirpation of a Covered Species from the Plan Area, that will constitute an unforeseen circumstance. In that event, the Implementing Entity may work with the Wildlife Agencies to develop a translocation plan to repopulate the Preserve System with the affected Covered Species, or take other actions, up to the limits described under the No Surprises Rule.

11.5 References Cited

Baltar, M.J.E. Keeley, F.P. Schoenberg. 2014. "County-level analysis of the impact of temperature and population increases on California wildfire data." *Environmetrics* 25: 6 pages 397–405.

Bartolome, J. W., W.J. Barry, T. Griggs, and P. Hopkinson.2007. "Valley grassland." *Terrestrial Vegetation of California*, third edition. M. G. Barbour, T. Keeler-Wolf, and A. Schoenherr. Berkeley, California: University of California Press.

Bernazzani, P, B.A. Bradley, and J.J. Opperman. 2012. "Integrating Climate Change into Habitat Conservation Plans Under the U.S. Endangered Species Act." *Environmental Management*. DOI 10.1007/s00267-012-9853-2.

Brooks, M.L., C.M. D'Antonio, D.M. Richardson, J.B. Grace, J.E. Keeley, J.M. DiTomaso, R.J. Hobbs, M. Pellant, D. Pyke. 2004. Effects of invasive alien plants on fire regimes. *Bioscience 54:677-688*.

California Energy Commission and California Natural Resources Agency. 2012. *Our Changing Climate: Vulnerability and Adaptation to the Increasing Risks rom Climate Change in California*. A Summary Report on the Third Assessment from the California Climate Change Center. Accessed January 2016. http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf.

California Natural Resources Agency. 2009. *California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008*. http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf.

California Natural Resources Agency. 2014. *Safeguarding California: Reducing Climate Risk*. An Update to the 2009 California Climate Adaptation Strategy. July. http://resources.ca.gov/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf.

Capital Region Climate Readiness Collaborative. 2014. *Climate Change Risks and Solutions for the Capital Region*. November 2014. http://www.climatereadiness.info/wp-content/uploads/2014/04/Sacramento-Climate-Change-Risks-Nov-2014.pdf.

D'Antonio, C, S. Bainbridge, C. Kennedy, J. Bartolome, S. Reynolds. 2000. *Ecology and Restoration of California Grasslands With Special Emphasis on the Influence of Fire and Grazing on Native Grassland Species*. Dept. of Integrative Biology; Dept. of Environmental Science, Policy, and Management, UC Berkeley. http://globalrestorationnetwork.org/uploads/files/LiteratureAttachments/120_ecology-and-restoration-of-california-grasslands-with-special-emphasis-on-the-influence-of-fire-and-grazing-on-native-grassland-species.pdf.

DWR (Department of Water Resources). 2015. *California's Most Significant Droughts: Comparing Historical and Recent Conditions*. February 2015.

Hinds, N.E.A. 1952. "Evolution of the California Landscape." *California Division of Mines* Bulletin No. 158. 240 pp.

FRAP. 2014. GIS Data analysis based on Fire Perimeters Version 13_2. http://frap.cdf.ca.gov/data/frapgisdata-sw-fireperimeters_download.php.

Gardali, T., N.E. Seavey, R. T. Digaudio, and L.A. Comrack. 2012. A climate change vulnerability assessment of California's at-risk birds. PLoS One Volume 7, Issue 3. March 2012. http://www.plosone.org/article/fetchObject.action?uri=info:doi/10.1371/journal.pone.0029507&representation=PDF.

Hurteau, M.D., A.L. Westerling, C. Wiedinmyer, and B.P. Bryant. 2014. Projected Effects of Climate and Development on California Wildfire Emissions through 2100. Environmental Science and Technology 48:2298−2304. dx.doi.org/10.1021/es4050133.

Lund, J.R. 2012. "Flood Management in California." *Water* 4:157–169.

NWCG (National Wildfire Coordinating Group) 2014. Glossary of Wildland Fire Technology. October 2014. http://www.nwcg.gov/pms/pubs/glossary/pms205.pdf.

Phurisamban. 2014. *Addressing Climate Change Adaptation in Water Resource Management: A Case Study of the Sacramento Region*. October 2014. Sacramento, California: Capital Region Climate Readiness Collaborative.

Silveira, J.G. 1998. Avian uses of vernal pools and implications for conservation practices. Pages 92-106 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). *Ecology, Conservation, and Management of Vernal Pool Ecosystems* – Proceedings from a 1996 Conference. Sacramento, California: California Native Plant Society. 1998.

U.S. Bureau of Reclamation. 2014. *West-Wide Climate Risk Assessment. Sacramento and San Joaquin Basins Climate Impact Assessment*. September 2014.

USFWS (United States Fish and Wildlife Service). 1993. Endangered and threatened wildlife and plants; determination of threatened status for the GGS. Federal Register 58: 54053-54066.

USFWS (United States Fish and Wildlife Service) and NOAA (National Oceanic and Atmospheric Administration). 1998. Final rule: "Habitat Conservation Plan Assurances ("No Surprises") Rule." February 23, 1998. Federal register, Volume 53, pages 8859–8873.

Willis, A.D., J.R. Lund, E.S. Townsley, and B.A. Faber. 2011. Climate change and flood operations in the Sacramento Basin, California. San Francisco Estuary & Watershed Science. 9:1–18.

12 ECONOMICS ANALYSIS AND FUNDING PROGRAM

12.1 Overview

The federal Endangered Species Act (ESA) requires that the Plan Permittees provide assurances that the South Sacramento Habitat Conservation Plan (SSHCP or Plan) will be adequately funded over the proposed 50-year Permit Term. The Biological Goals and Measurable Objectives of the SSHCP cannot be attained without adequate funding. The SSHCP funding program is critical to the successful development, implementation, and viability of the SSHCP. Estimating the full costs of the operating SSHCP is an essential step to demonstrate adequate funding to meet regulatory requirements.

This chapter presents the SSHCP economic analysis (including the SSHCP cost analysis and SSHCP funding program). The economic analysis evaluates the costs associated with implementation of the SSHCP and identifies the funding mechanism(s) that will be used to pay for the SSHCP. In order to ensure enough funding, all costs associated with the Conservation Actions necessary to implement the SSHCP had to be identified. Because of the geographic scale of the Plan, the complexity of the Conservation Actions, and the long time frame over which these actions will occur, the cost-estimating process involves many assumptions. The costs are identified for planning purposes only to estimate funding levels needed to implement the Plan. This chapter is organized as follows:

Section 12.2 describes the approach to the cost analysis, including an overview of the methodology used, and data sources.

Section 12.3 presents planning-level cost estimates for the various actions and activities associated with implementation of the SSHCP.

Section 12.4 describes the funding program and quantifies the primary funding mechanism (development fees). This section also presents a mechanism to address cost changes over time.

12.2 Cost Analysis Methodology and Data

The SSHCP economic analysis and associated cost estimates are based on the best information available. Information used in this cost analysis includes, but is not limited to, the estimated acres of impact of future Covered Activities (Chapter 6), estimated costs of the SSHCP habitat preservation and implementing re-establishment/establishment requirements, costs of land by location of the proposed SSHCP Preserve System (Chapter 7), estimated costs of anticipated Preserve System management and monitoring activities (Chapter 8), the staffing and overhead costs of the proposed SSHCP implementation structure (Chapter 9), and estimated costs of addressing any future changed circumstances (Chapter 11). Estimated costs associated with

operating the SSHCP are organized into the following eight categories, which are further explained in Section 12.3:

- Land or Easement Acquisition for the Preserve System
- Habitat Re-establishment/Establishment Activities in the Preserve System
- Habitat Management, Monitoring, and Adaptive Management in the Preserve System
- Changed Circumstances
- Agricultural Enhancement in the Preserve System
- Plan Administration
- Endowment
- SSHCP Plan Development.

The SSHCP cost analysis relies on a detailed financial spreadsheet model (see Appendix I) to track costs and funding requirements associated with SSHCP implementation. The model assesses SSHCP conservation requirements and generates a set of cost estimates, organized by SSHCP land cover type categories. Based on the anticipated cost to acquire necessary land and to implement the Plan, the model estimates funding requirements and the required level of the development fees that will be imposed on Covered Activities to meet these funding requirements.

The SSHCP cost analysis relies on many data sources. Key steps taken were as follows:

1. The analysis of SSHCP costs considered a hypothetical "Preferred SSHCP Preserve System" that indicated the approximate location and SSHCP land cover type that could be acquired by the SSHCP.
2. A land valuation exercise identified estimated per-acre land costs based on the location and SSHCP land cover type anticipated for acquisition.
3. A review of cost assumptions for habitat re-establishment/establishment, management, monitoring, and other costs yielded additional cost estimates by SSHCP land cover type.
4. Costs were aggregated to identify the total funding needed for implementation of the SSHCP Preserve System.
5. Development fees were derived by determining the total cost of mitigation per acre impacted by Covered Activities for each SSHCP land cover type.

Generally, estimates are informed by literature reviews, independent research, and input from land managers experienced with habitat preservation and re-establishment/establishment in Northern California, as well as a review of cost models in similar "regional" habitat conservation

plans (HCPs) that have already been permitted by the U.S. Fish and Wildlife Service (USFWS).[1] The values presented in this chapter represent the best available cost estimates based on the information currently available to the Plan Permittees. All costs are presented in 2015 dollars. Shortly after Plan implementation begins and actual cost data are available, the Implementing Entity will compare the cost assumptions made in this economic analysis with the cost of implementing the SSHCP. If actual costs of Plan implementation are inconsistent with the economic analysis, development fees will be adjusted to bring the development fees in line with the observed cost of implementing the SSHCP.

12.3 Costs Associated with Implementation of the SSHCP

This section discusses the assumptions that are made to estimate the cost associated with operating the SSHCP.

12.3.1 Land and Easement Acquisition Costs

Meeting the Plan's Biological Goals and Measurable Objectives for preservation of SSHCP land cover types requires acquisition of land or conservation easements on properties with suitable ecological characteristics (see Chapter 7). As discussed in the following paragraph, costs associated with the acquisition of land or conservation easements include the cost of the land itself, costs associated with a preliminary biological assessment of the land's habitat values, transaction-related expenses such as title and escrow fees and commissions, and initial site improvements.

The total cost of land to be acquired by fee tile and conservation easement under the SSHCP is estimated to be $487 million over the 50-year Permit Term, including the actual cost of the land or the easement as well as the transaction costs, Preserve Documentation Report (PDR) costs, and initial site improvement costs, as well as an overall 10% contingency, as discussed below. This estimate relies on the assumption that 31% of newly acquired lands will be acquired in fee title (as opposed to conservation easement), and that the cost of a conservation easement ranges from 70% to 80% of the cost of a fee title acquisition. Furthermore, it is assumed that 43% of fee title acquisitions will occur within the Urban Development Area (UDA) where land is more expensive.

12.3.1.1 Fee Title Land Value

Fee title land values are based on a review of comparable private market sales of lands in the Plan Area, data from the California Chapter of the American Society of Farm Managers and

[1] Cost models from the East Contra Costa County HCP/Natural Community Conservation Plan, the Natomas Basin HCP, the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan, the Sacramento Valley Open Space Conservancy, and the Central Valley Farmland Trust were used to inform the SSHCP cost model.

Rural Appraisers, and interviews with local land appraisers.[2] Values are distinguished by parcel size and parcel location within Preserve Planning Units. Land acquisition costs used in this cost estimate range from $9,000 per acre to $35,000 per acre for parcels located outside of the UDA and from $25,000 per acre to $150,000 per acre for parcels located inside of the UDA. Planning-level average fee title land value assumptions range from about $26,000 to $53,000 per acre in the UDA and $9,000 to $13,000 per acre outside the UDA, as shown in Table 12-1.

The price differences shown in Table 12-1 reflect the development potential of properties within and outside of the UDA and variation in parcel sizes. Assumptions concerning development potential in the Plan Area reflect land use policy from the existing General Plans of the three land use jurisdictions (the County of Sacramento, City of Rancho Cordova, and City of Galt) that are within the Plan Area. The UDA boundary roughly corresponds with the County's Urban Services Boundary that marks the anticipated extent of infrastructure (sewer and water supply) needed to support future urban development and corresponds with City of Galt's Sphere of Influence and city limit and the City of Rancho Cordova's city limit. Parcels of land that are within the UDA tend to have higher average per-acre values compared to parcels found outside of the UDA due to the potential for urban development. Parcels located outside of the UDA are generally characterized by a real estate market in which value is driven by agricultural and rural residential uses (and in some cases, mitigation bank uses) which have lower per-acre values compared to urban real estate markets.

Smaller parcels of land are typically more highly valued than larger parcels. This is due to the fact that smaller parcels are typically already entitled for some urban use where larger parcels are typically entitled for agricultural uses. Also, there is a smaller pool of buyers for large parcels of land and as a result, the cost analysis assumes that prices for large parcels will be lower on a per-acre basis.

Table 12-1
Average Per-Acre Fee Title Land Value Assumptions

PPU	UDA Relationship	2 to 10 acres	10 to 20 acres	20 acres +	Weighted Average
PPU 1	Inside UDA	$150,000	$50,000	$27,500	$28,000
PPU 2	Inside UDA	*No Acquisitions in PPU 2*			
PPU 3	Inside UDA	$150,000	$50,000	$27,500	$32,000
PPU 4	Inside UDA	$100,000	$40,000	$25,000	$26,000
PPU 5	Outside UDA	$35,000	$15,000	$10,000	$11,000
PPU 6	Outside UDA	$35,000	$15,000	$12,800	$13,000

[2] Sacramento County Assessor data and Trends in Agricultural Land & Lease Values (2014).

Table 12-1
Average Per-Acre Fee Title Land Value Assumptions

PPU	UDA Relationship	2 to 10 acres	10 to 20 acres	20 acres +	Weighted Average
PPU 7	Outside UDA	$25,000	$15,000	$9,000	$9,000
PPU 8	Inside UDA	$150,000	$50,000	$50,000	$53,000

Notes:
PPU = Preserve Planning Unit
UDA = Urban Development Area

12.3.1.2 Conservation Easement Values

Conservation easements generally cost less than fee title acquisition because the grantee of the easement is only acquiring an interest in the real property while the grantor of the easement retains ownership and control of the property consistent with the terms of the easement.

The scope of a conservation easement, and the restrictions it imposes on land use, determines the cost of the easement. For the SSHCP economic analysis, easement costs were developed based on assumptions related to the scope of the proposed easements and restrictions on land use that will be used by the Implementing Entity in acquiring preserve lands, with inputs from an appraiser experienced in easement valuation[3] (see Appendix D, Sample Easements). Generally, conservation easement values within the Plan Area, on average, are 70% to 85% of fee title value. For the SSHCP economic analysis, a weighted average of about 77% of fee title value was applied to land cover type values, with resulting per-acre easement costs shown in Table 12-2.

Table 12-2
Average Per-Acre Conservation Easement Costs

PPU	UDA Relationship	2 to 10 acres	10 to 20 acres	20 acres +	Weighted Average
PPU 1	Inside UDA	$120,000	$40,000	$22,000	$23,000
PPU 2	Inside UDA	*No Acquisitions in PPU 2*			
PPU 3	Inside UDA	$120,000	$40,000	$22,000	$25,000
PPU 4	Inside UDA	$80,000	$32,000	$20,000	$21,000
PPU 5	Outside UDA	$28,000	$12,000	$8,000	$8,000
PPU 6	Outside UDA	$25,000	$11,000	$9,000	$9,000
PPU 7	Outside UDA	$20,000	$12,000	$7,000	$7,000
PPU 8	Inside UDA	$120,000	$40,000	$40,000	$43,000

Notes:
PPU = Preserve Planning Unit
UDA = Urban Development Area

[3] Gregory A. House (House Agricultural Consultants), Accredited Farm Manager, Accredited Rural Appraiser, and Certified Professional Agronomist.

12.3.1.3 Land Transaction Costs

A number of transaction costs are associated with the land acquisition process, whether it be fee title or conservation easement. Typically, these costs are part of the due-diligence process and include commissions and legal fees, title searches and insurance, appraisals, legal boundary surveys, and Phase 1 Environmental Assessment costs. Because the results of the due-diligence process may cause the Implementing Entity to decide not to acquire certain properties, the economic model assumes that some transaction costs will be incurred on properties that are not acquired. The economic model assumes that transaction costs are 5% of the land or easement purchase price. This percentage is generally consistent with the transaction costs assumed in other HCP economic analyses. Assuming that the average property acquisition is 100 acres, it will require about 350 transactions to assemble the SSHCP Preserve System. It is likely that roughly 25% more properties will be investigated than will be acquired. The land acquisition process is discussed in detail in Chapter 9.

Preserve Documentation Report

A PDR (Appendix F) will be prepared by the Implementing Entity for all properties proposed for acquisition by the SSHCP and will identify existing physical and biological conditions on properties being considered for acquisition. As specified in Appendix F, each PDR will include information on the property location, physical condition of facilities such as fences, and biological setting, including documentation of special-status and other species on the property. The habitat assessment conducted as part of a PDR will require limited biological surveys, and the completed PDR will be a brief report with accompanying maps. Costs assumptions for completion of an average PDR are based on the estimate that it will require 22 hours at $150 per hour for contracted biological staff to complete required tasks. Also included in the PDR cost is a post-acquisition biological assessment, which is estimated to require 1 hour of biologist time per acre. Assuming there will be five PDRs for every four property acquisitions and that the average acquisition is 100 acres, PDR cost is estimated to be about $189 per acre.

Recordation of Easements

All lands acquired for the SSHCP Preserve System will need a conservation easement, even lands that are held in fee title by the Implementing Entity. Conservation easements will be negotiated individually between willing sellers and the Implementing Entity. The terms of the easement and prices paid for easements will be variable depending on the purpose of the easement and the degree to which the easement restricts land uses. Easements will be recorded for Stream Setbacks and Preserve Setbacks to provide the Implementing Entity with the ability to enforce the Avoidance and Minimization Measures that are expected to occur within the area of the setback (see Chapter 5). Costs for the preparation of a conservation easement are estimated as

part of total transaction costs, which are assumed to be 5% of the transaction value (including some costs attributable to parcels for which due diligence occurs but are not acquired).

Initial Site Improvements

The economic analysis assumes that most lands preserved in fee title will require varying levels of site improvements upon acquisition, such as removal of degraded facilities, repair and replacement of gates, and installation of signage and new fencing. The cost analysis assumes that conservation easements will require the same level of site improvements as properties acquired in fee title. Although the extent of the improvements needed is dependent on the condition of the property at the time it is acquired, the SSHCP's economic analysis assumes each preserved property will require initial site improvements averaging $257 per acre preserved, which reflects estimates of demolition, safety improvement, fencing, and signage for a typical property.

12.3.2 Habitat Re-establishment/Establishment

Habitat re-establishment/establishment costs are estimated to be approximately $183 million over the 50-year Permit Term. Estimates of re-establishment/establishment costs were developed for each of the land cover types that require re-establishment/establishment (i.e., Vernal Pool, Seasonal Wetland, Freshwater Marsh, Swale, Stream/Creek, Stream/Creek (Vernal Pool Invertebrate Habitat [VPIH]), Open Water, Riparian (including Mixed Riparian Woodland and Mixed Riparian Scrub), Mine Tailing Riparian Woodland, Blue Oak Woodland, and Blue Oak Savanna). Only costs associated with the re-establishment/establishment activities are addressed here. Cost to acquire land where re-establishment or establishment will occur is discussed in Section 12.3.1. It is important to note that re-establishment/establishment will, in most cases, take place within Preserve System lands that are acquired for purposes of meeting conservation requirements. Accordingly, it is not anticipated that additional lands will be needed to accommodate all the re-establishment/establishment required under this Plan. It should also be noted that the portion of the re-establishment/establishment fee to acquire land is to replace the upland land cover type that will be lost as a result of constructing re-established or established wetlands.

Cost estimates to re-establish/establish habitat are based on interviews with land management agencies active in the region that have engaged in habitat re-establishment/establishment; interviews with conservation banks; and cost estimates prepared for potential habitat re-establishment/establishment sites located within the Plan Area.[4]

[4] Interviews were conducted with staff from Westervelt Environmental Services, the Sacramento Valley Conservancy, and the Stone Lakes National Wildlife Refuge. Cost estimates to design, build, and monitor 50 acres of Vernal Pool re-establishment within the Plan Area were prepared by Dudek restoration experts for purposes of estimating potential re-establishment costs. Current bids to construct vernal pools within the Plan Area were used to estimate potential establishment costs.

Costs associated with habitat re-establishment/establishment include, but are not limited to, site reconnaissance, soil testing and other site feasibility studies as necessary, engineering design and preparation of construction drawings and specifications, land acquisition, staking, earthwork, plant and seed procurement, planting/seeding, and installation of irrigation system. Additionally, re-establishment/establishment projects are subject to additional costs associated with intensive short-term monitoring and maintenance activities for the first 5 years after re-establishment/ establishment is complete. Finally, estimates of habitat re-establishment/establishment costs assume that some portion of habitat re-establishment/establishment projects may not be successful. In particular, re-established/established vernal pool habitat projects have historically been challenging relative to other wetland projects (see Table 12-3 for assumed success rates).[5] In addition, a 10% contingency is applied to guard against shortfalls in planning and design costs, construction costs, and short-term monitoring and maintenance costs. Contingency funds can also be used to remediate re-establishment/establishment sites if the site is not functioning properly. Note that long-term monitoring and management costs for remediation sites are addressed in Section 12.3.7, Endowment.

It is anticipated that contractors will be hired by the Implementing Entity to design, build, and monitor habitat re-establishment/establishment projects. These projects require specialized equipment and technical knowledge to successfully implement habitat re-establishment/ establishment. It also is possible that the Plan will acquire credits from mitigation banks that are within the Plan Area. Staff time, equipment, and vehicles for the Implementing Entity to account for the time needed to hire and oversee contractor designs, specification, and construction are included in SSHCP Administration Cost, discussed in Section 12.3.6.

Table 12-3
Habitat Re-establishment/Establishment Costs

Re-establishment/ Establishment Type	Estimated Per-Acre Cost	Success Rate	Expected Per-Acre Cost	Per-Acre Cost with Contingency
Vernal Pool	$68,834	65%	$105,898	$116,488
Blue Oak	$30,000	50%	$60,000	$66,000
Riparian	$54,511	80%	$68,139	$74,953
Mine Tailing Riparian Woodland	$54,511	65%	$83,863	$92,249
Seasonal Wetland	$59,294	80%	$74,118	$81,529
Freshwater Marsh	$56,388	80%	$70,485	$77,533
Swale	$53,130	75%	$70,840	$77,924

[5] John Zanzi of Dudek has 30 years' experience with design, implementation and long-term monitoring of mitigation projects in California. Mr. Zanzi's professional experience informs the success rates used in this Plan by virtue of his firsthand experience that spans numerous similar mitigation projects including construction implementation and performance of 5-year monitoring programs that collect quantitative data to analyze the interim trajectory and final mitigation project performance.

Table 12-3
Habitat Re-establishment/Establishment Costs

Re-establishment/ Establishment Type	Estimated Per-Acre Cost	Success Rate	Expected Per-Acre Cost	Per-Acre Cost with Contingency
Stream/Creek (VPIH)	$53,130	80%	$66,412	$73,053
Open Water	$50,650	90%	$56,278	$61,906
Stream/Creek	$54,511	85%	$64,131	$70,544

12.3.2.1 Cost of Regulatory Compliance

Implementation of habitat re-establishment/establishment activities may require additional regulatory compliance. Costs of regulatory compliance for habitat re-establishment/ establishment are estimated to be about $31 million over the 50-year Permit Term.

The SSHCP economic analysis assumes that CEQA, NEPA, Sections 401 and 404 of the Clean Water Act, Section 106 of the National Historic Preservation Act, Sections 1600–1607 of the California Fish and Game Code, and other miscellaneous requirements (e.g., county grading permits, road encroachment permits, stormwater pollution prevention plans) will be required for SSHCP habitat re-establishment/establishment activities. Estimated costs reflect the costs for contracting the preparation and submittal of compliance documents and permit applications.

All regulatory compliance costs are expected to be incurred during the Permit Term and will not be required for ongoing management and monitoring activities. Based on input from consultant firms familiar with projects in the region and based on expert opinion from the Plan Permittees local jurisdictions, it is estimated that regulatory compliance will add about 20% to the cost of the re-establishment/establishment activities, with the additional costs attributed to preparing regulatory compliance documents for habitat re-establishment/establishment actions.

12.3.3 Habitat Management, Monitoring, and Adaptive Management Costs

12.3.3.1 Habitat Management Costs

All land that is part of the SSHCP Preserve System must be managed according to the Preserve System Monitoring and Management Program and SSHCP Conservation Strategy. As discussed in Section 8.2, all Preserve lands acquired in fee title will be subject to active land management by the Implementing Entity. Preserve lands acquired by conservation easement will primarily be managed by individual landowners according to a Preserve Management Plan prepared by the Implementing Entity. Habitat management costs are estimated to be approximately $15 million over the 50-year Permit Term.

Costs associated with management of the SSHCP Preserve System include upfront capital expenditures on equipment, materials, and infrastructure improvements; construction of field facilities; and installation of water wells and pumping equipment. Ongoing management costs include invasive species control and other maintenance activities during the Permit Term. An overall average cost per acre of $500 was applied for the upfront management costs, while $15 per acre per year is assumed for ongoing management activities.[6] Management costs were assumed to apply to all Preserve land owned in fee title as well as to 5% of the conservation easement lands. As mentioned earlier, all of the land that makes up the SSHCP Preserve System will be managed, and property that is encumbered by an easement will primarily be managed by the landowner. However, up to 5% of properties encumbered by an easement will require specialized management that will be conducted and paid for by the SSHCP Implementing Entity. Specialized management may include management techniques that are designed to enhance habitat for individual species such as, but not limited to, unconventional crop rotations or fallowing of fields.

The cost to manage the Preserve System is largely based on the size of the Preserve System. Costs are expected to increase as the Preserve System grows. However, costs will not increase in proportion to the size of the Preserve System because per acre management costs are expected to eventually decrease due to efficiencies of scale. Post-permit management costs are expected to stabilize at a lower cost level. At the end of the 50-year Permit Term, management costs are expected to decline to about 50% of the annual cost in year 50, since the Preserve System will be fully assembled and re-establishment/establishment will be at or near completion.

Cost of Preparing Preserve Management Plans

In addition to basic management activities described above, the SSHCP Preserve System Monitoring and Management Program will include direction on how each land cover type will be managed to ensure that its biological value as habitat is maintained and/or re-established. The SSHCP Preserve System Monitoring and Management Program will address topics such as agricultural production, grazing regimes, weed control, prescribed fire measures, and wetland management issues. The SSHCP Preserve System Monitoring and Management Program will be updated periodically, and the costs associated with those updates have also been included in the cost analysis. Focused property-specific or Preserve-specific Preserve Management Plans will be developed from the SSHCP Preserve System Monitoring and Management Program. It is

[6] The analysis assumes that all management requirements would be satisfied by the per-acre fixed and annual cost estimates, either directly by the Implementing Entity or through vendor/contractors hired by the Implementing Entity. If management activities are executed by the Implementing Entity, a variety of facility, vehicle, and other equipment costs would be incurred, consistent with the per-acre management cost estimate.

estimated that about 3% ($400,000 before contingency) of the overall cost of habitat management can be attributed to the preparation of Preserve Management Plans.

Species Enhancement Measures

In addition to basic management activities, as part of the proposed Conservation Strategy the SSHCP includes Measurable Objectives that will benefit target species (see Chapter 7), rather than the more general species benefits provided by the Preserve System as a whole. These include planting hedgerows to benefit Swainson's hawk (*Buteo swainsoni*) and greater sandhill crane (*Grus canadensis;* Objective AG3), preparation of targeted species mobility studies for California tiger salamander (*Ambystoma californiense;* Objective CTS3), and others. Cost estimates were developed for each measure and distributed across land cover types. It is estimated that about 11% ($1.7 million before contingency) of the overall cost of habitat management can be attributed to habitat assessment and planning.

12.3.3.2 Habitat Monitoring Costs

As discussed in Section 8.3, all Preserve lands acquired in fee title or by conservation easement will be monitored by the Implementing Entity or consultants that are hired to complete monitoring tasks. Costs associated with monitoring of the SSHCP Preserve System include planning, conducting, analyzing, and reporting on presence/absence or status and trends of Covered Species and SSHCP land cover types within the Preserve System; and planning, conducting, analyzing, and reporting on compliance and effectiveness of AMMs and measurable objectives. Refer to Chapter 8 for details on monitoring requirements.

An overall average cost per acre of $50 was applied for the upfront monitoring costs. Ongoing monitoring is assumed to be $13 to $50 per acre per year, with agricultural lands assumed to require significantly less monitoring work than other land cover types. Lower levels of monitoring are required for row crop and irrigated pasture so monitoring of row crop and irrigated pastures was set at 25% of the annual per-acre cost of monitoring for all other land cover types.

Habitat monitoring costs (including Adaptive Management, discussed in Section 12.3.3.3) are estimated to be about $45 million over the 50-year Permit Term. While all SSHCP Preserves are monitored as part of implementation, the intensive monitoring of re-establishment/establishment projects during the post construction period are not included in this cost category, but are included in the re-establishment/establishment cost category in Section 12.3.2. At the end of the 50-year Permit Term, monitoring costs are expected to decline to about 50% relative to the annual cost in year 50.

12.3.3.3 Adaptive Management Costs

Costs associated with adaptive management are included in habitat management costs category. Adaptive management activities within the Preserve System will include any change in the management of the Preserve System necessary to meet the Biological Goals and Measurable Objectives described in Chapter 7. These changes will be informed by monitoring described in Chapter 8. Adaptive management tasks are described in Section 8.3.4.2.

12.3.4 Cost of Remediating Changed Circumstances

The SSHCP funding program is required to account for costs associated with the Plan's defined changed circumstances (see Chapter 11). Costs of remediating changed circumstances are estimated to be about $8 million over the 50-year Permit Term. Due to the uncertainty inherent in changed circumstances, it is not possible to forecast the prevalence and extent of these events in the Plan Area with precision. It was assumed that the cost of remedial measures to address changed circumstances will add 10% to management costs and 15% to monitoring costs of the total management budget. Contingency funds can also be used to remediate changed circumstances if necessary.

The Implementing Entity will maintain sufficient financial reserves to fund remedial actions described in Chapter 11 when they arise. As discussed in Section 12.4, the Implementing Entity will annually assess its funding reserves and supplement those reserves if necessary to fund implementation of the most expensive remedial actions that might occur. Funds used to supplement these financial reserves could come from outside the Implementing Entity or from within the Implementing Entity budget (i.e., funds shifted from other SSHCP uses). This approach will ensure that adequate funds are available immediately in the event of a changed circumstance occurring.

Annual funding for remedial measures will accrue each year, and annual funding for remedial measures will grow each year in proportion of the size of the Preserve System. The combination of these two factors will lead to substantial remedial measures funding reserves generated later in the Permit Term. Changed circumstances described in Chapter 11 are more likely to occur on a larger scale later in the Permit Term due to the greater size of the Preserve System and the expected effects of climate change.

As described in Chapter 11, the Implementing Entity is required to implement remedial action if any of the changed circumstances occur. The cost assumptions are made for planning purposes and will not limit the Implementing Entity's obligation to respond to these changed circumstances. Remedial measures for the Preserve System are not required after the Permit Term so these costs are assumed to apply only during the Permit Term.

12.3.5 Agricultural Enhancement Funding

Landowners who sell easements on lands that become part of the Preserve System and who engage in farming activities are eligible for monetary payments for the purpose of agricultural enhancement. These payments can only be used to improve the property that is under conservation easement. Examples of what the payments can be used for include the installation or repair of wells, fences, barns, drainage/irrigation systems; demolition of structures, and clearing and leveling of land that does not impact wetland or riparian resources. The SSHCP Implementing Entity must approve all expenditures. The SSHCP economic analysis assumes that payments under the agricultural enhancement program will be $10 per acre per year. Agricultural enhancement costs are estimated to be approximately $6 million over the 50-year Permit Term. Agricultural enhancement activities that are included in the conservation easement agreement are assumed to occur in perpetuity.

12.3.6 SSHCP Administration Cost

Plan administration costs represent operating costs that will be incurred by the Implementing Entity, including staffing, supplies, facilities, equipment, outside professional services, and other miscellaneous expenses. Based on descriptions of the SSHCP Implementing Entity provided in Chapter 9, staffing costs are needed for 7.0 full-time equivalent (FTE) positions (and associated salary and benefit and tax costs). Office expenses include, but are not limited to, computers, other IT equipment and software, office furniture, supplies, communications, copying and printing, and postage. Office space is assumed to be provided by Sacramento County for $8,000 per FTE. General office costs including utilities, office equipment including copy and fax machines, an office telephone system, printers, scanners, publications, and digital cameras are included in the office charge. Additional costs included in the economic model include liability insurance, accounting, legal review, travel, and public outreach.

Including a 10% contingency, the SSHCP administration costs are estimated at an average of about $1.3 million per year or $66 million over the 50-year Permit Term. At the end of the Permit Term, the Implementing Entity will continue to manage the SSHCP Preserve System, though the level of annual cost is assumed to decrease by about 50% given the loss of certain needs/functions (e.g., land acquisitions). Estimates of Plan administration costs were based on a review of budget information from other regional conservation organizations/HCPs.

It is important to note that labor and equipment costs associated with many SSHCP implementation activities are not included under the SSHCP administration cost category. For example, labor and other costs associated with most habitat establishment and re-establishment, management, and monitoring activities are excluded from staffing costs, as

these activities are likely to be undertaken primarily by outside contractors and are captured in the separate cost estimates for these categories.

In addition, administrative costs incurred by Plan Permittees other than the Implementing Entity to fulfill their own responsibilities under the Plan are not included in the cost estimates. For example, each Plan Partner will incur costs when reviewing applications for take authorization from various project proponents (see Chapter 10). The participating cities and the County might recover these costs from applicants according to the policies in place at each local jurisdiction. The development fee amounts specified in the Plan do not reflect the costs of application review by the local jurisdictions, and revenues from the development fees will not be used to cover these costs. Similarly, the cost of all conditions on Covered Activities described in Chapter 5 will be borne by the project proponents, either public agencies or private developers.

Staff

It is assumed that the Implementing Entity will employ an executive director dedicated to Plan implementation that directs all the activities of the Implementing Entity; a program manager who directs all natural resource aspects of Plan implementation; up to two Preserve Managers who provide on-site management of individual SSHCP Preserves; and an administrative assistant who handles day-to-day administrative tasks (some staff are part-time). The Implementing Entity also will employ a budget analyst. It is assumed that data management and analysis (including geographic information system (GIS)), accounting, legal and real-estate services will be contracted to one of the Plan Partners or will be provided by consultants. Staff-specific costs include employee salaries and benefits (estimated using a salary multiplier of 50% to include the costs such as health insurance, payroll taxes, retirement plan payments, worker's compensation, disability, and life insurance).

Up to three positions (2.5 FTE) to staff the Implementing Entity are identified in the cost model for year 1, increasing to four from year 2 to year 4. Seven FTEs are identified in the cost model after year 5 of implementation. Staffing levels at the Implementing Entity will increase slowly over time as the Preserve System grows and responsibilities increase.

Other staffing mixes could be used by the Implementing Entity to fulfill the obligations of the Plan; but for the purposes of the cost analysis, the staffing mix described in the preceding paragraphs was used. Costs for personnel to monitor and manage the Preserve System and to re-establish/establish habitat are included in the monitoring, management, and habitat re-establishment/establishment cost categories. It is assumed that habitat re-establishment/establishment, management and monitoring will mainly be provided by consultants. Costs to staff the Implementing Entity are estimated to be about $44 million over the 50-year Permit Term.

Governing Board

Implementation of the SSHCP is overseen by a Governing Board composed of members from the County of Sacramento, City of Galt and City of Rancho Cordova. For purposes of the economic analysis it is assumed that there will be a total of six board members each receiving a stipend of $100 per meeting. It is anticipated that the board will meet up to twice a year. Board stipends are estimated to total $60,000 over the 50-year Permit Term.

Insurance

Insurance costs are an important part of program administration. Insurance costs were included for professional insurance for the Governing Board members (often known as "directors' and officers' insurance"), general liability insurance to cover public recreational use within SSHCP Preserves, and professional liability insurance for Implementing Entity staff. Insurance is estimated to be $1 million over the 50-year Permit Term.

12.3.7 Endowment

The development fees include a contribution to a non-wasting endowment fund designed to generate sufficient interest to cover the ongoing annual costs beyond the 50-year Permit Term. The endowment needs are based on estimates of the long-term average real interest rate. The periodic audits of the funding program will review the accrual of the endowment and the long-term interest rates and determine if any adjustments are required.

As noted in the preceding sections, only a few activities including management and monitoring, agricultural enhancement, and plan administration will continue in perpetuity beyond the end of the 50-year Permit Term. Due to the reduced levels of activity at the end of the land-acquisition process and the completion of habitat re-establishment construction, costs are assumed to be reduced by 50% during the post-Permit Term, except for Agricultural Enhancement which continues at the same level as during the Permit Term. The post-permit SSHCP budget provides an additional allowance for legal defense equal to 7.5% of other post-permit costs. The annual cost of ongoing activities is about $1.9 million.

The SSHCP cost analysis includes a non-wasting endowment from which the real interest earned is sufficient to cover average annual post-permit costs. Based on Plan Permittee research of real interest rates as well as a review of interest rate assumptions in other regional HCPs, a real interest rate of 3% is assumed (i.e., net interest over-and-above inflation). This assumption is consistent with the endowment requirements maintained by the California Department of Fish and Wildlife and on the endowment program operated by the National Fish and Wildlife Foundation.

A non-wasting endowment of about $62 million is required at the end of the Permit Term. This includes the additional cost (7.5% of the base endowment), about $4.3 million, as a legal endowment. Assuming an even distribution of development and development fee payment over the 50-year Permit Term, interest revenues accruing to the endowment during the Permit Term are estimated to cover about 42 percent of the endowment need.

12.3.8 SSHCP Development and Preparation Cost Recovery

The development and preparation of the SSHCP documents entailed a significant amount of Permittee and consultant time and costs. Taking into account labor costs and expenditures, the Plan Permittees estimate that their direct contributions total about $6 million. These are contributions that were paid using City and County General Funds and from contributions provided by the Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Southeast Connector Joint Powers Authority. These contributions do not include grant awards. The costs of Plan development have already been incurred. In addition, the Plan Partners will fund the Implementing Entity operations, including the executive director, program manager, administrative assistant, and other staff, as well as legal, real estate, accounting, and other functions for the first 2 years of implementation. This is necessary as the Plan will not have collected enough development fees within the first 2 years to be self-sustaining. Recovery of plan development costs are spread over the 50-year Permit Term, which with interest brings total plan development cost to about $10 million. The Plan Partners will not pay the Plan preparation cost recovery component of the development fee for their Covered Activities.

12.3.9 Summary of HCP Costs and Funding Requirements

A summary of SSHCP implementation costs is presented in Table 12-4. The costs presented in Table 12-4 also represent the total funding requirements for implementation of the SSHCP. The cost estimates include all costs associated with SSHCP implementation during the Permit Term as well as establishing the non-wasting endowment (including legal endowment) required at the end of the Permit Term to cover costs that extend beyond the Permit Term in perpetuity.

Table 12-4
Summary of Plan Costs

Cost Category	Cost Estimate	Average Annual Cost	Distribution of Costs
Land and Easement Acquisition Costs	$487,238,000	$9,745,000	57.0%
Habitat Re-establishment/Establishment	$183,098,000	$3,662,000	21.4%
Habitat Management, Monitoring, and Adaptive Management	$59,995,000	$1,200,000	7.0%
Changed Circumstances	$8,231,000	$165,000	1.0%
Agricultural Enhancement	$6,015,000	$120,000	0.7%
Plan Administration	$66,009,000	$1,320,000	7.7%
Endowment	$35,301,000	$712,000	4.1%
SSHCP Development	$9,547,000	$191,000	1.1%
Total	**$855,432,000**	**$17,115,000**	**100.0%**

12.3.9.1 Contingency Cost

The Plan costs presented in this section are planning-level estimates. To account for uncertainties in costs, contingencies have been added to the costs to help protect against short-term cost overruns. A general contingency of 10% is included in the cost model for land and easement acquisition, habitat re-establishment/establishment, habitat management, and plan administration. The contingency for monitoring activities is set at 15% to account for easement enforcement actions. Contingency costs are reported in the total cost estimate for each SSHCP cost element. A contingency fund will be used to offset any program costs that are higher than predicted by this Plan. Contingency funds have been set at modest levels because the SSHCP has a development fee adjustment program that allows for adjustments to cover changing economic conditions (see Automatic Adjustment of Development Fees to Account for Inflation in Section 12.4.3.2). In total, about 8% of the total plan cost ($71 million) is a direct contingency cost.

12.4 SSHCP Funding Program (Sources and Assurances)

Long-term viability of the SSHCP requires adequate funding to cover the Plan's implementation costs. Funding to implement the SSHCP is expected to come predominantly from development fees charged on future development.

This section outlines the key parameters of the SSHCP funding program, which include:

- SSHCP Development Fee Concept
- SSHCP Development Fee Structure
- SSHCP Development Fee Program and Schedule
- Funding Adequacy and Assurances.

12.4.1 SSHCP Development Fee Concept

The SSHCP development fees are set at levels that fully offset the cost of compensating for the species take and habitat loss authorized by the SSHCP Incidental Take Permits and the loss of aquatic features protected under the Clean Water Act.

The SSHCP includes a development fee structure that is based on the land cover types impacted by a SSHCP Covered Activity. This approach accounts for variations in costs that are associated with conservation requirements for each different land cover type. Each new development project will pay development fees based on the land cover types affected by the development. The SSHCP development fees were estimated on a per-acre-of-development basis.

The per-acre development fee is calculated by summing the total HCP implementation costs associated with mitigating the impacts of each SSHCP natural land cover type and then dividing that total cost by the number of acres of impact (direct and indirect).

Because the SSHCP implementation cost includes both costs during the Permit Term and the cost of establishing the required endowment to cover costs of managing the SSHCP Preserve System after the end of the 50-year Permit Term, a project's one-time development fee must be adequate to cover all SSHCP implementation costs for each land cover type preserved.

As discussed in Chapters 7 and 9 and in the following sections, some urban development projects will be required to dedicate SSHCP Preserve System lands on site. For these developers and potentially others who agree to on-site dedications with the SSHCP Implementing Entity, these on-site land dedications will act to reduce the number of acres on which the land component of the development fee will need to be paid. As also indicated in the development fee schedule, all new developments/impacts will be required to make contributions towards a range of other costs, though the re-establishment/establishment component of the development fee only applies to the land cover types where such mitigation actions are required.

12.4.2 SSHCP Development Fee Structure

The SSHCP employs a development fee structure, where covered projects and activities incur different development fees based on the types of habitat and amount of habitat impacted. The underlying principle for the development fee structure is that land preservation and conservation requirements, and therefore costs, vary by habitat type. For example, per-acre land costs will vary by land cover type depending on the need to mitigate the loss of land covers inside the UDA where land is more expensive. Similarly, annual monitoring costs are assumed to differ by land cover, while land management costs apply to fee title acquisitions. Re-establishment/ establishment mitigation requirements only apply to certain types of land covers.

More specifically, the SSHCP development fees are separated into twelve land cover groupings, including: (1) Agriculture, (2) Valley Grassland, (3) Vernal Pool, (4) Blue Oak Savanna and Woodland, (5) Riparian, (6) Mine Tailing Riparian Woodland, (7) Seasonal Wetland, (8) Freshwater Marsh, (9) Swale, (10) Stream/Creek (VPIH), (11) Open Water, and (12) Stream/Creek. The SSHCP Conservation Strategy (Chapter 7) includes re-establishment/ establishment objectives for all but two of these land cover types: Agriculture and Valley Grassland.

This Plan uses development impact fees to fund mitigation that will offset losses of land cover types, Covered Species habitat, and other biological values. These one-time development fees pay for the full cost of mitigating project effects on the Covered Species. Once paid, applicants do not need to find their own mitigation to satisfy state and federal endangered species or Clean Water Act laws. In addition, these development fees should also satisfy all or most of the CEQA mitigation needs for biological resources, as discussed in Chapter 1.

Methods for calculating development fees are explained in Chapter 10. As described in Chapter 10, applicants must submit an SSHCP land cover type map, wetland delineation (if applicable), and a map depicting modeled species habitat found on the project site (if applicable). The Land Use Authority Permittee or the Implementing Entity will use these reports to finalize the site-specific land cover type map to be used for calculating impacts to SSHCP land cover types and for calculating SSHCP development fees. The underlying analysis for the development fee calculations is provided in the *SSHCP Nexus Study*.

12.4.3 SSHCP Development Fee Program and Schedule

The development fees used in the SSHCP economic model are presented in Table 12-5. Development fees are shown by land cover, with the preservation component of the fee distinguished from the re-establishment/establishment fee. Appendix I includes additional detail concerning the cost components that compose the fee.

Table 12-5
Development Fees Used in the SSHCP Economic Model

Land Cover	Preservation Fees		Re-Establishment/Establishment Fees		Total
	Land	*Other*	*Re-Establishment/ Establishment and Land*	*Other*	
Agriculture	$13,511	$3,752	$0	$0	$17,263
Valley Grassland	$14,545	$5,548	$0	$0	$20,093
Vernal Pool – Direct	$26,675	$11,317	$152,844	$5,940	$196,776
Vernal Pool – Indirect	$26,675	$11,317	$0	$0	$37,992
Blue Oak	$16,285	$5,896	$92,258	$5,940	$120,379
Riparian	$25,238	$11,156	$103,001	$5,940	$145,336
Mine Tailing Riparian Woodland	$9,398	$5,716	$123,757	$5,940	$144,811
Seasonal Wetland	$17,723	$5,921	$110,893	$5,940	$140,477
Freshwater Marsh	$23,233	$6,156	$106,098	$5,940	$141,428
Swale – Direct	$17,451	$5,945	$106,566	$5,940	$135,902
Swale – Indirect	$17,451	$5,945	$0	$0	$23,396
Streams/Creeks (VPIH) – Direct	$33,592	$6,389	$100,722	$5,940	$146,643
Streams/Creeks (VPIH) – Indirect	$33,592	$6,389	$0	$0	$39,981
Open Water	$17,424	$5,944	$87,345	$5,940	$116,653
Streams/Creeks	$12,132	$5,746	$97,710	$5,940	$121,529

12.4.3.1 Land Dedication in Lieu of Development Fees

The implementation strategy outlined in Chapter 9 describes a land dedication process where project proponents can dedicate land towards satisfying their mitigation requirements and thereby reduce their development fees. When the dedication of land (or a re-establishment/establishment site) is accepted into the SSHCP Preserve System, development fees will be adjusted by reducing the appropriate portion of the development fee (e.g., the "land" component of the SSHCP development fee) at a 1:1 ratio. It should be noted that some components of the proposed SSHCP development fees (i.e., "other" fees shown in Table 12-5) will remain unchanged because these fee revenues are used to fund SSCHP requirements for management and monitoring, changed circumstances, plan administration, plan development, and endowment. Land dedication in lieu of paying the land purchase component of the SSHCP development fee is only awarded after the Implementing Entity

has approved the land dedication and recordation of a conservation easement or transfer of fee title to the Implementing Entity has occurred.

As described in Chapter 10, if an applicant proposes to dedicate land or an easement in lieu of paying part of the required SSHCP development fees, then the Implementing Entity must review the proposed land dedication or the easement to ensure that it is consistent with the SSHCP Conservation Strategy. The SSHCP has strict criteria for siting Preserves, and not all land within the SSHCP Plan Area is suitable for establishing SSHCP Preserves. The Implementing Entity must determine whether the proposed land dedication is consistent with SSHCP AMMs described in Chapter 5, Section 5.4, Conditions on Covered Activities, and with the Biological Goals and Measurable Objectives described in Chapter 7 (Table 7-1, Biological Goals, Measurable Objectives, and Conservation Actions). An applicant must provide information in support of a land dedication proposal as detailed in Chapter 10. Mitigation fee implementation will be covered in more detail in the Mitigation Fee Ordinances.

12.4.3.2 Development Fee Adjustment Program

The funding program must ensure that the SSHCP remains solvent in perpetuity. SSHCP funding will never lag behind increasing costs, and Plan implementation will never be compromised. Therefore, the SSHCP funding program is able to respond to changing economic conditions, including inflation and a dynamic real estate market. It is able to respond to any unexpected funding shortfalls over the Permit Term.

The SSHCP economic model predicts future changes in costs and revenues using the best available information. To ensure that SSHCP funding never lags behind increasing costs, the SSHCP includes automatic development fee adjustments and periodic development fee audits.

Automatic Adjustment of Development Fees to Account for Inflation

The proposed SSHCP development fees will be automatically adjusted annually for inflation. For purposes of development fee adjustments, the SSHCP development fees are organized into two categories: (1) land acquisition and (2) all other costs of implementing the SSHCP. These two categories are subject to differing rates of inflation. Therefore, an inflation index that is appropriate to each category has been selected.

The SSHCP cost analysis assumes that the cost of land acquisition is tied directly to real estate values in the Plan Area. All other costs are tied more generally to changes in the cost of labor/personnel, services, and goods and materials. Therefore, it is anticipated that different rates of inflation could apply to land acquisition and other costs over time and require different inflation indices.

For land acquisition costs, the index to adjust the land acquisition cost portion of development fees will be the annual Home Price Index for the Sacramento–Arden–Arcade–Roseville, California Metropolitan Statistical Area from the Office of Federal Housing Enterprise Oversight. This index is selected because it is a well-regarded public data source with relevant geographic coverage. The development fee adjustment index will be based on the change in the average annual Home Price Index (Quarter 1 through Quarter 4) for the prior calendar year. The "other costs" will be indexed using the California Construction Cost Index (CCCI). The CCCI is the most applicable index as it tracks labor and materials costs that are relevant to other SSHCP costs.

Periodic Audit and Adjustment of SSHCP Development Fees

In addition to annual development fee adjustments, the SSHCP will conduct periodic comprehensive reviews of the SSHCP funding program and development fees to ensure that the development fees generated by Covered Activities are adequately covering Plan implementation costs. A comprehensive development fee audit will be completed at least every 3 years for the first 15 years of the Plan (i.e., years 3, 6, 9, 12, and 15) and at least every 5 years thereafter (i.e., years 20, 25, 30, 35, 40, and 45), where year 1 is the first full calendar year of SSHCP implementation. This minimum frequency of development fee audits was established to avoid cost-related uncertainties in early years of Plan implementation and to allow time to accumulate sufficient data to analyze the relationship between costs and development fee revenues. The audit process will include a detailed review of implementation costs and how actual costs compare to the cost assumptions in the original economic model (see Appendix I). Following completion of the independent development fee audits, SSHCP development fees may be adjusted to reflect refined cost estimates.

12.4.4 Funding Adequacy and Assurances

The SSHCP funding program is designed so that mitigation-based funding sources will meet all expected costs of the Plan. It is acknowledged that future costs of conservation are difficult to predict. Therefore, the SSHCP development fee adjustment program will be used to address any funding shortfalls, which help ensure funding adequacy over the Permit Term and in perpetuity. As discussed in Section 12.3.4, a contingency fund will be maintained to address any unexpected funding shortfalls, associated primarily with higher-than-expected land management and monitoring costs. Contingency funding is included in the economic model.

12.4.4.1 Catch-Up Fee Ordinance

As discussed in Chapter 9, each Land Use Authority Permittee will adopt a catch-up-fee ordinance. This ordinance requires third-party project applicants to pay a catch-up-fee in the

unusual circumstance that a third-party project proponent pays required SSHCP development fees prior to receiving Land Use Authority Permittee issuance of a local permit and the SSHCP development fee is thereafter increased.

12.4.4.2 Short-Term Funding Shortfalls

As described in Chapter 9, the SSHCP has a robust Jump-Start Stay-Ahead program that ensures that progress toward assembling the SSHCP Preserve System will always stay ahead of Covered Activity impacts. This is accomplished by requiring that the SSHCP maintain enough Preserve land to be at least 2% ahead of the remaining preservation needed for each SSHCP land cover type as required by the SSHCP Conservation Strategy. To ensure that the 2% stay-ahead requirement is always maintained, the Plan Partners must first check with the Implementing Entity prior to extending take coverage to Third-Party Project Proponents or prior to using take coverage for their own projects to ensure that there is enough habitat available to mitigate project impacts and to maintain a 2% cushion. If the Implementing Entity determines that the amount of impact that is anticipated to occur will exceed the stay-ahead provision's 2% threshold for any land cover group, then fees cannot be used to satisfy mitigation requirements (see Chapter 9 for alternatives to paying a fee).

Over the entire Permit Term, fee revenue may fall short of expectations if fewer Covered Activities occur than assumed under the Plan. Although unlikely, this shortfall will make it difficult for the Permittees to meet their conservation obligations. If it appears that take authorized under the permits will fall short of expectations, substantially reducing fee revenue, the Implementing Entity and other Permittees will work with the Wildlife Agencies to extend the term of the permits to allow the use of the authorized take and allow full implementation of the Plan. As described above, the Local Partners are not expected to, nor are they required to, utilize local general funds for Habitat Plan implementation in the event of funding shortfalls as a result of less fee revenue than expected, either in the short term or the long term.

Alternatively, if revenues fall far short of expectations and it is unlikely that the Permittees will meet their permit obligations, they may apply to reduce the authorized take and reduce the permit obligations. Any Permit Term extension or request for reductions in Plan obligations will follow the requirements for a major amendment described in Chapter 9.

12.4.4.3 Post-Permit Management and Monitoring

The Plan Permittees are obligated to continue to protect, manage, and maintain the Preserve System after the end of the 50-year permit period. As noted in Section 12.3.8, only a few activities including management and monitoring, agricultural enhancement, and plan administration will continue in perpetuity beyond the end of the 50-year Permit Term. Funding

obligations such as land acquisition, habitat re-establishment/establishment, remedial measures and contingency, will not continue post-permit.

Due to the reduced levels of activity at the end of the land acquisition process, the completion of habitat re-establishment construction and the absence of the need to fund contingency and remedial measures, costs are assumed to be reduced by 50% during the post-Permit Term.

Funding provided by interest on the endowment is expected to fully fund post-permit costs. Any shortfalls in the endowment during the Permit Term will be identified by the comprehensive development fee audit to be completed at least every 3 years for the first 15 years and at least every 5 years thereafter. If the endowment is not growing fast enough to reach its target size, then the endowment fee portion of the development fees will be increased to make up the shortfall. With these built-in safeguards in the endowment, post-permit funding is expected to be adequate to fully offset post-permit costs of management and monitoring.

Five years prior to the termination of the permit, the Plan Permittees will determine how to handle the continuing obligations of the Implementing Entity with the approval of the Wildlife Agencies. Cost assumptions regarding post-permit costs are presented in Section 12.3.8.

13 ALTERNATIVES TO AVOID OR REDUCE TAKE

The federal Endangered Species Act (ESA) requires that Habitat Conservation Plan (HCP) applicants identify alternative actions that were considered to reduce the level of take to federally listed species and to provide a rationale for why those alternatives were not chosen. The Endangered Species Consultation Handbook (USFWS and NMFS 1998) identifies two alternatives commonly used in HCPs: (1) an alternative that would reduce take below levels anticipated for the proposed project, and (2) an alternative that would avoid take and hence not require a permit from the U.S. Fish and Wildlife Service (USFWS). Because the ESA only requires that alternative approaches be based on take of federally listed wildlife species covered by an HCP, this chapter provides a description of alternative take scenarios that were considered to avoid or reduce take of federally listed species covered under the South Sacramento Habitat Conservation Plan (SSHCP or Plan). Because take of federally listed plant species are not prohibited under the ESA and because this Plan requires Covered Activities fully avoid take of Sacramento Orcutt grass (*Orcuttia viscida*) and slender Orcutt grass (*Orcuttia tenuis*), this chapter does not address these plants. The identification and discussion of project alternatives required by the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) are presented in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) that has been prepared for the SSHCP.

13.1 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

As discussed in Chapter 3, vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*) spend their entire life cycles within ephemeral wetlands, including vernal pools and swales. However, adjacent upland habitats such as valley grasslands are also considered essential habitat for the two shrimp species because vernal pools and swales require supporting hydrology (e.g., adequate runoff to supply the pools, intact perched aquifer). As discussed in Chapter 6, surveys suggest that vernal pool fairy shrimp and vernal pool tadpole shrimp are relatively well distributed throughout the Plan Area. They are considered to be potentially present in any area that contains vernal pools and swales with adjacent upland habitat adequate to supply runoff to the pools and swales.

Take of vernal pool fairy shrimp and vernal pool tadpole shrimp could be avoided if Covered Activities do not cause direct or indirect effects to the vernal pool ecosystem. A "no take" alternative for vernal pool fairy shrimp and vernal pool tadpole shrimp would therefore need to include avoidance of modeled habitat in the vernal pool ecosystem.

This "no take" alternative for vernal pool fairy shrimp and vernal pool tadpole shrimp was considered but deemed infeasible by the Plan Permittees. Complete avoidance of the vernal pool ecosystem would preclude implementation of city and County of Sacramento (County)

General Plans by disallowing much of the planned development within the Urban Development Area (UDA). The UDA is defined as that portion of the Plan Area that is also within the County's Urban Service Boundary (USB), city spheres of influence, and city boundaries. The UDA is where most Covered Activities will be permitted and where most new growth is planned to occur. The "no take" alternative was rejected as it is inconsistent with the purposes of the SSHCP (Chapter 1) in that it would preclude implementation of Land Use Authority Permittee General Plans.

Another alternative that was considered is to reduce take by requiring that all development projects within vernal pool recovery areas (i.e., Mather Core Recovery Area and Cosumnes/Rancho Seco Core Recovery Area) avoid impacts to vernal pools and swales. While this "reduced take" alternative would allow for some additional development to occur within the UDA over the "no take" alternative, it would still preclude a significant amount of development from occurring within a majority of the area identified within city and County General Plans for urbanization. Similar to the "no take" alternative, this "reduced take" alternative was also rejected as it would be inconsistent with the purpose and need of the SSHCP. It would preclude implementation of Land Use Authority Permittee General Plans.

In addition, both the "no take" and "reduced take" alternatives are biologically inferior to the Preserve System approach proposed under the SSHCP. Both of these alternatives likely would require on-site avoidance and minimization only of occupied vernal pools and swales (as documented by protocol-level presence/absence surveys) and immediately adjacent upland habitat. This piecemeal type of avoidance of spatially discrete resources typically results in small, isolated preserves that become degraded over time due to various adverse indirect edge effects (e.g., non-native species, pollutants). Such habitat fragmentation and isolation also disrupts dispersal of individuals within and among vernal pool complexes via natural dispersal mechanisms (e.g., wind, overland flows, and animals), potentially resulting in reduced genetic exchange and various related effects such as genetic drift, reduced genetic diversity, reduced likelihood of colonizations (i.e., the "rescue" effect), and, thus, higher likelihood of local extirpations. The ecosystem value of these small, fragmented preserves will also be reduced because management will be more difficult and expensive, sometimes even impossible.

Under the SSHCP, preserves established for vernal pool fairy shrimp and vernal pool tadpole shrimp will be large and interconnected by habitat linkages, and thus will maintain the ecosystem processes necessary for conserving these species that would be more difficult under the "no take" and "reduced take" alternatives (see Sections 7.6.2.9 and 7.6.2.11). In addition to providing biologically superior preserves and habitat linkages, the SSHCP requires implementation of fully funded monitoring and management programs in perpetuity. An advantage of the SSHCP is that monitoring and management will be comprehensive and backed by local government entities implementing the Plan, thus providing a greater level of certainty that management and monitoring

will continue in perpetuity and will occur consistently on all SSHCP established preserves and habitat linkages within the Plan Area (see Chapter 8, Monitoring and Management Programs, and Chapter 10, Project Application Process). While the "no take" and "reduced take" alternatives would avoid a greater acreage of vernal pools and swales, both alternatives would lack key components that the SSHCP offers to enhance and manage the vernal pool fairy shrimp and vernal pool tadpole shrimp in perpetuity.

13.2 Valley Elderberry Longhorn Beetle

As discussed in Chapter 3, the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) occurs in several land cover types in the Plan Area that support its host plant (elderberry), including mine tailing riparian woodland, mixed riparian woodland, and mixed riparian scrub. It has been documented along the Cosumnes River/Deer Creek riparian corridor and along Dry Creek east of the City of Galt. Exit holes have also been documented within the Mine Tailing Riparian Woodland in Rancho Cordova on the Aerojet property (Talley et al. 2007) just outside the Plan Area and along the Cosumnes River near Rancho Murieta (Talley 2003).

Many factors have contributed to the decline of this species, although the effects of many potential environmental stressors are poorly understood (USFWS 1984). Over the past 150 years, approximately 90% of the riparian habitat in California has been lost to development or other human activities (USFWS 1984, 2006).Levees, dams, and other structures or activities that alter the hydrology of riparian areas may directly destroy riparian habitat or indirectly cause loss of riparian forests and elderberry shrubs. Habitat fragmentation also may threaten valley elderberry longhorn beetle because isolation of small patches of riparian forest may prevent genetic flow among occupied patches, thus effectively isolating metapopulations (Collinge et al. 2001). Furthermore, small habitat patches bordered by development may not be adequately protected from adverse edge effects such as urban runoff, pollutants, and invasive species, including Himalayan blackberry (*Rubus discolor*). Also, fogging of riparian areas by mosquito abatement districts or the California Department of Public Health to control mosquitoes may adversely affect the valley elderberry longhorn beetle.

Take of valley elderberry longhorn beetle could be avoided if Covered Activities do not directly impact riparian habitats that support occupied elderberry shrubs (as determined by focused surveys for beetles or exit holes). A "no take" alternative for valley elderberry longhorn beetle would therefore need to include avoidance of all riparian sites supporting occupied elderberry shrubs.

This "no take" alternative for valley elderberry longhorn beetle was considered but deemed infeasible by the Plan Permittees. Although focused surveys for valley elderberry longhorn beetle have not been conducted throughout the Plan Area, the SSHCP assumes that habitat

patches supporting elderberry shrubs that have characteristics predictive of beetle occupancy (i.e., certain shrub densities and shrub sizes, number of stems, and range of branch sizes (Talley et al. 2007)), are widespread in riparian portions of the Plan Area. While most urban development Covered Activities would occur outside of the riparian areas that provide suitable habitat for the valley elderberry longhorn beetle, complete avoidance of occupied habitat patches would preclude implementation of several Covered Activities. Covered Activities that could directly permanently or temporarily impact habitat for the valley elderberry longhorn beetle include major transportation projects and other infrastructure projects (e.g., recycled and wastewater pipelines) that cross riparian zones at stream crossings, operation and maintenance of transportation and flood control facilities and water delivery systems, and construction and operation and maintenance of recreational facilities (e.g., trails). The "no take" alternative could preclude or severely restrict one or more of these Covered Activities. The "no take" alternative was therefore rejected as it is inconsistent with the purposes of the SSHCP and would conflict with mandates for human health and safety (e.g., flood control).

In addition, the "no take" alternative is biologically inferior to the Preserve System approach proposed under the SSHCP. The "no take" alternative would require on-site avoidance and minimization only of riparian habitat patches supporting host plants occupied by the valley elderberry longhorn beetle. This piecemeal type of avoidance of spatially discrete resources typically results in small, isolated preserves that become degraded over time due to various adverse indirect edge effects (e.g., non-native species, dust, pollutants). Such habitat fragmentation and isolation also disrupts dispersal of individuals between disjunct riparian patches, potentially resulting in reduced genetic exchange and various related effects such as genetic drift, reduced genetic diversity, reduced likelihood of colonizations, and, thus, higher likelihood of local extirpations.

Under the SSHCP, there would be no net loss of riparian habitat from Covered Activities, preserves supporting riparian habitat with elderberry shrubs would be established, stream setbacks would be established in select riparian areas, and additional acreage of suitable habitat for the valley elderberry longhorn beetle would be re-established or established per USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999), thus resulting in a net increase in suitable habitat for the species. The re-establishment and establishment strategy, in concert with no net loss of existing riparian acreage and established preserves, will help protect the ecosystem processes necessary for conserving valley elderberry longhorn beetle in the Plan Area. Assembly of preserves and habitat re-establishment/ establishment beyond the existing compensatory mitigation required by the U.S. Army Corps of Engineers (USACE) and California Department of Fish and Wildlife (CDFW) under existing Section 404 and Section 1600 regulations, respectively, likely would not occur under a "no take" alternative. Therefore, a "no take" alternative would make it more difficult to protect ecosystem processes.

In addition to providing biologically superior mitigation for riparian habitat impacts resulting from Covered Activities, the SSHCP requires implementation of fully funded monitoring and management programs in perpetuity. An advantage of the SSHCP is that monitoring and management will be comprehensive and backed by local government entities implementing the Plan, thus providing a greater level of certainty that management and monitoring will continue in perpetuity and will occur consistently on all SSHCP established preserves within the Plan Area (see Chapter 8, Monitoring and Management Programs, and Chapter 10, Project Application Process). While the "no take" alternative could avoid a greater number of currently occupied habitat patches, this alternative would lack key components that the SSHCP offers to enhance and manage the valley elderberry longhorn beetle in perpetuity.

13.3 California Tiger Salamander

California tiger salamander (*Ambystoma californiense*) uses seasonal wetlands such as vernal pools for breeding and nearby upland habitats such as valley grassland, blue oak savanna, and blue oak woodland for refugia and dispersal. Based on existing occurrence data for the SSHCP, California tiger salamanders are limited to the southeastern portion of the Plan Area outside of the UDA. Their distribution generally extends north from the San Joaquin/Sacramento County boundary to just south of the Cosumnes River and from the Amador/Sacramento County boundary east to the City of Galt.

Impacts to California tiger salamander have largely occurred from agricultural conversion of habitat and low-density development associated with rural agricultural residential developments. More recently, this species has also become increasingly threatened by higher-density urban development within its range. Direct impacts include the fill of breeding or refugia habitat that is near or contiguous with breeding locations. Some road expansion and maintenance projects also likely directly and indirectly impact California tiger salamander by creating barriers to movement and causing direct mortality by vehicle strikes.

Take of California tiger salamander could be avoided if Covered Activities do not directly impact breeding sites and adjacent and nearby upland habitat used for refugia and/or dispersal. A "no take" alternative for California tiger salamander would therefore need to include avoidance of all occupied breeding sites and sufficient upland habitat adjacent to and near occupied sites to maintain both the hydrology of the breeding sites and provide for refugia and dispersal. Avoidance of California tiger salamander habitat would include eliminating impacts to all breeding sites located in the southeastern portion of the County and a minimum 1.5-mile buffer around those wetland resources. Because the species' distribution in the Plan Area is entirely outside of the UDA on agriculturally zoned land, avoidance of take could only be achieved by prohibiting agricultural activities on suitable habitat. The SSHCP only covers agricultural activities on SSHCP preserves for the benefit of Covered Species. Therefore, there

is no mechanism available to the SSHCP to implement this alternative. In addition, the County has identified this area for agricultural use within its General Plan and has adopted a Right-To-Farm Ordinance. Prohibition on all agriculture activities in this area would thus require legislative action, making a "no take" alternative infeasible. Therefore, this "no take" alternative was rejected.

Another "no take" alternative considered for California tiger salamander is to eliminate rural transportation projects in California tiger salamander modeled habitat. Rural transportation project Covered Activities in California tiger salamander modeled habitat primarily consist of shoulder widening undertaken to improve roadway safety. Because these Covered Activities involve improvements of existing roadways, it is not possible to realign these projects to avoid California tiger salamander habitat. Although direct impacts to California tiger salamander habitat from road widening likely would be small and not substantially reduce available upland habitat, these roadway improvements may increase the risk of mortality from vehicle strikes that result from expanding roadway widths and increased traffic volumes. This "no take" alternative was rejected because roadway improvements are considered important safety measures and eliminating them as Covered Activities is not consistent with the purposes of the SSHCP, could jeopardize human health and safety, and precludes implementation of locally adopted General Plans.

The two "no take" alternatives are biologically inferior to the approach proposed under the SSHCP. The "no take" alternatives would require on-site avoidance only of occupied breeding sites and adjacent and nearby upland habitats for California tiger salamander. This avoidance would not result in establishment of preserves. The SSHCP establishes a large, landscape-level preserve in the southeastern portion of the Plan Area to provide adequate habitat to support the California tiger salamander's full life cycle, including breeding sites and upland refugia and dispersal habitat (see Section 7.6.2.14).

In addition, the SSHCP requires implementation of fully funded monitoring and management programs in perpetuity. An advantage of the SSHCP is that monitoring and management will be comprehensive and backed by local government entities implementing the Plan, thus providing a greater level of certainty that management and monitoring will continue in perpetuity and will occur consistently on all SSHCP established preserves and habitat linkages within the Plan Area (see Chapter 8, Monitoring and Management Programs, and Chapter 10, Project Application Process). While the "no take" alternative could avoid a greater number of currently occupied habitat patches, this alternative would lack key components that the SSHCP offers to enhance and manage the California tiger salamander in perpetuity.

13.4 Giant Gartersnake

Giant gartersnake (*Thamnophis gigas*) uses several land cover types for foraging, including seasonal wetlands, freshwater marsh, open water, and streams/creeks and uses mixed riparian scrub and valley grassland for aestivation. Giant gartersnake uses upland habitat for breeding, aestivation, dispersal, and refugia in close proximity to aquatic habitat for foraging. Occurrence records for giant gartersnake in the Plan Area are concentrated in the southern and southwestern portions of the Plan Area (Figure 3-18), indicating it is absent from the northwestern, northern, and eastern portions of the Plan Area. The distribution of giant gartersnake in the southern and southwestern portions of the Plan Area is limited by the extent of perennial waters.

Giant gartersnake is threatened by habitat loss and degradation, including urban development, conversion of habitat to agricultural uses, and in-stream capital improvement projects and associated ongoing operations and maintenance. Although some giant gartersnake populations have persisted at low population levels in artificial wetlands associated with agricultural and flood-control activities, many of these altered wetlands are now threatened by urban development. Impacts from these activities could result in a loss of breeding, aestivation, and foraging habitat and/or result in habitat fragmentation, causing populations to become increasingly isolated.

Take of giant gartersnake could be avoided if Covered Activities do not directly impact occupied breeding, foraging, refugia, and dispersal areas in the southwestern and southern portions of the Plan Area. Avoidance of giant gartersnake habitat therefore likely would require eliminating impacts to all streams within the southwestern and southern portions of the Plan Area, plus a minimum 0.25-mile buffer on either side of streams to preserve adjacent upland and seasonal wetland resources. Like California tiger salamander, a vast majority of the giant gartersnake occurrences in the Plan Area are outside of the UDA on agriculturally zoned land. And as with California tiger salamander, avoidance of upland habitat could only be achieved by prohibiting agricultural activities on modeled habitat. Any prohibition on agriculture activities would be extremely difficult to implement and would conflict with General Plan policy, making a "no take" alternative outside of the UDA infeasible.

Within the UDA, a small portion of the giant gartersnake's range includes Laguna Creek and its tributaries. Take of giant gartersnake habitat inside the UDA could be avoided or reduced by eliminating or restricting capital improvement projects within Laguna Creek's floodplain, including flood control projects, water supply, drainage, sewer, roadway improvements, and related operations and management. This "no take" or "reduced take" alternative is infeasible because not undertaking some of these projects would put human health and safety at risk and would preclude implementation of locally adopted General Plans. The "no take" and

"reduced take" alternatives both within and outside of the UDA therefore were rejected because they are infeasible.

The "no take" and "reduced take" alternatives for giant gartersnake are biologically inferior to the Preserve System approach proposed under the SSHCP. Both alternatives would require on-site avoidance only of occupied habitats. This on-site avoidance would not involve establishment of preserves. The SSHCP helps to establish and consolidate large preserves in the southwestern and southern portions of the Plan Area near Badger Creek and will connect to the Stone Lakes National Wildlife Refuge, providing preserve areas large enough to support the gartersnake's full life cycle, including foraging, breeding, refugia, and dispersal habitat (see Section 7.6.2.16).

In addition, the SSHCP requires implementation of fully funded monitoring and management programs in perpetuity. An advantage of the SSHCP is that monitoring and management will be comprehensive and backed by local government entities implementing the Plan, thus providing a greater level of certainty that management and monitoring will continue in perpetuity and will occur consistently on all SSHCP preserves (see Chapter 8, Monitoring and Management Programs, and Chapter 10, Project Application Process). While the "no take" and "reduced take" alternatives could avoid a greater number of currently occupied habitat patches, these alternatives would lack key components that the SSHCP offers to maintain giant gartersnake in the Plan Area in perpetuity.

13.5 References Cited

Collinge, S.K., M. Holyoak, C.B. Barr, and T.J. Marty. 2001. "Riparian Habitat Fragmentation and Population Persistence of the Threatened Valley Elderberry Longhorn Beetle in Central California." *Biological Conservation* 100:103–113.

Talley, T.S. 2003. Notes from the laboratory and field research on the valley elderberry longhorn beetle. For research conducted at the University of California, Davis, from 2002 to 2003.

Talley, T.S., E. Fleishman, M. Holyoak, D.D. Murphy, and A. Ballard. 2007. "Rethinking a Rare Species Conservation Strategy in an Urban Landscape: The Case of the Valley Elderberry Longhorn Beetle." *Biological Conservation* 135:21–32.

USFWS and NMFS (U.S. Fish and Wildlife Service and National Marine Fisheries Service). 1998. *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act*. Final. March 1998.

USFWS. 1984. *Valley Elderberry Longhorn Beetle Recovery Plan*. Portland, Oregon: USFWS. June 28, 1984.

USFWS. 1999. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. Sacramento, California: USFWS, Sacramento Fish and Wildlife Office. July 9, 1999.

USFWS. 2006. *Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*). 5-Year Review: Summary and Evaluation*. U.S. Fish and Wildlife Service, Sacramento, California. September 26, 2006.

INTENTIONALLY LEFT BLANK

SSHCP South Sacramento Habitat Conservation Plan

FINAL SOUTH SACRAMENTO HABITAT CONSERVATION PLAN







PLAN PARTNERS

County of Sacramento

City of Rancho Cordova

City of Galt

Sacramento County Water Agency

Southeast Connector Joint Powers Authority

VOLUME II
APPENDICES

January 2018

APPENDIX A

Glossary and Acronyms

APPENDIX A1

Glossary of Terms

APPENDIX A1
Glossary of Terms

A

Adaptive management: A scientific approach to resource management that combines management, monitoring and research to effectively manage complex ecosystems in the face of uncertainty. Adaptive management addresses uncertainty about the system by identifying clear objectives, identifying areas of uncertainty and alternative hypotheses, testing critical assumptions, monitoring to provide feedback about the ecosystem and actions, learning from the ecosystem as actions are taken to manage it, and incorporating what is learned into future actions. Often includes development of conceptual models of the ecosystem or species. As described in the Five-Point Policy, adaptive management is "an integrated method for addressing uncertainty in natural resource management."[1] See Chapter 8 of the SSHCP.

Agencies: See definitions for "Wildlife Agencies" and "Permitting Agencies."

Agricultural-residential development: In the 2010 Sacramento County General Plan (County of Sacramento 2011), low-density, single-family residential is defined as a land use area meant to allow the keeping of animals and the raising of crops for personal or income supplementation purposes.[2]

Applicant: See "Plan Permittees."

Aquatic land cover: Aquatic land covers are a subset of the SSHCP land cover types defined in Chapter 3. There are 11 aquatic land cover types: (1) vernal pool grassland, (2) vernal pool, (3) swale, (4) seasonal wetland, (5) freshwater marsh, (6) streams/creeks (vernal pool invertebrate habitat), (7) streams/creeks, (8) open water, (9) mixed riparian woodland, (10) mixed riparian scrub, and (11) mine tailing riparian woodland.

Aquatic resource: Aquatic resources are defined as waters including wetlands, rivers, streams, lakes, marine, and estuarine systems. Also see definition of Waters of U.S.

Arterial roads: In Sacramento County, these are roads that provide linkages between thoroughfares and collectors. Arterials can also provide for mobility and direct access within commercial and retail corridors through two-way left-turn lanes.[3] As described in Chapter 5,

[1] USFWS (U.S. Fish and Wildlife Service). 2000. Addendum to the HCP Handbook: 5-Point Policy. 65 FR 35242. June 1, 2000.

[2] County of Sacramento. 2014. "Summary of Zoning Classifications." Accessed September 12, 2014. http://www.planning.saccounty.net/zc/docs/ZoningClassSummary.pdf.

[3] County of Sacramento. 2009. "Circulation – Transportation Element." Sacramento County General Plan of 2005-2030. Amended November 9, 2011. Sacramento, California: Sacramento County Community Planning and Development Department. Accessed September 12, 2014. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx.

APPENDIX A1 (Continued)

Covered Activities, arterial roads are typically developed as four-lane roadways with a center two-way left-turn lane or a raised center median with adjacent Class I, Class II, or Class III bikeway facilities.

Authorized incidental take (authorized take): The amount of incidental take of covered species and amount of habitat modification or degradation in the Incidental Take Permits (ITPs) issued to Permittees pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act (ESA), and the amount of take of covered species requested by the SSHCP Permittees for inclusion in the California Department of Fish and Wildlife (CDFW) ITP issued under the California Endangered Species Act (CESA) pursuant to California Fish and Game Code Section 2081. Also see definition of "Incidental Take."

Avoidance and Minimization Measures: Measures to avoid and minimize adverse effects resulting from covered activities described in Chapter 5 of the SSHCP. See Section 5.6. Includes the following AMM types:

- ***Best management practice (BMP):*** Measures to avoid and minimize impacts resulting from covered activities during and after construction. An approach to pollution control that is based on adopting methods that have been determined to be the most effective, practical means of preventing or reducing water pollution from non-point sources.[4]
- ***Low-impact development (LID):*** An approach to land development (or re-development) that employs principles such as preserving and establishing natural landscape features and minimizing effective imperviousness to manage water in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed.

B

Biological Resources Letter Report: Documents the biological resources present within a site that is proposed for development Covered Activities. Each report includes at a minimum 1) a map of SSHCP Land Cover Types based on a field investigation of the site, 2) descriptions of Covered Species habitat present on the site, 3) any observations of Covered Species and other species observed on the site during a general biological resources survey, 4) results of any required species-specific surveys, and 5) any site-specific conditions that should be applied to the proposed project to avoid or minimize take of Covered Species and habitat. Prepared as a part of the Project Application Package.

[4] A Dictionary of Environment and Conservation (2 ed.). Oxford University Press. 2013.

APPENDIX A1 (Continued)

Biological opinion (BO): A document which includes: (1) the opinion of the USFWS or the National Marine Fisheries Service as to whether or not a Federal action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of designated critical habitat; (2) a summary of the information on which the opinion is based; and (3) a detailed discussion of the effects of the action on listed species or designated critical habitat. [50 CFR §402.02, 50 CFR §402.14(h)].[5]

Bio-swale: Vegetated, mulched, or xeriscaped channels that provide treatment and retention as they move stormwater from one place to another. Vegetated swales slow, infiltrate, and filter stormwater flows. As linear features, vegetated swales are particularly suitable along streets and parking lots.

Buffer: A zone around a sensitive environmental feature (e.g., nest site) where human activity is restricted to minimize direct and indirect effects to the feature. For example, a buffer will be required between a nesting bird and construction activities.

Buffering: In GIS analysis, a polygon enclosing a point, line, or polygon at a specified distance. In the SSHCP, buffering was used to identify zones of avoidance such as stream or preserve setbacks where a waterway or preserve boundary was buffered by a given distance to create the area of avoidance.

C

California Natural Diversity Database (CNDDB): A CDFW program that inventories the locations and status of rare plants and animal occurrences within California.[6]

Changed circumstance: Changes in the circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by the plan developers and the Service and can be planned for (e.g., the listing of a new species, or a fire, flood, drought, or other natural catastrophic event in areas prone to such events (50 CFR 17.3). (Also see definitions for "Unforeseen Circumstance" and "No Surprises Policy/Assurances").

Claypan: Dense, compact, slowly permeable layer with a high clay content.

Community plan: In Sacramento County, this is a development plan proposed by a land developer and approved by one of the SSHCP Permittees that sets forth policy and

[5] USFWS. 1998 . Endangered Species Consultation Handbook.
[6] CDFW. 2014. California Natural Diversity Database (CNDDB). Accessed September 18, 2014. http://www.dfg.ca.gov/biogeodata/cnddb/.

APPENDIX A1 (Continued)

implementation strategies for such items as land use, transportation, urban design, parks, schools, and public services, in a defined development community.[7]

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved (33 CFR 332).

Conservation action(s): Specific SSHCP activities that will be carried out to meet the conservation needs of the covered species and natural communities in order to achieve the SSHCP biological goals and biological objectives.

Conservation Strategy: The SSHCP's overall and unified approach for achieving the SSHCP biological goals and biological objectives. Elements of the Conservation Strategy include preserve assembly guidelines, conditions on Covered Activities, avoidance and minimization measures (AMMs), habitat preservation, habitat re-establishment/establishment, habitat monitoring and management, and species monitoring and management. The SSHCP Conservation Strategy provides for conservation of 29 covered species and their habitats; avoids or minimizes impacts of covered activities; mitigates for the impacts of covered activities on the covered species and their habitats on the basis of species and habitat needs; provides a regional approach to the avoidance, minimization, and mitigation of impacts to the maximum extent practicable; provides protection to wetlands and waters of the Plan Area; and contributes to recovery of some listed Covered Species.

Conserve, Conservation: Under the federal ESA, "conservation," "conserve," and "conserving" means to use, and the use of all methods and procedures that are necessary to bring any listed species to the point at which the protection measures provided by the ESA are no longer necessary (also see definition of "Recovery" below). Such conservation methods and procedures may include, but are not limited to, all activities associated with scientific resources management such as species research, census, law enforcement, habitat acquisition, maintenance, propagation, live trapping, transplantation, and the regulated taking of individuals in extraordinary cases where population pressures within a given ecosystem cannot be otherwise relieved (ESA Section 3.(3)).[8]. The SSHCP, especially Chapters 5, 7, 8, 9, and 10, describes the methods and procedures by which the Permittees will conserve each SSHCP covered species within the boundaries of the Plan Area

[7] County of Sacramento. 2014. "Specific Plans/Community Plans/Special Projects." MSA Planning and Community Development Department. Accessed September 18, 2014. http://www.planning.saccounty.net/plans-projects.html.

[8] USFWS. 1998 . Endangered Species Consultation Handbook.

APPENDIX A1 (Continued)

Conservation bank: See also definition of "mitigation bank."

Conservation Easement: A legally enforceable land preservation agreement that transfers certain use rights on a property from a landowner to a qualified third-party land protection organization, typically restricting future urban development, as well as several other activities and/or land uses on the property, and "running with" the property in perpetuity.

Construction monitoring: Monitoring by approved biologists of all ground-disturbing Covered Activities to ensure that required SSHCP Avoidance and Minimization Measures are implemented correctly, and to collect information on the effectiveness of the implemented SSHCP Avoidance and Minimization Measure.

Core preserve: A SSHCP habitat preserve that is at least 800 acres in size and contains extensive areas of contiguous habitat, including substantial areas of habitats that are representative of habitats found in the geographic region, and include populations of Covered Species considering the specific ecological needs of SSHCP Covered Species. Most SSHCP Core preserves are located in the UDA. See Section 7.4.1. See also definitions for "landscape preserve," "minor preserve," "linkage preserve," "satellite preserve," and "cropland preserve."

Covered Activity (Activities): The otherwise lawful activities and projects described in Chapter 5 of the SSHCP that are implemented in the Plan Area by the Plan Permittees, or implemented by third parties (e.g., project proponents or private developers) that are subject to the jurisdiction of a Plan Permittee. Species incidental take resulting from Covered Activities is covered under the ESA and CESA Incidental Take Permits (see definition for Incidental Take Permit [ITP]).

Covered Species: The species that will be listed on the CESA and federal ESA ITPs issued by the two Wildlife Agencies (USFWS and CDFW). The Plan addresses 29 species (21 wildlife and 8 plants), of which, 10 are currently listed as threatened or endangered under CESA or the federal ESA (see Table 1-2 for a complete list of species covered under this Plan).[9]

Critical Habitat : For federally-listed species Critical Habitat consists of: (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Act, on which are found those physical or biological features (constituent elements) (a) essential to the conservation of the species and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination by the Secretary that such areas are

[9] Chapter 1.

APPENDIX A1 (Continued)

essential for the conservation of the species.[10] [ESA §3 (5)(A)] Designated critical habitats are described in 50 CFR §17.

Constituent Elements: Also referred to as primary constituent elements. The physical and biological features of designated or proposed critical habitat essential to the conservation of the species, including, but not limited to: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and (5) habitats that are protected from disturbance or are representative of the historic geographic and ecological distributions of a species. [ESA §3(5)(A)(i), 50 CFR §424.12(b)][11]

Core Recovery Area: Core recovery areas are the specific sites identified by the USFWS as necessary to recover endangered or threatened species[12]. As discussed in Chapter 3, there are two Core Recovery Areas in the SSHCP Plan Area.

Cropland preserve: SSHCP Preserves consisting of existing croplands or irrigated pasture-grasslands that have been identified as uniquely important foraging, roosting, and nesting habitat in the Plan Area for some Covered Species, including Swainson's hawk, white-tailed kite, northern harrier, tricolored blackbird, and greater sandhill crane. See Chapter 7 of the SSHCP.

D

Depressional wetland: Depressional wetlands are confined to topographic basins or hollows that are either too small or too shallow to form lakes or reservoirs. This is a very large category of wetlands that includes vernal pools and natural as well as artificial ponds. There is no minimum or maximum size for depressional wetlands. They often depend on multiple water sources, including local runoff, groundwater, and direct precipitation. Their waters can be saline, alkaline, or fresh.[13] See definition of vernal pool crustacean habitat.

Detention: Water management practice or system that delays the downstream progress of stormwater by the use of temporary storage or metered outlets.[14]

---

10 USFWS. 1998 . Endangered Species Consultation Handbook.
11 USFWS. 1998 . Endangered Species Consultation Handbook.
12 USFWS. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.
13 California Water Quality Monitoring Council: http://www.mywaterquality.ca.gov/eco_health/wetlands/extent/types/depressional.shtml.
14 Corps. 2014. "Glossary." Accessed September 18, 2014. http://chl.erdc.usace.army.mil/glossary.

APPENDIX A1 (Continued)

Detention basin: An excavated area along waterways that collects stormwater runoff and gradually releases it in a controlled manner to prevent downstream areas from flooding or being eroded.

Development: See "Urban Development."

Discharge: The volume of stormwater that passes a given location within a given period of time, usually expressed in cubic feet per second.[15]

Distribution: The geographic area within which a species or other taxon of organisms occurs; the spatial pattern or arrangement of the members of a species, population, or other group of organisms.[16] See also "species range."

Duripan: Soil that is cemented by alluvial silica in a subsurface hardpan (see the definition of "hardpan."

E

Ecosystem/Ecological System: The natural interacting biotic and abiotic system in a given area, which includes all of the organisms (plants, animals, fungi, and micro-organisms) that live in particular habitat, along with their immediate physical environment. Examples include a lake, forest, or drainage basin. The term was first used by British ecologist Arthur Tansley in 1935, who visualized ecosystems as being composed of two parts, the biome and the habitat. In Tansley's view 'all parts of such an ecosystem—organic and inorganic, biome and habitat—may be regarded as interacting factors which, in a mature ecosystem, are in approximate equilibrium; it is through their interactions that the whole system is maintained'. Many ecologists regard ecosystems as the basic units of ecology because they are complex, interdependent, and highly organized, and because they are the basic building blocks of the biosphere.[17]

Edge effect: These are foreseeable permanent indirect effects to natural communities and species habitat resulting from development and increased human populations along the boundaries of open space areas, which result in chronic habitat degradation and decline or loss of species.

---

[15] USGS Water Science School. "Glossary of Terms." Accessed September 18, 2014. http://water.usgs.gov/edu/dictionary.html#main. Note, this differs from the definition of "discharge" according to the CWA.

[16] Dictionary of Ecology, evolution, and systematics, second edition; Lincoln et al, Cambridge University Press.

[17] A Dictionary of Environment and Conservation. Oxford University Press. 2013.

APPENDIX A1 (Continued)

Effect(s): Covered Activities cause environmental stressors (see definition below) that result in direct, indirect or cumulative effects on covered species and species habitats. Effects are primarily discussed in Chapter 6 of the SSHCP.

- ***Direct effects*** result from removal, modification, or degradation of a land cover type that provides habitat for a SSHCP covered species; removes a species population, or a species occurrence (or portions of thereof); or directly harms, harasses, kills or injures an individual of any covered species. Direct effects occur at the time and place of the covered activity implementation (e.g., ground disturbance, vegetation removal, inundation). Direct effects can be either permanent or temporary (see definitions of permanent and temporary impacts immediately below).
- ***Indirect effects*** result from modification or degradation of species habitat over time, eventually partially or fully removing the value of the habitat for breeding, feeding, or sheltering. Indirect effects are defined by USFWS as "those that are caused by the proposed action and are later in time, but are still reasonably certain to occur" (50 CFR 402.02).
- ***Permanent effects*** are direct or indirect effects that result from permanent removal, modification, or degradation of covered-species habitat, or that affect habitat for more than one year during covered activity implementation and/or more than one year after completion of the covered activity (e.g., creating a new road through grassland). Permanent effects also include indirect impacts to land covers that result in a permanent (i.e., more than one year after completion of the covered activity) change to species habitat or habitat functions (e.g., development around a wetland that reduces the water supply to a wetland that subsequently results in a reduction in the size, hydrologic regime, or water quality of the wetland). Effects that result in reduction of long-term viability of a plant or animal occurrence are also considered permanent.
- ***Temporary effects*** are direct effects that alter land cover for less than one year and the disturbed area recovers or is restored to pre-project conditions within one year (e.g., prescribed burning, construction staging areas) of completing ground disturbance. For the purposes of this Plan, all effects associated with covered activities that have a duration exceeding one year or that take more than one year to restore immediately following construction will be considered permanent. For purposes of the SSHCP, all temporary effects associated with covered activities are assumed to occur within the permanent effect footprint and therefore separate acreages have not been calculated for temporary effects. It is also assumed that AMMs will avoid to the maximum extent feasible temporary effects to covered species.

APPENDIX A1 (Continued)

- ***Cumulative effects*:** Under the federal ESA, the effects of future state or private activities (non-federal activities) that are reasonably certain to occur within the action area of an action subject to consultation.

Emergent vegetation: Aquatic plants that grow with their roots under water but their leaves and stems above the surface of the water.[18]

Endemic species: A species whose distribution is restricted to a certain area or environmental feature (e.g., soil types, natural community). A native species found only within a given area.19

Enhance, Enhancement: The manipulation of the physical, chemical, or biological characteristics of a land cover or ecosystem to heighten, intensify, or improve a specific resource function, such as species habitat quality. "Enhancement" does not result in a gain in resource area.

- ***Habitat enhancement:*** The manipulation of an existing habitat for Covered Species that improves its value to one or more Covered Species for breeding, feeding, or sheltering.

Ephemeral stream (as a jurisdictional aquatic resource): A stream that has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.[20] (See also "intermittent stream" and "perennial stream.")

Environmental Stressor: The component(s) or action(s) of a Covered Activity that results in adverse effects to Covered Species.

Establishment (creation):[21] The manipulation of the physical, chemical, or biological characteristics present to develop a resource that did not previously exist. Establishment results in a gain in resource area and functions.

Eutrophication: A common form of water pollution which involves the enrichment of a body of freshwater with nutrients such as nitrate fertilizers (washed from the soil by rain) and phosphates (from fertilizers and detergents in municipal sewage). The pollution enriches the waterbody, and this encourages the rapid growth of aquatic plants and can cause excessive growth of algae

[18] A Dictionary of Environment and Conservation (2 ed.). Oxford University Press. 2013.
[19] A Dictionary of Environment and Conservation. Oxford University Press. 2013.
[20] This definition is consistent with that found in the 2012 NWPs (Federal Register, Vol. 77(34), February 21, 2012).
[21] Note that in the context of this Plan and per 40 CFR 230, the word "establish" is synonymous with "create." See 73 FR 19594, "Compensatory Mitigation for Losses of Aquatic Resources."

(bloom) and vascular plants. This in turn reduces the availability of light and the aerobic decomposition of dead algae reduces dissolved oxygen, making the water uninhabitable for some species. Some of the algae and bacteria produce relatively large amounts of toxins, which further disrupt the aquatic ecosystem. Since the early 20th century such blooms have been a regular occurrence in the most heavily polluted parts of the Great Lakes in North America, but they have declined as water quality has improved as a result of improved pollution control and water quality management strategies. Lakes can be classified according to their nutrient content as oligotrophic (nutrient poor), mesotrophic (moderately productive), or eutrophic (very productive and fertile).[22]

Extirpated: Locally extinct, for example, a species that no longer survives in regions that were once part of its range, but that still exists elsewhere in the wild or in captivity.[23]

F

Fallow lands: Cropland and agricultural fields that are abandoned or deliberately rested for one full growing season.

Fee-title: Private ownership of real estate in which the owner has the right to control, use, and transfer the property at will. In the SSHCP, preserves could be established through acquisition of land in fee-title (also see "conservation easement").

Five-Point Policy: An addendum to the HCP Handbook, published by the USFWS and NMFS (2000), that provides additional requirements for preparing HCPs, including (1) biological goals and objectives, (2) adaptive management, (3) monitoring, (4) shorter permit duration, and (5) increased public participation.[24]

Flexible preserve: In the SSHCP, 500 acres of "flexible" preserve will be included in the SSHCP Preserve System inside the UDA to mitigate for anticipated take of vernal pool land covers. Flexible preserves must be located inside or within 1 mile of the Mather Core Recovery Area (MCRA) and contain vernal pool resources, and must be established in PPUs 1, 2, or 3. Flexible preserve could be of any combination of minor or satellite-sized SSHCP preserve (see Chapter 7). Also see "core preserve, minor preserve, satellite preserve, linkage preserve, landscape preserve, cropland preserve."

---

22 A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
23 A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
24 USFWS. 2000. "The HCP Handbook Addendum." Accessed September 18, 2014. http://www.fws.gov/Midwest/Endangered/permits/documents/HCPAddendum.pdf.

APPENDIX A1 (Continued)

Flood: A flow beyond the carrying capacity of a waterway channel (e.g., drainage, creek, stream, river).[25]

Floodplain: Normally dry land adjacent to a body of water such as a river or stream that is susceptible to inundation by floodwaters.[26]

Fossorial: Adapted for digging or burrowing into the ground.[27]

Fully protected species: Any species identified in California Fish and Game Code Sections 3511, 4700, 4800, 5050, or 5515. (See discussion of fully protected SSHCP covered species in Section 1.2.4).

G

General plan: A comprehensive policy document required for local land use authorities, usually a county or a city, for the purpose of providing guidance as to the location and type of land use that will be permitted to occur at any given location.[28]

Geographic information system (GIS): Computer-based mapping technology that manipulates geographic data in digital layers and enables one to conduct a wide array of environmental analyses.

Geomorphic provinces (regions): Areas in which distinct land forms and processes shaping such forms are present.[29]

Governing Authority (GA): In the SSHCP, Implementing Entity is a body of elected officials representing each of the Plan Permittees that is responsible for proper implementation of the HCP, ensuring compliance with the Implementing Agreement, monitoring the actions of the Plan Participants, managing fees collected by the Plan Participants, and informing the Plan Participants of changes in status of the HCP. See definition of Implementing Entity.

Governing Board: The Implementing Entity is overseen by a Governing Board that is ultimately responsible for ensuring implementation of the SSHCP. The Governing Board will make all decisions related to the governance and administration of the SSHCP, except where otherwise delegated to other commissions, committees or entities as the Governing Board sees fit.

---

25 Corps. 2014. "Glossary." Accessed September 18, 2014. http://chl.erdc.usace.army.mil/glossary.
26 Corps. 2014. "Glossary." Accessed September 18, 2014. http://chl.erdc.usace.army.mil/glossary.
27 A Dictionary of Ecology, Evolution, and Systematics (2 ed.) Cambridge University Press 2013.
28 Fulton, William. 1999. *Guide to CA Planning*. 2nd ed. Point Arena, California: Solano Press Books.
29 Allaby, Michael, ed. 1994. *The Concise Oxford Dictionary of Ecology*. Oxford University Press. New York, 1994: 175.

APPENDIX A1 (Continued)

The JPA Governing Board is limited to the three Land Use Authority Permittees because the Joint Exercise of Powers Act requires that a JPA can only exercise powers held by all the participating agencies.

Greenfield: Undeveloped land, usually either open space or agricultural land cover.

H

Habitat: The place or environment where a plant or animal naturally lives and grows (a group of particular environmental conditions).[30] Habitat may be occupied (i.e., individuals or a population of the species are or have recently been present) or unoccupied. See "Critical Habitat" definition.

Habitat connectivity: The degree to which a landscape facilitates or impedes movement of organisms, eggs, cysts, seeds, or pollen among different resource patches.

Habitat degradation: A notable reduction in the amount and/or quality of habitat.

Habitat fragmentation: Habitat fragmentation is the process by which habitat loss results in the division of large, continuous habitats into smaller, more isolated remnants (see "habitat patches" below). Habitat fragmentation is a landscape-level phenomenon, and patch-level processes (patch area, edge effects and patch shape complexity) can only be understood within a landscape context. A dominant effect of increasing habitat loss is a reduction in patch area, with resulting declines in population density and species richness, and significant alterations to community composition, species interactions and ecosystem functioning.[31]

Habitat patches (islands): Habitat areas that are physically or spatially isolated from other areas of similar habitat type.

Habitat preservation: A process that involves bringing land with Covered Species habitat under protective status through fee title (see "fee title") or conservation easement (see "conservation easement").

Hardline preservation process: This process is termed "hardline" because the exact locations and preserve boundaries are known at this time. Inside the Urban Development Area (UDA), some preserves have already been proposed by willing landowners, but the preserves have not

[30] USFWS. 2008. Endangered Species: Glossary. Endangered Species Glossary. Last updated July 16, 2014. Accessed September 17, 2014. http://www.fws.gov/midwest/endangered/glossary/index.html.

[31] Didham, Raphael K(Nov 2010) Ecological Consequences of Habitat Fragmentation. In: ELS. John Wiley & Sons Ltd, Chichester. http://www.els.net [doi: 10.1002/9780470015902.a0021904].

APPENDIX A1 (Continued)

been formally put under conservation easement by the SSHCP. These nine "hardline" preserve locations are in PPUs 1 and 2, and total approximately 1,740 acres (see Figures 7-2 to 7-5).

Hardpan: A hardened, impervious layer of soil, such as clay.

I

Implementation Commission: An Implementation Commission will be formed by the Governing Board. This commission will assume some of the duties of the Governing Board including, but not limited to, land or easement acquisition approval and approval of management and monitoring plans for the preserve system.

Implementing Agreement: An agreement that legally binds the permittee to the requirements and responsibilities of a conservation plan and section 10 permit. It may assign the responsibility for planning, approving, and implementing the mitigation measures under the HCP.[32]

Implementing Entity: The body that is responsible for implementation of a permitted HCP. The SSHCP Implementing Entity is composed of a Governing Board, Implementation Commission, various committees and staff who oversee management and administration of the Plan. See definition of "Implementing Agreement."

Implementing ordinance: The primary legal document that the SSHCP Permittees will develop, approve, and execute to formalize consistent and transparent implementation of the SSHCP, Implementing Agreement, and Permits.

Incidental take: Take that results from, but is not the purpose of, carrying out an otherwise lawful activity.[33] See definition of "take" below.

Incidental Take Permit(s) (ITP): A permit that exempts a permittee from the prohibition of take under 9 of the ESA and is issued by the USFWS pursuant to Section 10(a)(1)(B) (also called a Section 10 permit). CDFW may also authorize the incidental take of state-listed species under CESA through issuance of an Incidental Take Permit pursuant to Fish and Game Code Section 2081, subdivisions (b) and (c).

Infiltration: The flow of water downward from the land surface into and through the upper soil layers.[34]

---

32 HCP Handbook 1998.

33 USFWS. 2008. Endangered Species: Glossary. Endangered Species Glossary. Last updated July 16, 2014. Accessed September 17, 2014. http://www.fws.gov/midwest/endangered/glossary/index.html.

34 Corps. 2014. "Glossary." Accessed September 18, 2014. http://chl.erdc.usace.army.mil/glossary.

APPENDIX A1 (Continued)

Infiltration basin: A shallow earthen basin constructed in naturally pervious soils, designed for infiltrating stormwater by retaining runoff from development and allowing it to percolate into the underlying soils and into groundwater over a specified drawdown period.

Infiltration trench: A long, narrow trench constructed in naturally pervious soils and filled with gravel, designed for storing runoff until it infiltrates into the soil over a specified drawdown period.

Intermittent stream: A stream that has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow (see also "ephemeral stream" and "perennial stream").

Invasive species: Animals, plants or other organisms introduced by man into places out of their natural range of distribution, where they become established and disperse, generating a negative impact on the local ecosystem and species.[35][36]

J

Jeopardize the continued existence of: Under the federal ESA, an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.[37]

Jump-Start and Stay-Ahead: Provisions included in the SSHCP implementation schedule to ensure mitigation occurs prior to implementation of covered activities. See Chapter 9.

L

Laguna Creek Wildlife Corridor: An SSHCP-planned preserve along Laguna Creek in the northern portion of the Plan Area that is at least 300 feet wide except where existing constraints limit this width. This corridor is designed to maintain species movement, provide resident habitat for wildlife, preserving riparian habitat, and maintaining hydrologic connections between planned preserves inside the UDA. See definition for "SSHCP Preserves," "Wildlife Corridor," and "Stream Corridor."

35 http://www.iucn.org/about/union/secretariat/offices/iucnmed/iucn_med_programme/species/invasive_species/.
36 A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
37 USFWS. 2008. Endangered Species: Glossary. Endangered Species Glossary. Last updated July 16, 2014. Accessed September 17, 2014. http://www.fws.gov/midwest/endangered/glossary/index.html.

APPENDIX A1 (Continued)

Land cover type(s): The dominant feature of the land surface discernible from aerial photographs and defined by vegetation, water, or human uses. The SSHCP Land Cover types are described in Chapter 3.

Land dedication: Land that is donated by the owner to a qualified land protection organization, generally for open space or conservation use.

Land use: A general characterization of type(s) of uses allowable within a geographic area as determined by a local jurisdiction (e.g., City or County) general plan or zoning ordinance such as housing, business, industry, open space, agriculture, natural resources, recreation, education, public buildings and grounds, and other categories of public and private uses of land. Land use in the Plan Area is described in Chapter 4.

Land Use Authority Permittee(s): These entities have regulatory authority over zoning and entitlements within the Plan Area. Land Use Authority Permittees can extend incidental take coverage provided by the SSHCP ITPs to covered activities implemented by third-party project proponents that are under the jurisdiction of that Land Use Authority Permittee. Land Use Authority Permittees under the SSHCP are the County of Sacramento and the Cities of Galt and Rancho Cordova.

Landscape ecology: Principles and theories for understanding the structure, functioning, and change of landscapes and ecosystems over time.[38]

Landscape preserve: A SSHCP preserve that is at least 10,000 acres in size and containing extensive areas of contiguous natural land covers where natural ecological functions can continue to operate, typically without extensive land management activities. One Landscape preserve will be located outside the UDA. See Section 7.4.1.

LiDAR: Stands for **"**light detection and ranging." A remote sensing method used to measure ranges to the earth. Used in geographic information system (GIS) processes to create maps and models.[39] In the SSHCP LiDAR was used to developed detailed topographic maps of portions of the Plan Area containing vernal pools; analysis of that topography allowed for identification of microwatersheds.

Linkage Preserve: SSHCP preserves that are generally more linear-shaped landscape features that connect large habitat blocks (e.g., core and minor preserves) and are designed to provide for hydrological connectivity or dispersal and movement of species between preserve areas. See Section 7.4.1.

---

38 A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

39 NOAA (National Oceanic and Atmospheric Administration). 2014. "What is LIDAR?" Accessed September 15, 2014. http://oceanservice.noaa.gov/facts/lidar.html.

APPENDIX A1 (Continued)

Listed species: A species (including a subspecies or a distinct population segment of a vertebrate species) that is listed as endangered or threatened under the federal ESA or CESA.

Loss of waters: Waters of the U.S. that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. Refer to "Waters of the U.S."

Low-Impact Compatible Land Use: Passive or active open space land uses that have limited indirect effects on wetlands and vernal pool species habitats within adjacent existing and planned preserves. Examples of these compatible adjacent land uses are parks, athletic fields, detention basins, and schools with athletic fields adjacent to preserves. The design and construction of these land uses does not impact the soil hardpan and perched aquifer of the open space area or the adjacent preserve, and does not allow increased runoff into the adjacent preserves. See "open space" below.

M

Mesic: A moderately moist habitat.[40]

Metapopulation: A set of partially isolated populations that belong to the same species, between which individuals can freely migrate.[41]

Microhabitat: The immediate environment in which an organism lives, where factors such as moisture and light may be different from those in the surrounding area.[42]

Minor preserve: SSHCP preserves that are between 250 and 800 acres in size that support populations that are important to the viability of a covered species, have unusually high biological diversity, and/or have a high concentration of sensitive biological resources. Most minor preserves are located in the UDA. See Section 7.4.1.

Mitigation: Any actions that are taken to avoid or minimize negative environmental impacts. This can take various forms, including avoiding the impact by not taking a certain action; minimizing impacts by limiting the scale of the action; rectifying the impact by repairing or

[40] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
[41] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
[42] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

APPENDIX A1 (Continued)

restoring the affected environment; reducing the impact by taking protective steps; and compensating for the impact by replacing or providing substitute resources.[43]

Mitigation bank: A site, or suite of sites, where aquatic resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by USACE permits. In general, a mitigation bank sells compensatory mitigation credits to a USACE permittee whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a banking enabling instrument[44]. Also see definition of conservation bank above.

Mitigation fee: The proposed fee for any Covered Activities that affect Covered Species or species habitat. These fees will fund the cost of implementing of the SSHCP including (1) land acquisition, (2) habitat establishment, re-establishment and enhancement, (3) monitoring and long-term management, and (4) plan administration components of the SSHCP.[45]

N

Native species: A species that is within its historical natural range, and occurs naturally in a given area or habitat, as opposed to an introduced species or invasive species.[46]

Natural Communities Conservation Plan (NCCP): A CDFW program designed to use an ecosystem approach to conserve natural communities at the ecosystem scale while accommodating compatible land use.

Naturalized habitats or vegetation: Result when non-native species establish new self-perpetuating populations within native habitats or vegetation communities, and undergo widespread dispersal and become permanently incorporated within the resident native habitat or vegetation community.

Navigable waters of the United States: Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination

[43] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
[44] 33 CFR Part 332.
[45] CEQA Guidelines, Section 15126.4(a)(1).
[46] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events that impede or destroy navigable capacity. [47]

Non-listed species: Means a species or subspecies that is not listed as endangered or threatened under the federal ESA or CESA.

No surprises policy/assurances: Assurances to Permit holders that if unforeseen circumstances arise, the USFWS will not require more land, water, or money or additional restrictions on the use of land, water, or other natural resources beyond the level stated in the Habitat Plan without the consent of the Permittee (63 FR 35, February 23, 1998). Applies as long as Permittee is implementing terms and conditions of the Habitat Plan properly. [48]

O

Occurrence: Plant taxa, animal taxa, and natural communities in the CDFW California Natural Diversity Database (CNDDB) are referred to as "elements." An "element occurrence" or "occurrence" is a location record for a site which contains an individual, population, nest site, den, or stand of a special status element. Populations, individuals, or colonies located within 1/4 mile of each other generally constitute a single occurrence, sometimes with multiple "parts. An occurrence from a source other than the CNDDB is generally defined as a spatially discrete point location or database record for any particular resource (e.g., special-status plant or animal).

Open space land (rural and urban): The County of Sacramento General Plan (2011) defines rural and urban open space as follows:

- ***Rural open space:*** Open space areas are largely un-fragmented areas of undeveloped land that are set aside primarily to preserve and/or enhance the County's wildlife habitat, agricultural productivity and recreational opportunities**.**
- ***Urban open space:*** Urban open space areas are typically undeveloped land within urbanized areas that are set aside to provide public recreational opportunities as well as the chance to experience natural areas and wildlife habitat. They may also be developed areas that are available to the public to provide a feeling of openness.

Ordinary High Water Mark (OHWM): A line on the shore or stream channel established by the fluctuations of water and indicated by physical characteristics or by other appropriate means that consider the characteristics of the surrounding area (see 33 CFR 328.3(e)).

[47] 33 C.F.R. § 329.4.
[48] Santa Clara Valley Habitat Plan. August 2012.

APPENDIX A1 (Continued)

P

Participating Special Entity: In the SSHCP defined as a public agency such as a water, school, irrigation, transportation, or other special district that is not subject to the jurisdiction of Plan Permittees but that requests and receives coverage under the SSHCP during implementation according to the terms of the SSHCP.[49]

Perched aquifer: Groundwater that is separated from the underlying main body of groundwater (aquifer) by a layer of impermeable clay, silica/iron complex or bedrock (aquiclude).[50] Perched water tables supporting vernal pools can exist for several months during the winter/spring months (drying out by late summer).

Perennial stream: A stream that normally contains flowing water at all times.[51] (see also "intermittent stream" and "ephemeral stream").

Performance standards: Under Section 404 of the CWA defined as observable or measurable physical (including hydrologic), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives.

Permit amendment: A change to the incidental take permit(s) issued by the USFWS or CDFW that necessitate a renegotiating and reissuing of the permit(s). Modifications and amendments are defined as follows.

- ***Administrative revisions:*** non-substantive changes or corrections to the Plan that do not require approval from the Permitting Agencies.
- ***Minor Modifications:*** changes that do not adversely affect the impact assessments or conservation strategy described in the Habitat Plan and do not adversely affect the ability of the Implementing Entity to achieve the conservation strategy commitments of the SSHCP.
- ***Amendments:*** revisions to the SSHCP, Aquatic Resources Program, or the Implementing Agreement that may affect an impact analysis, so would require a corresponding amendment to one or all of the SSHCP Permits.

Permitting Agencies: Agencies that are issuing permits for the SSHCP or developing programmatic agreements for the SSHCP. In the SSHCP the permitting agencies are: California Department of Fish & Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), U.S. Army

[49] "Glossary." Santa Clara Valley Habitat Plan. August 2012.
[50] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
[51] Corps. 2014. "Glossary." Accessed September 18, 2014. http://chl.erdc.usace.army.mil/glossary.

APPENDIX A1 (Continued)

Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and U.S. Environmental Protection Agency (EPA).

Plan Area: The area encompassed by the SSHCP permits within which the Plan Permittees have authorization from the Wildlife Agencies for the take of Covered Species and species habitat resulting from Covered Activities. See Chapter 1.

Plan Permittees: The SSHCP was prepared by six local jurisdictions, including the County of Sacramento, City of Galt, City of Rancho Cordova, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Southeast Connector Joint Powers Authority. These six permit applicants and a (to be formed) SSHCP Implementing Entity are collectively referred to as the Plan Permittees.

Population: A group of individuals of the same species who are living in the same area at the same time and share a common gene pool, which makes it possible for them to interbreed.[52] Also see definition of "Occurrence."

Population size: The number of individuals in a given population.

Pre-Acquisition Preserve Documentation Report (PDR): A report that assesses the baseline inventory of SSHCP land cover types, species occurrences, and general ecological health and function of a property prior to the inclusion of the property in the SSHCP Preserve System and the acceptance of a land dedication, a fee title purchase, or an easement purchase.

Pre-construction survey: A survey that is conducted to identify Covered Species and/or their habitats on a given property or land area prior to the initiation of a ground-disturbing covered activity, to ensure that species and habitat avoidance and minimization measures can be effectively implemented during that activity. Specifics for pre-construction surveys are dictated by relevant species protocols.

Pre-design survey: Surveys that are required during preparation of the Project Application Package These surveys assess the location and quantity of modeled habitat and the potential for select Covered Species to be present at the project site. The surveys require land cover type mapping and wetland delineations. Based on land cover type mapping, the Land Use Authority Permittee or Implementing Entity will assess the potential for each covered species to be present on the project site and to be affected by the proposed action. The potential for presence is based on the presence of modeled habitat for a species. Depending on the land

[52] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

APPENDIX A1 (Continued)

covers present, specific Covered Species surveys may be required as directed by Species AMMs (Section 5.2). See Chapter 10.

Preservation/Preserve (verb): For purposes of the SSHCP Conservation Strategy, preventing changes in land use from a natural state by, for example, purchasing land in fee title or establishing a conservation easement. For purposes of the ARP, the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area and functions.

Preserve (noun): A SSHCP Preserve is a discrete area of habitat acquired and managed for the benefit of Covered Species.

Preserve Assembly Guideline: The SSHCP preserve assembly guidelines (see Section 7.3.1) will be applied by the Implementing Entity in a manner that will assemble the SSHCP Preserve System described in Section 7.5, and will assure that all SSHCP Biological Goals and Measurable Objectives specifying preserve acquisition objectives are achieved. Because the exact locations and boundaries of the softline criteria-based preserves are unknown, the SSHCP Conservation Strategy presents and analyzes a conceptual Preserve System based on reasonable assumptions regarding potential acquisition areas.

Preserve Management Plan (PMP): A document prepared for individual SSHCP preserves that tiers from the Preserve System Management Plan (see below) . Each PMP will set forth the management actions to be employed on the property to benefit Covered Species and habitats to provide for meeting the SSHCP biological goals and objectives, identify habitat and species monitoring requirements on that preserve, and include criteria for implementing adaptive monitoring and management of the preserve.

Preserve Planning Unit (PPU): PPUs are geographic subdivisions of the Plan Area delineated to capture specific habitat or agricultural land cover types or areas identified as being important for a specific Covered Species. There are eight PPUs. See Chapter 1.

Preserve Setback: A setback of at least 50-feet established outward from the boundary of any existing and planned preserve within the UDA to reduce impacts that may result from adjacent urban development Covered Activities. The minimum 50-foot setback will remain in its natural state and function as a transition area between intensive development and preserves. See Section 5.2.7, Covered Activities in Preserve Setbacks,

Preserve System: The SSHCP Preserve System is composed of individual SSHCP Preserves (see "Preserve" above). The SSHCP Preserve System will connect with existing preserves to

best conserve the natural/naturalized land covers, cropland, and irrigated pasture-grassland in the Plan Area.

Project: See Covered Activities above.

Project proponent: Means a person or entity (third-party) that has requested use of the SSHCP permits held by the one of the Land Use Authority Permittee or Implementing Entity for a proposed project or activity that is a SSHCP Covered Activity and that is subject to the land use or other regulatory authority of that Land Use Authority Permittee or Implementing Entity.

R

Range: The limits of the geographical distribution of a species; the entire geographical area over which a species occurs.

- ***Historic Range:*** The natural range or geographical areas that a particular species was known or believed to occupy in the past.[53]
- ***Known Range:*** The geographical area over which a species has lived naturally in recent times or is known to occur.[54]

Recharge: The flow to groundwater from the infiltration of surface water.

Recovery: Improvement in the status of a listed species to the point at which listing is no longer appropriate under the federal ESA listing criteria.[55] Also see definition of "Listed Species."

Recovery plan: A document authored by USFWS or NOAA Fisheries that serves as a guide for activities to be undertaken by federal, state, or private entities in helping to recover and conserve endangered or threatened species.[56]

Re-establishment: For the SSHCP Conservation Strategy, re-establishment means the act of replacing, restoring, or renovating habitat to close to its historical condition, such as the physical and vegetation structure and ecosystem functions of a damaged habitat. For the ARP, a form of restoration in which there is manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historical functions to a former aquatic resource or land cover type. Re-establishment results in rebuilding a former aquatic resource/land cover type,

53 A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
54 A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.
55 "USFWS Endangered Species Act Glossary." http://www.fws.gov/midwest/endangered/glossary/index.html. Accessed 09/11/08.
56 USFWS. 2008. Endangered Species: Glossary. Endangered Species Glossary. Last updated July 16, 2014. Accessed September 17, 2014. http://www.fws.gov/midwest/endangered/glossary/index.html.

and results in a gain in aquatic resource area/land cover type and functions. Also see SSHCP definition of establishment (creation).

Restrictive Layer (e.g., duripan, hardpan, claypan): A layer of impermeable clay, silica/iron complex or bedrock within the soil horizon that precludes infiltration to the groundwater aquifer. Also see "Perched Aquifer."

Right-of-way: A legal right of passage over private property, usually for roadways, railroads, or public utilities.

Rural collector roadways: Two-lane roads in rural areas of Sacramento County.[57] Also see definition for "Arterial Roadways."

S

Satellite preserve: SSHCP Preserves that are smaller than core and minor preserves (i.e., less than 250 acres), but that support populations that are important to the viability of a covered species in the Plan Area, or have a particularly high concentration of sensitive biological resources. Satellite preserves are inside the UDA. See Section 7.4.1.

Softline criteria-based preserve design: A strategy used to create future habitat preserves based on a set of guidelines and parameters for preserve system design, including a system of zones and sub-zones, to guide the process of land acquisition for the Preserve System over time. Also see definition for "hardline preserve design."

Species modeled habitat: Covered species suitable habitat was "modeled" based on the best available information on the life history and biology of each covered species, the species habitats needed for breeding and for feeding or sheltering at each life history stage, known occurrences within the Plan Area, associations between covered species and the SSHCP land cover types in the Plan Area, and when available information on range, soil type associations and elevation limits. Each species model was reviewed by local species-experts. This information was compiled using GIS to generate a map-based model of species suitable habitat within the Plan Area for each SSHCP covered species. See Chapter 3 of the SSHCP.

Species range: See "range."

[57] County of Sacramento. 2009. "Circulation – Transportation Element." Sacramento County General Plan of 2005-2030. Amended November 9, 2011. Sacramento, California: Sacramento County Community Planning and Development Department. Accessed September 12, 2014. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx.

APPENDIX A1 (Continued)

Specific plan: A plan developed by a Land Use Authority that sets forth policy and implementation strategies for such items as land use, transportation, urban design, parks, schools, and public services, in a defined geographic area, for the purpose of implementing a General Plan on an area-specific basis.[58]

Sphere of influence (SOI): A plan for the probable ultimate physical boundaries and service area of a city as determined by the local agency formation commission of each county.[59]

State-listed species: Species that are listed as threatened or endangered species, or a candidate for such status, under CESA.

Stay-Ahead and Jump-Start: Provisions included in the SSHCP implementation schedule (see Chapter 10) to ensure mitigation occurs prior to implementation of covered activities.

Stream Setback: Designated areas adjacent to streams within which only specified activities could occur in order to prevent or reduce impacts. See Section 5.2.6 Covered Activities in Stream Setbacks, See also "Preserve Setback" and "buffer."

Submergent vegetation: Vegetation that is inundated by water.

Substrate: The surface on which a plant or animal lives and grows; for example a rocky or sandy substrate.[60]

Suitable habitat: Specific SSHCP land cover types where the environmental and geographic conditions (i.e., biotic and abiotic conditions) are present for a given species to persist and survive. Essential habitat elements are present. Suitable habitat can be represented by specific areas on a geographic map when the distribution of environmental factors are known and/ or defined through criteria based upon the environmental conditions the species requires. Suitable habitat may be occupied (i.e., individuals or a population of the species are or have recently been present) or unoccupied. See "species modeled habitat."

Swale: Drainages typically found in flat to gently rolling valley grassland in association with vernal pool complexes on shallow soils with an impermeable clay or hardpan layer. They convey runoff through broad gently sloping ephemeral drainages during, and for short periods after, rainstorms. Soils may remain saturated during the early part of the growing season, but dry up by summer. Swales support several of the native plants commonly found in vernal pools. Swales

[58] County of Sacramento. 2014. "Specific Plans/Community Plans/Special Projects." MSA Planning and Community Development Department. Accessed September 18, 2014. http://www.planning.saccounty.net/plans-projects.html.

[59] Fulton, William. 1999. *Guide to CA Planning*. 2nd ed. Point Arena, California: Solano Press Books.

[60] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

associated with vernal pools may provide conduits for movement of covered plant and animal propagules (seeds, cysts, eggs, and spores) and adult California tiger salamanders and western spadefoots among vernal pools.

T

Take: Under the CESA and the California Fish and Game Code (Section 86), "take" is defined as "hunt, pursue, catch, capture, or kill," or an attempt to do any such act, and violations of CESA's take prohibition are criminal misdemeanors under State of California law (Fish and Game Code, Section 86, 12000)

Under the federal ESA, "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering (16 U.S.C. 1532).

- ***Harass:*** Harass in the definition of "take" in the ESA means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3).
- ***Harm:*** Harm in the definition of "take" in the ESA means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering (50 CFR 17.3).

Technical Advisory Committee (TAC): Part of the SSHCP Implementing Entity. The committee formed to inform the scientific decisions made by the Implementing Entity in implementing the SSHCP, as provided in Section 10.2.4 and as further described in Chapter 10.

Terrace: A relatively flat, natural surface along a river valley, above the level of the floodplain.[61]

Third-party project proponents: Individuals, landowners, other private parties, or Participating Special Entities P that are not Plan Permittees and that receive coverage under a Plan Permittees ITPs in accordance with Chapter 9.

Turbidity: The degree of cloudiness in water (or air) that is caused by the presence of suspended solids.[62]

[61] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

APPENDIX A1 (Continued)

U

Unforeseen circumstance: Changes in circumstances surrounding an HCP that were not or could not be anticipated by HCP participants and the USFWS that result in a substantial and adverse change in the status of a covered species.[63] Also see definitions of "changed circumstance" and "no surprises rule."

Unincorporated county: The area of Sacramento County not within the boundaries of an incorporated city.[64]

Upland habitat: Covered Species habitat for generally aquatic species that occurs within a terrestrial land cover type. The SSHCP identifies upland habitat for California tiger salamander, western spadefoot, giant gartersnake, and western pond turtle.

Urban Development Area (UDA): As defined in the SSHCP, an area that shows the potential extent of future development based on the anticipated expansion of infrastructure and areas designated for development by local jurisdictions, which may extend beyond the Urban Services Boundary (USB); those locations within the Plan Area that are also within the Sacramento County USB, and the incorporated Cities of Rancho Cordova, Galt, and Galt's sphere of influence (a.k.a. Urban Development Area).

Urban Policy Area (UPA): As identified in the County of Sacramento General Plan (2011), an area of Sacramento County capable of supplying a 20-year supply of developable land sufficient to accommodate projected growth; intended to direct growth in a logical manner and to identify areas where infrastructure, requiring large capital investments, will be needed in the near future.[65]

Urban Services Boundary (USB): As identified in the County of Sacramento General Plan (2011), the boundary demarcating the area within which long-range urbanization will occur in Sacramento County, and urban services, such as water and sewer, will be provided; attempts to limit urban sprawl, thereby protecting open space and agricultural areas outside the USB boundary.[66]

---

62 A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

63 USFWS. The HCP Handbook. Accessed September 18, 2014. http://www.fws.gov/endangered/esa-library/pdf/hcp.pdf.

64 Fulton, William. 1999. *Guide to CA Planning*. 2nd ed. Point Arena, California: Solano Press Books.

65 County of Sacramento. 2011. "Land Use Element." *Sacramento County General Plan*. November 2011. Accessed September 18, 2014. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan/Land%20Use%20Element%20-%20Amended%2011.9.11.pdf.

66 County of Sacramento. 2011. "Land Use Element." *Sacramento County General Plan*. November 2011. Accessed September 18, 2014. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan/Land%20Use%20Element%20-%20Amended%2011.9.11.pdf.

APPENDIX A1 (Continued)

V

Vernal pool: Vernal pools are a type of depressional seasonal wetland that is characterized by an annual cycle of winter inundation and summer drought which result in a specific set of physical parameters and a unique assemblage of highly specialized endemic plants and animals. Vernal pools retain water seasonally due to a shallow, impermeable soil layer beneath the surface and the absence of a drainage outlet.[67] See "restrictive layer" and "perched aquifer" and "microwatershed." See definition of SSHCP Vernal Pool land cover type in Chapter 3.

Vernal pool crustacean habitat: Typified by vernal pools, vernal pool crustacean habitat is a class of depressional wetlands ranging from well vegetated vernal pools and seasonal wetlands to sparsely to non-vegetated playa/alkali lakes and rock pools. Species have also been found in roadside ditches, tire ruts and other non-natural depressional areas. The most prominent feature of vernal pool crustacean habitat is the presence of a pronounced wet/dry hydrologic regime. The wet/dry cycle begins with a wet phase in which the pools inundate during the rainy season and a dry phase beginning in late spring or early summer. Vernal pool crustacean habitat may inundate and dry down more than once in a season. Vernal pools have highly specialized endemic wetland vegetative communities that are adapted to the distinct wet/dry hydrologic regime. The vegetative community can consist of both obligate (occur in inundated portion of wetland only) and facultative (may occur along saturated fringe and transition to upland) wetland species, but is predominantly endemic wetland obligate species. However, vernal pool crustacean habitat may include shallow depressional wetlands characterized by non-native plant species and wetland facultative plant species. Vernal pool crustacean habitat is strongly related to the hydrologic regime of the wetlands which can also be a function of the soils and underlying substrate. Most vernal pool crustacean habitat falls into one of two categories with regards to hydrology, a surface flow system or a perched aquifer/surface water system. Each system has characteristic hydrologic patterns and water quality characteristics. Vernal pool crustacean habitat is not currently identified as a SSHCP land cover type, however for the purposes of analysis and impact assessment all vernal pool land cover types are considered vernal pool crustacean habitat.

Vernal Pool Landscape: Vernal pool landscape is an aggregation of SSHCP land cover types consisting of vernal pools, swales, streams/creeks (vernal pool invertebrate habitat), and valley grassland. This aggregation was developed as a GIS overlay for the purposes of conducting impact analysis and developing the SSHCP Conservation Strategy based on conservation of vernal pool landscapes, including all the components of the vernal pool landscape ecosystem.

[67] USFWS. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.

APPENDIX A1 (Continued)

W

Water quality: The chemical, physical, and biological characteristics of a water body, usually in respect to its suitability for habitat or another particular purpose.[68]

Waters of the U.S. The term waters of the United States means:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    b. (From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    c. Which are used or could be used for industrial purposes by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under this definition;
5. Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;
6. The territorial sea;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Watershed: In the ARP, a land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean.[69]

---

[68] "USGS Water Science Glossary of Terms." USGS. http://ga.water.usgs.gov/edu/dictionary.html#U. Accessed 09/11/08.

APPENDIX A1 (Continued)

Wildlife Agencies: In the SSHCP, the Wildlife Agencies are the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) in combination. Also see definition for "Permitting Agency."

Wildlife corridor: A linear landscape feature that facilitates the movement of plants and animals between two or more habitat patches. Sacramento County's Laguna Creek Wildlife Corridor is an important landscape feature in the Plan Area and will be an important component of the Plan-wide Preserve System for maintaining movement and resident habitat for wildlife, preserving riparian habitat, and maintaining hydrologic connections between preserves inside the UDA. Outside the UDA, the Cosumnes River/Deer Creek Corridor serves a similar function. See Section 7.4.1 and the definition for "stream corridor."

X

Xeric: Having very little moisture, tolerant of or adapted to dry conditions.[70]

[69] 33 CFR 332.2 [§ 230.92]. http://www.poa.usace.army.mil/Portals/34/docs/regulatory/33cfr332.pdf.
[70] A Dictionary of Environment and Conservation (2nd); Park and Allaby 2013; Oxford University Press.

APPENDIX A1 (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX A2

Acronym List

APPENDIX A2
Acronym List

Acronym/Abbreviation	Definition
AMM	Avoidance and Minimization Measure
amsl	above mean sea level
APLIC	Avian Power Line Interaction Committee
ARB	California Air Resources Board
ARP	Aquatics Resource Program
ATV	all-terrain vehicle
BBS	Breeding Bird Survey
BCI	Body Condition Index
BGO	biological goal and objective
BMP	best management practice
BO	Biological Opinion
CAAQS	California Ambient Air Quality Standards
Cal-IPC	California Invasive Plant Council
CAS	Climate Adaptation Strategy
CCCI	California Construction Cost Index
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHU	Critical Habitat Unit
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRAM	California Rapid Assessment Method
CRPR	California Rare Plant Rank
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationships
CWMW	California Wetland Monitoring Workgroup
DDT	dichlorodiphenyltrichloroethane
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	federal Endangered Species Act
e-waste	electronic waste
FCAM	Condition Assessment Methods
FEMA	Federal Emergency Management Agency
FTE	full-time equivalent
GIS	geographic information system
HCP	habitat conservation plan
HUC	hydrologic unit code
I-5	Interstate 5
IA	Implementing Agreement

APPENDIX A2 (Continued)

Acronym/Abbreviation	Definition
INRMP	Integrated Natural Resources Management Plan
IRT	Interagency Review Team
ITP	Incidental Take Permit
JPA	Joint Powers Authority
LAFCO	Local Agency Formation Commission
LAU	land area unit
LAWG	Local Agency Working Group
LID	low-impact development
LIDAR	Light detection and ranging
LOS	level of service
MBTA	Migratory Bird Treaty Act
MMP	Monitoring and Management Program
MS4	municipal separate storm sewer system
N-deposition	nitrogen deposition
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Association
Nox	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NWR	National Wildlife Refuge
OHV	off-highway vehicle
OHWM	ordinary high-water mark
PAC	Public Advisory Committee
PAO	Proportion of Area Occupied
PCE	Primary Constituent Element
PDR	Preserve Documentation Report
PG&E	Pacific Gas & Electric
PMP	Preserve Management Plan
PPU	Preserve Planning Unit
PRMP	Preserve Resource Management Plan
RAWG	Regional Agency Working Group
RDM	residual dry matter
Regulatory Agencies	USFWS, CDFW, ACOE, and SWRCB
ROG	reactive organic gas
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
SASD	Sacramento Area Sewer District
SCWA	Sacramento County Water Agency

APPENDIX A2 (Continued)

Acronym/Abbreviation	Definition
SOI	sphere of influence
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utilities District
SR	State Route
SRCSD	Sacramento Regional County Sanitation District
SSHA	South Sacramento Habitat Agency
SSHCP	South Sacramento Habitat Conservation Plan
SSQP	Sacramento Stormwater Quality Partnership
SSURGO	Soil Survey Geologic Database
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
UDA	Urban Development Area
UPA	Urban Policy Area
USACE	United States Army Corps of Engineers
USB	Urban Services Boundary
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
VPIH	Vernal Pool Invertebrate Habitat
VWADI	vernal wetland acre/density index
Wildlife Agencies	USFWS and CDFW
WRAMP	Wetland and Riparian Area Monitoring Program

APPENDIX A2 (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX B

Species Accounts

APPENDIX B
Species Accounts

1 DWARF DOWNINGIA (DWDO)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Dwarf Downingia (DWDO)

(Downingia pusilla)

Status USFWS: None

Status CDFG: None

Status CNPS:2.2



© 2004 Carol W. Witham

1.1 Legal Status

Dwarf downingia (*Downingia pusilla*) is considered to be rare, threatened or endangered in California, but more common elsewhere, thus qualifying its designation as a list 2.2 species by the California Native Plant Society (CNPS), meaning it is fairly threatened in California with a moderate degree/immediacy of threat, but it is more common outside of California (CNPS 2010). It has been assigned an R-E-D Code of 1-2-1, meaning it is rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time, it is endangered in a portion of its range, and it is more or less widespread outside of California.

Being a CNPS List 2 plant species, dwarf downingia meets the California Department of Fish and Game (CDFG) definition of a special plant though it has no formal protection status by the CDFG or United States Fish and Wildlife Service (USFWS).

1.2 Life History and Ecology

1.2.1 Species Description and Life History

1.2.1.1 Morphology

Dwarf downingia, a strict endemic of the vernal pool hydrologic regime, is an annual member of the Bellflower family (Campanulaceae). This inconspicuous species is variable with regard to stem length (Mason 1957). Single small-stature plants can be erect and less than three centimeters in

height at maturity, or longer branched stems (up to 15 cm) can sprawl horizontally, forming relatively dense colonies, or mix with the other sprawling vernal pool species (Dittes pers. obs.). Small (five to ten millimeter-long) narrowly linear leaves are alternately arranged on the stems. Single flowers are borne in the leaf axils towards the tips of the stems.

Dwarf downingia possesses atypical flowers within the genus with regard to size and symmetry. Typical *Downingia* flowers, ranging from five to 19 millimeters in length, are bilaterally symmetrical, with two narrow "upper petals" and a broad, three-lobed "lower petal." These five corolla lobes, mostly blue or blue-purple with varying combinations of white and yellow, are united into a tube below their bases. The flower is borne at the apex of a long narrow stalk-like ovary (inferior ovary).

In comparison to characteristically showy *Downingia* flowers, the flowers of dwarf downingia are very small, ranging from only 2.5 to 5.4 millimeters in length. In addition, they lack the strong bilateral symmetry characteristic of other *Downingia* species; dwarf downingia flowers appear almost radial or star-like, with five narrow, triangular lobes that barely exceed the green calyx lobes. Dwarf downingia flowers can be white or blue, with two small yellow spots near the throat (Hickman 1993). This is a very inconspicuous plant and must be surveyed for while in flower, as there is no other way to identify this species.

1.2.1.2 Ecological Life Cycle

Other than field observations recorded in the California Natural Diversity Data Base (CNDDB) (CDFG 2010), basic taxonomy and biogeographic treatments, dwarf downingia remains mostly unstudied. Since all vernal pool plant species share similar environmental selective pressures, they likely also share similar adaptive traits. For this reason, studies addressing the life history and ecology of other more common vernal pool plant may species provide some insight into the life history and ecology of dwarf downingia.

Dwarf downingia shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait allows populations to persist through the regular and extreme summer drought that characterizes vernal pools and the Mediterranean Climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

1.2.1.3 Seed Germination

The specific timing of the germination of dwarf downingia seeds relative to the timing of the vernal pool inundation cycle has not been studied or described in detail. In general, *Downingia* seeds germinate during the early stages of vernal pool inundation (Zedler 1987). Studies involving germination of *Downingia cuspidata* have demonstrated a required pretreatment for germination at high percentages, although complete submersion was not required (Myers 1975).

APPENDIX B (Continued)

Studies involving *D. concolor* have had erratic to poor germination results (Hoover 1937; Linhart 1972 as reported in Zedler 1987). Seeds of other more common *Downingia* spp. occurring in the Sacramento Valley (*D. bicornuta, D. ornatissima, D. cuspidata, D. bella*) germinate under water in pool basins or in inundated soil at shallow edges of filled pools (Dittes pers. obs.). Germination requirements and optima for dwarf downingia have not been investigated. Seed dormancy and required environmental cues for in-situ germination may exist, but are presently unknown.

1.2.1.4 Vegetative Growth

One of the challenges posed to many vernal pool plant species is optimization of photosynthesis and other metabolic processes in both the early season aquatic and later season terrestrial phases of the vernal pool cycle. *Downingia* and many other vernal pool species, being amphibious, possess differing aquatic and terrestrial growth forms. After germination, seedlings and young plants growing under water produce thickened, elongate, spongy stems with large air chambers, and narrowly linear leaves that lack waxy cuticle (Weiler 1962). Stems produced in the terrestrial phase are thinner with denser tissue, and leaves are somewhat wider, thicker and posses waxy cuticle. The air-filled aquatic stems hold the plant vertical in the water column and with the thinner leaves, facilitate light exposure and gas exchange. This in effect lengthens the growing season by maximizing growth while vernal pools are still inundated.

1.2.1.5 Reproduction

Dwarf downingia and other species in the genus flower and set seeds during the dry-down and terrestrial phase of the vernal pool hydrologic cycle, typically during March through May (CNPS 2010). The very small, reduced flowers and included anthers and stigma reflect a self-fertilizing breeding system for dwarf downingia, in contrast to the outcrossing strategy for almost all other Downingias (Weiler 1962; Zedler 1987; Thorp 1990). Once fertilized, the inferior ovary elongates into a narrow stalk like capsule that can reach two to three centimeters in length. The mature capsules produce numerous minute dust-like seeds that are released as the capsule disintegrates through the late spring, summer and fall months. Fecundity and variation in seed production have not been investigated in dwarf downingia.

1.2.1.6 Dispersal

In many other vernal pool species, seed dispersal is naturally limited, although this has not been stated specifically for *Downingia*. Limited seed dispersal in vernal pool species is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974, 1980). Natural dispersal of dwarf downingia seeds likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock.

APPENDIX B (Continued)

Evidence of dwarf downingia dispersal and colonization exists in occupancy of man-made topo-hydrologic features within occupied vernal pool landscapes (stock pond margins, roadside ditches, rutted tire tracks, gravel pits and scraped depressions (Witham 1991; CDFG 2010). As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming ungulates (Griggs 1980). Dwarf downingia, and about 10-15 other vernal pool species occur both in Californian and South American vernal pool habitats (amphitropical); a distribution most likely resulting in historic long-distance dispersal by migratory waterfowl (Zedler 1987).

1.2.1.7 Seed Dormancy

The existence of a dormant soil seed bank is unknown for dwarf downingia. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

1.2.1.8 Population Genetics

The population biology and genetics of dwarf downingia have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1998) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the limited number of occurrences and the scattered geographical distribution, all intra-pool dwarf downingia populations should be considered unique, and for the purposes of conservation, important genetic entities.

1.2.2 Habitat Requirements and Ecology

1.2.2.1 Biogeography and Landform Relations

It is generally held that many of the endemic vernal pool plant species, including downingias, are relatively recent evolutionary derivations of more common and widespread upland progenitors (Stebbins 1976; Stone 1990; Raven and Axlerod 1978; Thorne 1984). These neoendemic vernal pool species are thought to have evolved from terrestrial habitat into seasonally aquatic vernal pool habitat made available as the Mediterranean Climate developed and the inland Tertiary-age Sea dried.

Dwarf downingia occurrences are associated mainly with northern claypan vernal pools in central Sacramento County, with northern hardpan vernal pools in the foothills of the Sierra Nevada, and with vernal pools of the Interior Valleys of the Coast Range in Napa and Sonoma Counties (CDFG

APPENDIX B (Continued)

2010). Throughout this area, the species occurs on a variety of landforms and soil associations. In Sacramento County, dwarf downingia occurs primarily on the Laguna and Riverbank.

1.2.2.2 Hydrology Relations

Dwarf downingia is a strict endemic of the vernal pool hydrologic cycle. It is of importance to conservation however, that in contrast to the "deeply-adapted" vernal pool grasses of the Orcuttiae Tribe, and legenere (*Legenere limosa*), dwarf downingia occupies more commonly occurring, smaller and/or shallower vernal pools with comparatively more "flashy" hydrology (CDFG 2010; Dittes pers. obs.). In a survey of eight dwarf downingia-occupied vernal pools at Beale Air Force Base, the mean vernal pool area was found to be 299 square meters (357.6 square yards) and the mean vernal pool depth was 20.8 centimeters (8.2 inches). These are reported as being of average area and depth among the pools measured in that study (Platenkamp 1998). Vernal pool dimensions or reference to size are not given for any of the other CDFG occurrences. Dwarf downingia is also known to occupy the margins of larger or deeper vernal pools, and the seasonally fluctuating vernal pool-like edges of more severely inundated systems, including seasonal marsh, slough and stock pond habitats.

1.2.2.3 Biological Community Relations

Floristic associations provide further indication of preference for less extreme (more typical) vernal pool hydrological cycles. Dwarf downingia grows in the same hydro-topographical position as more commonly occurring vernal pool associates, including Fremont's goldfields (*Lasthenia fremontii*), smooth goldfields (*L. glaberrima*), dwarf wooly marbles (*Psilocarphus brevissimus*), Oregon wooly marbles (*P. oregonus*), annual hairgrass (*Deschampsia danthonoides*), popcorn-flowers (*Plagiobothrys stipitatus* var. *micranthus, P. bracteatus),* double-horned downingia (*Downingia bicornuta*), mousetail (*Myosurus minimus*), American pillwort (*Pilularia americana*), quillwort (*Isoetes howellii*), coyote thistle (*Eryngium* spp.), and others. All species reported as associates of dwarf downingia in Sacramento County (CDFG 2010). Most of these are commonly occurring vernal pool species that inhabit small to medium size vernal pools and swales, and the slopes and margins of larger and/or deeper pools. It is interesting to note that at least one population has been reported as growing among deeper pool associations [e.g., smooth goldfields, common spikerush (*Eleocharis macrostachya*), and water starwort (*Callitriche marginata)]*.

1.2.2.4 Non-Native Weed Relations

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp,

APPENDIX B (Continued)

gussoneanum), two non-native facultative wetland species typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Since dwarf downingia occupies the smaller to medium size, "more typical" vernal pool types and the margins of larger or deeper pools, it may be more susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch buildup than the Orcuttiae grasses, or the more deeply-adapted legenere.

Other weedy hydrophytic species reported as growing with dwarf downingia include lippia (*Phyla nodiflora*), and swamp pricklegrass (*Crypsis schoenoides*). Although none of the following are specifically reported to co-inhabit vernal pools with dwarf downingia, other non-native weedy hydrophytes may present future problems, including European mannagrass (*Glyceria declinata*), field bindweed (*Convolvulus arvensis*), Common unicorn plant (*Probiscidea louisianica*), Bermuda-grass (*Cynodon dactylon*) and paradox canary-grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), another native species, can also dominate vernal pools (Schlising, Unger pers. comms.).

1.2.2.5 Livestock Grazing Relations

Specific interactions between livestock grazing and dwarf downingia are largely unknown. In general, appropriately timed dry-pasture livestock grazing regimes are thought to be compatible with the development and persistence of vernal pool vegetation. Robins and Vollmer (2002) provide a review of information pertaining to livestock grazing in vernal pool ecosystems.

Many extant populations of dwarf downingia inhabit long-operating cattle ranches, so persistence indicates tolerance for at least some level of grazing. Timing of livestock grazing is likely more important than stocking rates in affecting persistence of dwarf downingia. During the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. Once the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. It should be noted however, as with many other vernal pool annuals, small stature and high plant densities ensure that in all but extreme cases, a portion of every year's cohort escapes destruction, matures and sets seed. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect on dwarf downingia.

APPENDIX B (Continued)

1.2.2.6 Disturbance Response

Observations of field workers provide some evidence of the potential response of dwarf downingia populations to particular disturbance regimes. Several dwarf downingia populations persist despite periodic disking of the vernal pool substrates over decades (Kelsey pers. comm.; Dittes pers. obs.; CDFG 2010). It is very important to note that in these cases, disking is not so deep as to significantly affect the subtending impermeable layer or the vernal pool hydrological cycle. In addition, the disking is performed in the late summer or fall months in preparation for dryland winter grain crops, so vernal pool plants have set seed and dried. Persistence of populations in fall-disked and planted dryland winter wheat fields has also been noted for several of the Orcuttiae grasses (Hoover 1941; Crampton 1959; Stone et al. 1988). This has been observed for other more common vernal pool species as well (Ahart pers. comm. 2003).

If this disking occurs earlier in the growing season, before seeds are mature, over consecutive years, population extirpation is probable through exhaustion of soil seed bank. These are outstanding examples of the overriding selective force of the vernal pool hydrologic cycle in affecting floristic composition, and the importance of timing of management-related disturbances relative to specific life-history stages.

1.2.2.7 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for dwarf downingia are identified in Table DWDO-1 and have been derived from input from local species experts.

Table DWDO-1
Essential Habitat Elements for Dwarf Downingia

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

APPENDIX B (Continued)

1.3 Species Distribution and Population Trends

1.3.1 Species Distribution

Presently, dwarf downingia is recorded from 117 CNDDB occurrences in California (CDFG 2010). These are distributed primarily in the Great Central Valley from Fresno County in the south, to Tehama County in the north. Dwarf downingia also occurs at scattered sites in the interior valleys of the southern North Coast Ranges, in Napa and Sonoma Counties. These occurrences are all situated at sites ranging from 10 to 1,600 feet elevation above mean sea level (CNPS 2010), and lie within the California Floristic Province (Sacramento Valley and San Joaquin Valley Sub-regions of the Great Valley Region; Sierra Nevada Foothill Subregion of the Sierra Nevada Region; North Coast Range Subregion of the Northwest Region; Hickman 1993). At least two additional occurrences, not yet registered in the CNDDB, occur in Sacramento County (Gibson and Skordal 1994; TNC *date unknown*).

Throughout its range, dwarf downingia occupies a variety of landforms and numerous soil associations.

1.3.2 Central Valley Distribution

Dwarf downingia is known from three geographically defined population centers in the Central Valley. The northernmost is located in Tehama County, between the vicinity of Red Bluff in the north and Black Butte Lake in the south. The southernmost population center occupies a narrow band in the San Joaquin Valley along the eastern edge of Merced County and a single occurrence on the northern edge of Fresno County. The central population center, located in the southern Sacramento Valley, is comprised of occurrences within Solano, Placer, Sacramento, and Yuba Counties.

1.3.3 Range within the Plan Area

Of the 10 occurrences of dwarf downingia recorded from Sacramento County (eight CNDDB occurrences and two occurrences not-yet registered), five are located outside of the Plan Area (CNDDB occurrence #32, #56, #57, #58, and #59). Of the remaining five occurrences, three are located within the UDA in the City of Elk Grove (CNDDB occurrence #54, #55, and an occurrence not yet registered); and two occurrences are located outside of the UDA within the Plan Area. One of these is encompassed within the 16,420-acre The Nature Conservancy (TNC) Cosumnes River Preserve (CNDDB occurrence #53) and the other is located within the Howard Ranch preserve and is not yet registered with the CNDDB.

It is important to note that owing to its small stature, preference for small to medium-sized vernal pools and the area of remaining unsurveyed or partially surveyed habitat, moderate to high potential exists for discovery of additional populations within the Plan Area.

APPENDIX B (Continued)

Table DWDO-2 shows the soil series, geological formation and landform associations for each known occurrence in Sacramento County. Generally, dwarf downingia is associated with Lower Unit Riverbank and old terrace remnant alluvial deposits of the Laguna Formation. For the purposes of the SSHCP, the range of dwarf downingia is considered to include all vernal habitats.

Table DWDO-2
Extant CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations for Dwarf downingia In Sacramento County

Occurrence #	Quadrangle	Soil Series	Geological Formation and Landform
32	Rio Linda	San Joaquin Fine Sandy Loam (0-3% slopes and 3-8% slopes)	Lower Unit Riverbank Formation
53	Galt	Adjacent to Clear Lake Clay, Partially Drained, 0-2% Slopes	Adjacent to Qfa
54	Elk Grove	Redding Gravelly Loam, 0-8% Slopes	Laguna
55	Elk Grove	Redding Gravelly Loam, 0-8% Slopes	Laguna
56	Florin	San Joaquin-Galt Complex, 0-3% Slopes	Lower Unit Riverbank Formation
57	Rio Linda	San Joaquin Fine Sandy Loam (0-3% Slopes and 3-8% Slopes)	Lower Unit Riverbank Formation
58	Rio Linda	San Joaquin Fine Sandy Loam (0-3% Slopes and 3-8% Slopes)	Lower Unit Riverbank Formation
59	Rio Linda	San Joaquin Fine Sandy Loam (0-3% Slopes and 3-8% Slopes)	Lower Unit Riverbank Formation

1.3.4 Population Levels and Trends

Dwarf downingia is known from a total of 117 CNDDB occurrences. Of the 117 CNDDB occurrences recorded, two are extirpated and one possibly extirpated from Sonoma County, one is extirpated from Napa County, one is extirpated and another possibly extirpated from Placer County, and one is extirpated from Sacramento County. Of the remaining 110 CNDDB occurrences presumed extant, 26 have not been revisited since before 1983 (CDFG 2010). Of the 84 CNDDB occurrences reported since 1983 and presumed extant, one is listed as experiencing a decreasing trend, and the rest are listed as trend "unknown" (CDFG 2010). It should be noted though, that the vast majority of these 84 occurrences are located on private lands and most are reported as being subject to one or more threats.

It is impossible to determine the number of historically occurring dwarf downingia populations or the acreage of suitable habitat lost to historic agricultural and urban land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978).

APPENDIX B (Continued)

Since dwarf downingia is adapted to the smaller, more "flashy" types of vernal pools, as well as to the margins of larger or deeper pools, estimates of vernal pool habitat lost may reflect loss of potentially suitable dwarf downingia habitat as well. Effects of historic livestock grazing combined with drought cycles and habitat alterations relating to development of non-native annual grassland are not quantifiable.

Table DWDO-3
Dwarf downingia Population Estimates Recorded For Sacramento County

CNDDB Occurrence #	# of Pools Observed	Range of Population Estimates
32	unknown	1994: 100 plants
53	Large vernal marsh	1991: 1000 plants
54	1	1991: 200 plants
55	6 vernal pools and 2 scraped areas	1991: 300
56	2 vernal pools	1990: varied from 100's to 1000's
57	Created depression	1991:50 plants
58	Vernal pool	1993: 50 plants
59	Vernal pool	1993: 150 plants

Between-year variation in population numbers has been documented for several of the dwarf downingia occurrences outside of Sacramento County, although none have been studied in detail. One occurrence is reported as supporting 300 plants in 1988, and 10,000 in 1989 (CNDDB occurrence #29). Another occurrence (CNDDB occurrence #60) was reported as supporting more than 1,000 plants in 1989 and 237 plants in 1990. CNDDB occurrence #62 was found to support 200-400 plants in 1989 and 36 plants in 1990 (CDFG 2010).

Studies involving other vernal pool plant rarities, including Orcuttiae grasses and Hoover's spurge (*Chamaesyce hooveri*) have demonstrated marked fluctuation in numbers of individuals within populations between years (Griggs 1983; Holland 1987; Alexander and Schlising 1997). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). It is not known however, to what degree dwarf downingia exhibits a similar between-year pattern.

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given dwarf downingia population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another critical aspect of population demography is the presence and nature of the soil seed bank, which is unknown for dwarf downingia.

APPENDIX B (Continued)

1.4 Threats to the Species

Potential direct threats to dwarf downingia include: loss of vernal pool habitat to agricultural or urban/industrial land-use conversions; construction and maintenance of firebreaks, roads, and utility corridors; inappropriate livestock grazing regimes (later spring/summer rotations, sheep versus cattle); grassland fires; recreational vehicles; equestrian and pedestrian traffic, and refuse dumping.

Potential Indirect threats to dwarf downingia include hydrological alteration of sub-watersheds by surrounding developments and land uses, shifts in competitive interactions (hydrology-mediated or invasive weeds), windblown refuse accumulation, point and non-point source water pollution, air pollution, and global climate change.

1.5 Data Gaps and Conservation Implications

Despite its distinctive appearance and relative rarity, dwarf downingia has received little research attention from botanists or ecologists. Aside from general observations of field workers provided in the CNDDB, detailed studies have not been conducted regarding the biology, ecology, pollinators, breeding system, population genetics, habitat relationships, population levels, trends or threats associated with this species. Pertinent data gaps, implications for conservation, and operating assumptions include:

1.5.1 Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Plan Area and elsewhere within the range of the species. In the Plan Area, discovery of new populations may occur on the large dry-land ranchlands, public quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of the County.

1.5.2 Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

Throughout its range, dwarf downingia is associated with a variety of geological formations and associated soil types. In Sacramento County, this species is occurs on the Lower Unit Riverbank Formation (five occurrences) and on the Laguna Formation (two occurrences) (CDFG 2010). The exact nature of relationship to landform is however, unknown. It is unknown if soil pH or other edaphic factors influence dwarf downingia distribution and population vigor. It is possible that the presence of functioning vernal pools, regardless of landform, soil series and soil pH indicates suitable habitat.

APPENDIX B (Continued)

1.5.3 Unknown Pollination Ecology

Dwarf downingia possesses the smallest flowers of any of the species in the genus, and is thought to be a self-pollinator; however, without knowing specific breeding abilities and pollinator relationships, it is difficult to ascertain habitat needs for potentially co-evolved insect pollinators.

1.5.4 What Constitutes Population Vigor, and How to Measure?

Population vigor will need to be monitored during the life of the SSHCP, yet population dynamics, including year-to-year variability in abundance, have not been studied for dwarf downingia. The existence of a dormant soil seed bank, a critical contributor to population stability in some other vernal pool species, is unknown for dwarf downingia as well. Other rare vernal pool species have been shown to be highly variable in abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors contributing to year-to-year population fluctuations may be difficult to identify (Alexander and Schlising 1997).

Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

1.5.5 Specific Hydrological Requirements of Dwarf downingia

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting dwarf downingia populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor and/or assess hydrological suitability of dwarf downingia-vernal pool habitat within established preserves. Similarly, assessment of potentially suitable dwarf downingia habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing dwarf downingia populations are established, assessed and monitored over time, a more quantifiable definition of suitable dwarf downingia -vernal pool hydrology may be developed.

1.5.6 Baseline Hydrological Trend of Pools and Existing Indirect Effects

Extant dwarf downingia populations may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

APPENDIX B (Continued)

Baseline dwarf downingia conditions for the SSHCP may not be pristine, so if trends in vigor or habitat quality become apparent during the 50-year period or at some time beyond, it may be difficult to attribute trend to any specific management activity.

1.5.7 Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990).

Proposed preserve designs may not afford complete protection to the hydrological systems that support dwarf downingia and other species assemblages dependant on them.

1.5.8 Definition of Appropriate Scale Dwarf Downingia-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective dwarf downingia-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes dwarf downingia at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

1.5.9 Determination of Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the dwarf downingia-vernal pool preserves, primarily for purposes of upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with dwarf downingia-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2000; Robins and Vollmar 2002). It is important to note that dwarf downingia does persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems. Since dwarf downingia occupied small to medium size vernal pools, management of Italian wild rye and Mediterranean barley around the margins of vernal pools, and Medusa-Head Grass in uplands should be of particular management concern.

Presently, Witham et al. are formulating site-specific livestock grazing regimes for annual grassland-vernal pool systems in an area of Sacramento County (Witham pers. comm.). Livestock grazing regimes in dwarf downingia -vernal pool preserves covered under the SSHCP will tier towards the results of this work, as well as to the specific needs of dwarf downingia. Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

APPENDIX B (Continued)

1.5.10 Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include European mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, lippia, paradox canary grass, hairy hawkbit, cocklebur and cattails. None of these are reported to co-inhabit dwarf downingia-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in dwarf downingia-occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to dwarf downingia, owing to the latter's preference for small to medium size vernal pools.

Potential competitive interactions with these species may affect the vigor of dwarf downingia populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect dwarf downingia populations.

1.5.11 Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to design preserves for multi-species conservation. Suitability of dwarf downingia habitat for supporting other rare plant species has not been specifically addressed, although in Sacramento County natural populations of legenere and Sanford's arrowhead (*Sagittaria sanfordi*) are documented as sharing habitat with it. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well.

Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between November 1st and April 15th may be compatible with or even benefit some dwarf downingia-associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

1.5.12 Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

Population genetics for dwarf downingia are completely unknown. For an overview of genetic considerations of vernal pool plant species see Elam (1998).

Current limitations in our understanding of dwarf downingia population genetics have little immediate conservation implication, given the extreme rarity of dwarf downingia.

APPENDIX B (Continued)

If experimental inoculation of pools is proposed as part of the SSHCP, appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are consistent with what we know and do not know about dwarf downingia ecology and population genetics.

1.5.13 Critical Population Size

Critical population size is a statistical estimate of the minimum number of individuals required for a population to maintain itself over generations, through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since dwarf downingia is an annual species, its population sizes are known to be highly variable from year to year, and the soil seed bank constitutes an important demographic component of the population, definition and assessment of a critical population size is impracticable and lacks ecological meaning.

Knowledge of critical population size provides an ecologically meaningful and quantifiable benchmark for adaptive management purposes (e.g., if monitored populations drop to within 30 percent of critical population size, site-specific analysis, appropriate management changes and additional monitoring will occur). This is not possible for annual species, so other measurable benchmarks are needed.

1.5.14 Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is completely unknown for dwarf downingia. There have been no studies addressing the presence of a soil seed bank, seed dormancy or longevity.

From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

1.5.15 Unknown Aspects of Experimental Inoculation

Since there are so few natural populations of dwarf downingia in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied dwarf downingia

habitat, create meta-population structure at extant occurrences where single pools may support the species, and ensure existence should any natural populations become compromised.

Uncertainties regarding the political ramifications and ecological effectiveness of experimental inoculation lead the conservation community and Agencies to not consider experimental inoculation as an appropriate conservation goal. Given the extreme rarity of this species though, this option may need reconsideration at some point in time.

1.5.16 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant dwarf downingia occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of dwarf downingia, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect dwarf downingia and other native plant species.

1.5.17 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for dwarf downingia populations within the implementation period of this HCP, or at some time beyond.

1.6 Literature Cited

Ahart, Lowell, Rancher/Botanist Honcutt, Butte County, California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

APPENDIX B (Continued)

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G. M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Gibson and Skordal. 1994. Mitigation Monitoring Report for Perry Ranch Fall Brook. November 1994. Sacramento, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

APPENDIX B (Continued)

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservatio*n 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1937. Endemism in the flora of the Great Valley of California. Ph.D. Dissertation, University of California, Berkeley, California.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

APPENDIX B (Continued)

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Slender Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1981. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany,* 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Kelsey, Jon. 2001. Rancher Snelling, Merced County, California.

Leidy, R.A. and E.G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Linhart, Y.B. 1972. Differentiation within natural populations of California annual plants. Ph.D. Dissertation. University of California, Berkeley, California.

Mason, H.L. 1957. Flora of the Marshes of Califiornia. University of California Press, Berkeley and Los Angeles, California.

Myers, E.L. 1975. Seed germination of two vernal pool species: Downingia cuspidate and Plagiobothrys leptocladus. M.S. Thesis. San Diego State University, California. 76 pp.

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

Raven, P. H. and D. I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. *Fremontia* 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. Soil Survey of Sacramento County, California. April 1993. Sacramento, California.

Stebbins, G.L. 1976. Ecological islands and vernal pools of California. *In* S.Jain [ed.] Vernal pools: their ecology and conservation, 1-4. Institute of Ecology Publ. 9, University of California, Davis, California.

Stone, D.R. 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment. *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

APPENDIX B (Continued)

The Nature Conservancy (TNC). *date unknown.* Howard Ranch Special-status species Survey. Sacramento County, California.

Thorne, R.F., 1984. Are California vernal pools unique? *In* S. Jain and P. Moyle [eds.], Vernal pools and intermittent streams, 1-8. Institute of Ecology Publ. 28. University of California, Davis, California.

Thorp, R.W. 1990. Vernal pool flowers and host-specific bees *in* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Restoration Ecologist EDAW, Sacramento, California.

Weiler, J.H., Jr. 1962. A bio-systematic study of the genus *Downingia*. Ph.D Thesis. University of California, Berkeley, California. 189 pp.

Witham, C. 1991. Dwarf Downingia, rare plant of the month. Hibiscus, Sacramento Valley Chapter Newsletter. California Native Plant Society.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H. 1987. The Ecology of southern California vernal pools: a community profile. U.S. Fish and Wildlife Service Biological report 85(7.11).

Zedler, P.H. 1990. Life Histories of Vernal Pool Vascular Plants, In: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

2 BOGG'S LAKE HEDGE-HYSSOP (BLHH)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Bogg's Lake hedge-hyssop (BLHH)
(Gratiola heteropepala)
Status USFWS: None
Status CDFG: Endangered
Status CNPS: List 1B.2



© 2005 Robert E. Preston, Ph.D.

2.1 Legal Status

Bogg's Lake hedge-hyssop (*Gratiola heterosepala*) was listed by the California Department of Fish and Game (CDFG), as State Endangered under the California Endangered Species Act (CESA) in 1978. The California Native Plant Society (CNPS) includes Bogg's Lake hedge-hyssop as a CNPS List 1B.2 species which means it is a plant species that is fairly threatened in California with moderate degree or immediacy of threat (CNPS 2010). CNPS has also assigned an R-E-D Code of 1-2-2, meaning it is rare but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time, it is endangered in a portion of its range, and it is rare outside of California (CNPS 2010).

2.2 Life History and Ecology

2.2.1 Species Description and Life History

Bogg's Lake hedge-hyssop is a small-stature annual in the figwort family (Scrophulariaceae). This diminutive species has an erect, un-branched stem that can reach from two to 10 cm in height. Small one to two centimeter-long leaves are arranged oppositely on the stem; the lower ones are linear-lanceolate and the upper ones are shorter, proportionally wider and more blunt (obtuse) at the tip. The inflorescence is comprised of one to several six to eight millimeter-long flowers arranged in a terminal raceme. Individual pale-yellow and white, tubular flowers are born on 10 to 20 millimeter-long stalks (pedicels). The pedicels and upper stem are glandular puberulent. The calyx is comprised of five round-tipped sepals, three of which are united about 1/3 the distance from their base, and two that are more–or-less separate. Of the three united

sepals, the central one is wider and longer. Numerous small seeds are produced in pear-shaped (pyriform) capsules that usually equal the mature calyx in length (four to six millimeter).

The more common and potentially co-occurring bractless hedge-hyssop (*Gratiola ebracteata*) is distinguished from its rare relative on the basis of having more elongate and sharply pointed sepals that are mostly separate to their bases, and white, versus mostly yellow flowers (Mason and Bacigalupi 1954; Hickman 1993). A third species, clammy hedge-hyssop (*Gratiola neglecta*), is distinguished from *G. bracteata,* and *G. heterosepala* on the basis of having two small bracts subtending the flowers, and flowers that are at least two to three times as long as the calyx.

Bogg's Lake hedge-hyssop, and the genus *Gratiola* in general, has received little attention from biologists or ecologists. Other than basic taxonomic and biogeographic treatments, and a single study of pollinator ecology (Kaye et al. 1990), Bogg's Lake hedge-hyssop remains mostly unstudied. Ecological information, mostly from observations of field workers, exists mostly as a result of land management and agency-mandated resource management activities (Corbin 2000; Corbin et al. 1994; Schoolcraft 2000; Plantenkamp 1998; Jones and Stokes 1994).

2.2.1.1 Ecological Life Cycle

Bogg's Lake hedge-hyssop shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to the populations avoidance of the regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean Climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

2.2.1.2 Seed Germination

The specific timing of germination of Bogg's Lake hedge-hyssop seeds relative to the timing of the vernal pool inundation cycle has not been described in detail. Observations indicate that Bogg's Lake hedge-hyssop seeds germinate and begin juvenile growth under water (Kaye et al. 1990; Corbin et al. 1994). Seed longevity, germination requirements and germination optima for Bogg's Lake hedge-hyssop have not been investigated.

2.2.1.3 Vegetative Growth

One of the challenges to many vernal pool plant species is optimization of physiological processes in both the early season aquatic and later season terrestrial phases of the vernal pool cycle. For Bogg's Lake hedge-hyssop, the hollow (fistulous) stem is the principal structural adaptation to growth in the aquatic habitat. The air-filled stems hold the plant vertical in the water column, thus facilitating light exposure and gas exchange. This in effect lengthens the growing season by maximizing growth while vernal pools are still inundated. It is interesting to note that, although the species inhabits the basins and slopes of deeper/larger vernal pools, it

lacks distinctly different juvenile aquatic morphology, an adaptation that is shared by many other deep pool annual species with which it occurs (e.g., *Orcuttia* spp., *Downingia* spp., *Navarretia* spp., *Eryngium* spp., *Callitriche* spp.).

2.2.1.4 Reproduction

Bogg's Lake hedge-hyssop flowers and sets seeds during the dry-down phase of the vernal pool hydrologic cycle, typically while shallow water up to two inches (five centimeters) deep remains in the pool basin (Corbin et al. 1994). Flowering occurs in the Central Valley from April to June (CNPS 2010), and at higher elevations as late as August (Corbin et al. 1994; CNPS 2010; CDFG 2010). Bogg's Lake hedge-hyssop is completely self-compatible as indicated by pollinator exclusion experiments (Kaye et al. 1990). Fruits mature quickly, usually within one to two weeks after the flowers appear (Corbin et al. 1994). The mature capsules produce numerous minute seeds that are released as the 4-valved capsule opens, and as the parent plant disintegrates. Fecundity and variation in seed production have not been investigated in Bogg's Lake hedge-hyssop .

2.2.1.5 Dispersal

In many other vernal pool species, seed dispersal is naturally limited, although this has not been stated specifically for *Gratiola*. Limited seed dispersal in vernal pool species is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974, 1980, 1990). Bogg's Lake hedge-hyssop does not appear to have dispersal-limiting traits (e.g., fruit adherent to parent plant, fruit not opening).

Evidence of natural Bogg's Lake hedge-hyssop dispersal and colonization exists in occupancy of man-made topo-hydrologic features located within or near occupied vernal pool landscapes (artificially created vernal pools, stock pond and reservoir margins, ditches, and other excavated or scraped depressions (CDFG 2010). Further evidence of long-range dispersal exists in the relatively widespread range of this species in northern California. Natural dispersal of Bogg's Lake hedge-hyssop seeds likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming native ungulates (Griggs 1980).

2.2.1.6 Seed Dormancy

Seed dormancy is indicated by observation of a three-year period where Bogg's Lake hedge-hyssop plants were absent, followed by reappearance during the favorable growing season of the fourth year (Corbin et al. 1994). Seed longevity and seed abundance in the soil has not been investigated. The presence of a persistent soil seed bank provides insurance against localized

extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

2.2.1.7 Population Genetics

Population genetics of Bogg's Lake hedge-hyssop have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the limited number of occurrences in the Plan Area and the scattered geographical distribution, all intra-pool Bogg's Lake hedge-hyssop populations should be considered unique, and for the purposes of conservation, important genetic entities.

2.2.2 Habitat Requirements and Ecology

2.2.2.1 Biogeography and Landform Relations

Bogg's Lake hedge-hyssop is strictly associated with the vernal pool-type hydrologic cycle. Over its geographic range, this species is found in a number of distinct physiographic/edaphic settings. In Sacramento County, Bogg's Lake hedge-hyssop is associated with vernal pools located on ancient weathered alluvial terraces of the Laguna Geologic formation, with soils of the Redding, Red Bluff and related Series. Soils of the Redding Series tend to be strongly acidic (indication of age and weathering) and are generally gravelly with cobble. These soils also typically possess a shallow, water-impermeable iron-silica hardpan that favors the development of vernal pools (SCS 1993). In Tehama County, Bogg's Lake hedge-hyssop occurs in vernal pools associated with cemented hardpan of the Tuscan, Toomes and related series, as well as in more shallow volcanic soils (CDFG 2010). The montane occurrences of Lassen, Shasta and Modoc Counties are also associated with volcanic soils, but in addition to volcanic mudflow and basalt substrates, wetlands formed on large hydric clay flats also support the species. Similarly, in Lake County, and Solano County, Bogg's Lake hedge-hyssop is associated with large seasonal Playa Lake-type pools formed on clay substrates.

2.2.2.2 Hydrology Relations

Bogg's Lake hedge-hyssop is a strict endemic of the vernal pool hydrologic cycle. This species is reported to grow in well-developed vernal pools, and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies (small lakes, reservoirs, stock ponds, seasonally saturated clay flats in meadows). It is significant to note that most of the other rare species with which Bogg's Lake hedge-hyssop grows are also associated with well-developed large or deep vernal pools that exhibit more extreme, longer duration inundation such as slender

APPENDIX B (Continued)

Orcutt grass (*Orcuttia tenuis*), San Joaquin Valley Orcutt grass (*O. ineaequalis*), Sacramento Orcutt grass (*O. viscida*), Greene's tuctoria (*Tuctoria greenei*), hairy Orcutt grass (*Orcuttia pilosa*), legenere (*Legenere limosa*), and Hoover's spurge (*Chamaesyce hooveri)* (CDFG 2010). Specific pool area, pool depth, or other measures of pool hydrology are not reported for any of the Bogg's Lake hedge-hyssop occurrences. It has been observed that the species germinates and grows underwater, and quickly flowers and sets seed as the pool dries, while two to five inches of water remain in the pool basin.

2.2.2.3 Biological Community Relations

Floristic associations provide further indication of preference for more extreme vernal pool hydrological cycles. Like the Orcuttiae grasses, Bogg's Lake hedge-hyssop often grows in comparatively barren areas within deeper portions of vernal pools, sometimes in barren openings with commom spikerush (*Eleocharis macrostachya*). In addition to the fore-mentioned rarities, other associated species indicative of well-developed vernal pool hydrology, including hairy pepperwort (*Marsilea vestida*), coyote thistle (*Eryngium castrense, E. vaseyi*), Alisma-leaved coyote thistle (*E. alismifolium),* bee-thistle (*E. arictulatum*), Mathia's thistle (*E. mathiasae),* bractless hedge-hyssop, downingias (*Downingia bicornuta, D. bacigalupi, D. cuspidata, D. ornatissima*), quillwort (*Isoetes howellii, I. orcuttii and I. nuttallii*), flowering quillwort (*Lilaea scilloides*), smooth goldfields (*Lasthenia glaberrima*), California elatine (*Elatine californica*), and winged water starwort (*Callitriche marginata*),

Other vernal pool endemics reported as occurring with Bogg's Lake hedge-hyssop include common inhabitants of shallower or smaller to medium-size vernal pools with shorter duration ponding, or the slopes and edges of larger or deeper pools. These species include Fremont's goldfields (*Lasthenia fremontii*), white-headed navarretia (*Navarretia leucocephala*), stalked popcorn-flower (*Plagiobothrys stipitatus*), bracted popcorn-flower (*P. bracteatus*), dwarf wooly marbles (*Psilocarphus brevissimus*), dwarf downingia (*Downingia pusilla*), annual hairgrass (*Deschampsia danthonioides*), Douglas' meadowfoam (*Limnanthes douglasii*), tricolored monkey-flower (*Mimulus tricolor*).

2.2.2.4 Non-Native Weed Relations

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian Rye and Mediterranean Barley, two non-native facultative wetland species typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. Some suggest that built-up thatch from Italian wild rye (*Lolium multiflorum*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as

well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2001).

Since Bogg's Lake hedge-hyssop occupies medium to larger or deeper vernal pools, it may not be particularly susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch buildup, as with the more deeply-adapted legenere and Orcuttiae grasses.

No weedy hydrophytic species are presently reported as growing with Bogg's Lake hedge-hyssop. Although none of the following are specifically reported to co-inhabit vernal pools with Bogg's Lake hedge-hyssop, other non-native weedy hydrophytes may present future problems, including mannagrass (*Glyceria declinata*), lippia (*Phyla nodiflora*), swamp pricklegrass (*Crypsis schoenoides*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), Bermuda grass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), a native species, can also dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

2.2.2.5 Livestock Grazing Relations

In general, appropriately timed dry-pasture livestock grazing regimes are thought to be compatible with the persistence of vernal pool vegetation. Robins and Vollmer (2002) provide a review of information pertaining to livestock grazing in vernal pool ecosystems. Observations made on (U.S. Bureau of Land Management (BLM) and U.S. Forest Service (USFS) grazing allotments indicate that Bogg's Lake hedge-hyssop populations are somewhat resistant to grazing and trampling pressures, with abundant and vigorous flowering and fruiting plants present despite hoof-pocked surfaces. Others have indicated livestock grazing as a threat (CDFG 2010).

Many extant populations of Bogg's Lake hedge-hyssop inhabit long-operating cattle ranches and USFS and BLM grazing allotments. Persistence in un-irrigated pasture systems indicates tolerance for at least some level of grazing. In most cases, timing of livestock grazing is likely more important than stocking rates in affecting persistence of Bogg's Lake hedge-hyssop , as it is for the Orcuttiae grasses (Stone et al. 1988). During the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. As the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. Excessive trampling and grazing during this period may negatively affect Bogg's Lake hedge-hyssop, and other vernal pool species. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect

APPENDIX B (Continued)

on Bogg's Lake hedge-hyssop (Mason and Bacigalupi 1954; CDFG 1987) especially since the plant usually disintegrates rapidly once pools have dried (Corbin et al. 1994).

It should be noted however, as with many other vernal pool annuals, small stature and high plant densities ensure that in all but extreme cases, a portion of every year's cohort escapes destruction, matures and sets seed.

2.2.2.6 Disturbance Response

Observations of field workers provide some evidence of the potential response of Bogg's Lake hedge-hyssop populations to particular disturbance regimes. One occurrence has been extirpated as a result of disking and harrowing. It is interesting to note that several rare and common vernal pool species, including Bogg's Lake hedge-hyssop and Orcuttiae grasses are recorded to persist despite periodic disking of the vernal pool substrates over decades (Hoover 1941; Crampton 1959; Stone et al. 1988; CDFG 2010; Ahart pers. comm.; Kelsey pers. comm.; Dittes pers. obs.). It is very important to note that in these cases, disking is not so deep as to significantly affect the subtending impermeable layer or the vernal pool hydrological cycle. In addition, the disking is performed in the late summer or fall months in preparation for dry land winter grain crops, so vernal pool plants have set seed and dried. If this disking occurs earlier in the growing season, before seeds are mature, over consecutive years, population extirpation is probable through exhaustion of soil seed bank.

2.2.2.7 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Bogg's Lake hedge-hyssop are identified in Table BLHH-1 and have been derived from input from local species experts.

Table BLHH-1
Essential Habitat Elements for Bogg's Lake Hedge Hyssop

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, and vernal pool.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the

APPENDIX B (Continued)

Table BLHH-1
Essential Habitat Elements for Bogg's Lake Hedge Hyssop

Essential Activities	Land Cover Types	Habitat Elements
		development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

2.3 Species Distribution and Population Trends

2.3.1 Species Distribution

Bogg's Lake hedge-hyssop was first collected from Bogg's Lake in Lake County, California in 1954. Since that time, 90 total occurrences have been recorded (CDFG 2010), ranging from Fresno County in the south to northern Modoc County in northeast California. Bogg's Lake hedge-hyssop occurrences are distributed among five of the Geographic Sub-regions of the California Floristic Province, as described by Hickman (1993); the San Joaquin Valley, Sacramento Valley, Inner Coast Range, Cascade Range Foothill, High Cascade Range, and the non-Warner Mountain and Warner Mountain Sub-regions of the Modoc Plateau Region. Bogg's Lake hedge-hyssop is among the most widespread of the rare vernal pool species addressed in the SSHCP and exhibits the widest range in elevations (25 to 7,900 feet elevation) (CNPS 2010).

Tehama and Modoc Counties together support 40 percent of the 90 presently known Bogg's Lake hedge-hyssop occurrences, with 17 and 19 occurrences for each county, respectively. Shasta County supports 14 occurrences (16 percent of total), while Sacramento County supports 11 occurrences (12 percent of total) and Solano County supports six occurrences (seven percent of total). San Joaquin, Fresno, Lake, Placer, Lassen, Madera, Siskiyou, Merced, and Fresno Counties each support five or fewer occurrences (CDFG 2010).

This comparatively wide geographic and elevation distribution of Bogg's Lake hedge-hyssop may partially reflect comparatively broad habitat requirements relative to some of the other vernal pool rarities (e.g., Sacramento Orcutt Grass). It may also reflect a different propensity for seed dispersal by waterfowl, or perhaps even a different "biogeographic legacy" (e.g., timeline of evolution and geographic distribution of ancestral taxon).

2.3.2 Central Valley Distribution

In the Central Valley, Bogg's Lake hedge-hyssop occurs among five roughly defined population centers. The southernmost of these, comprising four CNNDB occurrences, is located along the eastern edge of the Great Central Valley near the Fresno and Madera County lines. The next population center to the northwest, comprised of a single occurrence, is located approximately 45 miles away in eastern Merced County. A third population center is located 75 miles to the north

and is comprised of 18 occurrences. These occurrences extend approximately 45 miles north-to-south along the eastern edge of the Great Central Valley from northern San Joaquin County north through Sacramento County, to western Placer County. A fourth population center, comprised of six occurrences, is located approximately 30 miles to the west near the Sacramento-San Joaquin River Delta in Solano County. The northernmost Great Central Valley population center, comprised of four occurrences, is located in southern Tehama County, approximately 75 miles north of the northernmost Placer County occurrence. Another Tehama County population center, comprised of 13 additional occurrences, is located approximately 20 miles further northeast at higher elevations on the volcanic mudflow formations of the Cascade Range Foothills, east of the Great Central Valley.

2.3.3 Range within the Plan Area

Currently, there are ten CNDDB occurrences of Bogg's Lake hedge-hyssop within the Plan Area (Figure BLHH-1), all of which are located within the Urban Development Area (UDA). Within the UDA, the northeastern-most occurrence (CNDDB occurrence #48) is located northwest of the intersection of White Rock and Prairie City Roads. This occurrence is located on private land and is comprised of an unrecorded number of occupied pools. The next occurrence to the southwest is located approximately seven mi away (CNDDB occurrence #57) at the proposed Sunrise-Douglas Subdivision development. With 12 occupied pools, this is the largest Bogg's Lake hedge-hyssop occurrence in Sacramento County (CDFG 2010).

The next occurrence to the west (CNDDB occurrence #84) is located approximately two miles from the Sunrise Douglas site, just north of Morrison Creek and west of Eagles Nest Road near the southern edge of Mather Field. This occurrence is comprised of an unrecorded number of occupied vernal pools.

Another occurrence (CNDDB occurrence #30), associated with the 138-acre Sheldon Mitigation Site, is located approximately 2.5 miles south of the Sunrise-Douglas occurrence, just north of the Cosumnes River Floodplain. The number of occupied pools at this site is not recorded. CNDDB occurrence #81, comprised of a single occupied pool, is located on private land near Laguna Creek east of Excelsior Road, approximately 4.5 miles west by southwest of CNDDB occurrence #30.

The three westernmost occurrences (CNDDB occurrence #33, #34, and #35) are distributed along a north-south oriented axis with Elk Grove-Florin Road on the west, and Gerber Road and Elk Grove Boulevard on the north and south, respectively. The southernmost of these three occurrences (CNDDB occurrence #33) is located on private land, and is comprised of one occupied vernal pool. CNDDB occurrence #34, located on private land approximately 1.8 miles to the north, is comprised of an unrecorded number pools. The northernmost of these three

APPENDIX B (Continued)

occurrences (CNDDB occurrence #35) is located approximately one mile north of the central occurrence, and is also comprised of an unrecorded number of occupied pools.

Two additional occurrences are associated with the Kiefer Landfill development (CNDDB occurrence #18 and #82). Occurrence #18 is composed of seven occupied vernal pools, and occurrence #82 is reported to support one occupied vernal pool (Jones and Stokes 1998; CDFG 2010).

In Sacramento County, eight of the nine (89 percent) extant Bogg's Lake hedge-hyssop occurrences are associated with the Laguna Formation. Associated soils include those of the Redding and Red Bluff/Redding Series. This geological landform is comprised of remnant old-terrace alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene, between 600,000 and 1,500,000 years ago. Laguna Formation and associated soils are strongly associated with the distribution of vernal pools. Table BLHH-2 shows the soil series, geological formation and landform associations for each known occurrence in Sacramento County. It is significant to note that owing to the diminutive size of the species, its ability to inter-mingle with the more common species bractless hedge-hyssop, and the area of unsurveyed or partially surveyed area of Laguna Formation, other occurrences are likely to be present in Sacramento County. In addition, well-developed vernal pools on landforms other than Laguna could provide suitable habitat. For the purposes of the SSHCP, the range of Bogg's Lake hedge-hyssop is considered to be all vernal habitats as well as other seasonal wetlands and impoundments.

Table BLHH-2
CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations for Bogg's Lake hedge-hyssop in Sacramento County

CNDDB Occurrence #	Quadrangle	Soil Series	Geological Formation and Landform
3 (possibly extirpated)	Rio Linda	San Joaquin Fine Sandy Loam, 3-8% Slopes	Lower Unit, Riverbank Formation
18	Buffalo Creek	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
30	Sloughhouse	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
33	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
34	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	North Merced Gravel (Arroyo Seco gravel)
35	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
48	Buffalo Creek	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.

APPENDIX B (Continued)

Table BLHH-2
CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations for Bogg's Lake hedge-hyssop in Sacramento County

CNDDB Occurrence #	Quadrangle	Soil Series	Geological Formation and Landform
57	Buffalo Creek	Red Bluff-Redding Complex, 0-5% Slopes	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
81 (extirpated)	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
82	Buffalo Creek	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
84	Carmichael	Red Bluff-Redding Complex, 0-5% Slopes	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.

2.3.4 Population Levels and Trends

Of the 90 documented CNDDB occurrences, all but two are presumed extant. One occurrence in Sacramento County is listed as "possibly extirpated" after the vernal pools were plowed, harrowed, and leveled for a housing development in 1977 (CNNDB occurrence #3) (CDFG 2010). The extirpated occurrence is located in the City of Elk Grove where the site had been disked and partially leveled and is slated for development (CDFG 2010).

Downward population trends have been reported for five populations (two in Sacramento County and one each in Placer, Lake, and Tehama Counties); while three occurrences from Shasta County are classified as "fluctuating" and one Shasta County occurrence is classified as "increasing." The population trends for the remaining occurrences are listed as "unknown."

It should be noted that Bogg's Lake hedge-hyssop is a diminutive and a relatively ephemeral species that easily escapes the notice of botanists, particularly since the taxonomic features used to circumscribe it are subtle, and it often grows intermingled with the more common and superficially similar species. Given these considerations and the amount of unsurveyed or partially surveyed potentially suitable habitat, additional occurrences will likely be discovered.

It is impossible to determine the number of historically occurring Bogg's Lake hedge-hyssop populations lost or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before these species first received attention (Stone et al. 1988). Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978; Jones and Stokes 1990), however owing to habitat specificity (restriction to), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for Bogg's Lake hedge-hyssop.

APPENDIX B (Continued)

There has been no comprehensive effort to monitor all populations of Bogg's Lake hedge-hyssop although various monitoring projects have been conducted by the BLM and USFS. However, the population estimates for some of the occurrences in Sacramento County occurrences have been made (Table BLHH-3).

Table BLHH-3
Bogg's Lake Hedge-hyssop Population Estimates for Sacramento County (CNDDB)

CNDDB Occurrence #	Occurrence # of pools observed	Range of population estimates
3	Reported from "several vernal pools:	Possibly extirpated
18	7	10,000 + plants
30	1	1990: 0 plants 1993: 1,000 + plants
33	1	1991: 20 plants
34	1	1991: 200 plants
35	3	?
48	Ponds	?
57	12	Several thousand to several hundred thousand
81	1	1998: 1 plant
82	1	?
84	1	2000: 1,000's of plants

Observations of Bogg's Lake hedge-hyssop indicate that abundance of individuals in a population can vary greatly from year-to year, depending at least in part on precipitation of the season. Abundance estimates made at several occurrences range from a complete lack of plants to thousands in subsequent years (CDFG 2010). Population variability in some vernal pools species is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for Hoover's spurge, hairy Orcutt grass, and Greene's tuctoria at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Bogg's Lake hedge-hyssop population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

2.4 Threats to the Species

Potential direct threats to Bogg's Lake hedge-hyssop include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions; construction and maintenance of firebreaks, roads, and utility corridors; timber harvest activities (in montane Occurrences); inappropriate livestock grazing regimes (later spring/summer rotations); grassland fires; recreational vehicles; equestrian and pedestrian traffic; and refuse dumping (CDFG 1992, 1998; CDFG 2010; Corbin et al. 1994; Kaye et al. 1990).

Potential Indirect threats to Bogg's Lake hedge-hyssop include hydrological alteration of sub-watersheds by surrounding developments and land uses; shifts in competitive interactions (hydrology-mediated or invasive weeds); windblown refuse accumulation; point and non-point source water pollution; air pollution, and global climate change.

2.5 Data Gaps and Conservation Implications

With exception to an investigation into the breeding system (Kaye et al. 1990), various monitoring projects, and the visual observations of field workers (Corbin et al. 1994; Schoolcraft 2000; CDFG 2010; Witham pers. comm.), Bogg's Lake hedge-hyssop has received limited research attention. Detailed studies have not been conducted regarding the biology, ecology, potential for cross pollination, population genetics, habitat relationships, population dynamics, trends or threats. Pertinent data gaps, implications for conservation, and operating assumptions include the following.

2.5.1 Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Plan Area and elsewhere within the range of the species. In the Plan Area, discovery of new populations of Bogg's Lake hedge-hyssop may occur on the large dry-land ranchlands, public/quasi-public lands and vernal pool-grassland preserves already established in Sacramento County.

2.5.2 Unknown Relationship Between Landform/Soil Chemistry and Bio-Geographic Distribution

In Sacramento County, Bogg's Lake hedge-hyssop has a geographic association with old alluvial terraces possessing acidic soils, primarily of the Redding and Red Bluff Families (Laguna Geological Formation). The exact nature of this relationship is, however, unknown. It is unknown if soil pH or other edaphic factors influence the species distribution and population vigor. It is possible that functioning vernal pools with well-developed hydrology, regardless of landform, soil series and soil pH may provide suitable habitat for this species. This is supported by the occurrence of this species in vernal pools and wetlands with vernal pool-type hydrology

on other landforms, with different soil types, at varying locations. In the Plan Area, vernal pools are most frequent and best developed on the Laguna Formation.

2.5.3 Unknown Pollination Ecology

In a study conducted in Oregon, Bogg's Lake hedge-hyssop has been shown to be completely self-compatible, and insects were never observed visiting its flowers (Kaye et al. 1990). It is not known though whether or not out-crossing ability exists, and if so, whether or not insect pollinators are associated with the species anywhere in its range.

2.5.4 What Constitutes Population Vigor, and How to Measure?

Population vigor will need to be monitored during the life of the SSHCP, yet population dynamics, including year-to-year variability in abundance, has not been described in detail for any of the occurrences in Sacramento County. In other areas, Bogg's Lake hedge-hyssop population estimates have been made over varying periods of time. Populations estimates range from 1,000,000 plants at CNDDB occurrence #36, to a single individual at CNDDB occurrence #64. Observations made over time also indicate that Bogg's Lake hedge-hyssop populations can vary by several orders of magnitude between years, with low numbers present during years with sub-optimal hydrology (CDFG 2010; Corbin et al. 1994). Other rare vernal pool species have been shown to be variable in population abundance from year-to-year (Holland 1987; Griggs pers. comm.), and causative factors contributing to year-to-year population fluctuations in rare species may be difficult to identify (Alexander and Schlising 1997).

Population vigor will be difficult to assess based on number of individuals present over short intervals of time. Trends occurring over longer periods may occur that are not discernable, and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

2.5.5 Specific Hydrological Requirements of Bogg's Lake hedge-hyssop

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting Bogg's Lake hedge-hyssop populations in the Plan Area (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of Bogg's Lake hedge-hyssop -vernal pool habitat within established preserves. Similarly, assessment of potentially suitable Bogg's Lake hedge-hyssop habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing Bogg's Lake hedge-hyssop populations are established, assessed and

monitored over time, a more quantifiable definition of suitable Bogg's Lake hedge-hyssop - vernal pool hydrology will emerge based on learned information.

2.5.6 Baseline Hydrological Trend of Pools and Existing Indirect Effects

Extant Bogg's Lake hedge-hyssop populations in the Plan Area may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Baseline Bogg's Lake hedge-hyssop habitat conditions for the SSHCP may not be pristine, so if trends in vigor or habitat quality become apparent during the 50-year period or at some time beyond, it may be difficult to attribute trend to any specific management activity.

2.5.7 Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990).

Proposed preserve designs may not afford complete protection to the hydrological systems that support Bogg's Lake hedge-hyssop and other species assemblages dependant on them.

2.5.8 Definition of Appropriate Scale Bogg's Lake hedge-hyssop -Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective Bogg's Lake hedge-hyssop -vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes rare plant populations at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

2.5.9 Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the Bogg's Lake hedge-hyssop -vernal pool preserves, primarily for purposes of upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with Bogg's Lake hedge-hyssop -occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2000; Robins and Vollmar 2002). It is important

to note that Bogg's Lake hedge-hyssop does persist though, in historically and contemporary operating livestock ranches and USFS and BLM grazing allotments. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems. Since Bogg's Lake hedge-hyssop occupies medium to large-size vernal pools, management of Italian wild rye and Mediterranean barley around the margins of vernal pools, and Medusa-head grass in uplands should be monitored and managed but not primarily for the needs of Bogg's Lake hedge-hyssop specifically.

Presently, Witham et al. are formulating site-specific livestock grazing regimes for annual grassland-vernal pool systems in an area of Sacramento County. Livestock grazing regimes in Bogg's Lake hedge-hyssop -vernal pool preserves covered under this HCP will tier towards the results of this work, as well as to the specific needs of Bogg's Lake hedge-hyssop . Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

2.5.10 Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, filed bindweed, lippia, paradox canary-grass, hairy hawkbit, Cocklebur and cattails. None of these are reported to co-inhabit Bogg's Lake hedge-hyssop -occupied vernal pools in Sacramento County. Any of these and others now unknown may appear and/or change in abundance in Bogg's Lake hedge-hyssop -occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to Bogg's Lake hedge-hyssop if they are allowed to completely dominate the vernal pool margins and adjacent uplands. Potential competitive interactions with these species may affect the vigor of Bogg's Lake hedge-hyssop populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect Bogg's Lake hedge-hyssop populations.

2.5.11 Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine to design preserves for multi-species conservation. Bogg's Lake hedge-hyssop has been reported as sharing vernal pools with other rare plant species, including Sacramento Orcutt grass, hairy Orcutt grass, slender Orcutt grass, Greene's tuctoria, San Joaquin Valley Orcutt grass, Bogg's Lake hedge-hyssop , Hoover's spurge, legenere, succulent owl's-clover. Many of these pool complexes supporting rare species also provide habitat for rare invertebrates, amphibians, mammals, and bird species as well.

APPENDIX B (Continued)

Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between July 1 and April 1 may be compatible with or even benefit some Bogg's Lake hedge-hyssop -associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

2.5.12 Genetic Variation (Spatial and Temporal [Seed Bank], Genetic Drift, Genetic Bottlenecks)

Population genetics for Bogg's Lake hedge-hyssop are completely unknown. For an overview of genetic considerations of vernal pool plant species, see Elam 1998). Current limitations in our understanding of Bogg's Lake hedge-hyssop population genetics have little immediate conservation implication, given the relatively few number of Bogg's Lake hedge-hyssop occurrences in the Plan Area.

If experimental inoculation of pools is proposed as part of the SSHCP, appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are consistent with what we know and do not know about Bogg's Lake hedge-hyssop ecology and population genetics.

2.5.13 Critical Population Size

Critical population size is a statistical estimate that defines the minimum number of individuals required for a population to maintain itself over generations, through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since Bogg's Lake hedge-hyssop is an annual species, its population sizes may be highly variable from year to year, and the soil seed bank constitutes an unknown demographic component of the population, definition and assessment of a critical population size is impracticable and lacks ecological meaning for the purposes of the SSHCP.

Knowledge of critical population size provides an ecologically meaningful and quantifiable benchmark for adaptive management purposes (e.g., if monitored populations drop to within 30 percent of critical population size, site-specific analysis, appropriate management changes and additional monitoring will occur). This is not possible for annual species, so other measurable benchmarks are needed.

APPENDIX B (Continued)

2.5.14 Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is indicated by the observation of a three-year period during which plants were absent, followed by abundant plants the following favorable hydrologic season. Beyond this observation though, there have been no empirical studies addressing the presence of a soil seed bank, seed dormancy or longevity for Bogg's Lake hedge-hyssop.

From the perspective of conservation, knowledge of site specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

2.5.15 Unknown Aspects of Experimental Inoculation

Since there are so few natural populations of Bogg's Lake hedge-hyssop in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied Bogg's Lake hedge-hyssop habitat, create meta-population structure at extant occurrences where single pools may support the species, and help ensure existence should any natural populations become compromised. Dispersal into, and colonization of artificially created or enhanced vernal pools, stock-ponds, reservoirs and even rutted tire tracks in occupied vernal pool landscapes has been documented (CDFG 2010; Sanger pers. comm. 2003). Bogg's Lake hedge-hyssop is a fully self-compatible species, which is a pre-adaptation for colonization.

Uncertainties regarding the political ramifications and ecological effectiveness of experimental inoculation lead the conservation community and Agencies to not consider experimental inoculation as an appropriate conservation goal. Given the rarity of this species in the Plan Area though, this option may need reconsideration at some point in time.

2.5.16 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant Bogg's Lake hedge-hyssop occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Bogg's Lake hedge-hyssop, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and

effectively, these pollutants may negatively affect Bogg's Lake hedge-hyssop and other native plant species in the future.

2.5.17 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for Bogg's Lake hedge-hyssop populations within the implementation period of this HCP, or at some time beyond.

2.6 Literature Cited

Ahart, Lowell. Rancher/Botanist Honcut, Butte County, California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Dept. of Fish and Game, Redding, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 1987. California native plant status report: *Gratiola heterosepala*. California Department of Fish and Game Endangered Plant Project, California Natural Diversity Data Base, and California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 1992. Annual report on the status of California state-listed threatened and endangered animals and plants. Sacramento, California.

California Department of Fish and Game (CDFG). 1996. The status of rare, threatened, and endangered animals and plants of California comined annual report for 1993, 1994, and 1995. An addendum to the 1992 report. Sacramento, California.

APPENDIX B (Continued)

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Corbin, B. 2000. Letter to Ellen Cypher, Endangered Species Recovery Program, Bakersfield, California, 3 p. + 4 pp. attachments. (Cited by USFWS 2000; Original not seen.)

Corbin, B. and G. Schoolcraft, A. Sanger, and J Molter. 1994. *Gratiola heterosepala* Conservation Strategy. Unpublished report to Lassen National Forest, Modoc National Forest, Alturus Resource Area BLM, and Redding Resource Area BLM.

Corbin, Beth. District Botanist USDA, Bureau of Land Management (formerly with Lassen National Forest).

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

APPENDIX B (Continued)

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193.

Griggs, Tom, Ph.D. Senior Restoration Ecologist, River Partners, Chico, California.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., and V.I. Dains. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1994. Durta property wetland delineation and special status species surveys. Prepared for Sacramento County Department of Public Works. Sacramento, California.

Jones and Stokes 1998. Kiefer Landfill Wetland Mitigation Plan. Sacramento, California.

Kaye, T., W. Messinger, S. Massey, and R Meinke. 1990 Gratiola heterosepala: inventory and breeding system evaluation. Unpublished report to the U.S. Bureau of Land Management, Lakeview, Oregon.

Kelsey, Jon. Rancher/Botanist Snelling, Merced County, California.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

APPENDIX B (Continued)

Mason H.L., and R. Bacigalupi. 1954. A new Gratiola from Boggs Lake, Lake County, California. *Madrono* 12:150-152.

Molter, Joe. District Botanist USDA, Bureau of Land Management

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Sanger, Alison. Forest Botanist, Lassen National Forest, Susanville, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Schoolcraft, G.D. 2000. Letter to Ellen Cypher, Endangered Species Recovery Program, Bakersfield, California, 2pp. (Cited by USFWS 2000; Original not seen)

Soil Conservation Service (SCS). 1993. United States Department of Agriculture Soil Conservation Service. Soil Survey of Sacramento County, California. Sacramento, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Thorpe, R. 2003. Unpublished E-Mail to Daniel Burmester, CDFG.

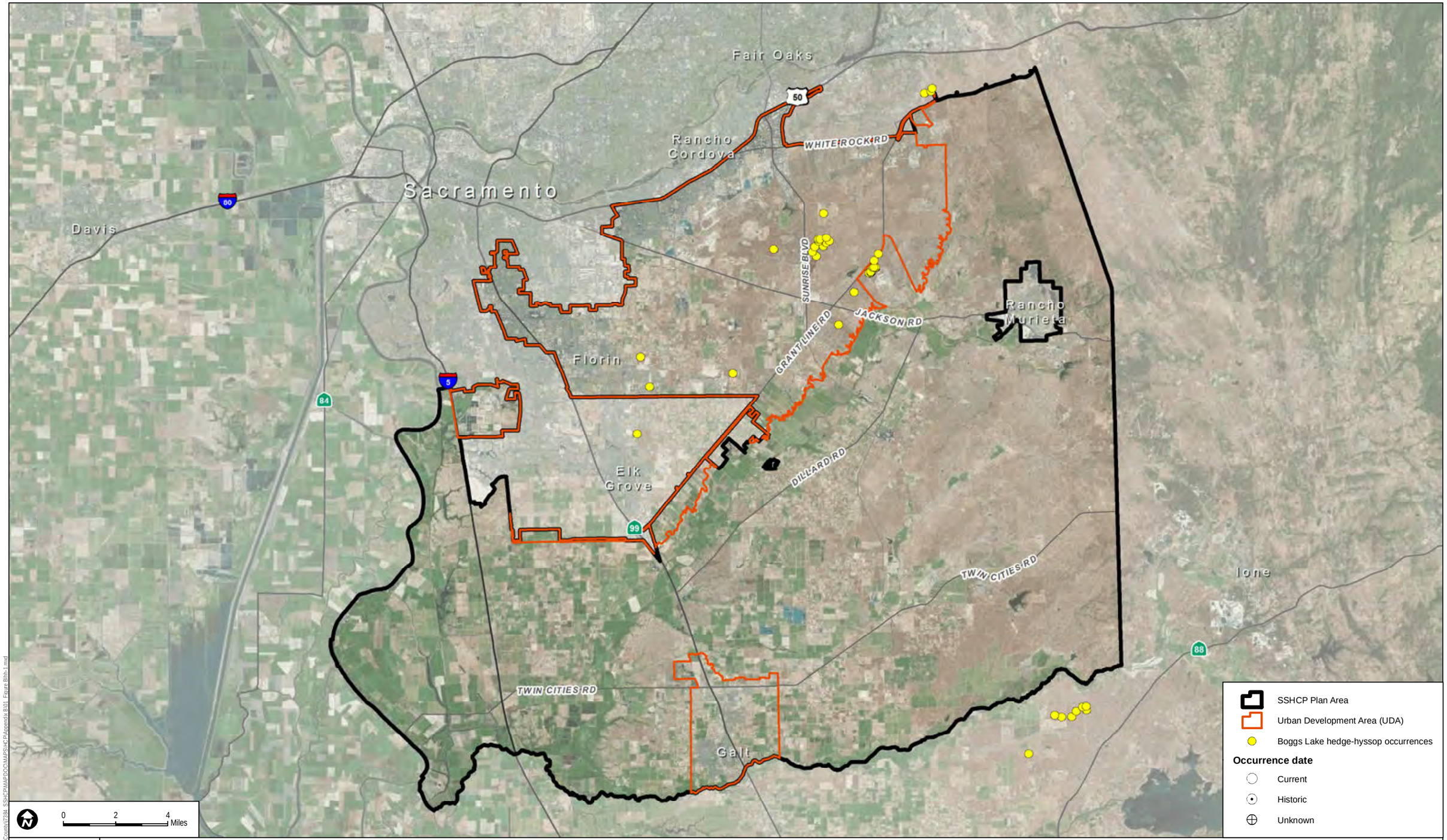
Unger, Ron. Senior Restoration Ecologist, EDAW, Sacramento California.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H. 1990. Life Histories of Vernal Pool Vascular Plants, In: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, CDFG 2012, Sugnet & Associates 1993, Jones & Stokes 2990

FIGURE BLHH-1

Boggs Lake Hedge-Hyssop Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\I2394 SSHCP\MAPS\CMAPS\HCP\Planning\Fig B101 Figure Blhh-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

3 AHART'S DWARF RUSH (ADR)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Ahart's dwarf rush (ADR)

(Juncus leiospermus ahartii)

Status USFWS: None

Status CDFG: None

Status CNPS: 1B.2



photo courtesy BCAG

3.1 Legal Status

Ahart's dwarf rush is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a list 1B.2 species by the California Native Plant Society (CNPS 2010). It has been assigned an R-E-D Code of 3-2-3, meaning it is distributed in one to several highly restricted occurrences, endangered in a portion of its range, and entirely restricted to California.

Being a CNPS List 1B plant species, Ahart's dwarf rush meets the California Department of Fish and Game's (CDFG) definition of a special plant though it has no formal protection status by the CDFG or United States Fish and Wildlife Service (USFWS).

3.2 Life History and Ecology

3.2.1 Species Description and Life History

Dwarf rush (*Juncus leiospermus* F.J. Herm.), is represented by two varieties, var. *leiospermus* (Red Bluff dwarf rush), and var. *ahartii* (Ahart's dwarf rush), both of which are rare and endemic to California. The species is an annual in the rush family (Juncaceae) that is restricted to wetlands possessing vernal pool-type hydrology.

This inconspicuous species exhibits a tufted growth form, with a basal cluster of thread-like leaves exceeded by one to several erect, 1.9 to 11.6 centimeter-long, stiff, thread-like stems. One to seven flowers are born together in a compact cluster at the tip of each stem. The flower clusters are subtended by small (0.7 to 2.4 millimeters) bract scales. Flowers are small (1.5 to 4.6 millimeters) and comprised of 6 to 10 dark brown, pointed scales, three stamens, and a single

APPENDIX B (Continued)

ovary with a long (1.5 to 3 millimeters), three-branched style. The mature fruit capsule is similar to the flower scales in color and is equal, or slightly exceeding them in length. Ahart's dwarf rush (*J.leiospermus* var. *ahartii*) is distinguished from the rare Red Bluff dwarf rush (*J.leiospermus* var. *leiospermus*) on the basis of the former having only one to two flowers per cluster, overall smaller size and fewer parts (Ertter 1986).

Other small annual rushes also occur in vernal pool habitat and may co-occur with Ahart's dwarf rush. Dwarf rush is distinguished from the closely related Yosemite rush (*J. triformis*) by the latter having slightly narrower stems (less than 0.4 millimeter), capsules shorter than flower scales, and flower scales that are unequal in length. Dwarf rush is most easily distinguished from toad rush (*J. bufonius* vars.) on the basis of having a simple versus a branched stem and terminal versus axillary flowers. Dwarf rush is readily distinguished from leafy-bracted dwarf rush (*J. capitatus*) by the former having a shorter inflorescence bract (0.7 to 2.4 millimeters versus five to 15 millimeters). Dwarf rush is distinguished from inch-high rush (*J. uncialis*) and vernal pool dwarf rush (*J. hemiendytus* vars.) by its comparatively long (1.5 to 3 millimeters) long style.

Ahart's dwarf rush, and annual vernal pool rushes in general, have received little attention from biologists or ecologists. Other than observations of field botanists and basic taxonomic and biogeographic treatments (Ertter 1986), the biology and ecology of Ahart's dwarf rush remains unstudied.

Since all vernal pool plant species share similar environmental selective pressures, they likely also share similar adaptive traits. For this reason, studies addressing the life history and ecology of other more common vernal pool plant species may provide some insight into the life history and ecology of Ahart's dwarf rush.

Ahart's dwarf rush shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to population's avoidance of the regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

The specific timing of the germination of Ahart's dwarf rush seeds relative to the timing of the vernal pool inundation cycle has not been studied or described. In general, a given vernal pool species may germinate either during the wetting phase or the inundation-phase of the vernal pool cycle (Keeley and Zedler 1998). Based on the preference of Ahart's dwarf rush for the outer margins of larger vernal pools, the margins of shallow vernal pools, and shallow swales (CDFG 2010; Dittes and Guardino pers. obs.) and its relatively early flowering date (late March), it might be expected that it germinates relatively early in the hydrological season during the wetting or early inundated-phase, in saturated, as opposed to inundated soil. Germination

APPENDIX B (Continued)

requirements, optima and the potential presence of seed dormancy for Ahart's dwarf rush have not been investigated.

One of the challenges posed to "deeply adapted" vernal pool plants is the need to photosynthesize and grow while submersed, and then transition into a terrestrial growth phase. Many vernal pool species exhibit an aquatic juvenile growth form that is different from the adult form. These morphological adaptations, not exhibited by Ahart's dwarf rush, facilitate light exposure and gas exchange under aquatic conditions, thus lengthening the growing season by maximizing growth while vernal pools are still inundated. The lack of this specialized dimorphism is further indicative of preference to the less-extreme inundation regimes of those encountered in the spectrum of vernal wetland types.

Dwarf rush flowers and sets seeds during the terrestrial phase of the vernal pool hydrologic cycle, typically in March and April (CNPS 2010). The very long style, and large stamens generally indicate an outcrossing breeding strategy (Hickman 1993), although breeding system and pollination strategies have not been investigated for this species. It is likely that these and other outcrossing annual *Juncus* are mainly wind-pollinated, although the potential for flower-visiting insects has not been studied.

Mature fruit capsules dehisce and release mature seeds by late spring to early summer (Dittes pers. obs.). Unlike some other vernal pool species (e.g., Orcuttiae grasses, pincushion navarretia), Ahart's dwarf rush does not appear to exhibit anti-dispersal adaptations, although the species often appears in small discrete aggregations amid larger areas of available habitat (Dittes pers. obs.). Natural dispersal of seeds, however limited, likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming ungulates (Griggs 1980).

The existence of a dormant soil seed bank is unknown for Ahart's dwarf rush. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

The population biology and genetics of Ahart's dwarf rush have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the highly limited number of

occurrences and the scattered geographical distribution, all Ahart's dwarf rush populations should be considered unique, and for the purposes of conservation, important genetic entities.

3.2.2 Habitat Requirements and Ecology

It is generally held that many of the endemic vernal pool plant species are relatively recent evolutionary derivations of more common and widespread upland progenitors (Stebbins 1976; Stone 1990; Raven and Axlerod 1978; Thorne 1984), likely including Ahart's dwarf rush. These neoendemic vernal pool species are thought to have evolved from terrestrial habitat into seasonally aquatic vernal pool habitat made available as the Mediterranean Climate developed and the inland Tertiary-age Sea dried.

In Eastern Sacramento County, the two Ahart's dwarf rush occurrences are associated with the Redding Gravelly Loam Series of the Arroyo Seco Formation. This soil series has a very gravelly hardpan approximately 28 inches below the surface and is strongly cemented with silica. These soils are typically acidic and conducive to the development of vernal pool hydrology).

Ahart's dwarf rush is strictly adapted to the vernal pool hydrologic cycle. It is of importance to conservation however, that in contrast to most of the more "deeply-adapted" vernal pool endemics, Ahart's dwarf rush occupies the more "flashy" hydrology of vernal pool margins, shallow vernal pools, and swales (Ahart pers. comm.; Dittes and Guardino pers. obs.; CDFG 2010). The closely related and comparatively more widespread Red Bluff dwarf rush is also known from vernally moist edges of groundwater seep areas as well. Quantified vernal pool dimensions are not given for any of the CNDDB occurrences.

Floristic associations provide further indication of preference for the more "flashy" portion of the spectrum of vernal pool hydrological cycles. In Butte County, Ahart's dwarf rush is most often observed with other "shallow pool" or "edge" species, including other annual rushes (toad rush; *Juncus bufonius*, leaf-bracted rush; *J. capitatus*, inch-high rush; *J. capitatus*), annual hairgrass (*Deschampsia danthonoides*), Sacramento Valley pogogyne (*Pogogyne zizyphoroides*), marigold navarretia (*Navarretia tagetina*), smooth cat's-ear (*Hypochaeris glabra*), hyssop loosestrife (*Lythrum hyssopifolium*), long-beaked hawkbit (*Leontodon taraxicoides*), cowbag clover (*Trifolium depauperatum*) and Fremont's goldfields (*Lasthenia fremontii*) (Dittes and Guardino pers. obs.; Ahart pers. comm.).

Although Ahart's dwarf rush is also recorded as occurring with the more "deeply-adapted" vernal pool endemics, including coyote thistle (*Eryngium castrense*), bractless hedge-hyssop (*Gratiola ebracteata*), tricolor monkey-flower (*Mimulus tricolor*), American pillwort (*Pilularia americana*), double-horned downingia (*Downingia bicornuta*), ornate downingia (*Downingia ornatissima*), white-headed navarretia (*Navarretia leucocephala*) and water

APPENDIX B (Continued)

pygmyweed (*Crassula aquatica*) (CDFG 2010), it usually is growing at the higher-drier edge of hydro-topographic position preferred by the latter species (Dittes and Guardino pers. obs.; Ahart pers. comm.). Interestingly, Ahart's dwarf rush is also known to do well on disturbed gopher mounds along the margins of the wetlands as well (Ahart pers. comm.; Dittes and Guardino pers. obs.; CDFG 2010).

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural areas, and ruderal habitats. Italian wild rye (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), two non-native facultative wetland species, typically dominate vernal pool portions of disturbed wetlands in the Central Valley and can be invasive around vernal pool margins and in smaller, more ephemeral vernal pool types. Similarly, long-beaked hawkbit (*Leontodon taraxicoides*), another non-native annual, can dominate the edges of vernal pool and the basins of smaller pools and swales. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Since Ahart's dwarf rush occupies the margins of pools and smaller pools and swales, it may be more susceptible to the effects of excessive growth of Italian wild rye, Mediterranean barley, long-beaked hawkbit, and thatch buildup, than many of the other "more deeply-adapted" vernal pool rarities. As a case in point, Ahart mentions that some populations of Ahart's dwarf rush and other vernal pool species in his area have diminished over the years with concomitant increase in cover of European annual grasses (Ahart 2003 and pers. comm.).

Specific interactions between livestock grazing and Ahart's dwarf rush have not been investigated empirically. Some regimes of livestock grazing have been shown to benefit the floristic composition of vernal pools and associated upland annual grassland. Vernal pools included within livestock exclosures have demonstrated a "simplification" of floral composition with a shift towards dominance by Italian wild rye and Mediterranean barley (Robins and Vollmar 2002; Dittes pers. obs.). Uplands that are not grazed can shift in dominance towards Medusa-head grass and yellow-star thistle (*Centaurea solstitialis*). Appropriate livestock grazing regimes can result in reduction of cover by weedy grasses and thatch and opening of habitat at vernal pool margins by hoof-pocking. This in turn increases micro-habitat heterogeneity and provides germination and colonization opportunities for other native vernal pool species.

Field observations indicate that annual rushes, and many other associated vernal pool annuals do well on gopher mounds and between deep hoof print depressions in wetter areas, and within the puddled hoof prints around drier margins (Dittes pers. obs.). It has also been observed though, that in some cases at the Vina Plains Preserve in Tehama County, excessive trampling of shallow

vernal pools can result in their obliteration as distinct topographical features, particularly on heavy clay soils (Schlising pers. comm.). Robins and Vollmer (2002) provide a recent review of information pertaining to livestock grazing in vernal pool-annual grassland ecosystems.

Timing of grazing appears more important than stocking rates in affecting persistence of some vernal pool rarities (Stone *et. al*. 1988; Robins and Vollmer 2002). During the period when pools are inundated and upland forage is still green and attractive (late fall to early spring), cattle tend to not congregate in pools, and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. Once the upland forage cures and the vernal pools are in the flowering and seed-producing terrestrial phase (mid-spring to early summer), moist pools become more attractive to livestock, and trampling pressures are increased. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect on most vernal pool annuals, and may enhance the habitat by further reducing thatch and exposing soil for the following growing season (Ahart pers. comm.).

Ahart's dwarf rush is small enough to escape grazing pressures by livestock (except perhaps sheep). The most vulnerable stage of Ahart's dwarf rush is probably after pool margins have dried and the plant is in flower, before seed matures. It likely will not attract grazers, but if trampled at this point in the life cycle, seed production may be limited. However, with many vernal pool species of such small stature, at least some individuals escape livestock trampling pressures during most years except under all, but the most severe grazing regimes.

Although none are specifically reported to co-inhabit vernal pools with Ahart's dwarf rush, several non-native weedy hydrophytes may present future problems. Mannagrass (*Glyceria occidentalis*), an aggressive weed of irrigated agriculture and degraded vernal pools, has already been reported as a potential problem at vernal pools in the region. Additional species to consider include rosy lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), swamp pricklegrass (*Crypsis schoenoides*), crabgrass (*Cynodon dactylon*) and paradox canary-grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), another native species, can also dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

3.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Ahart's dwarf rush are identified in Table ADR-1 and have been derived from input from local species experts.

APPENDIX B (Continued)

Table ADR-1
Essential Habitat Elements for Ahart's Dwarf Rush

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

3.3 Species Distribution and Population Trends

3.3.1 Range Wide Distribution

Presently, Ahart's dwarf rush is recorded from 10 CNDDB occurrences scattered throughout the Great Central Valley, from Calaveras County in the south to Tehama County in the north (CDFG 2010). These occurrences are all situated at sites ranging from 100 to 320 feet in elevation, and with the exception of the occurrence in Calaveras County (San Joaquin Valley Subregion) and the occurrence in Tehama County (North Coast Ranges Subregion), all lie within the Sacramento Valley Subregion of the Great Valley Region of the California Floristic Province (Hickman 1993).

3.3.2 Central Valley Distribution

The northernmost occurrence of Ahart's dwarf rush is located in Tehama County. Four occurrences are found in Butte County, one in the vicinity of the Oroville Municipal Airport, south of Chico and three on the Peter Ahart Ranch, near Honcut (CDFG 2010). The single occurrence in Yuba County is located south of Honcut Creek near the Butte County line. Two occurrences are located in central Sacramento County, and the southernmost occurrence is located in the northwest portion of Calaveras County (CDFG 2010).

3.3.3 Range within the Plan Area

Currently, there are two documented CNDDB occurrences of Ahart's dwarf rush in Sacramento County and the two not-yet-recorded occurrences, each of which is found within both the Plan Area and UDA (CDFG 2010; Mather Field date unknown; Wetland Research Associates 2004).

APPENDIX B (Continued)

Figure ADR-1 shows these occurrences. One of the occurrences (CNDDB occurrence #7) is located southeast of Rancho Cordova on private land southeast of the intersection of Kiefer Boulevard and Sunrise Boulevard. The other occurrence (CNDDB occurrence #8) is located approximately 1.75 miles to the northwest on Mather Field. The two occurrences not yet recorded are located on Mather Field north of Kiefer Boulevard.

It is important to note that owing to its small stature, preference for vernal pool margins and swales, early flowering season, and the area of remaining unsurveyed or partially surveyed habitat, moderate to high potential exists for discovery of additional populations of Ahart's dwarf rush within the Plan Area.

Table ADR-2 shows the soil series, geological formation and landform associations for the two Ahart's dwarf rush occurrences in Sacramento County that are recorded in the CNDDB. Generally, this species is associated with old terrace remnant alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene between 600,000 and 1,500,000 years ago. Though the distribution of the taxon is extremely disjunct, the range of the taxon in the Plan Area is considered to be all vernal pool habitats.

Table ADR-2
Extant CNDDB Occurrence Numbers, Distribution, Associated Soil Series And Landform Formations For Ahart's dwarf rush In Sacramento County

CNDDB Occurrence #	Quadrangle	Soil Series	Geological Formation and Landform
7	Buffalo Creek	Redding gravelly loam	Arroyo Seco Formation Remnant high terraces
8	Carmichael	Redding gravelly loam	Arroyo Seco Formation Remnant high terraces

3.3.4 Population Levels and Trends

Ahart's dwarf rush is known from a total of 10 CNDDB occurrences, all in California, including four in Butte County, two in Sacramento County, and one in each of Calaveras, Placer, Tehama and Yuba Counties (CDFG 2010).

Of the 10 documented occurrences presumed extant, one in Sacramento County (CNDDB occurrence #7) is listed as "Possibly Extirpated" (CDFG 2010). The other Sacramento County occurrence, presumed extant (CNDDB occurrence #8), was observed to support approximately 300 plants in 2001 (CDFG 2010). The Tehama County occurrence is reported as supporting 750 plants as of 2004. The Calaveras County population was observed to support approximately 100 plants among three vernal pools in 1987, the last time this population was recorded (CDFG

APPENDIX B (Continued)

2010). The Placer County occurrence, reported as supporting 45 plants in 1990, is on land proposed for development. The Yuba County occurrence was reported as supporting several hundred plants among three colonies in 1998 (CDFG 2010). The northernmost occurrence (CNDDB occurrence #4) was observed to support several hundred plants in the spring of 2003 (Dittes and Guardino pers. obs.). The occurrences on the Peter Ahart Ranch are presumed extant, but it and other vernal pool species in the area likely have diminished over the last few decades concomitant with an overall increase in range productivity and increasing abundance of weedy annual European grasses (Ahart pers. comm. 2003). Table ADR-3 shows the population estimates of the CNDDB occurrences.

Table ADR-3
Population Estimates for CNDDB Occurrences

CNDDB #	# of Pools Observed	Range of Population Estimates
7	Unknown	1999: 4 plants
8	Unknown	2000: 300 plants

It is impossible to determine the number of historically occurring Ahart's dwarf rush populations or the acreage of suitable habitat lost to historic agricultural and urban land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978); however, owing to habitat specificity, only a subset of the vernal pool habitat lost within the natural range of the species may have provided suitable habitat for Ahart's dwarf rush. Effects of historic livestock grazing combined with drought and habitat alterations relating to development of non-native annual grassland are unknown as well.

There has been no comprehensive effort to monitor any of the known populations of Ahart's dwarf rush. Numbers of individuals have not been recorded for the populations since their discovery and the overall population dynamics for this plant are unknown.

Studies involving other vernal pool plant rarities, including Orcuttiae grasses and Hoover's Spurge have demonstrated marked fluctuation in numbers of individuals within populations between years (Griggs and Jain 1983; Holland 1987; Alexander and Schlising 1997). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). It is not known however, if Ahart's dwarf rush exhibits a similar between-year pattern.

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Ahart's dwarf rush population. It is important to consider however, that in order

to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another critical aspect of population demography is the presence and nature of the soil seed bank, which is unknown for Ahart's dwarf rush.

3.4 Threats to the Species

Potential threats to Ahart's dwarf rush include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, hydrological alteration of sub-watersheds and associated vernal pool habitat, shifts in competitive interactions (hydrological mediated or invasive weedy species), inappropriate livestock grazing regimes (none, mid-spring rotations, sheep vs. cattle), recreational vehicle use, equestrian and pedestrian traffic, refuse dumping, windblown refuse accumulation, air pollution and global climate change.

Proposed development is a threat to one of the Sacramento County Occurrences (CNDDB occurrence # 7). This population is now listed as "Possibly Extirpated" (CDFG 2010). Proposed development of an aggregate mine was stated as a threat to the only other Sacramento County Occurrence (CNDDB occurrence #8) in 2000. This occurrence is now within the boundaries of the proposed Mather Field Vernal Pool Preserve. Off-road vehicle traffic, road construction, cattle grazing, surrounding development and a proposed subdivision are stated as threats for the single Placer County occurrence (CNDDB occurrence #3). Power line corridor maintenance activities are stated as a threat to the single Yuba County Occurrence (CNDDB occurrence #9). No threats are stated for the Calaveras County population (CNDDB occurrence #2). The Butte County occurrences in the vicinity of Honcut (CNDDB #1, #5, and #6) have no threats stated in the CNDDB. According to Ahart though (pers. comm. 2003), these populations may be experiencing a decline in vigor associated with increasing range productivity and increasing abundance of annual European grasses.

3.5 Data Gaps and Conservation Implications

Despite its distinctive appearance and extreme rarity, Ahart's dwarf rush has received little research attention from botanists or ecologists. Aside from general observations of field workers provided in the CNDDB and the taxonomic work of Ertter (1986), nothing else exists regarding the biology, ecology, pollinators, breeding system, population genetics, habitat relationships, population levels, trends or threats associated with this taxon. Pertinent data gaps, implications for conservation, and operating assumptions include:

3.5.1 Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Plan Area and elsewhere within the range of the species. In the Plan Area, discovery of new

populations may occur on the large dry-land ranchlands, public and quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of Sacramento County.

3.5.2 Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

Ahart's dwarf rush has a geographic association with old alluvial terraces possessing acidic soils primarily of the Redding Series. The exact nature of this relationship is however, unknown. It is unknown if soil pH or other edaphic factors influence Ahart's dwarf rush distribution and population vigor. It is possible that the presence of functioning vernal pools, regardless of landform, soil series and soil pH can provide suitable habitat.

3.5.3 Unknown Pollination Ecology

The pollination ecology of Ahart's dwarf rush has not been studied. Floral morphology (long style and style branches, exerted anthers) suggests an outcrossing breeding strategy. The inconspicuous scale-like flower parts and lack of nectar suggest wind pollination, as with most other graminoids (grasses, sedges, rushes, and other grass-like plants). Without knowing specific aspects of pollination ecology, it is difficult to ascertain the importance of associated uplands in the design and management of preserves supporting Ahart's dwarf rush.

It is well documented that specific co-evolved bee species are depended on by a guild of vernal pool plant species. Conservation of these vernal pool plant communities depends on inclusion of adequate areas of surrounding functioning upland habitat to maintain populations of the co-evolved ground-dwelling bees. Some suggest that buffers of up to ½-mile around vernal pools might be needed (Robin Thorp, e-mail to D. Burmester 2003).

3.5.4 What Constitutes Population Vigor, and How to Measure?

Population vigor will need to be monitored during the life of the SSHCP, yet population dynamics, including year-to-year variability in abundance, have not been studied for Ahart's dwarf rush. The existence of a dormant soil seed bank, a critical contributor to population stability in some other vernal pool species, is unknown for Ahart's dwarf rush as well. Other rare vernal pool species have been shown to be highly variable in abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors contributing to year-to-year population fluctuations may be difficult to identify (Alexander and Schlising 1997). Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

APPENDIX B (Continued)

3.5.5 Specific Hydrological Requirements of Ahart's dwarf rush

Data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting Ahart's dwarf rush populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor and/or assess hydrological suitability of Ahart's dwarf rush-vernal pool habitat within established preserves. Similarly, assessment of potentially suitable Ahart's dwarf rush habitat for preserve establishment or for detection of the species at this time must rely on generalities.

3.5.6 Baseline Hydrological Trend of Pools and Existing Indirect Effects

Extant Ahart's dwarf rush populations may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown. Baseline Ahart's dwarf rush conditions for the SSHCP may not be pristine, so if trends in vigor or habitat quality become apparent during the 50-year period or at some time beyond, it may be difficult to attribute trend to any specific management activity.

3.5.7 Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990).Proposed preserve designs may not afford complete protection to the hydrological systems that support Ahart's dwarf rush and other species assemblages dependant on them.

3.5.8 Definition of Appropriate Scale Ahart's dwarf rush-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective Ahart's dwarf rush-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark *et. al*. 1998).

APPENDIX B (Continued)

3.5.9 Determination of an Appropriate Livestock Grazing Regime

Specific grazing regimes have not been formulated for annual grassland pasture systems with Ahart's dwarf rush-occupied pools, although grazing and monitoring of vernal pool-annual grassland stems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002).

Ahart (2003 and pers. comm.) emphasizes the need to graze vernal pool-annual grasslands, particularly those supporting Ahart's dwarf rush, for the purposes of maintaining vernal pool diversity and the "edge" habitat that Ahart's dwarf rush and many of the showy vernal pool annuals require. This upper, drier topographic-hydrologic microhabitat has been termed the "transition zone" between the wetter vernal pool habitat and the surrounding upland annual grassland matrix (Schlising and Sanders 1982).

Since Ahart's dwarf rush occupies small and/or shallow vernal pools, or the edges of larger pools, management of Italian wild rye and Mediterranean barley in and around pools and Medusa-head grass in surrounding uplands should be of particular management concern. Ahart states that for this species, it is better to err on the side of overgrazing (Ahart pers. comm. 2003).

Presently, Witham et al. are formulating site-specific livestock grazing regimes for annual grassland-vernal pool systems in an area of Sacramento County. Livestock grazing regimes in Ahart's dwarf rush-vernal pool preserves covered under the SSHCP will tier towards the results of this work, as well as to the specific needs of Ahart's dwarf rush. Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

3.5.10 Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, bindweed, lippia, paradox canary-grass, long-beaked hawkbit, cocklebur and cattails. None of these are reported to co-inhabit Ahart's dwarf rush-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in Ahart's dwarf rush-occupied pools over time. Italian Rye and Mediterranean Barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to Ahart's dwarf rush, owing to the latter's preference for small to medium size vernal pools. Similarly, Medusa-head grass in uplands should be monitored and controlled. Potential competitive interactions with these species may affect the vigor of Ahart's dwarf rush populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect Ahart's dwarf rush populations.

APPENDIX B (Continued)

3.5.11 Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine design preserves for multi-species conservation. Suitability of Ahart's dwarf rush habitat for supporting other rare plant species has not been specifically addressed. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well. Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime after May 15 may be compatible with or even benefit some Ahart's dwarf rush-associated pool complexes, but may be detrimental to other later-flowering species depending on those complexes (e.g., slender Orcutt grass).

3.5.12 Genetic Variation (Spatial and Temporal [Seed Bank], Genetic Drift, Genetic Bottlenecks)

Population genetics for Ahart's dwarf rush are completely unknown. Current limitations in our understanding of Ahart's dwarf rush population genetics have little immediate conservation implication, given the extreme rarity of Ahart's dwarf rush.

If experimental inoculation of pools is proposed as part of the SSHCP, appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are consistent with what we know and do not know about Ahart's dwarf rush ecology and population genetics.

3.5.13 Critical Population Size

In conservation biology, critical population size is usually defined as a statistical probability over time, or model that describes the minimum number of individuals required for a population to maintain itself through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since Ahart's dwarf rush is an annual species, its population sizes are known to be highly variable from year to year, and the soil seed bank constitutes an important demographic component of the population, definition and assessment of a critical population size is impracticable and lacks ecological meaning.

Knowledge of critical population size provides an ecologically meaningful and quantifiable benchmark for adaptive management purposes (e.g., if monitored populations drop to within 30 percent of critical population size, site-specific analysis, appropriate management changes and

additional monitoring will occur). This is not possible for annual species, so other measurable benchmarks are needed.

3.5.14 Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is completely unknown for Ahart's dwarf rush. There have been no studies addressing the presence of a soil seed bank, seed dormancy or longevity. From the perspective of conservation, knowledge of site specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

3.5.15 Unknown Aspects of Experimental Inoculation

Since there are so few natural populations of Ahart's dwarf rush in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied Ahart's dwarf rush habitat, create meta-population structure at extant occurrences where single pools may support the species, and ensure existence should any natural populations become compromised. Uncertainties regarding the political ramifications and ecological effectiveness of experimental inoculation lead the conservation community and agencies to not consider experimental inoculation as an appropriate conservation goal. Given the extreme rarity of this species though, this option may need reconsideration at some point in time.

3.5.16 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter. ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant Ahart's dwarf rush occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Ahart's dwarf rush, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect Ahart's dwarf rush and other native plant species.

3.5.17 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in

temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology. It is likely that given the expected global climate trends, a vigor response of some kind could be expected for Ahart's dwarf rush populations within the implementation period of this HCP, or at some time beyond.

3.6 Literature Cited

Ahart, L. 2003. Thoughts on *Juncus leiospermus* var. *ahartii*. Unpublished note given to John Dittes.

Ahart, Lowell. Retired Rancher, Botanist, Oroville, California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. *In*: Castri, F di, Mooney, H.A. (eds) Mediterranenan type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2000. Biological information-Slender Orcutt Grass. Accessed online October 26, 2002 at http://www.dfg.ca.gov/hcpb/species/jsp/more_info.jsp?specy=plants&idNum=178.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

APPENDIX B (Continued)

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

Day, A.G. 1993. New taxa and nomenclatural changes in *Allophyllum, Gilia*, and *Navarretia* (Polemoniaceae). *Novon* 3(4): 331-340.

Day, AG. 1995. Sessile-flowered species in the Navarretia leucocephala group (Polemoniaceae). *Madrono* 42(1):34-39.

DeVilla, Bill. Consultant, Owner Ecosystems West, Ben Lomond, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Ertter, B. 1986. The Juncus triformis complex. *Memoirs of the New York Botanical Garden,* 39:1-90.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. *In* Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

APPENDIX B (Continued)

Griggs, F.T. 1981. 1981a. Life histories of vernal pool annual grasses. *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management. *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3 or 4) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

APPENDIX B (Continued)

Jones & Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Slender Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1981. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*, 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Keeley, J.E. and P.H. Zedler. 1998. Characterization and Global Distribution of Vernal Pools. Pp. 1-14 *in*: C.W. Whitham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, CCA. 1998.

Leidy, R.A. and E.G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones & Stokes, Sacramento, California.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18:1 pp. 18-29.

APPENDIX B (Continued)

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J.R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. *American Journal of Botany* 69: 1082-1095.

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. *Fremontia* 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. Soil Survey of Sacramento County, California. April. U.S. Department of Agriculture. Sacramento, California.

Stebbins, G.L. 1976. Ecological islands and vernal pools. *Fremontia* 4(3):12-18.

Stone, R.D., 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment. Pp. 89-108 *in:* D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants: their habitatand biology. Studies from the Herbarium Number 8, California State University, Chico, California.

Stone, Douglas. Ph.D. Candidate, University of California, Berkeley, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

The Nature Conservancy (TNC). 2000. Effects of Presribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Thorne, R.F. 1984. Are California's vernal pools unique? Pp 1-8 *in:* S. Jain and P. Moyle (Editors). Vernal pools and intermittent streams. Institute of Ecology, University of California, Davis, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Restoration Ecologist EDAW, Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1997. Determination of Endangered Status for *Orcuttia pilosa, Orcuttia viscida, Tuctoria greenei* and Threatened Status for *Castilleja campestris* ssp *succulenta, Chamaesyce hooveri, Neostapfia colusana, Orcuttia inaequalis* and *Orcuttia tenuis*. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

Wetland Research Associates. 2004. Mather Field Natural Resources Assessment Phase I&II, February 5, 2004. Sacramento, California.

Witham, C. W. 2006. 2006 Focused Field Survey Ahart's Dwarf Rush. Prepared for County of Sacramento. September 21, 2006. Sacramento, California.

Witham, C. W. 2007. 2007 Focused Field Survey Ahart's Dwarf Rush. Prepared for County of Sacramento. September 4, 2007. Sacramento, California.

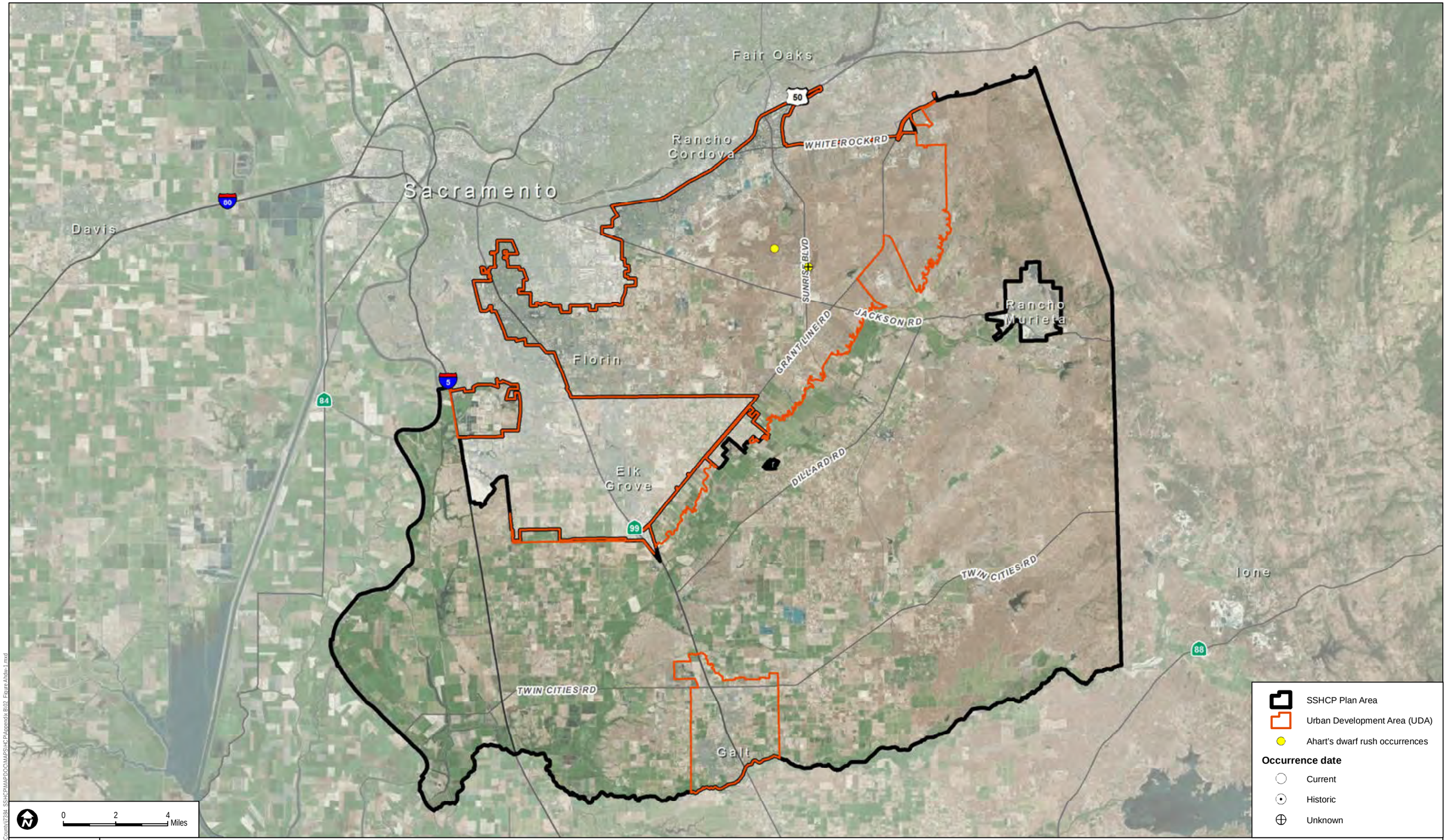
Witham, C. W. 2008. 2008 Focused Field Survey Ahart's Dwarf Rush. Prepared for County of Sacramento. September 2, 2008. Sacramento, California.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H., 1990. Life histories of vernal pool vascular plants. Pp. 123-146 *in:* D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants: their habitats and biology. Studies from the Herbarium Number 8, California State University, Chico, California.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CNDDB 2012

FIGURE ADR-1

Ahart's Dwarf Rush Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0294 SSHCP\MAPS\ArcMAPS\HCP\Appendix B\02_Figure A\fig-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

4 LEGENERE (LEG)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Legenere (LEG)

(Lgenere limosae)

Status USFWS: None

Status CDFG: None

Status CNPS: 1B.1



© 2000 John Game (Calphotos)

4.1 Legal Status

Legenere (*Legenere limosa*), a vernal pool endemic, is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a List 1B Species by the California Native Plant Society (CNPS) (CNPS 2010). It has been assigned an R-E-D Code of 2-3-3, meaning it is distributed in a limited number of occurrences, occasionally more if each occurrence is small, it is endangered throughout its range, and entirely restricted to California.

Being a CNPS List 1B plant species, legenere meets the California Department of Fish and Game (CDFG) definition of a special plant though it has no formal protection status by the CDFG or United States Fish and Wildlife Service (USFWS).

4.2 Life History and Ecology

4.2.1 Species Description and Life History

Legenere is an inconspicuous annual in the Bellflower family (Campanulaceae). This species has slender, sprawling, sometimes branched stems that can grow from 10 to 30 centimeters in length. These stems may also root at the nodes. Small one to three centimeter-long leaves are arranged alternately on the stem; the lower (submersed) ones are linear and early deciduous and the upper ones (emersed) are proportionally shorter, wider and oblong-lanceolate to oblanceolate (Mason 1957), or narrowly triangular (Hickman 1993; Oswald 1994). The inflorescence is a terminal raceme with flowers and fruit born on slender six to 20 millimeter-long stalks (pedicels). These flowers are alternately arranged along an often zig-zag central axis. Each flower stalk is

subtended by a six to 12 millimeter-long leaf-like bract. Flowers consist of an inferior ovary, five narrowly triangular green sepals that are 1/2 to 1/3 the length of the ovary, and five greenish-white to yellowish petals (two to four millimeter-long) that are unequally united into a two-lipped, five-lobed corolla with a tubular base. The lower flowers often lack petals entirely. The +3.5 millimeter-long obconic ovary elongates as it matures, eventually becoming a cylindrical fruit that reaches six to 10 millimeter in length and one to two millimeter diameter.

Legenere is a monotypic genus with no close relatives in North America Stone (1990). When in full fruit and without petals present however, legenere might be confused with potentially co-occurring with downingia (*Downingia* spp.). Mature downingias, however, lack the often up-curved, narrow pedicel (stalk) that subtends each cylindrical fruit. Downingias also do not exhibit the often zig-zag central axis of the inflorescence.

The genus *Legenere* has received little empirical study from biologists or ecologists and other than basic taxonomic and biogeographic treatments, legenere remains mostly unstudied. Ecological information resulting from observations of field botanists exists primarily as a result of land management and Agency-related resource surveys (Holland 1983; Platenkamp 1998; CDFG 2010).

4.2.1.1 Ecological Life Cycle

Legenere shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to the population's avoidance of the regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

4.2.1.2 Seed Germination

The specific timing of germination of legenere seeds relative to the timing of the vernal pool inundation cycle has not been described in detail. Seeds are reported to germinate under water in late February to April (Holland 1983). Seed longevity, dormancy characteristics, germination requirements and germination optima for legenere have not been investigated.

4.2.1.3 Vegetative Growth

One of the challenges to many vernal pool plant species is optimization of physiological processes in both the early season aquatic and later season terrestrial phases of the vernal pool cycle. For legenere, the principal structural adaptation to amphibious growth appears to be production of thin linear aquatic leaves, and thicker, proportionately wider aerial leaves. Although not determined for legenere, it has been shown in other amphibious vernal pool plants that the aquatic leaves lack both waxy cuticle and stomates, in this respect differing from adult

aerial leaves (Keeley 1990). These juvenile leaves optimize photosynthesis in the aquatic environment and maximize growth while vernal pools are still inundated, thus lengthening the vernal pool-growing season.

4.2.1.4 Reproduction

Legenere flowers and sets seeds during the dry-down phase of the vernal pool hydrologic cycle, sometimes while shallow water or inundated soil remains in the deepest parts of the pool basin (Dittes pers. obs.). Flowering and fruit maturation occurs from April through June (CNPS 2010; CDFG 2010), and likely varies by vernal pool depth/ponding duration and conditions of the season. Although pollination and breeding experiments have not been carried out for legenere, the reduced white flowers and flowers without corollas suggest a self-pollinating breeding system. Oswald (1994) has observed completely cleistogamous plants (flowers never open) in the Northern Sacramento Valley, which further indicates self-compatibility. Plants typically produce from several to 10 or more fruit, with each fruit containing up to 20 small smooth brown seeds (Holland 1983).

4.2.1.5 Dispersal

Short-distance seed dispersal in legenere appears to be naturally limited by the mature fruit capsule, which only partially opens at its apex. Seeds can remain in the mature capsule after disintegration of the mother plant, potentially being transported by flowing water during the following fall-winter inundation phase (Holland 1983). Seed dispersal is naturally limited in a suite of other vernal pool plant species. This adaptive trait is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974, 1980; Zedler 1990). It should be noted though, that at several occurrences, legenere is recorded to inhabit artificially excavated depressions, drainage ditches and created or enhanced wetlands within occupied vernal pool landscapes (CDFG 2010), thus indicating capacity for short-range, between pool dispersal.

Evidence of long-distance dispersal and colonization exists in the overall geographic distribution of this species in northern California. Natural dispersal of legenere seeds likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming native ungulates (Griggs 1980).

4.2.1.6 Seed Dormancy

Seed dormancy and a stored soil seed bank is indicated by observation of multi-year periods with insufficient precipitation where legenere plants were absent, followed by reappearance

during following favorable-hydrology growing seasons (Holland 1983; CDFG 2010). Seed longevity and seed abundance in the soil has not been investigated. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

4.2.1.7 Population Genetics

Population genetics of legenere have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. In general, self-pollinating species tend to exhibit low levels of intrapopulation variation and a high degree of between population divergences. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the limited number of occurrences in the Plan Area and the scattered geographical distribution, all intra-pool legenere populations should be considered unique, and for the purposes of conservation, important genetic entities.

4.2.2 Habitat Requirements and Ecology

4.2.2.1 Biogeography and Landform Relations

Legenere is strictly associated with the vernal pool-type hydrologic cycle. Over its geographic range, this species is found in several physiographic/edaphic settings, including northern basalt, northern claypan, northern hardpan, northern volcanic ashflow, and northern volcanic mudflow vernal pools (Holland 1983). In Sacramento County, legenere is associated with vernal pools located on various geologic surfaces, including the Laguna, Mehrten, Riverbank, Undifferentiated Surficial Alluvial Deposit and South Fork Gravels. For this reason, it is more likely that presence of wetland habitat with suitable vernal pool-type hydrology is a more important factor in determining the geographical distribution of this species than is geologic surface or soils. All well-developed vernal pools, regardless of landform association, should be considered potentially suitable habitat for legenere.

4.2.2.2 Hydrology Relations

Legenere is a strict endemic of the vernal pool hydrologic cycle. This species grows in well-developed vernal pools and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies (small lakes, ponds, stock ponds), and basins within seasonal drainages (Holland 1983; CDFG 2010). Legenere has been reported to inhabit vernal wetlands ranging in size from 40 square feet to 100 acres (Holland 1983). Topographical position within

pools and associated plant species indicate tolerance of, or preference for, the more extreme (longer-duration) inundation regimes encountered in vernal wetlands. It is interesting to note however, that in the larger/deeper pools encountered by Holland (1983), legenere was reported as not inhabiting basin positions deeper than eight inches ponding depth.

4.2.2.3 Biological Community Relations

Floristic associations provide further indication of preference for more extreme vernal pool hydrological cycles. Legenere most frequently co-occurs in micro-sites with smooth goldfields (*Lasthenia glaberrima*) and common spikerush (*Eleocharis macrostachya*) (CDFG 2010). Both are typically associated with well-developed large or deep pools with longer periods of inundation, as well as with vernal marshes, permanent marsh edges and the seasonally fluctuating margins of stockponds. Most rare plant species found with legenere are also inhabitants of pools with longer duration inundation, including slender Orcutt grass (*Orcuttia tenuis*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), and Sanford's arrowhead (*Sagittaria sanfordi*). Other associates indicative of well-developed vernal pool hydrology include three-sepaled buttercup (*Ranunculus bonariensis* var. *trisepalus*), coyote thistle (*Eryngium castrense*, *E. vaseyi*), bractless hedge-hyssop (*Gratiola ebracteata*), downingias (*Downingia bicornuta*, *D. cuspidata, D. ornatissima*), flowering quillwort (*Lilaea scilloides*), and American pillwort (*Pilularia americana*).

Other vernal pool endemics reported as occurring with legenere include common inhabitants of shallower and/or smaller to medium-size vernal pools with shorter duration ponding, or the slopes and edges of larger or deeper pools. These species include Fremont's goldfields (*Lasthenia fremontii*), white-headed navarretia (*Navarretia leucocephala*), stalked popcorn-flower (*Plagiobothrys stipitatus*), bracted popcorn-flower (*P. bracteatus*), wooly marbles (*Psilocarphus brevissimus*), dwarf downingia (*Downingia pusilla*), annual hairgrass (*Deschampsia danthonioides*), and Douglas' meadowfoam (*Limnanthes douglasii*).

4.2.2.4 Non-Native Weed Relations

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye (*Lolium multiflorum*), and Mediterranean barley (*Hordeum marimum* ssp. *gussoneanum*), two non-native facultative wetland species, typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types and the margins of larger/deeper ones as well. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Since legenere occupies medium to larger or deeper vernal pools, it may not be particularly susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch build-up, as with the more deeply-adapted Orcuttiae grasses and Bogg's Lake hedge-hyssop.

Weedy hydrophytic species presently reported as growing with legenere include mannagrass (*Glyceria occidentalis declinata*) and lippia (*Phyla nodiflora*). Although not-yet reported to co-inhabit vernal pools with legenere, other non-native weedy hydrophytes may present future problems. These species include swamp pricklegrass (*Crypsis schoenoides*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), Bermuda grass (*Cynodon dactylon*), and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), a native species, can also become weedy and dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

4.2.2.5 Livestock Grazing Relations

In general, appropriately timed dry-pasture livestock grazing regimes are thought to be compatible with the persistence of vernal pool vegetation. Robins and Vollmer (2002) provide a review of information pertaining to livestock grazing in vernal pool ecosystems.

Livestock grazing is reported as a threat at a number of populations (CDFG 2010), however many extant populations of legenere inhabit long-operating cattle ranches. Persistence in un-irrigated pasture systems indicates tolerance for at least some level of grazing. In most cases, timing of livestock grazing is likely more important than stocking rates in affecting persistence of legenere, as it is for the Orcuttiae grasses (Stone et al. 1988). During the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools, and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. As the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. Excessive trampling and grazing during this period may negatively affect legenere, and other vernal pool species. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect on legenere.

It should be noted however, of all vernal pool rarities, legenere is the only one with a decumbent or sprawling habit, and it tends to intermingle with a comparatively succulent mass of intertwined smooth goldfields (*Lasthenia glaberrima*) stems. This growth habit, combined with typically low population numbers may make legenere somewhat more susceptible to inappropriately timed livestock grazing. For most other vernal pool annuals, small stature and high plant densities ensure that in all but extreme cases, a portion of every year's cohort escapes destruction, matures, and sets seed.

APPENDIX B (Continued)

4.2.2.6 Disturbance Response

With exception to persistence of some populations within operating ranches, little is known about the potential response of legenere to other disturbances. One wetland in Sacramento County, observed to support up to 1,000 to 10,000 plants in 1991 (CNDDB occurrence # 33), has been "…disked annually for firebreak" (CDFG 2010). Another "large vernal pool" in Tehama County, "ripped and filled in Fall of 1994," was observed to support an estimated 1,000 legenere plants in 1995 (CDFG 2010).

Populations of several other rare vernal pool species, including Orcuttiae grasses and dwarf downingia, as well as more common species, may persist despite periodic disking of their resident pools over decades (Hoover 1941; Crampton 1959; Stone et al. 1988; Ahart pers. comm.; Kelsey pers. comm.; Dittes pers. obs.; CDFG 2010). It is exceedingly important to note that in these cases, disking is not so deep as to significantly affect the subtending impermeable layer or the vernal pool hydrological cycle. In addition, the disking is performed in the late summer or fall months in preparation for dry land winter grain crops, so vernal pool plants have set seed and dried. If this disking occurs earlier in the growing season, before seeds are mature, over consecutive years population extirpation is probable through exhaustion of the soil seed bank.

4.2.2.7 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for legenere are identified in Table LEG-1 and have been derived from input from local species experts.

Table LEG-1
Essential Habitat Elements for Legenere

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

APPENDIX B (Continued)

4.3 Species Distribution and Population Trends

4.3.1 Species Distribution

Legenere was first collected in 1890 from Solano County, California. Since that time, 61 occurrences have been recorded in the California Natural Diversity Data Base (CNDDB) (CDFG 2010), ranging from Santa Clara County in the south to southern Shasta County at the northern edge of the Great Central Valley. Legenere occurrences are distributed among four of the Geographic Sub-regions of the California Floristic Province, as described by Hickman (1993), including the San Joaquin Valley, Sacramento Valley, Inner Coast Range and Cascade Range Foothills. Elevations of legenere occurrences range from one to 880 meters (three to 2,887 feet) (CNPS 2010).

Sacramento County has the largest number of legenere occurrences with 23 of the 61 occurrences (38 percent) represented. Solano County has the second largest number with 12 occurrences (~20 percent), followed by Tehama County with five occurrences reported (~eight percent). The remaining 21 occurrences are found in Lake, Placer, Yuba, , Sonoma, Alameda, Napa, Santa Clara, Shasta, San Mateo, San Joaquin and Stanislaus Counties which each have three or fewer occurrences (CDFG 2010).

Legenere's comparatively wide geographic and elevation distribution may partially reflect comparatively broad habitat requirements, or preference for a more commonly occurring vernal pool hydro-period. It may also reflect a higher propensity for seed dispersal by waterfowl, or even a different "biogeographic legacy" (e.g., timeline of evolution and geographic distribution of ancestral taxon).

4.3.1.1 Central Valley Distribution

The Central Valley supports 52 (85 percent) of the 61 recorded legenere occurrences. The two southernmost occurrences, one of which is extirpated, are located in the Central Valley in northern San Joaquin County, approximately three miles southeast of the City of Galt. The next occurrence to the north is in southern Sacramento County, located approximately 7.5 miles away, just south of the Cosumnes River. An additional 22 occurrences are recorded from Sacramento County, these being widely distributed from near Interstate 5 near the western edge of the county, to the vicinity of Arkansas Creek along the eastern county line, to just northeast of Rio Linda, near the county's northern boundary (CDFG 2010).

Another population center, comprised of 12 clustered occurrences is located approximately 15 miles to the west in Solano County. A gap of approximately 12 miles exists between the northernmost Sacramento County occurrence and the two closely situated occurrences in Placer County. Another two occurrences are located approximately 19 miles further north of the Placer

County occurrences in southwest Yuba County. A distance of approximately 70 miles separates the southernmost of the two Tehama County occurrences from the Yuba County occurrences to the south. In Tehama County, the southern most of the two occurrences is located between Corning and Black Butte Lake in southern Tehama County, and the other is located approximately 15 miles to the northeast, west of the Sacramento River near Gerber. The northernmost Central Valley legenere population is comprised of a single occurrence southeast of Redding at the Stillwater Plains (CDFG 2010). Although suitable habitat exists in Butte County, legenere has not yet been encountered there.

4.3.1.2 Range within the Plan Area

Of the 23 CNDDB legenere occurrences presently known in Sacramento County, 21 are located within the Plan Area (Figure LEG-1). The two outlying occurrences, one of which is extirpated, are located near the northern Sacramento County line, in the vicinity of Rio Linda (CNDDB occurrences #32 and #33). Of the 21 extant occurrences in the Plan Area, 15 are located within the UDA, and six are outside (CDFG 2010). One additional legenere occurrence not yet recorded in the CNDDB is located within the UDA (within the Sunrise-Douglas Mitigation Bank).

Within the UDA, the western-most CNDDB occurrence, located within the 2,465-acre Beach Lake Mitigation Site on the south side of Laguna Creek, is comprised of an unspecified number of vernal pools (CNDDB occurrence #41). Another occurrence is located approximately 3.5 miles to the east on private land, northeast of the intersection of State Highway 99 and Sheldon Road. This occurrence (CNDDB occurrence #31) is comprised of an unspecified number of occupied vernal pools as well (CNDDB 2010). A distance of less than two miles separates occurrence #31 from its nearest neighbor (CNDDB occurrence #27), located northwest of the intersection of Waterman and Bond Roads. Occurrence #27, comprised of five occupied natural pools and five occupied created pools, is located on private land (CDFG 2010). Another occurrence, supporting three colonies, is located on private land, approximately 0.75 miles to the east, northeast of the intersection of Waterman Road and Bond Road (CNDDB occurrence #30). Two occurrences, situated within 0.75 mile of each other, are located on the 320-acre Gene Andel Park, approximately five miles northeast of CNDDB occurrence #30. One of these (CNDDB occurrence #28) is comprised of four occupied vernal pools; the other (CNDDB occurrence #29), located approximately 1.3 miles to the north, is comprised of two colonies associated with vernally wet depressions along a seasonal drainage (CDFG 2010).

Four CNDDB occurrences are located three to four miles to the north of occurrence #29, in association with Mather Air Force Base (AFB); all are near the southern boundary, north of Kiefer Blvd. The westernmost of these occurrences (CNDDB occurrence #44), is comprised of four occupied vernal pools. The next occurrence to the southeast, located approximately one-mile distant within the 700-acre Mather Regional Park, is comprised of two occupied vernal

pools (CNDDB occurrence #45). The two easternmost of the four Mather AFB occurrences, each support one occupied vernal pool (CNDDB occurrences #46 and #47) (CDFG 2010).

An additional occurrence, not yet registered in the CNDDB, is located east of Mather Field, northeast of the intersection of Sunrise Boulevard and Kiefer Boulevard (Figure LEG-1). This occurrence, comprised of 12 occupied vernal pools, is included within the 400-acre Sunrise-Douglas Mitigation Bank (Sugnet and Associates 1998). Another occurrence, not yet registered in the CNDDB, is located within the UDA to the east (Cordova Hills Survey *date unknown*) and another occurrence is located outside the UDA in the southeastern portion of the Plan Area at Howard Ranch (TNC *date unknown*).

In Sacramento County, nine of the 23 legenere occurrences (39 percent) are associated with River Bank Formation. This Formation consists of alluvial deposits associated with the Sacramento, American and Cosumnes Rivers. Eight other legenere occurrences (40 percent) are associated with Redding and Red Bluff/Redding soils of the Laguna Formation. This geological landform is comprised of remnant old-terrace alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene, between 600,000 and 1,500,000 years ago. Laguna Formation and associated soils are strongly associated with the distribution of vernal pools. It is significant to note that owing to the diminutive size of the species, its ability to inter-mingle with more common species, and the area of unsurveyed or partially surveyed area of Riverbank and Laguna Formation, other occurrences are likely to be present in Sacramento County. In addition, well-developed vernal pools on landforms other than Riverbank and Laguna could provide suitable habitat. Though the distribution of the species is extremely disjunct, the range of the species in the Plan Area is considered to be all vernal habitats, seasonal wetlands, and seasonal impoundments.

4.3.1.3 Population Levels and Trends

Of the 61 documented CNDDB occurrences, six are now reported as "extirpated" (10 percent), including one occurrence in each of Sacramento County (CNNDB occurrence #32), Placer County (Occurrence CNDDB #14), and Sonoma County (occurrence #8). An occurrence on the San Joaquin and Stanislaus County line (CNDDB occurrence #4) is reported as extirpated, as well as two occurrences in Solano County (occurrence CNDDB #2 and #3). A single occurrence in Lake County (occurrence CNDDB #9) is reported as "possibly extirpated" (CDFG 2010).

Population trends are listed as unknown from all occurrences statewide, with the exception of one occurrence in Placer County (decreasing) and one occurrence in Lake County listed as possibly extirpated (CDFG 2010). Population trends for all extant legenere occurrences in Sacramento County are reported as unknown. In all but three cases, only one estimate for population numbers is recorded (Table 3). Botanists making second visits to the other three sites

APPENDIX B (Continued)

did not observe any legenere plants during 1993 (CNNDB occurrence #5) and 1997 (CNNDB occurrences #46 and #47) (CDFG 2010).

It should be noted that legenere is an inconspicuous and relatively ephemeral species that easily escapes the notice of botanists; it lacks showy flowers, and it most frequently grows clambering and mixed with the stems of more common and superficially similar species. Given these considerations and the amount of unsurveyed or partially surveyed suitable habitat in the Plan Area, additional occurrences may have escaped notice during past surveys, and more populations likely remain to be discovered.

It is impossible to determine the number of historically occurring legenere populations lost or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978; Jones and Stokes 1990), however owing to habitat specificity (restriction to), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for legenere.

There has been no comprehensive effort to monitor all populations of legenere. In summary, the following population estimates for the Sacramento County occurrences have been recorded (CDFG 2010).

Table LEG-3
Legenere Population Estimates for Sacramento County

CNDDB Occurrence #	Occurrence # of pools observed	Range of population estimates
5	Streambed	1976: Locally common 1983: none
12	Large vernal pool (> 1 Acre)	1983: 1000+
13	Vernal pool (~ 1000 sq ft.)	1983: 100
21	Vernal pool Marsh	1991: >4100
22	Large vernal marsh	1991: 15
27	5 vernal pools and 5 created depressions	1991: 1000's
28	4 vernal pools	1988: <100
29	Ephemeral drainage	1988: <100
30	Seasonal wetland vernal pool	1991: 300+
31	Vernal pools	1993: 2500+
32	Artificial seasonal pond	1991: 150 1997: Site extirpated by subdivision
33	Seasonal wetland	1991: 1000-10,000 1997: none (too late for surveys?)
40	Vernal pool	1995: 50
41	Vernal pools	1995: 300

APPENDIX B (Continued)

Table LEG-3
Legenere Population Estimates for Sacramento County

CNDDB Occurrence #	Occurrence # of pools observed	Range of population estimates
42	Vernal pools	1995: Unknown
44	4 vernal pools	1997: Several hundred
45	2 vernal pools	1997: Several hundred
46	1 deep vernal pool	1993: 1000 1997: none
47	1 vernal pool and swale	1993: 500 1997: none
50	Stock pond	2000: ?
60	Vernal pools	2002: thousands
62	Vernal pool	2002: ~1,000
63	Vernal pool	2003: 300-500

Source: CDFG 2010.

Observations, monitoring and research conducted on other rare vernal pool species indicate that abundance of individuals within populations may vary greatly between species, between populations within species, and within populations through years (Griggs and Jain 1983; Holland 1987; Alexander and Schlising 1997; CDFG 2010). For Orcuttiae grasses and other species, this extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for hairy Orcutt grass (*Orcuttia pilosa*), Hoover's spurge (*Chamaesyce hooveri*), and Greene's tuctoria (*Tuctoria greenei*) at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given legenere population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

4.4 Threats to the Species

Potential direct threats to legenere include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions; construction and maintenance of firebreaks, roads, and utility corridors; inappropriate livestock grazing regimes (later spring/summer rotations); feral

pigs, recreational target shooting, grassland fires; recreational vehicles; equestrian and pedestrian traffic; and refuse dumping (CDFG 2010).

Potential Indirect threats to legenere include hydrological alteration of sub-watersheds by surrounding developments and land uses; shifts in competitive interactions (hydrology-mediated or invasive weeds); windblown refuse accumulation; point and non-point source water pollution; air pollution, and global climate change.

4.5 Data Gaps and Conservation Implications

With exception to observations of field workers (Holland 1983; Platenkamp 1998; Preston pers. comm.; CDFG 2010), legenere has received limited research attention. Detailed studies have not been conducted regarding the biology, ecology, potential for cross pollination, population genetics, habitat relationships, population dynamics, trends or threats associated with the species. Pertinent data gaps, implications for conservation, and operating assumptions include the following.

4.5.1 Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Plan Area and elsewhere within the range of the species. In the Plan Area, discovery of new populations of legenere may occur on the large dry-land ranchlands, public quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of the County.

4.5.2 Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

In Sacramento County, legenere is associated primarily with the Riverbank and Laguna Formations, although it also occurs on Mehrten, Undifferentiated Surfucial Alluvial Deposits, and South Fork Gravels as well. Elsewhere within its range, legenere is associated with northern basalt flow, northern claypan, northern hardpan, northern volcanic ashflow, and northern volcanic mudflow vernal pool settings. Soil properties, including chemistry, likely vary substantially among these edaphic settings.

The exact nature of the relationship of Landform to species distribution is unknown. It is probable that functioning vernal pools with well-developed hydrology, regardless of landform, soil series and soil pH (except extremes) may provide suitable habitat for this species. In the Plan Area, vernal pools are most frequent and best developed on the Laguna Formation.

APPENDIX B (Continued)

4.5.3 Unknown Pollination Ecology

In general, plants with reduced flowers tend to be self-pollinators. In addition to plants producing flowers with no petals at all (Holland 1983; Mason 1957), Oswald (1994) mentions cleistogamous flowers present in northern California legenere populations. Pollination and breeding studies have not been conducted, so the potential for outcrossing and potential pollinator relationships are unknown.

4.5.4 What Constitutes Population Vigor, and How to Measure?

Population vigor will need to be monitored during the life of the SSHCP, yet population dynamics, including year-to-year variability in abundance, has not been described in detail for any of the occurrences in Sacramento County, or elsewhere. The majority of CNDDB occurrences do not have population estimates recorded for single year observations. Where given, estimates range from 15 plants to 10,000 individuals, although most vernal pools are reported to support fewer than 1,000 individuals. At several sites, observations made over multiple years indicate that legenere populations can vary between years, with low numbers present during years with sub-optimal hydrology (CDFG 2010). Other rare vernal pool species have been shown to be variable in population abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors contributing to year-to-year population fluctuations in rare species may be difficult to identify (Alexander and Schlising 1997).

Population vigor will be difficult to assess for this cryptic species, based on number of individuals present over short intervals of time. Trends occurring over longer periods may occur that are not discernable, and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

4.5.5 Specific Hydrological Requirements of Legenere

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting legenere populations in the Plan Area (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of legenere -vernal pool habitat within established preserves. Similarly, assessment of potentially suitable legenere habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing legenere populations are established, assessed and monitored over time, a more quantifiable definition of suitable legenere-vernal pool hydrology will emerge based on the new information.

APPENDIX B (Continued)

4.5.6 Baseline Hydrological Trend of Pools and Existing Indirect Effects

Extant legenere populations in the Plan Area may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Baseline legenere habitat conditions for the SSHCP may not be pristine, so if trends in vigor or habitat quality become apparent during the 50-year period or at some time beyond, it may be difficult to attribute trend to any specific management activity.

4.5.7 Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations are complex and may vary substantially by geography (Holland and Dains 1990).

Proposed preserve designs may not afford complete protection to the hydrological systems that support legenere and other species assemblages dependant on them.

4.5.8 Definition of Appropriate Scale Legenere-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective legenere-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes rare plant populations at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

4.5.9 Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the legenere-vernal pool preserves, primarily for purposes of upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with legenere-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002). It is important to note that legenere does persist though, in historically and contemporary operating livestock ranches and United States Forest Service (USFS) and Bureau of Land Management (BLM) grazing allotments. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species

in these systems. Since legenere occupies medium to large-size vernal pools, management of Italian wild rye and Mediterranean barley around the margins of vernal pools, and Medusa-head grass in uplands should be monitored and managed, but not primarily for the needs of legenere specifically.

Presently, Witham and others are formulating site-specific livestock grazing regimes for annual grassland-vernal pool systems in an area of Sacramento County (Witham pers. comm.). Livestock grazing regimes in legenere-vernal pool preserves covered under the SSHCP will tier towards the results of this work, as well as to the specific needs of legenere. Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

4.5.10 Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass and lippia. Others that may become problematic in the future include swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, paradox canary grass, hairy hawkbit, cocklebur, and cattails. None of these species are reported to co-inhabit legenere-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear and/or change in abundance in legenere -occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to legenere if they are allowed to completely dominate the vernal pool margins and adjacent uplands. Potential competitive interactions with these species may affect the vigor of legenere populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect legenere populations.

4.5.11 Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine to design preserves for multi-species conservation. Within Sacramento County, legenere has been reported as sharing vernal pools and wetlands with other rare plant species, including slender Orcutt grass, Bogg's Lake hedge-hyssop, and Sanford's arrowhead. Many of these pool complexes supporting rare species also provide habitat for rare invertebrates, amphibians, mammals, and bird species as well.

Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between July 1st and April 1st may be compatible with or even benefit some legenere-associated

pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

4.5.12 Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

Population genetics for legenere are completely unknown. For an overview of genetic considerations of vernal pool plant species, see Elam (1998). Current limitations in our understanding of legenere population genetics have little immediate conservation implication, given the relatively few number of legenere occurrences in the Plan Area.

If experimental inoculation of pools is proposed as part of the SSHCP, appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are consistent with what we know and do not know about legenere ecology and population genetics.

4.5.13 Critical Population Size

Critical population size is a statistical estimate of the minimum number of individuals required for a population to maintain itself over generations, through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since legenere is an annual species, its population sizes may be highly variable from year to year, and the soil seed bank constitutes an unknown demographic component of the population, definition and assessment of a critical population size is impracticable and lacks ecological meaning for the purposes of the SSHCP.

Knowledge of critical population size provides an ecologically meaningful and quantifiable benchmark for adaptive management purposes (e.g., if monitored populations drop to within 30 percent of critical population size, site-specific analysis, appropriate management changes and additional monitoring will occur). This is not possible for annual species, so other measurable benchmarks are needed.

4.5.14 Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is indicated by the observation of multiple-year periods during which plants were absent, followed by reappearance during a following favorable hydrologic season. Beyond observations though, there have been no empirical studies addressing the presence of a soil seed

bank, seed dormancy or longevity for legenere. From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

4.5.15 Unknown Aspects of Experimental Inoculation

Since there are few populations of legenere in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied legenere habitat, create meta-population structure at extant occurrences where single pools may support the species, and help ensure existence should any natural populations become compromised. Dispersal into, and colonization of artificially created or enhanced seasonal wetlands and vernal pools, irrigation ditches, trenches next to railroad tracks and a artificial ponds has been documented (CDFG 2010). Legenere appears to be a self-compatible species, which is a pre-adaptation for colonization.

Uncertainties regarding the political ramifications and ecological effectiveness of experimental inoculation lead the conservation community and agencies to not consider experimental inoculation as an appropriate conservation goal. Given the rarity of this species in the Plan Area though, this option may need reconsideration at some point in time.

4.5.16 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant legenere occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of legenere, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect legenere and other native plant species in the future.

4.5.17 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall

patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for legenere populations within the implementation period of this HCP, or at some time beyond.

4.6 Literature Cited

Ahart, Lowell. Rancher/Botanist, Honcut, Butte County, California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game, Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Cordova Hills. *Date unknown*. Cordova Hills Survey. Rancho Cordova, California.

APPENDIX B (Continued)

Crampton, B. 1959. The grass genera Orcuttia and Neostapfia: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Dains, V.I. 1988. Botanical Survey of the South Florin Park Site. June 21, 1988. Sacramento, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in*: C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus Orcuttia (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1980. Population studies in the genus Orcuttia (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Senior Restoration Ecologist, River Partners, Chico, California.

Griggs, F.T. and S.K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus Orcuttia. *Biological Conservation* 27: 171-193.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1983. Endangerment Status of *Legenere limosa* (Greene) McVaugh in California. Submitted to the California Natural Diversity Database, Department of Fish and Game. Sacramento, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In*: T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

APPENDIX B (Continued)

Holland, R.F., and V.I. Dains, 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in*: Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes 1998. Kiefer Landfill Wetland Mitigation Plan. Sacramento, California.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1994. Durta property wetland delineation and special-status species surveys. Prepared for Sacramento County Department of Public Works. Sacramento, California.

Kaye, T., W. Messinger, S. Massey, and R Meinke. 1990 Gratiola heterosepala: inventory and breeding system evaluation. Unpublished report to the U.S. Bureau of Land Management, Lakeview, Oregon.

Keeley, J.E., 1990. Photosynthesis in vernal pool macrophytes: relation of structure and function. *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Kelsey, Jon. Rancher/Botanist, Snelling, Merced County, California.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Mason H.L., and R. Bacigalupi. 1954. A new Gratiola from Boggs Lake, Lake County, California. *Madrono* 12:150-152.

Mason, H.L., 1957. Flora of the Marshes of California. University of California Press, Berkeley and Los Angeles, California.

Oswald, V.H. 2002. Selected Plants of Northern California and Adjacent Nevada. Studies from the Herbarium, California State University, Chico, Chico, California.

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

APPENDIX B (Continued)

Robins, J.D. and J.E. Vollmar. 2002. Livestock Grazing and Vernal Pools in Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. United States Department of Agriculture Soil Conservation Service. Soil Survey of Sacramento County, California. Sacramento, California.

Stone, R.D. 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment. *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Sugnet and Associates, Inc. 1993. Wetland Preservation and Compensation Plan Sammis Sunrise-Douglas. June 18, 1993. Sacramento, California.

Sugnet and Associates, Inc. 1998. Sunrise-Douglas Conservation Plan. Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

The Nature Conservancy (TNC). *Unknown date*. Howard Ranch Rare Species Survey. Sacramento, County, California.

Thorpe, R. 2003. Unpublished E-Mail to Daniel Burmester, CDFG.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

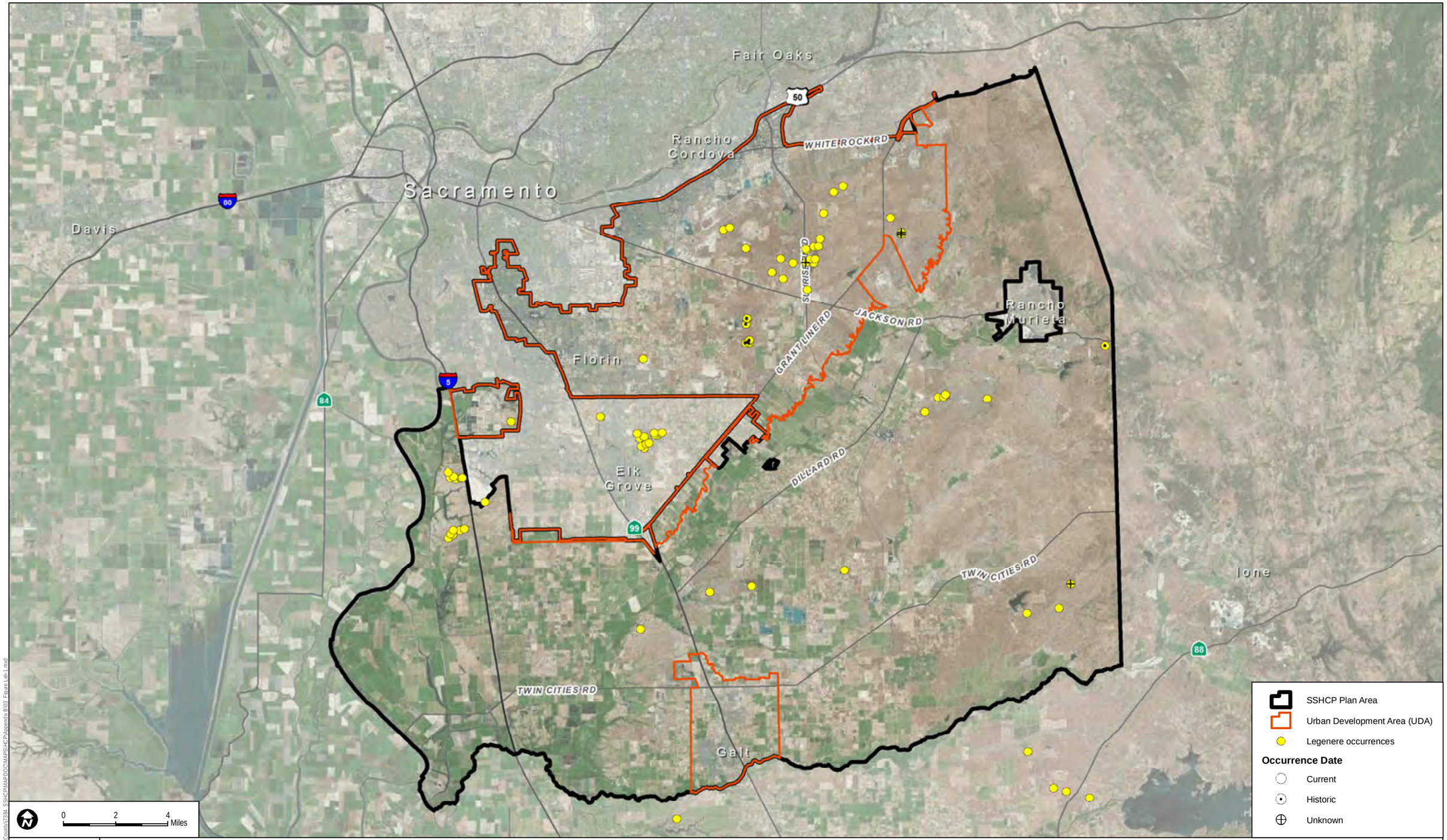
Unger, Ron. Senior Restoration Ecologist, EDAW, Sacramento California.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H. 1990. Life Histories of Vernal Pool Vascular Plants, *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CDFG 2012

FIGURE LEG-1

Legenere Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0284 SSHCP\MAPS\CM\MPS\HCP\Planning\B103_Figure1-leg1.mxd

INTENTIONALLY LEFT BLANK

5 PINCUSHION NAVARRETIA (PINA)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Pincushion Navarretia (PINA)
(Navarretia myersii)
Status USFWS: None
Status CDFG: None
Status CNPS: 1B.1

5.1 Legal Status

Pincushion navarretia *(Navarretia myersii)* is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a list 1B.1 species by the California Native Plant Society (CNPS 2010). It has been assigned an R-E-D Code of 3-3-3, meaning it is distributed in one to several highly restricted occurrences, endangered throughout its range, and entirely restricted to California.

Being a CNPS List 1B.1 plant species, pincushion navarretia meets the California Department of Fish and Game's (CDFG) definition of a special plant though it has no formal protection status by the CDFG or United States Fish and Wildlife Service (USFWS).

5.2 Life History and Ecology

5.2.1 Species Description and Life History

Pincushion navarretia, a strict vernal pool endemic, is an annual in the phlox family (Polemoniaceae). This distinctive species grows very low with aggregations attaining a mat-like appearance. The typically low-growing stems can reach up to two centimeters in height. Long thread-like leaves reaching from four to eight centimeters in length radiate from the base of the inflorescence. The inflorescence is comprised of five to 60, long (1.2 to 2.1 centimeters), tubular, sessile (stalkless) white flowers (Day 1993). These sessile flowers, long flower tubes and low-growing stems are features that most readily distinguish pincushion navarretia from the co-occurring and much more common white-headed navarretia (*N. leucocephala* ssp. *leucocephala*).

APPENDIX B (Continued)

Interestingly, pincushion navarretia specimens collected from the northern edge of its range (Sacramento and Amador Counties) possess slightly shorter flower tubes, and in Sacramento County, more lobing of the inflorescence bracts, than do specimens collected from the type locality in Merced County. Plants from these northern localities are considered to be morphologic and geographic intermediates between typical *N. myersii* ssp. *myersii* and the closely related and even more rare Small pincushion navarretia (*N. myersii* ssp. *deminuta* P.S Allen and Day), which only occurs in the Coast Ranges to the northeast (Day 1995).

Pincushion navarretia, and the genus in general, has received little attention from biologists or ecologists. Pincushion navarretia was included in an investigation of evolution of adaptive morphological and life history traits of vernal pool species, with the genus *Navarretia* used as a model (Spencer and Reiseberg 1998). Pincushion navarretia was determined to be one of the more highly adapted of the vernal pool specialists in the group. Other than this single study and basic taxonomic and biogeographic treatments, pincushion navarretia remains mostly unstudied.

Since all vernal pool plant species share similar environmental selective pressures, they likely also share similar adaptive traits. For this reason, studies addressing the life history and ecology of other more common vernal pool plant species may provide some insight into the life history and ecology of pincushion navarretia.

Pincushion navarretia shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to populations avoidance of the regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean Climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

The specific timing of the germination of pincushion navarretia seeds relative to the timing of the vernal pool inundation cycle has not been studied or described. In general, a given vernal pool species may germinate either during the wetting phase or the inundation-phase of the vernal pool cycle (Keeley and Zedler 1998). Seeds of the more common and related white-headed navarettia germinate under water in pool basins or on saturated soil at pool margins in the late fall and winter months, after the soil profile is saturated and vernal pools have filled (Crampton 1959; Dittes pers. obs.).

Germination requirements and optima for pincushion navarretia have not been investigated. It has been shown however, that seeds readily germinate in the laboratory by cold-stratifying imbibed seeds at two to four degrees Celsius in the dark for two weeks and then subjecting them to a cycle of 16 hours of light at 21 degrees Celsius and eight hours of dark at 15 degrees Celsius (Spencer and Rieseberg 1998). Unlike Orcuttiae grasses, symbiosis with an aquatic fungus does not appear necessary to break seed dormancy in the lab. Seed dormancy and required environmental cues for in-situ germination may exist, but are presently unknown.

APPENDIX B (Continued)

One of the challenges posed to vernal pool plants is the need to photosynthesize and grow while submersed, and then transition into a terrestrial growth phase. pincushion navarretia and some other vernal pool species exhibit a juvenile isoetid growth form defined by production of cylindrical, air-filled, erect/floating leaves while submersed. These leaves facilitate light exposure and gas exchange, thus lengthening the growing season by maximizing growth while vernal pools are still inundated. This juvenile morphology contrasts with that of "adult" plants, or those producing growth during the dry-down or terrestrial phase of the vernal pool cycle. In their study of adaptive traits of vernal pool navarretias, Spencer and Rieseberg (1998) found that pincushion navarretia was the only one possessing an "unambiguous" isoetid growth form. The others were found to exhibit an inducible isoetid growth form, likely indicating a less strict requirement for, or lower tolerance of more severe vernal pool inundation regimes.

Pincushion navarretia flowers and sets seeds during the terrestrial phase of the vernal pool hydrologic cycle, typically in May (CNPS 2010), although populations in eastern Merced County were fully flowering by April 15th (Dittes and Guardino 2001). The large flowers, long flower tubes, and exerted stamens and stigmas indicate an outcrossing breeding strategy, as do a high proportion of pollen grains per flower, a large pollen-ovule ratio, and a comparatively wide corolla limb (Spencer and Rieseberg 1998).

Considering the unusually long white flowers, a specific co-evolved insect pollinator of pincushion navarretia may exist, although this has not been investigated. The existence of pollinator guilds involving co-evolved native solitary bees has been reported as occurring with a variety of vernal pool plant species (Thorp 1990, 1996). Although pollinators of Navarretia have not been investigated specifically, native solitary bees have been frequently observed visiting the closely related White-Headed Navarretia (Dittes pers. obs.). Fecundity and variation in seed production have not been investigated in pincushion navarretia.

As with many other vernal pool species, seed dispersal is naturally limited, in the case of pincushion navarretia, by an indehiscent fruit capsule that is forced open only after the fiberous seed coats absorb water and expand (Spencer and Rieseberg 1998). Limited seed dispersal in vernal pool species is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974, 1980). Natural dispersal of seeds, however limited, likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming ungulates (Griggs 1980).

The existence of a dormant soil seed bank is unknown for pincushion navarretia. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop

failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

The population biology and genetics of pincushion navarretia have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the highly limited number of occurrences and the scattered geographical distribution, all intra-pool pincushion navarretia populations should be considered unique, and for the purposes of conservation, important genetic entities.

5.2.2 Habitat Requirements and Ecology

It is generally held that many of the endemic vernal pool plant species are relatively recent evolutionary derivations of more common and widespread upland progenitors (Stebbins 1976; Stone 1990; Raven and Axlerod 1978; Thorne 1984), including pincushion navarretia (Spencer and Rieseberg 1998). These neoendemic vernal pool species are thought to have evolved from terrestrial habitat into seasonally aquatic vernal pool habitat made available as the Mediterranean Climate developed and the inland Tertiary-age Sea dried.

Most of the pincushion navarretia occurrences in eastern Merced County are associated with the ancient, weathered alluvial terraces comprising the Valley Springs and Ione Geologic Formations (Dittes and Guardino 2001). A small number of occurrences are also found in vernal pools on the North Merced Gravels Formation. In Sacramento County, pincushion navarretia is associated primarily with the Ione and Laguna Formations

Pincushion navarretia is a strict vernal pool endemic. It is of importance to conservation however, that in contrast to the "deeply-adapted" vernal pool grasses of the Orcuttiae Tribe, pincushion navarretia occupies more commonly occurring, smaller and/or shallower vernal pools with comparatively more "flashy" hydrology. In a survey involving 19 occupied vernal pools in eastern Merced County, pincushion navarretia was documented as occurring in small to medium size vernal pools that range from 16 to 283 square meters (0.004 to 0.07 acres) in area and from 12.7 to 25.4 centimeters (five to 10 inches) in depth (Dittes and Guardino 2001). At the Phoenix Field Ecological Reserve in Sacramento County (CNDDB occurrence #3) pincushion navarretia is reported to inhabit the margins of "the more shallow, dry pools" in the complex (CDFG 2010). Vernal pool dimensions (or reference to size) are not given for any of the other CNDDB occurrences.

APPENDIX B (Continued)

Floristic associations provide further indication of preference for less extreme (more typical) vernal pool hydrological cycles than the Orcuttiae grasses. In contrast to the latter, pincushion navarretia grows in the same hydro-topographical position as more commonly occurring vernal pool associates, while Common Spikerush (*Eleocharis macrostachya*, an indicator of longer duration inundation) is lacking. Pincushion navarretia grows mixed together with Fremont's goldfields (*Lasthenia fremontii*), wooly marbles (*Psilocarphus* spp.), annual hairgrass (*Deschampsia danthonoides*), stipitate popcorn-flower (*Plagiobothrys stipitatus*), double-horned downingia (*Downingia bicornuta*), bluestars (*Brodiaea minor*), toad rush (*Juncus bufomius*), capitate rush (*Juncus capitatus*), quillwort (*Isoetes howellii*), coyote thistle (*Eryngium* spp.), Sacramento Valley pogogyne (*Pogogyne zizyphoroides*), long-beaked stork's-bill (*Erodium botrys*), and succulent owl's clover (*Castilleja campestris* ssp. *succulenta*). Most of these species are commonly occurring vernal pool species that inhabit small to medium size vernal pools and swales, and the slopes and margins of larger or deeper pools that support Orcuttiae grasses and common spikerush.

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye and Mediterranean barley, two non-native facultative wetland species, typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass, and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2001).

Since pincushion navarretia occupies the smaller to medium size, "more typical" vernal pool types and the margins of larger and/or deeper pools, it may be more susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch buildup than the Orcuttiae grasses, or the more deeply-adapted legenere (*Legenere limosa*).

Although none are specifically reported to co-inhabit vernal pools with pincushion navarretia, several non-native weedy hydrophytes may present future problems. Mannagrass (*Glyceria declinata*), an aggressive weed of irrigated agriculture and degraded vernal pools, has already been reported as a potential problem at vernal pools in the region. Additional species to consider include rosy lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), swamp pricklegrass (*Crypsis schoenoides*), crabgrass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), another native species, can also dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

Specific interactions between livestock grazing and pincushion navarretia are largely unknown. In general, appropriately timed dry-pasture livestock grazing regimes are thought to be

compatible with the development and persistence of vernal pool vegetation. Robins and Vollmer (2001) provide a review of information pertaining to livestock grazing in vernal pool ecosystems.

All populations of pincushion navarretia located in eastern Merced County inhabit long-operating cattle ranches, so persistence indicates tolerance for at least some level of grazing. Observations made along fence-lines in the region indicate however, that sheep grazing may be responsible at least in part, for absence of pincushion navarretia and the co-occurring rare succulent owl's-clover in some areas (Dittes and Guardino 2001). Sheep exert a somewhat different selective pressure in vernal pools owing to very close cropping of vegetation and a tendancy to "nest" in pool basins during the terrestrial phase (Kelsey pers. comm.).

Timing of livestock grazing is likely more important than stocking rates in affecting persistence of pincushion navarretia. By limiting grazing to the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. Once the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. Grazing in the summer and fall months, after seeds have set and plants have died likely has little effect on pincushion navarretia.

Although responses to disturbance have not been described for pincushion navarretia, other pertinent examples exist. As an illustration of the role of timing in response of vernal pool species to potential disturbances, Hoover (1941) and Crampton (1959) have reported Orcuttieae grass populations being completely disked in dry-farmed grain fields in the late fall, without apparent detriment to the Orcuttieae populations the following growing season. It has been noted that the same disking performed during the late spring or summer growing periods may completely deplete the soil seed bank if performed over successive years (Stone et al. 1988). Similarly, a small vernal pool located in the middle of a winter-wheat field in eastern Merced County persists and continues to support the rare dwarf downingia (*Downingia pusilla*), despite annual disking and planting over decades (Kelsey pers. comm.; Dittes pers. obs.). It is very important to note that in these cases the disking is not disrupting the water-retaining capacity and hydrological cycle of the respective vernal pools. This is not always the case with disking.

5.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for pincushion navarretia are identified in Table PINA-1 and have been derived from input from local species experts.

APPENDIX B (Continued)

Table PINA-1
Essential Habitat Elements of Pincushion Navarretia

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

5.3 Species Distribution and Population Trends

5.3.1 Range Wide Distribution

Presently, pincushion navarretia is recorded from 14 CNDDB occurrences distributed along a narrow swath of the Great Central Valley, from Placer County in the north to Merced County in the south (CDFG 2010). These occurrences are all situated at sites ranging from 65 to 1,082 feet in elevation (CNPS 2010), and all lie within either the Sacramento Valley or San Joaquin Valley Subregions of the Great Valley Region of the California Floristic Province (Hickman 1993).

5.3.2 Central Valley Distribution

The northernmost occurrence of pincushion navarretia is located near the City of Lincoln in Placer County. Six CNDDB occurrences are located in eastern Sacramento County, three in Amador County (one of these is shared with Sacramento County), one in Calaveras County, one in Placer County and four in Merced County (CDFG 2010).

5.3.3 Range within the Plan Area

Currently, of the six documented CNDDB occurrences of pincushion navarretia recorded from Sacramento County, five are included within the Plan Area (CNDDB #7-10 and #16). These five are located outside of the UDA in the southeast corner of the County. Most of these occurrences are on the 13,000-acre Howard Ranch property. The Howard Ranch is managed by The Nature Conservancy (TNC) as part of the Cosumnes River Watershed Project. The remaining

APPENDIX B (Continued)

Sacramento County Occurrence (CNDDB occurrence #3) is located outside of the Plan Area, just north of the American River at the Phoenix Field Ecological Reserve.

It is important to note that owing to its small stature, preference for small to medium-sized vernal pools and the area of remaining unsurveyed or partially surveyed habitat, moderate to high potential exists for discovery of additional populations within the Plan Area.

Table PINA-2 shows the soil series, geological formation and landform associations for each known occurrence in Sacramento County. Generally, pincushion navarretia is associated with old terrace remnant alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene between 600,000 and 1,500,000 years ago (confirm). Though the distribution of the taxon is extremely disjunct, the range of the taxon in the Plan Area is considered to be vernal habitats embedded in valley grasslands or oak savannah.

Table PINA-2
Extant CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations For Pincushion Navarretia In Eastern Sacramento County

CNDDB Occurrence #	Quadrangle	Soil Series	Geological Formation and Landform
3	Folsom	Red Bluff-Redding	Laguna Formation
7	Carbondale	Amador-Gillender	Valley Springs Formation
8	Carbondale	Amador-Gillender	Valley Springs Formation
9	Goose Creek	Corning	Laguna Formation
10	Goose Creek	Hadselville-Pentz	Modesto Formation

5.3.4 Population Levels and Trends

Of the 15 documented occurrences presumed extant, one in Amador County (CNDDB occurrence #2) has not been observed since 1941; the Calaveras County population (CNDDB occurrence #13) has not been observed since 1957, and the Placer County population (CNDDB occurrence #12) has not been observed since 1971. The exact locations and status of these occurrences are unknown. The remaining 12 CNDDB occurrences presumed extant are also given a trend assessment of unknown (CDFG 2010).

It is impossible to determine the number of historically occurring pincushion navarretia populations or the acreage of suitable habitat lost to historic agricultural and urban land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978); however, owing to habitat specificity, only a subset of the vernal pool habitat lost within the natural range of the species may have provided suitable habitat for pincushion

navarretia. Effects of historic livestock grazing combined with drought and habitat alterations relating to development of non-native annual grassland are unknown as well.

There has been no comprehensive effort to monitor any of the known populations of pincushion navarretia. Numbers of individuals have not been recorded for any of the populations and year-to-year population dynamics are unknown (wait to hear back from TNC and CDFG).

Table PINA-2
Population Estimates of CNDDB Occurrences

CNDDB #	# of Pools Observed	Range of Population Estimates
3	Unknown	1994: 1000 plants
7	Unknown	2005: 1000's
8	Unknown	Unknown
9	Unknown	Unknown
10	Unknown	Unknown

Studies involving other vernal pool plant rarities, including Orcuttiae grasses and Hoover's Spurge have demonstrated marked fluctuation in numbers of individuals within populations between years (Griggs 1983; Holland 1987; Alexander and Schlising 1997). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). It is not known however, if pincushion navarretia exhibits a similar between-year pattern.

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given pincushion navarretia population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another critical aspect of population demography is the presence and nature of the soil seed bank, which is unknown for pincushion navarretia.

5.4 Threats to the Species

Potential threats to pincushion navarretia include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, hydrological alteration of sub-watersheds and associated vernal pool habitat, shifts in competitive interactions (hydrological mediated or invasive weeds), inappropriate livestock grazing regimes (later spring/summer rotations, sheep vs. cattle), recreational vehicle use, equestrian and pedestrian traffic, refuse dumping, windblown refuse accumulation, air pollution and global climate change.

Irrigation runoff and invasive plants are listed as a threat at one occurrence (CNDDB occurrence #3) (CDFG 2010). Although no threats are listed for the remaining 12 occurrences, all are located on operating cattle ranches and are subject to potentially inappropriate livestock grazing regimes.

5.5 Data Gaps and Conservation Implications

Despite its distinctive appearance and extreme rarity, pincushion navarretia has received little research attention from botanists or ecologists. Aside from general observations of field workers provided in the CNDDB and the study of vernal pool adaptive traits in the genus *Navarretia* (Spencer and Rieseberg 1998), nothing else exists regarding the biology, ecology, pollinators, breeding system, population genetics, habitat relationships, population levels, trends or threats associated with this taxon. Pertinent data gaps, implications for conservation, and operating assumptions include:

5.5.1 Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Plan Area and elsewhere within the range of the species. In the Plan Area, discovery of new populations may occur on the large dry-land ranchlands, public quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of the County.

5.5.2 Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

Pincushion navarretia has a geographic association with old alluvial terraces possessing acidic soils primarily of the Ione, and to a lesser extent, Red Bluff Families (Arroyo Seco and Laguna Geological Formations). The exact nature of this relationship is however, unknown. It is unknown if soil pH or other edaphic factors influence pincushion navarretia distribution and population vigor. It is possible that the presence of functioning vernal pools, regardless of landform, soil series and soil pH can provide suitable habitat.

5.5.3 Unknown Pollination Ecology

Pincushion navarretia possesses the longest flowers of any of the species in the genus. Floral morphology generally reflects breeding systems and pollinator relationships. It may be expected that the very long flower tubes select for a particular pollinator, perhaps even a specialized co-evolved species. Bumble-bee flies (family Bombylidae), butterflies, and moths all have feeding apparatus long enough to reach potential nectar rewards located at the base of the floral tube. Since the stigma and anthers are exerted though, it may also be possible that solitary bees, small beetles, or some insect with less specialized mouthparts collects the pollen from the exerted stamens for use and incidentally spreads it to the exerted stigmas of nearby flowers.

APPENDIX B (Continued)

5.5.4 What Constitutes Population Vigor, and How to Measure?

Population vigor will need to be monitored during the life of the SSHCP, yet population dynamics, including year-to-year variability in abundance, have not been studied for pincushion navarretia. The existence of a dormant soil seed bank, a critical contributor to population stability in some other vernal pool species, is unknown for pincushion navarretia as well. Other rare vernal pool species have been shown to be highly variable in abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors contributing to year-to-year population fluctuations may be difficult to identify (Alexander and Schlising 1997).

Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

5.5.5 Specific Hydrological Requirements of Pincushion Navarretia

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting pincushion navarretia populations (e.g., timing of rainfall, depth of ponding, duration of ponding, and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor and/or assess hydrological suitability of pincushion navarretia -vernal pool habitat within established preserves. Similarly, assessment of potentially suitable pincushion navarretia habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing pincushion navarretia populations are established, assessed and monitored over time, a more quantifiable definition of suitable pincushion navarretia -vernal pool hydrology will emerge based on the new information.

5.5.6 Baseline Hydrological Trend of Pools and Existing Indirect Effects

Extant pincushion navarretia populations may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Baseline pincushion navarretia conditions for the SSHCP may not be pristine, so if trends in vigor or habitat quality become apparent during the 50-year period or at some time beyond, it may be difficult to attribute trend to any specific management activity.

APPENDIX B (Continued)

5.5.7 Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990). Proposed preserve designs may not afford complete protection to the hydrological systems that support pincushion navarretia and other species assemblages dependant on them.

5.5.8 Definition of Appropriate Scale pincushion navarretia -Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective pincushion navarretia -vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes pincushion navarretia at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et. al. 1998).

5.5.9 Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the pincushion navarretia -vernal pool preserves, primarily for purposes of upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with pincushion navarretia-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002). It is important to note that pincushion navarretia does persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems. Since pincushion navarretia occupied small to medium size vernal pools, management of Italian Rye and Mediterranean Barley around the margins of vernal pools, and Medusa-head grass in uplands should be of particular management concern.

Presently, Witham et al. are formulating site-specific livestock grazing regimes for annual grassland-vernal pool systems in an area of Sacramento County. Livestock grazing regimes in pincushion navarretia -vernal pool preserves covered under the SSHCP will tier towards the results of this work, as well as to the specific needs of pincushion navarretia. Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

APPENDIX B (Continued)

5.5.10 Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, lippia, paradox canary grass, hairy hawkbit, cocklebur and cattails. None of these are reported to coinhabit pincushion navarretia -occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in pincushion navarretia -occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to pincushion navarretia, owing to the latter's preference for small to medium size vernal pools.

Potential competitive interactions with these species may affect the vigor of pincushion navarretia populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect pincushion navarretia populations.

5.5.11 Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine design preserves for multi-species conservation. Suitability of pincushion navarretia habitat for supporting other rare plant species has not been specifically addressed, although natural populations of the rare Sacramento Orcutt grass (Orcuttia viscida), legenere (*Legenere limosa*), and succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*) are documented as sharing vernal pools with it. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well. Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between November 1st and April 15th may be compatible with or even benefit some pincushion navarretia -associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

5.5.12 Genetic Variation (Spatial and Temporal [Seed Bank], Genetic Drift, Genetic Bottlenecks)

Population genetics for pincushion navarretia are completely unknown. Current limitations in our understanding of pincushion navarretia population genetics have little immediate conservation implication, given the extreme rarity of pincushion navarretia.

If experimental inoculation of pools is proposed as part of the SSHCP, appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are

consistent with what we know and do not know about pincushion navarretia ecology and population genetics.

5.5.13 Critical Population Size

In conservation biology, critical population size is usually defined as a statistical probability over time, or model that describes the minimum number of individuals required for a population to maintain itself through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since pincushion navarretia is an annual species, its population sizes are known to be highly variable from year to year, and the soil seed bank constitutes an important demographic component of the population, definition and assessment of a critical population size is impracticable and lacks ecological meaning.

Knowledge of critical population size provides an ecologically meaningful and quantifiable benchmark for adaptive management purposes (e.g., if monitored populations drop to within 30 percent of critical population size, site-specific analysis, appropriate management changes and additional monitoring will occur). This is not possible for annual species, so other measurable benchmarks are needed.

5.5.14 Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is completely unknown for pincushion navarretia. There have been no studies addressing the presence of a soil seed bank, seed dormancy or longevity. From the perspective of conservation, knowledge of site specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

5.5.15 Unknown Aspects of Experimental Inoculation

Since there are so few natural populations of pincushion navarretia in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied pincushion navarretia habitat, create meta-population structure at extant occurrences where single pools may support the species, and ensure existence should any natural populations become compromised. Uncertainties regarding the political ramifications and ecological

effectiveness of experimental inoculation lead the conservation community and agencies to not consider experimental inoculation as an appropriate conservation goal. Given the extreme rarity of this species though, this option may need reconsideration at some point in time.

5.5.16 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter. ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant pincushion navarretia occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of pincushion navarretia, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect pincushion navarretia and other native plant species.

5.5.17 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology. It is likely that given the expected global climate trends, a vigor response of some kind could be expected for pincushion navarretia populations within the implementation period of this HCP, or at some time beyond.

5.6 Literature Cited

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. *In*: Castri, F di, Mooney, H.A. (eds) Mediterranenan type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

APPENDIX B (Continued)

Barry, S. F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2000. Biological information-Slender Orcutt Grass. Accessed online October 26, 2002 at http://www.dfg.ca.gov/hcpb/species/jsp/more_info.jsp?specy=plants&idNum=178.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

Day, A.G. 1993. New taxa and nomenclatural changes in *Allophyllum, Gilia*, and *Navarretia* (Polemoniaceae). *Novon* 3(4): 331-340.

Day, A.G. 1995. Sessile-flowered species in the Navarretia leucocephala group (Polemoniaceae). *Madrono* 42(1):34-39.

DeVilla, Bill. Consultant, Owner Ecosystems West, Ben Lomond, California.

APPENDIX B (Continued)

Dittes, J. C., and J. L. Guardino. 2001. Chapter 3: Rare Plants. *In* Vollmar J. E. (ed.) 2002. Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting, Berkeley, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 1981. 1981a. Life histories of vernal pool annual grasses. *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3 or 4) California Native Plant Society. Berkeley, California.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Slender Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1981. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*, 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

APPENDIX B (Continued)

Leidy, R.A. and E.G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California..

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones & Stokes, Sacramento, California.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18:1 pp. 18-29.

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J.R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. *American Journal of Botany* 69: 1082-1095.

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. *Fremontia* 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2001 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). April 1993. Soil Survey of Sacramneto County, California. U.S. Department of Agriculture Sacramento, California.

Spencer, S. C., and L. H. Rieseberg. 1998. Evolution of amphibious vernal pool specialist annuals: putative vernal pool adaptive traits in *Navarretia* (Polemoniaceae). In C.W. Witham, D. Belk, W. Ferren, and R. Ornduff (eds.) Ecology, conservation, and management of vernal pool ecosystems -- proceedings from a 1996 conference. California Native Plant Society, Sacramento, California (in press).

APPENDIX B (Continued)

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Stone, Douglas. Ph.D. Candidate, University of California, Berkeley, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B. C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Presribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Restoration Ecologist EDAW, Sacramento California.

United States Fish and Wildlife Service (USFWS). 1997. Determination of Endangered Status for Orcuttia pilosa, Orcuttia viscida, Tuctoria greenei and Threatened Status for Castilleja campestris ssp succulenta, Chamaesyce hooveri, Neostapfia colusana, Orcuttia inaequalis and Orcuttia tenuis. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

United Stated Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

Witham, Carol. Consulting Botanist, Davis, California.

APPENDIX B (Continued)

6 SLENDER ORCUTT GRASS (SLOG)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Slender Orcutt Grass (SLOG)
(Orcuttia tenuis)
Status USFWS: Endangered
Status CDFG: Endangered
Status CNPS: List 1B.



Joe Molter, BLM

6.1 Legal Status

Slender Orcutt grass (*Orcuttia tenuis*) was first listed as state Endangered by the California Department of Fish and Game (CDFG) under the California Endangered Species Act in 1988 (Stone et al. 1988), and on March 26, 1997 the species received Listing as Endangered under the Federal Endangered Species Act by the United States Fish and Wildlife Service (USFWS) (USFWS 1997). The California Native Plant Society (CNPS) includes slender Orcutt grass as a CNPS List 1B.1 species and has assigned an R-E-D Code of 2-3-3, meaning it is distributed in a limited number of occurrences, occasionally more if each occurrence is small, it is endangered throughout its range, and found only in California (CNPS 2010).

6.2 Life History and Ecology

6.2.1 Species Description and Life History

Slender Orcutt grass is a member of the distinctive *Orcuttieae* Tribe of the grass family (Poaceae), a group of nine vernal pool species endemic to California and northern Baja California. The Orcutt grasses have been long recognized by botanists as highly evolved, ecologically unusual and naturally restricted (Hoover 1941; Crampton 1959; Reeder 1965, 1980, 1982).

As with other members of the tribe, slender Orcutt grass is a relatively small-stature annual species. Its five to 15 centimeter-long, sparsely hairy-sticky stems are weakly tufted and mostly erect. Like the stems and inflorescences, the 1-2 mm wide, one to five centimeters-long leaves are sparsely hairy and covered with a sticky, highly aromatic exudate. Small scale-bracted

APPENDIX B (Continued)

flowers (florets) are arranged in erect, two-ranked, flattened spikelets that are usually separated from each other along the exserted terminal five to 10 centimeter-long spikes (Hickman 1993). Often, the flowering stems branch from the upper nodes, with each branch terminating in a single spike-like inflorescence (Stone et al. 1988).

Slender Orcutt grass is most readily distinguished from its closest relative hairy Orcutt grass (*O. pilosa*) on the basis of the stem branching mostly from the upper nodes, the spikelets being evenly spaced rather than congested along the inflorescence axis, and being only sparsely hairy (Reeder 1982; Hickman 1993). Other than the arrangement of spikelets, slender Orcutt grass is similar to hairy Orcutt grass with respect to floral characteristics. Both have similar-sized irregularly toothed glumes and equally five-toothed lemmas, also of similar size. Although morphologically similar, specific status of slender Orcutt grass is further substantiated by a chromosome number of 2n=26, versus 2n=30 for hairy Orcutt grass (Reeder 1982).

All Orcutt grasses are very highly evolved and uniquely adapted members of the endemic vernal pool flora. Their anatomy and physiology (Keeley 1981, 1990, 1998), morphology, and life history traits (Crampton 1959; Griggs 1974, 1976, 1980, 1981) are highly adapted to the stressful, more extreme portions of the vernal pool niche. Some adaptive traits (physiology, anatomy, morphological-distinct life history stages) confer ability of individuals to survive the varied stresses of a single hydrological season, while others (e.g., annual habit, precise germination cues, stored soil seed bank, indeterminate flowering, dispersal-limiting traits) confer population stability through time in the context of year-to-year hydrological uncertainties that characterize the Mediterranean climate (Griggs 1980; Stone et al. 1988).

Evolution of the annual growth habit is a key adaptation of slender Orcutt grass to vernal pool habitat, as is the case with almost all other vernal pool plants (Griggs and Jain 1983; Holland 1987). The annual growth habit allows populations to persist through the regular and extreme summer drought that is characteristic of California's vernal pool landscape (Stone et al. 1988).

Slender Orcutt grass seeds germinate during the fall or winter months, generally 2-4 weeks after standing water has been present in the vernal pool (Griggs 1980). Germination can continue after cessation of winter rains and as the shallow water at the pool margins begins to warm and recede (Griggs 1974; Holland 1987; Stone et al. 1988). A requirement of cold stratification followed by increasingly warm fluctuating diurnal temperatures and the presence of a symbiotic aquatic fungus (*Alternaria* sp., *Curvilaria* sp.) that has been determined necessary for Orcutt grass seed germination (Griggs 1980, 1981; Keeley 1988). Sensitivity to these environmental cues ensures germination only during years with hydrological conditions favorable for plants to complete their entire life cycle (Griggs 1980, 1981; Stone et al. 1988).

APPENDIX B (Continued)

Slender Orcutt grass is thought to be one of the least specifically adapted of the genus with regard to hydrology and habitat breadth (Stone et al. 1988). It has been observed to be more likely than other Orcutt grasses to germinate during years of marginal precipitation, although seedling mortality can be high during such years (Griggs 1981).

Members of the genus *Orcuttia* develop long (approximately ten centimeters), thin (one to two millimeters-wide) juvenile leaves that float on the water surface when seeds germinate under shallow water or when seeds become submersed shortly after germination (Hoover 1941; Griggs 1974, 1980, 1981; Reeder 1982). By facilitating light exposure and atmospheric gas exchange for photosynthesis while submersed, these amphibious juvenile leaves maximize vegetative growth before vernal pool dry-down (Griggs 1981; Stone et al. 1988; Keeley 1990).

Orcutt grass plants are able to produce most of their aboveground vegetative growth, as well as flowers and seed as the vernal pools dry down in late spring and early to mid-summer (Crampton 1959). Vegetative and phenological demographics appear to be largely determined by pool dry-down rate (Griggs 1974, 1980; Stone et al. 1988). Thus, mature fruiting plants in drying soil above the waterline and submersed seedlings further toward the center can occur simultaneously in a single pool.

Indeterminate growth of new stems and spikelets provides for prolonged productivity as seasonally available water allows (Griggs 1974, 1980). This habit may result in smaller plants with fewer flowers and seeds maturing earlier in the season at the pool margins, and later maturing, larger, more fecund plants towards the pool center. This morphological and phenological plasticity confers an adaptive advantage in the context of extreme seasonal fluctuations and the unpredictable year-to-year variability of the Mediterranean Climate (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988).

Since Orcutt grasses mature in a terrestrial setting during the hotter, more xeric late spring and summer months, possession of the C_4 photosynthetic pathway and Krantz Anatomy (Griggs 1980; Keeley 1990, 1998) are important adaptive traits. This photosynthetic pathway allows plants to exchange atmospheric gasses with increased efficiency and concomitant reduction in water loss to evaporative transpiration. This permits the extended period of vegetative growth and reproduction of Orcutt grasses into the hot arid summer months after most other vernal pool associates have completely desiccated (Griggs 1980; Stone et al. 1988).

All Orcutt grasses possess an aromatic sticky glandular exudate on the stems, leaves and inflorescences. This trait is thought to be advantageous both as an anti-desiccation (Hoover 1941; Crampton 1959) and anti-herbivory adaptation (Griggs 1974, 1980). Grasshoppers can exert significant herbivory pressures late in the season although it has not been noted for slender Orcutt grass specifically.

APPENDIX B (Continued)

Slender Orcutt grass plants flower and set seed as the margins and basin of the vernal pools dry from May through October (CNPS 2010). Detailed pollination and breeding experiments have not been conducted on this species. Like most other grasses, Orcutt grasses are thought to be primarily wind-pollinated out-breeders as indicated by protogynous floral maturation, strongly exserted anthers and measured patterns of genetic variation (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988). In one instance, native solitary bees of the family Halictidae were observed collecting pollen from one of its relatives, slender Orcutt grass (Griggs 1974).

Seed production of Orcutt grass plants is known to vary greatly between individuals along moisture gradients within single pools, among populations between pools, and within pools between years (Griggs 1980; Griggs and Jain 1983). Fully mature slender Orcutt grass individuals can produce from 11 to over 164 seeds per plant, with an average of 58 seeds estimated. Seed set in Orcutt grasses appears uncertain and dependent on precise synchrony of appropriate environmental conditions and phenological development (Stone et al. 1988).

After the growing season, the mature slender Orcutt grass seeds are held tightly within maternal floral structures (lemma and pelea) on the inflorescence until the mechanical action of wind, heavy rain and winter inundation shatter the inflorescences and release the mature florets. This lack of dispersal is thought to be an adaptation to the sparsely scattered distribution of suitable large vernal pools (Griggs 1974, 1980). It is an advantage for a large proportion of the seed crop to remain within the available large-pool habitat, rather than chance loss to unsuitable uplands. Even though dispersal is naturally limited, Orcutt grass colonization of pools was probably a more frequently occurring event in the historic past when there were likely more populations, many more pools, more pool interconnectivity, exceedingly larger waterfowl migrations, and unfenced roaming ungulates (Griggs 1980). Of the Genus *Orcuttia*, slender Orcutt grass exhibits the greatest propensity for colonizing newly available habitat, most likely the result of seed transport by livestock (Stone et al. 1988).

Not all *Orcuttia* seeds germinate every year, resulting in the buildup of a dormant soil seed bank (Griggs 1974, 1980, 1981). The soil seed bank is a critical adaptive barrier against local extinction events that could otherwise result from the unpredictable occurrence and duration of favorable growing conditions (Stone et al. 1988). In a study of five slender Orcutt grass populations, 14 seeds were found dormant in the soil for every 1 growing plant present (Griggs 1980; Griggs and Jain 1983). Between-population and between-year variation in soil seed bank density and the duration of seed viability in the soil is unknown. The soil seed bank also may contribute to overall genetic diversity of populations, as seeds stored over multiple years produced under varying growth conditions may harbor adaptive allelic combinations that are infrequently expressed or selected.

APPENDIX B (Continued)

Studies of seed weight and allozyme electrophoresis indicate that Orcutt grasses possess low levels of gene flow between populations, and high levels of gene flow within (Griggs 1980, 1984; Griggs and Jain 1983). This is to be expected given the highly insular distribution and seasonally dynamic nature of vernal pool habitat (Stone et al, 1988). These studies also revealed very high levels of genetic diversity within the seed families of individual plants, with almost 50 percent of each species' genetic variation represented in samples from one plant. In addition, approximately 80 to 90 percent of the total genetic diversity of each species was represented in each population (Griggs 1980, 1984; Griggs and Jain 1983). It should be noted that this study was limited to assaying seven enzyme systems from two populations of slender Orcutt grass.

6.2.2 Habitat Requirements and Ecology

Like all grasses in the genus *Orcuttia*, slender Orcutt grass is strictly adapted to the vernal pool hydrological cycle. The tribe is thought to be a relatively ancient evolutionary group (Griggs 1981; Reeder 1982), descendant from a perennial ancestor related to the Chlorideae Tribe (Keeley 1998). The ancestral entity is thought to have inhabited the marshy margins of the Tertiary-age sea formerly covering the Great Central Valley (Axelrod 1973; Raven and Axelrod 1978). The evolving Orcuttieae lineage adapted to the increasing seasonal stresses as the Mediterranean climate developed and the inland water body receded.

Interestingly and of potential significance to conservation, slender Orcutt grass appears to be the least specific of the genus *Orcuttia* with regard to niche breadth and habitat specificity. This is indicated by occupation of a wider range of vernal pool sizes and vernal wetland types, occurrence over a greater geographical area and landform types, a larger number of occurrences, and a marked tendency to colonize newly available habitats (where seed sources are available), including constructed stock-ponds and hydrology-enhanced vernal pools (Stone et al. 1988).

Over its geographic range, slender Orcutt grass is associated with a number of distinct physiographic/edaphic settings (Stone et al. 1988). In eastern Sacramento County (southernmost populations) and on the Stillwater and Millville Plains of Shasta County, slender Orcutt grass is associated with vernal pools located on ancient weathered alluvial terraces with soils of the Redding and related Series (Stone et al. 1988). Soils of the Redding series tend to be strongly acidic (indication of age and weathering) and are generally gravelly with cobble. These soils also typically possess a shallow, water-impermeable iron-silica hardpan that favors the development of vernal pools (SCS 1993). In Tehama County, slender Orcutt grass occurs in vernal pools associated with cemented hardpan of the Tuscan, Toomes and related Series, as well as in more shallow volcanic soils and in volcanic bedrock depressions (Stone et al. 1988; CDFG 2010). The montane Occurrences of Lassen and Shasta Counties are also associated with volcanic soils, but in addition to mudflow and bedrock substrates, wetlands formed on large clay flats also support the species.

APPENDIX B (Continued)

Orcutt grasses are strongly adapted to the more extreme hydrological cycles encountered in the spectrum of vernal pool types, e.g., they are typically associated with larger or deeper vernal pools that tend to possess more extreme regimes of inundation (Crampton 1959; Griggs 1974). Of the members of the genus *Orcuttia*, slender Orcutt grass tends to occupy the widest range of vernal pool sizes and types (Stone et al. 1988). Vernal pools occupied by slender Orcutt grass documented prior to 1988 range in size from 840 square meters to 45 hectares at Boggs Lake, and among the 39 pools measured, the median pool size was found to be 6,500 square meters (Stone et al. 1988). Upslope watershed area (Area of Drainage) associated with occupied pools was reported by Stone et al. (1988) to range from 0.4 to 1,145 acres among the known occurrences. It should be noted that a number of occurrences have been discovered since 1988.

Vernal pool hydrology has not been precisely defined for any of the Orcutt grasses. In general, ponding must be of sufficient duration and under the appropriate seasonal temperature regime to release the seeds from dormancy through decomposition of maternal floral structures in the presence of a symbiotic aquatic fungus (Griggs 1980; Griggs and Jain 1983; Keeley 1988). The depth or duration of pool inundation are not only critical for germination, but are likely strong determinants excluding other less specialized, but obligate vernal pool species from the barren micro-sites located in the deeper parts of pools that are inhabited by Orcutt grass species.

Ponding cannot be so excessive though, as to foster the recruitment and proliferation of native perennial marsh species, in particular common spikerush (*Eleocharis macrostachya*) (Crampton 1959; Stone et al. 1988; CDFG 2010) and cattail (*Typha* spp.). Common spikerush, a potentially aggressive rhizomatous species, is usually only found in the deepest portions of the more well developed natural vernal pools. In such cases where it co-occurs with slender Orcutt grass, the latter grows mostly in barren areas lacking the spikerush, or at topographical positions just above the spikerush zone (Stone et al. 1988). Prolonged duration of ponding resulting from placement of berms, construction of road surfaces, or other alterations in the vicinity of natural pools has been cited as potential impacts at a number of slender Orcutt grass occurrences (CDFG 2010).

In the Sacramento Valley, slender Orcutt grass occurs in pools with other vernal pool endemics, including stalked popcorn-flower (*Plagiobothrys stipitatus*), common spikerush, coyote thistle (*Eryngium castrense*), white-headed navarretia (*Navarretia leucocephala*), water shamrock (*Marsilea vestida*), dwarf wooly marbles (*Psilocarphus brevissimus*), downingia (*Downingia* spp.), California damasonium (*Damasonium californicum*), vernal pool foxtail (*Alopecurus saccatus*), annual hairgrass (*Deschampsia danthonioides*), doveweed (*Eremocarpus setigerus*), smooth spike-primrose (*Epilobium pygmaeum*), Fitch's spikeweed (*Hemizonia fitchii*), Fremont's Goldfields (*Lasthenia fremontii*), and rabbitsfoot grass (*Polypogon monspeliensis*) (Stone et al. 1988; CDFG 2010). Many of these other vernal pool species however, do not appear to tolerate the hydrologic extremes of prime Orcutt grass habitat. They complete their lifecycle

APPENDIX B (Continued)

earlier in the season, and are therefore confined to the shallower margins or slopes of the deeper pools that support Orcutt grasses (Crampton 1959; Stone et al. 1988).

Hydrological stresses associated with vernal pools, and Orcutt grass pools specifically, exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian rye grass (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), are two non-native facultative wetland species that typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. They cannot however, tolerate the more extreme inundation regimes of deeper Orcutt pools. Thatch build-up from Italian rye grass, Mediterranean barley, medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Although none are specifically reported to co-inhabit vernal pools with slender Orcutt grass "weedy species" are mentioned as a threat at several of the occurrences (CDFG 2010). Several non-native weedy hydrophytes may present future problems within the deeper portions of occupied Orcutt grass pools through competitive exclusion (as with common spikerush). Mannagrass (*Glyceria occidentalis*), an aggressive weed of irrigated agriculture and degraded vernal pools, has already been reported as a potential problem at several of the known related Sacramento Orcutt grass (*Orcuttia viscida*) populations. Additional species to consider include rosy lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), swamp pricklegrass (*Crypsis schoenoides*), Bermuda grass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), another native species, can also dominate portions of Orcutt grass-type pools (Schlising, Unger pers. comm.).

Appropriately timed dry-pasture livestock grazing regimes are generally thought to be compatible with Orcutt grass populations, and may even enhance habitat in situations where Common Spikerush may otherwise predominate (Stone et al. 1988; CDFG 2010). By grazing from late fall, into early to mid-spring months, livestock are generally kept from the occupied portions of Orcutt grass pools by standing water, inundated soil and attraction to abundant green forage in the uplands. Most problems with livestock grazing arise from later spring and summer grazing regimes, when the Orcutt grass pools have dried and flowering and fruiting plants are exposed and vulnerable to trampling and cropping (Stone et al. 1988). In addition, during the later season when the upland forage has dried, the moist bottoms of vernal pools become highly attractive and may suffer increased trampling and hoof-pocking (Dittes pers. obs).

As an example of the role of timing in response to potential disturbances, Hoover (1941) and Crampton (1959) have reported Orcuttieae populations being completely disked in dry-farmed grain

fields in the late fall, without apparent detriment to the Orcuttieae populations the following growing season. It has been noted that the same disking performed during the late spring or summer growing periods may completely deplete the soil seed bank and extirpate the population if performed over successive years (Stone et al. 1988).

6.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Sacramento Orcutt grass are identified in Table SLOG-1 and have been derived from the USFWS's list of primary constituent elements in the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table SLOG-1
Essential Habitat Elements for Slender Orcutt Grass

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

6.3 Species Distribution and Population Trends

6.3.1 Species Distribution

Slender Orcutt grass is distributed in the Sacramento Valley from eastern Sacramento County in the south, to the vicinity of Redding in Shasta County to the north. The species also occupies the adjacent Cascade Range Foothills in the region north and northeast of Red Bluff, as well as sites in the Pit River Drainage, located northeast of the Sacramento Valley. Another concentration of occurrences is located in the montane region of northern Plumas, western Lassen and eastern Shasta Counties, extending from the vicinity of Lake Almanor, north to the plateau region east and northeast of Lassen Peak. Two disjunct populations, comprising the westernmost

occurrences, are located in the Inner Coast Range region of Lake County. Slender Orcutt grass is among the most widespread of the Orcuttiae grasses and exhibits the widest range in elevations (85 to 5,760 feet).

Slender Orcutt grass occurrences are distributed among five of the Geographic Subregions of the California Floristic Province, as described by Hickman (1993); the Sacramento Valley (Sacramento, Butte and Tehama Counties), Inner Coastal Range (Lake County), Cascade Range Foothill (Tehama County), High Cascade Range (Tehama, Shasta, Siskiyou, Plumas and Lassen Counties), and the non-Warner Mountain Subregion of the Modoc Plateau Region (Modoc County) (CNPS 2010).

This comparatively wide distribution may partially reflect the previously mentioned observations of Stone et al. (1988) regarding its comparatively broad habitat requirements relative to some of the other Orcutt grasses (e.g., Sacramento Orcutt grass). It may also reflect a different propensity for seed dispersal by waterfowl, or perhaps even a different "biogeographic legacy" (e.g., timeline of evolution and geographic distribution of ancestral taxon).

6.3.2 Central Valley Distribution

In the Central Valley, slender Orcutt grass occurs among five population centers. The southernmost of these, comprising three CNNDB occurrences and one yet to be recorded occurrence, is located in eastern Sacramento County. The next population center, comprised of two occurrences, is located approximately 65 miles to the north in southern Butte County. The next population center to the north, comprised of 30 occurrences, is located in Tehama County (CDFG 2010).

A large portion of the extant slender Orcutt grass occurrences are distributed among the remaining two Central Valley population centers. The northernmost, extends from the Stillwater Plains near Redding, to the Millville Plains in the vicinity of Cottonwood and Anderson to the south. The remaining Central Valley population center is located at slightly higher elevations in the Cascade Range Foothills of Tehama County, north and northeast of Red Bluff in the vicinity of Manton, Dales Lake, Dales, and Hog Lake Plateau.

6.3.3 Range within the Plan Area

Currently, there are three recorded CNDDB occurrences of slender Orcutt grass presently known within the Plan Area (Figure SLOG-1), and one occurrence that is not yet registered with the CNDDB (Witham pers.comm.). One of these (CNDDB occurrence #16) is situated on the alluvial terrace at the northern edge of Laguna Creek, southeast of the intersection of Gerber and Excelsior Roads. This occurrence, comprised of a single occupied natural vernal pool, is situated within a proposed 300-acre habitat preserve (Klotz Property). This occurrence is located within

the Plan Area as well as within the Sacramento UDA. The second slender Orcutt grass occurrence within the Plan Area is located just south of the Klotz property and is also located on a property that is proposed for a preserve (occurrence #90).

The third slender Orcutt grass occurrence located within the Plan Area is situated on the terrace landscape to the east of Mather Field, between Douglas Road and Kiefer Boulevard (CNDDB occurrence #71). This occurrence, comprised of one occupied natural vernal pool, is also located within the UDA. This occurrence is not currently protected, but is proposed for inclusion within a 20-acre vernal pool mitigation preserve (Radmacher pers. comm, 2003)

A fourth occurrence not yet reported in the CNDDB is located at the Unico Radio Facility on the south side of White Rock Road. This occurrence is within the Plan Area as well as within the UDA (Radmacher pers. comm. 2003).

In Sacramento County, slender Orcutt grass is associated with the Laguna Formation. This geological landform is comprised of remnant old-terrace alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene, between 600,000 and 1,500,000 years ago. Table 1 shows the soil series, geological formation and landform associations for each known Occurrence. Though the distribution of the species is extremely disjunct, the range of the species in the Plan Aarea is considered to be vernal pools and vernal impoundments.

6.3.4 Population Levels and Trends

Alice Eastwood collected the type collection for slender Orcutt grass in Shasta County in 1912. Since then, a total of 90 occurrences have been recorded (CDFG 2010), including 31 in Tehama County, 24 in Shasta County, a shared occurrence in Shasta and Tehama counties, five in Lassen County, 18 in Modoc County, four in Plumas County, three in Sacramento County and two occurrences in each of Siskiyou, Butte, and Lake counties. It should be noted that an additional population not yet recorded in the CNDDB is known from Sacramento County (CDFG 2010).

Of the 90 documented CNDDB occurrences, one is possibly extirpated from Shasta County and the shared Shasta/Tehama County occurrence is possibly extirpated. In addition, downward population trends have been reported for six populations in Shasta County, two in Tehama County, and one in Plumas County. Of the 90 known occurrences, only two have been classified as “stable.” The population trends for the remaining 79 occurrences are classified as “unknown.” By 1991, the CDFG stated that the trend for slender Orcutt grass is one of decline (USFWS 1997).

It is impossible to determine the number of historically occurring slender Orcutt grass populations or the acreage of suitable habitat lost to historic agricultural land-use conversions,

since so much had happened before these species first received attention (Stone et al. 1988). Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978, Jones & Stokes 1990), however owing to habitat specificity (restriction to), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for slender Orcutt grass (Stone et al. 1988). Concerns over loss of Orcutt grass populations and habitat were expressed beginning with some of the earliest investigators (Hoover 1941; Crampton 1959, 1976; Griggs 1974).

There has been no comprehensive effort to monitor all populations of slender Orcutt grass. Various monitoring projects have been conducted by BLM, USFS, and CDFG. Stone et al. (1988) also provided estimates of populations at all Occurrences visited in 1986 and 1987.

Research conducted at other sites and on other Orcuttiae species indicate that abundance of individuals within Orcutt grass populations varies greatly between species, between populations within species, and within populations through years (Griggs and Jain 1983). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), and Greene's tuctoria (*Tuctoria greenei*) at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Orcutt grass population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

6.4 Threats to the Species

Potential direct threats to slender Orcutt grass include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, construction and maintenance of firebreaks, roads, and utility corridors, timber harvest activities (in montane occurrences), inappropriate livestock grazing regimes (later spring/summer rotations), grassland fires, recreational vehicles, equestrian and pedestrian traffic, and refuse dumping.

Potential Indirect threats to slender Orcutt grass include hydrological alteration of sub-watersheds by surrounding developments and land uses, shifts in competitive interactions

(hydrology-mediated or invasive weeds), windblown refuse accumulation, point and non-point source water pollution, air pollution, and global climate change.

The proposed Klotz Preserve encompasses approximately 300 acres of vernal pool habitat supporting one CNDDB Occurrence of slender Orcutt grass (CNDDB Occurrence #16). The proposed Were preserve encompasses approximately 160 acres of vernal pool habitat supporting one CNDDB Occurrence of slender Orcutt grass (CNDDB Occurrence #90) The other Sacramento County CNDDB Occurrence (CNDDB Occurrence #71) is currently unprotected, but is planned for inclusion within a proposed 20-acre vernal pool preserve. The fourth slender Orcutt grass occurrence known in Sacramento County, located at the Unica Radio Facility Site, is currently unprotected.

The USFWS has designated critical habitat areas for slender Orcutt grass that encompasses all of the known occurrences and a large portion of the remaining potentially suitable habitat.

6.5 Data Gaps and Conservation Implications

Grasses of the Tribe Orcuttieae, including slender Orcutt grass, are among the most studied and best known of all vernal pool plant species and vernal pool species assemblages. As previously discussed, researchers have variously addressed taxonomy and biogeography, biology, ecology, breeding system, population genetics, habitat relationships, population levels, trends and threats. Even with the attention of researchers and relatively extensive body of information, data gaps with varying implications for conservation remain including:

6.5.1 What Constitutes Population Vigor, and How to Measure?

Population vigor will need to be monitored during the life of this SSHCP, yet a good measure of Orcutt grass population vigor is difficult to define, given the highly variable year-to-year abundance within populations (Holland 1987; Griggs pers. comm. 2003). The contribution of the stored soil seed bank to population numbers and population genetic diversity is an important, but currently unknown factor as well. Furthermore, even if a trend at the population level is discerned, causative factors contributing to year-to-year population fluctuations may be very difficult to identify (Alexander and Schlising 1997).

Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

APPENDIX B (Continued)

6.5.2 Specific Hydrological Requirements of Slender Orcutt Grass

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting slender Orcutt grass populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate). At the same time, It is also important to note that slender Orcutt grass is cited as one of the more broadly adapted species of the genus, inhabiting a wider array of vernal pool sizes and types, and one of the most likely to germinate during years with marginal precipitation (Holland 1987; Griggs pers. comm.).

The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of slender Orcutt grass-vernal pool habitat within established preserves. Similarly, assessment of potentially suitable slender Orcutt grass habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing slender Orcutt grass populations are established, assessed and monitored over time, a more quantifiable definition of suitable slender Orcutt grass-vernal pool hydrology may be developed.

6.5.3 Baseline Hydrological Trend of Pools and Existing Indirect Effects

Several slender Orcutt grass populations throughout the state have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Baseline slender Orcutt grass conditions for the SSHCP are not pristine, so if trends in vigor or habitat quality become apparent during the 50-year period or at some time beyond, it may be difficult to attribute trend to any specific management activity.

6.5.4 Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990). The geo-hydrologic investigation of Hanes and Stromberg (1998), conducted at a single site over three years in eastern Sacramento County, addresses aspects of vernal pool hydrology that are important to consider in formulation of hydrological buffers (e.g., relationship between pool basin hydrology and surrounding upland soil profile).

APPENDIX B (Continued)

Proposed preserve designs may not afford complete protection to the hydrological systems that support slender Orcutt grass and other species assemblages dependant on them without more information on appropriate scale hydrologic buffers.

6.5.5 Definition of Appropriate Scale Slender Orcutt Grass-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective slender Orcutt grass-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale Sacramento Orcutt grass pool preserve at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

Proposed preserve designs may not afford complete protection to the ecosystems that slender Orcutt grass and other species assemblages depend on without more information on appropriate scale of preserve area.

6.5.6 Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the slender Orcutt grass-vernal pool preserves, primarily for purposes of upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with slender Orcutt grass-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998, TNC 2000; Griggs 2002; Robins and Vollmar 2002; Burmester pers. comm.). It is important to note that slender Orcutt grass and other members of the Orcuttiae tribe do persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems.

Presently, Witham et al. are formulating site-specific livestock grazing regimes for annual grassland-vernal pool systems in an area of Sacramento County (Witham pers. comm.). Livestock grazing regimes in slender Orcutt grass-vernal pool preserves covered under the SSHCP will tier towards the results of this work, as well as to the specific needs of slender Orcutt grass. Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

With regard to compatible grazing regimes, timing of grazing appears far more important than stocking rate, grazing intensity, or duration of rotation in annual grassland pasture systems that support Orcutt grass-occupied vernal pools (Stone et al. 1988; Griggs 2000; Griggs pers. comm.). During the inundated period of the vernal pool cycle (generally late fall through mid-to late spring), germinating seed and establishing aquatic-phase seedlings are afforded protection

from trampling and grazing by a general aversion of cattle to standing water, as well as attractive forage in uplands. Even if some cattle congregate at the edge or meander into or across the pools while inundated, germinating seeds in the deeper portions of the pools are unaffected, the vast majority of the pool substrate escapes trampling and nothing is eaten.

Conversely, grazing during the dry-down period or terrestrial phase, when plants are flowering and setting seed can be detrimental to the season's flowering effort and seed crop (generally mid- to late spring through the summer and early fall months). Given multiple years of improperly timed grazing and seed loss (both from standing crop and exhaustion of soil seed bank), populations may decline in vigor and may even be extirpated.

6.5.7 Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in Orcuttiae-occupied vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, Lippia (*Phyla nodiflora*), paradox canary grass, cocklebur, and cattails. Of these, common spikerush presently co-inhabit slender Orcutt grass-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in slender Orcutt grass-occupied pools over time.

Potential competitive interactions with these species may affect the vigor of slender Orcutt grass populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect slender Orcutt grass populations.

6.5.8 Unknown Relationship Between Landform/Soil Chemistry And Bio-Geographic Distribution

In Sacramento County, slender Orcutt grass has a geographic association with old alluvial terraces possessing soils primarily of the Redding Family (Laguna Geological Formation). Occurrences in Tehama, Lassen and Modoc Counties are associated with other landforms and soils as well. The exact nature of this relationship to landform and soil is however, unknown. Given the relatively wide distribution of this species though, it is unlikely that soil pH or other parameter of soil chemistry strongly influences slender Orcutt grass distribution and population vigor. It is more likely that large or deep vernal pools, regardless of landform, soil series and soil pH may provide suitable habitat.

From the perspective of slender Orcutt grass conservation, this uncertainty has bearing on the definition of potentially suitable habitat, which guides surveys and establishment of habitat preserves.

APPENDIX B (Continued)

6.5.9 Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to design preserves for multi-species conservation. Suitability of slender Orcutt grass habitat for supporting other rare plant species has not been specifically addressed, although natural populations of the rare pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), and legenere (*Legenere limosa*) are documented as sharing specific vernal pools with slender Orcutt grass. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals and bird species as well.

Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between November 1st and May 1st may benefit slender Orcutt grass-associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

6.5.10 Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

It has been determined that *Orcuttia* populations are genetically isolated as well as diverse, the latter both within and between pools (populations), and within the "seed family" of a single reproductive plant. In addition, there is a high degree of localized adaptation and strong intra-pool selective pressures (Griggs 1980; Griggs and Jain 1983). However, investigations of slender Orcutt grass population genetics have been limited to measures of seed size and weight (genetically fixed traits) within and among populations, and electrophoretic study of seven enzyme systems in only two populations. These analyses represent a very small portion of the genome and allow limited interpretation of patterns of genetic diversity and limited inference as to uniqueness of a given population. Another potentially important consideration is that there has been no assessment of the "genetic memory" potentially associated with stored seeds in the soil seed bank. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon.

Current limitations in our understanding of slender Orcutt grass population genetics have little immediate conservation implication, given that no take of slender Orcutt grass will be allowed under the SSHCP.

If experimental inoculation of pools is proposed as part of the SSHCP, or as part of the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005), appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are consistent with what we know and do not know about slender Orcutt grass ecology and population genetics.

APPENDIX B (Continued)

6.5.11 Critical Population Size

Critical population size is a statistical estimate that defines the minimum number of individuals required for a population to maintain itself over generations, through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since slender Orcutt grass is an annual species, its population sizes are known to be highly variable from year to year, and the soil seed bank constitutes an important demographic component of the population, definition and assessment of a critical population size is impracticable and lacks ecological meaning.

Knowledge of critical population size provides an ecologically meaningful and quantifiable benchmark for adaptive management purposes (e.g., if monitored populations drop to within 30 percent of critical population size, site-specific analysis, appropriate management changes and additional monitoring should occur). This is not possible for annual species, so other measurable benchmarks are needed.

For purposes of the SSHCP, it may best be assumed that assessment of multi-year population vigor trends along with habitat condition may better serve as an indicator of long-term population viability, rather than trying to define what a critical number of individuals required for population viability might be.

6.5.12 Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, it appears that slender Orcutt grass populations depend on a substantial reserve of dormant seed stored in the soil as a buffer against single year and multiple-year cycles of unfavorable hydrological conditions. This population parameter has only been measured in a few pools during one growing season (Griggs 1980). There have been no other studies addressing spatial or temporal variability of seed abundance in the soil seed bank or longevity of dormant seeds.

From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

APPENDIX B (Continued)

6.5.13 Unknown Aspects of Experimental Inoculation

Since there are so few natural populations of slender Orcutt grass in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied slender Orcutt grass habitat, create meta-population structure at extant occurrences where single pools now support the species, and ensure existence should any natural populations become compromised.

In addition to complete protection and enhancement of natural populations, it has been suggested that experimental inoculations may be desirable for Orcuttieae conservation (Griggs and Jain 1983; Griggs pers. comm.). The experimental establishment of a Sacramento Orcutt grass population at Phoenix Field (CNDDB occurrence #15), now 25 years-old, provides some indication of the probable success of inoculating suitable habitat and creating self-sustaining populations. However, not all experimental inoculations attempted during the research of Griggs were "successful." (Griggs pers. comm.). Inoculations of slender Orcutt grass planted in Tehama County into artificial pools have had marginal success due to excessive ponding and competitive exclusion from Cattails. These Occurrences (CNDDB Occurrence # 72, #73 and #74) are rank as "poor" and the current population trends are "unknown." The population genetics and long-term viability of artificially inoculated population for Orcutt grasses are unknown.

Uncertainties regarding the political ramifications and ecological effectiveness of experimental inoculation lead the conservation community and Agencies to not consider experimental inoculation as an appropriate conservation goal. Given the ecological characteristics of slender Orcutt grass though, preservation of unoccupied slender Orcutt grass habitat alone will likely do little for the conservation or recovery of this species.

6.5.14 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant slender Orcutt grass occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of slender Orcutt grass, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect slender Orcutt grass and other native plant species.

If air pollution becomes such a problem that slender Orcutt grass is affected, few management options will exist to change conditions for this species.

6.5.15 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for slender Orcutt grass populations within the implementation period of the SSHCP, or at some time beyond.

6.5.16 Unknown Number of Undiscovered Populations

Additional unsurveyed potentially suitable habitat exists within the Plan Area, principally on the larger private dry-land ranches that harbor well-developed vernal pools and vernal pool complexes. Authorities generally consider slender Orcutt grass as one of the more completely understood species with regard to distribution and frequency (Stone, Taylor, Macdonald, Griggs, 2002 pers. comm.), owing primarily to typical association with only the best developed of vernal pools and seemingly natural restricted range; however, it is also acknowledged that a limited number of additional populations could be yet discovered as the remaining large tracts become surveyed.

It is very unlikely however, that enough populations remain to be discovered to justify a future change in the conservation status of slender Orcutt grass (Stone, Taylor, Witham, Griggs pers. comm.).

It is assumed for the SSHCP that most, but perhaps not all extant populations of slender Orcutt grass are already known. It is further assumed that since there are so few natural populations and the probability of finding a substantial number more is low, that all populations yet discovered are of great conservation importance and should receive the same protection and management.

6.6 Literature Cited

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Dept. of Fish and Game, Redding, California.

APPENDIX B (Continued)

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. In: Castri, F di, Mooney, H.A. (eds) Mediterranean type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Clark, G.M., T.J. Roscoe, M.J. Van Ess, and N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

APPENDIX B (Continued)

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 1981. Life histories of vernal pool annual grasses. *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, F.T. and S.K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. Biological *Conservation* 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hickman, J.C. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley, California.

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., and V.I. Dains, 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

APPENDIX B (Continued)

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*. 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18: 18-29.

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J. R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. American Journal of Botany 69: 1082-1095.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley California.

Soil Conservation Service (SCS). 1993. United States Department of Agriculture Soil Conservation Service. Soil Survey of Sacramento County, California. Sacramento, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

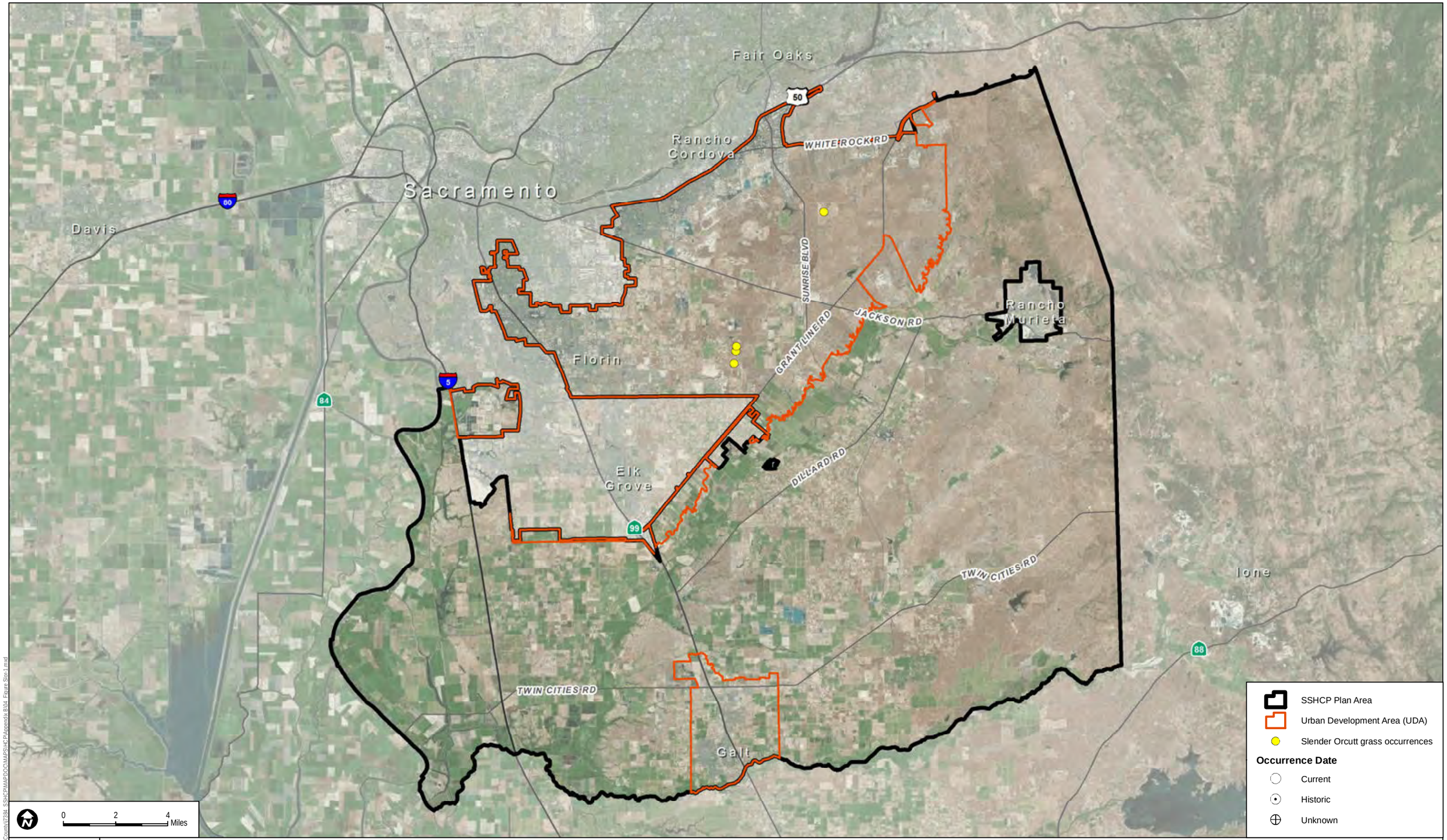
United Stated Fish and Wildlife Service (USFWS). 1997 Determination of Endangered Status for *Orcuttia pilosa*, *Orcuttia viscida*, *Tuctoria greenei* and Threatened Status for *Castilleja campestris* ssp *succulenta*, *Chamaesyce hooveri*, *Neostapfia colusana*, *Orcuttia inaequalis* and *Orcuttia tenuis*. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

United Stated Fish and Wildlife Service (USFWS). 2003. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule August 6, 2003. Portland, Oregon. Federal Register. Vol. 68:46683 U.S. Fish and Wildlife Service Publication.

United Stated Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE SLOG-1

Slender Orcutt Grass Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0284 SSHCP\MAPS\CMAPS\HCP\Planning\fig 8104 Figure Slog-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

7 SACRAMENTO ORCUTT GRASS (SAOG)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Sacramento Orcutt Grass (SAOG)

(Orcuttia tenuis)

Status USFWS: Endangered

Status CDFG: Endangered

Status CNPS: 1B.1

7.1 Legal Status

Sacramento Orcutt grass (*Orcuttia viscida*), also commonly called sticky Orcutt grass, was first listed as state Endangered by the California Department of Fish and Game (CDFG) under the California Endangered Species Act in 1988 (Stone et al. 1988), and on March 26, 1997 the species received listing by the United States Fish and Wildlife Service (USFWS) as Endangered under the Federal Endangered Species Act (USFWS 1997). The California Native Plant Society (CNPS) includes Sacramento Orcutt grass as a CNPS List 1B.1 species and has assigned an R-E-D Code of 3-3-3, meaning it is distributed in several highly restricted occurrences, or present in such small numbers that it is seldom found and reported, it is endangered throughout its range, and found only in California (CNPS 2010).

7.2 Life History and Ecology

7.2.1 Species Description and Life History

Sacramento Orcutt grass is a member of the distinctive Orcuttieae Tribe of the grass family (Poaceae), a group of nine vernal pool species endemic to California and northern Baja California. The Orcutt grasses have been long recognized by botanists as highly evolved, ecologically unusual and naturally restricted (Hoover 1941; Crampton 1959; Reeder 1965, 1980, 1982).

As with other members of the tribe, Sacramento Orcutt grass is a relatively small-stature annual species. Its three to 10 centimeter-long, densely hairy-sticky stems are tufted and mostly erect to spreading with age. Like the stems and inflorescences, the two to four

APPENDIX B (Continued)

millimeter-wide leaves are also hairy and densely covered with a sticky, highly aromatic exudate. Small scale-bracted flowers (florets) are arranged in dense two-ranked, flattened spikelets that are more or less overlapping and clustered together into exserted terminal three to five centimeter-long spikes (Hickman 1993).

Sacramento Orcutt grass is most readily distinguished from its closest relatives California Orcutt grass (*O. californica)* and San Joaquin Valley Orcutt grass (*O. inaequalis*) on the basis of having five unequal lemma lobes with the central lobe being the longest, the large lemma size (six to seven millimeter), lemma awn length (greater than one millimeter), and comparatively long fruit (± 2.5 millimeter) (Hickman 1993). These morphological characters were first used to circumscribe the taxon as *O. californica* var. *viscida* (Hoover 1941). Subsequent study of morphology, chromosome number and seed protein composition justified elevation of both varieties *O. tenuis* and *O.inaequalis* to specific rank (Reeder 1980, 1982).

All Orcutt grasses are very highly evolved and uniquely adapted members of the endemic vernal pool flora. Their anatomy and physiology (Keeley 1981, 1990, 1998), morphology, and life history traits (Crampton 1959; Griggs 1974, 1980, 1981) are highly adapted to the stressful, more extreme portions of the vernal pool niche. Some adaptive traits (physiology, anatomy, morphological-distinct life history stages) confer ability of individuals to survive the varied stresses of a single hydrological season, while others (e.g., annual habit, precise germination cues, stored soil seed bank, indeterminate flowering, dispersal-limiting traits) confer population stability through time in the context of year-to-year hydrological uncertainties that characterize the prevailing Mediterranean Climate (Griggs 1980; Stone et al. 1988).

Evolution of the annual growth habit is a key adaptation of Sacramento Orcutt grass to vernal pool habitat, as is the case with almost all other vernal pool plants (Griggs and Jain 1983; Holland 1987). The annual growth habit allows populations to persist through the regular and extreme summer drought that is characteristic of California's vernal pool landscape (Stone et al. 1988).

Sacramento Orcutt grass seeds germinate during the later spring months after cessation of winter rains and as the shallow water at the pool margins begins to warm and recede (Griggs 1974; Holland 1987; Stone et al. 1988). A requirement of cold stratification followed by increasingly warm fluctuating diurnal temperatures and the presence of a symbiotic aquatic fungus that has been determined necessary for Orcutt grass seed germination (Griggs 1980, 1981; Keeley 1988). Sensitivity to these environmental cues ensures germination only during years with hydrological conditions favorable for plants to complete their entire life cycle (Griggs 1980, 1981; Stone et al. 1988).

Sacramento Orcutt grass is thought to be the most specifically adapted of the genus with regard to suitable hydrology (Stone et al. 1988). It has been observed to be the least likely to germinate

APPENDIX B (Continued)

during years of marginal precipitation (Holland 1987). During a 14 year-long observation period at one population (CNDDB Occurrence #15), it was determined that Sacramento Orcutt grass numbers peaked in years when heavy rains (greater than 40 centimeters [15.7 inches]) occurred in the period from November through April and vernal pools remained inundated longer than usual (Holland 1987).

Members of the genus *Orcuttia* develop long (approximately 10 centimeters), thin (one to two millimeters-wide) juvenile leaves that float on the water surface when seeds germinate under shallow water or when seeds become submersed shortly after germination (Hoover 1941; Griggs 1974, 1980, 1981; Reeder 1982). By facilitating light exposure and atmospheric gas exchange for photosynthesis while submersed, these amphibious juvenile leaves maximize vegetative growth before vernal pool dry-down (Griggs 1981; Stone et al. 1988; Keeley 1990).

Orcutt grass plants are able to produce most of their above-ground vegetative growth, as well as flowers and seed as the vernal pools dry down in late spring and early to mid-summer (Crampton 1959). Vegetative and phenological demographics appear to be largely determined by pool dry-down rate (Griggs 1974, 1980; Stone et al. 1988). Thus, mature fruiting plants in drying soil above the waterline and submersed seedlings further toward the center can occur simultaneously in a single pool.

Indeterminate growth of new stems and spikelets provides for prolonged productivity as seasonally available water allows (Griggs 1974, 1980). This habit may result in smaller plants with fewer flowers and seeds maturing earlier in the season at the pool margins, and later maturing, larger, more fecund plants towards the pool center. This morphological and phenological plasticity confers an adaptive advantage in the context of extreme seasonal fluctuations and the unpredictable year-to-year variability of the Mediterranean Climate (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988).

Since Orcutt grasses mature in a terrestrial setting during the hotter, more xeric late spring and summer months, possession of the C_4 photosynthetic pathway and Krantz Anatomy (Griggs 1980; Keeley 1990, 1998) are important adaptive traits. This photosynthetic pathway allows plants to exchange atmospheric gasses with increased efficiency and concomitant reduction in water loss to evaporative transpiration. This permits the extended period of vegetative growth and reproduction of Orcutt grasses into the hot arid summer months after most other vernal pool associates have completely desiccated (Griggs 1980; Stone et al. 1988).

All Orcutt grasses possess an aromatic sticky glandular exudate on the stems, leaves and inflorescences. This trait, particularly well developed in Sacramento Orcutt grass, is thought to be advantageous both as an anti-desiccation (Hoover 1941; Crampton 1959) and anti-herbivory

APPENDIX B (Continued)

adaptation (Griggs 1974, 1980). Grasshoppers can exert significant herbivory pressures late in the season although it has not been noted for Sacramento Orcutt grass specifically.

Sacramento Orcutt grass plants flower and set seed as the margins and basin of the vernal pools dry from April through July (CNPS 2010). Detailed pollination and breeding experiments have not been conducted on this species. Like most other grasses, Orcutt grasses are thought to be primarily wind-pollinated out-breeders as indicated by protogynous floral maturation, strongly exserted anthers and measured patterns of genetic variation (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988). In one instance, native solitary bees of the family Halictidae were observed collecting pollen from Sacramento Orcutt grass plants (Griggs 1974).

Seed production of Orcutt grass plants is known to vary greatly between individuals along moisture gradients within single pools, among populations between pools, and within pools between years (Griggs 1980; Griggs and Jain 1983). Fully mature Sacramento Orcutt grass individuals can produce from 0 to over 600 seeds per plant. Seed set in Orcutt grasses appears uncertain and dependent on precise synchrony of appropriate environmental conditions and phenological development (Stone et al. 1988).

After the growing season, the mature Sacramento Orcutt grass seeds are held tightly within maternal floral structures (lemma and pelea) on the inflorescence until the mechanical action of wind, heavy rain and winter inundation shatter the inflorescences and release the mature florets. This lack of dispersal is thought to be an adaptation to the very sparsely scattered distribution of suitable large vernal pools (Griggs 1974, 1980). It is an advantage for a large proportion of the seed crop to remain within the available large-pool habitat, rather than chance loss to unsuitable uplands. Even though dispersal is naturally limited, Orcutt grass colonization of pools was probably a more frequently occurring event in the historic past when there were likely more populations, many more pools, more pool interconnectivity, exceedingly larger waterfowl migrations, and unfenced roaming ungulates (Griggs 1980).

Not all *Orcuttia* seeds germinate every year, resulting in the buildup of a dormant soil seed bank (Griggs 1974, 1980, 1981). The soil seed bank is a critical adaptive barrier against local extinction events that could otherwise result from the unpredictable occurrence and duration of favorable growing conditions (Stone et al. 1988). In a study of one Sacramento Orcutt grass population, 44 seeds were found dormant in the soil for every one growing plant present (Griggs 1980; Griggs and Jain 1983). Between-population and between-year variation in soil seed bank density and the duration of seed viability in the soil is unknown. The soil seed bank also may contribute to overall genetic diversity of populations, as seeds stored over multiple years produced under varying growth conditions may harbor adaptive allelic combinations that are infrequently expressed or selected for.

APPENDIX B (Continued)

Studies of seed weight and allozyme electrophoresis indicate that Orcutt grasses possess low levels of gene flow between populations, and high levels of gene flow within (Griggs 1980, 1984; Griggs and Jain 1983). This is to be expected given the highly insular distribution and seasonally dynamic nature of vernal pool habitat (Stone et al, 1988). These studies also revealed very high levels of genetic diversity within the seed families of individual plants, with almost 50 percent of each species' genetic variation represented in samples from one plant. In addition, approximately 80 to 90 percent of the total genetic diversity of each species was represented in each population (Griggs 1980, 1984; Griggs and Jain 1983). It should be noted that this study was limited to assaying four enzyme systems from two populations of Sacramento Orcutt grass.

7.2.2 Habitat Requirements and Ecology

Like all grasses in the genus *Orcuttia*, Sacramento Orcutt grass is strictly adapted to habitats possessing vernal pool-type hydrology. The tribe is thought to be a relatively ancient evolutionary group (Griggs 1981; Reeder 1982), descendant from a perennial ancestor related to the Chlorideae Tribe (Keeley 1998). The ancestral entity is thought to have inhabited the marshy margins of the Tertiary-age sea formerly covering the Great Central Valley (Axelrod 1973; Raven and Axelrod 1978). The evolving Orcuttieae lineage adapted to the increasing seasonal stresses as the Mediterranean climate developed and the inland water body receded.

Interestingly and of potential significance to conservation, Sacramento Orcutt grass appears to be the most specific of the genus *Orcuttia* with regard to niche breadth, as indicated by restriction to the largest of pools (Stone et al. 1988), comparatively poor seed germination during marginal hydrologic-seasons (Stone et al. 1988; Holland 1987), and highly limited geographic distribution.

Sacramento Orcutt grass is restricted to the older and more weathered high terrace alluvial landform that comprises the Laguna Geologic Formation (SCS 1993). Soils associated with Sacramento Orcutt grass vernal pools include the Red Bluff-Redding Complex (0 to 5 percent slopes), Redding Gravelly Loam (0 to 8 percent slopes), Corning Complex (0 to 8 percent slopes), and Xerarents-Urban Land San Joaquin Complex (0 to 5 percent slopes). These soils tend to be strongly acidic, an indication of age and weathering (SCS 1993). In addition to being acidic, these soils are gravelly with cobble, and in many places, they possess a shallow, water-impermeable iron-silica hardpan that favors the development of vernal pools (SCS 1993).

Natural restriction of Sacramento Orcutt grass to these alluvial terrace landforms and associated soil series may reflect the propensity of these soils and landforms to develop suitably large vernal pools with appropriate hydrological regimes. Holland and Dains (1990) have shown how landform and soil relate to hydrological characteristics of vernal pools, and how these factors may influence floristic composition. This distribution may also reflect on the biogeography of an

APPENDIX B (Continued)

old geological surface that has remained exposed and relatively undisturbed over geological time, away from lower elevation, more recent alluvial depositions.

Orcutt grasses are strongly adapted to the more extreme hydrological cycles encountered in the spectrum of vernal pool types (e.g., they are typically associated with larger or deeper vernal pools that tend to possess more extreme regimes of inundation) (Crampton 1959; Griggs 1974). Of the members of the genus *Orcuttia*, Sacramento Orcutt grass tends to occupy the larger, more hydrologic-extreme pools. Vernal pools occupied by Sacramento Orcutt grass documented prior to 1988 range in size from 100 square meters (~120 square yards) to 10 hectares (~25 acres), and among the 10 pools measured, the median pool size was found to be 2,800 square meters (~3,349 square yards) (Stone et al. 1988). Upslope watershed area (Area of Drainage) associated with occupied pools was reported by Stone et al. (1988) to range from 0.5 to 123 acres among the known occurrences.

Since 1988, additional smaller pools within one of the pool complexes located east of Mather Air Force Base were found to support this species (CNDDB Occurrence #6) (CDFG 2010). Even though Sacramento Orcutt grass can be found in smaller pools (as measured by surface area), it is important to consider that even these are relatively deep, exhibit characteristics of well-developed vernal pool hydrology (Preston 2002 pers. comm.), and are situated in relatively close proximity to more typical, large pools within the 123-acre drainage area reported by Stone et al. (1988).

Vernal pool hydrology has not been precisely defined for any of the Orcutt grasses. In general, ponding must be of sufficient duration and under the appropriate seasonal temperature regime to release the seeds from dormancy through decomposition of maternal floral structures in the presence of a symbiotic aquatic fungus (Griggs 1980; Griggs and Jain 1983; Keeley 1988). The depth or duration of pool inundation are also likely factors excluding other less specialized, but obligate, vernal pool species from the barren micro-sites located in the deeper parts of pools that are inhabited by Sacramento Orcutt grass.

Ponding cannot be so excessive though, as to foster the recruitment and proliferation of native perennial marsh species, in particular common spikerush (*Eleocharis macrostachya*) (Crampton 1959; Stone et al. 1988; CDFG 2010). This potentially aggressive rhizomatous species is usually only found in the deepest portions of the more well developed natural vernal pools. In such cases where it co-occurs with Sacramento Orcutt grass, the latter grows mostly in barren areas lacking the spikerush (Stone et al. 1988). Prolonged duration of ponding resulting from placement of berms, construction of road surfaces, or urban development in the vicinity of natural pools appears to have resulted in increase vigor of common spikerush with concomitant loss of Sacramento Orcutt grass vigor in three pools in the complex east of Grant Line Road (CNDDB Occurrence #6) (Jones and Stokes 1990, 1998). Hydrological alteration and proliferation of

APPENDIX B (Continued)

common spikerush may also have negatively affected Sacramento Orcutt grass habitat at two Phoenix Field occurrences (CNDDB Occurrences #5 and 15) and the occurrence immediately east of Mather Air Force Base (CNDDB Occurrence #17; Preston pers. comm.).

Sacramento Orcutt grass occurs in pools with other vernal pool endemics, including Howell's quillwort (*Isoetes howelii*), coyote thistle (*Eryngium castrense*), dwarf wooly marbles (*Psilocarphus brevissimus*), flowering quillwort (*Lilaea scilloides*), stalked popcorn-flower (*Plagiobothrys stipitatus*), common spikerush, pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), legenere (*Legenere limosa*), white-headed navarretia (*Navarretia leucocephala*), double-horned downingia (*Downingia bicornuta*), goldfields (*Lasthenia* spp.) and hairy pepperwort (*Marsilea vestida*) (CDFG 2010). Many of these other vernal pool species however, do not appear to tolerate the hydrologic extremes of prime Sacramento Orcutt grass habitat. They complete their life cycle earlier in the season, and are therefore confined to the shallower margins or slopes of the deeper pools that support Sacramento Orcutt grass (Crampton 1959; Stone et al. 1988).

Hydrological stresses associated with vernal pools, and Orcutt grass pools specifically, exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*) are two non-native facultative wetland species that typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. They cannot however, tolerate the more extreme inundation regimes of deeper Orcutt pools. Thatch build-up from Italian rye grass, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmer 2001)

Several non-native weedy hydrophytes may however, present problems within the deeper portions of occupied Orcutt pools through competitive exclusion (as with common spikerush). Mannagrass (*Glyceria occidentalis*), an aggressive weed of irrigated agriculture and degraded vernal pools has already been reported as a potential problem at two of the known Sacramento Orcutt grass populations (CNDDB Occurrences #16 and #17). Although not recorded from any Sacramento Orcutt grass populations, other non-native aggressive species that can become problematic in deeper Orcutt grass-type vernal pools include rosy Lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*), swamp pricklegrass (*Crypsis schoenoides*), Bermuda grass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*) (Dittes pers. obs.). Cocklebur (*Xanthium strumarium*), another native species, can also come to dominate portions of Orcutt grass-type pools (Schlising, Unger pers. comm.).

Appropriately timed dry-pasture livestock grazing regimes are generally thought to be compatible with Orcutt grass populations, and may even enhance habitat in situations where Common spikerush may otherwise predominate (Stone et al. 1988; CDFG 2010). By grazing from late fall, into early to mid-spring months, livestock are generally kept from the occupied portions of Orcutt grass pools by standing water, inundated soil and attraction to abundant green forage in the uplands. Most problems with livestock grazing arise from later spring and summer grazing regimes, when the Orcutt grass pools have dried and flowering and fruiting plants are exposed and vulnerable to trampling and cropping (Stone et al. 1988). In addition, during the later season when the upland forage has dried, the moist bottoms of vernal pools become highly attractive and may suffer increased trampling and hoof-pocking (Dittes pers. obs).

As an example of the role of timing in relation to potential disturbance response, Hoover (1941) and Crampton (1959) have reported Orcuttieae populations being completely disked in dry-farmed grain fields in the late fall, without apparent detriment to the populations the following growing season. It has been noted that the same disking performed during the late spring or summer growing periods may completely deplete the soil seed bank and extirpate the population if performed over successive years (Stone et al. 1988).

7.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Sacramento Orcutt grass are identified in Table SAOG-1 and have been derived from the USFWS's list of primary constituent elements in the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table SAOG-1
Essential Habitat Elements for Sacramento Orcutt Grass

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

APPENDIX B (Continued)

7.3 Species Distribution and Population Trends

7.3.1 Species Distribution

Sacramento Orcutt grass occurs only in southeastern Sacramento County near the juncture of the Sierra Nevada foothills and eastern edge of the Sacramento Valley, qualifying it as the most geographically restricted member of the genus *Orcuttia*. There are no historic records or collections of this species made outside of this area (Stone et al. 1988; CDFG 2010). This distinction may partially reflect the previously mentioned observations of Holland (1987) and Stone et al. (1988) regarding its relatively high level of ecological specialization and comparatively narrow habitat requirements. This distribution also may reflect the fact that the largest, most hydrological stable pools located at lower topographical positions in the Central Valley were the first to have been lost to agriculture in the latter 19th and early 20th centuries, before the pioneering collections of Hoover and Crampton were made.

7.3.2 Central Valley Distribution

Sacramento Orcutt grass occurs within a narrow swath of remnant high terraces that lay near the juncture of the Northern Sierra Nevada Foothill and Sacramento Valley Biogeographic Provinces (Hickman 1993), between 110 and 270 feet in elevation (CDFG 2010). The recorded range of the species extends in a narrow band of habitat from the terrace just north of the American River in the vicinity of Orangevale, south approximately 26 miles to the vicinity of Rancho Seco Lake on the Arroyo Seco Mesa (see Figure SAOG-1 for the distribution of records of Sacramento Orcutt grass within Sacramento County).

Nine extant (and one extinct) CNDDB occurrences are recorded from within this narrow north-to-south oriented band (CDFG 2010). These ten CNDDB occurrences are clustered among three geographically defined regions, hereafter referred to as the northernmost, central, and southernmost population centers (CDFG 2010).

The northernmost of the three Sacramento Orcutt grass population centers, located on the alluvial terrace north of the American River, is comprised of three CNDDB occurrences. The northernmost occurrence, located near Orangevale, is extinct (CNDDB occurrence #4). One occurrence, comprised of one occupied vernal pool, is located further south at Phoenix Field (CNDDB occurrence #5). An artificially introduced population is located in a single vernal pool at nearby Phoenix Park (CNDDB occurrence # 15). It has been suggested that since the Phoenix Park Occurrence has established from seed derived from the Phoenix Field occurrence, the two are best considered as one genetic population. The northernmost population center (CNDDB occurrences #4, #5, and #15) is located outside of the Plan Area.

APPENDIX B (Continued)

7.3.3 Range within the Plan Area

The central population center is located on the terrace landscape east of Mather Air Force Base in the vicinity of the Laguna Creek watershed. As measured by the number of CNDDB occurrences, number of occupied pools and past estimates of the number of individuals, this population center comprises the core of the species' currently known distribution (CDFG 2010; Stone pers. comm. 2002). Within an area spanning approximately seven miles by four miles, six CNDDB occurrences are known. This central Sacramento Orcutt grass population center lies within the Plan Area, however four of the occurrences are included within the UDA (CNDDB occurrences #17, #18, #19 and #20) and two occurrences are in the Keifer Landfill area outside of the UDA (CNDDB occurrences #1 and #6).

The southernmost population center, comprised of just one occurrence (CNDDB occurrence #16), is located approximately three miles north of the Sacramento-San Joaquin County Line near Rancho Seco Lake. This population is located approximately 14 miles south of the next nearest population. This southernmost site is located within the Plan Area, but outside of the Sacramento UDA. Though the distribution of the species is extremely disjunct, the range of the species in the Plan Area is considered to be vernal pools and vernal impoundments.

7.3.4 Population Levels and Trends

It is impossible to determine the number of historically occurring Sacramento Orcutt grass populations or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before these species first received attention (Stone *et. al*. 1988). Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978). Owing to habitat specificity (restriction to largest pools), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for Sacramento Orcutt grass (Stone et al. 1988). Concerns over loss of Orcutt grass populations and habitat were expressed beginning with some of the earlier investigators (Hoover 1941; Crampton 1959, 1976; Griggs 1974).

The first collections of Sacramento Orcutt grass were made by Hoover in 1941. At that time, much habitat had already been lost, including some of the larger, lower terrace pools that occupied sites most favorable to agricultural development. Since 1941, a total of only 30 occupied vernal pools have been recorded, two of which (CNDDB occurrence #4 and portion of CNDDB occurrence # 6) were extirpated by 1988 (Stone et al. 1988, CDFG 2010). By 1991, the USWFS stated that the trend for Sacramento Orcutt Grass is one of rapid decline (USFWS 1997).

APPENDIX B (Continued)

There has been no comprehensive effort to monitor all populations of Sacramento Orcutt grass. Informal monitoring projects have been conducted by the CDFG at the Phoenix Field Ecological Preserve, by Holland at the Phoenix Park Vernal Pool Preserve, and by Jones and Stokes at the Kiefer Landfill sites (Preston pers comm.). Stone et al. (1988) also provided estimates of populations at all occurrences visited in 1986 and 1987. Population estimates recorded for Sacramento Orcutt Grass are summarized in Table SAOG-2.

Table SAOG-2
Sacramento Orcutt Grass Population Estimates for Eastern Sacramento County

CNDDB Occurrence #	Occurrence # of pools observed	Range of population estimates
1	1	1986-87: "numerous" 1995: 400,000 1998: 138,000
5	1	1986: >200,000 1994-96: >100,000 1997: 9,500
6	6-19	1990: "thousands" 1995: >1,000,000 1998: 129,000
15	1	1978: (0) pool seeded 1985: >1,000 1986: >10,000 1991: >1,000 1995: ~ 100,000 1996: 35 1997: 1,000
16	1	1986: ~500 1987:200 1993: < 20 (M. Gause) 1995: 300
17	1	1987: >10,000 1995: >10,000
18	1	1987: 1,000
19	4	1994: "hundreds" 1995: 1,200,000
20	Unknown	Unknown

Source: CDFG 2010; Stone et al. 1988

These data (**Table SAOG-2**), and the research of others indicate that abundance within Orcutt grass populations varies greatly between species, between populations within species, and within populations through years (Griggs and Jain 1983; Holland 1987). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in

available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), and Greene's tuctoria (*Tuctoria greenei*) at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Orcutt grass population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

7.4 Threats to the Species

Potential direct threats to Sacramento Orcutt grass include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, construction and maintenance of firebreaks, roads, and utility corridors, inappropriate livestock grazing regimes (later spring/summer rotations), grassland fires, recreational vehicles, equestrian and pedestrian traffic, and refuse dumping.

Potential Indirect threats to Sacramento Orcutt grass include hydrological alteration of sub-watersheds by surrounding developments and land uses, shifts in competitive interactions (hydrology-mediated or invasive weeds), windblown refuse accumulation, point and non-point source water pollution, air pollution, and global climate change.

Preserves currently established or in the process of becoming established that include Sacramento Orcutt grass are the Sunrise-Douglas Mitigation Bank and the Kiefer Landfill Wetland Preserve. The Sunrise-Douglas preserve encompasses approximatly 480 acres of vernal pool annual grassland habitat supporting two CNDDB occurrence (CNDDB occurrence #17 and #18). The proposed Kiefer Wetland Preserve will encompass two CNDDB occurrences (CNDDB occurrence #1 and #6), encompassing 19 occupied pools, and an undetermined number of acres of annual grassland vernal pool habitat. The remaining Sacramento Orcutt Grass Occurrences in the Plan Area (CNDDB occurrences #16, #19 and #20) remain unprotected.

The USFWS has designated critical habitat areas for Sacramento Orcutt grass that encompasses all of the known 0ccurrences and a large portion of the remaining potentially suitable habitat.

7.5 Data Gaps and Conservation Implications

Grasses of the Tribe Orcuttieae, including Sacramento Orcutt grass, are among the most studied and best known of all vernal pool plant species and vernal pool species assemblages. As

previously discussed, researchers have variously addressed taxonomy and biogeography, biology, ecology, breeding system, population genetics, habitat relationships, population levels, trends and threats. Even with the attention of researchers and relatively extensive body of information, data gaps with varying implications for conservation remain including:

7.5.1 What Constitutes Population Vigor, and How to Measure?

Population vigor will need to be monitored during the life of this SSHCP, yet a good measure of Orcutt grass population vigor is difficult to define, given the highly variable year-to-year abundance within populations (Holland 1987; Griggs pers. comm. 2003). The contribution of the stored soil seed bank to population numbers and population genetic diversity is an important, but currently unknown factor as well. Furthermore, even if a trend at the population level is discerned, causative factors contributing to year-to-year population fluctuations may be very difficult to identify (Alexander and Schlising 1997). Therefore, trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

7.5.2 Specific Hydrological Requirements of Sacramento Orcutt Grass

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting Sacramento Orcutt Grass populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate). At the same time, It is also important to note that Sacramento Orcutt Grass is cited as one of the more specifically adapted species of the genus, inhabiting the more well-developed of vernal pools, and one of the least likely to germinate during years with marginal precipitation (Holland 1987; Griggs pers. comm.). The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of Sacramento Orcutt Grass-vernal pool habitat within established preserves. Similarly, assessment of potentially suitable Sacramento Orcutt grass habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing Sacramento Orcutt grass populations are established, assessed and monitored over time, a more quantifiable definition of suitable Sacramento Orcutt grass -vernal pool hydrology may be developed.

7.5.3 Baseline Hydrological Trend of Pools and Existing Indirect Effects

Most of the Sacramento Orcutt grass populations have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds. Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown. Baseline Sacramento Orcutt grass

conditions for the SSHCP are not pristine, so if trends in vigor or habitat quality become apparent during the 50-year period or at some time beyond, it may be difficult to attribute trend to any specific management activity.

7.5.4 Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990). The geo-hydrologic investigation of Hanes and Stromberg (1998), conducted at a single site over three years in eastern Sacramento County, addresses aspects of vernal pool hydrology that are important to consider in formulation of hydrological buffers (e.g., relationship between pool basin hydrology and surrounding upland soil profile).

Proposed preserve designs may not afford complete protection to the hydrological systems that support Sacramento Orcutt grass and other species assemblages dependant on them without more information on appropriate scale hydrologic buffers.

7.5.5 Definition of Appropriate Scale Sacramento Orcutt Grass -Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective Sacramento Orcutt grass -vernal pool preserves. It is a paradigm of conservation biology that “bigger is better” for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale Sacramento Orcutt grass -vernal pool preserve at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998). Proposed preserve designs may not afford complete protection to the ecosystems that Sacramento Orcutt grass and other species assemblages depend on without more information on appropriate scale of preserve area.

7.5.6 Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the Sacramento Orcutt grass -vernal pool preserves, primarily for purposes of upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with Sacramento Orcutt grass -occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002; Burmester pers. comm). It is important to note that Sacramento Orcutt grass and other members of the Orcuttiae tribe do persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems.

Presently, Witham et al. are formulating site-specific livestock grazing regimes for annual grassland-vernal pool systems in an area of Sacramento County (Witham pers. comm.). Livestock grazing regimes in Sacramento Orcutt grass -vernal pool preserves covered under the SSHCP will tier towards the results of this work, as well as to the specific needs of Sacramento Orcutt grass. Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

With regard to compatible grazing regimes, timing of grazing appears far more important than stocking rate, grazing intensity, or duration of rotation in annual grassland pasture systems that support Orcutt grass-occupied vernal pools (Stone et al. 1988; Griggs 2000; Griggs pers. comm.). During the inundated period of the vernal pool cycle (generally late fall through mid-to late spring), germinating seed and establishing aquatic-phase seedlings are afforded protection from trampling and grazing by a general aversion of cattle to standing water, as well as attractive forage in uplands. Even if some cattle congregate at the edge or meander into or across the pools while inundated, germinating seeds in the deeper portions of the pools are unaffected, the vast majority of the pool substrate escapes trampling and nothing is eaten.

Conversely, grazing during the dry-down period or terrestrial phase, when plants are flowering and setting seed can be detrimental to the season's flowering effort and seed crop (generally mid-to late spring through the summer and early fall months). Given multiple years of improperly timed grazing and seed loss (both from standing crop and exhaustion of soil seed bank), populations may decline in vigor and may even be extirpated.

7.5.7 Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in Orcuttiae-occupied vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, lippia, paradox canary grass and cocklebur. Of these, western mannagrass and common spikerush presently co-inhabit Sacramento Orcutt grass -occupied vernal pools. Any of these, as well as currently unknown, species may appear or change in abundance in Sacramento Orcutt grass -occupied pools over time.

Potential competitive interactions with these species may affect the vigor of Sacramento Orcutt grass populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect Sacramento Orcutt grass populations

APPENDIX B (Continued)

7.5.8 Unknown Relationship Between Landform/Soil Chemistry and Bio-Geographic Distribution

As previously mentioned, Sacramento Orcutt Grass has a strong geographic association with old alluvial terraces possessing soils primarily of the Redding, and to a lesser extent, Red Bluff Families (Laguna Geological Formation). This association has proven useful in predicting the location of new populations, as indicated by the southernmost discovery on Llano Seco Mesa (Stone 2002 pers. comm.). The exact nature of this relationship is however unknown. Does pH or some other factor influence Orcutt grass population vigor, or do soil associations with tendency to develop and support large vernal pools/hydrology, regardless of landform and soil pH, provide suitable habitat? From the perspective of Sacramento Orcutt grass conservation, this uncertainty has bearing on the definition of potentially suitable habitat, which guides surveys and establishment of habitat preserves.

7.5.9 Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to design preserves for multi-species conservation. Suitability of Sacramento Orcutt grass habitat for supporting other rare plant species has not been specifically addressed, although natural populations of the rare pincushion navarretia, Bogg's-Lake hedge hyssop, and legenere are documented as sharing specific vernal pools with Sacramento Orcutt grass. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between November 1st and May 1st may benefit Sacramento Orcutt grass -associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

7.5.10 Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

It has been determined that *Orcuttia* populations are genetically isolated as well as diverse, the latter both within and between pools (populations), and within the "seed family" of a single reproductive plant. In addition, there is a high degree of localized adaptation and strong intra-pool selective pressures (Griggs 1980; Griggs and Jain 1983). However, investigations of Sacramento Orcutt grass population genetics have been limited to measures of seed size and weight (genetically fixed traits) within and among populations, and electrophoretic study of four enzyme systems in only two populations. These analyses represent a very small portion of the genome and allow limited interpretation of patterns of genetic diversity and limited inference as to uniqueness of a given population. Another potentially important consideration is that there has

been no assessment of the "genetic memory" potentially associated with stored seeds in the soil seed bank. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon.

Current limitations in our understanding of Sacramento Orcutt grass population genetics have little immediate conservation implication, given that no take of Sacramento Orcutt grass will be allowed under the SSHCP. If experimental inoculation of pools is proposed as part of the SSHCP, or as part of the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005), appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are consistent with what we know and do not know about Sacramento Orcutt grass ecology and population genetics.

7.5.11 Critical Population Size

Critical population size is a statistical estimate that defines the minimum number of individuals required for a population to maintain itself over generations through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since Sacramento Orcutt grass is an annual species, its population sizes are known to be highly variable from year to year, and the soil seed bank constitutes an important demographic component of the population, definition and assessment of a critical population size is impracticable and lacks ecological meaning.

Knowledge of critical population size provides an ecologically meaningful and quantifiable benchmark for adaptive management purposes (e.g., if monitored populations drop to within 30 percent of critical population size, site-specific analysis, appropriate management changes and additional monitoring should occur). This is not possible for annual species, so other measurable benchmarks are needed. For purposes of the SSHCP, it may best be assumed that assessment of multi-year population vigor trends along with habitat condition may better serve as an indicator of long-term population viability, rather than trying to define what a critical number of individuals required for population viability might be.

7.5.12 Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, it appears that Sacramento Orcutt Grass populations depend on a substantial reserve of dormant seed stored in the soil as a buffer against single year and multiple-year cycles of unfavorable hydrological conditions. This population parameter has only been measured in a few pools during one growing season (Griggs 1980). There have been no other

studies addressing spatial or temporal variability of seed abundance in the soil seed bank or longevity of dormant seeds. From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

7.5.13 Unknown Aspects of Experimental Inoculation

Since there are so few natural populations of Sacramento Orcutt Grass, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved, but unoccupied Sacramento Orcutt grass habitat, create meta-population structure at extant occurrences where single pools now support the species, and ensure existence should any natural populations become compromised.

In addition to complete protection and enhancement of natural populations, it has been suggested that experimental inoculations may be desirable for Orcuttieae conservation (Griggs and Jain 1983; Griggs pers. comm.). The experimental establishment of one population at Phoenix Field (CNDDB occurrence #15), now 25 years-old, provides some indication of the probably success of inoculating suitable habitat and creating self-sustaining populations. However, not all experimental inoculations attempted during the research of Griggs were "successful" (Griggs pers. comm.), and the population genetics and long-term viability of the artificially inoculated population are unknown.

Uncertainties regarding the political ramifications and ecological effectiveness of experimental inoculation lead the conservation community and Agencies to not consider experimental inoculation as an appropriate conservation goal. Given the ecological characteristics of Sacramento Orcutt grass though, preservation of unoccupied potentially suitable Sacramento Orcutt grass habitat alone will likely do little for the conservation or recovery of this species.

7.5.14 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter. ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant Sacramento Orcutt grass occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Sacramento Orcutt grass, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively,

these pollutants may negatively effect Sacramento Orcutt grass and other native plant species. If air pollution becomes such a problem that Sacramento Orcutt grass is affected, few management options will exist to change conditions for this species.

7.5.15 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology. It is likely that given the expected global climate trends, a vigor response of some kind could be expected for Sacramento Orcutt grass populations within the 50-year implementation period of the SSHCP, or at some time beyond.

7.5.16 Unknown Number of Undiscovered Populations

Additional unsurveyed potentially suitable habitat exists within the Plan Area, principally on the larger private dry-land ranches that harbor well-developed vernal pools and vernal pool complexes. Authorities generally consider Sacramento Orcutt grass as one of the more completely understood species with regard to distribution and frequency (Stone, Taylor, Macdonald, Griggs, 2002 pers. comm.), owing primarily to typical association with only the best developed of vernal pools and seemingly natural restricted range. However, it is also acknowledged that a limited number of additional populations could be yet discovered as the remaining large tracts become surveyed. It is very unlikely however, that enough populations remain to be discovered to justify a future change in the conservation status of Sacramento Orcutt grass (Stone, Taylor, Witham, Griggs pers. comm.).

It is assumed for the SSHCP that most, but perhaps not all, extant populations of Sacramento Orcutt grass are already known. It is further assumed that since there are so few natural populations and the probability of finding a substantial number more is low, that all populations yet discovered are of great conservation importance and should receive the same protection and management.

7.6 Literature Cited

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Dept. of Fish and Game, Redding, California.

APPENDIX B (Continued)

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. *In*: Castri, F di, Mooney, H.A. (eds) Mediterranenan type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist,California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

DeVilla, Bill. Consultant, Owner Ecosystems West, Ben Lomond, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 1981. Life histories of vernal pool annual grasses, *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Senior Restoration Ecologist River Partners, Chico, California.

Griggs, F.T. and S.K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hickman, J.C. (ed.) 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F. and V.I. Dains. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

APPENDIX B (Continued)

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Sacramento Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*, 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18:1 pp. 18-29.

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J.R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. *American Journal of Botany* 69: 1082-1095.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley California.

APPENDIX B (Continued)

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. Soil Survey of Sacramento County, California. United States Department of Agriculture. Sacramento, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Stone, Douglas. Ph.D. Candidate, University of California, Berkeley, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Senior Restoration Ecologist EDAW, Sacramento California.

United States Fish and Wildlife Service (USFWS). 1997. Determination of Endangered Status for *Orcuttia pilosa*, *Orcuttia viscida*, *Tuctoria greenei* and Threatened Status for *Castilleja campestris* ssp *succulenta*, *Chamaesyce hooveri*, *Neostapfia colusana*, *Orcuttia inaequalis* and *Orcuttia tenuis*. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

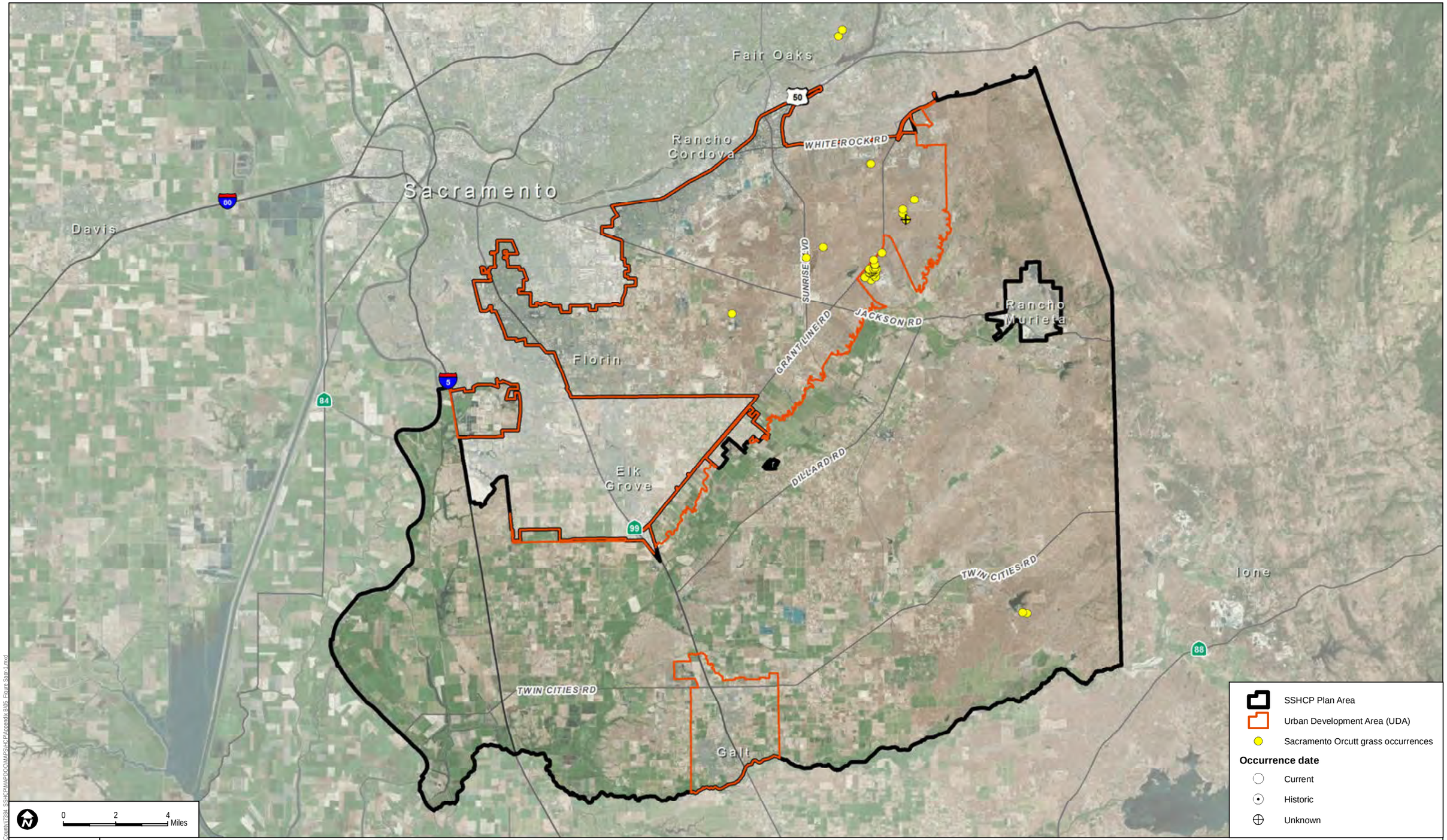
United States Fish and Wildlife Service (USFWS). 2003. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule August 6, 2003. Portland, OR. Federal Register. Vol. 68:46683 U.S. Fish and Wildlife Service Publication.

APPENDIX B (Continued)

United Stated Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

Witham, Carol. Consulting Botanist, Davis, California.

Register. Vol. 68:46683 U.S. Fish and Wildlife Service Publication.



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE SAOR-1

Sacramento Orcutt Grass Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0294 SSHCP\MAPS\CMAPS\HCP\Palmerella B105 Figure Size 1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

8 SANFORD'S ARROWHEAD (SAAR)

Prepared by Dittes and Guardino Consulting (John Dittes and Josephine Guardino)

Sanford's Arrowhead (SAAR)
(Sagittaria sanfordii Green)
Status USFWS: None
Status CDFG: None
Status CNPS: List 1B.2



© 2007 Wendy Fisher

8.1 Legal Status

Sanford's Arrowhead (*Sagittaria sanfordii*), an obligate wetland species, is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a list 1B.2 species by California Native Plant Society (CNPS 2010). It has been assigned an R-E-D Code of 2-2-3, meaning it is distributed in a limited number of occurrences, occasionally more if each occurrence is small, it is endangered in a portion of its range, and entirely restricted to California.

Being a CNPS List 1B.2 plant species, Sanford's Arrowhead meets the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 of the California Endangered Species Act (CESA) of the California Department of Fish and Game (CDFG) Code, and is eligible for state listing. It is mandatory that all CNPS 1B species be fully considered during preparation of environmental documents relating to California Environmental Quality Act (CEQA) (CNPS 2010). Owing to its relatively limited geographic range and ongoing and potential future threats, Sanford's Arrowhead may become a candidate for future agency listing.

8.2 Life History and Ecology

8.2.1 Species Description and Life History

8.2.1.1 Physical Description

Sanford's Arrowhead is a perennial member of the water plantain family (*Alismataceae*). This emergent marsh species possesses a thin elongate underground stem (rhizome) that produces small [8-15 millimeters (0.3-0.6 inches) –wide] spherical tubers (corms) at their apices. New plants (clones), comprised of a cluster of leaves and one to several inflorescence stalks, grow

APPENDIX B (Continued)

from these tubers at the onset of the growing season. Emergent leaves possess sheathing stalks and range from two to ten decimeters (~8-39 inches) in length. The leaves are completely linear and three-angled, or they may possess a narrowly elliptic to lanceolate blade that ranges from five to 15 centimeters (~2-5.9 inches) in length (Mason 1957; Hickman 1993). Plants tend to grow in colonial patches.

The inflorescence is comprised of a naked stem bearing several whorled-series of flowers near the apex. The lowermost inflorescence whorls are typically comprised of three female flowers and the upper whorls are comprised entirely of male flowers. Both male and female flowers possess three white roundish petals with entire margins, as well as three small green narrowly triangular sepals. The petals are deciduous, and as the fruits mature, the flower stalks elongate to two to three centimeters (0.8-1.2 inches) and curve downward relative to the inflorescence axis. Fruits are arranged in dense ovoid head-like clusters, and from a distance superficially resemble green berries. Individual fruit are narrowly flattened side-to-side and possess a small lateral beak at the apex (Mason 1957). Initially, the emergent inflorescence stalk is erect and shorter than the leaves. As the fruits mature the entire inflorescence may recline and float on the surface of the water.

Sanford's Arrowhead is distinguished from its close relatives on the basis of its emergent leaves being narrowly linear to narrow-ovate or lanceolate, in contrast to the sagittate (arrowhead-shaped) leaves of the other Arrowhead species. In addition, only in Sanford's Arrowhead do the stalks of the maturing fruit thicken and curve downward relative to the inflorescence axis; the others possess stalks that remain un-thickened and curved upward (Hickman 1993).

Other than basic taxonomic and biogeographic treatments (Mason 1957; Hickman 1993), Sanford's Arrowhead is mostly unstudied. Existing biological and ecological information is derived mostly from observations of field botanists, primarily as a result of land management and agency-related resource surveys (Gause and Burmester pers. comms.).

Other species in the genus *Sagittaria*, have been variously studied with respect to breeding systems and reproduction (Wooten 1971; Kaul 1985; Delesalle and Muenchow 1992; Muenchow and Blum 1994; Muenchow 1998; Sarkissian et al. 2001; Huang 2003), dispersal and population dynamics (Gordon 1996), seed germination (Keddy and Constabel 1986; Gordon 1996; Leck 1996), seedling-hydrology relations (Keddy and Ellis 1985; Delesalle and Blum 1994), fish and wildlife interactions (Gruenhagen and Fredrickson 1990; Hohman et al. 1990; Muenchow and Delesalle 1992; Gough and Grace 1998; Evers et al. 1998), competitive interactions and community relations (Shaffer et al. 1992), and population genetics and rare plant conservation (Newberry 1991; Edwards and Sharitz 2000). Where applicable, information derived from studies of related Sagittaria species is referenced here for Sanford's Arrowhead.

APPENDIX B (Continued)

8.2.1.2 Ecological Life Cycle

Sanford's Arrowhead shares the perennial clonal growth habit with the vast majority of other endemic emergent marsh plants. Thin elongate rhizomes produce ovoid tubers (corms) at their tips that allow the plant to persist within the submersed substrate through the dormant winter season. New plants (clones) are produced from these tubers at the onset of favorable growing conditions (Mason 1957). Observations have also been made of a Sanford's Arrowhead colony reappearing with vigor following a year during which the habitat failed to flood and aerial leaves and stems were completely absent (Gause pers. comm.). The ability of this colony to withstand at least one year of unfavorable hydrologic conditions and then reappear with vigor is likely attributable to the dormant rhizome and associated tubers/corms.

8.2.1.3 Seed Germination

Seed longevity, after-ripening, dormancy characteristics, germination requirements and optima for Sanford's Arrowhead have not been investigated. Similarly, no observations have been recorded or are otherwise available relating to seed ecology, germination or seedling growth in the field. Many marsh species exhibit soil-seed banking as a dynamic of their population ecology. This trait is unknown for Sanford's Arrowhead.

8.2.1.4 Vegetative Growth

Little is known regarding the dynamics of vegetative growth of Sanford's Arrowhead (e.g., growth rates, rhizome elongation rate or rhizome length, time to reproduction, clone longevity, physiological adaptations, etc.). Sanford's Arrowhead colonies have been observed to persist in a vegetative state throughout the year, without significant seasonal dieback of leaves (Gause pers. comm.).

8.2.1.5 Reproduction

Like many perennial marsh species, Sanford's Arrowhead reproduces asexually by dispersal of fragmented rhizomes and tubers, as well as sexually, via flowering and seed production. The relative contributions of asexual and sexual reproduction to population dynamics (e.g., dispersal, colonization, population growth and maintenance) likely vary by the type of aquatic system (isolated and static versus interconnected and flowing), and the nature of seasonal disturbances (flood, scour, trampling, waterfowl foraging, dredging and other ditch maintenance, etc.).

Sanford's Arrowhead flowers from May through October. As previously mentioned, this species has separate male and female flowers within a single inflorescence. Although pollination and breeding experiments have not been carried out for Sanford's Arrowhead specifically, the separate male and female flowers and well-developed petals suggest an out-

crossing breeding system. Pollination ecology of Sanford's Arrowhead has not been investigated. For two other Sagittaria species, principal flower visitors appeared to be generalist bees as well as assorted wasps and flies (Muenchow and Delesalle 1994). Fecundity has not been addressed for Sanford's Arrowhead.

8.2.1.6 Dispersal

Many perennial marsh species exhibit a comparatively wide geographic range and low morphologic variability (Mason 1957). This may reflect high dispersal potential associated with interconnected watercourses and with actions of migratory waterfowl. Waterfowl, muskrats, beavers and other wildlife readily consume all parts of some Sagittaria species, including seeds and tubers (Mason 1957). In addition, floodwaters likely disperse mature fruits and seeds, as well as fragmented rhizomes and associated tubers.

Evidence of long-distance dispersal and colonization exists in the overall geographic distribution of Sanford's Arrowhead in California, with disjunct northern and southern populations in Del Norte and Orange Counties, respectively. As with other wetland species, natural dispersal of seeds was likely a more frequent event when there were many more wetland acres, more interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming native ungulates.

8.2.1.7 Seed Dormancy

Seed dormancy and stored soil seed banks are characteristics shared by many perennial marsh species. These traits however have not been investigated for Sanford's Arrowhead specifically. In perennial marsh species, the presence of a persistent soil seed bank may facilitate recolonization following prolonged periods of drought. A soil seed bank also ensures germination within barren topographic-hydrologic positions made newly available as water levels recede within drought-affected basins. Perenniating tubers/corms and rhizomes may buffer colonies against at least one year of drought; dormant seeds in the soil profile may further assure persistence over longer periods. Recruitment from persistent seed banks may also contribute over time to genetic diversity of populations that are potentially dominated by clones arising through high rates of vegetative reproduction (Edwards and Sharitz 2000).

8.2.1.8 Population Genetics

Population genetics of Sanford's Arrowhead have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Given the limited number of occurrences in the Plan Area and the widely scattered geographical distribution, all Sanford Arrowhead occurrences should be considered unique, and for the purposes of conservation, important genetic entities.

APPENDIX B (Continued)

8.2.2 Habitat Requirements and Ecology

8.2.2.1 Biogeography and Landform Relations

Sanford's Arrowhead is strictly associated with freshwater marsh hydrology. Since this topographic-hydrologic setting occurs on nearly all landforms supporting rivers, creeks, lakes, ponds and irrigation channels, strong correlations with landforms should not be expected. In addition to numerous Central Valley settings, Sanford's Arrowhead is also recorded from marsh habitats in Orange and Ventura Counties of southern California and from the coastal region of Del Norte County. Sanford's Arrowhead also occurs on the Tuscan Volcanic Formation in the Cascade Range Foothills.

All marsh habitats, natural, modified and man-made, regardless of landform association, should be considered potentially suitable habitat for Sanford's Arrowhead. For the purposes of this HCP, freshwater marsh, open water, and streams/creeks are identified as land-cover types that may contain this species.

8.2.2.2 Hydrology Relations

As previously noted, Sanford's Arrowhead is strictly associated with hydrologic systems supporting emergent marsh vegetation. These include the margins of rivers, streams, ponds, reservoirs, irrigation and drainage canals and ditches, and stock-ponds. This species is reported to inhabit the cracks in concrete-lined irrigation/drainage ditches as well. Sanford's Arrowhead is also reported to occur in several seasonal wetlands with sufficient hydrology for persistence of emergent marsh species. As with other perennial marsh species, Sanford's Arrowhead likely inhabits specific zones defined by depth of ponding. Water depths are reported for only three of the 68 occurrences reported in CNDDB in 2010 (CDFG 2010); these range from four inches to two feet in depth (CDFG 2010). Observations made by some indicate preference for the relatively shallow margins of deeper marsh systems (Gause pers. comm.).

8.2.2.3 Biological Community Relations

Plant species reported as occurring with Sanford's Arrowhead include regionally common emergent marsh species, as well as non-emergent wetland species more typically associated with marsh edges, saturated soil and even disturbed irrigated pastures. At one occurrence, Sanford's Arrowhead is reported as co-occurring with species more typically associated with vernal pools, including the rare legenere (*Legenere limosa*) and dwarf downingia (*Downingia pusilla*) (CDFG 2010).

Regionally common emergent marsh species associated with Sanford's Arrowhead include cattail (*Typha* spp.), other arrowheads (*Sagittaria latifolia*, *S. montevidensis, S. rigida*), water

APPENDIX B (Continued)

plantain (*Alisma plantago-aquatica*), tule (*Scirpus acutus*), yellow or Montevido waterweed (*Ludwigia peploides* ssp. *peploides* or *L.p.* ssp. *montevidensis*, respectively), parrot's-feather (*Myriophyllum aquaticum*), and willow-weed (*Polygonum lapathifolium*).

Co-occurring non-emergent wetland species more typically associated with the margins of permanent marshes, and/or with seasonal marshes, include various umbrella sedges (*Cyperus difformis, C. eragrostis, Cyperus* sp.), lady's-thumb (*Polygonum persicaria*) and assorted native bearded spangletop (*Leptochloa fascicularis*), and non-native perennial grasses barnyard grass (*Echinochloa crus-galli*, purple love grass (*Eragrostis diffusa*), dallisgrass (*Paspalum dilatatum*), Johnsongrass (*Sorghum halepense*) and bristlegrass (*Setaria* sp.). Willow (*Salix* spp.) is reported to share habitat with Sanford's Arrowhead as well (CDFG 2010).

8.2.2.4 Non-Native Weed Relations

Many of the previously mentioned emergent marsh associates, native and non-native alike, can be aggressive competitors. This trait results from vigorous lateral vegetative growth, either underground via rhizomes or stolons, with branching and elongating stems in the water column, or sprawling clambering aerial stems. Some floating species can completely cover the surface of water and mud as well such as mosquito fern (*Azolla* spp.), duckweed (*Lemma* spp.), water hyacinth (*Eichornia crassipes*), young mannagrass (*Glyceria* spp.), and others. Unlike terrestrial habitats, water availability is not a limiting factor for emergent marsh species. Rather, competition between species for available rooting substrate and light impose limits on population establishment, growth and persistence.

As mentioned previously, some of the commonly reported species associated with Sanford's Arrowhead are non-native perennial grasses, many of which are relatively aggressive weeds of marsh edges, irrigation ditches, irrigated pastures, rice fields and seasonal wetlands. In addition, other aggressively weedy wetland species in the region may present competitive problems with Sanford's Arrowhead, including other arrowheads (*Sagittaria* spp.), water plantains (*Alisma* spp., *Damasonium* spp.), water pepperweeds (*Polygonum* spp.), water hyacinth, water-nymph (*Najas* spp.), burhead (*Echinodorus berteroi*), water-milfoil (*Myriophyllum* spp.), waterweeds (*Elodea* spp., *Hydrilla verticillata, Ottelia alismoides*), Brazilian waterweed (*Egeria densa*), pondweed (*Potamogeton* spp.), purple loosestrife (*Lythrum salicaria*), and others.

The perennial marsh wetland habitat is highly productive, with much potential for intense interspecies competitive interactions. Many of the component species, including Sanford's Arrowhead, can be aggressive spreaders by rhizomes, stolons, or by dispersal of fragments/propagules. Ability for rapid lateral overtopping growth is the norm in this habitat. Sanford's Arrowhead is reported to be weedy and troublesome at the Rancho Cordova Golf Course ponds (CDFG 2010); however, other information on competitive interactions is lacking.

APPENDIX B (Continued)

8.2.2.5 Livestock Grazing Relations

Interactions of livestock grazing with Sanford's Arrowhead have not been specifically addressed. As with other species though, interactions likely vary according to a variety of site-specific factors and timing. For example, marsh habitats located within irrigated pastures are likely to receive less grazing and trampling pressure than would the same habitat if it were located within a non-irrigated upland annual grassland setting. Within non-irrigated upland pastures, grazing and trampling pressures within the marshy shallows probably vary by season, with relatively little tendency of livestock to enter the marshy shallows during late winter to mid-spring months when forage and water is abundant and an increased pressure from livestock as the weather dries and warms into the summer months (Dittes pers. obs.). The capacity of colonies to recover from grazing and trampling is not known; however many rhizomatous perennial marsh species have the marked capacity to re-sprout after fragmentation of rhizome mats.

Among all of the CNDDB occurrences, livestock grazing is reported as a potential threat at only two (CNDDB occurrence # 14 and 15) (CDFG 2002). Nutrient loading, algae blooms and eutrophication associated with runoff from irrigated and overstocked pastures may potentially negatively affect some aquatic plant species, including Sanford's Arrowhead.

8.2.2.6 Disturbance Response

Owing to high vegetative productivity, rhizomatous or stoloniferous spread, subterranean tubers, and seed production, many emergent marsh species are well-adapted to, and may even benefit from periodic disturbances. In the absence of disturbances and a limiting deep-water edge, some marsh habitats may diminish in emergent species diversity, and may eventually transition into semi-terrestrial and terrestrial habitat. It is likely that in addition to basin topography, periodic disturbances (sediment scour and deposition) associated with seasonal flood events are an important determinant in the succession and species composition of any given marsh, as well as the meta-population dynamics of a given emergent marsh species. These dynamics are unknown as they relate to Sanford's Arrowhead.

The foraging activities of ducks and other waterfowl have been cited as loosening the rhizome tubers of Sagittaria, thus facilitating dispersal and potential colonization events. One mention of significant foraging of Sanford's Arrowhead by ducks is given in Tehama County (CDFG 2002). All parts of some Sagittaria species are edible for waterfowl, and dispersal is facilitated by wildlife breaking off tubers and perhaps spreading seeds while foraging (Mason 1954).

8.2.2.7 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Sanford' Arrowhead are identified in Table SAAR-1 and have been derived from input from local species experts.

Table SAAR-1
Essential Habitat Elements for Sanford's Arrowhead

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Freshwater marsh, open water, streams/creeks.	Strictly associated with hydrologic systems supporting emergent marsh vegetation, including the margins of rivers, streams, ponds, reservoirs, irrigation and drainage canals and ditches, and stock-ponds. Sanford's Arrowhead is also reported to occur in several seasonal wetlands with sufficient hydrology for persistence of emergent marsh species. As with other perennial marsh species, Sanford's Arrowhead likely inhabits specific zones defined by depth of ponding; however, additional information is needed to determine depth requirements.

8.3 Species Distribution and Population Trends

8.3.1 Species Distribution

Sanford's Arrowhead is distributed from Orange and Ventura Counties in southern California to Butte and Tehama Counties at the northern edge of the Great Central Valley. A disjunct population occurs in the most northwestern part of the state near Crescent City in Del Norte County (CNPS 2010).

Sanford's Arrowhead occurrences are distributed among six of the Geographic Sub-regions of the California Floristic Province, as described by Hickman (1993), including the San Joaquin Valley, Sacramento Valley, Cascade Range Foothills, Outer North Coast Range, Western Transverse Range, and South Coast. Sanford's Arrowhead ranges from sea level to 2,132 feet above mean sea level (CNPS 2010).

Sacramento County has the largest number of Sanford Arrowhead occurrences with 40 of the 68 occurrences (59%) represented (CDFG 2010). Calflora reports 86 records within California, 10 of which are within Sacramento County (Calflora 2010). Fresno County has the second largest number with eight occurrences (12%), followed by Butte and Merced Counties each having five occurrences reported (7% each) (CDFG 2010). Of the remaining 10 occurrences, San Joaquin and Tehama each have three (4% each), Del Norte, El Dorado, Madera, Mariposa, Orange, Placer, Shasta, and Ventura Counties each support one occurrence (<2% each) (CDFG 2010).

APPENDIX B (Continued)

8.3.2 Central Valley Distribution

The Central Valley supports the majority of Sanford's Arrowhead occurrences. The northernmost Central Valley occurrences are located approximately 28 miles apart from each other in east-central and southern Butte County (CDFG 2002). Forty occurrences are located in Sacramento County (CDFG 2010). Another 15 Occurrences are distributed in the Central Valley along an arc of approximately 65 miles, extending from central Merced to northern Madera counties (CDFG 2002).

8.3.3 Range within the Plan Area

Of the 40 total (32 extant) Sanford's Arrowhead CNDDB occurrences presently recorded from Sacramento County, 23 occurrences (58%) are located within the Plan Area, 15 of which are located within the Urban Development Area (UDA) (Figure SAAR-1) (CDFG 2010). Figure SAAR-1 shows the occurrence records within Plan Area from CNDDB (CDFG 2010) and one additional occurrence (Wetland Research Associates 2004).

Occurrences of Sanford's Arrowhead in Sacramento County have been documented in the following Landform Formations: Basin deposits, lower and middle units in the Riverbank Formation, stream channel deposits, Turlock Lake Formation, and upper unit Modesto Formation/Alluvial deposits (CDFG 2002).

8.3.4 Population Levels and Trends

Of the 68 documented CNDDB Sanford's Arrowhead occurrences, one (CNDDB occurrence #2) located in Ventura County, is now reported as "extirpated". Another eight occurrences located in Sacramento County are reported as possibly extirpated (CDFG 2010). It is important to note though, that of the remaining 59 occurrences presumed extant, 11 have not been observed since between 1940 and 1958, even though the habitats were resurveyed in 1980 (CDFG 2002; none of these are in Sacramento County). One occurrence observed in 1975 was resurveyed in 1993 with no plants found (CDFG 2002). Twenty CNDDB occurrences are historic; they have not been observed in the last 20 years (CDFG 2010). Population trends are listed as unknown for all Sanford's Arrowhead Occurrences statewide.

It should be noted that Sanford's Arrowhead is a relatively cryptic emergent marsh species, the habitats are not easily surveyed, and much unsurveyed habitat is associated with agricultural and urbanized areas, neither of which are frequented by botanists. For these reasons, additional as-yet undiscovered Sanford's Arrowhead occurrences should be expected within the Plan Area.

It is impossible to determine the number of historically occurring Sanford's Arrowhead lost or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much

had happened before this species first received attention. The Great Central Valley marsh system once extended from the southern edge of the Tulare Lake Basin in the southern San Joaquin Valley, almost interrupted, to the Sacramento River basin of Butte and Tehama counties in the north. Early explorers write about the extensive Tule Marsh that impeded east-west travel at most of these latitudes within the Great Central Valley. Mason reports of a 100-acre population of Sanford's Arrowhead observed in 1912 from near Tracy that by 1954 was gone and the habitat entirely under cultivation (Mason 1954). It has been estimated that by 1978 only 4% of California's pre-settlement Central Valley wetlands remained (Airola and Messick 1987 as cited by Snyder 1994). Loss of Sanford's Arrowhead populations and habitat since pre-settlement times is incalculable and without doubt, substantial.

There has been no comprehensive effort to monitor any populations of Sanford's Arrowhead over years, so variations in abundance and other population dynamics are unknown.

Observations, monitoring and research conducted on other perennial marsh species indicate that abundance of individuals within populations can vary greatly between years, with some species exhibiting even transitory behavior (Mason 1957). Furthermore, successional changes can be relatively rapid in marshes, and if a deep-water edge is not available to impede spread, and if disturbances do not remove accumulated biomass, transition into terrestrial or semi-terrestrial habitats may result. Owing to these dynamics, long-term management and monitoring of Sanford's Arrowhead and other aquatic and emergent marsh species pose unique challenges.

8.4 Threats to the Species

Potential direct threats to Sanford's Arrowhead include: loss of emergent marsh habitat owing to agricultural and urban land-use conversion, irrigation and drainage ditch maintenance, flood control activities, road widening and maintenance, inappropriate livestock grazing regimes, recreational vehicles, bicycle traffic, and refuse dumping (CDFG 2010).

Potential indirect threats to Sanford's Arrowhead include: hydrological alteration of sub-watersheds by surrounding developments and land uses; shifts in competitive interactions (hydrology-mediated or invasive non-native and weedy native species); sedimentation; windblown refuse accumulation; herbicides, nutrient loading and other point and non-point source water pollution; recreational boat waves; foraging damage by wildlife; ecological succession, air pollution, and global climate change.

Note that of the 32 occurrences presumed extant in Sacramento County (CDFG 2010), none are included within established preserves, and at least 15 are habitants of artificial or otherwise maintained irrigation, drainage, or flood control conveyances (CDFG 2002). Only 10 appear to be associated with relatively natural wetland systems (CDFG 2002).

With regard to the remaining 27 presumed extant CNNDB occurrences outside of Sacramento County, only two are encompassed within established preserves; one of these is associated with a stockpond at The Nature Conservancy's (TNC) Vina Plains Preserve in Tehama County (CNDDB occurrence # 33), and another is located on Bureau of Land Management (BLM) land at Hog Lake, Tehama County (CNDDB occurrence # 34). Of the 19 remaining occurrences, eight are associated with irrigation/drainage canals, two are in man-made reservoirs, one is located in a groundwater recharge basin, and one is associated with a stockpond (CDFG 2002). Of the remaining seven occurrences, three do not have habitat notes included (CDFG 2002). In summary, of the 27 presumed extant occurrences outside of Sacramento County (CDFG 2010), only four are associated with presumably "natural" hydrological features (CDFG 2002).

8.5 Data Gaps

It is significant to note that Sanford's Arrowhead is difficult to survey for, and it can be difficult to see when growing with other emergent marsh species. Furthermore, since it occurs in association with a variety of water body-types, including irrigation and drainage ditches and canals (habitats seldom surveyed), other occurrences are likely to be present within Sacramento County. All marsh habitats, regardless of landform association, should be considered as potentially suitable habitat for Sanford's Arrowhead. It is likely that as additional surveys are conducted, new occurrences/populations will be discovered within the Plan Area. It is impossible however, to predict the number of future discoveries in Sacramento County or elsewhere.

With exception to observations of field workers (CDFG 2010), Sanford's Arrowhead has received limited research attention. Detailed studies have not been conducted regarding the biology, ecology, breeding system, population genetics, habitat-hydrology relationships, population dynamics, trends or threats. Investigations have been conducted on the biology and ecology of other Arrowhead species, including the sometimes co-occurring wide-leaved arrowhead or tule potato (*Sagittaria latifolia*). Pertinent data gaps for Sanford's Arrowhead specifically, along with implications for conservation, and operating assumptions include:

8.5.1 Unknown Number of Undiscovered Occurrences

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Plan Area and elsewhere within the range of the species. In the Plan Area, discovery of new populations of Sanford's Arrowhead may occur anywhere that emergent marsh habitat is present, including natural drainages, artificial irrigation/drainage conveyances, reservoir and lake margins and stockponds. Potential habitat is also present within channelized natural, and artificially excavated drainages within urbanized areas. In these situations, Sanford's Arrowhead can colonize reaches that are concrete-lined; here inhabiting cracks or rooting on accumulated sediments.

APPENDIX B (Continued)

8.5.2 Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

In the 2002 CNDDB in Sacramento County, 11 of the 28 Sanford's Arrowhead occurrences are associated with Lower and Middle Units of the River Bank Formation. Another four occurrences are associated with Stream Channel Deposits, three are associated with the Turlock Formation, two with the Upper Unit Modesto Formation, and one occurrence is associated with each of the Quaternary Fanglomerate (Qfa) and Basin Deposits (CDFG 2002). The nature of relationship of landform to Sanford's Arrowhead is likely attributable to factors affecting the development and persistence of emergent marsh habit. Recent alluvial deposits are associated with active watercourses.

8.5.3 Unknown Breeding System and Pollination Ecology

Pollination and breeding studies have not been conducted for Sanford's Arrowhead and specific pollinator relationships are unknown. It may be important to note that the flowers of Sanford's Arrowhead closely resemble those found in other Sagittaria species, as well as those in other genera of the family Alismataceae (*Alisma, Damasonium, Echinodorus*). Separate male and female flowers and relatively large flower petals suggest an outcrossing breeding strategy, although self-compatibility has been demonstrated for other species of Sagittaria (Muenchow and Delesalle 1994).

An investigation of pollination ecology involving the common arrowheads (*Sagittaria latifolia* and *S. australis*) in Colorado revealed that flower visitors there are principally generalist bees of the genera *Bombus, Lasioglossum, Ceratina and Augochlora*, as well as assorted flies and wasps (Muenchow and Delesalle 1994).

8.5.4 Specific Hydrological Requirements of SAAR

Numerical data do not exist regarding specific hydrological parameters associated with emergent marsh habitats supporting Sanford's Arrowhead populations in the Plan Area, or elsewhere (e.g., maximum and minimum inundation tolerances; optimal ponding depth; response to water level fluctuations; tolerance of dry-down/desiccation; wave action and other water current relationships, etc.).

8.5.5 Interactions with Non-Native Weeds (and Aggressive Natives) and Weed Management Activities

Non-native weeds, or aggressive native species reported as occurring in emergent marsh habitats with Sanford's Arrowhead are listed in Section 2.2. All of these and others not-yet known may become problematic in Sanford's Arrowhead-occupied emergent marsh preserves

owing to aggressive lateral growth and strong competitive abilities. Other aquatic weeds not yet known from the region or even from North America may become problematic following potential future introductions. Interactions between Sanford's Arrowhead and associated emergent marsh species are unknown.

8.5.6 Interactions with Non-Native and Native Wildlife Species and Wildlife Management Activities

Wildlife interactions with Sanford's Arrowhead are mostly unknown. One reference is made of waterfowl heavily utilizing a Sanford's Arrowhead population (CDFG 2010). Other Sagittaria species are well documented with regard to food utilization by waterfowl (Mason 1957). In addition to waterfowl, muskrats likely utilize all parts of Sagittaria plants as well. Grazing of seedlings or young vegetation by crayfish is not known, but is likely. Other aquatic pest invertebrate and fish species not-yet known from the region, but which could become established if introduced, could threaten Sanford's Arrowhead emergent marsh habitats in the future (e.g. Asian mitten crab, jumping carp, etc.).

8.5.7 Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

Population genetics for Sanford's Arrowhead are completely unknown.

8.5.8 Critical Population Size

Critical population size is a statistical estimate of the minimum number of individuals required for a population to maintain itself over generations, through time. This population parameter has been determined for assorted wildlife and some perennial plant species. The most simplistic estimations take into account recruitment rates of individuals into the population via reproduction and immigration, and removal rates of individuals from that same population via death and emigration.

Since Sanford's Arrowhead is a perennial clonal species, definition and identification of an individual plant (genetic ramet) may be impossible. Delineation of single colonies may even be difficult owing to spread of underwater/subterranean rhizomes. Other "invisible" components with demographic importance include the number of perenniating rhizome-tubers, discernment between recruited seedlings and young shoots arising from rhizomes vegetatively, and the potential existence of a dormant soil seed bank. These unknown, difficult to identify and critical demographic parameters complicate the applicability of the concept of Critical Population Size for monitoring of Sanford's Arrowhead demography for the purposes of the SSHCP.

APPENDIX B (Continued)

8.5.9 Seed Longevity and Dynamics of Stored Soil Seed Bank

There have been no empirical studies addressing the presence of a soil seed bank, seed dormancy or longevity for Sanford's Arrowhead.

8.5.10 Unknown Aspects of Experimental Inoculation

Since there are few populations of Sanford's Arrowhead in Sacramento County that are not threatened, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable emergent marsh habitat and increasing the number of naturally self-sustaining populations. In addition, so much Sanford's Arrowhead habitat within the Plan Area is not protected and is subject to potential impacts resulting from routine maintenance (irrigation and drainage channels), that losses of colonies and individuals could be used for conservation of the species within habitat preserves created and managed in the context of the SSHCP.

Any additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied emergent marsh habitat, create meta-population structure at extant occurrences where single colonies may support the species, and help ensure existence should any natural populations become compromised. Dispersal into, and colonization of artificially created or enhanced irrigation ditches, excavations next to railroad tracks and artificial ponds has been documented (CDFG 2010). Sanford's Arrowhead has been successfully transplanted elsewhere in Sacramento County by the U.S. Army Corp of Engineers (USACE) (Burmester pers. comm.). The common tule potato and many other clonal emergent marsh species are readily transplantable where suitable marsh habitat exists.

8.5.11 Water Quality

Sanford's Arrowhead occupies habitats that are particularly subject to a variety of types of point and non-point-source water pollutants. Specific examples include sediment transport in storm-water runoff; myriad hydrocarbons from road, highway and rooftop surfaces; nutrient runoff from dairies and stockyards; fertilizer runoff from golf courses, residential landscaping and agricultural areas; herbicide runoff from roadside and highway shoulder maintenance activities; chemical and material spills from road and highway surfaces industrial areas and construction sites; myriad rain-borne air pollutants; recreational watercraft, and others. In addition, the relationship between Sanford's Arrowhead and relationships to basic physical properties of water are unknown as well, including turbidity, conductivity, pH, Biological Oxygen Demand (BOD), and others. Interestingly, the common tule potato, and several other emergent marsh species have been investigated and variously utilized in small-scale non-conventional wastewater treatment systems.

8.5.12 Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide, etc.)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to emergent marsh vegetation. Assuming that extant Sanford's Arrowhead occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Sanford's Arrowhead, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect Sanford's Arrowhead and other native plant species in the future.

8.5.13 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

8.5.14 Baseline Hydrological Trend of Emergent Marshes and Existing Indirect Effects

Extant Sanford's Arrowhead populations in the Plan Area have undoubtedly experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete consideration and management/protection at the level of watershed, or precise hydrological monitoring and accurate modeling on a wetland complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

8.6 Literature Cited

Burmester, Daniel. Regional Ecologist.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

APPENDIX B (Continued)

California Department of Fish and Game (CDFG). 2002. California Natural Diversity Data Base search of Sanford's Arrowhead. California Department of Fish and Game. Sacramento, California.

California Department of Fish and Game.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Delesalle, V.A. and S. Blum. 1994. Variation in germination and survival among families of Sagittaria latifolia in response to salinity and temperature. *International Journal of Plant Sciences*. 155(2):187-195.

Delesalle, V.A. and G.E. Muenchow. 1992. Opportunities for selfing and inbreeding depression in Sagittaria congeners (Alismataceae) with contrasting sexual systems. *Evolutionary Trends in Plants*. 6(2):81-91.

Edwards, A.L. and R.R. Sharitz. 2000. Population genetics of two rare perennials in isolated wetlands: Sagittaria isoetiformis and Sagittaria teres (Alismataceae). *American Journal of Botany*. 87(8):1147-1158.

Evers, D.E., C.E. Sasser, J.G. Gosselink, D.A. Fuller, and J.M. Visser. 1998. The impact of vertebrate herbivores on wetland vegetation in Atchafalaya Bay, Louisiana. *Estuaries*. 21(1):1-13.

Gause, Matt. Consulting Botanist.

Gordon, E. 1996. Dispersal type, germination and seedling growth of Sagittaria latifolia (Alismataceae). *Fragmenta Floristica et Geobotanica* 41(2):657-688.

Gough, L. and J.B. Grace. 1998. Herbivore effects on plant species density at various productivity levels. *Ecology*. 79(5):1586-1594.

Gruenhagen, N.M. and L.H. Fredrickson. 1990. Food used by migratory female mallards in northwest Missouri (USA). *Journal of Wildlife Management*. 54(4):622-626.

Hickman, J. C. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley, California.

Hohman, W.L., D.W. Woolington, and J.H. Devries. 1990. Food habits of wintering canvasbacks in Louisiana (USA). *Canadian Journal of Zoology* 68(12):2605-2609.

APPENDIX B (Continued)

Huang, S. Q. 2003. Flower dimorphism and the maintenance of andromonoecy in *Sagittaria guyanensis* ssp. *lappula* (Alismataceae). *New Phytologist*. Vol. 157(2):357-364.

Kaul, R.B. 1985. Reproductive phenology and biology in annual and perennial Alismataceaae. *Aquatic Botany*. 22(2):153-164.

Keddy, P. A. and T.H. Ellis. 1985. Seedling Recruitment of 11 Wetland Plant Species Along a Water Gradient: Shared or Distinct Responses? *Canadian Journal of Botany*. 63: 1876-1879.

Keddy, P.A. and P. Constabel. 1986. Germination of Ten Shoreline Plants in Relation to Seed Size, Soil Particle Size and Water Level: An Experimental Study. *Journal of Ecology*. 74: 133-141.

Leck, M.A. 1996. Germination of Macrophytes from a Delaware River tidal freshwater wetland. *Bulletin of the Torrey Botanical Club*. 123(1):48-76.

Mason, H.L., 1957. Flora of the Marshes of Califiornia. University of California Press, Berkeley and Los Angeles, California.

May Consulting, Walnut Grove, California.

Muenchow, G.E. 1998. Subandrodioecy and male fitness in *Sagittaria lancifolia* ssp. *lancifolia*. *American Journal of Botany* 85:513-?.

Muenchow, G. and V. Delesalle. 1992. Patterns of Weevil herbivory on male, monoecious and female inflorescences of Sagittaria latifolia. *American Midland Naturalist*. 127(2):355-367.

Muenchow, G. and V. Delesalle. 1994. Pollination Response to Male Floral Display Size in Two Sagittaria (Alismataceae) Species. *American Journal of Botany*. 81(5):568-573.

Newberry, G. 1991. Factors affecting survival of the rare plant Sagittaria fasciculata E.O.Beal (Alismataceae). *Castanea*. 56(1):59-64. Rancho Cordova, California.

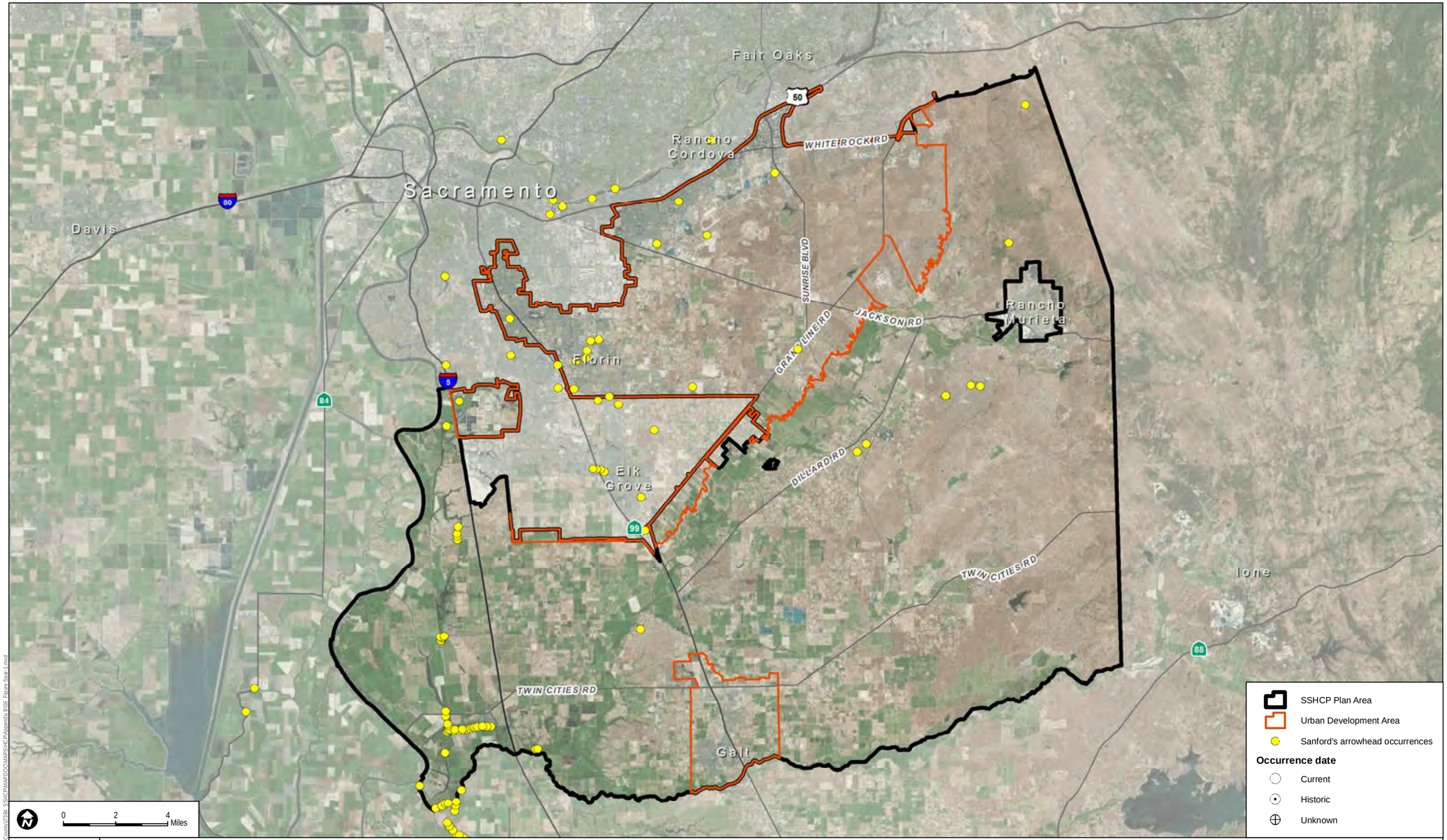
Sarkissian T.S., S.C.H. Barrett and L.D. Harder. 2001. Gender Variation in Sagittaria latifolia (Alismataceae): Is Size All That Matters? *Ecology*. 82:360-373.

Shaffer, G.P., Sasser, C.E., Gosselink, J.G. and M. Rejmanek. 1992. Vegetation dynamics in the emerging Atchafalaya Delta, Louisiana, USA. *Journal of Ecology*. Vol 80(4):667-687.

APPENDIX B (Continued)

Wetland Research Associates. 2004. Mather Field Natural Resources Assessment Phase I&II, February 5, 2004. Sacramento, California.

Wooten. J.W. 1971. The Monoecious and Dioecious Conditions in Sagittaria latifiloia L. (Alismataceae). *Evolution*. 25:549-553.



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE SAAR-1

Sanford's Arrowhead Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0294 SSHCP\MAPS\COMMON\SHCP\Planning\fig B106 Figure Saar-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

9 MID-VALLEY FAIRY SHRIMP (MVFS)

Prepared by Christopher Rogers

Mid-Valley Fairy Shrimp (MVFS)

(Branchinecta mesovallensis)

Status USFWS: None

Status CDFG: None

9.1 Legal Status

The mid-valley fairy shrimp meets the requirements as a "rare, threatened or endangered species" under the California Environmental Quality Act (CEQA); however, they have no formal State or Federal protected species status. Mid-valley fairy shrimp was petitioned for endangered status under the Federal Endangered Species Act (USFWS 2003), but rejected for listing (USFWS 2004).

9.2 Life History and Ecology

9.2.1 Species Description and Life History

The mid-valley fairy shrimp is a typical Branchinectid anostracan. The female's second antennae are smooth, and there are no cephalic ridges or cornices. The female's thoracic surface has two paired dorsolateral projections on the fifth to seventh segments, and a pair of single dorsolateral conical projections on the fourth segment. The brood pouch is pyriform (Eriksen and Belk 1999; Belk and Fugate 2000; Rogers 2002c). The basal fourth of the male mid-valley fairy shrimp's second antennal proximal segment bears an anteriomedial pulvillus, but otherwise is smooth (Eriksen and Belk 1999; Belk and Fugate 2000). The distal segment of the male second antennae is flattened laterally, with the bilobed apex bent medially. This bilobed apex is asymmetrical: the anterior lobe is larger than the posterior. Live animals are typically off-white to grey, although the brood pouch may be green or yellow (Rogers pers. obs.). Depending upon the rapidity of development, mature animals may vary in length from three to 38 millimeters (Rogers pers. obs.). Animals may shrink as much as 11 to 32 percent upon preservation (Rogers 2002b).

Anostracans like the mid-valley fairy shrimp are a component of the zooplanktonic community within episodic, ephemeral aquatic habitats and can occur in densities as high as 200 per liter of

APPENDIX B (Continued)

water (Rogers pers. obs.). The vast majority of fairy shrimp are omnivorous, indiscriminately filtering particles from the water column, including bacteria, unicellular algae, and micrometazoa (Eriksen and Belk 1999). Fairy shrimp will attempt to consume whatever material they can fit into their feeding groove, and do not discriminate based upon taste as do some other crustacean groups (Eriksen and Belk 1999). Mid-valley fairy shrimp will also rasp periphyton from sticks, stems and slender leaves (Rogers pers. obs.).

During the dry phase of their habitat, the anostracans survive as diapausing cysts (resting eggs) in and on the substrate (Sars 1896, 1898; Eriksen and Belk 1999; Rogers and Fugate 2001). When the habitat inundates from seasonal rainfall, some of the cysts hatch, and the nauplii (early larval form of anostraca) swim into the upper water column (Eriksen and Belk 1999). These larval forms are typically indistinguishable between species.

The maturation rates of the animal vary extensively depending upon temperature, and habitat type (Helm 1998; Eriksen and Belk 1999; Rogers *In review*), and the mid-valley fairy shrimp can reach maturity in as little as four days (Rogers *In review*; Rogers pers. obs.). In the genus Branchinecta, the brood pouch is truncate and as wide as the thoracic genital segments. However, when oocytes are present in the lateral pouches, the brood pouch is wider than the genital segments, forming an amplexial groove, and males can amplex the female successfully. If the oocytes are not present in the lateral pouches the female is sometimes able to wriggle out of the male's grasp (Rogers 2002b). Males approach the females from beneath to amplex. Amplexus is sustained for a second or two, as mating is rapid and the female is released immediately afterwards (Rogers 2002b). The female typically sheds her cysts as the shell forms over the fertilized oocyte (Murugan et al. 1996) and the cysts fall to the substrate.

The cysts lay dormant in the substrate until the pool dries and re-inundates during the subsequent rains. Beyond inundation of the habitat, the specific cues for hatching are unknown although temperature (Hall 1959; Belk 1977; Al-Tikrity and Grainger 1990; Belk and Nelson 1995; Helm 1998; Eriksen and Belk 1999; Rogers *In review*) and conductivity (Anderson 1958; Bowen et al. 1988; Broch 1969, 1988; Brown and Carpelan 1971; Brown 1972) are believed to play a large role. The mid-valley fairy shrimp is typically univoltine (i.e., one generation per year); however, animals of different ages may be present if a pool partially inundates allowing some cysts to hatch, and then later increases in volume, hydrating cysts that were further up-slope (Rogers pers. obs.).

Planktonic crustacea are important in the food web, as they represent a high fat, high protein resource for migratory waterfowl. Mallard (*Anas platyrhynchos*), green-winged teal (*A. carolinensis*), bufflehead (*Bucephala albeola*), greater yellowlegs (*Tringa melanoleuca*), and killdeer (*Charadrius vociferus*) all forage actively in Central Valley vernal pools on the

invertebrate and amphibian fauna during the winter months (Proctor 1964; Horne1966; Mellors, 1975; Silveira 1996; Dumont and Negrea 2002).

Predator consumption of fairy shrimp cysts aids in distributing populations of fairy shrimp. Predators (e.g., birds, amphibians) expel viable cysts in their excrement, often at locations other than where they were consumed (Proctor 1964; Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts are also transported by wind, and in mud carried on the feet of animals, including livestock that may wade through the habitat (Rogers in prep). This type of dispersal aids ephemeral pool crustaceans to exploit a wide variety of ephemeral habitats (Rogers 2000).

Being prey items of birds, mid-valley fairy shrimp are an intermediate host for avian cestodes (Rogers *In review*). Anostracans that are hosting a cestode tend to be bright pink in color. The change in color is due to the presence of cestode cysticercoides. The parasitic tapeworm castrates the host, which causes the host animal to accumulate lipids (probably linked to carotenoid pigments) that would otherwise be expended by the host during reproduction (Amat et al. 1991).

No specific bacterial, viral or protozoan diseases have been reported for the mid-valley fairy shrimp. Occasionally, specimens with black markings or lesions will appear in collections. These black markings, sometimes referred to as 'black disease', are actually evidence of the normal immune response of all crustacea to any bacteria, where any foreign bacteria is infused with melanin to lethal levels (Bang 1983). Branchiopod crustaceans are commonly found with phoretic ciliate protozoan colonies around the mouth and posterioventral portions of the head, which are abandoned with the exuvia by the crustacean with each molt.

Mid-valley fairy shrimp commonly co-occur with the California fairy shrimp (*Linderiella occidentalis* Dodds, 1923) (Eriksen and Belk 1999; Rogers *In review*). This species has also been reported co-occurring with the vernal pool fairy shrimp (*Branchinecta lynchi* Eng, Belk and Eriksen 1990) on three occasions, where the mid-valley fairy shrimp was probably washed into the vernal pool fairy shrimp habitat by abnormally high rainfall (Eriksen and Belk 1999). Other species of Branchinecta (*B. lindahli* Packard, 1883, *B. coloradensis* Packard, 1874, *B. mackini* Dexter, 1956, *B. lynchi*, *B. conservatio* Eng, Belk and Eriksen, 1990) occur within the range of the vernal pool fairy shrimp, but are typically found in different, although similar, habitats (Rogers *In review*).

9.2.2 Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The mid-valley fairy shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are

APPENDIX B (Continued)

dependent upon intact sub-watersheds, and the surrounding uplands that support those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

The mid-valley fairy shrimp needs the cold winter waters to hatch and grow in, typically appearing after the first frosts, and the dry summers to dry the resting cysts and prevent them from being attacked by fungi. Habitats supporting the mid-valley fairy shrimp are typically in Central Valley California floristic provinces below 300 meters in elevation. Typical habitat for mid-valley fairy shrimp in California includes vernal pools and seasonally ponded areas within vernal swales (Eng et al. 1990). Vernal pools that support these fairy shrimp are often grass or mud-bottomed, with clear to tea-colored water, and are often in basalt flow depression pools in grasslands (Eriksen and Belk 1999).

Mid-valley fairy shrimp have been found in habitats ranging from 0.001 to 0.5 acre in area, and typically utilizes habitats shorter in duration than is used by congeners (Eriksen and Belk 1999; Rogers pers. obs.).

Various physiochemical factors have been examined in laboratory experiments and existing mid-valley fairy shrimp habitats including alkalinity, total dissolved solids (TDS), and pH (Rogers *In review*). The importance of many of these parameters has recently been called into question with evidence that type and amount of dissolved salts may be a more important habitat requirement (Rogers *In review*). Considering the daily fluctuations in pH of a given habitat, this is to be expected. During the daylight hours, the hydrophytes are photosynthesizing, removing the CO_2 (from HCO_3) from the water, and raising the pH. During the night, the hydrophytes are respiring, increasing the CO_2 (and thereby, the HCO_3) in the water lowering the pH. If there is rainfall, the distilled precipitation will lower the pH, as will winds that cause surface action. When the habitats are drying and losing volume through evaporation, the pH, alkalinity, TDS, and electrical conductivity will increase, just as they decrease when the pools inundate or reinundate (Rogers *In review*).

Some vernal pools need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it also oxidizes the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat component. Conversely, excessive livestock grazing can be detrimental to mid-valley fairy shrimp. Over-grazing tends to result in a large amount of manure in vernal pools. The organic waste reduces the dissolved oxygen in the water, leaving the gill-breathing invertebrates like the mid-valley fairy shrimp without oxygen (Rogers 1998, pers.

APPENDIX B (Continued)

obs,). It is important not to alter grazing regimes in conservation areas until the importance of grazing to those particular systems are assessed.

Common wetland plant species that co-occur with mid-valley fairy shrimp generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of these shrimp to be present. These plants may include: coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), goldfields (*Lasthenia* spp.), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and toad rush (*Juncus bufonius*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods may have hydrology that cannot support shrimp species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*) and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round cannot support special-status shrimp species because the shrimp's cysts must dry out before they can hatch (Eriksen and Belk 1999), or if they remain wet or moist through the warmer summer months, the cysts will fungus (Rogers pers. obs.). These plants include cattails (*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

Fairy shrimp are a component of a larger invertebrate community structure (Rogers 1998). This invertebrate community includes mostly planktonic crustacea dependent upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as flatworms, and a suite of insect species, including: vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*), and many others (Rogers 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers 1998).

Therefore, potential special-status shrimp habitat is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that may also support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow special-status shrimp species to complete their life cycles and to maintain water temperatures conducive to special-status shrimp species.

Optimal mid-valley fairy shrimp habitat tends to be small, with an abbreviated hydroperiod, neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal pool invertebrate community (Eriksen and Belk 1999; Rogers pers. obs., 1998, *In review*).

APPENDIX B (Continued)

9.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Vernal Pool Fairy Shrimp are identified in Table MVFS-1 and are largely based on the essential habitat elements for mid-valley fairy shrimp.

Table MVFS-1
Essential Habitat Elements for Mid-Valley Fairy Shrimp

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

9.3 Species Distribution and Population Trends

There are more than 40 species of *Branchinecta* world-wide (Belk and Brtek 1995, 1997; Rogers and Fugate 2001; Belk and Rogers 2002) distributed throughout the Holarctic and Neotropical regions, with one species ranging into the Antarctic. The mid-valley fairy shrimp is endemic to California (Eriksen and Belk 1999; Belk and Fugate 2000).

Habitat occupied by fairy shrimp tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been lost, and an unknown number of mid-valley fairy shrimp occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more mid-valley fairy shrimp habitat will and is being encroached upon and impacted throughout the species range.

9.3.1 Range Wide Distribution

The earliest collections of the mid-valley fairy shrimp were made by Clyde Eriksen in the late 1960's at Mather Air Force Base. Eriksen collected the mid-valley fairy shrimp with specimens of the vernal pool tadpole shrimp, *Lepidurus packardi*. The mid-valley fairy shrimp was not

recognized as a new species until Anne Huber collected material from south of Mather Field and sent the specimens to Mike Fugate for identification. Fugate sent the material on to Denton Belk, who identified them as an undescribed species.

The mid-valley fairy shrimp is found in California from southern Sacramento County, west to Solano and Contra Costa Counties, and along the east side of the Central Valley south to Fresno County (Eriksen and Belk 1999). The entire range of this species is within the Central Valley.

9.3.2 Central Valley Distribution

The mid-valley fairy shrimp is endemic to California Central Valley grassland vernal pools (Belk and Fugate 2000). Known occurrences include: scattered occurrences from Mather Field area of Sacramento, south through Galt from Sacramento County; Jepson Prairie, Travis Air Force Base and Vacaville areas in Solano County: from Lodi north to the county border in San Joaquin County; the Byron Airport in Contra Costa County; the Virgina Smith Trust (Haystack Mountain) and Arena Plains National Wildlife Reserve in Merced County; one location in central Madera County; and one in northern Fresno County (Erickson and Belk 1999; Belk and Fugate 2000; Rogers in prep.). Figure MVFS-1 provides the general distribution of mid-valley fairy shrimp throughout the State as recorded by CNDDB data.

9.3.3 Range within the Plan Area

The mid-valley fairy shrimp was first officially reported from the Plan Area in the species' original description (Belk and Fugate 2000). Specimens were collected from Mather Air Force Base as early as 1967 by Dr. Clyde Eriksen (Eriksen, pers. comm.). Numerous surveys related to development projects have been conducted within and adjacent to the Plan Area (USFWS records; CDFG 2010), but the area has not been thoroughly surveyed for mid-valley fairy shrimp, and the total extent of potential habitat is unknown. Figure MVFS-1 illustrates the known recorded occurrences of mid-valley fairy shrimp within Sacramento County. The range of the species in the Plan Area is considered to be vernal habitats embedded in valley grassland and oak savannah.

9.3.4 Population Levels and Trends

An unknown amount of vernal pool habitat has been lost and with it, an unknown number of mid-valley fairy shrimp occurrences. Attempts have been made to calculate lost vernal pool acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more mid-valley fairy shrimp habitat will and is being encroached upon and impacted throughout the species' range.

Adequate determination of remaining mid-valley fairy shrimp occurrences throughout the animal's range as well as population trends is difficult. Eriksen and Belk (1999) present a map of localities for the mid-valley fairy shrimp with less than 30 localities represented, with the greatest density of occurrences in southern Sacramento County.

The California Natural Diversity Data Base (CNDDB) vernal pool crustacean records (CDFG 2010) may be somewhat misleading, due to the inconsistency of the data presented. Some records refer to individual pools, while others refer to pool complexes, and others still refer to groups of complexes. Additionally, the CNDDB does is not updated when a particular site or population is extirpated. Because of issues such as these, it is difficult to determine what actually constitutes a "population" or "occurrence" in any attempt at impact analysis.

In addition, survey maps and records tend to show where vernal pool crustaceans are, and do not emphasize where they are not. Compounding these difficulties, records are typically a reflection of where surveys have been conducted, rather than a delineation of special-status shrimp distribution. Therefore, it is difficult to establish baseline conditions for this species across the entire species range, as well as within the Plan Area. None of this is to say that vernal pool crustaceans are not threatened, endangered, or should not be protected. The issue is that where a paucity of adequate data exists, consistent data reporting would help prevent ambiguous interpretation or mischaracterization of species conservation needs.

9.4 Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem to where it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that out compete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Over grazing tends to result in large amounts of manure in vernal pools. The organic waste reduces the dissolve oxygen in the water during decomposition, leaving gill-breathing invertebrates without oxygen (Rogers 1998, pers. obs,). Conversely, vernal pool grasslands are disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (i.e.; Eleocharis sp., Eryngium sp.) and exotic plants (i.e.; Glyceria sp. Lolium multiflorum) that generate deep thatch layers on the pool substrate. As this thatch layer decomposes, it also reduces the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Both lack of and excessive grazing cause an increase in organic matter in the habitat that eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that outcompete the

obligatory vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat suitability component, and the removal of grazing or excessive grazing are threats to the mid-valley fairy shrimp.

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles or paving or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities that may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. There is concern that Bullfrogs (Rana catesbeiana) may feed upon federally protected vernal pool crustaceans (Balfour and Morey 1999). Manna grass and Italian rye grass are both exotic plants that occur in vernal pools. These species tend to produce heavy thatch and eventually organic loads upon decomposition, which reduce available oxygen in the water (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish (Gambusia affinis) into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

Additional threats to the vernal pool invertebrate community structure include off-road vehicle use of vernal pool habitat for recreational “mud-bogging,” conversion of vernal pools into deep stock tanks that do not dry during the summer, and draining of vernal pools.

9.5 Data Gaps and Conservation Implications

Restoration and creation of mid-valley fairy shrimp habitat has been demonstrated to be feasible (Rogers 1998). Specific habitat parameters for this and other vernal pool invertebrate species are still poorly understood. For example, there appears to be a need by this species to have a minimum pool volume and a minimum pool surface area within a given habitat to be occupied.

Since this species has been found in a wide variety of natural and artificial vernal pool habitats, it is likely that it is in some respects an opportunist, as most temporary water fauna must be.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the Plan Area. Since the SSHCP is assuming that all potential habitat within the Plan Area is occupied by mid-valley fairy shrimp, and it is not feasible economically or temporally to survey the entire Plan Area, it may be expedient to estimate mid-valley fairy shrimp distribution through aerial photographic interpretation. Some specific areas will need to be physically verified as to whether they support potential mid-valley fairy shrimp habitat. Additionally, artificial habitats like railroad toe-drains, stock tanks, and roadside scrapes will also need to be verified. In addition, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and the role, seasonality and intensity of grazing and other disturbances in vernal pool ecosystems. Furthermore, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

9.6 Literature Cited

Al-Tikrity, M.R. and J.N.R. Grainger. 1990. The effect of temperature and other factors on the hatching of the resting eggs of *Tanymastix stagnalis* (L.) (Crustacea, Anostraca). *Journal of Thermal Ecology*, 15(1): 87-90.

Amat, F., A. Gozalbo, J.C. Navarro, F. Hontoria, and I. Varó. 1991. Some aspects of *Artemia* biology affected by cestode parasitism. *Hydrobiologia* 212:39 – 44.

Balfour, P.S. and S.R. Morey. 1999. Prey selection by juvenile bullfrogs in a constructed vernal pool complex. *Transactions of the Western Section of the Wildlife Society*, 35:34-40.

Bang, F.B. 1983. Crustacean Disease Respnses. *In:* The Biology of the Crustacea, Vol. 6. Pathobiology. Edited by D. E. Bliss and A. J. Provenzano, Jr. Pp. 113-153. Academic Press, New York, New York.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

Belk, D. 1977. Zoogeography of the Arizona fairy shrimps (Crustaca: Anostraca). *Arizona Academy of Science*, 12: 70-78.

Belk, D. and J. Brtek. 1995. Checklist of the Anostraca. *Hydrobiologia* 298:315-353.

Belk, D. and J. Brtek. 1997. Supplement to 'Checklist of the Anostraca'. *Hydrobiologia* 359:243-245.

Belk, D. and M.L. Fugate. 2000. Two new *Branchinecta* (Crustacea: Anostraca) from the southwestern United States. *The Southwestern Naturalist* 45(2):111-117.

Belk, D. and D.C. Rogers. 2002. A confusing trio of *Branchinecta* (Crustacea: Anostraca) from the western North America with a description of a new species. *Hydrobiologia*. 486:49–55.

Bowen, S.T., M.R. Buoncirstiani and J.R. Carl. 1988. *Artemia* habitats: ion concentratins tolerated by one superspecies. *Hydrobiologica*, 158: 201-214.

Broch, E.S. 1969. The osmotic adaptation of the fairy shrimp *Brachinecta campestris* Lynch to saline astatic waters. *Limnology and Oceanography*, 14: 485-492.

Broch, E.S. 1988. Osmoregulatory patterns of adaptation to inland astatic waters by two species of fairy shrimps, *Branchinecta gigas* Lynch and *Branchinecta mackini* Dexter. *Journal of Crustacean Biology*, 8: 383-391.

Brown, L.R. and L.H. Capelan. 1971. Egg hatching and life history of a fairy shrimp *Branchinecta mackini* Dexter (Crustacea: Anostraca) in a Mohave desert playa (Rabbit Dry Lake). *Ecology*, 52(1): 41-54.

Brown, R.J. 1972. A study of the mechanisms of osmotic and ionic regulation of the fairy shrimp, *Branchinecta mackini* (Crustacea, Branchiopoda). Ph. D. thesis. University of Toronto. Toronto, Canada. 215 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Center for Biological Diversity (CBD). 2001. Petition to list the midvalley fairy shrimp as an endangered species under the Endangered Species Act with concurrent designation of critical habitat. Center for Biological Diversity, PO 40090, Berkeley, California 94704-4090.

APPENDIX B (Continued)

Collie, N. and E.W. Lathrop. 1976. Chemical characteristics of the standing water of a vernal pool on the Santa Rosa Plateau, Riverside County, California. Pp. 27-31 *In:* S. Jain (ed.) Vernal Pools, their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis, California.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. *Verh. Internat. Verein. Limnol*. 23:1107-1113.

Dumont, H.J. and S. Negrea. 2002. Introduction to the Class Branchiopoda. Guides to the Microinvertebrates of the Continental Waters of the World. Backhuys, Leiden.

Eng, L., D. Belk, and C. Eriksen. 1990 Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.

Eriksen, C. and D. Belk. 1999. *Fairy shrimps of California's pools, puddles, and playas*. Mad River Press, Eureka, California.

Eriksen, pers. comm. Dr. Clyde Eriksen. P.O. Box 23 Wise River, Montana 59763.

Hall, R.E. 1959. The development of eggs of *Chirocephalus diaphanus* Prévost at a low temperature. *Hydrobiologia*, 13: 156-159.

Helm, B. 1998. Biogeography of eight large branchiopods endemic to California. Pp. 124-139 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

APPENDIX B (Continued)

Horne, F.R. 1966. The effect of digestive enzymes on the hatchability of Artemia salina eggs. *Transactions of the American Microscopical Society*, 85(2): 271-274.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's Heartland*. University of California Press, Berkeley.

Lilljeborg, W. 1889. Diagnosen zweier Phyllopoden-Arten aus Süd-Brasilien. Abhandlungen herausgegeben vom naturwissenschaftlichen *Vereine zu Bremen*, 10: 424.

Linder, F. 1941. Contributions to the morphology and the taxonomy of the Branchiopoda Anostraca. *Zoologiska Bidrag fran Uppsala*, 10: 101-302.

Mellors, W.K. 1975. Selective Predation of ephippial *Daphnia* and the resisitance of ephippial eggs to digestion. *Ecology* 65:974-980.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Murugan, G., A. Maeda-Martinez, G. Criel, and H. Dumont. 1996. Unfertilized oocytes in Streptocephalids: resorbed or released? *Journal of Crustacean Biology*, 16(1):54–60.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. *Ecology*, 45(3):656-658.

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

Rogers, D.C. 2002b. Amplexial morphology of selected Anostraca. *Hydrobiologia,* 486:1-18.

Rogers, D.C. 2002c. Female based characters for anostracan (Crustacea:Branchiopoda) identification: a key for species in California and Oregon, USA. *Hydrobiologia,* 486 125-132.

APPENDIX B (Continued)

Rogers, D.C. *In prep*. Dispersal agents and speciation in the Branchiopoda (Crustacea).

Rogers, D.C. and M. Fugate. 2001. *Branchinecta hiberna*, a new species of fairy shrimp (Crustacea: Anostraca) from western North America. *Western North American Naturalist,* 61(1):11 – 18.

Rogers, D.C. *In review*. Distribution and habitat parameter surveys for the fairy shrimp *Branchinecta mesovallensis* (Crustacea: Branchiopoda: Anostraca). Submitted to Zootaxa.

Sars, G.O. 1896. On some West Australian Entomostraca raised form dried sand. *Archiv for Mathematik og Naturvidenskab* 19(1):1-35. 4pls.

Sars, G.O. 1898. On some South-African Phyllopoda raised from dried mud. *Archiv for Mathematik og Naturvidenskab* 20(4):1-43. 4pls.

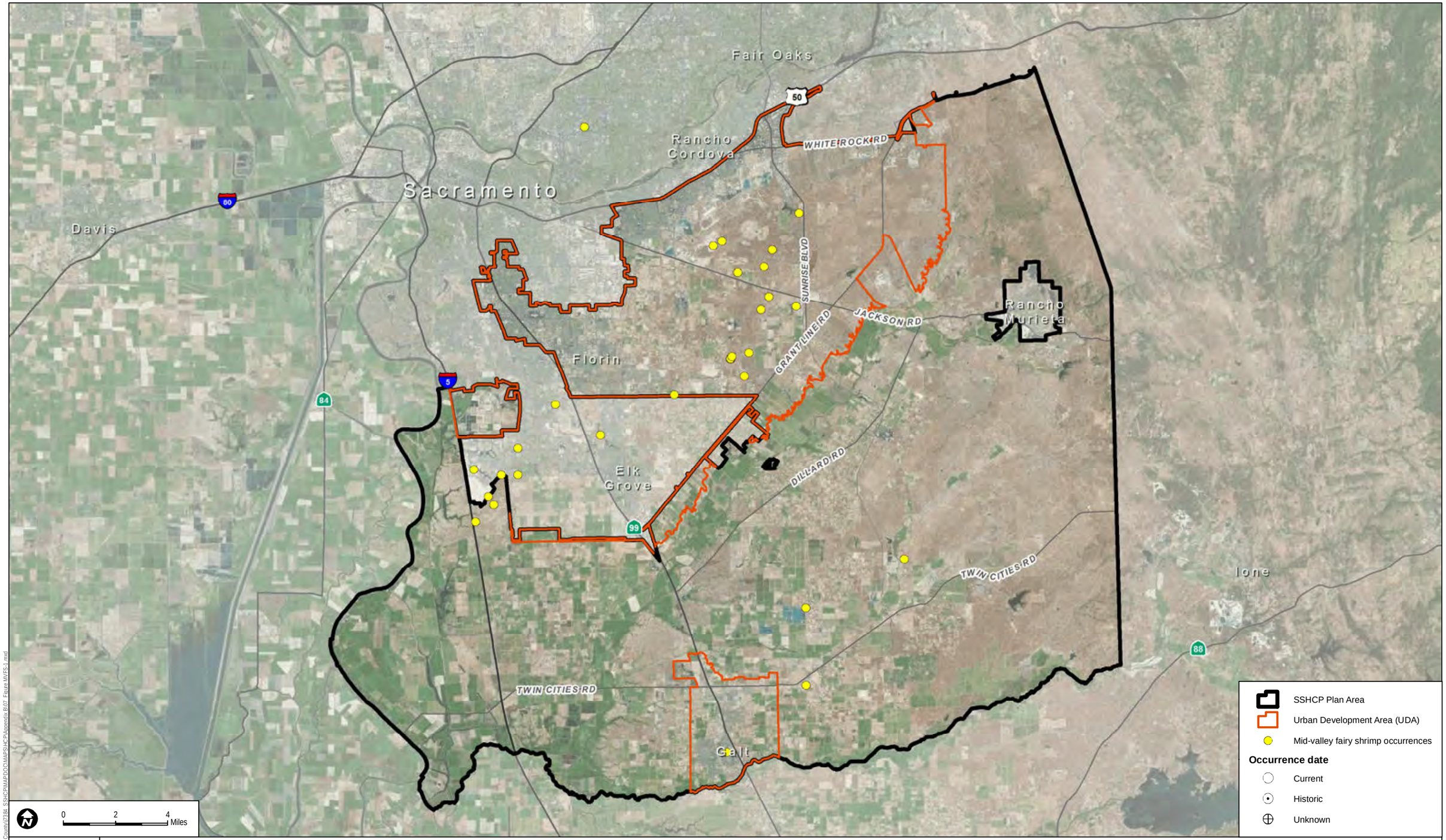
Silveira, J. 1996. Avian uses of vernal pools and implications for conservation practice. Pp. 92-106 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1994. Federal Register Final Rule; determination of endangered status for the conservancy fairy shrimp, longhorn fairy shrimp, and the mid-valley fairy shrimp; and threatened status for the vernal pool fairy shrimp. September 19.

United States Fish and Wildlife Service (USFWS). 2003. Federal Register Notice of 90-day Petition Finding and Initiation of Status Review; 90-day finding for a petition to list the midvalley fairy shrimp as endangered. April 29.

United States Fish and Wildlife Service (USFWS). 2004. Federal Register Notice; 12-month finding for a petition to list the midvalley fairy shrimp as endangered. January 26.

Wissinger, S.A., A.J. Bohonak, H.H. Whiteman, and W.S. Brown. 1999. Habitat Permanence, salamander predation and invertebrate communities. *In:* Invertebrates in Freshwater Wetlands of North America: Ecology and Management, edited by D. P. Batzer, R. B. Bader, and S. A. Wissinger, John Wiley and Sons, Inc. New York.



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, Foothill Associates 2010, Kassis-Sylva 2011, Vollmar 2012

FIGURE MVFS-1

Midvalley Fairy Shrimp Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2084_SSHCP\MAPDOC\MAPS\HCP\Appendix B\07_Figure MVFS-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

10 VERNAL POOL FAIRY SHRIMP (VPFS)

Prepared by Christopher Rogers

Vernal Pool Fairy Shrimp (VPFS)

(Branchinecta lynchi)

Status USFWS: Threatened

Status CDFG: None



www.nd.water.ca.gov

10.1 Legal Status

The vernal pool fairy shrimp (*Branchinecta lynchi*) was federally listed as threatened on 19 September 1994 (56 CFR 48136).

10.2 Life History and Ecology

10.2.1 Species Description and Life History

The vernal pool fairy shrimp is a typical Branchinectid anostracan. The female's second antennae are smooth, and there are no cephalic ridges or cornices. The female's thoracic surface has two paired dorsolateral projections on the third, and fifth to eleventh segments, and a pair of single dorsolateral conical projections on the fourth segment. The broodpouch is pyriform (Eng et al. 1990; Rogers 2002c). The basal fourth of the male vernal pool fairy shrimp's second antennal proximal segment bears an anteriomedial pulvillus and a posteriobasal transverse 'ridge-like' apophysis (Eng et al. 1990; Eriksen and Belk 1999). The medial surface of the distal third of the proximal second antennal segment has a small sparsely spined tubercle. Live animals are typically off-white to grey, although the broodpouch may be green or yellow (Rogers pers. obs.). Depending upon the rapidity of development, mature animals may vary in length from three to 38 millimeters (Rogers pers. obs.). Animals may shrink as much as 11 to 32 percent upon preservation (Rogers 2002b).

Anostracans like the vernal pool fairy shrimp are a component of the zooplanktonic community within episodic, ephemeral aquatic habitats and can occur in densities as high as 200 per liter of water (Rogers pers. obs.). The vast majority of fairy shrimp are omnivorous, indiscriminately filtering particles from the water column, including bacteria, unicellular algae, and micrometazoa (Eriksen and Belk 1999). Vernal pool fairy shrimp will attempt to consume whatever material

APPENDIX B (Continued)

they can fit into their feeding groove, and do not discriminate based upon taste as do some other crustacean groups (Eriksen and Belk 1999). Vernal Pool Fairy shrimp will also rasp periphyton from sticks, stems and slender leaves (Rogers pers. obs.).

During the dry phase of their habitat, the anostracans survive as diapausing cysts (resting eggs) in and on the substrate (Sars 1896, 1898; Eriksen and Belk 1999; Rogers and Fugate 2001). When the habitat inundates from seasonal rainfall, some of the cysts hatch, and the nauplii (early larval form of anostraca) swim into the upper water column (Eriksen and Belk 1999). These larval forms are typically indistinguishable between species.

The maturation rates of the animal vary extensively depending upon temperature and habitat (Gallagher 1996; Helm 1998; Eriksen and Belk 1999; Rogers 2002a). Gallegher (1996) and Helm (1998) reported the vernal pool fairy shrimp as reaching maturity in 14 and 18 days respectively; however, Rogers (pers. obs.) observed this species reaching maturity in as little as six days under high temperatures. In the genus *Branchinecta*, the brood pouch is truncate and as wide as the thoracic genital segments. When oocytes are present in the lateral pouches, the brood pouch is wider than the genital segments, forming an amplexial groove, and males can amplex the female successfully. If the oocytes are not present in the lateral pouches the female is sometimes able to wriggle out of the male's grasp (Rogers 2002b). Males approach the females from beneath to amplex. Amplexus is sustained for a second or two, as mating is rapid and the female is released immediately afterwards (Rogers 2002b). The female typically sheds her cysts as the shell forms over the fertilized oocyte (Murugan et al. 1996) and the cysts fall to the substrate.

The cysts lay dormant in the substrate until the pool dries and re-inundates during the subsequent rains. Beyond inundation of the habitat, the specific cues for hatching are unknown although temperature (Hall 1959; Belk 1977; Al-Tikrity and Grainger 1990; Belk and Nelson 1995; Eriksen and Belk 1999) and conductivity (Anderson 1958; Bowen et al. 1988; Broch 1969, 1988; Brown and Carpelan 1971; Brown 1972) are believed to play a large role. The vernal pool fairy shrimp is typically univoltine (i.e., one generation per year); however animals of different ages may be present if a pool partially inundates allowing some cysts to hatch, and then later increases in volume, hydrating cysts that were further up-slope (Rogers pers. obs.).

Planktonic crustacea are important in the food web, as they represent a high fat, high protein resource for migratory waterfowl. Mallard, Green-Winged Teal, Bufflehead, Greater Yellowlegs, and Killdeer all forage actively in Central Valley vernal pools on the invertebrate and amphibian fauna during the winter months (Proctor 1964; Horne1966; Mellors, 1975; Silveira 1996; Dumont & Negrea 2002).

Predator consumption of fairy shrimp cysts aids in distributing populations of fairy shrimp. Predators (e.g., birds, amphibians) expel viable cysts in their excrement, often at locations other

than where they were consumed (Proctor 1964; Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts are also transported by wind, and in mud carried on the feet of animals, including livestock that may wade through the habitat (Rogers *in prep*). This type of dispersal aids ephemeral pool crustaceans to exploit a wide variety of ephemeral habitats (Rogers 2000).

Being prey items of birds, vernal pool fairy shrimp are an intermediate host for avian cestodes (Rogers 2002a). Anostracans that are hosting a cestode tend to be bright pink in colour. The change in colour is due to the presence of cestode cysticercoides. The parasitic tapeworm castrates the host, which causes the host animal to accumulate lipids (probably linked to carotenoid pigments) that would otherwise be expended by the host during reproduction (Amat et al. 1991).

No specific bacterial, viral or protozoan diseases have been reported for the vernal pool fairy shrimp. Occasionally, specimens with black markings or lesions will appear in collections. These black markings, sometimes referred to as "black disease," are actually evidence of the normal immune response of all crustacea to any bacteria, where any foreign bacteria is infused with melanin to lethal levels (Bang 1983). Branchiopod crustaceans are commonly found with phoretic ciliate protozoan colonies around the mouth and posterioventral portions of the head, which are abandoned with the exuvia by the crustacean with each molt.

Vernal pool fairy shrimp commonly co-occur with the California fairy shrimp (*Linderiella occidentalis*) (Dodds 1923; Eriksen and Belk 1999). This species has also been reported co-occurring with the mid-valley fairy shrimp (*Branchinecta mesovallensis* Belk and Fugate 2001) on three occasions, where the Mid-Valley Fairy Shrimp was probably washed into the vernal pool fairy shrimp habitat by abnormally high rainfall (Eriksen and Belk 1999). Other species of Branchinecta (*Branchinecta lindahli* Packard 1883, *B. coloradensis* Packard 1874, *B. mackini* Dexter 1956*, B. mesovallensis, B. conservatio* Eng, Belk and Eriksen 1990, *B. longiantenna* Eng, Belk, and Eriksen 1990) occur within the range of the vernal pool fairy shrimp, but are typically found in different, although similar, habitats (Rogers 2002a).

10.2.2 Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The vernal pool fairy shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependent upon intact sub-watersheds, and the surrounding uplands that support those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

APPENDIX B (Continued)

The vernal pool fairy shrimp needs the cold winter waters to hatch and grow in, typically appearing after the first frosts, and the dry summers to dry the resting cysts and prevent them from being attacked by fungi. Habitats supporting the vernal pool fairy shrimp are typically in Central Valley California floristic provinces below 300 m elevation. Typical habitat for vernal pool fairy shrimp in California include vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas and alkali flats (Eng et al. 1990). Vernal pool fairy shrimp have also been found in water pooled in sandstone outcrops and in alkaline vernal pools. Vernal pools that support these fairy shrimp are often grass or mud bottomed, with clear to tea-colored water, including basalt flow depression pools in grasslands (USFWS 1994; Eriksen and Belk 1999).

Pool volume is important in determining potential shrimp habitat because deeper pools with a large surface area can more easily maintain their dissolved oxygen levels. Similarly, deep pools will pond long enough to allow the shrimp to complete their life cycle. Vernal pool fairy shrimp have been found in pools ranging from 0.1 to 1.5 ac (Eriksen and Belk 1999; Rogers pers. obs.).

Various physiochemical factors have been examined in existing vernal pool fairy shrimp habitats including alkalinity, total dissolved solids (TDS), and pH (Keely 1984; Collie and Lathrop 1976; Eriksen and Belk 1999). The USFWS (1994) described the water in pools occupied by vernal pool fairy shrimp as having low conductivity and chloride; however, specific data were not provided. Eriksen and Belk (1999) presented a range of attributes measured by different workers, reporting alkalinity ranging from 22 to 274 parts per million (ppm), TDS of 48 to 481 ppm, and pH ranging from 6.3 to 8.5 inches occupied habitats. However, the importance of many of these parameters has recently been called into question with evidence that type and amount of dissolved salts may be a more important habitat requirement (Rogers 2002a). Considering the daily fluctuations in pH of a given habitat, this is to be expected. During the daylight hours, the hydrophytes are photosynthesizing, removing the CO2 (from HCO3) from the water, and raising the pH. During the night, the hydrophytes are respiring, increasing the CO2 (and thereby, the HCO3) in the water lowering the pH. If there is rainfall, the distilled precipitation will lower the pH, as will winds that cause surface action. When the habitats are drying and losing volume through evaporation, the pH, alkalinity, TDS, and electrical conductivity will increase, just as they decrease when the pools inundate or reinundate (Rogers 2002a).

Some vernal pools need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it also oxidizes the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat suitability component. Conversely, excessive livestock grazing can be detrimental to vernal pool fairy shrimp. Over-grazing tends to allow a great deal

APPENDIX B (Continued)

of manure into vernal pools. The organic waste oxidizes the water, leaving the gill-breathing invertebrates like the vernal pool fairy shrimp without oxygen (Rogers 1998). It is important not to alter grazing regimes in conservation areas until the importance of grazing to those particular systems are assessed.

Common wetland plant species that co-occur with special-status shrimp species generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of these shrimp to be present. These plants may include coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), goldfields (*Lasthenia* spp.), common spikerush (*Eleocharis macrostachya*), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and aquatic buttercup (*Ranunculus aquatilis*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods may have hydrology that cannot support shrimp species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*), toad rush (*Juncus bufonius*), false dandelion (*Hypochoeris radicata*), and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round cannot support special-status shrimp species because the shrimp's cysts must dry out before they can hatch (Eriksen and Belk 1999), or if they remain wet or moist through the warmer summer months, the cysts are subject to attack by fungi (Rogers pers. obs.). These plants include cattails (*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

The vernal pool fairy shrimp is a component of a larger invertebrate community structure (Rogers 1998). This invertebrate community includes mostly planktonic crustacea dependant upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as flatworms, and a suite of insect species, including vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*), and many others (Rogers, 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers 1998).

Therefore, potential habitat for special-status shrimp is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that may also support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow special-status shrimp species to complete their life cycles and to maintain water temperatures conducive to development and reproduction.

Optimal habitat for vernal pool fairy shrimp tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal

pool invertebrate community (Eriksen and Belk 1999; Rogers pers. obs., 1998, 2001a). Unfortunately, little effort has been made to accurately quantify these parameters.

10.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for vernal pool fairy shrimp are identified in Table VPFS-1 and have been derived from the USFWS's list of primary constituent elements in the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table VPFS-1
Essential Habitat Elements for Vernal Pool Fairy Shrimp

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

10.3 Species Distribution and Population Trends

There are more than 40 species of *Branchinecta* world-wide (Belk and Brtek 1995, 1997; Rogers and Fugate 2001; Belk and Rogers 2002) distributed throughout the Holarctic and Neotropical regions, with one species ranging into the Antarctic. The vernal pool fairy shrimp is endemic to Oregon and California (Eng et al. 1990; Eriksen and Belk 1999).

Habitat occupied by fairy shrimp tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been lost, and an unknown number of vernal pool fairy shrimp occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California and Oregon, more vernal pool fairy shrimp habitat will and is being encroached upon and impacted throughout the species range.

APPENDIX B (Continued)

10.3.1 Range Wide Distribution

The earliest collections of the vernal pool fairy shrimp on record were made by Dr. G. Eisen at "San Francisco" in 1874 (Lilljeborg 1889; Linder 1941), which were misidentified as *Branchinecta coloradensis* (Eng et al. 1990). Linder (1941) used Eisen's misidentified material for his sketch of *B. coloradensis*; on page 191 of Linder's definitive monograph of the anostraca the vernal pool fairy shrimp is clearly pictured.

The vernal pool fairy shrimp is found in California from the Redding/Bella Vista area of Shasta County in the north, throughout the Central Valley, and west to the central Coast Ranges, from northern Solano County to Pinnacles National Monument in San Benito County. Disjunct occurrences were also reported to occur in San Luis Obispo County, Santa Barbara County, and Riverside County, and from near Rancho California and the Santa Rosa Plateau in Riverside County. A disjunct population(s) has been reported in Jackson County near Medford Oregon (Eng et al. 1990; USFWS 1994; Eriksen and Belk 1999).

The existence of recently discovered occurrences near Medford, Oregon (Eriksen and Belk 1999) may indicate that there are other undiscovered occurrences between Shasta County, California and Medford.

10.3.2 Central Valley Distribution

In 1994, the USFWS reported that there were 32 occurrences of the vernal pool fairy shrimp ranging from the Stillwater Plain in Shasta County through most of the length of the Central Valley to Paisley in Tulare County (USFWS 1994).

Since then, vernal pool fairy shrimp have been reported from throughout Sacramento, Colusa and Glenn Counties, as well as Central Valley portions of the following counties: Tehama, Butte, Sutter, Yuba, Placer, Stanislaus, Madera, Fresno and Tulare on the east side of the valley (Eriksen and Belk 1999), and Alameda, Solano, Yolo, Colusa and Glenn on the west side (Eriksen and Belk 1999).

10.3.3 Range within the Plan Area

The vernal pool fairy shrimp were first officially reported from the Plan Area in 1982 (CDFG 2010). Specimens were collected from near Mather Air Force Base as early as 1967 by Dr. Clyde Eriksen (Eriksen, pers. comm.). Numerous surveys related to development projects have been conducted within and adjacent to the Plan Area (USFWS records; CDFG 2010), but the area has not been thoroughly surveyed for vernal pool fairy shrimp, and the total extent of potential habitat is unknown. Figure VPFS-1 illustrates the known recorded occurrences of vernal pool

fairy shrimp within Sacramento County. The range of the species in the Plan Area is considered to be vernal habitat embedded in valley grassland and oak savannah.

10.3.4 Population Levels and Trends

An unknown amount of vernal pool habitat has been lost and with it, an unknown number of vernal pool fairy shrimp occurrences. Attempts have been made to calculate lost vernal pool acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California and Oregon, more vernal pool fairy shrimp habitat will and is being encroached upon and impacted throughout the species' range.

Adequate determination of remaining vernal pool fairy shrimp occurrences throughout the animal's range as well as population trends is difficult. The USFWS (1994) listed 32 known occurrences of the vernal pool fairy shrimp. These data were collected during a prolonged drought in California. Sugnet and Associates (1993) submitted a study claiming 178 "discrete locations" supporting the vernal pool fairy shrimp, however as specific localities were not divulged, the data are unverifiable and therefore not scientifically useful in any type of analyses. Eriksen and Belk (1999) present a map of localities for the vernal pool fairy shrimp with more than 200 localities represented, with the greatest density of occurrences in Sacramento County.

The California Natural Diversity Data Base (CNDDB) vernal pool crustacean records (CDFG 2010) may be somewhat misleading, due to the inconsistency of the data presented. Some records refer to individual pools, while others refer to pool complexes, and others still refer to groups of complexes. Additionally, the CNDDB is not updated when a particular site or population is extirpated. Because of issues such as these, it is difficult to determine what actually constitutes a "population" or "occurrence." when using this data.

In addition, survey maps and records tend to show where vernal pool crustaceans are, and do not emphasize where they are not. Compounding these difficulties, records are typically a reflection of where surveys have been conducted, rather than a delineation of special-status shrimp distribution. Therefore, it is difficult to establish baseline conditions for this species across the entire species range, as well as within the Plan Area. None of this is to say that vernal pool crustaceans are not threatened, endangered, or should not be protected. The issue is that where a paucity of adequate data exists, consistent data reporting would help prevent ambiguous interpretation or mischaracterization of species conservation needs.

10.4 Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem to

APPENDIX B (Continued)

where it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that out compete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Overgrazing tends to result in a large amount of manure in vernal pools. The organic waste oxidizes the water, leaving gill-breathing invertebrates without oxygen (Rogers 1998). Conversely, vernal pool grasslands are disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (e.g., *Eleocharis* sp., *Eryngium* sp.) and exotic plants (e.g., *Glyceria* sp. *Lolium multiflorum*) that generate deep thatch layers on the pool substrate. As this thatch layer decomposes, it lowers the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Both lack of and excessive grazing cause an increase in organic matter in the habitat that eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that outcompete the obligatory vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat component, and the removal of grazing or excessive grazing are threats to the vernal pool fairy shrimp.

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles, paving or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. There is concern that bullfrogs (*Rana catesbeiana*) may feed upon federally protected vernal pool crustaceans (Balfour and Morey 1999). Manna grass (*Glyceria declinata*) and Italian rye grass are both exotic plants that occur in vernal pools, tend to produce heavy thatch and eventually create organic loads upon decomposition which reduce dissolved oxygen in the water (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish (*Gambusia affinis*) into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes

surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

Additional threats to the vernal pool invertebrate community structure includes: off-road vehicle use of vernal pool habitat for recreational "mud-bogging;" conversion of vernal pools into deep stock tanks that do not dry during the summer; and draining of vernal pools.

10.5 Data Gaps and Conservation Implications

Restoration and creation of vernal pool fairy shrimp habitat has been demonstrated to be feasible (Rogers 1998). However, specific habitat parameters for this and other vernal pool invertebrate species are still poorly understood. For example, there appears to be a need by this species to have a minimum pool volume and a minimum pool surface area within a given habitat to be occupied. Since this species has been found in a wide variety of natural and artificial vernal pool habitats, it is likely that it is in some respects an opportunist, as most temporary water fauna must be.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the Plan Area. Since the SSHCP is assuming that all potential habitat within the Plan Area is occupied by vernal pool fairy shrimp, and it is not feasible economically or temporally to survey the entire Plan Area, it may be expedient to estimate vernal pool fairy shrimp distribution through aerial photographic interpretation. Some specific areas will need to be physically verified as to whether they support potential vernal pool fairy shrimp habitat. Additionally, artificial habitats like railroad toe-drains, stock tanks, and road-side scrapes will also need to be verified. In addition, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and the importance of seasonality and intensity of grazing and other disturbances in vernal pool ecosystems. Furthermore, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

10.6 Literature Cited

Al-Tikrity, M.R. and J.N.R. Grainger. 1990. The effect of temperature and other factors on the hatching of the resting eggs of *Tanymastix stagnalis* (L.) (Crustacea, Anostraca). *Journal of Thermal Ecology*, 15(1): 87-90.

APPENDIX B (Continued)

Amat, F., A. Gozalbo, J.C. Navarro, F. Hontoria, and I. Varó. 1991. Some aspects of *Artemia* biology affected by cestode parasitism. *Hydrobiologia* 212:39 – 44.

Balfour, P.S. and S.R. Morey. 1999. Prey selection by juvenile bullfrogs in a constructed vernal pool complex. *Transactions of the Western Section of the Wildlife Society*, 35:34-40.

Bang, F.B. 1983. Crustacean Disease Respnses. *In:* The Biology of the Crustacea, Vol. 6. Pathobiology. Edited by D. E. Bliss and A. J. Provenzano, Jr. Pp. 113-153. Academic Press, New York, New York.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Belk, D. 1977. Zoogeography of the Arizona fairy shrimps (Crustaca: Anostraca). *Arizona Academy of Science*, 12: 70-78.

Belk, D. and D.C. Rogers. 2002. A confusing trio of *Branchinecta* (Crustacea: Anostraca) from the western North America with a description of a new species. *Hydrobiologia*. 486:49–55.

Belk, D. and J. Brtek. 1995. Checklist of the Anostraca. *Hydrobiologia* 298:315-353.

Belk, D. and J. Brtek. 1997. Supplement to 'Checklist of the Anostraca'. *Hydrobiologia* 359:243-245.

Belk, D. and M.L. Fugate. 2000. Two new *Branchinecta* (Crustacea: Anostraca) from the southwestern United States. *The Southwestern Naturalist* 45(2):111-117.

Bowen, S.T., M.R. Buoncirstiani and J.R. Carl. 1988. *Artemia* habitats: ion concentratins tolerated by one superspecies. *Hydrobiologica*, 158: 201-214.

Broch, E.S. 1969. The osmotic adaptation of the fairy shrimp *Brachinecta campestris* Lynch to saline astatic waters. *Limnology and Oceanography*, 14: 485-492.

Broch, E.S. 1988. Osmoregulatory patterns of adaptation to inland astatic waters by two species of fairy shrimps, *Branchinecta gigas* Lynch and *Branchinecta mackini* Dexter. *Journal of Crustacean Biology*, 8: 383-391.

APPENDIX B (Continued)

Brown, L.R. and L.H. Capelan. 1971. Egg hatching and life history of a fairy shrimp *Branchinecta mackini* Dexter (Crustacea: Anostraca) in a Mohave desert playa (Rabbit Dry Lake). *Ecology*, 52(1): 41-54.

Brown, R.J. 1972. A study of the mechanisms of osmotic and ionic regulation of the fairy shrimp, *Branchinecta mackini* (Crustacea, Branchiopoda). Ph. D. thesis. University of Toronto. Toronto, Canada. 215 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Center for Biological Diversity (CBD). 2001. Petition to list the midvalley fairy shrimp as an endangered species under the Endangered Species Act with concurrent designation of critical habitat. Center for Biological Diversity, PO 40090, Berkeley, California 94704-4090.

Collie, N. and E.W. Lathrop. 1976. Chemical characteristics of the standing water of a vernal pool on the Santa Rosa Plateau, Riverside County, California. Pp. 27-31 *In:* S. Jain (ed.) Vernal Pools, their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis, California.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. Verh. Internat. *Verein. Limnol*. 23:1107-1113.

Dumont, H.J. and S. Negrea. 2002. *Introduction to the Class Branchiopoda*. Guides to the Microinvertebrates of the Continental Waters of the World. Backhuys, Leiden.

Eng, L., D. Belk, and C. Eriksen. 1990 Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.

Eriksen, C. and D. Belk. 1999. *Fairy shrimps of California's pools, puddles, and playas*. Mad River Press, Eureka, California.

Eriksen, pers. comm. Dr. Clyde Eriksen. P.O. Box 23 Wise River, Montana 59763.

Hall, R.E. 1959. The development of eggs of *Chirocephalus diaphanus* Prévost at a low temperature. *Hydrobiologia*, 13: 156-159.

APPENDIX B (Continued)

Helm, B. 1998. Biogeography of eight large branchiopods endemic to California. Pp. 124-139 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Horne, F.R. 1966. The effect of digestive enzymes on the hatchability of Artemia salina eggs. *Transactions of the American Microscopical Society*, 85(2): 271-274.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's heartland*. University of California Press, Berkeley.

Lilljeborg, W. 1889. Diagnosen zweier Phyllopoden-Arten aus Süd-Brasilien. Abhandlungen herausgegeben vom naturwissenschaftlichen. *Vereine zu Bremen*, 10: 424.

Linder, F. 1941. Contributions to the morphology and the taxonomy of the Branchiopoda Anostraca. Zoologiska Bidrag fran Uppsala, 10: 101-302.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Mellors, W.K. 1975. Selective Predation of ephippial *Daphnia* and the resisitance of ephippial eggs to digestion. *Ecology* 65:974-980.

APPENDIX B (Continued)

Murugan, G., A. Maeda-Martinez, G. Criel, and H. Dumont. 1996. Unfertilized oocytes in Streptocephalids: resorbed or released? *Journal of Crustacean Biology*, 16(1):54–60.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. *Ecology*, 45(3):656-658.

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

Rogers, D.C. 2002a. Draft: Distribution and habitat parameter surveys B*ranchinecta mesovallensis* (Crustacea: Branchiopoda: Anostraca). Report to US Fish and Wildlife Service. Jones and Stokes Associates.

Rogers, D.C. 2002b. Amplexial morphology of selected Anostraca. *Hydrobiologia* 486:1-18.

Rogers, D.C. 2002c. Female based characters for anostracan (Crustacea:Branchiopoda) identification: a key for species in California and Oregon, USA. *Hydrobiologia* 486 125-132.

Rogers, D.C. and M. Fugate. 2001. *Branchinecta hiberna*, a new species of fairy shrimp (Crustacea: Anostraca) from western North America. *Western North American Naturalist* 61(1):11 – 18.

Rogers, D.C. *In prep*. Dispersal agents and speciation in the Branchiopoda (Crustacea).

Sars, G.O. 1896. On some West Australian Entomostraca raised form dried sand. *Archiv for Mathematik og Naturvidenskab* 19(1):1-35. 4pls.

Sars, G.O. 1898. On some South-African Phyllopoda raised from dried mud. *Archiv for Mathematik og Naturvidenskab* 20(4):1-43. 4pls.

Silveira, J. 1996. Avian uses of vernal pools and implications for conservation practice. Pp. 92-106 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

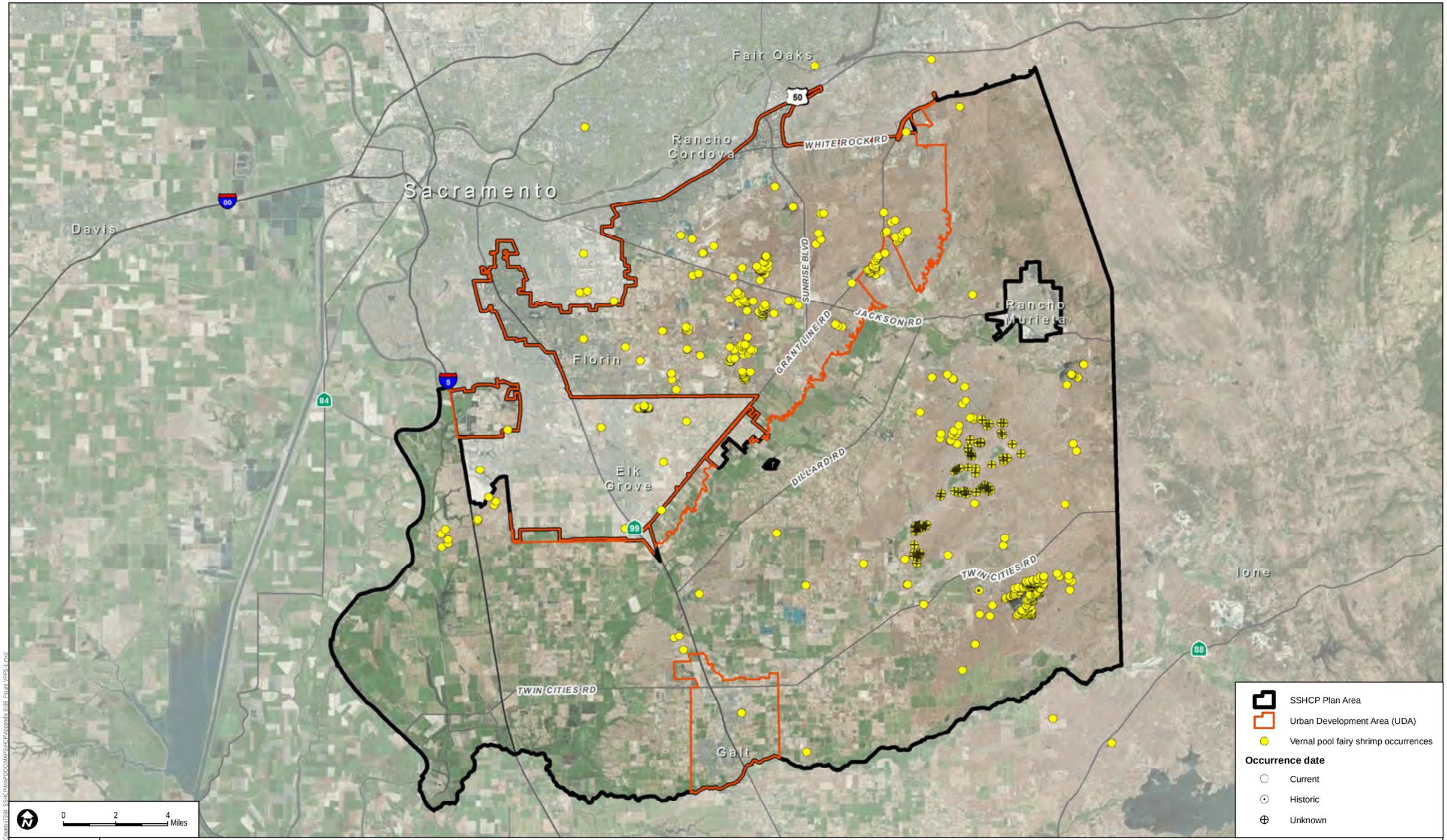
APPENDIX B (Continued)

United States Fish and Wildlife Service (USFWS). September 19, 1994. Federal Register Final Rule; determination of endangered status for the conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool fairy shrimp; and threatened status for the vernal pool fairy shrimp.

Wissinger, S.A., A.J. Bohonak, H.H. Whiteman, and W. S. Brown. 1999. Habitat Permanence, salamander predation and invertebrate communities. *In:* Invertebrates in Freshwater Wetlands of North America: Ecology and Management, edited by D. P. Batzer, R. B. Bader, and S. A. Wissinger, John Wiley and Sons, Inc. New York.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, ECORP 2009, EcoAnalysts 2008, Foothill Associates 2011, Helm 2007, Kassis-Sylva 2011, Gibson & Skordal 1994, Sugnet 1996, Richard Hill 1999 Kiefer 2011, LSA 2011, Vollmar 2011, USFWS 2014, Wildlands 2010

FIGURE VPFS-1

Vernal Pool Fairy Shrimp Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\I2394 SSHCP\MAPS\CMAPS\SHCP\Appendix B\08_Figure VPFS-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

11 VALLEY ELDERBERRY LONGHORN BEETLE (VELB)

Prepared by Christopher Rogers

Valley Elderberry Longhorn Beetle (VELB)
(Desmocerus californicus dimorphus)
Status USFWS: Threatened
Status CDFG: None



11.1 Legal Status

The Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) (VELB) was federally listed as a threatened species on August 8, 1980 (50 CFR part 17, 52803 – 52807).

11.2 Life History and Ecology

11.2.1 Physical Description and Taxonomy

VELB is an atypical lepturine Cerambycid beetle. The Cerambycidae are the longhorned wood boring beetles. The subfamily Lepturinae is comprised mostly of small, showy, diurnal, species that are commonly found on flowers through the spring and summer, although they are generally more abundant at higher altitudes. Elderberry beetles are in the genus *Desmocerus*, the sole genus in the Lepturine tribe (*Desmocerini* Linsley and Chemsak 1972; Monné and Hovore 2001). This tribe is separated from all other Lepturine tribes by the form of the mandibles, which are broad and short, without internal pubescence (Linsley and Chemsak 1972).

The California elderberry longhorn beetle (*D. californicus*) was originally described by Horn in 1881. This beetle is black in color, with red to orange margins on the elytra in living animals, fading to yellow in death. The pronotum disc is plane, with confluent punctations. The elytra are densely punctate or rugose. Adult beetles range from 14 to 25 millimeters in length (Linsley and Chemsak 1972).

VELB was described as a separate species by Fisher (1921) and was reduced to subspecific status by Doane et al. (1936). The majority of male VELB can be separated from the nominate subspecies by the short, suberect, pale setae on the antennae (as opposed to dark setae), and having the black elytral markings reduced to a single elongated apical dot and a single elongated

basal dot per each elytron (Linsley and Chemsak 1972). Although it has been reported that a percentage of VELB males have identical elytral patterns to the nominate form (Linsley and Chemsak 1972; Eya 1976; Barr 1991), there is no explanation as to how this percentage is separated from the nominate form. The female VELB cannot be separated morphologically from the nominate subspecies. The larva has not been described, but the life history and immature stages of the nominate taxon were detailed by Davis and Comstock (1924).

This species has been confused with females of the common and widespread Lepturine *Anastrangalia laetifica* (LeConte) 1859, which is smaller (8 to 13 millimeters), much more elongated, and is similarly colored, except that the elytra have a subbasal, sutural, elongated black marking, and an elongated black marking near the elytral margin.

11.2.2 Reproduction

The VELB is univoltine. The female oviposits between eight and 20 eggs in bark crevices on the host plant (Burke 1921; Barr 1991). The host plant is the elderberry (*Sambucus* spp.) (Burke 1921; Linsley and Chemsak 1972, 1997; Barr 1991). The eggs are 3.5 to 1.25 millimeters in diameter, oblong (football shaped), with a small knob at each end, and have wavy, longitudinal ridges, white initially, and then darkening to reddish brown (Burke 1921; Barr 1991). The egg is attached to the shrub by a thin secretion and the larva ecloses within 30 to 40 days (Burke 1921).

The newly emerged larvae bore into the wood of the host plant (Linsley and Chemsak 1972; Barr 1991). Burke (1921) and Eya (1976) reported that the larvae take two years to mature, however Halstead (1991) believes that one year is the norm. The larva typically bores into the central pith of stems and feeds there; however, on large trunks the larvae feed upon the wood (Burke 1921). The larvae create an elongated, longitudinal gallery through the heart of the stems, filling it with frass and shredded wood (Barr 1991). When the larva is ready to pupate it chews a circular to slightly oval exit hole (7 to 10 millimeters in diameter) to the outside, which it plugs with frass. Then the larva backs up into the gallery and constructs a pupal chamber out of shredded wood and frass (Barr 1991). Jones and Stokes (1985, 1986, 1987a, and 1987b) and Halstead (1991) reported that 70 percent of exit holes are within 1.2 meters of the ground in stems greater than 13 mm in diameter; however holes may be as high as three meters above the ground (Barr 1991, Rogers pers. obs.). Pupae can be found between January and April, and the pupal stage lasts about one month (Burke 1921).

After pupation, the teneral adult remains in the pupal cell for several weeks prior to emergence (Burke 1921). The adult eventually emerges from the pupal chamber, through the exit hole (Barr 1991). The adults readily fly from shrub to shrub. VELB is most often seen on, in, or immediately under the host plant's inflorescences; however, copulation occurs on the lower parts of the stems (Barr 1991; Rogers pers. obs.). The adults feed on the leaves,

and to a lesser extent on the flowers (Linsley and Chemsak 1972; Barr 1991). The adults are active from March to early June.

11.2.3 Ecological Relationships

There are no known diseases of VELB. Numerous species of Cleridae (checkered beetles), Cucujidae (flat bark beetles), Ostomatidae (bark-gnawing beetles), Elateridae (click beetles), Asilidae (robber flies), Phymatidae (ambush bugs), Reduviidae (ambush bugs), and some Thysanoptera (thrips) are known predators of Cerambycid beetles (Linsley 1961). All are common in the Central Valley, but none have been reported feeding on VELB.

The non-native invasive Argentine ant (*Linepithema humile*) has been observed attacking and killing VELB larvae. The ants enter the exit hole that the beetle makes prior to pupation, and remove the larva (Huxel 2000).

Birds that hunt insect larvae in wood, such as woodpeckers, creepers, and nuthatches, may also prey upon VELB, but no observations of this have been reported. Adult beetles may not be taken by birds due to their warning colors. Whether these warning colors are genuine or represent Batesian mimicry is unknown.

11.2.4 Habitat Requirements and Ecology

The VELB is completely dependent upon its host plant, the elderberry (*Sambucus glauca, S. mexicana, S. caerulea*) (Linsley and Chemsak 1972, 1997; Eng 1984; Barr 1991; Collinge et al. 2001) using no other recorded larval host plant. This shrub is a component of riparian forests throughout the Central Valley. Although this shrub occasionally occurs outside of riparian areas, shrubs supporting the greatest beetle densities are where the shrubs are abundant and interspersed among dense riparian forest, including species such as Fremont's cottonwood (*Populus fremontii*), box elder (*Acer negundo*), western sycamore (*Platanus racemosa*), California black walnut (*Juglans hindsii* var. *californica*), white alder (*Alnus rhombifolia*), willow (*Salix* spp.), button-willow (*Cephalanthus occidentalis*), Oregon ash (*Fraxinus latifolia*), wild grape (*Vitis californicus*), California hibiscus (*Hibiscus lasiocarpos*), and western poison-oak (*Toxicodendron diversilobum*) (Barr 1991; USFWS 1999; Collinge *et a*l. 2001). Isolated elderberry shrubs separated from contiguous habitat by extensive development are not typically considered to provide viable habitat for VELB (USFWS 1998; Collinge et al. 2001).

Although VELB can be found wherever elderberry shrubs are found, the VELB is also a component of a larger community structure dependent upon riparian forest (Eya 1976; USFWS 1984, 1999; Barr 1999; Huxel 2000; Collinge et al. 2001). This community includes numerous other invertebrates dependent upon riparian corridors including other invertebrates like the Sierra sideband snail *(Monodenia mormonum)*, bumblebee scarab *(Licnanthe rathvoni)*, flat headed

borers (*Buprestis viridisuturalis* and *Buprestis laeviventris)*, the oak root borers *(Prionus lecontei* and *Prionus californicus)*, monarch butterfly (*Danaus plexippus)*, California dogface *(Zerene eurydice)*, western tiger swallowtail (*Papilio rutulus)*, and Argiope orb weavers (Rogers, pers, obs.), as well as vertebrates such as yellow-billed cuckoo and least Bell's vireo.

Therefore, suitable VELB habitat is defined as elderberry shrubs that are adjacent to, or contiguous with riparian forest, flood plains or relict elderberry savannah that measure greater than or equal to one inch in diameter measured at ground level.

11.2.5 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The essential habitat elements for VELB are identified in Table VELB-1 and have been derived from input from local species experts.

Table VELB-1
Essential Habitat Elements for Valley Elderberry Longhorn Beetle

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Mine tailing riparian woodland, valley oak riparian woodland, mixed riparian woodland, and mixed riparian scrub.	Requires elderberry shrubs (*Sambucus glauca*, *S. mexicana, S. caerulea*); generally in a matrix of other continuous to semi-continuous riparian vegetation.

11.3 Species Distribution and Population Trends

Habitat occupied by VELB tends to form and exist in riparian corridors and on the level open ground of periodic flood plains. This geomorphic setting historically has been desirable for agricultural, urban or industrial development. As a result, much of this habitat type has been converted through dams and levees for use as developable land. Although it has been estimated that 90 percent of California riparian habitat has been lost over the last century and a half (Barr 1991; Barbour et al. 1991; Smith 1980; Reiner and Griggs 1989; TNC 1990; Jacobs 1992; Naiman et al. 1993; Naiman and Décamps 1997) it is difficult to accurately quantify in terms of direct VELB habitat losses. Therefore, an unknown amount of riparian forest and elderberry savannah habitat has been lost, and an unknown number of VELB metapopulations as well (Collinge et al. 2001).

Long-term datasets on VELB occupancy are limited to those collected by Collinge et al. (2001) who, in 1997, re-surveyed sites visited by Barr (1991). Both found about 25 percent occupancy of elderberry groups and 20 percent occupancy of sites. However, decreases in the number of sites with elderberry (at seven fewer re-visited sites: a 10 percent decline) and in density of

elderberry between surveys, resulted in lower total numbers of occupied sites and shrub groups (Collinge et al. 2001). Considering elderberry loss, and VELB extirpations (exit holes no longer found) and colonizations (exit holes found in 1997 where there were none in 1991) at sites that still had elderberry, Collinge et al. (2001) counted extirpations at nine of 72 re-visited sites (12.5 percent over six years, or about 2.5 percent of sites per year), and colonizations at four of 43 previously unoccupied sites revisited (nine percent over six years or about 1.5 percent of sites per year). colonizations only were identified within major drainage systems.

Lang et al. (1989) found much lower occupancy rates along the southern half of the Sacramento River than in the northern half and attributed the lower rates to the loss and narrowing of riparian corridors associated with agricultural development. This pattern may also reflect changes that have occurred through time. Loss of over 90 percent of riparian habitat (Katibah et al. 1984; GIC 2003) and subsequent fragmentation in the VELB's range may have resulted in not only loss of populations occurring in destroyed areas, but also degradation and declines in occupancy rates within remnants of habitat.

11.3.1 Range Wide Distribution

Desmocerus californicus is one of three species of *Desmocerus* in North America. VELB is one of two subspecies of *D. californicus*. The nominate subspecies is widespread in coastal California, ranging from Mendocino County southward to western Riverside and northern San Diego Counties, and also into the southern Sierra Nevada range (Kern and Tulare Counties). The VELB subspecies is a narrowly defined endemic taxon, limited distributionally to portions of the California Central Valley and Sacramento-San Joaquin River Delta (USFWS 1999). Studies to assess the distribution and extent of the valley subspecies began in the late 1970's (Eya 1976) and the USFWS proposed the species for listing in 1978. Since VELB was listed in 1980, numerous distributional studies have been conducted (summarized in Barr 1991; Halstead and Oldham 2000). This subspecies is endemic to California, occurring below 900 meters elevation (USFWS 1999).

11.3.2 Central Valley Distribution

In the Central Valley proper, VELB was first collected from "Sacramento, California," the precise location being unknown (Fisher 1921). Additional material was identified from Putah Creek in Solano and Yolo counties, and from along the Lower American River in Sacramento County (Linsley and Chemsak 1972). Linsley and Chemsak (1972) also reported a single female from the Merced River; however, since the females cannot be separated to subspecific level, the identification is considered unverified.

Subsequent to various surveys throughout the Central Valley, the USFWS (1999) prepared a map of the presumed range of VELB. This map encompasses the entire Central Valley, and the Sacramento-San Joaquin River Delta, below 900 meters in elevation. Additionally the CNDDB identifies 201 occurrences in a continuous band from Shasta County in the north to Kern County in the southern portion of the State (CDFG 2010).

11.3.3 Range within Plan Area

Because comprehensive surveys for VELB in the Plan Area have not been conducted and because known occurrences throughout the species range are based mostly on incidental observations, the population size and locations of this species in the Plan Area are not known. Few surveys focused on VELB have been conducted within and adjacent to the Plan Area, and the total extent of potential habitat (i.e., elderberry shrubs) is unknown. Of the 22 known occurrences of VELB recorded within the CNDDB from Sacramento County 15 are located north and outside of the Plan Area in proximity to the American River. Of the remaining seven CNDDB occurrences located within the Plan Area, five CNDDB occurrences are located along the Cosumnes River/Deer Creek riparian corridor, one along Highway 50 in Rancho Cordova, and one is located along Dry Creek east of the City of Galt (CDFG 2010). There were also several documented exit holes within the mine tailing riparian woodland in Rancho Cordova on the Aerojet property (Talley et al. 2007) and along the Cosumnes River near Rancho Murieta (Talley 2003). There are no previously recorded occurrences along the Sacramento River within the County (CDFG 2010).

It is important to note that much of the Plan Area encompasses privately owned property, a majority of which has not been surveyed for the presence of VELB; therefore, there is a high probability that future surveys will identify additional occurrences within the Plan Area.

Figure VELB-1 illustrates the recorded distribution of known VELB occurrences (based primarily on exit holes) within Sacramento County (CDFG 2010; Talley et al. 2007; Talley 2003). Recently made exit holes can be identified and are commonly used as an indicator of species presence. As noted above, extensive mapping efforts on public and private lands within the Plan Area have not been conducted and would be needed to fully characterize the distribution of VELB in the Plan Area. For the purposes of the SSHCP, the range of the species within the Plan Area is considered to be the entire Plan Area (particularly since isolated elderberry shrubs may occur almost anywhere).

11.3.4 Population Levels and Trends

The VELB is known from a total of 201 CNDDB occurrences, which include 23 in Fresno County; 22 in Sacramento County; 21 in Tehama County; 18 each in Butte and Yolo

Counties; 17 in San Joaquin County; 13 Yuba County; 12 in Glenn County; ten in Tulare County; nine in Solano County; eight in Stanislaus County; seven each in Colusa, Placer, and Sutter Counties; six each in Madera and Tuolumne Counties, four each in Kern, Merced, Napa, and Shasta Counties; two in El Dorado County; and one each in Amador Calaveras, and Mariposa Counties (CDFG 2010).

Of the 201 CNDDB occurrences recorded, all are listed as presumed extant (CDFG 2010). Only one recorded occurrence, which is located in Sacramento County along State Highway 50, is listed as experiencing a decreasing trend the rest are listed as trend unknown (CDFG 2010); this occurrence has Argentine ants which have killed two newly emerged VELB (Calderaro pers.obs.).

An unknown amount of riparian forest and elderberry savannah has been lost, and with it, an unknown number of VELB occurrences. Due to current pressures of the increasing human populations in California, more VELB habitat is being and will continue to be encroached upon and impacted throughout the species range. Although it has been estimated that 90 percent of California riparian habitat has been lost over the last century and a half (Barr 1991) it is difficult to adequately quantify. It is not unreasonable to assume that as riparian habitat is lost, VELB will experience a decreasing trend in population.

11.4 Threats to the Species

The greatest threat to VELB is the elimination, loss, or modification of their habitat by development and other activities, which reduce or eliminate their host plants. Levees, dams or other structures or activities that alter the hydrology of riparian areas may lead to the direct loss of riparian forests and elderberry shrubs. Habitat fragmentation also may pose a threat to the VELB, as development which isolates small patches of riparian forest may prevent VELB movement and genetic flow between occupied areas of habitat, isolating metapopulations (Collinge et al. 2001). Furthermore, small areas of habitat, which are surrounded by development may not be buffered against run-off and other degrading effects from adjacent developed areas, such as storm run-off contaminants.

Opportunistic invasive non-native plants like the Himalayan blackberry (*Rubus discolor*) may overwhelm elderberry shrubs by the sheer mass of their growth form, and may shade out the leaves, killing the shrub, or prevent VELB from moving between shrubs, or dispersing to other shrubs. Excessive livestock grazing in riparian areas can be detrimental to riparian communities. Cattle and horses chew on elderberry and other riparian forest species, often girdling shrubs and trees, and eventually killing them.

Pesticide drift from agriculture or direct fogging of riparian areas by mosquito abatement districts or the State Health Department to control encephalitis mosquitoes may affect VELB.

11.5 Data Gaps and Conservation Implications

The ecology, status, and management of VELB have received increased attention in recent years; however, there are several sources of uncertainty regarding VELB and its requirements in the Plan Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

11.5.1 Population and Habitat Distribution within the Plan Area

VELB occur in suitable habitat within the Plan Area; however, comprehensive surveys for VELB in the Plan Area have not been conducted and the existing occurrence data are based primarily on incidental observations (particularly the presence of exit holes which may or may not be associated with VELB). Consequently, the population size and distribution of the species throughout the Plan Area are not known. Although the distribution of different land cover-types is mapped and quantifiable, the quality of habitat (particularly as it relates to essential habitat components such as elderberry shrubs and stem size) for VELB within most of these areas is unknown. These information gaps limit our ability to identify the best lands available for preserving VELB habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for VELB will be considered relatively high in lands that support (or recently supported) known occurrences and/or are adjacent to these areas.

11.5.2 Determining Threat Severity

Although certain factors are known to contribute to VELB decline range wide, exactly how and to what extent these factors contribute to the decline of the VELB are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., adjacent use of pesticides and herbicides); therefore, to improve conservation planning efforts for VELB in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

11.5.3 Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for VELB

Achieving the conservation goals and objectives for VELB will require successful enhancement and restoration of suitable habitat as well as maintenance of dispersal corridors.

APPENDIX B (Continued)

The function of habitat (e.g., connectivity, biodiversity, etc.) is an important factor for suitability of VELB. Whether restored or enhanced habitats can retain the structural attributes suitable for VELB is unknown.

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for VELB, then those lands would not support sustainable populations.

11.6 Literature Cited

Barr, C. B. 1991. The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* Fisher (Insecta: Coleoptera: Cerambycidae). USFWS, Sacramento, California.

Burke, H. E. 1921.Biological notes on *Desmocerus*, a genus of roundhead borers, the species of which infest various elders. *Journal of Economic Entomology*, 14:450-452.

Calderaro, Angela, PMC.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Collinge, S.K., M. Holyoak, C.B. Barr, and J.T. Marty. 2001. Riparian habitat fragmentation and population persistence of the threatened valley elderberry longhorn beetle in central California. *Biological Conservation,* 100:103-113.

Eng, L.L. 1984. Rare, threatened and endangered invertebrates in California riparian systems. In: California riparian systems ecology, conservation, and productive management. Ed. R.E. Warnter and K.M. Hendrix, Berkeley: University of California Press.

Eya, B. K. 1976. Distribution and status of a longhorn beetle, *Desmocerus californicus dimorphus* Fisher (Coleoptera: Cerambycidae). Unpublished report, Department of Zoology, University of California, Davis, California. 6 pp.

Fisher, W. S. 1921. A new Cerambycid beetle from California. *Proceedings of the Entomological Society of Washington,* 23 (9): 206-208.

Geographic Information Center (GIC). 2003. The Central Valley Historic Mapping Project. Report of the Habitat Restoration Program, U.S. Fish and Wildlife Service. Geographic Information Center, California State University, Chico, Dept. of Geography and Planning, Chico, CA 95929-0425, Chico, California.

APPENDIX B (Continued)

Halstead, J. A. 1990. Letter to G.C. Kobetich, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Field Office, Sacramento California. October 29, 1990.

Halstead, J. A. 1991. Unpublished manuscript. Kings River Conservation District, Fresno, California. 47pp.

Halstead, J. A. and J. A. Oldham. 2000. New distribution records for the elderberry longhorn beetle *Desmocerus californicus* Horn (Coleoptera: Cerambycidae). Pan-Pacific Entomologist 76:74-76.

Holyoak, M., T.S. Talley and S.E. Hogle. 2010. The effectiveness of US mitigation and monitoring practices for the threatened Valley elderberry longhorn beetle. *Journal of Insect Conservation*. 14(1):43-52.

Horn, G. H. 1881. The Species of Desmocerus. *Transactions of the American Entomological Society*, 9:7-8.

Hovore, Frank, Frank Hovore and Associates.

Huxel, G. 2000. The effect of the Argentine ant on the threatened valley elderberry longhorn beetle. *Biological Invasions,* 2:81-85.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Jones and Stokes Associates, Inc. 1985. Survey of the Habitat and Populations of the Valley Elderberry Longhorn Beetle along the Sacramento River. 1985 Progress Report. Prepared for the U.S. Fish and Wildlife Service, Sacramento Endangered Species Field Office, Sacramento, California. 46 pp.+ appendices.

Jones and Stokes Associates, Inc. 1986. Survey of the Habitat and Populations of the Valley Elderberry Longhorn Beetle along the Sacramento River. 1986 Progress Report. Prepared for the U.S. Fish and Wildlife Service, Sacramento Endangered Species Field Office, Sacramento, California. 13 pp.+ appendices.

Jones and Stokes Associates, Inc. 1987a. Biological Survey of the Raleys Landing Project Site, Yolo County. Sacramento, California.

APPENDIX B (Continued)

Jones and Stokes Associates, Inc. 1987b. Survey of the Habitat and Populations of the Valley Elderberry Longhorn Beetle along the Sacramento River. Final Report. Prepared for the U.S. Fish and Wildlife Service, Sacramento Endangered Species Field Office, Sacramento, California. 48 pp.+ appendices.

Katibah, E. E., K. J. Dummer, and N. E. Nedeff. 1984. Current condition of riparian resources in the Central Valley of California. Pages 314-321 in R. E. Warner and K. M. Hendrix, editors. California Riparian Systems: Ecology, Conservation, and Productive Management. University of California Press, Berkeley, California.

Lang, F. J., J. Jokerst, and G. Sutter. 1989. Habitat populations of the valley elderberry longhorn beetle along the Sacramento River. US Forest Service General Technical Report PSW-110, pp. 242-247.

Linsley, E.G. 1961. Cerambycidae of North America, Part I. Introduction. University of California Publications in Entomology 18:1-97.

Linsley, E.G. 1964. Cerambycidae of North America, Part V. Taxonomy and Classification of the Subfamily Cerambycinae, Tribes Callichromini Through Ancylocerini. *University of California Publications in Entomology*, 22:1-197.

Linsley, E.G. and J. A. Chemsak. 1972. Cerambycidae of North America, Part VI, No.1. Taxonomy and Classification of the Subfamily Lepturinae. *University of California Publications in Entomology*, 69:1-138.

Linsley, E.G. and J. A. Chemsak. 1997. Cerambycidae of North America, Part VIII. Bibliography, Index and Host Plant Index. *University of California Publications in Entomology*, 117:1-534.

Monné, M.A. and F.T. Hovore. 2001. Checklist of the Cerambycidae of the Western Hemisphere, Part 1. Parandrinae through Lepturinae. Electronic version, Internet files at www.hovore.com.

Naiman, R. J., H. Décamps, and M. Pollock. 1993. The role of riparian corridors in maintaining regionalbiodiversity. *Ecological Applications,* 3:209-212.

Naiman, R. J. and H. Décamps. 1997. The ecology of interfaces: riparian zones. *Annual Review of Ecology and Systematics,* 28:621-658.

Serpa, Larry, The Nature Conservancy.

APPENDIX B (Continued)

Smith, F. 1980. A short review of the status of riparian forests in California. *In*: Sands, A. (Ed.), Riparian Forests in California: Their Ecology and Conservation. University of California Regents, Berkeley, California, pp 1-2.

Talley, T.S. 2007. Which heterogeneity framework? Consequences for conclusions about patchy population structure. *Ecology*. 88(6), pp. 1476–1489.

Talley, T.S. 2003. Data obtained from surveys conducted in March 21, 2003; April 7, 2003; April 17, 2003. The data has been modified to show only new exit holes.

Talley, T.S. 2005. Spatial ecology and conservation of the valley elderberry longhorn beetle. PhD dissertation. University of California, Davis.

Talley, Theresa, University of California, Davis.

Talley T.S, E. Fleishman, M. Holyoak, D.D. Murphy, and A. Ballard. 2007. Rethinking a rare-species conservation strategy in an urban landscape: The case of the Valley Elderberry Longhorn Beetle. *Biological Conservation*. 135:21–32.

United States Fish and Wildlife Service (USFWS). August 8, 1980. Federal Register Final Rule; Listing the Valley elderberry longhorn beetle as a Threatened Species with critical habitat. 50 CFR part 17, 52803 – 52807.

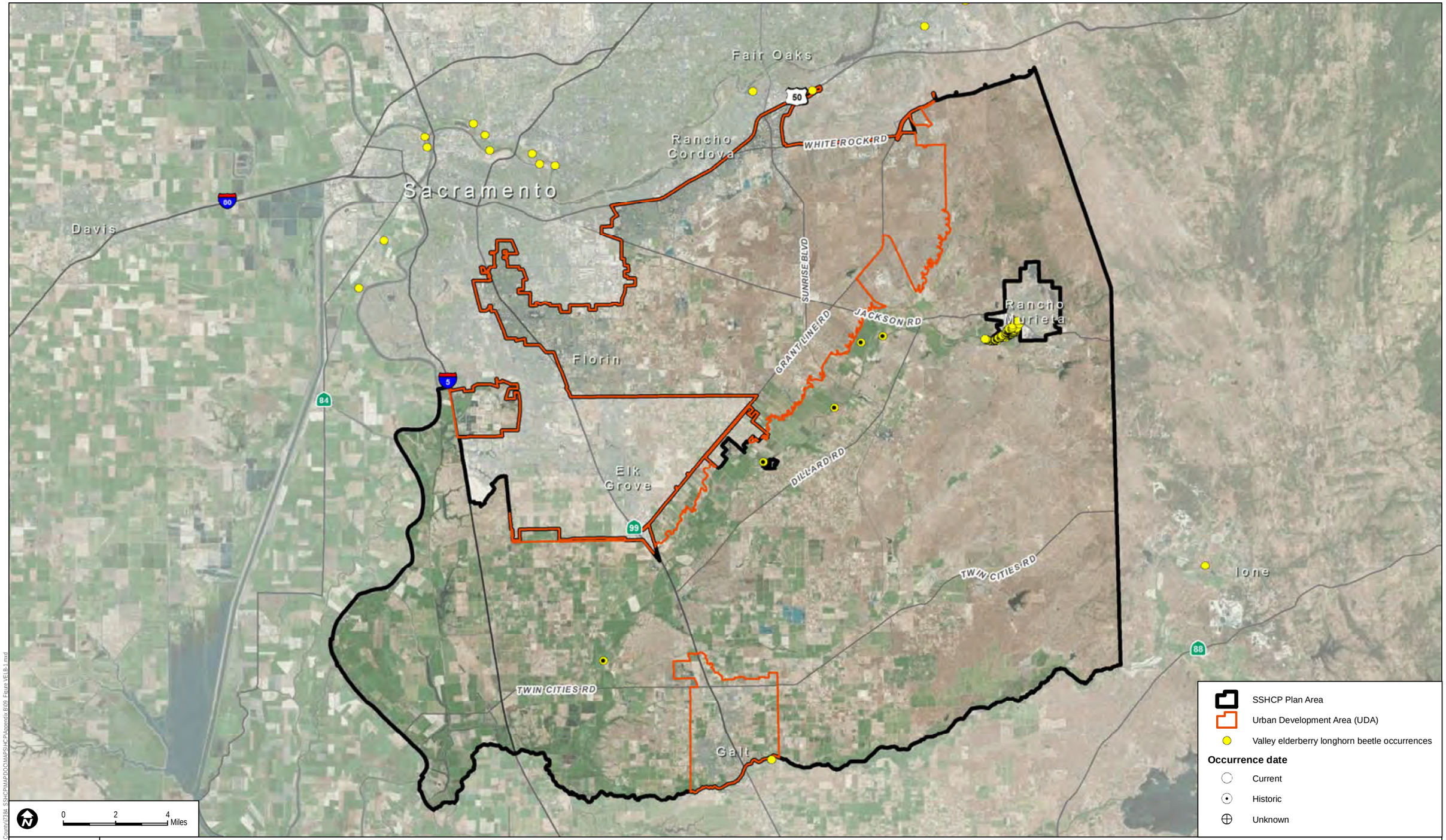
United States Fish and Wildlife Service. 1984 (USFWS). Valley Elderberry Longhorn Beetle Recovery Plan. U. S. Fish and Wildlife Service, Portland, Oregon. 62 pp.

United States Fish and Wildlife Service (USFWS). 1998. Letter dated 7 December 1998 to the California Statewide Certified Development Corporation.

United States Fish and Wildlife Service (USFWS). 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle, 9 July 1999.

United States Fish and Wildlife Service (USFWS). 2006. Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) Five-year Review Summary and Evaluation. September 2006. USFWS, Sacramento Fish and Wildlife Office, Sacramento, California.

Witham, Carol, Ecologist.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, T. Talley 2003

FIGURE VELB-1

Valley Elderberry Longhorn Beetle Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0294 SSHCP\MAPS\CMAPS\HCP\Appendix B\09_Figure VELB-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

12 RICKSECKER'S WATER SCAVENGER BEETLE (RWSB)

Prepared by Christopher Rogers

Ricksecker's Water Scavenger Beetle (RWSB)

(Hydrochara ricksecker)

Status USFWS: Species of Concern

Status CDFG: None

12.1 Legal Status

The Ricksecker's water scavenger beetle (hydrochara) (*Hydrochara ricksecker*) is considered a special animal by the California Department of Fish and Game.

12.2 Life History and Ecology

12.2.1 Species Description and Life History

Ricksecker's hydrochara was originally described in the genus *Hydrocharis* (in error) by Horn in 1895. Leech (1956) moved it to the genus *Hydrochara*. The Ricksecker's hydrochara is a typical aquatic Hydrophilid beetle. The sexes are not readily separable. The Ricksecker's hydrochara is 10 to 12 millimeters in length, and dorsally convex. The overall color is black. Dorsally the beetle has metallic green reflections, and the lateral margins of the pronotum and elytra are testaceous to yellow. Ventrally, the keel is short, ending in a sharp spine (Smetana 1980). Underwater, the black ventral surface appears silvery due to the air trapped on the ventral setae. This species can readily be confused with the widespread *Tropisternus lateralis* Fabricius 1775, which is slightly smaller, is less convex, and has a much more elongated ventral keel. The larva has not yet been formally described; however, it can be separated from all other Hydrophilid genera by the five segmented legs, symmetrical mandibles, reduced gula, lateral abdominal projections, and tracheal gills absent (Archangelski 1997; Rogers and Serpa *in prep*).

The vast majority of Hydrophilid beetles, including the Ricksecker's hydrochara, are predatory as larvae and omnivorous as adults. Ricksecker's hydrochara is a component of the benthic community within episodic, ephemeral aquatic habitats (Rogers pers. obs.). Ricksecker's

hydrochara larvae indiscriminately attack anything their size or smaller, and attempt to consume it, including other insects, crustaceans, amphibian larvae, and other Ricksecker's hydrochara larvae (Rogers pers. obs.; Serpa pers. obs.). Like other Hydrophilid species, the larvae tend to keep to shallow margins and heavily vegetated areas, and upon making a kill, carry the prey item to the surface and hold it out of the water while consuming it (Plague 1996; Rogers pers. obs.). Adults feed on common frog-fruit (*Phyla nodiflora*), and dead insects and tadpoles (Serpa pers. obs.; Rogers pers. obs.).

The Ricksecker's hydrochara is univoltine. Oviposition and eclosion have not been observed. Early instar larvae appear in the pools three to four weeks after the pools first fill (Rogers pers. obs.). The larvae grow quickly, usually requiring only two or three meals to molt to each subsequent instar. When temperatures begin to rise (typically March) the late instar larvae leave the pool, and construct a burrow in the adjacent uplands, typically where the soil is slightly moist, and pupate therein (Rogers pers. obs.). Pupation lasts two to four days, depending upon temperature. Upon emergence, the adults fly to a different vernal pool and mate (Rogers pers. obs.). The ovisac of other *Hydrochara* spp. is constructed by the female at the water surface, in vegetation. The ovisac is typically off-white, roughly subspherical, 10 to 18 millimeters in length, with a slender mast (Archangelski 1997). The mast and operculum are brownish. The adults may die after mating and oviposition, as dead adults have been found as the pools are drying (Rogers pers. obs).

There are no known diseases, parasites or predators of the Ricksecker's hydrochara, other than the species' own cannibalistic larvae.

Ricksecker's hydrochara co-occurrs with the following fairy shrimps: California fairy shrimp (*Linderiella occidentalis* Dodds, 1923), mid-valley fairy shrimp (*Branchinecta mesovallensis* Belk and Fugate 2001), vernal pool fairy shrimp (*B. lynchi* Eng, Belk and Eriksen, 1990) and Conservancy fairy shrimp (*B. conservatio* Eng, Belk and Eriksen, 1990), as well as vernal pool tadpole shrimp (*Lepidurus packardi* Simon, 1886) (Rogers pers. obs.).

12.2.2 Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The Ricksecker's hydrochara depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependent upon intact sub-watersheds, and the surrounding uplands that support those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

Habitats supporting the Ricksecker's hydrochara are typically in Central Valley California floristic provinces below 300 meters in elevation. The physical parameters that affect the

APPENDIX B (Continued)

suitability of aquatic habitats for Ricksecker's hydrochara have not been described. Collection records suggest that the Ricksecker's hydrochara is not sensitive to the size of vernal pools or other aquatic habitats, and primarily utilizes vernal pools and swales, seasonal wetlands and other ephemeral habitats, as well as constructed vernal pools (Serpa pers. obs.; Rogers pers. obs.). Adults have been observed to burrow into the substrate at the bottoms of pools (Serpa pers. obs.; Rogers pers. obs.). It is probable that, like other vernal pool insects, the larvae, pupae or adults may over-summer in burrows at or above the vernal pool water line, or the eggs may be dessication resistant and lay dormant in the pool bottom. Neither larvae nor adults have been found in similar habitat in nearby permanent waters, although similar Hydrophilid beetle species have been found in these situations.

Excessive livestock grazing may be detrimental to Ricksecker's hydrochara . Overgrazing tends to result in large amounts of manure in vernal pools. The decomposition of this organic waste reduced the dissolved oxygen in the water, leaving the gill-breathing invertebrates like the Ricksecker's hydrochara without oxygen (Rogers 1998). Conversely, most vernal pool grasslands need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it also reduces the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat suitability component.

Common wetland plant species that co-occur with Ricksecker's hydrochara generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of this species to be present. These plants may include coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), common frogfruit (*Phyla* spp.), goldfields (*Lasthenia* spp.), common spikerush (*Eleocharis macrostachya*), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and aquatic buttercup (*Ranunculus aquatilis*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods will have hydrology that cannot support this species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*), toad rush (*Juncus bufonius*), false dandelion (*Hypochoeris radicata*), and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round do not appear to support Ricksecker's hydrochara (Rogers pers. obs.). These plants include cattails (*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

APPENDIX B (Continued)

The Ricksecker's hydrochara is a component of a larger invertebrate community structure dependant on vernal pools (Rogers, 1998). This invertebrate community includes mostly planktonic crustacea dependant upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as Flatworms, and a suite of insect species, including vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*), and many others (Rogers, 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers, 1998).

Therefore, potential Ricksecker's hydrochara habitat is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that also support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow Ricksecker's hydrochara to complete its life cycle.

Optimal Ricksecker's hydrochara habitat tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, sustaining a complex vernal pool invertebrate community (Rogers pers. obs., 1998). Unfortunately, little effort has been made to accurately quantify these parameters.

12.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Ricksecker's hydrochara are identified in Table RWSB-1 and have been derived from input from local species experts.

Table RWSB-1
Essential Habitat Elements for Ricksecker's hydrochara

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

APPENDIX B (Continued)

12.3 Species Distribution and Population Trends

Habitat occupied by Ricksecker's hydrochara tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been lost, and an unknown number of Ricksecker's hydrochara occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more Ricksecker's hydrochara habitat is being and will be encroached upon and impacted throughout the species range.

12.3.1 Range Wide Distribution

Ricksecker's hydrochara is the smallest species in the genus Hydrochara, which currently has 22 currently recognized species reported from North America, Eurasia, and Africa (Smetana 1980; Archangelski 1997). Only two species occur in California.

Ricksecker's hydrochara was redescribed by Smetana in 1980, at which time only 14 specimens were known, all of which were collected from the San Francisco Bay region. Smetana grouped Ricksecker's hydrochara with Hydrochara similis (d'Orchymont), a species from India, into the Similis Group, a sub-group within the genus Hydrochara.

Ricksecker's hydrochara was originally described as endemic to the San Francisco Bay region, occurring in Alameda, Marin, San Mateo, and Sonoma Counties (Smetana 1980). Recent collections have been made in Solano County at the Jepson Prairie Preserve, and from vernal pools in Sacramento and Placer counties (Rogers pers. obs.; Serpa pers. obs.; CDFG 2010).

12.3.2 Central Valley Distribution

In the Central Valley proper, Ricksecker's hydrochara have been collected from Solano, Sacramento and Placer Counties (Rogers pers. obs., Serpa pers. obs.). In Solano County, all records are from the Jepson Prairie Preserve and vicinity (Rogers pers. obs.; Serpa pers. obs.). In Sacramento County, this species has been collected from Plan Area (Rogers pers. obs.; Serpa pers. obs.; Witham pers. obs.), and from Blue Ravine in Folsom (Rogers pers. obs.). The single Placer County record comes from just south of Lincoln, at the Twelve Bridges Preserve (Rogers pers. obs.).

APPENDIX B (Continued)

12.3.3 Range in the Plan Area

Figure RWSB-1 illustrates the known recorded occurrences of Ricksecker's water scavenger beetle within Sacramento County. The Ricksecker's hydrochara were first reported from the Plan Area from Mather Field (Rogers pers. obs.). This species has been collected from Mather Field on three additional occasions (Rogers pers. obs.; Serpa pers. obs.; Witham pers. obs.), from Ranch Seco (Rogers pers. obs.), Howard's Ranch (TNC Rare Species Survey) and from Peterson Ranch (Serpa pers. obs.).

No surveys focused on Ricksecker's hydrochara have been conducted within and adjacent to the Plan Area and the total extent of potential habitat is unknown. Therefore, the range of the species in the Plan Area is considered to be vernal habitats embedded in valley grassland and oak savannah.

12.3.4 Population Levels and Trends

An unknown amount of vernal pool habitat has been lost, and with it, an unknown number of Ricksecker's hydrochara occurrences. Attempts have been made to calculate lost vernal pool acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more Ricksecker's hydrochara habitat will be and is being encroached upon and impacted throughout the species range. Adequate determination of remaining Ricksecker's hydrochara populations throughout the animal's range as well as population trends is difficult, as no specific surveys have ever been conducted outside of the locations listed above

12.4 Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem until it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that out compete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Overgrazing tends to result in large amounts of manure in vernal pools. The organic waste oxidizes the water, leaving gill breathing invertebrates without oxygen (Rogers 1998). Conversely, vernal pool grasslands are disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (e.g., *Eleocharis* sp., *Eryngium* sp.) and exotic plants (e.g., *Glyceria* sp. *Lolium multiflorum*) that generate deep thatch layers on the pool substrate. As this thatch layer decomposes, it lowers the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998).

Both lack of grazing and excessive grazing cause an increase in organic matter in the habitat that eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that out compete the obligate vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat component, and the removal of grazing or excessive grazing may be threats to the Ricksecker's hydrochara .

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles, paving or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. manna grass and Italian rye grass are both exotic plants that occur in vernal pools, tend to produce heavy thatch and eventually create organic loads upon decomposition, which reduce dissolved oxygen in the water upon decomposition (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

Additional threats to the vernal pool invertebrate community structure includes: off-road vehicle use of vernal pool habitat for recreational 'mud-bogging'; conversion of vernal pools into deep stock tanks that do not dry during the summer; and draining of vernal pools.

12.5 Data Gaps and Conservation Implications

Restoration and creation of vernal pool habitat has been demonstrated to be feasible (Rogers 1998). Specific habitat parameters for this and other vernal pool invertebrate species are still poorly understood.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the Plan Area. Since the SSHCP is assuming that all

potential habitat within the Plan Area is occupied by Ricksecker's hydrochara , and it is not feasible economically or temporally to survey the entire Plan Area, it may be expedient to estimate Ricksecker's hydrochara distribution through aerial photographic interpretation. Some specific areas will need to be physically verified as to whether they support potential Ricksecker's hydrochara habitat. Additionally, artificial habitats like railroad toe-drains, stock tanks, and roadside scrapes will also need to be verified. In addition, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and the importance of seasonality and intensity of grazing and other disturbances in vernal pool ecosystems. Furthermore, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

12.6 Literature Cited

Archangelsky, M. 1997. Studies on the Biology, Ecology, and Systematics of the Immature Stages of New World Hydrophiloidea (Coleoptera: Staphyliniformia). *Bulletin of the Ohio Biological Survey* 12(1) 1-207. ISBN 0-86727-126-4.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. Verh. Internat. *Verein. Limnol*. 23:1107-1113.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

APPENDIX B (Continued)

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's heartland*. University of California Press, Berkeley.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Plague, G.R. 1996. Examination of the feeding behavior of larval *Tropisternus* (Coleoptera: Hydrophilidae). *Journal of the Kansas Entomological Society*, 69:104-107.

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

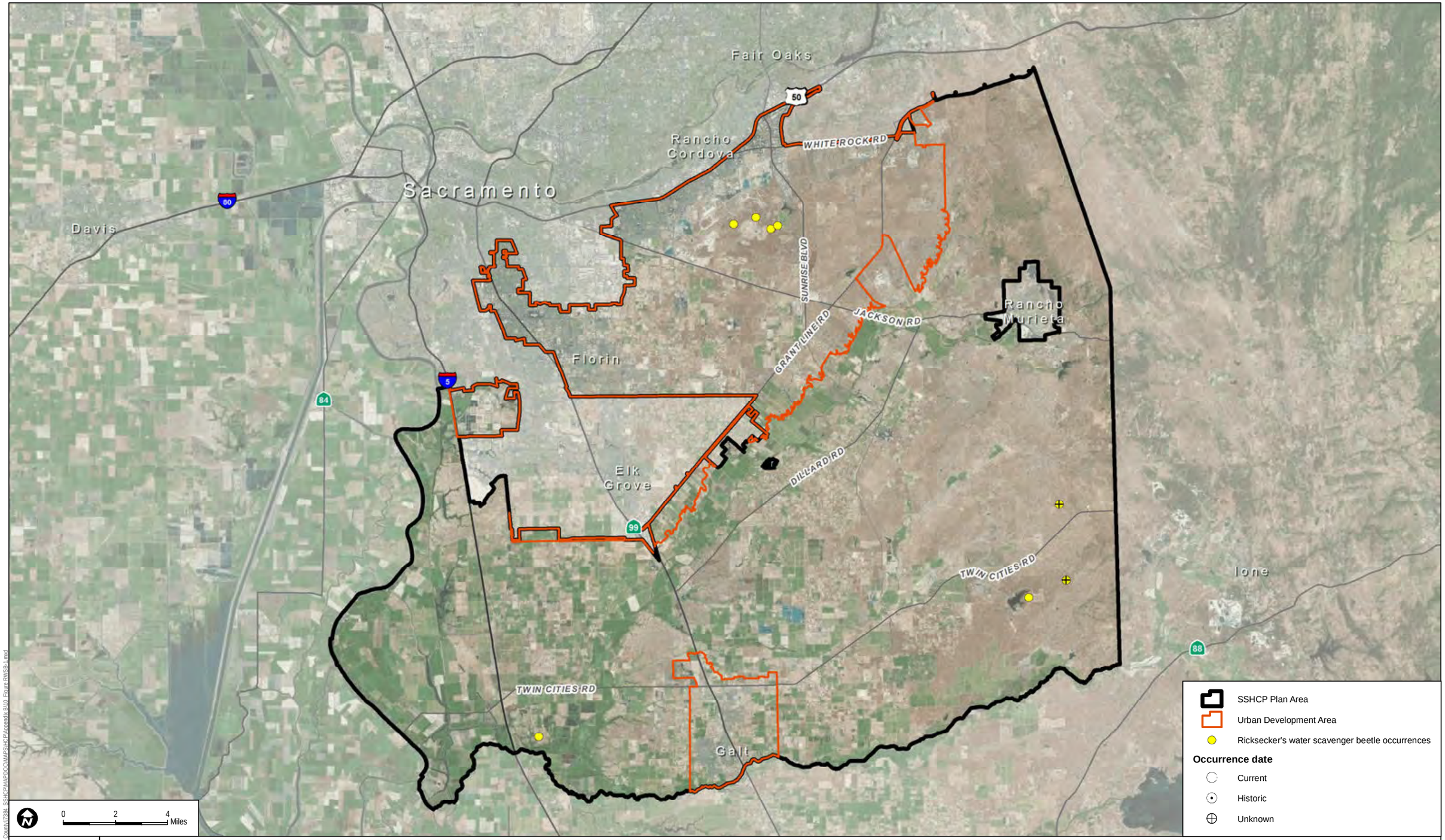
Serpa, Larry, The Nature Conservancy.

Smetana, A. 1980. Revision of the genus *Hydrochara* Berth. (Coleoptera: Hydrophilidae). Memoirs of the Entomological Society of Canada, No. 111.

Witham, Carol, Ecologist.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, Chris Rogers 2000, TNC

FIGURE RWSB-1

Ricksecker's Water Scavenger Beetle Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7936 SSHCP\MAPDOC\MAPS\HCP\Admin\ 8x10 Figure RWSB-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

13 VERNAL POOL TADPOLE SHRIMP (VPTS)

Prepared by Christopher Rogers

Vernal Pool Tadpole Shrimp (VPTS)

(Lepidurus packardi)

Status USFWS: Endangered

Status CDFG: None



13.1 Legal Status

The vernal pool tadpole shrimp (*Lepidurus packardi*) was federally listed as endangered on 19 September 1994 (56 CFR 48136).

13.2 Life History and Ecology

13.2.1 Species Description and Life History

The vernal pool tadpole shrimp is a typical member of the genus *Lepidurus*. Like some other tadpole shrimp species, this species appears to be unisexual (Rogers 2001).

The vernal pool tadpole shrimp was considered a subspecies of the Eurasian *Lepidurus apus* by Longhurst (1955). Lynch (1972) commented that the vernal pool tadpole shrimp was separate from *L. apus*, but did not provide a quantitative analysis. Rogers quantitatively reinstated the vernal pool tadpole shrimp as a separate species in 2001.

The vernal pool tadpole shrimp is separated from most other nearctic *Lepidurus* species by having the nuchal organ (a large tubercle behind the eyes) intersected by a line drawn between the posterior apices of eyes, and 24 to 29 body rings and 30 to 35 pairs of legs. The caudal lamina is truncate, 0.3 to 0.1 times the length of carapace. Mature specimens have the sulcus spines triangular, as long as broad, separated by at least twice their width, with numerous small spines of varying shapes, sometimes in double rows, separating the larger spines. Smaller specimens have large acute spines, 1.2 to 1.5 times as long as broad. Old specimens may have the largest sulcus spines rounded. The endites three, four and five of the second thoracic appendages project beyond the carapace margin. The adult length is 15 to 86 millimeters from anterior margin of carapace to tip of caudal lamina.

APPENDIX B (Continued)

Lepidurus cryptus Rogers 2001 is inseparable morphologically from the vernal pool tadpole shrimp. This species had been previously confused with The vernal pool tadpole shrimp (Linder 1952; Lynch 1972). Analysis of 12S rDNA and allozyme data, performed by King and Hanner (1998), demonstrates that it is genetically distinct from the vernal pool tadpole shrimp (Rogers 2001).

The vernal pool tadpole shrimp may vary in coloration depending upon habitat, although it is most commonly green. In highly turbid water, this species may be nearly translucent to buff colored with brown mottles. In slightly turbid to clear water it may range from light green to dark green, dark green mottled with brown, chocolate brown, brown with green mottles, and black. The vernal pool tadpole shrimp can on occasion reach very large sizes. One specimen from Stanislaus County measured 86 millimeters from the anterior carapace margin to the apex of the caudal lamina (Rogers 2001).

Notostracans like the vernal pool tadpole shrimp are a component of the zooplanktonic community within episodic, ephemeral aquatic habitats; although the larger they grow the more time they spend at or near the bottom (Rogers pers. obs.). Tadpole shrimp are omnivorous, with a strong preference for animal matter, and will capture and consume live invertebrates, amphibian larvae, or carrion (Longhurst 1955). Vernal pool tadpole shrimp will also filter detritus for micrometazoa (Rogers pers. obs.).

During the dry phase of their habitat, Notostracans survive as diapausing cysts (resting eggs) in and on the substrate (Sars 1896, 1898; Eriksen and Belk 1999; Rogers and Fugate 2001). When the habitat inundates from seasonal rainfall, some of the cysts hatch, and the nauplii (early larval form of crustacea) swim into the upper water column (Eriksen and Belk 1999). These early instars are typically indistinguishable between species. The maturation rates of vernal pool crustaceans vary extensively depending upon temperature (Eriksen and Belk 1999; Rogers 2002), and the vernal pool tadpole shrimp can reach maturity in 19 days (Rogers pers. obs.). Vernal pool tadpole shrimps may persist as adults right up to the point when the pool dries.

Contrary to Ahl (1991), each individual is capable of producing viable cysts without sexual reproduction (Longhurst 1955; Rogers 2001). Populations are probably made up of either parthenogenic females, amphigenic females (females with lobes of testicular tissue on the ovaries) or both (Bernard 1889; Longhurst 1954; Sassaman 1991, 1995; Maeda-Martinez, et al., 2000; Rogers 2001). The cysts are produced by the ovaries into a marsupium on the 11th thoracopods, made from a modification of the subapical lobe, which holds the cysts, and the exopodite, which forms the “lid” of the marsupium (Fryer 1988). The female typically sheds her cysts as the shell forms over the fertilized oocyte (Murugan et al. 1996) and the cysts fall to the substrate.

APPENDIX B (Continued)

The cysts lay dormant in the substrate until the pool dries and re-inundates during the subsequent rains. Beyond inundation of the habitat, the specific cues for hatching are unknown although temperature (Hall 1959; Belk 1977; Al-Tikrity and Grainger 1990; Belk and Nelson 1995; Eriksen and Belk 1999) and conductivity (for example: Anderson 1958; Bowen et al. 1988; Broch 1969, 1988; Brown and Carpelan 1971; Brown 1972) are believed to play a large role. The vernal pool tadpole shrimp is typically univoltine (i.e., one generation per year), however animals of different ages may be present if a pool partially inundates allowing some cysts to hatch, and then later increases in volume, hydrating cysts that were further up-slope (Rogers pers. obs.).

Planktonic crustacea are important in the food web, as they represent a high fat, high protein resource for migratory waterfowl. Mallard, Green-winged Teal, Bufflehead, Greater Yellowlegs, and Killdeer all forage actively in Central Valley vernal pools on the invertebrate and amphibian fauna during the winter months (Proctor 1964; Horne1966; Mellors, 1975; Silveira 1996; Dumont and Negrea 2002).

Predator consumption of cysts aids in distributing populations of vernal pool crustaceans. Predators (e.g., birds, amphibians) expel viable cysts in their excrement, often at locations other than where they were consumed (Proctor 1964; Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts are also transported by wind, and in mud carried on the feet of animals, including livestock that may wade through the habitat (Rogers in prep). This type of dispersal aids ephemeral pool crustaceans to exploit a wide variety of ephemeral habitats (Rogers 2000).

Vernal pool tadpole shrimp are an intermediate host for the metacercariae of an echinostome fluke (Ahl 1991) which also infects co-occurring gastropods. The parasitic fluke castrates the vernal pool tadpole shrimp. This fluke is most likely a bird parasite.

No specific bacterial, viral or protozoan diseases have been reported for the vernal pool tadpole shrimp. Occasionally, specimens with black markings or lesions will appear in collections. These black markings, sometimes referred to as “black disease,” are actually evidence of the normal immune response of all crustacea to any bacteria, where any foreign bacteria is infused with melanin to lethal levels (Bang 1983). Branchiopod crustaceans are commonly found with phoretic ciliate protozoan colonies around the mouth and posterioventral portions of the head, which are abandoned with the exuvia by the crustacean with each molt.

Vernal pool tadpole shrimp commonly co-occur with fairy shrimp such as *Linderiella occidentalis* (Dodds 1923), *Branchinecta conservatio* Eng, Belk, and Eriksen 1990, *B. lindahli* Packard 1883, *B. coloradensis* Packard 1874, and vernal pool fairy shrimp (*B. lynchi* Eng, Belk, and Eriksen 1990). The mid-valley fairy shrimp (*B. mesovallensis* Belk and Fugate 2001) and *B.*

APPENDIX B (Continued)

longiantenna Eng, Belk, and Eriksen 1990 both occur within the range of the vernal pool tadpole shrimp, but are typically found in different habitats (Rogers pers. obs.).

13.2.2 Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The Vernal pool tadpole shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetland characteristics are dependent upon intact sub-watersheds, and the surrounding uplands that support those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

The Vernal pool tadpole shrimp needs the cold winter waters to hatch and develop, typically appearing after the first frosts, and the dry summers to dry the resting cysts and prevent them from being attacked by fungi. Habitats supporting the Vernal pool tadpole shrimp are typically in Central Valley California floristic provinces below 300 m elevation. Typical habitat for Vernal pool tadpole shrimp in California include vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas and alkali flats (Eriksen and Belk 1999; Rogers 2001). Vernal pool tadpole shrimp have also been found in alkaline vernal pools. Vernal pools that support these shrimp may be grass or mud-bottomed with clear to tea-colored or highly turbid water, and are often in grassland depression pools (USFWS 1994; Rogers 2001).

Pool volume is important in determining potential shrimp habitat because deeper pools with a large surface area can more easily maintain their dissolved oxygen levels. Similarly, deeper pools will pond long enough to allow the shrimp to complete their life cycle. Vernal pool tadpole shrimp have been found in pools ranging from 0.1 to 80+ acres (USFWS 1994; Eriksen and Belk 1999; Rogers pers. obs.).

Various physiochemical factors have been examined in existing Vernal pool tadpole shrimp habitats including alkalinity, total dissolved solids (TDS), and pH (Collie and Lathrop 1976; Eriksen and Belk 1999). The U.S. Fish and Wildlife Service (1994) described the water in pools occupied by vernal pool tadpole shrimp as having low conductivity and chloride, however specific data were not provided. In addition, the importance of many of these parameters has recently been called into question with evidence that type and amount of dissolved salts may be a more important habitat requirement for vernal pool crustaceans (Rogers 2002). Considering the daily fluctuations in pH of a given habitat, this is to be expected. During the daylight hours, the hydrophytes are photosynthesizing, removing the CO_2 (from HCO_3) from the water, and raising the pH. During the night, the hydrophytes are respiring, increasing the CO_2 (and thereby the HCO_3) in the water lowering the pH. If there is rainfall, the distilled precipitation will lower the pH, as will winds that cause surface action. When the habitats are drying and losing volume

APPENDIX B (Continued)

through evaporation, the pH, alkalinity, TDS, and electrical conductivity will increase, just as they decrease when the pools inundate or reinundate (Rogers 2002).

Some vernal pools need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it reduces the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat suitability component. Conversely, excessive livestock grazing can be detrimental to vernal pool tadpole shrimp. Over-grazing tends to result in a large amount of manure in vernal pools. The decomposition of this organic waste removes oxygen from the water, leaving the gill-breathing invertebrates like the vernal pool tadpole shrimp without oxygen (Rogers 1998). It is important not to alter grazing regimes in conservation areas until the importance of grazing to those particular systems are assessed.

Common wetland plant species that co-occur with special-status shrimp species generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of these shrimp to be present. These plants may include coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), goldfields (*Lasthenia* spp.), common spikerush (*Eleocharis macrostachya*), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and aquatic buttercup (*Ranunculus aquatilis*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods may have hydrology that cannot support shrimp species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*), toad rush (*Juncus bufonius*), false dandelion (*Hypochoeris radicata*), and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round cannot support special-status shrimp species because the shrimp's cysts must dry out before they can hatch (Eriksen and Belk 1999), or if they remain wet or moist through the warmer summer months, the cysts will be attacked by fungi (Rogers pers. obs.). These plants include cattails (*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

The vernal pool tadpole shrimp is a component of a larger invertebrate community structure (Rogers 1998). This invertebrate community includes mostly planktonic crustacea dependant upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as flatworms, and a suite of insect species, including vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*),

and many others (Rogers 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers 1998).

Therefore, potential special-status shrimp habitat is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that may also (but does not have to) support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow special-status shrimp species to complete their life cycles and to maintain water temperatures conducive to development and reproduction.

Optimal vernal pool tadpole shrimp habitat tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal pool invertebrate community (Rogers pers. obs., 1998, 2001). Unfortunately, little effort has been made to accurately quantify these parameters.

13.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Vernal pool tadpole shrimp are identified in Table VPTS-1 and have been derived from the USFWS's list of primary constituent elements in the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table VPTS-1
Essential Habitat Elements for Vernal Pool Tadpole Shrimp

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

13.3 Species Distribution and Population Trends

There are six species of *Lepidurus* in North America (Rogers 2001) distributed throughout arctic Canada, Alaska, and Greenland and western portions of the United States and Mexico. The vernal pool tadpole shrimp is endemic to California (Rogers 2001).

APPENDIX B (Continued)

Habitat occupied by tadpole shrimp tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been lost, and an unknown number of vernal pool tadpole shrimp occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more habitat for vernal pool tadpole shrimp will and is being encroached upon and impacted throughout the species range.

13.3.1 Range Wide Distribution

The vernal pool tadpole shrimp was originally described by Simon (1886) from "California," and the types were apparently lost (Rogers 2001). Linder (1952) reported the vernal pool tadpole shrimp from the California Central Valley one mile north of Davis, Yolo County, and from the California Great Basin. Longhurst (1955) synonymized both the vernal pool tadpole shrimp and *Lepidurus couesii* with the Eurasian *L. apus* (Linneaus) 1756. Lynch (1972) redescribed *L. couesii* and provided specific morphological characters for the genus *Lepidurus* in North America, emphasizing that both the vernal pool tadpole shrimp and *L. couesii* are taxa distinct from each other and from *L. apus.* Lynch deposited material at the U. S. National Museum of Natural History identified as the vernal pool tadpole shrimp from the Great Basin Regions of south central Oregon.

The USFWS gave the vernal pool tadpole shrimp protection as an endangered species in 1994 (59 FR 48153). It was reported at that time that the vernal pool tadpole shrimp was known only from 14 occurrences in the Central Valley of California, but did not mention the Linder or Lynch references or material, although the references were cited.

Helm (1998) reported *L. couesii* from the east side of the Cascade Mountains in Lassen County, California, and *Lepidurus* n. sp., the "Modoc Plateau Tadpole Shrimp" from two locations in Modoc County, California, citing King pers. comm. as his source for the shrimp's identification. King and Hanner (1998) performed 12S rDNA and allozyme analysis of *Lepidurus* populations throughout western North America, reporting a taxon they referred to as "*L. couesii*-1" from Klamath County, Oregon, and the east side of the Casacade Mountains in Shasta and Lassen counties, California. In addition, they mention Linder's Lassen County vernal pool tadpole shrimp material, but do not comment on its implications. King and Hanner concluded that *L. couesii* populations from Manitoba, Canada may represent a separate species from "*L. couesii*-1" in the Sierra Nevada, Cascade Mountains and Great Basin regions of northeastern California and south-central Oregon. Furthermore, King and Hanner stated: "Because our Oregon locality. . . seems to be the same as one of the sites from which Linder (1952) examined material (i.e., near Klamath Falls, OR) we suggest that the California/Oregon clade should retain the name *L.*

couesii." However, Rogers (2001) demonstrated that the specimens from King and Hanner's "*L. couesii*-1" localities are morphologically distinct from the type specimens of *L. couesii* from Montana and thus their suggestion that the specific name *couesii* be applied to the taxon they call "*L. couesii*-1"cannot be accepted. Furthermore, Rogers demonstrated that the *Lepidurus* that Linder and Lynch had identified as the vernal pool tadpole shrimp were actually an unrecognized cryptic species, which he described. This cryptic species *Lepidurus cryptus* Rogers 2001, is morphologically indistinguishable from the vernal pool tadpole shrimp, and hence the confusion. Rogers (2001) quantitatively established the vernal pool tadpole shrimp as endemic to the Central Valley of California.

13.3.2 Central Valley Distribution

In 1994, the USFWS reported that there were 14 known occurrences of the vernal pool tadpole shrimp ranging from the Vina Plains in Tehama County, through most of the length of the Sacramento Valley to Sacramento, and west to Solano County at the Jepson Prairie (59 FR 48153).

Since then, vernal pool tadpole shrimp have been reported from throughout Sacramento, Colusa and Glenn Counties, as well as Central Valley portions of Tehama County, Butte County, Sutter County, Yuba County, Placer County, Stanislaus County, Madera County, Fresno County and Tulare County on the east side of the valley (Eriksen and Belk 1999), and Alameda County, Solano County, Yolo County, Colusa County and Glenn County on the west side (Rogers 2001).

13.3.3 Range within the Plan Area

The vernal pool tadpole shrimp was first officially reported from the Plan Area in 1982 (CDFG 2010); however, specimens were collected from near Mather Air Force Base as early as 1967 by Dr. Clyde Eriksen (Eriksen, pers. comm.). Numerous surveys related to development projects have been conducted within and adjacent to the Plan Area (USFWS records; CDFG 2010), but the area has not been thoroughly surveyed for vernal pool tadpole shrimp, and the total extent of potential habitat is unknown. Figure VPTS-1 illustrates the known recorded occurrences of vernal pool tadpole shrimp within Sacramento County. The range of the species in the Plan Area is considered to be vernal habitats embedded in grassland and oak savannah.

13.3.4 Population Levels and Trends

An unknown amount of vernal pool habitat has been lost and with it an unknown number of vernal pool tadpole shrimp occurrences. Attempts have been made to calculate lost vernal pool acreages (for example: Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California and Oregon, more habitat

for vernal pool tadpole shrimp will be and is being encroached upon and impacted throughout the species range.

Adequate determination of remaining vernal pool tadpole shrimp occurrences throughout the animal's range as well as population trends is difficult. The USFWS (1994) listed 14 known occurrences of the vernal pool tadpole shrimp. These data were collected during a prolonged drought in California. Sugnet and Associates (1993) submitted a study claiming 345 'discrete locations' supporting the vernal pool tadpole shrimp, however as specific localities were not divulged, the data are unverifiable and therefore not scientifically useful in any type of analyses. Rogers (2001) presents a map and a list of 23 specific localities for the vernal pool tadpole shrimp represented.

The California Natural Diversity Data Base (CNDDB) vernal pool crustacean records (CDFG 2010) may be somewhat misleading, due to the inconsistency of the data presented. Some records refer to individual pools, while others refer to pool complexes, and others still refer to groups of complexes. Additionally, the CNDDB does is not updated when a particular site or population is extirpated. Because of issues such as these, it is difficult to determine what actually constitutes a "population" or "occurrence" in any attempt at impact analysis.

In addition, survey maps and records tend to show where vernal pool crustaceans are, and do not emphasize where they are not. Compounding these difficulties, records are typically a reflection of where surveys have been conducted, rather than a delineation of special-status shrimp distribution. Therefore, it is difficult to establish baseline conditions for this species across the entire species range, as well as within the Plan Area. None of this is to say that vernal pool crustaceans are not threatened, endangered, or should not be protected. The issue is that where a paucity of adequate data exists, consistent data reporting would help prevent ambiguous interpretation or mischaracterization of species conservation needs.

13.4 Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem so that it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that outcompete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Overgrazing tends to result in large amounts of manure in vernal pools. The decomposition of organic waste removes oxygen from the water, leaving gill-breathing invertebrates without oxygen (Rogers 1998, pers. obs,). Conversely, vernal pool grasslands are

APPENDIX B (Continued)

disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (e.g., *Eleocharis* sp., *Eryngium* sp.) and exotic plants (e.g., *Glyceria* sp. *Lolium multiflorum*) that generate deep thatch layers on the pool substrate. As this thatch layer decomposes, it also removes oxygen from the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Both lack of and excessive grazing cause an increase in organic matter in the habitat that eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that outcompete the obligatory vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat suitability component, and the removal of grazing or excessive grazing are threats to the vernal pool tadpole shrimp.

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles, paving, or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. There is concern that bullfrogs (*Rana catesbeiana*) may feed upon federally protected vernal pool crustaceans (Balfour and Morey 1999). Manna grass (*Glyceria declinata*) and Italian rye grass are both exotic plants that occur in vernal pools, tend to produce heavy thatch and eventually create organic loads upon decomposition, which reduce dissolved oxygen in the water (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish (*Gambusia affinis*) into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

Additional threats to the vernal pool invertebrate community structure includes: off-road vehicle use of vernal pool habitat for recreational “mud-bogging;” conversion of vernal pools into deep stock tanks that do not dry during the summer; and draining of vernal pools.

13.5 Data Gaps and Conservation Implications

Restoration and creation of habitat for vernal pool tadpole shrimp has been demonstrated to be feasible (Rogers 1998). However, specific habitat parameters for this and other vernal pool invertebrate species are still poorly understood. For example, there appears to be a need by this species to have a minimum pool volume and a minimum pool surface area within a given habitat to be occupied. Since this species has been found in a wide variety of natural and artificial vernal pool habitats, it is likely that it is in some respects an opportunist, as most temporary water fauna must be.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the SSHCP Study Area. Since the SSHCP is assuming that all potential habitat within the SSHCP study area is occupied by vernal pool tadpole shrimp, and it is not feasible economically or temporally to survey the entire SSHCP Study Area, it may be expedient to estimate vernal pool tadpole shrimp distribution through aerial photographic interpretation. Some specific areas will need to be physically verified as to whether they support potential habitat for vernal pool tadpole shrimp. Additionally, artificial habitats like railroad toe-drains, stock tanks, and roadside scrapes will also need to be verified. In addition, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and importance of seasonality and intensity of grazing and other disturbances in vernal pool ecosystems. Furthermore, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

13.6 Literature Cited

Al-Tikrity, M.R. and J.N.R. Grainger. 1990. The effect of temperature and other factors on the hatching of the resting eggs of *Tanymastix stagnalis* (L.) (Crustacea, Anostraca). *Journal of Thermal Ecology*, 15(1): 87-90.

Amat, F., A. Gozalbo, J. C. Navarro, F. Hontoria, and I. Varó. 1991. Some aspects of *Artemia* biology affected by cestode parasitism. *Hydrobiologia* 212:39–44.

Balfour, P.S. and S.R. Morey. 1999. Prey selection by juvenile bullfrogs in a constructed vernal pool complex. *Transactions of the Western Section of the Wildlife Society*, 35:34-40.

APPENDIX B (Continued)

Bang, F.B. 1983. Crustacean Disease Respnses. *In:* The Biology of the Crustacea, Vol. 6. Pathobiology. Edited by D. E. Bliss and A. J. Provenzano, Jr. Pp. 113-153. Academic Press, New York, New York.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Belk, D. 1977. Zoogeography of the Arizona fairy shrimps (Crustaca: Anostraca). *Arizona Academy of Science*, 12: 70-78.

Belk, D. and D.C. Rogers. 2002. A confusing trio of *Branchinecta* (Crustacea: Anostraca) from the western North America with a description of a new species. *Hydrobiologia*. 486:49–55.

Belk, D. and J. Brtek. 1995. Checklist of the Anostraca. *Hydrobiologia* 298:315-353.

Belk, D. and J. Brtek. 1997. Supplement to 'Checklist of the Anostraca'. *Hydrobiologia* 359:243-245.

Belk, D. and M.L. Fugate. 2000. Two new *Branchinecta* (Crustacea: Anostraca) from the southwestern United States. *The Southwestern Naturalist* 45(2):111-117.

Bowen, S. T., M. R. Buoncirstiani and J. R. Carl. 1988. *Artemia* habitats: ion concentratins tolerated by one superspecies. *Hydrobiologica*, 158: 201-214.

Broch, E.S. 1969. The osmotic adaptation of the fairy shrimp *Brachinecta campestris* Lynch to saline astatic waters. *Limnology and Oceanography*, 14: 485-492.

Broch, E.S. 1988. Osmoregulatory patterns of adaptation to inland astatic waters by two species of fairy shrimps, *Branchinecta gigas* Lynch and *Branchinecta mackini* Dexter. *Journal of Crustacean Biology*, 8: 383-391.

Brown, L.R. and L.H. Capelan. 1971. Egg hatching and life history of a fairy shrimp *Branchinecta mackini* Dexter (Crustacea: Anostraca) in a Mohave desert playa (Rabbit Dry Lake). *Ecology*, 52(1): 41-54.

Brown, R.J. 1972. A study of the mechanisms of osmotic and ionic regulation of the fairy shrimp, *Branchinecta mackini* (Crustacea, Branchiopoda). Ph. D. thesis. University of Toronto. Toronto, Canada. 215 pp.

APPENDIX B (Continued)

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Center for Biological Diversity (CBD). 2001. Petition to list the mid-valley fairy shrimp as an endangered species under the Endangered Species Act with concurrent designation of critical habitat. Center for Biological Diversity, PO 40090, Berkeley, California 94704-4090.

Collie, N. and E.W. Lathrop. 1976. Chemical characteristics of the standing water of a vernal pool on the Santa Rosa Plateau, Riverside County, California. Pp. 27-31 *In:* S. Jain (ed.) Vernal Pools, their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis, California.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. Verh. Internat. *Verein. Limnology*, 23:1107-1113.

Dumont, H.J. and S. Negrea. 2002. *Introduction to the Class Branchiopoda*. Guides to the Microinvertebrates of the Continental Waters of the World. Backhuys, Leiden.

Eng, L., D. Belk, and C. Eriksen. 1990 Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.

Eriksen, C. and D. Belk. 1999. *Fairy shrimps of California's pools, puddles, and playas*. Mad River Press, Eureka, California.

Hall, R.E. 1959. The development of eggs of *Chirocephalus diaphanus* Prévost at a low temperature. *Hydrobiologia*, 13: 156-159.

Helm, B. 1998. Biogeography of eight large branchiopods endemic to California. Pp. 124-139 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

APPENDIX B (Continued)

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Horne, F.R. 1966. The effect of digestive enzymes on the hatchability of Artemia salina eggs. *Transactions of the American Microscopical Society*, 85(2): 271-274.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's heartland*. University of California Press, Berkeley.

Lilljeborg, W. 1889. Diagnosen zweier Phyllopoden-Arten aus Süd-Brasilien. Abhandlungen herausgegeben vom naturwissenschaftlichen Vereine zu Bremen, 10: 424.

Linder, F. 1941. Contributions to the morphology and the taxonomy of the Branchiopoda Anostraca. Zoologiska Bidrag fran Uppsala, 10: 101-302.

Linder, F. 1952. Contributions to the Morphology and Taxonomy of the Branchiopoda Notostraca, with Specific Reference to the North American Species. *Proceedings of the United States National Museum*. 102:1-69.

Lynch, J. 1972. *Lepidurus couesii* Packard (Notostraca) Redescription With a Discussion of Specific Characters in the Genus. *Crustaceana*. 23:43-49.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Mellors, W.K. 1975. Selective Predation of ephippial *Daphnia* and the resisitance of ephippial eggs to digestion. *Ecology* 65:974-980.

Murugan, G., A. Maeda-Martinez, G. Criel, and H. Dumont. 1996. Unfertilized oocytes in Streptocephalids: resorbed or released? *Journal of Crustacean Biology*, 16(1):54–60.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. *Ecology*, 45(3):656-658.

APPENDIX B (Continued)

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

Rogers, D.C. 2001. Revision of the Nearctic *Lepidurus* (Notostraca). *Journal of Crustacean Biology* 21: 991–1006.

Rogers, D.C. 2002a. Draft: Distribution and habitat parameter surveys B*ranchinecta mesovallensis* (Crustacea: Branchiopoda: Anostraca). Report to US Fish and Wildlife Service. Jones and Stokes Associates.

Rogers, D.C. 2002b. Amplexial morphology of selected Anostraca. *Hydrobiologia* 486:1-18.

Rogers, D.C. 2002c. Female based characters for anostracan (Crustacea:Branchiopoda) identification: a key for species in California and Oregon, USA. *Hydrobiologia* 486 125-132.

Rogers, D.C. and M. Fugate. 2001. *Branchinecta hiberna*, a new species of fairy shrimp (Crustacea: Anostraca) from western North America. *Western North American Naturalist* 61(1):11 – 18.

Rogers, D.C. *In prep*. Dispersal agents and speciation in the Branchiopoda (Crustacea).

Sars, G.O. 1896. On some West Australian Entomostraca raised form dried sand. *Archives for Mathematik og Naturvidenskab* 19(1):1-35. 4pls.

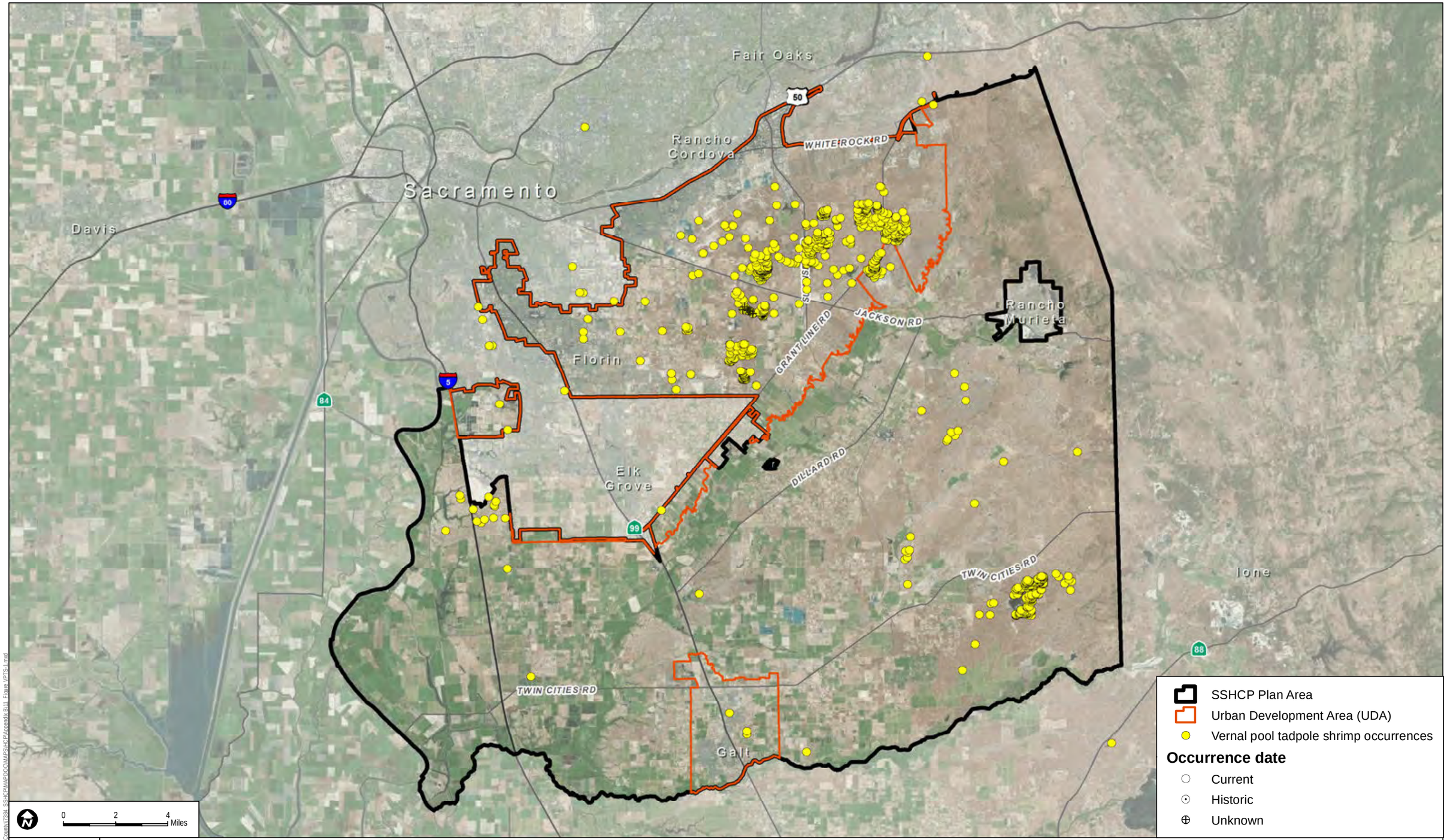
Sars, G.O. 1898. On some South-African Phyllopoda raised from dried mud. *Archives for Mathematik og Naturvidenskab* 20(4):1-43. 4pls.

Silveira, J. 1996. Avian uses of vernal pools and implications for conservation practice. Pp. 92-106 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

United States Fish and Wildlife Service (USFWS). September 19, 1994. Federal Register Final Rule; determination of endangered status for the conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool tadpole shrimp; and threatened status for the vernal pool fairy shrimp.

APPENDIX B (Continued)

Wissinger, S. A., A. J. Bohonak, H. H. Whiteman, and W. S. Brown. 1999. Habitat Permanence, salamander predation and invertebrate communities. *In:* Invertebrates in Freshwater Wetlands of North America: Ecology and Management, edited by D. P. Batzer, R. B. Bader, and S. A. Wissinger, John Wiley and Sons, Inc. New York.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, C. Witham 2011, C. Little 2011,ECORP 2012, EcoAnalysts 2008, Foothill Associates 2011, Gibson & Skordal 2011, Helm 2011, Richard Hill 1999, Sugnet & Associated 1997, Kassiss-Sylva 2011, Kiefer 2011, LSA 2009, USFWS 2014, Vollmar 2011, Wildlands 2010

FIGURE VPTS-1

Vernal Pool Tadpole Shrimp Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0284 SSHCP\MAPS\CMAPS\HCP\Planning\fig B11 Figure VPTS-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

14 CALIFORNIA TIGER SALAMANDER (CTS)

Prepared by May Consulting (Jamison Watts)

California Tiger Salamander (CTS)

(Ambystoma californiense)

Status USFWS: Threatened

Status CDFG: Threatened



14.1 Legal Status

In August 2004, the United States Fish and Wildlife Service (USFWS) listed the California tiger salamander (*Ambystoma californiense)* as threatened range-wide, downgrading the status of the Santa Barbara and Sonoma Counties populations from endangered to threatened. To promote conservation efforts of the California Tiger Salamander (CTS), the USFWS also adopted a special rule under section 4(d) of the Federal Endangered Species Act (ESA) of 1973, which allows the Secretary of the Interior to issue a "special rule" tailored to meet the conservation needs of a particular threatened species (special rules cannot be issued for endangered species). Based on the 4d rule, "take" of the threatened CTS caused by existing routine ranching activities on private, State or tribal lands is exempt from the prohibitions of the ESA. The intent of the 4d rule is to allow landowners and ranchers to continue activities that are important for livestock operations, as those activities also maintain habitat for the CTS.

In March 2010, the California Fish and Game Commission (Commission) voted that listing of the CTS pursuant to the California Endangered Species Act (CESA) was warranted. The CDFG will initiate the formal listing process by preparing an Initial Statement of Reasons for Regulation Change (or Pre-publication of Notice Statement) according to Government Code Section 11346.4 for consideration by the Commission. This preparation includes an assessment of the potential for adverse economic impacts. This is likely to occur prior to the next commission meeting with the document issued at that meeting. Once approved by the Commission, a 45-day comment period will follow upon publication of the notice of proposed rulemaking in the California Regulatory Notice Register. If the CDFG modifies the proposed rule following the comment period, then it will notice an additional 15-day comment period on any new material relied upon and on the proposed modifications. The next steps are then adoption by the Commission and review by the Office of Administrative Law. While this process

could move quickly, final action could still be many months away in the future. Technically, the CTS is not a listed species until the Commission adopts the final rule. However, until then, it remains protected as a candidate species, meaning that take of CTS is prohibited under CESA without CDFG authorization.

14.2 Life History and Ecology

14.2.1 Species Description and Life History

14.2.1.1 Taxonomy

In 1853, Gray first described CTS as *Ambystoma californiense* based on specimens that he collected in Monterey, California (Grinnell and Camp 1917). Storer (1925) and Bishop (1943) also considered CTS to be a distinct species; however, Dunn (1940), Gehlbach (1967) and Frost (1985) believed CTS to be a subspecies of the more widespread eastern tiger salamander (*A. tigrinum*). Nonetheless, based on recent studies of the geographic distribution, phylogenetics, and ecological differences among the members of the *A. tigrinum* complex, the CTS has been determined to represent a distinct species (Shaffer and Stanley 1991; Jones 1993; Shaffer et al. 1993; Shaffer and McKnight 1996; Irschick and Shaffer 1997; Petranka 1998). Furthermore, the range of this amphibian does not naturally overlap with any other species of tiger salamander (*Ambystoma* spp.) (Stebbins 1985; Petranka 1998).

14.2.1.2 Species Description

CTS is a large, stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 208 millimeters (8.2 inches), with males generally averaging 203 millimeters (8 inches) in total length, and females averaging 173 millimeters (6.8 inches) in total length. For both sexes, the average snout-to-vent length is approximately 91 millimeters (3.6 inches). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. Ventral coloration varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae, larger tails, and larger overall size (Stebbins 1962; Loredo and Van Vuren 1996).

14.2.1.3 Reproduction

Adult CTS breed in vernal pools and similar seasonal water bodies. The females lay their eggs in the water (Twitty 1941; Shaffer et al. 1993; Petranka 1998) in groups of two to four, on twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). In ponds with little or no vegetation, females may attach eggs to objects under the water, such as rocks and boards on the

APPENDIX B (Continued)

pool's bottom (Jennings and Hayes 1994). In the East San Francisco Bay Area (Bay Area), CTS may lay eggs twice, once in December and again in February (Bobzien 2003). After breeding, adults leave the pool and return to small mammal burrows in surrounding uplands (Loredo et al. 1996; Trenham 1998a), where they may continue to come out nightly for approximately the next two weeks to feed (Shaffer et al. 1993). In drought years, seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994).

The eggs hatch in 10 to 14 days with newly hatched CTS larvae ranging in size from 11.5 to 14.2 millimeters (0.5 to 0.6 inches) in total length (Petranka 1998). The larvae are aquatic, yellowish gray in color and have a broad fat head, large, feathery external gills, and broad dorsal fins that extend well onto the back. They feed on zooplankton, small crustaceans, and aquatic insects for approximately six weeks after hatching, after which time they begin foraging for larger prey (P. Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific treefrogs (*Pseudacris regilla*) and California red-legged frogs (*Rana draytonii*) (J. Anderson 1968). CTS larvae are among the top aquatic predators in seasonal pool ecosystems. Often resting on pool bottoms in shallow water, larvae also may be found at different layers in the water column in deeper water. Young CTS are wary and commonly dart into vegetation on the bottom of pools when approached by potential predators (Storer 1925).

As most seasonal ponds and pools dry up during the summer, the larval stage of CTS usually lasts three to six months (Petranka 1998), although some larvae in Contra Costa and Alameda Counties may remain in their breeding sites over the summer (Shaffer and Trenham 2002). The absence of paedomorphism (mature adults that retain larval characteristics) in the species suggests that CTS are unable to express this life history trait, presumably because most of their evolutionary history has been spent in seasonal vernal pool habitats (Shaffer and Trenham 2002).

Before they can metamorphose (change into a different physical form) into the terrestrial stage, amphibian larvae must reach a critical minimum body size (Wilbur and Collins 1973). Larvae collected near Stockton in the Central Valley during the spring varied from 47 to 58 millimeters (1.9 to 2.3 inches) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch et al. 1988; Pechmann et al. 1989; Morey 1998; Trenham 1998b). Pechmann et al. (1989) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians. P. Anderson (1968) and Feaver (1971) determined that CTS larvae perish, if a site dries before they complete metamorphosis. In Madera County, Feaver (1971) found that only 11 of 30 pools sampled supported larval CTS, and five of these dried before metamorphosis could occur. Out of the original 30 pools, only six (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively

correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch et al. 1988; Scott 1994; Morey 1998).

Lifetime reproductive success for CTS and other tiger salamanders is low. Trenham et al. (2000) found the average female bred 1.4 times and produced 8.5 young that survived to metamorphosis per reproductive effort. This resulted in roughly 11 metamorphic offspring over the lifetime of a female. Preliminary data suggest that most individuals of CTS require two years to become sexually mature, but some individuals may be slower to mature (Shaffer et al. 1993). Some animals do not breed until they are four to six years old. While individuals may survive for more than 10 years, many breed only once, and in some populations, less than five percent of marked juveniles survive to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations can decline greatly from unusual, randomly occurring natural events as well as from human caused factors that reduce breeding success and individual survival. Furthermore, factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for migrating individuals to replenish the population have the potential of quickly extirpating a population.

14.2.1.4 Diet and Foraging

Post-metamorphic juveniles and adults of CTS appear to be "sit-and-wait" predators similar to the closely related *Ambystoma tigrinum*, taking earthworms, snails, insects, fish, and even small mammals (Stebbins 1972). CTS larvae prey on vernal pool macroinvertebrates (Stebbins 1972), but also take other amphibian larvae once they attain sufficient size.

14.2.1.5 Dispersal and Migration

Movements made by CTS can be grouped into two main categories: (1) breeding migration, and (2) post-metamorphosis dispersal. Breeding migration is the movement of adult CTS between a breeding pond and the surrounding upland habitat during a reproductive cycle while post-metamorphosis dispersal involves recently metamorphosed individuals leaving their natal pond and moving into the surrounding upland habitat. CTS are also known to exhibit what has been termed interpond dispersal, but this is considered to be a breeding migration. Though not yet supported by empirical data, it is believed that dispersing post-metamorphs sometimes encounter other suitable breeding ponds during dispersal and then return to these other ponds upon maturing rather than return to their natal pond (Bumgardner pers. comm.). The benefits of such an evolutionary strategy are apparent when considering that seasonal wetlands appear and disappear over time as older pools fill and new pools are created. Following breeding, adult CTS return to upland habitats, where they may live for one or more years before breeding again (Trenham et al. 2000). Adult CTS have been observed up to 2,092 meters (1.3 miles) from breeding ponds (S. Sweet *in litt.* 1998), which may be vernal pools, stock ponds, or other

APPENDIX B (Continued)

seasonal or perennial water bodies. A recent trapping effort in Contra Costa County captured CTS 805 meters (2,641 feet) to 1,207 meters (3,960 feet) from the nearest breeding aquatic habitat (USFWS 2004b). Trenham et al. (2001) observed CTS moving up to 670 meters (2,200 feet) between breeding ponds in Monterey County. Similarly, in an experimental study, Trenham and Shaffer (2005) found that 95 percent of CTS resided within 640 meters (2,100 feet) of their breeding pond at Jepson Prairie in Solano County. Trenham et al. (2001) recommended that plans to maintain local populations of CTS should include pond(s) surrounded by at least 173-meter (567-feet) wide buffers of terrestrial habitat occupied by burrowing mammals. The distance between the upland and breeding sites is thought to depend on local topography and vegetation, and the distribution of California ground squirrel or other rodent burrows (Stebbins 1989). The rate of natural movement of salamanders among breeding sites depends on the distance between the ponds or complexes of ponds and on the quality of intervening habitat (e.g., salamanders may move more quickly through sparsely covered and open grassland than they can through densely vegetated lands) (Trenham 1998a).

After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. Upon reaching sexual maturity, most individuals return to their natal (birth) pond to breed, while others disperse to other ponds (Trenham et al. 2001). Some data suggest that juvenile CTS disperse further into upland habitats than adult CTS. A trapping study conducted in Solano County during winter 2002–03 found that juveniles used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More juvenile CTS were captured at distances of 100, 200, and 400 meters (300, 600, and 1,300 feet) respectively, from a breeding pond than at 50 meters (160 feet). Approximately 20 percent of the total captures were found 400 meters (1,300 feet) from a breeding pond. Fitting a distribution curve to the data revealed that 95 percent of juvenile CTS could be found within 640 meters (2,000 feet) of the pond, with the remaining five percent being found at even greater distances. In the same study, post-breeding movements away from breeding ponds by adults appear to be much shorter. During post-breeding emigration, radio-equipped adult CTS were tracked to burrows 19 to 248 meters (62 to 813 feet) from their breeding ponds (Trenham 2001). These reduced movements may be due to adult CTS having depleted physical reserves post-breeding, the drier weather conditions that are typical of the period when adults leave the ponds, or reduced reproductive/bioenergetic benefits from traveling further away from a breeding pond.

When studying interpond dispersal, documented dispersers moved no more than 670 meters (2,200 feet) from breeding sites in Monterey County, and based on a projected exponential relationship between dispersal probability and distance, less than one percent of dispersers were likely to move between ponds separated by 1,160 meters (0.70 miles) (Trenham et al. 2001). The frequency of dispersal among known extant occurrences or subpopulations ultimately depends on the distance between the ponds or complexes and on the intervening habitat (Trenham et al.

2001). Moreover, the distance between upland refugia and breeding sites depends on local topography and vegetation, and the distribution of California ground squirrel or other rodent burrows (Stebbins 1989). Unlike other ambystomatid salamanders, CTS and other tiger salamanders are grassland animals and do not favor forested areas as corridors for movement or long-term residence. Trenham (2001) found that radio-tracked adults favored grasslands with scattered large oaks over more densely wooded areas. Based on the Monterey County study, Trenham et al. (2001) recommends that plans to maintain local populations of CTS should include pond(s) surrounded by at least 173-meter (567-foot) wide buffers of terrestrial habitat occupied by fossorial (burrowing) mammals.

14.2.1.6 Survivorship

Individual CTS have been known to live more than 10 years (Stebbins 1951; Trenham et al. 2000) and at least one specimen was known to live beyond 20 years (USFWS 2004a). CTS eggs are susceptible to desiccation, and predation by fish, crayfish, and insect larva (Stebbins 1972; Zeiner et al. 1988). CTS larvae are preyed upon by native frogs, garter snakes, egrets, herons (Zeiner et al. 1988) and the introduced bullfrog (*Rana catesbeiana*) (Anderson 1968). In addition, current research has suggested a negative correlation between larvae and the presence of predatory fishes including mosquitofish (*Gambusia affinis*) (USFWS 2004b). During their seasonal migration to ponds, adult CTS are preyed upon by raccoons (*Procyon lotor*) (USFWS 2004a). Adults are also highly susceptible to mortality from vehicle traffic if roads are constructed between their breeding and aestivation sites (Shaffer et al. 1993).

14.2.2 Habitat Requirements and Ecology

Rangewide, suitable habitat for CTS includes vernal pools, and seasonal and perennial ponds, and surrounding upland areas in grassland, oak savannah, edges of mixed hardwood-conifer woodland and low elevation coniferous forest plant communities from sea level to about 1,067 meters (3,600 feet) (Stebbins 1989; Stebbins 2003; Shaffer et al. 1993; Jennings and Hayes 1994; Petranka 1998; CDFG 2010; Bobzien 2003; USFWS 2004a).

14.2.2.1 Wetland Habitat and Aquatic Ecology

Once fall or winter rains begin, adult CTS emerge from their upland refugia at night to feed and migrate to the breeding ponds (Stebbins 1985, 1989; Shaffer et al. 1993). Males migrate to the breeding ponds before females (Twitty 1941; Shaffer et al. 1993; Loredo and Van Vuren 1996; Trenham 1998b) and usually remain there for approximately six to eight weeks, while females stay for approximately one to two weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996; Trenham 1998b). Most marked salamanders have been recaptured at the pond where they were initially captured. In one study, approximately 80 percent were

APPENDIX B (Continued)

recaptured at the same pond over the course of three breeding seasons (Trenham 1998b). A CTS breeding site is defined as a location where CTS are able to successfully breed in years of normal rainfall and persist during the dry months of the year. Therefore, suitable habitat includes both suitable wetlands and surrounding uplands.

Historically, vernal pools and other natural seasonal ponds and surrounding uplands constituted primary breeding sites utilized by CTS (Storer 1925; Feaver 1971; Zeiner et al. 1988; Trenham et al. 2000). Vernal pools typically form in topographic depressions underlain by an impervious layer such as claypan, hardpan, or volcanic strata that prevents the downward percolation of water. Vernal pool hydrology is characterized by inundation of water during the late fall, winter, and spring, followed by complete desiccation during the summer dry season (Holland and Jain 1988). Vernal pools support a diverse and highly evolved biota that has adapted to the ever-changing water regime and benefits from the lack of predation by non-native fish. Twenty-nine other federally or State-listed species within the range of CTS are vernal pool specialists, including 24 plants, four crustaceans, and one insect (Keeler-Wolf et al. 1998). CTS, like listed vernal pool crustaceans, inhabit these seasonally inundated habitats. However, listed vernal pool crustaceans require a relatively short period of inundation to complete their life cycle (USFWS 2004b). Therefore, many pools that support crustaceans may not hold water long enough to allow successful metamorphosis of CTS. In a study of amphibians located in eastern Merced County, CTS larvae were only observed in the largest vernal pools (Laabs et al. 2001). Unlike vernal pool crustaceans, CTS can breed and metamorphose in perennial ponds.

Stock ponds for cattle, sheep, horses, and other livestock have been, and continue to be, built to supply local water needs, especially in rural grazing lands in coastal and Sierra Nevada foothill areas (Bennett 1970) and in the absence of historical breeding ponds, have become important aquatic habitats for the CTS throughout its range (USFWS 2004a). These artificial water bodies have become especially important to CTS breeding success in the Bay Area and Coast Range regions where vernal pool complexes have been largely extirpated (Stebbins 1985; Zeiner et al. 1988; Shaffer et al. 1993; CDFG 2004). Of the 155 CTS locality records in the East Bay Area (Alameda and Contra Costa Counties) where the wetland type was identified, 85 percent (131 sites) were located in stock ponds (CDFG 2004). However, management of these water bodies ultimately determines their suitability as CTS breeding habitat (USFWS 2004a). As is true of natural vernal pools, the inundation period of stock ponds can be insufficient in allowing larvae to metamorphose (e.g., when early drawdown of irrigation ponds occurs). Conversely, in contrast to natural vernal pools, stock ponds may be perennial in nature and support predatory fish and bullfrogs, known predators of CTS (Shaffer et al. 1993; Seymour and Westphal 1994). In addition, inappropriate management of ponds can threaten CTS rangewide by increasing sedimentation of breeding ponds and impacts from stock animals (Hamilton and Jepson 1940; Prunuske 1987). In addition, stock ponds may be geographically isolated from other seasonal

wetlands occupied by CTS, and newly created ponds may be located beyond the maximum dispersal distances of juvenile or adult salamanders. However, it is possible that during this species' lifetime, individuals from sub-populations could migrate between aquatic and upland habitats, colonizing newly created and geographically isolated ponds provided the intervening habitat could be successfully traversed by dispersing CTS (USFWS 2004a).

14.2.2.2 Upland Habitat and Terrestrial Ecology

The upland component of CTS habitat typically consists of grassland or oak savannah (Shaffer et al. 1993; USFWS 2004a); however, in Santa Barbara and eastern Contra Costa Counties, some CTS breeding ponds occur in grasslands within scrub or chaparral habitats (Shaffer et al. 1993; USFWS 2004a). CTS typically utilize burrows in open grassland or under isolated oaks, and less commonly in woodlands (Shaffer et al. 1993). CTS cannot dig their own burrows and depend on fossorial mammals such as California ground aquirrel (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Seymour and Westphal 1994; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a) for upland wintering sites.

A key component of CTS habitat, upland wintering sites are where subadult and adult CTS spend the dry summer and fall months of the year aestivating (a state of dormancy or inactivity in response to hot, dry weather). During this time, CTS eat very little (Shaffer et al. 1993). In Sonoma County, occurrence of CTS is significantly associated with occurrence of gophers (USFWS 2004b). The utilization of ground squirrel and gopher burrows by CTS suggests a commensal relationship between these species (Loredo et al. 1996); therefore, active fossorial rodent populations are likely required to sustain CTS as inactive burrow systems become progressively more unsuitable over time. Loredo et al. (1996) found that California Ground Squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, fossorial mammals. CTS use both occupied and unoccupied burrows and movement within and between burrow systems continues for at least several months after CTS return from the breeding ponds (Trenham 2001; Shaffer and Trenham 2004).

Metamorphosed juveniles leave their natal ponds in the late spring or early summer. Before the ponds dry completely, these individuals settle in small mammal burrows, to which they return at the end of nightly movements (Zeiner et al. 1988; Shaffer et al. 1993; Loredo et al. 1996). Similar to the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925; Shaffer et al. 1993) before settling in their selected upland sites for the dry, hot summer months. While most CTS rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during dispersal or migration (Lorendo et al. 1996).

14.2.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The essential habitat elements for CTS are identified in Table CTS-1 and have been derived from the USFWS's list of primary constituent elements identified in the Designation of Critical Habitat for the CTS, Central Population: Final Rule (USFWS 2005) as well as input from local species experts.

Table CTS-1
Essential Habitat Elements for California Tiger Salamander

Essential Activities	Land Cover Types	Habitat Elements
Breeding and larval development	Vernal impoundment, vernal pool, and seasonal impoundment.	Provide suitable wetlands (i.e., wetlands must be inundated with winter rain for a minimum of 12 weeks in a year of average rainfall). Seasonal wetlands are preferred, but permanent man-made ponds may be used so long as predatory fish are absent.
Foraging, dispersal, migration, and summer Inactivity	Blue oak savanna, blue oak woodland, and valley grassland.	Provide upland habitat suitable for dispersal, migration, and over-summering. Must also contain small mammal burrows or other underground habitat that CTS depend upon for food, shelter, and protection from the elements and predation.

14.3 Species Distribution and Population Trends

14.3.1 Range-wide Distribution

Genetic studies of the CTS suggest that levels of interchange among populations are very low, and that populations or groups of subpopulations (metapopulations) are genetically isolated from one another (Shaffer et al. 1993; Shaffer and Trenham 2002). Studies of mitochondrial DNA and allozymes (proteins) indicate that there are six populations of *A. californiense*, which are found in the following areas: (1) Santa Rosa area of Sonoma County; (2) Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties); (3) Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeast Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties); (4) southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings counties); (5) Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties); and (6) Santa Barbara County (Shaffer and Trenham 2002).

Along the Coast Ranges, the species occurs in the Santa Rosa area of Sonoma County, southern San Mateo County south to San Luis Obispo County, and the vicinity of northern Santa Barbara County (CDFG 2010). In the Central Valley and surrounding Sierra Nevada foothills and Coast

Ranges, the species occurs from northern Yolo County (Dunn 1940) southward to northwestern Kern County and northern Tulare and Kings Counties (CDFG 2010). Other occurrences of CTS from Lake and Mono Counties outside the range of the CTS have been identified as non-native Tiger Salamanders (Shaffer et al. 1993). CTS at Grass Lake in Siskiyou County (Mullen and Stebbins 1978) have been identified as the northwestern tiger salamander (*A. t. melanostictum*) (USFWS 2004b). The USFWS notes several historical occurrences of individual CTS outside its current range. In the northeastern Sacramento Valley, there is a single occurrence located at the Gray Lodge Waterfowl Management Area in southern Butte County and northern Sutter County, and there is also a single occurrence located in Glenn County; both of these records are from the mid 1960s (CDFG 2010). There are two records from 1939 and another, from an unknown date, of CTS recorded from the edge of the range in southwestern San Luis Obispo County (CDFG 2010; Shaffer and Trenham 2002); however, it should be noted that these latter two records have recently been shown to be misidentified specimens (Hunt 2009). There is also a historic record of CTS from outside the species' range in Riverside County that was recorded in the late 1800's (CDFG 2010); however, subsequent surveys have not been able to verify the presence of CTS from this latter location (Stebbins 1989; Shaffer et al. 1993).

Although the area between Butte County and the Cosumnes River contains suitable vernal pools and has been surveyed extensively, the species has only been recorded along the southern edge of Sacramento County, south of the Cosumnes River and in northern Yolo County (CDFG 2010). It is likely that the species is uncommon or absent in much of the southernmost San Joaquin Valley because of unsuitable habitat. This includes areas to the south of Los Banos in Merced County, and the foothills of the Sierra Nevada south of Visalia in Tulare County (Shaffer et al. 1993). The factors that restrict the CTS in the northern and southern extent of its range are not fully understood, but may include low rainfall in the southern San Joaquin Valley and a greater abundance of non-native predatory fish in the northern Sacramento Valley (Hayes 1977). Studies suggest that the present patchy distribution pattern was caused by a combination of the extreme anthropogenic changes in and around the Central Valley, and the restrictive breeding requirements of the species (Dahl 1990; Fisher and Shaffer 1996; Frayer et al. 1989; Holland 1978, 1998; Jones and Stokes 1987; Shaffer et al. 1993; Trenham et al. 2000). Because there are only a few historic collections of the species from the 1800's, and the majority of collections have occurred in the last 25 years (CDFG 2010) subsequent to significant changes in historic habitat-types (Shaffer et al. 1993), documentation of the historic distribution of the CTS does not exist. The USFWS based the analysis associated with listing on estimated current distribution and habitat availability and then assumed the available habitat was populated (USFWS 2004a).

14.3.2 Range within Plan Area

The California Natural Diversity Database (CNNDB) has 22 occurrence records of CTS in Sacramento County (CDFG 2010). An additional four occurrences, not reported in the CNDDB,

have been recorded at Gill Ranch (Gill Ranch Survey 2003). Figure CTS-1 shows the recorded occurrences of CTS in Sacramento County. Twenty-one occurrences of CTS are outside the Urban Development Area (UDA) within the Plan Area; all of which are located south of the Cosumnes River and east of Interstate 5. Although the eastern edge of the Sacramento Valley between Butte County and the Cosumnes River contains suitable vernal pools and associated upland, and has been surveyed extensively, the species has only been recorded in the southeastern-most portion of Sacramento County in this part of the valley (USFWS 2004a).

The range of CTS in the Plan Area includes suitable wetland habitats and the grasslands and blue oak savannah south of the Consumes River in the following watersheds: South of Cosumnes River-Badger Creek, North Fork Badger Creek, Middle Laguna, Upper Laguna, Willow Creek, Town of Wilton–Cosumnes River, Arkansas Creek–Cosumnes River, Liberty Cemetery–Dry Creek, Lower Laguna, Loch Lane–Dry Creek, Grizzley South–Cosumnes River and Hadselville Creek. CTS have not been recorded north of the Cosumnes River in the Plan Area. No occurrences have been documented in this latter area despite extensive surveys in very large areas with presumably suitable habitat (e.g., Mather, Sacramento Valley Conservancy Vernal Pool Prairie Preserve, Sunrise Douglas Area, Kiefer landfill, and East of Grant Line Road (CDFG 2010).

14.3.3 Population Level and Trends

Population trends for CTS are difficult to assess due to limited data for the species. Data for the species is lacking for several reasons: 1) the species is difficult to detect; 2) CTS spend much of their life underground (Storer 1925; Feaver 1971; Shaffer et al. 1993); and 3) all individuals do not migrate to breeding pools each year (Trenham et al. 2000). Consequently, population estimates for the species are not possible and the USFWS primarily relies on measures of habitat availability as well as current and future habitat status as an indication of the status of the species.

The life history and ecology of CTS make it likely that it has a metapopulation structure (Hanski and Gilpin 1991). A metapopulation is a set of local populations or breeding sites within an area, where typically migration from one local population or breeding site to other areas containing suitable habitat is possible, but not routine. Movement between areas containing suitable habitat (i.e., dispersal) is restricted due to inhospitable conditions around and between areas of suitable habitat. Because many of the areas of suitable CTS habitat may be small, and support small numbers of CTS, local extinction of these small units may be common. A metapopulation's persistence depends on the combined dynamics of these local extinctions and the subsequent recolonization of these areas through dispersal (Hanski and Gilpin 1991, 1997; McCullough 1996; Hanski 1999).

Habitat loss has reduced the size and connectivity of patches of suitable and occupied CTS habitat (USFWS 2003, 2004b). Reduction in the extent and amount of suitable water bodies, grasslands, and other suitable upland habitats likely has eliminated connectivity among most of the known breeding sites, making recolonization of some sites more difficult following local extinction (USFWS 2003, 2004b). Furthermore, the reduction of habitat below a certain size threshold has the effect of reducing the quality of the remaining habitat by reducing the size of habitat boundaries, and making effects of other factors such as amount of food, availability of rodent burrows, pesticide use, mortality from vehicles, and predators more pronounced given the smaller area now exposed to such impacts (Semlitsch and Brodie 1998). Currently, there is not enough data to determine potential impact thresholds regarding CTS, whereby any further reduction in habitat quality or quantity would decrease survivorship or persistence (USFWS 2003, 2004a). Area of suitable habitat is likely dependent upon factors such as land-use adjacent to habitat boundaries (i.e., residential, industrial, community park), number of coterminous roads and number of vehicular trips on those roads, amount of pesticide use within the breeding pool watershed, or whether domestic animals or people have access to the site during periods when CTS are on the move and vulnerable. According to the USFWS (2003, 2004a), there is a size threshold for habitat below which the combination of various impacts will result in the loss of more CTS than the fragmented populations can produce and local extinction will occur.

14.4 Threats to the Species

Although certain factors are known to contribute to CTS decline range-wide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantified than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for CTS in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect California Tiger Salamander and other target species, the potential for success in conserving the species is reduced. The following is a summary of factors known or suspected to negatively affect CTS.

14.4.1 Habitat Loss and Alteration

Destruction or modification of CTS habitat is caused by conversion of rangeland to a variety of urban and agricultural land uses. The USFWS (2004b) defines urban impacts as non-agricultural development activities such as building and maintenance of housing, commercial, and industrial developments; construction and widening of roads and highways; golf course construction and maintenance; landfill operation and expansion; operation of gravel mines and quarries; dam building and inundation of habitat by reservoirs; and other infrastructure activities that support urban areas. Agricultural impacts include the conversion of native habitat by disking and deep-

ripping; and cultivation, planting, irrigation, and maintenance of row crops, orchards, and vineyards. These impacts threaten suitable breeding and upland habitat for CTS.

14.4.2 Loss of Upland Habitat

Research suggests that even CTS using breeding ponds that are protected from development may not persist as viable populations if upland habitat is unavailable or reduced in the area, or if breeding ponds become fragmented and isolated from other breeding ponds (Marsh and Trenham 2001; Trenham and Shaffer 2005). Earthmoving operations and cultivation in upland habitat can directly or indirectly kill or injure CTS in burrows or on the surface by crushing or trapping them. Such activities render all affected areas unsuitable for CTS breeding, feeding, and sheltering. Earth disturbing practices can also expose CTS to adverse environmental conditions (increased predation, high temperatures, low humidity), destroy food sources, and alter surface hydrology (potentially affecting breeding ponds). Disking, deep-ripping, or grading of upland habitat also destroys California ground squirrel burrows and crevices utilized by CTS, making suitable subterranean refugia unavailable and likely reducing long-term adult survival of CTS (Loredo et al. 1996). Stebbins (2003) maintains that extensive control of California ground squirrels and Botta's pocket gophers is considered a serious threat to the species.

14.4.3 Loss of Wetland Habitat

Filling, disking, or excavating wetland habitat can directly kill or injure CTS larvae, eggs, or breeding adults, and prevent future use of the wetland for reproduction. Additionally, surviving adults may be unable to locate alternative breeding sites in subsequent years if habitat is present, but has become highly fragmented by roads, housing, agriculture, and other non-habitat elements. Changes in vernal pool or pond inundation duration and depth caused by urban and agricultural land use (e.g., digging of drainage/irrigation ditches, construction of permanent ponds or reservoirs, deepening or terming of seasonal wetlands, and redirection of runoff from developments) can reduce reproductive success for CTS by: 1) prematurely drying wetlands and desiccating larvae; 2) extending the inundation period and facilitating invasion of non-native predators; 3) creating conditions that are more conducive for hybridization with non-native Tiger Salamanders; and 4) increasing vulnerability to disease by increasing isolation and fragmentation (USFWS 2004a).

14.4.4 Rangewide Habitat Trends

Although the CTS still occurs throughout the majority of its historic range, the overall area of the species' natural habitat has been substantially reduced and the species has become increasingly rare (Shaffer et al. 1993; Barry and Shaffer 1994; Fisher and Shaffer 1996). Some researchers estimate that as much as 75 percent of CTS historic habitat has been lost (Shaffer et al. 1993).

APPENDIX B (Continued)

Historically, approximately 3.7 million hectares (9.1 million acres) of valley and coastal grasslands existed within the range of the Central Valley CTS population (Central CTS) (Kuchler 1988). An additional 2.6 million hectares (6.5 million acres) of blue oak/foothill pine, valley oak, or mixed hardwoods (Kuchler 1988) also existed, of which some portion was likely used by the species; however, urbanization and intensive agriculture have eliminated virtually all valley grassland and oak savanna habitat from the Central Valley floor. Loss of grasslands has exceeded the loss of all other habitats in California (Ewing et al. 1988) and it has been estimated that less than 10 percent of California's Central Valley grasslands remain (USFWS 2003). Consequently, valley grasslands and the Central CTS are now distributed primarily in a ring around the Central Valley (Heady 1977; Holland 1978).

The relative loss of habitat has also been significant with respect to vernal pool grasslands, the historic breeding habitat of the CTS (Trenham et al. 2000). Approximately 1.68 million hectares (4.15 million acres) of grasslands in 20 Central Valley counties are estimated to have supported vernal pools at the time of European settlement (Holland 1978, 1998; Holland and Jain 1988; CDFG 2010) although there is no historical data to substantiate this estimate. Most of this area, except the northern Sacramento Valley, was within the CTS assumed historic range (Shaffer et al. 1993). The remaining vernal pool complexes in California are now fragmented and significantly reduced in area (USFWS 2004b). Where vernal pools exist, the habitat is often disturbed and degraded and the natural regime has been affected by drainage modification, off-road vehicle use, gravel mining, non-native plant invasion, road construction, and urban development (Jones and Stokes Associates 1987; USFWS 2004b; Keeler-Wolf et al. 1998). Vernal pools in California are now recognized as threatened resources, and many of the species that inhabit them are listed as threatened or endangered species (Jones and Stokes Associates 1987; Wright 1991; USFWS 2004b). Estimates of vernal pool habitat loss through the 1980s were at two to three percent annually and this rate is compounded continually (Holland 1988). During the 1980s and 1990s, vernal pool grasslands continued to be lost at an estimated rate of 1.5 percent per year (Holland 1998). As of 1997, 377,165 hectares (931,991 acres) of vernal pool grasslands remained in the Central Valley, representing a loss of approximately 78 percent (Holland 1998). Along the southeastern edge of the Central Valley, from San Joaquin to Fresno counties, at least 25 percent of the 259–hectare (640–acre) sections that had contained vernal pools in 1970 (Holland 1978) were wholly converted to agriculture or urban uses by 1994 (Seymour and Westphal 1994). This conversion estimate is probably conservative because it does not include partially converted sections where vernal pool habitat may also have been lost (Seymour and Westphal 1994). Holland (1998) estimated that at a continued 1.5 percent annual loss of vernal pools in California, 50 percent of the vernal pool habitat present in 1997 would be lost by 2043 (46 years), representing a cumulative loss of 88 percent of vernal pool grasslands.

APPENDIX B (Continued)

As part of an evaluation of CTS status throughout its range, Shaffer et al. (1993) detected CTS in only 36 of 86 localities (42 percent) that had been previously recorded, and ponds currently occupied by CTS were significantly higher in elevation than those that were unoccupied or had been previously occupied; although it should be noted that these decreases may also be the result of low sampling frequency. Some researchers (Shaffer et al. 1993; Seymour and Westphal 1994; Fisher and Shaffer 1996; Davidson et al. 2002) believe these and other data suggest that many of the low-elevation breeding sites on the valley floor have been eliminated in recent years, restricting habitat used by this species to higher elevations on the margin of its ecological requirements. These higher elevation breeding sites are likely human-created stock ponds or bermed ponds that have benefited the species by offsetting the loss of CTS natural, historic vernal pool breeding habitat; however, these artificial breeding ponds have a shorter life span than natural vernal pools if not maintained. Additionally, some of these artificial breeding ponds can place CTS at risk of predation by holding water for a greater period than vernal pools.

Using information from 632 CTS records identified in the CNDDB, of which 589 records were considered extant by the CDFG, as well as 79 CTS breeding sites from Carnegie Off-Road Vehicular Park and the Los Vaqueros watershed, the USFWS (2004b) analyzed threats to the Central CTS throughout the remaining portions of its range in 20 counties. Their results suggested that there were approximately 378,882 hectares (936,204 acres) of Central CTS upland and aquatic habitat remaining in 2003 (USFWS 2004b). Of the 378,882 hectares (936,204 acres) of Central CTS habitat, 28,526 hectares (70,489 acres, 8 percent) fell within areas delineated by general plans or other planned development (high-density residential, medium-density residential, industrial, and commercial development) (USFWS 2004b). Because they are within areas that were to be developed, the USFWS considered these areas to be threatened by development. These development projects may destroy and fragment upland or aquatic breeding habitat and reduce the likelihood of long-term persistence and viability at the affected localities.

The USFWS determined that an additional 24,240 hectares (59,897 acres, 6 percent) of the estimated 378,882 hectares (936,204 acres) of Central CTS habitat is threatened by low-density residential development (2- to 20-acre parcels). Furthermore, 45,880 hectares (113,371 acres, 12 percent) of CTS habitat is threatened by very-low-density residential development (20- to 160-acre parcels) (USFWS 2004b). The land use data the USFWS used to evaluate the threat of low-density and very-low-density development is based on a minimum delineation of these areas in 2000 (USFWS 2004b). These areas will likely be further developed resulting in a greater number of houses per area in the future, and in some cases, low-density areas are regions that will become incorporated into high-density urban areas (USFWS 2004b).

Low-density residential development is a greater threat to the Central CTS than very-low-density residential development due to the greater number of houses per acre. These low-density housing developments may result in the extirpation of CTS at some locations due to the direct effects of

construction that destroy breeding sites or indirect effects that alter hydrology and increase sedimentation. Structures, roads, and highways fragment habitat and prevent CTS from reaching their breeding sites by eliminating or disrupting their upland habitat or migratory corridors (Marsh and Trenham 2001). Reduced availability of upland habitat decreases the long-term population viability of CTS breeding sites (Trenham and Shaffer 2005). In the eastern United States, 25 percent of the upland habitat within 300 meters (984 feet) of a spotted salamander (*A. maculatum*) vernal pool breeding site was destroyed, resulting in a 53 percent decline in the abundance of the species at the site (Calhoun and Klemens 2002).

Low-density housing would also further fragment CTS habitats within the Sierra Nevada and Coast Range foothill counties, which are among the fastest growing counties in California (CGCDD 2003). These areas provide the last strongholds of remaining CTS (USFWS 2004b). CTS are known to have a high rate of interpond dispersal between breeding ponds, but only when the ponds are relatively close together (i.e., less than 670 meters [2,200 feet]) (Trenham et al. 2001). Therefore, the loss of breeding localities, or their isolation due to habitat fragmentation, may result in the extirpation of other breeding locations (Marsh and Trenham 2001). Furthermore, decreased landscape connectivity and increased habitat fragmentation has had negative effects on other amphibian assemblages including the eastern tiger salamander (*A. tigrinum*) (Lehtinen et al. 1999). Increased numbers of residents living in low-density residential developments and rural houses may also result in increased introduction of non-native predators, increased applications of pesticides or agricultural contaminants, and rodent control that may reduce the long-term viability of CTS inhabiting these areas. The CTS may also be threatened by the construction of new roads or increased mortality due to increased vehicle traffic (USFWS 2004b).

Estimates of the location and amount of habitat threatened by conversion and fragmentation from urban uses described above does not consider all of the projected human population growth, urbanization, and subsequent habitat loss that will occur in the counties inhabited by the Central CTS because most city and county general plans have variable planning horizons that do not extend beyond 20 years (USFWS 2004b). California developers and builders constructed 2.8 million new housing units between 1980 and 1997, and an additional 220,000 units will be required each year for the next 20 years with the human population of the State almost doubling in less than 40 years (CGCDD 2003). New housing is currently being constructed in low-density developments on the edge of urban areas or beyond such areas (CGCDD 2003). Most of the future growth of California will be outside of the current metropolitan areas (San Francisco, Los Angeles, and San Diego), occurring in the Sacramento, San Joaquin, and Imperial valleys (CGCDD 2003). Two of these valleys are inhabited by CTS.

Rangeland areas contain vernal pool grassland are being lost as a result of rural residential development (CGCDD 2003). Privately owned rangeland in California decreased by 252,524

APPENDIX B (Continued)

hectares (624,000 acres) from 1982 to 1997, an average loss of 16,997 hectares (42,000 acres) per year (USFWS 2004a), and from 1998 to 2000, the State lost an additional 21,555 hectares (53,263 acres) of rangeland (CGCDD 2003). The decline in farm rancher income, the aging of ranchers, tax implications of intergenerational transfers of ranches, and the difficulty of beginning a ranching operation (e.g., in terms of cost and knowledge of ranching) are all reasons California is experiencing the loss of rangeland (CGCDD 2003).

Projecting the future loss of Central CTS habitat from conversion of rangeland to intensive agriculture is difficult because conversion to this land use is largely unregulated by cities and counties. Conversion to intensive agriculture largely depends upon the individual landowner and is based on numerous factors that are difficult to predict, such as economic considerations, markets, and water availability. The loss of rangelands and vernal pool grasslands has been well documented in counties within the range of the Central CTS and annual rates of loss have been estimated (CDC 1994, 1998, 2000; Holland 1978, 1998, 2003; Jones and Stokes Associates 1987; Keeler-Wolf et al. 1998; CDFG 2003; CDWR 1998). The cumulative loss of vernal pool grassland was estimated at 78 percent by the late 1990s, and annual rates of loss have been between 1 and 3 percent during the 1980s and 1990s. Some of the loss of Central CTS habitat has resulted from conversion to intensive agriculture, and some is attributable to urbanization and other non-agricultural activities. The USFWS (2004b) believes that the continued loss of Central CTS habitat due to intensive agriculture represents an important threat to the species.

The USFWS anticipates that this conversion of land use will continue to adversely affect CTS if human population growth continues to increase as projected (75 percent increase from 2000 to 2040) in the range of the Central CTS (CDF 1998). If these projections are correct, this population growth will continue to spur the conversion of irrigated agriculture conversion to urban use, and the subsequent displacement of intensive agriculture on to rangeland in the foothill areas of the Central Coast or east side of the San Joaquin Valley (CDWR 1998; CDC 2002). However, the rate of displacement and subsequent conversion to intensive agriculture is expected to continue at lower rates than in the past as areas with suitable soils and water availability necessary for intensive agriculture become increasingly scarce. Additionally, there can be a financial incentive for landowners to convert existing rangeland and grasslands areas to irrigated crops, as rangeland is generally valued much less per acre than irrigated agricultural (ASFMRA 2003). Conversion of Central CTS habitat to intensive agriculture, in addition to the loss of habitat to rural residential housing, further fragments CTS habitat. Fragmentation of habitat may not only be directly impacting breeding sites, but may also be creating barriers to interpond dispersal and seasonal movements between breeding sites and upland refugia (Marsh and Trenham 2001; Trenham and Shaffer 2005; Calhoun and Klemens 2002).

APPENDIX B (Continued)

14.4.5 Urban and Population Growth

As the human population of the State of California continues to increase, there is a concomitant increase in urban and suburban development. According to the 2000 census, the number of people in California has increased by 13.8 percent since 1990 (CDF 2002). The average growth in human population within the counties in the range of the Central CTS during this period has been 19.5 percent (CDF 1998). Counties in the East Bay Area region and State Highway 99 corridor in the San Joaquin Valley are also undergoing increases in urbanization related to population growth (CDF 1998, 2002). From 1995 to 2020, the human population in the Central Valley, Bay Area, and Central Coast counties is projected to grow by 49 percent (from 12.8 million to 19.1 million people) (CDWR 1998). According to the California Department of Finance (CDF), the human population in the counties inhabited by the Central CTS is expected to grow by 75 percent from 2000 to 2040 (from 11.2 million to 19.6 million people) (CDF 1998). Therefore, impacts to the CTS due to conversion of its habitat resulting from urban development are expected to continue (USFWS 2004b).

14.4.6 Disease, Parasitism and Non-Native Species

The specific effects of disease on the CTS are not known and there is presently no information indicating disease is prevalent in existing populations in California (USFWS 2004a). Chytrid Fungus infections (chytridiomycosis) have been detected specifically in Central CTS and pathogens (fungi, bacteria, and viruses) have been known to adversely affect other amphibians including other tiger salamander species (USFWS 2004b). Ranaviruses are another potential threat to CTS because they have been found to adversely affect other amphibians including other Tiger Salamander species, and it is carried by non-native species that occur within the range of CTS, including bullfrogs and non-native tiger salamander species. Nowhere are pathogens indicated as an imminent threat.

Bullfrogs prey on CTS (Anderson 1968; Lawler et al. 1999), which has resulted in an overall pattern of the decline in areas where bullfrogs and other exotic species are present (Fisher and Shaffer 1996). The bullfrog, native to North America east of the Great Plains, was introduced into California in the late1800s and early-1900s, and has rapidly spread throughout the State (Storer 1925; Hayes and Jennings 1986). Morey and Guinn (1992) documented a shift in amphibian community composition at a vernal pool complex, with CTS becoming proportionally less abundant as bullfrogs increased in number. Bullfrogs are unable to establish permanent breeding populations in unaltered vernal pools and seasonal ponds because they require more than one year to complete their aquatic larval stage. Dispersing immature bullfrogs take up residence in such water bodies during the winter and spring where they prey on native amphibians, including larval CTS (Laabs et al. 2001; Morey and Guinn 1992; Seymour and Westphal 1994).

APPENDIX B (Continued)

Bullfrogs are known to travel at least 2.6 kilometers (1.6 miles) between ponds (Bury and Whelan 1984), and have the potential to naturally colonize new areas where they do not currently exist, including areas where Central CTS occur. In one study of the eastern San Joaquin Valley, 22 of 23 ponds (96 percent) with CTS were within the bullfrogs' potential dispersal range (Seymour and Westphal 1994). In addition, because bullfrogs are still sought within California for sport and as food, and may be taken without limit under a fishing license (USFWS 2004b), the threat of transport for intentional establishment in new habitat already occupied by CTS is significant.

Western mosquitofish (*Gambusia affinis*), first introduced in California in 1922, are native to central North America (watersheds tributary to the Gulf of Mexico) and have been introduced throughout the world for mosquito control. The species occurs throughout California wherever the water does not get too cold for extended periods and they are still widely planted throughout the State (Boyce 1994; Moyle 2002) by about 50 local mosquito abatement districts. Mosquitofish are ubiquitous because of their tolerance of poor water quality and wide temperature ranges (Boyce 1994). Larval CTS may be especially vulnerable to mosquitofish predation due to their fluttering external gills, which may attract these visual predators (Graf and Allen-Diaz 1993). Loredo-Prendeville et al. (1994) found no CTS inhabiting ponds containing mosquitofish. Leyse and Lawler et al. (2000) found that the survival of CTS in experimental ponds stocked with mosquitofish, at densities similar to those found in many stock ponds, was significantly reduced. Larvae that survived in ponds with mosquitofish were smaller, took longer to reach metamorphosis, and had injuries such as shortened tails. However, a recent experiment that replicated conditions in vernal pool environments and permanent ponds determined that, at low densities, mosquitofish did not have a significant effect on larval CTS growth and survival, but that growth and size at metamorphosis was significantly reduced at high fish densities (USFWS 2004b).

Other non-native fish have either been directly implicated in predation of CTS or appear to have the potential to prey upon them (Fisher and Shaffer 1996; Shaffer et al. 1993). For example, introductions of sunfish species (e.g., largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), catfish (*Ictalurus* spp.), and fathead minnows (*Pimephales promelas*) are believed to have eliminated CTS from several breeding sites in Santa Barbara County (USFWS 2000). In eastern Merced County, CTS were absent in stock ponds where non-native fish were present, whereas stock ponds absent of non-native fish had CTS present (Laabs et al. 2001). Non-native sunfish, catfish, and bullheads (*Ameiurus* spp.) have been, and still are, widely planted in ponds in California to provide for sportfishing. By 1984, the California fish fauna included about 50 such transplanted and exotic species, mostly of eastern North American origin (Hayes and Jennings 1986). The alien species have been introduced for a variety of reasons including ornamental, sport, bait, insect control and food uses. Thus, the USFWS considers

introductions of such nonnative fish species into Central CTS breeding habitat a threat to the persistence of the species in these locations (USFWS 2004a).

14.4.7 Other Natural or Manmade Factors Affecting California Tiger Salamander Continued Existence

Several other factors may threaten CTS including exposure to various contaminants, rodent population control efforts, chemical mosquito control, direct mortality while crossing roads, hybridization with non-native tiger salamanders, and certain practices associated with livestock grazing.

14.4.7.1 Contaminants

Little research has been done on the effects of contaminants to the CTS, especially with respect to agricultural pesticides. Most toxicological studies to date have been conducted on other amphibian species, specifically anuran species (frogs and toads). Although not specifically on CTS, these latter studies provide insight to the potential risks of contaminants to the CTS. Like most amphibians, CTS inhabit both aquatic and terrestrial habitats during different stages of their life cycle and may be exposed to a variety of pesticides and other chemicals throughout their range. Due to their permeable skin, amphibians may be particularly vulnerable to environmental stressors such as pesticides (Blaustein and Wake 1990). It is important to note that toxicants do not have to be present at lethal levels to be harmful. Toxicants at sub-lethal levels may still cause adverse effects such as developmental abnormalities in larvae and behavioral anomalies in adults (Hall and Henry 1992; Blaustein and Johnson 2003). Sources of chemical pollution which may adversely affect CTS include pesticides used in agricultural, landscaping, roadside maintenance, and rodent and vector control activities, as well as hydrocarbons and other pollutants that enter stormwater runoff from residential areas and industrial facilities (USFWS 2004a).

14.4.7.2 Rodent Control

As CTS spend the majority of their lives aestivating underground, typically in ground squirrel, pocket gopher, and other burrowing mammal burrows (Loredo et al. 1996; Trenham 1998a), widespread burrowing mammal control likely poses a significant threat to CTS. Beginning in the early 1900's (Marsh 1987), burrowing mammal control methods have included trapping, shooting, fumigation of burrows, use of toxic (e.g., anticoagulant) baits, and deep ripping of burrow areas (USFWS 2004a). Burrowing mammal control programs are widely conducted (frequently via bait stations placed at specific sites) on and around various commercial agricultural operations, including grazing/range lands, various row crop areas, and vineyards (Thompson *in litt*. 1998). In addition, flood control agencies and levee districts, routinely conduct extensive California Ground Squirrel control programs around levees, canals, and other

facilities under their management (USFWS 2004b). Pocket gopher control is common around golf courses, residential homes, and gardens. Two of the most commonly used rodenticides, chlorophacinone and diphacinone, are anticoagulants that cause animals to bleed to death. These chemicals can be absorbed through the skin and are considered toxic to fish and wildlife (USFWS 2004a). These latter two chemicals, along with strychnine, are used to control rodents (Thompson *in litt.* 1998). Although the effects of these poisons on CTS have not been assessed, any use in close proximity to occupied Central CTS habitat may have various direct and indirect toxic effects. Gases, including aluminum phosphide, carbon monoxide, and methyl bromide, are used in rodent fumigation operations and are introduced into burrows by either using cartridges or by pumping. When such fumigants are used, most or all animals inhabiting the fumigated burrow are non-selectively killed (Salmon and Schmidt 1984).

In addition to possible direct adverse effects of rodent control chemicals and gasses, California ground squirrel and Botta's pocket gopher control operations may also indirectly affect CTS by reducing the number of upland burrows available to them (Loredo-Prendeville et al. 1994). Because the burrow density required by CTS is unknown, the impacts of less than total burrow loss are also unknown. It is currently thought that active California Ground Squirrel colonies are probably needed to sustain CTS because inactive burrow systems become progressively unsuitable over time (USFWS 2004a). For example, Loredo et al. (1996) found that burrow systems usually collapsed within 18 months following cessation of California ground squirrel use and that CTS did not utilize collapsed burrows.

14.4.7.3 Mosquito Control

In addition to the use of western mosquitofish, a common chemical method of mosquito control in California involves the use of methoprene, an insect hormone mimic that increases the level of juvenile hormone in insect larvae and disrupts the molting process. Lawrenz (1984, 1985) found that methoprene (Altosoid SR–10) retarded the development of selected crustacea that had the same molting hormones (i.e., juvenile hormone) as insects, and anticipated that the same hormone may control metamorphosis in other arthropods. Because the success of many aquatic vertebrates relies on an abundance of invertebrates in temporary wetlands, any delay in insect growth could reduce the numbers and density of available prey (Lawrenz 1984, 1985). Therefore, the use of methoprene could have an indirect adverse effect on CTS by reducing the availability of prey.

14.4.7.4 Road-Crossing Mortality

Although no systematic studies of road mortality of the CTS have been conducted, traffic related mortality on CTS is well documented (Hansen and Tremper 1993; USFWS 2004a). For example, during one 15-day period in 2001 at a Sonoma County location, 26 road-killed CTS were found

(USFWS 2004a). Loss of CTS to vehicular-caused mortality in the vicinity of breeding sites can range from 25 to 72 percent of the observed CTS crossing roads (Twitty 1941; Launer and Fee 1996). Additionally, mortality is likely exacerbated by associated roadway curbs and berms as low as 9 to 12 centimeters (3 to 5 inches) that allow CTS access to roadways, but prevent their exit (Launer and Fee 1996; S. Sweet *in litt.* 1998).

Vehicular usage on California roads is increasing proportional to human population growth and urban expansion. During November 2002, California's estimated total vehicular travel on State highway system roads alone was 23 billion kilometers (14.27 billion miles) (Caltrans 2003). From 1972 to 2001, the State highway system total vehicular usage rose steadily from 108.6 billion to 270 billion kilometers (67.1 to 167.8 billion miles) annually. For the California counties in which the Central CTS may occur, State highway system total annual vehicular usage in 1999, 2000, and 2001 was 86.0, 90.0, and 92.1 billion kilometers (53.3, 55.9, and 57.2 billion miles) respectively. Moreover, in those areas of the State where the Central CTS occurs, road densities from past urbanization are already high. Overall, these areas have 5,860.2 kilometers (3,641.5 miles) of roads (and rail tracks) of all types. The range of current road (and rail) density is from 1.01 kilometer per 100 hectares (0.25 mile per 100 acres) in the southern San Joaquin Valley, to 1.64 kilometers per 100 hectares (0.41 mile per 100 acres) in the Bay Area counties. The USFWS (2004a) believes that these high road-use and road-density values and subsequent associated road-kill mortality are a threat to the species, a threat that will continue growing in concert with the State's rapid growth of human population and urbanization.

14.4.7.5 Hybridization

Hybridization has been defined by Rhymer and Simberloff (1996) as ''interbreeding of individuals from what are believed to be genetically distinct populations, regardless of taxonomic status.'' Hybridization between species may lead to introgression, which occurs when hybrid individuals repeatedly backcross to one or both parental types so that genetic material is transferred between the two species. Natural hybridization can be an important component of evolutionary processes; however, hybridization and introgression can be cause for concern, particularly if they are the result of human activities such as the introduction of non-native taxa. In the extreme, hybridization between native and non-native taxa can lead to loss of the native taxon through ''genetic assimilation'' (Rhymer and Simberloff 1996; Allendorf et al. 2001). Hybridization has been implicated in the extinction of populations and species of many animal and plant taxa (Rhymer and Simberloff 1996; Allendorf et al. 2001), including Tecopa pupfish (*Cyprinodon nevadensis calidae*), Amistad gambusia (*Gambusia amistadensis*), and longjaw cisco (*Coregonus alpenae*) (Rhymer and Simberloff 1996).

Of particular concern is the threat of genetic contamination and assimilation of CTS by non--native barred tiger salamanders (*A. mavortium*), which were introduced into central California as

APPENDIX B (Continued)

bass bait in the mid-1900s (Riley et al. 2003). Riley et al. (2003) studied hybridization between these two species relative to habitat-types commonly used by the species and identified diagnostic genetic markers from mtDNA and nuclear DNA. They found clear evidence that the two species are interbreeding in the wild and producing viable and fertile hybrid offspring. Furthermore, they determined that the extent of genetic mixing depends on the breeding habitat, with non-hybrid CTS more likely to occur in natural habitats than in artificial or disturbed wetlands. Vernal pools contained significantly fewer larvae with hybrid genotypes and significantly more non-hybrid parental genotypes than expected. Fitzpatrick and Shaffer (2004) further analyzed the frequencies of hybrid genotypes in breeding habitats, focusing on natural vernal pools, ephemeral man-made cattle pools and perennial man-made ponds. They found that perennial ponds contained a high percentage of non-native alleles (alternative forms of a gene). They suggested that this may be because *A. mavortium* has 1) a more flexible breeding phenology than CTS and can therefore take advantage of perennial ponds by breeding earlier in the fall, and 2) exhibits facultative paedomorphosis (i.e., retention of larval characteristics as an adult). These two characteristics of *A. mavortium* may increase the relative ability of non-native alleles to persist in perennial ponds. Riley et al. (2003) and Fitzpatrick and Shaffer (2004) show that the extent of hybridization between *A. mavortium* and CTS may depend on the breeding habitat used (i.e., artificial and highly modified habitats may facilitate hybridization) and that, in at least some circumstances (e.g., where there are perennial ponds), non-native genes may be more likely to persist than native genes.

CTS hybridization has been found to varying degrees in the Central Coast, Bay Area, and Central Valley portions of the CTS range (Shaffer and Trenham 2002; H.B. Shaffer *in litt.* 2003; USFWS 2004a). Of particular concern is the widespread hybridization within the Central Coast population where introduced genes have been found from southern Santa Clara County throughout most of Monterey County down to Fort Hunter Liggett on the San Luis Obispo County line, and east across all of San Benito County (H.B. Shaffer *in litt.* 2003). Within this region, virtually all Monterey County populations of the CTS have been compromised by non-native genes, and every population of the CTS at Fort Hunter Liggett is either introduced or a hybrid mixture (H.B. Shaffer *in litt.* 2003).

Using Geographic Information System (GIS), the USFWS estimated the number of Central CTS records (presumably CTS without non-native genes present) that were threatened by hybridization (USFWS 2004b). A CTS record was considered threatened by hybridization if the record was within 2.1 kilometers (1.3 miles) of a hybridized or non-native tiger salamander observation. Dr. H. Bradley Shaffer of University of California at Davis provided locations of hybridized or non-native tiger salamander locations. Other records also were considered threatened if they were part of a larger polygon that consisted of multiple records located within 2.1 kilometers (1.3 miles) of a hybridized or non-native Tiger Salamander observation. The

USFWS's assumptions were that if a non-native or hybridized tiger salamander was within 2.1 kilometers (1.3 miles) (based on the maximum observed migration distance of a tiger salamander, Sweet *in litt.* 1998) of a CTS record, then the non-native or hybridized tiger salamander would be able to migrate to the native CTS breeding site and breed with the individuals at that location. Additionally, if the non-native or hybrid was located within 2.1 kilometers (1.3 miles) of a polygon consisting of multiple records, then there would be sufficient intervening breeding habitat located within the polygon to allow for the nonnative or hybrid tiger salamanders to migrate to and breed with the CTS records within the polygon (USFWS 2004b).

Using this analysis, the USFWS determined that 48 records (22 percent) in the Bay Area region, 56 records (78 percent) in the Central Coast region, and 27 records (8 percent) in the Central Valley region were threatened by hybridization because of their close proximity to non-native and hybridized tiger salamanders (USFWS 2004b). Non-native tiger salamanders are not known to occur within the range of the CTS in Sonoma County. In Santa Barbara County, nonnative tiger salamanders are known from the Lompoc Federal Penitentiary. The closest known CTS breeding pond is approximately 12.9 kilometers (8 miles) from the Penitentiary.

14.4.7.6 Livestock Grazing

Rangeland, suitably managed for livestock (cattle, sheep, and horses), is generally thought to be compatible in many cases with CTS habitat requirements (Shaffer et al. 1993; Loredo et al. 1996; USFWS 2004a). By maintaining shorter vegetation, grazing may make areas more suitable for California Ground Squirrels whose burrows are essential to CTS survival. The long-term effects of ranching on the species is thought to have been either neutral or beneficial where burrowing rodents were not completely eradicated, because the CTS would have likely been extirpated from many areas if stock ponds had not been built and maintained for livestock production (USFWS 2004b).

14.5 Data Gaps and Conservation Implications

In recent years, the ecology, status, and management of CTS have received increased attention; however, there are several sources of uncertainty regarding CTS and its requirements in the Plan Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

14.5.1 Population and Habitat Distribution within the Plan Area

CTS occur in suitable habitat within the Plan Area; however, the species' overall distribution, abundance, and population structure are incompletely known. Land cover-types used by CTS, such as vernal impoundment, vernal pool, and seasonal impoundment, and adjacent uplands

(blue oak woodland, blue oak savanna, and valley grassland), occur throughout Sacramento County. Nonetheless, almost all records of CTS are from the southeastern portion of the area.

Though comprehensive surveys for CTS have been conducted in much of the Plan Area, the population size and distribution of the species throughout the Plan Area are still incompletely known. In addition, though the distribution of different habitat-types is mapped and quantifiable, the quality of habitat (particularly as it relates to certain essential habitat components) for CTS within many areas is unknown. These information gaps limit our ability to identify the best lands available for preserving CTS habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for CTS will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, have multiple breeding sites that may function as a metapopulation, or are adjacent to these areas.

14.5.2 Determining Threat Severity

Certain factors are known to contribute to CTS decline rangewide; however, exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., habitat fragmentation, changes in hydroperiod of potential breeding sites, etc.). Therefore, to improve conservation planning efforts for CTS in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

14.5.2.1 Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for California Tiger Salamander

Achieving the conservation goals and objectives for CTS will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability for CTS. Whether created, restored or enhanced habitats can retain the functional attributes suitable for CTS is unknown.

If habitat creation, restoration and enhancement techniques cannot eventually result in habitats with functional characteristics suitable for CTS, then those lands would not support sustainable populations.

14.6 Literature Cited

Allendorf, F.W., R.F. Leary, P. Spruell and J.K. Wenburg. 2001. The problem with hybrids: setting conservation guidelines. *Trends in ecology and Evolution,* 16(11):613-622.

APPENDIX B (Continued)

American Society of Farm Managers and Rural Appraisers (ASFMRA). 2003. Trends in Agricultural Land & Lease Values. Pp. 1-29.

Anderson, J.D. 1968. Comparison of the food habits of *Ambystoma macrodactylum sigillatum, Ambystoma macrodactylum croceum*, and *Ambystoma tigrinum californiense. Herpetologica,* 24(4): 273-284.

Anderson, P.R. 1968. The reproductive and developmental history of the California tiger salamander. Master's thesis, Department of Biology, Fresno State College, Fresno, California. 82pp.

Barry, S.J. and H.B. Shaffer. 1994. The status of the California tiger salamander (*Ambystoma californiense*) at Lagunita: A 50-year update. *Journal of Herpetology,* 28(2): 159-164.

Bennett, G.W. 1970. *Management of lakes and ponds*. Second Edition. Van Nostrand Reinhold Company, New York.

Bishop, S.C. 1943. *Handbook of Salamanders: the Salamanders of the United States, of Canada, and of Lower California*. Comstock Publishing Co., Inc. Ithaca, New York. pp. 119-123.

Blaustein, A.R. and D.B. Wake. 1990. Declining amphibian populations: a glocal phenomenon? *Trends in Ecology and Evolution*, 5(7): 203-204.

Blaustein, A.R. and Johnson, T.J. 2003. Explaining frog deformities. An eight-year investigation into the cause of a shocking increase in deformed amphibians has sorted out the roles of three prime suspects. *Scientific American*. 4 pp.

Bobzien, S. 2003. East Bay Regional Park District Comments to the USFWS for the listing of the Central California Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*). Proposed Rule.

Boyce, K. 1994. Beneficials: mosquitofish. Sacramento County/Yolo County Mosquito and Vector Control District. 2.

Bumgardner, Michael. 2010.

Bury, R.B and J.A. Whelan. 1984. Ecology and Management of the Bullfrog. Fish and Wildlife Service/Resource Publication 155.

Calhoun, A., and M.W. Klemens. 2002. Best development practices (BDPs) for conserving pool breeding amphibians in residential and commercial developments (MCA Tech. Paper 5).

APPENDIX B (Continued)

California Department of Conservation (CDC). 1994. Farmland conversion report 1990 to 1992. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Conservation (CDC). 1998. Farmland conversion report 1994 to 1996. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Conservation (CDC). 2000. Farmland conversion report 1998 to 2000. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Conservation (CDC). 2002. Farmland conversion report 2000 to 2002. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Finance (CDF). 2002. Demographic Research Unit. E-6 County Population Estimates and Detailed Components of Change, July 1, 2000. Historical 1999 Estimates and Census 2000 Counts. California Agriculture and Natural Resources Publication 7438, January 2002.

California Department of Finance (CDF). 1998. County Population Projections with Age, Sex and Race/Ethnic Detail, July 1990 – 2040 in 10-year Increments.

California Department of Fish and Game (CDFG). 2003. Atlas of the Biodiversity of California. Sacramento, California. 121 pp.

California Department of Fish and Game (CDFG). 2004. Evaluation of Petition: Request of the Center for Biological Diversity et al. (2004) to list the California tiger salamander (*Ambystoma californiense*) as endangered. Sacramento, California. 81 pp.

California Department of Fish and Game (CDFG). 2005. State and Federally Listed Endangered and Threatened Animals of California. Sacramento, California. 11 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Transportation (Caltrans). 2000. Natural Environment Study and Biological Assessment. State Route 120, Oakdale Expressway Project. Technical Report: 10-STA-120 April 2000.

California Department of Transportation (Caltrans). 2003. California Department of Transportation's Internet website, January 2, 2003 Web site http://www.dot.ca.gov/.

APPENDIX B (Continued)

California Department of Water Resources (CDWR). 1998. The California water plan update. DWR Bulletin 160-98.

City of Gilroy Community Development Department (CGCDD). 2003. Mesa Ridge Subdivision. Draft Environmental Impact Report. SCH# 20030120070.

Dahl, T.E. 1990. Wetland losses in the United States 1780's to 1980's. U.S. Dept. Interior, Fish and Wildlife Service, Washington, D.C. 21pp.

Davidson, C., H.B. Shaffer, and M.R. Jennings. 2002. Spatial tests of the pesticide drift, habitat destruction, UV-B and climate change hypotheses for California amphibian declines.

Dunn, E.R. 1940. The races of *Ambystoma tigrinum*. *Copeia,* 1940(3): 154-162.

Ewing, M.S., S.A. Ewing, and K.M. Kocan. 1988.*Ichthyophthirius* (Ciliophora): population studies suggest reproduction in host epithelium. *Journal of Protozoology*, 35:549-552.

Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense* Gray, Hyla regilla Baird and Girard and *Scaphiopus hammondi hammondi* Girard. Master's thesis, Department of Biology, Fresno State College, Fresno California. 58pp.

Fisher, R.N. and H.B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley. *Conservation Biology,* 10(5): 1387-1397.

Fitzpatrick, B.M. and H.B. Shaffer. 2004. Environment-dependent admixture dynamics in a tiger salamander hybrid zone. *Evolution,* 58(6):1282-1293.

Frayer, W. E., Peters, D. D., and Pywell, H. R. 1989. Wetlands of the California Central Valley:status and trends. United States Fish and Wildlife Service Portland, Oregon.

Frost, D.R., editor. 1985. Amphibian species of the world: a taxonomic and geographical reference. Allen Press, Inc. and Association of Systematics Collection, Lawrence, Kansas. pp. 553-558.

Gehlbach, F.R. 1967. *Ambystoma tigrinum*. Catalogue of American Amphibians and Reptiles 1:52.1-52.4.

Gill Ranch Survey. 2003. 135 Gill Ranch Survey, Sacramento County, Calfiornia.

APPENDIX B (Continued)

Graf, M. and Allen-Diaz. 1993. Evaluation of mosquito abatement district's use of mosquitofish as biological mosquito control: case study - Sindicich Lagoon in Briones Regional Park. Unpublished manuscript. 22 pp.

Grinnell, J., and C.L. Camp. 1917. A distributional list of the amphibians and reptiles of California. *University of California Publications in Zoology,* 17(10): 131, 138.

Hall R.J. and P.F.P. Henry. 1992. Assessing effects of pesticides on amphibians and reptiles: status and needs. *Herpetological Journal,* 2:65-71.

Hamilton, C.L., and H.J. Jepson. 1940. Stock-water developments: wells, springs, and ponds. U.S. Department of Agriculture Farmers' Bulletin No. 1859.

Hansen, R.W., and R.L. Tremper. 1993. Amphibians and Reptiles of Central California. California Natural History Guides. University of California Press, Berkeley. 11 pp.

Hanski, I. 1999. Metapopulation Ecology. Oxford University Press, Oxford, England.

Hanski, I. and M. Gilpin. 1991. Metapopulation dynamics: brief history and conceptual domain. *Biological Journal of Linean Society,* 42: 3-16.

Hanski, I. and M. Gilpin. 1997. Metapopulation Dynamics. *Nature,* 396: 41–49.

Hayes and Jennings. 1986. Decline of ranid frog species in Western North America: Are bullfrogs responsible? *Journal of Herpetology,* 220(4):490-509.

Hayes, M.P. 1977. A Sacramento Valley record of the California tiger salamander (*Ambystoma californiense*) with comments on its distribution and ecology (Amphibia, Caudata, Ambystomatidae). Unpublished manuscript.

Heady, H.F. 1977. Valley Grassland. Pp. 491-514 In: M. G. Barbour and J. Major (Editors). Terrestrial Vegetation of California. California Native Plant Society, Special Publication No. 9.

Heady. 1988.

Holland, D.C., M.P. Hayes, and E. McMillan. 1990. Late summer movement and mass mortality in the California tiger salamander (*Ambyostoma californiense*). *Southwestern Naturalist,* 35:217-220.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Sp. Pub. 4:1-12.

APPENDIX B (Continued)

Holland, R.F. 1998a. No net loss? Changes in Great Valley vernal pool distribution from 1989 to 1997. Prepared for the California Department of Fish and Game, Natural Heritage Division, Sacramento, California.

Holland, R.F. 1998b. Great Valley vernal pool distribution, photorevised, p. 71-75 *In* Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferren, and R. Ornduff. (editors.). Ecology, conservation, and management of vernal pool ecosystems. California Native Plant Society, Sacramento, California.

Holland, R.F. 2003. Distribution of vernal pool habitats in five counties of California's southern Coast Ranges. Prepared for U. S. Fish and Wildlife Service, Ventura, California.

Holland, R.F. and S. Jain. 1988. Vernal pools. Pp. 513-533 *in* M. G. Barbour and J. Major, eds. Terrestrial vegetation of California. California Native Plant Society, Special Publication No. 9.

Hunt, L.E. 2009. Assessment of California Tiger Salamander (*Ambystoma californiense*) Occurrence in Brizziolari Creek and Stenner Creek Watersheds, San Luis Obispo County, California, with a Discussion of their Regional Distribution. USFWS Contract No. 101814M720-0001.

Irschick, D.J., and H.B. Shaffer. 1997. The polytypic species revisited: morphological differentiation among tiger salamanders (*Ambystoma tigrinum*) (Amphibia: Caudata). *Herpetologica,* 53(1): 30-49.

Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. Final report to California Dept. of Fish and Game. Pp. 12-16.

Jones and Stokes and Associates. 1987. Sliding toward extinction: California's natural heritage. Privately produced.

Jones, T.R. 1993. Intraspecific genetic variation and cladogenesis in California tiger salamanders *Ambystoma tigrinum californiense* Gray). Unpublished manuscript. 49 pp.

Keeler-Wolf, T., D.R. Elam, K. Lewis, and S.A. Flint. 1998. California vernal pool assessment preliminary report. California Department of Fish and Game, Sacramento, California.

Kuchler, A.W. 1988. The Map of the Natural Vegetation of California. Pp 909-938 and map in: M. G. Barbour and J. Major (Editors). Terrestrial Vegetation of California. California Native Plant Society, Special Publication No. 9.

APPENDIX B (Continued)

Laabs, D.M., S.G. Orloff and M. L. Allaback. 2001. Ponds and stream-breeding amphibians. Pp. 191-230 *in* Vollmer, J. E., (Ed.) Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands.

Launer, A., and C. Fee. 1996. Biological research on California tiger salamanders at Stanford University. 25 pp. plus figures, tables, and appendix.

Lawler, S.P., D. Dritz, T. Strange, and M. Holyoak. 1999. Effects of introduced mosquitofish and bullfrogs on the threatened California red-legged frog. *Conservation Biology,* 13(3):613-622.

Lawrenz, R.W. 1984-85. The response of invertebrates in temporary vernal wetlands to Altosid® SR-10 as used in mosquito abatement programs. *Journal of the Minnesota Academy of Science,* 50: 31-34.

Lehtinen, R.M. and S.M. Galatowitsch. 2001. Colonization of restored wetlands by amphibians in Minnesota. *American Midland Naturalist,* 145(2): 388-396.

Lehtinen, R.M., S.M. Galatowitsch, and J.R. Tester. 1999. Consequences of habitat loss and fragmentation for wetland amphibian assemblages. *Wetlands,* 19(1):1-12.

Leyse, K. and Lawler, S.P. 2000. Effect of mosquitofish (*Gambusia affinis*) on California tiger salamander (*Ambystoma californiense*) larvae in permanent ponds. Mosquito Control Research, annual report 2000.

Loredo, I. and D. Van Vuren. 1996. Reproductive ecology of a population of the California tiger salamander. *Copeia,* 1996(4): 895-901.

Loredo, I., D. Van Vuren and M.L. Morrison. 1996. Habitat use and migration behavior of the California tiger salamander. *Journal of Herpetology,* 30(2): 282-285.

Loredo-Prendeville, I., D. Van Vuren, A.J. Kuenzi, and M.L. Morrison. 1994. California ground squirrels at Concord Naval Weapons Station: alternatives for control and the ecological consequences. Pp. 72-77 *In* W. S. Halverson and A. C. Crabb (editors). Proceedings of the 16th Vertebrate Pest Conference. University of California Publications.

Marsh, D.M. and P.C. Trenham. 2001. Metapopulation dynamics and amphibian conservation. *Conservation Biology,* 15(1): 40-49.

Marsh, R.E. 1987. Ground squirrel control strategies in Californian agriculture. Pp. 261-277 *In* Richards, C. G. J. and T. Y. Ku (editors). Control of mammal pests. Taylor and Francis, London, New York and Philadelphia.

APPENDIX B (Continued)

McCullough, D.R. (editor) 1996. Metapopulations and wildlife conservation. Island Press, Covelo, California. 432 pp.

Morey, S.R. 1998. Pool duration influences age and body mass at metamorphosis in the western spadefoot toad: implications for vernal pool conservation. Pp. 86-91 *In* Witham, C.W., E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Ecology, Conservation, and Management of Vernal Pool Ecosystems Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California. 1998.

Morey, S.R. and D.A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. Pp. 149-157 *In* Williams, D.F., S. Byrne, T.A. Rado (editors). Endangered and Sensitive Species of the San Joaquin Valley, California. California Energy Commission, Sacramento, California. 1992.

Moyle, P.B. 2002. *Inland Fishes of California*. University of California Press.

Mullen, D.A. and R.C. Stebbins. 1978. An addition to the amphibian fauna of California. *Great Basin Naturalist,* 38(4): 429-437.

Pechmann, J.H.K., D.E. Scott, J.W. Gibbons, and R.D. Semlitsch. 1989. Influence of wetland hydroperiod on diversity and abundance of metamorphosing juvenile amphibians. *Wetlands Ecology and Management,* 1(1):3-11.

Pechmann, J.H.K., R.A. Estes, D.E. Scott and J.W. Gibbons. 2001. Amphibian colonization and use of ponds created for trial mitigation of wetland loss. *Wetlands,* 21(1): 93-111.

Petranka, J.W. 1998. *Salamanders of the United States and Canada*. Smithsonion Institution Press.

Prunuske, L. 1987. Groundwork: A Handbook for Erosion Control in North Coastal California. Marin County Resource Conservation District. 60 pp.

Rhymer, J.M. and D. Simberloff. 1996. Extinction by hybridization and introgression. *Annual Review of Ecology and Systematics*, 27: 83-109.

Riley, S.P.D., H.B. Shaffer, S.R. Voss and B.M. Fitzpatrick. 2003. Hybridization between rare, native tiger salamanders (*Ambytoma californiense*) and its introduced cogener. *Ecological Applications,* 13(5):1263-1275.

Salmon, T.P., and R.H. Schmidt. 1984. An introductory overview to California ground squirrel control. Pp. 32-37 *In* Clark, D. O. (editor). Proceedings of the Eleventh Vertebrate Pest Conference, March 6-8, 1984, Sacramento, California.

APPENDIX B (Continued)

Scott, D.E. 1994. The effect of larval density on adult demographic traits in *Ambystoma opacum*. *Ecology,* 75:1383-1396.

Semlitsch, R.D. 1998. Biological delineation of terrestrial buffer zones for pond-breeding salamanders. *Conservation Biology,* 12(5): 1113-1119.

Semlitsch, R.D. and J.R. Bodie. 1998. Are small isolated wetlands expendable? *Conservation Biology,* 12(5): 1129-1133.

Semlitsch, R.D., D.E. Scott, and J.H.K. Pechmann. 1988. Time and size at metamorphosis related to adult fitness in *Ambystoma talpoideum*. *Ecology,* 69: 184-192.

Seymour, R., and M. Westphal. 1994. Final Report - Status and habitat correlates of California tiger salamanders in the eastern San Joaquin Valley: results of the 1994 survey. Report prepared by the Coyote Creek Riparian Station for the U.S. Fish and Wildlife Service, Sacramento Office. 33 pp.

Shaffer, H.B., *in litt.* 2003. Federal Register Vol. 69, No. 149. Wednesday, August 4, 2004. Rules and Regulations.

Shaffer, H.B. and M.L. McKnight. 1996. The polytypic species revisited: genetic differentiation and molecular phylogenetics of the tiger salamander *Ambystoma tigrinum* (Amphibia:Caudata) complex. *Evolution,* 50(1): 417-433.

Shaffer, H.B. and P.C. Trenham. 2004. Family Ambystomatidae. Pp. 1-10.

Shaffer, H.B. and P.C. Trenham. 2005. *Ambystoma californiense.* Pp. 1093-1102. *In* Lannoo, M. J. (Ed.), Status and Conservation of US Amphibians. Volume 2: Species Accounts, University of California Press, Berkeley, California.

Shaffer, H.B. and P.C. Trenham. 2002. Distinct Population Segments of the California Tiger Salamander. Section of Evolution and Ecology, and Center for Population Biology, University of California.

Shaffer, H.B. and S.E. Stanley. 1991. Final report to California Department of Fish and Game; California tiger salamander surveys, 1991. Unpublished report. 11 pp. plus figure, tables and appendix.

Shaffer, H.B., R.N. Fisher, and S.E. Stanley. 1993. Status report: the California tiger salamander (*Ambystoma californiense*). Final report for the California Department of Fish and Game. 36 pp. plus figures and tables.

APPENDIX B (Continued)

Shaffer, M. 1987. Variable Populations For Conservation. Minimum viable populations: Coping with uncertainty. Cabridge University Press. Cambridge. pp. 69-86.

Stebbins, R.C. 1951. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 1962. Amphibians of the western United States. Ambystomids. University of California Press. Berkeley and Los Angeles. pp. 29-49 and plates.

Stebbins, R.C. 1972. California Amphibians and Reptiles. University of California Press. Berkeley, California. 152 pp.

Stebbins, R.C. 1985. A field guide to western reptiles and amphibians. Houghton Mifflin Co. Boston, Massachusetts. Pp. 33-37.

Stebbins, R.C. 1989. Declaration of R. C. Stebbins in support of petition of writ of mandate. Sierra Club and Richard Pontuis v. Gilroy City Council, Shappell Industries et al. Santa Clara County Superior Court. March 16, 1989. 11 pp. plus exhibits.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians*, 3rd Edition. Houghton Mifflin Company. Boston, Massachusetts. 530 pp.

Storer, T.I.1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27: 60-71.

Sweet, S., Ph.D., *in litt.* 1998. Letter to Dwight Harvey, U.S. Fish and Wildlife Service with enclosed report, "Vineyard development posing an imminent threat to *Ambystoma californiense* in Santa Barbara County, California." 31 August 1998.

Thompson, R. *in litt.* 1998. Senior Biologist, Science Applications International Corporation. 19 October 1998, letter to Al McCurdy, County of Santa Barbara. With enclosed "Proposed Alternative Amphibian Management Plan, Premiere Partners Property in Lost Alamos Valley."

Trenham, P.C. 1998b. Demography, migration, and metapopulation structure of pond breeding salamanders. Unpublished Ph.D. dissertation. University of California, Davis. 96 pp.

Trenham, P.C. 1998a. Radio Tracking Information, unpublished manuscript. 6 pp.

Trenham, P.C. 2001. Terrestrial habitat use by adult California tiger salamanders. *Journal of Herpetology,* 35(2): 343-346.

APPENDIX B (Continued)

Trenham, P.C., and H.B. Shaffer. 2005. Amphibian upland habitat use and its consequences for population viability. *Ecological Applications,* 15:1158–1168.

Trenham, P.C., H. B. Shaffer, W. D. Koening and M. R. Stromberg. 2000. Life History and Demographic variation in the California Tiger Salamander (*Ambystoma californiense*). *Copeia,* 2000(2): 365-377.

Trenham, P.C., W. D. Koenig and H.B. Shaffer. 2001. Spatially autocorrelated demography and interpond dispersal in the salamander *Ambystoma californiense*. *Ecology,* 82(12): 3519-3530.

Twitty, V. C. 1941. Data on the life history of *Ambystoma tigrinum californiense* Gray. *Copeia,* 1941(1): 1-4.

United States Fish and Wildlife Service (USFWS). 1994. Endangered and threatened wildlife and plants; Determination of endangered status for the Conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool tadpole shrimp; and threatened status for the vernal pool fairy shrimp; Final Rule 59 FR 48136-48153.

United States Fish and Wildlife Service (USFWS). 1996. Endangered and threatened species; notice of reclassification of 96 candidate taxa. Federal Register 61:7457-7463.

United States Fish and Wildlife Service (USFWS). 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, Oregon. 319 pages.

United States Fish and Wildlife Service (USFWS). 2000. Endangered and threatened wildlife and plants; Emergency rule to list the Santa Barbara County distinct population of the California tiger salamander as endangered; Rule and proposed rule. 65 FR 3096.

United States Fish and Wildlife Service (USFWS). 2002. Endangered and threatened wildlife and plants; Emergency Rule Listing the Sonoma County Distinct Population Segment of the California Tiger Salamander as Endangered. Federal Register 67: 47726-47740, July 22, 2002.

United States Fish and Wildlife Service (USFWS). 2004a. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemption for Existing Routine Ranching Activities. Federal Register 69(149) 47212-47248.

APPENDIX B (Continued)

United States Fish and Wildlife Service (USFWS). 2004b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population; Proposed Rule. Federal Register 69(153) 48570-48649.

United States Fish and Wildlife Service (USFWS). 2005. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population; Final Rule. Federal Register 70(162) 49380-49458.

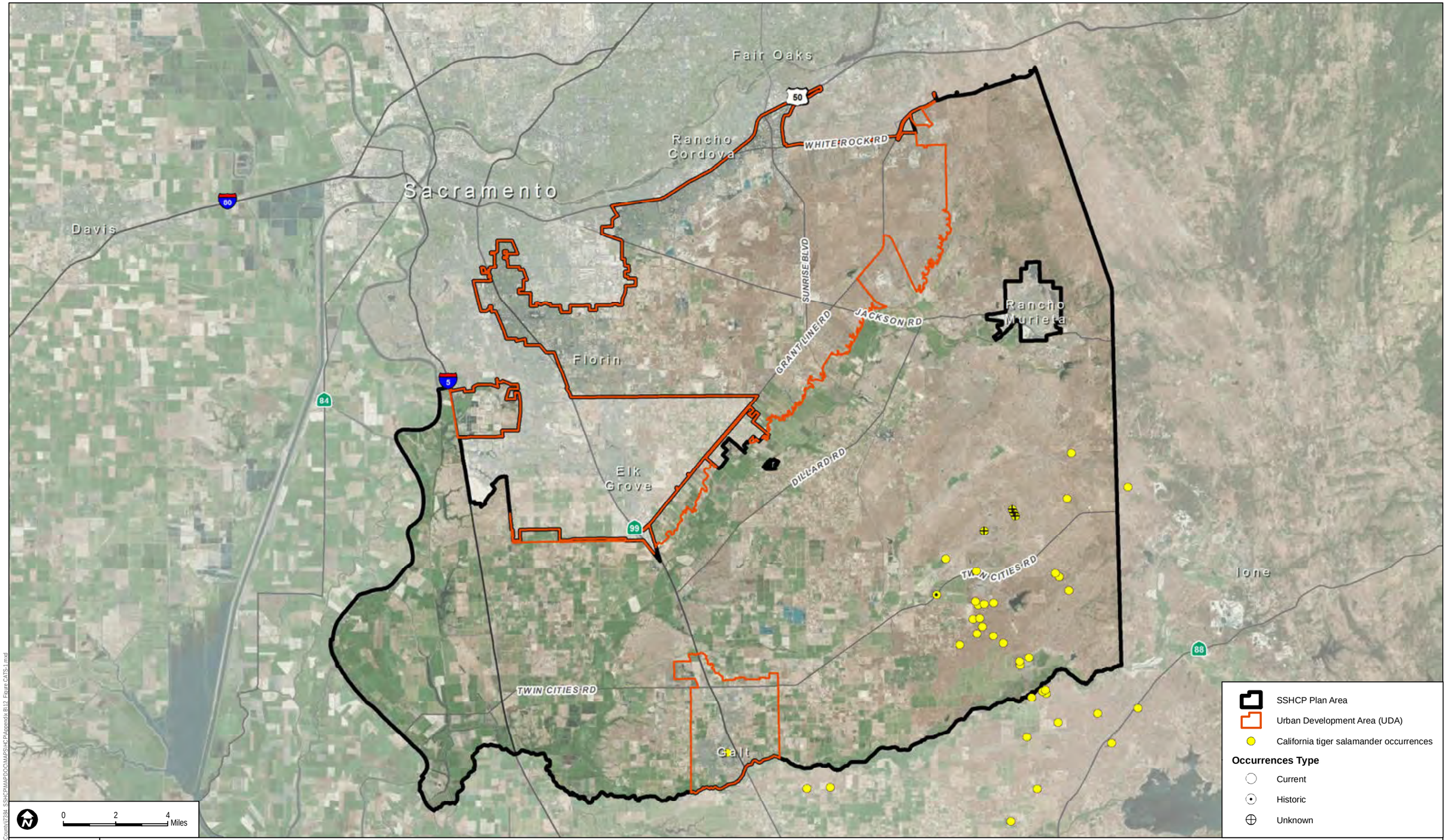
United States Fish and Wildlife Service (USFWS). Proposed Rule to list the Central California distinct population segment of the California tiger salamander as Threatened. Federal Register 68:28648-2888. May 23, 2003.

Wilbur, H.M. and J.P. Collins. 1973. Ecological aspects of amphibian metamorphosis. *Science* (n.s.), 182(4119): 1305-1314.

Wright, S.A., 1991. Pheonological Survey of abundance and diversity of aquatic fauna in Sacramento County Vernal Pools.

Zedler, J.B., and J.C. Calloway. 1999. Tracking wetland restoration: do mitigation sites follow desired trajectories? *Restoration Ecology,* 7(1): 69-73.

Zeiner, D.C., W. Laudenslayer, and K. Mayer. 1988. Tiger salamander *Ambystoma tigrinum*. Pages 2-3, in: California's Wildlife, Volume 1: Amphibians and Reptiles. The Resources Agency, California Department of Fish and Game.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012

FIGURE CTS-1

California Tiger Salamander Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\I2394 SSHCP\MAPS\CM\MAPS\HCP\Admin\fr B12 Figure CATS-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

15 WESTERN SPADEFOOT (WST)

Prepared by May Consulting (Jamison Watts)

Western Spadefoot (WST)
(Spea hammondii)
Status USFWS: None
Status CDFG: Species of Special Concern



15.1 Legal Status

The western spadefoot (*Spea hammondii*) was a Category 2 candidate for listing in 1994 (USFWS 1994). This species currently has no federal listing status. The western spadefoot was designated a species of special concern by the State of California in 1994 (Jennings and Hayes 1994; CDFG 1998).

15.2 Life History and Ecology

15.2.1 Species Description and Life History

15.2.1.1 Taxonomy

Spadefoots are members of the Family Pelobatidae. Two closely related genera of spadefoots have been recognized within this Family: *Scaphiopus* and *Spea* (Cannatella 1985; Weins and Titus 1991). Western spadefoots are officially recognized within the genus *Spea* (Weins and Titus 1991) although many literature sources reference *Scaphiopus* as the genus. Species relationships within *Spea* have been difficult to define due to morphological homogeneity among species. At least four species currently are recognized (Weins and Titus 1991). Named by Baird in 1859, *Spea hammondii* was believed to have a broad geographic range from California to western Texas and Oklahoma with a distributional gap in the Mojave Desert of California (Storer 1925; Stebbins 1966). Brown (1976) identified morphological, vocalization, and reproductive differences between eastern (Arizona eastward) and western (California) populations, justifying species recognition for each. The California populations retained the name *Spea hammondii* while the eastern populations were designated as *Spea multiplicata*. This distinction was further supported by electrophoretic analyses conducted by Sattler (1980) and by allozymic and

morphological analyses conducted by Weins and Titus (1991). Genetic variation across the range of *Spea hammondii* has not been studied to date.

15.2.1.2 Species Description

Western spadefoots are dusky green or gray above and often have four irregular light-colored stripes on their back, with the central pair of stripes sometimes distinguished by a dark, hourglass-shaped area. The skin tubercles (small, rounded protuberances) are sometimes tipped with orange or are reddish in color, particularly among young individuals (Storer 1925; Stebbins 1985). The iris of the eye is usually a pale gold. The abdomen is whitish without any markings. Spadefoots have a wedge-shaped, glossy black "spade" on each hind foot. The call of the western spadefoot is hoarse and snore-like, and lasts between 0.5 and 1.0 second (Stebbins 1985). Snout-vent length ranges in size from 3.7 to 6.2 centimeters (1.5 to 2.5 inches) (Stebbins 1985).

Spadefoots are distinguished from the true toads (genus *Bufo*) by their cat-like eyes (their pupils are vertically elliptical in bright light, but are round at night), the single black sharp-edged "spade" on each hind foot, teeth in the upper jaw, and rather smooth skin (Stebbins 1985). The parotid glands (large swellings on the side of the head and behind the eye) are absent or indistinct on spadefoots. Adult males may have a dusky throat and dark nuptial pads on the innermost front toes (i.e., thumb). Western spadefoots and southern spadefoots (*Spea multiplicata*) lack a cranial boss (a ridge between the eyes). This trait distinguishes these species from the Plains spadefoot (*S. bombifrons)* and Great Basin spadefoot (*S. intermontanus*), which each have a cranial boss. Compared to western spadefoots, southern spadefoots have a more elongate spade, are brownish above, and have a copper-colored iris.

The eggs of western spadefoots are pigmented and are found in irregular cylindrical clusters of about 10 to 42 eggs attached to plant stems and other submerged objects in temporary pools (Stebbins 1985). Spadefoot larvae (tadpoles) can reach seven centimeters (2.5 inches) in length. They have oral papillae (small nipple-like projections that encircle the mouth), and their eyes are set close together at the top of the head. Their body is broadest just behind the eyes (Storer 1925).

Western spadefoot larvae are similar in appearance to other spadefoot larvae. The larvae have oral papillae, and their eyes are set close together and situated well inside the outline of the head as viewed from above. Western spadefoot larvae resemble those of the Plains spadefoot in that their body is broadest just behind the eyes and they are light to medium gray or brown above. In addition, western spadefoot larvae have an upper mandible that is beaked and a lower mandible that is notched. These larvae grow to around seven centimeters (2.8 inches) (Storer 1925).

APPENDIX B (Continued)

15.2.1.3 Reproduction

Western spadefoots breed from January to May in temporary pools and drainages that form following winter or spring rains. Water temperatures in these pools must be between nine (9) degrees Celsius (48 degrees Fahrenheit) and 30 degrees Celsius (86 degrees Fahrenheit) for western spadefoots to reproduce (Brown 1966, 1967). Oviposition (egg-laying) does not occur until water temperatures reach the required minimum of nine (9) degrees Celsius (48 degrees Fahrenheit) (Jennings and Hayes 1994). Depending on the water temperature and annual rainfall, oviposition may occur between late February and late May (Storer 1925; Burgess 1950; Feaver 1971; Stebbins 1985). During breeding, highly vocal aggregations of more than 1,000 individuals may form (Jennings and Hayes 1994). Breeding calls are audible at great distances and are thought to bring individuals together at suitable breeding sites (Stebbins 1985). Females deposit their eggs in numerous small irregularly cylindrical clusters of 10 to 42 eggs (average is 24) (Storer 1925), and may lay more than 500 eggs in one season (Stebbins 1951). Eggs are deposited on plant stems or pieces of detritus in temporary rain pools, or sometimes pools in ephemeral stream courses (Storer 1925; Stebbins 1985).

Eggs hatch in 0.6 to sic (6) days depending on water temperature (Brown 1967). At relatively high water temperatures (e.g., 21 degrees Celsius [70 degrees Fahrenheit]), Storer (1925) noted that approximately half of the Western spadefoot eggs failed to develop, possibly due to a fungus that thrives in warmer water and invades the eggs. Larval development can be completed in 3 to 11 weeks (Burgess 1950; Feaver 1971) depending on food resources and water temperature, but must be completed before pools dry. In eight vernal pools examined by Morey (1998), the average duration to complete larval development (hatching to metamorphosis) was 58 days (range 30 to 79 days). Further, pools that persisted for longer periods permitted longer larval development resulting in larger juveniles with greater fat reserves at metamorphosis. Morey (1998) concluded that longer periods of larval development are associated with larger body size at metamorphosis, which is correlated to greater fitness and survivorship (Pfennig 1992).

Annual reproductive success probably varies with precipitation levels with success being lower in drier years (Fisher and Shaffer 1996). Recently metamorphosed juveniles emerge from water and seek refuge in the immediate vicinity of natal ponds where they spend several hours to several days near ponds before dispersing. Weintraub (1979) reported that toadlets of Plains spadefoot seek refuge in drying mud cracks, under boards, and under other surface objects including decomposing cow manure. Age of sexual maturity in western spadefoot is unknown, but considering the relatively long period of subterranean dormancy (eight to nine months), individuals may require at least two years to mature (Jennings and Hayes 1994).

APPENDIX B (Continued)

15.2.1.4 Demography

Virtually no data are available on demographic values such as long-term population dynamics, survival rates, reproductive success, and dispersal rates for western spadefoot. However, it is assumed that protecting connectivity corridors between metapopulations is essential for conservation of the species. Morey and Guinn (1992) reported that western spadefoot abundance appeared to remain stable from 1982 to 1986 at a vernal pool complex in Stanislaus County, California. Based on systematic collections of road-killed western spadefoots, proportions of adults and juveniles were 70 percent and 30 percent, respectively, and the proportions of adult males and females were about equal (USFWS 2005).

In a study of amphibian reproduction in 30 vernal pools in Madera County, Feaver (1971) reported a mortality rate of 81 percent for larval spadefoots , 10 percent of which he attributed to predation from California tiger salamander (*Ambystoma californiense*) larvae, while the remainder was due to desiccation from pools drying before metamorphosis was complete. In some years, all reproductive potential is lost when pools dry before any spadefoot larvae are able to metamorphose (Baldwin 1988; Morey 1998). Morey (1998) reported that Western spadefoot larvae that occurred in pools lasting less than five weeks experienced nearly 100 percent mortality. Denver et al. (1998) reported that the Western spadefoot showed the ability to "accelerate metamorphosis in response to water volume reduction" triggered by the reduced opportunity or inability to feed in combination with reduced water volume.

15.2.1.5 Diet and Foraging

Adult western spadefoots forage on a variety of insects, worms, and other invertebrates. Morey and Guinn (1992) examined the stomach contents of 14 Western spadefoots and found 11 different food items including grasshoppers (Order Orthoptera: Family Gryllacrididae), true bugs (Order Hemiptera), moths (Order Lepidoptera: Family Noctuidae and unidentified moths), ground beetles (Order Coleoptera: Family Carabidae), predaceous diving beetles (Order Coleoptera: Family Dytiscidae), ladybird beetles (Order Coleoptera: Family Coccinellidae), click beetles (Order Coleoptera: Family Elateridae), flies (Order Diptera: Family Heleomyzidae), ants (Order Hymenoptera: Family Formicidae), and earthworms (Order Haplotaxida). Adult spadefoots can consume 11 percent of their body mass during a single outing, and Dimmit and Ruibal (1980) speculated that adult southern spadefoots may be able to acquire sufficient energy for their long dormancy period (eight to nine months) in only a few weeks. The specific food habits of western spadefoot larvae are unknown; however, the larvae of southern spadefoot and Plains spadefoot consume planktonic organisms and algae, and also will scavenge dead organisms, including other spadefoot larvae (Bragg 1964). In addition, larvae of Plains spadefoots reportedly will prey on fairy shrimp (e.g., *Branchinecta* spp.) (Bragg 1962).

APPENDIX B (Continued)

15.2.2 Habitat Requirements and Ecology

Western spadefoots primarily occur in lowland habitats generally below 900 meters (3,000 feet) within or adjacent to washes, floodplains of rivers, alluvial fans, playas, and alkali flats. They also occur in the foothills and mountains (Stebbins 1985) up to 1,363 meters (4,500 feet) (Morey 1988). Associated vegetative communities include valley-foothill grassland, open chaparral, pine-oak woodland and lower montane conifer and mixed conifer forest within open areas comprised of short grasses and sandy or gravelly soil. Western spadefoots have two distinct habitat requirements including quiet streams (Stebbins 2003) or seasonal pools for breeding and uplands for foraging and dry-season aestivation. Western spadefoot eggs and larvae have been observed in a variety of permanent and temporary wetlands including rivers, creeks, pools in intermittent streams, vernal pools, and temporary rain pools (CDFG 2010). They have also been found in altered wetlands including vernal pools that have been disturbed by activities such as earthmoving, disking, intensive livestock use, and off-road vehicle use, and man-made wetlands such as artificial ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits (Fisher and Shaffer 1996; CDFG 2010). Although western spadefoots have been observed inhabiting and breeding in wetlands altered or created by humans, survival and reproductive success in these pools have not been compared to unaltered natural pools and research suggests that vernal pools and other temporary wetlands may be optimal for breeding due to the absence or reduced abundance of both native and nonnative predators, many of which require more permanent wetlands.

Often undervalued in conservation planning, terrestrial habitats surrounding aquatic breeding sites are critical to the survival of many semiaquatic species that depend on mesic ecotones to complete their life cycles (Semlitsch and Bodie 2003). Several studies have shown the close dependence of semiaquatic species, such as reptiles and amphibians, on terrestrial habitats for critical life history functions. During periods of drought, aquatic habitats may not be available to semiaquatic species for extended periods of their lives. In such cases, terrestrial habitats act as population reservoirs or sources for adults until breeding and reproduction can again occur (Semlitsch and Bodie 2003). In addition, adult frogs, salamanders and turtles are generally philopatric to individual wetlands and migrate annually between aquatic and terrestrial habitats to forage, reproduce and overwinter or aestivate (Burk and Gibbons 1995; Semlitsch 1998). The amount of terrestrial habitats used during migrations to and from wetlands and for foraging defines the terrestrial core habitat of a population. This aggregation of adults constitutes a local population centered on a single wetland or wetland complex (Semlitsch and Bodie 2003). Local populations are connected by dispersal and are part of a larger metapopulation, which extends across the landscape (Pulliam 1988; Marsh and Trenham 2001).

Annual natal migrations centered on a single wetland or wetland complex are biologically different than dispersal to new breeding sites. It is generally thought that dispersal among

populations is achieved primarily by juveniles for amphibians (Gill 1978; Breden 1987; Berven and Grudzien 1990) or by males for turtles (Morreale *et a*l. 1984). Dispersal by juvenile amphibians tends to be unidirectional and longer in distance than the annual migratory movements of breeding adults (Breden 1987; Seburn et al. 1997). Thus, habitats adjacent to wetlands can serve as stopping points and travel corridors for dispersal to other nearby wetlands (Semlitsch and Bodie 2003). In any given western spadefoot population, we expect that some subpopulations will disappear, but the habitat they occupied will eventually be recolonized if it remains suitable.

Little is currently known regarding western spadefoot dispersal distances and overland movement patterns from aquatic breeding sites to upland aestivation sites. Semlitsch and Bodie (2003) summarized data from the literature on the use of terrestrial habitats by 19 frog and 13 salamander species representing 1363 individuals that are otherwise typically associated with wetlands. In general, plethodontid stream salamanders (e.g., *Desmognathus fuscus*, *Eurycea bislineata*, *Eurycea longicauda*), although migratory at some stage of their life cycle, remain close to the edges of ponds and streams and seldom move more than 20-30 m from aquatic habitats. Alternatively, some species of frogs, toads and newts are highly mobile and move 1,000 to 1,600 meters (e.g., *Bufo bufo*, *Rana catesbbeiana*, *Notophthalmus viridescens*). The majority of the remaining species occur at intermediate distances, where they emigrate to find suitable terrestrial habitat. The overall core terrestrial habitat ranged from 159 to 290 meters (522 to 951 feet) from the edge of aquatic breeding sites.

15.2.2.1 Behavior

Western spadefoots are almost completely terrestrial and enter water only to breed (Dimmitt and Ruibal 1980); however, typical of amphibians, Western spadefoots require a certain level of moisture to avoid desiccation, which can be a challenge in the arid habitats occupied by the species. Consequently, spadefoots have adapted behaviorally and physiologically to better facilitate moisture retention.

During dry periods for example, spadefoots construct and occupy burrows that may be up to 0.9 meters (3 feet) in depth (Ruibal et al. 1969) where they may remain for 9 to 10 months aestivating. Like all amphibians, Western spadefoots have very permeable skin, which allows them to absorb moisture from the surrounding soil. Ruibal et al. (1969) found that spadefoots may select soils that are relatively sandy and friable when constructing burrows as these attributes facilitate both digging and water absorption. Research also suggests that spadefoots may retain urea to increase the osmotic pressure within their bodies preventing water loss to, and facilitating water absorption from, surrounding soil with relatively high moisture tensions (Ruibal et al. 1969; Shoemaker et al. 1969).

APPENDIX B (Continued)

Spadefoots emerge from burrows to forage and breed following rains in the winter and spring; however, the factors that stimulate emergence are not well understood. In Arizona, spadefoots emerged after as little as 0.25 centimeters (0.1 inch) of precipitation, which barely wet the soil surface and obviously did not soak down to burrows (Ruibal et al. 1969). Sound or vibration from rain striking the ground appears to be the primary emergence cue used by spadefoots, and even the vibrations of a motor can cause them to emerge (Dimmitt and Ruibal 1980). Spadefoots may move closer to the surface prior to precipitation and may even emerge to forage on nights with adequate humidity. Most surface activity is nocturnal. Morey and Guinn (1992) report that surface activity is related to both moisture and cooler temperatures that occur following storms. Surface activity has been observed in all months from October to May (Morey 1988; Morey and Guinn 1992). Above-ground activity is primarily nocturnal, presumably to reduce water loss. Even when exposed to artificial light, spadefoots will immediately move away or begin burrowing underground (Storer 1925; Ruibal et al. 1969). During the day, spadefoots dig and occupy relatively shallow burrows two to five centimeters (0.5 to 2 inches) in depth (Ruibal et al. 1969), and may even use small mammal burrows. In addition to breeding during periods of above-ground activity, spadefoots must acquire sufficient energy resources prior to reentering dormancy (Seymour 1973).

15.2.2.2 Interspecific Interactions

The role of predation on the population dynamics of western spadefoots is unclear. The extended dormancy period of adult and juvenile spadefoots reduces their exposure to predators. Also, toxic secretions from dermal glands provide a significant deterrent to predators. Predators pose a much greater threat to larval western spadefoots than to adults. Spadefoot larvae are preyed upon by a variety of native predators including wading birds, garter snakes (*Thamnophis* spp.), and Raccoons (*Procyon lotor*) (Childs 1953; Feaver 1971). Feaver (1971) found Western spadefoot larvae were preyed upon by California tiger salamander larvae when the two species co-existed in the same pools and the California tiger salamander larvae matured first; however, if western spadefoot and California tiger salamander larvae are the same size, no predation may occur (Anderson 1968).

Nonnative predators introduced within the range of western spadefoots include crayfish (*Procambarus clarkii*), various fishes, and bullfrogs (*Rana catesbeiana*) (Hayes and Warner 1985; Hayes and Jennings 1986; Morey and Guinn 1992; Jennings and Hayes 1994; Fisher and Shaffer 1996). Nonnative fish, many of which are predatory, negatively affect native amphibians by preying upon eggs and larvae (Jennings 1988). In some locations, mosquitofish (*Gambusia affinis*), purposely introduced to control mosquitoes, also prey on Western spadefoot eggs and larvae (Grubb 1972; Jennings and Hayes 1994; Fisher and Shaffer 1996). Introduced bullfrogs have been implicated in the declines of native amphibians (Moyle 1973; Hayes and Jennings 1986), but may not be significant predators of adult western spadefoots, although western

spadefoots have been found in the stomachs of bullfrogs on at least two occasions (Hayes and Warner 1985; Morey and Guinn 1992). Bullfrogs may present more of a threat to larval western spadefoots than adults. During dispersal between permanent water sources, juvenile bullfrogs will use temporary water sources (e.g., vernal pools) as resting and feeding areas, increasing the potential for predation on spadefoot larvae (Morey and Guinn 1992).

Although, bullfrogs are of concern regarding the conservation of western spadefoots, some significant ecological differences exist that may minimize interactions between the species. For example, spatial segregation may exist due to bullfrogs occurring less frequently in the temporary wetlands (e.g., vernal pools) used by western spadefoots. Also, western spadefoots increase activity in response to moisture and low temperatures following storms whereas bullfrogs increase activity in response to warmer temperatures prior to storms (Morey and Guinn 1992). Thus, some temporal segregation may occur as well; however, some studies indicate that declining population trends may be associated with introduced predators including bullfrogs (USFWS 2005). At a site in Stanislaus County, California, western spadefoot abundance remained stable during 1982 to 1986 despite dramatic increases in bullfrog abundance during this same period (Morey and Guinn 1992).

Western spadefoots have been recorded in 11 of the 17 vernal pool regions described by Keeler-Wolf et al. (1998). The species has been documented to co-occur with several other rare species, some of which are federally protected. Among the 406 locations for western spadefoots in the CNDDB (CDFG 2010), the following special status animals have been documented to co-occur: California tiger salamander, California red-legged frog (*Rana draytonii*), vernal pool tadpole shrimp (*Lepidurus packardi*), vernal pool fairy shrimp (*Branchinecta lynchi*), and California fairy shrimp (*Linderiella occidentalis*). Rare plants have also been observed in association with western spadefoot and include San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), hairy Orcutt grass (*O. pilosa*), fleshy owl's clover (*Castilleja campestris* ssp. *succulenta*), Colusa grass (*Neostapfia colusana*), and Hoover's spurge (*Chamaesyce hooveri*). In addition, both adult and larval western spadefoots consume food items that also are used by other co-occurring amphibians including pacific tree frog (*Hyla regilla*), California tiger salamander, and western toad (*Bufo boreas*) (Morey and Guinn 1992). Thus, some degree of resource competition may unnecessarily occur, depending upon the abundance of food resources.

15.2.2.3 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for western spadefoot are identified in Table WST-1 and have been derived from input from local species experts.

APPENDIX B (Continued)

Table WST-1
Essential Habitat Elements for Western Spadefoot

Essential Activities	Land Cover Types	Habitat Elements
Breeding and larval development	Vernal impoundment, vernal pool, vernal swale, seasonal wetlands, seasonal impoundment, swale, open water, and streams/creeks.	Temporary pools, drainages, and quiet streams that form following winter or spring rains. Water temperatures in these pools must be between 9 degrees Celsius (48 degrees Fahrenheit) and 30 degrees Celsius (86 degrees Fahrenheit) for western spadefoots to reproduce.
Foraging, dispersal, migration, and summer inactivity	Blue oak savanna, blue oak woodland, and valley grassland.	Require uplands to create burrows and some degree of moisture. In particularly dry areas spadefoots may select soils that are relatively sandy and friable.

15.3 Species Distribution and Population Trends

15.3.1 Central California Distribution

The western spadefoot is nearly endemic to California, and historically ranged from Redding in Shasta County southward to Mesa de San Carlos in northwestern Baja California, Mexico (Stebbins 1985) occurring throughout the Central Valley, Coast Ranges and coastal lowlands (Jennings and Hayes 1994). However, in recent decades the western spadefoot has been extirpated throughout most of the lowlands of southern California (Stebbins 1985) and from many historic locations within the Central Valley (Jennings and Hayes 1994; Fisher and Shaffer 1996). According to Fisher and Shaffer (1996), the western spadefoot has suffered a severe decline with virtually complete extirpation from the Sacramento Valley, a reduced density of populations in the eastern San Joaquin Valley and modest declines in the Coast Ranges. The average elevation of sites where the species still occurs is significantly higher than the average elevation for historical sites suggesting that declines have been more pronounced in lowlands (USFWS 2005).

15.3.2 Population Levels and Trend

Three relatively recent sources of data have presented information regarding the current status and distribution of the western spadefoot. Jennings and Hayes (1994) examined 832 museum and sighting records from 346 locations and concluded that western spadefoots still occurred in 18 California counties, but had been extirpated from six counties. Fisher and Shaffer (1996) conducted field surveys of 315 sites in the Sacramento Valley, San Joaquin Valley, and Coast Ranges from 1990 to 1992 that confirmed the presence of western spadefoots in 13 counties. The CNDDB (CDFG 2010) lists 406 records of western spadefoots from 26 counties. These records

range from 1978 to 2006 and do not represent a systematic survey. Additionally, the status of most of the sites where western spadefoots were observed is unknown and many sites may no longer exist due to subsequent development. Some of the records were submitted by biological consultants who conducted surveys on sites that were about to be developed (USFWS 2005).

15.4 Threats to the Species

Although certain factors are known to contribute to western spadefoot decline rangewide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for western spadefoot in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect western spadefoot and other target species, the potential for success in conserving the species is reduced. The following is a summary of known and suspected threats to western spadefoot in the Plan Area.

Habitat loss and fragmentation are currently the most significant threats to the survival and recovery of western spadefoot (USFWS 2005). Although determining the degree of severity among contributing factors is difficult without additional information, habitat loss generally is a result of urbanization and agricultural conversion, but can also occur in the form of habitat alteration and degradation resulting from the following: changes to natural hydrology; introduction of invasive species; incompatible grazing regimes, including insufficient grazing for prolonged periods; infrastructure projects (e.g., roads, water storage and conveyance, utilities); recreational activities (e.g., off-highway vehicles and hiking); erosion; contamination; and poor rangeland management and/or lack of monitoring. Habitat fragmentation generally is a result of activities associated with habitat loss (e.g., roads and other infrastructure projects that contribute to the isolation and fragmentation of suitable habitats).

Most western spadefoot habitat is not protected and those areas that are protected are relatively small and therefore highly subject to external threats. It is likely that western spadefoots suffered dramatic reductions in the mid to late 1900's when urban and agricultural development were rapidly destroying natural habitats in the Central Valley and southern California (Jennings and Hayes 1994). Jennings and Hayes (1994) estimated that over 80 percent of the habitat once known to be occupied by the western spadefoot in southern California (from the Santa Clara River Valley in Los Angeles and Ventura Counties southward) has been developed or converted to uses that are incompatible with successful reproduction and recruitment of the species. In northern and central California, loss of habitat has been less severe, but nevertheless significant. It is estimated that over 30 percent of the habitat once occupied by western spadefoots has been developed or converted (Jennings and Hayes 1994). Regions that have been severely affected

include the lower two-thirds of the Salinas River system, and much of the areas east of Sacramento, Fresno, and Bakersfield. In addition, many of the suitable seasonal wetlands and vernal habitats concentrated on valley terraces above the Central Valley floor, have begun disappearing or been fragmented (Jennings and Hayes 1994).

California has both the highest absolute and relative human population growth in the United States. California's population is predicted to grow by almost 18 million by the year 2025, an increase of over 50 percent, the highest of any state in the nation (US Census Bureau 1996). Approximately 73 percent of the land within the Central Valley is privately owned, and in areas containing vernal pool habitats, only six percent of the land area is in public ownership (USFWS 2005). According to the 1997 National Resources Inventory (USDA 2000), California ranked sixth in the nation in amount of non-federal land developed between 1992 and 1997, at over 221,200 hectares (546,700 acres). If current population trends continue, seasonal wetland habitats in California, especially those on private land, will be increasingly threatened and possibly extirpated.

In more recent years, vernal pool habitats have been lost primarily as a result of widespread urbanization. Between 1994 and 2003, the Sacramento Field Office of the USFWS conducted section seven consultations on impacts to almost 20,250 hectares (50,000 acres) of vernal pool habitats across California (USFWS 2005). Over half of this loss of habitat, 10,125 hectares (25,000 acres), was the result of residential, commercial, and industrial development projects. The construction of infrastructure associated with urbanization including the construction of highways, wastewater treatment plants, sewer lines, water supply projects, and other utility projects has also contributed greatly to the loss and fragmentation of vernal pools and seasonal wetlands in California (USFWS 2005).

In addition to urbanization, conversion of California's Central Valley to intensive agricultural uses continues to contribute to the decline of vernal pool habitat. From 1992 to 1998, 50,825 hectares (125,591 acres) of grazing land were converted to other agricultural uses in the Central Valley of California. It is likely that much of this land supported vernal pools. Holland (1998) estimated that more than 12,950 hectares (32,000 acres) of vernal pool habitats were lost in the San Joaquin Valley vernal pool region from the late 1980's through 1997, mostly as a result of agricultural conversion. Since 1994, the Sacramento USFWS office has reviewed projects converting more than 6,070 hectares (15,000 acres) of vernal pool habitats to intensive agricultural uses via section 7 of the Endangered Species Act (USFWS 2005).

15.4.1 Altered Hydrology

In addition to direct habitat loss, changes to vernal pool hydrology may also adversely affect spadefoot populations. For example, physical barriers, such as roads and canals can dam or block

APPENDIX B (Continued)

hydrologically linked systems and alter wetland hydrology both upstream and downstream of the barrier by truncating connectivity and flow. Wetland hydrology also may be altered by changes to patterns of surface and subsurface flow, depending on topography, precipitation, and soil types (Hanes et al. 1990; Hanes and Stromberg 1998). In addition, increased runoff and nuisance flows associated with urban development and impervious surfaces can result in altered hydrology of seasonal wetlands on and off-site. For example, stormwater drains, or the coverage of land surfaces with concrete, asphalt, or irrigated lawns, can alter the duration, volume discharge and frequency of surface flows through increased flooding and runoff (USFWS 2005).

As the timing, frequency, and duration of vernal pool inundation are critical to the survival of vernal pool species including the western spadefoot, alterations to hydrology can be particularly harmful due to premature pool dry-down before the life cycle of the species is completed, preventing reproduction and disrupting gene flow. Similarly, flowing water that artificially removes plants and animals, including cysts, eggs or seeds, from the pool complexes can also prevent successful reproduction and disrupt gene flow. Water flow into vernal pools during the summer can significantly alter vernal pool species composition (Clark et al. 1998). In addition, longer periods of inundation and/or changes in water depth can effectively change seasonal wetland functions (e.g., change from vernal pool to perennial/permanent wetlands), which could potentially provide suitable habitat for introduced bullfrogs and fish.

Excluding livestock and/or changing the grazing intensity and/or season of use can also alter vernal pool hydrology. Historically, native herbivores helped maintain appropriate inundation periods of seasonal wetlands by limiting vegetation accumulation and by sustaining soil conditions that create favorable vernal pool habitat (Barry 1995). The removal of cattle grazing from historically grazed grasslands has been found to dramatically decrease the inundation period of vernal pools (Marty 2004). In a study conducted in pools inhabited by spadefoots, Marty (2004) found that the removal of grazing led to a reduction in pool inundation below the period of time necessary for successfully metamorphose by western spadefoot. Standing dry or dead vegetation may reduce overland flows during precipitation events via interception and direct evaporation. In addition, changes in vernal pool hydrology resulting from livestock exclusion are interrelated with the invasion of nonnative annual species (USFWS 2005). Bauder (1987) found a direct correlation between nonnative vegetation and length of inundation in vernal pools.

In some areas, the alteration of hydrology, often in combination with specific land use practices, has caused downcutting of sloughs and swales, thus threatening the stability and functions of adjacent vernal pools. Any ground-disturbing activities, such as plowing, trenching, grading, deep-ripping, scraping, off-road vehicles, inappropriate levels of livestock grazing, or other activities, adjacent to or within the watersheds of vernal pools can result in siltation when pools fill during the following wet season. Siltation is particularly likely in areas where high, disturbed

slopes rise above the level of the vernal pools. Poorly designed trail and road systems near vernal pools may also cause erosion and result in siltation of vernal pools. Larval western spadefoots may suffocate in pools with high levels of siltation and turbidity and siltation may also result in the burial and/or asphyxiation of eggs. Runoff from irrigated agricultural lands can also alter the hydrology of adjacent vernal pools and also can contribute to erosion, siltation, and contaminant loads (USFWS 2005).

15.4.2 Contaminants

Amphibians typically have complex life cycles and thus more opportunities for and routes of exposure than other vertebrates. The western spadefoot is exposed to a variety of toxins throughout its range, but the sensitivity of this species to pesticides, heavy metals, air pollutants, and other contaminants is largely unknown. Each year, millions of kilograms (millions of pounds) of fertilizer, insecticides, herbicides, and fungicides are used on crops, forests, rights of way, and landscape plants in California. Some of these chemicals are extremely toxic to aquatic organisms such as amphibians and their prey. Industrial facilities and motor vehicles also release contaminants that may harm the western spadefoot. Contaminants from road materials, leaks, and spills also could adversely affect western spadefoots by contaminating the water in wetlands.

15.4.3 Human Waste, Recreational Use, and Vandalism

As vernal pool habitats become increasingly rare and urban development expands, threats from disposal of waste, off-road vehicle use, and vandalism increase. People often dump unwanted items such as trash, tires, and appliances in vernal pool areas. Not only can these items release toxic substances into the environment and contaminate water and soil (Ripley et al. 2004), but they can directly affect species by crushing them and restricting photosynthesis in plants by shielding the sun. Waste material also may disrupt the natural hydrologic flow.

Certain recreational activities threaten vernal pool ecosystems and western spadefoots may be adversely affected by off-road vehicle use, hiking, and bicycling. When off-road vehicles and bicycles cut through vernal pool complexes, they may impair hydrological functions by displacing soil and causing erosion or truncating swale connectivity, thus resulting in hydrological changes. Similarly, some off-road enthusiasts (e.g., bicyclists may create dirt jump ramps, which also could result in the aforementioned effects. Western spadefoots may be crushed and killed as a result of careless site users. Trampling also may reduce the reproductive output of western spadefoots using the area.

15.4.4 Inappropriate Livestock Grazing

Considering the historic grazing of native ungulates and other herbivores in vernal pool ecosystems, properly managed livestock grazing can play a significant role as a process surrogate

in the protection and enhancement of vernal pool ecosystems. Livestock grazing has three primary effects on vernal pools: consumption of vegetation, trampling, and nutrient input from urine and feces (Vollmar 2002). However, inappropriate levels of grazing, from overgrazing, undergrazing, or inappropriately timed grazing, can result in significant adverse effects to vernal pool ecosystems on which western spadefoots depend.

Although experts maintain that the relationship between grazing livestock and vernal pool habitat condition is difficult to quantify, the prevailing belief is that livestock grazing can play an important role as a management tool in vernal pool habitat (USFWS 2005). The perceived need for some amount of ecosystem disturbance should not be interpreted as an invitation to indiscriminately graze vernal pool landscapes. Because vernal pool species exhibit a variety of life history strategies, grazing regimes must take these needs into consideration.

15.4.5 Random, Naturally Occurring Events

Western spadefoots occurring in small habitat patches are vulnerable to random environmental fluctuations or variation (stochasticity) due to annual weather patterns and availability of food and other environmental factors. As with most vernal pool species, western spadefoot populations are unevenly distributed within fragmented vernal habitats and are predominantly isolated from other. As a result, these populations are more vulnerable to stochastic extinction and genetic problems, particularly in the expression of deleterious genes (known as inbreeding depression). Individuals and populations possessing deleterious genetic material are less likely able to withstand environmental change and survivorship is decreased.

15.4.6 Disease

Chytrid fungus (*Batrachochytrium dendrobatidis*) is known to contribute to amphibian declines, and could be spread via infected organisms or contaminated equipment (USFWS 2005). Diseases and parasitic threats may range from benign to fatal. The vectors and biochemical pathways associated with spread and infection should be considered in order to adequately minimize the threats posed by diseases and pathogens.

15.4.7 Non-Native Species

Another reason for the population decline of the western spadefoot is the introduction of nonnative predators, specifically bullfrogs, crayfishes and fishes (e.g., mosquitofish) (Hayes and Warner 1985; Hayes and Jennings 1986; Fisher and Shaffer 1996). All of these species were introduced into California in the late 1800's and early 1900's, and through range expansions, additional introductions, and transplants, these exotics have become established throughout most of California (USFWS 2005). Fisher and Shaffer (1996) reported an inverse relationship between the presence of western spadefoots and nonnative predators. Additionally, nonnative predators

may have displaced western spadefoots at lower elevations, resulting in the species being found primarily at higher elevation sites where these predators apparently are less abundant (Fisher and Shaffer 1996). Fisher and Shaffer (1996) assessed native amphibian populations in the Coast Ranges, Sierra Nevada foothills, and Central Valley. They predicted that widespread declines of western spadefoots would occur if nonnative species continued to spread into low-elevation Coast Range habitats. In the San Joaquin Valley they found that relatively few nonnative predators were present, but native amphibians still had declined significantly. The San Joaquin Valley was the most intensively farmed and most modified of the three regions examined. It has been subject to extensive habitat loss, degradation, and fragmentation (USFWS 1998). Adverse impacts from these activities as well as isolation from other western spadefoot populations may have caused the observed declines. In addition, disking the soil as a part of row-cropping and other forms of intensive agriculture are likely to cause mortality of western spadefoots in their underground burrows.

15.4.8 Roads

Roads represent an additional threat to the western spadefoot. Road construction can result in direct mortality of the western spadefoot and can cause direct loss and fragmentation of habitat. Roads can also cause indirect loss of habitat by facilitating additional road construction and urban development (a major cause of habitat loss for the western spadefoot) (USFWS 2005). Mortality of western spadefoots from motor vehicle strikes has been observed by multiple researchers (Morey and Guinn 1992; CDFG 2010), and appears to be both widespread and frequent. For instance, Jennings (1998) reported road mortality at all seven sites that he surveyed in Kings and Alameda Counties. The impact of motor vehicle-caused mortality on populations of western spadefoots is unknown. Roads can also be a barrier to movements and effectively isolate populations. In Germany, roads are significant barriers to gene flow among common frog (*Rana temporaria*) populations and has resulted in genetic differentiation (Reh and Seitz 1990). Similarly, Kuhn (1987, in Reh and Seitz 1990) determined that approximately 24 to 40 cars per hour on a given road resulted in mortality of 50 percent of common toads (*Bufo bufo*) as individuals attempted to migrate across the road. Heine (1987, *in* Reh and Seitz 1990) identified that 26 cars per hour effectively reduced toad survival at road crossings to zero.

15.4.9 Noise and Vibration

Activities that produce low frequency noise and vibration, such as grading for development and seismic exploration for natural gas in or near habitat for western spadefoots, may be detrimental to the species. Dimmitt and Ruibal (1980) determined that southern spadefoots were extremely sensitive to such stimuli and would break dormancy and emerge from their burrows in response to these disturbances. Disturbances that cause spadefoots to emerge at inappropriate times could result in detrimental effects such as mortality or reduced fitness.

15.5 Data Gaps and Conservation Implications

In recent years, the ecology, status, and management of the western spadefoot have received increased attention. There are several sources of uncertainty regarding western spadefoot and its requirements in the Plan Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

15.5.1 Population and Habitat Distribution within the Plan Area

Western spadefoots occur in suitable habitat within the Plan Area. The species' overall distribution, abundance, and population structure are incompletely known. Habitat-types used by western spadefoot, such as drainages, vernal pools, other seasonal wetlands, some perennial wetlands, and adjacent uplands, occur throughout Sacramento County.

No comprehensive surveys for western spadefoot have been conducted in the Plan Area. Therefore, the population size and distribution of the species throughout the Plan Area are still incompletely known. In addition, though the distribution of suitable habitat-types is mapped and quantifiable, the quality of habitat (particularly as it relates to certain essential habitat components) for California tiger salamander within many areas is unknown. These information gaps limit our ability to identify the best lands available for preserving western spadefoot habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for western spadefoot will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, have multiple breeding sites that may function as a metapopulation, or are adjacent to these areas.

15.5.2 Determining Threat Severity

Certain factors are known to contribute to western spadefoot decline rangewide. Exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., habitat fragmentation, changes in hydroperiod of potential breeding sites, etc.). Therefore, to improve conservation planning efforts for western spadefoot in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

15.5.3 Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Western Spadefoot

Achieving the conservation goals and objectives for western spadefoot will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability for western spadefoot. Whether created, restored or enhanced habitats can retain the functional attributes suitable for western spadefoot is unknown.

If habitat creation, restoration and enhancement techniques cannot eventually result in habitats with functional characteristics suitable for western spadefoot, then those lands would not support sustainable populations.

15.6 Literature Cited

Allaby, M. 1994. The Concise Oxford Dictionary of Ecology. Oxford University Press. New York, New York.

Anderson, P.R. 1968. The reproductive and developmental history of the California tiger salamander. Master of Science Thesis. Fresno State College, Fresno, California.

Baird, J. 1856. *Scaphiopus hammondii*. Master of Arts Thesis, Fresno State College, Fresno, California.

Baldwin, K.S. 1988. Effects of pond quality on the life history features of the western spadefoot toad. *American Zoologist* (abstract) 28:87A.

Barry, S.J. 1995. Vernal Pools on California's Annual Grasslands. *Rangelands* 17(5):173–175.

Barry, S.J. 1998. Managing the Sacramento Vernal Pool Landscape to Sustain Native Flora. Pp. 236–240 *in*: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren, Jr., and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems: proceedings from a 1996 conference. California Native Plant Society, Sacramento, California. 285 pages.

Bauder, E.T. 1987. Threats to San Diego Vernal Pools and a Case Study in Altered Pool Hydrology. *In*: Elias, T.S. (ed.). Conservation and Management of Rare and Endangered Plants. Proceedings of a California Conference on the Conservation and Management of Rare and Endangered Plants. *California Native Plant Society*. 1987:209–213.

Berven, K.A. and T.A. Grudzien. 1990. Dispersal in the wood frog (*Rana sylatica*) – Implications for genetic population-structure. *Evolution* 44 (8): 2047-2056.

APPENDIX B (Continued)

Bragg, A.N. 1962. Predation on arthropods by spadefoot tadpoles. Herpetologica 18:144.

Bragg, A.N. 1964. Further study of predation and cannibalism in spadefoot tadpoles. *Herpetologica* 20(1):17-24.

Breden, F. 1987. The effect of post-metamorphic dispersal on the population genetic structure of Fowler's toad, (*Bufo woodhousei fowleri). Copeia* 987:386-395.

Brown, H.A. 1966. Temperature adaptation and evolutionary divergence in allopatric populations of the spadefoot toad, *Scaphiopus hammondii*. Doctor of Philosophy Dissertation, University of California, Riverside, California.

Brown, H.A. 1967. Embryonic temperature adaptations and genetic compatibility of two allopatric populations of the spadefoot toad, *Scaphiopus hammondii*. *Evolution* 21(4):742-761.

Brown, H.A. 1976. The status of California and Arizona populations of the western spadefoot toads (genus *Scaphiopus*). *Contributions in Science of the Natural History Museum of Los Angeles County* 286:1-15.

Burgess, R.C., Jr. 1950. Development of spade-foot toad larvae under laboratory conditions. *Copeia* 1950(1):49-51.

Burk, V.J. and J.W. Gibbons. 1995. Terrestrial buffer zones and wetland conservation: a case study of freshwater turtles in a Carolina bay. *Conservation Biology* 9:1365-1369.

California Department of Fish and Game (CDFG). 1998. Special animal list. California Natural Heritage Division, Sacramento, California. 66 pages.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Cannatella, D.C. 1985. A phylogeny of primitive frogs (Archaeobatrachians). Doctor of Philosophy dissertation, University of Kansas, Lawrence, Kansas.

Childs, H.E. 1953. Selection by predation on albino and normal spadefoot toads. *Evolution* 7:228–233.

Clark, G.M., T.J. Roscoe, M. J. van Ess, and N. Wymer. 1998. Management considerations for small vernal pool preserves: the Phoenix vernal pools. Pages 250-254 *In*: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren, Jr., and R. Ornduff, editors. Ecology, conservation,

APPENDIX B (Continued)

and management of vernal pool ecosystems: proceedings from a 1996 conference. California Native Plant Society, Sacramento, California. 285 pages.

Cooperrider, A.Y., C. Carroll, K. Nelson, R. Noss, D. Olson, H. Welsh, and W. Zielinski. 1999. Terrestrial fauna of redwood forests. *In* R.F. Noss, editor. The Redwood Forest: History, Ecology, and Conservation of Coast Redwoods. Island Press, Washington, DC.

Denver R.J., N. Mirhadi and M. Phillips. 1998. Adaptive plasticity in amphibian metamorphosis: response of *Scaphiopus hammondii* tadpoles to habitat desiccation. *Ecology* 79:1859-1872.

Dimmitt, M.A. and R. Ruibal. 1980. Environmental correlates of emergence in spadefoot toads (*Scaphiopus*). *Journal of Herpetology* 14(1):21-29.

Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense* Gray, *Hyla regilla* Baird and Girard, and *Scaphiopus hammondii* Girard. Master of Arts Thesis, Fresno State College, Fresno, California.

Fisher, R.N., and H.B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley. *Conservation Biology* 10(5):1387-1397.

Gill, D.E. 1978. The metapopulation ecology of the red-spotted newt, *Notophthalmus viridescens* (Rafinesque). Ecological Monographs 48:145-166.

Grubb, J.C. 1972. Differential predation by *Gambusia affinis* on the eggs of seven species of anuran amphibians. *American Midland Naturalist* 88:102-108.

Hanes, T. and L. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pages 38-49 *in*: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren, Jr., and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht, and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pages 49-60 *in*: D.H. Ikeda and R.A. Schlising, editors. Vernal pool plants, their habitats and biology. Studies from the Herbarium Number 8, California State University. Chico, California.

Hayes, M.P. and J. Warner. 1985. *Rana catesbeiana* (bullfrog) food. *Herpetological Review* 16(4):109.

Hayes, M.P., and J. Warner. 1985. *Rana catesbeiana* (bullfrog) food. *Herpetological Review* 16(4):109.

APPENDIX B (Continued)

Hayes, M.P., and M.R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana*) responsible? *Journal of Herpetology* 20:490-509.

Heine, G. 1987. Einfache Meß- und Rechenmethode zur Ermittlung der Überlebenschance wandernder Amphibien beim Überqueren von Straßen.

Holland, R.F. 1998. Great Valley vernal pool distribution, photorevised 1996. Pages 71-75 *in*: C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren Jr. and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems--Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Jennings, M.R. 1988. Natural history and decline of native ranids in California. Pages 61-72 *in*: H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty, editors. Proceedings of the conference on California Herpetology, Southwestern Herpetologists Society.

Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game, Sacramento, California.

Keeler-Wolf, T., D.R. Elam, K. Lewis and S.A. Flint. 1998. California vernal pool assessment preliminary report. California Department of Fish and Game, Sacramento, California. 159 pages.

Kuhn, J. 1987. Strassentod der Erdkröte (*Bufo bufo* L.): Verlusquoten und Verkehrsaufkommen. Verhalten auf der Strasse. Beith. Veröff. Naturshutz und

Marsh, D.M. and P.C. Trenham. 2001. Metapopulation dynamics and amphibian conservation. *Conservation Biology* 15:40-49.

Marty, J. 2004. Managing for diversity in California vernal pool grasslands. Presentation Abstracts. Ecology and Management of California Grasslands. April 2–3, 2004, University of California at Berkeley.

Morey, S.R. 1988. Western spadefoot *Scaphiopus hammondi*. Pages 56-57 *in*: D. C. Zeiner, W. F. Laudenslayer, Jr., and K. E. Mayer, editors. California's wildlife. Volume 1. Amphibians and reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, California.

Morey, S.R. 1998. Pool duration influences age and body mass at metamorphosis in the western spadefoot toad: implications for vernal pool conservation. Pages 86-91 *in*: C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren Jr., and R. Ornduff, editors. Ecology, conservation,

APPENDIX B (Continued)

and management of vernal pool ecosystems: Proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Morey, S.R., and D. A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. Pages 149-158 *in*: D. Williams, S. Byrne, and T. A. Rado, editors. Endangered and sensitive species of the San Joaquin Valley, California. The California Energy Commission, Sacramento, California.

Morreale, S.J., J.W. Gibbons, and J.D. Congdon. 1984. Significance of activity and movement in the yellow-bellied slider turtle (*Pseudemys scripta*). *Canadian Journal of Zoology* 62:1038-1042.

Moyle, P. B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California. Copeia 1973:18-22.

Noss R.F., Strittholt J.R., Vance-Borland K., C. Carroll, and P.A. Frost. 1999. A conservation plan for the Klamath-Siskiyou ecoregion. *Natural Areas Journal* 19(4):392-411.

Pfennig, D.W. 1992. Polyphenism in Spadefoot toad tadpoles as a local evolutionary stable strategy. *Evolution* 46(5): 1408-1420.

Pulliam, H. R. 1988. Sources, sinks and population regulation. *The American Naturalist* 132:652-661.

R. Ferren, Jr., and R. Ornduff (eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society; Sacramento, California.

Reh, W., and A. Seitz. 1990. The influence of land use on the genetic structure of populations of the common frog *Rana temporaria*. *Biological Conservation* 54:239-249.

Ripley, B.J., K.C. Davis, B.J. Carter and M.A. Simovich. 2004. Toxicity of malathion and Roundup to the San Diego fairy shrimp. 2002-2003 Transactions of the Western Section of the Wildlife Society 38/39: 13-21.

Ruibal, R., L. Tevis, Jr., and V. Roig. 1969. The terrestrial ecology of the spadefoot toad *Scaphiopus hammondii*. *Copeia* 1969:571-584.

Sattler, P.W. 1980. Genetic relationships among selected species of North American *Scaphiopus*. *Copeia* 1980:605-610.

APPENDIX B (Continued)

Seburn, C.N.L., D.C. Seburn, and C.A. Paskowski. 1997. Northern leopard frog (*Rana pipiens*) dispersal in relation of habitat. Pages 64-72 *in* D. M. Green, editor. Amphibians in decline: Canadian studies of a global problem. Society for the Study of Amphibians and Reptiles, St. Louis, Missouri.

Semlitsch, R.D. 1998. Biological delineation of terrestrial buffer zones for pond-breeding salamanders. *Conservation Biology* 12:1113-1119.

Semlitsch, R.D. and J.R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology* 17(5):1219-1228.

Seymour, R.S. 1973. Energy metabolism of dormant spadefoot toads (*Scaphiopus*). *Copeia* 1973:435-445.

Shoemaker, V.H., L. McClanahan, Jr., and R. Ruibal. 1969. Seasonal changes in body fluids in a field population of spadefoot toads. *Copeia* 1969:585-591.

Stebbins, R.C. 1951. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 1966. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 1985. *A field guide to western reptiles and amphibians*. Second Edition, revised. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 2003. *Western Reptiles and Amphibians*. Third Edition, revised. Houghton Mifflin Company, Boston, Massachusetts.

Storer, T.L. 1925. A synopsis of the amphibia of California. *University of California Publications in Zoology* 27:1-342.

United States Census Bureau. 1996. Populations Projections for States by Age, Sex, Race, and Hispanic Origin. Accessed online November 4, 2004 at http://www.census.gov/population/www/projections/ppl47.html#tableb.

APPENDIX B (Continued)

United States Department of Agriculture (USDA). 2000. Summary Report: 1997 National Resources Inventory (revised December 2000). Natural Resources Conservation Service, Washington, DC, and Statistical Laboratory, Iowa State University, Ames, Iowa. 89 pages.

United States Fish and Wildlife Service (USFWS). 1994. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened species; proposed rule. Federal Register 59(219):58982-59028.

United States Fish and Wildlife Service (USFWS). 1996. Endangered and threatened wildlife and plants; Notice of final decision on identification of candidates for listing as endangered or threatened. Federal Register 61:64481-64485.

United States Fish and Wildlife Service (USFWS). 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, Oregon. 319 pages.

United States Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland, OR. xxii + 574 pp.

Vollmar, J.E. (editor). 2002. Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands. Merced, California: Merced County UC Development Office.

Weins, J.J., and T.A. Titus. 1991. A phylogenetic analysis of *Spea* (Anura: Pelobatidae). *Herpetologica* 47:21-28.

Weintraub, J.D. 1979. Selection of daytime retreats by recently metamorphosed *Scaphiopus multiplicatus*. *Journal of Herpetology* 14(1):83-84.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

16 WESTERN POND TURTLE (WPT)

Prepared by May Consulting (Jamison Watts)

Western Pond Turtle (WPT)
(Actinemys marmorata)
Status USFWS: None
Status CDFG: Species of Concern



16.1 Legal Status

The western pond turtle (*Actinemys marmorata*), including the northwestern sub-species (*A. m. marmorata*) and the southwestern sub-species (*A. m. pallida*), is a California species of concern.

16.2 Life History and Ecology

16.2.1 Species Description and Life History

16.2.1.1 Taxonomy

The phylogenetic relationships of the western pond turtle are in a state of flux. Recent evidence suggests that the species is distinct from the other three species of the former group *Clemmys and Emys* in eastern North America (Bickham et al. 1996; Feldman and Parham 2001; Holman and Fritz 2001). Feldman and Parham (2002) and Parham and Feldman (2002) presented evidence that the western pond turtle should be placed in the genus *Emys*, along with the European pond turtle (*Emys orbicularis*) and Blanding's turtle (*Emys* [=*Emydoidea*] *blandingii*), and this view has been adopted by others (Spinks et al. 2003; Spinks and Shaffer 2005). In contrast, Holman and Fritz (2001) and Stephens and Wiens (2003) believed that the western pond turtle is not closely related to any extant species and should be placed in its own genus, *Actinemys*. The Turtle Taxonomy Working Group (2007) recorded it as "*Emys* or *Actinemys marmorata* Baird and Girard 1852 [formerly in *Clemmys*]." The genus *Actinemys* is used in both of the most recent standardized names of North American herpetofauna (Collins and Taggart 2002; Iverson et al. 2008) and globally (Fritz and Havas 2007).

The first specimens of *A. marmorata* were collected in 1841 in the vicinity of Puget Sound, Washington and described by Baird and Girard (1852) as *Emys marmorata*. Seeliger (1945)

described two subspecies: northern pacific pond turtle (*Clemmys* [=*Actinemys*] *marmorata marmorata*) and southern pacific pond turtle (*Clemmys* [=*Actinemys*] *m. pallida*). A broad range of intergradations occurs from the American River south through the San Joaquin Valley (Seeliger 1945; Stebbins 2003).

Recently, Spinks and Shaffer (2005) reported genetic differences indicating four un-named clades within *A. marmorata*, with the following distributions: 1) from the Transverse Mountains of southern California south into Baja California Norte; 2) San Joaquin Valley and adjacent foothills; 3) Ventura and Santa Barbara counties in central coastal California; and 4) all of the remaining populations. These data suggest considerable genetic fragmentation within the species, especially in the southern half of the range. The new groups do not follow the pattern of the earlier described subspecies (i.e., *A. m. marmorata* and *A. m. pallida*).

16.2.1.2 Species Description

The western pond turtle is the only native box turtle widely distributed in the western United States (Stebbins 1985). The painted turtle (*Chrysemys picta*), which is found primarily in the Midwestern United States, ranges into the Pacific Northwest. The painted turtle can be distinguished from the western pond turtle by the presence of yellow lines on the head and limbs, and red markings on the shell (Stebbins 1985). The pond slider or red-eared slider (*Trachemys scripta elegans*), has been introduced in the west. The pond slider can be distinguished from the western pond turtle by the presence of lengthwise wrinkles and streaks on the shell, absence of spotting on the head and neck, and a broad red, yellow, or orange stripe or blotch behind the eye (Stebbins 1985).

The western pond turtle is a small (9 to 19 centimeters, 3.5 to 7.5 inches) aquatic turtle characterized by an olive, dark brown, or black shell with a spotted head and neck (Stebbins 1985) and is often observed basking on logs, rocks, or floating on the surface of calm water bodies. The northwestern subspecies is defined on the basis of mottled head and neck coloration and a relatively high frequency of inguinal shields. The southern subspecies is defined on the basis of light head and neck coloration with more prominent markings in these areas, and a reduced frequency of occurrence of large inguinal shields.

16.2.1.3 Reproduction

The age of first reproduction is typically seven to nine years of age for the southern western pond turtle and 10 to 14 years of age for the northern western pond turtle (Holland 1991a). Most females lay eggs in alternate years; however, Hays *et a*l. (1999) reported that females nested every year. Gist and Jones (1989) suggest that sperm storage within the female may occur. This may allow adults to mate in the fall, when environmental conditions are highly suitable, while

fertilization occurs during the next year. Clutch size ranges from one to 13 eggs, with larger females generally laying larger clutches (Holland 1985a, 1991a; Storer 1930; Ernst et al. 1994). From May through August females make many extended movements into upland habitat where they dig shallow nests (Rathburn et al. 1992; Reese and Welsh 1997). Nest locations range from 12 to 402 m (39 to 1,319 ft) from aquatic habitat (Storer 1930; Holland 1991b; Rathbun et al. 1992) and are typically located in open areas dominated by grasses and forbs. Soils are dry and generally well drained with significant clay/silt content and low slope. Nests on sloping terrain often have a southern or southwestern exposure. Females excavate their nests in the ground, deposit the eggs, and cover the nest by scraping soil and vegetation over the eggs. Females tend to be very wary during overland nesting movements and may abandon nesting attempts if disturbed (Holland 1991a; Rathbun et al. 1992). Some level of nest site philopatry has been reported in the western pond turtle (Holland 1994). This suggests a great need for the protection of upland habitats that may be used by nesting turtles.

Incubation requires from 96 to 104 days in the wild (Holland 1991a). In captivity, Feldman (1982) noted an incubation period of 73 to 80 days. Normal hatching success is approximately 70 percent (Feldman 1982; Holland 1994). In southern California, juveniles may emerge from the nest in early fall; however, most hatchlings overwinter in the nest and move to water in during March to April (Holland 1994; Reese and Welsh 1997). Feldman (1982) suggested that the eggs of the western pond turtle must normally be laid in soils that are relatively dry. He noted that eggs placed in a wet environment exploded when internal pressure exceeded the limits of the eggs. He further noted that hatchlings did not leave the eggs when temperatures exceeded 27 degrees Celsius, “but once moved to a cooler environment, they broke free from the eggs within two to three hours.” This response, he concluded, may reduce the potential for dehydration when hatchlings leave the nest to seek aquatic habitat.

16.2.1.4 Diet and Foraging

Western pond turtles are opportunistic predators and occasionally scavengers (Bury 1986; Ashton et al. 1998). The majority of their diet consists of crustaceans, arthropods (i.e., insect larvae and crayfish), but western pond turtles also feed opportunistically on carrion. Western pond turtles will eat plant matter and have been observed foraging on submergent vegetation mats, as well as willow, alder, and other plant types (Bury 1986; Holland 1994). Herbivory in adults may provide an important source of nutrients and some proteins when animal food is unavailable. Adults, particularly females, consume a greater percentage of plant material than do juveniles (Bury 1986). Young turtles feed on mosquito larvae and other aquatic invertebrates, and nekton (Holland 1994). Western pond turtles commonly forage from early morning to early evening. It has been reported that the western pond turtle must swallow its food underwater (Holland 1994).

APPENDIX B (Continued)

16.2.1.5 Dispersal and Migration

In the majority of its range, western pond turtles are active from approximately March through October with the peak of activity in May and June (USFWS 1999). Western pond turtles are generally inactive during the winter months (December to February) within most of their range; however, western pond turtles in southern California are active throughout the year. During this time, turtles either bury into the bottom mud of ponds, creeks, or other watercourses, or they move upland, well away from water, to find suitable habitat to wait out periods of unsuitable weather (Holland 1994; Reese and Welsh 1997). During the winter months, some western pond turtles may become active for short periods (Holland 1994). After their winter inactive period, western pond turtles have been reported to congregate in vernal pools before returning to riverine systems. This may allow them to utilize a warm water habitat while high seasonal water flows in rivers still exist (Ashton et al. 1998). In the fall and spring, hatchling turtles may move as far as 400 m from their nest locations to aquatic sites nearby (Holland 1994).

During their active season, western pond turtles engage in movements along the watercourses in which they live seeking suitable foraging and basking habitat (USFWS 1999). Active season home ranges are typically represented by several hundred meters of the same creek bank (Holland 1994), as they rarely move between drainages (Holland 1991a). Bury (1972a) found active season home ranges of western pond turtles to average one hectare (2.5 acre) for males, 0.3 hectare (0.7 acre) for females, and 0.4 hectare (one acre) for juveniles. Within the northern California stream system studied by Bury (1972a), males moved greater distances than females or juveniles. More extensive movement occurs seasonally when females move upland to find suitable nesting locations. When studying the terrestrial movements of western pond turtle within the Trinity River system of northern California, Reese (1996) found a mean terrestrial migration distance from aquatic sites of 118 meters (range = 39-423 meters).

Western pond turtles exhibit a high degree of site fidelity in both aquatic and terrestrial environments (Ashton et al. 1998; Holland 1994). Western pond turtles trapped and moved at the Los Vaqueros watershed for example, moved 3.2 to 6.4 kilometers (2 to 4 miles) to return to the original trapping site (USFWS 1999). Other long-distance movements may occur in response to drying of local water bodies, or other unknown factors (Ashton et al. 1998). This species is capable of moving distances of 1.6 to 12.8 kilometers (1 to 8 miles) over upland habitat to find water (Ernst et al. 1994; Holland 1994).

16.2.1.6 Survivorship

Survivorship in western pond turtles is apparently dependent on age and sex (USFWS 1999). Hatchlings and first-year juveniles average only eight to 12 percent survivorship and this rate may not increase significantly until turtles are 4–5 years old (USFWS 1999). Once the turtles

reach adulthood, survivorship increases dramatically, with an average adult turnover rate of only three to five percent (Holland *in* Hays et al. 1999). On average, adult males have a higher probability of surviving than adult females, with skewed sex ratios observed as high as 4:1 (Holland 1991a). The most plausible explanation for these observed sex ratios is that females suffer higher rates of predation during overland nesting attempts (Holland 1991a). The maximum-recorded age for western pond turtle is 39 to 40 years, but the expected longevity for this species is likely 50 to 70 years (Ashton et al. 1998; USFWS 1999).

The western pond turtle is preyed upon by a wide variety of native and introduced predators including large and small mammals, raptors, herons, corvids, snakes, frogs, and fish. Of the native predators, the raccoon (*Procyon lotor*) is a ubiquitous and effective predator, taking animals of all sizes, including eggs and hatchlings. The spotted skunk (*Spilogale putorius*) is also a suspected predator of nests. In Oregon, over 90 percent of the 100 nests examined in 1991-1992 were destroyed by predators, most likely raccoons or skunks (Holland 1992). Raccoon populations, in particular, respond favorably to urban environments, where human refuse may support larger populations than normal. Larger populations of raccoons and other predators combined with reduced nesting habitat for western pond turtles adjacent to aquatic habitat results in concentrations of nests, which are more easily detected by predators. Other native predators observed to have locally significant effects on western pond turtles are the black bear (*Ursus americanus*), river otter (*Lutra canadensis*), and mink (*Mustela vison*) (Holland 1991a). Two introduced predators of particular concern are the bullfrog (*Rana catesbeiana*) and the largemouth bass (*Micropterus salmoides*). Both species have been observed feeding on juvenile western pond turtles (Moyle 1973; Holland 1991a).

16.2.2 Habitat Requirements and Ecology

Western pond turtles inhabit a variety of aquatic habitats from sea level to elevations of 1,980 meters (6,500 feet). They are found in fresh to brackish aquatic habitats including marshes, rivers, ponds and streams. Western pond turtles also may occur in man-made habitats, such as irrigation ditches, reservoirs, and sewage and millponds. Western pond turtles have been found in waters with temperatures as low as one degree Celsius (34 degrees Fahrenheit), and rarely in water with temperatures exceeding 39 to 40 degrees Celsius (102 to 104 degrees Fahrenheit) (Boyer 1965; Holland 1994; Jennings and Hayes 1994), but seem to become more active in water that consistently reaches 15 degrees Celsius (60 degrees Fahrenheit) (Jennings and Hayes 1994). Preferred aquatic habitat is characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, partially submerged rocks and logs, open mud banks and matted floating vegetation for thermoregulatory basking. Western pond turtles use aquatic habitats primarily for foraging, thermoregulation, and avoidance of predators (Boyer 1965; Holland 1994, Reese and Welsh 1998a). Basking is done intermittently throughout the day and is primarily conducted to maintain a body temperature of

APPENDIX B (Continued)

24 to 32 degrees Celsius (75 to 90 degrees Fahrenheit) (Boyer 1965; Bury 1986). Hatchling and young turtles (one year) require shallow water areas (less than 30 centimeters [11.8 inches] deep) dominated primarily by emergent aquatic reeds (*Juncus* spp.) and sedges (*Carex* spp.) (Holland 1991a) and have been observed to avoid areas of open water lacking these species (Boyer 1965; Holland 1994; Hays et al. 1999; Reese and Welsh 1998a). Highly fluctuating flow rates associated with aquatic habitats may diminish habitat quality for western pond turtles (Reese and Welsh 1998b). Conversely, western pond turtles may leave aquatic habitat as pools dry. Holland (1994) reported overland movements of five kilometers (3.1 miles) possibly resulting in turtles seeking more appropriate aquatic habitat.

Western pond turtles "hibernate" in both aquatic and terrestrial habitats. Aquatic refugia consist of rocks, logs, mud, and undercut areas along banks while terrestrial hibernacula consist of burrows in leaf litter, heavy brush, or soil (Holland 1994). In woodland and sage scrub habitats along coastal streams in central California, most western pond turtles leave the drying creeks in late summer and return after winter floods. These turtles spend an average of 111 days in upland refugia that are an average of 50 meters (164 feet) from the creeks (Rathbun et al. 1992). Upland nesting sites must be dry and often have a high clay or silt component. Typically, western pond turtles dig nests in open sunny areas that are on slopes no steeper than 25 degrees.

16.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for western pond turtle are identified in Table WPT-1 and have been derived from input from local species experts.

Table WPT-1
Essential Habitat Elements for Western Pond Turtle

Essential Activities	Land Cover Types	Habitat Elements
Foraging, breeding and dispersal	Vernal impoundment, vernal pool, vernal swale, seasonal wetlands, seasonal impoundment, swale, freshwater marsh, open water, and streams/creeks.	Fresh to brackish aquatic habitats characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, partially submerged rocks and logs, open mud banks and matted floating vegetation for thermoregulatory basking. Highly fluctuating flow rates associated with aquatic habitats may diminish habitat quality.
Nesting and aestivation	Blue oak savanna, blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, mixed riparian scrub, and valley grassland.	Aquatic aestivation sites consist of rocks, logs, mud, and undercut areas along banks while terrestrial hibernacula consist of burrows in leaf litter, heavy brush, or soil. Upland nesting sites must be dry and often have a high clay or silt component.

APPENDIX B (Continued)

16.3 Species Distribution and Population Trends

16.3.1 Range-wide Distribution

The northern western pond turtle historically and currently ranges from Puget Sound, Washington, south through Oregon, generally west of the Sierra-Cascade crest, to the American River drainage in central California. The southwestern subspecies ranges from the vicinity of Monterey Bay, California, south through the Coast Ranges to Baja California, Mexico. The area of the Central Valley of California between the American River drainage and the Transverse Ranges is considered to be a zone of introgression between the two subspecies (Seeliger 1945). Historically, the western pond turtle inhabited the vast permanent and seasonal wetlands on the Central Valley, with the Tulare Lake Basin being a stronghold for the species. Today, the western pond turtle remains in 90 percent of its historic range, but at greatly reduced numbers (Holland 1991a). Records of the species from Grant County, Oregon, and British Columbia, Canada, are believed to represent introduced animals (Nussbaum et al. 1983; Storer 1937). Outlying populations of the species occur in Nevada primarily in the Carson River drainage. Whether or not these populations are native or represent introduced animals is debated by the experts (Holland 1991a).

16.3.2 Central Valley Distribution

Historically in the Central Valley, western pond turtles inhabited the permanent and seasonal wetlands of the area, with the Tulare Lake Basin as a major population center (Hays et al. 1999; USFWS 1999). Today, western pond turtles occur in 90 percent of their historic range in the Central Valley, but in greatly reduced numbers (Jennings and Hayes 1994).

16.3.3 Range within the Plan Area

The Plan Area falls within the introgression zone for the two subspecies of western pond turtle. Currently there are no records for the southern western pond turtle in the Plan Area. There are 25 known occurrences of western pond turtle in Sacramento County (CDFG 2010). Among these 25 locations, seven are known to occur in the Urban Development Area (UDA). Figure WPT-1 provides the distribution of western pond turtle recorded in Sacramento County. The range of western pond turtle within the Plan Area is therefore considered to be the entire Plan Area.

16.3.4 Population Level and Trends

Western pond turtle were once abundant in California, Oregon, and locally in Washington, but are declining in numbers throughout their range, particularly in Washington, northern Oregon, southern California and Baja California (Lovich 1998; Hays et al. 1999). Although the western pond turtle still exists in about 90 percent of its original range, this species has been completely

or ecologically extirpated from a number of areas including the Puget Sound area of Washington, Willamette River drainage in Oregon, Klamath River drainage of Oregon and California, San Francisco metropolitan area, southern San Joaquin Valley, Los Angeles and San Diego metropolitan areas, and Nevada (Holland 1991a). A variety of factors, including habitat loss and modification, commercial exploitation, disease, introduced predators and competitors, and other natural and man-made factors working together have resulted in a significant decline in western pond turtle populations throughout 75 to 80 percent of its range (Holland 1991a; Jennings and Hayes 1994; Hays et al. 1999; USFWS 1999).

The population status and trends of western pond turtle in the HCP Study Area is unknown. The western pond turtle is believed to have been abundant in the area when it supported extensive wetlands (Hays et al. 1999), but conversion of former wetlands to agricultural lands and urban development has likely resulted in local declines of these populations (Jennings and Hayes 1994).

16.4 Threats to the Species

Although certain factors are known to contribute to western pond turtle decline rangewide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for western pond turtle in the Plan area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect western pond turtle and other target species, the potential for success in conserving the species is reduced. The following is a summary of factors known or suspected to negatively affect western pond turtle.

16.4.1 Habitat Loss and Alteration

Habitat loss and alteration are most responsible for the historic decline of western pond turtles throughout its range (USFWS 1999). In California, over 90 percent of historic wetlands have been diked, drained, and filled primarily for agricultural development and urban development (Frayer et al. 1989). Urbanization has significantly altered or eliminated western pond turtle habitat, with significant impacts occurring in southern California. Local extirpation of the southwestern subspecies in the Los Angeles Basin has occurred primarily through the channelization and cementing of numerous tributaries comprising the watershed (Brattstrom and Messer 1988; Holland 1991a).

APPENDIX B (Continued)

Water diversions for agriculture and urban uses have also negatively affected western pond turtle populations. For example, agricultural, aquatic habitats, such as rice lands, are used to convey and store agricultural water and are consequently subject to changes in the timing and amount of water flow. Many rivers, particularly in more arid regions such as the San Joaquin Valley, have had significant portions of their flows diverted for agriculture resulting in very low flows or no flows for several miles of stream during summer months. In addition, numerous wetlands are channelized and periodically cleaned of aquatic vegetation, rendering them less suitable for western pond turtles. Furthermore, where western pond turtles persist adjacent to agricultural lands, upland nesting opportunities may be limited or nonexistent due to the practice of farming up to the edge of aquatic habitats. Such actions typically result in the elimination of western pond turtles from affected waters and isolation of turtle populations located in other portions of the drainage (Holland 1991a). Because western pond turtles are long-lived, populations may persist in these isolated wetlands long after recruitment of young has ceased (Jennings and Hayes 1994; USFWS 1999) resulting in very small and heavily adult biased populations (Holland 1991a).

Changes in the nature and timing of water releases from reservoirs adversely affects downstream habitat by eliminating or altering basking sites, upland refugia, foraging areas, and particularly, hatchling microhabitat (Reese and Welsh 1998b; Hays et al. 1999). High releases of water in the Trinity River in late May to early June in 1991, for example, scoured out several miles of hatchling turtle habitat (Holland 1991a) and a similar incident occurred in Piru Creek in southern California (Holland 1991a). Reservoirs also are typically stocked with exotic species of fish, which may expand into previously isolated turtle habitat. Reservoirs, in general, provide poor habitat for turtles because of the lack of emergent aquatic vegetation, basking sites, high recreational use, and presence of exotic species. Only small groups of adults are typically seen using reservoir habitats (Holland 1991a).

Another significant source of habitat alteration throughout the range of the western pond turtle is livestock grazing. Livestock have been documented as a major cause of excessive habitat disturbance in riparian areas (Behnke and Raleigh 1978; Kauffman and Krueger 1984). Cattle have a disproportionately greater adverse affect on riparian and other wetland habitats because they tend to concentrate in these areas, particularly during the dry season (Marlow and Pogacnik 1985). Cattle trample and eat emergent vegetation (Platts 1981) that serves as foraging habitat for turtles of all sizes and as critical microhabitat for hatchlings and first-year animals. Stream banks also are trampled by cattle often resulting in the collapse of undercut banks (Platts 1981; Kauffman et al. 1983) that provided refugia for turtles. Cattle grazing results in increased erosion in streams (Winegar 1977), which in turn fills in deep pools, increases stream velocity, and adversely affects aquatic invertebrates (Behnke and Raleigh 1978; Platts 1981). Cattle may also crush turtles (Holland 1991a).

In-stream and streamside mining operations for sand and gravel also unfavorably alter western pond turtle habitat. These operations may directly eliminate or modify aquatic habitats and adjacent riparian habitat, alter the pattern of water flow, increase siltation, which fills in pools and alters the prey base, and disrupt normal behavior patterns or force displacement (Holland 1991a). In addition, removal of basking sites (e.g., logs, snags, and rocks) for aesthetic reasons or to facilitate recreational pursuits has a negative effect on western pond turtles. Loss of basking sites changes thermoregulatory behavior of turtles and reduces available foraging and refuge sites. According to Holland (1992), this activity is a primary factor in the observed decline of western pond turtles in several lakes in Oregon.

Construction of roadways and railways adjacent to western pond turtle habitat may adversely affect western pond turtles in several ways. First, roads often present a partial or complete barrier to turtles traveling overland to nesting or over wintering sites. Western pond turtles have been observed crushed on roadways in California, Oregon and Washington, with the majority of these being gravid (with developing young or eggs) or postpartum females (Holland 1985a, 1992). In addition to hampering access to nesting areas, roadbeds reduce the area of potential nesting. Roads constructed on south-facing slopes adjacent to the Umpqua River in Oregon likely eliminated both existing and potential nesting habitat (Holland 1992). Train tracks may have similar adverse affects on western pond turtles. At two locations in Oregon, western pond turtles were found dead between railroad tracks. In both cases, the railroad tracks paralleled the north side of the watercourse and were located between the watercourse and potential nesting habitat (Holland 1992). Holland (1992) hypothesized that the turtles became trapped between the railroad tracks when unable to find a way to exit under the rail.

16.4.2 Over Utilization for Commercial, Recreational, Scientific, or Educational Purposes

Records of harvesting western pond turtles for food date back to the commercial harvest of this species for the San Francisco market (Lockington 1879). At the time, commercial harvest had already depleted populations of the western pond turtle in the San Francisco area, resulting in commercial operations focusing on populations in the San Joaquin Valley, particularly Tulare Lake (Elliot 1883; Brown 1940). Over 18,000 western pond turtles were offered for sale in San Francisco markets, presumably in one year in the 1890s (Smith 1895). This practice continued at least through the 1920s (Storer 1930).

Collection of western pond turtles for food still exists today with numbers from 20 to over 100 taken in a single outing (Holland 1991a). In addition, a commercial pet market exists for the species despite state prohibitions. Holland (1991a) noted western pond turtles for sale by a Florida dealer in 1991 and in some California pet stores through at least 1985. Bury (1982) noted removal of over 500 turtles from one lake in southern California for the pet trade.

Incidental collection of the species by fisherman may be a significant mortality factor in some areas. Approximately 3.6 percent of turtles captures by Holland (1991a) at an Oregon site had ingested fishhooks. At a California site, about six percent of captured turtles showed evidence of trauma related to removal of hooks, had hooks in place, or were found dead with hooks embedded in the esophagus or stomach (Holland 1991a). A turtle captured by Holland (1991a) in Oregon before and after ingestion of a fishhook had lost a significant amount of weight, suggesting that hooked turtles may eventually starve to death. Hooked turtles are often killed by fishermen, who mistakenly presume that western pond turtles are competitors for fish or consume ducklings (Holland 1991a). Similarly, indiscriminate shooting of western pond turtles can be a significant mortality factor, particularly in areas adjacent to urban development. In southern California for example, a substantial proportion of a western pond turtle population under study was shot by two individuals carrying rifles (Holland 1991a). In Washington, shooting of turtles for sport was reported in the early 1970's (Milner 1986).

16.4.3 Disease, Parasitism and Non-Native Species

The only documented instance of disease outbreak in the western pond turtle occurred in an isolated Klickitat County population in southern Washington in 1990 (Holland 1991b). A significant portion of the population displayed symptoms of upper respiratory disease syndrome, a disease previously observed in desert tortoises (*Gopherus agassizi*). A minimum of 42 to 47 percent of the population died from the disease despite extensive efforts to treat diseased animals in captivity (Holland 1991b). The agent and mechanism responsible for the epidemic are unknown. Given the highly contagious nature of this disease and the high observed rates of mortality, the potential exists for significant population declines should this disease appear in contiguous western pond turtle populations. Evidence of this or a similar disease was found in a turtle from the Willamette River drainage in Oregon (Holland 1991a). Parasites that affect the western pond turtle include trematodes, helminthes, nematodes, lungworms, and leeches (Holland 1994).

Two introduced predators, the bullfrog and largemouth bass have been observed feeding on juvenile western pond turtles (Holland 1991a). Both species were introduced into the western United States in the latter part of the 19th century, and through range expansions, reintroductions, and transplants these species have become established across most of the western United States (Moyle 1973). Bullfrogs forage primarily in shallow water, the microhabitat favored by hatchling and juvenile western pond turtles. Examination of a number of sites in Washington, Oregon, and California by Holland (1991a) indicates a negative correlation between the abundance of bullfrogs and the abundance of small western pond turtles. Their impact on populations of native species is thought to be significant due to the high reproductive potential of the bullfrog (i.e., egg masses may have 20,000 individuals eggs). Although many authors have reported bullfrogs feeding on native reptiles and amphibians, the extent to which

bullfrogs can modify or contribute to the decline of their prey populations has been the source of much speculation (Morey and Guinn 1992). High concentrations of bullfrogs within structurally simple habitats (e.g., vernal pools and heavily grazed ponds) may have a significant impact on local populations. Interestingly, recent investigations suggest that Bullfrogs may not contribute to changes in the community composition and structure of native amphibians, particularly in complex habitat types (e.g., heavily vegetated stream courses) (Morey and Guinn 1992). The vulnerability of hatchling turtles remains very high when bullfrogs are sympatric with the western pond turtle. The impact of bullfrogs on the recruitment of western pond turtles is poorly understood and may not be evident until many years have past. This may result in significant gaps in recruitment or the absence of entire cohorts.

Another factor that may adversely affect western pond turtle populations is the introduction of non-native competitors. Numerous species of nonnative aquatic turtles have been observed within the range of the western pond turtle (Jennings 1987). These species include the painted turtle, red-eared slider, common snapping turtle (*Chelydra serpentina*), spiny soft-shelled turtle (*Apalone spinifera*), alligator snapping turtle (*Macroclemys temmincki*), stinkpot (*Sternotherus odoratus*), diamondback terrapin (*Malaclemys terrapin*), and Mississippi map turtle (*Graptemys kohni*). Most of these turtles represent animals imported for the pet or food trade that have been released or escaped captivity. In addition to competition for food, exotic turtles also may carry new pathogens for which western pond turtles exhibit no immunity.

Additional non-native competitors of particular concern are carp (*Cyprinus carpio* and *Carassius auratus*), aunfish (*Lepomis* spp. and *Pomoxis* spp.), and crayfish (*Cambarus*, *Procambarus*, and *Pacifasticus*). Carp alter aquatic habitats by consuming emergent and floating vegetation. Their activities also produce turbid water conditions. These alterations of the aquatic habitat may have a significant impact on hatchling turtle habitat, may reduce the availability of invertebrate prey, and decrease turtle foraging success as turtles rely primarily on vision to capture prey (Holland 1991a). Sunfish, which are capable of reaching large population sizes in aquatic habitats may modify or compete for the available invertebrate prey base (Holland 1991a). Although direct scientific data are unavailable to support this hypothesis, Holland (1991a) noted that several sites lacking native or nonnative fishes support the largest known western pond turtle populations. Crayfish, which also may prey on young western pond turtles, may compete with western pond turtles for both the invertebrate prey base and carrion (Holland 1991a).

16.4.4 Other Natural or Manmade Factors Affecting Its Continued Existence

Off-road vehicle activity poses a threat to western pond turtles both directly and indirectly. Direct impacts include crushing of individual turtles or nests and access to remote populations of the turtle for the purposes of collection or shooting. Off-road vehicle activity indirectly impacts western pond turtles by interfering with normal foraging and basking activities, and by

altering or restricting overland or instream movements of turtles. Long-term impacts of off-road vehicle activity include increased soil erosion, soil compaction, vegetation removal, siltation of the watercourse, and alteration or loss of refugia. According to Holland (1991a), western pond turtle populations located in off-road vehicle areas in California tend to be small and disjunct, and occur in very limited habitats. Poor habitat quality combined with a very low probability of maintenance or reestablishment by immigration, renders these populations highly susceptible to extirpation.

Boat traffic also may adversely affect western pond turtles. Observations on the Rogue River in Oregon by Holland (1992) indicate that high levels of boat traffic may detrimentally alter basking and other behavior patterns. In addition, turtles that become acclimated to boat or vehicle traffic are potentially more susceptible to shooting. Holland (1991b) found that flight distances were significantly less in turtle populations acclimated to low or moderate levels of vehicle traffic than for populations in isolated areas. Boat propellers may also injure or kill western pond turtles (Holland 1992).

The exact role that contaminants play in western pond turtle mortality is unknown. Only one documented instance of contaminant-related mortality of western pond turtles was reported by Bury (1972b). Turtle mortality resulted from a spill of diesel fuel. In Oregon, pollution of several tributaries to the Willamette River (i.e., the Tualatin and Clackamas Rivers) in the late 1950's and 1960's may be related to the disappearance of western pond turtles from these rivers (Holland 1991a). The long life span and food habits of the western pond turtle could render this species prone to bioaccumulation of contaminants, such as heavy metals; however, no data are available to support this hypothesis (Holland 1991a).

The most significant natural factor affecting western pond turtle populations is drought. The six-year drought in California (1987 to 1992) had a major effect on western pond turtle populations, particularly in central and southern California within the range of the southern western pond turtle. Surveys of eight sites conducted by Holland (1991a) from 1987 to 1991 in central and southern California indicated that turtle populations had declined from 65 to 100 percent as a result of drought. One population in the Pajaro-Salinas River drainage of central coastal California, which contained the highest recorded density of turtles, suffered an 85 percent population decline (Holland 1991a). Drying of the habitat resulted in 1) concentrating large numbers of turtles in the few remaining pools, 2) major increases in the distance between pools, 3) exhaustion of the prey base, 4) increased exposure to predators, and 5) a general increase in stress suffered by the turtle population (Holland 1991a). Observations of additional sites by Holland (1991a) within the range of the southern western pond turtle indicated that drought related declines in populations of this subspecies were widespread. Where non-native predators and competitors were present, the adverse affects of drought were probably magnified (Holland 1991a).

Fire, which is often associated with drought and the over accumulation of combustible plant material, adversely affects western pond turtles in several ways. Unseasonal fires may kill overwintering turtles or hatchlings in the nest. Sweet (*in* Holland 1991a) reported that the Sespe Creek fire in fall 1991 probably killed any adult or hatchling turtles overwintering in the uplands. Excessive siltation of streams following fires may alter the prey base and eliminate refugial habitat, generally decreasing the suitability of the stream for turtles (Holland 1991a).

16.5 Data Gaps and Conservation Implications

The ecology, status, and management of western pond turtle s have received increased attention in recent years. There are several sources of uncertainty regarding western pond turtle and its requirements in the Plan Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

16.5.1 Population and Habitat Distribution within the Plan Area

Western Pond Turtles occur in suitable habitat within the Plan area; however, their overall distribution, abundance, and population structure are not well known. Habitat-types used by western pond turtles, such as suitable riverine and lacustrine habitats and adjacent uplands, occur throughout much of the Central Valley and are well represented in Sacramento County and the Plan area.

Because comprehensive surveys for western pond turtle in the Plan Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and distribution of the species throughout the Plan Area are not known. In addition, though the distribution of different land cover-types is mapped and quantifiable, the quality of habitat for western pond turtle s within most of these areas is unknown. These information gaps limit our ability to identify the best lands available for preserving western pond turtle habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for western pond turtle will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

16.5.2 Determining Threat Severity

Although certain factors are known to contribute to western pond turtle decline rangewide, exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve

conservation planning efforts for western pond turtle in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

16.5.3 Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Western Pond Turtle

Achieving the conservation goals and objectives for western pond turtle will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability of western pond turtle. Whether restored or enhanced habitats can retain the structural attributes suitable for western pond turtle is unknown.

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for western pond turtle, then those lands would not support sustainable populations.

16.6 Literature Cited

Allaby, M. 1994. The Concise Oxford Dictionary of Ecology. Oxford University Press. New York, New York. 415 pp.

Ashton, D.T., A. J. Lind, and K.E. Schlick. 1998. WPT (*Clemmys marmorata*). Natural History. Unpublished report. USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, California.

Baird, S.F. and C. Girard. 1852. Descriptions of new species of reptiles collected by the U.S. Exploring Expedition under the command of Capt. Charles Wilkes, U.S.N. *Proceeding of the Academy of Natural Science Philadelphia* 6:174-177.

Behnke, R.J. and R.F. Raleigh. 1978. Grazing and the riparian zone: Impacts and management perspectives. Pages 263-267, *In*: R.R. Johnson and J.F. McCormick (technical coordinators) Strategies for Protection and Management of Floodplain Wetlands and Other Riparian Ecosystems. U.S.D.A. Forest Service General Technical Report WO-12.

Bickham, J. W., T. Lamb, P. Minx, and J. C. Patton. 1996. Molecular Systematics of the Genus *Clemmys* and the Intergenetic Relationships of Emydid Turtles. *Herpetelogica*. 52(1): pp 89-97.

Boyer, D. R. 1965. Ecology of the basking habitat in turtles. *Ecology* 46:99-118.

APPENDIX B (Continued)

Brattstrom, J.W., and D.F. Messer. 1988. Current status of the southwestern pond turtle, *Clemmys marmorata pallida*, in southern California. Final Report, Contract C-2044. California Department of Fish and Game, Sacramento. 62 pp.

Brown, R.R. 1940. *History of Kings County*. A.R. CaWPTon, Hanford, California.

Bury, R.B. 1972a. Habits and home range of the Pacific pond turtle, *Clemmys marmorata*, in a stream community. Dissertation for Doctor of Philosophy and Zoology. University of California, Berkeley. 205 pp.

Bury, R.B. 1972b. The effects of diesel fuel on a stream fauna. *California Department of Fish and Game Bulletin* 58:291-295.

Bury, R.B. 1982. Turtle of the month -*Clemmys marmorata* - a true western turtle (Pacific Pond). *Tortuga Gazette*:3-5.

Bury, R.B. 1986. Feeding ecology of the turtle, *Clemmys marmorata*. Journal of *Herpetology*. 20(4):515-521.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Carr, A. 1952. *Handbook of turtles: The turtles of the United States, Canada and Baja California*. Cornell University Press, Ithaca, New York

Collins, J.T. and T.W. Taggart. 2002. Standard Common and Current Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians. Fifth Edition. Publication of The Center for North American Herpetology, Lawrence, Kansas. iv + 44 pp. http://www.cnah.org/.

Cooperrider, A.Y., C. Carroll, K. Nelson, R. Noss, D. Olson, H. Welsh, and W. Zielinski. 1999. Terrestrial fauna of redwood forests. *In* R.F. Noss, editor. The Redwood Forest: History, Ecology, and Conservation of Coast Redwoods. Island Press, Washington, DC.

Elliot, W.W. 1883. *History of Tulare County, California*. San Francisco, California.

Ernst, C.H., J.E. Lovich, and R.W. Barbour. 1994. *Turtles of the United States and Canada*. Smithsonian Institution Press, Washington, DC.

Evenden, F.G., Jr. 1948. Distribution of the turtles of western Oregon. *Herpetologica* 4:201-204.

APPENDIX B (Continued)

Feldman, C.R. and J.F. Parham. 2001. Molecular Systematics of Emydine Turtles. Linnaeus Fund Research Report. *Chelonian Conservation and Biology*. 4(1): pp 224-228.

Feldman, C.R. and J.F. Parham. 2002. Molecular Phylogenetics of Emydine Turtles: Taxonomic Revision and the Evolution of Shell Kinesis. *Molecular Phylogenetics and Evolution*. 22(3): pp 388-398.

Feldman, M. 1982. Notes on reproduction in *Clemmys marmorata*. *Herpetological Review* 13(1):10-11.

Frayer, W.E., D.D. Peters, and H.R. Pywell. 1989. Wetlands of the California Central Valley: Status and trends. U. S. Fish and Wildlife Service, Portland, Oregon.

Fritz, U. and P. Havas. 2007. Checklist of chelonians of the world. *Vertebrate Zoology* 57: 149-368.

Gist, D. H. and J.M. Jones. 1989. Storage of sperm in the oviducts of turtles. *Journal of Morphology* 199:379-384.

Gray, E. 1995. DNA fingerprinting reveals lack of genetic variation in northern populations of the western pond turtle (*Clemmys marmorata*). *Conservation Biology* 9:1244-1255.

Hays, D.W., K.R. McAllister, S.A. Richardson, and D.W. Stinson. 1999. Washington State Recovery Plan for Western Pond Turtle. Washington Department of Fish and Wildlife, Olympia, Washington.

Holland, D.C. 1985a. An ecological and quantitative study of the western pond turtle (*Clemmys marmorata*) in San Luis Obispo County, California. Master's Thesis, California State University Fresno, Fresno, California. 181 pp.

Holland, D.C. 1985b. *Clemmys marmorata* (western pond turtle) feeding. *Herpetological Review* 16(4):112-113.

Holland, D.C. 1991a. A synopsis of the ecology and status of the western pond turtle (*Clemmys marmorata*) in 1991. Report prepared for the U.S. Fish and Wildlife Service, National Ecology Research Center. 146 pp.

Holland, D.C. 1991b. Status and reproductive dynamics of a populations of western pond turtles (*Clemmys marmorata*) in Klickitat County, Washington in 1991. Report prepared for Washington Department of Wildlife. 40 pp. + figures, tables and appendices.

APPENDIX B (Continued)

Holland, D.C. 1992. A synopsis of the distribution and current status of the western pond turtle (*Clemmys marmorata*) in Oregon. Report prepared for Oregon Department of Fish and Wildlife. 41 pp. + tables and figures.

Holland, D.C. 1994. The Western Pond Turtle: Habitat and History. US Department of Energy, Bonneville Power Administration, Portland, Oregon. DOE/BP-62137-1.

Holman, J. A. and U. Fritz. 2001. A New Emydine Species from the Medial Miocene (Barstovian) of Nebraska, USA with a New Generic Arrangement for the Species of *Clemmys* sensu McDowell (1964) (Reptilia: Testudines: Emydidae). *Zoologische Abhandlungen*, 51(19): pp 321-343.

Iverson, J.B., P.A. Meylan, and M.E. Seidel. 2008. Testudines-Turtles. In: Crother, B.I. (Ed.) Scientific and Standard English Names for Amphibians and Reptiles of North America North of Mexico. SSAR Herpetological Circular 37, pp. 67-74.

Jennings, M.R. 1987. Annotated checklist of the amphibians and reptiles of California, second revised edition. Southwestern Herpetologists Society, Special Publication 3:1-48.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and reptile species of concern in California. California Department of Fish and Game technical report, Inland Fisheries Division, Rancho Cordova, California.

Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications. A review. *Journal of Range Management* 37(5):430-438.

Kauffman, J.B., W.C. Krueger, and M. Vavra. 1983. Impacts of cattle on streambanks in northeastern Oregon. *Journal of Range Management* 36(6):683-685.

Lockington, W.N. 1879. Notes on some reptiles and batrachia of the Pacific coast. *The American Naturalist* 13(12):780-784.

Lovich, J.E. 1998. Human-induced changes in the Mojave and Colorado Desert Ecosystems: recovery and restoration potential. Pages 529-531 *in* M.J. Mac, P.A. Opler, C.E. Puckett-Haecker, and P.D. Doran (eds.). Status and trends of the nation's biological resources. US Dept. of the Interior, USGS, Reston, Virginia.

APPENDIX B (Continued)

Marlow, C.B. and T.M. Pogacnik. 1985. Time of grazing and cattle-induced damage to streambanks. Pages 279-284, *In*: R.R. Johnson, C.D. Ziebell, Patton, D. R., P.F. Folliott, and R.H. Hamre (technical coordinators) Riparian Ecosystems and Their Management: Reconciling Conflicting Uses. First North American Riparian Conference. United States Department of Agriculture, National Forest Service, General Technical Report RM-120.

Milner, R. 1986. Status of the western pond turtle (*Clemmys marmorata*) in northwestern Washington, 1986. Unpublished report. Washington State Department of Fish and Game, Olympia, Washington.

Morey, S.R. and D.A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. Pp. 149-157 *In* Williams, D.F., S. Byrne, T.A. Rado (editors). Endangered and Sensitive Species of the San Joaquin Valley, California. California Energy Commission, Sacramento, California. 1992.

Moyle, P.B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California. *Copeia* 1973 (1):18-22.

Noss, R.F., J.R. Strittholt, K. Vance-Borland, C. Carroll, and P. Frost. 1999. A conservation plan for the Klamath-Siskiyou ecoregion. *Natural Areas Journal* 19 (4):392-411.

Nussbaum, R.A., E.D. Brodie, Jr., and R.C. Storm. 1983. *Amphibians and reptiles of the Pacific Northwest. University Press of Idaho*. 332 pp.

Parham, J.F. and C.R. Feldman. 2002. Generic Revisions of Emydine Turtles. Turtle and Tortoise Newsletter. Issue 6: pp 28-30. Accessed online at http://www.chelonian.org/ttn/archives/ttn6/pp28-30.shtml.

Platts, W.S. 1981. Influence of forest and rangeland management on anadromous fish habitat in western North America - effects of livestock grazing. General Technical Report PNW-124. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. 25 pp.

Rathbun, G.B., N. Siepel, and D. Holland. 1992. Nesting behavior and movements of western pond turtles, *Clemmys marmorata*. *The Southwestern Naturalist* 37(3)319-324.

Reese, D.A. 1996. Comparative demography and habitat use of western pond turtles in northern California: the effects of damming and related alterations. PhD dissertation. University of California, Berkeley.

APPENDIX B (Continued)

Reese, D.A. and H.H. Welsh. 1997. Use of terrestrial habitat by western pond turtles, *Clemmys marmorata*: implications for management. Pp. 352-357 *in* J. Van Abbema, editor. Proceedings: Conservation, Restoration, and Management of Tortoises—and International Conference. State University of New York, Purchase, New York.

Reese, D.A. and H.H. Welsh. 1998a. Habitat use by western pond turtles in the Trinity River, California. *Journal of Wildlife Management* 62:842-853.

Reese, D.A. and H.H. Welsh. 1998b. Comparative demography of *Clemmys marmorata* populations in the Trinity River of California in the context of dam-induced alterations. *Journal of Herpetology* 32(4):505-515.

Seeliger, M.L. 1945. Variation in the Pacific mud turtle. *Copeia* 1945(3): 150159.

Semlitsch, R.D. and J.R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology* 17(5):1219-1228.

Smith, H.M. 1895. Notes on the reconnaissance of the fisheries of the Pacific Coast of the United States in 1884. Bulletin of United States Fish Commission 14:223-288.

Spinks, P.Q. and H.B. Shaffer. 2005. Rangewide Molecular Analysis of the Western Pond Turtle (*Emys marmorata*): Cryptic Variation, Isolation by Distance, and Their Conservation Implications. *Molecular Ecology*. 14: pp 2047-2064.

Spinks, P.Q., G.B. Pauly, J.J. Crayon and H.B. Shaffer. 2003. Survival of the western pond turtle (*Emys marmorata*) in an urban California environment. *Biological Conservation*.113: pp 257-267.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians*, 3rd Edition. Houghton Mifflin Company. Boston, Massachusetts. 530 pp.

Stebbins, R.C. 1985. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Mass. 336 pp.

Steinhart, P. 1990. California's wild heritage. Threatened and endangered animals in the golden state. California Department of Fish and Game, California Academy of Sciences, Sierra Club Books. 108 pp.

Stephens, P.R. and J.J. Wiens. 2003. Ecological Diversification and Phylogeny of Emydid Turtles. *Biological Journal of the Linnean Society*. 79(4): pp 577-610.

APPENDIX B (Continued)

Storer, T.I. 1930. Notes on the range and life-history of the Pacific fresh-water turtle, *Clemmys marmorata*. University of California Publications in Zoology. 32(5):429-441.

Storer, T.I. 1937. Further notes on the turtles of the north Pacific coast of North America. *Copeia*:250-252.

United States Fish and Wildlife Service (USFWS). 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened, proposed rule. Federal Register 56(225):58804-58836.

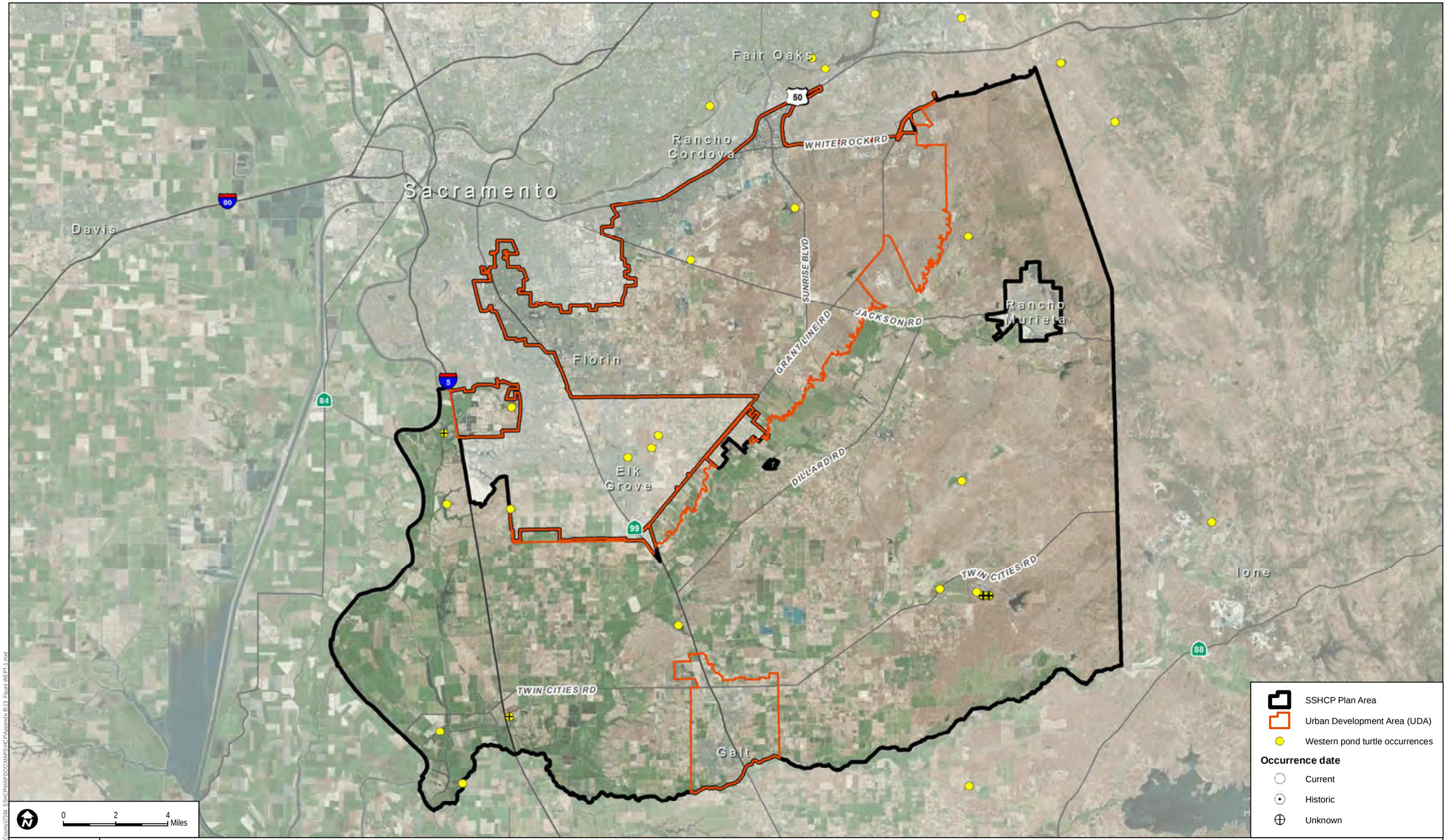
United States Fish and Wildlife Service (USFWS). 1993. Endangered and threatened wildlife and plants; petition finding on the western pond turtle. Federal Register 58(153): 42717-42718.

United States Fish and Wildlife Service (USFWS). 1999. Draft Recovery Plan for the western pond turtle (*Thamnophis gigas*). US Fish andWildlife Service, Portland, Oregon. Pages 116-131.

Winegar, H.H. 1977. Camp Creek channel fencing - Plant, wildlife, soil, and water response. *Rangeman's Journal* 4(1):10-12.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, CH2MHILL/Garcia & Associates, EIP Associates

FIGURE WPT-1

Western Pond Turtle Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2036_SSHCP\MAPS\CMAPS\SHCP\Planning\fig B13_Figure WPT-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

17 GIANT GARTER SNAKE (GGS)

Prepared by May Consulting (Jamison Watts)

Giant Garter Snake (GGS)

(Thamnophis gigas)

Status USFWS: Threatened

Status CDFG: Threatened



17.1 Legal Status

The giant garter snake (*Thamnophis gigas*) was listed as threatened by the State of California in 1971 and the United States Fish and Wildlife Service (USFWS) in 1993 under the Federal and California Endangered Species Acts respectively (USFWS 1993).

17.2 Life History and Ecology

17.2.1 Species Description and Life History

17.2.1.1 Species Description

The giant garter snake is one of the world's largest garter snakes, reaching a total length of up to 162 centimeters (64 inches). Females are slightly longer and proportionately heavier (typically 500 to 700 grams [1.0 to 1.4 pounds]) than males. The maximum number of dorsal scale rows is 23 or 21; supralabials (scales on upper lip) number eight with the 6th shorter than the 7th; subcaudals (scales on the underside of the tail, counted beginning with the first scale behind the vent) number 73 to 81 inches males and 65 to 73 inches females; and the lateral stripe, when present, is confined to dorsal scale rows two and three (Van Denburgh and Slevin 1918; Fitch 1940; Stebbins 1985; Rossman and Stewart 1987; Rossman et al. 1996).

Dorsal background color varies from brown to olive with a cream, yellow, or orange dorsal stripe and two light colored lateral stripes. Some individuals have a checkered pattern of black spots between the dorsal and lateral stripes. Background coloration, prominence of the checkered pattern, and the three yellow stripes are individually and geographically variable (R. Hansen

1980). Individuals in the northern Sacramento Valley for example, tend to be darker with more pronounced mid-dorsal and lateral stripes (California Department of Fish and Game [CDFG] 1992). The ventral coloration is variable from cream to orange to olive-brown to pale blue with or without ventral markings (R. Hansen 1980; CDFG 1992). Supralabial scales are dull brown and usually lack distinct wedge markings (R. Hansen 1980; CDFG 1992). As giant garter snake nears ecdysis (skin shedding), all pattern characteristics and colors may be obscured.

The giant garter snake can be distinguished from the common garter snake (*T. sirtalis*) and western terrestrial garter snake (*T. elegans*) by its color pattern, scale numbers, and head shape. The giant garter snake lacks the red lateral markings of the common garter snake. The Western terrestrial garter snake has well defined stripes and a black to dark gray ground color. The giant garter snake has a maximum of 23 or 21 scale rows and eight supralabials while the common garter snake has a maximum of 19 scale rows and seven supralabials, and the western terrestrial garter snake has a maximum of 19 or 21 scale rows and eight supralabials. In addition, the giant garter snake's seventh supralabial scale is wider than the sixth (R. Hansen 1980; Stebbins 1985; Rossman et al. 1996). The giant garter snake has an elongated head with a pointed muzzle (Stebbins 1985; Rossman et al. 1996) where the relative width of the muzzle of the giant garter snake averages 75.6 percent in males and 65.1 percent in females (calculated as InR/NR, where InR is the width of contact between the internasal and rostral scales, and NR is the width of contact between the nasal and rostral scales) (Rossman et al. 1996). The common garter snake and western terrestrial garter snake have broad muzzles with the relative muzzle width of the western terrestrial garter snake averaging 99 to 112 percent, and the relative muzzle width of the common garter snake averaging 127.6 percent (Rossman et al. 1996).

Subspecies have not been described for the giant garter snake, but there appears to be some morphological variation, principally with aspects of dorsal coloration and pattern, that conforms to geographic units (i.e., northern and southern groupings) (Boundy 1990). To date, there have been no range-wide studies of genetic variation in the giant garter snake. The only contemporary genetic studies on the giant garter snake have incorporated allozyme variation (Lawson and Dessauer 1979) or mtDNA sequencing (de Queiroz and Lawson 1994) in phylogenetic studies of the Sierra Nevada garter snake complex.

17.2.1.2 Reproduction

The giant garter snake breeding season begins soon after emergence from over-wintering sites and extends from March into May (USFWS 1999). Females brood young internally, and typically give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23 (Hansen and Hansen 1990). At birth, young have an average snout-vent length of approximately 20.6 centimeters (8.1 inches) and weight of three to five grams (0.1 to 0.2 ounces). Following birth,

young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size by one year of age (G. Hansen pers. comm.). Sexual maturity averages three years in males and five years for females (USFWS 1999).

During 1989 and 1990, sex ratio data were collected from giant garter snakes captured by hand in the Natomas Basin population near Sacramento County (Hansen and Brode 1993). In a sample of 191 individuals, the ratio of females to males was approximately 1.5:1 (Hansen and Brode 1993). During 1996, sex ratio data were collected for three other populations (Wylie et al. 1997). The ratio of females to males was approximately 1:1 at both Badger Creek Marsh in Sacramento County and Gilsizer Slough in Sutter County. In contrast, the sex ratio was roughly 2:1 at Colusa National Wildlife Refuge in Colusa County.

17.2.1.3 Diet and Foraging

Giant garter snakes feed primarily on aquatic prey such as fish and amphibians. Brode (1988) and G. Hansen (1988) suggest that the giant garter snake specializes in ambushing small fish underwater, and Rossman et al. (1996) suggest the giant garter snake occupies a niche similar to some eastern water snakes (*Nerodia* spp.). They appear to take advantage of pools which trap and concentrate prey items. R. Hansen (1980) and Hansen and Brode (1993) observed giant garter snakes feeding on mosquitofish (*Gambusia affinis*) confined to small pools of water. The predominant food items of giant garter snakes are now introduced species such as carp (*Cyprinus carpio*), mosquitofish, other small fish, and bullfrogs (*Rana catesbeiana*) (Fitch 1941; Fox 1951; R. Hansen 1980; Brode 1988; Hansen and Brode 1993; Rossman et al. 1996; USFWS 1993). Native species preyed upon by giant garter snakes include the Sacramento blackfish (*Orthodox microlepidotus*) and Pacific treefrog (*Hyla regilla*). Cunningham (1959) reported a record of a giant garter snake from Buena Vista Lake, Kern County, swallowing a live Sacramento blackfish, which it had just dragged onto the bank. Historically, giant garter snake food also may have included the extinct thick-tailed chub (*Gila crassicauda*) and the federally threatened California red-legged frog (*Rana draytonii*), which has been extirpated from the Central Valley floor (R. Hansen 1980; Rossman et al. 1996).

17.2.1.4 Dispersal and Migration

Giant garter snakes begin emerging from winter retreats around April 1st. By April 15th, most giant garter snakes are active and beginning to search for food. By May 1st, all giant garter snakes have usually emerged and are actively foraging. Around October 1st, giant garter snakes begin seeking winter retreats. Foraging and other activities are sporadic at this time and dependent upon weather conditions. By November 1st, most snakes are in winter retreats and will remain there until spring (Brode 1990; Hansen and Brode 1993).

APPENDIX B (Continued)

Seasonal activity may begin earlier than April 1st (as early as March 1st) in some years. Hansen and Brode (1993) concluded that they may emerge from winter retreats during any month of the year based on captures of giant garter snakes in the Natomas Basin in March and multiple observations of injured snakes. In 1996, captures of giant garter snakes began in March at Gilsizer Slough and at Colusa National Wildlife Refuge (Wylie et al. 1997). Late March was reported as the earliest time of regular seasonal activity at the Mendota Wildlife Area (R. Hansen 1980). Giant garter snake activity peaks during April and May; therefore, they may become less detectable in mid- to late summer (Hansen and Brode 1993). Hansen and Brode (1993) found that the sudden decrease in observations of giant garter snakes along canals in June and July corresponded with the sudden appearance of giant garter snakes within maturing rice fields. Captures at Gilsizer Slough and Colusa National Wildlife Refuge became infrequent after June of 1996 (Wylie et al. 1997). At Badger Creek Marsh, captures in 1996 became infrequent after mid-July, and in August of 1996, giant garter snakes at Badger Creek Marsh used burrows as much as 50 meters (164 feet) away from the marsh edge to escape extreme heat (Wylie et al. 1997).

Giant garter snakes are generally inactive during the winter months although some individuals may bask or move short distances on warmer days. For example, juveniles were occasionally observed at the Mendota Wildlife Area during the winter months when the air temperature was only 15 degrees Celsius (59 degrees Fahrenheit) (R. Hansen 1980). In the Sacramento Valley, 50 percent of the radio-telemetered snakes were observed, at some time, basking or moving short distances during the winter months (Wylie et al. 1997).

Fitch (1940) considered the giant garter snake as a "strictly diurnal snake"; however, observations by R. Hansen (1980) suggest that giant garter snakes are flexible in terms of their activity. Giant garter snakes were observed feeding at night on mosquitofish in small pools of water, and giant garter snakes at the Mendota Wildlife Area exhibited diurnal activity during the spring (March to June), and nocturnal activity during the hot summer months (R. Hansen 1980). Cunningham (1959) observed giant garter snakes feeding at night in September, 2.5 hours after dark at Buena Vista Lake. Hansen and Brode (1993) also observed giant garter snakes after sunset during hot weather. G. Hansen reported observing giant garter snakes active at night at the Mendota Wildlife Area, Gray Lodge Wildlife Area, and within the Natomas Basin during cool spring nights as well as during hot weather (USFWS 1993). The daily activity of giant garter snakes as described by Hansen and Brode (1993) follows a general pattern: 1) emergence from burrows after sunrise; 2) increasing body temperature to activity temperatures by basking, particularly during cool weather or on cold mornings; and 3) foraging or courting activity for the remainder of the day.

During radio-telemetry studies conducted by the USFWS, giant garter snakes typically moved little from day to day; however, total activity varied widely among individuals (USFWS 1993). At the Colusa National Wildlife Refuge, snakes moved up to eight kilometers (five miles) in two

days in response to dewatering of habitat during refuge maintenance of water control structures (Wylie et al. 1997). Giant garter snakes usually remain in close proximity to wetland habitats, but can be found as far away as 250 meters (820 feet) from their edge (G. Hansen 1988; Wylie et al. 1997). Hansen and Brode (1993) also documented giant garter snakes moving at least 400 meters (0.25 miles) between small lateral ditches and larger canals within the Natomas Basin. Some marked and recaptured giant garter snakes moved distances greater than 800 meters (0.5 miles) in as little as a day. The average distance between upland, over wintering sites and aquatic breeding sites is thought to be approximately 150 meters, ranging from 50 to 400 meters (G. Wylie and S. Barry pers. comm. 2005)

Derived from telemetry data, the USFWS estimated the home range sizes of giant garter snakes at three study sites (Table GGS-1). The mean home range estimate for individual snakes was 19.0 hectares (47 acres) (range 0.8 hectares [2 acres] to 259.5 hectares [641 acres], N=27) at Gilsizer Slough; 53.2 hectares (131 acres) (range 1.3 to 1,130 hectares [3.2 to 2,792 acres], N=29) at the Colusa National Wildlife Refuge; and 9.2 hectares (23 acres) (range 4.2 to 82.0 hectares [10.3 to 203 acres], N=8) at Badger Creek (USFWS 1993).

Table GGS-1
Population Estimates and Home Range Size Estimates for
Three Populations of Giant Garter Snakes

Site (surface area in hectares/acres)	Year	Population Estimate (95% C.I.)*	Median Home Range in hectares/acres (range in hectares)**
Gilsizer Slough (1,430/3,500)	1995	206 (136-349)	19.0/47 (0.8-259.5) N =27
	1996	170 (128-248)	
Colusa NWR (4,500/11,120)	1996	132 (80-254)	53.2/131 (1.3 - 1,130) N =29
	1997	119 (72-239)	
Badger Creek (235/580)	1996	191 (69-674)	9.2/23 (4.2 - 82.0) N =8

* Population estimates for giant garter snakes from the mark-recapture model with time-specific changes in probability of capture, which results in a conservative estimate. Estimates are derived from two-week time intervals. ** Home range estimates (ha/ac) for individual giant garter snakes derived from telemetry using the adaptive kernal method. "N" is the number of snakes in the sample. "C.I." is the Confidence Interval.

17.2.1.5 Ecological Relationships

A number of native mammals and birds are known or likely predators of giant garter snake including raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), opossums *(Didelphis virginiana*), foxes (*Vulpes vulpes*, *Urocyon cinereoargenteus*), hawks (*Buteo* spp.), northern harriers *(Circus cyaneus*), egrets (*Ardea alba*, *Egretta thula*), bitterns (*Botaurus lentiginosus*), and great blue herons (*Ardea herodias*). Many areas supporting garter snakes have been documented to have abundant predators (R. Hansen 1980; Hansen and Brode 1993; Wylie et al.

1997). G. Hansen (1986) observed that nearly all giant garter snakes captured and examined possessed scars or recent injuries, presumably acquired during attacks by predators. R. Hansen (1980) concluded that the abundance and diversity of predators suggested that predation pressure might be severe; however, predation does not seem to be a limiting factor in areas that provide abundant cover, high concentrations of prey items, and connectivity to a permanent water source (Wylie et al. 1997).

The giant garter snake may coexist with two other species of garter snakes. The Valley garter snake (*T. sirtalis fitchi*) was found to coexist with giant garter snakes in all areas that currently support them (R. Hansen 1980; G. Hansen 1986). The western terrestrial garter snake was observed at locations in the Elk Grove and Galt areas of Sacramento County, and Badger Creek Marsh supports all three species of garter snakes (G. Hansen 1986). Differences in foraging behavior may allow these species to co-exist. The Valley garter snake forages among vegetation bordering the water, while the giant garter snake captures its food in the water (R. Hansen 1980). Giant garter snakes may also successfully compete with the Valley garter snake by specializing on small fish as prey (Brode 1988).

17.2.2 Habitat Requirements and Ecology

Endemic to valley floor wetlands in California's Central Valley, the giant garter snake inhabits marshes, sloughs, low gradient streams, and other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields. Giant garter snakes feed on small fishes, tadpoles, and frogs (Fitch 1941; G. Hansen 1980; G. Hansen 1988). Suitable habitat consists of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover, (2) emergent, herbaceous wetland vegetation, such as *Scirpus* and *Typha* spp. for escape cover and foraging habitat during the active season, (3) grassy banks and openings in waterside vegetation for basking, and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (G. Hansen 1988). Giant garter snakes are absent from larger rivers and other water bodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Hansen 1980; Rossman and Stewart 1987; Brode 1988; G. Hansen 1988). Riparian woodlands do not typically provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (R. Hansen 1980).

The ideal concept of a marsh managed for giant garter snake includes shallow and deep water with variations in topography, including some higher ground resembling ditch banks, or "islands" similar to a rice check. Rice fields contain warm, shallow water with emergent vegetation (i.e., rice plants), which is present during the giant garter snake's active season (spring through early fall). During the late summer when rice fields contain large numbers of mosquitofish and Pacific tree frogs, rice fields may provide important nursery areas for newborn

APPENDIX B (Continued)

giant garter snakes (Brode and Hansen 1992; Hansen and Brode 1993). In addition, this habitat-type and its associated water conveyance system, if managed properly, provides hydrological connectivity, protection from predators, relatively warm water to aid metabolism, gestation, and digestion, and a reliable source of food (USFWS 1993).

Today, giant garter snakes appear to be most numerous in rice growing regions. The diverse habitat elements of rice lands, rice fields, tail-water marshes, ditch and drain components of water conveyance systems, delivery canals, and associated levees, all contribute structure and complexity to this man-made ecosystem. Giant garter snakes can apparently survive in this artificial ecosystem because the spring and summer flooding and fall dry-down of rice culture roughly coincides with the biological needs of the species (USFWS 1999). Giant garter snakes utilize rice lands extensively and depend on them for habitat (Fuller pers. comm. 2005). Giant garter snake seasonal activity associated with rice cultivation occurs as follows:

- **Spring:** Rice is planted and the fields are flooded with several inches of water. Rice fields that contain prey species such as small fish or frogs attract giant garter snakes.
- **Summer:** While the rice grows, giant garter snake continue to use rice fields as long as prey species are present in sufficient densities.
- **Late Summer/Fall:** Rice fields are drained and rice is harvested. Giant garter snakes move off the fields into adjacent habitats and the females, who have just delivered young, intensively forage to regain their body weight before winter. The dry-down of rice fields during this time is thought to be important because prey species which have been proliferating, become concentrated in the remaining pockets of standing water where snakes can gorge prior to the period of winter inactivity.
- **Winter:** giant garter snakes are predominantly dormant in the winter and rice fields are fallow.

In addition to grassy banks, giant garter snakes will bask in bulrush, cattails, shrubs overhanging the water, patches of waterweed (*Ludwigia peploides*) and other floating vegetation. In the San Joaquin Valley, giant garter snakes also bask in openings within saltbush (*Atriplex* spp.) (Van Denburgh and Slevin 1918; Brode 1988). Riparian vegetation such as saltbush and willows (*Salix* spp.) provide cover from predation. Giant garter snakes also bask in openings in vegetation created by rip-rap placed around water control structures. Giant garter snakes use small mammal burrows and other soil crevices above prevailing flood elevations during the winter (i.e., November to mid-March), typically with sunny exposures along south- and west-facing slopes (USFWS 1999). During the active season, small mammal burrows, crayfish burrows, and soil crevices provide retreats from extreme heat (Hansen and Brode 1993). In one study, wintering site location varied from canal banks and marsh areas to riprap along a railroad

grade near the marsh (Wylie et al. 1997). Wintering locations of radio-telemetered snakes tended to be in the vicinity of spring capture sites. In addition, during the active season, giant garter snakes use burrows as far as 50 meters (164 feet) away from the marsh edge, whereas, overwintering snakes use burrows as far as 250 meters (820 feet) from the edge of marsh habitat (Wylie et al. 1997).

Brode and Hansen (1992) and Hansen and Brode (1993), reported that giant garter snakes begin utilizing rice fields as early as June. In agricultural areas where rice fields and agricultural waterways are available, radio-telemetered giant garter snakes were located in rice fields 19 to 20 percent of the time, in marsh habitat 20 to 23 percent, and in canal and agricultural waterway habitats 50 to 56 percent of the time (Wylie et al. 1997). Between 48 and 55 percent of these latter snakes used rice fields at some time. Where marsh habitat and adjacent uplands were the only habitat available, giant garter snakes used the marsh edge most of the time (Wylie et al. 1997).

17.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The essential habitat elements for giant garter snake are identified in Table GGS-2 and have been derived from the USFWS's list of essential habitat components in the Draft Recovery Plan for the giant garter snake (USFWS 1999) as well as input from local species experts.

Table GGS-2
Essential Habitat Elements for Giant Garter Snake

Essential Activities	Land Cover Types	Habitat Elements
Foraging, breeding and dispersal	Seasonal impoundments, freshwater marsh, open water, and streams/creeks.	Adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; emergent, herbaceous wetland vegetation for escape cover, dispersal, and foraging habitat during the active season; and grassy banks and openings in waterside vegetation for basking.
Winter and summer inactivity	Mine tailing riparian woodland, valley oak riparian woodland, mixed riparian scrub, cropland, seasonal wetlands, seasonal impoundment, and freshwater marsh.	Uplands for cover and refuge during high summer temperatures. Higher elevation uplands for cover and refuge from flood waters during winter dormancy.

APPENDIX B (Continued)

17.3 Species Distribution and Population Trends

17.3.1 Range-wide Distribution

Giant garter snakes are endemic to the valley floors of the Sacramento and San Joaquin Valleys of California (Fitch 1940; Hansen and Brode 1980; R. Hansen 1980; Rossman and Stewart 1987). Although the boundaries of its original distribution are uncertain, records coincide with the historical distribution of the large flood basins, fresh water marshes, and tributary streams of the Central Valley of California (Hansen and Brode 1980). Fitch (1940) described the historical range of giant garter snakes as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield in Kern County. Fox (1951) indicated that intergrades between giant garter snakes and another closely related species (then called *T. elegans aquaticus*) occurred from Butte County near Gridley south to Sacramento. Hansen and Brode (1980) suggested that the intergrades described by Fox (1951) were actually giant garter snakes and described the range of the giant garter snake as extending from Burrel in Fresno County, north to Gridley. Rossman and Stewart (1987) examined additional specimens and concluded that the range of the giant garter snake extended to about 32 kilometers (20 miles) north of Gridley.

The giant garter snake probably occurred historically from Butte County in the north, southward to Buena Vista Lake in Kern County. Giant garter snakes have probably always been absent from the northern portion of the San Joaquin Valley, where the floodplain of the San Joaquin River is restricted to a relatively narrow trough by alluvium from tributary rivers and streams. This 100-kilometer (62 -mile) gap in its distribution separates populations in Merced County from those along the eastern fringes in the Sacramento/San Joaquin River Delta (Delta) in San Joaquin County (Hansen and Brode 1980). Because extensive marshes once occurred throughout the Delta, it is possible that giant garter snakes historically occupied this area (G. Hansen 1986, 1988). The foothills of the Coast Ranges and Sierra Nevada Mountains probably define the eastern and western boundaries of their range. Rossman et al. (1996) described the elevational distribution as ranging from sea level to 122 meters (400 feet) above mean sea level; whereas locality records in the southern Sacramento Valley occurred between three and 12 meters (10 and 40 feet) in elevation (G. Hansen 1986).

R. Hansen (1980) investigated the gap between the distribution of the giant garter snake and Sierra garter snake on the eastern side of San Joaquin Valley and determined that extensive riparian forests along river corridors historically limited the ranges of the two garter snake species. The river corridors lacked rocks or exposed vegetation (e.g., bulrushes, cattails) and areas on shore that might serve as basking sites. Prey items may also have been less abundant in these riparian corridors than in sloughs and marshes of the Central Valley floor (R. Hansen 1980).

APPENDIX B (Continued)

17.3.2 Sacramento County Distribution

There are 56 documented occurrences of giant garter snake in Sacramento County in the California Natural Diversity Data Base (CNDDB) (CDFG 2010). Thirty-nine (70 percent) of these occurrences are located in northern Sacramento County (i.e., north of Interstate 80)and constitute the southern portion of the American Basin population, the largest extant population of the giant garter snake (USFWS 1999). Reconnaissance-level surveys of this area conducted by the USFWS prior to 1991 indicated that approximately 570 hectares (1,408 acres) of giant garter snake habitat existed in the form of man-made irrigation channels and drainage ditches, and an undetermined number of acres of suitable habitat within approximately 5,260 hectares (13,000 acres) of adjoining rice fields; however, much of this habitat is now gone. The remaining 17 CNDDB occurrences in Sacramento County (i.e., south of Interstate 80) are in the following general locations: just north of the Antioch Bridge, Horseshoe Bend, Stone Lake, Laguna Creek, Morrison Creek, Snodgrass Slough, Willow Creek, Badger Creek, Hadselville Creek, and Elk Grove Creek. In addition, an unknown number of giant garter snakes are believed to occur along portions of Elder Creek (USFWS 1999) as well as hydrologically connected irrigation canals and tail waters in agricultural areas. Together, these occurrences suggest that Sacramento County supports a substantial proportion of the current rangewide distribution of giant garter snake. Figure GGS-1 displays the previously recorded occurrences of giant garter snake in Sacramento County (CDFG 2010).

17.3.3 Range within Plan Area

There are 15 documented occurrences of giant garter snake within the Plan Area including six within the Urban Development Area (UDA) and nine outside of the UDA (CDFG 2010). The giant garter snake occurrence records within the Plan Area are concentrated within the southern and southwestern portions of the Plan Area (Figure GGS-1). There are no occurrence records east of Clay Station Road in the southern portion of the Plan Area or east of Bradshaw Road in the City of Elk Grove (CDFG 2010). The occurrence record located in the southern part of the City of Elk Grove east of Waterman Road approximately one mile north of Grant Line Road is assumed to be recorded in error. Eric Hansen (pers. comm., January 12, 2006) considers this occurrence questionable given the general lack of essential habitat components for the species at and near this location, the lack of other documented occurrences from the vicinity, and no supporting documentation for the occurrence (e.g., specimen or photograph). The documented occurrence records seem to indicate that the range of the species is west of State Highway 99 and south of the Cosumnes River; however, according to the Draft Recovery Plan for the giant garter snake, the distribution of giant garter snake is defined by the Delta Recovery Area from the Draft Giant Garter Snake Recovery Plan (USFWS 1999). The range was then extended to include streams and creeks that have been visually determined to have a

perennial water source and are hydrologically connected to current or past occurrence records according to CNDDB (CDFG 2010).

17.3.4 Population Levels and Trends

Agricultural and flood control activities have extirpated the giant garter snake from the southern one third of its range in the former wetlands associated with the historic Buena Vista, Tulare, and Kern lakebeds (Hansen and Brode 1980; R. Hansen 1980; CDFG 1992; G. Hansen 1986, 1988). As recently as the 1970's, the range of the giant garter snake extended from near Burrel (Hansen and Brode 1980) northward to the vicinity of Chico (Rossman and Stewart 1987). CDFG studies (G. Hansen 1988) indicate that giant garter snake populations are distributed in portions of the rice production zones of Sacramento, Sutter, Butte, Colusa, and Glenn Counties; along the western border of the Yolo Bypass in Yolo and Solano Counties; west to the vicinity of Woodland in Yolo County and the vicinity of Liberty Farms in Solano County; and along the eastern fringes of the Sacramento/San Joaquin River Delta from the Laguna Creek/Elk Grove region of central Sacramento County southward to the Stockton area of San Joaquin County. Giant garter snakes also occur in the central San Joaquin Valley in rice production zones in Fresno and Merced Counties, and at Mendota Wildlife Area in Fresno County (G. Hansen 1996; USFWS 1993). In September 1998, a giant garter snake was positively identified in the western Sacramento/San Joaquin Delta in the vicinity of Decker and Sherman Islands, in Sacramento County (USFWS 1999). The last record of a giant garter snake this far west in the Delta region was a specimen collected in the 1930's to 1940's. It is not known if this snake represents a resident population in the western Delta or was washed into the Delta during high water flows in the winter of 1997-1998 (USFWS 1999).

The San Joaquin Valley populations of giant garter snakes have apparently suffered severe declines and possible extirpations over the last three decades. Prior to 1980, several areas within the San Joaquin Valley supported populations of giant garter snakes. Until recently, there were no post-1980 sightings from Stockton southward despite several survey efforts (G. Hansen 1988). Surveys of historic localities conducted during 1986 did not detect any giant garter snakes (G. Hansen 1988). However, during the 1995 surveys of historic locality records and adjacent waterways, one road-killed giant garter snake was found, and three presumed giant garter snakes were observed, but not captured. These two sightings occurred at the Mendota Wildlife Area, and two occurred several miles south of the city of Los Banos. These data indicated that giant garter snakes are still extant in two localities within the San Joaquin Valley, but are in extremely low to undetectable numbers. giant garter snakes also were observed in the Caldoni Marsh/White Slough Wildlife Area in San Joaquin County during 1995 surveys (G. Hansen 1996).

In 1994, the Biological Resources Division of the US Geological Survey (BRD) (formerly the National Biological Survey) began a study of the life history and habitat requirements of the giant

APPENDIX B (Continued)

garter snake in response to an interagency submittal for consideration as a National Biological Survey Ecosystem Initiative. Since April of 1995, the BRD has further documented occurrences of giant garter snakes within some of the populations identified in the final rule to list this species (USFWS 1993). The BRD has studied populations of giant garter snakes at the Sacramento and Colusa National Wildlife Refuges within the Colusa Basin; at Gilsizer Slough within the Sutter Basin; and at the Badger Creek area of the approximately 46,000-acre Cosumnes River Preserve, within the Badger Creek/Willow Creek area (Wylie et al. 1997). These populations, along with the American Basin population of giant garter snakes, represent the largest extant populations. During 1997, the BRD also surveyed at Stone Lakes National Wildlife Refuge, where four locality records from 1992 and earlier occur on or within close proximity to the Refuge (CDFG 2010). Although suitable habitat is present at Stone Lakes National Wildlife Refuge, the BRD did not find giant garter snakes during their trapping efforts (USFWS 1999). Surveys over the last two decades have located the giant garter snake as far north as the Butte Basin in the Sacramento Valley.

Currently, the USFWS recognizes 13 separate populations of giant garter snakes, with each population representing a cluster of discrete locality records within contiguous habitat (USFWS 1993). The 13 extant populations largely coincide with historical riverine flood basins and tributary streams throughout the Central Valley (G. Hansen 1980, Brode and Hansen 1992) and include: (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin/Willow Slough, (6) Yolo Basin/Liberty Farms, (7) Sacramento Basin, (8) Badger Creek/Willow Creek, (9) Caldoni Marsh, (10) East Stockton -- Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrel/Lanare. These populations are distributed discontinuously in small isolated patches and are vulnerable to extirpation by random, naturally occurring environmental events, population dynamics and genetic processes. All 13 populations are isolated from each other without protected dispersal corridors. These populations span the Central Valley from just southwest of Fresno (i.e., Burrel/Lanare) north to Butte Creek. The 11 counties where the giant garter snake is still presumed to occur are: Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo.

The current distribution and abundance of the giant garter snake is much reduced from former times (USFWS 1999). Agricultural and flood control activities have extirpated the giant garter snake from the southern one third of its range in former wetlands which were associated with the historic Buena Vista, Tulare, and Kern lakebeds (Brode and Hansen 1992; CDFG 1992; G. Hansen 1986; Hansen and Brode 1980; R. Hansen 1980). These lakebeds once supported vast expanses of ideal giant garter snake habitat, consisting of Cattail and Bulrush-dominated marshes. South of Fresno, virtually no suitable freshwater habitat remains (Hansen and Brode 1980). Vast expanses of Bulrush and Cattail floodplain habitat also typified much of the Sacramento Valley historically (Hinds 1952). Prior to reclamation activities beginning in the mid-to late 1800's, about 60% of the Sacramento Valley was subject to seasonal flooding in broad, shallow flood basins that provided

expansive areas of giant garter snake habitat (Hinds 1952). However, these valley floor wetlands have since been subjected to the cumulative effects of upstream watershed modifications, water storage and diversion projects, as well as urban and agricultural development resulting in their almost complete elimination; however, a relatively small percentage of semi-natural and artificial wetlands remain, which currently provides suitable habitat for giant garter snake (USFWS 1999). Regardless of the extent of wetlands currently remaining, field studies (Hansen 1986; Hansen 1988) indicate that the species is absent from most areas with seemingly suitable habitat.

17.4 Threats to the Species

Although certain factors are known to contribute to giant garter snake decline range wide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for giant garter snake in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect giant garter snake and other target species, the potential for success in conserving the species is reduced. The following is a summary of factors known or suspected to negatively affect giant garter snake.

17.4.1 Habitat Loss and Alteration

Habitat loss and alteration throughout the range of the giant garter snake has resulted in fragmented and isolated habitat remnants supporting small, scattered populations of giant garter snake. Principles of population genetics stipulate that small populations confined to limited habitat areas are more vulnerable to extirpation from stochastic (random) environmental, genetic and demographic events than larger, less fragmented populations (Schonewald-Cox et al. 1983). When an existing, local population becomes extinct, there is virtually no chance of recolonization by other populations unless adequate dispersal corridors are protected and maintained into perpetuity. In addition, the breeding of closely related individuals can cause genetic problems in small populations, particularly the expression of deleterious genes (known as inbreeding depression).

A number of land use practices and other human activities currently threaten the survival of the giant garter snake throughout its remaining range. Although some giant garter snake populations have persisted at low population levels in artificial wetlands associated with agricultural and flood control activities, many of these altered wetlands are now threatened with urban development. Several cities within the current range of the giant garter snake are expanding rapidly within or near the historic range of the giant garter snake and include, but are not limited

to, Chico (Butte Basin population), Yuba City (Sutter Basin population), Sacramento (American and Sacramento Basin populations), Galt (Badger/Willow Creek population), Stockton (East Stockton population), and Gustine and Los Banos (North and South Grasslands population). In addition, the North Delta Water Management project proposed by the California Department of Water Resources would facilitate urban development and adversely affect the Sacramento Basin population; the American River Watershed Investigation or local equivalent by the Corps would facilitate urban growth that may adversely affect the American Basin population; and the Sacramento River Flood Control Project, Phase II Marysville/Yuba City Area, and Yuba River Basin project would facilitate urban growth in the vicinity of the Sutter Basin population.

Certain agricultural practices can also destroy habitat that supports the giant garter snake. For example, intensive vegetation control activities along canal banks can fragment and isolate available habitat. In addition, G. Hansen (1982, 1986), and G. Hansen and J. Brode (USFWS 1993) observed livestock grazing threats to four populations of the species. Studies on other garter snake species have established a negative cause and effect relationship between livestock grazing and snake population demographics (Szaro et al. 1985). The giant garter snake requires dense vegetative cover in proximity to waterside foraging and basking habitats in which to seek refuge from predators and other forms of disturbance. Livestock grazing along the edges of water sources degrades habitat quality by reducing vegetative cover. Overall, grazing has eliminated or reduced the quality of available habitat at four known locations (USFWS 1993).

17.4.1.1 Northern Sacramento County

Habitat supporting the giant garter snake in the American Basin is threatened by a number of activities including urbanization. In addition, the United States Corps of Engineers and/or local project sponsors are proposing flood protection for this approximately 22,260-hectare (55,000-acre) agricultural area. The USFWS (USFWS 1991) anticipates that the provision of flood control would result in the conversion of most or all of this area to urban land uses within the next 50 years. Other projects in the American Basin include the North Natomas Community Drainage System and associated urban development. These projects, which are proposed by the City of Sacramento, would affect about 42 kilometers (26 miles) of giant garter snake habitat along existing canals and ditchesas well as additional rice field habitat (Brode and Hansen 1992). In addition, the Sacramento Metropolitan Airport is proposing about 765 hectares (1,890 acres) of development on agricultural and vacant lands that could result in major adverse impacts to the species, including the loss of about 14.5 kilometers (9.0 miles) of canal habitat and 607 hectares (1,500 acres) of rice fields, as well as the disruption of movement corridors (Brode and Hansen 1992). Roadway improvements or construction projects, or the planned extension of the Sacramento Regional Transit system in this area, would likely result in elevated mortality from increased traffic on local roads and highways (Brode and Hansen 1992).

APPENDIX B (Continued)

17.4.1.2 Plan Area

Habitat supporting the giant garter snake in the Plan Area is threatened by a number of activities including urbanization. Development within the Urban Development Area (UDA) may adversely affect the species if present. For example, the City of Elk Grove contains natural and man-altered wetland features that may support giant garter snake. These features include areas within the Stone Lakes National Wildlife Refuge, Cosumnes River, Sacramento River and associated tributaries (e.g., Deer Creek, Morrison Creek, and Laguna Creek), and vegetative communities consisting of valley oak woodland, annual grassland, valley foothill riparian, and agricultural lands. Some of the irrigation ditches and open water habitats in the UDA support suitable habitats for this species.

17.4.2 Over Utilization for Commercial, Recreational, Scientific, or Educational Purposes

Although giant garter snakes do not seem to be of great interest to reptile collectors, the species has been found for sale in pet shops (USFWS 1993); however, collection for commercial purposes does not appear to threaten the giant garter snake.

Collection and harassment associated with recreational activities apparently cause a substantial impact in certain areas (USFWS 1993). Recreationists can disturb basking snakes, interfering with thermoregulatory behavior. Fishing pressure at the Mendota population during the 1970's and 1980's resulted in numerous observed instances of road kills and other possible killing and injuring of giant garter snakes (USFWS 1993). In the American Basin, collection of crayfish for human consumption also results in harassment of giant garter snakes and disturbance and harassment associated with fishing pressure also is implicated in the demise of the giant garter snake population at Burrell (USFWS 1993).

17.4.3 Disease and Predation

Little information on diseases that affect the giant garter snake is available. The CDFG ceased mark and recapture studies on the giant garter snake in the American Basin after observing that marked snakes were slow to heal and often became infected (USFWS 1993).

Unidentified parasitic worms have been found in giant garter snakes from the American Basin population (USFWS 1993). Infected snakes exhibited reduced appetites and growth rates compared to uninfected snakes and all infected snakes eventually died after lingering malaise, although some reached 12 to 14 months of age. Upon death, uniformly sized five- to eight-centimeter worms emerged from noticeable lumps at locations along the ventral or dorsal skin surfaces. The degree of threat posed by these worms to the American Basin population or the species throughout its range is not known.

APPENDIX B (Continued)

Predation levels on the giant garter snakes have increased due to a number of factors. A number of native mammals and birds are known or likely predators of giant garter snakes, including raccoons, skunks, opossums, foxes, hawks, egrets, and herons. The abundance and diversity of predators and a paucity of escape cover in remaining giant garter snake habitat suggest that predation pressure on this species probably is severe (Hansen 1980). The high fecundity (Hansen and Hansen 1990) and extremely wary behavior (Hansen 1980 and references cited therein) of the species provide additional evidence that the species has developed physiological and behavioral adaptations to help withstand predatory pressure. Hansen (1986) observed that nearly all captured and examined giant garter snakes possessed scars or recent injuries (presumably acquired during attacks by predators).

Domestic cats prey upon the giant garter snake. G. Hansen (USFWS 1993) has observed numerous snake kills by domestic cats in one of his longtime study areas about 3.2 kilometers (2 miles) from the closest urban development in the City of Davis, Yolo County.

Few, if any, native fish species pose a predatory threat to the giant garter snake. However, introduced large mouth bass and catfish are voracious, opportunistic predators of many species of invertebrates, fish, reptiles, amphibians, birds, and small mammals, and have become established in virtually all permanent and semi-permanent waters throughout the Central Valley (USFWS 1993). These introduced predatory fishes have been responsible for eliminating many species of native fishes and aquatic vertebrates in the western United States (Minkley 1973; Moyle 1976).

Bass in the 0.4 to 1.4 kilogram size class can take 30 to 38-centimeter snakes and would prey upon giant garter snakes (USFWS 1993). The instinctive response of giant garter snakes to dive under water upon disturbance (Fitch 1941) would be maladaptive where nonnative predatory fish have become established. Parmley and Mulford (1985) reported an instance of a Largemouth Bass eating a water snake. Introduced predatory fish may explain the absence of garter snakes from large bodies of water (Brode 1988). Brode (1988) believed that the giant garter snake was absent from large bodies of water due to the presence of introduced predatory fishes.

Introduction of the bullfrog to virtually all areas inhabited by the giant garter snake further increases the threat of predation facing the species. The spread of Bullfrogs has contributed to the demise of numerous species of native amphibians and reptiles (Schwalbe and Rosen 1989; Holland 1991). Bury and Whelan (1984) cited 14 cases of bullfrogs eating snakes. These studies documented (1) bullfrog ingestion of garter snakes up to 80 centimeters (31.5 inches) in length, (2) depletion of the <80-centimeter length (snout-vent) age class, and (3) disappearance and resurgence of garter snake populations coincident with the introduction and decline of bullfrog populations. Schwalbe and Rosen (1989) concluded that bullfrogs have a high potential for eliminating garter snake populations. Treanor (1993) found that unidentified

APPENDIX B (Continued)

garter snakes *(Thamnophis* spp.*)* comprised 6.0 and 6.4 percent volume of bullfrog stomach contents in the months of July and August at Gray Lodge Waterfowl Management Area, a known giant garter snake location.

17.4.4 Other Natural or Manmade Factors Affecting Giant Garter Snake Continued Existence

In rice production areas of the American Basin, the largest remaining population of giant garter snakes inhabits water management facilities adjoining rice fields (in rare instances the snake occurs along other agricultural waterways) (USFWS 1993). The seasonal flooding and draining of rice ponds may provide an adequate forage base and may prevent establishment of populations of large predatory fish (Brode and Hansen 1992).

However, Pacific Environmental Consultants (1992) cites sources that document 250,000-acre swings in rice production over a three-year time span suggesting that these situations do not represent stable conditions for associated giant garter snake populations. Rice production varies depending upon market conditions (e.g., Department of Agriculture price support programs), and water availability for agriculture (e.g., State Water Resources Control Board Draft Interim Water Rights Decision, D—1630) protects estuarine fisheries values by reducing winter and spring exports from the Delta, which could result in reduced acreage of rice production.

Furthermore, intensive control of vegetation along water delivery and drainage facilities eliminates remaining habitat and prevents reestablishment of former habitat (Hansen 1988; Brode and Hansen 1992; USFWS 1993). For example, more intensive maintenance practices have eliminated habitat along water canals in the American Basin along State Route 70/99 (USFWS 1993). Such activities can kill or injure snakes, remove critical escape cover, eliminate prey populations, and destroy small mammal burrows and other soil fissures needed as winter retreat habitat. G. Hansen observed the complete elimination of suitable habitat from maintenance practices along both sides of canals where giant garter snakes were found the previous season (USFWS 1993).

The giant garter snake is vulnerable to changes in water management because it depends on the availability of wetlands. In response to Statewide water shortages associated with drought, water management agencies, including the California Department of Water Resources and US Bureau of Reclamation, announce reductions in delivery of water to certain agricultural regions. In addition, the Department of Water Resources has begun acting as a broker to facilitate transfer of water from users with discretionary supplies to those with critical needs. Water districts from around the State are offering to purchase water from water districts in rice production regions of the Sacramento Valley (USFWS 1993).

Contaminants, such as fertilizers and pesticides, could adversely affect giant garter snake populations by degrading water quality and reducing prey populations. Selenium contamination of agricultural drain water appears to pose a severe threat to any giant garter snake population that still may inhabit the Grasslands region of western Merced County in the San Joaquin Valley (USFWS 1999). High levels of selenium contamination have been documented in biota from at least six major canals and watercourses in the Merced Grasslands (Saiki et al. 1991, 1992a) that have historic giant garter snake records. The bioaccumulative food chain threat of selenium contamination to fish, frogs, and fish-eating birds in the region has been well documented (Ohlendorf et al. 1986, 1988; Saiki and Lowe 1987; Saiki and May 1988; Hothem and Ohlendorf 1989; Saiki et al. 1991, 1992b, 1993). Contaminant studies on aquatic organisms and their habitats in the grasslands and neighboring areas documented elevated levels of waterborne selenium in many representative water bodies in this region that exceeded known toxicity thresholds for giant garter snake prey species (San Joaquin Valley Drainage Program 1990; Central Valley Regional Water Quality Control Board 1992; Hermanutz 1992; Hermanutz et al. 1992; Nakamoto and Hassler 1992). Elevated salinity of waters in the grasslands due to a sodium sulfate-based salt have also been documented at deleterious levels in resident fishes and amphibians (Ohlendorf et al. 1986, 1988; Saiki et al. 1992a), the major food source of giant garter snakes.

According to the USFWS (1993), most or all giant garter snake populations are vulnerable to adverse effects from flooding, and a 100-year flood event has the potential of extirpating all remaining populations of giant garter snake. Many areas, such as in the rice production districts of the Sacramento Valley, flood more frequently, even during winters with normal levels of rainfall. In Glenn and Colusa Counties, Willow Creek, Walker Creek, French Creek, Wilson Creek, Logan Creek, Hunter Creek, Lurline Creek, and the Colusa Drain all flood to heights exceeding the levee tops (USFWS 1993). In eastern Sutter County, many creeks convey water to heights one to two feet above levee tops (USFWS 1993). These flooding events may account, at least in part, for the apparent absence of the giant garter snake in many rice production districts.

Giant garter snakes retreat to habitats at higher elevations during the winter dormancy period. Commercial development, agricultural conversion, and levee channel construction and maintenance along the edges of wetlands have eliminated much of the retreat habitat, forcing giant garter snakes to overwinter in flood-prone (streamside) levee slopes.

17.5 Data Gaps and Conservation Implications

The ecology, status, and management of giant garter snake have received increased attention in recent years; however, there are several sources of uncertainty regarding giant garter snake and its requirements in the Plan Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

APPENDIX B (Continued)

17.5.1 Population and Habitat Distribution within the Plan Area

Giant garter snakes occur in suitable habitat within the Plan Area; however, their overall distribution, abundance, and population structure are not well known. Land cover-types used by giant garter snakes, such as suitable seasonal impoundments, freshwater marsh, open water, streams and creeks as well as adjacent uplands, occur throughout much of the Central Valley and are well represented in Sacramento County and the Plan Area.

Because comprehensive surveys for giant garter snake in the Plan Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and distribution of the species throughout the Plan Area are not known. In addition, though the distribution of different habitat-types is mapped and quantifiable, the quality of habitat (particularly as it relates to essential habitat components) for giant garter snakes within most of these areas is unknown. These information gaps limit the ability to identify the best lands available for preserving giant garter snake habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for giant garter snake will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

17.5.1.1 Determining Threat Severity

Although certain factors are known to contribute to giant garter snake decline rangewide, exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., stormwater flooding of occupied winter retreats). Therefore, to improve conservation planning efforts for giant garter snake in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

17.5.1.2 Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Giant Garter Snake

Achieving the conservation goals and objectives for giant garter snake will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability of giant garter snake. Whether restored or enhanced habitats can retain the structural attributes suitable for giant garter snake is unknown.

APPENDIX B (Continued)

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for giant garter snake, then those lands would not support sustainable populations.

17.6 Literature Cited

Barry, Sean. Herpetologist. Entrix Environmental Consultants. Sacramento, California. April 2005.

Boundy, J.J. 1990. Biogeography and variation in southern populations of the garter snake *Thamnophis atratus*, with a synopsis of the *T. couchii* complex. Unpublished Master's Thesis, San Jose State University. 105 pp.

Brode, J. 1988. Natural history of the Giant Garter Snake (*Thamnophis couchii gigas*). Pages 25-28, *In* Proceedings of the conference on California herpetology, H.F. DeListe, P.R. Brown, B. Kaufman, and B.M. McGurty (eds). Southwestern Herpetologists Society, Special Publication No. 4.

Brode, J. 1990. Guidelines for procedures and timing of activities related to the modification or relocation of Giant Garter Snake habitat. CDFG Inland Fisheries Division, October 1990.

Brode, J., and G. Hansen. 1992. Status and future management of the giant garter snake (*Thamnophis gigas*) within the southern American Basin, Sacramento and Sutter counties, California. CDFG, Inland Fisheries. Division.

Bury, R.B., and J.A. Whelan. 1984. Ecology and management of the bullfrog. US Fish and Wildlife Service, Resource Publication 155:1-23.

California Department of Fish and Game (CDFG). 1992. Draft five-year status report. CDFG, Inland Fisheries Division.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Regional Water Quality Control Board, Central Valley Region. 1992. Agricultural drainage contribution to water quality in the Grasslands Area of western Merced County, California: October 1990 to September 1991.

Cooperrider, A.Y., C. Carroll, K. Nelson, R. Noss, D. Olson, H. Welsh, and W. Zielinski. 1999. Terrestrial fauna of redwood forests. In R.F. Noss, editor. The Redwood Forest: History, Ecology, and Conservation of Coast Redwoods. Island Press, Washington, DC.

APPENDIX B (Continued)

Cunningham, J. D. 1959. Reproduction and food of some California snakes. *Herpetologica,* 15(1):17-20.

de Queiroz, A., and R. Lawson. 1994. Phylogenetic relationships of the garter snakes based on DNA sequence and allozyme variation. *Biological Journal of the Linnaeus Society*, 53:209-229.

Fitch, H.S. 1941. The feeding habits of California garter snakes. California Department of Fish and Game 27:2-32.

Fitch, H.S. 1948. Further remarks concerning *Thamnophis ordinoides* and its relatives. *Copeia* 1948(2):121-126.

Fitch, H.S. 1940. A biogeographical study of the *ordinoides* Artenkreis of garter snakes (genus *Thamnophis*. *University of California Publications in Zoology*. 44:1-150.

Fitzgerald, Kelly. Fish and Wildlife Biologist. US Fish and Wildlife Service. Sacramento, California. February 2006.

Fox, W. 1951. Relationships among the garter snakes of the T*hamnophis elegans rassenkreis*. *University of California Publications in Zoology.* 50:485-530.

Frankham, R. 1995. Effective population size/adult population ratios in wildlife: a review. Genetical Research 66(2):95-107.

Frayer, W.E., D.D. Peters, and H.R. Pywell. 1989. Wetlands of the California Central Valley: Status and trends. US Fish and Wildlife Service, Portland, Oregon.

Hansen, Eric. Herpetologist. Environmental Biology Consultant. Sacramento, California. June 2006.

Fuller, Ken. Fish and Wildlife Biologist. US Fish and Wildlife Service. Sacramento, California. March 2005.

Hansen G.E., and J.M. Brode. 1980. Status of the giant garter snake, *Thamnophis couchi gigas* (Fitch). California Department of Fish and Game. Inland Fisheries Endangered Species Program Special Publication Report No. 80-5. 14 pp.

Hansen G.E., and J.M. Brode. 1993. Results of relocating canal habitat of the GGS (*Thamnophis gigas*) during widening of State Route 99/70 in Sacramento and Sutter counties, California. Final report for Caltrans Interagency Agreement 03E325 (FG7550) (FY 87/88-91-92). Unpublished. 36 pp.

APPENDIX B (Continued)

Hansen, G.E. 1982. Status of the giant garter snake (*Thamnophis couchii gigas*) along portions of Laguna and Elk Grove creeks, Sacramento County, California. Report to Sacramento County Planning Dept. 15 pp.

Hansen, G.E. 1986. Status of the Giant Garter Snake (*Thamnophis couchi gigas* (Fitch)) in the Southern San Joaquin Valley During 1986. Final report for CDFG, Standard Agreement No. C1433. Unpublished. 31 pp.

Hansen, G.E. 1988. Review of the status of the GGS (*Thamnophis couchi gigas*) and its supporting habitat during 1986-1987. Final report for CDFG, Contract C-2060. Unpublished. 31 pp.

Hansen, G.E. 1996. Status of the Giant Garter Snake (*Thamnophis gigas*) in the San Joaquin Valley in 1995. Final report for CDFG, Standard Agreement No. FG4052IF. Unpublished 31 pp.

Hansen, R.W. 1980. Western aquatic garter snakes in central California: an ecological and evolutionary perspective. Master's thesis, Department of Biology, California State University, Fresno. 78 pp.

Hansen, R.W. and G.E. Hansen. 1990. *Thamnophis gigas*. Reproduction. Herpetological Review 21(4):93-94.

Hermanutz, R.O. 1992. Malformation of the fathead minnow (*Pimephales promelas*) in an ecosystem with elevated selenium concentrations. Bulletin of Environmental Contamination and Toxicology Report 49:290-294.

Hermanutz, R.O., K. N. Allen, T. H. Roush, and S. F. Hedtke. 1992. Effects of elevated selenium concentrations on bluegills (*Lepomis macrochirus*) in outdoor experimental streams. Environmental Toxicology and Chemistry 11:217-224.

Hinds, N.E.A. 1952. Evolution of the California landscape. California Division of Mines Bulletin No. 158. 240 pp.

Holland, D. 1991. A synopsis of the ecology and status of the western pond turtle (*Clemmys marmorata)* in 1991. Unpublished report for the US Fish and Wildlife Service, San Simeon, California.

Hothem, R.L., and H.M. Ohlendorf. 1989. Contaminants in foods of aquatic birds in Kesterson Reservoir, California, 1985. Archives of Environmental Contamination and Toxicology 18:773-786.

APPENDIX B (Continued)

Lawson, R. and H. C. Dessauer. 1979. Biochemical genetics and systematics of garter snakes of the *Thamnophis elegans-couchii-ordinoides* complex. Occasional Papers of the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana, No. 56. 24 pp.

Minkley, W.L. 1973. *Fishes of Arizona*. Arizona Game and Fish Department. Phoenix, Arizona.

Moyle, P. B. 1976. *Inland fishes of California*. University of California Press, Berkeley, Los Angeles, and London.

Nakamoto, R.J., and T. Hassler. 1992. Selenium and other trace elements in bluegills from agricultural return flows in the San Joaquin Valley, California. *Archives of Environmental Contamination and Toxicology* 22:88-98.

Noss, R. F., E. Dinerstein, B. Gilbert, M. Gilpin, B. J. Miller, J. Terborgh, and S. Trombulak. 1999. Core areas: where nature reigns. Pages 99-128 *in* M. E. Soulê and J. Terborgh, editors. *Continental conservation: scientific foundations of regional reserve networks.* Island Press. Washington, D.C., USA.

Ohlendorf, H.M., D.J. Hoffman, M.K. Saiki, and T.W. Aldrich. 1986. Embryonic mortality and abnormalities of aquatic birds: Apparent impacts of selenium from irrigation drainwater. The Science of the Total Environment, 52:49-63.

Ohlendorf, H.M., R.L. Hothem, and T.W. Aldrich. 1988. Bioaccumulation of selenium by snakes and frogs in the San Joaquin Valley, California. *Copeia* 1988(3):704-710.

Parmley, D., and C. Mulford. 1985. An incident of largemouth bass (*Micropterus salmoides*) feeding on a water snake. *Texas Journal of Science* 37:89.

Rossman, D., and G. Stewart. 1987. Taxonomic reevaluation of *Thamnophis couchii* (Serpentes: Colubridae). Occasional Papers of the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana. No. 63. 25 pp.

Rossman, D.A., N.B. Ford, and R.A. Seigel. 1996. *The garter snakes: evolution and ecology*. University of Oklahoma Press, Norman. 331 pp.

Saiki, M.K., and T.P. Lowe. 1987. Selenium in aquatic organisms from subsurface agricultural drainage water, San Joaquin Valley, California. *Archives of Environmental Contaminants and Toxicology*. 16: 657-670.

Saiki, M.K., and T.W. May. 1988. Trace element residues in bluegills and common carp from the lower San Joaquin River, California, and its tributaries. *The Science of the Total Environment* 74:199-217.

APPENDIX B (Continued)

Saiki, M.K., M.R. Jennings, and R.H. Wiedmeyer. 1992b. Toxicity of agricultural subsurface drainwater from the San Joaquin Valley, California, to juvenile chinook salmon and striped bass. *Transactions of the American Fisheries Society*. 121:78-93.

Saiki, M.K., M.R. Jennings, and S.J. Hamilton. 1991. Preliminary assessment of the effects of selenium in agricultural drainage on fish in the San Joaquin Valley. Pages 369-385, *In*: A. Dinar and D. Zilberman (eds.). The economics and management of water and drainage in agriculture. Kluwer Academic Publishers, Boston, Massachusetts.

Saiki, M.K., M.R. Jennings, and T.W. May. 1992a. Selenium and other elements in freshwater fishes from the irrigated San Joaquin Valley, California. *The Science of the Total Environment* 126:109-137.

Saiki, M.K., M.R. Jennings, and W.G. Brumbaugh. 1993. Boron, molybdenum, and selenium in aquatic food chains from the lower San Joaquin River and its tributaries, California. *Archives of Environmental Contaminants and Toxicology*, 24:307-319.

San Joaquin Valley Drainage Program. 1990. Fish and wildlife resources and agricultural drainage in the San Joaquin Valley, California. San Joaquin Valley Drainage Program, 2800 Cottage Way, Room W-2143, Sacramento, California. 2 vol.

Schonewald-Cox C.M., S.M. Chambers, B. MacBryde and W.L. Thomas. eds 1983. *Genetics and conservation: a reference for managing wild animal and plant populations.* Benjamin/Cummings, Melo Park, California.

Schwalbe, C.R., and P.C. Rosen. 1989. Preliminary report on effect of bullfrogs on wetland herpetofaunas in southeastern Arizona, Pages 166-173, *In*: Szaro, R.C., K.E. Severson and D.R. Patton (tech. coords.). 1989. Management of amphibians, reptiles, and small mammals in N. America. US Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-166.

Semlitsch, R. D. and J. R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology,* 17(5):1,219-1,228.

Stebbins, R.C. 1985. *A field guide to western reptiles and amphibians*. Houghton Mifflin Co., New York. 336 pp.

Szaro, R., S. Belfit, J. Aitkin, and J. Rinne. 1985. Impact of grazing on a riparian garter snake. Paper presented at the Symposium on riparian ecosystems and their management: reconciling conflicting uses. Tucson, Arizona.

APPENDIX B (Continued)

Treanor, R.R. 1993. Contributions to the biology of the bullfrog, (*Rana catesbeiana* Shaw), in California. CDFG, Inland Fisheries Administrative Report No. 83-1.

United States Fish and Wildlife Service (USFWS). 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened, proposed rule. Federal Register 56(225):58804-58836.

United States Fish and Wildlife Service (USFWS). 1993. Endangered and threatened wildlife and plants; determination of threatened status for the GGS. Federal Register 58: 54053-54066.

United States Fish and Wildlife Service (USFWS). 1999. Draft Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*). US Fish and Wildlife Service, Portland, Oregon. ix+ 192 pp.

Van Denburgh, J., and Slevin, J.R. 1918. The garter snakes of western North America. *Proceedings of California Academy of Sciences*, 8 (4):181-270.

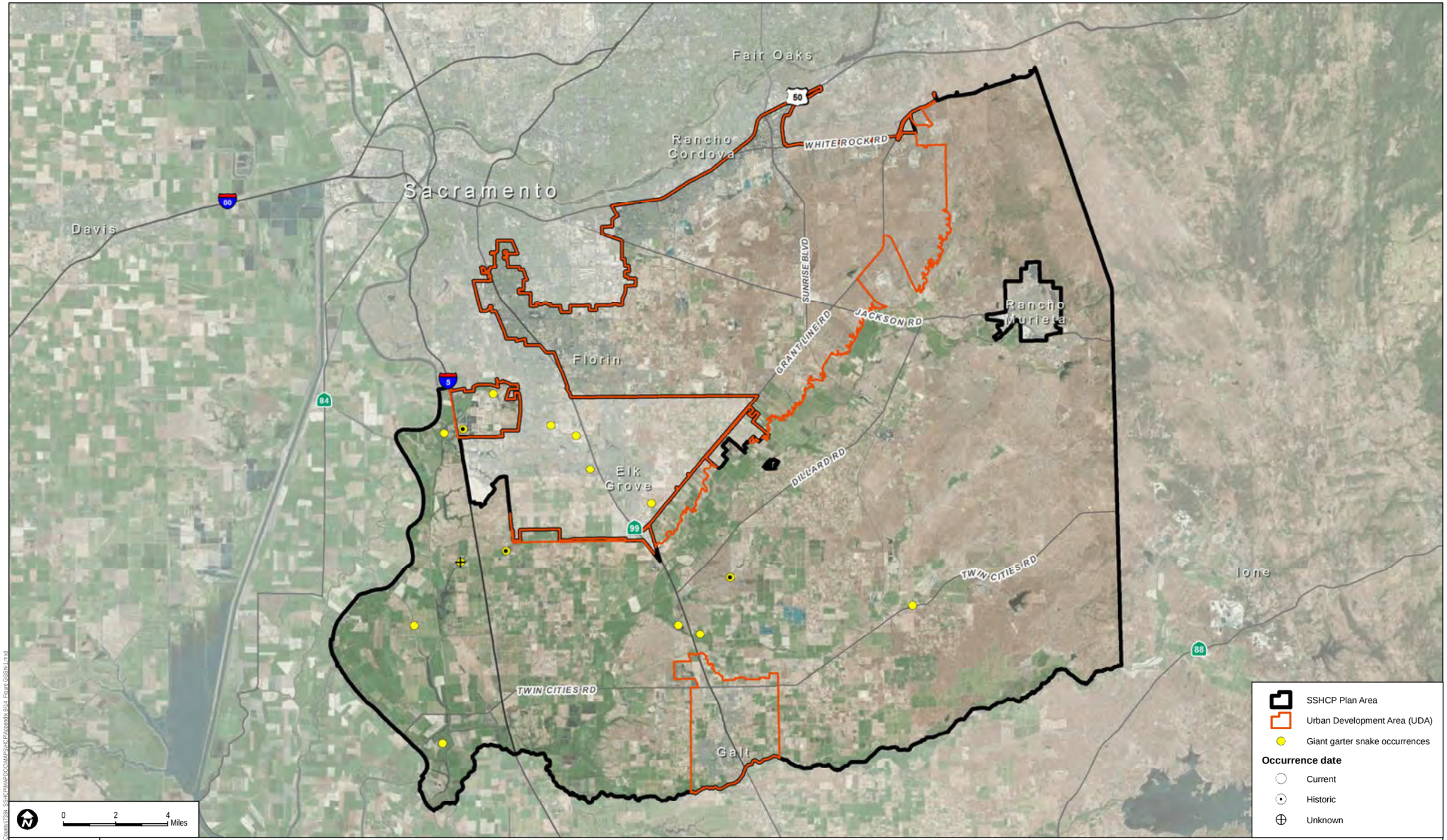
Wilcox, B.A. and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. *American Naturalist* 125:879-887.

Wylie, G. D., M. Cassaza, and J. K. Daugherty. 1997. 1996 Progress report for the GGS study. Preliminary report, US Geological Survey, Biological Resources Division.

Wylie, Glen. Herpetologist. US Geologic Survey. Dixon, California. April 2005.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, CNPS 1999

FIGURE GGS-1

Giant Gartersnake Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0294 SSHCP\MAPS\CMAPS\HCP\Palmerio\B14 Figure GGS-1.mxd

INTENTIONALLY LEFT BLANK

18 COOPER'S HAWK (COHA)

Prepared by Henderson Ecology and Planning (Steve Henderson)

Cooper's Hawk (COHA)

(Accipiter cooperii)

Status USFWS: None

Status CDFG: Bird Species of Special Concern



18.1 Legal Status

Cooper's hawk (*Accipiter cooperii*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800). This species is considered a Special Animal by the California Department of Fish and Game (CDFG).

18.2 Life History and Ecology

18.2.1 Species Description and Life History

18.2.1.1 Physical Description

Cooper's hawk is a medium-sized (e.g., crow-sized) woodland hawk with short, rounded wings and a long tail. Adult birds have yellow legs and orange-red eyes. The back and upper wing coverts are blue-gray, and the breast and underparts are finely barred with rufous or rust coloration. Young and juvenile birds are brown on the back and white on the breast with fine brownish streaks. Female Cooper's hawks are approximately one-third larger than males, and western birds are smaller than eastern birds. Adult mass of western females averages 16.7 and 15.5 ounces (473 and 439 grams) during the breeding season and migration, respectively. Adult mass of western males averages around 9.9 ounces (280 grams) during breeding and migration. Length estimates for western Cooper's hawks have not been summarized; however, eastern

females average 17.7 inches (45 centimeters) in length, while males average 15.4 inches (39 centimeters). (Rosenfield and Bielefeldt 1993).

Field identification of Cooper's hawk can be difficult where the species co-occurs with similar species. This species is frequently confused with the smaller sharp-shinned hawk (*A. striatus*) and larger northern goshawk (*A. gentilis*).

18.2.1.2 Taxonomy

Cooper's hawk is one of three North American hawks in the genus *Accipiter*. The other two species are the larger northern goshawk and smaller sharp-shinned hawk. Two subspecies of *A. cooperii*, the western *A. c. mexicanus* and eastern *A. c. cooperii*, are no longer recognized (Rosenfield and Bielefeldt 1993).

18.2.1.3 Reproduction

The breeding season for Cooper's hawk is generally March to July, however breeding is sometimes initiated earlier. Cooper's hawks typically begin breeding after two years of age, although breeding by first-year males (Rosenfield and Wilde 1982) and females (Meng 1951; Hennessy 1978; Reynolds and Wight 1978; Moore and Henny 1984; Asay 1987) have been documented. Cooper's hawks are monogamous and generally breed once per year; however, renesting can occur if a clutch is lost early in the incubation period (Rosenfield and Bielefeldt 1993). Pairs generally return to the same territory each year, but typically build a new (alternate) nest in the vicinity of the existing nest (Reynolds and Wight 1978). In California, the rate of nest area reoccupancy has been found to be 80 percent, and half of nesting attempts occurred in rebuilt nests (Asay 1987). In Southeast Arizona, Boal and Mannan (1999) observed color-banded pairs of Cooper's hawks on their territories during the non-breeding seasons, suggesting that some pairs maintain their pair bonds year-round.

Throughout its range, Cooper's hawk nests in evergreen and deciduous tree species. In California, 75 of 77 (97 percent) Cooper's hawk nests studied by Asay (1987) in three low-elevation study areas (Sacramento, Stockton, and southern California) were in live oaks (*Quercus wislizenii* or *Q. agrifolia*). The other two nests were in a blue oak (*Q. douglasii*) and California sycamore (*Platanus racemosa*). Most of these nests occurred in groves of six or more trees; however, two were in solitary trees 30 to 40 meters from the nearest tree.

Cooper's hawk nests are stick platforms with a cup lined with bark, placed in a crotch or lateral limb against the trunk of a tree. On average, nests are constructed 26 to 49 feet (8 to 15 meters) high, in trees 8.3 to 20 inches (21 to 52 centimeters) diameter-at-breast-height (dbh), and in stands with 64 to 95 percent canopy closure and 600 to 2,863 trees per acre (243 to 1,159 trees per hectare) (Rosenfield and Bielefeldt 1993).

Once the nest is built, Cooper's hawks engage in a month-long prelaying and copulatory period (Rosenfield et al. 1991). During this period, the male leaves the nest area to forage for himself and the female, but spends most of his time near the nest. The male provides nearly all the female's food during the pre-laying and nesting periods (Rosenfield and Bielefeldt 1993). In California, Cooper's hawks typically lay eggs in April and May. Clutch sizes range from one to seven eggs, but clutch sizes of three to five eggs are typical. Immature breeders tend to lay approximately five to 10 days later than adults. Incubation lasts approximately 34 to 36 days, and young remain in the nest an additional 30 to 34 days. Young may remain together in the vicinity of the nest for up to five to six weeks or more prior to dispersal (Rosenfield and Bielefeldt 1993). Boal and Spaulding (2000) recently observed a nesting attempt that involved nest helping by a third Cooper's hawk. Both the parental male and a subadult male delivered food to the nesting female, and all three individuals defended the nest.

18.2.1.4 Survival and Longevity

The maximum reported age of a Cooper's hawk is 12 years, while nine years is the maximum age known for a breeding bird. First year and adult annual survivorship has been estimated at 22 to 28 percent and 63 to 66 percent for first year and adult birds, respectively, using life table methods (Rosenfield and Bielefeldt 1993). Mannan et al. (2004) estimated a survival rate of 67 percent for radio-tagged fledgling Cooper's hawks, through 180 days of age, in an urban setting in Tuscon, Arizona.

18.2.1.5 Dispersal Patterns

The small amount of information on Cooper's hawk natal dispersal is based on band return data and a few localized studies. In Wisconsin, the average distance between the natal site and subsequent breeding site was 7.5 miles (12.0 kilometers) for six males, and 8.9 miles (14.4 kilometers) for a female (Rosenfield and Bielefeldt 1993). A female Cooper's hawk was also documented dispersing 49 miles (79 kilometers) between the natal and subsequent breeding site (Rosenfield and Bielefeldt 1993). Mannan et al. (2004) studied dispersal of 40 radio-tagged fledgling Cooper's hawks in urban Tuscon, Arizona. Dispersal patterns were characterized by relatively sedentary behavior in the natal area, followed by long movements after 11 to 13 weeks of age, then settlement and sedentary behavior in the fall/winter home range. The average distance between natal sites and winter home ranges was 6.8 and 3.7 miles (10.9 and 6.0 kilometers) for females and males, respectively.

There is little empirical information about adult dispersal; however, the available information suggests that adult Cooper's hawks exhibit strong fidelity to nesting areas (Rosenfield and Bielefeldt 1993), and pairs often reuse the same nest sites over consecutive years (Call 1978).

APPENDIX B (Continued)

18.2.1.6 Diet and Foraging

Cooper's hawks primarily eat medium-sized birds and mammals; and birds comprise most of the diet (Peterson and Murphy 1992; Rosenfield and Bielefeldt 1993). Important avian prey includes mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), northern flicker (*Colaptes auratus*), jays (*Cyanocitta* spp., *Aphelocoma* spp.), and European starling (*Sturnus vulgaris*). Other documented avian prey includes ring-necked pheasant (*Phasianus colchicus*), American crow (*Corvus brachyrhynchos*), rock pigeon (*Columba livia*), house sparrow (*Passer domesticus*), and dark-eyed junco (*Junco hyemalis*). Mammalian prey includes chipmunks (*Tamius* spp., *Eutamius* spp.), hares (*Lepus* spp.), deer mouse (*Peromyscus*), tree squirrels (*Sciurus* spp., *Tamiasciurus*), ground squirrels (*Ammospermophilus* spp., *Spermophilus* spp.). Cooper's hawks also eat reptiles, mammals, insects, and fish.

In an urban environment, Roth and Lima (2003) found that mourning dove, European starling, and rock pigeon comprised 91 percent of the diet of eight Cooper's hawks. In this study, small birds such as house sparrow were abundant, but rarely attacked. Mammals were not taken.

Cooper's hawks are considered aggressive ambush predators, using concealment to catch prey. Surprise attacks are often initiated at close range from behind an obstruction (Roth and Lima 2003). They often use a series of brief perch and scan episodes to locate and capture prey. In open habitats, Cooper's hawks occasionally hunt from the air, scanning the ground and stooping on prey (Rosenfield and Bielefeldt 1993).

18.2.1.7 Movement and Migration Patterns

Cooper's hawks breeding in the northern portions of the species' range are more migratory than those at more southern latitudes (Palmer 1988; Rosenfield and Bielefeldt 1993). Most Cooper's hawks breeding in California are permanent, non-migratory residents; however, Cooper's hawks breeding in montane habitats may exhibit seasonal movements, moving to snow-free lower elevations during winter (Zeiner et al. 1990).

18.2.1.8 Territoriality/Home Range

Cooper's hawk home ranges have been estimated at 988 to 4,446 acres (400 to 1,800 hectares) in New York, Michigan, Oregon, New Mexico, and Wisconsin. Home range size varies through the nesting cycle, and small portions of the home range may be used disproportionately (Rosenfield and Bielefeldt 1993). In urban Tuscon, Arizona, home range size for nine subadult Cooper's hawks during their first fall/winter averaged 1,905 acres (771 hectares) (Mannan et al. 2004). In a study of nesting Cooper's hawks in the Sacramento area, the average distance between adjacent nests was 0.99 mile (1.6 kilometers) (Asay 1987).

APPENDIX B (Continued)

In Tuscon, Mannan and Boal (2000) studied the movements of adult male Cooper's hawks in adjacent home ranges during the breeding season. Home range sizes for nine individuals ranged between 32.9 and 322.7 acres (13.3 and 130.6 hectares) and averaged 161.9 acres (65.5 hectares), while only one pair of home ranges overlapped. These home range sizes were considerably smaller than those reported elsewhere. Home range size apparently decreased with the number of years a Cooper's hawk maintained its breeding territory. The authors suggested that these relatively small home ranges may be a function of abundant prey availability, and Cooper's hawks in their study area may not require long foraging distances to meet their energetic requirements. In a study by Estes and Mannan (2003), the proportion of land use types within home ranges varied considerably among territories, and Cooper's hawks did not appear to select their home ranges based on the land use categories recognized by the authors. Also, patterns of habitat use suggested that male Cooper's hawks foraged primarily in areas surrounding their nests.

18.2.2 Habitat Requirements and Ecology

Throughout its range, the Cooper's hawk nests in a wide variety of woodland and forest habitats, including oak woodland, riparian woodland, coniferous, deciduous, and mixed forest, woodlots, and suburban and urban areas. In much of California's lowland valley and foothill landscapes, including those within the Plan Area, this species appears strongly associated with live oak woodland (Asay 1987). At higher elevations in California (e.g., the Sierra Nevada), Cooper's hawks nest in conifer forest (Asay 1987; Zeiner et al. 1990; Henderson pers. obs.).

On average, Cooper's hawk nests are constructed 26 to 49 feet (8 to 15 meters) high, in trees 8.3 to 20 inches (21 to 52 centimeters) diameter-at-breast-height (dbh), and in stands with 64 to 95 percent canopy closure and 600 to 2,863 trees per acre (243 to 1,159 trees per hectare) (Rosenfield and Bielefeldt 1993). Dense canopy closure is a consistent feature of most nest sites, and the tallest tree in the stand is often selected for nesting (Kennedy 1988). Kennedy (1988) suggested that suitability of Cooper's hawk nest sites may be a function of four primary factors: 1) proximity to foraging habitat with dense prey populations; 2) availability of prey during the fledgling period; 3) historic nest success at a site; and 4) the overall vegetation structure of the site.

In a study of 77 Cooper's hawk nests in California, Asay (1987) found that nearly all nests (i.e., 75) were in live oak trees. The other two nests were in a blue oak and California sycamore; and these trees were in stands of live oak. This study focused on three study areas at relatively low elevation including the Sacramento study area (Sacramento, Placer, and El Dorado counties at 98 to 656 feet [30 to 200 meters] elevation), the Stockton study area in the foothills east of Stockton (Calaveras county at 394 to 1,378 feet [120 to 420 meters] elevation), and the southern California study area in the hills east and north of San Diego (Riverside and San Diego Counties at 345 to 3,593 feet [105 to 1,095 meters] elevation). The Sacramento study area, which included

APPENDIX B (Continued)

27 nest sites, was dominated by gray pine (*Pinus sabiniana*), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), blue oak, and interior live oak (*Q. wislizenii*). In the vicinity of Folsom Lake, habitat consisted of relatively continuous and dense stands of interior live oak, gray pine, and shrubs. Occupied areas south of Folsom Lake consisted of more patchy stands of interior live oak mixed with valley oak, blue oak, and gray pine in a matrix of rolling grasslands. Although not specified in Asay's study, riparian woodlands also provide important habitat for Cooper's hawks in Sacramento County.

Other key findings of Asay's (1987) study of Cooper's hawk nesting habitat in lowland California were: 1) most nests occurred in groves of six or more trees; 2) stand structure was characterized by the canopies of multiple trees growing together; 3) the understory of these stands was relatively sparse, comprised of larger branches, few small branches and leaves, and sparse ground cover that included short grass and/or poison oak; 4) most nest trees (79 percent) were in flat or bottomland areas, although 21 percent occurred on steep hillsides; 5) nests were typically constructed in one of the most mature trees in the stand, in or just below the canopy; and 6) the heights of 48 nests ranged 18.7 to 46 feet (5.7 to 14 meters) and averaged 33 feet (10.1 meters) above ground.

In typical conifer forest habitats, Cooper's hawks inhabit medium to older aged forests with moderate tree densities, high canopy closure, and high canopy height (Reynolds et al. 1982; Moore and Henny 1983). Forest edge habitats are generally included within the home range (Rosenfield and Bielefeldt 1993). In Oregon, Cooper's hawks nested in stands of intermediate ages (30 to 70 years old) and densities (2,240 trees per acre [907 trees per hectare]). Comparatively, northern goshawks nested in older and more open stands, and sharp-shinned hawks nested in the youngest and densest stands (Reynolds 1983; Moore and Henny 1983).

Cooper's hawks also breed in urban and suburban areas. Several urban populations of Cooper's hawks have been well documented (Beebe 1974; Stahlecker and Beach 1979; Murphy et al. 1988; Rosenfield et al. 1991; Mannan et al 2004). Cooper's hawks appear tolerant of habitat fragmentation and human disturbance near the nest (Beebe 1974; Murphy et al. 1988; Palmer 1988; Rosenfield et al. 1992). Urban nest sites have included isolated trees within 492 feet (150 meters) of commercial and recreational activities, and 66 to 98 feet (20 to 30 meters) of residential houses (Stahlecker and Beach 1979; Rosenfield and Bielefeldt 1993). In urban Tuscon, first-year Cooper's hawks used a variety of habitats before settling on winter home ranges, but occurred most frequently (35 percent of locations) in riparian areas (Mannan et al. 2004). Adult Cooper's hawks in Tuscon nested more frequently in eucalyptus (*Eucalyptus* spp., 70.8 percent), Aleppo pine (*Pinus halepensis*, 25 percent), and cottonwood (4.2 percent) trees than expected based on their availability (Boal and Mannan 1998). Most nest trees were in the yards of single-family residences (48.3 percent) and high-use recreational areas (28.3 percent). Human disturbance levels did not appear to affect nest site selection. Compared to random sites,

nest sites were characterized by groves of greater canopy closure and more trees greater than 32.8 feet (10 meters) tall. Furthermore, nest trees were taller and larger (Boal and Mannan 1998).

18.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Cooper's hawk are identified in Table COHA-1 and have been derived from input from local species experts.

Table COHA-1
Essential Habitat Elements for Cooper's Hawk

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, mixed riparian scrub, and orchards.	Structurally diverse woodland habitats that provide suitable prey abundance and diversity (i.e., medium-sized birds) and large numbers of sites within which to perch, scan, and launch attacks on potential prey.
Nesting	Blue oak woodland, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, and mixed riparian scrub.	Groves of trees; stand structure with the canopies of multiple trees growing together; sparse understory; and mature trees that allow for placement of nests 18 to 46 feet above ground.

18.3 Species Distribution and Population Trends

18.3.1 Species Distribution

Cooper's hawk is the most widely distributed North American Accipiter south of Canada (American Ornithologists' Union 1957; Asay 1987). Populations of Cooper's hawk occur throughout most of the United States as well as southern Canada and northern Mexico. Northern populations are migratory or partially migratory (Palmer 1988; Rosenfield and Bielefeldt 1993), while some southwestern populations migrate as well (Millsap 1981; Kelly and Kennedy 1993). Most Cooper's hawks winter in the coterminous United States, most of Mexico, and south to Costa Rica and possibly Panama (Ridgely and Gwynne 1989; Rosenfield and Bielefeldt 1993).

18.3.2 Central Valley Distribution

Cooper's hawk is a breeding resident throughout most of California, including the Central Valley, in a variety of woodland habitats. Based on its close association with live oak woodlands (Asay 1987), its Central Valley breeding distribution is probably concentrated in the foothill woodlands along the upper margins of the Central Valley.

APPENDIX B (Continued)

18.3.3 Range Within the Plan Area

Cooper's hawks occur in suitable habitat within the Plan Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by Cooper's hawks, such as oak and riparian woodland, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Plan Area, particularly in the eastern portion of the Plan Area and outside the Urban Development Area (UDA). At most sites within these land-cover types, the presence of Cooper's hawk is not known, and it is assumed that most of this habitat is not occupied.

Asay (1987) studied breeding habitat characteristics and productivity of Cooper's hawks at 27 nest sites in Sacramento, El Dorado, and Placer Counties collectively; however, the number and locations of sites specifically in Sacramento County were not reported. In the Plan Area, the CNDDB reports three occurrences inside the UDA and no occurrences outside the UDA (CDFG 2010). There are four CNDDB occurrence records of Cooper's hawk in Sacramento County outside, but near the Plan Area (CDFG 2010). Figure COHA-1 shows the known occurrences of Cooper's Hawk inside the Plan Area (CDFG 2010; Henderson unpublished; Asay 1987). The occurrence data from the CNDDB does not allow for an estimate of the distribution or population size of Cooper's hawk in the Plan Area because they are based on a very small number of surveys in a limited area. Local ornithologists C. Conard and J. Trochet provided additional occurrence and habitat distribution information, which is summarized below.

- At the Cosumnes River Preserve, at least three Cooper's hawk nests have been documented in the Lower Preserve over the last 10 years. All of these nests failed before fledging, presumably due to predation by great horned owls (*Bubo virginianus*). Also, an adult Cooper's hawk carrying a towhee was recently observed at the Tall Forest (Trochet pers. comm.). This adult could have been delivering food to a nest.
- In 2003, nesting was documented east of Highway 99 at Bond Drive (Trochet pers. comm.).
- First-year Cooper's hawks are regularly observed at the Bufferlands (Conard pers. comm.).
- Cooper's hawks have historically nested in McKinley Park (Trochet pers. comm.).
- Nesting has not been documented at Howard Ranch (Trochet pers. comm.).
- Habitat identified as suitable for nesting Cooper's hawks in the Plan Area includes dense stands of interior live oak near Scott Road (Conard pers. comm.). Also, riparian woodland along Deer Creek downstream of its crossing with Scott Road, which includes cottonwood trees, has a high potential to support breeding Cooper's hawks (Trochet pers. comm.).

Because comprehensive surveys or monitoring efforts for Cooper's hawk in the Plan Area have not been conducted, and because the known occurrences are based mostly on incidental

observations or limited surveys (e.g., CNDDB, anecdotal records, surveys conducted over a limited area), the population size and extent of suitable nesting habitat for this species in the Plan Area are not well known.

SSHCP compliance monitoring (including pre-project surveys for covered activities and pre-acquisition surveys for potential preserve lands) will be used to expand upon and refine Cooper's hawk occurrence and habitat distribution information through implementation of the SSHCP.

18.3.4 Population Levels and Trend

Overall, Cooper's hawk has been considered common in the western portion of its range (Reynolds 1989), and western populations have been considered relatively stable (Snyder et al. 1973; Jones 1979). Grinnell and Miller (1944) once considered Cooper's hawk a common breeder throughout its range in California. Although population declines in the west are less well documented than in the east, Remsen (1978) reported that breeding populations of Cooper's hawk had declined throughout California over the two or three decades prior to 1978. At that time, breeding populations had been extirpated from some areas (e.g., the Colorado River), and severe declines were reported for the Sacramento Valley (Gaines 1974), Santa Cruz and Santa Clara Counties (Chandik and Baldridge 1969), Santa Barbara area, northern San Diego County, and Yosemite National Park (Gaines 1977, Remsen 1978). Also, analysis of Breeding Bird Survey (BBS) data for the 20-year period (1983 to 2003) suggests that Cooper's hawk populations in California may have declined (P = 0.11) during that period (Sauer et al. 2004).

18.4 Threats to the Species

The primary threat to Cooper's hawk, particularly in California, is probably habitat loss and degradation as a result of urbanization and development. Direct or indirect human disturbance of nesting activities, particularly in suburban areas, may also threaten populations (Thelander 1973; Olendorff and Kochert 1977; Remsen 1978; Bosakowski et al. 1993; Boal and Mannan 1998).

Declines in eastern Cooper's hawk populations attributed to pesticide contamination have been documented (Henny and Wight 1972; Snyder et al. 1973; Bednarz et al. 1990). In San Diego, one Cooper's hawk in 1968 was found to be highly contaminated with DDT (dichlorodiphenyltrichloroethane) (Risebrough et al. 1968); however, pesticide contamination of Cooper's hawks in California has not been reported elsewhere (Remsen 1978).

Shooting and trapping were important factors in historical population declines, but are no longer considered a threat (Rosenfield and Bielefeldt 1993). Timber harvest is considered a potential threat, but the impacts of logging on this species are poorly understood (Reynolds 1983; Rosenfield and Bielefeldt 1993). The availability of breeding habitat is apparently not a limiting factor for Cooper's hawk populations, at least in some areas, including suburban areas

(Rosenfield and Bielefeldt 1993). More than 100 nest sites for this species have been found during on-going surveys by the Golden Gate Raptor Observatory (GGRO) in the larger East Bay Area (i.e., urban areas from El Cerrito south to Alameda) since 2002 (Fish 2008).

Trichonmoniasis, a digestive tract disease in raptors that originates from infected avian prey (particularly doves), has been reported to be common and an important source of mortality in nestling and fledgling Cooper's hawks in some urban populations (Boal et al. 1998; Boal and Mannan 1999; Rosenfield et al. 2002; Estes and Mannan 2003). However, the prevalence of infection appears to vary widely across the Cooper's hawk's breeding range (Rosenfield et al. 2002). Also, West Nile virus has been isolated from brain tissue of a Cooper's hawk in Connecticut (Wakem et al. 1999).

18.5 Data Gaps and Conservation Implications

The ecology, status, and management of Cooper's hawks have received considerable attention in recent years. However, there are several sources of uncertainty regarding Cooper's hawks and their requirements in the Plan Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

18.5.1 Population and Habitat Distribution within the Plan Area

Cooper's hawks occur in suitable habitat within the Plan Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by Cooper's hawks, such as oak and riparian woodland, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Plan Area, particularly in the eastern portion of the Plan Area and outside the UDA. However, at most sites within these land-cover types, the presence of Cooper's hawk is not known, and it is assumed that most of this habitat is not occupied.

Because comprehensive surveys for Cooper's hawk in the Plan Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and nesting locations of this species throughout the Plan Area are not known. Also, although the distribution of oak and riparian woodlands is mapped and quantifiable, the quality of habitat for Cooper's hawks within most of these areas is unknown. A few areas identified as suitable for nesting Cooper's hawks in the Plan Area include dense stands of interior live oak near Scott Road (Conard pers. comm.). Also, riparian woodland along Deer Creek downstream of its crossing with Scott Road has a high potential to support breeding Cooper's hawks (Trochet pers. comm.).

These information gaps limit our ability to identify the best lands available for preserving Cooper's hawk habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value of woodland and riparian woodland land-cover types for Cooper's hawk will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas (e.g., near the Cosumnes River Preserve).

18.5.2 Effectiveness of Woodland Enhancement and Restoration Techniques in Creating Suitable Habitat Structure for Cooper's Hawk

Achieving the conservation goals and objectives for Cooper's hawk will require successful enhancement and restoration of oak and riparian woodlands. The structure of woodlands (e.g., dense canopy closure) is an important factor for suitability of Cooper's hawk. Whether restored or enhanced woodlands can retain the structural attributes suitable for Cooper's hawk is unknown. If woodland restoration and enhancement techniques cannot eventually create woodland habitats with structural characteristics suitable for Cooper's hawk, then those lands would not support breeding pairs.

18.6 Literature Cited

American Ornithologists' Union. 1957. Check-list of North American birds. American Ornithologists' Union, Washington, D.C.

Asay, C.E. 1987. Habitat and productivity of Cooper's hawks nesting in California. *California Fish and Game* 73:80–87.

Bednarz, J. C., D. Klem Jr., L. J. Goodrich, and S. E. Senner. 1990. Migration counts of raptors at Hawk Mountain, Pennsylvania, as indicators of population trends, 1934-1986. *The Auk* 107:96-109.

Beebe, F.L. 1974. Field studies of the Falconiformes of British Columbia. Brit. Col. Prov. Mus. Occas. Paper No. 17. 163 pp.

Boal, C.W. and R.L. Spaulding. 2000. Helping at a Cooper's Hawk nest. *Wilson Bulletin* 112:275-277.

Boal, C.W. and R.W. Mannan. 1998. Nest-site selection by Cooper's hawks in an urban environment. *Journal of Wildlife Management* 62:864–871.

Boal, C.W. and R.W. Mannan. 1999. Comparative breeding ecology of Cooper's Hawks in urban and exurban areas of southeast Arizona. *Journal of Wildlife Management* 63:77-84.

Boal, C.W., R.W. Mannan, and K. S. Hudelson. 1998. Trichomoniasis in Cooper's Hawks from Arizona. *Journal of Wildlife Diseases* 34:590-593.

APPENDIX B (Continued)

Bosakowski, T., R. Speiser, and L.J. Niles. 1993. Loss of Cooper's Hawk nesting habitat to suburban development: inadequate protection for a state-endangered species. *Journal of Raptor Research* 27:26-30.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Partners in Flight (CalPIF). 2002. Version 2.0. The oak woodland bird conservation plan: a strategy for protecting and managing oak woodland habitats and associated birds in California (S. Zack, lead author). Point Reyes Bird Observatory, Stinson Beach, California. http://www.prbo.org/calpif/plans.html.

Call, M. W. 1978. Nesting Habitats and surveying techniques for common western raptors. Technical Note TN-316. U.S. Department of the Interior - Bureau of Land Management, Denver Service Center.

Chandik, T., and A. Baldridge. 1969. The nesting season. Middle Pacific Coast Region. *Audubon Field Notes* 23:688-693.

Conard, C. Ornithologist. Telephone conversation, October 15, 2004.

Estes, W.A., and R.W. Mannan. 2003. Feeding behavior of Cooper's Hawks at urban and rural nests in southeastern Arizona. *Condor* 105:107-116.

Fish, A.M. 2008. October 22, 2008 letter to West Contra Costa Unified School District from Golden Gate Raptor Observatory in regards to information and comments on Cooper's hawk at Castro Park.

Gaines, D. 1974. A new look at the nesting riparian avifauna of the Sacramento Valley, California. *Western Birds* 5:61-80.

Gaines, D. 1977. *Birds of the Yosemite Sierra*. Cal-Syl Press, Oakland, California.

Grinnell, J. and A.H. Miller. 1944. *Distribution of the birds of California*. Pacific Coast Avifauna, No. 27. Berkeley, California.

Hennessy, Stephen P. 1978. Ecological relationships of accipiters in northern Utah-with special emphasis on the effects of human disturbance. 66 p. M.S. Thesis, Utah State University, Logan.

APPENDIX B (Continued)

Henny, C.J., and H.M. Wight. 1972. Population ecology and environmental pollution: red-tailed and Cooper's hawks. *In* Population ecology of migratory birds: a symposium. *United States Fish and Wildlife Service Report* 2:229–250.

Jones, S. 1979. The Accipiters: Goshawk, Cooper's Hawk, Sharp-shinned Hawk. U.S. Bureau of Land Management Technical Note No. 335. 51 pp.

Kelly, E.J., and P.L. Kennedy. 1993. A Dynamic State Variable Model of Mate Desertion in Cooper's Hawks. *Ecology*, 74(2):351-366.

Kennedy, P.L. 1988. Habitat characteristics of Cooper's Hawks and Northern Goshawks nesting in New Mexico. Pp. 218-227 *in* Proc. Southwestern raptor management symposium (R. Glinski, B.G. Pendleton, M.B. Moss, B.A. Millsap, and S.W. Hoffman, Editors). Natl. Wildl. Fed. Sci. Tech. Ser. No. 11.

Mannan, R.W., and C.W. Boal. 2000. Home range characteristics of male Cooper's Hawks in an urban environment. *Wilson Bulletin* 112:21-27.

Mannan, R.W., W.A. Estes, and W.J. Matter. 2004. Movements and survival of fledgling Cooper's Hawks in an urban environment. *Journal of Raptor Research* 38:26-34.

Meng, H. K. 1951. The Cooper's hawk, Accipiter cooperii (Bonaparte). Ph.D. Thesis, Cornell Univ., Ithaca, New York. 202pp.

Millsap, B.A. 1981. Distributional status of Falconiformes in west central Arizona with notes on ecology, reproductive success, and management. U.S. Bureau of Land Management Technical Note 355.

Moore, K.R. and C.J. Henny. 1983. Nest site characteristics of three coexisting *Accipiter* hawks in northeastern Oregon. *Raptor Research* 17:65–76.

Moore, K.R. and C.J. Henny. 1984. Age-specific productivity and nest site characteristics of Cooper's Hawks (*Accipiter cooperii*). *Northwest Sci*. 58:290-299.

Murphy, R.K., M.W. Gratson, and R.N. Rosenfield. 1988. Activity and habitat use by a breeding male Cooper's hawk in a suburban area. *Journal of Raptor Research* 22: 97-100.

Olendorff, R.R. and M.N. Kochert 1977. Land Management for the Conservation of Birds of Prey. From R.D. Chancellor. World Conference on Birds of Prey, Vienna, 1975, Report of Proceedings. International Council for Bird Preservation.

APPENDIX B (Continued)

Palmer, R. S., ed. 1988. Handbook of North American birds. Vol. 5. Yale Univ. Press, New Haven. 465 pp.

Peterson, D.J., and R.K. Murphy. 1992. Prey delivered to two cooper's hawk Accipiter cooperii nests in northern mixed grass prairie. *Canadian Field-Naturalist* 106: 385-386.

Remsen, J.V. 1978. Bird Species of Special Concern in California, Cooper's Hawk. California Department of Fish and Game. Sacramento, California.

Reynolds, R.T. 1983. Management of western coniferous forest habitat for nesting accipiter hawks. U.S. Forest Service Technical Report RM-102.

Reynolds, R.T. 1989. Status reports: accipiters. Pages 92-101 *in* B. G. Pendleton, C. E. Ruibal, D. L. Krahe, K. Steenhof, M. N. Kockert, and M. L. LeFranc, editors. Proceedings of the western raptor management symposium and workshop. National Wildlife Federation, Washington, D.C., USA.

Reynolds, R. T. and H. M. Wight. 1978. Distribution, density, and productivity of accipiter hawks breeding in Oregon. *Wilson Bulletin,* 90:182-96.

Reynolds, R.T., E.C. Meslow, and H.M. Wight. 1982. Nesting habitat of coexisting *Accipiter* in Oregon. *Journal of Wildlife Management* 46:124–138.

Ridgely, R.S. and J.A. Gwynne. 1989. A guide to the birds of Panama with Costa Rica, Nicaragua, and Honduras. Rev. E. Princeton University Press, Princeton, New Jersey.

Risebrough, R. W., P. Reiche, D. B. Peakall, S. G. Herman, and M. N. Kirven. 1968. Polychlorinated biphenyls in the global ecosystem. *Nature* 220:1098-1102.

Rosenfield, R.N. and J. Wilde 1982. Male Cooper's Hawk Breeds in Juvenal Plumage Male Cooper's Hawk Breeds in Juvenal Plumage. *The Wilson Bulletin*, 94(2): 213.

Rosenfield, R.N., J. Bielefeldt, L.J. Rosenfield, S.J. Taft, R.K. Murphy, A.C. Stewart. 2002. Prevalence of Trichomonas gallinae in Nestling Cooper's Hawks among Three North American Populations Prevalence of Trichomonas gallinae in Nestling Cooper's Hawks among Three North American Populations. *The Wilson Bulletin*, 114(1):145-147.

Rosenfield, R.N., and J. Bielefeldt. 1993. Cooper's Hawk (*Accipiter cooperii*). *In* The Birds of North America, No. 75 (A. Poole and F. Gill, Editors). Philadelphia: The Academy of Natural Sciences, Washington, DC. The American Ornithologists' Union.

APPENDIX B (Continued)

Rosenfield, R.N., C.M. Morasky, J. Bielefeldt, and W.L. Loope. 1992. Forest fragmentation and island biogeography, a summary and bibliography. USDI, National Park Service Technical Report 92/08.

Rosenfield, R.N., J. Bielefeldt, L.J. Rosenfield, S.J. Taft, R.K. Murphy, and A.C. Stewart. Prevalance of *Trichomonas gallinae* in nestling Cooper's Hawks among three North American populations. *Wilson Bulletin* 114:145-147.

Rosenfield, R.N., J. Bielefeldt, R.K. Anderson, and J.M. Papp. 1991. Status Reports: accipiters. Pp. 42-49 *in* Proc. Midwest Raptor Management Symposium and Workshop. Natl. Wildl. Fed., Washington, D.C.

Roth, T. C. and S. L. Lima. 2003. Hunting behavior and diet of Cooper's Hawks: an urban view of the small-bird-in-winter paradigm. *Condor* 105:474–483.

Sauer, J.R., J.E. Hines, and J. Fallon. 2004. The North American Breeding Bird Survey, Results and Analysis 1966-2003. Version 2004.1. USGS Patuxent Wildlife Research Center, Laurel, Maryland.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Snyder, N.F.R., H.A. Snyder, J.L. Lincer, and R.T. Reynolds. 1973. Organochlorines, heavy metals, and the biology of North American accipiters. *BioScience* 23:300-305.

Stahlecker, D.W. and A. Beach. 1979. Successful nesting by Cooper's hawks in an urban environment. *Inland Bird Banding* 51:56-57.

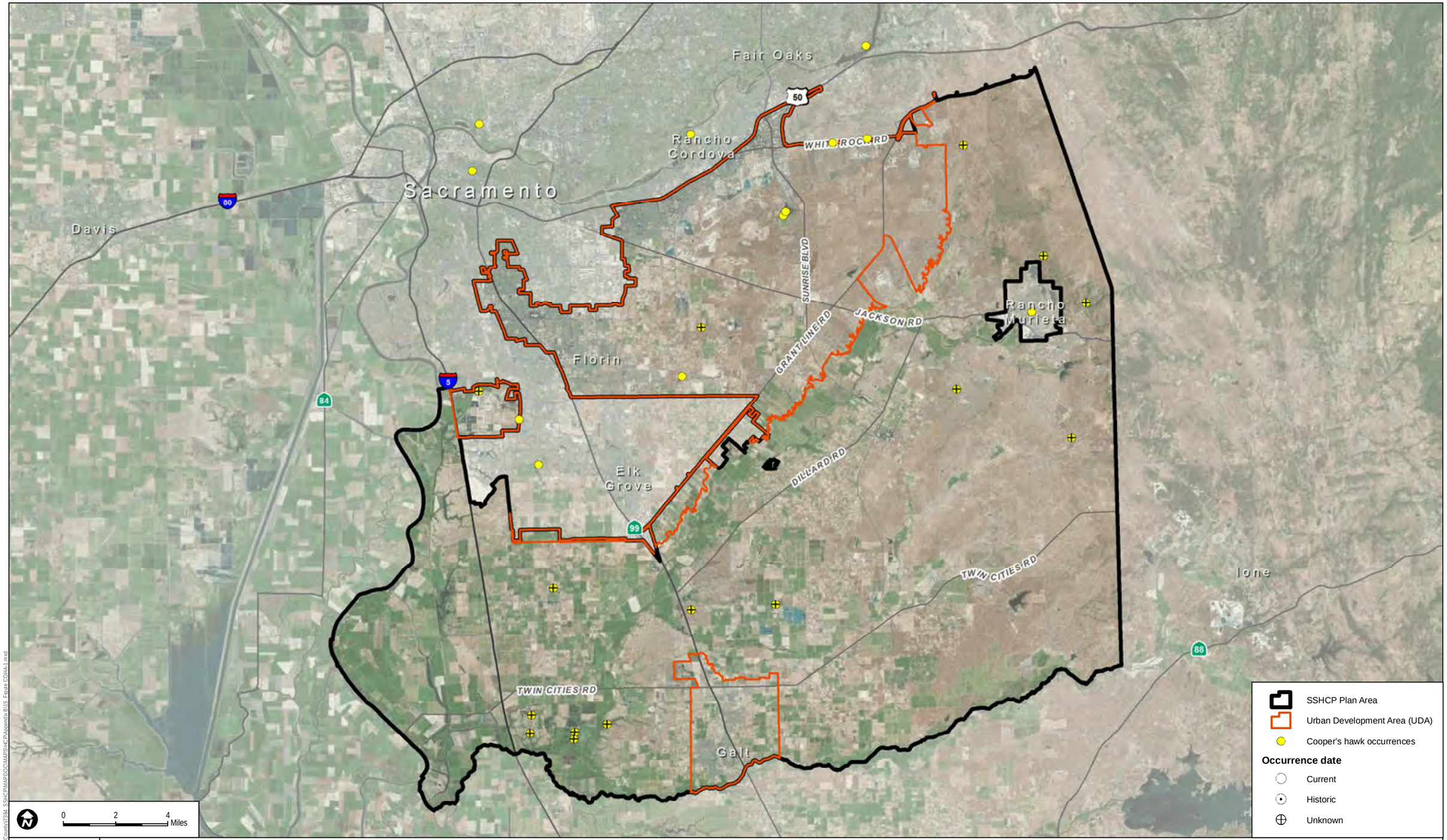
Thelander, C.G. 1973. Bald Eagle Reproduction in California. 1972-1973. California Department og Fish and Game, Wildlife Branch Adm. Rep. 73-5. 17 pp.

Trochet, J. Ornithologist. Telephone conversation, October 15, 2004.

Wakem, E.M, R.A. French, A.E. Garmendia, and H.J. Van Kruiningen. 1999. Isolation of West Nile virus from mosquitoes, crows, and a Cooper's Hawk in Connecticut. *Science* 286(5448):2331-2333.

APPENDIX B (Continued)

Zeiner, D. C., W. F Laudenslayer Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife: volume II: birds. California Department of Fish and Game. Sacramento, California.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org

FIGURE COHA-1

Cooper's Hawk Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0284 SSHCP\MAPS\MAPSHCP\Planning\fig\B15_Figure COHA-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

19 TRICOLORED BLACKBIRD (TRIC)

Prepared by Todd Sloat Biological Consulting (Todd Sloat)

Tricolored Blackbird (TRIC)

(Agelaius tricolor)

Status USFWS: Bird of Conservation Concern

Status CDFG: Species of Special Concern



iStockphotos

19.1 Legal Status

The tricolored blackbird (*Agelaius tricolor*) is legally protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7012) and California Fish and Game Code (Section 3503.5 and 3800). The species is also considered a species of special concern by the California Department of Fish and Game (CDFG) (Shuford and Gardali 2008). The tricolored blackbird was formerly a candidate (category 2) for federal listing as either Threatened or Endangered by the U.S. Fish and Wildlife Service (USFWS) (59 Federal Register [219]: 58990), and was also informally identified as a Species of Concern (USFWS 1995). More recently, the USFWS (2002) designated the tricolored blackbird as a Bird of Conservation Concern (BCC). The Bureau of Land Management (BLM) also designates it as a Sensitive Species (BLM 1999).

19.2 Life History and Ecology

19.2.1 Species Description and Life History

19.2.1.1 Physical Description

The tricolored blackbird is a medium-sized, sexually dimorphic blackbird. Adults range from 18 to 24 centimeters (7 to 9.5 inches) in length (from beak to tail) and weight between 40 to 70 grams (1.4 to 2.5 ounces), depending on the sex and season (Beedy and Hamilton 1999). Adult males are entirely black, glossed bluish (in full sunlight), with bright red lesser wing-coverts forming conspicuous reddish patches on wing shoulders (epaulets). The median-coverts are buffy white (August through February) to pure white (February through July) (Mailliard 1910; DeHaven 1975). Adult females are mostly black, with distinct grayish streaks; relatively whitish chins and throats, rarely with faint pinkish or peach wash; and small but distinct reddish shoulder

patches (DeHaven 1975). Juveniles of both sexes (April through August) are similar to adult females but are much paler gray and buff (Pyle 1997).

19.2.2 Demography

19.2.2.1 Reproduction

During the breeding season, tricolored blackbirds typically nest in dense colonies (some estimated as having 200,000+ nests), with males defending small territories and mating with one to four females (Beedy and Hamilton 1999). They are also considered itinerant breeders, sometimes nesting more than once at different locations during the breeding season. Studies by Neff (1937) reported that nesting colonies are often located in seasonal wetlands with tules (*Scirpus* spp.) and cattails (*Typha* spp.) present. More recent studies indicate that nesting colonies are also regularly found in Himalayan blackberries (*Rubus discolor*) (Cook 1999) and grain fields (DeHaven 2000).

Female tricolored blackbirds breed in their first year, but most males apparently defer breeding until they are at least two years old (Payne 1969). Nest construction, done exclusively by females, is usually highly synchronous and may be initiated as soon as the day of arrival at the breeding colony (Neff 1937). Additional birds may be recruited to the colony site and initiate nesting later. These birds may nest in a continuing concentric wave at the margin of the colony (Orians 1961). As colonization of a breeding site proceeds, the area occupied by nests expands (Tyler 1907), engulfing any previously established breeding red-winged blackbird (*Agelaius phoeniceus*) nest sites (Orians 1961).

Tricolored blackbird nests are bound to upright plant stems from a few inches up to about six feet (1.8 meters) above water or ground (Harrison 1978). Nests in the canopies of willows (*Salix* spp.) and ashes (*Fraxinus* spp.), however, may be more than 12 feet (3.6 meters) high (Hamilton pers. comm.). Tricolored blackbird nests are rarely built on the ground (Neff 1937). Deep cup nests are constructed with outer layers of long leavers (e.g., cattail thatch, annual grasses, or forbs) woven tightly around supporting stems. The inner layers are coiled stems of grasses lined with soft plant down, mud, or algal fibers. Nest building takes about four days (Payne 1969).

Egg laying can begin as early as the second day after nest initiation, but ordinarily starts about four days after the arrival of birds at breeding sites (Payne 1969). One egg per day is laid, and clutch size is typically three to four eggs (Payne 1969, Hamilton et al. 1995). Emlen (1941) and Orians (1961) estimated the tricolored blackbirds incubation period at 11 or 12 days, while Payne (1969) estimated this interval at 11 to 14 days. Incubation begins before clutches are completed, and eggs in individual nests hatch asynchronously (Hamilton pers. comm.).

APPENDIX B (Continued)

Tricolored blackbird clutches take about nine days from hatching until the oldest nestling is willing to jump from the nest when disturbed. Young require about 15 days from this pre-fledging date until they are independent of their parents. Thus, one successful nesting effort for a reproductive pair takes about 45 days (Hamilton et al. 1995). The persistence of a successful colony takes additional time, depending on the presence of females recruited into the colony after the initial establishment.

A successful tricolored blackbird colony, including some asynchronous nests, takes about 50 days from nest initiation to fledging. Because most first nesting efforts are made before April 25, most nesting attempts observed between April 25 and May 20 are probably second or third attempts by birds that lost earlier nests. A pair beginning nesting after April 25 and before May 20 would not have had sufficient time (i.e., about 45 days) to complete a prior, successful nest (Beedy and Hamilton 1997).

Tricolored blackbird activity during the early stages of colony settlement may give the erroneous impression of high local nesting densities because typically more birds are present at some colonies initially than will actually remain to nest (Hamilton et al. 1995). Flight activity over colonies during the settlement phase is mainly by males that have not established nesting territories. Males gaining breeding territories may remain below the canopy of nesting substrates and, therefore, out of view. The mean number of females per male is estimated to be two (Orians 1961; Payne 1969), but some colonies may have nearly as many males as females (Hamilton pers. comm.). A count of active tricolored blackbird nests per unit area is a better indication of local abundance than numbers of singing males (Neff 1937).

Females on nests are quiet during incubation, and active colonies may appear to be largely deserted. The more synchronous colonies are particularly inconspicuous at this stage and can be easily overlooked. Close approach by an observer, however, usually causes females to leave their nests and fly away (Hamilton pers. comm.).

Banding studies, summarized by Neff (1942) and DeHaven and Neff (1973), indicated life span may extend to at least 13 years (Kennard 1975; Beedy and Hamilton 1999). No annual survivorship studies have been conducted and available banding data is inadequate to determine annual survivorship (Beedy and Hamilton 1999).

Dyer et al. (1977 *in* DeHaven 2000) reported red-winged blackbird's (*Agelaius phoeniceus*), the tricolored blackbird's closest relative, annual survival between 42 to 62 percent and an average life expectancy of 2.14 years.

APPENDIX B (Continued)

19.2.2.2 Dispersal Patterns

A crèche of tricolored blackbirds is a group of fledglings that have left the nest and assembled either at the colony site or at locations between colonies and favorable foraging areas (Payne 1969). These fledglings are conspicuous, both because they are vociferous and because adults are feeding them as rapidly as possible (Hamilton pers. comm.). DeHaven et al. (1975) banded 33,058 nestlings and only 39 percent of band recoveries were re-located within 16 kilometers (10 miles) of natal colonies.

19.2.2.3 Diet and Foraging

Tricolored blackbirds primarily forage by gleaning food parts from the ground and secondarily by gleaning food parts from foliage (Ehrlich et al. 1988). Food items are diverse and change seasonally. During the nesting season, foods delivered by adults to nestlings include beetles and weevils, grasshoppers, caddisfly larvae, and moth and butterfly larvae (Orians 1961; Crase and DeHaven 1977; Skorupa et al. 1980), and, especially in current rice-growing areas, dragonfly larvae (Hamilton pers. comm.). In contrast, breeding season foraging studies in Merced County showed that animal matter makes up about 91 percent of the food volume of nestlings and fledglings, 56 percent of the food volume of adult females, and 28 percent of that of adult males (Skorupa et al. 1980). Studies conducted since the 1980's have documented tricolored blackbirds feeding on dairy cow silage that is stored in large open piles on the ground (Cook pers. comm.). Also, the importance of grasshoppers as a dietary item has been highlighted during the breeding season (Cook pers. comm.; DeHaven 2000).

Adults may continue to consume plant foods through the nesting cycle, but also forage on insects and other animal foods. Immediately before and during nesting, adults are often attracted to dairies, where the birds take high-energy items from livestock feed rations. Adults with access to livestock feed, such as cracked corn, begin providing it to nestlings when they are about 10 days old (Hamilton et al. 1995).

More that 88 percent of all winter food in the Sacramento Valley is plant material, primarily seeds or rice and other grains, but also weed seeds (Crase and DeHaven 1978). In winter, tricolored blackbirds often associate with other blackbirds, but flocks as large as 15,000 individuals (almost all tricolored blackbirds) may aggregate at one location and disperse to foraging sites. Some winter foraging flocks are almost exclusively composed of one sex (Hamilton pers. comm.), which may imply an as-yet unidentified gender difference in foraging preferences.

APPENDIX B (Continued)

19.2.2.4 Movement and Migration Patterns

In late March and early April, tricolored blackbirds vacate wintering areas in the Sacramento-San Joaquin River Delta and along coastal central California and arrive at breeding locations in Sacramento County and throughout the San Joaquin Valley (DeHaven et al. 1975). A substantial, but as yet unmeasured, number of tricolored blackbirds also winter in the northern San Joaquin Valley (Hamilton pers. comm.).

During the breeding season, tricolored blackbirds often exhibit itinerant breeding and move to new breeding locations following previous nesting attempts elsewhere (Hamilton 1998). Most probably move from the San Joaquin Valley and Sacramento County to the northern Sacramento Valley for second or third nesting attempts. While this trend was noted in all three years of an intensive study, colonies may form at any time during the breeding season (April through July) throughout the known breeding distribution of this species (Hamilton et al. 1995; Hamilton 2000).

Long-term banding studies by DeHaven et al. (1975) demonstrated a major postbreeding season movement into the Sacramento Valley from other breeding locales. Large postbreeding roosts continue to develop in this area from late summer (August) into fall (Hamilton pers. comm.).

The timing of major movements to wintering areas is unknown. Large foraging flocks can be seen in pasturelands north of Rio Vista, Solano County, by late October (Beedy pers. obs.), and Hamilton (pers. comm.) has seen large flocks in the Sacramento and San Joaquin River Delta by late November. During winter, tricolored blackbirds can be found in large flocks by themselves, or with other blackbird species including red-winged blackbirds and Brewer's blackbirds (*Euphagus cyanocephalus*) (Beedy and Hamilton 1999).

19.2.2.5 Ecological Relationships

Several wildlife species are known to raid tricolored blackbird nests. In addition, great-tailed grackles (*Quisalus mexicanus*), a southern species expanding its range northward, have been reported nesting near and exhibiting aggression toward tricolored blackbird breeding colonies (Hamilton pers. comm. *in* Beedy and Hamilton 1999). Roosting European starlings (*Sturnus vulgaris*) are associated with desertion of tricolored blackbird colonies (Payne 1969 *in* Beedy and Hamilton 1999).

19.2.3 Habitat Requirements and Ecology

Tricolored blackbirds are closely related to red-winged blackbirds, but the two species differ substantially in their breeding ecology. Red-winged blackbird pairs defend individual territories, while tricolored blackbirds are among the most colonial of North American

APPENDIX B (Continued)

passerines (Bent 1958; Orians 1961, 1980; Orians and Collier 1963; Payne 1969; Beedy and Hamilton 1999). As many as 20,000 or 30,000 tricolored blackbird nests have been recorded in cattail marshes of 9 acres (four hectares) or less (Neff 1937; DeHaven et al. 1975), and individual nests may be built less than 1.5 feet (0.50 meters) from each other (Neff 1937). The tricolored blackbirds highly synchronized and colonial breeding system have adapted to exploit a rapidly changing environment where the locations of secure nesting habitat and rich insect food supplies were ephemeral and likely to change each year (Orians 1961; Orians and Collier 1963; Collier 1968; Payne 1969).

Tricolored blackbirds have three basic requirements for selecting their breeding colony sites: a protected nesting substrate that is either flooded, thorny, spiny, or "visually" but not actually spiny; a suitable foraging space providing adequate insect prey within a few miles of the nesting colony; and open accessible water (Hamilton et al. 1995; Beedy and Hamilton 1997, 1999). DeHaven (2000), however, questioned whether the lack of water constitutes a significant limitation on breeding substrate utilization.

Almost 93 percent of the 252 tricolored blackbird breeding colonies reported by Neff (1937) were in freshwater marshes dominated by tules and cattails. The remaining colonies in Neff's study were in willows, blackberries (*Rubus* spp.), thistles (*Cirsium* and *Centaurea* spp.), or nettles (*Urtica* spp.). In contrast, only 53 percent of the colonies reported during the 1970s were in cattails and tules (DeHaven et al. 1975).

An increasing percentage of tricolored blackbird colonies in the 1980s and 1990s were reported in Himalayan blackberries (Beedy et al. 1991; Cook 1996, 1999), and some of the largest recent colonies are in grain fields (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Other substrates where they have been observed nesting include giant European reed (*Arundo donax*), safflower (*Carthamus tinctorius*) (DeHaven et al. 1975), tamarisk (*Tamarix* spp.), elderberry (*Sambucus* spp.), poison-oak (*Toxicodendron diversilobum*), and riparian scrublands and forests (e.g., *Salix, Populus,* and *Fraxinus* spp.) (American Birds file data).

Tricolored blackbird foraging habitats in all seasons include annual grasslands, wet and dry vernal pools and other seasonal wetlands, agricultural fields (such as large tracts of alfalfa and pastures with continuous haying schedules, and recently tilled fields), cattle feedlots, and dairies. They also forage occasionally in mixed riparian scrub habitats along marsh borders. Weed-free row crops and intensively managed vineyards and other orchards do not serve as regular foraging sites (Beedy and Hamilton 1997, 1999; DeHaven 2000).

Grassland and vernal pool complexes characterize the landscape in much of the tricolored blackbirds breeding range and preferred foraging habitat in southern Sacramento County (Cook 1999). Ungrazed grasslands containing tall grasses (greater than 15 centimeters [six inches] tall)

and vernal pools were considered preferred over dry, grazed grasslands containing short grasses (Cook 1999). Foraging birds often congregate at the margins of wet vernal pools and in their interiors once they dry (Cook 1999). Most tricolored blackbirds forage within five kilometers (three miles) of their colony sites (Orians 1961), but commute distances of up to 13 kilometers (eight miles) have been reported (Hamilton pers. comm.). Short-distance foraging (i.e., in sight of the colony) for nestling provisioning also is common. Both sexes are known to provision nestlings (Beedy and Hamilton 1999).

Proximity to suitable foraging habitat appears to be extremely important for the establishment of colony sites, because tricolored blackbirds always forage, at least initially, in the field containing the colony site (Cook 1999). Usually only a minor fraction of the area within the commuting ranges of a colony, however, provides suitable foraging habitat (Beedy and Hamilton 1999; Cook 1999). For example, within a five-kilometer (three-mile) radius there may be low-quality foraging habitats such as cultivated row crops, orchards, and vineyards, along with high-quality foraging areas like irrigated pastures, lightly grazed rangelands, vernal pools, and recently hayed alfalfa fields (Cook 1999).

19.2.3.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for tricolored blackbird are identified in Table TRIC-1 and have been derived from input from local species experts.

Table TRIC-1
Essential Habitat Elements for Tricolored Blackbirds

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, cropland, vineyards, orchards, irrigated pasture grassland, valley grassland, seasonal wetlands, freshwater marsh, and open water.	Foraging space providing adequate insect prey within a few miles of the nesting colony; and open accessible water.
Nesting	Mine tailing riparian woodland, valley oak riparian woodland, mixed riparian scrub, cropland, seasonal wetlands, seasonal impoundment, and freshwater marsh.	A protected nesting substrate, including flooded, thorny, spiny, or “visually” spiny vegetation.

APPENDIX B (Continued)

19.3 Species Distribution and Population Trends

19.3.1 Species Distribution

Surveys indicate that the Tricolored Blackbirds overall range is little changed since the 1930s (Neff 1937; DeHaven et al. 1975; Beedy et al. 1991; Hamilton 1998). Tricolored blackbirds are largely endemic to California, and more than 99 percent of the global population occurs in the state. In any give year, more than 75 percent of the breeding population occurs in the Central Valley (Hamilton 2000). Small breeding populations also exist at scattered sites in Oregon, Washington, Nevada, and western coastal Baja California (Beedy and Hamilton 1999).

19.3.2 Central Valley Distribution

Tricolored blackbird breeding colonies have been observed in all Central Valley counties (Beedy and Hamilton 1997, 1999; Hamilton 2000). DeHaven et al. (1975) found that tricolored blackbirds were unlikely to nest at the sites where they hatched or where they had nested the year before (N=298 recoveries from 45,660 banded birds). Other studies have demonstrated that breeding colonies often exhibit site fidelity and traditionally use many of the same areas year after year if they continue to provide essential resources, including secure nesting substrates, water, and suitable foraging habitats (Beedy et al. 1991; Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Therefore, there may be regional differences in the degree of site fidelity. As discussed earlier, the distribution of tricolored blackbirds in the Central Valley varies according to relatively predictable, seasonal movements.

19.3.3 Range within Plan Area

Observations and field studies of tricolored blackbirds have been ongoing in southern Sacramento County since 1991 (Cook 1999). Colonies occurred primarily in the approximately 1,036 square kilometers (400 square miles) region bordered by U.S. Highway 50 to the north, U.S. Highway 99 to the west, and the county line to the south and east. A total of 46 active tricolored blackbird colony sites had been documented in the Plan Area from surveys conducted until 1999 (Cook 1999). Of the 46 nest sites reported by Cook (1999), 37 colonies were found in Himalayan blackberries surrounded by mostly fallow, annual grasslands. The remaining eight colonies were in cattail marshes or willows. Between 1992 and 1994, an average of 22 active tricolored blackbird colonies were found in the Plan Area. That number declined in 1997, 1998, and 1999 when the counts were 12, 11, and 9, respectively. Six formerly active colony sites have been lost (i.e. nesting habitat), including one of the largest colonies (Bozich Ranch) observed since 1992 (Cook 1999). Figure TRIC-1 provides the distribution of known tricolored blackbird occurrences in Sacramento County. The range of the species in the Plan Area, for the purpose of

the SSHCP, encompasses the full extent of those cover types within which various and extensive data collections have documented the species in the Plan Area.

19.3.4 Population Levels and Trend

19.3.4.1 Historical Populations

Published and unpublished accounts of historical tricolored blackbird breeding observations were summarized by Dawson (1923), Neff (1937), Grinnell and Miller (1944), and Beedy et al. (1991). Hamilton et al. (1995) also provided an update of historical tricolored blackbird observations. The first systematic, rangewide surveys of their population status and distribution were conducted by Neff (1937, 1942). He observed as many as 736,500 adults per year (1934) in just eight Central Valley counties. During a five-year interval, he found tricolored blackbirds in 26 California counties. The largest numbers of breeding tricolored blackbirds were in the Central Valley (Neff 1937).

Neff (1937) summarized his observations of 252 California colonies. These surveys were conducted after most Central Valley wetlands were lost (Frayer et al. 1989). Neff (1937) found many large colonies, including one in Glenn County containing more than 200,000 nests (about 300,000 adults) covering almost 24 hectares (60 acres), and several others in Sacramento and Butte Counties that contained more than 100,000 nests (about 150,000 adults). Most large tricolored blackbird colonies observed by Neff (1937) were associated with freshwater emergent wetlands in rice growing areas of California.

Orians (1961) and Payne (1969) made detailed accounts of the ecology and breeding biology of tricolored blackbirds. These workers observed colonies of up to 100,000 nests in Colusa, Yolo, and Yuba Counties, but did not attempt to survey the entire range of the species. DeHaven et al. (1975) conducted population surveys and banding studies of tricolored blackbirds in the Central Valley from 1969 through 1972. They concluded that the tricolored blackbirds geographic range and major breeding areas were unchanged in the 35 years since Neff's (1937) study. They observed an average of about 133,000 individuals per year and estimated that the overall population size had declined by more than 50 percent since the 1930s. It is possible, however, that DeHaven et al. (1975) underestimated the tricolored blackbird total population size because they did not survey large portions of the southern San Joaquin Valley (Beedy and Hamilton 1999). Table TRIC-2 shows the tricolored blackbird colonies in Sacramento County from 1991 to 1999 (Cook 1999).

APPENDIX B (Continued)

Table TRIC-2
Tricolored Blackbird Colonies in Sacramento County from 1991 through 1999[1].

No.	Name	Habitat	1991	1992	1993	1994a	1994b	1997	1998	1999
1	Rancho Seco	HB	K's	20000	5000	20000	7000	4000	N	2400
2	Latrobe	HB	K's	4000	N	4000		N	Y	3500
3	Folsom	HB	K's	3000	3500	6000	5000	N	N	&
4	Calvine	HB	H's	250	1000	250		X	Y	X
5	Calvine @ Hwy 99	HB	H's	X	X	X	X	X	X	X
6	Slough-house [1]	HB	2000	N	N	N	N	N	?	N
7	Slough-house [2]	HB	1600	N	N	N	N	N	?	N
8	Clay @ Dillard	HB	400	Y	N		400	N	?	N
9	Marengo [1]	HB	600	X	X	X	X	X	X	X
10	Borden & West	HB	Y	?	?	600	?	?	?	?
11	Alabama	Cattail	?	5000	N	N	N	N	N	N
12	Alabama [2]	HB	?	5000	?	?	?	110	?	N
13	Campbell	HB	?	5000	7000	4000		N	N	N
14	Cherokee	HB	?	1500	15000	N	N	15000	1500	N
15	Cherokee [2]	HB	?	500	N	N	N	N	N	N
16	Moore	Cattail	Y*	3000	7500	?	?	?	?	?
17	Green Rd	Cattail	?	3000	N	N	N	N	N	?
18	Colony Rd	HB	Y	3000	550	400	400	X	X	X
19	Knox	HB	?	4000	2400	15000		1000	3500	4500
20	Sheldon	HB	?	500	Y*	500		N	N	&
21	Van Vleck [1]	Cattail	?	1950	3000	4000		?	?	?
22	Van Vleck [2]	Willows	?	500	?	?	?	?	?	?
23	Van Vleck [3]	Willows	?	1500	?	?	?	?	?	?
24	Elder Ck	HB	?	5000	30	7000		N	N	52
25	Bozich Ranch	HB	Y*	20000	N	N	N	N	N	X
26	Bradshaw	HB	?	350	350	350		N	Y	N
27	Grant Line @ Mosher	HB	?	1500	?	?	?	?	Y	N
28	Hwy99 @ Twin Cities	HB	?	100	?	?	?	?	?	?
29	Walmort	HB	?	Y						
30	Alta Mesa	HB	?	?	3500	3000		N	?	Y
31	Brad/Elder	HB	?	?	3500	4500		N	N	N
32	Horse	HB	Y*	Y*	2000	N	N	N	?	#
33	Davis Rd	HB	?	?	1600	1000		500	900	1200
34	Bull	HB	?	?	320	N	N	N	X	X
35	Ivie	HB	?	?	260	N	N	N	N	N
36	Betts Ranch	HB	?	?	7500	?	?	?	?	?
37	Koessler	HB	?	?	?	4000		3000	?	20
38	Scott Marsh	Cattail	?	?	500	5000	5750	300	Y	3000
39	Eagles Nest	HB	?	?	?	1000		250	Y	Y
40	Grant Line @ Bradshaw	HB	?	?	Y	6750	2500	?	?	N

APPENDIX B (Continued)

Table TRIC-2
Tricolored Blackbird Colonies in Sacramento County from 1991 through 1999[1].

No.	Name	Habitat	1991	1992	1993	1994a	1994b	1997	1998	1999
41	Slough-house [3]	HB	N	N	N		40	30	?	N
42	Excelsior-Jackson Hwy	HB	?	N	N	15		N	?	N
43	Mather	HB	?	?	?	9000		200	?	?
44	Dillard-Cosumnes	unknown	?	?	?	?	?	Y	Y	?
45	Marengo Marsh	Cattails	N	N	?	?	?	3000	4000	N
46	Tavenor & Apricot	HB	?	?	?	?	?	3000	?	
Total number of colonies			**13**	**24**	**21**	**22**		**12**	**9**	
Total number of birds				**86142**	**64510****	**96365**	**21090**	**32387**	**NA**	**16671**

[1] Data from Cook (1999)
Y = Nesting occurred, but colony size estimate not available
Y* = Observation reported by landowner
N = The site was visited, but no colony was observed
X = No breeding due to nesting habitat loss
? = Breeding unverified. The site may or may not have been used that year.
= Birds observed, but the site was not used for breeding
& = Settlement attempted, but was unsuccessful
** = Probably an underestimate. An intensive survey
K's = Thousands; H's= Hundreds
HB = Himalayan blackberry

Notes: This table includes only observed colonies. Because not all colonies may have been observed, the total population sizes may have been larger. In 1991, the colony size estimating skills were under development. Therefore, relatively reliable estimates are not available. In 1993, the total estimated number of breeding birds is probably less than the actual number because survey efforts were focused on obtaining data about reproductive success at a sample of colonies, such that survey effort was not comparable to other years. The 1994a and 1994b surveys represent an early and later (second) breeding attempt following the first. The total estimate for the number of breeding tricolored blackbirds in Sacramento County in 1994 would therefore be the combined total, or, 111,855. In 1998, survey effort was not comparable to other years. The total number for the year is, therefore, an underestimate.

19.3.4.2 Recent Populations

The USFWS, CDFG, and California Audubon cosponsored intensive, volunteer tricolored blackbird surveys (Volunteer Surveys) in suitable habitats throughout California in 1994, 1997, 1999, and 2000 (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Results of late April surveys for Sacramento County, Sacramento Valley, and the statewide totals for these four years are presented in Table TRIC-3. In 2001, Point Reyes Bird Observatory (PRBO) coordinated the Volunteer Surveys with the help of Bill Hamilton and developed a web based data sheet and submittal process for volunteers. A statewide estimate of 142,045 adults was reported, but PRBO believed data from priority sites was not submitted (PRBO 2002). Therefore, some researchers do not consider the 2001 effort comparable to previous years such as those in 1994, 1997, 1999, and 2000 (Cook pers. comm.)

Local, regional, and statewide tricolored blackbird populations have experienced major declines since 1994. These declines are especially alarming because approximately 99 percent of the global population of this species occurs in California (Beedy and Hamilton 1999).

APPENDIX B (Continued)

Table TRIC-3
Total Adult Tricolored Blackbirds (breeding and nonbreeding) in Statewide Surveys.[1]

Region	1994	1997	1999	2000	% Decline (1994-2000)
Sacramento County	94,028	31,508	12,859	16,383	-82.6%
Sacramento Valley	98,362	37,426	24,748	30,979	-68.7%
Statewide Total	369,359	237,928	104,786	162,508	-56%

[1] Data from Hamilton (2000)

The Volunteer Survey results (summarized by Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000) have identified several important distribution and population trends for tricolored blackbirds that should be emphasized for the SSHCP: 1) local, regional, and statewide populations and distributions vary from year to year; 2) 60 percent of all Tricolored Blackbirds located in all years were found in the ten largest colonies; 3) 70 percent of all tricolored blackbird nests and 86 percent of all foraging by nesting birds were on private agricultural lands; 4) in some portions of their range, tricolored blackbirds have definitely declined or been eliminated, including local extirpation in most of Yolo County and portions of southern Sacramento County.

A decline in the number of breeding tricolored blackbirds in Sacramento County has mirrored the species' overall population decline since 1994. In the four years when accurate population censuses were made, Sacramento County supported 50 to 95 percent of the Sacramento Valley breeding population, and between 10 and 25 percent of the statewide population. In each census year since 1992, one or more of the state's 10 largest colonies has been in southern Sacramento County, and this area has consistently supported some of the largest and most successful colonies observed anywhere in the species' range (Cook 1996, 1999; Beedy and Hamilton 1997).

Declines in the tricolored blackbird population is northern Sacramento County corresponded with a reduction in the percentage of the statewide population nesting in Himalayan blackberries, which averaged from 22 to 34 percent in 1992 and 1994, but declined to about 12 percent and 17 percent in 1997 and 1999, respectively (Cook 1999). Most Himalayan blackberry nesting colonies in the Plan Area are situated in areas where the extent of suitable foraging and nesting habitat has been substantially reduced since 1992 because of extensive conversion of grasslands and vernal pools to vineyards. Declines in the number of breeding tricolored blackbirds in southern Sacramento County is probably related to this documented habitat loss (Cook 1999) (**Table 3**).

Reproductive success of tricolored blackbird colonies in southern Sacramento County has consistently been the highest of any region in the state since studies began in 1992 (Cook 1999). On average, the reproductive success of colonies in Himalayan blackberries was substantially higher than in other habitats, such as cattails, which approached zero in most years. The high

reproductive success of tricolored blackbirds in Himalayan blackberry habitats was attributed to a marked reduction in predation rates compared to marsh habitats (Cook 1999).

19.4 Threats to the Species

19.4.1 Habitat Loss and Alteration

At one time virtually all alluvial soils in the Central Valley supported riparian woodlands, marshlands, or perennial grasslands, but these lands were converted to agricultural and urbanization uses (Frayer et al. 1989). Many formerly agricultural areas within the historical range of the tricolored blackbird are now being urbanized. Tricolored blackbirds in Sacramento County forage in the extensive, lightly to moderately grazed annual grasslands associated with ranches and rural subdivisions (Cook pers. comm.). These land uses currently provide suitable habitat for tricolored blackbirds, habitat that will be largely eliminated if current development patterns and land use conversions continue.

In some places, most historical tricolored blackbird breeding and foraging habitats have been eliminated, and there is little or no breeding effort where once there were large colonies (Orians 1961; Beedy et al. 1991). Elsewhere, tricolored blackbirds have shifted from cattails as a primary nesting substrate (Neff 1937) to Himalayan blackberries (DeHaven 1975) and more recently to cereal crops and barley silage (Hamilton et al. 1995). Nests and nest contents in cereal crops and silage are often destroyed by agricultural operations (Hamilton et al. 1995). Harvesting silage and plowing weedy fields are currently the most common reasons tricolored blackbird colonies are destroyed on agricultural lands.

Agricultural cropping patterns have also affected tricolored blackbird habitat. DeHaven (2000) quantified changes in California cropping patterns and found that tricolored blackbird "friendly" habitats such as rangelands, grassland, and pastures have decreased. These habitats are often replaced by other crops that do not provide habitat (e.g., fruit and nuts, vegetables and melons, cotton, tomatoes, beans, potatoes, sugar beets, and vineyards). Clearly, irrigated and non-irrigated pastures (alfalfa, various hay crops, etc.) and grasslands of various kinds, dry seasonally wet areas, dairies, livestock feedlots, and harvested grain fields continue to be important crops and areas to tricolored blackbirds during breeding and non-breeding periods (DeHaven 2000).

In addition to the increase in tricolored blackbird non-habitat crops, changes in management of habitat friendly crops such as rice and hay have affected foraging. Tricolored blackbirds were observed in huge flocks during the fall and winter months in the 1970s in rice fields after they were harvested and burned (DeHaven 2000). Recent crop harvesting and management changes (i.e., flooding during fall) preclude significant foraging by tricolored blackbirds (DeHaven 2000). More intensive pest control management practices in hay and pastures is hypothesized to

substantially reduce insect-foraging opportunities, although no confirming studies have been conducted (DeHaven 2000).

In recent years and possibly also in the past, more than half of all observed nesting efforts by tricolored blackbirds occurred in a few, large colonies (Hamilton et al. 1995; Beedy and Hamilton 1997). Concentration of a high proportion of the known population in a few breeding colonies increases their risk of major reproductive failures, especially if they are situated in vulnerable habitats such as active agricultural fields.

19.4.1.1 Predation

Predation is at present a major cause of complete nesting failure at some tricolored blackbird colonies (Hamilton et al. 1995; Beedy and Hayworth 1992). Historical accounts documented the destruction of nesting colonies by a diversity of predators, including wolves (*Canis lupus*) and gray foxes (*Urocyon cinereoargenteus*) (Hermann 1853), skunks (*Mephitis* sp.) and opossums (*Didelphis virginiana*) (Evermann 1919), Swainson's hawks (*Buteo swainsoni*) (Mailliard 1914), Cooper's hawks (*Accipiter cooperii*), burrowing owls (*Athene cunicularia*), American crows (*Corvus brachyrhynchos*), raccoons (*Procyon lotor*), and mink (*Mustela vison*) (Neff 1937).

More recently, Payne (1969) reported predation of tricolored blackbird nests by feral domestic cats (*Felis catus*), northern harriers (*Circus cyaneus*), barn owls (*Tyto alba*), short-eared owls (*Asio flammeus*), and yellow-billed magpies (*Pica nuttallii*). Merlins (*Falco columbarius*) may associate with flocks of wintering tricolored blackbirds and have been observed preying on adults (Manolis pers. comm.).

At some colonies, especially those in permanent freshwater marshes, black-crowned night herons (*Nycticorax nycticorax*) devastate nesting efforts and eliminate all or most nests (Hamilton et al. 1995). At foothill locations and in the southern San Joaquin Valley, common ravens (*Corvus corax*) may assemble and destroy all or almost all nests within colonies. In the Central Valley, coyotes (*Canis latrans*) are a major predator of tricolored blackbird colonies, especially in silage field colonies, and cattail colonies when water is withdrawn (Hamilton pers. comm.).

19.4.1.2 Poisoning, Hunting, Contaminants, and Pollution

Tricolored blackbirds were commercially hunted in the early 1900's (DeHaven 2000) and were regularly shot during hazing programs in an effort to limit crop damage in rice. Neff (1937) reported that greater than 300,000 tricolored blackbirds and red-winged blackbirds were killed and marketed during one five-year period in the 1930's. As agriculture expanded, the use of poisons was adopted to also control blackbirds from rice crop depredations (DeHaven 2000).

McCabe (1932) described the strychnine poisoning of 30,000 breeding tricolored blackbirds as part of an agricultural experiment. Poisoning to regulate numbers of blackbirds preying on crops in California, especially rice, was considered a major source of adult mortality by Neff (1942). This practice continued until the 1960s, and thousands of tricolored blackbirds and other blackbirds were exterminated to control damage to rice crops in the Central Valley. However, improved harvesting methods, earlier ripening rice varieties, and fewer blackbirds have resulted in few recent reports of blackbird crop depredation, and no control programs are currently operating (Gorenzel pers comm.).

During 1986, Beedy and Hayworth (1992) observed a complete nesting failure of a large (about 47,000 breeding adults) tricolored blackbird colony at Kesterson Reservoir, Merced County. External examinations of dead nestlings collected from roads surrounding the reservoir revealed that two of the 10 specimens had club feet (Grau pers. comm. *in* Beedy and Hayworth 1992). Similar deformities were found for shorebirds and other water birds that were also collected at Kesterson Reservoir (Ohlendorf et al. 1986). Pathological examinations of the tricolored blackbird nestlings revealed some evidence of heart muscle degeneration. Selenium toxicosis was suspected as the cause of the deaths (Beedy pers. comm.).

Hamilton (pers. comm.) observed a colony sprayed by mosquito abatement operators in Kern County. All sprayed eggs failed to hatch. Hosea (1986) attributed the loss of at least two tricolored blackbird colonies to aerial herbicide applications.

19.4.1.3 Human Disturbance

Tricolored blackbirds are sensitive to human disturbance at active nesting colonies. Entry into colonies may be required for management purposes or for scientific study; however, to avoid unnecessary disturbance of the nesting birds, colonies should not be entered by casual observers (Beedy and Hamilton 1999).

19.5 Data Gaps and Conservation Implications

Several researchers have documented the life history, habitat requirements, species distribution, population trends, and threats to the species throughout California and the Plan Area. This information is critical for the development of the tricolored blackbird Conservation Strategy. Equally important is the acknowledgment of information considered to be data gaps, along with their implications for conservation. These topics are discussed below.

19.5.1 Wintering Habitat

Most of the tricolored blackbird population within the SSHCP is assumed to winter along the Delta and central coast area; however, it is unclear if important wintering habitat is necessary

within the Plan Area. Wintering habitat requirements, if not met, can potentially aid to the further decline of the species rangewide and in the Plan Area.

19.5.2 Locations of Important yet Unknown Tricolored Blackbird Colonies

Undescribed tricolored blackbird breeding colonies may be located within portions of the Plan Area that have not been surveyed. In the Plan Area, discovery of new populations of tricolored blackbirds may occur anywhere that vernal pool/grassland complexes, emergent marshes, natural drainages, artificial irrigation/drainage conveyances, reservoirs and lake margins and stockponds, and silage fields are present.

Tricolored blackbirds do not currently occupy habitat that appears suitable (Cook pers. comm). Although specific habitat elements are present (i.e., Himalayan blackberry), and general habitats such as irrigated pasture and rangelands occur nearby, no active colonies have been identified. Decisions regarding which areas to include as tricolored blackbird preserves would benefit from discovering if there are any relationships between amount of suitable habitat and food abundance to support specific population sizes of nesting tricolored blackbirds.

No studies have been conducted that can make predictions regarding the potential size of a tricolored blackbird colony based on the quality of nearby foraging habitat or other operating factors (e.g., predation). Tricolored blackbird colony sizes vary tremendously (e.g., 50 to 20,000 individuals) within the Plan Area, and no data is available to conclude why some colonies are larger than others.

19.5.3 Predators and Nest Destruction

Several predators have been documented to cause complete reproductive failure of large tricolored blackbird colonies; however, determination of “safe” distances between tricolored blackbird colonies and the most devastating of these predators (e.g., black-crowned night-heron colonies) may provide effective protection during nesting.

Knowledge of these “safe” distances, if any, would help in the establishment of the proper location for preserves. Furthermore, predator populations such as black-crowned night herons may have to be discouraged from nesting or roosting near historical or current locations supporting tricolored blackbird colonies.

19.5.4 Pesticide and Herbicide Application

The use of pesticides and herbicides in agricultural areas and their impacts on prey items for tricolored blackbirds is unknown. There is no information on whether tricolored blackbirds could

benefit from changes in pesticide or herbicide applications that are still consistent with effective management of agricultural crops.

19.5.4.1 Unknown Factors Affecting Breeding Site Fidelity

Tricolored blackbird colonies are generally thought of as nomadic colonial nesters. This nomadic behavior is hypothesized to have evolved due their dependence upon highly productive, but unpredictable food resources that are necessary during the nestling and fledgling stages of the breeding season. However, recent data suggests an increase in nest site fidelity even at sites that experience complete reproductive failure, suggesting suitable nesting habitat may be limited.

Managing for tricolored blackbirds by establishing preserves may be the desired strategy to ensure populations are maintained and enhanced; however, if tricolored blackbirds leave previously successful breeding sites (i.e., preserves) for unknown reasons, conservation of the species may be difficult.

19.5.5 Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a response of some kind could be expected for tricolored blackbird populations within the implementation period of this HCP, or at some time beyond.

19.6 Literature Cited

Beedy, Edward C. Beedy Environmental Consulting, Nevada City, California.

Beedy, E.C. 1989. Draft habitat suitability index model, Tricolored Blackbird (*Agelaius tricolor*). Prepared for U.S. Bureau of Reclamation, Sacramento, California.

Beedy, E.C., S.D. Sanders, and D. Bloom. 1991. Breeding status, distribution, and habitat associations of the Tricolored Blackbird (*Agelaius tricolor*) 1859-1989. Prepared for U.S. Fish and Wildlife Service, Sacramento.

APPENDIX B (Continued)

Beedy, E.C. and A. Hayworth. 1992. Tricolored Blackbird nesting failures in the Central Valley of California: general trends or isolated phenomena? Pages 33-46 in D.F. Williams, S. Byrne, and T.A. Rado (eds), Endangered and sensitive species of the San Joaquin Valley, California. California Energy Commission. Sacramento, California.

Beedy, E.C. and W.J. Hamilton III. 1997. Tricolored Blackbird status update and management guidelines. Prepared for U.S. Fish and Wildlife Service, Migratory Birds and Habitat Programs, and California Department of Fish and Game, Bird and Mammal Conservation Program. Sacramento, California.

Beedy, E.C. and W.J. Hamilton III. 1999. Tricolored Blackbird (*Agelaius tricolor*) in A. Poole and F. Gill (eds.), The birds of North America, No. 423. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Bent, A.C. 1958. Life histories of North American blackbirds, orioles, tanagers, and allies. Dover Publications, Inc. New York, New York.

Bureau of Land Management (BLM). 1999. Updated Animal Sensitive Species List—Updated Draft. Sacramento California. Online version: http://www.blm.gov/nhp/efoia/ca/Public/IMs/1999/CAIM99-112.htm.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Collier, G. 1968. Annual cycle and behavioral relationships in the Red-Winged and Tricolored Blackbirds of southern California. Ph.D. dissertation. University of California, Los Angeles, California.

Cook, L. 1996. Nesting adaptations of Tricolored Blackbirds (*Agelaius tricolor*). Master's thesis, University of California, Davis.

Cook, L. 1999. Tricolored Blackbird (*Agelaius tricolor*) conservation plan for southern Sacramento County. Unpublished report submitted to Jones & Stokes, in cooperation with the southern Sacramento County Habitat Conservation Plan.

Cook, Liz. California Department of Water Resources, Sacramento, California.

Crase, F.T., and R.W. DeHaven. 1977. Food of nestling Tricolored Blackbirds. *Condor.* 79: 265-269.

APPENDIX B (Continued)

Crase, F.T., and R.W. DeHaven. 1978. Food selection by five sympatric California blackbird species. *California Fish and Game,* 64:255-267.

Dawson, W. L. 1923. *The Birds of California*: Vol. I. South Moulton Co., San Francisco, California.

DeHaven, R.W. 1975. Plumages of the Tricolored Blackbird. *Western Bird Bander,* 50:59-61.

DeHaven, R.W., F.T. Crase, P.D. Woronecki. 1975. Breeding status of the Tricolored Blackbird, 1969-1972. *California Department Fish and Game,* 61:166-180.

DeHaven, R.W., and J. A. Neff. 1973. Recoveries and returns of Tricolored Blackbirds, 1941-1964. *Western Bird Bander,* 48:10-11.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use – for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Emlen, J.T. 1941. An experimental analysis of the breeding cycle of the Tricolored Red-Wing. *Condor,* 43:209-219.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The birder's handbook*. Simon and Schuster, New York. 785pp.

Evermann, B.W. 1919. A colony of Tricolored Blackbrids. *The Gull,* 1:2-3.

Frayer, W.E., D.D. Peters, and H.R. Pywell. 1989. Wetlands of the California Central Valley: status and trends-1939 t mid-1980s. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon.

Gardali, Tom. Ornithologist. Point Reyes Bird Observatory, Palo Marin, California.

Gorenzel, Paul. Staff Research Associate, Wildlife Damage Management, U.C. Davis, California.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. *Pacific Coast Avifauna*, No. 27. Berkeley, California.

Hamilton, W.J. III. 1998. Tricolored Blackbird itinerant breeding in California. *Condor,* 100:218-226.

Hamilton, W.J. III, L. Cook, and R. Grey. 1995. Tricolored Blackbird project 1994. Unpublished report prepared for U.S. Fish and Wildlife Service, Portland, Oregon.

APPENDIX B (Continued)

Hamilton, W.J. III. 2000. Tricolored Blackbird 2000 survey and population analysis. Unpublished report prepared for U.S. Fish and Wildlife Service, Portland, Oregon.

Hamilton, W. J. III. Emeritus professor, Division of Environmental Studies, University of California, Davis, California.

Harrison, C. 1978. A field guide to the nests, eggs, and nestlings of North American birds. The Stephen Greene Press. Brattleboro, Vermont.

Hosea, R.C. 1986. A population census of the Tricolored Blackbird, Agelaius tricolor (Audubon), in four counties in northern Central Valley of California. M.S. thesis. California State University, Sacramento, California.

Hunting, K. California Department of Fish and Game, Sacramento. California.

Kennard, J.H. 1975. Longevity records of North American birds. *Bird-banding*, 46:55-73.

Mailliard, J. 1914. Notes on a colony of Tricolored Red-Wings. *Condor,* 16:204-207.

Manolis, Tim. Ornithologist. Sacramento Audubon Society, Sacramento California. Conversations with Ted Beedy in 1989-1996.

McCabe, T.T. 1932. Wholesale poison for the Red-Wings. *Condor,* 34:49-50.

Neff, J.A. 1937. Nesting distribution of the Tricolored Red-Wing. *Condor,* 39:61-81.

Neff, J.A. 1942. Migration of the Tricolored Red-Wing in central California. *Condor,* 44:45-53.

Ohlendorf, H.M., D.J. Hoffman, M.K. Saiki, and T.W. Aldrich. 1986. Embryonic mortality and abnormalities of aquatic birds. *Science of the Total Environment,* 52:49-63.

Orians, G.H. 1961. Social stimulation within blackbird colonies. *Condor,* 63:330-337.

Orians, G.H. 1980. Some adaptations of marsh-nesting blackbirds. Monographs in Population Biology. Princeton University Press, Princeton, New Jersey.

Orians, G.H. and G. Collier. 1963. Competition and blackbird social systems. *Evolution*. 17: 449-459.

Payne, R. 1969. Breeding seasons and reproductive physiology of Tricolored Balckbirds and Red-Winged Blackbirds. *University of California Publication Zoology*, 90:1-115.

APPENDIX B (Continued)

Point Reyes Bird Observatory (PRBO). 2002. Tricolored Blackbird survey report 2001. Prepared for U.S. Fish and Wildlife Service, Portland, Oregon.

Pyle, P. 1997. *Identification guide to North American Birds*.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Skorupa, J. P., R. L. Hothem and R. W. DeHaven. 1980. Foods of breeding Tricolored Blackbirds in agricultural areas of Merced County, California. *Condor,* 82:465-467.

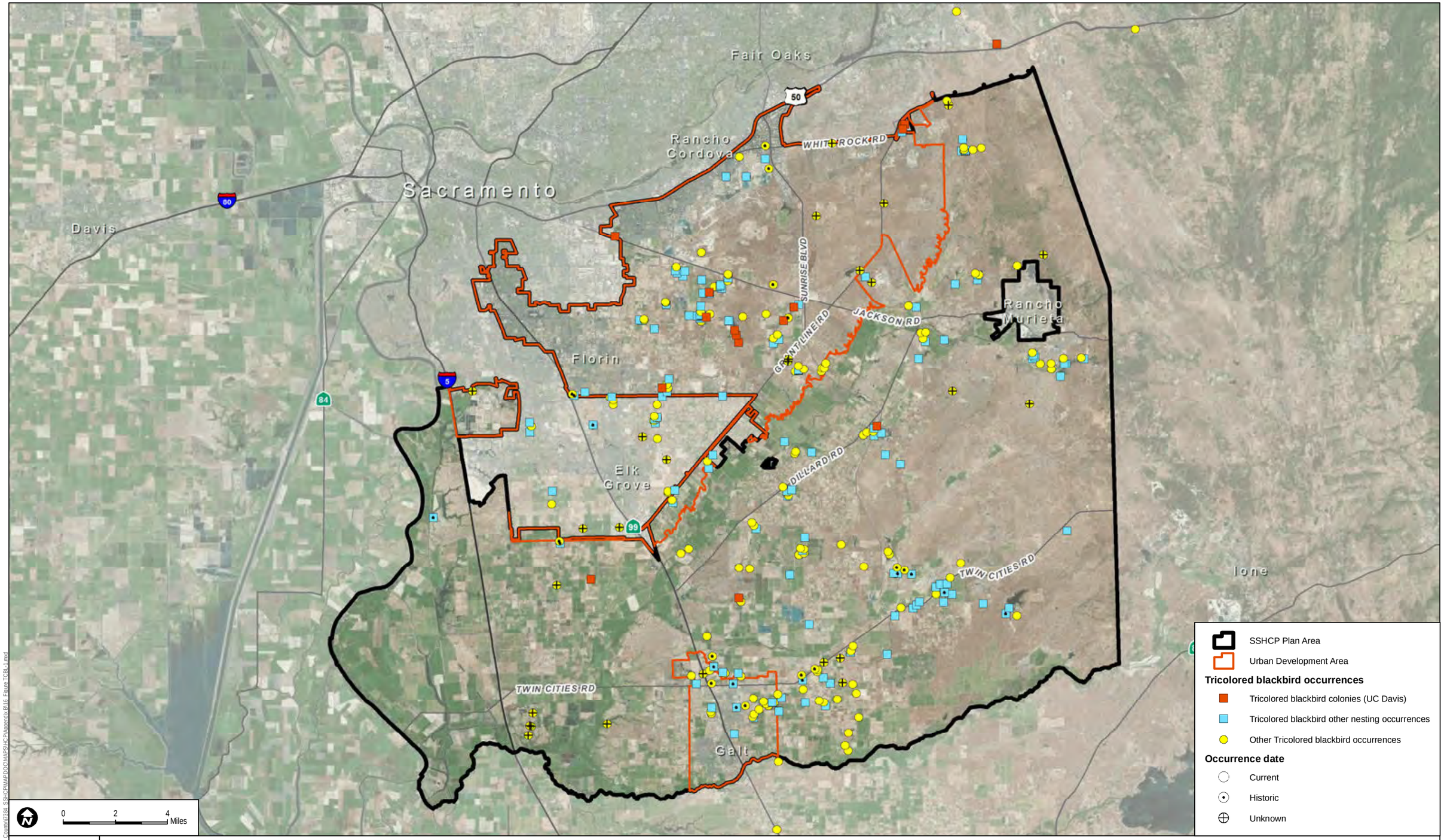
Tyler, J. G. 1907. A colony of Tri-Colored Blackbirds. *Condor,* 9:199-178.

United States Fish and Wildlife Service (USFWS). 1995. Migratory nongame birds of management concern in the United States: The 1995 list. Prepared by the Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Washington, D.C.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Online version: http://migratorybirds.fws.gov/reports/bcc2002.pdf.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, UC Davis 2014, CDFG 2012, BIOS 2012, Lizette Cook 1997, ebird.org

FIGURE TRIC-1

Tricolored Blackbird Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2094 SSHCP\MAPDOC\MAPS\HCP\Appendix B\16_Figure TCBL-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

20 WESTERN BURROWING OWL (BUOW)

Prepared by Henderson Ecology and Planning (Steve Henderson)

Western Burrowing Owl (BUOW)

(Athene cunicularia hypugaea)

Status USFWS: Bird of Conservation Concern

Status CDFG: First Priority Bird Species of Concern



20.1 Legal Status

Western burrowing owl (*Athene cunicularia hypugaea*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800). This species is designated as a First Priority Bird Species of Special Concern (BSSC) by the California Department of Fish and Game (CDFG) (Shuford and Gardali 2008); Bird of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS) (USFWS 2002); and Sensitive Species by the U.S. Bureau of Land Management (BLM).

On April 7, 2003, conservation organizations submitted to the California Fish and Game Commission a petition to list the California population of the western burrowing owl as an endangered or threatened species under the California Endangered Species Act (CESA) (Center for Biological Diversity [*CBD*] et al. 2003). In December 2003, the commission voted to reject the petition. This decision was certified on February 5, 2004.

APPENDIX B (Continued)

20.2 Life History and Ecology

20.2.1 Species Description and Life History

20.2.1.1 Physical Description

Western burrowing owl is a small, round-headed, ground-dwelling owl that inhabits open habitats such as grasslands, deserts, steppes, and agricultural lands. Burrowing owls are unique in physical appearance and behavior among other owls due to their ground-dwelling and non-arboreal natural history. Individuals have long legs relative to their body size, a stubby tail, bright yellow eyes (irises) and white eyebrows, an oval facial ruff, and no ear tufts. Their long legs allow the species to scan over short- or sparsely-vegetated landscapes for predators and prey from the ground, and pursue insect prey on foot. The head, back, and upper wings of adults are brown with thick white or buffy-white spots; while the underparts are generally buffy-white in color with brown barring along both sides. Adults range from approximately 7.5 to 9.8 inches (19 to 25 centimeters) in total length (from bill to tail) and weigh approximately 5.3 ounces (150 grams). Adult burrowing owls have a wingspan of approximately 20 to 24 inches (50.8 to 61.0 centimeters). Their wings are rounded and long relative to body size. Burrowing owls exhibit sexual size and color dimorphism as females are larger and darker than males (Haug et al. 1993.); however, it is often difficult to distinguish between males and females in the field.

20.2.1.2 Taxonomy

Burrowing owl was originally classified as *Strix cunicularia* in 1782. Through several taxonomic and name revisions, it has been moved between the genera *Speotyto* and *Athene* (Haug et al. 1993; Clark 1997). The species was classified as *Athene* by the American Ornithologists' Union (AOU) in 1983 (AOU 1983), reclassified as *Speotyto* in 1991 based on genetic data (AOU 1991), and moved back to *Athene* in 1997 (AOU 1997).

As many as 21 subspecies of *A. cunicularia* have been recognized; however, Konig et al. (1999) recognizes only 13 subspecies. Two subspecies occur in North America: Florida burrowing owl (*A. c. floridana*) occurs in Florida and the Bahama Islands, while western burrowing owl (*A. c. hypugaea*) occurs in North America west of the Great Plains and south to Panama (Haug et al. 1993). The remaining subspecies, with the exception of two island forms (i.e., *A. c. rostrata* [Clarion Island off the west coast of Mexico] and *A. c. troglodytes* [Hispaniola]) are all found in South America.

20.2.1.3 Reproduction

During the breeding season, burrowing owls build nests in excavated burrows, underground tunnels, or burrow facsimiles. They typically adopt burrows or tunnels excavated by fossorial mammals or reptiles, including ground squirrels, prairie dogs, badgers, skunks, armadillos,

APPENDIX B (Continued)

marmots, foxes, coyotes, and tortoises (Karalus and Eckert 1987). In California's Central Valley, California ground squirrel (*Spermophilus beecheyi*) populations are particularly important to the breeding ecology and conservation of burrowing owls, by creating and maintaining availability of burrowing owl nesting and satellite burrows. Where the number and availability of suitable natural burrows are limited (e.g., where burrows have been destroyed or ground squirrels eradicated), burrowing owls will occupy drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures.

Nesting burrowing owls often occur in loose colonies, depending on local population density and site conditions. Breeding adults can exhibit strong nest site fidelity and often return to the same or nearby burrows each year. This life history trait can make burrowing owl populations particularly sensitive to loss of occupied nesting habitat and permanent displacement of owls from nest sites; and it is important that conservation planning efforts for western burrowing owl emphasize *in situ* protection of occupied nesting habitat. During the nesting period, adults and juveniles typically utilize several satellite burrows around the main or nest burrow. During nest site selection, the adult pair will often prepare or "renovate" several neighboring burrows by scraping out dirt with their bills, feet, and wings. One of those burrows is eventually selected as the nest burrow. Adults frequently line the nest burrow with cattle or horse manure, other organic material such as vegetation or feathers, or debris (CBD et al. 2003).

Like other owls, burrowing owls usually breed once per year in an extended reproductive period; however, renesting and production of a second brood within a nesting season, after the first brood successfully fledged, was recently documented in California (Gervais and Rosenberg 1999). Most adults are monogamous, although polygamy and extra-pair fertilizations occasionally occur (Johnson 1997b). Localized high densities of burrowing owls, along with the mobility of their young, facilitate extra-pair copulations, brood amalgamation and mixing, and joint-nesting (and possibly intraspecific brood parasitism). In one study of burrowing owls near Sacramento, at least 37 percent of adults exhibited parental behavior toward offspring that were not their own (i.e., alloparenting). They were similarly non-discriminating in their choice of mates, breeding randomly with respect to the local group of adults (Johnson 1997b).

Both sexes reach sexual maturity at one year of age. The burrowing owl nesting season (including courtship, breeding, and fledging stages) is generally February through August. Most Burrowing owls in California begin pair formation and courtship in February or early March; however in the Imperial Valley, pair formation is initiated as early as mid-January (Coulombe 1971). Courtship and pair formation begins when the male conducts courtship displays and vocalizations. Males produce a "who-who" call to attract females while standing near a potential nest burrow. After a female is attracted to the site, courtship behaviors include a combination of vocalizations and posturing by both sexes, typically within 49 feet (15 meters) of the burrow.

Nest site selection begins once the pair has formed. Males collect and deliver the majority of nesting material (Anderson et al. 2001).

Burrowing owl pairs breed from March through May, although the peak breeding period is April through May. During March through May, eggs are laid at least one day apart and are incubated by both adults for about three to four weeks. Females can lay up to 12 eggs; however, the average clutch size is seven eggs (Haug et al. 1993). The female incubates the eggs for 28 to 30 days. The male forages and delivers food to the female and guards the burrow entrance during the day. Young owlets are brooded in the nest chamber for another two to three weeks, at the end of which time they may be seen at the burrow entrance in their natal-down plumage. Nestlings emerge asynchronously and tentatively. They gradually become bolder, eventually spending more time outside near the burrow entrance. During this period, nestlings can range widely on foot, even before they can fly. The adults guard their brood tenaciously, attacking intruders if provoked. Older nestlings or fledglings may move to nearby satellite burrows as the natal burrow becomes crowded. Fledging occurs six to eight weeks after emergence. Fledglings typically remain near the burrow and accompany the adults in foraging flights at dusk (Rosenberg et al. 1998).

Reproductive success is probably the most important demographic parameter in ensuring population viability for most species with short life spans and low survival rates (Emlen and Pilkitch 1989; CBD et al. 2003); and it is probably the most important demographic parameter for burrowing owl populations (Gervais and Rosenberg 1999); however, accurately estimating reproductive rates for burrowing owls is difficult (Gorman et al. 2003). Up to ten young per pair can be fledged in especially productive years (Gervais and Rosenberg 1999). In recent years, the number of young fledged in central California has ranged between three and six, and was typically four or five (DeSante et al. 1997). In the Sacramento area, the mean per capita rate of reproduction of burrowing owls has been estimated at zero to 4.5 offspring per individual (Johnson 1997c). Anecdotal information suggests that burrowing owl fledging success in the early 1900's was six to eight young per nest (Dawson 1923). The possible decline in fledging success in the Central Valley since the early 1900's corresponds with documented population declines of other avian predators occurring in Central Valley grassland habitats (e.g., loggerhead shrike [*Lanius ludovicianus*], American kestrel [*Falco sparverius*]) (DeSante et al. 1997). Rosenberg and Haley (2004) reported that average fledging success in the Imperial Valley was 2.5 young per nest.

20.2.1.4 Survival and Longevity

Extensive data on burrowing owl longevity are not available. The maximum life span documented for a banded burrowing owl is approximately 8.5 years (Rosenberg et al. 1998). Burrowing owl adult and juvenile survival rates vary considerably among studies. The range of

reported between-year return rates is 30–83 percent (Thomsen 1971; Haug et al. 1993; Clayton and Schmutz 1997; CBD et al. 2003). Depending on assumptions about emigration and immigration, the probability that juvenile burrowing owls will survive to one year of age (the age of first breeding) has been estimated between 0.23 and 0.93, while annual adult survivorship has been estimated between 0.42 and 0.93 (Johnson 1997c).

20.2.1.5 Dispersal Patterns

Nest site fidelity is common in resident burrowing owl populations. Breeding adults often return to the same or nearby burrows each year (Botelho and Arrowood 1998). Also, second-year birds will often attempt to nest near (less thean 0.2 mile [300 meters]) their natal sites (Rosenberg et al. 1998). Burrowing owls in migratory populations often renest in or near the same burrow, particularly if breeding was successful there the previous year (Belthoff and King 1997).

As of 1993, the USFWS Bird Banding Lab (BBL) documented 44 records of burrowing owls band returns in California. Nearly all of these records were from the same area in which the birds were originally banded or adjacent areas. Only two records were from owls that moved substantial distances (one between Orange County and Mexico, another between Orange County and Nevada) (Barclay pers. comm., cited in CBD et al. 2003). In two burrowing owl demography studies conducted in the San Francisco Bay Area, owls moved an average distance of 0.5 to 0.9 miles (0.8 to 1.4 kilometers) (n=276 owls) between breeding seasons. Of this sample population, 27 percent remained at the same nest site; 14 percent dispersed less than 265 feet (80.8 meters) away; 34 percent dispersed 0.05 to 0.5 mile (80 to 804.7 meters); eight percent dispersed 0.5 to 1.0 mile (804.7 meters to 1.6 kilometers); 14 percent dispersed 1.0 to 5.0 mile (1.6 to 8.0 kilometers); and two percent moved 5.0 to 10 miles (8.0 to 16.1 kilometers) (Chromczak unpublished data, cited in CBD et al. 2003). Adults that experience failed nesting attempts have been documented to move miles (up to tens of kilometers) away prior to subsequent renesting attempts, sometimes within the same season (Gervais pers. comm., cited in CBD et al. 2003).

20.2.1.6 Diet and Foraging

Burrowing owls primarily eat small rodents and large arthropods (Coulombe 1971; Green and Anthony 1989; Silva et al. 1995; Gervais et al. 2003). Important rodent prey items include mice, voles, rats, kangaroo rats, and young ground squirrels. Arthropod prey includes grasshoppers, beetles, crickets, dragonflies, other insects, and crayfish. Burrowing owls are considered opportunistic predators (Thomsen 1971; Zarn 1974; York et al. 2002) and will also prey on small birds, reptiles, amphibians, and other small live prey. Burrowing owls have been documented preying on several bird species including killdeer (*Charadrius vociferus*), western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), Wilson's warbler (*Wilsonia pusilla*), American avocet (*Recurvirostra americana*), red-winged blackbird (*Agelaius phoeniceus*),

Brewer's blackbird (*Euphagus cyanocephalus*), mourning dove (*Zenaida macroura*), and black-headed grosbeak (*Pheucticus melanocephalus*) (see CBD et al. 2003). They have also been documented preying on burrowing owl chicks (Botelho 1996; Rosenberg et al. 1988); spadefoots (*Spea* spp.) (Sperry 1941; Bond 1942); snakes, centipedes, and scorpions (Stoner 1933; Neff 1941); and bats, including hoary bat (*Lasiurus cinereus*) (Thomsen 1971) and Mexican free-tailed bat (*Tadarida brasiliensis*) (Gobalet 1999).

Burrowing owls often hunt from a perch. Foraging behavior is variable but generally consists of hunting while hovering or hover-gliding and returning to the perch. Burrowing owls also chase their prey on foot while walking, running, or hopping. Hunting behavior apparently depends on vegetation type and structure, time of day, and the type of prey pursued (Thompson and Anderson 1988; Haug et al. 1993).

Burrowing owls are primarily crepuscular (i.e., dawn and dusk) foragers, but will hunt at any time (Grant 1965; Marti 1974; Rosenberg et al. 1988). Nesting burrowing owls are also central-place foragers (Gervais et al. 2003; Rosenberg and McKelvey 1999), foraging from and returning to the same location. Some owls may forage up to one mile from their burrow (Johnson pers. comm.) and nocturnal foraging can occur up to several miles away from the burrow. During the breeding season, adult male burrowing owls have been documented foraging over a range of 0.8 to 1.2 square miles (2 to 3 square kilometers) (Haug and Oliphant 1987) and primarily within 0.4 mile (600 meters) of the nest burrow (Gervais et al. 2003; Rosenberg and Haley 2004).

Burrowing owls tend to concentrate their hunting in natural grasslands, agricultural lands, uncultivated fields, ungrazed areas, and open ruderal areas such as roadsides that support abundant small mammal and arthropod populations (Haug and Oliphant 1990; Gervais et al. 2003). In urban areas, burrowing owls are often attracted to street lights, where insect prey congregates. In a recent study conducted in California's San Joaquin Valley, burrowing owls did not appear to differentiate between grassland and cropland in their foraging habitat selection (Gervais et al. 2003).

20.2.1.7 Movement and Migration Patterns

The tendency of burrowing owl populations to migrate annually varies over the species range. Populations are resident in locations where food availability is stable and available throughout the year. Burrowing owl populations in the northern part of the species' range are migratory, leaving their breeding grounds in the fall and returning to the same or nearby areas (often the same burrow) in the spring. However, most California populations are resident (i.e., non-migratory) (Thomsen 1971; Haug et al. 1993) or wander during winter months (Coulombe 1971; Martin 1973; Botelho 1996), especially in central and southern California (CBD et al. 2003). The winter burrowing owl population in California is large relative to other regions

throughout the species' range. It is thought that some owls migrating from northern areas (e.g., Canada, Washington, Oregon, and Idaho) winter in California and augment resident populations (Coulombe 1971). Non-migratory seasonal movements in burrowing owl populations can also occur. For example, after the young fledge, family groups will sometimes move among burrows in the fall and juveniles may adopt their own nearby burrow. During winter, pairs will examine and select new burrows as territorial boundaries are relaxed and pair formation proceeds (Thomsen 1971).

During the breeding season, adult burrowing owls remain close to or inside their nest burrows throughout most of the day. They have been documented spending most of their time within 162 to 325 feet (49.4 to 99.1 meters) of their nest or satellite burrows during daylight hours (Haug and Oliphant 1990). Individuals often begin perching outside in the afternoon and foraging at dusk. Nesting adults return to the burrow at night (Thomsen 1971).

20.2.1.8 Territoriality/Home Range

Home range sizes of western burrowing owls vary greatly among individuals (Gervais et al. 2003). During the breeding season, adult male burrowing owls have been documented foraging over a range of 0.8 to 1.2 square miles (2 to 3 square kilometers) (Haug and Oliphant 1987), and primarily within 0.4 mile (600 meters) of the nest burrow (Gervais et al. 2003; Rosenberg and Haley 2004). Although burrowing owls aggressively defend a small territory around their burrows against predators and other owls (CBD et al. 2003), the home ranges of adjacent males may overlap considerably (Haug and Oliphant 1987). Inter-nest distances, which can indicate the limit of an owl's territory, have been found to average between 198 to 695 feet (60.4 to 211.8 meters) (Thomsen 1971; Haug and Oliphant 1990).

Gervais et al. (2003) studied space use and habitat selection of a burrowing owl population in a San Joaquin Valley agricultural landscape (near Fresno, California). Out of several biophysical variables analyzed, including cover-type (e.g., grass, crop) and distance to road edges and irrigation ditches, distance-from-nest was the best predictor of foraging habitat use. In their study, approximately 80 percent of foraging observations occurred within 0.37 mile (600 meters) of the nest burrow, independent of cover-type availability or other factors measured. These results are different than those reported by Haug and Oliphant (1990), who found that burrowing owls used grass-forb habitats more frequently than croplands or grazed pasture. Also, Gervais et al. (2003) reported that variation in burrowing owl home range size was not explained by several variables including cover-type composition, number of neighboring nests, reproductive output, and the proportion of rodents in the diet.

APPENDIX B (Continued)

20.2.1.9 Ecological Relationships

In California's Central Valley, perhaps the most important ecological relationship for the burrowing owl is its commensalism with California Ground Squirrels. Because burrowing owls generally need fossorial animals to dig their burrows, burrowing owl population dynamics in the Central Valley are closely linked with California Ground Squirrel populations. California Ground Squirrels create and maintain burrowing owl nest and satellite burrows. Furthermore, burrowing owl habitat quality is considered proportional to the condition and viability of California Ground Squirrel populations. In addition to creating burrows, colonial rodents such as California Ground Squirrels can maintain burrowing owl nest burrows between breeding seasons, and vigilant ground squirrels incidentally alert burrowing owls to predation threats by alarm-calling (Trulio 1994).

Predator-prey relationships are important for burrowing owls, particularly because burrowing owls are both a predator and prey species. Predation on burrowing owls generally occurs in two forms: predation of nests and/or incubating adults in the nest chamber, and predation of juvenile or adult birds outside the nest chamber. Nest predators are typically species that are capable of accessing the nest chamber and include foxes (*Vulpes* spp.), badgers (*Taxidea taxus*), skunks (*Mephitis* spp.), raccoons (*Procyon lotor*), and rattlesnakes (*Crotalus viridis*) (Coulombe 1971; Kemper 1996). Predators of burrowing owls above ground include prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), golden eagle (*Aquila chrysaetos*), foxes, coyote (*Canis latrans*), and domestic dogs (*C. familiaris*) and cats (*Felis catus*).

20.2.2 Habitat Requirements and Ecology

Historically, burrowing owls in California were most abundant in broad, interior, lowland valley bottoms and flat coastal lowlands (Grinnell and Miller 1944). According to DeSante and Ruhlen (1995), 92 percent of breeding burrowing owls in California occurred in these lowland settings, usually below approximately 200–984 feet (60–300 meters) in elevation. In these landscapes, burrowing owls occurred primarily in open prairie and shrub-steppe habitats (Coulombe 1971; Butts 1973). Most of the burrowing owl's original prairie habitat in California has been removed and other open habitats in lowland landscapes are experiencing the most intensive urban development pressures in the state (CBD et al. 2003).

Throughout their life cycle, burrowing owls require habitat with three basic attributes: open, well-drained terrain outside areas at risk of flooding; short, sparse vegetation; and underground burrows or burrow facsimiles. Burrowing owls inhabit grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and

APPENDIX B (Continued)

berms, coastal uplands, and urban vacant lots, as well as the undeveloped margins of airports, golf courses, roads, and railroad beds. Burrowing owls typically occur in habitats with less than 30 percent tree or shrub cover (DeSante et al. 1996). In California, the four cover types most frequently occupied by burrowing owls are: grasslands adjacent to intensive agriculture; intensive agriculture where owls nest along irrigation banks; large, unfragmented grasslands; and small grassland and ruderal patches surrounded by and adjacent to urban development (Rosenberg and DeSante 1997; Rosenberg and Haley 2004). The proximity of nest sites to suitable foraging habitat is especially important, as burrowing owls tend to forage near their burrows (Gervais et al. 2003).

The most important habitat consideration for burrowing owls is the availability of underground burrows throughout their life cycle. While burrowing owls nest and roost in these burrows, they do not typically create them. Throughout their range, they use burrows excavated by fossorial mammals or reptiles, including ground squirrels, prairie dogs, badgers, skunks, armadillos, marmots, foxes, coyotes, and tortoises (Karalus and Eckert 1987). Where the number and availability of natural burrows are limited (e.g., where burrows have been destroyed or ground squirrels eradicated), owls may occupy other natural and unnatural sites such as rock outcrops (Gleason and Johnson 1985; Rich 1986), concrete and asphalt (Trulio 1994), cavities under piles of rubble, drainage culverts, discarded pipe and other tunnel-like structures, and human-made artificial burrows (Collins and Landry 1977).

In the Sacramento region, including the Plan Area, burrowing owls most commonly live in natural tunnels created by California ground squirrels. Accordingly, the quality of burrowing owl habitat in the Plan Area is closely and positively related to the occurrence and population viability of California ground squirrels in an area. DeSante et al. (1996, 2003) found that the best predictor of burrowing owl reoccupancy of nest sites in California was ground squirrel presence. Burrowing owls and ground squirrels can co-inhabit the same burrow system (Johnson pers. comm.), but the frequency with which this occurs has not been measured, and underground interactions have not been studied.

Vegetation height and structure, and the availability of roost sites, particularly affect burrowing owl habitat quality, especially because this species is a small ground-dweller (Zarn 1974; Green and Anthony 1989; Trulio 1994). Burrowing owls select sites that support short vegetation, even bare soil, presumably because they can easily see over it and maneuver through it; however, they will tolerate tall vegetation if it is sparse. Owls will perch on raised burrow mounds or other relief, such as rocks, tall plants, fence posts, and debris piles to attain good visibility. During the breeding season, they may also need enough permanent cover and taller vegetation within their foraging range to provide them with sufficient prey, such as small mammals (Wellicome 1994). In Santa Clara County, vegetation cover and average vegetation height at occupied burrow habitat were 44 to 57 percent and six inches (15.2 centimeters), respectively (Trulio 1994).

APPENDIX B (Continued)

burrowing owls in Oklahoma occured where vegetation was four inches (10.2 centimeters) or less in height (Butts 1973). Green and Anthony (1989) reported that 28 percent vegetation cover was optimal in the Columbia Basin, and that burrowing owls used areas with high proportions of bare ground. Some land management practices that manipulate vegetation while avoiding burrow damage or disturbance, including moderate grazing or vegetation removal, can enhance or maintain suitable vegetation in burrow habitat (Coulombe 1971; Green and Anthony 1989; Trulio 1994; Jones pers. comm.).

Burrowing owls sometimes occur in small habitat fragments, including grassland or ruderal patches surrounded by urban development (Rosenberg and DeSante 1997; DeSante et al. 2004). In general, burrowing owl colonies often occur in habitat edges and/or disturbed sites characterized by natural or anthropogenic soil disturbance (including soil piles and bare ground) and topographic breaks (Gifford pers. comm.). Their proximate association with these areas may be independent of certain landscape variables such as habitat patch size; therefore, these settings appear to simply provide burrowing owls with some of their required habitat elements, including suitable digging sites for California ground squirrels, short and sparse vegetation, and good visibility. However, the spatial requirements of burrowing owls, and how long-term population viability varies with landscape-level parameters, are not well understood. CDFG's burrowing owl mitigation guidelines (CBOC 1993) imply that breeding pairs or resident individuals of burrowing owls may require a minimum of 6.5 acres (2.6 hectares) of contiguous foraging habitat to persist (based on a 300-foot [91.4-meter] radius around an occupied burrow). For example, the guidelines for avoiding project impacts on pairs or individuals requires preserving a minimum of 6.5 acres of foraging habitat contiguous with occupied burrow sites for each pair of breeding owls or single unpaired resident bird. Guidelines for mitigating the loss of foraging and burrowing habitat on a project site requires protection of at least 6.5 acres of foraging habitat per pair or unpaired resident bird. Whether these guidelines have an empirical ecological or demographic basis is not clear.

Burrowing owl pairs have been observed in isolated habitat patches as small as one acre (0.4 hectare). However, an area this size does not support the foraging requirements of most burrowing owls, and individuals occurring at sites this small must forage offsite. Reproductive success and long-term persistence in small and isolated habitats are unknown. Although the relationship between habitat area and population viability of this species is not well documented, small and isolated habitat patches are not likely to sustain high reproductive success or long-term persistence.

In urban settings, burrowing owls occurring in isolated habitats may experience frequent disturbances from adjacent land uses (e.g., habitat degradation, predation) and barriers to foraging areas. For example, the availability of rodent prey may be limited in isolated habitats, and ground squirrels may abandon or be eradicated from small parcels of habitat in urban

settings. Also, small and isolated occurrences are more likely to experience random local extirpation as a result of natural disturbances (e.g., Goodman 1987) and recolonization of small or isolated habitat patches is less likely than recolonization of large habitat areas. Burrowing owls can tolerate considerable levels of non-threatening human activity and noise in locations that sustain their other habitat requirements (e.g., suitable nesting and foraging habitat, and roosting sites) (CBD et al. 2003).

What constitutes an isolated habitat patch for burrowing owl and the minimum size of a viable patch of habitat (i.e., habitat capable of sustaining a population over a long time) are not well documented. These parameters are likely affected by habitat quality, juxtaposition of the site relative to other suitable habitat, surrounding land uses, and prey availability. Burrowing owls have been observed in small lots nearly surrounded by development. Furthermore, burrowing owls will fly through urban areas to forage in nearby areas; however, the type and minimum extent of development that constitutes a barrier to movement between occupied patches and nearby foraging areas is not known. Although small and isolated patches of habitat can support owls, these sites may be unlikely to attract new pairs.

20.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for burrowing owl are identified in Table BUOW-1 and have been derived from input from local species experts.

Table BUOW-1
Essential Habitat Elements for Burrowing Owl

Essential Activities	Land Cover Types	Habitat Elements
Foraging, breeding and dispersal	Blue oak savanna, cropland, irrigated pasture grassland, and valley grassland.	Open, well-drained terrain outside areas at risk of flooding; short, sparse vegetation; and underground burrows or burrow facsimiles. Requirement for burrows is facilitated by healthy populations of California ground squirrel.

20.3 Species Distribution and Population Trends

20.3.1 Species Distribution

Western burrowing owl occurs throughout western North America west of the Mississippi River, and south through Mexico to Panama (Haug et al. 1993). In California, western burrowing owl is a year-round resident. Historically, burrowing owl was widespread and occurred in suitable habitats throughout the state (Grinnell and Miller 1944), but its range has contracted

significantly, particularly in coastal grasslands. Its present range includes lowlands from north-central California west of the Sierra Nevada and south to Mexico, desert regions of southwestern California, and scattered locations in the Great Basin (DeSante et al. 1996). Burrowing owls are absent from coastal areas north of Sonoma County. They are also absent from montane regions such as the Sierra Nevada and the ranges between Santa Barbara and San Bernardino Counties.

20.3.2 Central Valley Distribution

There are historical records of burrowing owl occurrence from nearly every county in the Central Valley (DeSante et al. 1996). DeSante et al. (1996) described the western burrowing owl's Central Valley range in terms of its county distribution within three geographic zones: Northern Central Valley, Middle Central Valley, and Southern Central Valley. Approximately half of all breeding groups known to occur in the Central Valley during the 1980's disappeared by the early 1990s (DeSante and Ruhlen 1995).

20.3.3 Range within the Plan Area

The Plan Area occurs within the Middle Central Valley portion of the burrowing owl's range. DeSante et al. (1996) estimated that the Central Valley supports 14 percent of the total California burrowing owl population (and some of the highest population densities, along with Imperial Valley); and 11 percent of the total population occurs in the Middle and Northern Central Valley, and southern San Francisco Bay Area combined. The Plan Area lies within the core of this region. This area is particularly important to the current and future western burrowing owl population in California for several reasons: 1) it is located within a complex that supports some of the highest burrowing owl population densities in the state; 2) it historically supported some large burrowing owl populations (see below); 3) breeding populations still remain within this area, and there are opportunities to enhance existing populations; 4) large areas of suitable habitat remain in the area; and 5) the greater region is threatened by intensive development and urbanization pressure.

Western burrowing owls occur in suitable habitat within the Plan Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by burrowing owls, such as grasslands, vernal pool grasslands, fallow agricultural fields, and open oak savannah occur throughout most of the Central Valley and are well-represented in Sacramento County and the Plan Area, particularly outside the Urban Development Area (UDA); however, at most sites within these land-cover types, the presence of burrowing owls is not known, and it is assumed that most of this habitat is not occupied

Since the 1950's, large colonies of burrowing owls have been recorded in the Plan Area at Executive Airport, Sacramento Army Depot, Cosumnes River College, and Mather Air Force

Base (DeSante et al. 1996; CDFG 2010; Johnson pers. comm.). Large colonies have also been documented in Sacramento County outside the study area at the California State University Campus. Effects from surrounding development and habitat degradation have reduced burrowing owl numbers in these areas. Some populations remain in increasingly isolated tracts of urban open space south of the American River and in the North Natomas area, in Sacramento County but outside the Plan Area.

Although burrowing owl populations have declined or disappeared from much of their historical habitat, outlying areas of the County still provide suitable habitat for the species. Burrowing owls are known to occupy patches of habitat that extend from the Sacramento Regional County Sanitation District (SRCSD) Bufferlands (Jones pers. comm.) to The Nature Conservancy's Cosumnes River Preserve (Reiner pers. comm.), as well as habitat in the rolling grasslands in eastern Sacramento County. The Meadowview and Pocket areas within the City of Sacramento (outside the Plan Area) support disjunct, isolated populations north to Florin Road (Roscoe pers. comm.). No comprehensive data exist on the distribution or abundance of these owls or on their demographic relationship to the burrowing owls within the city limits of Sacramento. It seems likely, however, that extant habitat south and east of the city boundary has served for some time as a "refuge" for burrowing owls being displaced from the Sacramento Metropolitan Area by urbanization.

Because comprehensive surveys or monitoring efforts for western burrowing owl in the Plan Area have not been conducted, and because the existing data of known occurrences are based mostly on incidental observations or limited surveys (e.g., CNDDB, anecdotal records, surveys conducted over a limited area), the population size and nesting distribution of this species in the Plan Area are not known. There are 36 previously recorded occurrences scattered throughout the Plan Area, 17 of which are within the UDA (CDFG 2010). For the purposes of the SSHCP, the species is considered to range throughout the Plan Area in areas of suitable habitat.

20.3.4 Population Levels and Trend

The burrowing owl is experiencing precipitous population declines throughout North America. In Canada, its numbers are rapidly declining, and in 1995 the Committee on the Status of Endangered Wildlife in Canada listed it as an endangered species. In Mexico, it is officially considered a threatened species. The burrowing owl is also declining throughout most of the western United States, and has disappeared from much of its historical range in California. Nearly 60 percent of California burrowing owl colonies that existed in the 1980's had disappeared by the early 1990s (DeSante and Ruhlen 1995; DeSante et al. 1997). In the San Francisco Bay Area and the central portion of the Central Valley (from Yolo and Sacramento Counties to Merced County), the burrowing owl population has declined by at least 65 percent since 1986 (DeSante pers. comm.).

Burrowing owls remain throughout nearly all of their Central Valley range. Approximately half of all breeding groups known to occur in the Central Valley during the 1980s disappeared by the early 1990s (DeSante and Ruhlen 1995). Due to severe losses of habitat suitable for burrowing owls in the Plan Area over the past several decades, as a result of development and certain agricultural conversions, it is assumed that western burrowing owl populations in the Plan Area have declined substantially over recent decades.

20.4 Threats to the Species

Western burrowing owl is threatened over most of its range by several factors. The Center for Biological Diversity et al. (2003) provides a thorough description of threat factors, including documentation by specific studies in several cases. The following section summarizes threats to western burrowing owl populations. Immediate threats to western burrowing owl include the conversion of grassland habitat to urban and agricultural uses, and the loss of suitable agricultural lands to development. Approximately 91 percent of burrowing owls in California occur on private land. Statewide, over 86 percent of grasslands are in private ownership (Bates 2006). Equally important is the loss of fossorial rodent populations such as prairie dogs and ground squirrels across much of the owl's historical habitat. Eradication programs have decimated populations of these rodents and have in turn disrupted the commensal ecological relationship the owls have with these species. Another cause of population declines is thought to be pesticide use (especially organophosphates in southern Canada); however, the available evidence does not clearly indicate that other contaminants are reducing populations (Gervais et al. 1997). Habitat fragmentation (Remsen 1978) probably increases foraging distances, making hunting less efficient, and potentially reducing reproductive success. Furthermore, fragmentation may reduce the chances that a male owl will attract a mate and successfully reproduce.

Studies of island biogeography suggest that small, isolated populations can suffer from genetically induced problems that may jeopardize the long-term survival of a species (Goodman 1987; Hanski and Gilpin 1997), and recent studies of burrowing owls suggest that such genetically induced problems may threaten the species. One study suggests that small owl populations many be genetically isolated from other populations (Johnson 1992). Another study found a population of owls near Sacramento to be inbred due to small population size rather than non-random mating (Johnson 1997a).

Other documented threats to western burrowing owl throughout the species' range include predation, mortality due to collisions with vehicles and wind turbines, and relocation of burrowing owls away from occupied habitat for development (CBD et al. 2003). Attempts to exterminate rodents by the use of poisons may also kill burrowing owls (Rosenberg et al. 1998).

Western burrowing owls in south Sacramento County are specifically threatened by habitat loss and fragmentation as a result of conversion of habitat to urban uses and agriculture, particularly the conversion of grasslands to vineyards. Also, the loss of suitable agricultural land to development has reduced the extent of suitable habitat. It is assumed that control of ground squirrels has reduced the extent and quality of burrowing owl habitat by reducing the number of suitable nesting burrows. It is possible that the use of rodenticides and insecticides have reduced prey populations, resulting in lowered survivorship and reproductive success.

20.5 Data Gaps and Conservation Implications

The ecology, status, and management of western burrowing owl have received considerable attention in recent years; however, there are several sources of uncertainty regarding burrowing owl and its requirements in the Plan Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

20.5.1 Population and Habitat Distribution within the Plan Area

Because comprehensive surveys for western burrowing owl in the Plan Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and nesting locations of this species throughout the Plan Area are not known. In addition, though the distribution of grassland, agricultural, and ruderal land-cover types is mapped and quantifiable, the quality of habitat for burrowing owls within most of these areas is unknown.

These information gaps limit our ability to identify the best lands available for preserving burrowing owl habitat, and accurately estimate the impacts resulting from covered activities. Until these data gaps are remedied, the conservation value for burrowing owl will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

20.5.2 Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for the western burrowing owl are not well documented. This causes uncertainty in determining what preserve design will be effective in meeting the conservation goals for burrowing owls.

20.6 Literature Cited

American Ornithologists' Union (AOU). 1983. Check-list of North American birds. 6th edition. American Ornithologists' Union, Washington, D.C.

APPENDIX B (Continued)

American Ornithologists' Union (AOU). 1991. Thirty-eighth supplement to the American Ornithologists' Union Check-list of North American birds. *Auk* 108:750-754.

American Ornithologists' Union (AOU). 1997. Forty-first supplement to the check-list of North American birds. *Auk* 114:542-552.

Anderson, S.H., L.W. Ayers, J.A. Dechant, M.T. Green, W.H. Howe, S.L. Jones, D.S. Klute, D.K. Rosenberg, S.R. Sheffield and T.S. Zimmerman. 2001. Draft status assessment and conservation plan for the Western Burrowing Owl in the United States. Administrative Report. U.S. Department of Interior, Fish and Wildlife Service, Denver, Colorado.

Bates, C. 2006. Burrowing Owl (Athene cunicularia). In The Draft Desert Bird Conservation Plan: a strategy for reversing the decline of desert-associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/desert.html.

Belthoff, J.R., and A.R. King. 1997. Between-year movements and nest burrow use by Burrowing Owls in southwestern Idaho: 1996 annual report. *Technical Bulletin* No. 97-3, Bureau of Land Management, Boise.

Botelho, E.S. 1996. Behavioral ecology and parental care of breeding Western Burrowing Owls (*Speotyto cunicularia hypugaea*) in southern New Mexico, USA. Dissertation, New Mexico State University, Las Cruces, New Mexico.

Botelho, E.S. and P.C. Arrowood. 1998. The effect of burrow site use on the reproductive success of a partially migratory population of Western Burrowing Owls (*Speotyto cunicularia hypugaea*). *Journal of Raptor Research* 32:233-240.

Butts, K.O. 1973. Life history and habitat requirements of Burrowing Owls in western Oklahoma. Master's thesis, Oklahoma State University, Stillwater. 188 pp.

California Burrowing Owl Consortium (CBOC). 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. (April 1993) California Department of Fish and Game (CDFG). Sacramento, California. Accessed online at http://www.dfg.ca.gov/wildlife/nongame/docs/boconsortium.pdf.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

APPENDIX B (Continued)

California Department of Fish and Game and Point Reyes Bird Observatory (CDFG and PRBO). 2003. California Bird Species of Special Concern: Updated Draft List and Solicitation of Input. Available at http://www.prbo.org/cms/.

Center for Biological Diversity (CBD), Santa Clara Valley Audubon Society, Defenders of Wildlife, San Bernardino Valley Audubon Society, California State Park Rangers Association and Tri-County Conservation League. 2003. Petition to the State of California Fish and Game Commission and Supporting Information for Listing the California Population of the Western Burrowing Owl (*Athene cunicularia hypugaea*) as an Endangered or Threatened Species Under the California Endangered Species Act. Submitted April 7.

Clark, R.J. 1997. A review of the taxonomy and distribution of the Burrowing Owl (*Speotyto cunicularia*). Pages 14-23 in J.L. Lincer and K. Steenhof (Editors). The Burrowing Owl, its Biology and management: including the Proceedings of the First International Symposium. Raptor Research Report No. 9.

Clayton, K.M. and J.K. Schmutz. 1997. Burrowing Owl (*Speotytcou nicularia*) survival in prairie Canada. Pages 107-110 *in* J.R. Duncan, D.H. Johnson, and T.H Nicholls [EDs.], Biology and conservation of owls of the northern hemisphere. U.S. Dep. of Agri. For Serv. Gem Tech. Rep. NC-190.

Collins CT and RE Landry. 1977. "Artificial Nest Burrows for Burrowing Owls." *North American Bird Bander* 2:151-154.

Coulombe, H.N. 1971. Behavior and population ecology of the burrowing owl, *Speotyto cunicularia*, in the Imperial Valley of California. *Condor* 73:162-176.

Dawson, W.L. 1923. *Birds of California, Volume 2*. South Moulton Company, San Francisco, California.

DeSante, David. Ornithologist. The Institute for Bird Populations, Point Reyes Station, California.

DeSante, D.F. and E.D. Ruhlen. 1995. A census of burrowing owls in California, 1991-1993. Institute for Bird Populations, Point Reyes Station, California.

DeSante, D.F., E.D. Ruhlen and D.K. Rosenberg. 1996. The distribution and relative abundance of burrowing owls in California: evidence for a declining population. Institute for Bird Populations. Point Reyes Station, California.

APPENDIX B (Continued)

DeSante, D.F., E.D. Ruhlen and D.K. Rosenberg. 2004. Density and abundance of burrowing owls in the agricultural matrix of the imperial valley, California. *Studies in Avian Biology* 27:116-119.

DeSante, D.F., E.D. Ruhlen, D.K. Rosenberg and R. Scalf. 2003. The distribution and relative abundance of burrowing owls in California in the early 1990s. Abstract. California Burrowing Owl Symposium Program and Abstracts.

DeSante, D.F., E.D. Ruhlen, S.L. Adamany, K.M. Burton and S. Amin. 1997. A census of burrowing owls in central California in 1991. Pages 38-48 in J.L. Lincer and K. Steenhof (Editors). The burrowing owl, its Biology and management: including the Proceedings of the First International Symposium. Raptor Research Report No. 9.

Emlen, J.M. and E.K. Pilkitch. 1989. Animal population dynamics: identification of critical components. *Ecological Modeling*. 44: 253-273.

Gervais, J. A. and D.K. Rosenberg. 1999. Burrowing Owls in California produce second broods of chicks. *Wilson Bulletin* 111:569-571.

Gervais, J.A., D.K. Rosenberg and R.G. Anthony. 2003. Burrowing Owl space use and pesticide exposure risk. *Journal of Wildlife Management* 67:155-64.

Gervais, J.A., D.K. Rosenberg, D.M. Fry, L.A. Trulio and K.K. Sturm. 2000. Burrowing owls and agricultural pesticides: Evaluation of residues and risks for three populations in California. *Environmental Toxicology and Chemistry* 19:337-343.

Gervais, J. A., D. K. Rosenberg, D. M. Fry, and L. A. Trulio. 1997. Evaluation of contaminant residues in burrowing owls populations from central and southern California. The Institute for Bird Populations, Point Reyes Station, California. Publication No. 79.

Gifford, Dan. Biologist. California Department of Fish and Game, Sacramento, California.

Gleason, R.S. and D.R. Johnson. 1985. Factors influencing nesting success of burrowing owls in southeastern Idaho. *Great Basin Naturalist* 45: 81-84.

Goodman, D. 1987. The demography of chance extinction. Pages 11–34 in M.E. Soule (ed). Viable populations for conservation. Cambridge University Press, Cambridge, UK.

Gorman, L.R., D.K. Rosenberg, N.A. Ronan, K.L. Haley, J.A. Gervais and V. Franke. 2003. Estimation of reproductive rates of burrowing owls. *Journal of Wildlife Management* 67:493-500.

APPENDIX B (Continued)

Green, G.A. and R.G. Anthony. 1989. Nesting success and habitat relationships of burrowing owls in the Columbia Basin, Oregon. *Condor* 91:347-354.

Grinnell, J. and A.H. Miller. 1944. *The Distribution of the Birds of California*. Cooper Ornithological Club. Berkeley, California.

Hanski, I. and Gilpin, M.E. 1997. *Metapopulation Biology*, Academic Press, San Diego, California.

Haug, E. A., and L. W. Oliphant. 1987. Breeding biology of Burrowing Owls in Saskatchewan. Pages 269-271 *in* G. L. Holroyd, P. H. R. Stepney, G. C. Trottier, W. B. McGillivray, D. M. Ealey, and K. E. Eberhart, editors. Endangered species in the prairie provinces. Natural History Occasional Paper No. 9. Provincial Museum of Alberta, Edmonton, Alberta.

Haug, E.A., B.A. Millsap and M.S. Martell. 1993. The Burrowing Owl (*Speotyto cunicularia*). In Poole, A. and F. Gill (editors). The birds of North America, No. 61. Philadelphia: The Academy of Natural Sciences; Washington, D. C. The American Ornithologists' Union. Washington, D. C. The American Ornithologists' Union.

Johnson, B.S. 1992. Effects of demography, mating patterns, and sociality on the population genetics and dynamics of the burrowing owl. Ph.D. dissertation. University of California, Davis.

Johnson, B.S. 1997a. Characterization of population and family genetics of the burrowing owl by DNA fingerprinting with pV47-2. Pages 58–63 in J.L Lincer and K. Steenhof (eds.). The burrowing owl, its biology and management. Raptor Research Report No. 9.

Johnson, B.S. 1997b. Reproductive success, relatedness, and mating patterns of colonial burrowing owls. Pages 64-67 in J.L Lincer and K. Steenhof (eds.). The burrowing owl, its biology and management. Raptor Research Report No. 9.

Johnson, B.S. 1997c. Demography and population dynamics of the burrowing owl. Pages 28–33 in J.L. Lincer and K. Steenhof (eds.). The burrowing owl, its biology and management. Raptor Research Report No. 9.

Johnson, Brenda. Conservation Planning Ecologist and Western Burrowing Owl Expert. California Department of Fish and Game, Sacramento, California.

Jones, Roger. Wildlife Biologist and Resource Manager. Sacramento Regional County Sanitation District (SRCSD) Bufferlands, Sacramento, California.

APPENDIX B (Continued)

Karalus, K. E. and A. W. Eckert. 1987. *The owls of North America*. Weathervane Books, New York, New York.

König, C., F. Weick, and J.-H. Becking, eds. 1999. Owls : a guide to the owls of the world. Pica Press, Sussex, UK.

Nelson.

Pandolfino, Ed. Chair, Placer County Conservation Committee. Sierra Foothills Audubon Society.

Reiner, R. Ecologist, The Nature Conservancy, California.

Remsen, J.V., Jr. 1978. Bird species of special concern in California. Calif. Dept. of Fish and Game, Wildlife Management Branch Admin. Report, No. 78-1. 54pp.

Rich, T. 1986. Habitat and nest-site selection by Burrowing Owls in the sagebrush steppe of Idaho. *Journal of Wildlife Management* 50:548–555. CrossRef, CSA.

Roscoe.

Rosenberg D. K. and D. F. DeSante. 1997. Demographic characteristics of burrowing owl populations in California. Progress Report, September 1997. Institute for Bird Populations. Point Reyes Station, California. Publication No. 95.

Rosenberg, D.K. and K.L. Haley. 2004. The ecology of burrowing owls in the agroecosystem of the Imperial Valley, California. Studies in Avian Biology 27:120-135.

Rosenberg, D.K. and K.S. McKelvey. 1999. Estimation of habitat selection for central-place foraging animals. Journal of Wildlife Management 63:1028-1038.

Rosenberg, D.K., J. Gervais, H. Ober and D. DeSante. 1998. An adaptive management plan for the burrowing owl population at Naval Air Station Lemoore, Lemoore, California. The Institute for Bird Populations. Point Reyes Station, California. Publication No. 95.

Sacramento Regional County Sanitation District Bufferlands [SRCSD Bufferlands]. 2004. Sacramento Regional Wastewater Treatment Plant Bufferlands Annual Report 2003. Available at http://www.srcsd.com/pdf/annl-rpt-bufferlands-2003.pdf

APPENDIX B (Continued)

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Silva, S.I., I. Lazo, E. Silva-Aranguiz, F.M. Jaksic, P.L. Meserve and J.R. Gutierrez. 1995. Numerical and functional response of burrowing owls to long-term mammal fluctuations in Chile. Journal of Raptor Research 29:150-255.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73:177-192.

Trulio, L. A. 1994. The ecology of a population of burrowing owls at a naval air station in northern California. Dept. of the Navy. San Bruno, California.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Available at http://migratorybirds.fws.gov/reports/bcc2002.pdf.

Wellicome, T. I. 1994. Taverner award recipient's report: Is reproduction in Burrowing Owls limited by food supply? *Picoides* 7:9-10.

Zarn, M. 1974. Burrowing Owl. U.S. Department of Interior, Bureau of Land Management. Technical Note T-N-250, Denver, Colorado, 25 pp.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

21 FERRUGINOUS HAWK (FEHA)

Prepared by Todd Sloat Biological Consulting (Todd Sloat)

Ferruginous Hawk (FEHA)
(Buteo regalis)
Status USFWS: None
Status CDFG: None



21.1 Legal Status

Ferruginous hawk (*Buteo regalis*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800).

21.2 Life History and Ecology

21.2.1 Species Description and Life History

21.2.1.1 Physical Description

Ferruginous hawk is a large broad-winged hawk that occurs in two morphs (light and dark) with no intermediate morph. The dark morph is less frequent. Adult light morphs are rust colored on the back and shoulders, with a pale head, and white tail with pale rust washings. When observed in flight from below, the species appears mostly white, with a rufous "V" patch that is formed from the leg feathers. Observed from above, a white crescent-shaped patch is distinctive in the outer primaries. Dark morphs have a deep brown-colored head and body, upper-and lower-wing surfaces, and tail coverts. The back and breast are a dark rufous color. The tail, primaries, and secondaries are white or pale (Bechard and Schmutz 1995; Sibley 2000; Udvardy 1998). Adults are not sexually dimorphic in plumage, but females tend to show more pigmentation on the legs and belly (Bechard and Schmutz 1995).

Juvenile light morphs are generally similar to adults; however, the darker colored feathers are more brown than rufous. When observed from below in flight, juvenile feathers are more white or pale as compared to adults. They also lack the rufous "V" shape that is formed from the leg feathers on adults. Like light morphs, juvenile dark morphs are similar to adults, but have

feathers that are more brown than rufous. In both morphs, juvenile iris color is pale, while adult iris color is reddish-brown (Sibley 2000).

21.2.1.2 Reproduction

Ferruginous hawks do not regularly breed in California, with the most recent breeding being recorded in 1989 in northeastern California (Harlow and Bloom 1989). Since the species is not a regular breeder in California and has not been recorded breeding in the Central Valley, reproduction will not be discussed in detail in this account.

Ferruginous hawks are apparently monogamous, and pairs initiate nesting mid-March to mid-April depending on location (Bechard and Schmutz 1995). Clutch size in this species is larger than in most raptors, generally ranging from two to four eggs, but occasionally ranging up eight eggs in years of high prey abundance (Smith and Murphy 1978). Both sexes participate in nest building. Nests are most often located in trees and shrubs, followed by cliffs, utility structures, and ground outcrops (Olendorff 1993). Incubation is estimated to range between 32 and 33 days (Palmer 1988), while young leave the nest between 38 and 50 days after hatching (Powers 1981 *in* Bechard and Schmutz 1995).

Suitable nesting sites have declined in some portions of the breeding range given that isolated trees are uncommon, many have fallen, and little new regeneration is occurring. Furthermore, ferruginous hawks may experience reduced reproductive success due to harassment by later arriving Swainson's hawks and competition for nest sites (Leslie 1992). Establishment of artificial nesting platforms in regions with limited available nest sites has proven successful in addressing this issue (Bechard and Schmutz 1995).

21.2.1.3 Longevity, Survival, and Mortality

Maximum potential longevity is believed to be 20 years of age (Lloyd 1937; Houston 1984 in Bechard and Schmutz 1995). The oldest known age of a wild ferruginous hawk is 17 years 11 months. Banding data from Schmutz and Fyge (1987) was used to estimate first year mortality at 65 percent, while reoccupancy of nest data from Woffinden and Murphy (1989) has been used to estimate annual adult mortality at 25 percent.

Ferruginous hawks fall prey to birds and mammals. Great horned owls (*Bubo virginianus*) take nestlings, common ravens (*Corvus corax*) and American crows (*Corvus brachyrhynchos*) prey on eggs and nestlings, and ground predators such as coyotes (*Canis latrans*), American badgers (*Taxidea taxus*), and foxes (*Vulpes* spp.) may be a serious threat to ground-nesting pairs and young after fledging (Bechard and Schmutz 1995).

APPENDIX B (Continued)

Other sources of mortality include illegal shooting, presumed collisions with automobiles, and high-tension wire collisions or electrocution (Gossett 1993). Olendorff (1973) also reported that eggs and young are killed when blown or pushed from nests.

21.2.1.4 Dispersal Patterns

Band return data for juvenile ferruginous hawks from the first 90 days after banding found that 48 individuals moved less than 15.5 miles from their natal site, while 33 individuals dispersed as far as 1,056 miles (Gossett 1993 in Bechard and Schmutz 1995). No other dispersal information is available for the ferruginous hawk.

21.2.1.5 Diet and Foraging

Prey selection by ferruginous hawks is determined primarily by availability (Steenhof and Kochert 1985 *in* Bechard and Schmutz 1995). Some individuals have even been reported to forage on prairie dogs (*Cynomys* spp.) immediately after the prey was shot by squirrel hunters (Chesser 1979).

Ferruginous hawks opportunistically forage at times during the day when their main prey items are available. Four types of prey pursuit have been described and include: 1) still hunting from perches with flights of less than 100 meters to capture prey; 2) short-distance strikes originating from the ground; 3) aerial hunting; and 4) hovering. No communal feeding has been reported, though 10 to 20 ferruginous hawks have been observed standing or perching in the same general area (Bechard and Schmutz 1995).

Mammals are the most common food items with rabbits and hares (*Syvillagus* and *Lepus* spp.), ground squirrels (*Spermophilus* spp.), and prairie dogs *Cynomys* spp.) comprising most of the food consumed by adults and juveniles throughout the year. Bechard and Schmutz (1995) summarized ferruginous hawk prey reported from several studies throughout the species' range by percent occurrence and percent biomass. Mammals were most frequently preyed upon (83 percent) and constituted 95 percent of the food biomass, while birds were the second prey group most frequently eaten (13 percent), but only constituted 3.8 percent of the food biomass. Amphibians, reptiles, and insects were also consumed, but were found to be much less frequent and comprised less than one percent of the food biomass. No food habit studies of wintering ferruginous hawks in California have been conducted.

21.2.1.6 Movement and Migration Patterns

The ferruginous hawk is a migratory species in the northern part of its breeding range, but little is known regarding migration for southern nesting individuals. Fall migration of juveniles begins in early August, while most ferruginous hawks migrate in September and October. Adults begin

migration later in August and peak migration occurs in late October and early November. Migration of both juveniles and adults is completed by the end of November (Bechard and Schmutz 1995).

Spring migration is different in that hatch-year birds migrate later than adults. As with most bird species, the migration period of ferruginous hawks is shorter during spring. Adults migrate between mid-February and early April, with peak activity occurring during the month of March. First year birds start spring migration in early April, peak between mid-April and mid-May, and finish with the latest migrating individuals leaving in early June.

Most individuals that winter in California are believed to have originated in the states west of the continental divide. Gossett (1993) used band recovery data to calculate that 4.1 percent of eastern nesting birds were recovered west of the continental divide, while 27.5 percent of western birds were recovered east of the divide. In California, Garrison (1990) reported that 66 percent of band recoveries were from breeding populations west of the Rocky Mountains, while the remaining recoveries were from the north and east. Fidelity to wintering areas by migratory individuals is unknown (Bechard and Schmutz 1995).

21.2.1.7 Territoriality/Home Range

Bechard and Schmutz (1995) suggest that the ferruginous hawk may defend winter territories. Winter densities in Utah have been reported at one individual per 3.60 square miles (Smith and Murphy 1978), while Plumpton and Andersen (1997) found a mean daily minimum convex polygon home range size of 1.36 square miles. Data on nesting territory size has been reported by several researchers and may also be useful as an estimate for winter habitat requirements (Hunting 2001). Breeding home ranges have been reported between 2.28 and 2.93 square miles per pair (Smith and Murphy 1978; Bechard and Schmutz 1995).

21.2.1.8 Ecological Relationships

Ferruginous hawks depend on a small number of prey species for their main food items. Consequently, population cycles and abundance of these species are highly correlated with the number of breeding pairs, eggs laid, and young fledged (Thurow et al. 1980; White and Thurow 1985; Woffinden and Murphy 1989; Steenhof and Kochert 1985; Schmutz and Hungle 1989 *in* Bechard and Schmutz 1995).

21.2.2 Habitat Requirements and Ecology

The ferruginous hawk is considered an "open country" species that inhabits the grasslands, shrub steppes, and deserts of western North America. Since the species does not regularly nest in California, only the habitat requirements and ecology of wintering ferruginous hawks will be

described herein. During the winter, ferruginous hawks use grasslands and arid areas, particularly where pocket gophers, ground squirrels, rabbits, or prairie dogs are abundant. Ferruginous hawks also winter near cultivated fields that support populations of pocket gophers (Bechard and Schmutz 1995), and are known to use urban open space grasslands as long as prey is available (Berry et al. 1998).

Few field studies of the ferruginous hawk have been conducted in wintering areas, and none are known for the Central Valley of California. Therefore, descriptions of the species' winter habitat requirements in California are based mostly on the personal observations of birders. Manolis (pers. comm.) has observed ferruginous hawks in open grassland habitats and non-vineyard agricultural areas in the Plan Area. Characteristics of these grasslands and agricultural lands are that they support abundant prey and include friable soils (for digging and burrowing), moderate to dense vegetative cover (particularly grasses), and some topographic variation (West pers. comm.).

Ferruginous hawks wintering in Utah have been found in higher numbers in irrigated pastures and dry croplands (Brouse 1999). The spatial requirements of ferruginous hawks during winter have not been widely reported (Bechard and Schmutz) and what constitutes the minimum size of suitable winter foraging habitat is unknown for most areas. In Colorado, Plumpton and Andersen (1997) found a mean daily minimum convex polygon home range size of 1.36 square miles. The minimum patch size for ferruginous hawks is likely affected primarily by prey availability, but also by the juxtaposition of the site relative to other suitable habitat, and by surrounding land uses. Ferruginous hawks generally roost individually, but sometimes roost communally in groups of up to 24 birds (Olendorff 1993).

21.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for ferruginous hawk are identified in Table FEHA-1 and have been derived from input from local species experts. This species does not nest within the Plan Area and therefore essential habitat elements for nesting is not included.

Table FEHA-1
Essential Habitat Elements for Ferruginous Hawk

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, and valley grassland.	Abundant rodent populations.

APPENDIX B (Continued)

21.3 Species Distribution and Population Trends

21.3.1 Species Distribution

Ferruginous hawks nest in western North America, from southern Saskatchewan and Alberta south to central New Mexico and Arizona, east to the Great Plains, and west to central Nevada and Oregon. Nesting occurs in 17 states and three provinces in western North America (Bechard and Schmutz 1995).

The winter distribution includes the southwestern United States and northern Central America. In California, ferruginous hawks occur commonly in each of the eight geographic regions used in analysis of the National Audubon Society's Christmas Bird Count (CBC) data (Garrison 1990). In each region, ferruginous hawks were reported to occur in over 22 percent (range 22 to 56percent) of CBC's between 1950 through 1988. When CBC data was standardized by search effort, Ferruginous hawks were most commonly observed in the North Interior, followed by the South Interior, Central Coast, and South Coast. Fewer individuals were found in the North and South Sierras, North Coast, and Central Valley.

Analysis of more recent CBC data found more ferruginous hawks in the Sierra Nevada, Cascades, and Inner Coast Range physiographic regions than other regions. Regions reporting moderate numbers of ferruginous hawks included the South Coast, Central Coast, and Central Valley. Those regions reporting the fewest ferruginous hawks included the Mojave and Colorado Deserts, North Coast, and High Desert (Hunting 2001).

21.3.2 Central Valley Distribution

Ferruginous hawks were detected regularly on more than 97 percent of the CBCs in the Central Valley between 1980 and 1997 (Hunting 2001); however, no additional data analysis on these records has been reported.

21.3.3 Range within the Plan Area

Observations of ferruginous hawk in the Plan Area are primarily opportunistic sightings of individuals by birders or observations during CBCs. Most observations of ferruginous hawks have been reported from open grassland habitats in the eastern portion of the Plan Area from Interstate 50 south to Howard Ranch (Manolis pers. comm). Winter observations have also been recorded from non-vineyard agricultural habitats in the south and southwestern portions of the Plan Area. There are three previously recorded occurrences of ferruginous hawk reported to the CNDDB within Sacramento County, all of which are within the UDA (CDFG 2010). Figure FEHA-1 shows the occurrences within the Plan Area according to CNDDB (CDFG 2010) and other sources (ebird.org 2005-2010).

APPENDIX B (Continued)

21.3.4 Population Levels and Trend

The ferruginous hawk range-wide population was estimated at between 5,842 and 11,330 individuals between 1990 and 1995 (Olendorff 1993). In the grasslands of the Great Plains, Schmutz et al. (1992) estimated 14,000 individuals; however, no range-wide breeding population or California wintering population estimates have been conducted to date (Bechard and Schmutz 1995, Garrison 1990).

Garrison (1990) analyzed CBC data and found the species winters throughout the state. Analysis was grouped in eight regions and two time periods (Table FEHA-2). The greatest number of ferruginous hawks occurred in the North Interior, Central Coast, South Coast, and South Interior regions.

Table FEHA-2
Measures of Abundance for Wintering Ferruginous Hawks in California based on Christmas Bird Count Data Between 1949-1988 (Garrison 1990)

Region	N (#)	% of CBCs with Ferruginous hawks	Avg. No. Ferruginous hawks/CBC	Avg. No. Ferruginous hawks/100 party mi.
North Coast	17	32.5	0.64	.20
North Interior	6	56.8	2.51	1.07
North Sierra	4	28.6	0.50	0.16
Central Valley	21	36.5	0.94	0.33
Central Coast	19	34.4	1.40	0.65
South Sierra	7	22.4	0.31	0.28
South Interior	14	35.0	2.25	0.78
South Coast	23	37.0	1.63	0.63

Regional populations have been documented as both increasing and decreasing; however, the North American population is generally considered to be declining (Bechard and Schmutz 1995). In California, Garrison (1990) and Hunting (2003) used CBC data to investigate trends and found increases in wintering ferruginous hawks. Although many comparisons between time periods (1949-1969 compared with 1970-1988) within regions lacked adequate sample sizes, ferruginous hawks were significantly more frequent and more individuals were observed per CBC in the Central Coast and South Coast regions. No significant differences were found in the North Coast and Central Valley regions, although the Central Valley showed increases in the percentage of ferruginous hawks/CBC and more individuals/CBC. Garrison provided several reasons why the recorded increases in wintering birds may be artificial, and could not unequivocally conclude these increases were "real."

APPENDIX B (Continued)

More recent analysis of CBC data by Hunting (2001) also reported increases in wintering ferruginous hawks (Table FEHA-3). Both mean ferruginous hawk detections per count circle and mean number of count circles detecting ferruginous hawks increased in six of seven physiographic regions with a decrease noted only in the South Coast region. Some increases, however, were attributed to an increase in the absolute number of count circles (Hunting 2001).

Table FEHA-3
Mean Ferruginous hawk Observations (Circles Detecting Ferruginous hawks) for Each of Seven California Physiographic Regions[1]

Physiographic Region	Mean Count Circle Observations (Circles) 1980-89	Mean Count Circle Observations (Circles) 1990-97	Numeric (percent) Change
North Coast	2.43 (4.8)	2.76 (7.5)	0.33 (12.1)
Sierra Nevada, Cascades and Inner Coast Range	3.53 (2.2)	8.14 (3.8)	4.61 (56.7)
Great Central Valley	2.73 (11.6)	4.43 (14.7)	1.7 (38.5)
Central Coast	2.70 (20.4)	4.63 (27.0)	1.93 (41.7)
South Coast	5.06 (13.6)	4.77 (15.8)	-0.29 (-6.1)
Mojave and Colorado Deserts	3.17 (4.2)	3.83 (4.7)	0.66 (17.4)
High Desert, Mono and Inyo Counties	0.33 (0.2)	1.30 (0.8)	0.97 (77.5)
Mean Observations[2]	3.27 (+-0.96)	5.22 (+-2.88)	

1 Table copied from Hunting 2001
2 Due to small sample size, values for High Desert, Mono and Inyo Counties omitted from calculation

21.4 Threats to the Species

Threats to ferruginous hawks occur in their breeding and wintering areas; however, since this species does not regularly nest in California, only threats in their wintering areas will be discussed in this account. Also, some historical threats such as egg collection, which occurred from 1900 to 1930 (Bechard and Schmutz 1995), no longer occur and are not considered a key factor in population declines (Bechard and Houston 1984; Bechard and Schmutz 1995). The use of organochlorine pesticides between the 1940's and 1960's also caused severe reductions in raptor populations from secondary poisoning. These pesticides have been banned in the United States since the 1970's, although they are still used in Central and South America (Sibley 2000).

21.4.1 Habitat Loss and Alteration

Foraging habitat (i.e., grasslands) for ferruginous hawks has been lost to urbanization or converted to agricultural crops that do not support prey species or are not used for foraging. Conversion of grassland habitats to urban and agricultural uses proportionately exceeds the conversion of any other habitat type in California (Ewing et al. 1988; Moore et al. 1990 *in*

Hunting 2001). DeHaven (2000) quantified changes in California cropping patterns and found that ferruginous hawk "friendly" habitats such as rangelands, grassland, and pastures have decreased. These habitats have been replaced by a variety of other crops (e.g., fruit and nuts, cotton, and vineyards) that are not used by ferruginous hawks, or by crops (e.g., vegetables and melons, tomatoes, beans, potatoes, sugar beets) that are suspected as having lower quality foraging value. Unlike other wintering raptors in California, ferruginous hawks do not use agriculture areas as frequently. Instead, they are more frequently found using natural habitat types such as grasslands and vernal pool/grassland complexes for foraging.

21.4.2 Shooting

Historically, raptors were illegally shot for sport like many other bird species (Bendire 1892; Cameron 1914; Salt 1939 *in* Bechard and Schmutz 1995). Shootings are still reported (Howard 1975; Harmata 1981), but decreases in the rate of band recoveries since the mid-1940's suggest a decrease in the numbers shot (Houston and Bechard 1984). Bechard and Schmutz (1995), however, suggest that shootings may still be a problem on the wintering grounds (Harmata 1981; Gilmer et al. 1985).

21.4.3 Pesticides

The control of ground squirrel and prairie dog populations with pesticides (i.e., strychnine) may affect ferruginous hawks (Hunting 2001). Eradication programs have decimated populations of these rodents. In addition, secondary poisoning has been documented for several raptors species; however, no studies have been found that document secondary poisoning of ferruginous hawks, and Bechard and Schmutz (1995) suggest pesticides pose little threat to the species.

21.5 Data Gaps and Conservation Implications

The ecology, status, and management of ferruginous hawks have received attention in recent years. However, there are several sources of uncertainty regarding ferruginous hawk and its requirements in the Plan Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

21.5.1 Population and Habitat Distribution within the Plan Area

Ferruginous hawks occur in suitable habitat within the Plan Area; however, their overall abundance and population structure are not well known. Land-cover types used by ferruginous hawks, such as grasslands, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Plan Area; however, at most sites with these land-cover types, the status of ferruginous hawk is not known.

APPENDIX B (Continued)

Because comprehensive surveys for ferruginous hawk in the Plan Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g., anecdotal records), the population size and important wintering areas of this species throughout the Plan Area are not known. Although the distribution of grasslands is mapped and quantifiable, the quality of habitat for ferruginous hawks within most of these areas is unknown.

These information gaps limit our ability to identify the best lands available for preserving ferruginous hawk habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value of grassland and agricultural land-cover types for ferruginous hawk will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

21.5.2 Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for ferruginous hawk are not well documented. This causes uncertainty in determining whether the preserve design will be effective in meeting the conservation goals for ferruginous hawk.

21.5.3 Effectiveness of Mammalian Prey Population Enhancement Measures in Improving Foraging Habitat for Ferruginous Hawk

Achieving the conservation goals and objectives for ferruginous hawk may require successful enhancement of mammalian prey populations. Mammalian prey populations, particularly leporids and ground squirrels, should be passively or actively promoted on all lands acquired and managed for ferruginous hawk habitat. However, whether these efforts will succeed at increasing the available prey base and enhancing habitat for ferruginous hawk is unknown.

21.5.4 Other Data Gaps

Other data gaps that could be important for ferruginous hawk conservation include: 1) responses of ferruginous hawk populations to habitat management and enhancement techniques; 2) prey population dynamics and cycles; and 3) an appropriate livestock grazing and fire regime appropriate for ferruginous hawk habitat management and enhancement.

21.6 Literature Cited

Bechard, M.J., and C.S. Houston. 1984. North Dakota oologists. Blue Jay 42: 176-183.

APPENDIX B (Continued)

Bechard, M.J., and J.K. Schmutz. 1995. Ferruginous hawk (*Buteo regalis*). *In* The Birds of North America, No. 172 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

Bendire, C.E. 1892. Life histories of North American birds. *U.S. Nat. Mus. Spec*. Bull. 1.

Berry, M.E., C.E. Bock, and S.L. Haire. 1998. Abundance of diurnal raptors on open space grasslands in an urbanized landscape. *Condor* 100: 601-608.

Brouse, P. 1999. Twenty year change in the raptor community in northern Utah during the non-breeding season. *Journal of Raptor Research,* 33(4):317-322.

Cameron, E.S. 1914. Ferruginous rough-leg *Archibuteo ferrugineus* in Montana. *Auk* 31: 158-167.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Chesser, R.K. 1979. Opportunistic feeding on man-killed prey by Ferruginous hawks. *Wilson Bull*. 91: 330-331.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use—for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, New York. Accessed online http://ebird.org/content/ebird

Ewing, R.A., N. Tosta, R. Tuazon, L. Huntsinger, R. Marose, K., Nielson, R. Motroni, and S. Turan. 1988. California's forest and rangelands: growing conflict over changing uses. California Department of Forestry and Fire Protection. 348 pp. with appendices.

Garrison, B.A. 1990. Trends in winter abundance and distribution of Ferruginous hawks in California. *Trans. West. Sect. Wildl. Soc*. 26: 51-56.

Gilmer, D.S., D.L. Evans, P.M. Konrad, and R.E. Stewart. 1985. Recoveries of Ferruginous hawks banded in south central North Dakota. *Journal of Field Ornithology*, 56: 184-187.

APPENDIX B (Continued)

Gossett, D.N. 1993. Studies of Ferruginous hawk biology: I. Rediscoveries of banded Ferruginous hawks from presumed eastern and western subpopulations. II. Morphological and genetic differences of presumed subpopulations of Ferruginous hawks. Master's thesis, Boise State Univ, Boise, Idaho.

Harlow, D.L., and P.H. Bloom. 1989. Buteos and the golden eagle. Pages 102-110 *in* B.G. Pendleton, ed. Proceedings of the western raptor management symposium and workshop. National Wildlife Federation Scientific and Technical Series No. 12. Washington, D.C.

Harmata, A.R. 1981. Recoveries of Ferruginous hawks banded in Colorado. *North American Bird Bander*, 6: 144-147.

Houston, C.S., and M.J. Bechard. 1984. Decline of the Ferruginous hawk in Saskatchewan. *American Birds* 38: 166-170.

Howard, R.P. 1975. Breeding ecology of the Ferruginous hawk in northern Utah and southern Idaho. Master's thesis, Utah State Univ., Logan.

Hunting, K. 2001. Ferruginous hawk (*Buteo regalis*). Species account for the CalPIF Grassland Bird Conservation Plan. http://www.prbo.org/calpif/htmldocs/species/grassland/fehaacct.html.

Leslie, D.G. 1992. Population status, habitat and nest-site characteristics of a raptor community in eastern Colorado. M.S. thesis. Colorado State University, Fort Collins, Colorado. 45 pages.

Lloyd, H. 1937. Twenty-year-old Ferruginous Rough-legged Hawk. *Can. Field-Nat.* 51: 137.

Manolis, Tim.

Moore, S., J. Winckel, S. Detwiler, S. Klasing, P. Gaul, N. Kanim, B. Kesser, A. DeBevec, K. Beardsley, and L. Puckett. 1990. Fish and wildlife resources and agricultural drainage in the San Joaquin Valley, California. Volume 1. San Joaquin Valley Drainage Program, Sacramento, California. 364+ pp.

Oldendorff, R.R. 1993. Status, biology, and management of Ferruginous hawks: a review. Raptor Res. and Tech. Asst. Cen., Spec. Rep. U.S. Dep. Interior, Bur. Land Manage., Boise, Idaho.

Olendorff, R.R. 1973. Ecology of the nesting birds of prey of northeastern Colorado. Tech. rep. 211, U.S. Int. Biol. Prog., Grassland Biome, Fort Collins, Colorado.

APPENDIX B (Continued)

Palmer, R. S. 1988. Ferruginous Hawk. Pages 135-151 *in* Handbook of North American birds, volume 5. Yale University Press, New Haven, Connecticut.

Plumpton, D.L., and D.E. Andersen. 1997. Habitat use and time budgeting by wintering Ferruginous hawks. Condor 99:888-893.

Salt, W.R. 1939. Notes on recoveries of banded ferruginous rough-legged hawks (*Buteo regalis*). *Bird Banding* 10:80-84.

Schmutz, J.K., S.H. Bretchel, K.D. De Smet, G.L. Hjertaas, G.L. Holroyd, C.S. Houston, and R.W. Nero. 1992. Recovery Plan for the Ferruginous Hawk in Canada. Prepared for Recovery of Nationally Endangered Wildlife (RENEW), Ottawa.

Schmutz, J.K., and D.J. Hungle. 1989. Population of Ferruginous and Swainson's hawks increase in synchrony with ground squirrels. *Can. J. Zool*. 67:2598-2601.

Schmutz, J.K., and R.W. Fyfe. 1987. Migration and mortality of Alberta Ferruginous hawks. *Condor* 89:169-174.

Sibley, D.A. 2000. *The Sibley guide to Bird Life and Behavior*. National Audubon Society. Alfred A. Knopt, New York. 587pp.

Smith, D.G., and J.R. Murhpy. 1978. Biology of the Ferruginous hawk in central Utah. *Sociobiology* 3:79-98.

Steenhof, K., and M.N. Kochert. 1985. Dietary shifts of sympatric buteos during a prey decline. *Oecologia* 66: 6-16.

Thurow, T.L., C.M. White, R.P. Howard, and J.F. Sullivan. 1980. Raptor ecology of the Raft River Valley, Idaho. E.G. & G. Idaho, Inc., Idaho Falls, ID. 45pp.

Udvardy, M.D.F. 1998. The Audubon Society Field Guide to North American Birds. Alfred A. Knopf, Inc. New York.

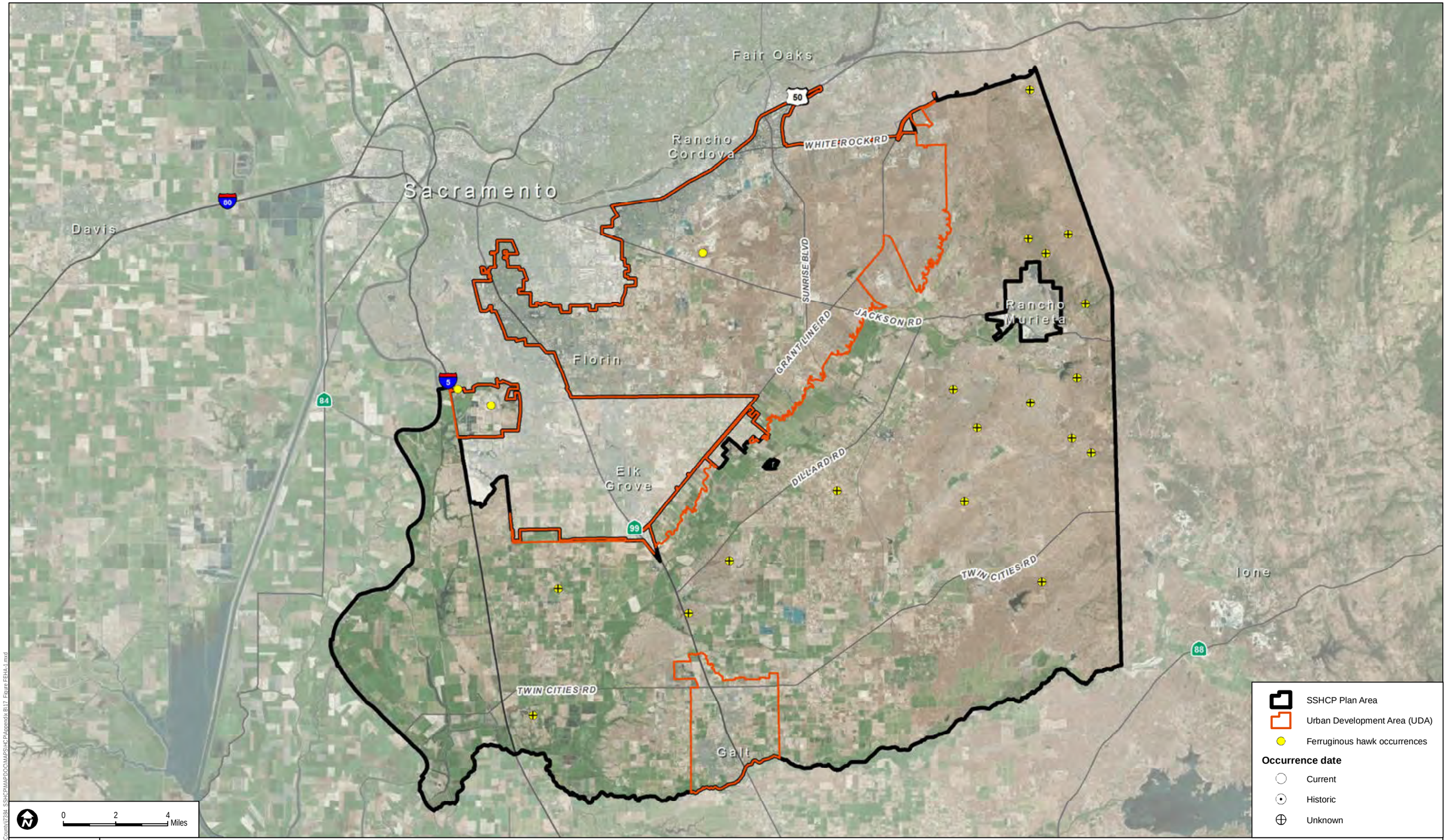
United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Online version: http://migratorybirds.fws.gov/reports/bcc2002.pdf.

West.

APPENDIX B (Continued)

White, C.M., and T.L. Thurrow. 1985. Reproduction of Ferruginous hawks exposed to controlled disturbance. *Condor* 87: 14-22.

Woffinden, N.D., and J.R. Murphy. 1989. Decline of a Ferruginous hawk population: a 20-year summary. *Journal of Wildlife Management*, 53: 1127-1132.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org

FIGURE FEHA-1

Ferruginous Hawk Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0294 SSHCP\MAPS\CMAPS\HCP\Planning\fr\B17 Figure FEHA-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

22 SWAINSON'S HAWK (SWHA)

Prepared by Waldo Holt

Swainson's Hawk (SWHA)
(Buteo swainsoni)
Status USFWS: None
Status CDFG: Threatened



22.1 Legal Status

Swainson's hawk (*Buteo swainsoni*) is a migratory bird that is provided protection by the Migratory Bird Treaty Act of 1918. In 1983, the California Fish and Game Commission, acting on the recommendation of the California Department of Fish and Game (CDFG), listed the Swainson's hawk as a Threatened species, thereby providing protection under the California Endangered Species Act (CESA).

22.2 Life History and Ecology

Swainson's hawk is a member of the genus *Buteo*. Other members of this genus that are found on an annual basis in the South Sacramento Habitat Conservation Plan (SSHCP) area (i.e., Plan Area) include two resident species: red-shouldered hawk (*B. lineatus*) and red-tailed hawk (*B. jamaicensis*). Although many red-tailed hawks are resident in the Sacramento Valley, substantial numbers of red-tailed hawks from other portions of western North America migrate to and overwinter in the Plan Area each winter. Two additional *Buteo* spp. also are found in the Plan Area, but are strictly winter visitors and do not nest in the Plan Area: ferruginous hawk (*B. regalis*) and rough-legged hawk (*B. lagopus*). Swainson's hawk is a summer visitor that nests in the Plan Area, but winters in Central and South America. Swainson's hawk is not closely related to the other *Buteo* spp. in the Plan Area. It is thought to be most closely related to Galapagos hawk (*B. galapagos*) and white-tailed hawk (*B. albicaudatus*) (Palmer 1988).

APPENDIX B (Continued)

22.2.1 Species Description and Life History

22.2.1.1 Adult Description

The Swainson's hawk is a medium-sized *Buteo*, weighing 1.5 to 2.5 pounds. It is less than two feet long and has a wingspan of approximately four feet. In general, it is slightly larger than a red-shouldered hawk, but it is slightly smaller than the other *Buteos* in the Plan Area. It appears more slender than other *Buteos* due to its relatively long tail and more pointed wings. When perched, the wingtips extend to the tip of the tail. When in flight, the wings are extended in a shallow "U" shape. This slight dihedral silhouette in flight and the more pointed wings are good field marks for distinguishing Swainson's hawks from other flying *Buteos*.

Adult Swainson's hawks, like several other *Buteos*, have different color variations. These color variations are referred to as "morphs" that are generally described as one of the following: light, rufous, intermediate, or dark. These are not discrete color variations, but represent attempts to broadly classify what is a continuum of variation in color. The color variation is readily observed on the underside of the bird and is largely confined to the lower belly, underwing linings and throat. Color on these feathers can range from almost completely white to almost completely black but is usually between these extremes, and is most often represented by brown or rufous speckling, or bars, or washes of color. Clark and Wheeler (1987) noted that dark morphs represent only one to 10 percent of local populations in the Swainson's hawk's entire breeding range, and that the overwhelming majority of individuals are light morphs. However, in the Central Valley roughly 33 percent can be classified as light morph and another 33 percent as dark morph, while the remaining 33 percent are an intermediate morph that has some of the characteristics of dark morphs (Estep 1989; England et al. 1997).

The eye of the adult is dark brown. The hooked, medium-sized beak is dark with a yellow cere (the unfeathered nasal area at the base of the upper mandible). There can be a varying amount of white feathering just above the cere. Otherwise, the feathering on the head is a solid brown to chocolate-gray. This color spreads down the nape and the back to the rump, and extends onto the upperwing coverts (feathers covering the forward part of wing). The chin and throat color is variable. In lighter individuals the chin can have a squared-off white patch. While darker individuals can lack this patch entirely with the chin and throat being completely brown. On other individuals the chin and throat patch can be streaked or otherwise partially present. The breast is always a solid brown bib, with a well-defined horizontal demarcation between breast and belly that is most prominently observable on light morph individuals. Much of the underparts are variable in color. The belly, flanks, axillaries, and underwing coverts can be anything from an immaculate white to rufous or a very dark brown. Throughout most of the species' range, its underparts are usually white, however, in the Central Valley, a multitude of

color variations are found. The majority of birds in the Central Valley exhibit characteristics of dark or intermediate morphs.

Swainson's hawks of all color morphs have dark gray remiges (i.e., the large primary and secondary flight-feathers). In all morphs, one can see contrast between the brown coverts and darker flight-feathers of the upperwing. The contrast is most prominently seen on the underside of the wings. When viewed from below, the darker gray trailing edge of the wings stands out against the lighter underwing coverts. This field mark is widely used to identify the species and, though less pronounced, is even evident on most dark morph Swainson's hawks.

The undertail coverts (feathers between vent and tail on underside) are white, often with some amount of sparse brown barring. This is the case with all color morphs of the species. The tail is a light gray-brown with numerous darker horizontal bands. The sub-terminal band is a bit wider. The prominence of these bands is variable and tends to become fainter toward the base of the tail. The tail can sometimes appear to be slightly reddish when viewed from below (especially when sunlight is shining through it). The legs and feet are yellow or yellow-green while the talons are black.

22.2.1.2 Sub-Adult Description

Juveniles are similar in size and shape to adults, but have coloration different plumage. The eye is lighter and gray. The head is mainly brown, forehead white and crown streaked. The supercilium (line above eye) is pale, while the cheeks and throat are buffy with dark brown malar streaks (lines at sides of throat). The back and upper wing coverts are brown with buffy edges to the individual feathers. The primary and secondary flight-feathers are dark. The underparts are creamy to buffy, with varying amounts of dark brown spotting. The breast does not have a well-defined bib (unlike in adults) and is buffy with dark brown irregular spots. The tail is usually more distinctly banded with the sub-terminal band not noticeably wider. The cere, legs and feet are yellow, while the talons are black. Individuals that will ultimately attain a dark or light plumage as adults are noticeably more heavily or, conversely, less heavily spotted respectively as juveniles. Second-year plumages are best identified by the juvenal plumage features that are retained: the pale supercilium on a head that usually is otherwise paler than in the adult plumage; the breast is not yet a solid, well-defined bib, but can have irregular dark blotches; and the tail can be less evenly banded.

22.2.1.3 Sexual Dimorphism

Female Swainson's hawks are, on average, larger than males. Total length of males is 48 to 51 centimeters and mass is 693 to 936 grams, while females are 51 to 56 centimeters long and weigh 937 to 1367 grams (J.K. Schmutz *in* Palmer 1988). In the Central Valley of California,

sexual dimorphism is apparent in the color morphs. The female, in virtually every mated pair in the Central Valley is the darker of the pair (Estep 1989; Holt pers. obs.). Females, therefore, tend to account for more of the dark morph individuals, while more of the light morph individuals are male. Clark and Wheeler (1987) notes that "(B)irds of each color morph tend to mate preferentially with their own morph." Sharp (1902) noted that the ample Swainson's hawk population that once existed in southern California was exclusively dark morph. Heerman (*in* Cassin 1856) reports a "new species" of hawk from the Central Valley of California that he calls the "black hawk" (*Buteo insignatus*). It is evident from his description and an illustration made from specimens that he was referring to female dark morph Swainson's hawks standing next to fledgling Swainson's hawks near nests. No description of an adult male Swainson's hawk is given by Heerman.

22.2.1.4 Longevity

Data concerning longevity is not abundant. A recovered band from an individual killed in Argentina indicated an age of 19 years six months (Woodbridge *et a*l. 1995b). A female observed at a nesting site in the Butte Valley, California was banded nearby as a nestling 24 years earlier (Bradbury pers. comm. 2004). These individuals likely are representative of the maximum lifespan for the species.

22.2.1.5 Age at Sexual Maturity

Sexual maturity is perhaps achieved by the third year (Cameron 1913). Instances of breeding at two years have been observed (Woodbridge et al. 1995a). In the Central Valley, individuals in sub-adult plumage have been observed paired with an adult and attempting to breed, but most encounter difficulties, probably due to inexperience, and fail entirely or loose chicks from starvation (n=5, Holt unpubl. notes). Individuals, once mature, are capable of breeding annually throughout the remainder of their life.

22.2.1.6 Reproductive Strategy

Mated pairs are largely reported to establish nesting territories that are in the same general area from where they were hatched (Woodbridge et al. 1995a; Gilmer and Stewart 1984; Bechard 1980). Pairs are monogamous and can remain together for many years (England et al. 1997). Site tenacity is evident, as the same individuals will return year after year to the same nesting territory (England et al. 1997). Estep (1989) had each of nine color-banded individuals return in successive years (1986-87) to the same nesting territory in the Central Valley. Pair bonding and courtship can take up to several weeks. A pair bond is formed while engaging in: soaring together in the nesting territory, displays of leg-dragging while soaring, undulating swoops, calling to each other, food sharing, copulating and, nest building. Nest building takes one to two

APPENDIX B (Continued)

weeks and eggs are laid approximately one week after copulation (Fitzner 1980). Clutch size is between one to four eggs. The female does almost all of the incubating of the eggs with the male incubating only briefly to allow the female a respite and an opportunity to stretch her wings. The male provisions the female during incubation and continues provisioning the female and chicks into the nestling and fledgling stages, at which time the female assists with provisioning from areas closer to the nest (Estep 1989; England et al. 1997).

Throughout the North American breeding range, adults arrive on nesting territories in March to May, lay eggs between April and June, and the young fledge between June and August (England et al. 1997). The Central Valley population is disjunct from the remainder of the species breeding range. The Central Valley has a relatively warmer climate than many other parts of the species' breeding range; therefore, the nesting season proceeds a bit earlier than in the more intemperate parts of the range. In the Central Valley, Swainson's hawks arrive at nesting territories from mid-February to the first week in April. Eggs are laid April to mid-May and fledging takes place from mid-June through early August (Swainson's Hawk Technical Advisory Committee 2000; Holt pers. obs.). The latest known nesting dates from the Central Valley population are associated with a nest in Yolo County and another in Sacramento County in 2003. Due to unrelenting inclement weather in April of that year, initial nesting attempts of these pairs were interrupted and secondary nest building and egg-laying took place as late as May 19 to 23 (Holt pers. obs.). Nest-building generally takes one week (Fitzner 1980). Egg-laying involves the laying of a single egg every other day until the clutch is completed (Fitzner 1980). The incubation period is 34 to 35 days (Fitzner 1980). Chicks take two to four days to hatch (Fitzner 1980). Chicks are altricial (helpless) and hatch asynchronously. This allows the first chicks that hatch to get a head start on their younger siblings. The first chick is able to beg for food earlier than the younger chicks and therefore, gains extra strength so that in those years when food resources are short, the available supply will go only to the older chick(s). This strategy ensures the survival of the largest number of offspring that the food resources will allow when the abundance of food for chicks cannot be predicted at the time when eggs are laid. With asynchronous hatching, the smallest chicks will not garner their fair share when times are tough and will only survive in years of abundant resources. Elimination of the smallest chicks usually occurs by starvation as a result of competition with their more developed siblings.

Chicks develop in the nest for 27 to 33 days (Fitzner 1980) before they are able to walk or hop onto nearby limbs (branching). First flight (fledging) takes place between 38 to 46 days (Fitzner 1980). For the first seven to 10 days after first flight the young stay near the nest (Fitzner 1980). The parents continue to feed the young for one month (Fitzner 1980). After that, the fledglings must fend for themselves. They then range widely in search of prey, covering up to one hundred miles in a day and associate in loose groups with other fledglings (Anderson et al. in progress).

The pair bond and parental bonds are then relinquished and adults and juveniles migrate separately in autumn (Woodbridge et al. 1995b; Bradbury et al. in prep).

Multi-year studies addressing reproduction have documented the mean number of fledged young per nesting attempt. The high is 1.67 fledglings per attempt (Bednarz 1988), while the low is 1.11 fledglings (England et al. 1995). Eight studies from six states and one province document 2,023 chicks fledged out of 1,444 nesting attempts for an average of 1.40 fledglings per nesting attempt (synthesized from England et al. 1997). It is assumed that a high percentage of first-year individuals do not survive to breeding age, but data concerning survivorship and recruitment is currently inadequate to address this question.

22.2.1.7 Seasonal Movements

At the conclusion of nesting when fledglings no longer are dependent upon adults, Swainson's hawks become gregarious and nomadic. Nesting territories and local foraging areas are abandoned and no longer defended. Large flocks of Swainson's hawks join together and range widely in pursuit of prey. They roost communally in trees at night. These flocks are loose associations joined primarily to exploit a common prey source and are not necessarily concerned with pre-migratory staging (Johnson et al. 1987). They remain gregarious and nomadic throughout the entire non-nesting period.

The Swainson's hawk is a neotropical migrant. Migratory movements of the atypical, disjunct Central Valley population are discussed below. The overwhelming majority of the population funnels through the Isthmus of Panama each Boreal autumn/Austral spring and then returns through Panama each Boreal spring/Austral autumn. In migration, they stay over land and do not attempt over-water crossings of extended length. They are reported to roost in trees or on the ground at night in Central America (Smith 1980; Smith et al. 1986).

Migration routes are primarily east of the Rocky Mountains and down the eastern coast of Mexico through Central America and over mountain passes in the Andes in Columbia. The return trip north covers roughly similar routes, only in reverse (Palmer 1988; England et al. 1997). They travel diurnally, seeking thermal updrafts and soaring upward in circles, barely flapping their wings. They then glide for as far as they can go, taking advantage of updrafts with skill while efficiently conserving stored fat reserves (Smith 1980; Smith et al. 1986). They will surf along weather fronts, using the change in air pressure to coast great distances with as little wasted effort as possible. Great masses of Swainson's Hawks have been observed passing over a single spot in Costa Rica or Panama (Smith 1973; Smith 1980). Brown and Amadon (1968) consider the immense migrating flocks of Swainson's hawks to be the most impressive avian gatherings in North America since the demise of the passenger pigeon.

During the Austral summer/Boreal winter, Swainson's hawks remain gregarious and nomadic. They use communal roosts at night (Woodbridge et al. 1995b; Bradbury et al. in prep). They flock together in pursuit of prey, which are almost exclusively insects such as swarms of locusts or dragonflies (Orlog *in* Smith 1980; Jaramillo 1993; Woodbridge et al. 1995b). Seasonal migration can involve many thousands of miles each way. Those that nest furthest north may face the extreme journey of a complete migration of 14,000 miles (Palmer 1988). Six to eight months is spent in migration and wintering, with each leg of migration capable of taking up to two months (Palmer 1988).

22.2.2 Habitat Requirements and Ecology with Emphasis on the Central Valley of California and Plan Area

22.2.2.1 Nesting Habitat

Swainson's hawks build their nests with sticks and twigs and some stems from other vegetation. A nest is about two feet in diameter and about one foot deep (England et al. 1997). In the Central Valley of California, there are about 25 different tree species that have been utilized for nesting (Holt pers. obs.; CDFG 2010). The most common nest trees are Fremont's cottonwood (*Populus fremontii*), oaks (*Quercus* spp.), willows (*Salix* spp.), walnuts (*Juglans* spp.), eucalyptus (*Eucalyptus* spp.), pines (*Pinus* spp.), and Deodar cedar (*Cedrus deodara*). They build the nest in the top part of the tree (Bloom 1980). Swolgaard (2004) found nests to be located on average at 79 percent of tree height (n=94). Estep (1989) found average nest height to be 81.8 percent of the average tree height (n=40). In oaks, the nest is often situated in smaller branches toward the top of the tree. In cottonwoods, willows and eucalypts it often is in a crotch of vertical branches. In cottonwoods, nests are also commonly placed atop large mistletoe clumps. Selected conifers are often ones that are very tall, frequently with the tops broken off, being flattened on top or having a large limb projecting from the side (England et al. 1995). In the Central Valley, Estep (1989) documents the mean height of nest trees in his study area at 57.7 feet and the mean height of the nest at 47.2 feet (n=40). In a study done on the Sacramento River (Moreno 1994), the mean tree height was 63.3 feet and the mean height of the nest was 50.6 feet (n=32). In northern San Joaquin County, Swolgaard (2004) found mean tree height to be 62 feet and mean nest height to be 49 feet (n=94). Mature tall trees provide extra safety from dangers below, sturdiness during storm events, and superior vantage points from which to assess potential threats and hunting opportunities.

Most nest trees are associated with riparian systems. Schlorff and Bloom (1984) found 87 percent of all Swainson's hawk's nests in the Central Valley to be associated with riparian systems. Within his study area in parts of Yolo, Sacramento and San Joaquin Counties, Estep (1989) found 78.1 percent of nest trees to be in riparian systems. This, however, is not due to any known affinity for aquatic systems by Swainson's hawks, but may reflect a relationship of

superior nesting territories located adjacent to superior foraging habitat. Swainson's hawk's nests are also found well away from waterways in lone trees in fields and pastures, in trees along roadside edges, in small groves, around farm buildings, and in some urban areas.

Nest trees selected in riparian strips or groves are typically among the tallest trees in the stand and they are also situated at an edge of the stand. When in a grove, the nest tree is at the outer edge of the grove (Bloom 1980; Estep 1989). Curiously, in riparian strips a nest tree is typically on the riverside edge much more so than on the landside edge (Wilkinson and Levy 1993; Moreno 1994; Holt pers. obs.). This may be because a particular riverside tree may be taller than other nearby trees, it may have fewer disturbances at the river's edge, or it could offer the best vantage of the surrounding territory. Nest trees can also be found in close proximity to farm buildings (Bloom 1980; Swolgaard 2004); often in large, well-established, exotic tree species or relict natives. It is likely that a tradeoff exists between the amount of extra disturbance at farm buildings versus the safety of a truly superior nesting tree. Or, it may simply be that a marginally suitable nest tree occurs in an agricultural landscape of cleared open fields that is a vastly superior territory.

22.2.2.2 Urban Nesting

Nesting in completely urbanized areas is an unusual phenomenon that has recently been discovered in some particular urban settings: 1979 in Davis (P. Bloom pers. comm.) and 1983 in Stockton (D. Yee pers. comm.). England et al. (1995), reported on a five-year study that compared urban-nesting Swainson's Hawks in Davis and Stockton with nearby rural-nesting populations. They found that urban-nesting Swainson's hawks selected nest trees that were among the tallest trees and the trees were either exotic conifers or relict native trees that existed prior to the human constructions. Conifers were particularly selected in urban landscapes: 79 percent in Davis (n=14) and 94 percent in Stockton (n=17). Nests located at the top of 80-foot deodar cedars are common in Stockton (pers. obs.). From this height the hawks have unobstructed views in all directions. England et al. (1995) offered that the preference for conifers is due to their abundance in urban settings, they are the tallest trees, and the dense evergreen foliage and radial branching pattern provide extra screening from activity below.

Urban-nesting always occurs in association with suitable foraging habitat being relatively close to the nest (e.g., Stockton and Davis are surrounded in all directions by high quality foraging habitat in suitable agricultural crops). Comparatively, both Lodi, which is surrounded by vineyards, and Sacramento, with its urban sprawl, lack urban nests (England et al. 1995). At some point the energetic demands on the provisioning male of carrying prey items long distances outweighs the energy value gained. England et al. (1995) calculated that when suitable foraging habitat is beyond five to eight kilometers from suitable urban-nesting habitat, such as in Lodi and Sacramento, urban nesting does not occur. Furthermore, England et al. (1995) reported that the

reproductive success of urban-nesting Swainson's hawks was lower than rural-nesting Swainson's hawks during the same period.

22.2.2.3 Nest Territory Characteristics

Although a nest territory can include only a single tree, it more typically has multiple trees. A lookout-perch that affords a good vantage of potential threats or hunting opportunities in the surrounding area is a necessary component of a nest territory. Such a perch can often be in a tree that is not the nest tree. In alternate years, a nest might be placed in a different tree within a nesting territory, but the same lookout-perch will be used. Multiyear studies (Wilkinson and Levy 1993; England et al. 1995) and long-term data collections (CDFG 2010) reveal that it is quite common to have alternate nesting sites within the same nest territory. This is necessary when the nest or nest tree from the previous year has been destroyed is appropriated by other raptors, or is found to be newly situated too close to a neighboring raptor's territory or to some other disturbance. The overall size of a nesting territory, as such, can vary substantially from year to year. Over the years, nest territories can dynamically shift, having differing shapes and components. Some nesting territories do remain constant, with the same nest in the same tree for many years, while others are subject to various changes on an annual basis (Holt pers. obs.; Estep pers. comm.).

Estep (1989) found that territories surrounded by preferred foraging habitats were defended more aggressively than territories surrounded by less-favorable foraging habitats. Furthermore, this suggests that a high quality nest territory and its associated foraging habitats and prey base is more important than a particular nest tree.

22.2.2.4 Nesting Density

Estep (1989) found, in four plots comprising a 374-square-mile study area in the Central Valley, the average distance between nests was 1.14 kilometers. This is the closest average spacing of Swainson's hawk nests recorded (England et al. 1997). It is attributed to riparian nesting habitat being largely contained in thin strips next to treeless agricultural fields of suitable foraging habitat, while in other parts of the breeding range conditions are more savannah-like with trees dotted throughout the foraging habitats.

22.2.2.5 Competition for Nest Territories

Selection of a poor nest site can be a factor in nesting failure. Competition exists for nest sites. Conflicts with red-tailed hawks and red-shouldered hawks, as well as white-tailed kites (*Elanus leucurus*) erupt into territorial fights over nest sites when Swainson's hawks arrive from spring migration and find a favored nest site occupied by another raptor. The Swainson's hawks begin nesting later in the year when other raptors have already selected nest sites and may be brooding

eggs. Nesting raptors are not happy to be dislodged. Territorial fighting can go on for days and can include calling, swooping, stooping with talons outstretched, and even contact with strikes of sharp talons or wheeling in flight with talons interlocked. Swainson's hawks are often forced to accept a second choice in these interactions. They usually have little success evicting red-tailed hawks, but apparently fair better against white-tailed kites. Great-horned owls begin nesting months earlier and do not build their own nest. They appropriate existing raptor nests, including Swainson's hawk's nests that are left over from the previous year. Swainson's hawks have not been observed to succeed in evicting these large, predatory owls.

American crows (*Corvus brachyrhynchos*), yellow-billed magpies (*Pica nuttalli*), American kestrels (*Falco sparverius*), and western kingbirds (*Tyrannus verticalis*) often harass and mob Swainson's hawks at nest sites, but these smaller birds, while undoubtedly are annoying, have not been observed to thwart Swainson's hawks in their nest site selection.

Intra-specific competition between Swainson's hawks for nest territories also occurs, but such disputes have not been reported to rise to the level where breeding success is impacted.

22.2.2.6 Diet and Foraging

The Swainson's hawk is considered to be largely insectivorous, but breeding pairs are thought to switch to vertebrate prey due to the energetic demands of reproduction (Johnson et al. 1987). Locusts, grasshoppers, dragonflies, crickets, grubs, etc. are the major staple of the Swainson's hawk's diet (Palmer 1988; England et al. 1997). They snatch locusts and dragonflies out of the air with their talons and transfer the prey to their beaks while on the wing (Orlog *in* Smith 1980; Johnson et al. 1987; Jaramillo 1993). They hunt on the ground, sometimes running after grasshoppers and crickets (Bloom 1980; Johnson et al. 1987; Estep 1989). On their wintering grounds, Swainson's hawks are almost exclusively insectivores (Orlog *in* Smith 1980; Jaramillo 1993; Woodbridge et al. 1995b). They are known in Spanish-speaking South America as the locust hawk (aguililla de langosta) or the grasshopper hawk (aguililla de saltamontes). During migration, it is thought that they fast for much of the journey (Smith et al. 1986; Brown and Amadon 1968)

Returning spring migrants in northeastern California were measured to be eight to 14 percent lighter than adults that were weighed in July (Bloom pers. comm.).

During the nesting season dragonflies, grasshoppers, dobsonflies, crickets, etc. continue to be a part of the Swainson's hawk's diet (Grinnell et al. 1930; Bloom 1980; Johnson et al. 1987; Estep 1989). However, insects are not a primary food source for provisioning at the nest. They might be considered as just a "snack" that the male devours for himself (Estep 1989). Insects individually do not have very much caloric bulk. Instead, the male Swainson's hawk provisions

its mate and offspring by switching to a variety of larger vertebrate prey. In Alberta and Saskatchewan, ground squirrels are the major prey item (Schmutz et al. 1980; Houston 1990). In Utah they have a preference for whitetail jackrabbits (Smith and Murphy 1973). In New Mexico, they prefer black-tailed jackrabbits (Bednarz 1988). In Arizona, they take a variety of lizards and snakes (Bednarz 1988). In North Dakota, the species takes pocket gophers (Gilmer and Stewart 1984). In Washington, pocket gophers and snakes are the major food items (Fitzner 1980; Bechard 1980). In northeastern California, voles and ground squirrels are a big part of the diet (Woodbridge 1985; Bloom 1980). Bird species are also a large component of their vertebrate diet everywhere (England et al. 1997). Overall, this paints a picture of the Swainson's hawk as an opportunistic hunter that can handle a variety of vertebrate prey depending upon the prey's availability in a given region.

Hunting techniques include snatching insects out of the air or running insects down on the ground as mentioned above. The Swainson's hawk takes much of its prey while foraging on the wing over open country. This is different from the red-tailed hawk, which hunts from perches with much more frequency, and red-shouldered hawks that hunt from perches almost exclusively. Vertebrate prey is captured usually by descending upon the targeted animal from the air. Besides soaring over open country looking for available prey, Swainson's hawks also commonly will stand on the ground and wait for a burrowing animal such as a gopher to reappear at the surface to pounce upon it (Bechard 1980; Holt pers. obs.). They are everywhere noted (Woodbridge et al. 1995b; England et al. 1997) to use farm machinery as a beater as tractors mowing or plowing in fields displace small rodents, birds or insects making them easy targets as they scurry for cover. Fire and flood-irrigation also provide events when Swainson's hawks take advantage of dislodged prey (Estep 1989). Swainson's hawks appear to look for and to key on these events knowing that they will produce available prey.

22.2.3 Foraging Habitats

22.2.3.1 Diet

Reproductive success for the Swainson's hawk in the Plan Area is directly correlated to the adults' ability to capture and deliver sufficient prey to successfully fledge young from the nest. Key components in this success involve prey densities, prey availability, and distance to the nest site. The Swainson's hawk is an opportunistic hunter that can handle a variety of vertebrate prey depending upon the prey's availability in a given area. In the Central Valley a wide variety of prey items are taken including: small mammals, birds, reptiles, and insects; however, the California vole (*Microtus californicus*) is the preferred prey item (Bloom 1980; Estep 1989; Babcock 1995; Swainson's Hawk Technical Advisory Committee 2000; Ron Schlorff pers. comm. 2003; Joe Papp pers. comm. 2004; Holt pers. obs.). Estep (1989) found that California vole was the single most important prey item in his study areas in Yolo, Sacramento and San

APPENDIX B (Continued)

Joaquin counties. Eight species of mammal, including California vole, Botta's pocket gopher (*Thomomys bottae*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), Norway rat (*Rattus norvegicus*), California ground squirrel (*Spermophilus beecheyi*), house mouse (*Mus musculus*), and black-tailed jackrabbit (*Lepus californicus*),were found among prey remains and regurgitated pellets, with the California vole comprising 69.2 percent of all mammalian prey. Birds represented a very significant dietary component as well, with at least 15 different species found (including juvenile ducks and pheasants). Other species taken include Pacific gopher snake (*Pituophis catenifer*), western toad (*Bufo boreas*), crayfish species (*Pacifastacus* spp; *Procambarus* spp.), and numerous insects (mostly grasshoppers and crickets). J. Papp, a nest-tree climber who bands dozens of Central Valley Swainson's hawk nestlings each year in a long term telemetry study, confirms that the overwhelming majority of prey items in nests are California voles (Papp pers. comm.). While the variety of prey species that can be taken by Swainson's hawks is important to the nesting success of many Swainson's hawks, the consensus of field biologists who have examined prey remains or pellets and observed numerous prey captures and deliveries at nest sites is that the California vole is clearly the favored prey species of Swainson's hawks in the Central Valley (Babcock 1995; Bloom 1980; Bradbury et al. *in prep*.; England et al. 1995; Estep 1989; Schlorf pers. comm.; Swolgaard 2004).

Prey Availability

The availability of prey, rather than prey densities, appears to be the most important factor for foraging success (Estep 1989; England et al. 1997). Swainson's hawks in the Central Valley are very effective at exploiting prey when that prey is made available to them due to the effects of agricultural activities such as harvesting, disking, mowing, flood irrigating, and burning of fields (Palmer 1988; Estep 1989; England et al. 1997). These activities make prey available to predation by dislodging them or reducing their cover. Estep (1989) found that 12 radio-tagged Swainson's hawks spent 52.8 percent of their observed foraging time hunting in response to these activities. He also observed that 73.4 percent of all observed prey captures were made in association with these activities (n=143). Similar observations are noted in several other studies of Central Valley Swainson's hawks (Bloom 1980; Babcock 1995; England et al. 1995; Herzog 1996; Swolgaard 2004). The dense vegetative cover that is in place during the extended growing period of a particular crop provides good rodent habitat, allowing prey populations time to increase their numbers. The rapid removal of that cover then leaves prey species suddenly vulnerable to predation by Swainson's hawks.

Agricultural Foraging Habitats

In four study plots in Sacramento, Yolo and San Joaquin Counties, Estep (1989) analyzed agricultural habitats based on 724 hours of preference data gathered on 12 radio-tagged

APPENDIX B (Continued)

Swainson's hawks between May 6, 1986 and September 12, 1987. He then ranked Swainson's hawk agricultural foraging habitats in descending order of importance: alfalfa, disked field, fallow, dry-land pasture, beets, tomatoes, irrigated pasture, grains, other row crops, and other. Estep (1989) also extensively trapped for small rodents in these habitats. Swolgaard (2004) did not use radio-tagged individuals, but did record 246 observations of Swainson's hawks foraging in agricultural habitats from April through August of both 2002 and 2003. His findings are generally corroborative of Estep's (alfalfa is high preference, vineyards are low, etc.). A discussion of agricultural foraging habitats ranked by Estep (1989) in descending order of preference is provided below.

Alfalfa is generally associated with the dairy industry. The process of harvesting alfalfa occurs four to seven times a year. The entire field is mowed and the cut hay is left to dry in a row. It is turned over on another day for further drying and on a later day, it is baled and removed. The field is then flood-irrigated and the whole process is repeated. Each of these activities provides a foraging opportunity for Swainson's Hawks. Swolgaard (2004) also rated irrigated hay (alfalfa) as clearly being the first preference. He observed that Swainson's hawk's foraging in alfalfa is correlated to harvest and irrigation, but further noted that there is a preference for alfalfa fields that are not in the first year of production. Alfalfa often stays in place for several years (three to seven years). This allows the population of voles and gophers to increase as the field becomes well established. After the alfalfa crop has run its course for a number of years, grains such as corn, oats, or wheat (crops also important as fodder for dairy cattle) are the most common crops that will be planted in that field for a few years before alfalfa is planted again.

Disked fields are fields in a temporary state of dormancy and are between crops. They constitute a small portion of the total amount of agricultural habitats that may be available at any one time. Because they lack vegetative cover, they also lack significant numbers of small rodents. Estep ranked them highly because it was a daily activity for some Swainson's hawks to spend time running down grasshoppers and crickets in these fields.

Fallow fields make up a rather small amount of total agricultural habitats. Unlike disked fields they have significant weedy vegetation and therefore have significant rodent populations. Swolgaard (2004) observed that 76 percent of foraging observations in this habitat were when machinery was removing vegetation.

Dry pasture is largely comprised of annual grasslands and is grazed primarily by cattle during some part of the year. A large portion of the Swainson's hawk's historical habitat is believed to be similar to this current habitat, although the prey species, their abundance, and availability are likely quite different today as introduced grasses and forbs and introduced grazers now dominate this habitat. Therefore, direct comparisons with historical conditions should be considered with caution. Estep's relatively high ranking of this agricultural habitat was based largely on two

radio-tagged hawks that had nests immediately adjacent to this habitat. Therefore, they used dry pasture regularly during foraging. These same individuals were observed to use other habitats opportunistically in response to farming activities. The reverse was not observed. Swainson's hawks with nests not adjacent to dry pasture did not utilize dry pasture for foraging. Swolgaard (2004) observed Swainson's hawks foraging in this habitat, but noted that its frequency of use was lower than expected based on its availability

Sugar beets (which are no longer in production in Sacramento County) and tomatoes have been observed as a foraging habitat, but only for a short time when they are being harvested. Sugar beets were an important foraging habitat for Swainson's hawks because they could be harvested at different times of the year, resulting in staggered availability throughout the nesting season. Tomatoes, on the other hand, are harvested beginning in late July. The main harvesting period therefore occurs from late summer into autumn. Swainson's hawks are largely finished with nesting as the tomato harvest begins; however, tomato fields are observed to be important foraging habitats for fledglings and pre-migratory adults (Anderson et al. in progress; Holt pers. obs.). First-year mortality in Swainson's hawks is undoubtedly high and migration is a perilous journey. Therefore, tomato fields have important value for Central Valley Swainson's hawks immediately after nesting. Irrigated pasture is occasionally used for foraging. Estep (1989) noted use during periods when the pasture was being irrigated. Swolgaard (2004) observed use when the vegetative cover was at its lowest (grazed).

Grains include wheat, oats and rice. Wheat is a common crop in the Central Valley and Plan Area where it is typically planted in fall and harvested in the spring. Both Estep (1989) and Swolgaard (2004) observed limited foraging in wheat. Furthermore, foraging in this crop occurred primarily during or immediately after harvest. Estep trapped in harvested wheat where he found relatively low numbers of house mouse and deer mouse. Estep observed no foraging in rice fields.

Corn and sunflower are the main component of "other row crops." Estep (1989) considered that the low preference for foraging in these crops is a feature of these crops' attaining a vegetative height that excludes Swainson's hawks. Swolgaard (2004) also observed a low preference for foraging in these habitats. Estep trapped relatively low numbers of deer mouse in cornfields in early summer. However, as in other agricultural habitats, rodent populations build up during the growing season in cornfields. During the beginning of harvest, in September and early October, just prior to southern migration, Swainson's hawks take advantage of the foraging opportunity that corn harvesting offers (Herzog 1996; Holt pers. obs.). Therefore, corn and sunflower crops have some limited value to foraging Swainson's hawks. Also, when taken in combination with other foraging habitats that are rotated on a regular basis (wheat, oats, hay, tomatoes, alfalfa, disced field, etc.), the value of corn and sunflower acquires some added value as a piece in the over-all mosaic of suitable foraging habitats. Lastly, the small population of Swainson's hawks that winter in the

APPENDIX B (Continued)

Sacramento – San Joaquin Delta forage for small rodents (mainly house mouse) almost exclusively in harvested corn and sunflower fields (Yee pers. comm.; Holt pers. obs.; Herzog 1996).

Other is a category where Estep (1989) groups various infrequently used habitats. Taken collectively these are the lowest ranked habitats and either have very low prey populations or are inaccessible to Swainson's hawks. These habitats include lawn, riparian vegetation, vineyards, orchards, residential areas, oak woodland, asparagus, onions, parks, golf courses, and edge habitats. It should be noted that Estep (1989) trapped a rather high rodent population, primarily house mouse and western harvest mouse, in edge habitats. Swolgaard (2004) grouped edge habitats differently and included them in a category he termed Ag-urban. His Ag-urban habitats included roadside edges, median strips, weedy lots, railroad right-of-ways, canal levees, and margins along a local airstrip. Swolgaard observed these areas to be used for foraging in disproportion to the small amount of area they covered in his study area. Furthermore, most foraging occurred when these edges were being mowed. Swolgaard noted that Estep had trapped rodents in high densities in edge habitats and cited references documenting voles using road edges as habitat corridors and dispersal routes (Getz *et a*l. 1978; LaPolla and Barrett 1993). Therefore, it may be appropriate to consider edge habitats separately because they may have value as prey refugia and corridors connecting agricultural habitats.

Common agricultural habitats in the Central Valley that are not thought to provide much, if any, foraging opportunities for Swainson's Hawks include safflower, orchards, cotton, vineyards, and rice (Bloom 1980; Estep 1989; England et al. 1995; Babcock 1995).

The purpose of Swolgaard's study (2004) was to determine habitat use by Swainson's hawks in the lower Mokelumne River watershed, an area in northern San Joaquin County adjacent to the Plan Area. The study area supports extensive viticulture. Swolgaard cites vineyard acreage increasing in this study area by 54 percent during the period 1987 to 1997 (DWR 2002). Swolgaard found that foraging by Swainson's hawks does occur in vineyards; however, statistical analysis of habitat selection revealed that foraging in vineyards occurred less than would be expected by random choice. It was evident that Swainson's hawks did not select for vineyards, and that foraging occurred in vineyards perhaps only by members of pairs whose nest trees are in areas that have now become surrounded by vineyards. Foraging was also observed disproportionately at edges of vineyards and along interior road edges of vineyards.

In summary, Swainson's hawks forage successfully in a variety of agricultural habitats. Alfalfa is the crop that provides the highest foraging due to high prey densities and regular harvesting and irrigation that make prey available for capture. However, a variety of suitable agricultural habitats also provide valuable foraging habitats at differing times and for different prey species during the period of time when Swainson's hawks are in the Plan Area. This mosaic of suitable

foraging habitats that provides the best opportunity for regular and successful hunting during the nesting season.

Home Range Size

The home range (total area utilized during the nesting period) for Swainson's hawks in the Central Valley is reported as larger than for Swainson's hawks in general (England et al. 1997). Estep (1989) found mean home ranges to be 6,818 acres, while Babcock (1995) plotted 9,978 acres as the mean home range in his study area in eastern Yolo County. These large-sized home ranges are due to the fact that the best agricultural foraging habitats are fragmented. Estep (1989) and Babcock (1995) both observed Swainson's hawk home ranges to expand to include distant agricultural foraging areas when prey availability was superior at more distant locations. During periods of low prey availability, radio-tagged male Swainson's hawks were recorded to travel as far as 17 miles (Estep 1989) and 18 miles (Babcock 1995) from a nest to exploit more favorable agricultural foraging opportunities. Although at these distances, it was observed that prey items were consumed in the field and not transported back to the nest, likely due to the excessive energy demands required to do so (Estep 1989; Babcock 1995). England et al. (1995) discovered that urban nests, which are in some cases completely surrounded by unsuitable foraging habitat, must have suitable foraging habitat within three to five miles from the nest tree to successfully fledge young (England et al. 1995). Furthermore, urban nest sites typically fledged fewer young than non-urban nest sites.

Nest-site Selection

In the Plan Area nest-site selection is strongly correlated to alfalfa and row and field crop agricultural habitats. Almost all Swainson's hawk nesting sites are located in portions of Sacramento County where irrigated pasture, hay, grain and field crops are being cultivated even though suitable nesting habitat exists elsewhere in the county. For example, there are large cottonwood trees on numerous streams on the eastern side of the Plan Area, there is nesting habitat in the older urbanized areas of the county, and there are unused trees on Delta islands. However, Swainson's hawks are rarely selecting nesting sites in these areas. In each of these situations, the failure to select nesting sites in these areas appears to be related to the lack of nearby suitable foraging habitat throughout the entire nesting season.

Vineyards in the Plan Area are fragmented in distribution and have only recently been converted from other crop types in the last two decades. Viticulture has increased in Sacramento County by 263 percent during the period 1987 to 1997 (DWR 2002). Swolgaard (2004) found that Swainson's hawks do not prefer nest-sites in vineyard habitats; however, the species' avoidance of vineyards is not as strong in some nearby portions of the species' range (e.g., the Lodi area in

northern San Joaquin County where vineyards have been a regular part of the landscape for more than 50 years).

Agricultural Foraging Habitat Crop Rotations

Swainson's hawk nest-site selection is strongly correlated to suitable agricultural habitats. The most favored agricultural foraging habitats: alfalfa, row, and field crops are usually planted in cyclical rotations, changing from one field to another in one year to the next, or as with alfalfa, the crop stays in one place for four or five years before it is then removed. For example, a field with hundreds of acres of suitable foraging habitat can be planted with a crop that is largely unsuitable for foraging the next year. Nonetheless, Swainson's hawks often show strong nest-site fidelity and return to the same nest territory year after year. The landscape that they return to may be different each year due to crop rotations and conversions. Within the several thousand acres typically associated with a home range/nest territory, it is likely that multiple suitable agricultural habitats will be present within any given year and high quality foraging habitat will occur somewhere within the territory at all times during the nesting season due to differences in planting, irrigation, and harvesting schedules (i.e., activities that make prey available in high numbers).

22.2.3.2 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for Swainson's hawk are identified in Table SWHA-1 and have been derived from input from local species experts.

Table SWHA-1
Essential Habitat Elements for Swainson's Hawk

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, valley grassland.	Valley grassland and open agriculture, especially alfalfa, irrigated pasture, or other field or row crops that support rodent populations and are managed such that the rodents become available through activities such as flood irrigation and harvesting.
Nesting	Blue oak savanna, blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, and mixed riparian scrub.	Mature trees for nesting (approx. 50 feet) near (less than five miles) foraging habitat. Generally includes isolated trees adjacent to foraging habitat.

22.3 Species Distribution and Population Trends

22.3.1 Breeding Range

The Swainson's hawk's breeding range is distributed over much of western North America: in the south from Sonora, Chihuahua, Durango, Coahuila, and Nuevo Leon, Mexico north to Alberta, Saskatchewan and Manitoba, Canada; east to Minnesota, Iowa, Kansas, Oklahoma, and Texas,; and west to coastal valleys in Washington and British Colombia. Disjunct populations occur in Missouri, northern British Columbia, and the Central Valley of California, and possibly Yukon and Alaska (Palmer 1988; England et al. 1997; Howell and Webb 1995).

22.3.2 Boreal Winter/Austral Summer Range

The winter range during the Austral summer in South America is primarily known to be northern Argentina, Paraguay, Uruguay, and southern Brazil (Palmer 1988; England et al. 1997). However, knowledge of South American distribution is incomplete. Human alteration of habitats (clearing of forests and subsequent increases in cattle pasture and cultivation) throughout South and Central America may provide suitable habitats that may now be utilized in areas not historically known to have Swainson's hawks. Orlog (*in* Smith 1980) and Jaramillo (1993) reported large concentrations of Swainson's hawks in Argentina where flocks were composed almost entirely of juveniles. This suggests that the population is segregated by age class on the wintering grounds and that the juveniles continue to the southern extreme of the winter range (Palmer 1988; Jaramillo 1993). Orlog (*in* Smith 1980) reports that locust swarms are being reduced by pesticides, and that this could be resulting in Swainson's hawks wintering further north.

22.3.3 Wintering in North America

Some migration dropouts and stragglers have been noted in Boreal winter in southern Florida where it is thought that they are primarily wayward juveniles that cannot manage the over-water crossing further south (Browning 1974). In addition, scattered winter records are noted from Mexico and Central America (Howell and Webb 1995). Observations and telemetry data (Bradbury et al. in prep) have recently documented the presence of a wintering population based primarily in western Mexico, southern Mexico and Central America. Also, a small population, never observed to exceed 30 individuals (Holt pers. obs.), has recently wintered in the Sacramento – San Joaquin River Delta of California (Herzog 1996). While the breeding origins of many Mexican-wintering Swainson's Hawks are now know to be the Central Valley of California, it is also thought that the Mexican wintering population is also comprised of Swainson's Hawks from other parts of the breeding range (Bradbury et al. in prep; Holt pers. obs.).

APPENDIX B (Continued)

22.3.4 Wintering Locations of the Central Valley Breeding Population

The Swainson's hawk population which breeds in the Central Valley of California is now known to have significantly different wintering areas and migration routes than the main population (Bradbury et al. in prep.). In a study that successfully tracked 17 Central Valley-breeding Swainson's hawks with satellite telemetry devices, it was discovered that eight individuals spent the winter in Mexico, one wintered partly in Mexico and partly in Central America, three wintered in Colombia, four wintered in northern Argentina and southern Bolivia, and one wintered in northern Mexico and then returned to the Sacramento–San Joaquin River Delta in the Central Valley in mid-January (Bradbury et al. in prep.). Those birds that did go to northern Argentina/southern Bolivia were still well north of the known wintering areas of the main Swainson's hawk population (Jaramillo 1993; Woodbridge et al. 1997). Wintering in western Mexico (Sinaloa, Nayarit) should be considered to be a recent phenomenon as the areas where foraging now occurs have only been cleared for agricultural production in the past four decades and had previously been extensive thorn forest, a habitat that would not provide any opportunities for Swainson's hawk foraging (Bradbury et al. in prep.). It appears that the habitats in Central America and South America where Central Valley Swainson's hawks have been discovered to be wintering are likewise landscapes that have been altered by clearing and agricultural cultivation at least within the past century.

22.3.5 Nesting Distribution in the Central Valley

Swainson's hawk nesting data in California has been compiled by the CDFG since 1979. Data sources used by the CDFG include the following: 1) CNDDB (CDFG 2010), 2) records supplied by Ron Schlorff of the CDFG Non-Game Division, and 3) Swainson's hawk census data obtained by CDFG Region II biologists in 2002 and 2003 (Gifford pers.comm.). Nesting in the Central Valley occurs throughout the valley, extending from Tehama County in the north to Kern County in the south. However, the population is largely concentrated in the middle of the valley in a semi-circle around the Delta, primarily in Yolo, Solano, Sacramento, and San Joaquin counties. Roughly 60 to 65 percent of the statewide population and 70 to 75 percent of the Central Valley population occurs in this latter area. This distribution pattern conforms broadly to the distribution of agricultural habitats in the valley that are suitable for foraging. While alfalfa, irrigated pasture, mixed row, and field crops are found throughout the valley, they are broadly concentrated in those same areas where nesting Swainson's hawks are shown to be concentrated. Vineyards, cotton, orchards and dry native scrub dominate the landscape in the southern end of the valley, while rice and orchards are the dominant crops in the northern end of the valley.

22.3.6 Nesting Distribution in the Plan Area

In the Plan Area, there are 109 records documented in the CNDDB (CDFG 2010). This number includes some duplicate records of the same nesting territory in different years. There are an additional 49 nest-sites recorded in surveys conducted in 2002 and 2003 by CDFG Region II field biologists. This data has been collected as part of a larger census effort that samples randomly selected blocks throughout the entire Sacramento Valley. This data also includes some duplicates of previously recorded nesting territories. Finally, there is an additional set of seven nest-sites along Dry Creek on the County line that have been culled from Craig Swolgaard's study in 2002-2003. Compiled together, these data points depict the approximate nesting distribution of Swainson's hawk in the Plan Area. Figure SWHA-1 illustrates the distribution of known Swainson's hawk nest sites within Sacramento County as recorded in the CNDDB (CDFG 2010) as well as other sources (ebird.org 2005-2010; Estep 2006, 2007; Gill Ranch Survey 2003).

Swainson's hawk nest territories are aggregated in the south-central part of the county and river bottom lands associated with the Cosumnes River, Deer Creek, and Dry Creek. Swainson's hawks also nest in some urban areas and the dry annual grassland on the east side of the county, albeit in very low numbers.

22.4 Population Levels and Trends

22.4.1 Range Wide Population Estimate and Trend

Historical population estimates for Swainson's hawk are non-existent. However, comments from several observers mention that the Swainson's hawk was abundant in western North America in the nineteenth century (Palmer 1988; England et al. 1997). By the end of the nineteenth century and well into the twentieth century, observers were noting that Swainson's hawks were becoming less common (Palmer 1988; England et al. 1997). Serious declines in Swainson's hawk numbers continue to be reported in California (Grinnell and Miller 1944; Walton 1978; Bloom 1980), Nevada (Heron and Lucas 1978), southern Saskatchewan (Houston and Bechard 1983), and southeast Oregon (Littlefield et al. 1984).

Recent estimates of the total population of Swainson's hawks are widely disparate and range between 300,000 (Palmer 1988) and 1,000,000 (Clark and Wheeler 2003). England et al. (1997) state that no comprehensive estimate of population has been calculated for the species. Migration period counts over single points in Panama and eastern Mexico in the last 25 years vary from as high as 845,465 to as low as 175,644. Unfortunately, different count methodologies have been employed in different years, resulting in the inability to meaningfully compare the data (England et al. 1997).

APPENDIX B (Continued)

In Canada, serious declines in reproductive success have been reported (Houston and Schmutz 1995). It is likely that differing pressures upon local populations in different regions of the species' range result in an uneven trend with regard to the species range wide population status.

22.4.2 California and Central Valley Population Estimates and Trend

Grinnell and Miller (1944) provide the following remark in regards to Swainson's hawks in California "Formerly abundant, but now (1943) greatly reduced in numbers and in extent of breeding range, as a result of human influences." Small (1994) states that a "drastic decline for the species in the far west began in the 1930's, accelerated through the 1940's, the 1950's and into the early 1960's. In the 1970's and 1980's, the population remained at a fairly constant but diminished level. Sporadic migratory flocks of 100 to 300 are still occasionally reported, and large summer feeding concentrations of non-breeders (numbering up to 150) have recently been found in the mid-Central Valley . . ." Bloom (1980) undertook an analysis of the Swainson's hawk in California. He reviewed historical records and egg collections in order to estimate the historical distribution, and found that the current range had been reduced drastically from its historical extent. Historical records indicate a past existence of breeding populations in appropriate habitat in most of California's bioregions, including the Southern Transverse Ranges, Central Coast Ranges, Central Valley, Great Basin, and Mojave-Colorado Desert. Small populations were documented to have been in Owens Valley, Shasta Valley, and Sonoma County. Unfortunately, historical records typically describe single nest trees and do not support conclusions about the size of local populations.

Bloom (1980) addressed this problem by extrapolating known densities per area of suitable habitat to larger unsurveyed areas. Thereby, he estimated a total statewide historical population to be between 4,284 to 17,136 breeding pairs. Bloom thought that the exact number probably fell somewhere in between those extremes. Bloom (1980) compared the minimum number with his 1979 statewide survey estimate of 375 pairs. Thus, a minimum 91 percent decline was calculated. Bloom (1980) also estimated an historical population in the Central Valley between 1,656 to 6,624 breeding pairs. Thus, using his 1979 population estimate of 280 breeding pairs for the Central Valley, the inferred decline for that region would be a minimum of 83.1 percent.

Hand in hand with the significant reduction in population, an enormous reduction in the former breeding range in California was documented (Bloom 1980). Historical populations have been extirpated from virtually all of Southern California, including: coastal valleys, the Mojave and Colorado Deserts, Transverse Ranges, and Santa Catalina Island. Coastal valleys of Central California (Livermore, Salinas, Sonoma) also no longer have breeding populations of Swainson's hawks. Bloom (1980) states that because of the Central Valley population size and distribution, it probably functions as the nucleus of recruitment into the other areas historically occupied in the state, with the probable exception of the Klamath Basin. Therefore, it is likely

that recovery of populations in these areas outside of the Central valley is dependent upon a healthy Central Valley population.

Bloom's Central Valley population estimate of 280 pairs (Bloom 1980) was revised to 430 pairs in 1989 after further survey work (CDFG 1993, 1994). This increase in numbers was attributed to an increase in survey intensity rather than an increase in real numbers. Subsequent survey work in the Central Valley in the 1990's was never coordinated nor completely compiled. Therefore, no new calculation of population estimate was derived. The Swainson's Hawk Technical Advisory Committee (2000) estimates that there are as many as 900 pairs in the Central Valley. This is a reasonable guess; however, it is not possible to arrive at an accurate number without comprehensive surveys Nine hundred pairs are well short of Bloom's estimate of 1,656 to 6,624 historical pairs for the Central Valley. However, the reported increases in numbers could mean that the downward trend may have abated. Swainson's hawks are a relatively long-lived species. Thus, their longevity can have a masking effect on true population trends, particularly when relying on patchy and incomplete data. Therefore, estimates of current population trends are perhaps not prudent without more complete long-term data on population and reproduction.

22.4.3 Plan Area Population Estimates and Trend

In 1979, Bloom (1980) estimated the then current population between the Cities of Stockton and Sacramento, to be 75 pairs. In 1993, all of Sacramento County had 49 documented active pairs (CDFG Raptor Records Database). The CNDDB has 109 separate nesting records for Swainson's hawk in the Plan Area from the period between 1979 and 2010 (see Figure SWHA-1). This number is a compilation of data from several sources and does not reflect an accurate population estimate for the Plan Area. Earlier CNDDB records from 1979 through 1984 do not usually record a nest-site, but merely are an observation of a Swainson's hawk. Data from CDFG Region II census efforts in 2002 and 2003 accounts for 49 nest-sites, while Swolgaard's study in 2002-2003 of northern San Joaquin County includes seven nest sites along Dry Creek. Both of these efforts involve some duplication of records over the two-year periods. In addition, both studies surveyed only portions of the Plan Area. Therefore, it is not possible to estimate the number of nesting Swainson's hawk pairs is in the Plan Area based on the available data. Therefore, population trends for the area cannot be assessed at this time.

22.5 Threats to the Species

In general, settlement in both North and South America has brought with it a myriad of changes that have consequentially altered the environment that Swainson's hawks live in. To a large extent, vegetative cover types have undergone significant changes: clearing of land, cultivation of agriculture, new grazing regimes (fencing, sheep and cattle). These activities foster changes in

plant species diversity and abundance (including invasive exotics) and subsequently affect prey-species composition and availability. Extirpations or extinctions of numerous prey species, such as the Rocky Mountain Locust, or the introduction of exotic prey species, such as house mouse, undoubtedly has affected Swainson's hawks in ways that will never be entirely known. The rangewide decline in Swainson's hawk numbers is something that was likely the result of a multitude of factors and will never be entirely understood.

Within California, Bloom (1980) documented a dramatic statewide decline in the Swainson's hawk population, and subsequent reduction of the breeding range. The reasons for this decline are again not completely understood. Bloom (1980) discussed habitat destruction, pesticide poisoning, and direct shooting as all contributing to the decline.

22.5.1 Elimination of Nesting Habitat

Smith (1977) estimated that 98.5 percent of the Central Valley's riparian forest had been eliminated largely by flood control and irrigation projects. Katibah (1981) estimated that 94 percent of riparian forest in the Central Valley had been removed and that the vast majority of the remaining habitat was disturbed, degraded or otherwise impacted by human activities. Schlorff and Bloom (1984) found 87 percent of all Swainson's hawk nests in the Central Valley to be associated with riparian systems. Estep (1989) found 78.1 percent of nest trees to be in riparian systems. With regard to this loss of nesting habitat, Schlorff and Bloom (1984) state that if "species such as the Swainson's hawk are to survive, the trend of destruction must be reversed."

Nest trees that are not in riparian systems such as roadside trees exist only in so far as they are "out of the way." With continued increases in vehicle traffic, roadways everywhere are being widened or otherwise improved. These projects often result in the removal of numerous trees that may be suitable nesting sites for Swainson's hawk. Some relict trees in lone agricultural fields die every year and are never replaced. Lone trees in grazing pastures are also disappearing. They are not being replaced when they die or are cut down. Recruitment of new trees is hampered by continued heavy grazing which removes seedlings. Also, lowered ground water levels, due to over-drafting of underground aquifers, can also hamper recruitment.

22.5.2 Elimination of Foraging Habitat

Loss of foraging habitat is perhaps the most serious threat to Swainson's hawks. Urbanization has removed large areas of historical habitat. Incompatible foraging crops (cotton, rice, orchards, vineyards, etc.) are dominant in much of the Central Valley. Large areas of former foraging habitat have been completely removed and are now highly urbanized landscapes. This is

particularly true in Southern California where entire valleys no longer have any remaining suitable habitat.

Bloom (1980) notes that Swainson's hawks have also disappeared from areas (e.g., Central Coast Ranges) that have not been transformed by excessive urbanization. Therefore, he concludes that "habitat destruction, although a serious threat to the remaining population, does not appear to be the complete answer."

22.5.3 Poisoning

Bloom (1980) considered pesticide poisoning to be a threat to Swainson's hawks during migration passages or on their wintering grounds where pesticides use is not as well regulated. The Swainson's hawk's reliance on relatively short-lived terrestrial mammalian prey during the breeding season in North America, could induce a build up of pesticide residues to levels where eggshell thinning could affect reproduction (Henry and Kaiser 1979). Bloom thought that if Swainson's hawks from particular breeding areas all migrated via the same routes and all went to the same wintering areas, then they could all be vulnerable to the same threats during that journey. This could explain why Swainson's hawks are declining or have been extirpated from entire areas of their former breeding range.

Difficulties with insecticide poisoning in Argentina was suspected by Orlog (*in* Littlefield et al. 1984). The mass mortality of Swainson's hawks in Argentina resulting from direct organophosphate poisoning was discovered by Woodbridge et al. (1995b). Organophosphate chemicals were apparently being sprayed from tractors coursing across sunflower, corn, and alfalfa fields to control grasshoppers. Swainson's hawks, being attracted to the grasshoppers and field machinery, were found to have been mortally affected after being directly sprayed by the chemical or ingesting heavily contaminated insects. In 1996 approximately 5,000 dead Swainson's hawks were observed in Provincia de La Pampa with an estimated total kill of 16,000 to 20,000 (Goldstein et al. 1996). Additional mortality events of lower magnitude were reported in 1997 and 1998 (Woodbridge 1998; Rich et al. 2004). Education programs and restrictions on use of highly toxic pesticides have since dramatically reduced mortality of wintering Swainson's hawks (Woodbridge 1998).

Existing satellite telemetry data for Central Valley Swainson's hawks (Bradbury et al. in prep.) found no individuals wintering in areas where pesticide poisoning has been discovered. Also, band recoveries of deceased Swainson's hawks in Argentina did not include any from individuals banded in the Central Valley. The majority (13 of 17) of Central Valley Swainson's hawks that were tracked by satellite wintered north of the equator where the timing of farming operations (and assumedly pesticide applications) is different than in Argentina. The months when Swainson's hawks from the Central Valley are in Mexico is the winter season, a time when

insecticides are generally not being applied (Bradbury pers. comm.; Holt pers. obs.). Therefore, the evidence indicates that Swainson's hawks from the Central Valley are not involved in the poisonings in Argentina. Furthermore, there is no evidence that Swainson's hawks from the Central Valley are involved in similar pesticide poisoning elsewhere.

22.5.4 Direct Shooting

Shooting of Swainson's hawks is something that has been widely reported in North America (Cameron 1913; Gabrielson and Jewett 1970; Palmer 1988) and in migration (Bloom 1980). Swainson's hawks were thought to be killers of chickens and even lambs and calves. Therefore, Swainson's hawks were routinely shot out of the air and at nest sites. Bloom (1980) points out that in California, in large areas of the Swainson's hawk's former range (Central Coast, Mojave Desert, southern San Joaquin Valley, etc.), red-tailed hawks and red-shouldered hawks continue to exist in fairly large numbers. Both of these species were persecuted as well by the same riflemen, however, both continue to exist in areas where Swainson's hawks no longer are found. Bloom (1980) reasoned that it is likely that shooting on the breeding grounds, therefore, is not the prime reason for the species' extirpation in those areas. Shooting could be a problem on migration routes or at winter roosts. Roost sites and mountain passes in particular are locations where Swainson's hawks are vulnerable to shooters. Information concerning Swainson's hawks in Central and South America is inadequate to assess the magnitude of this problem.

22.5.5 Threats within the Plan Area

Within the Plan Area, the loss of foraging and nesting habitat are the prime threats to the species. Loss of roadside nest trees and lone trees in agricultural fields and pastures, as mentioned above, should continue to be a challenge. Future flood control projects, spurred by increased human population, will pose threats to riparian nesting habitat. For instance, seven miles of trees along the south bank of the Mokelumne River (on the boundary of the Plan Area) were removed in the mid-1990's for flood control purposes. Mitigation for this long linear reach of nesting habitat, that undoubtedly held several nest trees was all placed in one 20-acre grove – a tree stand that would likely support only one nest territory. Urbanization threatens to remove both nesting habitat and foraging habitat. The Cities of Elk Grove, Galt, and Rancho Cordova, and the County of Sacramento are all expected to continue to grow and affect existing habitat for the species.

Agricultural conversions from one crop to another are not regulated and are difficult to track. Crops, be they compatible foraging habitat for Swainson's hawk or not, are planted on the basis of whether a farmer can profit from the activity. Cropping patterns from 50 years ago were likely different from what they are today. For example, major changes that have greatly affected Swainson's Hawks are the complete loss of sugar beets as a foraging habitat and the recent dramatic increase in vineyards. In Sacramento County, vineyards have increased in acreage by

APPENDIX B (Continued)

263 percent in the period 1987 to 1997 (DWR 2002). This trend may have slowed, but there is no certainty in regards to what crops will be profitable to grow in the future.

Another matter of concern is the low reproductive success of Swainson's hawks in the Central Valley compared to other North American regions. Data from England et al. (1995), England et al. (1997), and Swolgaard (2004) compare multi-year studies of reproductive performance from differing regions of the Swainson's hawk's breeding range (**Table SWHA-2**). An average of 17.34 percent fewer chicks fledged from successful nests in studies that were done in the Central Valley versus the chicks fledged per successful nest in studies done in other areas of the Swainson's hawk's breeding range.

Table SWHA-2
Reproductive Performance of Swainson's Hawks in Various Populations

Location	Years of study	Number of nesting attempts	% successful nesting attempts	# chicks/ successful nest	Source
SE Washington	3	48	81.3%	1.85	Fitzner 1978
NE Colorado	3	119	54.6%	2.18	Olendorff 1973
SE Alberta, Canada	3	153	71.2%	1.98	Schmutz 1987
SE North Mexico	3	36	81.0%	1.94	Bednarz 1988
Saskatchewan, Canada	22	2031		1.91	Houston and Schmutz 1995
NE California	11	454	65.5%	2.24	Woodbridge et al. 1995a
Yolo County, California	5	492	82.1%	1.64	England et al. 1995
San Joaquin County, California	5	60	80.0%	1.73	England et al. 1995
Central Valley, California	2	69	83.5%	1.42	Estep 1989
Central Valley, California	2	31	54.8%	1.50	Holt *in*: Swolgaard 2004

Six studies outside of the Central Valley have a combined average of 1.96 chicks fledged per successful nest. While four combined studies within the Central Valley have an average of 1.62 chicks fledged per successful nest. This data is spread over a 28-year period, collected independently by differing investigators, and is sufficient to illuminate that there is a low rate of chicks fledged per successful nests for Central Valley Swainson's hawks. Nests with four chicks fledged are not unusual outside of the Central Valley (Brown and Amadon 1968; Palmer 1988; England et al. 1997), but in the Central Valley four chicks fledged in a nest is very rare. No such nest has been documented in the Plan Area, but at least one has been observed near Tracy, California in 1999 (Holt pers. obs.).

22.6 Data Gaps and Conservation Implications

A thorough understanding of the demographics of the population within the Plan Area would provide at least two important sources of information that could then be used to develop a more effective conservation strategy for the species: 1) age structure of the population; and 2) reproductive performance. This information would provide an opportunity to understand whether the species is still in decline in the area or has stabilized, albeit at a low population. The information might also provide insight into how much exchange is occurring with other adjacent populations outside the Plan Area. It could provide information on whether effective recruitment is occurring from the reproductive pairs that occur in the Plan Area (and if not…how that may be related to available habitat).

22.7 Literature Cited

Anderson, D.A., J. Dinsdale, and J.A. Estep. In progress. Movements, Behavior, and Post-Fledging Dependency of Juvenile Swainson's hawks in the Central Valley of California.

Babcock, K.W. 1995. Home range and habitat use of breeding Swainson's Hawks in the Sacramento Valley of California. *Journal of Raptor Research*, 29: 193- 197.

Bechard, M.J. 1980. Factors affecting nest productivity of Swainson's Hawk (*Buteo swainsoni*) in southeastern Washington. Ph.D. diss., Washington State Univ.,Pullman.

Bechard, M.J. 1982. Effect of vegetative cover on foraging site selection by Swainson's hawk. *Condor,* 84: 153-159.

Bechard, M.J. 1983. Food supply and the occurrence of brood reduction in Swainson'shawk. *Wilson Bulletin*, 95: 233-242.

Bednarz, J.C. 1988. A comparative study of the breeding ecology of Harris' and Swainson's Hawks in southeastern New Mexico. *Condor,* 90: 311-323.

Bloom, P.H. 1980. The status of the Swainson's hawk in California, 1979. Final Report II-8.0, USDI Bureau Land Management and Federal Aid in Restoration, Project. W-54-R-12, California Department of Fish and Game, Sacramento, California.

Bloom, P.H.

Bradbury, M., Estep, J.A., and D. Anderson. *In Preparation*. Migratory patterns and wintering range of the Central Valley Swainson's hawk.

APPENDIX B (Continued)

Bradbury, Michael. Wildlife Biologist, California Department of Water Resources, Sacramento, California.

Brown, L. and D. Amadon. 1968. Eagles, hawks, and falcons of the world. McGraw-Hill Book Co., New York, New York.

Browning, M.R. 1974. Comments on the winter distribution of Swainson's Hawks (*Buteo swainsoni*) in North America. *American Birds*, 28:865-867.

Burt, W.H. and R.P. Grossenheider. 1952. A field Guide to the Mammals North America North of Mexico. Houghton Mifflin Co. Boston, Massachusetts.

California Department of Fish and Game (CDFG). 1993. Five-year status review: Swainson's Hawks (*Buteo swainsoni*). Report to California Fish and Game Commission. Sacramento California.

California Department of Fish and Game (CDFG). 1994. Staff report regarding mitigation for impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California. Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Cameron, E.S. 1913. Notes on Swainson's Hawk (*Buteo swainsoni*) in Montana. *Auk,* 30: 167-176 and 381-394.

Canevari, Nick. University of California Cooperative Extension, Stockton CA

Cassin, J. 1856. *Illustrations of the Birds of California*, Texas, Oregon, British and Russian America.

Clark, W. S. and B. K. Wheeler. 1987. *A Field Guide to Hawks of North America*. Houghton Mifflin, Boston, Massachusetts.

Clark, W. S. and B. K. Wheeler. 2003. *Raptors of Western North America*. Princeton University Press, Princeton.

Department of Water Resources (DWR). 2002. Land Use Data. Internet. http://waterplan.water.ca.gov/landwateruse/landuse/ludataindex.htm

APPENDIX B (Continued)

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, New York. Accessed online http://ebird.org/content/ebird

England, A. Sidney, J. Estep, W. Holt. 1995. Nest-site and reproductive performance of urban-nesting Swainson's hawks in the Central Valley of California. *Journal of Raptor Research*, 29: 179–186.

England, A. Sidney, M.J. Bechard and C.S. Houston. 1997. Swainson's hawk (*Buteoswainsoni*). *in* Birds of North America, No. 265 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania.

Estep, J. .2006. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Elk Grove Planning Area. Estep Environmental Consulting, Sacramento, California.

Estep, J. 2007. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Rancho Cordova Planning Area. Estep Environmental Consulting, Sacramento, California.

Estep, J.A. 1989. Biology, movements and habitat relationships of the Swainson's Hawk in the Central Valley of California, 1986-87. Calif. Dept. Fish and Game, Nongame Bird and Mammal Sec. Rep.

Estep, James. Wildlife Biologist, Jones & Stokes Associates, Sacramento, California.

Fitzner, R.E. 1980. Behavioral ecology of the Swainson's Hawk (*Buteo swainsoni*) in Washington. Pac. NW Lab. PLN-2754.

Gabrielson, I.N. and S.G. Jewett. 1970. *Birds of the Pacific Northwest*. Dover Publications, Inc. New York, New York.

Getz, G.L., R.C. Frederick, and D.L. Gates. 1978. Interstate roadsides as dispersal routes for *Microtus pennsylvanicus*. *Journal of Mammalogy,* 59: 208 – 212.

Gifford, Daniel. Wildlife Biologist, California Department of Fish and Game, Rancho Cordova, California.

Gill Ranch Survey 2003. 135 Gill Ranch Survey. Sacramento County, California.

Gilmer, D.S., and R.E. Stewart. 1984. Swainson's Hawk nesting ecology in North Dakota. *Condor,* 86: 12-18.

APPENDIX B (Continued)

Goldstein, M.I., B. Woodbridge, M.E. Zaccagnini, and S.B. Canavelli. 1996. An assessment of mortality of Swainson's Hawks on wintering grounds in Argentina. *Journal of Raptor Research*, 30:106-107.

Grinnell, J., and A. Miller. 1944. Distribution of the birds of California. Cooper Ornithological Club. Berkeley, California.

Grinnell, J., J. Dixon, and J. Linsdale. 1930. Vertebrate natural history of the Lassen Peak region.

Henry, C.J. and T.E. Kaiser. 1979. Organochlorine and Mercury Residues in Swainson's Hawk Eggs from the Pacific Northwest. *The Murrelet*, 60(1):2-5.

Heron, G., and P. Lucas. 1978. Population surveys, species distribution, and key habitats of selected non-game species. Nev. Dept. Fish and Game, Job Performance Rep.Proj. W-53-R, Study 1.

Herzog, S.K. 1996. Wintering Swainson's Hawks in California's Sacramento-San Joaquin River Delta. *Condor,* 98: 876-879.

Holt, W.

Houston, C. S. and J. K. Schmutz. 1995. Declining reproduction among Swainson's Hawks in prairie Canada. *Journal of Raptor Research*, 29: 198-201.

Houston, C.S. 1990. Saskatchewan Swainson's Hawks. *American Birds,* 44: 215-220.

Houston, C.S. and M.J. Bechard. 1983. Red-tailed Hawk distribution, Saskatchewan. *Blue Jay*, 41: 99-109.

Howell, S.N.G., and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford Univ. Press, New York, New York.

Jaramillo, A.P. 1993. Wintering Swainson's Hawks in Argentina: food and age segregation. *Condor,* 95: 475-479.

Johnson, C.G., L.A. Nickerson, and M.J. Bechard. 1987. Grasshopper consumption and summer flocks of non-breeding Swainson's Hawks. *Condor,* 89: 676-678.

Katibah, E.F. 1981. A brief history of riparian forests in the Central Valley of California. Paper presented at the California Riparian Systems Conference. (UC Davis Sep. 1981) Davis, California.

APPENDIX B (Continued)

LaPolla, V.N. & G. Barrett. 1993. Effects of corridor width and presence on the population dynamics of meadow voles. *Landscape Ecology,* 8: 25 – 37.

Littlefield, C.D., S.P. Thompson, and B.D. Ehlers. 1984. History and present status of Swainson's Hawks in southest Oregon. *Journal of Raptor Research*, 18: 1-5.

Moreno, L. 1994. A study of nest distribution, nest site preferences, foraging habitat availability, disturbance, and population productivity of Swainson's Hawks along the Sacramento River. Dept.of Fish. Biol. UC Davis, Davis, California.

Olendorff, R.R. 1973. The ecology of the nesting birds of prey of northeastern Colorado. USIBP Grassland Biome Tech. Rep. No. 211.

Palmer, R.S. 1988. Swainson's Hawk. Pp. 48-73 in Handbook of North American birds.Vol. 5. Diurnal raptors (Pt.2) Yale Univ. Press. New Haven, Connecticut.

Papp, Joe.

Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, New York.

Schlorff, Ronald. Wildlife Biologist, California Department of Fish and Game Non-game Division, Sacramento, California.

Schlorff, R.W. and P.H. Bloom. 1984. Importance of riparian systems to nesting Swainson's hawks in the Central Valley of California. *in* R. E. Warner and K. M. Hendrix, eds. California riparian systems: ecology, conservation, and productive management. University of California Press, Berkeley, California.

Schmutz, J.K. 1987. The effect of agriculture on ferruginous and Swainson's hawks. *Journal of Range Management*, 40: 438 – 440.

Schmutz, J.K., S.M. Schmutz, and D.A. Boag. 1980. Coexistence of three species of hawks (*Buteo* spp.) in the prairie-parkland ecotone. *Canadian Journal of Zoolology*, 58: 1075-1089.

Sharp, C.S. 1902. Nesting of Swainson's Hawk. *Condor,* 4: 116-118.

APPENDIX B (Continued)

Simpson, David. United States Department of Agriculture, Natural Resources Conservation, Stockton, California.

Smallwood, K.S. 1995. Scaling Swainson's Hawk population density for assessing habitat use across an agricultural landscape. *Journal of Raptor Research*, 29: 172- 178.

Smith, D.G. and J.R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. Brigham Young University Scientific Bulletin, Biol. Ser. 18(3): 1-76.

Smith, F.E. 1977. A short review of the status of riparian forests in California. In: A Sands (ed.). Riparian Forests in California: their ecology and conservation. Inst. of Eco. Pub. 15. UC Davis. Davis, California.

Smith, N. 1973. Spectacular Buteo migration over Panama Canal Zone. *American Birds,* 27: 305.

Smith, N. 1980. Hawk and Vulture migration in the tropics. In: Migrant Birds in the neotropics: ecology, behavior, distribution and conservation. Eds. A. Keast and E.Morton. Smithsonian Institute Press. Washington, D.C.

Smith, N., D. Goldstein, and G. Bartholomew. 1986. Is long-distance migration possible for soaring hawks using only stored fat? *Auk,* 103: 607-611.

Swainson's Hawk Technical Advisory Committee. 2000. Recommended timing and methodology for Swainson's Hawk nesting surveys in California's Central Valley. Unpublished manuscript. TAC. Sacramento, California.

Swolgaard, C., 2004. Nesting density and habitat use of Swainson's Hawk in a vineyardlandscape in northern San Joaquin County, California. Master's Thesis, CSUS, Sacramento, California.

Thompson, Debby, Sacramento County Agricultural Commissioner's Office, Galt, California.

United States Fish and Wildlife Service (USFWS). 1991. Sacramento urban area levee reconstruction project: Sacramento River Swainson's Hawk nesting population study, 1990. Unpublished manuscript. U. S. Army Corps of Engineers. Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1993. Sacramento urban area levee reconstruction project: Sacramento River Swainson's Hawk nesting population study, 1991. Unpublished manuscript. U. S. Army Corps of Engineers. Sacramento, California.

APPENDIX B (Continued)

United States Fish and Wildlife Service (USFWS). 1994. Sacramento urban area levee reconstruction project: Sacramento River Swainson's Hawk nesting population study, 1992. Unpublished manuscript. U. S. Army Corps of Engineers. Sacramento, California.

Walton, B.J. 1978. Nesting of Swainson's Hawk in San Luis Obispo County, California in 1977. Western Birds 9: 82.

Wilkinson, C.W., and C.M. Levy. 1993. Sacramento Urban Area Levee Construction Project: Sacramento River Swainson's Hawk Nesting Population Study, 1992. Prepared for U.S. Army Corps of Engineers, Sacramento, California.

Woodbridge, B. 1985. Biology and management of Swainson's Hawk in the Butte Valley, California. U.S. Forest Service Report, 19 pp.

Woodbridge, B. 1998. Calfiornia Partners in Flight riparian bird conservation plan for the Swainson's hawk. http://www.prbo.org/calpif/htmldocs/species/riparian/swhaacct.html. California Partners in Flight, Point Reyes Bird Observatory, Stinson Beach, California.

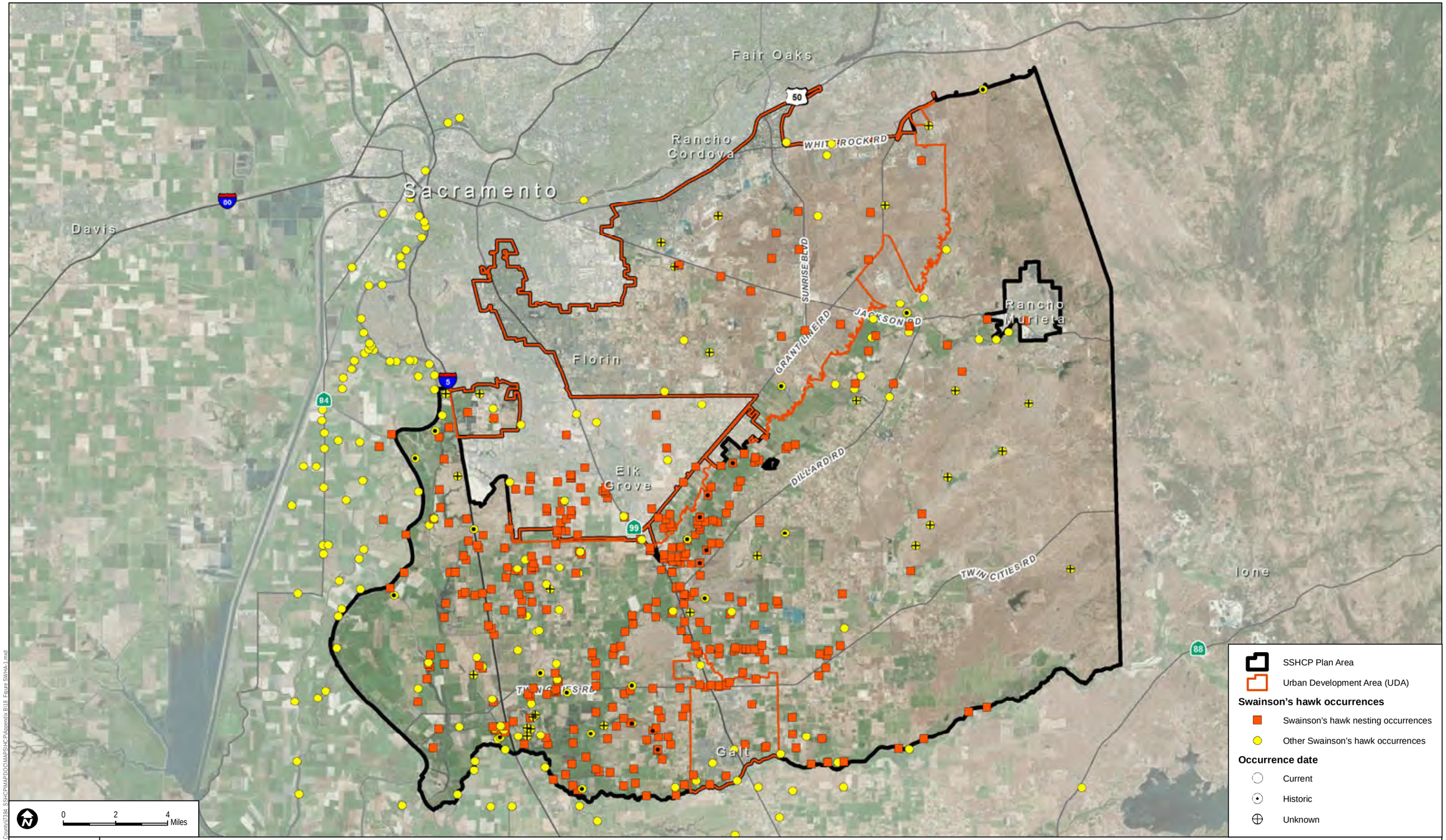
Woodbridge, B., K.K. Finley, and P. H. Bloom. 1995a. Reproductive performance, age structure, and natal dispersal of Swainson's hawks in the Butte Valley, California. *Journal of Raptor Research*, 29: 187-192.

Woodbridge, B., K.K. Finley, S.T. Seager. 1995b. An investigation of the Swainson's Hawk in Argentina. *Journal of Raptor Research*, 29(3): 202-204.

Yee, David. Field Ornithologist, Lodi, California.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, BIOS 2012, ESTEP Environmental 2006, ebird.org

FIGURE SWHA-1

Swainson's Hawk Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2094_SSHCP\MAPDOC\MAPS\HCP\Appendix B\18_Figure SWHA-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

23 NORTHERN HARRIER (NOHA)

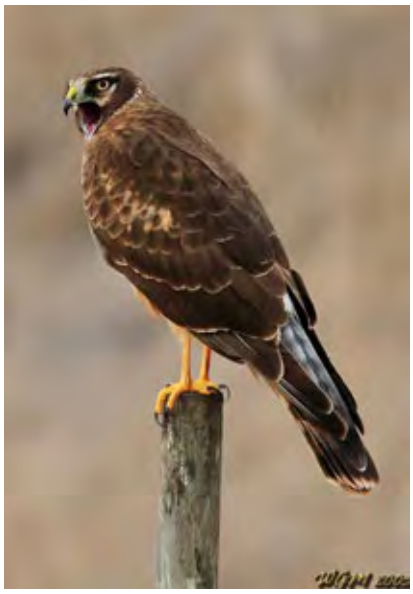
Prepared by Henderson Ecology and Planning (Steve Henderson)

Northern Harrier (NOHA)

(Circus cyaneus)

Status USFWS: Bird of Conservation Concern

Status CDFG: Second Priority Bird of Special Concern



23.1 Legal Status

Northern harrier (*Circus cyaneus*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800). This species is designated as a Second Priority Bird Species of Special Concern (BSSC) by the California Department of Fish and Game (CDFG) (Shuford and Gardali 2008) and a Bird of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS) (USFWS 2002).

23.2 Life History and Ecology

23.2.1 Species Description and Life History

23.2.1.1 Physical Description

Northern harrier is a long-winged, long-tailed hawk with a distinctive white rump patch in both sexes. Individuals have an "owlish" appearance in the face due to a facial ruff or disk. The male has a pale gray back, head, and breast, with black wing tips. Female and subadult northern harriers are brown on the back and are streaked on the breast. The juvenile coloring has a rusty tone. Northern harrier has a distinct flying style with its wings held in a shallow

APPENDIX B (Continued)

"V." It is usually observed gliding unsteadily (e.g., tilting) and low over grasslands and marshes (MacWhirter and Bildstein 1996).

23.2.1.2 Taxonomy

Two subspecies of *C. cyaneus* are recognized: *C. c. hudsonius* and *C. c. cyaneus*. North American birds belong to *C. c. hudsonius*, a large subspecies (Cramp and Simmons 1980), while *C. c. cyaneus* occurs in Eurasia (MacWhirter and Bildstein 1996).

23.2.1.3 Reproduction

Northern Harriers are primarily monogamous; however, polygyny also occurs. The frequency of polygynous males is positively correlated with local prey abundance (Simmons et al. 1986; Ehrlich et al. 1988). Northern harriers reach sexual maturity at one to two years of age (Martin 1987), and females are more likely to breed during their first year than males; however, first-year males are more likely to breed in years when vole (*Microtus* spp.) abundance is high (Hamerstrom et al. 1985).

The breeding season for Northern harrier is generally late March through mid-September, although breeding is sometimes initiated earlier. Males arrive on the breeding grounds before females, typically in March or April. Pair formation likely occurs on the breeding grounds (Hamerstrom 1986). Courtship usually begins in March or April, followed by nest site selection and construction. Both sexes may select the nest site (Hamerstrom 1986; Simmons et al. 1987), and both sexes engage in nest construction. Adult northern harriers are primarily nomadic and exhibit low fidelity to breeding sites (Hamerstrom 1969; Burke 1979; MacWhirter and Bildstein 1996). When northern harriers do return to general nesting areas over consecutive years, they usually do not return to the same specific nest site (Breckenridge 1935; MacWhirter 1985).

Northern harriers nest on the ground in open, vegetated habitats such as grasslands, wetlands, and agricultural fields. Nests are typically built in dense, tall vegetation in areas that are undisturbed during the nesting period; and nest sites are often in wet areas. Nests are bowls or platforms constructed with vegetation (e.g., grasses, forbs). Northern harriers often construct platforms below the nest using sturdy vegetative material (e.g., cattails), to elevate the nest, particularly in wet areas. Nest construction typically lasts between seven to 14 days. Egg-laying can occur in early April through July, but peaks in late April through early July. The female lays four to nine eggs (five is normal); eggs are laid 2–3 days apart. The female incubates the eggs for 30 to 32 days, while the male delivers food to the female. Hatching usually occurs from April through June, and peaks in May–June. Fledging occurs 30 to 35 days later. Both parents feed the young (Hamerstrom et al. 1985, Ehrlich et al. 1988). Fledged juveniles remain near the nest site and are fed by the parents for approximately 2–4 weeks, when the family group disperses

APPENDIX B (Continued)

(Bildstein 1992; MacWhirter 1994; MacWhirter and Bildstein 1996). Northern harriers typically produce one brood per season, but will produce a second brood if the first clutch fails during egg-laying or shortly thereafter (Simmons 1984).

Several studies have reported nest success (i.e., percentage of clutches with ≥ 1 young fledged) for northern harrier populations in North America. Nest success ranged from 18 to 79 percent in 12 studies (MacWhirter and Bildstein 1996). Loughman and McLandress (unpubl. data, *cited in* CPIF 2000) estimated nest success for four regions in California between 1987 and 1992. In the Sacramento Valley, San Joaquin Valley, Suisun Marsh, and northeastern California, nest success was 18 percent (n = 20), 28 percent (n = 40), 21 percent (n = 135), and 16 percent (n = 36), respectively.

23.2.1.4 Survival and Longevity

The maximum reported age of a northern harrier is 16.5 years (Bildstein 1988), while the average age at death among 114 banded birds was 1.4 years (Keran 1981 *cited in* MacWhirter and Bildstein 1996). First-year female and adult survivorship has been estimated at 40 percent and 72.4 percent respectively (Martin 1987). Bildstein (1988) estimated pre-1950s survival rates for first-year and adult harriers at 41 percent and 70 percent respectively.

23.2.1.5 Dispersal Patterns

There is little empirical information about natal and post-breeding dispersal of northern harriers, and further research on this subject is needed. Juveniles exhibit virtually no fidelity to their natal area, and fledged juveniles do not typically contribute to the breeding population in their natal area (Hamerstrom 1969; MacWhirter and Bildstein 1996). There is no information available on dispersal patterns and distances between natal and subsequent breeding sites. Adult northern harriers are primarily nomadic and exhibit low fidelity to breeding sites. When northern harriers do return to general nesting areas over consecutive years, they usually do not return to the same specific nest site (Breckenridge 1935; MacWhirter 1985).

23.2.1.6 Diet and Foraging

Northern harriers primarily eat voles (*Microtus* spp.) and other small mammals; however, they also eat birds, small reptiles, amphibians, and some insects (e.g., grasshoppers, beetles, crickets, and locusts) (MacWhirter and Bildstein 1996). In five studies conducted throughout North America, voles were the primary prey item (MacWhirter and Bildstein 1996). In California, in addition to *Microtus*, other important prey items were leporids (hares and rabbits), quail, finches, and blackbirds (red-winged blackbird and yellow-headed blackbird) (Selleck and Glading 1943).

Northern harriers hunt while flying and "patrolling" low above open ground. Harriers make low, quartering flights three to 30 feet (one to nine meters) above ground. Foraging individuals dive from flight or hover and pounce on prey. Northern Harriers have an "owlish" facial ruff or disk, which aids in the audible detection of prey (much in the same way as owls) (MacWhirter and Bildstein 1996).

Most aspects of northern harrier's population ecology are closely linked to prey availability, particularly local abundance and population cycles of small mammals (CPIF 2000). Rodent populations often experience population cycles between years. Because small mammals (e.g., voles) typically comprise the majority of the harrier's diet during the breeding season, northern harrier populations are sensitive to these cycles. For example, Northern harriers can experience increased nest densities, clutch sizes, nest success rates, and frequency of polygyny during peaks and increase phases in rodent cycles (Hamerstrom et al. 1985; Simmons et al. 1986; MacWhirter and Bildstein 1996).

Passerine birds, particularly nestlings and fledglings, are also important prey for northern harriers. Bernard et al. (1987) found that this prey group constituted the second most important diet for nesting northern harriers. Passerines have higher levels of calcium, iron, crude fat, and gross energy than grasshoppers and voles (Bird et al. 1982). Also, the timing of northern harrier nestling periods corresponded with passerine nestling periods, when young passerines were relatively abundant and available to foraging harriers (Bernard et al. 1987).

Northern harriers are generally opportunistic predators, and commonly shift their diets within a breeding season in response to prey availability and changes in local vegetation structure (MacWhirter 1985; Barnard et al. 1987). For example, Martin (1987) reported that northern harriers foraging in alfalfa fields preyed primarily on voles until vegetation height reached 18 inches (46 centimeters). Thereafter, harriers abandoned alfalfa and switched their diets to passerines and reptiles. After the alfalfa was cut, northern harriers switched their diet back to voles.

23.2.1.7 Movement and Migration Patterns

Northern harrier breeding populations in the northern portions of the species' range are more migratory than those at more southern latitudes (MacWhirter and Bildstein 1996). In the United States, migrating northern harriers depart their breeding grounds in August to December, and leave their wintering grounds in February to March. Migratory birds may winter in California, and some migrate south through Central and South America (MacWhirter and Bildstein 1996).

Many northern harrier populations breeding in California are residents; however, this species is nomadic and moves within and between seasons in response to prey availability (MacWhirter

and Bildstein 1996). Northern harriers winter throughout California and typically occupy habitats similar to those used during the breeding season (MacWhirter and Bildstein 1996).

23.2.1.8 Territoriality, Home Range, and Spacing

Northern Harriers are not strongly territorial during the breeding season, except near the nest where both sexes defend the territory. Reported territory sizes for males have ranged from 2.0 to 271.8 acres (0.8 to 110 hectares). Females typically defend a smaller territory (Simmons 1983; Martin 1987). Territory sizes vary with habitat and prey availability (Martin 1987; Temeles 1987). Temeles (1987) showed that, in Yolo County, California, northern harriers adapted their territory sizes to maintain a consistent rate of prey capture. During winter, female territory size varies greatly. Temeles (1987, 1989) reported that female territory sizes in winter ranged from 9.6 to 308.6 acres (3.9 to 124.9 hectares) (mean = 83 acres [33.6 hectares]), and were inversely correlated with house mouse (*Mus musculus*) availability and pressure by intruders. In addition, prey availability was the only significant predictor of territory size in abundant food years. During winter, females defend territories and exclude non-territorial males. Females are approximately 12.5 percent larger and 50 percent heavier than males and dominate most aggressive interactions with males (MacWhirter and Bildstein 1996). Males are not considered territorial during winter.

During the breeding season, reported average home range sizes from eight studies were 420.1 to 37,066.5 acres (170 to 15,000 hectares); while the median size was 642.5 acres (260 hectares) (MacWhirter and Bildstein 1996 *citing* Smith and Murphy 1973, Rees 1976, Toland 1985, Martin 1987, Serrentino 1987). Females tend to hunt closer to the nest, and maintain smaller home ranges, than males (Martin 1987, Temeles 1987, MacWhirter and Bildstein 1996). Males reportedly will hunt ≥ 10 kilometers from the nest (Barnard 1983, Thompson-Hanson 1984). As the nestling period progresses, males and females can increase their home range by a factor of 2.5 or greater (MacWhirter and Bildstein 1996). In California, during the winter, males maintain considerably larger foraging ranges than females, presumably because they are non-territorial, or they use areas with lower prey densities or different prey composition than those favored by females (MacWhirter and Bildstein 1996).

Prey availability and habitat quality also affect northern harrier breeding densities, inter-nest distances, and spacing (MacWhirter and Bildstein 1996). Loughman and McLandress (unpubl. data, *cited in* CPIF 2000) estimated breeding densities of northern harrier in four regions of California. In the Sacramento Valley, San Joaquin Valley, Suisun Marsh, and northeastern California, nest densities (number of nests per square kilometer) were 4.2 to 5.7 (for 1987 - 1988), 5.0 to 6.7 (for 1987–1991), 3.3 to 24.8 (for 1987–1992), and 7.4 to 9.0 (for 1987–1989), respectively. The highest density reported, 24.8 nests per square kilometer at Suisun Marsh, occurred during an unusually high vole population year.

APPENDIX B (Continued)

23.2.2 Habitat Requirements and Ecology

Northern harrier breeds in a variety of open grassland, wetland, and agricultural habitats. Open wetland habitats used for breeding include marshy meadows, wet and lightly grazed pastures, and freshwater and brackish marshes. Northern Harrier breeding habitat also includes dry upland habitats, including grasslands, croplands, drained marshlands, and shrub-steppe in cold deserts. Although Midwestern populations use wetland habitats more frequently, western populations tend to use upland habitats (e.g., grasslands) disproportionately. Northern harriers winter throughout California where suitable habitat occurs. Wintering habitat includes open areas dominated by herbaceous vegetation, including grasslands, pastures, croplands, coastal sand dunes, brackish and freshwater marsh, and estuaries. Northern harriers rarely occur in forested areas (Grinnel and Miller 1944; Martin 1987; MacWhirter and Bildstein 1996).

The quality of open nesting habitats for northern harrier appears to be a function of five primary factors: 1) vegetation composition and structure; 2) prey abundance; 3) levels of ground disturbance during the nesting season; 4) site moisture; and 5) predation. Successful nesting by northern harriers generally require open habitats with dense, tall vegetation, a high prey base and few predators (CPIF 2000), and no agricultural or other disturbances that destroy their nests. Also, northern harriers appear to prefer moist or wet sites; however they will nest in dry sites that support other elements of suitable habitat (e.g., dense, tall vegetation). These factors are discussed below.

Vegetation height and structure particularly affect northern harrier habitat quality, especially because this species is a ground-nester. Northern Harriers nest on the ground in open, vegetated habitats such as grasslands and wetlands. Harrier nests in upland fields are typically surrounded by grasses and forbs; whereas nests in wet sites are often surrounded by marsh grasses and cattails (Hamerstrom and Kopeny 1981; Simmons and Smith 1985; Loughman and McLandress unpubl. data, and LBWA unpubl. data *cited in* CPIF 2000). Nests are typically built in dense, tall vegetation in areas that are undisturbed during the nesting period; and nest sites are often in wet areas. Nests are bowls or platforms constructed with vegetation (e.g., grasses, forbs). Northern Harriers often construct platforms below the nest using sturdy vegetative material (e.g., cattails), to elevate the nest, particularly in wet areas.

Loughman and McLandress (unpubl. data, *cited in* CPIF 2000) reported the average vegetation height at nest sites in four regions of California (Sacramento Valley, San Joaquin Valley, Suisun Marsh, and Northeastern California). Vegetation height was lowest in the Suisun Marsh (12.6 to 24.1 inches [32.0 to 61.2 centimeters]) and greatest in the San Joaquin Valley (23.3 to 37.8 inches [59.2 to 96.0 centimeters]). Nest sites in Northeastern California were dominated by residual vegetation, while live vegetation was dominant in the other three study areas. Vegetation composition documented around northern harrier nests includes annual and perennial grasses

APPENDIX B (Continued)

(Poaceae), rushes (*Carex* spp.), sedges (*Juncus* spp.), hemlock (*Conium* spp.), milk thistle (*Silybum* spp.), dock (*Rumex* spp.), mustard (*Brassica* spp.), clover (*Trifolium* spp.), and goldenrod (*Sildago* spp.) (Simmons and Smith 1985; Loughman and McLandress unpubl. data, and LBWA unpubl. data *cited in* CPIF 2000).

Northern harrier nest sites are characterized by partial or complete vegetation cover around the nest circumference (Loughman and McLandress unpubl. data, LBWA unpubl. data *cited in* CPIF 2000); however, the canopies directly above nests are typically open (i.e., the nests are not concealed). Simmons and Smith (1985) reported lower success of concealed nests. Loughman and McLandress (unpubl. data *cited in* CPIF 2000) reported that 71 percent of nests at Suisun Marsh and 93 percent of nests in northeastern California were characterized by no canopy cover. Also, 78 percent of nests located at Los Banos and Salt Slough Wildlife Areas were characterized by open canopies (LBWA unpubl. data *cited in* CPIF 2000). Northern Harrier nests on state and federal wildlife refuges in California were located in upland fields managed for waterfowl breeding (Loughman and McLandress unpubl. data). Nest sites were surrounded by tall annual or perennial grasses with no nest canopy cover.

Site moisture is also associated with the quality of northern harrier nesting habitat. In most nesting habitats, including dry uplands, a disproportionate number of nests are located in wet sites (Simmons and Smith 1985, Martin 1987, Grant et al. 1991). Simmons and Smith (1985) reported that northern harriers in Canada had higher nest success in wet sites (wetland fringe or wet meadows) than in dry sites; and wet sites were selected more than expected based on availability (Simmons and Smith 1985). Although both moisture and vegetation characteristics were correlated with nest success, moisture was the best predictor. Wet sites may be preferred due to reduced predation rates there (Simmons and Smith 1985; MacWhirter and Bildstein 1996). Also, moisture may be simply correlated with or affect other factors that directly determine habitat quality (e.g., vegetation structure and prey abundance).

Where agricultural lands provide suitable vegetation characteristics and prey availability, and are free of disturbances during the nesting period, these areas can provide important nesting habitat for northern harrier. Northern Harriers will attempt to nest in agricultural fields that support suitable vegetation characteristics and prey availability early in the nesting cycle. In Yolo County, California, harrier nests were found in three different upland types: uncultivated field of grasses and weeds, cultivated rice field, and cultivated field of clover (Temeles 1987). Also, in Yolo County, Hopkins (pers. comm.) reported nesting by northern harriers in hayfields. However, where northern harriers nest in agricultural lands, practices such as mowing, disking, and haying during the nesting cycle cause nest destruction (MacWhirter and Bildstein 1996); and these lands can function as population sinks. Because northern harriers are ground nesters with a long nesting period (approximately 75 days between nest construction and fledging young), nest success in croplands remains very sensitive to agricultural practices. Without landowner

commitments to avoid nest destruction, the attractiveness of some croplands to northern harriers early in the nesting period can significantly threaten regional population dynamics, particularly in the Central Valley where agricultural lands are abundant.

Hamerstrom and Kopeny (1981) reported that northern harriers were very adaptive nesters, and continued nesting in marsh areas that were drained and converted to farmland or grasslands; however, it is unknown whether survival and reproduction vary between disturbed and natural habitats (CPIF 2000).

Some agricultural lands also provide high-quality foraging habitat for northern harrier. Agricultural lands that are suitable for foraging are those that support abundant rodent populations (e.g., alfalfa and irrigated pasture). Williams et al. (2000) compared winter use of croplands and rangelands by northern harrier and other raptors in eastern Kansas. Harrier densities were higher in croplands than in rangelands; and harriers generally preferred idle land. The authors hypothesized that the importance of cropland as winter foraging habitat was a function of high prey abundance, good visibility of prey in harvested fields, and a relatively high amount of suitable hunting habitat.

There is no empirical information on effects of habitat fragmentation and habitat patch size on the viability of northern harrier populations (CPIF 2000). The spatial requirements of northern harriers, and how reproductive success and long-term persistence varies with landscape-level parameters, are not known. Although these relationships are not documented, it is assumed that small and isolated habitat patches are less likely to sustain high reproductive success or long-term persistence than larger areas. Northern Harriers using isolated habitats may experience frequent disturbances from adjacent land uses (e.g., nest disturbance, habitat degradation, predation). Important biotic interactions between harriers and rodent populations may be disrupted, because some rodent populations may be sensitive to habitat area and surrounding land uses as well. For example, the availability of voles and other rodent prey may be limited in isolated habitats, and rodents may abandon or be eradicated from small parcels of habitat.

23.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for northern harrier are identified in Table NOHA-1 and have been derived from input from local species experts.

APPENDIX B (Continued)

Table NOHA-1
Essential Habitat Elements for Northern Harrier

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, valley grassland, vernal impoundment, vernal pool, vernal swale, seasonal wetlands, seasonal impoundment, swale, and freshwater marsh.	Abundant rodent populations.
Nesting	Blue oak savanna, cropland, irrigated pasture grassland, and valley grassland.	Open habitats with dense, tall vegetation, a high prey base, and few predators. Nests are typically built in dense, tall vegetation in areas that are undisturbed during the nesting period; and nest sites are often in wet areas.

23.3 Species Distribution and Population Trends

23.3.1 Species Distribution

Breeding populations of northern harrier primarily occur throughout most of Canada and Alaska; central, coastal, and southwestern California into the Baja Peninsula, Mexico; and the west-central and northeastern United States. Northern harriers winter in most of the coterminous United States except portions of the northern-most states; Mexico and Central America; and Cuba and the Bahamas. Most wintering birds occur in the western and southern United States (MacWhirter and Bildstein 1996).

In California, northern harriers historically bred throughout the state except in deserts, woodlands, and forested mountains. Historical breeding localities included the interior from Siskiyou County south to western Riverside and San Bernardino Counties and coastal regions from Marin County to San Diego County (Grinnell and Miller 1944). The northern harrier's range also includes the Sierra Nevada foothills up to 3,600 feet elevation (CPIF 2000). Breeding populations were probably concentrated in most of the Central Valley, Sacramento-San Joaquin River Delta, Suisun Marsh, and portions of the San Francisco Bay (Zeiner et al. 1990). The northern harrier's present California breeding range is similar to its historical distribution; however, extensive local population declines continue as a result of habitat loss (Remsen 1978; Martin 1989; MacWhirter and Bildstein 1996; CPIF 2000).

23.3.2 Central Valley Distribution

Northern harrier's breeding range in California includes most of the Central Valley, where this species is a year-round resident (Zeiner et al. 1990;MacWhirter and Bildstein 1996).

APPENDIX B (Continued)

23.3.3 Range Within the Plan Area

Northern harriers occur in suitable habitat within the Plan Area and are probably regular breeders (Trochet pers. comm.). Their overall distribution, abundance, and population structure are not well known. The CNDDB (CDFG 2010) reports no occurrences of northern harrier in Sacramento County, but this simply reflects the failure of local biologists to report records of the species since it is regularly observed in the area during the breeding season. Occurrences of northern harrier shown in Figure NOHA-1 are from various other sources (ebird.oeg 2005-2010; Klotz Property 2005). Land-cover types used by northern harriers, such as irrigated pasture-grassland, and valley grassland occur throughout much of the Central Valley and are well-represented in Sacramento County and the Plan Area.

Sacramento-area ornithologists C. Conard and J. Trochet provided additional occurrence and habitat distribution information, which is summarized below.

- Two nests have been documented at the Sacramento Regional County Sanitation District (SRCSD) Bufferlands. One nest was located in a hayfield approximately 50 to 60 acres in size. The other nest was in cropland (Conard pers. comm.).
- Nesting was documented approximately three years ago at The Nature Conservancy's Howard Ranch (Trochet pers. comm.).
- Approximately six nests have been documented at the Cosumnes River Preserve in the Lower Preserve area (Trochet pers. comm.). Additionally, in 2004, an immature male and an adult female were observed copulating at the Cosumnes River Preserve. This pair was observed there into early summer. The most suitable habitat at the preserve appears to occur in areas where water is drained away latest (Trochet pers. comm.).
- Other habitat identified as suitable for nesting northern harriers in the Plan Area includes areas along Scott and Latrobe Roads, in the eastern portion of the Plan Area (Trochet pers. comm.).

Because comprehensive surveys or monitoring efforts for northern harrier in the Plan Area have not been conducted, and because the existing data of known occurrences are based mostly on incidental observations or limited surveys (e.g., anecdotal records, surveys conducted within limited areas), the population size and nesting locations of this species in the Plan Area are not known. Nonetheless, for the purposes of the SSHCP, the species is considered to range throughout the Plan Area.

23.3.4 Population Levels and Trend

Northern harrier has experienced an overall population decline over its distribution during the 20th century (del Hoyo et al. 1995, MacWhirter and Bildstein 1996); however, specific population status and trends vary regionally. White (1994) considered harrier population trends variable, but possibly decreasing, in western North America. Furthermore, he cited habitat modification (particularly wetlands loss) as the most important cause of possible declines. Analysis of Breeding Bird Survey (BBS) data indicates an overall decline of northern harrier populations throughout the species breeding range, although trends vary regionally. In the Western BBS Region, BBS data indicate a population decrease between 1996 and 2003 (N = 408, $P < 0.01$), 1966–1979 (N = 123, $P = 0.14$), and 1980–2003 (N = 372, $P < 0.01$) (Sauer et al. 2004).

In California, northern harrier has experienced localized population declines (CPIF 2000). BBS data suggest a slight statewide (California) population increase between 1966 and 2003 (N = 56, $P = 0.36$), 1966 to 1979 (N = 31, $P = 0.15$), and 1980 to 2003 (N = 45, $P = 0.51$) (Sauer et al. 2004); although this trend is not considered statistically significant. The BBS trend for northern harrier in the Central Valley is similar to the statewide trend. Furthermore, based on Christmas Bird Count (CBC) data, the winter population as of 1990 was estimated at 13,200 birds (Johnsgard 1990).

23.4 Threats to the Species

The primary threat to northern harrier, particularly in California, is habitat loss and degradation as a result of urbanization, development, and agricultural conversion. North American populations of northern harrier have declined during the 20th century, mainly as a result of the extensive draining of wetlands, implementation of monoculture farming, and reforestation of open farmlands (MacWhirter and Bildstein 1996). White (1994) also cited habitat modification, particularly loss of wetlands, as the most important cause of possible population declines. In agricultural landscapes, overgrazing of pastures, fewer fencerows and larger croplands, and widespread use of insecticides and rodenticides have reduced prey availability for northern harriers (MacWhirter and Bildstein 1996).

Direct or indirect human disturbance of nesting activities, particularly in agricultural areas, threatens northern harrier populations. Where northern harriers nest in agricultural lands, practices such as early mowing, disking, and haying during the nesting cycle can cause nest destruction (MacWhirter and Bildstein 1996); and these lands can function as population sinks. Also, these activities near a nest can cause parents to abandon the nest (MacWhirter and Bildstein 1996). Because northern harriers are ground nesters with a long nesting period

(approximately 75 days between nest construction and fledging young), nest success in croplands remains very sensitive to agricultural practices for a long duration.

Reproductive failure and declines in northern harrier populations in the mid-20th century have been linked to organochloride pesticide contamination, particularly dichlor-diphenylethylene (DDE), the major metabolite of Dichlorodiphenyltrichloroethane (DDT). However, these populations apparently recovered quickly after regulation of DDT in the early 1970s (Hamerstrom 1969, 1986; MacWhirter and Bildstein 1996).

In south Sacramento County, northern harrier is specifically threatened by habitat loss and fragmentation as a result of conversion of habitat to urban uses and agriculture, particularly the conversion of grasslands to vineyards. Also, the loss of suitable agricultural land to development has reduced the extent of suitable foraging habitat. It is possible that the use of rodenticides and insecticides have reduced prey populations, resulting in lowered survivorship and reproductive success.

23.5 Data Gaps and Conservation Implications

The ecology, status, and management of northern harriers have received considerable attention in recent years. There are several sources of uncertainty regarding northern harrier and its requirements in the Plan Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

23.5.1 Population and Habitat Distribution within the Plan Area

Northern harriers occur in suitable habitat within the Plan Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by northern harriers, such as grasslands, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Plan Area. At most sites with these land-cover types, the status of northern harrier is not known.

Because comprehensive surveys for northern harrier in the Plan Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g., anecdotal records), the population size, nesting locations, and important wintering areas of this species throughout the Plan Area are not known. Although the distribution of grasslands is mapped and quantifiable, the quality of habitat for northern harriers within most of these areas is unknown.

Until this data gap is remedied, the conservation value of grassland and agricultural land-cover types for northern harrier will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, and/or are adjacent to these areas.

APPENDIX B (Continued)

23.5.2 Effectiveness of Grassland and Wetland Enhancement and Restoration Techniques in Creating Suitable Habitat Structure for Northern Harrier

Achieving the conservation goals and objectives for northern harrier will require successful enhancement and restoration of grassland and wetland habitats. The structure of these habitats (e.g., dense, tall vegetation) is an important factor for suitability of northern harrier. Whether restored or grasslands and wetlands can retain the structural attributes suitable for northern harrier is unknown.

If restoration and enhancement techniques cannot eventually create grassland and wetland habitats with structural characteristics suitable for northern harrier, then those lands would not support breeding pairs or contribute directly toward the conservation strategy for the species.

23.5.3 Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for northern harrier are not well documented. This causes uncertainty in determining whether the preserve design will be effective in meeting the conservation goals for northern harrier.

23.5.4 Effectiveness of Mammalian Prey Population Enhancement Measures in Improving Foraging Habitat for Northern Harrier

Achieving the conservation goals and objectives for northern harrier may require successful enhancement of mammalian prey populations. Mammalian prey populations, particularly California vole, should be passively or actively promoted on all lands acquired and managed for northern harrier habitat. Whether these efforts will succeed at increasing the available prey base and enhancing habitat for northern harrier is unknown.

23.5.5 Other Data Gaps

Other data gaps that could be important for northern harrier conservation include: 1) responses of northern harrier populations to habitat management and enhancement techniques; 2) prey population dynamics and cycles; 3) variation in recruitment and survival between natural and disturbed habitats; 4) habitat use and nest success between wet and dry habitats; and 5) an appropriate livestock grazing and fire regime appropriate for northern harrier habitat management and enhancement.

APPENDIX B (Continued)

23.6 Literature Cited

Barnard, P.E. 1983. Foraging behaviour and endergetcs of Northern Harriers *Circus cyaneus* (L.). Honor's thesis, Acadia University, Wolfville, NS.

Barnard, P.E., R.B. MacWhirter, R.E. Simmons, G.L. Hansen, and P.C. Smith. 1987. Timing of breeding and the seasonal importance of passerine prey to Northern Harriers. *Canadian Journal of Zoology*, 65:1942-1946.

Bildstein, K.L. 1988. Northern Harrier *Circus cyaneus*. Pp. 251-303 I*n* Handbook of North American Birds (R. S. Palmer, editor), volume 4. Yale University Press, New Haven, Connecticut.

Bildstein, K.L. 1992. Causes and consequences of reversed sexual size dimorphism in raptors: the head start hypothesis. *Journal of Raptor Research*, 26:115-123.

Bird, D.M., S.K. Ho, and D. Pare. 1982. Nutritive values of three common prey items of the American Kestrel. *Comp. Biochem. Physiol. A*. 73:513-515.

Breckenridge, W.J. 1935. An ecological study of some Minnesota Marsh Hawks. *Condor* 37:268-276.

Burke, C.J. 1979. Effect of prey and land use on mating systems of harriers. Master's thesis, University of Wisconsin, Stevens Point.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Fish and Game and Point Reyes Bird Observatory (CDFG and PRBO). 2003. California Bird Species of Special Concern: Updated Draft List and Solicitation of Input. Available at http://www.prbo.org/cms/.

California Partners in Flight (CPIF). 2000. Version 1.0. The draft grassland bird conservation plan: a strategy for protecting and managing grassland habitats and associated birds in California (B. Allen, lead author). Point Reyes Bird Observatory, Stinson Beach, California. http://www.prbo.org/calpif/plans.html.

Conard, C. Ornithologist. Telephone conversation, October 15, 2004.

del Hoyo, J., A. Elliot, and J. Sargatal, editors. 1995. Handbook of the birds of the world. Volume 2. Lynx Edicions. Barcelona.

APPENDIX B (Continued)

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, New York. Accessed online http://ebird.org/content/ebird.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. The birder's handbook, a field guide to the natural history of North American birds. Simon and Schuster.

Grant, C.V., B.B. Steele, and R.L. Bayn, Jr. 1991. Raptor population dynamics in Utah's Uinta Basin: the importance of food resource. *Southwest Naturalist*, 36:265-280.

Grinnell, J. and A.H. Miller. 1944. *Distribution of the birds of California*. Pacific Coast Avifauna, No. 27. Berkeley, California.

Hamann, B., H. Johnston, P. McClelland, S. Johnson, L. Kelly, and J. Gobielle. 1999. Birds. Pages 3.1-3.34 *in* G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: A Review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307 pp.

Hamerstrom, F. 1969. A harrier population study. Pp. 367-383 I*n* Peregrine Falcon populations, their biology and decline (J. J. Hickey, editor). University of Wisconsin Press, Madison.

Hamerstrom, F. 1986. Harrier, hawk of the marsh: the hawk that is ruled by a mouse. Smithsonian Institution Press, Washington, D.C.

Hamerstrom, F. and M. Kopeny. 1981. Harrier nest-site vegetation. *Journal of Raptor Research* 15:86-88.

Hamerstrom, F., F. N. Hamerstrom, and C. J. Burke. 1985. Effect of voles on mating systems in a central Wisconsin population of harriers. *Wilson Bulletin*, 97:332-346.

Hopkins, J. President. Institute for Ecological Health. Meeting, September 28, 2004.

Johnsgard, P.A. 1990. Hawks, eagles and falcons of North America: biology and natural history. Smithsonian Institution Press, Washington, D.C.

Keran, D. 1981. The incidence of man-caused and natural mortalities to raptors. *Journal of Raptor Research,* 15:108-112.

MacWhirter, R.B. 1985. Breeding ecology, prey selection and provisioning strategies of Northern Harriers *Circus cyaneus* (L.). Honor's thesis, Mount Allison University, Sackville, NB.

APPENDIX B (Continued)

MacWhirter, R.B. 1994. Offspring sex ratios, mortality, and relative provisioning of daughters and sons in the Northern Harrier (*Circus cyaneus*). Ph.D. Dissertation, Ohio State University, Columbus.

MacWhirter, R.B., and K.L. Bildstein. 1996. Northern Harrier (*Circus cyaneus*) in A. Poole and F. Gill (eds.), The Birds of North America. The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

Martin, J.W. 1987. Behavior and habitat use of breeding Northern Harriers in southwestern Idaho. *Journal of Raptor Research,* 21:57-66.

Martin, J.W. 1989. Harriers and kites. Pp. 83-91 *In* Proceedings of the western raptor management symposium and workshop. National Wildlife Federation, Washington, D.C.

Rees, J.R. 1976. Behavioral ecology of marsh hawks in dissimilar habitats. Master's thesis. Eastern Washingon State College, Cheney, Washington.

Remsen, J.V. 1978. Bird Species of Special Concern in California. California Department of Fish and Game. Sacramento, California.

Richardson, C.T., and C.K. Miller. Recommendations for protecting raptors from human disturbance: a review. *Wildlife Society Bulletin* 25:634-638.

Romin, L.A., and J.A. Muck. 1999. Utah field office guidelines for raptor protection from human and land use disturbances. U.S. Fish and Wildlife Service, Utah Field Office, Salt Lake City.

Sauer, J.R., J.E. Hines, and J. Fallon. 2004. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2003. Version 2004.1.* USGS Patuxent Wildlife Research Center, Laurel, Maryland.

Selleck, D.M., and B. Glading. 1943. Food habits of nesting Barn Owls and Marsh Hawks at Dune Lakes, California, as determined by the "cage nest" method. California Fish and Game 20:122-131.

Serrentino, P. 1987. The breeding ecology and behavior of Northern Harriers in Coos County, New Hampshire. Master's thesis, University of Rhode Island, Kingston.

Simmons, R., and P.C. Smith. 1985. Do Northern Harriers (Circus cyaneus) choose nest sites adaptively? *Canadian Journal of Zoolology*, 63:494-498.

APPENDIX B (Continued)

Simmons, R., P. Barnard, and P.C. Smith. 1987. Reproductive behavior of *Circus cyaneus* in North America and Europe: a comparison. *Ornis Scand*. 18:33-41.

Simmons, R.E. 1983. Polygyny, ecology and mate choice in the Northern Harrier *Circus cyaneus* (L.). Master's thesis, Acadia University, Wolfville, NS.

Simmons, R.E. 1984. Do Northern Harriers lay replacement clutches? *Journal of Raptor Research,* 18:103-106.

Simmons, R.E., P.C. Smith, and R.B. MacWhirter. 1986. Hierarchies among Northern Harrier (*Circus cyaneus*) harems and the cost of polygyny. *Journal of Animal Ecology*, 55:755-771.

Small, A. 1994. *California birds: their status and distribution*. Ibis Publ. co., Vista, California.

Smith, D.G., and J.R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. *Brigham Young University Scientific Bulletin Bio. Ser*. 28:1-76.

Temeles, E.J. 1987. The relative importance of prey availability and intruder pressure in feeding territory size regulation by harriers, *Circus cyaneus*. *Oecologia* 74:286-297.

Temeles, E.J. 1989. The effect of prey consumption on territorial defense by harriers: differential responses to neighbors versus floaters. *Behavioral Ecology Sociobiol*. 24:239-243.

Thompson-Hanson, P.A. 1984. Nesting ecology of Northern Harriers on the Hanford site, south-central Washington. Master's thesis, Washington State University, Pullman.

Toland, B. 1985. Northern Harrier predation on Greater Prairie Chickens in southwest Missouri. *Journal of Raptor Research,* 19:146-148.

Trochet, J. Ornithologist. Telephone conversation, October 15, 2004.

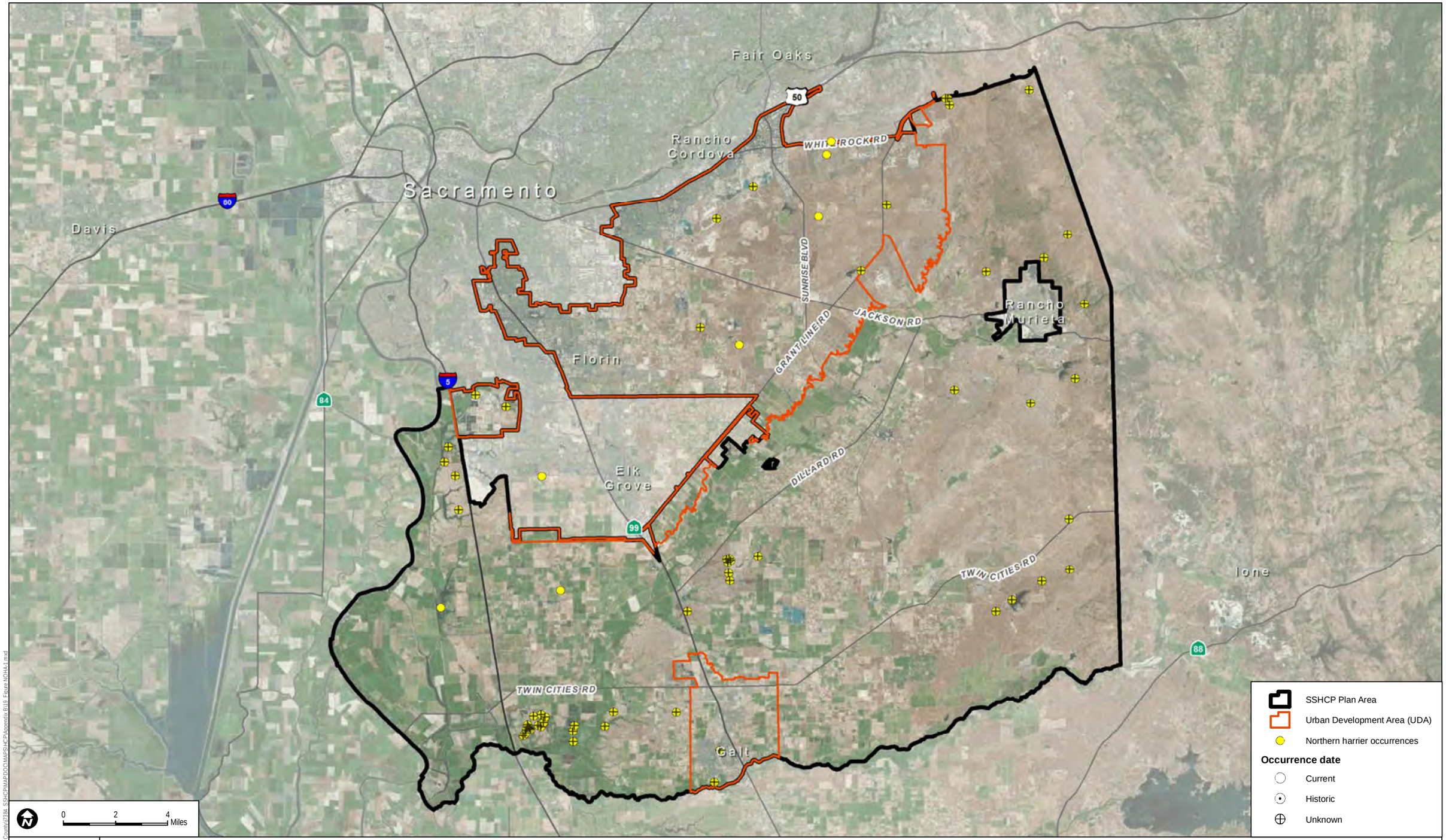
United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Accessed online at http://migratorybirds.fws.gov/reports/bcc2002.pdf.

White, C.M. 1994. Population trends and current status of selected western raptors. *Studies in Avian Biology* 15:161-172.

Williams, C.K., R.D. Applegate, R.S. Lutz, and D.H. Rusch. 2000. A comparison of raptor densities and habitat use in Kansas cropland and rangeland ecosystems. *Journal of Raptor Research* 34:203-209.

APPENDIX B (Continued)

Zeiner, D. C., W. F Laudenslayer Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife: volume II: birds. California Department of Fish and Game. Sacramento, California.



SOURCE: Bing Maps, County of Sacramento 2014, ebird.org

FIGURE NOHA-1

Northern Harrier Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\0294_SSHCP\MAPDOC\MXD\SHCP\Appendix B\19_Figure NOHA-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

24 WHITE-TAILED KITE (WHKI)

Prepared by Todd Sloat Biological Consulting (Todd Sloat)

White-tailed Kite (WHKI)

(Elanus leucurus)

Status USFWS: None

Status CDFG: Fully Protected Species



Ron Wolf 2008

24.1 Legal Status

The white-tailed kite (*Elanus leucurus*) is legally protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7012). It is also protected under the California Fish and Game Code (Section 3503.5, 3513, and 3800) and is identified and protected as a California Fully Protected Species (Section 3511). White-tailed kite is not listed as a species of special concern by the California Department of Fish and Game (CDFG) (Shuford and Gardali 2008).

24.2 Life History and Ecology

24.2.1 Species Description and Life History

24.2.1.1 Physical Description

White-tailed kites are medium-sized hawks (total length 12.6 to 15 inches) with a long white tail and large, black shoulder patches. In adults, these features contrast with a gray back and white underparts. The sexes are similar is size, but females tend to have darker backs than males. Adults have red eyes and juveniles have yellow eyes. Juveniles have fluffy streaks on the breast and head, and gray and white-tipped feathers on the back. White-tailed kites are also recognized by their foraging behavior, frequently hovering in the air "kiting" while searching for prey (Sibley 2000; Sibley 2001).

APPENDIX B (Continued)

24.2.1.2 Reproduction

White-tailed kites are monogamous and breed between February and October. Pairs select nest sites and build stick nests in trees, and are generally considered territorial to other kites and most large raptors (Dunk 1995; Henry 1983). Alternate nests are commonly built and may be used in subsequent breeding attempts (Waian 1973) even when first nest is successful and young are still dependent (Wright 1978). Most white-tailed kite nest studied by Erichsen (pers. comm.) failed during the first attempt due to factors including weather, predation or harassment (i.e. by Swainson's hawks [*Buteo swansonii*] or Corvids). Two broods are more common during periods of high prey abundance (Stendell 1972).

Nests are built by both sexes and the age at first breeding is unknown. Each sex gathers sticks to build nest and carries them in bill or with feet, although female places most of the sticks during nest construction (Dunk 1995). Most nests are located within the upper third of the tree and may be shaded or exposed to direct sunlight for long periods. The nests are primarily composed of small twigs and lined with grass, hay, or leaves and can take as long as 28 days to build (Dixon et al. 1957).

Females typically lay a clutch of four eggs and lay one egg every other day (Stendell 1972). Females incubate eggs exclusively (Dixon et al. 1957). Incubation begins after first or second egg is laid (Stendell 1972) and lasts for 30 to 32 days (Hawbecker 1942). Females take breaks from incubation to preen, stretch (Dixon et al. 1957), remove pellets which are dropped greater than 164 feet (50 meters) from the nest (Dunk 1995), and receive prey from the male.

Males continue to deliver prey to female when young hatch, although only female feeds prey to altricial young (Dixon et al. 1957). Prey are torn apart and fed to young until they are about 3.5 weeks old (Moore and Barr 1941). Although siblings attempt to monopolize food, females discourage aggressive young, and siblicide is not reported (Dixon et al. 1957; Dunk 1995). Young fledge around four to five weeks after hatching, and adults may teach young to fly by hovering over nest and fledglings (Waian 1973). Within two months of fledging, immature White-tailed kites are known to establish and hold territories (Dunk 1995).

24.2.1.3 Longevity, Survival, and Mortality

Little data is available for longevity and survival of white-tailed kites. The maximum life span recorded is five years and eleven months (Clapp et al. 1982). Mortality of white-tailed kites primarily occurs from natural causes (inclement weather and predation) (Stendell 1972). Predation by other large raptors is suspected from the remains of immature white-tailed kites found beneath larger raptor perches (Dunk 1995).

APPENDIX B (Continued)

24.2.1.4 Dispersal Patterns

Little information is available for dispersal patterns of white-tailed kites. No evidence of natal philopatry exists, although one individual immature established a territory adjacent to natal territory (Dunk 1995).

24.2.1.5 Diet and Foraging

White-tailed kites may be observed in California hovering over grassland and ruderal habitat along the side of and in-between the Interstate 5 corridor. The species hunts almost exclusively by hovering at heights between five to 25 meters, often facing into the wind. A white-tailed kite will hover for longer periods (greater than one minute) in windy conditions, but will hover for a shorter duration until it attacks, flies to another hover location, soars, or flies to a perch (Dunk 1995; Jacsic et al. 1987). Hunting from a perch is rarely recorded (Dunk 1995). An attacking bird holds its wings nearly vertical and then drops straight down feet first. Once prey is captured, individuals fly to nearby perch to consume prey by first eviscerating, then decapitating and eating the head and body parts (Dunk 1995). During time periods when the male is feeding female or young, males fly to nest site with prey and exchange with female by perching side-by-side or by aerial exchange where female approaches hovering male from behind and grasps prey with talons from male (Dunk 1995; Waian 1973).

White-tailed kites predominantly feed on small mammals (greater than 95 percent), although a remarkable number of 10,959 different prey items have been reported from California (Dunk 1995). The species is considered a small mammal specialist, and several dietary studies (Hawbecker 1940, 1942; Dixon et al. 1957; Waian and Stendell 1970; Waian 1973; Wright 1978; Stendell 1972) from pellet analysis reveal that voles (*Microtus* spp.), house mice (*Mus musculus)*, and harvest mice (*Reithrodontomys* spp.) are the most frequent prey species eaten. Vole is most frequently eaten and is a prey species known to dramatically fluctuate in abundance. Small mammals other than house and harvest mice are occasionally eaten (2.1 to 18 percent). White-tailed kites are not known to drink water, and pellet casting is related to timing of feeding (Stendell 1972).

24.2.1.6 Movement and Migration Patterns

White-tailed kites are generally thought of as resident species throughout their range although nomadism is suggested (Dunk 1995). White-tailed kites have expanded their range during the last 40 years (Waian and Stendell 1970; Eisenmann 1971; Pruett-Jones et al. 1980) and colonized San Clemente Island from mainland California, a distance of 50 miles (Scott 1994). Nomadism appears to be linked to low abundances of California voles (*Microtus californicus*). Individuals are reported moving prior to the breeding season (January through April) (Stendell 1972).

Individuals banded as nestlings were found 12 miles away from natal site in 8 months after banding, and 100 miles after two years (Dixon et al. 1957). Stendell (1972) recovered four nestlings that were banded. One individual was found one mile of the natal site, and the other three were found between 10 and 30 miles from the natal site.

24.2.1.7 Territoriality/Home Range

Territoriality of white-tailed kites during the nesting season likely varies by an order of magnitude throughout the species range (Dunk 1995). Competitors proximately regulate territoriality size, but ultimately prey numbers regulate territory size because they apparently control competitor's numbers (Dunk and Cooper 1994). Territory sizes estimated along the south coast of California near Long Beach ranged from 22 to 128 acres (nine to 52 hectares) (Waian 1973) and near San Diego from 42 to 217 acres (17 to 88 hectares) (Henry 1983).

Breeding densities of white-tailed kites vary with local prey abundance, ranging from one pair per 64 acres to one pair per 1,116 acres in occupied habitat (Stendell 1972). Winter densities along the north coast ranged from one white-tailed kite per 15 acres to one per 28 acres in occupied areas that supported large vole populations (Dunk and Cooper 1994).

White-tailed kites roost individually or communally during winter and often reuse roost sites annually, sometimes greater than 30 years (Erichsen pers. comm.). Communal roosts typically contain between 10 and 40 individuals (Waian 1973), and have supported more than 100 (Bolander and Arnold 1965). Communal roost sites are located in a variety of locations including woodlands and even large trees within urban areas (Erichsen pers. comm.). Human disturbance in urban areas has caused white-tailed kites to abandon some communal roost sites (Waian 1973; Dunk 1995), but in some instances, attempts to discourage communal roosting by kites are difficult and unsuccessful (Erichsen pers. comm.). White-tailed kites are known to travel over twenty miles to communally roost together (Erichsen pers. comm.).

24.2.1.8 Ecological Relationships

Predator-prey relationships are important for white-tailed kites, particularly because they are predators and affected by prey (small mammals) population cycles and abundance; and predation by other taxa is a source of mortality. Populations appear regulated by prey availability (Stendell 1972; Dunk and Cooper 1994), therefore availability of nesting and roosting sites may be important in areas where prey is abundant. Population distribution is also attributed to prey abundance (Dunk and Cooper 1994), as white-tailed kites have expanded their range during the last 40 years (Waian and Stendell 1970), even across ocean waters some 50 miles away to colonize San Clemente Island (Scott 1994).

APPENDIX B (Continued)

Increased competition for nest sites with other raptors and corvids is suspected to negatively affect white-tailed kite populations (Dunk 1995). In areas where competitors occur, territory size is negatively influenced by competitor abundance (e.g. northern harriers [*Circus cyaneus*], red-tailed hawks [*Buteo jamaicensis*], red-shouldered hawks [*B. lineatus*], American kestrels [*Falco sparverius*], short-eared owls [*Asio flammeus*], and barn owls [*Tyto alba*]) (Dunk and Cooper 1994). Some competitors (red-tailed hawks, common ravens [Corvus *corax*]) are kleptoparasitic.

Suitable nesting substrates have declined in some regions where isolated trees have fallen and new regeneration is lacking.

24.2.2 Habitat Requirements and Ecology

White-tailed kites generally inhabit low-elevation grasslands, wetlands dominated by grasses, oak woodlands, and agricultural and riparian areas (Dunk 1995). Nests are built in trees that occur in isolation or in riparian areas. Other nesting raptor species as well as other conspecifics are known to compete for nest sites and territory size, but ultimately abundance of prey species is the primary factor that influences their numbers and distribution (Dunk 1995).

Nest tree selection has not been well studied. White-tailed kites have been found nesting in isolated trees and in trees within large stands (greater than 100 hectares) (Dunk 1995). Nests are built in several tree species and even in a few shrubs. These species include valley oak (*Quercus lobata*), interior live oak (*Q. wislizeni*), boxelder (*Acer negundo*), ornamental trees, cottonwood (*Populus* spp.), olive (*Olea* spp.), (CDFG 2010; Pickwell 1930; Hawbecker 1942; Dixon et al. 1957). The height of nest trees/shrubs ranges from 10 feet (three meters) [e.g., coyote-brush (*Baccharis* spp.) and saltbush (*Atriplex* spp.)] (Stendell 1972) to 164 feet (50 meters) [e.g. coast redwood (*Sequoia sempervirens)* and sitka spruce (*Picea sitchensis)*] (Dunk 1995). In the Central Valley, white-tailed kites have been observed nesting in valley oak, cottonwood, and pine (*Pinus* spp.) trees (Hopkins pers. comm.). White-tailed kites are territorial with conspecifics, and are known to nest at relatively close distances (e.g. 153 meters) (Dixon et al. 1957; Pickwell 1930; Hawbecker 1942). Erichsen (pers. comm.) reported that white-tailed kite nests in riparian areas were typically located within 0.25 miles of one another.

The size and structural diversity of woodlands supporting white-tailed kite nests has not been well documented. Nest sites are rarely found in isolated trees. They are usually located on the edge or riparian habitats, or in hedgerows and groups of trees, and are commonly found adjacent to natural vegetation, pasture crops (alfalfa) and sugar beets (Erichsen pers. comm.).

White-tailed kites use a variety of habitat types for foraging and the importance of these habitats is dependent on vegetation structure and prey abundance. Lightly grazed or ungrazed grasslands/pastures support larger prey populations and are thus considered more suitable,

APPENDIX B (Continued)

although intensively cultivated areas are also used (Dunk 1995). In cultivated areas, perennial crops such as alfalfa and sugar beets tend to support higher prey numbers, and White-tailed kite nest densities have been highly correlated with these two crops (Erichsen et al. 1994). Nesting studies conducted by Hawbecker (1942) showed that white-tailed kites foraged up to within 0.5 miles from the nest during the breeding season. During winter and the breeding season, Warner and Rudd (1975) found foraging from nest or perch sites extended up to 1.8 miles, but most were less than 0.6 miles. Foraging primarily occurred in two habitat types, riparian and irrigated cultivated land (e.g. alfalfa, tomatoes, sugar beets).

The occurrence and abundance of white-tailed kites during the breeding and non-breeding seasons are strongly affected by the dynamics of local rodent prey populations. Because rodent population cycles are often irruptive, and kite populations are sensitive to the availability of rodent prey, the suitability of an area and its occupancy by white-tailed kites may vary during certain years. Stendell (1972) found the density of voles at the onset of the breeding season affects the presence and abundance of nesting white-tailed kites. Winter densities of white-tailed kites are strongly correlated with the abundance of voles. The mean number of California Voles/territory was estimated at 1,483 for territories ranging from 3.9 to 53 acres (1.6 to 21.5 hectares) in northern California (Dunk and Cooper 1994). In other studies occurring in southern California (Waian 1973; Henry 1983), no prey abundances were reported with nesting territories.

Because white-tailed kites are highly dependent on voles, understanding habitat types optimal for prey species is of high importance. Many small mammal studies have been conducted including two studies in and adjacent to the Plan Area (Jones et al. 1999; Wyatt et al. 1991). The three most abundant species in both studies were the deer mouse (*Peromyscus maniculatus*), house mouse, and meadow vole (*Microtus californicus*). Jones et al. (1999) found the highest numbers of small mammals in perennial grassland, ruderal roadside vegetation, and restored riparian habitat when compared to alfalfa, annual grassland, and seasonal wetland. Abundance indices for these species varied by season and habitat type. When abundance indices for each of the three dominant species were combined for each season, the highest total index (1.47) occurred in perennial grassland habitat during spring.

The level of human disturbance that white-tailed kites can tolerate during the breeding season is unknown. The species generally avoids areas with regular human disturbance, although a small number of pairs appear to tolerate humans and nest at rural and urban margins (Erichsen pers. comm.). Communal roosts during the non-breeding season have been disturbed by humans and caused abandonment (Dunk 1995); however, if not disturbed, the species is known to roost communally in residential areas in cities for several consecutive years (Whisler pers. comm).

APPENDIX B (Continued)

24.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for white-tailed kite are identified in Table WHKI-1 and have been derived from input from local species experts.

Table WHKI-1
Essential Habitat Elements for White-tailed Kite

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, valley grassland, vernal impoundment, vernal pool, seasonal wetlands, seasonal impoundment, and freshwater marsh.	White-tailed kites predominantly feed on small mammals (>95%). The occurrence and abundance of white-tailed kites during the breeding and non-breeding seasons are strongly affected by the dynamics of local rodent prey populations. Because rodent population cycles are often irruptive, and kite populations are sensitive to the availability of rodent prey, the suitability of an area and its occupancy by white-tailed kites may vary during certain years. CFP (2000) listed an objective of identifying habitat requirements of prey populations. In agricultural areas, prey populations vary, but perennial crops (ex. pasture, alfalfa) generally provide better foraging opportunities compared to annual crops (e.g. grains).
Nesting	Blue oak woodland, mixed riparian scrub, mine tailing riparian woodland, and mixed riparian woodland.	Nest tree or woodland nest site selection has not been well studied and may not be as important as prey abundance. Nests can be found in isolated trees, but are more often associated with small or medium size riparian woodlands with associated grasslands, irrigated pastures, or cultivated crops such as alfalfa and sugar beets. Dunk (1995) suggests that adding nest trees in open grasslands where there are few trees may be useful if White-tailed kites are limited by nest sites. A few white-tailed kites are known to nest in urban and suburban areas.

24.3 Species Distribution and Population Trends

24.3.1 Species Distribution

In the United States, the white-tailed kite breeds primarily in the Central Valley, coastal valleys and prairies of California. A few instances of breeding have been documented in Oregon and Washington. The white-tailed kite also commonly nests in southern Texas, and small nesting populations can be found in Florida. Outside the United States, white-tailed kites are found along the coastal areas of Mexico, Panama, the slope of the Caribbean, Colombia, Venezuela, Guyana, Brazil, Paraguay, Uruguay, and northern Argentina (Dunk 1995).

APPENDIX B (Continued)

24.3.2 Central Valley Distribution

White-tailed kites can be found throughout the Central Valley where grasslands, vernal pool complexes, low-growing agriculture crops, and oak savannah and woodlands occur. No studies have documented the densities of breeding or wintering population numbers within the Central Valley.

24.3.3 Range WithIn Plan Area

White-tailed kites occur in suitable habitat throughout the Plan Area; their overall distribution, abundance, and population structure are not well known. Land cover types used by white-tailed kites, such as grasslands, vernal pool grasslands, riparian, oak savannah and woodlands, fallow agricultural fields, and cultivated agricultural fields occur throughout most of the Plan Area, particularly outside the Urban Development Area (UDA). At most sites within these land cover types, the presence and population status of white-tailed kites is not known.

No regularly occurring surveys have been conducted throughout the Plan Area, however, white-tailed kites are known to nest or forage throughout the Plan Area (Connard pers. comm.). These areas include Mather Lake (Conard pers. comm.), Mather Regional Park, Laguna Creek (Jones pers. comm.), and Morrison Creek and adjacent lands (Jones pers. comm.). They are also known to nest or forage in the Cosumnes River corridor, The Nature Conservancy's (TNC) Howard Ranch (Trochet pers. comm.), and suspected to nest at Stone Lakes National Wildlife Refuge (NWR) (Conard pers. comm.). The above areas constitute a subset of the potential habitat available for nesting and foraging white-tailed kites.

Some additional information on white-tailed kite distribution is also available from Swainson's hawks surveys conducted by the CDFG. These surveys are conducted throughout the Central Valley and include sixteen 3.1 square miles (five square kilometers) survey plots in the Plan Area. During the Swainson's hawk surveys, the presence of white-tailed kites were recorded if they were observed on any one of the three survey visits conducted during the Swainson's hawk breeding season. White-tailed kites were found in nine of the sixteen survey plots. The location of these survey plots where the kites were found primarily occurred in the southwestern portion of the Plan Area. Interestingly, no white-tailed kites were found in four study plots located in the central eastern portion of the county (i.e., near the area of Rancho Murrieta).

Because comprehensive surveys or monitoring efforts for the white-tailed kite in the Plan Area have not been conducted, and because the existing data of known occurrences are based mostly on incidental observations or limited surveys, the population size and nesting distribution of this species in the Plan Area are not well known. In the Plan Area, the CNDDB reports six occurrences inside the UDA, and four occurrences outside the UDA (CDFG 2010). These

numbers do not provide an estimate of the distribution or population size of the kites because they are based on a very small number of surveys in a limited area. Figure WHKI-1 illustrates the distribution of occurrences of white-tailed kites within the Plan Area as recorded in the CNDDB (CDFG 2010) and from other sources (ebird.org 2005-2010; Estep 2007; Klotz Property 2005).

24.3.4 Population Levels and Trend

White-tailed kite populations have fluctuated greatly over the past century. According to Grinnel and Miller (1944), this species was common and widespread in the Central Valley and foothills before 1895 but was rare or entirely gone from many areas by the 1940's. The declines in California populations during this period have been attributed to a combination of habitat loss, shooting (kites were considered a pest species), and possibly egg collecting (Waian and Stendell 1970). From the 1940's to the early 1980's California populations increased dramatically (Fry 1966; Waian and Stendell 1970; Pruett-Jones et al. 1980), and their range expanded greatly (Dunk 1995). Factors that may have contributed significantly to this population increase include increased agricultural irrigation, reduced hunting, and the natural potential of the species for population growth.

Since the early 1980's, white-tailed kite populations have steadily decreased again throughout much of their range in California. The most significant declines have occurred in southern California grassland regions (i.e. 38.7 percent between 1982 and 1991) (Dunk 1995). No other values for percent declines in other regions were reported; however, ten of the remaining 13 regions showed declines. Factors possibly contributing to this decline include:

- The conversion of natural habitat or agricultural lands to urban development;
- Conversion of grassland, pastures, and agricultural fields to non-suitable crops such as vineyards;
- Increased disturbance of kites by human activities, farming techniques that remove vegetation along field margins that host prey species; and
- Increased competition for nesting sites with other raptors or with corvids (crows, ravens, and jays).

No population size or population trends have been specifically studied for the Central Valley or within the Plan Area. From Breeding Bird Surveys, Sauer et al. (1999) determined that overall numbers in California have increased, but increases were not statistically significant. Regional areas found to be decreasing included the Central Valley, southern California grasslands, and southern Pacific rainforests (CPF 2000). The California Natural Diversity Database (CNDDB) of the CDFG listed 10 occurrences in the Plan Area (CDFG 2010). These data are based on a small

number of reports and do not represent an accurate measure of local population size. The actual population size in Plan Area is unknown and expected to be much larger than reported.

24.4 Threats to the Species

The white-tailed kite is threatened by habitat loss and alteration, and possibly from shooting, collisions with stationary/moving structure or objects, and disturbance at nest and communal roost sites. Few studies have good empirical data on population declines and because the species is known to vary in its nesting distribution, identifying whether once occupied habitat has become unsuitable is difficult. The following summarizes threats to white-tailed kite populations.

24.4.1 Habitat Loss and Alteration

Both nesting and foraging habitat for white-tailed kites has been lost to urbanization or converted to agricultural crops that do not support prey species or that are used for foraging. In addition, much of the grassland habitat used for foraging by white-tailed kite has been converted to other uses. DeHaven (2000) quantified changes in California cropping patterns and found that white-tailed kite "friendly" habitats such as rangelands, grassland, and pastures have decreased. These habitats have been replaced by a variety of other crops (e.g. fruit and nuts, cotton, and vineyards) that are not used by white-tailed kites, or by crops (e.g., vegetables and melons, tomatoes, beans, potatoes) that are suspected of lower quality than grassland habitats for foraging white-tailed kites.

Habitat loss and alteration also threatens white-tailed kites by fragmenting habitat, minimizing natural tree recruitment, and potentially lowering reproductive success by requiring kites to forage over longer distances. In fragmented habitat, increased foraging time theoretically also increases the time susceptible to predation and agonistic interactions with competitors. Fredrickson and Laubhan (1995) documented increasing fragmentation by urbanization, and in some areas, encroaching woody vegetation was decreasing grassland patch size. Some bird species are only found in grassland patches that are 100 times the size of an average territory of a given species (CDFG and PRBO 2003). In rangelands, natural tree recruitment has been minimized, and the decreased number of trees may limit nesting opportunities for white-tailed kites (Dunk 1995).

24.4.2 Shooting

White-tailed kites were once considered a pest species and were shot (Waian and Stendel 1970). No new research such as banding studies has been conducted that may prove that shooting still occurs. In general, white-tailed kites and other raptors are not regularly shot and this threat is not considered to seriously affect their populations (Hunt pers. comm.).

APPENDIX B (Continued)

24.4.3 Disturbance at Nest and Communal Roost Sites

White-tailed kites are sensitive to human disturbance during communal roosting and nesting (Dunk 1995). They are known to travel greater than twenty miles during winter to roost together (Erichsen pers. comm.), most often in areas of little human disturbance, and nesting pairs are usually found in areas with minimal disturbance. Waian (1973) reported that white-tailed kites temporarily abandoned a communal roost site, although the type of disturbance and season was not reported. During this study, all terrain vehicles repeatedly disrupted a communal roost and the kites abandoned the site one day after the disturbance (Dunk 1995). Some individuals are known to tolerate disturbance of regular vehicle traffic and human activities, especially during winter. White-tailed kites are known roost communally in residential areas and also at urban fringes (Whisler pers. comm.). At one communal roost site in Davis, a landowner tried several measures to disturb greater than 100 kites communally roosting in pine trees. The white-tailed kites simply flew in at dark. Eventually, and landowner removed the tops of the trees to discourage their use by kites (Erichsen pers. comm.). Even during the nesting season, white-tailed kites have established nest sites in areas such as parks and areas at the urban fringe (CDFG 2010; Whisler pers. comm.), although one nest site monitored by Erichsen (pers. comm.) failed to produce young.

24.5 Data Gaps and Conservation Implications

Several researchers have documented many of the life history traits, habitat requirements, distribution, population trends, and threats to the species throughout its range. This information is important for the development of the white-tailed kite Conservation Strategy; however, the data gaps have implications for the species conservation.

24.5.1 Unknown Number of Undiscovered White-tailed Kite Nesting Territories/ Breeding Areas and Communal Roost Sites.

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Plan Area and elsewhere within the range of the species. In the Plan Area, discovery of nesting territories/breeding areas or communal roost sites of white-tailed kites may occur anywhere that suitable habitat is present.

24.5.2 Unknown Relationship Between Apparently Suitable Habitat Conditions but Unoccupied by Nesting Individuals

White-tailed kites do not currently occupy habitat that appears suitable (Jones pers. comm). Although specific habitat elements are present (i.e., nest trees), and general habitats such as fallow fields occur nearby, no active nest sites have been identified.

24.5.3 Pesticide and Herbicide Application

The use of pesticides and herbicides in agricultural areas and their impacts on prey items for white-tailed kite are unknown. Traditional efforts of rodent control may have impacts on white-tailed kite foraging opportunities.

24.5.4 Unknown Relationship between West Nile Virus and White-tailed Kites

West Nile Virus has only recently been reported in North America and has been found to primarily affect crows and other corvids by causing direct mortality. Many other birds species are also exposed, and owls appear to be a susceptible family of birds that develop both clinical signs and significant mortality (Fitzgerald et al. 2002). It is unknown if the virus can affect other raptors, such as the white-tailed kite, but some researchers believe that raptors may develop West Nile Virus by ingestion of infected prey such as smaller birds or mice, rather than direct transmission by biting mosquitoes (Garmendia et al. 2000).

24.6 Literature Cited

Bolander, G.L., and J.R. Arnold. 1965. An abundance of White-tailed Kites in Sonoma County, California. *Condor* 67:446.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Fish and Game and Point Reyes Bird Observatory (CDFG and PRBO). 2003. California Bird Species of Special Concern: Updated Draft List and Solicitation of Input. Available at http://www.prbo.org/cms/.

California Partners in Flight (CPF). 2000. Version 1.0. The draft grassland bird conservation plan: a strategy for protecting and managing grassland habitats and associated birds in California (B. Allen, lead author). White-tailed Kite focal species account (prepared by J. Moore). Point Reyes Bird Observatory, Stinson Beach, California. http://www.prbo.org/CPIF/Consplan.html.

Clapp, R.B., M.K. Klimkiewicz, and J.H. Kennard. 1982. Longevity records of North American birds: Gaviidae through Alcidae. *Journal of Field Ornithology*, 53: 81-208.

Conard, Chris. Ornithologist. Sacramento Regional Wastewater Treatment Plant – Bufferlands. Elk Grove, California. Conversations with Todd Sloat, October 2004.

APPENDIX B (Continued)

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use—for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Dixon, J.B., R.E. Dixon, and J. E. Dixon. 1957. Natural history of the White-tailed Kite in San Diego County, California. *Condor* 59: 156-165.

Dunk, J.R. 1995. White-tailed Kite (*Elanus leucurus*). *In* The Birds of North America, No. 178 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornitholgists' Union, Washington, D.C.

Dunk, J.R. and R.J. Cooper. 1994. Territory size regulation in Black-shouldered Kites. *Auk* 111: 588-595.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, New York. Accessed online http://ebird.org/content/ebird

Eisenmann, E. 1971. Range expansions and population increase in North and Middle America of the White-tailed Kite (*Elanus leucurus*). *American Birds* 25:529-536.

Erichsen, Andrea. Pacific Municipal Consultants. Rancho Cordova, California. Conversations and email correspondence with Todd Sloat, October, November, December 2004.

Erichsen, A.L., K.S. Smallwod, N.D. Ottum, and D.M. Fry. 1994. The white-tailed kite: GIS analysis of habitat selection in the Sacramento Valley, California with implication for Conservation of wildlife in agricultural landscapes. Abstract. *Journal of Raptor Research* 28(1):46.

Erichsen, A.L., K.S. Smallwood, A.C. Commandatore, B.W. Wilson, and D.M. Fry. 1996. White-tailed Kite Movement and Nesting Patterns in an Agricultural Landscape. *In*. Raptors in Human Landscapes. D. Bird and J.J. Negro eds. Academic Press, London. pp. 165-175.

Estep, J. 2007. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Rancho Cordova Planning Area. Estep Environmental Consulting, Sacramento, California.

Fitzgerald, S.D., J.S. Patterson, M. Kiupel, H.A. Simmons, S.D. Grimes, C.F. Sarver, R.M. Fulton, B.A. Steficek, T.M. Cooley, J.P. Massey, and J.G. Sikarskie. 2002. Clinical and pathologic features of West Nile Virus infection in Native North American Owls (Family Strigidae). *Avian Diseases*, 47 (3):602-610.

APPENDIX B (Continued)

Fredrickson, L.H., and M.K. Laubhan. 1995. Land use impacts and habitat preservation in the grasslands of western Merced County, California. Grassland Water District, Los Banos. 83 pp.

Fry, D.R., Jr. 1966. Recovery of the White-tailed Kite. *Pacific Discovery* 19: 27-30.

Garmendia, A.E., H.J. Van Kruningern, R.A. French, J.F. Anderson, T.G. Andreadis, A. Kumar, and A.B. West. 2000. Recovery and identification of West Nile virus from ahawk in winter: *Journal of Clinical Microbiology* 38:3110-3111.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Pacific Coast Avifauna, No. 27. Berkeley, California.

Hawbecker, A.C. 1940. The nesting of the White-tailed Kite in Southern Santa Cruz County, California. *Condor* 42: 106-111.

Hawbecker, A.C. 1942. A life history study of the White-tailed Kite. *Condor* 44: 267-276.

Henry, M.E. 1983. Home range and territoriality in breeding White-tailed Kites. Master's thesis, San Diego State Univ., San Diego, California.

Hunt, Grainger. Santa Cruz Predatory Bird Research Group, U.C. Santa Cruz. McArthur, California. Conversations with Todd Sloat, January 2005.

Jaksic, F.M., R. Rozzi, A. Labra, and J.E. Jimenez. 1987. The hunting behavior of Black-shouldered Kites (*Elanus caeruleus leucurus*) in central Chile. *Condor* 89: 907-911.

Jones, Roger. Sacramento Regional Wastewater Treatment Plant – Bufferlands. Elk Grove, California. Conversations with Todd Sloat, October 2004.

Jones, R.T. Faith, T. Sloat, B. Young, and S. Brown. 1999. Mammalian use of the Sacramento Regional Wastewater Treatment Plant Bufferlands, Elk Grove, California.

Klotz Property. 2005. Klotz Property Open Space Preserve, Figure 6. Special-Status Species Location Map. Sacramento, California.

Moore, R.T., and A.T. Barr. 1941. Habits of the White-tailed kite. *Auk* 58:452-462.

Pickwell, G. 1930. The White-tailed Kite. *Condor* 32: 221-239.

APPENDIX B (Continued)

Pruett-Jones, S.G., M.A. Pruett-Jones, and R.L. Knight. 1980. The White-tailed Kite in North and Middle America: current status and recent population changes. *American Birds* 34:682-688.

Sauer, J.R., J.E. Hines, I. Thomas, J. Fallon, and G. Gough. 1999. The North American breeding bird survey, results and analysis 1996-1998. Version 98.1. USGS Patuxent.

Scott, T.A. 1994. Irruptive dispersal of Black-shouldered Kites to a coastal island. *Condor* 96: 197-200.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Sibley, D.A. 2000. *The Sibley guide to Bird Life and Behavior*. National Audubon Society. Alfred A. Knopf, New York. 587pp.

Sibley, D.A. 2001. *The Sibley guide to Birds*. National Audubon Society. Alfred A. Knopf, New York. 544 pp.

Stendell, R.C. 1972. The occurrence, food habits, and nesting strategy of White-tailed Kites in relation to a fluctuating vole population. Ph.D. diss., Univ. of California, Berkeley.

Trochet, John. Ornithologist. The Nature Conservancy, Elk Grove, California. Conversations with Todd Sloat, October 2004.

United States Fish and Wildlife Service (USFWS). 1995. Migratory nongame birds of management concern in the United States: The 1995 list. Prepared by the Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Washington, D.C.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Online version: http://migratorybirds.fws.gov/reports/bcc2002.pdf.

Waian, L.B. 1973. The behavioral ecology of the North American White-tailed Kite (*Elanus leucurus majusculus*) of the Santa Barbara coastal plain. Ph.D. diss., Univ. of California, Santa Barbara.

Waian, L.B., and R.C. Stendell. 1970. The White-tailed Kite in California with observations of the Santa Barbara population. *California Fish and Game* 56: 188-198.

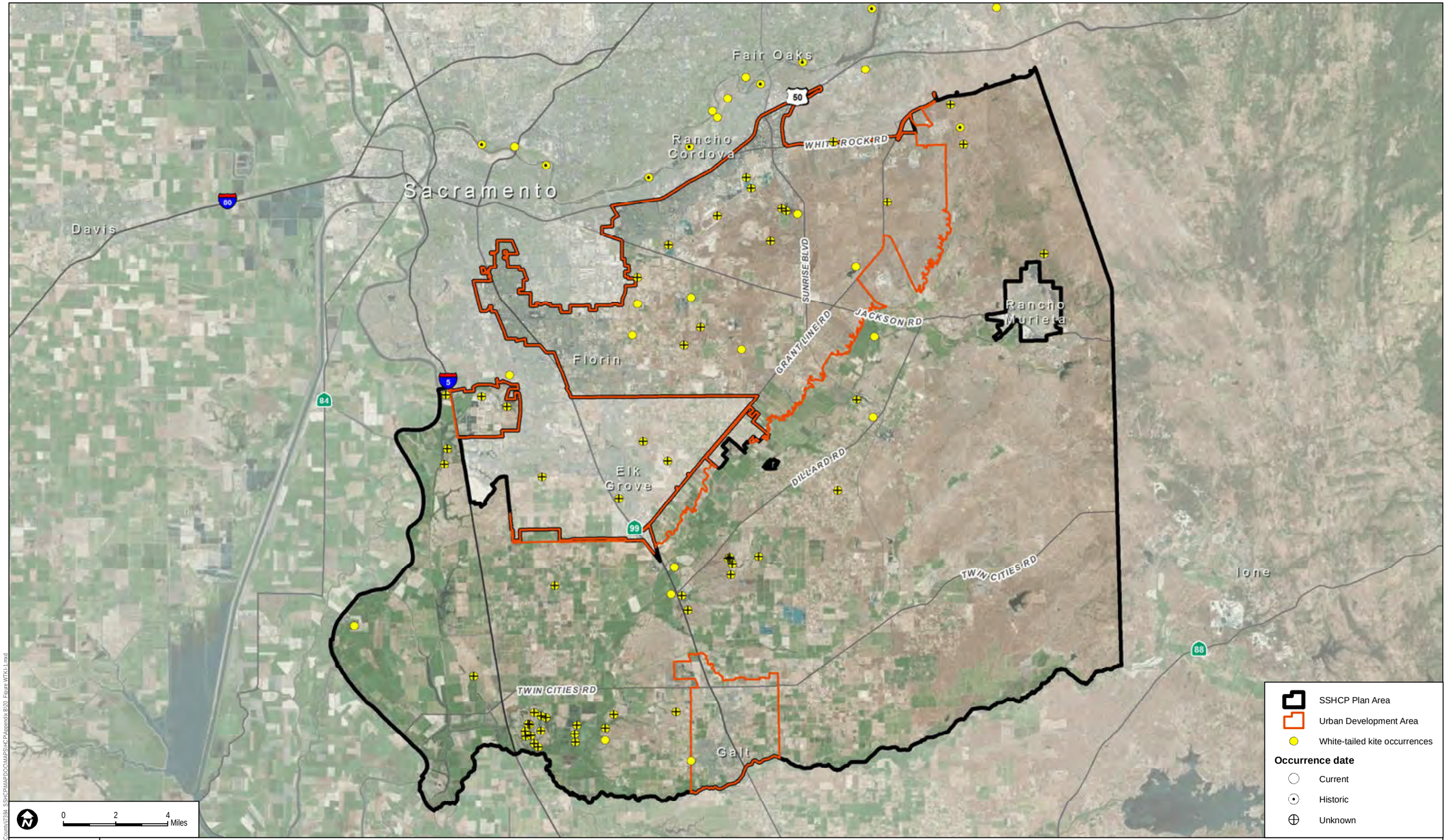
APPENDIX B (Continued)

Warner, J.S., and R.L. Rudd. 1975. Hunting by the White-tailed Kite. *Condor* 77: 226-230.

Whisler, Ed. Ed Whisler Consulting. Davis, California. Conversations with Todd Sloat, November 2004.

Wright, B.A. 1978. Ecology of the White-tailed Kite in San Diego County. Master's thesis, San Diego State Univ., San Diego.

Wyatt, D.T., K.M. Norton, and T.R. Nosal. 1991. Area mammalian resources at the proposed Caltrans mitigation bank at Beach Lake, Sacramento County, 1991.



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ESTEP 2006, ebird.org

FIGURE WHKI-1

White-Tailed Kite Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\0294_SSHCP\MAPS\CM\MPSHCP\Palomino\8\20_Figure WHKI-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

25 GREATER SANDHILL CRANE (SACR)

Prepared by Todd Sloat Biological Consulting (Todd Sloat)

Greater Sandhill Crane (SACR)
(Grus candadensis tabida)
Status USFWS: None
Status CDFG: Threatened



25.1 Legal Status

Greater sandhill crane (*Grus canadensis tabida*) is listed as threatened under the California Endangered Species Act (CESA) and is legally protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7012) and the California Fish and Game Code (Section 3503.5 and 3800).

25.2 Life History and Ecology

25.2.1 Species Description and Life History

25.2.1.1 Physical Description

The greater sandhill crane is the largest of six subspecies occurring in North America. All sandhill cranes subspecies physically appear similar except for size. Adult sandhill cranes are gray overall with a dull red skin on their crown and lores. They have white colored feathers on the chin, throat, and cheek, and black colored primary feathers. The males and females are similar in plumage. Juveniles lack the dull red crown, and the gray colored body is irregularly mottled with brownish-red. Adults can also appear mottled brownish-red, but the color is from "stains" and not a true feather color.

25.2.2 Demography

25.2.2.1 Reproduction

In California, nesting greater sandhill cranes occur in Lassen, Modoc, Plumas, Shasta, Sierra, and Siskiyou Counties (Littlefield 1989; CDFG 1997).

Greater sandhill cranes nest in open areas of wet meadows. These areas are often interspersed with emergent marsh. Sandhill cranes usually build their nests over shallow water. Clutch size is typically two, and adults and young forage in emergent marsh and meadow habitat during the nesting season (CDFG 1997).

25.2.2.2 Longevity, Survival, and Mortality

The maximum age in the wild for any subspecies of sandhill crane is 21 years (Tacha et al. 1992), while in an eastern unhunted population of greater sandhill cranes, annual survival rates for post-juvenile males and females were 0.87 and 0.86 respectively. Ivey (pers. comm.) calculated survival rates for greater sandhill cranes nesting at Malheur National Wildlife Refuge (NWR) and Modoc NWR. For Malheur NWR, he found an annual survival rate of 0.9 (se=0.013) for adults and 0.66 (se=0.096) for juveniles. At Modoc NWR, annual survival rate was calculated to be 0.88 (se = 0.016) for the population.

Mortality can occur from a variety of factors. Greater sandhill cranes are not legally hunted in California and hunting is not considered a serious threat to the species. Collisions with transmission lines are known to cause crane mortality, especially in areas with high winds and fog (Tacha et al. 1992), while sandhill cranes also die from diseases such as avian botulism and cholera (Windingstad 1988).

Mortality from predation by foxes (*Vulpes* spp.), racoon (*procyon lotor*), coyote (*Canis latrans*), gray wolf (*C. lupus*), bobcat (*Lynx rufus*), common raven (*Corvus corax*), eagles, and owls typically occurs with eggs and young (Walkinshaw 1973).

25.2.2.3 Dispersal Patterns

Adults and young generally expand their range after breeding which leads to pre-migration staging (Tacha et al. 1992). Pairs and family groups consistently return to breeding areas and wintering sites if habitat conditions are suitable. Juveniles remain with adults during the first year in family groups and do not disperse until they return to the breeding areas the following year. Males are more philopatric to the natal site than females, although distances moved have not been reported (Tacha et al. 1992).

25.2.2.4 Diet and Foraging

Sandhill Cranes forage on a variety of food items by probing with their bills and gleaning food on the ground surface. They are considered omnivorous and have been reported to feed on cultivated grains, berries, small mammals, insects, snails, reptiles, amphibians, nestling birds, and seeds.

Studies by Ivey and Herziger (2003) show that within and adjacent to the Plan Area, wintering greater sandhill cranes feed in a variety of agriculture crop types; however, food items consumed in the study have not been documented.

25.2.2.5 Movement and Migration Patterns

Greater sandhill cranes are migratory and leave the northern breeding areas in mid-September. Cranes migrate in small groups (20 to 50 individuals) composed of pairs and family groups. By late October, most greater sandhill cranes have left their northern breeding or staging areas and have arrived on the wintering grounds. Once on the wintering grounds, greater sandhill cranes use traditional areas throughout the winter. Migration back to the breeding areas starts in February and is completed by mid-March (Ivey and Herziger 2003).

25.2.2.6 Territoriality/Home Range

Winter home ranges of greater sandhill cranes using the Staten Island area averaged 0.66 square miles (1.71 square kilometers), varying from 0.07-2.12 square miles (0.17-5.49 square kilometers). Cranes using other areas (e.g., Tyler Island, Cosumnes River Floodplain, and Sacramento-San Joaquin River Delta) were found to not travel far during winter. Only one of thirty-nine color marked greater sandhill cranes left the main winter use area. The rest remained in the main winter use area (Ivey and Herziger 2003).

Linear distances greater sandhill cranes traveled to forage from roost sites were also calculated by Ivey and Herzier (2003) and Pogson (1990). The average distance traveled was 0.88 mi (range 0.17-1.89 mi) (Ivey and Herziger 2003) and 1.74 miles (Pogson 1990) between roost sites and foraging areas.

25.2.3 Habitat Requirements and Ecology

Greater sandhill cranes wintering in and adjacent to the Plan Area use open agricultural habitats, natural vegetation communities, and seasonally managed wetlands. After the onset of winter rains, Sandhill Cranes begin foraging for invertebrates by probing soils in grassland habitats and overturning cattle dung. They also hunt for mice in taller grassland vegetation (Littlefield and Ivey 2000). They appear to avoid grassland habitats when vegetation exceeds 10 inches (25 centimeters). Invertebrates are also consumed in natural and managed seasonal wetlands.

Grain is also an important component to the sandhill crane's diet and as such agricultural habitat types are frequently utilized as foraging habitat. Common habitat types used for foraging include pastures, alfalfa, corn (chopped, disced, flooded, and stubble), tomatoes (flooded, ripped), and wheat (disced, ripped, flooded, stubble) (Ivey and Herziger 2003). Ivey (pers. comm.) rated agriculture crops in the Plan Area in order of importance. Rice and corn

APPENDIX B (Continued)

were rated the highest, followed by winter wheat and irrigated pasture. Alfalfa was the next highest rated crop, followed by hay, dryland pasture, and row crops. Sandhill Crane use in the above crop types occurs even though the crops are harvested for farming income. Allowing the crops to mature (e.g., corn) and serve as "food plots" for cranes has been successful in attracting cranes to refuges (Littlefield and Ivey 2000).

Habitats also important for greater sandhill cranes include flooded fields for roosting and rocky uplands (e.g., dirt and gravel roads) for collecting "grit." Roosting areas are located in shallowly flooded areas where cranes loaf during the day and seek protection from terrestrial predators at night. Although they will select sites with emergent vegetation along the periphery of the wetland, they rarely use roosts with heavy emergent vegetation (Littlefield and Ivey 2000). The size of roost sites is variable. Sandhill cranes roosting in Oregon used sites between 1-300 acres (0.5 to 120 hectares), with water depths averaging 4.5 inches (11.7 centimeters). Littlefield (1993) reported cranes abandoning roost sites when water depths reached eight to 11 inches (20 to 29 centimeters). He recommended roost sites should be at least 20 acres (8 hectares) in size, with water maintained from early September to mid-March. Collection of grit by cranes is important when their diet is composed of grain seeds. Grit collected in dirt and gravel roads can be essential when none is available near foraging sites. Sandhill Cranes in Sutter County have been reported flying up to five miles (eight kilometers) to obtain grit (Littlefield and Ivey 2000).

Greater sandhill cranes travel limited distances to foraging sites from night roost areas. Typically, the foraging areas are located within two miles of the night roost site. Most of the roost sites within the Plan Area are known.

Greater sandhill cranes are intolerant of excessive human disturbance and such disturbance may play an important role in habitat selection. Excessive disturbance has caused cranes to abandon foraging and roosting sites, and repeated disturbance affects their ability to feed and store energy needed for survival. Ivey and Herziger (2003) documented disturbance of greater sandhill cranes on Staten Island, a highly used area by cranes, and found that aircraft, vehicles, hunting, and recreational activities (e.g., birding, walking, horseback riding, bicycling, boating) can cause cranes to run or fly away. Ivey (pers. comm.) found that cranes generally avoid suitable agricultural foraging habitat near occupied dwellings, and foraging areas within 100 yards of human structures should not be considered suitable.

Greater sandhill cranes generally use open areas without significant distances of fencing. For example, the 9,200 acres on Staten Island contain virtually no fences. The only fencing on the entire island is located around a few residences. Sandhill cranes run and flap when initiating flight and this behavior prevents them from gaining altitude quickly and avoiding fences.

APPENDIX B (Continued)

25.2.4 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The essential habitat elements for greater sandhill crane are identified in Table SACR-1 and have been derived from input from local species experts.

Table SACR-1
Essential Habitat Elements for Greater Sandhill Crane

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Cropland, irrigated pasture grassland, valley grassland, freshwater marsh, and seasonal wetlands.	Open agricultural habitats (preferred without fencing). Foraging items (e.g. invertebrates or grains). Manage grassland habitats to not exceed 10 in height.
Roosting	Vernal impoundment, vernal pool, seasonal wetland, seasonal impoundment, and freshwater marsh.	Flooded fields with water maintained from early September to mid-March. Rocky uplands (e.g., dirt and gravel roads) for collecting "grit." Cranes abandon roost sites when water depths reached 8-11 in. Cranes are intolerant of excessive human disturbance.

25.3 Species Distribution and Population Trends

25.3.1 Species Distribution

Greater sandhill cranes nest in the Great Lakes states, northwestern Minnesota, southeastern Manitoba; Rocky Mountain states; northeastern Nevada; southern British Columbia; southwestern Washington; central, eastern, and southeastern Oregon; and the Great Basin portion of California. Wintering sandhill cranes are found in southern Georgia and Florida, Texas Gulf Coast, New Mexico, southeastern Arizona, northern Mexico, southeastern California, and the Central Valley of California. In California, greater sandhill cranes nest in northeastern California and winter in the Central Valley, Sacramento-San Joaquin River Delta, southern Imperial County, Lake Havasu NWR, and the Colorado River Indian Reserve (Zeiner et al. 1990).

25.3.2 Central Valley Distribution

Greater sandhill cranes occur in limited locations in the Central Valley. A winter population estimate of 8,500 individuals was reported in January 1993. Of this estimate, 61 percent were using the Butte Basin, while the other two major areas used included the Cosumnes Floodplain and Delta. In the mid-1980's, crane biologists believed 61 percent of the wintering greater sandhill cranes were found in the Delta, and the number of Cranes using the Cosumnes Floodplain increased from one percent in 1983 to 23 percent in 1984 (Littlefield and Ivey 2000). Apparently, Crane use of the Cosumnes Floodplain increases during flood years (Ivey pers. comm.).

Sandhill Cranes are counted each winter in the Central Valley during the "Mid-winter Waterfowl Survey Program" which is conducted from airplanes. No attempt is made to separate the species observed during the survey, but on occasion, ground surveys have been conducted concurrently with aerial surveys in order to determine relative proportions of Greater and Lesser Sandhill Cranes. Hoffman (pers. comm.) found that in the Sacramento Valley, most of the cranes observed were greater sandhill cranes, while those in the Sacramento-San Joaquin River Delta had a more even distribution of Greater and lesser sandhill cranes. The mid-winter waterfowl count conducted January 3rd to 6th, 2005 found 7,786 sandhill cranes in the Sacramento Valley, 2,611 in the Sacramento-San Joaquin River Delta, and 1,335 in the San Joaquin Valley.

The nearest greater sandhill crane use outside of the Plan Area occurs on the Stone Lakes NWR where several hundred greater sandhill cranes occur each winter. Crane use on the NWR and adjacent agriculture land occurs in wetland and irrigated pasture (Harvey pers. comm.). Greater sandhill crane use adjacent to the refuge has decreased from agriculture conversion.

25.3.3 Range within the Plan Area

Greater sandhill crane use in the Plan Area principally occurs in the Cosumnes River Floodplain. During the 1970's, few cranes were found in the Cosumnes River Floodplain, but by 1984, an estimated 24 percent of the wintering population was found using the flooded meadows and pastures of this latter area in late January (Littlefield and Ivey 2000). Pogsen and Lindstedt (1988) recorded a peak of 1,631 greater sandhill cranes during the 1983/84 winter along the Cosumnes River Foodplain and between the preserve and State Highway 99. Apparently, greater sandhill cranes use the Sacramento-San Joaquin River Delta in early winter. When local duck clubs dewater fields after hunting season (i.e., early January), these cranes move to the Cosumnes River Floodplain. Surveys in 1999 suggest crane use in the Sacramento-San Joaquin River Delta and Cosumnes River Floodplain is similar to that found in the mid-1980's (Littlefield and Ivey 2000).

Greater sandhill cranes that are foraging and roosting at the Cosumnes River Preserve tend to be concentrated in the roadless area south of Desmond Road, one to two miles east of Franklin Boulevard, and north of the Cosumnes River (Figure SACR-1) (Ivey and Herziger 2003). Greater sandhill cranes also use the area immediately west of the Plan Area south of Lambert Road (Harvey pers. comm.).

For the purposes of the SSHCP, the range of wintering greater sandhill crane is that area identified as use areas in the *Conservation Assessment for Greater Sandhill Crane Wintering on the Cosumnes River Floodplain and Delta Region* (Littlefield and Ivey 2000); however, this area was extended to include recorded occurrences (ebird.org 2005-2010) and all suitable habitat within a two-mile buffer of the occurrence location. In coordination with USFWS and CDFG the

range was extended to include other adjacent habitat that is otherwise consistent with that previously defined. Figure SACR-1 shows the reported locations of sandhill crane sightings as reported by local birders on ebird.org (2005-2010) as well as the estimated range of the species within the Plan Area. There are no records for greater sandhill crane in the California Natural Diversity Data Base (CNDDB) (CDFG 2010).

25.3.4 Population Levels and Trend

Market hunting between 1880 and 1915 has been cited as having a severe impact on greater sandhill cranes (Littlefield and Ivey 2000). In the 1920's, Dawson (1923 *in* Littlefield and Ivey 2000) reported there were no more than six nesting pairs left in California. Two decades later, in 1944, Walkinshaw (1949 *in* Littlefield and Ivey 2000) estimated only three to five nesting pairs in California. In 1988, 276 pairs were reported and by 2000, 465 pairs were recorded at 127 sites (i.e., an increase of 68 percent).

Although population estimates have been regularly recorded on the breeding grounds in northern California, solid population data is not available for greater sandhill cranes wintering in California. The last detailed winter estimate was conducted in the Central Valley in January 1984. Surveyors found 6,000 greater sandhill cranes. Surveys in 1991 to 1993 estimated 8,500 individuals. During the mid-1980's, 23 percent (1,380) of the sandhill cranes occurred in the Cosumnes River Floodplain (Pogson 1990 *in* Littlefield and Ivey 2000). No recent detailed winter estimates are available for the Cosumnes River Floodplain. Ivey (pers. comm.) estimated that around 1,000 individuals used the area during the 2002/03 winter, while approximately 1,500 were documented using nearby Staten Island.

25.4 Threats to the Species

Historic threats to the species included market hunting, agricultural expansion, and wetland drainage. Although sandhill cranes are no longer hunted in California, agricultural expansion and wetland impacts still occur and affect the species. These and other threats are described below.

25.4.1 Habitat Loss and Alteration

Foraging and roosting habitat for the greater sandhill crane has been lost to urbanization or converted to agricultural crops that do not provide habitat for the species (i.e., vineyards, orchards). Conversion of grassland habitats to urban and agricultural uses proportionately exceeds the conversion of any other habitat type in California (Ewing et al. 1988; Moore et al. 1990 *in* Hunting 2001). Much of the grassland and grassland/vernal pool habitat used by foraging cranes has been converted to other uses. Some of these uses, including agricultural crops such as rice, corn, winter wheat, and irrigated pasture provide high quality habitat for cranes. However, many of these crops have been recently replaced by a variety of other crops

(e.g., fruit and nuts, and vineyards) (DeHaven 2000) that are not used by greater sandhill cranes, or by crops (e.g., cotton, potatoes, tomatoes) that are rarely used or are of lower quality than grassland habitats (Ivey and Herziger 2003).

Recent habitat loss in the area of Stone Lakes NWR near the Plan Area has affected greater sandhill cranes. Greater Sandhill Cranes have been displaced from suitable habitat associated with the East Franklin Project (roughly 3,000 acres). Similarly, the conversion of approximately 1,200 acres of suitable habitat to vineyards at the Circle K Ranch has displaced cranes. Additional future expansion in the area (i.e., City of Elk Grove) could impact even more crane habitat.

Decreasing patch size of natural habitats and agriculture crops has been found to reduce habitat suitability for many bird species (including sandhill cranes). Ivey (pers. comm.) found that greater sandhill cranes generally will not use suitable foraging areas that are within 100 yards of a human dwelling. Cranes also flush and are disturbed when automobiles approach within such distances. When larger, more continuous tracks of lands are split and made smaller for other crops, vehicle traffic from farming operations often increases, and this increase in human activity negatively affects crane use.

25.4.2 Collision with Transmission Lines, Fences, and Television/Radio Towers

Greater Sandhill Crane collisions with distribution lines have been reported by several authors (Pogson et al. 1988; Tacha et al. 1978; Walkinshaw 1956; Wheeler 1966; Drewien 1973; Lewis 1974; Nesbitt and Gilbert 1976 *in* California Energy Commission 1995). These collisions typically occur in foggy and windy conditions and result in mortality (Tacha et al. 1978; Lewis 1974; Nesbitt and Gilbert 1976; Littlefield and Ivey 2000). It is unknown if these collisions occur frequently enough to be considered a threat to the overall population. Drewien (1973) found that collisions with power lines accounted for 37 percent of the observed Sandhill Crane mortality in his study population, while Pogson et al. (1988) concluded that power line collisions seem to be the largest source of unnatural mortality for California's Central Valley Sandhill Crane population. In one incident in Texas (i.e., one day), 52 sandhill cranes were found dead or dying from collision with distribution lines (Tacha et al. 1978). Limiting distribution lines in areas where Sandhill Cranes forage and roost during the breeding season is considered an effective means of minimizing mortality (Ludwig pers. comm.)

25.4.3 Disturbance of Foraging and Roosting Areas

Greater Sandhill Cranes do not tolerate regular disturbances. Types of disturbances that are detrimental to the subspecies include hunting, birding, photography, operating equipment for habitat management, boating, and aircraft. Disturbance forces them to expend unnecessary

energy that is needed for survival during winter and migration. Disturbance during pre-dawn hours, such as hunting activities has caused cranes to leave roosts in darkness, increasing their risk for collisions with transmission lines or other obstructions. Only one pre-dawn disruption is usually necessary before cranes abandon a site (Littlefield and Ivey 2000).

Aircraft were found to affect the greatest numbers of greater sandhill cranes using Staten Island (Ivey and Herziger 2003). Aircraft disturbance documented during the study occurred from planes assessing water levels for mosquito abatement, weeds, levee integrity, as well as flying for recreational reasons. While aircraft have the ability to affect more cranes because they can cover large areas quickly, the most frequent disturbance type occurred from vehicles, including all-terrain vehicles (ATV's) (Ivey and Herziger 2003). Cars and trucks disturb cranes less than ATV's, providing the drivers stay inside the vehicle. This study also showed cranes are more tolerant to vehicles during mid-day compared to pre-dawn. Slow moving farm equipment only slightly disturbed cranes.

Disturbance from hunting also poses a serious threat to greater sandhill cranes. Hunters accessing hunt areas during pre-dawn hours flush cranes from their roosts and hunter presence can keep cranes from roosting or foraging in an area (Ivey and Herziger 2003). Because of hunting-related disturbances to cranes, Staten Island implemented a crane friendly hunting program. This program has been considered successful at minimizing disturbances and increasing crane use of the island. Ivey and Herziger (2003) noted that the number of greater sandhill cranes roosting on Staten Island more than doubled after the opening day of waterfowl season. This increase in crane numbers was attributed to the disturbance of cranes in nearby crane use areas (i.e., adjacent Delta Islands).

Waterfowl hunting may impact cranes less that pheasant hunting if hunters are limited to using blinds. During pheasant hunting, hunters and dogs who are on foot are more disruptive to cranes than waterfowl hunters sitting concealed in blinds (Ivey and Herziger 2003).

25.4.4 Epizootic Events

Like other waterfowl, sandhill cranes are limited by the low availability of wetland roost areas. For example, less than twenty salt lakes in western Texas provide roost areas for up to 80 percent of the mid-continent population during winter. Thus, greater numbers of Sandhill Cranes are "forced" to use these limited roost areas and are more susceptible to epizootic events such as cholera, avian botulism, aspergillosis, salmonella, and avian tuberculosis. Each of the above diseases has been documented to kill Sandhill Cranes (Tacha et al. 1992).

Avian cholera has resulted in greater sandhill crane mortality in San Joaquin County (S. Lindstedt pers. comm. with G. Ivey). Although no details were reported with this event, it is

assumed to have only affected a small number of Sandhill Cranes. Several years of data collected from waterfowl surveys may support this assumption. Sandhill Cranes have been observed roosting in areas where thousands of dead waterfowl were being recovered due to death from avian cholera (Gifford pers. comm.). During an avian cholera abatement program from the mid-1970's to 2000 in the Sacramento-San Joaquin River Delta and Yolo Bypass area, two greater sandhill cranes were documented to succumb to avian cholera. In addition, another 32 records of sandhill cranes (subspecies unknown) were reported dead over a period of 20 years (Gifford pers. comm.). These numbers appear low, but may be important from a population perspective given there are fewer than 10,000 greater sandhill cranes wintering in California.

25.5 Data Gaps and Conservation Implications

Several researchers have documented the life history traits, habitat requirements, distribution, population trends, and threats to the subspecies throughout its range. This information is important for the development of the greater sandhill crane Conservation Strategy. The discovery of new information, considered here as data gaps, has additional implications for the species conservation. These topics are discussed below.

25.5.1 Population and Habitat Distribution within the Plan Area

Greater Sandhill Cranes occur in suitable habitat within the Plan Area. Greater Sandhill Cranes are not known to utilize many other apparently suitable lands within the study area. Until this data gap is remedied, the conservation value of grassland, seasonal wetlands, vernal pools, and suitable agricultural land-cover types for greater sandhill crane will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

25.5.2 Amount of Wintering Habitat

Most of the greater sandhill crane wintering population within the Plan Area is assumed to occur in the Cosumnes River Floodplain. However, in severe winters where the amount of flooded area is greatly expanded, suitable foraging habitat may be limited if preserve boundaries have not included enough land.

25.5.3 Pesticide and Herbicide Application

The use of pesticides and herbicides in agricultural areas and their direct and indirect impacts (i.e., through effects on prey species) on greater sandhill cranes are unknown. Traditional methods for controlling invertebrates may cause toxicitiy effects or reduce foraging opportunities.

APPENDIX B (Continued)

25.6 Literature Cited

California Department of Fish and Game (CDFG). 1997. Annual report on the status of California state listed threatened and endangered plants and animals. Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Energy Commission (CEC). 1995. Avian Collision and Electrocution: An Annotated Bibliography. Publ. No. P700-95-001. Sacramento, California.

Dawson, W.L. 1923. The birds of California. South Moulton College, San Diego, Los Angeles, San Francisco, California.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use—for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Drewien, R. 1973. Ecology of Rocky Mountain greater sandhill cranes. Dissertation. Univ. of Idaho, Moscow. 82 pp.

Ebird.org. 2005-2010. Records of Occurrence Locations of Greater Sandhill Cranes as self-reported by local birders on ebird.org.

Ewing, R. A., N. Tosta, R. Tuazon, L. Huntsinger, R. Marose, K., Nielson, R. Motroni, and S. Turan. 1988. California's forest and rangelands: growing conflict over changing uses. California Department of Forestry and Fire Protection. 348 pp. with appendices.

Gifford, Dan. Wildlife Biologist. California Dept. of Fish and Game. Correspondence with Todd Sloat, November, 2004.

Harvey, Tom. Refuge Manager. Stone Lakes National Wildlife Refuge. Conversation with Todd Sloat, January 2005.

Hofmann, Paul. Associate Wildlife Biologist. Sacramento Valley Central Sierra Region, California Department of Fish and Game. Conversation and correspondence with Todd Sloat, April 2005.

APPENDIX B (Continued)

Hunting, K. 2001. Ferruginous Hawk (*Buteo regalis*). Species account for the CalPIF Grassland Bird Conservation Plan. http://www.prbo.org/calpif/htmldocs/species/grassland/fehaacct.html

Ivey, G.L., C.P. Herziger. 2003. Sandhill Crane monitoring at Staten Island, San Joaquin County, California, 2002-03. A survey for The Nature Conservancy, Galt, California.

Ivey, Gary. Ornithologist. Correspondence with Todd Sloat, October 2004, January 2005.

Lewis, J.C. 1974. Ecology of the sandhill crane in the southeastern central flyway. Dissertation. Oklahoma State University, Stillwater. 214 pp.

Littlefield, C. D. 1989. Status of sandhill crane breeding populations in California, 1988. California Department of Fish and Game Nongame Bird and Mammal Section Rept. Sacramento, California.

Littlefield, C.D. 1993. Annual assessment and monitoring report for Grater Sandhill cranes and other threatened and endangered species on the Little Dry Creek nit, California. California Dept. of Fish and Game, Rancho Cordova, California.

Littlefield, C.D. 1995. Demographics of a declining flock of Greater Sandhill cranes in Oregon. *Wilson Bulletin,* 107:667-674.

Littlefield, C.D., and G.L. Ivey. 2000. Conservation assessment for Greater Sandhill Cranes wintering on the Cosumnes River Floodplain and Delta Region of California. The Nature Conservancy.

Ludwig, Shannon. Wildlife Biologist. Modoc National Wildlife Refuge. Conversation with Todd Sloat in February 2005.

Moore, S., J. Winckel, S. Detwiler, S. Klasing, P. Gaul, N. Kanim, B. Kesser, A. DeBevec, KI. Beardsley, and L. Puckett. 1990. Fish and wildlife resources and agricultural drainage in the San Joaquin Valley, California. Volume1. San Joaquin Valley Drainage Program, Sacramento, California. 364+ pp.

Nesbitt, S.A. and D.T. Gilbert. 1976. Powerlines and fences: hazards to birds. *Florida Naturalist,* 49(2):23.

Pogson, T.H. 1990. Distribution, abundance, and behavior of Greaer Sandhill Cranes, Grus Canadensis tabida, winering in California's Central Valley. M.S. Thesis, Univeristy of Alaska, Fairbanks, Alaska.

APPENDIX B (Continued)

Pogson, T.H., and S.M. Lindstedt. 1988. Abundance, distribution, and habitat of Central Valley Population Greater Sandhill Cranes during winter. Unpublished report. Biology and Wildlife, University of Alaska, Fairbanks.

Tacha, T.D., D.C. Martin, and C.G. Endicott. 1978. Mortality of sandhill cranes associated with utility highlines. Pages 175-176 in: J.C. Lewis, ed. Proceedings of 2nd crane workshop, Rockport, Texas. National Audubon Society. Colorado State University Printing Service, Ft. Collins, Colorado.

Tacha, T.D., S.A. Nesbitt, and P.A. Vohs. 1992. Sandhill Crane. *In* The Birds of North America, No. 31 (A. Poole, P. Stettenheim, and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Walkinshaw, L.H. 1949. The Sandhill Cranes. Cranbrook Institute of Science Bulletin 29, Bloomfield Hills, Michigan.

Walkinshaw, L.H. 1956. Sandhill cranes killed by flying into power line. *Wilson Bulletin*, 68(4):325-326.

Walkinshaw, L.H. 1973. *Cranes of the World*. Winchester Press, New York.

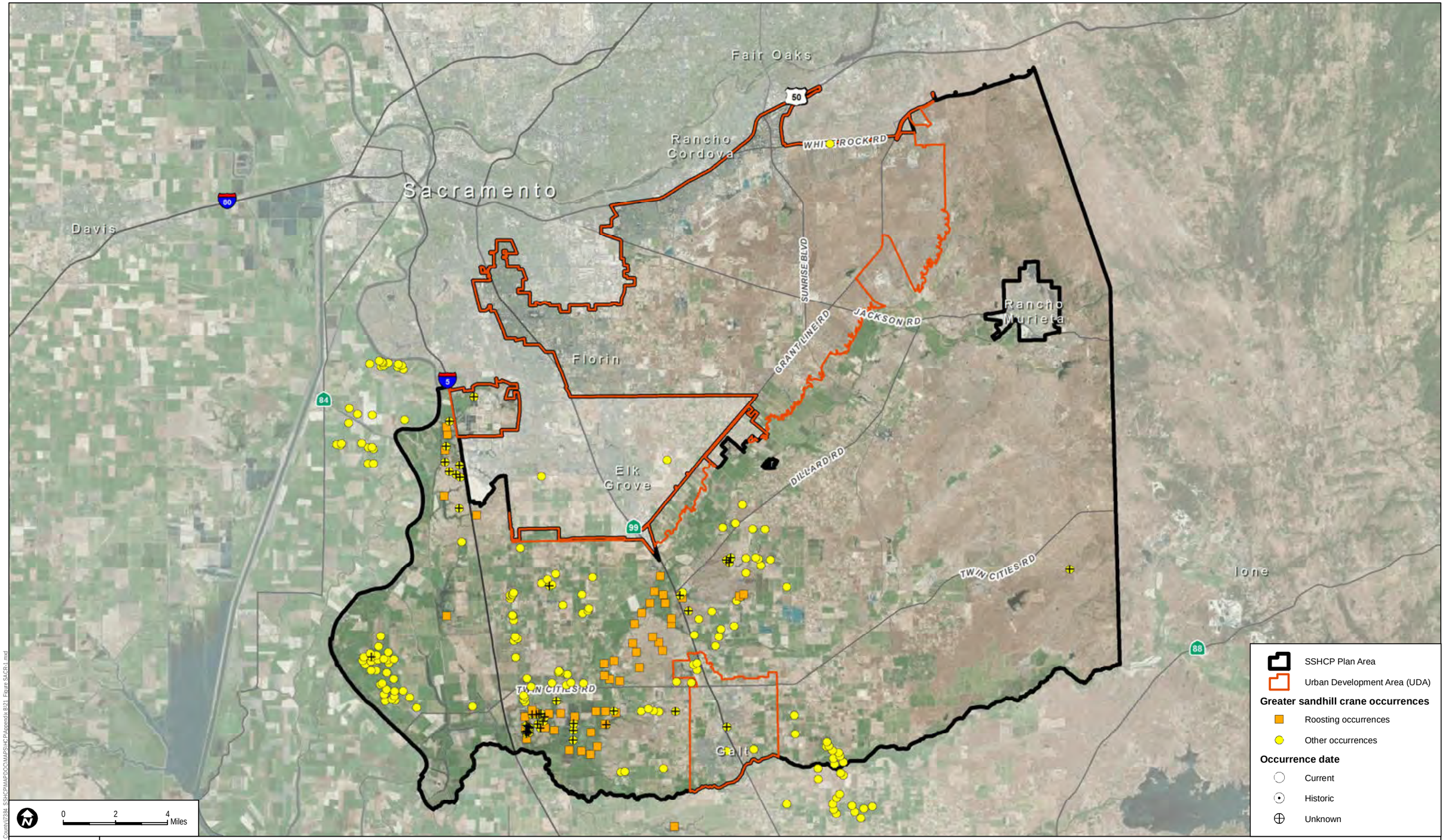
Wheeler, R.H. 1966. Sandhill crane casualties in the blizzard of March 22, 1966. *Nebraska Bird Review,* 34(4)69-70.

Windingstad, R. M. 1988. Nonhunting mortality in Sandhill Cranes. *Journal of Wildlife Management*, 52:260-263.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990. California's wildlife. Vol. 1 amphibians and reptiles. Vol. II - birds, and Vol. III - mammals. California Department of Fish and Game. Sacramento, California.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, TNC 2000, Ivey 2003, Pogson & Lindstedt 2005, ebird.org, ICF 2013

FIGURE SACR-1

Greater Sandhill Crane Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\7936 SSHCP\MAPDOC\MAPS\HCP\Aplendix B\01 Figure SACR-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

26 LOGGERHEAD SHRIKE (LOSH)

Prepared by Henderson Ecology and Planning (Steve Henderson)

Loggerhead Shrike (LOSH)

(Lanius ludovicianus)

Status USFWS: Bird of Conservation Concern

Status CDFG: Second Priority Bird of Special Concern



26.1 Legal Status

Loggerhead shrike (*Lanius ludovicianus*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and the California Fish and Game Code (Section 3800). This species is designated as a Second Priority Bird Species of Special Concern (BSSC) by the California Department of Fish and Game (CDFG) (Shuford and Gardali 2008); and a Bird of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS) (USFWS 2002).

26.2 Life History and Ecology

26.2.1 Species Description and Life History

26.2.1.1 Physical Description

Loggerhead shrike is a medium-sized (7.9 to 9.8 inches [20 to 25 centimeters]), large-headed Passerine with dark gray on the back and white on the breast. Its distinguishing feature is a black face mask that extends over the bill (Yosef 1996).

26.2.1.2 Taxonomy

There is considerable geographic variation in plumage and morphometrics within *Lanius ludovicianus.* The current systematics (Clements 2000) recognize 11 subspecies of *L. ludovicianus*. Five subspecies occur in California: *L. l gambeli*, *L. l. excubitorides, L. l. mearnsi, L. l. anthonyi,* and *L. l. grinnelli*. *L. l. gambeli* breeds from Washington south to southwestern California, including the Plan Area; *L. l. grinnelli* breeds from San Diego County south to north-central Baja California, Mexico. *L. l. excubitorides* breeds in southeast California, east *of L. l*

gambeli; *L. l. mearnsi* is a resident on San Clemente Island; and, *L. l. anthonyi* is a resident on Santa Cruz, Santa Rosa, and Santa Catalina Islands (Yosef 1996).

26.2.1.3 Reproduction

The breeding season for loggerhead shrike generally begins before most other sympatric Passerine species (in late January or early February), and extends to July. In non-migratory populations, shrikes remain paired during the winter. Territory establishment probably begins between February and March. There is no information available about the specific timing of nest construction; however, it probably begins soon after territory establishment. Nest construction lasts approximately six to 11 days. Loggerhead shrikes build open cup nests, placing them in well-hidden microsites on a tree or shrub. Eggs are typically laid between March and June. Females normally lay five to six eggs and incubate for 15 to 17 days. The female usually feeds the nestlings until they fledge at 16 to 20 days after hatching; however, the male will feed the nestlings if the female is absent from the nest for extended periods. During the nestling period, the male provides the brooding female with food and participates in nest sanitation (e.g., removing fecal matter and regurgitated pellets) (Yosef 1996).

26.2.1.4 Survival and Longevity

There are no reliable juvenile or adult survival estimates for loggerhead shrike.

26.2.1.5 Dispersal Patterns

Banding studies indicate that adult loggerhead shrikes exhibit some site fidelity, and juveniles disperse widely. Recapture rates of loggerhead shrikes banded as juveniles are low. In Alberta, the average distance of juvenile dispersal was 4.2 mi (6.7 kilometers). Over the period of three years since the time of banding, shrikes dispersed up to 43.5 miles (70 kilometers) from their natal site. The rates of breeding adults returning to breeding sites between selected years were 73 percent in Idaho, 68 percent in Indiana, 60 percent in Virginia, 54 percent in Missouri, 57 percent in Iowa, and 41 percent and 59 percent in Minnesota. On San Clemente Island, California, return rates between years were 30 to 90 percent between 1985 and 1988. In other areas, (e.g., Alberta and North Dakota) return rates of breeding adults were lower (Yosef 1996).

26.2.1.6 Diet and Foraging

Loggerhead shrikes eat small to medium-sized animal matter, including arthropods, birds, amphibians, reptiles, and small mammals. They also eat roadkills and carrion. Shrikes forage primarily on large ground-dwelling insects that require little to no water (Miller and Stebbins 1964). A loggerhead shrike is able to carry prey as heavy as its own mass with its feet. It can carry smaller items in its bill. Hunting perches are especially important for loggerhead shrike

foraging (Brooks and Temple 1990; Yosef and Grubb 1994). Loggerhead shrikes hunt from perches such as fences, shrubs, trees, utility lines, and poles. Shrikes kill their vertebrate prey by attacking the nape and tearing the cerebral vertebrae. They often impale their prey on barbed wire and other sharp objects. Loggerhead shrikes forage primarily in the morning (Yosef 1996).

26.2.1.7 Movement and Migration Patterns

Migration in loggerhead shrikes is poorly understood. Northern populations of loggerhead shrike are migratory. They migrate annually between their breeding and wintering grounds. Their spring migration to the breeding grounds begins in January and extends to March, peaking between February and March. Fall migration to the wintering grounds generally begins in August and extends through November, peaking between September and November. Birds apparently migrate individually during the day (Yosef 1996.) Although not explicitly reported, Loggerhead shrike populations in Sacramento County are presumably resident and non-migratory.

26.2.1.8 Territoriality/Home Range

Loggerhead shrikes are territorial and aggressive during the breeding season. They maintain relatively large territories, and all activities associated with reproduction (i.e., mating, foraging, brooding) occur within the territory. In mainland California, the average size of territories averaged 21 acres (8.5 hectares) and ranged between 10.9 acres (4.4 hectares) and 39.5 acres (16 hectares) (Yosef 1996). In areas of year-round residence (such as much of lowland California) members of a pair are known to defend adjoining territories during the non-breeding season and then defend a single nesting territory comprised of the adjoining winter territories during the breeding season (Lefranc 1997).

26.2.1.9 Ecological Relationships

There is little data available on predation of loggerhead shrike. Nest predators have included feral cats, black-billed magpies (*Pica pica hudsonia*), weasels (*Mustela* spp.), raccoons (*Procyon lotor*), and snakes. Potential nest predators are often mobbed by shrikes. These species include American crow (*Corvus brachyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), and northern harrier (*Circus cyaneus*) (Yosef 1996).

Prior to nesting, loggerhead shrikes engage in "group meetings," where neighboring shrikes convene to call and display. This behavior is thought to facilitate familiarity among neighboring territorial shrikes and minimize agonistic behavior among them during breeding activities. Shrikes interact with, and appear to dominate, many species that share their habitat. Nest parasitism of loggerhead shrike by Brown-headed Cowbird was first documented in Iowa in 1991. Shrikes readily chase cowbirds that approach nests containing eggs (Yosef 1996). The extent and intensity of cowbird nest parasitism on loggerhead shrike is unknown.

APPENDIX B (Continued)

26.2.2 Habitat Requirements and Ecology

Loggerhead shrikes occur in dry, open habitats including grasslands, pastures with fence rows, agricultural fields, open woodlands (savannahs), scrub, and riparian areas. Suitable breeding habitat has the following characteristics: 1) short, sparse vegetation; 2) scattered or isolated low trees or large shrubs for nest sites; and 3) available hunting perches with an open view (Yosef 1996; Cade and Woods 1997). Loggerhead shrikes typically avoid completely treeless and shrubless areas (Cade and Woods 1997), as well as urbanized and densely wooded areas (Grinnell and Miller 1944). Winter foraging habitat is similar to summer breeding and foraging habitat, however, shrikes also use idle pastures and hayfields during the winter (Bartgis 1992).

In many areas, loggerhead shrike abundance is correlated with the amount of pastureland and available perches (Gawlik and Bildstein 1993; Yosef 1996). Hunting perches are especially important for loggerhead shrike foraging (Brooks and Temple 1990; Yosef and Grubb 1994). Loggerhead shrikes hunt from perches such as fences, shrubs, trees, utility lines, and poles. Yosef and Grubb (1994) experimentally added wooden posts (averaging 53 inches tall) to loggerhead shrike territories. They found that productivity increased and territory size decreased in territories where perches were added compared to control sites. The authors concluded that habitats managed for loggerhead shrikes should include abundant hunting perches, as well as an adequate prey base and nest sites.

Loggerhead shrikes may also forage in areas where vegetation is tall and dense, although these areas are considered suboptimal. Foraging success in these areas may be similar to that in more open and sparse areas, but involves more hovering, more flights, and increased perch-switching (Yosef and Grubb 1993).

26.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for loggerhead shrike are identified in Table LOSH-1 and have been derived from input from local species experts.

Table LOSH-1
Essential Habitat Elements for Loggerhead Shrike

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture/grassland, and valley grassland.	Open habitats with abundant, large arthropods (e.g., grasshoppers) and numerous hunting perches.
Nesting	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, mixed riparian scrub, and orchards.	Structurally diverse woodland habitats that dense vegetation for siting nests.

26.3 Species Distribution and Population Trends

26.3.1 Species Distribution

The breeding range of loggerhead shrike is extensive. It includes Alberta, Saskatchewan, and Manitoba in Canada; most of the United States with the exception of the Pacific Northwest and most of the northeastern states; and most of Mexico. Northern populations of loggerhead shrike are migratory. Their winter distribution includes northern California, northern Nevada, northern Utah, central Colorado, Kansas, western Missouri, northern Kentucky, and northern Virginia south through the southern United States and Mexico (Yosef 1996). Loggerhead shrike has apparently always been more frequent throughout the western and southern portions of its range than other areas of its distribution (Cade and Woods 1997).

In California, loggerhead shrike is a year-round resident throughout the foothill and lowland regions in the central to southern portion of the state. Although it does not breed or winter in the north coast region of California, winter migrants occur there (Zeiner et al. 1990).

26.3.2 Central Valley Distribution

Loggerhead shrike is a resident in the Central Valley where there is suitable habitat. The Central Valley may have historically functioned as a core area for interior populations of loggerhead shrike in California. Although shrikes occur in successional habitats, the Central Valley supported abundant breeding habitat that is considered more permanent or stable, such as perennial grasslands and open savannahs (Cade and Woods 1997).

26.3.3 Range Within Plan Area

Loggerhead shrikes occur year-round in suitable habitat throughout the Plan Area. They are probably regular breeders in the Plan Area in low densities (Trochet pers. comm.); however, their overall distribution, abundance, and population structure are not well known. The CNDDB (CDFG 2010) reports no occurrences of loggerhead shrike in Sacramento County. There are occurrences from other sources (Ebird.org 2005-2010) that report the species throughout the Plan Area. Figure LOSH-1 shows the occurrences of loggerhead shrike within the Plan Area.

Land cover types used by loggerhead shrikes, such as irrigated pasture-grassland, cropland, blue oak savanna, blue oak woodland, orchards, and valley grassland occur throughout much of the Central Valley and are well-represented in Sacramento County and the Plan Area; however, at most sites within these land-cover types, the presence of loggerhead shrike is not known.

APPENDIX B (Continued)

Sacramento-area ornithologists C. Conard and J. Trochet provided occurrence and habitat distribution information, which is summarized below.

- At the Sacramento Regional County Sanitation District (SRCSD) Bufferlands (and at nearby Stone Lakes National Wildlife Refuge), approximately two to three shrike nests are located each year. Loggerhead shrikes occur regularly throughout the agricultural lands and grasslands where suitable habitat features exist (Conard pers. comm.).
- Loggerhead shrikes occur regularly during summer at The Nature Conservancy's Howard Ranch; although their abundance is not high. Also, a nest that produced two young was documented there in 2001 (Trochet pers. comm.).
- At the Consumes River Preserve, shrikes nested successfully from 1995–1997 north of the Tall Forest. This area supports pastureland with scattered small trees and shrubs, and was considered the most reliable location to observe shrikes during all seasons. The area has since been converted to rice fields and no longer supports loggerhead shrikes during the breeding season (Trochet pers. comm.).
- On County land northeast of the Tall Forest, shrikes nested successfully near pasture and fallow rice fields (Trochet pers. comm.). Also, along Bruceville Road, 0.2 to 0.3 miles south of Twin Cities Road, adult shrikes with four young were observed over a period of time (Trochet pers. comm.).
- Nesting has not been documented at Valensin Ranch, although some locations there provide suitable breeding habitat.
- Loggerhead shrikes have been documented at least twice during the breeding season at the Schneider property, along Meiss Road approximately 1.75 miles from Ione Road, although nesting has not been documented there. This property may not support suitable nest sites (small trees or shrubs). Nesting could have occurred in the adjacent dredge spoils area that supports small trees or shrubs; however this area has not been searched (Trochet pers. comm.).
- In general, loggerhead shrikes occur regularly during the breeding season throughout south Sacramento County, in open country with elevated perches and appropriate vegetation for breeding. They are probably regular, low-density breeders throughout the entire southern portion of the County where suitable habitat exists (Trochet pers. comm.).

Because comprehensive surveys or monitoring efforts for loggerhead shrike in the Plan Area have not been conducted, and because the known occurrences are based mostly on incidental observations or limited surveys (e.g., anecdotal records, surveys conducted over a limited area), the population size and nesting locations of this species in the Plan Area are not well known.

26.3.4 Population Levels and Trend

Prior to the mid-1900s, loggerhead shrike was considered widespread and abundant (Yosef 1996; Cade and Woods 1997); however, loggerhead shrike populations have been declining rangewide since that time, and it has been extirpated locally throughout the species' range (Cade and Woods 1997). Much of the evidence for population declines has come from analysis of Breeding Bird Survey (BBS) data. Loggerhead shrike is one of the few species that show a significant decline (based on BBS data) in most states.

Analysis of Breeding Bird Survey (BBS) data indicates an overall decline of loggerhead shrike populations throughout the species breeding range, although trends vary regionally (Sauer et al. 2004). In California, loggerhead shrike has experienced extensive local population declines. BBS data suggest a significant statewide (California) population decrease between 1966 and 2003 (N = 108, $P = 0.01$). The BBS trend for loggerhead shrike in the Central Valley is similar to the statewide trend.

26.4 Threats to the Species

The primary cause of loggerhead shrike population declines is breeding habitat loss and degradation as a result of urbanization, development, and agricultural conversion (Morrison 1981; Yosef 1996; Cade and Woods 1997). Another important cause of population declines is related to pesticides that are ingested with the species' prey (Yosef 1996).

Shooting of perched shrikes due to dislike of their raptor-like habits contributed to the species decline in the past century (Yosef 1996), but is not likely to be a significant source of mortality in current populations. Road kills and increased predation of young and eggs by common raven, domestic cats, and foxes may also be factors in the species decline.

26.5 Data Gaps and Conservation Implications

There are several sources of uncertainty regarding loggerhead shrikes and their requirements in the Plan Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

26.5.1 Population and Habitat Distribution within the Plan Area

Loggerhead shrikes occur in suitable habitat within the Plan Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by shrikes, such as grasslands and pastureland, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Plan Area. At most sites with these land cover types, the presence of loggerhead shrike is not known.

Because comprehensive surveys for loggerhead shrike in the Plan Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g., anecdotal records), the population size, nesting locations, and important wintering areas of this species throughout the Plan Area are not known. Although the distribution of grasslands and other open habitats is mapped and quantifiable, the quality of habitat for shrikes within most of these areas is unknown.

These information gaps limit our ability to identify the best lands available for preserving loggerhead shrike habitat and accurately estimate the impacts resulting from covered activities. Until this data gap is remedied, the conservation value of valley grassland, blue oak savannah, and pasture land-cover types for loggerhead shrike will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

26.5.2 Effectiveness of Habitat Enhancement Techniques in Creating Suitable Nest and Perch Sites for Loggerhead Shrike

Achieving the conservation goal and objectives for loggerhead shrike will require successful enhancement of grassland and other habitats. The structure of these habitats (e.g., short, sparse vegetation), and presence of nest and perch sites, are important factors for suitability. Whether enhancement and management can retain the elements suitable for loggerhead shrike is unknown.

If restoration techniques cannot eventually create grassland and other habitats with characteristics suitable for nesting shrikes, then those lands would not support breeding pairs or wintering individuals.

It is assumed that careful design and implementation of grassland enhancement plans could create suitable loggerhead shrike breeding habitat. Habitat enhancement and restoration efforts to achieve conservation objectives for loggerhead shrike will incorporate habitat requirements into their objectives, designs, and performance standards. Also, restoration and enhancement projects will be established as working experiments. It is expected that enhancement and management efforts aimed at burrowing owl conservation will also benefit loggerhead shrike.

26.5.3 Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for loggerhead shrike are not understood. This causes uncertainty in determining whether the preserve design will be effective in meeting the conservation goal for loggerhead shrike. The criteria for designing preserves will be based on the best available information on or inferences about spatial requirements for all

covered species. The minimum size and connectivity requirements of preserves will be expected to meet or exceed requirements to maintain loggerhead shrike populations.

26.6 Literature Cited

Bartgis, R. 1992. Loggerhead Shrike. P. 281-297 *in* Migratory nongame birds of management concern in the northeast (K. J. Schneider and D. M. Pence, eds.). U.S. Fish and Wildlife Service, Region 5, Newton Corner, Massachusetts.

Brooks, B.L., and S.A. Temple. 1990. Habitat availability and suitability for loggerhead shrikes in the upper Midwest. *American Midland Naturalist* 123: 75-83.

Cade, T.J. and C.P. Woods. 1997. Changes in distribution and abundance of the loggerhead shrike. *Conservation Biology,* 11:21-31.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Clements, J.F. 2000. *Birds of the World: A Checklist*. 5th ed. Ibis Publishing. Vista, California.

Conard, C., Ornithologist. E-mail correspondence, December 9, 2004.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, NY. Accessed online http://ebird.org/content/ebird.

Gawlik, D.E. and K.L. Bildstein. 1993. Seasonal habitat use and abundance of loggerhead shrikes in South Carolina. *Journal of Wildlife Management*, 57:352-357.

Grinnell, J., and A.H. Miller. 1944, Reprinted 1986. *The distribution of the birds of California*. Cooper Ornithological Club, Pacific Coast Avifauna. Number 27.

Lefranc, N. 1997. *Shrikes: A Guide to the Shrikes of the World*. Yale University Press. New Haven and London. 192 pp.

Miller, A.H., and R.C. Stebbins. 1964. The lives of desert animals in Joshua Tree National Monument. University of California Press, Berkeley. 452 pp.

Morrison, M.L. 1981. Population trends of the loggerhead shrike in the United States. *American Birds*. 35:754-757.

APPENDIX B (Continued)

Sauer, J.R., J.E. Hines, and J. Fallon. 2004. The North American Breeding Bird Survey, Results and Analysis 1966 - 2003. Version 2004.1. USGS Patuxent Wildlife Research Center, Laurel, Maryland.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Trochet, J., Ornithologist. E-mail correspondence, December 9, 2004.

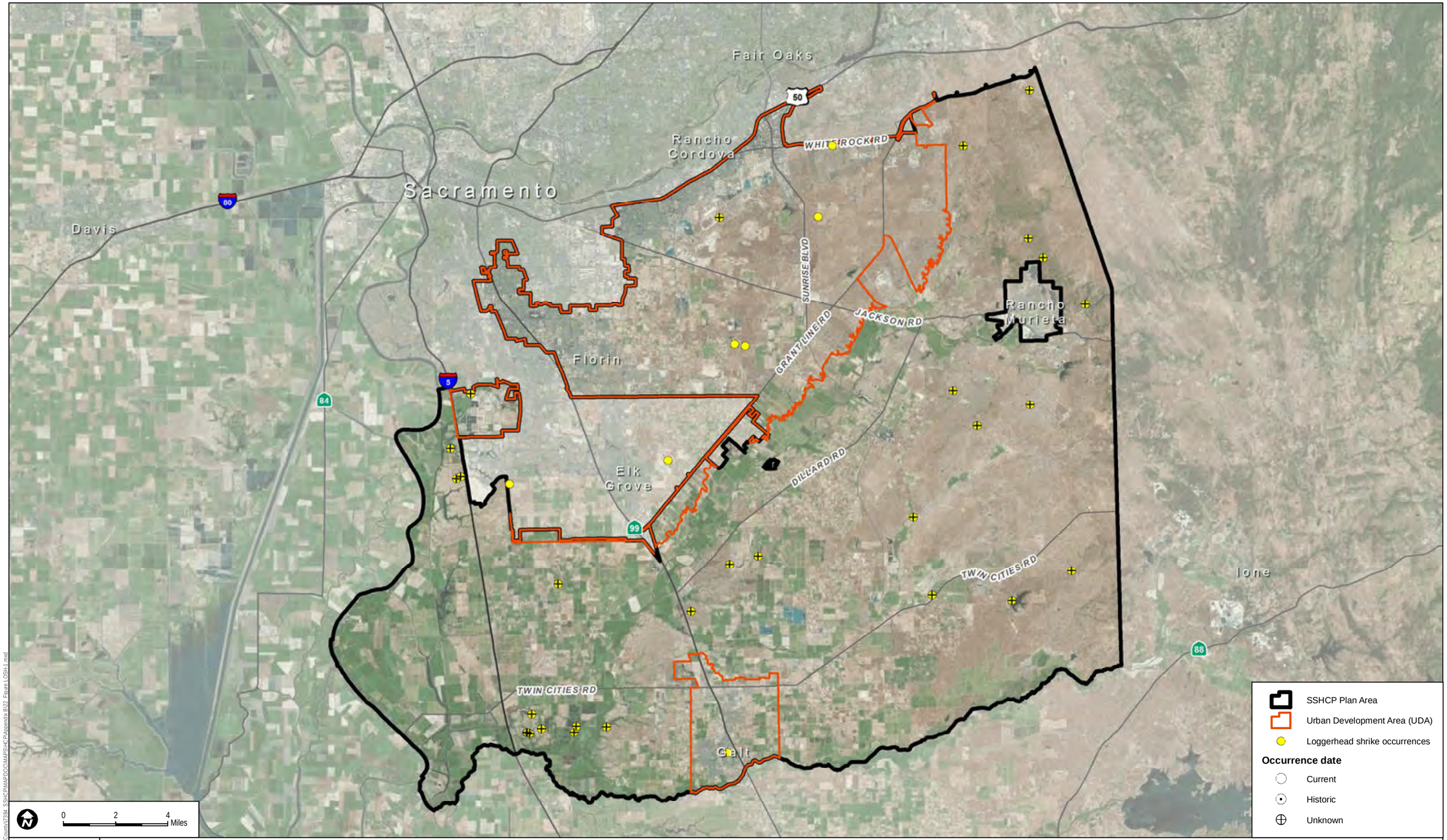
United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Available at http://migratorybirds.fws.gov/reports/bcc2002.pdf .

Yosef, R. and T.C. Grubb. 1993. Effect of vegetation height on hunting behavior and diet of loggerhead shrikes. *Condor* 95:127-131.

Yosef, R. and T.C. Grubb. 1994. Resource dependence and territory size in loggerhead shrikes. *Condor,* 95:127-131.

Yosef, R., 1996. Loggerhead Shrike (*Lanius ludovicianus*). In The Birds of North America, No. 231 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Zeiner, D. C., W. F Laudenslayer Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife: volume II: birds. California Department of Fish and Game. Sacramento, California.



SOURCE: Bing Maps, County of Sacramento 2012

FIGURE LOSH-1

Loggerhead Shrike Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\0284 SSHCP\MAPS\CMAPS\HCP\Planning\8\22_Figure LOSH-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX B (Continued)

27 WESTERN RED BAT (WRB)

Prepared by Heather L. Johnson

Western Red Bat (WRB)

(Lasiurus blossevillii)

Status USFWS: None

Status CDFG: Species of Special Concern



27.1 Legal Status

The western red bat (*Lasiurus blossevillii*) is considered a special animal by the California Department of Fish and Game (CDFG) (Bolster 1998). This status is based largely on the findings of the Western Bat Working Group (WBWG), which rates management concern for the western red bat as high priority, indicating that this species is imperiled or at high risk of imperilment (WBWG 1998).

27.2 Life History and Ecology

27.2.1 Species Description and Life History

The western red bat is a member of the taxonomic Order Chiroptera and Family Vespertilionidae, the largest of the three bat families present in California. The generic name *Lasiurus* may be translated as "hairy-tailed." Until 1988 the western red bat was considered a subspecies of *Lasiurus borealis* and was known as *L. b. teliotis* (Shump and Shump 1982). Current taxonomy recognizes the eastern red bat (*L. borealis*) and the western red bat (*L. blossevillii*; Baker et al. 1988) as full species.

27.2.1.1 Identification

This species is a medium-sized bat (six to 13 grams in the Sacramento Valley, Johnson unpubl. data) with long pointed wings (forearm 35 to 45 mm, Pierson et al. 2002) and a wingspan of 28 to 32 centimeters (Harvey et al. 1999). As its name suggests it is a distinctive rusty reddish color washed with white. The underparts are slightly paler. Color can vary from "a very distinct red to a yellow-brown" (Pierson et al. 2002). The wing membranes are black with orange demarcations along the fingers and the interfemoral membrane is heavily furred (bat species outside this genus usually have naked or partially furred tail membranes). Barbour and

Davis (1969) state that the tail is long and extends straight out in flight, which gives this bat a distinctive silhouette against the sky as compared to other species with shorter tails. The western red bat has short, broad, and rounded ears that do not extend much above the dorsal fur line (Barbour and Davis 1969). The tragus is triangular. The nose is plain and short. The feet are small, slender, and furred and there is fur on the wrists.

The western red bat is not likely to be confused with other species known to occur in Sacramento County due to its distinctive coloration; however, two congeners occur in California: the yellow bat (*L. xanthinus*) and hoary bat (*L. cinereus*). The northernmost known occurrences for the yellow bat are in Los Angeles and San Bernardino Counties (Constantine 1998). Therefore, this species is not expected to occur in Sacramento County. The hoary bat may occur in Sacramento County, but it is a larger bat (forearm 46 to 58 millimeters, Pierson et al. 2002), its fur is generally dark gray with whitish hair tips giving it a frosty appearance, and it has yellow fur around the face with black rimmed ears. Although *L. blossevillii* can appear somewhat frosted and have a yellowish tinge to its fur, it is never as dark nor as frosted as *L. cinereus*, nor as yellow as *L. xanthinus* (Pierson et al. 2002).

27.2.1.2 Life History

The life history of the western red bat centers on reproduction and meeting the energetic demands of a small insectivorous mammal. Several aspects of this species' life history are uncommon among bats in northern California, namely its roosting, social, reproductive, and migratory habits. The western red bat is solitary and roosts in foliage. During the day, it shelters on the underside of overhanging leaves. It most often roosts individually; however, females with dependent young roost together and multiple individuals are sometimes found in clusters during migration (e.g., roosting in the same tree). The western red bat uses torpor to conserve energy during the day when it is inactive (Shump and Shump 1982; Willis and Brigham 2001). It hangs by one foot in a compact position and it is thought that the furred tail membrane acts as a blanket. The fur on its feet and wrists and the overall thickness of the fur are adaptations to the greater exposure of its chosen roost sites.

This species makes north-south migrations in spring and fall that may be hundreds of miles. Cryan (2003) studied seasonal dispersal of the western red bat on a continental scale and stated that seasonal dispersal from California is apparently limited, and it is unclear if California populations mix with others to the south and east. During migration western red bats may form small groups (Constantine 1959), though males and females may travel separately (Barclay 1984). Western red bats may be year-round residents in the Bay Area (Orr 1950). During winter cold snaps the eastern red bat extends torpor (hibernates) and the western red bat may do so as well. Most of the life history traits of the eastern red bat and western red bat are assumed to be shared.

Pups are born from late spring to early summer (Pierson et al. 2002). Three pups are usual in a litter, but there may be as many as five (Allen 1939; Pierson et al. 2002). It is thought that red bats have more young than other bat species because their roosting habits in foliage expose them to greater predation. The literature contains numerous accounts of birds attacking red bats and their young (Allan 1947; Constantine 1959; Downing and Baldwin 1961; Elwell 1962; Hoffmeister and Downes 1964; Wilks and Laughlin 1961). The large number of pups seem especially burdensome to females because grounded mothers have often been found unable to fly due to the weight of the clinging pups (Allan 1947; Pearson pers. comm. 2004; Stains 1965). Western red bat pups are weaned between six to eight weeks of age when they have grown to adult size and are thus able to fly.

The only longevity record known for the western red bat is two years for an individual in captivity; however, this species does not adapt well to captivity (Pearson pers. comm. 2004). Potential predators of this species include jays (Allan 1947; Constantine 1959; Elwell 1962; Hoffmeister and Downes 1964), American crows (*Corvus brachyrhynchos*), American kestrels (*Falco sparverius*), hawks (*Buteo* spp.), owls (*Bubo* spp., *Asio* spp.) (Allen 1939), opossums (Sperry 1933), skunks (*Mephitis* spp.), weasels (*Mustela* spp.), rats (*Rattus* spp.), snakes (Allen 1939), and cats. Terrestrial predators may capture bats roosting in low-growing branches. Western red bats, like all mammals, can also contract the rabies virus. In addition, infected bats may be a vector for the disease before they die.

27.2.2 Habitat Requirements and Ecology

The western red bat occurs primarily in the low and middle elevations in broadleaf tree communities (Pierson et al. 1999). It is less abundant in mixed conifer forests. This species roosts in the foliage of large shrubs and trees in habitats bordering forests, rivers, agricultural areas, and urban areas (Harvey et al. 1999). Roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas with mature trees (WBWG 1998).

Pierson et al. (1999) describe roosting habitat as large diameter riparian cottonwoods and sycamores, and older orchard trees (particularly walnuts). Constantine (1958, 1959, 1966) studied red bats in California, Georgia, and Iowa. He found that roosts have the following attributes: protection from view from all directions except below; no obstructions below allowing the bat to drop downward to begin flight; no lower perches from which predatory birds or mammals can see or reach the bat; dark ground cover minimizing the reflection of sunlight; sufficient adjacent vegetation to break up wind currents and retard the distribution of dust; location on the south or southwest side of the tree; and height usually four to 10 feet above ground. The western red bat usually hangs from the leaf petiole, but occasionally hangs from a

twig or branch (Barbour and Davis 1969). Hanging from one foot it closely resembles a dead leaf and the wing markings are thought to add to the camouflage.

Foraging occurs in and amongst vegetation and regularly occurs over the same territory (Allen 1939). Foraging has been noted in habitats such as mature orchards, oak woodland, low elevation conifer forest, and non-native trees in urban and rural residential areas. In addition, this species may forage in habitats adjacent to streams and rivers that do not provide roosting habitat. No dietary information is available for western red bats in California (Pierson et al. 2002); however, eastern red bats prey on moths, flies, beetles, and tiny wasps (WBWG 1998). Western red bats may forage all night (perhaps males and nonreproductive females), but there is often an initial foraging period after sunset and a minor secondary activity period before sunrise that corresponds to periods of increased insect activity (WBWG 1998).

Habitat requirements in Sacramento County may include open water for drinking and foraging, undisturbed foliage roost sites that provide protection from predators, and structurally diverse vegetation that supports a diversity of insect prey. Water features are a vital habitat component because bats often drink immediately after emergence and water is an important source of concentrated insects. Studies by Pierson et al. (1999) comparing mature riparian habitat extending greater than 50 meters back from the Sacramento River to areas with less extensive or degraded habitat suggest that this species prefers the mature, extensive riparian habitat. Mature orchards with dense canopies provide alternate roosting sites and may provide foraging habitat (Pierson et al. 1999).

27.2.2.1 Essential Habitat Elements

Essential habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The essential habitat elements for western red bat are identified in Table WRB-1 and have been derived from input from local species experts.

Table WRB-1
Essential Habitat Elements for Western Red Bat

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, orchards, mixed riparian scrub, vernal impoundment, vernal pool, seasonal wetlands, seasonal impoundment, freshwater marsh, open water, and streams/creeks.	A variety of habitats including oak woodland and savanna, grassland, riparian areas, and wetlands are suitable foraging habitat. Nearby water features are a vital habitat component because bats typically have high water needs. Furthermore, water features are an important source of concentrated insects.

APPENDIX B (Continued)

Table WRB-1
Essential Habitat Elements for Western Red Bat

Essential Activities	Land Cover Types	Habitat Elements
Roosting	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, and mixed riparian woodland.	Roosts are provided by the foliage of large shrubs and trees in habitats bordering forests, rivers, agricultural areas, and urban areas Roosts have the following attributes: protection from view from all directions except below; no obstructions below allowing the bat to drop downward to begin flight; no lower perches from which predatory birds or mammals could see or reach the bat; dark ground cover minimizing the reflection of sunlight; sufficient adjacent vegetation to break up wind currents and retard the distribution of dust; location on the south or southwest side of the tree; and height usually 4-10 feet above ground.

27.3 Species Distribution and Population Trends

Anecdotal observations suggest that the historical abundance of eastern red bat and western red bat was likely much greater than at present (O'Shea et al. 2003). Carter et al. (2003) concluded that quantitative information concerning long-term population trends of solitary foliage roosting bats cannot be drawn from existing data because of the lack of standardized reporting and inability to determine the proportion of total population sampled. Carter et al. (2003) noted that indices of abundance such as submissions to health agencies for rabies testing and trends in habitat are the only present means to indirectly assess population trend.

27.3.1 Range Wide Distribution

The western red bat ranges from southern British Columbia south to Baja California and Mexico, and east to Wyoming (Hall 1981). This species regularly occurs in California, Arizona, New Mexico, and throughout western and central Mexico to South America (Baker et al. 1988; Cryan 2003; Hall 1981). The only known region where both red bat species overlap is in west Texas (WBWG 1998).

27.3.2 Central Valley Distribution

The western red bat occurs throughout the Central Valley in suitable habitat. Although its range includes much of western North America, the only areas with multiple records for breeding females are California river valleys west of the Sierra Nevada crest (Pierson et al. 1999). Breeding females appear to be highly associated with lower elevation riparian habitats, particularly relatively intact stands of cottonwood and sycamore in the Central Valley (Pierson et

al. in review, 2002). Cryan (2003) summarized capture data from California as follows "Males and females are together at lower elevations in California during winter (Grinnell 1918, Orr 1950) but segregate during spring and summer; females remain in lowland areas, whereas males apparently move to higher elevations (Grinnell 1918; Shump and Shump 1982)." Sutter County capture data is consistent with these findings (Johnson 2000).

The Museum of Vertebrate Zoology (MVZ) at the University of California Berkeley has museum specimens from Tehama, Sutter, Butte, Yolo, Yuba, Sacramento, Solano, San Joaquin, Merced, Madera, Fresno, Tulare, Kings, and Kern Counties. Specimens have also been collected in San Joaquin County in 1950 and 1987 and deposited in the California Academy of Sciences. Johnson (2000) captured western red bats in blue oak woodland in the Sutter Buttes, Sutter County. Roost sites have been found in orange and apricot orchards near Esparto and Rumsey, Yolo County (Constantine 1959).

The four MVZ records for Sacramento County are from the following locations: (1) Eddinger–Johnson Ranch south of Sacramento, (2) two miles northwest of Folsom, and (3) Sacramento (two specimens taken in 1952 and in 1990). A dead western red bat was found on a sidewalk in downtown Sacramento in 1995 (Johnson pers. obs.). In addition, from 1977 to 2002 at least 56 western red bats were submitted to the Sacramento County Public Health Laboratory (Constantine unpubl. data 2004). Though the California Natural Diversity Database (CNDDB) does not contain records for this species in Sacramento County (CDFG 2010), the CNDDB does provide scattered occurrence records for western red bat throughout California.

27.3.3 Range within the Plan Area

Western red bat records were obtained from the numerous bat specimens annually submitted for rabies testing to the Sacramento County Public Health Laboratory. Fifty-six records for the western red bat (1977 to 2002) varied in location precision from "Sacramento County" to "Sacramento" to an actual address (CDFG 2010). Over 30 western red bats were from localities reported as the City of Sacramento, Folsom, Rancho Cordova, Wilton, Elk Grove, or Galt (Constantine unpubl. data 2004). These specimens included females and immature individuals indicating the presence of a reproductive population. Further details are unavailable on most of the occurrence localities, but seven addresses were given for locations inside the Plan Area. Though a bat monitoring project conducted at the Cosumnes River Preserve has also detected western red bats, there has been no area-wide assessment of whether available habitats within the Plan Area provide appropriate roosting and foraging habitat for the species.

27.3.4 Population Levels and Trends

Estimates of historic and current population levels for the western red bat are currently unavailable; however, detailed information on the species, including population trends, should be available when a report on the distribution and status of the western red bat in California becomes available (Pierson et al. in review). More information may also become available as a result of the release of the revised Mammal Species of Special Concern by the CDFG (Brylski et al. in review).

In order to assess the trend of the species, long-term monitoring of both roosting and foraging habitat conducted over multiple years is needed. Biologists recognize that "most efforts at monitoring bat populations involve use of indices that are uncalibrated in relation to population size, do not incorporate measures of variation or detectability, are discontinuous in time and space, and sometimes lack standard protocols" (O'Shea et al. 2003). Roost count indices are typically used to monitor bat populations; however, aspects of the life history of the western red bat (i.e., roosting individually or in small groups in inconspicuous locations) make it especially difficult to study. Ball (2002) proposed that if land uses and bat habitat can be monitored simultaneously, patterns in the availability and condition of bat habitat will emerge to guide their management.

O'Shea et al. (2003) states that current estimates of the relative abundance of low density foliage roosting species come primarily from capture and echolocation-detector index measures. Pierson and Rainey (Stillwater Sciences et al. 2003) were able to infer western red bat roost locations, as well as migratory and foraging activity by observing riparian woodland at sunset and visually and acoustically monitoring bats as they emerged. Though the USGS has a report in press that may suggest improved methods for estimating numbers of bats with this type of life history (O'Shea and Bogan 2003), acoustic monitoring of foraging activity may be the primary available means of monitoring this species and assessing habitat condition.

27.4 Threats to the Species

Potential threats to the western red bat in the Plan Area include habitat removal, direct mortality, and increased predation. Furthermore, roosting habitat in riparian cottonwood and sycamore stands may be lost as result of reduced regeneration due to hydrological alteration of watersheds (WBWG 1998). Direct mortality may occur from pesticide use in orchards (WBWG 1998). Pierson et al. (2002) state "the intensive use of pesticides in fruit orchards may constitute a threat to roosting bats and may significantly reduce the amount of insect prey available." Although western red bats occur in urban and agricultural habitats, they may suffer higher levels of predation from the unnaturally high numbers of urban-tolerant species such as jays, crows,

opossums, and domestic cats that occur in and are concentrated in these habitats (Pierson et al. 2002; Johnson pers. obs.).

27.5 Data Gaps and Conservation

The ecology, status, and management of the western red bat have received increased attention in recent years; however, there are several sources of uncertainty regarding western red bat and its requirements in the Plan Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

27.5.1 Population and Habitat Distribution within the Plan Area

Western red bats occur in suitable habitat within the Plan Area. However, their overall distribution, abundance, and population structure are not well known. Land cover types used by western red bats occur throughout much of the Central Valley and are well represented in Sacramento County and the Plan Area.

Because comprehensive surveys for western red bat in the Plan Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and distribution of the species throughout the Plan Area are not known. In addition, though the distribution of different land cover types is mapped and quantifiable, the quality of habitat for western red bat within most of these areas is unknown. These information gaps limit our ability to identify the best lands available for preserving western red bat habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for western red bat will be considered relatively high in lands that support (or recently supported) known occurrences (particularly roost sites) or are adjacent to these areas.

27.5.2 Determining Threat Severity

Although it is unknown if western red bats have declined rangewide, most bats for which there is good data have shown population declines (particularly those species with limited roost sites and special roost site requirements). Activities that directly remove or replace suitable habitat (particularly roost sites) with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for western red bat in the Plan Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

27.5.3 Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Western Red Bat

Achieving the conservation goals and objectives for western red bat will require successful enhancement and restoration of suitable habitat that functions as both roosting and foraging habitat; however, whether restored or enhanced habitats can retain the structural attributes suitable for western red bat is unknown.

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for western red bat, then those lands would not support sustainable populations.

27.6 Literature Cited

Allan, P.F. 1947. Blue jay attacks red bats. Journal of Mammalogy 28(2):180.

Allen, G.M. 1939. Bats. Harvard University Press, Cambridge, Massachusetts, 368 p.

Baker, R.J., J.C. Patton, H.H. Genoways, and J.W. Bickham. 1988. Genic studies of *Lasiurus* (Chiroptera: Vespertilionidae). Occasional Papers of the Museum at Texas Tech University 117:1-15.

Ball, L.C. 2002. A strategy for describing and monitoring bat habitat. Journal of Wildlife Management 66(4):1148-1153.

Barbour, R.W., and W.H. Davis. 1969. Bats of America. University of Kentucky Press, Lexington, 285 pp.

Barclay, R.M.R. 1984. Observations on the migration, ecology and behaviour of bats at Delta Marsh, Manitoba. Canadian Field-Naturalist 98(3):331-336.

Bolster, B.C., editor. 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report prepared by P.V. Brylski, P.W. Collins, E.D. Pierson, W.E. Rainey and T.E. Kucera. Report submitted to California Department of Fish and Game Wildlife Management Division, Nongame Bird and Mammal Conservation Program for Contract No.FG3146WM. Accessed online May 12, 2010 at http://www.dfg.ca.gov/wildlife/nongame/ssc/docs/mammal/species/11.pdf.

Brylski, P.V., P.W. Collins, E.D. Pierson, W.E. Rainey, and T.E. Kucera. In Review. Mammal species of special concern in California. California Department of Fish and Game, Habitat Conservation Planning Branch, 1416 Ninth Street, Sacramento, California, 95814-5560.

APPENDIX B (Continued)

Carter, T.C., M.A. Menzel, and D.A. Saugey. 2003. Population trends of solitary foliage-roosting bats. *In* T. J. O'Shea and M. A. Bogan, editors. Monitoring trends in bat populations of the United States and territories: problems and prospects. United States Geological Survey, Biological Resources Division, Information and Technology Report. In press. Washington, D. C., USA.

Constantine, D.G. 1958. Ecological observations on lasiurine bats in Georgia. *Journal of Mammalogy* 39(1):64-70.

Constantine, D.G. 1959. Ecological observations on lasiurine bats in the north bay area of California. *Journal of Mammalogy* 40(1):13-15.

Constantine, D.G. 1966. Ecological observations on lasiruine bats in Iowa. *Journal of Mammalogy* 47(1):34-41.

Constantine, D.G. 1998. Range extensions of ten species of bats in California. *Bulletin of Southern California Academy of Sciences* 97(2):49-75.

Constantine, Denny G., D.V.M. Walnut Creek, California.

Cryan, P.M. 2003. Seasonal distribution of tree bats. *Journal of Mammalogy* 84(2):579-593.

Downing, S.C., and D.H. Baldwin. 1961. Sharp-shinned hawk preys on red bat. *Journal of Mammalogy* 42:540-541.

Elwell, A.S. 1962. Blue jay preys on young bats. *Journal of Mammalogy* 43(3):434.

Grinnell, H.W. 1918. A synopsis of the bats of California. *University of California Publications in Zoology* 17:223-404.

Hall, E.R. 1981. *The mammals of North America. Vol. 1*. John Wiley and Sons, New York. 600 pp.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. *Bats of the United States*. Arkansas Game and Fish Commission in cooperation with the U.S. Fish and Wildlife Service.

Hoffmeister, D.F., and W.L. Downes. 1964. Blue jays as predators of red bats. *Southwestern Naturalist* 9(2):102-109.

Johnson, H.L. 2000. Roosting and foraging ecology of bats in the Sutter Buttes, Sutter County, California. Unpublished Masters Thesis, California State University, Sacramento, 114 pp.

APPENDIX B (Continued)

O'Shea, T.J., and M.A. Bogan, editors. 2003. Monitoring trends in bat populations of the United States and territories: problems and prospects. United States Geological Survey, Biological Resources Division, Information and Technology Report. In press. Washington, D. C., USA.

O'Shea, T.J., M.A. Bogan, and L. E. Ellison. 2003. Monitoring trends in bat populations of the United States and territories: status of the science and recommendations for the future. *Wildlife Society Bulletin* 31(1):16-29.

Orr, R.T. 1950. Notes on the seasonal occurrence of red bats in San Francisco. *Journal of Mammalogy* 31(4):457-458.

Pearson, Marilyn. Wildlife Rehabilitator, Sacramento, California.

Pierson, E.D., P.W. Collins, W.E. Rainey, P.A. Heady, and C. J. Corben. 2002. Distribution, Status and Habitat Associations of Bat Species on Vandenberg Air Force Base, Santa Barbara County, California. Santa Barbara Museum of Natural History Technical Reports – No. 1

Pierson, E.D., W.E. Rainey, and C. Corben. 1999. [Abs.]. The western red bat, *Lasiurus blossevillii* – implications of distribution for conservation. *Bat Research News* 40(4):187.

Pierson, E.D., W.E. Rainey, and C. Corben. In Review. Distribution and status of red bats, *Lasiurus blossevillii* in California. Report to Species Conservation and Recovery Program, Habitat Conservation Planning Branch, California Department of Fish and Game, Sacramento, California. 40 pp.

Shump, K.A., and A.U. Shump. 1982. *Lasiurus borealis*. Mammalian Species No. 183, 1-6 pp.

Sperry, C.E. 1933. Opossum and skunk eat bats. *Journal of Mammalogy* 14:152-153.

Stains, H.J. 1965. Female red bat carrying four young. *Journal of Mammalogy* 46(2):333.

Stillwater Sciences and William Rainey, Elizabeth Pierson, and Chris Corben in consultation with Mary Power. 2003. Sacramento River Ecological Indicators Pilot Study. Berkeley, California.

Western Bat Working Group (WBWG). 1998. Species accounts: ecology, conservation, and management of western bat species. Western Bat Working Group Workshop, February 9-13, 1998, Reno, Nevada.

APPENDIX B (Continued)

Wilks, B.J., and H.E. Laughlin. 1961. Roadrunner preys on a bat. *Journal of Mammalogy* 42:98.

Willis, C.K.R., and R.M. Brigham. 2001. [Abs.] Daily torpor use by temperate insect-eating bats in natural roosts. *Bat Research News* 42(3):128-129.

APPENDIX B (Continued)

28 AMERICAN BADGER (AMB)

Prepared by Henderson Ecology and Planning (Steve Henderson)

American Badger (AMB)

(Taxidea taxus)

Status USFWS: None

Status CDFG: Species of Special Concern



28.1 Legal Status

American Badger (*Taxidea taxus*) is designated as a species of special concern by the California Department of Fish and Game (CDFG) (Williams 1986).

28.2 Life History and Ecology

28.2.1 Species Description and Life History

28.2.1.1 Physical Description

American Badgers are heavy-bodied, short-legged, grayish mammals that have a white medial stripe from the nose over the top of the head and down the back. Badgers have a black nose, white cheeks, and a black spot in front of each ear. Their feet are black with extremely long front claws. The belly and the short tail are yellowish (Burt and Grossenheider 1980).

28.2.1.2 Taxonomy

There are four described extant subspecies of *T. taxus* (Long 1973); two of these occur in California: *T. t. jeffersonii and T. t. berlandieri*. Long (1972) noted that some of these specimens from the Central Valley exhibit intermediate characters, suggesting intergradation (Williams 1986). According to Long (1973), Sacramento County is within the estimated range of *T. t. jeffersonii;* however, Kyle et al. (2004) shows Sacramento County within the range of *T. t. berlandieri.*

Generally *T. t. jeffersonii* occurs in the Coast Ranges, Sierra Nevada and northeast into Oregon, Washington, northern Nevada, Idaho, Colorado, Montana, and into Canada (Long 1973; Kyle et al. 2004). *T. t. jeffersonii* (Harlan) generally ranges in the better-watered areas of

California, including coastal areas, most of the Sierra Nevada, and most of the Great Basin Province (Williams 1986). This subspecies is generally larger and darker-colored and occurs in cooler, moister areas (Williams 1986). *T. t. berlandieri* ranges throughout the Central Valley and southern California, and east through Arizona, New Mexico, southern Nevada, and Texas (Kyle et al. 2004). *T. t. berlandieri* Baird ranges through the hotter, drier desert and grassland associations of southeastern California and the Central Valley and are generally smaller and lighter-colored.

28.2.1.3 Reproduction

Badgers mate in summer and early fall. Young are born in March to early April in burrows, and are raised by the female (Long 1973; Minta 1993). Natal burrows are dug typically in dry, sandy soil in areas with sparse overstory cover (Zeiner et al. 1990). Juveniles disperse approximately three to four months following birth (Minta 1993).

28.2.1.4 Survival and Longevity

In captivity, the typical and maximum reported longevity of badgers is 11 and 15.5 years, respectively (Long 1973). There are no known survival rates reported for badger populations.

28.2.1.5 Diet and Foraging

Badgers are mostly carnivorous and prey primarily on fossorial (i.e., digging) mammals, especially ground squirrels and pocket gophers (Whitaker 1989). Badgers dig their prey out of burrows. They also prey on reptiles, insects, worms, eggs, birds, and carrion. Badgers shift their diet seasonally and annually in response to prey availability (Zeiner et al. 1990).

28.2.1.6 Movement and Migration Patterns

American Badgers are nocturnal and diurnal, active year-round, and non-migratory (Long 1973; Zeiner et al. 1990). Dispersing young females may move greater than 32 miles, whereas males may move greater than 63 miles (Messick and Hornocker 1981).

28.2.1.7 Territoriality/Home Range

Badgers are solitary and exhibit a simple social structure (Lindzey 1982; Messick 1987; Minta 1993). Olfactory communication is well-developed in this species. Badgers mark their territories with urine, feces, and scent glands. Males appear more territorial than females (Minta 1993). Female and male home range sizes in Utah have been estimated at 338 to 751 acres and 1,327 to 1,549 acres, respectively (Lindzey 1978). In Idaho, female and male badger home ranges averaged 400 acres and 600 acres, respectively (Messick and Hornocker 1981). Minimum patch

size is 25 acres (Laudenslayer and Parisi 2007). Above 100 acres, area alone does not increase habitat suitability for an individual badger (Laudenslayer and Parisi 2007).

28.2.2 Habitat Requirements and Ecology

American Badger occurs in a variety of open habitats, including grasslands, shrublands, savannahs, and meadows. Factors that positively affect habitat suitability for badgers are food availability, presence of friable soils, and uncultivated ground (Williams 1986). Badgers dig their own burrows, and excavate their prey in friable soils. Badgers prey primarily on fossorial rodents, particularly ground squirrels. In Wyoming, badger density was correlated with ground squirrel density (Minta 1993). Accordingly, it is assumed that the quality of badger habitat in the Plan Area is closely and positively related to the occurrence and population viability of California ground squirrel (*Spermophilus beechyi*) in an area.

28.3 Species Distribution and Population Trends

28.3.1 Species Distribution

American Badger is distributed in North America from the south-central Canadian provinces south throughout the western and central United States, and south to central Mexico (Williams 1986). Its distribution does not include the eastern or southeastern United States.

28.3.2 Central Valley Distribution

In California, American Badger's range includes open habitat throughout the state, including the Central Valley. This species does not occur in the humid forests of northwestern California in Del Norte and northwestern Humboldt Counties (Williams 1986).

28.3.3 Range Within The Plan Area

The Plan Area is positioned within American Badger's range in California. American Badgers have been documented in the northeastern portion of the Plan Area (Figure AB-1); however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by badgers, including cropland (foraging), blue oak savanna, and valley grassland, occur throughout the Central Valley and are represented in Sacramento County and the Plan Area, particularly outside the Urban Development Area (UDA). Within suitable habitat in the Plan Area, the presence of badgers has not been established by extensive surveys. It is assumed that most of this habitat is not occupied.

There are few occurrence records of badger in Sacramento County and the Plan Area. There are four CNDDB records and one additional occurrence record (Trochet pers.comm.) within

Sacramento County, two of which are within the UDA (CDFG 2010). One occurrence record is within the City of Sacramento, south of Jackson Highway (State Hwy 16) near Power Inn Road and is presumed extant (CDFG 2010). Of the four occurrence records within the Plan Area, only one that is located in southeastern Rancho Cordova is extirpated (CDFG 2010). Trochet (pers. comm.) observed a badger at Valensin Ranch, Cosumnes River Preserve, in approximately 1997–1998. There is also a 1938 CNDDB record located north of Hood recorded within the Museum of Vertebrate Zoology (CDFG 2010; also reported in Williams 1986). Both of these occurrences are inside the Plan Area and outside the urban services boundary (USB). These records do not provide an estimate of the distribution or population size of American Badger, because they are based on a very small number of surveys in a limited area.

28.3.4 Population Levels and Trend

Although there is very little empirical information about American Badger population status and trends in California, badger populations have clearly declined or were extirpated in several areas of California (Williams 1986). Badger populations in some parts of the State may be stable; however, in the middle Central Valley, the population size and number of locations occupied by badgers have declined. The overall population decline and local extirpations in the middle Central Valley are probably greater than in any other portion of California (Larsen 1987).

28.4 Threats to the Species

The American badger is threatened by habitat conversion to urban and agricultural uses, farming operations, shooting and trapping, poisoning, and reduction of prey base as a result of rodent control activities (Williams 1986). Loss of prey species (through poisoning), fur harvesting, and mortality from vehicles are other likely contributors to the downward trend of this species (Apps et al. 2002; Newhouse and Kinley 2000; Scobie 2002). Furthermore, badgers have a history of persecution, and are often perceived by humans as a pest species, for which they are shot or poisoned (Rahme et al. 1995). Shooting and trapping may have been important factors in population declines historically (Williams 1986).

In California, the primary threat to American Badger is habitat loss and degradation as a result of urbanization, development, and agricultural conversion (Williams 1986; Neal and Cheeseman 1996). The conversion of pasture and grasslands to farmland has led to a decline in the number of badgers as suitable foraging and denning habitat is reduced.

Predator control with the usage of indiscriminate trapping and poisons have caused extensive loss (Ahlborn 2005). In some parts of the USA and Canada, badger numbers have declined because of indiscriminate “pest control” activities (traps set for coyotes, and poisons meant for

other predators), unregulated sport hunting, and trapping (some 50,000 badgers were taken every year for their fur in the 1970's, though this number fell to 20,000 in the 1980's) (Jackson 2010).

Vehicular accidents are also a major cause of badger mortality (USFS 2008). A peak in the number of road casualties occurs in February through March. According to the University of California at Davis California Roadkill Observation System (CROS), there were approximately 15 observed roadkills of American Badger reported in California between 2009 and 2010, out of approximately 4,000 reports of medium-sized mammals (i.e., skunks, raccoons, coyotes, jackrabbits, and foxes) (CROS 2010).

28.5 Data Gaps

Little research or monitoring has been conducted on the populations of the American Badger in California. As a result, many knowledge gaps exist with regard to the abundance, distribution and population trends of this species, as well as its behavior, habitat requirements, prey species, mortality factors and ecological role. The primary data gap for American Badger is lack of distributional data for the species within the Plan Area and throughout California. It is not feasible economically or temporally to survey the entire Plan Area. Some specific areas will need to be physically verified as to whether they support badger habitat and species presence. In addition, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve areas to assess their suitability and value as preservation habitats for this species.

28.6 Literature Cited

Ahlborn, G. 2005. American Badger (*Taxidea taxus*). California Wildlife Habitat Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group. Accessed online at: http://www.dfg.ca.gov/whdab/cwhr/A043.html.

Apps, C.D., N. J. Newhouse, and T.A. Kinley. 2002. Habitats associations of American badgers in southeastern British Columbia. *Canadian Journal of Zoology*, 80:1228-1239.

Burt, W. H., and R. P. Grossenheider. 1980. A field guide to the mammals. Houghton-Mifflin Co. New York, NY. 287 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Jackson, Steve. 2010. American Badger (*Taxidea taxus*) fact file. Accessed online April 27, 2010 at www.badgers.org.uk/badgerpages.

APPENDIX B (Continued)

Kyle, C.J., R.D. Weir, N.J. Newhouse, H. Davis, and C. Strobeck. 2004. Genetic Structure of Sensitive and Endangered Northwestern Badger Populations (*Taxidea taxus taxus* and *T. t. jeffersonii*). *Journal of Mammalogy*, Vol. 85, No. 4 (Aug., 2004), pp. 633-639.

Larsen, C. J. 1987. Badger distribution study. California Department of Fish and Game, Nongame Wildlife Investigations Report, Proj. W-65-R-4, Job I-11.

Laudenslayer, Jr., W.F. and M.D. Parisi. 2007. Species Notes for American Badger (*Taxidea taxus*): California Wildlife Habitat Relationships (CWHR) System Level II Model Prototype. California Department of Fish and Game, California Interagency Wildlife Task Group, October, 2007. Accessed April 27, 2010 online at http://www.dfg.ca.gov/biogeodata/cwhr/downloads/Level_II/Notes/II_American_Badger.pdf.

Lindzey, F. G. 1982. Badger, *Taxidea taxus*. Pp. 653–663 in Wild mammals of North America: biology, management, and economics (J. A. Chapman and G. A. Feldhamer, eds.). The Johns Hopkins University Press, Baltimore, Maryland.

Linzey, F. G. 1978. Movement patterns of badgers in northwestern Utah. *Journal of Wildlife Management*. 42:418-422.

Long, C. A. 1973. *Taxidea taxus*. Mammal. Species. No. 26. 4 pp.

Long, C. A. 1972. Taxonomic revision of the North American badger, *Taxidea taxus*. *Journal of Mammalogy*, 53:725_759.

Messick, J. P. 1987. North American badger. Pages 584-597 *in* M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, eds. Wild furbearer management and conservation in North America. Ontario Ministry of Nat. Resources.

Messick, J. P., and M. G. Hornocker. 1981. Ecology of the badger in southwestern Idaho. *Wildlife Monographs* 76:1-53.

Minta, S. C. 1993. Sexual differences in spatio-temporal interaction among badgers. Oecologia 96:402-409.

Neal, E., and C. Cheeseman. 1996. Badgers. T& AD Poyser, UK.

Newhouse, N.J. and T.A. Kinley. 2000. Update COSEWIC status report on the American badger *Taxidea taxus* in Canada. Pp. 1-26 in COSEWIC assessment and status report on the American badger *Taxidea taxus* in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ontario, Canada.

APPENDIX B (Continued)

Rahmea, A.H., A.S. Harestad and F.L. Bunnell. 1995. Status of the badger in British Columbia. British Columbia Ministry of Environment, Lands and Parks, Wildlife Working Report WR-72:1-51.

Scobie, D. 2002. Status of the American badger (*Taxidea taxus*) in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Division, and Alberta Conservation Association, Wildlife Status Report 43:1-17.

Trochet, J. Ornithologist. E-mail correspondence.

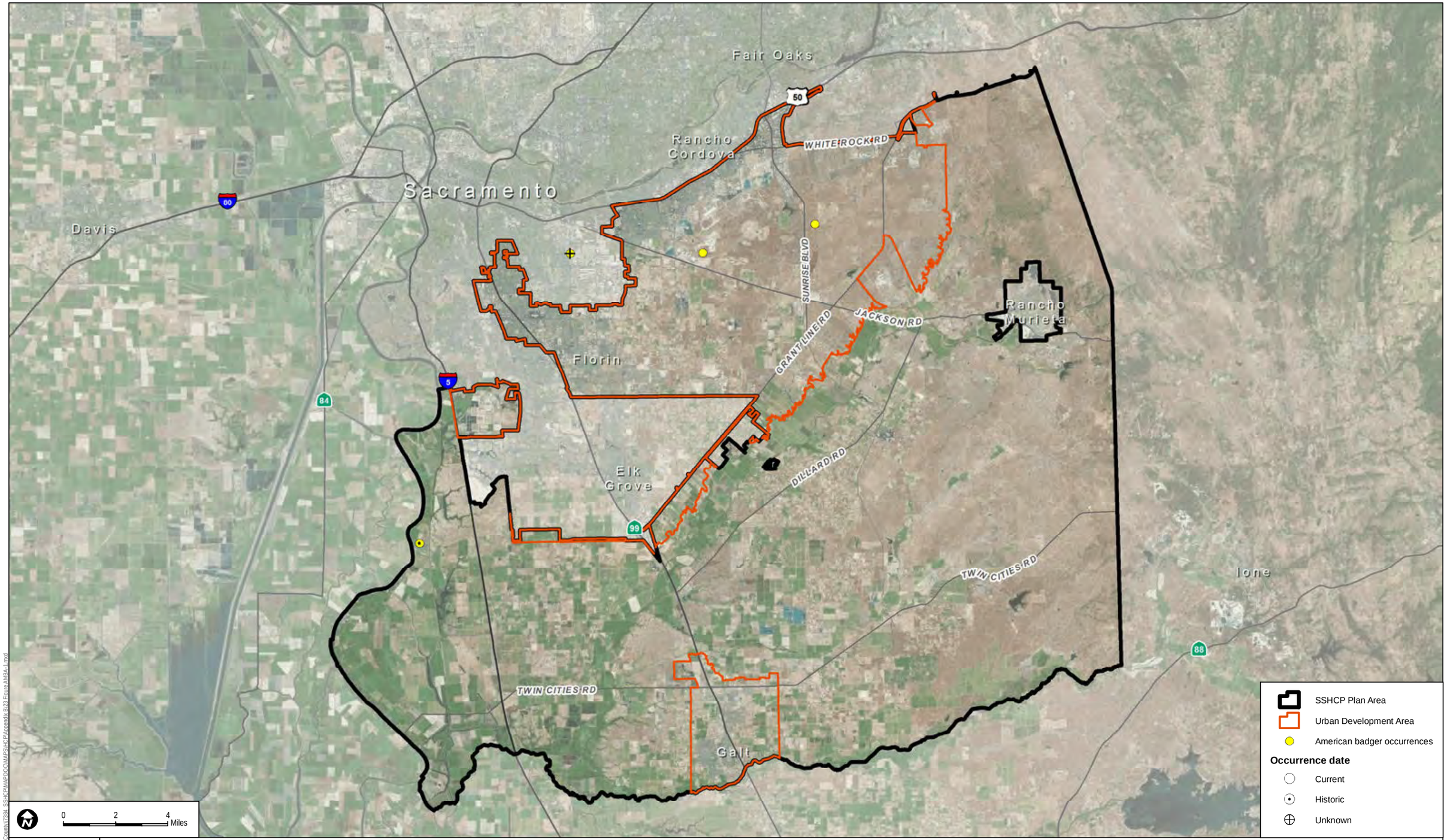
United States Forest Service (USFS). 2008. Species Accounts: Animals. Available online at: http://www.fs.fed.us/r5/scfpr/ projects/lmp/read.htm.

Williams, D. F. 1986. Mammalian Species of Special Concern in California, American Badger. California Department of Fish and Game, Sacramento. Admin. Rep. 86-1. 112 pp.

Zeiner, D. C., W. F. Laudenslayer, K. E. Mayer, and M. White. 1990. California's Wildlife: volume 3: mammals. California Department of Fish and Game. Sacramento, California.

APPENDIX B (Continued)

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012

FIGURE AMBA-1

American Badger Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

Path: Z:\Projects\Sacramento County\0294 SSHCP\MAPS\CMAPS\SHCP\Planning\fig 8\29 Figure AMBA-1.mxd

INTENTIONALLY LEFT BLANK

APPENDIX C

Implementing Agreement

FINAL

IMPLEMENTING AGREEMENT

for the

HABITAT CONSERVATION PLAN

for

SOUTH SACRAMENTO COUNTY

January 2018

South Sacramento Habitat Conservation Plan

1.0 PARTIES

The Parties to this Implementing Agreement are the County of Sacramento, City of Galt, City of Rancho Cordova, Sacramento County Water Agency, the Southeast Connector Joint Powers Authority and the SSHCP Implementing Entity (collectively the "Plan Permittees"), and the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) (collectively the "Parties").

2.0 RECITALS AND PURPOSE

2.1 Recitals.

2.1.1 The Plan Area, and in particular the Preserve System, has been determined to provide, or potentially provide, habitat for the Covered Species as defined in Section 3.

2.1.2 The Plan Area is currently used for a variety of purposes including the potential for development. Plan Permittees are desirous of undertaking a number of activities, including public, residential, commercial and industrial development activities as summarized in Section 5 within the Plan Area in a manner that is designed to avoid or minimize adverse impacts to the Covered Species. Additionally, Plan Permittees wish to undertake actions that would be beneficial to and contribute to the conservation of the Covered Species.

2.1.3 Plan Permittees have developed a series of measures, described in the South Sacramento Habitat Conservation Plan ("SSHCP", "Plan" or "HCP"), to minimize and mitigate to the maximum extent practicable the effects of Take of Covered Species incidental to Plan Permittees' Covered Activities.

2.2 Purpose. The purpose of this Agreement is to clarify the provisions of the SSHCP and the processes the Parties intend to follow to ensure successful implementation of the SSHCP in accordance with the Permit and applicable law.

3.0 DEFINITIONS

The following terms as used in this Agreement will have the meanings set forth below. Additional terms and acronyms are contained in Appendix A of the SSHCP:

3.1 Terms defined in Endangered Species Act or Implementing Regulations. Terms used in this Agreement and specifically defined in the Endangered Species Act ("ESA") or in regulations adopted by the USFWS under the ESA have the same meaning as in the ESA and those implementing regulations, unless this Agreement expressly provides otherwise.

3.2 Certificate of Inclusion. means a document other than a Development Authorization, executed by a Plan Permittee and a third party that extends the incidental Take authorization granted to Plan Permittees to such third party for the purpose of carrying out a

Covered Activity in the Plan Area. Execution of a Certificate of Inclusion by the third party places such third Party under the legal control of that Plan Permittee for purposes of enforcing and implementing the Permit, including the SSHCP and this Agreement. A Certificate of Inclusion template is attached to this agreement as Exhibit "C".

3.3 Changed Circumstances. means as defined in the "No Surprises" rule at 50 C.F.R. Section 17.3, means changes in circumstances affecting a Covered Species or the Plan Area covered by the SSHCP that can reasonably be anticipated by the Parties and that can reasonably be planned for in the SSHCP (e.g. the listing of a new species, or a fire or other natural catastrophic event in areas prone to such event.) Changed Circumstances and the planned responses to those circumstances are described in Chapter 11 of the SSHCP. Changed Circumstances are not Unforeseen Circumstances.

3.4 Covered Activities. means certain activities carried out by Plan Permittees in the Plan Area that may result in incidental Take of Covered Species that is authorized under the Permit. Covered Activities means the activities analyzed in detail in Chapter 5 of the SSHCP provided that these activities are otherwise lawful.

3.5 Covered Entity. means the recipient of a Development Authorization or a Certificate of Inclusion issued pursuant to the governmental powers of Plan Permittees.

3.6 Covered Species. means those 28 species within the Plan Area, each of which the SSHCP addresses in a manner sufficient to meet all of the criteria for issuing an incidental Take permit under ESA § 10(a)(1)(B). These species are discussed in Appendix B of the HCP and listed in Exhibit "A" to this Agreement.

3.7 Development Authorization. means a permit, lease, license, contract or similar written authorization issued pursuant to the governmental powers of Plan Permittees, under which the recipient has the right to engage in a Covered Activity and against whom Plan Permittees have the legal authority and has committed to enforce applicable terms of the Permit, including the SSHCP and this Agreement.

3.8 Effective Date. means the date following execution of this Agreement by the Parties, on which the Permit is issued. Any Plan Permittees executing this Agreement after the Effective Date shall, upon execution, become a Party to this Agreement, with all rights and obligations of Parties defined herein, and this Agreement shall be enforceable between each later executing Plan Permittees and all prior signing Parties.

3.9 HCP, Plan or SSHCP. means the South Sacramento Habitat Conservation Plan prepared by Plan Permittees as depicted on Figure 1-1 attached to the SSHCP.

3.10 Land Use Authority Permittee. means the County of Sacramento, and the Cities of Galt and Rancho Cordova.

3.11 Listed Species. means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is listed as endangered or threatened under the ESA.

3.12 Permit. means the incidental take permit issued by the USFWS to Plan Permittees pursuant to Section 10(a)(1)(B) of the ESA for Take of the Covered Species incidental to Covered Activities within the Plan Area, as it may be amended from time to time.

3.13 Plan Area. means the area in which all conservation actions will be implemented and generally where the Plan Permittees have Take Authorization for Covered Species and species habitat resulting from Covered Activities.

3.14 Plan Permittees. means the County of Sacramento ("County"), City of Galt ("Galt"), City of Rancho Cordova ("Rancho Cordova"), Sacramento County Water Agency ("SCWA"), the Southeast Connector Joint Powers Authority ("JPA") and the SSHCP Implementing Entity.

3.15 SSHCP Implementing Entity. means joint powers authority formed by the County and Cities to provide primary policy direction for implementation of the SSHCP, as set forth in Chapter 9 of the SSHCP.

3.16 Take. means as defined in the ESA and implementing regulations means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any listed or unlisted animal Covered Species. Harm means an act that actually kills or injures a Covered Species, including an act that causes significant habitat modification or degradation where it actually kills or injures a Covered Species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Take of plant species is not prohibited under the ESA; however, the plant species identified in Chapter 1 of the HCP and in Exhibit A of this Agreement are listed on the Permit as Covered Species in recognition of the conservation measures provided for such species under the plan and receive No Surprises Assurances under the Permit. For purposes of determining any outstanding mitigation owed upon termination of the Permit under Section 6 herein, Take includes impacts to Covered plant species.

3.17 Unforeseen Circumstances. means as defined in the "No Surprises" rule at 50 C.F.R. section 17.3 means changes in circumstances affecting a Covered Species or geographic area covered by the SSHCP that could not reasonably have been anticipated by Plan Permittees and the USFWS at the time of the SSHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species as addressed in Chapter 11 of the HCP.

3.18 Unlisted Species. means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is not listed as endangered or threatened under the ESA.

3.19 Other Terms. means any other capitalized term not otherwise defined herein shall carry the same meaning and definition as that term is used and defined in the SSHCP.

4.0 INCORPORATION OF HCP

Subject to Section 15.11 herein, the SSHCP and each of its provisions are intended to be, and by this reference are, incorporated herein. Notwithstanding such incorporation, it is acknowledged by the Parties that the HCP was drafted by the Plan Permittees and submitted to USFWS in support of the application for the Permit. Characterizations, analyses, and representations in the HCP, and in particular, characterizations, analyses and representations in the HCP of Federal or State laws, regulations and policies, represent the views of the Plan Permittees and shall not control the administration of the Permit by USFWS in accordance with Federal and State laws, regulations and policies. In the event of any inconsistency between the HCP and this Agreement, the provisions of the Agreement control. Similarly, in the event of any inconsistency between the HCP or Agreement and the Permit, the Permit controls.

5.0 OBLIGATIONS OF THE PARTIES

5.1 Obligations of Plan Permittees. Plan Permittees will fully and faithfully implement the Take minimization, mitigation and other requirements of the HCP, this Agreement and the Permit.

5.1.1 Mitigation Obligations. Plan Permittees will implement and fulfill the obligations described in Chapters 5 [Covered Activities], 7 [Conservation Strategy], 8 [Monitoring and Management], 9 [Implementation], 10 [Permit Application Process] and 12 [HCP Funding Program] of the SSHCP.

5.1.2 Interim Obligations upon a Finding of Unforeseen Circumstances. If the USFWS makes a finding of Unforeseen Circumstances, during the period necessary to determine the nature and location of additional or modified mitigation, Plan Permittees will avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected Covered Species.

5.1.3 Duty to enforce. Plan Permittees shall undertake all necessary actions to enforce all applicable terms of the HCP, this Agreement and the Permit as to itself, and any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued over which Plan Permittees have committed to enforce the terms of the HCP, this Agreement and the Permit. Any substantial non-compliance by Plan Permittees, or any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued may be deemed by USFWS a violation of the Permit by Plan Permittees. In addition, any failure by Plan Permittees to enforce the applicable provisions of the HCP, this Agreement or the Permit against itself, or any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued may be deemed by USFWS a non-compliance by Plan Permittees with the HCP, this Agreement or the Permit and a violation of the Permit by

Plan Permittees. USFWS shall take into account all efforts undertaken by Plan Permittees to enforce the terms of the HCP, this Agreement and the Permit as to itself, any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued and all actions taken by Plan Permittees to redress the effects of such non-compliance, particularly the enforcement efforts and redress actions specifically described in the HCP.

5.1.4 Changed Circumstances. Plan Permittees shall undertake all appropriate measures provided in Chapter 11 of the SSHCP to respond to Changed Circumstances.

5.1.5 Transfer of Preserve System. As set forth in more detail in Chapter 9, Plan Permittees may not transfer ownership or control, including fee title or a conservation easement, of any portion of the Preserve System, that is intended to stay within the Preserve System, to a third party, other than an agency of the Federal government, unless a conservation easement or equivalent legal protection, in a form approved by USFWS and which names USFWS as a third-party beneficiary, has been recorded. Nothing herein prohibits the sale of Preserve System land to a third party for non-conservation purposes if the USFWS and the SSHCP Implementing Entity find that the land is not supporting the Preserve System.

5.2 Obligations of the USFWS. Upon execution of this Agreement by each Party, and satisfaction of all other applicable legal requirements, the USFWS will issue Plan Permittees a permit under Section 10(a)(1)(B) of the ESA, authorizing incidental Take by Plan Permittees of each listed wildlife Covered Species resulting from Covered Activities in the Plan Area. The Permit will be conditioned on compliance with all terms and conditions of the Permit, including the HCP, this Agreement and applicable law.

5.2.1 Permit coverage. The Permit will identify all Covered Species. The Permit will take effect for listed Covered Species at the time the Permit is issued. Subject to compliance with all other terms of this Agreement, the Permit will take effect for an unlisted Covered Species upon the listing of such species. Any reference in this Agreement or in the HCP to incidental Take or Take of Covered Species shall, for the purpose of Covered plant Species include loss or impacts to Covered plant Species identified in the Permit.

5.2.2 "No surprises" assurances. Upon issuance of the Permit, Plan Permittees shall receive regulatory assurances pursuant to the "No Surprises" regulations at 50 C.F.R. 17.22(b) (5) and 17.32(b) (5). Pursuant to the "No Surprises" regulations, as long as Plan Permittees have complied with their obligations under the HCP, this Agreement, and the Permit, USFWS shall not require additional conservation and mitigation measures that involve the commitment of additional land, water, or financial compensation or additional restrictions on the use of land water or other natural resources otherwise available for development or use under the original terms of the HCP without the consent of Plan Permittees.

5.2.3 USFWS Cooperation and Assistance. USFWS shall cooperate and provide, to the extent appropriated funds are available for that purpose, technical assistance to the

Plan Permittees. Nothing in this Agreement shall require the USFWS to act in a manner contrary to the requirements of the Anti-Deficiency Act.

5.2.4 Assurances Regarding SSHCP. After opportunity for public review and comment, based on the best available current scientific and commercial data, the USFWS has found that the SSHCP, as implemented by this Agreement: 1) is consistent with and will complement other applicable conservation planning and regulatory programs and efforts addressing wildlife within the region, 2) minimizes and mitigates the potential significant adverse impacts of the Covered Activities on the Covered Species, 3) will ensure that the measures agreed upon by the Plan Permittees and the USFWS will be met, and 4) will be implemented. The USFWS shall not take a position inconsistent with the acknowledgments set forth in this section, including, without limitation, in the form of comments offered by the USFWS in the context of any CEQA or NEPA process associated with approvals for Covered Activities with regard to effects on Covered Species.

5.2.5 Take Authorization for Newly Regulated Covered Species; Savings Provision. Subject to compliance with all other terms of this Agreement, the Section 10(a) Permit will automatically become effective for each unlisted Covered Species upon the listing of such species as endangered or threatened under FESA. If it is judicially determined that the USFWS was not authorized to cause the Section 10(a) Permit to become effective automatically as to Covered Species as they become listed pursuant to FESA, the USFWS shall accept the minimization and mitigation measures in the SSHCP and this Agreement as the basis for an application for a Section 10(a) amendment or separate Section 10(a) Permits, Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712) ("MBTA") Permits, and/or other Take Authorizations. The USFWS shall use reasonable efforts to review and process the application expeditiously so as to ensure, provided the Permit amendment or application meets the requirements of the ESA and other applicable federal laws, that the Take Authorization is effective concurrently with the listing of the Covered Species under FESA. In issuing such Permits, amendments and/or Take Authorizations, and to the extent that such judicial determination creating the circumstances requiring such additional review and processing allows, the USFWS shall not request, impose, recommend or require further mitigation, conservation, compensation, enhancement or other protection for such Covered Species except as expressly provided in this Agreement.

5.2.6 Changes in the Environmental Laws. It is acknowledged and agreed by the USFWS that the Permittees are agreeing to perform substantial avoidance, minimization, mitigation, conservation and management measures as set forth in this Agreement. If a change in, or an addition to, any federal law governing or regulating the impacts of the Covered Activities on land, water or biological resources as they relate to Covered Species, including, but not limited to, ESA and NEPA, the USFWS shall give due consideration to the measures required under the SSHCP in applying the new laws and regulations to the Plan Permittees.

5.2.7 Section 7 Consultations. The USFWS will evaluate the direct, indirect, and cumulative effects of the Covered Activities in their internal ESA biological opinion issued in connection with the SSHCP and issuance of the Section 10(a) Permit. As a result, and to the maximum extent allowable, in any consultation under Section 7 of ESA subsequent to the Effective Date involving the Plan Permittee(s) or any entity or individual for which a Development Authorization or Special Participating Entity has been issued with regard to Covered Species and Covered Activities, the USFWS shall ensure that the ESA biological opinion issued in connection with the proposed project that is the subject of the consultation is consistent with the internal ESA biological opinion. Such project must be consistent with the terms and conditions of the SSHCP and this Agreement. Any reasonable and prudent measures included under the terms and conditions of an ESA biological opinion issued subsequent to the Effective Date with regard to the Covered Species and Covered Activities shall, to the maximum extent appropriate, be consistent with the implementation measures of the SSHCP and this Agreement. The USFWS shall not impose measures in excess of those that have been or will be required by the Plan Permittee(s) pursuant to the SSHCP and this Agreement. The USFWS shall process subsequent ESA consultations for Covered Activities in accordance with the process and time periods set forth in 50 Code of Federal Regulations, section 402.14. The Parties agree that this section does not create an independent cause of action.

5.2.8 Future Recovery Plans. Recovery plans under ESA delineate actions necessary to recover and protect federally listed species. These plans frequently include information, or may lead to the development of information, that can contribute to the development of an adaptive management program. However, recovery plans do not obligate any Plan Permittee, individual or entity to undertake specific tasks.

The Parties acknowledge that ESA recovery plans have no effect on the implementation of this SSHCP, except to the extent that they may contribute information to, or assist in achieving the goals of, the Plan's Adaptive Management provisions. Any recovery plan applicable to any Covered Species within the SSHCP Plan Area that is developed after the Effective Date shall:

A. Not require any additional land or financial compensation by Permittees;

B. Be finalized only after the USFWS has consulted with and requested input from the SSHCP Implementing Entity on the preparation of the recovery plan; and

C. Not in any way diminish the Take Authorization for Covered Species granted to Plan Permittees pursuant to the SSHCP, this Agreement, or the Section 10(a) Permit.

5.2.9 Migratory Bird Treaty Act. The Section 10(a) Permit shall constitute a Special Purpose Permit under 50 Code of Federal Regulations section 21.27, for the Take of

Covered Species Adequately Conserved listed under ESA and which are also listed under the MBTA, in the amount and/or number specified in the SSHCP, subject to the terms and conditions specified in the Section 10(a) Permit. Any such Take will not be in violation of the MBTA. The MBTA Special Purpose Permit will extend to Covered Species listed under ESA and also under the MBTA after the Effective Date of the Section 10(a) Permit. This Special Purpose Permit shall be valid for a period of three (3) years from its Effective Date, provided the Section 10(a) Permit remains in effect for such period. The Special Purpose Permit shall be renewed pursuant to the requirements of the MBTA, provided the Permittees remain in compliance with the terms of this Agreement and the Section 10(a) Permit. Each such renewal shall be valid for a period of three (3) years, provided that the Section 10(a) Permit remains in effect for such period.

6.0 TERM

6.1 Initial Term. This Agreement, the HCP, and the Permit will remain in effect for a period of fifty (50) years from the Effective Date of the original Permit. Notwithstanding the stated term, the Parties agree that preservation of the Preserve System shall be permanent.

6.2 Permit Renewal. Upon agreement of the Parties and in compliance with all applicable laws, the USFWS may extend the Permit beyond the initial term under the applicable regulations in force on the date of such extension. If the Plan Permittees desire to extend the Permit, they will so notify the USFWS at least four (4) months before the then-current term is scheduled to expire. Extension of the Permit constitutes extension of the SSHCP and this Agreement for the same amount of time, subject to any modifications agreed to by the Parties at the time of extension.

6.3 Surrender of the Permit. Any one or combination of Plan Permittees may withdraw from the Permit by surrendering the Permit to the USFWS in accordance with the regulations of the USFWS in force on the date of such surrender. (These regulations are currently codified at 50 CFR 17.22(b)(7) and 17.32(b)(7) and by their express terms apply in place of 50 CFR 13.26 to the extent of any conflict.

6.4 Procedure Applicable to Early Surrender of the Permit. If anyone or a combination of Plan Permittees elects to surrender the Permit before expiration of the full term, then in addition to surrendering the Permit, relevant Plan Permittees will provide a status report detailing the nature and amount of any incidental Take of the Covered Species, the minimization and mitigation measures provided for Take up through the date of early surrender, and the status of compliance with all other terms of the HCP. Within 90 days after receiving the surrendered Permit and a status report meeting the requirements of this paragraph, USFWS will use reasonable efforts to give written notice to the relevant Plan Permittees identifying all required outstanding mitigation and minimization measures.

6.5 Effect of Early Surrender. Upon the relevant Plan Permittee(s)' surrender of the Permit in accordance with Section 6.3, no further Take by relevant Plan Permittee(s) or any entity

or individual for which a Development Authorization has been issued by that Plan Permittee(s) shall be authorized under the terms of the Permit. Notwithstanding early surrender of the Permit, the relevant Plan Permittees shall implement each of the post-termination mitigation and minimization measures identified by USFWS in their written notice under Section 6.3, for any incidental Take of a Covered Species resulting from Covered Activities carried out in accordance with the Permit prior to the date of surrender, provided, however, that the post-termination mitigation and minimization measures identified by USFWS are subject to the voluntary dispute resolution procedure outlined in Section 14.2 herein. USFWS will only cancel the Permit upon determination that all applicable post-termination mitigation and minimization measures have been implemented. If prior to termination of the Permit, USFWS has approved the transfer of a portion of the Permit in accordance with all applicable statutory and regulatory requirements, then the transferred portion of the Permit shall remain in effect notwithstanding termination of the remaining portion.

7.0 SUSPENSION OR REVOCATION OF THE PERMIT

USFWS may suspend or revoke the Permit for cause in accordance with the laws and regulations in force at the time of such suspension or revocation. (The regulations governing permit suspension and revocation are currently codified at 50 CFR 13.27 (suspension) and 50 CFR 13.28, 17.22(b)(8) and 17.32(b)(8) (revocation). Suspension or revocation may apply to the entire Permit, or only to specified Covered Species, portions of the Plan Area or Covered Activities. Except where USFWS determines emergency action is necessary to avoid irreparable harm to a Covered Species, it will not suspend the Permit without first requesting the Plan Permittees to take appropriate remedial actions, if any such actions are available, and providing the Plan Permittees with written notice of the facts or conduct which may warrant the suspension, and an adequate and reasonable opportunity, including, where appropriate, use of the voluntary dispute resolution procedure outlined in Section 14.2, to demonstrate why suspension is not warranted.

7.1 Continuing Liability for Outstanding Mitigation. Notwithstanding revocation of the Permit, Plan Permittees affected by the suspension will remain liable for all incidental Take of Covered Species that occurred prior to revocation and shall fully implement all measures required under the HCP to minimize and mitigate for such Take. USFWS shall use their reasonable efforts to notify Plan Permittees in writing of all required outstanding minimization and mitigation measures within 90 days of permit revocation.

7.2 Other Rights and Authorities Not Affected. Nothing in this Section 7 prevents Plan Permittees from seeking review by a court of competent jurisdiction of any decision of the USFWS to revoke the Permit. Likewise, nothing in this Section affects or circumscribes the authority of USFWS to carry out their enforcement and other responsibilities under the ESA.

8.0 FUNDING

Plan Permittees warrant that they will expend SSHCP program funds as may be necessary to fulfill their obligations under the HCP. Plan Permittees will promptly notify the USFWS of

any material change in Plan Permittees' financial ability to fulfill its obligations. The funding program is set forth in detail in Chapter 12 of the SSHCP.

9.0 MONITORING AND REPORTING

9.1 Planned Periodic Reports. As described in the HCP, the SSHCP Implementing Entity will submit periodic reports describing their activities and results of the monitoring program provided for in the SSHCP. In accordance with Chapters 8 and 9 of the SSHCP, the SSHCP Implementing Entity will submit an annual report by April 1 of each year that describes for the reporting period the status of Covered Activities, the results of the required monitoring, any instances of noncompliance with the provisions of the HCP, actions taken to rectify the non-compliance, any problems under the HCP, and all other of the reporting requirements set forth in Chapters 8 and 9 of the SSHCP.

9.2 Other Reports. The SSHCP Implementing Entity, Plan Permittees, or both, as relevant, will provide, within 30 days of being requested by the USFWS if feasible, any additional information in their possession or control related to implementation of the SSHCP that is requested by the USFWS for the purpose of assessing whether the terms and conditions of the Permit, including the HCP, are being fully implemented.

9.3 Certification of Reports. All reports will include the following certification from a responsible company official who supervised or directed preparation of the report:

> I certify under penalty of law, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

9.4 Monitoring by USFWS. Plan Permittees acknowledge the necessity for USFWS to monitor compliance with the Permit and will cooperate fully in such monitoring. USFWS may conduct inspections and monitoring in connection with the Permit in accordance with its regulations. (See 50 C.F.R. § 13.21(e)(2))

10.0 CHANGED CIRCUMSTANCES

10.1 Plan Permittees-Initiated Response to Changed Circumstances. Plan Permittees will give notice to the USFWS after learning that any of the Changed Circumstances listed in Chapter 11 of the HCP have occurred. As soon as practicable thereafter, Plan Permittees will use best efforts to modify their activities in the manner described in Chapter 11 of the HCP, to the extent necessary to mitigate the effects of the Changed Circumstances on Covered Species, and will report to the USFWS on their actions. Plan Permittees will make such modifications without awaiting notice from the USFWS.

10.2 Service-Initiated Response to Changed Circumstances. If the USFWS determines that Changed Circumstances have occurred and that Plan Permittees have not responded in accordance with Chapter 11 of the HCP, the USFWS will so notify Plan Permittees and will direct Plan Permittees to make the required changes. Within 30 days after receiving such notice, Plan Permittees will make the required changes and report to the USFWS on their actions. If such actions are not feasible within this time frame, or if the Plan Permittees disagree with the direction from the USFWS, the SSHCP Implementing Entity will meet and confer with the USFWS. USFWS and the SSHCP Implementing Entity will use best efforts to develop a mutually agreeable action plan and schedule. Such changes are provided for in the HCP, and hence do not constitute Unforeseen Circumstances or require amendment of the Permit or HCP.

11.0 ADAPTIVE MANAGEMENT

11.1 Plan Permittees-Initiated Adaptive Management. Plan Permittees will implement the adaptive management provisions in Chapter 8 of the SSHCP, when changes in management practices are necessary to achieve the SSHCP's biological objectives, or to respond to monitoring results or new scientific information. Plan Permittees will make such changes without awaiting notice from the USFWS, and will report to the USFWS on any actions taken pursuant to this section.

11.2 Service-Initiated Adaptive Management. If the USFWS determines that one or more of the adaptive management provisions in the HCP have been triggered and that Plan Permittees have not changed their management practices in accordance with Chapter 8 of the SSHCP, the USFWS will so notify Plan Permittees and will direct Plan Permittees to make the required changes. Unless Plan Permittees invoke the voluntary dispute resolution procedure outlined in Section 14.2 to demonstrate why the required adaptive management changes are not warranted, Plan Permittees will make the required changes and report to the USFWS on their actions within 60 days after receiving such notice. Such changes are provided for in the HCP, and hence do not constitute Unforeseen Circumstances or require amendment of the Permit or HCP, except as provided in this section.

11.3 Reductions in Mitigation. Plan Permittees will not implement adaptive management changes that may result in less mitigation than provided for Covered Species under the original terms of the SSHCP, unless the USFWS first provides written approval. Plan Permittees may propose any such adaptive management changes by notice to the USFWS, specifying the adaptive management modifications proposed, the basis for them, including supporting data, and the anticipated effects on Covered Species, and other environmental impacts. Within 60 days of receiving such a notice, the USFWS will either approve the proposed adaptive management changes, approve them as modified by the USFWS, or notify Plan Permittees that the proposed changes constitute permit amendments that must be reviewed under Section 13.2 of this Agreement. If the USFWS has not responded within the 60 day period, the proposed adaptive management changes will be deemed approved.

11.4 No Increase in Take. This section does not authorize any modifications that would result in an increase in the amount and nature of Take, or increase the impacts of Take, on Covered Species beyond that analyzed under the original SSHCP and any amendments thereto. Any such modification must be reviewed as a permit amendment under Section 13.2 of this Agreement.

12.0 LAND TRANSACTIONS

12.1 Acquisition of Preserve System Lands. Land for the Preserve System will be acquired pursuant to Chapter 9 of the SSHCP.

12.2 Transfer of Preserve System Lands. Plan Permittees may not transfer ownership or control, including fee title or a conservation easement, of any portion of the Preserve System that is intended to stay within the Preserve System, to a third party, other than an agency of the Federal government, unless a conservation easement or equivalent legal protection, in a form approved by USFWS and which names USFWS as a third-party beneficiary, has been recorded pursuant to Section 5, above. Plan Permittees may transfer all or a portion of the Preserve System to an agency of the Federal government if, prior to the transfer, the USFWS determines in writing that the transfer will not compromise the effectiveness of the SSHCP based on adequate commitments by that agency regarding management of such land. Transfers of all or portions of the Preserve System under this section may be processed as minor modifications to the SSHCP in accordance with Section 13.1. Nothing herein prohibits the sale of Preserve System land to a third party for non-conservation purposes if the USFWS and the SSHCP Implementing Entity find that the land is not supporting the Preserve System.

13.0 MODIFICATIONS AND AMENDMENTS

13.1 Minor modifications.

13.1.1 Procedure. Either Plan Permittees or USFWS may propose minor modifications to the HCP or this Agreement by providing notice to all Parties. Such notice shall include a statement of the reason for the proposed modification and an analysis of its environmental effects, if any, including the effects of the proposed modification on operations under the SSHCP and on Covered Species. The other Parties will use reasonable efforts to respond to proposed modifications within 30 days of receipt of such notice. Proposed modifications will become effective upon the other Parties' written approval or shall be deemed approved by a Party if no response is received within 30 days of receipt of such notice. If USFWS determines that such modifications would result in operations under the SSHCP that are significantly different from those analyzed in connection with the SSHCP, adverse effects on the environment that are new or significantly different from those analyzed in connection with the SSHCP, or additional Take not analyzed in connection with the SSHCP, it may be processed as an amendment of the Permit in accordance with Section 13.2 of this Agreement. Parties may also institute the Dispute Resolution process set forth in Section 14.2 of this Agreement to resolve the objection.

13.1.2 Subject Matter of Minor Modifications. Subject to Section 13.1.1, Minor modifications to the HCP and Agreement processed pursuant to this subsection may include but are not limited to Chapter 9.10.2 of the SSHCP.

13.1.3 Other Proposed Changes to HCP or Agreement. Except for Administrative Revisions described in Chapter 9.10.1 of the SSHCP, any other proposed modifications to the SSHCP or Agreement will be processed as amendments of the Permit in accordance with Section 13.2 of this Agreement.

13.2 Amendment of the Permit. The Permit may be amended in accordance with all applicable legal requirements, including but not limited to the ESA, the National Environmental Policy Act, and the USFWS' permit regulations. In addition, the Party seeking to amend the Permit shall provide a statement of the reasons for the amendment and an analysis of its environmental effects, including its effects on operations under the HCP and on Covered Species. The Party seeking to amend the Permit shall follow the procedures outlined in Chapter 9 of the SSHCP.

13.3 Amendment of this Agreement. In addition to other approval requirements identified in this Section that may apply, this Agreement may only be amended consistent with the ESA and with the written consent of each Party.

14.0 ENFORCEMENT OF PERMIT AND DISPUTE RESOLUTION

14.1 General Authorities and Legal Rights. Nothing contained in this Agreement is intended to, or shall, limit the authority of the United States government to seek civil or criminal penalties or otherwise fulfill its enforcement and other responsibilities under the ESA or other applicable federal law. Nothing contained in this Agreement limits the rights of the Plan Permittees under applicable federal or state law to seek redress against the USFWS as otherwise permitted by law.

14.2 Dispute Resolution. The Parties recognize that disputes concerning implementation of, compliance with, or termination of the Permit, including the SSHCP and this Agreement may arise from time to time. The Parties will work together in good faith to resolve such disputes, and may use the informal dispute resolution procedures set forth in Section 14.2.1, or such other procedures upon which the Parties may adopt. However, if at any time, any Party determines that circumstances so warrant, it may seek any available administrative or judicial remedy without engaging in or waiting to complete informal dispute resolution.

14.2.1 Informal Dispute Resolution Process. Unless the Parties elect another dispute resolution process, or unless a Party has initiated administrative proceedings or suit in Federal court, the Parties may use the following process to attempt to resolve disputes:

(a) The USFWS will notify the Plan Permittees of the alleged non-compliance with, or violation of the Permit, including the HCP and this Agreement, the basis for

contending that the non-compliance or violation has occurred, and the remedies the USFWS proposes to correct the alleged non-compliance or violation. Where Plan Permittees allege that USFWS's alleged reasons for non-compliance or violation of the Permit, including HCP implementation, is inconsistent with the terms of the SSHCP, this Agreement and/or the Permit, Plan Permittees will notify USFWS of their objection, the basis for the objection and the manner in which Plan Permittees believe the SSHCP, Agreement and/or Permit should be interpreted and implemented.

(b) The notified Party will have 60 days, or such other time as may be agreed to by the Parties, to respond. During this time either Party may seek clarification of the information provided in the initial notice. The Parties will use reasonable efforts to provide any information then available that may be responsive to such inquiries.

(c) Within 30 days after such response is provided or is due, representatives from each Party will meet and negotiate in good faith toward a solution satisfactory to both Parties, or will establish a specific process and timetable to seek such a solution.

(d) If any issues cannot be resolved through such negotiations, the Parties may consider non-binding mediation and other alternative dispute resolution processes and, if a dispute resolution process is agreed upon, will make good faith efforts to resolve all remaining issues through that process.

15.0 MISCELLANEOUS PROVISIONS

15.1 No Partnership. Neither this Agreement nor the HCP shall make or be deemed to make any Party to this Agreement the agent for or the partner of any other Party.

15.2 Notices. Any notice permitted or required by this Agreement shall be in writing, delivered personally, or by overnight mail, to the persons listed below, or shall be deemed given five (5) days after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as follows, or at such other address as any Party may from time to time specify to the other Party in writing. Notices may be delivered by facsimile or other electronic means, provided that they are also delivered personally or by overnight or certified mail. Notices shall be transmitted so that they are received within the specified deadlines.

Deputy Manager
United States Fish and Wildlife Service
California/Nevada Operations Office
2800 Cottage Way, Room W-2606
Sacramento, California 95825
Telephone: 916-414-6464
Telefax: 916-414-6486

California Department of Fish and Wildlife Service
[Plan Permittees Address]
Telephone:
Telefax:

County of Sacramento
[Plan Permittees Address]
Telephone:
Telefax:

City of Galt
[Plan Permittees Address]
Telephone:
Telefax:

City of Rancho Cordova
[Plan Permittees Address]
Telephone:
Telefax:

Sacramento County Water Agency
[Plan Permittees Address]
Telephone:
Telefax:

Southeast Connector Joint Powers Authority
[Plan Permittees Address]
Telephone:
Telefax:

SSHCP Implementing Entity
[Plan Permittees Address]
Telephone:
Telefax:

15.3 Availability of Funds. Implementation of this Agreement and the HCP by the USFWS is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. The Parties acknowledge that the USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

15.4 Duplicate Originals. This Agreement may be executed in any number of duplicate originals. Each Party shall maintain in their records a complete original of this Agreement.

15.5 No Third-Party Beneficiaries. Without limiting the applicability of rights granted to the public pursuant to the ESA or other federal law, this Agreement shall not create any right or interest in the public, or any member thereof, as a third-Party beneficiary hereof, nor shall this Agreement be construed to authorize anyone to maintain a suit for personal injuries or damages or any other cause of action pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third parties shall remain as imposed under existing law.

15.6 Relationship to the ESA and Other Authorities. The terms of this Agreement shall be construed in accordance with the ESA and applicable federal law. Nothing in this Agreement is intended to limit or diminish the legal obligations and responsibilities of the USFWS as an agency of the federal government.

15.7 References to Regulations. Any reference in this Agreement, the HCP, or the Permit to any regulation or rule of the USFWS shall be deemed to be a reference to such regulation or rule in existence at the time an action is taken.

15.8 Applicable Laws. All activities undertaken pursuant to this Agreement, the HCP, or the Permit must be in compliance with all applicable state and federal laws and regulations.

15.9 Successors and Assigns. This Agreement shall be incorporated as a term and condition of the Permit. Assignment or other transfer of the Permit shall be governed by the USFWS' regulations in force at the time.

15.10 Permit Renewal. The Permit may be extended or renewed in accordance with all applicable laws and regulations in force at the time such action is initiated.

15.11 Agreement not an Enforceable Contract. Notwithstanding any language to the contrary in this Agreement, this Agreement is not intended to create, and shall not be construed to create an enforceable contract between the USFWS and Plan Permittees under the law with regard to the Permit or otherwise and none of the Parties to this Agreement shall be liable in damages to any other Party or any other third party or person for any performance or failure to perform any obligation identified in this Agreement. The sole purposes of this Agreement as between the USFWS and Plan Permittees are to clarify the provisions of the HCP and the processes the Parties intend to follow to ensure the successful implementation of the HCP in accordance with the Permit and applicable Federal law.

15.12 Compliance with the California Environmental Quality Act (CEQA). The Parties agree that the Plan provides extensive analysis and mitigation for the protection of Covered Species. For this reason, the Parties agree that compliance with the SSHCP constitutes full mitigation for impacts to Covered Species under the California Environmental Quality Act (CEQA) for Covered Activities. Nothing in this Section negates the requirement for full

compliance with CEQA for Covered Activities, as determined by the applicable Plan Permittee.

15.13 Annexation and Deannexation of Lands. Each of the Plan Permittees shall enforce the terms of the Plan, the Permit, and this Agreement as to all individuals or entities subject to its jurisdiction, including lands in the Plan Area annexed into the Plan Permittees' jurisdictions after the Effective Date of this Agreement provided the Minor Modification requirements of Section 13.1 of this Agreement have been met. Any land annexed into the Plan Area shall receive Take Authorization pursuant to the Permit provided the Minor Modification requirements of Section 13.1 of this Agreement have been met. If the Minor Modification requirements cannot be met, a Permit Amendment will be required.

In the event of the annexation or deannexation of any land within the Plan Area to another jurisdiction that is not a Plan Permittee, the Parties shall seek to enter into an agreement between the Plan Permittees, the Local Agency Formation Commission ("LAFCO"), the annexing or deannexing jurisdiction and the USFWS as part of the annexation process to ensure that any development of the annexed lands proceeds in accordance with the conservation goals of the SSHCP. If an agreement can be reached, that jurisdiction shall become a Plan Permittee after executing an addendum to this Agreement and complying with Section 9.10.3 of the SSHCP.. If an agreement cannot be reached, or if the SSHCP requirements are not imposed as a condition of annexation by LAFCO, then the annexed or deannexed land will not receive Take Authorization pursuant to the Permit, the SSHCP or this Agreement. Additionally, such annexation or deannexation may result in the revocation or suspension of the Permits pursuant to Section 7.0 of this Agreement. Parties within such annexed or deannexed land that qualify as Participating Special Entities may receive Take Authorization.

15.14 Incorporation of New Cities within SSHCP Boundaries. During the term of the SSHCP, and after the Effective Date, one or more new cities may be incorporated within the Plan Area. Such newly incorporated cities, upon execution of an Implementing Agreement with the USFWS substantially similar in form to this Agreement, shall receive Take Authorization pursuant to the Permit and all other rights and obligations granted by the Permit, the SSHCP and this Agreement. Incorporation of a new city within the Plan Area shall constitute a Minor Modification and shall be processed as such pursuant to Section 13.1 of this Agreement. In the event a newly incorporated city fails to participate in the SSHCP, the Permit may be revoked or suspended as set forth in Section 7.0 of this Agreement.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Implementing Agreement.

BY _____ Date _____

[insert USFWS official who will sign the permit]
Deputy Manager
United States Fish and Wildlife Service, Region 8
Sacramento, California

BY _____ Date _____
Deputy Director
Habitat Conservation Division
California Department of Fish and Wildlife
Sacramento, California

BY _____ Date_____
[Name], Chair]
County of Sacramento

BY _____ Date_____
[Name], Mayor
City of Galt

BY _____ Date_____
[Name], Mayor
City of Rancho Cordova

BY _____ Date_____
[Name], Chair
Sacramento County Water Agency

BY _____ Date_____
[Name], Chair
Southeast Connector Joint Powers Authority

BY _____ Date_____
[Name], Chair
SSHCP Implementing Entity

Exhibit A
Covered Species and Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Invertebrates			
Lepidurus packardi Vernal pool tadpole shrimp	E*	—	—
Branchinecta lynchi Vernal pool fairy shrimp	T*	—	—
Branchinecta mesovallensis Mid-valley fairy shrimp	—	—	—
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	T	—	—
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	—	—	—
Amphibians			
Ambystoma californiense California tiger salamander, (Central Valley population)	T*	T	—
Spea hammondii Western spadefoot	—	CSC	—
Reptiles			
Actinemys marmorata Western pond turtle	—	CSC	—
Thamnophis gigas Giant gartersnake	T	T	—
Birds			
Accipiter cooperii Cooper's hawk	—	WL	—
Agelaius tricolor Tricolored blackbird	BCC	T (Emergency Listed)	—
Athene cunicularia hypugea Western burrowing owl	BCC	CSC	—
Buteo regalis Ferruginous hawk	BCC	—	—
Buteo swainsoni Swainson's hawk	BCC	T	—
Circus cyaneus Northern harrier	—	CSC	—
Elanus leucurus White-tailed kite	—	CFP	—
Grus canadensis tabida Greater sandhill crane	—	T; CFP	—
Lanius ludovicianus Loggerhead shrike	BCC	CSC	—
Mammals			
Lasiurus blossevillii Western red bat	—	CSC	—
Taxidea taxus American badger	—	CSC	—

Exhibit A
Covered Species and Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Plants			
Downingia pusilla Dwarf downingia	—	—	2.2
Gratiola heterosepala Boggs Lake hedge-hyssop	—	E	1B.2
Juncus leiospemus var. *ahartii* Ahart's dwarf rush	—	—	1B.2
Legenere limosa Legenere	—	—	1B.1
Navarretia myserii Pincushion navarretia	—	—	1B.1
Orcuttia tenuis Slender Orcutt grass	T*	E	1B.1
Orcuttia viscida Sacramento Orcutt grass	E*	E	1B.1
Sagittaria sanfordii Sanford's arrowhead	—	—	1B.2

Status Definitions

Federal:

E = Listed as endangered under the federal ESA
T = Listed as threatened under the federal ESA
* = Species has designated Critical Habitat located within the Plan Area.
— = No federal ESA listing
BCC = Bird of Conservation Concern, USFWS 2008.

State:

E = Listed as endangered under CESA
T = Listed as threatened under CESA
CFP = Fully protected under the California Fish and Game Code
CSC = Species of special concern in California
WL = Watch List
— = No state status

California Rare Plant Rank (CRPR)

1B = Rare, threatened, or endangered in California and elsewhere
2 = Rare, threatened, or endangered in California but more common elsewhere

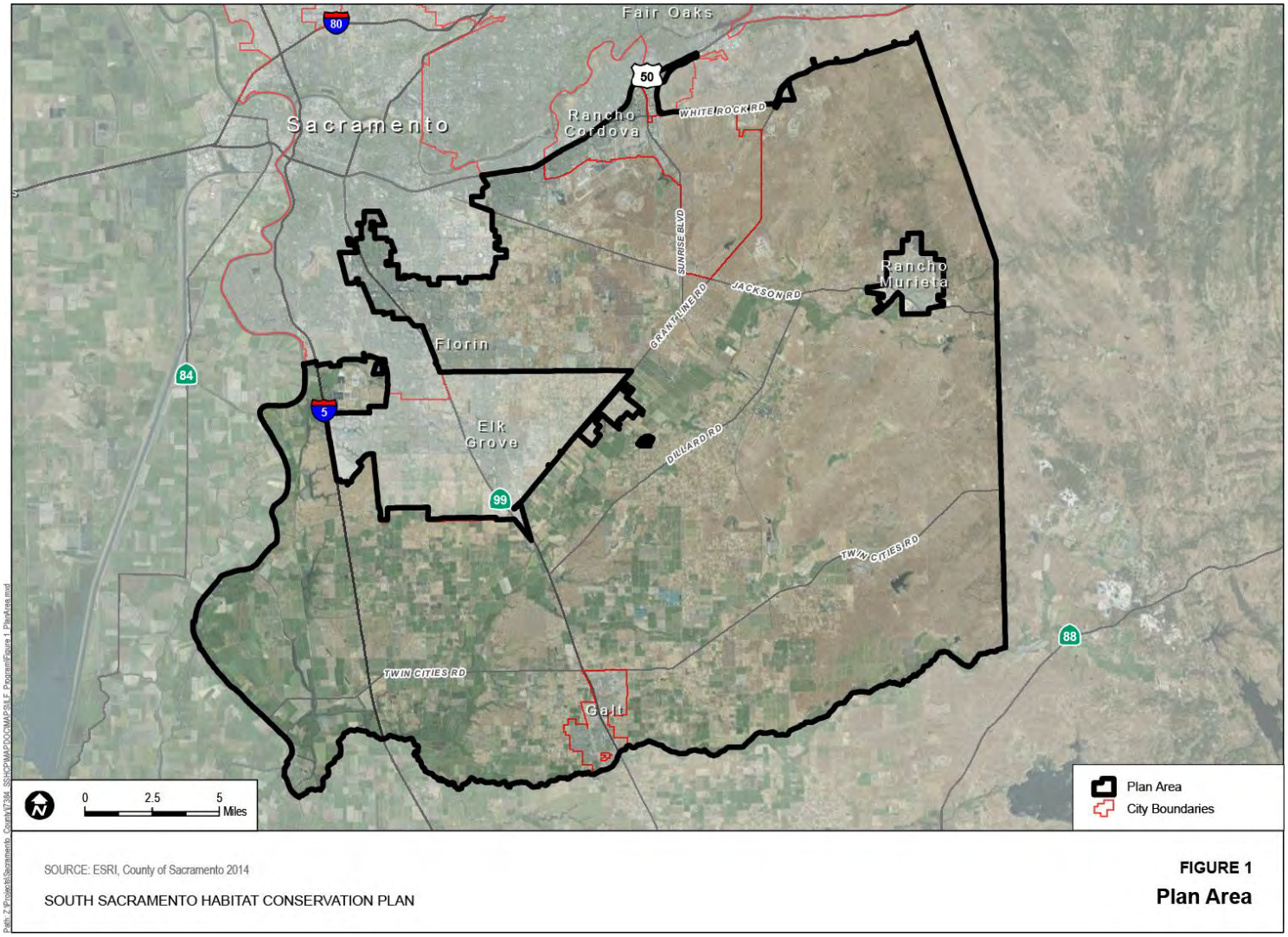
CRPR Threat Ranks

0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

South Sacramento Habitat Conservation Plan

Exhibit B

Map of Plan Area



South Sacramento Habitat Conservation Plan

Exhibit C

Certificate of Inclusion

APPENDIX D

Sample Easements

APPENDIX D1

Sample Conservation Easement

APPENDIX D1
Sample Conservation Easement

Recording requested, and when recorded, return to: South Sacramento Conservation Agency Street Address City, State, Zip Attn: Executive Director	

(space above this line reserved for recorder's use)

SAMPLE CONSERVATION EASEMENT DEED AND AGREEMENT CREATING ENFORCEABLE RESTRICTIONS IN PERPETUITY

CONSERVATION EASEMENT DEED

THIS GRANT DEED OF HABITAT CONSERVATION EASEMENT (the "Grant") is made as of _____ ___, 20XX by and between the _____, a _____, as "Grantor" and the South Sacramento Conservation Agency, a California nonprofit public benefit corporation, as "Grantee."

RECITALS

A. Grantor owns real property consisting of approximately _____ acres, in Sacramento County, California, as described in Exhibit A and shown more particularly on the map attached as Exhibit B, attached hereto and incorporated herein, which together with all appurtenances thereto, including without limitation all mineral and mineral rights, if any, and all water and water rights appurtenant to such land (collectively, the "Property").

B. The Property possesses wildlife and habitat values of great importance to Grantor, Grantee, the people of the State of California and the people of the United States. The Property will provide high quality natural habitat for [***specify plant and/or animal species***] and contain [***list habitats; native and/or non-native***], [***include the following phrase only if there are jurisdictional wetlands:*** and restored, created, enhanced and/or preserved jurisdictional waters of the United States]. Individually and collectively, these wildlife and habitat values comprise the "Conservation Values" of the Property.

C. The Property is comprised of open space land, , which also provide essential habitat for South Sacramento Habitat Conservation Plan (SSHCP) Covered Species, and other significant relatively natural habitat and buffer for many species of wildlife.

APPENDIX D1 (Continued)

D. Protection and preservation of the Property, including its wildlife habitat, shall assure that this area and its existing features shall continue to be available for SSHCP Covered Species and other natural habitat values and buffer for wildlife, a significant public benefit by preserving open space against development pressure, and scenic qualities.

E. As fee owner, Grantor owns the affirmative rights to identify, preserve, and protect forever the existing features and Conservation Values of the Property.

F. _____, a _____, paid for the acquisition of this Conservation Easement Deed for Agricultural Land and Agreement Creating Enforceable Restrictions in Perpetuity from Grantor and provided _____ Dollars ($_____) in management funds to Grantee to satisfy mitigation requirements imposed by the South Sacramento Habitat Conservation Plan (SSHCP), Plan Participant _____ (the "Plan Participant").

G. The State of California recognizes the public importance and validity of habitat conservation easements by enactment of Section 815 et seq. of the California Civil Code, and Grantee is an entity qualified under such Civil Code provisions to hold conservation easements.

H. Grantee is authorized to hold conservation easements pursuant to California Civil Code §815.3 and, as relevant to tax-exempt non-profit organizations, §501(c)(3) of the Internal Revenue Code.

I. To accomplish all of the aforementioned purposes, Grantor intends to convey to Grantee, and Grantee intends to obtain from Grantor, a Conservation Easement over a portion of the Property (the 'Easement Area"). The Easement Area is more particularly described in Exhibit C attached hereto and incorporated herein and depicted on the map in Exhibit D attached hereto to and incorporated herein (the "Easement Area Map") restricting the use which may be made of the Property to preserve and protect forever the agricultural, open-space, foraging and/or nesting habitat for SSHCP Covered Species and other wildlife habitat and scenic values of the Property.

COVENANTS, TERMS, CONDITIONS AND RESTRICTIONS

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and pursuant to the laws of the United States and the State of California, including California Civil Code Section 815, *et seq.*, Grantor hereby voluntarily grants and conveys to Grantee a conservation easement in perpetuity over the Property.

1. Purposes.

The purposes of this Conservation Easement are to ensure that the Property will be retained forever in its natural, restored, or enhanced condition and to prevent any use of the Property that will impair or interfere with the Conservation Values of the Property. Grantor intends that this Conservation Easement will confine the use of the Property to activities that are consistent with such purposes, including, without limitation, those involving the preservation, restoration and enhancement of native species and their habitats.

APPENDIX D1 (Continued)

2. Easement Documentation Report.

The parties acknowledge that a Preserve Documentation Report (the "Report") of the Property has been prepared by a competent biologist familiar with the environs and approved by Grantor and Grantee in writing, a copy of which is on file with Grantor and Grantee at their respective address for notices, set forth below. Selected portions of the Report are attached hereto as Exhibit C. The parties agree that the Report contains an accurate representation of the biological and physical condition of the Property at the time of this Grant, and of the historical uses of the Property, including historical water uses. Notwithstanding the forgoing, if a controversy arises with respect to the nature and extent of the physical, biological condition of the Property or the permitted historical uses of the Property, the parties shall not be foreclosed from utilizing any and all other relevant documents, surveys or other evidence or information to assist in the resolution of the controversy. The Report includes an aerial photograph where the "Agricultural Area" of the Property is delineated.

3. Grantee's Rights.

To accomplish the purposes of this Conservation Easement, Grantor hereby grants and conveys the following rights to Grantee:

(a) To preserve and protect the Conservation Values of the Property.

(b) To enter the Property at reasonable times, in order to monitor compliance with and otherwise enforce the terms of this Conservation Easement and any Management Plan developed for the Property and to implement at Grantee's sole discretion Management Plan activities that have not been implemented, provided that Grantee shall not unreasonably interfere with Grantor's authorized use and quiet enjoyment of the Property.

(c) To prevent any activity on or use of the Property that is inconsistent with the purposes of this Conservation Easement and to require the restoration of such areas or features of the Property that may be damaged by any act, failure to act, or any use or activity that is inconsistent with the purposes of this Conservation Easement.

(d) To require that all mineral, air and water rights as Grantee deems necessary to preserve and protect the biological resources and Conservation Values of the Property shall remain a part of and be put to beneficial use upon the Property, consistent with the purposes of this Conservation Easement.

(e) All present and future development rights appurtenant to, allocated, implied, reserved or inherent in the Property; such rights are hereby terminated and extinguished, and may not be used on or transferred to any portion of the Property, nor any other property adjacent or otherwise.

(f) Grantee may erect a sign or other appropriate marker in a prominent location on the Property, visible from a public road, bearing information indicating that the environmental and scenic resources of the Property are protected by Grantee. The wording of the information on the sign shall be jointly determined by Grantee and Grantor, but shall clearly indicate that the Property is privately owned and not open to the public. Grantee shall be responsible for the costs of erecting and maintaining its sign or marker.

APPENDIX D1 (Continued)

(g) Subject to Grantor's approval, which approval shall not be unreasonably withheld or denied, Grantee shall have the right to conduct fish, wildlife, plant, and habitat studies on the Property, as well as research and monitoring on the Property, provided that such studies, research, and monitoring shall be carried out in a manner that shall not interfere unreasonably with the permitted use(s) or enjoyment of the Property by Grantor, its successors in interest, or any legally recognized occupant(s) or user(s) of the Property. Any other parties interested in conducting scientific studies on the Property are subject to the approval of Grantor, and such approval shall not be unreasonably withheld or denied.

4. Prohibited Uses.

Any activity on or use of the Property that is inconsistent with the purposes of this Conservation Easement is prohibited. Without limiting the generality of the foregoing, the following uses and activities by Grantor, Grantor's agents, and third parties are expressly prohibited:

(a) Unseasonable watering; use of fertilizers, pesticides, biocides, herbicides or other agricultural chemicals; weed abatement activities; incompatible fire protection activities; and any and all other activities and uses which may impair or interfere with the purposes of this Conservation Easement [***include the following language only if the Management Plan, including any adaptive management measures, specifies such an exception:***], except for [***insert specific exception(s)***] as specifically provided in the Management Plan.

(b) Use of off-road vehicles and use of any other motorized vehicles except on existing roadways [***include the following language only if the Management Plan, including any adaptive management measures, specifies such an exception:***], except for [***insert specific exception(s)***] as specifically provided in the Management Plan.

(c) Agricultural activity of any kind [***include the following language only if the Management Plan, including any adaptive management measures, specifies such an exception:***] except grazing for vegetation management as specifically provided in the Management Plan.

(d) Recreational activities, including, but not limited to, horseback riding, biking, hunting or fishing except for personal, non-commercial, recreational activities of the Grantor, so long as such activities are consistent with the purposes of this Conservation Easement and specifically provided for in the Management Plan.

(e) Commercial, industrial, residential, or institutional uses.

(f) Any legal or de facto division, subdivision or partitioning of the Property.

(g) Construction, reconstruction, erecting or placement of any building, billboard or sign, or any other structure or improvement of any kind [***include the following language only if the Management Plan specifies such an exception:***], except for [***insert specific exception(s)***] as specifically provided in the Management Plan.

APPENDIX D1 (Continued)

(h) Depositing or accumulation of soil, trash, ashes, refuse, waste, bio-solids or any other materials.

(i) Planting, introduction or dispersal of non-native or exotic plant or animal species.

(j) Filling, dumping, excavating, draining, dredging, mining, drilling, removing or exploring for or extracting minerals, loam, soil, sand, gravel, rock or other material on or below the surface of the Property, or granting or authorizing surface entry for any of these purposes.

(k) Altering the surface or general topography of the Property, including but not limited to any alterations to habitat, building roads or trails, paving or otherwise covering the Property with concrete, asphalt or any other impervious material except for those habitat management activities specified in the Management Plan.

(l) Removing, destroying, or cutting of trees, shrubs or other vegetation, except as required by law for (i) fire breaks, (ii) maintenance of existing foot trails or roads, or (iii) prevention or treatment of disease [***include the following language only if the Management Plan specifies such an exception:***]; and except for [***insert specific exception(s)***] as specifically provided in the Management Plan.

(m) Manipulating, impounding or altering any natural water course, body of water or water circulation on the Property, and any activities or uses detrimental to water quality, including but not limited to degradation or pollution of any surface or sub-surface waters [***include the following language only if the Management Plan specifies such an exception:***], except for [***insert specific exception(s)***] as specifically provided in the Management Plan].

(n) Without the prior written consent of Grantee, which Grantee may withhold, transferring, encumbering, selling, leasing, or otherwise separating the mineral, air or water rights for the Property; changing the place or purpose of use of the water rights; abandoning or allowing the abandonment of, by action or inaction, any water or water rights, ditch or ditch rights, spring rights, reservoir or storage rights, wells, ground water rights, or other rights in and to the use of water historically used on or otherwise appurtenant to the Property, including but not limited to: (i) riparian water rights; (ii) appropriative water rights; (iii) rights to waters which are secured under contract with any irrigation or water district, to the extent such waters are customarily applied to the Property; and (iv) any water from wells that are in existence or may be constructed in the future on the Property.

(o) Engaging in any use or activity that may violate, or may fail to comply with, relevant federal, state, or local laws, regulations, or policies applicable to Grantor, the Property, or the use or activity in question.

5. Grantee's Duties.

(a) To ensure that the purposes of this Conservation Easement as described in

APPENDIX D1 (Continued)

Section 1 are being accomplished, Grantee and its successors and assigns shall:

(1) Perform, at a minimum on an annual basis, compliance monitoring inspections of the Property; and

(2) Prepare reports on the results of the compliance monitoring inspections, and provide these reports to the Signatory Agencies on an annual basis.

(b) In the event that the Grantee's interest in this Conservation Easement reverts to or is transferred to the State of California, CDFW will carry out the tasks specified in Section 4(a) to the extent that funds and staff are available for that purpose. If CDFW determines that it cannot carry out the specified tasks, the Third Party Beneficiaries may identify a replacement Grantee, acceptable to all, and CDFW, subject to obtaining all necessary approvals, will transfer this Conservation Easement to the identified replacement Grantee in compliance with Section 10(a) of this Conservation Easement.

6. Grantor's Duties.

Grantor shall undertake all reasonable actions to prevent the unlawful entry and trespass by persons whose activities may degrade or harm the Conservation Values of the Property or that are otherwise inconsistent with this Conservation Easement. In addition, Grantor shall undertake all necessary actions to perfect and defend Grantee's rights under Section 3 of this Conservation Easement, and to observe and carry out the obligations of Grantor under the Management Plan.

7. Reserved Rights.

Grantor reserves to itself, and to its personal representatives, heirs, successors, and assigns, all rights accruing from Grantor's ownership of the Property, including the right to engage in or permit or invite others to engage in all uses of the Property that are not prohibited or limited by, and are consistent with the purposes of, this Conservation Easement.

8. Grantee's Remedies.

If Grantee determines that a violation of this Conservation Easement has occurred or is threatened, Grantee shall give written notice to Grantor of such violation and demand in writing the cure of such violation ("Notice of Violation"). If Grantor fails to cure the violation within thirty (30) days after receipt of a Notice of Violation, or if the cure reasonably requires more than thirty (30) days to complete and Grantor fails to begin the cure within the thirty (30)-day period or fails to continue diligently to complete the cure, Grantee may bring an action at law or in equity in a court of competent jurisdiction for any or all of the following: to recover any damages to which Grantee may be entitled for violation of the terms of this Conservation Easement or for any injury to the Conservation Values of the Property; to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies; to pursue any other legal or equitable relief, including but not limited to, the restoration of the Property to the condition in which it existed prior to any violation or injury; or to otherwise enforce this

APPENDIX D1 (Continued)

Conservation Easement. Without limiting the liability of Grantor, Grantee may apply any damages recovered to the cost of undertaking any corrective action on the Property.

If Grantee, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate injury to the Conservation Values of the Property, Grantee may pursue its remedies under this Conservation Easement without prior notice to Grantor or without waiting for the period provided for cure to expire. Grantee's rights under this section apply equally to actual or threatened violations of this Conservation Easement.

Grantor agrees that Grantee's remedies at law for any violation of this Conservation Easement are inadequate and that Grantee shall be entitled to the injunctive relief described in this section, both prohibitive and mandatory, in addition to such other relief to which Grantee may be entitled, including specific performance of this Conservation Easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. Grantee's remedies described in this section shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity, including but not limited to the remedies set forth in California Civil Code Section 815, *et seq.* The failure of Grantee to discover a violation or to take immediate legal action shall not bar Grantee from taking such action at a later time.

(a) Costs of Enforcement.

All costs incurred by Grantee, where Grantee is the prevailing party, in enforcing the terms of this Conservation Easement against Grantor, including, but not limited to, costs of suit and attorneys' and experts' fees, and any costs of restoration necessitated by negligence or breach of this Conservation Easement, shall be borne by Grantor.

(b) Grantee's Discretion.

Enforcement of the terms of this Conservation Easement by Grantee shall be at the discretion of Grantee, and any forbearance by Grantee to exercise its rights under this Conservation Easement in the event of any breach of any term of this Conservation Easement shall not be deemed or construed to be a waiver of such term or of any subsequent breach of the same or any other term of this Conservation Easement or of any rights of Grantee under this Conservation Easement. No delay or omission by Grantee in the exercise of any right or remedy shall impair such right or remedy or be construed as a waiver.

(c) Acts Beyond Grantor's Control.

Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury to or change in the Property resulting from (i) any natural cause beyond Grantor's control, including, without limitation, fire not caused by Grantor, flood, storm, and earth movement, or any prudent action taken by Grantor under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes; or (ii) acts by Grantee or its employees.

(d) Enforcement; Standing.

All rights and remedies conveyed to Grantee under this Conservation Easement shall extend to and are enforceable by the Third-Party Beneficiaries (as defined in Section 15(m)). These enforcement rights are in addition to, and do not limit, the rights of

APPENDIX D1 (Continued)

enforcement under the Management Plan. If at any time in the future Grantor uses, allows the use, or threatens to use or allow use of, the Property for any purpose that is inconsistent with or in violation of this Conservation Easement then, despite the provisions of California Civil Code Section 815.7, the California Attorney General and the Third-Party Beneficiaries each has standing as an interested party in any proceeding affecting this Conservation Easement.

(e) Notice of Conflict.

If Grantor receives a Notice of Violation from Grantee or a Third-Party Beneficiary with which it is impossible for Grantor to comply consistent with any prior uncured Notice(s) of Violation, Grantor shall give written notice of the conflict (hereinafter "Notice of Conflict") to the Grantee and Third-Party Beneficiaries. In order to be valid, a Notice of Conflict shall be given within fifteen (15) days of the date Grantor receives a conflicting Notice of Violation, shall include copies of the conflicting Notices of Violation, and shall describe the conflict with specificity, including how the conflict makes compliance with the uncured Notice(s) of Violation impossible. Upon issuing a valid Notice of Conflict, Grantor shall not be required to comply with the conflicting Notices of Violation until such time as the entity or entities issuing said conflicting Notices of Violation issue(s) revised Notice(s) of Violation that resolve the conflict. Upon receipt of a revised Notice of Violation, Grantor shall comply with such notice within the time period(s) described in the first grammatical paragraph of this Section. The failure of Grantor to issue a valid Notice of Conflict within fifteen (15) days of receipt of a conflicting Notice of Violation shall constitute a waiver of Grantor's ability to claim a conflict.

(f) Reversion.

If the Signatory Agencies determine that Grantee is not holding, monitoring or managing this Conservation Easement for conservation purposes in the manner specified in this Conservation Easement or the Management Plan then, pursuant to California Government Code Section 65965(c), this Conservation Easement shall revert to the State of California, or to another public agency or nonprofit organization qualified pursuant to Civil Code Section 815.3 and Government Code Section 65965 (and any successor or other provision(s) then applicable) and approved by the Signatory Agencies.

9. Access.

This Conservation Easement does not convey a general right of access to the public.

10. Costs and Liabilities.

Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property. Grantor agrees that neither Grantee nor Third-Party Beneficiaries shall have any duty or responsibility for the operation, upkeep or maintenance of the Property, the monitoring of hazardous conditions on it, or the protection of Grantor, the public or any third parties from risks relating to conditions on the Property. Grantor remains solely responsible for obtaining any applicable governmental permits and approvals required for any activity or use permitted by this Conservation Easement and any activity or use shall be undertaken in accordance with all applicable federal, state, local and administrative agency laws, statutes, ordinances, rules, regulations, orders and requirements.

APPENDIX D1 (Continued)

(a) Taxes; No Liens.

Grantor shall pay before delinquency all taxes, assessments (general and special), fees, and charges of whatever description levied on or assessed against the Property by competent authority (collectively "Taxes"), including any Taxes imposed upon, or incurred as a result of, this Conservation Easement, and shall furnish Grantee with satisfactory evidence of payment upon request. Grantor shall keep the Property free from any liens (other than a security interest that is expressly subordinated to this Conservation Easement, as provided in Section 15(k)), including those arising out of any obligations incurred by Grantor for any labor or materials furnished or alleged to have been furnished to or for Grantor at or for use on the Property.

(b) Hold Harmless.

(1) Grantor shall hold harmless, protect and indemnify Grantee and its directors, officers, employees, agents, contractors, and representatives and the heirs, personal representatives, successors and assigns of each of them (each a "Grantee Indemnified Party" and collectively, "Grantee's Indemnified Parties") from and against any and all liabilities, penalties, costs, losses, damages, expenses (including, without limitation reasonable attorneys' fees and experts' fees), causes of action, claims, demands, orders, liens or judgments (each a "Claim" and, collectively, "Claims"), arising from or in any way connected with: (i) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause, except that this indemnification shall be inapplicable to any Claim due solely to the negligence of Grantee or any of its employees; (ii) the obligations specified in Sections 6, 10 and 10(a); and (iii) the existence or administration of this Conservation Easement. If any action or proceeding is brought against any of the Grantee's Indemnified Parties by reason of any such Claim, Grantor shall, at the election of and upon written notice from Grantee, defend such action or proceeding by counsel reasonably acceptable to the Grantee's Indemnified Party or reimburse Grantee for all charges incurred for services of the California Attorney General in defending the action or proceeding].

(2) Grantor shall hold harmless, protect and indemnify Third-Party Beneficiaries and their respective directors, officers, employees, agents, contractors, and representatives and the heirs, personal representatives, successors and assigns of each of them (each a "Third-Party Beneficiary Indemnified Party" and collectively, "Third-Party Beneficiary Indemnified Parties") from and against any and all Claims arising from or in any way connected with: (i) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause and (ii) the existence or administration of this Conservation Easement. *Provided, however,* that the indemnification in this Section 10 (b) (2) shall be inapplicable to a Third-Party Beneficiary Indemnified Party with respect to any Claim due solely to the negligence of that Third-Party Beneficiary Indemnified Party or any of its employees. If any action or proceeding is brought against any of the Third-Party Beneficiary Indemnified Parties by reason of any Claim to which the indemnification in this Section 10 (b) (2) applies, then at the election of and upon written notice from the Third-Party Beneficiary Indemnified Party, Grantor shall defend such action or proceeding by counsel reasonably acceptable to the applicable Third-Party Beneficiary Indemnified Party or reimburse the Third-Party Beneficiary Indemnified Party for all charges incurred for services of the California Attorney General or the U.S. Department of Justice in defending the action or proceeding.

APPENDIX D1 (Continued)

(c) Extinguishment.

If circumstances arise in the future that render the preservation of Conservation Values, [***include this phrase only if there are jurisdictional wetlands:*** including wetland functions and values,] or other purposes of this Conservation Easement impossible to accomplish, this Conservation Easement can only be terminated or extinguished, in whole or in part, by judicial proceedings in a court of competent jurisdiction.

(d) Condemnation.

If all or part of the Property is taken in exercise of eminent domain by public, corporate, or other authority so as to abrogate the restrictions imposed by this Conservation Easement, Grantor and Grantee shall join in appropriate actions at the time of such taking to recover the full value of the taking and all incidental or direct damages resulting from the taking. All expenses incurred by Grantor and Grantee in such action shall be paid out of the recovered proceeds. The remaining proceeds shall be divided consistent with the provisions of this Paragraph using the ratio of the value of Grantee's and Grantor's interests that is set forth in subparagraph A above, it being expressly agreed that the Conservation Easement constitutes a compensable property right.

11. Transfer of Conservation Easement or Property.

(a) Conservation Easement.

This Conservation Easement may be assigned or transferred by Grantee upon written approval of the Signatory Agencies, which approval shall not be unreasonably withheld or delayed, but Grantee shall give Grantor and the Signatory Agencies at least sixty (60) days prior written notice of the proposed assignment or transfer. Grantee may assign or transfer its rights under this Conservation Easement only to an entity or organization: (i) authorized to acquire and hold conservation easements pursuant to California Civil Code Section 815.3 and Government Code Section 65967 (and any successor or other provision(s) then applicable), or the laws of the United States; and (ii) otherwise reasonably acceptable to the Signatory Agencies. Grantee shall require the assignee to record the assignment in the county where the Property is located. The failure of Grantee to perform any act provided in this section shall not impair the validity of this Conservation Easement or limit its enforcement in any way. Any transfer under this section is subject to the requirements of Section 12.

(b) Property.

Grantor agrees to incorporate the terms of this Conservation Easement by reference in any deed or other legal instrument by which Grantor divests itself of any interest in all or any portion of the Property, including, without limitation, a leasehold interest. Grantor agrees that the deed or other legal instrument shall also incorporate by reference the Management Plan, and any amendment(s) to those documents. Grantor further agrees to give written notice to Grantee and the Signatory Agencies of the intent to transfer any interest at least sixty (60) days prior to the date of such transfer. Grantee or the Signatory Agencies shall have the right to prevent any transfers in which prospective subsequent claimants or transferees are not given notice of the terms, covenants, conditions and restrictions of this Conservation Easement (including the exhibits and documents incorporated by reference in it). The failure of Grantor to perform any act provided in this section

APPENDIX D1 (Continued)

shall not impair the validity of this Conservation Easement or limit its enforceability in any way. Any transfer under this section is subject to the requirements of Section 12.

12. Merger.

The doctrine of merger shall not operate to extinguish this Conservation Easement if the Conservation Easement and the Property become vested in the same party. If, despite this intent, the doctrine of merger applies to extinguish the Conservation Easement then, unless Grantor, Grantee, and the Signatory Agencies otherwise agree in writing, a replacement conservation easement or restrictive covenant containing the same protections embodied in this Conservation Easement shall be recorded against the Property.

13. Notices.

Any notice, demand, request, consent, approval, or other communication that Grantor or Grantee desires or is required to give to the other shall be in writing, with a copy to each of the Signatory Agencies, and served personally or sent by recognized overnight courier that guarantees next-day delivery or by first class United States mail, postage fully prepaid, addressed as follows:

To Grantor: [Grantee name]
[Grantee address]
Attn:_____

To Grantee: [***insert the appropriate Grantee information:***]

[***Remove/modify the following blocks as appropriate when CDFW or the USFWS are not third-party beneficiaries to the CE.***]

To CDFW: [Department of Fish and Game]
[Region name] Region
[REGION ADDRESS]
[Attn: Regional Manager]

With a copy to: Department of Fish and Game
Office of General Counsel
1416 Ninth Street, 12th Floor
Sacramento, CA 95814-2090
Attn: General Counsel

To USFWS: United States Fish and Wildlife Service
[Field Office name] Field Office
[FIELD OFFICE ADDRESS]
Attn: Field Supervisor

or to such other address a party or a Signatory Agency shall designate by written notice to Grantor, Grantee and the Signatory Agencies. Notice shall be deemed effective upon delivery in

APPENDIX D1 (Continued)

the case of personal delivery or delivery by overnight courier or, in the case of delivery by first class mail, three (3) days after deposit into the United States mail.

14. Amendment.

This Conservation Easement may be amended only by mutual written agreement of Grantor and Grantee and written approval of the Signatory Agencies, which approval shall not be unreasonably withheld or delayed. Any such amendment shall be consistent with the purposes of this Conservation Easement and California law governing conservation easements, and shall not affect its perpetual duration. Any such amendment shall be recorded in the official records of the county in which the Property is located, and Grantee shall promptly provide a conformed copy of the recorded amendment to the Grantor and the Signatory Agencies.

15. Additional Provisions.

(a) Controlling Law.

The interpretation and performance of this Conservation Easement shall be governed by the laws of the United States and the State of California, disregarding the conflicts of law principles of such state.

(b) Liberal Construction.

Despite any general rule of construction to the contrary, this Conservation Easement shall be liberally construed to effect the purposes of this Conservation Easement and the policy and purpose of California Civil Code Section 815, *et seq.* and Government Code Section 65965. If any provision in this instrument is found to be ambiguous, an interpretation consistent with the purposes of this Conservation Easement that would render the provision valid shall be favored over any interpretation that would render it invalid.

(c) Severability.

If a court of competent jurisdiction voids or invalidates on its face any provision of this Conservation Easement, such action shall not affect the remainder of this Conservation Easement. If a court of competent jurisdiction voids or invalidates the application of any provision of this Conservation Easement to a person or circumstance, such action shall not affect the application of the provision to any other persons or circumstances.

(d) Entire Agreement.

This document (including its exhibits and the Management Plan incorporated by reference in this document) sets forth the entire agreement of the parties and the Signatory Agencies with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings, or agreements of the parties relating to the Conservation Easement. No alteration or variation of this Conservation Easement shall be valid or binding unless contained in an amendment in accordance with Section 14.

(e) No Forfeiture.

Nothing contained in this Conservation Easement will result in a forfeiture or reversion of Grantor's title in any respect.

APPENDIX D1 (Continued)

(f) Successors.

The covenants, terms, conditions, and restrictions of this Conservation Easement shall be binding upon, and inure to the benefit of, the parties and their respective personal representatives, heirs, successors, and assigns, and shall constitute a servitude running in perpetuity with the Property.

(g) Termination of Rights and Obligations.

A party's rights and obligations under this Conservation Easement terminate upon transfer of the party's interest in the Conservation Easement or Property, except that liability for acts, omissions or breaches occurring prior to transfer shall survive transfer.

(h) Captions.

The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon its construction or interpretation.

(i) No Hazardous Materials Liability.

(1) Grantor represents and warrants that it has no knowledge or notice of any Hazardous Materials (defined below) or underground storage tanks existing, generated, treated, stored, used, released, disposed of, deposited or abandoned in, on, under, or from the Property, or transported to or from or affecting the Property.

(2) Without limiting the obligations of Grantor under Section 10 (b), Grantor hereby releases and agrees to indemnify, protect and hold harmless the Grantee's Indemnified Parties (defined in Section 10 (b) (1)) from and against any and all Claims (defined in Section 10 (b)(1)) arising from or connected with any Hazardous Materials or underground storage tanks present, alleged to be present, released in, from or about, or otherwise associated with the Property at any time, except any Hazardous Materials placed, disposed or released by Grantee or any of its employees. This release and indemnification includes, without limitation, Claims for (A) injury to or death of any person or physical damage to any property; and (B) the violation or alleged violation of, or other failure to comply with, any Environmental Laws (defined below). If any action or proceeding is brought against any of the Grantee's Indemnified Parties by reason of any such Claim, Grantor shall, at the election of and upon written notice from the applicable Grantee Indemnified Party, defend such action or proceeding by counsel reasonably acceptable to the Grantee Indemnified Party or reimburse Grantee for all charges incurred for services of the California Attorney General in defending the action or proceeding].

(3) Without limiting the obligations of Grantor under Section 10 (b), Grantor hereby releases and agrees to indemnify, protect and hold harmless the Third-Party Beneficiary Indemnified Parties (defined in Section 10 (b)(2)) from and against any and all Claims arising from or connected with any Hazardous Materials or underground storage tanks present, alleged to be present, released in, from or about, or otherwise associated with the Property at any time, except that this release and indemnification shall be inapplicable to a Third-Party Beneficiary Indemnified Party with respect to any Hazardous Materials placed, disposed or released by that Third-Party Beneficiary Indemnified Party or any of its employees. This release

APPENDIX D1 (Continued)

and indemnification includes, without limitation, Claims for (A) injury to or death of any person or physical damage to any property; and (B) the violation of alleged violation of, or other failure to comply with, any Environmental Laws. If any action or proceeding is brought against any of the Third-Party Beneficiary Indemnified Parties by reason of any such Claim, Grantor shall, at the election or and upon written notice from the applicable Third-Party Beneficiary Indemnified Party, defend such action or proceeding by counsel reasonably acceptable to the Third-Party Beneficiary Indemnified Party for all charges incurred for services of the California Attorney General or the U.S. Department of Justice in defending the action or proceeding.

(4) Despite any contrary provision of this Conservation Easement, the parties do not intend this Conservation Easement to be, and this Conservation Easement shall not be, construed such that it creates in or gives to Grantee or any Third-Party Beneficiaries any of the following:

(A) The obligations or liability of an "owner" or "operator," as those terms are defined and used in Environmental Laws (defined below), including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (42 U.S.C. § 9601, *et seq.*; hereinafter, "CERCLA"); or

(B) The obligations or liabilities of a person described in 42 U.S.C. § 9607(a)(3) or (4); or

(C) The obligations of a responsible person under any applicable Environmental Laws; or

(D) The right to investigate and remediate any Hazardous Materials associated with the Property; or

(E) Any control over Grantor's ability to investigate, remove, remediate or otherwise clean up any Hazardous Materials associated with the Property.

(5) The term "Hazardous Materials" includes, without limitation, (a) material that is flammable, explosive or radioactive; (b) petroleum products, including by-products and fractions thereof; and (c) hazardous materials, hazardous wastes, hazardous or toxic substances, or related materials defined in CERCLA, the Resource Conservation and Recovery Act of 1976 (42 U.S.C. § 6901, *et seq.*; hereinafter, "RCRA"); the Hazardous Materials Transportation Act (49 U.S.C. §5101, *et seq.*; hereinafter, "HTA"); the Hazardous Waste Control Law (California Health & Safety Code § 25100, *et seq.*; hereinafter, "HCL"); the Carpenter-Presley-Tanner Hazardous Substance Account Act (California Health & Safety Code § 25300, *et seq.*; hereinafter "HSA"), and in the regulations adopted and publications promulgated pursuant to them, or any other applicable Environmental Laws now in effect or enacted after the date of this Conservation Easement.

(6) The term "Environmental Laws" includes, without limitation, CERCLA, RCRA, HTA, HCL, HSA, and any other federal, state, local or administrative agency statute, ordinance, rule, regulation, order or requirement relating to pollution, protection of

APPENDIX D1 (Continued)

human health or safety, the environment or Hazardous Materials. Grantor represents, warrants and covenants to Grantee and Third-Party Beneficiaries that activities upon and use of the Property by Grantor, its agents, employees, invitees and contractors will comply with all Environmental Laws.

(j) Warranty.

Grantor represents and warrants that Grantor is the sole owner of the Property. Grantor also represents and warrants that, [***choose applicable statement:*** there are no outstanding mortgages, liens, encumbrances or other interests in the Property (including, without limitation, mineral interests) which may conflict or are inconsistent with this Conservation Easement ***or*** the holder of any outstanding mortgage, lien, encumbrance or other interest in the Property (including, without limitation, mineral interest) which conflicts or is inconsistent with this Conservation Easement has expressly subordinated such interest to this Conservation Easement by a recorded Subordination Agreement approved by Grantee and the Signatory Agencies].

(k) Additional Interests.

Grantor shall not grant any additional easements, rights of way or other interests in the Property (other than a security interest that is expressly subordinated to this Conservation Easement), nor shall Grantor grant, transfer, abandon or relinquish (each a "Transfer") any mineral, air, or water right or any water associated with the Property, without first obtaining the written consent of Grantee and the Signatory Agencies. Such consent may be withheld if Grantee or the Signatory Agencies determine(s) that the proposed interest or Transfer is inconsistent with the purposes of this Conservation Easement or will impair or interfere with the Conservation Values of the Property. This Section 15(k) shall not limit the provisions of Section 3(d) or 4(n), nor prohibit transfer of a fee or leasehold interest in the Property that is subject to this Conservation Easement and complies with Section 11. Grantor shall provide a copy of any recorded or unrecorded grant or Transfer document to the Grantee and Signatory Agencies.

(l) Recording.

Grantee shall record this Conservation Easement in the Official Records of the County in which the Property is located, and may re-record it at any time as Grantee deems necessary to preserve its rights in this Conservation Easement.

(m) Third-Party Beneficiary.

Grantor and Grantee acknowledge that the [***include the agencies that will be third-party beneficiaries***] (the "Third-Party Beneficiaries") are third party beneficiaries of this Conservation Easement with the right of access to the Property and the right to enforce all of the obligations of Grantor including, but not limited to, Grantor's obligations under Section 15, and all other rights and remedies of the Grantee under this Conservation Easement.

(n) Funding.

Endowment funding for the perpetual management, maintenance and monitoring of the Property is specified in and governed by the South Sacramento Habitat Conservation Plan.

APPENDIX D1 (Continued)

IN WITNESS WHEREOF Grantor has executed this Conservation Easement Deed the day and year first above written.

GRANTOR: [***Notarization Required***]

BY:_____

NAME:_____

TITLE:_____

DATE: _____

Approved as to form:

South Sacramento Conservation Agency:

BY: _____

(Insert Name)

(Insert Title)

DATE: _____

Approved as to form:

BY: _____

(Insert Counsel Name)

APPENDIX D2

Sample Agricultural Easement

APPENDIX D2
Sample Conservation Easement For Agricultural Lands

Recording requested, and when recorded, return to: South Sacramento Conservation Agency Street Address City, State, Zip Attn: Executive Director	

(space above this line reserved for recorder's use)

SAMPLE CONSERVATION EASEMENT DEED FOR AGRICULTURAL LAND AND AGREEMENT CREATING ENFORCEABLE RESTRICTIONS IN PERPETUITY

THIS GRANT DEED OF HABITAT CONSERVATION EASEMENT (the "Grant") is made as of _____ ___, 20XX by and between the _____, a _____, as "Grantor" and the South Sacramento Conservation Agency, a California nonprofit public benefit corporation, as "Grantee."

Recitals

A. Grantor owns real property consisting of approximately _____ acres, in Sacramento County, California, as described in Exhibit A and shown more particularly on the map attached as Exhibit B, attached hereto and incorporated herein, which together with all appurtenances thereto, including without limitation all mineral and mineral rights, if any, and all water and water rights appurtenant to such land (collectively, the "Property").

B. The Property possess significant conservation values, including, without limitation, scenic, natural habitat, hydrologic, open space, ecological, agricultural and scientific values of great importance to Grantor, Grantee, and the people of the State of California and the people of the United States. (collectively, the "Conservation Values").

C. The Property is comprised of open space land, appropriate to use for certain types of agriculture, which also provide essential foraging and/or nesting habitat for South Sacramento Habitat Conservation Plan (SSHCP) Covered Species, and other significant relatively natural habitat and buffer for many species of wildlife including, but not limited to, raptors, migratory birds, and others.

D. Protection and preservation of the Property, including its wildlife habitat, shall assure that this area and its existing features shall continue to be available for certain types of agriculture, which provide foraging and or nesting habitat for SSHCP Covered Species

and other natural habitat values and buffer for wildlife, a significant public benefit by preserving open space against development pressure, and scenic qualities.

E. As fee owner, Grantor owns the affirmative rights to identify, preserve, and protect forever the existing features and Conservation Values of the Property.

F. _____, a _____, paid for the acquisition of this Conservation Easement Deed for Agricultural Land and Agreement Creating Enforceable Restrictions in Perpetuity from Grantor and provided _____ Dollars ($_____) in management funds to Grantee to satisfy mitigation requirements imposed by the South Sacramento Habitat Conservation Plan (SSHCP), Plan Participant _____ (the "Plan Participant").

G. The State of California recognizes the public importance and validity of agricultural and habitat conservation easements by enactment of Section 815 *et seq*. of the California Civil Code, and Grantee is an entity qualified under such Civil Code provisions to hold conservation easements.

H. Grantee is authorized to hold conservation easements pursuant to California Civil Code §815.3 and, as relevant to tax-exempt non-profit organizations, §501(c)(3) of the Internal Revenue Code.

I. To accomplish all of the aforementioned purposes, Grantor intends to convey to Grantee, and Grantee intends to obtain from Grantor, a Conservation Easement over a portion of the Property (the 'Easement Area"). The Easement Area is more particularly described in Exhibit C attached hereto and incorporated herein and depicted on the map in Exhibit D attached hereto to and incorporated herein (the "Easement Area Map") restricting the use which may be made of the Property to preserve and protect forever the agricultural, open-space, foraging and/or nesting habitat for SSHCP Covered Species and other wildlife habitat and scenic values of the Property.

Grantor Intends to Grant

NOW, THEREFORE, in consideration of the above and the mutual covenants, terms, conditions, and restrictions contained herein, and for the good and valuable consideration, the receipt and sufficiency of which is hereby acknowledge, and pursuant to the laws of the State of California and in particular California Civil Code 815 *et seq.*, Grantor hereby voluntarily grants and conveys to Grantee, its successors and assigns, a Conservation Easement in gross forever in, on, over, and across the Property (the "Conservation Easement"), subject to the terms and conditions set forth herein, restricting forever the uses which may be made of the Property, and the parties agree as follows:

1. **PURPOSES:** The multiple natural resource conservation purposes of this Conservation Easement are to identity, preserve, protect, enhance, monitor and restore in perpetuity the Conservation Values of the Property, including, without limitation,

APPENDIX D2 (Continued)

the following (collectively, "Conservation Purposes"): (a) the availability of the Property for agriculture by protecting the Property from development pressure; (b) the conservation and habitat values of the Property as foraging and/or nesting habitat for SSHCP Covered Species and for other wildlife including the processes which sustain that habitat; and (c) the open space character and scenic qualities of the Property which are important public benefits and are consistent with the availability of the Property for wildlife habitat and agriculture.

It is intended that this Conservation Easement shall foster agricultural practices on the Property in harmony with the protection and preservation of conservation and habitat values of the Property as foraging and/or nesting habitat for SSHCP Covered Species and for other wildlife habitat and the processes that sustain that habitat, and in harmony with the open space qualities of the Property. It is intended that each such purpose shall be conducted in a manner consistent with all of such multiple natural resource conservation purposes. This Conservation Easement prohibits use of the Property for any purpose that would impair, degrade or interfere with any of the multiple natural resources conservation purposes stated above.

2. **EASEMENT DOCUMENTATION REPORT:** The parties acknowledge that a Preserve Documentation Report (the "Report") of the Property has been prepared by a competent biologist familiar with the environs and approved by Grantor and Grantee in writing, a copy of which is on file with Grantor and Grantee at their respective address for notices, set forth below. Selected portions of the Report are attached hereto as Exhibit C. The parties agree that the Report contains an accurate representation of the biological and physical condition of the Property at the time of this Grant, and of the historical uses of the Property, including historical water uses. Notwithstanding the forgoing, if a controversy arises with respect to the nature and extent of the physical, biological condition of the Property or the permitted historical uses of the Property, the parties shall not be foreclosed from utilizing any and all other relevant documents, surveys or other evidence or information to assist in the resolution of the controversy. The Report includes an aerial photograph where the "Agricultural Area" of the Property is delineated.

3. **GRANTEE'S RIGHTS:** To accomplish the purpose of this Conservation Easement, the rights and interests which are conveyed to Grantee by this Conservation Easement include, but are not limited to, the following:

   a. **Preserve and Protect.** Grantee may identify, preserve, protect, enhance, monitor (including the right to conduct evaluations of habitat quantity and quality and to survey for threatened species and monitor their populations) and restore in perpetuity the Conservation Values of the Property. If Grantor chooses not to farm in the Agricultural Area, Grantee shall have the right to farm the Agricultural Area or lease

APPENDIX D2 (Continued)

the Agricultural Area for farming, provided such farming is consistent with the terms of this Conservation Easement and Grantor has approved Grantee's lessee, which approval shall not be unreasonably withheld or delayed.

b. To require that all mineral, air, and water rights as Grantee deems necessary to preserve and protect the biological resources and Conservation Values of the Property shall remain a part of and be put to beneficial use upon the Property, consistent with the purposes of this Conservation Easement.

c. **Entry and Access Rights:** Grantee and Grantee's employees and agents, and staff from the South Sacramento Conservation Agency, are hereby granted rights of access to enter upon the Property, using appurtenant easements and rights-of-way, if any, and may enter upon the Property at reasonable times in order to monitor compliance with and otherwise enforce the terms of this Conservation Easement, to study and make scientific observations of the natural elements and ecosystems of the Property, to determine whether Grantor's activities are in compliance with the terms this Conservation Easement and to take all actions deemed necessary by Grantee to identify, preserve, protect, enhance, monitor and restore in perpetuity the Conservation Values. Except in cases where Grantee determines that immediate entry is required to prevent, terminate, or mitigate a violation of the Conservation Easement, such entry shall be upon prior reasonable notice to Grantor and shall not unreasonably interfere with Grantor's use and quiet enjoyment of the Property.

d. **Enforcement.** Grantee may prevent or enjoin any activity on, or use of, the Property that is inconsistent with the purposes of this Conservation Easement, and may enforce the restoration of such areas or features of the Property that may be damaged by any inconsistent activity or use. This right of enforcement extends to the South Sacramento Conservation Agency or its designee as third party beneficiary hereof.

e. **Signs.** Grantee may erect a sign or other appropriate marker in a prominent location on the Property, visible from a public road, bearing information indicating that the environmental and scenic resources of the Property are protected by Grantee. The wording of the information on the sign shall be jointly determined by Grantee and Grantor, but shall clearly indicate that the Property is privately owned and not open to the public. Grantee shall be responsible for the costs of erecting and maintaining its sign or marker.

f. **Scientific Studies.** Subject to Grantor's approval, which approval shall not be unreasonably withheld or denied, Grantee shall have the right to conduct fish, wildlife, plant, and habitat studies on the Property, as well as research and monitoring on the Property, provided that such studies, research, and monitoring shall be carried out in a manner that shall not interfere unreasonably with the permitted use(s) or

APPENDIX D2 (Continued)

enjoyment of the Property by Grantor, its successors in interest, or any legally recognized occupant(s) or user(s) of the Property. Any other parties interested in conducting scientific studies on the Property are subject to the approval of Grantor, and such approval shall not be unreasonably withheld or denied.

4. **PERMITTED USES OF THE PROPERTY.** Grantor and Grantee intend that this Conservation Easement shall confine the uses of the Property to the multiple natural resource conservation uses of agriculture, open space, scenic, conservation, and wildlife habitat, including the processes which sustain that habitat, and to such other incidental uses as are expressly permitted herein, all in accordance with the terms and conditions of this Conservation Easement. Except as prohibited or otherwise limited by Paragraph 5 below and Exhibit E attached hereto, Grantor reserves the right to use and enjoy the Property in any manner which is consistent with the Conservation Purposes of this Conservation Easement. In that regard, the uses set forth in Exhibit D attached hereto, though not an exhaustive list of consistent permitted uses, are consistent with this Conservation Easement, and shall not be precluded, prevented or limited by this Conservation Easement, except as follows: (a) as provided in Paragraph 5 below and Exhibit E attached hereto; (b) in those instances in which prior approval by Grantee is required under this Conservation Easement; and (c) in those instances in which any action or practice is or becomes inconsistent with the Conservation Purposes or diminishes or impairs any of the specific Conservation Values, as determined by Grantee in the exercise of Grantee's reasonable discretion.

5. **PROHIBITED USES OF THE PROPERTY.** Any activity on or use of the Property that is inconsistent with the Conservation Purposes (including, without limitation, any activity or use that diminishes or impairs the Conservation Values) is prohibited. Though not an exhaustive list of prohibited uses, none of the uses described in Exhibit E attached hereto and incorporated herein by reference shall be made of or on the Property. In making this Grant, Grantor has considered the possibility that uses prohibited by the terms of this Grant may become more economically valuable than permitted uses and that neighboring properties may in the future be put entirely to such prohibited uses. It is the intent of both Grantor and Grantee that any such changes shall not be deemed to be circumstances justifying the termination, extinguishment, or modification of this Grant or the Conservation Easement. In addition, the inability of Grantor, or Grantor’s heirs, successors, or assigns, to conduct or implement any or all of the uses permitted under the terms of this Grant, or the unprofitability of doing so, shall not impair the validity of this Grant or the Conservation Easement or be considered grounds for the termination, extinguishment, or modification of same.

APPENDIX D2 (Continued)

6. **REMEDIES.**

   a. **Notice of Violation: corrective action.** If grantee becomes aware that a violation of the terms of this conservation easement has occurred or is threatened to occur, grantee shall give written notice to the grantor of such violation and demand corrective action sufficient to cure the violation and, where the violation involves injury to the property resulting from any use or activity inconsistent with the conservation values or the conservation purposes, to restore the portion of the property so injured. If grantor fails to cure the violation within thirty (30) days after receipt of notice from grantee, or under circumstances where the violation cannot reasonably be cured within a thirty (30) day period, fails to begin curing such violation within the thirty (30) day period or fail to continue diligently to cure such violation until finally cured, grantee shall have all remedies available at law or in equity to enforce the terms of this conservation easement, including without limitation the right to seek a temporary or permanent injunction with respect to such activity, to cause the restoration of that portion of the property affected by such activity to the condition that existed prior to the undertaking of such prohibited activity, to pay monetary amounts which, if not paid, could result in the extinguishment, modification, non-enforcement or impairment of the conservation easement, and/or to recover any damages arising from the violation. Grantee's rights under this paragraph 6.a apply equally to actual or threatened violations of the terms of this conservation easement. Grantor agrees that grantee's remedies at law for any violation of the terms of this conservation easement are inadequate and that grantee shall be entitled to seek the injunctive relief described in this paragraph 6.a, both prohibitive and mandatory, in addition to such other relief to which grantee may be entitled, including specific performance of the terms of this conservation easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. The remedies described in this paragraph 6 shall be cumulative and shall be in addition to all remedies hereafter existing at law or in equity. Furthermore, the provisions of California civil code section 815 *et seq*. Are incorporated herein by this reference, and this conservation easement shall include all of the rights and remedies set forth therein.

   b. **Cost of Enforcement.** In any action, suit or other proceeding undertaken to enforce the provisions of this Conservation Easement, the prevailing party shall be entitled to recover from the non-prevailing all reasonable costs and expenses including, without limitation, attorneys' and experts' fees and costs, and if such prevailing party shall recover judgment in any action or proceeding, such costs and expenses shall be included as part of the judgment. In addition, any costs of restoration shall be borne by the Grantor.

APPENDIX D2 (Continued)

c. **Emergency Enforcement.** If Grantee, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the Conservation Values or to prevent breach or extinguishment of the Conservation Easement, Grantee may purse its remedies under this Paragraph 6 without prior notice to Grantor or without waiting for the period to cure to expire.

d. **Non-Waiver.** Enforcement of the terms and provisions of this Conservation Easement shall be at the discretion of Grantee, and the failure of Grantee to discover a violation or to take action under this Paragraph 6 shall not be deemed or construed to be a waiver of Grantee's rights hereunder with respect to such violation in the event of any subsequent breach. In no event shall any delay or omission by Grantee in exercising any right or remedy constitute an impairment of or a waiver or such right or remedy.

e. **Acts Beyond Grantor's Control.** Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury to or change in the Property resulting from causes beyond Grantor's control, including fire, flood, storm, and earth movement.

f. **Third Party Beneficiary Enforcement.** It is understood by the Grantor that all rights and remedies conveyed under this Conservation Easement shall extend to and are enforceable by the South Sacramento Conservation Agency and California Department of Fish and Game as a third party beneficiaries.

   i. **TRANSFER.** Grantee may, in Grantee's sole and absolute discretion, transfer all or any of its interests in this Conservation Easement without Grantor's consent, provided that (1) Grantee requires, as a condition of such transfer, that the Conservation Purposes of the Conservation Easement continue to be carried out following such transfer; (2) any assignment shall be approved by the South Sacramento Conservation Agency and made only to a local, state or federal agency and/or to an organization qualified at the time of the transfer as an eligible donee under Internal Revenue Code Section 170(h)(3) or its successor, or any regulation issued thereunder, and such organization shall be an entity qualified pursuant to Civil Code Section 815 et seq. or any subsequent State law governing the creation, transfer and enforcement of conservation easements; and (3) Grantee shall provide Grantor with notice of the assignment, at the address last provided by Grantor to Grantee, within thirty (30) days of the effective date of the assignment.

   If Grantee, or its successors, ceases to exist or no longer qualifies under Section 170(h)(3) of the Internal Revenue Code, then the South Sacramento Conservation Agency shall identify and select an appropriate local, state or federal agency and/or organization qualified at the time of the transfer as an eligible donee under

APPENDIX D2 (Continued)

Internal Revenue Code Section 170(h)(3) or its successor, or any regulation issued thereunder, and such organization shall be an entity qualified pursuant to Civil Code Section 815 et seq. or any subsequent State law governing the creation, transfer and enforcement of conservation easements, having similar purposes that agrees to assume the responsibility imposed by this Conservation Easement to which to transfer this Conservation Easement.

7. **MANAGEMENT FUNDS.** Concurrent with the recordation of this Conservation Easement and as reflected in Recital F, above, Grantee received a one-time distribution of _____ Dollars ($_____) in management funds (the "Management Funds"), of which _____ Dollars ($_____) shall be a non-wasting endowment. Grantee may spend the Management Funds on any property interest held by Grantee for XX in Sacramento County for any purpose related to such property interest in the Grantee's sole and absolute discretion, including, but not limited to, management, monitoring, enforcement, or restoration..

8. **RUNNING WITH THE LAND.** The Conservation Easement created by this Grant is perpetual and shall burden and run with the Property forever. Every provision of this Conservation Easement that applies to the Grantor or Grantee shall also apply forever to and shall burden or benefit, as applicable, their respective agents, heirs, devisees, administrators, employees, personal representatives, lessees, and assigns, and all other successors as their interest may appear. Grantor agrees that transfer by Grantor of any interest in the Property shall be in accordance with the terms of Paragraph 20 of this Conservation Easement and Paragraph 11 of Exhibit D attached hereto, and shall not be made in violation with the terms of Exhibit E attached hereto.

9. **REPRESENTATION AND WARRANTIES.**

   a. **Hazardous Materials.** Grantor represents and warrants that the Property (including, without limitation, any associated air, soil, groundwater, and surface water) is free of any conditions that individually or in aggregate (1) pose a significant risk to human health or the environment; (2) violate any Environmental Law, as that term is defined below in Paragraph 16; or (3) could reasonably be expected to cause any person to incur environmental investigation, removal, remediation, or other cleanup costs. There are no underground tanks located on the Property. Grantor represents and warrants that Grantor shall comply with all Environmental Laws in using the Property and that Grantor shall keep the Property free of any material environmental defect, including, without limitation, contamination from Hazardous Materials, as that term is defined below in Paragraph 16.

   b. **State of Title.** Subject to matters of record as disclosed in the title policy issued to Grantee insuring Grantee's interests in the Conservation Easement created by this

Grant, Grantor warrants that Grantor has good and sufficient title to the Property (including all appurtenances thereto, including, without limitation, all minerals and mineral rights and all water and water rights) and that Grantor has full right and authority to grant this Conservation Easement to Grantee. All deeds of trust and mortgages recorded against the Property, or any portion thereof, are and shall continue to be subordinated to the Conservation Easement created by this Grant.

c. **Compliance with Laws.** Grantor has not received notice of and has no knowledge of any material violation of any federal, state, county or other governmental or quasi-governmental statute, ordinance, regulation, law or administrative or judicial order with respect to the Property.

d. **No Litigation.** There is no action, suit or proceeding which is pending or threatened against the Property or any portion thereof relating to or arising out of the ownership or use of the Property, or any portion thereof, in any court or in any federal, state, county, or municipal department, commission, board, bureau, agency or other governmental instrumentality.

e. **Authority To Execute Conservation Easement.** The person executing this Conservation Easement on behalf of Grantee represents that execution of this Conservation Easement has been duly authorized by Grantee. The person(s) executing this Conservation Easement on behalf of the Grantor represents that the execution of this Conservation Easement has been duly authorized by the Grantor.

10. **COSTS, LEGAL REQUIREMENTS, AND LIABILITIES.** Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep and maintenance of the Property and agrees that Grantee shall have no duty or responsibility for the operation or maintenance of the Property, the monitoring of hazardous conditions thereon, or the protection of Grantor, the public, or any third parties from risks relating to conditions on the Property. Grantor agrees to pay any and all real property taxes and assessments levied by competent authority on the Property before delinquency and that Grantor shall keep Grantee's interest in the Property free of any liens, including those arising out of any work performed for, materials furnished to or obligations incurred by Grantor. Grantor shall be solely responsible for any costs related to the maintenance of general liability insurance covering acts on the Property. Grantor remains solely responsible for obtaining any applicable governmental permits and approvals for any activity or use permitted by this Conservation Easement, and any activity or use shall be undertaken in accordance with all applicable federal, state, and local laws, regulations, and requirements.

11. **INDEMNIFICATION BY GRANTOR.** Notwithstanding any other provision herein to the contrary, Grantor hereby agrees to indemnify, defend, and hold harmless Grantee, its

APPENDIX D2 (Continued)

members, directors, officers, employees, agents, and contractors and their heirs and assigns (the "Indemnified Parties") from and against any costs, liabilities, penalties, damages, claims or expenses (including, without limitation, reasonable attorneys' fees and costs) and litigation costs (collectively, "Damages") which the Indemnified Parties may suffer or incur as a result of or arising out of any of the following: (a) the activities of Grantor on the Property; (b) the inaccuracy of any representation or warranty made by Grantor; (c) the breach of any provision of this Conservation Easement; (d) any injury to or the death of any person or physical damage to any property resulting from any act, omission, condition or other matter related to or occurring on or about the Property, regardless of cause, except to the extent caused by the negligence or willful misconduct of any of the Indemnified Parties; or (e) the existence or the administration of this Conservation Easement. Without limiting the foregoing, Grantor shall indemnify, defend, and hold harmless the Indemnified Parties for all of the following:

a. **Approvals.** Approvals requested by Grantor, whether given or withheld by Grantee hereunder, except as such Damage is the result of Grantee's gross negligence or intentional misconduct.

b. **Taxes.** Any real property taxes, insurance, utilities or assessments that are levied against the Property, including those for which exemption cannot be obtained, or any other costs of maintaining the Property.

c. **Hazardous Materials.** Any Hazardous Material, as that term is defined in Paragraph 16, present, alleged to be present, or otherwise connected in any way to the Property, whether by or after the date of this Conservation Easement.

12. **NOTICE; APPROVAL.**

a. **Notice for Entry.** Where notice to Grantor of Grantee's entry upon Property is required herein, Grantee shall notify any of the persons constituting Grantor or their authorized agents by telephone or in person, or by written notice in the manner described below in subparagraph C, prior to such entry.

b. **Other Notice.** Except as provided in subparagraph A above, whenever express approval, agreement or consent is required by this document, the initiating party shall give written notice, in the manner described below in subparagraph C, and detailed information to the other party. The receiving party shall review the proposed activity and notify the initiating party, within sixty (60) days after receipt of notice of any objections to such activity. Any objections by a party shall be based upon its opinion that the proposed activity is inconsistent with the terms of the Conservation Easement.

c. **Written Notices.** Any written notice called for in this Conservation Easement may be delivered (1) in person; (2) by certified mail, return receipt requested, postage paid;

APPENDIX D2 (Continued)

(3) by facsimile with the original deposited with the United States Post office, postage prepaid on the same date as sent by facsimile; or (4) by a reputable overnight courier that guarantees next day delivery and provided a receipt, and addressed as follows:

To the Grantor: XX

To Grantee: XX

Either party may, from time to time, by written notice to the other, designate a different address which shall be substituted for the one above specified. Notice is deemed to be given upon receipt.

d. **Notice of Reserved Rights.** Grantor shall notify Grantee, in writing, at least sixty (60) days before exercising any reserved right which may have an adverse impact on any Conservation Values.

e. **Subsequent Activities.** Permission to carry out, or failure to object to, any proposed use or activity shall not constitute consent to any subsequent use or activity of the same or any different nature.

13. **SEVERABILITY AND ENFORCEABILITY.** The terms and purposes of this Conservation Easement are intended to be perpetual. If any provision or purpose of the Conservation Easement or the application thereof to any person or circumstance is found to be invalid, the remainder of the provisions and purposes of the Conservation Easement, and the application of such provision or purpose to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

14. **VALUATION; EXTINGUISHMENT; CONDEMNATION.**

a. **Stipulated Fair Market Value.** Grantor and Grantee agrees that this Grant of a perpetual Conservation Easement gives rise to a property right, immediately vested in Grantee, which for purposes of this Paragraph, the parties stipulate to have a fair market value of the greater of:

i. $_____, which is the product obtained when the per acre value paid to the Grantor of this Conservation Easement for the purchase of this easement is multiplied by ____, the total number of acres of Property; or

ii. the number obtained by multiplying (1) the fair market value of the Property unencumbered by this Conservation Easement (minus any increase in value after the date of this grant attributable to improvements) by (2) [insert x], which is the ratio of the value of the Conservation Easement at the time of this grant to the value of the Property, without the deduction for the value of the Conservation Easement. For Purposes of this Paragraph, the ratio of the value of the

APPENDIX D2 (Continued)

Conservation Easement to the value of the Property unencumbered by the Conservation Easement shall remain constant.

If for any reason there is an extinguishment of the restrictions of this Conservation Easement, Grantee, on a subsequent sale, exchange, or taking of the Property, shall be entitled to a portion of the proceeds at least equal to the amount determined in accordance with this Paragraph. If such extinguishment occurs with respect to fewer than all acres of the Property, the amounts described above shall be calculated based on the actual number of acres subject to extinguishment.

b. **Judicial Extinguishment.** It is the intention of the parties that the Conservation Purposes of the Conservation Easement shall be carried out in perpetuity. Liberal construction is expressly required for purposes of effectuating the Conservation Easement in perpetuity, notwithstanding economic hardship or changed conditions of any kind.

c. **Condemnation.** If all or part of the Property is taken in exercise of eminent domain by public, corporate, or other authority so as to abrogate the restrictions imposed by this Conservation Easement, Grantor and Grantee shall join in appropriate actions at the time of such taking to recover the full value of the taking and all incidental or direct damages resulting from the taking. All expenses incurred by Grantor and Grantee in such action shall be paid out of the recovered proceeds. The remaining proceeds shall be divided consistent with the provisions of this Paragraph using the ratio of the value of Grantee's and Grantor's interests that is set forth in subparagraph A above, it being expressly agreed that the Conservation Easement constitutes a compensable property right.

15. **INTERPRETATION**

a. **Liberally Construed.** It is the intent of this Conservation Easement to preserve the condition of the Property and each of the Conservation Purposes protected herein, notwithstanding economic or other hardship or changes in surrounding conditions. The provisions of this Conservation Easement shall be liberally construed to effectuate their purposes of preserving and protecting in perpetuity the Conservation Values and other Conservation Purposes described above, and allowing Grantor's use and enjoyment of the Property to the extent consistent with the Conservation Purposes. Liberal construction is expressly required for purposes of effectuating this Conservation Easement in perpetuity, notwithstanding economic hardship or changed conditions of any kind. The Conservation Purposes described herein are the intended best and most productive use of the Property. No remedy or election given by any provision in this Conservation Easement shall be deemed exclusive unless so indicated, but it shall, wherever possible, be cumulative with all other remedies at law or in equity. The parties acknowledge that each party and its counsel have reviewed and revised this

APPENDIX D2 (Continued)

Conservation Easement and that no rule of construction that ambiguities are to be resolved against the drafting party shall be employed in the interpretation of this Conservation Easement. In the event of any conflict between the provisions of this Conservation Easement and the provisions of any use and zoning restrictions of the State of California, the county in which the Property is located, or any other governmental entity with jurisdiction, the more restrictive provisions shall apply.

b. **Governing Law.** This Conservation Easement shall be interpreted in accordance with the laws of the State of California, and shall be subject to the provisions of Civil Code Section 815 *et seq*. or any subsequent State law governing the creation, transfer and enforcement of conservation easements.

c. **Captions.** The captions have been inserted solely for convenience of reference and are not part of the Conservation Easement and shall have no effect upon construction or interpretation.

d. **No Hazardous Materials Liability.** Notwithstanding any other provision herein to the contrary, the parties do not intend this Conservation Easement to be construed such that it creates in or gives to Grantee:

   i. the obligations or liabilities of an "owner" or "operator" as those words are defined and used in Environmental Laws, as defined below, including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (42 USC § 9601 *et seq*. and hereinafter "CERCLA");

   ii. the obligations or liabilities of a person described in 42 USC §9607(a)(3);

   iii. the obligations of a responsible person under any applicable Environmental Laws, as defined below;

   iv. the right to investigate and remediate any Hazardous Materials, as defined below, associated with the Property; or

   v. any control over Grantor's ability to investigate, remove, remediate or otherwise clean up any Hazardous Materials associated with the Property.

e. Definitions.

   i. The terms "Grantor" and "Grantee," wherever used in this Conservation Easement and any pronouns used in place thereof, shall mean and include, respectively, the above-named Grantor, its personal representatives, heirs, devisee, personal representatives, and assigns, and all other successors as their interest may appear and Grantee and its successors and assigns.

   ii. The term "Hazardous Materials" includes, without limitation, (a) material that is flammable, explosive, or radioactive; (b) petroleum products; and (c) hazardous

APPENDIX D2 (Continued)

wastes, hazardous or toxic substances, or related materials defined in the CERCLA (42 USC 9601 *et seq*.), the Hazardous Materials Transportation Act (49 USC §6901 *et seq*.), the Hazardous Waste Control Law (Cal. Health & Safety Code §25100 *et seq*.), the Hazardous Substance Account Act (Cal. Health & Safety Code §25300 *et seq*.), and in the regulations adopted and publications promulgated pursuant to them, or any other applicable Environmental Laws now in effect or enacted after this date.

iii. The term "Environmental Laws" includes, without limitation, any federal, state, local, or administrative agency statute, regulation, rule, ordinance, order or requirement relating to pollution, protection of human health, the environment or Hazardous Materials.

16. **SUBSEQUENT LIENS ON PROPERTY.** No provision of the Conservation Easement should be construed as impairing the ability of Grantor to use this Property as collateral for subsequent borrowing, provided that any deed of trust, mortgage, lien, or encumbrance arising from such a borrowing must, at all times, be subordinated to the Conservation Easement and this Grant. Any successor interest of Grantor, by acceptance of a deed, lease or other document purporting to convey an interest in the Property, shall be deemed to have consented to, reaffirmed and agreed to be bound by all of the terms, covenants, restrictions and conditions of this Conservation Easement.

17. **RE-RECORDING**. Grantee is authorized to re-record this Grant Deed, or record or file any notices or instruments necessary, as appropriate to assure the enforceability in perpetuity of this Conservation Easement. For such purpose, Grantor appoints Grantee as Grantor's attorney-in-fact to execute, acknowledge and deliver any such instrument for recording or filing on Grantor's behalf. The power of attorney in the immediately preceding sentence is irrevocable and coupled with any interest. Without limiting the foregoing, the Grantor agrees to execute any such instruments upon request.

18. **ACCESS.** Nothing contained in this Conservation Easement shall give or grant to the public a right to enter upon or use the Property or any portion thereof where no such right existed in the public immediately prior to the execution of this Grant Deed. Grantor shall undertake all reasonable actions to prevent the unlawful entry and trespass by persons whose activities might diminish or impair the Conservation Values.

19. **SUBSEQUENT TRANSFERS; NO MERGER.** Grantor shall incorporate the terms of this Grant Deed by reference in any deed or legal instrument by which Grantor divests any interest in the Property, including without limitation, any lease. Grantor shall give Grantee at least thirty (30) days written notice prior to the date of such transfer, which notice shall include the name, address and telephone number of the transferee. Grantor's failure to perform any act required by this Paragraph shall not impair the validity of the Conservation Easement or this Grant Deed or limit its enforceability in any way. Any

APPENDIX D2 (Continued)

successor in interest of Grantor, by acceptance of a deed, lease, or other document purporting to convey an interest in the Property, shall be deemed to have consented to, reaffirmed and agreed to be bound by all of the terms, covenants, restrictions, and conditions of this Conservation Easement.

20. **ENTIRE AGREEMENT.** This Grant Deed, together with the attached exhibits and schedules, and any documents incorporated herein by reference, constitutes the entire agreement of the parties with respect to the subject matter hereof, and supersedes all prior agreement and understandings of the parties.
21. **AMENDMENTS.** The Conservation Easement may be amended only by way of a written instrument signed by Grantor and Grantee, and approved by the South Sacramento Conservation Agency. Any such amendment shall be consistent with the Conservation Purposes, and shall comply with Section 815 *et seq*. of the California Civil Code.
22. **COUNTERPARTS.** This Grant Deed may be signed in one or more counterparts, all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Grant Deed of Conservation Easement as of the date first above written.

_____

DATE:_____

BY:_____

NAME:_____

ITS: _____

DATE:_____

EXHIBITS

Exhibit A – Legal Description of Property
Exhibit B – Map of Property
Exhibit C – Selected Portion of the Easement Documentation Report
Exhibit D – Permitted Uses of the Property
Exhibit E – Prohibited Uses of the Property
Exhibit F – Prohibited Plant List

APPENDIX D2 (Continued)

STATE OF CALIFORNIA)

) ss.

COUNTY OF _____)

On _____ ____, 20xx, before me, _____, the undersigned, personally appeared _____ personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS by hand and official seal.

_____

EXHIBIT A

Legal Description of Property

EXHIBIT B

Map of Property

EXHIBIT C

Selected Portion of the Easement Documentation Report

EXHIBIT D

Permitted Uses of the Property

EXHIBIT D
Permitted Uses of the Property

The uses set forth in this Exhibit D detail specific activities that are permitted under the Conservation Easement. The uses set forth in this Exhibit D are also intended to provide guidance in determining the consistency of other activities with the Conservation Purposes. Notwithstanding the uses set forth in this Exhibit D and, notwithstanding any provision of this Grant to the contrary, in no event shall any of the permitted uses of the Property (whether set forth in this Exhibit D or elsewhere in this Grant) be conducted in a manner or to an extent that diminishes or impairs the Conservation Values or that otherwise violates this Grant.

1. **Historical Agricultural Practices.** Except as prohibited or restricted in Paragraph 6 of Exhibit E of this Grant, Grantor may continue historical agricultural practices on the Property in the manner and location as set forth in the Report to the extent that such practices are consistent with the Conservation Values and Conservation Purposes of the Conservation Easement. All farming operations on the Property shall be consistent with reasonable farming practices and shall be in full compliance with all applicable federal, state and local statutes, laws, rules, regulations and ordinances (collectively, the "Laws"). The term "historical agricultural practices" includes the continued historic use of fertilizers, pesticides herbicides, and other biocides, provided that such use, including, without limitation, the amount, frequency, and manner of application, shall be in accordance with all applicable Laws, and such use does not diminish or impair the Conservation Values or the Conservation Purposes of the Conservation Easement and shall not diminish or impair the naturally occurring ecosystem on and around the Property (not including any impacts caused to such ecosystems that are the intended result of the application of such fertilizers, pesticides, herbicides and/or biocides as long as the application of such substances has been conducted in accordance with the instructions for application set forth for such substance and such application is consistent with those good farm management practices that are customary in the general geographic area in which the Property is located).

2. **New Practices.** Except as prohibited or restricted in Paragraph 5 or Exhibit E of this Grant, and subject to obtaining Grantee's prior approval in accordance with the notice and approval provisions contained herein, it shall be permissible to carry on agricultural practices, and other practices or activities, that differ from historical agricultural practices, so long as such practices do not result in significant soil degradation, or significant pollution or degradation of any surface or subsurface waters, and such practices are consistent with and do not diminish or impair the Conservation Purposes of this Conservation Easement.

   The following new practices are hereby found to be consistent with the Conservation Purposes of this Conservation Easement and do not require compliance with the notice

EXHIBIT D (Continued)

and approval procedures described above so long as such new practices shall not result in significant soil degradation, or significant pollution or degradation of any surface or subsurface waters and such new practices are consistent with and do not diminish or impair the Conservation Purposes of this Conservation Easement:

a. grazing of livestock;

b. cultivation and harvest of alfalfa, clover and other permanent pasture; and

c. substitution of new fertilizers, pesticides and herbicides for those Grantor presently uses, provided that such use, including, but not limited to, the amount, frequency, and manner of application shall be in accordance with all applicable Laws, and such use does not diminish or impair the naturally occurring ecosystems existing on the Property (not including any impacts caused to such ecosystems that are the intended result of the application of such fertilizers, pesticides, herbicides and/or biocides as long as the application of such substances has been conducted in accordance with the instructions for application set forth for such substance and such application is consistent with those good farm management practices that are customary in the general geographic area in which the Property is located); and

d. the planting of native trees and shrubs anywhere on the Property except within the Agricultural Area of the Property as identified in the Report.

Except as expressly permitted in the immediately preceding sentence, the cultivation and harvest of any non-annual crops on the Property requires Grantee's prior approval in accordance with the notice and approval provisions contained above.

3. **Fences.** Grantor may maintain, repair, replace and rebuild the fences that exist on the Property as of the date of this Grant. Grantor, with Grantee's prior written approval, may construct and maintain new fences anywhere on the Property for purposes reasonable and customary management of agriculture, livestock, and wildlife.

4. **Irrigation Systems.** Grantor may maintain, repair, replace and rebuild any irrigation systems that exists on the Property as of the date of this Grant, and may construct and maintain new irrigation system improvement anywhere on the Property for purposes reasonable and customary management of agriculture, livestock, and wildlife.

5. **Roads.** Grantor may maintain and repair existing roads at currently existing levels of improvement, and construct and maintain such new unpaved and otherwise unimproved roads as may be reasonably necessary for Grantor's agricultural activities on the Property and in manner that shall not diminish or impair the Conservation Values of the Property or the Conservation Purposes of this Conservation Easement, provided, however, that any new roads may not be constructed unless prior written consent has been obtained from Grantee, which approval shall not be unreasonably withheld.

EXHIBIT D (Continued)

6. **Fishing and Hunting.** Grantor may fish or to hunt or trap wildlife on the Property, to the extent that fish or animals subject to such activities are not afforded protection under applicable Laws and provided such fishing, hunting or trapping is conducted in compliance with applicable Laws, and in a manner that does not significantly deplete the wildlife resources on the Property; and provided, further, that hunting on the Property shall be subject to regional hunting season restrictions applicable to individual hunters at local State Wildlife Areas, which shall in no event include any special regulation hunting seasons that would increase hunting activities on the Property in a manner that would be inconsistent with the Conservation Purposes or the Conservation Values of the Conservation Easement. Commercial hunting and fishing are permitted so long as conducted in accordance with the provisions of this Paragraph, provided, however, that commercial fish farms are prohibited. Control of predatory and problem animals shall use selective control techniques, which shall be limited in their effectiveness to specific animals which have caused damage to agriculture, livestock and other property.

7. **Water Resources.** Grantor may develop and maintain such groundwater resources on the Property as are necessary or convenient for agricultural, livestock, and wildlife habitat uses in a manner consistent with this Conservation Easement. Grantor may maintain such surface water resources on the Property as are noted in the Report as currently existing on the Property.

8. **Passive Recreational Uses.** Grantor may conduct passive recreational uses on the Property, including, but not limited to, bird watching, hiking, horseback riding, and picnicking, provided that these uses require no surface alteration or other development of the Property.

9. **Signs.** Grantor may erect a reasonable number of signs or other appropriate markers in a prominent location on the Property, visible from a public road, which identify agricultural or open space activities on the Property and/or state that no trespassing or no hunting is allowed on the Property.

10. **Transfer of Property.** Grantor may transfer the Property, provided that the transfer is not prohibited in Exhibit E and that Grantor notifies Grantee before the transfer of the Property, and the document of conveyance shall expressly incorporate by reference this Grant. Leasing of the Property for a period of five (5) or more years must be approved in writing by Grantee, whose approval shall not unreasonably be withheld. The failure of Grantor to perform any act required by this Paragraph shall not impair the validity of this Grant or the Conservation Easement or limit the enforceability in any way.

11. **Residual Rights; Prior Approval.** Except as expressly limited herein, Grantor may exercise and enjoy all rights as fee owner of the Property, including the right to use the Property for any purpose which is consistent with and does not diminish or impair

EXHIBIT D (Continued)

the Conservation Values of the Property or the Conservation Purposes of the Conservation Easement.

If any question exists regarding whether historic or new practices or activities are permitted or would impair or diminish the Conservation Values of the Property or the Conservation Purposes of the Conservation Easement, Grantor shall notify Grantee pursuant to Paragraph 13 of the Conservation Easement and obtain Grantee's written approval prior to engaging in such practices or activities.

EXHIBIT E

Prohibited Uses of the Property

EXHIBIT E
Prohibited Uses of the Property

Though not an exhaustive list of prohibited uses, none of the uses described below shall be made of the Property. The following are set forth both to list specific prohibited activities on the Property, and to provide guidance in determining whether other activities are not consistent with the Conservation Purposes of the Conservation Easement:

1. **No Subdivision.** The legal or de facto division, subdivision, or partitioning of the Property, any fee transfer of less than the entire Property.
2. **No Non-Agricultural Commercial Uses.** The establishment of any commercial or industrial uses on the Property other than the agricultural uses and commercial practices allowed by the terms of Exhibit D of this Grant. Examples of prohibited commercial or industrial uses include, but are not limited to, (a) the establishment or maintenance of any commercial feedlots, which are defined as any open or enclosed area where domestic livestock are grouped together for intensive feeding purposes; (b) the planting and cultivation orchards or vineyards; (c) the establishment or maintenance of any commercial greenhouses or plant nurseries; the (d) establishment or maintenance of any gravel mines; and (e) the establishment of any multi-family dwellings.
3. **No Non-Agricultural Practices in the Agricultural Area.** The planting and cultivation of any non-agricultural plants, including, but not limited to, native trees and shrubs, in the Agricultural Area as identified in the Report.
4. **No Use or Transfer of Development Rights.** Except as expressly permitted by terms of Exhibit D of this Grant, the exercise of any development rights associated with the Property, including without limitation, the construction or placement of any residential or other buildings, golf courses, camping accommodations, boat ramps, bridges, mobile homes, house trailers, permanent tent facilities, Quonset huts or similar structures, underground tanks, billboards, signs, or other advertising, and/or other structures or improvements, street lights, utility structures or lines, sewer systems or lines.

   Except as expressly permitted by terms of Exhibit D of this Grant, all development rights that are now or hereafter allocated to, implied, reserved or inherent in the Property are terminated and extinguished, and may not be used on or transferred to any portion of the Property as it now or hereafter may be bounded or described, or to any other property adjacent or otherwise, nor used for the purpose of calculating permissible lot yield of the Property or any other property.
5. **Natural Resource Development.** Except soils, sands and other material as appropriate for the conduct of the agricultural and other activities expressly permitted on the Property in this Grant, the exploration for or extraction of minerals, gas, hydrocarbons, soils, sands, gravel or rock or any other material on or below the surface of the Property.

EXHIBIT E (Continued)

6. **Prohibited Agriculture.** Any annual crop not historically planted on the Property or approved in writing by Grantor. Any non-annual crop not expressly permitted by the terms of Exhibit D of this Grant or approved in writing by Grantor. The planting, cultivation and harvest of any orchards, vineyards, artichokes, asparagus, sod, rice, safflower, or cotton.

7. **No Dumping.** The dumping, storage, or other disposal of non-compostable refuse, trash, sewer sludge or unsightly or toxic or Hazardous Materials or agrichemicals, except that fertilizers, pesticides, biocides, and herbicides permitted under Paragraphs 1 and 2 of Exhibit D may be stored on the Property provided that such storage is in full compliance with applicable Laws, best management practices, and does not diminish or impair the Conservation Values of the Property.

8. **No New Roads.** The construction, reconstruction or replacement of any roadways, except as expressly permitted in Exhibit D of this Grant, without the consent of Grantee.

9. **No Destruction of Native Trees or Shrubs.** The removal, cutting or destruction of native trees or shrubs on the Property, except for disease or insect control or to prevent property damage or personal injury and except for the removal of native trees that are four inches or less in diameter when measured at chest height from those areas of the Property that are used by Grantor for agricultural purposes permitted under this Grant.

10. **No Biocides.** The use of fertilizers, pesticides, biocides, and herbicides or other agricultural chemicals on the Property, except as expressly permitted in Exhibit D of this Grant.

11. **No Long-Term Leases.** Leasing the Property for a period of five (5) or more years without the prior written approval of Grantee.

12. **No Alteration of Natural Water Courses; Degradation of Water Quality.** Except with the prior consent of Grantee, the manipulation or alteration of natural water courses, wetland, streambank, shoreline, or body of water. Activities or uses detrimental to water quality, including but not limited to, degradation or pollution of any surface or subsurface waters; provided, however, that Grantor shall be allowed to conduct any of the uses specifically permitted in this Grant even if such uses result in some adverse impact on water quality so long as such permitted uses are conducted in full compliance with all applicable Laws and consistent with those good farming practices that are customary in the general geographic area in which the Property is located.

13. **No Impairment of Water Rights.** Severance, conveyance, or encumbrance of water or water rights appurtenant to the Property, separately from the underlying title to the Property, or other action which diminishes or extinguishes such water rights.

EXHIBIT E (Continued)

Nothing in this provision shall restrict the right of the Grantor to sell rights to use water, or to use water on the Property, or on lands other than the Property on a temporary basis (maximum one-year increments), provided that such sale or use does not permanently impair the riparian or other water rights appurtenant to the Property nor reduce water rights below what is necessary for present or future agricultural production on the Property.

This Conservation Easement for Agricultural Lands shall not sever or impair any riparian water rights appurtenant to the Property.

14. **Inconsistent or Adverse Actions.** Any action or practice which is or becomes not consistent with, or which diminishes or impairs the Conservation Values of the Property or the Conservation Purposes of the Conservation Easement.

15. **Vehicles.** The use of any motorized vehicles off designated roadways, except for agricultural purposes.

16. **Introduction of Non-native Species.** The intentional or reckless introduction of non-native plant or animal species which may in Grantee's determination threaten the Conservation Values of the Property or the Conservation Purposes of the Conservation Easement, which species include, but are not limited to, the plants, trees and weeds listed on Exhibit F, attached hereto and incorporated herein by reference. Grantor shall not be considered reckless for failure to prevent, investigate or research any potential manner that such items may be introduced to the Property if such prevention, investigation or research is not within Grantor's normal business practices, or such potential manner has not been brought to Grantor's attention.

17. **Subsequent Transfers.** Conveyance by Grantor of any interest in the Property in a manner that would directly or indirectly violate the prohibitions of this Exhibit E, or in any manner that does not comply with the requirements of Exhibit D and Paragraph 20 of this Grant.

18. **No Hazing.** The hazing or other disturbance of cranes or Swainson's hawks on, approaching, or leaving the Property for the purpose of, without limitation, discouraging the presence of or habitat use by cranes and other migratory birds on the Property.

19. **Junkyards.** The storage or disassembly of inoperable automobiles, machinery, equipment, trucks, and similar items for purposes of storage, sale, or rental of space for any such purpose.

EXHIBIT E (Continued)

INTENTIONALLY LEFT BLANK

EXHIBIT F

Prohibited Plant List

EXHIBIT F
Prohibited Plant List

None of the following plant, tree, or weed species shall be planted on the Property:

Alligatorweed	*Alternanthera philoxeroides*
Ambulia	*Limnophila indica*
Arundo or Giant Weed	*Arundo donax*
Baby's breath	*Gypsophila paniculata*
Beancaper, Syrian	*Zygophyllum fabago*
Bearded creeper	*Crupina vulgaris*
Bermudagrass	*Cynodon* spp. and hybrids
Biddy biddy	*Acaena novae-zelandiae*
Biddy biddy, pale	*Acaena pallida*
Birdweed, field	*Convolvulus arvensis*
Black locust	*Robinia pseudoacacia*
Bladderflower	*Araujia sericifera*
Blueweed	*Helianthus ciliaris*
Broom, French	*Genista monspessulana*
Broom, Scotch	*Cytisus scoparius*
Broomrape, branched	*Orobanche ramosa*
Broomrape, Cooper's	*Orobanche cooperi*
Broomrape, Desert	*Orobanche cooperi*
Camelthorn	*Alhagi maurorum*
Capeweed	*Arctotheca calendula*
Chinese pistachio	*Pistacia atlantica* or *P. chinensis*
Chinese tallow tree	*Sapium sebiferum*
Chinese or scarlet wisteria	*Sesbania punicea*
Comfrey, rough	*Symphytum asperum*
Crupina, common	*Crupina vulgaris*
Distaff thistle, smooth	*Carthamus baeticus*
Distaff thistle, whitestern	*Carthamus leucocaulos*
Distaff thistle, woolly	*Carthamus lanatus*
Dodder, all species except giant dodder	*Cuscuta* spp.
Dodder, giant	*Cuscuta reflexa*
Diver's woad	*Isatis tinctoria*
Edible fig	*Ficus carica*
English Ivy	*Hedera helix*
Eucalyptus	*Eucalyptus* spp.
Fanwort, Carolina	*Cabomba caroliniana*
Field cress, Austrian	*Rorippa autriaca*
Field cress, creeping yellow	*Rorippa sylvestris*
Flag, western blue	*Iris missouriensis*
Foxtail, giant	*Setaria faberi*
Garlic, false	*Nothoscordum inodorum*

EXHIBIT F (Continued)

Garlic, wild	*Allium vineale*
Gaura, scarlet	*Gaura coccinea*
Gaura, Drummond's	*Gaura drummondii*
Gaura, wavy-leaved	*Gaura sinuata*
Goatgrass, barb	*Aegilops triuncialis*
Goatgrass, jointed	*Aegilops cylindrica*
Goatgrass, oyate	*Aegilops ovata*
Gorse	*Ulex europaeus*
Groundcherry, grape	*Physalis viscosa*
Groundcherry, long-leaf	*Physalis longifolia*
Halogeton	*Halogeton glomeratus*
Hermal	*Pegamon harmala*
Henbane, black	*Hyoscyamus niger*
Himalayan Blackberry	*Rubus discolor.*
Hoarycress, globe-podded	*Cardaria pubescens*
Hoarycress, heart-podded	*Cardaria draba*
Hoarycress, lens-podded	*Cardaria chalepensis*
Horsenettle, Carolina	*Solanum carolinense*
Horsenettle, white	*Solanum elaeagnifolium*
Hydrilla	*Hydrilla verticillata*
Iris, Douglas	*Iris douglasiana*
Iris, western blue flag	*Iris missouriensis*
Johnsongrass	*Sorghum halepense*
Jointvetch, rough	*Aeschynomene rudis*
Kangaroothorn	*Acacia paradoxa*
Kelp	*Polygonum amphibium* var. *emersum*
Kikuyugrass	*Pennisetum clandestinum*
Klamathweed	*Hypericum perforatum*
Knapweed, diffuse	*Centaurea diffusa*
Knapweed, Russian	*Acroptilon repens*
Knapweed, spotted	*Centaurea maculosa*
Knapweed, squarrose	*Centaurea squarrosa*
Knotweed, giant	*Polygonum sachalinensis*
Knotweed, Himalayan	*Polygonum polystachyum*
Knotweed, Japanese	*Polygonum cuspidatum*
Loosestrife, purple	*Lythrum salicaria*
Lettuce, water	*Pistia stratiotes*
Mallow, alkali	*Malvella leprosa*
Marigold, wild	*Tagetes minuta*
Medusahead	*Taeniatherum caput-medusae*
Melon, dedaim	*Cucumis melo* var. *Dudaim*
Melon, paddy	*Cucumis myriocarpus*
Mesquite, creeping	*Prosopis strombulifera*

EXHIBIT F (Continued)

Mistletoe, European	*Viscum album*
Mustard, purple	*Chorispora tenella*
Nightshade, heartleaf	*Solanum cardiophyllum*
Nightshade lanceleaf	*Solanum lanceolatum*
Nightshade, Torrey's	*Solanum dimidiatum*
Nightshade, white-margined	*Solanum arginatum*
Nimblewill	*Muhlenbergia schreberi*
Nutsedge, purple	*Cyperus rotundus*
Nutsedge, yellow	*Cyperus esculentus*
Onion, panicled	*Allium paniculatum*
Osage orange	*Maclura pomifera*
Pampas Grass	*Cortaderia jabata* or *C. selloana*
Peaweed, Austrian	*Sphaerophysa salsula*
Peppercress, perennial	*Lepidium latifolium*
Periwinkle	*Vinca major*
Povertyweed	*Iva axillaris*
Punagrass	*Achnatherum brachychaetum*
Puncturevine	*Tribulus terrestris*
Quackgrass	*Elytrigia repens*
Ragweed, giant	*Ambrosia trifida*
Ragwort, Oxford	*Senecio squalidus*
Ragwort, tansy	*Senecio jacobaea*
Restharrow, foxtail	*Ononis alopecuroides*
Rice, red	*Oryza rufipogon*
Russianthistle, barbwire	*Salsola paulsenii*
Russionthistle, common	*Salsola tragus*
Russianthistle, spineless	*Salsola collina*
St. Johnswort	as *Hypericum perforatum* (see Klamathweed)
Sage, meadow	*Salvia virgata*
Sage, Mediterranean	*Salvia aethiopis*
Salsola, wormleaf	*Salsola vermiculata*
Salt cedar (Tamarisk)	*Tamarix* spp.
Salttree, Russian	*Halimodendron halodendron*
Salvinia	*Salvinia auriculata complex*
Sandbur, coast	*Cenchrus incertus*
Sandbur, mat	*Cenchrus longispinus*
Sandbur, southern	*Cenchrus echinatus*
Satintail	*Imperata brevifolia*
Sicilian starthistle	*Centaurea sulphurea*
Skeletonweed	*Chondrilla juncea*
Sowthistle, perennial	*Sonchus arvensis*
Smooth-leaved elm	*Ulmus minor*
Spongeplant (S. American & N. American)	*Limnobium spongia sensu lato*

EXHIBIT F (Continued)

Spurge, leafy	*Euphorbia esula*
Spurge, oblong	*Euphorbia oblongata*
Spurge serrate	*Euphorbia serrata*
Spurge, Geraldton carnation	*Euphorbia terracina*
Starthistle, Iberian	*Centaurea iberica*
Starthistle, purple	*Centaurea calcitrapa*
Starthistle, Sicilian	*Centaurea sulphurea*
Starthistle, yellow	*Centaurea solstitialis*
Swinecress	*Coronopus squamatus*
Tanglehead	*Heteropogon contortus*
Thistle, artichoke	*Cynara cardunculus*
Thistle, Canada	*Cirsium arvense*
Thistle, distaff, smooth	*Carthamus baeticus*
Thistle, distaff, whitestern	*Carthamus leucocaulos*
Thistle, distaff, woolly	*Carthamus lanatus*
Thistle, golden	*Scolymus hispanicus*
Thistle, Illyrian	*Onopordum illyricum*
Thistle, Itaslian (see also “Thistle, slenderflowered”)	*Arduus pycnocephalus*
Thistle, Japanese	*Cirsium japonicum*
Thistle, musk	*Carduus nutans*
Thistle, plumeless	*Carduus acanthoides*
Thistle, Scotch	*Onopordum acanthium*
Thistle, slenderflowered	*Carduus tenuiflorus*
Thistle, Taurian	*Onopordum tauricum*
Thistle, wavyleaf	*Cirsium undulatum*
Thistle yellowspine	*Cirsium ochrocentrum*
Toadflax, Dalmatian	*Linaria genistifolia* subsp. *Dalmatica*
Tree of Heaven or Ailanthus	*Ailanthus altissima*
Waterlily, banana	*Nymphaea mexicana*
Witchweed	*Striga asiatica*

APPENDIX E

Land Cover Type Report/ Vernal Pool Watershed Mapping

APPENDIX E1

Land Cover Type Report

APPENDIX E1
Land Cover Type Report

1 INTRODUCTION

The purpose of developing a land cover type map of the Plan Area is to provide current land cover type baseline data for use in the development of the South Sacramento Habitat Conservation Plan (SSHCP) and of other necessary permits (e.g., Clean Water Act Section 404). Classification of habitats in the Plan Area, particularly aquatic resources, is necessary to ensure protection of a vast array of aquatic, wetland, and riparian land cover types. This effort to map land cover types should not be confused with General Plan Land Use designations that are used by local governmental jurisdictions to define what type of uses are allowed to occur on any given parcel. Land cover types are defined as the dominant feature of the land surface discernible from aerial photographs and defined by vegetation, water, or human uses.

2 METHODS

The original delineation of vernal pool and swale land cover types are based on the interpretation of black and white aerial imagery dated March 2001. All vernal pool or swale cover types, approximately 5,000 acres, were mapped at a scale of 1 inch = 200 feet (1:2,400). The original delineation of all other land cover types are based on the interpretation of color aerial imagery dated November 2002. A total of approximately 336,000 acres were mapped at a scale of 1 inch = 400 feet (1:4,800). As SSHCP planning progressed, approximately 3,000 additional acres were mapped and included in the Plan Area. Changes to habitat that occurred after the initial mapping (e.g. changing from a natural habitat to an urban land use) are reflected on the land cover type map as of 2014.

Twenty-five (25) different land cover types are displayed on the land cover types map. Seventeen land cover types are classified as SSHCP "natural land covers," which includes native and naturalized environments and agricultural lands that have habitat value for SSHCP Covered Species. Eight SSHCP land cover types are classified as "developed/non-habitat land covers" and provide minimal habitat value for native species, including the SSHCP Covered Species These 25 land cover types reflect the most comprehensive coverage of land cover types discernable at the chosen mapping scales. Land cover type categories are roughly based on the habitat types described in the California Department of Fish and Game's (CDFG) List of California Natural Communities and were modified to meet the needs of Sacramento County for inclusion in the SSHCP process.

Initial field surveys were conducted on approximately 4,000 acres of selected, County-owned parcels located throughout the Plan Area to provide recognition of signatures for aerial interpretation of the remaining portions of the Plan Area. These areas were selected by the County primarily for accessibility reasons. Areas used in field verification included a parcel

APPENDIX E1 (Continued)

along the Cosumnes River in Rancho Murieta, Gene Andal Park and Wetlands Preserve, the Sacramento Regional County Sanitation District (SRCSD) Bufferlands, the Nicholas Ranch and Valensin Ranch parcels of the Cosumnes River Preserve, and Deer Creek Hills. Problematic aerial signatures that were not contained in the field survey areas or easily identified from aerial photographs were spot-checked from public roads to the degree feasible.

Vernal Pool and Swale Mapping Conducted by the Geographical Information Center

Initial mapping was completed in two phases: Phase I included all maps contained in the Urban Development Area (UDA) and Phase II included all of the remaining non-UDA maps located in the south Sacramento County area. The black and white ortho-photographic images were brought into ArcView 3.3 Geographic Information System (GIS) software and the vernal-wetland signatures were heads-up digitized into polygons which were recorded as a shape file. Vernal pool/wetlands were identified primarily by visual signatures, including contrasting shades (color) and to some degree texture and shape. Geographic Information Center (GIC) cartographers then vectorized, and attributed these maps to create a seamless GIS layer for both Phase I and Phase II of the Plan Area.

All Other Land Cover Type Mapping Conducted by EDAW

Initial mapping was completed in two phases: Phase I included all maps contained in the UDA and Phase II included all of the remaining non-UDA maps located in the south Sacramento County area. The entire Plan Area was hand-mapped by qualified EDAW botanists onto color print-outs of the aerial photographs based on interpretations using habitat signatures verified in the field. EDAW GIS specialists and Geographic Computer Technologies (GCT) scanned, vectorized, and attributed these maps to create a seamless GIS layer for both Phase I and Phase II of the Plan Area.

Land cover types mapped by EDAW that were identified in the field, but that were not discernable at the mapping scale of 1:4,800, were not included in the resulting map layer. If features were present during 2004 field surveys (e.g., new development, additional restoration activities) that were not yet present when the 2002 aerial photographs were flown, these features were omitted from the initial mapping effort. Similarly, care was taken by EDAW botanists and GIS specialists when mapping portions of the Plan Area familiar to the botanists to delineate only the aerial signatures readily identifiable at the 1:4,800 scale to reduce potential sources of bias.

Integration of EDAW and GIC Mapping Efforts

Upon completion of both mapping efforts by EDAW and GIC, Sacramento County staff integrated the GIC vernal pool and swale shape file into the broader EDAW land cover type shape file. This was done by first clipping the EDAW land cover types shape file with the GIC

vernal pool and swale shape file. The GIC vernal pool and swale file and the EDAW land cover type map were then merged to create the final land cover types map.

Sacramento County staff then reviewed the final land cover type map for shape file registration errors and inaccurately labeled land cover types and modified the map where needed. This included identifying intersections between land cover type features that should not intersect, such as vernal pools intersecting open water features. Intersections where then reviewed against aerial images and corrected where necessary.

SSHCP Expansion Area Mapping Conducted by PMC

The initial SSHCP study area excluded lands west of Interstate 5. These lands, approximately 33,000-acres, were later included within the final Plan Area. Experienced PMC GIS specialist heads-up digitized 2009 aerial imagery creating habitat features into polygons. The mapping was conducted utilizing ArcView 9.3 at a maximum scale of 1:4,800 (1 inch = 400 feet). This area was then added to land cover type mapping prepared for the Plan Area to create a seamless land cover type layer for the entire Plan Area.

Periodic Map Updates and Refinement

Overtime, the SSHCP land cover type mapping required periodic updates to reflect changes to the environment (e.g., development, conversion of agricultural lands, and habitat restoration) as well as further refinement to better inform the SSHCP planning process (e.g., more precise mapping of agricultural residential areas).

- **Vernal swale** – initial mapping efforts included two categories of swales – vernal swales that provide habitat for listed vernal pool invertebrate species and swales that do not provide habitat for listed vernal pool invertebrate species. In consultation with the Wildlife Agencies, it was determined that it was not possible to differentiate between these two cover types using aerial photography. All features that were classified as vernal swale were re-classified as swale.
- **Vernal impoundment** – initial mapping efforts included a vernal impoundment land cover-type classification. In consultation with the Wildlife Agencies, it was determined that vernal impoundments would be re-classified to vernal pool, open water or seasonal wetland land cover types. Each feature that was classified as vernal impoundment was checked against four sets of aerial photos flown during the summer months (2003, 2005, 2009 & 2010). If water or vegetation was present in at least three of the four aerial photos the feature was re-classified as open water or seasonal wetland. The open water classification was applied when at least half of the feature was inundated. When little or no water was present but vegetation was present indicating that the feature did not completely dry down,

APPENDIX E1 (Continued)

then the feature was re-classified as seasonal wetland. If water or vegetation was not present in at least three of the four aerial photos then the feature was re-classified as vernal pool with a few exceptions. Those exceptions are if woody vegetation was present around the perimeter or within the feature, then the feature was re-classified to open water or seasonal wetland. If a feature was surrounded by an agricultural cover type or within topography dominated by mine tailings the feature was re-classified as open water or seasonal wetland. Features completely surrounded by non-habitat cover types were re-classified to the surrounding non-habitat cover type classification.

- **Seasonal impoundments** –The same methodology used to reclassify vernal impoundments was used to reclassify seasonal impoundments.
- **Wetland Restoration** – initial mapping efforts included a land cover type classification that attempted to identify restored or created wetlands. This classification was abandoned as it was difficult to accurately identify all restored or created wetlands using aerial photography. All features with the wetland restoration land cover type classification were re-classified to an appropriate wetland land cover type classification. The SSHCP land cover type database does include coding that identifies if a vernal pool feature is suspected of being created or restored.
- **Woodland Restoration –** initial mapping efforts included a land cover type classification that attempted to identify restored or created riparian woodland areas. This classification was abandoned as it was difficult to accurately identify all restored or created riparian woodland using aerial photography. All features with the woodland restoration land cover type classification were re-classified to either mixed riparian scrub or mixed riparian woodland.
- **Agricultural-residential mapping** – the initial mapping under represented the acres of upland habitats (e.g., valley grassland) in areas characterized by small parcels (less than 5 acres in size); therefore, it was determined that further refinement of the land cover type mapping was necessary to assess effects to covered species habitat in these areas. Specifically at issue is that many backyard areas within Agricultural-residential developments were mapped as grassland and a number of larger fields were mapped as low density development. Areas with agricultural-residential development were reviewed against aerial photos and where appropriate were re-classified to reflect the correct cover type. All parcels less than 5-acres were reviewed against March 2009 aerial imagery and the land cover type mapping was adjusted were upland habitats represented more than 0.5 acres.
- **Streams/creeks and swales** – the initial mapping relied on aerial interpretation of streams. In February 2008, the United States Army Corps of Engineers (USACE) Research and Development Center conducted an "Assessment of the Riparian Integrity

APPENDIX E1 (Continued)

for the South Sacramento Habitat Conservation Plan." The draft document reported on the hydrology, water quality, and habitat integrity of stream reaches inside the SSHCP Urban Development Area (UDA). The assessment also produced a GIS data set of the stream reaches inside the UDA. This data is a reliable representation of streams within the UDA and more accurate than the original aerial interpretation. The land cover type map was then reviewed against the USACE derived data to ensure the land cover type map was consistent with the USACE derived data. Features mapped as streams/creeks where the USACE did not identify a stream were reclassified as a swale or other land cover type based on March 2009 imagery.

- **Streams/creek vernal pool invertebrate habitat (VPIH)** – The stream/creek VPIH land cover type was created in late 2012 to distinguish intermittent drainages that provide suitable habitat for vernal pool crustaceans from those that do not. The stream/creek (VPIH) land cover type is vegetated with valley grassland plant species and conveys water after rain events. Unlike the Swale land cover type, the Stream/Creek (VPIH) land cover is less likely to support vegetation characteristic of vernal pools, and the SSHCP does not consider the Stream/Creek (VPIH) land cover habitat for vernal pool plant Covered Species. However, the Stream/Creek (VPIH) land cover is known to provide movement corridors and may provide habitat for vernal pool crustaceans.
- **Eucalyptus woodland and valley oak riparian woodland** – These two land cover type classifications were included as part of the initial mapping efforts, but are no longer used by the SSHCP. The eucalyptus woodland classification was abandoned after a large grove was removed leaving only small scattered clusters of eucalyptus trees that are difficult to discern form aerial photos. The valley oak riparian woodland classification was abandoned after it was determined that features mapped valley oak riparian woodland were indistinguishable from the mixed riparian woodland land cover type classification.

Minimum Mapping Units and Linear Features

The minimum mapping units listed in Table E-1 reflect the level of accuracy at which particular land cover types could be identified and delineated from aerial photographs and digitized using ArcMap. Minimum mapping units were calculated based on an average of the five smallest complete polygons for each cover type. Linear features (i.e., streams and creeks, aqueducts, and roads) do not have associated minimum mapping units. Linear features with discernable widths were mapped as polygons wherever possible; however, stream features for which widths were indiscernible at the mapping scale of 1:4,800 were digitized as line features and subsequently buffered. The average width of small streams and drainage ditches during the field verification surveys was identified as 6 feet with the concurrence of Sacramento County staff. Therefore, a 3-

foot buffer was added to each side of these line features and the resulting polygons were then merged into the land cover type layer using batch erase and union functions.

Table E-1
Minimum Mapping Unit for SSHCP Land Cover Type Map

Land Cover Type	Minimum Mapping Unit (acres)
Aqueducts	3.8
Blue Oak Savanna	3.8
Blue Oak Woodland	2.0
Cropland	2.5
Disturbed	0.9
Freshwater Marsh	0.01
High Density Development	0.4
Irrigated Pasture-Grassland	0.7
Low Density Development	0.08
Major Road	1.7
Mine Tailing Riparian Woodland	0.1
Mine Tailings	0.4
Mixed Riparian Scrub	0.1
Mixed Riparian Woodland	0.04
Open Water	0.1
Orchards	0.5
Recreation/Landscaped	0.2
Seasonal Wetlands	0.1
Streams/Creeks	0.02
Streams/Creeks (VPIH)	0.02
Swale	0.003
Valley Grassland	0.01
Vernal Pool	0.001
Swale	0.001
Vineyards	1.2

3 LAND COVER MAPPING RESULTS

Each of the 25 land cover types is described below. Total acreages and percentages of the total Plan Area covered by each land cover type are listed in Table E-2.

APPENDIX E1 (Continued)

Table E-2
Acreages and Percentages of Land Cover Types Within the Plan Area

SSHCP Land Cover Type	Area (Acres) in Plan Area	Percentage of Total Plan Area
Natural Land Cover Category (have habitat value)		
Aquatic Land Cover Types		
Vernal Pool	4,536	1.4
Swale	1,252	0.4
Seasonal Wetland	2,600	0.8
Freshwater Marsh	2,954	0.9
Mixed Riparian Woodland	5,856	0.2
Mixed Riparian Scrub	1,454	0.5
Mine Tailings Riparian Woodland	641	0.2
Stream/Creek (Vernal Pool Invertebrate Habitat)*	73	0.02
Stream/Creek	2,778	0.9
Open Water	2,344	0.7
Terrestrial Land Cover Types		
Valley Grassland	135,152	42.5
Blue Oak Savanna	5,637	1.8
Blue Oak Woodland	9,132	2.9
Cropland	51,829	16.3
Orchard	3,907	1.2
Vineyard	26,460	8.3
Irrigated Pasture	15,991	5.0
Developed / Non-Habitat Land Cover Category		
Aqueduct	264	0.1
Disturbed	6,288	2.0
High-Density Development	13,073	4.1
Low-Density Development	18,608	5.9
Major Roads	2,764	0.9
Mine Tailings	1,098	0.3
Recreation/Landscaped	2,180	0.7
Not Mapped	784	0.2
Total	**317,655**	

Land Cover Type Descriptions

Vernal Pool Land Cover

Vernal pools are seasonal ephemeral wetlands that fill and dry each year. In Central Valley annual grasslands, they form in shallow depressions that are underlain with a soil or a soil layer impermeable to water. In California's Mediterranean climate (rainy winter months followed by a hot, dry season), vernal pool soils typically become wetted in November. Water collects in the

APPENDIX E1 (Continued)

depressions and stands during late winter and early spring, then recedes as temperatures rise and rainfall diminishes. The soil, however, remains moist through April and May, then it desiccates and stays dry until the cycle begins again. The specific regime of vernal pool inundation—too short and unpredictable to support aquatic species but long enough to eliminate upland species—is what characterizes vernal pools as ephemeral wetlands and differentiates them from other aquatic ecosystems such as alkali meadows and seasonally flooded emergent bulrush or tule marshes (Solomeshch et al. 2007).

Vernal pools support unique assemblages of highly specialized plants and animals that are adapted to the annual cycle of winter inundation and summer drought. Consequently, vernal pools are one of the few habitats in California still dominated by native plant and animal species (Rains et al. 2008). Many vernal pool plant genera and species are endemic to California, and their presence indicates the specific hydrology and water chemistry of the vernal pool. Vernal pools were once a very common element of the Central Valley landscape, but only a small portion has not been converted to agricultural and urban developments; consequently, many vernal pool taxa are now rare and endangered.

Vernal pools provide habitat for rare and endangered animals such as vernal pool tadpole shrimp (*Lepidurus packardi*), vernal pool fairy shrimp (*Branchinecta lynchi*), conservancy fairy shrimp, Ricksecker's water scavenger beetle (*Hydrochara richseckeri*), and several amphibians (e.g., western spadefoot toad (*Spea hammondii*), California tiger salamander (*Ambystoma californiense*)), and vernal pools support a number of migratory birds in the winter (Alexander 1976; Helm 1998; Silveira 1998; Solomeshch et al. 2007; USFWS 2004b). A specific group of plant taxa occupies vernal pools, most of which are annuals capable of slow underwater growth in winter and rapid development and reproduction in spring after the water is gone but before soils dry. Plant species are not distributed evenly through the pools, but grow in concentric zones that reflect different lengths of inundation as the pool dries (Solomeshch et al. 2007). As discussed in Chapter 2, Central Valley vernal pools occur on many geological surfaces, but in all cases, vernal pools are underlain by a low-permeability layer such as claypans, hardpans (e.g., silica-cemented duripans), mudflows, or bedrock (Rains et al. 2008). Because vernal pools are associated with specific landforms, geologic formations, and soils (Smith and Verrill 1998), vernal pools tend to be clustered at the landscape scale, forming vernal pool complexes (Rains et al. 2006; USFWS 2006). Based on a vernal pool's landform, underlying geology, nature of the soil's water-restricting layer, frequency of ponding, and ponding duration, Sawyer and Keeler-Wolf (1995) have identified five vernal pool types in Northern California. As discussed in Section 2.3, most vernal pools in the Plan Area are broadly classified as Northern Hardpan vernal pools and Northern Volcanic Mudflow vernal pools (Jones and Stokes 1990). In addition, a less specialized vernal pool type with generally lower species richness is found on Drainageway formation soils in the Plan Area.

APPENDIX E1 (Continued)

Northern Volcanic Mudflow vernal pools occur on ancient mudflows called lahars (see Section 2.3). These pools are small, form in irregular depressions in gently sloping surfaces, and are often rocky and shallow. Water chemistry is mixo-saline, fresh (Sawyer and Keeler-Wolf 1995). In the Plan Area, Northern Volcanic Mudflow vernal pools are found on the Mehrten and Valley Springs formation in rocky soil series and complexes such as Hadselville-Pentz, Red Bluff-Redding, Corning-Redding, Amador-Gillender, and Pardee-Rancho Seco (Jones and Stokes 1990). Mudflow pools in the Plan Area are hydrologically complex; in some areas, vernal pools are in complex reticulated drainage networks with a high density of interconnected pools, swales, and ephemeral drainages (Jones and Stokes 1990). The seasonal hydrology of Northern Volcanic Mudflow vernal pools includes a perched water table (see Section 3.2.3), but pool hydrology is relatively "flashy" (i.e., pools fill and drain relatively rapidly). Northern Volcanic Mudflow vernal pools contain relatively rich flora that includes several vernal pool obligate species. The species richness and ecological complexity of Northern Mudflow pools in the Plan Area exceed that of the Young-Terrace Northern Hardpan pools and the Drainageway vernal pools in the Plan Area. Possible explanations of the rich (less specialized) flora of Northern Mudflow pools include the recent origin of the pools and their quickly changing or "flashy" hydrology. Mudflow pools fill and drain rapidly, and may be less stressful to most plant life than pools that remain flooded for extended periods, such as the Old-Terrace Northern Hardpan vernal pools (Jokerst 1990; Jones and Stokes 1990).

Northern Hardpan vernal pools form on alluvial terraces in old, acidic, nutrient-depleted soils with iron-silicate cemented soil layer. These soils often exhibit well-developed mound-intermound topography to form aggregations of pools and "mima mounds." Water chemistry is mixo-saline fresh (Sawyer and Keeler-Wolf 1995; USFWS 2005). Northern Hardpan vernal pools typically have a conductivity of 40 to 70 mhos per 1 centimeter, which is similar to an oligotrophic high Sierran lake (Keeley and Zedler 1998; Williamson et al. 2005). Water in hardpan vernal pools is not only low in dissolved salts, but also in dissolved nitrogen. For example, Rains et al. (2006) reported that, during the growing season, nitrate and phosphate concentrations were below detection limits (i.e., 0.006 milligrams per liter (mg/L) and 0.03 mg/L, respectively), and the amount of ammonium was negligible (0.1 mg/L). Within the Plan Area, Northern Hardpan vernal pools occur on the low (younger) terrace Riverbank Formation soil series (e.g., San Joaquin, Galt, Madera, Tehama), as well as on the high (older) terrace Laguna Formation and Arroyo Seco gravels (e.g. Corning, Redding, Red Bluff, Mokelumne soil series). Vernal pools occur extensively on both landforms types (Jones and Stokes 1990).

The Plan Area's Low-Terrace Northern Hardpan vernal pools (e.g., on San Joaquin soils) are of recent geologic origin, which may explain their relatively unspecialized flora that often includes non-native plants, low species richness, scarcity of vernal pool obligates, and low numbers of special-status plants. Most young terrace sites in the Plan Area have been plowed, graded, or

APPENDIX E1 (Continued)

heavily grazed because of their arable soils and proximity to reliable water; this may also account for their less specialized flora. Low-Terrace Northern Hardpan vernal pools also serve an important function as habitat for shorebirds, waterfowl, and raptors because of their location in the central portion of the valley along the Sacramento River (Jones and Stokes 1990; Silveira 1998).

High-Terrace Northern Hardpan vernal pools (e.g., on Corning and Redding soil series) are the most complex type of vernal pool in the Plan Area because of their rich and varied flora, presence of special-status plant and invertebrate species, and complex hydrology, and because they often occur in areas with complex, highly convoluted interspersions of several soil types. Soils on high-terrace landform sites varies over short distances such that sites in proximity to each other may have entirely different restricting layer types, depth, and vernal pool plant community. High-Terrace Northern Hardpan vernal pools are floristically rich and dominated by vernal pool obligate plant species (true "specialists"), and typically support special-status species. The tremendous age and geographic location of High-Terrace Northern Hardpan pools may account for their rich and highly specialized flora (Jones and Stokes 1990). Little of the high-terrace landform has been farmed in the Plan Area because irrigation water is lacking and many sites are not arable. Some high-terrace vernal pool areas were dryland farmed in the past with wheat or oats; this type of farming appears to have had little effect on high-terrace vernal pools, while on other formations, this disrupted vernal pool surface hydrology. Consequently, High-Terrace Northern Hardpan vernal pools are relatively abundant in the Plan Area (Jones and Stokes 1990).

Drainageway vernal pools are located on no particular Plan Area geologic formation, but formed on recent alluvial deposits adjacent to the incised channels of active watercourses. Consequently, Drainageway vernal pools are interspersed throughout the other three vernal pool types present in the Plan Area. Drainageway vernal pools fill and drain rapidly, and may depend on overland runoff and direct precipitation to maintain their hydrology relative to the other vernal pool types (Jones and Stokes 1990). Additionally, the basins of Drainageway vernal pools are often shallow and susceptible to evaporation, or slightly sloped, which encourages drainage. Drainageway vernal pools have an unspecialized flora relative to the other three vernal pool types in the Plan Area (Jones and Stokes 1990).

The four types of vernal pools present in the Plan Area can be further classified by the presence or absence of certain dominant or less abundant vernal pool plant species (Sawyer et al. 2009). Vernal pool community structure (i.e., the type, number, and relative abundance of species) is largely determined by the pool's physical makeup (e.g., size, depth, substrate, water chemistry) and the pool's hydrology; different patterns of species dominance and the presence or absence of certain species can be indicative of physical and hydrology differences among vernal pools (Holland and Jain 1988). Vernal pools in the Plan Area exhibit a great variety of size, depth, soil, and water chemistry. Key physical parameters may include pool drainage area, slope, soil type, soil structure and depth, pool size and depth, timing of the pool hydrologic cycle, and pool

interconnectivity. In particular, several SSHCP vernal pool Covered Species require large, deep pools that are long lasting to successfully complete their life cycles, including Boggs Lake hedge-hyssop (*Gratiola heterosepala*), Sacramento Orcutt grass (*Orcuttia viscida*), slender Orcutt grass (*Orcuttia tenuis*), vernal pool tadpole shrimp, California tiger salamander, and western spadefoot toad. Other vernal pool Covered Species are found in small to medium-sized "flashy" pools that dry out relatively quickly, but may inundate and dry out several times during the wet season, including Ahart's dwarf rush (*Juncus leiospemus* var. *ahartii*), dwarf downingia (*Downingia pusilla*), and pincushion navarretia (*Navarretia myersii*). For some plants in the latter category, the edges of larger vernal pools may provide conditions equivalent to the smaller, flashy pools. Other Covered Species associated with vernal pools include legenere (*Legenere limosa*), vernal pool fairy shrimp, Ricksecker's water scavenger beetle, most of the bird Covered Species (mostly as foraging habitat), American badger (*Taxidea taxus*), and western red bat (*Lasiurus blossevillii*) (see Table 3-2).

Preserving the full range of physical and hydrologic conditions found in Plan Area vernal pools is necessary to ensure that all vernal pool Covered Species and representative examples of the different Plan Area vernal pool types and existing variation in vernal pool plant and animal associations are considered and protected (Jones and Stokes 1990). By protecting the range of diversity in vernal pool types, the SSHCP can ensure that the entire range of known and unknown ecological and biological values is represented in a Preserve System, and that the intrinsic values of this facet of the region's natural heritage are considered. Preserving the range of plant and animal associations also provides natural laboratories to study the factors influencing the presence or absence of species, migration, and establishment of species, patterns of species dominance, and other phenomena (Jones and Stokes 1990).

Plan Area vernal pools occur in complexes of pools interconnected by intermittent surface swales and by the seasonal perched aquifer that forms between the soil surface and the sub-surface restricting layer. Consequently, the Vernal Pool land covers in the Plan Area cannot be described or analyzed in isolation of their ecologically and hydrologically connected SSHCP land covers of Swale, Valley Grassland, and Stream/Creek (Vernal Pool Invertebrate Habitat (VPIH)). Therefore, in addition to discussing the Vernal Pool land cover individually in SSHCP Chapters 3, 6, and 7, the Plan Permittees also define and discuss an SSHCP Vernal Pool Ecosystem (see Section 3.2.3).

Seasonal Wetland Land Cover

Seasonal Wetland is an ephemeral wetland that ponds for extended periods during a portion of the year, generally the rainy winter season, then dries relatively slowly, typically in the summer and early fall. Seasonal Wetland tends to occur as an isolated wetland within moderate to large depressional features in Valley Grassland; along streams, creeks, and rivers; and along the edges

of open water. Seasonal Wetland is often characterized by herbaceous annual and perennial species such as curly dock (*Rumex crispus*) and bulrush (*Scirpus* spp.).

Seasonal Wetland provides habitat for some Covered Species (Table 3-2). The SSHCP does not consider Seasonal Wetland to be suitable habitat for vernal pool crustaceans.

Covered Species associated with the Seasonal Wetland land cover include Bogg's Lake hedge-hyssop, legenere, Sanford's arrowhead (*Sagittaria sanfordi*), California tiger salamander, western spadefoot, giant gartersnake (*Thamnophis gigas*), all of the bird Covered Species (mostly as foraging habitat) except Cooper's hawk (*Accipiter cooperii*), American badger, and western red bat.

Swale Land Cover

The movement of surface water between vernal pools can occur in a network of narrow and intermittent surface "swales" (Solomeshch et al. 2007). Swales are shallow seasonal drainages found in flat to gently rolling Valley Grassland in association with vernal pool complexes, on soils with an impermeable layer (see Section 2.3). Swales convey runoff as shallow, gently sloping ephemeral wetlands during, and for short periods after, winter rainstorms. Soils within the Swale land cover type may remain saturated during the winter and early spring, but dry by summer. Swales are associated with vernal pools and provide intermittent conduits between vernal pools for movement of surface water and propagules of vernal pool plant and animal Covered Species (seeds, cysts, eggs, and spores), and movement of adult California tiger salamanders and western spadefoots. Swales support several native plant species commonly found in vernal pools. Swales also often include smaller shallow depressional features that may pond during the rainy season to provide suitable reproductive habitat for some vernal pool Covered Species, and may be considered vernal pools. Generally, the Swale land cover provides suitable habitat for portions or all of the life cycle of many of the Covered Species that occur in the Vernal Pool land cover types, including Ahart's dwarf rush, dwarf downingia, pincushion navarretia, mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp, vernal pool tadpole shrimp, Ricksecker's water scavenger beetle, and western spadefoot. In addition, all of the bird Covered Species (except Cooper's hawk and greater sandhill crane (*Grus canadensis tabida*)) use Swale land cover (primarily as foraging habitat), along with American badger and western red bat (see Table 3-2).

The Swale land cover type cannot be adequately described or analyzed separately or in isolation of other ecologically and hydrologically connected SSHCP land covers (i.e., Vernal Pool, Valley Grassland, and Stream/Creek VPIH). Therefore, in addition to discussing the Swale land cover individually in SSHCP Chapters 3, 6, and 7, the Plan Permittees also define, discuss, and analyze a combined SSHCP Vernal Pool Ecosystem (see Section 3.2.3 below).

APPENDIX E1 (Continued)

Stream/Creek Vernal Pool Invertebrate Habitat Land Cover

As discussed below, the larger SSHCP Stream/Creek land cover type includes intermittent and perennial linear water features such as rivers, streams, creeks, and drainages. The SSHCP Stream/Creek VPIH land cover type is typically an intermittent drainage that is vegetated with Valley Grassland plant species and conveys water after rain events (is ephemeral). Unlike the Swale land cover type, the Stream/Creek (VPIH) land cover is less likely to support vegetation characteristic of vernal pools, and the SSHCP does not consider the Stream/Creek (VPIH) land cover habitat for vernal pool plant Covered Species. However, the Stream/Creek (VPIH) land cover is known to provide movement corridors, and may provide suitable habitat for vernal pool crustaceans, including mid-valley fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp, within depressional features of the drainage that pond water between storm events. Western burrowing owl (*Athene cunicularia hypugea*) may also use Stream/Creek (VPIH) habitat. See Figure 3-2 for locations of Stream/Creek (VPIH) habitat.

The Stream/Creek (VPIH) land cover cannot be adequately described or analyzed separately or in isolation of other ecologically and hydrologically connected SSHCP land covers (i.e., the Vernal Pool, Valley Grassland, and Swale land covers). Therefore, in addition to discussing Stream/Creek (VPIH) individually in SSHCP Chapters 3, 6, and 7, the Plan Permittees also define, discuss, and analyze a combined SSHCP Vernal Pool Ecosystem (see Section 3.2.3).

Freshwater Marsh Land Cover

Most of California's freshwater marshes occur in the Sacramento Valley and San Joaquin Delta regions. The majority of Freshwater Marsh in the Plan Area occurs along the perennial Cosumnes River and Deer Creek, and along the margins of streams and open water in the Plan Area. Freshwater Marsh is typically dominated by perennial herbaceous plant species such as cattails (*Typha* spp.), tules (*Scirpus* spp.), and other emergent plant species, and is generally found along the edges of aquatic habitats such as ponds, lakes, and rivers. It is important habitat for western pond turtle (*Actinemys marmorata*), giant gartersnake, northern harrier (*Circus cyaneus*), tricolored blackbird (*Agelaius tricolor*), and western red bat (Table 3-2).

Open Water Land Cover

Open Water includes perennial or features, such as natural or built ponds, lakes, and reservoirs. Open Water may contain no vegetation, or non-rooted aquatic vegetation, such as algae, floating pondweeds, and other plants. Along shorelines, rooted, emergent vegetation may occur, forming Freshwater Marsh. Like Freshwater Marsh, Open Water habitat is used by numerous bird, mammal, amphibian, and reptile species, including several Covered Species, such as western

pond turtle, giant gartersnake, tricolored blackbird, and western red bat. The marshy shorelines may be used by tricolored blackbird for nesting colonies (Table 3-2).

The Open Water land cover type is found throughout the SSHCP area. Open Water features are largely unnamed with the exception of Blodgett Reservoir inside the Urban Development Area (UDA) and Rancho Seco Lake outside the UDA.

Stream/Creek Land Cover

Outside of the UDA, the Stream/Creek land cover type includes intermittent and perennial linear water features such as rivers, streams, creeks, drainages, and roadside and irrigation ditches. Within the UDA, this land cover type includes streams identified by the U.S. Army Corps of Engineers. A separate category was created for aqueducts throughout the Plan Area.

The SSHCP Stream/Creek land cover includes rivers such as the Cosumnes River, streams such as Laguna Creek, and smaller intermittent or perennial creeks. The Stream/Creek land cover type was mapped from aerial photographs. Where a river or stream channel was not discernable because of dense over story cover, the centerline of the channel has been approximated and buffered by a width of 6 feet. Polygons of the Stream and Creek land cover occur in Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, Agriculture, and Developed land cover types.

Covered species associated with the Stream/Creek land cover type include Sanford's arrowhead, giant gartersnake, western pond turtle, and western red bat (Table 3-2).

Mixed Riparian Woodland Land Cover

Riparian land covers are associated with Plan Area streams and creeks and typically occur in the zone between the active stream channel and adjacent upland land covers. While "riparian" has various definitions, the SSHCP uses the National Research Council's 2002 definition: "Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas in the Plan Area are adjacent to perennial, intermittent, and ephemeral streams, lakes."

Riparian ecosystems are highly dependent on landscape setting and numerous physical and biotic interactions. Riparian ecosystems provide essential foraging, shelter, and breeding habitat for several of the Covered Species and other native plant and animal species, including both resident and migratory species.

APPENDIX E1 (Continued)

The Mixed Riparian Woodland land cover type is distinguishable by an open canopy layer dominated by tall Fremont cottonwood trees. Beneath this open layer, a moderately dense mid-canopy layer is composed of tree species such as Oregon ash (*Fraxinus latifolia*), Goodding's willow (*Salix gooddingii*), California black walnut (*Juglans californica* var. *hindsii*), valley oak (*Quercus lobata*), and box elder (*Acer negundo*). In some areas, a subcanopy of dense Riparian Scrub dominated by willow species, including arroyo willow and sandbar willow, is present. A discontinuous shrub layer is also present, particularly along the northern boundary of the Plan Area, and includes species such as blue elderberry, Himalayan blackberry, coyote-brush, wild rose, and wild grape. The understory is sparsely to densely vegetated with herbaceous species. Invasive weeds that have colonized portions of the Mixed Riparian Woodland in the Plan Area include tamarisk (*Tamarix* spp.) and giant European reed (*Arundo donax*).

Included in the Mixed Riparian Woodland Land Cover Type are valley oak riparian woodlands. Although they are not a separate land cover type, owing to an inability to distinguish them from other riparian communities, valley oak riparian woodlands are notable as they were once a dominate community along waterways in the Plan Area. Valley oak riparian woodland intergrades with the Valley Grassland land cover type and wooded borders along streams and agricultural fields in the Plan Area. Tree associates in the Plan Area include California sycamore (*Platanus racemosa*), California black walnut, interior live oak (*Quercus wislizeni*), box elder, and blue oak. The shrub understory consists of western poison-oak, blue elderberry, California wild grape, toyon (*Heteromeles arbutifolia*), California coffeeberry, and California blackberry (*Rubus ursinus*). Various sorts of wild oats (*Avena* spp.), brome (*Bromus* spp.), barley (*Hordeum* spp.), ryegrass (*Lolium* spp.), and needlegrass (*Nassella* spp.) dominate the ground cover.

Covered species associated with the Mixed Riparian Woodland land cover type include valley elderberry longhorn beetle, western pond turtle, Cooper's hawk, Swainson's hawk, white-tailed kite, and western red bat (Table 3-2).

Mixed Riparian Scrub Land Cover

Mixed Riparian Scrub land cover type is interspersed with Mixed Riparian Woodland in the floodplains of waterways throughout Sacramento County. In the Plan Area, this land cover type consists of an open to dense shrubby thicket dominated by a mixture of sandbar willow (*Salix exigua*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), and immature stands of mixed riparian woodland tree species (see description below). This plant community can also be a subcanopy community in Mixed Riparian Woodland. Though dense stands of Riparian Scrub in the Plan Area typically lack an understory, some of the more open canopy mixed Riparian Scrub stands do support an understory of native and non-native species, including wild rose (*Rosa californica*), wild grape (*Vitis californica*), perennial pepperweed (*Lepidium latifolium*), Himalayan blackberry (*Rubus discolor*), curly dock (*Rumex crispus*), and various non-native grasses.

APPENDIX E1 (Continued)

Covered species associated with the Mixed Riparian Scrub land cover type include valley elderberry longhorn beetle, giant gartersnake, western pond turtle, Cooper's hawk, loggerhead shrike, Swainson's hawk, white-tailed kite, and western red bat (Table 3-2).

Mine Tailing Riparian Woodland Land Cover

The Mine Tailings Riparian Woodland land cover type is distributed among older mine tailings. This land cover type contains species commonly found in Riparian Woodlands and Riparian Scrub habitats, such as Fremont cottonwood (*Populus fremontii*), blue elderberry (*Sambucus mexicana*), willow (*Salix* spp.), and coyote-brush (*Baccharis pilularis*). In the Plan Area, this land cover type can also intergrade with mixed riparian forest along bodies of water.

Covered species associated with the Mine Tailing Riparian Woodland land cover type include valley elderberry longhorn beetle, western pond turtle, Cooper's hawk, loggerhead shrike, white-tailed kite, and western red bat (Table 3-2).

Valley Grassland Land Cover

Valley Grassland is by far the most common single land cover in the Plan Area. Including non-habitat land covers, it accounts for about 43% of the land covers in the Plan Area. Valley Grassland, being so widespread throughout the Plan Area, is essential for both the long-term survival of many of the Covered Species and for conserving ecological functions of other land cover types within the Plan Area.

Valley Grassland in the SSHCP Plan Area is an annual herbaceous plant community now characterized mostly by naturalized annual grasses. Generally, its composition in the Plan Area varies with geographic, and land use factors, such as rainfall, temperature, elevation, slope, aspect, grazing, and other herbivory (e.g., livestock, wildlife, rodent, songbird, and insect use), and fire frequency and duration. In the Plan Area, Valley Grassland is dominated by naturalized herbaceous annual forbs, and patches with relatively high proportions of native grasses and forbs.

Valley Grassland in the Plan Area is associated with several natural communities, including vernal pools, and occurs as an understory within Valley Oak Riparian Woodland, Blue Oak Woodland, and Blue Oak Savanna. Valley Grassland also may occur as a co-dominant with perennial grasses within some of the areas mapped as Valley Grassland in the Plan Area. For example, purple needlegrass (*Stipa pulchra*) can be found as the dominant grass (i.e., comprising greater than 20% cover) in small patches along ridgetops of low-lying hills in the eastern portion of Sacramento County.

Valley Grassland supports numerous wildlife species, including several Covered Species. Covered Species associated with Valley Grassland included California tiger salamander, western

spadefoot giant gartersnake, western pond turtle, all of the bird Covered Species (except Cooper's hawk), American badger, and western red bat (Table 3-2).

As part of the Vernal Pool Ecosystem mapping unit, Valley Grassland also supports wetland-dependent species (vernal pool crustaceans and plants) by maintaining and moderating hydrology for wetlands that they occupy.

Cropland Land Cover (Row and Field Crops)

Cropland is concentrated in the western part of the Plan Area in the Sacramento River and Cosumnes River floodplains. Cropland includes annual row and field crops (e.g., small grains, corn, tomatoes, melons, peppers, safflower, sunflower) and short-term perennial crops (e.g., asparagus). Rice is a row crop grown in Sacramento County, but seldom in the Plan Area. Small fields of rice have recently been planted on the existing Cosumnes River Preserve.

An important ecological function of Cropland in the Plan Area is to provide rodent and insect prey and plant material forage for a number of the bird Covered Species. Small rodents are important prey for raptors, such as Swainson's hawks, white-tailed kite, and Cooper's hawk. Western burrowing owls consume a mix of small rodents, arthropods, and other small animals. Loggerhead shrikes primarily prey on ground-dwelling insects but also take small rodents. Swainson's hawks switch to a diet of insects after the breeding season. Greater sandhill crane is a winter visitor that forages for seeds and small animals, and tricolored blackbird forages on invertebrates during the nesting season and plant material during the non-nesting season (Table 3-2).

Irrigated Pasture-Grassland Land Cover

Irrigated Pasture-Grassland is scattered throughout much of the Plan Area in relatively small patches. Irrigated Pasture-Grassland is fairly common, but occurs in a scattered distribution generally in the central portion of the Plan Area. The Irrigated Pasture-Grassland land cover includes hay production (alfalfa, clovers, and mixed grasses), seasonal summer pasture for livestock (primarily cattle), and year-round pasture for livestock (primarily cattle or horses). Seasonal pasture appears to be the most common use. Irrigated Pasture-Grassland is typically seeded, cut/grazed, and reseeded on a regular basis on an approximately 5- to 7-year cycle before the fields are left fallow to rest, and the cycle is started over again.

Within the Irrigated Pasture-Grassland land cover type, alfalfa fields provide by far the most productive foraging habitat for raptors and are used by other Covered Species, such as greater sandhill crane, and tricolored blackbird (Table 3-2). As a perennial crop grown for several years before removal and replacement, alfalfa provides good cover for rodents and time for establishment of a good prey base. Farming operations during the growing season consist of

periodic flood irrigation and four to six mowings. Both types of operations result in temporary increases in prey availability.

Many of the Covered Species that use Cropland also use Irrigated Pasture-Grassland. Pasture is suitable tricolored blackbird foraging habitat if it is within two miles of a colony nesting site. Greater sandhill cranes use Irrigated Pasture-Grassland for roosting and foraging (Table 3-2).

Orchard Land Cover (Fruit and Nut Orchards)

Orchards are scattered throughout the Plan Area, with the largest concentration along the western boundary of the Plan Area. The Orchard land cover has limited wildlife habitat value (Table 3-2), but provides perches for raptors foraging in adjacent Cropland and Valley Grassland. In particular, larger nut trees and other trees at these edge areas may be used by "sight predators" such as Swainson's hawk for perches to find prey in adjacent fields. Western red bat is known to roost in orchards, including apricot, peach, pear, almond, walnut, and orange trees (Constantine 1959; Pierson et al. 2006) (Table 3-2).

Vineyard Land Cover

Vineyard land cover is located mostly in the southern portion of the Plan Area outside of the UDA. In Sacramento County, vineyards are primarily established for wine grape production, with some minor table grape producers. Vineyards are primarily "clean cultivated," meaning no other vegetation is allowed to grow between the rows or on the edges of fields and irrigation ditches. As such, vineyards typically provide only limited habitat for native plants and wildlife (Table 3-2). However, vineyards using "environmentally friendly" management practices may provide habitat value through use of bat boxes, raptor perches, and owl boxes to encourage presence of these species and reduce insect and predation damage.

Blue Oak Woodland Land Cover and Blue Oak Savanna Land Cover

Blue Oak Woodland and Blue Oak Savanna comprise approximately 5% of the Plan Area, a majority of which is located in the far eastern portion of the Plan Area.

Blue oaks are typically drought-tolerant, and unlike interior live oaks, are deciduous, dropping their leaves during periods of extreme moisture stress. This survival trait may explain the observed patterns of blue oak distribution, with blue oaks occupying drier, shallower, and well-drained soils than interior live oaks or valley oaks (McDonald 1985).

In general, the SSHCP differentiated and mapped Blue Oak Woodland land cover and Blue Oak Woodland Savanna by their tree-cover densities.

APPENDIX E1 (Continued)

Blue Oak Woodland is characterized by greater than 10% tree cover formed primarily by blue oak with other foothill tree species mixed in. Blue Oak Woodland generally has a sparse shrub layer and well-developed Valley Grassland layer, sometimes including vernal pools and other wetland features. Other tree species that may occur in Blue Oak Woodland include foothill pine (*Pinus sabiniana*), interior live oak (*Quercus wislizenii*), valley oak (*Quercus lobata*), and California buckeye (*Aesculus californica*). The shrub layer, where present, only includes scattered individuals of poison oak (*Toxicodendron diversilobum*), and coyote brush (*Baccharis pilularis*). Blue Oak Woodland often has a relatively open canopy, when compared to the riparian land covers present in the Plan Area.

Blue Oak Savanna land cover type is characterized by a sparse (less than 10%) tree canopy structure that ranges from scattered blue oak trees and small clusters of blue oaks, to small areas of blue oak stands. Like Blue Oak Woodland, it generally has little to no shrub layer, but has a well-developed Valley Grassland layer. Blue Oak Savanna is typically transitional between Valley Grassland and Blue Oak Woodland.

Oak Woodland and Savanna provide important cover, nesting, and roosting sites for native bird species, as well as caching sites for acorn storage, for a variety of birds, mammals, and other native species. Covered Species that use Blue Oak Woodland and/or Savanna include American badger, western red bat, Cooper's hawk, western burrowing owl, and white-tailed kite. Where suitable aquatic land cover occurs in association with Blue Oak Woodland and Blue Oak Savanna land cover, California tiger salamander, western spadefoot, and western pond turtle may also occur. Old, large oak trees are of particular habitat value, providing an array of living and dead branches as sites for woodpeckers to excavate cavities and for insect-eaters to forage for larvae and adult insects. Dead branches and trunks are critically important for cavity nesting birds, for mammals as storage sites for acorns, and as perches for sight-dependent predators, such as raptors (Gutierrez and Koenig 1978). The fallen logs of dead oaks provide sustenance and cover for arthropods, fungi, and wildlife, and may potentially extend activity periods for these species in drier climates by retaining soil moisture and providing shade (Giusti et al. 2004).Oak trees produce a critically important food crop, acorns. Acorn production is typically episodic, some years with copious acorn production and other years with minimal acorn production. High yield acorn years appear critical in triggering pulses in invertebrate and vertebrate population sizes (McShea and Rappole 2000; McShea and Schwede 1993). Blue Oak Woodland and Blue Oak Savanna provide different habitat functions for some of the Covered Species. For example, western burrowing owl and American badger may occur in the open savannas but not denser woodlands. White-tailed kites may nest in woodlands and forage in savannas.

APPENDIX E1 (Continued)

Aqueduct Land Cover

The aqueduct land cover type in the Plan Area is represented by the Folsom South Canal.

Disturbed Land Cover

The disturbed land cover type is defined as open-space areas that have been subject to previous or ongoing disturbances such as along roadsides, trails, and parking lots. Scraped or graded land, gravel mining, and waste disposal sites are included in this land cover type. Disturbed land cover type is vegetated with diverse weedy flora. These areas are of special concern as they tend to harbor and facilitate the spread of invasive plant species. Vascular plant species associated with the disturbed land cover typically include Johnson grass, Canadian horseweed (*Conyza canadensis*), milk thistle (*Silybum marianum*), yellow-star thistle (*Centaurea solstitialis*), stinkwort (*Dittrichia graveolens*) and field bindweed (*Convolvulus arvensis*).

High-Density Development Land Cover

The high-density development land cover type includes urban and suburban residential neighborhoods, urban centers, industrial areas, airports, and wastewater treatment plants. Most of this high-density development occurs in the SSHCP UDA in the northwestern portion of the Plan Area.

Low-Density Development Land Cover

The low-density development land cover type consists of relatively sparse residences and other structures, such as farm buildings, and small rural neighborhoods with large individual property sizes per house. Plant nurseries are also included in this category. While the majority of low-density development occurs outside of the UDA, it is found throughout the Plan Area.

Major Roads Land Cover

The major roads land cover type includes linear features with paved surfaces and can vary from large freeways to smaller arterial roads found within urban settings. Smaller roads not mapped as Major Roads were mapped as an element of High-Density or Low-Density Development.

Mine Tailings Land Cover

Mine Tailings Land Cover is defined by the large tailing piles that rise significantly above the surrounding landscape as a result of gold dredging occurring in the early 1900s through approximately 1960. The large tailing piles are composed almost entirely of rounded river rock that was excavated from ancient riverbeds. Most of the mine tailings are associated with historic gold mining are located in the northeastern portion of the Plan Area. Smaller outcroppings of tailings in are often the result of current and recent gravel mining activities. The mine tailings are

unvegetated; the SSHCP mapped any woody vegetation observed between tailings piles as the Mine Tailing Riparian Woodland land cover type (see Section 3.2.1).

Recreation/Landscaped Land Cover

The recreation/landscaped land cover type includes gardens, parks, golf courses, off-highway vehicle (OHV) parks, and greenbelts. Most landscaped and recreation areas are planted with non-native grasses, shrubs, and trees. Species composition in urban habitats varies with planting design and climate. Monoculture is commonly observed in tree groves and street tree strips. For example, many of the windbreaks in south Sacramento County are planted with pure stands of eucalyptus, olive (*Olea europaea*) trees, or other hardwoods. Most recreation and landscaped areas are regularly maintained by irrigation, mowing, pruning, or other management techniques.

Not Mapped

There is a small section of the Plan Area along the Sacramento River that was not mapped. This area was not mapped as it is in-between the river side toe of a levee and the center of the river.

4 LITERATURE CITED

California Department of Fish and Game (CDFG). 1988. *A Guide to Wildlife Habitats of California*. Kenneth E. Mayer and William F. Laudenslayer, Jr., eds. State of California, Resources Agency: Sacramento, California. 166 pp.

Cornell, F. D. 1909. Hickory's younger brother. *Sunset Magazine* (March):274–281.

Jones and Stokes Associates (JSA). 1990. *Sacramento County Vernal Pools: Their Distribution, Classification, Ecology, and Management*. Sacramento, California.

Parker, I., and W. J. Matyas. 1981. *CALVEG: A Classification of Californian Vegetation*. U.S. Department of Agriculture, Forest Service, Reg. Ecol. Group: San Francisco.

Saunders, Ramona. 2002. *2002 Crop & Livestock Report*. Deputy Ag Commissioner, Sacramento County: Sacramento, California.

APPENDIX E1 (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX E2

Vernal Pool Watershed Mapping

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

MEMORANDUM

To:	U.S. Fish and Wildlife Service
From:	Tyler Friesen, Dudek
Subject:	SSHCP Vernal Pool Watershed Analysis Using LIDAR Data
Date:	February 6, 2014
cc:	Sherri Miller, Terry Adelsbach, Richard Radmacher, Bill Ziebron
Attachment(s):	Figures 1–4; Attachment A, ArcGIS Glossary

LIDAR OVERVIEW – FROM ARCGIS ONLINE RESOURCE CENTER

What Is LIDAR?

Light detection and ranging (LIDAR) is an optical remote-sensing technique that uses laser light to densely sample the surface of the Earth, producing highly accurate x, y, z measurements. LIDAR, primarily used in airborne laser mapping applications, is emerging as a cost-effective alternative to traditional surveying techniques such as photogrammetry. LIDAR produces mass point cloud datasets that can be managed, visualized, analyzed, and shared using ArcGIS.

The major hardware components of a LIDAR system include a collection vehicle (aircraft, helicopter, vehicle, and tripod), laser scanner system, Global Positioning System (GPS) , and inertial navigation system (INS). An INS system measures roll, pitch, and heading of the LIDAR system.

LIDAR is an active optical sensor that transmits laser beams toward a target while moving through specific survey routes. The reflection of the laser from the target is detected and analyzed by receivers in the LIDAR sensor. These receivers record the precise time from when the laser pulse left the system to when it is returned to calculate the range distance between the sensor and the target. Combined with the positional information (GPS and INS), these distance measurements are transformed to measurements of actual three-dimensional points of the reflective target in object space.

LIDAR Laser Returns

Laser pulses emitted from a LIDAR system reflect from objects both on and above the ground surface: for instance, vegetation, buildings, and bridges. One emitted laser pulse can

return to the LIDAR sensor as one or many returns. Any emitted laser pulse that encounters multiple reflection surfaces as it travels toward the ground is split into as many returns as there are reflective surfaces.

The first returned laser pulse is the most significant return and will be associated with the highest feature in the landscape like a treetop or the top of a building. The first return can also represent the ground, in which case only one return will be detected by the LIDAR system.

Multiple returns are capable of detecting the elevations of several objects within the laser footprint of an outgoing laser pulse. The intermediate returns, in general, are used for vegetation structure, and the last return for bare-earth terrain models.

Post-Processing LIDAR Data

The point data is post-processed after the LIDAR data collection survey into highly accurate geo-referenced x, y, z coordinates by analyzing the laser time range, laser scan angle, GPS position, and INS information. Additional information is stored along with every x, y, and z positional value. The following LIDAR point attributes are maintained for each laser pulse recorded: intensity, return number, number of returns, point classification values, points that are at the edge of the flight line, RGB (red, green, and blue) values, GPS time, scan angle, and scan direction. These data are typically stored as LAS files. LAS is an industry format created and maintained by the American Society for Photogrammetry and Remote Sensing. LAS is a published standard file format for the interchange of LIDAR data. It maintains specific information related to LIDAR data. It is a way for vendors and clients to interchange data and maintain all information specific to that data.

LIDAR Point Classification

Every LIDAR point can have a classification assigned to it that defines the type of object that has reflected the laser pulse. LIDAR points can be classified into a number of categories including bare earth or ground, top of canopy, and water. The different classes are defined using numeric integer codes in the LAS files.

SSHCP VERNAL POOL WATERSHED ANALYSIS USING LIDAR DATA

Purpose: To identify individual vernal pool watershed boundaries in order to assess potential direct and indirect impacts to aquatic resources contained in existing and planned preserves within the South Sacramento Habitat Conservation Plan (SSHCP) Urban Development Area (UDA).

This analysis uses a similar approach implemented by ECORP Environmental Consulting, conducted for the Cordova Hills development in 2007.

Process

1. Acquire high resolution classified LIDAR data
2. Develop a Digital Terrain Model (DTM) of the UDA
3. Utilize industry standard hydrologic assessment tools to determine hydrologic characteristics of the UDA
4. Divide UDA into sub-areas to facilitate a faster model run time
5. Identify hydrologic boundaries between individual vernal pool features and their watersheds.

Acquire High-Resolution Classified LIDAR Data

LIDAR surveys were conducted for Sacramento County during 2004 and 2007. The County of Sacramento provided Dudek with classified LIDAR data from these surveys. Figure 1 shows the extent of these surveys in relation to the SSHCP plan area boundary and the UDA.

Develop a DTM of the UDA

Using LAS files from both the 2004 and 2007 surveys, Dudek selected all the LAS files that fell within 1,000 feet for the UDA. The distance of 1,000 feet was chosen to incorporate vernal pool feature watersheds that may extend beyond the UDA boundary. Dudek then created a master LAS dataset filtering the classified LAS files to isolate only bare earth returns. These bare earth points were converted in ArcGIS into a raster dataset using 5-foot by 5-foot cell sizes (see Attachment A for a description of raster datasets). A cell size of 5 feet by 5 feet was chosen to capture the maximum amount of vernal pool features with the least amount of interpolation of the LIDAR data. Dudek then created a hydrologically corrected model by filling all sinks in the resulting raster (see Attachment A for a description of the ArcGIS Fill tool). The final product was a hydrologically corrected DTM of the UDA.

Utilize Industry Standard Hydrologic Assessment Tools to Determine Hydrologic Characteristics of the UDA

In order to identify watersheds from the hydrologically corrected DTM, the direction of flow across the DTM was assessed using the flow direction tool in ArcGIS (see Attachment A for a description of the ArcGIS flow direction tool). The result was a master flow direction raster dataset of the UDA. By assessing direction of flow, it is possible to identify the boundaries between watershed (ridges) using previously mapped vernal pool features as pour points.

Divide UDA into Sub-Areas to Facilitate a Faster Model Run Time

The UDA was broken into seven sub areas to facilitate a faster run time of the model. These sub-areas were defined by the boundaries of planned preserves and the entire project boundary of the five major development projects currently proposed within the UDA. These areas are defined as follows:

1. Cordova Hills development and adjacent planned preserves
2. Jackson and Newbridge developments and adjacent planned preserves
3. Sun Creek and Arboretum development and adjacent planned preserves
4. Regional Planning Unit (RPU) 1 planned preserves not captured in the above sub-areas
5. RPU 3 planned preserves not captured in the above sub-areas
6. The western portion of Laguna Creek Wildlife Corridor and adjacent planned preserves not captured in the above sub-areas
7. RPU 4 planned preserves not captured in the above sub-areas.

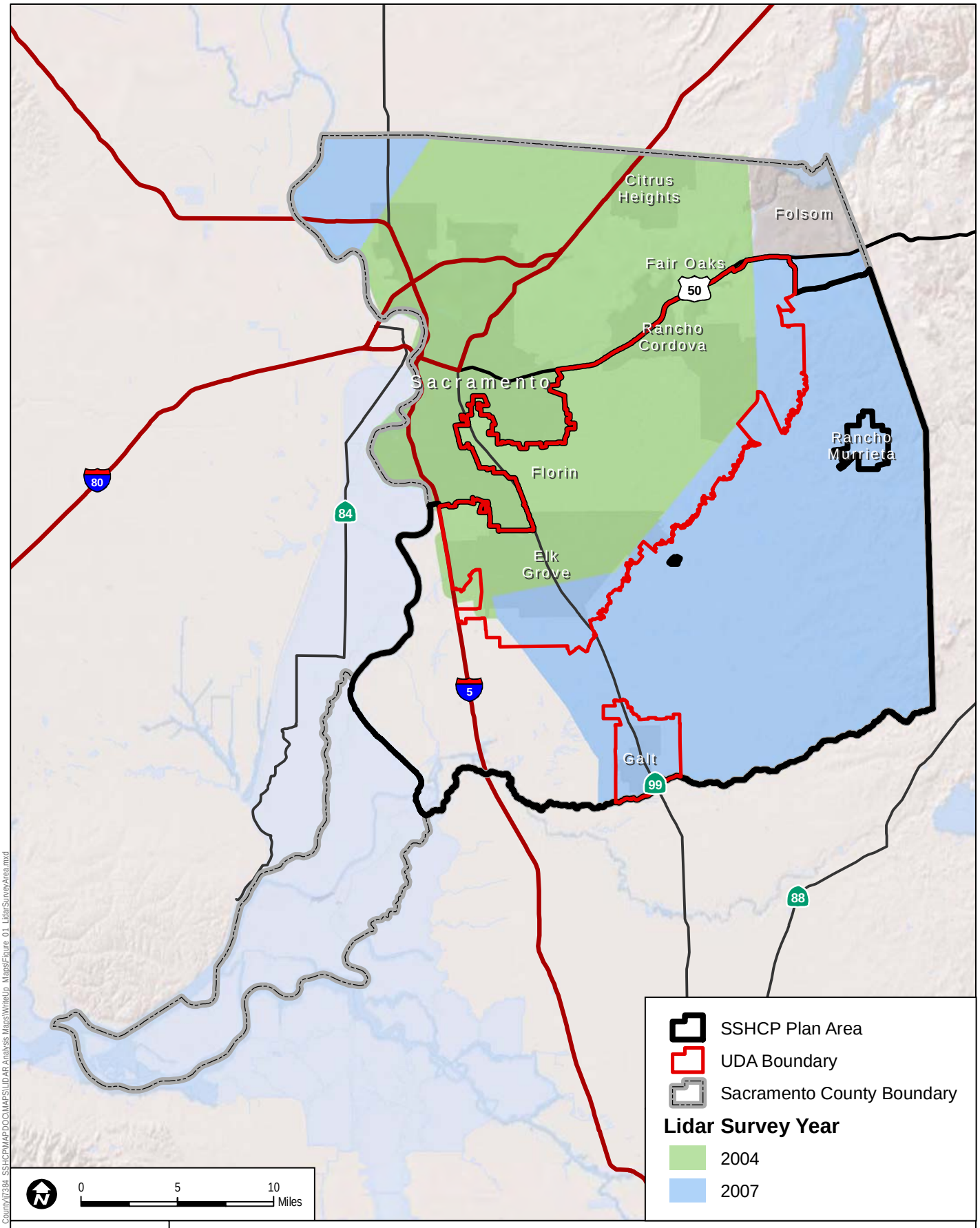
See Figure 2 for a map showing the sub-areas.

All vernal pool features within the boundaries and up to 250 feet outside of these boundaries were analyzed. The flow direction raster was then clipped to within 1 mile of the above 250-foot buffered area. One mile was chosen to analyze vernal pool feature watersheds under the assumption that it would be difficult to near impossible for stakeholders to adjust existing planned conservation boundaries more than 1 mile in order to protect the watershed from indirect effects. See Figure 3 for an example of these areas.

Identify Hydrologic Boundaries Between Individual Vernal Pool Features and Their Watersheds

Once a master flow-direction raster dataset was established, the watershed of each individual vernal pool feature could be determined using the ArcGIS watershed tool (see Attachment A for a description of the ArcGIS watershed tool). Each vernal pool feature from the SSHCP land cover database was converted into its own raster dataset using the same cell size (5 feet by 5 feet) as the input flow direction, using a numeric code as the unique identifier. These data were used as the pour point inputs in the watershed tool. A pour point is defined as the cells above which the contributing area, or catchment, will be determined. A custom script was written using Python programming language to analyze the individual watershed of each pour point feature. The output of this analysis was a raster dataset identifying the

contributing area for each vernal pool feature. Each of these raster datasets were converted into polygons and combined to create a master watershed file for each of the sub-areas. With these datasets it is possible to identify the watershed of any given vernal pool feature and all contributing vernal pool watershed (see Figure 4 for an example).



Path: Z:\Projects\Sacramento County\7384 SSHCP\MAPDOC\MAPS\UDAR Analysis Maps\WriteUp Maps\Figure 01 LidarSurveyArea.mxd

DUDEK

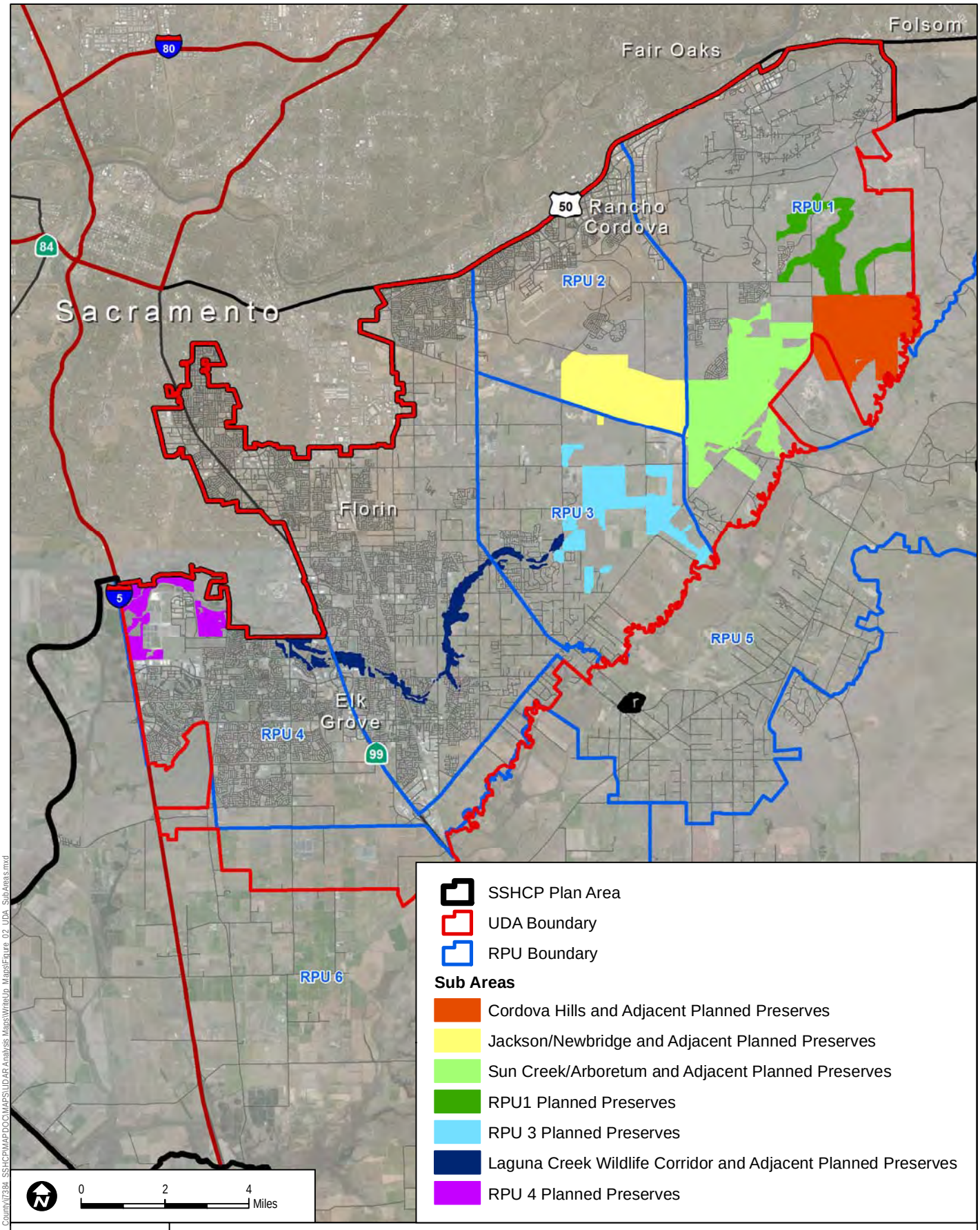
7384

SOURCE: County of Sacramento 2013

FIGURE 1

Sacramento County Lidar Survey Areas

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\UDAR Analysis Maps\WriteUp_Maps\Figure_02_UDA_SubAreas.mxd

DUDEK

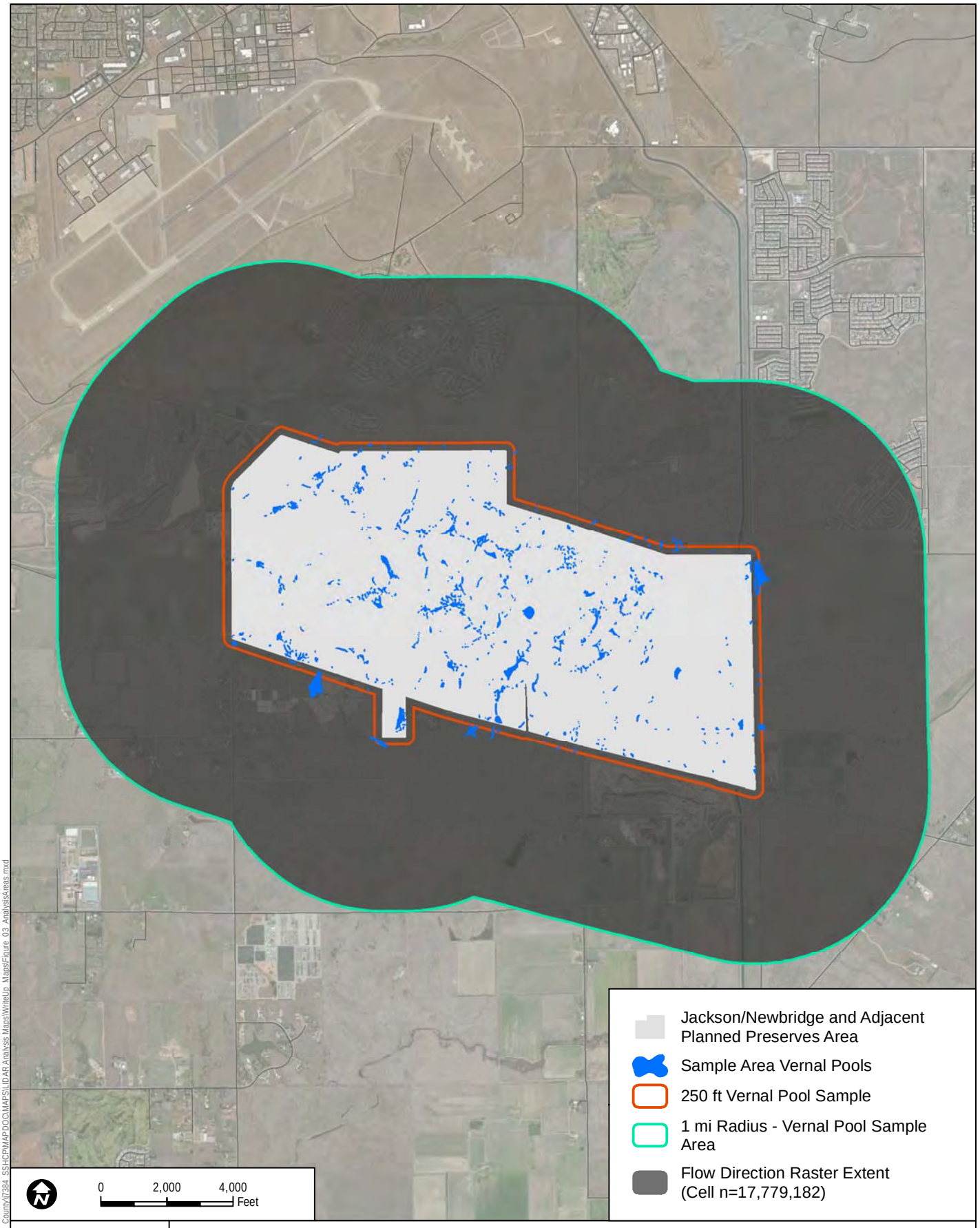
7384

SOURCE: County of Sacramento 2013

FIGURE 2

Study Sub Areas

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\LIDAR Analysis Maps\WriteUp_Maps\Figure_03_AnalysisAreas.mxd

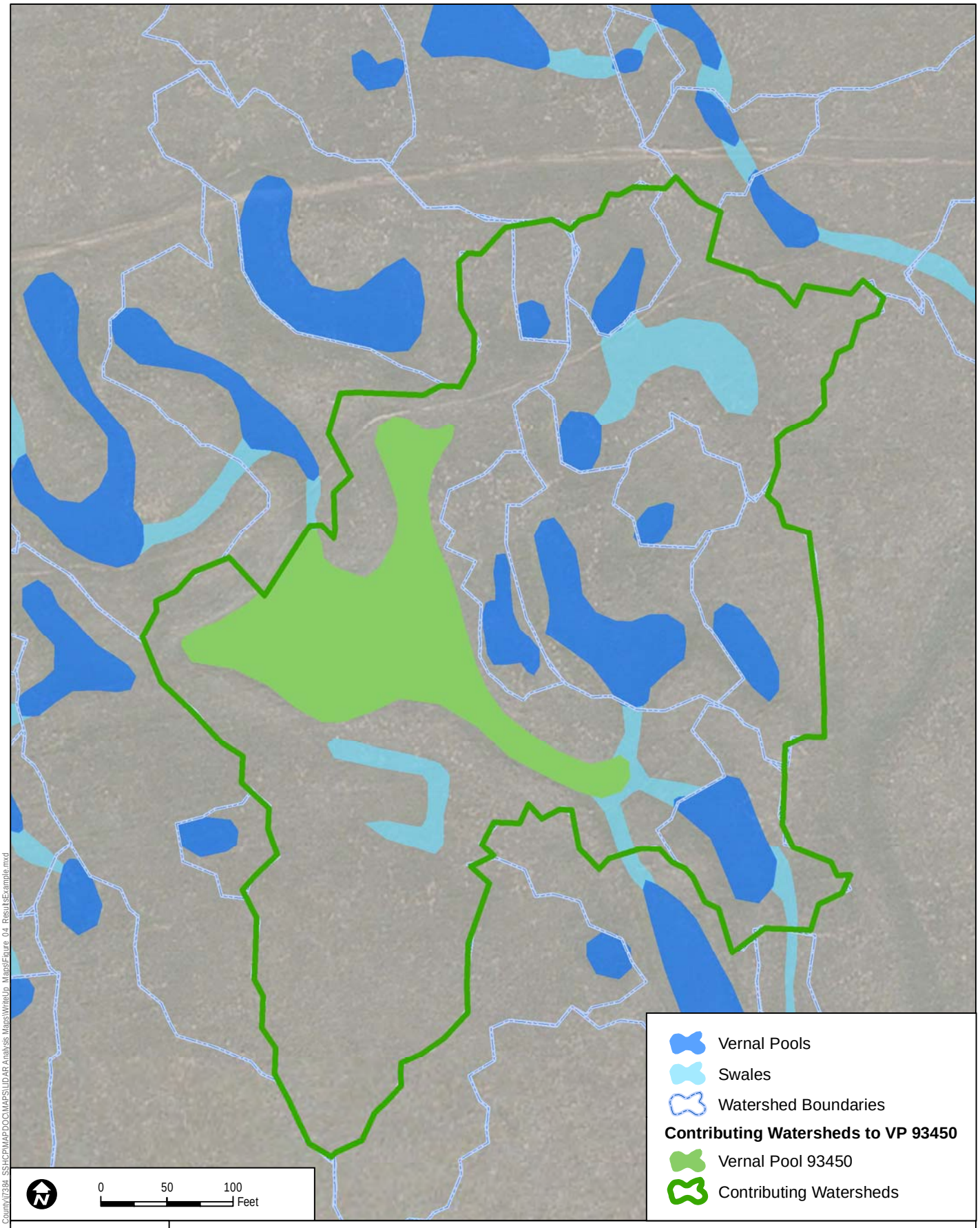
DUDEK

7384

SOURCE: County of Sacramento 2013

FIGURE 3
Watershed Analysis Areas - Jackson and Newbridge Developments and Adjacent Planned Preserves

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN



Path: Z:\Projects\Sacramento County\7384 SSHCP\MAPDOC\MAPS\LIDAR Analysis Maps\WriteUp Maps\Figure 04 Results\Example.mxd

DUDEK

7384

SOURCE:Bing 2014, County of Sacramento 2013

FIGURE 4

Watershed Contribution Areas for Vernal Pool 93450

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN

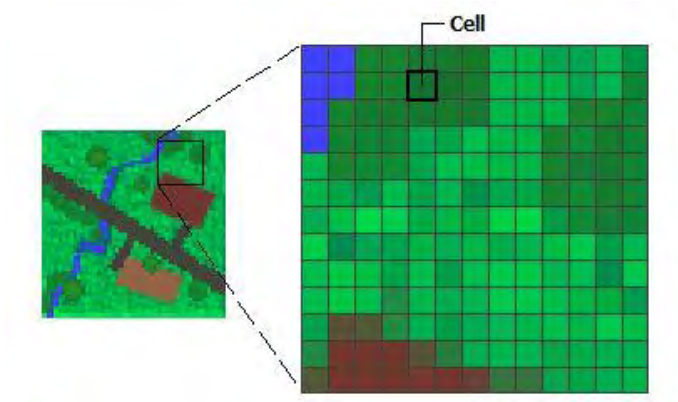
ATTACHMENT A

ArcGIS Glossary

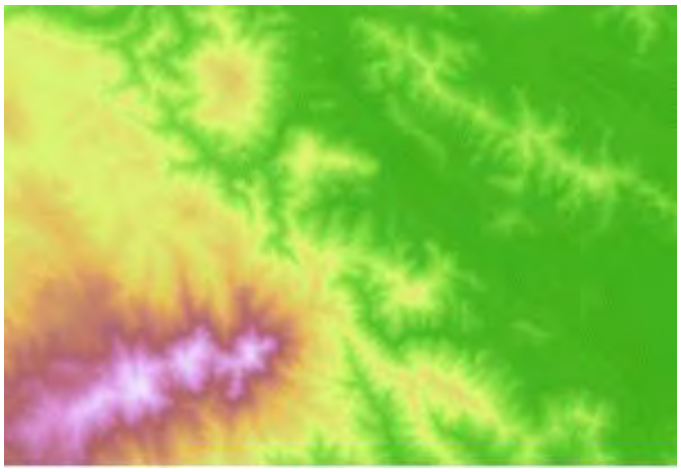
ATTACHMENT A
ArcGIS Glossary

All descriptions are adapted or copied directly from the ArcGIS Online Resource Center.

RASTER DATA



In its simplest form, a raster consists of a matrix of cells (or pixels) organized into rows and columns (or a grid) where each cell contains a value representing information, such as elevation. Rasters are digital aerial photographs, imagery from satellites, digital pictures, or even scanned maps.



Rasters are well suited for representing data that changes continuously across a landscape (surface). They provide an effective method of storing the continuity as a surface. They also provide a regularly spaced representation of surfaces. Elevation values measured from the earth's surface are the most common application of surface maps, but other values, such as rainfall, concentration, and density, can also define surfaces that can be spatially analyzed. The raster below displays elevation—using green to show lower elevation and red, pink, and white cells to show higher elevations.

For more information on raster data please visit this link. http://resources.arcgis.com/en/help/main/10.2/index.html#//009t00000002000000.

FILL (SPATIAL ANALYST)

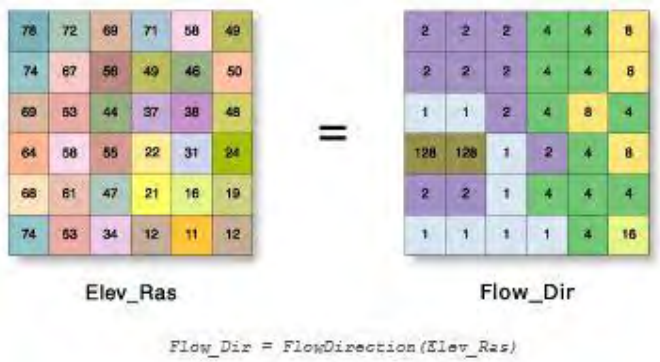
Summary: Fills sink in a surface raster to remove small imperfections in the data.

Usage: A sink is a cell with an undefined drainage direction; no cells surrounding it are lower. The pour point is the boundary cell with the lowest elevation for the contributing area of a sink. If the sink were filled with water, this is the point where water would pour out. The output surface raster will have all sinks filled to the limit of the pour point.

ATTACHMENT A (Continued)

FLOW DIRECTION (SPATIAL ANALYST)

Summary: Creates a raster of flow direction for each cell to its steepest downslope neighbor.



Usage:

- The output of the Flow Direction tool is an integer raster whose values range from 1 to 255. The values for each direction from the center are:

32	64	128
16		1
8	4	2

For example if the direction of the steepest drop was to the left of the current processing cell, its flow direction would be coded as 16.

- If a cell has the same change in z-value in multiple directions and is not part of a sink, the flow direction is assigned with a lookup table defining the most likely direction.
- A cell at the edge of the surface raster will flow toward the inner cell with the steepest drop in z-value. If the drop is less than or equal to zero, the cell will flow out of the surface raster.

WATERSHED (SPATIAL ANALYST)

Summary: Determines the contributing area above a set of cells in a Raster.



Delineating Watersheds: Watersheds can be delineated from a DEM by computing the flow direction and using it in the watershed tool.

To determine the contributing area, a raster representing the direction of flow must first be created with the Flow Direction tool.

ATTACHMENT A (Continued)

You will then need to provide the locations you wish to determine the catchment area for. Source locations may be features, such as vernal pools, dams, or stream gauges, for which you want to determine characteristics of the contributing area. The output is a raster of the watersheds.

The above example shows the result when multiple pour points are defined in the analysis. Because the goal of the SSHCP analysis was to identify the entire vernal pool watersheds independent of all other vernal pool features watersheds were calculated individually with each vernal pool feature as its own pour point resulting in as many runs of the watershed tool as there were vernal pools.

The value of each watershed was taken from the value of the feature pour point data. In the case of the vernal pool watershed analysis the resulting watersheds were coded with the unique vernal pool ID number it corresponds to.

ATTACHMENT A (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX F

Preserve Documentation Report Template

APPENDIX F
Preserve Documentation Report Template

F.1 Introduction

F.1.1 Purpose

To provide an accurate representation of the physical and biological conditions of the property. The report should provide a description of the general setting, presence and condition of existing improvements, developments and other man-made features, and major biological components and natural resource conservation values associated with the property.

F.1.2 Methods

Data collection methods may include field surveys utilizing Global Positioning System and Geographic Information System resources, aerial photograph interpretation, and queries of existing databases.

F.2 Property Location and Existing Setting

F.2.1 Location of Property

Provide a detailed description of the property location using Township, Range, and Section number(s) from 7.5 minute USGS Topographical Quadrangle maps, as well as approximate distances of boundary lines from Section lines and local landmarks.

F.2.2 Existing Setting

Describe climate and the properties topography, hydrological features, geology, and soil types.

F.2.3 Land Use

Describe the property's current and historical land uses.

F.2.4 Surrounding Land Uses

Describe the land uses in the immediate vicinity of the property.

F.3 Physical Condition of the Property

Document the location of physical features on the property.

APPENDIX F (Continued)

F.3.1 Roads and Utility Lines

F.3.2 Fences, Rock Walls, and Gates

F.3.3 Developed Water Features including Canals, Irrigation Ditches, and Wells

F.3.4 Developed Structures Including Residential Homes, Barns and Other Outbuildings

F.3.5 Miscellaneous Features

F.4 Biological Setting and Condition of the Property

Describe the major terrestrial and aquatic biological communities present on the property. Summarize the conservation value of the preserve and list the special status species that have the potential to occur on the property.

F.4.1 Conservation Values of the Preserve

F.4.2 Terrestrial Communities

F.4.3 Aquatic Communities

F.4.4 Special Status Plant Species

F.4.5 Special Status Reptiles, Amphibians, and Insects

F.4.6 Special Status Fish

F.4.7 Special Status Birds (Non-Raptor)

F.4.8 Special Status Birds (Raptors)

F.4.9 Special Status Mammals

F.4.10 Non-Native Plant Species and Noxious Weeds

F.4.11 Invasive Species and Noxious Weeds

Describe any infestations of invasive species or noxious weeds found on the property and any sign of invasive species or noxious weeds on properties that are immediately adjacent to the property. Identify species and quantify the area impacted by invasive plants or noxious weeds and provide a map depicting exact locations.

APPENDIX F (Continued)

F.4.12 Invasive Plants and Noxious Weeds

F.4.13 Invasive Animal Species

F.5 Preparers of Report

List names, addresses, and phone numbers for all preparers.

F.6 Literature Cited

List references and any personal communications that were used in compiling the report

F.7 List of Appendices

Appendix 1- Map Depicting Regional Vicinity

Appendix 2- Map Depicting Property Boundary

Appendix 3- Map Depicting Physical Features Found on the Property

Appendix 4- Map Depicting Location of Soils Units

Appendix 5- Map Depicting Locations of Bio-communities and Species Locations

Appendix 6- Map Depicting Locations of Invasive Species and Noxious Weeds

Appendix 7- Photo Point Locations

Appendix 8- Easement Documentation Photographs

APPENDIX F (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX G

Preserve Management and Monitoring Details

APPENDIX G1

Vernal Pool Monitoring Protocols

APPENDIX G1
Vernal Pool Monitoring Protocols

G1.1 Vernal Pool Monitoring

Long-term monitoring within the South Sacramento Habitat Conservation Program (SSHCP) plan area will provide valuable information on the success of vernal pool conservation. Regional plan area-wide monitoring (monitoring at a landscape scale) is critical for management, including management effectiveness monitoring to evaluate the response of the ecosystem to different management actions. It is critical for understanding (a) status and trends (b) impacts of any management actions and (c) to determine when there is a need for adaptive management. While all management actions should be monitored to some extent, adaptive management is generally the process of experimentally testing the effectiveness and/or feasibility of different management alternatives where the outcome of the management is uncertain (e.g., Williams et al. 2012).

The appropriate sampling design, including survey methods designed to collect large-scale data, is important in designing meaningful monitoring programs. Monitoring and management programs must be approached with attention to:

- appropriateness of selected response variables (e.g., reduction of thatch, water quality, etc.)
- temporal/spatial scales of measurement (i.e., over what time period and where),
- frequency/timing of measurements (e.g., how often and relation to conditions such as rainfall),
- precision and accuracy of measurements,
- ability to detect a change if it happens, and
- fiscal responsibility.

Regional or plan area-wide monitoring must be designed to obtain a statistically rigorous sample that, over time, will result in the ability to monitor the status of the vernal pool in the SSHCP plan area and determine whether the habitat is being adequately conserved by the plan.

G1.1.1 Vernal Pool Habitat Monitoring Goals

VP Monitoring Goal 1: Develop and implement a standardized formal monitoring program that collects data in sufficient detail to evaluate the health of vernal pools.

VP Monitoring Goal 2: Use results of standardized formal monitoring programs to develop adaptive management protocols, identify triggers for adaptive management, and develop pilot studies to fill data gaps and address uncertainties related to adaptive management.

APPENDIX G1 (Continued)

G1.1.1.1 Vernal Pool Plan Area Wide Habitat Conservation

Vernal pools occur in throughout the SSHCP Plan Area. Conservation of the habitat within the Urban Development Area (UDA) is important because it is believed that the highest concentrations of a number of vernal pool species, including vernal pool tadpole shrimp (*Lepidurus packardi*), Sacramento Orcutt grass (*Orcuttia viscida*), and slender Orcutt grass (*O. tenuis*), are located in vernal pools inside the UDA. Conservation of vernal pools outside the UDA is also important because it is the intent of the SSHCP to preserve a wide range of vernal pools over a geographically diverse area. Further, some vernal pool species are either only known from areas outside the UDA, such as California tiger salamander (*Ambystoma californiense*) or most documented occurrences for some species are outside the UDA, including pincushion navarretia (*Navarretia myersii* ssp. *myersii*), vernal pool fairy shrimp (*Branchinecta lynchi*), Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*), and western spadefoot (*Spea hammondii*).

Conservation goals and objectives are found in the conservation strategy for the vernal pools (Chapter 7, Table 7-2). The monitoring protocol intends to monitor the overall Plan's success and whether and how the Plan meets its conservation goals and objectives. The broad SSHCP conservation goal and objectives for vernal pools that will be achieved by the Plan are listed in Table G1-1.

Table G1-1
Vernal Wetlands Biological Goals and Objectives

Overall Biological Goal	Vernal Pool Biological Objectives
Goal 3. Ensure the persistence of each covered species within the Plan Area by preserving, restoring, and creating SSHCP terrestrial and aquatic landcovers throughout the Plan Area to provide suitable breeding, feeding, and/or sheltering habitat for each species minimize habitat fragmentation, and provide habitat connectivity that allows individuals to move and disperse throughout the preserve system.	**Objective VGVP1.** Preserve a minimum of x acres of valley grassland – vernal pool landcover with a minimum of x acres of vernal pools. Up to x acres of vernal pools will be preserved if all estimated impacts occur. The Implementing Entity will prioritize preservation of valley grassland – vernal pool land cover based on the preserve assembly criteria.
	Objective VGVP2. Preserve and maintain enough of the watershed of preserved vernal pools, to maintain the vernal pools' existing hydrological regime and biological functions. This would include a minimum 50-foot setback and a 50-foot buffer at the outer perimeter of each vernal pool preserve within the UDA.
	Objective VP1. Preserve a minimum of x acres of vernal pools within or adjacent to (within one mile of) the Mather Core Area and/or the Cosumnes Rancho Seco Core Area. Up to x acres of vernal pools will be preserved if all estimated impacts occur. Mitigation for vernal pools impacted within a vernal pool Core Recovery Area will occur within or adjacent to a vernal pool core recover area (adjacent is defined as up to one mile from the recovery core area). The Implementing Entity will assure that at least x-acres of vernal pools are preserved within the Mather Core Area, and at least x-acres of vernal pool are preserved within the Cosumnes/Rancho Seco Core Recovery Area.
	Objective VP2. Restore or create a minimum of x acres of vernal pools within or adjacent to (within one mile of) the Mather Core Area and/or the Cosumnes Rancho Seco Core Area. Up to x acres of vernal pools will be restored and/or created if all estimated impacts occur. At least 50 acres will be restored or created within or adjacent to the Mather Core Area.

APPENDIX G1 (Continued)

G1.1.2 Monitoring Questions

Success in meeting the overall conservation goal and objectives listed in Table G1-1 will be determined through monitoring and addressing the following primary questions related to the SSHCP operating conservation strategy for vernal pools:

- What is the historical and current distribution of vernal pools within the SSHCP planning area?
- How many acres of vernal pools (natural and restored and/or created) are preserved, and what is their distribution in the SSHCP Preserve System?
- How stable is vernal pool habitat in the SSHCP Preserve System?
- To what extent do anthropogenic activities threaten vernal pools, and specifically what type of SSHCP covered activities pose the greatest threat?
- To what extent do SSHCP covered activities-related development and altered hydrology in the vernal pool watershed affect the long-term viability of vernal pools in the SSHCP Preserve System?
- Are and what invasive species are impacting vernal pools in the SSHCP Preserve System?
- How successful are vernal pool mitigation sites (natural vs. restored and/or created pools) in the SSHCP Preserve System?
- How is climate change affecting vernal pool ecology in the SSHCP Preserve System?

In addition, the following secondary adaptive management and mitigation questions will also be answered:

- What are the best sites for restoring and/or creating vernal pools in the SSHCP Preserve System?
- What vernal pool restoration and/or creation methods are most successful in re-establishing vernal pools in the SSHCP Preserve System?
- What vernal pool management techniques are most successful in maintaining sustainable vernal pools in the SSHCP Preserve System?

G1.1.3 Monitoring Design

G1.1.3.1 Baseline Survey

There is already considerable baseline information for vernal pools in the SSHCP planning area, including within existing (e.g., South Mather) and planned preservation areas (e.g.,

APPENDIX G1 (Continued)

Sacramento County Department of Economic Development 2013; Appendices B-1 and B-2 of the Aquatic Resources Plan (ARP)). As news lands are considered for acquisition for the SSHCP Preserve System, they will be surveyed for vernal pool resources which will be mapped to establish to add to the existing baseline dataset. Sites considered for acquisition will be evaluated using several criteria:

- Potential to support vernal pool covered species;
- Supports high density vernal pool complexes;
- Contains large or deep vernal pools;
- Adjacent to currently preserved lands; and
- Located on parcels 20 acres or greater in size and/or occur in larger, open space areas.

While many of the vernal pools in the SSHCP plan area have already been identified (e.g., Sacramento County Department of Economic Development 2013; Appendices B-1 and B-2 of the ARP), it is likely that some have been missed, that new pools have been created, and that some s have been lost since the last vernal pool mapping effort. New initial comprehensive baseline surveys on candidate preserve sites should, to the extent feasible, include mapping of all vernal pools on site (using GPS/GIS technologies) during the wet season when pools are inundated. The surveys should assess habitat quality for both the vernal pool basin and the surrounding watershed.

Site Selection

Long-term monitoring of vernal pools will be conducted in the Preserve System with a sample size of vernal pools large enough to detect trends in important response variables that reflect vernal pool ecological functions (e.g., hydroperiod, occupation by covered species, etc.). Sample sites (or macro-plots) will be selected using stratified random sampling or pseudo-random sampling to ensure a representative set of sample sites. Sampling factors may include geomorphology, soil types, topography, vegetation communities, and proximity to development edges. Sample size will be increased as preserves are added to the system.

The appropriate sample size for each preserve site will be determined as part of the individual management plan for each preserve. The minimum sample size should be based on factors such as the size of the preserve, the number of vernal pool features, the heterogeneity of the preserve (e.g., different soil types or topographic features of the site), and adjacent land uses, and must take into account periodic sampling variability related to annual weather patterns such as drought and El Nino events.

APPENDIX G1 (Continued)

Within each macro-plot, 3 or 4 vernal pools will be selected for long term-monitoring, as described in Section 1.4.

Monitoring Schedule

Monitoring visits should be scheduled consistently to collect compatible and comparable data over time. However, generally it is desirable to collect substantial baseline data in the first few years of a monitoring program to establish the variability of a system. Because vernal pool ecology is strongly tied to annual precipitation, monitoring should attempt to establish baseline conditions through at least one wet-dry cycle. Initially for the first six to eight years, monitoring plots should be visited annually during the wet season to collect baseline data for annual variability. Thereafter monitoring frequency likely could be reduced, such as not more than every three years on average, but with the objective of sampling at least once during different precipitation conditions (i.e., dry, average, and wet) over an eight to ten year period.

The monitoring schedule should also reflect the response variable being monitored and measured. For example, general vegetation conditions in the vernal pool watershed may have relatively low variability and only change significantly over longer time scales, allowing for less frequent monitoring. However, if a site is vulnerable to invasion by fast-colonizing invasive species, more frequent monitoring may be needed.

Monitoring for hydrology will be conducted at least once during three periods within the same monitoring cycle. A monitoring cycle is defined as the wet season from October 16 to April 14 in a given year. The first survey should occur once following inundation (see discussion in Section 1.4). The second survey should occur mid-season once the first floating hydrophytes appear. The third survey should occur during the dry-down phase.

It is likely that new monitoring methods will be developed over time (e.g., automated monitoring for some response variables) and that data compiled and analyzed as part of the SSHCP will bring a better understanding of the effectiveness of current monitoring protocols, including adequate frequency and timing of surveys for the different response variables. As such monitoring schedules will be evaluated at the discretion of the SSHCP Implementing Entity with input from the Technical Advisory Committee (TAC) and modifications will be made when deemed necessary.

Monitoring will only occur on sites that are either controlled by the SSHCP implementing entity, where the implementing entity has a formal agreement such as a conservation easement or on sites owned by parties that agree to work cooperatively with the SSHCP implementing entity.

APPENDIX G1 (Continued)

G1.1.4 Vernal Pool Habitat Monitoring

Goals for the vernal pool monitoring program include:

- Identify vernal pool habitat variables that are correlated with cover species distribution and abundance in the SSHCP Preserve System;
- Identify management actions to maintain or improve vernal pool habitat quality, including upland habitat/watershed and vernal pool basins, in the Preserve System; and
- Identify trends and circumstances in the Preserve System that require adaptive management responses.

Most habitat monitoring should occur concurrently with the wet season invertebrate sampling events. Sites should be surveyed after the first substantial storm event (rainfall greater than 0.15 inch) during the rainy season (October 16 - April 14) to determine whether and when pools have been inundated. According to U.S. Fish and Wildlife Service protocol, a pool is considered to be inundated when it holds greater than 3 cm (1.2 inches) of standing water 24 hours after a rain event. This initial assessment can occur at a representative reference set of vernal pools distributed throughout the Preserve System. After inundation status has been determined, selected pools within each macro-plot should be sampled at least three times during the wet season per monitoring cycle; the first sampling should be conducted approximately one month after inundation; the second sampling should be conducted when the first floating hydrophytes appear; and the third sampling should be conducted during the early stages of drying (but before the pool is completely dry).

Data to be collected in the permanent monitoring plots include:

- Pool location and surface area: the perimeter of each pool should be mapped using GPS technology with reasonable accuracy (e.g., currently 6" to 1' with standard GPS units).[1]
- Water level: measure the deepest part of the pool using a depth staff permanently installed and secured in the deepest part of the pool.
- Water temperature
- Water quality/chemistry (e.g., alkalinity, conductivity, dissolved ammonium, turbidity, salinity, total dissolved solids, algal blooms): collect water samples using acid washed plastic bottles. Measure samples using a water quality meter and/or sent to a laboratory for analysis.
- Level of habitat disturbance: qualitatively note habitat disturbances including grazing, mowing, OHV activity, impediments, fragmentation, trash/debris etc.

[1] Professional land surveyors could map vernal pools with even greater precision, but 6" to 1' in considered accurate enough for the vernal pool monitoring program.

APPENDIX G1 (Continued)

- Plant species composition: qualitatively determine plant species composition (wetland and surrounding upland) at each monitoring pool, including dominant, sensitive, indicator and non-native species. Vernal pool tadpole shrimp, for example, are commonly found with plant species that require similar inundation periods (Mediterranean barley, toad rush, false dandelion, and Italian rye grass, coyote thistle, downingia, goldfields, spikerush, wooly-marbles, hair Grass, and aquatic buttercup). Several plant species have incompatible inundation cycles and thus may indicate a lower probability of tadpole shrimp occurrences (e.g., cattails, willow, cottonwood, duckweed, nut grass, Baltic rush, and bullrush).
- Qualitative habitat quality: establish at least two permanent vantage points per pool and take photographs from vantage points during each sampling event.

Because "plot fatigue" can occur when multiple visits are made to the same plot within the same survey season and year after year, surveys should include measure to reduce chronic disturbance. For example, during wet season surveys, disturbance during seining can be avoided by placing rocks to step on in the vernal pool basin.

To prevent cross-sample contamination, samples will be returned to the same pool from which they were retrieved. Also, because vernal pool biota are microscopic and highly vagile, they can inadvertently stick to objects and can easily be transported across vernal pool complexes. Therefore, extra care will be taken to avoid cross-contamination between pools, specifically if multiple pools from multiple complexes are surveyed by the same survey personnel. All equipment will be thoroughly cleaned before visiting a new vernal pool complex. Field vehicles will be restricted to paved roads.

Collection of individuals for purposes of laboratory identification and/or museum vouchers will be discouraged. Monitoring and sampling will be conducted by experienced personnel in possession of a valid U.S. Fish and Wildlife Service 10(a) take/handling permit.

G1.1.5 Vernal Pool Species Monitoring

G1.1.5.1 Vernal Pool Tadpole Shrimp and Vernal Pool Fairy Shrimp Monitoring Goals

Vernal pool monitoring include three goals for vernal pool tadpole shrimp (VPTS) and vernal pool fairy shrimp (VPFS):

VPTS & VPFS Monitoring Goal 1: Develop and implement a standardized formal monitoring program that collects data in sufficient detail to evaluate species trends in presence and abundance within vernal pools currently known to be occupied by VPTS or VPFS.

APPENDIX G1 (Continued)

VPTS & VPFS Monitoring Goal 2: Develop and implement a standardized formal monitoring program that collects data in sufficient detail to evaluate the expansion of VPTS or VPFS into vernal pools previously known not to be occupied by VPTS or VPFS, including both through natural dispersal and colonization and through artificial inoculation implemented as part of an adaptive management strategy.

VPTS & VPFS Monitoring Goal 3: Use results of standardized formal monitoring programs to develop adaptive management protocols, identify triggers for adaptive management, and develop pilot studies to fill data gaps and address management uncertainties before full-scale management is implemented (e.g., does the management work and does it have any unintended adverse consequences?).

G1.1.5.2 VPTS and VPFS Conservation Strategy Goals

Conservation (including management) of the shrimp species within the UDA is important because the UDA supports important vernal pool complexes that are thought to support the highest concentrations of VPTS The VPTS also has slightly different habitat requirements than some other vernal pool crustaceans, with a life cycle that depends on larger or deeper hydrological systems with longer lasting aquatic phases. Most of these pool types occur within the UDA. Most of the documented occurrences for VPFS, however, are outside the UDA, as is a substantial percentage of the VPTS occurrences (see Table 7-5 in Chapter 7 of the SSHCP).

The monitoring protocol for VPFS and VPTS will monitor the overall Plan's success and whether and how the Plan meets its conservation goals and objectives (see Table G1-1 and Table 7-2 in Chapter 7-2).

G1.1.5.3 VPTS and VPFS Monitoring Questions

Success of these conservation strategy for VPTS and VPFS will be determined through monitoring and addressing the following primary conservation and preservation questions:

- What is the historical and current distribution of VPTS and VPFS in the SSHCP Preserve System, and how many and what acreage of occupied pools (natural and restored and/or created) are preserved?
- How stable are the VPTS and VPFS populations over time in the SSHCP Preserve System.
- What habitat covariates are associated with long-term persistence of healthy VPTS and VPFS populations in the SSHCP Preserve System (e.g., vernal pool basin size, vernal pool complex size, upland habitats, hydroperiods, non-natives species, etc.)?

- To what extent do existing and anticipated environmental conditions (e.g., invasive plant and wildlife species, climate change) and covered activities threaten VPTS and VPFS in the Preserve System?
- To what extent do development covered activities and altered hydrology in the vernal pool watershed affect the long-term viability of the VPTS and VPFS populations in the Preserve System?
- How do suitable habitat conditions for VPTS and VPFS differ from those of other large branchiopods species or from one another?
- How successful are vernal pool mitigation sites (including existing natural pools and restored and/or created pools) in the Preserve System?

In addition, the following secondary adaptive management and mitigation questions will also be addressed:

- What are the best sites for re-establishing VPTS and VPFS in the Preserve System?
- What vernal pool restoration techniques are most successful in re-establishing VPTS and VPFS populations in the Preserve System?
- What vernal pool management techniques are most successful in maintaining sustainable VPTS and VPFS populations in the Preserve System?

G1.1.5.4 Baseline Surveys

A representative sample of vernal pools on SSHCP existing preserves will be surveyed for presence of VPTS and VPFS to establish a baseline dataset of the distribution of the two species in the existing preserves. Sample macro-plots will be selected using the stratified random or pseudo-random sampling methods described in Section 1.3.1 for vernal pools in general. These existing preserves baseline surveys for VPTS and VPFS will occur during the wet season when pools are inundated and the species are detectable. Specimens will be collected with dip nets and returned to the same pool immediately after identification.

For new preserve sites, surveys will be conducted for presence of VPTS and VPFS. Depending on the size of the site and variability of the site conditions, surveys may be conducted in a representative sample of vernal pools (e.g., on large sites with many pools) or all the pools (e.g., on small sites or sites with a small number of pools). For new preserve sites being considered for acquisition for the Preserve System, presence/absence surveys may also be conducted as needed in non-randomly selected pools if the randomized selection process appears to omit pools considered to be highly suitable for the species and their omission could result in a false negative finding for the preserve site. That is, a more subjective sampling method may be more

appropriate for establishing presence/absence on a candidate preserve site, while random sampling methods are necessary for making probabilistic inferences from monitoring data to larger areas. The main caution is that species occupancy in vernal pools that are selected in a non-random way cannot be used to infer conditions in other vernal pools (e.g., proportion of pools occupied).

G1.1.5.5 Site Selection

Long-term monitoring of VPTS and VPFS will be conducted in the Preserve System with a sample size of vernal pools large enough to detect trends in populations, such as proportion of occupied pools, relative population abundance, etc., as described in Section 1.3.1. It is expected that pilot studies will be needed to establish adequate sample sizes with the statistical power to detect VPTS and VPFS population trends (e.g., what sample size is needed to detect a 25% occupancy/population increase or decrease with 80% power of detection?). Generally, the more variable the sample data are between surveys (which is a problem of detection error), the larger the number of sample sites needed. As the vernal pool monitoring program is fleshed out, reasonable change thresholds (that may trigger management) and the desired power of the statistical tests will need to be determined by the Implementing Entity in consultation with the TAC.

The necessary sample size for each preserve site will be determined as part of the individual management plan for each preserve, but will also need to be coordinated with the overall monitoring program for the Preserve System. For example, if a preserve site supports vernal pool conditions (e.g., hydrology, soils, topography) that are well represented in the Preserve System, relatively few sample sites on the particular site may be needed as part of the Preserve System-wide monitoring program. However, if the site supports a unique or poorly represented type of vernal pool in the Preserve System, more sample sites may be needed to ensure that adequate data for that vernal pool type is being collected. Whatever sampling scheme is implemented on an individual preserve, it will need to serve the dual purpose of (1) monitoring the status of VPTS and VPFS on the particular preserve site (e.g., in order to inform site-specific management), and (2) monitoring the status of the species in the overall Preserve System (e.g., in order to determine whether the operating conservation strategy is meeting the Plan goals and objectives).

G1.1.5.6 Monitoring Schedule

The monitoring protocol designed to address the above questions will include habitat and species-specific monitoring that accommodate the species' different life cycles. While occupancy monitoring ideally is conducted during the wet season, cyst bank status and density monitoring, should it become necessary, is best evaluated during the dry season; hence, monitoring could occur during the wet and dry seasons. However, because cyst bank status is a more intrusive and intensive monitoring method, it is anticipated to play a small role and/or

APPENDIX G1 (Continued)

would be used on limited basis to address specific questions (e.g., cyst survival during extended drought periods), as opposed to being implemented on a broad scale. The monitoring schedule should be re-evaluated and adjusted, if necessary, every three to five years to ensure that appropriate data are collected to measure the Plan's conservation goals. This review will be conducted by the Implementing Entity in consultation with the TAC.

Monitoring visits should be scheduled consistently to collect compatible and comparable data over time. Initially for the first six to eight years, monitoring plots should be visited annually during the wet season to collect a rigorous baseline dataset. Thereafter monitoring frequency likely could be reduced, such as not more than every three years on average, but with the objective of sampling at least once during different precipitation conditions (i.e., dry, average, and wet) over an eight to ten year period.

As described in Section 1.3.1, a monitoring cycle is defined as the wet season from October 16 to April 14 in a given year. Generally, three surveys per cycle are conducted at each sample vernal pool, with the first following inundation; the second survey at mid-season once the first floating hydrophytes appear; and the third during the dry-down phase. For VPTS and VPFS, presence/absence surveys will be conducted in the same pools within the macro-plots monitored for general habitat conditions (see Section 1.4). Sampling for VPTS and VPFS will be timed, to the extent feasible, with general surveys, but will also be timed to coincide with the period the species are most readily identifiable in the field (typically January to mid-February). Generally, up to two surveys will be conducted within a monitoring cycle at each sample vernal pool. If both species are detected during the first survey in pool, re-sampling of the same pool is not necessary. If surveys are negative after two sample events, the qualified biologist will have the discretion to conduct additional samples at pools where he/she believes one or both of the species may be present, and for some reason the first two samples were conducted under marginal conditions for detection.

Approximately every 10 years during highly suitable weather patterns (i.e., timing and amount of rainfall), recent aerial photographs or some other remote sensing data (e.g., satellite imagery) will be reviewed and reconnaissance-level surveys will be conducted to update the overall distribution and status of vernal pools in the Preserve System. The purpose of the Preserve System-wide review is to generate any new information about the entire vernal pool system, including those pools that are not included in the statistically-based sampling effort. Depending of the results of the reconnaissance-level surveys, some pools may be targeted for follow-up surveys to determine the status of VPTS and VPFS. For example, good management practices may result in occupancy with VPTS or VPFS where the species had not been found before. Alternatively, anthropogenic influences (e.g., along edges) may have eliminated VPTS or VPFS from previously occupied vernal pools or a vernal pool complex.

APPENDIX G1 (Continued)

G1.1.5.7 VPTS and VPFS Monitoring Protocol

Goals:

- Determine presence/absence of VPTS and VPFS in the Preserve System vernal pools;
- Determine relative abundance (productivity) in vernal pools across the Preserve System;
- Determine species richness and diversity in the Preserve System vernal pools;
- Identify predatory species in the Preserve System vernal pools; and
- Identify factors that may degrade habitat quality of the Preserve System vernal pool.

Wet season sampling is important to understand the status of the species; species occupancy (presence/absence); abundance or productivity; and determine covariates (e.g., habitat conditions, predators). Monitoring will be scheduled as describe in Section 1.5.6. During each survey, representative portions of the pool bottom, edges, and vertical water column shall be adequately sampled using a dip net appropriate for the size of the pool. Net mesh size shall not be larger than (1/8) inch.

A standardized dip net pull will be used for each survey and is defined as extending the net and pulling it back using a sweeping motion intended to sample approximately 4 cubic feet of water.

Information for the following response variables will be collected:

- Species present or absent (in the case of VPTS and VPFS)
- Relative abundance of VPTS and VPFS: the number of individuals of both species captured during each dip net pull. Relative abundance will be assigned according to the following categories.
    - Low = average <1 individual per standardized dip-net pull
    - Medium = average 1-5 individuals per standardized dip-net pull
    - High = average 6-25 individuals per standardized dip-net pull
    - Very High = average >25 individuals per standardized dip-net pull
- Species richness and diversity: number of different taxa (by species, if possible), including the presence of all live stages (tadpole/metamorph/adult) of amphibians.
- Presence of predatory species, including, western spadefoot (also a covered species) and waterfowl and shorebirds.

- Opportunist (mosquito/chironomus) abundance: abundance of invertebrate families least sensitive to changes in water quality and habitat suitability. These may include mosquitoes and chironomid midges of the genus chironomus.
- Presence of trash, algal blooms, trampling, etc. that may degrade habitat quality.

G1.1.5.8 Management for VPTS and VPFS

Management for VPTS and VPFS will include routine preserve management and maintenance and adaptive management. Routine management will include actions expected to benefit VPTS and VPFS, including fencing, signage, patrols, trash removal, public education, and restrictions on public access, etc. Routine management also refers to biologically-based habitat management actions that are known or strongly expected to have a high degree of success. For example, control of certain highly invasive species in the watershed of vernal pools such as yellow starthistle (*Centaurea solstitialis*) that can develop dense stands in grasslands may affect watershed hydrology. While management of habitat factors such as invasives controls can be considered a routine management action, the actual conditions under which controls are implemented and the methods used may be less certain. Where there is uncertainty in the effectiveness or feasibility of a management action(s), or the potential for unintended biological effects (e.g., non-native species used for biocontrol), an adaptive management strategy may be needed.

The conditions under which adaptive management should be applied will need to be determined by the Implementing Entity in consultation with the TAC as the management plan is developed. Some examples of conditions under which adaptive management actions may be triggered as a result of monitoring include the following:

- If VPTS or VPFS occurrences in occupied monitoring pools have declined a certain percent relative to the baseline data and initial monitoring survey results over specified monitoring periods. Pilot studies are needed to determine what percent population changes over what period of time will be detectable with acceptable statistical power and that are biologically significant (i.e., just because a statistically significant change may be detected, it is not necessarily biologically significant).
- Certain preserves are not maintaining populations with routine management relative to adjacent preserves over a specified monitoring period (i.e., the cause of the decline is uncertain.
- Monitoring information indicates that adverse factors relative to VPTS or VPFS health or habitat degradation exist, including disease, predation, algae infestation, etc. than are not amendable to routine management and the most effective management action is uncertain.

APPENDIX G1 (Continued)

- Known or new invasive species are invading and degrading vernal pool habitats despite routine management (e.g., new control methods may need to be tested).

Because adaptive management, by nature, is experimental, management measures will need to be evaluated through pilot studies that test their effectiveness and feasibility, as well identifying any unintended adverse effects, on small scale before they are applied on a large scale. The results of the pilot studies will be evaluated by the Implementing Entity in consultation with the TAC.

The following are examples of potential adaptive management measures:

- Habitat Management:
    - Invasives control: Identify alternative feasible invasive control methods, such as grazing, prescribed burns, herbicides, mechanical removal, biocontrols (e.g., fungi, bacteria, insects). Test selected alternative methods, including different applications of a particular control (e.g., grazing regime or type of grazer). Determine whether and what rate and methods of invasives controls are adequate or most effective for the target species (e.g., fall vs. spring prescribed burns).
    - Thatch management: develop a grazing management plan to control thatch buildup without adversely affecting the vernal pool ecosystem (e.g., Marty 2007). A grazing management plan should, for example, specify the types and stocking rates of livestock (Animal Month Unit, AMU), grazing schedule, and the optimal grazing results (e.g., through the measurements of Residual Dry Matter, RDM). Consider whether fire management may be an alternative effective large-scale method to control thatch without harming the vernal pool ecosystem and the VPTS or VPFS. Identify smaller-scale thatch control methods, such as mowing or weed whacking, where large-scale grazing and/or burns cannot feasibly be applied,
    - Hydrological function and land use: Based on monitoring of hydrological covariates (e.g., watershed condition, hydroperiod, water chemistry) implement measures designed to improve hydrological functions and their effect on VPTS and VPFS. Hydrological studies should be conducted as a pilot program on a subset of monitoring pools (including connected and fragmented pools) to study the effects of management of factors such as surface and subsurface hydrology and vernal pool fragmentation on vernal pool conditions on the status of the species. In addition, existing land use and management practices that may be adversely affecting vernal pool habitat functions (e.g., type and intensity of grazing, pesticide/herbicide/fertilizer use of surrounding land uses, land alterations, flood control, mining operations, contaminated run-off, etc.) should examined and potential management interventions identified and tested.

APPENDIX G1 (Continued)

- Species Management:
  - Predator control: Introduction of the bullfrog (*Rana catesbeiana*) to areas inhabited by the VPTS or VPFS appears to increase predation threats to these species. Although bullfrogs do not establish permanent breeding populations in vernal pools, dispersing immature males may temporarily occupy ephemeral wetlands during the rainy season. Bullfrogs are also extremely difficult to eradicate, because they have no natural enemies and can travel long distances between aquatic habitats. In addition, waterfowl and shorebirds may prey on crustaceans in shallow and clear pools. While waterfowl and shorebird predation is a natural "baseline" condition, in combination with non-native predators such as bullfrogs, predation could severely reduce VPTS or VPFS populations that threaten survival and recovery of the species in the Plan Area. Predator control programs therefore may need to be implemented if monitoring indicates that predation is a substantial threat to VPTS or VPFS populations; e.g., bullfrogs are found in vernal pools. Targeted predator controls programs that do not involve introducing non-native species (e.g., predatory fish), use of toxicants, or draining vernal pools should tested. For example, removal methods such as trapping should be investigated, but such methods would need to avoid take of VPTS and VPFS. See, for example, Louette et al. (2013).
  - Disease control: shrimp species appear to be susceptible to bacterial infections and parasites. Flukes (Trematoda) of an undetermined species have parasitized VPFS at the Vina Plains in Tehama County (USFWS 2005). Microsporiodiosis also is known to affect some fairy shrimp species. The main cause of these diseases is believed to be contaminated water. Treatment of contaminated water sources, including groundwater, is the only known antidote to these types of infections and diseases.
- Information Comparison: compare information from othe vernal pool ecosystems/species and evaluate whether this information is applicable to management of VPTS or VPFS in the SSHCP Plan Area.
- Stewardship program:
  - Re-evaluate success of current land stewardship programs.
  - Re-evaluate access controls; establish new access controls, if necessary.
  - Monitor adjacent land uses and determine the potential effect of these land uses on the health of the vernal pool ecosystem, VPTS and VPFS.

G1.1.5.9 Future Studies/Data Gaps for VPTS and VPFS

As described in Section 1.5.7, dip-netting will be used to assess relative abundance of VPTS and VPFS during baseline studies. However, information about cyst bank densities, population

APPENDIX G1 (Continued)

sizes, and population viability would contribute to managing vernal pool ecosystems for these two species, especially with projected climate change that may stress vernal pools and their constituent species in the coming decades. An understanding of the relationship between cyst bank densities and population viability over time, for example, would be extremely helpful in assessing long-term population trends and identifying when management interventions are critically needed.

VPTS and VPFS produce cysts that may remain dormant in vernal pool sediment for many years, and only a fraction of the cysts may hatch even when physical conditions are optimal. It is possible, therefore, for presence/absence surveys to continue detecting fairy shrimps for a period of time even if the population is in decline and viable offspring are no longer produced in a given pool (U.S. Fish and Wildlife Service, Draft Fairy Shrimp Monitoring Plan, 2008).

For these reasons, future studies of VPTS and VPFS may include a study of cysts, as outlined below.

Goals:

- Determine cyst bank density;
- Determine population size; and
- Determine population viability.

Dry season sampling is not required at this time but could become an important tool to monitor the stability and density of the tadpole shrimp cyst bank. Aside from the dry season fairy shrimp sampling protocol presented below, there is no viable population density model/protocol available in California currently available. The dry season fairy shrimp sampling protocol probably is too invasive to be used repetitively at a large-scale during SSHCP monitoring, but potentially could be applied at small scale at targeted populations. Dr. Andrew Bohonak of San Diego State University is currently developing and refining a density-estimating protocol intended to collect data in a rigorous manner while minimizing impacts to vernal pool biota. Density estimation should not be conducted until this protocol has been accepted as appropriate.

If population density measurements should be necessary to evaluate the dynamics of a failing VPTS or VPFS population in an otherwise functioning ecosystem (see adaptive management above), and until Dr. Bohonak's protocol is available, the following dry season sampling protocol may be applicable. Soil sampling should be conducted every three sampling seasons to collect, culture, and analyze cysts. The dry season and wet season sampling cycle should be the same (each dry season sample should be collected in

APPENDIX G1 (Continued)

the same year as the wet season sample). Sampling should be conducted per U.S. Fish and Wildlife Service protocol (2001), as follows:

- Soil shall be collected when it is dry to avoid damaging or destroying cysts which are more fragile when wet. A hand trowel or similar instrument shall be used to collect approximately one liter volume sample per pool of the top 1-3 centimeters of pool sediment. Whenever possible, soil samples shall be collected in chunks. The trowel shall be used to pry up intact chunks of sediment, rather than loosening the soil by raking and shoveling which can damage cysts.
- To avoid significantly impacting the sample pools it is recommended that a total of 10 soil samples of approximately 50 ml each shall be taken from each pool (not the 100 ml samples recommended in the U.S. Fish And Wildlife Service protocol), for a total soil sample volume of approximately 500 ml per pool.
- Soil sampling locations should include: 1.) one soil sample taken from the edge of the pool, at least four soil samples shall be taken from equidistant points along the longest transect of the pool; 2.) one soil sample taken from the edge of the pool, at least four soil samples shall be taken from equidistant points along the widest transect of the pool; or 3.) if neither the longest or the widest transect encompasses the deepest part (or parts) of the pool, then at least two soil samples shall be taken from the deepest part (or parts) of the pool.
- Soil sieving should be conducted to extract cysts from soil samples. The soil samples shall not be ground, crushed, or otherwise manipulated in order to expedite the sieving process. A relatively short period of pre-soaking the soil sample may be helpful/necessary in order to facilitate the sieving process. Small aliquots (approximately 50 ml in volume) of soil shall be gently washed with water through a graded series of U.S. standard eight inch soil sieves ending in mesh sizes 300 micron (um), and 150 micron (um).
- Washed and sieved soil fractions from the 300 um and 150 um sieves shall be examined under a dissecting microscope for tadpole shrimp and fairy shrimp cysts. The process shall be repeated until all individual soil samples have been examined. All sieved material shall be processed and dried as quickly as possible, preferably within one hour from the initial wetting.
- Cysts should be removed from the soil, separated by cyst type into labeled vials, allowed to air-dry, and then stored dry.
- Cyst density information for each soil sample location shall be calculated by dividing the total number of cysts recovered by the total amount of soil from the individual aliquots from that soil sample location. Total cyst density information for each soil sample location shall be reported for each species in terms of: none; 1-25 cysts/100 ml soil; 26-

50 cysts/100 ml soil; 51-100 cysts/100 ml soil; 101-199 cysts/100 ml soil; or more than 200 cysts/100 ml soil.

Cysts should be cultured and hydrated and identified to the genus and species level, if possible, to determine the percentage of VPTS or VPFS cysts within the sample.

G1.2 Reference Cited

Louette, G., S. Devisscher, and T. Adriaens. 2013. "Control of Invasive American Bullfrog Lithobates catesbeianus in Small Shallow Water Bodies. European Journal of Wildlife Research 59:105–114.

U.S. Fish and Wildlife Service. USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

APPENDIX G2

Functional Survey Groupings

APPENDIX G2
Functional Survey Groupings

Preserve Vernal Pool – Wet Season Surveys

Attribute/Species (Scientific Name)	Survey Type	Survey Window*
Inundation/ponding	Aerial photos/field verification	Winter/Spring
Plants		
Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*)	Wet season	February 15 through April 30
Dwarf downingia (*Downingia pusilla*)	Wet season	March 1 through May 31
Legenere (*Legenere limosa*)	Wet season	April 1 through June 30
Pincushion navarretia (*Navarretia myersii* ssp. *myersii*)	Wet season	April 1 through May 31
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)	Wet season	April 1 through July 31
Wildlife		
Vernal pool tadpole shrimp	Wet season	Wet season – winter/spring
Vernal pool fairy shrimp (*Branchinecta lynchi*)	Wet season	Wet season – winter/spring
Mid-valley fairy shrimp (*Branchinecta mesovallensis*)	Wet season	Wet season – winter/spring
Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*)	Wet season	Winter/spring
California tiger salamander (*Ambystoma californiense*)	Larval surveys – dip netting	March through May
	Adult surveys – drift fences, pitfall traps, night visual	October 15 through March 15
Western spadefoot (*Spea hammondii*)	Larval surveys	October through May

* Survey windows subject to revision.

Preserve Vernal Pool – Dry Season Surveys

Attribute/Species (Scientific Name)	Survey Type	Survey Window
Residual dry matter	Dry season	Fall
Plants		
Sacramento Orcutt grass (*Orcuttia viscida*)	Dry season	May 1 through June 30
Slender Orcutt grass (*Orcuttia viscida*)	Dry season	May 1 through July 31
Sanford's arrowhead (*Sagittaria sanfordii*)	Dry season	May 1 through September 30

Preserve Riparian Surveys

Attribute/Species (Scientific Name)	Survey Type	Survey Window
CRAM	—	All year
Restoration monitoring	—	All year

APPENDIX G2 (Continued)

Attribute/Species (Scientific Name)	Survey Type	Survey Window
Wildlife		
Cooper's hawk (*Accipiter cooperii*)	Foraging	All year
	Nesting	March 15 through August 15
White-tailed kite (*Elanus leucurus*)	Nesting	March 15 through August 15
Swainson's hawk (*Buteo swainsoni*)	Nesting	March 15 through August 15
Western pond turtle (*Actinemys marmorata*)	Aquatic/basking sites	June through September (sunny days to observe basking)
Giant gartersnake (*Thamnophis gigas*)	Aquatic/basking sites	May 1 through September 30
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Exit hole surveys	All year

CRAM = California Rapid Assessment Method

Preserve Vernal-Pool Grassland and Valley Grassland Surveys

Attribute/Species (Scientific Name)	Survey Type	Survey Window
Residual dry matter	—	Fall
Wildlife		
Tricolored blackbird (*Agelaius tricolor*)	Foraging	All year
	Nesting	March 15 through June 15
Western burrowing owl (*Athene cunicularia*) (occupied nesting burrows)	Nesting/Wintering	All year
Ferruginous hawk (*Buteo regalis*)	Foraging	November 1 through February 28
Swainson's hawk (*Buteo swainsoni*)	Foraging	March 15 through August 15
Northern harrier (*Circus cyaneus*)	Foraging	All year
	Nesting	March 15 through August 15
White-tailed kite (*Elanus leucurus*)	Foraging	All year
Loggerhead shrike (*Lanius ludovicianus*)	Foraging	All year
	Nesting	February 1 through June 30
American badger (*Taxidea taxus*)	Grassland/savanna	All year
Pallid bat (*Antrozous pallidus*)	Foraging	April through November
Western red bat (*Lasiurus blossevillii*)	Foraging	April through November
Yuma myotis (*Myotis yumanensis*)	Foraging	April through November

Cropland and Irrigated Pasture Preserve Surveys

Attribute/Species (Scientific Name)	Survey Type	Survey Window
Crop type	Mapping/Field Inspection	During growing season
Wildlife		
Greater sandhill crane (*Grus canadensis*)	Foraging – cropland and irrigated pasture grassland	September 1 through February 15
Loggerhead shrike (*Lanius ludovicianus*)	Foraging – cropland and irrigated pasture grassland	All year

APPENDIX G2 (Continued)

Attribute/Species (Scientific Name)	Survey Type	Survey Window
Swainson's hawk (*Buteo swainsoni*)	Foraging – cropland and irrigated pasture grassland	March 15 through August 15
Northern harrier (*Circus cyaneus*)	Foraging – cropland and irrigated pasture grassland	All year
	Nesting – cropland and irrigated pasture grassland	March 15 through August 15
Tricolored blackbird (*Agelaius tricolor*)	Foraging – cropland and irrigated pasture grassland	All year
	Nesting – cropland only	—
Western burrowing owl (*Athene cunicularia*)	Wintering – cropland and irrigated pasture grassland	July 16 through February 14 (non-breeding season)
	Nesting – cropland and irrigated pasture grassland	February 15 through July 15 (breeding season)
White-tailed kite (*Elanus leucurus*)	Foraging – cropland and irrigated pasture grassland	All year
Pallid bat (*Antrozous pallidus*)	Foraging – all agricultural land types, roosting – orchards only	April through November
Western red bat (*Lasiurus blossevillii*)	Foraging – all agricultural lands, roosting – orchards only	April through November

Bat Roost Surveys

Attribute/Species (Scientific Name)	Survey Type	Survey Window
Roost installation inspection	Field verification	Any time
Wildlife		
Pallid bat (*Antrozous pallidus*)	Roosts	April through November
Yuma myotis (*Myotis yumanensis*)	Roosts	April through November

APPENDIX G2 (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX G3

Preserve Management Toolbox

APPENDIX G3
Preserve Management Toolbox

G3.1 Introduction

This appendix presents a management "toolbox" that will be used in the development of individual Preserve Management Plans (PMPs). The Implementing Entity will consult this appendix during PMP preparation to identify those management activities that could apply to their parcels to achieve the measureable objectives and other commitments of the South Sacramento Habitat Conservation Plan (SSHCP) Conservation Strategy. The following describes the toolbox of potential land management methods, their potential applications, and potential limitations to provide information for how and why the methods will be applied. These descriptions do not include discussions of detailed management methods such as timing, frequency, or combining methods. Such details will be incorporated into individual PMPs depending on the selected methods. Following the description of land management methods, the methods are presented in a matrix (Table G3-1) that identifies how they might be used to address threats and stressors to SSHCP land cover types and Covered Species habitats.

G3.2 Routine Preserve Maintenance and Land Management

Routine management refers to a variety of Preserve management activities generally expected to benefit Covered Species and their habitats, including fencing, signage, public education, trash and refuse removal, general inspections, patrols, and enforcement. Most of the routine management activities are related to minimizing the effects of adjacent urban development and associated human activities on biological resources within Preserves.

Patrols also are expected to reduce intentional and accidental fire ignitions (e.g., from discarded cigarettes).

Fencing

Installation and regular inspection of fencing and gates, and immediate repair when necessary, is critical to exclude indirect effects such as trash dumping, off-road-vehicle activity, and trespassing on SSHCP Preserves. Fencing maintenance is also critical for control of livestock that will be used for vegetation management. Internal cross-fencing, if desired to more closely control grazing locations, must be carefully considered to ensure that water remains available for livestock and to avoid restrictions on wildlife travel corridors.

Maintain Agricultural Facilities and Structures

Facilities and structures that are necessary for pre-acquisition agricultural operations on a new SSHCP Preserve should be repaired and maintained, and those for which there is no current or anticipated need should be removed or re-used elsewhere within the SSHCP Preserve System.

APPENDIX G3 (Continued)

Abandoned and derelict structures such as sheds and barns may be used by bats for day roosts, including at least two of the covered bat species (pallid bat (*Antrozous pallidus*) and Yuma myotis (*Myotis yumanensis*)). Therefore, these should only be removed or moved elsewhere if they are unoccupied by bats.

Debris and Trash Removal

All Preserves and Preserve parcels and adjoining areas should be regularly inspected for debris and trash accumulation, including that resulting from agricultural operations on Cropland and Irrigated Pasture Preserves. At a minimum, the Implementing Entity will conduct bi-annual cleanup days to remove trash from each SSHCP Preserve, and will coordinate with the county to have illegal dumping cleared from adjacent roadway shoulders.

If there are stockpiles of what must be retained on a Preserve site, they should be on graveled or bare dirt areas that have been pre-treated with herbicides to control weeds.

Methods for Preserve Fire Breaks

Fire breaks adjacent to public roads are required by Plan Area fire protection districts. Districts recommend fire breaks to be 16 feet in width and created using a disk line or scrape line in the spring or early summer after grass growth has slowed. Disked fire breaks are preferred as they will support plants the following year and scraped breaks do not. Internal fire breaks within Preserve units should be phased out. Fire breaks required for prescribed burns should consist of creating a black line around the prescribed burn area.

Methods to Limit Off-Road Travel

The Implementing Entity will limit off-road-vehicle use by Preserve staff on Preserves to during the wet season. When off-road-vehicle use is required for ranching operations, operators will not drive through vernal pools.

Method to Minimize Impacts from Existing Utility Corridors

Holders of utility easements that traverse Preserves will be escorted by Preserve Managers to ensure that their activities remain within the easements and that access routes are consistent with the PMP.

Install and Maintain Appropriate Signage

All SSHCP Preserve parcels will have signs posted along any fenceline and any gate that adjoins a public road or other public area (e.g., public parks). Sign content is at the discretion of the

Implementing Entity depending on the purpose of the sign (e.g., no trespassing, description of the Preserve), but must include a public information telephone number.

G3.3 Habitat Vegetation Management, Thatch Control, and Non-Native Plant Control

Grazing

Grazing management is expected to be a primary habitat management tool on SSHCP Preserves to control vegetation such as annual grass thatch and some invasive weeds. The primary grazers in the Plan Area will be cattle, but targeted grazing may be conducted using sheep and goats depending on the size of the Preserve and the objective of the grazing (e.g., a specific invasive species or an area not available for cattle grazing). Grazing can have beneficial and adverse effects on natural resources in the SSHCP Preserve System depending on factors such as stocking rates and timing of grazing activities, and grazing management will address both types of effects. Over-grazing and large congregations of grazers can have severe effects on vegetation communities, Covered Species habitat, soil conditions, stormwater runoff, and water quality, and a lack of grazing or under-grazing can result in buildup of thatch, which can reduce habitat quality for SSHCP Covered Species, including altering vernal pool hydrology, altering vegetation community composition, and increasing the risk of catastrophic wildfires. Generally, grazing objectives are expressed as the desired residual dry matter (RDM) left after grazing, but may also include objectives related to protecting certain resources (e.g., Riparian zones, Oak Woodland).

Controlled grazing can be a useful management tool for a variety of natural resources. For example, it can be used to control thatch buildup in the Vernal Pool Grassland, Grassland, and Woodland Savanna land covers. Reducing thatch can maintain vernal pool hydroperiods and allow vernal pool species to complete their aquatic life cycle phases. Reducing thatch also improves growth and recruitment of upland plant species such as annual wildflowers and oak trees (as long as trampling or browsing of seedlings and saplings is controlled); reduces the buildup of fuels that increases the chance of catastrophic wildfires; improves overland movement capabilities of species such as California tiger salamander (*Ambystoma californiense*) and western spadefoot (*Spea hammondii*); and encourages use by burrowing species such as California ground squirrel (*Otospermophilus beecheyi*), gopher, and other rodents whose burrows provide refuge or denning habitats for Covered Species such as tiger salamander, western spadefoot, giant gartersnake (*Thamnophis gigas*), and burrowing owl (*Athene cunicularia*), and provides prey for several of the bird Covered Species.

Managed grazing on SSHCP Preserves will be needed to address potential adverse effects of grazing, including impacts on wetland, riparian, and woodland vegetation (e.g., trampling and

browsing); soil disturbances; invasive exotic species establishment; and water quality impacts where cattle and other grazers may congregate. These are indicated as "inappropriate grazing" effects in Table G3-1.

Managed grazing to avoid adverse effects includes appropriate stocking rates, seasonal timing of grazing activities, rotational grazing patterns, distributing resources such water and mineral and salt licks to disperse cattle and avoid congregation in sensitive areas (e.g., Wetland and Riparian habitats), and exclusion fences to protect sensitive areas.

Prescribed Burns

Prescribed burns (also called controlled burns) can be used as an alternative to grazing as a Grassland and Vernal Pool Grassland management tool. Prescribed burns may also be used to reduce thatch and reduce fuel loads in Shrub Land cover types. Prescribed burns may improve vegetation communities by reducing total cover (that shades out recruits), removing senescent individuals, controlling pests, and promoting nutrient cycling. It is expected that prescribed burns will primarily be used only in the larger SSHCP Preserves to control thatch, but may also be used as a targeted method to control certain invasive plant species such as medusahead (*Taeniatherum caput-medusae*) and goatgrass (*Aegilops cylindrica*) that are unpalatable to grazers.

Although prescribed burning may be used to control other invasive species, its effectiveness has not been well tested. Factors such as the optimum season(s) to burn and the frequency of burns in the Plan Area need to be investigated. It is unlikely that prescribed burns will be used on a large scale in SSHCP Preserves located in the Urban Development Area because of public safety and air quality concerns, but it may be useful on a smaller scale and/or in more remote areas of the SSHCP Preserve System.

Mowing

Similar to grazing and prescribed burns, mowing may be used to control thatch and invasive species. Mowing generally will be used in the larger-size SSHCP Preserves with Vernal Pool Grassland land cover, and probably will be used on smaller SSHCP Preserves than grazing management and prescribed burning management actions, and where these other land management methods cannot be feasibly used.

Similar to prescribed burning, the optimum seasons and frequency of mowing, and the appropriate mowing heights (e.g., to affect targeted species but avoid inadvertent impacts to species) are resource-specific and will need additional study to understand the most effective applications of mowing.

Manual Removal of Vegetation

Manual removal refers to the use of weed trimmers, raking, hand- or tool-pulling, chainsaws, digging, hand-cutting, and other methods. These typically are used at small scales to target certain vegetation issues. Manual removal may be desirable were large-scale methods could cause substantial damage to sensitive resources such as native riparian species. Raking can be used to reduce thatch in smaller areas where other methods cannot be used, and the other methods are often species-specific removal methods. For example, weed trimmers are effective in cutting back infestations of starthistle (*Centaurea solstitialis*).

Pesticides (Including Herbicides)

As discussed in Chapter 5, pesticide use on SSHCP Preserves is not a SSHCP Covered Activity. However, herbicides may be used for management in targeted situations where potential adverse effects on sensitive resources (e.g., unintended drift, runoff) will not occur and no take of Covered Species is possible. Most of the available herbicides are non-selective for specific types of plants (e.g., glyphosate and paraquat), so they will be limited to targeted situations. Herbicide use is also expensive and labor intensive. Herbicides may be effective when used in conjunction with other removal methods such a "cut-and-spray" of invasive plants. Herbicides will be well-tested at a small scale before applied at a larger scale.

Biological Controls

Biological controls generally refer to use of biological organisms (e.g., pathogens, insects) to control invasive plants and animals. Relatively little is known about effective biological controls for Plan Area management issues, but some research indicates the potential for biological controls for invasive plants such as starthistle, Italian thistle (*Carduus pycnocephalus*), and milk thistle (*Silybum marianum*).

G3.4 Wildlife Management on Preserves

Domestic Animal Control

With the exception of livestock—domestic animals used exclusively in agricultural operations—domestic animals will be prohibited within Preserves. Signs prohibiting the presence of domestic animals within Preserves will be clearly posted along any fenceline and any gate that adjoins a public road or other public area (e.g., public parks). Pet dogs along public roadways or trails crossing or adjacent to Preserves must remain on a leash at all times. The Implementing Entity will monitor for unattended domestic or feral animals that are observed within the Preserves, report the occurrences to the appropriate animal control agencies, and take other necessary steps to legally remove feral animals.

APPENDIX G3 (Continued)

Guard Animals for Herds

Grazing herds (especially sheep, if used) might be protected from naturally occurring predators through use of guard dogs or donkeys. Lethal control of native predator species will not be used on SSHCP Preserves.

Trapping

Trapping refers to a broad set of management tools that may be used to remove invasive wildlife and urban-related predators. For example, brown-headed cowbird (*Molothrus ater*) trapping can be used to reduce nest parasitism; cowbirds are known to parasitize loggerhead shrike (*Lanius ludovicianus*) nests.

Trapping may be used to control bullfrogs (*Lithobates catesbeianus*) and crayfish in aquatic Covered Species breeding habitats.

Trapping may be used to remove certain urban-related non-native predators or non-native pests such as raccoons, opossums, and non-native rats and mice from sensitive areas where they are impacting a SSHCP Covered Species, under the direction or with permission from the California Department of Fish and Wildlife.

Rodent Burrow Management

Burrow management primarily refers to maintaining existing ground squirrel burrows and enhancing burrow availability for use by Covered Species such as California tiger salamander, western spadefoot, giant gartersnake, and burrowing owl. Maintaining and enhancing ground squirrel burrows will be related to other land management activities, such as thatch management. Burrowing mammals tend to be more prevalent where vegetative cover is lower.

Pesticides

The Implementing Entity will ensure that pesticide use will not result in any direct or indirect adverse effects on Covered Species by limiting use of pesticides and controlling application to only where needed. An example of a potential beneficial use of pesticides is Argentine ant control (*Linepithema humile*) (e.g., nest/mound treatments and broadcast application), but only where it can be shown to have no effects on native species, habitats, and other factors such as water quality.

Vector control in Sacramento County refers to mosquito and West Nile virus controls. West Nile virus is known to infect Cooper's hawk (*Accipiter cooperii*) and loggerhead shrike, and raptors such as white-tailed kite (*Elanus leucurus*) could be infected through ingestion of prey such as

smaller birds and rodents or directly by bites. Similar to pesticide use on SSHCP Preserves, vector control has potential for both beneficial and detrimental indirect effects on wildlife, including Covered Species. Although controlling mosquitos to reduce the chance of West Nile virus infections will be beneficial to humans, spraying Preserve habitat with pesticides (e.g., Dibrom) can have harmful effects on water quality and potential direct and secondary toxic effects on wildlife. Releasing mosquitofish (*Gambusia affinis*) can also adversely affect Covered Species such as vernal pool invertebrates, California tiger salamander, and western spadefoot.

G3.5 Management of Aquatic Land Covers on Preserves

Sediment Removal

Sediment removal may be a useful management tool for maintaining aquatic land covers and some semi-aquatic Covered Species—such as California tiger salamander and western pond turtle (*Actinemys marmorata*)—that can benefit from deeper water within a ponded area. For example, deeper water may provide tiger salamanders protection from some predatory birds such as herons and urban-related predators such as raccoons. Sediment removal may be conducted in conjunction with draining Emergent Wetland land cover and open water, described below.

Wetland Draining

Draining primarily is a tool for managing bullfrogs, crayfish, and non-native predatory fish in California tiger salamander and western spadefoot breeding habitats. Perennial wetlands (e.g., stockponds) that are suitable for tiger salamander, western spadefoot, and western pond turtle may benefit from periodic draining in the summer/fall to eliminate non-native predators that require aquatic habitat. Also, wetland draining may control excessive emergent wetland vegetation that degrades aquatic habitat for tiger salamander.

APPENDIX G3 (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX G3 (Continued)

Table G3-1
Threats, Stressors, and Potential Management Methods

Resource	Threats and Management Issues	Potential Management Methods																				
		Vegetation Management and Non-Native Plant Control						*Hydrology Management*		*Wildlife Management*						*Routine Maintenance*						
		Grazing	*Prescribed Burns*	*Mowing*	*Manual Removal*	*Herbicides*	*Biological Controls*	*Sediment Removal*	*Wetland Draining*	*Trapping*	*Pesticides*	*Domestic Animals*	*Vector Control*	*Burrows*	*Guard Animals*	*Fencing*	*Structures*	*Trash Removal*	*Fire Breaks*	*Off-Road Travel*	*Maintain Nature Trails*	*Signage*
Aquatic Habitats and Species																						
Vernal Pool and Vernal Pool Grassland Watersheds, Vernal Pool Species	Thatch	•	•	•	•	•																
	Invasive plants	•	•	•	•	•	•										•	•		•	•	
	Invasive wildlife						•		•	•	•	•				•		•				
	Hydrology	•	•	•	•	•														•		
	Nitrogen deposition		•																	•	•	
	Inappropriate grazing	•										•			•	•	•					
	Human activity											•				•	•	•		•	•	•
	Altered fire regime	•	•	•	•	•												•	•	•	•	•
Other Wetlands	Invasive plants	•			•	•	•										•	•		•	•	
	Invasive wildlife						•		•	•	•	•				•		•				
	Hydrology	•			•	•		•												•		
	Inappropriate grazing	•										•			•	•	•					
Riparian	Invasive plants	•			•	•	•										•	•		•	•	
	Invasive wildlife						•		•	•	•	•				•		•				
	Inappropriate grazing	•										•			•	•	•					
	Hydrology	•			•	•														•		
Valley Grassland	Thatch	•	•	•	•	•																
	Invasive plants	•	•	•	•	•	•											•		•	•	
	Inappropriate grazing	•										•			•	•	•					
	Altered fire regime	•	•	•	•	•												•	•	•	•	•
Amphibians	Thatch	•	•	•	•	•																
	Hydrology	•	•	•	•	•		•												•		
	Emergent vegetation				•				•													
	Invasive plants	•	•	•	•	•	•										•	•		•	•	
	Invasive wildlife						•		•	•	•	•				•		•				
	Inappropriate grazing	•										•			•	•	•					
	Upland refugia	•	•	•	•	•					•			•								
	Human activity											•				•	•	•		•	•	•
	Native predators							•														
	Urban-related predators							•		•		•				•						

APPENDIX G3 (Continued)

Table G3-1
Threats, Stressors, and Potential Management Methods

Resource	Threats and Management Issues	Potential Management Methods																				
		Vegetation Management and Non-Native Plant Control						*Hydrology Management*		*Wildlife Management*						*Routine Maintenance*						
		Grazing	*Prescribed Burns*	*Mowing*	*Manual Removal*	*Herbicides*	*Biological Controls*	*Sediment Removal*	*Wetland Draining*	*Trapping*	*Pesticides*	*Domestic Animals*	*Vector Control*	*Burrows*	*Guard Animals*	*Fencing*	*Structures*	*Trash Removal*	*Fire Breaks*	*Off-Road Travel*	*Maintain Nature Trails*	*Signage*
	Pesticides										•											
	Disease											•										
	Altered fire regime	•	•	•	•													•	•	•	•	•
Semi-Aquatic Reptiles	Thatch	•	•																			
	Hydrology	•	•	•	•	•		•												•		
	Invasive plants	•	•	•	•	•	•										•	•		•	•	
	Invasive wildlife						•		•	•	•	•				•		•				
	Inappropriate grazing	•										•			•	•	•					
	Human activity											•				•	•	•		•	•	•
	Urban-related predators									•		•				•						
	Pesticides										•											
	Altered fire regime	•	•	•	•	•										•		•	•	•	•	•
Upland Habitats and Species																						
Woodland	Thatch	•	•	•	•	•																
	Invasive plants	•	•	•	•	•	•										•	•		•	•	
	Invasive wildlife						•		•	•	•	•				•		•				
	Inappropriate grazing	•										•			•	•	•					
	Hydrology	•	•	•	•	•														•		
Bird Covered Species	Hydrology	•	•	•	•	•														•		
	Invasive plants	•	•	•	•	•											•	•		•	•	
	Invasive wildlife						•			•	•	•				•		•				
	Inappropriate grazing	•										•			•	•	•					
	Dens (burrowing owl)	•	•	•	•	•					•			•							•	
	Human activity											•				•	•	•		•	•	•
	Urban-related predators									•		•				•						
	Pesticides										•											
	Altered fire regime	•	•	•	•	•												•	•	•	•	•
	Disease											•	•									
Mammals	Hydrology	•	•	•	•	•														•		
	Invasive plants	•	•	•	•	•											•	•		•	•	
	Inappropriate grazing	•										•			•	•	•					
	Human activity											•				•	•	•		•	•	•

Table G3-1
Threats, Stressors, and Potential Management Methods

Resource	Threats and Management Issues	Potential Management Methods																				
		Vegetation Management and Non-Native Plant Control						*Hydrology Management*		*Wildlife Management*						*Routine Maintenance*						
		Grazing	*Prescribed Burns*	*Mowing*	*Manual Removal*	*Herbicides*	*Biological Controls*	*Sediment Removal*	*Wetland Draining*	*Trapping*	*Pesticides*	*Domestic Animals*	*Vector Control*	*Burrows*	*Guard Animals*	*Fencing*	*Structures*	*Trash Removal*	*Fire Breaks*	*Off-Road Travel*	*Maintain Nature Trails*	*Signage*
	Urban-related predators									•		•				•						
	Pesticides										•											
	Altered fire regime	•	•	•	•	•												•	•	•	•	•
	Disease								•			•	•									

INTENTIONALLY LEFT BLANK

APPENDIX G4

Management Plan Template

APPENDIX G4
Management Plan Template

(Example- For Discussion Purposes Only)

G4.1 Introduction

G4.1.1 Name and Location of the Property

G4.1.2 General Goals for the Property

G4.1.3 Primary Considerations that Drive Development and Implementation of the Management Plan

G4.1.4 Expected Timeframe for the Management Plan's Implementation

G4.1.5 Parties to Be Involved in Plan Implementation May Be Identified

G4.2 Property Description

G4.2.1 Land Cover Types

G4.2.2 Delineated Jurisdiction Features

G4.2.3 Species Inventory

G4.2.4 Problem Conditions

G4.2.5 Threats to Desirable Attributes

G4.2.6 Potential Ecologic Restoration/Enhancement Opportunities

G4.2.7 Connections

G4.2.7.1 Boundary Descriptions

G4.2.7.2 Access Points

G4.2.7.3 Adjacent Landowners and Land Uses Pertinent to Understanding Management Problem

G4.2.7.4 Priorities to Be Addressed in the Plan

G4.2.7.5 Nearby Preserves Exist that Provide Points of Reference for Activities at the Subject Property

APPENDIX G4 (Continued)

G4.3 Management History

G4.4 Public Use

G4.4.1 Permitted Uses

G4.4.2 Trail Types

G4.4.3 Signage

G4.5 Management Objectives

G4.6 Management Prescriptions

G4.6.1 Management Prescription 1

G4.6.1.1 Person Days Needed

G4.6.1.2 Timing of Activities

G4.6.1.3 Technical Resources

G4.6.1.4 Parties Who Will or Could Be Responsible for Accomplishing the Prescriptions or Parts of Prescriptions

G4.6.1.5 Monitoring and Adaptive Management Plan

G4.6.2 Management Prescription 2

G4.7 Species Monitoring Pan

G4.7.1 Monitoring Schedule

G4.8 Annual Work Plan

G4.9 Management Tools

G4.9.1 Preserve Monitoring Schedule

G4.9.2 Photo-Monitoring Points

G4.9.3 Inventory Responsibilities

G4.9.4 Fire Management Plan

APPENDIX G4 (Continued)

G4.10 Funding or In-Kind Resource Needs

G4.10.1 Working Budget

G4.11 Appendices

G4.11.1 Legal Description, Property Plat, Deed, etc.

G4.11.2 Maps

G4.11.3 Cultural Resources Report

G4.11.4 Verified Wetland Delineation

APPENDIX G4 (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX H

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SACRAMENTO TO ESTABLISH PROCEDURES AND REQUIREMENTS FOR IMPLEMENTATION OF THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

WHEREAS, the County of Sacramento Board of Supervisors finds that the ecosystems of the County of Sacramento ("County") and/or southern Sacramento County and the vegetation communities and sensitive species they support are fragile, irreplaceable resources that are vital to the general welfare of all residents; these vegetation communities and natural areas contain habitat value which contributes to the region's environmental resources; and special protections for these vegetation communities and natural areas must be established to prevent future endangerment of the plant and animal species that are dependent upon them.

WHEREAS, this Resolution will protect the County's and the region's biological resources, vegetation communities, and natural areas, and prevent their degradation and loss by guiding development outside of important resource areas, and by establishing mitigation standards which will be applied to development projects.

WHEREAS, adoption and implementation of this Resolution will enable the County to achieve the conservation goals set forth in the South Sacramento Habitat Conservation Plan ("SSHCP"), to implement the associated Implementing Agreement executed by the Board of Supervisors on _____, 2016, and to preserve the ability of affected property owners to make reasonable use of their land consistent with the requirements of the National Environmental Policy Act ("NEPA"), the California Environmental Quality Act ("CEQA"), the Federal Endangered Species Act ("FESA"),

the California Endangered Species Act ("CESA"), the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act, California Fish and Game Code Section 1600, and other applicable laws.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED

SECTION I. APPLICATION OF REGULATIONS

Except as provided in Section II, this Resolution shall apply to all land within the County shown on the SSHCP Plan Map, attached as Exhibit "1." Upon application to the County for a development project**,** an applicant shall be required to comply with the procedures set forth in this Resolution. Upon the County's initiation of a project that is subject to the SSHCP, the County shall be required to comply with the procedures set forth in this Resolution.

SECTION II. EXEMPTIONS

This Resolution shall not apply to the following:

A. The adoption or amendment of the County's General Plan.

B. The adoption or amendment of any land use or zoning ordinance.

C. Any project for which and to the extent that a vesting tentative map pursuant to the Subdivision Map Act, or a development agreement pursuant to Government Code sections 65864 et seq., approved or executed prior to adoption of this Resolution, confers vested rights under the County's ordinances or state law to proceed with the project notwithstanding the enactment of this Resolution. Projects subject to this exemption must comply with all provisions of any applicable state and federal law.

D. Any project for which the Board of Supervisors determines that application of this Resolution would result in the property owner being deprived of all reasonable economic use of the property in violation of federal or state constitutional prohibitions against the taking of property without just compensation.

SECTION III. PROCEDURES

A. The County will be responsible for ensuring that an activity that is covered by the SSHCP ("Covered Activity") that occurs within its jurisdiction, including its own projects, is eligible to use the SSHCP by following the application processing procedures pursuant to Chapter 10 of the SSHCP.

B. Before extending Incidental Take coverage to a project, the County must receive confirmation in writing from the SSHCP Implementing Entity that the proposed species and habitat take is consistent with the SSHCP's "jump-start" and "stay-ahead" requirements pursuant to Chapter 9 of the SSHCP.

C. The County is responsible for ensuring that the proposed project's design and construction is in compliance with SSHCP requirements pursuant to Chapter 10 of the SSHCP, and for ensuring that monitoring of avoidance and minimization measures occur during construction pursuant to Chapter 8 of the SSHCP.

D. The County will collect all information required for the SSHCP annual report for each Covered Activity that it approves.

E. The County will pay SSHCP fees related to its own projects and collect SSHCP fees from third-party project proponents. If a third party project proponent proposes to provide land or a conservation easement instead of paying a fee to satisfy mitigation requirements, the SSHCP Implementing Entity must review the proposed

land dedication or the conservation easement for consistency with the conservation strategy outlined in Chapter 7 of the SSHCP.

F. The County will provide the SSHCP Implementing Entity with copies of each approved project application package, whether it is its own application package or a third-party project proponent's.

G. The County will adopt the SSHCP fee as set by the SSHCP Implementing Entity.

H. The County will ensure that Covered Activities that they undertake and Covered Activities conducted by third-party project proponents are consistent with the requirements of the Aquatic Resources Plan.

SECTION IV. DEFINITIONS

For purposes of this Resolution, the following terms shall have the meaning set forth herein:

A. "Plan Area" means the area in which all conservation actions will be implemented and generally where the Plan Permittees have Take Authorization for Covered Species and species habitat resulting from Covered Activities.

B. "SSHCP" means the South Sacramento Habitat Conservation Plan prepared by Plan Permittees as depicted on Figure XX attached to the SSHCP.

C. "SSHCP Plan Map" means the map of the area encompassed by the SSHCP as set forth in the attached Exhibit "1."

D. "Project" means any action or activity that is a Covered Activity as described in Chapter 5 of the SSHCP that are implemented in the Plan Area by the Plan Permittees,

or implemented by third parties (e.g. project proponents or private developers) that are subject to the jurisdiction of a Plan Permittee.

On a motion by Supervisor _____, seconded by Supervisor _____, the foregoing Resolution was passed and adopted by the Board of Supervisors of the County of Sacramento, State of California this _____ day of _____ 2016, by the following vote, to wit:

AYES: Supervisors,

NOES: Supervisors,

ABSENT: Supervisors,

ABSTAIN: Supervisors,

RECUSAL: Supervisors,
(PER POLITICAL REFORM ACT (§ 18702.5.))

_____
Chair of the Board of Supervisors
of Sacramento County, California

(SEAL)

ATTEST: _____
Clerk, Board of Supervisors

w:\forms\forms.off\resolution-template.doc

EXHIBIT "1"

SSHCP PLAN MAP WHICH IS EXHIBIT "A" TO THE IMPLEMENTING AGREEMENT

EXHIBIT "2"

MODEL CONSERVATION EASEMENT

APPENDIX I

SSHCP Economic Model

SSHCP Implementation Cost Summary (2015$)

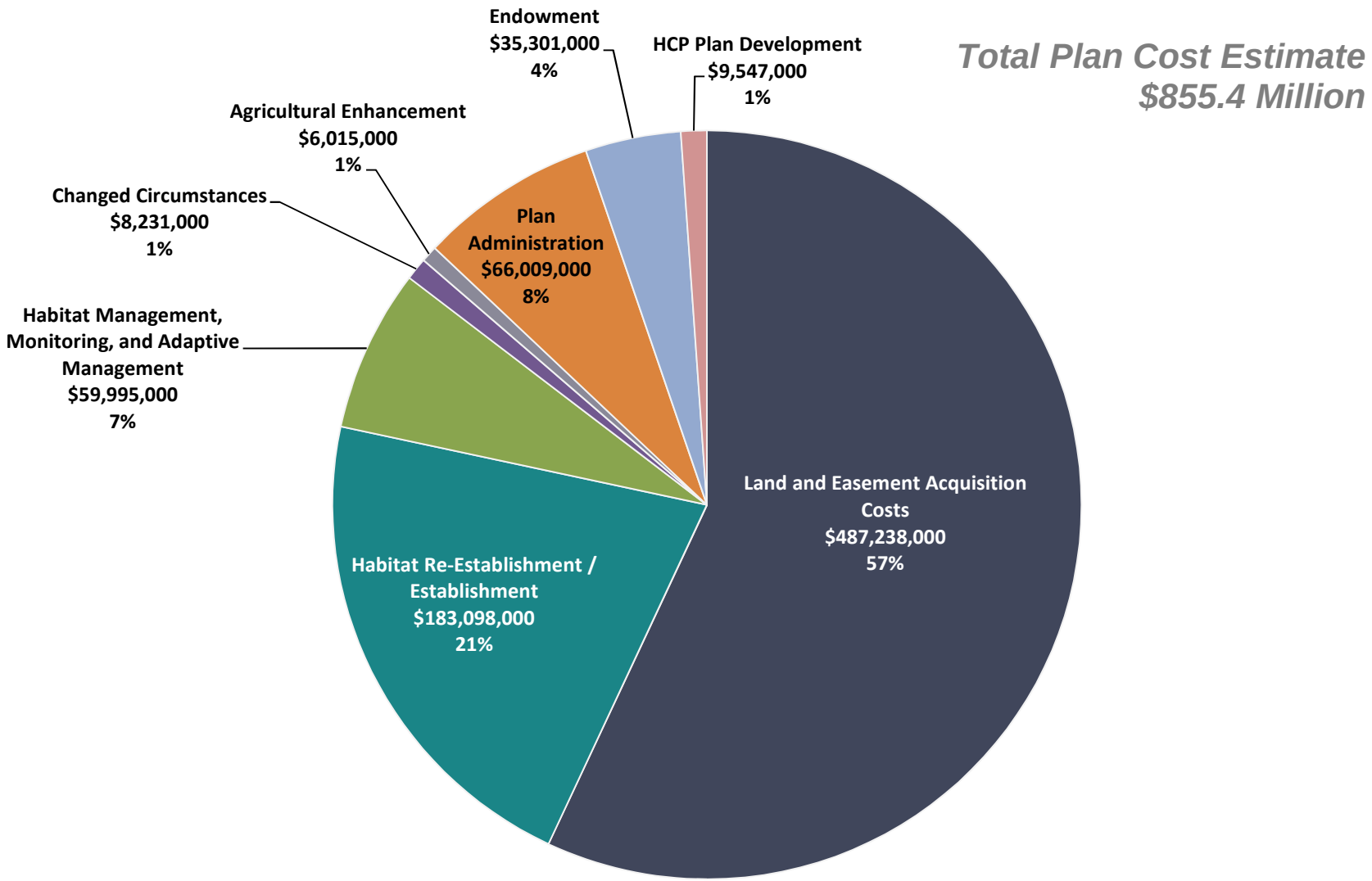


Figure 1
SSHCP Implementation Cost Summary (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Cost Category	Preservation Cost Estimate	Re-Establishment/ Establishment Cost Estimate	Total Cost Estimate	Distribution
Land and Easement Acquisition Costs	$463,903,000	$23,334,000	$487,238,000	57.0%
Habitat Re-Establishment / Establishment	$0	$183,098,000	$183,098,000	21.4%
Habitat Management, Monitoring, and Adaptive Management	$55,538,000	$4,458,000	$59,995,000	7.0%
Changed Circumstances	$7,649,000	$582,000	$8,231,000	1.0%
Agricultural Enhancement	$6,015,000	$0	$6,015,000	0.7%
Plan Administration	$62,758,000	$3,251,000	$66,009,000	7.7%
Endowment	$33,446,000	$1,855,000	$35,301,000	4.1%
HCP Plan Development	$9,077,000	$470,000	$9,547,000	1.1%
Total	**$638,385,000**	**$217,048,000**	**$855,432,000**	**100.0%**

Figure 2
SSHCP Implementation Cost Summary by Land Cover (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Perservation Cost Estimate	Re-Establishment/ Establishment Cost Estimate	Total Cost Estimate	Distribution
Agriculture	$166,372,000	$0	$166,372,000	19%
Valley Grassland	$418,326,000	$0	$418,326,000	49%
Vernal Pool	$17,512,000	$61,767,000	$79,279,000	9%
Blue Oak	$1,043,000	$4,615,000	$5,658,000	1%
Riparian	$13,575,000	$40,635,000	$54,210,000	6%
Mine Tailing Riparian Woodland	$3,295,000	$28,274,000	$31,569,000	4%
Seasonal Wetland	$2,448,000	$12,268,000	$14,716,000	2%
Freshwater Marsh	$3,589,000	$14,229,000	$17,818,000	2%
Swale	$5,838,000	$26,327,000	$32,164,000	4%
Streams/Creeks (VPIH)	$845,000	$2,347,000	$3,192,000	0%
Open Water	$3,460,000	$14,459,000	$17,920,000	2%
Streams/Creeks	$2,082,000	$12,127,000	$14,209,000	2%
Total	**$638,385,000**	**$217,048,000**	**$855,432,000**	**100%**

Figure 3(a)
SSHCP Estimated Fee Levels per Acre of Impact (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Preservation Fee	Re-Establishment/ Establishment Fee	Total Fee
Agriculture	$17,300	N/A	$17,300
Valley Grassland	$20,100	N/A	$20,100
Vernal Pool	$38,000	$158,800	$196,800
Blue Oak	$22,200	$98,200	$120,400
Riparian	$36,400	$108,900	$145,300
Mine Tailing Riparian Woodland	$15,100	$129,700	$144,800
Seasonal Wetland	$23,600	$116,800	$140,500
Freshwater Marsh	$29,400	$112,000	$141,400
Swale	$23,400	$112,500	$135,900
Streams/Creeks (VPIH)	$40,000	$106,700	$146,600
Open Water	$23,400	$93,300	$116,700
Streams/Creeks	$17,900	$103,700	$121,500

Figure 3(b)
SSHCP Estimated Preservation Fee Levels per Acre of Impact (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Land Acquisition	Habitat Management and Monitoring	Changed Circumstances	Agricultural Enhancement	Plan Administration	Plan Development	Endowment Fee	Preservation Fee Total
Agriculture	$13,511	$695	$91	$204	$1,819	$263	$680	$17,263
Valley Grassland	$14,545	$1,973	$274	$161	$1,819	$263	$1,057	$20,093
Vernal Pool - Direct	$26,675	$3,873	$540	$341	$3,639	$526	$2,400	$37,992
Vernal Pool - Indirect	$26,675	$3,873	$540	$341	$3,639	$526	$2,400	$37,992
Blue Oak	$16,285	$1,973	$273	$162	$1,819	$263	$1,406	$22,181
Riparian	$25,238	$3,588	$511	$408	$3,639	$526	$2,483	$36,394
Mine Tailing Riparian Woodland	$9,398	$1,749	$251	$215	$1,819	$263	$1,418	$15,113
Seasonal Wetland	$17,723	$2,003	$277	$154	$1,819	$263	$1,404	$23,644
Freshwater Marsh	$23,233	$2,295	$306	$85	$1,819	$263	$1,388	$29,389
Swale - Direct	$17,451	$2,102	$286	$131	$1,819	$263	$1,344	$23,396
Swale - Indirect	$17,451	$2,102	$286	$131	$1,819	$263	$1,344	$23,396
Streams/Creeks (VPIH) - Direct	$33,592	$2,650	$341	$0	$1,819	$263	$1,315	$39,981
Streams/Creeks (VPIH) - Indirect	$33,592	$2,650	$341	$0	$1,819	$263	$1,315	$39,981
Open Water	$17,424	$2,032	$279	$148	$1,819	$263	$1,403	$23,368
Streams/Creeks	$12,132	$1,787	$255	$206	$1,819	$263	$1,416	$17,879

Figure 3(c)
SSHCP Estimated Re-Establishment/Establishment Fee Levels per Acre of Impact (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Re-Est. / Est.	Land Acquisition	Habitat Management and Monitoring	Changed Circumstances	Plan Administration	Plan Development	Endowment Fee	Re-Est. / Est. Fee Total
Agriculture								$0
Valley Grassland								$0
Vernal Pool - Direct	$139,786	$13,058	$2,495	$326	$1,819	$263	$1,038	$158,784
Vernal Pool - Indirect								$0
Blue Oak	$79,200	$13,058	$2,495	$326	$1,819	$263	$1,038	$98,198
Riparian	$89,943	$13,058	$2,495	$326	$1,819	$263	$1,038	$108,942
Mine Tailing Riparian Woodland	$110,699	$13,058	$2,495	$326	$1,819	$263	$1,038	$129,698
Seasonal Wetland	$97,835	$13,058	$2,495	$326	$1,819	$263	$1,038	$116,834
Freshwater Marsh	$93,040	$13,058	$2,495	$326	$1,819	$263	$1,038	$112,038
Swale - Direct	$93,508	$13,058	$2,495	$326	$1,819	$263	$1,038	$112,507
Swale - Indirect								$0
Streams/Creeks (VPIH) - Direct	$87,664	$13,058	$2,495	$326	$1,819	$263	$1,038	$106,662
Streams/Creeks (VPIH) - Indirect								$0
Open Water	$74,287	$13,058	$2,495	$326	$1,819	$263	$1,038	$93,285
Streams/Creeks	$84,652	$13,058	$2,495	$326	$1,819	$263	$1,038	$103,651

Figure 4
SSHCP Impacts and Mitigation Requirement Summary by Land Cover (Acres)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Impacts		Ratio Equivalence		Conservation Acreage		
	Direct	Indirect	Preservation Ratio	Re-Establishment/ Establishment Ratio	Preservation	Restoration/ Creation	Total
Agriculture	9,696	0	1.0	0.0	9,696	0	9,696
Valley Grassland	22,014	0	1.0	0.0	22,014	0	22,014
Vernal Pool	389	94	2.0	1.0	966	389	1,355
Blue Oak	47	0	1.0	1.0	47	47	94
Riparian	373	0	2.0	1.0	746	373	1,119
Mine Tailing Riparian Woodland	218	0	1.0	1.0	218	218	436
Seasonal Wetland	105	0	1.0	1.0	105	105	210
Freshwater Marsh	127	0	1.0	1.0	127	127	254
Swale	234	44	1.0	1.0	278	234	512
Streams/Creeks (VPIH)	22	4	1.0	1.0	26	22	48
Open Water	155	0	1.0	1.0	155	155	310
Streams/Creeks	117	0	1.0	1.0	117	117	234
Total	**33,497**	**142**			**34,495**	**1,787**	**36,282**

Figure 5
SSHCP Conservation Summary by Land Cover (Acres)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Preservation Required	Hardline Preservation	HCP Land Acquisition		
			Net Preservation	Re-Establishment/ Establishment	Total
Agriculture	9,696	75	9,621	0	9,621
Valley Grassland	22,014	1,650	20,364	0	20,364
Vernal Pool	966	63	903	389	1,292
Blue Oak	47	0	47	47	94
Riparian	746	0	746	373	1,119
Mine Tailing Riparian Woodland	218	0	218	218	436
Seasonal Wetland	105	2	103	105	208
Freshwater Marsh	127	6	121	127	248
Swale	278	38	240	234	474
Streams/Creeks (VPIH)	26	6	20	22	42
Open Water	155	9	146	155	301
Streams/Creeks	117	1	116	117	233
Total	**34,495**	**1,850**	**32,645**	**1,787**	**34,432**

Figure 6
SSHCP Fee Title and Easement Acquisition Summary by Land Cover (Acres)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Fee Title Acquisitions		Easement		Total
	Acres	Percentage	Acres	Percentage	
Agriculture	1,864	19%	7,757	81%	9,621
Valley Grassland	6,422	32%	13,941	68%	20,364
Vernal Pool	647	50%	645	50%	1,292
Blue Oak	64	68%	30	32%	94
Riparian	522	47%	597	53%	1,119
Mine Tailing Riparian Woodland	252	58%	184	42%	436
Seasonal Wetland	145	69%	64	31%	208
Freshwater Marsh	206	83%	42	17%	248
Swale	331	70%	143	30%	474
Streams/Creeks (VPIH)	42	100%	0	0%	42
Open Water	211	70%	90	30%	301
Streams/Creeks	139	60%	94	40%	233
Total	**10,845**	**31%**	**23,586**	**69%**	**34,432**

Figure 7
SSHCP Acquisition Land Cost Estimate by PPU (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

	Fee Title Acquisitions			Easement Acquisitions			
PPU	**Acres**	**Avg. Per-Acre Cost Estimate**	**Total Cost**	**Acres**	**Avg. Per-Acre Cost Estimate**	**Total Cost**	**Acquisition Cost Estimate**
PPU 1	2,156	$28,172	$60,743,383	0	$22,538	$0	$60,743,383
PPU 2	0	$0	$0	0	$0	$0	$0
PPU 3	1,633	$31,621	$51,651,149	0	$25,297	$0	$51,651,149
PPU 4	506	$26,379	$13,356,444	0	$21,103	$0	$13,356,444
PPU 5	403	$10,606	$4,273,774	2,283	$8,485	$19,374,442	$23,648,216
PPU 6	1,412	$12,963	$18,300,550	8,000	$9,074	$72,592,182	$90,892,732
PPU 7	2,348	$9,074	$21,300,754	13,303	$7,259	$96,563,419	$117,864,173
PPU 8	377	$53,284	$20,070,964	0	$42,627	$0	$20,070,964
N/A	223	$42,781	$9,550,744	0	$34,225	$0	$9,550,744
Restoration	1,787	$10,881	$19,443,719	N/A	N/A	N/A	$19,443,719
Total	**10,845**	**$20,165**	**$218,691,481**	**23,586**	**$7,993**	**$188,530,043**	**$407,221,524**

Figure 8
SSHCP Acquisition Total Cost Estimate (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Cost Item	Assumption	Total Land Cost Estimate
Base Land Acquisition Cost	See **Figure 7**	$407,222,000
Transaction Costs	5 percent of Base Cost	$20,361,000
PDR (Preserve Documentation Record Review)	$189 per acre	$6,521,000
Site Improvement Costs	$257 per acre	$8,840,000
Contigency	10 percent	$44,294,000
Total Land Cost		**$487,238,000**

Figure 9
SSHCP Land Acquisition Summary by PPU (Acres)
South Sacramento Habitat Conservation Plan Cost Analysis

PPU	Agriculture	Valley Grassland	Vernal Pool	Blue Oak	Riparian	MTRW	Seasonal Wetland	Freshwater Marsh	Swale	VPIH	Open Water	Streams/ Creeks	Total
PPU 1	1	2,000	92	0	0	2	0	0	33	17	11	0	2,156
PPU 2	0	0	0	0	0	0	0	0	0	0	0	0	0
PPU 3	188	1,304	48	12	13	0	0	8	33	3	23	2	1,633
PPU 4	20	368	3	0	22	0	22	63	1	0	6	1	506
PPU 5	369	1,848	19	0	351	0	20	3	7	0	20	50	2,686
PPU 6	8,228	640	27	0	349	0	25	41	10	0	49	43	9,412
PPU 7	529	13,914	713	35	3	216	29	6	151	0	37	19	15,650
PPU 8	287	83	0	0	0	0	5	0	2	0	0	0	377
N/A	0	206	1	0	8	0	1	0	3	0	1	2	223
Restoration	0	0	389	47	373	218	105	127	234	22	155	117	1,787
Total	**9,621**	**20,364**	**1,292**	**94**	**1,119**	**436**	**208**	**248**	**474**	**42**	**301**	**233**	**34,432**

Figure 10
SSHCP Re-Establishment / Establishment Cost Estimate (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Restoration Acreage	Per-Acre Cost Estimate (1)	Per-Acre Cost w/ Contingency 10%	Re-Establishment/ Establishment Cost Estimate	Regulatory Compliance Cost Estimate 20%	Total Cost
Vernal Pool	389	$106,000	$116,000	$45,314,000	$9,063,000	$54,377,000
Blue Oak	47	$60,000	$66,000	$3,102,000	$620,000	$3,722,000
Riparian	373	$68,000	$74,800	$27,957,000	$5,591,000	$33,549,000
MTRW	218	$84,000	$92,400	$20,110,000	$4,022,000	$24,132,000
Seasonal Wetland	105	$74,000	$81,400	$8,561,000	$1,712,000	$10,273,000
Freshwater Marsh	127	$70,000	$77,000	$9,847,000	$1,969,000	$11,816,000
Swale	234	$71,000	$78,100	$18,234,000	$3,647,000	$21,881,000
VPIH	22	$66,000	$72,600	$1,607,000	$321,000	$1,929,000
Open Water	155	$56,000	$61,600	$9,595,000	$1,919,000	$11,514,000
Streams/Creeks	117	$64,000	$70,400	$8,254,000	$1,651,000	$9,904,000
Total	1,787			**$152,581,000**	**$30,516,000**	**$183,098,000**

(1) Includes planning and design, construction cost, and O&M costs (for initial 5 years). Also reflects success rates ranging from 65 percent to 90 percent.

Figure 11
SSHCP Management and Monitoring Cost Estimate (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Management		Monitoring		Total Cost
	Acres	Cost	Acres	Cost	
Agriculture	2,327	$2,386,973	9,696	$3,575,400	$5,629,122
Valley Grassland	8,770	$8,995,136	22,014	$29,168,550	$36,907,853
Vernal Pool	742	$705,598	1,355	$1,795,375	$2,450,391
Blue Oak	66	$60,663	94	$124,550	$182,535
Riparian	552	$512,537	1,119	$1,482,675	$1,969,612
Mine Tailing Riparian Woodland	262	$237,007	436	$577,700	$808,477
Seasonal Wetland	150	$138,431	210	$278,250	$410,292
Freshwater Marsh	214	$201,100	254	$336,550	$525,221
Swale	376	$352,546	512	$678,400	$1,010,557
Streams/Creeks (VPIH)	48	$46,034	48	$63,600	$105,918
Open Water	225	$208,365	310	$410,750	$609,122
Streams/Creeks	144	$131,247	234	$310,050	$437,389
Total	**13,875**	**$13,975,639**	**36,282**	**$38,801,850**	**$51,046,489**
Contingency		$1,397,564		$5,820,278	$7,217,841
Total w/ Contigency		**$15,373,203**		**$44,622,128**	**$59,995,330**

Figure 12
SSHCP Plan Administration Cost Estimate (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Cost Item	Total	Average Annual Cost
Staff and Board Compensation (1)	$43,672,115	$873,442
Office and Equipment Costs	$3,409,100	$68,182
Additional Overhead, Professional Services, Other Costs	$12,926,750	$258,535
Total	**$60,007,965**	**$1,200,159**
Contingency	$6,000,797	$120,015.93
Total	**$66,008,762**	**$1,320,175**

(1) Assumes 7.0 Full Time Equivalent (FTE) staff at Implementing Entity from Year 5 onwards. Assumes 2.5 FTE in Year 1.

Figure 13
SSHCP Ongoing Costs and Endowment Cost Estimate (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Land Cover	Management	Monitoring	Agricultural Enhancement	Admin	Total Annual
Agriculture	$20,371	$70,325	$77,567	$170,541	$338,804
Valley Grassland	$66,126	$551,525	$139,413	$372,356	$1,129,419
Vernal Pool	$5,447	$33,475	$6,450	$29,489	$74,861
Blue Oak	$1,775	$6,625	$298	$5,456	$14,154
Riparian	$2,128	$21,275	$5,971	$20,749	$50,123
Mine Tailing Riparian Woodland	$1,279	$8,625	$1,837	$9,613	$21,353
Seasonal Wetland	$2,090	$8,475	$636	$7,698	$18,898
Freshwater Marsh	$816	$3,725	$423	$4,677	$9,641
Swale	$2,230	$10,825	$1,428	$11,392	$25,875
Streams/Creeks (VPIH)	$1,072	$3,575	$1	$2,887	$7,535
Open Water	$523	$3,875	$897	$5,232	$10,527
Streams/Creeks	$205	$2,925	$944	$3,949	$8,023
Annual Legal Defense Allowance					$128,191
Total Annual					**$1,837,404**
Year-50 Endowment Requirement					**$61,246,811**
Year 1-50 Cumulative Interest Earnings					**$25,946,056**
Net Funding Required for Endowment					**$35,300,756**

Figure 14
SSHCP Other Costs and Assumptions (2015$)
South Sacramento Habitat Conservation Plan Cost Analysis

Cost Item	Cost	Assumptions
Agricultural Enhancement Costs	$6,014,525	$10 per acre per year over 23,951 easement acres
Changed Circumstances	$8,230,639	Adds 10% to the cost of habitat management and 15% to the cost of habitat monitoring
HCP Plan Development	$9,546,963	Reimbursement of $6.0 million plan preparation cost, financed with interest over the 50-year permit term

APPENDIX J

Voluntary Additional Conservation

APPENDIX J
Voluntary Additional Conservation

J.1 Introduction

The purpose of this appendix is to identify voluntary conservation actions that if implemented can supplement the South Sacramento Habitat Conservation Plan (SSHCP) Conservation Strategy. This supplementary conservation has the potential to benefit certain SSHCP Covered Species, other native species in the Plan Area that are not Covered Species, and some key natural communities. It also provides assistance to sustainable agriculture and the overall ecological functions of the rural landscape in the Plan Area. These supplemental conservation actions complement and reinforce the SSHCP Conservation Strategy and provide further benefits to the plan.

These supplemental conservation actions only take place as outside funding is available. It is expected that a non-profit group will be formed by local stakeholder groups to support fundraising and implementation of these voluntary conservation actions. The non-profit group will annually report supplementary conservation activities and planned activities to the SSHCP Implementing Entity for tracking purposes.

The supplemental conservation actions do not compete with, or impede, the SSHCP Conservation Strategy or use any development fees collected for SSHCP Covered Activities. The SSHCP's Technical Advisory Committee (see Chapter 9 of the SSHCP) verifies that individual actions do not compete with the SSHCP's acquisition needs for mitigation. Supplemental conservation actions only involve landowners wishing to sell conservation easements or otherwise participate, and existing farming and ranching activities continue on new conservation easements. Any conservation actions implemented on these conservation easements would be complementary to existing farming and ranching activities.

J.2 Supplemental Habitat Conservation

J.2.1 Northeast Sector of Plan Area

Protect 8,000 acres of the total oak woodland, oak savanna, and grassland[1] in the northeast portion[2] of the Plan Area. This provides conservation of habitats in an area that will receive little protection through the SSHCP Conservation Strategy as it lacks any significant populations of Covered Species. It includes grasslands with deeper soils that may be suitable for badger (*Taxidea taxus*), foraging ferruginous hawk (*Buteo regalis*), and western burrowing owl (*Athene cunicularia*). It also might benefit species not covered by the SSHCP, such as the golden eagle (*Aquila chrysaetos*), merlin (*Falco columbarius*), long-eared owl (*Asio otus*), and sharp-shinned hawk (*Accipiter striatus*).

[1] Includes wildflower field habitats.
[2] South of White Rock Road, north of Meiss Road, and east of the Urban Services Boundary (USB).

APPENDIX J (Continued)

J.2.2 Lands West of Interstate 5

Protect 300 acres of irrigated pasture and grasslands west of Interstate 5, especially lands within the Stone Lakes National Wildlife Refuge Acquisition Boundary. This supplemental conservation occurs primarily on lands below sea level to avoid competition with the SSHCP Conservation Strategy. This may benefit greater sandhill crane (*Grus canadensis tabida*), Swainson's hawk (*Buteo swainsoni*), and other SSHCP Covered Species, as well as several species that are not covered by the SSHCP (e.g., American peregrine falcon (*Falco peregrinus anatum*), short-eared owl (*Asio flammeus*), merlin, sharp-shinned hawk, white-faced ibis (*Plegadis chihi*)).

J.2.3 Cropland Upland Habitat for Greater Sandhill Cranes

Conserve 2,000 acres of upland habitat adjacent to floodplain areas used by greater sandhill cranes for roosting and foraging refugia during a lower Cosumnes River flood event. These are areas outside of sandhill crane modeled habitat, as shown on Figure 3-22 in Chapter 3 of the SSHCP.

J.3 Wildlife Movement Corridors

Conserve lands outside of the Urban Development Area (UDA) to create additional wildlife corridors beyond what is already required in the SSHCP. For each wildlife corridor, it is necessary to conserve sufficient land so that the corridor will function. It is not necessary to protect all the land in a corridor, although it is necessary to avoid a complete break of a corridor by a permanent, incompatible land use.

J.3.1 East–West Wildlife Movement Corridors

Establish two east–west corridors south of the Cosumnes River between the vernal pool grasslands landscape in the east county and the farmland landscape in the southwest portion of the Plan Area, with an average width of 1,000 feet.

J.3.2 North–south Farmland Wildlife Movement Corridor

Establish one wildlife movement corridor joining agricultural lands north and south of the Cosumnes River, with an average width of 1,000 feet.

J.3.3 East County Corridor

Establish one wildlife movement corridor stretching from White Rock Road to the San Joaquin County line and also connecting with rural lands in El Dorado County just north of the Cosumnes River and also with Amador County. Much of this corridor is already protected (e.g., Howard

Ranch) or will be protected through the northeast sector habitat conservation mentioned previously (see Section J.2.1).

J.4 Additional Habitat Re-establishment and Establishment

J.4.1 Riparian Habitat in Southern Plan Area

Re-establish or establish 500 acres of riparian habitat, including mixed-riparian woodland, valley oak woodland, and mixed riparian scrub along streams in the southern part of the Plan Area, west of the vernal pool grasslands; areas that were historically riparian woodland and scrub. This may benefit SSHCP Covered Species such as the Swainson's hawk and Cooper's hawk, as well as additional species such as the yellow-breasted chat (*Icteria virens*) and least Bell's vireo (*Vireo bellii pusillus*). The re-establishment will not compete with the SSHCP Conservation Strategy, which will be focused on the Cosumnes River Corridor.

J.4.2 Hedgerows in Cropland

Establish an additional 10,000 linear feet of hedgerows in cropland beyond what is already required in the SSHCP.

J.5 Voluntary Species Management Measures

The following suggests supplemental conservation actions for tricolored blackbird (*Agelaius tricolor*) and the western burrowing owl.

J.5.1 Tricolored Blackbird

The tricolored blackbird population has been surveyed frequently in Sacramento County. During the 1990s, it was discovered that population levels had diminished greatly. By 1999, a number of sites that had colonies year after year were no longer occupied and there were no large (15,000–20,000 bird) colonies surveyed (Cook 1999). Later surveys, from 2008 to 2014, also show a low number of birds until 2014, when there was a relatively large increase from the prior three survey periods, but still below historical averages when compared to surveys conducted in the 1990s (see Table J-1).

In 2014, Sacramento County had over 20% of the entire, state-wide population at the time of the late April survey. Many of the Plan Area colony sites are within the SSHCP UDA (Meese 2014) particularly in the Jackson, Bradshaw, and Grant Line Road area, where they were found nesting in Himalayan blackberries (*Rubus armeniacus*) (Witham, pers. comm. 2015).

APPENDIX J (Continued)

Table J-1
Historical Breeding Tricolored Survey Results from Sacramento County

Year	Number of Birds
1992	86,142
1993	64,510
1994	96,365
1997	32,387
1999	16,671
2008	3,551
2011	6,105
2014	29,272

Sources: Cook 1999; Meese 2014; Witham, pers. comm. 2015.

The SSHCP has objectives for conservation of acres of modeled foraging habitat. In addition, there is an objective to conserve, within the SSHCP Preserve System, at least five extant colony sites occupied in recent years, to protect one colony site prior to the take of a colony site, to establish two new potential colony sites for every colony site that is taken, to conserve at least one "large" colony site that has supported a minimum of 1,500 birds, and to experiment on ways to protect colony sites from predation.

The voluntary measures in this appendix go beyond these SSHCP objectives. In addition, they recognize that while many active colonies over the last few years have been located within the UDA, the potential for long-term conservation within this boundary is very limited. Ultimately, the landscape within the UDA will be built out except for approximately 7,500 acres of Vernal Pool Grassland preserves, stream corridors, and few additional landscape linkages. Therefore, the long-term focus for conservation is outside the UDA, including some historic sites that still possess water sources and adequate foraging habitat.

The voluntary conservation measures include conserving and establishing at least 30 existing or potential colony sites with suitable nesting substrates outside the UDA and by the last 5 years of the permit period, maintain an annual average of 50,000 breeding birds within the SSHCP Preserve System.

J.5.2 Western Burrowing Owl

In the Plan Area most sightings of western burrowing owl occur form within the UDA and there are very few recent (2014 and 2015) breeding season sightings. Within the UDA occurrences of western burrowing owl are known from the Cordova Hills Master Plan project area, the Regional San. Bufferlands and in and around the Mather Field area. The SSHCP database includes all known occurrence information (Figure 3-27 in the SSHCP). Some occurrences have been

recorded from outside the UDA; however the vast majority of the SSHCP Plan Area outside of the UDA has not been surveyed for owls. It is thought that many of the occurrences outside of the UDA are wintering only and there are indications that western burrowing owl are absent altogether from seemingly suitable grassland sites where ground squirrels are active (Gardner, pers. comm. 2014).

The SSHCP Conservation Strategy for the western burrowing owl includes the protection of seven sites known to support western burrowing owl, management to enhance habitat, establishment of ground squirrel colonies, and possible use of artificial burrows. Additional management actions include providing the short vegetation height required by the owls and provision of artificial sentinel perches.

The voluntary conservation measures include conserving, on average, at least 60 breeding pairs by the last 5 years of the permit period.

J.5.3 Other Species

Determine additional management measures required for other Covered Species, such as the northern harrier (*Circus cyaneus*) and loggerhead shrike (*Lanius ludovicianus*), as well as additional at-risk species, using the latest scientific and management research and modifying over time as knowledge improves.

J.6 Develop a Program to Assist and Encourage Sustainable Agriculture Practices

Work with area farmers, the Natural Resources Conservation Service, and others to encourage and financially assist sustainable agricultural practices, including provision of native pollinator food sources and refugia. Provide incentives to farmers to maintain the cropland mosaic that is important for sandhill crane, Swainson's hawk, and other Covered Species. Work to minimize impacts on sandhill crane and Swainson's hawk from agricultural operations.

J.7 Develop and Implement an Outreach, Education and Stewardship Program

The purposes of this program are to build long-term support for the SSHCP, to provide volunteer support for habitat establishment and re-establishment projects and a docent program, and to develop a "citizen scientists" project to assist with the SSHCP monitoring program (Chapter 8 of the SSHCP). It will include field trips for elected officials and their staff, members of various organizations, and interested citizens.

J.8 References

Cook, L.F.1999. *Tricolored Blackbird (*Agelaius tricolor*) Conservation Plan for Southern Sacramento County*. Unpublished report submitted to Jones and Stokes.

eBird. 2015. "Western Burrowing Owl." Accessed June 23, 2015. http://ebird.org/content/ebird/.

Meese, R.J. 2014. *Results of the 2014 Tricolored Blackbird Statewide Survey*. Davis, California: University of California, Davis, Department of Environmental Science and Policy. July 31, 2014. Accessed January 8, 2016. http://tricolor.ice.ucdavis.edu/reports.

Gardner, T. 2014. Personal communication from Todd Gardner (California Department of Fish and Wildlife) to Richard Radmacher (County of Sacramento). June 2014.

Gervais, J.A., D.K. Rosenberg, and L.A. Comrack. 2007. "Burrowing owl." In Shuford, W. D., and Gardali, T., eds. *California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California*. Studies of Western Birds No. 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Witham, C. 2015. Verbal communication from Carol Witham to R. Radmacher, Senior Planner, County of Sacramento. November 19, 2015.

APPENDIX K

Project-Specific Avoidance and Minimization Measures

APPENDIX K
Project-Specific Avoidance and Minimization Measures

At the time of SSHCP completion, five separate Master Plans or Specific Plans for urban development were under preparation or had recently been approved by a Local Land Use Authority within the SSHCP Plan Area (see Section 5.2.1.3 and Section 5.5.1). For purposes of this discussion, the terms "Master Plan" and "Specific Plan" are synonymous. Because these Master Plans were being processed concurrently with the development of the SSHCP, these Master Plans were designed to comply with SSHCP permit application requirements, including the SSHCP Avoidance and Minimization Measures described in Chapter 5. In addition, each Master Plan was designed to include on-site preserve(s) that are consistent with the SSHCP Conservation Strategy as depicted in Figure 7-2, *Existing Preserves and SSHCP Planned Hardline Preserves*.

It must be noted however, that SSHCP Avoidance and Minimization Measures as described in Chapter 5 were written to apply to a broad range of projects and it may not always be feasible for every project to apply each SSHCP Avoidance and Minimization Measures as written. In some instances, variances to the SSHCP Avoidance and Minimization Measures were requested by the Third-Party Project Applicant representing the Master Plan. Variances were accommodated only when necessary and only when the variance would not have a significant impact on the integrity of the Preserve System.

Two of the five Master Plan projects, Cordova Hills and SunCreek, were approved by a Local Land Use Authority prior to completion of the SSHCP. As such variances for these projects are well understood. Three of the Master Plan projects, Arboretum, Jackson Township and NewBridge are still in various stages of planning and review. As these Plans progress additional variances may be given to these Master Plan projects where necessary and only when the variance would not have a significant impact on the integrity of the Preserve System.

This Appendix provides a brief description of each Master Plan project followed by a description of any variances from SSHCP Avoidance and Minimization Measures that have been granted to the project.

Arboretum Specific Plan

The proposed Arboretum Specific Plan encompasses approximately 1,349 acres and is located in the eastern portion of the UDA within the City of Rancho Cordova. The Specific Plan is bound by Kiefer Boulevard on the north, Jackson Highway on the south, Grant Line Road on the east, and Sunrise Boulevard on the west. The current Arboretum Specific Plan description includes residential, commercial, office, mixed use and public/quasi-public uses that total approximately 722 acres; recreation uses of approximately 55 acres; and major roadways of approximately 86 acres. The Specific Plan area may provide for the construction of up to 5,000 residential dwelling units at a net density of 9.3 units per acre.

APPENDIX K (Continued)

In addition to the developed acres described above, the site will also contain approximately 254 acres of on-site preserve as required by the SSHCP Conservation Strategy (Chapter 7). These acres are a land donation/in lieu of SSHCP mitigation fees as described in Chapter 9.

The Arboretum Specific Plan does not require any variances from the SSHCP avoidance and minimization measures at this time.

Cordova Hills Specific Plan

The approved Cordova Hills Specific Plan encompasses approximately 2,668 acres and is located in the eastern portion of the UDA within the unincorporated portion of Sacramento County. The Specific Plan is bound by Glory Lane to the north, by parcel boundaries that are adjacent or are proximal to the County's Urban Services Boundary to the south, by parcel boundaries that are adjacent or are proximal to Carson Creek to the east and Grant Line Road to the west. The current Cordova Hills Specific Plan description includes residential, commercial, office, and quasi-public uses that total approximately 1,296 acres; a University/College Campus Center of 223 acres; and open space, recreation, buffer land and agricultural uses of 656 acres. The Specific Plan Area may provide for the construction of up to 8,000 residential dwelling units at various densities.

In addition to the developed acres described above, the site will also contain approximately 493 acres of on-site preserve as required by the SSHCP Conservation Strategy (Chapter 7). These acres are a land donation/in lieu of SSHCP mitigation fees as described in Chapter 9.

Specific variances from SSHCP Avoidance and minimization measures for Cordova Hills include the following:

EDGE-3 (Preserve Setbacks): There are instances within the 50' setback where the hardpan will be impacted due to compliance with the American Disabilities Act and for footing of arched culverts at various locations. In these instances, variances from AMM Edge-3 are allowed. The 50' edge condition will only be established adjacent to the Plateau Preserve, Central Drainage Preserve, Carson Creek Preserve, and University Preserve.

EDGE-7 (Hardpan/Duripan Protection): Cordova Hills has two variances from this AMM: 1) Two water transmission mains (16" and 24") would be constructed within the North Loop Road right-of-way through the Plateau Preserve north of North Loop Road; and 2) a water transmission main and a sewer force main will be placed along Town Center Boulevard within the southern portion of the Plateau Preserve. These sections of pipeline would puncture the hardpan. A clay-bentonite soil mix will be backfilled into the trench up to the level of the top of the duripan once the pipelines are in place.

APPENDIX K (Continued)

ROAD-2 (Wildlife Crossing Structures): Cordova Hills has three variances to AMM Road-2 where a dry crossing cannot be provided due to grading and spacing constraints. Two culvert crossing along North Loop Road and one at the intersection of University and Grant Line will not contain a dry crossing due to grading and spacing constraints.

TCB-1 (Tricolored Blackbird Surveys): Cordova Hills has conducted surveys for special-status species and tri-colored blackbirds were not detected. No further surveys for tri-colored blackbirds are required.

BAT-1 (Winter Hibernaculum Surveys): Cordova Hills has conducted bat hibernaculum surveys. Bat hibernaculum is in the form of large trees, bridges, and old buildings, none of which are present on site. No further surveys for bat hibernacula are required.

Jackson Township Master Plan

The proposed Jackson Township Master Plan encompasses approximately 1,391 acres and is located in the center of the UDA. The proposed Master Plan is bound by Kiefer Boulevard on the north, Jackson Highway on the south, Excelsior Road on the east and on the west by parcel boundaries that are proximal to the east side of Eagles Nest Road.

The current Jackson Township Master Plan description includes residential, commercial, office, mixed use and public/quasi-public uses that total approximately 813 acres; open space, recreation, and agricultural uses of approximately 263 acres; and roadways will account for approximately 90 acres. The current Master Plan area may provide for the construction of up to 6,143 residential dwelling units at various densities.

In addition to the developed acres described above, the site will also contain approximately 225 acres of on-site preserve as required by the SSHCP Conservation Strategy (Chapter 7). These acres are a land donation/in lieu of SSHCP mitigation fees as described in Chapter 9.

STREAM-5 (Design for Stream Channel Re-Routing, Widening or Deepening): Jackson Township will re-route, widen and deepen that portion of Elder Creek that runs through their property. While Jackson Township will comply with AMM Stream-5, it is noted that Elder Creek will be used for stormwater drainage and maintenance for the channel will be required. As the Jackson Township Master Plan progresses, conditions will be included that address this issue.

NewBridge Specific Plan

The proposed NewBridge Specific Plan encompasses approximately 1,095 acres and is located in the center of the UDA within the unincorporated portion of Sacramento County. The Specific Plan is bound by Kiefer Boulevard to the north, Jackson Highway to the south, Sunrise

APPENDIX K (Continued)

Boulevard to the east and on the west by parcel boundaries that are proximal to the west side of Eagles Nest Road. The NewBridge Specific Plan application includes residential, commercial, office, mixed use, and public quasi-public uses of approximately 585 acres; and open space and recreation of approximately 111 acres. The Specific Plan area may provide for the construction of up to 2,975 residential dwelling units at various densities.

In addition to the developed acres described above, the site will also contain approximately 101 acres of on-site preserve as required by the SSHCP Conservation Strategy (Chapter 7). These acres are a land donation/in lieu of SSHCP mitigation fees as described in Chapter 9.

The NewBridge Specific Plan does not require any variances form the SSHCP avoidance and minimization measures at this time.

SunCreek Specific Plan

The approved SunCreek Specific Plan encompasses approximately 1,265 acres and is located in the eastern portion of the UDA within the City of Rancho Cordova. The Specific Plan is bound by Jackson Highway on the north, Douglas Road on the south, Grant Line Road on the east, and Sunrise Boulevard on the west. The SunCreek Specific Plan includes residential, commercial, office, mixed use and public/quasi-public uses that total approximately 816 acres; open space and recreation uses of approximately 136 acres; and roadways will account for approximately 108 acres. The Specific Plan area may provide for the construction of up to 4,698 residential dwelling units at various densities.

In addition to the developed acres described above, the site will also contain approximately 205 acres of on-site preserve as required by the SSHCP Conservation Strategy (Chapter 7). These acres are a land donation/in lieu of SSHCP mitigation fees as described in Chapter 9.

EDGE-3 (Preserve Setbacks): There are instances where the 50’ setback cannot be accommodated due to agreements that were made prior to completion of the SSHCP between the project applicant, local land use authorities and state and federal regulatory agencies. In these instances, variances from AMM Edge-3 are allowed. Although a few wetland setback areas fall short of the minimum buffer requirement, the overall Project design satisfies the HCP’s goals because the distance between the Preserve’s aquatic features (i.e. vernal pool habitat, Waters of the United States, etc.) and the proposed Covered Activities or impacts generally exceeds the 50 foot requirement. Furthermore, The SunCreek Specific Plan Area designed its open space areas, setbacks, and adjacent land use designations to minimize indirect impacts to the maximum extent possible. The aforementioned data on wetland and watershed relationships indicate that the watersheds preserved on SunCreek’s are sufficient to maintain the wetlands’ functions and values.

APPENDIX K (Continued)

EDGE-7 (Hardpan/Duripan Protection): Sun Creek has two variances from this AMM: 1) where utility trenches (i.e. sewer, drainage, water or dry utilities) will run through the preserve on the Shalako property and 2) where utility trenches (i.e. sewer, drainage, water or dry utilities) will run through the preserve setback on the Jaeger Ranch property. These utility trenches will puncture or disrupt the soil hardpan or duripan. A clay-bentonite soil mix will be backfilled into the trench up to the level of the top of the duripan once the utilities are in place.

APPENDIX K (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX L

SSHCP Preserve Design

APPENDIX L
Preserve Design

The proposed approach for determining areas to be targeted for preserve establishment under the South Sacramento Habitat Conservation Plan (SSHCP) is based on land cover types present, known occurrences of covered species within the Plan Area, and known presence of suitable habitat for covered species. Preserves within the Plan Area will be designed, established, and managed according to the following established principles of ecology and conservation biology. These principles are summarized in Table 1 and their applicability to the SSHCP is explained below.

Table 1
Preserve Design Guiding Principles

Goal	Effect	Poor	Good	Example
Minimize Fragmentation	Fragmentation disrupts movement and lowers species diversity.			Roads bisecting preserves can prevent movement between preserves.
Minimize Edge Effects	Non-compatible uses adjacent to preserves lowers habitat values and species abundance/diversity.			Feral cats from residential development dramatically reduce song bird populations.
Establish Connectivity	Linking preserves allows for increased movement amongst interacting landscapes			A corridor between grasslands and a lake allows species to utilize both habitats.
Establish Buffers	Buffers help reduce edge effects to protect preserve integrity.			A vegetate buffer absorb pollutants to protect waterways.
Maximize Heterogeneity	Preserves with greater mix of habitats tend to support greater biodiversity.			An oak preserve with a stream may support greater biodiversity than an oak preserve without a stream.
Protect Watersheds	Preserving watersheds helps maintain hydrologic stability and water quality.			Nutrients from landscaping upstream flows into the preserve and harms species.
Maximize Population	Larger populations are less vulnerable to disease and local disturbances.			If 10% of a populations is resistant to a disease, 10 individuals will not persist, but 20 may.
Maintain Distribution	Allows species to repopulate after disturbances, protects metapopulations and genetic variation.			Individuals in one preserve are able to repopulate another after a fire.

Source: Sacramento County

Minimize Preserve Fragmentation

Along with outright habitat conversion, habitat fragmentation is a leading cause of biodiversity reduction on both local and regional levels. By definition, habitat fragmentation results in a habitat type being reduced in size and more isolated from adjacent areas of similar habitat types.

APPENDIX L (Continued)

The more isolated a given habitat type (and associated species), the more difficult it becomes for those species to migrate, escape harsh conditions and exchange genetic information.

As land use within the HCP area changes over time, areas currently characterized by intact habitat will inevitably become fragmented as parcels change ownership or are divided, resulting in the presence of smaller, separate patches of habitat when compared with current conditions. Some of these patches will be located adjacent to urban areas, agricultural settings, or roadways. Others patches will become isolated and remain as small "islands" in the landscape. Fragmented habitats can have a number of negative effects on species movement. For instance, roads or other barriers can impede or prevent movement of a species across part of its range. Individuals that are forced to disperse across urban or agricultural topography are directly threatened by predation and harsh environmental conditions. Fragmentation can increase distances between suitable patches of habitat, altering movement of dispersal-limited organisms (e.g., seeds, cysts, eggs, juveniles). Patch size, number, and degree of isolation can all have an effect on the movement of organisms between patches (Molles 1999).

Fragmentation not only disrupts movement, it can also alter ecosystem dynamics, especially when corridors are located next to human development, or when natural disturbance patterns (e.g., fire, water flow, erosion patterns) are altered. This can disrupt the "patch mosaics" seen on the unfragmented landscape. Fragmentation also decreases the diversity of animals in an area, including birds, bees and beetles. Some of these decreases may significantly affect ecosystem processes such as pollination and decomposition (Molles 1999).

Species richness is also affected by fragmentation, decreasing as habitat patches ("islands") become smaller and more isolated. Species richness on islands (and in habitat patches) is a balance between immigration and extinction of species. Immigration rates are influenced by the distance from the source of immigrants, while extinction rates are mostly determined by "island" size (MacArthur and Wilson 1967). Plant and animal species that require the frequent exchange of genetic material to re-colonize extirpated populations are especially affected by fragmentation and subsequent isolation of habitat patches. The ability of subpopulations to move between patches is important in the persistence of some species, especially those in "sink" populations, small groups that, left alone, would probably go extinct (Molles 1999). Isolated subpopulations are particularly susceptible to genetic disorders and lower reproductive success caused by inbreeding. This can lead isolated populations to become more vulnerable to local extinction as a result of stochastic events (Ellstrand and Elam 1993).

When habitat is fragmented, the remaining patches are affected by the changes in the physical environment along the perimeter, such as differences in hydrology, light intensity, temperature and wind speed. This "edge effect" (change in the physical nature of the habitat) can extend into

the remnants of intact habitat, degrading them as well and reducing their effective area. Edge effects are explained in more detail in Section 2.1.2.

Obviously, minimizing habitat fragmentation and emphasizing the preservation of larger, intact areas are crucial conservation goals for any conservation effort. However, if preservation of landscape level preserves is impracticable, then clustering habitat fragments across the landscape can ameliorate some of the negative effects on movement associated with smaller, fragmented habitats (Kareiva and Wennergren 1995). This allows the fragments to achieve greater species diversity by increasing dispersal opportunities. It is crucial to note though, that the covered species vary greatly in their ability to traverse non-natural areas between preserves (e.g., western burrowing owl [*Athene cunicularia hypugea*], western spadefoot [*Spea hammondii*], and Sacramento Orcutt grass [*Orcuttia viscida*]).

L.1 Minimize Edge Effects

The long-term biological viability of preserves, stream corridors and landscape linkages will be affected by adjacent land use. When the adjacent land uses are different from each other, such as a housing development or a busy road next to a habitat preserve, they will likely have negative impacts on the conservation land. These impacts may include light and noise pollution, vibration, alterations to hydrology, water pollution, illegal dumping of rubbish and toxic chemicals, spread of invasive non-native plants and presence of pets which may adversely affect native species. These impacts are known as edge effects and result in the outermost parts of a preserve or a landscape linkage being adversely affected by these and other external factors. The interior parts of a preserve or landscape linkage, where the edge effects are much less, is known as interior habitat as opposed to edge habitat.

Preserves with a high perimeter to area ratio will have greater edge effects, thus offering less protection to species targeted for conservation. This means that habitat within a single large preserve experiences less edge effect than the same amount of habitat encompassed by a number of smaller preserves. The lower quality of edge habitat makes it harder for many native species to survive. For example, altered hydrology will decrease the habitat quality of vernal pools. The presence of domestic cats or other pets will reduce the reproductive success of ground-nesting birds, including western burrowing owls, and reduce the population of small mammals that are food for native predators. Some animals are adversely affected by traffic noise. Weedy plants and feral animals more easily invade fragmented habitats with edges adjacent to human activities and invasive non-native plants may out-compete the existing vegetation of a preserve. Edge-loving predators benefit from increase in edges, while edge-avoiding species are negatively affected by such an increase.

Different negative edge effects permeate into preserves, stream corridors and landscape linkages to different extents. There is widespread acceptance that a setback width of 100 to 200 feet will

APPENDIX L (Continued)

protect a stream from runoff water pollution, provided that the ground in the setback contains native vegetation. However, most studies of this effect have been carried out in the eastern and Pacific Northwest portions of the U.S., typically in forested landscapes. A 100 foot wide buffer of hardpan grassland soil such as exists in the SSHCP grassland areas, probably does not provide an adequate setback to filter runoff water pollution when already saturated by previous rains. It is also noted that setbacks sufficient in size to absorb nutrients are often insufficient in size to provide adequate wildlife habitat. For example, the impacts caused by domestic cats may well reach beyond the size of a setback buffer established to protect water quality. Numerous giant garter snakes (*Thamnopsis gigas*) in Yolo County have been killed by domestic cats at locations up to two miles from the closest urban development (see giant garter snake species account, Appendix A). Busy roads in Europe disturb grassland bird species up to a distance of 1.3 miles.

Maximizing the interior/edge ratio of a preserve will reduce these negative edge effects as it will maximize the percentage of a preserve that is interior habitat. A circular preserve has the highest interior/edge ration and the highest percentage of interior habitat. In contrast, a long, thin preserve may be entirely edge habitat. The design of preserves must seek to avoid the latter shape.

Additional key features for vernal pool grassland preserves within the Urban Development Area (UDA) are:

- Wherever possible include entire subwatersheds within the preserve. This minimizes the area experiencing negative hydrologic effects from adjacent lands;
- Wherever possible include a setback area beyond the subwatershed boundary; and
- Where a subwatershed is bisected by the preserve boundary, apply specific preserve design measures such as vegetated swales to prevent runoff from an adjacent site with incompatible land use such as a road into the preserve.

The major landscape scale vernal pool grassland preserves outside the UDA will be large enough for the edge habitat to be a very small percentage of the total preserve acreage, providing that incompatible uses such as housing do not occur as non-preserve “islands” within the preserve. The latter phenomenon could have a severe negative impact on the biological value of these preserves.

Stream corridors are by definition long and thin. Preserve areas along streams must be wide enough to include an adequate setback that protects the waterway, the riparian vegetation and important upland sites such as giant garter snake refugia from adverse edge effects.

Landscape linkages between preserves may also be long and thin due to previously existing development or land use designations in the preserve area. In determining the minimum width of a landscape linkage it is necessary to consider which species are likely to use the linkage corridor

for dispersal, how they tend to disperse and how extensive the edge effects is expected to be given adjacent land uses. The minimum widths for landscape linkages described in Chapter 7 of the SSHCP take into account the need to provide interior habitat, balanced with the local land use scenario and the acreage requirement for an individual linkage.

In addition, it is possible to reduce negative edge effects by guiding land use decisions and resulting design in areas immediately adjacent to preserves. The application of "green" site sensitive design requirements to adjacent development will help reduce edge effects. These requirements may include measures such as placing small streets rather than backyards next to preserves, fencing that precludes movement of domestic animals into preserves, landscaping guidelines that prohibit use of known invasive species, and strict avoidance of any stormwater or summer-watering runoff from developed areas into preserves (see Chapter 6 of the SSHCP).

L.2 Establish Connectivity between Preserves

Blocks of habitat that are connected by natural linkages or corridors such as drainages and associated riparian corridors, swales, topographical depressions, ridgelines and other linear vegetated areas (grasslands, woodlands, some agriculture areas), can provide terrestrial corridors (linkages) to other areas of suitable habitat that have been otherwise isolated by fragmentation.

Habitat corridors have been defined in a variety of ways; in simplest terms, corridors are narrow strips of land that differ from the matrix situated on either side (Forman and Gordon 1986). In terms of ecological function, corridors may be defined as linear areas of vegetation that facilitate the movement of plants and animals between other habitat patches (Merriam 1984). In some cases, the corridor may itself provide habitat for an adapted assemblage of plants or animals, and only a dispersal route for others (Rosenberg et al. 1997). For example, a seasonal drainage may provide habitat that will only support a non-specialized assemblage of non-native annual grasses and invertebrates that are more characteristic of a disturbed seasonal wetland, or emergent marsh. Yet this same seasonal drainage may convey seeds and cysts (eggs) of more specialized vernal pool organisms from a source vernal pool complex to another sink vernal pool complex. The vernal pool organisms themselves do not complete their life cycle within the drainage, but individuals, seeds, or cysts may pass from one vernal pool complex to the other through it.

Some corridors provide for movement (linkages), but do not necessarily provide suitable habitat for any of the species moving through them. Example of these includes concrete underpasses under freeways or roads, clear cuts, agricultural areas, roadways, railroads, fence lines, utility corridors, disturbed/modified greenways, and golf courses.

It is thought that in the absence of movement of genetic material, small, isolated populations are more affected by stochastic events, more prone to inbreeding depression and therefore more

APPENDIX L (Continued)

vulnerable to extinction. These population and genetic aspects as they relate to the value of movement corridors is highly disputed for various reasons (Simberloff et al. 1992).

Movement corridors are used differently by different species, depending on their home ranges, seasonal distributions, food supplies, hibernation needs, reproduction needs, species behavior, and the type and location of the corridor being used. For example, coyotes (*Canis latrans*) and bobcats (*Lynx rufus*) have larger home ranges and will move larger distances in a given time frame than raccoons, skunks, California tiger salamanders (*Ambystoma californiense*) or a western spadefoots (*Spea hammondii*). In addition, some species move on a daily basis (bobcats and coyotes), while other species may migrate only seasonally (e.g., California tiger salamander and western spadefoot). Some observations about wildlife corridors indicate that larger species are more commonly recorded in corridors than smaller ones (Lindenmayer and Nix 1993).

Although corridors can have many ecological benefits, there are also disadvantages associated with corridors (Simberloff et al. 1992). Corridors can facilitate the spread of invasive species, disease and fire at faster rates than would occur without connections between fragmented habitats. Since corridors are often narrow and linear in nature, they typically experience a high degree of edge effects and are more likely to be dominated by a non-native herbaceous understory. They also may be more likely to harbor a higher number of predators (both native and non-native), and may even act like biological sinks. These effects are amplified when corridors are adjacent to urbanized development.

In general, corridors should be wide, continuous, natural, and structurally diverse as opposed to narrow, fragmented, unnatural, and with low structural diversity. Multiple corridors are better than a single corridor and corridors should connect to natural habitats outside of the Plan Area where appropriate (LGIEN 2001).

The SSHCP recognizes that both corridors (habitat corridors such as riparian areas and seasonal drainages) and biological movement linkages (grassland areas that provide connections between vernal pool/grassland preserves) are a necessary component of the overall Conservation Plan. The SSHCP also recognizes that not all covered species will equally benefit from a particular configuration of connective corridors and landscape linkages. For instance, a landscape linkage dominated by annual grassland and with a low density of vernal pool or swale habitat will provide very little value to the majority of vernal pool species. Such a landscape linkage may however, provide important value to other wildlife species, particularly upland reptiles (lizards and snakes), small and medium-sized mammals (including bats) and perhaps some species of birds.

APPENDIX L (Continued)

L.3 Establish Buffers

In addition to properly designed preserve areas, buffers should be established around the preserve systems because they reduce the adverse effects of adjacent urban and agricultural land uses. Preserves located close to urban areas are particularly vulnerable to edge effects and anthropogenic alternations of the preserved ecosystem (e.g., changes in hydrology, trash dumping, foot and bicycle traffic, and the invasion of exotic species). Buffers between developed and preserved lands can help ameliorate these negative effects and ensure ecological function is maintained in the preserve as a whole.

Simply defined, buffers are strips of land that are permanently covered with vegetation (NRCS 2001). Buffers can be planted windbreaks, hedgerows, grassed waterways, filter strips, and fenced areas around waterways that exclude livestock. Buffers can act as filters, absorbing various pollutants, trapping sediments, and, in the case of vernal pool preserves, absorbing or redirecting summer irrigation run-off. Well-designed buffers can also provide habitat for some wildlife species and beneficial insects.

Although there is general agreement that buffers are beneficial, there are no biological criteria for "standard" buffer widths because they vary for different impacts, species, habitat and local conditions. Fixed-width buffers are more efficient from a design or planning viewpoint and tend to be adopted as "regulatory standard", but biologists recommend buffers of varying widths depending on individual situations and ecosystem function. In general, narrower buffers are not as effective as wider buffers.

While buffers are an important component of all preserves within the preserve system, they may be even more important to smaller satellite preserves, which are more susceptible to edge effects than larger preserves. Therefore, isolated vernal pool preserves in the SSHCP should be surrounded by buffers of maximum possible width to minimize adverse effects from adjacent land uses and to ensure continued ecosystem function to the greatest extent possible. As preserves are acquired, buffers will be established within the existing footprint of the preserve. Acquisition of additional land beyond the preserve footprint is not required for a buffer.

L.4 Maximize Heterogeneity within Preserves

Habitat heterogeneity is important to consider in the design of the SSHCP Preserve System. Heterogeneous habitats generally support greater biodiversity. In addition, they are more likely to be ecologically complex and may be more resilient over time.

Heterogeneity should be considered at multiple spatial scales i.e., it can be assessed on a regional, local and site-specific scale. By maximizing preservation of habitat heterogeneity at all of these scales, the likelihood of capturing the full range of ecosystem functions and services

needed for the long term survival of covered species is maximized, and the likelihood of long term preservation of biodiversity is enhanced.

An additional consideration in preserve design is heterogeneity arising from juxtaposition of one habitat with other habitat types. For example, vernal swales, seasonal drainages and emergent marshes may interact ecologically with vernal pools in a given landscape setting, e.g., through hydrological connection, dispersal and source-sink dynamics of organisms, and habitat support for foraging or prey organisms. Similarly, the presence of corridors, ridges, and other physical features likely contribute to habitat heterogeneity on a broad scale.

L.5 Protect Watersheds

The protection of watersheds is an important principal for design, establishment, and management of preserves for a number of reasons related to habitat function, hydrologic stability, and water quality.

Since hydrologic regimes are often the main factor in determining the presence of certain wetland flora and fauna, those features of the landscape that support the hydrology of a given wetland feature are of principal importance to maintain in establishing and managing preserves targeting the preservation of wetland dependent species. Hydrology of wetland features may depend on the presence of intact soil profiles in adjacent and upslope positions, intact swale and seasonal drainage morphology in the surrounding landscape, and surface and subsurface flows from upslope positions. Sufficient sub-watershed area should be preserved so that natural sources of surface and sub-surface water influx and outflow remain intact, potential development-related increases in surface runoff are minimized, and point and non-point sources of water pollution are avoided (e.g., runoff from roads, roofs, paved surfaces, utility pipes, landscaped areas, etc.).

The specific hydrologic relationships that may exist between a single wetland feature and its surrounding and underlaying soils, between it and adjacent wetland features, and between the wetland complex and surrounding uplands are ultimately too complex to empirically measure and describe for purposes relating to the SSHCP. The likelihood of long-term habitat stability and long term survival of wetland dependent species is maximized however, if all preserves are designed to protect entire sub-watersheds that support wetland features, wherever possible.

L.6 Maximize Population Size

It is generally accepted concept of population ecology that larger plant and wildlife populations tend to be more stable in the long-term, and less vulnerable to extirpation, compared with smaller populations and/or simpler, less extensive meta-population complexes. For purposes of the SSHCP, population size is defined as the number of interbreeding individuals within a single habitat unit (e.g., number of individuals of a given vernal pool species within a single vernal

pool), or the number of interbreeding sub-populations within a given geographic setting (e.g., the number of genetically interrelated vernal pools within a complex or the number of genetically interrelated vernal pools among complexes). At both scales of consideration, bigger populations are preferable for a number of reasons.

Depending on the breeding system of the organism in question, larger populations tend to possess higher genetic diversity, which can buffer the population against negative demographic trends, including genetic bottlenecks, genetic drift, and inbreeding depression. Through higher levels of genetic diversity, larger populations may also be more pre-adapted to cope with changing environmental conditions. Empirical determination of patterns of genetic diversity is technically complex and cost prohibitive for the number of species and at the scale of the SSHCP. Designing preserves to encompass large populations, and management of these preserves to support large populations maximizes the likelihood that maximum genetic diversity is captured.

In addition, populations comprising a larger number of individuals, or a larger number of sub-population components are more likely to persist through local stochastic disturbances (e.g., drought, flood, fire, pollution spill, disease, noxious weed infestations, introduction of feral predators, adverse grazing regimes, negative demographic shifts, etc.) than smaller populations.

L.7 Maintain Species Distribution Across Their Native Range

It is important to consider and maintain the local, regional and range wide distribution of a covered species during landscape-scale conservation planning, for long-term species viability. The most apparent benefit of maintaining a species' full range is assurance that stochastic disturbances (e.g., drought, flood, fire, pollution spill, disease, noxious weed infestations, introduction of feral predators, dramatic demographic shifts, etc.) that may cause extinctions are limited to localized sub-populations and that the species may persist in portions of its range that escaped the disturbance. Unaffected populations might also serve as sources for natural re-colonization or active restoration of extirpated populations. Species that are highly restricted in their range, either naturally or as a result of human activity, are more vulnerable to extinction over the long-term.

Maintenance of a species' full range also helps assure preservation of genetic diversity that may be a requisite for long-term vigor and adaptation to changing environmental conditions (e.g., climate change, introduction of new pathogens, etc.). The genetic makeup of a given species is the sum of the combined genetic pool of its various populations. Different populations located apart from one another tend to experience different selective pressures over time. As a consequence, geographically separate populations may exhibit differing genetic diversity, including unique variants of genetically fixed adaptive traits. For example, populations that have

evolved in the drier and harsher portions of a species' overall range might harbor genetic traits that pre-adapt those populations to long-term drought cycles.

In addition, maintaining the full range of a species increases the likelihood of capturing persisting meta-population dynamics and other landscape-scale ecological phenomena (ecosystem functions). This includes a higher probability of long-distance dispersal of individuals (and genes) between sub-populations, populations and meta-populations, if both small and large-scale species distribution patterns are maintained. Another important consideration is that preservation of the full geographic range of all endemic species within a region and between regions further ensures that landscape-scale habitat relationships and requirements of other species are met. The attractiveness of particular landscapes to waterfowl migrating along the Pacific Flyway is of particular importance. If populations of species are lost in significant portions of their ranges because of habitat loss, migratory patterns of the waterfowl may change, thus affecting the dispersal potential and long-term population dynamics of other species located in the region (Silveira 1998; USFWS 2005).

L.8 Maximize Preserve Size

In general, larger preserves are preferable to smaller ones for a variety of reasons that relate to ecological complexity, habitat support value, and long-term habitat sustainability. Larger preserves are more likely to be ecologically stable through time (Leidy and White 1998).

Establishment of larger preserves increases the likelihood that habitat variability is encompassed. Multiple landforms, multiple soil associations, and multiple habitat types are all more likely to be present in large contiguous areas, than they are in small isolated preserves. In general, greater habitat diversity is associated with greater biodiversity and more complex trophic relationships (food web). Larger preserves may also support larger and more complex meta-populations of plants and animals. Larger populations and more complex meta-populations are more likely to capture overall genetic diversity and spatial patterns of genetic diversity across the landscape. These larger, more complex populations are also more resilient to local extirpations resulting from chance events (floods, erosion/sedimentation, unfavorable grazing regimes, pathogens, predators, toxic spills, etc.). Larger preserves also result in less habitat fragmentation, and afford greater insulation from edge effect. Since larger preserves may more easily encompass more intact watersheds, the integrity of unaltered hydrological cycles is better assured.

The practicalities of vegetation management are also more favorable in larger preserves. Upland vegetation management options, including viable livestock grazing operations and controlled fire regimes are easier to implement on larger preserves than they are on small isolated preserves that are surrounded by development.

In all cases, preserves established as part of the SSHCP will be made as large as possible. However, it is important to note that smaller preserves can possess significant conservation value. It is also recognized that within the Plan Area rare species are found within urban settings where the opportunity to set aside large preserves no longer exists. In these cases, the application of adaptive management will help ensure the survival of these species in small preserves and will maintain the integrity of the ecological functions of the preserves in the long term.

L.9 Conservation of Ecological Functions and Values

Ecological functions are an array of biological and physical functions that different habitat provide, while ecological values are the values of these functions to society. Some ecological functions, such as providing habitat for animals and plants, are common to all habitat types in the Plan Area. Each of these habitat types is characterized by a variety of structural features, varying patterns across the landscape, and ecological processes that contribute to ecological functions of the habitat. Ecological processes include movement of energy and nutrients through food-webs, and the cycling of chemical constituents through soil, water and air.

Several habitat types in the Plan Area provide ecological functions related to flood control. Streams are the conduit for moving storm-water through the Plan Area and into the major rivers. Seasonal wetlands adsorb floodwaters and reduce the amount of water flowing down streams during storms. Riparian vegetation reduces the flow rate of the storm run-off, allowing more time for groundwater recharge. In addition, wetlands and riparian areas improve stream water quality by removing pollutants and reducing non-point source pollution run-off. All of these functions provide direct benefits to human communities in the Plan Area.

The SSHCP conserves and, in some cases enhances, ecological functions and values through the variety of measures including preserve acquisition, habitat restoration, and habitat enhancement. The direct conservation of functioning stream corridors, seasonal wetlands and vernal pool wetlands will ensure that ecological functions of major portions of the Plan Area continue to exist. Restoration of riparian vegetation along several key reaches of streams in the Plan Area will improve the overall ecological functions of stream corridors, while restoration of highly degraded historic vernal pool areas outside the UDA will contribute to compensation for loss of vernal pools within the take area. Several agricultural conservation measures will reduce non-point source water pollution and provide native habitat patches for beneficial insects and other features. Enhancements of upland and aquatic habitats will improve a variety of ecological functions.

The conservation strategy provides for the conservation of habitat and species, as well as ecological functions at the landscape scale. This approach helps to maximize the level of ecological functioning of the entire Plan Area. For example, the conservation of large vernal pool

grassland areas ensures adequate habitat for species that utilize both vernal pools and the surrounding upland habitat, for pollinators of vernal pool plant species and for larger animals that have important roles in the overall ecological functions of vernal pool grasslands. This approach allows for the loss of vernal pools in lower quality habitat areas within the UDA, as well as a small amount of loss in high-quality areas. Coupled with a "no net loss of wetlands" requirement, this landscape-level approach provides for more effective conservation of vernal pool functions and values than a project-by-project approach consisting of avoidance, mitigation and compensation measures. While the project-by-project approach can result in a higher level of vernal pool avoidance on a particular project site, it is likely to result in establishment of small preserves subject to relatively large edge effects from adjacent non-compatible uses, and is unlikely to achieve the conservation of very large vernal pool landscapes that fully conserve ecological functions.

L.10 Literature Cited

Ellstrand N. C., Elam D. R. 1993. Population genetic consequences of small population size: implications for plant conservation. *Annual Review of Ecology & Systematics* 24: 217-242.

Forman, R. T. and M. Gordon. 1986. *Landscape ecology*. New York: John Wiley.

Kareiva, P., and U. Wennergren. 1995. Connecting landscape patterns to ecosystem and population processes. *Nature* 373: 299-302.

Leidy R. A. and White E. G. 1998. Toward an ecosystem approach to vernal pool compensation and conservation. *In*: Witham C.W., Bauder E.T., Belk D., Ferren W.R. Jr and Ornduff R. (eds), Ecology, Conservation, and Management of Vernal Pool Ecosystems: Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, USA, pp. 263–273.

Lindenmayer, D. B., and H. A. Nix. 1993. Ecological Principles for the Design of Wildlife Corridors. *Conservation Biology*, 7 (3): 627-630.

Local Government Information and Education Network (LGIEN).2001. Local Government Topics: Environmental Corridors: "Lifelines for Living". LGIEN Fact Sheet Series 2001-013. John Church, Extension Educator, Natural Resources, University of Illinois Extension. Accessed online at http://www.extension.uiuc.edu/factsheets/LGIEN%202001-0013.pdf

MacArthur, R. H. and Wilson, E. O. 1967. *The Theory of Island Biogeography*. Princeton, N.J.: Princeton University Press.

APPENDIX L (Continued)

Merriam, G. 1984. Connectivity: A fundamental ecological characteristic of landscape pattern. Pages 5-15 *in* J. Brandt and P. Agger. eds. Proc. first int. seminar on methodology in landscape ecolo. res. and planning. Int. Assoc. for Landscape Ecol., Roskilde Univ., Roskilde. Denmark.

Molles, M. C. Jr. 1999.*Ecology: Concepts and Applications*. McGraw-Hill.

Natural Resource Conservation Service (NRCS). 2001. "Buffer Strips: Common Sense Conservation." United States Department of Agriculture. Accessed online at http://www.nrcs.usda.gov/feature/buffers/#Anchor-Benefits.

Rosenberg D. K., B. R. Noon and E. C. Meslow (1997) Biological corridors: form, function, and efficacy. *Bioscience* 47: 677–687.

Silveira, J. G. 1998. Avian uses of vernal pools and implications for conservation practice. Pages 92-106 *in* C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, eds. Ecology, conservation, and management of vernal pool ecosystems. Proceedings of a 1996 conference California Native Plant Society, Sacramento, California.

Simberloff, D., J. A. Farr, J. Cox, and D. W. Mehlman. 1992. Movement corridors: conservation bargains or poor investments? *Conservation Biology* 6:493-504.

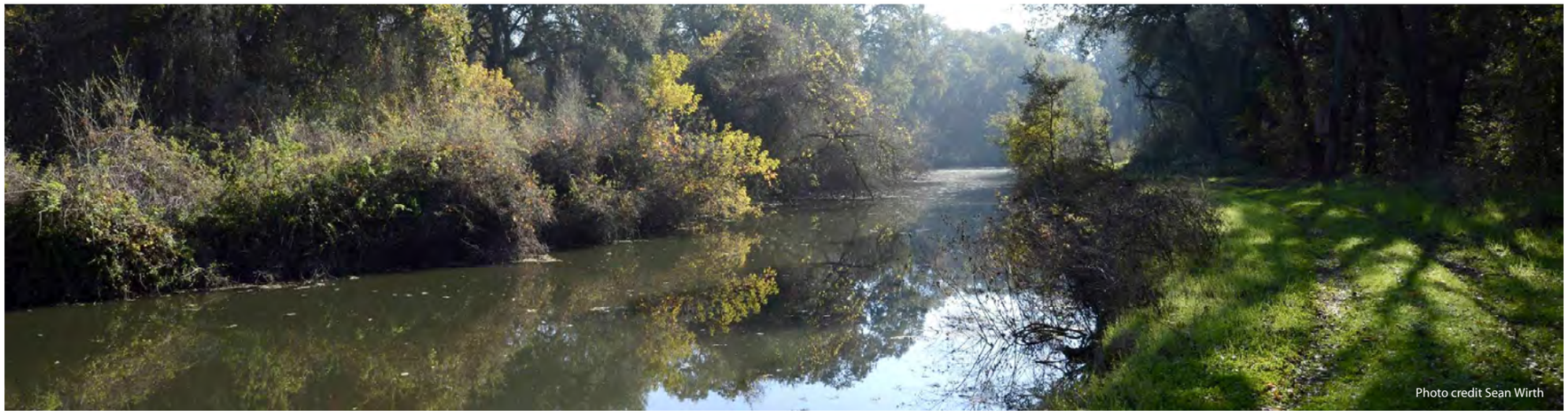
United States Fish and Wildlife Service (USFWS). 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.* December 15, 2005. Region 1, USFWS. Portland, OR: U.S. Fish and Wildlife Service. http://www.fws.gov/sacramento/es/recovery_plans/vp_recovery_plan _links.htm.

APPENDIX L (Continued)

INTENTIONALLY LEFT BLANK

SSHCP South Sacramento Habitat Conservation Plan

AQUATIC RESOURCES PROGRAM


Photo credit Sean Wirth



PLAN PARTNERS

County of Sacramento

City of Rancho Cordova

City of Galt

Sacramento County Water Agency

Southeast Connector Joint Powers Authority

VOLUME I

February 2017

ACKNOWLEDGEMENTS

The plan partners wish to thank the following individuals and agencies who provided significant input to the process or were directly involved in preparing this Draft Aquatic Resources Program (ARP).

Plan Permittees

County of Sacramento

Leighann Moffitt
Rich Radmacher
Krista Whitman

City of Rancho Cordova

Aaron Bush
Paul Junker (Michael Baker)
Joyce Hunting (Hunting Environmental)

City of Galt

Chris Erias

Sacramento County Water Agency

Michael Peterson
Kerry Schmitz

Southeast Connector Joint Powers Authority

Tom Zlotkowski

Program Manager

Bill Ziebron (Ziebron Group)

Local Partner

Sacramento Regional County Sanitation District

Steve Norris
Bryan Young

State and Federal Permitting Agencies

U.S. Army Corps of Engineers

Michael Jewell
Mary Packenham-Walsh
Lisa Gibson

U.S. Environmental Protection Agency

Paul Jones

State Water Resources Control Board

Bill Orme

Regional Water Quality Control Board

Elizabeth Lee

California Department of Fish and Wildlife

Jeff Drongesen
Todd Gardner
Jennifer Nguyen

Consultants

Dudek

Laurie Monarres
David Wickens
Sherri Miller
Tyler Friesen

Draft

SSHCP Aquatic Resources Program

February 2017

Prepared by:

County of Sacramento
City of Rancho Cordova
City of Galt
Sacramento County Water Agency
Southeast Connector Joint Powers Authority

With Assistance From:

Dudek
853 Lincoln Way, Suite 105
Auburn, CA 95603

Best, Best and Krieger
3390 University Avenue
5th Floor, PO Box 1028
Riverside, CA 92502

Citation:

County of Sacramento, City of Rancho Cordova, City of Galt, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Southeast Connector Joint Powers Authority. 2017. *Draft SSHCP Aquatic Resources Program*. February 2017. Sacramento, CA.

TABLE OF CONTENTS

Section **Page No.**

ACRONYMS AND ABBREVIATIONS ..... **IX**

EXECUTIVE SUMMARY ..... **XI**

1 INTRODUCTION **1**
1.1 Introduction to the ARP 1
1.1.1 ARP Overview 2
1.1.2 ARP Program Objectives 5
1.2 SSHCP Summary 6
1.3 ARP Purpose 7
1.4 Relationship of ARP to the SSHCP 13

2 AQUATIC RESOURCES PERMITTING OVERVIEW **15**
2.1 Regulatory Framework 15
2.2 Local Aquatic Resources Permitting Program Overview 15
2.3 Associated State and Federal Aquatic Resources Permits/Approvals 16
2.3.1 Clean Water Act Section 404 16
2.3.2 California Fish and Game Code/Section 1600 Master or Long-Term Streambed Alteration Agreement 17
2.3.3 Clean Water Act Section 401 Porter-Cologne Act/Waste Discharge 18

3 AQUATIC RESOURCES IN THE PLAN AREA **19**
3.1 Diversity and Abundance of Aquatic Resources in the Plan Area 19
3.1.1 Types of Wetland Waters 19
3.1.2 Types of Non-Wetland Waters 25
3.1.3 Amounts (Abundance) of Aquatic Resources 27
3.2 Functions and Services of Aquatic Resources in the Plan Area 30
3.2.1 Current Condition of Aquatic Resources 30

4 PROPOSED IMPACTS TO AQUATIC RESOURCES **69**
4.1 Estimated Impacts to Abundance and Diversity of Aquatic Resources within the Plan Area 69
4.1.1 Impacts on Abundance and Diversity of Aquatic Resources 70
4.2 Estimated Impacts to Functions and Services of Aquatic Resources in the Plan Area 71
4.2.1 Impacted Condition of Aquatic Resources 75

5 MITIGATION FRAMEWORK FOR AQUATIC RESOURCES **99**
5.1 Mitigation Overview 99

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

5.2 Avoidance and Minimization 100
5.2.1 Landscape-Scale Avoidance 100
5.2.2 Project Scale 106
5.3 Compensatory Mitigation 117
5.3.1 Compensatory Mitigation Requirements 120
5.3.2 Development of an ILF Program to Fulfill Compensatory Mitigation Requirements 129

6 AQUATIC RESOURCES PROFILE POST-MITIGATION 131
6.1 Aquatic Resources Abundance and Diversity After Impacts and Mitigation 131
6.2 Estimated Future Condition of Aquatic Resources in the Plan Area 134
6.2.1 Future Condition of Aquatic Resources 134

7 LOCAL AQUATIC RESOURCES IMPACT PERMIT APPLICATION PROCESS 159
7.1 Introduction 159
7.2 Submittal of Aquatic Resources Impact Permit Applications 159
7.2.1 Aquatic Resources Impact Permit Applications for Third-Party Project Proponents 159
7.2.2 Pre-Application Procedures 160
7.2.3 Aquatic Resources Impact Permit Applications for Local Land Use Authority Permittees 161
7.3 Master Plan Consistency with Aquatic Resources Impact Permits 161
7.4 Aquatic Resources Impact Permit Application Processing 161
7.4.1 Timing of Aquatic Resources Impact Permit Application Submittal 162
7.4.2 Components of the Aquatic Resources Impact Permit Application Package 162
7.5 Review for Completeness 168
7.6 Assessment of Impacts 169
7.6.1 Method for Calculating Impacted Acreage 169
7.6.2 Appealing the Impact Assessment 169
7.7 State and Federal Agency Review 169
7.8 Fees 170
7.8.1 SSHCP Development Fees 170

8 AQUATIC PERMITTING PROGRAM 171
8.1 General Permit Approach 172
8.1.1 USACE 404 General Permit and the Local Permit Program 172

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

8.1.2 Section 401 CWA Water Quality Certification, State Board General Order ... 175
8.1.3 California Fish and Game Code/Section 1600 MSAA ... 175
8.2 CWA Section 404 Permitting for Projects Ineligible for General Permits ... 176
8.2.1 CWA Section 404 Individual Permits ... 176
8.3 Programmatic Section 401 CWA Certification/Porter-Cologne Act Waste Discharge ... 179
8.4 California Fish and Game Code/Section 1600 Streambed Alteration Agreements ... 180
8.5 Other Federal Laws ... 181
8.5.1 Section 7 of the Federal ESA ... 181
8.5.2 Section 106 of the National Historic Preservation Act ... 182

9 REFERENCES ... 185

APPENDICES

A Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program
B-1 Vernal Pool Classifications
B-2 Addendum to Vernal Pool Classifications
C Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Plan
D Re-establishment and Establishment Guidelines

FIGURES

1 Plan Area ... 3
2 Urban Services Boundary and Urban Development Area ... 9
3 Reserve Design Map ... 11
4 Watersheds ... 31
5 Current Condition of Aquatic Resources in the Overall Plan Area ... 34
6 Current Condition of Aquatic Resources in the American River Watershed ... 36
7 Current Condition of Aquatic resources in the Deer Creek Watershed ... 37
8 Current Condition of Aquatic Resources in the Laguna Watershed ... 38
9 Current Condition of Aquatic Resources in the Lower Cosumnes Watershed ... 39

TABLE OF CONTENTS (CONTINUED)

Page No.

10 Current Condition of Aquatic Resources in the Lower Dry Creek Watershed....40
11 Current Condition of Aquatic Resources in the Lower Mokelumne River Watershed....41
12 Current Condition of Aquatic Resources in the Morrison Creek Watershed....42
13 Current Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed....43
14 Current Condition of Aquatic Resources in the Snodgrass Slough Watershed....44
15 Current Condition of Aquatic Resources in the Upper Cosumnes Watershed....45
16 Functional Assessment - American River Watershed....47
17 Functional Assessment - Deer Creek Watershed....49
18 Functional Assessment - Laguna Watershed....51
19 Functional Assessment - Lower Cosumnes River Watershed....53
20 Functional Assessment - Lower Dry Creek Watershed....55
21 Functional Assessment - Lower Mokelumne River Watershed....57
22 Functional Assessment - Morrison Creek Watershed....59
23 Functional Assessment - Sherman Lake-Sacramento River Watershed....61
24 Functional Assessment - Snodgrass Slough Watershed....63
25 Functional Assessment - Upper Cosumnes River Watershed....65
26 Summary of Overall Aquatic Resources Condition per Watershed....67
27 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Plan Area....77
28 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the American River Watershed....79
29 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Deer Creek Watershed....81
30 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Laguna Watershed....83
31 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed....85
32 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed....87
33 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Mokelumne River Watershed....89
34 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed....91

TABLE OF CONTENTS (CONTINUED)

Page No.

35 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed 93
36 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed....95
37 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed....97
38 Existing and Future Watershed Profiles of Aquatic Resources in the Plan Area 136
39 Existing and Future Watershed Profiles of Aquatic Resources in the American River Watershed....139
40 Existing and Future Watershed Profiles of Aquatic Resources in the Deer Creek Watershed....141
41 Existing and Future Watershed Profiles of Aquatic Resources in the Laguna Watershed 143
42 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed....145
43 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed....147
44 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Mokelumne Watershed 149
45 Existing and Future Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed....151
46 Existing and Future Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed....153
47 Existing and Future Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed 155
48 Existing and Future Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed....157

TABLES

1 Aquatic Resource Types and Amounts per Watershed within the Plan Area....28
2 Current Condition of Aquatic Resources in the Overall Plan Area 33
3 American River Watershed Current Conditions 35
4 Deer Creek Watershed Current Conditions 36
5 Laguna Watershed Current Conditions....37
6 Lower Cosumnes Watershed Current Conditions....38

TABLE OF CONTENTS (CONTINUED)

Page No.

7 Lower Dry Creek Watershed Current Conditions 39
8 Lower Mokelumne River Watershed Current Conditions 40
9 Morrison Creek Watershed Current Conditions 41
10 Sherman Lake–Sacramento River Watershed Current Conditions 42
11 Snodgrass Slough Watershed Current Conditions 43
12 Upper Cosumnes Watershed Current Conditions 44
13 Direct Impacts to Aquatic Resources in the Plan Area by Type (Acres) 72
14 Post-Impact Abundance of Aquatic Resources in the Plan Area by Type (Acres) 73
15 Condition of Remaining Aquatic Resources in the Overall Plan Area After Impacts and Before Accounting for Compensatory Mitigation 76
16 Condition of Remaining Aquatic Resources in the American River Watershed After Impacts and Before Accounting for Compensatory Mitigation 78
17 Condition of Remaining Aquatic Resources in the Deer Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation 80
18 Condition of Remaining Aquatic Resources in the Laguna Watershed After Impacts and Before Accounting for Compensatory Mitigation 82
19 Condition of Remaining Aquatic Resources in the Lower Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation 84
20 Condition of Remaining Aquatic Resources in the Lower Dry Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation 86
21 Condition of Remaining Aquatic Resources in the Lower Mokelumne River Watershed After Impacts and Before Accounting for Compensatory Mitigation 88
22 Condition of Remaining Aquatic Resources in the Morrison Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation 90
23 Condition of Remaining Aquatic Resources in the Sherman Lake–Sacramento River Watershed After Impacts and Before Accounting for Compensatory Mitigation 92
24 Condition of Remaining Aquatic Resources in the Snodgrass Slough Watershed After Impacts and Before Accounting for Compensatory Mitigation 94

TABLE OF CONTENTS (CONTINUED)

Page No.

25 Condition of Remaining Aquatic Resources in the Upper Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation 96
26 Mather Core Recovery Area Existing and Post-Impact Vernal Pool Conditions (Acres) 98
27 Stream Setback Minimum Requirements in the UDA 104
28 Summary of SSHCP Aquatic Resources Protection 111
29 Jump-Start Provision Acreage Requirements (at Permit Issuance) 119
30 Compensatory Mitigation Ratios 121
31 Compliance Monitoring 124
32 AMM Compliance Monitoring 126
33 Effectiveness Monitoring 127
34 Future Abundance (Acres) of Aquatic Resources in the Plan Area, by Aquatic Resource Type 132
35 Future Condition of Aquatic Resources in the Overall Plan Area 135
36 Future Condition of Aquatic Resources in the American River Watershed 138
37 Future Condition of Aquatic Resources in the Deer Creek Watershed 140
38 Future Condition of Aquatic Resources in the Laguna Watershed 142
39 Future Condition of Aquatic Resources in the Lower Cosumnes Watershed 144
40 Future Condition of Aquatic Resources in the Lower Dry Creek Watershed 146
41 Future Condition of Aquatic Resources in the Lower Mokelumne River Watershed 148
42 Future Condition of Aquatic Resources in the Morrison Creek Watershed 150
43 Future Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed 152
44 Future Condition of Aquatic Resources in the Snodgrass Slough Watershed 154
45 Future Condition of Aquatic Resources in the Upper Cosumnes Watershed 156

INTENTIONALLY LEFT BLANK

ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Meaning
AMM	Avoidance and Minimization Measure
APE	area of potential effect
ARI	Aquatic Resources Impact
ARP	Aquatic Resources Program
BMP	best management practice
CDFW	California Department of Fish and Wildlife
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CRAM	California Rapid Assessment Method
CWA	Clean Water Act
DEESA	Determination of Environmentally Equivalent or Superior Alternative
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act (federal)
FCAM	Functional/Condition Assessment Method
GIS	geographic information system
GP	General Permit
HUC	Hydrologic Unit Code
ILF	in-lieu fee
ITP	Incidental Take Permit
IP	Individual Permit
JPA	Joint Powers Authority
LEDPA	least environmentally damaging practicable alternative
LID	low-impact development
LOP	Letter of Permission
LSA	Lake or Streambed Alteration Agreement
LTLSA	Long-Term Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
MSAA	Master Streambed Alteration Agreement
MSLTA	Master Streambed Long-Term Agreement
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHWM	ordinary high-water mark
PGP	Programmatic General Permit
Porter-Cologne	Porter-Cologne Water Quality Control Act
PPU	Preserve Planning Unit

Draft SSHCP Aquatic Resources Program

Acronym or Abbreviation	Meaning
RDM	residual dry matter
RGP	Regional General Permit
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SHPO	State Historic Preservation Office
SP	Standard Permit
SSHCP	South Sacramento Habitat Conservation Plan
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
USB	Urban Services Boundary
UDA	Urban Development Boundary
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VPIH	Vernal Pool Invertebrate Habitat
VWADI	Vernal Wetland Acre/Density Index
WDR	Waste Discharge Requirement
WQC	Water Quality Certification
WRAMP	Wetland and Riparian Area Monitoring Plan

EXECUTIVE SUMMARY

The South Sacramento Habitat Conservation Plan (SSHCP) Aquatic Resources Program (ARP) is a local jurisdiction-based aquatic resources permitting program that also supports the anticipated implementation of a more efficient permitting strategy by the state and federal aquatic resource regulatory agencies (see SSHCP Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) Appendix C). The comprehensive, long-term watershed approach used in the ARP enables better protection and management of aquatic resources and enables increased permitting efficiency. It benefits the regulated public and initiates the formation of a large, connected conservation system that coordinates a balance between population growth and resource use. Such outcomes would not be possible under the conventional project-by-project resource agency review approach of the past.

The local jurisdiction based aquatic resources permitting program contained in the ARP promotes a regional approach to balancing development and conservation[1] of aquatic resources located within the SSHCP Plan Area. Application of procedures contained in the ARP will ensure that impacts to aquatic resources are avoided and minimized to the greatest extent practicable during implementation of future planned development.[2] The ARP also implements aquatic resource avoidance, minimization and compensatory mitigation at a landscape[3] level to protect largely intact watersheds in the Plan Area, including their associated aquatic resources. A primary goal of ARP implementation is to achieve an overall no net loss of aquatic resources functions and services.

The ARP local aquatic resources permitting program works in coordination with the SSHCP, and would complement the SSHCP's approach to evaluating SSHCP Covered Activities that require filling aquatic resources located within the Plan Area. The existing aquatic resources are described in terms of abundance, type, and condition as they occur in each Hydrologic Unit Code (HUC)-10 watershed of the SSHCP Plan Area. Under existing conditions, the Plan Area contains a total of approximately 24,255[4] acres of aquatic resources, comprised of 10

[1] The Oxford Dictionary of Ecology defines conservation as "the maintenance of environmental quality and resources. In modern scientific usage, conservation implies sound biosphere management within given social and economic constraints, producing goods and services for humans without depleting natural ecosystem diversity, and acknowledging the naturally dynamic character of environmental systems. This contrasts with a "preservation" approach, which, it is argued, protects species or landscapes without reference to natural change in living systems or human requirements".

[2] Planned development means the type and locations of future urban development and associated infrastructure as described in the approved General Plans for Sacramento County, Rancho Cordova, and Galt.

[3] A landscape can be defined as a heterogeneous land area composed of interacting ecosystems that is repeated in a similar form throughout; a landscape is a land area at least a few kilometers wide (Forman and Godron 1981, 1986).

[4] The total acreage of aquatic resources reported in the ARP is approximately 232 acres less than the total acreage of aquatic resources reported in the SSHCP. This is primarily due to three factors: (1) The use of different geographical information system (GIS) processes that result in fractional differences in acreage

different aquatic resource land cover types (e.g., freshwater marsh, vernal pool, open water); 8,280 acres of which are considered high-condition aquatic resources based on a landscape-level functional assessment.

The anticipated impacts to aquatic resources within the SSHCP Plan Area are used to project the abundance, diversity, and condition of remaining aquatic resources prior to considering compensatory mitigation. The predicted impacts, not considering compensatory mitigation, show an effect (reduction of 1,613 acres) on the abundance of aquatic resources. However, the overall types of aquatic resources and condition of the resources would remain largely unchanged even prior to considering the compensatory mitigation strategy of the SSHCP. The SSHCP's overall Conservation Strategy that requires landscape-scale and project-level avoidance and minimization measures (AMMs) would also contribute to maintaining the condition of aquatic resources. Landscape-scale measures include assembling a large network of interconnected preserves that preserve natural corridors, provide large blocks of contiguous habitat, and include buffers between new development and natural areas. From a project-level scale, avoidance and minimization of impacts would be ensured by requiring each development Covered Activity incorporate low-impact development (LID) design measures, implement best management practices (BMPs), comply with siting and design requirements, and provide Stream and Preserve Setbacks. All of these measures and practices synergistically combine to ensure maintenance of Plan Area aquatic resource functions and services.

In addition to the SSHCP and ARP's avoidance and minimization strategy, compensatory mitigation for unavoidable impacts to aquatic resources would be implemented with a watershed approach and would systematically prioritize compensatory mitigation projects based on anticipated impacts to aquatic resources, considering both watershed- and function-based factors. Upon consideration of the SSHCP and ARP compensatory mitigation strategy, the predicted future watershed profiles resulting from implementation of the SSHCP demonstrate that overall aquatic resource abundance, type, and condition within the Plan Area would be maintained or improved. There would not be a net loss of aquatic resources in terms of acreage; all aquatic resource types would remain intact; and the amount of high-condition resources within the Plan Area would be increased.

totals; (2) Rounding; and (3) Some of the acreage of riparian land cover types reported in the SSHCP are considered non-jurisdictional as they are mitigation sites comprised of created or restored riparian habitat. Non-jurisdiction aquatic resources are not discussed in the ARP. It is this last factor that accounts for the majority of the difference in reported aquatic resource acreage between the ARP and the SSHCP.

1 INTRODUCTION

1.1 Introduction to the ARP

The Aquatic Resources Program (ARP) is a local jurisdiction based aquatic resources permit program that adds to the strength of the South Sacramento Habitat Conservation Plan's (SSHCP or Plan's) framework of protection of natural communities and native plant and wildlife species, including protection of aquatic resources. The ARP identifies, classifies, and ranks the aquatic resources located within the SSHCP Plan Area (see discussion of Plan Area in ARP Section 1.2) (Figure 1), and describes a program to implement locally based permitting that relies on a systematic approach of aquatic resource avoidance, minimization, and compensatory mitigation. The implementation of this program is synergistic with other natural resources avoidance, minimization, and compensatory mitigation described in the SSHCP. Implementation of the SSHCP and ARP would protect ecological diversity and function in Southern Sacramento County, while allowing planned urban growth and development in accordance with approved General Plans and applicable laws. The ARP introduces a locally based permit program that would also promote more efficient permitting approaches by state and federal programs that regulate aquatic resources. The regional SSHCP Preserve System (see SSHCP Section 7.5) would be used within the ARP as part of a unified watershed strategy of avoidance, minimization, and compensatory mitigation. The ARP permitting framework (local, state, and federal, as envisioned by the Plan Permittees) would be more protective of aquatic resources compared to the current project-by-project permitting process, based on several factors described in this document.

While the ARP focuses on a permit program to address impacts to aquatic resources and the SSHCP focuses on permitting related to incidental take of species, both permitting processes are done in conjunction with one another and in coordination with a local jurisdictions' land use entitlement permitting process. Projects seeking permits to impact aquatic resources will follow the local permit application process described in Section 7 of this document. Some basic components of the permit package include a project description, submittal of a wetland delineation, a description of how a project complies with AMMs, and a compensatory mitigation plan.

The Plan Permittees (Sacramento County, the City of Galt, the City of Rancho Cordova, the Sacramento County Water Agency, the Southeast Connector Joint Powers Authority, and the SSHCP Implementing Entity) are also seeking concurrent and parallel authorizations from federal and state regulatory agencies for customized, more efficient permitting approaches to address impacts to waters of the United States and waters of the state as a result of implementing future activities and projects (Covered Activities) permitted under the SSHCP's ESA and CESA Incidental Take Permits (ITPs).

Broadly, the SSHCP and ARP provide a framework for an improved process for projects (Covered Activities) to obtain environmental permits for impacts to federally and state-regulated species, natural communities, and aquatic resources, while ensuring a comprehensive watershed-based mitigation strategy that includes avoidance, minimization, establishment, re-establishment, and preservation of aquatic resources. Because so many of the SSHCP's Covered Species live part or all of their lives in water bodies, the Plan conserves wetland and stream habitats that are subject to regulation under Sections 404 and 401 of the federal Clean Water Act (CWA), California's Porter-Cologne Water Quality Control Act, and California Fish and Game Code Section 1600 et eq. pursuant to California's Lake and Streambed Alteration Program.

Aquatic resources identified in the SSHCP Plan Area include those regulated by the U.S. Army Corps of Engineers (USACE), the State Water Resources Control Board (SWRCB), Central Valley Regional Water Quality Control Board (Central Valley RWQCB), the California Department of Fish and Wildlife (CDFW), and local zoning and aquatic resource ordinances.

The ARP is a watershed-based plan developed to be synergistic with and will be implemented in conjunction with the SSHCP for the purpose of improving the protection and management of Plan Area aquatic resources with a watershed-level approach and with a better evaluation of cumulative impacts.

1.1.1 ARP Overview

The ARP is a local-jurisdiction based aquatic resources regulatory program, that further hopes to enable a new state and federal regulatory framework with increased efficiencies, within a regional conservation approach (as described in the SSHCP) for aquatic resources located within the Plan Area. This regional approach avoids and minimizes impacts to Plan Area aquatic resources, and will provide compensatory mitigation at a landscape level to protect a subset of largely intact watersheds in the Plan Area, including their aquatic resources. A primary goal of ARP implementation is to achieve an overall no net loss of aquatic resource functions and services in accordance with the USACE's and U.S. Environmental Protection Agency's (EPA's) 2008 Compensatory Mitigation Rule, *33 C.F.R. Parts 325 and 332, Compensatory Mitigation for Losses of Aquatic Resources: Final Rule* (Mitigation Rule). The ARP is directly tied to the SSHCP and designed to be fully integrated with the SSHCP. The SSHCP includes a mitigation strategy that is consistent with the CWA Sections 404 and 401 implementing regulations, in particular the Mitigation Rule, California Fish and Game Code Section 1600, and the Porter-Cologne Water Quality Control Act (Porter-Cologne).

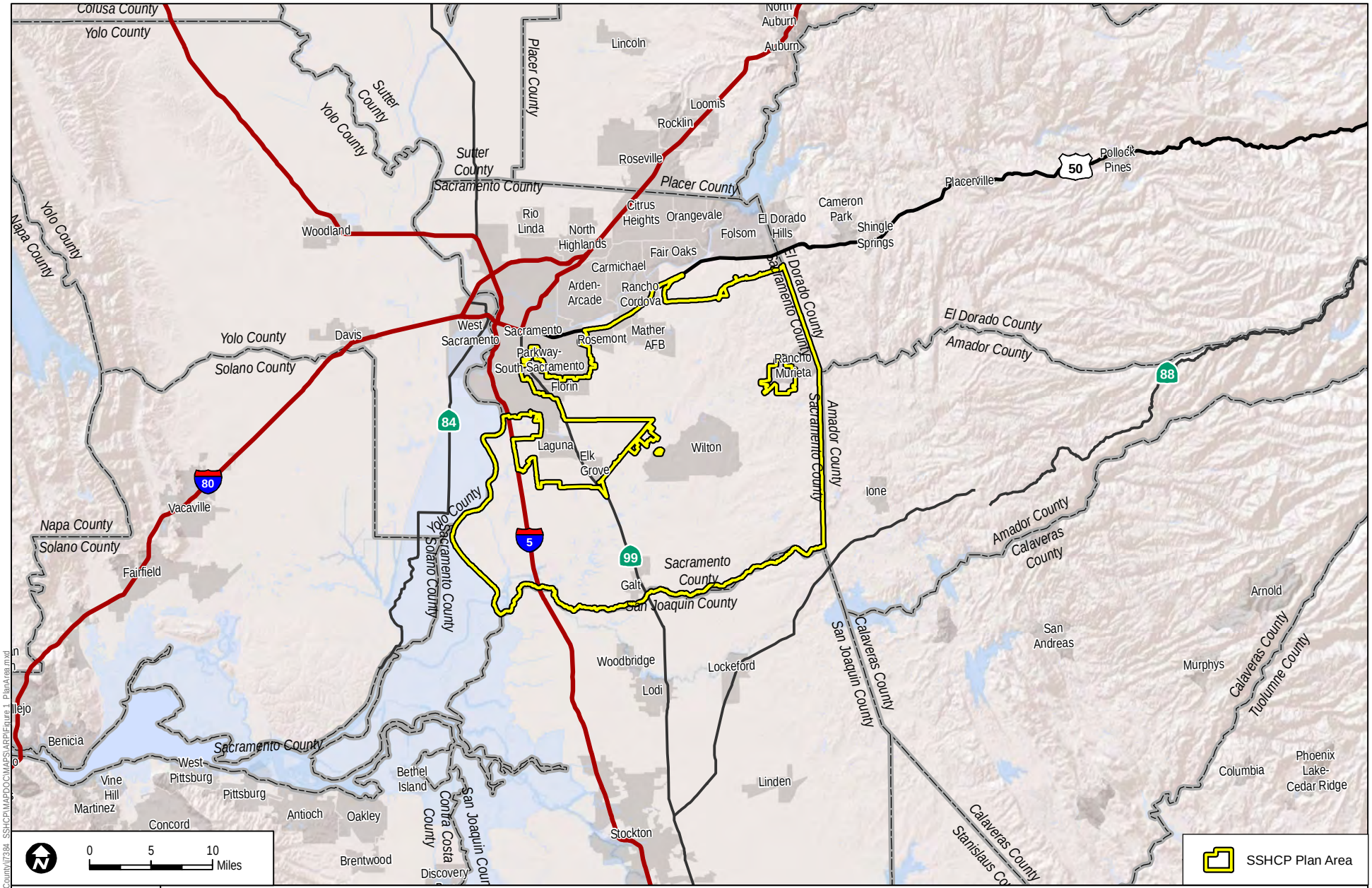


FIGURE 1

Plan Area

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 1_PlanArea.mxd

Draft SSHCP Aquatic Resources Program

INTENTIONALLY LEFT BLANK

The ARP proposes to implement a regional compensatory mitigation strategy that recognizes the abundance, diversity, and condition of the aquatic resources so better decisions for avoidance, re-establishment, establishment, and preservation of aquatic resources are determined. This mitigation strategy is consistent with and provides for the planned urban growth and development described in the approved General Plans for Sacramento County, Galt and Rancho Cordova, and together they would result in improved economic and environmental planning for the Plan Area. This balanced regional approach to development and aquatic resource conservation in south Sacramento County provides a greater level of landscape- and watershed-scale protection of aquatic resources than has generally occurred with the conventional project-by-project agency review and permitting under the CWA Sections 404 and 401, and the California Fish and Game Code 1600 programs.

The avoidance, minimization, compensatory mitigation requirements coupled with the more efficient permitting process described in the ARP are derived from the SSHCP. However, the ARP focuses on Plan Area aquatic resources specifically, and, in some areas, addresses them in greater detail than the SSHCP. The ARP additionally articulates a proposed local jurisdiction-based aquatic resources permitting program that would be implemented via ordinances and would be implemented synergistically with the SSHCP.

1.1.2 ARP Program Objectives

The Plan Permittees and key stakeholders propose to implement a local aquatic resources permitting program, and have also coordinated with federal and state resource agencies to develop processes with a set of broad program goals for SSHCP Covered Activities that would collectively achieve the following ARP program objectives:

- **Local Implementation:** Establish local ordinances for successful implementation of the SSHCP and ARP.
- **Local Permitting Program:** Establish a local program carried out by the Plan Permittees to ensure improved permitting efficiency for future SSHCP Covered Activities for CWA 404 permits, 401 certifications, and California Fish and Game Code 1600 agreements. Such efficiency will help the regulated public and resource agencies save time and money, and will facilitate a better decision-making processes at the landscape and project levels.
- **Predictability:** Create a standardized and predictable permitting process for future SSHCP Covered Activities. A regionally integrated process allows permitting consistency and a more environmentally effective decision-making process.

- **Fair and Equitable Decisions:** Create a predictable decision-making outcome based upon a comprehensive approach that incorporates regionally important factors better serves the regulated public.
- **Greater Ecological Benefits:** Implement ecologically effective, watershed-based aquatic resource mitigation and conservation to achieve more robust protection for aquatic resources in the Plan Area.

1.2 SSHCP Summary

To offset expected impacts of future planned development described in the General Plans , the SSHCP would provide a landscape-level approach to protection of important biological and ecological resources, including suitable Covered Species habitats such as wetlands, streams, riparian, natural upland land covers, and certain types of agricultural lands that have important wildlife habitat value for SSHCP Covered Species (e.g., certain croplands and irrigated pasture-grassland). The SSHCP would provide Covered Activities with ESA and CESA incidental take coverage for their impact to 28 Covered Species of plants and wildlife, and to 17 land cover types that provide suitable habitat for the 28 Covered Species. The SSHCP Conservation Strategy will preserve approximately 36,282 acres. Properties would be acquired for the Preserve System from willing sellers via avoidance, land transfers in lieu of fees, and fees collected for development of the conservation mitigation strategy for Covered Activities located largely within urbanized areas. The 36,282 acres of new conservation would add to the approximately 64,535 acres of existing conservation in the Plan Area, resulting in total conservation of approximately 100,817 acres.

The Plan Area includes 317,656 acres within south Sacramento County, including the Cities of Galt and Rancho Cordova (see Figure 1, Plan Area). The Plan Area is defined as the area in which all SSHCP conservation actions would be implemented and where all SSHCP Covered Activities would occur. The boundary of the Plan Area was defined using political and ecological factors. The geographical boundaries are U.S. Highway 50 to the north, the Sacramento River levee and County Road J11 to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and the San Joaquin County line to the south.

The Plan Area excludes the northern portion of Sacramento County, the City of Sacramento, the City of Elk Grove, the City of Folsom, the sovereign lands of the Miwok Tribe, and the Sacramento County community of Rancho Murieta. These areas were excluded from the Plan Area because they were either significantly built out, would not use the SSHCP, or were not likely to benefit from the SSHCP due to the absence of listed species or their habitats. The sovereign lands of the Miwok Tribe are not included as the tribe is not a proposed Plan Permittee.

A majority of development Covered Activities would occur within Sacramento County's Urban Services Boundary (USB). The USB is the limit to which urban services, such as public water

and sewer, would be provided; as such, it defines the "footprint" for urban development in Sacramento County. Development Covered Activities would also occur within the City limits of Galt and Rancho Cordova, and within the extra-territorial sphere of influence for the City of Galt. Together, the USB, the Galt and Rancho Cordova city limits, and the City of Galt's sphere of influence define the SSHCP Urban Development Area (UDA) (Figure 2). All urban development-related Covered Activities would occur within the UDA. Covered Activities outside the UDA are limited to a defined list of infrastructure projects (see Chapter 5 of the SSHCP), including specific rural transportation projects and specific water-related utilities (e.g., recycled water). See Chapter 6 of the SSHCP for a description of impacts to land covers and Covered Species resulting from Covered Activities.

The Plan Area is divided into two components: inside and outside of a UDA. Inside the UDA is where the planned development outlined in the General Plans (the SSHCP urban development Covered Activities) would occur. Consequently, most ground disturbance and associated species incidental take would occur inside the UDA. However, a limited amount of species incidental take is also requested for the specific infrastructure project Covered Activities and for preserve management Covered Activities proposed outside of the UDA. Under the SSHCP, natural resource preserves would be established in strategic locations within the Plan Area.

The UDA portion of the Plan Area totals 67,618 acres. Geographically, the UDA is the portion of the Sacramento County USB, the incorporated Cities of Rancho Cordova and Galt, and Galt's sphere of influence that are also within the Plan Area. The Plan Area outside of the UDA totals 250,038 acres.

To assist with development of the SSHCP Conservation Strategy, the Plan Area was further divided into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species habitat are present, and where habitat preservation is planned (Figure 3). These eight SSHCP PPUs are geographic subdivisions of the Plan Area designed to ensure that the SSHCP Biological Goals and Measurable Objectives (see Chapter 7 of the SSHCP) would be met for biological resources present in every part of the Plan Area.

1.3 ARP Purpose

The basic purpose of the ARP is to institute a locally based aquatic permitting program that is also anticipated to assist the Plan Permittees in complying with the requirements of federal, state, and local laws that protect aquatic resources. The ARP would be implemented locally using Aquatic Resources Protection Ordinances and would draw upon the comprehensive, landscape-, and project-level Conservation Strategy, as described in the SSHCP. The overall purpose of the ARP is to improve the protection of aquatic resources with a locally based, watershed-level approach and a better evaluation of individual and cumulative impacts. This strategy would benefit state and

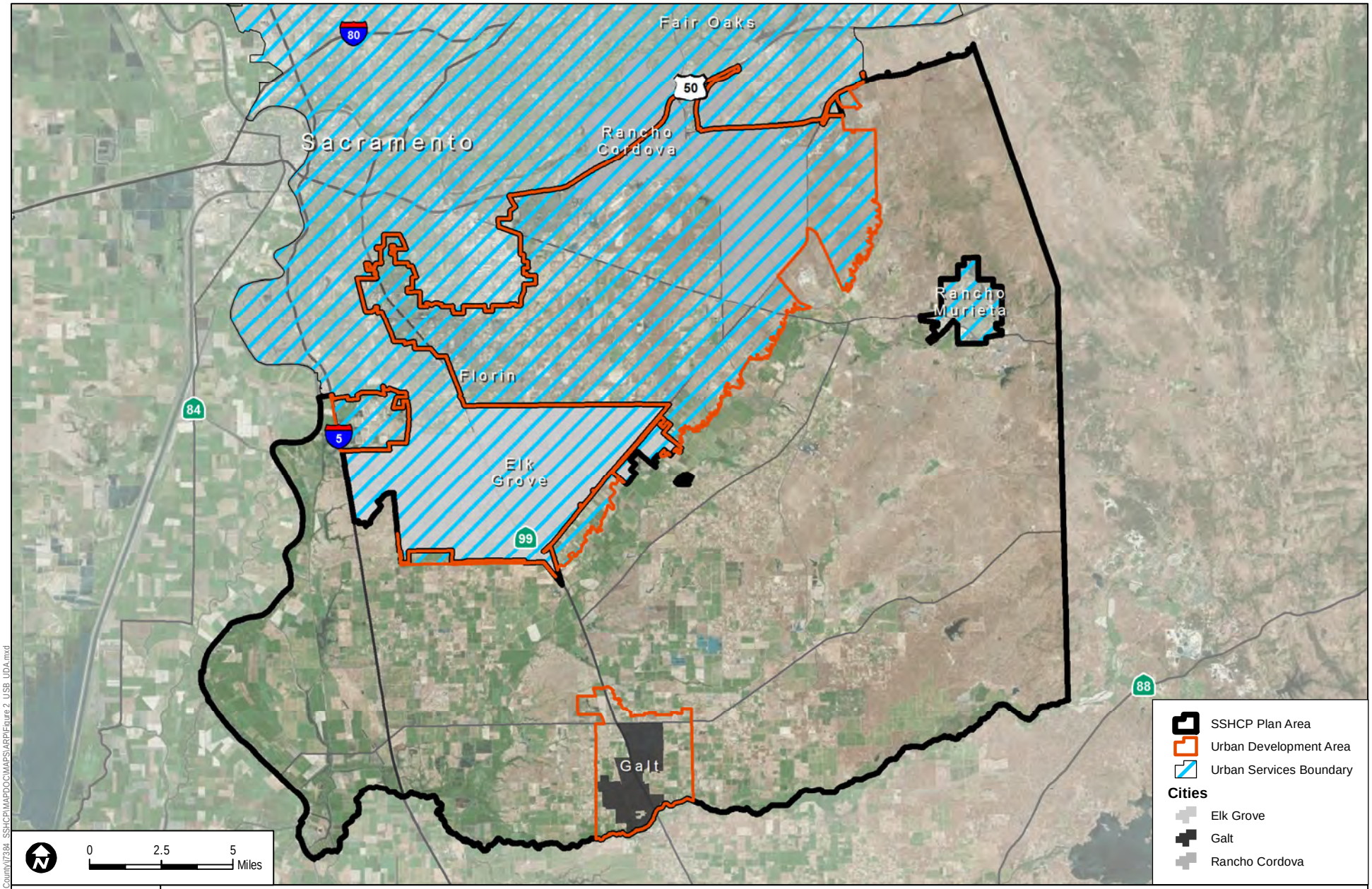
federal regulatory agencies by allowing for development of more efficient aquatic permitting processes, and the regulated public by streamlining permitting processes to allow a consolidated view of projected impacts and compensatory mitigation needs. This strategy also provides opportunities to accomplish greater environmental benefits than could be achieved via the conventional project-by-project review process.

The three Land Use Authority Permittees (the County of Sacramento and the Cities of Galt and Rancho Cordova), along with the SSHCP Implementing Entity (see Chapter 9 of the SSHCP), would administer the ARP. Incorporating aquatic resources protection into the environmental permit review process at the local level, closer to where project impacts occur, is expected to result in greater benefits to aquatic resources and regulatory efficiency.

The three SSHCP Land Use Authority Permittees and the Implementing Entity would establish a locally implemented permit process to administer the requirements set forth in the ARP, including review of applications for SSHCP Covered Activities that propose to impact aquatic resources in the Plan Area. They would do so by enacting Aquatic Resources Protection Ordinances. Compliance with the ARP and Aquatic Resources Protection Ordinances would be monitored, as described in Section 5.3.1.3 of the ARP, and in Chapter 8 of the SSHCP. Environmental review implemented at the local level would ensure compliance with established ordinances to protect aquatic resources in conjunction with local government aquatic resources protection policies (i.e., General Plan Policies) as part of the decision-making process (see Section 9.7 of the SSHCP).

Administration of the requirements set forth in the ARP and the Aquatic Resources Protection Ordinances would be implemented by one of the Land Use Authority Permittees or the Implementing Entity, depending on which of these governmental organizations has jurisdiction over a project. Jurisdiction over a project would be ceded to the Land Use Authority Permittee in which jurisdiction the project is being implemented. If a Land Use Authority Permittee does not have land use jurisdiction over a project (e.g., school district projects), then the Implementing Entity would take jurisdiction for purposes of administrating the ARP and Aquatic Resources Protection Ordinances.

In addition to describing the local aquatic resources permit program, the ARP describes the types, abundance, diversity, and condition of existing aquatic resources. It then identifies the anticipated impacts to those aquatic resources as a result of implementation of the SSHCP Covered Activities. The ARP uses a regional and local conservation strategy administered with federal, state, and local permitting agencies to improve the protection of aquatic resources within the Plan Area.



SOURCE: Bing Maps, County of Sacramento 2014

FIGURE 2

Urban Services Boundary and Urban Development Area

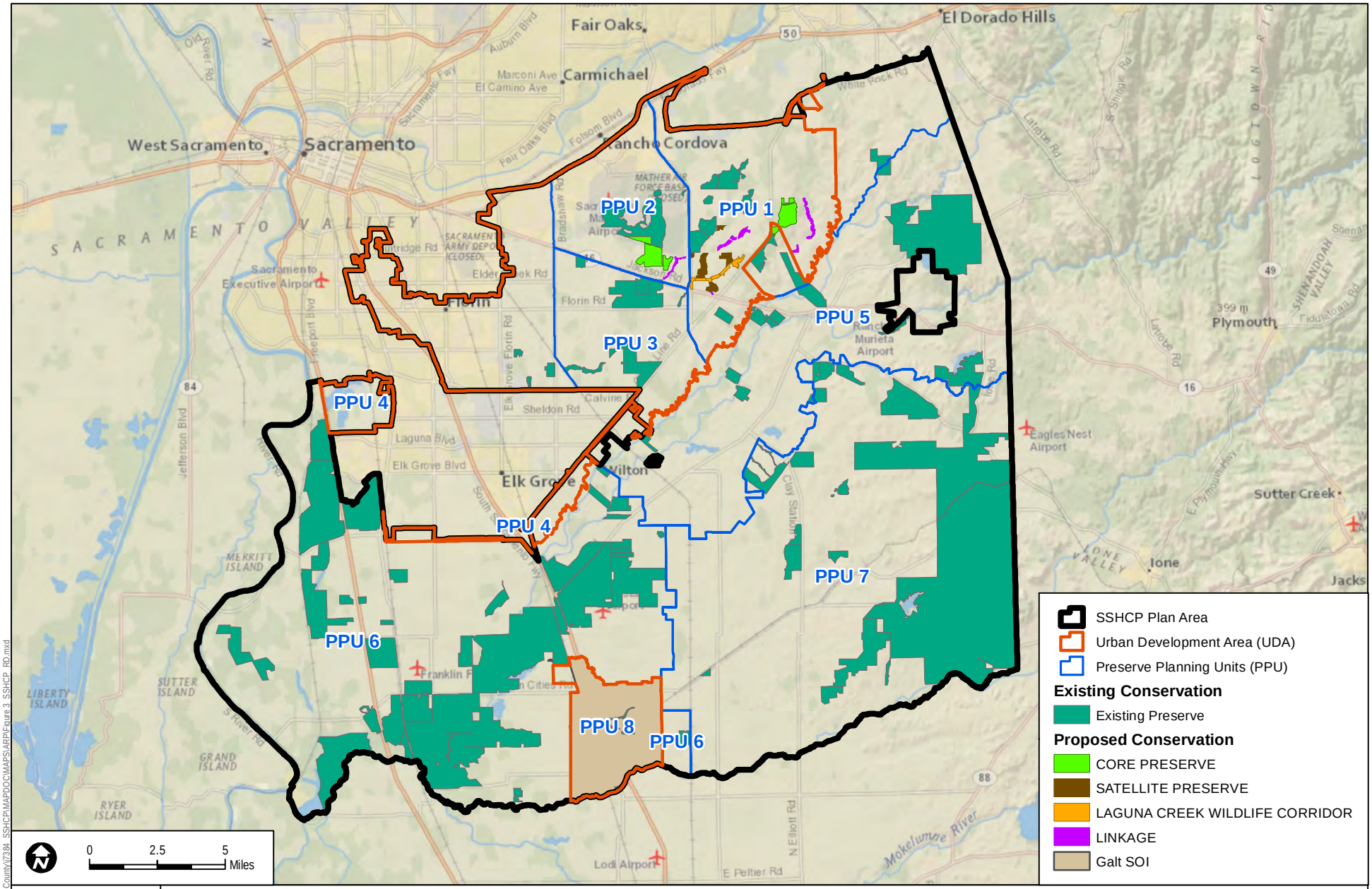
SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\V7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 2_USB_UDA.mxd

Draft SSHCP Aquatic Resources Program

INTENTIONALLY LEFT BLANK



SOURCE: ESRI 2015, County of Sacramento 2014

FIGURE 3

Reserve Design Map

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\r7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 3_SSHCP_RD.mxd

INTENTIONALLY LEFT BLANK

1.4 Relationship of ARP to the SSHCP

The ARP was developed in conjunction with the SSHCP to develop AMMs and compensatory mitigation requirements that meet or exceed the CWA and State of California Lake and Streambed Alteration Agreement Program mandates, and implement these standards in a local aquatic resources permit program. The ARP relies on (and is fully consistent with) the conservation plan of the SSHCP, including (1) Covered Activities that would use the ARP, (2) AMMs fully consistent with those of the SSHCP to avoid and reduce direct and indirect adverse impacts to aquatic habitats, (3) impacts analysis, and (4) mitigation for aquatic resources (e.g., the Conceptual SSHCP Preserve System, and proposed in-lieu fee (ILF) program). The ARP refers to SSHCP sections that describe or analyze aquatic resources, rather than re-stating facts and/or processes from the SSHCP. Thus, the synergistic relationship of the ARP to the SSHCP Conservation Strategy benefits Plan Area native plant and animal species and their habitats by providing a more effective strategy of protection of aquatic resources located within the SSHCP Plan Area. Together, the ARP and SSHCP would result in a comprehensive Conservation Strategy for conservation of all native plant and wildlife species of the Plan Area, including 28 special-status species of plants and wildlife, including 10 that are currently listed as threatened or endangered under the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA).

The list of SSHCP Covered Species can be found in SSHCP Chapter 1 (Table 1-2). SSHCP Chapter 5 describes the Covered Activities and conditions that would be required during Covered Activity implementation to avoid, minimize, or mitigate Covered Activity impacts to Plan Area natural communities, aquatic resources, and each Covered Species. The SSHCP Conservation Strategy includes Biological Goals and Measureable Objectives for the operational SSHCP at the landscape, natural community, and Covered Species levels (SSHCP Chapter 7, Table 7-1). The ARP focuses on the SSHCP Covered Activities that could impact aquatic resources of the Plan Area.

The Permittees developed the ARP to apply the SSHCP's standards and procedures in an integrated aquatic resources permitting process that is guided by local ordinance. The SSHCP includes a mitigation program that will achieve the SSHCP Biological Goals and Measureable Objectives for the Plan Area aquatic resources (see SSHCP Chapter 7). Together, the ARP and SSHCP provide the Plan Permittees, third-party project proponents, and resource agencies with a comprehensive regional approach to natural resource conservation and project permitting (see SSHCP Chapter 1 for details).

The ARP and the SSHCP are synergistic. The SSHCP minimizes and mitigates for impacts to Covered Species suitable habitat, including aquatic natural communities and their associated uplands, and provides for the conservation and management of aquatic natural communities at a

landscape-level and community-level scale. The ARP provides a programmatic approach for Plan Permittees and third-party project proponents to obtain permits for Covered Activity impacts to aquatic resources. The approach results in a more efficient process for issuing state and federal permits for Covered Activity impacts to aquatic resources, while maintaining a robust conservation strategy that includes required avoidance, minimization, and compensatory mitigation. Where it is determined that Covered Activity impacts to aquatic resources are unavoidable, and after all required SSHCP AMMs have been incorporated into the Covered Activity project, compensatory mitigation would be required. The aquatic resource mitigation requirements outlined in the ARP are integral to achieving many of the SSHCP Biological Goals and Measurable Objectives (see SSHCP Chapter 7).

The ARP would expedite permitting of Covered Activities that may impact aquatic resources within the Plan Area. The ARP describes the type, diversity, abundance, and condition of aquatic resources in the Plan Area and describes a Covered Activity permitting process that includes measures to avoid and minimize impacts to aquatic resources; and when impacts to aquatic resources cannot be avoided, the ARP provides an aquatic resources compensatory mitigation strategy that is consistent with and would be implemented synergistically with the SSHCP mitigation and conservation strategy.

2 AQUATIC RESOURCES PERMITTING OVERVIEW

2.1 Regulatory Framework

The ARP is designed to be a local-jurisdiction-based aquatic resources permitting program that demonstrates consistency with the SSHCP's regulatory framework for Covered Activity impacts under the CESA and ESA. The ARP is also intended to be consistent with and either meet or exceed the requirements of Sections 404 and 401 of the federal CWA and Porter-Cologne. The ARP is also written to be consistent with California Fish and Game Code Sections 1600–1616 (Lake or Streambed Alteration Agreement). Together, the ARP and SSHCP would result in a comprehensive Conservation Strategy for the conservation of aquatic resources, natural communities, native species, and 28 species of plants and wildlife within the Plan Area, including 10 that are listed as threatened or endangered under the federal ESA, CESA, or both, in the Plan Area. Chapter 1 of the SSHCP provides an overview of the regulatory framework.

2.2 Local Aquatic Resources Permitting Program Overview

A local-jurisdiction-based permit program (as mentioned above and described in greater detail in Section 7 of this document) is intended to serve as a program/document that federal and state regulatory agencies (e.g., USACE, Central Valley RWQCB, CDFW) can rely upon to develop complementary and efficient permitting approaches representative of their jurisdictional mandates (e.g., CWA Section 404). The ARP is designed to demonstrate consistency with the requirements of these regulatory agencies by protecting aquatic resources using a comprehensive, long-term watershed approach. This would allow the ARP to enact more efficient permitting timelines as well as to improve the protection and management of aquatic resources in the Plan Area.

The local jurisdiction based permit program would be established via a local aquatic resources protection ordinance that would require a project applicant who is impacting aquatic resources within the SSHCP Plan Area to acquire an Aquatic Resources Impact Permit form a local Land Use Authority Permittee. Each Land Use Authority Permittee that is participating in the SSHCP (Sacramento County, City of Rancho Cordova, and City of Galt) would be required to adopt aquatic resources protection ordnances. Locally based permit programs will be developed to occur concurrently with the SSHCP permitting process as well as with local entitlement permitting processes required by Land Use Authority Permittees. A detailed description of the aquatic resources permitting process and the application requirements is included in Section 7 of this document.

Under the currently implemented project-by-project aquatic permit review approach, the regulatory agencies have fewer opportunities to evaluate impacts or compensatory mitigation on a regional scale; thus, often have difficulty addressing aquatic resource impacts in a comprehensive manner. The ARP offers an opportunity to integrate local land use planning with aquatic resource protection,

which is expected to improve aquatic resources protection in a coordinated fashion, on a regional scale, and with greater certainty for the Plan Permittees.

The ARP's local aquatic permitting program would be implemented through Aquatic Resources Protection Ordinances adopted by the County of Sacramento and the Cities of Galt and Rancho Cordova, whereby the Land Use Authority Permittees and the Implementing Entity would have a standardized and integrated permitting review process established for Covered Activities implemented in the Plan Area (see ARP Chapter 8). The Aquatic Resources Protection Ordinances would incorporate AMMs, as described in SSHCP Section 5.4, which are equal to or stronger than those historically required by federal and state regulatory agencies on a conventional project-by-project basis. In this way, the ARP and Aquatic Resources Protection Ordinances would lead to consistent and robust aquatic resource protection measures.

For Covered Activities that comply with the requirements of the ARP and the SSHCP, and which require environmental permits from the regulatory agencies, the ARP would provide the opportunity for a fully integrated regulatory approach, by, as described above, providing a local program upon which state and federal aquatic resource programs could develop programmatic and complementary approaches to streamline their permitting processes. The approach would establish clear permitting procedures, along with reasonable timelines for review. The permitting procedures would thereby increase efficiency for the Plan Permittees and for the regulatory agencies.

2.3 Associated State and Federal Aquatic Resources Permits/Approvals

The ARP and the Aquatic Resources Protection Ordinances are intended to be consistent with the following federal and state regulations. The following programs have also been coordinating with the Plan Partners for an extended period of time, including working as cooperating agencies on NEPA and CEQA compliance documents for the SSHCP. As such, while the ARP cannot dictate the final decisions that state and federal agencies may make concerning their own aquatic permit approaches that can align with the locally based program, it has been developed in close coordination with the state and federal agency programs in order to optimize its consistency and ability to serve as a basis for a suite of complementary state and federal aquatic permitting approaches.

2.3.1 Clean Water Act Section 404

Section 404 of the CWA regulates discharge of dredged or fill material into "waters of the United States." The USACE and the EPA administer Section 404 of the CWA. Waters of the United States regulated under Section 404 of the CWA are identified in USACE regulations at 33 CFR 328.3. In

addition to streams and other waters of the United States with an ordinary high-water mark (OHWM), the definition of waters of the United States includes wetlands. Wetlands are defined as areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 (7)(b)).

The USACE evaluates two types of permits under Section 404 of the CWA: general permits (nationwide, regional, and programmatic) and individual permits (letters of permission and standard permits). General permits are issued by the USACE on a nationwide or regional basis for a category or categories of activities when (1) those activities are substantially similar in nature and cause only minimal individual and cumulative environmental impact; or (2) the general permit would result in avoiding unnecessary duplication of the regulatory control exercised by another federal, state, or local agency provided it has been determined that the environmental consequences of the action are individually and cumulatively minimal (33 CFR 322.2(f)). Individual permits are evaluated on a case-by-case basis for activities that do not qualify for a general permit (i.e., that may have more than a minimal adverse environmental impact).

The USACE intends to use the ARP and Aquatic Resources Protection Ordinances in the development of a Section 404 CWA permitting strategy for SSHCP Covered Activities (see SSHCP Environmental Impact Statement/Environmental Impact Report [EIS/EIR], Appendix C). The strategy could potentially include a Programmatic General Permit (PGP) based on the ARP and/or a Regional General Permit (RGP) for Covered Activities that have no more than minimal impacts on the aquatic environment; a Letter of Permission (LOP) procedure for Covered Activities with impacts that meet certain requirements/thresholds and are more than minimal but would have less-than-significant impacts to waters of the U.S.; and an abbreviated Standard Permit (SP) procedure for other Covered Activities that exceed the LOP threshold and/or may have significant adverse impacts to waters of the U.S., but otherwise comply with the requirements of the ARP and SSHCP.

2.3.2 California Fish and Game Code/Section 1600 Master or Long-Term Streambed Alteration Agreement

Section 1600 of the California Fish and Game Code requires that a Streambed Alteration Application be submitted to the CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW reviews the proposed actions and, if necessary, submits to the applicant a proposal for measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the applicant is a Lake or Streambed Alteration Agreement (LSA). Covered Activities that require an LSA may also require a permit from the USACE under Section 404 of the CWA. In these instances, the conditions of the CWA Section 404 permit and the LSA may overlap.

The ARP describes how the local Land Use Authority Permittees (County of Sacramento and Cities of Rancho Cordova and Galt) and the Implementing Entity would work with CDFW to develop a streamlined process for review of notifications of Lake or Streambed Alteration and, if applicable, issue Master Streambed Alteration Agreements (MSAA) or Routine Maintenance Agreements for future SSHCP Covered Activities to be implemented by a local Land Use Authority Permittee. Under the MSAA, a local Land Use Authority Permittee implementing a Covered Activity must submit a notification of streambed alteration to CDFW before construction. The notification requires an application fee for Streambed Alteration Agreements, with a specific fee schedule to be determined by CDFW.

For all other SSHCP Covered Activities that need a Streambed Alteration Agreement, the ARP would serve to quicken CDFW review by requiring projects' incorporation and compliance with the ARP's AMMs and the SSHCP conservation measures.

2.3.3 Clean Water Act Section 401 Porter-Cologne Act/Waste Discharge

Section 401 of the CWA requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification that the discharge would comply with the state's applicable effluent limitations and water quality standards. In California, the RWQCB where the dredge or fill activity occurs administers CWA Section 401 requirements. For dredge or fill activities that occur in more than one RWQCB, the SWRCB administers CWA Section 401 requirements.

Porter-Cologne is California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater. Porter-Cologne grants the SWRCB and the RWQCBs' power to protect water quality. Porter-Cologne grants the SWRCB and the RWQCBs' authority to adopt plans and policies, to regulate discharges of waste to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. Covered Activities that require a CWA Section 401 water quality certification, a CWA Section 404 permit, and/or a SAA may also require a report of waste discharge.

The ARP would facilitate the Central Valley RWQCB's development of water quality certification strategies, in conjunction with USACE's development of a CWA Section 404 permitting strategy for the Plan Area.

3 AQUATIC RESOURCES IN THE PLAN AREA

The status of existing aquatic resources in the Plan Area can be described in terms of the aquatic resources' diversity, abundance, and condition. Diversity is described in terms of the variety of aquatic resources by SSHCP land cover type (common name) and Cowardin class. Abundance is described in terms of acreage of each aquatic resource type within the Plan Area and per watershed (at the Hydrologic Unit Code [HUC]-10 level). Condition is described using a landscape-level functional assessment to determine the relative capacity of aquatic resources to perform various functions and services related to hydrology, water quality, and habitat.

3.1 Diversity and Abundance of Aquatic Resources in the Plan Area

The SSHCP and ARP impact analyses and Conservation Strategy are based upon land cover type mapping of the Plan Area. Land cover type classification is based upon the California Natural Communities classification system developed by CDFW (Sawyer and Keeler-Wolf 1995) and consists of polygons, or non-linear resources. Chapter 3 of the SSHCP provides further detail for the land cover type definitions and mapping methods. The land cover types described in the ARP are identical to the land cover types described in the SSHCP. Land cover types in the Plan Area were identified and classified through interpretation of signatures of major vegetation and physical characteristics discernible on aerial photography. This information was refined through ground-truthing.

Ten of the land cover types mapped in the Plan Area are composed of or contain aquatic features and, for purposes of this analysis, are considered potential jurisdictional aquatic resources (see Table 3-1 in Chapter 3 of the SSHCP). The definition of these land cover types and classifications of land cover types as interpreted by the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) are included below. This planning-level inventory of aquatic resources was mapped to be fully inclusive of all areas that could potentially be waters of the United States and waters of the state. As such, the acreages mapped as potentially jurisdictional are likely to be larger than the actual extent of waters of the United States and waters of the state. Exact extents of waters of the United States and waters of the state would be delineated and the mapping verified by the regulatory agencies for individual Covered Activities brought forth under the SSHCP ITPs.

3.1.1 Types of Wetland Waters

Vernal Pool Land Cover (Cowardin: Palustrine, Emergent Wetland, Nonpersistent)

Vernal Pools are a type of seasonal wetland that is characterized by a specific set of physical parameters and a unique assemblage of highly specialized endemic plants and animals that are adapted to the annual cycle of winter inundation and summer drought. The most important

feature of Vernal Pools is a distinct wet/dry hydrologic regime. Vernal Pools generally occur in complexes of interconnected pools either by swales, described below, or through a perched aquifer that exists between the soil surface and the sub-surface restricting layer or both.

All Vernal Pools may appear to be similar, yet each pool may exhibit different hydrologic behavior. In some Vernal Pool habitats, clay soils keep most water on or near the surface, so Vernal Pools receive nearly all of their water due to direct precipitation and are maintained by surface flows. In these sites, smaller and shallower pools dry quickly due to evapo-transpiration (Williamson et al. 2005). In other Vernal Pool habitats, the smaller and shallower Vernal Pools can be buffered against evapo-transpiration loss by perched aquifers (Williamson et al. 2005; Rains at al. 2006). The ecology of Vernal Pools located on duripan or claypan soils in the Central Valley appear to be supported by perched aquifers (Rains et al. 2006). In these soils, a sub-surface hydrologic restricting layer has formed preventing percolation of water into the groundwater aquifer and creates the sub-surface perched aquifer. In these soils and hydrologic conditions, seasonal surface water and perched groundwater hydrologically connect uplands, vernal pools, and streams at the catchment scale. Perched groundwater discharges from uplands to vernal pools thereby stabilizes the pools and causes them to remain inundated for longer periods than would be the case if they were recharged only by precipitation. The greater watershed can supply as much as 60% or more of the water needed to fill pools to the margin; however, individual Vernal Pools can display markedly different hydrology due to variations in topography and soil properties near each pool (Williamson et al. 2005; O'Geen et al. 2008; Leibowitz and Brooks 2008). Whether a Vernal Pool system is a direct-precipitation surface water overland flow driven (e.g., clay soil pools) or is a perched aquifer/surface flow system (e.g., duripan/claypan soil pools) also greatly influences water chemistry in vernal pools and seasonal wetlands (Rains et al. 2008; O'Driscoll and Parizek 2008).

Water chemistry and related abiotic factors have been shown to influence aquatic flora and fauna biodiversity and abundance (Kneitel and Lessin 2010; Lessin 2010; Poirier 2012), although the degree to which such changes affect vernal pools is poorly understood because the fundamental hydrogeological characteristics of perched aquifers remain relatively unexplored (Rains et al. 2006). It is possible that remnant Vernal Pools within altered landscapes, or higher densities of re-established or established Vernal Pools, may not have adequate surface and/or subsurface flows to adequately function as suitable habitat for certain species. Alternatively, the abiotic habitat components such as water chemistry, which is mediated by transport through subsurface and surface flows, may alter the suitability of the habitat to support tadpole shrimp if anthropogenic activities significantly affect upland watersheds (Rains et al. 2008). For example, truncating the upland watershed of a perched aquifer vernal pool system may convert the system from a perched aquifer/surface flow system to a direct precipitation surface water overland flow system, which may function similarly from a hydroperiod perspective but may be fundamentally altered from an abiotic water chemistry perspective. The vernal pools in the Plan Area are all perched

aquifer/surface flow type pools that are supported by sub-surface hydrology. Therefore, the hydrologic regime of Vernal Pools in the Plan Area is mediated by the interaction between the pool and the surrounding uplands that support the perched aquifer. The majority of Vernal Pools occurring within the Plan Area are largely supported by sub-surface perched aquifer hydrology. Factors affecting Vernal Pools are further discussed in SSHCP Chapters 2, Physical Setting; 3, Biological Resources Setting; and 6, Effects Analysis.

Vernal Pools in the Plan Area exhibit a variety of size and pool depth. Appendix B-1 describes the variation in Plan Area Vernal Pool complexes in greater detail. Approximately 4,537 acres of Vernal Pools have been identified within the Plan Area. Key physical parameters include landform, drainage area, geologic formation, slope, soil type, structure and depth, pool size and depth, timing of the hydrologic cycle, and pool interconnectivity. Different geologic formations in the Plan Area (see SSHCP Chapter 2) and their associated soils exhibit different propensities for the development of Vernal Pools (Keeley and Zedler 1998; Holland and Dains 1990; Metz 2001) and Vernal Pool physical parameters appear to vary by soil type. Various geological formations support characteristic Vernal Pool types that differ in fundamental physical and biological ways between geologic formations in a given region (Holland and Dains 1990; Smith and Verrill 1998, Platenkamp 1998; Metz 2001; Vollmar 2002; Helm and Vollmar 2002; Laabs et al. 2002; Dittes and Guardino 2002).

As discussed in SSHCP Chapter 3, the particular plant and animal species present in Vernal Pools vary based on physical, chemical, biologic and hydrologic parameters. In particular, several SSHCP Covered Species generally require large, deep pools that are long lasting to successfully complete their life cycles, including Boggs Lake hedge-hyssop (*Gratiola heterosepala)*, Sacramento and slender Orcutt grasses (*Orcuttia viscida* and *O. tenuis*), vernal pool tadpole shrimp (*Lepidurus packardi*), California tiger salamander (*Ambystoma californiense*), and western spadefoot (*Spea hammondii*). Other vernal pool Covered Species occur in and around small to medium-sized pools, or the more "flashy" pools that dry out relatively quickly and may inundate and dry several times during the wet season, such as Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*), dwarf downingia (*Downingia pusilla*), and pincushion navarretia (*Navarretia myersii*). For some plants in the latter category, the edges of larger Vernal Pools may provide conditions equivalent to small, flashy pools. The SSHCP Covered Species include two amphibian, four invertebrate, and seven plant Covered Species that depend on Vernal Pools (see SSHCP Table 3-2).

Seasonal Wetland Land Cover (Cowardin: Palustrine, Emergent Wetland, Nonpersistent)

Seasonal Wetlands are wetlands that saturate and/or pond for variable periods during a portion of the year, generally the rainy winter season, then dry relatively slowly, typically in the summer and early fall. Seasonal Wetlands tend to occur within moderate to large-sized depressional

features in valley grassland; along streams, creeks, and rivers; and along the edges of open water. Seasonal Wetlands are often characterized by herbaceous annual and perennial species, such as curly dock (*Rumex crispus*) and bulrush (*Scirpus* spp.).

Seasonal Wetlands provide habitat for some Covered Species (SSHCP Table 3-2). The SSHCP does not consider Seasonal Wetlands to be suitable habitat for the vernal pool invertebrate Covered Species. However, as discussed in SSHCP Section 3.4, Seasonal Wetlands do provide habitat for California tiger salamander, western spadefoot, Boggs lake hedge-hyssop, legenere (*Legenere limosa*), and Sanford's arrowhead (*Sagittaria sanfordii*). Other Covered Species that use seasonal wetland land cover as habitat are giant garter snake (*Thamnophis gigas*), all of the bird Covered Species except Cooper's hawk (*Accipiter cooperii;* mostly as foraging habitat), American badger (*Taxidea taxus*), and the three covered bat species. There are approximately 2,600 acres of Seasonal Wetlands mapped within the SSHCP Plan Area.

Swale Land Cover (Cowardin: Riverine, Intermittent, Nontidal)

Swales are shallow seasonal drainages typically found in flat to gently rolling valley grassland in association with vernal pool complexes on soils with an impermeable claypan or hardpan layer. Swales convey runoff as broad gently sloping ephemeral drainages during, and for short periods after, winter rainstorms. Swales are often associated with vernal pools and can provide conduits between vernal pools for movement of covered vernal pool plant and animal propagules (seeds, cysts, eggs, and spores) and adult California tiger salamanders and western spadefoots. Swales support several native plants commonly found in vernal pools. Swales also often include smaller shallow vernal pool riverine features that compose the headwaters of ephemeral tributaries within the Plan Area. The Plan Area includes approximately 1,252 acres of Swale.

Swales provide suitable habitat for portions or all of the life cycle of many of the Covered Species that occur in the vernal pool land cover type, including Ahart's dwarf rush, dwarf downingia, pincushion navarretia, mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp, Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*), and western spadefoot. In addition, all of the bird Covered Species (except Cooper's hawk and greater sandhill crane (*Grus canadensis*)) would use Swale land cover as foraging habitat, along with the American badger, and the three bat Covered Species (SSHCP Table 3-2).

Freshwater Marsh Land Cover (Cowardin: Palustrine, Emergent Wetland, Persistent)

The Freshwater Marsh land cover type is defined by herbaceous wetlands occurring along rivers, streams, lakes, and other linear or open bodies of water that are dominated by emergent hydrophytic (water-loving) plants such as grasses, reeds, rushes, and sedges (Kramer 1988).

Freshwater Marshes are typically perennial wetlands, but may dry out for short periods. Freshwater Marshes vary in size from small clumps to vast areas covering several kilometers (Kramer 1988). On the upper margins of this habitat, saturated or periodically flooded soils support several moist soil plant species, including big-leaf sedge (*Carex amplifolia*), Baltic rush (*Juncus balticus*), redroot flatsedge (*Cyperus erythrorhizos*), nutgrass (*Cyperus rotundus*), and on more alkali sites, saltgrass (*Distichlis spicata*). On wetter sites, common cattail (*Typha* spp.), bulrushes, and arrowhead (*Sagittaria* spp.) are potential dominant species.

Most of California's Freshwater Marshes occur in the Sacramento Valley and the San Joaquin Delta regions. Approximately 2,954 acres of freshwater marsh are mapped within the Plan Area. The majority of Freshwater Marsh in the Plan Area occurs along the perennial Cosumnes River and Deer Creek and along the margins of open water in the southeastern portion of the Plan Area in PPU 6. Freshwater Marsh is important habitat for western pond turtle, giant garter snake, and tricolored blackbird (*Agelaius tricolor*) (SSHCP Table 3-2).

Riparian Land Covers (Cowardin: Palustrine, Forested or Scrub/Shrub Wetland)

While "riparian" has various definitions, the SSHCP uses the National Research Council's 2002 definition: "Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas in the Plan Area are adjacent to perennial, intermittent and ephemeral streams, lakes" (NRC 2002). The ARP assumes that riparian areas are aquatic resources so that the broadest suite of potential aquatic resources in the Plan Area are conserved.

Riparian ecosystems are highly dependent on landscape setting and numerous physical and biotic interactions. Riparian ecosystems provide essential foraging, shelter, and breeding habitat for several of the Covered Species and other native plant and animal species, including both resident and migratory species. SSHCP Covered Species that strongly depend on riparian land covers and often associated stream/creek land covers for at least some critical phase of their life history include valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), giant garter snake, western pond turtle, Cooper's hawk, Swainson's hawk (*Buteo swainsonii*), white-tailed kite (*Elanus leucurus*), pallid bat (*Antrozous pallidus*), western red bat (*Lasiurus blossevillii*), and Yuma myotis bat (*Myotis yumanensis*).

Over the last 150 years, there have been substantial anthropogenic alterations of streams and creeks that support riparian habitat in the Central Valley related to agriculture, rangeland use, and urban development (Katibah 1984), including straightening and deepening of channels;

construction of levees, dams, and other impoundments; riprap and concrete walls; vegetation clearing; and other alterations (see SSHCP Chapter 2). These alterations have adversely affected many riparian functions by isolating active stream and creek channels from their floodplains, altering natural flow patterns (e.g., timing and amount), and disrupting many other dynamic physical processes, such as groundwater recharge and sediment transport, scouring, and deposition that affect the fluvial dynamics of the system, including growth and distribution of riparian vegetation. In the Plan Area, these alterations may be expressed as small patches of riparian vegetation, usually as small clusters of trees and shrubs, or just a thin strip of riparian vegetation that is only one or two trees wide. In the eastern portion of the Plan Area (PPU 6 and PPU 8 in Figure 3), there are cottonwoods in some streamside locations, while along other streams, there is little riparian woodland vegetation. Streams flowing through vernal pool and valley grassland land covers in PPUs 1, 2, 3, 5, and 7 often exhibit little difference in vegetation between the riparian zone along the stream and the adjacent uplands; in some cases, there is just patchy distribution of mixed riparian scrub. Some streams in the urban areas of PPUs 3 and 4 are bounded by concrete walls and support no riparian vegetation, while others have narrow undeveloped riparian zones with a mix of trees, grasses, vernal pools, and seasonal wetlands (see SSHCP Chapter 2).

The SSHCP has identified three riparian land cover types totaling approximately 7,952 acres or 2.5% of the Plan Area: Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland.

The Mine Tailing Riparian Woodland land cover type is distributed among older mine tailings. This land cover type contains species commonly found in riparian woodlands and riparian scrub habitats, such as Fremont cottonwood (*Populus fremontii*), blue elderberry (*Sambucus mexicana*), willow (*Salix* spp.), and coyote-brush (*Baccharis pilularis*). In the Plan Area, this land cover type can also intergrade with Mixed Riparian Forest along bodies of water.

Mixed Riparian Scrub land cover type is interspersed with Mixed Riparian Woodlands in the floodplains of waterways throughout Sacramento County. In the Plan Area, this land cover type consists of an open to dense shrubby thicket dominated by a mixture of sandbar willow (*Salix exigua*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), and immature stands of mixed riparian woodland tree species (see description below). This plant community can also be a subcanopy community in Mixed Riparian Woodlands. Though dense stands of riparian scrub in the Plan Area typically lack an understory, some of the more open canopy mixed riparian scrub stands do support an understory of native and non-native species, including wild rose (*Rosa californica*), wild grape (*Vitis californica*), perennial pepperweed (*Lepidium latifolium*), Himalayan blackberry (*Rubus discolor*), curly dock, and various non-native grasses.

The Mixed Riparian Woodland land cover type is distinguishable by an open canopy layer dominated by tall Fremont cottonwood trees. Beneath this open layer, a moderately dense mid-

canopy layer is composed of tree species such as Oregon ash (*Fraxinus latifolia*), Goodding's willow (*Salix gooddingii*), California black walnut (*Juglans californica* var. *hindsii*), valley oak (*Quercus lobata*), and box elder (*Acer negundo*). In some areas, a subcanopy of dense riparian scrub dominated by willow species, including arroyo willow and sandbar willow, is present. A discontinuous shrub layer is also present, particularly along the northern boundary of the Plan Area, and includes species such as blue elderberry, Himalayan blackberry, coyote-brush, wild rose, and wild grape. The understory is sparsely to densely vegetated with herbaceous species. Invasive weeds that have colonized portions of the mixed riparian woodland in the Plan Area include tamarisk (*Tamarix* spp.) and giant reed (*Arundo donax*).

Riparian land covers are associated with Plan Area streams and creeks (see SSHCP Section 3.2.1) and typically occur in the zone between the active stream channel mapped as streams/creeks and adjacent upland land covers.

The best-developed existing Riparian systems in the Plan Area are outside the UDA in PPU 6 along the parallel Cosumnes River and Deer Creek that run from the northeast to the southwest (Figure 3). In many areas, the Cosumnes River riparian woodland is relatively wide and is characterized by a multi-canopy structure, including a mix of cottonwood, sycamore, and valley oaks; a shrub layer of narrow-leaf willow (*Salix exigua*), California and Himalayan blackberry, and wild grape; and an understory layer of grasses, forbs, and sedges. This species and structural diversity provides suitable habitat for a rich diversity of wildlife, including several Covered Species.

Besides the Riparian land cover along the Cosumnes River and Deer Creek, the other main concentrations of Riparian land cover in the Plan Area are approximately 219 acres of Mine Tailing Riparian Woodland in the northern portion of the Plan Area (PPU 1) and approximately 345 acres of Mine Tailing Riparian Woodland just south of the Cosumnes River in the eastern portion of the Plan Area (north portion of PPU 7). The document treats Mine Tailing Riparian Woodland land cover as an aquatic resource.

3.1.2 Types of Non-Wetland Waters

Open Water Land Cover (Cowardin: Riverine and Limnetic, Unconsolidated Bottom, Nontidal)

The Open Water land cover type includes perennial or seasonal features, such as natural or manmade ponds, lakes, and reservoirs. Open Waters may contain either no vegetation, or non-rooted aquatic vegetation, such as algae, floating pondweeds, and other plants. Along shorelines, rooted, emergent vegetation may occur, forming freshwater marsh. Like freshwater marsh, open water habitats are used by numerous bird, mammal, amphibian, and reptile species, including several Covered Species, such as western pond turtle and giant garter snake. The marshy shorelines may be used by tricolored blackbird for nesting colonies (SSHCP Table 3-2).

Open Water habitat is found throughout the SSHCP area, and accounts for 2,342 acres in the Plan Area. The largest open water features are found on or near the Cosumnes River and Deer Creek. These open water features are largely unnamed with the exception of Blodgett Reservoir inside the UDA and Rancho Seco Lake outside the UDA.

Stream/Creek Land Cover (Cowardin: Riverine, Perennial or Intermittent, Nontidal)

The SSHCP Stream/Creek land cover includes rivers such as the Cosumnes River, streams such as Laguna Creek, and smaller intermittent or perennial creeks. This land cover also includes ephemeral streams outside the UDA; ephemeral streams inside the UDA were assumed to be associated with the vernal pool ecosystem and are categorized as stream/creek (vernal pool invertebrate habitat [VPIH]) below.

The Plan Area includes approximately 2,777 acres of Stream/Creek land cover. Polygons of the Stream/Creek land cover occur in areas that contain vernal pools and other wetlands, in Valley Grassland, Blue Oak Woodlands and Savannas, Agriculture, and Developed land cover types.

According to the National Hydrography Dataset, the Plan Area includes approximately 930 miles of "natural" streams and creeks (i.e., excluding artificial path, canal/ditch, connector, and pipeline). The larger streams inside the UDA, such as Laguna Creek, have perennial flow, due to summer runoff from irrigation. However, the upstream portions of these creeks, if undeveloped, generally have intermittent (i.e., seasonal) flows. Many smaller creeks and tributaries to larger creeks have intermittent or ephemeral (i.e., following rain events) flows. Most streams in the Plan Area are valley floor streams characterized by slow-moving water, except after rain events, and often carry substantial sediment loads as a result of land disturbances. Some reaches of tributaries in the eastern portion of the Plan Area flow over gently sloping terrain and have more of a pool and riffle structure. Due to their relatively small size and location among urban and farming or rangeland uses, most Plan Area creeks have been substantially affected in terms of water quality, invasive species, habitat loss, or other habitat degradation, although they still provide suitable habitat and important ecological functions for several of the Covered Species in the SSHCP, especially where the streams and creeks are associated with other riparian and wetland communities. The following streams are listed as impaired waters under Section 303(d) of the CWA: Carson Creek, Cosumnes River, Deer Creek, Elder Creek, Lower Mokelumne River, and Morrison Creek.

Covered Species associated with the Stream/Creek land cover type include Sanford's arrowhead, California tiger salamander, western spadefoot, giant garter snake, western pond turtle, and western red bat. Some streams or creeks provide habitat for vernal pool crustaceans, which are addressed in the Stream/Creek VPIH land cover below.

Over the last 150 years, there have been substantial man-made alterations of many of the streams and creeks in the Plan Area, including straightening and deepening of channels, construction of levees, dams and other impoundments, riprap and concrete walls, vegetation clearing, and other changes. These changes have adversely affected many stream and creek area functions by separating active channels from their natural floodplains, altering natural flow patterns, and disrupting many other dynamic physical processes that maintain stream and creek functions.

Stream/Creek (VPIH) Land Cover (Cowardin: Riverine, Intermittent, Nontidal)

The SSHCP Stream/Creek (VPIH) land cover type was only mapped in the UDA; outside the UDA these features are included in either the Swale land cover type or the Stream/Creek land cover type. Stream/Creek (VPIH) is typically vegetated (i.e., with valley grassland plant species) and conveys water only after rain events (ephemeral). Unlike most swales, streams/creeks (VPIH) are less likely to exhibit vegetation characteristic of vernal pools, and the SSHCP does not consider Stream/Creek (VPIH) land cover habitat for vernal pool plant Covered Species. However, the Stream/Creek (VPIH) land cover can provide suitable habitat for some vernal pool crustaceans in depressional features that may pond water between storm events. The Stream/Creek (VPIH) land cover type often occurs in association with vernal pools and swales. The Plan Area includes approximately 73 acres of stream/creek (VPIH).

3.1.3 Amounts (Abundance) of Aquatic Resources

Within the Plan Area, there are a total of approximately 24,256 acres of mapped potentially jurisdictional aquatic resources, spread throughout 10 different HUC-10 watersheds: American River (HUC 1802011102), Deer Creek (HUC 1804001305), Laguna (HUC 1804001307), Lower Cosumnes River (HUC 1804001308), Lower Dry Creek (HUC 1804001209), Lower Mokelumne River (HUC 1804001211), Morrison Creek (HUC 1802016304), Sherman Lake–Sacramento River (HUC 1802016307), Snodgrass Slough (HUC 1804001210), and Upper Cosumnes River (HUC 1804001306). The watersheds containing the greatest abundance of aquatic resources are Snodgrass Slough and Lower Cosumnes River (Figure 4). The watersheds containing the least amounts of aquatic resources are the American River, Sherman Lake–Sacramento River, and Lower Mokelumne River.

The most abundant aquatic resource types within the Plan Area are Mixed Riparian Woodland and vernal pool. The least abundant are Ephemeral Streams (likely due to the narrow width of such creeks) and Mine Tailing Riparian woodland. See Table 1 for a summary of aquatic resource types and amounts per watershed.

Draft SSHCP Aquatic Resources Program

Table 1
Aquatic Resource Types and Amounts per Watershed within the Plan Area

Riparian, Wetland, or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Acres and Linear Miles (if applicable) per Watershed[1]										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes*	
Riparian	Mine Tailing Riparian Woodland	R	47.9	40.7	158.3	17.3	0	0	129.4	2.0	0	245.5	**641.1**
	Mixed Riparian Scrub	R	0	80.4	58.1	271.8	47.1	2.4	57.0	130.1	528.2	99.7	**1,274.7**
	Mixed Riparian Woodland	R	0.4	835.8	261.7	1,877.0	400.6	196.4	157.1	50.6	1,292.6	732.6	**5,804.8**
Subtotal Riparian			*48.3*	*956.9*	*478.1*	*2,166.1*	*447.7*	*198.8*	*343.5*	*182.7*	*1,820.8*	*1,077.8*	*7,720.6*
Wetland Waters	Freshwater Marsh	PEM1	2.0	38.3	167.2	1,126.9	47.5	20.9	369.9	39.7	1,029.6	112.3	**2,954.1**
	Seasonal Wetland	PEM2	22.6	128.7	418.6	615.8	116.7	0	106.7	0	781.7	408.9	**2,599.8**
	Swales	R	2.8 (2.61 linear miles)	160.4 (127.55 linear miles)	428.2 (366.66 linear miles)	144.2 (96.86 linear miles)	65.2 (57.45 linear miles)	0	358.5 (218.44 linear miles)	1.4 (0.69 linear mile)	10.2 (8.10 linear miles)	80.6 (57.14 linear miles)	**1,251.5 (935.50 linear miles)**
	Vernal Pools	PEM2	6.9	274.3	1,917.0	619.1	202.8	0.1	766.5	5.3	420.9	324.7	**4,537.5**
Subtotal Wetland Waters			*34.3*	*601.7*	*2931*	*2,506.00*	*432.2*	*21*	*1,601.6*	*46.4*	*2,242.40*	*926.5*	*11,342.90*

Draft SSHCP Aquatic Resources Program

Table 1
Aquatic Resource Types and Amounts per Watershed within the Plan Area

Riparian, Wetland, or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Acres and Linear Miles (if applicable) per Watershed[1]										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes*	
Non-Wetland Waters	Open Water	POW	2.7	200.1	297.4	663.1	8.7	3.1	156.7	9.4	720.3	280.2	**2,341.6**
	Streams/ Creeks (Intermittent and Perennial)	R2UB/ R3UB	5.4 (7.30 linear miles)	228.2 (215.56 linear miles)	416.0 (257.08 linear miles)	345.0 (148.53 linear miles)	78.2 (77.63 linear miles)	67.4 (8.02 linear miles)	122.7 (69.82 linear miles)	23.9 (7.01 linear miles)	1,141.0 (151.77 linear miles)	349.7 (94.88 linear miles)	**2,777.4 (1,037.61 linear miles)**
	Streams/ Creeks VPIH (Ephemeral)	R4SB	0	18.7 (11.29 linear miles)	0	0	0	0	54.5 (38.19 linear miles)	0	0	0	**73.2 (49.48 linear miles)**
Subtotal Non-Wetland Waters			*8.1*	*447*	*713.4*	*1,008.1*	*86.9*	*70.5*	*333.9*	*33.3*	*1,861.3*	*629.9*	*5,192.20*
Subtotal Wetland Waters and Non-Wetland Waters			*42.4*	*1,048.7*	*3,644.4*	*3,514.10*	*519.1*	*91.5*	*1,935.5*	*79.7*	*4,103.70*	*1,556.4*	*16,535.10*
Grand Total[1]			**90.7**	**2,005.6**	**4,122.5**	**5,680.2**	**966.8**	**290.3**	**2,279.0**	**262.4**	**5,924.5**	**2,634.2**	**24,255.7**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

3.2 Functions and Services of Aquatic Resources in the Plan Area

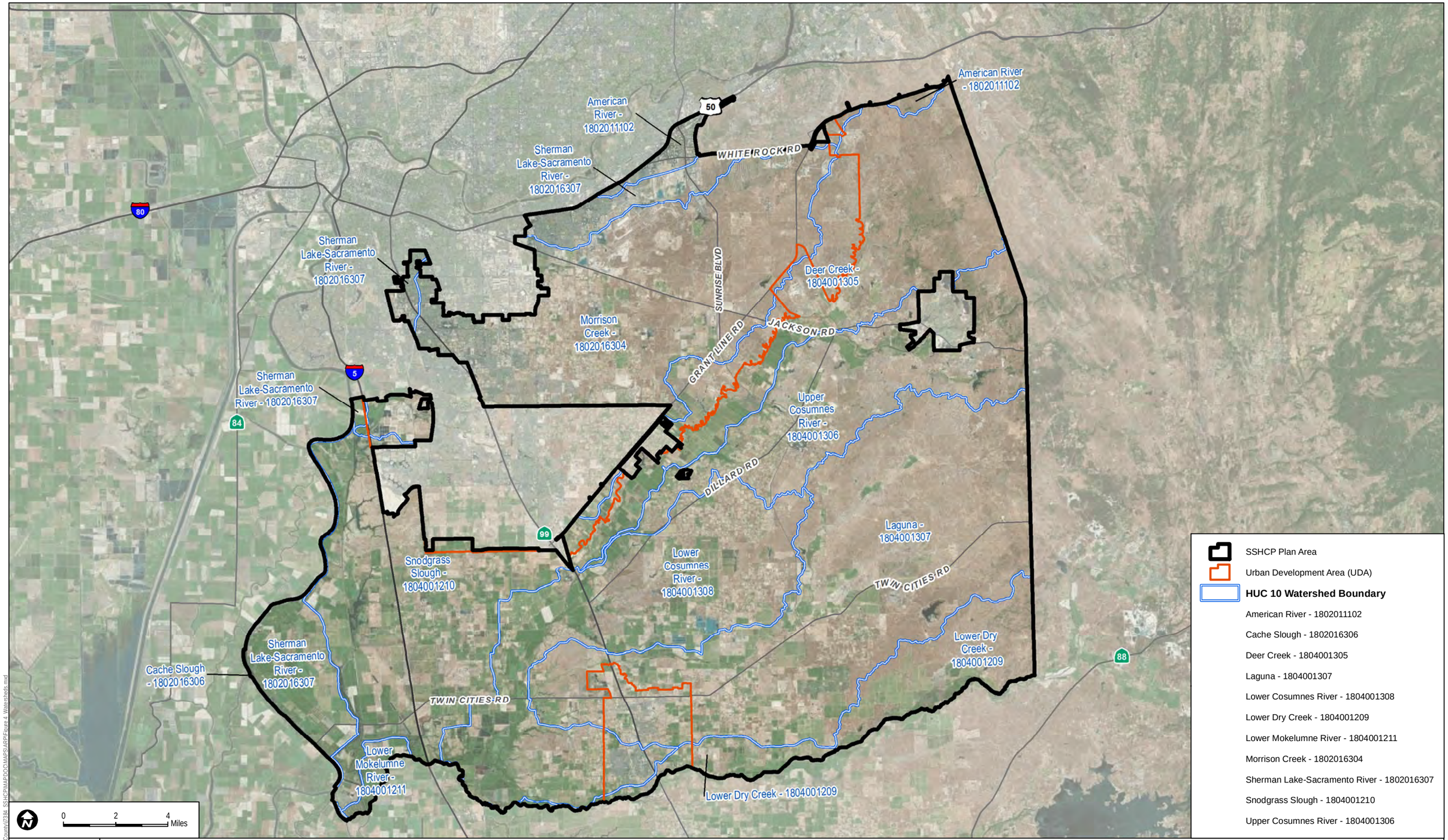
The current condition of aquatic resources within the Plan Area is used to describe the relative ability of the resources to support various functions and services. Condition is obtained from the results of the Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Plan (Appendix C), which categorizes the Plan Area's aquatic resources into high, moderate, low, or very low condition relative to aquatic resources within the Plan Area.

3.2.1 Current Condition of Aquatic Resources

A landscape-level assessment of the relative quality of potentially jurisdictional waters of the United States and waters of the state was prepared for the aquatic resource types mapped in the Plan Area using a Functional/Condition Assessment Method (FCAM) developed for use by the ARP (Appendix C) and the SSHCP. The functional assessment assists in determining which potentially jurisdictional aquatic resource areas have the highest quality and greatest potential for re-establishment/establishment and preservation.

The overall quality of aquatic resources was assessed based on the following factors: area of the aquatic resource, HUC-10 watershed, primary adjacent land cover, secondary adjacent land cover, and aquatic resource type. Function scores were assigned for each of these factors, per aquatic resource feature, based upon ability to maintain or improve the following functions: habitat, water quality, and hydrology. Habitat was evaluated based on the ability of an aquatic resource to support wildlife and plant species. Water quality was evaluated based on the ability to improve or maintain water quality through processes such as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion. Hydrology was evaluated based on the ability of an aquatic resource to facilitate groundwater recharge and store floodwaters via beneficial flood storage and flood flow modifications.

The functional assessment factor related to the habitat, water quality, and hydrology conditions for each HUC-10 watershed was based on the results of a watershed study completed for the SSHCP and ARP (Appendix A). The watershed study results were used to develop appropriate scores for aquatic resources occurring in each HUC-10, based on Covered Species occurrences within each HUC-10 (habitat function score), percentage natural land cover within each HUC-10 (water quality function score), and percentage impervious surface within each HUC-10 (hydrology function score).



Path: Z:\Projects\Sacramento_County\2562_SSHCP\MAPS\ArcPro\Figure 4_Watersheds.mxd

DUDEK

SOURCE: Bing Maps 2015, USGS 2013 National Hydrography Dataset (NHD)

FIGURE 4

Watersheds

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

AGENDA ITEM 11.1

2562

INTENTIONALLY LEFT BLANK

The results of the FCAM analysis provide an overall functional score of very low, low, moderate, or high for each potentially jurisdictional land cover type. Table 2 summarizes the current condition of aquatic resources in the Plan Area, and Figure 5 is a graphical depiction of those data.

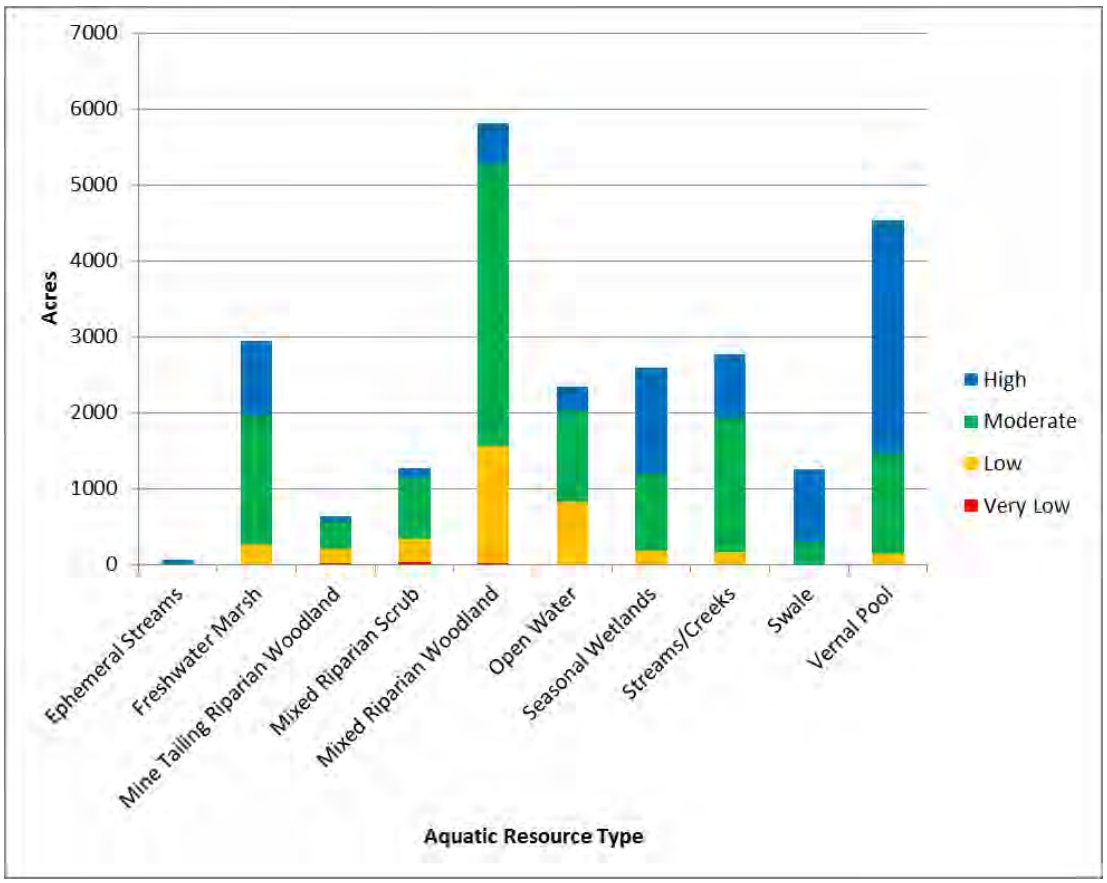
Table 2
Current Condition of Aquatic Resources in the Overall Plan Area

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.6	363.8	183.4	26.3	**641.1**
	Mixed Riparian Scrub	R2/R3	112.0	820.2	297.7	44.7	**1,274.7**
	Mixed Riparian Woodland	R2/R3	520.9	3,710.3	1,554.9	18.8	**5,804.8**
		Subtotal Riparian	*700.5*	*4,894.3*	*2,036.0*	*89.8*	*7,720.6*
Wetland Waters	Freshwater Marsh	PEM1	988.0	1,697.2	268.9	0	**2,954.1**
	Seasonal Wetland	PEM2	1,395.8	1,019.3	184.7	0	**2,599.8**
	Swales	R2/R3	944.3	302.2	5.0	0	**1,251.5**
	Vernal Pools	PEM2	3,067.5	1,313.0	157.0	0	**4,537.5**
		Subtotal Wetland Waters	*6,395.6*	*4,331.7*	*615.6*	*0*	*11,342.9*
Non-Wetland Waters	Open Water	POW	298.3	1,206.3	821.1	15.9	**2,341.6**
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	840.9	1,758.4	177.0	1.0	**2,777.4**
	Streams/Creeks VPlH (Ephemeral)	R4SB	44.3	27.4	1.5	0	**73.2**
		Subtotal Non-Wetland Waters	*1,183.5*	*2,992.1*	*999.6*	*16.9*	*5,192.2*
		Subtotal Wetland Waters and Non-Wetland Waters	*7,579.1*	*7,323.8*	*1,615.2*	*16.9*	*16,535.1*
		Grand Total[1]	**8,279.6**	**12,218.1**	**3,651.2**	**106.7**	**24,255.7**

Note: 1. Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Of the aquatic resource types, vernal pools exhibited the greatest acreage of high condition features (3,067 acres out of 4,053 acres). This result was expected, as the SSHCP and ARP recognize the highly specialized habitat functions that vernal pools serve (see Appendix B-1). Swales, Seasonal Wetlands, and Freshwater Marsh had the next largest high condition acreages (944 acres, 1,396 acres, and 988 acres, respectively). Approximately 50% of all aquatic resources within the Plan Area are considered to be of moderate condition. Mixed Riparian Woodland and Open Water resources had the largest acreages of low condition features (1,554 acres and 821 acres, respectively). The Plan Area overall did not exhibit large acreages or proportions of very low condition resources (only 107 acres total across all resource types).

Figure 5 Current Condition of Aquatic Resources in the Overall Plan Area



Current conditions of the aquatic resources can be further examined at the watershed (HUC-10) level. The following tables (Tables 3 through 12) and associated figures (Figures 6 through 15) describe the current condition of the aquatic resources within each of the ten watersheds located within the Plan Area (Figures 16 through 25). These figures, or watershed profiles, visually summarize the abundance, diversity, and condition of aquatic resources in each watershed. Deer

Creek, Laguna, Lower Cosumnes River, Lower Dry Creek, Morrison Creek, and Upper Cosumnes River watersheds all contain a majority of moderate to high condition aquatic resources. Of these, the watersheds with the greatest proportion of high condition aquatic resources are Laguna and Morrison Creek. American River, Lower Mokelumne, Sherman Lake–Sacramento River, and Snodgrass Slough watersheds currently contain no high condition aquatic resources, and the resources are mostly low to moderate in condition. Sherman Lake–Sacramento River watershed contains the greatest acreage of very low condition aquatic resources and has the highest proportion of low condition resources. Figure 26 summarizes aquatic resources condition acreages by watershed.

Table 3
American River Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	27.4	15.4	5.1	47.9
	Mixed Riparian Scrub	R2/R3	0	0	0	0	0
	Mixed Riparian Woodland	R2/R3	0	0.4	0	0	0.4
Subtotal Riparian			*0*	*27.8*	*15.4*	*5.1*	*48.3*
Wetland Waters	Freshwater Marsh	PEM1	0	2.0	0	0	2.0
	Seasonal Wetland	PEM2	0	22.6	0	0	22.6
	Swales	R2/R3	0	2.8	<0.1	0	2.8
	Vernal Pools	PEM2	0	5.1	1.0	0	6.1
Subtotal Wetland Waters			*0*	*32.5*	*1*	*0*	*33.5*
Non-Wetland Waters	Open Water	POW	0	0	2.7	0	2.7
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	5.4	<0.1	0	5.4
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*5.4*	*2.7*	*0*	*8.1*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*37.9*	*3.7*	*0*	*41.6*
Grand Total[1]			**0**	**65.7**	**19.1**	**5.1**	**89.9**

Note: 1. Table may not total precisely due to rounding.

Figure 6 Current Condition of Aquatic Resources in the American River Watershed

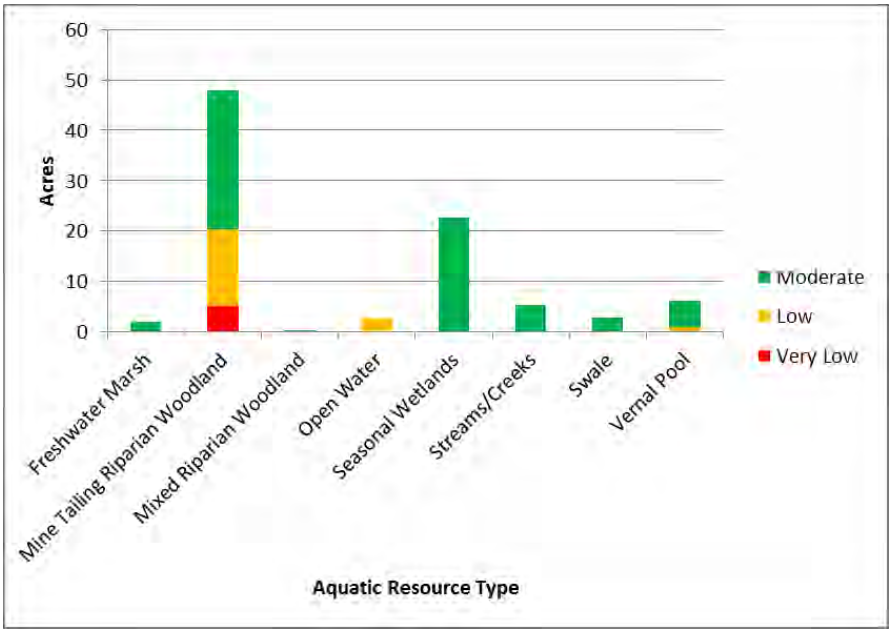


Table 4
Deer Creek Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	13.0	27.7	0	40.7
	Mixed Riparian Scrub	R2/R3	49.1	28.3	3.0	0	80.4
	Mixed Riparian Woodland	R2/R3	150.6	667.3	18.0	0	835.8
Subtotal Riparian			*199.7*	*708.6*	*48.7*	*0*	*956.9*
Wetland Waters	Freshwater Marsh	PEM1	15.5	22.8	0	0	38.3
	Seasonal Wetland	PEM2	70.8	57.9	0	0	128.7
	Swales	R2/R3	131.7	28.5	0.2	0	160.4
	Vernal Pools	PEM2	182.2	89.2	3.0	0	274.3
Subtotal Wetland Waters			*400.2*	*198.4*	*3.2*	*0*	*601.7*
Non-Wetland Waters	Open Water	POW	29.2	167.6	3.2	0	200.1
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	178.4	49.9	<0.1	0	228.2
	Streams/Creeks VPIH (Ephemeral)	R4SB	14.8	3.8	0	0	18.7
Subtotal Non-Wetland Waters			*222.4*	*221.3*	*3.2*	*0*	*447*
Subtotal Wetland Waters and Non-Wetland Waters			*622.6*	*419.7*	*6.4*	*0*	*1,048.7*
Grand Total[1]			**822.3**	**1,128.3**	**55.1**	**0**	**2,005.6**

Note: [1] Table may not total precisely due to rounding.

Figure 7 Current Condition of Aquatic resources in the Deer Creek Watershed

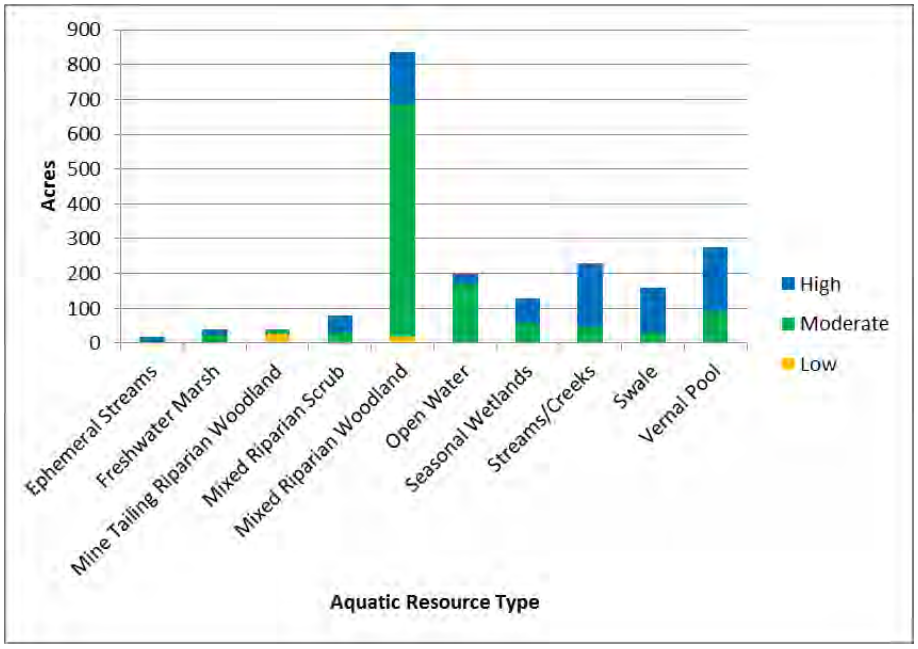


Table 5
Laguna Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.6	71.8	18.9	0	158.3
	Mixed Riparian Scrub	R2/R3	19.7	36.4	2.1	0	58.1
	Mixed Riparian Woodland	R2/R3	122.7	137.8	1.2	0	261.7
		Subtotal Riparian	*210.0*	*246.0*	*22.2*	*0*	*478.1*
Wetland Waters	Freshwater Marsh	PEM1	147.7	19.1	0.4	0	167.2
	Seasonal Wetland	PEM2	400.7	17.9	0	0	418.6
	Swales	R2/R3	416.1	11.8	0.3	0	428.2
	Vernal Pools	PEM2	1,837.2	39.7	3.5	0	1,917.0
		Subtotal Wetland Waters	*2,801.7*	*88.5*	*4.2*	*0*	*2,931.0*
Non-Wetland Waters	Open Water	POW	182.1	101.3	14.0	0	297.4
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	341.2	74.8	0	0	416.0
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*5,23.3*	*176.1*	*14.0*	*0*	*713.4*
		Subtotal Wetland Waters and Non-Wetland Waters	*3,325.0*	*264.6*	*18.2*	*0*	*3,644.4*
		Grand Total[1]	**3,535.0**	**510.6**	**40.4**	**0**	**4,122.5**

Note: [1] Table may not total precisely due to rounding.

Figure 8 Current Condition of Aquatic Resources in the Laguna Watershed

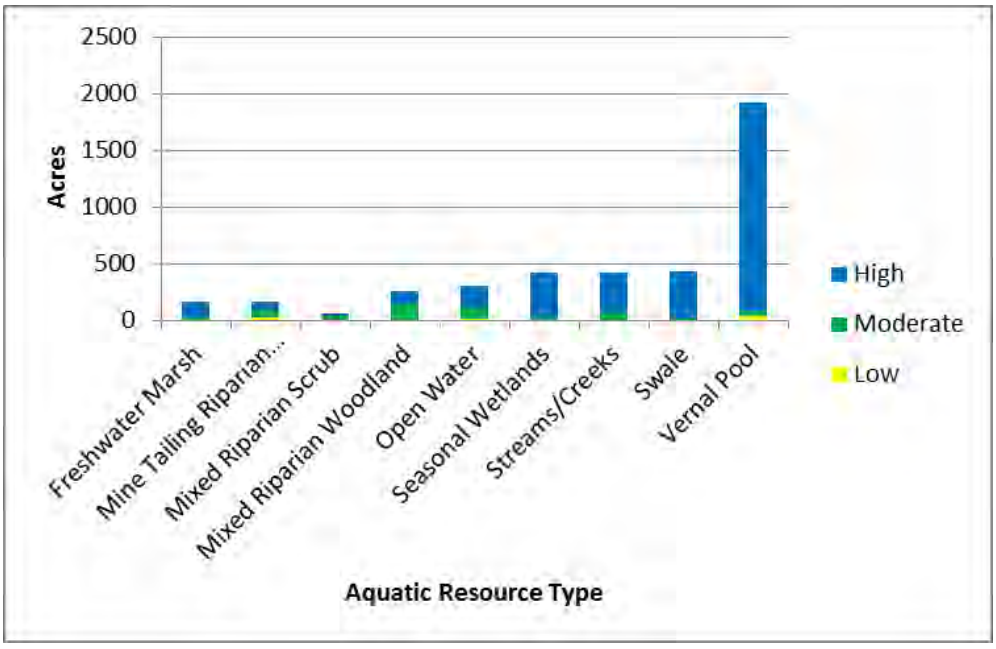


Table 6
Lower Cosumnes Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	17.3	0	0	17.3
	Mixed Riparian Scrub	R2/R3	0	257.2	14.6	0	271.8
	Mixed Riparian Woodland	R2/R3	0	1,438.4	438.6	0	1,877.0
	Subtotal Riparian		*0*	*1,712.9*	*453.2*	*0*	*2,166.1*
Wetland Waters	Freshwater Marsh	PEM1	498.1	619.9	8.9	0	1,126.9
	Seasonal Wetland	PEM2	420.5	193.8	1.5	0	615.8
	Swales	R2/R3	16.0	126.9	1.3	0	144.2
	Vernal Pools	PEM2	273.5	300.5	45.1	0	619.1
	Subtotal Wetland Waters		*1,208.1*	*1,241.1*	*56.8*	*0*	*2,506.0*
Non-Wetland Waters	Open Water	POW	0	279.3	383.8	0	663.1
	Streams/Creeks (Intermittent and Perennial)	R2UB/ R3UB	135.6	147.5	61.9	0	345.0
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
	Subtotal Non-Wetland Waters		*135.6*	*426.8*	*445.7*	*0*	*1,008.1*
	Subtotal Wetland Waters and Non-Wetland Waters		*1,343.7*	*1,667.9*	*502.5*	*0*	*3,514.1*
	Grand Total[1]		**1,343.7**	**3,380.8**	**955.7**	**0**	**5,680.2**

Note: 1. Table may not total precisely due to rounding.

Figure 9 Current Condition of Aquatic Resources in the Lower Cosumnes Watershed

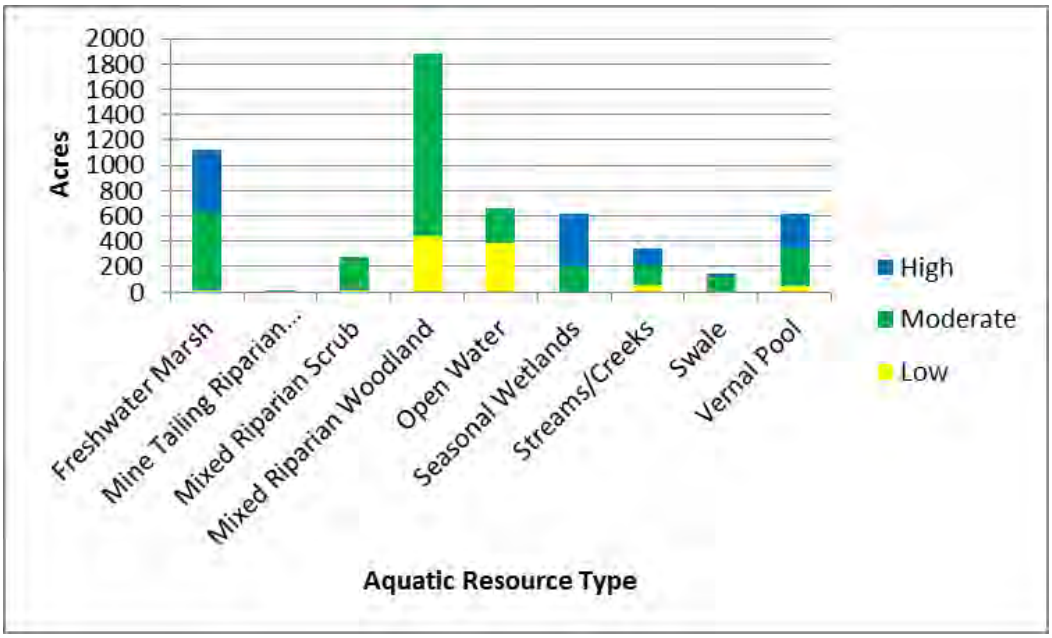


Table 7
Lower Dry Creek Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	3.1	39.8	4.2	0	47.1
	Mixed Riparian Woodland	R2/R3	0	378.4	22.3	0	400.6
Subtotal Riparian			*3.1*	*418.2*	*26.5*	*0*	*447.7*
Wetland Waters	Freshwater Marsh	PEM1	16.4	30.9	0.2	0	47.5
	Seasonal Wetland	PEM2	105.1	11.6	0	0	116.7
	Swales	R2/R3	42.8	22.4	<0.1	0	65.2
	Vernal Pools	PEM2	104.4	91.8	6.6	0	202.7
Subtotal Wetland Waters			*268.7*	*156.7*	*6.8*	*0*	*432.1*
Non-Wetland Waters	Open Water	POW	0	6.8	1.9	0	8.7
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	13.8	60.4	4.0	0	78.2
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*13.8*	*67.2*	*5.9*	*0*	*86.9*
Subtotal Wetland Waters and Non-Wetland Waters			*282.5*	*223.9*	*12.7*	*0*	*519*
Grand Total[1]			**285.6**	**642.1**	**39.2**	**0**	**966.7**

Note: [1] Table may not total precisely due to rounding.

Figure 10 Current Condition of Aquatic Resources in the Lower Dry Creek Watershed

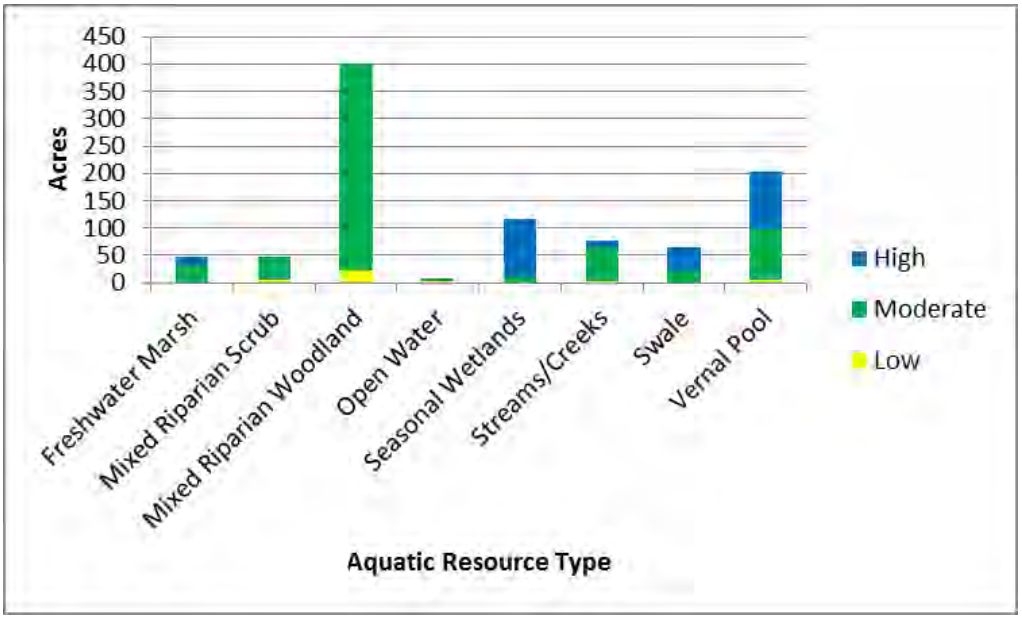


Table 8
Lower Mokelumne River Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	<0.1	2.4	0	2.4
	Mixed Riparian Woodland	R2/R3	0	19.5	176.8	0	196.4
		Subtotal Riparian	*0*	*19.5*	*179.2*	*0*	*198.8*
Wetland Waters	Freshwater Marsh	PEM1	0	20.9	0	0	20.9
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swales	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0.1	0	0	0.1
		Subtotal Wetland Waters	*0*	*21.0*	*0*	*0*	*21.0*
Non-Wetland Waters	Open Water	POW	0	3.1	0	0	3.1
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	65.1	2.2	0	67.4
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*0*	*68.2*	*2.2*	*0*	*70.5*
		Subtotal Wetland Waters and Non-Wetland Waters	*0*	*89.2*	*2.2*	*0*	*91.5*
		Grand Total[1]	**0**	**108.7**	**181.4**	**0**	**290.3**

Note: [1.] Table may not total precisely due to rounding.

Figure 11 Current Condition of Aquatic Resources in the Lower Mokelumne River Watershed

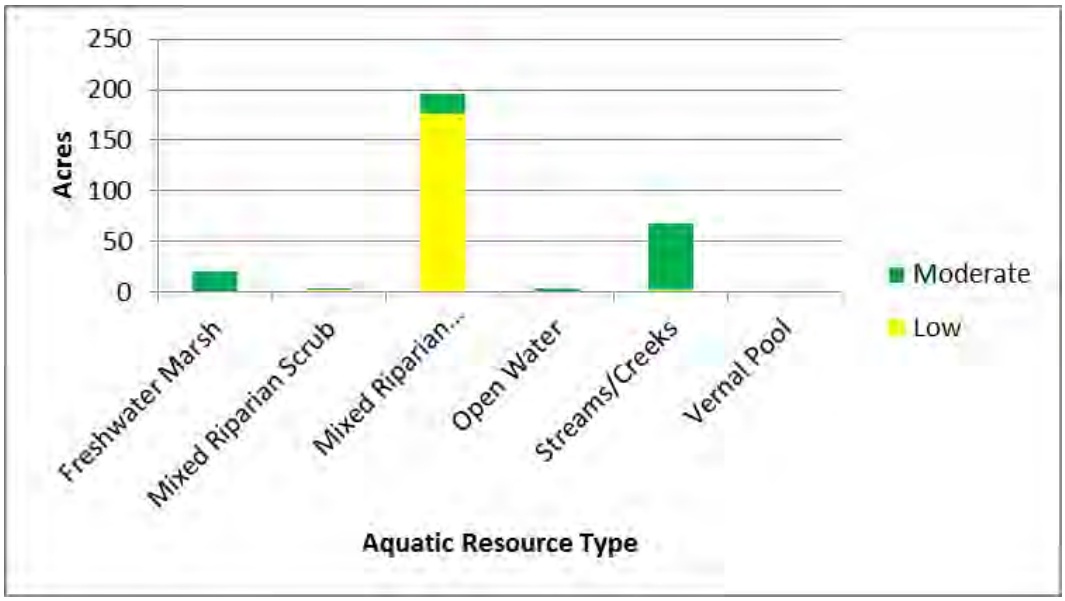


Table 9
Morrison Creek Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	25.9	84.3	19.2	129.4
	Mixed Riparian Scrub	R2/R3	3.2	47.0	6.8	0	57.0
	Mixed Riparian Woodland	R2/R3	0	98.9	58.2	0	157.1
		Subtotal Riparian	*3.2*	*171.8*	*149.3*	*19.2*	*343.5*
Wetland Waters	Freshwater Marsh	PEM1	261.8	103.5	4.6	0	369.9
	Seasonal Wetland	PEM2	59.5	23.0	24.2	0	106.7
	Swales	R2/R3	277.2	80.0	1.4	0	358.5
	Vernal Pools	PEM2	522.3	231.4	12.6	0	766.3
		Subtotal Wetland Waters	*1,120.8*	*437.9*	*42.8*	*0*	*1,601.4*
Non-Wetland Waters	Open Water	POW	0	118.8	37.9	0	156.7
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	7.3	93.0	22.4	0	122.7
	Streams/Creeks VPIH (Ephemeral)	R4SB	29.5	23.5	1.5	0	54.5
		Subtotal Non-Wetland Waters	*36.8*	*235.3*	*61.8*	*0*	*333.9*
		Subtotal Wetland Waters and Non-Wetland Waters	*1,157.6*	*673.2*	*104.6*	*0*	*1,935.3*
		Grand Total[1]	**1,160.8**	**845**	**253.9**	**19.2**	**2,278.8**

Note: 1. Table may not total precisely due to rounding.

Figure 12 Current Condition of Aquatic Resources in the Morrison Creek Watershed

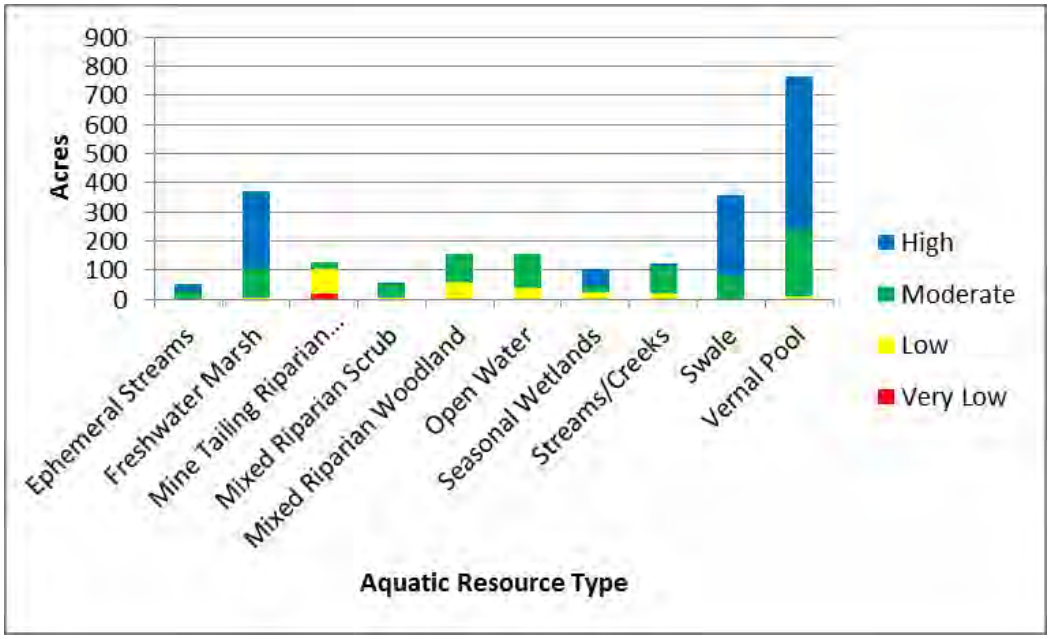


Table 10
Sherman Lake–Sacramento River Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	2.0	2.0
	Mixed Riparian Scrub	R2/R3	0	0	85.4	44.7	130.1
	Mixed Riparian Woodland	R2/R3	0	0	31.9	18.8	50.6
Subtotal Riparian			*0*	*0*	*117.3*	*65.5*	*182.7*
Wetland Waters	Freshwater Marsh	PEM1	0	7.2	32.5	0	39.7
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swales	R2/R3	0	1.3	0.1	0	1.4
	Vernal Pools	PEM2	0	3.0	2.4	0	5.3
Subtotal Wetland Waters			*0*	*11.5*	*35.0*	*0*	*46.4*
Non-Wetland Waters	Open Water	POW	0	0	9.4	0	9.4
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	0.3	22.6	1.0	23.9
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*0.3*	*32.0*	*1.0*	*33.3*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*11.8*	*67.0*	*1.0*	*79.7*
Grand Total[1]			**0**	**11.8**	**184.3**	**66.5**	**262.4**

Note: [1] Table may not total precisely due to rounding.

Figure 13 Current Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed

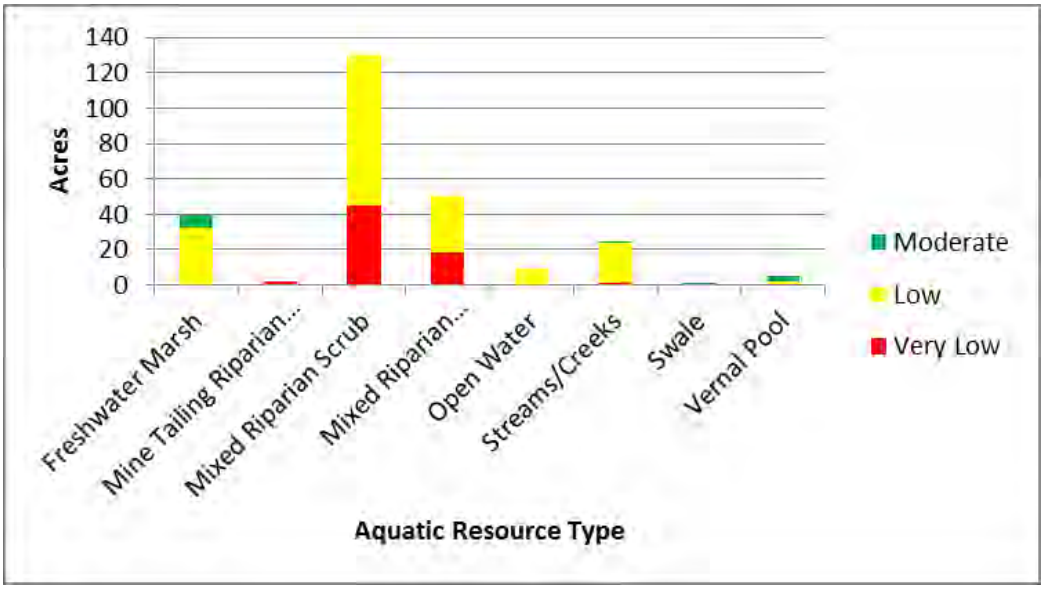


Table 11
Snodgrass Slough Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	350.7	177.5	0	528.2
	Mixed Riparian Woodland	R2/R3	0	488.1	804.4	0	1,292.6
Subtotal Riparian			*0*	*838.8*	*981.9*	*0*	*1,820.8*
Wetland Waters	Freshwater Marsh	PEM1	0	809.3	220.3	0	1,029.6
	Seasonal Wetland	PEM2	0	623.8	157.9	0	781.8
	Swales	R2/R3	0	9.7	0.5	0	10.2
	Vernal Pools	PEM2	0	407.5	13.4	0	420.9
Subtotal Wetland Waters			*0*	*1,850.3*	*392.1*	*0*	*2,242.5*
Non-Wetland Waters	Open Water	POW	0	417.4	287.0	15.9	720.3
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	1,077.2	63.9	0	1,141.0
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*1,494.6*	*350.9*	*15.9*	*1,861.3*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*3,344.9*	*743.0*	*15.9*	*4,103.8*
Grand Total[1]			**0**	**4,183.7**	**1,724.9**	**15.9**	**5,924.6**

Note: [1] Table may not total precisely due to rounding.

Figure 14 Current Condition of Aquatic Resources in the Snodgrass Slough Watershed

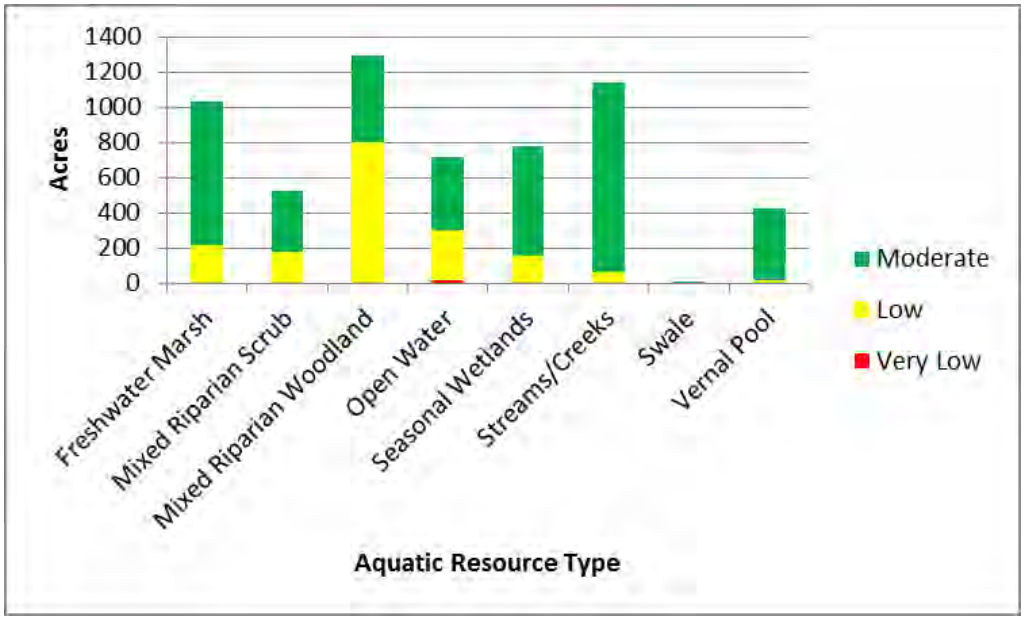
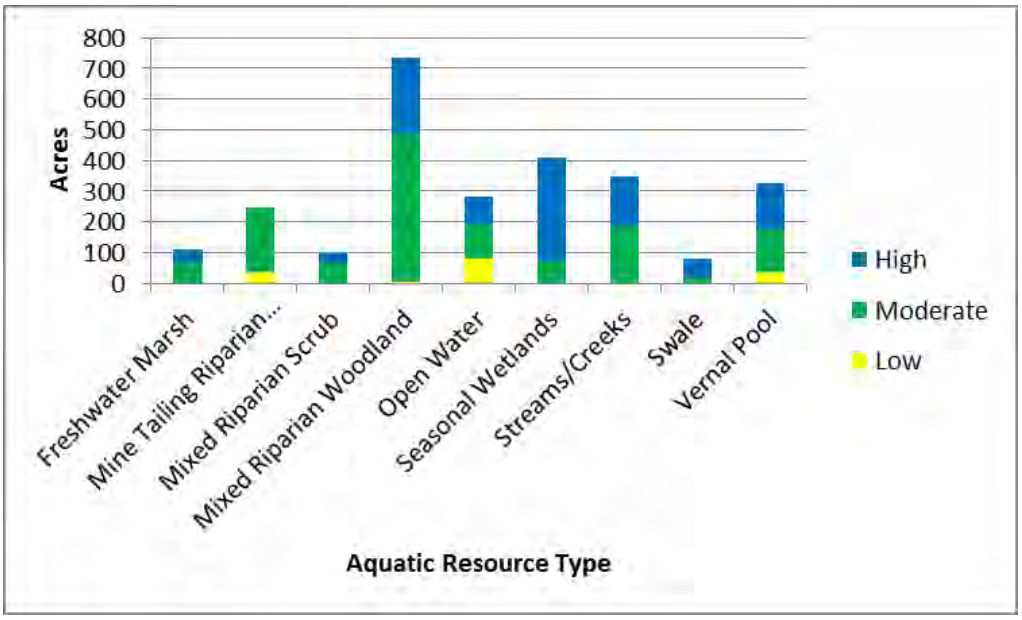


Table 12
Upper Cosumnes Watershed Current Conditions

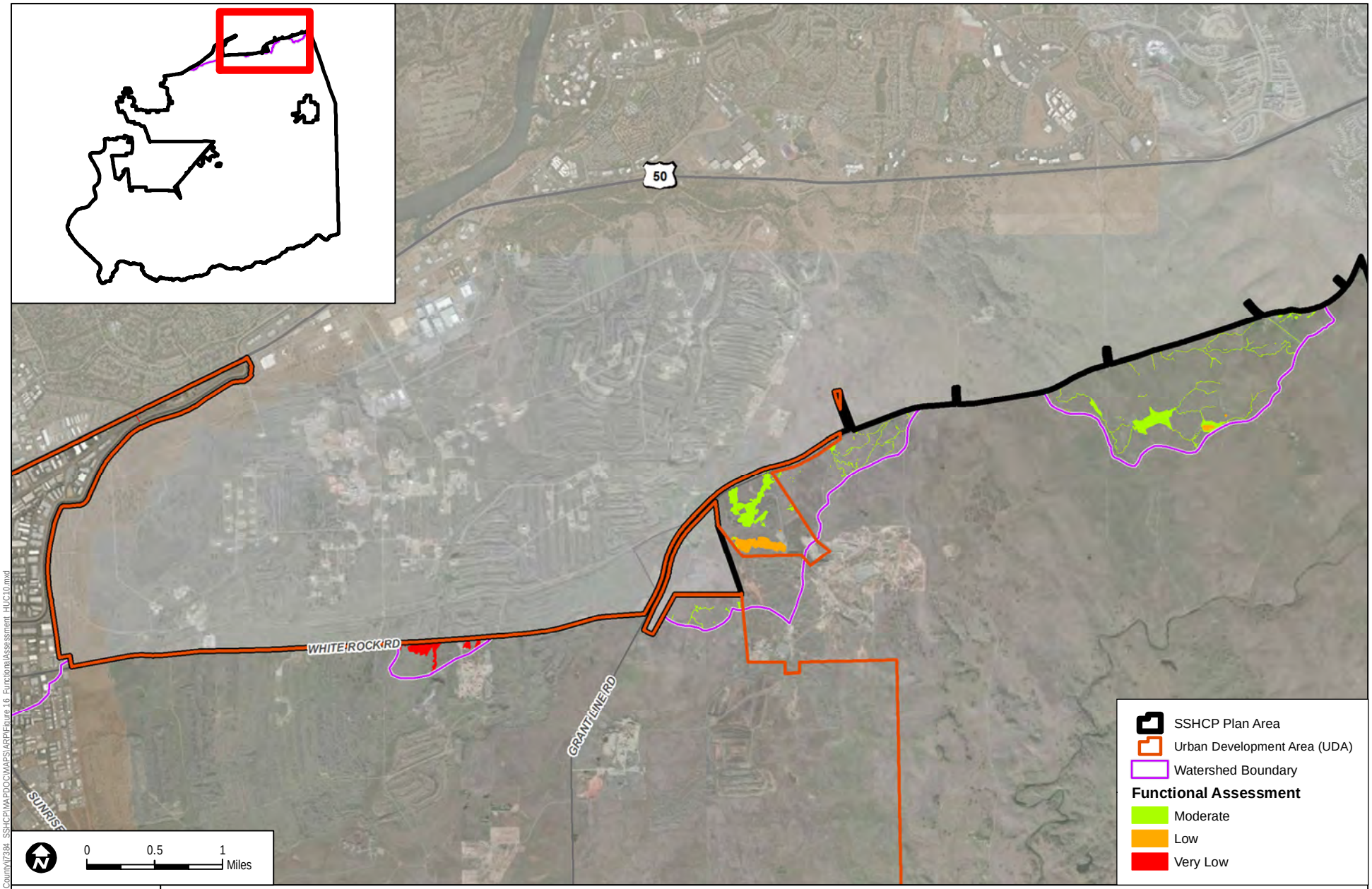
Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	208.4	37.1	0	245.5
	Mixed Riparian Scrub	R2/R3	37.0	61.0	1.7	0	99.7
	Mixed Riparian Woodland	R2/R3	247.6	481.7	3.4	0	732.6
		Subtotal Riparian	*284.6*	*751.1*	*42.2*	*0*	*1077.8*
Wetland Waters	Freshwater Marsh	PEM1	48.7	61.6	2.0	0	112.3
	Seasonal Wetland	PEM2	339.2	68.7	1.0	0	408.9
	Swales	R2/R3	60.6	18.8	1.2	0	80.6
	Vernal Pools	PEM2	147.0	143.8	34.0	0	324.7
		Subtotal Wetland Waters	*595.5*	*292.9*	*38.2*	*0*	*926.5*
Non-Wetland Waters	Open Water	POW	87.0	111.9	81.3	0	280.2
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	164.8	184.9	<0.1	0	349.7
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*251.8*	*296.8*	*81.3*	*0*	*629.9*
		Subtotal Wetland Waters and Non-Wetland Waters	*847.3*	*589.7*	*119.5*	*0*	*1,556.4*
		Grand Total[1]	**1,131.9**	**1,340.8**	**161.7**	**0**	**2,634.2**

Note: [1] Table may not total precisely due to rounding.

Figure 15 Current Condition of Aquatic Resources in the Upper Cosumnes Watershed



INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 16_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

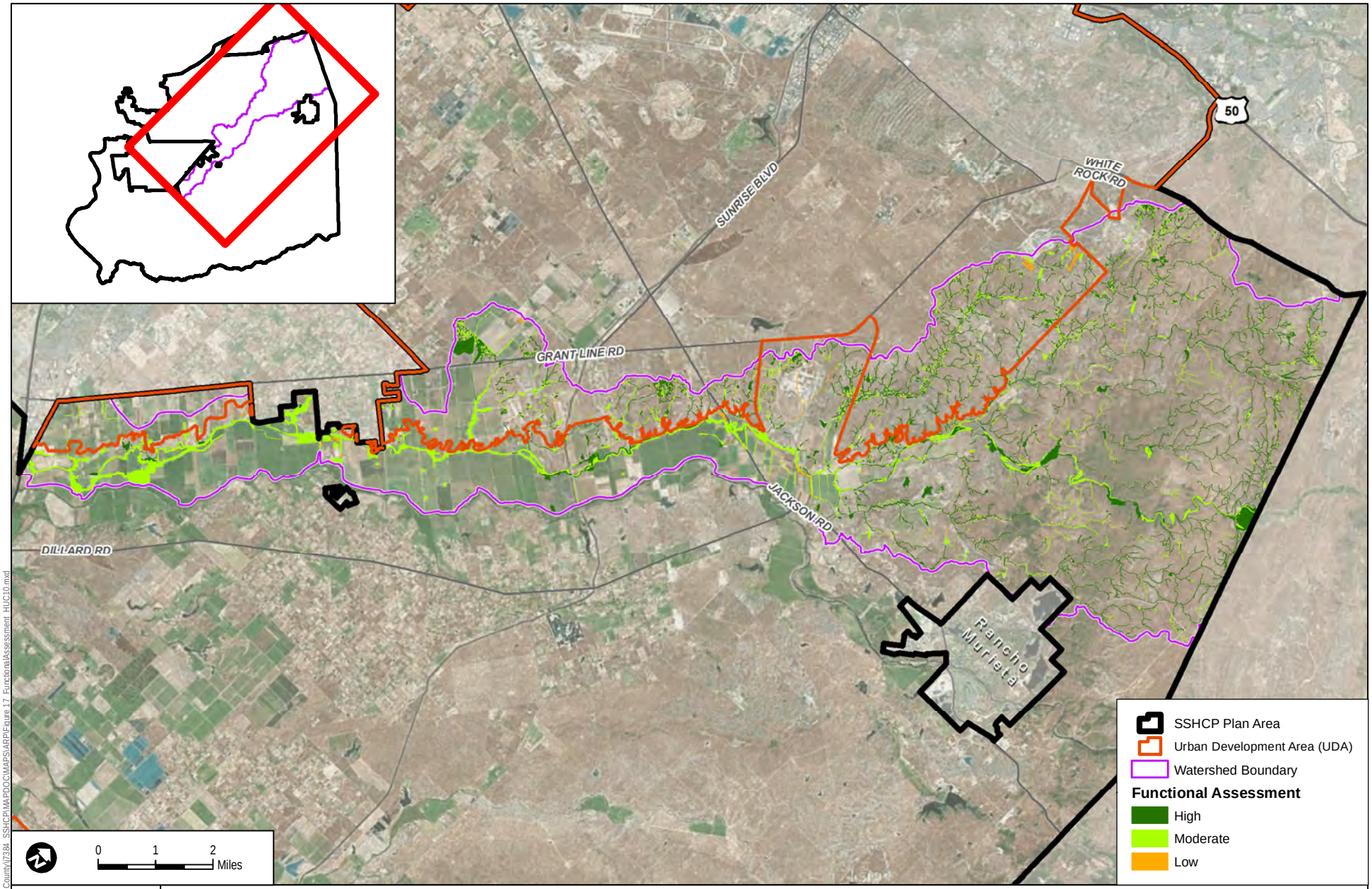
DUDEK

FIGURE 16

Functional Assessment - American River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 17_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

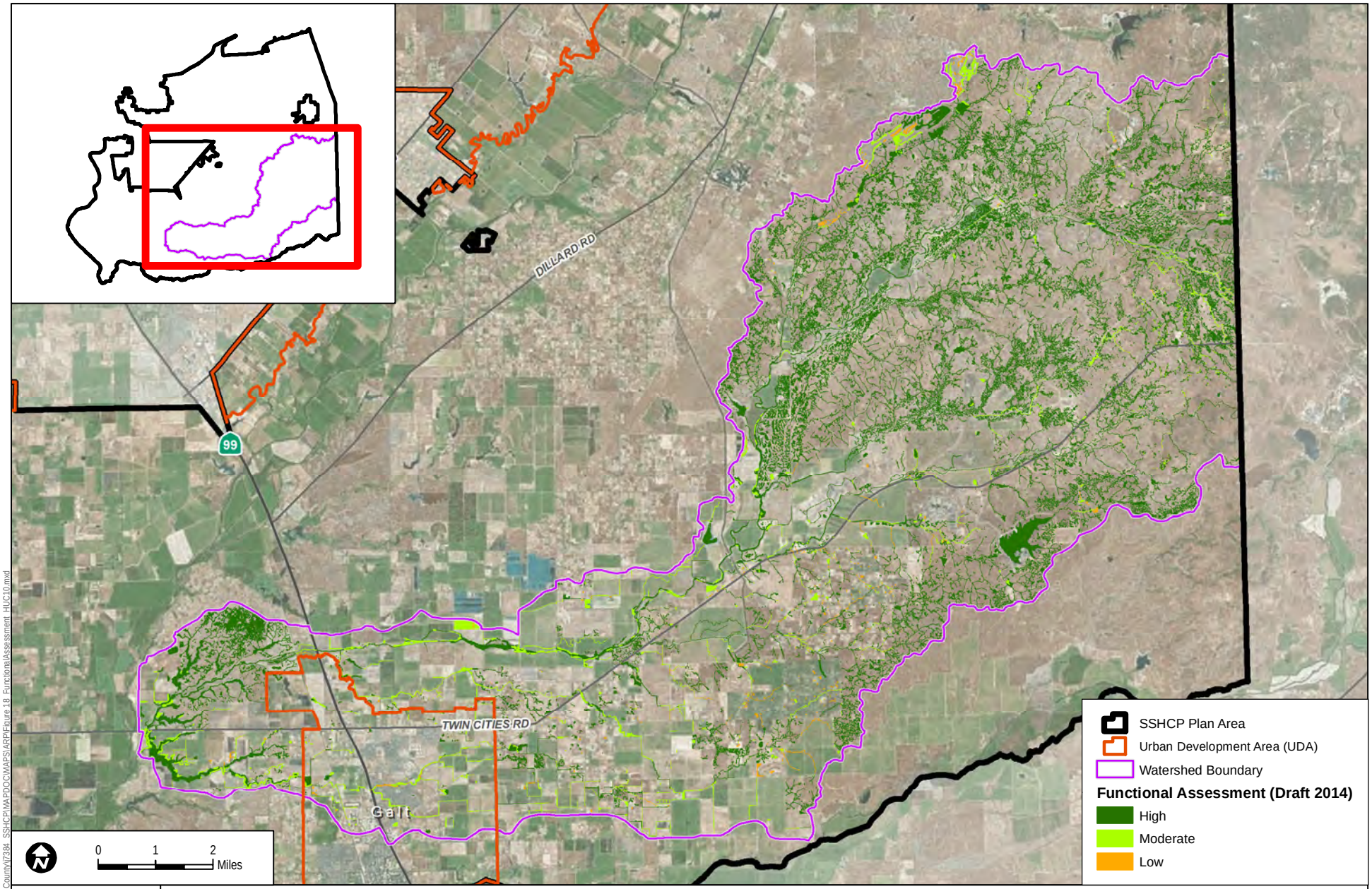
DUDEK

FIGURE 17

Functional Assessment - Deer Creek Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

DUDEK

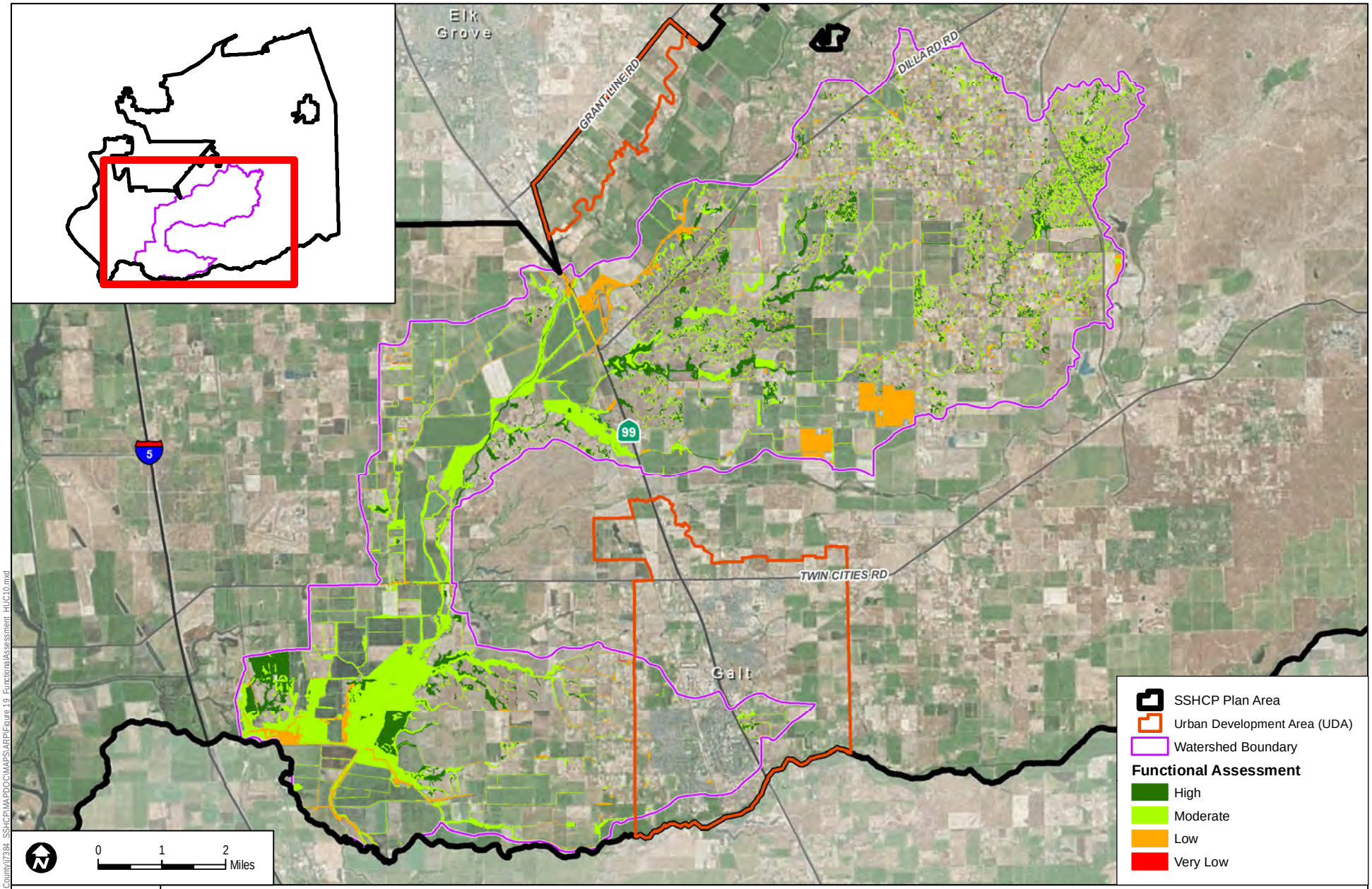
FIGURE 18

Functional Assessment - Laguna Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 1.8_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

FIGURE 19

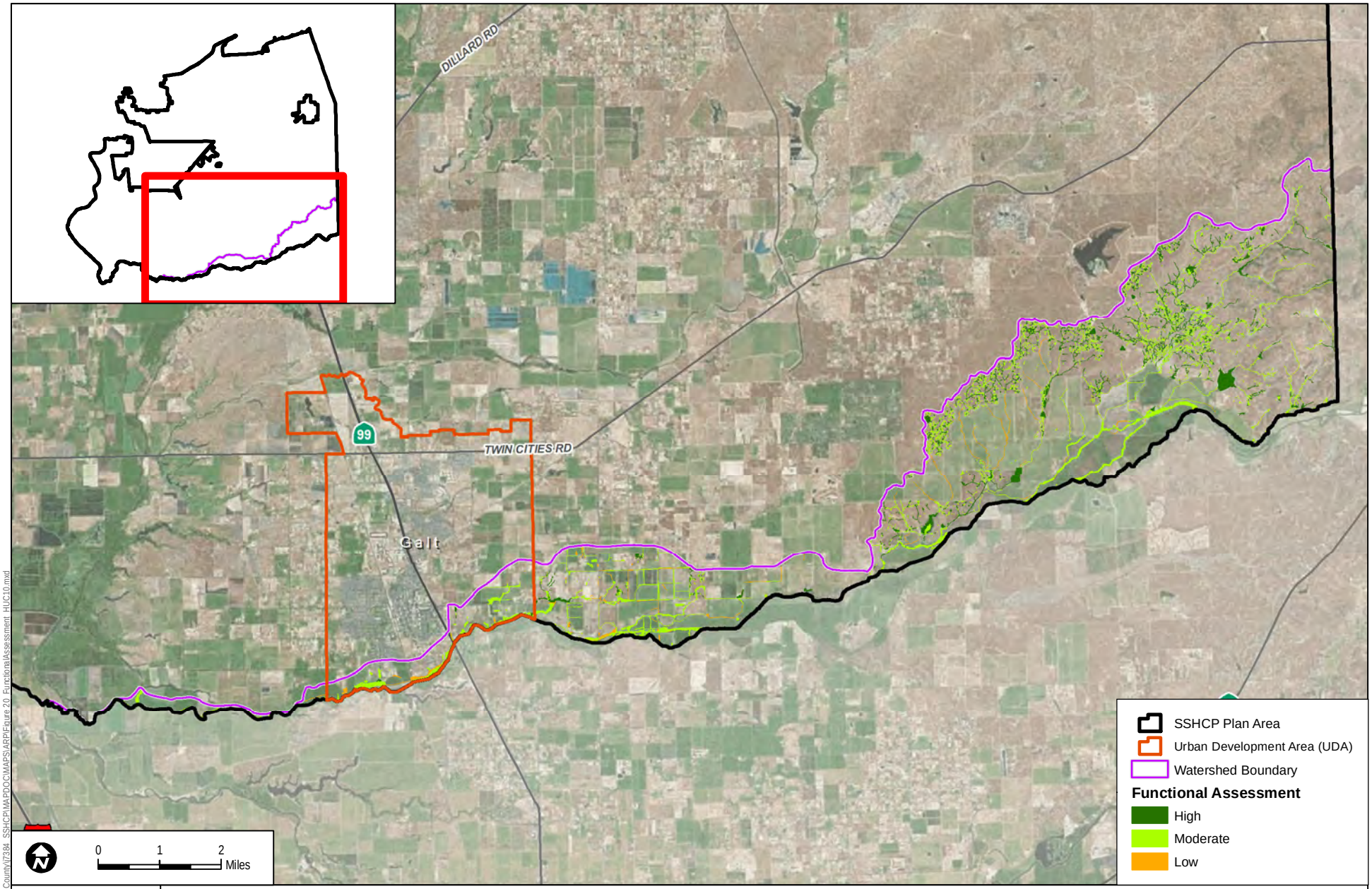
Functional Assessment - Lower Cosumnes River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 19_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

FIGURE 20

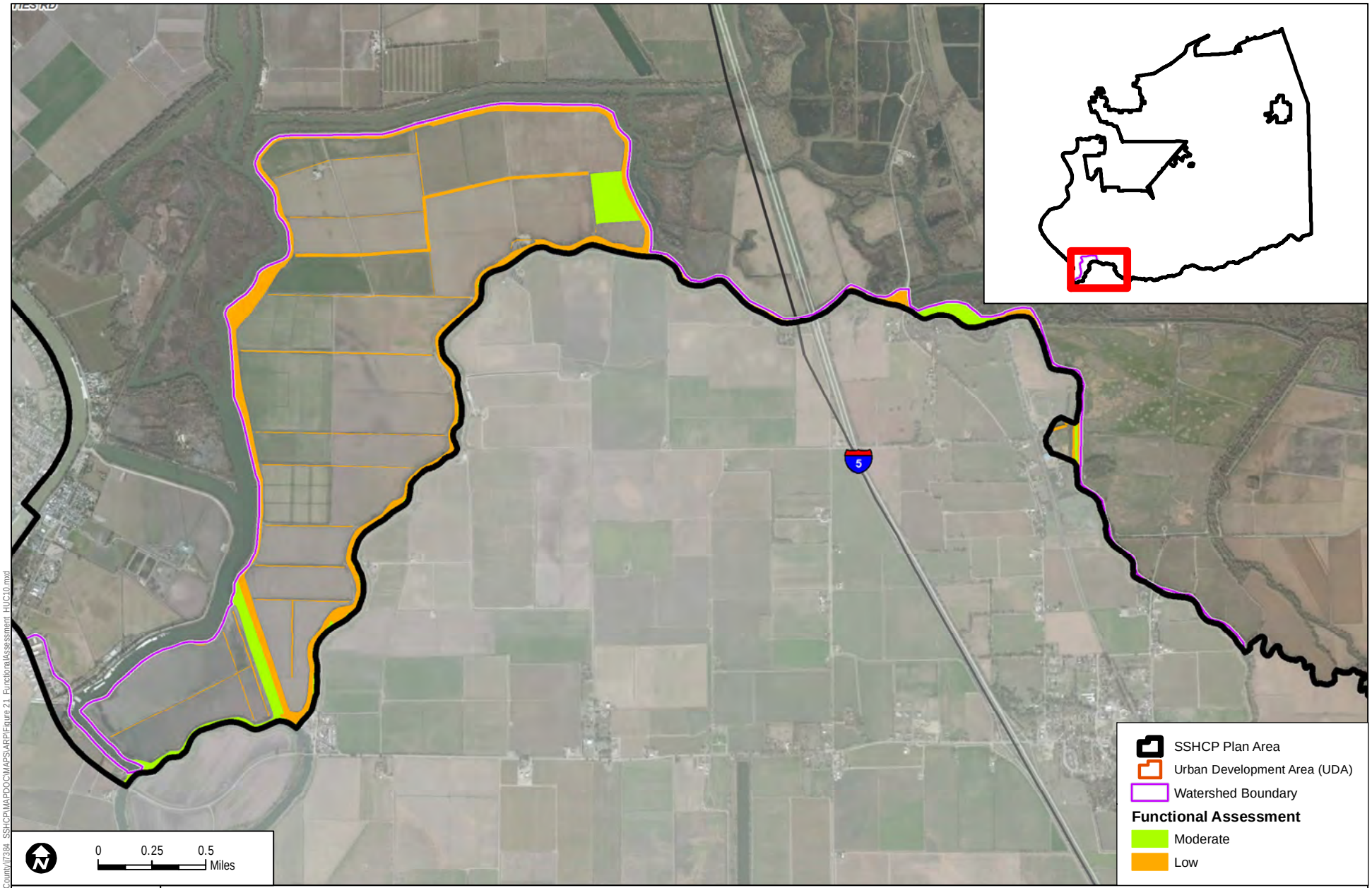
Functional Assessment - Lower Dry Creek Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\r2384_SSHCP\MAPDOC\MAPS\ARP\Figure 20_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 21_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

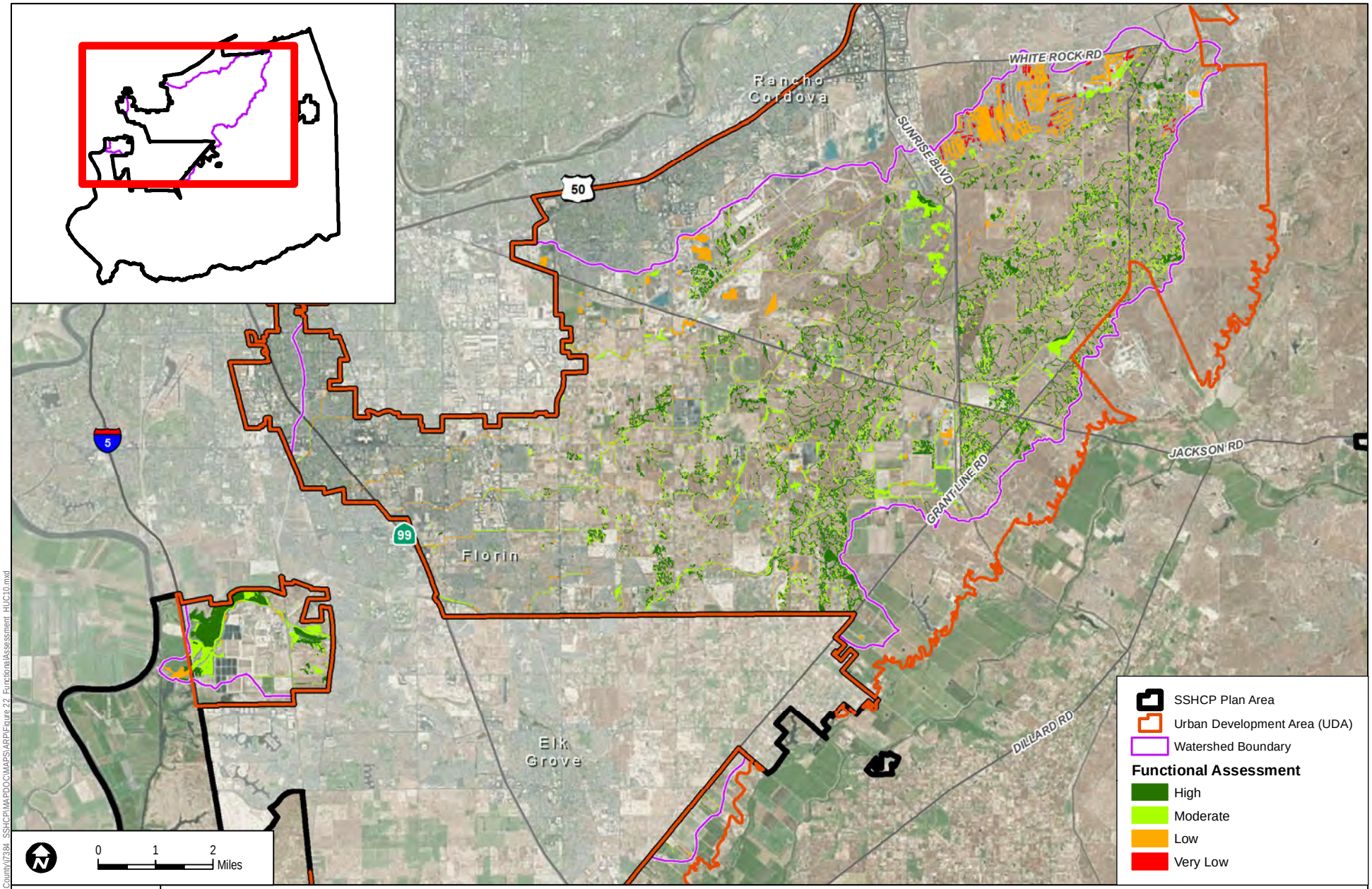
DUDEK

FIGURE 21

Functional Assessment - Lower Mokelumne River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

DUDEK

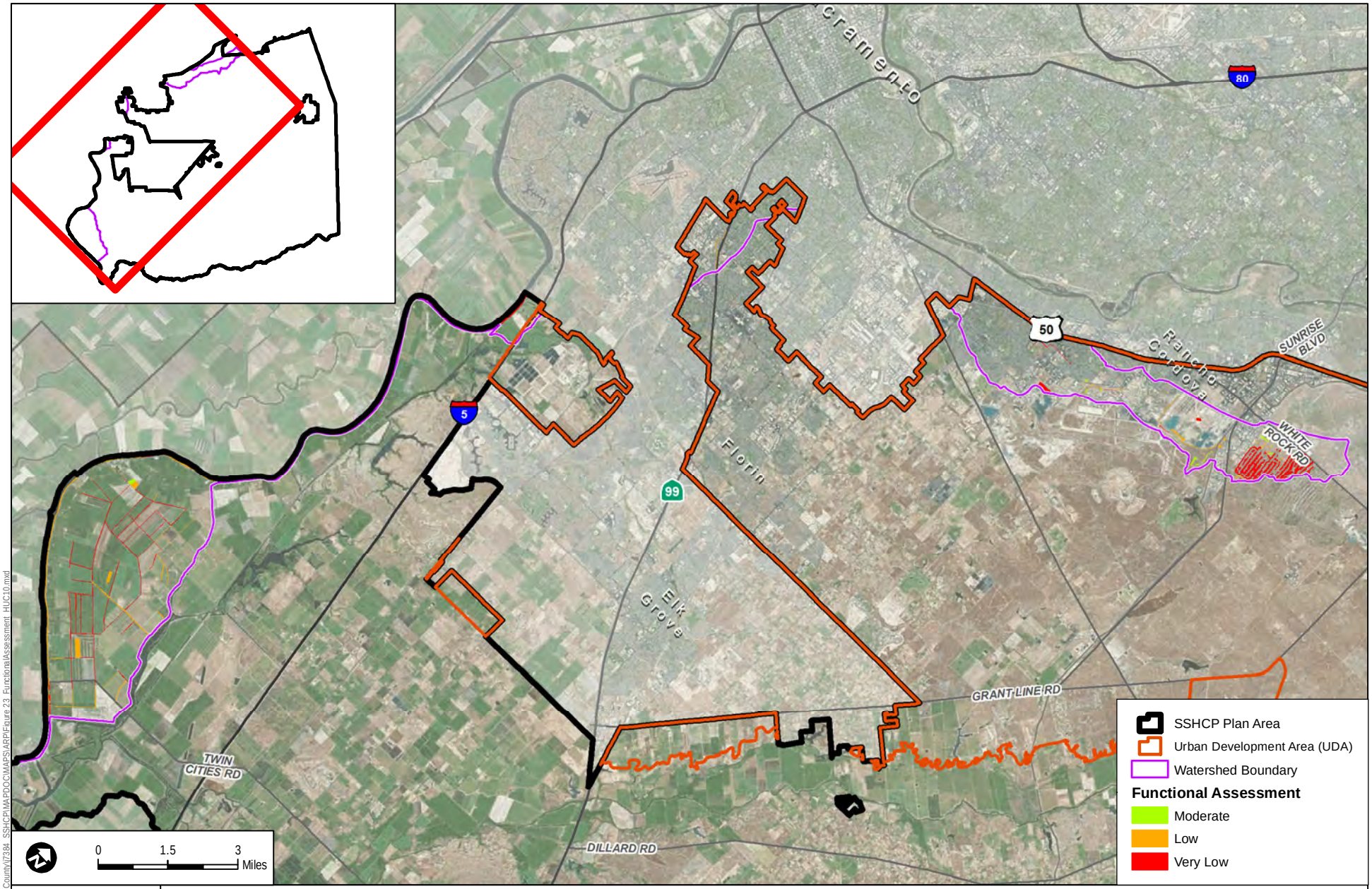
FIGURE 22

Functional Assessment - Morrison Creek Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 22_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

FIGURE 23

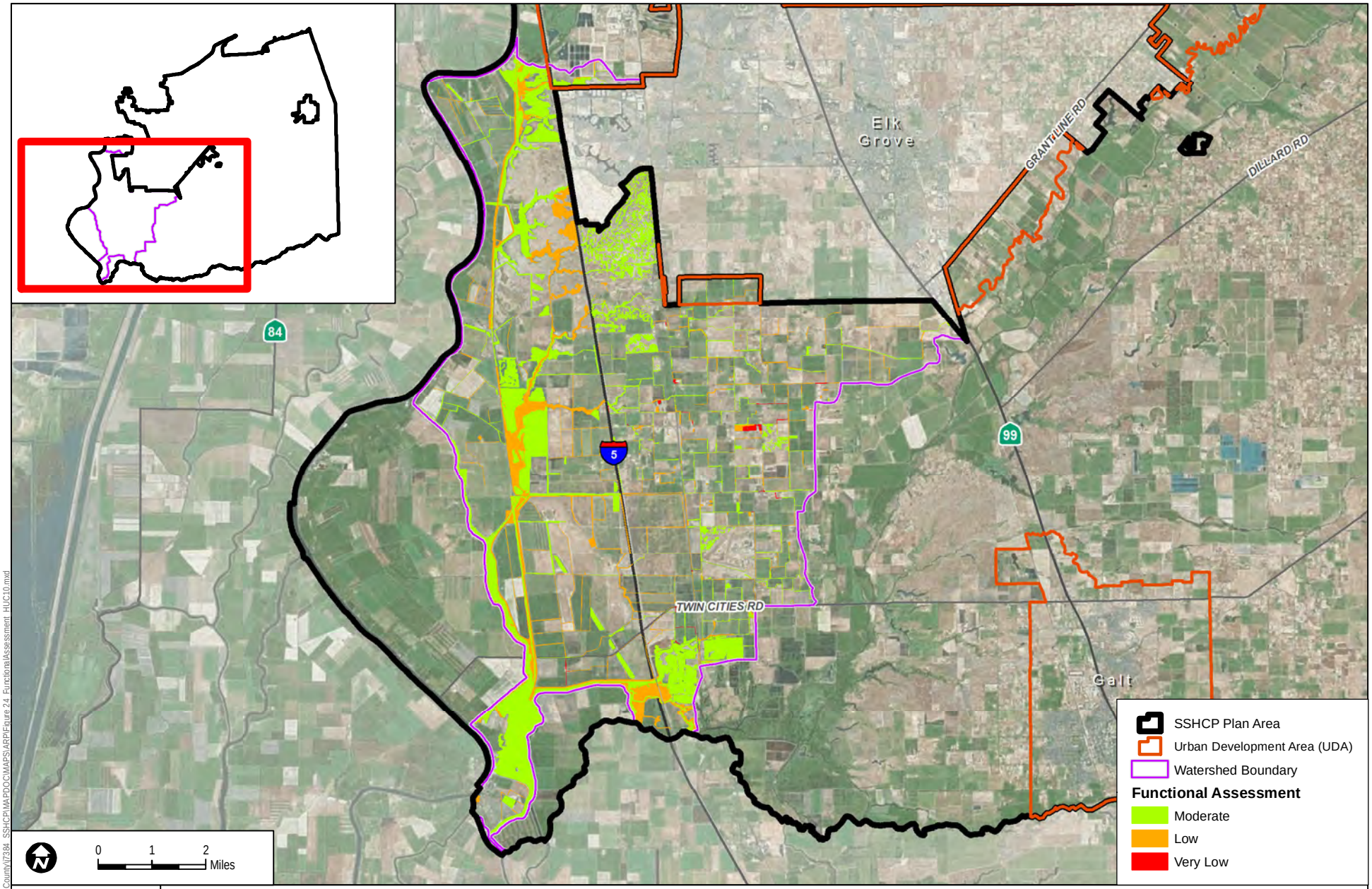
Functional Assessment - Sherman Lake-Sacramento River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 23_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

DUDEK

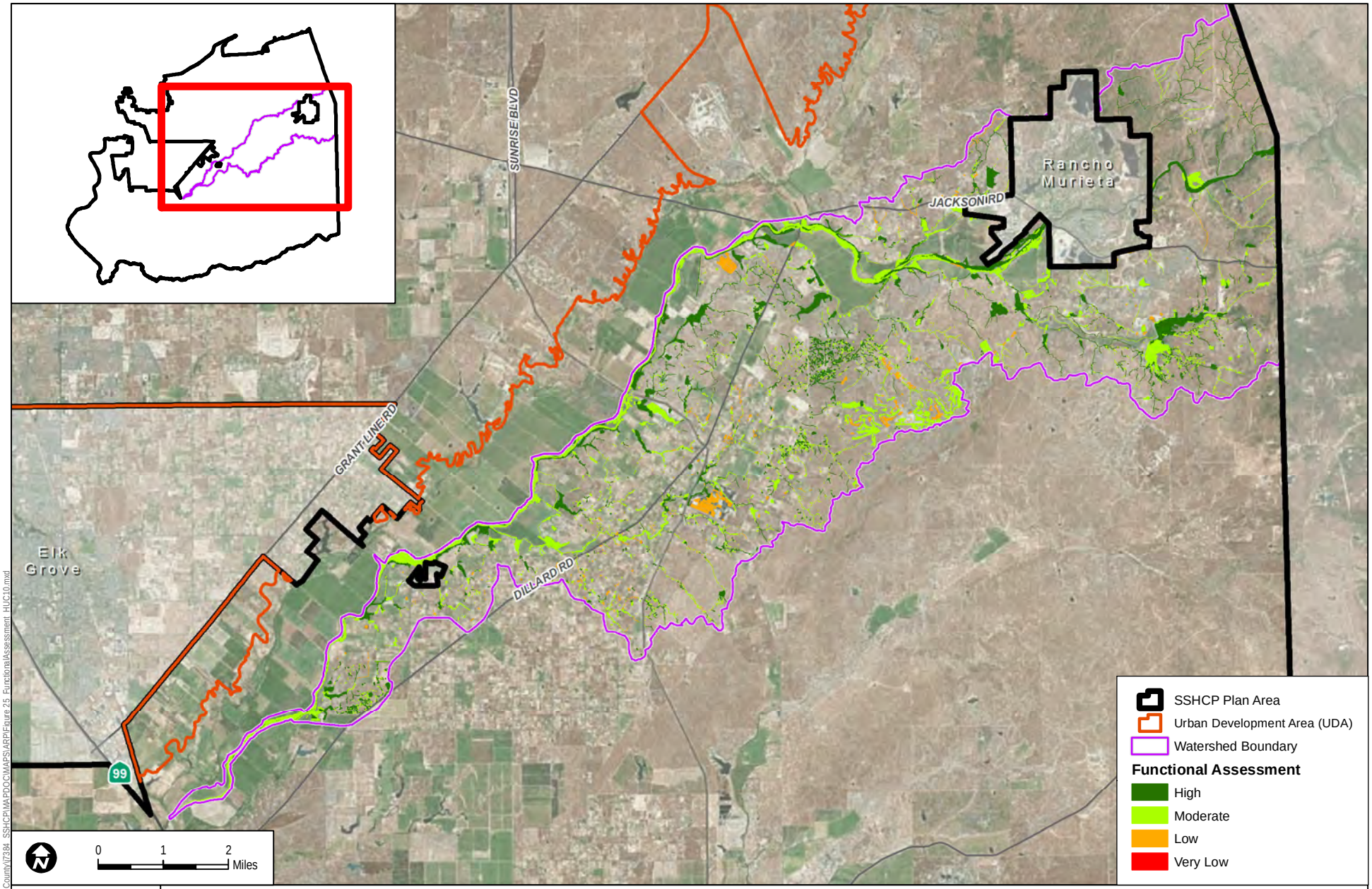
FIGURE 24

Functional Assessment - Snodgrass Slough Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

Path: Z:\Projects\Sacramento_County\V734_SSHCP\MAPDOC\MAPS\ARPF\Figure 24_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 25_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

DUDEK

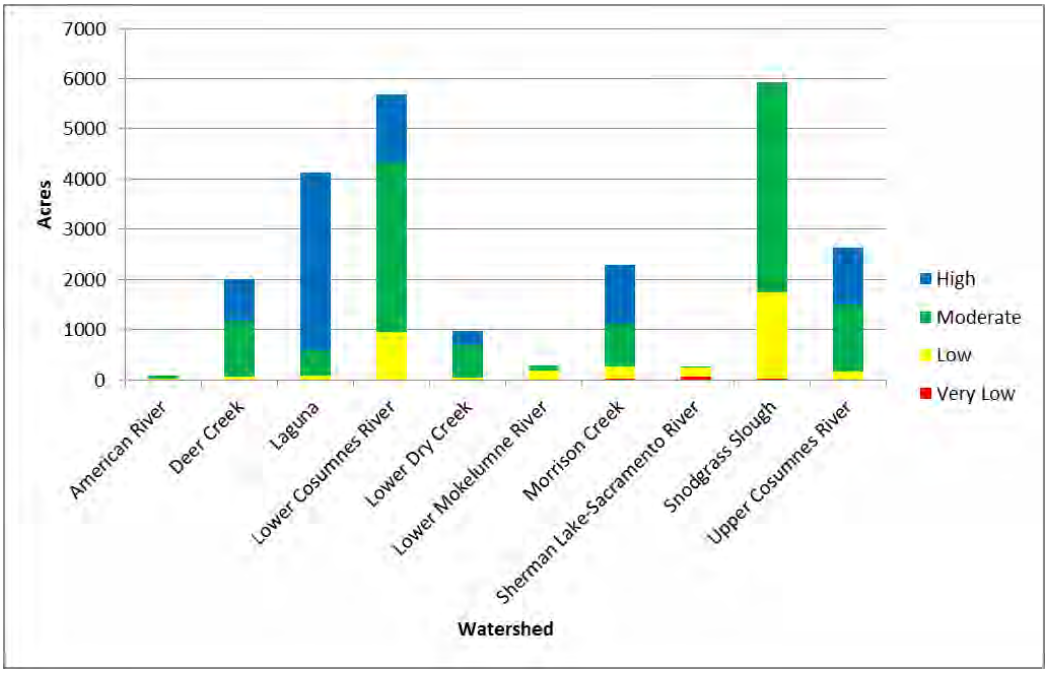
FIGURE 25

Functional Assessment - Upper Cosumnes River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK

Figure 26 Summary of Overall Aquatic Resources Condition per Watershed



INTENTIONALLY LEFT BLANK

4 PROPOSED IMPACTS TO AQUATIC RESOURCES

Proposed impacts to aquatic resources within the SSHCP in the Plan Area can be described in terms of the aquatic resources' resulting diversity, abundance, and condition, in the same manner as they were for the existing conditions. Diversity is again described in terms of the variety of aquatic resources by land cover type (common name) and Cowardin class that would be impacted, and the variety that would remain after impacts. Abundance is described in terms of acreage of each impacted aquatic resource type within the Plan Area and per watershed (at the HUC-10 level), and the acreage that would remain. Condition is described using a landscape-level functional assessment to determine the relative capacity of the remaining aquatic resources to perform various functions and services related to hydrology, water quality, and habitat. In this section, the effects of implementing the SSHCP are examined without considering compensatory mitigation (please see Chapter 6 for an assessment of effects after consideration of compensatory mitigation), but do consider incorporation of AMMs, whose implementation would be integral to carrying out Covered Activities in the SSHCP.

4.1 Estimated Impacts to Abundance and Diversity of Aquatic Resources within the Plan Area

The SSHCP allows for specific categories of Covered Activities to occur within the Plan Area and to receive incidental take authorization from the Wildlife Agencies (U.S. Fish and Wildlife Service (USFWS) and CDFW). Covered Activities are described in Section 5.2 of Chapter 5 of the SSHCP. Conditions on Covered Activities are described in Section 5.3 of the SSHCP. The majority of the Covered Activities would be implemented within the region of the Plan Area designated as the UDA. Such Covered Activities include urban development and mining in the UDA, as well as Covered Activities in Preserves, Preserve Setbacks, and Stream Setbacks. Urban development in the UDA comprises planned urban growth and all ground-disturbing activities associated with urban development. This includes the construction of typical urban facilities, public and private, such as residential, commercial, and industrial structures; park and recreation facilities; water supply facilities; flood control and stormwater management (including operations and maintenance activities, such as vegetation control, sediment removal in the immediate vicinity of bridges, culverts and pipes, and erosion repair); stream bank stabilization projects; public and private utilities; and urban transportation. Covered Activities in Stream Setbacks and in the Laguna Creek Wildlife Corridor include trails, low-velocity bio-retention swales, perpendicular stream crossings, stream bank stabilization, fencing, shade structures (e.g., awnings) and shade trees, interpretive signs and kiosks, riparian habitat re-establishment or establishment, outfalls, and flood control structures and stormwater management (see Section 5.2.6 in Chapter 5 of the SSHCP). Covered Activities in Preserve Setbacks include trails, low-velocity bio-retention swales, fencing, firebreaks, shade structures and shade trees, and interpretive signs and kiosks (see Section 5.2.5 in Chapter 5 of the SSHCP). Covered Activities

in preserves include management and monitoring; low-impact nature trails; habitat enhancement, re-establishment, and establishment; species surveys, research, and adaptive management activities; water supply for livestock; groundwater monitoring and extraction wells; and utility maintenance and repair (see Section 5.2.7 in Chapter 5 of the SSHCP). Covered Activities in preserve linkages include all of the Covered Activities described in preserves plus limited use of detention basins (see Section 5.2.7 in Chapter 5 of the SSHCP). Covered Activities outside the UDA are limited to rural transportation projects, recycled water projects, and SSHCP Preserve System Covered Activities. Complete descriptions of all categories of Covered Activities can be found in Section 5.2 of the SSHCP.

Direct impacts are assumed to result in a permanent loss[5] of aquatic resources. Direct impacts to aquatic resources resulting from the SSHCP's Covered Activities were quantified at a programmatic scale using a geographic information system (GIS). GIS was used to overlay an electronic map-layer of projected Covered Activity footprints onto an electronic map-layer of the SSHCP land cover baseline (existing conditions) map to quantify the acres of overlap to determine acres of direct impact to each potentially jurisdictional aquatic resource land cover type. In this manner, direct impacts were quantified at a programmatic scale. This approach reasonably estimates the amount of permanent loss of aquatic resources within the Plan Area that would result from implementation of Covered Activities. For example, it is likely that a number of stream channels would be widened and/or deepened within the Plan Area, but the stream channel will remain in its relative position within the landscape. For purposes of the SSHCP impacts analysis, it is assumed that Covered Activities would impact the entire stream, resulting in a permanent loss of stream acres even though this may not be the case. This conservative approach to quantifying impacts to aquatic resources provides the uppermost thresholds for anticipated direct impacts resulting in permanent loss of aquatic resources.

Participation in the SSHCP/ARP is compulsory. Impacts to all aquatic resources within the SSHCP Plan Area would be tracked by the application processes implemented by the Land Use Authority Permittees, and by the monitoring program of the SSHCP/ARP that requires periodic surveys to be performed that are designed to detect conversion of aquatic resources throughout the Plan Area.

4.1.1 Impacts on Abundance and Diversity of Aquatic Resources

Within the Plan Area, of the currently existing 24,255 acres of mapped potentially jurisdictional aquatic resources, there are projected direct impacts to approximately 1,614 acres, leaving approximately 22,641 acres (93%) of aquatic resources remaining in the Plan Area. Of the total

[5] Aquatic resources that are permanently adversely affected by filling, flooding, excavation, or drainage because of the activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody.

amount of potentially jurisdictional aquatic resources, there are 11,343 acres of wetland waters, 5,192 acres of non-wetland waters, and 7,721 acres of riparian (Table 1). As shown in Table 13, of the currently existing 11,343 acres of wetland waters, there are projected direct impacts to approximately 856 acres, leaving approximately 10,487 acres (92%) of wetland waters remaining in the Plan Area. Of the currently existing 5,192 acres of non-wetland waters, there are projected direct impacts to approximately 294 acres, leaving approximately 4,898 acres (94%) of wetland waters remaining in the Plan Area. Of the currently existing 7,721 acres of riparian aquatic resources, there are projected direct impacts to approximately 464 acres, leaving approximately 7,257 acres (94.0%) of riparian aquatic resources remaining in the Plan Area. The watershed with the largest acreage amount of projected impacts to aquatic resources is the Morrison Creek watershed, with a total of 994 acres of impact (43.6% of aquatic resources). Proportionally, the watershed with the largest amount of impacts (61.6%) is the American River watershed; however, the actual acreage of impact is only 56 acres.

Within the Plan Area the land cover types that have the largest acreage of impact is vernal pool (389 acres), followed by Swale (235 acres). See Table 13 for a summary of impacts to aquatic resources types per watershed and Table 14 for a summary of remaining aquatic resources by type per watershed.

4.2 Estimated Impacts to Functions and Services of Aquatic Resources in the Plan Area

The effects of the SSHCP Covered Activities impacts are estimated by projecting the future condition of aquatic resources within the Plan Area, without considering mitigation. The projected future condition is obtained from the results of the Functional Assessment Report (Appendix C), which categorizes the Plan Area's aquatic resources into high, moderate, low, or very low condition.

Table 13
Direct Impacts to Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake-Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Riparian	Mine Tailing Riparian Woodland	R	47.9	40.5	0	0	0	0	127.8	2.0	0	0	218.2
	Mixed Riparian Scrub	R	0	1.6	5.0	4.1	9.9	0	36.5	3.9	0.7	0	61.7
	Mixed Riparian Woodland	R	0	15.4	9.2	17.0	78.4	0.1	54.5	2.7	1	4.9	184.1
Subtotal Riparian			*47.9*	*57.5*	*14.2*	*21.1*	*88.3*	*0.1*	*218.8*	*8.6*	*1.7*	*4.9*	*464*
Wetland Waters	Freshwater Marsh	PEM1	1.4	2.0	7.5	0.7	2.5	0	104.8	0.4	7.2	0.5	127.0
	Seasonal Wetland	PEM2	0	10.1	15.0	4.2	1.4	0	68.0	0	6.5	0.3	105.5
	Swale	R2/R3	0.9	62.3	2.3	2.6	0.9	0	162.7	1.4	1.2	0.1	234.5
	Vernal Pools	PEM2	4.4	33.2	31.1	14.1	9.4	0	283.4	5.3	5.0	3.1	389.1
Subtotal Wetland Waters			*6.7*	*107.6*	*55.9*	*21.6*	*14.2*	*0*	*618.9*	*7.1*	*19.9*	*4*	*856.1*

Draft SSHCP Aquatic Resources Program

Table 13
Direct Impacts to Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake-Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Non-Wetland Waters	Open Water	POW	0.5	70.8	2.0	0.1	0.3	0	80.4	0.2	1.1	0	155.3
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0.9	12.3	14.0	6.4	2.5	<0.1	57.4	3.8	18.5	1.1	116.8
	Streams/ Creeks (VPIH) Ephemeral	R4SB	0	2.6	0	0	0	0	19.0	0	0	0	21.6
Subtotal Non-Wetland Waters			*1.4*	*85.7*	*16.0*	*6.5*	*2.8*	*0*	*156.8*	*4*	*19.6*	*1.1*	*293.7*
Subtotal Wetland Waters and Non-Wetland Waters			*8.1*	*193.3*	*71.9*	*28.1*	*17*	*0*	*718.3*	*11.1*	*39.5*	*5.1*	*1,149.8*
Grand Total[1]			**56**	**250.8**	**86.1**	**49.2**	**105.3**	**0.1**	**937.1**	**19.7**	**41.2**	**10**	**1,613.8**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Table 14
Post-Impact Abundance of Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Riparian	Mine Tailing Riparian Woodland	R	0	0.2	158.3	17.3	0	0	1.6	0	0	245.5	422.9
	Mixed Riparian Scrub	R	0	78.8	53.1	267.7	37.2	2.4	20.7	126.2	527.5	99.7	1,213.2

Table 14
Post-Impact Abundance of Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
	Mixed Riparian Woodland	R	0.4	820.5	252.5	1,859.9	322.3	196.2	102.6	48.0	1,290.6	727.7	5,620.7
Subtotal Riparian			*0.4*	*899.5*	*463.9*	*2,144.9*	*359.5*	*198.6*	*124.9*	*174.2*	*1,818.1*	*1,072.9*	*7,256.8*
Wetland Waters	Freshwater Marsh	PEM1	0.6	36.2	159.7	1,126.2	45.0	20.9	265.2	39.3	1,022.4	111.7	2,827.1
	Seasonal Wetland	PEM2	22.6	118.9	403.5	611.5	115.4	0	38.9	0	775.2	408.6	2,494.6
	Swale	R2/R3	1.9	98.1	425.9	141.6	64.3	0	195.9	0	9.1	80.4	1,017.2
	Vernal Pools	PEM2	2.5	241.1	1,886.0	605.0	193.3	0.1	481.2	0	415.9	321.6	4,146.5
Subtotal Wetland Waters			*27.6*	*494.3*	*2,875.1*	*2,484.3*	*418*	*21*	*981.2*	*39.3*	*2,222.6*	*922.3*	*10,485.4*
Non-Wetland Waters	Open Water	POW	2.2	129.4	295.4	663.0	8.4	3.1	78.4	9.2	719.2	280.2	2,188.5
	Perennial or Intermittent Streams/ Creeks	R2UB/R3 UB	4.7	216.1	402.0	338.6	75.7	67.4	65.4	20.1	1,122.8	348.6	2,661.2
	Streams/ Creeks (VPIH) Ephemeral	R4SB	0	16.1	0	0	0	0	35.6	0	0	0	51.6
Subtotal Non-Wetland Waters			*6.9*	*361.6*	*697.4*	*1,001.6*	*84.1*	*70.5*	*179.4*	*29.3*	*1842*	*628.8*	*4,901.3*
Subtotal Wetland Waters and Non-Wetland Waters			*34.5*	*855.9*	*3,572.5*	*3,485.9*	*502.1*	*91.5*	*1,160.6*	*68.6*	*4,064.6*	*1,551.1*	*15,386.7*
Grand Total[1]			**34.9**	**1,755.4**	**4,036.4**	**5,630.8**	**861.6**	**290.1**	**1,285.5**	**242.8**	**5,882.7**	**2,624.0**	**22,643.5**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

4.2.1 Impacted Condition of Aquatic Resources

The landscape-level assessment (FCAM) that was used to describe the existing condition of the aquatic resources was also used to predict the future condition of the resources after Covered Activity impacts have occurred. As with existing condition, the future condition of aquatic resources describes the relative ability of the resources to support various functions and services. The overall quality of remaining aquatic resources (after direct impacts have occurred) was predicted based on the same factors: area of the aquatic resource, HUC-10 watershed, primary adjacent land cover, secondary adjacent land cover, and aquatic resource type. Function scores were assigned for each of these factors, per aquatic resource feature, based upon ability to maintain or improve the following functions: habitat, water quality, and hydrology. The second factor, HUC-10 watershed, was updated based on the predicted future state of each of the watersheds. The results of the analysis provided an overall functional score of very low, low, moderate, or high for each aquatic resource.

Table 15 summarizes acreage and function/condition of aquatic resources (hereinafter simply condition) using FCAM, in the overall Plan Area following impacts and before accounting for compensatory mitigation, and Figure 27 is a graphical depiction of those data, showing how the impacted Plan Area compares to the existing conditions. Compared to the existing conditions, the impacted Plan Area conditions without mitigation show that the amount of high condition resources remains stable (very slight increase of 29 acres). However, the amounts of moderate, low, and very low condition resources all decrease (decreases of 1,266 acres, 297 acres, and 79 acres, respectively). The slight increase in the amount of high condition resources is the result of the shifts in Covered Species occurrences among watersheds resulting from implementation of the SSHCP and the subsequent shift of some of the associated function scores from moderate to high via an improvement to one or more of the attributes (e.g., implementation of setback).

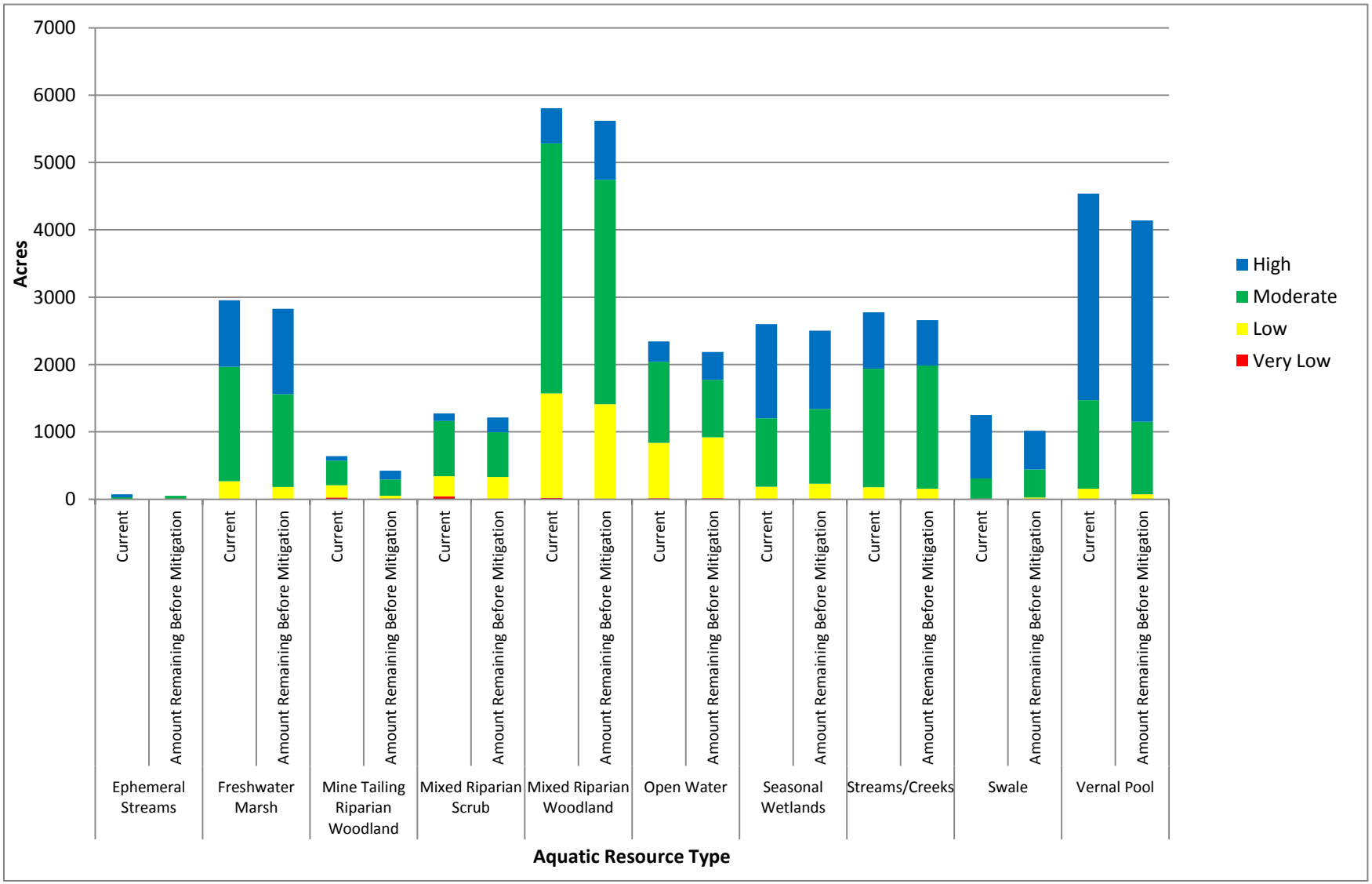
Tables 16 through 25 summarize the condition of aquatic resources in each HUC-10 watershed following impacts and before accounting for compensatory mitigation, and Figures 28 through 37 are graphical depictions, comparing the existing to the impacted watershed conditions. Table 26 summarizes current conditions in the Mather Core Recovery Area and following impacts prior to accounting for compensatory mitigation.

Table 15
Condition of Remaining Aquatic Resources in the Overall Plan Area After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	131.0	241.0	50.9	0	422.9
	Mixed Riparian Scrub	R2/R3	218.3	665.3	324.2	5.4	1,213.2
	Mixed Riparian Woodland	R2/R3	877.7	3,332.7	1,403.5	6.7	5,620.7
		Subtotal Riparian	*1,227.0*	*4,239.0*	*1,778.6*	*12.1*	*7,256.8*
Wetland Waters	Freshwater Marsh	PEM1	1,267.5	1,378.0	181.6	0	2,827.1
	Seasonal Wetland	PEM2	1,162.5	1,107.8	231.8	0	2,502.1
	Swales	R2/R3	575.4	415.6	26.4	0	1,017.3
	Vernal Pools	PEM2	2,988.2	1,078.7	72.3	0	4,139.1
		Subtotal Wetland Waters	*5,993.6*	*3,980.1*	*512.1*	*0*	*10,485.6*
Non-Wetland Waters	Open Water	POW	413.6	855.8	903.6	15.5	2,188.5
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	674.3	1,832.2	154.7	0	2,661.2
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	46.1	5.5	0	51.6
		Subtotal Non-Wetland Waters	*1,087.9*	*2,734.1*	*1,063.8*	*15.5*	*4,901.3*
		Subtotal Wetland Waters and Non-Wetland Waters	*7,081.5*	*6,714.2*	*1,575.9*	*15.5*	*15,386.9*
		Grand Total[1]	**8,308.5**	**10,953.2**	**3,354.5**	**27.6**	**22,643.7**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Figure 27 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Plan Area



The Morrison Creek watershed, in addition to showing the largest decrease in abundance (acreage) of aquatic resources, was also predicted to have the largest decrease in high condition aquatic resources (943 acres), showing a shift in portions of Freshwater Marsh, Swale, and vernal pool resources to moderate condition. The amount of high condition aquatic resources is balanced out throughout the overall Plan Area because of shifts in moderate condition resources to high in other watersheds such as Lower Cosumnes and Upper Cosumnes as a result of changed Covered Species occurrences following SSHCP implementation (see Appendix C, Functional Assessment).

Within the Mather Core Recovery Area, 80% of high condition and moderate condition vernal pools would be avoided. Vernal pools in the Mather Core Recovery Area have recognized ecological importance and those proposed for avoidance were selected based on an assessment of their conservation value using FCAM and the Vernal Wetland Acre/Density Index (VWADI) as described in Section 5.2.1 below. Those vernal pool complexes with the highest conservation value scores received special consideration during the development of the SSHCP Conservation Strategy and the conceptual design of the SSHCP Preserve System.

Table 16
Condition of Remaining Aquatic Resources in the American River Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0	0	0	0
	Mixed Riparian Woodland	R2/R3	0	0	0.4	0	0.4
Subtotal Riparian			*0*	*0*	*0.4*	*0*	*0.4*
Wetland Waters	Freshwater Marsh	PEM1	0	0.2	0.4	0	0.6
	Seasonal Wetland	PEM2	0	22.6	0	0	22.6
	Swales	R2/R3	0	1.4	0.5	0	1.9
	Vernal Pools	PEM2	0	2.5	<.1	0	2.5
Subtotal Wetland Waters			*0*	*26.7*	*0.9*	*0*	*27.6*
Non-Wetland Waters	Open Water	POW	0	0	2.2	0	2.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	1.9	2.9	0	4.7
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*1.9*	*5.1*	*0*	*6.9*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*28.6*	*6*	*0*	*34.5*
Grand Total[1]			**0**	**28.6**	**6.4**	**0**	**34.9**

Note: [1] Table may not total precisely due to rounding.

Figure 28 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the American River Watershed

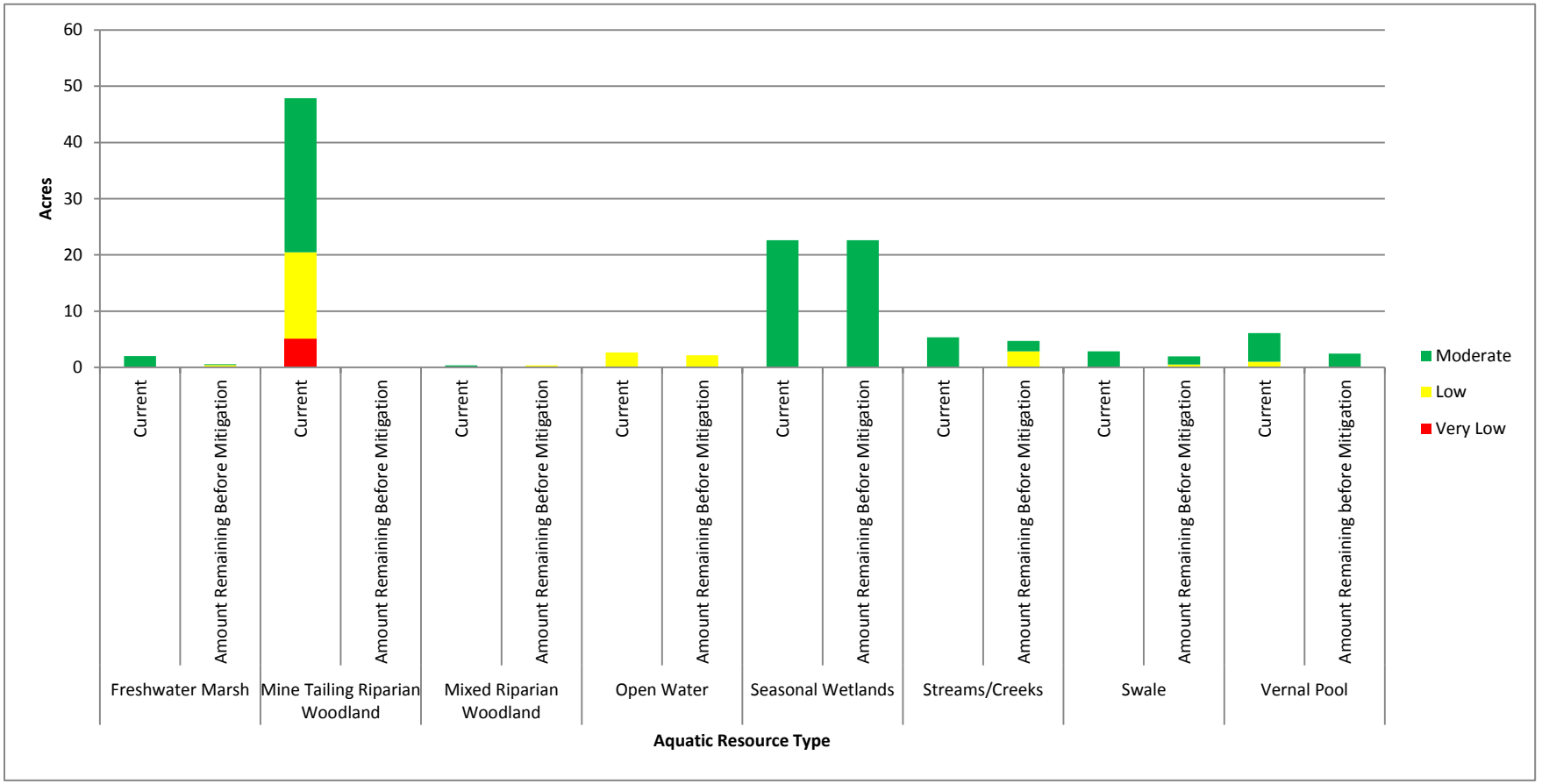


Table 17
Condition of Remaining Aquatic Resources in the Deer Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0.2	<0.1	0	0.2
	Mixed Riparian Scrub	R2/R3	40.3	35.4	3.0	0	78.8
	Mixed Riparian Woodland	R2/R3	106.6	694.6	19.3	0	820.5
		Subtotal Riparian	*146.9*	*730.2*	*22.3*	*0*	*899.5*
Wetland Waters	Freshwater Marsh	PEM1	21.9	14.3	0	0	36.2
	Seasonal Wetland	PEM2	13.8	100.1	5.0	0	118.9
	Swale	R2/R3	70.9	26.3	0.9	0	98.1
	Vernal Pools	PEM2	183.6	57.2	0.3	0	241.1
		Subtotal Wetland Waters	*290.2*	*197.9*	*6.2*	*0*	*494.3*
Non-Wetland Waters	Open Water	POW	69.4	56.4	3.6		129.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	121.5	<0.1	0	216.1
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	15.3	0.8	0	16.1
		Subtotal Non-Wetland Waters	*69.4*	*193.2*	*4.4*	*0*	*361.6*
		Subtotal Wetland Waters and Non-Wetland Waters	*359.6*	*391.1*	*10.6*	*0*	*855.9*
		Grand Total[1]	**506.5**	**1,121.3**	**32.9**	**0**	**1,755.4**

Note: [1] Table may not total precisely due to rounding.

Figure 29 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Deer Creek Watershed

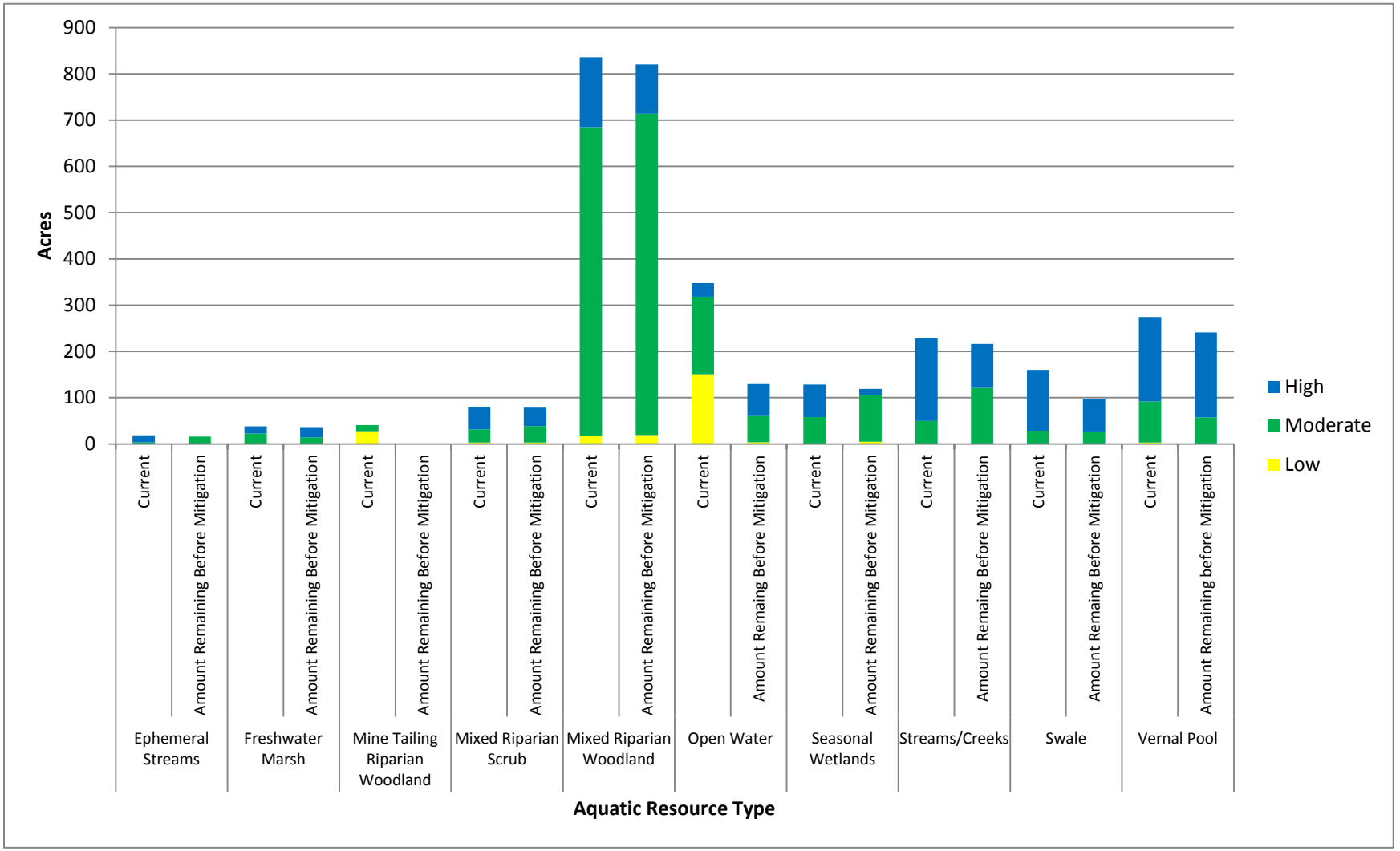
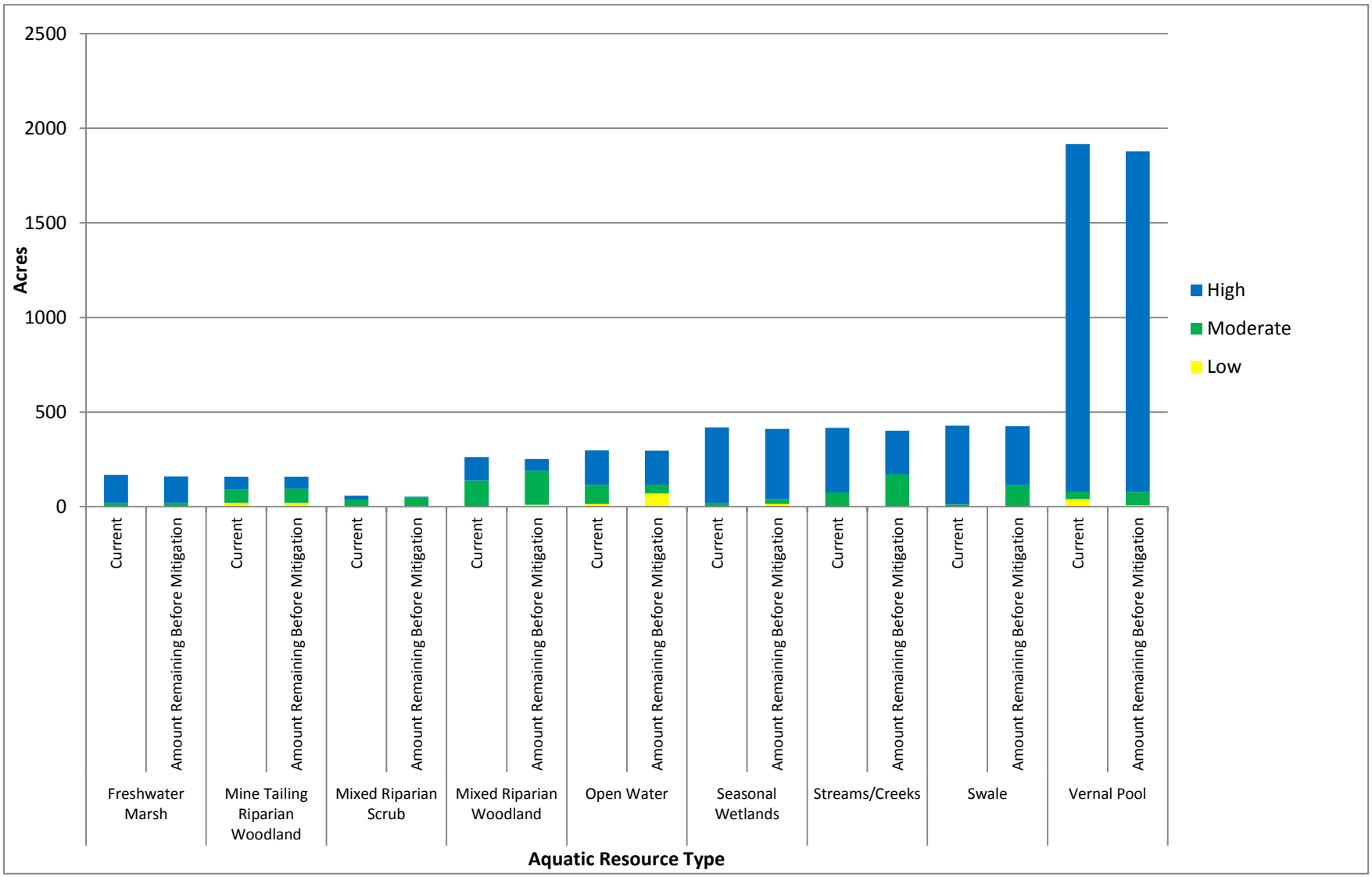


Table 18
Condition of Remaining Aquatic Resources in the Laguna Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	63.8	74.8	19.7	0	158.3
	Mixed Riparian Scrub	R2/R3	5.4	45.6	2.1	0	53.1
	Mixed Riparian Woodland	R2/R3	63.0	179.5	10.0	0	252.5
Subtotal Riparian			*132.2*	*299.9*	*31.8*	*0*	*463.9*
Wetland Waters	Freshwater Marsh	PEM1	139.6	19.6	0.4	0	159.7
	Seasonal Wetland	PEM2	370.8	25.1	14.5	0	410.5
	Swales	R2/R3	312.0	113.7	0.3	0	425.9
	Vernal Pools	PEM2	1,801.3	70.3	7.4	0	1,879.0
Subtotal Wetland Waters			*2,623.7*	*228.7*	*22.6*	*0*	*2,875.1*
Non-Wetland Waters	Open Water	POW	178.8	47.5	69.2	0	295.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	232.3	167.6	2.0	0	402.0
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*411.1*	*215.1*	*71.2*	*0*	*697.4*
Subtotal Wetland Waters and Non-Wetland Waters			*3,034.8*	*443.8*	*93.8*	*0*	*3,572.5*
Grand Total[1]			**3,167.0**	**743.7**	**125.6**	**0**	**4,036.4**

Note: [1] Table may not total precisely due to rounding.

Figure 30 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Laguna Watershed



AGENDA ITEM 11.1

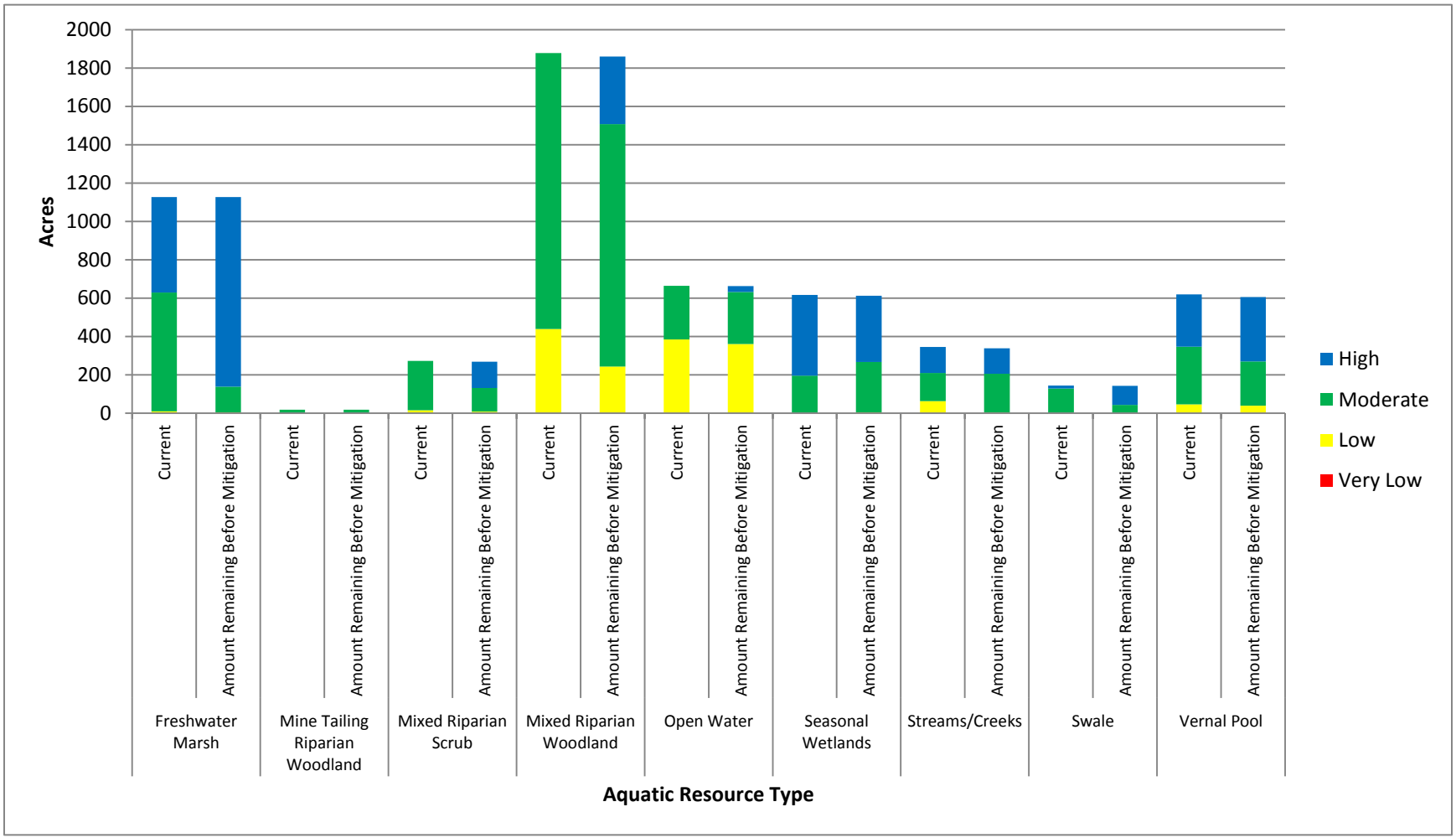
2614

Table 19
Condition of Remaining Aquatic Resources in the Lower Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	17.3	0	0	17.3
	Mixed Riparian Scrub	R2/R3	137.5	122.8	7.4	0	267.7
	Mixed Riparian Woodland	R2/R3	352.6	1,264.0	243.4	0	1,859.9
		Subtotal Riparian	*490.1*	*1,404.1*	*250.8*	*0*	*2,144.9*
Wetland Waters	Freshwater Marsh	PEM1	988.0	134.4	3.9	0	1,126.2
	Seasonal Wetland	PEM2	345.9	262.7	3.4	0	612.0
	Swale	R2/R3	99.4	41.0	1.2	0	141.6
	Vernal Pools	PEM2	335.6	230.7	38.1	0	604.5
		Subtotal Wetland Waters	*1,768.9*	*668.8*	*46.6*	*0*	*2,484.30*
Non-Wetland Waters	Open Water	POW	31.6	270.5	360.9	0	663.0
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	133.2	203.4	2.0	0	338.6
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*164.8*	*473.9*	*362.9*	*0*	*1,001.6*
		Subtotal Wetland Waters and Non-Wetland Waters	*1,933.70*	*1,142.70*	*409.5*	*0*	*3,485.90*
		Grand Total[1]	**2,423.8**	**2,546.80**	**660.3**	**0**	**5,630.80**

Note: [1] Table may not total precisely due to rounding.

Figure 31 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed



Draft SSHCP Aquatic Resources Program

Table 20
Condition of Remaining Aquatic Resources in the Lower Dry Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	31.8	5.4	0	37.2
	Mixed Riparian Woodland	R2/R3	0	269.9	52.3	0	322.3
Subtotal Riparian			*0*	*301.7*	*57.7*	*0*	*359.5*
Wetland Waters	Freshwater Marsh	PEM1	16.4	26.5	2.2	0	45.0
	Seasonal Wetland	PEM2	71.8	39.3	4.3	0	115.4
	Swale	R2/R3	10.8	53.4	<0.1	0	64.3
	Vernal Pools	PEM2	103.0	88.2	2.1	0	193.3
Subtotal Wetland Waters			*202*	*207.4*	*8.6*	*0*	*418*
Non-Wetland Waters	Open Water	POW	0	6.6	1.9	0	8.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	16.6	55.9	3.3	0	75.7
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*16.6*	*62.5*	*5.2*	*0*	*84.1*
Subtotal Wetland and Non-Wetland Waters			*218.6*	*269.9*	*13.8*	*0*	*502.1*
Grand Total[1]			**218.6**	**571.6**	**71.5**	**0**	**861.6**

Note: [1] Table may not total precisely due to rounding.

Figure 32 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed

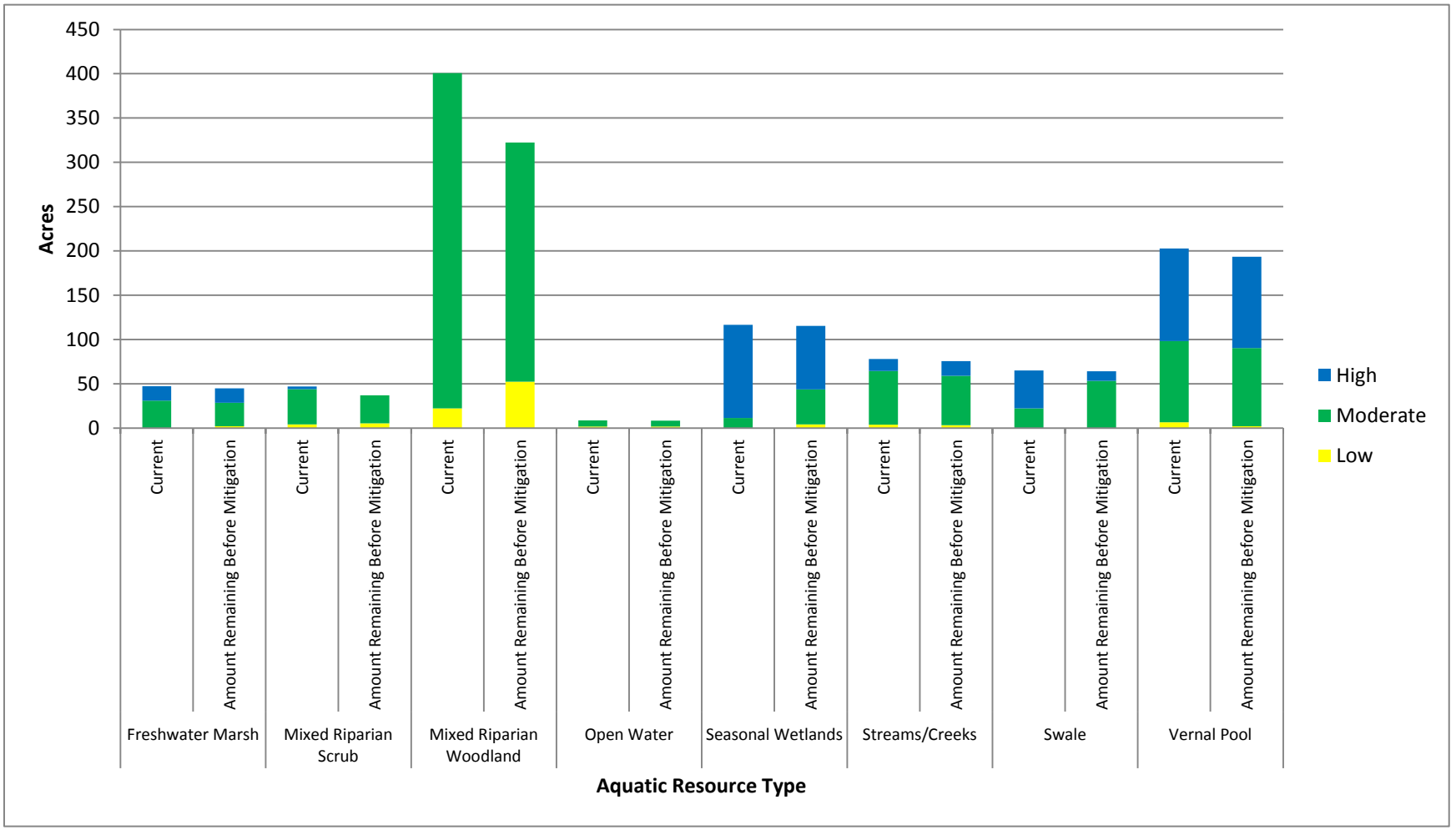


Table 21
Condition of Remaining Aquatic Resources in the Lower Mokelumne River Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	<0.1	2.4	0	2.4
	Mixed Riparian Woodland	R2/R3	0	14.0	182.2	0	196.2
		Subtotal Riparian	*0*	*14*	*184.6*	*0*	*198.6*
Wetland Waters	Freshwater Marsh	PEM1	0	20.9	0	0	20.9
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swale	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0.1	0	0	0.1
		Subtotal Wetland Waters	*0*	*21*	*0*	*0*	*21*
Non-Wetland Waters	Open Water	POW	0	0	3.1	0	3.1
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	65.1	2.2	0	67.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*0*	*65.1*	*5.3*	*0*	*70.5*
		Subtotal Wetland Waters and Non-Wetland Waters	*0*	*86.1*	*5.3*	*0*	*91.5*
		Grand Total[1]	**0**	**100.1**	**189.9**	**0**	**290.1**

Note: [1] Table may not total precisely due to rounding.

Figure 33 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Mokelumne River Watershed

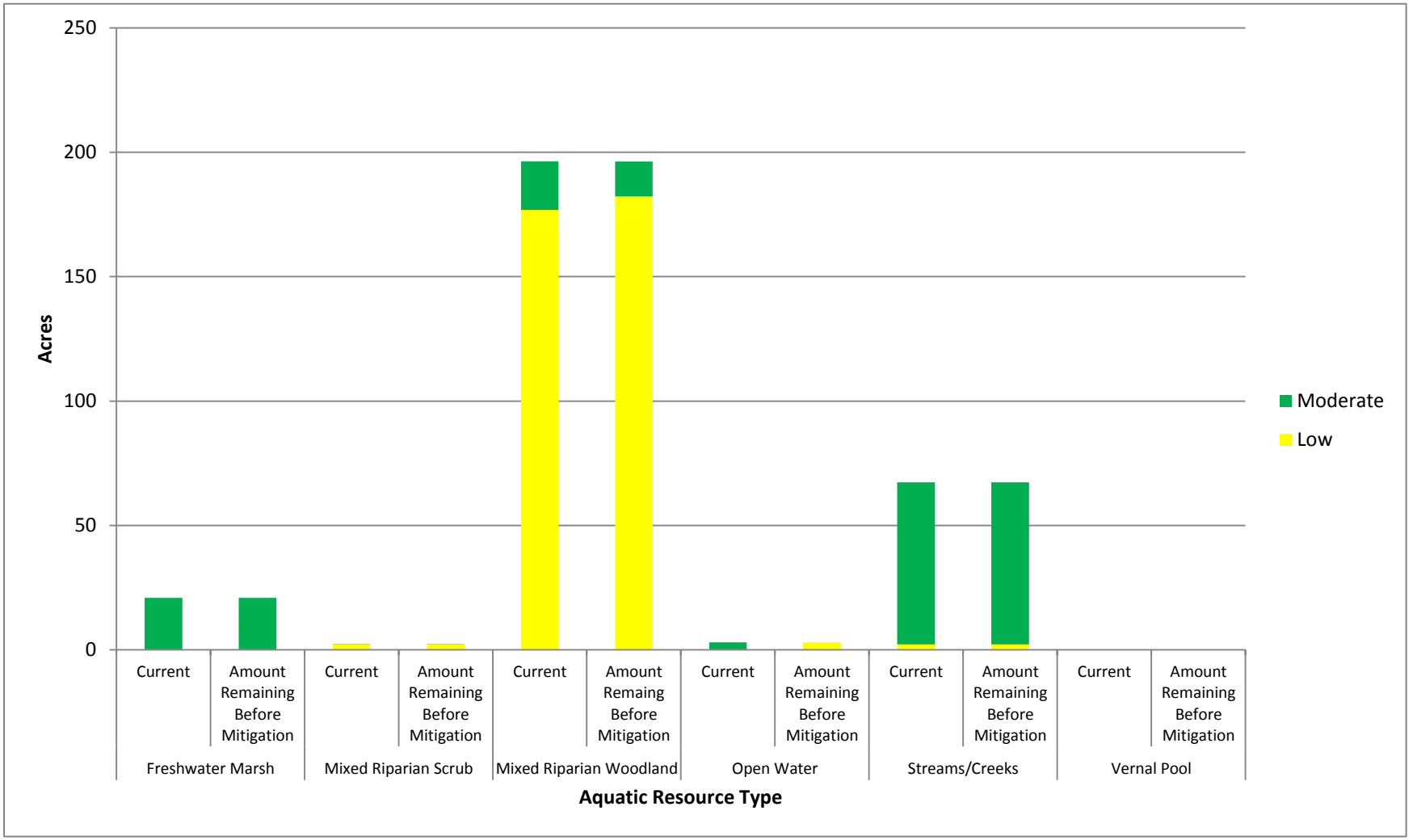


Table 22
Condition of Remaining Aquatic Resources in the Morrison Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	1.6	0	1.6
	Mixed Riparian Scrub	R2/R3	3.2	11.2	6.3	0	20.7
	Mixed Riparian Woodland	R2/R3	0	54.5	48.1	0	102.6
		Subtotal Riparian	*3.2*	*65.7*	*56.0*	*0*	*124.9*
Wetland Waters	Freshwater Marsh	PEM1	13.8	228.5	22.8	0	265.2
	Seasonal Wetland	PEM2	0	24.5	14.4	0	38.9
	Swale	R2/R3	16.8	158.5	20.6	0	195.9
	Vernal Pools	PEM2	283.7	183.6	13.9	0	481.2
		Subtotal Wetland Waters	*314.3*	*595.1*	*71.7*	*0*	*981.2*
Non-Wetland Waters	Open Water	POW	0	19.4	59.0	0	78.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	30.2	35.2	0	65.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	30.8	4.7	0	35.6
		Subtotal Non-Wetland Waters	*0*	*80.4*	*98.9*	*0*	*179.4*
		Subtotal Wetland Waters and Non-Wetland Waters	*314.3*	*675.5*	*170.6*	*0*	*1,160.6*
		Grand Total[1]	**317.5**	**741.2**	**226.6**	**0**	**1,285.5**

Note: [1] Table may not total precisely due to rounding.

Figure 34 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed

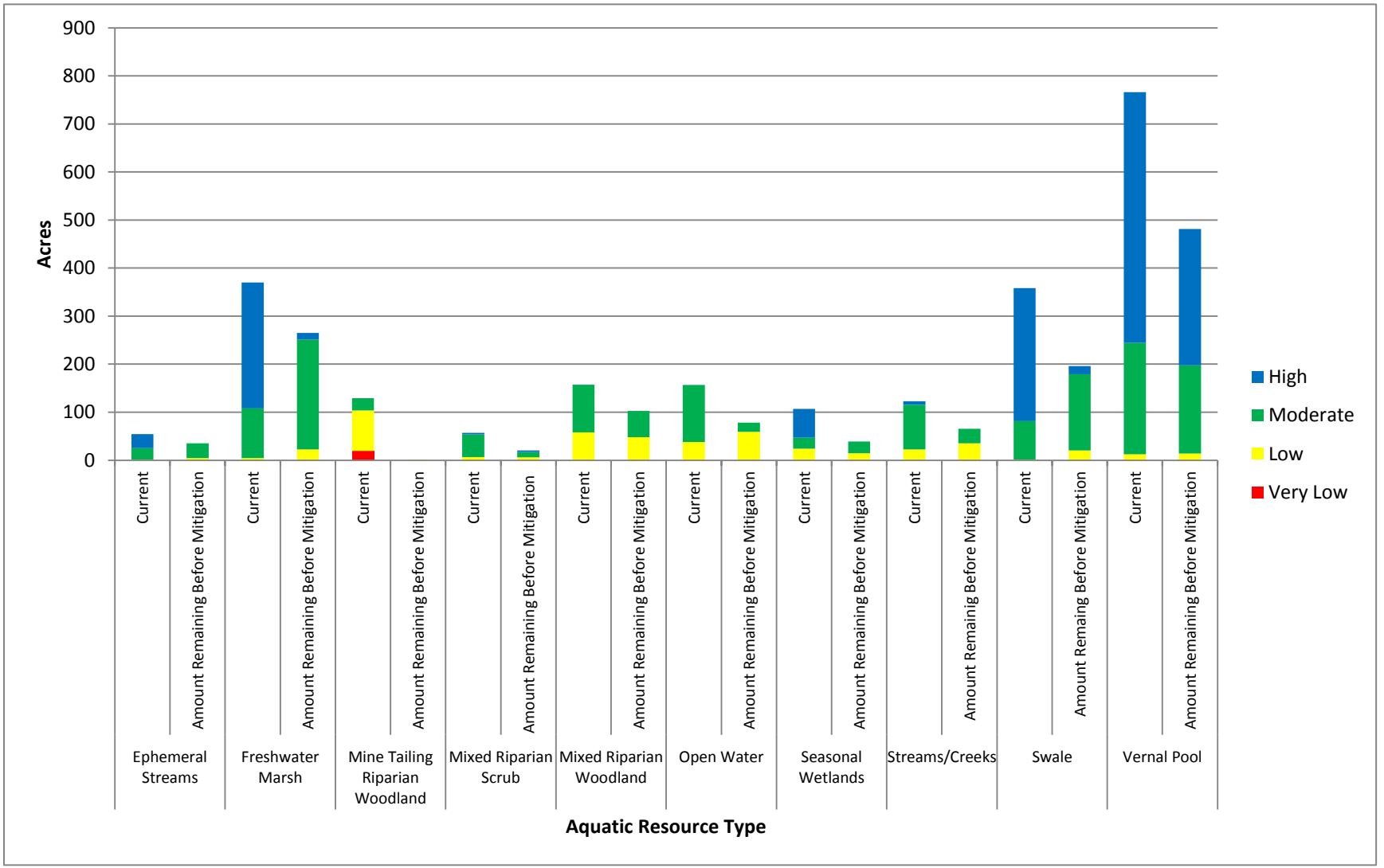


Table 23
Condition of Remaining Aquatic Resources in the Sherman Lake–Sacramento River Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0	120.8	5.4	126.2
	Mixed Riparian Woodland	R2/R3	0	0	41.2	6.7	48.0
Subtotal Riparian			*0*	*0*	*162.0*	*12.1*	*174.2*
Wetland Waters	Freshwater Marsh	PEM1	0	39.3	0	0	39.3
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swale	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0	0	0	0
Subtotal Wetland Waters			*0*	*39.3*	*0*	*0*	*39.3*
Non-Wetland Waters	Open Water	POW	0	0	9.2	0	9.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	0.3	19.8	0	20.1
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*0.3*	*29.0*	*0*	*29.3*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*39.6*	*29.0*	*0*	*68.6*
Grand Total[1]			**0**	**39.6**	**191.0**	**12.1**	**242.8**

Note: [1] Table may not total precisely due to rounding.

Figure 35 **Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed**

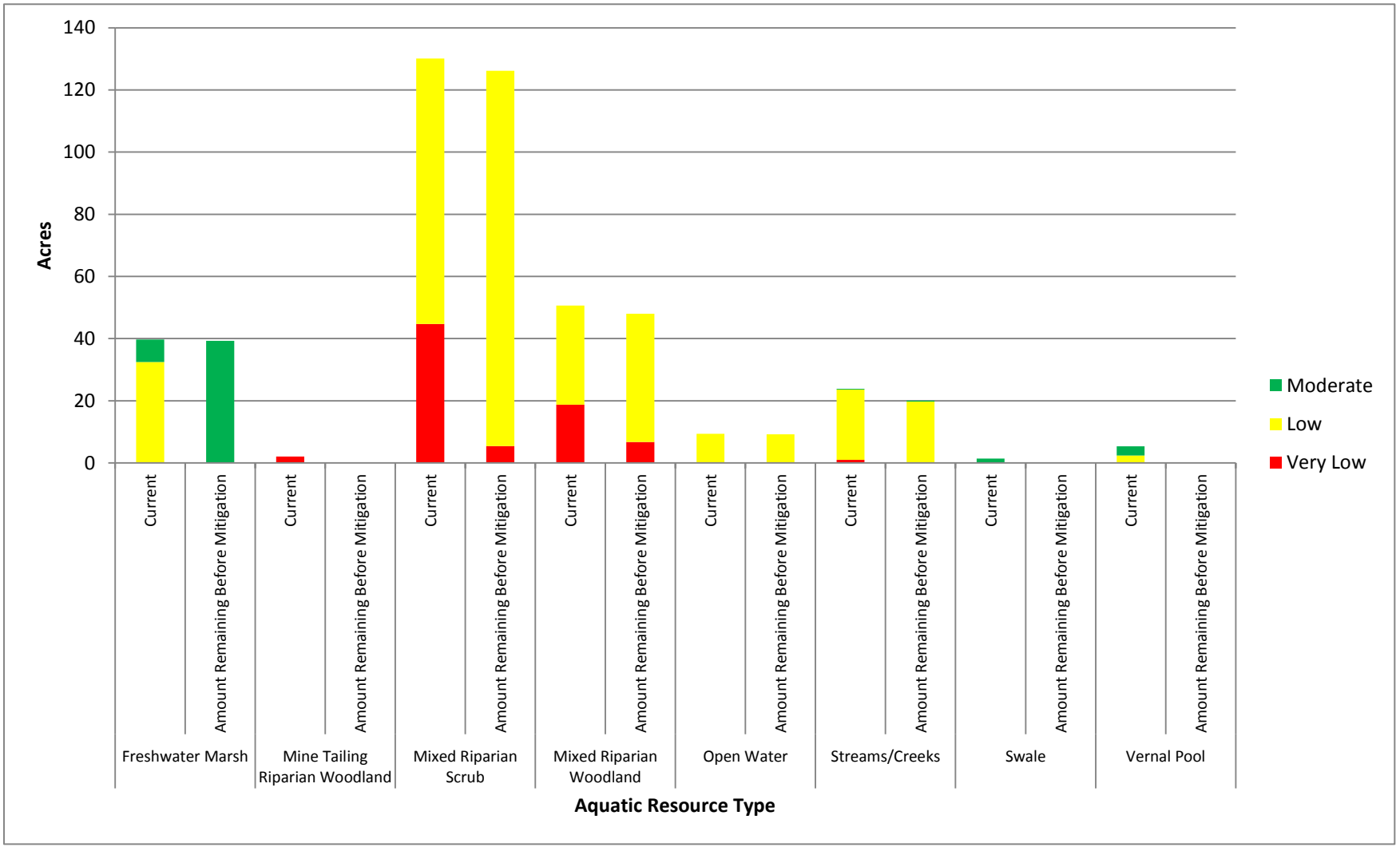


Table 24
Condition of Remaining Aquatic Resources in the Snodgrass Slough Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	350.7	176.9	0	527.5
	Mixed Riparian Woodland	R2/R3	0	488.1	802.5	0	1,290.6
Subtotal Riparian			*0*	*838.8*	*979.4*	*0*	*1818.1*
Wetland Waters	Freshwater Marsh	PEM1	0	871.7	150.7	0	1,022.4
	Seasonal Wetland	PEM2	0	590.8	184.5	0	775.2
	Swale	R2/R3	0	6.6	2.5	0	9.1
	Vernal Pools	PEM2	0	408.9	7.0	0	415.9
Subtotal Wetland Waters			*0*	*1,878.0*	*344.7*	*0*	*2,222.6*
Non-Wetland Waters	Open Water	POW	0	389.9	313.8	15.5	719.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	22.1	1,013.8	86.9	0	1,122.8
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	350.7	176.9	0	527.5
Subtotal Non-Wetland Waters			*22.1*	*1,754.4*	*577.6*	*15.5*	*2,369.5*
Subtotal Wetland Waters and Non-Wetland Waters			*22.1*	*3,632.4*	*922.3*	*15.5*	*4,592.1*
Grand Total[1]			**22.1**	**4,471.2**	**1,901.7**	**15.5**	**6,410.2**

Note: [1] Table may not total precisely due to rounding.

Figure 36 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed

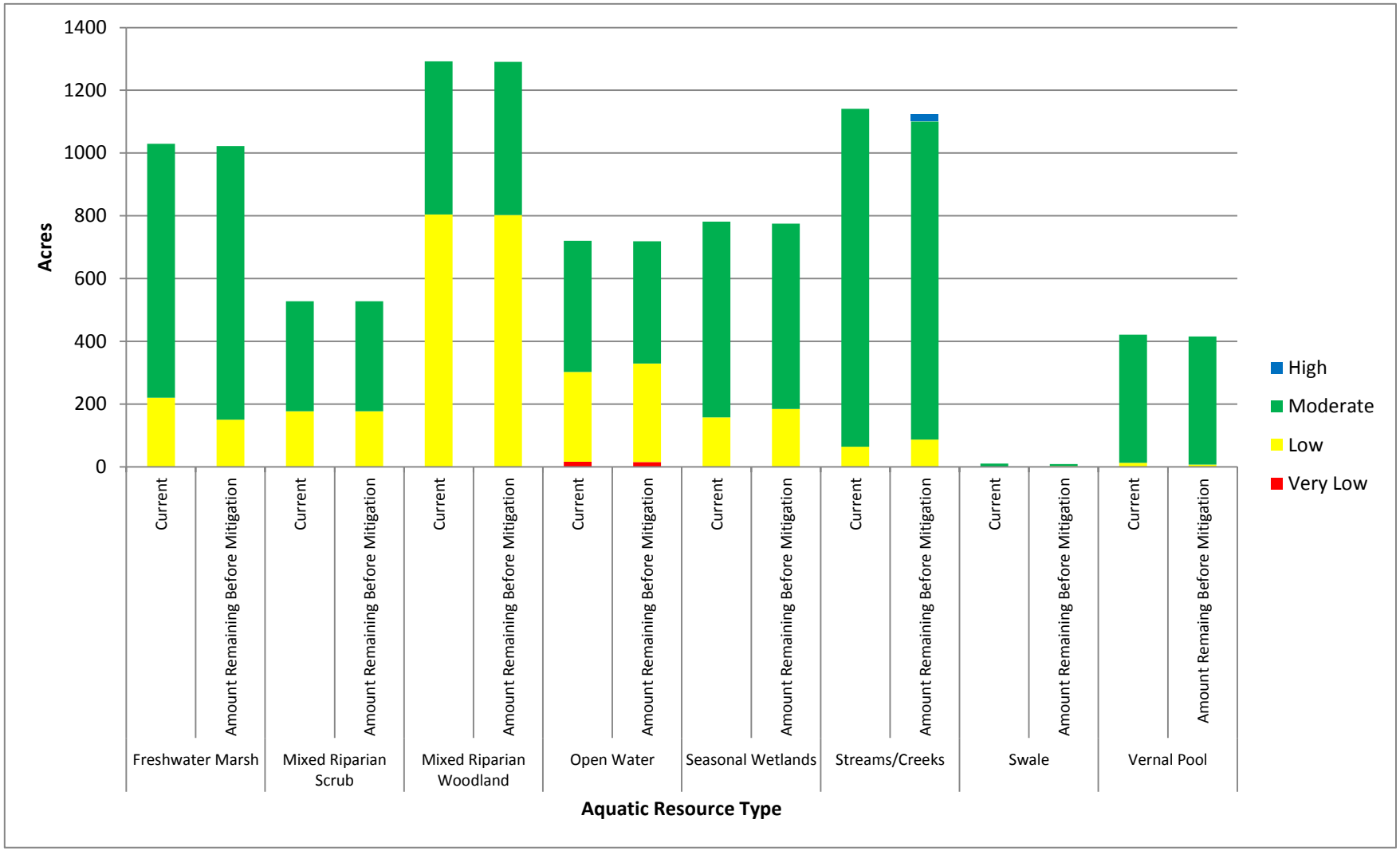


Table 25
Condition of Remaining Aquatic Resources in the Upper Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.2	148.7	29.7	0	245.5
	Mixed Riparian Scrub	R2/R3	31.8	67.9	0	0	99.7
	Mixed Riparian Woodland	R2/R3	355.6	368.1	4.0	0	727.7
		Subtotal Riparian	*454.6*	*584.7*	*33.7*	*0*	*1,072.9*
Wetland Waters	Freshwater Marsh	PEM1	87.8	22.6	1.3	0	111.7
	Seasonal Wetland	PEM2	360.2	42.7	5.7	0	408.6
	Swale	R2/R3	65.5	14.6	0.3	0	80.5
	Vernal Pools	PEM2	281.0	37.2	3.4	0	321.6
		Subtotal Wetland Waters	*794.5*	*117.1*	*10.7*	*0*	*922.4*
Non-Wetland Waters	Open Water	POW	133.8	65.6	80.7	0	280.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	175.6	172.6	0.4	0	348.6
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*309.4*	*238.2*	*81.1*	*0*	*628.8*
		Subtotal Wetland Waters and Non-Wetland Waters	*1,103.9*	*355.3*	*91.8*	*0*	*1,551.2*
		Grand Total[1]	**1,558.5**	**940.0**	**125.5**	**0**	**2,624.1**

Note: [1] Table may not total precisely due to rounding.

Figure 37 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed

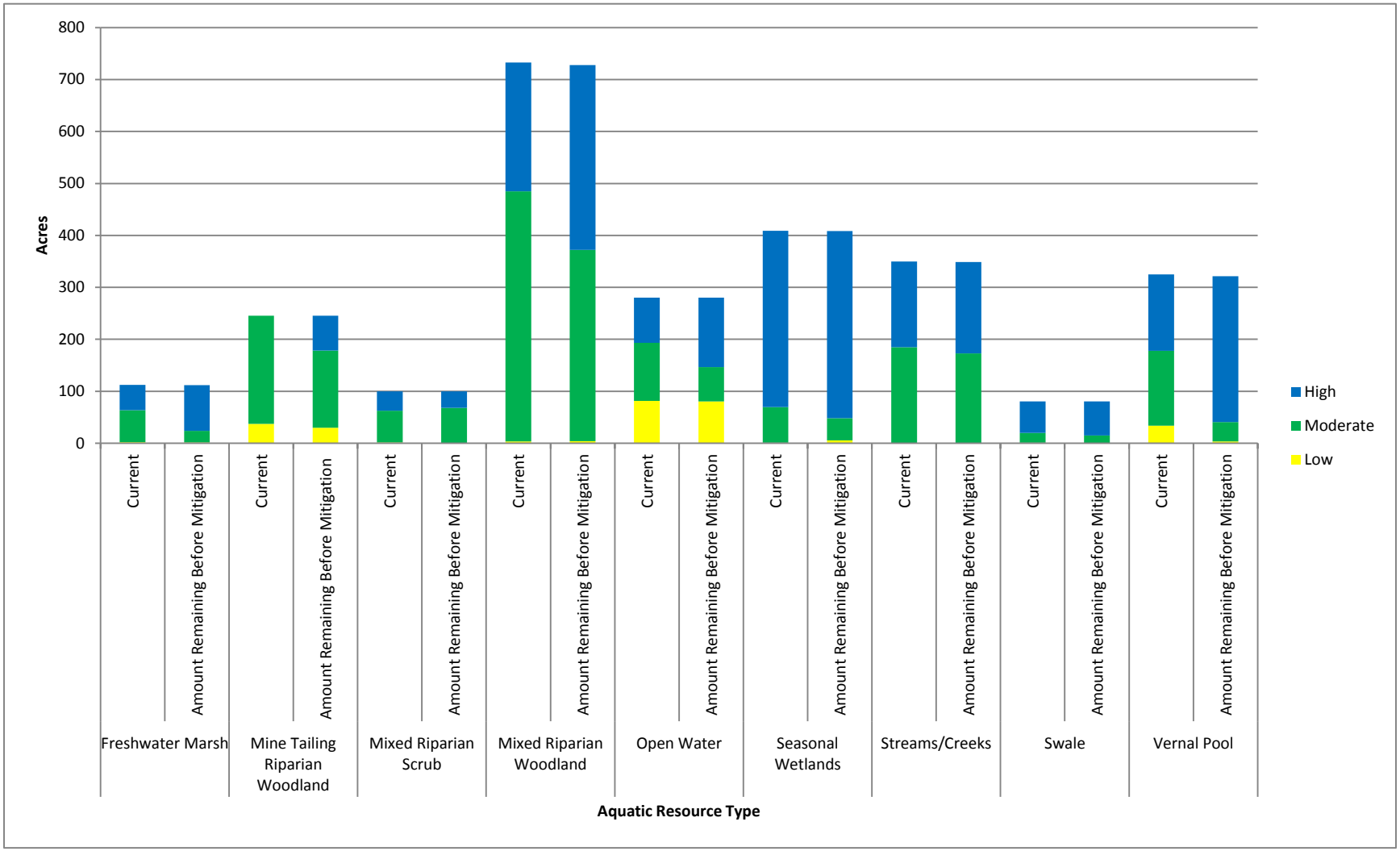


Table 26
Mather Core Recovery Area Existing and Post-Impact Vernal Pool Conditions (Acres)

Condition	High	Moderate	Low	Very Low	Total
Current	525.0	181.4	1.2	0	707.6
Remaining	425.2	144.5	0.5	0	570.1

In summary, the predicted impacts resulting from the SSHCP, prior to considering compensatory mitigation, show an impact on the abundance of aquatic resources. The diversity and condition of the resources largely remain intact, as none of the aquatic resource types are disproportionately impacted within the Plan Area, and the amount of high condition resources remains stable.

5 MITIGATION FRAMEWORK FOR AQUATIC RESOURCES

5.1 Mitigation Overview

The SSHCP and ARP would establish a network of conservation areas in the Plan Area that would preserve sensitive species and their natural communities in perpetuity. Preservation of these natural communities includes many types of waters of the United States and waters of the state, riparian buffer areas, and adjacent upland areas. The SSHCP Conservation Strategy would be an integral part of a more efficient regulatory permitting process implemented over a 50-year period. This more efficient permitting process implements a watershed perspective applied to a regional approach to avoidance, minimization, and compensatory mitigation for impacts to waters of the United States and waters of the state. This efficient permitting process would be different from the conventional permit-by-permit review process because it combines the mandates of the ESA with mandates of Section 404 of the CWA to allow for the formation of a singular, comprehensive state and federal regulatory framework for future projects that implements a more efficient permitting process for better decision-making and greater environmental benefits. It allows the regulated public the ability to comply as a whole and contribute to the overall larger SSHCP Conservation Strategy. It is envisioned that the alternative selected for the SSHCP would provide the greatest amount of avoidance and minimization at a regional level for 404 purposes. This approach would follow a process of landscape-level and project-level AMMs. These AMMs would be monitored during project implementation to assure they provide regional consistency across the Plan Area, and would be instrumental as a supporting basis for the SSHCP and ARP to avoid and minimize impacts to aquatic resources to the greatest extent practicable. It would also direct compensatory mitigation, when required, to be integrated on a watershed basis into a comprehensive system of larger, integrated and connected conservation areas. The SSHCP Conservation Strategy and associated state and federal regulatory framework approach would be superior to the existing permitting framework because it would pursue procedural goals that seek to reduce the likelihood of fragmentation of important landscapes, including aquatic resources, mixed into a matrix of urban development when administered over a 50-year period.

The Section 404(b)(1) Guidelines (40 CFR Part 230) require that all Department of the Army permits subject to Section 404 of the CWA comply with a strict sequencing approach: all appropriate and practical steps to avoid and minimize adverse impacts to waters of the United States must be taken before a permit can be issued by USACE. Additionally, compensatory mitigation for unavoidable impacts may be required to ensure that an activity requiring a CWA Section 404 permit complies with the 404(b)(1) Guidelines. The SSHCP would provide the regulated public access to greater environmental permitting certainty for development projects, while implementing a Conservation Strategy that incorporates a watershed-based approach. This is accomplished by achieving each of the stated SSHCP Biological Goals and Measureable

Objectives and conservation measures, including establishing a network of preserves with high-value resources while still providing for development. Under this strategy, the SSHCP and ARP are intended to protect watershed integrity, provide and maintain natural corridors, produce ample blocks of contiguous habitat, and provide necessary buffers for these natural areas. From a project-level standpoint, avoidance and minimization of impacts to aquatic resources by the regulated public would be consistent, robustly implemented, and would be subject to a comprehensive set of AMMs, including low-impact development (LID), best management practices (BMPs), siting and design requirements, Stream Setbacks, and Preserve Setbacks. All of the Covered Activity AMMs and the other components of the SSHCP Conservation Strategy synergistically combine to ensure maintenance of current functions and services within the Plan Area and provide avoidance and protection of thousands of acres of regulated aquatic resources and important habitats (see Section 5.4 in Chapter 5 of the SSHCP). Furthermore, compensatory mitigation for Covered Activity impacts to aquatic resources authorized under the SSHCP and ARP would be considered by using a watershed approach. The USACE/EPA "Mitigation Rule" requires the use of a watershed approach to the extent appropriate and practicable, stating "The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites" (33 CFR 332.3[c]). The SSHCP and ARP would be consistent with the Mitigation Rule, by systematically prioritizing compensatory mitigation projects based on anticipated impacts to aquatic resources, considering both watershed- and function-based factors, and pursuant to the type (e.g., mitigation bank) and location preference hierarchy identified in the 2008 Mitigation Rule at 33 CFR 332.3(b)(2) through (b)(6). However, the preference hierarchy may be overridden where appropriate, for instance when the required compensatory mitigation involves larger, more ecologically valuable parcels; is subject to more rigorous scientific and technical analysis, planning, and implementation; involves advanced site identification and planning; and utilizes significant investment of financial resources for sites located to successfully replace lost functions and services, taking into account such watershed-scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, trends in land use, ecological benefits, compatibility with adjacent land uses; and in general, when practicable, to meet the aforementioned considerations in the same watershed.

5.2 Avoidance and Minimization

5.2.1 Landscape-Scale Avoidance

The Plan Area contains two specific regions: the UDA, where local jurisdictions anticipate urban growth and lands outside the UDA, which includes agricultural land and natural landscapes with natural intact sources of surface and sub-surface water influx and outflow (described in greater detail in Appendix A, Watershed Study for the SSHCP and ARP). The lands outside the UDA already include several large areas of conservation lands (described in Section 7.2.2 of the

SSHCP). Preservation and management requirements inside the UDA would differ from those outside the UDA because the areas adjacent to these Preserves would have very different land uses. However, the ARP (through implementation of the SSHCP by the Plan Permittees) would implement a comprehensive strategy to protect the functions and services of watersheds in the Plan Area. The strategy begins with avoidance and minimization of impacts to aquatic resources at a landscape scale using a watershed-based approach for the overall Plan Area.

The Plan Area aquatic resources avoidance strategy would be built upon AMMs, LID measures, and a framework of existing and proposed preserves and linkages. Implementation of these measures would achieve the SSHCP goals and objectives for vernal pools, maximize protection of intact hydrologic sub-basins, establish stream corridors and setbacks, protect aquatic resources, and connect existing preserves to proposed preserves. The Preserve System would implement avoidance, protection, and ultimately include a vast network of thousands of acres of vernal pool systems, seasonal wetlands, streams, adjacent riparian zones, grasslands and other ecologically important areas where further development of the watershed would not occur.

The vernal pool habitat Conservation Strategy was based in part upon a Vernal Wetland Acre/Density Index (VWADI) (Dittes et al. 2007) that described and classified the vernal pool complexes within the Plan Area (see Section 5.2, Appendix B-1 and Appendix B-2). The VWADI is based on variation in vernal pool acreage and density. Plan Area vernal pools were classified according to the VWADI into five categories of conservation value, with the highest conservation value placed on high-density vernal pool complexes (most wetted acres with densest vernal pool complexes and largest number of pools). Those vernal pool complexes with the highest conservation value scores were considered during the development of the SSHCP Conservation Strategy and the conceptual design of the SSHCP Preserve System described in SSHCP Section 7.5. The VWADI should not be confused with the FCAM described in Appendix C. While both processes were used to help determine which areas within the Plan Area have the highest-quality vernal pool resources, the VWADI was used to inform the SSHCP Conservation Strategy as it relates to the preservation of vernal pool resources primarily for the protection of endangered species. The FCAM was developed to evaluate all aquatic resource classifications, not just vernal pool, and to include measurements of value for habitat, water quality and hydrology. The VWADI and FCAM are independent of one another, but are complementary and both are used to direct conservation actions for vernal pool ecosystem conservation.

The result of SSHCP implementation would be a net gain of aquatic resources functions and services in the Plan Area, which is depicted in the ARP's pre- and post-watershed profiles (see Chapter 6). Implementation of the SSHCP's comprehensive balanced approach to aquatic resource conservation can provide a greater level of landscape- and watershed-scale protection of aquatic resources than is possible via the conventional project-by-project permitting approach under the CWA Sections 404 and 401, and the California Fish and Game Code 1600 programs.

5.2.1.1 Landscape-Scale Avoidance within the UDA Watersheds

Landscape-scale avoidance within the UDA watersheds would be implemented to include protection of wetlands and streams to minimize adverse effects from the construction of new impervious surfaces. Within the UDA, sufficient sub-watershed areas would be protected via a system of AMMs during project design and development, so that natural sources of surface and sub-surface water influx and outflow remain intact, and potential development-related increases in impervious surfaces, runoff, and sources of water pollution are avoided or minimized (e.g., runoff from roads, roofs, paved surfaces, utility pipes, landscaped areas). Landscape-scale avoidance within the UDA watersheds would involve implementation of Stream Setbacks, protection of wetlands adjacent to streams, and LID measures that would be incorporated into urban development project design (as described in the SSHCP in Chapter 5). Implementation of landscape-scale avoidance strategies on 6,941 acres of land within the UDA watersheds would mitigate negative impacts to water quality and surface water runoff that could occur with urban development.

Three HUC-10 sub-watersheds occur within the UDA (Morrison Creek, American River, and Sherman Lake–Sacramento River). For first- and second-order streams[6] that flow through the UDA, a 25-foot setback buffer on either side would be enforced. The primary objective of this 25-foot buffer is to reduce sediment and nutrient inputs from surface flows in urban areas to protect water quality and habitat downstream. Dense urban adjacent land covers provide low habitat potential for Covered Species; however, a minimal buffer would reduce sediment and nutrient inputs, retain some potential for stream restoration, and provide recreational opportunities. For Morrison Creek, Gerber Creek, and Elder Creek, a Stream Setback of 100 feet on either side would be enforced. For preserve linkages that include creeks or streams, avoidance measures would include the creek or stream plus a minimum 300-foot setback on either side of the creek (in accordance with the process outlined in the SSHCP in Chapter 5, Section 5.6). The protective setback from Laguna Creek would be 150 feet wide on either side.

The SSHCP would require a robust strategy of avoidance of aquatic resources for Covered Activity projects proposed in the UDA. Project proponents who seek incidental take coverage under the SSHCP would be required by Land Use Authority Permittees or the Implementing Entity, whoever has jurisdiction over the project, to demonstrate efforts that avoid direct and indirect impacts to mapped aquatic resources pursuant to a Determination of Environmentally Equivalent or Superior Alternative (DEESA) project design requirement (see Section 5.2.2.1). Complete avoidance would be selected, if practicable. Part of the SSHCP stream mitigation policy within the UDA involves comprehensive landscape-scale avoidance of streams. Stream

[6] The SSHCP uses the Strahler stream order system where stream order is based on hierarchy of tributaries.

buffer widths within UDA watersheds were developed to meet adequate stream protection with goals such as: stabilize streambanks with vegetation; reduce erosion by uncontrolled runoff; reduce nutrient, sediments, and other contaminants loads; provide a visually appealing greenbelt; and provide recreational opportunities.

5.2.1.2 Avoidance and Preserve Assembly within Watersheds Outside UDA

The SSHCP Preserve Assembly sets goals that would preserve and link the highest-quality natural land covers, cropland, and irrigated pasture-grassland within the Plan Area (described in detail in the SSHCP in Chapter 7, Section 7.2.2.1), with a Preserve System 36,282 acres in size, and 27,554 acres of which would be located outside the UDA. Avoidance and minimization of aquatic resources would be accomplished through preserve design and assembly, which includes protecting the rarest types and highest-functioning aquatic resources (e.g., vernal pools, streams, certain seasonal wetlands) and implementing inter-preserve connectivity. The SSHCP Preserve System would be designed to protect watershed function, and specifically hydrologic regimes. This preserve design would be important to aquatic resources and water quality and its many existing and potential beneficial uses, and an important determinant of certain aquatic resource-dependent/associated plants and wildlife. It would also be designed to preserve natural upland landscapes associated with streams and wetland features for maintaining aquatic resource dependent/associated species—a strategy of primary importance. Upland landscapes adjacent to aquatic resources provide greater environmental benefits to aquatic functions and services and become another advantage to the overall avoidance and protection package of the SSHCP Conservation Strategy.

5.2.1.3 AMMs at the Landscape Scale

The SSHCP contains numerous requirements for avoidance and minimization of adverse impacts to aquatic resources. At a landscape scale, the SSHCP provides a framework for supporting avoidance and minimization of adverse impacts to aquatic resources in combination with a systematic landscape-level compensatory mitigation strategy. The SSHCP Conservation Strategy and Goal 2 of the associated Biological Goals and Measureable Objectives (SSHCP Chapter 7) describe requirements for implementing Covered Activities under the SSHCP.

The framework of requirements constituting the SSHCP's regional/landscape avoidance strategy include, but are not limited to, the following measures:

- Consistent with the USB and sphere of influence boundaries, directing impacts within the 317,656-acre Plan Area to an approximate 33,497-acre impact area, 32,059 acres of which would be inside the UDA and 1,448 acres of which would be outside the UDA.

The envelope is linked to areas within the UDA and certain pre-defined infrastructure projects outside of the UDA.

- Considering watershed needs within the Plan Area, habitat/biological functions have been found to be of primary importance to protect, while still preserving water quality and hydrology (chemical and physical functions). The SSHCP and ARP include the following components, which result in landscape-level avoidance of 22,502 acres of existing aquatic resources in the Plan Area:
    - Preservation into perpetuity of 15% (3,539 acres) of the Plan Area's existing potentially jurisdictional aquatic resources within the 36,282-acre Preserve System. The areas selected for avoidance under the SSHCP must be those that demonstrate higher habitat functions, per the Conservation Actions included in Table 7-1 in Chapter 7 of the SSHCP. However, most of the aquatic resources with high habitat functions also have high water quality and hydrology functions. Aquatic resources situated within proposed preserves are also afforded extra protection via adjacent natural upland buffers (i.e., the Preserve Setbacks) of a minimum of 50 feet in width (minimum 25 feet each side of the stream) to reduce edge effects. Note that 9,136 acres (38%) of aquatic resources in the Plan Area are already protected in existing preserves, which would become linked together by new preserves established under the SSHCP Conservation Strategy.
    - Of the other 11,419 acres of existing potentially jurisdictional aquatic resources in the Plan Area, approximately 9,827 acres (86%) would *not* be directly impacted by Covered Activities.
- Goal 2 of the SSHCP Conservation Strategy includes a Measureable Objective requiring avoidance of creeks in the UDA (a minimum of 10% avoidance required). However, the Plan would actually avoid 30% of all creek acreage in the UDA.
- Requirement for project proponents to establish Stream Setbacks. Avoided creeks (including ephemeral streams) would have minimum setback requirements based on specific objectives of the overall mitigation strategy (Table 27).

Table 27
Stream Setback Minimum Requirements in the UDA

Stream	Minimum Setback on Each Side (from the Top of Bank Measured in Aerial Perspective)
Laguna Creek	150 feet
Elder Creek	100 feet
Frye Creek	100 feet or as depicted as part of the NewBridge development project hardline Preserve (see Appendix K of the SSHCP)
Gerber Creek	100 feet
Morrison Creek	100 feet

Table 27
Stream Setback Minimum Requirements in the UDA

Stream	Minimum Setback on Each Side (from the Top of Bank Measured in Aerial Perspective)
Central Paseo	100 feet or as depicted as part of the Cordova Hills development project hardline Preserve (Appendix K of the SSHCP)
Sun Creek	100 feet or as depicted as part of the Sun Creek development project hardline Preserve (see Appendix K of the SSHCP)
Avoided 1st and 2nd Order Tributaries to Above Streams	25 feet

- Roadway construction or widening Covered Activities within the Plan Area would be subject to stream avoidance or minimization requirements (see AMMs ROAD-1, STREAM-1, STREAM-2, STREAM-3, STREAM-4, and STREAM-5 in SSHCP Section 5.4).
- The majority (55%) of impacts to vernal pools would occur outside the Mather Core Recovery Area. Vernal pool preservation, re-establishment, and establishment would be heavily weighted toward areas inside the Mather Core Recovery Area and the Cosumnes/Rancho Seco Core Recovery Area. The SSHCP would establish large and interconnected preserves in these Recovery Areas to protect a contiguous network of vernal pool habitat. Existing project-by-project permitting tends to result in a larger number of preserved pools, but ones that are isolated and more vulnerable to edge effects. In this way, the SSHCP would provide superior benefits to a rare aquatic resource as compared to a project-by-project permitting approach.
- On-site project requirements to maintain hydrologic conditions, minimize effects on downstream hydrology through stormwater retention and other measures (LID), mandatory construction monitoring near Covered Species aquatic habitat, and mandatory implementation of erosion control measures during project construction "scale up" such that the overall Plan Area would not experience a net loss of aquatic resources functions and services.
- Compensatory mitigation Covered Activities (re-establishment, establishment, preservation of aquatic resources) would be strategically located within the preserved areas where they would provide maximum functional gain. This would occur programmatically within the Plan Area. This singular approach to compensatory mitigation is better than could be achieved by a project-by-project permitting approach.
- The USACE's General Permit (GP) general conditions and any updates to those conditions would be proposed to require compliance with appropriate SSHCP AMMs and be tailored for protection of the aquatic resources in the Plan Area.

- The Plan Permittees have requested that the USACE develop a GP(s) (RGP/PGP) that would propose a per-project impact thresholds (caps), which in addition to assuring minimal individual and cumulative environmental impacts, would provide incentive for individuals and organizations to avoid aquatic resources in project planning, in order to qualify for using a GP(s) (see Chapter 7).
- The proposed RGP/PGP may also require overall impact threshold caps to limit the overall amount of direct impacts (loss) of aquatic resources during any single 5-year span of the GP(s) so that impacts to aquatic resources can be monitored and adaptive management can be implemented as necessary.
- For impacts within the UDA, caps would be tailored to address protection of streams as they are crucial to implementation of corridors in the SSHCP Preserve System. As such, a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA would be avoided. Plan-wide, 90% of all streams would be avoided, and outside the UDA, all headwaters would be avoided.

AMMs applied across the entire Plan Area would quicken the permitting process for Covered Activities and would allow the regulated public as a whole to contribute to the implementation of the overall avoidance and minimization of aquatic resources within the development envelope and the formation of a large, connected conservation system. Such outcomes would not be possible under the project-by-project review process.

5.2.2 Project Scale

5.2.2.1 AMMs at the Project Scale

In addition to ensuring avoidance and minimization at a landscape scale, the SSHCP and ARP also require project-scale avoidance and minimization. Goal 2 of the SSHCP Conservation Strategy Biological Goals and Measurable Objectives is to "Maintain or improve physical, chemical and biological functions of aquatic resources within the Plan Area." Each project proposed within the Plan Area would need to conform to the following procedure to ensure that adequate avoidance and minimization requirements have been met.

As Covered Activity projects are proposed within the Plan Area, an assessment of the potential on-site effects of those Covered Activity projects on aquatic resources shall be performed using available information supplied by the SSHCP and ARP, augmented by project-specific mapping provided to and reviewed by the Plan Permittees prior to submittal to the USACE, RWQCB, and CDFW (see Section 10.4.3.3 in Chapter 10 of the SSHCP).

The documentation for the project-scale assessment shall include mapping (which for greatest accuracy in informing project-scale AMMs is suggested to utilize a project's aquatic resources delineation mapping prepared in accordance with the Sacramento District USACE's minimum standards for aquatic resources delineations), and a description of the functions and services of the mapped areas' aquatic resources. Factors to be considered to describe the functions and services include hydrologic regime, flood storage and flood flow modification, nutrient retention and transformation, sediment trapping and transport, toxicant trapping, and maintenance of plant and animal communities. Many of these factors would already have been given consideration, and existing information from the SSHCP and ARP can be utilized and augmented if necessary. The functions and services assessment would focus on the current functions and services being provided, particularly for those areas that should be considered for priority acquisition for the SSHCP Preserve System, as well as those functions that may affect aquatic resource diversity, abundance, and condition; and/or conservation of Covered Species within the SSHCP Preserve System.

For aquatic resources proposed to be impacted, applicable mitigation shall be required by the Plan Permittees, as follows. To ensure that these standards are met, Land Use Authority Permittees or the Implementing Entity, depending on who has jurisdiction over the project, shall require that project proponents develop on-site project alternatives demonstrating efforts that first avoid, and then minimize direct and indirect effects to the aquatic resources mapped pursuant to this section. A complete on-site avoidance alternative shall be selected by the Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, and if practicable, while taking into account the SSHCP and ARP Conservation Strategy.

If a complete avoidance alternative is not practicable as determined by the Implementing Entity or Land Use Authority Permittees, depending on who has land use jurisdiction over the project, an alternative that minimizes direct and indirect impacts to aquatic resources and associated functions and services to the greatest extent practicable shall be selected. Those impacts that are unavoidable shall be mitigated (minimized and compensated) such that the lost functions and services are replaced as set forth below under the DEESA.

Determination of Environmentally Equivalent or Superior Alternative

Consistent with the regional Conservation Strategy of the SSHCP, the following is an approach that gives consideration to on-site avoidance and minimization. The guiding principles for the SSHCP Conservation Strategy (Section 7.1 of Chapter 7 of the SSHCP) emphasize establishment of large and interconnected preserves, which is not compatible with the typical approach of on-site avoidance. That existing approach tends to result in many small, isolated aquatic resources that are subject to edge effects and provide reduced habitat value compared to large preserves. If a complete avoidance alternative is not practicable and an alternative is selected as set forth

above, a DEESA shall be made by the Land Use Authority Permittees or the Implementing Entity, depending on who has land use jurisdiction over the project, to ensure replacement of any lost functions and services to aquatic resources. The DEESA shall be submitted with the Project Application and shall include the following information to be supplied by the proponent and reviewed by the Land Use Authority Permittees or the Implementing Entity, depending on who has jurisdiction over the project, for accuracy and consistency with the SSHCP and ARP:

- A defined project area boundary and project area acreage.
- A detailed project description, including an overall project purpose statement, that demonstrates: (1) why an avoidance alternative is not practicable;[7] and (2) that the Covered Activity project minimizes direct and indirect effects to aquatic resources to the greatest extent practicable. This description would include information regarding any aquatic resources on site that are proposed to be avoided. It would also include information regarding any impacted aquatic resources in the context of the regional Conservation Strategy of the SSHCP (e.g., a statement that the project proposal is consistent with the requirements of the SSHCP and any terms and conditions of the SSHCP ITPs).
- Amount (acres and linear feet and cubic yards) of unavoidable impacts (permanent, causing loss of waters, and temporary) to aquatic resources associated with the project, and amount of indirect impacts.
- A detailed description of project design features and mitigation measures that reduce impacts, including but not limited to, impact minimization; on-site first-order stream realignment (as opposed to removal); and SSHCP BMPs, AMMs, and LID AMMs.
- A description and amount of SSHCP-required compensatory mitigation through re-establishment, establishment, and/or preservation. Compensatory mitigation must conform to the SSHCP Conservation Strategy and the minimum mitigation ratios required by the ARP and must be consistent with the USACE/EPA Mitigation Rule (33 CFR Part 332). The primary way development project Covered Activities would accomplish the required mitigation is the purchase of credits from an ILF program that would be used for the Plan Area. (See Section 5.3 for specific compensatory mitigation requirements.)
- A finding that demonstrates that although the proposed Covered Activity project would not completely avoid impacts to aquatic resources, with proposed design and compensation measures, the project would be environmentally equivalent or superior to

[7] Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose.

that which would occur under a complete avoidance alternative without these measures, based on one or more of the following factors:

- Effects on designated Critical Habitat and Core Recovery Areas
- Effects on the diversity of aquatic resources within the Plan Area
- Effects on vernal pool and other habitat connectivity and function of the SSHCP Preserve System
- Effects on the condition of aquatic resources within the Plan Area
- Effects on the abundance of aquatic resources within the Plan Area
- Effects on Covered Species.

A written record of DEESAs shall be maintained by the Land Use Authority Permittees or Implementing Entity, depending on who has land use jurisdiction over the project. When a PGP (and/or other type of general permit, e.g., RGP) is verified, a written record of DEESA shall be included in the annual reporting documentation prepared by the Implementing Entity and submitted to the regulatory agencies. If a project is authorized using a LOP or SP, then a written record of DEESA would be provided as part of the application that is submitted to the USACE for review.

In addition to the avoidance and minimization requirements associated with the above DEESA procedure, the SSHCP has a number of other resource protection measures that help avoid and minimize impacts to aquatic resources. These objectives are set forth in the SSHCP Conservation Strategy Measureable Objectives W-1 through W-6 for SSHCP Biological Goal 2, *Maintain or improve physical, chemical, and biological function of aquatic resources within the Plan Area* (Table 7-1 in SSHCP Chapter 7) and the SSHCP AMMs (ARP Table 28 and SSHCP Section 5.4).

An avoidance measure of primary importance to the hydrologic and ecological connectivity of the SSHCP Preserve System is the requirement for establishment of Stream Setbacks, as described in this section of the ARP and in SSHCP Section 5.4. SSHCP Stream setbacks only apply to streams that are within the UDA. Setbacks have not been established for any of the rivers in the Plan Area as they are all located outside of the UDA. Some reaches of the Cosumnes River would be protected via implementation of the SSHCP Conservation Strategy.

A cohesive strategy of Stream Setback avoidance (the landscape adjacent to the aquatic resource) is an added measure of stream protection afforded under the framework of the SSHCP that would not be possible under the conventional review process. Width of specific Stream Setbacks would be determined by SSHCP AMM STREAM-2. In addition, a 150-foot setback measured from the top of the bank on both sides of the stream would be applied to Laguna Creek within the UDA (minimum 300-foot corridor width). If trails are located within the wildlife corridor, the nearest

edge of the trail would be located at least 80 feet from the top of bank. Laguna Creek's setback width is larger, set at 300 feet, because it serves as a buffer to absorb pollutants and as a corridor to preserve and protect habitat for the movement of plants and animals between otherwise separated preserves. A 100-foot setback measured from the top of the bank on either side of the stream channel would be required for the following creeks located within the UDA: Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek. Within the UDA, the setback for these creeks would generally protect habitat of plant and animal species, filter sediments and other contaminants and allow for maintenance and restoration of riparian vegetation. While not specifically designed as a wildlife corridor in the same manner as Laguna Creek, these creeks have the potential to function as movement corridors for many native species, and to provide habitat functions within the UDA. In addition to Laguna Creek, Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek, a setback width of 25 feet would be required for all first and second order streams that are avoided. These streams are smaller, typically ephemeral but still play a role in overall water quality protection. When an avoided stream reach in the UDA supports riparian vegetation, the setback would be equal to the riparian edge plus 25 feet or the setback defined above, whichever is greater. If trails are located within the Stream Setback, the nearest edge of the trail would be located at least 50 feet from the top of bank. This would protect downstream reaches by reducing loads of sediment and other contaminants.

The limits and uses of the Stream Setback system would be well defined by the Implementing Entity or local Land Use Authority Permittees, depending on who has jurisdiction over the project, during the preservation and urban development process. Stream protection provided by the setback system would preserve and link the highest-quality natural land covers.

Temporary and permanent re-routing of stream channel or activities involving channel widening or deepening as part of the Urban Development Covered Activity would incorporate a suite of AMMs designed to maintain biological, physical, and chemical integrity of streams in the Plan Area. These measures include the utilization of BMPs for construction equipment, bioengineering practices, and actions to maintain overall stream function. These practice details are listed in SSHCP Section 5.4.1, the BMP AMMs, and STREAM-4 and STREAM-5. These measures are more stringent than current standards within the Plan Area.

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing Requirements?	How General Permit Conditions are Addressed, If Any
		UDA	*Non-UDA*	*HCP*	*ARP*		
SSHCP Conservation Strategy Biological Goals (Table 7-1 of SSHCP)							
SSHCP Goal 2	Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	●	●	●	●	Yes	—
SSHCP Conservation Strategy Measurable Objectives (Table 7-1 of SSHCP)							
Objective W1 of Goal 2	Ensure that during implementation of Objective L2 (establishing 11 linkage preserves), the linkages that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek, in accordance with the process outlined in Section 5.6.	●	●	●	●	Yes	Addresses OGC-5.
Objective W2 of Goal 2	Covered Activities shall implement stream setback requirements in the UDA for creeks and streams as described in Section 5.6.	●		●	●	Yes	Addresses OGC-5.
Objective W3 of Goal 2	Covered Activities shall implement the following, as outlined in Section 5.4.2: Design AMMs (Low-Impact Development (LID) and ROAD Measures) Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD Measures)	●	●	●	●	No (County/USACE)	Addresses RGC-12 and NWP-12
Objective W4 of Goal 2	Ensure that aquatic resources are preserved and managed during preserve assembly (see Objectives VP1, VG1, VG2, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).	●	●	●	●	Yes	—
Objective W5 of Goal 2	Ensure that aquatic resources are established or re-established during preserve assembly (see Objectives VP2, SW2, FWM2, OW2, RIP2, and RIP4).	●	●	●	●	Yes	—
Objective W6 of Goal 2	Avoid a minimum of 10% of the SSHCP land cover type Streams/Creeks (Invertebrate Habitat) in the UDA.	●		●	●	Yes	Addresses OGC-5.
SSHCP AMMs for Covered Activities (Section 5.4 of SSHCP)							
LID-1: Stormwater Quality	Incorporate stormwater management into site designs to satisfy requirements of the Stormwater Quality Design Manual for the Sacramento and South Placer Regions.	●	●	●	●	No (County/RWQCB)	—
LID-2: Groundwater Recharge	When siting preserves, consider locations that are also suitable for groundwater recharge.	●		●	●	No (County)	—
LID-3: Natural Site Features	Preserve and use natural site features (e.g., creeks, streams) to retain existing hydrologic patterns and retain Covered Species habitat.	●	●	●	●	No (County)	—
STREAM-1: Laguna Creek Wildlife Corridor	150-foot setback from top of bank along Laguna Creek within the UDA.	●		●	●	Yes	—
STREAM-2: UDA Stream Setbacks	100-foot setbacks from top of bank along Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, Sun Creek.	●		●	●	Yes	—
STREAM-3: Minor Tributaries to UDA Streams	Apply 12.5-foot setback from each side of top of bank along avoided first- and second-order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, Sun Creek, and Laguna Creek.	●		●	●	Yes	—
STREAM-4: Minimize Effects from Temporary Channel Re-Routing	When diverting water from a stream channel via coffer dams or other means, minimize impacts to existing habitat through specific design and construction best management practices.	●	●	●	●	Yes	—
STREAM-5: Design for Stream Channel Re-Routing, Widening or Deepening	When altering a stream channel, incorporate design features that re-establish natural conditions (hydrology, surface flow, substrate, vegetation, etc.).	●	●	●	●	Yes	—
BMP-1: Construction Fencing	Temporarily stake out and identify all aquatic resources and setback areas between development and protected areas as non-disturbance areas during construction.	●	●	●	●	No (County/USACE)	Addresses RGC-12
BMP-2: Erosion Control	Install acceptable erosion control barriers to protect aquatic resources from any Covered Activities that may cause erosion.	●	●	●	●	No (County/USACE)	Addresses NWP-12
BMP-3: Equipment Storage and Fueling	Site equipment storage, fueling, and staging areas avoid and minimize discharge into aquatic resources.	●	●	●	●	No (County)	—

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
BMP-4: Erodible Materials	Avoid deposition of erodible materials in waterways during construction or maintenance (e.g., cleaning culverts, subdrains, roadsides, or other road/flood control facility). Do not stockpile brush, loose soils, or other debris material within stream channels or on adjacent banks. Dispose of materials so that they cannot enter an aquatic resource. If water and sludge must be pumped from a subdrain or other structure, convey the material to a settling basin to prevent sediment from entering a waterway.	●	●	●	●	No (County/USACE)	Addresses NWP-12
BMP-5: Dust Control	Minimize aerial drift of sediments and airborne pollutants into aquatic resources.	●	●	●	●	No (County)	—
BMP-6: Construction Lighting	Not relevant to aquatic resources.	●	●	●		No (County)	—
BMP-7: Biological Monitor	Construction monitoring by qualified biologist to ensure compliance with BMPs.	●	●	●	●	No (County)	—
BMP-8: Training of Construction Staff	Training of construction staff to avoid aquatic resources.	●	●	●	●	No (County)	—
BMP-9: Soil Compaction	Treat all temporarily disturbed areas following construction to remove compaction and restore infiltration capacity, soil chemistry, and hydrologic characteristics similar to natural conditions.	●	●	●	●	No (County)	Addresses NWP-11
BMP-10: Revegetation	Cover and revegetate repaired surfaces of earthen flood-control channels, except in cases where soil would be expected to erode rapidly, such as during the rainy season or in channels with hardened bank.	●	●	●	●	No (County/USACE)	Addresses NWP-12 and NWP-13
EDGE-1: Compatible Land Uses	Site parkways, detention basins, and designated open space adjacent to setbacks and preserve/linkage boundaries to provide storage of stormwater flows and additional buffering.	●		●	●	Yes	—
EDGE-2: Single-Loaded Streets	Not relevant to aquatic resources.	●		●		Yes	—
EDGE-3: Preserve Setbacks	Reduce changes to surface hydrology and perched aquifer supporting vernal pools, and other types of disturbance from adjacent development on preserves, including aquatic resources.	●		●	●	Yes	—
EDGE-4: Locate Stormwater Control Outside Preserves	Stormwater flows must be directed away from preserves and preserve setbacks, and directed into stormwater control facilities inside the development.	●		●	●	Yes	—
EDGE-5: Stormwater Control in Preserve Setbacks	Design bioretention swales and other methods to prevent stormwater flows into preserves/linkages with aquatic resources.	●	●	●	●	Yes	—
EDGE-6: Detention Basins in Linkage Preserves	Detention basins within Linkage Preserves designed and constructed so as not to impact the duripan or hardpan. Basins would capture storm flows and summer runoff and discharge to stormwater facilities or bio-swales and through percolation and discharge to the perched aquifer.	●		●	●	Yes	—
EDGE-7: Hardpan/ Duripan Protection	Minimize indirect impacts to aquatic resources by limiting disruption of the soil duripan.	●	●	●	●	Yes	—
EDGE-8: Outdoor Lighting	Not relevant to aquatic resources.	●	●	●		Yes	—
EDGE-9: Livestock Access to Preserves	Design preserve access in such a way that livestock used for vegetation management don't damage aquatic resources.	●	●	●	●	Yes	—
EDGE-10: Prevent Invasive Species Spread	Maintain areas near Preserves to prevent spread of invasive non-native species that could reduce aquatic habitat function.	●	●	●	●	Yes	—
ROAD-1: Road Project Location	Site roads to minimize impacts on aquatic resources.	●	●	●	●	Yes	—
ROAD-2: Wildlife Crossing Structures	Design of culverts would be increased in diameter to allow for movement of wildlife; would also allow for increased flood flows.	●	●	●	●	Yes	Addresses NWP-3
ROAD-3: Roadside Pesticide Use	Use herbicides and pesticides only when necessary (e.g., to control invasive organisms that threaten covered species or their habitats). Application in strict compliance with label requirements and state and federal regulations, and only when weather conditions minimize drift and impacts on non- target sites.	●	●	●	●	Yes	—

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
NATURE TRAIL-1: Trail Plan	Nature Trails would be designed and sited to avoid impacts to aquatic resources.	●		●	●	Yes	—
NATURE TRAIL-2: Trail Protection of Duripan	Nature Trails would not interfere with the perched aquifer supporting the existing hydrologic regime of the vernal pool-grassland, and would not interfere with existing pool hydrology.	●		●	●	Yes	—
NATURE TRAIL-3: Trail Location	Nature Trails would be located away from sensitive aquatic resources.	●		●	●	Yes	—
NATURE TRAIL-4: Biological Studies Prior to Trail Design	Studies (e.g., wetland delineations) prior to trail design to identify sensitive aquatic resources that must be avoided.	●		●	●	Yes	—
NATURE TRAIL-5: Monitoring of Trail Impacts	Use of Nature Trails would be discontinued if monitoring indicates aquatic resources are being adversely impacted.	●		●	●	Yes	—
RE-ESTABLISHMENT/ ESTABLISHMENT-1: Vernal Pool	Created vernal pools would be designed to replicate historical density and range of vernal pool sizes, and must not impact the hydrology of existing vernal pools.	●	●	●	●	Yes	—
RE-ESTABLISHMENT/ ESTABLISHMENT-2: Vernal Pool Inocula Bank)	A vernal pool inocula bank would be established that stores soils removed from impacted vernal pools; these soils would be used when re-establishing/establishing vernal pools to maximize colonization by native vernal pool plants and invertebrates.	●	●	●	●	Yes	—
UTILITY-1: Avian Collision Avoidance	Not relevant to aquatic resources.	●	●	●		Yes	—
UTILITY-2: Utility Maintenance on Preserves	Avoid creating new disturbance to aquatic resources when accessing utilities for maintenance.	●	●	●	●	Yes	—
UTILITY-3: Trenchless Construction Methods	Avoidance of direct impacts to surface waters and indirect impacts to aquatic resources on existing or conceptual preserves by limiting disruption of the soil duripan.	●	●	●	●	Yes	—
UTILITY-4: Siting of Entry and Exit Location	Entry and exit locations for the trenchless construction method would be sited to avoid impacts to vernal pools and riparian woodland.	●	●	●	●	Yes	—
LEVEE-1: Preparation of Hydrologic Analysis	Prior to approving a draft Preserve management plan that (1) includes modifying or breaching an existing levee, or (2) would place a potential impedance to high-water event flood-flows on the water side of an existing levee (including new riparian vegetation plantings, or other new preserve facilities), a hydrologic analysis would be conducted. The Preserve activity would only be implemented if the hydrologic analysis concludes that the activity would not result in a substantial increase in flood stage elevations or flood risk on lands outside the Preserve.	●	●	●	●	Yes	NWP-10
2012 Nationwide Permit General Conditions							
NWP-2	Avoid activities in spawning areas during spawning seasons.	●	●	●	●	No (USACE/NMFS)	—
NWP-3	All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of indigenous aquatic species.	●	●	●	●	No (USACE)	Addressed by ROAD-2: UDA Wildlife Crossing Structures
NWP-4	Avoid activities in waters of the United States that serve as breeding areas for migratory birds to the maximum extent practicable.	●	●	●	●	No (MBTA)	Added to SSHCP Chapter 10, Project Application Process
NWP-5	Avoid shellfish populations (Not Applicable)					—	—
NWP-6	No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts.	●	●	●	●	No (County/USACE)	Addressed by BMP-4: Erodible Materials and also added to SSHCP Chapter 10, Project Application Process.
NWP-7	Avoid activity near a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-8	Minimize adverse effects from impoundments.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-9	Maintain the pre-construction course, condition, capacity, and location of open waters for each activity, including stream channelization and stormwater management activities.	●	●	●	●	No (USACE/CDFW)	Added to SSHCP Chapter 10, Project Application Process

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
NWP-10	Comply with applicable FEMA-approved state or local floodplain management requirements.	●	●	●	●	No (USACE/FEMA/ County)	LEVEE-1, Added to SSHCP Chapter 10, Project Application Process
NWP-11	Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-12	Use and maintain appropriate soil erosion and sediment controls during construction, and stabilize as early as practicable all exposed soil and other fills, as well as any work below the ordinary high-water mark. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.	●	●	●	●	No (County/USACE)	Addressed by BMP-2: Erosion Controls, BMP-4: Erodible Materials, BMP-10: Revegetation
NWP-13	Remove all temporary fills and return affected areas to pre-construction elevations. The affected areas must be revegetated, as appropriate.	●	●	●	●	No (County/USACE)	Addressed by BMP-4: Erodible Materials, BMP-10: Revegetation
NWP-14	Any authorized structure or fill shall be properly maintained.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-15	The activity must be a single and complete project. The same permit cannot be used more than once for the same single and complete project.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-16	No activities in Wild and Scenic Rivers or in a river under study for possible inclusion.	●	●	●	●	No (USACE, California Resources Agency, others)	Added to SSHCP Chapter 10, Project Application Process
NWP-17	No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-18	Compliance with the Endangered Species Act.	●	●	●	●	No (USFWS)	Inherent to an SSHCP
NWP-19	Compliance with the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Projection Act.	●	●	●	●	No (MBTA/USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-20	Compliance with Section 106 of the National Historic Preservation Act.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-21	Required response to the discovery of unknown historic or archeological remains.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-22	Requirements related to Critical Resource Waters (Not Applicable)					—	—
NWP-23	Description of project mitigation (avoidance, minimization, compensation). Evidence of an appropriate in-lieu fee.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-24	Demonstrate that all impoundment structures are safely designed.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-25	Requirement for Section 401 Water Quality Certification.	●	●	●	●	No (USACE/RWQCB)	Added to SSHCP Chapter 10, Project Application Process
NWP-26	Coastal Zone Management Zone consistency (Not Applicable)					—	—
NWP-27	Comply with any Regional Conditions (see below) or Specific Conditions added by the USACE or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification.	●	●	●	●	No (USACE/RWQCB)	Added to SSHCP Chapter 10, Project Application Process
NWP-28	Use of more than one permit for a single and complete project is prohibited.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-29	Requirements associated with transferring the permit verification if the permittee sells the property associated with the permit. Requirements for the contents of a letter from the permittee along with transference of the permit verification.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-30	Provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-31	Pre-Construction Notification (Not Applicable)					—	—
Sacramento District Regional General Conditions to the 2012 Nationwide Permits							
RGC-1	Include with PCN demonstration of compliance with all General and Regional Conditions. (Not Applicable)					—	Not Applicable
RGC-2	Pre-Construction Notification (Not Applicable)					—	Not Applicable

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
RGC-3	Record NWP Permit verification with Registrar of Deeds or other appropriate official. (Not Applicable)					—	Not Applicable
RGC-4	Preserve all avoided waters of the United States in legally protected preserves and maintain in perpetuity.	•	•	•	•	No (USACE)	Inherent to the SSHCP, also added to SSHCP Chapter 10, Project Application Process
RGC-5	For all activities resulting in temporary fill in waters of the United States a) Use fill materials consisting of cleaned and washed gravel; b) Clearly delineate the existing ground elevation of waters temporarily filled during construction; c) Remove all temporary fill within 30 days of completion of construction activities.	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-6	Apply the following to all road crossings: a) for all activities in waters of the United States that are suitable habitat for federally listed fish species, road crossings must not hinder passage or spawning of fish; b) road crossings shall be designed to ensure that no more than minor impacts would occur to fish and wildlife passage or expected high flows; no construction activities within standing or flowing waters; d) bank stabilization for road crossings must comply with Regional Condition 19. In no case shall stream crossings result in a reduction in the pre-construction bankfull width or depth of perennial streams or negatively alter the flood control capacity of perennial streams.	•	•	•	•	No (USACE)	Addressed by ROAD-2: UDA Wildlife Crossing Structures
RGC-7	Lead federal agency shall provide all relevant documentation to the USACE demonstrating any previous consultation efforts, as it pertains to the USACE Regulatory permit area (for Section 7 and EFH compliance) and the USACE Regulatory area of potential effect (APE) (for Section 106 compliance).	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-8	Additional documentation required for NWPs that require Pre-Construction Notification (Not Applicable).					—	Not Applicable
RGC-9	For permittee responsible mitigation, develop and submit to the USACE for review and approval, a final comprehensive mitigation and monitoring plan for all permittees responsible mitigation prior to commencement of construction activities within waters of the United States.	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-10	The permittee shall complete the construction of any compensatory mitigation required by special condition(s) of the NWP verification before or concurrent with commencement of construction of the authorized activity,	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-11	The permittee is responsible for all authorized work.	•	•	•	•	No (USACE)	Already addressed in SSHCP Implementation Chapter and built into the SSHCP
RGC-12	Requirements to clearly identify the limits of disturbance in the field.	•	•	•	•	No (County/USACE)	Addressed by BMP-1: Construction Fencing
RGC-13	When a Pre-Construction Notification is required, the permittee shall notify the appropriate district office of the start date for the authorized work within 10 days prior to initiation of construction activities. (Not Applicable)					—	Not Applicable
RGC-14	Requirement to allow Corps representatives to inspect the project site.	•	•	•	•	No (USACE)	Added to HCP Chapter 10, Project Application Process
RGC-15	Revocation of NWPs for activities located in the Mather Core Recovery Area that may affect vernal pools. (Not Applicable)					—	Not Applicable
RGC-16	Revocation of NWPs for activities located in the Primary or Secondary Zone of the Legal Delta. (Not Applicable)					—	Not Applicable
RGC-17	For all activities within the Secondary Zone of the Legal Delta, the permittee shall conduct compensatory mitigation for unavoidable impacts within the Secondary Zone of the Legal Delta. (Not Applicable)					—	Not Applicable
RGC-18	Requirements for construction of utility lines under NWP 12. (Not Applicable)					—	Not Applicable
RGC-19	Requirements for bank stabilization activities under NWP 13 and 14. (Not Applicable)					—	Not Applicable

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
RGC-20	Requirements for Pre-Construction Notification under NWP 23. (Not Applicable)					—	Not Applicable
RGC-21	Requirements for Pre-Construction Notification under NWP 27. (Not Applicable)					—	Not Applicable
RGC-22	Restrictions on channelization or relocation of intermittent or perennial drainages under NWPs 29 and 39. (Not Applicable)					—	Not Applicable
RGC-23	Requests to waive linear foot limitations for intermittent and ephemeral streams under NWPs 1, 13, 29, 39, 40, 42, 43, 44, 50, 51, or 52. (Not Applicable)					—	Not Applicable
RGC-24	Requirements for upland vegetated buffers under NWPs 29, 39, 40, 42, and 43. (Not Applicable)					—	Not Applicable
RGC-25	Under NWP 46, the discharge shall not cause the loss of greater than 0.5 acre of waters of the United States or the loss of more than 300 linear feet of ditch, unless specifically waived in writing by the USACE. (Not Applicable)					—	Not Applicable
RGC-26	All NWPs except 3, 6, 20, 27, 32, and 38 are revoked for activities in histosols, fens, bogs and peatlands and in wetlands contiguous with fens. (Not Applicable)					—	Not Applicable
Other General Conditions							
OGC-1	The PGP expiration date.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-2	Plan Permittees shall require that project applicants develop on-site project alternatives demonstrating efforts that first avoid, and then minimize direct and indirect effects to the aquatic resources mapped pursuant to this section and shall review these alternatives with the Plan Permittee. A complete on-site avoidance alternative shall be selected, if practicable, while taking into account the regional alternatives analysis completed through the SSHCP and ARP.	●	●	●	●	No (USACE)	SSHCP Chapter 12 addresses to some extent, but is also added to Project Application Process (Chapter 10)
OGC-3	Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity, as well as the location of delineated waters of the United States on the site.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-4	Numbered and dated pre-project color photographs.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-5	Linear foot impact limitations to particular streams.	●	●	●	●	No (USACE)	Derived from new Goal 2 Objective W-6.
OGC-6	Dewatering plan, if applicable.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process, but requirements are specified for Covered Species.
OGC-7	Proposed construction schedule.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-8	Any other information pertinent to the stream channel or wash involved.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-9	A list of all other permits and authorizations as required by law, ordinance, or regulation.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-10	Acreage and linear foot impacts triggering an LOP or SP with the USACE.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-11	Requirements for as-built drawings post-construction.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-12	Requirement for a Department of the Army Standard Permit where the District Engineer determines impacts to aquatic resources may be more than minimal, individually or cumulatively, as a result of the proposed work.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-13	Annual inspections to ensure activities authorized under this permit do not result in more than minimal impacts to waters of the United States.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-14	No activity is authorized under this permit which is not in conformance with the SSHCP.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process

5.3 Compensatory Mitigation

The central goal of compensatory mitigation for Covered Activities authorized under the SSHCP permitting framework is to maintain and improve the aquatic resources diversity, abundance, condition, and ecological connectivity across the Plan Area's differing landscape and geomorphic settings. A comprehensive preserve system would be assembled thorough protocols, described in detail in Appendix D, and outlined in 33 CFR Part 325 Sections 332.4(c)(2) through (c)(14) of the USACE's Mitigation Rule.

All Covered Activity projects proposed under the SSHCP and ARP would conform to a systematic mitigation strategy that includes the avoidance and minimization requirements of the previous subsections as well as the comprehensive compensatory mitigation strategy. Table 13 summarizes the potential maximum impacts. These potential impacts to aquatic resources over the 50-year term of the SSHCP (1,613 acres including 262 linear miles of non-wetland waters) would be compensated through the following: re-establishment/establishment of 1,613 acres of aquatic resources including re-establishment/establishment of 262 linear miles or 294 acres of non-wetland waters[8], 855 acres of wetland waters, and 464 acres of riparian habitat . Riparian establishment or re-establishment would occur that would be CDFW jurisdictional and may also be CWA 404/401 jurisdictional; and 2,248 acres of aquatic resources would be preserved.

A key component of the SSHCP's Conservation Strategy is the SSHCP Preserve System that would establish a network to systematically protect natural areas inside and outside of the UDA. Approximately 36,282 acres of new SSHCP Preserve lands would be established within the Plan Area by the end of the 50-year SSHCP. This is approximately 11% of the overall Plan Area. When considered together with the existing preserved lands in the Plan Area, the total amount of preserved land would total 99,030 acres, or 31.0%, of the Plan Area. The SSHCP Conservation Strategy is based on guiding principles of conservation biology and landscape ecology with goals and objectives to: minimize habitat fragmentation by forming large preserves and maintaining habitat linkages between preserves, protect watersheds and their ecosystem functions through sub-watershed preservation and conservation of streams and associated water quality, preserve irreplaceable and threatened resources, minimize indirect edge effects, utilize setbacks, and maintain Plan Area land cover heterogeneity within preserves. The SSHCP and ARP's proposed aquatic resources preservation would occur within the conceptual SSHCP Preserve System. All preservation would meet the standards and requirements of the Mitigation Rule (33 CFR 332.3[h]).

[8] The 262 linear miles on non-wetland waters includes Streams/Creeks (Intermittent and Perennial) and Streams/Creeks VPIH (Ephemeral). The 262 linear miles equates to 294 acres.

Compensatory mitigation in the form of aquatic resource re-establishment and establishment would also be placed within the SSHCP Preserve System. The Re-establishment and Establishment Guidelines (Appendix D) describe protocols for restoring and establishing aquatic resources within the Plan Area. These guidelines provide the outline, (consistent with SPD's 2015 Regional Compensatory Mitigation and Monitoring Guidelines), for how compensatory mitigation projects would be planned, designed, implemented, and managed such that the projects would be viable into perpetuity and would adequately compensate for unavoidable impacts to aquatic resources. In order to determine the re-establishment and establishment potential in the Plan Area and in each watershed, the SSHCP Permittees took an inventory available land suitable for re-establishment and/or establishment in order to maximize the amount of mitigation replaced within the watershed. This inventory was based upon the future state of the Plan Area, accounting for impacts from SSHCP Covered Activities.

Costs for the aquatic resources compensatory mitigation projects would be covered through the Covered Activity project mitigation fees collected under the SSHCP. Fees under the SSHCP are set at levels that fully offset the cost of compensating for the unavoidable impacts to aquatic resources. The SSHCP includes a fee structure that is distinguished by land cover type. This approach accounts for variations in costs associated with the particular requirements for each land cover type. Each new project would pay fees based on the land cover types affected by the development project and the fee schedule. The SSHCP fees were estimated on a per-acre-of-development basis, i.e., the fee represents the payment required to compensate for 1 acre of development of that land cover type. Re-establishment and establishment costs were estimated by taking into account costs associated with site reconnaissance, soil testing, engineering and preparation of construction drawings and specifications, land acquisition, staking, earthwork, plant and seed procurement, planting/seeding, and installation of irrigation system. Additionally, re-establishment and establishment projects must also account for costs associated with short-term monitoring and maintenance (5 to 10 years after projects are in the ground), as well as less intensive monitoring and management in perpetuity. Contingency costs were also accounted for in the fee calculations. Chapter 12 of the SSHCP describes the funding calculations and funding program.

Fees collected for compensatory mitigation would be routed to a proposed ILF program that is consistent with the federal Mitigation Rule (33 CFR Part 332) so that project proponents can satisfy their obligations under Section 404 of the CWA and the SSHCP. See Section 5.3.2.

Another key component of the SSHCP Conservation Strategy is the Jump-Start and Stay-Ahead provisions (described in detail in the SSHCP in Chapter 9, Section 9.5.5). These provisions require impacts to be mitigated in advance of Covered Activity project implementation, and ensure that Preserve System assembly would keep pace with development and make steady progress towards assembling the entire SSHCP Preserve System.

To satisfy this requirement, the Implementing Entity[9] would, prior to implementation of SSHCP Covered Activities, protect SSHCP land cover types and Covered Species habitat in advance of impacts—the "Jump-Start" provision (described in the SSHCP in Chapter 9, Section 9.5.5.2). The Jump-Start provision would ensure that there is enough Preserve area and habitat benefits are provided to fully offset the initial habitat loss and species take expected when the Plan is first implemented. The Jump-Start provision applies to all SSHCP land cover types (Table 29).

Table 29
Jump-Start Provision Acreage Requirements (at Permit Issuance)

Land Cover Grouping	Total Acres of Required Preservation by Land Cover Grouping[a]	Initial Acreage Required (before Permit Issuance) to Meet Jump-Start Provision (i.e., 5% of Required Preservation)
Valley Grassland	22,014	1,100[b]
Vernal Pool	966	48
Other Vernal Pool Invertebrate Wetland Habitat[c]	304	15
Other Wetland[d]	504	25
Agricultural	9,696	484
Riparian	964	48
Oak Woodland	47	2

Notes:
[a] Based on the sum of required preservation for each land cover type (refer to SSHCP Table 7-2) that is composed by the land cover grouping.
[b] This 1,100 acres must be preserved within the Vernal Pool Ecosystem (Chapter 3, Section 3.2.3, of SSHCP).
[c] Includes all Swale and Stream/Creek (VPIH) habitat that is considered invertebrate habitat.
[d] Includes Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water.

Over the term of the permit, the Implementing Entity would maintain a "cushion" of mitigation that is established in advance of impacts—the "Stay-Ahead" provision (described in the SSHCP in Chapter 9, Section 9.5.5.3). The stay-ahead provision requires that the Implementing Entity maintain enough Preserve land to be at least 2% ahead of the remaining preservation required for each SSHCP land cover grouping by the SSHCP Conservation Strategy at all times. This means that each project proposing to use the SSHCP must be checked against the stay-ahead provision prior to issuing ITPs to ensure that the project does not result in stay-ahead preserve land dropping below the 2% threshold. The Stay-Ahead provision would avoid temporal impacts to Covered Species that occur when mitigation is delayed from the time that impacts occur to when the associated mitigation benefits are available to the species (e.g., environmental benefits resulting from preserve management, habitat enhancement, and habitat re-establishment activities).

[9] The Implementing Entity is the body that is responsible for implementation of a permitted HCP. The SSHCP Implementing Entity consists of a Governing Board, Implementation Commission, and various committees and staff who oversee management and administration of the Plan.

Under the Jump-Start and Stay-Ahead provisions, compensatory mitigation for project proposals would exist ahead of impacts, thus eliminating the temporal loss factor of consideration under the federal Mitigation Rule. This would ensure consistency with USACE and RWQCB guidelines pursuant to Sections 404 and 401 of the CWA, and would satisfy California Fish and Game Code Section 2081(b), which requires impacts to state-listed species to be mitigated in advance of the impacts. It would also satisfy requirements under the federal ESA.

The purpose of the compensatory mitigation strategy proposed under the SSHCP and ARP is to implement a systematic mitigation strategy that individual Covered Activity projects can conform and contribute to as a means to offset unavoidable impacts to aquatic resources. It is a strategy that integrates the compliance procedures of several federal and state resource agencies to provide a long-term vision for environmental protection and monitoring, which enables greater environmental benefits and greater efficiency and certainty in environmental permitting for Plan Permittees and project proponents that implement Covered Activities under the jurisdiction of a Land Use Authority Permittee or the Implementing Entity. It is a strategy that benefits from the opportunities provided by regional conservation planning, offering a vision that is more challenging to achieve in a project-by-project review setting.

5.3.1 Compensatory Mitigation Requirements

5.3.1.1 Impact Threshold Measures

Under the SSHCP and ARP, there would be no minimum threshold of proposed acreage loss of aquatic resources for compensatory mitigation to be required. That is, all permanent loss of aquatic resources incurred by a project would require compensatory mitigation[10]. This is in contrast to the USACE's discretion to waive the compensatory mitigation requirement for loss of waters of the United States less than one-tenth of an acre (General Condition 23 of the 2012 Nationwide Permits).

5.3.1.2 Compensatory Mitigation Ratios

The compensatory mitigation ratios listed in the ARP are based upon a landscape-level assessment of the diversity, abundance, and condition of all aquatic resources types that occur in the Plan Area. The compensatory mitigation ratios listed in Table 30 represent the amount of compensatory mitigation required to maintain or improve the physical, chemical, and biological functions of aquatic resources within the Plan Area (as outlined in the SSHCP in the Biological Goals and Measureable Objectives in Table 7-1) when such impacts to aquatic resources are

[10] As discussed in Section 4.1, it is assumed that all impacts are permanent and would result in the loss of aquatic resources.

unavoidable. The compensatory mitigation ratios are also designed to be consistent with USACE's Mitigation Rule and to consider the factors used for determining compensatory mitigation requirements as required for processing Department of the Army permits under Section 404 of the CWA (USACE South Pacific Division Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios [Mitigation Ratios Procedure]).

Table 30 describes compensatory mitigation ratios provided by the SSHCP Conservation Strategy for each aquatic resource type that would be impacted by Covered Activities within the Plan Area. All ratios are in terms of (combined) re-establishment/establishment/preservation to impact. Vernal pools, mixed riparian scrub, and mixed riparian woodland would be mitigated at a ratio of at least 3:1, where a minimum 1:1 of that mitigation is provided by re-establishment or establishment. For all other aquatic resource land cover types (mine tailing riparian woodland, seasonal wetland, freshwater marsh, swale, streams/creeks [VPIH], open water, and streams/creeks) compensatory mitigation would occur at a ratio of at least 2:1, where again, a minimum ratio of 1:1 is accomplished by re-establishment or establishment. The final column of Table 30 lists the actual amount of each land cover type projected to be provided by the SSHCP. For certain land cover types, such as vernal pools, the projected amounts exceed the required amounts.

Table 30
Compensatory Mitigation Ratios

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Direct Impacts *Acres*	Required Re-establishment/ Establishment + Preservation Ratios	Required Re-estab/ Estab/ Preserve (acres)	Projected Amounts (acres)
Riparian	Mine Tailing Riparian Woodland	R2/R3	218	2:1 (min re-estab/estab 1:1)[a]	0[a]	0 (0 re-estab/estab)[a]
	Mixed Riparian Scrub and Mixed Riparian Woodland	R2/R3	246	3:1 (min re-estab/estab 1:1)	1,174[a]	1,174 total (464 re-estab/estab)[a]
Subtotal Riparian			*464*	-	*1,174*	*1,765 (464 re-estab/estab)*
Wetland Waters	Freshwater Marsh	PEM2	127	2:1 (min re-estab/estab 1:1)	254	254 total (127 re-estab/estab)
	Seasonal Wetland	PEM2	105	2:1 (min re-estab/estab 1:1)	210	210 total (105 re-estab/estab)
	Swales	PEM2	234	2:1 (min re-estab/estab 1:1)	468	468 total (234 re-estab/estab)
	Vernal Pools	PEM2	389	3:1 (min re-estab/estab 1:1)	1,167	1,167 total (389 re-estab/estab)
Subtotal Wetland Waters			*855*	-	*2,099*	*2,099 total (855 re-estab/estab)*
Non-Wetland	Open Water	POW	155	2:1 (min re-estab/estab 1:1)	310	310 total (155 re-estab/estab)

Table 30
Compensatory Mitigation Ratios

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Direct Impacts *Acres*	Required Re-establishment/ Establishment + Preservation Ratios	Required Re-estab/ Estab/ Preserve (acres)	Projected Amounts (acres)
Waters	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	117	2:1 (min restor 1:1 linear foot)	234	234 total (117 restor)
	Streams/Creeks VPIH (Ephemeral)	R4SB	22	2:1 (min restor 1:1 linear foot)	44	44 total (22 restor)
Subtotal Non-Wetland Waters			*294*	—	*588*	*588*
Subtotal Wetland Waters and Non-Wetland Waters			*1,149*	—	*2,687*	*2,687*
Total[b]			**1,613**	**—**	**3,861**	**4,452**

Notes:
[a] Mine Tailing Riparian Woodland will be mitigated by preserving and re-establishing or establishing Mixed Riparian Scrub or Mixed Riparian Woodland.
[b] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

The ARP compensatory mitigation ratios are based upon factors consistent with the federal mitigation rule. The ARP compensatory mitigation ratios utilize the FCAM that was developed for the Plan Area that is aquatic resource-based, standardized, and comparable from site to site (the Functional Assessment for the SSHCP and ARP is described in detail in Appendix C). The FCAM can be implemented to determine a before-after-mitigation-impact procedure to assess aquatic resource functional gain. Compensatory mitigation ratios described in the ARP also take into consideration mitigation site location, enhancement or preservation of an aquatic resource that doesn't result in a net gain in aquatic resource area, aquatic resource type conversion need from a watershed perspective, risk and uncertainty, and temporal loss of aquatic resource functions (as described in Appendix C). The purpose of the ARP compensatory mitigation ratios strategy is to proactively offset unavoidable impacts to aquatic resources and maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.

As previously mentioned, two key components of the SSHCP Conservation Strategy are the Jump-Start and Stay-Ahead provisions (described in detail in the SSHCP in Chapter 9, Section 9.5.5). These components of the SSHCP Conservation Strategy were developed to address the temporal loss consideration described in the Mitigation Ratios Procedure. Jump-Start and Stay-Ahead provisions require impacts to be mitigated in advance of Covered Activity project implementation and ensure that SSHCP Preserve System assembly would

keep pace with urban development and make steady progress towards assembling the entire conceptual SSHCP Preserve System (see SSHCP Section 7.5). Implementation of these provisions would ensure that lost aquatic resource functions are replaced ahead of Covered Activity project impacts, avoiding temporal loss.

5.3.1.3 Monitoring and Management

Aquatic resources within the Plan Area would be monitored throughout SSHCP implementation as part of the SSHCP Monitoring Program and SSHCP Preserve System Management Program, which would be implemented to ensure that the requirements of the SSHCP and ARP are being met. The purposes of these programs are to ensure compliance with all elements of the SSHCP and associated permits (compliance monitoring) and to evaluate the beneficial effects of the SSHCP Conservation Strategy (mitigation program) to make sure all SSHCP goals and objectives are being met (effectiveness monitoring). Compliance monitoring would focus on ensuring all actions implemented under the SSHCP and ARP are in compliance with all requirements of their associated permits and that impacts do not exceed the amounts authorized under the permits. Effectiveness monitoring would focus on ensuring mitigation (i.e., required avoidance, minimization, and compensatory mitigation) carried out under the SSHCP and ARP is achieving the SSHCP's goals and objectives, such as ensuring the overall aquatic resource abundance, diversity, and condition of the Plan Area is maintained or improved in perpetuity. The Plan Permittees are collectively responsible for conducting all the required monitoring and reporting under the SSHCP and ARP. Annual monitoring reports from the Plan Permittees would be consolidated through the Implementing Entity, who would serve as the main point of contact.

A fully developed monitoring program would be finalized within 1 year of permit issuance with input and coordination among the SSHCP Implementing Entity, Land Use Authority Permittees, the regulatory and Wildlife Agencies, and a Technical Advisory Committee (TAC). Chapter 8 of the SSHCP describes the programmatic approach and monitoring questions that would be addressed by the SSHCP monitoring program. It is envisioned that monitoring of aquatic resources would be best achieved by implementing the California Wetland and Riparian Area Monitoring Plan (WRAMP) framework (CWMW 2010).

The WRAMP framework is commonly used to assess the compliance and effectiveness of development projects affecting aquatic resources. The WRAMP framework is suited to natural resources monitoring in general, including terrestrial wildlife and habitat, but has primarily been focused on aquatic resources. The WRAMP framework uses standardized mapping and assessment methods that combine to provide a comprehensive assessment of aquatic resource abundance, diversity, and condition within a watershed context.

Assessments are conducted at three levels, as described by the EPA's three-level data classification system:

1. **Level 1 – Landscape Assessment**

   Uses GIS, remote sensing data, and field surveys to inventory aquatic resources at a planning level. The data layers used to create the SSHCP's land cover maps are an example of Level 1 data.

2. **Level 2 – Rapid Assessment**

   Uses visible field diagnostics, semi-quantitative rapid assessment methods, and existing data to assess conditions. The California Rapid Assessment Method (CRAM) is an example of a Level 2 assessment method.

3. **Level 3 – Intensive Site Assessment**

   Provides quantitative field data to give more precise answers to management questions. Examples of a Level 3 assessment include intensive bioassessment sampling (e.g., benthic macroinvertebrates or algae), protocol-level or otherwise systematic surveys for Covered Species, and collecting biological and abiotic data such as plant species abundance or percent cover.

The monitoring requirements for aquatic resources in the Plan Area are a subset of the requirements of the SSHCP and are tied to the Biological Goals and Measureable Objectives of Chapter 7 of the SSHCP. Tables 31 through 33 are derived from Tables 8-1 through 8-4 in Chapter 8 of the SSHCP, and they summarize the measurable objectives to be achieved, the monitoring questions associated with each measurable objective, and the potential monitoring approach (Level 1, 2, or 3) for each question.

Table 31
Compliance Monitoring

Related Objectives or SSHCP Commitment (from SSHCP Chapter 7)	Monitoring Question	Compliance Monitoring Approach
The SSHCP requests take of land cover types (impacts to aquatic resources)	How many acres of land cover types have been impacted by Covered Activities?	Map impacted areas and quantify area of disturbance. Input impacts into tools such as the Project Tracking System in EcoAtlas. Ensure that impacts do not exceed amount authorized. (Level 1)
Objectives VPP1, VPP2, VPP3, VPP4, VPP5, VPP6, VPP7.	Are plant Covered Species populations being protected within Preserves?	Conduct assessment of take and preservation and protection of covered plant species to ensure preservation amounts are keeping up with impact amounts for vernal pools. (Level 1)
Objectives L1, L2, W4, W5, VPG1, VP1, VP3, SW1, FWM1,	Are SSHCP land cover acquisition goals being met in the Preserve System, including	Mapping of acquired Preserve lands using aerial surveys and GIS and verification that

Draft SSHCP Aquatic Resources Program

Table 31
Compliance Monitoring

Related Objectives or SSHCP Commitment (from SSHCP Chapter 7)	Monitoring Question	Compliance Monitoring Approach
ES1, SC1, OW1, RIP1, RIP3, VG1, BOW1, AG1.	acquisition of linkages to existing Preserves?	landscape-scale Preserve selection criteria for land cover types have been met. (Level 1)
Objectives W1, W2.	Are the vernal pool land covers and the Creeks/Stream land covers being adequately protected from adjacent Covered Activities? Does each proposed project design include appropriate setbacks for creeks and streams? Are requisite Stream Setbacks and Preserve being established?	During project design review, compare design against checklist that includes setbacks (Level 1). Map the preserves, corridors, and habitats of concern using aerial surveys and GIS mapping (with particular attention to buffer widths from vernal pools, streams, and creeks). Compare GIS mapping against conditions of approval. (Level 1)
Objectives VPI1, VPI2, VPI3, VPI4, CTS2, WS1, WPT1, GGS1, CH1, CH2, TB1, TB2, TB3, TB4, BO1, BO2, FH1, SH1, SH2, SH3, NH1, NH2, NH3, WK1, WK2, WK3, WK4, GS1, GS2, LS1, LS2, , WR1, WR2, WR3, WR4, AB1, AB2.	Are preserved, re-established, or established aquatic resources being adequately maintained/managed for the benefit of Covered Species?	SSHCP Annual Reports submitted by Implementing Entity, with field verification by Implementing Entity or designee. (Level 2)
Objectives VP2, SW2, RIP2, RIP4, OW2, FWM2.	Do established or re-established aquatic resources meet success criteria (performance standards)?	Monitor aquatic habitat success criteria as defined by permit conditions (Level 2).
Objectives RIP 2, RIP4	Does re-established or established riparian habitat meet success criteria (performance standards)?	Monitor success criteria as defined by permit conditions (Level 2).
Objective W3.	Were the appropriate AMMs always implemented? Is each AMM being implemented according to requirements described in Chapter 5 of the SSHCP?	Design review and comparison with checklist of AMMs. Field verification by permit compliance staff of relevant jurisdiction. (Level 2)
Objective W4, W5	Are preserved, re-established, or established aquatic resources acreage goals/requirements being met?	SSHCP Annual Reports submitted by Implementing Entity, specifying locations and amounts of compensatory mitigation implemented. (Level 1)
Objective W4, W5	Are preserved, re-established, or established aquatic resources functional/condition performance standards being met?	SSHCP Annual Reports submitted by Implementing Entity, with field verification by Implementing Entity or designee. (Level 2)
Objective CTS1.	Is the required number of occupied breeding ponds within designated Critical Habitat for California tiger salamander (*Ambystoma californiense*) being protected?	Conduct survey for occupied California tiger salamander breeding ponds and map results. Field verification of pond preservation and comparison against maps. (Level 3)

Table 32
AMM Compliance Monitoring

AMM	Monitoring Questions	Compliance Monitoring Approach
LID-1 (Stormwater Quality):	Are projects incorporating appropriate stormwater management into designs to satisfy the requirements outlined in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions?	Design review by Land Use Authority Permittee or Implementing Entity.
LID-2 (Groundwater Recharge):	Has the proponent identified areas in the project site that could be appropriate for groundwater recharge? Has the drainage design incorporated groundwater recharge?	Design review by Land Use Authority Permittee or Implementing Entity.
LID-3 (Natural Site Features):	Has the proponent identified important natural site features within the project site? Has the project design avoided or preserved these natural site features?	Design review by Land Use Authority Permittee or Implementing Entity.
RE-ESTABLISHMENT/ ESTABLISHMENT-1 (Vernal Pool)	Are entities conducting vernal pool re-establishment/establishment on SSHCP Preserves following the guidelines identified in the AMM?	Implementing Entity review of vernal pool re-establishment/establishment plans. Field verification by Implementing Entity of vernal pool conditions and consistency with stated guidelines and plans. (Level 1 and Level 2)
RE-ESTABLISHMENT/ ESTABLISHMENT-2 (Vernal Pool Inocula Bank)	Are soils from converted vernal pools being excavated and stored using the appropriate protocols? Are inocula placed in re-established or established pools being sourced from the appropriate geologic formation and soil type?	Land Use Authority Permittee review of plans for projects converting vernal pools to ensure that they clearly state the disposition of vernal pool soils. Implementing Entity coordination with entities re-establishing or establishing vernal pools on preserves to ensure that inocula are correct. (Level 2)
STREAM-1 (Laguna Creek Wildlife Corridor)	Are proponents establishing the appropriate setback on Laguna Creek? Are trails being placed in the correct location within the setbacks?	Review of project plans by Land Use Authority or Implementing Entity to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established. (Level 1 and Level 2)
STREAM-2 (UDA Stream Setbacks)	Are proponents establishing appropriate setbacks on Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek? Are trails being placed in the correct location within the setbacks?	Review of project plans by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established. (Level 1 and Level 2)

Table 32
AMM Compliance Monitoring

AMM	Monitoring Questions	Compliance Monitoring Approach
STREAM-3 (Minor Tributaries to UDA Streams)	Are proponents establishing appropriate setbacks on first and second order tributaries that are credited as avoided? Are trails being placed in the setbacks?	Review of project plans by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established. (Level 1 and Level 2)
STREAM-4 (Minimize Effects from Temporary Channel Re-routing)	If stream channels are being re-routed during construction, are the measures identified in the AMM being implemented to avoid hydrologic impacts?	Local Land Use Authority Permittee or Implementing Entity review of plans for temporary stream channel re-routing. Periodic inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm required measures are being implemented and maintained.(Level 1 and Level 2)
STREAM-5 (Design for Stream Channel Re-Routing, Widening, or Deepening)	Do designs for stream channel re-routing, widening, or deepening include the considerations outlined in the AMM?	Local Land Use Authority Permittee or Implementing Entity review of plans for stream channel re-routing. Local Land Use Authority Permittee or Implementing Entity field verification of project implementation. (Level 1 and Level 2)

Table 33
Effectiveness Monitoring

Related Objectives	Preserve Monitoring Question	Effectiveness Monitoring Approach
Objectives W4, W5	Are aquatic resources abundance, diversity, and condition being maintained or improved within the Plan Area as the SSHCP is implemented?	Monitor and track overall aquatic resource abundance and diversity annually over the life of the SSHCP (Level 1). Implement random or probabilistic sampling design throughout Plan Area at recommended intervals over the life of the SSHCP to track trends in condition; likely incorporating CRAM (Level 2).
Objectives VPI1, VPI2, VPI3, VPI4	What vernal pool invertebrate species are occupying preserved vernal pools?	Statistically valid status and trends sampling of all preserved pools in permanent and impermanent plots, conducted annually for the first 10 years after vernal pool preservation (Level 3).

Table 33
Effectiveness Monitoring

Related Objectives	Preserve Monitoring Question	Effectiveness Monitoring Approach
Objectives CTS2, WS1, WPT1, GGS1, CH1, TB1, TB2, TB3, TB5, FH1, SH1, SH2, SH3, NH1, NH2, WK1, WK2, GS1, GS2, LS1, LS2, BO1, BO2, WR1, WR2, AB1	Are Covered Species using preserved modeled-habitat? Is there a positive correlation between preserved nesting/roosting/foraging sites?	Conduct presence/absence surveys at appropriate timing for each Covered Species within preserved, established, or re-established habitat (Level 2).
Objectives VPI1, VPI2, VPI3, VPI4, CTS2, WS1, WPT1, GGS1, CH1, CH2, TB1, TB2, TB3, TB4, BO1, BO2, FH1, SH1, SH2, SH3, NH1, NH2, NH3, WK1, WK2, WK3, WK4, GS1, GS2, LS1, LS2, WR1, WR2, WR3, WR4, AB1, AB2	Is preserved, re-established, or established habitat being adequately maintained/managed for the benefit of Covered Species?	Annual SSHCP reports submitted by Implementing Entity, with field verification by Implementing Entity or designee (Level 2).
Objectives WS2, WPT2, GGS2, CH2, TB4, TB6, BO1, BO2, SH4, NH3, WK3, WK4, GS3, GS4, LS3, WR3, WR4, AB2	Are Covered Species occupying re-established or established habitat?	Compliance monitoring reports submitted annually by Implementing Entity. Field verification by Implementing Entity or designee. Presence/absence surveys at appropriate timing for each species (Level 2).
Objective HAB2	Are the physical conditions on the Preserves meeting the breeding feeding or sheltering needs of all Covered Species?	Rapid monitoring (CRAM or similar) for subset of Preserves, on at least an annual basis, compared against reference sites (Level 2).
Objective HAB4	Where are non-native weeds occurring in the Preserve System, and what species? Are they being eradicated in a timely fashion? Are the monitoring and management methods being updated to account for changed conditions?	Weed assessment and mapping within the Preserves on at least an annual basis, with other opportunistic assessment. Annual reporting of weed eradication efforts. TAC review of the SSHCP Conservation Strategy every 5 years (Level 2).
Objective HAB7	What is the biomass of vegetation within vernal pool-grassland, valley grassland, blue oak savanna, and other grasslands?	Annually monitor using residual dry matter (RDM) or another rapid monitoring technique at the end of the growing season; use a consistent time each year (Level 2).
Objective RIP5	What is the depth to groundwater within Preserves and how is it changing?	Annually measure depth to water table on Preserve parcels with existing wells (Level 2).
Objective GGS3	What is the hydrologic condition along Badger Creek? How much supplemental water would be required to maintain baseline conditions during summer? Is supplemental water maintaining appropriate hydrologic conditions in perpetuity?	Conduct hydrologic study for Badger Creek. Review hydrologic conditions every 5 years to ensure continued habitat suitability for giant garter snake (*Thamnophis gigas*) (Level 3). Annually review aerial imagery of Badger Creek to observe the ratio of open water and emergent vegetation (Level 1).

In order to properly manage the suite of monitoring data that would be collected for the SSHCP and ARP, the Implementing Entity would establish a GIS-linked database for use in compliance

monitoring, effectiveness monitoring, adaptive management, and annual reporting requirements. To the extent feasible, the database would be linked with other statewide or regional data repositories, such as the Regional Data Center of the California Environmental Data Exchange Network (CEDEN) and the California EcoAtlas Information System. The California EcoAtlas provides free public access to information about the quantity and quality of California wetlands. EcoAtlas enables integration of information to provide landscape context for consideration of wetland extent and condition.

The Implementing Entity would prepare annual reports summarizing the previous year's Covered Activities and provide a summary of all activities that have been implemented since SSHCP issuance, including all preserve monitoring results. Final reports are due to the regulatory agencies by January 31 following the end of the previous year's reporting cycle, which runs from October 1 to September 30.

5.3.2 Development of an ILF Program to Fulfill Compensatory Mitigation Requirements

The SSHCP Plan Permittees recognize the importance of a successful compensatory mitigation strategy accomplished in a timely fashion and nested in the overall conservation plan of the SSHCP. The Jump-Start and Stay-Ahead Provision (described in detail in the SSHCP in Chapter 9, Section 9.5.5) was developed to offset the potential for temporal loss of aquatic resources diversity, abundance, and condition at a sub-watershed landscape level in the Plan Area. Under this provision, the Plan Permittees would implement the compensatory mitigation requirement (pursuant to standards set forth in the 2008 federal Mitigation Rule [33 CFR Part 332]) prior to the authorized project impacts (the "Jump Start" portion of the provision). The Plan Permittees would use the "stay ahead" provisions required by the SSHCP in satisfying compensatory mitigation needs of Covered Activity projects. Thus, the importance of the "Jump-Start and Stay-Ahead" Provision is that compensatory mitigation acreage would always be ahead of impacted acreage (as opposed to similar stay-ahead programs that are based on "rough proportionality" and can actually fall behind from an acre-to-acre standpoint).

To meet the requirements of the 2008 federal Mitigation Rule (33 CFR Part 332), the Plan Permittees anticipate development of their own ILF program. The Plan Permittees would submit an ILF program proposal to the USACE (and Interagency Review Team) for review and subsequent approval by the USACE's District Engineer. The ILF would have technical consistency with the proposed restoration/creation approaches contained in Appendix D of this document. Because of the robust Jump-Start and Stay-Ahead Provision described above, a common challenge approached in many ILFs, temporal loss, is not anticipated to be an issue with the SSHCP's proposed ILF program.

The Plan Area is within the service area of several existing mitigation banks with credit availability, which may be a viable option to allow early implementation of the SSHCP compensatory mitigation strategy. Compensatory mitigation carried out via purchase of mitigation bank credits is preferred in the hierarchy set forth by the federal mitigation rule to offset impacts for authorized impacts to waters of the United States. However, an ILF program may override the USACE's mitigation bank preference when credits become available for ecologically valuable parcels identified in advance and based upon the rigorous scientific and technical analysis as part of a project-specific ILF planning framework. ILF programs can achieve important ecological and societal benefits by focusing primarily on watershed needs and by siting multiple compensatory mitigation projects in strategic locations of a watershed to meet specific needs and goals. It is for these reasons Plan Permittees believe an ILF program would best suit the long-term compensatory mitigation needs of the SSHCP regulatory framework.

6 AQUATIC RESOURCES PROFILE POST-MITIGATION

As was summarized for existing conditions (Chapter 3) and conditions post-impact without mitigation (Chapter 4), the final status of aquatic resources within the Plan Area (following impacts and mitigation) is summarized here in terms of the aquatic resources' resulting diversity, abundance, and condition. Diversity is again described in terms of the variety of aquatic resources by land cover type (common name) and Cowardin class that would remain following impacts and mitigation. Abundance is described in terms of acreage of each aquatic resource type within the Plan Area and per watershed (at the HUC-10 level) that would exist following impacts and mitigation. Condition is described using a landscape-level functional assessment to determine the relative capacity of the aquatic resources to perform various functions and services related to hydrology, water quality, and habitat.

6.1 Aquatic Resources Abundance and Diversity After Impacts and Mitigation

Within the Plan Area, of the currently existing 24,256 acres of mapped potentially jurisdictional aquatic resources, there are projected impacts to approximately 1,613 acres. However, following implementation of the SSHCP's compensatory mitigation strategy, all impacted acreage of aquatic resources would be replaced, resulting in no net loss of acres of aquatic resources (i.e., no impact on abundance). Furthermore, there would not be a disproportionate loss of any particular aquatic resource type, so aquatic resources diversity would also be maintained. The only aquatic resource types that show moderate decreases in abundance are Mine Tailing Riparian Woodlands and Open Water, both of which consist largely of unnatural or man-made features. As the intent of the SSHCP compensatory mitigation program is to establish and/or re-establish natural, high-quality aquatic resources, all of the required mitigation acreage to offset losses of Mine Tailing Riparian Woodlands is shifted to either Mixed Riparian Scrub or Mixed Riparian Woodland; and some of the required mitigation acreage to offset losses of Open Water is shifted to either Freshwater Marsh or Seasonal Wetlands.

See Table 34 for a summary of future aquatic resources abundance by type (diversity) per watershed.

Table 34
Future Abundance (Acres) of Aquatic Resources in the Plan Area, by Aquatic Resource Type

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed (acres)										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Riparian	Mine Tailing Riparian Woodland	R	0	0.2	158.3	17.3	0	0	1.6	0	0	245.5	422.9
	Mixed Riparian Scrub	R	0	80.4	58.1	290.0	47.1	2.4	20.7	130.1	546.4	99.7	1,274.9
	Mixed Riparian Woodland	R	0.4	959.5	261.7	1,908.9	400.6	196.4	102.6	52.7	1,324.5	815.7	6,023.0
Subtotal Riparian			*0.4*	*1,040.1*	*478.1*	*2,216.2*	*447.7*	*198.8*	*124.9*	*182.8*	*1,870.9*	*1,160.9*	*7,720.8*
Wetland Waters	Freshwater Marsh	PEM1	2.0	38.3	167.2	1,194.5	47.5	20.9	315.2	39.7	1,097.2	112.3	3,034.5
	Seasonal Wetland	PEM2	22.6	199.7	444.5	616.3	134.0	<0.0	38.9	0.2	799.9	427.0	2,189.0
	Swales	R2/R3	2.9	160.4	518.0	144.2	141.0	0	225.9	1.4	10.3	80.6	1,284.7
	Vernal Pools	PEM2	6.9	274.3	2,026.7	618.6	319.4	0.1	531.2	5.3	420.9	324.7	4,528.2
Subtotal Wetland Waters			*34.4*	*672.7*	*3,156.4*	*2,573.6*	*641.9*	*21.0*	*1,111.2*	*46.6*	*2,328.3*	*944.6*	*11,036.4*

Table 34
Future Abundance (Acres) of Aquatic Resources in the Plan Area, by Aquatic Resource Type

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed (acres)										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Non-Wetland Waters	Open Water	POW	2.7	129.4	295.4	663.0	8.4	3.1	78.4	9.	719.2	280.2	2,189.0
	Perennial or Intermittent Streams/ Creeks	R2UB/ R3UB	5.6	228.3	416.3	345.0	92.5	67.4	65.4	23.9	1,155.7	362.0	2,762.9
	Streams/ Creeks (VPIH) Ephemeral	R4SB	0	18.7	0	0	0	0	35.6	0	0	0	54.2
Subtotal Non-Wetland Waters			*8.3*	*376.4*	*711.7*	*1,008.0*	*1,00.9*	*70.5*	*179.4*	*32.9*	*1,874.9*	*642.2*	*5,006.1*
Subtotal Wetland Waters and Non-Wetland Waters			*42.7*	*1,049.1*	*3,868.1*	*3,581.6*	*641.9*	*91.5*	*1,290.6*	*79.5*	*4,203.2*	*1,586.8*	*16,042.5*
Grand Total[1]			**43.1**	**2,089.2**	**4,346.2**	**5,797.8**	**1,089.6**	**290.3**	**1,415.5**	**262.3**	**6,074.1**	**2,747.7**	**23,763.3**

Note: [1.] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

6.2 Estimated Future Condition of Aquatic Resources in the Plan Area

The effects of implementation of the SSHCP on the condition of aquatic resources are estimated by projecting the future condition of aquatic resources within the Plan Area, including consideration of mitigation as prescribed by the SSHCP. The projected future condition is obtained from the results of the Functional Assessment Report (Appendix C), which categorizes the Plan Area's aquatic resources into high, moderate, low, or very low condition.

6.2.1 Future Condition of Aquatic Resources

The landscape-level assessment that was used to describe the existing aquatic resource conditions (Chapter 3) and conditions with projected impacts (Chapter 4) was also used to predict the future condition of the aquatic resources accounting for both impacts and mitigation. The overall quality of future aquatic resources was predicted based on the same factors: area of the aquatic resource, HUC-10 watershed, primary adjacent land cover, secondary adjacent land cover, and aquatic resource type. Function scores were assigned for each of these factors, per aquatic resource feature, based upon ability to maintain or improve the following functions: habitat, water quality, and hydrology. The second factor, HUC-10 watershed, was updated based on the predicted future state of each of the watersheds, with the same scoring measures as were used for the impact-only conditions (see Chapter 4). The results of the analysis provided an overall functional score of very low, low, moderate, or high for each aquatic resource.

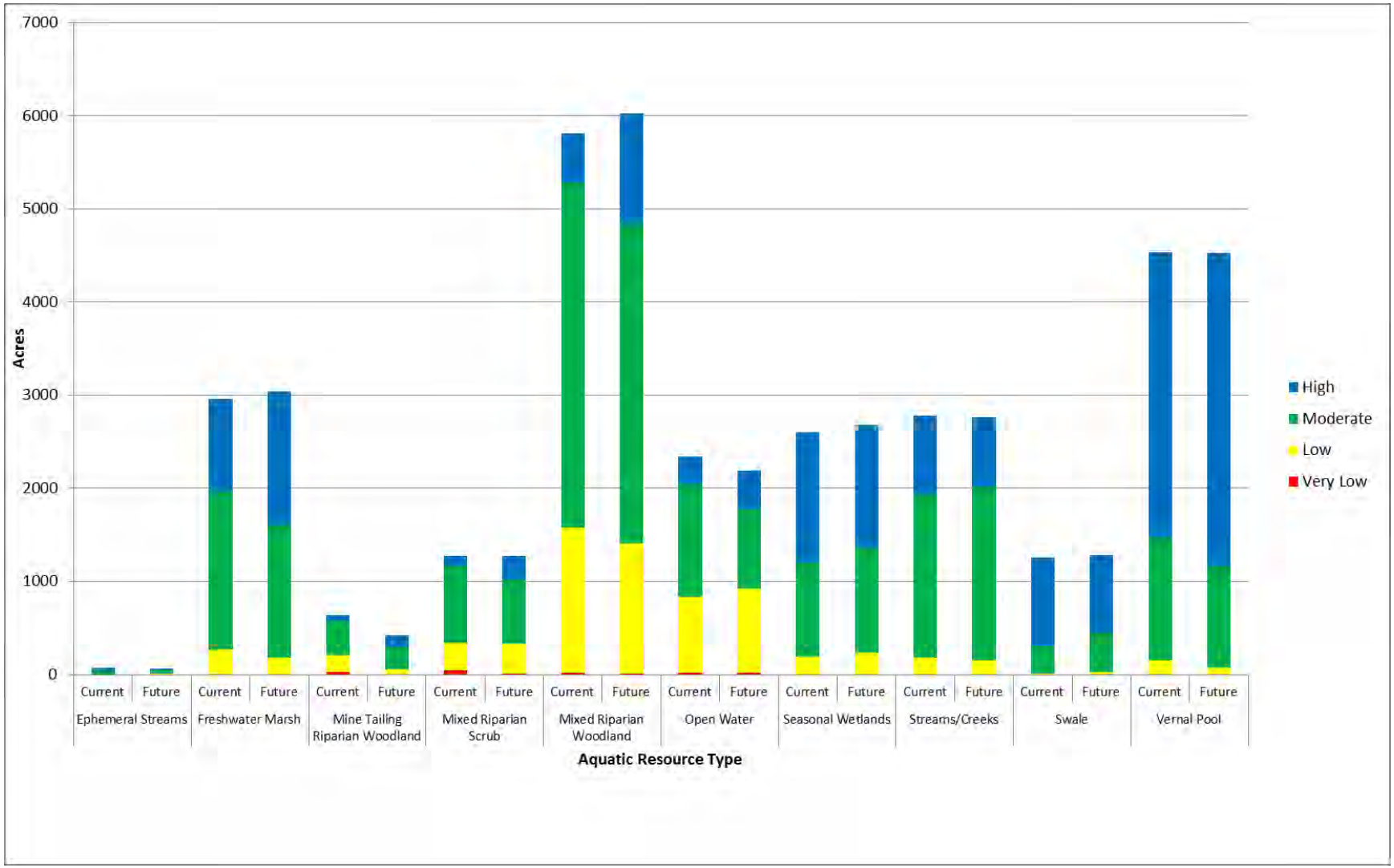
Table 35 summarizes the future condition of aquatic resources in the overall Plan Area following implementation of the SSHCP, including the mitigation program, and Figure 38 is a graphical depiction of those data, showing how the future Plan Area compares to the existing conditions. Compared to the existing conditions, the future Plan Area conditions show that the amount of high condition resources would increase (increase of 1,391 acres) as a result of the strategic and coordinated approach to mitigation implementation. This means that the future state of aquatic resources in the Plan Area would benefit from implementation of the SSHCP, as the established and re-established aquatic resources would be appropriately sited as required by Conservation Actions in Table 7-1, such that the overall conditions of Plan Area aquatic resources would be improved.

Table 35
Future Condition of Aquatic Resources in the Overall Plan Area

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	131.0	241.0	50.9	0	422.9
	Mixed Riparian Scrub	R2/R3	257.1	688.1	324.2	5.4	1,274.9
	Mixed Riparian Woodland	R2/R3	1,178.62	3,434.15	1,403.50	6.73	6,023.0
		Subtotal Riparian	*1,566.7*	*4,363.3*	*1,778.6*	*12.1*	*7,720.8*
Wetland Waters	Freshwater Marsh	PEM1	1,425.3	1,427.6	181.6	0	3,034.5
	Seasonal Wetland	PEM2	1,318.7	1,132.6	231.8	0	2,683.1
	Swales	R2/R3	839.2	419.1	26.4	0	1,284.7
	Vernal Pools	PEM2	3,362.52	1,093.38	72.26	0	4,528.1
		Subtotal Wetland Waters	*6,945.7*	*4,072.7*	*512.1*	*0*	*11,530.5*
Non-Wetland Waters	Open Water	POW	413.6	856.3	903.6	15.5	2,189.0
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	742.0	1,866.1	154.7	0	2,762.9
	Streams/Creeks (VPIH) Ephemeral	R4SB	2.6	46.1	5.5	0	54.2
		Subtotal Non-Wetland Waters	*1,158.2*	*2,768.5*	*1,063.8*	*15.5*	*5,006.1*
		Subtotal Wetland Waters and Non-Wetland Waters	*8,103.9*	*6,841.2*	*1,575.9*	*15.5*	*16,536.6*
		Grand Total[1]	**9,670.6**	**1,1204.4**	**3,354.4**	**27.6**	**24,257.3**

Note: 1. Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Figure 38 Existing and Future Watershed Profiles of Aquatic Resources in the Plan Area



Tables 36 through 45 summarize the future condition of aquatic resources in each HUC-10 watershed following implementation of the SSHCP and Figures 39 through 48 are graphical depictions, comparing the existing to the future watershed conditions.

The watersheds with the largest amounts of impacts are the American River, Morrison Creek, and Sherman Lake–Sacramento River watersheds. Following SSHCP implementation of the prescribed mitigation program, the American River watershed would retain approximately the same amounts of aquatic resources, with only a loss of mine tailing riparian woodland. Mine tailing riparian woodland mitigation acreages would be compensated for in the form of mixed riparian woodland or mixed riparian scrub in watersheds outside the UDA, primarily within, but not limited to, the adjacent Deer Creek and Upper Cosumnes watersheds. Re-establishment and establishment requirements for all other aquatic resource types in the American River watershed would occur within the portion of its watershed that is outside the UDA. Despite the American River watershed having the largest proportion of expected impacts, aquatic resource abundance and diversity would be maintained and remain stable.

The Morrison Creek watershed in its future state would have an overall decrease in abundance of aquatic resources, as it would experience the largest amount of development within the UDA portion of the Plan Area. An inventory was taken of available land suitable for re-establishment and/or establishment within the Morrison Creek watershed in order to maximize the amount of mitigation replaced within watershed. This inventory identified approximately 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment that is ecologically feasible within the Morrison Creek watershed. Remaining requirements for aquatic resource impacts within the watershed would be mitigated for in-kind within other adjacent watersheds. There would be a hierarchy of preference such that mitigation would be exhausted within the Morrison Creek watershed first. Mitigation would occur closest to the impact sites before exploring mitigation farther away.

The Sherman Lake–Sacramento River watershed in its future state would maintain the same aquatic resource abundance and diversity and would have a slight increase in condition. Re-establishment and/or establishment types of compensatory mitigation would occur within the portion of the watershed that is outside the UDA for all aquatic resource types.

The Deer Creek, Lower Cosumnes, Lower Dry Creek, and Upper Cosumnes watersheds in their future states all show increases in aquatic resource condition, resulting from the properly targeted preservation and compensatory mitigation strategy implemented through the SSHCP.

Table 36
Future Condition of Aquatic Resources in the American River Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0	0	0	0
	Mixed Riparian Woodland	R2/R3	0	0	0.4	0	0.4
		Subtotal Riparian	*0*	*0*	*0.4*	*0*	*0.4*
Wetland Waters	Freshwater Marsh	PEM1	0	1.6	0.4	0	2.0
	Seasonal Wetland	PEM2	0	22.6	0	0	22.6
	Swale	R2/R3	0	2.4	0.5	0	2.9
	Vernal Pools	PEM2	0	6.9	<0.1	0	6.9
		Subtotal Wetland Waters	*0*	*33.5*	*0.9*	*0*	*34.4*
Non-Wetland Waters	Open Water	POW	0	0.48	2.17	0	2.65
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	2.72	2.88	0	5.60
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*0*	*3.2*	*5.1*	*0*	*8.3*
		Subtotal Wetland Waters and Non-Wetland Waters	*0*	*36.7*	*6.0*	*0.0*	*42.7*
		Grand Total[1]	**0**	**36.7**	**6.4**	**0**	**43.1**

Note: 1. Table may not total precisely due to rounding.

Figure 39 Existing and Future Watershed Profiles of Aquatic Resources in the American River Watershed

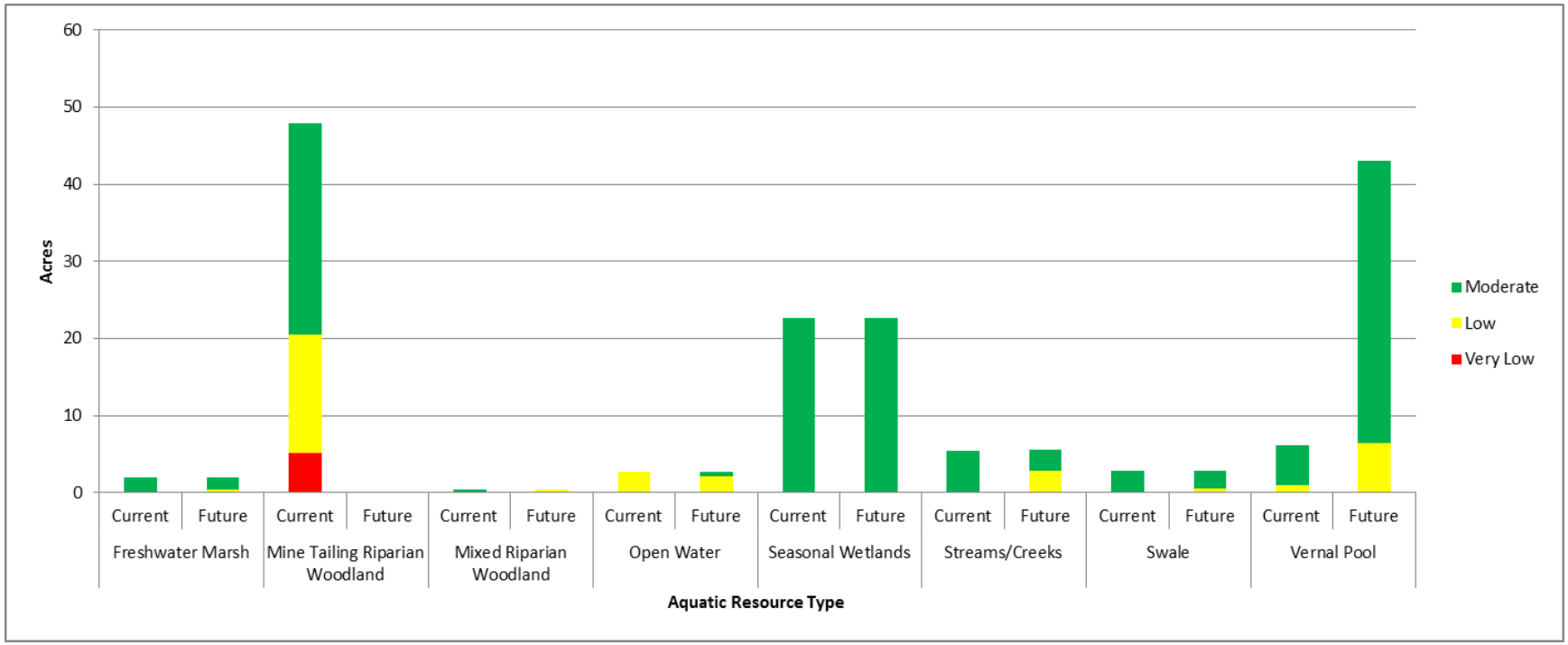


Table 37
Future Condition of Aquatic Resources in the Deer Creek Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0.20	<0.1	0	0.2
	Mixed Riparian Scrub	R2/R3	42.0	35.4	3.0	0	80.4
	Mixed Riparian Woodland	R2/R3	245.9	694.6	19.3	0	959.5
Subtotal Riparian			*287.9*	*730.2*	*22.3*	*0*	*1,040.1*
Wetland Waters	Freshwater Marsh	PEM1	24.0	14.3	0	0	38.3
	Seasonal Wetland	PEM2	94.6	100.1	5.0	0	199.7
	Swale	R2/R3	133.2	26.3	0.9	0	160.4
	Vernal Pools	PEM2	216.9	57.2	0.3	0	274.3
Subtotal Wetland Waters			*468.7*	*197.9*	*6.2*	*0*	*672.7*
Non-Wetland Waters	Open Water	POW	69.4	56.4	3.6	0	129.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	106.8	121.5	<0.1	0	228.3
	Streams/Creeks (VPIH) Ephemeral	R4SB	2.6	15.3	0.8	0	18.7
Subtotal Non-Wetland Waters			*178.8*	*193.2*	*4.4*	*0*	*376.4*
Subtotal Wetland Waters and Non-Wetland Waters			*647.5*	*391.1*	*10.6*	*0*	*1,049.10*
Grand Total[1]			**935.4**	**1,121.3**	**32.9**	**0**	**2,089.2**

Note: 1. Table may not total precisely due to rounding.

Figure 40 Existing and Future Watershed Profiles of Aquatic Resources in the Deer Creek Watershed

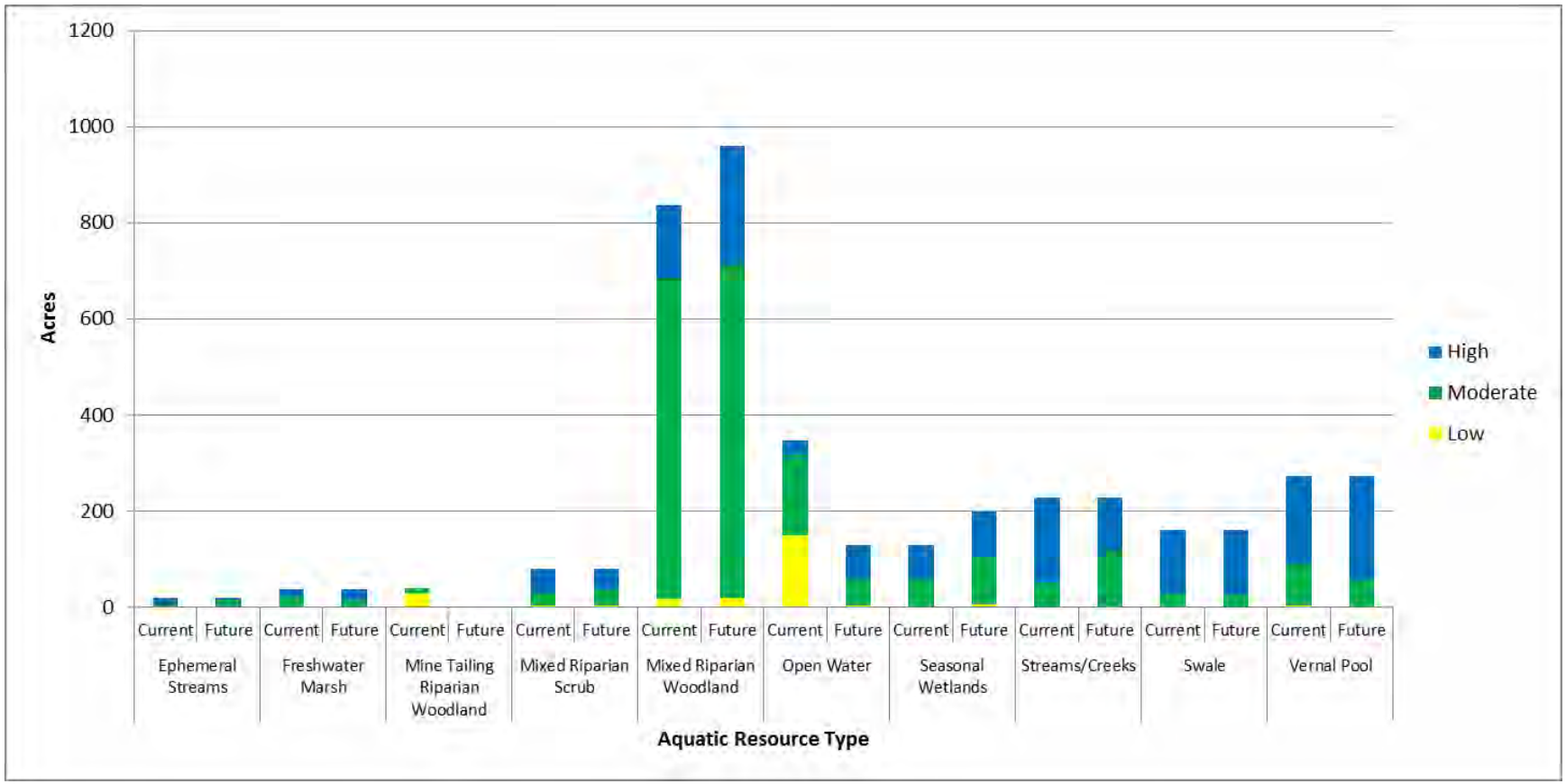


Table 38
Future Condition of Aquatic Resources in the Laguna Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	63.8	74.8	19.7	0	158.3
	Mixed Riparian Scrub	R2/R3	10.4	45.6	2.1	0	58.1
	Mixed Riparian Woodland	R2/R3	72.2	179.5	10.0	0	261.7
		Subtotal Riparian	*146.4*	*299.9*	*31.8*	*0*	*478.1*
Wetland Waters	Freshwater Marsh	PEM1	147.1	19.6	0.4	0	167.2
	Seasonal Wetland	PEM2	404.8	25.1	14.5	0	444.5
	Swale	R2/R3	404.1	113.7	0.3	0	518.0
	Vernal Pools	PEM2	1,949.0	70.3	7.4	0	2,026.7
		Subtotal Wetland Waters	*2,905.0*	*228.7*	*22.6*	*0*	*3,156.4*
Non-Wetland Waters	Open Water	POW	178.8	47.5	69.2	0	295.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	246.6	167.6	2.0	0	416.3
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*425.4*	*215.1*	*71.2*	*0*	*711.7*
		Subtotal Wetland Waters and Non-Wetland Waters	*3,330.4*	*443.8*	*93.8*	*0*	*3,868.1*
		Grand Total[1]	**3,476.8**	**743.7**	**125.6**	**0**	**4,346.2**

Note: 1. Table may not total precisely due to rounding.

Figure 41 Existing and Future Watershed Profiles of Aquatic Resources in the Laguna Watershed

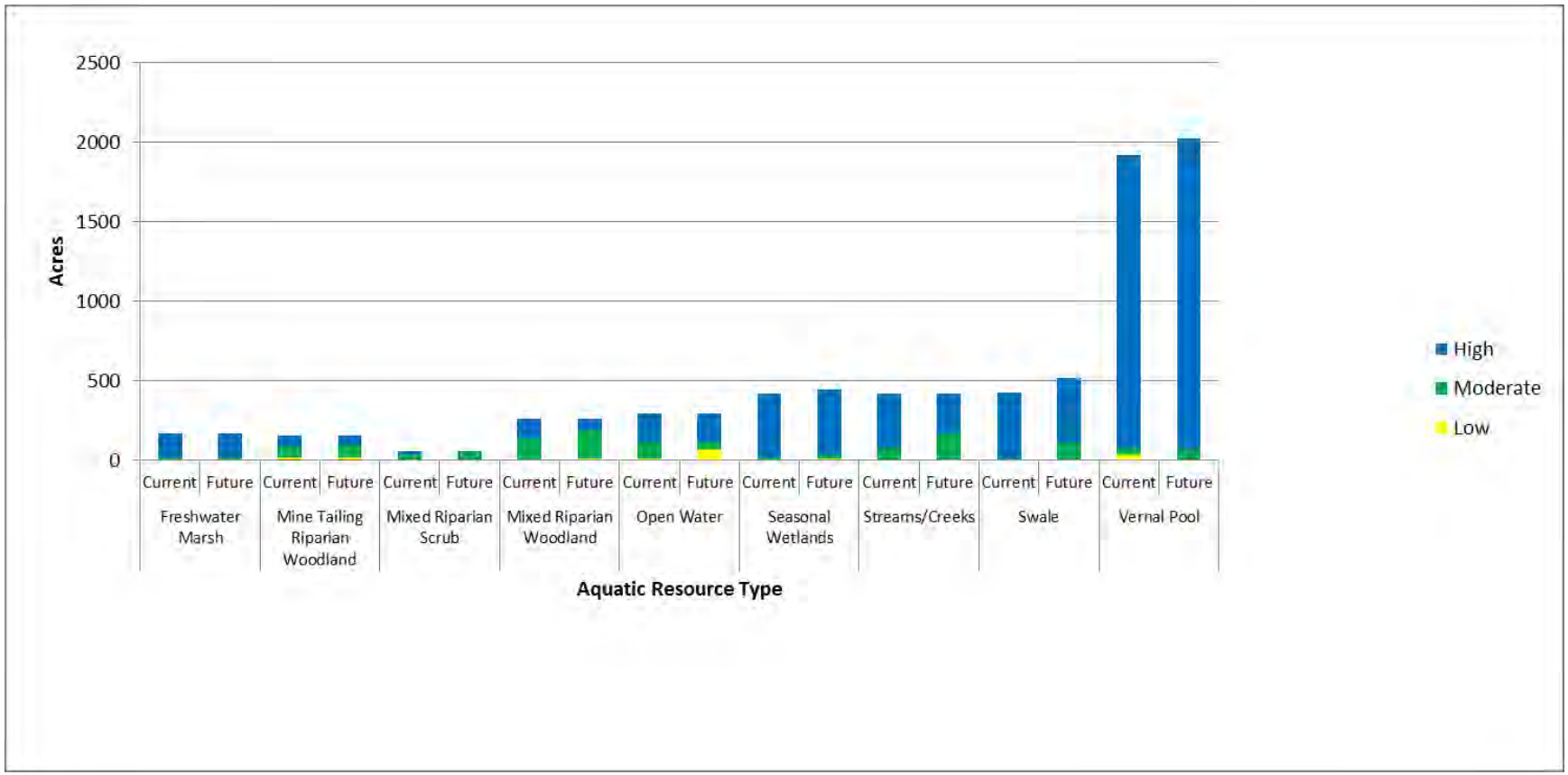
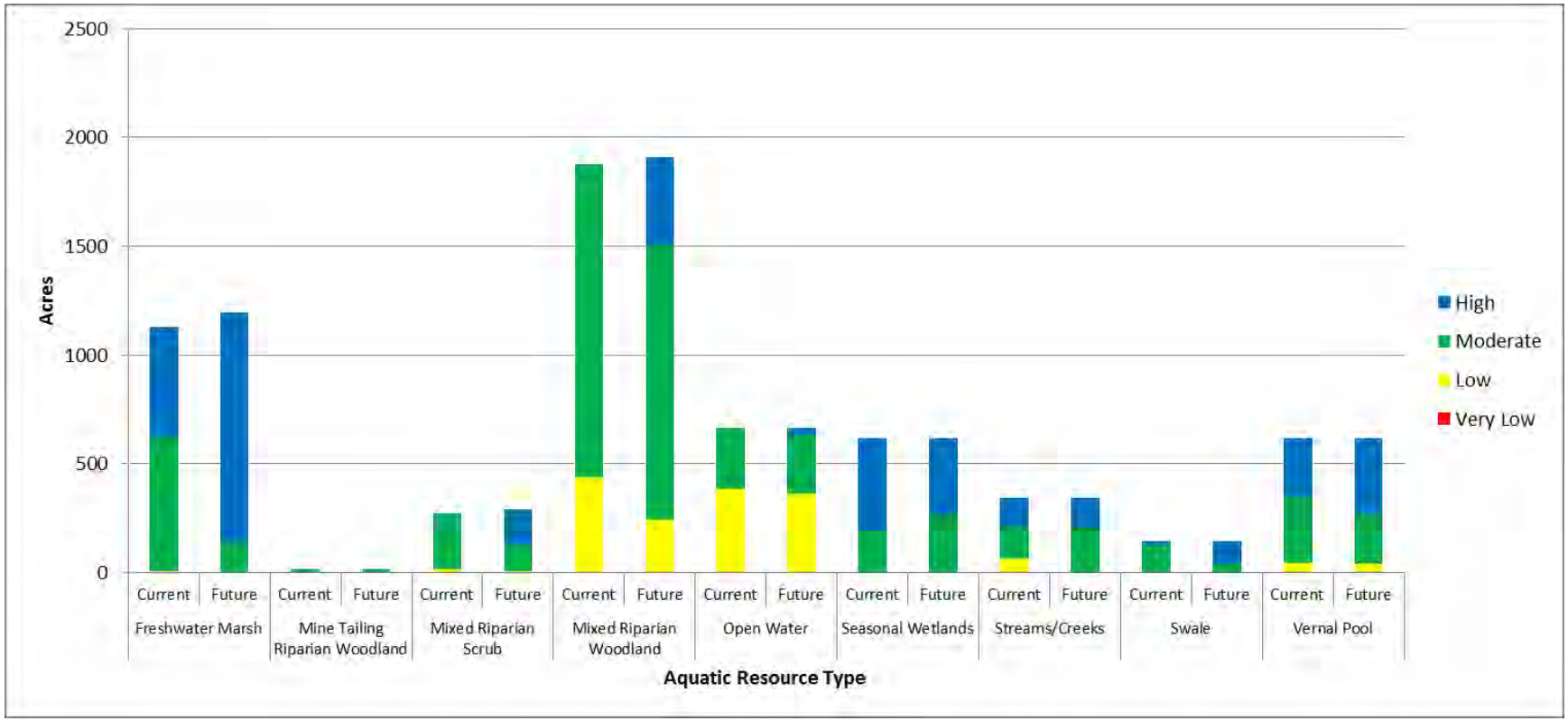


Table 39
Future Condition of Aquatic Resources in the Lower Cosumnes Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	17.3	0	0	17.3
	Mixed Riparian Scrub	R2/R3	159.8	122.8	7.4	0	290.0
	Mixed Riparian Woodland	R2/R3	401.5	1,264.0	243.4	0	1,908.9
		Subtotal Riparian	*561.3*	*1,404.1*	*250.8*	*0*	*2,216.2*
Wetland Waters	Freshwater Marsh	PEM1	1,056.2	134.4	3.9	0	1,194.5
	Seasonal Wetland	PEM2	350.2	262.7	3.4	0	616.3
	Swale	R2/R3	102.0	41.0	1.2	0	144.2
	Vernal Pools	PEM2	349.8	230.7	38.1	0	618.6
		Subtotal Wetland Waters	*1,858.2*	*668.8*	*46.6*	*0*	*2,573.60*
Non-Wetland Waters	Open Water	POW	31.6	270.4	360.9	0	663.0
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	139.6	203.4	2.0	0	345.0
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*171.2*	*473.8*	*362.9*	*0*	*1,008.0*
		Subtotal Wetland Waters and Non-Wetland Waters	*2,029.4*	*1,142.6*	*409.5*	*0*	*3,581.6*
		Grand Total[1]	**2,590.7**	**2,546.7**	**660.3**	**0**	**5,797.8**

Note: 1. Table may not total precisely due to rounding.

Figure 42 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed



Draft SSHCP Aquatic Resources Program

Table 40
Future Condition of Aquatic Resources in the Lower Dry Creek Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	9.9	31.8	5.4	0	47.1
	Mixed Riparian Woodland	R2/R3	15.7	332.6	52.3	0	400.6
		Subtotal Riparian	*25.6*	*364.4*	*57.7*	*0*	*447.7*
Wetland Waters	Freshwater Marsh	PEM1	18.8	26.5	2.2	0	47.5
	Seasonal Wetland	PEM2	90.4	39.3	4.3	0	134.0
	Swale	R2/R3	87.5	53.4	<0.1	0	141.0
	Vernal Pools	PEM2	229.1	88.2	2.1	0	319.4
		Subtotal Wetland Waters	*425.8*	*207.4*	*8.6*	*0*	*641.9*
Non-Wetland Waters	Open Water	POW	0	6.57	1.86	0	8.43
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	33.4	55.9	3.3	0	92.5
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*33.4*	*62.5*	*5.2*	*0*	*100.93*
		Subtotal Wetland Waters and Non-Wetland Waters	*459.2*	*269.9*	*13.8*	*0*	*742.8*
		Grand Total[1]	**484.8**	**634.3**	**71.5**	**0**	**1,190.5**

Note: 1. Table may not total precisely due to rounding.

Figure 43 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed

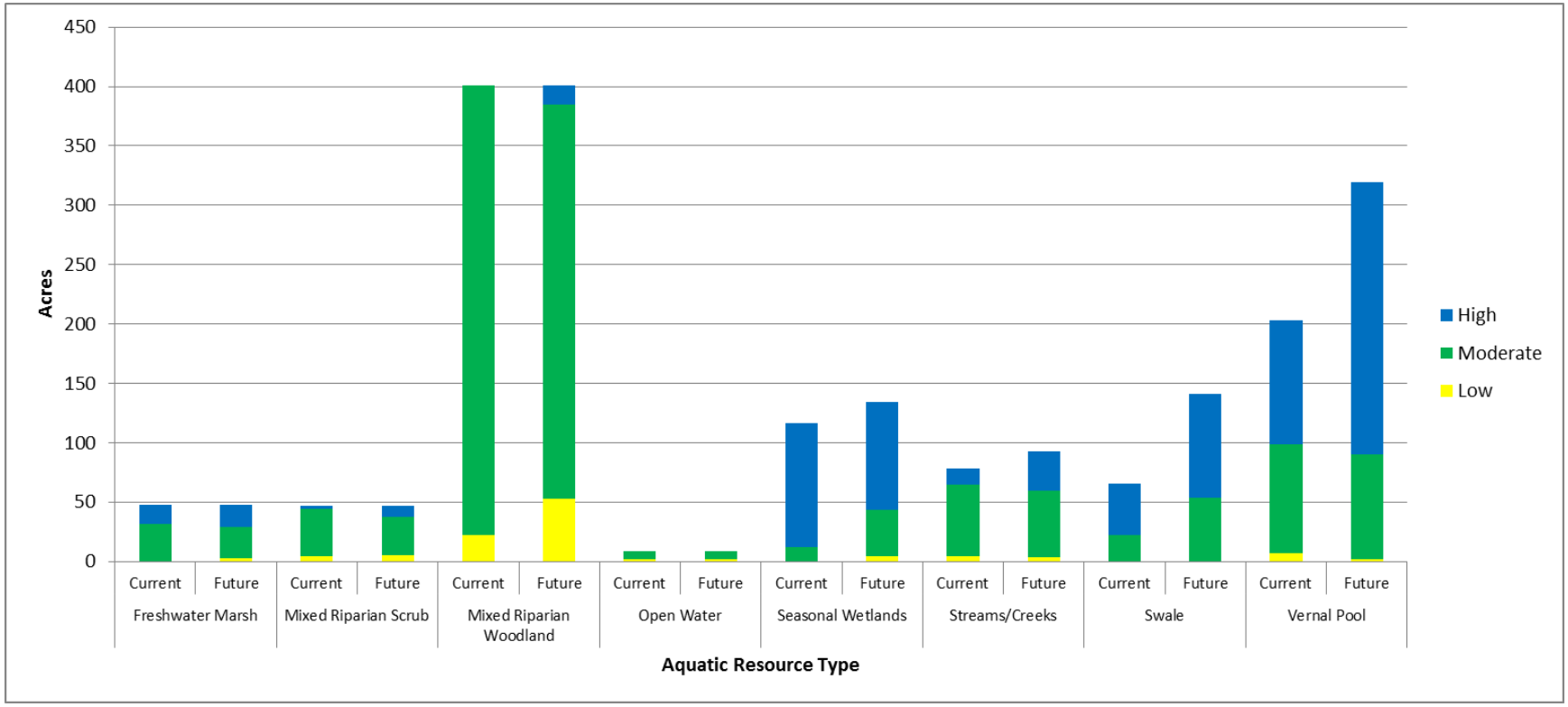


Table 41
Future Condition of Aquatic Resources in the Lower Mokelumne River Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0.02	2.4	0	2.4
	Mixed Riparian Woodland	R2/R3	0	14.1	182.2	0	196.4
Subtotal Wetland Riparian			*0*	*14.1*	*184.6*	*0*	*198.8*
Wetland Waters	Freshwater Marsh	PEM1	0	20.9	0	0	20.9
	Seasonal Wetland	PEM2	0	0.01	0	0	0.01
	Swale	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0.1	0	0	0.1
Subtotal Wetland Waters			*0*	*21.0*	*0*	*0*	*21.0*
Non-Wetland Waters	Open Water	POW	0	0	3.1	0	3.1
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	65.1	2.2	0	67.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*65.1*	*5.3*	*0*	*70.5*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*86.1*	*5.3*	*0*	*91.5*
Grand Total[1]			**0**	**100.2**	**189.9**	**0**	**290.3**

Note: 1. Table may not total precisely due to rounding.

Figure 44 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Mokelumne Watershed

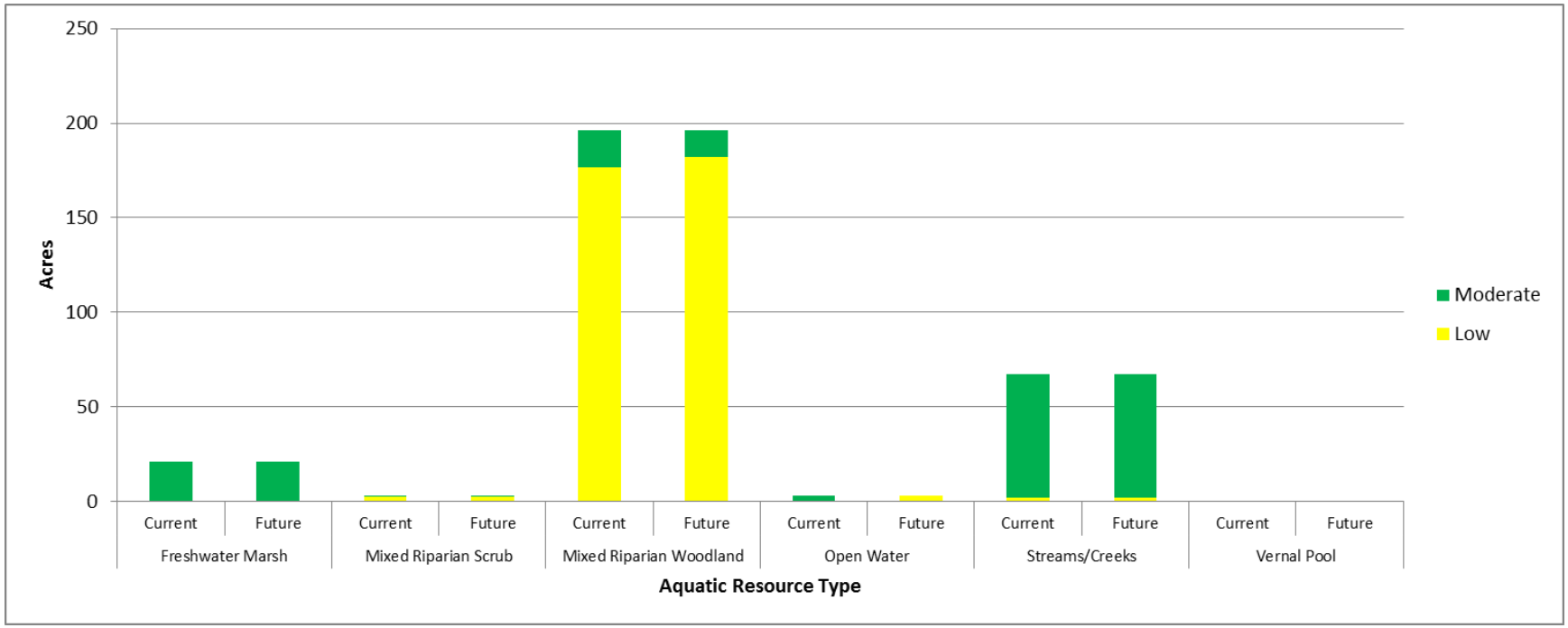


Table 42
Future Condition of Aquatic Resources in the Morrison Creek Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	1.61	0	1.61
	Mixed Riparian Scrub	R2/R3	3.2	11.2	6.3	0	20.7
	Mixed Riparian Woodland	R2/R3	0	54.5	48.1	0	102.6
		Subtotal Riparian	*3.2*	*65.7*	*56.0*	*0*	*124.9*
Wetland Waters	Freshwater Marsh	PEM1	63.8	228.5	22.8	0	315.2
	Seasonal Wetland	PEM2	0	24.5	14.4	0	38.9
	Swale	R2/R3	46.8	158.5	20.6	0	225.9
	Vernal Pools	PEM2	333.7	183.6	13.9	0	531.2
		Subtotal Wetland Waters	*444.3*	*595.1*	*71.7*	*0*	*1,111.2*
Non-Wetland Waters	Open Water	POW	0	19.4	59.0	0	78.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	30.2	35.2	0	65.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	30.8	4.7	0	35.6
		Subtotal Non-Wetland Waters	*0*	*80.4*	*98.9*	*0*	*179.4*
		Subtotal Wetland Waters and Non-Wetland Waters	*444.3*	*675.5*	*170.6*	*0*	*1,290.6*
		Grand Total[1]	**447.5**	**741.2**	**226.6**	**0**	**1,415.5**

Note: 1. Table may not total precisely due to rounding.

Figure 45 Existing and Future Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed

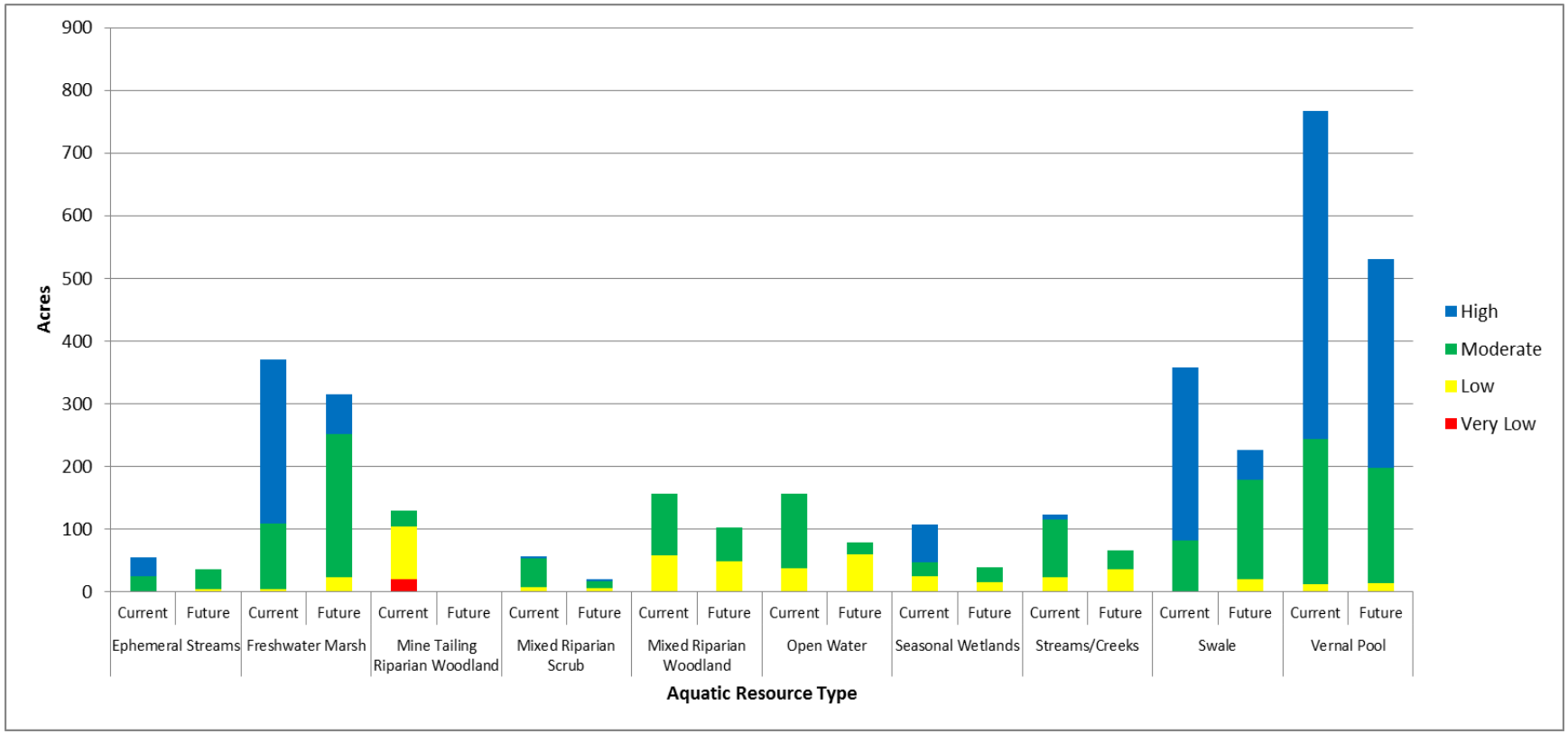


Table 43
Future Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	3.9	120.8	5.4	130.1
	Mixed Riparian Woodland	R2/R3	0	4.7	41.2	6.7	52.7
		Subtotal Riparian	*0*	*8.6*	*162.0*	*12.1*	*182.8*
Wetland Waters	Freshwater Marsh	PEM1	0	39.7	0	0	39.7
	Seasonal Wetland	PEM2	0	0.2	0	0	0.2
	Swale	R2/R3	0	1.4	0	0	1.4
	Vernal Pools	PEM2	0	5.3	0	0	5.3
		Subtotal Wetland Waters	*0*	*46.6*	*0*	*0*	*46.6*
Non-Wetland Waters	Open Water	POW	0	0	9.2	0	9.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	4.1	19.8	0	23.9
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*0*	*4.1*	*29.0*	*0*	*33.1*
		Subtotal Wetland Waters and Non-Wetland Waters	*0*	*50.7*	*29*	*0*	*79.7*
		Grand Total[1]	**0**	**59.3**	**191.0**	**12.1**	**262.5**

Note: 1. Table may not total precisely due to rounding.

Figure 46 Existing and Future Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed

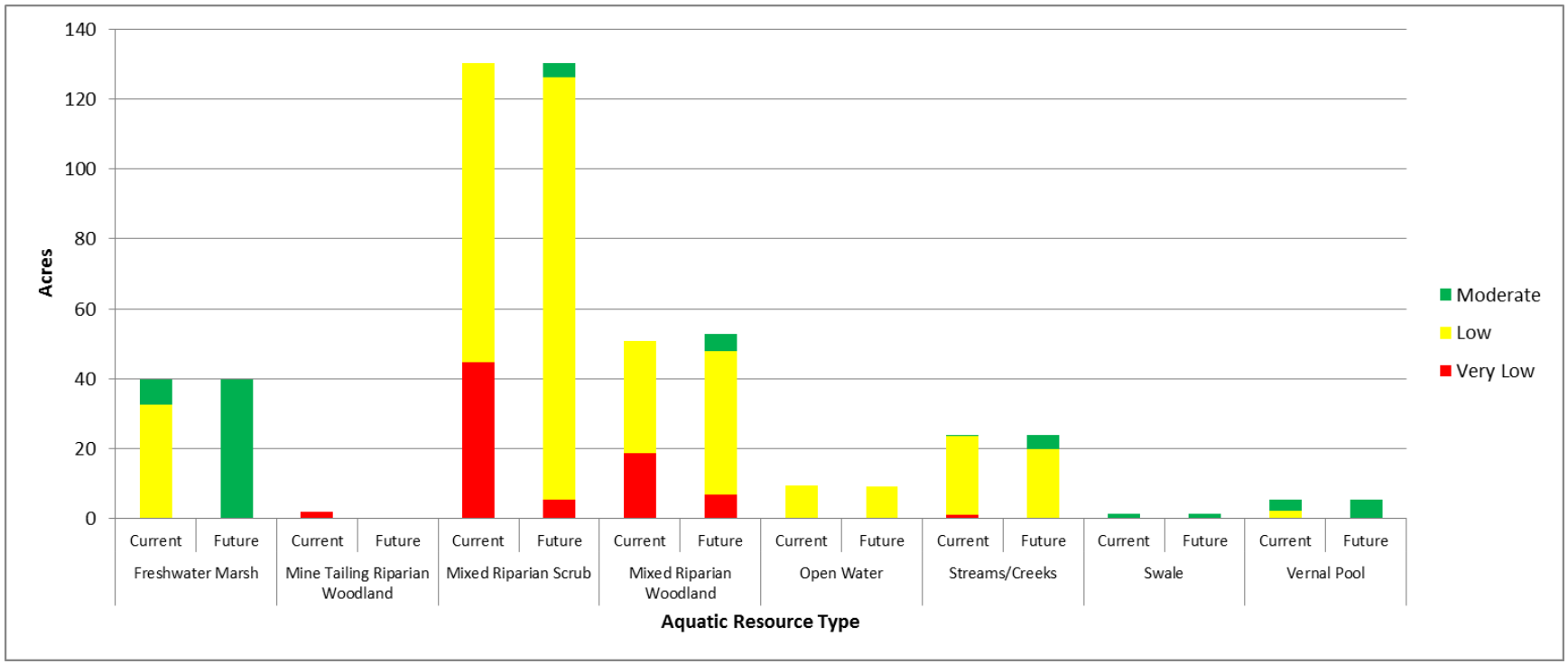
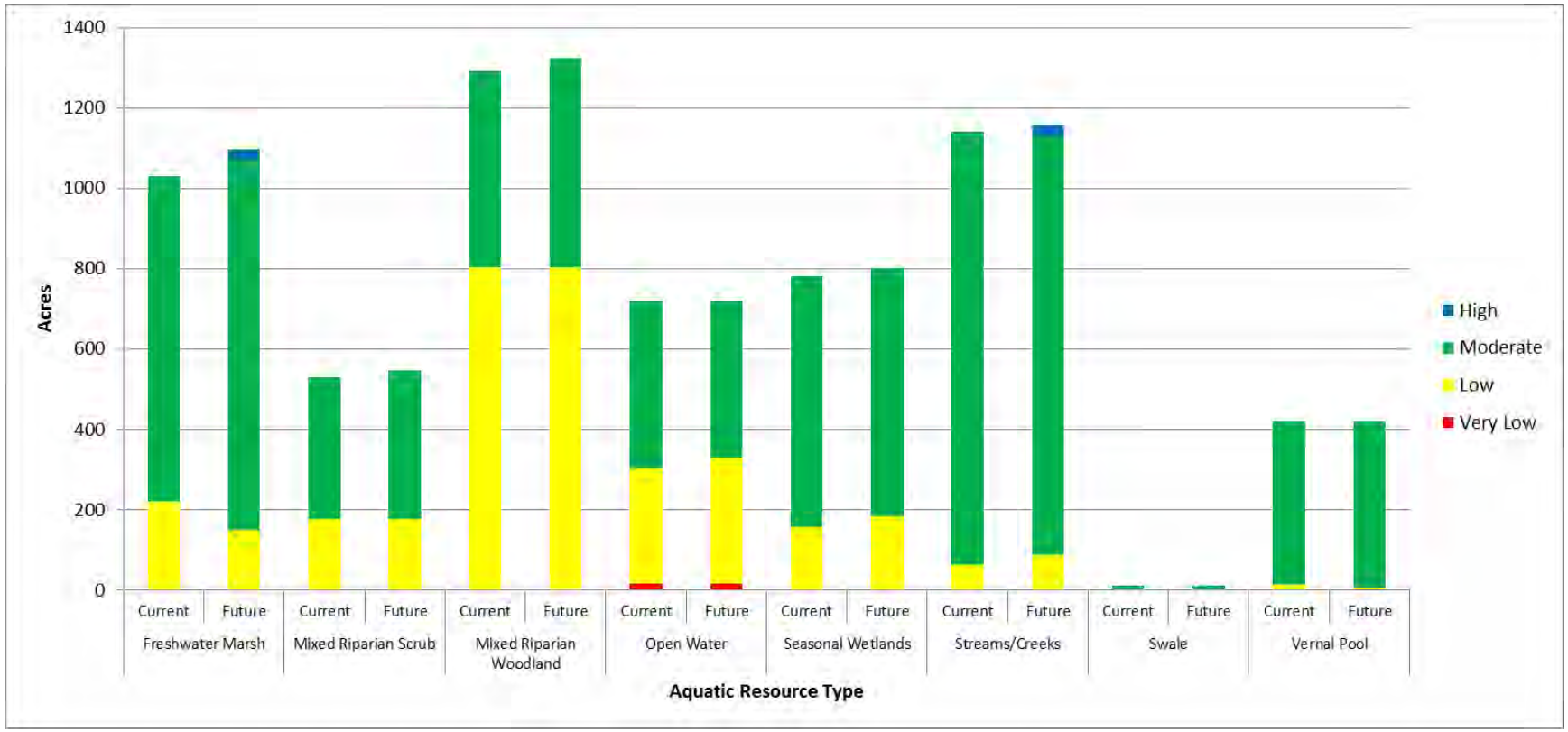


Table 44
Future Condition of Aquatic Resources in the Snodgrass Slough Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	369.6	176.9	0	546.4
	Mixed Riparian Woodland	R2/R3	0	522.0	802.5	0	1,324.5
		Subtotal Riparian	*0*	*891.6*	*979.4*	*0*	*1,870.9*
Wetland Waters	Freshwater Marsh	PEM1	27.0	919.5	150.7	0	1,097.2
	Seasonal Wetland	PEM2	0	615.4	184.5	0	799.9
	Swale	R2/R3	0	7.8	2.5	0	10.3
	Vernal Pools	PEM2	0	413.9	7.0	0	420.9
		Subtotal Wetland Waters	*27.0*	*1,956.6*	*344.7*	*0*	*2,328.3*
Non-Wetland Waters	Open Water	POW	0	389.9	313.8	15.5	719.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	25.7	1,043.0	86.9	0	1,155.7
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*25.7*	*1,432.9*	*400.7*	*15.5*	*1,874.9*
		Subtotal Wetland Waters and Non-Wetland Waters	*52.7*	*3,389.5*	*745.4*	*15.5*	*4,203.2*
		Grand Total[1]	**52.7**	**4,281.1**	**1,724.8**	**15.5**	**6,074.1**

Note: 1. Table may not total precisely due to rounding.

Figure 47 Existing and Future Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed



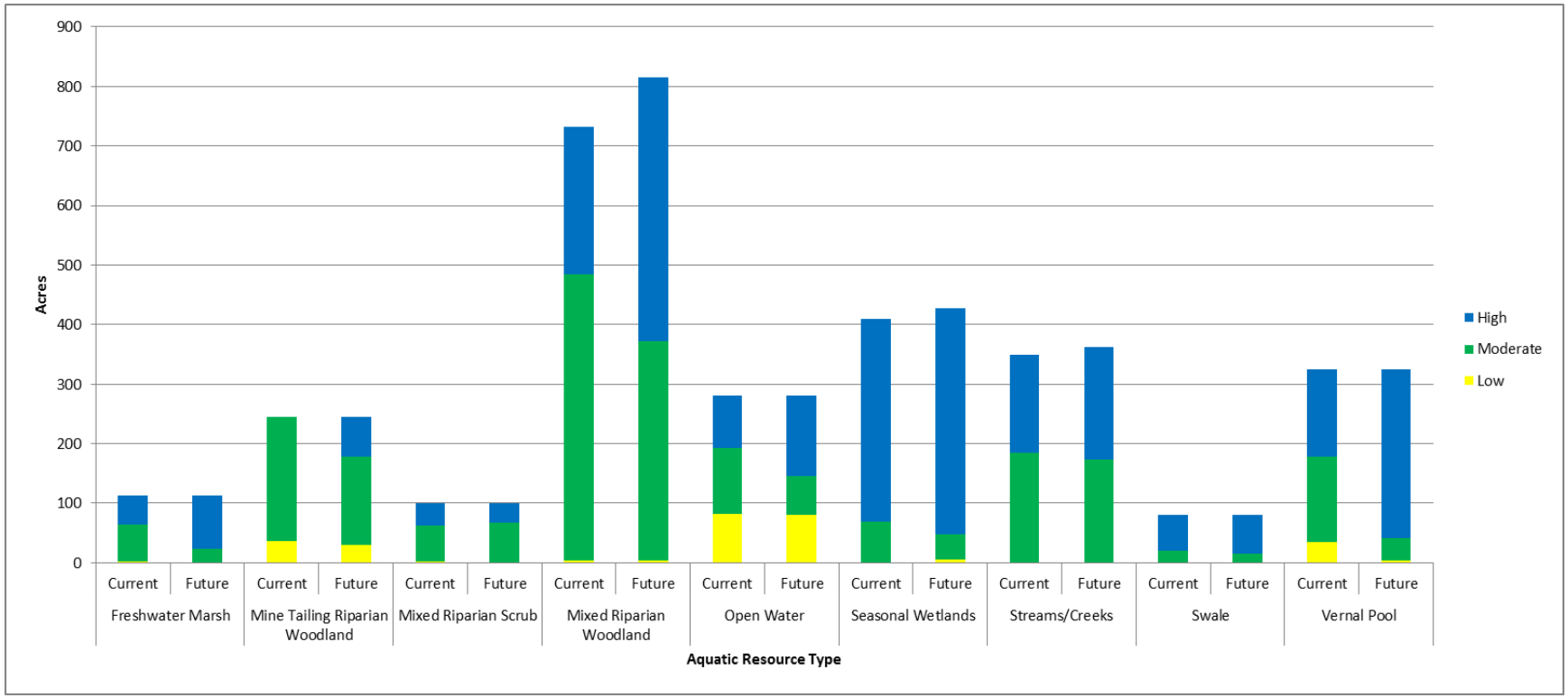
Draft SSHCP Aquatic Resources Program

Table 45
Future Condition of Aquatic Resources in the Upper Cosumnes Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.2	148.7	29.7	0	245.5
	Mixed Riparian Scrub	R2/R3	31.8	67.9	0	0	99.7
	Mixed Riparian Woodland	R2/R3	443.6	368.1	4.0	0	815.7
		Subtotal Riparian	*542.6*	*584.7*	*33.7*	*0*	*1,160.9*
Wetland Waters	Freshwater Marsh	PEM1	88.4	22.6	1.3	0	112.3
	Seasonal Wetland	PEM2	378.7	42.7	5.7	0	427.0
	Swale	R2/R3	65.7	14.6	0.3	0	80.6
	Vernal Pools	PEM2	284.1	37.2	3.4	0	324.7
		Subtotal Wetland Waters	*816.9*	*117.1*	*10.7*	*0*	*944.6*
Non-Wetland Waters	Open Water	POW	133.8	65.6	80.7	0	280.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	190.0	172.6	0.4	0	362.9
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*323.8*	*238.2*	*81.1*	*0*	*643.1*
		Subtotal Wetland Waters and Non-Wetland Waters	*1,140.7*	*355.3*	*91.8*	*0*	*1,587.70*
		Grand Total[1]	**1,683.3**	**940.0**	**125.5**	**0**	**2,748.6**

Note: 1. Table may not total precisely due to rounding.

Figure 48 Existing and Future Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed



In summary, the predicted future watershed profiles resulting from implementation of the SSHCP demonstrate aquatic resource abundance, diversity, and condition within the Plan Area would be maintained or improved. There would not be a net loss of aquatic resources in terms of acreage, aquatic resource diversity would be maintained, and the amount of high-condition resources within the Plan Area would be increased.

7 LOCAL AQUATIC RESOURCES IMPACT PERMIT APPLICATION PROCESS

7.1 Introduction

This section explains the local jurisdictions' Aquatic Resource Impact (ARI) Permit process and provides an overview of how Land Use Authority Permittees will issue ARI Permits to third-party project proponents under the ARP. This section also describes the permit application process for Plan Permittees, an explanation of specific requirements that must be satisfied by a project proponent prior to obtaining a permit, and in-lieu fee and land dedication requirements.

7.2 Submittal of Aquatic Resources Impact Permit Applications

7.2.1 Aquatic Resources Impact Permit Applications for Third-Party Project Proponents

Third-party project proponents are private project applicants that are seeking ministerial[11] or discretionary[12] permits from a Land Use Authority Permittee. Third-party project proponents shall submit their ARI Permit Application Package, the contents of which are described in Section 7.4.2, to the Land Use Authority Permittee with land use jurisdiction over their proposed project. Only the Land Use Authority Permittee with land use jurisdiction over a proposed project may issue ARI Permits to that project. For example, a project proposed by a third-party project proponent within the city limits of Rancho Cordova may only obtain an ARI Permit through the City of Rancho Cordova. The Land Use Authority Permittee will review the ARI Permit Application for consistency with all of the requirements that are described in this section and will provide the Implementing Entity, USACE, and RWQCB with a copy for tracking purposes.

Land Use Authority Permittees issue land use approval permits for a wide range of projects. Project applicants typically approach the information desk of the local jurisdiction (Land Use Authority Permittee) to inquire about land use approval permit requirements for their activity and the Land Use Authority Permittee will direct the customer to prepare the appropriate application. The Land Use Authority Permittee will review all local permitting applications to determine whether an activity will result in impacts to aquatic resources. If an activity would result in impacts to aquatic resources and

[11] A ministerial permit is a permit that requires little to no judgment on behalf of the Land Use Authority Permittee. An example of a ministerial permit is a building permit where as long as a parcel is zoned to allow the building of a structure the applicant only needs to follow building codes to construct their project.

[12] A discretionary permit is a permit that requires the use of judgement by a Land Use Authority Permittee before the permit can be issued. An example of a discretionary permit is a permit for a general plan amendment.

is otherwise not exempt, as defined by local aquatic resource protection ordinances, the applicant will be required to complete and submit an ARI Permit Application Package.

Potential CEQA Review

Many private third-party project proponent Covered Activities will require a land use approval and be subject to the California Environmental Quality Act (CEQA). For such activities, review of ARI Permit Applications should generally be undertaken concurrently with the CEQA environmental review. To facilitate this approach, the Land Use Authority Permittee should generally request that third-party project proponents submit an ARI Permit Application Package as part of the land use approval application and CEQA process.

There are many benefits to preparing the ARI Permit Application Package early in the planning process. First, submitting an ARI Permit Application Package during the land use approval/CEQA process will illustrate the various requirements required of the proposed project, and provide time for the project proponent to change the project description or to identify alternatives for CEQA analysis. Second, it will enable the CEQA document to refer to the project-specific requirements as identified in the ARI Permit Application. Finally, it will enable the local jurisdiction to provide early review of the ARI Permit Application for completeness. Based on a review of this initial information and a determination of ARI Permit requirements, the Land Use Authority Permittee can establish conditions of approval specifying ARI Permit conditions and fee requirements.

Each Land Use Authority Permittee is responsible for ensuring that an activity, upon issuance of an ARI Permit, fully complies with the terms of the permit.

7.2.2 Pre-Application Procedures

Prior to submitting an ARI Permit Application Package, third-party project proponents are encouraged to meet with the appropriate Land Use Authority Permittee. The purpose of the pre-submittal meeting is to allow the Land Use Authority Permittees to explain what information must be assembled for a specific project in support of the ARI Permit Application.

Pre-application meetings are also recommended to discuss AMMs and to determine if an applicant is proposing or is required to provide land dedication to offset all or a portion of their mitigation. Land dedications must be designed so that they comply with SSHCP/ARP AMMs as described in Chapter 5 of the SSHCP. Meeting early in the application process to discuss these criteria is strongly recommended to avoid delays in project approvals should land dedications not meet the criteria set forth in the SSHCP/ARP. A Land Use Authority Permittee may require a fee for these pre-submittal meetings and/or pre-submitted project proposal review.

7.2.3 Aquatic Resources Impact Permit Applications for Local Land Use Authority Permittees

Each local Land Use Authority Permittee that is participating in the SSHCP will adopt an aquatic resources protection ordinance requiring that permits be obtained by any party that is impacting aquatic resources within the SSHCP Plan Area. As such, all Land Use Authority Permittees are also required to comply with local aquatic resources protection ordinances and will complete an ARI Permit Application Package following the permit application process explained in Section 7.4. Each Land Use Authority Permittee will need to establish an internal process for ensuring that their projects are in compliance with the wetland protection ordinance. Because each Land Use Authority Permittee conducts project design and review independently, a single process that must be followed by all Land Use Authority Permittees will not be provided here. The completed ARI Permit Application Package will be submitted to the SSHCP Implementing Entity, USACE, and the RWQCB so that the project can be tracked for compliance monitoring purposes.

7.3 Master Plan Consistency with Aquatic Resources Impact Permits

Due to the large area that a master plan[13] encompasses, third-party project proponents initiating master plans are required to consult with their respective Land Use Authority Permittee about compliance with aquatic resources protection ordinances early in the master plan process. Ensuring that the master plan complies with the provisions of an aquatic resources protection ordinance will reduce the likelihood of project delays. Master plans must be designed to comply with the requirements of the aquatic resources protection ordinance.

Early consultation with the Land Use Authority Permittee will:

- Ensure that all required AMMs are addressed by the master plan.
- Ensure that on-site avoidance areas and Preserves are planned in appropriate locations to satisfy aquatic resources protection ordinance requirements.

7.4 Aquatic Resources Impact Permit Application Processing

An applicant will submit an ARI Permit Application Package for review and approval by the Land Use Authority Permittee following the process described in this section.

[13] A master plan is a document that broadly defines land use, circulation, and infrastructure for a specific area (Master Plan Area) and includes implementation measures that guide how development within the Master Plan Area will occur. The requirements for master plans can be fulfilled by a variety of planning tools, including specific plans, comprehensive plans, special planning areas, or any combination thereof.

7.4.1 Timing of Aquatic Resources Impact Permit Application Submittal

All applicants needing to obtain an ARI Permit must do so prior to any ground-disturbing activity; however, they can also obtain an ARI Permit earlier by the following means:

a. In conjunction with any Plan Permittee discretionary review;

b. For ministerial projects, prior to the issuance of any building or grading permit; or

c. In the absence of building or grading permits, prior to the Covered Activity being performed.

7.4.2 Components of the Aquatic Resources Impact Permit Application Package

Applicants must include the data, documentation, and/or exhibits as described in this section as part of the ARI Permit Application package. Land Use Authority Permittees designate, and may amend, the form and timing in which the following information must be provided; however, each Land Use Authority Permittee's ARI Permit Application Package must include each of the application components described herein. Land Use Authority Permittees may charge a fee to recover costs associated with review and processing of the ARI Permit Application. Applicants are responsible for the costs associated with preparation of the ARI Permit Application, including surveys. Forms for the ARI Permit Application Package will be made available by the Land Use Authority Permittees. The ARI Permit Application includes the components specified in the following subsections.

7.4.2.1 Applicant Information

This part of the application should include the applicant's name and contact information, property owner's name and contact information, and names and contact information for any consultants preparing materials in support of the ARI Permit Application.

7.4.2.2 Project Description and Map

The project description must include a written description of the location of the project site, including Assessor's Parcel Number(s), as well as a written description of all activities proposed within the project site. The written description must include the following:

- Timing of construction activity;
- Type of equipment used;
- Type of fill material and cubic yards, square feet, acreage, and where appropriate linear feet of each type of fill;

- Type and location of permanent and/or temporary impacts to aquatic resources.

The application must also include a site plan illustrating the exact location of the project site overlaid on an aerial photograph at a scale no smaller than 1 inch equals 100 feet (a scaling ratio of 1:1200) showing the location, width, depth, and length of all existing and proposed activities, including structures, roads, stormwater facilities, sewage treatment, installations, stockpiling areas, borrow sites and location of avoidance areas or on-site Preserves, if applicable, within the project site.

7.4.2.3 Aquatic Resources Delineation

"Aquatic resources delineation" means identifying the amount and boundaries of aquatic resources as defined in Section 3 of this document, including wetlands. A Land Use Authority Jurisdiction shall determine the probable existence of aquatic resources on the property involved in a development permit application. If aquatic resources are believed to exist on a property, the project applicant must prepare an aquatic resources delineation. All aquatic resources delineations shall be performed in accordance with the minimum standards set forth by the Sacramento District USACE and State Water Quality Control Board at the time of the delineation. All aquatic resources delineations shall be verified by the USACE. Aquatic resource delineations must be prepared by an individual or firm qualified to prepare them. All maps will be prepared using GIS technology and all shapefiles will be provided to the Land Use Authority Permittee for tracking purposes. When a USACE-verified and valid (i.e., non-expired) delineation for a project site already exists, that delineation can be used. Waters[14] (including wetlands) found to be present on site must be classified using the nomenclature system developed for the SSHCP (see SSHCP Appendix E).

7.4.2.4 Determination of Environmentally Equivalent or Superior Alternative

As described in greater detail in Section 5.2.2.1, if a complete avoidance alternative is not practicable, a DEESA will be prepared to ensure replacement of any lost functions and services to aquatic resources. The DEESA shall include the following information:

- A defined project area boundary and project area acreage.
- A detailed project description, including an overall project purpose statement, that demonstrates: (1) why an avoidance alternative is not practicable;[15] and (2) that the Covered Activity project minimizes direct and indirect effects to aquatic resources to the greatest extent practicable. This description would include information regarding any aquatic

[14] As defined in 33 CFR 328 or 40 CFR 230.2(s).
[15] Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose.

resources on site that are proposed to be avoided. It would also include information regarding any impacted aquatic resources in the context of the regional Conservation Strategy of the SSHCP (e.g., a statement that the project proposal is consistent with the requirements of the SSHCP and any terms and conditions of the SSHCP ITPs).

- Amount (acres and linear feet and cubic yards) of unavoidable impacts (permanent, causing loss of waters, and temporary) to aquatic resources associated with the project, and amount of indirect impacts.
- A detailed description of project design features and mitigation measures that reduce impacts, including, but not limited to, impact minimization; on-site first-order stream realignment (as opposed to removal); and SSHCP BMPs, AMMs, and LID AMMs.
- A description and amount of SSHCP-required compensatory mitigation through re-establishment, establishment, and/or preservation. Compensatory mitigation must conform to the SSHCP Conservation Strategy and the minimum mitigation ratios required by the ARP and must be consistent with the USACE/EPA Mitigation Rule (33 CFR Part 332). The primary way development project activities would accomplish the required mitigation is the purchase of credits from an ILF program that would be used for the SSHCP Plan Area. (See Section 5.3 for specific compensatory mitigation requirements.)
- Demonstration that, although the proposed Covered Activity project would not completely avoid impacts to aquatic resources, with proposed design and compensation measures, the project would be environmentally equivalent or superior to that which would occur under a complete avoidance alternative without these measures, based on one or more of the following factors:
    - Effects on designated Critical Habitat and Core Recovery Areas
    - Effects on the diversity of aquatic resources within the Plan Area
    - Effects on vernal pool and other habitat connectivity and function of the SSHCP Preserve System
    - Effects on the condition of aquatic resources within the Plan Area
    - Effects on the abundance of aquatic resources within the Plan Area
    - Effects on Covered Species.

7.4.2.5 Proposed Compensatory Mitigation Plan

A proposed compensatory mitigation plan shall be included that explains how the project applicant will compensate for permanent and temporary impacts to aquatic resources that will occur, after efforts to avoid and minimize have been exhausted. There are three accepted methods for meeting compensatory mitigation requirements: (1) payment into an ILF program

approved by the USACE and that contains the impact site within its service area, (2) payment into a mitigation bank approved by the USACE and that contains the impact site within its service area, and/or (3) a permittee-responsible compensatory mitigation plan pursuant to local Land Use Jurisdiction Permittee ordinances that is in compliance with the Mitigation Rule. If all or part of the applicant's compensatory mitigation obligation will be satisfied via an ILF fund or through purchase of credits at a mitigation bank, the name and contact information for the ILF fund or the mitigation bank must be provided.

If an applicant is proposing permittee-responsible compensatory mitigation, the Implementing Entity must determine whether the proposed permittee-responsible compensatory mitigation is consistent with SSHCP AMMs described in SSHCP Chapter 5, Section 5.4, Conditions on Covered Activities, and with the biological goals and objectives described in Chapter 7 of the SSHCP (Table 7-1, Biological Goals, Measureable Objectives, and Conservation Actions). It should be noted that the SSHCP has fairly strict criteria that must be adhered to when siting Preserves, and it is possible that a site proposed for permittee-responsible compensatory mitigation will not meet the criteria for an SSHCP Preserve. If it is determined that permittee-responsible compensatory mitigation is not consistent with the requirements of the SSHCP, the applicant may wish to work with the Implementing Entity to find alternative sites that will support the SSHCP Conservation Strategy.

An applicant must provide the following information in support of permittee-responsible compensatory mitigation:

The compensatory mitigation plan consists of two parts: baseline information for the site and a conceptual compensatory mitigation plan. If off-site aquatic resource compensatory mitigation is proposed, baseline information for both the project site and mitigation site is required.

Baseline information shall include:

- Aquatic resources delineation as described pursuant to local aquatic resources protection ordinances;
- Description and maps of land cover types and vegetative conditions at the site;
- Description and maps of hydrological conditions at the site;
- Description of soil conditions at the site based on an on-site analysis and available soils information from online or published sources such as the Natural Resources Conservation Service's soils maps;
- A topographic map of the site; and
- A functional assessment or condition of the existing aquatic resources.

The contents of the compensatory mitigation plan shall be consistent with the USACE's Regional Compensatory Mitigation and Monitoring Guidelines for the South Pacific Division (2015), Appendix D, and include:

- Title page;
- Contributor page;
- Distribution page;
- Table of contents;
- Brief description of proposed compensatory mitigation project and proposed source of compensatory mitigation;
- Determination of goals and objectives of the proposed project. Specific criteria shall be provided for evaluating whether or not the goals and objectives of the compensatory mitigation project are being met. Such criteria may include water quality standards, survival rates of planted vegetation, species abundance and diversity targets, habitat diversity indices, or other ecological, geological, or hydrological criteria;
- A description of all permanent and temporary impacts (acreage and linear feet) that require compensatory mitigation pursuant to local aquatic resources protection ordinances;
- Description of site selection criteria such as watershed overview, landscape setting and position, and site-specific information, including consistency with the site selection guidance provided in the ARP (Appendix D);
- Other baseline information, such as a map showing locations of permanent and/or temporary impact and compensatory mitigation sites; map showing proposed preserves and setbacks; delineation of aquatic resources; functional/condition assessment, if appropriate; species of concern (federal and/or state); cultural resources; existing and planned land uses within and surrounding the proposed compensatory mitigation sites(s); existing site topography/elevations; aerial photos, land uses, site changes (deep ripping, impoundments, channel straightening or realignment); interviews with adjacent landowners, ranchers, land managers regarding locations of seeps, observations of flood events, trespassing/vandalism, opportunities for education and outreach.
- Written specifications for the compensatory mitigation project shall be provided. The specifications shall include the proposed construction sequence; grading and excavation details; water and nutrient requirements for planting; specification of substrate stockpiling techniques; and planting instructions, as appropriate. These written specifications shall be accompanied by detailed site diagrams, scaled cross-sectional drawings, topographic maps showing slope percentage and final grade elevations, and any other drawings appropriate to show construction techniques or anticipated final outcome;

- Discussion and map of plant material to be planted and planting densities;
- Preliminary drainage plan identifying location of proposed drainage facilities, including detention structures and water quality features (e.g., swales);
- Discussion of water sources for all aquatic resources on the site;
- Project schedule;
- A monitoring and management program to measure the success of the compensatory mitigation project pursuant to local aquatic resources protection ordnances. The monitoring and management program must include the following:
    - The compensatory mitigation project shall be monitored for a period necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. Compensatory mitigation projects are required to have a minimum monitoring period of 5 years. For aquatic resources with slow development rates (e.g., vernal pools and riparian habitats) a monitoring period of more than 5 years is required. Monitoring periods may be extended if performance standards are not being met. Before determining success, there should be at least two consecutive annual monitoring reports where all the performance standards are met without human intervention (e.g., artificial irrigation).
    - Monitoring shall be designed to measure the performance standards outlined in the compensatory mitigation plan.
    - A monitoring protocol shall be included outlining how the monitoring data will be evaluated by agencies that are tracking the progress of the project.
    - Monitoring reports shall be submitted annually, or on a pre-arranged alternate schedule, for the duration of the monitoring period.
    - Monitoring reports shall analyze the results of monitoring, documenting milestones, successes, problems, and recommendations for corrective and/or contingency actions to ensure success of the compensatory mitigation project.
- A contingency plan that identifies potential courses of action, and any corrective measures to be taken when monitoring or evaluation indicates project performance standards are not being met.
- A monitoring and management program to measure and maintain the long-term sustainability of the compensatory mitigation project in perpetuity. Monitoring and management programs shall be consistent with established practices of the SSHCP and ARP and information collected in a manner that allows for seamless integration into the SSHCP database.

7.4.2.6 Financial Assurances for Permittee-Responsible Compensatory Mitigation

A project applicant proposing permittee-responsible compensatory mitigation shall submit itemized cost estimates showing required financial assurances pursuant to local aquatic resources protection ordinances, including cost estimates associated with performance and maintenance assurances.

7.4.2.7 Description of How the Project Complies with SSHCP Avoidance and Minimization Measures

Project applicants using the SSHCP must document how the proposed project will comply with SSHCP AMMs described in SSHCP Chapter 5, Section 5.4. See the SSHCP AMMs worksheet attached to the SSHCP permit application package.

7.5 Review for Completeness

The Land Use Authority Permittee will compare the ARI Permit Application Package against a Project Review Checklist, to confirm that all requirements have been met, including requirements such as setbacks and other AMMs. The Land Use Authority Permittee's review process may be subject to the processing time and requirements of the Permit Streamlining Act (Government Code Section 65920 et seq.). For most projects, the Land Use Authority Permittee will review the ARI Permit Application Package for completeness within 30 days of receipt of a complete ARI Permit Application package. The Land Use Authority Permittee or Implementing Entity may extend the review period for large or potentially complex projects up to an additional 30 days by providing written notice to the applicant. The Land Use Authority Permittee may continue to extend the review period after written notice until the Land Use Authority Permittee deems that a SSHCP permit application package is complete.

The Land Use Authority Permittee is also authorized to close ARI Permit Applications when they determine that the applicant has failed to provide requested information within a reasonable period. In such an event, the Land Use Authority Permittee shall provide written notice that the ARI Permit Application will be closed within 30 days unless all required materials are submitted.

7.6 Assessment of Impacts

After a complete ARI Permit Application has been submitted, the involved Land Use Authority Permittee shall prepare an assessment of aquatic resource cover type impacts that would result from the project.

7.6.1 Method for Calculating Impacted Acreage

The Land Use Authority Permittee or Implementing Entity will prepare an impact assessment that identifies the location and amount of each aquatic resource cover type that will be directly impacted as a result of implementing an activity. Permanent losses of aquatic resources will be calculated by overlaying the map generated to identify project impacts onto the wetlands delineation. If any portion of a wetland land cover type is impacted, then the entire feature is considered to be directly impacted. The impact assessment will include both a map depicting the area of impact and table(s) quantifying the acres of impact to each land cover type. The results will be used to determine the required mitigation to offset impacts.

7.6.2 Appealing the Impact Assessment

An applicant has the right to appeal the impacts assessment made by a Land Use Authority Permittee. Written objections must be filed with the Land Use Authority Permittee within 30 calendar days of receiving the initial impact assessment, and must be accompanied by data supporting the appeal, such as surveys, aerial photos, maps, or resource agency-verified delineations. The Land Use Authority Permittee has 30 calendar days from the receipt of the appeal to respond. Disagreements that cannot be resolved between the Land Use Authority Permittee staff and applicants will be decided by the Land Use Authority Permittee's governing Board or Council.

7.7 State and Federal Agency Review

While an ARI Permit is required as a condition of local Aquatic Resource Protection Ordnances, the ARI Permit Application is also used to satisfy state and federal aquatic resource permitting requirements.

Programmatic General Permit

As discussed below in Section 8, a project that does not exceed 2 acres of loss of waters, and/or more than 500 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear foot limit is waived in writing by the USACE, can use a Programmatic General Permit to satisfy state and federal aquatic resource permitting requirements. The ARI Permit Application has been designed to provide all of the information necessary to process a Programmatic General Permit. Because the local Land Use Authority Permittees are authorized to issue Programmatic General

Permits on behalf of the USACE and the RWQCB, no further state or federal resource agency review of the application is required.

Letter of Permission and Standard Permits

Projects that exceed the aquatic resource impact thresholds set for the Programmatic General Permit will be required to seek either a Letter of Permission or a Standard Permit from the USACE as explained in further detail in Section 8 below. Similarly to the Programmatic General Permit the ARI Permit Application has been designed to provide all of the information necessary to process a Letter of Permission or Standard Permit. Unlike the Programmatic General Permit, a Letter of Permission or a Standard Permit cannot be issued by the Land Use Authority Permittees. All ARI Permit Applications completed for projects that exceed the Programmatic General Permit threshold will be submitted to the USACE and RWQCB for review and issuance of either a Letter of Permission or Standard Permit depending on the size of impacts to aquatic resources.

7.8 Fees

Once a project receives a draft compliance determination letter, the Land Use Authority Permittee will calculate fees based on the project impacts. Once impacts are calculated, they must be reported to the SSHCP Implementing Entity, if the project applicant is using the SSHCP to satisfy mitigation obligation, so they can be tracked for compliance with the Plan's stay-ahead provision (see Chapter 9 of the SSHCP). Fees are subject to automatic adjustments to allow for fluctuating land values and other mitigation-related costs. Annual adjustments will be made on or before March 15 of each calendar year, and other adjustments may be made during periodic audits. Table 12-5, Development Fees Used in the SSHCP Economic Model, in SSHCP Chapter 12 sets forth the initial SSHCP development fee structure.

7.8.1 SSHCP Development Fees

SSHCP Development Fee Payment Timing

Mitigation for project impacts, whether through payment of the SSHCP development fee, use of conservation or mitigation bank credits, or by permittee-responsible compensatory mitigation, must occur prior to land disturbance. For master planned projects, an applicant can choose to pay fees for a unit of land to be impacted (a phase or portion of a larger project) rather than paying fees for the full project area at one time. Project proponents that pay fees in advance of issuance of local Land Use Authority permits are subject to provisions of the "catch-up fee ordinance" as described in Chapter 9 of the SSHCP. This ordinance states that if a project proponent pays fees prior to issuance of a permit and fees increase before the permit is issued, the project proponent will pay the difference between what was originally paid and the amount of the fee increase. Fee payments are final and nonrefundable and remove any need for land dedication in lieu of fees.

8 AQUATIC PERMITTING PROGRAM

This section describes how the local permitting program contained in the ARP complements and combines with an anticipated federal and state permitting strategy to provide a comprehensive permit program for the Plan Area. Numerous federal and state regulatory agencies (USACE, RWQCB, and CDFW) have aquatic resources permitting authority over Covered Activities within the Plan Area. The SSHCP and ARP's local permitting program and comprehensive, long-term watershed approach is designed to enable these regulatory agencies to shorten permitting timelines and improve the protection and management of aquatic resources in the Plan Area.

Since many species covered under the SSHCP are closely associated with aquatic resources, state and federal aquatic resources regulatory programs can use the SSHCP framework to develop more efficient permitting processes for SSHCP Covered Activities. In comparison to building upon the ARP's framework and local permitting program, the project-by-project application review currently employed within the Plan Area does not provide as comprehensive an ability for the regulatory agencies to evaluate aquatic resources impacts and compensatory mitigation at a watershed scale.

The SSHCP and ARP are expected to provide the opportunity to increase permitting efficiency, inclusive of the development of the USACE's CWA Section 404 permitting strategy, which could include multiple permit instruments and/or processes, including a GP(s), an LOP, and an abbreviated SP process. The USACE is a cooperating agency on the USFWS' Environmental Impact Statement (EIS) under NEPA being developed for the SSHCP. The USACE anticipates using the EIS as a programmatic document and would incorporate analysis from it to the maximum extent possible to address compliance with NEPA associated with CWA Section 404 permitting for future SSHCP Covered Activities.

Parallel to the USACE's permitting strategy, the RWQCB and CDFW have opportunities to increase the efficiency of their permitting processes, while improving the protection and management of aquatic resources in the Plan Area. The RWQCB could issue a programmatic CWA Section 401 Water Quality Certification (WQC) for the USACE's GP(s), and adopt a more efficient WQC approach for projects associated with USACE's LOP and SP processes. The RWQCB could also adopt a more efficient Waste Discharge Requirement (WDR) approach for waters of the state. The CDFW could issue a Master LSA or Long-Term LSA for activities and adopt a more efficient individual SAA process. The RWQCB and CDFW are cooperating agencies on the Environmental Impact Report (EIR) under CEQA being developed for the SSHCP, and therefore would be able to use the EIR as a programmatic document, and incorporate analysis from it to address compliance with CEQA associated with future SSHCP Covered Activities.

Final decisions on permit strategies and instruments would be made by the USACE Sacramento District, RWQCB, and CDFW. As such, the anticipated vision described in this document is preliminary, but has been reviewed in concert with the various agencies and articulates what is a representative, common outlook.

8.1 General Permit Approach

8.1.1 USACE 404 General Permit and the Local Permit Program

The USACE issues GPs for activities with no more than minimal individual and cumulative impacts on the aquatic environment. GPs are issued on a nationwide, regional, and programmatic basis. PGPs are based on a local or state program that protects aquatic resources. The SSHCP Plan Permittees are seeking a PGP from the USACE for SSHCP Covered Activities within the Plan Area.

8.1.1.1 CWA Section 404 General Permit Overview

If a PGP approach is adopted by the USACE, the PGP would be established for SSHCP Covered Activities with minimal individual and cumulative environmental impacts. The PGP would be premised on the SSHCP, ARP and Aquatic Resources Protection Ordinances that would be adopted by the County of Sacramento, the Cities of Galt and Rancho Cordova and the Implementing Entity. The ordinances would provide the legal structure for the Land Use Authority Permittees and Implementing Entity to implement the local aquatic program. Each proponent proposing to verify a project under the PGP would then submit an application to the Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, to discharge dredged or fill material into waters of the United States and waters of the state, and would receive verification from the Land Use Authority Permittees or Implementing Entity for qualified Covered Activities. It would be the Land Use Authority Permittees' or Implementing Entity's responsibility to determine consistency with the SSHCP, the ARP, and the aquatic resources ordinance, depending on who has jurisdiction over the project. The Land Use Authority Permittees and Implementing Entity would submit reports to the USACE at regular intervals for Covered Activity projects approved under the PGP. The PGP would be valid for a period of 5 years, with the potential for reauthorization by the USACE if the program is in compliance with all requirements of the SSHCP, ARP, and PGP. The USACE also has the ability to suspend or revoke GPs (either PGPs or RGPs) in accordance with 33 CFR 325.7 in response to compliance issues and/or a determination that use of the GPs has exceeded minimal individual and cumulative adverse impacts to waters of the United States.

An alternative (or, potentially future addition) to the PGP approach is the establishment of an RGP for SSHCP Covered Activities. Like a PGP, a RGP would only authorize activities substantially similar in nature with minimal individual and cumulative environmental impacts. The main difference between a PGP and RGP is that a PGP is founded upon an existing program

(federal, state or local) and is designed to avoid duplication with that program(s). As envisioned in the context of the ARP, this is anticipated to involve the USACE's issuance of a PGP for use by the Land Use Authority Permittees and Implementing Entity in verifying its use to authorize a project. The USACE also has discretion to issue a PGP that provides that the USACE review and verify authorizations for certain activities or levels of activity, should it be necessary to ensure a PGP meets the standard of minimal individual and cumulative environmental impacts. Under an RGP each project proponent proposing to authorize a project via the RGP would submit a request for verification to the appropriate SSHCP Land Use Authority Permittees or Implementing Entity, who would act as a "clearinghouse" for the permit applications by conducting the initial screening process to verify project consistency with the SSHCP and ARP. The project applications would then be submitted to the USACE, who would review the application requests under the RGP to determine compliance and make permit decisions. The USACE also has the discretion to specify types and/or levels of activities under a RGP that are "non-notifying," such that no pre- or post-project notification or reporting would be necessary between the project proponent and/or SSHCP "clearinghouse" and the USACE. The RGP would be valid for a period of 5 years, with the potential for reauthorization by the USACE if the program is in compliance with all requirements of the SSHCP, ARP, and terms and conditions of the RGP. The USACE also has the ability to suspend or revoke GPs (either PGPs or RGPs) in response to compliance issues and/or a determination that use of the GPs has exceeded minimal individual and cumulative adverse impacts to waters of the United States.

Under either permitting approach, application for use of these GPs is voluntary. Covered Activity projects that would discharge dredged or fill material into waters of the United States and meet the terms and conditions of the USACE GP(s) are eligible, but not obligated, to apply for verification under the GP(s).

8.1.1.2 General Permit Proposal and Basis for General Permit Acreage Threshold

The SSHCP Plan Permittees are developing a local aquatic resources program that they anticipate would support the USACE's issuance of a PGP for discharge of dredged or fill material into waters of the United States that would cause no more than minimal individual and cumulative environmental impacts. This section is written to express how the SSHCP Plan Permittees would envision a proposed PGP, whose final terms and conditions would be determined by the USACE. To qualify for use of the PGP, the loss of waters of the United States, including wetland waters of the United States, resulting from a single and complete Covered Activity project is envisioned by the SSHCP Plan Permittees to not exceed 2 acres of loss of waters, and/or more than 500 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear foot limit is waived in writing by the USACE.

In addition to a specific acreage limit of loss of waters for any given single project, the SSHCP PGP overall impact amounts would be "capped" over a 5-year implementation term. This Plan Area-wide impact acreage cap would be set at 155 acres of loss of wetlands within the Plan Area per 5-year term of the PGP. Assuming the PGP is reauthorized at 5-year intervals by the USACE, this cap would be repeated approximately nine times between the time of the SSHCP's approval and the end of its 50-year term.

The SSHCP Covered Activities fall into eight general categories:

- Urban Development in the UDA
- Mining in the UDA
- Rural Transportation Projects
- Recycled Water Projects
- Covered Activities in Preserve Setbacks in the UDA
- Covered Activities in Stream Setbacks in the UDA
- SSHCP Preserve System Covered Activities
- Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System.

Covered Activities allowed under each of the above-listed categories are described in detail in the SSHCP in Section 5.2.

As described above, to qualify for use of the SSHCP PGP, the proposed loss of waters of the United States resulting from a single and complete Covered Activity project could not exceed a total of 2 acres and/or 500 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear foot limit is waived in writing by the USACE. The per-project acreage threshold of the SSHCP PGP is a higher acreage amount than the typical 0.5-acre threshold of the USACE's Nationwide Permit Program.

The following projects and activities are envisioned by the SSHCP Plan Permittees to not be eligible for authorization under the anticipated SSHCP PGP because they are not covered by the SSHCP Permits:[16] agricultural projects; agricultural-residential development outside the UDA; trail systems outside the UDA; airport operations and expansion outside the UDA; rural infrastructure that is not identified as a Covered Activity; landfills, mining outside the UDA; oil and gas extraction or production; projects related to the Cosumnes River; projects that have received state and/or federal (as applicable) aquatic resource permits in advance of the official

[16] For a complete description of activities and actions not covered by the SSHCP permits, please see Section 5.3 of the SSHCP.

implementation date of the SSHCP; existing or proposed preserves not under SSHCP Management; establishment, of new and management and operation of existing mitigation and conservation banks; pesticide use; dam construction or removal; water diversion; wind energy; power lines outside the UDA; and emergency, safety, and police services. Covered Activities that do not require a development, grading, building, or other construction permit are eligible, but not obligated, to be authorized under the SSHCP PGP.

8.1.2 Section 401 CWA Water Quality Certification, State Board General Order

The SSHCP Plan Permittees are seeking a programmatic Section 401 CWA Water Quality Certification from the RWQCB. As with the proposed USACE General Permit (described above in Section 7.1.1.2), the programmatic 401 Certification would authorize SSHCP activities that cause no more than minimal individual and cumulative adverse impacts to aquatic resources within the Plan Area. Covered Activities authorized under the programmatic 401 Certification would need to satisfy the RWQCB's water quality anti-degradation policy by demonstrating that maintenance of water quality standards are being satisfied in the Plan Area. This would be accomplished when a project enters the SSHCP permitting framework. The local implementing agency would vet local Covered Activities with a review process that would assure all measures required under the SSHCP permitting framework for wildlife and water quality are met before submittal to the RWQCB for final review and approval. The programmatic 401 Certification would satisfy the Report of Waste Discharge requirements for Porter-Cologne.

The more efficient 401 Certification process would be attractive to project proponents because it would save time and costs associated when compared to the standard permitting process. From a regulatory standpoint, it would allow greater environmental benefits to accrue from project impacts considered from a watershed perspective.

8.1.3 California Fish and Game Code/Section 1600 MSAA

For projects that are initiated by a local Land Use Authority Permittee (Sacramento County, the City of Rancho Cordova, or the City of Galt) that need to notify CDFW pursuant to Section 1600 of the California Fish and Game Code, CDFW would enter into an MSAA)or a Long-Term Streambed Alteration Agreement (LTLSA). The aforementioned type permit vehicle (be it a CDFW MSAA or an LTLSA) would be valid for 12 years and would be eligible for a one-time extension for a maximum period of 17 years. For the amount of time remaining under the 50-year SSHCP following the expiration of the first MSAA or LTLSA and its extension, Sacramento County, the City of Rancho Cordova, or the City of Galt would enter into a new agreement that would build upon the first agreement for municipal projects.

For all other Covered Activity projects, CDFW would streamline the process to authorize activities under Section 1602 of the California Fish and Game Code that affect the bed and bank of streams, ponds, and lakes in the Plan Area with implementation of the ARP. The ARP and SSHCP address all impacts and the conservation of streams and riparian habitat and other water bodies regulated by CDFW.

In the streamlined process, the local Land Use Authority Permittees or Implementing Entity, whoever has jurisdiction, may act as a "clearinghouse" for the notification forms and would conduct an initial screening process to verify the project's consistency with the SSHCP, ARP, and the aquatic resources protection ordinances. The local Land Use Authority Permittees or Implementing Entity may then submit the notification forms to CDFW on behalf of the project proponent. Prior to processing an LSA Notification, CDFW must collect the fee for each LSA Notification submitted by the individual project proponent. CDFW is solely responsible for determining whether an LSA Agreement is required.

Ultimately, for land development Covered Activities that conform with the SSHCP permitting framework, the CDFW would enable a MSAA or LTLSA to increase the efficiency of their permitting process and benefit the County and Cities, and the JPA collectively.

8.2 CWA Section 404 Permitting for Projects Ineligible for General Permits

8.2.1 CWA Section 404 Individual Permits

Similar to the discussion above regarding an anticipated PGP, based on working with the USACE in the development of the SSHCP and ARP, the SSHCP Plan Permittees anticipate that the USACE would develop programmatic approaches to processing individual CWA 404 permits for the relatively small amount of SSHCP Covered Activity projects proposed to impact waters of the U.S. that would not fit under the terms and conditions of the PGP. The final determinations and related terms and conditions of these anticipated permit processes is at the discretion of the USACE. Project proponents with development Covered Activity projects located in the development envelope of the Plan Area that do not meet eligibility requirements under the PGP would be able to apply for CWA Section 404 authorization under an "abbreviated" individual permit (IP) process, encompassing two kinds of IPs: SPs and LOPs. For projects proposing to permanently impact more than 2 acres but not more than 10 acres of Waters of the United States, and/or more than 700 linear feet of perennial, intermittent, or third or higher-order ephemeral streams (unless this linear-foot limit is waived in writing by the USACE), a LOP procedure for Covered Activities in the Plan Area is envisioned (see Section 7.2.1.1). For projects proposing to permanently impact more than 10 acres of waters of the United States and/or 700 linear feet of perennial, intermittent, or third or higher-order ephemeral streams, an "abbreviated" SP

procedure for Covered Activities in the Plan Area is envisioned (see Section 7.2.1.2). To use either of these IP procedures, the project proponent would need to document compliance with the requirements of the SSHCP and ARP regulatory permitting framework in the project proposal. The SSHCP and ARP requirements would incorporate compliance with on-site avoidance, minimization, and compensatory mitigation as prescribed under the Plan Area regional assessment of existing aquatic resources diversity, abundance, and condition; impacts proposed upon those resources; and benefits accrued from the SSHCP and ARP AMMs and Conservation Strategy. The envisioned IP processes would be attractive to project proponents because it seeks to largely fulfill in advance the requirements of a separate off-site alternatives analysis, project-by-project assessment of compliance with the USACE's assessment of the Least Environmentally Damaging Practicable Alternative (LEDPA) requirements, and/or, in the case of SPs, alleviate the necessity of preparing a rigorous off-site alternatives analysis. In addition, the IP processes would save time and costs associated when compared to the USACE's typical permitting process through greater permit process certainty.

8.2.1.1 CWA Section 404 LOP

For moderate-scale development Covered Activity projects proposed under the SSHCP regulatory permitting framework that do not meet the eligibility requirements of the proposed SSHCP PGP, and have more than minimal impacts to aquatic resources but less than significant impacts on the human environment under NEPA, the Plan Permittees' understanding is that the USACE anticipates developing an abbreviated procedure for issuing LOPs under CWA 404. LOPs are a type of individual permit issued through abbreviated processing procedures, which includes coordination with federal and state wildlife agencies and a public interest evaluation, but without the publishing of an individual public notice (33 CFR 325.2(e)).

The envisioned LOP procedure would authorize the discharge of dredged or fill material into waters of the United States pursuant to Section 404 of the CWA for SSHCP Covered Activity projects. To qualify for use of the LOP, the loss of waters of the United States, including wetland waters of the United States, resulting from a single and complete Covered Activity project is envisioned to not exceed a total of 5 acres and/or would not permanently impact more than 700 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear-foot limit is waived in writing by the USACE.

Once the anticipated LOP procedure is in place, project proponents would submit project proposals to the Land Use Authority Permittees or Implementing Entity, whoever has jurisdiction, who would act as a "clearinghouse" for the CWA 404 permit applications by conducting the initial screening process to verify project consistency with the SSHCP and ARP. The applications would then be submitted to the USACE by the Land Use Authority Permittee or Implementing Entity, whichever has jurisdiction over the project, for review under the LOP

procedure. The Corps would likely prepare a simplified decision document (for their program's administrative record) that would refer to the SSHCP's EIS for compliance with NEPA and aspects of compliance with U.S. EPA's 404(b)(1) Guidelines.. The proposed LOP is envisioned to rely on the SSHCP to address avoidance, minimization and requirements for compensatory mitigation for impacts to aquatic resources. For instance, compensatory mitigation requirements would be the same as those in the SSHCP.

8.2.1.2 CWA Section 404 "Abbreviated" Standard Permit

Project proponents with Covered Activity projects located in the Plan Area that do not meet eligibility requirements under the PGP or the LOP procedure could seek authorization under an abbreviated SP process. This abbreviated SP process could be used as long as the project proponent conformed to the requirements of the SSHCP and ARP. The SSHCP permitting framework would require project compliance with on-site avoidance, minimization, and compensatory mitigation, as prescribed under the Plan.. Projects utilizing the abbreviated SP process are anticipated to only occur within the development envelope of the Plan Area (the UDA).

Advanced identification of plan-wide tradeoffs in aquatic resources loss and conservation would have already addressed aquatic resource impact avoidance at a regional level, thus, an off-site alternatives analyses would not be necessary for SP proponents to prepare for purposes of demonstrating compliance with the 404(b)(1) Guidelines. Therefore, SP proponents' alternatives analysis would be limited to addressing avoidance and minimization at the project site level. NEPA requirements for abbreviated SPs may be satisfied with an Environmental Assessment-level of review, or may require preparation of an EIS if proposing potentially significant effects on the human environment. Even for projects requiring the use of an EIS, the SP process is anticipated to be greatly compressed by relying on the SSHCP, ARP and ordinances. The USACE anticipates the use of tiering from the SSHCP EIS, use of programmatic compliance with other laws such as ESA, and alignment with the compensatory mitigation requirements contained in the SSHCP, ARP and ordinances.

The Plan Permittees would still act as the "initial clearinghouse" for permit applications that may enter into the abbreviated SP process, in the same manner they would for the PGP and LOP reviews. The Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, would screen all applications to ensure that the Covered Activity projects are in compliance with the SSHCP and ARP, and propose to incorporate all applicable terms and measures. The applications would then be submitted to the USACE by the Land Use Authority Permittee or Implementing Entity, whichever has jurisdiction over the project. The USACE would make the final determination whether or not a permit application could be processed under the abbreviated SP process.

The anticipated abbreviated SP process would be attractive to project proponents because it would save time and cost, and increase certainty in comparison to typical information requirements and processes involved in the USACE's review of standard permit applications. For instance, under the SSHCP permitting framework, urban development Covered Activity projects with more than minimal impacts to the aquatic environment are anticipated to only occur within the development envelope of the Plan Area (the UDA). The UDA has already been determined to be the most suitable location for large-scale development as determined by County and City General Plans. It is assumed that development projects processed under the SSHCP abbreviated SP procedure would, similar to the proposed PGP and LOP, not need to expend time and costs involved with developing an off-site alternatives analysis for the USACE's review and consideration, as described above. Also, the on-site avoidance and minimization requirements that are necessary for SP proponents to address would overlap with requirements of the SSHCP (e.g., stream setbacks) and would therefore satisfy the on-site alternatives analysis for purposes of demonstrating compliance with the 404(b)(1) Guidelines. The DEESA determination made by the Land Use Authority Permittees or the Implementing Entity would be submitted with the abbreviated SP application. As described above, the CSA 404 "abbreviated" SP regulatory approach would likely be utilized for some of the anticipated large-scale urban development Covered Activity projects, and would increase the efficiency of the permitting process (compared to the existing, typical standard permit process), while also promoting greater protection of aquatic resources to accrue from a regulatory framework that considers the balancing of landscape- and project-scale impacts to aquatic resources with a coordinated approach to avoidance, minimization and compensation for unavoidable impacts to aquatic resources.

8.3 Programmatic Section 401 CWA Certification/Porter-Cologne Act Waste Discharge

As discussed in Section 7.1.2, a programmatic Section 401 Water Quality Certification (also satisfying the requirements of the state's Porter-Cologne Act) is sought by the SSHCP Plan Permittees. This programmatic 401 Certification may be able to cover projects applied for under the PGP, and potentially cover (all or in part, promoting efficiency) some larger-scale projects applied for under a LOP or SP. Larger-scale Covered Activity projects proposed within the Plan Area that do not qualify for the programmatic Section 401 Water Quality Certification would be required to obtain individual 401 Water Quality Certifications, which may be required for some LOPs and SPs processed by the USACE. However, the Plan Permittees would establish a programmatic review process to assist in efficient processing of these individual 401 certifications for proposed Covered Activities that are in compliance with all requirements of the SSHCP and ARP. Under this more efficient review process, the Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, would still act as the initial "clearinghouse" for permit applications, in the same manner they would for the Section 404

application reviews. The Land Use Authority Permittees or Implementing Entity (as applicable) would screen all applications to ensure that the projects are in compliance with the SSHCP, ARP and applicable Aquatic Resources Protection Ordinance. This initial screening would be anticipated to facilitate a more efficient review process of individual 401 Water Quality Certification applications by the RWQCB by providing a "vetted" and more predictable review. To satisfy CEQA requirements, the Plan Permittees would be able to tier from the SSHCP EIS/EIR, which would greatly quicken their review timeline.

8.4 California Fish and Game Code/Section 1600 Streambed Alteration Agreements

The local Land Use Authority Permittees and the Implementing Entity would develop with CDFW an MOU for land development Covered Activity projects authorized under the SSHCP regulatory framework that notifies CDFW pursuant to Section 1600 et seq. of the California Fish and Game Code. Under this unique MOU, the CDFW would collect a fee for each notification submitted by the local Land Use Authority Permittees or Implementing Entity. However, this expedited MOU process would standardize AMMs and compensatory mitigation. The agreement would describe the SSHCP permitting framework arrangement between CDFW and the local Land Use Authority Permittees and the Implementing Entity, which would include procedures for avoidance, minimization, and compensatory mitigation requirements for all Covered Activities occurring within the Stream Zone, pursuant to Section 1602 of the California Fish and Game Code. Under this MOU, the CDFW would collect fees for each notification, pursuant to Section 1602 of the California Fish and Game Code, and determine whether to issue LSAs to individual Covered Activity projects. However, permitting would be standardized for proposals that comply with requirements set forth in the SSHCP, which would enable CDFW to quicken their permitting process under an MOU permitting procedure. To satisfy CEQA requirements, the CEQA lead agencies would be able to incorporate analysis from the SSHCP EIS/EIR, which would greatly quicken their review timeline. Ultimately, for land development Covered Activity projects that conform with the SSHCP permitting framework, the CDFW would enable the MOU to quicken their permitting process and benefit the County, Cities, and the Implementing Entity collectively.

For municipal projects authorized under the SSHCP regulatory framework, the Implementing Entity would describe such projects in advance and notify the CDFW pursuant to Section 1600 et seq. of the California Fish and Game Code and seek to append those projects to a MSAA or LTLSA.

8.5 Other Federal Laws

8.5.1 Section 7 of the Federal ESA

Section 7 of the ESA requires federal agencies to consult with the USFWS (and/or the National Marine Fisheries Service) to ensure that every action authorized, permitted, funded, or carried out by the federal agency would not jeopardize the continued existence of any federally listed species or destroy or adversely modify designated critical habitat.

As discussed in Section 2.3.1, projects or activities with the potential to discharge dredged or fill material into waters of the United States must consult with the USACE and must comply with Section 404 of the CWA. The USACE's issuance of a CWA 404 permit (or other USACE authorizations for impacts to jurisdictional waters) constitute a federal action, and must comply with the ESA. Therefore, the USACE would consult with the USFWS under ESA Section 7 before issuing a CWA permit (or other CWA authorizations) to any Plan Area project or activity that may impact a federally listed species.

The USACE often acts as the lead federal agency. When acting as lead federal agency, the USACE provides the federal nexus for Section 7 ESA consultation with the USFWS for projects with the potential to affect federally listed species. All of the federally listed species that occur in the Plan Area are SSHCP Covered Species (see SSHCP Chapter 1, Table 1-2).

Under the conventional project-by-project regulatory review process, the USACE first prepares a Biological Assessment to determine if the proposed project or activity may affect listed species or critical habitat. If the Biological Assessment indicates that the project or activity may affect a listed species, the USACE will request a formal consultation with the USFWS under ESA Section 7. (If the Biological Assessment determines that the project or activity is not likely to adversely affect the species or critical habitat, the USACE may request an informal consultation with the USFWS. If the USFWS does not concur with the no adverse determination of the informal consultation, the USFWS may require the USACE to initiate a formal consultation).

Under the conventional project-by-project regulatory review process, the finding by the USACE that the proposed project or activity would adversely impact a federally listed species (or its critical habitat) will initiate the preparation of a Biological Opinion by the USFWS. The Biological Opinion will include a full description of the proposed action, including any conservation measures proposed as part of the action, and will include a detailed discussion of the direct, indirect, and cumulative effects of the action on listed species or critical habitat, and will summarize the information upon which the opinion is based (including the information and analysis provided by the USACE's Biological Assessment). The Biological Opinion presents a determination on whether the proposed action is likely to jeopardize a listed species, or likely to adversely modify its critical habitat. Each Biological Opinion includes an "Incidental Take

Statement," which exempts the USACE and their permittees from the ESA's take prohibitions and penalties, and allows "take" of a specified number of individuals of a listed species, and/or allows modification or degradation of a specified acreage of species habitat. The beneficial effects of the project's conservation measures are taken into consideration for both the jeopardy and the incidental take analysis presented in the Biological Opinion. The incidental take statement also includes nondiscretionary "reasonable and prudent measures" that are necessary to minimize or reduce the impact of the incidental take. In order to be exempt from the prohibitions and penalties of the ESA, the USACE and their permittees must comply with the "terms and conditions" of the Biological Opinion, which implement the reasonable and prudent measures, and outline required future reporting and monitoring. The Biological Opinion's terms and conditions are non-discretionary.

Under the SSHCP and ARP's more efficient project permitting process, the USACE would seek to further streamline their CWA 404 regulatory review of individual future Covered Activities (see Section 7.2) by initiating a single ESA Section 7 consultation with the USFWS for all SSHCP Covered Activities that would require a CWA 404 permit (or other CWA authorization) from the USACE over the 50-year SSHCP. The USACE will request the USFWS prepare a single Programmatic Biological Opinion that programmatically address the direct, indirect, and cumulative effects on federally listed species and designated critical habitats resulting from all USACE's permitting and authorizations, over the 50-year term of the SSHCP. If the USACE can obtain a programmatic Section 7 consultation and Programmatic Biological Opinion, it would eliminate the need for the USACE to initiate individual ESA Section 7 consultations for every SSHCP Covered Activity that may discharge dredged or fill material into waters of the United States, and eliminate the need for the USACE to prepare and submit an individual Biological Assessment for each of those SSHCP Covered Activities, thus eliminating the need for the USFWS to prepare an individual Biological Opinion on each of those SSHCP Covered Activities.

At the time that the final SSHCP and final SSHCP EIS/EIR have completed required public reviews under NEPA and CEQA, the USACE would initiate a request for a programmatic Section 7 consultation with the USFWS, to seek Section 7 ESA coverage for all future SSHCP Covered Activities that the USACE would permit under their proposed multi-layered CWA 404 permitting strategy (i.e., the GPs, LOP, and SPs described in Section 7.2).

With a single programmatic Section 7 consultation anticipated to be in place, the conventional project-by-project "individual" Section 7 consultation would be unnecessary.

8.5.2 Section 106 of the National Historic Preservation Act

The USACE must assure that each Covered Activity project or activity that is permitted or otherwise authorized by the USACE under Section 404 of the CWA also complies with Section 106 of the National Historic Preservation Act (NHPA). The NHPA protects cultural resources that

are listed, or are eligible to be listed, on the National Register of Historic Places. To assure that each USACE decision to issue a CWA Section 404 permit or other CWA authorization to a SSHCP Covered Activity would not directly or indirectly result in a violation of the NHPA, the USACE and the Land-use Authority Permittees may develop a Programmatic Agreement (PA) with the State Historic Preservation Officer (SHPO) to expedite NHPA Section 106 consultations for future SSHCP Covered Activity projects and activities.

In addition, the USACE would also programmatically consult with Native American tribal contacts within the Plan Area, and may consider developing an MOU with the Plan Area Native American tribes concerning coordination and the protection of any Indian Trust Assets and other cultural resources at sites of Covered Activity projects or activities that are permitted or otherwise authorized by the USACE under CWA Section 404.

Draft SSHCP Aquatic Resources Program

INTENTIONALLY LEFT BLANK

9 REFERENCES

33 CFR 328.1–328.5. "Definition of Waters of the United States."

33 CFR 332.3. "General Compensatory Mitigation Requirements."

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. La Roe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. U.S. Fish and Wildlife Service.

CWMW (California Wetland and Monitoring Workgroup). 2010. *California Wetland and Riparian Area Monitoring Plan*.

Dittes, J.C. and J.L. Guardino. 2002. "A GIS-Based Vernal Wetland-Acre/Density Index (VWADI) for Classification and Conservation of Vernal Pool/Annual Grassland Landscapes in California's Great Central Valley."

Dittes, J.C., J.L. Guardino, and R.A. Radmacher. 2007. "A GIS-Based Vernal Wetland Acre/Density Index (VWADI) for Classification and Conservation of Vernal Pool/Annual Grassland Landscapes in California's Great Central Valley." In *Vernal Pool Landscapes*, edited by R.A. Schlising and D.G. Alexander, 125–141. *Studies from the Herbarium 14*. Chico, California: California State University.

Formant, R.T., and M. Godron. 1981. "Patch and Structural Components for Landscape Ecology." *Bioscience* 31: 733–740.

Forman, R.T. and M. Godron. 1986. *Landscape Ecology*. New York, NY: John Wiley and Sons.

Helm, B. and J.E. Vollmar. 2002. "Vernal Pool Large Brnchipods." Chapter 4 in *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland*, edited by J.E. Vollmar, 151–190.

Holland, R.F. and V.I. Dains. 1990. "The Edaphic Factor in Vernal Pool Vegetation." In *Vernal Pool Plants, Their Habitat and Biology*, edited by D.H. Ikeda and R.A. Schlising, 31–48. Studies from the Herbarium No. 8. Chico, California: California State University.

Katibah, E.F. 1984. "A Brief History of the Riparian Forest in the Central Valley of California." In *California Riparian Systems: Ecology Conservation and Productive Management*, edited by R.E. Warner and K.M. Hendrix, 23–29. Berkeley, California: University of California Press.

Keeley, J.E. and P.H. Zedler. 1998. "Characterization and Global Distribution of Vernal Pools." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, edited by Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 1–14. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California. Accessed June 3, 2015. http://vernalpools.ucmerced.edu/sites/vernalpools.ucmerced.edu/files/page/documents/1.1characterization_and_global_distribution_of_vernal_pools_by_jon_e._keely_and_paul_h._zedler_0.pdf.

Kneitel, J.M. and C.L. Lessin. 2010. "Ecosystem-Phase Interactions: Aquatic Eutrophication Decreases Terrestrial Plant Diversity in the California Vernal Pool Ecosystem." *Oecologia* 163: 461–469.

Kramer, G. 1988. "Fresh Emergent Wetland Vegetation." California Wildlife Habitat Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group.

Laabs, D.M., S.G. Orloff, and M.L. Allaback. 2002. "Chapter 5: Pond and Stream-Breeding Amphibians." In *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland*, 191–230.

Leibowitz, S.G. and R.T. Brooks. 2008. "Chapter 3: Hydrology and Landscape Connectivity of Vernal Pools." In *Science and Conservation of Vernal Pools in Northeastern North America*, 31 – 51.

Lessin, C.L. 2010. "Nutrient Addition Effects on Vernal Pool Communities." Master's thesis; California State University, Sacramento.

Metz, J. 2001. "Correlating Vernal Pool Distribution Patterns and Geologic Formations to Inform Conservation Planning in East Merced County." Master's thesis; University of California, Berkeley.

NRC (National Research Council). 2002. *Riparian Areas: Functions and Strategies for Management. NRC, Division on Earth and Life Sciences, Board on Environmental Studies and Toxicology, Water Science and Technology Board, Committee on Riparian Zone Functioning and Strategies of Management*. Washington, D.C.: National Academy Press.

O'Driscoll, M.A. and R.R. Parizek. 2008. "Geological Controls on Seasonal-Pool Hydroperiod in a Karst Setting." *Wetlands* 28(4): 1004–1017.

O'Geen, A.T., W.A. Hobson, R.A. Dahlgren, and D.B. Kelley. 2008. "Evaluation of Soil Properties and Hydric Soil Indicators for Vernal Pool Catenas in California." *Soil Science Society of America Journal* 72(3): 727.

Platentkamp G.A.J. 1998. "Patterns of Vernal Pool Biodiversity at Beale Air Force Base." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, edited by Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 38–49. Proceedings from a 1996 Conference. Sacramento, California: California Native Plant Society=.

Poirier, P.A. 2012. "Physical and Chemical Correlates of Sacramento County Vernal Pool Crustaceans." Master's thesis; University of the Pacific, Stockton, California.

Rains, M.C., G.E. Fogg, T.H. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. "The Role of Perched Aquifers in Hydrological Connectivity and Biogeochemical Processes in Vernal Pool Landscapes, Central Valley, California." *Hydrological Processes* 20: 1157–1175.

Rains, M.C., R.A. Dahlgren, G.E. Fogg, T. Harter, and R.J. Williamson. 2008. "Geological Control of Physical and Chemical Hydrology in California Vernal Pools." *Wetlands* 28(2): 347–362.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *Manual of California Vegetation*. Sacramento, California: California Native Plant Society.

Smith, D.W. and W.L. Verrill. 1998. "Vernal Pool-Soil-Landform Relationships in the Central Valley, California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, edited by C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 15–23. Proceedings from a 1996 conference. Sacramento, California: California Native Plant Society.

USACE (U.S. Army Corps of Engineers). 2015. *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for the South Pacific Division USACE*. January 12, 2015. Accessed September 28, 2016. http://www.spd.usace.army.mil/Missions/Regulatory/Public-Notices-and-References/Article/558934/final-regional-compensatory-mitigation-and-monitoring-guidelines/.

Vollmar, J.E. 2002. *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands*. Berkeley, California: Vollmar Consulting.

Williamson, R.J., G.E. Fogg, M.C. Rains, and T.H. Harter. 2005. *Hydrology of Vernal Pools at Three Sites, Southern Sacramento County*. Final Report For Project: F 2001 IR 20 Developing a Floristic Statewide Vernal Pool Classification, and a Functional Model of Pool Hydrology and Water Quality. April 22, 2005.

INTENTIONALLY LEFT BLANK

DRAFT

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Prepared by:

DUDEK

930 9th Street, Suite 1750
Sacramento, California 95814
Contact: Sherri Miller

FEBRUARY 2017

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

TABLE OF CONTENTS

Section **Page No.**

ACRONYMS AND ABBREVIATIONS ..... **V**

1 INTRODUCTION **1**
- 1.1 Purpose of the Watershed Study 1
- 1.2 Definition of Watershed 1
- 1.3 Functions and Services of Watersheds 2
- 1.4 Anthropogenic Impacts to Watersheds 2

2 METHODS **3**
- 2.1 Assembly of Baseline Data 3
  - 2.1.1 USGS National Hydrography Dataset 3
  - 2.1.2 Land Cover Dataset 3
  - 2.1.3 Hydrology 4
  - 2.1.4 Geological Formations 5
  - 2.1.5 Soils 5
  - 2.1.6 Slope and Elevation 5
  - 2.1.7 SSHCP Covered Species 5
  - 2.1.8 Preserve Design 6

3 RESULTS **9**
- 3.1 Summary of Watersheds in Plan Area 9
  - 3.1.1 Land Cover Types in Plan Area 9
  - 3.1.2 Hydrology in the Plan Area 10
  - 3.1.3 Geological Formations in Plan Area 14
  - 3.1.4 Soils in the Plan Area 21
  - 3.1.5 Slope and Elevation 26
  - 3.1.6 Covered Species 27
  - 3.1.7 Preserve Design 36
- 3.2 Description of Watersheds in Plan Area 38
  - 3.2.1 American River Watershed 38
  - 3.2.2 Deer Creek Watershed 40
  - 3.2.3 Laguna Creek Watershed 45
  - 3.2.4 Lower Cosumnes River Watershed 50
  - 3.2.5 Lower Dry Creek Watershed 54
  - 3.2.6 Lower Mokelumne River Watershed 58
  - 3.2.7 Morrison Creek Watershed 61

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

3.2.8 Sherman Lake-Sacramento River Watershed 66
3.2.9 Snodgrass Slough Watershed..... 70
3.2.10 Upper Cosumnes River Watershed..... 74

4 SUMMARY 81

5 LITERATURE CITED 85

TABLES

1 Summary of Watersheds in Plan Area 9
2 Summary of Land Cover Types in Plan Area by Watershed.....11
3 Summary of NHD Flowlines in Plan Area by Watershed 13
4 Summary of Landforms in Plan Area by Watershed.....20
5 Summary of Soil Types in Plan Area by Watershed 22
6 Summary of Slopes in the Plan Area 26
7 Summary of Elevation Ranges in the Plan Area.....26
8 Summary of Covered Species Occurrences Within Watersheds[1].....29
9 Modeled Habitat for Covered Species within a Watershed.....32
10 Summary of Watershed Conservation 36
11 Summary of Preserve Planning Units by Watershed.....37
12 Summary of Conserved Land Cover Types in the Deer Creek Watershed 44
13 Summary of Conserved Land Cover Types in the Laguna Creek Watershed 49
14 Summary of Conserved Land Cover Types in the Lower Cosumnes River Watershed....54
15 Summary of Conserved Land Cover Types in the Lower Dry Creek Watershed 57
16 Summary of Conserved Land Cover Types in the Lower Mokelumne River Watershed.....60
17 Summary of Conserved Land Cover Types in the Morrison Creek Watershed 65
18 Summary of Conserved Land Cover Types in the Sherman Lakes-Sacramento River Watershed.....69
19 Summary of Conserved Land Cover Types in the Snodgrass Slough Watershed.....73
20 Summary of Conserved Land Cover Types in the Upper Cosumnes River Watershed 78

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

TABLE OF CONTENTS (CONTINUED)

Page No.

FIGURES

1 Regional 87
2 Watersheds 89
3 Land Cover 91
4 Hydrology 93
5 Geological Formations 95
6 Soils 97
7 Elevation 99
8 Slope 101
9-1 Critical Habitat for Sacramento Orcutt Grass 103
9-2 Critical Habitat for Slender Orcutt Grass 105
9-3 Critical Habitat for Vernal Pool Fairy Shrimp 107
9-4 Critical Habitat for Vernal Pool Tadpole Shrimp 109
9-5 Critical Habitat for California Tiger Salamander 111
9-6 Ahart's Dwarf Rush Modeled Habitat and Known Occurrences 113
9-7 Boggs Lake Hedge-Hyssop Modeled Habitat and Known Occurrences 115
9-8 Dwarf Downingia Modeled Habitat and Known Occurrences 117
9-9 Legenere Modeled Habitat and Known Occurrences 119
9-10 Pincushion Navarretia Modeled Habitat and Known Occurrences 121
9-11 Sacramento Orcutt Grass Modeled Habitat and Known Occurrences 123
9-12 Slender Orcutt Grass Modeled Habitat and Known Occurrences 125
9-13 Sanford's Arrowhead Modeled Habitat and Known Occurrences 127
9-14 Midvalley Fairy Shrimp Modeled Habitat and Known Occurrences 129
9-15 Ricksecker's Water Scavenger Beetle Modeled Habitat and Known Occurrences 131
9-16 Valley Elderberry Longhorn Beetle Modeled Habitat and Known Occurrences 133
9-17 Vernal Pool Fairy Shrimp Modeled Habitat and Known Occurrences 135
9-18 Vernal Pool Tadpole Shrimp Modeled Habitat and Known Occurren 137
9-19 California Tiger Salamander Modeled Habitat and Known Occurrences 139
9-20 Western Spadefoot Modeled Habitat and Known Occurrences 141
9-21 Giant Gartersnake Modeled Habitat and Known Occurrences 143
9-22 Western Pond Turtle Modeled Habitat and Known Occurrences 145
9-23 Cooper's Hawk Modeled Habitat and Known Occurrences 147
9-24 Ferruginous Hawk Modeled Habitat and Known Occurrences 149

TABLE OF CONTENTS (CONTINUED)

Page No.

9-25 Greater Sandhill Crane Modeled Habitat and Known Occurrences 151
9-26 Loggerhead Shrike Modeled Habitat and Known Occurrences 153
9-27 Northern Harrier Modeled Habitat and Known Occurrences 155
9-28 Swainson's Hawk Modeled Habitat and Known Occurrences 157
9-29 Tricolored Blackbird Modeled Habitat and Known Occurrences 159
9-30 Western Burrowing Owl Modeled Habitat and Known Occurrences 161
9-31 White-Tailed Kite Modeled Habitat and Known Occurrences 163
9-32 American Badger Modeled Habitat and Known Occurrences 165
9-33 Western Red Bat Modeled Habitat and Known Occurrences 167
10 Reserve Design Map 169

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
amsl	above mean sea level
ARP	Aquatic Resources Program
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
EPA	U.S. Environmental Protection Agency
HUC	Hydrologic Unit Code
MCRA	Mather Core Recovery Area
NHD	National Hydrography Dataset
NRCS	National Resources Conservation Service
SSHCP	South Sacramento Habitat Conservation Plan
SSURGO	Soil Survey Geographic
TAC	Technical Advisory Committee
UDA	Urban Development Area
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USB	Urban Services Boundary
USGS	U.S. Geological Survey

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

1 INTRODUCTION

1.1 Purpose of the Watershed Study

The purpose of the watershed study for the South Sacramento Habitat Conservation Plan (SSHCP) and Aquatic Resources Program (ARP) is to describe the overall characteristics of watersheds in the SSHCP and ARP area (collectively called "Plan Area" in this document) (Figure 1). The framework of the watershed study is to describe the physical locations of the watersheds, including what proportion of each watershed is within the Plan Area, as well as the overall conditions of the watersheds in terms of environmental setting (e.g., land formations, soils, topography, existing land use), hydrology, and biological resources. In addition, the watershed study describes how the SSHCP Preserve System relates to each watershed located within the Plan Area, as one of the primary purposes of the SSHCP and ARP is to protect watershed functions, as described below:

> **Protect Watersheds:** Watershed function, and specifically hydrologic regimes, is an important determinant of certain aquatic resource-dependent and aquatic resource-associated plants and wildlife. Therefore, preserving upland landscapes associated with wetland features for maintaining aquatic resource-dependent and wetland-associated species is of primary importance. Sufficient sub-watershed area should be preserved so that natural sources of surface and sub-surface water influx and outflow remain intact, and potential development-related increases in surface runoff and sources of water pollution are avoided (e.g., runoff from roads, roofs, paved surfaces, utility pipes, landscaped areas).

1.2 Definition of Watershed

A watershed is defined by the U.S. Environmental Protection Agency (EPA) as a "land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the oceans" (33 CFR 332.2). The U.S. Department of Agriculture (USDA) further defines a watershed as "a geographic area of land, water and biota within the confines of a drainage divide" (USDA 2007). According to the USDA, "watershed boundaries define the aerial extent of surface water drainage to a point. Watershed boundaries always follow the highest ridgeline around the stream channels and meet at the bottom or lowest point of the land where water flows out of the watershed. The boundary between watersheds is defined as the topographic dividing line from which water flows in two different directions" (USDA 2007).

1.3 Functions and Services of Watersheds

According to Black (1997), there are five clearly identifiable functions of watersheds, three that are hydrologic (collection, storage, and discharge) and two that are ecological (chemical and habitat). The hydrologic functions of watersheds include the (1) **collection** of water from rainfall snowmelt and storage that becomes runoff, (2) **storage** of water of various amounts and durations, and (3) **discharge** of water as runoff. The ecological functions of watersheds include (4) providing diverse sites and pathways along which vital **chemical** reactions take place, and (5) providing **habitat** for the flora and fauna that constitute the biological elements of an ecosystem (Black 1997).

There are numerous anthropogenic and biological values of watersheds. According to Postel and Thompson (2005), healthy watersheds provide the following: water supplies for agricultural, industrial, and urban-domestic uses; water filtration/purification; flow regulation; flood, erosion, and sedimentation control; fisheries; timber and other forest products; recreation/tourism; biodiversity preservation; aesthetic enjoyment; climate stabilization; and cultural, religious, and inspiration values.

1.4 Anthropogenic Impacts to Watersheds

Modification of natural landscapes (i.e., vegetation, topography, and hydrology) is one of the prime human impacts on watersheds. Altering natural landscapes for development purposes, resource extraction, or recreation can affect collection, storage, and discharge functions of a watershed. Changes in the landscape resulting from these human activities can increase sedimentation and erosion, increase or redirect natural runoff, and alter hydrologic regimes, including timing of flows and groundwater recharge. In addition, land use modification or conversion can change the way a watershed is used by individual species or species communities, including their distribution and abundance within a watershed (i.e., habitat function) and can directly or indirectly affect the chemical reactions required for the watershed to sustain itself.

Introduction of pollutants into the watershed can happen directly through agricultural activities and runoff from impervious surfaces in more urbanized areas. Over the years, an increase of impervious surfaces has caused "significant changes to both the quality and quantity of the stormwater runoff, leading to degraded stream and watershed systems: an increased quantity of stormwater for stream process to absorb sedimentation, and an increased pollutant load carried by the stormwater" (Morisawa and LaLure 1979, Arnold et al. 1982, Bannerman et al. 1993, as cited in Brabec et al. 2002).

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

2 METHODS

2.1 Assembly of Baseline Data

Watersheds within the Plan Area were identified by overlaying the Plan Area with the U.S. Geological Survey (USGS) hydrologic unit map data. The watersheds were then intersected with land cover, hydrologic, geological, soil, slope, and elevation data that were assembled for the SSHCP to describe their physical and biological settings. The watersheds were also intersected with known occurrences of plant and animals species that are proposed for regulatory coverage under the SSHCP (Covered Species) and the proposed SSHCP Preserve System. Descriptions of the datasets used in the SSHCP and this watershed study are provided in the following subsections.

2.1.1 USGS National Hydrography Dataset

Watersheds in the United States are delineated by the USGS using a hierarchical system, which divides the U.S. into 21 regions, 221 subregions, 378 hydrologic accounting units, and 2,264 cataloging units (USGS 2013). Each hydrologic unit is identified by a unique Hydrologic Unit Code (HUC) consisting of two to eight digits based on the levels of classification in the hydrologic unit system (USGS 2009). Two additional levels were recently added to the hydrologic unit hierarchy: watershed (10-digit) and subwatershed (12-digit).

For the purpose of this watershed study, the Plan Area was divided at the 10-digit HUC level (i.e., watershed), which yields 10 watersheds within the Plan Area (Figure 2). Note that an 11th watershed, Cache Slough, appears on Figure 2; however, that watershed makes up only 6 acres of the Plan Area and therefore is not analyzed in this study.

2.1.2 Land Cover Dataset

Land cover mapping for the Plan Area occurred in several stages. Vernal Pool and Swale land cover type mapping occurred early in the SSHCP planning process and was accomplished through interpretation of black-and-white aerial imagery dated March 2001 and mapped at a scale of 1 inch = 200 feet (1:2,400). The primary mapping of all other land cover types was completed in 2004 and was developed from the interpretation of color aerial imagery dated November 2002 and mapped at a scale of 1 inch = 400 feet (1:4,800). These original mapping efforts have been updated and refined at various times to reflect modifications of land cover types, such as cover type conversion, to accommodate an expansion of the Plan Area boundary and to correct errors in the original mapping. The current land cover map provides fairly detailed information for the existing conditions in the Plan Area based on 2009 aerial photos and limited field-truthing, with the updates occurring in May 2010, September 2012, January 2013, March 2013, November 2013, May 2014, June 2014, August 2014, and December 2014.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

The land cover classification system developed for the SSHCP is a modification of the California Department of Fish and Game (CDFG)[1] List of California Natural Communities. There are 25 land cover types in the Plan Area, of which 17 provide native (e.g., Blue Oak Woodland) or naturalized (e.g., Valley Grasslands, Agriculture) conditions that have habitat value for Covered Species (Figure 3). The other eight land cover types, including developed and disturbed types, have little or no habitat value for Covered Species.

The land cover data were also used to generate a relative measure of impervious surfaces in the Plan Area. Impervious surfaces (e.g., paved roads, parking lots, driveways, rooftops, sidewalks) reflect urban intensity and may be used as a metric for adverse impacts to natural resources as a result of increased runoff, sedimentation, and pollutant loads into receiving waters (Brabec et al. 2002). For the purposes of this study, impervious surfaces are defined as Aqueduct, High-Density Development, and Major Roads. The Aqueduct land cover type is represented by the Folsom South Canal. The High-Density Development land cover type includes urban and suburban residential neighborhoods, urban centers, industrial areas, airports, and wastewater treatment plants. Most of this high-density development occurs inside the Urban Development Area (UDA) in the northwestern portion of the Plan Area. The Major Roads land cover type includes linear features with paved surfaces and can vary from large freeways to smaller arterial roads found within urban settings. It should be noted that this relative measure of impervious surfaces is not intended to calculate actual impacts, such as amount of runoff, etc., but rather to generally characterize the existing urban intensity in the Plan Area and to compare and contrast the different watersheds.

Low-density development was not included in the Impervious land cover category. While this land cover includes some impervious surfaces (e.g., driveways), it primarily consists of relatively sparse residences and other structures, such as farm buildings and small rural neighborhoods with large individual property sizes per house. Plant nurseries are also included in this category.

2.1.3 Hydrology

The USGS (2013) National Hydrography Dataset (NHD) contains hydrologic features such as lakes, ponds, streams, rivers, canals, dams, and stream gages (USGS 2013). The NHD dataset was intersected with the Plan Area to determine the type and quantity of hydrologic features within each watershed (Figure 4).

[1] The List of California Natural Communities was published by the CDFG before CDFG was formally renamed California Department of Wildlife (CDFW) in January 2013. Information from the CDFG prior to January 2013 therefore will be attributed to CDFG in this document, although the names are synonymous.

2.1.4 Geological Formations

The geological formations were derived from the Generalized Geological Map of Sacramento County prepared by the California State Geological Survey (CDMG 1999) (Figure 5). The Generalized Geological Map of Sacramento County, also referred to as a time-stratigraphic correlation map, is based on a correlation of similar-aged rock units from the east side of the Sacramento Valley with those on the west side of the valley, as well as a correlation of rock units from the northern Sacramento Valley with similarly aged rock units in the southern San Joaquin Valley. Because the time-stratigraphic correlation map is prepared on a small scale in the Plan Area, it provides excellent detail and well-refined demarcations in geologic units. However, geological formation data are unavailable for portions of four watersheds located in the western portion of the Plan Area; areas lacking data are identified in the descriptions of the four relevant watersheds in Section 3.2.

2.1.5 Soils

Individual soil units are organized into map units called soil associations, which consist of soil units of the same texture and composition that occur in geographic position. Soils for the Plan Area are from the National Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database (USGS and USDA NRCS 2009) (Figure 6).

2.1.6 Slope and Elevation

Both slope and elevation for the Plan Area were derived from the USGS National Elevation Dataset (USGS 2012) (Figures 7 and 8).

2.1.7 SSHCP Covered Species

A Technical Advisory Committee (TAC), with the assistance of outside experts, created a list of 28 plant and wildlife species proposed for federal regulatory coverage under the SSHCP. The TAC compiled data from a variety of sources, including the CDFG, California Natural Diversity Database (CNDDB), U.S. Fish and Wildlife Service (USFWS) files and databases, California Native Plant Society (CNPS) plant inventories, Sacramento County Audubon files, and solicited opinions from local experts and university researchers and staff from resource agencies. Occurrence data for Covered Species were generated from the data compilation effort and are described in detail in the SSHCP.

For the purposes of the direct effects and conservation analyses, Covered Species habitat was modeled based on the associations between species occurrence data and particular land cover types in the Plan Area and through review by species experts. This information was compiled to

generate models for land cover types and ranges within the Plan Area that each Covered Species is likely to use for breeding, foraging, and/or cover, or other important life history activities. Chapter 3 of the SSHCP describes the methods and results of those models. Figures 9-1 through 9-5 depict Critical Habitat for Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamander. Figures 9-6 through 9-29 depict modeled habitat and species occurrences for the 28 Covered Species.

2.1.8 Preserve Design

This section briefly describes the SSHCP Conservation Strategy in terms of identifying the primary development areas, geographically based Preserve Planning Units, existing conservation (e.g., existing biological Preserves, mitigation sites), and planned conservation that would occur through implementation of the SSHCP. A detailed description of the SSHCP Conservation Strategy is contained in Chapter 7 of the SSHCP.

Urban Development Area/Outside Urban Development Area

The UDA is where the large majority of SSHCP Covered Activities will occur, including anticipated residential, commercial, and industrial development and associated infrastructure (e.g., roads, utilities). For the purpose of the SSHCP and watershed study, it is assumed that the UDA will eventually be built out except for the existing and proposed preserves. Outside the UDA, SSHCP Covered Activities will primarily be limited to infrastructure projects. These include transportation projects, including road upgrade projects, road realignment/extension projects, interchange projects, and connector projects. Covered activities outside the UDA would also include water-related utility projects, including recycled water projects and operations and maintenance of flood control and storm drainage infrastructure.

Preserve Planning Units

To assist with development of an adequate SSHCP Conservation Strategy, the Plan Area was further divided into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species resources are present, and where habitat preservation will be planned (see Figure 1-1 in the SSHCP). These eight SSHCP PPUs are geographic subdivisions of the Plan Area designed to ensure that adequate Biological Goals and Measurable Objectives (Table 7-1 in the SSHCP) were developed for all biological resources located within the Plan Area.

PPUs were delineated to capture specific habitat or agricultural land cover types or areas identified as being important for a specific suite of species. For instance, PPU 7, which is located in the southeastern portion of the Plan Area, was delineated to encompass the vast majority of

vernal pool grasslands remaining in the County. PPU 7 also contains the designated Cosumnes/Rancho Seco Core Recovery Area (USFWS 2005), which is considered an important area for protection of vernal pool species. PPU 2 contains the designated Mather Core Recovery Area (USFWS 2005). PPU 6, located in the southwestern portion of the Plan Area, was delineated to encompass a vast majority of agricultural cover types that provide foraging habitat for many covered raptor species. While geopolitical or physical landmarks were used to delineate some PPU boundaries, this was done for ease of mapping and to make locating PPU boundaries in the field easier.

Existing Preserve Lands

The Plan Area supports several established Preserves both inside and outside of the UDA. Existing Preserve totals approximately 64,536 acres (17%) in the Plan Area and includes wildlife refuges, nature preserves, lands under conservation easements, open space, mitigation banks, and individual project mitigation sites. Of the 61,364 acres of existing Preserve, 3,172 acres (5%) are inside the UDA and 61,360 acres (95%) are outside the UDA. Existing Preserve areas are considered in the SSHCP to be protected for their resource values, and although they do not count as mitigation for future Covered Activities, they were carefully considered in the SSHCP Conservation Strategy so that proposed preserves can augment and link to the existing Preserves.. Valley grassland comprises 35,290 acres (55%) of the existing Preserve lands, followed by agriculture at 12,365 acres (17%), and blue oak woodland and savanna at 7,223 acres (11%). Existing Preserve also supports substantial acreages of riparian woodland and riparian scrub (2,510 acres, 4%), vernal pool and swale (2,336 acres, 4%), freshwater marsh (1,057 acres, 3%), and open water (720 acres, 1%).

Planned Conservation

Planned conservation will include both planned "hardline" Preserve based on known projects and currently proposed mitigation, and "criteria-based" conservation for future projects. The boundaries of the new criteria-based Preserves are not known at the time of SSHCP preparation.

The planned hardline Preserves in the Plan Area total 1,717 acres. Including the planned hardline Preserves, it is anticipated that approximately 37,030 acres will be newly conserved in the SSHCP Preserve System. The new criteria-based Preserves will be established according to the Conservation Actions for each of the relevant Biological Goals and Measureable Objectives included in Chapter 7 of the SSHCP (see Table 7-1 of the SSHCP).

The Laguna Creek Wildlife Corridor is identified separately from the other Preserves because it is a distinctive and important landscape feature in the Plan Area and is important for maintaining regional

movement and resident habitat for wildlife, conserving riparian habitat, and maintaining hydrologic connections between Preserves inside the UDA. The Laguna Creek Wildlife Corridor will be established through a combination of planned hardline and criteria-based preservation.

3 RESULTS

3.1 Summary of Watersheds in Plan Area

The Plan Area includes a portion or the entirety of 10 watersheds (10-digit hydrologic units), as defined by the Federal Standard for Delineation of Hydrologic Unit Boundaries (USGS and USDA NRCS 2009). Those 10 watersheds are American River, Deer Creek, Laguna Creek, Lower Cosumnes River, Lower Dry Creek, Lower Mokelumne River, Morrison Creek, Sherman Lake-Sacramento River, Snodgrass Slough, and Upper Cosumnes River (Table 1, Figure 2). One additional watershed, Cache Slough, intersects the Plan Area but only comprises 6 acres in the Plan Area and therefore is not discussed in the watershed study.

The Laguna Creek and Morrison Creek watersheds account for about 37% of the Plan Area, and the next three largest watersheds (Deer Creek, Lower Cosumnes, and Snodgrass Slough) watersheds account for another 41%, resulting in the five largest watersheds making up 78% of the Plan Area.

Table 1
Summary of Watersheds in Plan Area

Watershed	Acres of the Watershed in Plan Area	Total Watershed Acreage	Percent of Watershed in Plan Area	Cumulative Percentage of Watershed in Plan Area
Laguna Creek	73,976	96,788	76.4%	23.3%
Morrison Creek	42,926	69,540	61.7%	13.5%
Snodgrass Slough	40,426	51,616	78.3%	12.7%
Lower Cosumnes River	46,682	46,683	100.0%	14.7%
Deer Creek	43,803	81,504	53.7%	13.8%
Upper Cosumnes River	31,885	114,793	27.8%	10%
Lower Dry Creek	18,493	56,110	33%	5.8%
Sherman Lake-Sacramento River	13,987	121,608	11.5%	4.4%
American River	3,452	65,103	5.3%	1%
Lower Mokelumne River	2,019	141,965	1.4%	1%
Grand Total[1]	**317,655**	**845,709**	**28.5%**	**100%**

[1] The total does not include the approximately 268,589 acres of the Cache Slough watershed, which is not discussed in this document.

3.1.1 Land Cover Types in Plan Area

The Plan Area is organized into four main land cover types (Table 2, Figure 3):

Terrestrial. Natural terrestrial land covers comprise approximately 78% of the Plan Area, with valley grassland accounting for 43% of the terrestrial land cover. Blue oak woodland and

savanna account for about 5% of the terrestrial land cover, and riparian communities account for about 3% of the terrestrial land covers.

Aquatic. Aquatic land covers comprise approximately 5% of the natural land covers in the Plan Area, with vernal pool accounting for 1% of the aquatic land covers, and remaining acreage distributed among the other types, including streams/creeks (VPIH) at less than 0.1%, freshwater marsh at 0.9%, open water at 1%, seasonal wetland at 1%, streams/creeks at 1% and swale at 0.4%.

Agriculture. Agriculture comprises about 31% of the Plan Area, with croplands accounting for about 16%, vineyards at 8%, irrigated pasture-grassland at 5%, and orchards at 1%.

Non-Habitat. Non-habitat land covers comprise about 14% of the Plan Area, with low- and high-density development and major roads accounting for about 11% of the non-habitat land covers.

Impervious surfaces (i.e., aqueduct, high-density development, and major roads) total approximately 16,101 acres, or 5% of the Plan Area. Most of the impervious surfaces are located inside the UDA in the northwestern portion of the Plan Area.

3.1.2 Hydrology in the Plan Area

Flowline data are important for the watershed analysis because they describe the flow directions and networks within a watershed. These data, for example, allow for analyses about the effects of upstream hydrologic alterations (e.g., flow rates, timing of peak flows) or discharge of pollutants on downstream hydrology, water quality, and important resources such as aquatic and riparian wildlife habitat.

The Plan Area consists of five NHD flowline features (Table 3, Figure 4).

Stream/River. A stream/river is a naturally flowing body of water that may be perennial, intermittent, or ephemeral (USGS and USDA NRCS 2009). Stream/river accounts for approximately 841 miles of flowline features in the Plan Area and about 60% of the total flowline features.

Canal/Ditch. A canal/ditch is an "artificial open waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft" (USGS 2009). Canal/ditch is also an important flowline feature in the Plan Area, totaling approximately 347 miles in the Plan Area and comprising about 25% of the flowline features.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 2
Summary of Land Cover Types in Plan Area by Watershed

Land Cover Types	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Terrestrial												
Blue Oak Savanna	—	2,018	2,550	—	529	—	18	—	—	521	5,637	1.8%
Blue Oak Woodland	—	4,400	1,364	—	1,417	—	—	—	—	1,951	9,132	2.9%
Mine Tailing Riparian Woodland	48	41	158	17	—	—	129	2	—	245	641	0.2%
Mixed Riparian Scrub	—	80	61	285	47	2	200	130	548	100	1,454	0.5%
Mixed Riparian Woodland	0.4	836	262	1,929	401	196	157	51	1,293	733	5,856	1.8%
Valley Grassland	1,336	23,643	42,178	14,593	7,965	0.1	21,294	665	5,947	17,531	135,166	42.5%
Terrestrial Total	*1,384.4*	*31,018*	*46,573*	*16,824*	*10,359*	*198.1*	*21,798*	*848*	*7,788*	*21,081*	*157,886*	*50%*
Aquatic												
Streams/Creeks (VPIH)	—	19	—	—	—	—	55	—	—	—	73	<0.1%
Freshwater Marsh	2	38	167	1,127	47	21	370	40	1,030	112	2,954	0.9%
Open Water	3	200	297	663	9	3	159	9	720	280	2,344	0.7%
Seasonal Wetlands	23	129	419	616	117	—	107	—	782	409	2,600	0.8%
Streams/Creeks	6	228	416	345	78	67	123	24	1,141	350	2,778	0.9%
Swale	3	160	428	144	65	—	359	1	10	81	1,252	0.4%
Vernal Pool	7	274	1,917	619	203	0.1	764	5	421	325	4,535	1.4%
Aquatic Total	*98*	*1,048*	*3,644*	*3,514*	*519*	*91.1*	*1,937*	*79*	*4,104*	*1,557*	*16,536*	*5.2%*

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 2
Summary of Land Cover Types in Plan Area by Watershed

Land Cover Types	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Agriculture												
Cropland	—	4,065	5,958	12,614	2,742	1,671	2,245	4,986	16,275	1,273	51,829	16.3%
Irrigated Pasture-Grassland	—	836	5,070	3,447	316	8	1,399	0.1	3,295	1,620	15,991	5%
Orchards	—	137	612	116	212	—	199	1,749	653	229	3,907	1.2%
Vineyards	—	4,231	5,805	4,976	3,821	0.4	330	1,260	5,560	476	26,460	8.3%
Agriculture Total	—	*9,269*	*17,445*	*21,153*	*7,091*	*1,679.4*	*4,173*	*7,995.1*	*25,783*	*3,598*	*98,187*	*31%*
Non-Habitat												
Aqueducts	40	21	31	41	—	—	72	11	—	49	264	<0.1%
Disturbed	98	844	163	69	1	13	3,390	177	190	1,341	6,287	0.2%
High-Density Development	1,531	44	919	667	29	25	6,102	3,049	583	122	13,073	4.1%
Low-Density Development	7	864	4,284	3,976	421	6	3,703	403	1,433	3,510	18,608	5.6%
Major Roads	144	123	467	353	56	4	597	310	541	170	2,764	0.9%
Mine Tailings	18	127	306	—	—	—	212	13	—	422	1,098	3.4%
Recreation/ Landscaped	185	444	143	85	17	—	943	323	6	36	2,180	6.9%
Non-Habitat Total	*2,023*	*2,467*	*6,313*	*5,191*	*524*	*48*	*15,019*	*4,286*	*2,753*	*5,650*	*44,274*	*13.9%*
Grand Total	**3,452**	**43,803**	**73,976**	**46,682**	**18,493**	**2,019**	**42,926**	**13,987**	**40,426**	**31,885**	**317,649**[1]	—

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document. This total also does not include approximately 800 acres of unmapped lands along the Sacramento River, on the river side of the levees.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 3
Summary of NHD Flowlines in Plan Area by Watershed

Watershed	Artificial Path		Canal/Ditch		Connector		Pipeline		Stream/River		Grand Total	
	Feet	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*
American River	23,396	48.3	2,325	4.8	—	—	227	0.5	22,484	46.4	48,432	1
Deer Creek	52,425	5.6	68,836	7.4	7,995	0.9	1,207	0.1	799,852	86.0	930,315	12.6
Laguna Creek	125,769	6.6	141,811	7.5	154	<0.1	1,312	<0.1	1,630,736	85.8	1,899,782	25.8
Lower Cosumnes River	236,780	21.8	375,506	34.6	27	<0.1	73	<0.1	471829	43.5	1,084,215	14.7
Lower Dry Creek	26,254	5.5	33,152	7.0	805	0.2	—	—	414,948	87.3	475,159	6.5
Lower Mokelumne River	11,195	12.0	81,978	88.0	—	—	—	—	—	—	93,173	1.3
Morrison Creek	72,483	10.5	40,079	5.8	4,048	1	2,912	0.4	573,510	82.8	693,032	9.4
Sherman Lake-Sacramento River	65,946	26.9	172,021	70.1	81	<0.1	323	0.1	6,858	2.8	245,230	3.3
Snodgrass Slough	243,185	20.8	846,039	72.2	4,195	0.4	—	—	77,909	6.7	1,171,326	15.9
Upper Cosumnes River	199,470	27.9	68,518	9.6	507	0.1	903	0.1	444,746	62.3	714,142	9.7
Grand Total	**1,056,962**	**14.4**	**1,830,311**	**24.9**	**17,812**	**0.2**	**6,957**	**<0.1**	**4,442,871**	**60.4**	**7,354,913**	**100.0**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations. Any discrepancies in individual totals are due to rounding but the grand total for each watershed is consistent.

Connector. A connector is "A known, but nonspecific, connection between two nonadjacent network segments," such as a two-dimensional dam/weir that causes a gap between an upstream lake/pond and downstream stream/river (USGS 2009). Connectors make up about 3 miles in the Plan Area, but only 0.2% of the flowline features.

Pipeline. A pipeline is "A closed conduit, with pumps, valves and control devices, for conveying fluids, gases, or finely divided solids" (USGS 2009). About one mile of pipeline is included in the NHD dataset, accounting for less than 0.1% of the flowline features in the Plan Area.

Artificial Path. An artificial path is used as a surrogate to complete flowlines between NHD waterbodies and NHD areas where there is no obvious channel (USGS 2009). It is the connection between the inflow and outflow points of an in-line open water body. Artificial paths are restricted to one or more of the following features that may occur in the Plan Area:

- Lake/pond;
- Stream/river;
- Swamp/marsh;
- Canal/ditch;
- Wash; or
- Area of complex channels.

About 200 miles of artificial path are included in the NHD dataset, accounting for about 14% of the flowline features in the Plan Area.

3.1.3 Geological Formations in Plan Area

A geologic formation is a geomorphic feature on the Earth's surface representative of an episode of landscape development. The Plan Area includes 17 geological landforms (Table 4, Figure 5). Approximately 57% of the Plan Area is underlain by two main landforms types: Laguna Formation (19%) and the Riverbank Formations (38%).

Riverbank Formations (Qr)

The riverbank formations included four mapping units: Riverbank Formation, Undivided; Riverbank Formation, Upper Unit; Riverbank Formation, Middle Unit; and Riverbank Formation, Lower Unit.

The Riverbank Formation, Undivided, occupies the central portion of the Plan Area, generally subdivided by the Cosumnes River and Deer Creek. In the vicinity of Elk Grove, the Riverbank Formation is about 10 miles wide from west to east. To the east, it laps onto older materials composed of the Laguna Formation and the Turlock Lake Formation. To the west, it is overlain by younger alluvial materials. The Riverbank Formation, Undivided, as well was the other Riverbank formations, were deposited on a plain of aggradation that has been partly dissected. The upper surface of this plain, in most places, represents the upper surface of the Riverbank Formation. The upper surface is characterized by a gently undulating surface. Local variations in relief may be as much as 15 feet. The age of the Riverbank Formation ranges from middle to late Pleistocene and is probably related to the Donner Lake advance of Sierran glaciation. The Riverbank Formation consists of interbedded granitic sand, silt, and clay with metamorphic channel gravels. Its sediments are very similar to those in the Laguna Formation.

The Riverbank Formation, Upper Unit, is located in the southwestern portion of the Plan Area and borders Laguna Creek in the eastern portion. It is unconsolidated, compact dark brown to red alluvium.

The Riverbank Formation, Middle Unit, includes a small area along the north-central boundary of the Plan Area and a larger area along the south-central boundary. The Middle Unit, Riverbank Formation, is locally and remotely derived granitic and basic igneous alluvium (sand, silt, clay, and gravel).

The Lower Unit, Riverbank Formation, is located in the northwestern portion of the Plan Area and consists of red semi-consolidated gravel, sand, and silt. Its surface is higher and much more dissected than the Upper Unit and has much stronger soil profiles.

Copper Hill Volcanics (Jch)

The Copper Hill Volcanics comprise dark to medium green mafic to andesitic pyroclastic rocks deposited in the Late Jurassic (~163-145 million yrs). These volcanics are of similar age to the Salt Spring Slate (Clark 1964) and are found interfingered with the Salt Springs Slate in the northeast corner of the SSHCP area, at elevations above 400 feet above mean sea level (amsl).

Gopher Ridge Volcanics (Jgo)

The Gopher Ridge Volcanics are extrusive volcanic rocks ranging from fine tuff to coarse volcanic breccias and lavas (Clark 1964). The fine tuff is yellow green in color on a fresh face, but weathers to a dark gray, resembling the Salt Spring Slate. These volcanics have been extensively folded and faulted in the same metamorphic belt as the Salt Spring Slate and Copper

Hill Volcanics. The Gopher Ridge Volcanics are the oldest deposits of this group and are found along the western edge of the metamorphic belt at elevations above 150 feet amsl.

Intertidal Deposits (Qi)

The Intertidal Deposits are primarily peat and peaty mud formed in tidal marshes and swamps along the Sacramento River (Atwater 1979). These deposits form in areas influenced by tidal fluctuations in the San Francisco Bay and Sacramento Delta, and are therefore found at elevations within a few feet of mean sea level. These Holocene (<10,000 years) deposits typically range in thickness from 3 to 9 feet, and are mapped in the southwestern portion of the SSHCP.

Mine and Dredge Tailing (t)

Deposits of tailings occur south of the American River near Nimbus and at other scattered localities in the central and eastern portions of the Plan Area. These tailings are the result of gold dredge operations and consist of windrows of gravel, cobbles, boulders, sand, and silt. The largest single expanse of tailings extends from near Folsom southwesterly nearly to Mather Field, a distance of about 12 miles; it has a width that ranges from 1 to 4 miles and covers an estimated 12,000 acres.

Chico Formation (Ku)

The Chico formation is comprised of fossiliferous marine sandstone and minor siltstone found in the eastern portion of the Plan Area.

Basin Deposits (Qhb)

During the Holocene epoch, Basin Deposits formed in sink areas and occur now as unconsolidated clay, silt, and other fine materials. This formation covers a total of 663 acres in the eastern-most corner of the SSHCP Plan Area.

On this formation, four vernal wetlands were mapped. They cover a total of 3.1 acres, all outside the UDA. Average size (mean ± SE) of vernal wetlands on Basin Deposits is 0.78 ± 0.228 acres. Each of the four wetlands on this formation is 0.10 acre or larger.

Two deep pools occur in the Basin Deposits Formation outside the UDA that total 2.4 acres.

Alluvium (Q)

Undifferentiated alluvial deposits are sand, silt, and clay sedimentary deposits found in active stream channels. These deposits are unconsolidated and are found at lower elevations than older alluvial terrace deposits. Within the SSHCP area, these deposits are found along an

approximately 3-mile-long reach of a tributary to the Cosumnes River west of the Amador County Line and south of Jackson Road, and along an approximately 2-mile-long reach of a tributary to Dry Creek in the southeastern portion of the SSHCP area.

Levee and Channel Deposits (Qa)

Unconsolidated to poorly consolidated Levee and Channel Deposits are Holocene (<10,000 years) sediments that typically range in size from sand to clay size particles and are deposited during flood events when a river overtops its banks. These deposits are mapped along approximately 12 miles of the active stream channel of the Cosumnes River (Wagner et al. 1981). At their upstream extent, approximately 1 mile northeast of Wilton, the levee and channel deposits overlie the lower member of the Modesto Formation. The downstream extent of the levee and channel deposits occurs at the intersection of the Cosumnes River and Twin Cities Road.

Salt Springs Slate (Jss)

The Salt Spring Slate is a dark gray slate with poorly sorted angular grains of quartz and feldspar set in a fine grained clay matrix. Conglomerates associated with these deposits are fine grained with well-rounded pebbles (Clark, 1964). The Salt Spring Slate, found at elevations above 200 feet MSL in the eastern portion of the SSHCP area, is part of a northwest/ southeast trending volcanic and metamorphic belt that has been extensively folded and faulted.

Modesto-Riverbank Formation (Qmr)

The Modesto-Riverbank formation is a late Pleistocene (125,000 to 10,000 years) alluvial deposit comprising sand, silt, and gravel derived from the Sierra Nevada Mountains to the east. These fluvial terrace deposits are typically semi-consolidated and tend to form thin, impermeable soils, underlain by shallow hardpan. The formation is found along the Dry Creek, Laguna, and Browns Creek floodplains in the southeastern portion of the SSHCP area (Wagner et al. 1981).

North Merced Gravels (Qtnm)

The North Merced gravels are made up of well-rounded pebbles and cobbles of dark-colored metamorphic rocks. The formation occurs as a thin veneer, capping hills in the east-central part of Sacramento County. The southernmost outcrop area of the gravels is along the top of a southwesterly trending ridge about 2 miles north of Dry Creek. The gravels here overlie sediments of the Laguna Formation and rise from an elevation of about 150 feet to over 320 feet at their eastern extremity. Farther north, the gravels cap other flat-topped hills and are underlain usually by Laguna sediments. A broad area of North Merced gravels trends southwest from Folsom. This area is at most 3 miles wide and extends nearly as far as Florin Road and Bradshaw Road.

The North Merced gravels consist of discontinuous beds of lenticles of stream-laid detritus. This material was deposited by many rivers and streams, which drained the Sierra Nevada during the middle and latter parts of the Pleistocene Epoch. The North Merced gravels are easily distinguished from the underlying materials by the coarseness of the particles and red color of the iron oxide cement.

Laguna Formation (TI)

The Laguna Formation is exposed in the eastern and central portions of the Plan Area. The formation's eastern outcrop extends northward from Dry Creek, where its area of exposure is about 6 miles wide, to its northernmost exposure along Meiss Road. Its central outcrop extends northward from Deer Creek to its northernmost exposure along U.S. 50. This formation, ranging from late Miocene to early Pliocene in age, rests over the older Mehrten Formation. Where the Mehrten is andesitic in character and generally dark-colored, the Laguna is non-volcanic and is generally a tan to brown color. It is composed of a heterogeneous assemblage of beds of silt, clay, and sand with lenticles of gravel deposited on westward-sloping floodplains.

Valley Springs Formation (Tvs)

The Valley Springs Formation is exposed along the eastern side of the Plan Area from the southeastern corner along Dry Creek, northward to the headwaters of Carson Creek. The formation is generally exposed over an area from 1 to 2 miles in width. Its widest exposure is along Arkansas Creek, where it is exposed for 4 miles from east of Ione Road, west to the Cosumnes River.

The formation contains varying amounts of rhyolite ash, vitreous tuff, quartz sand containing abundant glass shards, and pale-colored beds of ashy clay. Frequently, sediments of the formation contain fragments of pumice, some of which may be as much as an inch in diameter. This formation varies with texture composition. There may be expansible clays present, especially in fine-grained material.

Mehrten Formation (Tm)

The Mehrten Formation is exposed discontinuously along a broad belt in the eastern portion of the Plan Area. The belt extends from the south county boundary at Dry Creek, where it is 4 miles wide, to U.S. 50, where it is less than a mile wide. In the subsurface, the Mehrten Formation extends westward from the area of outcrop at least as far west as the Sacramento River.

The Mehrten Formation is divided into two different layers. One is a sedimentary unit composed of gray to black andesitic sands, interbedded bouldery gravels, and blue to brown clay. The black sands are generally soft and well sorted. They were formed as fluvial deposits, having been derived

from andesitic detritus washed down the slopes of the mountains. Frequently laminated, the beds of black sand are commonly about 5 feet thick, although beds of up to 20 feet or more have been reported. Associated with the black sands are beds of stream gravel containing andesitic cobbles and boulders of up to several feet in diameter and beds of brown to blue clay and silt.

The second major unit of the Mehrten Formation is the tuff breccia. This rock is very dense and hard. It is composed of angular pieces and blocks of black, gray, and red fine-grained to porphyritic andesite, which range from less than an inch to over several feet in diameter. The tuff breccia was derived from andesitic eruptions to the east in the Sierra Nevada. During these eruptions, great quantities of highly mobile ash flowed west down the then-existing stream channels and picked up blocks of andesite debris, which were incorporated into the mass. The mass spread out over the westward-sloping plains and solidified as a pavement of hard, concrete-like rock, which ranged from only a few feet to over 30 feet in thickness. Flow patterns are readily evident where the upper surface of the tuff breccia is now exposed. On this surface, soil cover is scant, with the blocks of andesite standing out in bold relief, giving the appearance of a boulder-strewn field. Run-off from precipitation is nearly 100% due to the rocky surface.

Ione Formation (Ti)

The Ione Formation is exposed in the eastern portion of the Plan Area from Jackson Highway north to U.S. 50. In most of Sacramento County, younger sediments overlie this formation. This formation is divisible into three distinct layers. The uppermost layer of the formation is composed principally of uniform graded, medium to coarse quartz sandstone. Below the sandstone is a thick bed of white clay of ceramic quality. In some areas, the clay has been stained red to yellow and, where it is intense, the clay has become iron cemented and is present as ocher. The bottom layer is composed of blue to gray clay with occasional seams of brown coal and lignite. A zone of gravel composed of quartz and metamorphic fragments is reported to be at the base of the formation. North of the American River, the Ione Formation sediments become coarser grained. To the east, the Ione Formation is apparently contemporaneous with the Auriferous gravels of the Sierra Nevada. In certain areas outside of Sacramento County, deposits of the Ione Formation merge eastward with these gravels. The origin of the Ione Formation appears to be of a deltaic and littoral, or near-shore, environment of deposition.

Modesto Formation (Lower) (Qm2)

The Modesto formation is made up of arkosic alluvium and sand with minor gravel and silt, which together form alluvial fans and abandoned channel ridges in valleys and along streams. Qm2 is unweathered alluvium that forms terraces that are topographically lower than Qm1.

Table 4
Summary of Landforms in Plan Area by Watershed

Formation	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River	Grand Total	Percent of Plan Area
Alluvium	23	829	—	<1	1,045	—	—	—	—	1,106	3,003	<1
Basin Deposits	—	—	—	3,378	—	629	597	1,500	8,548	—	14,652	5%
Chico Formation	—	52	—	—	—	—	—	—	—	—	52	<1
Copper Hill Volcanics	109	1,118	—	—	—	—	—	—	—	—	1,227	<1
Gopher Ridge Volcanics	353	7,666	—	—	—	—	—	—	—	2,076	10,096	3%
Intertidal Deposits	—	—	—	—	—	1,066	—	4,360	455	—	5,881	2%
Ione Formation	—	2,167	1,156	—	—	—	—	—	—	1,995	5,318	2%
Laguna Formation	373	3,433	21,165	5,327	3,621	—	20,718	465	—	6,181	61,282	19%
Levee and Channel Deposits	—	3,215	751	5,919	1,213	323	18	4,115	2,159	444	18,162	6%
Mehrten Formation	6	7,223	11,099	—	4,931	—	8		—	3,191	26,459	8%
Mine and Dredge Tailings	—	452	482	—	—	—	748	375	—	1,185	4,675	1%
Modesto Formation (Lower)	—	5,672	—	—	—	—	—	—	—	2,542	8,214	3%
Modesto-Riverbank Formation	340	175	11,343	57	2,546	—	48	179	—	—	14,688	5%
North Merced Gravel	—	—	184	—	—	—	—	—	—	—	184	<1
Riverbank Formation	504	4,583	20,340	32,001	3,781	—	20,790	2,994	29,265	7,971	122,228	38%
Salt Springs Slate	283	6,217	—	—	—	—	—	—	—	1,301	7,801	2%
Valley Springs Formation	—	987	7455	—	1,356	—	—	—	—	3,892	13,690	4%
Grand Total	**3,452**	**43,803**	**73,976**	**46,682**	**18,493**	**2,020**	**42,926**	**13,987**	**40,426**	**31,885**	**317,655**	**100%**

Note: Due to the relatively coarse scale of the land cover mapping, rounding to nearest acre is applied to acreages 10 or greater. The six acres occurring in Cache Slough are not included in the total. Any discrepancies in individual totals are due to rounding but the grand total for each watershed is consistent.

* Information is not available for the entire Plan Area.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

3.1.4 Soils in the Plan Area

There are 129 different soil mapping units within the Plan Area. In order to condense the soil types within the Plan Area, the mapping units were grouped by the surface texture attribute (e.g., loam, clay, silt) (Table 5, Figure 6). Soil mapping units that did not contain a surface texture attribute are listed under "Other Soil Types" in Table 5. Overall, the Plan Area is dominated by loam soil subsets, primarily silt loam, which accounts for about 34% of the Plan Area. The "Other Soil Types" account for less than 5% of the soil types in the Plan Area.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
General Soil Types												
Silt Loam	43	10,939	20,230	30,367	6,366	394	15,233	1,705	12,892	9,306	107,475	34%
Gravelly Loam	104	7,498	22,038	2,335	5,251	—	8,987	41	—	7,332	53,586	17%
Loam	1,203	11,494	12,625	3,658	917	—	11,636	2,560	1,027	4,538	49,658	16%
Fine Sandy Loam	8	4,468	11,881	29	5,135	11	1,203	85	—	3,119	25,940	8%
Clay	—	536	1,462	2,771	127	1,198	2,028	1,642	13,138	920	23,821	7%
Sandy Loam	—	6,408	1,425	4,624	90	277	343	326	861	3,188	17,543	6%
Sandy Clay Loam	—	1,438	1,065	833	143	—	5	4	6,702	323	10,513	3%
Clay Loam	—	—	856	248	—	31	191	1,637	2,812	—	5,775	2%
Water	67	302	616	915	131	99	299	746	1,500	888	5,563	2%
Mucky Clay	—	—	—	—	—	—	—	3,601	92	—	3,693	1%
Loamy Sand	—	—	—	—	—	—	—	—	815	—	815	<1%
Cobbly Loam	—	—	4	—	19	—	—	—	—	—	23	<1%
Silty Clay Loam	—	—	<1	<1	16	9	—	—	—	—	25	<1%
Gravelly Silt Loam	—	21	—	—	—	—	—	—	—	—	21	<1%
Gravelly Sandy Loam	—	—	2	—	3	—	—	—	—	—	5	<1%
Coarse Sandy Loam	—	—	—	—	—	—	—	—	—	1	1	<1%

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Other Soil Types												
Xerorthents, dredge tailings, 2% to 50% slopes	332	335	395	—	—	—	599	362	—	1,427	3,449	1%
Xerarents-San Joaquin complex, 0 to 1% slopes	—	68	896	482	109	—	463	—	60	49	2,127	1%
Urban land	41	—	136	—	—	—	903	412	—	—	1,492	<1%
Xerarents-Urban land-San Joaquin complex, 0 to 5% slopes	101	—	—	—	—	—	359	234	—	5	698	<1%
Xerorthents, dredge tailings-Urban land complex, 0 to 2% slopes	1,197	—	—	—	—	—	—	98	—	—	1,295	<1%
Pits	75	58	18	—	—	—	384	198	10	420	1,163	<1%
Urban land-Natomas complex, 0 to 2% slopes	257	—	—	—	—	—	12	221	—	—	490	<1%

AGENDA ITEM 11.1

2750

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Xerarents-Redding complex, 0 to 2% slopes	24	18	321	422	—	—	166	—	—	—	950	<1%
Fluvaquents, 0 to 2% slopes, frequently flooded	—	—	—	—	—	—	—	—	517	—	517	<1%
Slickens	—	—	—	—	—	—	26	—	—	21	47	<1%
Lithic Xerorthents, 2% to 8% slopes	—	29	—	—	184	—	—	—	—	197	410	<1%
Dumps	—	135	—	—	—	—	88	—	—	—	223	<1%
Urban land-Xerarents-Fiddyment complex, 0 to 8% slopes	—	—	—	—	—	—	—	114	—	—	114	<1%
Xerofluvents, 0 to 2% slopes, flooded	—	56	—	—	—	—	—	—	—	130	186	<1%
Riverwash	—	—	5	—	—	—	—	—	—	21	26	<1%
Mokelumne soils and alluvial land	—	—	—	—	<1	—	—	—	—	—	<1	<1%

AGENDA ITEM 11.1

2751

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Placer diggings and Riverwash	—	—	—	—	<1	—	—	—	—	—	<1	<1%
Inks loam and Rock land, 3% to 45% slopes	—	—	<1	—	—	—	—	—	—	—	<1	<1%
Grand Total	**3,452**	**43,803**	**73,976**	**46,682**	**18,493**	**2,019**	**42,926**	**13,987**	**40,426**	**31,885**	**317,649[1]**	**100%**

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

3.1.5 Slope and Elevation

The topography of the Plan Area reflects the initial geological conditions as they have been modified over time by wind, rain, and flowing water. Generally, the Plan Area is dominated by flat or gently sloping terrain, and steep slopes are rare. The central and western regions of the Plan Area are dominated by flat terrain. In the eastern region, the flat terrain gives way to rolling hills (USDA NRCS 1993). Elevations range from approximately 5 feet below sea level in the southwest portion of the Plan Area to approximately 670 feet amsl in the eastern portion of the Plan Area. Because much of the Plan Area lies in low, flat terrain with little to no slope, natural drainageways in these areas are usually poorly defined and drainage of stormwater is slow. Tables 6 and 7 show a breakdown of the slopes and elevation ranges, respectively, for each watershed. These topographic features are represented on Figure 7 for elevations and Figure 8 for slopes.

Table 6
Summary of Slopes in the Plan Area

Watershed	0–20%		21%–40%		>40%		Total (acres)
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	
American River	3,452	100	—	—	—	—	3,452
Deer Creek	43,467	99.2	327	0.1	8	<0.1	43,803
Laguna Creek	73,833	99.8	141	0.2	2	<0.1	73,976
Lower Cosumnes River	46,682	100	—	—	—	—	46,682
Lower Dry Creek	18,246	98.7	242	1.3	5	<0.1	18,493
Lower Mokelumne River	2,019	100	—	—	—	—	2,019
Morrison Creek	42,924	99.9	2	<0.1	—	—	42,926
Sherman Lake-Sacramento River	13,987	100	—	—	—	—	13,987
Snodgrass Slough	40,426	100	—	—	—	—	40,426
Upper Cosumnes River	31,447	98.6	405	1.3	34	0.1	31,885
Total	**316,483**	**99.6**	**1,117**	**0.4**	**49**	**<0.1**	**317,649**[1]

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document.

Table 7
Summary of Elevation Ranges in the Plan Area

Watershed	0–500 feet		501–1,000 feet		Total (acres)
	Acres	*Percent*	*Acres*	*Percent*	
American River	3,385	98.1	66	2	3,452
Deer Creek	42,536	97.1	1,267	2.7	43,803
Laguna Creek	73,976	100.0	—	—	73,976
Lower Cosumnes River	46,682	100.0	—	—	46,682

Table 7
Summary of Elevation Ranges in the Plan Area

Watershed	0–500 feet		501–1,000 feet		Total (acres)
	Acres	*Percent*	*Acres*	*Percent*	
Lower Dry Creek	18,451	99.8	42	0.2	18,493
Lower Mokelumne River	2,019	100.0	—	—	2,019
Morrison Creek	42,926	100.0	—	—	42,926
Sherman Lake-Sacramento River	13,987	100.0	—	—	13,987
Snodgrass Slough	40,426	100.0	—	—	40,426
Upper Cosumnes River	31,761	99.6	124	0.4	31,885
Total	**316,149**	**99.5**	**1,499**	**0.5**	**317,649**[1]

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document.

Table 6 shows that more than 99% of the Plan Area supports slopes less than 20%, with a range of just over 98% in the Upper Cosumnes River watershed to 100% in several of the watersheds. Similarly, Table 7 shows that over 99% of the Plan Area has an elevation of less than 500 feet and that all of the watersheds have at least 97% of their elevations at less than 500 feet; only four watersheds have elevations above 500 feet. The Deer Creek watershed accounts for about 3% of the acreage in the Plan Area above 500 feet.

3.1.6 Covered Species

Occurrences of Covered Species recorded throughout the Plan Area are shown in Table 8 and are depicted on Figures 9-1 through 9-29 Generally, Table 8 shows that most of the occurrence data for Covered Species in the Plan Area are concentrated in 5 of the 10 watersheds: Morrison Creek and Laguna for the vernal pool Covered Species and Morrison Creek, Laguna, Snodgrass Slough, Upper Cosumnes River, and Lower Cosumnes River for the other Covered Species. These five watersheds combined account for 72% of the total Covered Species occurrences in the Plan Area. Descriptions of the Covered Species occurrences within the different watersheds are provided in the analyses below for each watershed. It should be noted that the Covered Species occurrence data generally reflect where the most comprehensive surveys have been conducted in the Plan Area and do not necessarily reflect negative findings elsewhere in the Plan Area. For example, most of the vernal pool Covered Species occurrences are known from existing vernal pool Preserves inside the UDA and existing Preserve in PPU 7 outside the UDA, and relatively few occurrences are from planned criteria-based conservation areas simply because many of these areas have not been surveyed.

The SSHCP also includes an analysis of potentially suitable habitat (i.e., modeled habitat) for each of the Covered Species (Table 9, Figures 9-1 through 9-29). Further, several of the

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Biological Goals and Measurable Objectives for plant species (Table 7-1, Chapter 7 of the SSHCP) prescribe that before an occurrence can be taken, one must be protected. For three Covered Species (giant garter snake, greater sandhill crane, and Swainson's hawk), the effects analysis also includes "high-value" habitat for the species in the Plan Area. High-value habitat is defined differently for each of the three species (Chapter 3 of the SSHCP), but generally refers to particularly important habitat in the Plan Area . Complete descriptions of the Covered Species are found in Chapter 3 of the SSHCP, effects of the SSHCP to Covered Species are described in Chapter 6, and the SSHC Conservation Strategy for the Covered Species is described in Chapter 7 of the SSHCP.

Similar to the Covered Species occurrences, Morrison Creek and Laguna support the majority of modeled habitat for vernal pool Covered Species, together accounting for 92% of the modeled habitat for both the vernal pool plants and vernal pool invertebrates. Modeled habitat for the other Covered Species is distributed across more watersheds, with Laguna accounting for most of the total, but with substantial modeled habitat in the Deer Creek, Lower Cosumnes River, Upper Cosumnes River, Morrison Creek, and Snodgrass Slough watersheds. More detailed descriptions of the modeled habitat for Covered Species within the different watersheds are provided in the analyses in Section 3.2 for each watershed.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 8
Summary of Covered Species Occurrences Within Watersheds[1]

Covered Species	Species Occurrence Total	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River
Vernal Pool Plants											
Ahart's dwarf rush	2	—	—	—	—	—	—	2	—	—	—
Boggs Lake hedge-hyssop	30	—	3	—	—	—	—	27	—	—	—
Dwarf downingia	10	—	—	2	1	—	—	—	—	7	—
Legenere	56	—	—	2	5	1	—	30	—	12	6
Pincushion navarretia	48	—	—	32	—	16	—	—	—	—	—
Sacramento Orcutt grass	40	—	19	2	—	—	—	19	—	—	—
Slender Orcutt grass	4	—	—	—	—	—	—	4	—	—	—
Occurrences in Watershed	**190**	**0**	**22**	**38**	**6**	**17**	**0**	**82**	**0**	**19**	**6**
Non-Vernal Pool Plant											
Sanford's arrowhead	**63**	**—**	**2**	**—**	**4**	**—**	**3**	**12**	**2**	**35**	**5**
Vernal Pool Invertebrates											
Vernal pool fairy shrimp	572	—	14	305	8	10	—	196	2	17	20
Vernal pool tadpole shrimp	748	2	16	187	3	5	—	505	2	21	7
Ricksecker's water scavenger beetle	4	—	—	3	1	—	—	—	—	—	—
Mid-valley fairy shrimp	33	—	—	5	1	—	—	18	—	9	—
Occurrences in Watershed	**1,357**	**2**	**30**	**500**	**13**	**15**	**0**	**719**	**4**	**47**	**27**

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 8
Summary of Covered Species Occurrences Within Watersheds[1]

Covered Species		Species Occurrence Total	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River
Wildlife												
Amphibians/Reptiles												
California tiger salamander		29	—	—	23	—	6	—	—	—	—	—
Giant garter snake		14	—	—	1	5	—	—	1	—	7	—
Western pond turtle		18	—	1	8	2	—	—	2	—	5	—
Western spadefoot		31	—	1	18	—	1	—	9	—	—	2
Birds												
Burrowing owl		90	1	4	23	14	—	—	26	6	16	—
Cooper's hawk		17	—	2	1	6	—	—	4	—	2	2
Ferruginous hawk		26	—	4	6	3	—	—	8	—	2	3
Loggerhead shrike		30	—	4	6	8	—	—	3	—	7	2
Northern harrier		62	1	6	7	20	1	—	9	2	13	3
Greater sandhill crane	All data	3,249	—	—	390	642	259	—	2	1,205	722	29
	Roosts	*48*	—	—	*7*	*29*	—	—	—	—	*12*	—
Swainson's hawk	All data	398	1	31	51	107	19	—	20	8	127	34
	Nests	*293*	—	*22*	*42*	*90*	*15*	—	*11*	*3*	*86*	*24*
Tricolored blackbird	All data	305	3	45	91	33	2	—	87	5	6	33
	Documented nests	*36*	—	*6*	*5*	*3*	—	—	*20*	—	*1*	*1*
White-tailed kite		58	—	4	1	23	—	—	13	4	10	3

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 8
Summary of Covered Species Occurrences Within Watersheds[1]

Covered Species	Species Occurrence Total	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River
Invertebrates											
Valley elderberry longhorn beetle	156	1	1	—	1	—	—	—	—	—	153
Mammals											
American badger	8	—	—	—	—		—	7	—	1	—
Western red bat	7	—	—	2	—	—	—	2	2	—	1
All Wildlife Species in Watershed[2]	**4,561**	**7**	**105**	**628**	**868**	**288**	**3**	**205**	**1,234**	**953**	**270**
Total Covered Species in Watershed[2]	**6,108**	**9**	**157**	**1,166**	**887**	**320**	**3**	**1,006**	**1,238**	**1,019**	**303**

1 The occurrence data reported in this table include all documented observations for the Covered Species in the Plan Area. Nest or roost sites are included for Swainson's hawk, tricolored blackbird, and greater sandhill crane.

2 Totals and percentages are based on sums of all occurrence data and do not include subtotals for nests or roosts for Swainson's hawk, tricolored blackbird, and greater sandhill crane, which are subsets of all occurrence data for these species.

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
Vernal Pool Plants (general habitat model in acres)												
Ahart's dwarf rush		25,135	126	2,954	6,689	1,269	327	—	10,974	19	2777	
Boggs Lake hedge-hyssop		37,001	183	3,908	8,663	4,954	484	—	12,702	67	815	5,225
Dwarf downingia		24,260	-	1,310	10,991	4,341	1,947	—	2,218	—	1,362	2,091
Legenere		50,971	156	4,174	16,491	6,210	2,107	—	15,118	137	1,679	4,899
Pincushion navarretia		57,437	79	8,242	29,570	1,408	6,351	—	6,841	7.33	—	4,939
Sacramento Orcutt grass		34,491	125	3951	14,275	1,371	2,005	—	9,972	19	—	2,774
Slender Orcutt grass		34,491	125	3,951	14,275	1,371	2,005	—	9,972	19	—	2,774
Non-Vernal Pool Plant												
Sanford's arrowhead		52,824	133	5,124	12,535	9,713	773	13	15,026	41	2,817	6,648
Vernal Pool Invertebrates												
Vernal pool fairy shrimp/Vernal pool tadpole shrimp	General	103,210	378	13,814	40,030	10,004	7,131	—	18,445	326	1,918	11,163
Ricksecker's water scavenger beetle	General	103,436	378	13,795	40,030	10,004	7,131	—	18,390	326	1,918	11,163
Mid valley fairy shrimp	General	53,698	208	5,705	13,594	7,412	770		16,907	309	1,852	6,941

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
Amphibians/Reptiles												
California tiger salamander	Upland	85,369	—	—	46,092	13,807	9,911	—	—	—	—	15,559
	Aquatic	4,424	—	—	2,336	1,070	319	—	—	—	—	699
Giant garter snake	Aquatic	7,290	—	3	697	2,430	1	91	441	66	3,559	2
	Upland	27,868	—	181	9,521	8,934	19	3	3,258	114	5,760	78
	High Value[3]	10,481	—	—	1,170	1,518	10	0.4	1,388	45	6,350	—
Western pond turtle	Breeding/ Foraging	6,355	10	392	739	1,866	132	91	515	7	2,005	599
	Nesting/ Aestivation	110,846	899	25,697	33,739	11,195	8,273	199	8,750	425	6,517	15,153
Western spadefoot	Aquatic	13,478	41	1,011	3,477	2,387	471	71	1,566	23	2,987	1,444
	Upland	149,862	1,318	30,062	46,092	14,593	9,911	—	21,312	627	5,945	20,002
Birds												
Burrowing owl	Nesting/ Foraging	204,644	1,336	30,562	55,756	30,654	11,553	1,679	24,956	1,704	25,499	20,945
Cooper's hawk	Foraging	5,637	-	2,018	2,550	—	529	—	18	—	—	521
	Nesting	17,010	48	5,357	1,846	2,231	1,865	199	487	182	1,767	3,028
Ferruginous hawk	Foraging	159,612	1,369	25,055	50,046	19,420	8,701	9	23,951	633	10,452	19,976
Loggerhead	Foraging	72,405	32	5,476	13,826	17,440	3,478	1,679	4,903	1,084	20,767	3,719

AGENDA ITEM 11.1

2760

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
shrike	Foraging/ Nesting	135,112	1,336	23,643	42,178	14,593	7,965	0.13	21,294	626	5,945	17,530
	Nesting	7,878	48	957	481	2,231	448	199	487	182	1,767	1,078
Northern harrier	Foraging	11,309	34	602	2,931	2,506	432	21	1,600	14	2,243	926
	Foraging/ Nesting	199,008	1,336	28,544	53,205	30,654	11,023	1,679	24,938	1,704	25,499	20,424
Greater Sandhill crane	Roosting	1,156	—	8	279	369	28	—	17	—	421	734
	Foraging	84,286	—	3,677	16,315	29,301	3,289	1,421	1,593	855	25,438	2,398
	Foraging/ Roosting	4,322	—	46	336	1,696	48	21	315	8	1,811	43
	High Value	81,473	—	2,569	14,103	30,527	2,599	1,442	75	836	26,848	2,474
Swainson's hawk	Foraging	205,988	1,303	27,862	55,969	32,033	11,408	1,679	26,168	1,711	26,712	21,142
	Nesting	7,237	—	916	323	2,214	448	199	358	180	1,767	832
	High Value[3]	75,534	—	3,177	10,092	25,942	1,942	1,878	1,926	1,356	28,340	881
Tricolored blackbird	Foraging	24,244	12	1,482	7,747	4,874	627	12	2,710	16	4,446	2,318
	Nesting-Foraging	188,539	1,361	27,875	48,721	28,950	10,871	1,692	24,016	1,712	24,016	19,324
White-tailed kite	Foraging	213,154	1,369	31,138	58,554	32,033	11,972	1,679	26,215	1,711	26,712	21,771
	Nesting	17,010	48	5,357	1,846	2,231	1,865	199	487	182	1,767	3,028

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
Invertebrates												
Valley elderberry longhorn beetle	General	7,878	48	957	481	2,231	448	199	487	182	1,767	1,078
Mammals												
American badger	General	149,136	1,369	26,225	47,492	15,972	8,879	—	22,542	633	7,158	18,866
Western red bat	Foraging	152,890	1,379	24,754	45,883	18,392	8,531	94	23,376	787	10,508	19,186
	Roosting/ Foraging	24,841	48	7,432	4,946	2,062	2,559	196	504	1,540	1,874	3,679

1 Total modeled habitat acreages for a species include areas where different models (e.g., foraging and breeding) for the species overlap (i.e., the acreages in the models for a particular species are not mutually exclusive).

2 Modeled habitat totals may not sum exactly to the modeled habitat acreages reported in the SSHCP due to rounding error.

3 High-value habitat is a subset of modeled habitat and is included in the total modeled habitat acreage.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

3.1.7 Preserve Design

The majority of conservation, existing and planned, within the Plan Area will occur within the Laguna Creek watershed, while very little conservation is designated within the American River watershed (Table 10, Figure 10). Watersheds with approximately 22% to 24% of existing conservation include Lower Dry Creek, Lower Cosumnes River, and Snodgrass Slough. Substantial conservation is planned for 7 of the 10 watersheds, ranging from approximately 2,571acres in Deer Creek to approximately 5,119 acres in Lower Cosumnes River. Ultimately, Laguna Creek watershed would have the highest total conservation by percentage at almost 27% and by acreage at more than 25,633 acres.

Table 10
Summary of Watershed Conservation

Watershed	Plan Area Total		Existing Conservation		Planned Conservation		No Conservation		Percentage of Conservation in Plan Area
	Acres	*% of Plan Area*	*Acres*	*% of Watershed*	*Acres*	*% of Watershed*	*Acres*	*% of Watershed*	
American River	997	0.4	0	0	0	0.0	997	0.6	0%
Deer Creek	34,971	13.5	5,464	8.5	2,571	7	26,936	17	23%
Laguna Creek	69,633	26.8	18,356	28.5	14,513	39.4	36,764	23	47%
Lower Cosumnes River	44,411	17	14,266	22	5,119	13.9	25,026	15.8	44%
Lower Dry Creek	17,661	6.8	8,834	13.7	358	1	8,470	5.3	52%
Lower Mokelumne River	2,019	0.8	1,642	2.5	0	0.0	377	0.2	81%
Morrison Creek	10,007	3.9	2,888	4.8	5,883	16	1,236	0.8	88%
Sherman Lake-Sacramento River	9,737	3.7	758	1.8	103	0.3	8,876	5.6	9%
Snodgrass Slough	38,806	15	8,943	13.9	5,497	14.9	24,366	15.4	37%
Upper Cosumnes River	31,602	12	3,368	5.2	2,803	7.6	25,429	16	20%
Total	**259,849**	**—**	**64,519**	**24.8**	**36,847**	**14.2**	**158,483**	**61**	**100**

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 11 provides a breakdown of the watersheds by non-UDA/UDA areas and PPUs. All but the Upper Cosumnes and Lower Mokelumne River watersheds intersect both the UDA and non-UDA areas and all intersect more than one PPU. Section 3.3 provides descriptions of the watersheds and how they relate to Preserve planning inside and outside the UDA and by PPUs.

Table 11
Summary of Preserve Planning Units by Watershed

Watershed		Outside of Preserve Planning Units (acres)	PPU 1 (acres)	PPU 2 (acres)	PPU 3 (acres)	PPU 4 (acres)	PPU 5 (acres)	PPU 6 (acres)	PPU 7 (acres)	PPU 8 (acres)	Total (acres)
American River	Non-UDA	1,094	—	—	—	—	—	—	—	—	1,094
	UDA	—	1,106	1,251	—	—	—	—	—	—	2,357
Deer Creek	Non-UDA	8,081	—	—	—	—	21,005	2,435	—	—	31,521
	UDA	—	8,150	—	3,003	1,130	—	—	—	—	12,283
Laguna Creek	Non-UDA	—	—	—	—	—	—	8,292	61,441	—	69,733
	UDA	—	—	—	—	—	—	—	—	4,242	4,242
Lower Cosumnes River	Non-UDA	—	—	—	—	—	4,941	31,008	8,942	—	44,891
	UDA	—	—	—	—	—	—	—	—	1,791	1,791
Lower Dry Creek	Non-UDA	—	—	—	—	—	—	1,218	16,176	--	17,394
	UDA	—	—	—	—	—	—	—	—	1,099	1,099
Lower Mokelumne River	Non-UDA	—	—	—	—	—	—	2,019	—	—	2,019
	UDA	—	—	—	—	—	—	—	—	—	—
Morrison Creek	Non-UDA	70	—	--	--	—	—	111	—	—	181
	UDA	12,210	10,146	6,028	11,301	3,060	—	—	—	—	42,745
Sherman Lake-Sacramento River	Non-UDA	—	—	—	—	—	—	9,737	—	—	9,737
	UDA	1,876	326	1,992	—	57	—	—	—	—	4,251
Snodgrass Slough	Non-UDA	—	—	—	—	—	—	39,420	—	—	39,420
	UDA	—	—	—	—	1,006	—	—	—	—	1,006

Table 11
Summary of Preserve Planning Units by Watershed

Watershed		Outside of Preserve Planning Units (acres)	PPU 1 (acres)	PPU 2 (acres)	PPU 3 (acres)	PPU 4 (acres)	PPU 5 (acres)	PPU 6 (acres)	PPU 7 (acres)	PPU 8 (acres)	Total (acres)
Upper Cosumnes River	Non-UDA	—	—	—	—	—	26,602	935	4,348	—	31,885
	UDA	—	—	—	—	—	—	—	—	—	—
Total		**23,330**	**19,729**	**9,271**	**14,303**	**5,253**	**52,549**	**95,182**	**90,906**	**7,132**	**317,655**

3.2 Description of Watersheds in Plan Area

3.2.1 American River Watershed

3.2.1.1 Land Cover Types

Approximately 3,452 acres, or about 5%, of the 65,103-acre American River watershed is located within the Plan Area. This watershed comprises 1% of the entire Plan Area and is located in the northern portion of the Plan Area (Figure 2). A little more than half of the watershed contains Non-habitat land cover types, which primarily includes high-density development and mine tailings (Table 2, Figure 3). The remaining undeveloped land consists of Valley Grassland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Blue Oak Woodland, and Savanna and Mixed Riparian scrub. Aquatic resources account for only approximately 98 acres, or about 3%, of the American River watershed. Impervious surfaces cover approximately 1,773 acres, or 51%, of the watershed within the Plan Area. Along with the Morrison Creek (16% impervious surfaces) and Sherman Lake-Sacramento River (24% impervious surfaces) watersheds, the American River watershed has one of the three highest percentages of impervious surfaces in the Plan Area.

3.2.1.2 Hydrology

According to the NHD flowline dataset, the American River watershed contains about 1% of the Plan Area's flowline features. Alder and Buffalo Creeks are the main water sources within this watershed, both of which are tributaries to the American River located north of the Plan Area.

Artificial paths (48%) and streams/rivers (46%) account for most of the flowline features in the American River watershed.

3.2.1.3 Geological Formations

The majority of the American River watershed is comprised of riverbank formations, Laguna formation and gopher ridge volcanics (45%) (Table 4, Figure 5).

3.2.1.4 Soils

The majority of this watershed (59%) contains dredge tailings, pits, and other remnants from mining operations (Table 5, Figure 6). The remaining acreage consists mostly of loam (35%) and gravelly loam (about 3%) soils.

3.2.1.5 Slope and Elevation

The entire American River watershed contains flat to gentle slopes (0-20%). (Table 6, Figure 7). This watershed does not contain any lands above 20% slopes. Similarly, the majority of the watershed is between an elevation range of 0-500 feet, with only about 2% ranging from 500-1,000 feet (Table 7, Figure 8).

3.2.1.6 Covered Species

The American River watershed includes documented occurrences for 10 of the 28 Covered Species, including: tricolored blackbird (*Agelaius tricolor*), Swainson's hawk (*Buteo swainsoni*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool tadpole shrimp (*Lepidurus packardi*), burrowing owl (*Athene cunicularia*), and northern harrier (*Circus cyaneus*) (Table 8). However, about 45% of the American River watershed has been influenced by human activities with about half of the watershed dominated by non-habitat land covers and agriculture (Table 2, Figure 3). Subsequently, in combination with making up only 1% of the Plan Area, the portions of the American River watershed within the Plan Area do not support a high overall percentage of the Covered Species occurrences in the Plan Area.

Modeled habitat for several species occurs within this watershed, with substantial amounts of modeled habitat for the covered bird and mammal species (Table 9). Except for Cooper's hawk and greater sandhill crane (*Grus canadensis*), whose modeled habitat is limited to the western portion of the Plan Area, the American River watershed supports more than 1,000 acres of modeled habitat for each of the covered bird and mammal species, including more than 1,384 acres of nesting habitat for loggerhead shrike (*Lanius ludovicianus*) and foraging habitat for Cooper's hawk, more than 1,336 acres of nesting/foraging habitat for burrowing owl, and more

than 5,455 acres of foraging habitat for ferruginous hawk (*Buteo regalis*), loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite. The watershed contains more than 1,361 acres of modeled nesting habitat for tricolored blackbird and a nesting colony of approximately 3,900 birds was observed in 2000. The watershed supports about 1,379 acres of foraging habitat and more than 48acres of roosting habitat for western red bat, and more than 1,369 acres of modeled general habitat for American badger (*Taxidea taxus*). The watershed also contains about 48 acres of modeled habitat for valley elderberry longhorn beetle, but only one documented occurrence for the species. The watershed supports very small amounts of modeled habitat for the vernal pool Covered Species, ranging from no modeled habitat for dwarf downingia (*Downingia pusilla)* to 156 acres for legenere (*Legenere limosa*). For amphibians and reptiles, the watershed supports about 51 acres of modeled breeding habitat and 1,318acres of modeled aestivation habitat for western spadefoot (*Spea hammondii*) and 10 acres of modeled breeding/foraging habitat and 899 acres of modeled aestivation/nesting habitat for western pond turtle (*Actinemys marmorata*). The watershed does not have modeled habitat for California tiger salamander (*Ambystoma californiense*) and giant garter snake (*Thamnophis gigas*) because it is outside the geographic range of these two species in the Plan Area. The watershed contains only 133 acres of modeled habitat for Sanford's arrowhead (*Sagittaria sanfordii*).

3.2.1.7 Conservation Considerations

Almost the entire American River watershed is located within the UDA. The 2,358 acres of this watershed within the UDA are split about equally between PPU 1, and PPU 2. Due to its relative lack of vernal pools and vernal pool Covered Species occurrences, the watershed is not considered an important component of the Conservation Strategy inside the UDA. While the American River watershed supports substantial modeled habitat for covered birds and mammals (generally more than 1,000 acres for each), these species are widespread in the Plan Area and the watershed supports a relatively small percentage (generally less than 2%) of the total modeled habitats for these species in the Plan Area. No planned Preserve components are located within this watershed and it is anticipated that much of PPU 2 will eventually be urbanized.

3.2.2 Deer Creek Watershed

3.2.2.1 Land Cover Types

The Deer Creek watershed bisects the Plan Area, extending from the northeastern edge to halfway into the Plan Area (Figure 2). Of the 81,504 acres of the watershed, 43,803 acres (54%) are within the Plan Area (Table 1). A large majority (94%) of the watershed contains "Habitat" land covers, which includes Agriculture (Table 2, Figure 3). Terrestrial land covers (31,018 acres and 71% of the watershed), consisting primary of Valley Grassland (23,643 acres and 54% of the

watershed), account for the majority of the watershed. Other terrestrial land covers include Blue Oak Savanna and Woodland (9% of the watershed) and Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland (2% of the watershed). Approximately 21% (9,269 acres) of the watershed consists of lands used for agricultural purposes and 6% (2,467 acres) fall under the Non-habitat land cover type. The remaining 2% of the watershed (1,048 acres) consists of aquatic resources such as streams and creeks, open water, and vernal pools. Impervious surfaces cover approximately 188 acres, or less than 1%, of the watershed within the Plan Area.

3.2.2.2 Hydrology

Approximately 86% of the NHD data within the Deer Creek watershed contains streams and rivers (Table 3, Figure 4). Deer Creek and its tributaries are the central focus of this watershed. Notable tributaries located within the watershed include Crevis Creek, Carson Creek, and Coyote Creek. The Cosumnes River separates the Deer Creek watershed from the Upper Cosumnes River watershed (see Section 3.2.10). Artificial paths account for about 6% of this watershed, with the majority related to the southern extension of the Folsom South Canal. The remaining NHD features within the Deer Creek watershed are canal/ditch (7%), connector (less than 1%), and pipeline (less than 1%).

3.2.2.3 Geological Formations

Gopher ridge volcanics, Mehrten formation and salt springs slate underlie the majority of the Deer Creek watershed, accounting for about 48% (Table 4, Figure 5). Several other geological formations are prominent within this watershed and include laguna formation, levee and channel deposits, Modesto formation, and riverbank formation.

3.2.2.4 Soils

A wide variety of loam subcategories occur within this watershed (Table 5, Figure 6): loam (26%), silt loam (25%), gravelly loam (17%), sandy loam (15%), fine sandy loam (10%), and sandy clay loam (3%). Additional soils include clay (1%) and soils listed in the other category (2%). A small percentage (less than 1%) includes areas covered in water.

3.2.2.5 Slope and Elevation

The Deer Creek watershed contains slopes from 0 to greater than 40%, with the vast majority of the slopes (99%) within the 0-20% category (Table 6, Figure 7). Less than 1% are within the 20%-40% and less than 1% are within the greater than 40% category. The majority of the steep slopes are concentrated along the portion of Deer Creek River located in the northeastern section

of the watershed. Of all the watersheds, Deer Creek contains the highest percentage (3%) of acreage within an elevation range of 500-1,000 feet (Table 7, Figure 8). This acreage is concentrated along the eastern border of the Plan Area.

3.2.2.6 Covered Species

The Deer Creek watershed includes documented occurrences for 16 of the 28 Covered Species, including: Boggs Lake hedge-hyssop, Sacramento Orcutt grass (*Orcuttia viscida*), Sanford's arrowhead, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, western pond turtle, western spadefoot, and white-tailed kite (Table 8). This watershed contains 2% of the known occurrences for these 16 Covered Species, and contains a substantial percentage of occurrences for two of the Covered Species, including 48% of the Sacramento Orcutt grass records and 15% of the ferruginous hawk records. Covered species have been recorded throughout the watershed, with the majority occurring along hydrologic features and within aquatic or terrestrial habitat. A cluster of vernal pool species records occur along the border of Deer Creek and Morrison watersheds east of the intersection of Grant Line Road and Keifer Boulevard.

Consistent with the occurrence of several vernal pool species, the Deer Creek watershed contains modeled habitat for all of the vernal pool Covered Species, ranging from 1,310 for dwarf downingia to 13,814 acres for vernal pool fairy shrimp and vernal pool tadpole shrimp (Table 9). The Deer Creek watershed contains substantial acreages of modeled habitats for all of the covered bird species, including 602 acres to well over 30,000 acres (64% of the watershed) of modeled foraging habitat for Cooper's hawk, loggerhead shrike, northern harrier, ferruginous hawk, Swainson's hawk, tricolored blackbird, white-tailed kite, and burrowing owl. The watershed also supports large amounts of nesting habitat for many of the covered birds, including more than 30,562 acres for burrowing owl (including foraging habitat), and about 5,357 acres for white-tailed kite. Of the 398 documented Swainson's hawk nest sites, 31 are in the Deer Creek watershed. The watershed also supports 3,177 acres of high-value foraging habitat for Swainson's hawk.

Fifteen of the 96 documented nest colonies for tricolored blackbird and 5 of 63 potential nest colonies are in the watershed. Approximately 14,280 individuals have been observed at the 96 documented nest colonies over the survey years, or 9% of the total individuals observed at nest colonies in the Plan Area. Nest colonies in this watershed have ranged from 30 to approximately 3,500 individuals.

The watershed is important for western spadefoot and western pond turtle, supporting almost 1,011 acres of modeled breeding habitat and almost 30,062 acres of modeled aestivation habitat for western spadefoot (both habitats provide foraging habitat as well) and more than 392 acres of breeding/foraging habitat and more than 25,697 acres of modeled nesting/aestivation habitat for western pond turtle. The Deer Creek watershed does not support modeled habitat for California tiger salamander because it is outside the species' range in the Plan Area, and supports only a small amount of modeled habitat for giant garter snake (3 acres of foraging and 181 acres of upland habitat), whose populations occur in the western portion of the Plan Area.

The Deer Creek watershed supports large acreages of modeled habitat for the covered mammals, including more than 26,225 acres of modeled general habitat for American badger and about 24,754 acres of modeled foraging habitat for western red bat (*Lasiurus blossevillii*) The watershed supports about 7,432 acres of roosting habitat for the western red bat.

The Deer Creek watershed supports a relatively small amount of modeled habitat for Sanford's arrowhead (5,124 acres, or 10% of the total in the Plan Area).

3.2.2.7 Conservation Considerations

The Deer Creek watershed supports substantial biological resources and is an important component of the SSHCP Conservation Strategy, as described in the previous section. Approximately 35% of the Deer Creek watershed is located outside of the UDA, and spans over PPUPPUs, 5 and 6 (Table 11). About 48% of the watershed in the Plan Area is within PPU 5. The Deer Creek watershed includes existing and planned conservation both inside and outside of the UDA. Existing conservation (5,463 acres) occur in a patchy distribution throughout the Deer Creek watershed, with the largest existing Preserve (about 4,490 acres) located immediately north of Rancho Murieta (Figure 10). Planned conservation totals about 2,570 acres and will focus primarily on linkage Preserves, riparian and wetland restoration (see Chapter 7 of the SSHCP). Restoration activities will be focused along the Cosumnes River. Implementation of the SSHCP would result in an integrated system of large Preserves connected by linkage Preserves (Chapter 7 of the SSHCP).

The majority of existing conservation within the Deer Creek watershed targets two terrestrial land covers: blue oak woodland and valley grassland, which together would account for about 78% of the total conservation in the watershed (Table 12). Agricultural areas will also be conserved, including about 914 acres of croplands and irrigated pasture-grassland that provide foraging habitat for several of covered bird species and western red bat. About 281 acres of aquatic habitat would conserved, with most comprised of vernal pool and swale.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 12
Summary of Conserved Land Cover Types in the Deer Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	73	—	73
Blue Oak Woodland	1,423	—	1,423
Mine Tailing Riparian Woodland	<1	—	<1
Mixed Riparian Scrub	1	14	15
Mixed Riparian Woodland	44	312	356
Valley Grassland	2,854	1,609	4,463
Terrestrial Total	*4,395*	*1,935*	*6,330*
Aquatic			
Streams/Creeks (VPIH)	<1	14	14
Freshwater Marsh	7	1	8
Open Water	6	10	16
Seasonal Wetland	5	15	20
Streams/Creeks	28	25	53
Swale	16	16	32
Vernal Pool	104	34	138
Aquatic Total	*166*	*115*	*281*
Agriculture			
Cropland	596	318	914
Irrigated Pasture-Grassland	138	37	175
Orchards	1	4	5
Vineyards	116	51	167
Agriculture Total	*851*	*410*	*1,261*
Non-Habitat Land Cover Type			
Disturbed	2	72	74
Low-density Development	27	33	60
Major Roads	12	5	17
Mine Tailings	10	—	10
Non-Habitat Land Cover Type Total	*51*	*110*	*161*
Grand Total	**5,463**	**2,570**	**8,033**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.3 Laguna Creek Watershed

3.2.3.1 Land Cover Types

The Laguna Creek watershed is approximately 96,788 acres, of which 73,976 acres are within the Plan Area, and comprises 76% of the Plan Area (Table 1). It is located in the southeastern portion of the Plan Area (Figure 2) and contains virtually all of the mapped land cover types in the Plan Area (Table 2, Figure 3). The large majority (91%) of the Laguna Creek watershed is undeveloped. Combined, Valley Grassland, Blue Oak Savanna, and Blue Oak Woodland account for 62% (approximately 46,092 acres) of the land covers in the watershed, and 68% of the natural land covers, including Agriculture. Agriculture accounts for 24% (approximately 17,445 acres) of the land covers in the Plan Area. The Laguna Creek watershed also supports all of the aquatic cover types except Streams/Creeks (VPIH), including approximately 2,764 acres of Vernal Pool, Seasonal Wetland, and Swale, approximately 416 acres of Streams/Creeks, and almost 300 acres of Open Water. Non-habitat land cover types comprise only 9% of the watershed, with Low-Density Development accounting for 68% of the Non-habitat land cover types. Impervious surfaces cover approximately 1,417 acres, or only 2%, of the watershed within the Plan Area.

3.2.3.2 Hydrology

According to the NHD flowline dataset, the Laguna Creek watershed contains almost 26% of the flowline types in the Plan Area, which is slightly higher than its total proportion (20%) of the Plan Area (Table 3, Figure 4). Reflecting the dominance of natural land cover types in the watershed, approximately 86% of the Laguna Creek watershed is stream/river, with artificial paths and canal/ditch accounting for almost all of the remaining 14%.

The main streams/rivers in the Laguna Creek watershed include Laguna Creek (south), which flows west from outside the Plan Area and drains to the Cosumnes River in the western portion of the watershed. Browns, Hadselville, Griffith, and Skunk Creeks all drain into Laguna Creek, with each having various tributaries creating a rich network of drainages in the watershed.

3.2.3.3 Geological Formations

The Laguna Creek watershed is underlain mostly by the laguna formation and the riverbank formation 56% of the watershed (Table 4). Other prominent formations in the watershed include the Mehrten formation and the modesto-riverbank formation.

3.2.3.4 Soils

Approximately 95% of the soil types located within the Laguna Creek watershed are loam subcategories with the majority of the soil type consisting of gravelly loam, silt loam, loam, and fine sandy loam (Table 5, Figure 6).

3.2.3.5 Slope and Elevation

The vast majority (more than 99%) of the Laguna Creek watershed is on flat to gentle slopes 0-20%, with only 141 acres on 21%-40% slopes and 2 acres on slopes greater than 40% (Table 6, Figure 7). Likewise, the entire watershed is at an elevation less than 500 feet (Table 7, Figure 8). In the Laguna Creek watershed, elevations range from about 250 feet amsl in the hillier areas in the eastern portion of the watershed to less than 15 feet amsl in the western portion of the watershed where Laguna Creek (south) drains into the Cosumnes River.

3.2.3.6 Covered Species

The Laguna Creek watershed includes documented occurrences for 23 of the 28 Covered Species, reflecting both its large size and diversity of land cover types (Table 8). Covered species documented in the watershed include dwarf downingia, legenere, pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Sacramento Orcutt grass, vernal pool fairy shrimp, Ricksecker's water scavenger beetle, vernal pool tadpole shrimp, mid-valley fairy shrimp, California tiger salamander, western spadefoot, western pond turtle, giant garter snake, Cooper's hawk, burrowing owl, loggerhead shrike, northern harrier, ferruginous hawk, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat.

This watershed has the second highest percentage (19%) of known occurrences for Covered Species after the Sherman-Lake Sacramento River watershed (see Section 3.2.8), including 20% of the vernal pool covered plant occurrences and 37% of the vernal pool invertebrate occurrences (Table 8). The majority of pincushion navarretia (67%), California tiger salamander (79%), and western spadefoot (58%) occurrences in the Plan Area are in this watershed. Approximately 53% of the Plan Area's vernal pool fairy shrimp occurrences and 25% of the vernal pool tadpole shrimp occurrences are in valley grassland and vernal pool land covers located in the northeastern section of the watershed. Three of the four Ricksecker's water scavenger beetle occurrences in the SSHCP database occur in the Laguna Creek watershed. The watershed includes relatively high percentages of occurrences for several other Covered Species, including burrowing owl (26%), ferruginous hawk (23%), tricolored blackbird (30%), and western red bat (29%).

Due to its large size and number of land cover types, of the 10 watersheds in the Plan Area, the Laguna Creek watershed contains among the largest acreages of modeled habitat for most

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Covered Species, except for giant garter snake, which generally occurs in the western portion of the Plan Area (Table 9).

Consistent with the occurrence of all the vernal pool Covered Species, the Laguna Creek watershed contains substantial modeled habitat for these species, ranging from 6,689 acres for Ahart's dwarf rush to 10,004acres for the vernal pool invertebrates (Table 9).

The Laguna Creek watershed contains substantial acreages of modeled habitats for all of the covered bird species, including almost 2,550 acres of modeled foraging habitat for Cooper's hawk and 2,931 to 58,554 acres (4%-79% of the watershed) of modeled foraging habitat for ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite and modeled nesting/foraging habitat for burrowing owl. The watershed supports approximately 16,315 acres of modeled foraging habitat and 279 acres of modeled roosting habitat for greater sandhill crane. The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety of more broad-scale land cover types for nesting (e.g., valley grassland, agriculture), including burrowing owl (55,756 acres), loggerhead shrike (42,659 acres), northern harrier (53,630 acres), and tricolored blackbird (48,721). However, for covered birds that are limited to riparian and woodland habitats for nesting, the Laguna Creek watershed supports more modest acreages of modeled nesting habitat relative to its large size, including 1,846 acres for Cooper's hawk and white-tailed kite and 323 acres for Swainson's hawk.

Of the 293 documented Swainson's hawk nest sites, 42 are in the Laguna Creek watershed. The Laguna Creek watershed supports 10,092 acres of high-value foraging habitat for Swainson's hawk. The watershed also supports 7 of the 48 documented roosting sites for the greater sandhill crane in the Plan Area.

Along with the Morrison Creek watershed, the Laguna Creek watershed supports the largest number of documented and potential tricolored blackbird nest colonies in the Plan Area (Table 8), with 20 of 96 documented nest colonies and 27 of 63 potential nest colonies in the watershed. The 20 documented nest colonies have ranged in size from approximately 20 individuals (1 site) to 6,750 individuals (1 site) observed in 1999 and have totaled about 22,630 individuals over the various surveys (14% of the approximately 158,330 individuals observed at all documented nest colonies).

The Laguna Creek watershed is extremely important for California tiger salamander and western spadefoot, and also provides substantial habitat for western pond turtle. As noted above, 76% of the occurrences (23 of 29) of the California tiger salamander are in the Laguna Creek watershed. Reflecting the habitat model parameters for the species (i.e., areas limited to south of the Cosumnes River), 49% of modeled aestivation habitat and 53% of the modeled

breeding/foraging habitat in the Plan Area are in the Laguna Creek watershed (Table 9). For western spadefoot, along with 58% of the documented occurrences (18 of 31), the Laguna Creek watershed supports 3,477 acres of modeled breeding habitat and 46,092 acres of modeled aestivation habitat. For western pond turtle, along with 45% of the documented occurrences (8 of 18), the Laguna Creek watershed supports 739 acres of modeled breeding/foraging habitat and 33,739 acres of modeled nesting/aestivation habitat. The Laguna Creek watershed has some value for giant garter snake, but is not as critical for this species compared to the Lower Cosumnes River (Section 3.2.4), Morrison Creek (Section 3.2.7), and Snodgrass Slough (Section 3.2.9) watersheds. There is one documented occurrence of giant garter snake in the Laguna Creek watershed, 9,521 acres of modeled upland habitat, 697 acres of modeled aquatic habitat, and 1,170 acres of high-value habitat.

The Laguna Creek watershed supports large acreages of modeled habitat for the covered mammals, including 47,492 acres of modeled general habitat for American badger and 45,883 acres of modeled foraging habitat for western red bat. The watershed supports about 4,946 acres of modeled roosting habitat for western red bat. The Laguna Creek watershed supports a moderate amount of modeled habitat for Sanford's arrowhead (12,535 acres, or 24% of the total in the Plan Area).

The Laguna Creek watershed also contains federally designated Critical Habitat for California tiger salamander (8,758 acres), Sacramento Orcutt grass (24,510 acres), and vernal pool fairy shrimp and vernal pool tadpole shrimp (27,048 acres).

3.2.3.7 Conservation Considerations

The large majority (88%) of the Laguna Creek watershed is located in PPU 7 outside UDA where limited Covered Activities would occur, but with substantial overlap with PPUs 6 and 8 in the western portion of the watershed. Chapter 7 of the SSHCP provides a detailed description of conservation considerations and conservation planning in these PPUs, with the main points summarized here.

The Laguna Creek watershed is one of the watersheds in the Plan Area least affected by man-made alterations and it supports numerous documented occurrences of Covered Species. In particular, it supports approximately 1,917 acres of the vernal pools in the Plan Area.

The conservation focus in the Laguna Creek watershed within PPUs 6 and 7 is maintaining large landscape Preserves that are interconnected, with valley grassland and vernal pool the primary conservation focus in PPU 7. In PPU 6, agricultural lands adjacent to the river and creek floodplains provide important foraging and roosting habitat for Covered Species such as Swainson's hawk, white-tailed kite, northern harrier, and greater sandhill crane.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Under the SSHCP, 18,315 acres of existing conservation and 14,493 acres of planned conservation would occur in the Laguna Creek watershed, including total conservation of 25,960 acres of valley grassland and 2,192 acres of aquatic habitat (Table 13, Figure 10). Much of the conservation would occur in the eastern part of the watershed in association with the existing 12,500-acre Chance Ranch and planned conservation to build upon the existing conservation, creating a landscape Preserve totaling between 33,500 and 34,000 acres in the southeastern portion of the Plan Area, and including conservation in the Upper Cosumnes River to the north and Lower Dry Creek to the south.

Table 13
Summary of Conserved Land Cover Types in the Laguna Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	2,362	33	2,395
Blue Oak Woodland	987	—	987
Mine Tailing Riparian Woodland	1	63	64
Mixed Riparian Scrub	23	4	27
Mixed Riparian Woodland	46	6	52
Valley Grassland	13,146	12,814	25,960
Terrestrial Total	*16,565*	*12,920*	*29,485*
Aquatic			
Freshwater Marsh	40	19	59
Open Water	9	12	21
Seasonal Wetland	129	47	176
Streams/Creeks	106	60	166
Swale	132	164	296
Vernal Pool	953	580	1,533
Aquatic Total	*1,329*	*863*	*2,192*
Agriculture			
Cropland	194	140	334
Irrigated Pasture-Grassland	39	380	419
Orchards	—	2	2
Vineyards	120	17	137
Agriculture Total	*353*	*539*	*892*
Non-Habitat Land Cover Type			
Disturbed	8	—	8
High-density Development	6	—	6
Low-density Development	6	85	91
Major Roads	18	11	29
Mine Tailings	22	75	97

Table 13
Summary of Conserved Land Cover Types in the Laguna Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Recreation/Landscaped	8	—	8
Non-Habitat Land Cover Type Total	*68*	*171*	*239*
Grand Total	**18,315**	**14,493**	**32,808**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.4 Lower Cosumnes River Watershed

3.2.4.1 Land Cover Types

The Lower Cosumnes River watershed is 46,683 acres, entirely located within the south-central portion of the Plan Area (Figure 2). This watershed consists primarily of Terrestrial and Agricultural land covers, accounting for 81% of the land covers in the watershed (Table 2, Figure 3). The terrestrial category is dominated by Valley Grasslands (14,593 acres), which accounts for approximately 87% of the total terrestrial land cover in the watershed. Agricultural areas total 21,153 acres and are the largest land covers in the Lower Cosumnes River watershed. Approximately 7% (3,514 acres) of the watershed is Aquatic land covers, including Seasonal Wetlands, Open Water, Freshwater Marsh, Vernal Pools, Wetland Restoration, Streams and Creeks and Swales. Approximately 11% (5,191 acres) of the watershed is Non-habitat land cover dominated by Low-Density Development (3,976 acres) and High-Density Development (667 acres). Impervious surfaces cover approximately 1,061 acres, or only 2%, of the watershed.

3.2.4.2 Hydrology

According to the NHD flowline dataset, the Lower Cosumnes River watershed consists primarily of stream/river (44%), canal/ditch (35%), and artificial path (22%) (Table 3, Figure 4). This watershed contains the lower portion of the Cosumnes River. The Cosumnes River and Badger Creek account for the majority of the stream/river and artificial path flowline data within this watershed. Agricultural areas are the largest land cover in this watershed, which is reflected by the high percentage of NHD flowline features categorized as canal/ditch.

3.2.4.3 Geological Formations

Riverbank formations account for approximately 69% of the Lower Cosumnes River watershed (Table 4, Figure 5). Other important formations include basin deposits, laguna formation and levee and channel deposits.

3.2.4.4 Soils

Approximately 65% of the soils within the Lower Cosumnes River watershed are silt loams with the majority falling within the San Joaquin soil series (Table 5, Figure 6). The remaining soils are subcategories of loam (25%), clay (6%), water (1%), and other (2%).

3.2.4.5 Slope and Elevation

The entire watershed is on flat to gentle slopes (Table 6, Figure 7), with elevations ranging from 0-500 feet (Table 7, Figure 8).

3.2.4.6 Covered Species

The Lower Cosumnes River watershed includes documented occurrences for 19 of the 28 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, valley elderberry longhorn beetle, California tiger salamander, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite.

This watershed contains 15% of the Plan Area's known occurrences of Covered Species. The second largest number of sandhill crane occurrences (20%) are in Lower Cosumnes River watershed, as are relatively large percentages of occurrences for Cooper's hawk (35%), loggerhead shrike (62%), northern harrier (32%), Swainson's hawk (27%), and white-tailed kite (40%). Five of the 14 documented occurrences for giant garter snake are in this watershed, primarily in close proximity to the Cosumnes River and its tributaries. Although the Lower Cosumnes River watershed supports 619 acres of vernal pool, it has relatively few occurrences of the covered vernal pool plant and invertebrate species, including no occurrences for most of the plants. There are also no occurrences for western spadefoot or California tiger salamander in the watershed, and only two occurrences for western pond turtle.

The Lower Cosumnes River watershed contains variable amounts of modeled habitats for the covered vernal pool species, ranging from 1,269 acres for Ahart's dwarf rush to 6,210 acres for legenere (Table 9). However, with the exception of Boggs Lake hedge-hyssop, it contains

substantially less modeled habitat for these species compared to the Laguna Creek (Section 3.2.3) and Morrison Creek (Section 3.2.7) watersheds. The Lower Cosumnes River watershed contains substantial acreages of modeled habitats for all of the covered bird species, including modeled foraging habitat ranging from about 19,420 acres for ferruginous hawk to 33,824 acres for tricolored blackbird and about 30,654 acres of modeled nesting/foraging habitat for burrowing owl. Second only to the Snodgrass Slough watershed (Section 3.2.9), the Lower Cosumnes River watershed supports the largest amount of high-value habitat for Swainson's hawk; 25,942 acres or 31% of the total in the Plan Area. The watershed supports variable amounts of modeled nesting habitat for covered birds, about 2,200 acres for the riparian/woodland nesting species (Cooper's hawk, Swainson's hawk, and white-tailed kite); about 30,654 acres for burrowing owl and 16,824 acres for loggerhead shrike; and about 28,950 acres for tricolored blackbird and 30,660 acres for northern harrier. The Lower Cosumnes River watershed also supports 369 acres of modeled roosting habitat for greater sandhill crane, second only to the Upper Cosumnes watershed, and 32% of the total modeled roosting habitat for the species in the Plan Area.

The Lower Cosumnes River watershed contains 90 of the 293 nest sites for Swainson's hawk, second only to the Snodgrass Slough watershed with 86 nest sites (Table 8). The watershed also contains by far the largest number of greater sandhill crane roost sites in the Plan Area (29 of the 48).

The watershed contains 7 of the 96 documented nest colonies for tricolored blackbird and 4 of 63 potential nest colonies. Approximately 2,980 individuals have been observed at the four nest colonies, or 2% of the approximately 158,330 individuals observed at nest colonies in the Plan Area over the different surveys. The four documented nest colonies have ranged in size from 130 to 1,500 individuals.

The Lower Cosumnes River watershed is important for all four of the covered amphibians and reptiles, and particularly giant garter snake. The watershed contains Badger Creek and other creeks that drain into the marsh at the Cosumnes River Preserve, which likely supports high-quality habitat due to its proximity and connectivity to a significant population of giant garter snake. The watershed supports 2,430 acres of modeled aquatic habitat, 8,934 acres of modeled upland habitat and 1,518 acres of high-value habitat for giant garter snake. The Lower Cosumnes River watershed also contains substantial modeled habitat for California tiger salamander, including more than 1, 0700 acres of modeled aquatic habitat and almost 13,807 acres of modeled upland habitat. For western pond turtle, the watershed supports more than 1,866 acres of modeled breeding/foraging habitat (29% of the total in the Plan Area and second only to the Snodgrass Slough watershed). However, compared to some other watersheds, the Lower Cosumnes River watershed supports a modest amount of modeled nesting/aestivation habitat (11,195 acres, or 10% of the total). The western spadefoot has not been documented in the Lower Cosumnes River watershed, but the

watershed supports substantial amounts of modeled habitat for the species, including almost 2,400 acres of modeled breeding habitat and about 14,590 acres of modeled aestivation habitat. The Lower Cosumnes River watershed supports substantial acreages of modeled habitat for the covered mammals, including more than 15,972 acres of modeled general habitat for American badger and almost 19,000 acres of modeled foraging habitat for western red bat. The watershed supports about 2,000 acres of modeled roosting habitat for western red bat. A bat monitoring program in the Cosumnes River Preserve has documented the occurrence of western red bat.

The Lower Cosumnes River watershed supports substantial modeled habitat for Sanford's arrowhead (9,713 acres, or 18% of the total in the Plan Area).

The Lower Cosumnes River watershed also contains federally designated Critical Habitat for Sacramento Orcutt grass (1,842 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,069 acres).

3.2.4.7 Conservation Considerations

The large majority (96%) of the Lower Cosumnes River watershed is located outside of the UDA. The portions of the watershed that occur within the UDA also overlap with PPUs 4 and 8. The remaining portion of the watershed that is outside of the UDA encompasses approximately 4,941 acres of PPU 5, 31,008 acres of PPU 6, and 8,942 acres of PPU 7 (Table 11). Notably, PPU 6 contains much of the aquatic and riparian resources in the Plan Area. Compared to the other PPUs, PPU 6 is the most important PPU for covered bird species and giant garter snake.

Current existing hardline Preserve areas, all outside of the UDA, total 14,270 acres of the watershed, with almost all located in PPU 6 (Figure 10). They include the Stone Lakes National Wildlife Refuge and the Cosumnes River Preserve. Planned conservation totals 5,116acres and includes agricultural and landscape Preserves as well as wetland and riparian restoration. These areas are immediately adjacent to existing Preserve areas and will focus on expanding the preservation of vernal pool habitat and important agricultural areas that provide foraging habitat for several covered bird species, including Swainson's hawk, white-tailed kite, tricolored blackbird, and greater sandhill crane, and roosting habitat for the crane. The Lower Cosumnes River watershed contains the second-most overall conservation in the Plan Area, with an emphasis on terrestrial and agricultural land covers (Table 14). In addition, approximately 2,340 acres of aquatic habitat will be conserved. Planned conservation will be located within PPUs 6 and 7 of the watershed.

Table 14
Summary of Conserved Land Cover Types in the Lower Cosumnes River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mine Tailing Riparian Woodland	17	—	17
Mixed Riparian Scrub	168	53	221
Mixed Riparian Woodland	1,437	111	1,548
Valley Grassland	5,239	1,861	7,100
Terrestrial Total	*6,861*	*2,025*	*8,886*
Aquatic			
Freshwater Marsh	960	42	1,002
Open Water	218	11	229
Seasonal Wetland	417	49	466
Streams/Creeks	133	81	214
Swale	52	38	90
Vernal Pool	171	141	312
Aquatic Total	*1,951*	*362*	*2,313*
Agriculture			
Cropland	4,598	1,867	6,465
Irrigated Pasture-Grassland	365	587	952
Orchards	40	<1	40
Vineyards	386	158	544
Agriculture Total	*5,389*	*2,612*	*8,001*
Non-Habitat Land Cover Type			
Aqueducts	—	20	20
Low-Density Development	62	97	159
Major Roads	<1	<1	1
Non-Habitat Land Cover Type Total	*62*	*117*	*179*
Grand Total	**14,263**	**5,116**	**19,379**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.5 Lower Dry Creek Watershed

3.2.5.1 Land Cover Types

The Lower Dry Creek watershed is located along the southern edge of the Plan Area (Figure 2). Approximately 33% of the watershed is located within the Plan Area. The watershed has very little non-agricultural development. Of the 18,493 acres in the watershed, approximately 5% are Terrestrial land covers and 38% are Agricultural land covers (Table 2, Figure 3).

Valley Grasslands dominate the terrestrial land cover in the watershed, comprising 7,965 of the 10,359 acres mapped as Terrestrial. The large majority (93%) of agricultural areas are cropland and vineyards. Aquatic and Non-habitat land covers each comprise about 3% of the remaining acreage within the watershed. Impervious surfaces cover approximately 85 acres, or less than 1% of the watershed within the Plan Area.

3.2.5.2 Hydrology

Approximately 87% of the flowlines within the Lower Dry Creek watershed are streams and rivers (Table 3, Figure 4). Artificial path (about 6%), canal/ditch (7%), and connector (less than 1%) account for the remainder of the NHD flowline features in this watershed. This watershed encompasses Dry Creek, which is located along the southern boundary of the Plan Area. The watershed ends where Dry Creek terminates into Mokelumne River located to the west (Figure 2).

3.2.5.3 Geological Formations

The Lower Dry Creek watershed consists of several different geological formations with the combined Riverbank formations, Laguna and Mehrten Formations, totaling approximately 67% of the watershed (Table 4, Figure 5). Other formations include Valley Springs, alluvial deposit formations, and levee and channel deposits.

3.2.5.4 Soils

Approximately 91% of the watershed consists of fine sandy loam, gravelly loam, and sandy loam (Table 5, Figure 6). The remaining soils are subcategories of loam (6%), other (2%), clay (less than 1%), and water (less than 1%).

3.2.5.5 Slope and Elevation

The vast majority (99%) of the Lower Dry Creek watershed contains gentle slops (i.e., 0-20% slopes) with a small fraction falling within the 20%–40% and >40% ranges (Table 6, Figure 7). Similarly, most of the watershed is within the 0–500 foot elevation range (Table 7, Figure 8). Only 40 acres (less than 1%), located along the eastern border of the Plan Area, is within the 500–1,000 foot elevation range.

3.2.5.6 Covered Species

The Lower Dry Creek watershed includes documented occurrences for 10 of the 28 Covered Species, including legenere, pincushion navarretia, vernal pool fairy shrimp, vernal pool tadpole

shrimp, California tiger salamander, western spadefoot, northern harrier, greater sandhill crane, Swainson's hawk, and tricolored blackbird. Overall, the watershed only contains 5% of the Covered Species occurrences, but it does contain 33% of the pincushion navarretia occurrences (16 of 48) and 21% of the California tiger salamander occurrences (6 of 29).

Consistent with general lack of occurrences for most of the vernal pool Covered Species, the Lower Dry Creek watershed contains some of the least amount of modeled habitat for these species, ranging from only 327 acres for Ahart's dwarf rush acres to 7,131 acres for the vernal pool invertebrates (Table 9). Although the Lower Dry Creek watershed, at 18,493 acres in the Plan Area, is one of the smaller watersheds, it contains substantial acreages of modeled habitats for all of the covered bird species due to its large amount of natural land and agriculture, and lack of non-habitat cover types (Table 2, Figure 3). It supports more than 432 acres to about 12,000 acres (2%–65% of the total land cover) of modeled foraging habitat for Cooper's hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, white-tailed kite, and burrowing owl. The watershed supports variable amounts of modeled nesting habitat for covered birds, including 1,865 acres for Cooper's hawk and white-tailed kite, 448 acres for Swainson's hawk, 11,553 acres for burrowing owl, 8,413 acres for loggerhead shrike, 10,871 acres for tricolored blackbird (although no nesting colonies have been observed), and 11,023 acres for northern harrier. Nineteen of the 398 Swainson's hawk nest sites are in the watershed. The Lower Dry Creek watershed supports 1,942 acres of high-value foraging habitat for Swainson's hawk. The watershed supports relatively small amounts of modeled habitat for greater sandhill crane, including only 28 acres of roosting habitat and 3,289 acres of foraging habitat.

The Lower Dry Creek watershed is important for California tiger salamander, containing more than 9,911 acres of modeled aestivation habitat and 319 acres of modeled breeding/foraging habitat. As noted above, 6 of the 29 occurrences of California tiger salamander are in the Lower Dry Creek watershed. The watershed is less important for western spadefoot, western pond turtle, and giant garter snake. For western spadefoot, the Lower Dry Creek contains a relatively modest amount of modeled habitat compared to most of the other watersheds, including only 3% of the modeled breeding habitat and 6% of the modeled aestivation habitat in the Plan Area. Similarly, for western pond turtle, the watershed contains less modeled habitat than several of the other watersheds, including only 2% of the modeled breeding/foraging habitat and 7% of the modeled aestivation habitat in the Plan Area. The Lower Dry Creek watershed has low value for the giant garter snake, supporting no modeled aquatic habitat, and only 19 acres of modeled upland habitat.

The Lower Dry Creek watershed supports substantial acreages of modeled habitat for the covered mammals due to its undeveloped condition, including more than 8,879 acres of modeled general habitat for American badger, and about 8,531 acres of modeled foraging

habitat for western red bat. The watershed also supports 2,559 acres of modeled roosting habitat for western red bat.

The Lower Dry Creek watershed supports a very small amount (773 acres) of modeled habitat for Sanford's arrowhead.

The Lower Dry Creek watershed also contains federally designated Critical Habitat for California tiger salamander (1,434 acres), Sacramento Orcutt grass (3,516 acres), and vernal pool fairy shrimp and vernal pool tadpole shrimp (4,335 acres).

3.2.5.7 Conservation Considerations

The Lower Dry Creek watershed is located primarily within southern portion of PPUPPU 7 (93%), with the remaining acreage located in PPUs 6 and 8. Almost the entire watershed is located outside of the UDA, except for the 1,099 acres in PPU 8 (Table 11). Because the majority of PPU 8 is located within Galt's city limits or sphere of influence it is anticipated that much of PPU 8 will eventually be urbanized.

Relative to some of the other watersheds, the Lower Dry Creek watershed has a lower priority for new conservation. Most of the species with modeled habitat in the watershed are broad ranging in the Plan Area and the conservation focus is elsewhere. Even for the more limited California tiger salamander, the conservation focus is in the Laguna Creek watershed, which contains 79% of the occurrences and large majority of modeled habitats for the species (Table 9). Further, other than expected build-out in PPU 8, the Covered Activities will have small impacts in the Lower Dry Creek watershed. The large majority (96%) of conservation in Lower Dry Creek Watershed is in existing conservation (8,652 acres), located primarily within PPU 7, and mostly in Chance Ranch (Tables 15 and 11). A small amount of planned conservation, primarily agriculture, is also proposed in the watershed. The majority of total conservation will be concentrated on terrestrial habitats, with emphasis on blue oak woodland and valley grassland and will be located within PPU 8.

Table 15
Summary of Conserved Land Cover Types in the Lower Dry Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	529	—	529
Blue Oak Woodland	1,406	—	1,406
Mixed Riparian Scrub	3	—	3
Mixed Riparian Woodland	79	—	79

Table 15
Summary of Conserved Land Cover Types in the Lower Dry Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Valley Grassland	5,717	188	5,905
Terrestrial Total	*7,734*	*188*	*7,922*
Aquatic			
Freshwater Marsh	4	—	4
Open Water	4	—	4
Seasonal Wetland	67	4	71
Streams/Creeks	29	<1	29
Swale	50	2	52
Vernal Pool	155	3	158
Aquatic Total	*309*	*9*	*318*
Agriculture			
Cropland	72	152	224
Irrigated Pasture-Grassland	285	7	292
Vineyards	251	<1	251
Agriculture Total	*608*	*159*	*767*
Non-Habitat Land Cover Type			
High-Density Development	1	—	1
Non-Habitat Land Cover Type Total	*1*	—	*1*
Grand Total	**8,652**	**356**	**9,008**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.6 Lower Mokelumne River Watershed

3.2.6.1 Land Cover Types

Although the Lower Mokelumne River watershed is more than 141,965 acres in size, only 3% of the watershed is located in the far southwest corner of the southern Plan Area (Figure 2) and it accounts for only 1% of the Plan Area. Due its minor role in the Plan Area, the discussion in this section is somewhat abbreviated compared to the discussions for the other watersheds. The small portion of this watershed located within the Plan Area is primarily made up of Agricultural land covers, specifically croplands. The remaining acreage includes Mixed Riparian Scrub and Woodland, and Aquatic land covers, and some residential areas. Impervious surfaces cover approximately 29 acres, or 1% of the watershed within the Plan Area.

3.2.6.2 Hydrology

The portion of the Lower Mokelumne River watershed that occurs within the Plan Area contains only artificial path and canal/ditch NHD flowline features (Table 3, Figure 4). The Mokelumne River, represented by the artificial path features, serves as a portion of the southern border for the Plan Area. This watershed extends to the west as a long sliver surrounding the Mokelumne River. The watershed ends where Lower Dry Creek terminates into the river. The canal and ditch flowline features, which account for 88% of the watershed, cross through the agricultural land covers, providing water to the area.

3.2.6.3 Geological Formations

Geological information is only available for the eastern sliver of the Lower Mokelumne River watershed. This portion of the watershed is dominated by intertidal deposits (53%), with basin deposits and levee and channel deposits accounting for the rest of the watershed (Table 4, Figure 5).

3.2.6.4 Soils

The majority (59%) of the Lower Mokelumne River watershed consists of clay soils, specifically Egbert clay, partially drained, 0 to 2% slopes (Table 5, Figure 6). The remaining soils are loam subcategories (35%) and water (5%).

3.2.5.5 Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0 to 500 feet (Tables 6 and 7, Figures 8 and 9).

3.2.6.6 Covered Species

The Lower Mokelumne River watershed only contains three documented occurrences of one Covered Species: Sanford's arrowhead. This species is located on the boundary of the Plan Area within the Mokelumne River. Similar to the Lower Dry Creek watershed, the lack of occurrences of Covered Species within this watershed may be attributed to large amounts of land that have been converted for agricultural purposes. In addition, only a very small portion of the watershed is actually located within the Plan Area.

Due to its small size within the Plan Area, the Lower Mokelumne watershed includes less than 1% of the modeled habitat for Covered Species. The watershed does not contain any modeled habitat for vernal pool species and contains limited habitat for giant garter snake, western pond turtle, and western spadefoot, none of which is high-value giant garter snake habitat. Of the

2,019 acres of this watershed within the Plan Area, anywhere from 9 to 1,700 acres are modeled habitat for several of the covered bird species, including burrowing owl, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite. All of the modeled habitat for Swainson's hawk (1,878 acres) is considered high value. There is limited habitat for Cooper's hawk (200 acres) and ferruginous hawk (9 acres). Approximately 200 acres of modeled roosting habitat for western red bat are present in the watershed. There are 94acres of modeled foraging habitat for western red bat. Only a small amount of modeled habitat for Sanford's arrowhead (13 acres) is in the watershed.

3.2.6.7 Conservation Considerations

The entire Lower Mokelumne River watershed is located outside of the UDA within PPU 6. Approximately 1,640 acres of the 2,019 acres located within the Plan Area contain existing hardline Preserve areas (Table 16, Figure 10). Due to its small size within the Plan Area and general lack of resources for the Covered Species relative to several of the other watersheds, no new conservation is proposed under the SSHCP.

Table 16
Summary of Conserved Land Cover Types in the Lower Mokelumne River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mixed Riparian Scrub	1	—	1
Mixed Riparian Woodland	149	—	149
Terrestrial Total	*150*	—	*150*
Aquatic			
Freshwater Marsh	21	—	21
Open Water	3	—	3
Streams/Creeks	<1	—	<1
Aquatic Total	*24*	—	*24*
Agriculture			
Cropland	1,464	—	1,464
Vineyards	<1	—	<1
Agriculture Total	*1,464*	—	*1,464*
Non-Habitat Land Cover Type			
Low-density Development	4	—	4
Non-Habitat Land Cover Type Total	*4*	—	*4*
Grand Total	**1,642**	—	**1,642**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.7 Morrison Creek Watershed

3.2.7.1 Land Cover Types

The Morrison Creek watershed is located within the northern half of the Plan Area (Figure 2). Of the 69,540 acres that comprise this watershed, 62%, or 42,926 acres, are located within the Plan Area, almost entirely inside the UDA (Table 11). Because it is located in the urbanizing portion of Sacramento County, approximately 45% of the watershed has already been developed and contains Non-habitat land covers, primarily High-Density Development. Agriculture accounts for about 10% of the watershed. Terrestrial (51%) and Aquatic (5%) land covers account for the remaining land covers in the Morrison Creek watershed. Valley Grassland accounts for about 98% of the Terrestrial land cover. This watershed also supports all of the aquatic cover types, including approximately 764 acres of Vernal Pools, 359 acres of Swale, and 107 acres of Seasonal Wetlands, which are embedded in the Valley Grasslands. Laguna Creek (north) is a significant east–west landscape feature that plays a prominent role in conservation. Impervious surfaces cover approximately 6,771 acres, or 16%, of the watershed. Along with the American River (51% impervious surfaces) and Sherman Lake-Sacramento River (24% impervious surfaces) watersheds, the Morrison Creek watershed has one of the three highest percentages of impervious surfaces in the Plan Area. Reflecting both its large size and more urbanized character, it also has by far the highest amount of impervious surface acreage in the Plan Area, with Snodgrass Slough having the second highest amount at approximately 1,124 acres.

3.2.7.2 Hydrology

The Morrison Creek watershed contains approximately 9% of the Plan Area's NHD flowline features (Table 3, Figure 4). Approximately 83% of the flowline features are stream and river features including Morrison Creek, Laguna Creek (north), Elder Creek, Strawberry Creek, Unionhouse (Beacon) Creek, and Frye Creek. Folsom South Canal accounts for the majority of the 72,483 linear feet of artificial path features. Canal/ditch features make up approximately 6% of the NHD flowline features within the Plan Area with connectors (1%) and pipeline (less than 1%) rounding out the remaining areas.

3.2.7.3 Geological Formations

The laguna and riverbank formations comprise 97% of the acreage in the Morrison Creek watershed (Table 4, Figure 5). The remaining prominent formations in the watershed include basin deposits and mine and dredge tailings.

3.2.7.4 Soils

The Morrison Creek watershed primarily contains loam subcategories such as silt loam, loam, and gravelly loam, which account for about 84% of the watershed (Table 5). Approximately 50% of the loam soils are from the San Joaquin soil series. Other loam subcategories comprise 4% of the soils, water covers less than 1% of the watershed, and 7% of the soils are listed in the Other category. Approximately 3% of the Other category is related to mining activities (dumps, pits, slickens, and Xerorthents, dredge tailings, 2% to 50% slopes) or urban development.

3.2.7.5 Slope and Elevation

The majority of the watershed is on flat to gentle slopes with elevations ranging from 0–500 feet (Table 6, Figure 7). Only 2 acres of the watershed are within the 20%–40% slope range (Table 7, Figure 8).

3.2.7.6 Covered Species

The Morrison Creek watershed includes documented occurrences for 23 of the 28 Covered Species despite substantial urbanization (Table 8). Covered species documented in the watershed include Ahart's dwarf rush, Boggs Lake hedge-hyssop, legenere, Sacramento Orcutt grass, slender Orcutt grass, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, western spadefoot, giant garter snake, western pond turtle, American badger, and western red bat.

This watershed has the third highest percentage (16%) of known occurrences for Covered Species in the Plan Area, including 43% of the covered vernal pool plants and 53% of the vernal pool invertebrate occurrences (Table 8). Due to the large area of vernal pools (764 acres and second only to the Laguna Creek watershed), swale, and seasonal wetlands, vernal pool flora and fauna are the most important biological resources in the watershed. The majority of most covered vernal pool plant occurrences in the Plan Area are in the Morrison Creek watershed, including both occurrences of Ahart's dwarf rush, all 4 occurrences of slender Orcutt grass, 27 of 30 occurrences of Boggs Lake hedge-hyssop, and 30 of 56 occurrences of legenere. The watershed also includes 12 of 63 occurrences for Sacramento Orcutt grass (with all but 2 of the remaining occurrences in the Deer Creek watershed). Similarly, the vernal pool invertebrates are well-represented in the Morrison Creek watershed, including 505 of the 748 occurrences of vernal pool tadpole shrimp, 196 of the 572 occurrences of vernal pool fairy shrimp, and 18 of 33 occurrences of mid-valley fairy shrimp. Western spadefoot, which is strongly associated with vernal pools and other ephemeral wetlands, has also been frequently found in the Morrison

Creek watershed, with 9 of the 31 occurrences in the Plan Area. The large majority of occurrences for these vernal pool species outside the Morrison Creek watershed are from the Laguna Creek watershed (Section 3.2.3). Although not a vernal pool species, 12 of the 63 occurrences of Sanford's arrowhead are from the watershed.

The Morrison Creek watershed, which includes Laguna Creek (north) and several other prominent creeks, includes 1 of 14 occurrences of giant garter snake (2 of 18 occurrences of western pond turtle

While there are occurrence data for all of the avian Covered Species in the Morrison Creek watershed, with a range of 1% of the occurrences for greater sandhill crane to 31% of the occurrences for Cooper's hawk, none stand out as prominent in the watershed. Also, except for species such as Swainson's hawk, tricolored blackbird, and sandhill crane (see discussion below), the occurrence data for avian species are not comprehensive for the Plan Area. Similarly, there are little data for the mammals in the Plan Area, with occurrence records for American badger (7 of 8 occurrences in the Plan Area) and western red bat (2 of 7 occurrences in the Plan Area).

Due to its large size and large number of land cover types, of the 10 watersheds in the Plan Area, the Morrison Creek watershed contains among the largest acreages of modeled habitat for most Covered Species (Table 9).

Consistent with the occurrence of all the vernal pool Covered Species, the Morrison Creek watershed contains substantial modeled habitat for these species, ranging from 2,200 acres for dwarf downingia to 18,400 acres for the vernal pool fairy shrimp and vernal pool tadpole shrimp (Table 9).

The Morrison Creek watershed contains substantial acreages of modeled habitat for all of the covered bird species, including up to 26,000 acres of modeled foraging habitat for Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite; about 1,593 acres of modeled foraging habitat for greater sandhill crane (but only 17 acres of modeled roosting habitat); and almost 24,956 acres of modeled nesting/foraging habitat for burrowing owl. The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety or more broad-scale land cover types for nesting (e.g., valley grassland), including loggerhead shrike (21,781 acres), northern harrier (24,938 acres), and tricolored blackbird (24,016 acres). However, for covered birds that are limited to riparian and woodland habitats for nesting, the Morrison Creek watershed supports modest amounts of modeled nesting habitat relative to its large size, including 487 acres for Cooper's hawk, 487 acres for white-tailed kite, and 358 acres for Swainson's hawk.

The Morrison Creek watershed contains 11 of the 293 Swainson's hawk nest sites and supports 1,926 acres of high-value foraging habitat for the species.

Along with the Laguna Creek watershed, the Morrison Creek watershed supports the largest number of documented and potential tricolored blackbird nest colonies in the Plan Area, with 42 of the 96 documented nest colonies and 16 of 63 potential nest colonies. The 42 documented nest colonies have ranged in size from approximately 100 individuals to 7,500 individuals in 1994. Approximately 50,690 individuals have been observed at the nest colonies over the course of the surveys, or 32% of the approximately 158,330 individuals observed at nest colonies in the Plan Area.

As noted above, the Morrison Creek watershed contains several occurrences of western spadefoot, western pond turtle, and giant garter snake, and it also provides substantial modeled habitat for these species. For western spadefoot, vernal pool, swale, and seasonal wetland are primary breeding habitats, and contribute to about 2,240 acres of modeled breeding habitat for the species in the watershed. For western pond turtle, the Morrison Creek watershed supports 515 acres of modeled breeding/foraging habitat and 8,750 acres of modeled nesting/aestivation habitat. The Laguna Creek Wildlife Corridor is an important habitat feature for western pond turtle because it provides important in-stream habitat to support breeding, foraging, movement, and dispersal. The western portion of the Morrison Creek watershed has important value for giant garter snake, but is not as critical for this species compared to the Lower Cosumnes River (Section 3.2.4) and Snodgrass Slough (Section 3.2.9) watersheds. The Morrison Creek watershed contains 3,258 acres of modeled upland habitat, 441 acres of modeled aquatic habitat, and 1,388 acres of high-value habitat for giant garter snake.

The Morrison Creek watershed supports large acreages of modeled habitat for covered mammals, including approximately 22,542 acres of modeled general habitat for American badger and more than 23,376 acres of modeled foraging habitat for western red bat.. The watershed supports a limited amount of roosting habitat for western red bat, including about 504 acres .

The Morrison Creek watershed also contains federally designated Critical Habitat for Sacramento and slender Orcutt grass (1,161 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,451 acres).

3.2.7.7 Conservation Considerations

About 45% of the Morrison Creek watershed within the Plan Area (99% of which is inside the UDA) is already developed and has little or no habitat value for the Covered Species. For this reason, approximately 23% of the watershed is outside of the PPUs (Table 11), although the Laguna Creek Wildlife Corridor outside the PPUs is an important habitat feature in the

watershed. However, as discussed in Section 3.2.7.6, the Morrison Creek watershed supports almost all of the Covered Species in the Plan Area and, along with the Laguna Creek watershed, is critical for conservation of the vernal pool ecosystems and associated plant and animal species in the Plan Area. The MCRA is an important component of the conservation of these resources in the watershed. Therefore, despite anticipated urban build out of much of the watershed inside the UDA, protection of these remaining resources in the watershed is one of the most important elements of the SSHCP and ARP conservation strategies.

Substantial conservation has already occurred in the Morrison Creek watershed in PPUs 1, 2, and 3, with existing conservation in the watershed totaling approximately 2,888 acres of hardline Preserve areas (Table 17). The SSHCP will add approximately 6,220 acres to existing conserved areas through designation of core, minor, and satellite Preserves and linkage Preserves inside the UDA, almost doubling the amount of conservation. The majority of planned conservation will be focused on valley grasslands (5,885 acres), and vernal pool and swale that occur within the valley grasslands, comprising the vernal pool ecosystem. One of the objectives of the SSHCP is to protect an additional 1,200 acres along the Laguna Creek Wildlife Corridor, which will provide both resident and movement habitat for many of the covered wildlife species, including western pond turtle and giant garter snake (see Chapter 7 of the SSHCP).

Table 17
Summary of Conserved Land Cover Types in the Morrison Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	—	15	15
Mine Tailing Riparian Woodland	—	1	1
Mixed Riparian Scrub	3	19	22
Mixed Riparian Woodland	1	75	76
Valley Grassland	2,456	4,740	7,196
Terrestrial Total	*2,460*	*4,850*	*7,310*
Aquatic			
Streams/Creeks (VPIH)	9	22	31
Freshwater Marsh	12	227	239
Open Water	4	67	71
Seasonal Wetland	1	35	36
Streams/Creeks	20	23	43
Swale	73	80	153
Vernal Pool	207	197	404
Aquatic Total	*326*	*651*	*977*

Table 17
Summary of Conserved Land Cover Types in the Morrison Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Agriculture			
Cropland	—	244	244
Irrigated Pasture-Grassland	22	58	80
Orchards	—	18	18
Agriculture Total	*22*	*320*	*342*
Non-Habitat Land Cover Type			
Disturbed	3	6	9
High-Density Development	45	<1	45
Low-Density Development	6	39	45
Major Roads	2	2	4
Mine Tailings	—	1	1
Recreation/Landscaped	24	16	40
Non-Habitat Land Cover Type Total	*80*	*64*	*144*
Grand Total	**2,888**	**5,885**	**8,773**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.8 Sherman Lake-Sacramento River Watershed

3.2.8.1 Land Cover Types

The Sherman Lake-Sacramento River watershed is located in the extreme western portion of the Plan Area, with approximately 12% located within the Plan Area (Table 1, Figure 2). The watershed intersects the Plan Area in four separate locations that together comprise about 5% of the Plan Area, including a large area along the northern portion of the Plan Area, a small area in the northwest corner of the Plan Area, and two areas along the western portion of the Plan Area. The Sherman Lake-Sacramento River watershed in the Plan Area is dominated by human activities. Together, Non-habitat and Agricultural land cover types account for 88% of the land covers in the watershed (Table 2, Figure 3). Of these two land cover types, High-Density Development and Cropland contain the largest acreages at 3,049 and 4,986 acres, respectively, accounting for 57% of the total land covers in the watershed within the Plan Area. The Sherman Lake-Sacramento River watershed contains all of the Aquatic land cover types mapped within the Plan Area, but in small amounts ranging from 1 to 40 acres and totaling only 79 acres. Terrestrial land covers, primarily Valley Grassland, comprise the remaining acreage, but only totaling 848 acres, or 6% of the land cover in the watershed within the Plan Area. Impervious

surfaces cover approximately 3,370 acres, or 24%, of the watershed, which is the highest percentage of the watersheds in the Plan Area.

3.2.8.2 Hydrology

According to the NHD flowline dataset, the majority of the hydrologic features within this watershed are canal/ditch (70%) (Table 3, Figure 4). The high percentage of canal/ditch features mapped within the Sherman Lake-Sacramento River watershed is related to the large amount of agricultural land covers mapped in the watershed. Artificial path features account for 27% of the watershed, stream/river features total 3%, and the remaining 0.1% of the watershed consists of pipeline connector features. The Sacramento River and the Folsom Canal encompass the artificial path features mapped within this watershed.

3.2.8.3 Geological Formations

Geological formation data is only available for a little less than half of the Sherman Lake-Sacramento River watershed. Intertidal and levee and channel deposits dominate this watershed, with basin deposits making up most of the rest of the watershed (Table 4, Figure 5).

3.2.8.4 Soils

The majority of the soils located in this watershed are loam subcategories (45%) and clay (12%) (Table 5, Figure 6). The remaining areas contain water (5%), mucky clay (26%) or are listed under the Other category (12%). The majority of the Other category is related to mining activities (dumps, pits, slickens, and Xerorthents, dredge tailings) or urban development.

3.2.8.5 Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0–500 feet (Tables 6 and 7, Figures 8 and 9).

3.2.8.6 Covered Species

The Sherman Lake-Sacramento River watershed includes documented occurrences for 10 of the 28 Covered Species, including Sanford's arrowhead, vernal pool fairy shrimp, burrowing owl, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat (Table 8). Overall, the watershed accounts for accounts for 27% of the Covered Species occurrences in the Plan Area, most of which are sandhill crane occurrences. The large majority (88%) of the Sherman Lake-Sacramento River watershed is developed or agriculture, which accounts for the relatively small number of Covered Species with occurrences

in the watershed compared to several of the other watersheds. Also, several of the species occurrences are located in non-habitat land covers and may no longer be extant. Almost all of the covered bird species documented in the Sherman Lake-Sacramento River watershed forage in croplands (4,986 acres in the watershed) and western red bat roosts in orchards.

Consistent with the lack of occurrence records for most Covered Species, the Sherman Lake-Sacramento River watershed lacks substantial modeled habitat for most of the Covered Species. For the covered vernal pool plant and animals, modeled habitat ranges from 7 acres for pincushion navarretia to 326 acres for the vernal pool invertebrates. Likewise, for the amphibians and reptiles, modeled habitat ranges from no habitat for California tiger salamander (the watershed is outside its range in the Plan Area) to about 627 acres of modeled upland habitat for western spadefoot. The occurrence of these species in the watershed is limited by a lack of modeled aquatic habitat, including only 66 acres for giant garter snake, 7 acres for western pond turtle, and 23 acres for western spadefoot.

The croplands and valley grassland (665 acres) in the Sherman Lake-Sacramento River watershed does provide habitat for several of the covered birds. The watershed supports anywhere from 14 to 1,711 acres of modeled foraging habitat for loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite, and this habitat also is modeled nesting habitat for northern harrier and tricolored blackbird. Notably, 1,356 acres of the modeled foraging habitat for Swainson's hawk is high-value habitat. The watershed provides about 1,704 acres of modeled nesting/foraging habitat for burrowing owl and about 855 acres of modeled foraging habitat for greater sandhill crane (but no modeled roosting habitat). The watershed contains limited habitat for the covered birds that nest in riparian and woodland habitat—182 acres for Cooper's hawk, Swainson's hawk (only 3 of the 295 nest sites), and white-tailed kite. The watershed contains 3 of the 96 documented nest colonies for tricolored blackbird and no potential nest colonies. While 2 of the 3 documented nest colonies are small, about 100 and 200 birds each, approximately 9,000 individuals were observed at the third site in 1944, making it the largest documented nest colony in the Plan Area.

The watershed contains almost 787 acres of modeled foraging habitat and almost 1,540 acres of modeled roosting habitat for western red bat. The watershed contains 633 acres of modeled habitat for American badger, but with the high level of urban development and intensive agriculture in the watershed, this species is unlikely to occur.

The Sherman Lake-Sacramento River watershed contains only 41 acres of modeled habitat for Sanford's arrowhead.

3.2.8.7 Conservation Considerations

Seventy percent of the Sherman Lake-Sacramento River watershed is located outside of the UDA in PPU 6 (Table 11). The remainder of the watershed overlaps with PPUs 1, 2, and a very small portion (25 acres) of PPU 4, with the rest outside of any PPUs. The Sherman Lake-Sacramento River watershed within the Plan Area has 757 acres of existing conservation, all of which is located in PPU 4 (Table 18, Figure 10). However, the croplands in the watershed are important foraging habitat for several of the covered bird species, including Swainson's hawk (5,630 acres of high-value habitat), loggerhead shrike, northern harrier, greater sandhill crane, tricolored blackbird, and white-tailed kite. Accordingly, the SSHCP protects approximately 3,590 acres of agricultural Preserve within the watershed, or approximately 31% of the total planned agricultural Preserve in the Plan Area. All of the planned conservation will be located within PPU 6.

Table 18
Summary of Conserved Land Cover Types in the Sherman Lakes-Sacramento River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mixed Riparian Scrub	—	—	0
Mixed Riparian Woodland	—	<1	<1
Valley Grassland	—	1	1
Terrestrial Total	*0*	*1*	*1*
Aquatic			
Freshwater Marsh	—	—	0
Streams/Creeks	<1	—	<1
Aquatic Total	*<1*	*0*	*<1*
Agriculture			
Cropland	753	101	854
Orchards	—	—	0
Vineyards	—	—	0
Agriculture Total	*753*	*101*	*854*
Non-Habitat Land Cover Type			
Disturbed	2	—	2
Low-density Development	1	<1	1
Major Roads	1	—	1
Non-Habitat Land Cover Type Total	*4*	*<1*	*4*
Grand Total	**757**	**102**	**859**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.9 Snodgrass Slough Watershed

3.2.9.1 Land Cover Types

Snodgrass Slough is the fifth largest watershed in the Plan Area behind the Laguna Creek Lower Cosumnes, Deer Creek and Morrison Creek watersheds and is entirely contained within the western portion of the Plan Area (Table 1, Figure 2). About 64% of the watershed is Agriculture, of which, about 63% is Croplands; Croplands cover about 40% of the entire watershed. Non-habitat land cover types, dominated by Low-Density Development, account for 7% of the watershed. Terrestrial habitat, dominated by Valley Grassland (76%), Mixed Riparian scrub and Woodland, covers about 19% of the watershed. The Snodgrass Slough watershed accounts for the highest acreage of Aquatic land cover within the Plan Area. Approximately 4,104 acres of the watershed supports all of the aquatic cover types mapped within the Plan Area, and represents 25% of the aquatic habitat in the Plan Area. Impervious surfaces cover approximately 1,124 acres, or 3%, of the watershed.

3.2.9.2 Hydrology

Reflecting the dominance of agricultural land covers within the watershed, approximately 72% of the NHD flowlines in the Snodgrass Slough are canal/ditch features (Table 3, Figure 4). Artificial paths account for almost 21% of the watershed while stream/river features comprise 7% and connector features are less than 1% of the watershed.

3.2.9.3 Geological Formations

Geological formation data are available for approximately 60% of the Snodgrass Slough watershed. Almost the entire watershed consists of riverbank formations, which make up approximately 72% of the watershed (Table 4, Figure 5). The remaining 1% of mapped geological data for the watershed consists of basin, intertidal and levee and channel deposits.

3.2.9.4 Soils

The majority of the soils in the Snodgrass Slough watershed are subcategories of loam soils (60%) (Table 5, Figure 6). The largest acreage falls into the silt loam category (32%), most of which contains the San Joaquin soil series. Approximately 32% of the watershed contains clay soils with water (4%) and the Other (1%) category rounds out the remaining acreage.

3.2.9.5 Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0–500 feet (Tables 6 and 7, Figures 8 and 9).

3.2.9.6 Covered Species

The Snodgrass Slough watershed includes documented occurrences for 18 of the 28 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and American badger, (Table 8). This watershed contains 17% of known occurrences for Covered Species in the Plan Area, fourth only to the Laguna Creek (26%) watershed, Sherman Lake-Sacramento River (20%) and Morrison Creek watersheds (16%). While the watershed contains occurrences for only two of the covered vernal pool plant species, it has the highest number of occurrences of dwarf downingia (7 of the 10 occurrences in the Plan Area) and second highest number of occurrences of legenere (12 of the 56 occurrences in the Plan Area). The watershed contains a small percentage of the occurrences in the Plan Area for vernal pool fairy shrimp (3%) and vernal pool tadpole shrimp (3%), but does contain 27% (9 of 33 occurrences) for mid-valley fairy shrimp. As an aquatic plant species, Sanford's arrowhead is well represented in the Snodgrass Slough watershed, with 56% of the occurrences (35 of 63) in the Plan Area.

The Snodgrass Slough watershed is important for both giant garter snake and western pond turtle. It supports an important subpopulation of giant garter snake, with 7 of the 14 occurrences in the Plan Area and 5 of the 18 occurrences for western pond turtle. Reflecting the more perennial and intermittent nature of the aquatic habitats (about 70% of the aquatic habitats are freshwater marsh, stream/creek, and open water), there are no documented occurrences for western spadefoot in the watershed. Also, the watershed is outside the range of California tiger salamander.

There are occurrence data for all of the avian Covered Species in the Snodgrass Slough watershed, including 32% of the occurrences for Swainson's hawk (127 of the 398 occurrences). Occurrence data for the other species ranges from 2% of the Plan Area occurrences of tricolored blackbird to 22% of the occurrences for greater sandhill crane (see discussion below).

Of the covered mammals, one of the eight occurrences for American badger are in the Snodgrass Slough watershed.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Due to its large size and large number and dominance by agriculture, of the 10 watersheds in the Plan Area, the Snodgrass Slough watershed contains among the largest acreages of modeled habitat for the Covered Species that use agriculture (Table 9).

For plants, the Snodgrass Slough contains over 1,679 acres of modeled habitat for legenere and over 2,817 acres of modeled habitat for Sanford's arrowhead. The watershed contains 1,918 acres of modeled habitat for the vernal pool invertebrates.

As an important area for giant garter snake and western pond turtle, the Snodgrass Slough contains large amounts of modeled habitat for both species. For giant garter snake, the watershed supports 3,559 acres of modeled aquatic habitat, 5,760 acres of modeled upland habitat and 6,350 acres of high-value habitat. The Snodgrass Slough and Lower Cosumnes River (Section 3.2.4) combined support 92% of the high-value habitat for giant garter snake. The Snodgrass Slough watershed also contains the largest amount of modeled breeding/foraging habitat for western pond turtle of the 10 watersheds in the Plan Area (2,005 acres, or 32% of the total in the Plan Area), and also contains almost 6,517 acres of nesting/aestivation habitat. Although western spadefoot has not been documented in the Snodgrass Slough watershed, the watershed supports 2,987acres of modeled aquatic habitat and 5,945 acres of modeled upland.

The Snodgrass Slough watershed contains substantial acreages of modeled habitats for all of the covered bird species, including approximately 2,243to 26,700 acres of modeled foraging habitat for loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite; about 10,452 acres for ferruginous hawk; and about 25,499 acres of modeled nesting/foraging habitat for burrowing owl.

The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety or more broad-scale land cover types for nesting (e.g., cropland, irrigated pasture-grassland, and valley grassland), including burrowing owl (25,499), northern harrier (28,260 acres), and tricolored blackbird (24,016 acres). Although the watershed supports substantial modeled nesting habitat for tricolored blackbird, only 1 of the 96 documented nest colonies and 2 of 63 potential nest colonies are in the watershed; about 100 individuals were observed at the documented nest colony in 1992. The watershed also contains more than 421 acres of modeled roosting habitat for greater sandhill crane, which accounts for 36% of the total in the Plan Area; modeled roosting habitat in the Snodgrass Slough and Lower Cosumnes River watersheds account for 99% of the total modeled roosting habitat in the Plan Area. Much of the high-value habitat (33%) for greater sandhill crane occurs in Snodgrass Slough. Twelve of the 48 documented roosting sites for greater sandhill crane in the Plan Area are in this watershed. For covered birds that are limited to riparian and woodland habitats for nesting, the Snodgrass Slough watershed supports modest amounts modeled nesting habitat relative to its large size—

1,767 acres for Cooper's hawk, Swainson's hawk, and white-tailed kite. However, despite a limited amount of modeled nesting habitat, the watershed has the highest proportion (38%) of Swainson's hawk nest sites of the watersheds in the Plan Area. Further, reflecting the value of agriculture as foraging habitat for Swainson's hawk, the watershed includes 28,340 acres of high-value foraging habitat for the species.

The Snodgrass Slough watershed supports more than 10,508 acres of foraging habitat and 1,874 acres of modeled roosting habitat for western red bat, including. The watershed also supports about 7,158 acres of modeled general habitat for American badger.

3.2.9.7 Conservation Considerations

The majority of the Snodgrass Slough watershed (98%) is located outside of the UDA within PPU 6 (Table 11). The remaining 1,006 acres of the watershed intersect PPU 4 PPU. PPU 4 encompasses the proposed sphere of influence for the City of Elk Grove. Because much of PPU 4 is located in the city's proposed sphere of influence and in the county's Urban Services Boundary (USB), it is anticipated that much of PPU 4 will eventually be urbanized.

The primary conservation considerations for the Snodgrass Slough watershed are giant garter snake and western pond turtle (to a lesser extent) and the covered birds. The watershed supports large percentages of high-value habitat in the Plan Area for giant garter snake and Swainson's hawk. For giant garter snake, the 6,030 acres of high-value habitat is 45% of the total in the Plan Area and for Swainson's hawk, the 31,230 acres of high-value habitat is 37% of the total in the Plan Area.

Existing conservation totals about 8,944 acres (62%) of the watershed and an additional 5,497 acres are planned for conservation (Table 19, Figure 10). A large portion of the planned conservation will include agricultural Preserves (82%) with the remaining acreage set aside for wetland restoration. The agricultural Preserves will provide high-value foraging habitat for Swainson's hawk, as well as many of the other Covered Species that use agricultural habitats. All of the planned conservation will occur within PPU 6. The Snodgrass Slough watershed will contain the highest acreage of total conservation for aquatic and agricultural land covers in the Plan Area.

Table 19
Summary of Conserved Land Cover Types in the Snodgrass Slough Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mixed Riparian Scrub	232	41	273
Mixed Riparian Woodland	246	67	313

Table 19
Summary of Conserved Land Cover Types in the Snodgrass Slough Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Valley Grassland	3,425	93	3,518
Terrestrial Total	*3,903*	*201*	*4,104*
Aquatic			
Freshwater Marsh	705	48	753
Open Water	465	26	491
Seasonal Wetland	655	24	679
Streams/Creeks	206	45	251
Swale	2	—	2
Vernal Pool	290	2	292
Aquatic Total	*2,323*	*145*	*2,468*
Agriculture			
Cropland	2,617	4,024	6,641
Irrigated Pasture-Grassland	60	891	951
Orchards	—	—	0
Vineyards	—	29	29
Agriculture Total	*2,677*	*4,944*	*7,621*
Non-Habitat Land Cover Type			
Disturbed	2	3	5
High-density Development	1	—	1
Low-density Development	35	201	236
Major Roads	3	3	6
Non-Habitat Land Cover Type Total	*41*	*207*	*248*
Grand Total	**8,944**	**5,497**	**14,441**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.10 Upper Cosumnes River Watershed

3.2.10.1 Land Cover Types

The Upper Cosumnes River watershed is located in the east-central portion of the Plan Area, which encompasses about 28% (31,885 acres) of the watershed (Table 1, Figure 2). The majority of the watershed in the Plan Area (21, 0810 acres, or 66%), consists of Terrestrial habitat by Valley Grassland (Table 2, Figure 3). Agricultural areas comprise about 11% and aquatic areas comprise about 5% of the watershed in the Plan Area. Non-habitat land cover, primarily Low-Density Development, covers the remaining 18% of the watershed. Impervious surfaces cover approximately 341 acres, or only 1%, of the watershed.

3.2.10.2 Hydrology

According to the NHD flowline dataset, approximately 62% of the Upper Cosumnes River watershed consists of stream/river features (Table 3, Figure 4). The majority of stream/river features in the watershed are tributaries to the Cosumnes River, which is mapped as an artificial path. The river and the Folsom South Canal account for most of the artificial path features mapped in the watershed. Less than 10% of the flowline features within the watershed include canal/ditch and connector or pipeline features.

3.2.10.3 Geological Formations

The Upper Cosumnes River watershed contains a variety of geological formations. Two formations total about 44% of the watershed and include the riverbank and Laguna formations (Table 4, Figure 5). Other prominent formations include Valley Springs, Mehrten, gopher ridge, and Modesto formations.

3.2.10.4 Soils

The majority of the soils within this watershed are subcategories of loam (87%)(Table 5, Figure 6). Approximately 3% of the watershed contains water, 3% clay, and 7% falls within the Other category. Most of the Other category (6%) is related to mining activities (pits, slickens and Xerorthents, dredge tailings, 2% to 50% slopes).

3.2.10.5 Slope and Elevation

While the majority of the Upper Cosumnes River watershed is on flat to gentle slopes with elevations ranging from 0–500 feet, a small percentage (0.4%) is located above 500 feet (Tables 6 and 7). This watershed contains the highest percentage of land with slopes between 20%–40% and greater than 40%. These areas occur along the eastern border of the Plan Area.

3.2.10.6 Covered Species

The Upper Cosumnes River watershed includes documented occurrences for 15 of the 28 Covered Species, including legenere; Sanford's arrowhead; vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, western spadefoot, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat.

This watershed contains 6% of documented occurrences of Covered Species within the Plan Area (Table 8). Most notably, the watershed contains 153 of the 156 known occurrences (98%)

of valley elderberry longhorn beetle, with the largest concentration of occurrences along the Cosumnes River just south of Rancho Murieta. Other than the longhorn beetle, no other Covered Species with documented occurrences in the watershed occur at particularly high levels relative to the other watersheds, ranging from 4% of total occurrences in the Plan Area for vernal pool fairy shrimp to 12% for ferruginous hawk. Therefore, the 6% of the documented occurrences of all Covered Species in the Plan Area is skewed by the extremely high percentage of valley elderberry longhorn beetle occurrences.

The Upper Cosumnes River contains 1,078 acres of modeled habitat for the valley elderberry longhorn beetle, which is substantially more than some of the other watersheds (Table 9). However, the habitat model for the beetle is very general because it includes all riparian communities under the assumption that the host plant elderberry is present. Therefore, the moderate amount of modeled habitat in the watershed compared to modeled habitat in the American River watershed (48 acres), Lower Cosumnes River watershed (2,231 acres), and Snodgrass Slough watershed (1,767 acres) should not be interpreted as the Upper Cosumnes River watershed having relatively higher value for the species.

The Upper Cosumnes River watershed contains modest amounts of modeled habitat for covered vernal pool species, ranging from 2,091 acres for dwarf downingia to 11,163acres for vernal pool invertebrates.

The Upper Cosumnes River watershed contains substantial acreages of modeled habitats for all of the covered bird species (except greater sandhill crane), including about 521 to 21,700 acres of modeled foraging habitat for Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite and about 20,945 acres of modeled nesting/foraging habitat for burrowing owl. The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety or more broad-scale land cover types for nesting (e.g., valley grassland), including loggerhead shrike (18,608 acres), northern harrier (20,424 acres), and tricolored blackbird (19,324 acres). For covered birds that nest in riparian and woodland habitats, the watershed supports substantial modeled nesting habitat, including 3,028 acres for Cooper's hawk and white-tailed kite and 832 acres for Swainson's hawk. Due to a relatively small amount of croplands and its location in the eastern portion of the Plan Area, the Upper Cosumnes River watershed supports only 881 acres of high-value foraging habitat for Swainson's hawk, or only 1% of the total in the Plan Area. Twenty-four of the 293 Swainson's hawk nest sites in the Plan Area are in this watershed. Seven of 96 documented nest colonies for tricolored blackbird and 9 of 63 potential nest colonies are in the Upper Cosumnes River watershed. Five the six colonies were observed in 1992, with others in 2000. The six documented nest colonies have ranged in size from approximately 200 individuals to 5,000 individuals at two different sites in 1992. Approximately 16,200 individuals have been

observed at the nest colonies over the surveys, or 10% of the approximately 158,330 individuals observed at nest colonies in the Plan Area. The Upper Cosumnes River has relatively low value for greater sandhill crane, with only 734 acres of modeled roosting habitat and 2,398 acres of modeled foraging habitat.

The Upper Cosumnes River watershed generally defines the northern boundary of the California tiger salamander's range in the Plan Area, and contains a substantial amount of modeled habitat for the species, including 700 acres of modeled aquatic habitat and 15,559 acres of modeled upland habitat. No high-value habitat for the species is present in the watershed and there are no documented occurrences. There are two occurrences of western spadefoot and no occurrences of western pond turtle in the watershed, but there is substantial modeled habitat for the two species, including 1,444 acres of modeled aquatic habitat and 20,002 acres of modeled upland habitat for western spadefoot, and 599 acres of modeled breeding/foraging habitat and 15,153 acres of modeled nesting/aestivation habitat for western pond turtle. The Upper Cosumnes River watershed has low value for giant garter snake, with only 78 acres of modeled upland habitat and 2 acres of modeled aquatic habitat.

The Upper Cosumnes River watershed supports large acreages of modeled habitat for the covered mammals, including more than 18,866 acres of modeled general habitat for American badger and about 19,186 acres of modeled foraging habitat and 3,679 acres of modeled roosting habitat for western red bat. The Upper Cosumnes River watershed supports a moderate amount of modeled habitat for Sanford's arrowhead (6,648 acres).

The Upper Cosumnes River watershed also contains federally designated Critical Habitat for Sacramento Orcutt grass (7 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (1,431 acres that is habitat for both species).

3.2.10.7 Conservation Considerations

The Upper Cosumnes River watershed is entirely outside of the UDA and encompasses a large portion of PPU 5 and small sections of PPUs 6 and 7 (Table 11). One of the primary conservation considerations in this watershed is the valley elderberry longhorn beetle, with 98% of occurrences for this species in the Plan Area concentrated along the upper Cosumnes River. It generally has high wildlife habitat value for the covered bird species (except greater sandhill crane), California tiger salamander, western spadefoot, western pond turtle, American badger, and western red bat. It has relatively low value for the covered plant species, vernal pool invertebrates, and giant garter snake.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

This watershed currently contains 3,358 acres of existing conservation, which are patchily distributed throughout the watershed (Table 20, Figure 10). Approximately 2,801 acres of the watershed are planned conservation. PPU 5 contains the majority of both existing and planned conservation. Valley grassland will comprise the majority of total conservation for this watershed, with the primary focus on connecting the Landscape Preserve in the Laguna Creek Watershed (PPU 7) with the Cosumnes River. Also, riparian restoration is planned for 890 acres of the watershed, and will be focused along the Cosumnes River. This watershed will contain approximately two-thirds of the riparian restoration within the Plan Area. The riparian restoration will provide both resident and nesting habitat for many of the Covered Species and will provide cover and refuge for species using the river as movement corridors. Importantly, the riparian restoration will provide resident and dispersal habitat for the valley elderberry longhorn beetle along the Cosumnes River.

Table 20
Summary of Conserved Land Cover Types in the Upper Cosumnes River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Woodland	443	—	443
Mine Tailing Riparian Woodland	7	—	7
Mixed Riparian Scrub	21	38	59
Mixed Riparian Woodland	55	376	431
Valley Grassland	2,453	1,479	3,932
Terrestrial Total	*2,979*	*1,893*	*4,872*
Aquatic			
Freshwater Marsh	7	<1	7
Open Water	10	—	10
Seasonal Wetland	46	31	77
Streams/Creeks	26	129	155
Swale	26	9	35
Vernal Pool	87	38	125
Aquatic Total	*202*	*207*	*409*
Agriculture			
Cropland	54	404	458
Irrigated Pasture-Grassland	20	23	43
Orchards	—	116	116
Vineyards	3	10	13
Agriculture Total	*77*	*553*	*630*
Non-Habitat Land Cover Type			
Disturbed	49	<1	49
High-density Development	1	—	1

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 20
Summary of Conserved Land Cover Types in the Upper Cosumnes River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Low-density Development	13	146	159
Major Roads	1	2	3
Mine Tailings	36	<1	36
Non-Habitat Land Cover Type Total	*100*	*148*	*248*
Grand Total	**3,358**	**2,801**	**6,159**

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

4 SUMMARY

Although all of the watersheds in the Plan Area support important biological resources, as described in the above sections, 5 of the 10 watersheds in the Plan Area stand out as relatively important for protection in the Plan Area: Laguna Creek, Lower Cosumnes River, Upper Cosumnes River, Morrison Creek, and Snodgrass Slough. The attributes that make these five watersheds particularly important for protection are summarized below.

Laguna Creek

The Laguna Creek watershed contains several attributes that make it important for conservation:

- It is the largest watershed in the Plan Area at 73,976 acres, or 76% of the Plan Area.
- It contains virtually all of the mapped land covers in the Plan Area, 91% of the watershed is undeveloped, and only 2% of the watershed is impervious surfaces.
- It contains 42% of the vernal pool in the Plan Area.
- It contains 26% of the flowline types in the Plan Area, of which 86% are natural stream/river.
- 29% of the watershed is Laguna formation, which is associated with vernal pools.
- It contains documented occurrences of 23 of the 28 Covered Species, including 19% of all Covered Species occurrences in the Plan Area, 20% of the vernal pool plant occurrences, 37% of the vernal pool invertebrate occurrences, 79% of the California tiger salamander occurrences, 58% of the western spadefoot occurrences, and 44% of western pond turtle occurrences.
- It contains large amounts of modeled habitats for all of the covered reptile, amphibian, bird, and mammal species. There are 10,092 acres of high-value habitat for Swainson's hawk. It contains 42 Swainson's hawk nest sites, 20 documented and 27 potential tricolored blackbird nest colonies, including a documented nest colony supporting approximately 6,750 individuals, and 7 roosting sites for greater sandhill crane.
- It contains federally designated Critical Habitat for California tiger salamander (8,758 acres), Sacramento Orcutt grass (24,510 acres), and vernal pool fairy shrimp and vernal pool tadpole shrimp (27,048 acres).
- It already contains 18,315 acres of existing conservation, including the 12,500-acre Chance Ranch.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Lower Cosumnes River

The Lower Cosumnes River watershed contains several attributes that make it important for conservation:

- 82% of the watershed is terrestrial habitat and agriculture and 8% is aquatic. Only 2% of the watershed is impervious surfaces.
- The lower Cosumnes River and Badger Creek are prominent features in the watershed.
- It contains documented occurrences of 19 of the 28 Covered Species, including 15% of all Covered Species occurrences in the Plan Area; 20% of the occurrences of greater sandhill crane; 23%–35% of occurrences of Cooper's hawk, loggerhead shrike, northern harrier, Swainson's hawk, and white-tailed kite; and 5 of the 14 documented occurrences for giant garter snake.
- It contains large amounts of modeled habitats for all of the covered reptile, amphibian, bird, and mammal species. 25,942 acres of high-value habitat are available for Swainson's hawk.
- It contains 90 Swainson's hawk nest sites and 29 roost sites for greater sandhill crane.
- It contains federally designated Critical Habitat for Sacramento Orcutt grass (1,842 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,069 acres).
- It already contains 14,263 acres of existing conservation, including the Stone Lakes NWR and Cosumnes River Preserve.

Upper Cosumnes River

The Upper Cosumnes River watershed contains several attributes that make it important for conservation:

- 66% of the watershed is undeveloped, with valley grassland the dominant land cover. Only 1% of the watershed is impervious surfaces.
- The upper Cosumnes River is the prominent landscape feature in the watershed and 62% of the flowlines in the watershed are stream/river features.
- It contains documented occurrences of 15 of the 28 Covered Species, including 98% of the valley elderberry longhorn beetle occurrences concentrated along the Cosumnes River.
- It contains large amounts of modeled habitats for all of the covered bird species (except greater sandhill crane), California tiger salamander, western spadefoot, western pond

turtle, American badger, and western red bat. High-value habitat includes 881 acres for Swainson's hawk.

- It contains federally designated Critical Habitat for Sacramento Orcutt grass (7 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (1,431 acres).
- It already contains 3,358 acres of existing conservation distributed throughout the watershed.

Morrison Creek

The Morrison Creek watershed contains several attributes that make it important for conservation:

- It is the fourth-largest watershed in the Plan Area at 42,926 acres, or 61%, of the Plan Area and comprises the large majority of the UDA.
- Undeveloped portions of the watershed support substantial areas of vernal pool and swale embedded within more than 21,294 acres of valley grassland.
- 83% of the flowline features are stream and river features, including Morrison Creek, Laguna Creek (north), Elder Creek, Strawberry Creek, Unionhouse (Beacon) Creek, and Frye Creek.
- The Laguna Creek Wildlife Corridor is a prominent landscape feature in the watershed that provides nesting, resident, and movement habitat for many of the Covered Species, including western pond turtle, giant garter snake, and tricolored blackbird.
- 48% of the watershed is Laguna formation, which is associated with vernal pools.
- It contains documented occurrences of 23 of the 28 Covered Species, including 16% of all Covered Species occurrences in the Plan Area 43% of the covered vernal pool plant species occurrences, 53% of the covered vernal pool invertebrate species occurrences, 29% of the western spadefoot occurrences, 19% of the Sanford's arrowhead occurrences, 7% of the giant garter snake occurrences, and 2% of the western pond turtle occurrences.
- It contains large amounts of modeled habitat for all of the Covered Species (except California tiger salamander). High-value habitat includes 1,388 acres for giant garter snake and 1,926 acres for Swainson's hawk.
- It contains 42 documented and 16 potential nest colonies for tricolored blackbird.
- It contains federally designated Critical Habitat for Sacramento and slender Orcutt grass (1,161 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,451 acres).
- It already contains 2,888 acres of existing conservation focused on valley grasslands and vernal pools.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Snodgrass Slough

The Snodgrass Slough watershed contains several attributes that make it important for conservation:

- It is the fifth largest watershed in the Plan Area and contains large areas of agriculture and aquatic habitats in the western portion of the Plan Area. About 3% of the watershed is impervious surfaces.
- It contains documented occurrences of 18 of the 28 Covered Species, including 17% of all Covered Species occurrences in the Plan Area, 70% of the occurrences of dwarf downingia, 21% of the occurrences of legenere, 27% of the occurrences of mid-valley fairy shrimp, 56% of the occurrences of Sanford's arrowhead, 50% of the occurrences of giant garter snake, 28% of the occurrences of western pond turtle, 32% of the occurrences of Swainson's hawk, and 23% of the occurrences of greater sandhill crane.
- It contains large amounts of modeled habitats for most of the Covered Species. High-value habitat includes 6,050 acres for giant garter snake and 28,340 acres for Swainson's hawkand 26,848 acres for greater sandhill crane. Along with the Lower Cosumnes River watershed, it is critical for conservation of Swainson's hawk foraging habitat, with the watersheds accounting for 72% of the high-value habitat.
- It contains 86 Swainson's hawk nest sites and 12 greater sandhill crane roost sites.
- It already contains 8,944 acres of existing conservation, including aquatic habitats that are important habitats for many of the Covered Species.

5 LITERATURE CITED

33 CFR 332.2. Definitions.

Atwater, B. 1979. "Explanation accompanying 'Generalized geologic map of the Rio Vista 15-minute quadrangle, California.'" United States Geological Survey Open File Report 79-853.

Black, P.E. 1997. Watershed Functions. *Journal of the American Water Resources Association* 33: 1–11.

Brabec, E., S. Schulte, P.L. Richards. 2002. "Impervious Surfaces and Water Quality: A Review of Current Literature and Its Implications for Watershed Planning." *Journal of Planning Literature* 16: 499. doi: 10.1177/088541202400903563. http://jpl.sagepub.com/content/16/4/499.

Clark, L.D. 1964. "Stratigraphy and Structure of Part of the Western Sierra Nevada Metamorphic Belt, California." United States Geological Survey Professional Paper 410.

CDMG (California Division of Mines and Geology). 1999. "Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Kaolin Clay Resources in Sacramento County." Open File Report 99-09.

Postel, S.L. and H. Thompson. 2005. "Watershed Protection: Capturing the Benefits of Nature's Water Supply Services." *Natural Resources Forum* 29: 98–108.

USDA (U.S. Department of Agriculture). 2007. "Watersheds, Hydrologic Units, Hydrologic Unit Codes, Watershed Approach, and Rapid Watershed Assessments." June 18, 2007.

USDA NRCS (U.S. Department of Agriculture, Natural Resources Conservation Service). 1993. *Soil Survey of Sacramento County, California*. USDA NRCS, in cooperation with the Regents of the University of California. April 1993. Accessed December 2012. http://soildatamart.nrcs.usda.gov/Manuscripts/CA067/0/sacramento.pdf.

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems in California and Southern Oregon*. Portland, Oregon: USFWS. Approved December 15, 2005. Accessed February 6, 2012. http://ecos.fws.gov/docs/recovery_plan/060614.pdf.

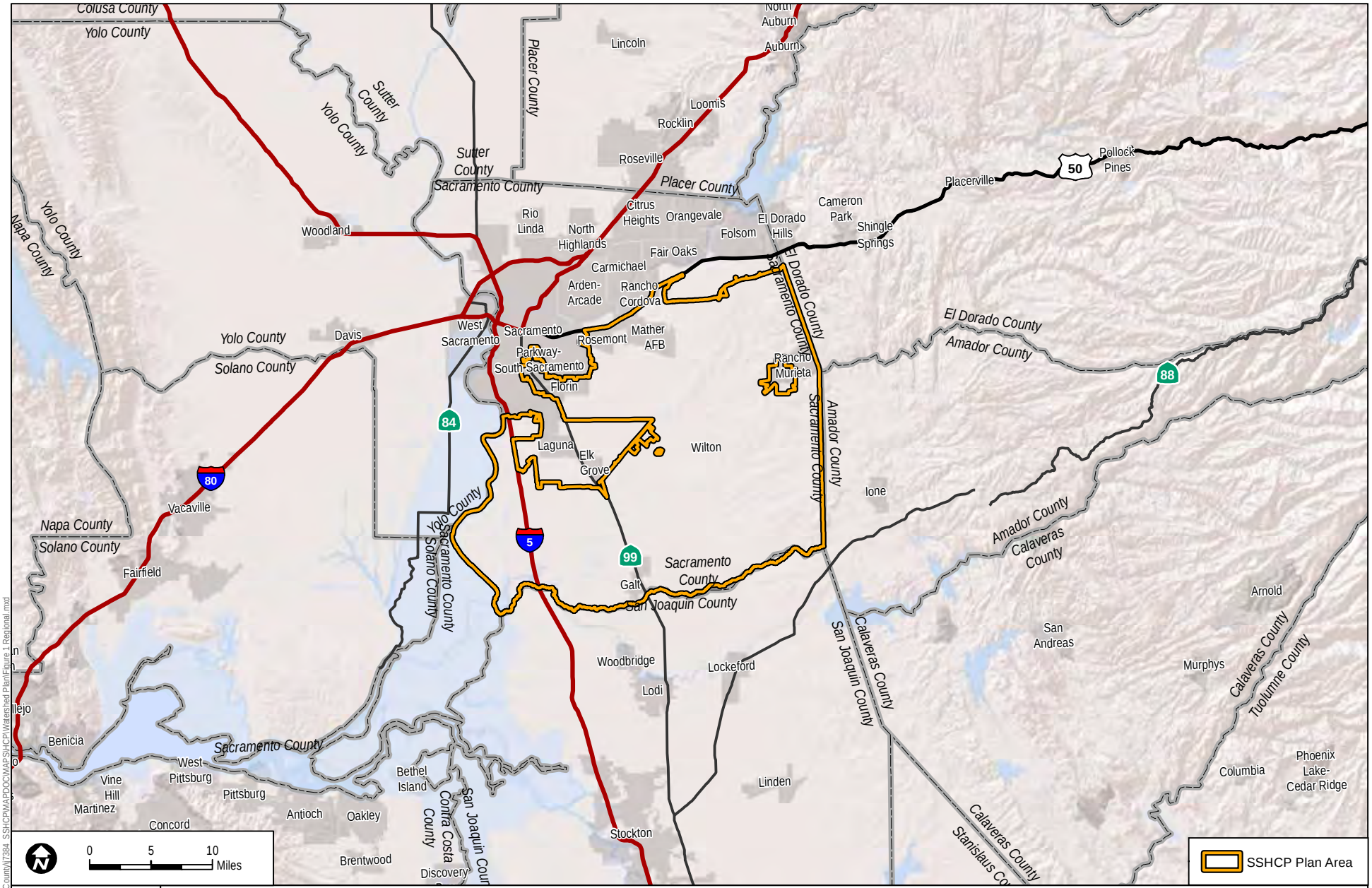
USGS and USDA NRCS (U.S. Geological Survey and U.S. Department of Agriculture, Natural Resources Conservation Service. 2009. "Federal Guidelines, Requirements, and Procedures for the National Watershed Boundary Dataset." Chapter 3 of Section A, Federal Standards, Book 11, Collection and Delineation of Spatial Data. Accessed June 1, 2015. http://pubs.usgs.gov/tm/tm11a3/pdf/TM11-A3.pdf.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

USGS (U.S. Geological Survey). 2012. National Elevation GIS Dataset. http://ned.usgs.gov/.

USGS. 2013. National Hydrography GIS Dataset. Accessed May 2013. http://nhd.usgs.gov/.

Wagner, D.L., C.W. Jennings, T.L. Bedrossian, and E.J. Bortugno, 1981. "Geologic Map of the Sacramento Quadrangle." 1:250,000. California Geological Survey Regional Geologic Map No. 1A.



SOURCE: ESRI, County of Sacramento 2014

FIGURE 1

Regional

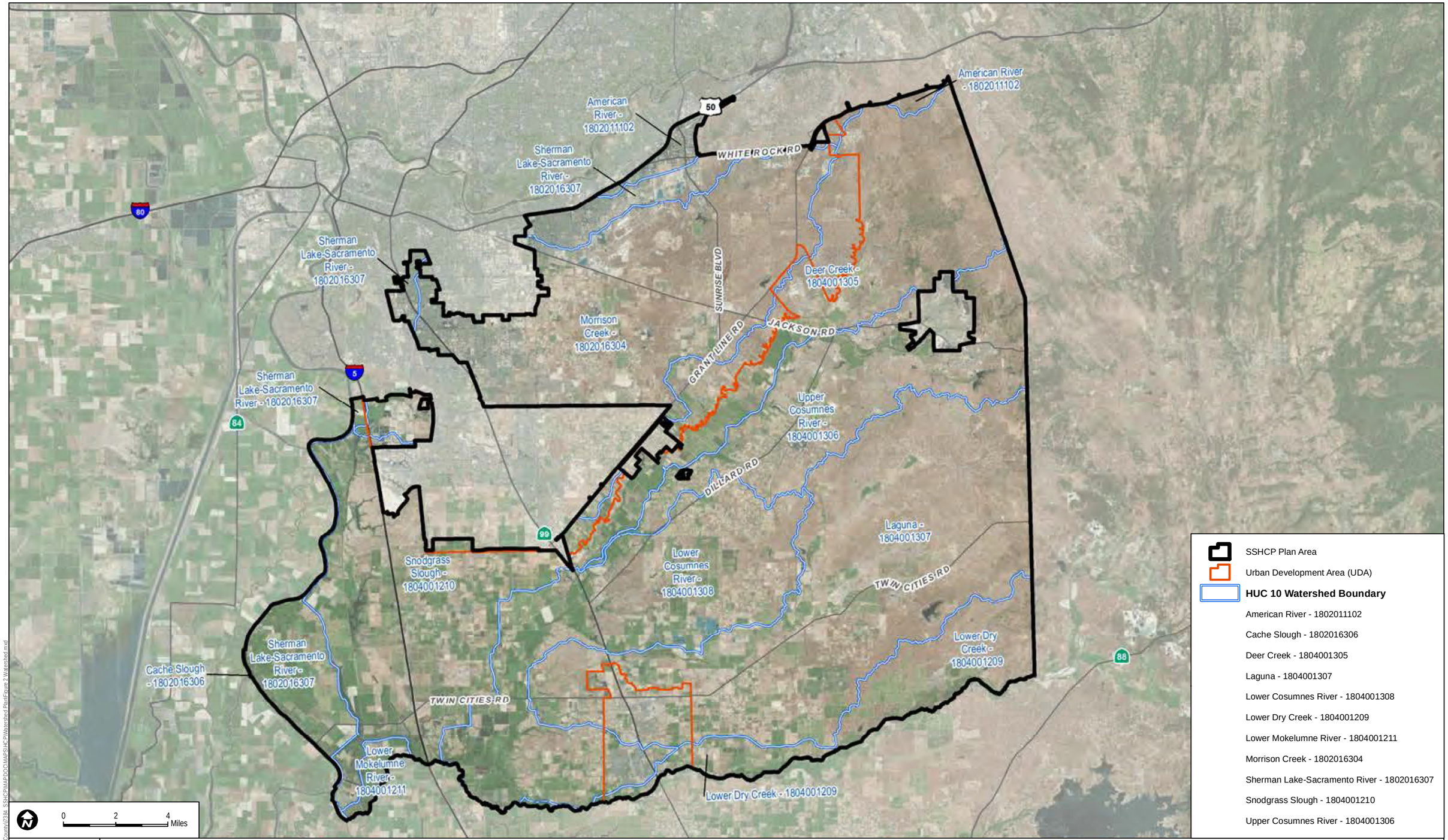
SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

DUDEK

Path: Z:\Projects\Sacramento County\7384 SSHCP\MAPDOC\MAP\SSHCP\Watershed Plan\Figure 1 Regional.mxd

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, USGS 2013 National Hydrography Dataset (NHD)

DUDEK

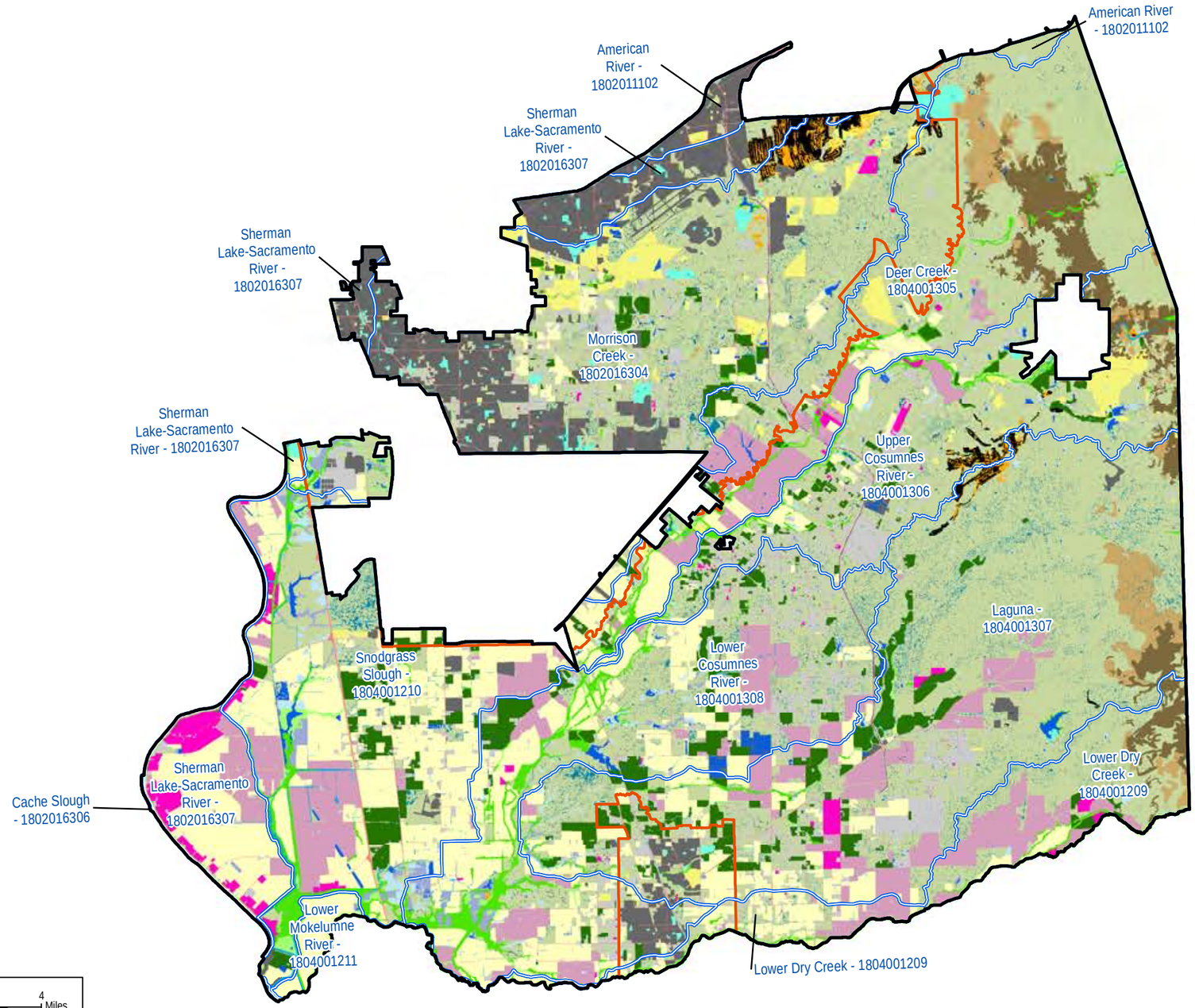
FIGURE 2

Watersheds

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento_County\2294_SSHCP\MAPDOC\MXD\SHC\Watershed Plan\Figure 2 Watershed.mxd

INTENTIONALLY LEFT BLANK



SSHCP Plan Area
Urban Development Area (UDA)
HUC 10 Watershed Boundary

Land Cover Types

Terrestrial
- Blue Oak Savanna
- Blue Oak Woodland
- Mine Tailing Riparian Woodland
- Mixed Riparian Scrub
- Mixed Riparian Woodland
- Valley Grassland

Aquatic
- Freshwater Marsh
- Open Water
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool

Agriculture
- Cropland
- Irrigated Pasture-Grassland
- Orchards
- Vineyards

Non-Habitat
- Aqueducts
- Disturbed
- High Density Development
- Low Density Development
- Major Roads
- Mine Tailings
- Recreation/Landscaped

SOURCE: USGS 2013 National Hydrography Dataset (NHD)

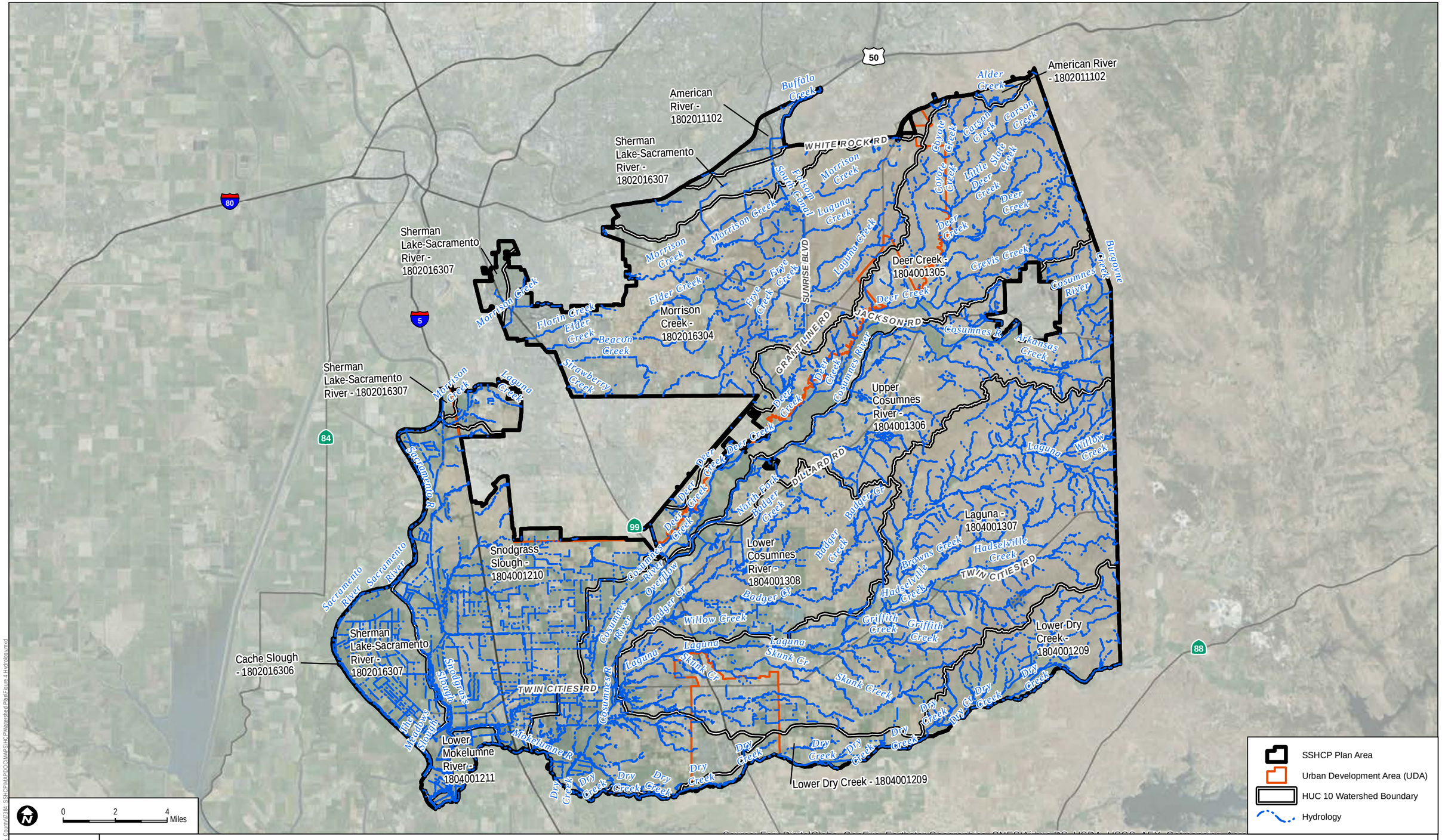
DUDEK

FIGURE 3
Land Cover

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento_County\72984 SSHCP\MAPPING\MAPS\HCP\Watershed Plan\Figure 3 Land Cover.mxd

INTENTIONALLY LEFT BLANK



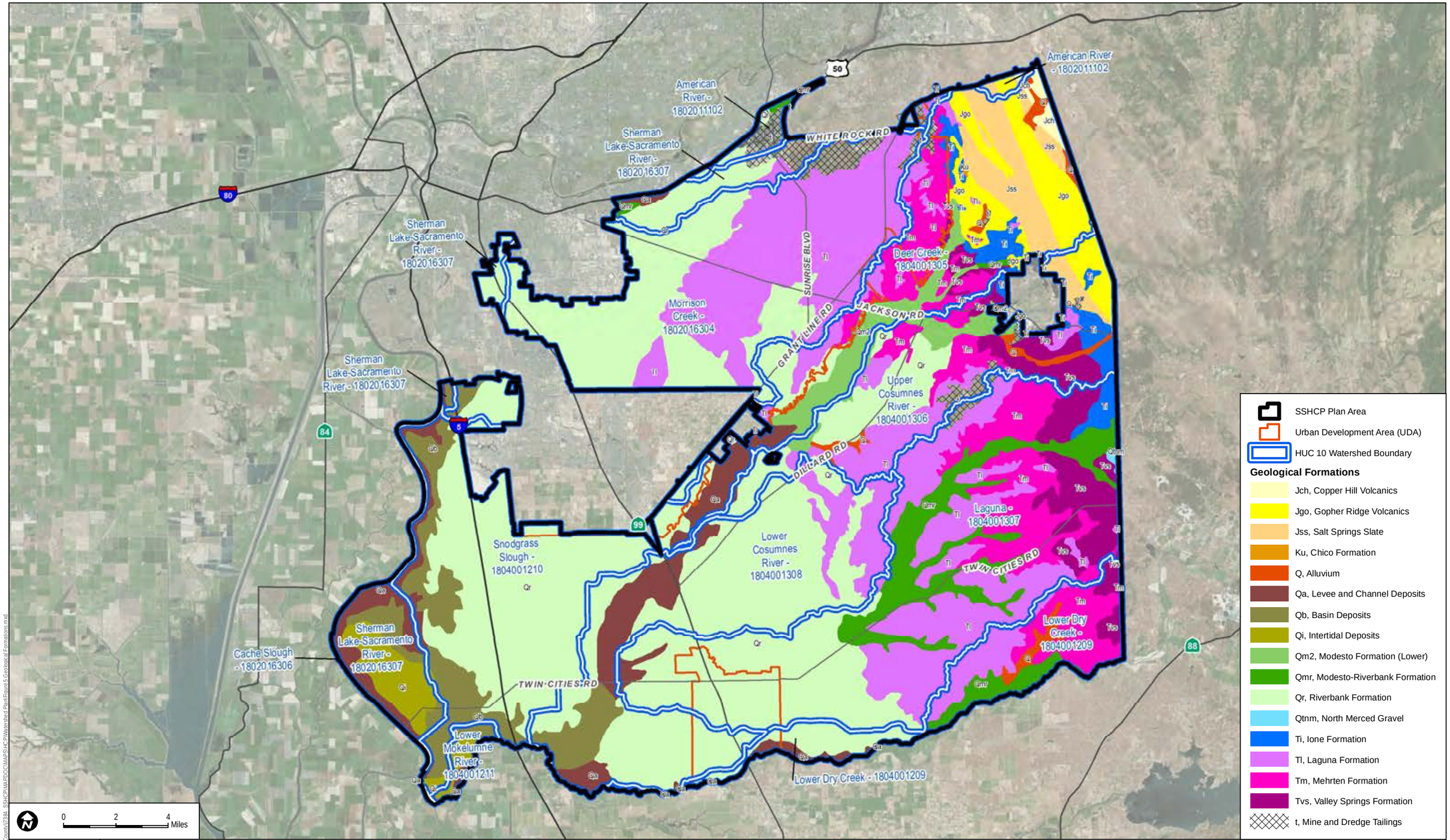
SOURCE: USGS 2013 National Hydrography Dataset (NHD), County of Sacramento 2012

FIGURE 4

Hydrology

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\2394_SSHCP\MAPPROJ\MAPS\HCP\Watershed Plan Figure 5 Geological Formations.mxd

SOURCE: Bing Maps 2015, County of Sacramento 2014, CA Geologic Survey 1981

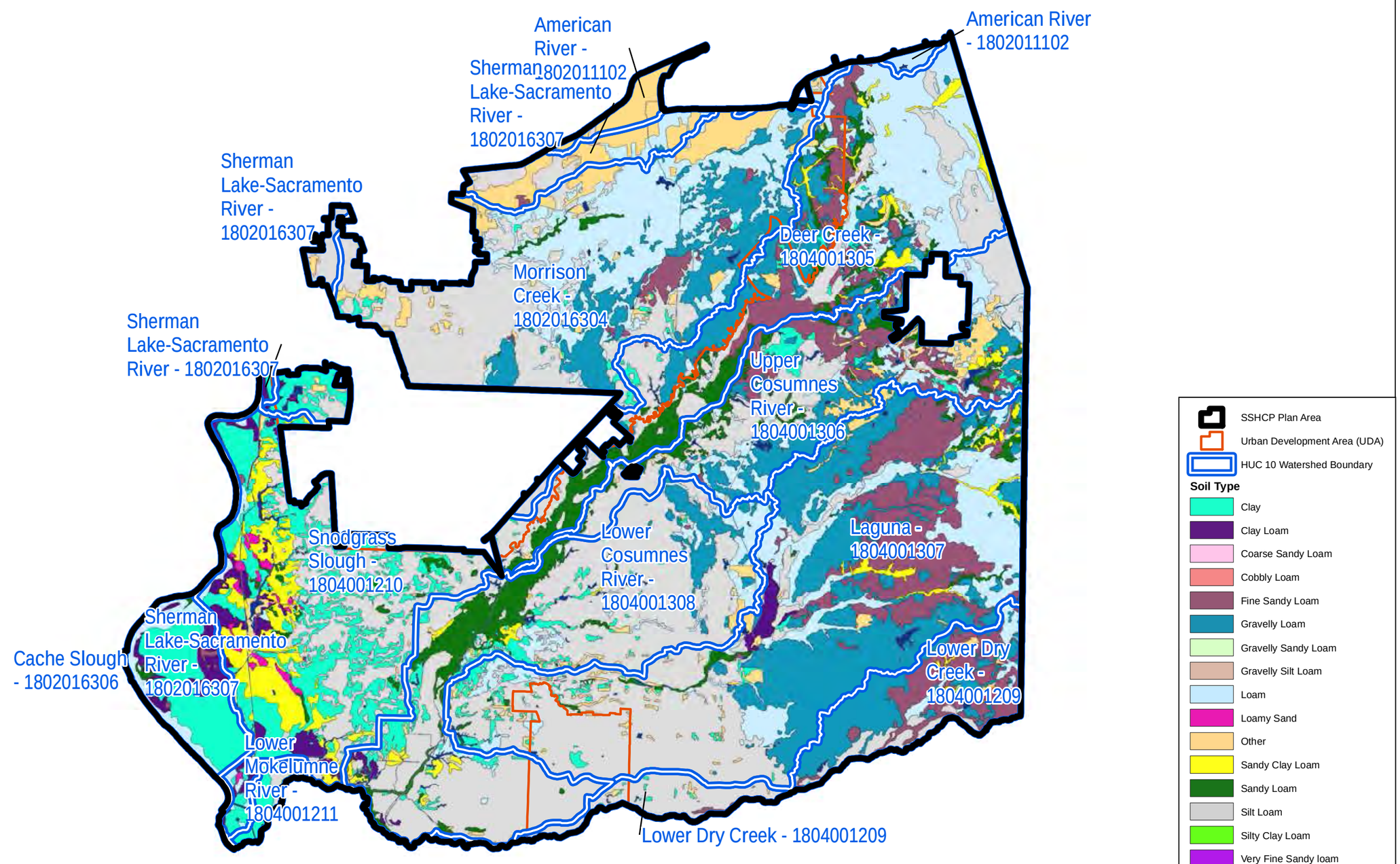
DUDEK

FIGURE 5

Geological Formations

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

INTENTIONALLY LEFT BLANK



SOURCE: National Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database 2009

FIGURE 6

Soils

DUDEK

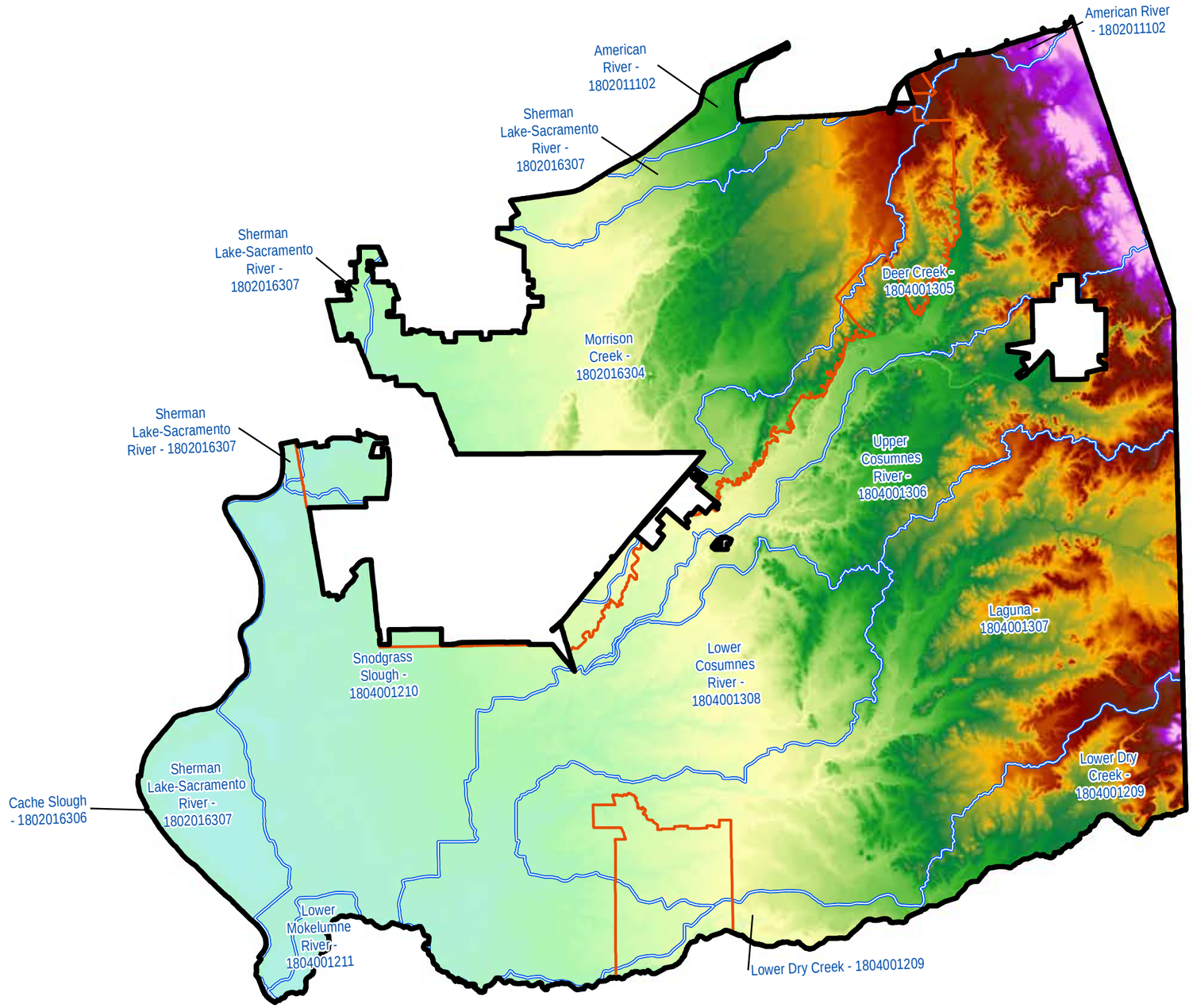
SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

AGENDA ITEM 11.1

Path: Z:\Projects\Sacramento_County\2784_SSHCP\MAPDOC\MXD\SSHCP\Watershed Plan\Figure 6 Soils.mxd

2824

INTENTIONALLY LEFT BLANK



SOURCE: USGS National Elevation Dataset (2010)

FIGURE 7
Elevation

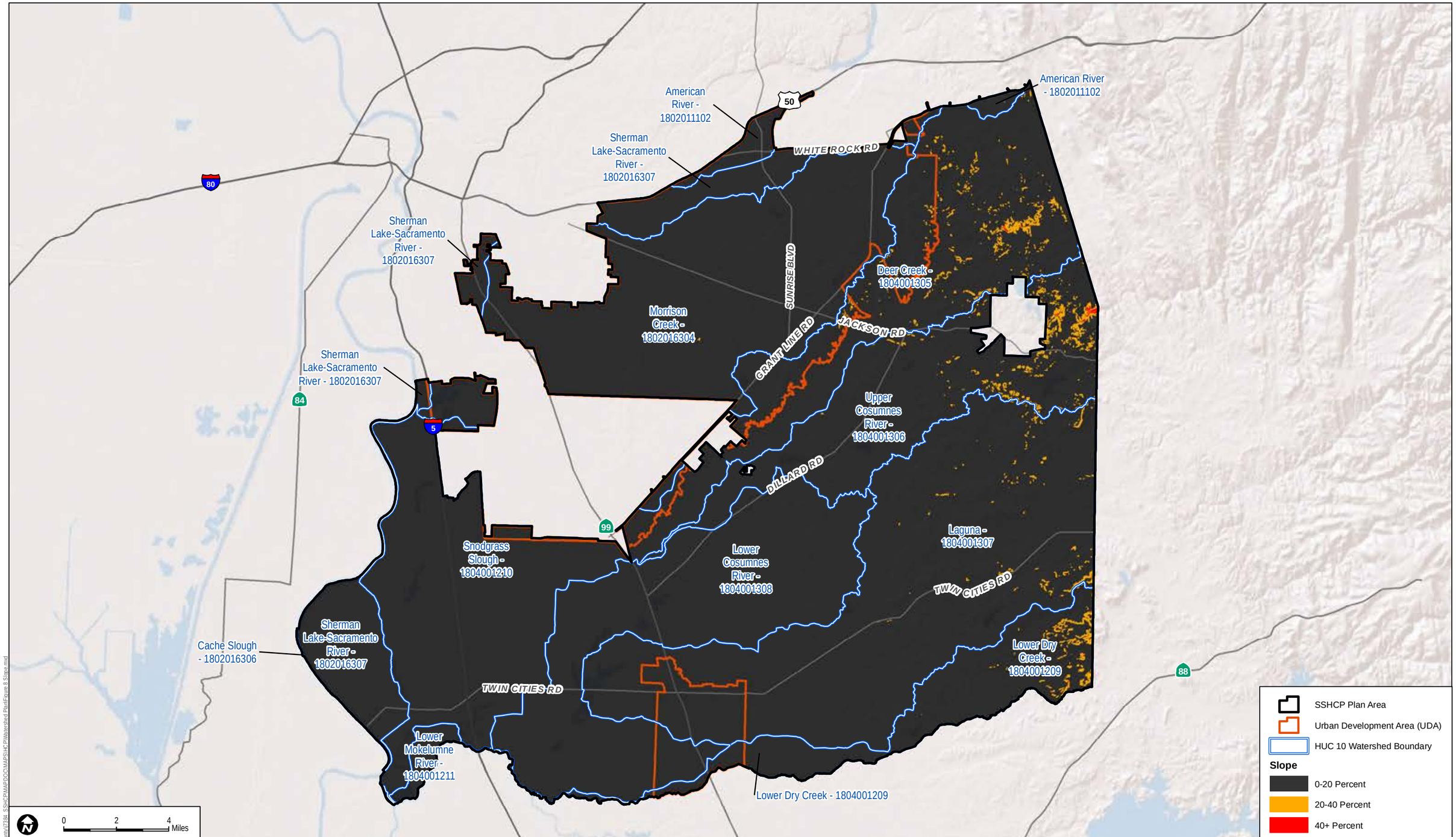
DUDEK

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

AGENDA ITEM 11.1

Path: Z:\Projects\Sacramento_County\7936_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Figure 7 Elevation.mxd

INTENTIONALLY LEFT BLANK



SOURCE: USGS National Elevation Dataset 2012

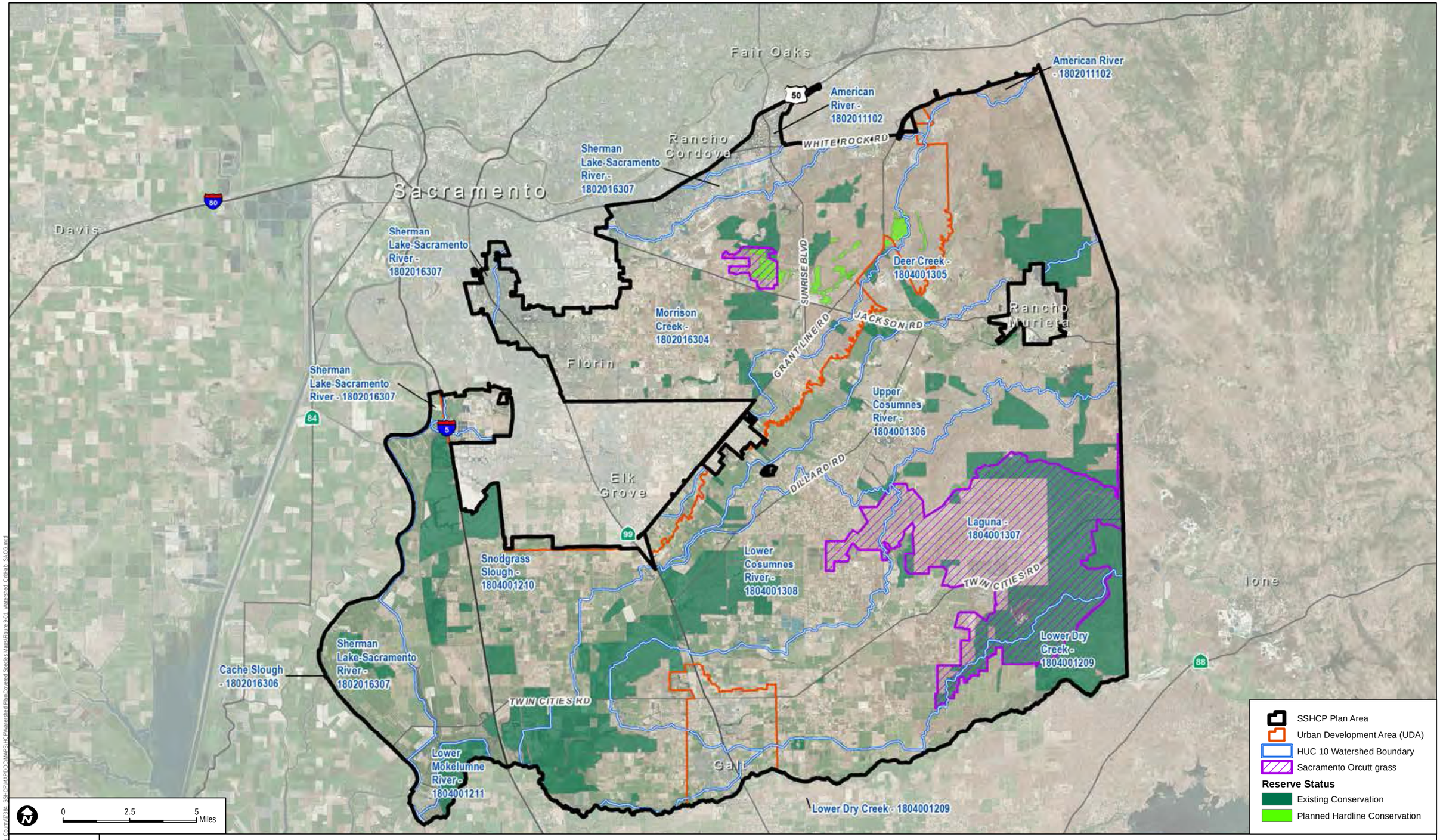
FIGURE 8
Slope

DUDEK

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento_County\7268_SSHCP\MAPDOC\MXD\SHC PlWatershed Plan\Figure 8 Slope.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-1

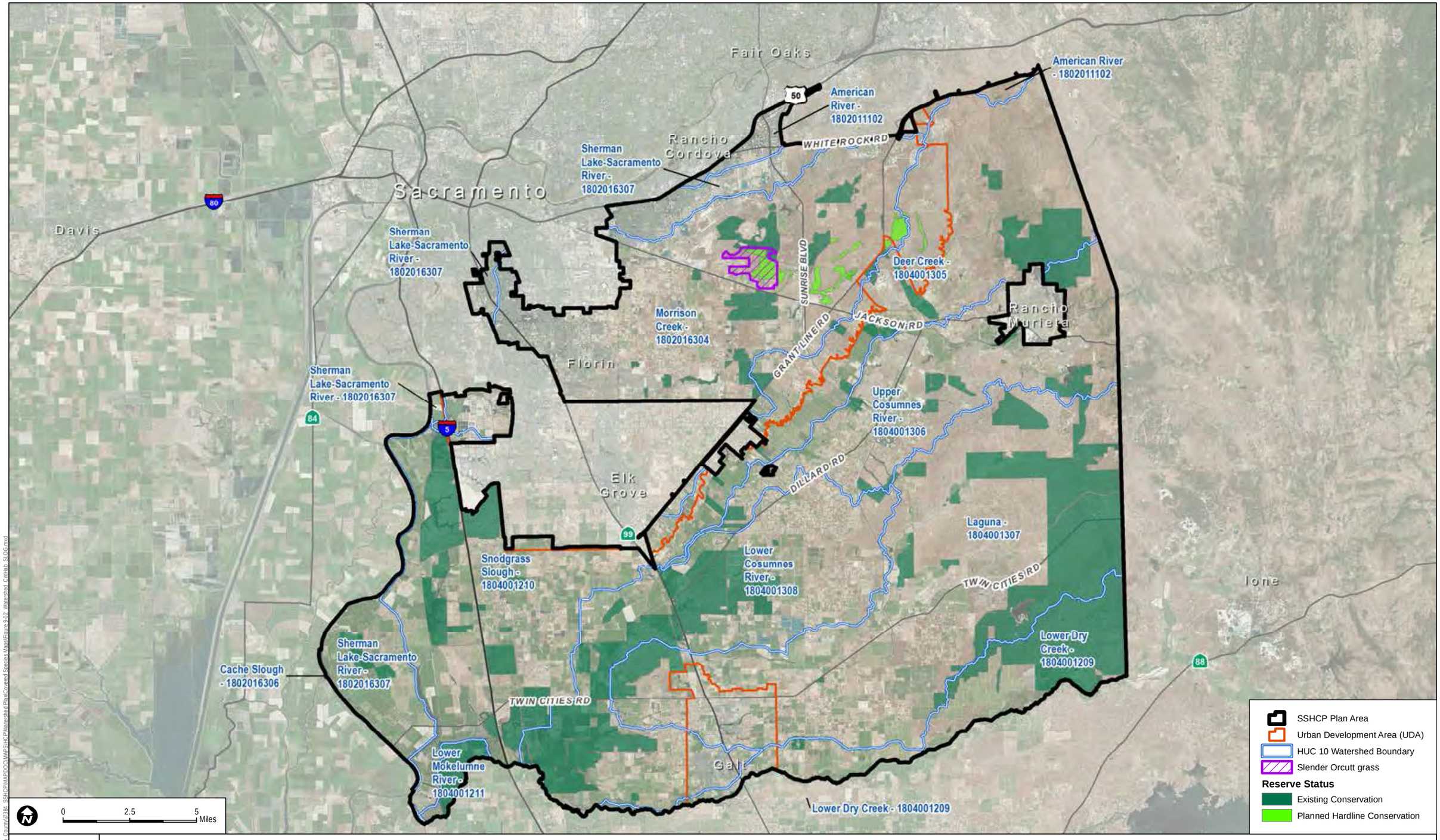
Critical Habitat for Sacramento Orcutt Grass

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

Path: Z:\Projects\Sacramento_County\2294_SSHCP\MAPS\ArcMAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-01_Watershed_Critical_SAOG.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

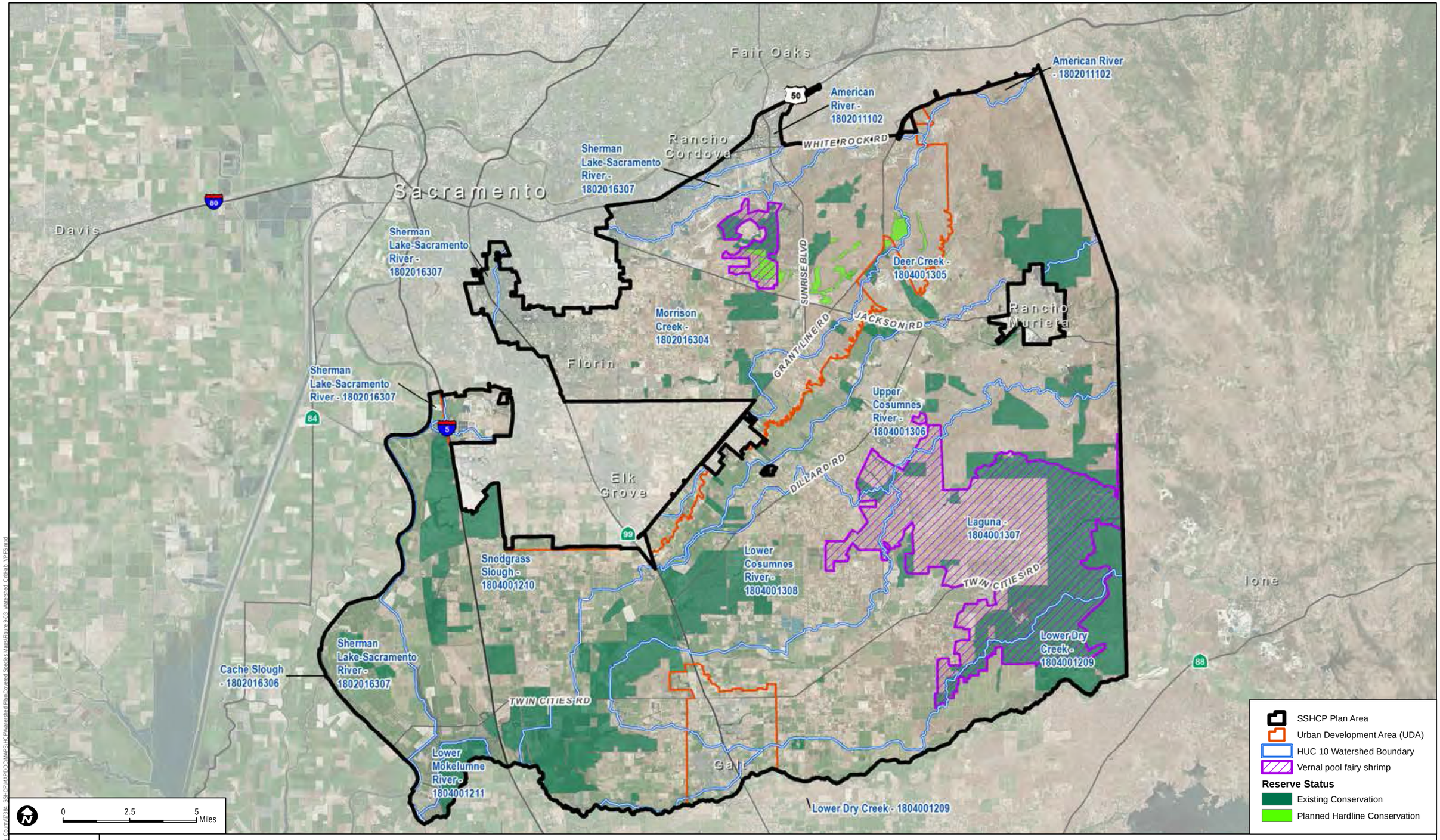
FIGURE 9-2

Critical Habitat for Slender Orcutt Grass

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

Path: Z:\Projects\Sacramento_County\2284_SSHCP\MAPS\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-02_Watershed_CritHab_SLOG.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento County\2294 SSHCP\MAPS\MXD\SSHCP\Watershed Plan\Covered Species Maps\Figure 9-03 Watershed CritHab VPFS.mxd

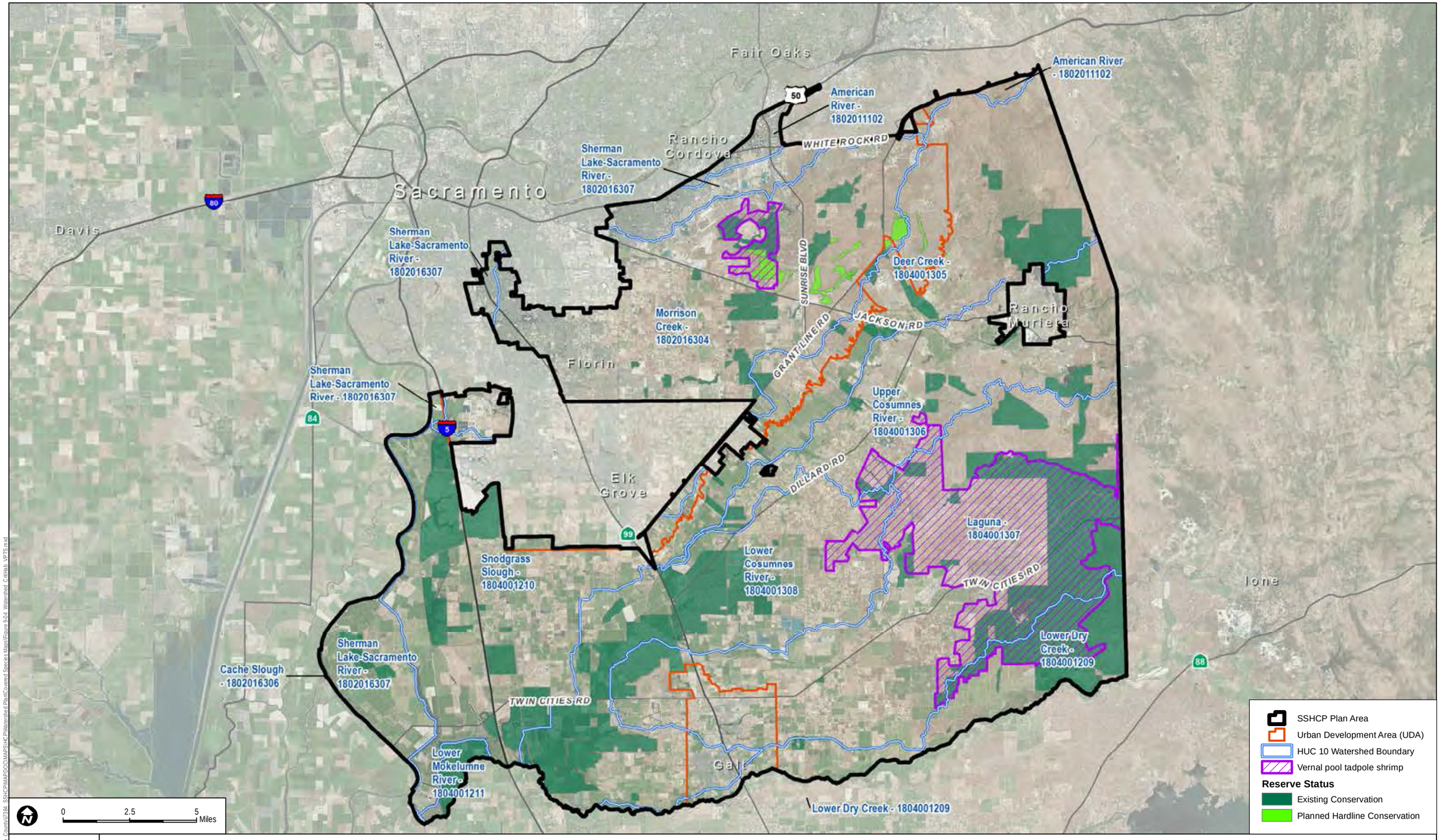
SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-3

Critical Habitat for Vernal Pool Fairy Shrimp

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento County\I2304 SSHCP\MAPS\MXD\SSHCP\Watershed Plan\Covered Species Maps\Figure 9-04 Watershed CritHab VPTS.mxd

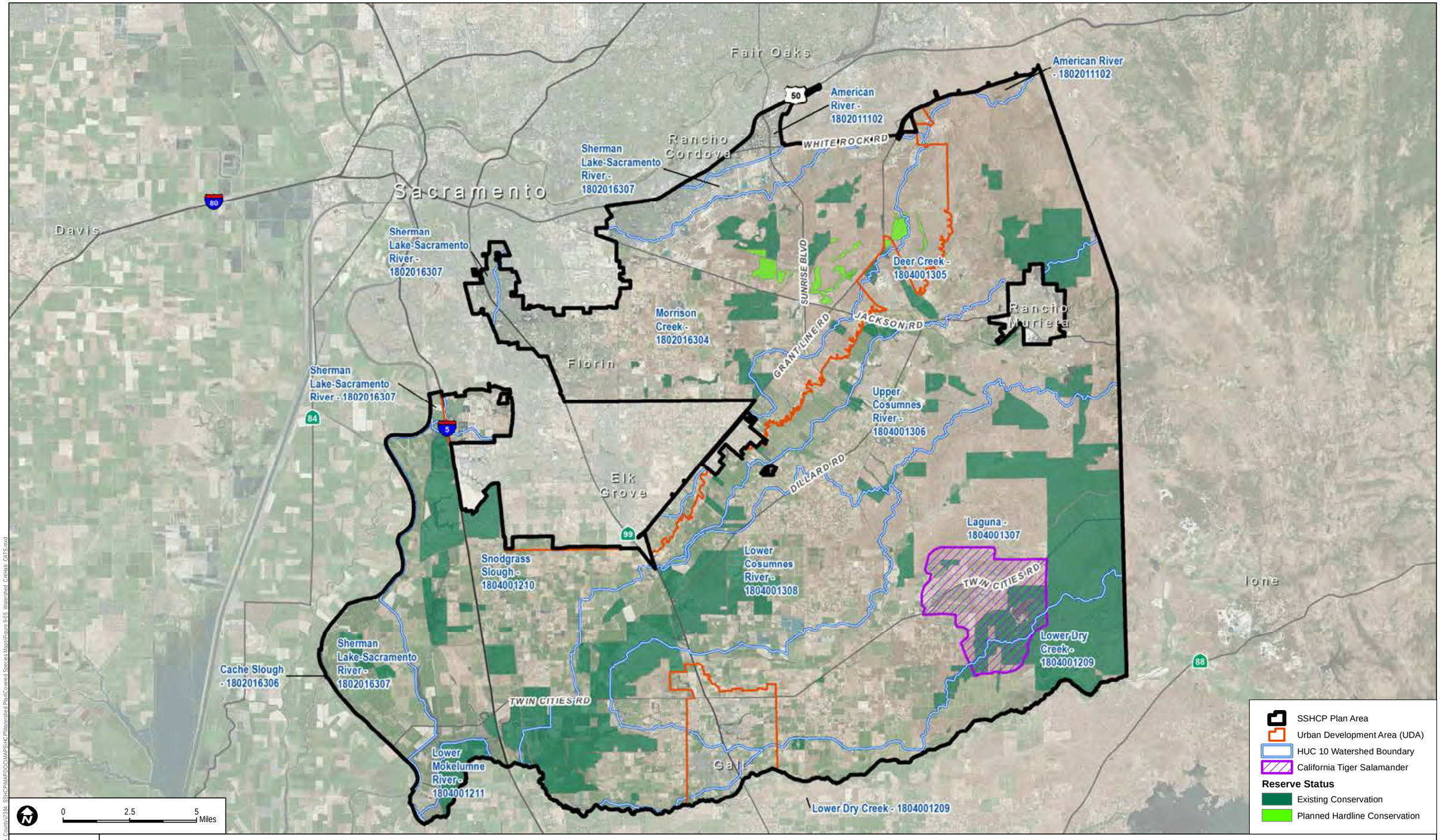
SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-4

Critical Habitat for Vernal Pool Tadpole Shrimp

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-5

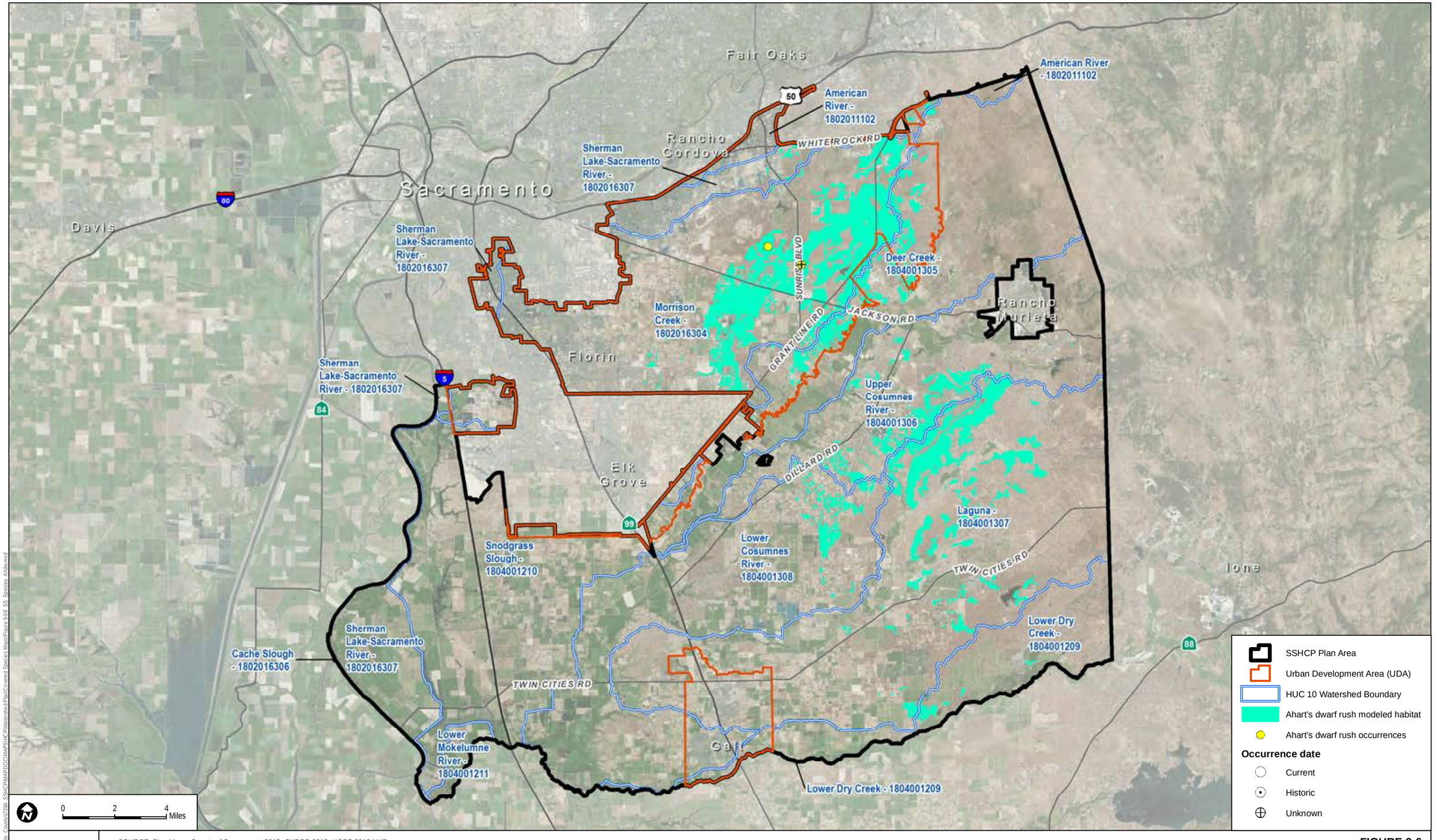
Critical Habitat for California Tiger Salamander

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

Path: Z:\Projects\Sacramento County\2294 SSHCP\MAPS\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-05 Watershed CalHab CATS.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CNDDB 2012, USGS 2013 NHD

FIGURE 9-6

Ahart's Dwarf Rush Modeled Habitat and Known Occurrences

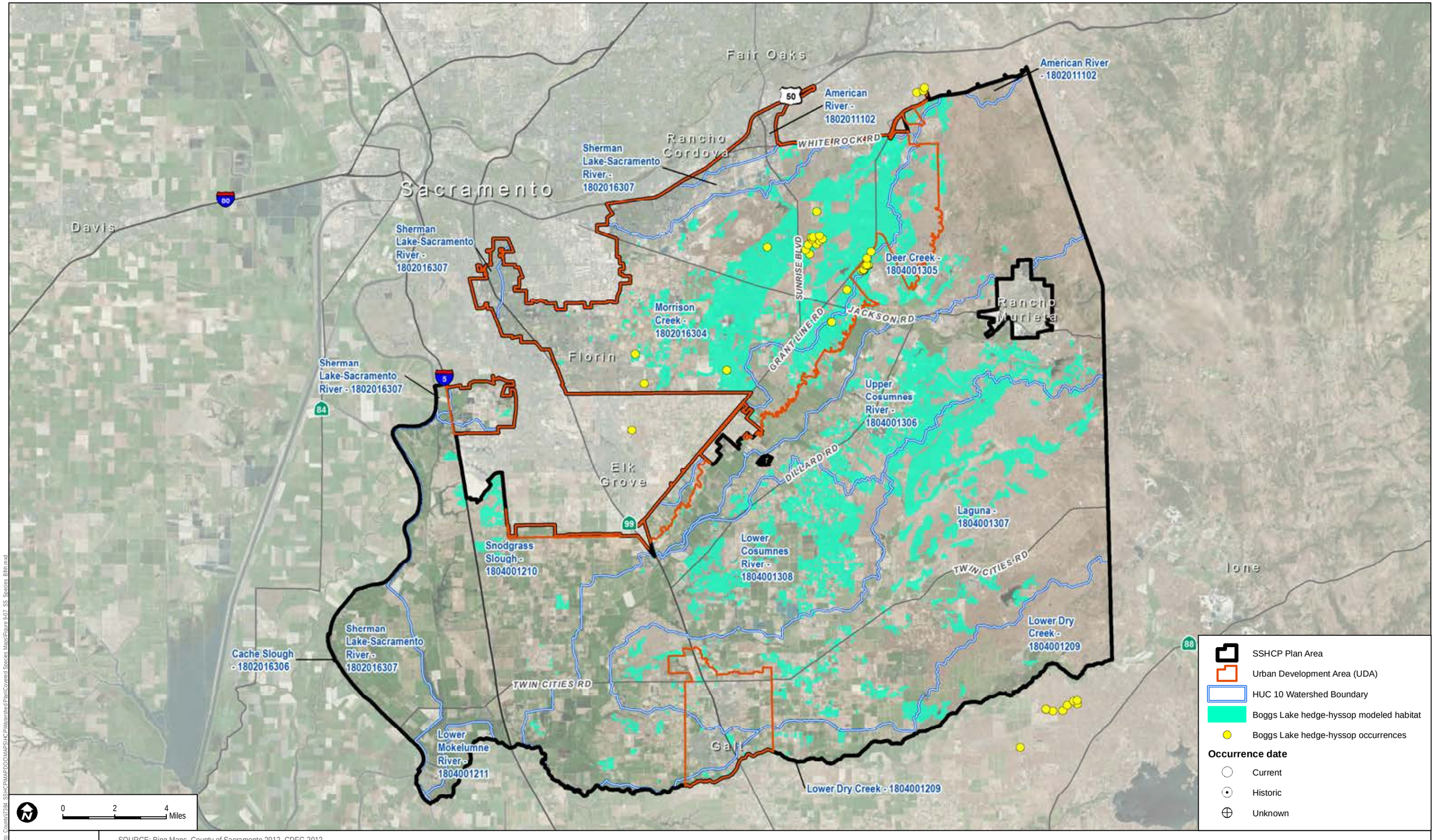
NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-06_SS_Species_Ahartsmd

AGENDA ITEM 11.1

2840

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, CDFG 2012, Sugnet & Associates 1993, Jones & Stokes 1990, USGS 2013 NHD

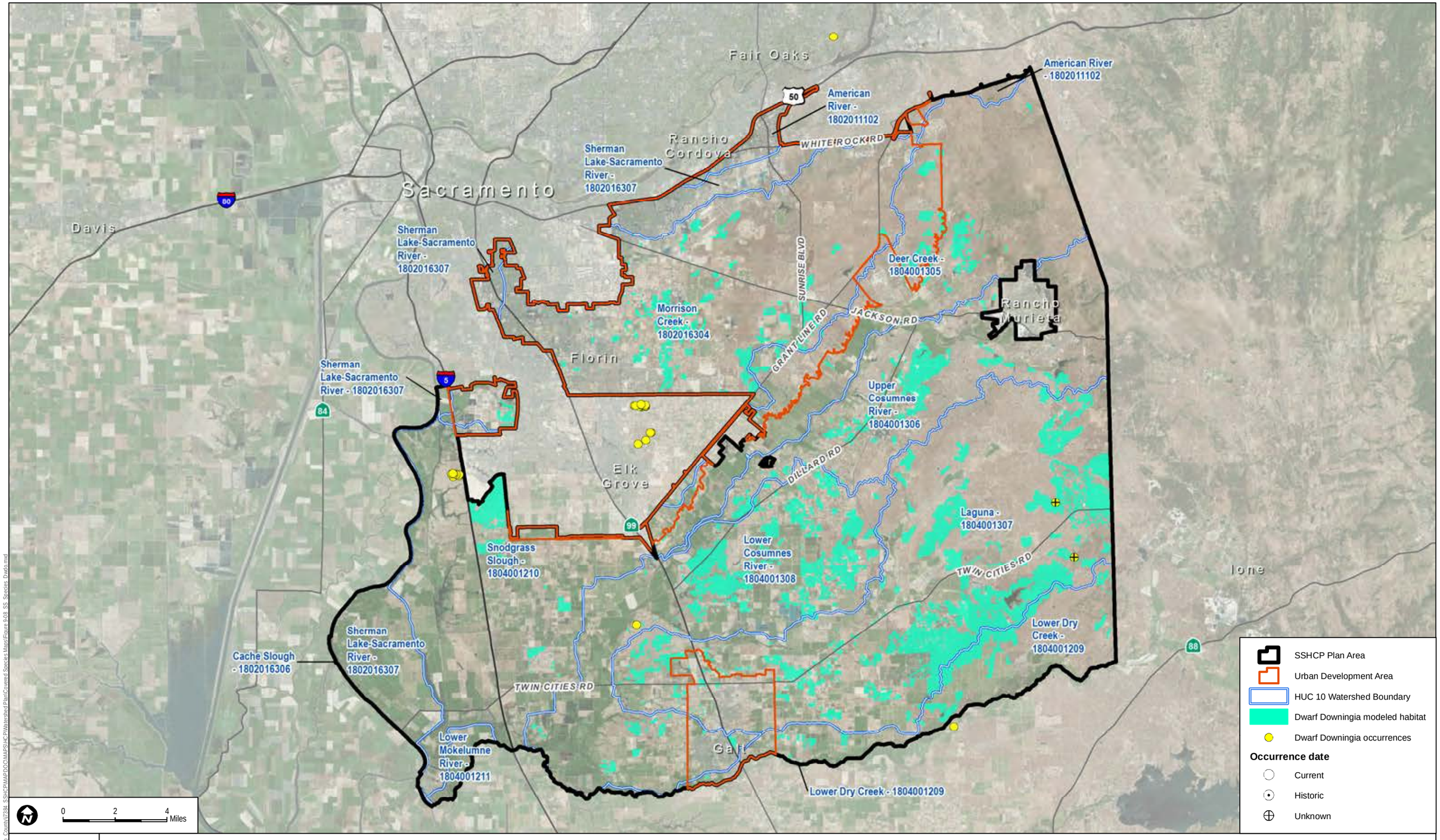
FIGURE 9-7

Boggs Lake Hedge-Hyssop Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7289_SSHCP\MAPDOC\MXD\SHCPWatershedPlan\Covered Species Maps\Figure 9-07_SS_Species_Bhh.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2015
CDFG 2012, Gibson & Skordal 1994, TNC, USGS 2013 NHD

FIGURE 9-8

Dwarf Downingia Modeled Habitat and Known Occurrences

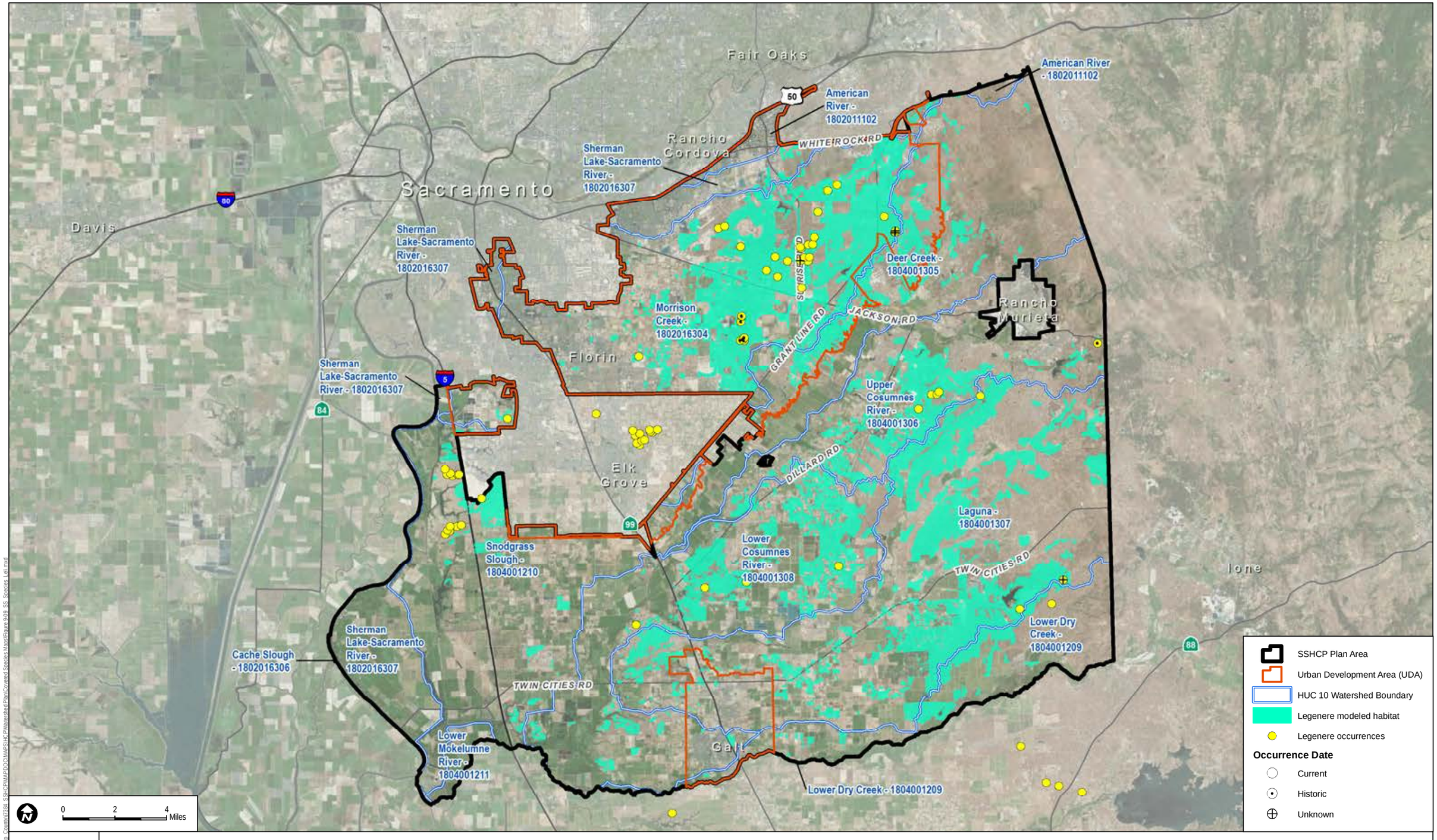
NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2294_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-08_SS_Species_Dwdn.mxd

AGENDA ITEM 11.1

2844

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CDFG 2012, USGS 2013 NHD

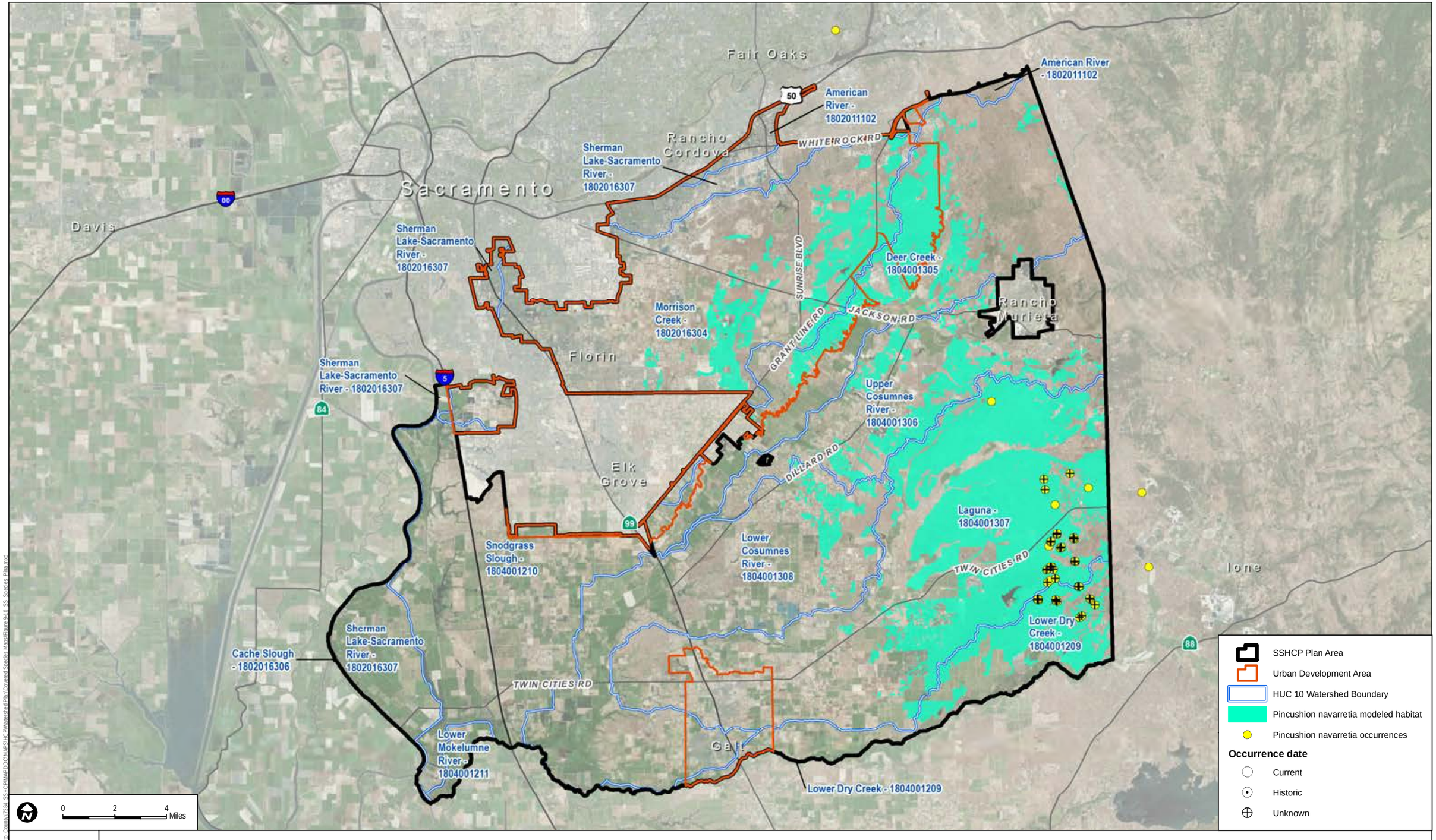
FIGURE 9-9

Legenere Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento County\2294 SSHCP\MAPS\ArcMAPS\SHCPWatershedPlan\Covered Species Maps\Figure 9-09 SS Species Leli.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CDFG 2012, TNC, USGS 2013 NHD

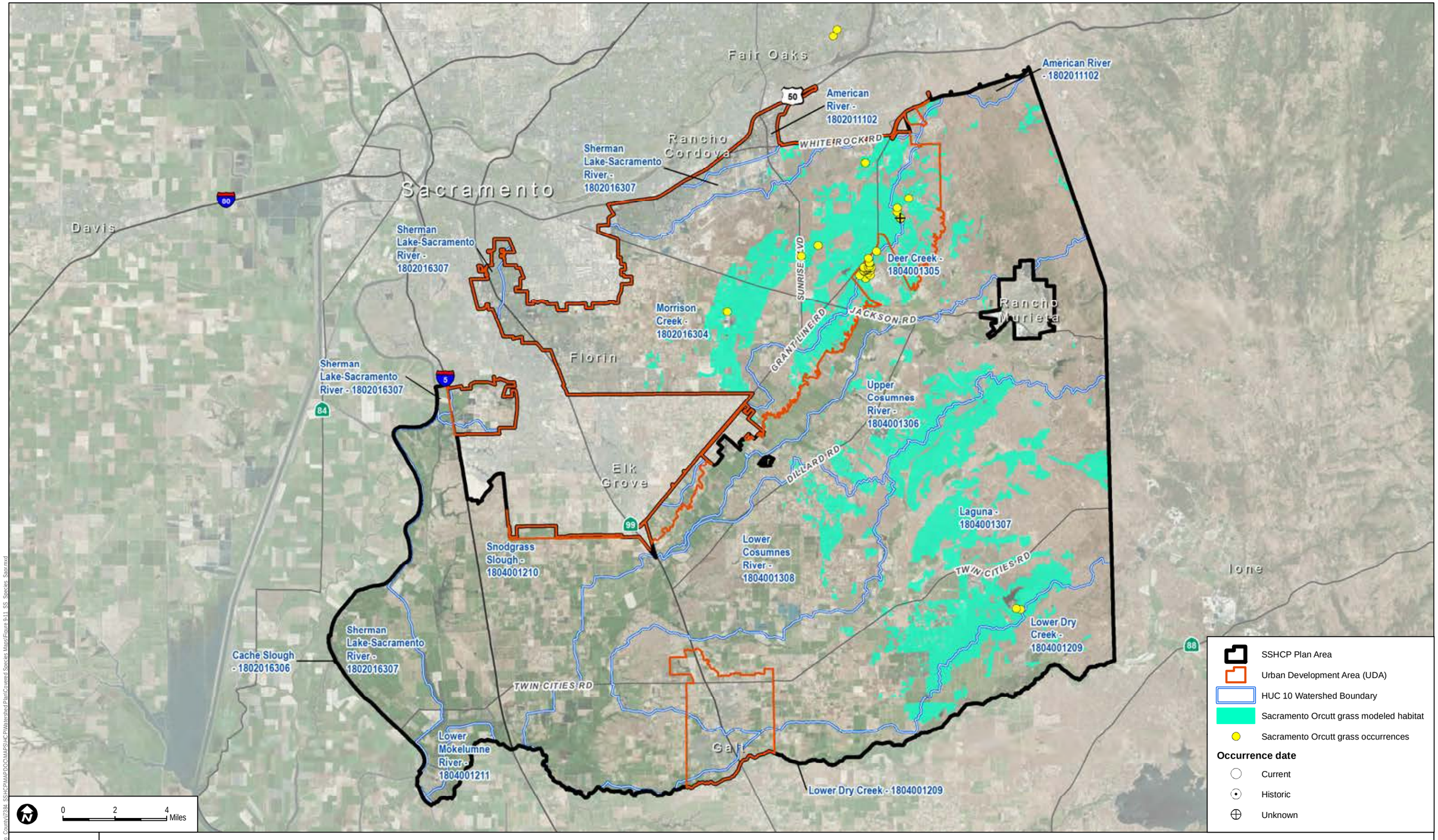
FIGURE 9-10

Pincushion Navarretia Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7295_SSHCP\MAPDOC\MAPS\HCPWatershed Plan\Covered Species Maps\Figure 9-10_SS_Species_Pla.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

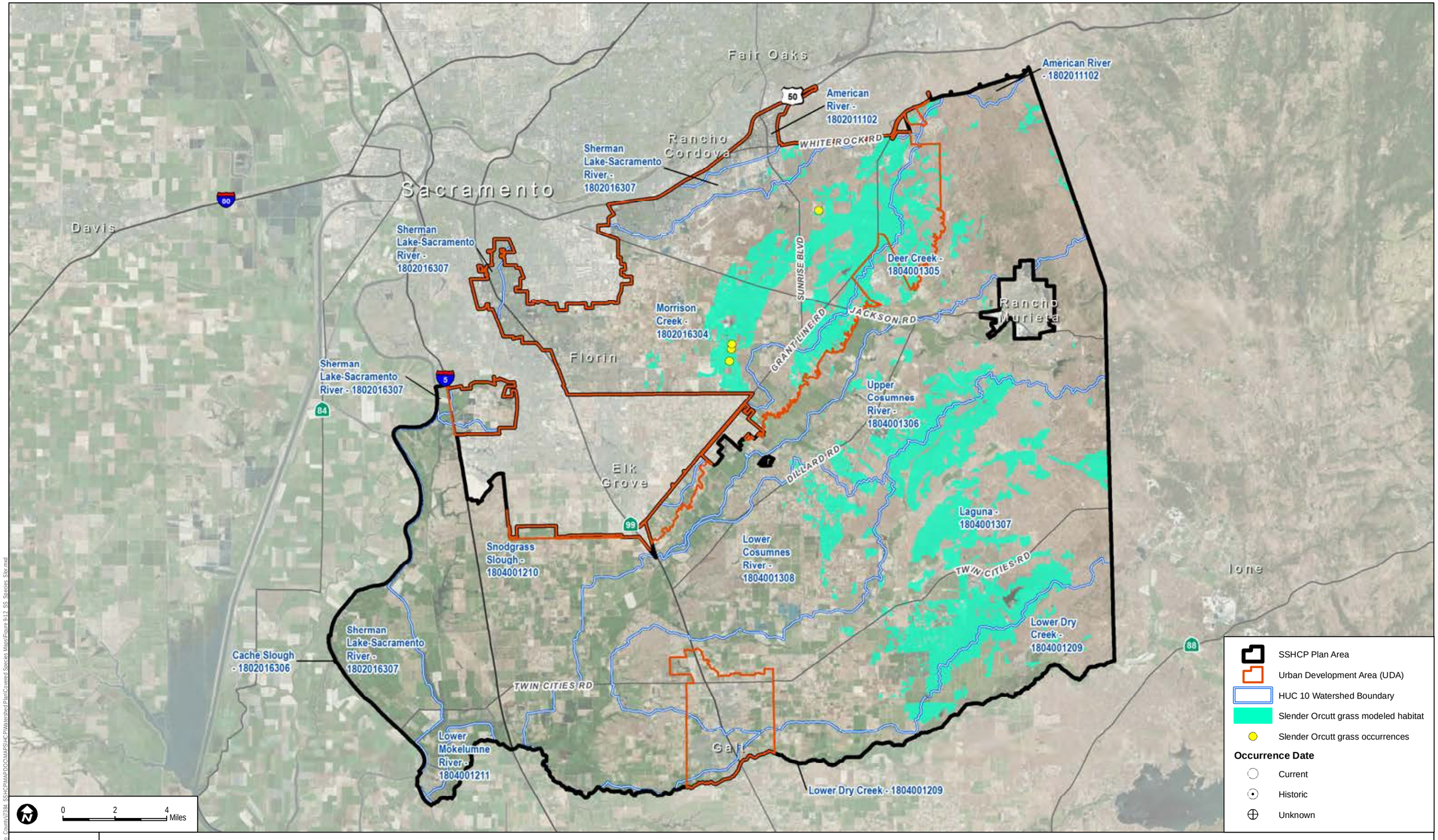
FIGURE 9-11

Sacramento Orcutt Grass Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-11_SS_Species_Sac.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

FIGURE 9-12

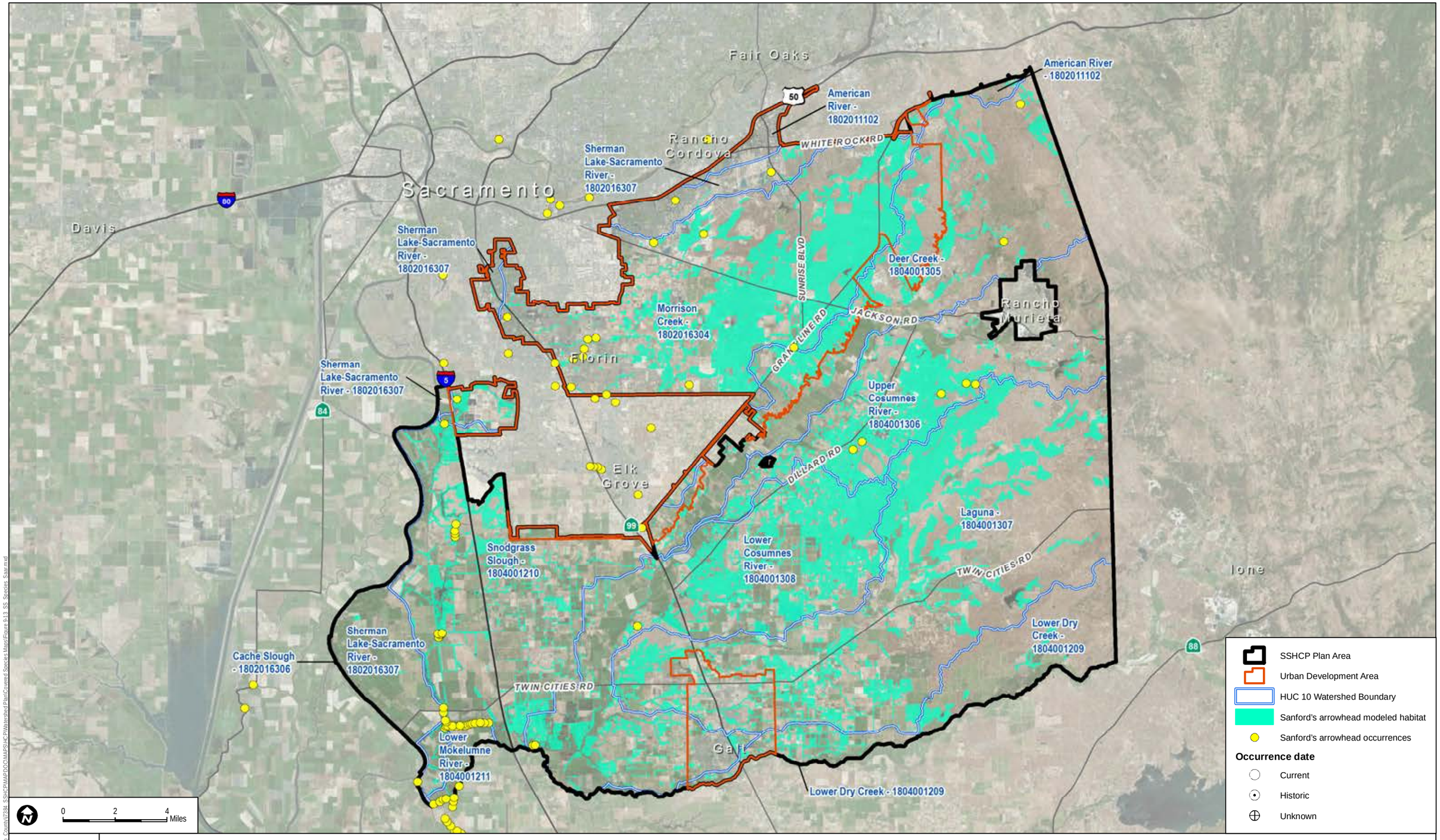
Slender Orcutt Grass Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-12_SS_Species_Slv.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\294_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-13_SS_Species_Sanford.mxd

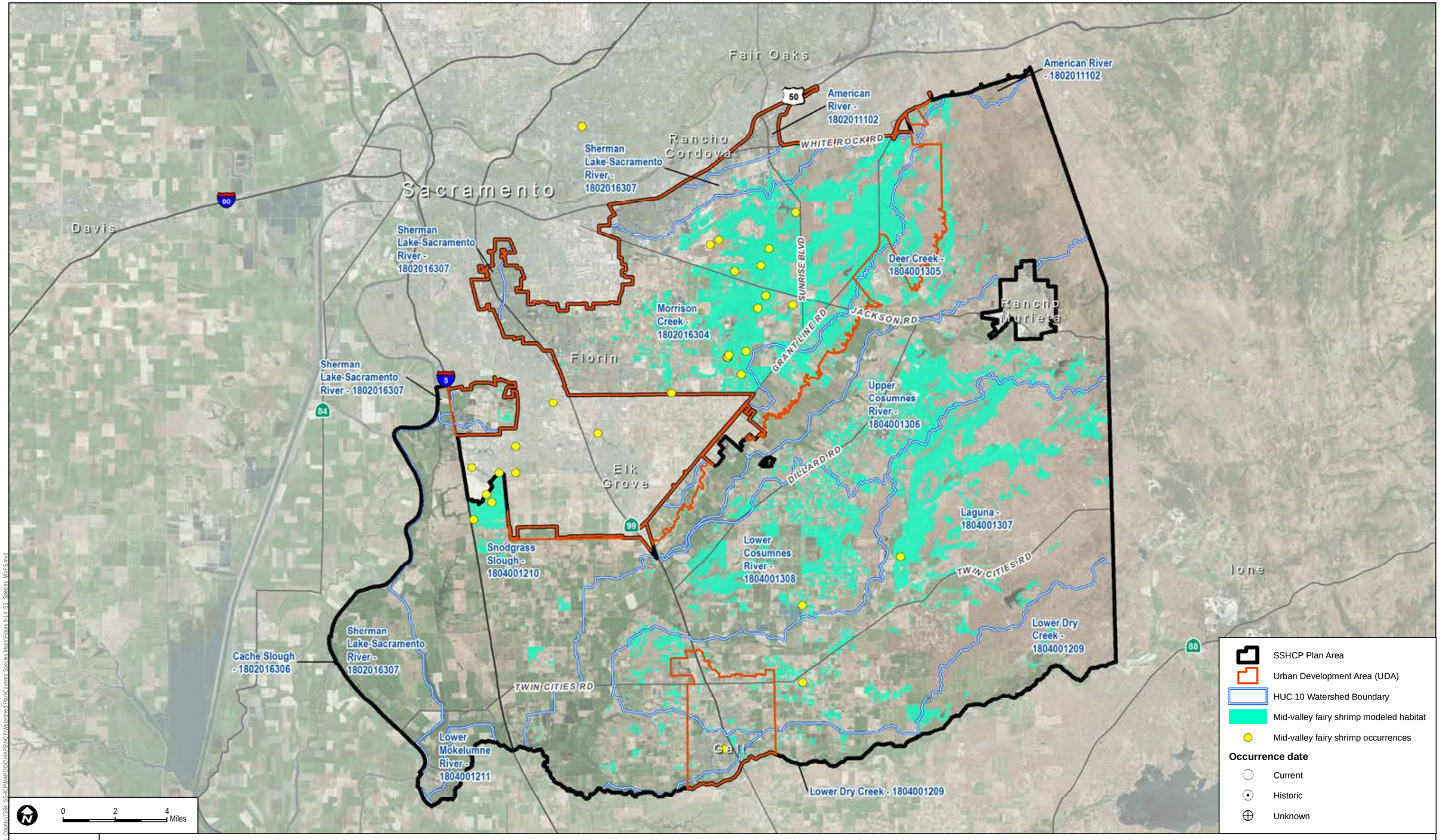
SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

FIGURE 9-13

Sanford's Arrowhead Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, Foothill Associates 2010, Kassis-Sylva 2011, Vollmar 2012, USGS 2013 NHD

FIGURE 9-14

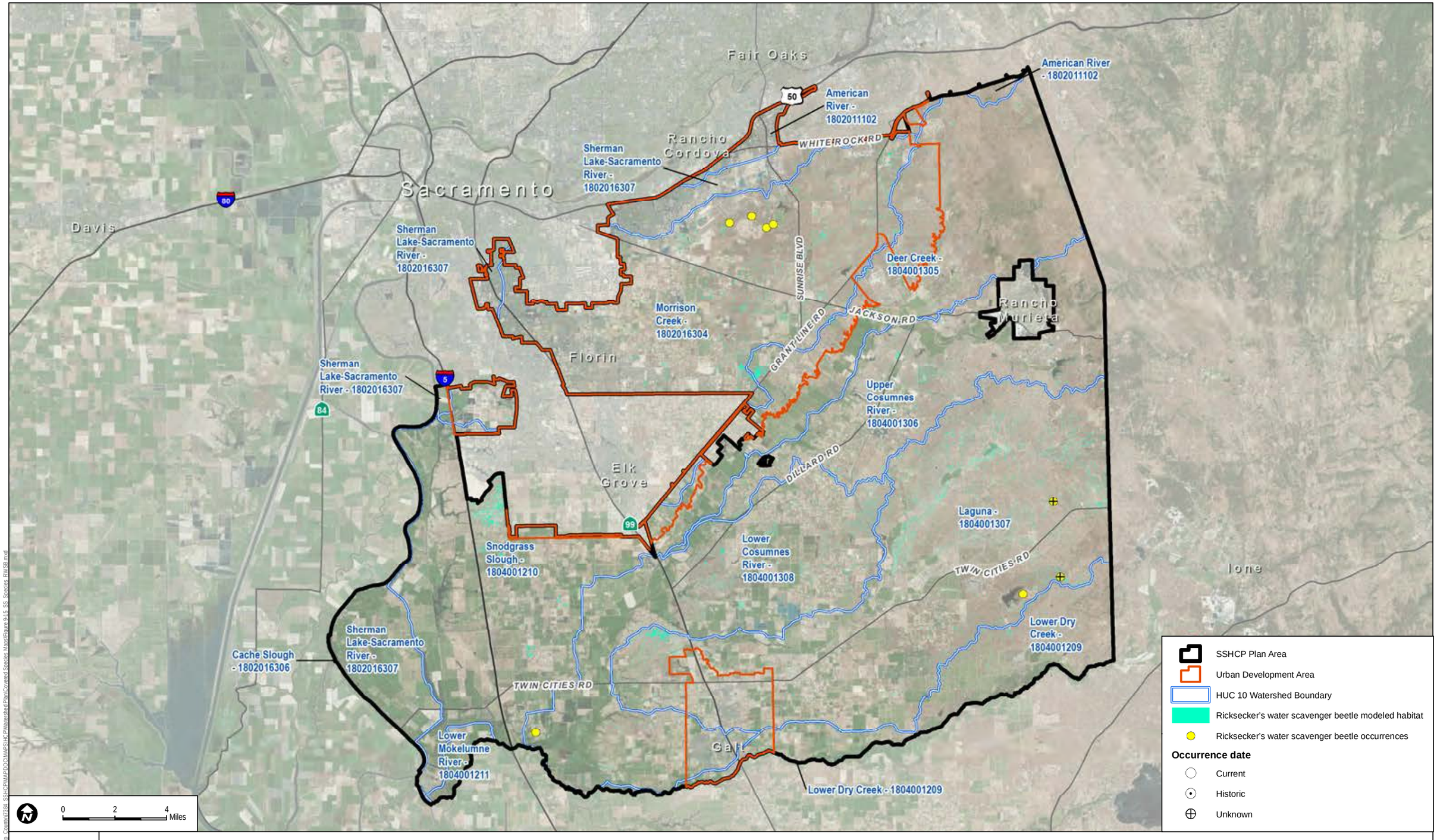
Midvalley Fairy Shrimp Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-14_SS_Species_MVFS.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, Chris Rogers 2000, TNC, USGS 2013 NHD

FIGURE 9-15

Ricksecker's Water Scavenger Beetle Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

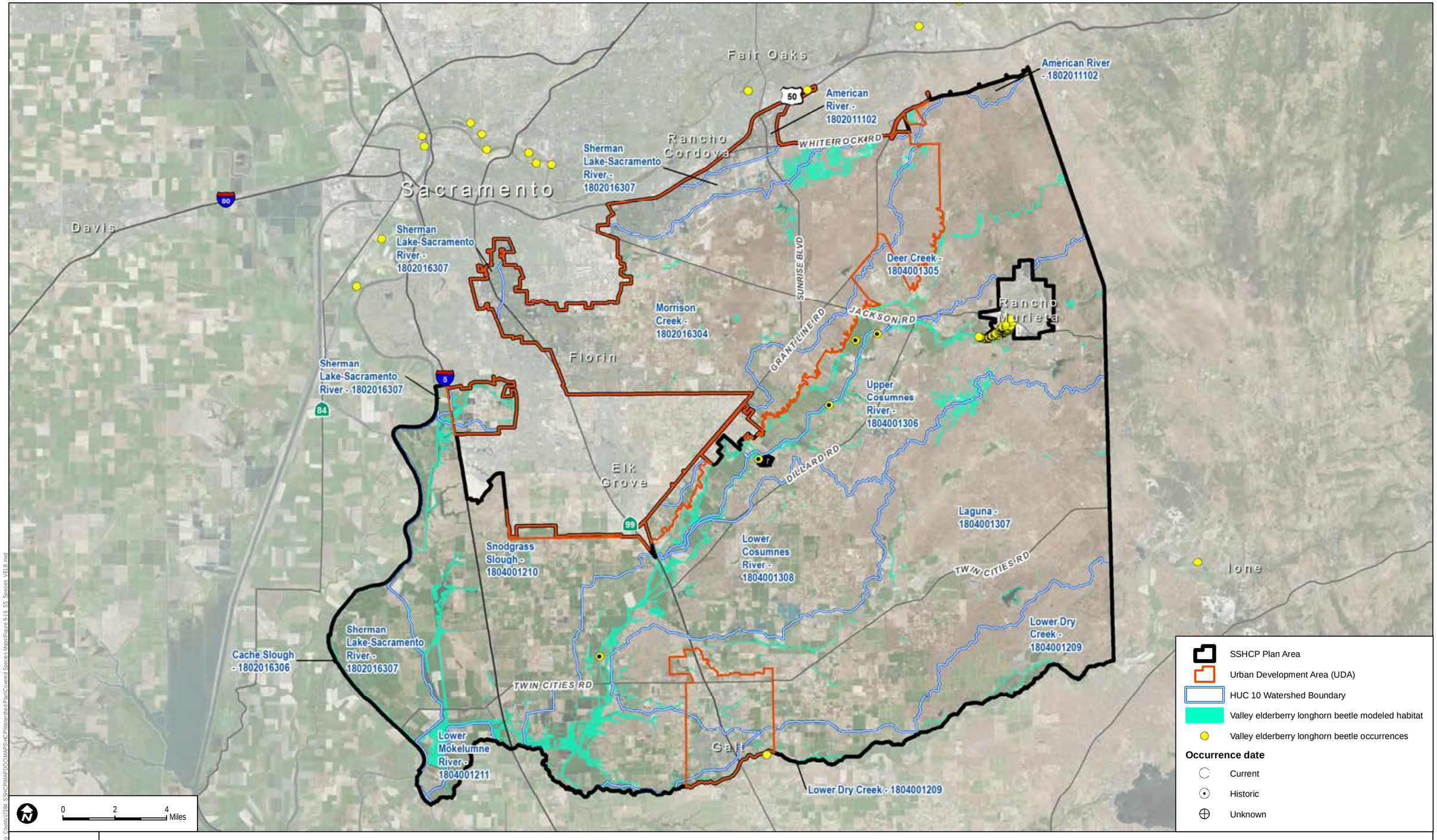
NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

AGENDA ITEM 11.1

2858

Path: Z:\Projects\Sacramento_County\239d_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-15_SS_Species_RWSB.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, T. Talley 2003, USGS 2013 NHD

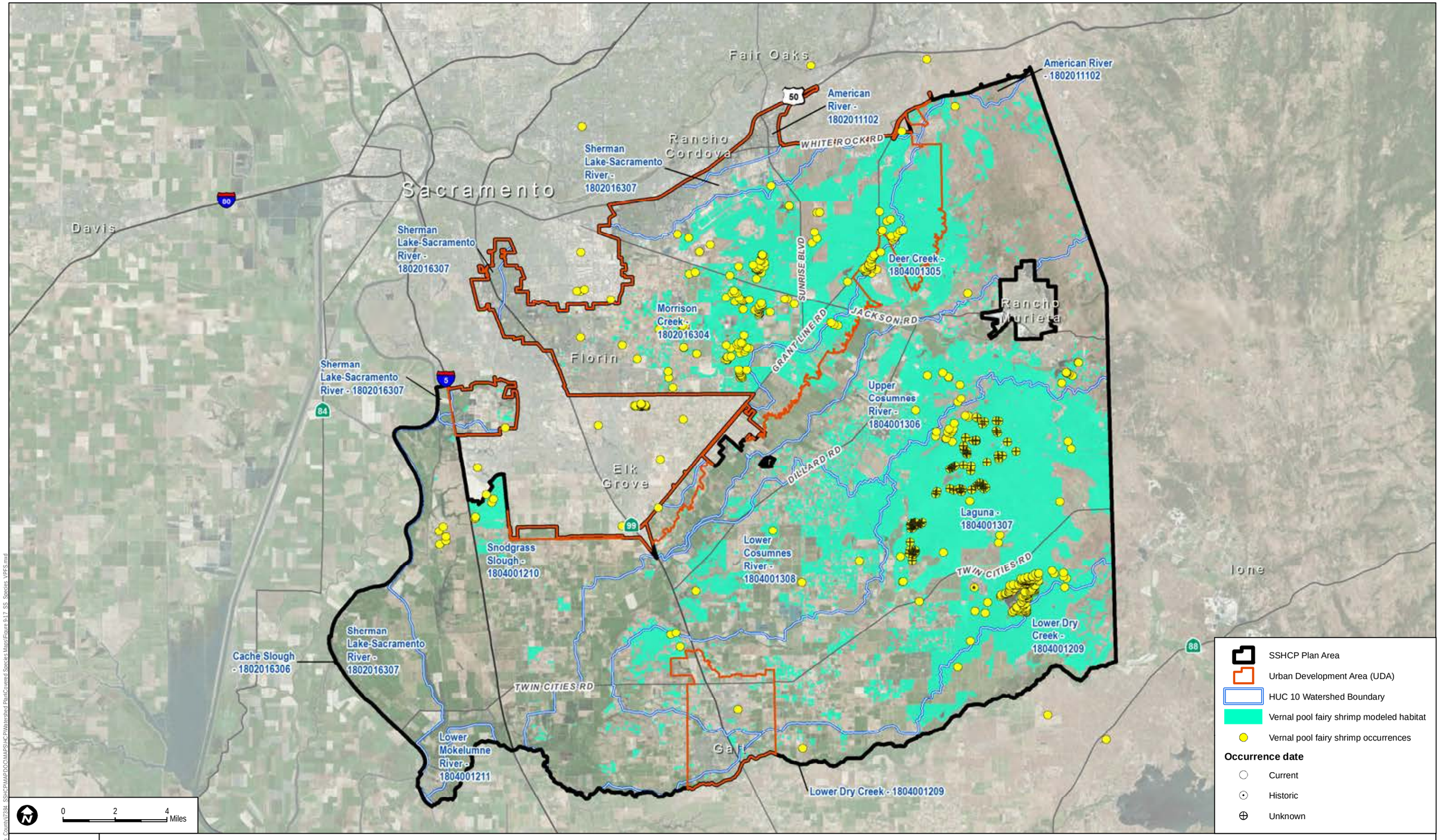
FIGURE 9-16

Valley Elderberry Longhorn Beetle Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2294_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-16_SS_Species_VELB.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-17_SS_Species_VPFS.mxd

SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, ECORP 2009, EcoAnalysts 2008, Foothill Associates 2011, Helm 2007, Kassis-Sylva 2011, Gibson & Skordal 1994, Sugnet 1996, Richard Hill 1999 Kiefer 2011, LSA 2011, Vollmar 2011, USFWS 2014, Wildlands 2010, USGS 2013 NHD

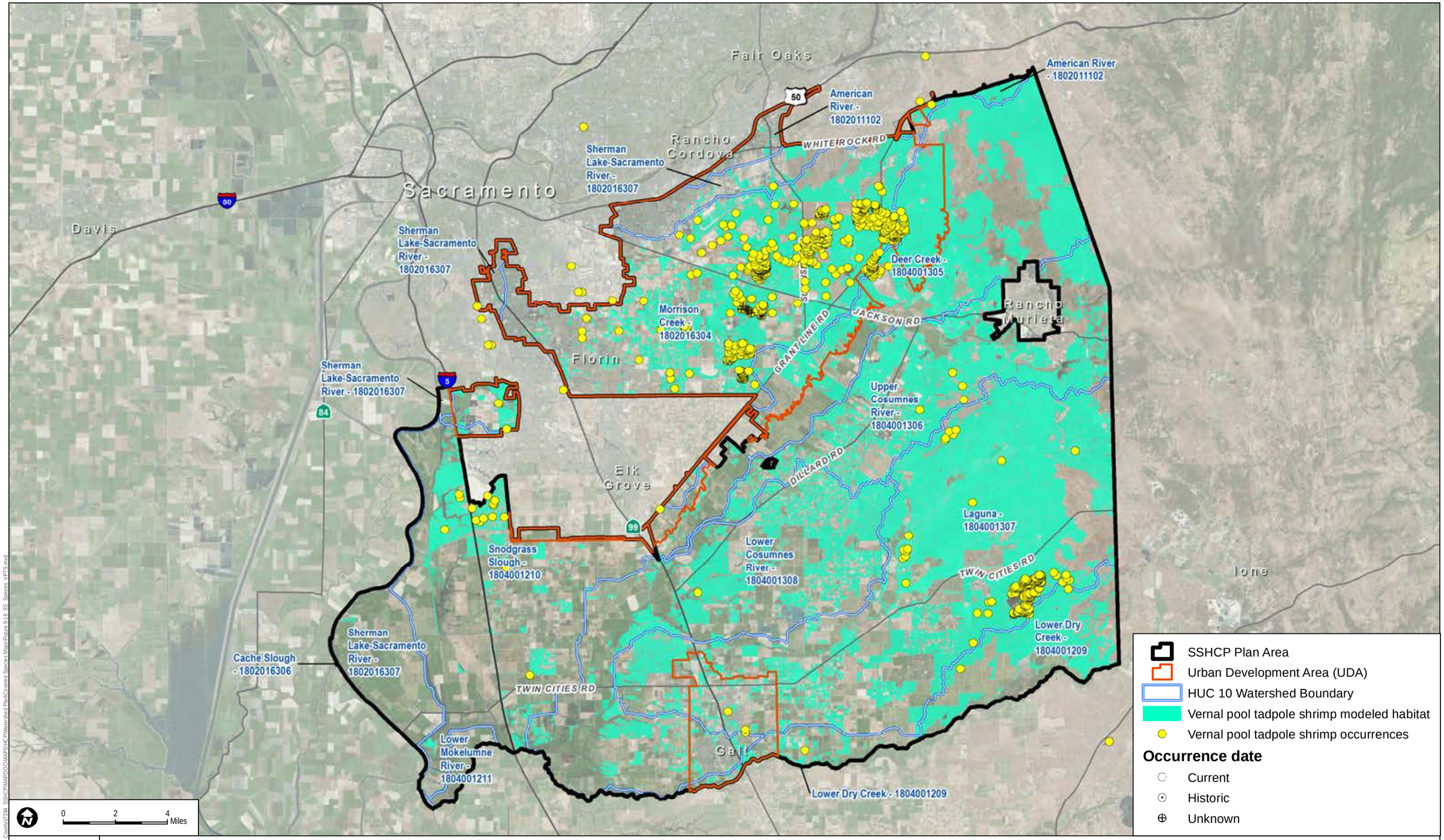
DUDEK

FIGURE 9-17

Vernal Pool Fairy Shrimp Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, C. Witham 2011, C. Little 2011,ECORP 2012, EcoAnalysts 2008, Foothill Associates 2011, Gibson & Skordal 2011, Helm 2011, Richard Hill 1999, Sugnet & Associated 1997, Kassiss-Sylva 2011, Kiefer 2011, LSA 2009, USFWS 2014, Vollmar 2011, Wildlands 2010, USGS 2013 NHD

DUDEK

FIGURE 9-18

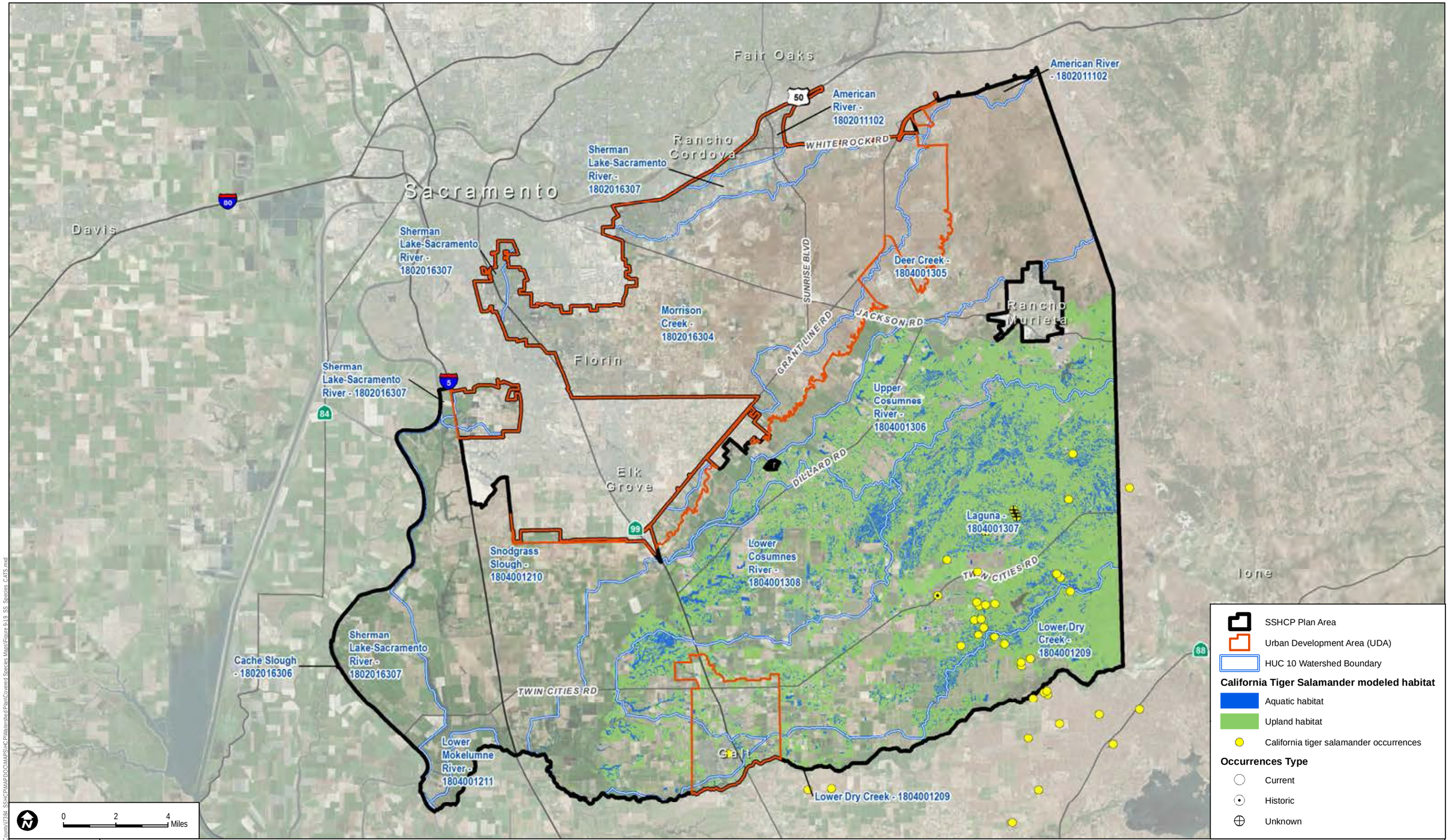
Vernal Pool Tadpole Shrimp Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2084_SSHCP\MAPPDOCS\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-18_SS_Species_VPTS.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, USGS 2013 NHD

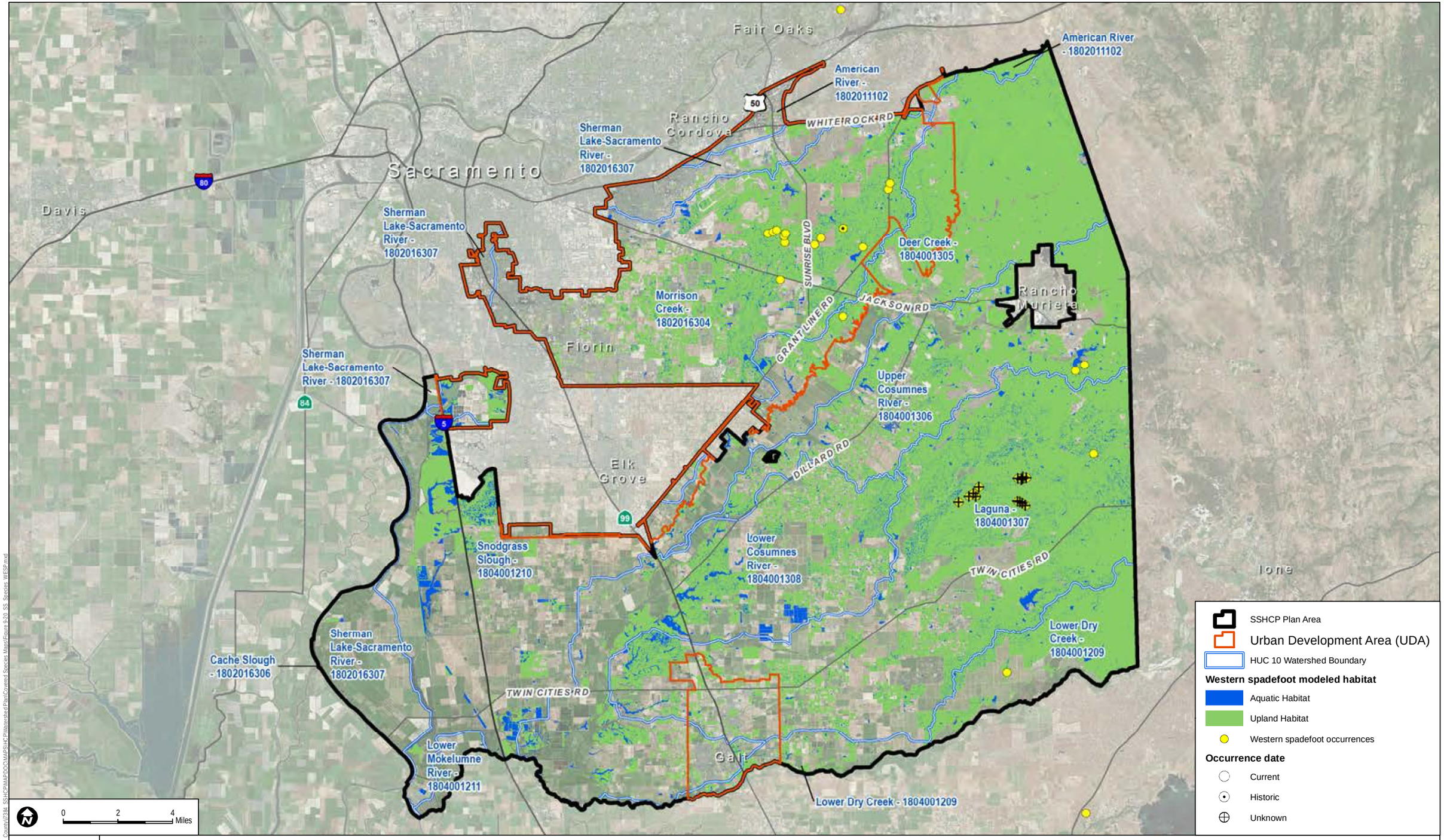
FIGURE 9-19

California Tiger Salamander Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2304_SSHCP\MAPS\CM\MPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-19_SS_Species_CATS.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\2014_SSHCP\MAPS\CM\MPSSHC_PWatershed Plan\Covered Species Maps\Figure 9-20_SS_Species_WESP.mxd

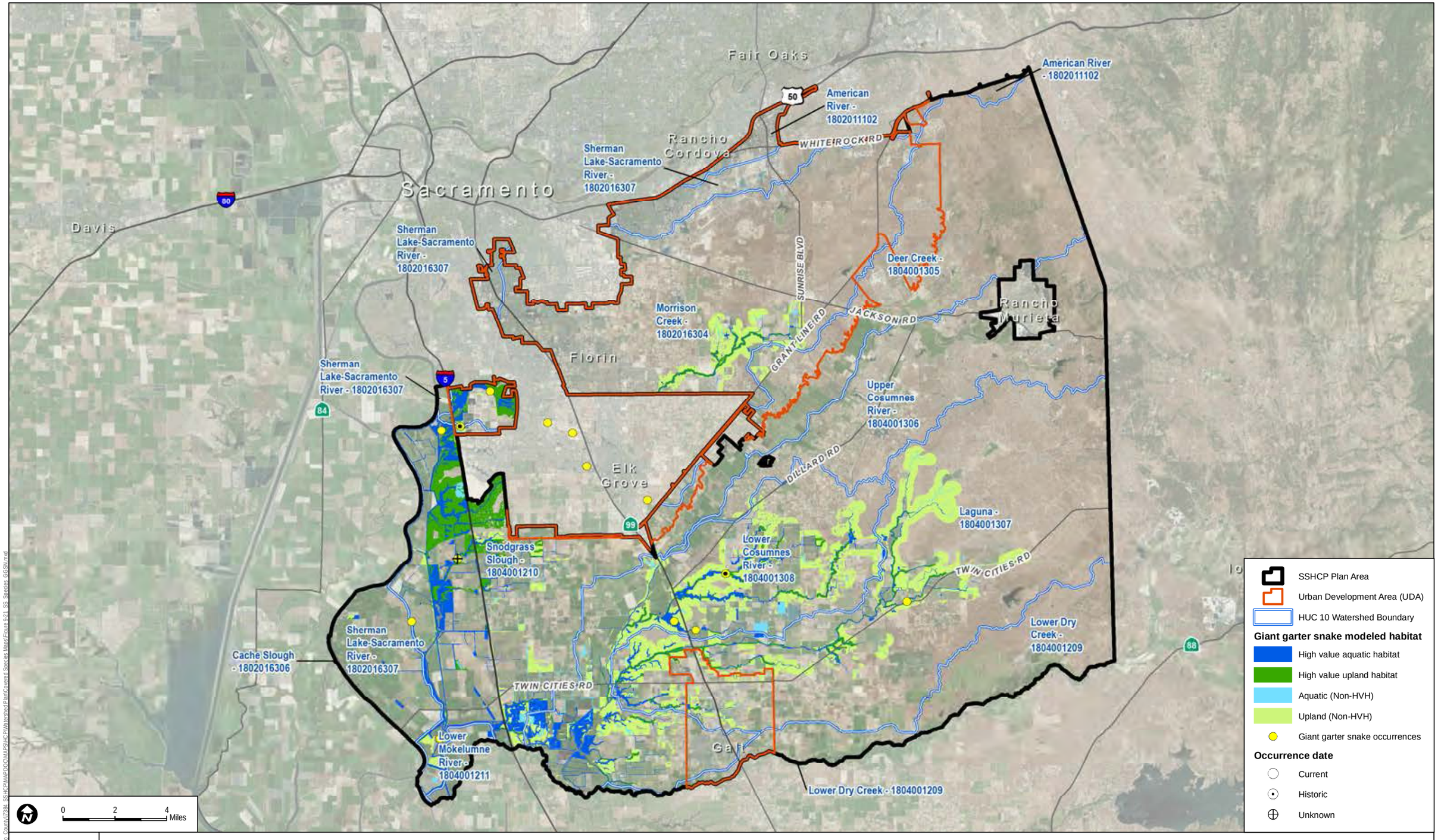
SOURCE: Bing Maps, County of Sacramento 2014, CNDDB 2012, CNPS 1999, USGS 2013 NHD

FIGURE 9-20

Western Spadefoot Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\2294_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-21_SS_Species_GGSN.mxd

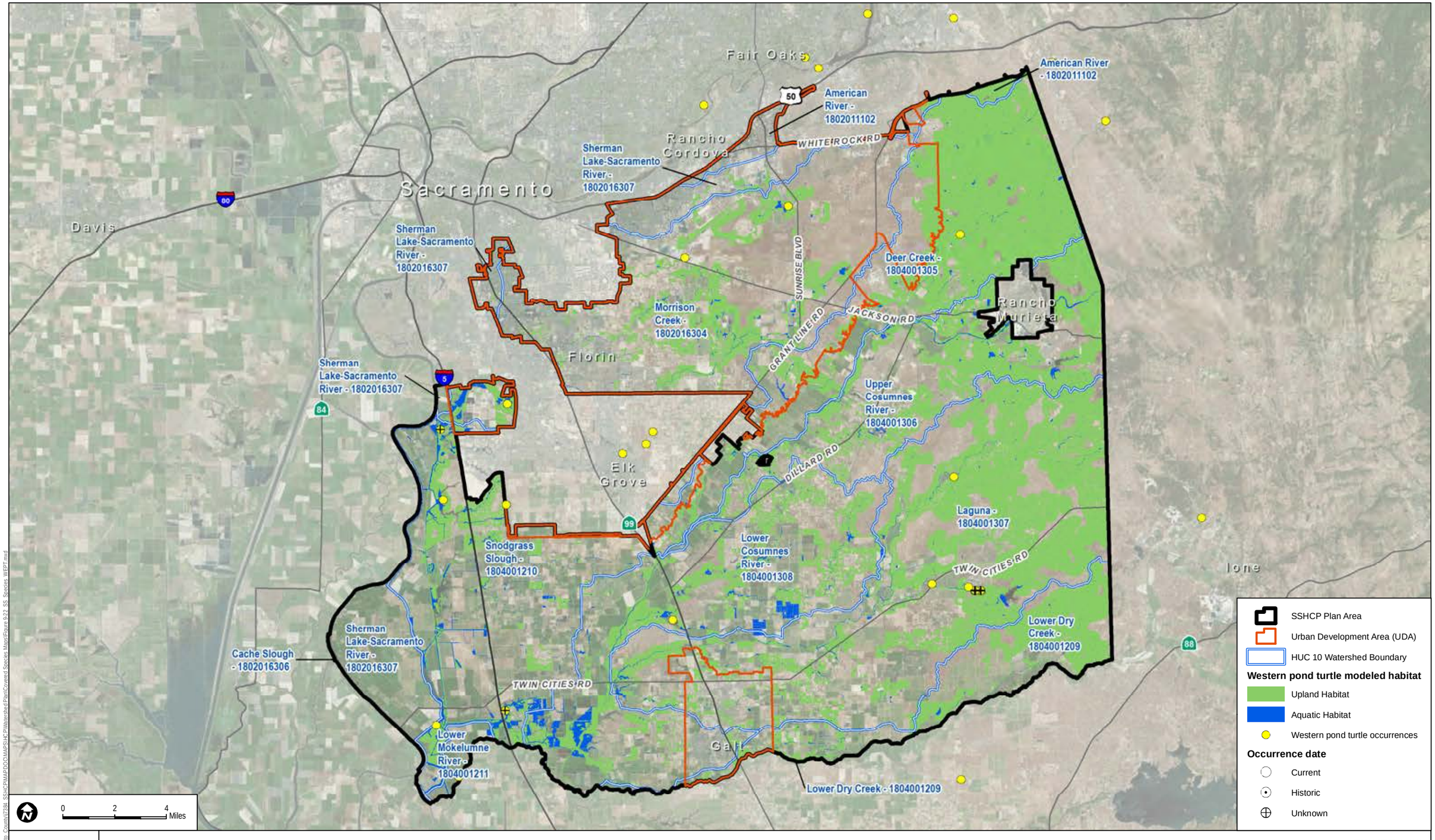
SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, CNPS 1999, USGS 2013 NHD

FIGURE 9-21

Giant Gartersnake Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2014, USGS 2013 NHD
CDFG 2012, CH2MHILL/Garcia & Associates, EIP Associates

DUDEK

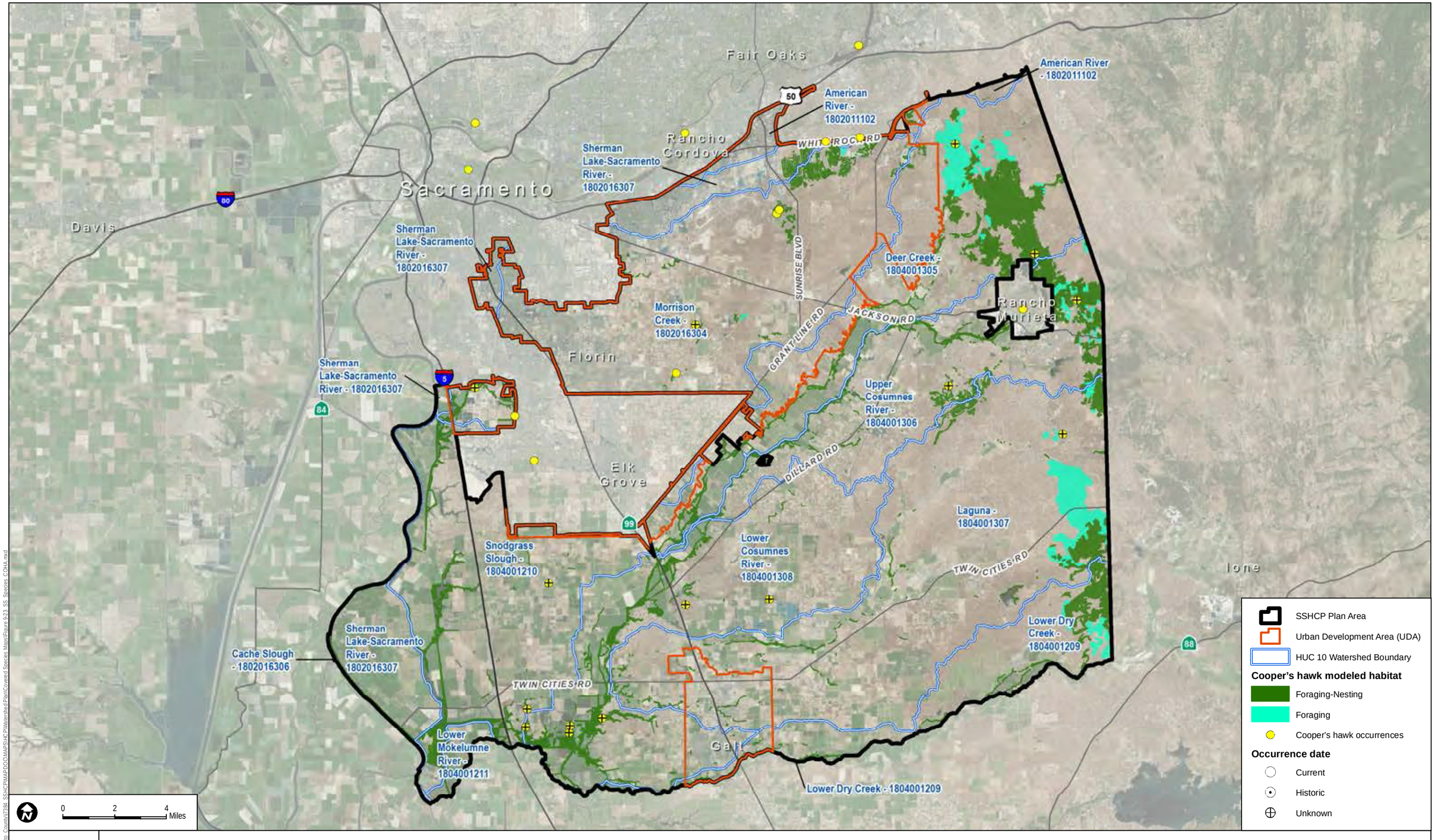
FIGURE 9-22

Western Pond Turtle Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7295_SSHCP\MAPDOC\MAPS\HCPWatershed Plan\Covered Species Maps\Figure 9-22_SS_Species_WPT.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org, USGS 2013 NHD

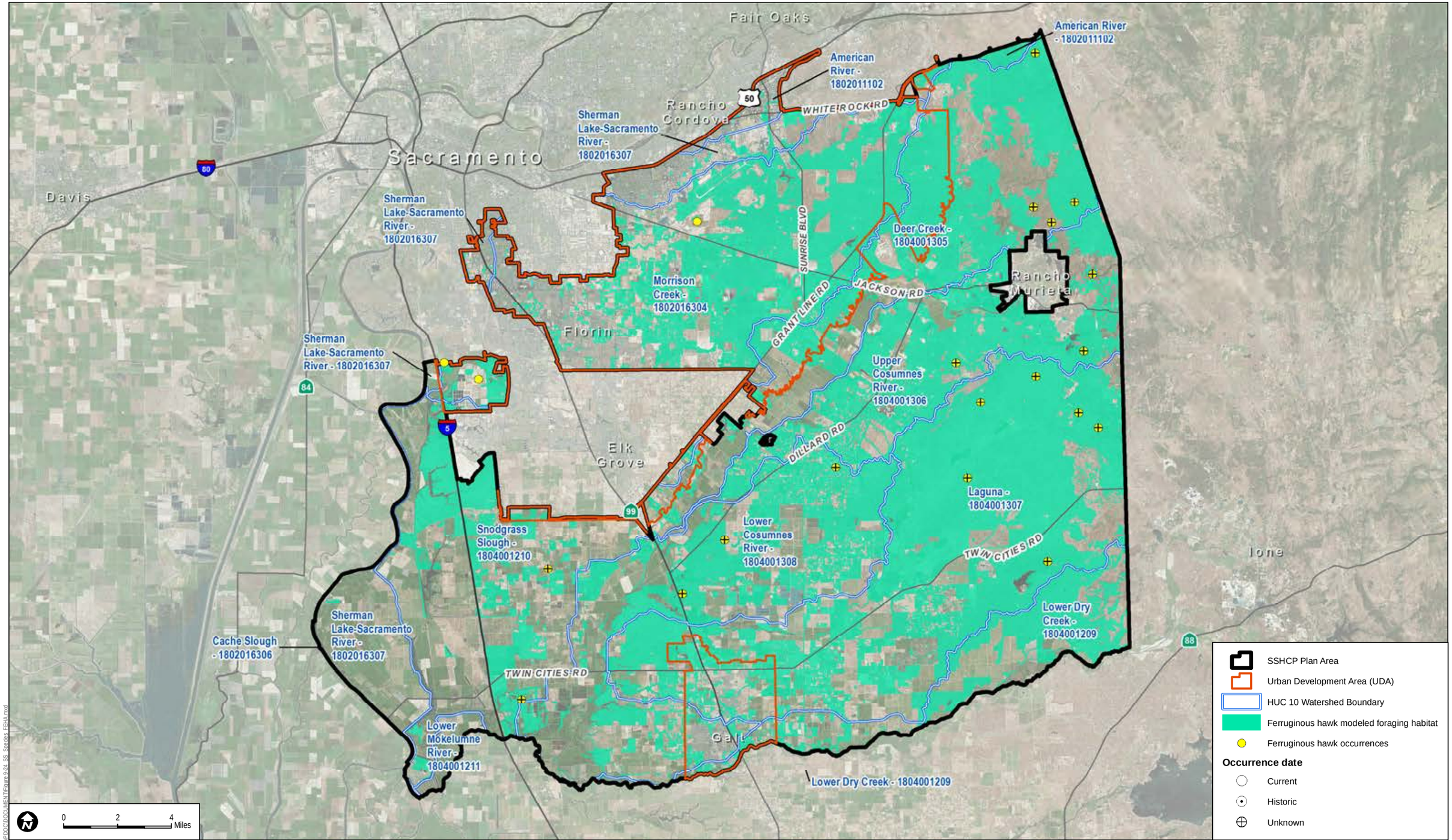
FIGURE 9-23

Cooper's Hawk Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MXD\SHCPWatershedPlan\Covered Species Maps\Figure 9-23_SS_Species_COHA.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org, USGS 2013 NHD

FIGURE 9-24

Ferruginous Hawk Modeled Habitat and Known Occurrences

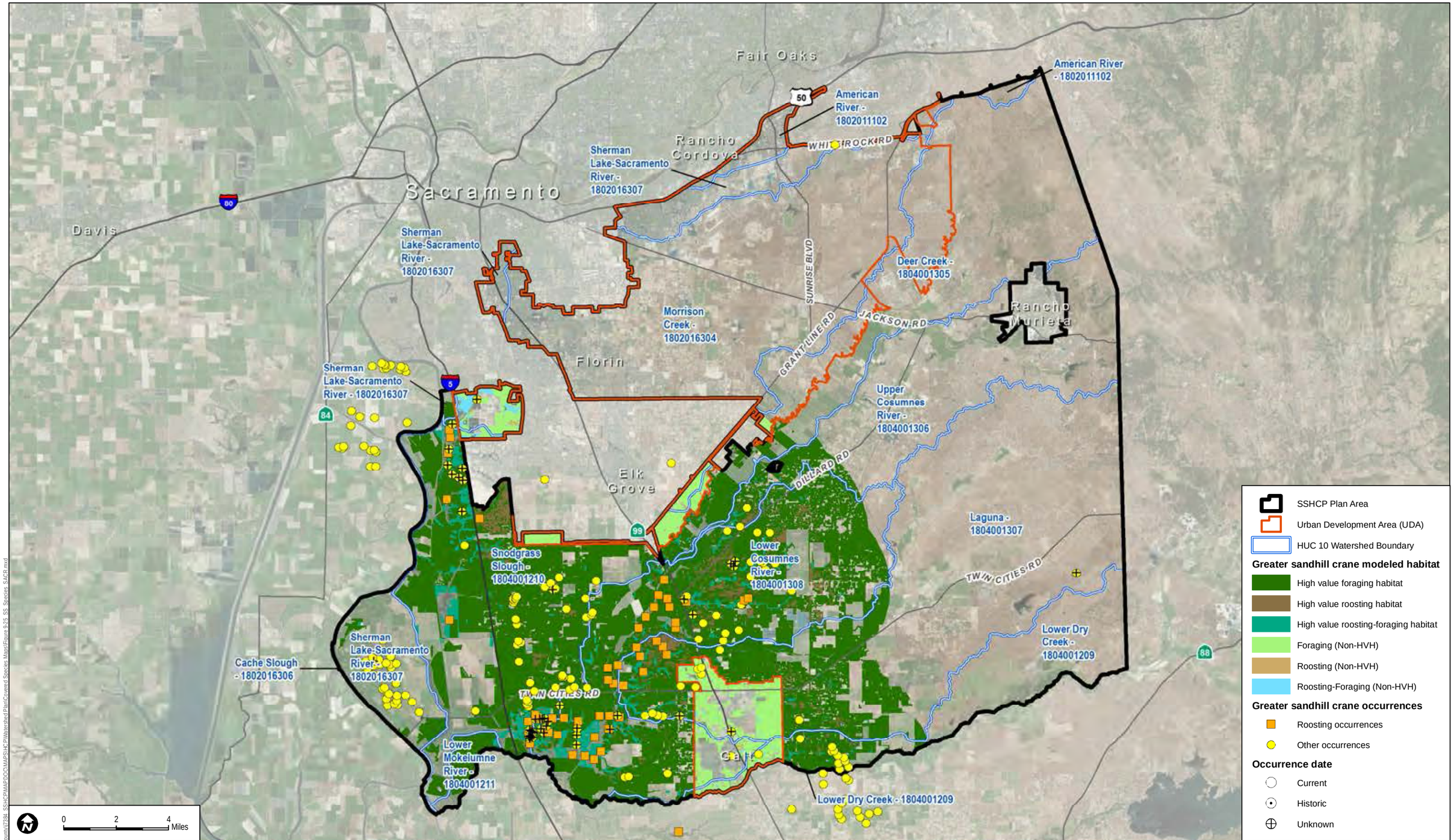
DUDEK

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\P2145\MAP\DOCUMENT\Figure 9-24_SS_Sierras_FEHA.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, TNC 2000, Ivey 2003, Pogson & Lindstedt 2005, ebird.org, ICF 2013, USGS 2013 NHD

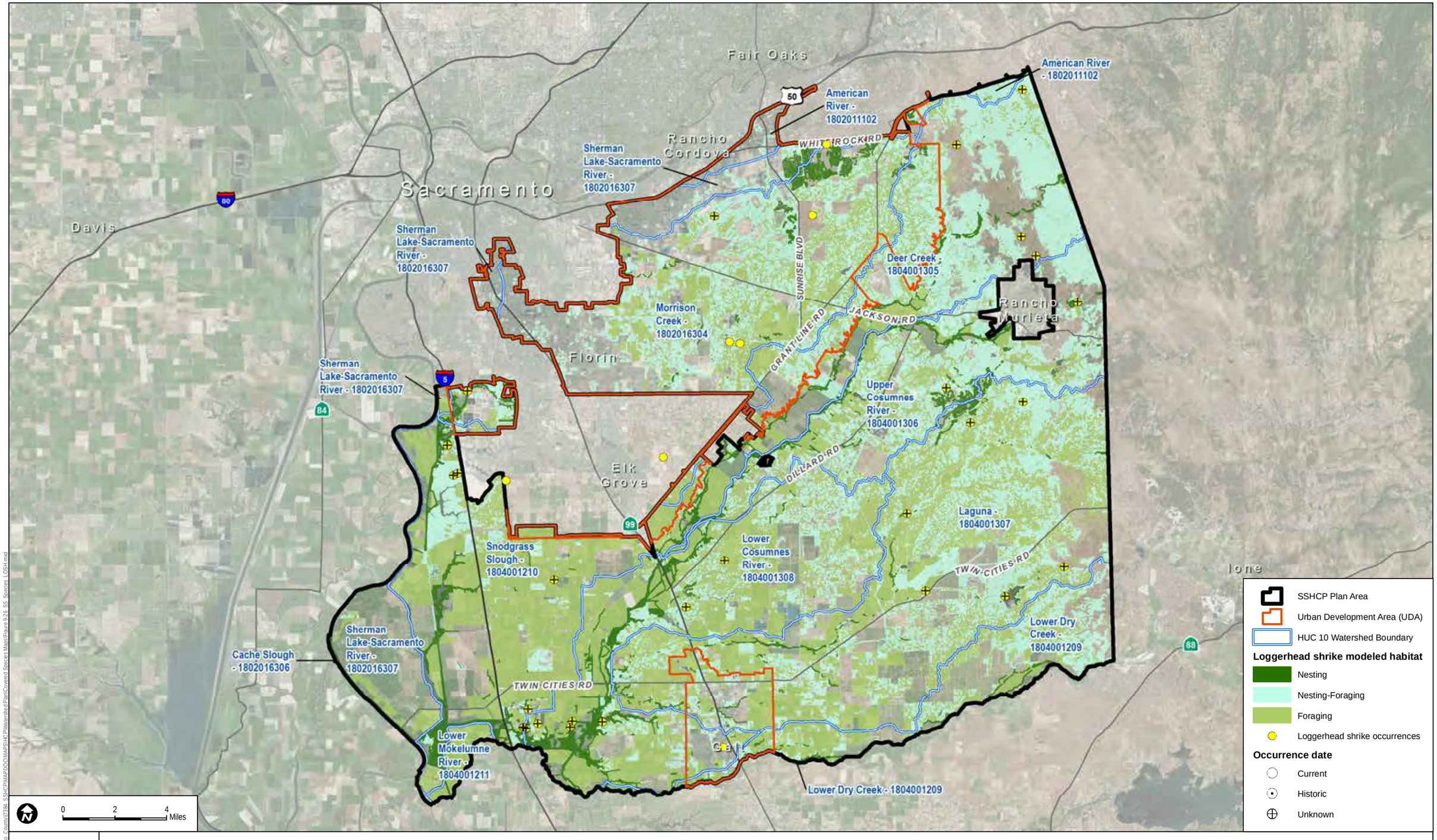
FIGURE 9-25

Greater Sandhill Crane Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7208_SSHCP\MAPDOC\MAPS\HCPWatershed Plan\Covered Species Maps\Figure 9-25_SS_Species_SACR.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

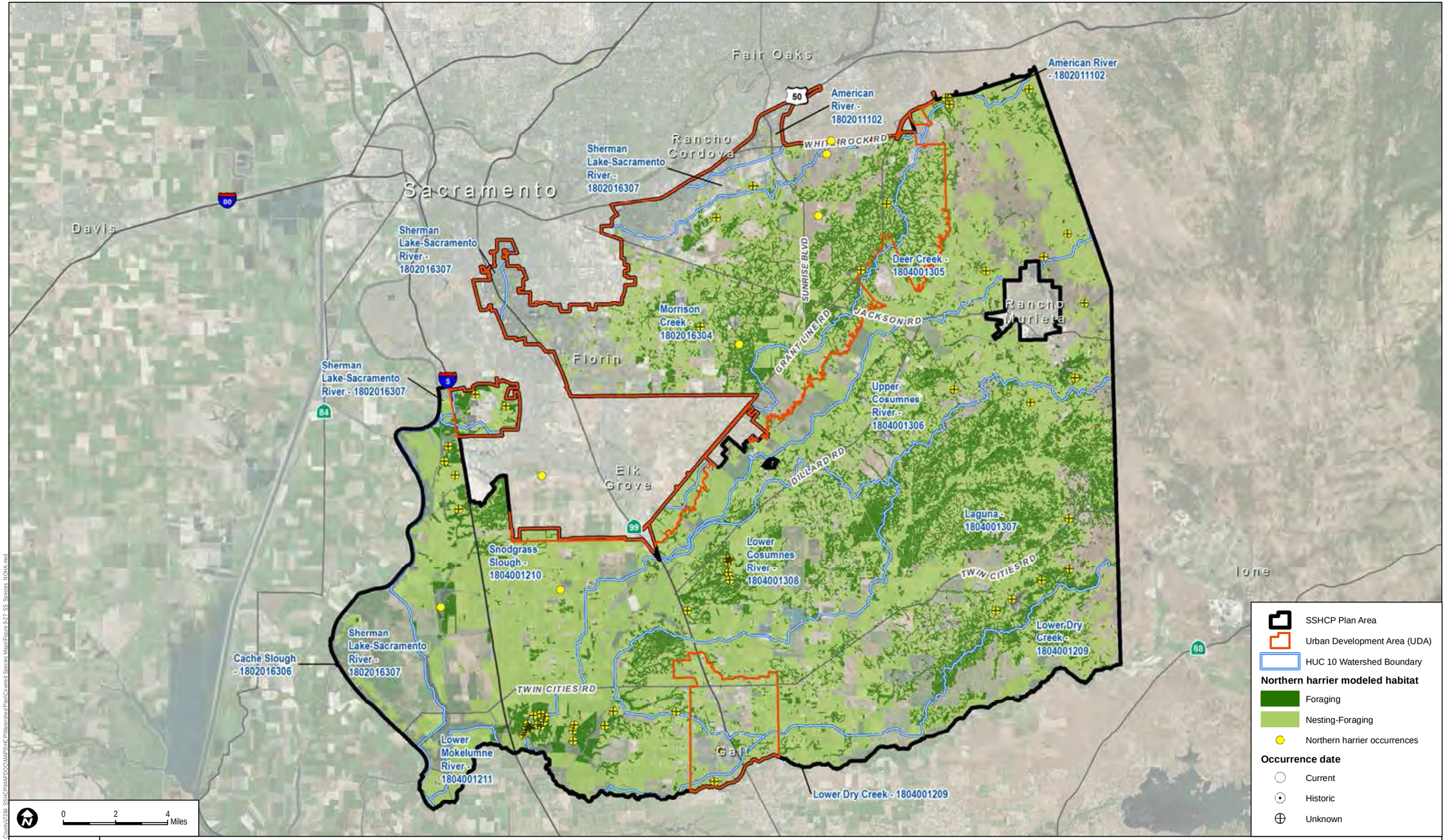
FIGURE 9-26

Loggerhead Shrike Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-26_SS_Species_LOGH.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, ebird.org, USGS 2013 NHD

FIGURE 9-27

Northern Harrier Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

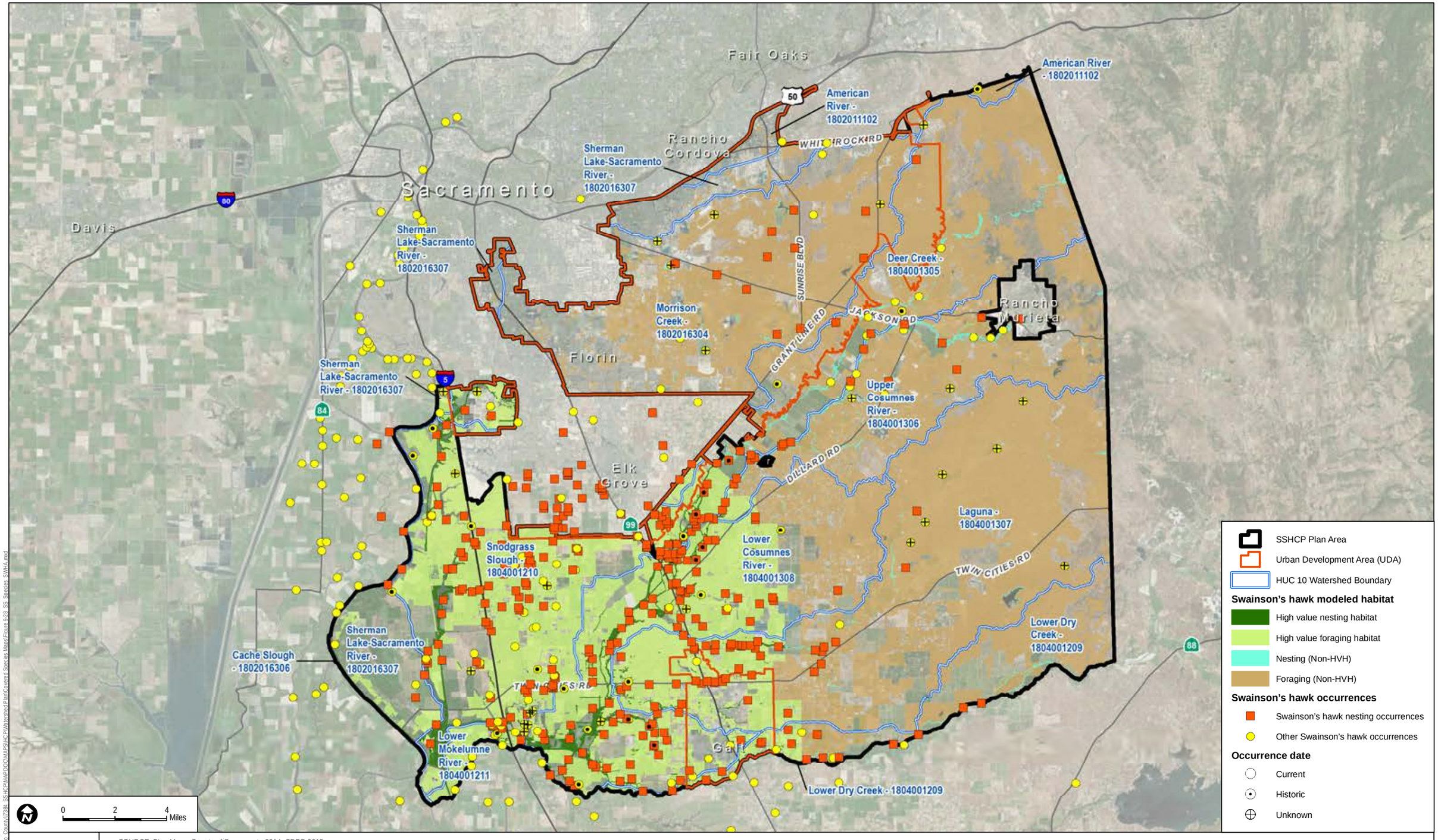
NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

AGENDA ITEM 11.1

2882

Path: Z:\Projects\Sacramento County\7398 SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-27 SS Species NOHA.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, BIOS 2012, ESTEP Environmental 2006, ebird.org, USGS 2013 NHD

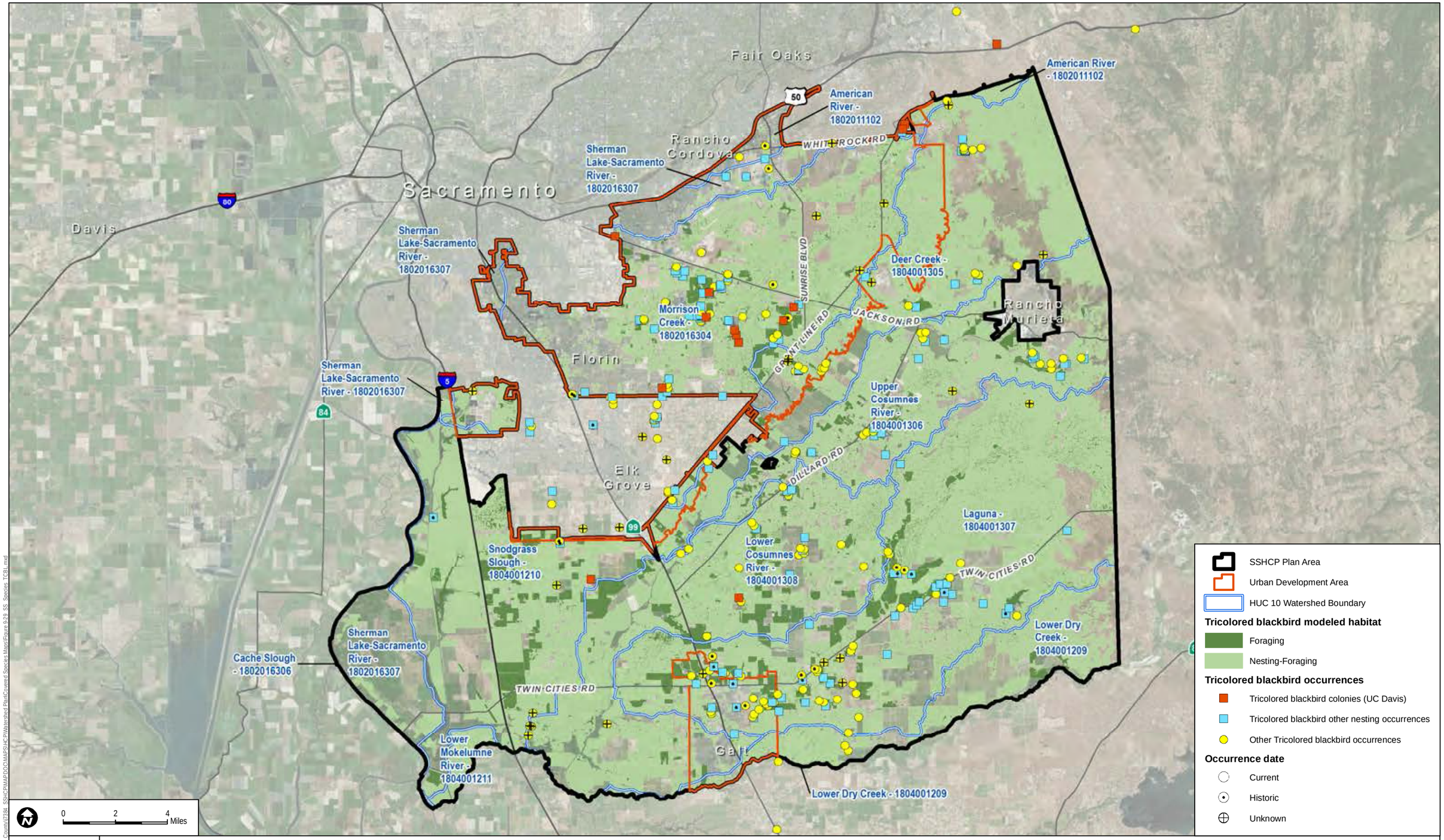
FIGURE 9-28

Swainson's Hawk Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7295_SSHCP\MAPDOC\MAPS\HCPWatershed Plan\Covered Species Maps\Figure 9-28_SS_Species_SWHA.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\2784_SSHCP\MAPPING\MAPS\PC\Watershed Plan\Covered Species Maps\Figure 9-29_SS_Species_TCBL.mxd

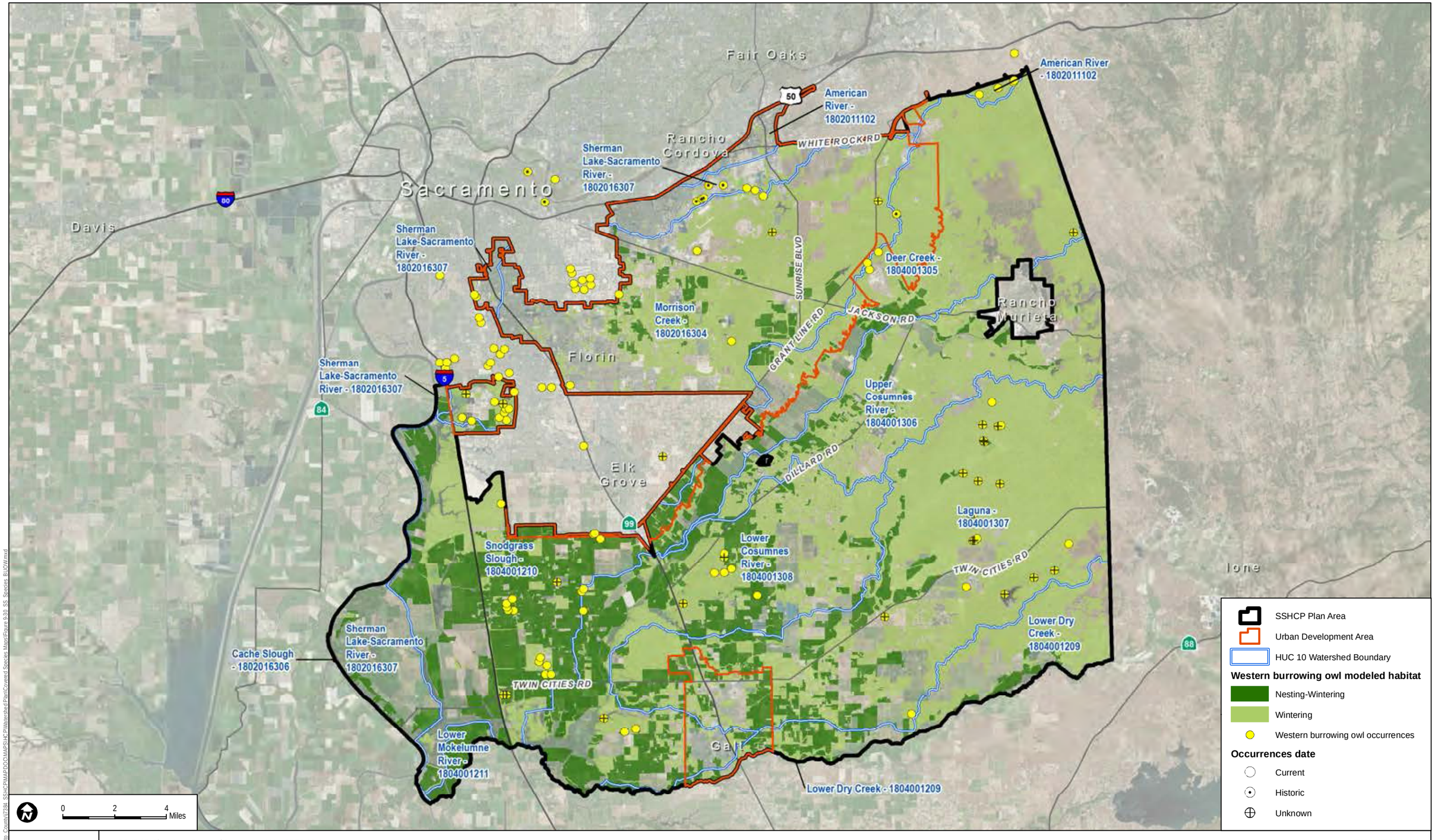
DUDEK

SOURCE: Bing Maps, County of Sacramento 2014, UC Davis 2014, CDFG 2012, BIOS 2012, Lizette Cook 1997, ebird.org, USGS 2013 NHD

FIGURE 9-29

Tricolored Blackbird Modeled Habitat and Known Occurrences

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, Chris Conrad 2004, Ebird.org, TNC, USGS 2013 NHD

FIGURE 9-30

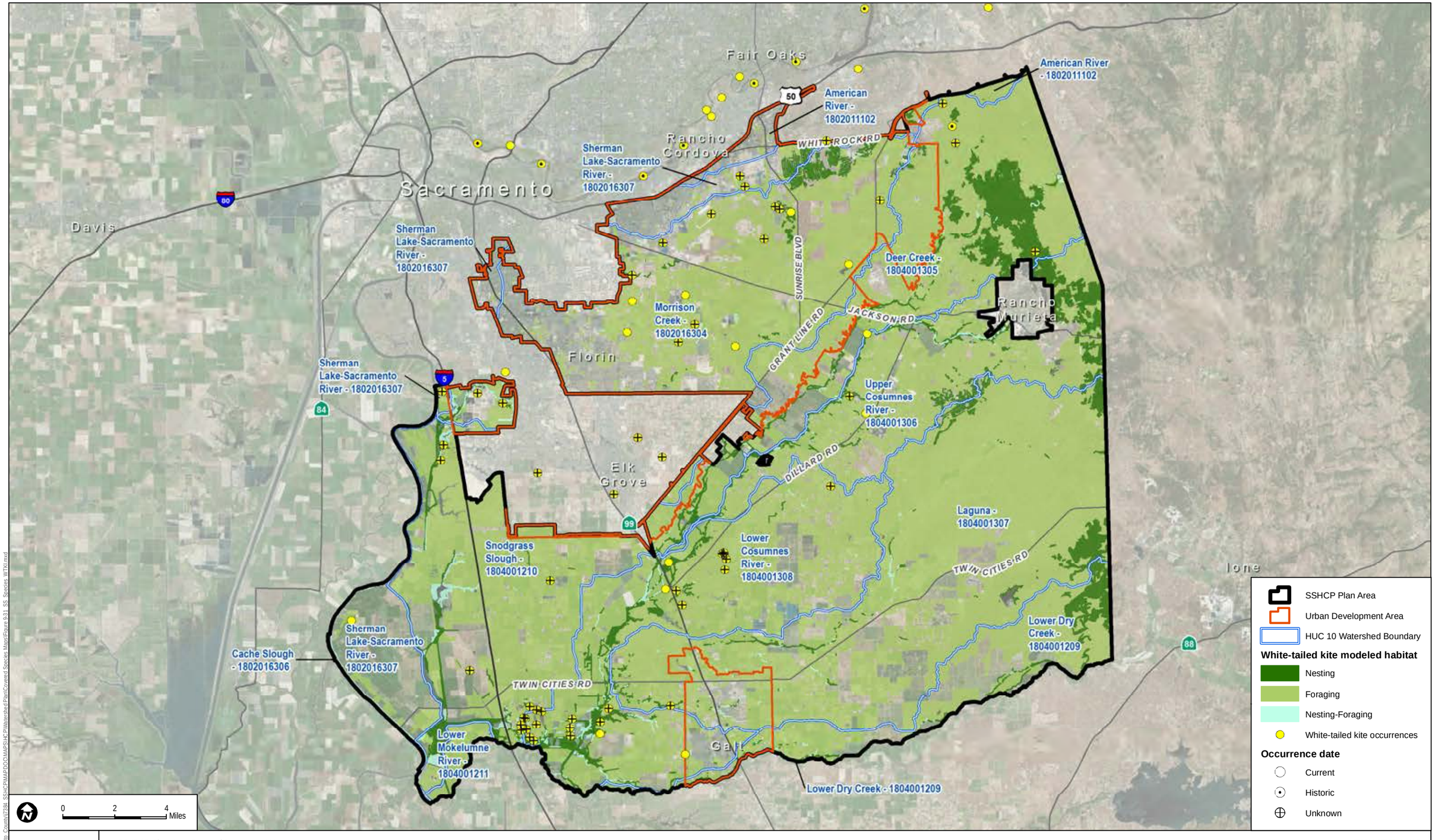
Western Burrowing Owl Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7295_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-30_SS_Species_BUOW.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ESTEP 2006, ebird.org, USGS 2013 NHD

FIGURE 9-31

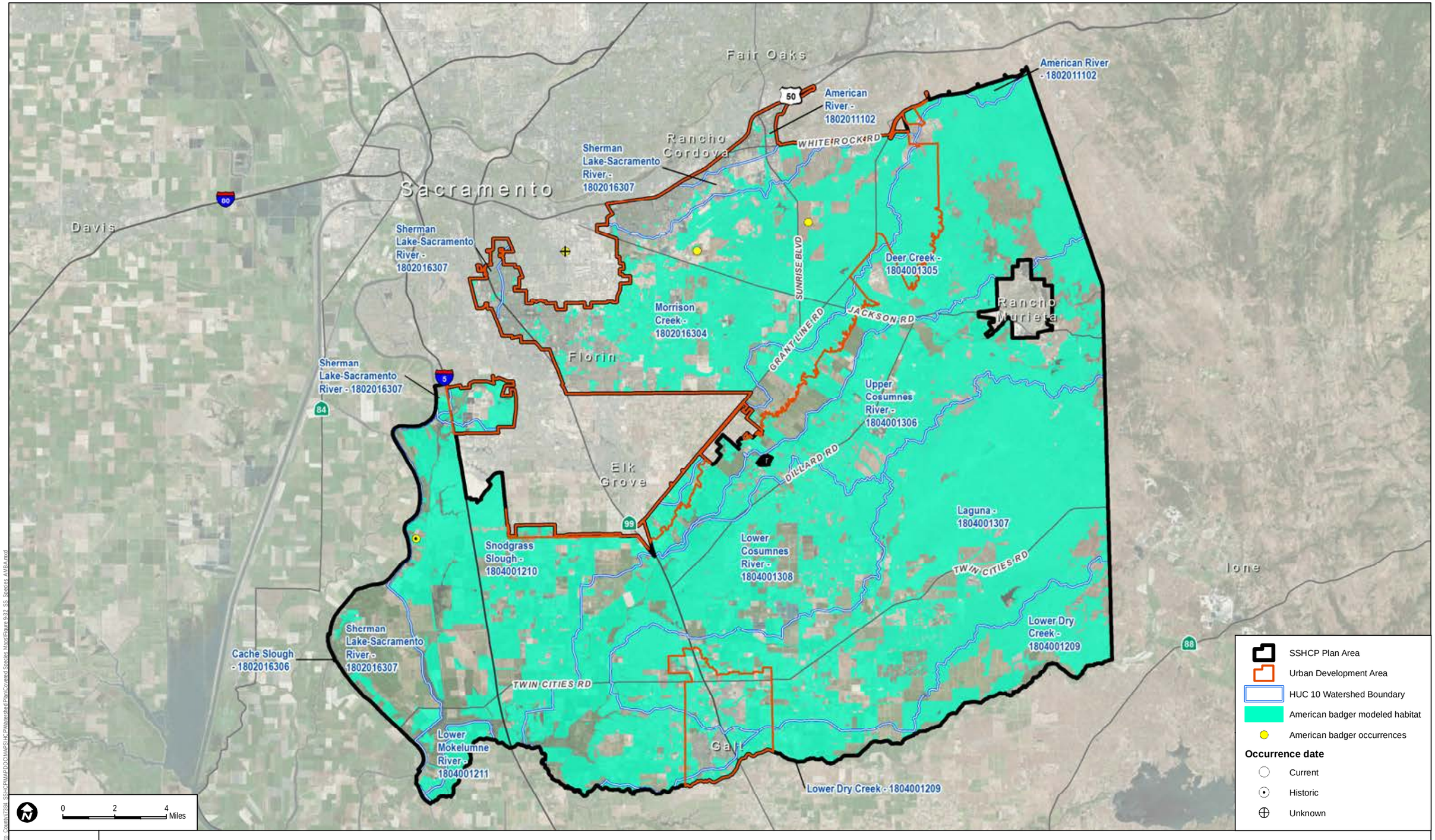
White-Tailed Kite Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7295_SSHCP\MAPDOC\MAPS\HCPWatershed\PlantCovered Species Maps\Figure 9-31_SS_Species_WTKI.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\2936_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-32_SS_Species_AMBA.mxd

SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, USGS 2013 NHD

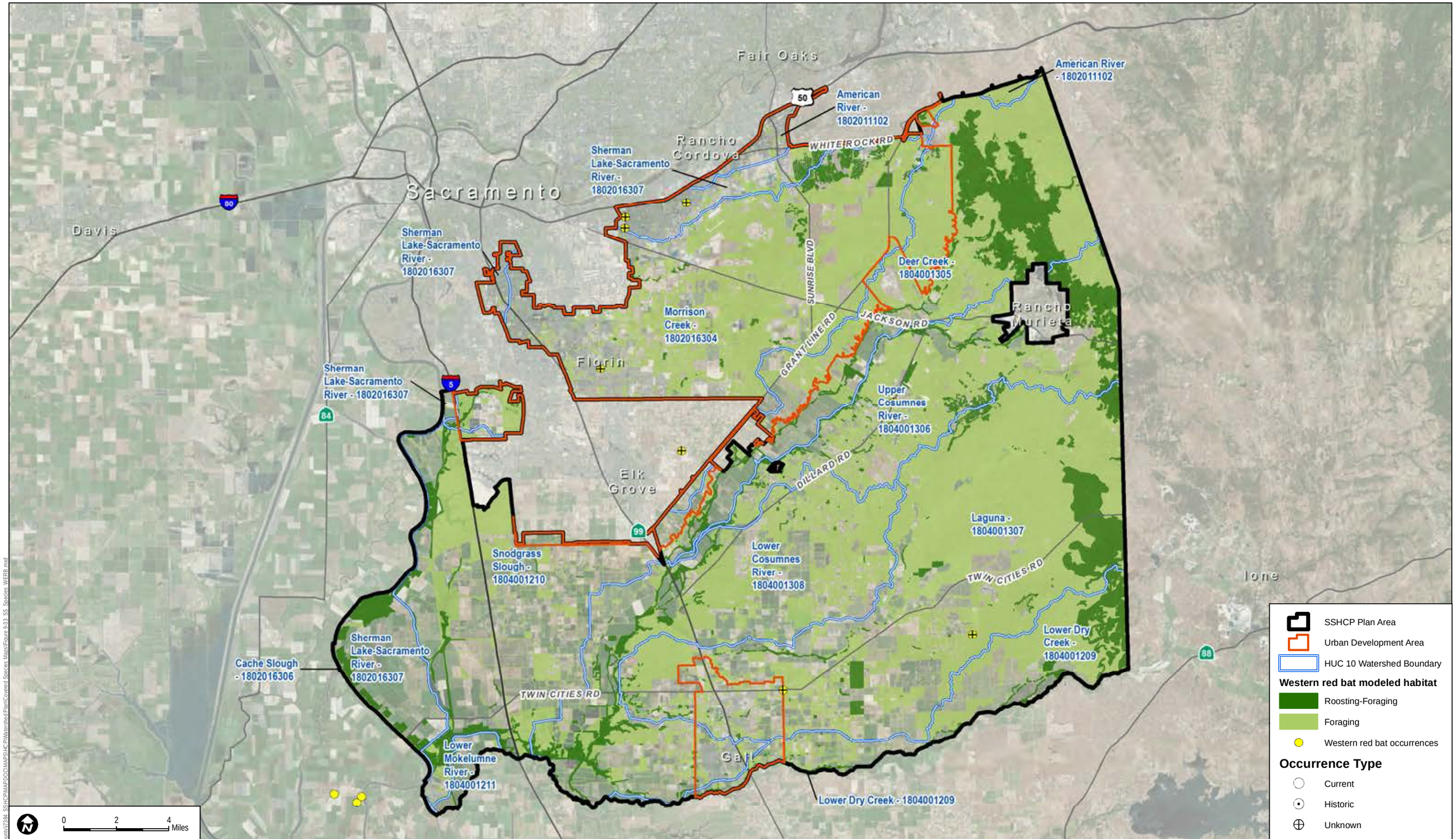
FIGURE 9-32

American Badger Modeled Habitat and Known Occurrences

DUDEK

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, USGS 2013 NHD

FIGURE 9-33

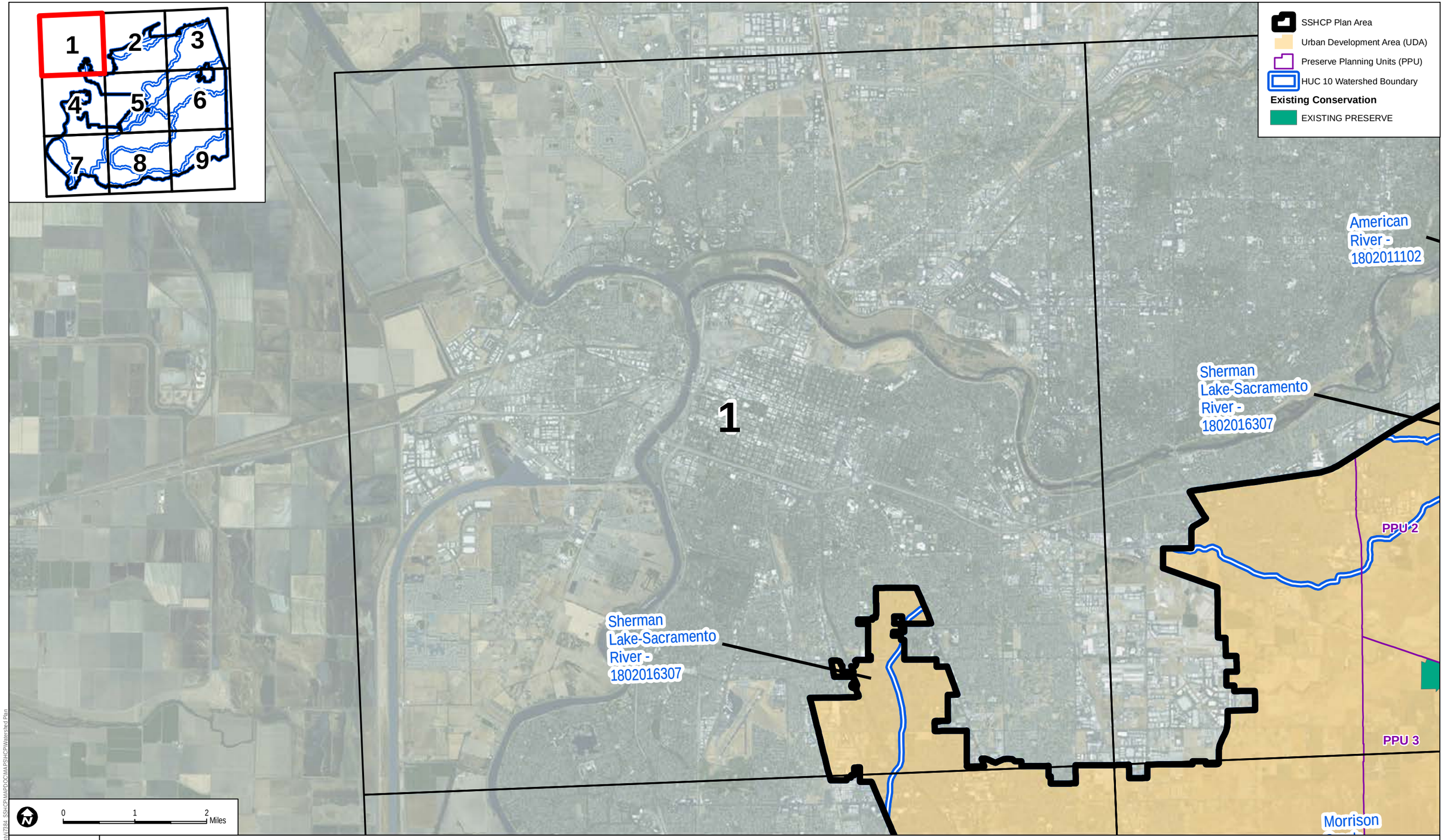
Western Red Bat Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

DUDEK

Path: Z:\Projects\Sacramento_County\7386_SSHCP\MAPDOC\MAPS\HCP\Watershed\PlanCovered Species Maps\Figure 9-33_SS_Species_WERB.mxd

INTENTIONALLY LEFT BLANK



DUDEK

7384

SOURCE: USGS 2013 National Hydrography Dataset (NHD), County of Sacramento 2014

Figure 10 - Reserve Design Map

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

MAP NUMBER 1

Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan

INTENTIONALLY LEFT BLANK

APPENDIX B-1
Vernal Pool Classifications

1 DESCRIPTION OF VERNAL POOLS AND VERNAL POOL COMPLEXES

California vernal pools are a type of seasonal wetland habitat that is characterized by a specific set of physical parameters and a unique assemblage of highly specialized endemic plants and animals. Owing in part to significant loss of this habitat type in the State since the latter part of the 19th century, a number of vernal pool-dependent species are now listed as rare, threatened, or endangered with State and Federal Agencies. California vernal pools and vernal pool complexes have received considerable research attention since first recognition of their unique biota and ecological characteristics in the early 20th century (Stone 1990). Excellent sources of information exist today as a result of numerous scientific investigations, many of which are included or otherwise referenced in published proceedings of four symposia convened over the last 25 years (Jain 1976; Jain and Moyle 1984; Ikeda and Schlising 1990; Witham 1998). Consultant-produced reports pertaining to vernal pool ecology and landscape-scale conservation include Jones and Stokes (1990) and Vollmar (2002). An overview of California vernal pool ecology and biogeography can be found at http://www.maphost.dfg.ca.gov/wetlands/"vp_asses_rept.

The following account provides an overview of vernal pool ecology and conservation as they pertain to analysis and planning needs for the approximately 344,600-acre SSHCP Study Area[1]. As landscape-scale conservation requires, emphasis is placed on the relationships between vernal pool habitat (climate, geology, soils, hydrology, and disturbance) and the associated assemblage of vernal pool-dependent plants and animals, including the 13 species covered by the SSHCP (Table B1-1).

Table B1-1
Vernal Pool Species Covered under the
South Sacramento County Habitat Conservation Plan

Group *Common Name* *Scientific Name*	Status[2]	General Distribution By County or Region[3]	Habitat Associaton[4]
Plants			
Ahart's dwarf rush *Juncus leiospermus* var. *ahartii*	CNPS 1B	Butte, Calaveras, Placer, Sacramento, Yuba	Shallow vernal pools and margins of large pools; 98-328 feet; March-June
Boggs Lake hedge-hyssop *Gratiola heterosepala*	SE, CNPS 1B	Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Shasta, Siskiyou, San Joaquin, Solano, Tehama; Oregon	"Larger" vernal pools, vernal marshes and swamps; 33-7,792 feet; March-August

[1] The "SSHCP Study Area" differs from the "Plan Area" as described in the main body of the SSHCP due to the Sphere of Influence (SOI) boundary changes and the inclusion of the area west of Interstate 5 in the southern portion of the County.

APPENDIX B-1 (Continued)

Table B1-1
Vernal Pool Species Covered under the
South Sacramento County Habitat Conservation Plan

Group *Common Name* *Scientific Name*	Status[2]	General Distribution By County or Region[3]	Habitat Associaton[4]
Dwarf downingia *Downingia pusilla*	CNPS 2	Merced, Mariposa, Napa, Placer, Solano, Sacramento, Sonoma, Stanislaus, Tehama, Yuba; South America	Small to medium vernal pools and swales; 3.3-1,450 feet; March-May
Legenere *Legenere limosa*	CNPS 1B	Lake, Napa, Placer, Sacramento, Shasta, San Mateo, Solano, Sonoma*, Stanislaus*, Tehama	"Larger/deeper" vernal pools; 3.3-2,887 feet; April-June
Pincushion navarretia *Navarretia myersii* spp. *myersii*	CNPS 1B	Amador, Lake, Merced, Sacramento	Small to medium size vernal pools; 66-1,083 feet; April-May
Sacramento Orcutt grass *Orcuttia viscida*	SE, FE, CNPS 1B	Sacramento	"Larger/deeper" vernal pools; 98-328 feet; April-July
Slender Orcutt grass *Orcuttia tenuis*	SE, FT, CNPS 1B	Lake, Lassen, Plumas, Sacramento, Shasta, Siskiyou, Tehama	"Larger/deeper" vernal pools; 115-5,775 feet; May-October
Invertebrates			
Mid-valley fairy shrimp *Branchinecta mesovallensis*	FSC	Southern Sacramento County, west to Solano and Contra Costa County, along east side of the Central Valley south to Fresno County	Small to medium vernal pools, rarely vernal swales.
Ricksecker's Water Scavenger Beetle *Hydrochara ricksecker*i	FSC	Alameda, Marin, Placer, Sacramento, San Mateo, Sonoma	Vernal pools and seasonal wetlands.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	Central Valley, central and southern Coast Ranges, southern Oregon	Small to medium vernal pools, occasionally vernal swales.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	Central Valley from Shasta County to northern Tulare County; endemic to Central Valley	Medium to large vernal pools.
Amphibians			
California tiger salamander *Ambystoma californiense*	ST, FT	Central Valley and Coast Range, from Sonoma to Santa Barbara County	Breeds in vernal pools and ponds; restricted to rodent burrows during dry months.
Western spadefoot *Spea hammondii*	SSC, FSC	Central Valley and Coast Range from eastern Alameda County to northwest Baja California; Mexico	Breeds in vernal pools and ponds, aestivates during dry months in self - made burrows.

Notes:

1. Data compiled from the California Native Plant Society's Inventory of Rare and Endangered Plants of California (2001), and USFWS Federal Register (1994, 1997, 2004a, 2004b).
2. FE: federal endangered; FT: federal threatened; FSC: federal species of concern; SE: state endangered; SSC: state species of concern; CNPS Lists= List 1B: rare, threatened or endangered in California and elsewhere; List 2: rare, threatened or endangered in California, but more common elsewhere.
3. Asterisks represent recorded extirpations.
4. Flowering periods are given for plants in this column.

APPENDIX B-1 (Continued)

1.1 Vernal Pool Habitat, Climate, Landforms, Geologic Formations and Soils

The vernal pool complexes of California are considered to be relatively recent ecological entities, having evolved in the Central Valley landscape after the inland Tertiary-Age sea receded, the late Pleistocene lakes dried, and the present-day Mediterranean-type climate fully developed (Stone 1990; Stebbins 1976; Raven and Axlerod 1978). The vernal pool ecosystem developed and persists as a result of complex relationships between this climate, the region's geology and soils, the vernal pool hydrological cycle, and biological, ecological, and evolutionary processes (Keeley and Zedler 1998; Stone 1990; Holland and Dains 1990).

The annual hydrological cycle that defines the vernal pool wetland ecosystem is driven by the predictable cool wet winters and warm, extremely dry summers that characterize the Mediterranean-type climate of California. In the context of this seasonal regime, vernal pools develop in depressional basins on substrates possessing an impermeable layer that restricts the downward percolation of water through the soil profile. In general, vernal pools are classified by the nature of the water impediment as being hardpan, claypan, or volcanic mudflow-type vernal pools (Holland 1978, 1986; Sawyer and Keeler-Wolf 1995).

Different geologic formations and their associated soils exhibit different propensities for the development of vernal pools (Keeley and Zedler 1998; Holland and Dains 1990; Metz 2001). Further, vernal pools and vernal pool complexes can differ in fundamental physical and biological ways between geologic formations in a given region (Holland and Dains 1990; Smith and Verrill 1998; Platenkamp 1998; Metz 2001; Vollmer 2002; Helm and Vollmar 2002; Laabs et al. 2002; Dittes and Guardino 2002). In addition to landform-specific variance in the soil substrate itself (e.g., particle size fraction, chemistry, depth to hardpan, water retaining capacity, etc.), sub-watershed drainage area, pool size, shape, ponding depth, ponding duration, soil dry-down rates and other hydrological dynamics appear to be related to Geologic Formation (Metz 2001; Smith and Verrill 1998; Hobson and Dahlgren 1998).

Particular geologic formations possess specific biogeographic legacies (e.g., ages, centers of evolutionary origin and diversification, available refugia during long-term extreme climatic cycles, anthropological land management history, etc.); these being reflected in present day patterns of biodiversity (Holland and Dains 1990; Dittes and Guardino 2002).

In the SSHCP Study Area, 18 different geologic formations support vernal wetlands. These geologic formations are listed in Table B1-2 and are further described in Section 3.

APPENDIX B-1 (Continued)

Table B1-2
Summary of Landforms, Geologic Formations and Soils in the SSHCP Study Area, with Associated Attributes

Landform	Geologic Formation	Period/Epoch	Age[2] (Ma)	Parent Material/Description
Other	Metamorphic Rocks, Undifferentiated (pKu)	Pre-Cretaceous	Prior to 145	Composed of amphibolite, greenstone, vein quartz, slate, and shale.
High Terrace	Ione (Ti)	Eocene	35-55	Quartz sandstone deposited along ancient inland seashore
Mudflow/Lavaflow	Valley Spings (Tvs)	Oligocene/ Miocene	5-35	Cemented rhyolitic tuff deposited as fluvial clay, silt, and sand
Mudflow/Lavaflow	Mehrten (Tm)	Miocene / Pliocene	2-25	Moderately undurated fluvial sand, silt, and minor gravel alluvium, presumably from reworked andesitic volcanic mudflow deposits to the northeast
High Terrace	Laguna (Tl)	Late Pliocene	2	Weakly to moderately indurated granitic alluvium (sand, silt and minor gravel)
High Terrace	North Merced Gravel (Qtnm)	Late Pliocene / Early Pleistocene	1-2	Thin, locally derived pediment veneer of cobble gravel on very high terraces capping Tertiary and pre-Tertiary rocks, deposited through outwash of Sierra Nevada glaciation
High Terrace	Turlock Lake (Tpl)	Late Pliocene / Early Pleistocene	1-2	Weakly indurated granitic alluvium (sand, fine sand, minor clay and gravel)
Low Terrace	Riverbank Undivided (Qr)	Pleistocene	0.1	Interbedded granitic sand, silt and clay, with metamorphic channel gravels
Low Terrace	Riverbank, Lower Unit (Qrl)	Pleistocene	0.1	Granitic alluvium (sand, silt, clay and gravel)
Low Terrace	Riverbank, Middle Unit (Qrm)	Pleistocene	0.1	Locally and remotely derived granitic and basic igneous alluvium (sand, silt, ,clay and gravel)
Low Terrace	Riverbank, Upper Unit (Qru)	Pleistocene	0.1	Unconsolidated but compact dark brown to red alluvium
Low Terrace	South Fork Gravels (Qsf)	Pleistocene	0.1	Stream-rounded cobbles and gravels in a clay matrix
Other	Upper Unit Modesto (Qmu)	Upper Pleistocene / Holocene	0.01	Mixture of arkosic sand, gravel, and silt consisting of mainly quartz and feldspar.
Other	Surficial Deposits (Qu)	Holocene	recent	Unconsolidated surficial deposits from mixed alluvial sources
Other	Dredge Tailing and Artificial Fill (t)	Holocene	recent	Rows of cobble, gravel, sand, silt, and clay.
Other	Alluvial Floodplain Deposits (Qfp)	Holocene	recent	Composed of fine sands, silts, and clay
Other	Alluvial Deposits, Undivided (Qha)	Holocene	recent	Composed of cobble, gravel, sand, silt, and clay

APPENDIX B-1 (Continued)

Table B1-2
Summary of Landforms, Geologic Formations and Soils
in the SSHCP Study Area, with Associated Attributes

Landform	Geologic Formation	Period/Epoch	Age[2] (Ma)	Parent Material/Description
Other	Basin Deposits (Qhb)	Holocene	recent	Composed of unconsolidated clay, silt, and fine sands formed in sink areas

Notes:
1 Information compiled from Tugel (1993), Smith and Verrill (1998) and Vollmar.
2 Age estimates of boundaries in mega-annum (Ma).

1.2 The Vernal Pool Hydrologic Cycle

California vernal pools are a subcategory of seasonal wetlands that are characterized by a very specific annual hydrologic regime, which is often cited as the strongest determinant in shaping vernal pool flora and fauna (see Section 1.3). Vernal pool basins transition through four hydro-ecologic phases during the course of a single year: (i) a wetting phase, (ii) an aquatic or inundation phase, (iii) a waterlogged-terrestrial phase, and (iv) a drought phase (Zedler 1987; Keeley and Zedler 1998). This seasonal hydrologic cycle encompasses extremes of inundation and drought, a regime that has been primary in shaping the highly specialized flora and fauna (Stone 1990). To the benefit of native biodiversity, this extreme hydrologic regime has also proven excessively stressful for the majority of non-native plant species that have come to define California's contemporary valley annual grassland habitats.

Differences in ecological function of vernal pools, and in patterns of vernal pool biodiversity are determined in large part by variance in vernal pool hydrologic regimes (Ebert and Balko 1984; Zedler 1987; Holland and Jain 1990; Jones and Stokes 1990; Jokerst 1990; Platenkamp 1998; Keeley and Zedler 1998). The characteristic concentric rings of species that occur around many vernal pools results from timing of germination and maturation relative to the seasonal inundation and dry-down of the pool basin and soil profile (Bliss and Zedler 1998; Keeley and Zedler 1998). Variance in vernal pool hydrology exists within and between pools/complexes within single years (Stone 1990; Holland and Jain 1984; Holland and Dains 1990), and within and among single pools/complexes between years.

A discussion of vernal pool types, or of variance in function of vernal pools requires thinking about the hydrologic regimes in terms of a gradient of inundation and dry-down severity of the pool basin and soil profile. At one end of the topo-hydrologic gradient are "flashy, shallow, small" pools with shallow soils and at the other end are "stable, deep, large" pools with deep soils. At a slightly higher/drier topo-hydrologic position, the "flashy/small" vernal pool type intergrades with less specialized and mostly non-native seasonal wetland species, and then at a slightly higher and drier position, with upland annual grassland vegetation. At a slightly

APPENDIX B-1 (Continued)

lower/wetter topo-hydrologic position, the "stable/large" vernal pool type intergrades with seasonal marsh vegetation, comprised mostly of comparatively common and widespread perennial wetland plant species.

The full spectrum of the vernal pool hydrologic cycle can occur within individual large/deep vernal pools during a typical year. In these larger systems, hydrology similar to that of "flashy-smaller" pools can be associated with the topographic higher and drier edges, and "stable" pool hydrology with the deeper pool basins; the intervening slope is intermediate. In a given vernal pool complex, smaller/flashy pools tend to support a vegetation assemblage that represents a higher/drier subset of the larger/stable pool vegetation assemblage in the same setting.

Although "flashy-smaller" pool hydrology and vegetation can be considered as a subset of the larger pool system, "flashy-smaller" pools likely differ from large pools in a number of physical parameters and ecological functions. This may be reflected in the preference of some vernal pool invertebrates for the smaller pool type (Helm 1998; Helm and Vollmar 2002; Simovich 1998).

Different topo-hydrographic pool types function differently within a given hydrological season. For instance, small/shallow pools fill earlier and dry-down earlier over the hydrological season, at times even filling and drying more than once in a single year (Jones and Stokes 1990). Large pools take a longer time to fill and remain inundated longer into the later spring and early summer months. In addition, they almost never completely fill and dry more than once per hydrological year.

These different pool types undoubtedly behave differently through extended dry and wet climatic cycles as well. During very dry periods, large pools may never completely fill, but may still support vernal pool biota in the deepest portions that is characteristic of shallower pools or higher topo-hydrological positions during wetter years. During these dry periods the smallest flashy pools lack the specialized hydrology to support the more deeply adapted elements of the vernal pool biota altogether. During wetter climatic cycles, large pools may begin to function more like emergent marsh habitats, with increasing cover of perennial marsh species in the deeper portions (e.g., common spikerush), and small-flashy pools may begin to resemble the condition of larger vernal pools during drier cycles.

Juxtaposition of interconnected large and small pools together in a single landscape setting probably affords stability to the associated vernal pool biotic assemblage during long periods of time and under fluctuating climatic conditions (Jones and Stokes 1990).

Alteration of the hydrology of vernal pools/complexes may result in shifts towards a seasonal marsh ecosystem if the inundated and/or waterlogged-terrestrial phases of the cycle are prolonged, or towards a less specialized seasonal wetland ecosystem if those phases are

shortened. Thus, consideration of watershed integrity, hydrological buffers, and spatial scale in the creation of vernal pool preserves is fundamental to vernal pool conservation.

Despite the importance of the hydrologic regime as a determining factor in shaping the ecology of vernal pools, few detailed studies exist which address the hydrologic dynamics that exist between the vernal pool sub-watershed, the surrounding soil profile, and pool hydrology. The most detailed study to date, conducted in Sacramento County within the Sunrise-Douglas Specific Study Area, documents the relative importance of direct precipitation, overland flow, and subsurface flow to the seasonal hydrological regime of a small set of vernal pools (Hains and Stromberg 1998). This research indicated that during the single year of data collection in this set of pools, direct precipitation was responsible for most of the hydrological input into pool basins, followed by subsurface flow through the soil profile from adjacent uplands later in the season. Although overland flow was not significant during the season of the study, the model produced indicates that under conditions of higher than normal rainfall, overland flow contributions would increase.

Dynamic relationships were found to exist between the hydrology of the vernal pool basin and the surrounding soil profile (Hains and Stromberg 1998). In the study pools, water flowed from the ponded basin into the drier surrounding upland soils early in the season, and from the saturated upland soils into the pond basin later in the season, thus buffering the pool's inundation regime against excessively rapid filling early in the season, and against rapid drying later.

1.3 Influence of Vernal Pool Hydrology on Biotic Assemblages

The extreme seasonal inundation and drought conditions of the vernal pool hydrologic cycle exert strict demands on the plant and animal inhabitants. As a result, vernal pool organisms possess a suite of life history (Zedler 1990), morphological (Griggs 1974, 1980), and anatomical and physiological (Feaver 1971; Keeley 1981, 1988, 1990, 1998) adaptations that allow them to cope with challenges imposed by the habitat.

In general, all vernal pool organisms have evolved life history adaptations as a way to take advantage of the short, stressful growing season, and to avoid the regular extreme summer drought (Zedler 1990, Kelley and Zedler 1998). The vast majority of vernal pool endemic plant species exhibit an annual life cycle (Zedler 1990). The ability to germinate, grow, and complete reproduction within one growing season allows populations of plants to pass the summer drought as seeds on/in the soil. Similarly, vernal pool invertebrates hatch from their dormant cysts/eggs after the pools fill; they mate, produce cysts/eggs, and die as the pools dry. For populations of these species, the summer is spent on/in the soil in the form of dormant cysts/eggs (Keeley and Zedler 1998). Storage of drought-dormant seeds/cysts in the soil profile may also afford stability to populations over multiple-year drought cycles (Griggs and Jain 1983; Holland 1987; Stone et al. 1988).

APPENDIX B-1 (Continued)

The inundated phase presents its own challenges to growth and survival, and an amphibious life history, with corresponding aquatic juvenile morphology and physiology, is an adaptive trait shared by plants and animals alike (Keeley and Zedler 1998). Like vernal pool amphibians, many vernal pool plant species possess dual morphology, with a juvenile grass-like (Isoetid) leaf form that is adapted for maximal growth underwater during the vernal pool inundated phase (Keeley 1981 1990, and 1998).

As the pool progresses through the waterlogged-terrestrial phase and into the drought-phase, the plants assume a different adult morphology that is suited to growth in the terrestrial setting. Adult amphibian vertebrates, including western spadefoot toad (*Spea hammondii*) and California tiger salamander (*Ambystoma californiense*), congregate, mate and lay egg masses in vernal pools during the inundated phase; the eggs hatch to produce aquatic larvae (pollywogs), which mature and metamorphose into the adult terrestrial form before the pool basins completely dry. The metamorphosed juveniles of the season and older adults then migrate to rodent burrows in the uplands after the pools dry to pass the summer in a state of dormancy.

Parameters of vernal pool hydrology (e.g., ponding duration, ponding depth, soil depth and water-holding capacity) have been variously correlated with patterns of plant (Alexander and Schlising 1998; Holland and Dains 1990; Stone et al. 1988; Platenkamp 1998; Dittes and Guardino 2002), invertebrate (Helm 1998; Helm and Vollmar 2002; Platenkamp 1998; Simovich 1998), vertebrate amphibian (Laabs, Orloff and Allaback 2002; Morey 1998), and avian biodiversity (Silviera 1998).

In general, larger/deeper vernal pools have potential to support a wider array of topo-hydrographic positions and greater overall plant diversity, as well as populations of "large pool" plant and animal species, including Orcuttiae grasses, legenere (*Legenere limosa*), California tiger salamander, western spadefoot toad, and vernal pool tadpole shrimp (*Lepidurus packardi*). All of these "large-pool" species require a relatively extended inundation phase for completion of their life cycles, as compared with more frequently occurring vernal pool taxa adapted to shorter inundation regimes.

While larger/deeper pools provide specialized habitat conditions that support several listed plant and animal species, smaller/flashy pools also provide important habitat for listed species. Two such invertebrate species are the vernal pool fairy shrimp (*Branchinecta lynchi*) and mid-valley fairy shrimp (*B. mesovallensis*), which have adapted to short inundation regimes by completing their life cycle in a relatively short amount of time. Similarly, Ahart's dwarf-rush (*Juncus leiospermus* var. *ahartii*), and to some extent, dwarf downingia (*Downingia pusilla*) and pincushion navarretia (*Navarretia myersii*), are rare plant species that are adapted to the "flashy small" pool type.

APPENDIX B-1 (Continued)

1.4 Influence of Vernal Pool Interconnectivity on Biotic Assemblage

Interconnectivity is an important consideration for vernal pool conservation for a number of reasons. A landscape encompassing multiple pools of varying sizes located in close proximity to each other is ecologically complex, presents comparatively more niches, is more likely to support meta-population dynamics, and is likely to be more resilient through time, particularly in light of climatic fluctuations, as compared to a landscape with low density and/or low diversity of pool types.

It is useful to consider vernal pool ecosystem interconnectivity at three different spatial/functional scales.

Ecological interconnectivity between individual vernal pools within complexes and between vernal pool complexes mediated by contiguity of hydrology,

Ecological interconnectivity between pools and pool complexes at a local scale as mediated by contiguity of upland matrix,

Ecological interconnectivity between vernal pool complexes in the region as mediated by attractiveness of vernal pool landscapes to waterfowl and shorebirds migrating along the Pacific Flyway.

Interconnectivity at each of these scales involves a set of functioning physical biological components and presents specific ecological implications for associated vernal pool biota.

Hydrological interconnectivity between individual vernal pools or between vernal pool complexes can occur through the soil profile, as surface sheet flow over the soil profile, or by movement of water through swales or seasonal drainages. Alteration of pool or swale hydrology within hydrological-related pool complexes may affect the hydrology of other pools within those complexes. In addition to influence of hydrologic regime, interconnectivity via swales and drainages also presents dispersal opportunities for myriad vernal pool organisms, including rare vernal pool plants, invertebrate and amphibian species that are covered under the SSHCP.

Ecological interconnectivity between pools and pool complexes via contiguity of the upland matrix is an important consideration for life-history needs and dispersal of vernal pool organisms as well. Amphibians, including western spadefoot toad and California tiger salamander, require contiguous uplands for summer aestivation and for terrestrial migration of adults between core and satellite elements within larger meta-populations. Plant seeds and invertebrate cysts and eggs may also be transported between vernal pools across contiguous uplands in mud on the hooves or legs of livestock. Solitary bees that are obligate vernal pool plant pollinators depend on the

uplands surrounding vernal pools as well, and it is not known what interconnectivity means for them regarding the temporal and spatial scale of meta-populations.

In addition, attraction of a given pool or pool complex to migratory waterfowl and shorebirds is likely influenced by the juxtaposition of the pools/complexes with each other and with the immediately surrounding uplands. Similarly, at the regional scale, juxtaposition of vernal pools/complexes with each other, with other open-space areas, and with developed areas, undoubtedly influences attractiveness of those pools and complexes to migratory waterfowl and shorebirds traveling the Pacific Flyway. The use of pools/complexes by waterfowl and shorebirds affects dispersal of seeds and invertebrate cysts and eggs. This interconnectivity has biogeographic implications at both local and regional scales.

1.5 Vernal Pool Organisms

California vernal pools are defined in part by their highly adapted and unique assemblages of obligate-associated plants and animal species. Due to the significant loss of vernal pool habitat throughout California (see Section 4), the Federal Government and/or State of California has listed over 80 vernal pool organisms as Threatened, Endangered or candidates for Listing (Keeler-Wolf et al. 1998). Table 1 includes the 7 vernal pool endemic plant species and 6 vernal pool endemic animal species covered by the SSHCP. A brief discussion of their biology, ecology, and conservation considerations follows. For a more complete discussion of these organisms, refer to the individual SSHCP species accounts (Appendix A of the SSHCP). Legal status, distribution by County, and habitat associations for the 13 vernal pool species are listed in Table 1.

1.5.1 Vernal Pool Plants

Vernal pools support a uniquely adapted, mostly native, and highly endemic flora. The hydrologic cycle that defines this seasonal wetland type is excessively stressful for more commonly occurring wetland species, and it precludes most of the non-native plants species that dominate the surrounding present-day annual grassland. There are more than 100 native plant species that are more or less restricted to the vernal pool ecosystem (Keeler-Wolf et al. 1998; Keeley and Zedler 1998), 90% of these are native, and 55% are entirely restricted to California (Holland 1976; Keeler-Wolf et al. 1998). A typical vernal pool usually supports 15–25 species (Holland and Jain 1977, 1984; Zedler 1987).

The vernal pool flora is comprised of two biogeographic elements: strict California vernal pool endemics, and more widely occurring cosmopolitan aquatic species (Keeley and Zedler 1990). Most of the California vernal pool endemics are derived from upland progenitors that evolved into the developing vernal pool landscape since the Pleistocene (Stone 1990).

APPENDIX B-1 (Continued)

Vernal pool plant species composition has been shown to vary at multiple spatial scales, with 28% of overall variability occurring between state regions, 17% of variability occurring between areas at the scale of counties, and 55% of the variability occurring among pools within landscape complexes or "within pastures" (Holland and Jain 1981). Variability at the largest scale is influenced by climate, source biota, geological surface and site history (Holland and Dains 1990).

At the smallest scale, within pool variability in plant species composition is attributable mostly to variance in inundation regime (Kopecko and Lathrop 1975; Schlising and Sanders 1982; Zedler 1987; Holland and Jain 1988; Jokerst 1990; Keeley and Zedler 1998; Bauder 2000). Barbour et al. (2003) investigated within-pool variance in plant species composition and concluded that whole pool vegetation assemblages are complexes of several apparently independent communities, each of which can be found in other pools, and which may have individual geographic restrictions. The fact that greatest differences in community types were found between the deep and shallow parts of single pools is evidence of the strong selective force of the vernal pool inundation regime.

The terms "shallow pool species and deep pool species" or "edge species and basin species" have been used to describe contrasting preferences of plants for the different portions of the larger range of vernal pool hydrological regimes. A good example of a shallow pool or edge species is found in Ahart's Dwarf Rush, one of the rare species covered under the SSHCP. Good examples of deep pool, or basin species are found in Sacramento and slender Orcutt grasses, two rare species also covered by the SSHCP. However, not all species are as easily assignable to the two categories. Vernal pool plants are able to occupy these hydrological-stressful habitats owing to genetically fixed physiological, structural (anatomical and morphological), and life history traits.

The majority of vernal pool plant species have evolved the annual life cycle (Stone 1990; Zedler 1990; Keeley and Zedler 1998). In this fashion plant populations avoid the predictable and extreme summer drought in the form of dormant seeds. Since not all seeds may germinate every year, some vernal pool plant species have been shown to maintain a persistent dormant soil seed bank that acts as a buffer against single or multiple years with poor rainfall (Griggs and Jain 1983).

Germination occurs either early in the season during the wetting phase, or later on during the inundation phase of the vernal pool annual hydrological cycle (Keeley and Zedler 1998). Many vernal pool species possess dual morphology, with a juvenile form specialized for growth in the aquatic phase, and then later an adult form that is more suited to conditions of the inundated terrestrial and drought phases of the hydrological cycle (Zedler 1990). It is common to see flowering and fruiting species at drying pool margins while at the same time other species are present as seedlings and aquatic juveniles in the inundated pool basin.

APPENDIX B-1 (Continued)

Seed dispersal of vernal pool plants tends to be limited. This is thought to be an adaptation to the discontinuous and unpredictable occurrence of vernal pools in the larger upland landscape. Successful germination, growth, and reproduction of a vernal pool plant seed is likely to be the highest in the same pool that supported the seed's parent plant. Most vernal pool plants lack specialized seed dispersal mechanisms. As a result, seeds tend to fall near the parent plant. Some dispersal of seeds also occurs via flowing water, on the hooves and legs of livestock (tule elk [*Cervus canadensis nannodes*], antelope [*Antilocapra americana*] and grizzly bears [*Ursus arctos horribilis*] originally), and on the feathers and feet of waterfowl and shorebirds, suggesting that some seeds may travel greater distances.

Genetics have been investigated for only a limited number of vernal pool plant species (Elam 1998). Owing to certain population traits (e.g., small or fluctuating population numbers) it is hypothesized that some vernal pool species are subject to effects of genetic drift. This is expected to result in reduced genetic diversity and a high degree of among-population (between pool) variation (Elam 1998). Other genetic characteristics of vernal pool plants include limited gene flow between pools (e.g., seed and pollen dispersal), high among-population (between pool) variation, and variable ecological selection within and between pools (Elam 1998).

Some vernal pool species are pollinated by wind (Orcuttiae grasses), some are self-pollinated (legenere, dwarf downingia) and others (e.g., *Lasthenia, Downingia, Blennosperma, Limnanthes*) by a suite of co-evolved specialist solitary bees of the family Andrenidae (Thorp and Long 1998, Thorp 1990). These solitary bees nest in small tunnels excavated in the uplands around vernal pools and rely on vernal pool plants entirely to supply pollen for their young while the plants, in turn, depend on the pollination services of the bees to produce seeds for the next generation..

See Appendix A of the SSHCP for specific life histories of vernal pool associated plants addressed in the SSHCP.

1.5.2 Vernal Pool Invertebrates

Invertebrates are a major part of California landscapes with respect to species richness, abundance and total biomass. Insects are especially diverse and dominant in terrestrial environments, but they can also share dominance of freshwater environments with crustaceans (Hickman et al. 2001). Insects are nearly absent in marine environments, perhaps because of the early occupancy of these aquatic habitats by a great number of crustaceans (Evans 1984). The only successful move of crustaceans to terrestrial habitats has been by the isopods (popularly known as pill bugs) (Hickman et al. 2001).

One well-known group of crustaceans, the branchiopods, has some members that are found only in vernal pools. Vernal pool branchiopods include fairy shrimp (Anostraca), tadpole shrimp

APPENDIX B-1 (Continued)

(Notostraca) and clam shrimp (Conchostraca). California hosts at least nine endemic and up to 29 total fairy shrimp species (Bauder et al. 1997), four of which are listed as endangered and one as threatened under the Federal Endangered Species Act (FESA). Fairy shrimp do not occur in running waters and none are true marine organisms (Zedler 1987). Branchiopods occurring within the SSHCP Study Area are the mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp (*Branchinecta lynchi*) and the vernal pool tadpole shrimp (*Lepidurus packardi*).

The only vernal pool insect covered under the SSHCP is the Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*). See Appendix A of the SSHCP for specific life history of Ricksecker's water scavenger beetle.

Vernal Pool Crustaceans

In a survey of California vernal pools Simovich (1998) found 67 species of crustaceans and 60-100 species of insects and other invertebrates. Aquatic crustaceans found in vernal pools include branchiopods (fairy shrimp, tadpole shrimp, and clam shrimp), cladocerans (water fleas), copepods, ostracods (seed shrimp), and rotifers (Zedler 1987). Crustacean diversity in vernal pools is mediated by a number of possible factors such as inundation period and pool size (Simovich 1998). Inundation period regulates presence of crustaceans based on time required for development. Long inundation periods may allow the co-existence of similar (especially congeneric) species by reducing temporal overlap. Vernal pools of varying sizes may provide more available niches for crustaceans to inhabit, increasing diversity.

Crustaceans are sometimes more diverse in ephemeral than in permanent water bodies, perhaps due to decreased predation and non-limited resources (Simovich 1998). Historical climatic fluctuations may have created opportunities for gene exchange between previously isolated gene pools as vernal pool complexes expanded and retracted in response to increased dry and wet periods. Genetic variability in vernal pool crustaceans found within populations (i.e. within pools) may be a result of fluctuating selection and generation overlap (Simovich 1998) that occurs as a result of prolonged diapause (Ellner et al. 1999). The combination of typically large crustacean cyst banks in vernal pools (Belk 1998) together with overlapping generations (due to lack of all cysts hatching each year) creates the potential for significant within pool genetic variation (Simovich 1998).

Dispersal capability sets a limit on the distribution of any organism. As crustaceans cannot fly, their dispersal is limited to passive movement. Simovich (1998) and Ahl (1991) postulated that crustacean dispersal between vernal pool complexes probably occurs by movements of birds that eat crustacean disseminules. Proctor (1964) and Proctor and Malone (1965) found that disseminules were passed successfully through the intestinal tracts of mallard ducks, chickens, pigeons and canaries. Proctor et al. (1967) found that viable disseminules were retained for

longer periods in killdeer than in mallard ducks, suggesting that killdeer and similar shorebirds could possibly be more effective than ducks as dispersal agents for aquatic organisms, as they can carry disseminules longer distances. Large-scale flood events, which no longer occur due to levees and damming of major rivers, are postulated as influential in dispersal of crustacean disseminules historically (USFWS 1999). Dispersal is critical for the long-term survival of these species (LAS 2004).

See Appendix A of the SSHCP for specific life histories of vernal pool associated crustaceans addressed in the SSHCP.

1.5.3 Aquatic Mollusks

Studies of two aquatic snails (*Fossaria sonomensis* and *Bakerilymnaea cockerelli*) in vernal pools by Gallagher (1993) and Newman (1973) found that both snails use a form of aestivation (summer dormancy) to avoid the extreme drought of the summer-dry vernal pool. These snails migrate into the sediments before the pool dries, reappearing as the first inhabitants of vernal pools when flooding occurs. Snails lay egg masses inside vernal pools, making snails totally dependent on pools as are fairy shrimp and tadpole shrimp. Gallagher (1993) also found that vernal pool inundation period was an important factor in regulating snail dynamics. Alexander (1976) postulated that stonefly larvae are potentially significant predators on snail egg masses in vernal pools.

1.5.4 Vernal Pool Insects

Most insects that use California vernal pools are winged opportunists, utilizing vernal pools when available but abandoning them as soon as they become unsuitable (Zedler 1987). Common large aquatic insects known to visit vernal pools include predaceous dragonfly nymphs, back-swimmers, water boatmen, predaceous diving beetles and water scavenger beetles. Flies are reported from vernal pools as well, but are probably largely accidental (Zedler 1987).

Surveys of natural and constructed pools in Folsom County, California, found 58 species of insects inhabiting vernal pools including one springtail (Collembola), one mayfly (Ephemeroptera), four dragonflies (Odonata), nine true bugs (Hemiptera), one stonefly (Trichoptera), 26 beetles (Coleoptera) and 16 flies (Diptera) (Rogers 1998).

Although the role of insects in vernal pool ecology is probably substantial, little is known about the insects that inhabit vernal pools (Zedler 1987). Terrestrial insects may serve as food sources for vernal pool organisms, prey on or compete with vernal pool organisms, and have some indirect effects on vernal pool ecology.

Mosquitoes are of concern to the public owing to their potential to spread disease, including West Nile Virus and Encephalitis. Detailed studies of mosquitoes in vernal pools are mostly

lacking. In a survey of aquatic macro-invertebrates in 27 natural and 37 artificially constructed pools, Rogers (1998) found that mosquito larvae and midge larvae together comprised less than 2% of the invertebrate richness in natural pools. Some of the artificial pools were similar to natural pools with regard to mosquito and midge populations. During the 2nd year of this study however, these fly species comprised between 40% and 78% of the invertebrate composition in pools at one site. In general, it is thought that functioning vernal pools do not provide optimal breeding habitat for mosquito populations because they support a diversity of predatory invertebrate species (water beetles, backswimmers, tadpole shrimp, amphibian larvae) that feed on the aquatic mosquito larvae (Rogers pers. comm.; Alexander pers. comm.).

Flower Visiting Insects

The most conspicuous terrestrial insects associated with vernal pools are oligolectic bees. Oligolectic bees only visit a small number of closely related plants (e.g. *Limnanthes, Lasthenia*, *Blennosperma*) for pollen food. These specialized bees are important to vernal pool plants and overall vernal pool ecology (Bauder et al. 1997; LSA 2004; Thorp 1976, 1990; Thorp & Leong 1995, 1996, 1998). The highest percentages of specialist-feeding bees occur in areas of California with a Mediterranean and desert climate. These bees rely entirely on their local, specific food plants and on the availability of suitable nest habitat.

Vernal pool specialist bees are critical pollinators of vernal pool plants because of their inherent fidelity to these plants. This relationship highlights the importance of maintaining the connections between vernal pools and the uplands surrounding them. The bees construct nests primarily in upland areas near pools (although nests have been found in created pools; (S. Chamberlain, pers. obs.) and probably do not move far from their nest sites. Leong and Thorp (1995) found that most bees they studies did not travel more than about 0.5 mile. Fragmentation of vernal pool habitats increases distances between pools, possibly inhibiting movement of these dispersal-limited bees (Leong and Thorp 1995), and decreasing visitation rates to their associated flowers. Decreased visitation rates may result in lower seed output, reducing the size of the soil seed bank, the "insurance policy" of vernal pool plants against unfavorable hydrological conditions.

1.5.6 Amphibians

There are four amphibians known to inhabit vernal pools within the SSHCP Study Area, including the Pacific chorus frog (*Pseudacris regilla*), western toad (*Bufo boreas*), western spadefoot toad and the California tiger salamander. The western spadefoot toad and the California tiger salamander are covered under the SSHCP.

See Appendix A of the SSHCP for specific life histories of vernal pool associated amphibians addressed in the SSHCP.

APPENDIX B-1 (Continued)

1.5.7 Birds

Vernal pools and vernal pool complexes are important to the conservation of many bird species. Silveira (1998) reported observing 86 different taxa (44 waterbirds and 42 landbirds) using vernal pools and associated uplands at eight areas in the Sacramento Valley and from two areas in northeastern California. These birds use a variety of vernal pool types, visit pools differently at different times of year and exploit different microhabitats within a given pool (Silveira 1998).

Birds are important to the conservation of vernal pool species, as they are essential for the dispersal of vernal pool disseminules from one pool to another. Migratory birds moving along the Pacific Flyway spread plant seeds as well as invertebrate eggs and cysts between vernal pool complexes. Dispersal is important to populations as it limits isolation that can lead to inbreeding and reduces the chances of local extirpation.

1.5.8 Waterfowl and Shore Birds

During the wet season, waterfowl and shorebirds visiting vernal pools feed on a wide variety of food sources, rest, and in some cases nest. Some birds feed on invertebrates from the deeper portion of the pools, while others forage along the shoreline feeding on invertebrates or grazing the vegetation (Silveira 1998; Sloat and Whisler 2002). Vernal pools provide essential high protein food sources to migratory birds at a time critical to the development of building flight muscles and reproductive organs (Siveira 1998; USDOI 1994).

Waterfowl tend to use vernal pools with larger surface areas more often than smaller pools (Baker et al. 1992), however smaller pools are also frequently used, especially for individual breeding pairs (Silveira 1998). Uplands associated with vernal pools are also heavily used by Canada geese (*Branta canadensis*), which require new vegetation growth late in the winter and early in the spring for protein (Silveira 1998; Bogiatto pers. comm.).

A study of shorebird use of Central Valley habitats did not include large areas of vernal pool grasslands, and therefore did not report much use of vernal pool habitat by shorebirds (Shuford et al. 1998). In contrast, a study conducted over two spring seasons at the Sacramento National Wildlife Refuge, showed that although vernal pools comprised less than 2% of the refuge's total available wetland habitat, they held the highest shorebird densities, and more species preferred vernal pools than any other wetland type (Feldhiem et al. 1999).

Although waterfowl and shorebirds require these seasonal wetlands to help complete their migration and are important to the conservation of vernal pool species, these birds are not specifically covered under the SSHCP.

APPENDIX B-1 (Continued)

2 VERNAL POOL FUNCTIONS AND ECOSYSTEM SERVICES

2.1 Functions

Vernal pool functions have been defined as the hydrologic, biogeochemical, and habitat support processes that characterize and define vernal pools as self-maintaining wetland ecosystems (Butterwick 1998). The term "Values" as applied to vernal pool ecosystems is a more subjective concept. Ecosystem values relate to the perceptions of people and society regarding vernal pools; these perceptions reflect cultural, socioeconomic and policy issues that can change over time (Butterwick 1998; NRC 1995).

Consideration of ecosystem function is the basis of the Hydrogeomorphic (HGM) approach to wetland assessment (Environmental Protection Agency [EPA], United States Army Corps of Engineers [ACOE]), which likely represents one of the more comprehensive frameworks and cohesive descriptions of vernal pool functions and ecosystem processes. Ten vernal pool functions have been proposed as part of the draft HGM approach; each function is associated with one of three categories: hydrology, biogeochemistry, and habitat support (Butterwick 1998). Each vernal pool ecosystem function is described below, along with a brief discussion of determinant factors, functional variance, and relationships among functions.

The HGM approach represents a conceptual framework that is useful in facilitating communication about an exceedingly complicated ecological phenomenon. It is important to recognize that in nature these 10 vernal pool ecosystem functions are closely interrelated and overlap in the processing through time of elements, compounds and genetic information. Additionally, these functions operate and interrelate in causal-dependent relationships at multiple spatial and temporal scales: from within single vernal pools within a single annual hydrologic cycle, to among all vernal pool complexes on a given set of geologic landforms over evolutionary time.

Finally, it is important to acknowledge that paradoxically, landscape-level ecosystem function and related evolutionary dynamics are critical components of long-term conservation planning/management, yet they are not readily perceivable and they are difficult to define and to quantify.

2.1.1 Hydrology (3 Functions)

Function 1- surface water storage is the capacity of the vernal pool basin to pond water seasonally and retain surface water for long duration. This function is dependent on a variety of factors, including but not limited to surface topography (e.g., area of drainage, dimensions of depression basin), soil depth and water-holding capacity, and the nature of the water-impermeable layer in the soil profile.

APPENDIX B-1 (Continued)

Function 2- subsurface water exchange is the capacity of the subsurface area above the restrictive layer to hold water and allow exchange of water between the pool basin and the surrounding landscape. This function is dependent on a variety of factors, including but not limited to the water holding capacity of the soil, soil permeability, and soil depth. These factors together influence the dynamics of water exchange between pool basins and surrounding pool and upland areas.

Function 3- surface water conveyance is the capacity to convey concentrated inter-storm water flow into and out of pool basins through swales. Swales lack bed and bank morphology yet they are critical components of drainage and interconnectivity of vernal pool-annual grassland landscapes. This function is dependent on a number of factors, including but not limited to topography, the nature of the soil profile, and the juxtaposition of pools/pool complexes within sub-watershed areas.

2.1.2 Biogeochemical (2 Functions)

Function 4- element removal is the capacity of vernal pools to remove and concentrate imported nutrients, contaminants, elements and compounds from the water through abiotic and biotic processes. This function is dependent on myriad physical, chemical and biological components of the ecosystem.

Function 5- element cycling is the capacity of vernal pools to support biogeochemical processes that convert and recycle elements and compounds from one form to another. The vernal pool biota provides both material and metabolic process to the function of element cycling. The annual development and decay of plant and animal biomass involves cycling (assimilation, conversion, release and breakdown) of myriad inorganic elements and organic and inorganic compounds.

2.1.3 Habitat Support (5 Functions)

Function 6- maintenance of characteristic vegetation is the capacity of vernal pools to support a characteristic suite of native plant species. Vernal pool plant species are uniquely adapted to the extreme regimes of inundation and drought that defines the annual vernal pool hydrologic cycle.

Function 7- maintains characteristic aquatic invertebrates is the capacity of vernal pools to provide the hydrologic, chemical, and temperature conditions that are required to support their characteristic aquatic invertebrate fauna. Like vernal pool plant species, vernal pool invertebrate species are uniquely adapted to the extreme regimes of inundation and drought that defines the annual vernal pool hydrologic cycle.

Function 8- maintains amphibian and avian populations is the capacity of vernal pools to provide suitable aquatic and terrestrial habitat for amphibians to complete their entire life cycle,

and for resting, feeding, hiding and reproduction of avian populations. Amphibian and avian species both depend on the quality of contiguous uplands, and particularly for birds, the juxtaposition of wetlands with other wetlands and habitat types (see Function 10).

Function 9- maintain populations of sensitive taxa is the capacity of vernal pools to perpetually support populations of rare, threatened or endangered species, almost all of which are strict vernal pool endemics. It should be noted that this function might not be discernible from Functions 6, 7 and 8 above, since sensitive taxa represent a subset of the vernal pool biotic assemblage; they are dependent on and interact with the same physical and biological conditions, functions and process as their more common vernal pool associates. The presence or absence of any given species, rare or otherwise, may depend as much on biogeography and history as on particular characteristics of a given vernal pool. A vernal pool does not need to support sensitive species to qualify as a fully functioning vernal pool, whereas nearly all of the other 10 functions mentioned here are essential. For these reasons, and because designation of species as sensitive is somewhat subjective in itself, Vernal Pool Function 9 may more appropriately be considered as a "Vernal Pool Value" (see Section 3.2.2).

Function 10- maintain habitat interspersion and connectivity is the capacity of vernal pools to interact with other vernal pools, vernal pool complexes and other wetland and upland habitat types. The juxtaposition of vernal pools and vernal pool complexes across the landscape influences meta-population dynamics, migration, recruitment, establishment and persistence of species through time and space, and the long-term dynamics of population genetics (evolution).

2.2 Ecosystem Processes (Values)

Vernal pool (wetland) values are those qualities and/or functions of the ecosystem that relate to societal perceptions of "goods and services" (Butterwick 1998; NRC 1995). These values are subjective because they relate not only to complex interrelated parameters of the vernal pool ecosystem, but also to the prevailing socio-economic, political and educational status of California's human population. Wetland ecosystem values, considered as a function of societal perception, vary not only through time in a given geographic area, but also across geography at any point in time (NRC 1995).

Since vernal pool habitats are generally part of larger watershed-scale systems, they may play various roles in the hydrological function of the larger landscape. By retaining direct precipitation as well as seasonal overland and subsurface flow during the rainy season, they buffer against flooding in downslope areas, and large complexes may even affect microclimate when hydrated during the warmer spring and early summer months by modifying local temperatures (the opposite of roofing or asphalt, which tend to increase local temperatures). Since vernal pools also function in geo-chemical processes (element removal and cycling), they

APPENDIX B-1 (Continued)

potentially mediate water quality when interconnected via swales or drainages, by assimilating and processing dissolved and suspended pollutants in runoff, and atmospheric pollutants precipitated in rainfall or dust.

APPENDIX B-1 (Continued)

3 HABITAT DISTRIBUTION

3.1 California Distribution

In California, vernal pool habitats occur in settings ranging in elevation from about 10 feet in Solano County to over 5,500 feet in Plumas County (CDFG 2003), and in association with a variety of geologic formations. The greatest areas of vernal pool habitat though, are associated with the Great Central Valley (Holland and Jain 1977; Holland 1978; Stone 1990). Areas of vernal pool habitat are also associated with the coastal terraces of San Diego County (Zedler 1987), and with scattered sites in the low elevation regions of the Peninsular and south and north Coast Ranges, the Sierra Nevada Range Foothills, the Cascade Range Foothills, and the Modoc Plateau (Holland and Jain 1977; Zedler 1987; Holland 1986).

The first maps of vernal pool complexes within the Central Valley were produced for CDFG by Holland (1978) and are shown in Figure 1. The most recent treatment of California vernal pools recognizes 17 biogeographically defined Vernal Pool Regions (Figure 2), including the Sand Diego, Western Riverside County, Santa Barbara, Carrizo, Central Coast, Livermore, San Joaquin Valley, Southern Sierra Foothills, Southeastern Sacramento Valley, Northwestern Sacramento Valley, Northeastern Sacramento Valley, Solano-Colusa, Santa Rosa, Lake-Napa, Mendocino, Sierra Valley, and Modoc Plateau Vernal Pool Regions (CDFG 1998).

3.2 Central Valley Distribution

The largest total number of vernal pools and the largest most intact vernal pool complexes remaining in the state are found in the Great Central Valley (Holland and Jain 1988; Keeler-Wolf et al. 1998; Vollmar 2002). These are distributed among 6 of the 17 biogeographic areas, including the San Joaquin Valley, Southern Sierra Foothills, Solano-Colusa, Northwestern Sacramento Valley, Northeastern Sacramento Valley, and Southeastern Sacramento Valley Vernal Pool Regions. The SSHCP Study Area is included entirely within the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf et al. 1998).

The Southeastern Sacramento Valley Vernal Pool Region includes all of the vernal pool complexes located within Sacramento, Placer, Amador, and El Dorado Counties, as well as a portion of the pool complexes located in northwest Calaveras County, northeast San Joaquin County, southern Yuba County, and as indicated in Figure 3, a small inclusion of pools in southern Sutter County. It has been noted that, although there are bio-geographical differences, the boundary between the Southeastern Sacramento Valley Vernal Pool Region and the Southern Sierra Foothills Vernal Pool Region is defined in part by jurisdictional areas of regulatory agencies and the treatments of bioregional assessment teams (Keeler-Wolf et al. 1998).

APPENDIX B-1 (Continued)

3.3 SSHCP Study Area Distribution

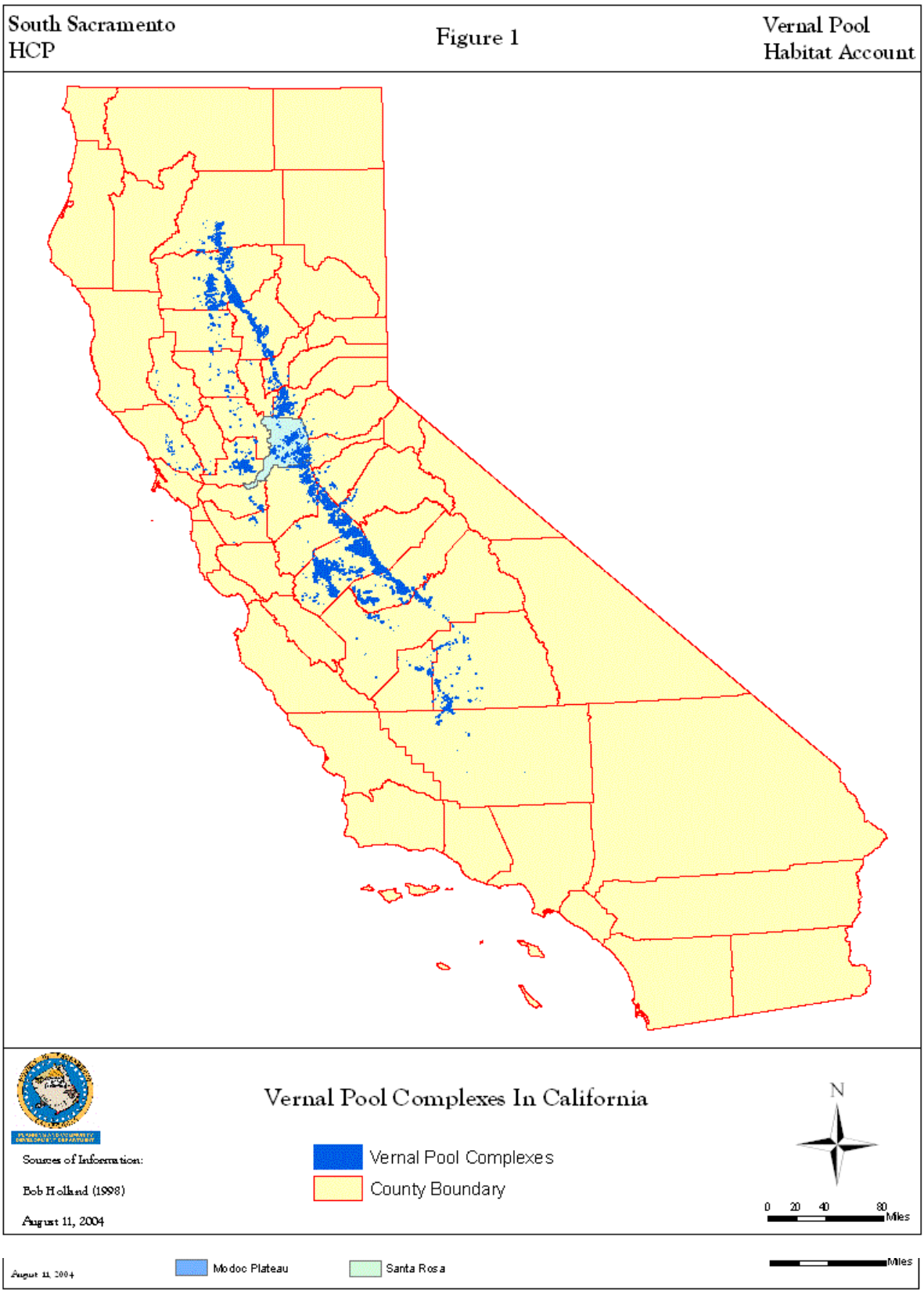
The SSHCP Study Area encompasses a significant portion of the vernal pool complexes that remain within the Southeastern Sacramento Valley Vernal Pool Region, as indicated in Figures 1 through 3. The current extent and distribution of vernal pools/wetlands in the SSHCP Study Area is illustrated in Figure 4. This map (Figure 4) was produced by the Geographic Information Center (GIC) at California State University, Chico using digital ortho-rectified black and white aerial photographs that were flown on March 15, 2001. For a more detailed description of this mapping procedure and constraints and assumptions relating to the map data, refer to Section 5.2 of this document.

The remaining extant vernal pool/annual grassland complexes located within the region as of 2001 are mostly concentrated in the south-eastern portion of Sacramento County. Here they are associated with 18 geologic formations that occur within the boundaries of the SSHCP Study Area, as illustrated in Figure 5.

Table B1-3 numerically summarizes the distribution of vernal wetlands across geologic formations in the SSHCP study area. This table contains the total number of acres represented by each geologic formation and the total number of vernal wetted acres occurring on each formation within the SSHCP Study Area. Totals calculated for each geologic formation are also presented as percentages of the total vernal wetted area and total land area.

The number of vernal wetlands and total wetted acres for each geologic formation that contain vernal features within the SSHCP Study Area are presented in Table B1-4. These parameters are further described for the vernal wetlands both inside and outside the Urban Development Area (UDA); Figures 6 and 7 illustrate these data.

APPENDIX B-1 (Continued)

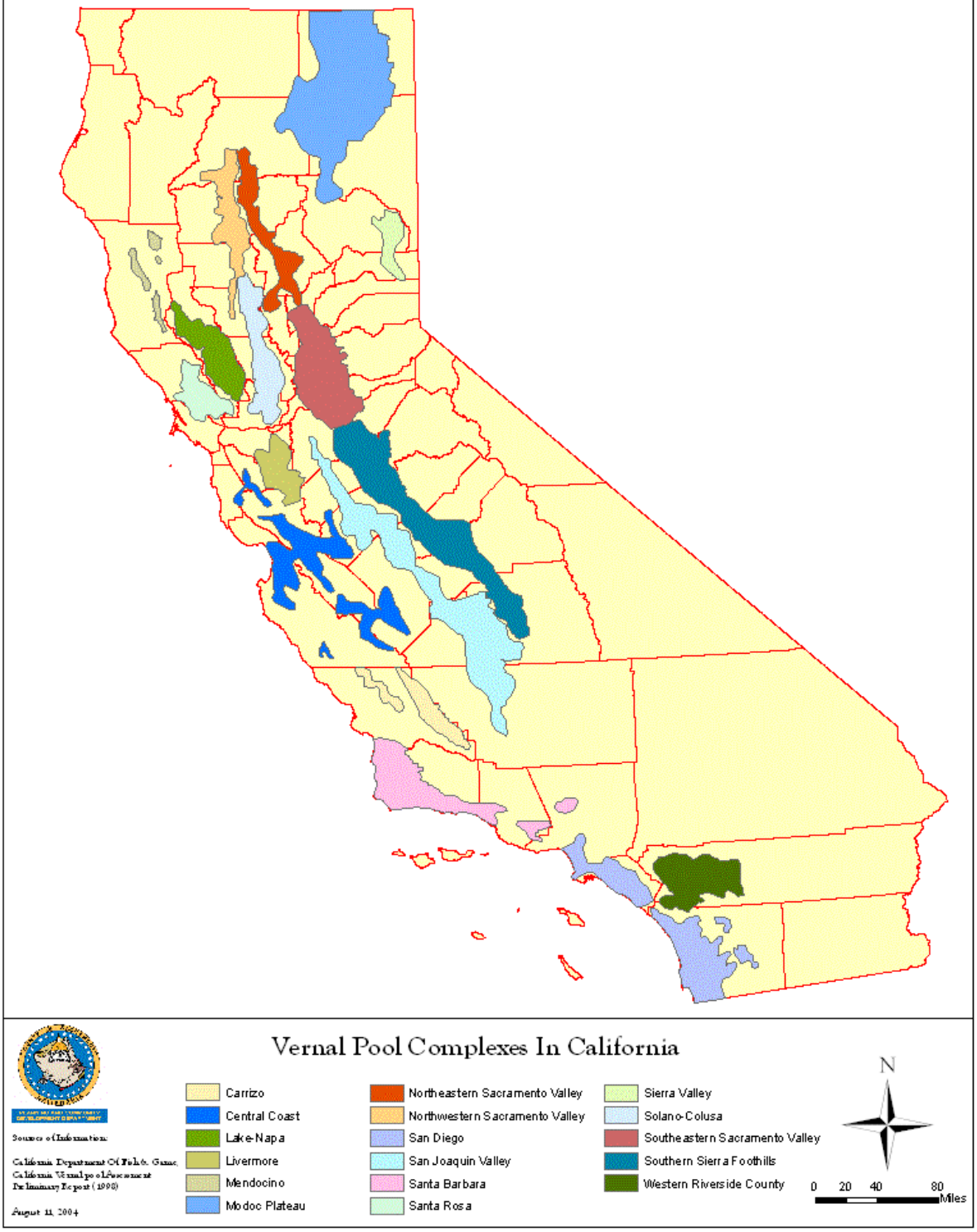


APPENDIX B-1 (Continued)

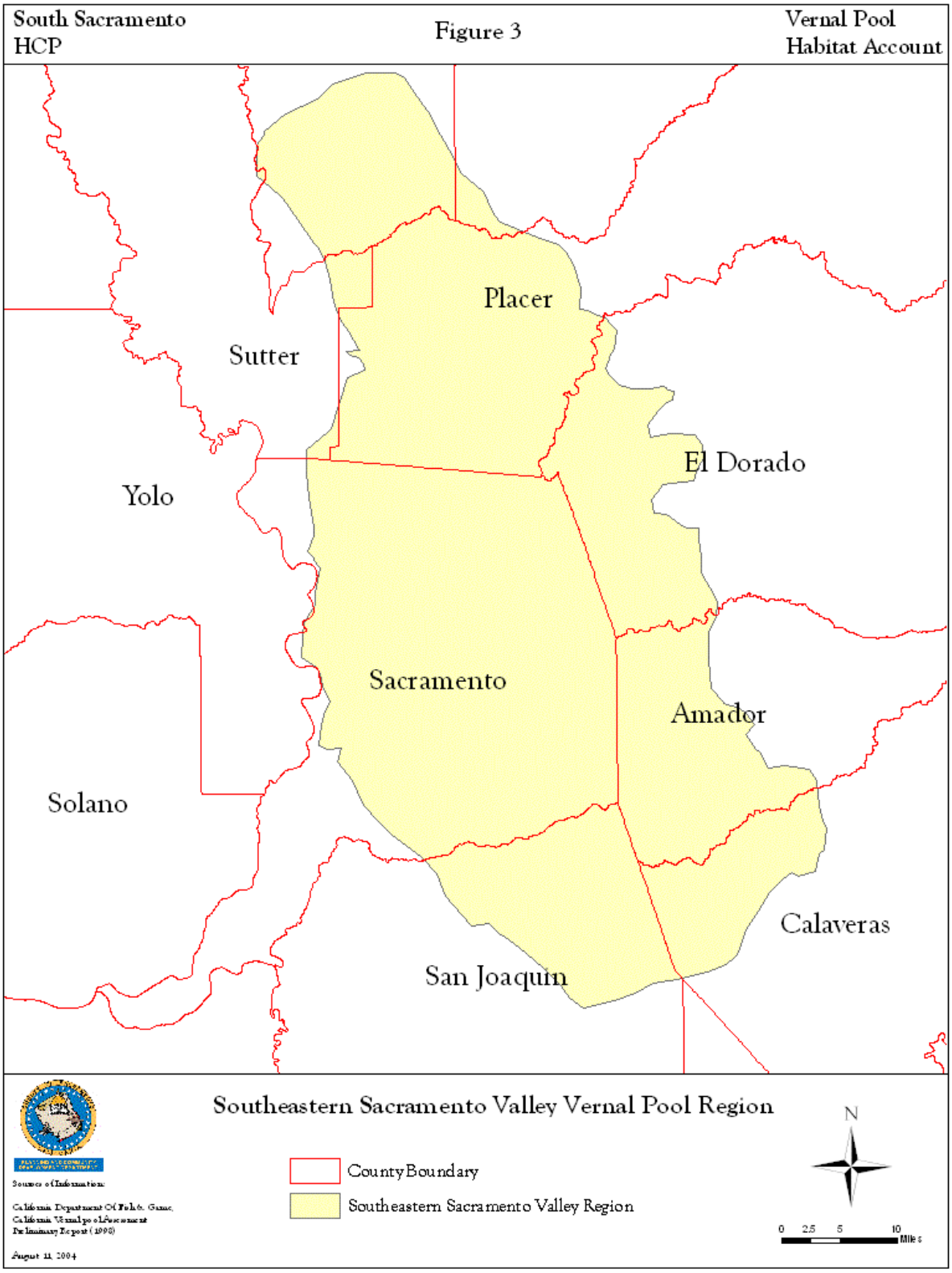
South Sacramento HCP

Figure 2

Vernal Pool Habitat Account



APPENDIX B-1 (Continued)



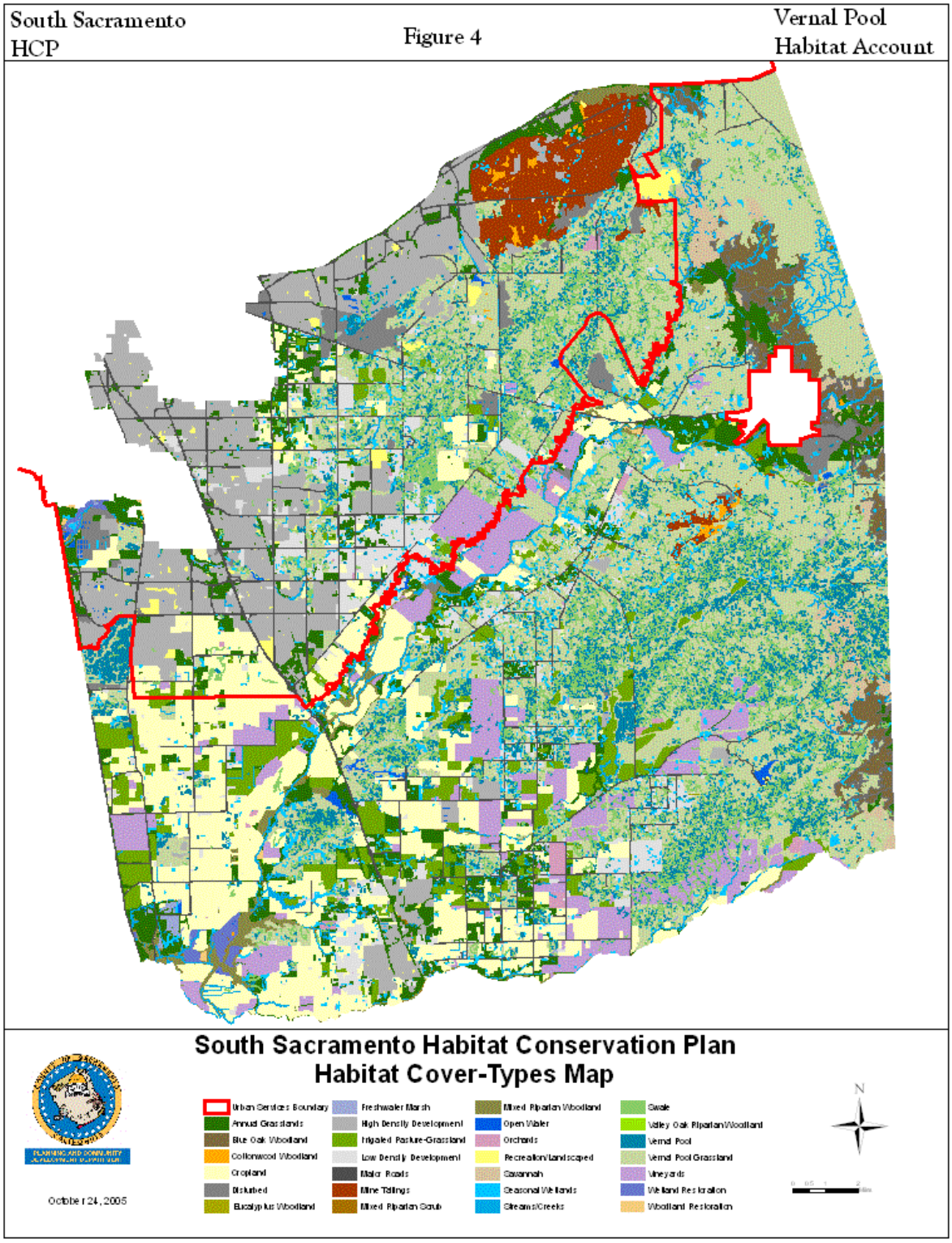
APPENDIX B-1 (Continued)

Table B1-3
Land and Vernal Wetland Acre Distribution by Geologic Formation in the SSHCP Study Area

Geologic Formation	Land Area (acres)	Vernal Wetland Area (acres)	Percent of Formation Occupied by Vernal Wetland Area (%)	Percent of Total Vernal Wetland Area (%)1	Percent of Total Land Area (%)1
Laguna (Tl)	67,582	1372.9	2.03	34.3	19.6
Riverbank, Lower Unit (Qrl)	53,357	494.8	0.93	12.4	15.5
Riverbank, Undivided (Qr)	51,425	700.6	1.36	17.5	14.9
Riverbank, Upper Unit (Qru)	28,212	303.9	1.08	7.6	8.2
Mehrten (Tm)	26,667	386.8	1.45	9.7	7.7
Metamorphic Rocks (pKu)	24,288	38.2	0.16	1.0	7.0
Riverbank, Middle Unit (Qrm)	18,953	187.5	0.99	4.7	5.5
Upper Unit Modesto (Qmu)	18,051	116.8	0.65	2.9	5.2
Dredge Tailing and Artificial Fill (t)	14,527	5.2	0.04	0.1	4.2
Valley Springs (Tvs)	13,648	248.1	1.82	6.2	4.0
Alluvial Floodplain Deposits (Qfp)	9,733	10.9	0.11	0.3	2.8
Undifferentiated Surficial Alluvial Deposits (Qu)	4,497	64.1	1.43	1.6	1.3
South Fork Gravels (Qsf)	3,975	48.8	1.23	1.2	1.2
Alluvial Deposits, Undivided (Qha)	3,419	1.6	0.05	0.04	1.0
Ione (Ti)	2,956	3.1	0.10	0.08	0.9
Turlock Lake (Tpl)	2,095	9.5	0.45	0.2	0.6
Basin Deposits (Qhb)	663	3.1	0.47	0.08	0.2
North Merced Gravels (Qtnm)	561	3.6	0.64	0.09	0.2
Total	**344,609**	**3999.5**	**N/A**	**100**	**100**

Notes:
1 Total refers to the entire SSHCP Study Area, rather than individual geologic formations.

APPENDIX B-1 (Continued)



APPENDIX B-1 (Continued)

Table B1-4
Number of Vernal Wetlands and Wetland acres for each Geologic Formation within the SSHCP Study Area that Contain Vernal Features

Geologic Formation	Total Acreage Inside SSHCPA	Number of Vernal Wetlands			Wetland Acres		
		Total	*Inside UDA*	*Outside UDA*	*Total*	*Inside UDA*	*Outside UDA*
Laguna (Tl)	67,582	**26844**	8484	18360	**1372.9**	587.5	785.4
Lower Unit Riverbank (Qrl)	53,357	**1719**	1055	664	**494.8**	107.1	387.7
Riverbank Undivided (Qr)	51,425	**9095**	1466	7629	**700.6**	107.2	593.4
Upper Unit Riverbank (Qru)	28,212	**2546**	240	2306	**303.9**	11.3	292.7
Mehrten (Tm)	26,667	**9759**	298	9461	**386.8**	14.8	372.1
Metamorphic Rocks (pKu)	24,288	**829**	17	812	**38.2**	0.3	37.9
Middle Unit Riverbank (Qrm)	18,953	**1970**	251	1719	**187.5**	22.6	165.0
Upper Unit Modesto (Qmu)	18,051	**1888**	1	1887	**116.8**	0.8	116.0
Dredge Tailing and Artificial Fill (t)	14,527	**162**	64	98	**5.2**	2.5	2.7
Valley Springs (Tvs)	13,648	**4018**	2	4016	**248.1**	0.1	248.0
Alluvial Floodplain Deposits (Qfp)	9,733	**59**	0	59	**10.9**	0	10.9
Undifferentiated Surficial Alluvial Deposits (Qu)	4,497	**1550**	568	982	**64.1**	23.8	40.4
South Fork Gravels (Qsf)	3,975	**586**	586	0	**48.8**	48.8	0
Alluvial Deposits, Undivided (Qha)	3,419	**32**	0	32	**1.6**	0	1.6
Ione (Ti)	2,956	**89**	0	89	**3.1**	0	3.1
Turlock Lake (Tpl)	2,095	**342**	342	0	**9.5**	9.5	0
Basin Deposits (Qhb)	663	**4**	0	4	**3.1**	0	3.1
North Merced Gravels (Qtnm)	561	**84**	41	43	**3.6**	2.2	1.4
Total	**344,609**	**61576**	**13415**	**48161**	**3999.5**	**938.5**	**3061.4**

Abbreviations are: UDA = Urban Development Area.

APPENDIX B-1 (Continued)

Figure 6 Number of Vernal Wetlands by Geologic Formation in the SSHCP Study Area. See Table B1-2 for Geologic Formation Names.

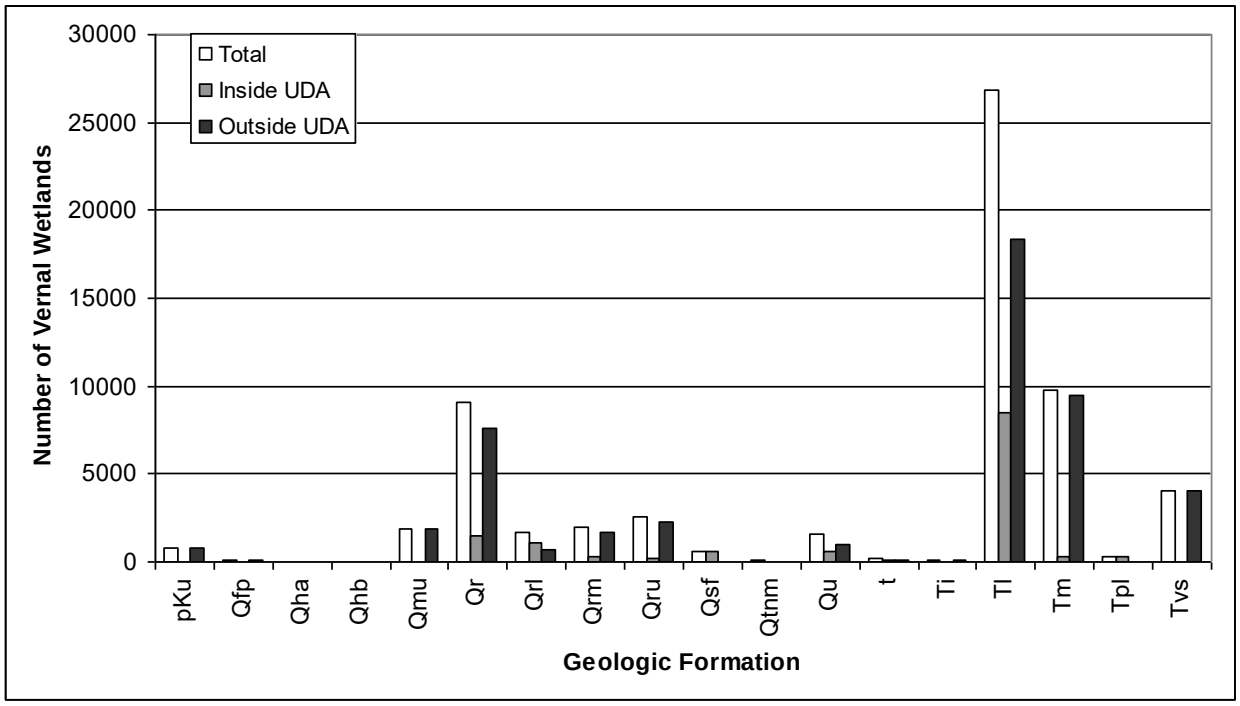
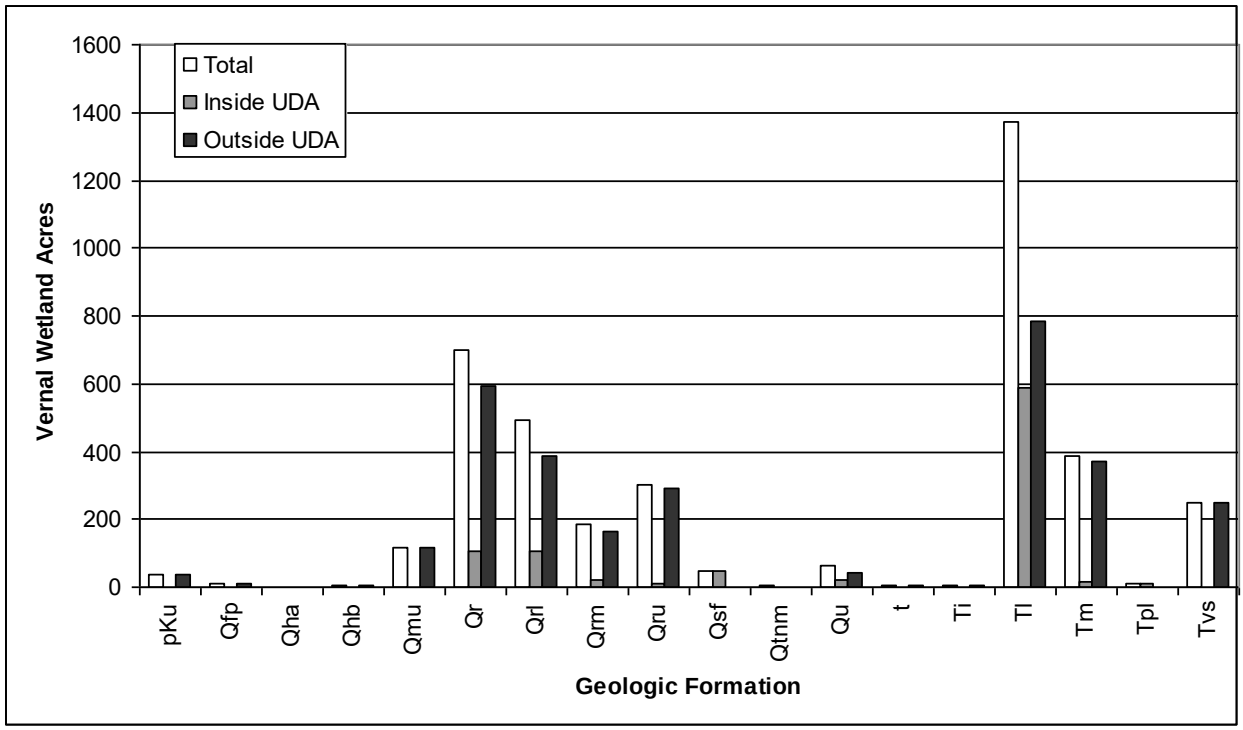


Figure 7 Number of Wetted Acres by Geologic Formation in the SSHCP Study Area. See Table B1-2 for geologic formation names.



APPENDIX B-1 (Continued)

The mean size of vernal pools / wetlands (in acres) for each geologic formation both inside and outside the UDA is summarized in Table B1-5 and illustrated in Figure 8.

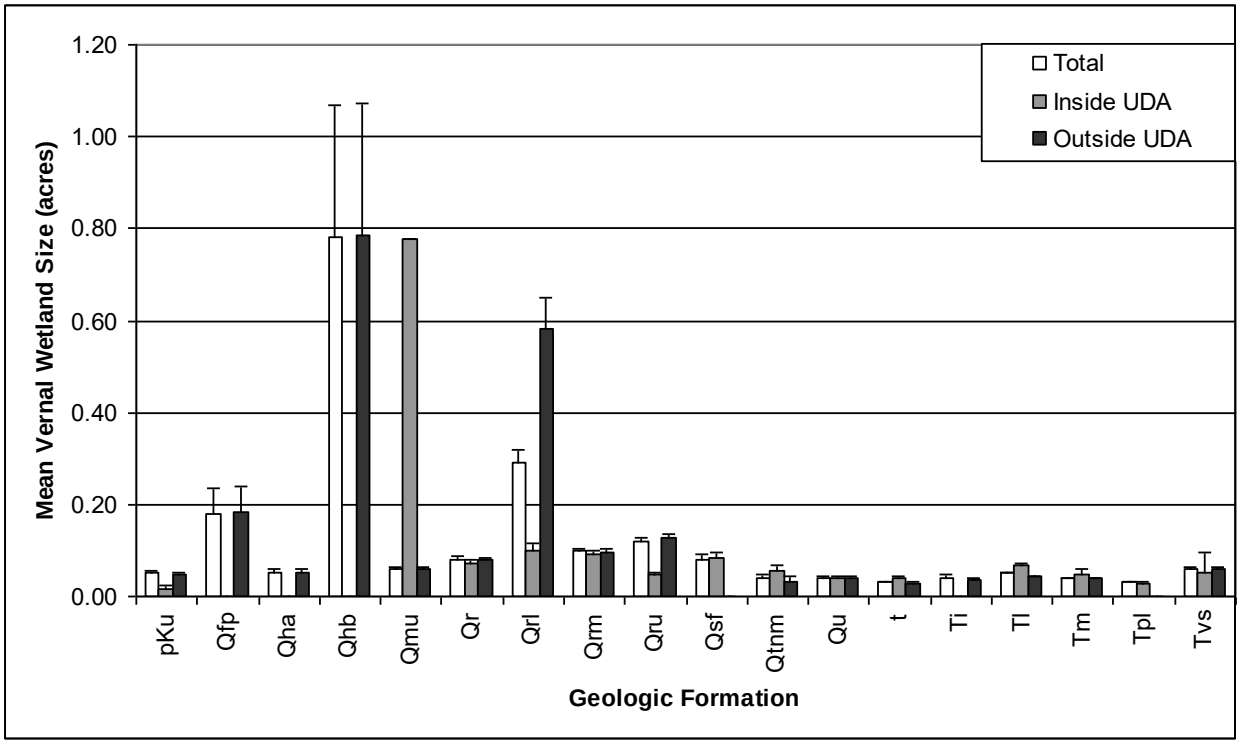
Table B1-5
Mean Vernal Wetland Size (acres) for Geologic Formations within the SSHCP Study Area

Geologic Formation	Total # of Vernal Wetlands	Mean Vernal Wetland Size		Mean Vernal Wetland Size Inside the UDA		Mean Vernal Wetland Size Outside the UDA	
		Mean	*SE*	*Mean*	*SE*	*Mean*	*SE*
Laguna (Tl)	26,844	0.05	0.001	0.07	0.004	0.04	0.001
Lower Unit Riverbank (Qrl)	1,719	0.29	0.028	0.10	0.013	0.58	0.067
Riverbank Undivided (Qr)	9,095	0.08	0.006	0.07	0.007	0.08	0.007
Upper Unit Riverbank (Qru)	2,546	0.12	0.008	0.05	0.006	0.13	0.008
Mehrten (Tm)	9,759	0.04	0.001	0.05	0.012	0.04	0.001
Metamorphic Rocks (pKu)	829	0.05	0.005	0.02	0.006	0.05	0.005
Middle Unit Riverbank (Qrm)	1970	0.10	0.006	0.09	0.010	0.10	0.006
Upper Unit Modesto (Qmu)	1888	0.06	0.004	0.78	N/A (one record)	0.06	0.004
Dredge Tailing and Artificial Fill (t)	162	0.03	0.003	0.04	0.005	0.03	0.005
Valley Springs (Tvs)	4,018	0.06	0.003	0.05	0.043	0.06	0.003
Alluvial Floodplain Deposits (Qfp)	59	0.18	0.054	N/A	N/A	0.18	0.054
Undifferentiated Surficial Alluvial Deposits (Qu)	1550	0.04	0.002	0.04	0.003	0.04	0.003
South Fork Gravels (Qsf)	586	0.08	0.011	0.08	0.011	N/A	N/A
Alluvial Deposits, Undivided (Qha)	32	0.05	0.011	N/A	N/A	0.05	0.011
Ione (Ti)	89	0.04	0.006	N/A	N/A	0.04	0.006
Turlock Lake (Tpl)	342	0.03	0.003	0.03	0.003	N/A	N/A
Basin Deposits (Qhb)	4	0.78	0.288	N/A	N/A	0.78	0.288
North Merced Gravels (Qtnm)	84	0.04	0.009	0.05	0.013	0.03	0.011
Total	**61,576**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Abbreviations are: UDA = Urban Development Area.

APPENDIX B-1 (Continued)

Figure 8 Mean (mean + 1 SE) Vernal Wetland Size for All Vernal Wetlands, and Those Inside and Outside the Urban Development Area by Geologic Formation in the SSHCP Study Area. See Table B1-2 for geologic formation names.



Large vernal wetlands (those covering 0.10 or more acres) comprise 10% of the total number of wetlands that occur in the SSHCP Study Area. Table B1-6 gives a summary of the large vernal wetlands and total wetted acres occurring on each geologic formation within the SSHCP Study Area. These large vernal wetlands were further sub-divided into five size categories (Table B1-7) that are illustrated graphically in Figure 9.

Table B1-6
Top 10% (Vernal wetlands greater than 0.1 acres) of Largest Vernal Wetlands and Total Vernal Wetland Acre for Geologic Formations within the SSHCP Study Area

Geologic Formation	Wetland Acres			Number of Vernal Wetlands		
	Total	*Inside UDA*	*Outside UDA*	*Total*	*Inside UDA*	*Outside UDA*
Laguna (Tl)	686.5	364.0	322.5	2,088	942	1,146
Lower Unit Riverbank (Qrl)	458.6	82.6	376.0	553	195	358
Riverbank Undivided (Qr)	465.4	66.4	399.0	989	164	825
Upper Unit Riverbank (Qru)	238.5	5.6	232.9	583	20	563
Mehrten (Tm)	186.6	7.8	178.8	636	13	623

APPENDIX B-1 (Continued)

Table B1-6
Top 10% (Vernal wetlands greater than 0.1 acres) of Largest Vernal Wetlands and Total Vernal Wetland Acre for Geologic Formations within the SSHCP Study Area

Geologic Formation	Wetland Acres			Number of Vernal Wetlands		
	Total	*Inside UDA*	*Outside UDA*	*Total*	*Inside UDA*	*Outside UDA*
Metamorphic Rocks (pKu)	19.5	0.0	19.5	59	0	59
Middle Unit Riverbank (Qrm)	133.2	15.8	117.4	391	44	347
Upper Unit Modesto (Qmu)	70.1	0.8	69.3	191	1	190
Dredge Tailing and Artificial Fill (t)	1.7	0.7	1.0	10	4	6
Valley Springs (Tvs)	151.9	0.0	151.9	413	0	413
Alluvial Floodplain Deposits (Qfp)	9.7	0.0	9.7	13	0	13
Undifferentiated Surficial Alluvial Deposits (Qu)	28.3	10.3	18.0	122	48	74
South Fork Gravels (Qsf)	32.9	32.9	0.0	82	82	0
Alluvial Deposits, Undivided (Qha)	0.7	0.0	0.7	3	0	3
Ione (Ti)	1.5	0.0	1.5	7	0	7
Turlock Lake (Tpl)	2.4	2.4	0.0	8	8	0
Basin Deposits (Qhb)	3.1	0.0	3.1	4	0	4
North Merced Gravels (Qtnm)	1.8	1.1	0.7	6	4	2
Total	**2492.4**	**590.4**	**1902.0**	**6,158**	**1525**	**4,633**

Abbreviations are: UDA = Urban Development Area.

Table B1-7
Top 10% (Vernal Wetlands Greater than 0.1 acres) of Largest Vernal Wetlands (in 5 Categories) for Geologic Formations within the SSHCP Study Area

Geologic Formation	Number of Large Vernal Wetlands (acres)					
	Total	*>4.0*	*4.0-1.1*	*1.1-0.7*	*0.7-0.37*	*0.37-0.10*
		(Inside the UDA / Outside the UDA)				
Laguna (Tl)	2088	6/4	48/24	29/32	111/114	748/972
Lower Unit Riverbank (Qrl)	553	3/13	5/64	11/58	20/85	156/138
Riverbank Undivided (Qr)	989	1/8	11/56	6/41	18/92	128/628
Upper Unit Riverbank (Qru)	583	0/3	0/27	2/32	2/85	16/416
Mehrten (Tm)	636	0/2	3/10	1/20	1/73	8/518
Metamorphic Rocks (pKu)	59	0/0	0/2	0/2	0/8	0/47
Middle Unit Riverbank (Qrm)	391	0/1	0/9	5/21	12/51	27/265
Upper Unit Modesto (Qmu)	191	0/0	0/10	1/15	0/20	0/145
Dredge Tailing and Artificial Fill (t)	10	0/0	0/0	0/0	0/0	4/6
Valley Springs (Tvs)	413	0/1	0/18	0/23	0/57	0/314

APPENDIX B-1 (Continued)

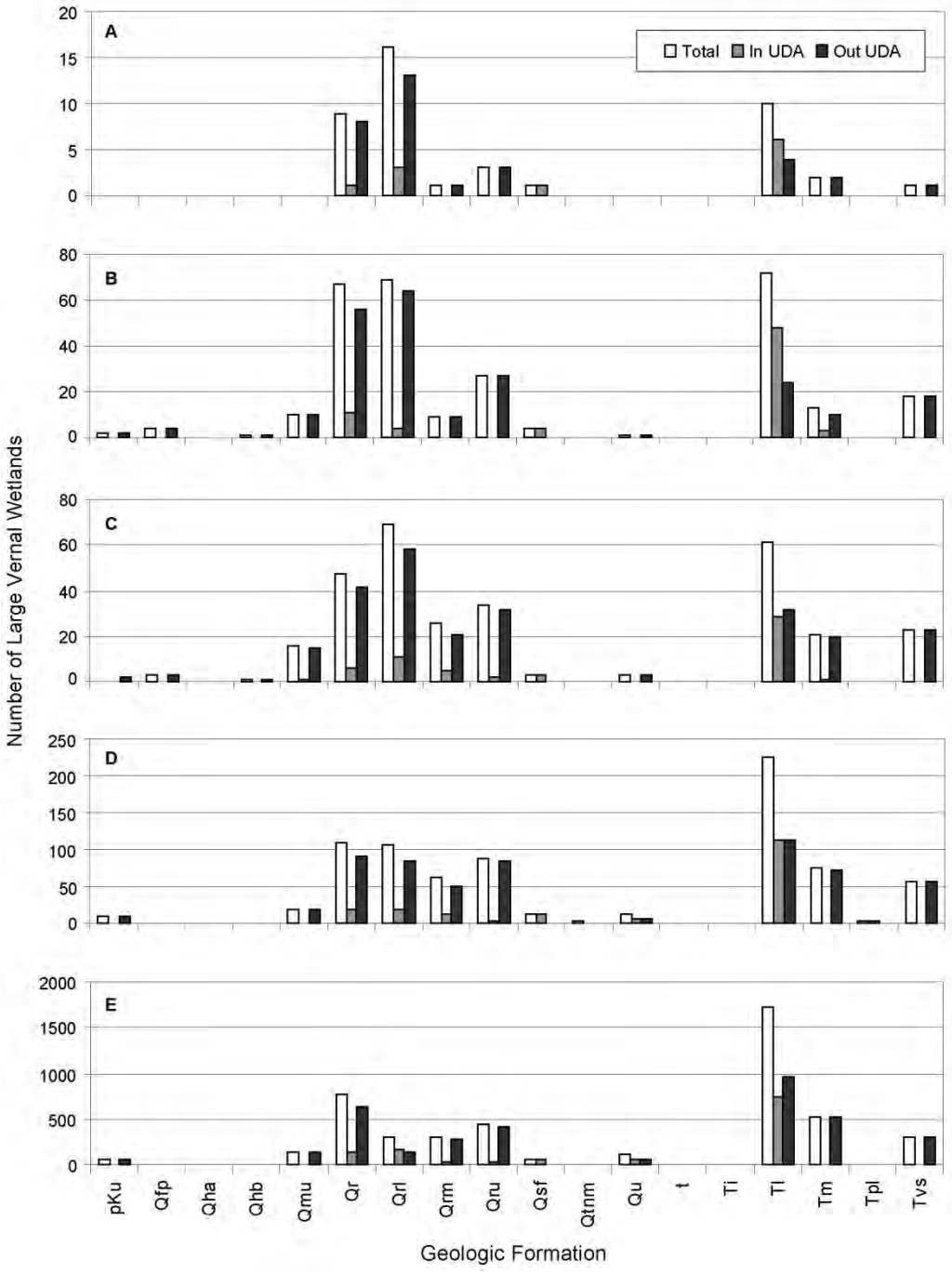
Table B1-7
Top 10% (Vernal Wetlands Greater than 0.1 acres) of Largest Vernal Wetlands (in 5 Categories) for Geologic Formations within the SSHCP Study Area

Geologic Formation	Number of Large Vernal Wetlands (acres)					
	Total	*>4.0*	*4.0-1.1*	*1.1-0.7*	*0.7-0.37*	*0.37-0.10*
		(Inside the UDA / Outside the UDA)				
Alluvial Floodplain Deposits (Qfp)	13	0/0	0/4	0/3	0/0	0/6
Undifferentiated Surficial Alluvial Deposits (Qu)	122	0/0	0/1	0/3	5/7	43/63
South Fork Gravels (Qsf)	82	1/0	4/0	3/0	14/0	60/0
Alluvial Deposits, Undivided (Qha)	3	0/0	0/0	0/0	0/0	0/3
Ione (Ti)	7	0/0	0/0	0/0	0/0	0/7
Turlock Lake (Tpl)	8	0/0	0/0	0/0	2/0	6/0
Basin Deposits (Qhb)	4	0/0	0/1	0/1	0/1	0/1
North Merced Gravels (Qtnm)	6	0/0	0/0	0/0	1/1	3/1
Total	6158	**43**	**297**	**309**	**780**	**4729**
In/Out	**1,525/4,633**	**11/32**	**71/226**	**58/251**	**186/594**	**1,199/3,530**

Abbreviations are: UDA = Urban Development Area.

APPENDIX B-1 (Continued)

Figure 9 Large vernal wetlands (the largest 10%) and their distribution among geologic formations in the SSHCP Study Area and position relative to the Urban Development Area. The graphs represent wetlands in the following large vernal wetland size categories from the top down: (A): >4.0 acres; (B): 4.0-1.1 acres; (C): 1.1-0.7 acres; (D): 0.7-0.37 acres; and (E): 0.37-0.10 acres. See Table B1-2 for geologic formation names.



APPENDIX B-1 (Continued)

The following discussion of the distribution of vernal wetlands in the SSHCP Study Area is organized by geologic formations with the most wetted acres to the formation with the least. Four geologic formations, Laguna, Undivided Riverbank, Mehrten, and Valley Springs contain 80% of the vernal wetlands mapped in the SSHCP Study Area (Table B1-4). The Laguna Formation contains 43% of all mapped vernal wetlands in the SSHCP Study Area. The Mehrten Formation is next in rank (although 5th in terms of overall acreage) bearing 16% of the total number of vernal wetlands, with Undivided Riverbank supporting 15% of the total. Some formations (e.g. Basin Deposits) are relatively minor in terms of number of acres covered, but are important because they support a few very large vernal wetlands.

Average vernal wetland size was calculated for each formation (mean ± 1SE). Means inside and outside the UDA were compared using a Student's t-test. For most of the formations, there was no significant difference between the means (at the .95 confidence level) inside and outside the UDA. However, means did differ significantly between wetlands inside and outside the UDA on the Metamorphic Rocks Formation, meaning that the larger average size of vernal wetlands outside the UDA is not attributable to random chance.

Deep pools were identified during the mapping process as pools that were at least 50% inundated as of March 15, 2001 (the date the aerial photographs were taken).

SSHCP covered species dependent on vernal pools (Table B1-1) are documented as occurring on 13 of the 18 geologic formations discussed below. Reported occurrences of these species were most often from vernal wetlands on the Laguna Formation. However, some formations (e.g., Lower Unit Riverbank, Riverbank Undivided) containing a smaller percentage of the overall number of vernal wetlands have a relatively high number of covered species occurrences.

3.3.1 Laguna Formation (Tl)

The Laguna Formation is the most extensive geologic formation in the SSHCP Study Area with a total of 67,582 acres (28,230 acres inside the UDA and 39,352 acres outside the UDA). It comprises 20% of the total SSHCP land area and is part of the High Terrace Landform that is restricted to the east side of the Central Valley (Smith and Verrill 1998; Jones and Stokes 1990; Reiner and Swenson 2000). The Laguna Formation is composed of interbedded alluvial gravel, sand and silt, deposited from ancient river channels draining from the Sierra Nevada Range, including the Feather, Yuba, American, Cosumnes, and Merced Rivers (Helley and Harwood 1985). It occurs in a band several miles wide running north-south along the eastern half of the SSHCP Study Area. Associated soil families include Redding, Red Bluff and Corning.

The Laguna Formation encompasses 43.5% of the 61,576 total vernal wetlands within the SSHCP Study Area. Of the 26,844 vernal wetlands occurring on this formation, 8,484 are located

inside the UDA and 18,360 are outside the UDA). The Laguna Formation ranks first in importance in terms of total number of wetlands.

Approximately 34% (1,373 acres) of the total vernal wetland acreage within the entire SSHCP Study Area occurs on the Laguna Formation. There are 587.5 vernal wetted acres within the UDA and 785.5 acres outside the UDA. Mean vernal wetland size (± 1 SE) on the Laguna Formation is 0.05 ±0.001 acres.

About one third (2,088) of the 6,158 largest vernal wetlands (defined as those ≥ 0.10 acre) mapped within the SSHCP Study Area occur on the Laguna Formation. The Laguna Formation also has the greatest portion (one third) of the top 10% of the largest vernal wetlands (pools >0.10 acres), encompassing a total of 2,088 of the 6,158 large vernal wetlands that occur in the SSHCP Study Area. Over half (55%) of the large wetlands on the Laguna Formation occur inside the UDA; the rest are located outside the UDA.

The Laguna formation has a total of 10,112 deep pools (3,330 inside the UDA and 6,782 outside the UDA). The total acreage of deep pools is 603.3 acres (296.3 acres inside the UDA and 307 acres outside the UDA).

Surveys conducted within the SSHCP Study Area to date have reported all 13 covered species (see Table B1-1) from vernal wetlands on the Laguna Formation (CDFG 2005). Sacramento Orcutt grass and slender Orcutt grass, the only SSHCP "no take species", are reported exclusively from the Laguna Formation.

3.3.2 Mehrten Formation (Tm)

The Mehrten Formation is made up of eroded, high standing remnants of andesitic volcanic mudflow fans that were deposited during the Pliocene and Miocene, 10-25 million years ago. In the San Joaquin Valley, this stratum overlies the Valley Spring Formation and sits under the Laguna Formation. Vernal pools tend to be located on the western edge of the Merhten Formation because the eastern portion increases in slope, precluding pool development (Smith and Verrill 1998). There are 26,667 acres of Mehrten Formation within the SSHCP Study Area (3,441 acres inside the UDA and 23,226 acres outside the UDA).

The Mehrten Formation ranks second in total number of vernal wetlands in the SSHCP Study Area, with 9,759 (16%) mapped (298 inside and 9,461 outside the UDA). There are a total of 387 wetted acres associated with the Mehrten Formation (15 acres inside and 372 acres outside the UDA). Mean size (± 1SE) of vernal wetlands on the Mehrten Formation is 0.04 ±0.001 acres. Vernal wetlands are similar in average size both inside and outside the UDA.

The Mehrten Formation encompasses about 10% (636) of the 6,158 largest vernal wetlands inside the SSHCP Study Area. All but 13 of these largest pools are located outside of the UDA.

The Mehrten Formation has a total of 1,829 deep pools (62 inside the UDA and 1,767 outside the UDA). The total acreage of deep pools is 43.9 acres (1.7 acres inside the UDA and 42.2 acres outside the UDA).

Covered species occurring in vernal wetlands on this formation include vernal pool tadpole shrimp, vernal pool fairy shrimp, legenere, and pincushion navarretia.

3.3.3 Riverbank Undivided Formation (Qr)

The Riverbank Undivided Formation covers the third largest area in the SSHCP with a total of 51,425 acres (15,850 acres inside and 35,575 acres outside the UDA). This formation is part of the lower, younger terrace deposited along the entire east side of the Central Valley and the west side of the Sacramento Valley during the Pleistocene (100,000 years ago). Soils with claypans and duripans are common, as are vernal pools (Smith and Verrill 1998). Riverbank Formation is generally confined to the central portion of the SSHCP Study Area and occurs on either side of the Cosumnes River.

The Riverbank Undivided Formation contains the third largest number of vernal wetlands within the SSHCP Study Area with a total of 9,095 (1,466 within the UDA and 7,629 outside the UDA). This is about 15% of the total number of vernal wetlands mapped. The total vernally wetted area of Riverbank Undivided Formation is 701 acres (107 acres within the UDA and 594 acres outside the UDA).

The mean size of vernal wetlands (±1 SE) on Riverbank Undivided Formation is 0.08 (±0.006) acres. The Riverbank Undivided Formation supports about 16% of the 6,158 largest vernal wetlands (top 10% largest) mapped within the SSHCP Study Area. Most of the 989 largest pools on this formation occur outside the UDA (174 inside and 825 outside the UDA).

The Riverbank Undivided Formation has a total of 2,462 deep pools (374 inside the UDA and 2088 outside the UDA). The total acreage of deep pools is 182.8 acres (33.1 acres inside the UDA and 149.7 acres outside the UDA).

Based on surveys conducted within the SSHCP Study Area to date, covered species reported from Riverbank Undivided include the vernal pool endemics vernal pool fairy shrimp, vernal pool tadpole shrimp, mid valley fairy shrimp, as well as California tiger salamander and the vernal pool plant, legenere.

APPENDIX B-1 (Continued)

3.3.4 Valley Springs Formation (Tvs)

The Valley Springs Formation is made up of eroded, high-standing remnants of rhyolitic volcanic mudflow fans that were deposited 20-35 million years ago. Vernal pools tend to be located on the western edge of the formation because the eastern portion increases in slope, precluding pool development (Smith and Verrill 1998). A total of 13,648 acres of Valley Springs Formation occurs on the south-eastern edge of the SSHCP Study Area (91 acres are inside the UDA and 13,557 acres are outside the UDA).

The Valley Springs Formation supports 4,018 vernal wetlands, all but 2 are located outside the UDA. These vernal wetlands total 248 acres. Mean size (±1 SE) of these vernal wetlands is 0.06 ±0.003 acres.

The Valley Springs Formation encompasses less than 10% (413) of the 6,158 largest vernal wetlands (≥ 0.01 acres). All of the largest wetlands on this formation are outside the UDA.

The Valley Springs Formation has a total of 1,606 deep pools that are outside the UDA. The total acreage of deep pools is 58.7 acres.

Pincushion navarretia is the only covered species found in vernal wetlands on this formation.

3.3.5 Upper Unit Riverbank Formation (Qru)

The Upper Unit Riverbank Formation is a compacted mixture of granitic sand, silt, and clay with channels of metamorphic gravel, dark brown to red in color. Sediments in this formation are similar to those in the Laguna Formation. This formation developed during the middle to late Pleistocene and covers 28,212 acres (6,295 acres inside the UDA and 21,917 acres outside the UDA) in the central to southern portion of the SSHCP Study Area, overlapping onto the older Laguna Formation to the east and covered by younger alluvium in the western portion.

The 2,546 vernal wetlands associated with Upper Unit Riverbank Formation cover a total of 304 acres. About 90% of these vernal wetlands are located outside the UDA. Mean size (± 1SE) of vernal wetlands on this formation is relatively large (0.12 ±0.008 acres). Vernal wetland mean size inside the UDA is 0.05 acres; outside the UDA, mean size is 0.12 acres. Statistically, the difference between the means is not significant (p = 1.658).

Of the 6,158 largest vernal wetlands (vernal wetlands ≥0.10 acre), 538 are located on the Upper Unit Riverbank Formation. Most of these large pools are located outside the UDA; only 20 occur within the boundaries of the UDA.

The Upper Unit Riverbank Formation has a total of 726 deep pools (12 inside the UDA and 714 outside the UDA). The total acreage of deep pools is 75.2 acres (0.6 acres inside the UDA and 74.6 acres outside the UDA).

Five covered species have been recorded from vernal wetlands on this formation within the SSHCP Study Area: western spadefoot, California tiger salamander, vernal pool fairy shrimp, vernal pool tadpole shrimp, and mid-valley fairy shrimp.

3.3.6 Middle Unit Riverbank Formation (Qrm)

The Middle Unit Riverbank Formation is similar in composition to the other Riverbank Formations. There are approximately 18,953 acres of Middle Unit Riverbank Formation located within the SSHCP Study Area (5,886 acres inside the UDA and 13,067 acres outside the UDA). This formation occurs in a few disjunct patches in the south-central and north-central parts of the SSHCP Study Area.

There are 1,970 vernal wetlands that occur on The Middle Unit Riverbank Formation (251 inside and 1,719 outside the UDA). These wetlands cover 188 acres, only 23 of which are found inside the UDA. Vernal wetland mean size (± 1 SE) is 0.10 ±0.006 acres. Average pool size inside and outside of the UDA does not differ significantly (p = 1.65).

The Middle Unit Riverbank Formation contains 391of the 6,158 top 10% largest vernal wetlands. Most of these large vernal wetlands are located outside the UDA.

The Middle Unit Riverbank Formation has a total of 501 deep pools (92 inside the UDA and 409 outside the UDA). The total acreage of deep pools is 50.3 acres (12.3 acres inside the UDA and 38 acres outside the UDA).

SSHCP covered species recorded from this formation include vernal pool tadpole shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, and legenere.

3.3.7 Upper Unit Modesto Formation (Qmu)

The Upper Unit Modesto Formation is the youngest unit of Pleistocene alluvium consisting of distinct alluvial terraces, some alluvial fans, and abandoned channel ridges (Helley and Harwood 1998). It forms the lowest deposits lying topographically above Holocene deposits along streams in valleys. Streams that still exist today deposited the Modesto Formation between 12,000 and 26,000 years ago. In the SSHCP Study Area, Upper Unit Modesto Formation covers a total of 18, 051 acres, bordering the Cosumnes River, Laguna Creek, Skunk Creek, Hadselville Creek, and Browns Creek. Most of these acres are outside the UDA (17,864 acres) and only 185 acres occur within the UDA.

The Upper Unit Modesto Formation supports 1,888 vernal wetlands covering a total of 117 acres. All but one of these wetlands occurs outside the UDA. The mean size (± 1SE) of vernal wetlands on this formation is 0.06 ±0.004 acres.

The Upper Unit Modesto has 191 of the top 10% of largest vernal wetlands (≥ 0.10 acres). Only one of these large wetlands occurs inside the UDA.

The Upper Unit Modesto Formation has a total of 837 deep pools (1 inside the UDA and 836 outside the UDA). The total acreage of deep pools is 63.8 acres (0.8 acres inside the UDA and 63 acres outside the UDA).

Four covered species are reported to occur in vernal wetlands on this formation: California tiger salamander, mid-valley fairy shrimp, Ahart's dwarf rush, and pincushion navarretia.

3.3.8 Lower Unit Riverbank Formation (Qrl)

There are 53,357 acres of Lower Unit Riverbank Formation (40,273 acres inside the UDA and 13,084 acres outside the UDA), making it the second largest geological formation within the SSHCP Study Area. It is made up of higher riverbank terraces and remnants of alluvial fans. The most extensive exposure of Lower Unit Riverbank is in and around the City of Sacramento and was probably deposited by the American River. The modern Sacramento River is impinging on and eroding this alluvial fan (Helley and Harwood 1985). Lower Unit Riverbank deposits occur in the northwest portion of the SSHCP Study Area.

The Lower Unit Riverbank Formation has 1,719 vernal wetlands within the Study Area (1,055 inside the UDA; 664 outside the UDA). The total area covered by vernal wetlands on the Lower Unit Riverbank Formation is 495 acres, about three-quarters of which, occurs outside the UDA. Mean size (±1 SE) of vernal wetlands on this formation is rather large, nearly 1/3 acre (0.29 ±0.028 acres). Average vernal wetland size is 0.1 acres inside the UDA and about 0.6 acres outside the UDA. The difference between the means is not statistically significant (p = 5.36).

Lower Unit Riverbank has 553 of the 6,158 largest vernal wetlands mapped in the SSHCP Study Area. Of these, 195 occur inside the UDA and 358 occur outside the UDA.

The Lower Unit Riverbank Formation has a total of 353 deep pools (233 inside the UDA and 120 outside the UDA). The total acreage of deep pools is 67.1 acres (29.8 acres inside the UDA and 37.2 acres outside the UDA).

Several occurrences of the SSHCP covered species vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, all vernal pool endemics, are recorded for this formation.

Legenere, another covered species, has also been reported from Lower Unit Riverbank Formation within the SSHCP Study Area.

3.3.9 Undifferentiated Surficial Alluvial Deposits Formation (Qu)

Undifferentiated Surficial Alluvial Deposits are found on 4, 497 acres largely confined to the banks of streams and rivers on the eastern side of the SSHCP Study Area. About a fourth of the area (1,189 acres) is located within the UDA and 3,309 acres are located outside the UDA. This formation derives from various alluvial sources deposited in geologically recent times.

There are 1,550 vernal wetlands on the Undifferentiated Alluvial Deposits Formation: 568 are found inside the UDA and 982 are outside. Total wetted area is 64.1 acres (23.8 acres inside and 40.4 acres outside the UDA). Mean size (±1 SE) of vernal wetlands on this formation is 0.04 ± 0.002 acres.

The Undifferentiated Surficial Alluvial Deposits Formation has 122 of the 6,158 largest vernal wetlands (1.9%). Forty-eight (48) of these occur within the UDA and 74 occur outside the UDA.

The Undifferentiated Surficial Alluvial Formation has a total of 565 deep pools (243 inside the UDA and 322 outside the UDA). The total acreage of deep pools is 30.2 acres (12.9 acres inside the UDA and 17.3 acres outside the UDA).

Six covered species are reported from vernal wetlands on Undifferentiated Surficial Alluvial Deposits in the SSHCP Study Area: western spadefoot, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, legenere, and pincushion navarretia.

3.3.10 Metamorphic Rock Formation (pKu)

Exposed metamorphic and granitic rocks are found in the northeastern part of the SSHCP Study Area. These rocks are part of the oldest geologic complex formed before the Cretaceous period, at least 145 million years ago. The Metamorphic Rock Formation of covers 7% (24, 288 acres) of the total land area in the SSHCP Study Area, of which 86 acres occur in the UDA and 24,201 acres are outside the UDA.

The Metamorphic Rock Formation has 829 vernal wetlands within the SSHCP Study Area, (17 inside the UDA and 812 outside the UDA). Total vernal wetland area for the Metamorphic Rock Formation is 38.2 acres, almost all of which falls outside the UDA. The average size (mean ± 1 SE) of vernal wetlands on this formation is 0.05 ±0.005 acres. This is the only formation on which average vernal wetland size differs significantly between those inside the UDA and those outside the UDA. Here, average vernal wetland size is statistically significantly smaller inside the UDA (p

= 0.002).The Metamorphic Rock Formation contains 59 of the 6,158 largest vernal wetlands (≥0.10 acres) in the SSHCP Study Area. All of these large wetlands occur outside the UDA.

The Metamorphic Rock Formation has a total of 213 deep pools outside the UDA. The total acreage of deep pools is 6 acres.

Vernal pool fairy shrimp is the only SSHCP covered species recorded from the Metamorphic Rock Formation at the time of this report.

3.3.11 South Fork Gravels Formation (Qsf)

South Fork Gravels form a broken belt of rounded pebbles and cobbles in a matrix of coarse sand that extends in a northeasterly direction in the center of the UDA. The age of this deposit has not been determined, but it is thought to be older than the Laguna Formation. South Fork Gravels cover a total 3,975 acres within the SSHCP Study Area (1.2% of total land area), all of which are inside the UDA.

The 586 vernal wetlands on the South Fork Gravels Formation occupy a total of 48.8 acres. Mean vernal wetland size (±1 SE) is 0.08 ± 0.011.

The South Fork Gravels Formation has 82 of the 6,158 vernal wetlands 0.1 acre or larger. All are located within the boundaries of the UDA.

The South Fork Gravels Formation has a total of 143 deep pools inside the UDA. The total acreage of deep pools is 18.8 acres.

Vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, and legenere are covered species reported from the South Fork Gravels Formation in the SSHCP Study Area.

3.3.12 Turlock Lake Formation (Tpl)

The Turlock Lake Formation is part of the high terrace on the east side of the Central Valley (Smith and Verrill 1998) that formed about a million years ago. It is made up of slightly cemented sand, gravel and silt occurring as a thin layer over the Laguna Formation in the upper central portion of the SSHCP Study Area. The Turlock Lake Formation covers a total of 2,095 acres, all of which are inside the UDA.

The Turlock Lake Formation has 342 vernal wetlands (9.5 wetted acres) within the SSHCP Study Area. Mean size (± 1SE) of these vernal wetlands is 0.03 ±0.003 acres. Eight of the 342 vernal wetlands on Turlock Lake Formation are 0.10 acres or larger. All of these large wetlands occur within the UDA.

APPENDIX B-1 (Continued)

The Turlock Formation has a total of 55 deep pools inside the UDA. The total acreage of deep pools is 2.2 acres.

SSHCP covered species reported from the Turlock Lake Formation to date are western spadefoot, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

3.3.13 Dredge Tailing and Artificial Fill Formation (t)

The Dredge Tailing and Artificial Fill Formation consists of rows of large cobble, gravel, sand, silt, and clay deposited along riverbanks as a result of gold mining undertaken during the 1800's. This formation covers 14,527 acres, 4.2% of the total land area of the SSHCP. Most (12,735 acres) of the land covered by dredge tailings and artificial fill occurs within the UDA in the northern portion of the SSHCP Study Area and 1,791 acres occur outside the UDA.

Less than one percent (162) of the mapped vernal wetlands occur on this formation (64 inside and 98 outside the UDA). These vernal wetlands cover about 5 acres; half of which occur within the UDA and the other half outside the UDA. Average vernal wetland size (mean ± 1SE) is 0.03 ±0.003 acres. There is no significant difference between the mean size of wetlands inside compared with outside the UDA.

Ten of the 6,158 largest pools occur on this formation, 4 of them inside and 6 outside the UDA.

The Dredge Tailings and Artificial Fill Formation has a total of 75 deep pools (10 inside the UDA and 65 outside the UDA). The total acreage of deep pools is 2.2 acres (0.8 acres inside the UDA and 1.4 acres outside the UDA).

No SSHCP covered species have been reported from this formation to date.

3.3.14 Ione Formation (Ti)

The Ione Formation is composed of three distinct layers: quartz sandstone overlying white clay, with gray or blue clay below. This developed during the Eocene (40-50 million years ago) when the Central Valley was covered by inland sea. Ione formation is exposed in the eastern portion of the SSHCP Study Area.

It covers a total of 2,956 acres (61 acres are inside the UDA and 2,895 acres are outside the UDA).

Eighty-nine vernal wetlands (3.1 wetted acres) have been mapped on Ione Formation. All fall outside the boundary of the UDA. Vernal wetland mean size (± 1 SE) is 0.4 ±0.006 acres. Of the 6,158 large vernal wetlands (≥ 0.1 acres), 7 occur on the Ione Formation. All of these large vernal wetlands are outside the UDA.

APPENDIX B-1 (Continued)

The Ione Formation has a total of 32 deep pools outside the UDA. The total acreage of deep pools is 0.8 acres.

There are no SSHCP covered species reported from this formation at this time.

3.3.15 North Merced Gravels (Arroyo Seco Gravel) Formation (Qtnm)

The North Merced Gravels Formation is made up of coarse, round pebbles and cobbles derived from dark metamorphic rocks that were laid down by streams and rivers draining the Sierra Nevada 1-3 million years ago. In the SSHCP Study Area, this formation occurs as a thin layer that overlies very high terraces of Laguna Formation sediments, covering 561 acres (500 acres are inside the UDA and 61 acres are outside the UDA).

There are 84 vernal wetlands on the North Merced Gravels Formation; 41 of these are found inside the UDA and 43 are outside the UDA, for a total of 3.6 wetted acres. Average size (mean ± 1 SE) of vernal wetlands mapped on this formation is 0.04 ±0.009 acres.

Six of the 6,158 largest vernal wetlands (4 inside and 2 outside the UDA) occur on North Merced Gravels within the Study Area.

The North Merced Gravels Formation has a total of 45 deep pools (9 inside the UDA and X outside the UDA). The total acreage of deep pools is 2.6 acres (1.2 acres inside the UDA and X acres outside the UDA).

Boggs Lake hedge-hyssop is the only covered species reported from North Merced Gravels in the SSHCP Study Area at this time.

3.3.16 Alluvial Floodplain Deposits (Qfp)

The Alluvial Floodplain Deposits Formation is made up of fine sand, silt, and clays deposited down during the current epoch. It covers 9,733 acres, all of it outside the UDA, primarily in the southwestern portion of the SSHCP Study Area. There are 59 vernal wetlands on this formation covering a total of 10.9 acres.

Vernal wetlands on this formation are relatively large. Mean wetland size (± 1 SE) is 0.18 ±0.054 acres. Thirteen of the largest 10% of vernal wetlands occur on this formation; about half of these are one acre or larger.

The Alluvial Floodplain Deposits Formation has a total of 21 deep pools outside the UDA. The total acreage of deep pools is 2 acres.

Dwarf downingia and legenere are the only covered species reported from vernal wetlands on Alluvial Floodplain Deposits within the SSHCP Study Area to date.

3.3.17 Undivided Alluvial Deposits (Qha)

Undivided Alluvial Deposits are composed of cobbles, gravel, sand, silt and clay. This formation occurs on less than 1% of the total SSHCP Study Area. Of the 3, 419 acres mapped, 838 acres occur inside the UDA and 2,582 acres occur outside the UDA in discrete patches along the boundaries of the SSHCP Study Area. There are 32 vernal wetlands on this formation that cover a total of 1.6 acres, all outside the UDA.

Mean area (±1 SE) of the vernal wetlands on Undivided Alluvial Deposits is 0.05 ±0.011 acres. Three of the top 10% largest vernal wetlands occur on this formation. All three are found outside the UDA.

The Undivided Deposits Formation has a total of 9 deep pools outside the UDA. The total acreage is 0.2 acres.

No covered species have been reported from this formation to date.

3.3.18 Basin Deposits (Qhb)

Basin Deposits occur as unconsolidated clay, silt, and other fine material that formed in sink areas during the Holocene epoch. This recent formation is found in the eastern-most corner of the SSHCP Study Area and covers a total of 663 acres (590 acres inside and 73 outside the UDA).

Four vernal wetlands were mapped on this formation; these cover a total of 3.1 acres, all outside the UDA. Average size (mean ± SE) of vernal wetlands on Basin Deposits is quite large: 0.78 ± 0.228 acres. Each of the four wetlands on this formation is 0.10 acres or larger.

The Basin Deposits Formation has a total of 2 deep pools outside the UDA). The total acreage of deep pools is 2.4 acres.

No covered species have been reported from this formation to date.

APPENDIX B-1 (Continued)

INTENTIONALLY LEFT BLANK

4 THREATS TO HABITAT AND AQUATIC RESOURCES

It is impossible to determine the acreage of vernal pool complexes, the number of vernal pools, or the distribution of types of vernal pools that once occurred in pre-settlement California. Dahl (1990) estimates that California has lost 95% of its pre-settlement wetlands (including vernal pools), more wetland loss than any other state in the Country. Holland (1998) reports a loss of approximately three million acres (~75%) of vernal pool complexes since the European settlement of California. He estimates that, as of July 1997, less than one million acres of mostly fragmented complexes remain. It was further estimated that since 1987, Merced County has lost 30,317 acres of vernal pool habitat, and that between 1972 and 1993 Sacramento County lost 30,512 acres (Holland 1998). Figures for total losses of vernal pool habitat statewide since 1997 are not available. However even at a conservative estimated loss rate of 1.5% per year (it may be greater considering current 50-year build-out projections for Merced, Sacramento, Solano, and Placer Counties), the estimated one million acres remaining in 1997 will be reduced by one-half in 46 years, down to just 12% of the pre-settlement California vernal pool acreage (Keeler-Wolf et al. 1998).

Vernal pool habitat remaining in California is further threatened by direct loss and by degradation resulting from residential and industrial development, agricultural land-use conversion, habitat fragmentation, hydrological alteration, invasive plant species, inappropriate livestock and vegetation management, non-point source water and air pollution and climate change.

4.1 Urban and Industrial Development

The greatest losses of California vernal pool habitat have resulted primarily from land-use conversion to irrigated agriculture, starting in the latter part of the 19th Century (see Section 4.2), and more recently, to residential and industrial development. Development remains the main threat to the continued existence of functioning vernal pool landscapes in the Central Valley and elsewhere in California (Jokerst 1993; Bauder et al. 1997; Keeler-Wolf et al. 1998).

It is important to note that Sacramento and Placer Counties together contain the majority of the vernal pool acreage existing in the Southeast Sacramento Valley Vernal Pool Bioregion. This Bioregion encompasses the majority of the State's Northern Hardpan Vernal Pool type as well (CDFG 1998). Most of the Volcanic Mudflow Vernal Pool type in this Bioregion has already been lost to development (Keeler-Wolf et al. 1998). Considering past losses, projections for development, and the high quality of some of the vernal pool habitat remaining in Sacramento and Placer Counties, the Southeast Sacramento Valley Vernal Pool Bioregion is one of the more ecologically important regions, and one of the most threatened.

Land development threatens the remaining vernal pool ecosystem directly through destruction and fragmentation of habitat. Loss of habitat, however may also indirectly affect the remaining areas by increasing the likelihood of other threats (e.g. habitat fragmentation, hydrological alteration, invasion by noxious species, changes in land management options/practices, pollution, inadequate mitigation measures, etc.).

4.2 Agricultural Conversion

Along with Urban/Industrial development, conversion to intensive agriculture has been a leading threat to vernal pool landscapes. Loss of vernal pool habitat began in earnest in the latter decades of the 19th Century, as agricultural development in the Central Valley spread from the deep-soil of fertile riverine floodplains onto the more poorly-drained soils of the higher-older alluvial fans and terraces (Smith and Verrill 1998). Common methods used to improve cultivation conditions in these vernal pool landscapes included leveling of mound-swale topography, excavation of drainage ditches to lower perched water tables, and ripping and blasting of subsoil horizons for improved water drainage. With the later advent of large-scale water delivery and drainage systems, conversion to irrigated agriculture expanded further still (Smith and Verrill 1998).

Until recently, most of the large tracts of middle and upper terrace-vernal pool habitat in the Central Valley remained intact as part of large-scale annual-pasture livestock ranches which, in most cases, have not significantly altered the landscape. In recent years, however, conversion of these otherwise marginal ranchland soils to vineyards has been increasing and has become a leading threat to vernal pools in the Southeastern Sacramento Valley Vernal Pool Bioregion (Keeler-Wolf et al. 1998).

4.3 Habitat Fragmentation

Fragmentation of vernal pool habitat results from a variety of causes and occurs at a range of spatial and temporal scales. This fragmentation reduces the spatial and ecological continuity within a given land unit (see discussion of ecological connectivity Section 1.4 of this report). Habitat fragmentation is an ongoing and cumulative threat to the vernal pool ecosystem.

It is important to consider the spatial scale of potential effects of developments. For example, Forman and Deblinger (2000) estimated the "road-effect zone" for a busy four-lane highway in Boston, Massachusetts to be an average of 600 meters in width and asymmetric. They suggest that avoidance of roads due to vehicle traffic is probably of more ecological impact to biota than the more evident roadkills. Plants that use animals for dispersal of their propagules are also affected by animal-road avoidance. Fragmentation of natural habitats by roads tends to fragment continuous populations into subpopulations, making each subpopulation more vulnerable to local extinction events due to decreased emigration, immigration and gene flow (Forman and

APPENDIX B-1 (Continued)

Alexander 1998). Roads and other fragmenting intrusions also lessen the visual aesthetic appeal of a natural landscape.

At the larger landscape scale, change in regional abundance and distribution of vernal pool habitat may also change the migration and habitat use patterns of waterfowl and shorebirds on the Pacific Flyway, which in turn also affects meta-population dynamics of numerous organisms and alters multiple landscape-scale ecological functions.

Considered at smaller scales, habitat fragmentation can result from placement of roadbeds, railroad tracks, walls, utility corridors or other developments within vernal pool complexes. These types of intrusions can prevent the California tiger salamander or western spadefoot from completing their necessary seasonal migrations to and from rodent burrows in adjacent uplands. In addition to altering the vernal pool hydrologic cycle, interruption of hydrologic interconnectivity by these types of developments can disrupt dispersal of plant seeds and invertebrate cysts/eggs, thus manifesting changes in long-term meta-population dynamics. Fences that limit the movement of livestock through the landscape may also affect meta-population dynamics, since livestock are also implicated in the transport of seeds, cysts and eggs.

One significant negative aspect of habitat fragmentation is the increased edge effect to which remaining preserved vernal pool habitat areas are subject. As remaining habitat areas diminish in size, the ratio of vulnerable edge to preserved interior area increases. Ecological consequences arise because, as this ratio increases, any given interior point (vernal pool or organism) is closer to potential threats existing outside of the preserve boundary. Concomitant with increased edge effect are increased vulnerability to stochastic disturbances, pollution, and increased vulnerability to invasions by non-native plant and feral animal species. Edge effect can be minimized for vernal pool/annual grassland preserves by maximizing the size of the preserve areas (in contrast to creating more numerous smaller preserves), and by designing preserves that are as round in shape as possible. All other factors considered equal, the best shape for an ecological preserve is a circle, and the least preferable is a long narrow rectangle.

Fragmentation ultimately leads to smaller and more numerous tracts of habitat areas, which may be proportionally more difficult to regulate, monitor and manage in a consistent, efficient, and economical fashion. In addition, smaller, more numerous preserves are more likely to be surrounded by developed residential and/or industrial areas that not only present more types and more frequent threats, but may also be less attractive to migratory waterfowl and shorebirds. For these and other reasons fragmented habitats are less likely to maintain complex ecosystem processes and species populations over time.

APPENDIX B-1 (Continued)

4.4 Invasive Non-native Plants and Animals

In general, vernal pool habitat is excessively demanding for most non-native plant and animal species; however, a number of invasive species exist which are documented as potential threats to vernal pool habitat. In addition, invasive species not yet known to be a threat to California vernal pools may be introduced in the future (see Data Gaps Section 7). Invasive species in both vernal pool basins and in surrounding uplands can negatively affect vernal pool habitat in a variety of ways, ultimately changing ecological functions and negatively affecting desirable species.

Non-native annual grasses of Mediterranean origin now dominate the uplands associated with vernal pool complexes in California. The transition from native vegetation to exotics began with European settlement and was hastened by years of drought and overgrazing during the late 1800s. Some suggest that rapid evapo-transpiration of water and built-up thatch from non-native grass species (e.g., foxtail chess, Italian wildrye, Mediterranean barley, Medusa-head grass, soft chess) may indirectly affect vernal pool species by lessening the amount of water entering the system through surface and subsurface flow (Marty 2003; Robins and Vollmar 2002). The effects of thatch buildup in uplands may negatively affect obligate vernal pool bee pollinators as well. Thick stands of mulch may also impede juvenile California tiger salamanders and western spadefoots during their migrations from their aquatic pool habitat to the upland areas and burrows used for summer activity and aestivation. Barbed awns and seed coats on non-native grasses can also injure or kill mammals by becoming lodged in their ears, eyes, throats and fur.

Italian wildrye and Mediterranean barley are two non-native facultative wetland species that typically dominate disturbed seasonal wetlands and invade smaller, more ephemeral vernal pool types. In heavy clay soils and in non-grazed systems, these two grasses can encroach upon the pool margins, resulting in a simplified pool edge habitat with diminished native plant diversity (Robins and Vollmar 2002).

Other weedy hydrophytic species reported as growing within vernal pools in the Sacramento Valley include lippia (*Phyla nodiflora*), swamp pricklegrass (*Crypsis schoenoides*), European mannagrass (*Glyceria declinata*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), Bermuda-Grass (*Cynodon dactylon*) and paradox canary-grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), a native species, can also dominate vernal pools (Schlising, Unger pers. comm.; Dittes pers. obs.).

Non-native mammals inhabiting grasslands and vernal pool complexes in California include the domestic cat, domestic dog, feral pig, Norwegian rat, black rat, house mouse and perhaps most recently, ferrets. These animals prey on native species, thus decreasing population viability. They also have the potential to spread diseases and parasites to other mammals within the area. Non-native birds such as the European house sparrow and European starling are also invading annual

grasslands and vernal pool complexes. These birds compete with native species for foraging areas and nesting sites.

Non-native amphibians known to invade vernal pools and seasonal wetlands include the introduced tiger salamander (*Ambystoma tigrinum*) and bullfrog (*Rana catesbiana*). Although bullfrogs require permanent bodies of water to complete their life cycles, they can migrate through vernal pools, where they feed voraciously on native amphibians and crustaceans. In general, native amphibians do not occur in water bodies occupied by bullfrogs and non-native fishes. The introduced tiger salamander (*Ambystoma tigrinum* was introduced as fish bait and now several populations have become established in California. The species has been reported to be hybridizing with California tiger salamander (Schaffer et al. 1993).

4.5 Livestock Grazing

In general, livestock grazing under appropriate conditions is thought to be compatible with vernal pool ecosystems, and in many cases even beneficial (Pyke and Marty 2005; Marty 2003; Vollmar and Robins 2002; Griggs 2000). In other cases though, livestock grazing can be deleterious when an incompatible grazing regime is used. Grazing is cited as a threat to a variety of sensitive vernal pool organisms at a number of Central Valley locations (CDFG 2003).

Complete absence of livestock grazing can be disadvantageous to vernal pools in several ways. Barry (1998) concluded that complete rest from grazing: allows upland species to encroach upon pool edges (species in centers of pools are less affected); can cause decreased water runoff and increased soil infiltration, percolation and water storage capacity due to increased vegetation; and can result in decreased diversity around pools. Marty (2003) found that aquatic invertebrate species richness was highest in grazed vernal pools, likely resulting from longer inundation periods due to higher soil compaction.

Some showy vernal pool plants (e.g., *Blennosperma, Downingia, Lasthenia, Limnanthes*) require the pollination services of specialist bees to reproduce (Thorp 1976, 1990; Thorp and Leong 1995, 1996, 1998). These bees nest in the soil of uplands within vernal pool complexes. Therefore, vernal pool conservation must consider nesting requirements of oligolectic (pollen specialist) bees to ensure longevity of some vernal pool plants. Effects of grazing on specialist bees are not known. Given that soil disturbance and compaction in grasslands is a well-known consequence of livestock grazing, with ecological affects varying by site (Duffey et al. 1974), perturbations to bee nests and potential nesting sites are possible. Conversely, these specialist bees may not fare well in situations where excessive thatch, particularly from Medusa-head grass, results because of too little grazing. Soil types, vegetation composition, number and type of livestock, grazing duration, and seasonal periods are all factors affecting soil compaction and erosion by livestock.

Other negative potential effects of livestock grazing on vernal pool habitats result more from inappropriate timing of the grazing regime, than from the intensity of the grazing. For example, Orcutt grass flowers and sets seed during the late spring and summer months. Grazing of Orcutt grass -occupied pools at this time can reduce or eliminate the season's reproductive effort, and over time can exhaust the soil seed bank. Grazing with livestock while the pool is still inundated in the late fall, winter, and early spring months allow plants in the juvenile life stage to escape grazing and trampling impacts. Similarly, grazing in the very late summer and fall months, after seeds have matured and dried, also allows for escape from these negative pressures (Stone et al. 1988). Grazing during the migration of California tiger salamander and western spadefoot can lead to mortality by trampling.

Influence of livestock grazing on the water chemistry of vernal pools has not received direct investigation, although Robins and Vollmar (2002) provide a good review of what is currently known. Excessive livestock use can result in nutrient overloading of vernal pool basins via input of feces and urine. Under these conditions, algal blooms proliferate and eutrophication (oxygen depletion) ensues. Excessive growth of algae also limits light penetration into the water column, limiting growth of plant seedlings and potentially affecting ecology of the invertebrate community. Livestock grazing may also result in the removal of nitrogen from the vernal pool ecosystem by conversion of plant material. Livestock congregating around pool edges may increase soil erosion and pool turbidity, potentially smothering amphibian larvae.

For these and potentially other reasons, overgrazing, under grazing and improperly timed livestock grazing can negatively affect the vernal pool species and vernal pool ecosystems.

4.6 Hydrologic Alterations

As described in Section 1.2 and 1.3 of this report, timing of the four phases of the vernal pool hydrological cycle is considered to be the over-riding factor in determining the biological structure and ecological functions of the vernal pool ecosystem. It follows then that any alteration of a sub-watershed that affects the timing of the hydrological cycle has potential to affect the ecological integrity of the vernal pools present there.

Water added to the system resulting in prolonged inundation and/or waterlogged-terrestrial phases could push the vernal pool hydrology and biota away from the unique vernal pool type and towards that of the common seasonal marsh. Alterations of this type can be observed where construction of berms (e.g., stockponds) and/or obstruction of swales by roadbeds, railroad tracks and canal berms have resulted in the impoundment of water in vernal swales or an increase in pond depth. Vernal pools can also shift toward a seasonal marsh inundation regime as a result of increased precipitation runoff flowing from nearby developed impermeable surfaces, from irrigated landscaping, and from irrigated agriculture.

Conversely, water removed from the vernal pool system resulting in abbreviation of the inundated and/or waterlogged-terrestrial phases can lead to a shift towards the less specialized seasonal wetland type that is dominated by low diversity of mostly non-native plant species and generalist invertebrates. Reduction of duration of the inundated and/or waterlogged-terrestrial phases may result from interruption of flow into pools in settings where swales contribute to pool basin hydrology. Since the hydrological cycle is linked to the surrounding upland soil profile (Hains and Stromberg 1990), disturbances to the surrounding upland soil profile within a watershed containing vernal pools may alter the vernal pool ecological function as well.

Degradation of vernal pools resulting from hydrological alteration are cited as threats at a number of recorded locations, including the Phoenix Field and Phoenix Park Preserves, at other sites in Sacramento County, and elsewhere in the state (CDFG 2003; USFWS 1994; Fisher and Schaffer 1996; Stone et al. 1988; Clark et al. 1998; Dittes pers. obs.).

4.7 Fires

Grassland fires are considered to be a beneficial part of the natural cycle of historic California grassland landscapes and are generally not considered a threat to vernal pools and vernal pool ecosystems. Contemporary annual grassland communities are commonly managed with fire to control the buildup of thatch and the cover of exotic species, namely Medusa-Head Grass and Yellow Star Thistle (Griggs 2000; Mawdsley 2000). However, there are cases where fire carries through vernal pools during the dry summer and fall months, impacting the rare late blooming Orcutt Grasses (Schlising pers.comm.). Removal of upland vegetation (by fire or grazing) may also increase grazing pressures on plants remaining within pools or exclosures. For example, grasshoppers were observed eating large amounts of the rare Orcutt Grass after adjacent uplands were burned and heavily grazed at the Vina Plains Preserve in Tehama County (Schlising pers. comm.).

Management activities associated with fire control activities (e.g., plowing or scraping fuel breaks) may impact vernal pools and vernal pool complexes. Sacramento Orcutt grass pools at the Keifer Landfill have fuel breaks constructed through them along Grant Line Road and along Keifer Boulevard. These fuel breaks may directly affect plants and animals and may also alter the hydrology both the impacted pool and surrounding pools.

4.8 Recreation Activities

Recreation is not commonly considered when discussing threats to vernal pools. Since vernal pools are aesthetically appealing for only a short part of the year, unlike riparian areas that have living vegetation and water for a significant part of the year, they have been described as having an

"image problem" (Zedler 1987). Impacts from recreation may become more of a concern as more development occurs and more preserves are established in close juxtaposition with housing tracts.

Vernal pool impacts resulting from recreation activities are reported from the Phoenix Park Preserve in Sacramento County (Clark et al. 1998). In this urban-natural area interface, trampling from foot, horse and bicycle traffic within the highly accessible Preserve was reported to compact soils, eliminate plant cover where trails came close to pools, and disturb plants and wildlife. In addition litter accumulation is also cited as a problem (CDFG 1983; Clark et al. 1998). Recreational off-road vehicle use during the wet season can create large ruts and reduce vegetative cover; this activity has been observed in Butte, Tehama and Sacramento Counties (Dittes per. obs.). Uncontrolled dogs and cats may disturb wildlife as well.

4.9 Pollution

A variety of point and non-point-source pollutants enter the vernal pool landscape via overland and subterranean flow of water, and atmospheric pollution can enter in precipitation and in the form of dust. Wind-blown trash accumulation and even illegal dumping of household garbage and garden waste has also been cited as threats in some vernal pool systems (CDFG 2003; Clark et al. 1998).

4.10 Water Pollution

One of the nutrients primarily responsible for eutrophication of freshwater systems is phosphorous, which is often bound to soil particles from agricultural land. Approximately 65 percent of the sediment washed into U.S. streams, rivers and lakes is from cropland, pastures and rangeland. Non-point sources of pollution in urban and residential areas include failing septic systems, septic system additives, improper disposal of household chemicals, storm water runoff, construction activities, and inappropriate use of fertilizers and pesticides (Master et al. 1998).

Impermeable surfaces such as asphalt, concrete, and roofing increase the intensity of storm water runoff and provide a path for runoff laden with sediment, heavy metals, oil and oxygen-demanding organic matter (Master et al. 1998). Nutrients or toxicants are dissolved in water and enter streams where they may move downstream, accumulate in deposits and be ingested by organisms (NRC 1992). Sacramento County (1993) stated that "urban storm water runoff discharges contain non-point source pollutants that lower the quality of receiving waters" in Sacramento County, and indicated that pasture runoff could also serve as a source of "surface water quality degradation".

Pesticide residues in water and soil are well known to have various deleterious effects on non-target organisms (Davidson 1979; Hurlbert et al. 1972; Simon and Buikerma 1997; Wurster 1968), although specific studies addressing the effects of pesticides in vernal pool ecosystems are

APPENDIX B-1 (Continued)

lacking. A recent study in the Sacramento area (Roseville) reported that urban runoff containing pyrethroides (the active ingredients found in most insecticides available for residential use) was responsible for sediment toxicity in about half the number of samples collected. In some cases, sediment toxicity caused total or near total (>90%) mortality when exposed to the aquatic amphipod species *Hyalella azteca* in laboratory exposures (Weston et al. 2005).

Herbicides are commonly used to control unwanted plants, native or otherwise. Duffey et al. (1974) recommend that herbicides should not be used on grasslands managed for nature conservation. The effect of herbicides on vernal pool organisms and ecology has not been quantified. However, Clark et al. (1998) observed that plants were killed in vernal pools that received herbicide-laden runoff from nearby areas. Enough seeds apparently were stored in the soil seed bank to allow plants to become reestablished the following year, but continued runoff containing herbicides would likely limit the ability of the vernal pool flora to recover. Similarly, herbicide runoff from the treated ground around a wooden utility pole in Eastern Merced County was observed to result in complete lack of vegetation in an adjacent vernal pool that received the runoff (Dittes pers. obs.)

APPENDIX B-1 (Continued)

INTENTIONALLY LEFT BLANK

5 CLASSIFICATION OF VERNAL POOLS / WETLANDS

Vernal pools/wetlands have been variously classified, depending on the scope and purposes of the particular effort. Classification systems developed by various regulatory agencies and consultants for vernal pools and seasonal wetlands, their defining parameters, and applicability to the SSHCP are summarized in the following discussion. These classification systems are variously based on landforms, geologic formations, soils, hydro-geomorphology, composition of vegetation, or combinations of these in the context of geographic setting (Butterwick 1998; Cowardian et al. 1979; Holland 1986; Jones & Stokes 1990; Reiner and Swenson 2000; Sawyer and Keeler-Wolf et al. 1998; Vollmar 2002).

5.1 Previous Vernal Pools/Wetlands Classification in Sacramento County and the SSHCP Study Area

The first comprehensive classification of Sacramento County's vernal pool habitat was based on association of vernal pool complexes with geologic landform (Jones and Stokes 1990). Landforms result from specific episodes of geologic activity and are physically recognizable features of the earth's surface that have distinguishable shape, range, and composition (Smith and Verrill 1998). According to this system, Sacramento County vernal pools fall into one of four categories: Young-Terrace Pools (Riverbank Formation), Old Terrace Pools (Laguna and Arroyo Seco Gravels), Mudflow Pools (Mehrten and Valley Springs Formation), or Drainage way (recent alluvial deposits over other formations). These four landforms are further subdivided by specific geologic surficial deposits (or formations) based on differences in age, parent material, soil profile development, texture, geomorphic expression, lithology, stratigraphy, induration, and depositional environment (Helly and Hardwood 1985).

Although it was noted that vernal pool habitat varies according to landform association, no quantifiable data were used to describe the patterns of variance. Qualitative generalizations regarding vernal pool shape, depth, size and surface drainage were provided for each of the soil series present in the County (Jones and Stokes 1990). It was acknowledged however, that substantial fieldwork is required before justifying the use of soil series as a primary category of vernal pool classification.

The Nature Conservancy (TNC) modified and applied this landform and geologic formation-based classification system to their Cosumnes River Watershed Project (Reiner and Swenson 2000). As part of this effort, vernal pools in the southeast SSHCP Study Area were categorized according to the following landform categories: Low Terrace Grasslands (Riverbank), High Terrace Grasslands (Laguna), Terrace Drainageway Grasslands (Modesto/Riverbank), and Mudflow Grasslands (Mehrten and Valley Springs Formations).

These landform categories were used by TNC in conjunction with soil maps and vernal pool density maps to qualitatively designate priority conservation areas within the watershed project boundary. As with the system of Jones and Stokes (1990), physical parameters of vernal pool variability were not quantitatively described within or between landforms for the Cosumnes River Watershed Project.

5.2 Classification System of Vernal Pool Complexes for the SSHCP

The SSHCP Vernal pool classification system includes a modification of the landform approach of Jones and Stokes (1990). This landform classification was used to describe vernal pool conservation goals within the Sacramento County General Plan (1993). TNC also used a landform-based approach for conservation planning in the Cosumnes River Watershed Project in southeast Sacramento County (Reiner and Swenson 2000), although it was slightly modified from the approach first proposed by Jones and Stokes (1990).

This current SSHCP classification system builds on these approaches, with additional refinement afforded by currently available GIS technology and GIS geological formation data (California Geological Survey 2003), and recent SSHCP Land Cover Types produced by EDAW (2005).

The SSHCP classification system for vernal pools/wetlands is intended to be workable for the scale and resolution of the SSHCP mapping effort, and for the general timeline and budget constraints of the SSHCP. Within the scope of these considerations, the classification system is intended to be refined enough to identify, delineate and prioritize conservation needs for the region's vernal wetlands to the fullest extent possible at this time.

This vernal wetland classification system will increase the probability that overall biodiversity, special-status species, and myriad complex ecological functions operating up to the landscape level, are captured within appropriate and proportional mitigation-related habitat preserves.

Analysis of vernal wetland distribution in the SSHCP Study Area is based on the mapping conducted by the Geographical Information Center (GIC) in Chico, California in 2005 (Figure 4). Delineation of vernal wetlands was performed by use of ortho-rectified black and white aerial photographs that were flown on March 15, 2001. These orthophoto images were brought into ArcView 3.3 GIS software and the vernal wetland signatures were digitized into polygons which were recorded as a shape file. Vernal pool/wetlands were identified primarily by visual signatures, including contrasting shades (color) and to some degree texture and shape.

The mapping criteria and methodology used for the SSHCP Study Area were similar to those used by GIC in creating regional maps of vernal pool wetlands for Tehama County and Shasta County. In the SSHCP Study Area, these wetlands were usually found in isolation and sometimes are interspersed with and/or connected to swales. The vernal pools/wetlands usually

APPENDIX B-1 (Continued)

have a relatively distinct boundary or contrasting edge that makes them visually discernible from less distinct saturated soil formations ("spongy areas").

The vernal pool/wetland delineations conducted remotely by interpretation of aerial photos are expected to differ somewhat from jurisdictional vernal pool acreages obtained using the standard USCOE (1987) 3-parameter approach (boundaries determined on the ground using indicators of hydrology, hydric soil and hydrophytic vegetation).

This is an unavoidable consequence of remote delineation. Comparison of the remote delineation with on-the-ground 3-parameter delineations was made at a few sites where the jurisdictional delineations were available (vicinity of Sunrise-Douglas and Mather Field vernal pool complexes). In these cases, there was good correspondence in the polygons and signatures derived by these two methods (Radmacher pers. comm.; Sacramento County 2005). It is important to note though, that some of the other landscape settings may differ in agreement between the remotely mapped vernal wetlands and what is actually on the ground. It is critical to note that owing to time constraints and lack of access to private property, on-the-ground verification/delineation of vernal wetlands is not possible at this time.

Expected discrepancies between results of the two delineation scales and methods are likely to include:

1. ***Overestimation of the number and acreage of jurisdictional vernal pool wetland features using the aerial photo data set:*** On the aerial photograph, some features delineated as vernal wetlands may appear vernal pool- like, with defined boundaries and hydric reflective signatures that contrast with the surrounding upland annual grassland. In reality however, these wetland features may or may not support an actual vernal pool hydrologic cycle. If the mapped feature ponds water for too short duration, the feature may be a less-specialized seasonal wetland; if ponding is of excessive duration, the feature may actually be a less specialized seasonal marsh. In addition, some mapped signatures may not be associated with ponded basins at all; rather they may merely reflect saturated soil profiles without "pools", especially with soils heavy in clay. In all three cases, wetland features mapped that do not support the vernal pool hydrologic cycle do not provide habitat support function for the vernal pool flora and fauna.
2. It is important to note that this type of error is not likely to apply equally across all vernal pool complexes that occur on the various geologic formations. For instance, the mapping of vernal pools is more likely to be very accurate and precise for the vernal pools associated with the high-terrace Laguna Formation. In contrast, accuracy and precision is comparatively less for vernal pools occurring on the heavier clay soils associated with the low terrace Riverbank Formations.

3. ***Underestimation of the number of separate and/or small jurisdictional vernal wetland features using the aerial photo data set:*** In some cases, the higher degree of resolution afforded by use of three parameters on the ground will result in exclusion of small non-wetland areas that bridge closely-juxtaposed wetland basins. From the scale of the aerial photograph, the shallow bridges are not discernible, and so multiple jurisdictional-delineable basins are conjoined and a lesser number of larger pools are perceived. In addition, a number of isolated smaller/shallower wetlands that exhibit less distinct visual signatures were likely overlooked on the aerial photo delineation, and would be included in the 3-parameter field delineation.
4. ***Underestimation of size of functioning "hydrologic complex" with the 3-parameter delineation;*** in the preceding two cases, the differences between the two delineation methods trend towards increased resolution of jurisdictional boundaries using the 3-parameter field delineation. Importantly however, the 3-parameter approach can result in underestimation of the functional wetland area. Any given vernal wetland area is functionally related with surrounding vernal pools, seasonal wetland ecotones and with uplands, subterranean groundwater and surrounding saturated soil profiles. These areas are involved with the functions of hydrology, element cycling, and habitat support, but they may not satisfy one or more of the 3 field criteria, and so are usually excluded from jurisdictional acreage calculations.

Owing to the regional-scale view afforded, and greatly increased resolution and accuracy as compared to the previous regional vernal pool map (Jones and Stokes 1990), the map produced from the 1:200-scale aerial photograph (GIC 2005) is highly valuable for regional conservation planning and is used here for the SSHCP.

It is important to consider however, that the 3 considerations discussed above, combined with human error that is inherent in the aerial photo-mapping and digitizing process, somewhat limit the 1:200-scale GIS layer with regard to calculating exact vernal wetland acreages for precision impact analysis and mitigation planning. Owing to time and budget constraints and lack of access to private property however, on-the-ground delineations are not possible to conduct prior to completion of the SSHCP. Accurate three-parameter jurisdictional delineations will eventually be conducted on all lands as they are developed and on all preserves as they are established.

5.2.1 Classification by Geologic Formations

Physical parameters of vernal pool complexes appear to vary by geologic formation. These factors may include drainage area, slope, soil structure, soil depth, pool size, pool depth, timing of vernal pool hydrologic cycle and vernal pool interconnectivity. These physical parameters in turn affect the structure and ecological dynamics of the associated vernal pool flora and fauna.

APPENDIX B-1 (Continued)

Different geologic formations support characteristic vernal pool types. In addition, specific geologic formations may possess specific biogeographic legacies that are reflected in present day patterns of vernal pool plant and animal biodiversity.

It follows then, that in order to ensure preservation of the full spectrum of impacted vernal pool types and functions, mitigation in-kind will involve preservation/restoration of vernal pools that occur in as close proximity as possible on the same type of geologic formation.

5.2.2 Classification of SSHCP Vernal Pool Complexes with Vernal Wetland-Acre/Density Index (VWADI)

In addition to correlation with geologic formations, a Vernal Wetland Acre/Density Index (VWADI) is used to describe and classify the vernal pool complexes within the SSHCP Study Area. This index is based on the variation in vernal wetland area (acres), and variation in vernal wetland density (number of vernal wetlands per unit land area). These two parameters, assessed together as an index for standardized 160-acre land analysis units, will serve as a primary descriptor of the range of spatial-ecological variability of vernal pool/wetland types in the SSHCP Study Area, within geological formations (see Section 6).

These analyses will provide the framework for the development of the SSHCP vernal pool-annual grassland habitat conservation strategy. For each parameter proposed however, full consideration of assumptions and limitations is required particularly as they relate to resolution and accuracy of the descriptive model (e.g., it is beneficial to know which ecological situations are likely to be overlooked, why, and what is the significance).

Additional ecological measures are also desirable for a more complete and accurate description of spatial and functional variability of vernal pools and vernal pool complexes (Jokerst 1993; Leidy and White 1998; Wacker and Kelly, 2004). It is imperative to consider vernal pool functions and processes at the landscape-scale as well to maximize the likelihood of achieving long-term conservation goals (Alexander and Schlising 1998; Jokerst 1993; Wacker and Kelly, 2004;). Ongoing vernal pool mitigation efforts have received criticism for focusing overly on replacement of acreage while givinglittle attention to the functioning landscape-scale ecosystem (Jokerst 1993; Wacker and Kelly 2004).

For the purposes of the SSHCP, a GIS-derived spatial-ecological index has been developed that allows for a more refined and quantifiable assessment of the region's vernal pool complexes. This relatively simple index is used here in conjunction with earlier regional conservation strategies that were based on association of vernal pool complexes with landform and geologic formation (Jones and Stokes 1990; Reiner and Swenson 2000). This VWADI is based on two parameters that are readily measurable remotely with GIS technology: 1) density of vernal

wetland features per 160-acre Land Analysis Unit(s) (LAU), and 2) wetted acres of vernal wetland habitat per 160-acre LAU.

Note that the size (area) of the vernal wetlands, a third important parameter, is inferable when vernal wetland density and wetted acres in each 160-acre LAU are plotted together on x and y axes. These three parameters considered together as an index reflect landscape-scale spatial relationships with ecological implications that are not discernible by considering each of the parameters in isolation (see following discussion).

Specifically, the VWADI is used here in the SSHCP to more accurately perform the following 3 tasks:

1. Describe spatial-ecological variability of vernal pool landscapes in the greater SSHCP Study Area;
2. Describe and quantify spatial-ecological variability of vernal pool landscapes within and between the various geologic formations encompassed by the SSHCP Study Area;
3. Describe and quantify spatial-ecological variability of vernal pool landscapes within and between different planning areas within the SSHCP Study Area (e.g., inside and outside of UDA).

It is critical to note that although the index itself is relatively simple, the exact utility is determined by the type and quality of the spatial data available. The GIS-data set utilized for the SSHCP was derived through manual delineation of black and white aerial photographs (scale: 1 inch = 400 feet) with limited subsequent field verification (see discussion under Section 5.2 above).

5.2.3 Development of the Vernal Wetland Acre/Density Index (VWADI)

The VWADI was produced by first creating a GIS grid-layer comprised of evenly distributed, contiguous 160-acre squares and then superimposing the grid-layer over the entire SSHCP Study Area on the GIS base Geologic Formation map. The 160-acre square grid unit was chosen for several reasons: this size and shape corresponds with ¼ of a 640-acre section and it therefore roughly corresponds with land-ownership boundaries; also, since preserves should be made as large in area as possible, use of multiple 160-acre subunits will allow for more detailed analysis and preserve planning. The grid units are hereafter referred to as LAUs.

A numbering system was then created to assign a unique identifier to each of the 2,311 LAUs. It was found that 1,372 LAUs encompass vernal pool habitat in the SSHCP Study Area as of 2006.

APPENDIX B-1 (Continued)

Once the grid system was created, the GIS program was queried to obtain the following two values for each of the 160-acre LAUs:

1. Vernal wetland density expressed as the total number of vernal wetland features encompassed within the LAU, including pools shared with contiguous LAUs; and
2. Total wet acres of vernal wetland habitat, including the portion(s) of shared wetland(s) that occur within the given LAU;

The density and wet-acre values were then ordinated onto standard-scale X and Y-axes, respectively (see Figures 10, 12, 14, and 16). This ordination results in visual-spatial segregation of different types of vernal pool complexes within continua of density and wetted acreage. Note that within any given LAU and relative to another, a doubling of wetted acreage with constant vernal pool density corresponds to a doubling in the average vernal pool/wetland size (area). Thus, even though it is not a directly measured parameter, vernal pool size is inferable within the index.

Once this ordination was performed for LAUs nested within each of the geologic formations and landforms, and within each of the planning areas previously described (see tasks 1-3, Section 5.2.2), the resulting X-Y Cartesian Grid was divided into 25 VWADI categories by designating 5 intervals along the X-axis (based on vernal pool density and designated A-E), and 5 intervals along the Y-axis (based on vernal pool wet-acres and designated 1-5; (see Figures 11, 13, 15, and 17). In this fashion, each 160-acre LAU is identifiable according to one of these 25 standardized alphanumeric values.

After creation of the 25 VWADI values and ordination of the LAUs a summary calculation was made that describes the numerical and spatial distribution of each "VWADI Category Type" that exists within the SSHCP Study Area for each geologic landform. For example and as indicated in Figure 11, on the Laguna Geologic Formation there are 15 160-acre LAUs that correspond to the D4 VWADI Category; 12 of the LAUs are located inside the UDA and three are outside of the UDA; there are a total of 122 wetted acres present in this category, of which 99 acres are located inside and 23 acres are outside of the UDA.

As with any other ecological index, there are assumptions and limitations to the model that require consideration. The following is an account of rationale, assumptions and limitations as they pertain to use of the VWADI for the purpose of the SSHCP.

Assumptions Regarding the Mapping Data:

- The GIS layer base map (GIC 2005) used to produce the index reasonably reflects conditions in the field with regard to vernal wetland locations and boundaries (see Section 5.0 above).

APPENDIX B-1 (Continued)

- Inaccuracies in delineation of vernal wetland boundaries on the GIS layer base map differ between Geologic Formations (e.g., accuracy is higher for vernal pools associated with high-terrace Laguna Formation, and is lower on clay soils of low-terrace Riverbank Formation).

Assumptions Regarding Vernal Pool/Geologic Formation Relations:

- Determinant relationships between geologic formations and physical characteristics of associated vernal pools, and in turn, physical characteristics of vernal pools influence vernal pool biota. For this reason, acquisition of land or easements will occur over broad range of formations.

Assumptions Regarding Vernal Wetland Density and Ecological Interconnectivity:

- Ecological interconnectivity increases with increasing vernal pool density per given land unit. For example two vernal pools located within 3 meters of each other inter-relate differently ecologically than two pools located 90 meters apart.
- Interconnectivity at the local scale generally increases with an increase in the size of any given vernal pool preserve supporting vernal pool complexes of a given density. Similarly, at the regional scale, interconnectivity increases with an increase in the number of juxtaposed large vernal pool preserves supporting vernal pool complexes.
- Maximum interconnectivity is associated with the largest areas encompassing the densest of pool complexes.
- High-density complexes possess specific ecological properties (e.g., attractiveness to migratory waterfowl, greater function of meta-population dynamics, increased number of ecological niches, and population stability in light of drought-wet cycles and perhaps even climate change).
- Vernal wetlands and complexes occur along gradients of interconnectivity (hydrological-spatial).

Assumptions Regarding Size (area) of Vernal Wetlands:

- Larger vernal pools (by area) possess specific ecological properties, functions and values that are different from smaller pools (e.g., a greater volume of water for a given depth, a larger number of possible habitat niches, increased attractiveness to migratory waterfowl).
- Vernal wetlands occur along gradients of size (area-depth).
- Size (area) may be a useful indicator of duration of hydro-period.
- Larger pools (by area) are more infrequently occurring.

APPENDIX B-1 (Continued)

Assumptions Regarding Vernal Pool Hydrology:

- Vernal pool hydro-period is one of the primary determinants in structuring the general vernal pool biological assemblage.
- Size (area) may be a useful indicator of hydrology.
- Vernal wetlands occur along gradients of severity of seasonal inundation cycle (duration/depth).
- Vernal pools exhibiting "deep-pool" hydrology (long duration) are more infrequently occurring.

Assumptions Regarding Vernal Pool Conservation Values:

- Vernal wetlands, regardless of size or interconnectivity, possess intrinsic ecological functions and values.
- High-density vernal pool complexes are infrequently occurring, are likely to be more ecologically complex and therefore possess higher conservation value.
- Large vernal pools are more infrequently occurring (in isolation and in complexes), they tend to be more ecologically complex than small vernal pools (in isolation and in complexes) and therefore possess higher conservation value.
- Vernal pools that are known to support special-status plant and/or animal species have high conservation value regardless of interconnectivity or size.

The VWADI approach will serve as an initial guide to address the spatial distribution of differing types of vernal pool complexes, and to aid in formulation of vernal pool habitat conservation goals (see Section 6.0). As time passes and more 3-parameter jurisdictional delineations are conducted in the SSHCP Study Area, the accuracy and precision of the VWADI approach will improve.

5.3 Results of VWADI Analysis

5.1 High Terrace Landform

The High Terrace Landform includes the Laguna, Turlock Lake and Ione Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for the three geologic formations are illustrated in Figure 10 and numerically summarized in Figure 11.

5.1.1 Laguna Geologic Formation (Tl)

The Laguna Geologic Formation encompasses a total of 403 LAU (29.4%), of which 162 (40.2%) are located inside of the UDA and 241 (59.8%) are located outside of the UDA. The 403 LAU are distributed among the five VWADI categories as follows: 104 LAU are included in

APPENDIX B-1 (Continued)

Category 1 (36 LAU are inside the UDA and 68 are outside the UDA), 85 LAU are included in Category 2 (38 LAU are inside the UDA and 47 are outside the UDA), 90 LAU are included in Category 3 (36 LAU are inside the UDA and 54 are outside the UDA), 64 LAU are included in Category 4 (21 LAU are inside the UDA and 43 are outside the UDA) and 60 LAU are included in Category 5 (19 LAU are inside the UDA and 41 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 557 and the total wetland acres per 160-acre LAU range from 0.006 to 20.12 acres.

5.1.2 Turlock Lake Geologic Formation (Tpl)

The Turlock Lake Geologic Formation encompasses a total of 11 LAU (0.8%), of which 11 (100%) are located inside of the UDA. The 11 LAU are distributed among the five VWADI categories as follows: one LAU is included in Category 1, two LAU are included in Category 2, four LAU are included in Category 3, and four LAU are included in Category 4. There are no LAU included within Category 5.

The number of vernal wetlands per 160-acre LAU was found to range from 11 to 84 and the total wetland acres per 160-acre LAU range from 0.3 to 6.4 acres.

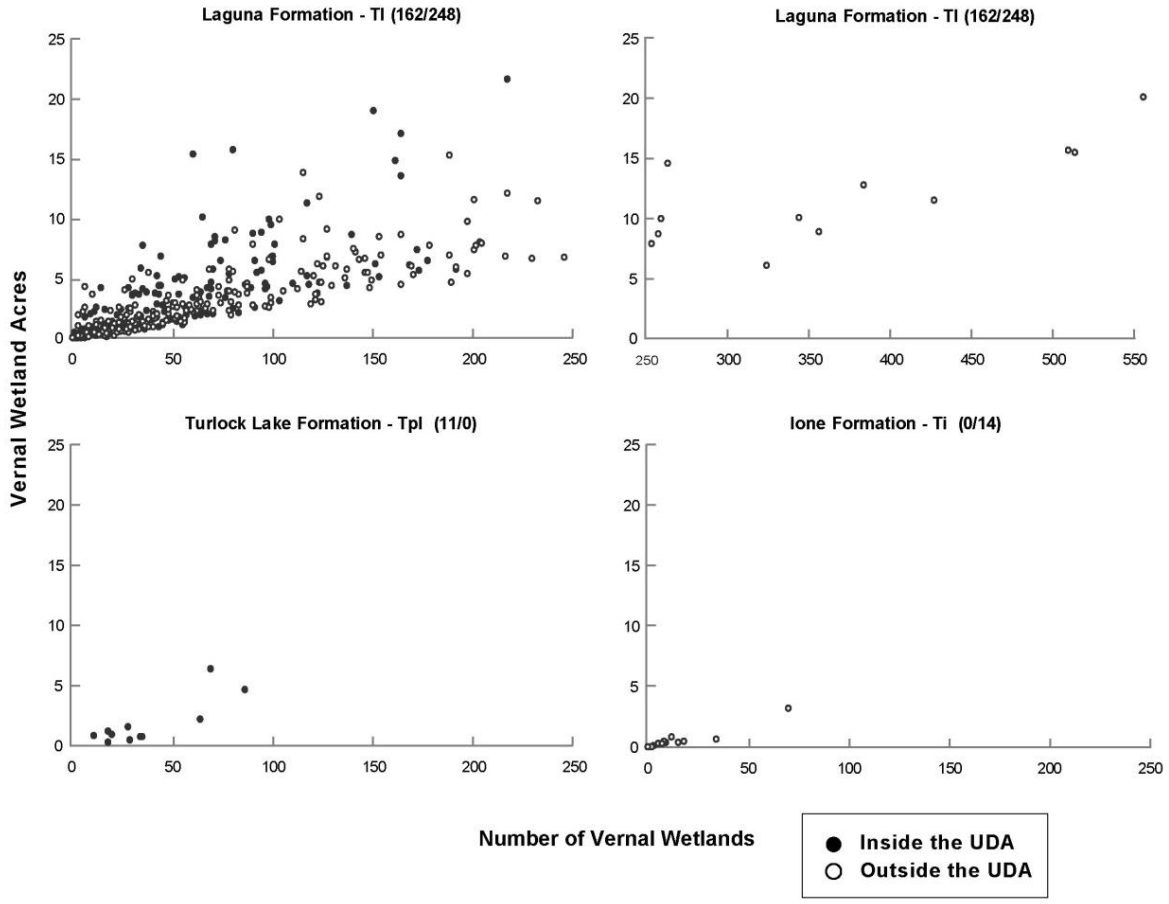
5.1.3 Ione Geologic Formation (Ti)

The Ione Formation encompasses a total of 13 LAU (0.9%), of which 13 (100%) are located outside of the UDA. The 13 LAU are distributed among the five VWADI categories as follows: one LAU is included in Category 2, one LAU is included in Category 3, three LAU are included in Category 4 and eight LAU are included in Category 5. There are no LAU included within Category 1.

The number of vernal wetlands per 160-acre LAU range from 1 to 71 and the total wetland acres per 160-acre LAU range from 0.02 to 3.15 acres.

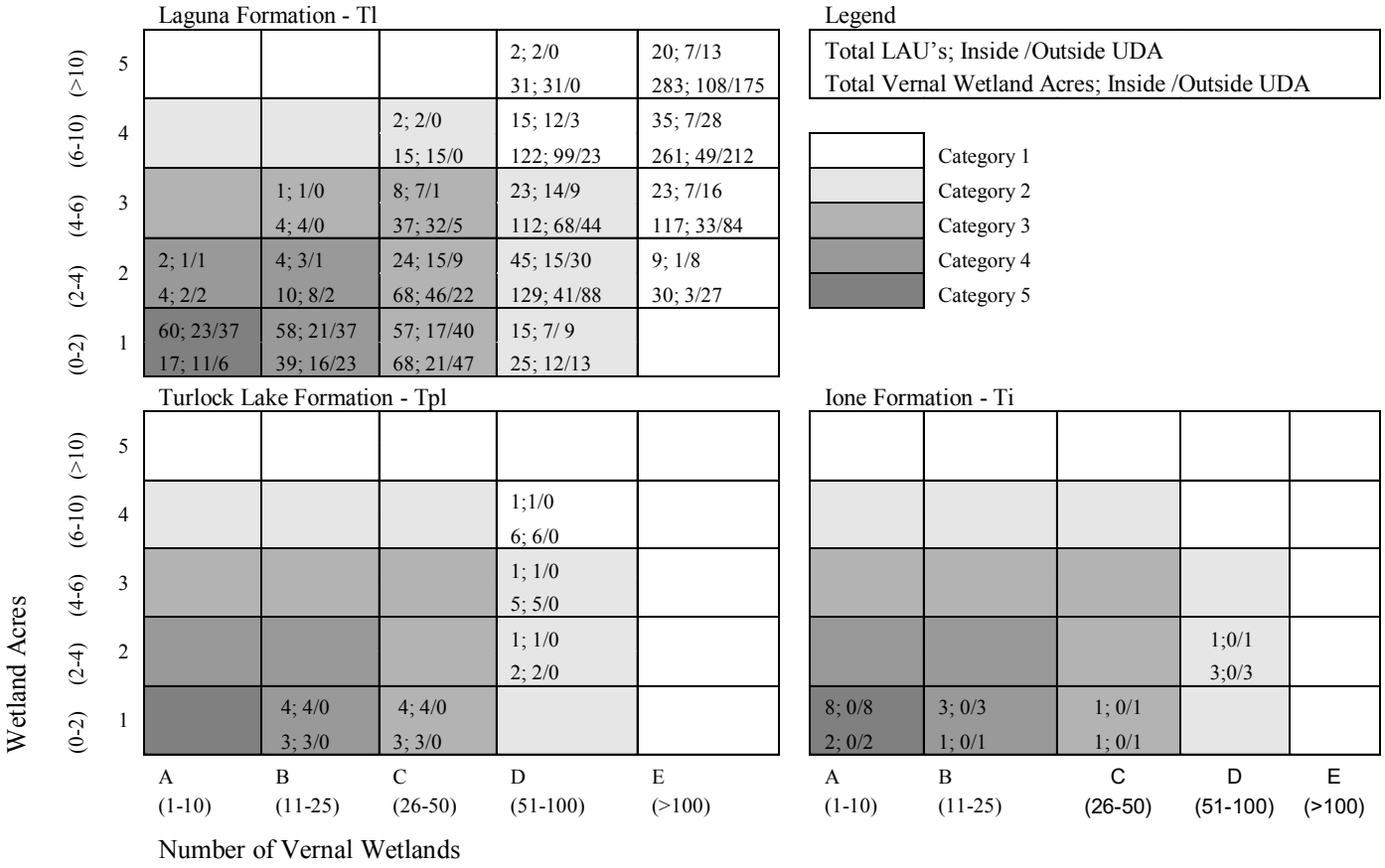
APPENDIX B-1 (Continued)

Figure 10 Relationship of number of vernal wetlands to wetted acres on High Terrace Landform geologic formations. Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation names are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 11 Vernal Wetland Acre/Density Index (VWADI) for High Terrace Landform geologic formations. Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area.



APPENDIX B-1 (Continued)

5.2 Low Terrace Landform

The Low Terrace Landform includes the Undivided Riverbank, Upper Unit Riverbank, Middle Unit Riverbank, Lower Unit Riverbank and South Fork Gravels Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for the five geologic formations are illustrated in Figure 12 and numerically summarized in Figure 13.

5.2.1 Undivided Riverbank Geologic Formation (Qr)

The Undivided Riverbank Formation encompasses a total of 261 LAU (17.9%), of which 68 (26.1%) are located inside of the UDA and 193 (73.9%) are located outside of the UDA. The total of 261 LAU are distributed among the five VWADI categories as follows: 41 LAU are included in Category 1 (seven LAU are inside the UDA and 34 are outside the UDA), 26 LAU are included in Category 2 (three LAU are inside the UDA and 23 are outside the UDA), 35 LAU are included in Category 3 (five LAU are inside the UDA and 30 are outside the UDA), 50 LAU are included in Category 4 (nine LAU are inside the UDA and 41 are outside the UDA) and 109 LAU are included in Category 5 (44 LAU are inside the UDA and 65 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 254 and the total wetland acres per 160-acre LAU range from 0.01 to 58.02 acres.

5.2.2 Upper Unit Riverbank Geologic Formation (Qru)

The Upper Unit Riverbank Formation encompasses a total of 105 LAU (7.2%), of which 27 (25.7%) are located inside of the UDA and 78 (74.3%) are located outside of the UDA. The 105 LAU are distributed among the five VWADI categories as follows: 15 LAU are included in Category 1 (all outside the UDA), six LAU are included in Category 2 (one LAU is inside the UDA and five are outside the UDA), seven LAU are included in Category 3 (one LAU is inside the UDA and six are outside the UDA), 15 LAU included in Category 4 (four LAU are inside the UDA and 11 are outside the UDA) and 62 LAU are included in Category 5 (21 LAU are inside the UDA and 41 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 237 and the total wetland acres per 160-acre LAU range from 0.01 to 26.98 acres.

5.2.3 Middle Unit Riverbank Geologic Formation (Qrm)

The Middle Unit Riverbank Formation encompasses a total of 63 LAU (4.6%), of which 15 (23.8%) are located inside of the UDA and 48 (76.2%) are located outside of the UDA. The 63 LAU are distributed among the five VWADI categories as follows: five LAU are included in Category 1 outside the UDA, eight LAU are included in Category 2 (one LAU is inside the UDA

and seven are outside the UDA), eight LAU are included in Category 3 (one LAU is inside the UDA and seven are outside the UDA), 12 LAU are included in Category 4 (two LAU are inside the UDA and ten are outside the UDA) and 30 LAU are included in Category 5 (11 LAU are inside the UDA and 19 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 114 and the total wetland acres per 160-acre LAU range from 0.005 to 17.98 acres.

5.2.4 Lower Unit Riverbank Geologic Formation (Qrl)

The Lower Unit Riverbank Formation encompasses a total of 108 LAU (7.9%), of which 79 (73.1%) are located inside of the UDA and 29 (26.9%) are located outside of the UDA. The 108 LAU are distributed among the five VWADI categories as follows: 20 LAU are included in Category 1 (six LAU are inside the UDA and 14 are outside the UDA), nine LAU are included in Category 2 (six LAU are inside the UDA and three are outside the UDA), five LAU are included in Category 3 (all LAU are inside the UDA), 14 LAU are included in Category 4 (13 LAU are inside the UDA and one is outside the UDA) and 60 LAU are included in Category 5 (49 LAU are inside the UDA and 11 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 90 and the total wetland acres per 160-acre LAU range from 0.001 to 47.92 acres.

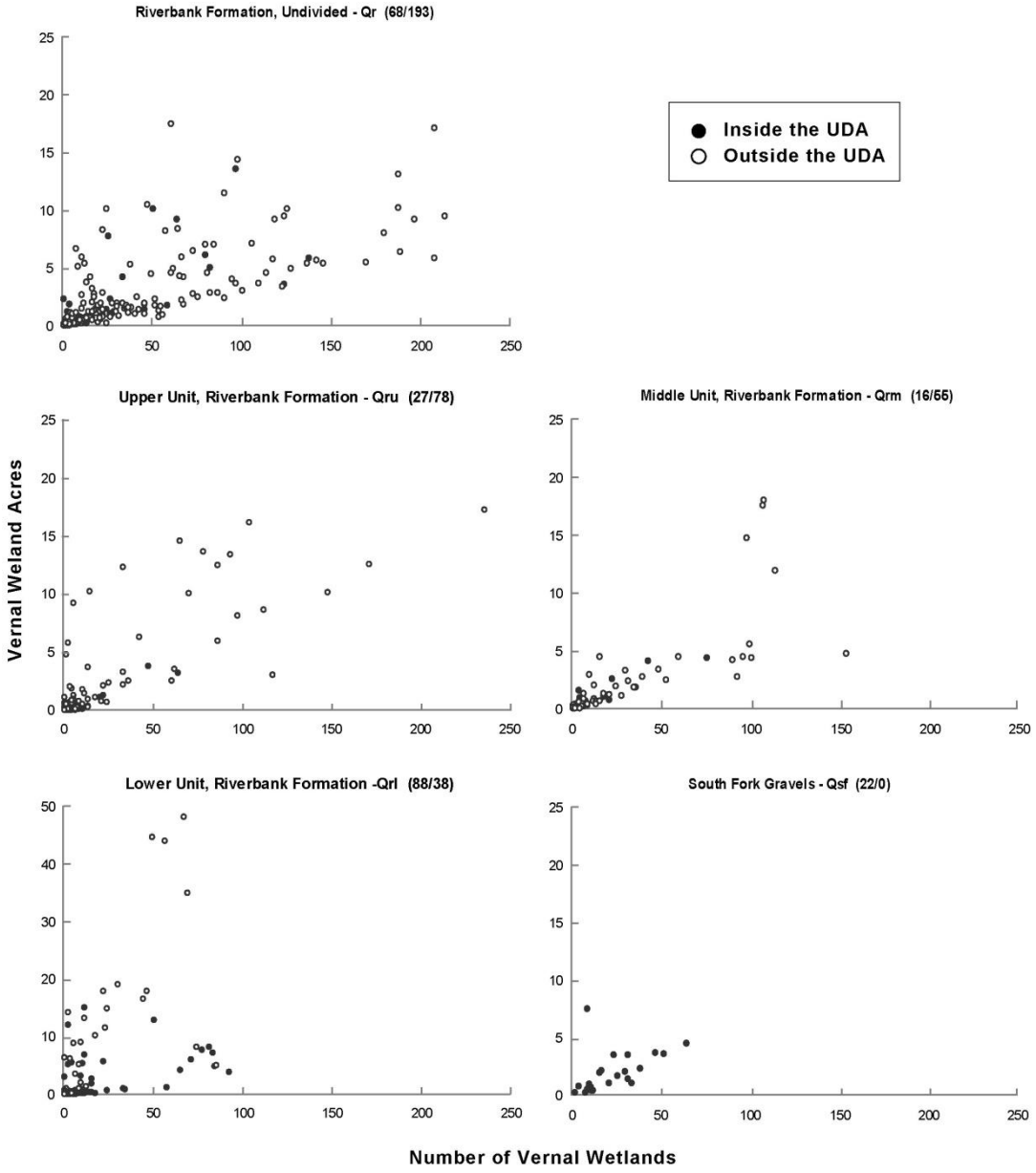
5.2.5 South Forks Gravel Geologic Formation (Qsf)

The South Forks Gravel Formation encompasses a total of 23 LAU (1.7%), of which 23 (100%) are located inside of the UDA. The 23 LAU are distributed among the five VWADI categories as follows: three LAU are included in Category 2, seven LAU are included in Category 3, six LAU are included in Category 4 and seven LAU are included in Category 5. There are no LAU included within Category 1.

The number of vernal wetlands per 160-acre LAU range from 2 to 64 and the total wetland acres per 160-acre LAU range from 0.07 to 7.07 acres.

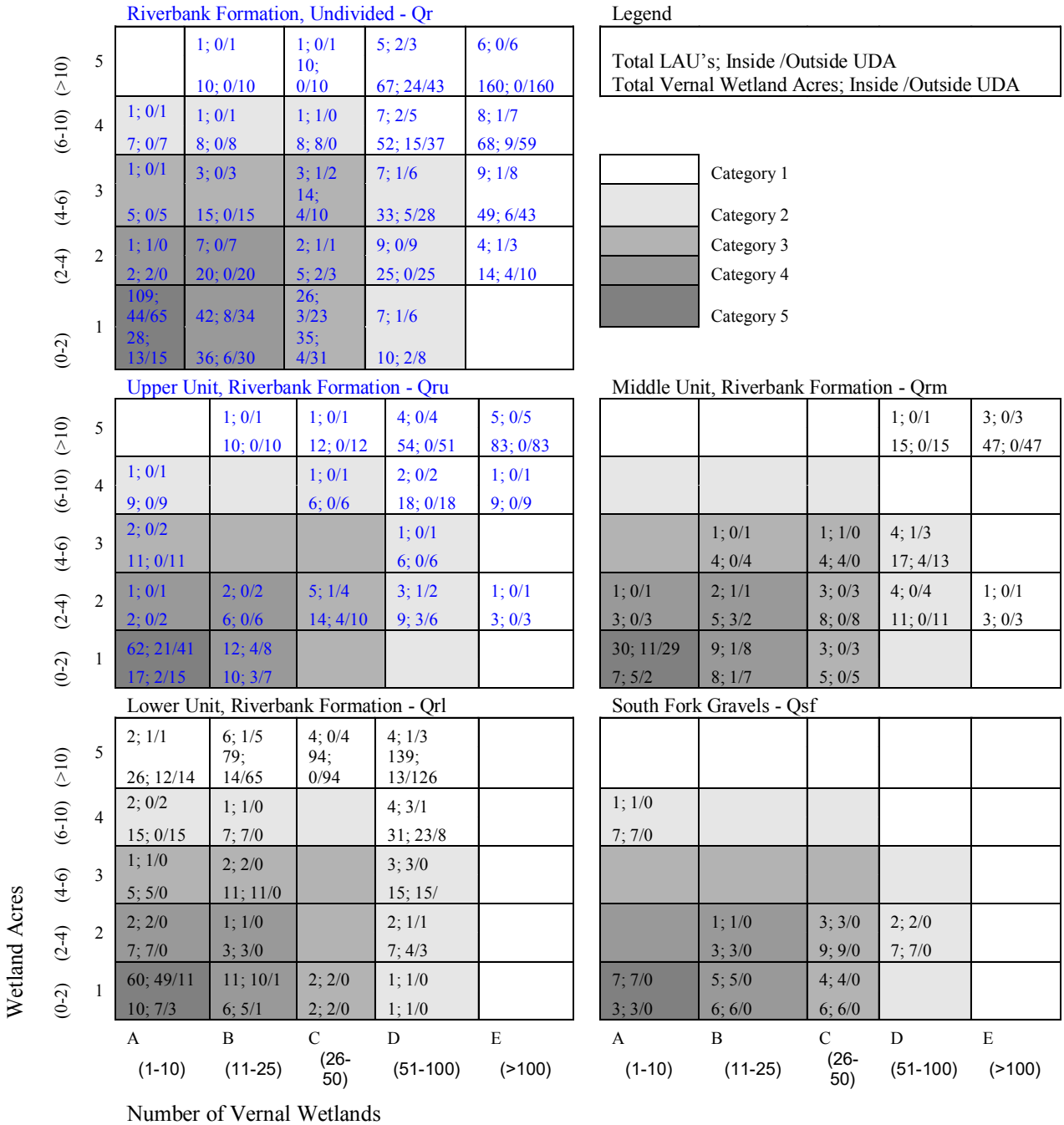
APPENDIX B-1 (Continued)

Figure 12 Relationship of number of vernal wetlands to wetted acres on Low Terrace Landform geologic formations. Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation name are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 13 Vernal Wetland Acre/Density Index (VWADI) for Low Terrace Landform geologic formations. Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area



APPENDIX B-1 (Continued)

5.3 Volcanic Mudflow Landform

The Volcanic Mudflow Landform includes the Mehrten and Valley Springs Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for the two geologic formations are illustrated in Figure 14 and numerically summarized in Figure 15.

5.3.1 Mehrten Geologic Formation (Tm)

The Mehrten Formation encompasses a total of 164 LAU (12%), of which 25 (15.2%) are located inside of the UDA and 139 (84.8%) are located outside of the UDA. The 164 LAUs are distributed among the five VWADI categories as follows: 47 LAUs are included in Category 1 (all 47 are outside the UDA), 31 LAUs are included in Category 2 (three LAUs are inside the UDA and 28 are outside the UDA), 27 LAUs are included in Category 3 (six LAU are inside the UDA and 21 are outside the UDA), 30 LAUs are included in Category 4 (eight LAUs are inside the UDA and 22 are outside the UDA) and 29 LAUs are included in Category 5 (eight LAUs are inside the UDA and 21 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 358 and the total wetland acres per 160-acre LAU range from 0.007 to 12.54 acres.

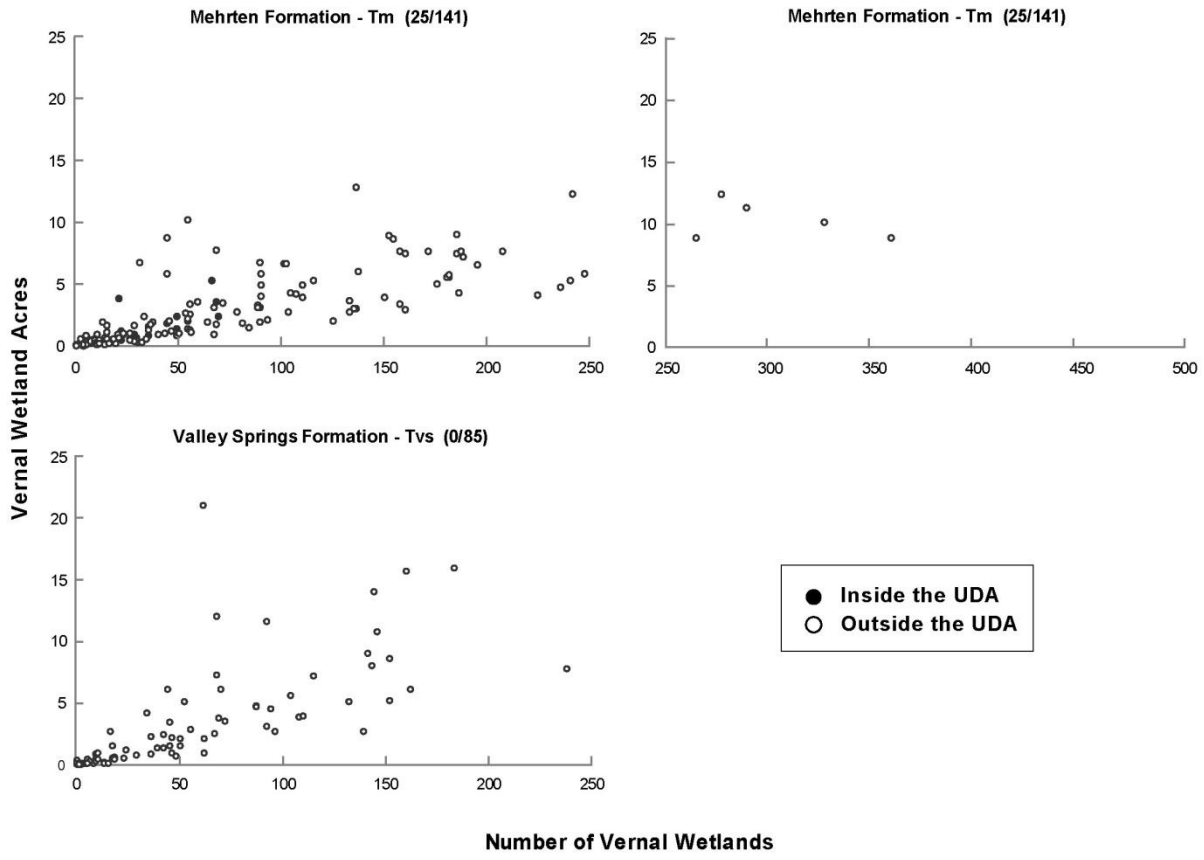
5.3.2 Valley Springs Formation (Tvs)

The Valley Springs Formation encompasses a total of 85 LAUs (6.2%), of which 85 (100%) are located outside of the UDA. The 85 LAUs are distributed among the five VWADI categories as follow): 21 LAUs are included in Category 1, 14 LAU are included in Category 2, 13 LAU are included in Category 3, 11 LAUs are included in Category 4 and 26 LAUs are included in Category 5.

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 239 and the total wetland acres per 160-acre LAU range from 0.004 to 21 acres.

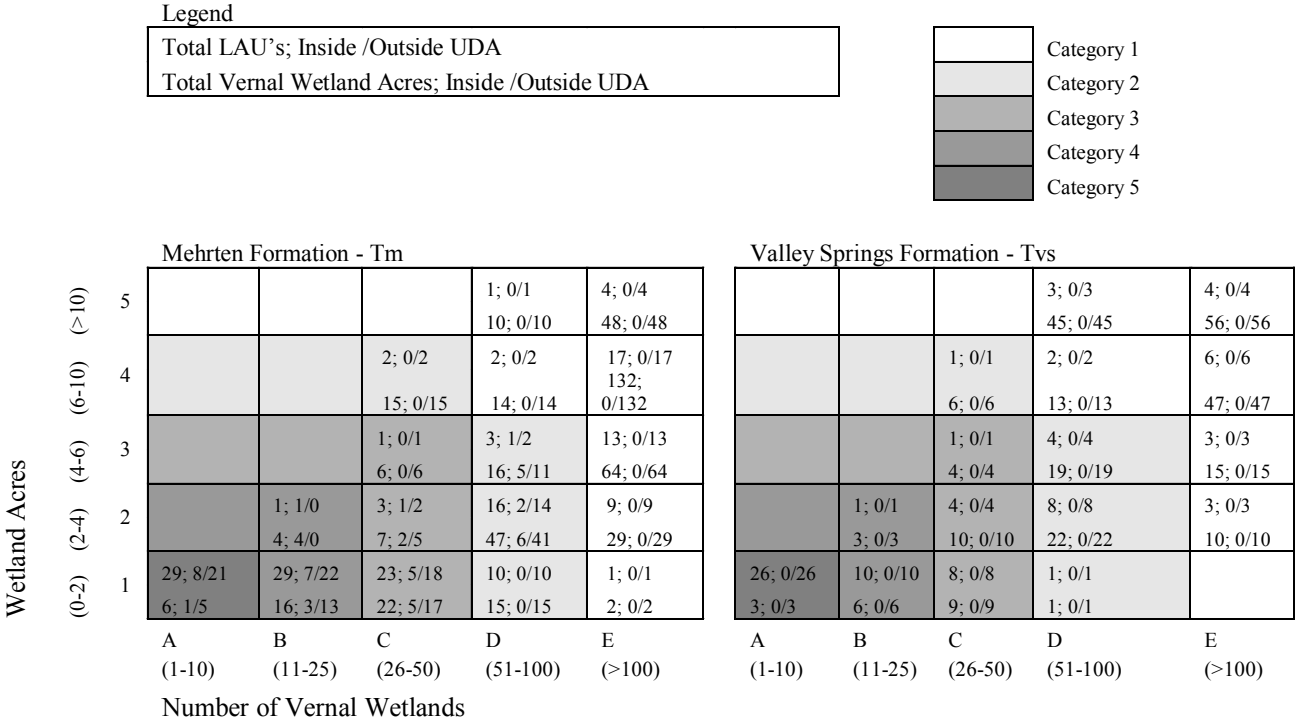
APPENDIX B-1 (Continued)

Figure 14 Relationship of number of vernal wetlands to wetted acres on Volcanic Mudflow Landform geologic formations. Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation name are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 15 Vernal Wetland Acre/Density Index (VWADI) for Volcanic Mudflow Landform geologic formations. Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area.



APPENDIX B-1 (Continued)

5.4 Other

The other Geologic Formations which do not fall in High Terrace, Low Terrace or Volcanic Mudflow Landform includes the Upper Unit Modesto, Undifferentiated Surficial Alluvial Deposits, Dredge Tailing and Artificial Fill and Metamorphic Rocks, Undifferentiated Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for these 4 geologic formations are illustrated in Figure 16 and numerically summarized in Figure 17. In addition to these four geologic formations, three other formations are included within this description (North Merced Gravels, Alluvial Deposits and Alluvial Floodplain Deposits), but are not included in the tables or graphs due to low overall number and acreage of vernal wetlands per LAU.

5.4.1 Upper Unit Modesto Geologic Formation (Qmu)

The Upper Unit Modesto Formation encompasses a total of 46 LAUs (3.4%), of which 46 (100%) are located outside of the UDA. The 46 LAUs are distributed among the five VWADI categories as follows: five LAUs are included in Category 1, one LAU is included in Category 2, one LAU is included in Category 3, six LAUs are included in Category 4 and 33 LAUs are included in Category 5.

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 146 and the total wetland acres per 160-acre LAU range from 0.008 to 15.36 acres.

5.4.2 Undifferentiated Surficial Alluvial Deposits Geologic Formation (Qu)

The Undifferentiated Surficial Alluvial Deposits Formation encompasses a total of five LAU (0.4%), of which one (20%) is located inside of the UDA and four (80%) are located outside of the UDA. The 5 LAU are distributed among the five VWADI categories as follows:, one LAU is included in Category 2 inside the UDA, one LAU is included in Category 3 outside the UDA and three LAUs are included in Category 5 outside of the UDA. There are no LAUs in Category 1 or 4.

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 98 and the total wetland acres per 160-acre LAU range from 0.03 to 5.45 acres.

5.4.3 Dredge Tailing and Artificial Fill Geologic Formation (t)

The Dredge Tailing and Artificial Fill Formation encompasses a total of 23 LAU (1.7%), of which 14 (60.9%) are located inside of the UDA and 9 (39.1%) are located outside of the UDA. The 23 LAU are distributed among the five VWADI categories as follows: one LAU is included in Category 2 outside the UDA, two LAUs are included in Category 3 outside the UDA, five

APPENDIX B-1 (Continued)

LAUs are included in Category 4 LAUs are inside the UDA and one is outside the UDA) and 15 LAUs are included in Category 5 (10 LAUs are inside the UDA and five are outside the UDA).

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 66 and the total wetland acres per 160-acre LAU range from 0.01 to 1.19 acres.

5.4.4 Metamorphic Rocks, Undifferentiated Geologic Formation (pKu)

The Metamorphic Rocks, Undifferentiated Geologic Formation encompasses a total of 84 LAU (6.1%), of which 1 (1.2%) is located inside of the UDA and 83 (98.8%) are located outside of the UDA. The 84 LAUs are distributed among the five VWADI categories as follows: five LAU are included in Category 2 outside the UDA), six LAUs are included in Category 3 outside the UDA, 15 LAUs are included in Category 4 (one LAU is inside the UDA and 16 are outside the UDA) and 58 LAUs are included in Category 5 outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 88 and the total wetland acres per 160-acre LAU range from 0.005 to 6.80 acres.

5.5.5 Alluvial Deposits, Undivided Geologic Formation (Qha)

The Alluvial Deposits, Undivided Formation encompasses a total of one LAU (0.07%) which is located outside of the UDA. This LAU is included in Category 5. There are no LAU within Category 1, 2, 3 or 4.

The number of vernal wetlands per 160-acre LAU is one and the total wetland acres 0.40 acres.

5.5.6 Alluvial Floodplain Deposits Geologic Formation (Qfp)

The Alluvial Floodplain Deposits Geologic Formation encompasses a total of 10 LAU (0.7%), all of which are located outside of the UDA. Of these 10 LAUs, one LAU is included in Category 3 and nine LAUs are included in Category 5. There are no LAUs within Category 1, 2 or 4.

The number of vernal wetlands per 160-acre LAU range from 1 to 34 and the total wetland acres per 160-acre LAU range from 0.03to 1.85 acres.

5.5.7 North Merced Gravels Geologic Formation (Qtnm)

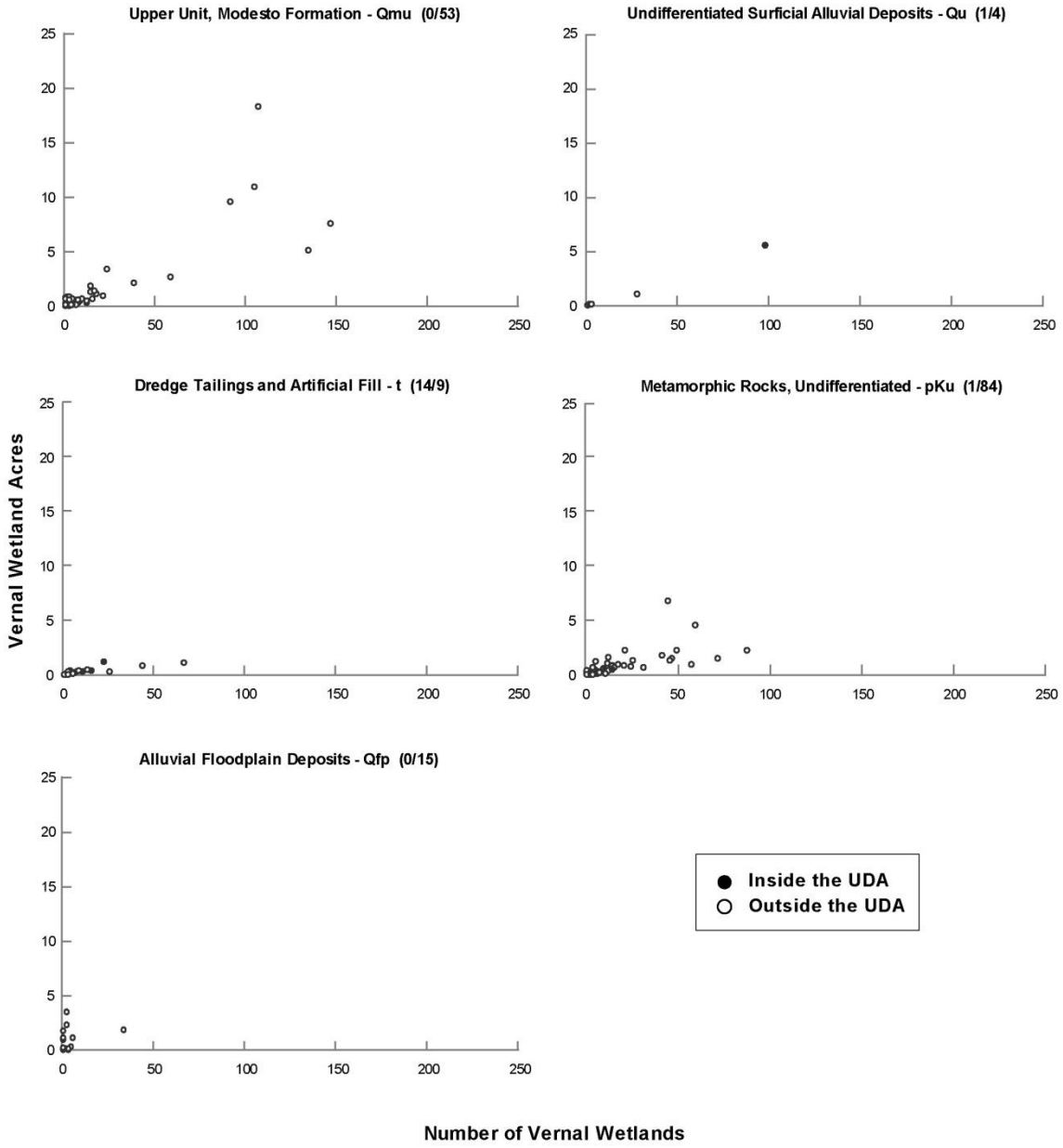
The North Merced Gravel Geologic Formation encompasses a total of two LAU (0.1%), both of which are located inside the UDA. One of the LAUs is included in Category 4 and one LAU is included in Category 5. There are no LAUs within Category 1, 2 or 3.

APPENDIX B-1 (Continued)

The number of vernal wetlands per 160-acre LAU range from 4 to 13 and the total wetland acres per 160-acre LAU range from 0.11 to 1.36 acres.

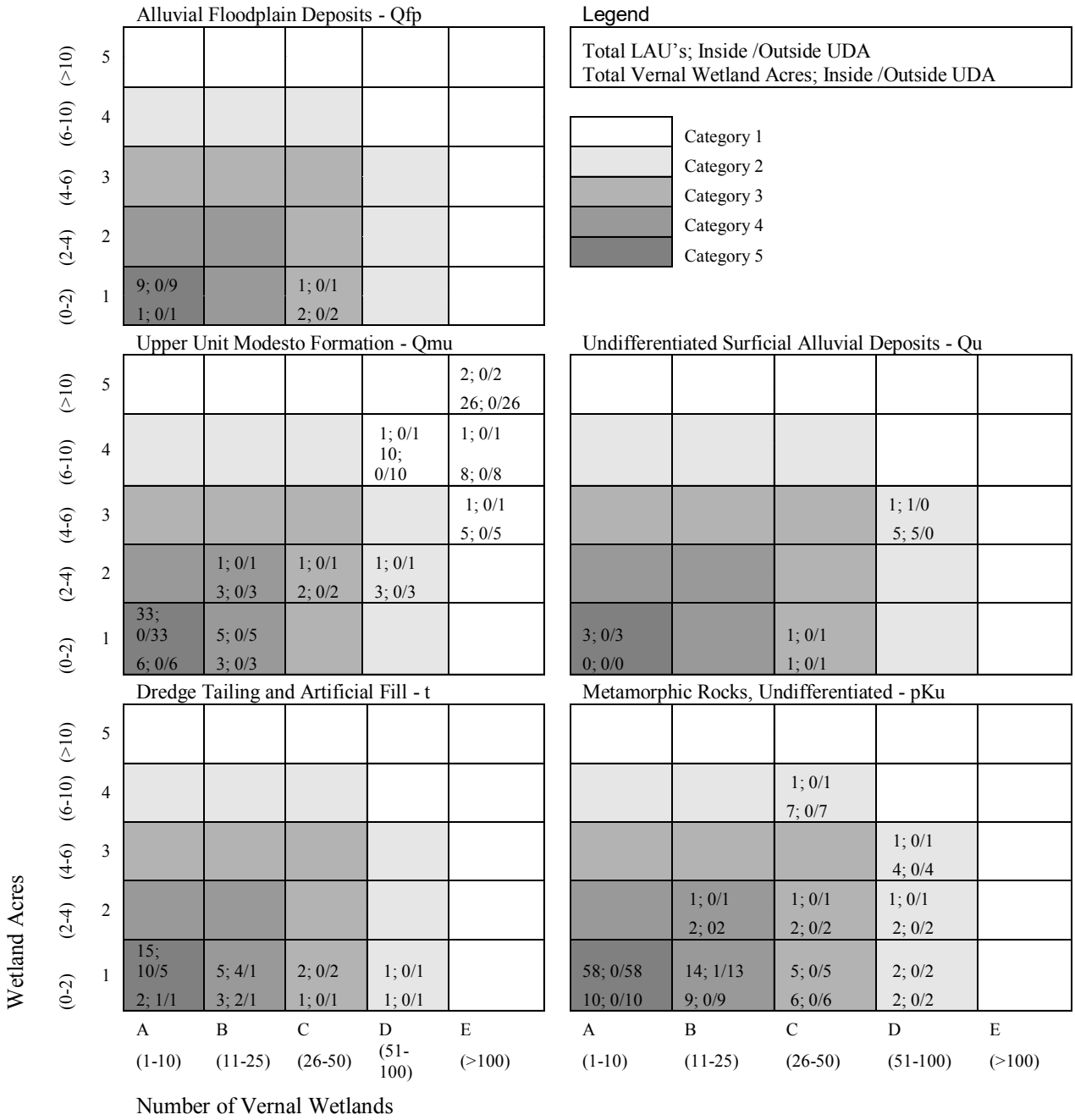
APPENDIX B-1 (Continued)

Figure 16 Relationship of number of vernal wetlands to wetted acres on other geologic formations (Qmu, Qu, t, and pKu). Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation name are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 17 Vernal Wetland Acre/Density Index (VWADI) for Other Geologic Formations (Qfp, Qmu, Qu, t, and pKu). Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area.



APPENDIX B-1 (Continued)

6 VERNAL WETTED ACRE DENSITY INDEX (VWADI) AND PRESERVE DESIGN

The VWADI was used to classify and describe the spatial distribution of vernal pools and vernal pool complexes within the Study Area. This information was also used to develop the SSHCP vernal pool/ grassland habitat conservation strategy by assisting in identification and definition of proposed preserve zones. This index helps in the assignment of conservation value to each 160-acre LAU, based on a set of considerations and assumptions:

- LAUs with dense vernal pool complexes are infrequently occurring;
- LAUs with large vernal pools are infrequently occurring;
- LAUs with dense vernal pool complexes are ecologically unique and important because they provide vernal pool heterogeneity;
- LAUs with large vernal pools are ecologically unique and important;
- LAUs with large vernal pools and/or dense vernal pool complexes are valuable for conservation because of their infrequency and their ecological uniqueness.
- LAUs with large vernal pools and/or dense vernal pool complexes are valuable for conservation because their mitigation-preservation ratio allows for acquisition of the greatest wetted-acres with the minimal loss of developable upland areas.

Although high density complexes and large vernal pools are emphasized, it is important to note that "small" vernal pool types provide important habitat functions as well. It is assumed however, that the "small" or "shallow"-type vernal pool habitat is present as a sub-habitat type that is present in most vernal pool complexes.

Based on these considerations, it was decided that 5 quantitative categories of conservation value would be used to address the 25 VWADI categories; the highest conservation value will be placed on category 1 LAUs (most wetted acres with densest vernal pool complexes and largest number of large pools), and the least conservation value on category 5 LAUs (least wetted acres, and most isolated and smaller vernal pools). It is recognized that these categories, along with the VWADI values are somewhat subjective and may lack fine ecological resolution (e.g., are all A5/Category-1 and A4/Category-2 LAUs actually ecologically different?). This is, however an objective and quantifiable approach to describing landscape vernal pool patterns available at the present time.

The VWADI is designed to identify high-density vernal pool complexes. High-density pool complexes are targeted specifically because it maximizes (1) the amount of wetted acreages

APPENDIX B-1 (Continued)

within a given land Unit, (2) the number of vernal pools within a given land unit and (3) the connectivity between vernal pools within and between land units.

Protecting the maximum number of vernal pools is an essential part of this strategy specifically because (1) vernal pools provides the habitat (both occupied and suitable) for the 13 covered vernal pool species that need to be protected (2) it protects vernal pool heterogeneity including size, shape, depth, landform association and species diversity.

In order to preserve the most ecologically complex vernal pool habitats and to acquire the required wetland acres necessary to mitigate for the proposed impacts, Category 1 and 2 LAUs will be the primary targets for proposed preserves zones. Since all vernal pools, regardless of size or density possess ecological function and conservation values; the remaining LAUs will be targeted where available in order to provide connectivity, buffers and specific species conservation opportunities.

Land Analysis Units in Categories 1 and 2 of the VWADI system have particularly high value for the conservation of ecologically functional vernal pool complexes. It is necessary to conserve most of the acres in these categories both inside and outside the UDA. In particular, ecological connectivity increases with increasing vernal pool density per given land unit, maximum interconnectivity is associated with the largest areas encompassing the densest of pool complexes.

Category 3 and 4 LAUs are targeted in cases where they provide corridors and buffers to existing and proposed preserves, as well as opportunities to protect known locations of vernal pool covered species, unique large pools and pools on specific formations.

Category 5 LAUs will be targeted when they have a clearly defined conservation value such as “no take species”, or unique habitat features and qualities. These features may include large and/or deep vernal pools, corridors, high quality upland habitats, and suitable vernal pool creation/restoration mitigation sites.

The total number and percentages of the different VWADI categories for the 1,372 LAU with vernal wetlands is included below as well as the total vernal pool/wetland acres;

Category 1 (18.7% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI value of A5, B5, C5, D5, E5, E4, E3, E2, E1 and D4). This category contains 2,480 wetland acres (62.2% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

Category 2 (14.0% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI of A4, B4, C4, D1, D2 and D3). This category contains 706 wetland acres (17.7% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

APPENDIX B-1 (Continued)

Category 3 (14.7% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI of A3, B3, C1, C2 and C3). This category contains 421 wetland acres (10.6% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

Category 4 (16.8% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI of A2, B1 and B2). This category contains 254 wetland acres (6.4% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

Category 5 (35.8% of all LAUs with vernal pool habitat; includes all A1). This category contains 128 wetland acres (3.2% of the total vernal pools/wetlands mapped within the SSHCP Study Area).

APPENDIX B-1 (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX B-1 (Continued)

7 LITERATURE CITED

ACOE (United States Army Corps of Engineers). 1987. Corps of Engineers wetlands delineation manual. (Technical report Y-87-1.) Vicksburg, MI. Prepared for the Department of the Army, Washington, D.C.

Ahl, J.S.B. 1991. Factors affecting contributions of the tadpole shrimp, Lepidurs packardi, to its oversummering egg reserves. Hydrobiologia 212:137-143.

Alexander, D.G. 1976. Ecological aspects of temporary annual pool fauna. Pages 32-36 in: S. Jain (Editor). Vernal Pools, Their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis.

Alexander, D.G. and R.A. Schlising. 1998. Patterns in time and space for rare macroinvertebrates and vascular plants in vernal pool ecosystems at the Vina Plain Preserve and implications for pool landscape management. Pp. 161-168 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Baker, W.S., F.E. Hayes and L.W. Lathrop. 1992. Avian use of vernal pools at the Santa Rosa Plateau Preserve, Santa Ana Mountains, California. The Southwestern Naturalist 37: 392-403.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Barbour, M., A. Solomeshch, C. Withham, R. Holland, R. Macdonald, S. Cilliers, J.A. Molina, j. Buck and J. Hillman. 2003. Vernal Pool Vegetation In California: Variation Within Pools. Madrono. Vol.50, No.3.

Bauder, E., D.A. Kreager and S. McMillan. 1997. Vernal Pools of Southern California. Draft Recovery Plan. Prepared for United States Fish and Wildlife Service. Portland, Oregon.

Belk, D. 1998. Global status and tends in ephemeral pool invertebrate conservation: implications for California fairy shrimp. Pages 147-150 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

APPENDIX B-1 (Continued)

Betts, R.A., P.M. Cox and F.I. Woodward. 2000. Simulated responses of potential vegetation to doubled-CO_2 climate change feedbacks on near-surface temperature. Global Change and Biogeography 9(2):171-180.

Bliss, S.A. and P.H. Zedler. 1998. The germination process in vernal pools: sensitivity to environmental conditions and effects on community structure. Oecolgia 113:67-73.

Butterwick, M. 1998. The Hydrogeomorphic approach and its use in vernal pool functional assessment. Pages 50-55 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

CDFG (California Department of Fish and Game). 1983. Management Plan for Phoenix Field Ecological Reserve (Prepared by S. Clemons).

CDFG. 2003. California Natural Diversity Data Base search, California Department of Fish and Game. Sacramento, California.

City of Elk Grove, 2000. East Franklin Specific Plan. Online: http://www.egplanning.org/projects/eastfranklin_sp.

Clark, G.M., T.J. Roscoe, M.J. van Ess and N. Wymer. 1998. Management considerations for small vernal pool preserves-the Phoenix vernal pools. Pages 250-254 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

CNPS (California Native Plant Society). 2001. Inventory of Rare and Endangered Plants of California. 6th ed. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, California.

Cowardin, L.M., V. Carter, F.C. Golet, E.T. La Roe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. (FWS/OBS-79/31) U.S. Fish and Wildlife Service. Washington.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. Madrono 15 pp. 97-110.

Dahl, T.E. 1990. Wetland losses in the United States: 1780's to 1980's. U.S. Fish and Wildlife Service. Washington, D.C.

APPENDIX B-1 (Continued)

Davidson, R.L. 1979. Micro-organisms. Pages 267-276 in: R.T. Coupland. Grassland Ecosystems of the World. Cambridge University Press. Cambridge, Great Britain.

Dittes, J.C. and J.L. Guardino. 2002. Rare Plants. Pages 55-150 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Duffey, E., M.G. Morris, J. Sheail, L.K. Ward, D.A. Wells and T.C.E. Wells. 1974. Grassland Ecology and Wildlife Management. Chapman & Hall, Great Britain.

Elam, D. R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Ellner, S.P., N.G. Hairston, Jr., C.M. Kearns and D. Babai. 1999. The roles of fluctuating selection and long-term diapause in microevolution of diapause timing in a freshwater copepod. Evolution 53:111-122.

Ellstrand, N.C. and D.R. Elam. 1993. Population genetic consequences of small population size: implication for plant conservation. *Annual Review of Ecology and Systematics* 24: 217-242.

Eriksen, C.H. and D. Belk. 1999. Fairy shrimps of California's puddles, pools, and playas. Mad River Press, Inc. Eureka, California. 196 p.

Evans, H.E. 1984. Insect Biology. Addison-Wesley Publishing Company. Reading, Massachusetts.

Evans, A.V. and J.N. Hogue. 2004. Introduction to California Beetles. California Natural History Guide. University of California Press. Berkeley and Los Angeles, California.

Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: Ambystoma tigrinum californiense Gray Hyla regilla Baird and Giard and Scaphiopus hammondi Giard. M.A. Thesis, Frenso State University, California.

Feldheim, C.L., J.E. Isola and M.A. Wolder. 1999. Shorebird population and habitat use variations between a dry and wet spring on the Sacramento National Wildlife Refuge, California. Draft report of Sacramento NWR, 752 County Rd. 99W, Willows, California.

Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29:207-230+C2.

APPENDIX B-1 (Continued)

Forman, R.T.T. and R.D. Deblinger. 2000. The ecological road-effect zone of a Massachusetts (U.S.A.) suburban highway. Conservation Biology 14(1):36-46.

Fugate, M. 1998. *Branchinecta* of North America: population structure and its implications for conservation practice. Pages 140-146 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Gallagher, S.P. 1993. Life history variation in the temporary pool snail, Fossaria sonomaensis, in the Northern Sacramento Valley. American Midland Naturalist 130:372-385.

Gathmann, A. and T. Tscharntke. 2002. Foraging ranges of solitary bees. Journal of Animal Ecology 71: 757-764.

Griggs, F. T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F. T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F. T. 2000. Vina Plains Preserve: eighteen years of adaptive management, Fremontia 27: No. 4. Pp 48-51.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. Biological Conservation 27: 171-193.

Hanes, T. and L. P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Helley, E.J. and D.S. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northeastern Sierran Foothills, California. Miscellaneous Field Studies Map MF-1790. U.U. Geological Survey.

APPENDIX B-1 (Continued)

Helm, B.P. 1998. Biogeography of eight large branchiopods endemic to California. Pages 124-139 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Helm, B.P. and J.E. Vollmar. 2002. Large Branchiopods. Pages 151-190 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Hickman, C.P. Jr., L.S. Roberts and A. Larson. 2001. Integrated Principles of Zoology. 11th ed. McGraw-Hill Companies Inc. Boston, Massachusetts.

Hickman, J.C. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley, California.

Hobson W.A. and R.A. Dahlgren. Soil forming processes in vernal pools of northern California, Chico area. Pp. 224-235 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Holland, D.C., M.P. Hayes, and E. McMilla. 1990. Late summer movement and mass mortality in the California tiger salamander. The Southwestern Naturalist 35(2): 217-220.

Holland, R. F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game, Sacramento, California.

Holland, R. F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R. F. 1998. Great Valley vernal pool distribution, photorevised 1996. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B-1 (Continued)

Holland, R.F. 1998. No net loss? Changes in Great Valley vernal pool distribution from 1989 to 1997. Unpublished Report prepared for the California Department of Fish and Game Natural Heritage Division. Sacramento, California.

Holland, R.F., and V.I. Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Holland R.F. and S.K. Jain. 1977. Vernal pools. Pages 515-533 in: M.G. Barbour and J. Major (Editors). Terrestrial vegetation of California. John Wiley & Sons. New York, New York.

Holland R.F. and S.K. Jain. 1984. Spatial and temporal variation in plant species diversity of vernal pools Pp. 198-209 in: S. Jain and P. Moyle. (Eds.)1984. Vernal pools and intermittent streams. Institute of Ecology, University of California, Davis, California. Number 28.

Hoover, R.F. 1941. The genus *Orcuttia*. Bulletin of the Torrey Botanic Club 68: 149-15.

Hurlbert, S.H., M.S. Mulla, and H.R. Willson. 1972. Effects of an organophosphorus insecticide on the phytoplankton, zooplankton, and insect populations of fresh-water ponds. Ecological Monographs 42(3):269-299.

Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Jain, S.K. 1976. Vernal pools: their ecology and conservation. Institute of Ecology, University of California, Davis, California.

Jain, S.K. and P. Moyle. (Eds.) 1984. Vernal pools and intermittent streams. Institute of Ecology, University of California, Davis, California. Number 28.

James, L.A. 1989. Sustained storage and transport of hydraulic gold mining sediment in the Bear River, California. Annals of the Association of American Geographers 79(4):570-592.

Jokerst, J.D. 1990. Floristic Analysis of Volcanic Mudflow Vernal Pools. *in:* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Jokerst, J.D. 1993. An alternative approach to vernal pool mitigation planning in Sacramento County. Interface Between Ecology and Land Development in California. 227-234.

APPENDIX B-1 (Continued)

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Slender Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Kareiva, P and U. Wennergren. 1995. Connecting landscape patterns to ecosystem and population processes. *Nature* 373: 299-302.

Keeley, J. E. 1984. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis.

Keeley, J. E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. Am. J. Bot. 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, CA. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. Oecologia 116(1-2): 85-97.

Keeley, J.E. and P.H. Zedler. 1998. Characterization and global distribution of vernal pools. Pp 1-14 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Keeler-Wolf, T., D.R. Elam, and S.A. Flint. 1998. California Vernal Pool Assessmeny Preliminary Report. The Resources Agency, Department of Fish and Game, Sacramento, California.

Laabs, D.M., S.G. Orloff and M.L. Allaback. 2002. Pond and stream-breeding amphibians. Pages 191-229 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

APPENDIX B-1 (Continued)

Leidy, R. A. and E. G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Leong, J.M., R.P. Randolph and R.W. Thorp. 1995. Observations of the foraging patterns of *Andrena (Diandrena) blennospermatis* Thorp (Hymenoptera: Andrendidae). Pan-Pacific Entomologist 71:68-71.

Loredo, I., D. Van Vuren. 1996. Habitat use and migration behavior of the California Tiger Salamander. *Herpetology* 30:282-285.

LSA Associates Inc. 2004. Solana County HCP/NCCP. Solano County Water Agency. Web page(s) at http://www.scwa2.com/hcpdocs.html. Downloaded 7/21/04.

MacArthur, R.H. and E.O. Wilson, 1967. *The Theory of Island Biogeography*. Princeton University Press, Princeton, New Jersey.

Marty, J. 2003. Cows Eat Grass. Cosumnes River Preserve. The Nature Conservancy. Power point presentation. Web page(s) at http://www.conserveonline.org/csd;internal&action=buildframes.action. Downloaded 7/24/04.

Master, L.L., S.R. Flack and B.A. Stein (Editors). 1998. Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity. The Nature Conservancy. Arlington, Virginia. Web page(s) at http://www.natureserve.org/publications/riversOflife.jsp. Downloaded 6/23/04.

Mawdsley, K.F. 2000. Jepson Prairie Preserve today. Fremontia 27: No. 4. Pp. 52-55.

Metz, J. 2001. Correlating vernal pool distribution patterns and geologic formations to inform conservation planning in East Merced County. Master's Thesis. University of California, Berkeley, California.

Molles, M.C. 1999. *Ecology Concepts and Applications*. The McGraw-Hill Companies, Inc. Boston, Massachusetts.

Morey, S.R. 1998. Pool duration influences age and body mass at metamorphosis in the Western Spadefoot Toad: implications for vernal pool conservation. Pages 86-91 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

APPENDIX B-1 (Continued)

National Research Council (NRC). 1995. Wetlands: Characteristics and Boundaries. National Academy Press. Washington D.C.

National Research Council (NRC). 1992. Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy. National Academy Press. Washington D.C.

Newman, K.C. 1973. Ammonia, urea, and uric acid levels in active and aestivating snails, *Bakerilymnaea cockerelli*. Thesis (M.A.). California State University, Chico. 55 pp.

Pierson, E.D. and W.E. Rainey. 2002. Bats. Pages 385399 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. Ecology 45:656-658.

Proctor, V.W and C.R. Malone. 1965. Further evidence of the passive dispersal of small aquatic organisms via the intestinal tract of birds. Ecology 46:728-729.

Proctor, V.W., C.R. Malone and V.L. DeVlaming. 1967. Dispersal of aquatic organisms: viabiligy of disseminules recovered from the intestinal tract of captive killdeer. Ecology 48:672-676.

Pyke, C.R. and J. Marty. 2005. Cattle Grazing Mediates Climate Change Impacts on Ephemeral Wetlands. Conservation Biology. 19: 1619-1625.

Raven, P. H. and D. I. Axlrod. 1978. Origin and Relationships of the California Flora. University of California Publications in Botany. 72:1-134

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. Fremontia 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

APPENDIX B-1 (Continued)

Rogers, D. C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Sacramento County. 1993. County of Sacramento General Plan. Planning and Community Development Department. Sacramento, CA. Web page(s) at http://www.saccounty.net/general-plan/gp-home.html. Downloaded 5/22/04.

Sawyer, J. O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society. Sacramento, California.

Schaffer, B.H., R.N. Fisher and S.E. Stanley. 1993. Status Report: The California Tiger Salamander (*Ambystoma californiense*). Inland Fisheries Division, California Department of Fish and Game (Contracts FG 9422 and FG 1383). Unpublished Report.

Semlitsch, R.D. 1998. Biological delineation of terrestrial buffer zones for pond-breeding salamanders. Conservation Biology 12: 1113-1119.

Shuford, W.D., G.W. Page, and J.E. Kjelmyr. 1998. Patterns and dynamics of shorebird use of California's Central Valley. Condor 100:227-244.

Silveira, J.G. 2000. Vernal pools and relict duneland at Arena Plains. Fremontia 27(4) & 28(1):38-47.

Silveira. J.G. 1998. Avian uses of vernal pools and implecations for conservation practice. Pp 92-106 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Simon, K.S. and A.L. Buikerma, Jr. 1997. Effects of organic pollution on an Appalachian Cave: changes in macroinvertebrate populations and food supplies. American Midland Naturalist 138(2):387-401.

Simovich, M.A. 1998. Crustacean biodiversity and endemism in California's ephemeral wetlands. Pages 107-118 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

APPENDIX B-1 (Continued)

Sloat T. R. and E.D. Whisler. 2002. Birds. *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Smith, D.W. and W.L. Verrill. 1998. Vernal pool-soil-landform relationships in the Central Valley, California. Pages 15-23 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 conference. California Native Plant Society. Sacramento, California.

Stebbins, G.L. 1976. Ecological islands and vernal pools of California. *In* S.Jain [ed.] Vernal pools: their ecology and conservation, 1-4. Institute of Ecology Publ. 9, University of California, Davis, California.

Stone, R. D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Stone 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment, *in* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants -Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Su, T. and M.S. Mulla. 2002a. Spatial occurrence and hatch of field eggs of the tadpole shrimp Triops newberryi (Notostrac: Triopsidae), a potential biological control agent of immature mosquitoes. Journal of Vector Ecology 27:128-137.

Su, T. and M.S. Mulla. 2002b. Introducction and establishment of tadpole shrimp Triops newberryi (Notostraca: Triopsidae) in a date garden for biological control of mosquitos in the Coachella Valley, southern California. Journal of Vector Ecology 27:138-148.

Sunahara, T., K. Ishizaka and M. Mogi. 2002. Habitat size: a factor determining the opportunity for encounters between mosquito larvae and aquatic predators. Journal of Vector Ecology 27: 8-20.

Sweet, S. 1998. University of California, Santa Barbara.

APPENDIX B-1 (Continued)

Teresa, S. and B. C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Thorne, R.F., 1984. Are California vernal pools unique? *In* S. Jain and P. Moyle [eds.], Vernal pools and intermittent streams, 1-8. Institute of Ecology Publ. 28. University of California, Davis, California.

Thorp, R. 2003. E-mail communication to Daniel Burmeister (Dept. of Fish and Game Regional Ecologist).

Thorp, R. 1990. Vernal pool flowers and host-specific bees. Pages 109-122 in: D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants--their habitat and biology. Studies from the Herbarium No. 8, California State University, Chico.

Thorp, R.W. 1976. Insect pollination of vernal pool flowers. Pages 36-40 in: S. Jain (Editor). Vernal Pools, Their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis.

Thorp, R.W. and J.M. Leong. 1998. Specialist bee pollinators of showy vernal pool flowers. Pages 169-179 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Thorp, R.W. and J.M. Leong. 1996. Determining effective mitigation techniques for vernal pool wetlands: effect of host-specific pollinators on vernal pool plants. Final Report. California Department of Transportation, Environmental Division. Sacramento, California.

Thorp, R.W. and J.M. Leong. 1995. Native bee pollinators of vernal pool plants. Fremontia 23(2):3-7.

TNC (The Nature Conservancy). 2000. Effects of prescribed fire and grazing on a vernal pool grassland landscape: Recommendations for monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

TNC. 2001. California North Coast Ecoregional Plan. The Nature Conservancy, San Francisco, California.

APPENDIX B-1 (Continued)

Trenham, P.C., W.D. Koenig, and H.B. Shaffer, 2001. Spatially autocorrelated demography and interpond dispersal in the California tiger salamander, *Ambystoma californiense*. Ecology 82: 3519-3530.

Trenham, P.C. 2001. Terrestrial habitat used by adult California tiger salamanders. Journal of Herpetology, 35(2):344-346.

Tugel, A.J. 1993. Soil Survey of Sacramento County, California. United States Department of Agriculture, Soil Conservation Service.

USDA (United States Department of Agriculture). 1991. Soil Survey of Sacramento County California. Florin, Sloughhouse Lower Cosumnes Resource Conservation Districts.

USDOI (United States Department of the Interior). 1994. The Impact of Federal Programs on Wetlands, Vol. II, A Report to Congress by Secretary of Interior, Washington, D.C.

USFWS (United States Fish and Wildlife Service). 2004. Draft recovery plan for vernal pool ecosystems of California and southern Oregon. Portland, Oregon. xxii + 574 pp.

USFWS. 1999. Biological opinion for the Solano project water service contract renewal. U.S. Fish and Wildlife Service. Sacramento, California. 107 pp. + append.

USFWS. 1996. Draft Interim Vernal Pool Habitat Complex Ecosystem and Species Conservation Standards. March 14 1996. H:\WPDOCS\STDINFO\PROTECTM\VPOOLS.WPD.

Vollmar, J.E. 1999. Report on the soils, habitats, and rare species associated with the vernal pool grasslands of Eastern Merced County, California. East Merced Resource Conservation District, Merced, California.

Vollmar, J.E. (Ed.) 2002. Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Wacker, M. and N.M. Kelly. 2004. Changes in vernal pool edaphic settings through mitigation at the project and landscape scale. Wetlands Ecology and Management. 12: 165-178.

Weston, D.P., R.W. Holmes, J. You and M.J. Lydy. 2005. Aquatic toxicity due to residential use of Pyrethroid insecticides. Environ. Sci. and Technol.

Witham, C., E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Wurster, C.F. Jr. 1968. DDT reduces photosynthesis by marine phytoplankton. Science 159:1474-1475.

APPENDIX B-1 (Continued)

Zedler, P.H. 1987. The ecology of Southern California vernal pools: a community profile. U.S. Fish and Wildlife Service, Biological Report 85(7.11), U.S. Department of the Interior, Washington, D.C.

Zedler, P.H. 1990. Life histories of vernal pool vascular plants. Pages 123-146 in: D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants-their habitat and biology. Studies from the Herbarium No. 8, California State University, Chico.

Zedler, P.H. and C. Black. 1992. Seed dispersal by a generalized herbivore: rabbits as dispersal vectors in a semiarid California vernal pool landscape. The American Midland Naturalist. Vol. 128 (No. 1) 1-9.

Personal Communications (2001–2006)

Ahart, Lowell, Rancher/Botanist Honcutt, Butte County. California.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Bogiatto Raymond, Adjunct Professor California State University, Chico.

Burmester, Daniel. Regional Ecologist, California Department of Fish and GameRancho Cordova, California.

Chamberlain, Scott. Biologist, Chico, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Kelsey, Jon. (2001) Rancher Snelling, Merced County. California.

Preston, Robert, Ph. D. Consulting Botanist, Jones & Stokes, Sacramento, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Ron Unger. Restoration Ecologist EDAW, Sacramento, California.

Witham, Carol. Consulting Botanist, Davis, California.

APPENDIX B-2
Addendum to Vernal Pool Classifications

1 PURPOSE

The purpose of this document is to explain the changes in the analysis methods described in *Vernal Pool Classifications* (Appendix B-1 of the Aquatic Resources Plan (ARP)) that were used to generate the results presented in the ARP. Specifically, the focus of this addendum is regarding the classification of SSHCP vernal pools and the Vernal Wetland Acre/Density Index (VWADI) (Section 5.2 of *Vernal Pool Classifications*).

2 MODIFICATIONS

There are three factors that were modified in the analysis presented in the ARP from those used in the 2010 *Vernal Pool Classifications* document that affect the results: (1) land cover data; (2) land analysis unit (LAU) size; and (3) assigned intervals for vernal pool wetted acreage categories. Each of these modifications is described below.

2.1 Land Cover Data

The 2010 *Vernal Pool Classifications* did not use the most current available land cover data, which identifies the size and location of the vernal pools. The original mapping efforts have been updated and refined at various times to reflect modifications of land cover types (such as cover type conversion), to accommodate an expansion of the Plan Area boundary, and to correct errors in the original mapping. The current land cover map provides fairly detailed information for the existing conditions in the Plan Area based on 2009 aerial photos and limited field-truthing, with the updates occurring in May 2010 and July 2012. The analysis presented in the ARP is based upon the current land cover data.

2.2 Land Analysis Units

The VWADI is based on the variation in vernal pool areas (acres) and variation in vernal pool density (number of vernal pools per unit land area). In the 2010 *Vernal Pool Classifications*, these two parameters were assessed together as an index for vernal pool resources within standardized 160-acre LAUs (i.e., one-quarter sections) and served as the primary descriptors of the range of spatial-ecological variability of vernal pools in the Plan Area. Based on an informal recommendation from the U.S. Fish and Wildlife to the County of Sacramento, a 40-acre LAU was used to generate the results for the VWADI presented in the ARP. The 40-acre LAUs allow for more detailed analysis and preserve planning.

2.3 Assigned Intervals Based Upon Vernal Pool Wetted Acres

As described in Section 5.2.3 of the 2010 *Vernal Pool Classifications*, 25 VWADI categories were designated using 5 intervals, designated A–E, based on vernal pool density and 5 intervals,

APPENDIX B-2 (Continued)

designated 1–5, based on vernal pool wet-acres[1] within the LAUs. The VWADI letter category for vernal pool wetland density is presented in Table B2-1. The attributes and assigned VWADI letter category for vernal pool density was not modified in the analysis presented in the ARP even though the LAU was reduced in size from 160 to 40 acres. For example, a 160-acre LAU with more than 100 vernal pools was assigned as "E" in the 2010 *Vernal Pool Classifications,* whereas in the ARP a 40-acre LAU would have to include more than 100 vernal pools to be assigned "E."

Table B2-1
Assigned Intervals Based Upon Vernal Pool Density

Total Number of Vernal Pools/LAU	VWADI Letter Category
1–10	A
11–25	B
26–50	C
51–100	D
>100	E

The attributes and assigned VWADI number category for vernal pool wetted acres was scaled to the 40-acre LAU in the analysis presented in the ARP. The VWADI number category for the vernal pool wet-acres in the 2010 *Vernal Pool Classifications* and the ARP are presented in Table B2-2 to show the differences between the two analyses. The more stringent requirement for the vernal pool density factor, in combination with the reduction in the size of the LAU, provides a more fine-grained analysis of the VWADI categories across the Plan Area landscape.

Table B2-2
Assigned Intervals Based Upon Vernal Pool Wetted Acres

Total Acres Vernal Pools/LAU		VWADI Number Category
2010 *Vernal Pool Classifications*	*ARP*	
0–2	0–0.5	1
2–4	0.5–1	2
4–6	1–1.5	3
6–10	1.5–2.5	4
>10	>2.5	5

[1] The wet-acres or wetted acres is equivalent to the area delineated as a vernal pool in the land cover data.

Vernal Pool		Wetland	Wetlands_S	102352.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.152227
Vernal Pool		Wetland	Wetlands_S	102353.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.152268
Vernal Pool		Wetland	Wetlands_S	102354.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	Snodgrass Slough	0.017819
Vernal Pool		Wetland	Wetlands_S	102355.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.146554
Vernal Pool		Wetland	Wetlands_S	102356.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	Snodgrass Slough	0.008449
Vernal Pool		Wetland	Wetlands_S	102357.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.219646
Vernal Pool		Wetland	Wetlands_S	102358.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.137151
Vernal Pool		Wetland	Wetlands_S	102359.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.093037
Vernal Pool		Wetland	Wetlands_S	102360.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.965545
Vernal Pool		Wetland	Wetlands_S	102361.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.173200
Vernal Pool		Wetland	Wetlands_S	102362.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.581125
Vernal Pool		Wetland	Wetlands_S	102363.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.076420
Vernal Pool		Wetland	Wetlands_S	102364.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.078590
Vernal Pool		Wetland	Wetlands_S	102365.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	Snodgrass Slough	0.049735
Vernal Pool		Wetland	Wetlands_S	102366.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.911602
Vernal Pool		Wetland	Wetlands_S	102368.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	1.588890
Vernal Pool		Wetland	Wetlands_S	102369.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	1.297800
Vernal Pool		Wetland	Wetlands_S	102370.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.230377
Vernal Pool		Wetland	Wetlands_S	102371.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.105975
Vernal Pool		Wetland	Wetlands_S	102372.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.746977
Vernal Pool		Wetland	Wetlands_S	102373.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	0.304358
Vernal Pool		Wetland	Wetlands_S	102374.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021697
Vernal Pool		Wetland	Wetlands_S	102375.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	11.0	Snodgrass Slough	1.026920
Vernal Pool		Wetland	Wetlands_S	102377.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029829
Vernal Pool		Wetland	Wetlands_S	102378.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.162130
Vernal Pool		Wetland	Wetlands_S	102379.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.010668
Vernal Pool		Wetland	Wetlands_S	102380.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.023584
Vernal Pool		Wetland	Wetlands_S	102381.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.091606
Vernal Pool		Wetland	Wetlands_S	102382.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.096718
Vernal Pool		Wetland	Wetlands_S	102383.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.064313
Vernal Pool		Wetland	Wetlands_S	102384.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.027642
Vernal Pool		Wetland	Wetlands_S	102385.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.063224
Vernal Pool		Wetland	Wetlands_S	102386.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.080379
Vernal Pool		Wetland	Wetlands_S	102387.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.106860
Vernal Pool		Wetland	Wetlands_S	102388.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.114716
Vernal Pool		Wetland	Wetlands_S	102389.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021697
Vernal Pool		Wetland	Wetlands_S	102390.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.032013
Vernal Pool		Wetland	Wetlands_S	102391.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.077707
Vernal Pool		Wetland	Wetlands_S	102392.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.023608
Vernal Pool		Wetland	Wetlands_S	102393.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.129901
Vernal Pool		Wetland	Wetlands_S	102394.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020915
Vernal Pool		Wetland	Wetlands_S	102395.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.015507
Vernal Pool		Wetland	Wetlands_S	102396.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.014421
Vernal Pool		Wetland	Wetlands_S	102397.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.028341
Vernal Pool		Wetland	Wetlands_S	102398.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.155206
Vernal Pool		Wetland	Wetlands_S	102399.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.017462
Vernal Pool		Wetland	Wetlands_S	102400.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.053232
Vernal Pool		Wetland	Wetlands_S	102401.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.199439
Vernal Pool		Wetland	Wetlands_S	102402.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.102810
Vernal Pool		Wetland	Wetlands_S	102403.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.017496
Vernal Pool		Wetland	Wetlands_S	102404.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.023168
Vernal Pool		Wetland	Wetlands_S	102405.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.032225
Vernal Pool		Wetland	Wetlands_S	102406.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.140600
Vernal Pool		Wetland	Wetlands_S	102407.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.047544
Vernal Pool		Wetland	Wetlands_S	102408.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.063968
Vernal Pool		Wetland	Wetlands_S	102409.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.072431
Vernal Pool		Wetland	Wetlands_S	102410.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.031078
Vernal Pool		Wetland	Wetlands_S	102411.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.055795
Vernal Pool		Wetland	Wetlands_S	102412.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.089333
Vernal Pool		Wetland	Wetlands_S	102413.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.355907
Vernal Pool		Wetland	Wetlands_S	102414.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029665
Vernal Pool		Wetland	Wetlands_S	102415.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.022936
Vernal Pool		Wetland	Wetlands_S	102416.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.053079
Vernal Pool		Wetland	Wetlands_S	102417.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.062634
Vernal Pool		Wetland	Wetlands_S	102418.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.042528
Vernal Pool		Wetland	Wetlands_S	102419.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.058252
Vernal Pool		Wetland	Wetlands_S	102420.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.022207
Vernal Pool		Wetland	Wetlands_S	102421.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.017132
Vernal Pool		Wetland	Wetlands_S	102422.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.057465
Vernal Pool		Wetland	Wetlands_S	102423.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.073484
Vernal Pool		Wetland	Wetlands_S	102424.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.190401
Vernal Pool		Wetland	Wetlands_S	102425.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.265141
Vernal Pool		Wetland	Wetlands_S	102426.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.012282
Vernal Pool		Wetland	Wetlands_S	102427.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.327271
Vernal Pool		Wetland	Wetlands_S	102428.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.044121
Vernal Pool		Wetland	Wetlands_S	102429.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.051363
Vernal Pool		Wetland	Wetlands_S	102430.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.050125
Vernal Pool		Wetland	Wetlands_S	102431.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.055676
Vernal Pool		Wetland	Wetlands_S	102432.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.111595
Vernal Pool		Wetland	Wetlands_S	102433.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.056580
Vernal Pool		Wetland	Wetlands_S	102434.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.

Vernal Pool		Wetland	Wetlands_S	102453.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021873
Vernal Pool		Wetland	Wetlands_S	102454.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.182644
Vernal Pool		Wetland	Wetlands_S	102455.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.119420
Vernal Pool		Wetland	Wetlands_S	102456.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021021
Vernal Pool		Wetland	Wetlands_S	102457.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.097192
Vernal Pool		Wetland	Wetlands_S	102458.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.069824
Vernal Pool		Wetland	Wetlands_S	102459.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.040807
Vernal Pool		Wetland	Wetlands_S	102460.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039645
Vernal Pool		Wetland	Wetlands_S	102461.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.023658
Vernal Pool		Wetland	Wetlands_S	102462.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.036778
Vernal Pool		Wetland	Wetlands_S	102463.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029149
Vernal Pool		Wetland	Wetlands_S	102464.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.015462
Vernal Pool		Wetland	Wetlands_S	102465.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.079507
Vernal Pool		Wetland	Wetlands_S	102466.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.013962
Vernal Pool		Wetland	Wetlands_S	102467.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.038279
Vernal Pool		Wetland	Wetlands_S	102468.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.066058
Vernal Pool		Wetland	Wetlands_S	102469.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.117874
Vernal Pool		Wetland	Wetlands_S	102470.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.019678
Vernal Pool		Wetland	Wetlands_S	102471.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.194390
Vernal Pool		Wetland	Wetlands_S	102472.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.234130
Vernal Pool		Wetland	Wetlands_S	102473.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039841
Vernal Pool		Wetland	Wetlands_S	102474.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.114960
Vernal Pool		Wetland	Wetlands_S	102475.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.015277
Vernal Pool		Wetland	Wetlands_S	102476.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.125447
Vernal Pool		Wetland	Wetlands_S	102477.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.076222
Vernal Pool		Wetland	Wetlands_S	102478.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.068780
Vernal Pool		Wetland	Wetlands_S	102479.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.092430
Vernal Pool		Wetland	Wetlands_S	102480.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.019472
Vernal Pool		Wetland	Wetlands_S	102481.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.015890
Vernal Pool		Wetland	Wetlands_S	102482.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018857
Vernal Pool		Wetland	Wetlands_S	102483.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.071490
Vernal Pool		Wetland	Wetlands_S	102484.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.051448
Vernal Pool		Wetland	Wetlands_S	102485.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.069240
Vernal Pool		Wetland	Wetlands_S	102486.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.060985
Vernal Pool		Wetland	Wetlands_S	102487.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.084389
Vernal Pool		Wetland	Wetlands_S	102488.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.061398
Vernal Pool		Wetland	Wetlands_S	102489.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Laguna	0.026694
Vernal Pool		Wetland	Wetlands_S	102490.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.184519
Vernal Pool		Wetland	Wetlands_S	102491.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.567243
Vernal Pool		Wetland	Wetlands_S	102492.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.019803
Vernal Pool		Wetland	Wetlands_S	102493.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.051362
Vernal Pool		Wetland	Wetlands_S	102494.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.090947
Vernal Pool		Wetland	Wetlands_S	102495.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.066562
Vernal Pool		Wetland	Wetlands_S	102496.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.030999
Vernal Pool		Wetland	Wetlands_S	102497.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.218168
Vernal Pool		Wetland	Wetlands_S	102498.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Laguna	0.025241
Vernal Pool		Wetland	Wetlands_S	102499.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.009215
Vernal Pool		Wetland	Wetlands_S	102500.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.095081
Vernal Pool		Wetland	Wetlands_S	102501.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.102642
Vernal Pool		Wetland	Wetlands_S	102502.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.023341
Vernal Pool		Wetland	Wetlands_S	102503.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029885
Vernal Pool		Wetland	Wetlands_S	102504.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.102334
Vernal Pool		Wetland	Wetlands_S	102505.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.065345
Vernal Pool		Wetland	Wetlands_S	102506.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.017674
Vernal Pool		Wetland	Wetlands_S	102507.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.049866
Vernal Pool		Wetland	Wetlands_S	102508.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.032084
Vernal Pool		Wetland	Wetlands_S	102509.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.033355
Vernal Pool		Wetland	Wetlands_S	102510.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.038614
Vernal Pool		Wetland	Wetlands_S	102511.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.028796
Vernal Pool		Wetland	Wetlands_S	102512.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.066208
Vernal Pool		Wetland	Wetlands_S	102513.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.075702
Vernal Pool		Wetland	Wetlands_S	102514.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.022392
Vernal Pool		Wetland	Wetlands_S	102515.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.024581
Vernal Pool		Wetland	Wetlands_S	102516.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.032311
Vernal Pool		Wetland	Wetlands_S	102517.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.017765
Vernal Pool		Wetland	Wetlands_S	102518.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.124264
Vernal Pool		Wetland	Wetlands_S	102519.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.103982
Vernal Pool		Wetland	Wetlands_S	102520.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.037948
Vernal Pool		Wetland	Wetlands_S	102521.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.068810
Vernal Pool		Wetland	Wetlands_S	102522.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.083652
Vernal Pool		Wetland	Wetlands_S	102523.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.108011
Vernal Pool		Wetland	Wetlands_S	102524.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039814
Vernal Pool		Wetland	Wetlands_S	102525.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.060407
Vernal Pool		Wetland	Wetlands_S	102526.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021551
Vernal Pool		Wetland	Wetlands_S	102527.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.031414
Vernal Pool		Wetland	Wetlands_S	102528.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.116450
Vernal Pool		Wetland	Wetlands_S	102529.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.012197
Vernal Pool		Wetland	Wetlands_S	102530.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.326798
Vernal Pool		Wetland	Wetlands_S	102531.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018770
Vernal Pool		Wetland	Wetlands_S	102532.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.056415
Vernal Pool		Wetland	Wetlands_S	102533.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.229241
Vernal Pool		Wetland	Wetlands_S	102534.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0

Vernal Pool		Wetland	Wetlands_S	102552.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.102677
Vernal Pool		Wetland	Wetlands_S	102553.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.095440
Vernal Pool		Wetland	Wetlands_S	102554.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.088803
Vernal Pool		Wetland	Wetlands_S	102555.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.055814
Vernal Pool		Wetland	Wetlands_S	102556.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.088869
Vernal Pool		Wetland	Wetlands_S	102557.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.062296
Vernal Pool		Wetland	Wetlands_S	102558.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.810630
Vernal Pool		Wetland	Wetlands_S	102559.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.068776
Vernal Pool		Wetland	Wetlands_S	102560.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.100886
Vernal Pool		Wetland	Wetlands_S	102561.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018990
Vernal Pool		Wetland	Wetlands_S	102562.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.218913
Vernal Pool		Wetland	Wetlands_S	102563.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.012878
Vernal Pool		Wetland	Wetlands_S	102564.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039253
Vernal Pool		Wetland	Wetlands_S	102565.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.102919
Vernal Pool		Wetland	Wetlands_S	102566.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.042838
Vernal Pool		Wetland	Wetlands_S	102567.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.115849
Vernal Pool		Wetland	Wetlands_S	102568.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.170284
Vernal Pool		Wetland	Wetlands_S	102569.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.546131
Vernal Pool		Wetland	Wetlands_S	102570.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.077074
Vernal Pool		Wetland	Wetlands_S	102571.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.013444
Vernal Pool		Wetland	Wetlands_S	102572.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020089
Vernal Pool		Wetland	Wetlands_S	102573.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.038645
Vernal Pool		Wetland	Wetlands_S	102574.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.289494
Vernal Pool		Wetland	Wetlands_S	102575.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.320187
Vernal Pool		Wetland	Wetlands_S	102576.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.033793
Vernal Pool		Wetland	Wetlands_S	102577.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.276681
Vernal Pool		Wetland	Wetlands_S	102578.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.066920
Vernal Pool		Wetland	Wetlands_S	102579.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.169425
Vernal Pool		Wetland	Wetlands_S	102580.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.079374
Vernal Pool		Wetland	Wetlands_S	102581.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.535299
Vernal Pool		Wetland	Wetlands_S	102582.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.058256
Vernal Pool		Wetland	Wetlands_S	102583.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020113
Vernal Pool		Wetland	Wetlands_S	102584.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.095572
Vernal Pool		Wetland	Wetlands_S	102585.0	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Laguna	0.053701
Vernal Pool		Wetland	Wetlands_S	102586.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.011724
Vernal Pool		Wetland	Wetlands_S	102587.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039750
Vernal Pool		Wetland	Wetlands_S	102588.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.045185
Vernal Pool		Wetland	Wetlands_S	102589.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.088983
Vernal Pool		Wetland	Wetlands_S	102590.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.074828
Vernal Pool		Wetland	Wetlands_S	102591.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.067874
Vernal Pool		Wetland	Wetlands_S	102592.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.030843
Vernal Pool		Wetland	Wetlands_S	102593.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.140079
Vernal Pool		Wetland	Wetlands_S	102594.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.282487
Vernal Pool		Wetland	Wetlands_S	102595.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.160348
Vernal Pool		Wetland	Wetlands_S	102596.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.047657
Vernal Pool		Wetland	Wetlands_S	102597.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.040147
Vernal Pool		Wetland	Wetlands_S	102598.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.201345
Vernal Pool		Wetland	Wetlands_S	102599.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.015822
Vernal Pool		Wetland	Wetlands_S	102600.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.051713
Vernal Pool		Wetland	Wetlands_S	102601.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.061672
Vernal Pool		Wetland	Wetlands_S	102602.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.069543
Vernal Pool		Wetland	Wetlands_S	102603.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.082104
Vernal Pool		Wetland	Wetlands_S	102604.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.063480
Vernal Pool		Wetland	Wetlands_S	102605.0	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Laguna	0.055214
Vernal Pool		Wetland	Wetlands_S	102606.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.091736
Vernal Pool		Wetland	Wetlands_S	102607.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.067404
Vernal Pool		Wetland	Wetlands_S	102608.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.258575
Vernal Pool		Wetland	Wetlands_S	102609.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.273561
Vernal Pool		Wetland	Wetlands_S	102610.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.023739
Vernal Pool		Wetland	Wetlands_S	102611.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.056572
Vernal Pool		Wetland	Wetlands_S	102612.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029799
Vernal Pool		Wetland	Wetlands_S	102613.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.084927
Vernal Pool		Wetland	Wetlands_S	102614.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.038112
Vernal Pool		Wetland	Wetlands_S	102615.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018526
Vernal Pool		Wetland	Wetlands_S	102616.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.604557
Vernal Pool		Wetland	Wetlands_S	102617.0	No Impact	Valley Grassland (Vernal Pool)	Disturbed	Class I	Class III	Class III	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	14.0	Laguna	1.244110
Vernal Pool		Wetland	Wetlands_S	102618.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018463
Vernal Pool		Wetland	Wetlands_S	102619.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039765
Vernal Pool		Wetland	Wetlands_S	102620.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.013671
Vernal Pool		Wetland	Wetlands_S	102621.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.062008
Vernal Pool		Wetland	Wetlands_S	102622.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.094223
Vernal Pool		Wetland	Wetlands_S	102623.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.329306
Vernal Pool		Wetland	Wetlands_S	102624.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.164543
Vernal Pool		Wetland	Wetlands_S	102625.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.030563
Vernal Pool		Wetland	Wetlands_S	102626.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.087314
Vernal Pool		Wetland	Wetlands_S	102627.0	No Impact	Vernal Pool	Vernal Pool	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	18.0	Laguna	0.143207
Vernal Pool		Wetland	Wetlands_S	102628.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.017745
Vernal Pool		Wetland	Wetlands_S	102629.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021485
Vernal Pool		Wetland	Wetlands_S	102630.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.012673
Vernal Pool		Wetland	Wetlands_S	102631.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.007034
Vernal Pool		Wetland	Wetlands_S	102632.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.019770
Vernal Pool		Wetland	Wetlands_S	102633.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.024293
Vernal Pool	

Vernal Pool	Wetland	Wetlands_S	102651.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.137443
Vernal Pool	Wetland	Wetlands_S	102652.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.530784
Vernal Pool	Wetland	Wetlands_S	102653.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.006785
Vernal Pool	Wetland	Wetlands_S	102654.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021680
Vernal Pool	Wetland	Wetlands_S	102655.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.264734
Vernal Pool	Wetland	Wetlands_S	102656.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.092412
Vernal Pool	Wetland	Wetlands_S	102657.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.290000
Vernal Pool	Wetland	Wetlands_S	102658.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018678
Vernal Pool	Wetland	Wetlands_S	102659.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.033527
Vernal Pool	Wetland	Wetlands_S	102660.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.038394
Vernal Pool	Wetland	Wetlands_S	102661.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.013585
Vernal Pool	Wetland	Wetlands_S	102662.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.327807
Vernal Pool	Wetland	Wetlands_S	102663.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.076941
Vernal Pool	Wetland	Wetlands_S	102664.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.156570
Vernal Pool	Wetland	Wetlands_S	102665.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.014132
Vernal Pool	Wetland	Wetlands_S	102666.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.257250
Vernal Pool	Wetland	Wetlands_S	102667.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.026703
Vernal Pool	Wetland	Wetlands_S	102668.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.026434
Vernal Pool	Wetland	Wetlands_S	102669.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.332293
Vernal Pool	Wetland	Wetlands_S	102670.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.013499
Vernal Pool	Wetland	Wetlands_S	102671.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.031039
Vernal Pool	Wetland	Wetlands_S	102672.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.084584
Vernal Pool	Wetland	Wetlands_S	102673.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.081574
Vernal Pool	Wetland	Wetlands_S	102674.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.106262
Vernal Pool	Wetland	Wetlands_S	102675.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.163525
Vernal Pool	Wetland	Wetlands_S	102676.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021181
Vernal Pool	Wetland	Wetlands_S	102677.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.239313
Vernal Pool	Wetland	Wetlands_S	102678.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.044683
Vernal Pool	Wetland	Wetlands_S	102679.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.048519
Vernal Pool	Wetland	Wetlands_S	102680.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.917013
Vernal Pool	Wetland	Wetlands_S	102681.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.016985
Vernal Pool	Wetland	Wetlands_S	102682.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Laguna	0.041939
Vernal Pool	Wetland	Wetlands_S	102683.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.054567
Vernal Pool	Wetland	Wetlands_S	102684.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.211797
Vernal Pool	Wetland	Wetlands_S	102685.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.024744
Vernal Pool	Wetland	Wetlands_S	102686.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.036755
Vernal Pool	Wetland	Wetlands_S	102687.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.610803
Vernal Pool	Wetland	Wetlands_S	102688.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.295328
Vernal Pool	Wetland	Wetlands_S	102689.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.155427
Vernal Pool	Wetland	Wetlands_S	102690.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.016393
Vernal Pool	Wetland	Wetlands_S	102691.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.210294
Vernal Pool	Wetland	Wetlands_S	102692.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.005592
Vernal Pool	Wetland	Wetlands_S	102693.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Laguna	0.023268
Vernal Pool	Wetland	Wetlands_S	102694.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.521230
Vernal Pool	Wetland	Wetlands_S	102695.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.086938
Vernal Pool	Wetland	Wetlands_S	102696.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.159966
Vernal Pool	Wetland	Wetlands_S	102697.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.173399
Vernal Pool	Wetland	Wetlands_S	102698.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.058163
Vernal Pool	Wetland	Wetlands_S	102699.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.024800
Vernal Pool	Wetland	Wetlands_S	102700.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.022062
Vernal Pool	Wetland	Wetlands_S	102701.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.015621
Vernal Pool	Wetland	Wetlands_S	102702.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.030571
Vernal Pool	Wetland	Wetlands_S	102703.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.111881
Vernal Pool	Wetland	Wetlands_S	102704.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.113027
Vernal Pool	Wetland	Wetlands_S	102705.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.033885
Vernal Pool	Wetland	Wetlands_S	102706.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.114784
Vernal Pool	Wetland	Wetlands_S	102707.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.261676
Vernal Pool	Wetland	Wetlands_S	102708.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.031556
Vernal Pool	Wetland	Wetlands_S	102709.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.107172
Vernal Pool	Wetland	Wetlands_S	102710.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.384685
Vernal Pool	Wetland	Wetlands_S	102711.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.053024
Vernal Pool	Wetland	Wetlands_S	102712.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.070542
Vernal Pool	Wetland	Wetlands_S	102713.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.037777
Vernal Pool	Wetland	Wetlands_S	102714.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.195176
Vernal Pool	Wetland	Wetlands_S	102715.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039782
Vernal Pool	Wetland	Wetlands_S	102716.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020518
Vernal Pool	Wetland	Wetlands_S	102717.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.025405
Vernal Pool	Wetland	Wetlands_S	102718.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.346071
Vernal Pool	Wetland	Wetlands_S	102719.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.216828
Vernal Pool	Wetland	Wetlands_S	102720.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.019824
Vernal Pool	Wetland	Wetlands_S	102721.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.032593
Vernal Pool	Wetland	Wetlands_S	102722.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020633
Vernal Pool	Wetland	Wetlands_S	102723.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.234179
Vernal Pool	Wetland	Wetlands_S	102724.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.273608
Vernal Pool	Wetland	Wetlands_S	102725.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.016541
Vernal Pool	Wetland	Wetlands_S	102726.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021095
Vernal Pool	Wetland	Wetlands_S	102727.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.043409
Vernal Pool	Wetland	Wetlands_S	102728.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.173738
Vernal Pool	Wetland	Wetlands_S	102729.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.104950
Vernal Pool	Wetland	Wetlands_S	102730.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.092175
Vernal Pool	Wetland	Wetlands_S	102731.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.463827
Vernal Pool	Wetland	Wetlands_S	102732.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.044117
Vernal Pool	Wetland	Wetlands_S	102733.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I

Vernal Pool		Wetland	Wetlands_S	102750.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.026216
Vernal Pool		Wetland	Wetlands_S	102751.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.100591
Vernal Pool		Wetland	Wetlands_S	102752.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.035873
Vernal Pool		Wetland	Wetlands_S	102753.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.100195
Vernal Pool		Wetland	Wetlands_S	102754.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021667
Vernal Pool		Wetland	Wetlands_S	102755.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.084610
Vernal Pool		Wetland	Wetlands_S	102756.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.155660
Vernal Pool		Wetland	Wetlands_S	102757.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.016065
Vernal Pool		Wetland	Wetlands_S	102758.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018683
Vernal Pool		Wetland	Wetlands_S	102759.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.121999
Vernal Pool		Wetland	Wetlands_S	102760.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.248346
Vernal Pool		Wetland	Wetlands_S	102761.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.023102
Vernal Pool		Wetland	Wetlands_S	102762.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.033500
Vernal Pool		Wetland	Wetlands_S	102763.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.066266
Vernal Pool		Wetland	Wetlands_S	102764.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.050583
Vernal Pool		Wetland	Wetlands_S	102765.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.108716
Vernal Pool		Wetland	Wetlands_S	102766.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029169
Vernal Pool		Wetland	Wetlands_S	102767.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.026986
Vernal Pool		Wetland	Wetlands_S	102768.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.024763
Vernal Pool		Wetland	Wetlands_S	102769.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.022825
Vernal Pool		Wetland	Wetlands_S	102770.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.271301
Vernal Pool		Wetland	Wetlands_S	102771.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.014136
Vernal Pool		Wetland	Wetlands_S	102772.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.379668
Vernal Pool		Wetland	Wetlands_S	102773.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.280761
Vernal Pool		Wetland	Wetlands_S	102774.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.140529
Vernal Pool		Wetland	Wetlands_S	102775.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.043627
Vernal Pool		Wetland	Wetlands_S	102776.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.025667
Vernal Pool		Wetland	Wetlands_S	102777.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.026846
Vernal Pool		Wetland	Wetlands_S	102778.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018269
Vernal Pool		Wetland	Wetlands_S	102779.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.115136
Vernal Pool		Wetland	Wetlands_S	102780.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.039420
Vernal Pool		Wetland	Wetlands_S	102781.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.059842
Vernal Pool		Wetland	Wetlands_S	102782.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.266628
Vernal Pool		Wetland	Wetlands_S	102783.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.022174
Vernal Pool		Wetland	Wetlands_S	102784.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.024903
Vernal Pool		Wetland	Wetlands_S	102785.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.030780
Vernal Pool		Wetland	Wetlands_S	102786.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.169767
Vernal Pool		Wetland	Wetlands_S	102787.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.097210
Vernal Pool		Wetland	Wetlands_S	102788.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.169936
Vernal Pool		Wetland	Wetlands_S	102789.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.044386
Vernal Pool		Wetland	Wetlands_S	102790.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.025318
Vernal Pool		Wetland	Wetlands_S	102791.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.037876
Vernal Pool		Wetland	Wetlands_S	102792.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.050599
Vernal Pool		Wetland	Wetlands_S	102793.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.655847
Vernal Pool		Wetland	Wetlands_S	102794.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.098060
Vernal Pool		Wetland	Wetlands_S	102795.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.149768
Vernal Pool		Wetland	Wetlands_S	102796.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.321965
Vernal Pool		Wetland	Wetlands_S	102797.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018691
Vernal Pool		Wetland	Wetlands_S	102798.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.085185
Vernal Pool		Wetland	Wetlands_S	102799.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.049392
Vernal Pool		Wetland	Wetlands_S	102800.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.171724
Vernal Pool		Wetland	Wetlands_S	102801.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.055695
Vernal Pool		Wetland	Wetlands_S	102802.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021136
Vernal Pool		Wetland	Wetlands_S	102803.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.028000
Vernal Pool		Wetland	Wetlands_S	102804.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.078002
Vernal Pool		Wetland	Wetlands_S	102805.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.032246
Vernal Pool		Wetland	Wetlands_S	102806.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.028783
Vernal Pool		Wetland	Wetlands_S	102807.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.025080
Vernal Pool		Wetland	Wetlands_S	102808.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.014486
Vernal Pool		Wetland	Wetlands_S	102809.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.052469
Vernal Pool		Wetland	Wetlands_S	102810.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.100386
Vernal Pool		Wetland	Wetlands_S	102811.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.082634
Vernal Pool		Wetland	Wetlands_S	102812.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.161980
Vernal Pool		Wetland	Wetlands_S	102813.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.115142
Vernal Pool		Wetland	Wetlands_S	102814.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.138640
Vernal Pool		Wetland	Wetlands_S	102815.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.088160
Vernal Pool		Wetland	Wetlands_S	102816.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.246306
Vernal Pool		Wetland	Wetlands_S	102817.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.090747
Vernal Pool		Wetland	Wetlands_S	102818.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.317272
Vernal Pool		Wetland	Wetlands_S	102819.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.138418
Vernal Pool		Wetland	Wetlands_S	102820.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.043602
Vernal Pool		Wetland	Wetlands_S	102821.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.042877
Vernal Pool		Wetland	Wetlands_S	102822.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.042290
Vernal Pool		Wetland	Wetlands_S	102823.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.112125
Vernal Pool		Wetland	Wetlands_S	102824.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.243270
Vernal Pool		Wetland	Wetlands_S	102825.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Laguna	0.035566
Vernal Pool		Wetland	Wetlands_S	102826.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.027338
Vernal Pool		Wetland	Wetlands_S	102827.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.016666
Vernal Pool		Wetland	Wetlands_S	102828.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.064407
Vernal Pool		Wetland	Wetlands_S	102829.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.056076
Vernal Pool		Wetland	Wetlands_S	102830.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.176600
Vernal Pool		Wetland	Wetlands_S	102831.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna

Vernal Pool		Wetland	Wetlands_S	102849.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.060289
Vernal Pool		Wetland	Wetlands_S	102850.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.021248
Vernal Pool		Wetland	Wetlands_S	102851.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.070630
Vernal Pool		Wetland	Wetlands_S	102852.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.058325
Vernal Pool		Wetland	Wetlands_S	102853.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.377936
Vernal Pool		Wetland	Wetlands_S	102854.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020316
Vernal Pool		Wetland	Wetlands_S	102855.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.307788
Vernal Pool		Wetland	Wetlands_S	102856.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.324285
Vernal Pool		Wetland	Wetlands_S	102857.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.093692
Vernal Pool		Wetland	Wetlands_S	102858.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.037689
Vernal Pool		Wetland	Wetlands_S	102859.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029334
Vernal Pool		Wetland	Wetlands_S	102860.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.198768
Vernal Pool		Wetland	Wetlands_S	102861.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.280010
Vernal Pool		Wetland	Wetlands_S	102862.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.014566
Vernal Pool		Wetland	Wetlands_S	102863.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.056003
Vernal Pool		Wetland	Wetlands_S	102864.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018355
Vernal Pool		Wetland	Wetlands_S	102865.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.077461
Vernal Pool		Wetland	Wetlands_S	102866.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.165595
Vernal Pool		Wetland	Wetlands_S	102867.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.051733
Vernal Pool		Wetland	Wetlands_S	102868.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.070919
Vernal Pool		Wetland	Wetlands_S	102869.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.025573
Vernal Pool		Wetland	Wetlands_S	102870.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.099050
Vernal Pool		Wetland	Wetlands_S	102871.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.307725
Vernal Pool		Wetland	Wetlands_S	102872.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.124250
Vernal Pool		Wetland	Wetlands_S	102873.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.022208
Vernal Pool		Wetland	Wetlands_S	102874.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.065230
Vernal Pool		Wetland	Wetlands_S	102875.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.034570
Vernal Pool		Wetland	Wetlands_S	102876.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.266026
Vernal Pool		Wetland	Wetlands_S	102877.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.319750
Vernal Pool		Wetland	Wetlands_S	102878.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.097341
Vernal Pool		Wetland	Wetlands_S	102879.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.183144
Vernal Pool		Wetland	Wetlands_S	102880.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.054641
Vernal Pool		Wetland	Wetlands_S	102881.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.221602
Vernal Pool		Wetland	Wetlands_S	102882.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.209868
Vernal Pool		Wetland	Wetlands_S	102883.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.279306
Vernal Pool		Wetland	Wetlands_S	102884.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.058263
Vernal Pool		Wetland	Wetlands_S	102885.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.518430
Vernal Pool		Wetland	Wetlands_S	102886.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.035066
Vernal Pool		Wetland	Wetlands_S	102887.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.010634
Vernal Pool		Wetland	Wetlands_S	102888.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.110428
Vernal Pool		Wetland	Wetlands_S	102889.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.195032
Vernal Pool		Wetland	Wetlands_S	102890.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.058165
Vernal Pool		Wetland	Wetlands_S	102891.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.015708
Vernal Pool		Wetland	Wetlands_S	102892.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.065373
Vernal Pool		Wetland	Wetlands_S	102893.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.100487
Vernal Pool		Wetland	Wetlands_S	102894.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.086013
Vernal Pool		Wetland	Wetlands_S	102895.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.129655
Vernal Pool		Wetland	Wetlands_S	102896.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.152828
Vernal Pool		Wetland	Wetlands_S	102897.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.082892
Vernal Pool		Wetland	Wetlands_S	102898.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.045903
Vernal Pool		Wetland	Wetlands_S	102899.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.026207
Vernal Pool		Wetland	Wetlands_S	102900.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.050633
Vernal Pool		Wetland	Wetlands_S	102901.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.164058
Vernal Pool		Wetland	Wetlands_S	102902.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Laguna	0.153116
Vernal Pool		Wetland	Wetlands_S	102903.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.784684
Vernal Pool		Wetland	Wetlands_S	102904.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.091063
Vernal Pool		Wetland	Wetlands_S	102905.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.596121
Vernal Pool		Wetland	Wetlands_S	102906.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.545281
Vernal Pool		Wetland	Wetlands_S	102907.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.187175
Vernal Pool		Wetland	Wetlands_S	102908.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.054432
Vernal Pool		Wetland	Wetlands_S	102909.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018104
Vernal Pool		Wetland	Wetlands_S	102910.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.146423
Vernal Pool		Wetland	Wetlands_S	102911.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.040270
Vernal Pool		Wetland	Wetlands_S	102912.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.046929
Vernal Pool		Wetland	Wetlands_S	102913.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.688285
Vernal Pool		Wetland	Wetlands_S	102914.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.029943
Vernal Pool		Wetland	Wetlands_S	102915.0	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	7.0	Laguna	0.019253
Vernal Pool		Wetland	Wetlands_S	102916.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.051327
Vernal Pool		Wetland	Wetlands_S	102917.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.402926
Vernal Pool		Wetland	Wetlands_S	102918.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.504448
Vernal Pool		Wetland	Wetlands_S	102919.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.032400
Vernal Pool		Wetland	Wetlands_S	102920.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.018516
Vernal Pool		Wetland	Wetlands_S	102921.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	2.410420
Vernal Pool		Wetland	Wetlands_S	102922.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.272654
Vernal Pool		Wetland	Wetlands_S	102923.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.215165
Vernal Pool		Wetland	Wetlands_S	102924.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.459275
Vernal Pool		Wetland	Wetlands_S	102925.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.030987
Vernal Pool		Wetland	Wetlands_S	102926.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.156704
Vernal Pool		Wetland	Wetlands_S	102927.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.276548
Vernal Pool		Wetland	Wetlands_S	102928.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.094659
Vernal Pool		Wetland	Wetlands_S	102929.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.535734
Vernal Pool		Wetland	Wetlands_S	102930.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0

Vernal Pool	Wetland	Wetlands_S	102948.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020507
Vernal Pool	Wetland	Wetlands_S	102949.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.020128
Vernal Pool	Wetland	Wetlands_S	102950.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.068399
Vernal Pool	Wetland	Wetlands_S	102951.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.558071
Vernal Pool	Wetland	Wetlands_S	102952.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.293799
Vernal Pool	Wetland	Wetlands_S	102953.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.538066
Vernal Pool	Wetland	Wetlands_S	102954.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.471679
Vernal Pool	Wetland	Wetlands_S	102955.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Laguna	0.047347
Vernal Pool	Wetland	Wetlands_S	102956.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.303864
Vernal Pool	Wetland	Wetlands_S	102957.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.200424
Vernal Pool	Wetland	Wetlands_S	102958.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.571599
Vernal Pool	Wetland	Wetlands_S	102959.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.303711
Vernal Pool	Wetland	Wetlands_S	102960.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.107749
Vernal Pool	Wetland	Wetlands_S	102961.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.255652
Vernal Pool	Wetland	Wetlands_S	102962.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.293052
Vernal Pool	Wetland	Wetlands_S	102963.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.336036
Vernal Pool	Wetland	Wetlands_S	102964.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.279113
Vernal Pool	Wetland	Wetlands_S	102965.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.131412
Vernal Pool	Wetland	Wetlands_S	102966.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.332747
Vernal Pool	Wetland	Wetlands_S	102967.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.448096
Vernal Pool	Wetland	Wetlands_S	102968.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.342047
Vernal Pool	Wetland	Wetlands_S	102969.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.496942
Vernal Pool	Wetland	Wetlands_S	102970.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.294512
Vernal Pool	Wetland	Wetlands_S	102971.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.576777
Vernal Pool	Wetland	Wetlands_S	102972.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.555139
Vernal Pool	Wetland	Wetlands_S	102973.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.245139
Vernal Pool	Wetland	Wetlands_S	102974.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.689355
Vernal Pool	Wetland	Wetlands_S	102975.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.464735
Vernal Pool	Wetland	Wetlands_S	102976.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	2.838850
Vernal Pool	Wetland	Wetlands_S	102977.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.783166
Vernal Pool	Wetland	Wetlands_S	102978.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.801276
Vernal Pool	Wetland	Wetlands_S	102979.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.245092
Vernal Pool	Wetland	Wetlands_S	102980.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.214681
Vernal Pool	Wetland	Wetlands_S	102981.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.580469
Vernal Pool	Wetland	Wetlands_S	102982.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.263509
Vernal Pool	Wetland	Wetlands_S	102983.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.144645
Vernal Pool	Wetland	Wetlands_S	102984.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.307394
Vernal Pool	Wetland	Wetlands_S	102985.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.449428
Vernal Pool	Wetland	Wetlands_S	102986.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.369575
Vernal Pool	Wetland	Wetlands_S	102987.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.261063
Vernal Pool	Wetland	Wetlands_S	102988.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.448079
Vernal Pool	Wetland	Wetlands_S	102989.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.510930
Vernal Pool	Wetland	Wetlands_S	102990.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.083649
Vernal Pool	Wetland	Wetlands_S	102991.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.175504
Vernal Pool	Wetland	Wetlands_S	102992.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.344393
Vernal Pool	Wetland	Wetlands_S	102993.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.315590
Vernal Pool	Wetland	Wetlands_S	102994.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.261401
Vernal Pool	Wetland	Wetlands_S	102995.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.287810
Vernal Pool	Wetland	Wetlands_S	102996.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.571838
Vernal Pool	Wetland	Wetlands_S	102997.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.291011
Vernal Pool	Wetland	Wetlands_S	102998.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.270360
Vernal Pool	Wetland	Wetlands_S	102999.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	1.184160
Vernal Pool	Wetland	Wetlands_S	103000.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.289719
Vernal Pool	Wetland	Wetlands_S	103001.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	1.159100
Vernal Pool	Wetland	Wetlands_S	103002.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.362156
Vernal Pool	Wetland	Wetlands_S	103003.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	1.273270
Vernal Pool	Wetland	Wetlands_S	103004.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.325626
Vernal Pool	Wetland	Wetlands_S	103005.0	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.939484
Vernal Pool	Wetland	Wetlands_S	103006.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.262926
Vernal Pool	Wetland	Wetlands_S	103007.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.345380
Vernal Pool	Wetland	Wetlands_S	103008.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.241464
Vernal Pool	Wetland	Wetlands_S	103009.0	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.110828
Vernal Pool	Wetland	Wetlands_S	103010.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.247628
Vernal Pool	Wetland	Wetlands_S	103011.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.236530
Vernal Pool	Wetland	Wetlands_S	103012.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.439529
Vernal Pool	Wetland	Wetlands_S	103013.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	1.503450
Vernal Pool	Wetland	Wetlands_S	103014.0	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	2.896500
Vernal Pool	Wetland	Wetlands_S	103015.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.329192
Vernal Pool	Wetland	Wetlands_S	103016.0	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.197311
Vernal Pool	Wetland	Wetlands_S	103017.0	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.550457
Vernal Pool	Wetland	Wetlands_S	103018.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	0.367226
Vernal Pool	Wetland	Wetlands_S	103019.0	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Laguna	1.190810
Vernal Pool	Wetland	Wetlands_S	103072.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.178779
Vernal Pool	Wetland	Wetlands_S	103073.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.117903
Vernal Pool	Wetland	Wetlands_S	103074.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.115771
Vernal Pool	Wetland	Wetlands_S	103075.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.060646
Vernal Pool	Wetland	Wetlands_S	103076.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.074504
Vernal Pool	Wetland	Wetlands_S	103077.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.095961
Vernal Pool	Wetland	Wetlands_S	103078.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.034133
Vernal Pool	Wetland	Wetlands_S	103079.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.112748
Vernal Pool	Wetland	Wetlands_S	103080.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.028305
Vernal Pool	Wetland	Wetlands_S	103081.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0

Vernal Pool	Wetland	Wetlands_S	103099.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.056381
Vernal Pool	Wetland	Wetlands_S	103100.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.130461
Vernal Pool	Wetland	Wetlands_S	103101.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.028715
Vernal Pool	Wetland	Wetlands_S	103102.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.020269
Vernal Pool	Wetland	Wetlands_S	103103.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.040808
Vernal Pool	Wetland	Wetlands_S	103104.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.284457
Vernal Pool	Wetland	Wetlands_S	103105.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.030917
Vernal Pool	Wetland	Wetlands_S	103106.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.018650
Vernal Pool	Wetland	Wetlands_S	103107.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.103191
Vernal Pool	Wetland	Wetlands_S	103108.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.023144
Vernal Pool	Wetland	Wetlands_S	103109.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.099330
Vernal Pool	Wetland	Wetlands_S	103110.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.031251
Vernal Pool	Wetland	Wetlands_S	103111.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.022429
Vernal Pool	Wetland	Wetlands_S	103112.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.275357
Vernal Pool	Wetland	Wetlands_S	103113.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.032619
Vernal Pool	Wetland	Wetlands_S	103114.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.023728
Vernal Pool	Wetland	Wetlands_S	103115.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.038961
Vernal Pool	Wetland	Wetlands_S	103116.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.066037
Vernal Pool	Wetland	Wetlands_S	103117.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.177612
Vernal Pool	Wetland	Wetlands_S	103118.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.075907
Vernal Pool	Wetland	Wetlands_S	103119.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.031765
Vernal Pool	Wetland	Wetlands_S	103120.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.307413
Vernal Pool	Wetland	Wetlands_S	103121.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.100399
Vernal Pool	Wetland	Wetlands_S	103122.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.137630
Vernal Pool	Wetland	Wetlands_S	103123.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.061174
Vernal Pool	Wetland	Wetlands_S	103124.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.127878
Vernal Pool	Wetland	Wetlands_S	103125.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.060876
Vernal Pool	Wetland	Wetlands_S	103126.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.044858
Vernal Pool	Wetland	Wetlands_S	103127.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.019921
Vernal Pool	Wetland	Wetlands_S	103128.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.167623
Vernal Pool	Wetland	Wetlands_S	103129.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.079609
Vernal Pool	Wetland	Wetlands_S	103130.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.022519
Vernal Pool	Wetland	Wetlands_S	103131.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.075185
Vernal Pool	Wetland	Wetlands_S	103132.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.064821
Vernal Pool	Wetland	Wetlands_S	103133.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.222477
Vernal Pool	Wetland	Wetlands_S	103134.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.138241
Vernal Pool	Wetland	Wetlands_S	103135.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.023360
Vernal Pool	Wetland	Wetlands_S	103136.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.047011
Vernal Pool	Wetland	Wetlands_S	103137.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.097961
Vernal Pool	Wetland	Wetlands_S	103138.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.061341
Vernal Pool	Wetland	Wetlands_S	103139.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.138853
Vernal Pool	Wetland	Wetlands_S	103140.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.038970
Vernal Pool	Wetland	Wetlands_S	103141.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.194107
Vernal Pool	Wetland	Wetlands_S	103142.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.070579
Vernal Pool	Wetland	Wetlands_S	103143.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.029618
Vernal Pool	Wetland	Wetlands_S	103144.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.041729
Vernal Pool	Wetland	Wetlands_S	103145.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.134254
Vernal Pool	Wetland	Wetlands_S	103146.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.043483
Vernal Pool	Wetland	Wetlands_S	103147.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.088121
Vernal Pool	Wetland	Wetlands_S	103148.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.062001
Vernal Pool	Wetland	Wetlands_S	103149.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.205575
Vernal Pool	Wetland	Wetlands_S	103150.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.105893
Vernal Pool	Wetland	Wetlands_S	103151.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Upper Cosumnes River	0.028187
Vernal Pool	Wetland	Wetlands_S	103152.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.106810
Vernal Pool	Wetland	Wetlands_S	103153.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.112895
Vernal Pool	Wetland	Wetlands_S	103154.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.016185
Vernal Pool	Wetland	Wetlands_S	103155.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.046358
Vernal Pool	Wetland	Wetlands_S	103156.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.156187
Vernal Pool	Wetland	Wetlands_S	103157.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.093133
Vernal Pool	Wetland	Wetlands_S	103158.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.040128
Vernal Pool	Wetland	Wetlands_S	103159.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.092501
Vernal Pool	Wetland	Wetlands_S	103160.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.149852
Vernal Pool	Wetland	Wetlands_S	103161.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.146327
Vernal Pool	Wetland	Wetlands_S	103162.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.185146
Vernal Pool	Wetland	Wetlands_S	103163.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.312449
Vernal Pool	Wetland	Wetlands_S	103164.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.704535
Vernal Pool	Wetland	Wetlands_S	103165.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.160476
Vernal Pool	Wetland	Wetlands_S	103166.0	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	Morrison Creek	0.205275
Vernal Pool	Wetland	Wetlands_S	103167.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.191518
Vernal Pool	Wetland	Wetlands_S	103168.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.130885
Vernal Pool	Wetland	Wetlands_S	103169.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.017422
Vernal Pool	Wetland	Wetlands_S	103170.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Upper Cosumnes River	0.087318
Vernal Pool	Wetland	Wetlands_S	103171.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.430635
Vernal Pool	Wetland	Wetlands_S	103172.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.084143
Vernal Pool	Wetland	Wetlands_S	103173.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.225582
Vernal Pool	Wetland	Wetlands_S	103174.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.048619
Vernal Pool	Wetland	Wetlands_S	103175.0	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Upper Cosumnes River	0.073149
Vernal Pool	Wetland	Wetlands_S	103176.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.038030
Vernal Pool	Wetland	Wetlands_S	103177.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Upper Cosumnes River	0.045934
Vernal Pool	Wetland	Wetlands_S	103178.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.164560

Vernal Pool	Wetland	Wetlands_S	103198.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.091330
Vernal Pool	Wetland	Wetlands_S	103199.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.082541
Vernal Pool	Wetland	Wetlands_S	103200.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.085965
Vernal Pool	Wetland	Wetlands_S	103201.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.155713
Vernal Pool	Wetland	Wetlands_S	103202.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.256315
Vernal Pool	Wetland	Wetlands_S	103203.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.082526
Vernal Pool	Wetland	Wetlands_S	103204.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.317520
Vernal Pool	Wetland	Wetlands_S	103205.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.036877
Vernal Pool	Wetland	Wetlands_S	103206.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.301109
Vernal Pool	Wetland	Wetlands_S	103207.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.028563
Vernal Pool	Wetland	Wetlands_S	103208.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.020795
Vernal Pool	Wetland	Wetlands_S	103209.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	1.256990
Vernal Pool	Wetland	Wetlands_S	103210.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.037634
Vernal Pool	Wetland	Wetlands_S	103211.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.089919
Vernal Pool	Wetland	Wetlands_S	103212.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.108933
Vernal Pool	Wetland	Wetlands_S	103213.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.181023
Vernal Pool	Wetland	Wetlands_S	103214.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.141242
Vernal Pool	Wetland	Wetlands_S	103215.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.168947
Vernal Pool	Wetland	Wetlands_S	103216.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.178140
Vernal Pool	Wetland	Wetlands_S	103217.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.098136
Vernal Pool	Wetland	Wetlands_S	103218.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.079658
Vernal Pool	Wetland	Wetlands_S	103219.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.009634
Vernal Pool	Wetland	Wetlands_S	103220.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.053666
Vernal Pool	Wetland	Wetlands_S	103221.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.019853
Vernal Pool	Wetland	Wetlands_S	103222.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.102954
Vernal Pool	Wetland	Wetlands_S	103223.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.037863
Vernal Pool	Wetland	Wetlands_S	103224.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.020102
Vernal Pool	Wetland	Wetlands_S	103225.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.025867
Vernal Pool	Wetland	Wetlands_S	103226.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.036912
Vernal Pool	Wetland	Wetlands_S	103227.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.139172
Vernal Pool	Wetland	Wetlands_S	103228.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.063471
Vernal Pool	Wetland	Wetlands_S	103229.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.108120
Vernal Pool	Wetland	Wetlands_S	103230.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.045775
Vernal Pool	Wetland	Wetlands_S	103231.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	19.0	Upper Cosumnes River	1.550150
Vernal Pool	Wetland	Wetlands_S	103232.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.023344
Vernal Pool	Wetland	Wetlands_S	103233.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.107658
Vernal Pool	Wetland	Wetlands_S	103234.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.035543
Vernal Pool	Wetland	Wetlands_S	103235.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.063848
Vernal Pool	Wetland	Wetlands_S	103236.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.008218
Vernal Pool	Wetland	Wetlands_S	103237.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.115785
Vernal Pool	Wetland	Wetlands_S	103238.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.100232
Vernal Pool	Wetland	Wetlands_S	103239.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.006231
Vernal Pool	Wetland	Wetlands_S	103240.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.081660
Vernal Pool	Wetland	Wetlands_S	103241.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.032202
Vernal Pool	Wetland	Wetlands_S	103242.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.207738
Vernal Pool	Wetland	Wetlands_S	103243.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.127631
Vernal Pool	Wetland	Wetlands_S	103244.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.076678
Vernal Pool	Wetland	Wetlands_S	103245.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.135349
Vernal Pool	Wetland	Wetlands_S	103246.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.194116
Vernal Pool	Wetland	Wetlands_S	103247.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.026219
Vernal Pool	Wetland	Wetlands_S	103248.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.052026
Vernal Pool	Wetland	Wetlands_S	103249.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.032473
Vernal Pool	Wetland	Wetlands_S	103250.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.264209
Vernal Pool	Wetland	Wetlands_S	103251.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.044024
Vernal Pool	Wetland	Wetlands_S	103252.0	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	11.0	Morrison Creek	0.190237
Vernal Pool	Wetland	Wetlands_S	103253.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.048803
Vernal Pool	Wetland	Wetlands_S	103254.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.169311
Vernal Pool	Wetland	Wetlands_S	103255.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.053429
Vernal Pool	Wetland	Wetlands_S	103256.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.032789
Vernal Pool	Wetland	Wetlands_S	103257.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.030744
Vernal Pool	Wetland	Wetlands_S	103258.0	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	11.0	Morrison Creek	0.199761
Vernal Pool	Wetland	Wetlands_S	103259.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.105826
Vernal Pool	Wetland	Wetlands_S	103260.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.168943
Vernal Pool	Wetland	Wetlands_S	103261.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.091091
Vernal Pool	Wetland	Wetlands_S	103262.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.097065
Vernal Pool	Wetland	Wetlands_S	103263.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.048296
Vernal Pool	Wetland	Wetlands_S	103264.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.086999
Vernal Pool	Wetland	Wetlands_S	103265.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.043086
Vernal Pool	Wetland	Wetlands_S	103266.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.192212
Vernal Pool	Wetland	Wetlands_S	103267.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.325325
Vernal Pool	Wetland	Wetlands_S	103268.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.114989
Vernal Pool	Wetland	Wetlands_S	103269.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.015310
Vernal Pool	Wetland	Wetlands_S	103270.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.147653
Vernal Pool	Wetland	Wetlands_S	103271.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.410598
Vernal Pool	Wetland	Wetlands_S	103272.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.018699
Vernal Pool	Wetland	Wetlands_S	103273.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.116639
Vernal Pool	Wetland	Wetlands_S	103274.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.152745
Vernal Pool	Wetland	Wetlands_S	103275.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.153771
Vernal Pool	Wetland	Wetlands_S	103276.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.072021
Vernal Pool	Wetland	Wetlands_S	103277.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.

Vernal Pool		Wetland	Wetlands_S	103297.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.059828
Vernal Pool		Wetland	Wetlands_S	103298.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.038502
Vernal Pool		Wetland	Wetlands_S	103299.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.073189
Vernal Pool		Wetland	Wetlands_S	103300.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.086912
Vernal Pool		Wetland	Wetlands_S	103301.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.081047
Vernal Pool		Wetland	Wetlands_S	103302.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.060980
Vernal Pool		Wetland	Wetlands_S	103303.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.180070
Vernal Pool		Wetland	Wetlands_S	103304.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.067141
Vernal Pool		Wetland	Wetlands_S	103305.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.076084
Vernal Pool		Wetland	Wetlands_S	103306.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.039100
Vernal Pool		Wetland	Wetlands_S	103307.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.214308
Vernal Pool		Wetland	Wetlands_S	103308.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.034369
Vernal Pool		Wetland	Wetlands_S	103309.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.169549
Vernal Pool		Wetland	Wetlands_S	103310.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.120605
Vernal Pool		Wetland	Wetlands_S	103311.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.042211
Vernal Pool		Wetland	Wetlands_S	103312.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.166163
Vernal Pool		Wetland	Wetlands_S	103313.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.032105
Vernal Pool		Wetland	Wetlands_S	103314.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.107720
Vernal Pool		Wetland	Wetlands_S	103315.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.062682
Vernal Pool		Wetland	Wetlands_S	103316.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.091786
Vernal Pool		Wetland	Wetlands_S	103317.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.063473
Vernal Pool		Wetland	Wetlands_S	103318.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.026242
Vernal Pool		Wetland	Wetlands_S	103319.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.040544
Vernal Pool		Wetland	Wetlands_S	103320.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.085319
Vernal Pool		Wetland	Wetlands_S	103321.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.197459
Vernal Pool		Wetland	Wetlands_S	103322.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.021026
Vernal Pool		Wetland	Wetlands_S	103323.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.024464
Vernal Pool		Wetland	Wetlands_S	103324.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.237347
Vernal Pool		Wetland	Wetlands_S	103325.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.058250
Vernal Pool		Wetland	Wetlands_S	103326.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.016761
Vernal Pool		Wetland	Wetlands_S	103327.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.135269
Vernal Pool		Wetland	Wetlands_S	103328.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.036217
Vernal Pool		Wetland	Wetlands_S	103329.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.104426
Vernal Pool		Wetland	Wetlands_S	103330.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.036919
Vernal Pool		Wetland	Wetlands_S	103331.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.027423
Vernal Pool		Wetland	Wetlands_S	103332.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.075713
Vernal Pool		Wetland	Wetlands_S	103333.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.129878
Vernal Pool		Wetland	Wetlands_S	103334.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.019484
Vernal Pool		Wetland	Wetlands_S	103335.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.145287
Vernal Pool		Wetland	Wetlands_S	103336.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.501068
Vernal Pool		Wetland	Wetlands_S	103337.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.102809
Vernal Pool		Wetland	Wetlands_S	103338.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.181064
Vernal Pool		Wetland	Wetlands_S	103339.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.099503
Vernal Pool		Wetland	Wetlands_S	103340.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.190351
Vernal Pool		Wetland	Wetlands_S	103341.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.083318
Vernal Pool		Wetland	Wetlands_S	103342.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.020713
Vernal Pool		Wetland	Wetlands_S	103343.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.047661
Vernal Pool		Wetland	Wetlands_S	103344.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.021901
Vernal Pool		Wetland	Wetlands_S	103345.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.248622
Vernal Pool		Wetland	Wetlands_S	103346.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.058033
Vernal Pool		Wetland	Wetlands_S	103347.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.039975
Vernal Pool		Wetland	Wetlands_S	103348.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.193320
Vernal Pool		Wetland	Wetlands_S	103349.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.323085
Vernal Pool		Wetland	Wetlands_S	103350.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.175639
Vernal Pool		Wetland	Wetlands_S	103351.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.109343
Vernal Pool		Wetland	Wetlands_S	103352.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.316555
Vernal Pool		Wetland	Wetlands_S	103353.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.110831
Vernal Pool		Wetland	Wetlands_S	103354.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.110971
Vernal Pool		Wetland	Wetlands_S	103355.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.205757
Vernal Pool		Wetland	Wetlands_S	103356.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.054492
Vernal Pool		Wetland	Wetlands_S	103357.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.066363
Vernal Pool		Wetland	Wetlands_S	103358.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.091609
Vernal Pool		Wetland	Wetlands_S	103359.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.138600
Vernal Pool		Wetland	Wetlands_S	103360.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Upper Cosumnes River	0.068370
Vernal Pool		Wetland	Wetlands_S	103361.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.149378
Vernal Pool		Wetland	Wetlands_S	103362.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.122949
Vernal Pool		Wetland	Wetlands_S	103363.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	Upper Cosumnes River	0.293539
Vernal Pool		Wetland	Wetlands_S	103364.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.199177
Vernal Pool		Wetland	Wetlands_S	103365.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.061310
Vernal Pool		Wetland	Wetlands_S	103366.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.026540
Vernal Pool		Wetland	Wetlands_S	103367.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.123316
Vernal Pool		Wetland	Wetlands_S	103368.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.126029
Vernal Pool		Wetland	Wetlands_S	103369.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.210381
Vernal Pool		Wetland	Wetlands_S	103370.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.102462
Vernal Pool		Wetland	Wetlands_S	103371.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.092102
Vernal Pool		Wetland	Wetlands_S	103372.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.170593
Vernal Pool		Wetland	Wetlands_S	103373.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.165483
Vernal Pool		Wetland	Wetlands_S	103374.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.358956
Vernal Pool		Wetland	Wetlands_S	103375.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.117425
Vernal Pool		Wetland	Wetlands_S	103376.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Mo

Vernal Pool		Wetland	Wetlands_S	103396.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.048358
Vernal Pool		Wetland	Wetlands_S	103397.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.032973
Vernal Pool		Wetland	Wetlands_S	103398.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.037319
Vernal Pool		Wetland	Wetlands_S	103399.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.014727
Vernal Pool		Wetland	Wetlands_S	103400.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.085766
Vernal Pool		Wetland	Wetlands_S	103401.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.014933
Vernal Pool		Wetland	Wetlands_S	103402.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.011935
Vernal Pool		Wetland	Wetlands_S	103403.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	17.0	Deer Creek	0.099307
Vernal Pool		Wetland	Wetlands_S	103404.0	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	15.0	Deer Creek	0.080203
Vernal Pool		Wetland	Wetlands_S	103405.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	11.0	Deer Creek	0.006352
Vernal Pool		Wetland	Wetlands_S	103406.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.115700
Vernal Pool		Wetland	Wetlands_S	103407.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.060993
Vernal Pool		Wetland	Wetlands_S	103408.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.043624
Vernal Pool		Wetland	Wetlands_S	103409.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.025516
Vernal Pool		Wetland	Wetlands_S	103410.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.087756
Vernal Pool		Wetland	Wetlands_S	103411.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.149239
Vernal Pool		Wetland	Wetlands_S	103412.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	11.0	Deer Creek	0.043811
Vernal Pool		Wetland	Wetlands_S	103413.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.024862
Vernal Pool		Wetland	Wetlands_S	103414.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.037083
Vernal Pool		Wetland	Wetlands_S	103415.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.063877
Vernal Pool		Wetland	Wetlands_S	103416.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.165083
Vernal Pool		Wetland	Wetlands_S	103417.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.039548
Vernal Pool		Wetland	Wetlands_S	103418.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.097821
Vernal Pool		Wetland	Wetlands_S	103419.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.019602
Vernal Pool		Wetland	Wetlands_S	103420.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.108118
Vernal Pool		Wetland	Wetlands_S	103421.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	11.0	Deer Creek	0.048751
Vernal Pool		Wetland	Wetlands_S	103422.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.068534
Vernal Pool		Wetland	Wetlands_S	103423.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.013051
Vernal Pool		Wetland	Wetlands_S	103424.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.087293
Vernal Pool		Wetland	Wetlands_S	103425.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.169619
Vernal Pool		Wetland	Wetlands_S	103426.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.050869
Vernal Pool		Wetland	Wetlands_S	103427.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	11.0	Deer Creek	0.012381
Vernal Pool		Wetland	Wetlands_S	103428.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.039911
Vernal Pool		Wetland	Wetlands_S	103429.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.166072
Vernal Pool		Wetland	Wetlands_S	103430.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.088814
Vernal Pool		Wetland	Wetlands_S	103431.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.056387
Vernal Pool		Wetland	Wetlands_S	103432.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.134311
Vernal Pool		Wetland	Wetlands_S	103433.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.068505
Vernal Pool		Wetland	Wetlands_S	103434.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.039273
Vernal Pool		Wetland	Wetlands_S	103435.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.091072
Vernal Pool		Wetland	Wetlands_S	103436.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.040168
Vernal Pool		Wetland	Wetlands_S	103437.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.120509
Vernal Pool		Wetland	Wetlands_S	103438.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.054646
Vernal Pool		Wetland	Wetlands_S	103439.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.016720
Vernal Pool		Wetland	Wetlands_S	103440.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.052300
Vernal Pool		Wetland	Wetlands_S	103441.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.031452
Vernal Pool		Wetland	Wetlands_S	103442.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.048413
Vernal Pool		Wetland	Wetlands_S	103443.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.095524
Vernal Pool		Wetland	Wetlands_S	103444.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.097417
Vernal Pool		Wetland	Wetlands_S	103445.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.040445
Vernal Pool		Wetland	Wetlands_S	103446.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.099741
Vernal Pool		Wetland	Wetlands_S	103447.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.062827
Vernal Pool		Wetland	Wetlands_S	103448.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.055456
Vernal Pool		Wetland	Wetlands_S	103448.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.073905
Vernal Pool		Wetland	Wetlands_S	103449.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.072635
Vernal Pool		Wetland	Wetlands_S	103450.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.308662
Vernal Pool		Wetland	Wetlands_S	103451.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.039481
Vernal Pool		Wetland	Wetlands_S	103452.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.057533
Vernal Pool		Wetland	Wetlands_S	103453.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.143128
Vernal Pool		Wetland	Wetlands_S	103454.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.090686
Vernal Pool		Wetland	Wetlands_S	103455.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.117406
Vernal Pool		Wetland	Wetlands_S	103456.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.133460
Vernal Pool		Wetland	Wetlands_S	103457.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.344738
Vernal Pool		Wetland	Wetlands_S	103458.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.085096
Vernal Pool		Wetland	Wetlands_S	103459.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.086000
Vernal Pool		Wetland	Wetlands_S	103460.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.095701
Vernal Pool		Wetland	Wetlands_S	103461.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.083055
Vernal Pool		Wetland	Wetlands_S	103462.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.107409
Vernal Pool		Wetland	Wetlands_S	103463.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.103178
Vernal Pool		Wetland	Wetlands_S	103464.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.069720
Vernal Pool		Wetland	Wetlands_S	103465.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.058999
Vernal Pool		Wetland	Wetlands_S	103466.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.064264
Vernal Pool		Wetland	Wetlands_S	103467.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.046187
Vernal Pool		Wetland	Wetlands_S	103468.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.046653
Vernal Pool		Wetland	Wetlands_S	103469.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.098590
Vernal Pool		Wetland	Wetlands_S	103470.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.045838
Vernal Pool		Wetland	Wetlands_S	103471.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.101192
Vernal Pool		Wetland	Wetlands_S	103472.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.063923
Vernal Pool		Wetland	Wetlands_S	103473.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.040698
Vernal Pool		Wetland	Wetlands_S	103474.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.129236
Vernal Pool		Wetland	Wetlands_S	103475.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0

Vernal Pool	Wetland	Wetlands_S	103493.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.146936
Vernal Pool	Wetland	Wetlands_S	103494.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.190300
Vernal Pool	Wetland	Wetlands_S	103495.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.094510
Vernal Pool	Wetland	Wetlands_S	103496.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.090230
Vernal Pool	Wetland	Wetlands_S	103497.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.031358
Vernal Pool	Wetland	Wetlands_S	103498.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.129772
Vernal Pool	Wetland	Wetlands_S	103499.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.030214
Vernal Pool	Wetland	Wetlands_S	103500.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.087926
Vernal Pool	Wetland	Wetlands_S	103501.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.066355
Vernal Pool	Wetland	Wetlands_S	103502.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.223858
Vernal Pool	Wetland	Wetlands_S	103503.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.189071
Vernal Pool	Wetland	Wetlands_S	103504.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.069571
Vernal Pool	Wetland	Wetlands_S	103505.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.092639
Vernal Pool	Wetland	Wetlands_S	103506.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.036160
Vernal Pool	Wetland	Wetlands_S	103507.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.034606
Vernal Pool	Wetland	Wetlands_S	103508.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.076137
Vernal Pool	Wetland	Wetlands_S	103509.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.017022
Vernal Pool	Wetland	Wetlands_S	103510.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.138290
Vernal Pool	Wetland	Wetlands_S	103511.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.157445
Vernal Pool	Wetland	Wetlands_S	103512.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.060750
Vernal Pool	Wetland	Wetlands_S	103513.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.145071
Vernal Pool	Wetland	Wetlands_S	103514.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.056659
Vernal Pool	Wetland	Wetlands_S	103515.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.097769
Vernal Pool	Wetland	Wetlands_S	103516.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.096840
Vernal Pool	Wetland	Wetlands_S	103517.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.006997
Vernal Pool	Wetland	Wetlands_S	103518.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.080108
Vernal Pool	Wetland	Wetlands_S	103519.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.134362
Vernal Pool	Wetland	Wetlands_S	103520.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.102473
Vernal Pool	Wetland	Wetlands_S	103521.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.067224
Vernal Pool	Wetland	Wetlands_S	103522.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.167380
Vernal Pool	Wetland	Wetlands_S	103523.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.163533
Vernal Pool	Wetland	Wetlands_S	103524.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.112798
Vernal Pool	Wetland	Wetlands_S	103525.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.123485
Vernal Pool	Wetland	Wetlands_S	103526.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.116124
Vernal Pool	Wetland	Wetlands_S	103527.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.099302
Vernal Pool	Wetland	Wetlands_S	103528.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.187106
Vernal Pool	Wetland	Wetlands_S	103528.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.055913
Vernal Pool	Wetland	Wetlands_S	103529.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.179723
Vernal Pool	Wetland	Wetlands_S	103530.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.057807
Vernal Pool	Wetland	Wetlands_S	103531.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.029822
Vernal Pool	Wetland	Wetlands_S	103531.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.073520
Vernal Pool	Wetland	Wetlands_S	103532.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.029304
Vernal Pool	Wetland	Wetlands_S	103532.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.145408
Vernal Pool	Wetland	Wetlands_S	103533.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.111929
Vernal Pool	Wetland	Wetlands_S	103534.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.093504
Vernal Pool	Wetland	Wetlands_S	103535.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.049731
Vernal Pool	Wetland	Wetlands_S	103536.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.085572
Vernal Pool	Wetland	Wetlands_S	103537.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.093685
Vernal Pool	Wetland	Wetlands_S	103538.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.079950
Vernal Pool	Wetland	Wetlands_S	103539.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	12.0	Deer Creek	0.000990
Vernal Pool	Wetland	Wetlands_S	103539.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.055395
Vernal Pool	Wetland	Wetlands_S	103540.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.113433
Vernal Pool	Wetland	Wetlands_S	103541.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.077242
Vernal Pool	Wetland	Wetlands_S	103542.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.048004
Vernal Pool	Wetland	Wetlands_S	103543.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.107629
Vernal Pool	Wetland	Wetlands_S	103544.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.068605
Vernal Pool	Wetland	Wetlands_S	103545.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.057833
Vernal Pool	Wetland	Wetlands_S	103546.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.161923
Vernal Pool	Wetland	Wetlands_S	103547.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.110665
Vernal Pool	Wetland	Wetlands_S	103548.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.095585
Vernal Pool	Wetland	Wetlands_S	103549.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.179982
Vernal Pool	Wetland	Wetlands_S	103550.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.064883
Vernal Pool	Wetland	Wetlands_S	103551.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.009896
Vernal Pool	Wetland	Wetlands_S	103551.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.138241
Vernal Pool	Wetland	Wetlands_S	103552.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.042659
Vernal Pool	Wetland	Wetlands_S	103553.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.076037
Vernal Pool	Wetland	Wetlands_S	103554.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.114203
Vernal Pool	Wetland	Wetlands_S	103555.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.102905
Vernal Pool	Wetland	Wetlands_S	103556.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.148634
Vernal Pool	Wetland	Wetlands_S	103557.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.084732
Vernal Pool	Wetland	Wetlands_S	103558.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.115620
Vernal Pool	Wetland	Wetlands_S	103558.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	18.0	Deer Creek	0.105961
Vernal Pool	Wetland	Wetlands_S	103559.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.090309
Vernal Pool	Wetland	Wetlands_S	103560.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.274298
Vernal Pool	Wetland	Wetlands_S	103561.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.127977
Vernal Pool	Wetland	Wetlands_S	103562.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.084811
Vernal Pool	Wetland	Wetlands_S	103563.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.131022
Vernal Pool	Wetland	Wetlands_S	103564.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.058341
Vernal Pool	Wetland	Wetlands_S	103565.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.099996
Vernal Pool	Wetland	Wetlands_S	103566.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.086375
Vernal Pool	Wetland	Wetlands_S	103567.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1

Vernal Pool	Wetland	Wetlands_S	103586.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.027326
Vernal Pool	Wetland	Wetlands_S	103587.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.084081
Vernal Pool	Wetland	Wetlands_S	103588.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.010342
Vernal Pool	Wetland	Wetlands_S	103589.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.161247
Vernal Pool	Wetland	Wetlands_S	103590.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.047301
Vernal Pool	Wetland	Wetlands_S	103591.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.057289
Vernal Pool	Wetland	Wetlands_S	103592.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.072826
Vernal Pool	Wetland	Wetlands_S	103593.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.088252
Vernal Pool	Wetland	Wetlands_S	103594.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.060874
Vernal Pool	Wetland	Wetlands_S	103595.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.089797
Vernal Pool	Wetland	Wetlands_S	103596.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.077813
Vernal Pool	Wetland	Wetlands_S	103598.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.077323
Vernal Pool	Wetland	Wetlands_S	103599.0	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	Morrison Creek	0.023053
Vernal Pool	Wetland	Wetlands_S	103600.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.058257
Vernal Pool	Wetland	Wetlands_S	103601.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.200325
Vernal Pool	Wetland	Wetlands_S	103602.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.063228
Vernal Pool	Wetland	Wetlands_S	103603.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.208600
Vernal Pool	Wetland	Wetlands_S	103604.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.172475
Vernal Pool	Wetland	Wetlands_S	103605.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.061021
Vernal Pool	Wetland	Wetlands_S	103606.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.050268
Vernal Pool	Wetland	Wetlands_S	103607.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.053603
Vernal Pool	Wetland	Wetlands_S	103608.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.143237
Vernal Pool	Wetland	Wetlands_S	103609.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.089874
Vernal Pool	Wetland	Wetlands_S	103610.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.105149
Vernal Pool	Wetland	Wetlands_S	103611.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.103733
Vernal Pool	Wetland	Wetlands_S	103612.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.049496
Vernal Pool	Wetland	Wetlands_S	103613.0	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	10.0	Morrison Creek	0.302707
Vernal Pool	Wetland	Wetlands_S	103614.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.184378
Vernal Pool	Wetland	Wetlands_S	103615.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.107147
Vernal Pool	Wetland	Wetlands_S	103616.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.101765
Vernal Pool	Wetland	Wetlands_S	103617.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.105554
Vernal Pool	Wetland	Wetlands_S	103618.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.245448
Vernal Pool	Wetland	Wetlands_S	103619.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.170247
Vernal Pool	Wetland	Wetlands_S	103620.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.101774
Vernal Pool	Wetland	Wetlands_S	103621.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.042120
Vernal Pool	Wetland	Wetlands_S	103622.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.079470
Vernal Pool	Wetland	Wetlands_S	103623.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.381164
Vernal Pool	Wetland	Wetlands_S	103624.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.154151
Vernal Pool	Wetland	Wetlands_S	103625.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.089736
Vernal Pool	Wetland	Wetlands_S	103626.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.069615
Vernal Pool	Wetland	Wetlands_S	103627.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.035383
Vernal Pool	Wetland	Wetlands_S	103628.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.059433
Vernal Pool	Wetland	Wetlands_S	103629.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.054439
Vernal Pool	Wetland	Wetlands_S	103630.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.012941
Vernal Pool	Wetland	Wetlands_S	103631.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.099637
Vernal Pool	Wetland	Wetlands_S	103632.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	7.0	Morrison Creek	0.025461
Vernal Pool	Wetland	Wetlands_S	103633.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	8.0	Morrison Creek	0.053485
Vernal Pool	Wetland	Wetlands_S	103634.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.103452
Vernal Pool	Wetland	Wetlands_S	103635.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.133857
Vernal Pool	Wetland	Wetlands_S	103636.0	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	13.0	Morrison Creek	0.094644
Vernal Pool	Wetland	Wetlands_S	103637.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.382969
Vernal Pool	Wetland	Wetlands_S	103638.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.089744
Vernal Pool	Wetland	Wetlands_S	103639.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.095538
Vernal Pool	Wetland	Wetlands_S	103640.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.271984
Vernal Pool	Wetland	Wetlands_S	103641.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.091500
Vernal Pool	Wetland	Wetlands_S	103642.0	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	11.0	Morrison Creek	0.116693
Vernal Pool	Wetland	Wetlands_S	103643.0	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	14.0	Morrison Creek	0.108182

Cover_Type	Type_PJDA	SubType_PJ	GIS_ID	IMPACT	Primary	Secondary	LC_Class	FAA_P_CLAS	FAA_S_CLAS	Final_Scor	F1_Habitat	F1_WQ	F1_Hydro	F2_Habitat	F2_WQ	F2_Hydro	F3_Habitat	F3_WQ	F3_Hydro	F4_Habitat	F4_WQ	F4_Hydro	F5_Habitat	F5_WQ	F5_Hydro	FA_Score	Calc_Acres	HU_10_Name
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6964.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-24.0	0.000398	Sherman Lake-Sacramento River
Disturbed - Other Linear Feature	Waters_E	Waters_E	640.000000	No Impact	Future Development	Disturbed	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-21.0	0.084343	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5033.000000	No Impact	Major Roads	Cropland	Class III	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-20.0	0.036288	Sherman Lake-Sacramento River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5074.000000	No Impact	Major Roads	Cropland	Class III	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-20.0	0.112772	Sherman Lake-Sacramento River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5137.000000	No Impact	Major Roads	Cropland	Class III	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-20.0	0.055483	Sherman Lake-Sacramento River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5640.000000	No Impact	Low Density Development	Major Roads - Other Linear Feature	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-19.0	0.003396	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5785.000000	No Impact	Low Density Development	Low Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-19.0	0.027998	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5830.000000	No Impact	Future Development	Low Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-19.0	0.068366	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5988.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-19.0	0.078080	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6964.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-19.0	0.088587	Snodgrass Slough
Disturbed - Other Linear Feature	Waters_P	Waters_IP	775.000000	No Impact	Future Development	Disturbed	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-18.0	0.186130	Morrison Creek
High Density Development - Other Linear Feature	Waters_P	Waters_IP	2373.000000	No Impact	Future Development	High Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-18.0	0.013131	Morrison Creek
High Density Development - Other Linear Feature	Waters_P	Waters_IP	2374.000000	No Impact	Future Development	High Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-18.0	0.002081	Morrison Creek
High Density Development - Other Linear Feature	Waters_P	Waters_IP	2412.000000	No Impact	Future Development	High Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-18.0	0.051680	Morrison Creek
Major Roads - Other Linear Feature	Waters_P	Waters_IP	11854.000000	No Impact	Future Development	Future Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-18.0	0.001402	Morrison Creek
Mixed Riparian Scrub	Waters_E	Waters_E	8287.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-19.0	0.000505	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	8137.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-19.0	0.034743	Sherman Lake-Sacramento River
Mixed Riparian Woodland	Wetland	Riparian	9170.000000	No Impact	Major Roads	Major Roads	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-19.0	5.326590	Sherman Lake-Sacramento River
Mixed Riparian Woodland	Wetland	Riparian	9187.000000	No Impact	Major Roads	Major Roads	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-19.0	0.278244	Sherman Lake-Sacramento River
Cropland - Other Linear Feature	Waters_E	Waters_E	321.000000	No Impact	Future Development	Low Density Development	Class II	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-18.0	0.020021	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_IP	7755.000000	No Impact	Future Development	Low Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-16.0	0.128579	Morrison Creek
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5562.000000	No Impact	Vineyards	Low Density Development	Class III	Class II	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-17.0	0.038311	Sherman Lake-Sacramento River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5712.000000	No Impact	Cropland	Low Density Development	Class III	Class II	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-17.0	0.008909	Sherman Lake-Sacramento River
High Density Development - Other Linear Feature	Waters_E	Waters_E	2257.000000	No Impact	High Density Development	Streams/Creeks	Class III	Class III	Class I	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-2.0	-2.0	-2.0	-16.0	0.007529	Snodgrass Slough
Open Water	Waters_P	Waters_P	10880.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	1.557240	Snodgrass Slough
Open Water	Waters_P	Waters_P	10882.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	1.131390	Snodgrass Slough
Open Water	Waters_P	Waters_P	10883.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	2.286550	Snodgrass Slough
Open Water	Waters_P	Waters_P	10884.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	1.417908	Snodgrass Slough
Open Water	Waters_P	Waters_P	10885.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.744551	Snodgrass Slough
Open Water	Waters_P	Waters_P	10886.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.744545	Snodgrass Slough
Open Water	Waters_P	Waters_P	10887.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.744567	Snodgrass Slough
Open Water	Waters_P	Waters_P	10888.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.744560	Snodgrass Slough
Open Water	Waters_P	Waters_P	10889.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.744554	Snodgrass Slough
Open Water	Waters_P	Waters_P	10890.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.744549	Snodgrass Slough
Open Water	Waters_P	Waters_P	10895.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.386782	Snodgrass Slough
Open Water	Waters_P	Waters_P	10896.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.292734	Snodgrass Slough
Open Water	Waters_P	Waters_P	10897.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.310445	Snodgrass Slough
Open Water	Waters_P	Waters_P	10899.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.234928	Snodgrass Slough
Open Water	Waters_P	Waters_P	10900.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.270164	Snodgrass Slough
Open Water	Waters_P	Waters_P	10901.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.081924	Snodgrass Slough
Open Water	Waters_P	Waters_P	10918.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.855259	Snodgrass Slough
Open Water	Waters_P	Waters_P	10919.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.632120	Snodgrass Slough
Open Water	Waters_P	Waters_P	10922.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.222851	Snodgrass Slough
Open Water	Waters_P	Waters_P	10923.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	0.163763	Snodgrass Slough
Open Water	Waters_P	Waters_P	10924.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-16.0	1.156510	Snodgrass Slough
Disturbed - Other Linear Feature	Waters_E	Waters_E	628.000000	No Impact	Major Roads	Vineyards	Class III	Class III	Class II	Very Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-2.0	-2.0	-16.0	1.111150	Sherman Lake-Sacramento River
Vineyards - Other Linear Feature	Waters_E	Waters_E	41535.000000	No Impact	Vineyards	Disturbed	Class II	Class II	Class III	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-16.0	0.174071	Sherman Lake-Sacramento River
High Density Development - Other Linear Feature	Waters_E	Waters_E	2255.000000	No Impact	Future Development	High Density Development	Class III	Class III	Class III	Very Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-15.0	0.290790	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5393.000000	No Impact	Future Development	Cropland	Class III	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-15.0	0.033396	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5587.000000	No Impact	Future Development	Cropland	Class III	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-15.0	0.051921	Snodgrass Slough
Disturbed - Other Linear Feature	Waters_E	Waters_E	609.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-15.0	0.056828	Lower Cosumnes River
High Density Development - Other Linear Feature	Waters_E	Waters_E	2245.000000	No Impact	Future Development	High Density Development	Class III	Class III	Class III	Very Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-15.0	0.000922	Lower Cosumnes River
High Density Development - Other Linear Feature	Waters_P	Waters_IP	2377.000000	No Impact	Future Development	Recreation/Landscaped	Class III	Class III	Class II	Very Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-2.0	-2.0	-14.0	0.057964	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	7943.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-15.0	0.917851	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	7953.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-15.0	0.264912	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	7963.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-15.0	0.970801	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	7972.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-15.0	0.877765	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	8138.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-15.0	0.091539	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	8141.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-15.0	0.162365	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	8147.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-15.0	0.267880	Sherman Lake-Sacramento River
Cropland - Other Linear Feature	Waters_E	Waters_E	291.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.539588	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	403.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.293224	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	414.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.088788	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	437.000000	No Impact	Major Roads	Cropland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.010593	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	463.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	1.021850	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4494.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.145719	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4498.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.074316	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4505.000000	No Impact	High Density Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.313126	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4523.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.086779	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4554.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.277191	Snodgrass Slough
Vineyards - Other Linear Feature	Waters_E	Waters_E	41517.000000	No Impact	Major Roads	Cropland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.001755	Snodgrass Slough
Vineyards - Other Linear Feature	Waters_E	Waters_E	41577.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Very Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-14.0	0.085486	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	89292.000000	Indirect Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	-1.0	-1.0	-13.0	0.059132	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89330.000000	Indirect Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	-1.0	-1.0	-13.0	0.020108	Morrison Creek
Open Water	Waters_P	Waters_P	11329.000000	No Impact	Future Development	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-13.0	0.776362	Morrison Creek
Open Water	Waters_P	Waters_P	11345.000000	No Impact	Future Development	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-13.0	2.070300	Morrison Creek
Swale	Waters_E	Waters_E	35301.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	-3.0	0.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-12.0	0.018001	American River
Open Water	Waters_P	Waters_P	10690.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-13.0	0.373668	Lower Dry Creek
Open Water	Waters_P	Waters_P	10697.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-13.0	0.711222	Lower Dry Creek
Major Roads - Other Linear Feature	Waters_E	Waters_E	11854.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Very Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-2.0	-2.0	-14.0	0.047157	Sherman Lake-Sacramento River
Mixed Riparian Woodland	Wetland	Riparian	9186.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Very Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-14.0	1.129820	Sherman Lake-Sacramento River
Cropland - Other Linear Feature	Waters_E	Waters_E	316.000000	No Impact	Future Development	Valley Grassland	Class II	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-2.0	-1.0	-13.0	1.088200	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5583.000000	No Impact	Future Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-13.0	0.338252	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5863.000000	No Impact	Future Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-13.0	0.320435	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36357.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-13.0	0.034828	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	7881.000000	No Impact	Major Roads	Not Mapped	Class I	Class III		Very Low	0.0	0.0	0.0	-3.0	-3.0	-

| | | |

Vernal Pool	Wetland	Wetlands_S	35589.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-10.0	0.036725	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8743.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-10.0	0.364354	Snodgrass Slough			
Mixed Riparian Woodland	Wetland	Riparian	8932.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-10.0	2.180280	Snodgrass Slough			
Mixed Riparian Woodland	Wetland	Riparian	8942.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-10.0	2.833460	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10881.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	4.605500	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10891.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	4.592890	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10972.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	253.217000	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2985.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.056405	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3038.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.213865	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3060.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.041994	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3067.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.095353	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3079.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.067242	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3154.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.049625	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3171.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	1.377480	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3200.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.080687	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3201.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.018481	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3238.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.033395	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3418.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.077834	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3506.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.034166	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3508.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.208288	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3535.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.227305	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3571.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-10.0	0.055756	Snodgrass Slough			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39276.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-10.0	0.029331	Snodgrass Slough			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39657.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-10.0	0.122620	Snodgrass Slough			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40086.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-10.0	0.000505	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10691.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.429188	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10692.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.505870	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10693.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.221301	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10694.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.173046	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10695.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.447533	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10700.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.164530	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10701.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.242575	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10770.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.588195	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10784.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.462195	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10785.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.158690	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10786.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.534230	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10787.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.844020	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10789.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.124610	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10792.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.155460	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10793.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	2.615390	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10794.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	2.615380	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10795.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	2.615380	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10796.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	2.615390	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10797.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	2.615380	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10798.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	2.154980	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10799.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.761180	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10800.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	2.615390	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10801.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.256796	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10802.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.272730	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10803.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.076930	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10807.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533570	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10808.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533560	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10810.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533570	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10811.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.533496	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10812.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.307484	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10813.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533560	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10816.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.091230	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10817.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533560	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10818.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	0.391880	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10819.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533570	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10821.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.160910	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10822.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533570	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10823.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.286810	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10825.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533570	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10826.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.286810	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10829.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.371040	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10830.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.286820	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10834.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.533570	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10836.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.194800	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10844.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.667270	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10845.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.674310	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10852.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.585310	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10854.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.453640	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10855.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.567260	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10856.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.567280	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10857.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.495830	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10858.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.426970	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10859.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.567280	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10860.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.567280	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10861.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.366370	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10862.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.380500	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10871.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.422430	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10872.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.436120	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10873.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.453550	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10874.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.441210	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10875.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.518800	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10876.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.545330	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10877.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.506740	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10878.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-10.0	1.545820	Lower Cosumnes River			
Ir	Waters_P	Waters_P	10940.000000	No Impact	Low Density Development	Low Density Development	Class

| | | |

Swale	Waters_E	Waters_E	32639.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.025228	Morrison Creek
Swale	Waters_E	Waters_E	32645.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.016096	Morrison Creek
Swale	Waters_E	Waters_E	32651.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.024517	Morrison Creek
Swale	Waters_E	Waters_E	32677.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.004830	Morrison Creek
Swale	Waters_E	Waters_E	32685.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.005058	Morrison Creek
Swale	Waters_E	Waters_E	32754.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.002912	Morrison Creek
Swale	Waters_E	Waters_E	32803.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.006914	Morrison Creek
Swale	Waters_E	Waters_E	32808.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.002017	Morrison Creek
Swale	Waters_E	Waters_E	32857.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.013184	Morrison Creek
Swale	Waters_E	Waters_E	32999.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.003603	Morrison Creek
Swale	Waters_E	Waters_E	33022.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.008262	Morrison Creek
Swale	Waters_E	Waters_E	33049.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.011225	Morrison Creek
Swale	Waters_E	Waters_E	33067.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.002948	Morrison Creek
Swale	Waters_E	Waters_E	33112.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.002992	Morrison Creek
Swale	Waters_E	Waters_E	33133.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.002386	Morrison Creek
Swale	Waters_E	Waters_E	33152.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.001675	Morrison Creek
Swale	Waters_E	Waters_E	33176.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.001261	Morrison Creek
Swale	Waters_E	Waters_E	33219.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.006509	Morrison Creek
Swale	Waters_E	Waters_E	33271.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.005576	Morrison Creek
Swale	Waters_E	Waters_E	33311.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.026445	Morrison Creek
Swale	Waters_E	Waters_E	33563.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.029500	Morrison Creek
Swale	Waters_E	Waters_E	33572.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.018114	Morrison Creek
Swale	Waters_E	Waters_E	34333.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.003223	Morrison Creek
Swale	Waters_E	Waters_E	34334.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.001192	Morrison Creek
Swale	Waters_E	Waters_E	34436.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.001272	Morrison Creek
Swale	Waters_E	Waters_E	34470.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.010359	Morrison Creek
Swale	Waters_E	Waters_E	34731.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.009403	Morrison Creek
Swale	Waters_E	Waters_E	34733.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.001788	Morrison Creek
Swale	Waters_E	Waters_E	34763.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.021831	Morrison Creek
Swale	Waters_E	Waters_E	34789.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.004231	Morrison Creek
Swale	Waters_E	Waters_E	34903.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-8.0	0.008796	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89351.000000	Indirect Impact	Disturbed	Mixed Riparian Scrub	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	-1.0	-1.0	-8.0	0.005977	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89364.000000	Indirect Impact	Disturbed	Mixed Riparian Scrub	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	-1.0	-1.0	-8.0	0.002585	Morrison Creek
Open Water	Waters_P	Waters_P	11172.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	-8.0	0.216499	Morrison Creek
Open Water	Waters_P	Waters_P	11185.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	-8.0	0.036106	Morrison Creek
Open Water	Waters_P	Waters_P	11224.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	-8.0	0.160331	Morrison Creek
Disturbed - Other Linear Feature	Waters_E	Waters_E	671.000000	No Impact	Disturbed	Cropland	Class III	Class III	Class II	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-2.0	-2.0	-10.0	0.128778	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8507.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-3.0	3.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.542207	Lower Mokelumne River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41440.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	-3.0	0.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.002014	American River
Freshwater Marsh	Wetland	Wetlands_P	932.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-8.0	0.054623	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7921.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-9.0	0.247814	Sherman Lake-Sacramento River
Mixed Riparian Scrub	Wetland	Riparian	8161.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-9.0	6.314490	Sherman Lake-Sacramento River
Mixed Riparian Woodland	Wetland	Riparian	8654.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-9.0	15.617000	Sherman Lake-Sacramento River
Mixed Riparian Woodland	Wetland	Riparian	41636.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-9.0	7.029400	Sherman Lake-Sacramento River
Cropland - Other Linear Feature	Waters_E	Waters_E	357.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	1.208950	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	388.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	1.179990	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	396.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	7.202810	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	451.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	2.219950	Snodgrass Slough
High Density Development - Other Linear Feature	Waters_E	Waters_E	2206.000000	No Impact	Cropland	High Density Development	Class III	Class II	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-8.0	0.103689	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4405.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.811309	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4460.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.784853	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4484.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.537385	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5241.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland - Other Linear Feature	Class III	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-8.0	0.001434	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5324.000000	No Impact	Vineyards	Vineyards - Other Linear Feature	Class III	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-8.0	0.074154	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5371.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland - Other Linear Feature	Class III	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-8.0	0.024178	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5649.000000	No Impact	Cropland	Cropland - Other Linear Feature	Class III	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-8.0	0.027560	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5769.000000	No Impact	Cropland	Cropland - Other Linear Feature	Class III	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-8.0	0.004531	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	7864.000000	No Impact	Major Roads	High Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	8.143860	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8287.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	2.655110	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9116.000000	No Impact	Future Development	Future Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	194.367000	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35740.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	1.0	1.0	-8.0	2.776790	Snodgrass Slough
Swale	Waters_E	Waters_E	19617.000000	No Impact	Major Roads	Disturbed	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.083505	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	354.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.209259	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	378.000000	No Impact	Major Roads	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.374799	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	465.000000	No Impact	Major Roads	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.706555	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_P	Waters_IP	355.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.485309	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4490.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.090324	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4498.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.000955	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4559.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-8.0	0.122001	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8938.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	4.370270	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8945.000000	No Impact	Major Roads	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	4.146840	Lower Cosumnes River
Recreation/Landscaped - Other Linear Feature	Waters_E	Waters_E	11586.000000	No Impact	Major Roads	Recreation/Landscaped	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-8.0	0.002749	Lower Cosumnes River
Swale	Waters_E	Waters_E	15723.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.014059	Lower Cosumnes River
Swale	Waters_E	Waters_E	16433.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.021645	Lower Cosumnes River
Swale	Waters_E	Waters_E	16461.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.026648	Lower Cosumnes River
Swale	Waters_E	Waters_E	16926.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.021124	Lower Cosumnes River
Swale	Waters_E	Waters_E	17138.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.039861	Lower Cosumnes River
Swale	Waters_E	Waters_E	17593.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.040464	Lower Cosumnes River
Swale	Waters_E	Waters_E	17721.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.046846	Lower Cosumnes River
Swale	Waters_E	Waters_E	17779.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.041382	Lower Cosumnes River
Swale	Waters_E	Waters_E	17820.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.009289	Lower Cosumnes River
Swale	Waters_E	Waters_E	17833.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.005522	Lower Cosumnes River
Swale	Waters_E	Waters_E	18719.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.041630	Lower Cosumnes River
Swale	Waters_E	Waters_E	19279.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.030252	Lower Cosumnes River
Swale	Waters_E	Waters_E	19322.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.018473	Lower Cosumnes River
Swale	Waters_E	Waters_E	20854.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-8.0	0.023933	Lower Cosumnes River
Swale	Waters_E	Waters_E	24819.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0

Vernal Pool	Wetland	Wetlands_S	95673.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-7.0	0.017762	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	96656.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-7.0	0.005089	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	96859.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-7.0	0.007321	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	96894.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-7.0	0.007992	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	97343.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-7.0	0.021567	Morrison Creek				
Mixed Riparian Scrub	Wetland	Riparian	8350.000000	No Impact	Future Development	Recreation/Landscaped	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.200471	Morrison Creek				
Mixed Riparian Woodland	Wetland	Riparian	41713.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.393342	Morrison Creek				
Open Water	Waters_P	Waters_P	11201.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-7.0	0.090703	Morrison Creek				
Open Water	Waters_P	Waters_P	11208.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-7.0	0.004622	Morrison Creek				
Open Water	Waters_P	Waters_P	11331.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-7.0	0.009190	Morrison Creek				
Open Water	Waters_P	Waters_P	11361.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-7.0	0.847921	Morrison Creek				
Open Water	Waters_P	Waters_P	11379.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-7.0	2.704180	Morrison Creek				
Open Water	Waters_P	Waters_P	11440.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-7.0	1.593070	Morrison Creek				
Open Water	Waters_P	Waters_P	11510.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-7.0	0.106881	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	3981.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.401117	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	3982.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	1.166590	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	3989.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.078325	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	3991.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.186712	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4002.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	1.437590	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4003.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.594526	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4042.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	1.059010	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4048.000000	No Impact	Future Development	Disturbed	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.995638	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4089.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	1.385680	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4105.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.086315	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4106.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.160911	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4117.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	1.121210	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4140.000000	No Impact	Future Development	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.964231	Morrison Creek				
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	40494.000000	No Impact	Future Development	Valley Grassland	Class I	Class I	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.006847	Morrison Creek				
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	40513.000000	No Impact	Future Development	Valley Grassland	Class I	Class I	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.101884	Morrison Creek				
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	40717.000000	No Impact	High Density Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.002587	Morrison Creek				
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	40744.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.000113	Morrison Creek				
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	41038.000000	No Impact	Low Density Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.000244	Morrison Creek				
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	41096.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.001620	Morrison Creek				
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	41151.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.0	0.080593	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4036.000000		Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	0.000194	Morrison Creek				
Streams/Creeks	Waters_P	Waters_IP	4036.000000		Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	1.324910	Morrison Creek				
Open Water	Waters_P	Waters_P	11165.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-9.0	0.036617	Deer Creek				
Open Water	Waters_P	Waters_P	11182.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	1.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-9.0	1.020000	Deer Creek				
Disturbed - Other Linear Feature	Waters_E	Waters_E	756.000000	No Impact	Disturbed	Blue Oak Woodland	Class III	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-2.0	-2.0	-2.0	-7.0	0.368467	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11019.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.390778	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11024.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.472866	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11026.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.206367	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11027.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.258765	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11028.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.287352	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11030.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.158023	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11031.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.148390	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11033.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.305413	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11037.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.156800	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11057.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.274893	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11059.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.286494	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11060.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.393701	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11064.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.630684	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11065.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.695690	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11068.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.602470	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11070.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.450739	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11071.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.443274	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11072.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.503308	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11074.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.455700	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11075.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.407668	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11077.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.610286	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11078.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.452171	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11079.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.564960	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11080.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.447424	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11081.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.385594	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11082.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.556009	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11083.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.410238	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11086.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.463027	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11089.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.488423	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11090.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.565595	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11091.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.519980	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11093.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.526511	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11094.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.497051	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11095.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.009680	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11096.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.504553	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11097.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.608180	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11098.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.402110	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11099.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.515683	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11100.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.532232	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11101.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.418180	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11102.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.537418	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11103.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.062210	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11105.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.409278	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11106.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.587968	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11107.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.527037	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11109.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.453545	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11110.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.520518	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11112.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.425092	Upper Cosumnes River				
Open Water	Waters_P	Waters_P	11113.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0

Open Water	Waters_P	Waters_P	11126.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.384484	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11127.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.721757	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11128.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.555345	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11129.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.705070	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11130.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.486524	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11132.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.537623	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11133.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.391793	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11134.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.605175	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11135.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.602788	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11136.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.317648	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11137.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.661760	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11138.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.614940	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11139.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.774128	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11142.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.707612	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11144.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.487480	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11148.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.615825	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11149.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.444562	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11151.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.459981	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11196.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.189144	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11209.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.023230	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11234.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	2.390300	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11249.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.796700	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11251.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.517147	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11286.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.376447	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11289.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	2.074590	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11332.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	2.232900	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11335.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	2.327840	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11339.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	2.511260	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11342.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	2.685630	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11348.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.171100	Upper Cosumnes River
Swale	Waters_E	Waters_E	35251.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	-3.0	0.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.410442	American River
Vernal Pool	Wetland	Wetlands_S	48830.000000	Indirect Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	-1.0	-1.0	-7.0	0.044898	Laguna
Disturbed - Other Linear Feature	Waters_P	Waters_IP	616.000000	No Impact	Future Development	Valley Grassland	Class III	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-2.0	-2.0	-2.0	-7.0	0.000001	Laguna
Open Water	Waters_P	Waters_P	10726.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.153809	Laguna
Open Water	Waters_P	Waters_P	10728.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.646640	Laguna
Open Water	Waters_P	Waters_P	10729.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.043980	Laguna
Open Water	Waters_P	Waters_P	10734.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	2.472310	Laguna
Open Water	Waters_P	Waters_P	10740.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.472944	Laguna
Open Water	Waters_P	Waters_P	10755.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.337649	Laguna
Open Water	Waters_P	Waters_P	10756.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.946284	Laguna
Open Water	Waters_P	Waters_P	10757.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.404512	Laguna
Open Water	Waters_P	Waters_P	10770.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.664473	Laguna
Open Water	Waters_P	Waters_P	10780.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.348688	Laguna
Open Water	Waters_P	Waters_P	10914.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.264796	Laguna
Open Water	Waters_P	Waters_P	10916.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.231066	Laguna
Open Water	Waters_P	Waters_P	10950.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.206191	Laguna
Open Water	Waters_P	Waters_P	10954.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.730605	Laguna
Open Water	Waters_P	Waters_P	10955.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.882804	Laguna
Open Water	Waters_P	Waters_P	11249.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	0.569100	Laguna
Open Water	Waters_P	Waters_P	11251.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-7.0	1.173690	Laguna
Mixed Riparian Scrub	Wetland	Riparian	7889.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.522157	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7924.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.242324	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8476.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	4.317030	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8517.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	1.043010	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8529.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.461110	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8557.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.783165	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8558.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.302516	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8720.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-7.0	0.643824	Lower Dry Creek
Stream/Creeks	Waters_P	Waters_IP	2693.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-7.0	1.136070	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8131.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-8.0	1.019370	Sherman Lake-Sacramento River
Mixed Riparian Woodland	Wetland	Riparian	8815.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-8.0	1.390030	Sherman Lake-Sacramento River
Cropland - Other Linear Feature	Waters_E	Waters_E	159.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	1.089780	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	293.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.059411	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	350.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.417840	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	368.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.049508	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	379.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.013237	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	412.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.205636	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	436.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.688222	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	467.000000	No Impact	Cropland	Vineyards	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.760965	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	493.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.008377	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	506.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.970415	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	513.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.842669	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	523.000000	No Impact	Mixed Riparian Woodland	Low Density Development	Class II	Class I	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-7.0	0.004438	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1429.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-7.0	0.588608	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4526.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.242210	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8196.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.458062	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36025.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-7.0	1.075260	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36593.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-7.0	1.611070	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36022.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.567562	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36034.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.153448	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36035.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.111406	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36036.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.663512	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36039.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.755917	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36067.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.109165	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36068.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.185489	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36118.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.668293	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36208.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.628248	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36269.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.284862	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36270.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.742523	Snodgrass Slough
I	Wetland	Wetlands_S	36275.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.975765	Snodgrass Slough
I	Wetland	Wetlands_S	36307.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low

Vineyards - Other Linear Feature	Waters_E	Waters_E	41566.000000	No Impact	Cropland	Vineyards	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.991383	Snodgrass Slough			
Mixed Riparian Scrub	Wetland	Riparian	8130.000000	No Impact	Major Roads	Not Mapped	Class I	Class III		Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-8.0	40.071400	Sherman Lake-Sacramento River			
Mixed Riparian Scrub	Wetland	Riparian	8205.000000	No Impact	Major Roads	Not Mapped	Class I	Class III		Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-8.0	33.814300	Sherman Lake-Sacramento River			
Mixed Riparian Woodland	Wetland	Riparian	9172.000000	No Impact	Major Roads	Not Mapped	Class I	Class III		Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-8.0	5.492100	Sherman Lake-Sacramento River			
Cropland - Other Linear Feature	Waters_E	Waters_E	393.000000	No Impact	Low Density Development	Valley Grassland	Class II	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-2.0	-1.0	-7.0	0.023091	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5082.000000	No Impact	Future Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-7.0	0.419551	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5834.000000	No Impact	Low Density Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-7.0	0.173745	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5846.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-7.0	0.341253	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5869.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-7.0	0.179074	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5879.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-7.0	0.386234	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5888.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-7.0	0.062942	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5936.000000	No Impact	Low Density Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-7.0	0.493282	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	41955.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.061451	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	41957.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004773	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	42018.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.001786	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	42019.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.001535	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	51482.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.019599	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	51504.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013471	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	51520.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.019831	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	51773.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.051208	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52688.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010080	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52700.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.050595	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52713.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.016169	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52715.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004895	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52716.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004406	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52722.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010537	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52732.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.008460	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52745.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.003083	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52751.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.002940	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52752.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004871	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52758.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.002660	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52761.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013944	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52762.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.009682	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52773.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011759	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52783.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.005021	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52784.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007370	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52798.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.008737	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52814.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011093	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52825.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007343	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	52828.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.006670	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53048.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011861	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53057.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.008720	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53224.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.033525	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53241.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.003957	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53253.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.020592	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53266.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.019863	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53283.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.047825	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53460.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.008742	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53467.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007847	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53929.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.012639	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	53946.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007485	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54232.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.029000	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54241.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.015259	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54244.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013935	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54267.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011751	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54299.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.070159	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54318.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013039	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54321.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013868	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54325.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011389	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54334.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004011	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54335.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.017858	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54336.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004181	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54338.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.014559	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54358.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010420	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54369.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007226	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54374.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.016432	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54411.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.028589	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54438.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.046381	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54455.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010940	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54462.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.005816	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54490.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010197	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54505.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013475	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54547.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.018377	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54556.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.015580	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54607.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007600	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54624.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011944	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54796.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.020294	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54879.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.002990	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54916.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.025023	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54944.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007098	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	54950.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.018814	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	55005.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.024042	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	55065.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.036266	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	55066.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.025704	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	55088.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004944	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	55246.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.012934	Lower Cosumnes River			
Vernal Pool	Wetland	Wetlands_S	55299.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0

Vernal Pool		Wetland	Wetlands_S	56834.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.003025	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56837.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.042516	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56854.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.068778	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56861.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.028660	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56862.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.021481	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56935.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.008514	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56950.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010298	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56989.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.015320	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56997.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.016209	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57150.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.006936	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57166.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.015910	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57230.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.049494	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57251.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011829	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	63568.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.045935	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	64738.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.014863	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	64781.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.003369	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	64834.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.001382	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	64866.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.015399	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	64886.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010028	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	64890.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.002460	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	64945.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.005353	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	65878.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.006508	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	68378.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004737	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	68419.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.029822	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	69199.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.003924	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	69603.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013135	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	69716.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.019680	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	69953.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007232	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	69988.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.005157	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	70012.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.022933	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	70134.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.045422	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	70531.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.005253	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	70806.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.031046	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	70922.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.017897	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	71241.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.014867	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	72296.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.006688	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	72772.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.001681	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	72784.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.001586	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	72954.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.007931	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75905.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.028902	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	76156.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010585	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35434.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.071333	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35477.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.033480	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35513.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.019738	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35514.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.027341	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35592.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.050311	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35641.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.026253	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36138.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011503	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36141.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.025424	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36145.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.021770	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36151.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.018655	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36158.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.018658	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36163.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.008034	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36170.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004704	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36182.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.040349	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36183.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.027070	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36188.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.022682	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36195.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.014301	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36211.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.023609	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36238.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.035195	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36242.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.048889	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36246.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.044229	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36261.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.055577	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36274.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.012528	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36278.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.038439	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36280.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011487	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36281.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.048400	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36282.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.002327	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36285.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.003770	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36287.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.038349	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36288.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.020886	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36297.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.050705	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36303.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.067995	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36312.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.032081	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36313.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.067236	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36321.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.035545	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36322.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.053038	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36326.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.059292	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36338.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.066039	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36339.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.017914	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36342.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.018109	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36345.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.034670	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36349.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.020895	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36353.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.022301	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36355.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.020153	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36367.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.071412	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36370.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.004696	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36373.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.042391	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36385.000000	No

Vernal Pool	Wetland	Wetlands_S	36474.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.061321	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36483.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.050421	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36494.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.039754	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36506.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.060399	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36519.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.031214	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36578.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.043249	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36598.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010466	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36612.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.022662	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36646.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.021478	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36651.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.011956	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36661.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.071017	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36663.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.063994	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36668.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.046105	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36669.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.054201	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36673.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.020993	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36676.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013242	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36681.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.055474	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36713.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.071890	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36722.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.009412	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36723.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.029585	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36733.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.057040	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36734.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.051734	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36735.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.035365	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36741.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.010003	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36745.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.008297	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36790.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.065290	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36823.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.063228	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36831.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.017972	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36835.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.023310	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36878.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.009035	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36879.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.026576	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36939.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.061417	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36992.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-7.0	0.013483	Lower Cosumnes River
Major Roads - Other Linear Feature	Waters_E	Waters_E	11854.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-2.0	-2.0	-6.0	0.005194	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8296.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.002595	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8298.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.000383	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8302.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.014483	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8308.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.001476	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8312.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.707888	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8316.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.023226	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8321.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.066730	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8323.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.348751	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8327.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.207940	Morrison Creek
Mixed Riparian Woodland	Waters_E	Waters_E	9116.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.001163	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9104.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.243032	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9124.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.300865	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9127.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.083637	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9136.000000	No Impact	Future Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.363513	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9178.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.295422	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9182.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.045299	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9205.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.007180	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9208.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.401750	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9212.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.047580	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9268.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.323400	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9276.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.183888	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9349.000000	No Impact	Disturbed	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.208988	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9351.000000	No Impact	Disturbed	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.298590	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9365.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.250048	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9388.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.300158	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	41714.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.364730	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	41715.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.661710	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	813.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.014799	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	821.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.053851	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	828.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.300040	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	834.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.167257	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	835.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.140435	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	841.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.036152	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	843.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.204455	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	846.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.014326	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	847.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.043975	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	849.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.023071	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	851.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.150393	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	869.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.071379	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	872.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.090413	Morrison Creek
Swale	Waters_E	Waters_E	30831.000000	No Impact	Future Development	Open Water	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.014467	Morrison Creek
Swale	Waters_E	Waters_E	31281.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.012802	Morrison Creek
Swale	Waters_E	Waters_E	31368.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.004157	Morrison Creek
Swale	Waters_E	Waters_E	31427.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.026366	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40807.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.003483	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41000.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.000596	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41012.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.037174	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41105.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.017165	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41312.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.023789	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41314.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.210326	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41316.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.074103	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41391.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-6.0	0.065834	Morrison Creek
Disturbed - Other Linear Feature	Waters_E	Waters_E	772.000000	No Impact	Disturbed	Disturbed	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-8.0	2.223190	Deer Creek
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6369.000000	No Impact	Low Density Development	Cropland	Class III	Class III	Class II	Low	0.0	0.0

Low Density Development - Other Linear Feature	Waters_E	Waters_E	5480.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class III	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-6.0	0.042305	Laguna			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39151.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-6.0	0.013620	Laguna			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39152.000000	No Impact	Major Roads	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-6.0	0.009103	Laguna			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39265.000000	No Impact	Major Roads	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-6.0	0.009192	Laguna			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39408.000000	No Impact	Major Roads	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-6.0	0.014093	Laguna			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39410.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-6.0	0.062868	Laguna			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40304.000000	No Impact	High Density Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-6.0	0.125978	Laguna			
Major Roads - Other Linear Feature	Waters_E	Waters_E	11854.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-2.0	-2.0	-6.0	0.020000	Lower Dry Creek			
Mixed Riparian Scrub	Wetland	Riparian	7862.000000	No Impact	Future Development	Mixed Riparian Woodland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.252610	Lower Dry Creek			
Mixed Riparian Scrub	Wetland	Riparian	7863.000000	No Impact	Future Development	Mixed Riparian Woodland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.514520	Lower Dry Creek			
Mixed Riparian Scrub	Wetland	Riparian	7866.000000	No Impact	Future Development	Mixed Riparian Woodland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.640840	Lower Dry Creek			
Mixed Riparian Scrub	Wetland	Riparian	7879.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.793647	Lower Dry Creek			
Mixed Riparian Scrub	Wetland	Riparian	7882.000000	No Impact	Future Development	Mixed Riparian Woodland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.239607	Lower Dry Creek			
Mixed Riparian Scrub	Wetland	Riparian	7915.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.091910	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8458.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.193170	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8482.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	4.314850	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8486.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.373915	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8493.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	2.094150	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8502.000000	No Impact	Future Development	Mixed Riparian Scrub	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.236668	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8509.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	2.777380	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8518.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	1.895980	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8559.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-6.0	0.397044	Lower Dry Creek			
Cropland - Other Linear Feature	Waters_E	Waters_E	438.000000	No Impact	Cropland	Valley Grassland	Class II	Class I	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	-6.0	0.022233	Snodgrass Slough			
Freshwater Marsh	Wetland	Wetlands_P	1281.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	-6.0	0.792325	Snodgrass Slough			
Freshwater Marsh	Wetland	Wetlands_P	1431.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	-6.0	0.003168	Snodgrass Slough			
Freshwater Marsh	Wetland	Wetlands_P	1453.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	-6.0	0.453797	Snodgrass Slough			
Freshwater Marsh	Wetland	Wetlands_P	1783.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	-6.0	2.269370	Snodgrass Slough			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5578.000000	No Impact	Cropland	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0	0.185781	Snodgrass Slough			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5662.000000	No Impact	Vineyards	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0	0.159624	Snodgrass Slough			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5684.000000	No Impact	Cropland	Low Density Development	Class III	Class II	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0	0.157769	Snodgrass Slough			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5771.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class III	Class II	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0	0.214708	Snodgrass Slough			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5977.000000	No Impact	Cropland	Low Density Development	Class III	Class II	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0	0.200893	Snodgrass Slough			
Seasonal Wetlands	Wetland	Wetlands_S	36565.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	1.0	1.0	-6.0	2.957460	Snodgrass Slough			
Seasonal Wetlands	Wetland	Wetlands_S	36628.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	-6.0	28.446600	Snodgrass Slough			
Streams/Creeks	Waters_E	Waters_E	3490.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.005517	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2959.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.499753	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2990.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.262463	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2997.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.543448	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3005.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.157919	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3024.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.560278	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3027.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.137600	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3046.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.125282	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3093.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.097754	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3117.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	1.317570	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3119.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.358150	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3163.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.281402	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3168.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.943356	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3179.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.916964	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3180.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.168460	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3190.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.270938	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3195.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.262585	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3198.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.581566	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3215.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.047715	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3226.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.359285	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3249.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.682325	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3253.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.398221	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3255.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.347707	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3275.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	1.507950	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3276.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.070950	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3330.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.239451	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3331.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.534124	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3346.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	1.281750	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3352.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	1.507280	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3358.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.788357	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3364.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.326349	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3380.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.425351	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3388.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.275714	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3389.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.000196	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3390.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.708891	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3391.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.004618	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3392.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.007054	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3415.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	1.549400	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3420.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.940105	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3423.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.368868	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3428.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.040310	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3430.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.518391	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3433.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.343228	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3435.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.609591	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3448.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.499872	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3449.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.469969	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3452.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	1.533100	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3460.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.523088	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3500.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.447702	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3544.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.012254	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3550.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-6.0	0.147849	Snodgrass Slough			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	4932.000000	No Impact	Cropland	Low Density Development	Class III	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0	0.047033	Lower Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5380.000000	No Impact	Cropland	Low Density Development	Class III	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0

Mixed Riparian Woodland	Wetland	Riparian	9211.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	1.014820	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9260.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.660235	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9282.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.691839	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9450.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.027141	Morrison Creek
Swale	Waters_E	Waters_E	28749.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.013089	Morrison Creek
Swale	Waters_E	Waters_E	28979.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.027687	Morrison Creek
Swale	Waters_E	Waters_E	29118.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.024626	Morrison Creek
Swale	Waters_E	Waters_E	29260.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.001578	Morrison Creek
Swale	Waters_E	Waters_E	29391.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.011819	Morrison Creek
Swale	Waters_E	Waters_E	29601.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.031735	Morrison Creek
Swale	Waters_E	Waters_E	29607.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.032707	Morrison Creek
Swale	Waters_E	Waters_E	29632.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.046019	Morrison Creek
Swale	Waters_E	Waters_E	29660.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.011939	Morrison Creek
Swale	Waters_E	Waters_E	29665.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.043629	Morrison Creek
Swale	Waters_E	Waters_E	29880.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.222728	Morrison Creek
Swale	Waters_E	Waters_E	30105.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.029161	Morrison Creek
Swale	Waters_E	Waters_E	30187.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.003162	Morrison Creek
Swale	Waters_E	Waters_E	30276.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.011880	Morrison Creek
Swale	Waters_E	Waters_E	30277.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.006671	Morrison Creek
Swale	Waters_E	Waters_E	30303.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.001247	Morrison Creek
Swale	Waters_E	Waters_E	30352.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.027020	Morrison Creek
Swale	Waters_E	Waters_E	30362.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.020930	Morrison Creek
Swale	Waters_E	Waters_E	30370.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.008094	Morrison Creek
Swale	Waters_E	Waters_E	30372.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.033749	Morrison Creek
Swale	Waters_E	Waters_E	30373.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000583	Morrison Creek
Swale	Waters_E	Waters_E	30569.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.008766	Morrison Creek
Swale	Waters_E	Waters_E	30604.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.003609	Morrison Creek
Swale	Waters_E	Waters_E	30607.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.005898	Morrison Creek
Swale	Waters_E	Waters_E	30658.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.025836	Morrison Creek
Swale	Waters_E	Waters_E	30763.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.046348	Morrison Creek
Swale	Waters_E	Waters_E	30772.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.003226	Morrison Creek
Swale	Waters_E	Waters_E	30776.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.035014	Morrison Creek
Swale	Waters_E	Waters_E	30781.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.019705	Morrison Creek
Swale	Waters_E	Waters_E	30812.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.009878	Morrison Creek
Swale	Waters_E	Waters_E	30860.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.022552	Morrison Creek
Swale	Waters_E	Waters_E	30863.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.005225	Morrison Creek
Swale	Waters_E	Waters_E	30873.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.024059	Morrison Creek
Swale	Waters_E	Waters_E	30879.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.028061	Morrison Creek
Swale	Waters_E	Waters_E	30920.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.033766	Morrison Creek
Swale	Waters_E	Waters_E	30980.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.007209	Morrison Creek
Swale	Waters_E	Waters_E	31080.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.035515	Morrison Creek
Swale	Waters_E	Waters_E	31091.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.010469	Morrison Creek
Swale	Waters_E	Waters_E	31094.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.033428	Morrison Creek
Swale	Waters_E	Waters_E	31102.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.047143	Morrison Creek
Swale	Waters_E	Waters_E	31111.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.043813	Morrison Creek
Swale	Waters_E	Waters_E	31126.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.004706	Morrison Creek
Swale	Waters_E	Waters_E	31155.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.021218	Morrison Creek
Swale	Waters_E	Waters_E	31169.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.009777	Morrison Creek
Swale	Waters_E	Waters_E	31182.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.009726	Morrison Creek
Swale	Waters_E	Waters_E	31194.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.003887	Morrison Creek
Swale	Waters_E	Waters_E	31247.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.019864	Morrison Creek
Swale	Waters_E	Waters_E	31260.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000092	Morrison Creek
Swale	Waters_E	Waters_E	31318.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.018885	Morrison Creek
Swale	Waters_E	Waters_E	31362.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.017829	Morrison Creek
Swale	Waters_E	Waters_E	31392.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000000	Morrison Creek
Swale	Waters_E	Waters_E	31397.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.002587	Morrison Creek
Swale	Waters_E	Waters_E	31403.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.008446	Morrison Creek
Swale	Waters_E	Waters_E	31405.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.015566	Morrison Creek
Swale	Waters_E	Waters_E	31415.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.012666	Morrison Creek
Swale	Waters_E	Waters_E	31433.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.034779	Morrison Creek
Swale	Waters_E	Waters_E	31499.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.007027	Morrison Creek
Swale	Waters_E	Waters_E	31501.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.016426	Morrison Creek
Swale	Waters_E	Waters_E	31632.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.009397	Morrison Creek
Swale	Waters_E	Waters_E	31643.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.027847	Morrison Creek
Swale	Waters_E	Waters_E	31656.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.046838	Morrison Creek
Swale	Waters_E	Waters_E	31685.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.001182	Morrison Creek
Swale	Waters_E	Waters_E	31686.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.012271	Morrison Creek
Swale	Waters_E	Waters_E	31691.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.004742	Morrison Creek
Swale	Waters_E	Waters_E	31707.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.043600	Morrison Creek
Swale	Waters_E	Waters_E	31713.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.010290	Morrison Creek
Swale	Waters_E	Waters_E	31754.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.015839	Morrison Creek
Swale	Waters_E	Waters_E	31771.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.038302	Morrison Creek
Swale	Waters_E	Waters_E	31890.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.003649	Morrison Creek
Swale	Waters_E	Waters_E	31954.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.015229	Morrison Creek
Swale	Waters_E	Waters_E	32001.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.004259	Morrison Creek
Swale	Waters_E	Waters_E	32065.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000116	Morrison Creek
Swale	Waters_E	Waters_E	32066.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.008767	Morrison Creek
Swale	Waters_E	Waters_E	32069.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.010571	Morrison Creek
Swale	Waters_E	Waters_E	32089.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.043470	Morrison Creek
Swale	Waters_E	Waters_E	32121.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000611	Morrison Creek
Swale	Waters_E	Waters_E	32169.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.004720	Morrison Creek
Swale	Waters_E	Waters_E	32217.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.006346	Morrison Creek
Swale	Waters_E	Waters_E	32243.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.013823	Morrison Creek
Swale	Waters_E	Waters_E	32297.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.042752	Morrison Creek
Swale	Waters_E	Waters_E	32317.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.027094	Morrison Creek
Swale	Waters_E	Waters_E	32318.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.012279	Morrison Creek
Swale	Waters_E	Waters_E	32323.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.014857	Morrison Creek
Swale	Waters_E	Waters_E	32339.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0

Swale	Waters_E	Waters_E	32629.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.025409	Morrison Creek
Swale	Waters_E	Waters_E	32648.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.040586	Morrison Creek
Swale	Waters_E	Waters_E	32664.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.020728	Morrison Creek
Swale	Waters_E	Waters_E	32692.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.005041	Morrison Creek
Swale	Waters_E	Waters_E	32694.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.017815	Morrison Creek
Swale	Waters_E	Waters_E	32794.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000249	Morrison Creek
Swale	Waters_E	Waters_E	32831.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.021638	Morrison Creek
Swale	Waters_E	Waters_E	33004.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.019535	Morrison Creek
Swale	Waters_E	Waters_E	33006.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.005958	Morrison Creek
Swale	Waters_E	Waters_E	33099.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.004589	Morrison Creek
Swale	Waters_E	Waters_E	33105.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.002016	Morrison Creek
Swale	Waters_E	Waters_E	33123.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.011365	Morrison Creek
Swale	Waters_E	Waters_E	33181.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.019335	Morrison Creek
Swale	Waters_E	Waters_E	33210.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.005908	Morrison Creek
Swale	Waters_E	Waters_E	33345.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.019289	Morrison Creek
Swale	Waters_E	Waters_E	33462.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000957	Morrison Creek
Swale	Waters_E	Waters_E	33471.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.010924	Morrison Creek
Swale	Waters_E	Waters_E	33536.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.012429	Morrison Creek
Swale	Waters_E	Waters_E	33539.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.015368	Morrison Creek
Swale	Waters_E	Waters_E	33596.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.003835	Morrison Creek
Swale	Waters_E	Waters_E	33621.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.038758	Morrison Creek
Swale	Waters_E	Waters_E	33753.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.027922	Morrison Creek
Swale	Waters_E	Waters_E	33760.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.002011	Morrison Creek
Swale	Waters_E	Waters_E	33762.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.001450	Morrison Creek
Swale	Waters_E	Waters_E	33765.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.024907	Morrison Creek
Swale	Waters_E	Waters_E	33768.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.002203	Morrison Creek
Swale	Waters_E	Waters_E	33783.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.022601	Morrison Creek
Swale	Waters_E	Waters_E	33832.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.004319	Morrison Creek
Swale	Waters_E	Waters_E	33906.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.017324	Morrison Creek
Swale	Waters_E	Waters_E	33915.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.016595	Morrison Creek
Swale	Waters_E	Waters_E	34080.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.005654	Morrison Creek
Swale	Waters_E	Waters_E	34121.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.046256	Morrison Creek
Swale	Waters_E	Waters_E	34179.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.029634	Morrison Creek
Swale	Waters_E	Waters_E	34259.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.033216	Morrison Creek
Swale	Waters_E	Waters_E	34330.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.047786	Morrison Creek
Swale	Waters_E	Waters_E	34369.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.002325	Morrison Creek
Swale	Waters_E	Waters_E	34468.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.019128	Morrison Creek
Swale	Waters_E	Waters_E	34740.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.036577	Morrison Creek
Swale	Waters_E	Waters_E	34783.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.015472	Morrison Creek
Swale	Waters_E	Waters_E	34900.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.000136	Morrison Creek
Swale	Waters_E	Waters_E	34910.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.001922	Morrison Creek
Swale	Waters_E	Waters_E	34911.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-5.0	0.045170	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91211.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-5.0	0.026114	Morrison Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	497.000000	No Impact	Disturbed	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.108932	Deer Creek
Cropland - Other Linear Feature	Waters_P	Waters_IP	497.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-7.0	0.119709	Deer Creek
Mixed Riparian Scrub	Wetland	Riparian	8242.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.226944	Deer Creek
Mixed Riparian Scrub	Wetland	Riparian	8243.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.685531	Deer Creek
Mixed Riparian Scrub	Wetland	Riparian	8245.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.961101	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9016.000000	No Impact	Major Roads	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.363007	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9017.000000	No Impact	Major Roads	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.047323	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9027.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	1.720250	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9312.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.700441	Deer Creek
Swale	Waters_E	Waters_E	29959.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-7.0	0.010836	Deer Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	481.000000	No Impact	Low Density Development	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.045805	Upper Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4609.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.157992	Upper Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4697.000000	No Impact	Low Density Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.021895	Upper Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4699.000000	No Impact	Low Density Development	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.019913	Upper Cosumnes River
Mine Tailings - Other Linear Feature	Waters_E	Waters_E	9525.000000	No Impact	Irrigated Pasture-Grassland	Mine Tailings	Class III	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-5.0	0.009097	Upper Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	41708.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	1.286592	Upper Cosumnes River
Swale	Waters_E	Waters_E	24870.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.003076	Upper Cosumnes River
Swale	Waters_E	Waters_E	24886.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.026122	Upper Cosumnes River
Swale	Waters_E	Waters_E	24890.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.009065	Upper Cosumnes River
Swale	Waters_E	Waters_E	25027.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.023273	Upper Cosumnes River
Swale	Waters_E	Waters_E	25674.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.009822	Upper Cosumnes River
Swale	Waters_E	Waters_E	25696.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.040995	Upper Cosumnes River
Swale	Waters_E	Waters_E	25699.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.022803	Upper Cosumnes River
Swale	Waters_E	Waters_E	26287.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.014014	Upper Cosumnes River
Swale	Waters_E	Waters_E	26312.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.042090	Upper Cosumnes River
Swale	Waters_E	Waters_E	26464.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.030906	Upper Cosumnes River
Swale	Waters_E	Waters_E	26551.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.017162	Upper Cosumnes River
Swale	Waters_E	Waters_E	27484.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.010387	Upper Cosumnes River
Swale	Waters_E	Waters_E	27743.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.015525	Upper Cosumnes River
Swale	Waters_E	Waters_E	31035.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.047323	Upper Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8470.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-5.0	5.488770	Lower Mokelumne River
Mixed Riparian Woodland	Wetland	Riparian	8601.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-5.0	7.879560	Lower Mokelumne River
Mixed Riparian Woodland	Wetland	Riparian	8619.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-5.0	153.169000	Lower Mokelumne River
Streams/Creeks	Waters_P	Waters_IP	2774.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-3.0	3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-5.0	1.729360	Lower Mokelumne River
Open Water	Waters_P	Waters_P	11529.000000	No Impact	Seasonal Wetlands	Seasonal Wetlands	Class I	Class I	Class I	Low	0.0	0.0	0.0	-3.0	0.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	-4.0	2.020920	American River
Open Water	Waters_P	Waters_P	11530.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Low	0.0	0.0	0.0	-3.0	0.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	-4.0	0.152958	American River
Cropland - Other Linear Feature	Waters_E	Waters_E	299.000000	No Impact	Future Development	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.033359	Laguna
Cropland - Other Linear Feature	Waters_E	Waters_E	322.000000	No Impact	Major Roads	Cropland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.376102	Laguna
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4391.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.009031	Laguna
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4514.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.236723	Laguna
Mixed Riparian Scrub	Wetland	Riparian	7991.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.557666	Laguna
Mixed Riparian Scrub	Wetland	Riparian	7999.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.631694	Laguna
Mixed Riparian Woodland	Waters_P	Waters_IP	8691.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.000505	Laguna
Mixed Riparian Woodland	Waters_P	Waters_IP	8700.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.001091	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8661.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	1.352486	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8670.000000	No Impact	Future Development	Disturbed	Class I	Class III

Swale	Waters_E	Waters_E	13067.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.012333	Laguna			
Swale	Waters_E	Waters_E	13134.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.046891	Laguna			
Swale	Waters_E	Waters_E	13174.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.037082	Laguna			
Swale	Waters_E	Waters_E	13522.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.018859	Laguna			
Swale	Waters_E	Waters_E	13814.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.014947	Laguna			
Swale	Waters_E	Waters_E	14299.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.026224	Laguna			
Swale	Waters_E	Waters_E	14830.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.019162	Laguna			
Swale	Waters_E	Waters_E	15539.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.017814	Laguna			
Swale	Waters_E	Waters_E	15553.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.017488	Laguna			
Swale	Waters_E	Waters_E	15666.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.010823	Laguna			
Swale	Waters_E	Waters_E	16142.000000	No Impact	Low Density Development - Other Linear Feature	Low Density Development - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	0.030808	Laguna			
Vineyards - Other Linear Feature	Waters_E	Waters_E	41567.000000	No Impact	Future Development	Vineyards	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.778556	Laguna			
Vineyards - Other Linear Feature	Waters_E	Waters_E	41574.000000	No Impact	Major Roads	Vineyards	Class II	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	0.653497	Laguna			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	4839.000000	No Impact	Valley Grassland	Low Density Development	Class III	Class I	Class III	Low	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-5.0	0.035102	Lower Dry Creek			
Mixed Riparian Woodland	Wetland	Riparian	8553.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-5.0	14.973500	Lower Dry Creek			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38789.000000	No Impact	Vineyards	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-5.0	0.209557	Lower Dry Creek			
Vernal Pool	Wetland	Wetlands_S	35557.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-5.0	0.033076	Lower Dry Creek			
Vineyards - Other Linear Feature	Waters_E	Waters_E	41542.000000	No Impact	Major Roads	Vineyards	Class II	Class III	Class II	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-5.0	4.903990	Lower Dry Creek			
Cropland - Other Linear Feature	Waters_E	Waters_E	261.000000	No Impact	Cropland	Orchards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-6.0	1.478310	Sherman Lake-Sacramento River			
Orchards - Other Linear Feature	Waters_E	Waters_E	10579.000000	No Impact	Cropland	Orchards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-6.0	0.332173	Sherman Lake-Sacramento River			
Orchards - Other Linear Feature	Waters_E	Waters_E	10585.000000	No Impact	Cropland	Orchards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-6.0	0.275007	Sherman Lake-Sacramento River			
Orchards - Other Linear Feature	Waters_E	Waters_E	10610.000000	No Impact	Cropland	Orchards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-6.0	0.206869	Sherman Lake-Sacramento River			
Orchards - Other Linear Feature	Waters_E	Waters_E	10611.000000	No Impact	Cropland	Orchards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-6.0	0.314603	Sherman Lake-Sacramento River			
Vineyards - Other Linear Feature	Waters_E	Waters_E	41507.000000	No Impact	Cropland	Vineyards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-6.0	3.104570	Sherman Lake-Sacramento River			
Vineyards - Other Linear Feature	Waters_E	Waters_E	41563.000000	No Impact	Cropland	Vineyards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-6.0	2.867270	Sherman Lake-Sacramento River			
Freshwater Marsh	Wetland	Wetlands_P	1094.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-5.0	6.188250	Snodgrass Slough			
Freshwater Marsh	Wetland	Wetlands_P	1204.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-5.0	8.845640	Snodgrass Slough			
Freshwater Marsh	Wetland	Wetlands_P	1319.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-5.0	2.526700	Snodgrass Slough			
Freshwater Marsh	Wetland	Wetlands_P	1523.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-5.0	6.795200	Snodgrass Slough			
Open Water	Waters_E	Waters_E	10928.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-5.0	0.000550	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10879.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-5.0	0.229008	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10906.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-5.0	1.613440	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10928.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-5.0	0.440307	Snodgrass Slough			
Open Water	Waters_P	Waters_P	10946.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-5.0	0.768504	Snodgrass Slough			
Open Water	Waters_P	Waters_P	11055.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-5.0	0.723834	Snodgrass Slough			
Open Water	Waters_P	Waters_P	11117.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	-5.0	39.328400	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2853.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-5.0	0.277222	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2855.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-5.0	0.473884	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2879.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-5.0	0.025547	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	2954.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-5.0	0.301878	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3167.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-5.0	0.564292	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3798.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-5.0	0.479735	Snodgrass Slough			
Streams/Creeks	Waters_P	Waters_IP	3798.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-5.0	0.119533	Snodgrass Slough			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39295.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	0.0	0.0	-5.0	0.659862	Snodgrass Slough			
Vineyards - Other Linear Feature	Waters_E	Waters_E	41544.000000	No Impact	Vineyards	Major Roads	Class II	Class II	Class III	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-5.0	12.416200	Snodgrass Slough			
Swale	Waters_E	Waters_E	23994.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-5.0	0.004137	Lower Cosumnes River			
Cropland - Other Linear Feature	Waters_E	Waters_E	245.000000	No Impact	Cropland	Low Density Development	Class II	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-5.0	0.260443	Lower Cosumnes River			
Cropland - Other Linear Feature	Waters_E	Waters_E	319.000000	No Impact	Cropland	Low Density Development	Class II	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-5.0	0.057623	Lower Cosumnes River			
Cropland - Other Linear Feature	Waters_E	Waters_E	362.000000	No Impact	Cropland	Low Density Development	Class II	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-5.0	0.116343	Lower Cosumnes River			
Freshwater Marsh	Wetland	Wetlands_P	1095.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-5.0	0.027564	Lower Cosumnes River			
Freshwater Marsh	Wetland	Wetlands_P	1320.000000	No Impact	Major Roads	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-5.0	1.461470	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10772.000000	No Impact	High Density Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	-5.0	0.634573	Lower Cosumnes River			
Open Water	Waters_P	Waters_P	10843.000000	No Impact	High Density Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	-5.0	0.736744	Lower Cosumnes River			
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39576.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	0.0	0.0	-5.0	0.003680	Lower Cosumnes River			
Swale	Waters_E	Waters_E	28786.000000	Indirect Impact	Future Development	Recreation/Landscaped	Class I	Class III	Class II	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-1.0	-1.0	-4.0	0.090390	Morrison Creek			
Cropland - Other Linear Feature	Waters_E	Waters_E	523.000000	No Impact	Mixed Riparian Woodland	Low Density Development	Class II	Class I	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	-4.0	0.058070	Morrison Creek			
Freshwater Marsh	Wetland	Wetlands_P	2067.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-4.0	0.539667	Morrison Creek			
Seasonal Wetlands	Wetland	Wetlands_S	37470.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	1.295140	Morrison Creek			
Seasonal Wetlands	Wetland	Wetlands_S	37502.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	2.991820	Morrison Creek			
Seasonal Wetlands	Wetland	Wetlands_S	37582.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	2.669940	Morrison Creek			
Seasonal Wetlands	Wetland	Wetlands_S	37660.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	1.107680	Morrison Creek			
Seasonal Wetlands	Wetland	Wetlands_S	37692.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	4.010090	Morrison Creek			
Swale	Waters_E	Waters_E	31264.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-4.0	0.004963	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	86873.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.042231	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	87771.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.015228	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	94427.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.033834	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	94838.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.016964	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	95409.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.006204	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	96929.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.063461	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	97313.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.001665	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	97348.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.014623	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	97455.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.007474	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	97625.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.059753	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	98634.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-4.0	0.032041	Morrison Creek			
Cropland - Other Linear Feature	Waters_E	Waters_E	478.000000	No Impact	Future Development	Valley Grassland	Class II	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-2.0	-1.0	-6.0	0.645531	Deer Creek			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7488.000000	No Impact	Low Density Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-6.0	0.319707	Deer Creek			
Vernal Pool	Wetland	Wetlands_S	91283.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-6.0	0.041322	Deer Creek			
Vernal Pool	Wetland	Wetlands_S	91721.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-6.0	0.037469	Deer Creek			
Vernal Pool	Wetland	Wetlands_S	91773.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-6.0	0.047833	Deer Creek			
Vernal Pool	Wetland	Wetlands_S	91774.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-6.0	0.006815	Deer Creek			
Vernal Pool	Wetland	Wetlands_S	91805.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-6.0	0.068760	Deer Creek			
Vernal Pool	Wetland	Wetlands_S	36548.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-6.0	0.026719	Deer Creek			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6527.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-4.0	0.059524	Upper Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6587.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-4.0	0.037487	Upper Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6626.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-4.0	0.057365	Upper Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7065.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-4.0	0.031105	Upper Cosumnes River			
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7119.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.

Vernal Pool		Wetland	Wetlands_S	74942.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.045204	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	74979.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.036526	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75375.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004697	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75593.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027891	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75634.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006151	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75679.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.028581	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75742.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014918	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	76779.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011105	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	78404.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014891	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	78740.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004696	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	78798.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013419	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	78809.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025790	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	79662.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004295	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	79697.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007097	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	81133.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017059	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	83404.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009307	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	84757.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012427	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	84869.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025056	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	84946.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.021034	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	84998.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.030907	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85035.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006361	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85042.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.002915	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85052.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.001705	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85062.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003603	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85085.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003575	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85095.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.001707	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85270.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014730	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85306.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026386	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	85325.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.018538	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	87429.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005786	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	89158.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.034581	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	90647.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.039573	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36860.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.042837	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36943.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026744	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36951.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.032185	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36957.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025988	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36958.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.064381	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36965.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.032822	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36992.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007290	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36999.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.048760	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37003.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017566	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37070.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.056121	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37071.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.038613	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37172.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.037441	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37195.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017141	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37209.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.024569	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37215.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.052576	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37390.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005376	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37391.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007401	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37393.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.016626	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37394.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015626	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37395.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019955	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37406.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.021946	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37415.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.046426	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37442.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.067677	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37489.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.055911	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37496.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.061723	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37614.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015762	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37617.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.020039	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37630.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025644	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37664.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004694	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37668.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017814	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37671.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.064511	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37677.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014373	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37686.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.029297	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37689.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019104	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37705.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.002180	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37707.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014985	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37709.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004111	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37716.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003325	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37752.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007743	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37755.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011399	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37756.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006040	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37780.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019180	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37783.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003864	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37791.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005048	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37804.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014672	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37820.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014543	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37829.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025545	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37853.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015537	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37864.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015333	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37881.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025681	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37885.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027069	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37888.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.028968	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37889.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019909	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37890.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.070257	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37896.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.062991	Upper Cosumnes River
Vernal Pool		Wetland	Wetlands_S	37902.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-

Vernal Pool	Wetland	Wetlands_S	37929.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013721	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37931.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012536	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37936.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.029649	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37937.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017543	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37943.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013950	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37950.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.036898	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37953.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026689	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37958.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.044461	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37982.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005744	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37983.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011057	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37985.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007095	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37992.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.050182	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38010.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010158	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38028.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003711	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38034.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007820	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38035.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010529	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38110.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.028410	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38113.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.056603	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38114.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.038234	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38151.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.062275	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38158.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015922	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38242.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.060508	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38317.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006530	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38324.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025940	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38325.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.018046	Upper Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7891.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-3.0	3.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	-4.0	1.354800	Lower Mokelumne River
Mixed Riparian Woodland	Wetland	Riparian	8583.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-3.0	3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-4.0	0.554465	Lower Mokelumne River
Mixed Riparian Woodland	Wetland	Riparian	8585.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-3.0	3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-4.0	6.775220	Lower Mokelumne River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5196.000000	No Impact	Major Roads	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-4.0	0.214983	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5311.000000	No Impact	Future Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-4.0	0.203818	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5345.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-4.0	0.084108	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5407.000000	No Impact	Future Development	Low Density Development	Class III	Class III	Class III	Low	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-4.0	0.668841	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5753.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-4.0	0.063265	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5922.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-4.0	0.012990	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9598.000000	No Impact	Mine Tailings	Seasonal Wetlands	Class II	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-4.0	0.120159	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9600.000000	No Impact	Mine Tailings	Seasonal Wetlands	Class II	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-4.0	0.144627	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9602.000000	No Impact	Mine Tailings	Seasonal Wetlands	Class II	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-4.0	0.154192	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9607.000000	No Impact	Mine Tailings	Seasonal Wetlands	Class II	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-4.0	2.465260	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9660.000000	No Impact	Mine Tailings	Seasonal Wetlands	Class II	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-4.0	0.645156	Laguna
Vernal Pool	Waters_E	Waters_E	56016.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.000342	Laguna
Vernal Pool	Wetland	Wetlands_S	42121.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025433	Laguna
Vernal Pool	Wetland	Wetlands_S	42396.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013178	Laguna
Vernal Pool	Wetland	Wetlands_S	42418.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013570	Laguna
Vernal Pool	Wetland	Wetlands_S	42654.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013492	Laguna
Vernal Pool	Wetland	Wetlands_S	42701.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.069481	Laguna
Vernal Pool	Wetland	Wetlands_S	42753.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.036723	Laguna
Vernal Pool	Wetland	Wetlands_S	42780.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.060753	Laguna
Vernal Pool	Wetland	Wetlands_S	42826.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019096	Laguna
Vernal Pool	Wetland	Wetlands_S	43274.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013776	Laguna
Vernal Pool	Wetland	Wetlands_S	43352.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.016595	Laguna
Vernal Pool	Wetland	Wetlands_S	43851.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012937	Laguna
Vernal Pool	Wetland	Wetlands_S	43870.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006900	Laguna
Vernal Pool	Wetland	Wetlands_S	43976.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.002177	Laguna
Vernal Pool	Wetland	Wetlands_S	43983.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.018996	Laguna
Vernal Pool	Wetland	Wetlands_S	44011.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.053693	Laguna
Vernal Pool	Wetland	Wetlands_S	44024.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.028601	Laguna
Vernal Pool	Wetland	Wetlands_S	44026.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.068775	Laguna
Vernal Pool	Wetland	Wetlands_S	44050.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009015	Laguna
Vernal Pool	Wetland	Wetlands_S	44090.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005278	Laguna
Vernal Pool	Wetland	Wetlands_S	44250.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005970	Laguna
Vernal Pool	Wetland	Wetlands_S	44260.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025150	Laguna
Vernal Pool	Wetland	Wetlands_S	44280.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003481	Laguna
Vernal Pool	Wetland	Wetlands_S	44284.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006580	Laguna
Vernal Pool	Wetland	Wetlands_S	44299.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.001792	Laguna
Vernal Pool	Wetland	Wetlands_S	44301.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013048	Laguna
Vernal Pool	Wetland	Wetlands_S	44304.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010210	Laguna
Vernal Pool	Wetland	Wetlands_S	44307.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010983	Laguna
Vernal Pool	Wetland	Wetlands_S	44314.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008867	Laguna
Vernal Pool	Wetland	Wetlands_S	44317.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.016346	Laguna
Vernal Pool	Wetland	Wetlands_S	44319.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.021166	Laguna
Vernal Pool	Wetland	Wetlands_S	44341.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008787	Laguna
Vernal Pool	Wetland	Wetlands_S	44344.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010357	Laguna
Vernal Pool	Wetland	Wetlands_S	44358.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011741	Laguna
Vernal Pool	Wetland	Wetlands_S	44370.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008376	Laguna
Vernal Pool	Wetland	Wetlands_S	44375.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.036910	Laguna
Vernal Pool	Wetland	Wetlands_S	44385.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005562	Laguna
Vernal Pool	Wetland	Wetlands_S	44398.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008906	Laguna
Vernal Pool	Wetland	Wetlands_S	44405.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015055	Laguna
Vernal Pool	Wetland	Wetlands_S	44426.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005078	Laguna
Vernal Pool	Wetland	Wetlands_S	44441.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012742	Laguna
Vernal Pool	Wetland	Wetlands_S	44445.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014356	Laguna
Vernal Pool	Wetland	Wetlands_S	44457.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003916	Laguna
Vernal Pool	Wetland	Wetlands_S	44458.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.018403	Laguna
Vernal Pool	Wetland	Wetlands_S	44468.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.022520	Laguna
Vernal Pool	Wetland	Wetlands_S	44490.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009398	Laguna
Vernal Pool	Wetland	Wetlands_S	44504.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019508	Laguna
Vernal Pool	Wetland	Wetlands_S	44510.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.020374	Laguna
Vernal Pool	Wetland	Wetlands_S	44551.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014873	Laguna
Vernal Pool	Wetland	Wetlands_S	44612.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.021843	Laguna
[illegible]	Wetland	Wetlands_S	44682.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.

Vernal Pool		Wetland	Wetlands_S	45916.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.034211	Laguna
Vernal Pool		Wetland	Wetlands_S	45922.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.029021	Laguna
Vernal Pool		Wetland	Wetlands_S	46009.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027926	Laguna
Vernal Pool		Wetland	Wetlands_S	46133.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.021504	Laguna
Vernal Pool		Wetland	Wetlands_S	46369.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009869	Laguna
Vernal Pool		Wetland	Wetlands_S	46438.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011139	Laguna
Vernal Pool		Wetland	Wetlands_S	46475.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.033793	Laguna
Vernal Pool		Wetland	Wetlands_S	46526.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007159	Laguna
Vernal Pool		Wetland	Wetlands_S	46859.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008285	Laguna
Vernal Pool		Wetland	Wetlands_S	47362.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.048680	Laguna
Vernal Pool		Wetland	Wetlands_S	47456.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.056667	Laguna
Vernal Pool		Wetland	Wetlands_S	47527.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013865	Laguna
Vernal Pool		Wetland	Wetlands_S	47530.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004131	Laguna
Vernal Pool		Wetland	Wetlands_S	47585.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.023713	Laguna
Vernal Pool		Wetland	Wetlands_S	47612.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017989	Laguna
Vernal Pool		Wetland	Wetlands_S	47623.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014292	Laguna
Vernal Pool		Wetland	Wetlands_S	47664.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003696	Laguna
Vernal Pool		Wetland	Wetlands_S	47691.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012222	Laguna
Vernal Pool		Wetland	Wetlands_S	49501.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006867	Laguna
Vernal Pool		Wetland	Wetlands_S	49591.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027662	Laguna
Vernal Pool		Wetland	Wetlands_S	49808.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.020767	Laguna
Vernal Pool		Wetland	Wetlands_S	49865.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.045542	Laguna
Vernal Pool		Wetland	Wetlands_S	49877.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007225	Laguna
Vernal Pool		Wetland	Wetlands_S	49917.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008451	Laguna
Vernal Pool		Wetland	Wetlands_S	50024.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.046075	Laguna
Vernal Pool		Wetland	Wetlands_S	50121.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013806	Laguna
Vernal Pool		Wetland	Wetlands_S	50262.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.053716	Laguna
Vernal Pool		Wetland	Wetlands_S	50270.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.022094	Laguna
Vernal Pool		Wetland	Wetlands_S	50271.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005123	Laguna
Vernal Pool		Wetland	Wetlands_S	50274.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.002059	Laguna
Vernal Pool		Wetland	Wetlands_S	50283.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014024	Laguna
Vernal Pool		Wetland	Wetlands_S	50299.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.059203	Laguna
Vernal Pool		Wetland	Wetlands_S	50307.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014702	Laguna
Vernal Pool		Wetland	Wetlands_S	50342.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.016179	Laguna
Vernal Pool		Wetland	Wetlands_S	50404.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.034150	Laguna
Vernal Pool		Wetland	Wetlands_S	50454.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.066246	Laguna
Vernal Pool		Wetland	Wetlands_S	50480.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004259	Laguna
Vernal Pool		Wetland	Wetlands_S	50490.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004251	Laguna
Vernal Pool		Wetland	Wetlands_S	50502.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004654	Laguna
Vernal Pool		Wetland	Wetlands_S	50527.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.036987	Laguna
Vernal Pool		Wetland	Wetlands_S	50535.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.032018	Laguna
Vernal Pool		Wetland	Wetlands_S	50630.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.044404	Laguna
Vernal Pool		Wetland	Wetlands_S	50631.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.059123	Laguna
Vernal Pool		Wetland	Wetlands_S	50637.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025566	Laguna
Vernal Pool		Wetland	Wetlands_S	50671.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015056	Laguna
Vernal Pool		Wetland	Wetlands_S	50682.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019003	Laguna
Vernal Pool		Wetland	Wetlands_S	50683.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.039052	Laguna
Vernal Pool		Wetland	Wetlands_S	50742.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014903	Laguna
Vernal Pool		Wetland	Wetlands_S	50758.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007839	Laguna
Vernal Pool		Wetland	Wetlands_S	51151.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007812	Laguna
Vernal Pool		Wetland	Wetlands_S	51191.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011955	Laguna
Vernal Pool		Wetland	Wetlands_S	51200.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011253	Laguna
Vernal Pool		Wetland	Wetlands_S	51215.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.020421	Laguna
Vernal Pool		Wetland	Wetlands_S	51236.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008712	Laguna
Vernal Pool		Wetland	Wetlands_S	51250.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005597	Laguna
Vernal Pool		Wetland	Wetlands_S	51446.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.032615	Laguna
Vernal Pool		Wetland	Wetlands_S	51661.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007203	Laguna
Vernal Pool		Wetland	Wetlands_S	51668.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017020	Laguna
Vernal Pool		Wetland	Wetlands_S	51916.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008666	Laguna
Vernal Pool		Wetland	Wetlands_S	51927.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008222	Laguna
Vernal Pool		Wetland	Wetlands_S	51953.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.022960	Laguna
Vernal Pool		Wetland	Wetlands_S	51973.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013943	Laguna
Vernal Pool		Wetland	Wetlands_S	51981.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.020052	Laguna
Vernal Pool		Wetland	Wetlands_S	51990.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.033101	Laguna
Vernal Pool		Wetland	Wetlands_S	52010.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007549	Laguna
Vernal Pool		Wetland	Wetlands_S	52022.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014080	Laguna
Vernal Pool		Wetland	Wetlands_S	52025.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.042334	Laguna
Vernal Pool		Wetland	Wetlands_S	52047.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025610	Laguna
Vernal Pool		Wetland	Wetlands_S	52050.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.032391	Laguna
Vernal Pool		Wetland	Wetlands_S	52053.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.033550	Laguna
Vernal Pool		Wetland	Wetlands_S	52131.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012645	Laguna
Vernal Pool		Wetland	Wetlands_S	52149.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.052108	Laguna
Vernal Pool		Wetland	Wetlands_S	52284.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006083	Laguna
Vernal Pool		Wetland	Wetlands_S	52739.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009452	Laguna
Vernal Pool		Wetland	Wetlands_S	52791.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.024219	Laguna
Vernal Pool		Wetland	Wetlands_S	52844.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.021212	Laguna
Vernal Pool		Wetland	Wetlands_S	52848.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011089	Laguna
Vernal Pool		Wetland	Wetlands_S	52850.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019304	Laguna
Vernal Pool		Wetland	Wetlands_S	52851.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026207	Laguna
Vernal Pool		Wetland	Wetlands_S	53658.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.038849	Laguna
Vernal Pool		Wetland	Wetlands_S	53678.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.020988	Laguna
Vernal Pool		Wetland	Wetlands_S	53705.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012272	Laguna
Vernal Pool		Wetland	Wetlands_S	56016.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.001380	Laguna
Vernal Pool		Wetland	Wetlands_S	75659.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006810	Laguna
Vernal Pool		Wetland	Wetlands_S	75667.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009997	Laguna
Vernal Pool		Wetland	Wetlands_S	75673.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004317	Laguna
Vernal Pool		Wetland	Wetlands_S	75687.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010433	Laguna
Vernal Pool		Wetland	Wetlands_S	75778.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.002575	Laguna
Vernal Pool		Wetland	Wetlands_S	76310.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006770	Laguna
Vernal Pool		Wetland	Wetlands_S	76316.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007983	Laguna
Vernal Pool		Wetland	Wetlands_S	79191.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015405	Laguna
Vernal Pool		Wetland	Wetlands_S	79246.000000	No Impact	Low Density

Vernal Pool		Wetland	Wetlands_S	82605.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004513	Laguna
Vernal Pool		Wetland	Wetlands_S	82616.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005530	Laguna
Vernal Pool		Wetland	Wetlands_S	83213.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.018233	Laguna
Vernal Pool		Wetland	Wetlands_S	83436.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.023363	Laguna
Vernal Pool		Wetland	Wetlands_S	83438.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027880	Laguna
Vernal Pool		Wetland	Wetlands_S	83459.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009302	Laguna
Vernal Pool		Wetland	Wetlands_S	83496.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013455	Laguna
Vernal Pool		Wetland	Wetlands_S	83508.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013717	Laguna
Vernal Pool		Wetland	Wetlands_S	83525.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011574	Laguna
Vernal Pool		Wetland	Wetlands_S	83549.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005980	Laguna
Vernal Pool		Wetland	Wetlands_S	83556.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011535	Laguna
Vernal Pool		Wetland	Wetlands_S	83661.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004140	Laguna
Vernal Pool		Wetland	Wetlands_S	83716.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013042	Laguna
Vernal Pool		Wetland	Wetlands_S	83738.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.029226	Laguna
Vernal Pool		Wetland	Wetlands_S	83778.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009267	Laguna
Vernal Pool		Wetland	Wetlands_S	83816.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019286	Laguna
Vernal Pool		Wetland	Wetlands_S	84287.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.041534	Laguna
Vernal Pool		Wetland	Wetlands_S	84432.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007599	Laguna
Vernal Pool		Wetland	Wetlands_S	84599.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005980	Laguna
Vernal Pool		Wetland	Wetlands_S	84605.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019843	Laguna
Vernal Pool		Wetland	Wetlands_S	85780.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011450	Laguna
Vernal Pool		Wetland	Wetlands_S	85805.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013269	Laguna
Vernal Pool		Wetland	Wetlands_S	35723.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.066152	Laguna
Vernal Pool		Wetland	Wetlands_S	35754.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.060796	Laguna
Vernal Pool		Wetland	Wetlands_S	35828.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026478	Laguna
Vernal Pool		Wetland	Wetlands_S	35836.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004127	Laguna
Vernal Pool		Wetland	Wetlands_S	35837.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005394	Laguna
Vernal Pool		Wetland	Wetlands_S	35840.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013676	Laguna
Vernal Pool		Wetland	Wetlands_S	35849.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.032743	Laguna
Vernal Pool		Wetland	Wetlands_S	35860.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.048497	Laguna
Vernal Pool		Wetland	Wetlands_S	35865.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.032331	Laguna
Vernal Pool		Wetland	Wetlands_S	35871.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.050646	Laguna
Vernal Pool		Wetland	Wetlands_S	35876.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009473	Laguna
Vernal Pool		Wetland	Wetlands_S	35878.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.054706	Laguna
Vernal Pool		Wetland	Wetlands_S	35879.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.033623	Laguna
Vernal Pool		Wetland	Wetlands_S	35880.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.057511	Laguna
Vernal Pool		Wetland	Wetlands_S	35881.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015820	Laguna
Vernal Pool		Wetland	Wetlands_S	35882.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.041339	Laguna
Vernal Pool		Wetland	Wetlands_S	35884.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.048674	Laguna
Vernal Pool		Wetland	Wetlands_S	35886.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.038840	Laguna
Vernal Pool		Wetland	Wetlands_S	35888.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.054300	Laguna
Vernal Pool		Wetland	Wetlands_S	35889.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026226	Laguna
Vernal Pool		Wetland	Wetlands_S	35893.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.068434	Laguna
Vernal Pool		Wetland	Wetlands_S	35895.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.064650	Laguna
Vernal Pool		Wetland	Wetlands_S	35899.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015146	Laguna
Vernal Pool		Wetland	Wetlands_S	35902.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026016	Laguna
Vernal Pool		Wetland	Wetlands_S	35904.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.043540	Laguna
Vernal Pool		Wetland	Wetlands_S	35905.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.057069	Laguna
Vernal Pool		Wetland	Wetlands_S	35907.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.046567	Laguna
Vernal Pool		Wetland	Wetlands_S	35908.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.063713	Laguna
Vernal Pool		Wetland	Wetlands_S	35909.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.041828	Laguna
Vernal Pool		Wetland	Wetlands_S	35910.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.060157	Laguna
Vernal Pool		Wetland	Wetlands_S	35913.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.031327	Laguna
Vernal Pool		Wetland	Wetlands_S	35914.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.052566	Laguna
Vernal Pool		Wetland	Wetlands_S	35920.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025036	Laguna
Vernal Pool		Wetland	Wetlands_S	35925.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010760	Laguna
Vernal Pool		Wetland	Wetlands_S	35926.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.053007	Laguna
Vernal Pool		Wetland	Wetlands_S	35928.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.041190	Laguna
Vernal Pool		Wetland	Wetlands_S	35930.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.059613	Laguna
Vernal Pool		Wetland	Wetlands_S	35932.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.043335	Laguna
Vernal Pool		Wetland	Wetlands_S	35940.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027796	Laguna
Vernal Pool		Wetland	Wetlands_S	35946.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.050727	Laguna
Vernal Pool		Wetland	Wetlands_S	35950.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.043444	Laguna
Vernal Pool		Wetland	Wetlands_S	35952.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.024379	Laguna
Vernal Pool		Wetland	Wetlands_S	35959.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.017180	Laguna
Vernal Pool		Wetland	Wetlands_S	35963.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.042588	Laguna
Vernal Pool		Wetland	Wetlands_S	35975.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.018294	Laguna
Vernal Pool		Wetland	Wetlands_S	35977.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.052582	Laguna
Vernal Pool		Wetland	Wetlands_S	35995.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.021997	Laguna
Vernal Pool		Wetland	Wetlands_S	36027.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.037375	Laguna
Vernal Pool		Wetland	Wetlands_S	36052.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.041989	Laguna
Vernal Pool		Wetland	Wetlands_S	36061.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.035179	Laguna
Vernal Pool		Wetland	Wetlands_S	36070.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.061525	Laguna
Vernal Pool		Wetland	Wetlands_S	36072.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.050956	Laguna
Vernal Pool		Wetland	Wetlands_S	36079.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008440	Laguna
Vernal Pool		Wetland	Wetlands_S	36089.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.010986	Laguna
Vernal Pool		Wetland	Wetlands_S	36094.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007982	Laguna
Vernal Pool		Wetland	Wetlands_S	36097.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.059411	Laguna
Vernal Pool		Wetland	Wetlands_S	36098.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.044317	Laguna
Vernal Pool		Wetland	Wetlands_S	36100.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026748	Laguna
Vernal Pool		Wetland	Wetlands_S	36104.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.052683	Laguna
Vernal Pool		Wetland	Wetlands_S	36106.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.029031	Laguna
Vernal Pool		Wetland	Wetlands_S	36107.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.057936	Laguna
Vernal Pool		Wetland	Wetlands_S	36108.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.039147	Laguna
Vernal Pool		Wetland	Wetlands_S	36112.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.016532	Laguna
Vernal Pool		Wetland	Wetlands_S	36114.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.059615	Laguna
Vernal Pool		Wetland	Wetlands_S	36117.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.035431	Laguna
Vernal Pool		Wetland	Wetlands_S	36124.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.063980	Laguna
Vernal Pool		Wetland	Wetlands_S	36126.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.047002	Laguna
Vernal Pool		Wetland	Wetlands_S	36219.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.045454	Laguna
Vernal Pool		Wetland	Wetlands_S	36226.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.009349	Laguna
Vernal Pool		Wetland	Wetlands_S	36230.000

Vernal Pool	Wetland	Wetlands_S	36332.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027507	Laguna
Vernal Pool	Wetland	Wetlands_S	36346.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006783	Laguna
Vernal Pool	Wetland	Wetlands_S	36843.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015571	Laguna
Vernal Pool	Wetland	Wetlands_S	37174.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.048243	Laguna
Vernal Pool	Wetland	Wetlands_S	37193.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.047891	Laguna
Vernal Pool	Wetland	Wetlands_S	37349.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.033534	Laguna
Vernal Pool	Wetland	Wetlands_S	37352.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006015	Laguna
Vernal Pool	Wetland	Wetlands_S	37360.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012385	Laguna
Vernal Pool	Wetland	Wetlands_S	37371.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.070133	Laguna
Vernal Pool	Wetland	Wetlands_S	37379.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.039017	Laguna
Vernal Pool	Wetland	Wetlands_S	37410.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004626	Laguna
Vernal Pool	Wetland	Wetlands_S	37426.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.030557	Laguna
Vernal Pool	Wetland	Wetlands_S	37429.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013400	Laguna
Vernal Pool	Wetland	Wetlands_S	37430.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.022697	Laguna
Vernal Pool	Wetland	Wetlands_S	37432.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008396	Laguna
Vernal Pool	Wetland	Wetlands_S	37436.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013915	Laguna
Vernal Pool	Wetland	Wetlands_S	37443.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006184	Laguna
Vernal Pool	Wetland	Wetlands_S	37447.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012111	Laguna
Vernal Pool	Wetland	Wetlands_S	37467.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.026520	Laguna
Vernal Pool	Wetland	Wetlands_S	37479.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.018210	Laguna
Vernal Pool	Wetland	Wetlands_S	37481.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.013050	Laguna
Vernal Pool	Wetland	Wetlands_S	37487.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.037346	Laguna
Vernal Pool	Wetland	Wetlands_S	37491.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.027102	Laguna
Vernal Pool	Wetland	Wetlands_S	37493.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.030428	Laguna
Vernal Pool	Wetland	Wetlands_S	37507.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.015721	Laguna
Vernal Pool	Wetland	Wetlands_S	37528.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.025222	Laguna
Vernal Pool	Wetland	Wetlands_S	37530.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.036396	Laguna
Vernal Pool	Wetland	Wetlands_S	37550.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005728	Laguna
Vernal Pool	Wetland	Wetlands_S	37554.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.012696	Laguna
Vernal Pool	Wetland	Wetlands_S	37557.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006918	Laguna
Vernal Pool	Wetland	Wetlands_S	37603.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.002541	Laguna
Vernal Pool	Wetland	Wetlands_S	37605.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006568	Laguna
Vernal Pool	Wetland	Wetlands_S	37620.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003273	Laguna
Vernal Pool	Wetland	Wetlands_S	37625.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.003249	Laguna
Vernal Pool	Wetland	Wetlands_S	37629.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004317	Laguna
Vernal Pool	Wetland	Wetlands_S	37634.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.011379	Laguna
Vernal Pool	Wetland	Wetlands_S	37648.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004972	Laguna
Vernal Pool	Wetland	Wetlands_S	37650.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004134	Laguna
Vernal Pool	Wetland	Wetlands_S	37652.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.014066	Laguna
Vernal Pool	Wetland	Wetlands_S	37653.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006625	Laguna
Vernal Pool	Wetland	Wetlands_S	37654.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004329	Laguna
Vernal Pool	Wetland	Wetlands_S	37659.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.004226	Laguna
Vernal Pool	Wetland	Wetlands_S	37667.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.006442	Laguna
Vernal Pool	Wetland	Wetlands_S	37702.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.029047	Laguna
Vernal Pool	Wetland	Wetlands_S	37892.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.048904	Laguna
Vernal Pool	Wetland	Wetlands_S	37895.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.019093	Laguna
Vernal Pool	Wetland	Wetlands_S	37903.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.007194	Laguna
Vernal Pool	Wetland	Wetlands_S	37906.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.008397	Laguna
Vernal Pool	Wetland	Wetlands_S	37914.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.044664	Laguna
Vernal Pool	Wetland	Wetlands_S	37932.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.030277	Laguna
Vernal Pool	Wetland	Wetlands_S	37962.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.016409	Laguna
Vernal Pool	Wetland	Wetlands_S	37963.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.067462	Laguna
Vernal Pool	Wetland	Wetlands_S	37969.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.060105	Laguna
Vernal Pool	Wetland	Wetlands_S	37976.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.037454	Laguna
Vernal Pool	Wetland	Wetlands_S	101413.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.035218	Laguna
Vernal Pool	Wetland	Wetlands_S	78681.000000		Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.005952	Laguna
Vernal Pool	Wetland	Wetlands_S	79455.000000		Mine Tailings	Mine Tailings	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.066524	Laguna
Cropland - Other Linear Feature	Waters_E	Waters_E	155.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.030377	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	163.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.778049	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	196.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.150602	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	224.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.133510	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	225.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.279697	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	228.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.348053	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	232.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.139094	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	233.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.106534	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	255.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.573643	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	311.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.145115	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	933.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-4.0	0.144999	Lower Dry Creek
Seasonal Wetlands	Wetland	Wetlands_S	35422.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	1.191220	Lower Dry Creek
Seasonal Wetlands	Wetland	Wetlands_S	35429.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	2.105500	Lower Dry Creek
Seasonal Wetlands	Wetland	Wetlands_S	35482.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-4.0	0.987667	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35474.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.898130	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35489.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.137382	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35493.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.146733	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35495.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.077415	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35562.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.208434	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35581.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.111742	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35612.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.088493	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35615.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-4.0	0.183534	Lower Dry Creek
Vineyards - Other Linear Feature	Waters_E	Waters_E	41499.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	1.110860	Lower Dry Creek
Vineyards - Other Linear Feature	Waters_E	Waters_E	41506.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.203962	Lower Dry Creek
Vineyards - Other Linear Feature	Waters_E	Waters_E	41520.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	1.098290	Lower Dry Creek
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4426.000000		Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.047413	Lower Dry Creek
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4439.000000		Vineyards - Other Linear Feature	Vineyards - Other Linear Feature	Class II	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-4.0	0.224175	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	3037.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-5.0	2.735230	Sherman Lake-Sacramento River
Streams/Creeks	Waters_P	Waters_IP	3039.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	-5.0	12.832400	Sherman Lake-Sacramento River
Freshwater Marsh	Wetland	Wetlands_P	1239.000000	No Impact	Cropland	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-4.0	1.792740	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	7921.000000	No Impact	Major Roads	Orchards	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-4.0	2.823880	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8133.000000	No Impact	Major Roads	Vineyards	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-4.0	9.309110	Snodgrass Slough
rian Scrub	Wetland	Riparian	8165.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0

| | | |

| | | |

Open Water	Waters_P	Waters_P	10806.000000	No Impact	Cropland	Orchards	Class I	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-4.0	9.203230	Sherman Lake-Sacramento River
Streams/Creeks	Waters_P	Waters_IP	2825.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-4.0	0.005215	Sherman Lake-Sacramento River
Streams/Creeks	Waters_P	Waters_IP	3083.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	-4.0	1.515450	Sherman Lake-Sacramento River
Streams/Creeks	Waters_P	Waters_IP	3893.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	-4.0	2.671660	Sherman Lake-Sacramento River
Cropland - Other Linear Feature	Waters_E	Waters_E	389.000000	No Impact	Valley Grassland	Cropland	Class II	Class I	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-3.0	0.005057	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	7988.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	34.957800	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8029.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	16.973500	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8131.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	9.028670	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8156.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	-3.0	1.636470	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8192.000000	No Impact	Cropland	Orchards	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	-3.0	1.792840	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8211.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	6.685510	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8261.000000	No Impact	Future Development	Mixed Riparian Woodland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	18.866800	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8585.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	30.887400	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8589.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	8.998830	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8627.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	16.276100	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8655.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	68.400200	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8815.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	60.080100	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8892.000000	No Impact	Major Roads	Open Water	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	73.703800	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3049.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	1.204270	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3072.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.323792	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3151.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.075377	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3164.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.096811	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3196.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.181368	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3199.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.062428	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3328.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.570275	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3382.000000	No Impact	Cropland	Disturbed	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.081690	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3384.000000	No Impact	Cropland	Disturbed	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.057062	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3386.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	1.002960	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3408.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.353158	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3455.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.434271	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3483.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.289463	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3492.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.100166	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3494.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.089205	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3505.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.230447	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3512.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	1.265440	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3704.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-3.0	0.773072	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39067.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.103229	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39214.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.095714	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39603.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.019146	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8205.000000	No Impact	Major Roads	Not Mapped	Class I	Class III		Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.554408	Snodgrass Slough
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5687.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class III	Class II	Class II	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-3.0	0.577885	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5720.000000	No Impact	Major Roads	Cropland	Class III	Class III	Class II	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	-3.0	0.140866	Lower Cosumnes River
Major Roads - Other Linear Feature	Waters_E	Waters_E	11854.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-2.0	-2.0	-3.0	1.330370	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7874.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	1.138660	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7875.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.122600	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7877.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.525187	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7986.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	1.425920	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8224.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.215718	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8562.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.834315	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8570.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.455200	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8581.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.828631	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8624.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.046070	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8749.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.014121	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8751.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.007234	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8752.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	1.050970	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8758.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.125664	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8759.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.541392	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8760.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	3.772360	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8917.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.895220	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8939.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	4.699570	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8940.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	3.098100	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8941.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.695128	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8943.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.427460	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8946.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.011776	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8950.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.174763	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8952.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.001315	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8973.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	4.089340	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	41681.000000	No Impact	Major Roads	Freshwater Marsh	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.432793	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10722.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	-3.0	1.458190	Lower Cosumnes River
Swale	Waters_E	Waters_E	16202.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.030498	Lower Cosumnes River
Swale	Waters_E	Waters_E	16206.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.002551	Lower Cosumnes River
Swale	Waters_E	Waters_E	16432.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.010609	Lower Cosumnes River
Swale	Waters_E	Waters_E	16804.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.007737	Lower Cosumnes River
Swale	Waters_E	Waters_E	16818.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.003078	Lower Cosumnes River
Swale	Waters_E	Waters_E	16936.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.019469	Lower Cosumnes River
Swale	Waters_E	Waters_E	16944.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.004286	Lower Cosumnes River
Swale	Waters_E	Waters_E	16945.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.006918	Lower Cosumnes River
Swale	Waters_E	Waters_E	17002.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.002872	Lower Cosumnes River
Swale	Waters_E	Waters_E	17006.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.026168	Lower Cosumnes River
Swale	Waters_E	Waters_E	17070.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.017860	Lower Cosumnes River
Swale	Waters_E	Waters_E	17271.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.006106	Lower Cosumnes River
Swale	Waters_E	Waters_E	17284.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.006314	Lower Cosumnes River
Swale	Waters_E	Waters_E	17614.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.009386	Lower Cosumnes River
Swale	Waters_E	Waters_E	17662.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.033745	Lower Cosumnes River
Swale	Waters_E	Waters_E	17687.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.009712	Lower Cosumnes River
Swale	Waters_E	Waters_E	17695.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.002363	Lower Cosumnes River
Swale	Waters_E	Waters_E	17698.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.003350	Lower Cosumnes River
Swale	Waters_E	Waters_E	17732.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.016338	Lower Cosumnes River
Swale	Waters_E

Swale	Waters_E	Waters_E	24117.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.006875	Lower Cosumnes River
Swale	Waters_E	Waters_E	24566.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.036131	Lower Cosumnes River
Swale	Waters_E	Waters_E	24612.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-3.0	0.012898	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39377.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.025296	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39483.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.326164	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39502.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.057014	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36284.000000	No Impact	Major Roads	Vineyards	Class I	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	-3.0	0.044169	Lower Cosumnes River
Swale	Waters_E	Waters_E	28778.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.076817	Morrison Creek
Swale	Waters_E	Waters_E	28826.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.157415	Morrison Creek
Swale	Waters_E	Waters_E	28840.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.176661	Morrison Creek
Swale	Waters_E	Waters_E	29171.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.302638	Morrison Creek
Swale	Waters_E	Waters_E	29323.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.122727	Morrison Creek
Swale	Waters_E	Waters_E	29471.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.055764	Morrison Creek
Swale	Waters_E	Waters_E	30110.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.504173	Morrison Creek
Swale	Waters_E	Waters_E	30254.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.273410	Morrison Creek
Swale	Waters_E	Waters_E	30266.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.070102	Morrison Creek
Swale	Waters_E	Waters_E	30271.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.516793	Morrison Creek
Swale	Waters_E	Waters_E	30750.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.062415	Morrison Creek
Swale	Waters_E	Waters_E	30882.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.061346	Morrison Creek
Swale	Waters_E	Waters_E	30907.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.048387	Morrison Creek
Swale	Waters_E	Waters_E	30958.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.094764	Morrison Creek
Swale	Waters_E	Waters_E	30965.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.915162	Morrison Creek
Swale	Waters_E	Waters_E	30995.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.131320	Morrison Creek
Swale	Waters_E	Waters_E	31068.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.200168	Morrison Creek
Swale	Waters_E	Waters_E	31079.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.156814	Morrison Creek
Swale	Waters_E	Waters_E	31081.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.076780	Morrison Creek
Swale	Waters_E	Waters_E	31103.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.138832	Morrison Creek
Swale	Waters_E	Waters_E	31145.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.252293	Morrison Creek
Swale	Waters_E	Waters_E	31210.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.070997	Morrison Creek
Swale	Waters_E	Waters_E	31211.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.567922	Morrison Creek
Swale	Waters_E	Waters_E	31426.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.088169	Morrison Creek
Swale	Waters_E	Waters_E	31454.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.457577	Morrison Creek
Swale	Waters_E	Waters_E	31455.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.142627	Morrison Creek
Swale	Waters_E	Waters_E	31625.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	1.297020	Morrison Creek
Swale	Waters_E	Waters_E	31799.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.428098	Morrison Creek
Swale	Waters_E	Waters_E	31804.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.122093	Morrison Creek
Swale	Waters_E	Waters_E	31810.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.122908	Morrison Creek
Swale	Waters_E	Waters_E	32026.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.075809	Morrison Creek
Swale	Waters_E	Waters_E	32229.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.724003	Morrison Creek
Swale	Waters_E	Waters_E	32256.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.192076	Morrison Creek
Swale	Waters_E	Waters_E	32314.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	1.181530	Morrison Creek
Swale	Waters_E	Waters_E	32346.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.133693	Morrison Creek
Swale	Waters_E	Waters_E	32385.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.771291	Morrison Creek
Swale	Waters_E	Waters_E	32404.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.399130	Morrison Creek
Swale	Waters_E	Waters_E	32413.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.119910	Morrison Creek
Swale	Waters_E	Waters_E	32424.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.152354	Morrison Creek
Swale	Waters_E	Waters_E	32574.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.184185	Morrison Creek
Swale	Waters_E	Waters_E	32652.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.054808	Morrison Creek
Swale	Waters_E	Waters_E	32656.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.147534	Morrison Creek
Swale	Waters_E	Waters_E	32691.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.633626	Morrison Creek
Swale	Waters_E	Waters_E	32706.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.090239	Morrison Creek
Swale	Waters_E	Waters_E	32774.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.080805	Morrison Creek
Swale	Waters_E	Waters_E	32776.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.237079	Morrison Creek
Swale	Waters_E	Waters_E	32777.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.095723	Morrison Creek
Swale	Waters_E	Waters_E	32895.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.208327	Morrison Creek
Swale	Waters_E	Waters_E	32909.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.056026	Morrison Creek
Swale	Waters_E	Waters_E	33048.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.292670	Morrison Creek
Swale	Waters_E	Waters_E	33068.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.062767	Morrison Creek
Swale	Waters_E	Waters_E	33070.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.240808	Morrison Creek
Swale	Waters_E	Waters_E	33071.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.063958	Morrison Creek
Swale	Waters_E	Waters_E	33094.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.057037	Morrison Creek
Swale	Waters_E	Waters_E	33125.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.157719	Morrison Creek
Swale	Waters_E	Waters_E	33139.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	-1.0	-2.0	0.030341	Morrison Creek
Swale	Waters_E	Waters_E	33167.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.356129	Morrison Creek
Swale	Waters_E	Waters_E	33244.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.150955	Morrison Creek
Swale	Waters_E	Waters_E	33348.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.212780	Morrison Creek
Swale	Waters_E	Waters_E	34124.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.090934	Morrison Creek
Swale	Waters_E	Waters_E	34614.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.078828	Morrison Creek
Swale	Waters_E	Waters_E	34928.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-2.0	0.090621	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	38214.000000	Indirect Impact	Cropland	Cropland	Class I	Class II	Class II	Low	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	-1.0	-1.0	-2.0	0.012656	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1869.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.461847	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1925.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.242712	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1926.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.317745	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1932.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.280463	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1933.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.386371	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1997.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.108785	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1999.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.327044	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2003.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.109733	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2030.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	1.082130	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2031.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	1.466130	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2068.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.583124	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2070.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	1.172140	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2071.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.701137	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2072.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.333707	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2073.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.074651	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2074.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	-2.0	0.081685	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2075.000000	No Impact

| | | |

Low Density Development - Other Linear Feature	Waters_E	Waters_E	6125.000000	No Impact	Valley Grassland	Low Density Development	Class III	Class I	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-2.0	0.014153	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8216.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.128794	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8218.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.417515	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8221.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.296616	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8494.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.535270	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8756.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.092931	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8765.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	2.401790	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8937.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-2.0	6.767260	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8971.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-2.0	189.703000	Lower Cosumnes River
Seasonal Wetlands	Wetland	Wetlands_S	35740.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	1.0	1.0	-2.0	0.056026	Lower Cosumnes River
Swale	Waters_E	Waters_E	17596.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.004120	Lower Cosumnes River
Swale	Waters_E	Waters_E	17653.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.015472	Lower Cosumnes River
Swale	Waters_E	Waters_E	17767.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.039846	Lower Cosumnes River
Swale	Waters_E	Waters_E	17831.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.028880	Lower Cosumnes River
Swale	Waters_E	Waters_E	17990.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.017446	Lower Cosumnes River
Swale	Waters_E	Waters_E	18011.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.021010	Lower Cosumnes River
Swale	Waters_E	Waters_E	18537.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.039919	Lower Cosumnes River
Swale	Waters_E	Waters_E	18803.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.036821	Lower Cosumnes River
Swale	Waters_E	Waters_E	19453.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.020918	Lower Cosumnes River
Swale	Waters_E	Waters_E	20577.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.010371	Lower Cosumnes River
Swale	Waters_E	Waters_E	22686.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.001377	Lower Cosumnes River
Swale	Waters_E	Waters_E	24467.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.001452	Lower Cosumnes River
Swale	Waters_E	Waters_E	24506.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-2.0	0.062303	Lower Cosumnes River
Swale	Waters_E	Waters_E	24511.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.003317	Lower Cosumnes River
Swale	Waters_E	Waters_E	24837.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.005397	Lower Cosumnes River
Swale	Waters_E	Waters_E	24981.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.019312	Lower Cosumnes River
Swale	Waters_E	Waters_E	25103.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.017948	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39517.000000	No Impact	Cropland	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	-2.0	0.044093	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	52055.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.012604	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	53081.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.018583	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	53161.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.015775	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	54156.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.007793	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	54185.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.066163	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	54491.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.029788	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	54522.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.060129	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	55488.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.034214	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	55544.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.048017	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	55565.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.053418	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56421.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.059208	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56463.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.010012	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56489.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.047771	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56593.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.021806	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56625.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.026733	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56633.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.028232	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56721.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.005941	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56835.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.013699	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56915.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.006507	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56918.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.003217	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56936.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.031569	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	57208.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.009146	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	57258.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.018975	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	57336.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.018807	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	64962.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.004465	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	65005.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.008052	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	68972.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.008996	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	69686.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.011219	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	69767.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.022447	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	71135.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.040603	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	71659.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.010415	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	72209.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.012047	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	74174.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.010714	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36197.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.049787	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36223.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.023073	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36334.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.039249	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36455.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.014870	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36829.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.015756	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36869.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.061709	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36912.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-2.0	0.055926	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	83390.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	6.399800	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85303.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	0.347765	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85698.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	0.234546	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85804.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	-1.0	-1.0	-1.0	0.004990	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88775.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	-1.0	-1.0	-1.0	0.013296	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90387.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	0.550107	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	93223.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	-1.0	-1.0	-1.0	0.015929	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	93913.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	3.451500	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	100073.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	1.868760	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	103166.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	0.205275	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	103291.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	-1.0	-1.0	-1.0	0.080917	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1992.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	-1.0	0.206883	Morrison Creek
Open Water	Waters_P	Waters_P	11373.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-1.0	4.555130	Morrison Creek
Open Water	Waters_P	Waters_P	11374.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-1.0	3.786520	Morrison Creek
Open Water	Waters_P	Waters_P	11445.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	0.0	-1.0	42.081700	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3926.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-1.0	4.784150	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3960.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	-1.0	0.929276	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3966.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	-1.0	1.696120	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3984.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	-1.0	0.477860	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3994.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	1

| | | |

Streams/Creeks	Waters_P	Waters_IP	2875.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-1.0	1.152200	Laguna
Streams/Creeks	Waters_P	Waters_IP	2947.000000	No Impact	Low Density Development - Other Linear Feature	Low Density Development - Other Linear Feature	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-1.0	0.102282	Laguna
Streams/Creeks	Waters_P	Waters_IP	2995.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-1.0	0.454017	Laguna
Streams/Creeks	Waters_P	Waters_IP	3292.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-1.0	0.046602	Laguna
Streams/Creeks	Waters_P	Waters_IP	3457.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	-1.0	0.028899	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39098.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.009054	Laguna
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	38939.000000	No Impact	Major Roads	Mixed Riparian Scrub	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.004097	Laguna
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	38976.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.021748	Laguna
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	38983.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.013541	Laguna
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	39011.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.032504	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8470.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-1.0	0.873553	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8532.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-1.0	5.495550	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8571.000000	No Impact	Major Roads	Vineyards	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	-1.0	10.159300	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38991.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	-1.0	0.053939	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8904.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	-2.0	5.194390	Sherman Lake-Sacramento River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39209.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Low	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.0	1.760220	Sherman Lake-Sacramento River
Cropland - Other Linear Feature	Waters_E	Waters_E	339.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	2.433350	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	427.000000	No Impact	Cropland	Vineyards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	2.557370	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	449.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	1.847540	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1459.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-1.0	22.186000	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1782.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-1.0	4.018580	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4370.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class I	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	1.632650	Snodgrass Slough
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4527.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	1.495230	Snodgrass Slough
Orchards - Other Linear Feature	Waters_E	Waters_E	10584.000000	No Impact	Cropland	Orchards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.444014	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35859.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	1.0	1.0	-1.0	3.424730	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35987.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	1.0	1.0	-1.0	1.549340	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36010.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	1.0	1.0	-1.0	1.456150	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36541.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	1.0	1.0	-1.0	1.210070	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36820.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-1.0	44.977200	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36890.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-1.0	77.602300	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	37340.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-1.0	15.120300	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51869.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Low	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.003352	Snodgrass Slough
Vineyards - Other Linear Feature	Waters_E	Waters_E	41546.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	2.775270	Snodgrass Slough
Vineyards - Other Linear Feature	Waters_E	Waters_E	41581.000000	No Impact	Cropland	Vineyards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	1.689030	Snodgrass Slough
Vineyards - Other Linear Feature	Waters_E	Waters_E	41589.000000	No Impact	Cropland	Vineyards	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	1.800330	Snodgrass Slough
Vineyards - Other Linear Feature	Waters_E	Waters_E	41608.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	1.698740	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	155.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.218645	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	156.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.725786	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	326.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.154343	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	394.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.215132	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	401.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.049323	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	411.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.894606	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	423.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.304664	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	454.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.007897	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	469.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.010458	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	489.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.019604	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1053.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-1.0	0.938541	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1209.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-1.0	0.134758	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1552.000000	No Impact	Low Density Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-1.0	0.779635	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1572.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-1.0	0.107082	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1576.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	-1.0	0.399368	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4462.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.007183	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4467.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.025890	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4525.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.003807	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4535.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.015920	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4536.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.062987	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4601.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.032466	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5741.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-1.0	0.030937	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5845.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class III	Class IA	Class IA	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	-1.0	0.563731	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5880.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-1.0	0.071470	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6088.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-1.0	0.024544	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6169.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-1.0	0.102737	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6199.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-1.0	0.007247	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6216.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-1.0	0.074087	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7869.000000	No Impact	Vineyards	Future Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.826072	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7871.000000	No Impact	Vineyards	Future Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.344363	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7872.000000	No Impact	Vineyards	Future Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.129368	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7876.000000	No Impact	Cropland	Future Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.293983	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8151.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.481823	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8152.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.107289	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8186.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.357720	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8225.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.623316	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8637.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	1.171890	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8922.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.017128	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8924.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.695606	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8925.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.005785	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8926.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.000891	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	41657.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.315508	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	41658.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	-1.0	0.402182	Lower Cosumnes River
Seasonal Wetlands	Wetland	Wetlands_S	35685.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	-1.0	1.871660	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	52127.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.007781	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	52319.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.037301	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	52729.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.029398	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	52768.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.020670	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	53317.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.151132	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	53523.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.026213	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S

Vernal Pool		Wetland	Wetlands_S	56958.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.036137	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57012.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.032781	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57034.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.029104	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57153.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.050108	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	59961.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.014014	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	60252.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.052962	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	60454.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.045562	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	60933.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.049488	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	70821.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.288489	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75661.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.013542	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75744.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.014278	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35420.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.224796	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35469.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.084196	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35470.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.263462	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35502.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.236891	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35544.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.338159	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35649.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.668807	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35652.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.153633	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35655.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.499993	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	35869.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.301042	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36111.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.077894	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36121.000000	No Impact	Major Roads	High Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.282793	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36144.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.253997	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36150.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.150373	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36176.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.090158	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36196.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.629952	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36199.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.094584	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36243.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.143119	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36248.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.097895	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36252.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.777834	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36255.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.814435	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36262.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.880434	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36264.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.114315	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36265.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.080091	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36266.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.265584	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36286.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.125504	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36292.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.334862	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36296.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.775466	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36309.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.115113	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36310.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.075225	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36318.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.160243	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36323.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.305009	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36330.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.242696	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36341.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.078254	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36347.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.212599	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36350.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.088084	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36360.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.504026	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36365.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.214557	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36376.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.219505	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36379.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.224433	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36380.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.202105	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36393.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.139173	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36408.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.120592	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36411.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.076792	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36414.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.103370	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36415.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.133126	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36419.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.900311	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36421.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.183104	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36425.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.246292	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36427.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.095560	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36428.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.288613	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36439.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.145305	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36440.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.522881	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36442.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.169995	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36443.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.641258	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36454.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.095216	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36468.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.163693	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36471.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.081409	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36478.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.147069	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36482.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.278406	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36484.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.164804	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36489.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.171197	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36505.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.910659	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36534.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.652537	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36625.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.104975	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36635.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.676403	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36641.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.078774	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36645.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.271084	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36648.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.127393	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36656.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.153356	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36662.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.087292	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36664.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.114971	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36665.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.374307	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36680.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.221943	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36686.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.200513	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36689.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.479345	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36694.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.098833	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36711.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0

Vernal Pool	Wetland	Wetlands_S	36755.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.415824	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36776.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.291382	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36778.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.167312	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36779.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.137130	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36780.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.281499	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36784.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.181000	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36792.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.098704	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36809.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.105367	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36818.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.688501	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36826.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.073719	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36827.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.320531	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36836.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.083295	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36837.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.271931	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36838.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.398640	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36839.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.296072	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36850.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.197500	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36854.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.139174	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36859.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.223523	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36861.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.291947	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36868.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.467552	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36891.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.302333	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36903.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.107094	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36929.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.283955	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36934.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.189172	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36942.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.195860	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36971.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Low	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	-1.0	0.219688	Lower Cosumnes River
Vineyards - Other Linear Feature	Waters_E	Waters_E	41488.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	1.288390	Lower Cosumnes River
Vineyards - Other Linear Feature	Waters_E	Waters_E	41491.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.565627	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	447.000000		Cropland	Cropland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.205082	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4550.000000		Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Low	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	-1.0	0.069450	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	9122.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	8.661060	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9126.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	14.567500	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9396.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	9.412700	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3980.000000	No Impact	Recreation/Landscaped	High Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.006037	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	829.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.224610	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	832.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.349010	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	834.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	0.0	0.043863	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	839.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.941690	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	842.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2.669110	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	857.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.014460	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	859.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.015670	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	861.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2.348440	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	862.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.860236	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	866.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.592060	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	868.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	7.011360	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	871.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.967240	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	881.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.129080	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	887.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.103130	Morrison Creek
Swale	Waters_E	Waters_E	28610.000000	No Impact	Future Development	Freshwater Marsh	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.068059	Morrison Creek
Swale	Waters_E	Waters_E	33796.000000	No Impact	Disturbed	Vernal Pool	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.067502	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41440.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.250596	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	40593.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	0.0	0.002910	Morrison Creek
Major Roads - Other Linear Feature	Waters_E	Waters_E	11854.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Low	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-2.0	-2.0	-2.0	0.006045	Deer Creek
Mixed Riparian Scrub	Wetland	Riparian	8255.000000	No Impact	Future Development	Open Water	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-2.0	1.127610	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	8950.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.722257	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9031.000000	No Impact	Disturbed	Seasonal Wetlands	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-2.0	1.241710	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9033.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.033366	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9064.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.308334	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9088.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.926773	Deer Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	820.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.000250	Deer Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	831.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.262316	Deer Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	836.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.248408	Deer Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	848.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.258922	Deer Creek
Swale	Waters_E	Waters_E	35081.000000	No Impact	Future Development	Blue Oak Savanna	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	-2.0	0.014485	Deer Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40610.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.157700	Deer Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40755.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.015029	Deer Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40954.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.460002	Deer Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40977.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.070638	Deer Creek
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	41340.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.230421	Deer Creek
Disturbed - Other Linear Feature	Waters_E	Waters_E	718.000000	No Impact	Valley Grassland (Vernal Pool)	Disturbed	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	0.0	0.079879	Upper Cosumnes River
Disturbed - Other Linear Feature	Waters_E	Waters_E	719.000000	No Impact	Valley Grassland (Vernal Pool)	Disturbed	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	0.0	0.134040	Upper Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7001.000000	No Impact	Low Density Development	Irrigated Pasture-Grassland	Class III	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	0.0	0.185478	Upper Cosumnes River
Major Roads - Other Linear Feature	Waters_E	Waters_E	11854.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-2.0	-2.0	0.0	0.050394	Upper Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8358.000000	No Impact	Disturbed	Streams/Creeks	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.702260	Upper Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	9280.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	5.271470	Upper Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	9297.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	5.234730	Upper Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	9298.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	3.319450	Upper Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	41705.000000	No Impact	Disturbed	Streams/Creeks	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.149127	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11018.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	0.0	0.577494	Upper Cosumnes River
Swale	Waters_E	Waters_E	25189.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.007004	Upper Cosumnes River
Swale	Waters_E	Waters_E	26295.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.001561	Upper Cosumnes River
Swale	Waters_E	Waters_E	26567.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.003572	Upper Cosumnes River
Swale	Waters_E	Waters_E	26597.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.012086	Upper Cosumnes River
Swale	Waters_E	Waters_E	26726.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.016197	Upper Cosumnes River
Swale	Waters_E	Waters_E	27443.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.024623	Upper Cosumnes River
Swale	Waters_E	Waters_E	27463.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.008082	Upper Cosumnes River
Swale	Waters_E	Waters_E	28643.000000

| | | |

Swale	Waters_E	Waters_E	25183.000000	No Impact	Low Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.025075	Laguna
Swale	Waters_E	Waters_E	28003.000000	No Impact	Mine Tailings	Seasonal Wetlands	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.044544	Laguna
Swale	Waters_E	Waters_E	28227.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.002674	Laguna
Swale	Waters_E	Waters_E	28230.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.003504	Laguna
Swale	Waters_E	Waters_E	28240.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.004796	Laguna
Swale	Waters_E	Waters_E	28287.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.029884	Laguna
Swale	Waters_E	Waters_E	28317.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.014345	Laguna
Swale	Waters_E	Waters_E	28320.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.033120	Laguna
Swale	Waters_E	Waters_E	28332.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.009581	Laguna
Swale	Waters_E	Waters_E	28340.000000	No Impact	High Density Development	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.019020	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39313.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.427897	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39362.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.019221	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39385.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.010954	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39386.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.068343	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39399.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.224503	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39533.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.021732	Laguna
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40254.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.122808	Laguna
Vernal Pool	Wetland	Wetlands_S	83377.000000	No Impact	Mine Tailings	Mine Tailing Riparian Woodland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	0.0	0.014400	Laguna
Vernal Pool	Wetland	Wetlands_S	84558.000000	No Impact	Mine Tailings	Mine Tailing Riparian Woodland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	0.0	0.005433	Laguna
Vernal Pool	Wetland	Wetlands_S	36232.000000	No Impact	Mine Tailings	Mine Tailing Riparian Woodland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	0.0	0.017490	Laguna
Vernal Pool	Wetland	Wetlands_S	36340.000000	No Impact	Mine Tailings	Mine Tailing Riparian Woodland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	0.0	0.057049	Laguna
Vernal Pool	Wetland	Wetlands_S	37558.000000	No Impact	Mine Tailings	Mine Tailing Riparian Woodland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	0.0	0.028541	Laguna
Vernal Pool	Wetland	Wetlands_S	37833.000000	No Impact	Mine Tailings	Mine Tailing Riparian Woodland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	0.0	0.057107	Laguna
Vernal Pool	Wetland	Wetlands_S	37871.000000	No Impact	Mine Tailings	Mine Tailing Riparian Woodland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	0.0	0.063328	Laguna
Swale	Waters_E	Waters_E	26154.000000		Mine Tailings	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.001752	Laguna
Swale	Waters_E	Waters_E	26166.000000		Mine Tailings	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.002482	Laguna
Mixed Riparian Scrub	Wetland	Riparian	7885.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	3.401900	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7907.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	0.0	0.622118	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7918.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	0.0	0.598233	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8447.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.260281	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8483.000000	No Impact	Future Development	Mixed Riparian Scrub	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	7.445080	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8492.000000	No Impact	Future Development	Mixed Riparian Scrub	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	8.712170	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8500.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.258984	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8525.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	11.250500	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8738.000000	No Impact	Vineyards	Orchards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	2.809240	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8775.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.863577	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8785.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	1.010838	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2606.000000	No Impact	Cropland	Low Density Development	Class I	Class III	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.001014	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2677.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.548465	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2685.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.172236	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2694.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.063357	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2736.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.009640	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2761.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.185811	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2768.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.027464	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2770.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	0.0	0.105679	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38730.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.224158	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38825.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.222279	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39095.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000065	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8775.000000		Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.136457	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8781.000000		Cropland	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	3.804570	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8785.000000		Vineyards	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	1.348750	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	351.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	0.0	3.580600	Snodgrass Slough
Freshwater Marsh	Waters_E	Waters_E	1424.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	1.0	1.0	0.0	0.003173	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	984.000000	No Impact	Major Roads	Streams/Creeks	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0	43.764000	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1122.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	1.0	1.0	0.0	0.506905	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1145.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	1.0	1.0	0.0	0.853205	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1271.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	1.0	1.0	0.0	1.864890	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1424.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	1.0	1.0	0.0	0.887005	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1477.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0	4.911340	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1763.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0	6.031870	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_SP	103837.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0	23.174500	Snodgrass Slough
Open Water	Waters_P	Waters_P	10698.000000	No Impact	Mixed Riparian Woodland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	0.357044	Snodgrass Slough
Open Water	Waters_P	Waters_P	10702.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	2.367120	Snodgrass Slough
Open Water	Waters_P	Waters_P	10719.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	3.121830	Snodgrass Slough
Open Water	Waters_P	Waters_P	10725.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	1.002960	Snodgrass Slough
Open Water	Waters_P	Waters_P	10767.000000	No Impact	Streams/Creeks	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	1.485240	Snodgrass Slough
Open Water	Waters_P	Waters_P	10917.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	1.895570	Snodgrass Slough
Open Water	Waters_P	Waters_P	11146.000000	No Impact	Mixed Riparian Woodland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	1.649810	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35720.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	3.237440	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36463.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.153390	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	37354.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	4.266980	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2931.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	5.223930	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3162.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	30.936200	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3300.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	2.069120	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3370.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	1.755950	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3434.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	3.074630	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3461.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	2.359140	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3469.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	2.028820	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3490.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	4.084130	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3513.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	2.267530	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3518.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	1.722860	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36378.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.134212	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36533.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.419179	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	282.000000	No Impact	Cropland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	0.0	0.197388	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	356.000000	No Impact	Cropland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	0.0	0.905649	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	435.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class II	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-2.0	-1.0	0.0	1.316950	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	470.000000	No Impact	Cropland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	0.0	0.079352	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	960.000000	No Imp

Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4567.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	0.0	0.000883	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5613.000000	No Impact	Cropland	Low Density Development	Class III	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	0.0	0.130455	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5654.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class III	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	0.0	0.167115	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5921.000000	No Impact	Cropland	Low Density Development	Class III	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	0.0	0.222097	Lower Cosumnes River
Seasonal Wetlands	Wetland	Wetlands_S	36409.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	4.418050	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2649.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.413556	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2710.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	1.230090	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2712.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.675707	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2783.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.654814	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2976.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.082386	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2986.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.316738	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3105.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	1.648810	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3180.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.001046	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3202.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.192935	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3213.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.539070	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3255.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.002801	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3391.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	1.621540	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3392.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.203760	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3394.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.504087	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3440.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.944843	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3481.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.065162	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3498.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.124132	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3517.000000	No Impact	Major Roads	Vineyards	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.784503	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3582.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.298223	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3595.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	0.136192	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3660.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	0.0	1.351060	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35448.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.036558	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35476.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class III	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.049270	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35498.000000	No Impact	Cropland	Low Density Development	Class I	Class III	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.027267	Lower Cosumnes River
Vineyards - Other Linear Feature	Waters_E	Waters_E	41505.000000	No Impact	Cropland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	0.0	0.161643	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8365.000000	No Impact	Irrigated Pasture-Grassland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.250886	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8397.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	5.418090	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9246.000000	No Impact	Irrigated Pasture-Grassland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	2.538770	Morrison Creek
Orchards - Other Linear Feature	Waters_E	Waters_E	10684.000000	No Impact	Valley Grassland (Vernal Pool)	Orchards	Class II	Class IA	Class II	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	1.0	0.083218	Morrison Creek
Swale	Waters_E	Waters_E	28536.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	3.980940	Morrison Creek
Swale	Waters_E	Waters_E	28863.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.060767	Morrison Creek
Swale	Waters_E	Waters_E	28883.000000	No Impact	Recreation/Landscaped	Vernal Pool	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.031741	Morrison Creek
Swale	Waters_E	Waters_E	28888.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.332635	Morrison Creek
Swale	Waters_E	Waters_E	29154.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.575126	Morrison Creek
Swale	Waters_E	Waters_E	29235.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.290094	Morrison Creek
Swale	Waters_E	Waters_E	29389.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.112775	Morrison Creek
Swale	Waters_E	Waters_E	29649.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.072627	Morrison Creek
Swale	Waters_E	Waters_E	29699.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.053438	Morrison Creek
Swale	Waters_E	Waters_E	29830.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.115796	Morrison Creek
Swale	Waters_E	Waters_E	29840.000000	No Impact	High Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.126797	Morrison Creek
Swale	Waters_E	Waters_E	29855.000000	No Impact	High Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.101138	Morrison Creek
Swale	Waters_E	Waters_E	29864.000000	No Impact	High Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.104825	Morrison Creek
Swale	Waters_E	Waters_E	29865.000000	No Impact	High Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.054583	Morrison Creek
Swale	Waters_E	Waters_E	29902.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	2.091000	Morrison Creek
Swale	Waters_E	Waters_E	30210.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.575629	Morrison Creek
Swale	Waters_E	Waters_E	30217.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.069075	Morrison Creek
Swale	Waters_E	Waters_E	30245.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.345600	Morrison Creek
Swale	Waters_E	Waters_E	30255.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.760706	Morrison Creek
Swale	Waters_E	Waters_E	30275.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.344145	Morrison Creek
Swale	Waters_E	Waters_E	30299.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.060492	Morrison Creek
Swale	Waters_E	Waters_E	30537.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.064495	Morrison Creek
Swale	Waters_E	Waters_E	30584.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.322395	Morrison Creek
Swale	Waters_E	Waters_E	30631.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.097825	Morrison Creek
Swale	Waters_E	Waters_E	30665.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.097037	Morrison Creek
Swale	Waters_E	Waters_E	30762.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.142847	Morrison Creek
Swale	Waters_E	Waters_E	30857.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.294464	Morrison Creek
Swale	Waters_E	Waters_E	30865.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.132212	Morrison Creek
Swale	Waters_E	Waters_E	30893.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.511914	Morrison Creek
Swale	Waters_E	Waters_E	30912.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.122432	Morrison Creek
Swale	Waters_E	Waters_E	30946.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.051265	Morrison Creek
Swale	Waters_E	Waters_E	31085.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.713680	Morrison Creek
Swale	Waters_E	Waters_E	31112.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.099454	Morrison Creek
Swale	Waters_E	Waters_E	31304.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.381452	Morrison Creek
Swale	Waters_E	Waters_E	31312.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.230548	Morrison Creek
Swale	Waters_E	Waters_E	31314.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.119335	Morrison Creek
Swale	Waters_E	Waters_E	31445.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.113897	Morrison Creek
Swale	Waters_E	Waters_E	31451.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.182500	Morrison Creek
Swale	Waters_E	Waters_E	31453.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.256034	Morrison Creek
Swale	Waters_E	Waters_E	31498.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.626300	Morrison Creek
Swale	Waters_E	Waters_E	31584.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.145270	Morrison Creek
Swale	Waters_E	Waters_E	31607.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.053786	Morrison Creek
Swale	Waters_E	Waters_E	31638.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.579602	Morrison Creek
Swale	Waters_E	Waters_E	31670.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.057354	Morrison Creek
Swale	Waters_E	Waters_E	31688.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.065628	Morrison Creek
Swale	Waters_E	Waters_E	31725.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.055059	Morrison Creek
Swale	Waters_E	Waters_E	31735.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.124155	Morrison Creek
Swale	Waters_E	Waters_E	31751.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.609986	Morrison Creek
Swale	Waters_E	Waters_E	31779.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.076908	Morrison Creek
Swale	Waters_E	Waters_E	31803.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.000118	Morrison Creek
Swale	Waters_E	Waters_E	31877.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.196625	Morrison Creek
Swale	Waters_E	Waters_E	31905.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.152258	Morrison Creek
Swale	Waters_E	Waters_E	31948.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0

Swale	Waters_E	Waters_E	32295.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.112146	Morrison Creek
Swale	Waters_E	Waters_E	32307.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.137319	Morrison Creek
Swale	Waters_E	Waters_E	32311.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.583062	Morrison Creek
Swale	Waters_E	Waters_E	32332.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.842684	Morrison Creek
Swale	Waters_E	Waters_E	32348.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.727167	Morrison Creek
Swale	Waters_E	Waters_E	32378.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.200992	Morrison Creek
Swale	Waters_E	Waters_E	32389.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.259877	Morrison Creek
Swale	Waters_E	Waters_E	32393.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.763750	Morrison Creek
Swale	Waters_E	Waters_E	32401.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.075369	Morrison Creek
Swale	Waters_E	Waters_E	32489.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.086368	Morrison Creek
Swale	Waters_E	Waters_E	32549.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.058815	Morrison Creek
Swale	Waters_E	Waters_E	32550.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.372803	Morrison Creek
Swale	Waters_E	Waters_E	32560.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.180273	Morrison Creek
Swale	Waters_E	Waters_E	32607.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.110627	Morrison Creek
Swale	Waters_E	Waters_E	32622.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.155018	Morrison Creek
Swale	Waters_E	Waters_E	32641.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.225671	Morrison Creek
Swale	Waters_E	Waters_E	32775.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.181316	Morrison Creek
Swale	Waters_E	Waters_E	32812.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.262708	Morrison Creek
Swale	Waters_E	Waters_E	32828.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.147131	Morrison Creek
Swale	Waters_E	Waters_E	32888.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.053992	Morrison Creek
Swale	Waters_E	Waters_E	32921.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.048377	Morrison Creek
Swale	Waters_E	Waters_E	32966.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.100800	Morrison Creek
Swale	Waters_E	Waters_E	33023.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.189254	Morrison Creek
Swale	Waters_E	Waters_E	33104.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.174885	Morrison Creek
Swale	Waters_E	Waters_E	33206.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.104417	Morrison Creek
Swale	Waters_E	Waters_E	33275.000000	No Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.016649	Morrison Creek
Swale	Waters_E	Waters_E	33365.000000	No Impact	Valley Grassland (Vernal Pool)	High Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.042969	Morrison Creek
Swale	Waters_E	Waters_E	33502.000000	No Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.024894	Morrison Creek
Swale	Waters_E	Waters_E	33503.000000	No Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.026813	Morrison Creek
Swale	Waters_E	Waters_E	33504.000000	No Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.002926	Morrison Creek
Swale	Waters_E	Waters_E	33559.000000	No Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.025396	Morrison Creek
Swale	Waters_E	Waters_E	33625.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.218121	Morrison Creek
Swale	Waters_E	Waters_E	33752.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.329755	Morrison Creek
Swale	Waters_E	Waters_E	33779.000000	No Impact	Valley Grassland (Vernal Pool)	Disturbed	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.001470	Morrison Creek
Swale	Waters_E	Waters_E	33883.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.143166	Morrison Creek
Swale	Waters_E	Waters_E	34052.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.074504	Morrison Creek
Swale	Waters_E	Waters_E	34091.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.054738	Morrison Creek
Swale	Waters_E	Waters_E	34254.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.055057	Morrison Creek
Swale	Waters_E	Waters_E	34321.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.075358	Morrison Creek
Swale	Waters_E	Waters_E	34754.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.072738	Morrison Creek
Swale	Waters_E	Waters_E	34772.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.123173	Morrison Creek
Swale	Waters_E	Waters_E	34798.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.257306	Morrison Creek
Swale	Waters_E	Waters_E	34799.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.063532	Morrison Creek
Swale	Waters_E	Waters_E	34840.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.828528	Morrison Creek
Swale	Waters_E	Waters_E	34863.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.129134	Morrison Creek
Swale	Waters_E	Waters_E	34925.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.071420	Morrison Creek
Swale	Waters_E	Waters_E	34987.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.536244	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85326.000000	No Impact	Recreation/Landscaped	Recreation/Landscaped	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.037090	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85410.000000	No Impact	Recreation/Landscaped	Recreation/Landscaped	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.058383	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85420.000000	No Impact	Recreation/Landscaped	Recreation/Landscaped	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.033413	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85496.000000	No Impact	Recreation/Landscaped	Recreation/Landscaped	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.066099	Morrison Creek
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7608.000000	No Impact	Valley Grassland	Low Density Development	Class III	Class I	Class III	Low	0.0	0.0	0.0	3.0	3.0	-1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	-1.0	0.031878	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9213.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	2.306190	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9305.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	3.491150	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9310.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	4.440020	Deer Creek
Seasonal Wetlands	Wetland	Wetlands_S	36872.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	1.0	1.0	-1.0	0.004986	Deer Creek
Swale	Waters_E	Waters_E	29794.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.019890	Deer Creek
Swale	Waters_E	Waters_E	29970.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.024191	Deer Creek
Swale	Waters_E	Waters_E	30090.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.045025	Deer Creek
Swale	Waters_E	Waters_E	30145.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.002539	Deer Creek
Swale	Waters_E	Waters_E	30823.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.024383	Deer Creek
Swale	Waters_E	Waters_E	31001.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.000583	Deer Creek
Swale	Waters_E	Waters_E	31620.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.025215	Deer Creek
Swale	Waters_E	Waters_E	32400.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.011026	Deer Creek
Swale	Waters_E	Waters_E	32411.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.005509	Deer Creek
Swale	Waters_E	Waters_E	32437.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.035769	Deer Creek
Swale	Waters_E	Waters_E	32506.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.027103	Deer Creek
Swale	Waters_E	Waters_E	32523.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.030369	Deer Creek
Swale	Waters_E	Waters_E	32721.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.020542	Deer Creek
Swale	Waters_E	Waters_E	32898.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.032215	Deer Creek
Swale	Waters_E	Waters_E	33189.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.005503	Deer Creek
Swale	Waters_E	Waters_E	33477.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.047472	Deer Creek
Swale	Waters_E	Waters_E	33695.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.039356	Deer Creek
Swale	Waters_E	Waters_E	33805.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.022405	Deer Creek
Swale	Waters_E	Waters_E	33980.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.035738	Deer Creek
Swale	Waters_E	Waters_E	34019.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.039213	Deer Creek
Swale	Waters_E	Waters_E	34059.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.041378	Deer Creek
Swale	Waters_E	Waters_E	34261.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.046179	Deer Creek
Swale	Waters_E	Waters_E	34545.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.002085	Deer Creek
Swale	Waters_E	Waters_E	35123.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.043789	Deer Creek
Swale	Waters_E	Waters_E	35126.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.045218	Deer Creek
Swale	Waters_E	Waters_E	35132.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.006314	Deer Creek
Swale	Waters_E	Waters_E	35267.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	-1.0	0.001528	Deer Creek
Vernal Pool	Wetland	Wetlands_S	37228.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Low	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	-1.0	0.071373	Deer Creek
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6971.000000	No Impact	Valley Grassland	Low Density Development	Class III	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	1.0	0.006066	Upper Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7282.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class III	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	1.0	0.086398	Upper Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7398.000000	No Impact	Valley Grassland	Low Density Development	Class III	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	1.0	0.041061	Upper Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7457.000000	No Impact	Valley Grass

Swale	Waters_E	Waters_E	24960.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.001298	Upper Cosumnes River
Swale	Waters_E	Waters_E	25105.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.086901	Upper Cosumnes River
Swale	Waters_E	Waters_E	25268.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.015334	Upper Cosumnes River
Swale	Waters_E	Waters_E	25373.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.006920	Upper Cosumnes River
Swale	Waters_E	Waters_E	25429.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.026685	Upper Cosumnes River
Swale	Waters_E	Waters_E	25448.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.009277	Upper Cosumnes River
Swale	Waters_E	Waters_E	25492.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.047732	Upper Cosumnes River
Swale	Waters_E	Waters_E	25546.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.015637	Upper Cosumnes River
Swale	Waters_E	Waters_E	25572.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.046457	Upper Cosumnes River
Swale	Waters_E	Waters_E	25585.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.004445	Upper Cosumnes River
Swale	Waters_E	Waters_E	25973.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.025086	Upper Cosumnes River
Swale	Waters_E	Waters_E	25977.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.007828	Upper Cosumnes River
Swale	Waters_E	Waters_E	26089.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.032501	Upper Cosumnes River
Swale	Waters_E	Waters_E	26097.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.002123	Upper Cosumnes River
Swale	Waters_E	Waters_E	26101.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.020705	Upper Cosumnes River
Swale	Waters_E	Waters_E	26150.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.002930	Upper Cosumnes River
Swale	Waters_E	Waters_E	26233.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.012488	Upper Cosumnes River
Swale	Waters_E	Waters_E	26256.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.010565	Upper Cosumnes River
Swale	Waters_E	Waters_E	26331.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.006012	Upper Cosumnes River
Swale	Waters_E	Waters_E	26387.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.110391	Upper Cosumnes River
Swale	Waters_E	Waters_E	26432.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.034748	Upper Cosumnes River
Swale	Waters_E	Waters_E	26507.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.039807	Upper Cosumnes River
Swale	Waters_E	Waters_E	27345.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.007727	Upper Cosumnes River
Swale	Waters_E	Waters_E	28769.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.199449	Upper Cosumnes River
Swale	Waters_E	Waters_E	28798.000000	No Impact	Future Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.219848	Upper Cosumnes River
Swale	Waters_E	Waters_E	28824.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.100132	Upper Cosumnes River
Swale	Waters_E	Waters_E	28867.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.033475	Upper Cosumnes River
Swale	Waters_E	Waters_E	29419.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.004292	Upper Cosumnes River
Swale	Waters_E	Waters_E	29615.000000	No Impact	Disturbed	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.043292	Upper Cosumnes River
Swale	Waters_E	Waters_E	29695.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.042934	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	75656.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.022406	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	75768.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.035661	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	78770.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.051354	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	79613.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.008905	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	84884.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.023255	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	84908.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.005628	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	84912.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.007733	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	84966.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.010668	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	87472.000000	No Impact	Mine Tailings	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.030357	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36979.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.008743	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37235.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.003757	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37369.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.005819	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37374.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.017271	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37376.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.003958	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37387.000000	No Impact	Low Density Development	Open Water	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.010601	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37708.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.006343	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37867.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.055633	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37954.000000	No Impact	Mine Tailings	Streams/Creeks	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.012263	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37994.000000	No Impact	Mine Tailings	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.022294	Upper Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7851.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.003246	Lower Mokelumne River
Mixed Riparian Woodland	Wetland	Riparian	8477.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.063878	Lower Mokelumne River
Mixed Riparian Woodland	Wetland	Riparian	8480.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.031545	Lower Mokelumne River
Mixed Riparian Woodland	Wetland	Riparian	8489.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.125051	Lower Mokelumne River
Open Water	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	0.480000	American River
Streams/Creeks	Waters_P	Waters_IP	4331.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	0.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.298537	American River
Streams/Creeks	Waters_P	Waters_IP	4338.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	0.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.441381	American River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5641.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class III	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	1.0	0.033672	Laguna
Mixed Riparian Scrub	Wetland	Riparian	8014.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.213720	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8668.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.237440	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8903.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.256341	Laguna
Orchards - Other Linear Feature	Waters_E	Waters_E	10617.000000	No Impact	Future Development	Orchards	Class II	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	1.0	0.206028	Laguna
Swale	Waters_E	Waters_E	12792.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.025905	Laguna
Swale	Waters_E	Waters_E	12803.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.033500	Laguna
Swale	Waters_E	Waters_E	13086.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.050443	Laguna
Swale	Waters_E	Waters_E	13108.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.129551	Laguna
Swale	Waters_E	Waters_E	13170.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.137552	Laguna
Swale	Waters_E	Waters_E	13578.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.041998	Laguna
Swale	Waters_E	Waters_E	16008.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.006101	Laguna
Swale	Waters_E	Waters_E	16075.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.024507	Laguna
Swale	Waters_E	Waters_E	16147.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.057550	Laguna
Swale	Waters_E	Waters_E	16195.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.033580	Laguna
Swale	Waters_E	Waters_E	16454.000000	No Impact	Major Roads	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.233796	Laguna
Swale	Waters_E	Waters_E	17262.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.004966	Laguna
Swale	Waters_E	Waters_E	18077.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.011732	Laguna
Swale	Waters_E	Waters_E	18111.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.025528	Laguna
Swale	Waters_E	Waters_E	19482.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.001815	Laguna
Swale	Waters_E	Waters_E	19531.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.024884	Laguna
Swale	Waters_E	Waters_E	19544.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.002356	Laguna
Swale	Waters_E	Waters_E	20183.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.029020	Laguna
Swale	Waters_E	Waters_E	20816.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.033102	Laguna
Swale	Waters_E	Waters_E	20833.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.012367	Laguna
Swale	Waters_E	Waters_E	21094.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.004233	Laguna
Swale	Waters_E	Waters_E	21462.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.002280	Laguna
Swale	Waters_E	Waters_E	21928.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.002025	Laguna
Swale	Waters_E	Waters_E	23315.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.024192	Laguna
Swale	Waters_E	Waters_E	24054.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.033940	Laguna
Swale	Waters_E	Waters_E	24320.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.000168	Laguna
Swale	Waters_E	Waters_E	24328.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0

Vernal Pool	Wetland	Wetlands_S	45909.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.048303	Laguna
Vernal Pool	Wetland	Wetlands_S	46996.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.044359	Laguna
Vernal Pool	Wetland	Wetlands_S	47250.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.012743	Laguna
Vernal Pool	Wetland	Wetlands_S	47701.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.007656	Laguna
Vernal Pool	Wetland	Wetlands_S	47732.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.013077	Laguna
Vernal Pool	Wetland	Wetlands_S	50238.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.004126	Laguna
Vernal Pool	Wetland	Wetlands_S	50278.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.013516	Laguna
Vernal Pool	Wetland	Wetlands_S	50297.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.008007	Laguna
Vernal Pool	Wetland	Wetlands_S	50332.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.015993	Laguna
Vernal Pool	Wetland	Wetlands_S	50381.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.016981	Laguna
Vernal Pool	Wetland	Wetlands_S	50439.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.020900	Laguna
Vernal Pool	Wetland	Wetlands_S	50443.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.023592	Laguna
Vernal Pool	Wetland	Wetlands_S	50472.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.003672	Laguna
Vernal Pool	Wetland	Wetlands_S	50476.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.001952	Laguna
Vernal Pool	Wetland	Wetlands_S	50510.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.034943	Laguna
Vernal Pool	Wetland	Wetlands_S	50556.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.019262	Laguna
Vernal Pool	Wetland	Wetlands_S	50570.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.013905	Laguna
Vernal Pool	Wetland	Wetlands_S	50575.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.052622	Laguna
Vernal Pool	Wetland	Wetlands_S	50594.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.038673	Laguna
Vernal Pool	Wetland	Wetlands_S	50664.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.053586	Laguna
Vernal Pool	Wetland	Wetlands_S	50780.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.014367	Laguna
Vernal Pool	Wetland	Wetlands_S	50787.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.001240	Laguna
Vernal Pool	Wetland	Wetlands_S	50997.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.004068	Laguna
Vernal Pool	Wetland	Wetlands_S	50998.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.003331	Laguna
Vernal Pool	Wetland	Wetlands_S	51181.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.005662	Laguna
Vernal Pool	Wetland	Wetlands_S	51270.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.015761	Laguna
Vernal Pool	Wetland	Wetlands_S	51283.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.017952	Laguna
Vernal Pool	Wetland	Wetlands_S	51417.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.007296	Laguna
Vernal Pool	Wetland	Wetlands_S	51966.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.042757	Laguna
Vernal Pool	Wetland	Wetlands_S	72778.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.050773	Laguna
Vernal Pool	Wetland	Wetlands_S	72819.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.029106	Laguna
Vernal Pool	Wetland	Wetlands_S	72863.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.014139	Laguna
Vernal Pool	Wetland	Wetlands_S	72993.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.013132	Laguna
Vernal Pool	Wetland	Wetlands_S	73032.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.013889	Laguna
Vernal Pool	Wetland	Wetlands_S	73100.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.036448	Laguna
Vernal Pool	Wetland	Wetlands_S	73142.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.007991	Laguna
Vernal Pool	Wetland	Wetlands_S	73152.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.003199	Laguna
Vernal Pool	Wetland	Wetlands_S	73177.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.004479	Laguna
Vernal Pool	Wetland	Wetlands_S	73188.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.001323	Laguna
Vernal Pool	Wetland	Wetlands_S	73410.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.022117	Laguna
Vernal Pool	Wetland	Wetlands_S	73461.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.016895	Laguna
Vernal Pool	Wetland	Wetlands_S	75700.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.052663	Laguna
Vernal Pool	Wetland	Wetlands_S	83155.000000	No Impact	Mine Tailings	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.005067	Laguna
Vernal Pool	Wetland	Wetlands_S	83468.000000	No Impact	Mine Tailings	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.003474	Laguna
Vernal Pool	Wetland	Wetlands_S	83706.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.002235	Laguna
Vernal Pool	Wetland	Wetlands_S	83715.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.002762	Laguna
Vernal Pool	Wetland	Wetlands_S	83719.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.001502	Laguna
Vernal Pool	Wetland	Wetlands_S	83763.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.011977	Laguna
Vernal Pool	Wetland	Wetlands_S	83893.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.006585	Laguna
Vernal Pool	Wetland	Wetlands_S	83951.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.010284	Laguna
Vernal Pool	Wetland	Wetlands_S	83970.000000	No Impact	High Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.004565	Laguna
Vernal Pool	Wetland	Wetlands_S	35891.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.002896	Laguna
Vernal Pool	Wetland	Wetlands_S	35954.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.000194	Laguna
Vernal Pool	Wetland	Wetlands_S	35956.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.000047	Laguna
Vernal Pool	Wetland	Wetlands_S	36026.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.000026	Laguna
Vernal Pool	Wetland	Wetlands_S	36030.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.000033	Laguna
Vernal Pool	Wetland	Wetlands_S	36129.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.000207	Laguna
Vernal Pool	Wetland	Wetlands_S	36201.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.029053	Laguna
Vernal Pool	Wetland	Wetlands_S	36844.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.025851	Laguna
Vernal Pool	Wetland	Wetlands_S	36852.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.028656	Laguna
Vernal Pool	Wetland	Wetlands_S	36853.000000	No Impact	Major Roads	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.000117	Laguna
Mixed Riparian Scrub	Wetland	Riparian	7852.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.433290	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7853.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.977549	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7897.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.204400	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7906.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.579975	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8023.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.419058	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8446.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.659658	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8450.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.914680	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8454.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.341742	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8455.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	3.978050	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8457.000000	No Impact	Cropland	Mixed Riparian Scrub	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.118850	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8460.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.327920	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8531.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.150732	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8533.000000	No Impact	Vineyards	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.642365	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8534.000000	No Impact	Vineyards	Mixed Riparian Scrub	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.125214	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8535.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.726140	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8538.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.568956	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8539.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.133482	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8541.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	3.115320	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8554.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.187204	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8563.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.408983	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8569.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	4.187360	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8593.000000	No Impact	Vineyards	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.650869	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8621.000000	No Impact	Vineyards	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.591030	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8628.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	3.648060	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8687.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	2.732170	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8699.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.682360	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8714.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.219000	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8725.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.792702	Lower Dry Creek
rian Woodland	Wetland	Riparian	8745.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0

Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39029.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.120131	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43142.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.006925	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43235.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.036355	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43247.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.022685	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43292.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.071185	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43308.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.015289	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43309.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.028802	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43359.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.010682	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43364.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.040318	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43381.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.012209	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43391.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.035291	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43400.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.010538	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43459.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.055168	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43471.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.056747	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43479.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.069148	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43485.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.045784	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43865.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.049016	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44069.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.013969	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44400.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.040562	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44453.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.006378	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44489.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.014907	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44632.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.008016	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44645.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.023990	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44786.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.019645	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44861.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.061898	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	44889.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.008523	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	45454.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.005332	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	46085.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.004509	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	46116.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.019321	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	46397.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.021253	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	46486.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.014132	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	46585.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.060933	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	46683.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.024393	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	46857.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.022863	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35528.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.060802	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35531.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.171562	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35560.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.118214	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35606.000000	No Impact	Low Density Development	Streams/Creeks	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.539074	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	35830.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	1.0	0.012376	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8786.000000		Irrigated Pasture-Grassland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.037617	Lower Dry Creek
Valley Grassland (Vernal Pool) - Other Linear	Waters_E	Waters_E	39716.000000		Valley Grassland (Vernal Pool)	Major Roads - Other Linear Feature	Class IA	Class IA	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	1.0	0.182156	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	1007.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	2.435260	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1044.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	1.442470	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1115.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.067292	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1123.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.584783	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1193.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	1.023510	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1275.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.799096	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1287.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.441528	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1384.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	2.404260	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1406.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	2.451560	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1440.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.616094	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1462.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.393797	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1466.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.150684	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1467.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.051702	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8183.000000	No Impact	Open Water	Cropland	Class I	Class I	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	1.0	0.561115	Snodgrass Slough
Open Water	Waters_P	Waters_P	10687.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	20.506200	Snodgrass Slough
Open Water	Waters_P	Waters_P	10723.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	26.187500	Snodgrass Slough
Open Water	Waters_P	Waters_P	10730.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	6.651260	Snodgrass Slough
Open Water	Waters_P	Waters_P	10743.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	21.609016	Snodgrass Slough
Open Water	Waters_P	Waters_P	10867.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	1.0	0.797886	Snodgrass Slough
Open Water	Waters_P	Waters_P	10869.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	1.0	1.421870	Snodgrass Slough
Open Water	Waters_P	Waters_P	10870.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	1.0	0.884900	Snodgrass Slough
Open Water	Waters_P	Waters_P	11111.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	10.314900	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36037.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	1.0	5.122790	Snodgrass Slough
Streams/Creeks	Waters_E	Waters_E	3429.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.000551	Snodgrass Slough
Streams/Creeks	Waters_E	Waters_E	3496.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.000632	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2753.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	4.893060	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2825.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	375.794000	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2864.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.157068	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2871.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	2.587640	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2882.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	37.445500	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2933.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.210744	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2938.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.132304	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2939.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.266134	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2941.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.193799	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2943.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.320152	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2944.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.185094	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2970.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.255893	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2971.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.257180	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2972.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.180106	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2993.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.116014	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2996.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.128335	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2999.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.236038	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3000.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.040170	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3001.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.161683	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3002.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.152653	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3004.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.225282	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3007.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.063694	Snodgrass Slough
Streams/

Streams/Creeks	Waters_P	Waters_IP	3044.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.093552	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3051.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.378266	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3069.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.113665	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3070.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.175635	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3081.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.391313	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3082.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.120580	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3097.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	1.102720	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3116.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.472412	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3120.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.348432	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3158.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.474889	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3160.000000	No Impact	Disturbed	Mixed Riparian Scrub	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	27.566400	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3161.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	156.581000	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3192.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.596166	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3223.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.153648	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3224.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.175442	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3227.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.726656	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3228.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.348139	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3229.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.312519	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3240.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	1.247410	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3264.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.198543	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3269.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.713537	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3270.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.803930	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3273.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.255454	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3274.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.499763	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3280.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	1.093140	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3322.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.042731	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3324.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.050245	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3359.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	1.197620	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3360.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	1.635330	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3371.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.452369	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3376.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.230930	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3397.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.539164	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3405.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.180106	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3406.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.129976	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3412.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.307511	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3424.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	1.307150	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3426.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	1.170852	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3427.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.168636	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3429.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.410876	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3442.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.521191	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3453.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.142626	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3454.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.244772	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3459.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.847571	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3476.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.076532	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3484.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.145040	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3489.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	5.242600	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3496.000000	No Impact	Cropland - Other Linear Feature	Cropland - Other Linear Feature	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.311071	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3502.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.089294	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3655.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	5.693440	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3823.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	118.564000	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38993.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.046880	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39262.000000	No Impact	Valley Grassland (Vernal Pool)	Cropland	Class I	Class IA	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.287150	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39412.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.042515	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39417.000000	No Impact	Valley Grassland (Vernal Pool)	Cropland	Class I	Class IA	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.092706	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	78387.000000		Mine Tailings	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.005804	Laguna
Vernal Pool	Wetland	Wetlands_S	78410.000000		Mine Tailings	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.004304	Laguna
Vernal Pool	Wetland	Wetlands_S	80208.000000		Mine Tailings	Swale	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.016707	Laguna
Cropland - Other Linear Feature	Waters_E	Waters_E	370.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland (Vernal Pool)	Class II	Class IA	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	-2.0	-1.0	1.0	0.008444	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	377.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland (Vernal Pool)	Class II	Class IA	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	-2.0	-1.0	1.0	0.309543	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1094.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	1.0	0.254034	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1336.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	1.0	2.209990	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1503.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	1.0	0.071350	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1528.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	1.0	0.190105	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1532.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	1.0	0.072393	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1535.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	1.0	0.075825	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1537.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	1.0	2.165750	Lower Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1602.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	1.0	0.124871	Lower Cosumnes River
Open Water	Waters_E	Waters_E	10815.000000	No Impact	Open Water	Major Roads - Other Linear Feature	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	1.0	0.000574	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10688.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.513507	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10762.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.261723	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10765.000000	No Impact	High Density Development	Streams/Creeks	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	1.0	2.775240	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10771.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	1.821440	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10773.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.794110	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10774.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	1.468100	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10831.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.204575	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10832.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.303430	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10833.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	1.0	6.776380	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10903.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	1.0	2.032230	Lower Cosumnes River
Open Water	Waters_P	Waters_P	11009.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.909623	Lower Cosumnes River
Seasonal Wetlands	Wetland	Wetlands_S	36091.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	1.0	1.309430	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2620.000000	No Impact	Future Development	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	0.945312	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2679.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	0.058387	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2711.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	0.000395	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2776.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	0.453463	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2787.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1.0	1.585810	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2807.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	1

Streams/Creeks (VPIH)	Waters_E	Waters_E	888.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland - Other Linear Feature	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	2.0	0.001833	Morrison Creek				
Streams/Creeks (VPIH)	Waters_P	Waters_IP	858.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Streams/Creeks (VPIH)	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	2.0	0.036812	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	38134.000000	Indirect Impact	Valley Grassland	Irrigated Pasture-Grassland	Class I	Class I	Class II	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	-1.0	0.0	1.0	-1.0	-1.0	2.0	0.009703	Morrison Creek				
Seasonal Wetlands	Wetland	Wetlands_S	37873.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	19.596800	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	83077.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.967985	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	85544.000000	No Impact	Recreation/Landscaped	Swale	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.055318	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	85555.000000	No Impact	Recreation/Landscaped	Swale	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.008817	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	85591.000000	No Impact	Recreation/Landscaped	Swale	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.009505	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	85949.000000	No Impact	Valley Grassland (Vernal Pool)	High Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.027148	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	85987.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	1.178750	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	86879.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.191389	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	90336.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.302672	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	90554.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	1.052880	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	91847.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.296776	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	96284.000000	No Impact	Valley Grassland (Vernal Pool)	High Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.010595	Morrison Creek				
Vernal Pool	Wetland	Wetlands_S	97395.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	1.910500	Morrison Creek				
Cropland - Other Linear Feature	Waters_E	Waters_E	580.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	0.0	0.019885	Deer Creek				
Cropland - Other Linear Feature	Waters_P	Waters_IP	479.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	0.0	0.155254	Deer Creek				
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4553.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	0.0	0.081363	Deer Creek				
Mixed Riparian Woodland	Wetland	Riparian	9026.000000	No Impact	Cropland	Disturbed	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	0.0	0.697450	Deer Creek				
Seasonal Wetlands	Wetland	Wetlands_S	36667.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	2.994510	Deer Creek				
Seasonal Wetlands	Wetland	Wetlands_S	36775.000000	No Impact	High Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	2.173690	Deer Creek				
Seasonal Wetlands	Wetland	Wetlands_S	37224.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	3.095680	Deer Creek				
Seasonal Wetlands	Wetland	Wetlands_S	37271.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.927980	Deer Creek				
Vernal Pool	Wetland	Wetlands_S	36993.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.939166	Deer Creek				
Vernal Pool	Wetland	Wetlands_S	37000.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.114517	Deer Creek				
Vernal Pool	Wetland	Wetlands_S	37008.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.203125	Deer Creek				
Vernal Pool	Wetland	Wetlands_S	37202.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.187779	Deer Creek				
Vernal Pool	Wetland	Wetlands_S	37216.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.082997	Deer Creek				
Vernal Pool	Wetland	Wetlands_S	38335.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.086128	Deer Creek				
Vernal Pool	Wetland	Wetlands_S	38337.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	0.0	0.142602	Deer Creek				
Vineyards - Other Linear Feature	Waters_E	Waters_E	41612.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	0.0	0.031080	Deer Creek				
Cropland - Other Linear Feature	Waters_E	Waters_E	480.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.038335	Upper Cosumnes River				
Freshwater Marsh	Wetland	Wetlands_P	1595.000000	No Impact	Low Density Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	2.0	0.326594	Upper Cosumnes River				
Freshwater Marsh	Wetland	Wetlands_P	1683.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	2.0	0.358216	Upper Cosumnes River				
Freshwater Marsh	Wetland	Wetlands_P	1833.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	2.0	0.426316	Upper Cosumnes River				
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4578.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.392334	Upper Cosumnes River				
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4718.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.009134	Upper Cosumnes River				
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4724.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.052227	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6481.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.014405	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6502.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.009784	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6606.000000	No Impact	Valley Grassland (Vernal Pool)	Major Roads	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.002928	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6615.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.010533	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6744.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.013955	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6761.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.099876	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6765.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.092758	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6885.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.000751	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6898.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.015696	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6900.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.048355	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7012.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.020626	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7267.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.012659	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7419.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.018775	Upper Cosumnes River				
Low Density Development - Other Linear Feature	Waters_E	Waters_E	7424.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.075715	Upper Cosumnes River				
Mine Tailing Riparian Woodland	Wetland	Riparian	9627.000000	No Impact	Mine Tailings	Seasonal Wetlands	Class II	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	2.0	7.478330	Upper Cosumnes River				
Seasonal Wetlands	Wetland	Wetlands_S	36685.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	1.793040	Upper Cosumnes River				
Seasonal Wetlands	Wetland	Wetlands_S	37021.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	2.156830	Upper Cosumnes River				
Seasonal Wetlands	Wetland	Wetlands_S	38046.000000	No Impact	Disturbed	Open Water	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	1.533930	Upper Cosumnes River				
Seasonal Wetlands	Wetland	Wetlands_S	38231.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	2.113250	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	71067.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.084979	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	75047.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.064074	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	75140.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.002042	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	75254.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.025064	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	75378.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.010818	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	75902.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.006141	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	76075.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.016667	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	76157.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.063401	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	76472.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.021711	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	76549.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.027850	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	76592.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.016702	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	76820.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.002615	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	78180.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.039667	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	78337.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.029894	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	78362.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.017171	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	78402.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.020118	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	78497.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.078867	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	78523.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.011042	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	85342.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.108504	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	87951.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.096427	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	36834.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.125367	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	36840.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.302116	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	36895.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.984565	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	36924.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.354902	Upper Cosumnes River				
Vernal Pool	Wetland	Wetlands_S	36938.000000	No Impact	Low Density Development	Low Density Development

Vernal Pool	Wetland	Wetlands_S	37154.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.191002	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37164.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.263312	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37166.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.555772	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37173.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.160527	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37191.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.098891	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37192.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.157061	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37205.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.110755	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37267.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.112626	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37338.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.705797	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37380.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.074999	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37414.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.107349	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37433.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.237776	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37438.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.008338	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37460.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.088193	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37466.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.241801	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37544.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.363872	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37566.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.335571	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37569.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.082566	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37607.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.150028	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37611.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.091400	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37613.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.179267	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37628.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.485951	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37632.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.163851	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37633.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.816955	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37639.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.883910	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37644.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.351008	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37649.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.173078	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37658.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.406830	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37665.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.161750	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37669.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.086969	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37715.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.152446	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37717.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.306204	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37723.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.161349	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37729.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.151274	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37739.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.797793	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37742.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.167387	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37746.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.400686	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37759.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.215612	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37760.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.102424	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37764.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.106348	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37768.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.221781	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37790.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.094149	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37792.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.356236	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37798.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.115957	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37801.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.124544	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37814.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.075938	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37827.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.495076	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37839.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.179338	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37843.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.264912	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37846.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.414288	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37855.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.201354	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37875.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.227596	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37897.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.090883	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37898.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.084716	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37910.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.099140	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37913.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.231050	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37919.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.119421	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37933.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.113678	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37947.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.082961	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37977.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.012731	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37981.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.179525	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37988.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.181881	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37991.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.090118	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38041.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.984350	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38080.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.844581	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38091.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.203450	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38092.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.212651	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38131.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.284557	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38150.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.142605	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38173.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.134730	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38217.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.105616	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38229.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.106070	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38263.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.837525	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38267.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.124418	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38301.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.133552	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38305.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.182207	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38308.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.485207	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38319.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.242801	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38322.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.161929	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38323.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.216987	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38330.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.218172	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	100860.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	3.0	0.722425	American River
Streams/Creeks	Waters_P	Waters_IP	4321.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	Moderate	0.0	0.0	0.0	-3.0	0.0	-3.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.212416	American River
Streams/Creeks	Waters_P	Waters_IP	4327.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	Moderate	0.0	0.0	0.0	-3.0	0.0	-3.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.537678	American River
Streams/Creeks	Waters_P	Waters_IP	4333.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	Moderate	0.0	0.0	0.0	-3.0	0.0	-3.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.358666	American River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41469.000000	No Impact	Valley Grassland	Blue Oak Woodland	Class I	Class I	Class I	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.145183	American River
Cropland - Other Linear Feature	Waters_E	Waters_E	268.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.337861	Laguna
Cropland - Other Linear Feature	Waters_E	Waters_E	330.000000	No Impact	Cropland	Irrigated

Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4454.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.233762	Laguna
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4472.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.021229	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5232.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.024579	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5506.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.001495	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5600.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.001466	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5628.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.054150	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5719.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class III	Class II	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	2.0	0.516308	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5754.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class III	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-2.0	-1.0	-1.0	2.0	0.147113	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5919.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.044088	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	6788.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class III	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	2.0	0.091342	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8695.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	2.0	1.843090	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8818.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	2.0	3.491190	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	35681.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	2.651550	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	36241.000000	No Impact	Low Density Development	Freshwater Marsh	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	2.117890	Laguna
Vernal Pool	Wetland	Wetlands_S	42647.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.042589	Laguna
Vernal Pool	Wetland	Wetlands_S	42651.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.025645	Laguna
Vernal Pool	Wetland	Wetlands_S	43508.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.009679	Laguna
Vernal Pool	Wetland	Wetlands_S	43519.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.036586	Laguna
Vernal Pool	Wetland	Wetlands_S	43938.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.154242	Laguna
Vernal Pool	Wetland	Wetlands_S	43941.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.143246	Laguna
Vernal Pool	Wetland	Wetlands_S	44016.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.078873	Laguna
Vernal Pool	Wetland	Wetlands_S	44670.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.007589	Laguna
Vernal Pool	Wetland	Wetlands_S	44680.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.086007	Laguna
Vernal Pool	Wetland	Wetlands_S	47551.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.065506	Laguna
Vernal Pool	Wetland	Wetlands_S	50207.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.121147	Laguna
Vernal Pool	Wetland	Wetlands_S	50383.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.112762	Laguna
Vernal Pool	Wetland	Wetlands_S	50645.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.116122	Laguna
Vernal Pool	Wetland	Wetlands_S	50646.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.091262	Laguna
Vernal Pool	Wetland	Wetlands_S	51788.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.025453	Laguna
Vernal Pool	Wetland	Wetlands_S	51854.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.006117	Laguna
Vernal Pool	Wetland	Wetlands_S	51925.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.007251	Laguna
Vernal Pool	Wetland	Wetlands_S	51928.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.010661	Laguna
Vernal Pool	Wetland	Wetlands_S	52039.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.010033	Laguna
Vernal Pool	Wetland	Wetlands_S	52235.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.003716	Laguna
Vernal Pool	Wetland	Wetlands_S	52502.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.012458	Laguna
Vernal Pool	Wetland	Wetlands_S	55980.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.059951	Laguna
Vernal Pool	Wetland	Wetlands_S	56028.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.002332	Laguna
Vernal Pool	Wetland	Wetlands_S	56047.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.003093	Laguna
Vernal Pool	Wetland	Wetlands_S	59548.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.008137	Laguna
Vernal Pool	Wetland	Wetlands_S	61703.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.004651	Laguna
Vernal Pool	Wetland	Wetlands_S	61954.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.002850	Laguna
Vernal Pool	Wetland	Wetlands_S	62591.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.015538	Laguna
Vernal Pool	Wetland	Wetlands_S	63066.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000299	Laguna
Vernal Pool	Wetland	Wetlands_S	63136.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000761	Laguna
Vernal Pool	Wetland	Wetlands_S	63363.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.003456	Laguna
Vernal Pool	Wetland	Wetlands_S	63401.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.001714	Laguna
Vernal Pool	Wetland	Wetlands_S	63441.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.001867	Laguna
Vernal Pool	Wetland	Wetlands_S	63590.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.017426	Laguna
Vernal Pool	Wetland	Wetlands_S	64262.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.001333	Laguna
Vernal Pool	Wetland	Wetlands_S	64351.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000749	Laguna
Vernal Pool	Wetland	Wetlands_S	64412.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.042601	Laguna
Vernal Pool	Wetland	Wetlands_S	64720.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.002029	Laguna
Vernal Pool	Wetland	Wetlands_S	64934.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000609	Laguna
Vernal Pool	Wetland	Wetlands_S	65215.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000184	Laguna
Vernal Pool	Wetland	Wetlands_S	65446.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000143	Laguna
Vernal Pool	Wetland	Wetlands_S	65571.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000275	Laguna
Vernal Pool	Wetland	Wetlands_S	65637.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000026	Laguna
Vernal Pool	Wetland	Wetlands_S	66045.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000091	Laguna
Vernal Pool	Wetland	Wetlands_S	66251.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.000618	Laguna
Vernal Pool	Wetland	Wetlands_S	66928.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.028325	Laguna
Vernal Pool	Wetland	Wetlands_S	68299.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.011204	Laguna
Vernal Pool	Wetland	Wetlands_S	72813.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.057750	Laguna
Vernal Pool	Wetland	Wetlands_S	72841.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.024859	Laguna
Vernal Pool	Wetland	Wetlands_S	72985.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.027134	Laguna
Vernal Pool	Wetland	Wetlands_S	74894.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.073455	Laguna
Vernal Pool	Wetland	Wetlands_S	86227.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.131593	Laguna
Vernal Pool	Wetland	Wetlands_S	35615.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.007042	Laguna
Vernal Pool	Wetland	Wetlands_S	35630.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.473755	Laguna
Vernal Pool	Wetland	Wetlands_S	35638.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.294497	Laguna
Vernal Pool	Wetland	Wetlands_S	35644.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.119490	Laguna
Vernal Pool	Wetland	Wetlands_S	35699.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.702261	Laguna
Vernal Pool	Wetland	Wetlands_S	35712.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.093799	Laguna
Vernal Pool	Wetland	Wetlands_S	35719.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.177465	Laguna
Vernal Pool	Wetland	Wetlands_S	35743.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.119154	Laguna
Vernal Pool	Wetland	Wetlands_S	35746.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.254800	Laguna
Vernal Pool	Wetland	Wetlands_S	35747.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.144460	Laguna
Vernal Pool	Wetland	Wetlands_S	35750.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.088969	Laguna
Vernal Pool	Wetland	Wetlands_S	35760.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.249190	Laguna
Vernal Pool	Wetland	Wetlands_S	35761.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.439441	Laguna
Vernal Pool	Wetland	Wetlands_S	35765.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.230331	Laguna
Vernal Pool	Wetland	Wetlands_S	35767.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.147438	Laguna
Vernal Pool	Wetland	Wetlands_S	35798.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.323331	Laguna
Vernal Pool	Wetland	Wetlands_S	35802.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.410595	Laguna
Vernal Pool	Wetland	Wetlands_S	35803.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.547900	Laguna
Vernal Pool	Wetland	Wetlands_S	35839.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.180007	Laguna
Vernal Pool	Wetland	Wetlands_S	35844.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.006516	Laguna
Vernal Pool	Wetland	Wetlands_S	35847.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.240724

Vernal Pool	Wetland	Wetlands_S	35897.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.104110	Laguna				
Vernal Pool	Wetland	Wetlands_S	35901.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.074310	Laguna				
Vernal Pool	Wetland	Wetlands_S	35912.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.120521	Laguna				
Vernal Pool	Wetland	Wetlands_S	35915.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.078129	Laguna				
Vernal Pool	Wetland	Wetlands_S	35922.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.106352	Laguna				
Vernal Pool	Wetland	Wetlands_S	35931.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.102516	Laguna				
Vernal Pool	Wetland	Wetlands_S	35935.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.104344	Laguna				
Vernal Pool	Wetland	Wetlands_S	35939.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.098198	Laguna				
Vernal Pool	Wetland	Wetlands_S	35945.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.318736	Laguna				
Vernal Pool	Wetland	Wetlands_S	35948.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.142293	Laguna				
Vernal Pool	Wetland	Wetlands_S	35949.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.084509	Laguna				
Vernal Pool	Wetland	Wetlands_S	35951.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.178206	Laguna				
Vernal Pool	Wetland	Wetlands_S	35960.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.636686	Laguna				
Vernal Pool	Wetland	Wetlands_S	35967.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.074185	Laguna				
Vernal Pool	Wetland	Wetlands_S	35972.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.108863	Laguna				
Vernal Pool	Wetland	Wetlands_S	35974.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.318896	Laguna				
Vernal Pool	Wetland	Wetlands_S	35991.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.077605	Laguna				
Vernal Pool	Wetland	Wetlands_S	35997.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.094213	Laguna				
Vernal Pool	Wetland	Wetlands_S	36014.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.172785	Laguna				
Vernal Pool	Wetland	Wetlands_S	36021.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.010718	Laguna				
Vernal Pool	Wetland	Wetlands_S	36029.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.135059	Laguna				
Vernal Pool	Wetland	Wetlands_S	36040.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.147742	Laguna				
Vernal Pool	Wetland	Wetlands_S	36042.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.269341	Laguna				
Vernal Pool	Wetland	Wetlands_S	36046.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.553985	Laguna				
Vernal Pool	Wetland	Wetlands_S	36060.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.320647	Laguna				
Vernal Pool	Wetland	Wetlands_S	36062.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.108446	Laguna				
Vernal Pool	Wetland	Wetlands_S	36066.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.080924	Laguna				
Vernal Pool	Wetland	Wetlands_S	36071.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.138288	Laguna				
Vernal Pool	Wetland	Wetlands_S	36076.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.195385	Laguna				
Vernal Pool	Wetland	Wetlands_S	36081.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.495440	Laguna				
Vernal Pool	Wetland	Wetlands_S	36083.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.133611	Laguna				
Vernal Pool	Wetland	Wetlands_S	36084.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.108122	Laguna				
Vernal Pool	Wetland	Wetlands_S	36088.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.099382	Laguna				
Vernal Pool	Wetland	Wetlands_S	36090.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.074135	Laguna				
Vernal Pool	Wetland	Wetlands_S	36092.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.164724	Laguna				
Vernal Pool	Wetland	Wetlands_S	36093.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.192333	Laguna				
Vernal Pool	Wetland	Wetlands_S	36095.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.242142	Laguna				
Vernal Pool	Wetland	Wetlands_S	36101.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.196118	Laguna				
Vernal Pool	Wetland	Wetlands_S	36109.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.161382	Laguna				
Vernal Pool	Wetland	Wetlands_S	36134.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.968954	Laguna				
Vernal Pool	Wetland	Wetlands_S	36143.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.122773	Laguna				
Vernal Pool	Wetland	Wetlands_S	36160.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.119341	Laguna				
Vernal Pool	Wetland	Wetlands_S	36161.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.117078	Laguna				
Vernal Pool	Wetland	Wetlands_S	36172.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.136501	Laguna				
Vernal Pool	Wetland	Wetlands_S	36174.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.170513	Laguna				
Vernal Pool	Wetland	Wetlands_S	36178.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.092100	Laguna				
Vernal Pool	Wetland	Wetlands_S	36193.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.762011	Laguna				
Vernal Pool	Wetland	Wetlands_S	36203.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.075743	Laguna				
Vernal Pool	Wetland	Wetlands_S	36302.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.306651	Laguna				
Vernal Pool	Wetland	Wetlands_S	36305.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.554628	Laguna				
Vernal Pool	Wetland	Wetlands_S	36306.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.777564	Laguna				
Vernal Pool	Wetland	Wetlands_S	36308.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.099710	Laguna				
Vernal Pool	Wetland	Wetlands_S	36311.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.129546	Laguna				
Vernal Pool	Wetland	Wetlands_S	36333.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.124651	Laguna				
Vernal Pool	Wetland	Wetlands_S	36364.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.095233	Laguna				
Vernal Pool	Wetland	Wetlands_S	36374.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.136104	Laguna				
Vernal Pool	Wetland	Wetlands_S	36407.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.005198	Laguna				
Vernal Pool	Wetland	Wetlands_S	36434.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	2.0	0.006730	Laguna				
Vernal Pool	Wetland	Wetlands_S	36458.000000	No Impact	Low Density Development	Low Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.681209	Laguna				
Vernal Pool	Wetland	Wetlands_S	36504.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.172478	Laguna				
Vernal Pool	Wetland	Wetlands_S	37357.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.119114	Laguna				
Vernal Pool	Wetland	Wetlands_S	37417.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.171552	Laguna				
Vernal Pool	Wetland	Wetlands_S	37425.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.170821	Laguna				
Vernal Pool	Wetland	Wetlands_S	37454.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.141774	Laguna				
Vernal Pool	Wetland	Wetlands_S	37462.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.091757	Laguna				
Vernal Pool	Wetland	Wetlands_S	37838.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.103593	Laguna				
Vernal Pool	Wetland	Wetlands_S	37905.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.079026	Laguna				
Vernal Pool	Wetland	Wetlands_S	37917.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.542966	Laguna				
Vernal Pool	Wetland	Wetlands_S	37952.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.239558	Laguna				
Vernal Pool	Wetland	Wetlands_S	37957.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.729283	Laguna				
Vernal Pool	Wetland	Wetlands_S	37967.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.282091	Laguna				
Vernal Pool	Wetland	Wetlands_S	37968.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.236551	Laguna				
Vernal Pool	Wetland	Wetlands_S	37972.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.095670	Laguna				
Vernal Pool	Wetland	Wetlands_S	37974.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.133856	Laguna				
Vernal Pool	Wetland	Wetlands_S	37977.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.650781	Laguna				
Vernal Pool	Wetland	Wetlands_S	38003.000000	No Impact	Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.144463	Laguna				
Vernal Pool	Wetland	Wetlands_S	102640.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.285984	Laguna				
Vineyards - Other Linear Feature	Waters_E	Waters_E	41506.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.639031	Laguna				
Vineyards - Other Linear Feature	Waters_E	Waters_E	41509.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.013140	Laguna				
Vineyards - Other Linear Feature	Waters_E	Waters_E	41515.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.153359	Laguna				
Vineyards - Other Linear Feature	Waters_E	Waters_E	41560.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.052308	Laguna				
Vineyards - Other Linear Feature	Waters_E	Waters_E	41579.000000	No Impact	Vineyards	Vineyards	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.219892	Laguna				
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4576.000000		Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	0.109736	Laguna				
Freshwater Marsh	Wetland	Wetlands_P	925.000000	No Impact	Major Roads	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	1.0	1.0	2.0	4.196660	Lower Dry Creek				
Mixed Riparian Woodland	Wetland	Riparian	8485.000000	No Impact	Cropland	Future Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	2.0	1.342900	Lower Dry Creek				
Mixed Riparian Woodland	Wetland	Riparian	8795.000000	No Impact	Orchards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.651163	Lower Dry Creek				
Seasonal Wetlands	Wetland	Wetlands_S	35487.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	2.0	2.562570	Lower Dry Creek				
Swale	Waters_E	Waters_E	12178.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	1.0

Mixed Riparian Scrub	Wetland	Riparian	7952.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.391032	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	7960.000000	No Impact	Mixed Riparian Woodland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.484362	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	7975.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.351910	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	7998.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.489144	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8013.000000	No Impact	Streams/Creeks	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	2.025140	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8017.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.888235	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8021.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.477197	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8022.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.630391	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8025.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.339741	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8026.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.673155	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8027.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.782077	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8030.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.376419	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8040.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.414248	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8046.000000	No Impact	Streams/Creeks	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.517597	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8051.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.621069	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8053.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.968693	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8056.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.443583	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8057.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.247216	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8058.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.385946	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8248.000000	No Impact	Open Water	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.208901	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8250.000000	No Impact	Open Water	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.295354	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8251.000000	No Impact	Open Water	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.466106	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8254.000000	No Impact	Open Water	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.784380	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8556.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.974140	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8568.000000	No Impact	Streams/Creeks	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.026530	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8587.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.818520	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8597.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.827650	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8599.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.250017	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8634.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.068130	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8640.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.720230	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8641.000000	No Impact	Streams/Creeks	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	2.575180	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8643.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.782273	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8653.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.975173	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8658.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.318860	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8685.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.997509	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8800.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	4.204730	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8978.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.022020	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9000.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.558431	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9001.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.356264	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9002.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	3.645410	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9003.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.541413	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9004.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	2.243650	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9005.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	2.367710	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9066.000000	No Impact	Freshwater Marsh	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.053295	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9068.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.003858	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	9069.000000	No Impact	Seasonal Wetlands	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.418875	Snodgrass Slough
Open Water	Waters_P	Waters_P	10731.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	30.375300	Snodgrass Slough
Open Water	Waters_P	Waters_P	10910.000000	No Impact	Cropland	Mixed Riparian Scrub	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	11.530100	Snodgrass Slough
Open Water	Waters_P	Waters_P	10997.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	2.0	0.226446	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2863.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.177957	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2867.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.187903	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2919.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.114706	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	2956.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.515026	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3065.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.727457	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3075.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.154631	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3099.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.027769	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3291.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.092334	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3327.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.390092	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3356.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.834012	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3362.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.210731	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3431.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.218249	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3486.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.249825	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3488.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.429230	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3531.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	2.0	2.560150	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3540.000000	No Impact	Cropland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.033623	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3596.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	2.0	19.462900	Snodgrass Slough
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39604.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.739372	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	79087.000000		Mine Tailings	Mine Tailings	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	2.0	0.113693	Laguna
Vineyards - Other Linear Feature	Waters_E	Waters_E	41530.000000		Vineyards	Irrigated Pasture-Grassland - Other Linear Feature	Class II	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	2.0	1.565140	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	911.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	2.0	0.463606	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8194.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	2.940030	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8470.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	1.750270	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8484.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	9.893510	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8601.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	134.362000	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8789.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	9.437010	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10777.000000	No Impact	Irrigated Pasture-Grassland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	0.323407	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10824.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	0.427529	Lower Cosumnes River
Open Water	Waters_P	Waters_P	10987.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	0.150482	Lower Cosumnes River
Open Water	Waters_P	Waters_P	11005.000000	No Impact	Irrigated Pasture-Grassland	Seasonal Wetlands	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	0.475025	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2757.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	2.0	26.618900	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2774.000000	No Impact	Major Roads - Other Linear Feature	Major Roads - Other Linear Feature	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	2.0	15.289000	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3032.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	2.0	0.361487	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3166.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	2.0	0.338158	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3211.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	2.0	2.222320	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3282.000000	No Impact	High Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	2.0	0.100201	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3286.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	-2.0

Swale	Waters_E	Waters_E	11944.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.154048	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39085.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	2.0	0.126473	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39090.000000	No Impact	Cropland	Cropland - Other Linear Feature	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.057110	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39432.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.766224	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39542.000000	No Impact	Cropland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.030549	Lower Cosumnes River
Swale	Waters_E	Waters_E	28698.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.012962	Morrison Creek
Swale	Waters_E	Waters_E	28734.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006591	Morrison Creek
Swale	Waters_E	Waters_E	28741.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004768	Morrison Creek
Swale	Waters_E	Waters_E	28747.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002823	Morrison Creek
Swale	Waters_E	Waters_E	28748.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025025	Morrison Creek
Swale	Waters_E	Waters_E	28752.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002600	Morrison Creek
Swale	Waters_E	Waters_E	28760.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.012496	Morrison Creek
Swale	Waters_E	Waters_E	28771.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.018203	Morrison Creek
Swale	Waters_E	Waters_E	28773.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.018636	Morrison Creek
Swale	Waters_E	Waters_E	28775.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009021	Morrison Creek
Swale	Waters_E	Waters_E	28796.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Mixed Riparian Woodland	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.044973	Morrison Creek
Swale	Waters_E	Waters_E	28844.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016320	Morrison Creek
Swale	Waters_E	Waters_E	28955.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003633	Morrison Creek
Swale	Waters_E	Waters_E	28960.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005795	Morrison Creek
Swale	Waters_E	Waters_E	28964.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004090	Morrison Creek
Swale	Waters_E	Waters_E	29038.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.034857	Morrison Creek
Swale	Waters_E	Waters_E	29049.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.036603	Morrison Creek
Swale	Waters_E	Waters_E	29072.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016007	Morrison Creek
Swale	Waters_E	Waters_E	29131.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.014936	Morrison Creek
Swale	Waters_E	Waters_E	29138.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025557	Morrison Creek
Swale	Waters_E	Waters_E	29275.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009824	Morrison Creek
Swale	Waters_E	Waters_E	29602.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.024247	Morrison Creek
Swale	Waters_E	Waters_E	29634.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.007653	Morrison Creek
Swale	Waters_E	Waters_E	30059.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.031073	Morrison Creek
Swale	Waters_E	Waters_E	30095.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.014002	Morrison Creek
Swale	Waters_E	Waters_E	30140.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.027427	Morrison Creek
Swale	Waters_E	Waters_E	30188.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015461	Morrison Creek
Swale	Waters_E	Waters_E	30193.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.007023	Morrison Creek
Swale	Waters_E	Waters_E	30202.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.018040	Morrison Creek
Swale	Waters_E	Waters_E	30247.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.023683	Morrison Creek
Swale	Waters_E	Waters_E	30252.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.031130	Morrison Creek
Swale	Waters_E	Waters_E	30265.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002890	Morrison Creek
Swale	Waters_E	Waters_E	30483.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.038717	Morrison Creek
Swale	Waters_E	Waters_E	30633.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016992	Morrison Creek
Swale	Waters_E	Waters_E	30638.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002397	Morrison Creek
Swale	Waters_E	Waters_E	30700.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009735	Morrison Creek
Swale	Waters_E	Waters_E	30707.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.010715	Morrison Creek
Swale	Waters_E	Waters_E	30715.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003010	Morrison Creek
Swale	Waters_E	Waters_E	30716.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009005	Morrison Creek
Swale	Waters_E	Waters_E	30717.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.034749	Morrison Creek
Swale	Waters_E	Waters_E	30719.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006034	Morrison Creek
Swale	Waters_E	Waters_E	30722.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003386	Morrison Creek
Swale	Waters_E	Waters_E	30732.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.031785	Morrison Creek
Swale	Waters_E	Waters_E	30735.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002674	Morrison Creek
Swale	Waters_E	Waters_E	30738.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.021369	Morrison Creek
Swale	Waters_E	Waters_E	30739.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.024963	Morrison Creek
Swale	Waters_E	Waters_E	30742.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002803	Morrison Creek
Swale	Waters_E	Waters_E	30746.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.010896	Morrison Creek
Swale	Waters_E	Waters_E	30747.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006502	Morrison Creek
Swale	Waters_E	Waters_E	30751.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.030272	Morrison Creek
Swale	Waters_E	Waters_E	30771.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011909	Morrison Creek
Swale	Waters_E	Waters_E	30775.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.027249	Morrison Creek
Swale	Waters_E	Waters_E	30777.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.043897	Morrison Creek
Swale	Waters_E	Waters_E	30788.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011419	Morrison Creek
Swale	Waters_E	Waters_E	30828.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009931	Morrison Creek
Swale	Waters_E	Waters_E	30833.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.007040	Morrison Creek
Swale	Waters_E	Waters_E	30837.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.026905	Morrison Creek
Swale	Waters_E	Waters_E	30869.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011892	Morrison Creek
Swale	Waters_E	Waters_E	30878.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009683	Morrison Creek
Swale	Waters_E	Waters_E	30917.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.022576	Morrison Creek
Swale	Waters_E	Waters_E	30927.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001182	Morrison Creek
Swale	Waters_E	Waters_E	30941.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025505	Morrison Creek
Swale	Waters_E	Waters_E	30949.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.035793	Morrison Creek
Swale	Waters_E	Waters_E	31069.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002185	Morrison Creek
Swale	Waters_E	Waters_E	31250.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025745	Morrison Creek
Swale	Waters_E	Waters_E	31269.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005849	Morrison Creek
Swale	Waters_E	Waters_E	31277.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006579	Morrison Creek
Swale	Waters_E	Waters_E	31292.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011528	Morrison Creek
Swale	Waters_E	Waters_E	31311.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006100	Morrison Creek
Swale	Waters_E	Waters_E	31323.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.035195	Morrison Creek
Swale	Waters_E	Waters_E	31324.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.017155	Morrison Creek
Swale	Waters_E	Waters_E	31329.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.023101	Morrison Creek
Swale	Waters_E	Waters_E	31353.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005741	Morrison Creek
Swale	Waters_E	Waters_E	31354.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.026151	Morrison Creek
Swale	Waters_E	Waters_E	31364.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016358	Morrison Creek
Swale	Waters_E	Waters_E	31365.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006810	Morrison Creek
Swale	Waters_E	Waters_E	31367.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.013699	Morrison Creek
Swale	Waters_E	Waters_E	31369.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.024440	Morrison Creek
Swale	Waters_E	Waters_E	31372.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.010362	Morrison Creek
Swale	Waters_E	Waters_E	31373.000000	Indirect Impact	Valley Grassland (Vernal Pool)

Swale	Waters_E	Waters_E	31727.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.029502	Morrison Creek
Swale	Waters_E	Waters_E	31734.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.017518	Morrison Creek
Swale	Waters_E	Waters_E	31752.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.012112	Morrison Creek
Swale	Waters_E	Waters_E	31755.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.027084	Morrison Creek
Swale	Waters_E	Waters_E	31756.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003774	Morrison Creek
Swale	Waters_E	Waters_E	31758.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016555	Morrison Creek
Swale	Waters_E	Waters_E	31760.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015664	Morrison Creek
Swale	Waters_E	Waters_E	31764.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002382	Morrison Creek
Swale	Waters_E	Waters_E	31765.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003087	Morrison Creek
Swale	Waters_E	Waters_E	31769.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.007354	Morrison Creek
Swale	Waters_E	Waters_E	31772.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001999	Morrison Creek
Swale	Waters_E	Waters_E	31773.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002465	Morrison Creek
Swale	Waters_E	Waters_E	31776.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002243	Morrison Creek
Swale	Waters_E	Waters_E	31777.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005969	Morrison Creek
Swale	Waters_E	Waters_E	31781.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015653	Morrison Creek
Swale	Waters_E	Waters_E	31782.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.008964	Morrison Creek
Swale	Waters_E	Waters_E	31786.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009773	Morrison Creek
Swale	Waters_E	Waters_E	31825.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006798	Morrison Creek
Swale	Waters_E	Waters_E	31828.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005679	Morrison Creek
Swale	Waters_E	Waters_E	31835.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.007885	Morrison Creek
Swale	Waters_E	Waters_E	31841.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.013791	Morrison Creek
Swale	Waters_E	Waters_E	31842.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.008908	Morrison Creek
Swale	Waters_E	Waters_E	31856.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.019779	Morrison Creek
Swale	Waters_E	Waters_E	31865.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016826	Morrison Creek
Swale	Waters_E	Waters_E	31876.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004139	Morrison Creek
Swale	Waters_E	Waters_E	31891.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.014179	Morrison Creek
Swale	Waters_E	Waters_E	31901.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016153	Morrison Creek
Swale	Waters_E	Waters_E	31912.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.041796	Morrison Creek
Swale	Waters_E	Waters_E	31915.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.024069	Morrison Creek
Swale	Waters_E	Waters_E	31940.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.037321	Morrison Creek
Swale	Waters_E	Waters_E	31960.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.028791	Morrison Creek
Swale	Waters_E	Waters_E	31976.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.008815	Morrison Creek
Swale	Waters_E	Waters_E	32007.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001795	Morrison Creek
Swale	Waters_E	Waters_E	32033.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006181	Morrison Creek
Swale	Waters_E	Waters_E	32041.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004436	Morrison Creek
Swale	Waters_E	Waters_E	32051.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.023584	Morrison Creek
Swale	Waters_E	Waters_E	32058.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011487	Morrison Creek
Swale	Waters_E	Waters_E	32064.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.019623	Morrison Creek
Swale	Waters_E	Waters_E	32079.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.045872	Morrison Creek
Swale	Waters_E	Waters_E	32210.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.024380	Morrison Creek
Swale	Waters_E	Waters_E	32214.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.014399	Morrison Creek
Swale	Waters_E	Waters_E	32298.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.013217	Morrison Creek
Swale	Waters_E	Waters_E	32300.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.014025	Morrison Creek
Swale	Waters_E	Waters_E	32326.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.022226	Morrison Creek
Swale	Waters_E	Waters_E	32350.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004631	Morrison Creek
Swale	Waters_E	Waters_E	32363.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003211	Morrison Creek
Swale	Waters_E	Waters_E	32375.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.035104	Morrison Creek
Swale	Waters_E	Waters_E	32382.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025352	Morrison Creek
Swale	Waters_E	Waters_E	32388.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025663	Morrison Creek
Swale	Waters_E	Waters_E	32479.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003314	Morrison Creek
Swale	Waters_E	Waters_E	32510.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.010928	Morrison Creek
Swale	Waters_E	Waters_E	32521.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.013542	Morrison Creek
Swale	Waters_E	Waters_E	32536.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.013643	Morrison Creek
Swale	Waters_E	Waters_E	32587.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003083	Morrison Creek
Swale	Waters_E	Waters_E	32601.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006394	Morrison Creek
Swale	Waters_E	Waters_E	32611.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001342	Morrison Creek
Swale	Waters_E	Waters_E	32615.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003731	Morrison Creek
Swale	Waters_E	Waters_E	32618.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.008510	Morrison Creek
Swale	Waters_E	Waters_E	32619.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002109	Morrison Creek
Swale	Waters_E	Waters_E	32620.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004976	Morrison Creek
Swale	Waters_E	Waters_E	32633.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.022924	Morrison Creek
Swale	Waters_E	Waters_E	32646.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015854	Morrison Creek
Swale	Waters_E	Waters_E	32647.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015707	Morrison Creek
Swale	Waters_E	Waters_E	32675.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005045	Morrison Creek
Swale	Waters_E	Waters_E	32676.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015756	Morrison Creek
Swale	Waters_E	Waters_E	32735.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.017164	Morrison Creek
Swale	Waters_E	Waters_E	32740.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.020301	Morrison Creek
Swale	Waters_E	Waters_E	32750.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015489	Morrison Creek
Swale	Waters_E	Waters_E	32757.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006840	Morrison Creek
Swale	Waters_E	Waters_E	32778.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001923	Morrison Creek
Swale	Waters_E	Waters_E	32779.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015792	Morrison Creek
Swale	Waters_E	Waters_E	32786.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.012659	Morrison Creek
Swale	Waters_E	Waters_E	32799.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004812	Morrison Creek
Swale	Waters_E	Waters_E	32818.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009220	Morrison Creek
Swale	Waters_E	Waters_E	32838.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.045735	Morrison Creek
Swale	Waters_E	Waters_E	32854.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.040635	Morrison Creek
Swale	Waters_E	Waters_E	32906.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.044229	Morrison Creek
Swale	Waters_E	Waters_E	32977.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.024225	Morrison Creek
Swale	Waters_E	Waters_E	32981.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002042	Morrison Creek
Swale	Waters_E	Waters_E	32993.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016673	Morrison Creek
Swale	Waters_E	Waters_E	32994.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003600	Morrison Creek
Swale	Waters_E	Waters_E	33010.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002442	Morrison Creek
Swale	Waters_E	Waters_E	33015.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001073	Morrison Creek
Swale	Waters_E	Waters_E	33016.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002014	Morrison Creek
Swale	Waters_E	Waters_E	33018.000000	Indirect Impact	Valley Grassland (

Swale	Waters_E	Waters_E	33157.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.043765	Morrison Creek			
Swale	Waters_E	Waters_E	33161.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011256	Morrison Creek			
Swale	Waters_E	Waters_E	33164.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.023070	Morrison Creek			
Swale	Waters_E	Waters_E	33170.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006290	Morrison Creek			
Swale	Waters_E	Waters_E	33180.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005485	Morrison Creek			
Swale	Waters_E	Waters_E	33186.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002872	Morrison Creek			
Swale	Waters_E	Waters_E	33190.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004985	Morrison Creek			
Swale	Waters_E	Waters_E	33202.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.017403	Morrison Creek			
Swale	Waters_E	Waters_E	33216.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011448	Morrison Creek			
Swale	Waters_E	Waters_E	33225.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003405	Morrison Creek			
Swale	Waters_E	Waters_E	33227.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.014174	Morrison Creek			
Swale	Waters_E	Waters_E	33231.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.015188	Morrison Creek			
Swale	Waters_E	Waters_E	33251.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006872	Morrison Creek			
Swale	Waters_E	Waters_E	33451.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011758	Morrison Creek			
Swale	Waters_E	Waters_E	33455.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025700	Morrison Creek			
Swale	Waters_E	Waters_E	33457.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003823	Morrison Creek			
Swale	Waters_E	Waters_E	33461.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006113	Morrison Creek			
Swale	Waters_E	Waters_E	33489.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.021608	Morrison Creek			
Swale	Waters_E	Waters_E	33562.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.019244	Morrison Creek			
Swale	Waters_E	Waters_E	33571.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005565	Morrison Creek			
Swale	Waters_E	Waters_E	33579.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001523	Morrison Creek			
Swale	Waters_E	Waters_E	33597.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003119	Morrison Creek			
Swale	Waters_E	Waters_E	33598.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.030196	Morrison Creek			
Swale	Waters_E	Waters_E	33603.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016486	Morrison Creek			
Swale	Waters_E	Waters_E	33676.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.019396	Morrison Creek			
Swale	Waters_E	Waters_E	33755.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.020831	Morrison Creek			
Swale	Waters_E	Waters_E	33758.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004952	Morrison Creek			
Swale	Waters_E	Waters_E	34111.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.008134	Morrison Creek			
Swale	Waters_E	Waters_E	34432.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001215	Morrison Creek			
Swale	Waters_E	Waters_E	34462.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.030747	Morrison Creek			
Swale	Waters_E	Waters_E	34540.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004067	Morrison Creek			
Swale	Waters_E	Waters_E	34548.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006413	Morrison Creek			
Swale	Waters_E	Waters_E	34555.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009185	Morrison Creek			
Swale	Waters_E	Waters_E	34601.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.006056	Morrison Creek			
Swale	Waters_E	Waters_E	34684.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003671	Morrison Creek			
Swale	Waters_E	Waters_E	34686.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001491	Morrison Creek			
Swale	Waters_E	Waters_E	34687.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009537	Morrison Creek			
Swale	Waters_E	Waters_E	34692.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004971	Morrison Creek			
Swale	Waters_E	Waters_E	34697.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003023	Morrison Creek			
Swale	Waters_E	Waters_E	34705.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.001886	Morrison Creek			
Swale	Waters_E	Waters_E	34707.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002924	Morrison Creek			
Swale	Waters_E	Waters_E	34708.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.009419	Morrison Creek			
Swale	Waters_E	Waters_E	34710.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004325	Morrison Creek			
Swale	Waters_E	Waters_E	34713.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.016015	Morrison Creek			
Swale	Waters_E	Waters_E	34715.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005620	Morrison Creek			
Swale	Waters_E	Waters_E	34725.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.017376	Morrison Creek			
Swale	Waters_E	Waters_E	34728.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.018756	Morrison Creek			
Swale	Waters_E	Waters_E	34739.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.004785	Morrison Creek			
Swale	Waters_E	Waters_E	34741.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.011210	Morrison Creek			
Swale	Waters_E	Waters_E	34746.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003267	Morrison Creek			
Swale	Waters_E	Waters_E	34748.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.013130	Morrison Creek			
Swale	Waters_E	Waters_E	34749.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.005812	Morrison Creek			
Swale	Waters_E	Waters_E	34750.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002575	Morrison Creek			
Swale	Waters_E	Waters_E	34751.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.022402	Morrison Creek			
Swale	Waters_E	Waters_E	34752.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.007516	Morrison Creek			
Swale	Waters_E	Waters_E	34758.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.003785	Morrison Creek			
Swale	Waters_E	Waters_E	34759.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.030525	Morrison Creek			
Swale	Waters_E	Waters_E	34761.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.033783	Morrison Creek			
Swale	Waters_E	Waters_E	34768.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.039524	Morrison Creek			
Swale	Waters_E	Waters_E	34769.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.043511	Morrison Creek			
Swale	Waters_E	Waters_E	34770.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.002082	Morrison Creek			
Swale	Waters_E	Waters_E	34771.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.021304	Morrison Creek			
Swale	Waters_E	Waters_E	34820.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.040955	Morrison Creek			
Swale	Waters_E	Waters_E	34956.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	3.0	0.025077	Morrison Creek			
Vernal Pool	Wetland	Wetlands_S	84040.000000	Indirect Impact	Mixed Riparian Scrub	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	-1.0	3.0	0.020434	Morrison Creek			
Freshwater Marsh	Wetland	Wetlands_SP	103852.000000	No Impact	Future Development	Seasonal Wetlands	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	137.230000	Morrison Creek			
Freshwater Marsh	Wetland	Wetlands_SP	103853.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	29.517100	Morrison Creek			
Open Water	Waters_P	Waters_IP	11172.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	3.0	0.014649	Morrison Creek			
Open Water	Waters_P	Waters_P	11233.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	3.0	1.444340	Morrison Creek			
Freshwater Marsh	Wetland	Wetlands_P	1809.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	1.0	0.892177	Deer Creek			
Seasonal Wetlands	Wetland	Wetlands_S	36857.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	3.549260	Deer Creek			
Streams/Creeks	Waters_P	Waters_IP	3859.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	1.0	0.112217	Deer Creek			
Vineyards - Other Linear Feature	Waters_P	Waters_IP	41601.000000	No Impact	Vineyards	Valley Grassland	Class II	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	1.0	0.518013	Deer Creek			
Cropland - Other Linear Feature	Waters_E	Waters_E	470.000000	No Impact	Cropland	Valley Grassland	Class II	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	3.0	0.073156	Upper Cosumnes River			
Freshwater Marsh	Wetland	Wetlands_P	1781.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.282537	Upper Cosumnes River			
Freshwater Marsh	Wetland	Wetlands_P	1834.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.117088	Upper Cosumnes River			
Freshwater Marsh	Wetland	Wetlands_P	1877.000000	No Impact	Low Density Development	Open Water	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.631591	Upper Cosumnes River			
Freshwater Marsh	Wetland	Wetlands_P	2059.000000	No Impact	Disturbed	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.181179	Upper Cosumnes River			
Freshwater Marsh	Wetland	Wetlands_P	2081.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	1.080760	Upper Cosumnes River			
Mine Tailing Riparian Woodland	Wetland	Riparian	9620.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	2.790190	Upper Cosumnes River			
Mine Tailing Riparian Woodland	Wetland	Riparian	9629.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	3.290680	Upper Cosumnes River			
Mine Tailing Riparian Woodland	Wetland	Riparian	9630.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	2.346390	Upper Cosumnes River			
Mine Tailing Riparian Woodland	Wetland	Riparian	9631.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.401944	Upper Cosumnes River			
Mine Tailing Riparian Woodland	Wetland	Riparian	9632.000000	No Impact

Mine Tailing Riparian Woodland	Wetland	Riparian	9665.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.829751	Upper Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9666.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.398550	Upper Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9667.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.815377	Upper Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9668.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.561026	Upper Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9684.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.909849	Upper Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9685.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.468993	Upper Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9688.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	1.491040	Upper Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9689.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.755633	Upper Cosumnes River
Seasonal Wetlands	Wetland	Wetlands_S	37141.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	1.0	1.0	3.0	1.042920	Upper Cosumnes River
Seasonal Wetlands	Wetland	Wetlands_S	38165.000000	No Impact	Disturbed	Disturbed	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	3.0	5.982960	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3595.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.054618	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37747.000000	No Impact	Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.033544	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	37818.000000	No Impact	Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.032402	Upper Cosumnes River
Vernal Pool	Wetland	Wetlands_S	38115.000000	No Impact	Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.042506	Upper Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	282.000000	No Impact	Cropland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	3.0	0.189217	Laguna
Cropland - Other Linear Feature	Waters_E	Waters_E	356.000000	No Impact	Cropland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	3.0	0.127568	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1024.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	1.562880	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1027.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	2.075220	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1151.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.046598	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1179.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.180355	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1181.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	1.258620	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1278.000000	No Impact	Future Development	Streams/Creeks	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.133040	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1298.000000	No Impact	Low Density Development	Seasonal Wetlands	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	1.0	1.0	3.0	0.726076	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5517.000000	No Impact	Vineyards	Low Density Development	Class III	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	3.0	0.194909	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9599.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.369951	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9601.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.304310	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9603.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.725455	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9610.000000	No Impact	Mine Tailings	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	-1.0	-1.0	-1.0	3.0	4.055530	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9613.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	1.962604	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9618.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	3.083730	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9626.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	0.554937	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9650.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	2.211720	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9662.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	2.182990	Laguna
Mine Tailing Riparian Woodland	Wetland	Riparian	9669.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	3.0	1.985240	Laguna
Orchards - Other Linear Feature	Waters_E	Waters_E	10601.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class II	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	3.0	0.036892	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	36186.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	1.0	1.0	3.0	1.731590	Laguna
Streams/Creeks	Waters_P	Waters_IP	2813.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.171750	Laguna
Streams/Creeks	Waters_P	Waters_IP	2827.000000	No Impact	Low Density Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.204962	Laguna
Streams/Creeks	Waters_P	Waters_IP	2849.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.176520	Laguna
Streams/Creeks	Waters_P	Waters_IP	2850.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.503872	Laguna
Streams/Creeks	Waters_P	Waters_IP	2968.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.188301	Laguna
Streams/Creeks	Waters_P	Waters_IP	2988.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.487694	Laguna
Streams/Creeks	Waters_P	Waters_IP	2989.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.775079	Laguna
Streams/Creeks	Waters_P	Waters_IP	2994.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.105482	Laguna
Streams/Creeks	Waters_P	Waters_IP	3012.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.020111	Laguna
Streams/Creeks	Waters_P	Waters_IP	3013.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.094023	Laguna
Streams/Creeks	Waters_P	Waters_IP	3015.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.196196	Laguna
Streams/Creeks	Waters_P	Waters_IP	3016.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.401682	Laguna
Streams/Creeks	Waters_P	Waters_IP	3068.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.173860	Laguna
Streams/Creeks	Waters_P	Waters_IP	3078.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.054971	Laguna
Streams/Creeks	Waters_P	Waters_IP	3103.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	1.240030	Laguna
Streams/Creeks	Waters_P	Waters_IP	3115.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	1.273920	Laguna
Streams/Creeks	Waters_P	Waters_IP	3189.000000	No Impact	Major Roads	Vineyards	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.276933	Laguna
Streams/Creeks	Waters_P	Waters_IP	3191.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.103473	Laguna
Streams/Creeks	Waters_P	Waters_IP	3213.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.032610	Laguna
Streams/Creeks	Waters_P	Waters_IP	3311.000000	No Impact	Future Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	1.644870	Laguna
Vernal Pool	Wetland	Wetlands_S	50149.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.021175	Laguna
Vernal Pool	Wetland	Wetlands_S	35634.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.034732	Laguna
Vernal Pool	Wetland	Wetlands_S	35772.000000	No Impact	Vineyards	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.049998	Laguna
Vernal Pool	Wetland	Wetlands_S	37315.000000	No Impact	Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.047911	Laguna
Vernal Pool	Wetland	Wetlands_S	37341.000000	No Impact	Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	3.0	0.007176	Laguna
Vineyards - Other Linear Feature	Waters_E	Waters_E	41505.000000	No Impact	Cropland	Valley Grassland	Class II	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-2.0	-1.0	3.0	0.214164	Laguna
Freshwater Marsh	Wetland	Wetlands_P	920.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	3.0	0.118194	Lower Dry Creek
Open Water	Waters_P	Waters_P	10707.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	3.0	1.175520	Lower Dry Creek
Open Water	Waters_P	Waters_P	10717.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	3.0	3.655660	Lower Dry Creek
Open Water	Waters_P	Waters_P	10853.000000	No Impact	Seasonal Wetlands	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	3.0	1.593220	Lower Dry Creek
Seasonal Wetlands	Wetland	Wetlands_S	35488.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	3.0	4.604850	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2684.000000	No Impact	Major Roads	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	2.332970	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	41904.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.062540	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	41998.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.008648	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	42009.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.051908	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	42012.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.016265	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	42582.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.016402	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43603.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.022042	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43654.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.025152	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43661.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.042292	Lower Dry Creek
Vernal Pool	Wetland	Wetlands_S	43716.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	3.0	0.043098	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	1233.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	7.186480	Sherman Lake-Sacramento River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5783.000000	No Impact	Valley Grassland (Vernal Pool)	Irrigated Pasture-Grassland	Class III	Class IA	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	3.0	0.181612	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8132.000000	No Impact	Streams/Creeks	Disturbed	Class I	Class I	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	3.0	5.125490	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8735.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	5.944950	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8862.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	8.170220	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8904.000000	No Impact	Cropland	Vineyards	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	23.793700	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3319.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	1.841630	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3354.000000	No Impact	Vineyards	Low Density Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	1.129720	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3458.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	5.512140	Snodgrass Slough
Swale	Waters_

| | | |

Streams/Creeks	Waters_P	Waters_IP	2606.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.119137	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2654.000000	No Impact	Cropland	Future Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.153106	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2690.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.572102	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2870.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.075254	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3031.000000	No Impact	Cropland	Disturbed	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.263917	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3174.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	1.337520	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3183.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.247280	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3197.000000	No Impact	Cropland	High Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.189680	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3230.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.133006	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3237.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.550610	Lower Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3593.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.078282	Lower Cosumnes River
Swale	Waters_E	Waters_E	24490.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	0.032503	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38659.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.068588	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39032.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.309059	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39312.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.444387	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39350.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	3.0	0.651741	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39444.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.082939	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39472.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.187541	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39497.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.196649	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39501.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.132134	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39541.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.035965	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39685.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.020003	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39743.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.339309	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39799.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.121219	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39809.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.193879	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39830.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.370333	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40016.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	3.0	0.048744	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40116.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	3.0	1.053200	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35625.000000	No Impact	Low Density Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	2.0	0.0	0.0	3.0	0.984028	Lower Cosumnes River
Swale	Waters_E	Waters_E	28792.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.043220	Morrison Creek
Swale	Waters_E	Waters_E	30850.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.010406	Morrison Creek
Swale	Waters_E	Waters_E	31808.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	-1.0	4.0	0.087371	Morrison Creek
Swale	Waters_E	Waters_E	32667.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.009284	Morrison Creek
Swale	Waters_E	Waters_E	34534.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.002716	Morrison Creek
Swale	Waters_E	Waters_E	34546.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.006552	Morrison Creek
Swale	Waters_E	Waters_E	34552.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.036592	Morrison Creek
Swale	Waters_E	Waters_E	34559.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.028832	Morrison Creek
Swale	Waters_E	Waters_E	34586.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	4.0	0.008853	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85112.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.054854	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85204.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006375	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85212.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010474	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85225.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005445	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85243.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.011138	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85246.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007007	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85259.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.001845	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85269.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007336	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85300.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.001977	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85307.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010502	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85314.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005545	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85328.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.040171	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85458.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.009609	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85588.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.052581	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	85767.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.014091	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	86019.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006392	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	86105.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.054898	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	86546.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022777	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	86586.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010334	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	86759.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.043500	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	87045.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.014052	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	87067.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010142	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	87500.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.004329	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	87657.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.060831	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	87970.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.026999	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88000.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.042971	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88212.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.043542	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88213.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.008532	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88308.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.069305	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88345.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010218	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88447.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.018042	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88487.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021384	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88569.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.035342	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88625.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.059625	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88676.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.069066	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88751.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006337	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88752.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013733	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88769.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.060978	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88778.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.016269	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88785.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.040743	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88796.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.037227	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88799.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.008544	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88804.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015095	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88805.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020992	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88813.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.027943	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	88818.000000	Indirect Impact	Valley Grassland (Vernal Pool)

Vernal Pool	Wetland	Wetlands_S	89920.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.042415	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89921.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.009473	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89924.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.025527	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89926.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.033497	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89933.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.017286	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89939.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.023867	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	89988.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.038370	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90001.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.043007	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90044.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.018311	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90106.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.058192	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90110.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Blue Oak Savanna	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.058649	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90125.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021401	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90127.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022446	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90140.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.011270	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90146.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.050653	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90149.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020460	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90191.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.027758	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90196.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010138	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90202.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012728	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90204.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007255	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90227.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.016556	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90257.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012235	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90278.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.031686	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90333.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012590	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90351.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.070939	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90364.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.050997	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90393.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022114	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90443.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.011576	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90477.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005508	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90488.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.001470	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90512.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013450	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90620.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.018139	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90624.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.037095	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90698.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005740	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90729.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.034325	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90733.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020941	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90735.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.018563	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90736.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020528	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90972.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.046321	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	90985.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.004766	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91109.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013944	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91120.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015529	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91167.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007363	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91240.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006207	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91313.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.053293	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91331.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.019537	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91400.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.048183	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91471.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015877	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91478.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.034952	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91490.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.058422	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91498.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.066237	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91501.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.016181	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91515.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.023838	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91520.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.036867	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91585.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013699	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91595.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.050220	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91636.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.028497	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91701.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.028684	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	91790.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012329	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92060.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.017133	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92073.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012295	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92303.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015566	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92316.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013877	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92358.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.042903	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92378.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.048109	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92381.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013009	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92387.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.054102	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92433.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022751	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92443.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.019910	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92446.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.050277	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92451.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.036917	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92456.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.008138	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92457.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.024839	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92465.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.033161	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92469.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.018280	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92472.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.009492	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92477.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.036175	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92487.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.061618	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92489.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010334	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92497.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.017575	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92498.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.033676	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92506.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.069417	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92509.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.040648	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	92566.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0

Vernal Pool		Wetland	Wetlands_S	93052.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.016526	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93055.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.043666	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93082.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.032530	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93083.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.027964	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93094.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.060047	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93124.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.029619	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93133.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.030113	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93150.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.044233	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93179.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.046183	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93519.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.023568	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93524.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.052990	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93710.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.031162	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93813.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021641	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93843.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.033662	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93875.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.063532	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93884.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.023939	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93897.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022130	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93906.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020388	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93927.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.017399	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93932.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.018886	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94077.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021400	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94135.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.062479	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94216.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006586	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94221.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010577	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94356.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.023317	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94371.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.053634	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94396.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006217	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94398.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.014143	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94409.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.025794	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94412.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.002722	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94415.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.029288	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94423.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.050632	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94435.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.014152	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94481.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.011721	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94492.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006933	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94496.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020181	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94501.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.033637	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94614.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.031995	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94668.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.053449	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94673.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005248	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94708.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015734	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94710.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.014762	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94732.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.033444	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94775.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.043818	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94782.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021259	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94803.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.058565	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94816.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.008408	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94852.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015734	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94892.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.051677	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94895.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.058771	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94912.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.016825	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94914.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.058208	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94925.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005585	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94935.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.019990	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94946.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022025	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94947.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.040088	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95001.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.071023	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95008.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013131	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95023.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.030437	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95024.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.067840	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95070.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.044290	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95081.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.032287	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95098.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.036786	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95118.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.031894	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95138.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.069396	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95193.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015370	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95228.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007618	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95233.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007891	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95236.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.024918	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95258.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.002075	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95261.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.002028	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95279.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.002325	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95288.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.002004	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95298.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007725	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95303.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007141	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95305.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.001199	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95306.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021004	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95321.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006547	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95325.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.004904	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95334.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007825	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95336.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.019306	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95419.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.009272	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95435.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005479	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95454.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I

Vernal Pool	Wetland	Wetlands_S	95703.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.039084	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95731.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.060481	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95734.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.008587	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95749.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.054440	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95776.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020396	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95803.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012937	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95842.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.023875	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95869.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.071853	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95908.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020754	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95913.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.008126	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95931.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.016120	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	95965.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.051126	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96016.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.008622	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96046.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.053402	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96134.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.028641	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96144.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012938	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96421.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.004527	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96443.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.034148	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96444.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007355	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96453.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010970	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96463.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012849	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96733.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.007857	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96770.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.005377	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96782.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.015506	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96852.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021253	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96867.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.012448	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	96927.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022412	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98097.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.034523	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98639.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.001422	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98880.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.018215	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98882.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.002668	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98969.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.032831	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99104.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.002640	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99145.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.068906	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99165.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021545	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99175.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.049793	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99413.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.033059	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99420.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010054	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99426.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.042658	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99440.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.025096	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99454.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.044421	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99456.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.019203	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99460.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.046817	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99461.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.048207	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99474.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.053907	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99480.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.071297	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99483.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.037733	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99499.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022874	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99520.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.010407	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99532.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.013588	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99535.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.019206	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99540.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.028137	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99550.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.024534	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99552.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.020170	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99554.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006713	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99566.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.071752	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99568.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.068846	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99575.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.019492	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99586.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.030638	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99591.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.022226	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99671.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.025259	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99916.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.021406	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	100078.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	-1.0	-1.0	4.0	0.006306	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	1986.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	4.264470	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2039.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	2.627470	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2080.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	3.398780	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2098.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	8.231570	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2137.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	6.164820	Morrison Creek
Open Water	Waters_E	Waters_E	11440.000000	No Impact	Valley Grassland (Vernal Pool)	Open Water	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.000505	Morrison Creek
Open Water	Waters_E	Waters_E	11445.000000	No Impact	Valley Grassland (Vernal Pool)	Open Water	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.001996	Morrison Creek
Open Water	Waters_P	Waters_P	11190.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	4.0	1.631760	Morrison Creek
Open Water	Waters_P	Waters_P	11340.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.056145	Morrison Creek
Open Water	Waters_P	Waters_P	11384.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	2.147020	Morrison Creek
Open Water	Waters_P	Waters_P	11385.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	1.813850	Morrison Creek
Open Water	Waters_P	Waters_P	11418.000000	No Impact	Valley Grassland (Vernal Pool)	Seasonal Wetlands	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.455383	Morrison Creek
Open Water	Waters_P	Waters_P	11419.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.176359	Morrison Creek
Open Water	Waters_P	Waters_P	11423.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.194615	Morrison Creek
Open Water	Waters_P	Waters_P	11429.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.129492	Morrison Creek
Open Water	Waters_P	Waters_P	11471.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	2.080060	Morrison Creek
Open Water	Waters_P	Waters_P	11497.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	2.133200	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3902.000000	No Impact	Future Development	Valley Grassland	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	1.892740	Morrison Creek
Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	41103.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.000038	Morrison Creek
Swale	Waters_E	Waters_E	29641.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.596703	Deer Creek
Swale	Waters_E	Waters_E	29968.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.059572	Deer Creek
Swale	Waters_E	Wa

Swale	Waters_E	Waters_E	34345.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.075360	Deer Creek
Swale	Waters_E	Waters_E	34354.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.053002	Deer Creek
Swale	Waters_E	Waters_E	34425.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.103718	Deer Creek
Swale	Waters_E	Waters_E	34506.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.099272	Deer Creek
Swale	Waters_E	Waters_E	34648.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.174995	Deer Creek
Swale	Waters_E	Waters_E	34659.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.053023	Deer Creek
Swale	Waters_E	Waters_E	34668.000000	Indirect Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	0.0	-1.0	-1.0	2.0	0.173379	Deer Creek
Vernal Pool	Wetland	Wetlands_S	87423.000000	Indirect Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	-1.0	-1.0	2.0	0.068701	Deer Creek
Freshwater Marsh	Wetland	Wetlands_P	2095.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	2.0	0.020573	Deer Creek
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4716.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland (Vernal Pool)	Class II	Class II	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	-2.0	-1.0	2.0	0.026204	Deer Creek
Open Water	Waters_P	Waters_P	11092.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	1.533750	Deer Creek
Open Water	Waters_P	Waters_P	11162.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	1.707350	Deer Creek
Open Water	Waters_P	Waters_P	11225.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.067124	Deer Creek
Open Water	Waters_P	Waters_P	11281.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.948852	Deer Creek
Open Water	Waters_P	Waters_P	11389.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.009007	Deer Creek
Open Water	Waters_P	Waters_P	11511.000000	No Impact	Future Development	Blue Oak Savanna	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	2.0	4.605120	Deer Creek
Open Water	Waters_P	Waters_P	11514.000000	No Impact	Recreation/Landscaped	Recreation/Landscaped	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.152921	Deer Creek
Open Water	Waters_P	Waters_P	11516.000000	No Impact	Recreation/Landscaped	Recreation/Landscaped	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.603115	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4083.000000	No Impact	Major Roads	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.234629	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4173.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.118666	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4176.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.204198	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4177.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.513494	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4179.000000	No Impact	Future Development	Blue Oak Woodland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	1.341030	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4206.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.017520	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4218.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.097914	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4222.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.134882	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4246.000000	No Impact	Future Development	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.127457	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4254.000000	No Impact	Future Development	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.243804	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4270.000000	No Impact	Future Development	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.509028	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4295.000000	No Impact	Future Development	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.184523	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4362.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.096971	Deer Creek
Freshwater Marsh	Wetland	Wetlands_P	1653.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	0.263517	Upper Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1720.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	1.584320	Upper Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1749.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	1.918500	Upper Cosumnes River
Freshwater Marsh	Wetland	Wetlands_P	1791.000000	No Impact	High Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	0.819341	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11012.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	4.0	0.363218	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11274.000000	No Impact	Disturbed	Seasonal Wetlands	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	0.095780	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	4032.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.046026	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	4061.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.200873	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	4088.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.432038	Upper Cosumnes River
Swale	Waters_E	Waters_E	35241.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.383857	American River
Swale	Waters_E	Waters_E	35243.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.336646	American River
Freshwater Marsh	Wetland	Wetlands_P	1153.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	0.053002	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1163.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	0.691569	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1170.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	1.592580	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1184.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	0.401754	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1332.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	1.0	1.0	4.0	0.034815	Laguna
Open Water	Waters_P	Waters_P	10732.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	4.0	0.346168	Laguna
Open Water	Waters_P	Waters_P	10765.000000	No Impact	High Density Development	Streams/Creeks	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	4.0	1.952470	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	35792.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	4.0	1.115770	Laguna
Streams/Creeks	Waters_P	Waters_IP	2752.000000	No Impact	High Density Development	Mixed Riparian Scrub	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.108963	Laguna
Streams/Creeks	Waters_P	Waters_IP	2759.000000	No Impact	High Density Development	Mixed Riparian Scrub	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.151482	Laguna
Streams/Creeks	Waters_P	Waters_IP	2767.000000	No Impact	Future Development	Mixed Riparian Scrub	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.100244	Laguna
Streams/Creeks	Waters_P	Waters_IP	2769.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.059593	Laguna
Streams/Creeks	Waters_P	Waters_IP	2835.000000	No Impact	Future Development	Mixed Riparian Scrub	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.733685	Laguna
Streams/Creeks	Waters_P	Waters_IP	2840.000000	No Impact	Future Development	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.062472	Laguna
Streams/Creeks	Waters_P	Waters_IP	2844.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.505084	Laguna
Streams/Creeks	Waters_P	Waters_IP	2880.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.054911	Laguna
Streams/Creeks	Waters_P	Waters_IP	2891.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	1.224100	Laguna
Streams/Creeks	Waters_P	Waters_IP	2902.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.412242	Laguna
Streams/Creeks	Waters_P	Waters_IP	2907.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.005414	Laguna
Streams/Creeks	Waters_P	Waters_IP	3033.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.066681	Laguna
Streams/Creeks	Waters_P	Waters_IP	3053.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.311186	Laguna
Streams/Creeks	Waters_P	Waters_IP	3054.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.017254	Laguna
Streams/Creeks	Waters_P	Waters_IP	3062.000000	No Impact	Major Roads	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.254714	Laguna
Streams/Creeks	Waters_P	Waters_IP	3089.000000	No Impact	Future Development	Valley Grassland	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.256856	Laguna
Streams/Creeks	Waters_P	Waters_IP	3473.000000	No Impact	High Density Development	Open Water	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.046833	Laguna
Streams/Creeks	Waters_P	Waters_IP	3485.000000	No Impact	High Density Development	Open Water	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.196523	Laguna
Streams/Creeks	Waters_P	Waters_IP	3664.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	0.017819	Laguna
Streams/Creeks	Waters_P	Waters_IP	3693.000000	No Impact	Major Roads	Blue Oak Savanna	Class I	Class III	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	1.0	2.0	2.0	4.0	1.089650	Laguna
Vineyards - Other Linear Feature	Waters_E	Waters_E	41513.000000	No Impact	Vineyards	Major Roads	Class II	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	4.0	2.913770	Laguna
Vineyards - Other Linear Feature	Waters_E	Waters_E	41552.000000	No Impact	Vineyards	Low Density Development	Class II	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	0.0	-2.0	-1.0	4.0	2.160010	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	37212.000000		Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	4.0	0.254826	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	37222.000000		Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	4.0	0.149384	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	37229.000000		Mine Tailing Riparian Woodland	Mine Tailings	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	4.0	0.012430	Laguna
Blue Oak Woodland - Other Linear Feature	Waters_E	Waters_E	27.000000	No Impact	Blue Oak Woodland	Blue Oak Savanna	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.221943	Lower Dry Creek
Blue Oak Woodland - Other Linear Feature	Waters_E	Waters_E	28.000000	No Impact	Blue Oak Woodland	Blue Oak Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.008622	Lower Dry Creek
Cropland - Other Linear Feature	Waters_E	Waters_E	287.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class II	Class I	Class IA	Moderate	2.0	2.0	2.0	-3.0	2.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	-2.0	-1.0	4.0	1.199950	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	912.000000	No Impact	Cropland	Seasonal Wetlands	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.000296	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	914.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.508734	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	917.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.595574	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	918.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.172589	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	919.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.037877	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	936.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	1.563610	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	944.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.339307	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	995.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.488197	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	1076.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.251923	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	1090.000000	No Impact

Streams/Creeks	Waters_P	Waters_IP	2659.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	4.0	0.093388	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2663.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.134937	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2667.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.143859	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2668.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.231302	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2681.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.046376	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2688.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.115558	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2692.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.680818	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2697.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.625223	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2699.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.162090	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2700.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.425833	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2701.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.173077	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2702.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.343580	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2703.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.088220	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2705.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.168510	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2706.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.083051	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2718.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.283219	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2721.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.159464	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2722.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.164047	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2723.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.115968	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2733.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.129884	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2737.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.081276	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2739.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.145939	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2744.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.295459	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2746.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.173191	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2747.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.118823	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	3036.000000	No Impact	Vineyards	Orchards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.803241	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38647.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.035245	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38649.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.188969	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38736.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.247096	Lower Dry Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	38765.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.048165	Lower Dry Creek
Freshwater Marsh	Wetland	Wetlands_P	1116.000000		Irrigated Pasture-Grassland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	4.0	0.055879	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	3036.000000		Vineyards	Orchards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	2.0	2.0	4.0	0.221774	Lower Dry Creek
Mixed Riparian Woodland	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	Moderate	2.0	2.0	2.0	-3.0	-3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	3.0	2.022310	Sherman Lake-Sacramento River
Mixed Riparian Woodland	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	Moderate	2.0	2.0	2.0	-3.0	-3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	3.0	2.664120	Sherman Lake-Sacramento River
Mixed Riparian Scrub	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	Moderate	2.0	2.0	2.0	-3.0	-3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	3.0	3.916156	Sherman Lake-Sacramento River
Streams/Creeks	Waters_P	Waters_IP	3343.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-3.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	3.0	0.289721	Sherman Lake-Sacramento River
Freshwater Marsh	Wetland	Wetlands_P	1270.000000	No Impact	Valley Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	-1.0	0.0	2.0	1.0	1.0	4.0	0.974889	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1343.000000	No Impact	Valley Grassland	Cropland	Class I	Class I	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	-1.0	0.0	2.0	1.0	1.0	4.0	1.031530	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8155.000000	No Impact	Cropland	Open Water	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	63.571800	Snodgrass Slough
Mixed Riparian Scrub	Wetland	Riparian	8181.000000	No Impact	Cropland	Open Water	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	5.639010	Snodgrass Slough
Mixed Riparian Woodland	Wetland	Riparian	8955.000000	No Impact	Cropland	Open Water	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	17.705300	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35663.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	3.540410	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35666.000000	No Impact	Freshwater Marsh	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	0.630091	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35678.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	1.325093	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35714.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	3.544670	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35727.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	3.694870	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	35794.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	2.649510	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36576.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	2.412230	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36594.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	1.498090	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	37059.000000	No Impact	Valley Grassland	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	2.546840	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	37247.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	4.0	1.027920	Snodgrass Slough
Swale	Waters_E	Waters_E	18796.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.031737	Snodgrass Slough
Swale	Waters_E	Waters_E	18824.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.027807	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	44265.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.187043	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	46578.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.044971	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51415.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.019890	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51478.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.069028	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51509.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.043742	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51790.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.023997	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51803.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.046184	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51839.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.037858	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51841.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.031539	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51861.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.021216	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	56847.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.065466	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57129.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.049129	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58560.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.009448	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58582.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.010560	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58586.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.032255	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58590.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.019712	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58614.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.012561	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58633.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.010943	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58641.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.024040	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58652.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.017089	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58702.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.033947	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58706.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.031040	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58726.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.037117	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58739.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.038330	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58775.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.028247	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58780.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.009839	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58805.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.037029	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58808.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.044789	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58814.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.065052	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58815.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.016782	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58831.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.042235	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58852.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.039229	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58861.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.046899	Snodgrass Slough
Vernal Pool

Vernal Pool	Wetland	Wetlands_S	58991.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.009330	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59076.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.049013	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59113.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.033976	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59148.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.044778	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59395.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.064158	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59621.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.044407	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	66340.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.009576	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36007.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.959525	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36023.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.341262	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36073.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	4.0	0.495992	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36075.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.235304	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36147.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.101613	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36200.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.074649	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36328.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.789866	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36426.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.117278	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36507.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	-1.0	2.0	0.0	0.0	4.0	0.170333	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101839.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.020046	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101849.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.069634	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101868.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.023859	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101921.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.053988	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101924.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.024919	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101954.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.026027	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101957.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.017497	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101971.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.069236	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101991.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.036230	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102015.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.045887	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102022.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.071345	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	447.000000	No Impact	Valley Grassland (Vernal Pool)	Cropland	Class II	Class IA	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	4.0	0.019512	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4545.000000	No Impact	Valley Grassland (Vernal Pool)	Irrigated Pasture-Grassland	Class II	Class IA	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	4.0	0.210780	Lower Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9592.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class II	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	4.0	0.352725	Lower Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9593.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class II	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	4.0	0.234934	Lower Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9594.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class II	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	4.0	1.113840	Lower Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9595.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class II	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	4.0	0.798631	Lower Cosumnes River
Mine Tailing Riparian Woodland	Wetland	Riparian	9596.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class II	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	4.0	0.660830	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7852.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.040531	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7853.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.128980	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7854.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.515528	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7865.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.704744	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7870.000000	No Impact	Vineyards	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.575589	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7878.000000	No Impact	Valley Grassland (Vernal Pool)	Future Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.871672	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7880.000000	No Impact	Vineyards	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.046493	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7962.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.290390	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7995.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.518350	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8074.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.148637	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8081.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.577132	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8083.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.746766	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8092.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.154120	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8095.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.774560	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8098.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.982069	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8100.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.458272	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8108.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.417750	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8111.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.783639	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8112.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.382854	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8119.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.177375	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8122.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.641009	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8129.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.519164	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8134.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.675320	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8142.000000	No Impact	Vineyards	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.456382	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8148.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.558407	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8166.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.831170	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8180.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.340030	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8189.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.832867	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8464.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.784430	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8466.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.893219	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8468.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.167737	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8471.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.889910	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8474.000000	No Impact	Cropland	Mixed Riparian Scrub	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.932840	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8491.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.751570	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8496.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.138301	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8617.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	3.188900	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8633.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.370990	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8639.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	3.737420	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8646.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.098164	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8647.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.200502	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8677.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.094370	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8679.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.787230	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8724.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.798214	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8737.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.217590	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8748.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	1.776580	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8790.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.149230	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8801.000000	No Impact	Cropland	Mixed Riparian Scrub	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.535294	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8803.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	3.452560	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8812.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	2.659060	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8813.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.482130	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8814.000000	No Impact	Cropland	Seasonal Wetlands	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.0	3.456620	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8816.000000	No

Swale	Waters_E	Waters_E	15967.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.026248	Lower Cosumnes River
Swale	Waters_E	Waters_E	15969.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.022783	Lower Cosumnes River
Swale	Waters_E	Waters_E	16058.000000	No Impact	High Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.086921	Lower Cosumnes River
Swale	Waters_E	Waters_E	16165.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.063402	Lower Cosumnes River
Swale	Waters_E	Waters_E	16209.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.007494	Lower Cosumnes River
Swale	Waters_E	Waters_E	16280.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.057264	Lower Cosumnes River
Swale	Waters_E	Waters_E	16363.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.034537	Lower Cosumnes River
Swale	Waters_E	Waters_E	17317.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.004514	Lower Cosumnes River
Swale	Waters_E	Waters_E	17324.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.019013	Lower Cosumnes River
Swale	Waters_E	Waters_E	17400.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.010243	Lower Cosumnes River
Swale	Waters_E	Waters_E	17558.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.045942	Lower Cosumnes River
Swale	Waters_E	Waters_E	17749.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.080663	Lower Cosumnes River
Swale	Waters_E	Waters_E	17762.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.005422	Lower Cosumnes River
Swale	Waters_E	Waters_E	17788.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.001448	Lower Cosumnes River
Swale	Waters_E	Waters_E	17849.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.015191	Lower Cosumnes River
Swale	Waters_E	Waters_E	17888.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.598317	Lower Cosumnes River
Swale	Waters_E	Waters_E	17977.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.361742	Lower Cosumnes River
Swale	Waters_E	Waters_E	18025.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.152845	Lower Cosumnes River
Swale	Waters_E	Waters_E	18089.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.189842	Lower Cosumnes River
Swale	Waters_E	Waters_E	18165.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.006986	Lower Cosumnes River
Swale	Waters_E	Waters_E	18183.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.245491	Lower Cosumnes River
Swale	Waters_E	Waters_E	18265.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.183822	Lower Cosumnes River
Swale	Waters_E	Waters_E	18395.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	1.625330	Lower Cosumnes River
Swale	Waters_E	Waters_E	18533.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.254665	Lower Cosumnes River
Swale	Waters_E	Waters_E	18622.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.061013	Lower Cosumnes River
Swale	Waters_E	Waters_E	18811.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.114934	Lower Cosumnes River
Swale	Waters_E	Waters_E	18889.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.123314	Lower Cosumnes River
Swale	Waters_E	Waters_E	20260.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.017382	Lower Cosumnes River
Swale	Waters_E	Waters_E	21913.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.284174	Lower Cosumnes River
Swale	Waters_E	Waters_E	22161.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.165860	Lower Cosumnes River
Swale	Waters_E	Waters_E	22507.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.920654	Lower Cosumnes River
Swale	Waters_E	Waters_E	22792.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.013402	Lower Cosumnes River
Swale	Waters_E	Waters_E	23332.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.015852	Lower Cosumnes River
Swale	Waters_E	Waters_E	23385.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.022364	Lower Cosumnes River
Swale	Waters_E	Waters_E	23734.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.010084	Lower Cosumnes River
Swale	Waters_E	Waters_E	23792.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.011332	Lower Cosumnes River
Swale	Waters_E	Waters_E	23961.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.014209	Lower Cosumnes River
Swale	Waters_E	Waters_E	24732.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.029798	Lower Cosumnes River
Swale	Waters_E	Waters_E	24941.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.073562	Lower Cosumnes River
Swale	Waters_E	Waters_E	25023.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.084994	Lower Cosumnes River
Swale	Waters_E	Waters_E	25101.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	0.0	0.0	4.0	0.391815	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39530.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	4.0	0.219506	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39543.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	4.0	0.003413	Lower Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	39682.000000	No Impact	Vineyards	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	4.0	0.061557	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	41788.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.014729	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	41791.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.033568	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	54216.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.086578	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	54546.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.084977	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	54658.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.084381	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56536.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.017122	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56559.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.075572	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56565.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.031124	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56588.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.038085	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56592.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.004426	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56607.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.012931	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56616.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.023367	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56626.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.020794	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	56646.000000	No Impact	Vineyards	Vineyards	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.036115	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	63522.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.040434	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	63586.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.011346	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35436.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.017483	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35465.000000	No Impact	Low Density Development	Freshwater Marsh	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.420485	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35475.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.011119	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35484.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.021031	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	35512.000000	No Impact	Irrigated Pasture-Grassland	Irrigated Pasture-Grassland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.004211	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36047.000000	No Impact	Low Density Development	Mixed Riparian Woodland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.112584	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36215.000000	No Impact	Low Density Development	Valley Grassland	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.327433	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36222.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.165678	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36352.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.097247	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36422.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.027206	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36508.000000	No Impact	Irrigated Pasture-Grassland	Cropland	Class I	Class II	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	2.0	0.0	0.0	4.0	0.062971	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36532.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.108701	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36819.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.161002	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36830.000000	No Impact	Low Density Development	Freshwater Marsh	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.273955	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36873.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.166900	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36908.000000	No Impact	Low Density Development	Swale	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.076990	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36961.000000	No Impact	Low Density Development	Streams/Creeks	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.161717	Lower Cosumnes River
Vernal Pool	Wetland	Wetlands_S	36972.000000	No Impact	Low Density Development	Streams/Creeks	Class I	Class III	Class I	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	0.118061	Lower Cosumnes River
Vineyards - Other Linear Feature	Waters_E	Waters_E	41573.000000	No Impact	Valley Grassland (Vernal Pool)	Vineyards	Class II	Class IA	Class II	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	0.0	-2.0	-1.0	0.0	0.0	0.0	4.0	0.001687	Lower Cosumnes River
Valley Grassland (Vernal Pool) - Other Linear	Waters_E	Waters_E	40116.000000		Valley Grassland (Vernal Pool)	Major Roads - Other Linear Feature	Class IA	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	4.0	0.113881	Lower Cosumnes River
Vernal Pool	Waters_E	Waters_E	85297.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.000588	Morrison Creek
Vernal Pool	Waters_E	Waters_E	92990.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004354	Morrison Creek
Vernal Pool	Waters_E	Waters_E	93013.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009021	Morrison Creek
Vernal Pool	Waters_E	Waters_E	93021.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008553	Morrison Creek
Vernal Pool	Waters_E	Waters_E	94333.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.000790	Morrison Creek
Vernal Pool	Waters_E

Vernal Pool		Wetland	Wetlands_S	86724.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.018359	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87029.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.024718	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87068.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.068544	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87237.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.006767	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87294.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.013119	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87306.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009672	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87512.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.007515	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87554.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.013040	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	87849.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017328	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88571.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.070828	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88577.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004635	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88588.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005386	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88622.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.001749	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88754.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.054193	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88771.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017240	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88782.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005188	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88830.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.001156	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88830.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.031991	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88833.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.001987	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88835.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.000769	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88922.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.015225	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	88924.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009089	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89043.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.059500	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89055.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.018148	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89116.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.015328	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89128.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.014789	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89166.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.015180	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89252.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.028456	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89405.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.019861	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89454.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.001922	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89454.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.061375	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89473.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008247	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89481.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005095	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89506.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.070598	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89866.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.063128	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	89975.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.025080	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90021.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.065301	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90035.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.016408	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90072.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.029859	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90096.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005373	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90139.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.068495	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90169.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.048909	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90219.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.027504	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90256.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004750	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90354.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.006960	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90456.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.052672	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90510.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.059080	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90688.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017514	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90752.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.010751	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90789.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.007369	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90796.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.019483	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	90802.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.016404	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91020.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.046247	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91184.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.016778	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91190.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.045282	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91243.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.002768	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91278.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.032025	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91296.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.060949	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91301.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011203	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91351.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004203	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91353.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.054736	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91588.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.015137	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91589.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008596	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91600.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.003721	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91608.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.007211	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91618.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.057588	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91842.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009497	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	91917.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.022085	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92043.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.020104	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92068.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.006544	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92074.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.013389	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92090.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017485	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92091.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009804	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92165.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.070895	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92172.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009644	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92186.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009528	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92243.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.048312	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92263.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0

Vernal Pool		Wetland	Wetlands_S	92951.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.031242	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92972.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005807	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	92990.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.000205	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93013.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008824	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93021.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.027959	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93025.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.049561	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93034.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.025673	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93099.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017462	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93114.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005747	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93139.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.025410	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93290.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.002495	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93388.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.033168	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93424.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.037717	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93645.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.044975	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93706.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.040550	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93732.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.060577	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93757.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.006959	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93759.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.029483	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93804.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.020091	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93851.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.038182	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93872.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009055	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93882.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.013346	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93935.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.040386	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93943.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.031931	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	93996.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017197	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94053.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.048112	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94106.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.028645	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94187.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.065411	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94203.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.021594	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94333.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.007133	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94425.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011019	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94429.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.016556	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94438.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011735	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94446.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.018161	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94459.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.052496	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94465.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.026945	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94556.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.007842	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94581.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.013979	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94613.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017501	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94680.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.025779	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94807.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.018953	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94904.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.035531	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94920.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.014127	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	94951.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.038560	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95192.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.049130	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95248.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.003384	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95308.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.018910	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95332.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.016730	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95335.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.006227	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95347.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004018	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95354.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017739	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95402.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005831	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95478.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.021708	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95510.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009676	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95597.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004476	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95605.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008080	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95625.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011918	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95651.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011122	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95798.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.015518	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95817.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.006723	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95835.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.052211	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95858.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.006522	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	95947.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.037796	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96176.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011636	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96205.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009237	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96243.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008740	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96269.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008888	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96326.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.026813	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96474.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.023803	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96519.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.027128	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96522.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004463	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96523.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011256	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96561.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.032584	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96571.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.024756	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96580.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011274	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96585.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004135	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96591.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.018570	Morrison Creek
Vernal Pool		Wetland	Wetlands_S	96600.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0

Vernal Pool	Wetland	Wetlands_S	97993.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.010938	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98127.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005435	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98134.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.004430	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98170.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.024916	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98195.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.024254	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98245.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.027547	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98776.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.063783	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	98858.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.032057	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99125.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.029918	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99129.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.052213	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99144.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.057604	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99162.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017953	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99186.000000	Indirect Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.019648	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99214.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.035435	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99266.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.035129	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99271.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.035220	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99293.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.021310	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99308.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.064698	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99377.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009402	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99384.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.011304	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99412.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.069988	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99512.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.010552	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99523.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.026073	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99541.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.003045	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99542.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.020938	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99551.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.037984	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99577.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.007384	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99578.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.028349	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99651.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.021422	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99743.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.008244	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99770.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.033275	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99955.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.041510	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99964.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.018099	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99966.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.028078	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99970.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.035515	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99974.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.025795	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99979.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.023650	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99981.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.009745	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	99987.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.017222	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	100001.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.050176	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	100004.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.016477	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	100035.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.013554	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	100060.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.005317	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	100076.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.041311	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	103599.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	-1.0	-1.0	5.0	0.023053	Morrison Creek
Freshwater Marsh	Wetland	Wetlands_P	2023.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	0.0	-1.0	0.0	1.0	0.0	0.0	2.0	1.0	1.0	5.0	2.048510	Morrison Creek
Mixed Riparian Scrub	Waters_P	Waters_IP	8336.000000	No Impact	Valley Grassland - Other Linear Feature	Valley Grassland - Other Linear Feature	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.001238	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8335.000000	No Impact	Freshwater Marsh	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.340403	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8336.000000	No Impact	Valley Grassland - Other Linear Feature	Valley Grassland - Other Linear Feature	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	1.989720	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8337.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.627728	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8338.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.283157	Morrison Creek
Mixed Riparian Scrub	Wetland	Riparian	8339.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	1.936570	Morrison Creek
Mixed Riparian Woodland	Waters_P	Waters_IP	9126.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.000003	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9130.000000	No Impact	Swale	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.251064	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9195.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.289785	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9196.000000	No Impact	Freshwater Marsh	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.250372	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9197.000000	No Impact	Valley Grassland	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.178853	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9198.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	2.545990	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9199.000000	No Impact	Freshwater Marsh	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	1.380100	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9200.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.147732	Morrison Creek
Mixed Riparian Woodland	Wetland	Riparian	9202.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.515056	Morrison Creek
Open Water	Waters_E	Waters_E	11499.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.000576	Morrison Creek
Open Water	Waters_P	Waters_P	11238.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.679666	Morrison Creek
Open Water	Waters_P	Waters_P	11316.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	2.968250	Morrison Creek
Open Water	Waters_P	Waters_P	11337.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	2.214980	Morrison Creek
Open Water	Waters_P	Waters_P	11388.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.247270	Morrison Creek
Open Water	Waters_P	Waters_P	11403.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.142656	Morrison Creek
Open Water	Waters_P	Waters_P	11465.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.027802	Morrison Creek
Open Water	Waters_P	Waters_P	11466.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.011837	Morrison Creek
Open Water	Waters_P	Waters_P	11467.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.062182	Morrison Creek
Open Water	Waters_P	Waters_P	11483.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.188671	Morrison Creek
Open Water	Waters_P	Waters_P	11499.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.555404	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3905.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	2.727520	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	3933.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	6.932640	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	4007.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	2.253360	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	4036.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	5.754020	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	4139.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	1.887500	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	4141.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	5.437570	Morrison Creek
Streams/Creeks	Waters_P	Waters_IP	4163.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	1.0	-3.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	2.231810	Morrison Creek
Streams/Creeks (VPIH)	Waters_E	Waters_E	813.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks (VPIH)	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0

Valley Grassland - Other Linear Feature	Waters_P	Waters_IP	41154.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.098911	Morrison Creek
Vernal Pool	Wetland	Wetlands_S	97900.000000	Indirect Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	1.0	-1.0	-1.0	3.0	0.009230	Deer Creek
Blue Oak Woodland - Other Linear Feature	Waters_E	Waters_E	89.000000	No Impact	Blue Oak Woodland	Major Roads	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.189566	Deer Creek
Blue Oak Woodland - Other Linear Feature	Waters_E	Waters_E	98.000000	No Impact	Blue Oak Woodland	Major Roads	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.007823	Deer Creek
Blue Oak Woodland - Other Linear Feature	Waters_E	Waters_E	117.000000	No Impact	Blue Oak Woodland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.401320	Deer Creek
Freshwater Marsh	Wetland	Wetlands_P	1447.000000	No Impact	Cropland	Disturbed	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	3.0	0.130815	Deer Creek
Freshwater Marsh	Wetland	Wetlands_P	1992.000000	No Impact	Irrigated Pasture-Grassland	Low Density Development	Class I	Class II	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	2.0	1.0	1.0	3.0	0.638991	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9027.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	0.019065	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9027.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	42.246800	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9027.000000	No Impact	Major Roads	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	17.079200	Deer Creek
Mixed Riparian Woodland	Wetland	Riparian	9303.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	26.429500	Deer Creek
Open Water	Waters_P	Waters_P	11004.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	3.0	3.200810	Deer Creek
Open Water	Waters_P	Waters_P	11395.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	3.0	1.417580	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	3491.000000	No Impact	Disturbed - Other Linear Feature	Disturbed - Other Linear Feature	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	0.356898	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	3813.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.097293	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	3961.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.803171	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	3961.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	1.263650	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4092.000000	No Impact	Future Development	Major Roads	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	3.0	6.482040	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4187.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.705779	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4210.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.002091	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4211.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.036793	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4217.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.101821	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4238.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.427193	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4239.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.276852	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4242.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.299772	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4299.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.130280	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4315.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	1.225850	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4332.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.727671	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4347.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.904627	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4350.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.039580	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4354.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	3.0	0.296119	Deer Creek
Swale	Waters_E	Waters_E	19423.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	0.212247	Deer Creek
Swale	Waters_E	Waters_E	29959.000000	No Impact	Major Roads	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	3.0	0.263563	Deer Creek
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	41131.000000	No Impact	Blue Oak Woodland	Major Roads	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	-1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	3.0	0.200548	Deer Creek
Disturbed - Other Linear Feature	Waters_E	Waters_E	748.000000	No Impact	Valley Grassland	Disturbed	Class III	Class I	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	5.0	1.957600	Upper Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	9027.000000	No Impact	Future Development	Vineyards	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	12.456000	Upper Cosumnes River
Open Water	Waters_P	Waters_IP	11164.000000	No Impact	Valley Grassland (Vernal Pool)	Major Roads	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	5.0	3.123200	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11215.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	5.0	0.732731	Upper Cosumnes River
Open Water	Waters_P	Waters_P	11244.000000	No Impact	Valley Grassland (Vernal Pool)	Mine Tailings	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	5.0	0.309499	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3491.000000	No Impact	Disturbed - Other Linear Feature	Disturbed - Other Linear Feature	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	5.0	1.820720	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3707.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.891087	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3746.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.091860	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3760.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.052911	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	3764.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.018362	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	4114.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.265041	Upper Cosumnes River
Swale	Waters_E	Waters_E	28606.000000	No Impact	Low Density Development	Irrigated Pasture-Grassland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	0.294039	Upper Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40407.000000	No Impact	Valley Grassland	Low Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	5.0	0.153921	Upper Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40567.000000	No Impact	Valley Grassland	Major Roads	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	5.0	0.384706	Upper Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40758.000000	No Impact	Valley Grassland	Major Roads	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	5.0	0.155381	Upper Cosumnes River
Valley Grassland - Other Linear Feature	Waters_E	Waters_E	40891.000000	No Impact	Valley Grassland	High Density Development	Class I	Class I	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	0.0	0.0	5.0	0.238288	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	2617.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.070279	Lower Mokelumne River
Streams/Creeks	Waters_P	Waters_IP	2618.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.024477	Lower Mokelumne River
Streams/Creeks	Waters_P	Waters_IP	2621.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.241369	Lower Mokelumne River
Streams/Creeks	Waters_P	Waters_IP	2624.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.082414	Lower Mokelumne River
Streams/Creeks	Waters_P	Waters_IP	2662.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.181990	Lower Mokelumne River
Streams/Creeks	Waters_P	Waters_IP	2674.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.066882	Lower Mokelumne River
Swale	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	6.0	0.930000	American River
Seasonal Wetlands	Wetland	Wetlands_S	38611.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	6.0	16.885400	American River
Swale	Waters_E	Waters_E	35203.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	6.0	0.204057	American River
Swale	Waters_E	Waters_E	35221.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	6.0	0.073600	American River
Swale	Waters_E	Waters_E	35245.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018970	American River
Swale	Waters_E	Waters_E	35297.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	6.0	0.361090	American River
Swale	Waters_E	Waters_E	35300.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	2.0	2.0	2.0	-3.0	0.0	-3.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	6.0	0.051348	American River
Disturbed - Other Linear Feature	Waters_E	Waters_E	670.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland - Other Linear Feature	Class III	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	-2.0	-2.0	-2.0	5.0	0.017887	Laguna
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5451.000000	No Impact	Valley Grassland	Irrigated Pasture-Grassland	Class III	Class I	Class II	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	-1.0	0.0	-2.0	-1.0	-1.0	5.0	0.036057	Laguna
Mixed Riparian Scrub	Wetland	Riparian	8033.000000	No Impact	Future Development	Recreation/Landscaped	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	5.152740	Laguna
Mixed Riparian Woodland	Wetland	Riparian	8837.000000	No Impact	Future Development	Cropland	Class I	Class III	Class II	Moderate	2.0	2.0	2.0	3.0	3.0	-1.0	-3.0	-3.0	-2.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	6.180800	Laguna
Open Water	Waters_P	Waters_P	10733.000000	No Impact	Vineyards	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.183949	Laguna
Open Water	Waters_P	Waters_P	10760.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	5.0	3.066920	Laguna
Open Water	Waters_P	Waters_P	10944.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	5.0	3.357090	Laguna
Open Water	Waters_P	Waters_P	10958.000000	No Impact	Valley Grassland (Vernal Pool)	High Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	0.0	-1.0	0.0	5.0	1.902250	Laguna
Streams/Creeks	Waters_P	Waters_IP	2906.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.080086	Laguna
Streams/Creeks	Waters_P	Waters_IP	2915.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	1.508920	Laguna
Streams/Creeks	Waters_P	Waters_IP	3113.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.001957	Laguna
Streams/Creeks	Waters_P	Waters_IP	3124.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.399184	Laguna
Streams/Creeks	Waters_P	Waters_IP	3138.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.785921	Laguna
Streams/Creeks	Waters_P	Waters_IP	3145.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.571610	Laguna
Streams/Creeks	Waters_P	Waters_IP	3148.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.062694	Laguna
Streams/Creeks	Waters_P	Waters_IP	3166.000000	No Impact	High Density Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	5.0	2.490330	Laguna
Streams/Creeks	Waters_P	Waters_IP	3286.000000	No Impact	Future Development	High Density Development	Class I	Class III	Class III	Moderate	2.0	2.0	2.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	-2.0	-2.0	-1.0	1.0	2.0	2.0	5.0	0.125155	Laguna
Streams/Creeks	Waters_P	Waters_IP	3308.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.279227	Laguna
Streams/Creeks	Waters_P	Waters_IP	3367.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.487292	Laguna
Streams/Creeks	Waters_P	Waters_IP	3410.000000	No Impact	Future Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.002020	Laguna
Streams/Creeks	Waters_P	Waters_IP	3425.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.110934	Laguna
Streams/Creeks	Waters_P	Waters_IP	3529.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	0.0	0.0	0.0	3.0	3.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	1.0	2.0	2.0	5.0	0.486695	Laguna
Streams/Creeks	Waters_P	Waters_IP	3536.000000	No Impact	Major Roads	Valley Grassland (V

Mixed Riparian Scrub	Wetland	Riparian	7851.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.219363	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7855.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	1.736550	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7884.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.414071	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7888.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.430737	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7892.000000	No Impact	Mixed Riparian Woodland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.174528	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7893.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.235818	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7894.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.216040	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7898.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.975770	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7900.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.300791	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7919.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.926835	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7932.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.168971	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7976.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.184308	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	7992.000000	No Impact	Streams/Creeks	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.275635	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8001.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.325614	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8003.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.445536	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8006.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.191061	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8007.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.115865	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8024.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.599223	Lower Dry Creek
Mixed Riparian Scrub	Wetland	Riparian	8043.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.238039	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8443.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.436438	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8444.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.192601	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8445.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.101142	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8448.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.199861	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8449.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.460069	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8451.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.202103	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8452.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.053780	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8456.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.977041	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8514.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.069384	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8520.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	1.955230	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8523.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	4.560000	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8524.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	1.359390	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8526.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.363694	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8527.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.471671	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8528.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.119852	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8536.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.973166	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8540.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.093101	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8542.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.769810	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8547.000000	No Impact	Valley Grassland	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	1.665910	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8561.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.169093	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8592.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.250150	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8603.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.110266	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8604.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.155858	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8607.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.145415	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8608.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.148380	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8609.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.115678	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8611.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.639777	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8612.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.096218	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8615.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.207480	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8616.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.131414	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8622.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.089740	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8623.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.169735	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8629.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.112412	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8632.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.208943	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8635.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	2.951830	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8652.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.045566	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8711.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.132026	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8712.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.154945	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8713.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.342616	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8716.000000	No Impact	Mixed Riparian Woodland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.115127	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8717.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.744288	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8731.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.452085	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8740.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.364088	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8769.000000	No Impact	Valley Grassland (Vernal Pool)	Vineyards	Class I	Class IA	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	2.0	1.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	4.768670	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8783.000000	No Impact	Valley Grassland (Vernal Pool)	Vineyards	Class I	Class IA	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	2.0	1.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	2.220680	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8793.000000	No Impact	Valley Grassland (Vernal Pool)	Vineyards	Class I	Class IA	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	2.0	1.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	4.388840	Lower Dry Creek
Mixed Riparian Woodland	Wetland	Riparian	8798.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	5.0	0.551493	Lower Dry Creek
Open Water	Waters_P	Waters_P	10921.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	-1.0	0.0	5.0	0.147223	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_P	2610.000000	No Impact	Vineyards	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.022482	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2645.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.290761	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2648.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.038123	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2664.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.229980	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2665.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.142769	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2669.000000	No Impact	Vineyards	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.208300	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2670.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.142215	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2682.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.169459	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2683.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.167193	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2689.000000	No Impact	Cropland	Freshwater Marsh	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.422833	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2696.000000	No Impact	Vineyards	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.086216	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2716.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.348719	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2755.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.258692	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2812.000000	No Impact	Cropland	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	1.263300	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2841.000000	No Impact	Cropland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.065147	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	2927.000000	No Impact	Orchards	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.064249	Lower Dry Creek
Streams/Creeks	Waters_P	Waters_IP	3073.000000	No Impact	Vineyards	Mixed Riparian Woodland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	5.0	0.051332	Lower Dry Creek
Swale	Waters_E	Waters_E	13057.000000	No Impact	Valley Grassland (Vernal Pool)	Vineyards	Class I	Class IA	Class II	Moderate	0.0	0.0	0.0	-3.0	2.0	2.0	2.0	1.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	5.0	0.045170	Lower Dry Creek
Swale	Waters_E	Waters_E	13861.000000	No Impact	Valley Grassland (Vernal Pool)	Vineyards	Class I	Class IA	Class II	Moderate	0.0	0.0	0

Freshwater Marsh	Wetland	Wetlands_P	981.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.221730	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	983.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.698650	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	985.000000	No Impact	Valley Grassland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.542585	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	986.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.130038	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	989.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.112289	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	993.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.213881	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	994.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.698781	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	996.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	2.341950	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	999.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.196278	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1001.000000	No Impact	Streams/Creeks	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.070562	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1009.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.170585	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1011.000000	No Impact	Streams/Creeks	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.425512	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1016.000000	No Impact	Streams/Creeks	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.677090	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1017.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.919436	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1019.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.674851	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1020.000000	No Impact	Open Water	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.190329	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1023.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.236339	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1025.000000	No Impact	Seasonal Wetlands	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	2.286070	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1038.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.010540	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1040.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.053959	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1041.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.259928	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1043.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.219387	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1045.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.735424	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1046.000000	No Impact	Streams/Creeks	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.047401	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1048.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.112002	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1049.000000	No Impact	Valley Grassland	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.412107	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1051.000000	No Impact	Valley Grassland	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.429230	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1055.000000	No Impact	Valley Grassland	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.936633	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1207.000000	No Impact	Mixed Riparian Woodland	Mixed Riparian Woodland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.496270	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1280.000000	No Impact	Mixed Riparian Scrub	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.255320	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1340.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.496139	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1349.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.191720	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1371.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.244416	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1407.000000	No Impact	Seasonal Wetlands	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.015158	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1423.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	2.429360	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1430.000000	No Impact	Streams/Creeks	Freshwater Marsh	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.043172	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1439.000000	No Impact	Streams/Creeks	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.431134	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1460.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.017981	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1461.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.060937	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1463.000000	No Impact	Valley Grassland	Seasonal Wetlands	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.063741	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1504.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.056543	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1508.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.136842	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1513.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.719849	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1525.000000	No Impact	Valley Grassland	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	2.398041	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1536.000000	No Impact	Valley Grassland	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.929100	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1551.000000	No Impact	Valley Grassland	Streams/Creeks	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.191491	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1566.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.751786	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1569.000000	No Impact	Valley Grassland	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.109960	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1570.000000	No Impact	Valley Grassland	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	1.576660	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1754.000000	No Impact	Valley Grassland	Open Water	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.001392	Snodgrass Slough
Freshwater Marsh	Wetland	Wetlands_P	1785.000000	No Impact	Valley Grassland	Mixed Riparian Scrub	Class I	Class I	Class I	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	5.0	0.555984	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36564.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	5.0	3.706670	Snodgrass Slough
Seasonal Wetlands	Wetland	Wetlands_S	36587.000000	No Impact	Cropland	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	-1.0	0.0	1.0	1.0	1.0	5.0	14.006600	Snodgrass Slough
Streams/Creeks	Waters_P	Waters_IP	3272.000000	No Impact	Valley Grassland	Cropland	Class I	Class I	Class II	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	1.0	1.0	1.0	0.0	-1.0	0.0	1.0	2.0	2.0	5.0	0.896921	Snodgrass Slough
Swale	Waters_E	Waters_E	18595.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	5.0	0.204595	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	44718.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.010735	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	44883.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.009001	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	44892.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.021841	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	44928.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.063561	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	44955.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.025264	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	44970.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.030093	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	45021.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.013922	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	45646.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.036977	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	45984.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.032246	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	46115.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.019498	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	46170.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.016889	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	46211.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.008924	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	46222.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.006637	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	46443.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.040669	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	46580.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.015300	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51401.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.047269	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51416.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.017567	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51523.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.004868	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51701.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.025554	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51708.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.029598	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51726.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.025034	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51802.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.007499	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51819.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.050569	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	51857.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.005821	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	53373.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.044519	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	53408.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.032422	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	55738.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.032253	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	55796.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.016507	Sn

Vernal Pool	Wetland	Wetlands_S	57140.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.030399	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57183.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.013120	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57242.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.034478	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57244.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.023280	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57792.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.009255	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57798.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.014571	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57811.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.035838	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57826.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.042260	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57838.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.048550	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57843.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.016152	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57868.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.022227	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57875.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.010957	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57880.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.024157	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57926.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.023238	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	57945.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.045354	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58001.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.010221	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58054.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.009403	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58063.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.010382	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58102.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.032742	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58105.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.008281	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58106.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.022898	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58113.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.006113	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58155.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.017335	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58179.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.014520	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58501.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.010446	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58529.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.006184	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58552.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.011423	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58563.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.013936	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58565.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.028106	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58597.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.045748	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58602.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.011853	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58606.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.030307	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58623.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.018551	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58629.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.026562	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58634.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.021766	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58636.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.008410	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58639.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.005884	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58660.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.023196	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58690.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.024436	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58707.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.005432	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58708.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.022809	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58713.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.009999	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58721.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.018663	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58722.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.005444	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58737.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.015994	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58742.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.045967	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58752.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.031475	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58753.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.023442	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58758.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.009560	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58776.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.020539	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58781.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.007608	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58790.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.032895	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58822.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.021898	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58824.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.012526	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58855.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.017943	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58865.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.016321	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58870.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.010880	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58894.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.017331	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58900.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.043980	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58905.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.047701	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58935.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.023918	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58942.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.019339	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58948.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.022830	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	58969.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.008005	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59018.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.011640	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59050.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.053488	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59082.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.023747	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59112.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.012795	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59129.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.019136	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59174.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.019115	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59184.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.030636	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59185.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.047966	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59238.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.006976	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59246.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.015639	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59273.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.029537	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59295.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.017225	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59320.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.006522	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59324.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.012675	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	59352.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0

Vernal Pool	Wetland	Wetlands_S	36424.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	5.0	0.136007	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36523.000000	No Impact	Cropland	Streams/Creeks	Class I	Class II	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	5.0	0.277954	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36547.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.011573	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36559.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.012159	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	36595.000000	No Impact	Cropland	Valley Grassland	Class I	Class I	Class I	Moderate	2.0	2.0	2.0	-3.0	-1.0	2.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	5.0	0.511807	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101809.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.062245	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101820.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.019723	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101826.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.038023	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101843.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.041868	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101869.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.048312	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101873.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.070818	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101878.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.051936	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101891.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.019728	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101902.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.012973	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101903.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.053257	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101912.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.056456	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101913.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.038678	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101914.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.024769	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101928.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.029191	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101932.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.019528	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101966.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.066248	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101974.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.031443	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101994.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.037863	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101995.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.008838	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101996.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.022325	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	101999.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.033104	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102010.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.029478	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102011.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.055361	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102020.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.042355	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102037.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.036923	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102040.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.069667	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102041.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.017335	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102043.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.028067	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102050.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.015414	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102054.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.058727	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102057.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.023877	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102068.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.013630	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102071.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.024837	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102076.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.027110	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102084.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.007078	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102105.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.037945	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102107.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.032532	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102109.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.013401	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102115.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.015737	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102117.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.028112	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102139.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.033126	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102146.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.059616	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102161.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.057458	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102174.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.029987	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102184.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.022348	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102248.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.007004	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102250.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.007783	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102258.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.027885	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102263.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.008441	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102264.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.009306	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102269.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.015842	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102306.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.010362	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102317.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.012208	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102319.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.056339	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102331.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.028294	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102344.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.043446	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102345.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.016372	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102351.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.016460	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102354.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.017819	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102356.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.008449	Snodgrass Slough
Vernal Pool	Wetland	Wetlands_S	102365.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	-3.0	-1.0	2.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.049735	Snodgrass Slough
Cropland - Other Linear Feature	Waters_E	Waters_E	198.000000	No Impact	Cropland	Cropland	Class II	Class I	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	5.0	1.618940	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	395.000000	No Impact	Vineyards	Cropland	Class II	Class II	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	5.0	0.750234	Lower Cosumnes River
Cropland - Other Linear Feature	Waters_E	Waters_E	459.000000	No Impact	Cropland	Cropland	Class II	Class II	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	5.0	1.240610	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4511.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	5.0	1.232850	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4513.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	5.0	0.845560	Lower Cosumnes River
Irrigated Pasture-Grassland - Other Linear Feature	Waters_E	Waters_E	4527.000000	No Impact	Vineyards	Irrigated Pasture-Grassland	Class II	Class II	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	5.0	0.118557	Lower Cosumnes River
Low Density Development - Other Linear Feature	Waters_E	Waters_E	5941.000000	No Impact	Valley Grassland (Vernal Pool)	Major Roads	Class III	Class IA	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	-2.0	-1.0	-1.0	5.0	0.786824	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7993.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	5.0	1.117920	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7994.000000	No Impact	Cropland	Low Density Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	5.0	2.818570	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	7997.000000	No Impact	Cropland	Valley Grassland (Vernal Pool)	Class I	Class II	Class IA	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	5.0	1.104930	Lower Cosumnes River
Mixed Riparian Scrub	Wetland	Riparian	8187.000000	No Impact	Cropland	Major Roads	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	5.0	3.239670	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8485.000000	No Impact	Cropland	Future Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	5.0	9.301860	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8499.000000	No Impact	Vineyards	Low Density Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.0	1.0	0.0	0.0	5.0	8.284410	Lower Cosumnes River
Mixed Riparian Woodland	Wetland	Riparian	8504.000000	No Impact	Vineyards	Future Development	Class I	Class II	Class III	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	-2.0	-2.0	-1.

Vernal Pool		Wetland	Wetlands_S	52912.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.049551	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	53216.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.013180	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	53908.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.053520	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54083.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.052831	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54095.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	1.149800	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54113.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.033653	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54383.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.056162	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54515.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.019901	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54528.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.050662	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54573.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.031520	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54576.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.013596	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54639.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.063197	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54653.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.032907	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54690.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.046526	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54886.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.111983	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	54951.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.013178	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55312.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.014447	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55602.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.029281	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55611.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.016135	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55673.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.023166	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55677.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.017523	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55707.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.008874	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55731.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.043895	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55771.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.037679	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55811.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.039017	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55846.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.045130	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55859.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.221619	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55868.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.012340	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	55992.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.009988	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56568.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.024387	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56569.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.019891	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56590.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.046307	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	56993.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.081482	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57014.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.015393	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57030.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.038762	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57036.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.024696	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	57241.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.594736	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	58187.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.022672	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	58207.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.030002	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	60434.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.028242	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	63061.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.004371	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	63316.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.014342	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	63344.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.034224	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	65319.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.019684	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	65484.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.025815	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	65487.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.057910	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	66149.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.009571	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	67109.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.015430	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	68652.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.067637	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	68919.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.043265	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	69000.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.013849	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	69549.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.061215	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	70070.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.044999	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	71016.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.017380	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	71620.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.019190	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	72631.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.014057	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	73104.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.024444	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	73146.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.023592	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	73288.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.007437	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	73564.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.025613	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	73951.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.013538	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	74263.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.037146	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	74441.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.025527	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	75886.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.007802	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36155.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.611791	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36479.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.021580	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36492.000000	No Impact	Irrigated Pasture-Grassland	Valley Grassland	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	5.0	0.004714	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36513.000000	No Impact	Irrigated Pasture-Grassland	Streams/Creeks	Class I	Class II	Class I	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	5.0	0.006247	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36650.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.068858	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36696.000000	No Impact	Major Roads	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.112539	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36828.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.065391	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36881.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.007886	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36932.000000	No Impact	Valley Grassland (Vernal Pool)	Low Density Development	Class I	Class IA	Class III	Moderate	0.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0	1.0	-2.0	-2.0	-1.0	2.0	0.0	0.0	5.0	0.029001	Lower Cosumnes River
Vernal Pool		Wetland	Wetlands_S	36995.000000	No Impact	Low Density Development	Valley Grassland (Vernal Pool)	Class I	Class III	Class IA	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	-3.0	-3.0	-2.0	1.0	0.0	0.0	2.0	0.0	0.0	5.0	0.221790	Lower Cosumnes River
Vineyards - Other Linear Feature		Waters_E	Waters_E	41568.000000	No Impact	Vineyards	Cropland	Class I	Class II	Class II	Moderate	2.0	2.0	2.0	3.0	0.0	1.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-2.0	-1.0	5.0	0.672146	Lower Cosumnes River
Mixed Riparian Scrub		Wetland	Riparian	8387.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.299586	Morrison Creek
Mixed Riparian Woodland		Waters_E	Waters_E	9450.000000	No Impact	Valley Grassland (Vernal Pool)	Mixed Riparian Woodland	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.000488	Morrison Creek
Mixed Riparian Woodland		Waters_P	Waters_IP	9262.000000	No Impact	Mixed Riparian Woodland	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class I	Class IA	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	6.0	0.000474	Morrison Creek
Mixed Riparian Woodland		Wetland	Riparian	9128.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.560339	Morrison Creek
Mixed Riparian Woodland		Wetland	Riparian	9129.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.216239	Morrison Creek
Mixed Riparian Woodland		Wetland	Riparian	9131.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.125884	Morrison Creek
Mixed Riparian Woodland		Wetland	Riparian	9133.000000	No Impact	Valley Grassland (Vernal Pool)	Swale	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	1.681570	Morrison Creek
Mixed Riparian Woodland		Wetland

Swale	Waters_E	Waters_E	28782.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022687	Morrison Creek
Swale	Waters_E	Waters_E	28787.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.020955	Morrison Creek
Swale	Waters_E	Waters_E	28788.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008792	Morrison Creek
Swale	Waters_E	Waters_E	28791.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001915	Morrison Creek
Swale	Waters_E	Waters_E	28803.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006158	Morrison Creek
Swale	Waters_E	Waters_E	28806.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025731	Morrison Creek
Swale	Waters_E	Waters_E	28808.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003766	Morrison Creek
Swale	Waters_E	Waters_E	28812.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006870	Morrison Creek
Swale	Waters_E	Waters_E	28813.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007310	Morrison Creek
Swale	Waters_E	Waters_E	28820.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002161	Morrison Creek
Swale	Waters_E	Waters_E	28823.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022198	Morrison Creek
Swale	Waters_E	Waters_E	28827.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025468	Morrison Creek
Swale	Waters_E	Waters_E	28831.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002405	Morrison Creek
Swale	Waters_E	Waters_E	28835.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005465	Morrison Creek
Swale	Waters_E	Waters_E	28838.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.044058	Morrison Creek
Swale	Waters_E	Waters_E	28845.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005751	Morrison Creek
Swale	Waters_E	Waters_E	28846.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010381	Morrison Creek
Swale	Waters_E	Waters_E	28848.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011924	Morrison Creek
Swale	Waters_E	Waters_E	28855.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007003	Morrison Creek
Swale	Waters_E	Waters_E	28857.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003753	Morrison Creek
Swale	Waters_E	Waters_E	28864.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014098	Morrison Creek
Swale	Waters_E	Waters_E	28871.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005964	Morrison Creek
Swale	Waters_E	Waters_E	28898.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005778	Morrison Creek
Swale	Waters_E	Waters_E	28901.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016451	Morrison Creek
Swale	Waters_E	Waters_E	28914.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004513	Morrison Creek
Swale	Waters_E	Waters_E	28917.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003129	Morrison Creek
Swale	Waters_E	Waters_E	28921.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009144	Morrison Creek
Swale	Waters_E	Waters_E	28922.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017842	Morrison Creek
Swale	Waters_E	Waters_E	28928.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008947	Morrison Creek
Swale	Waters_E	Waters_E	28934.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007548	Morrison Creek
Swale	Waters_E	Waters_E	28938.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016730	Morrison Creek
Swale	Waters_E	Waters_E	28945.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003975	Morrison Creek
Swale	Waters_E	Waters_E	28946.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006674	Morrison Creek
Swale	Waters_E	Waters_E	28949.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014283	Morrison Creek
Swale	Waters_E	Waters_E	28950.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019381	Morrison Creek
Swale	Waters_E	Waters_E	28951.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006942	Morrison Creek
Swale	Waters_E	Waters_E	28966.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037266	Morrison Creek
Swale	Waters_E	Waters_E	28983.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008881	Morrison Creek
Swale	Waters_E	Waters_E	29001.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008704	Morrison Creek
Swale	Waters_E	Waters_E	29013.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019184	Morrison Creek
Swale	Waters_E	Waters_E	29017.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.029510	Morrison Creek
Swale	Waters_E	Waters_E	29044.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023263	Morrison Creek
Swale	Waters_E	Waters_E	29047.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013949	Morrison Creek
Swale	Waters_E	Waters_E	29053.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017910	Morrison Creek
Swale	Waters_E	Waters_E	29057.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018177	Morrison Creek
Swale	Waters_E	Waters_E	29079.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.034719	Morrison Creek
Swale	Waters_E	Waters_E	29082.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025360	Morrison Creek
Swale	Waters_E	Waters_E	29091.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.031158	Morrison Creek
Swale	Waters_E	Waters_E	29098.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.047626	Morrison Creek
Swale	Waters_E	Waters_E	29109.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.031210	Morrison Creek
Swale	Waters_E	Waters_E	29116.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.034178	Morrison Creek
Swale	Waters_E	Waters_E	29122.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015321	Morrison Creek
Swale	Waters_E	Waters_E	29129.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.027282	Morrison Creek
Swale	Waters_E	Waters_E	29134.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005961	Morrison Creek
Swale	Waters_E	Waters_E	29142.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007944	Morrison Creek
Swale	Waters_E	Waters_E	29145.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004461	Morrison Creek
Swale	Waters_E	Waters_E	29158.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.036931	Morrison Creek
Swale	Waters_E	Waters_E	29160.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013249	Morrison Creek
Swale	Waters_E	Waters_E	29172.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010883	Morrison Creek
Swale	Waters_E	Waters_E	29178.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003582	Morrison Creek
Swale	Waters_E	Waters_E	29180.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005910	Morrison Creek
Swale	Waters_E	Waters_E	29181.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.034067	Morrison Creek
Swale	Waters_E	Waters_E	29186.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006392	Morrison Creek
Swale	Waters_E	Waters_E	29189.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021819	Morrison Creek
Swale	Waters_E	Waters_E	29192.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.026830	Morrison Creek
Swale	Waters_E	Waters_E	29196.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004139	Morrison Creek
Swale	Waters_E	Waters_E	29203.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006594	Morrison Creek
Swale	Waters_E	Waters_E	29209.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028692	Morrison Creek
Swale	Waters_E	Waters_E	29214.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009810	Morrison Creek
Swale	Waters_E	Waters_E	29218.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004422	Morrison Creek
Swale	Waters_E	Waters_E	29219.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001726	Morrison Creek
Swale	Waters_E	Waters_E	29221.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017827	Morrison Creek
Swale	Waters_E	Waters_E	29227.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003220	Morrison Creek
Swale	Waters_E	Waters_E	29238.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.042773	Morrison Creek
Swale	Waters_E	Waters_E	29246.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003139	Morrison Creek
Swale	Waters_E	Waters_E	29253.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.029362	Morrison Creek
Swale	Waters_E	Waters_E	29257.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.047256	Morrison Creek
Swale	Waters_E	Waters_E	29258.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.042157	Morrison Creek
Swale	Waters_E	Waters_E	29287.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005061	Morrison Creek
Swale	Waters_E	Waters_E	29290.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.046079	Morrison Creek
Swale	Waters_E	Waters_E	29292.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004503	Morrison Creek
Swale	Waters_E	Waters_E	29295.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025702	Morrison Creek
Swale	Waters_E	Waters_E	29298.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.046133	Morrison Creek
Swale	Waters_E	Waters_E	29301.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007459	Morrison Creek
Swale	Waters_E	Waters_E	29307.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021054	Morrison Creek
Swale	Waters_E	Waters_E	29313.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2

Swale	Waters_E	Waters_E	29363.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008479	Morrison Creek
Swale	Waters_E	Waters_E	29370.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.039901	Morrison Creek
Swale	Waters_E	Waters_E	29374.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005931	Morrison Creek
Swale	Waters_E	Waters_E	29383.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011831	Morrison Creek
Swale	Waters_E	Waters_E	29392.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.027735	Morrison Creek
Swale	Waters_E	Waters_E	29395.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018509	Morrison Creek
Swale	Waters_E	Waters_E	29407.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.044261	Morrison Creek
Swale	Waters_E	Waters_E	29431.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.045066	Morrison Creek
Swale	Waters_E	Waters_E	29434.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025733	Morrison Creek
Swale	Waters_E	Waters_E	29439.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007766	Morrison Creek
Swale	Waters_E	Waters_E	29450.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008803	Morrison Creek
Swale	Waters_E	Waters_E	29461.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004516	Morrison Creek
Swale	Waters_E	Waters_E	29464.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023529	Morrison Creek
Swale	Waters_E	Waters_E	29466.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005131	Morrison Creek
Swale	Waters_E	Waters_E	29469.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016427	Morrison Creek
Swale	Waters_E	Waters_E	29476.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012016	Morrison Creek
Swale	Waters_E	Waters_E	29506.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025910	Morrison Creek
Swale	Waters_E	Waters_E	29516.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010478	Morrison Creek
Swale	Waters_E	Waters_E	29518.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004316	Morrison Creek
Swale	Waters_E	Waters_E	29519.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001929	Morrison Creek
Swale	Waters_E	Waters_E	29521.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021350	Morrison Creek
Swale	Waters_E	Waters_E	29560.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037405	Morrison Creek
Swale	Waters_E	Waters_E	29565.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.032754	Morrison Creek
Swale	Waters_E	Waters_E	29567.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006645	Morrison Creek
Swale	Waters_E	Waters_E	29578.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022485	Morrison Creek
Swale	Waters_E	Waters_E	29592.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.026226	Morrison Creek
Swale	Waters_E	Waters_E	29600.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.030737	Morrison Creek
Swale	Waters_E	Waters_E	29616.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028195	Morrison Creek
Swale	Waters_E	Waters_E	29618.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009360	Morrison Creek
Swale	Waters_E	Waters_E	29622.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012104	Morrison Creek
Swale	Waters_E	Waters_E	29644.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005711	Morrison Creek
Swale	Waters_E	Waters_E	29645.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.044102	Morrison Creek
Swale	Waters_E	Waters_E	29661.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002810	Morrison Creek
Swale	Waters_E	Waters_E	29675.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018981	Morrison Creek
Swale	Waters_E	Waters_E	29679.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.045427	Morrison Creek
Swale	Waters_E	Waters_E	29696.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010702	Morrison Creek
Swale	Waters_E	Waters_E	29700.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.042284	Morrison Creek
Swale	Waters_E	Waters_E	29702.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017374	Morrison Creek
Swale	Waters_E	Waters_E	29708.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014241	Morrison Creek
Swale	Waters_E	Waters_E	29712.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004788	Morrison Creek
Swale	Waters_E	Waters_E	29713.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016120	Morrison Creek
Swale	Waters_E	Waters_E	29716.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015164	Morrison Creek
Swale	Waters_E	Waters_E	29719.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037218	Morrison Creek
Swale	Waters_E	Waters_E	29723.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.047712	Morrison Creek
Swale	Waters_E	Waters_E	29724.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037718	Morrison Creek
Swale	Waters_E	Waters_E	29728.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012917	Morrison Creek
Swale	Waters_E	Waters_E	29743.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017954	Morrison Creek
Swale	Waters_E	Waters_E	29745.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022194	Morrison Creek
Swale	Waters_E	Waters_E	29746.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009175	Morrison Creek
Swale	Waters_E	Waters_E	29749.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008713	Morrison Creek
Swale	Waters_E	Waters_E	29761.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008673	Morrison Creek
Swale	Waters_E	Waters_E	29762.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002866	Morrison Creek
Swale	Waters_E	Waters_E	29764.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002953	Morrison Creek
Swale	Waters_E	Waters_E	29777.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016075	Morrison Creek
Swale	Waters_E	Waters_E	29778.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.036512	Morrison Creek
Swale	Waters_E	Waters_E	29783.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007611	Morrison Creek
Swale	Waters_E	Waters_E	29784.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004056	Morrison Creek
Swale	Waters_E	Waters_E	29786.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007199	Morrison Creek
Swale	Waters_E	Waters_E	29787.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014727	Morrison Creek
Swale	Waters_E	Waters_E	29792.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016938	Morrison Creek
Swale	Waters_E	Waters_E	29800.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.039613	Morrison Creek
Swale	Waters_E	Waters_E	29803.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008786	Morrison Creek
Swale	Waters_E	Waters_E	29806.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037707	Morrison Creek
Swale	Waters_E	Waters_E	29808.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003008	Morrison Creek
Swale	Waters_E	Waters_E	29811.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.046908	Morrison Creek
Swale	Waters_E	Waters_E	29813.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010221	Morrison Creek
Swale	Waters_E	Waters_E	29817.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004769	Morrison Creek
Swale	Waters_E	Waters_E	29822.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015200	Morrison Creek
Swale	Waters_E	Waters_E	29824.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041515	Morrison Creek
Swale	Waters_E	Waters_E	29825.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006356	Morrison Creek
Swale	Waters_E	Waters_E	29826.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017212	Morrison Creek
Swale	Waters_E	Waters_E	29827.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015562	Morrison Creek
Swale	Waters_E	Waters_E	29833.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010625	Morrison Creek
Swale	Waters_E	Waters_E	29835.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.047347	Morrison Creek
Swale	Waters_E	Waters_E	29838.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005742	Morrison Creek
Swale	Waters_E	Waters_E	29839.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006547	Morrison Creek
Swale	Waters_E	Waters_E	29845.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041521	Morrison Creek
Swale	Waters_E	Waters_E	29846.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014485	Morrison Creek
Swale	Waters_E	Waters_E	29848.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010905	Morrison Creek
Swale	Waters_E	Waters_E	29850.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007296	Morrison Creek
Swale	Waters_E	Waters_E	29852.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004703	Morrison Creek
Swale	Waters_E	Waters_E	29857.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010521	Morrison Creek
Swale	Waters_E	Waters_E	29863.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009971	Morrison Creek
Swale	Waters_E	Waters_E	29873.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006022	Morrison Creek
Swale	Waters_E	Waters_E	29879.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022975	Morrison Creek
Swale	Waters_E	Waters_E	29881.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0

Swale	Waters_E	Waters_E	29918.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021547	Morrison Creek
Swale	Waters_E	Waters_E	29930.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018391	Morrison Creek
Swale	Waters_E	Waters_E	29932.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005419	Morrison Creek
Swale	Waters_E	Waters_E	29935.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.020000	Morrison Creek
Swale	Waters_E	Waters_E	29937.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003680	Morrison Creek
Swale	Waters_E	Waters_E	29940.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.032005	Morrison Creek
Swale	Waters_E	Waters_E	29941.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008964	Morrison Creek
Swale	Waters_E	Waters_E	29946.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.034144	Morrison Creek
Swale	Waters_E	Waters_E	29952.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011937	Morrison Creek
Swale	Waters_E	Waters_E	29954.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041028	Morrison Creek
Swale	Waters_E	Waters_E	29958.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037545	Morrison Creek
Swale	Waters_E	Waters_E	29973.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016590	Morrison Creek
Swale	Waters_E	Waters_E	29976.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.035569	Morrison Creek
Swale	Waters_E	Waters_E	29977.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037343	Morrison Creek
Swale	Waters_E	Waters_E	29984.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041625	Morrison Creek
Swale	Waters_E	Waters_E	29986.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016480	Morrison Creek
Swale	Waters_E	Waters_E	29987.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021377	Morrison Creek
Swale	Waters_E	Waters_E	29988.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025346	Morrison Creek
Swale	Waters_E	Waters_E	29990.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.032111	Morrison Creek
Swale	Waters_E	Waters_E	29993.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023298	Morrison Creek
Swale	Waters_E	Waters_E	29994.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.024196	Morrison Creek
Swale	Waters_E	Waters_E	30011.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022893	Morrison Creek
Swale	Waters_E	Waters_E	30016.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.031094	Morrison Creek
Swale	Waters_E	Waters_E	30024.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004116	Morrison Creek
Swale	Waters_E	Waters_E	30029.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041822	Morrison Creek
Swale	Waters_E	Waters_E	30032.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028299	Morrison Creek
Swale	Waters_E	Waters_E	30039.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037138	Morrison Creek
Swale	Waters_E	Waters_E	30048.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005866	Morrison Creek
Swale	Waters_E	Waters_E	30054.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013366	Morrison Creek
Swale	Waters_E	Waters_E	30061.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018561	Morrison Creek
Swale	Waters_E	Waters_E	30064.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005609	Morrison Creek
Swale	Waters_E	Waters_E	30067.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022174	Morrison Creek
Swale	Waters_E	Waters_E	30073.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011981	Morrison Creek
Swale	Waters_E	Waters_E	30079.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013807	Morrison Creek
Swale	Waters_E	Waters_E	30087.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.031937	Morrison Creek
Swale	Waters_E	Waters_E	30097.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003620	Morrison Creek
Swale	Waters_E	Waters_E	30116.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009278	Morrison Creek
Swale	Waters_E	Waters_E	30120.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009048	Morrison Creek
Swale	Waters_E	Waters_E	30123.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010018	Morrison Creek
Swale	Waters_E	Waters_E	30131.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006939	Morrison Creek
Swale	Waters_E	Waters_E	30132.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002925	Morrison Creek
Swale	Waters_E	Waters_E	30134.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018025	Morrison Creek
Swale	Waters_E	Waters_E	30148.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008732	Morrison Creek
Swale	Waters_E	Waters_E	30151.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011550	Morrison Creek
Swale	Waters_E	Waters_E	30153.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037836	Morrison Creek
Swale	Waters_E	Waters_E	30156.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006741	Morrison Creek
Swale	Waters_E	Waters_E	30163.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.029301	Morrison Creek
Swale	Waters_E	Waters_E	30167.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015496	Morrison Creek
Swale	Waters_E	Waters_E	30168.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.033504	Morrison Creek
Swale	Waters_E	Waters_E	30177.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.042438	Morrison Creek
Swale	Waters_E	Waters_E	30178.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015229	Morrison Creek
Swale	Waters_E	Waters_E	30180.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004565	Morrison Creek
Swale	Waters_E	Waters_E	30187.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001749	Morrison Creek
Swale	Waters_E	Waters_E	30195.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014855	Morrison Creek
Swale	Waters_E	Waters_E	30198.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003582	Morrison Creek
Swale	Waters_E	Waters_E	30200.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003930	Morrison Creek
Swale	Waters_E	Waters_E	30203.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010208	Morrison Creek
Swale	Waters_E	Waters_E	30208.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005304	Morrison Creek
Swale	Waters_E	Waters_E	30213.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006760	Morrison Creek
Swale	Waters_E	Waters_E	30214.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004849	Morrison Creek
Swale	Waters_E	Waters_E	30216.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014850	Morrison Creek
Swale	Waters_E	Waters_E	30217.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023820	Morrison Creek
Swale	Waters_E	Waters_E	30225.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.020802	Morrison Creek
Swale	Waters_E	Waters_E	30228.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010179	Morrison Creek
Swale	Waters_E	Waters_E	30243.000000	No Impact	Valley Grassland (Vernal Pool)	Streams/Creeks	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.031091	Morrison Creek
Swale	Waters_E	Waters_E	30254.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.000501	Morrison Creek
Swale	Waters_E	Waters_E	30256.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028800	Morrison Creek
Swale	Waters_E	Waters_E	30258.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023032	Morrison Creek
Swale	Waters_E	Waters_E	30259.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008571	Morrison Creek
Swale	Waters_E	Waters_E	30262.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013549	Morrison Creek
Swale	Waters_E	Waters_E	30279.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006265	Morrison Creek
Swale	Waters_E	Waters_E	30280.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006871	Morrison Creek
Swale	Waters_E	Waters_E	30281.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005364	Morrison Creek
Swale	Waters_E	Waters_E	30282.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008347	Morrison Creek
Swale	Waters_E	Waters_E	30283.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002948	Morrison Creek
Swale	Waters_E	Waters_E	30285.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009651	Morrison Creek
Swale	Waters_E	Waters_E	30287.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003892	Morrison Creek
Swale	Waters_E	Waters_E	30288.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001099	Morrison Creek
Swale	Waters_E	Waters_E	30293.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009496	Morrison Creek
Swale	Waters_E	Waters_E	30294.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022402	Morrison Creek
Swale	Waters_E	Waters_E	30298.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002445	Morrison Creek
Swale	Waters_E	Waters_E	30304.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007425	Morrison Creek
Swale	Waters_E	Waters_E	30319.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.036397	Morrison Creek
Swale	Waters_E	Waters_E	30321.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003797	Morrison Creek
Swale	Waters_E	Waters_E	30333.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004882	Morrison Creek
Swale	Waters_E	Waters_E	30344.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-

Swale	Waters_E	Waters_E	30422.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002302	Morrison Creek
Swale	Waters_E	Waters_E	30442.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022391	Morrison Creek
Swale	Waters_E	Waters_E	30517.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016297	Morrison Creek
Swale	Waters_E	Waters_E	30520.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.031698	Morrison Creek
Swale	Waters_E	Waters_E	30521.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009186	Morrison Creek
Swale	Waters_E	Waters_E	30526.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011838	Morrison Creek
Swale	Waters_E	Waters_E	30532.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014770	Morrison Creek
Swale	Waters_E	Waters_E	30534.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.029765	Morrison Creek
Swale	Waters_E	Waters_E	30538.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.027759	Morrison Creek
Swale	Waters_E	Waters_E	30541.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015450	Morrison Creek
Swale	Waters_E	Waters_E	30543.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005189	Morrison Creek
Swale	Waters_E	Waters_E	30544.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004990	Morrison Creek
Swale	Waters_E	Waters_E	30546.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007676	Morrison Creek
Swale	Waters_E	Waters_E	30547.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010499	Morrison Creek
Swale	Waters_E	Waters_E	30548.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003397	Morrison Creek
Swale	Waters_E	Waters_E	30552.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002967	Morrison Creek
Swale	Waters_E	Waters_E	30554.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011255	Morrison Creek
Swale	Waters_E	Waters_E	30560.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005203	Morrison Creek
Swale	Waters_E	Waters_E	30568.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028282	Morrison Creek
Swale	Waters_E	Waters_E	30571.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.033619	Morrison Creek
Swale	Waters_E	Waters_E	30572.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008892	Morrison Creek
Swale	Waters_E	Waters_E	30581.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003401	Morrison Creek
Swale	Waters_E	Waters_E	30586.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005162	Morrison Creek
Swale	Waters_E	Waters_E	30591.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017002	Morrison Creek
Swale	Waters_E	Waters_E	30592.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007679	Morrison Creek
Swale	Waters_E	Waters_E	30593.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005112	Morrison Creek
Swale	Waters_E	Waters_E	30596.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003148	Morrison Creek
Swale	Waters_E	Waters_E	30598.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003200	Morrison Creek
Swale	Waters_E	Waters_E	30609.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.045303	Morrison Creek
Swale	Waters_E	Waters_E	30614.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013537	Morrison Creek
Swale	Waters_E	Waters_E	30615.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.027712	Morrison Creek
Swale	Waters_E	Waters_E	30616.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003618	Morrison Creek
Swale	Waters_E	Waters_E	30619.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016000	Morrison Creek
Swale	Waters_E	Waters_E	30621.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028386	Morrison Creek
Swale	Waters_E	Waters_E	30623.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023478	Morrison Creek
Swale	Waters_E	Waters_E	30624.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003922	Morrison Creek
Swale	Waters_E	Waters_E	30626.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019217	Morrison Creek
Swale	Waters_E	Waters_E	30630.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.035798	Morrison Creek
Swale	Waters_E	Waters_E	30636.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041353	Morrison Creek
Swale	Waters_E	Waters_E	30639.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.042644	Morrison Creek
Swale	Waters_E	Waters_E	30640.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003249	Morrison Creek
Swale	Waters_E	Waters_E	30646.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002618	Morrison Creek
Swale	Waters_E	Waters_E	30647.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005107	Morrison Creek
Swale	Waters_E	Waters_E	30648.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015173	Morrison Creek
Swale	Waters_E	Waters_E	30651.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010369	Morrison Creek
Swale	Waters_E	Waters_E	30653.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004656	Morrison Creek
Swale	Waters_E	Waters_E	30655.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015428	Morrison Creek
Swale	Waters_E	Waters_E	30656.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.047156	Morrison Creek
Swale	Waters_E	Waters_E	30657.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005233	Morrison Creek
Swale	Waters_E	Waters_E	30667.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003182	Morrison Creek
Swale	Waters_E	Waters_E	30668.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037349	Morrison Creek
Swale	Waters_E	Waters_E	30672.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.038980	Morrison Creek
Swale	Waters_E	Waters_E	30676.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005807	Morrison Creek
Swale	Waters_E	Waters_E	30679.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002478	Morrison Creek
Swale	Waters_E	Waters_E	30680.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002946	Morrison Creek
Swale	Waters_E	Waters_E	30681.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012927	Morrison Creek
Swale	Waters_E	Waters_E	30683.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004065	Morrison Creek
Swale	Waters_E	Waters_E	30686.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009480	Morrison Creek
Swale	Waters_E	Waters_E	30687.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016279	Morrison Creek
Swale	Waters_E	Waters_E	30691.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008755	Morrison Creek
Swale	Waters_E	Waters_E	30692.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005084	Morrison Creek
Swale	Waters_E	Waters_E	30695.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012276	Morrison Creek
Swale	Waters_E	Waters_E	30698.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012802	Morrison Creek
Swale	Waters_E	Waters_E	30701.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012724	Morrison Creek
Swale	Waters_E	Waters_E	30702.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007737	Morrison Creek
Swale	Waters_E	Waters_E	30703.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.026249	Morrison Creek
Swale	Waters_E	Waters_E	30705.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022063	Morrison Creek
Swale	Waters_E	Waters_E	30706.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.031187	Morrison Creek
Swale	Waters_E	Waters_E	30718.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.026805	Morrison Creek
Swale	Waters_E	Waters_E	30720.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015197	Morrison Creek
Swale	Waters_E	Waters_E	30726.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009594	Morrison Creek
Swale	Waters_E	Waters_E	30727.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006307	Morrison Creek
Swale	Waters_E	Waters_E	30729.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002912	Morrison Creek
Swale	Waters_E	Waters_E	30731.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009197	Morrison Creek
Swale	Waters_E	Waters_E	30734.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010198	Morrison Creek
Swale	Waters_E	Waters_E	30737.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002579	Morrison Creek
Swale	Waters_E	Waters_E	30741.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002743	Morrison Creek
Swale	Waters_E	Waters_E	30744.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018398	Morrison Creek
Swale	Waters_E	Waters_E	30745.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007814	Morrison Creek
Swale	Waters_E	Waters_E	30749.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.034943	Morrison Creek
Swale	Waters_E	Waters_E	30755.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006117	Morrison Creek
Swale	Waters_E	Waters_E	30758.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019662	Morrison Creek
Swale	Waters_E	Waters_E	30759.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003170	Morrison Creek
Swale	Waters_E	Waters_E	30761.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.035229	Morrison Creek
Swale	Waters_E	Waters_E	30765.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.045902	Morrison Creek
Swale	Waters_E	Waters_E	30767.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0

Swale	Waters_E	Waters_E	30808.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003350	Morrison Creek
Swale	Waters_E	Waters_E	30810.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.032152	Morrison Creek
Swale	Waters_E	Waters_E	30814.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017482	Morrison Creek
Swale	Waters_E	Waters_E	30816.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.034604	Morrison Creek
Swale	Waters_E	Waters_E	30820.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.033198	Morrison Creek
Swale	Waters_E	Waters_E	30826.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.030019	Morrison Creek
Swale	Waters_E	Waters_E	30827.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008097	Morrison Creek
Swale	Waters_E	Waters_E	30830.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.024131	Morrison Creek
Swale	Waters_E	Waters_E	30834.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005395	Morrison Creek
Swale	Waters_E	Waters_E	30836.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006822	Morrison Creek
Swale	Waters_E	Waters_E	30839.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.044323	Morrison Creek
Swale	Waters_E	Waters_E	30845.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.038411	Morrison Creek
Swale	Waters_E	Waters_E	30849.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011230	Morrison Creek
Swale	Waters_E	Waters_E	30858.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041866	Morrison Creek
Swale	Waters_E	Waters_E	30868.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009980	Morrison Creek
Swale	Waters_E	Waters_E	30876.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019128	Morrison Creek
Swale	Waters_E	Waters_E	30877.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012172	Morrison Creek
Swale	Waters_E	Waters_E	30885.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.032243	Morrison Creek
Swale	Waters_E	Waters_E	30887.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004793	Morrison Creek
Swale	Waters_E	Waters_E	30890.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.026516	Morrison Creek
Swale	Waters_E	Waters_E	30895.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006576	Morrison Creek
Swale	Waters_E	Waters_E	30896.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008654	Morrison Creek
Swale	Waters_E	Waters_E	30897.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011512	Morrison Creek
Swale	Waters_E	Waters_E	30900.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010723	Morrison Creek
Swale	Waters_E	Waters_E	30901.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014042	Morrison Creek
Swale	Waters_E	Waters_E	30904.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011931	Morrison Creek
Swale	Waters_E	Waters_E	30908.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023894	Morrison Creek
Swale	Waters_E	Waters_E	30916.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021897	Morrison Creek
Swale	Waters_E	Waters_E	30918.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023916	Morrison Creek
Swale	Waters_E	Waters_E	30921.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.014548	Morrison Creek
Swale	Waters_E	Waters_E	30922.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007858	Morrison Creek
Swale	Waters_E	Waters_E	30923.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006391	Morrison Creek
Swale	Waters_E	Waters_E	30924.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007839	Morrison Creek
Swale	Waters_E	Waters_E	30925.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016065	Morrison Creek
Swale	Waters_E	Waters_E	30926.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041727	Morrison Creek
Swale	Waters_E	Waters_E	30928.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004827	Morrison Creek
Swale	Waters_E	Waters_E	30929.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006425	Morrison Creek
Swale	Waters_E	Waters_E	30932.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.042818	Morrison Creek
Swale	Waters_E	Waters_E	30934.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.033149	Morrison Creek
Swale	Waters_E	Waters_E	30935.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.041409	Morrison Creek
Swale	Waters_E	Waters_E	30937.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002860	Morrison Creek
Swale	Waters_E	Waters_E	30938.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017383	Morrison Creek
Swale	Waters_E	Waters_E	30943.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037699	Morrison Creek
Swale	Waters_E	Waters_E	30944.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022052	Morrison Creek
Swale	Waters_E	Waters_E	30948.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019356	Morrison Creek
Swale	Waters_E	Waters_E	30956.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.036564	Morrison Creek
Swale	Waters_E	Waters_E	30959.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016367	Morrison Creek
Swale	Waters_E	Waters_E	30961.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021016	Morrison Creek
Swale	Waters_E	Waters_E	30962.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006295	Morrison Creek
Swale	Waters_E	Waters_E	30963.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022266	Morrison Creek
Swale	Waters_E	Waters_E	30966.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013874	Morrison Creek
Swale	Waters_E	Waters_E	30973.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.027665	Morrison Creek
Swale	Waters_E	Waters_E	30974.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006859	Morrison Creek
Swale	Waters_E	Waters_E	30976.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022825	Morrison Creek
Swale	Waters_E	Waters_E	30977.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001836	Morrison Creek
Swale	Waters_E	Waters_E	30981.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006917	Morrison Creek
Swale	Waters_E	Waters_E	30982.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004556	Morrison Creek
Swale	Waters_E	Waters_E	30983.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007043	Morrison Creek
Swale	Waters_E	Waters_E	30984.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003359	Morrison Creek
Swale	Waters_E	Waters_E	30985.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.016180	Morrison Creek
Swale	Waters_E	Waters_E	30986.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007915	Morrison Creek
Swale	Waters_E	Waters_E	30992.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009082	Morrison Creek
Swale	Waters_E	Waters_E	30993.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028263	Morrison Creek
Swale	Waters_E	Waters_E	30994.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017213	Morrison Creek
Swale	Waters_E	Waters_E	30998.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005849	Morrison Creek
Swale	Waters_E	Waters_E	30999.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001294	Morrison Creek
Swale	Waters_E	Waters_E	31000.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004132	Morrison Creek
Swale	Waters_E	Waters_E	31002.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006640	Morrison Creek
Swale	Waters_E	Waters_E	31005.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007104	Morrison Creek
Swale	Waters_E	Waters_E	31007.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022827	Morrison Creek
Swale	Waters_E	Waters_E	31009.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004161	Morrison Creek
Swale	Waters_E	Waters_E	31010.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010076	Morrison Creek
Swale	Waters_E	Waters_E	31012.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005757	Morrison Creek
Swale	Waters_E	Waters_E	31013.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001807	Morrison Creek
Swale	Waters_E	Waters_E	31015.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006417	Morrison Creek
Swale	Waters_E	Waters_E	31016.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003066	Morrison Creek
Swale	Waters_E	Waters_E	31017.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.039352	Morrison Creek
Swale	Waters_E	Waters_E	31018.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008584	Morrison Creek
Swale	Waters_E	Waters_E	31020.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.027662	Morrison Creek
Swale	Waters_E	Waters_E	31021.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006386	Morrison Creek
Swale	Waters_E	Waters_E	31024.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019956	Morrison Creek
Swale	Waters_E	Waters_E	31026.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025233	Morrison Creek
Swale	Waters_E	Waters_E	31027.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018232	Morrison Creek
Swale	Waters_E	Waters_E	31032.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005982	Morrison Creek
Swale	Waters_E	Waters_E	31033.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028514	Morrison Creek
Swale	Waters_E	Waters_E	31034.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0

Swale	Waters_E	Waters_E	31055.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010887	Morrison Creek
Swale	Waters_E	Waters_E	31056.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007658	Morrison Creek
Swale	Waters_E	Waters_E	31057.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005932	Morrison Creek
Swale	Waters_E	Waters_E	31059.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019197	Morrison Creek
Swale	Waters_E	Waters_E	31062.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011065	Morrison Creek
Swale	Waters_E	Waters_E	31064.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004968	Morrison Creek
Swale	Waters_E	Waters_E	31065.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018243	Morrison Creek
Swale	Waters_E	Waters_E	31073.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.020010	Morrison Creek
Swale	Waters_E	Waters_E	31082.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003453	Morrison Creek
Swale	Waters_E	Waters_E	31084.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019020	Morrison Creek
Swale	Waters_E	Waters_E	31088.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.047579	Morrison Creek
Swale	Waters_E	Waters_E	31089.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010396	Morrison Creek
Swale	Waters_E	Waters_E	31093.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.012251	Morrison Creek
Swale	Waters_E	Waters_E	31095.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005253	Morrison Creek
Swale	Waters_E	Waters_E	31096.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.023460	Morrison Creek
Swale	Waters_E	Waters_E	31097.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011967	Morrison Creek
Swale	Waters_E	Waters_E	31098.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018860	Morrison Creek
Swale	Waters_E	Waters_E	31099.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001533	Morrison Creek
Swale	Waters_E	Waters_E	31100.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025684	Morrison Creek
Swale	Waters_E	Waters_E	31105.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021200	Morrison Creek
Swale	Waters_E	Waters_E	31106.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005572	Morrison Creek
Swale	Waters_E	Waters_E	31107.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010788	Morrison Creek
Swale	Waters_E	Waters_E	31114.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003861	Morrison Creek
Swale	Waters_E	Waters_E	31116.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.032145	Morrison Creek
Swale	Waters_E	Waters_E	31119.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002553	Morrison Creek
Swale	Waters_E	Waters_E	31130.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008452	Morrison Creek
Swale	Waters_E	Waters_E	31131.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002637	Morrison Creek
Swale	Waters_E	Waters_E	31133.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.046963	Morrison Creek
Swale	Waters_E	Waters_E	31137.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005199	Morrison Creek
Swale	Waters_E	Waters_E	31138.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004333	Morrison Creek
Swale	Waters_E	Waters_E	31140.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005447	Morrison Creek
Swale	Waters_E	Waters_E	31142.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.036444	Morrison Creek
Swale	Waters_E	Waters_E	31143.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.047315	Morrison Creek
Swale	Waters_E	Waters_E	31147.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.017660	Morrison Creek
Swale	Waters_E	Waters_E	31148.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002463	Morrison Creek
Swale	Waters_E	Waters_E	31149.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.019596	Morrison Creek
Swale	Waters_E	Waters_E	31151.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004455	Morrison Creek
Swale	Waters_E	Waters_E	31153.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010373	Morrison Creek
Swale	Waters_E	Waters_E	31158.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011902	Morrison Creek
Swale	Waters_E	Waters_E	31159.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009853	Morrison Creek
Swale	Waters_E	Waters_E	31162.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010125	Morrison Creek
Swale	Waters_E	Waters_E	31165.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004157	Morrison Creek
Swale	Waters_E	Waters_E	31167.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.011546	Morrison Creek
Swale	Waters_E	Waters_E	31168.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018359	Morrison Creek
Swale	Waters_E	Waters_E	31170.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028153	Morrison Creek
Swale	Waters_E	Waters_E	31171.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009179	Morrison Creek
Swale	Waters_E	Waters_E	31172.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013392	Morrison Creek
Swale	Waters_E	Waters_E	31176.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.004786	Morrison Creek
Swale	Waters_E	Waters_E	31180.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007891	Morrison Creek
Swale	Waters_E	Waters_E	31183.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.006228	Morrison Creek
Swale	Waters_E	Waters_E	31185.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.029805	Morrison Creek
Swale	Waters_E	Waters_E	31187.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008096	Morrison Creek
Swale	Waters_E	Waters_E	31188.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001199	Morrison Creek
Swale	Waters_E	Waters_E	31190.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003490	Morrison Creek
Swale	Waters_E	Waters_E	31197.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.015862	Morrison Creek
Swale	Waters_E	Waters_E	31198.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021877	Morrison Creek
Swale	Waters_E	Waters_E	31200.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028283	Morrison Creek
Swale	Waters_E	Waters_E	31201.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002841	Morrison Creek
Swale	Waters_E	Waters_E	31203.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.018479	Morrison Creek
Swale	Waters_E	Waters_E	31208.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.032210	Morrison Creek
Swale	Waters_E	Waters_E	31215.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.033528	Morrison Creek
Swale	Waters_E	Waters_E	31218.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002125	Morrison Creek
Swale	Waters_E	Waters_E	31225.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003852	Morrison Creek
Swale	Waters_E	Waters_E	31226.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010112	Morrison Creek
Swale	Waters_E	Waters_E	31230.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.020706	Morrison Creek
Swale	Waters_E	Waters_E	31231.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002702	Morrison Creek
Swale	Waters_E	Waters_E	31236.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.001839	Morrison Creek
Swale	Waters_E	Waters_E	31242.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.003553	Morrison Creek
Swale	Waters_E	Waters_E	31246.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.002783	Morrison Creek
Swale	Waters_E	Waters_E	31248.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.024964	Morrison Creek
Swale	Waters_E	Waters_E	31252.000000	No Impact	Valley Grassland (Vernal Pool)	Ephemeral Streams	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007360	Morrison Creek
Swale	Waters_E	Waters_E	31259.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.022107	Morrison Creek
Swale	Waters_E	Waters_E	31263.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.008743	Morrison Creek
Swale	Waters_E	Waters_E	31274.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.021755	Morrison Creek
Swale	Waters_E	Waters_E	31276.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007178	Morrison Creek
Swale	Waters_E	Waters_E	31282.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.009135	Morrison Creek
Swale	Waters_E	Waters_E	31287.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.028382	Morrison Creek
Swale	Waters_E	Waters_E	31288.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005396	Morrison Creek
Swale	Waters_E	Waters_E	31290.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.005409	Morrison Creek
Swale	Waters_E	Waters_E	31291.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.025045	Morrison Creek
Swale	Waters_E	Waters_E	31293.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.010572	Morrison Creek
Swale	Waters_E	Waters_E	31294.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.035555	Morrison Creek
Swale	Waters_E	Waters_E	31296.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.007235	Morrison Creek
Swale	Waters_E	Waters_E	31297.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.037691	Morrison Creek
Swale	Waters_E	Waters_E	31302.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	6.0	0.013046	Morrison Creek
Swale	Waters_E	Waters_E	31305.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	Moderate	0.0	0.0	0.0	3.0	1.0	-3.0	2.0

Vernal Pool	Wetland	Wetlands_S	76295.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.405976	Laguna
Vernal Pool	Wetland	Wetlands_S	76309.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106526	Laguna
Vernal Pool	Wetland	Wetlands_S	76324.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.718162	Laguna
Vernal Pool	Wetland	Wetlands_S	76330.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.124778	Laguna
Vernal Pool	Wetland	Wetlands_S	76336.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088673	Laguna
Vernal Pool	Wetland	Wetlands_S	76339.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.186136	Laguna
Vernal Pool	Wetland	Wetlands_S	76356.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.408150	Laguna
Vernal Pool	Wetland	Wetlands_S	76361.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.679930	Laguna
Vernal Pool	Wetland	Wetlands_S	76370.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.164799	Laguna
Vernal Pool	Wetland	Wetlands_S	76380.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.167860	Laguna
Vernal Pool	Wetland	Wetlands_S	76383.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.252275	Laguna
Vernal Pool	Wetland	Wetlands_S	76387.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089275	Laguna
Vernal Pool	Wetland	Wetlands_S	76479.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.112506	Laguna
Vernal Pool	Wetland	Wetlands_S	76493.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.117202	Laguna
Vernal Pool	Wetland	Wetlands_S	76543.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095553	Laguna
Vernal Pool	Wetland	Wetlands_S	76552.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.103280	Laguna
Vernal Pool	Wetland	Wetlands_S	76561.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.348487	Laguna
Vernal Pool	Wetland	Wetlands_S	76574.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087032	Laguna
Vernal Pool	Wetland	Wetlands_S	76606.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.091011	Laguna
Vernal Pool	Wetland	Wetlands_S	76610.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077911	Laguna
Vernal Pool	Wetland	Wetlands_S	76647.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.094333	Laguna
Vernal Pool	Wetland	Wetlands_S	76648.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083446	Laguna
Vernal Pool	Wetland	Wetlands_S	76660.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076254	Laguna
Vernal Pool	Wetland	Wetlands_S	76671.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.439530	Laguna
Vernal Pool	Wetland	Wetlands_S	76672.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.149536	Laguna
Vernal Pool	Wetland	Wetlands_S	76693.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.386658	Laguna
Vernal Pool	Wetland	Wetlands_S	76701.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086546	Laguna
Vernal Pool	Wetland	Wetlands_S	76760.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.101086	Laguna
Vernal Pool	Wetland	Wetlands_S	76763.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.073056	Laguna
Vernal Pool	Wetland	Wetlands_S	76768.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087133	Laguna
Vernal Pool	Wetland	Wetlands_S	76795.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.315148	Laguna
Vernal Pool	Wetland	Wetlands_S	76796.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.333351	Laguna
Vernal Pool	Wetland	Wetlands_S	76828.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.195840	Laguna
Vernal Pool	Wetland	Wetlands_S	76843.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089283	Laguna
Vernal Pool	Wetland	Wetlands_S	76844.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.256007	Laguna
Vernal Pool	Wetland	Wetlands_S	76847.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.237028	Laguna
Vernal Pool	Wetland	Wetlands_S	76851.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115715	Laguna
Vernal Pool	Wetland	Wetlands_S	76920.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081065	Laguna
Vernal Pool	Wetland	Wetlands_S	76929.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098618	Laguna
Vernal Pool	Wetland	Wetlands_S	76950.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.338500	Laguna
Vernal Pool	Wetland	Wetlands_S	76966.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.633209	Laguna
Vernal Pool	Wetland	Wetlands_S	76996.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095502	Laguna
Vernal Pool	Wetland	Wetlands_S	77017.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092745	Laguna
Vernal Pool	Wetland	Wetlands_S	77052.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074208	Laguna
Vernal Pool	Wetland	Wetlands_S	77061.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075510	Laguna
Vernal Pool	Wetland	Wetlands_S	77063.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.138864	Laguna
Vernal Pool	Wetland	Wetlands_S	77067.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.253514	Laguna
Vernal Pool	Wetland	Wetlands_S	77077.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.375235	Laguna
Vernal Pool	Wetland	Wetlands_S	77094.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.158049	Laguna
Vernal Pool	Wetland	Wetlands_S	77096.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.602810	Laguna
Vernal Pool	Wetland	Wetlands_S	77099.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115215	Laguna
Vernal Pool	Wetland	Wetlands_S	77106.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.155818	Laguna
Vernal Pool	Wetland	Wetlands_S	77117.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.343430	Laguna
Vernal Pool	Wetland	Wetlands_S	77121.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.358265	Laguna
Vernal Pool	Wetland	Wetlands_S	77162.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.107231	Laguna
Vernal Pool	Wetland	Wetlands_S	77183.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.394190	Laguna
Vernal Pool	Wetland	Wetlands_S	77203.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.645850	Laguna
Vernal Pool	Wetland	Wetlands_S	77210.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.116593	Laguna
Vernal Pool	Wetland	Wetlands_S	77236.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.973918	Laguna
Vernal Pool	Wetland	Wetlands_S	77247.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.224682	Laguna
Vernal Pool	Wetland	Wetlands_S	77341.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.110858	Laguna
Vernal Pool	Wetland	Wetlands_S	77350.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.633988	Laguna
Vernal Pool	Wetland	Wetlands_S	77355.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.215650	Laguna
Vernal Pool	Wetland	Wetlands_S	77379.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082273	Laguna
Vernal Pool	Wetland	Wetlands_S	77409.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.114008	Laguna
Vernal Pool	Wetland	Wetlands_S	77419.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.684199	Laguna
Vernal Pool	Wetland	Wetlands_S	77428.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.309167	Laguna
Vernal Pool	Wetland	Wetlands_S	77438.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.112869	Laguna
Vernal Pool	Wetland	Wetlands_S	77443.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.163475	Laguna
Vernal Pool	Wetland	Wetlands_S	77457.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.230656	Laguna
Vernal Pool	Wetland	Wetlands_S	77461.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075554	Laguna
Vernal Pool	Wetland	Wetlands_S	77474.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.343115	Laguna
Vernal Pool	Wetland	Wetlands_S	77476.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.160729	Laguna
Vernal Pool	Wetland	Wetlands_S	77482.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.794005	Laguna
Vernal Pool	Wetland	Wetlands_S	77513.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.094999	Laguna
Vernal Pool	Wetland	Wetlands_S	77524.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.818147	Laguna
Vernal Pool	Wetland	Wetlands_S	77528.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.234271	Laguna
Vernal Pool	Wetland	Wetlands_S	77547.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.423870	Laguna
Vernal Pool	Wetland	Wetlands_S	77571.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074313	Laguna
Vernal Pool	Wetland	Wetlands_S	77572.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.313617	Laguna
Vernal Pool	Wetland	Wetlands_S	77577.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.237503	Laguna
Vernal Pool	Wetland	Wetlands_S	77602.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0

Vernal Pool	Wetland	Wetlands_S	77776.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.155451	Laguna
Vernal Pool	Wetland	Wetlands_S	77787.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.079459	Laguna
Vernal Pool	Wetland	Wetlands_S	77789.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.072872	Laguna
Vernal Pool	Wetland	Wetlands_S	77798.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078883	Laguna
Vernal Pool	Wetland	Wetlands_S	77831.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.112921	Laguna
Vernal Pool	Wetland	Wetlands_S	77855.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078277	Laguna
Vernal Pool	Wetland	Wetlands_S	77858.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.233363	Laguna
Vernal Pool	Wetland	Wetlands_S	77867.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.137987	Laguna
Vernal Pool	Wetland	Wetlands_S	77882.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088692	Laguna
Vernal Pool	Wetland	Wetlands_S	77904.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.141535	Laguna
Vernal Pool	Wetland	Wetlands_S	77945.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.382112	Laguna
Vernal Pool	Wetland	Wetlands_S	77947.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074261	Laguna
Vernal Pool	Wetland	Wetlands_S	77948.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.104048	Laguna
Vernal Pool	Wetland	Wetlands_S	77958.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106443	Laguna
Vernal Pool	Wetland	Wetlands_S	77965.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.464527	Laguna
Vernal Pool	Wetland	Wetlands_S	77973.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083736	Laguna
Vernal Pool	Wetland	Wetlands_S	77986.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.110053	Laguna
Vernal Pool	Wetland	Wetlands_S	78011.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.167184	Laguna
Vernal Pool	Wetland	Wetlands_S	78013.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089856	Laguna
Vernal Pool	Wetland	Wetlands_S	78097.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081647	Laguna
Vernal Pool	Wetland	Wetlands_S	78158.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.139240	Laguna
Vernal Pool	Wetland	Wetlands_S	78184.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.164060	Laguna
Vernal Pool	Wetland	Wetlands_S	78186.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.432141	Laguna
Vernal Pool	Wetland	Wetlands_S	78215.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.202040	Laguna
Vernal Pool	Wetland	Wetlands_S	78271.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.080568	Laguna
Vernal Pool	Wetland	Wetlands_S	78304.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087944	Laguna
Vernal Pool	Wetland	Wetlands_S	78307.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100639	Laguna
Vernal Pool	Wetland	Wetlands_S	78310.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.122850	Laguna
Vernal Pool	Wetland	Wetlands_S	78349.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.142068	Laguna
Vernal Pool	Wetland	Wetlands_S	78360.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.094746	Laguna
Vernal Pool	Wetland	Wetlands_S	78401.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.117813	Laguna
Vernal Pool	Wetland	Wetlands_S	78414.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.210660	Laguna
Vernal Pool	Wetland	Wetlands_S	78418.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.155361	Laguna
Vernal Pool	Wetland	Wetlands_S	78420.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.138410	Laguna
Vernal Pool	Wetland	Wetlands_S	78421.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.122932	Laguna
Vernal Pool	Wetland	Wetlands_S	78451.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.138493	Laguna
Vernal Pool	Wetland	Wetlands_S	78485.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.134982	Laguna
Vernal Pool	Wetland	Wetlands_S	78499.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074711	Laguna
Vernal Pool	Wetland	Wetlands_S	78528.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129131	Laguna
Vernal Pool	Wetland	Wetlands_S	78530.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.110353	Laguna
Vernal Pool	Wetland	Wetlands_S	78537.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090270	Laguna
Vernal Pool	Wetland	Wetlands_S	78553.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078785	Laguna
Vernal Pool	Wetland	Wetlands_S	78567.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.297357	Laguna
Vernal Pool	Wetland	Wetlands_S	78614.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.264913	Laguna
Vernal Pool	Wetland	Wetlands_S	78615.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085592	Laguna
Vernal Pool	Wetland	Wetlands_S	78628.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.213042	Laguna
Vernal Pool	Wetland	Wetlands_S	78629.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.700228	Laguna
Vernal Pool	Wetland	Wetlands_S	78639.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106430	Laguna
Vernal Pool	Wetland	Wetlands_S	78642.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.331152	Laguna
Vernal Pool	Wetland	Wetlands_S	78645.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.097143	Laguna
Vernal Pool	Wetland	Wetlands_S	78658.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.357445	Laguna
Vernal Pool	Wetland	Wetlands_S	78674.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.176020	Laguna
Vernal Pool	Wetland	Wetlands_S	78736.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140340	Laguna
Vernal Pool	Wetland	Wetlands_S	78743.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078155	Laguna
Vernal Pool	Wetland	Wetlands_S	78749.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.094070	Laguna
Vernal Pool	Wetland	Wetlands_S	78752.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.123639	Laguna
Vernal Pool	Wetland	Wetlands_S	78782.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.093414	Laguna
Vernal Pool	Wetland	Wetlands_S	78800.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.147472	Laguna
Vernal Pool	Wetland	Wetlands_S	78806.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.132098	Laguna
Vernal Pool	Wetland	Wetlands_S	78810.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.143538	Laguna
Vernal Pool	Wetland	Wetlands_S	78815.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.108362	Laguna
Vernal Pool	Wetland	Wetlands_S	78833.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.079998	Laguna
Vernal Pool	Wetland	Wetlands_S	78842.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115509	Laguna
Vernal Pool	Wetland	Wetlands_S	78851.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077155	Laguna
Vernal Pool	Wetland	Wetlands_S	78871.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100011	Laguna
Vernal Pool	Wetland	Wetlands_S	78875.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.124501	Laguna
Vernal Pool	Wetland	Wetlands_S	78885.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140875	Laguna
Vernal Pool	Wetland	Wetlands_S	78887.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075201	Laguna
Vernal Pool	Wetland	Wetlands_S	78891.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077037	Laguna
Vernal Pool	Wetland	Wetlands_S	78924.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074938	Laguna
Vernal Pool	Wetland	Wetlands_S	78954.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.153455	Laguna
Vernal Pool	Wetland	Wetlands_S	78997.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.315689	Laguna
Vernal Pool	Wetland	Wetlands_S	79011.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.210025	Laguna
Vernal Pool	Wetland	Wetlands_S	79014.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084943	Laguna
Vernal Pool	Wetland	Wetlands_S	79079.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090999	Laguna
Vernal Pool	Wetland	Wetlands_S	79090.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.206030	Laguna
Vernal Pool	Wetland	Wetlands_S	79095.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.319841	Laguna
Vernal Pool	Wetland	Wetlands_S	79110.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.695870	Laguna
Vernal Pool	Wetland	Wetlands_S	79118.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.091925	Laguna
Vernal Pool	Wetland	Wetlands_S	79146.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.113121	Laguna
Vernal Pool	Wetland	Wetlands_S	79152.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.229842	Laguna
Vernal Pool	Wetland	Wetlands_S	79185.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0

Vernal Pool		Wetland	Wetlands_S	79461.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.158430	Laguna
Vernal Pool		Wetland	Wetlands_S	79480.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.114293	Laguna
Vernal Pool		Wetland	Wetlands_S	79488.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081834	Laguna
Vernal Pool		Wetland	Wetlands_S	79494.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089570	Laguna
Vernal Pool		Wetland	Wetlands_S	79500.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077768	Laguna
Vernal Pool		Wetland	Wetlands_S	79515.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077366	Laguna
Vernal Pool		Wetland	Wetlands_S	79534.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.072497	Laguna
Vernal Pool		Wetland	Wetlands_S	79545.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.151760	Laguna
Vernal Pool		Wetland	Wetlands_S	79557.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078590	Laguna
Vernal Pool		Wetland	Wetlands_S	79605.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.205896	Laguna
Vernal Pool		Wetland	Wetlands_S	79614.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.093379	Laguna
Vernal Pool		Wetland	Wetlands_S	79636.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074439	Laguna
Vernal Pool		Wetland	Wetlands_S	79663.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.099665	Laguna
Vernal Pool		Wetland	Wetlands_S	79670.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.284552	Laguna
Vernal Pool		Wetland	Wetlands_S	79686.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.101591	Laguna
Vernal Pool		Wetland	Wetlands_S	79703.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.229591	Laguna
Vernal Pool		Wetland	Wetlands_S	79711.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111411	Laguna
Vernal Pool		Wetland	Wetlands_S	79738.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.132656	Laguna
Vernal Pool		Wetland	Wetlands_S	79748.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.114422	Laguna
Vernal Pool		Wetland	Wetlands_S	79754.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078664	Laguna
Vernal Pool		Wetland	Wetlands_S	79756.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092266	Laguna
Vernal Pool		Wetland	Wetlands_S	79789.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.163475	Laguna
Vernal Pool		Wetland	Wetlands_S	79794.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.150608	Laguna
Vernal Pool		Wetland	Wetlands_S	79832.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.141621	Laguna
Vernal Pool		Wetland	Wetlands_S	79834.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.112230	Laguna
Vernal Pool		Wetland	Wetlands_S	79848.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.080948	Laguna
Vernal Pool		Wetland	Wetlands_S	79871.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074646	Laguna
Vernal Pool		Wetland	Wetlands_S	79990.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086260	Laguna
Vernal Pool		Wetland	Wetlands_S	79994.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.148734	Laguna
Vernal Pool		Wetland	Wetlands_S	80004.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.573776	Laguna
Vernal Pool		Wetland	Wetlands_S	80155.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.093422	Laguna
Vernal Pool		Wetland	Wetlands_S	80162.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.366127	Laguna
Vernal Pool		Wetland	Wetlands_S	80167.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084198	Laguna
Vernal Pool		Wetland	Wetlands_S	80206.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.073164	Laguna
Vernal Pool		Wetland	Wetlands_S	80305.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.538508	Laguna
Vernal Pool		Wetland	Wetlands_S	80375.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083078	Laguna
Vernal Pool		Wetland	Wetlands_S	80419.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.149750	Laguna
Vernal Pool		Wetland	Wetlands_S	80489.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.040550	Laguna
Vernal Pool		Wetland	Wetlands_S	80510.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.232887	Laguna
Vernal Pool		Wetland	Wetlands_S	80517.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.166151	Laguna
Vernal Pool		Wetland	Wetlands_S	80542.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095091	Laguna
Vernal Pool		Wetland	Wetlands_S	80561.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.159536	Laguna
Vernal Pool		Wetland	Wetlands_S	80580.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.493225	Laguna
Vernal Pool		Wetland	Wetlands_S	80586.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098227	Laguna
Vernal Pool		Wetland	Wetlands_S	80591.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.121673	Laguna
Vernal Pool		Wetland	Wetlands_S	80604.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.149520	Laguna
Vernal Pool		Wetland	Wetlands_S	80618.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.843438	Laguna
Vernal Pool		Wetland	Wetlands_S	80621.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.963706	Laguna
Vernal Pool		Wetland	Wetlands_S	80693.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.262956	Laguna
Vernal Pool		Wetland	Wetlands_S	80737.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.193611	Laguna
Vernal Pool		Wetland	Wetlands_S	80775.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.262559	Laguna
Vernal Pool		Wetland	Wetlands_S	80780.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076216	Laguna
Vernal Pool		Wetland	Wetlands_S	80845.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.112326	Laguna
Vernal Pool		Wetland	Wetlands_S	80932.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.498731	Laguna
Vernal Pool		Wetland	Wetlands_S	80939.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.122562	Laguna
Vernal Pool		Wetland	Wetlands_S	80951.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.101282	Laguna
Vernal Pool		Wetland	Wetlands_S	80974.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081309	Laguna
Vernal Pool		Wetland	Wetlands_S	80975.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.521780	Laguna
Vernal Pool		Wetland	Wetlands_S	81004.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.121489	Laguna
Vernal Pool		Wetland	Wetlands_S	81037.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.119603	Laguna
Vernal Pool		Wetland	Wetlands_S	81041.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.120637	Laguna
Vernal Pool		Wetland	Wetlands_S	81059.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.136166	Laguna
Vernal Pool		Wetland	Wetlands_S	81088.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084848	Laguna
Vernal Pool		Wetland	Wetlands_S	81192.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.382288	Laguna
Vernal Pool		Wetland	Wetlands_S	81203.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.122945	Laguna
Vernal Pool		Wetland	Wetlands_S	81220.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081416	Laguna
Vernal Pool		Wetland	Wetlands_S	81222.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.275155	Laguna
Vernal Pool		Wetland	Wetlands_S	81224.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.642459	Laguna
Vernal Pool		Wetland	Wetlands_S	81266.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098848	Laguna
Vernal Pool		Wetland	Wetlands_S	81314.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106150	Laguna
Vernal Pool		Wetland	Wetlands_S	81335.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.168719	Laguna
Vernal Pool		Wetland	Wetlands_S	81393.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098992	Laguna
Vernal Pool		Wetland	Wetlands_S	81408.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083775	Laguna
Vernal Pool		Wetland	Wetlands_S	81452.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.119989	Laguna
Vernal Pool		Wetland	Wetlands_S	81480.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.194123	Laguna
Vernal Pool		Wetland	Wetlands_S	81536.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.484390	Laguna
Vernal Pool		Wetland	Wetlands_S	81539.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.583067	Laguna
Vernal Pool		Wetland	Wetlands_S	81560.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.153308	Laguna
Vernal Pool		Wetland	Wetlands_S	81603.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.278171	Laguna
Vernal Pool		Wetland	Wetlands_S	81604.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.096630	Laguna
Vernal Pool		Wetland	Wetlands_S	81615.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.235248	Laguna
Vernal Pool		Wetland	Wetlands_S	81628.000000	No Impact	Valley Grassland (Vernal P

Vernal Pool		Wetland	Wetlands_S	81952.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.099448	Laguna
Vernal Pool		Wetland	Wetlands_S	82006.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.282505	Laguna
Vernal Pool		Wetland	Wetlands_S	82034.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.130977	Laguna
Vernal Pool		Wetland	Wetlands_S	82046.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.149950	Laguna
Vernal Pool		Wetland	Wetlands_S	82060.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.126178	Laguna
Vernal Pool		Wetland	Wetlands_S	82170.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.133911	Laguna
Vernal Pool		Wetland	Wetlands_S	82214.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111667	Laguna
Vernal Pool		Wetland	Wetlands_S	82217.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077750	Laguna
Vernal Pool		Wetland	Wetlands_S	82231.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106543	Laguna
Vernal Pool		Wetland	Wetlands_S	82238.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.228877	Laguna
Vernal Pool		Wetland	Wetlands_S	82255.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.080093	Laguna
Vernal Pool		Wetland	Wetlands_S	82256.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.202645	Laguna
Vernal Pool		Wetland	Wetlands_S	82287.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.096368	Laguna
Vernal Pool		Wetland	Wetlands_S	82291.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082314	Laguna
Vernal Pool		Wetland	Wetlands_S	82451.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088562	Laguna
Vernal Pool		Wetland	Wetlands_S	82459.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.080025	Laguna
Vernal Pool		Wetland	Wetlands_S	82472.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.196619	Laguna
Vernal Pool		Wetland	Wetlands_S	82548.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090014	Laguna
Vernal Pool		Wetland	Wetlands_S	82589.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.291943	Laguna
Vernal Pool		Wetland	Wetlands_S	82596.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.178673	Laguna
Vernal Pool		Wetland	Wetlands_S	82613.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076362	Laguna
Vernal Pool		Wetland	Wetlands_S	82625.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.096826	Laguna
Vernal Pool		Wetland	Wetlands_S	82655.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.150404	Laguna
Vernal Pool		Wetland	Wetlands_S	82690.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115523	Laguna
Vernal Pool		Wetland	Wetlands_S	82726.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085895	Laguna
Vernal Pool		Wetland	Wetlands_S	82738.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.145844	Laguna
Vernal Pool		Wetland	Wetlands_S	82768.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085205	Laguna
Vernal Pool		Wetland	Wetlands_S	82805.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100099	Laguna
Vernal Pool		Wetland	Wetlands_S	82833.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.206035	Laguna
Vernal Pool		Wetland	Wetlands_S	82837.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.249853	Laguna
Vernal Pool		Wetland	Wetlands_S	82866.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089526	Laguna
Vernal Pool		Wetland	Wetlands_S	82884.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.131854	Laguna
Vernal Pool		Wetland	Wetlands_S	82921.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081948	Laguna
Vernal Pool		Wetland	Wetlands_S	82922.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.401283	Laguna
Vernal Pool		Wetland	Wetlands_S	82926.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083171	Laguna
Vernal Pool		Wetland	Wetlands_S	82952.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075509	Laguna
Vernal Pool		Wetland	Wetlands_S	83015.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.121134	Laguna
Vernal Pool		Wetland	Wetlands_S	83054.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.148104	Laguna
Vernal Pool		Wetland	Wetlands_S	83069.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106863	Laguna
Vernal Pool		Wetland	Wetlands_S	83074.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.318015	Laguna
Vernal Pool		Wetland	Wetlands_S	83075.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076408	Laguna
Vernal Pool		Wetland	Wetlands_S	83080.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.141879	Laguna
Vernal Pool		Wetland	Wetlands_S	83083.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.216271	Laguna
Vernal Pool		Wetland	Wetlands_S	83125.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.270167	Laguna
Vernal Pool		Wetland	Wetlands_S	83129.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.126346	Laguna
Vernal Pool		Wetland	Wetlands_S	83137.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.182921	Laguna
Vernal Pool		Wetland	Wetlands_S	83148.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081983	Laguna
Vernal Pool		Wetland	Wetlands_S	83149.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081242	Laguna
Vernal Pool		Wetland	Wetlands_S	83158.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087489	Laguna
Vernal Pool		Wetland	Wetlands_S	83173.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115648	Laguna
Vernal Pool		Wetland	Wetlands_S	83192.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.099296	Laguna
Vernal Pool		Wetland	Wetlands_S	83197.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.134406	Laguna
Vernal Pool		Wetland	Wetlands_S	83207.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.280500	Laguna
Vernal Pool		Wetland	Wetlands_S	83224.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.142500	Laguna
Vernal Pool		Wetland	Wetlands_S	83236.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.225970	Laguna
Vernal Pool		Wetland	Wetlands_S	83244.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.079703	Laguna
Vernal Pool		Wetland	Wetlands_S	83250.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.433403	Laguna
Vernal Pool		Wetland	Wetlands_S	83254.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095130	Laguna
Vernal Pool		Wetland	Wetlands_S	83301.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.190796	Laguna
Vernal Pool		Wetland	Wetlands_S	83304.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084747	Laguna
Vernal Pool		Wetland	Wetlands_S	83314.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086952	Laguna
Vernal Pool		Wetland	Wetlands_S	83359.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.108678	Laguna
Vernal Pool		Wetland	Wetlands_S	83370.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.292320	Laguna
Vernal Pool		Wetland	Wetlands_S	83419.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.276167	Laguna
Vernal Pool		Wetland	Wetlands_S	83439.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.127539	Laguna
Vernal Pool		Wetland	Wetlands_S	83441.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.122365	Laguna
Vernal Pool		Wetland	Wetlands_S	83471.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.162828	Laguna
Vernal Pool		Wetland	Wetlands_S	83490.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.212109	Laguna
Vernal Pool		Wetland	Wetlands_S	83492.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.244296	Laguna
Vernal Pool		Wetland	Wetlands_S	83500.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.490434	Laguna
Vernal Pool		Wetland	Wetlands_S	83505.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.151783	Laguna
Vernal Pool		Wetland	Wetlands_S	83519.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.118518	Laguna
Vernal Pool		Wetland	Wetlands_S	83529.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.394311	Laguna
Vernal Pool		Wetland	Wetlands_S	83548.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.184424	Laguna
Vernal Pool		Wetland	Wetlands_S	83586.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.148380	Laguna
Vernal Pool		Wetland	Wetlands_S	83606.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.074066	Laguna
Vernal Pool		Wetland	Wetlands_S	83658.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.157323	Laguna
Vernal Pool		Wetland	Wetlands_S	83665.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.161577	Laguna
Vernal Pool		Wetland	Wetlands_S	83708.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.220620	Laguna
Vernal Pool		Wetland	Wetlands_S	83748.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106948	Laguna
Vernal Pool		Wetland	Wetlands_S	83751.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128193	Laguna
Vernal Pool		Wetland	Wetlands_S	83777.000000	No Impact	Val

Vernal Pool		Wetland	Wetlands_S	84527.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.715656	Laguna
Vernal Pool		Wetland	Wetlands_S	84616.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.040545	Laguna
Vernal Pool		Wetland	Wetlands_S	84633.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.278281	Laguna
Vernal Pool		Wetland	Wetlands_S	84654.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.139785	Laguna
Vernal Pool		Wetland	Wetlands_S	84655.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.248357	Laguna
Vernal Pool		Wetland	Wetlands_S	84734.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087846	Laguna
Vernal Pool		Wetland	Wetlands_S	84742.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081600	Laguna
Vernal Pool		Wetland	Wetlands_S	84761.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106164	Laguna
Vernal Pool		Wetland	Wetlands_S	84773.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.072747	Laguna
Vernal Pool		Wetland	Wetlands_S	84875.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128495	Laguna
Vernal Pool		Wetland	Wetlands_S	84917.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082534	Laguna
Vernal Pool		Wetland	Wetlands_S	84977.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.120356	Laguna
Vernal Pool		Wetland	Wetlands_S	84994.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076982	Laguna
Vernal Pool		Wetland	Wetlands_S	84999.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082958	Laguna
Vernal Pool		Wetland	Wetlands_S	85061.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.097045	Laguna
Vernal Pool		Wetland	Wetlands_S	85174.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111632	Laguna
Vernal Pool		Wetland	Wetlands_S	85385.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095364	Laguna
Vernal Pool		Wetland	Wetlands_S	85478.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084336	Laguna
Vernal Pool		Wetland	Wetlands_S	85856.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089924	Laguna
Vernal Pool		Wetland	Wetlands_S	86006.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.038148	Laguna
Vernal Pool		Wetland	Wetlands_S	86014.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075136	Laguna
Vernal Pool		Wetland	Wetlands_S	35709.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.570860	Laguna
Vernal Pool		Wetland	Wetlands_S	35782.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.200720	Laguna
Vernal Pool		Wetland	Wetlands_S	35806.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100117	Laguna
Vernal Pool		Wetland	Wetlands_S	35992.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.243620	Laguna
Vernal Pool		Wetland	Wetlands_S	36045.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.165267	Laguna
Vernal Pool		Wetland	Wetlands_S	36065.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.141176	Laguna
Vernal Pool		Wetland	Wetlands_S	36136.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.192610	Laguna
Vernal Pool		Wetland	Wetlands_S	36146.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.793927	Laguna
Vernal Pool		Wetland	Wetlands_S	36180.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.748815	Laguna
Vernal Pool		Wetland	Wetlands_S	36185.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.378990	Laguna
Vernal Pool		Wetland	Wetlands_S	36224.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085966	Laguna
Vernal Pool		Wetland	Wetlands_S	36234.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106491	Laguna
Vernal Pool		Wetland	Wetlands_S	36260.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085634	Laguna
Vernal Pool		Wetland	Wetlands_S	36263.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077541	Laguna
Vernal Pool		Wetland	Wetlands_S	36273.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.151223	Laguna
Vernal Pool		Wetland	Wetlands_S	36294.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.920163	Laguna
Vernal Pool		Wetland	Wetlands_S	36359.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.948428	Laguna
Vernal Pool		Wetland	Wetlands_S	36429.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.583944	Laguna
Vernal Pool		Wetland	Wetlands_S	36432.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.826569	Laguna
Vernal Pool		Wetland	Wetlands_S	36435.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.349407	Laguna
Vernal Pool		Wetland	Wetlands_S	36452.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129533	Laguna
Vernal Pool		Wetland	Wetlands_S	36571.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.429614	Laguna
Vernal Pool		Wetland	Wetlands_S	36596.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.575253	Laguna
Vernal Pool		Wetland	Wetlands_S	36966.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.605168	Laguna
Vernal Pool		Wetland	Wetlands_S	36982.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.197560	Laguna
Vernal Pool		Wetland	Wetlands_S	101052.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.977580	Laguna
Vernal Pool		Wetland	Wetlands_S	101055.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.164138	Laguna
Vernal Pool		Wetland	Wetlands_S	101056.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.506077	Laguna
Vernal Pool		Wetland	Wetlands_S	101057.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.133734	Laguna
Vernal Pool		Wetland	Wetlands_S	101058.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.397580	Laguna
Vernal Pool		Wetland	Wetlands_S	101059.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.440728	Laguna
Vernal Pool		Wetland	Wetlands_S	101060.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.596063	Laguna
Vernal Pool		Wetland	Wetlands_S	101062.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.361895	Laguna
Vernal Pool		Wetland	Wetlands_S	101065.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.427264	Laguna
Vernal Pool		Wetland	Wetlands_S	101068.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090670	Laguna
Vernal Pool		Wetland	Wetlands_S	101072.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.202379	Laguna
Vernal Pool		Wetland	Wetlands_S	101073.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.198360	Laguna
Vernal Pool		Wetland	Wetlands_S	101075.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100094	Laguna
Vernal Pool		Wetland	Wetlands_S	101076.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.102003	Laguna
Vernal Pool		Wetland	Wetlands_S	101077.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.358050	Laguna
Vernal Pool		Wetland	Wetlands_S	101085.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077485	Laguna
Vernal Pool		Wetland	Wetlands_S	101090.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.178251	Laguna
Vernal Pool		Wetland	Wetlands_S	101093.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087804	Laguna
Vernal Pool		Wetland	Wetlands_S	101098.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.145056	Laguna
Vernal Pool		Wetland	Wetlands_S	101099.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.122904	Laguna
Vernal Pool		Wetland	Wetlands_S	101104.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.145464	Laguna
Vernal Pool		Wetland	Wetlands_S	101106.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.073181	Laguna
Vernal Pool		Wetland	Wetlands_S	101108.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.072507	Laguna
Vernal Pool		Wetland	Wetlands_S	101112.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082625	Laguna
Vernal Pool		Wetland	Wetlands_S	101118.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084214	Laguna
Vernal Pool		Wetland	Wetlands_S	101122.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092129	Laguna
Vernal Pool		Wetland	Wetlands_S	101124.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.246808	Laguna
Vernal Pool		Wetland	Wetlands_S	101125.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081170	Laguna
Vernal Pool		Wetland	Wetlands_S	101126.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.347915	Laguna
Vernal Pool		Wetland	Wetlands_S	101127.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111288	Laguna
Vernal Pool		Wetland	Wetlands_S	101128.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081434	Laguna
Vernal Pool		Wetland	Wetlands_S	101130.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.147986	Laguna
Vernal Pool		Wetland	Wetlands_S	101132.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.150287	Laguna
Vernal Pool		Wetland	Wetlands_S	101136.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.126403	Laguna
Vernal Pool		Wetland	Wetlands_S	101157.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077440	Laguna
Vernal Pool		Wetland	Wetlands_S	101163.000000	No Impact	Valley Grassland (Vernal P

Vernal Pool		Wetland	Wetlands_S	101219.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.270480	Laguna
Vernal Pool		Wetland	Wetlands_S	101222.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.243791	Laguna
Vernal Pool		Wetland	Wetlands_S	101223.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.217691	Laguna
Vernal Pool		Wetland	Wetlands_S	101224.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098782	Laguna
Vernal Pool		Wetland	Wetlands_S	101226.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.598788	Laguna
Vernal Pool		Wetland	Wetlands_S	101228.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.142785	Laguna
Vernal Pool		Wetland	Wetlands_S	101231.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.361991	Laguna
Vernal Pool		Wetland	Wetlands_S	101234.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.387045	Laguna
Vernal Pool		Wetland	Wetlands_S	101235.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.093106	Laguna
Vernal Pool		Wetland	Wetlands_S	101241.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.137849	Laguna
Vernal Pool		Wetland	Wetlands_S	101244.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.264428	Laguna
Vernal Pool		Wetland	Wetlands_S	101251.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.252395	Laguna
Vernal Pool		Wetland	Wetlands_S	101253.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076858	Laguna
Vernal Pool		Wetland	Wetlands_S	101256.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.149759	Laguna
Vernal Pool		Wetland	Wetlands_S	101259.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.485300	Laguna
Vernal Pool		Wetland	Wetlands_S	101260.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090802	Laguna
Vernal Pool		Wetland	Wetlands_S	101261.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.287017	Laguna
Vernal Pool		Wetland	Wetlands_S	101262.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.880910	Laguna
Vernal Pool		Wetland	Wetlands_S	101263.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078017	Laguna
Vernal Pool		Wetland	Wetlands_S	101264.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.097230	Laguna
Vernal Pool		Wetland	Wetlands_S	101265.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.137468	Laguna
Vernal Pool		Wetland	Wetlands_S	101268.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.459894	Laguna
Vernal Pool		Wetland	Wetlands_S	101270.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.370486	Laguna
Vernal Pool		Wetland	Wetlands_S	101271.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089330	Laguna
Vernal Pool		Wetland	Wetlands_S	101272.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.307557	Laguna
Vernal Pool		Wetland	Wetlands_S	101277.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.219319	Laguna
Vernal Pool		Wetland	Wetlands_S	101278.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.339243	Laguna
Vernal Pool		Wetland	Wetlands_S	101280.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.332265	Laguna
Vernal Pool		Wetland	Wetlands_S	101281.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.112411	Laguna
Vernal Pool		Wetland	Wetlands_S	101284.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.134560	Laguna
Vernal Pool		Wetland	Wetlands_S	101285.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.228266	Laguna
Vernal Pool		Wetland	Wetlands_S	101286.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.357125	Laguna
Vernal Pool		Wetland	Wetlands_S	101288.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.291291	Laguna
Vernal Pool		Wetland	Wetlands_S	101289.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.201442	Laguna
Vernal Pool		Wetland	Wetlands_S	101293.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.123242	Laguna
Vernal Pool		Wetland	Wetlands_S	101294.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.330751	Laguna
Vernal Pool		Wetland	Wetlands_S	101295.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.374662	Laguna
Vernal Pool		Wetland	Wetlands_S	101296.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.068380	Laguna
Vernal Pool		Wetland	Wetlands_S	101297.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.109962	Laguna
Vernal Pool		Wetland	Wetlands_S	101298.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.224079	Laguna
Vernal Pool		Wetland	Wetlands_S	101299.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.229495	Laguna
Vernal Pool		Wetland	Wetlands_S	101300.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.160791	Laguna
Vernal Pool		Wetland	Wetlands_S	101301.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.175379	Laguna
Vernal Pool		Wetland	Wetlands_S	101302.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.138571	Laguna
Vernal Pool		Wetland	Wetlands_S	101303.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.146232	Laguna
Vernal Pool		Wetland	Wetlands_S	101305.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.105509	Laguna
Vernal Pool		Wetland	Wetlands_S	101307.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084501	Laguna
Vernal Pool		Wetland	Wetlands_S	101308.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077932	Laguna
Vernal Pool		Wetland	Wetlands_S	101310.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.171994	Laguna
Vernal Pool		Wetland	Wetlands_S	101312.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087613	Laguna
Vernal Pool		Wetland	Wetlands_S	101313.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.228126	Laguna
Vernal Pool		Wetland	Wetlands_S	101316.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085508	Laguna
Vernal Pool		Wetland	Wetlands_S	101317.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.354720	Laguna
Vernal Pool		Wetland	Wetlands_S	101318.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087197	Laguna
Vernal Pool		Wetland	Wetlands_S	101319.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.159550	Laguna
Vernal Pool		Wetland	Wetlands_S	101321.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.331493	Laguna
Vernal Pool		Wetland	Wetlands_S	101322.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.121407	Laguna
Vernal Pool		Wetland	Wetlands_S	101323.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.214519	Laguna
Vernal Pool		Wetland	Wetlands_S	101324.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.123004	Laguna
Vernal Pool		Wetland	Wetlands_S	101325.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.230611	Laguna
Vernal Pool		Wetland	Wetlands_S	101326.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.170333	Laguna
Vernal Pool		Wetland	Wetlands_S	101327.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.201858	Laguna
Vernal Pool		Wetland	Wetlands_S	101328.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.268679	Laguna
Vernal Pool		Wetland	Wetlands_S	101329.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.237007	Laguna
Vernal Pool		Wetland	Wetlands_S	101330.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.177545	Laguna
Vernal Pool		Wetland	Wetlands_S	101331.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.310193	Laguna
Vernal Pool		Wetland	Wetlands_S	101332.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.954450	Laguna
Vernal Pool		Wetland	Wetlands_S	101333.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.016570	Laguna
Vernal Pool		Wetland	Wetlands_S	101334.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.568200	Laguna
Vernal Pool		Wetland	Wetlands_S	101335.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.144673	Laguna
Vernal Pool		Wetland	Wetlands_S	101337.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088108	Laguna
Vernal Pool		Wetland	Wetlands_S	101338.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.101118	Laguna
Vernal Pool		Wetland	Wetlands_S	101340.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.403915	Laguna
Vernal Pool		Wetland	Wetlands_S	101341.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129580	Laguna
Vernal Pool		Wetland	Wetlands_S	101342.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.220935	Laguna
Vernal Pool		Wetland	Wetlands_S	101343.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.142512	Laguna
Vernal Pool		Wetland	Wetlands_S	101347.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.252316	Laguna
Vernal Pool		Wetland	Wetlands_S	101350.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076961	Laguna
Vernal Pool		Wetland	Wetlands_S	101353.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.159369	Laguna
Vernal Pool		Wetland	Wetlands_S	101355.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115214	Laguna
Vernal Pool		Wetland	Wetlands_S	101356.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.837950	Laguna
Vernal Pool		Wetland	Wetlands_S	101358.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grass

Vernal Pool	Wetland	Wetlands_S	101396.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.340617	Laguna
Vernal Pool	Wetland	Wetlands_S	101397.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.125886	Laguna
Vernal Pool	Wetland	Wetlands_S	101398.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.185193	Laguna
Vernal Pool	Wetland	Wetlands_S	101400.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089660	Laguna
Vernal Pool	Wetland	Wetlands_S	101401.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083465	Laguna
Vernal Pool	Wetland	Wetlands_S	101406.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128504	Laguna
Vernal Pool	Wetland	Wetlands_S	101408.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129880	Laguna
Vernal Pool	Wetland	Wetlands_S	101409.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.134114	Laguna
Vernal Pool	Wetland	Wetlands_S	101410.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.228390	Laguna
Vernal Pool	Wetland	Wetlands_S	101412.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.609306	Laguna
Vernal Pool	Wetland	Wetlands_S	101422.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.553950	Laguna
Vernal Pool	Wetland	Wetlands_S	101423.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.102941	Laguna
Vernal Pool	Wetland	Wetlands_S	101426.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.231066	Laguna
Vernal Pool	Wetland	Wetlands_S	101428.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.278121	Laguna
Vernal Pool	Wetland	Wetlands_S	101429.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.206531	Laguna
Vernal Pool	Wetland	Wetlands_S	101430.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.196526	Laguna
Vernal Pool	Wetland	Wetlands_S	101432.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140951	Laguna
Vernal Pool	Wetland	Wetlands_S	101434.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.167125	Laguna
Vernal Pool	Wetland	Wetlands_S	101435.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.159311	Laguna
Vernal Pool	Wetland	Wetlands_S	101436.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.467405	Laguna
Vernal Pool	Wetland	Wetlands_S	101438.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.252782	Laguna
Vernal Pool	Wetland	Wetlands_S	101440.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.172605	Laguna
Vernal Pool	Wetland	Wetlands_S	101443.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083223	Laguna
Vernal Pool	Wetland	Wetlands_S	101444.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.228845	Laguna
Vernal Pool	Wetland	Wetlands_S	101446.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075405	Laguna
Vernal Pool	Wetland	Wetlands_S	101449.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.246460	Laguna
Vernal Pool	Wetland	Wetlands_S	101450.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.209313	Laguna
Vernal Pool	Wetland	Wetlands_S	101451.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.299166	Laguna
Vernal Pool	Wetland	Wetlands_S	101452.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169335	Laguna
Vernal Pool	Wetland	Wetlands_S	101454.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.340280	Laguna
Vernal Pool	Wetland	Wetlands_S	101457.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.220064	Laguna
Vernal Pool	Wetland	Wetlands_S	101458.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.423031	Laguna
Vernal Pool	Wetland	Wetlands_S	101459.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.162931	Laguna
Vernal Pool	Wetland	Wetlands_S	101460.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.420079	Laguna
Vernal Pool	Wetland	Wetlands_S	101461.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.478240	Laguna
Vernal Pool	Wetland	Wetlands_S	101462.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.134091	Laguna
Vernal Pool	Wetland	Wetlands_S	101464.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082384	Laguna
Vernal Pool	Wetland	Wetlands_S	101465.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.257181	Laguna
Vernal Pool	Wetland	Wetlands_S	101466.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.195577	Laguna
Vernal Pool	Wetland	Wetlands_S	101467.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.143408	Laguna
Vernal Pool	Wetland	Wetlands_S	101471.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169169	Laguna
Vernal Pool	Wetland	Wetlands_S	101472.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.464945	Laguna
Vernal Pool	Wetland	Wetlands_S	101473.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.161585	Laguna
Vernal Pool	Wetland	Wetlands_S	101474.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.798853	Laguna
Vernal Pool	Wetland	Wetlands_S	101475.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.134918	Laguna
Vernal Pool	Wetland	Wetlands_S	101477.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.380938	Laguna
Vernal Pool	Wetland	Wetlands_S	101480.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.146291	Laguna
Vernal Pool	Wetland	Wetlands_S	101481.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.096560	Laguna
Vernal Pool	Wetland	Wetlands_S	101486.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.204990	Laguna
Vernal Pool	Wetland	Wetlands_S	101491.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.261298	Laguna
Vernal Pool	Wetland	Wetlands_S	101495.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.197124	Laguna
Vernal Pool	Wetland	Wetlands_S	101496.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.093820	Laguna
Vernal Pool	Wetland	Wetlands_S	101497.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.150603	Laguna
Vernal Pool	Wetland	Wetlands_S	101499.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092436	Laguna
Vernal Pool	Wetland	Wetlands_S	101501.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085450	Laguna
Vernal Pool	Wetland	Wetlands_S	101502.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128159	Laguna
Vernal Pool	Wetland	Wetlands_S	101505.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.569393	Laguna
Vernal Pool	Wetland	Wetlands_S	101507.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.185377	Laguna
Vernal Pool	Wetland	Wetlands_S	101508.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.163979	Laguna
Vernal Pool	Wetland	Wetlands_S	101509.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.375274	Laguna
Vernal Pool	Wetland	Wetlands_S	101510.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.285329	Laguna
Vernal Pool	Wetland	Wetlands_S	101511.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.074420	Laguna
Vernal Pool	Wetland	Wetlands_S	101512.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077785	Laguna
Vernal Pool	Wetland	Wetlands_S	101513.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.238005	Laguna
Vernal Pool	Wetland	Wetlands_S	101514.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087355	Laguna
Vernal Pool	Wetland	Wetlands_S	101515.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.523594	Laguna
Vernal Pool	Wetland	Wetlands_S	101516.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140061	Laguna
Vernal Pool	Wetland	Wetlands_S	101518.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.213948	Laguna
Vernal Pool	Wetland	Wetlands_S	101519.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.340490	Laguna
Vernal Pool	Wetland	Wetlands_S	101520.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.279005	Laguna
Vernal Pool	Wetland	Wetlands_S	101521.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.432580	Laguna
Vernal Pool	Wetland	Wetlands_S	101522.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083817	Laguna
Vernal Pool	Wetland	Wetlands_S	101524.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.005310	Laguna
Vernal Pool	Wetland	Wetlands_S	101525.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092272	Laguna
Vernal Pool	Wetland	Wetlands_S	101526.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169639	Laguna
Vernal Pool	Wetland	Wetlands_S	101527.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092468	Laguna
Vernal Pool	Wetland	Wetlands_S	101528.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092177	Laguna
Vernal Pool	Wetland	Wetlands_S	101534.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081250	Laguna
Vernal Pool	Wetland	Wetlands_S	101535.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087893	Laguna
Vernal Pool	Wetland	Wetlands_S	101537.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.104368	Laguna
Vernal Pool	Wetland	Wetlands_S	101538.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084657	Laguna
Vernal Pool	Wetland	Wetlands_S	101539.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0

Vernal Pool		Wetland	Wetlands_S	101568.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.109221	Laguna
Vernal Pool		Wetland	Wetlands_S	101569.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.144122	Laguna
Vernal Pool		Wetland	Wetlands_S	101572.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.266135	Laguna
Vernal Pool		Wetland	Wetlands_S	101573.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082620	Laguna
Vernal Pool		Wetland	Wetlands_S	101574.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.237050	Laguna
Vernal Pool		Wetland	Wetlands_S	101576.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.117949	Laguna
Vernal Pool		Wetland	Wetlands_S	101577.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.256836	Laguna
Vernal Pool		Wetland	Wetlands_S	101578.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.109793	Laguna
Vernal Pool		Wetland	Wetlands_S	101582.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077862	Laguna
Vernal Pool		Wetland	Wetlands_S	101584.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.434431	Laguna
Vernal Pool		Wetland	Wetlands_S	101585.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129931	Laguna
Vernal Pool		Wetland	Wetlands_S	101586.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140087	Laguna
Vernal Pool		Wetland	Wetlands_S	101587.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095193	Laguna
Vernal Pool		Wetland	Wetlands_S	101594.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075530	Laguna
Vernal Pool		Wetland	Wetlands_S	101595.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.313207	Laguna
Vernal Pool		Wetland	Wetlands_S	101596.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.212837	Laguna
Vernal Pool		Wetland	Wetlands_S	101597.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111420	Laguna
Vernal Pool		Wetland	Wetlands_S	101600.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.073170	Laguna
Vernal Pool		Wetland	Wetlands_S	101601.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084391	Laguna
Vernal Pool		Wetland	Wetlands_S	101605.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090663	Laguna
Vernal Pool		Wetland	Wetlands_S	101606.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.254314	Laguna
Vernal Pool		Wetland	Wetlands_S	101607.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087798	Laguna
Vernal Pool		Wetland	Wetlands_S	101608.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086428	Laguna
Vernal Pool		Wetland	Wetlands_S	101618.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.110964	Laguna
Vernal Pool		Wetland	Wetlands_S	101619.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.135794	Laguna
Vernal Pool		Wetland	Wetlands_S	101626.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084286	Laguna
Vernal Pool		Wetland	Wetlands_S	101629.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115998	Laguna
Vernal Pool		Wetland	Wetlands_S	101631.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.104492	Laguna
Vernal Pool		Wetland	Wetlands_S	101637.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087627	Laguna
Vernal Pool		Wetland	Wetlands_S	101639.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087436	Laguna
Vernal Pool		Wetland	Wetlands_S	101641.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.165526	Laguna
Vernal Pool		Wetland	Wetlands_S	101643.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.096411	Laguna
Vernal Pool		Wetland	Wetlands_S	101645.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083239	Laguna
Vernal Pool		Wetland	Wetlands_S	101647.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092147	Laguna
Vernal Pool		Wetland	Wetlands_S	101649.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078252	Laguna
Vernal Pool		Wetland	Wetlands_S	101650.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.173807	Laguna
Vernal Pool		Wetland	Wetlands_S	101651.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.222704	Laguna
Vernal Pool		Wetland	Wetlands_S	101654.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.506858	Laguna
Vernal Pool		Wetland	Wetlands_S	101665.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.240209	Laguna
Vernal Pool		Wetland	Wetlands_S	101673.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.293478	Laguna
Vernal Pool		Wetland	Wetlands_S	101674.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.108955	Laguna
Vernal Pool		Wetland	Wetlands_S	101677.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.269284	Laguna
Vernal Pool		Wetland	Wetlands_S	101678.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.159226	Laguna
Vernal Pool		Wetland	Wetlands_S	101692.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.147671	Laguna
Vernal Pool		Wetland	Wetlands_S	101695.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086060	Laguna
Vernal Pool		Wetland	Wetlands_S	101696.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098904	Laguna
Vernal Pool		Wetland	Wetlands_S	101699.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081156	Laguna
Vernal Pool		Wetland	Wetlands_S	101700.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.205307	Laguna
Vernal Pool		Wetland	Wetlands_S	101702.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078414	Laguna
Vernal Pool		Wetland	Wetlands_S	101703.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076451	Laguna
Vernal Pool		Wetland	Wetlands_S	101711.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.113297	Laguna
Vernal Pool		Wetland	Wetlands_S	101716.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.108955	Laguna
Vernal Pool		Wetland	Wetlands_S	101717.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.101732	Laguna
Vernal Pool		Wetland	Wetlands_S	101718.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111818	Laguna
Vernal Pool		Wetland	Wetlands_S	101724.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086389	Laguna
Vernal Pool		Wetland	Wetlands_S	101727.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.212858	Laguna
Vernal Pool		Wetland	Wetlands_S	101729.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.226463	Laguna
Vernal Pool		Wetland	Wetlands_S	101731.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.175528	Laguna
Vernal Pool		Wetland	Wetlands_S	101737.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.151581	Laguna
Vernal Pool		Wetland	Wetlands_S	101739.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111706	Laguna
Vernal Pool		Wetland	Wetlands_S	101742.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095445	Laguna
Vernal Pool		Wetland	Wetlands_S	101744.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.176670	Laguna
Vernal Pool		Wetland	Wetlands_S	101745.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095903	Laguna
Vernal Pool		Wetland	Wetlands_S	101748.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.159942	Laguna
Vernal Pool		Wetland	Wetlands_S	101749.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111991	Laguna
Vernal Pool		Wetland	Wetlands_S	101750.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.141389	Laguna
Vernal Pool		Wetland	Wetlands_S	101751.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.103341	Laguna
Vernal Pool		Wetland	Wetlands_S	101752.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098809	Laguna
Vernal Pool		Wetland	Wetlands_S	101753.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.126764	Laguna
Vernal Pool		Wetland	Wetlands_S	101755.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084711	Laguna
Vernal Pool		Wetland	Wetlands_S	101757.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.137376	Laguna
Vernal Pool		Wetland	Wetlands_S	101760.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.072879	Laguna
Vernal Pool		Wetland	Wetlands_S	101762.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.158359	Laguna
Vernal Pool		Wetland	Wetlands_S	101767.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075344	Laguna
Vernal Pool		Wetland	Wetlands_S	101775.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128554	Laguna
Vernal Pool		Wetland	Wetlands_S	101776.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.139841	Laguna
Vernal Pool		Wetland	Wetlands_S	101777.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.152270	Laguna
Vernal Pool		Wetland	Wetlands_S	101783.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.134669	Laguna
Vernal Pool		Wetland	Wetlands_S	101785.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.182854	Laguna
Vernal Pool		Wetland	Wetlands_S	101787.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.073493	Laguna
Vernal Pool		Wetland	Wetlands_S	101788.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.120363	Laguna
Vernal Pool		Wetland	Wetlands_S	101789.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (

Vernal Pool		Wetland	Wetlands_S	101845.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.091112	Laguna
Vernal Pool		Wetland	Wetlands_S	101846.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.183753	Laguna
Vernal Pool		Wetland	Wetlands_S	101847.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.127248	Laguna
Vernal Pool		Wetland	Wetlands_S	101854.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.101205	Laguna
Vernal Pool		Wetland	Wetlands_S	101857.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077082	Laguna
Vernal Pool		Wetland	Wetlands_S	101862.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077290	Laguna
Vernal Pool		Wetland	Wetlands_S	101863.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.305029	Laguna
Vernal Pool		Wetland	Wetlands_S	101864.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.138146	Laguna
Vernal Pool		Wetland	Wetlands_S	102116.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.132568	Laguna
Vernal Pool		Wetland	Wetlands_S	102124.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.293159	Laguna
Vernal Pool		Wetland	Wetlands_S	102130.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.114205	Laguna
Vernal Pool		Wetland	Wetlands_S	102131.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.196159	Laguna
Vernal Pool		Wetland	Wetlands_S	102132.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.204345	Laguna
Vernal Pool		Wetland	Wetlands_S	102143.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.319767	Laguna
Vernal Pool		Wetland	Wetlands_S	102149.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.164819	Laguna
Vernal Pool		Wetland	Wetlands_S	102158.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.183674	Laguna
Vernal Pool		Wetland	Wetlands_S	102159.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.225981	Laguna
Vernal Pool		Wetland	Wetlands_S	102163.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.131048	Laguna
Vernal Pool		Wetland	Wetlands_S	102164.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.211580	Laguna
Vernal Pool		Wetland	Wetlands_S	102171.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.258970	Laguna
Vernal Pool		Wetland	Wetlands_S	102173.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106524	Laguna
Vernal Pool		Wetland	Wetlands_S	102177.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.288956	Laguna
Vernal Pool		Wetland	Wetlands_S	102179.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.163032	Laguna
Vernal Pool		Wetland	Wetlands_S	102180.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086994	Laguna
Vernal Pool		Wetland	Wetlands_S	102186.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.118890	Laguna
Vernal Pool		Wetland	Wetlands_S	102191.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.103753	Laguna
Vernal Pool		Wetland	Wetlands_S	102192.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.416832	Laguna
Vernal Pool		Wetland	Wetlands_S	102193.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.118327	Laguna
Vernal Pool		Wetland	Wetlands_S	102202.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.379692	Laguna
Vernal Pool		Wetland	Wetlands_S	102203.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169373	Laguna
Vernal Pool		Wetland	Wetlands_S	102205.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.111391	Laguna
Vernal Pool		Wetland	Wetlands_S	102207.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.102104	Laguna
Vernal Pool		Wetland	Wetlands_S	102232.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128311	Laguna
Vernal Pool		Wetland	Wetlands_S	102241.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.453183	Laguna
Vernal Pool		Wetland	Wetlands_S	102242.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.114494	Laguna
Vernal Pool		Wetland	Wetlands_S	102245.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.480460	Laguna
Vernal Pool		Wetland	Wetlands_S	102247.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.200616	Laguna
Vernal Pool		Wetland	Wetlands_S	102251.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.079677	Laguna
Vernal Pool		Wetland	Wetlands_S	102268.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.471545	Laguna
Vernal Pool		Wetland	Wetlands_S	102272.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129995	Laguna
Vernal Pool		Wetland	Wetlands_S	102284.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090227	Laguna
Vernal Pool		Wetland	Wetlands_S	102294.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129887	Laguna
Vernal Pool		Wetland	Wetlands_S	102298.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.170078	Laguna
Vernal Pool		Wetland	Wetlands_S	102299.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076516	Laguna
Vernal Pool		Wetland	Wetlands_S	102302.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.222884	Laguna
Vernal Pool		Wetland	Wetlands_S	102305.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076136	Laguna
Vernal Pool		Wetland	Wetlands_S	102308.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098354	Laguna
Vernal Pool		Wetland	Wetlands_S	102311.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.132317	Laguna
Vernal Pool		Wetland	Wetlands_S	102314.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.240840	Laguna
Vernal Pool		Wetland	Wetlands_S	102323.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.811627	Laguna
Vernal Pool		Wetland	Wetlands_S	102333.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.072964	Laguna
Vernal Pool		Wetland	Wetlands_S	102336.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095751	Laguna
Vernal Pool		Wetland	Wetlands_S	102378.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.162130	Laguna
Vernal Pool		Wetland	Wetlands_S	102381.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.091606	Laguna
Vernal Pool		Wetland	Wetlands_S	102382.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.096718	Laguna
Vernal Pool		Wetland	Wetlands_S	102386.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.080379	Laguna
Vernal Pool		Wetland	Wetlands_S	102387.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106860	Laguna
Vernal Pool		Wetland	Wetlands_S	102388.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.114716	Laguna
Vernal Pool		Wetland	Wetlands_S	102391.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077707	Laguna
Vernal Pool		Wetland	Wetlands_S	102393.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129901	Laguna
Vernal Pool		Wetland	Wetlands_S	102398.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.155206	Laguna
Vernal Pool		Wetland	Wetlands_S	102401.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.199439	Laguna
Vernal Pool		Wetland	Wetlands_S	102402.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.102810	Laguna
Vernal Pool		Wetland	Wetlands_S	102406.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140600	Laguna
Vernal Pool		Wetland	Wetlands_S	102409.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.072431	Laguna
Vernal Pool		Wetland	Wetlands_S	102412.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089332	Laguna
Vernal Pool		Wetland	Wetlands_S	102413.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.355907	Laguna
Vernal Pool		Wetland	Wetlands_S	102423.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.073484	Laguna
Vernal Pool		Wetland	Wetlands_S	102424.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.190401	Laguna
Vernal Pool		Wetland	Wetlands_S	102425.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.265141	Laguna
Vernal Pool		Wetland	Wetlands_S	102434.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098258	Laguna
Vernal Pool		Wetland	Wetlands_S	102437.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106808	Laguna
Vernal Pool		Wetland	Wetlands_S	102443.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.110295	Laguna
Vernal Pool		Wetland	Wetlands_S	102445.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082777	Laguna
Vernal Pool		Wetland	Wetlands_S	102448.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.089752	Laguna
Vernal Pool		Wetland	Wetlands_S	102449.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.151913	Laguna
Vernal Pool		Wetland	Wetlands_S	102450.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.179282	Laguna
Vernal Pool		Wetland	Wetlands_S	102451.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090569	Laguna
Vernal Pool		Wetland	Wetlands_S	102454.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.182644	Laguna
Vernal Pool		Wetland	Wetlands_S	102455.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.119420	Laguna
Vernal Pool		Wetland	Wetlands_S	102457.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.097192	Laguna
Vernal Pool		Wetland	Wetlands_S	102465.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grass

Vernal Pool	Wetland	Wetlands_S	102513.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075702	Laguna
Vernal Pool	Wetland	Wetlands_S	102518.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.124264	Laguna
Vernal Pool	Wetland	Wetlands_S	102519.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.103982	Laguna
Vernal Pool	Wetland	Wetlands_S	102522.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083652	Laguna
Vernal Pool	Wetland	Wetlands_S	102523.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.108011	Laguna
Vernal Pool	Wetland	Wetlands_S	102528.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.116450	Laguna
Vernal Pool	Wetland	Wetlands_S	102530.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.326798	Laguna
Vernal Pool	Wetland	Wetlands_S	102533.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.229241	Laguna
Vernal Pool	Wetland	Wetlands_S	102536.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.108721	Laguna
Vernal Pool	Wetland	Wetlands_S	102538.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.287648	Laguna
Vernal Pool	Wetland	Wetlands_S	102539.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.141453	Laguna
Vernal Pool	Wetland	Wetlands_S	102541.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.139892	Laguna
Vernal Pool	Wetland	Wetlands_S	102542.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075966	Laguna
Vernal Pool	Wetland	Wetlands_S	102546.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.114238	Laguna
Vernal Pool	Wetland	Wetlands_S	102547.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.182114	Laguna
Vernal Pool	Wetland	Wetlands_S	102548.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.174438	Laguna
Vernal Pool	Wetland	Wetlands_S	102550.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078181	Laguna
Vernal Pool	Wetland	Wetlands_S	102552.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.102677	Laguna
Vernal Pool	Wetland	Wetlands_S	102553.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095440	Laguna
Vernal Pool	Wetland	Wetlands_S	102554.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088803	Laguna
Vernal Pool	Wetland	Wetlands_S	102556.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088869	Laguna
Vernal Pool	Wetland	Wetlands_S	102558.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.810630	Laguna
Vernal Pool	Wetland	Wetlands_S	102560.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100886	Laguna
Vernal Pool	Wetland	Wetlands_S	102562.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.218913	Laguna
Vernal Pool	Wetland	Wetlands_S	102565.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.102919	Laguna
Vernal Pool	Wetland	Wetlands_S	102567.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115849	Laguna
Vernal Pool	Wetland	Wetlands_S	102568.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.170284	Laguna
Vernal Pool	Wetland	Wetlands_S	102569.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.546131	Laguna
Vernal Pool	Wetland	Wetlands_S	102570.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077074	Laguna
Vernal Pool	Wetland	Wetlands_S	102574.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.289494	Laguna
Vernal Pool	Wetland	Wetlands_S	102575.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.320187	Laguna
Vernal Pool	Wetland	Wetlands_S	102577.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.276681	Laguna
Vernal Pool	Wetland	Wetlands_S	102579.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169425	Laguna
Vernal Pool	Wetland	Wetlands_S	102580.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.079374	Laguna
Vernal Pool	Wetland	Wetlands_S	102581.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.535299	Laguna
Vernal Pool	Wetland	Wetlands_S	102584.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.095572	Laguna
Vernal Pool	Wetland	Wetlands_S	102589.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088869	Laguna
Vernal Pool	Wetland	Wetlands_S	102593.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140079	Laguna
Vernal Pool	Wetland	Wetlands_S	102594.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.282487	Laguna
Vernal Pool	Wetland	Wetlands_S	102595.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.160348	Laguna
Vernal Pool	Wetland	Wetlands_S	102598.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.201345	Laguna
Vernal Pool	Wetland	Wetlands_S	102603.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082104	Laguna
Vernal Pool	Wetland	Wetlands_S	102606.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.091736	Laguna
Vernal Pool	Wetland	Wetlands_S	102608.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.258574	Laguna
Vernal Pool	Wetland	Wetlands_S	102609.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.273561	Laguna
Vernal Pool	Wetland	Wetlands_S	102613.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084927	Laguna
Vernal Pool	Wetland	Wetlands_S	102616.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.604557	Laguna
Vernal Pool	Wetland	Wetlands_S	102622.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.094223	Laguna
Vernal Pool	Wetland	Wetlands_S	102623.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.329306	Laguna
Vernal Pool	Wetland	Wetlands_S	102624.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.164543	Laguna
Vernal Pool	Wetland	Wetlands_S	102626.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087314	Laguna
Vernal Pool	Wetland	Wetlands_S	102635.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.631450	Laguna
Vernal Pool	Wetland	Wetlands_S	102636.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.330870	Laguna
Vernal Pool	Wetland	Wetlands_S	102637.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077797	Laguna
Vernal Pool	Wetland	Wetlands_S	102639.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076006	Laguna
Vernal Pool	Wetland	Wetlands_S	102641.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.574828	Laguna
Vernal Pool	Wetland	Wetlands_S	102642.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.201009	Laguna
Vernal Pool	Wetland	Wetlands_S	102644.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.117471	Laguna
Vernal Pool	Wetland	Wetlands_S	102645.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.479861	Laguna
Vernal Pool	Wetland	Wetlands_S	102648.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.141058	Laguna
Vernal Pool	Wetland	Wetlands_S	102651.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.137443	Laguna
Vernal Pool	Wetland	Wetlands_S	102652.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.530784	Laguna
Vernal Pool	Wetland	Wetlands_S	102655.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.264734	Laguna
Vernal Pool	Wetland	Wetlands_S	102656.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.092412	Laguna
Vernal Pool	Wetland	Wetlands_S	102657.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.290000	Laguna
Vernal Pool	Wetland	Wetlands_S	102662.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.327807	Laguna
Vernal Pool	Wetland	Wetlands_S	102663.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.076941	Laguna
Vernal Pool	Wetland	Wetlands_S	102664.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.156570	Laguna
Vernal Pool	Wetland	Wetlands_S	102669.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.332293	Laguna
Vernal Pool	Wetland	Wetlands_S	102672.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.084584	Laguna
Vernal Pool	Wetland	Wetlands_S	102673.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.081574	Laguna
Vernal Pool	Wetland	Wetlands_S	102674.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.106262	Laguna
Vernal Pool	Wetland	Wetlands_S	102675.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.163525	Laguna
Vernal Pool	Wetland	Wetlands_S	102677.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.239313	Laguna
Vernal Pool	Wetland	Wetlands_S	102680.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.917013	Laguna
Vernal Pool	Wetland	Wetlands_S	102687.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.610803	Laguna
Vernal Pool	Wetland	Wetlands_S	102688.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.295328	Laguna
Vernal Pool	Wetland	Wetlands_S	102689.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.155427	Laguna
Vernal Pool	Wetland	Wetlands_S	102691.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.210294	Laguna
Vernal Pool	Wetland	Wetlands_S	102694.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.521230	Laguna
Vernal Pool	Wetland	Wetlands_S	102695.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086938	Laguna
Vernal Pool	Wetland	Wetlands_S	102696.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0

Vernal Pool	Wetland	Wetlands_S	102731.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.463827	Laguna
Vernal Pool	Wetland	Wetlands_S	102733.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.171475	Laguna
Vernal Pool	Wetland	Wetlands_S	102734.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.211471	Laguna
Vernal Pool	Wetland	Wetlands_S	102735.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.198889	Laguna
Vernal Pool	Wetland	Wetlands_S	102738.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.103650	Laguna
Vernal Pool	Wetland	Wetlands_S	102740.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128009	Laguna
Vernal Pool	Wetland	Wetlands_S	102741.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169325	Laguna
Vernal Pool	Wetland	Wetlands_S	102743.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.327138	Laguna
Vernal Pool	Wetland	Wetlands_S	102744.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.075842	Laguna
Vernal Pool	Wetland	Wetlands_S	102746.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.375369	Laguna
Vernal Pool	Wetland	Wetlands_S	102749.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.429912	Laguna
Vernal Pool	Wetland	Wetlands_S	102753.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100195	Laguna
Vernal Pool	Wetland	Wetlands_S	102756.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.155660	Laguna
Vernal Pool	Wetland	Wetlands_S	102759.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.121999	Laguna
Vernal Pool	Wetland	Wetlands_S	102760.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.248346	Laguna
Vernal Pool	Wetland	Wetlands_S	102770.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.271301	Laguna
Vernal Pool	Wetland	Wetlands_S	102772.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.379668	Laguna
Vernal Pool	Wetland	Wetlands_S	102773.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.280761	Laguna
Vernal Pool	Wetland	Wetlands_S	102774.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.140529	Laguna
Vernal Pool	Wetland	Wetlands_S	102779.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115136	Laguna
Vernal Pool	Wetland	Wetlands_S	102782.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.266628	Laguna
Vernal Pool	Wetland	Wetlands_S	102786.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169767	Laguna
Vernal Pool	Wetland	Wetlands_S	102787.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.097210	Laguna
Vernal Pool	Wetland	Wetlands_S	102788.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.169936	Laguna
Vernal Pool	Wetland	Wetlands_S	102793.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.655847	Laguna
Vernal Pool	Wetland	Wetlands_S	102794.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.098060	Laguna
Vernal Pool	Wetland	Wetlands_S	102795.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.149768	Laguna
Vernal Pool	Wetland	Wetlands_S	102796.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.321965	Laguna
Vernal Pool	Wetland	Wetlands_S	102798.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.085185	Laguna
Vernal Pool	Wetland	Wetlands_S	102800.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.171724	Laguna
Vernal Pool	Wetland	Wetlands_S	102804.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.078002	Laguna
Vernal Pool	Wetland	Wetlands_S	102810.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100386	Laguna
Vernal Pool	Wetland	Wetlands_S	102811.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082634	Laguna
Vernal Pool	Wetland	Wetlands_S	102812.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.161980	Laguna
Vernal Pool	Wetland	Wetlands_S	102813.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.115142	Laguna
Vernal Pool	Wetland	Wetlands_S	102814.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.138640	Laguna
Vernal Pool	Wetland	Wetlands_S	102815.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.088160	Laguna
Vernal Pool	Wetland	Wetlands_S	102816.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.246306	Laguna
Vernal Pool	Wetland	Wetlands_S	102817.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090747	Laguna
Vernal Pool	Wetland	Wetlands_S	102818.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.317272	Laguna
Vernal Pool	Wetland	Wetlands_S	102819.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.138418	Laguna
Vernal Pool	Wetland	Wetlands_S	102823.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.112125	Laguna
Vernal Pool	Wetland	Wetlands_S	102824.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.243270	Laguna
Vernal Pool	Wetland	Wetlands_S	102833.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129041	Laguna
Vernal Pool	Wetland	Wetlands_S	102834.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086222	Laguna
Vernal Pool	Wetland	Wetlands_S	102836.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.205847	Laguna
Vernal Pool	Wetland	Wetlands_S	102840.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090293	Laguna
Vernal Pool	Wetland	Wetlands_S	102841.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.399658	Laguna
Vernal Pool	Wetland	Wetlands_S	102842.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.269727	Laguna
Vernal Pool	Wetland	Wetlands_S	102843.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.087530	Laguna
Vernal Pool	Wetland	Wetlands_S	102848.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.664844	Laguna
Vernal Pool	Wetland	Wetlands_S	102853.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.377936	Laguna
Vernal Pool	Wetland	Wetlands_S	102855.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.307788	Laguna
Vernal Pool	Wetland	Wetlands_S	102856.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.324285	Laguna
Vernal Pool	Wetland	Wetlands_S	102857.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.093692	Laguna
Vernal Pool	Wetland	Wetlands_S	102860.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.198768	Laguna
Vernal Pool	Wetland	Wetlands_S	102861.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.280010	Laguna
Vernal Pool	Wetland	Wetlands_S	102865.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.077461	Laguna
Vernal Pool	Wetland	Wetlands_S	102866.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.165595	Laguna
Vernal Pool	Wetland	Wetlands_S	102870.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.099050	Laguna
Vernal Pool	Wetland	Wetlands_S	102871.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.307725	Laguna
Vernal Pool	Wetland	Wetlands_S	102872.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.124250	Laguna
Vernal Pool	Wetland	Wetlands_S	102877.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.319750	Laguna
Vernal Pool	Wetland	Wetlands_S	102878.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.097341	Laguna
Vernal Pool	Wetland	Wetlands_S	102879.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.183144	Laguna
Vernal Pool	Wetland	Wetlands_S	102881.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.221602	Laguna
Vernal Pool	Wetland	Wetlands_S	102882.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.209868	Laguna
Vernal Pool	Wetland	Wetlands_S	102883.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.279306	Laguna
Vernal Pool	Wetland	Wetlands_S	102885.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.518430	Laguna
Vernal Pool	Wetland	Wetlands_S	102889.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.195032	Laguna
Vernal Pool	Wetland	Wetlands_S	102893.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.100487	Laguna
Vernal Pool	Wetland	Wetlands_S	102894.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.086013	Laguna
Vernal Pool	Wetland	Wetlands_S	102895.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.129655	Laguna
Vernal Pool	Wetland	Wetlands_S	102896.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.152828	Laguna
Vernal Pool	Wetland	Wetlands_S	102897.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.082892	Laguna
Vernal Pool	Wetland	Wetlands_S	102901.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.164058	Laguna
Vernal Pool	Wetland	Wetlands_S	102903.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.784684	Laguna
Vernal Pool	Wetland	Wetlands_S	102904.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.091063	Laguna
Vernal Pool	Wetland	Wetlands_S	102905.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.596121	Laguna
Vernal Pool	Wetland	Wetlands_S	102906.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.545281	Laguna
Vernal Pool	Wetland	Wetlands_S	102907.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.187175	Laguna
Vernal Pool	Wetland	Wetlands_S	102910.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0

Vernal Pool	Wetland	Wetlands_S	102939.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.609905	Laguna		
Vernal Pool	Wetland	Wetlands_S	102942.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.104602	Laguna		
Vernal Pool	Wetland	Wetlands_S	102943.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.128530	Laguna		
Vernal Pool	Wetland	Wetlands_S	102944.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.413889	Laguna		
Vernal Pool	Wetland	Wetlands_S	102946.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.467849	Laguna		
Vernal Pool	Wetland	Wetlands_S	102951.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.558071	Laguna		
Vernal Pool	Wetland	Wetlands_S	102952.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.293799	Laguna		
Vernal Pool	Wetland	Wetlands_S	102953.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.538066	Laguna		
Vernal Pool	Wetland	Wetlands_S	102954.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.471679	Laguna		
Vernal Pool	Wetland	Wetlands_S	102956.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.303864	Laguna		
Vernal Pool	Wetland	Wetlands_S	102957.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.200424	Laguna		
Vernal Pool	Wetland	Wetlands_S	102958.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.571599	Laguna		
Vernal Pool	Wetland	Wetlands_S	102959.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.303711	Laguna		
Vernal Pool	Wetland	Wetlands_S	102960.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.107749	Laguna		
Vernal Pool	Wetland	Wetlands_S	102961.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.255652	Laguna		
Vernal Pool	Wetland	Wetlands_S	102962.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.293052	Laguna		
Vernal Pool	Wetland	Wetlands_S	102963.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.336036	Laguna		
Vernal Pool	Wetland	Wetlands_S	102964.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.279113	Laguna		
Vernal Pool	Wetland	Wetlands_S	102965.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.131412	Laguna		
Vernal Pool	Wetland	Wetlands_S	102966.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.332747	Laguna		
Vernal Pool	Wetland	Wetlands_S	102967.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.448096	Laguna		
Vernal Pool	Wetland	Wetlands_S	102968.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.342047	Laguna		
Vernal Pool	Wetland	Wetlands_S	102969.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.496942	Laguna		
Vernal Pool	Wetland	Wetlands_S	102970.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.294512	Laguna		
Vernal Pool	Wetland	Wetlands_S	102971.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.576777	Laguna		
Vernal Pool	Wetland	Wetlands_S	102972.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.555139	Laguna		
Vernal Pool	Wetland	Wetlands_S	102973.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.245139	Laguna		
Vernal Pool	Wetland	Wetlands_S	102974.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.689355	Laguna		
Vernal Pool	Wetland	Wetlands_S	102975.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.464755	Laguna		
Vernal Pool	Wetland	Wetlands_S	102976.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.838850	Laguna		
Vernal Pool	Wetland	Wetlands_S	102977.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.783166	Laguna		
Vernal Pool	Wetland	Wetlands_S	102978.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.801276	Laguna		
Vernal Pool	Wetland	Wetlands_S	102979.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.245092	Laguna		
Vernal Pool	Wetland	Wetlands_S	102980.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.214681	Laguna		
Vernal Pool	Wetland	Wetlands_S	102981.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.580469	Laguna		
Vernal Pool	Wetland	Wetlands_S	102982.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.263509	Laguna		
Vernal Pool	Wetland	Wetlands_S	102983.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.144645	Laguna		
Vernal Pool	Wetland	Wetlands_S	102984.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.307394	Laguna		
Vernal Pool	Wetland	Wetlands_S	102985.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.449428	Laguna		
Vernal Pool	Wetland	Wetlands_S	102986.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.369575	Laguna		
Vernal Pool	Wetland	Wetlands_S	102987.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.261063	Laguna		
Vernal Pool	Wetland	Wetlands_S	102988.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.448079	Laguna		
Vernal Pool	Wetland	Wetlands_S	102989.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.510930	Laguna		
Vernal Pool	Wetland	Wetlands_S	102990.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.083669	Laguna		
Vernal Pool	Wetland	Wetlands_S	102991.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.175504	Laguna		
Vernal Pool	Wetland	Wetlands_S	102992.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.344393	Laguna		
Vernal Pool	Wetland	Wetlands_S	102993.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.315590	Laguna		
Vernal Pool	Wetland	Wetlands_S	102994.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.261401	Laguna		
Vernal Pool	Wetland	Wetlands_S	102995.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.287810	Laguna		
Vernal Pool	Wetland	Wetlands_S	102996.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.571838	Laguna		
Vernal Pool	Wetland	Wetlands_S	102997.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.291011	Laguna		
Vernal Pool	Wetland	Wetlands_S	102998.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.270360	Laguna		
Vernal Pool	Wetland	Wetlands_S	102999.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.184160	Laguna		
Vernal Pool	Wetland	Wetlands_S	103000.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.289719	Laguna		
Vernal Pool	Wetland	Wetlands_S	103001.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.159100	Laguna		
Vernal Pool	Wetland	Wetlands_S	103002.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.362156	Laguna		
Vernal Pool	Wetland	Wetlands_S	103003.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.273270	Laguna		
Vernal Pool	Wetland	Wetlands_S	103004.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.325626	Laguna		
Vernal Pool	Wetland	Wetlands_S	103005.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.939484	Laguna		
Vernal Pool	Wetland	Wetlands_S	103006.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.262926	Laguna		
Vernal Pool	Wetland	Wetlands_S	103007.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.345380	Laguna		
Vernal Pool	Wetland	Wetlands_S	103008.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.241464	Laguna		
Vernal Pool	Wetland	Wetlands_S	103009.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.110828	Laguna		
Vernal Pool	Wetland	Wetlands_S	103010.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.247628	Laguna		
Vernal Pool	Wetland	Wetlands_S	103011.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.236530	Laguna		
Vernal Pool	Wetland	Wetlands_S	103012.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.439529	Laguna		
Vernal Pool	Wetland	Wetlands_S	103013.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.503450	Laguna		
Vernal Pool	Wetland	Wetlands_S	103014.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	2.896500	Laguna		
Vernal Pool	Wetland	Wetlands_S	103015.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.329192	Laguna		
Vernal Pool	Wetland	Wetlands_S	103016.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.197311	Laguna		
Vernal Pool	Wetland	Wetlands_S	103017.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.550457	Laguna		
Vernal Pool	Wetland	Wetlands_S	103018.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.367226	Laguna		
Vernal Pool	Wetland	Wetlands_S	103019.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	1.190810	Laguna		
Vernal Pool	Wetland	Wetlands_S	59547.000000		Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.457411	Laguna		
Vernal Pool	Wetland	Wetlands_S	70624.000000		Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.090740	Laguna		
Vernal Pool	Wetland	Wetlands_S	81183.000000		Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	20.0	0.094197	Laguna		
Freshwater Marsh	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	0.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	1.0	1.0	19.0	0.671109	Lower Cosumnes River		
Freshwater Marsh	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	0.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	1.0	1.0	19.0	9.856800	Lower Cosumnes River		
Freshwater Marsh	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	0.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	1.0	1.0	19.0	14.472000	Lower Cosumnes River		
Freshwater Marsh	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	0.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	1.0	1.0	19.0	1.095200	Lower Cosumnes River		
Freshwater Marsh	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	0.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	1.0	1.0	19.0	1.608000	Lower Cosumnes River		
Freshwater Marsh	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A

Streams/Creeks	Waters_P	Waters_IP	4154.000000	No Impact	Valley Grassland	Blue Oak Woodland	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	18.860800	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	4159.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	1.886670	Upper Cosumnes River
Seasonal Wetlands	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	3.832650	Laguna
Seasonal Wetlands	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	0.676350	Laguna
Seasonal Wetlands	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	4.332450	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	3.226500	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	3.226500	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	3.226500	Laguna
Seasonal Wetlands	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	1.985959	Laguna
Seasonal Wetlands	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	0.764550	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	0.358500	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	0.358500	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	0.358500	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1107.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	21.0	25.422200	Laguna
Freshwater Marsh	Wetland	Wetlands_P	1154.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	1.0	21.0	2.751510	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	36754.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	9.245760	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	36990.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	5.427240	Laguna
Streams/Creeks	Waters_P	Waters_IP	2884.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	3.992240	Laguna
Streams/Creeks	Waters_P	Waters_IP	3126.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	5.113600	Laguna
Streams/Creeks	Waters_P	Waters_IP	3285.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	2.463570	Laguna
Streams/Creeks	Waters_P	Waters_IP	3295.000000	No Impact	Valley Grassland	Valley Grassland	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	2.103930	Laguna
Streams/Creeks	Waters_P	Waters_IP	3342.000000	No Impact	Valley Grassland (Vernal Pool)	Irrigated Pasture-Grassland	Class I	Class IA	Class II	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	-1.0	0.0	1.0	2.0	2.0	21.0	2.326900	Laguna
Streams/Creeks	Waters_P	Waters_IP	3345.000000	No Impact	Valley Grassland (Vernal Pool)	Vineyards	Class I	Class IA	Class II	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	-1.0	0.0	1.0	2.0	2.0	21.0	4.626640	Laguna
Streams/Creeks	Waters_P	Waters_IP	3557.000000	No Impact	Blue Oak Woodland	Blue Oak Savanna	Class I	Class I	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	2.597360	Laguna
Streams/Creeks	Waters_P	Waters_IP	3589.000000	No Impact	Valley Grassland (Vernal Pool)	Irrigated Pasture-Grassland	Class I	Class IA	Class II	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	-1.0	0.0	1.0	2.0	2.0	21.0	2.852970	Laguna
Seasonal Wetlands	Wetland	Wetlands_S	37204.000000		Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	5.939860	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	19.0	2.760750	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	19.0	2.760750	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	19.0	2.760750	Deer Creek
Seasonal Wetlands	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	19.0	10.060000	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	19.0	0.306750	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	19.0	0.306750	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	19.0	0.306750	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	0.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	20.0	6.400131	Lower Cosumnes River
Seasonal Wetlands	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	4.332450	Upper Cosumnes River
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	3.226500	Upper Cosumnes River
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	3.226500	Upper Cosumnes River
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	3.226500	Upper Cosumnes River
Seasonal Wetlands	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	21.0	0.764550	Upper Cosumnes River
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	0.358500	Upper Cosumnes River
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	0.358500	Upper Cosumnes River
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	21.0	0.358500	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	4277.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	20.0	13.906000	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4324.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	High	2.0	2.0	2.0	3.0	3.0	-1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	20.0	18.161800	Deer Creek
Streams/Creeks	Waters_P	Waters_IP	4031.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	22.0	54.768400	Upper Cosumnes River
Streams/Creeks	Waters_P	Waters_IP	4160.000000	No Impact	Valley Grassland	Valley Grassland (Vernal Pool)	Class I	Class I	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	22.0	3.127720	Upper Cosumnes River
Freshwater Marsh	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	1.0	1.0	22.0	7.500966	Laguna
Streams/Creeks	Waters_P	Waters_IP	3294.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	22.0	2.427790	Laguna
Streams/Creeks	Waters_P	Waters_IP	3475.000000	No Impact	Valley Grassland (Vernal Pool)	Freshwater Marsh	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	22.0	1.780530	Laguna
Streams/Creeks	Waters_P	Waters_IP	3507.000000	No Impact	Valley Grassland (Vernal Pool)	Blue Oak Savanna	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	22.0	3.945350	Laguna
Streams/Creeks	Waters_P	Waters_IP	3552.000000	No Impact	Valley Grassland (Vernal Pool)	Mixed Riparian Woodland	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	22.0	1.936310	Laguna
Streams/Creeks	Waters_P	Waters_IP	3714.000000	No Impact	Valley Grassland (Vernal Pool)	Seasonal Wetlands	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	22.0	1.973740	Laguna
Streams/Creeks	Waters_P	Waters_IP	3729.000000	No Impact	Valley Grassland (Vernal Pool)	Vernal Pool	Class I	Class IA	Class I	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	2.0	2.0	22.0	2.808430	Laguna
Freshwater Marsh	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	2.0	1.0	1.0	20.0	2.040000	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	3.226500	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	0.358500	Laguna
Streams/Creeks	Waters_P	Waters_IP	3436.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	5.299280	Laguna
Streams/Creeks	Waters_P	Waters_IP	3575.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	5.000010	Laguna
Streams/Creeks	Waters_P	Waters_IP	3604.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	4.078890	Laguna
Streams/Creeks	Waters_P	Waters_IP	3624.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	2.213780	Laguna
Streams/Creeks	Waters_P	Waters_IP	3680.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	13.145600	Laguna
Streams/Creeks	Waters_P	Waters_IP	3697.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	3.934810	Laguna
Streams/Creeks	Waters_P	Waters_IP	3728.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	2.443500	Laguna
Streams/Creeks	Waters_P	Waters_IP	3765.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	6.238590	Laguna
Streams/Creeks	Waters_P	Waters_IP	3828.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	21.981500	Laguna
Streams/Creeks	Waters_P	Waters_IP	3852.000000	No Impact	Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	9.392880	Laguna
Streams/Creeks	Waters_P	Waters_IP	3870.000000	No Impact	Valley Grassland (Vernal Pool)	Valley Grassland (Vernal Pool)	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	3.367990	Laguna
Streams/Creeks	Waters_P	Waters_IP	3604.000000		Valley Grassland (Vernal Pool) - Other Linear	Valley Grassland (Vernal Pool) - Other Linear	Class I	Class IA	Class IA	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	2.178030	Laguna
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	21.0	2.760750	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED INSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	21.0	0.306750	Deer Creek
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	3.226500	Upper Cosumnes River
Streams/Creeks	N/A	N/A	0.000000	CREATED OUTSIDE			N/A	N/A	N/A	High	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	23.0	0.358500	Upper Cosumnes River

APPENDIX D
Re-establishment and Establishment Guidelines

1 INTRODUCTION

The United States Army Corps of Engineers (USACE) and the US Environmental Protection Agency (EPA) define restoration as, "the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/ historic functions to a former or degraded aquatic resource" (USACE and EPA 2008). Restoration includes both rehabilitation, which repairs natural/historic functions to a degraded aquatic resource, and re-establishment, which returns natural/historic functions to a former aquatic resource. Establishment (i.e., creation) is defined as, "the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site." Re-establishing is always preferable to establishment because the likelihood of success is far greater where some aquatic resource characteristics are already present or were historically present. Additionally, because the establishment of wetland and other waters on upland and/or deepwater sites will result in a net decrease in upland and/or deepwater habitat, this should only occur when there are no existing or available sites with re-establishment opportunities. Even highly degraded and disturbed re-establishment sites are preferable to establishment sites. Nevertheless, it is expected that a portion of mitigation acreage under the South Sacramento Habitat Conservation Plan (SSHCP) will occur as wetland and other waters establishment due to a lack of available restoration sites outside the Urban Development Area (UDA).

This appendix explains the SSHCP protocols for establishment and restoration of wetlands and other water ecosystems. These protocols are based on the USACE's Mitigation Guidelines for the Clean Water Act (CWA) 404 Program and the United States Environmental Protection Agency's (EPA) *Principles for Ecological Restoration of Aquatic Resources* (EPA 2000). They are meant to provide applicants with a basic outline for planning, designing, implementing, and managing restoration or establishment projects. In so doing, the protocols are meant to ensure that wetland projects will be viable in perpetuity, and will adequately compensate for impacted habitat. This section will also provide standards that are specific to each of the 10 aquatic resources land cover types, including restoration and establishment methods, monitoring requirements, criteria against which success will be measured, and remedial steps for projects that do not meet the basic success criteria. It is recognized that ecosystem restoration and establishment is an evolving science, and that this document represents current understandings and expectations in the field. Therefore, the application of these protocols will allow adjustments in an adaptive manner to reflect the best available science of wetland and stream establishment and re-establishment, monitoring, and performance standards that can improve the long-term viability of restoration and establishment projects.

APPENDIX D (Continued)

The following methodology describes the process by which determinations were made regarding the potential for establishment and re-establishment acreage amounts to occur within the Plan Area.

Assumptions

Irrigated pasture and croplands are considered the only habitats where removal of the current land use and re-establishment of topography may result in re-established wetlands. Irrigated pasture is considered particularly suitable for re-establishment of wetlands because the hardpan is likely intact. Croplands, depending on the crop, may also retain the hardpan. Both land uses occur where wetlands may have historically occurred.

Orchards and vineyards are not suitable for wetland restoration because the lands have been deep-ripped to support the agricultural uses.

Valley grasslands may be suitable for establishment of wetlands, but only outside of 250 feet of an existing wetland feature so as not to create any indirect effects to the wetland per U.S. Fish and Wildlife Service (USFWS) protocol.

Only land in the Plan Area is considered for re-establishment or establishment.

It is assumed that parcels 20 acres in size or less will be too expensive to acquire and too small to support successful re-establishment or establishment.

It is assumed that existing preserves will not be suitable for re-establishment or establishment as this may risk damaging protected resources and easements may prohibit re-establishment or establishment.

Based on California Department of Fish and Wildlife recommendations, it is assumed that between 15% and 30% of land that is assumed to be suitable habitat will be available for acquisition.

Up to 8% of a site can be re-established or established with wetlands. This is based on the density of wetlands found in Valley Grassland cover type throughout the Plan Area. Wetlands include vernal pools, swales, seasonal wetlands, freshwater marsh, streams and open water. Wetland density within the Plan Area was derived from the acreage of wetlands within the Valley Grassland cover type as this is the only upland cover type that is reflective of historic natural conditions. All other upland cover types have been heavily modified.

Methodology

Identify all Cropland, Irrigated Pasture, and Valley Grassland cover types in the SSHCP Plan Area. This forms the “base map.”

APPENDIX D (Continued)

Using the parcel layer, remove all parcels from the base map that are less than 20 acres in size.

Using the existing preserve layer, remove all parcels from the base map that are already protected.

Using a buffer file, remove all lands from the base map that are within 250 feet of a vernal pool, swale, and stream/creek (VPIH) land cover type.

Calculate range of how many Cropland, Irrigated Pasture, and Valley Grassland acres are available for potential re-establishment or establishment, assuming 15% to 30% of the base map can be acquired.

Calculate range of how many wetland acres can be re-established or established based on 8% density.

Conclusions

The base map sums to 210,509 acres.

After removing lots smaller than 20 acres in size and already preserved lands, the map sums to approximately 135,455 acres.

After removing areas within 250 feet of existing VPIH land covers, the map sums to approximately 85,690 acres.

It is estimated that further investigation into the historical agricultural practices on some of the potential re-establishment or establishment sites will reveal past deep-ripping. Sites that have been deep-ripped will not have an intact perched aquafer, which is necessary to support most wetland cover types. There are some questions as to whether or not the perched aquifer in soils that have been deep-ripped can be repaired. Orchards and vineyards are not considered suitable candidates for re-establishment or establishment because deep-ripping has typically occurred where they were established. It is also understood that acquiring potential re-establishment or establishment sites is dependent on a willing buyer and willing seller agreement. Therefore, it is not probable that all identified potential wetland re-establishment or establishment sites can be acquired for re-establishment or establishment. It is estimated that between 15% and 30% of potential re-establishment or establishment sites will be successfully negotiated for acquisition and will be capable of supporting re-establishment or establishment efforts. Therefore, it is assumed that between 12,854 and 25,707 acres may be available for wetland re-establishment or establishment.

Wetland re-establishment and establishment guidelines set forth in this study limit the percent of land that can be re-established and established to 8% of the site. The remaining 92% is required as upland

APPENDIX D (Continued)

habitat, which supports the hydrology of the wetland. Therefore, it is estimated that between 1,028 and 2,057 acres of wetlands can be re-established or established within the Plan Area.

The SSHCP impacts analysis forecasts that approximately 1,200 acres of wetlands will be impacted. Because we assume that the Plan Area can provide between 1,028 and 2,057 acres of wetland re-establishment and establishment, the re-establishment/establishment ratio under the SSHCP is set at 1:1.

APPENDIX D (Continued)

2 GUIDELINES

The restoration and establishment process has several stages: site selection, site evaluation, project design, project implementation, project monitoring, and project management. General protocols for each of these stages are as follows:

2.1 Site Selection

The National Resource Council (NRC) stipulates that "site selection for wetland conservation and mitigation should be conducted on a watershed scale in order to maintain wetland diversity, connectivity, and appropriate proportions of upland and wetland systems needed to enhance the long-term stability of the wetland and riparian systems" (NRC 2001). Protected upstream and upland areas provide a safeguard against the negative edge effects of future development. Therefore, restoration and establishment sites that are contiguous to existing preserves or lands protected by conservation easements will have priority over wetland restoration or establishment sites outside of a comprehensive preserve system. All restoration and establishment sites must be under permanent conservation easement or have preserve status.

Consideration will be given to a site's position within the watershed, its function within the watershed, and the potential impacts of restoration or establishment on existing proximate wetland and other aquatic resource habitats within the same watershed. Restoration or establishment sites that can benefit the watershed in which they are situated will have priority over those with little to no impact; sites with no potential impact on the watershed in which they are situated will have priority over those with potential negative impacts. Sites with potential negative impacts to the watershed or nearby habitat will be avoided.

Wetlands and other waters that have retained functional hydrodynamics or degraded and former wetlands whose hydrodynamics can be re-established through passive restoration tend to be more fiscally and environmentally sustainable than those where functional hydrodynamics must be engineered or created. Active hydrodynamic restoration methods, like grading and excavation can severely damage the substrate and encourage the spread of invasive plant species. "Hard" engineering solutions, such as irrigation and pumping systems, are costly and cannot readily adapt to seasonal and annual fluctuations in rainfall and water level. Hence, restoration and establishment sites that do not require active intervention to remediate wetland or other waters hydrodynamics will have priority over other sites. No restoration or establishment projects that use irrigation as a primary or long-term water source are permitted.

Soil type and permeability are also important considerations, as they dictate a site's ability to retain water and support vegetation. Highly permeable soils are not likely to retain enough water to function as a wetland or other water ecosystem, except where water tables or water inflow

APPENDIX D (Continued)

rates are high. Factors such as soils pH, nutrient content, climate, parent material, relief, organisms, and the overriding influence hydrologic regime, will influence whether wetland-appropriate vegetation struggles or thrives. Therefore, restoration and establishment sites with soil types known to support wetland hydrology and vegetation will have priority over other sites.

Additionally, restoration and establishment site selection will consider the potential effects of habitat restoration on nearby County airport operations. Pursuant to Title 33 of the Code of Federal Regulations (CFR) Section 332.3, compensatory mitigation projects should not be located where they will increase risks to aviation by attracting wildlife to areas where aircraft–wildlife strikes may occur (e.g., near airports). Thus, those sites that are less likely to increase wildlife hazard attractants within a County airport's approach and departure airspace will be given priority over other sites.

Lastly, because a central goal of mitigation is to offset unavoidable adverse impacts to wetlands, streams, and other aquatic resources to maintain a diverse assortment of wetland types, functions, landscape settings, and geomorphic settings, sites that have unique or rare topographical, geomorphic, vegetative, biotic, or functional characteristics will have priority over other sites.

In summary, the Implementing Entity will prioritize restoration and establishment sites that:

- Are contiguous to existing preserves or lands under conservation easements;
- Can withstand re-establishment or establishment projects without adverse impacts to the watershed or habitat in which they are situated;
- Do not require active intervention to remediate wetland or other waters' hydrodynamics;
- Have appropriate soil types, composition, and permeability;
- Do not attract wildlife within the approach and departure airspace of County airports, and
- Have unique or rare characteristics.

Once a restoration or establishment site is selected, a reference site will be identified. Reference sites should be in-kind and as proximate to the restoration or restoration site as possible. The site being mitigated for can be used as the reference site if it is reasonably proximate and similar to the restoration or establishment site, and if it has not been destroyed prior to the start of the restoration or establishment project. Reference sites should not be chosen randomly, but rather so that collectively they represent the diversity of species and plant communities that exist on the sites that are going to be destroyed.

APPENDIX D (Continued)

2.2 Site Evaluation

Once the restoration or establishment site and the reference site are selected, an interdisciplinary team of experts will survey the site. This team will include the Implementing Entity and at least one Monitoring Biologist (MB). The MB will be a professional botanist, biologist, or restoration ecologist familiar with California flora and fauna, and experienced with wetland or other waters re-establishment or establishment projects; alternatively, the MB can be a firm specializing in the re-establishment or establishment of wetlands and other waters. This person or firm will be contracted to perform the baseline evaluation (in addition to the monitoring responsibilities detailed in Section 2.5).

The baseline evaluation will actually consist of two surveys: one in wet season (January to February) and one in the flowering period (March through May). Each survey should note the following, using either metrics on or descriptions of:

- Topography and slope;
- Water quality (turbidity, nutrient levels, presence of toxins, etc.);
- Subsurface water flow rate, direction, depth, and duration;
- Surface water flow rate, direction, depth, and duration;
- Soil/substrate type, permeability, moisture levels, and erosion;
- Dominant vegetation type, location, density, and elevation;
- Presence and location of invasive species;
- Presence and location of listed species;
- Aquatic function (if any);
- Historical and current uses of the site; and
- Historical and current uses of neighboring land that may affect the project outcome.

Surveys of plant and animal species specific to particular wetland or other water types may need to occur within a more specific time frame or multiple times over the course of the survey period for the results to be accurate and reliable. These particular survey requirements will be detailed within the restoration and establishment guidelines of each wetland and other water type.

The reference site should be surveyed at the same time and using the same methods and metrics as the restoration or establishment site.

APPENDIX D (Continued)

2.3 Project Design

Project design depends upon the desired outcome of each project. The overarching goal for all mitigation projects under the SSHCP is an ecosystem strategy approach to re-establish or establish sustainable and functioning ecosystems that match the characteristics and functions of the ecosystems they replace within a system of conservation areas and reserves so that species dispersal mechanisms remain functional. However, depending on project-specific constraints and opportunities, this may be too broad or constraining. Therefore, the Implementing Entity and MB will use the baseline evaluation findings to set project-specific goals and to design the project with the aim of meeting those goals. As part of the project design, the team will also generate an implementation plan that describes how the design will be implemented. Lastly, the team will generate a monitoring and management plan, which will include project-specific outcomes, criteria against which progress toward meeting those objectives can be measured, and the monitoring methods that will be used to measure those criteria.

In general, passive restoration design is preferable to active restoration, as it is less invasive and the result is self-sustaining. Passive restoration involves removing the source of degradation (e.g., cattle grazing, culverts, etc.) and allowing natural process to gradually return the site to a functioning wetland or other water ecosystem. However, passive restoration design will not meet the goals of every restoration project, especially on severely degraded sites, and passive designs cannot be used for establishment projects. Therefore, it is expected that some projects will utilize active restoration and establishment project designs.

The USACE South Pacific Division's *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines* (USACE 2015) recommend the following considerations for mitigation planning: A mitigation plan for wetland compensatory mitigation projects should consider the NRC's operational guidelines for restoring ecologically self-sustaining wetlands (NRC 2001). This succinct document provides some useful guidelines on factors to consider in planning wetland compensatory mitigation. In addition, examination of existing compensatory mitigation sites has provided information that can be used to ensure the success of proposed compensatory mitigation sites. In general, compensatory mitigation sites should be designed with the following in mind.

General Design Recommendations for Compensatory Mitigation

- Ensure an adequate buffer subject to minimal or no human disturbance is established and protected adjacent to any aquatic resources in the compensatory mitigation site.
- Integrate macro- and micro-topographic features to create a diversity of hydrologic and geomorphic conditions, plant communities, and animal habitat.

APPENDIX D (Continued)

- Design the compensatory mitigation project to mimic a local reference site of similar class and landscape position that provides the desired habitat features and functionality.
- Incorporate mitigation plantings of species native to the local area.
- Avoid or minimize impacts to special-status species and other biological resources.

Design Recommendations for Wetland Compensatory Mitigation

- Select compensatory mitigation sites with natural, self-sustaining sources of hydrology (surface water, groundwater, and precipitation). The use of engineered structures such as pumps, water control structures, or diversions is strongly discouraged. Securing water rights and/or understanding the risks of existing or future water diversions are critical elements.

Design Recommendations for Stream Compensatory Mitigation

- Ensure the main channel through the compensatory mitigation site is free to migrate laterally over its active and terrace floodplain.
- Ensure channel geometry (plan, profile, and cross-section) of the compensatory mitigation site is appropriate for the watershed location and physical/hydrological condition.
- Use local, native materials as fill material to the extent practicable.
- Use bioengineering techniques to the extent practicable.
- Establish/restore and protect riparian areas next to the stream channel.

Additionally, project designs must address the three fundamental components of wetland ecosystems: hydrology, substrate, and vegetation. According to the NRC's Committee on the Characterization of Wetlands (NRC 1995):

> The states of the three factors that characterize wetlands are… recurrent, sustained saturation (the hydrological criterion), physical and chemical conditions in the substrate that reflect recurrent, sustained saturation (the substrate criterion), and the presence of organisms that are specifically adapted to recurrent and sustained saturation of the substrate (the biologic criterion).

2.3.1 Hydrology

The project design should describe how topography and hydrology of the site will be altered (if at all) to re-establish or establish the appropriate hydrodynamics and hydroperiod for the wetland or other water ecosystem. The design should also explain what aquatic function is expected to result from this change.

APPENDIX D (Continued)

This component of the project design should utilize natural hydrologic patterns whenever possible, and avoid depending on hard engineering to achieve the desired hydrology. Soft engineering is always preferable to hard engineering, as it is more natural and self-sustaining, requires minimal maintenance, and is more cost-effective. As explained in Section 2.1, grading, excavation, pumping, and irrigation are undesirable and should be avoided. Irrigation is never acceptable as a primary or long-term water source.

2.3.2 Substrate

The project design should describe how (if at all) the soil or substrate will be amended or translocated to re-establish or establish the appropriate level of saturation and nutrient/organic matter content for the wetland or other water ecosystem. The project design should utilize existing soil and substrate whenever appropriate for the wetland or other water type being re-established or established. To avoid the spread of invasive species, soil and/or substrate translocated from off site should be sourced from sites free of invasive species.

2.3.3 Vegetation

The project design should describe how (if at all) the site will be vegetated or revegetated. Substrate, plants, and seeds collected from the site can be used to revegetate and repopulate the site after hydrology is re-established or established. When no native seed bank exists, site-suitable plant species should be procured from as local a source as possible. Off-site plant, seed, and substrate collection should come from local sites free of invasive species. Commercial seeds for native plants can be substituted if no local seed banks are available. Project designs, especially active designs, should use variation to allow for adaptive management. When designs include excavation or grading, they should provide appropriately heterogeneous topography. When designs include revegetation, they should create varying plant elevations and emergence levels. Such variations enable flexibility in case of extreme weather events and other unpredictable factors that can affect the project.

In summary, the Implementing Entity will design restoration and establishment projects that:

- Are based on foreseeable constraints and information derived from the baseline evaluation;
- Strive to meet project-specific goals, outcomes, and success criteria;
- Specify monitoring frequency and management protocols;
- Are passive, whenever possible;
- Address the water, substrate, and biota that compose the wetland or other water type;

- Utilize existing hydrological patterns, topography, soil, substrate, native vegetation, and/or local seed banks, whenever possible; and
- Create variation to allow for experimentation and adaptive management.

2.4 Implementation

The implementation plan must provide a timeline for the project implementation, and must describe all avoidance and minimization measures that the Implementing Entity will take during implementation of the project. These measures are described in detail in Chapter 7 Conservation Strategy of the SSHCP.

2.4.1 Timing

Implementation will occur either before or after the breeding and aestivation seasons of species present at the restoration or establishment site. The Implementing Entity will also time the implementation so that revegetation occurs during the appropriate growing season. If the planned implementation season arrives with unexpectedly poor conditions (e.g., drought, flood, etc.) the Implementing Entity will postpone project implementation until better conditions emerge, up to one calendar year or 18 months.

2.4.2 Avoidance and Minimization

Prior to entering the restoration or establishment site all boots, tools, truck tires, truck beds, and any other equipment should be washed and disinfected to limit the spread of invasive species and disease. If invasive species are already present at the re-establishment or establishment site prior to implementation, and the project design involves eradicating such species, the Implementing Entity will use mowing, hand weeding, and other natural methods to do so. Herbicides and pesticides will be avoided.

When the project design involves excavation or grading, the Implementing Entity will salvage appropriate native soils, substrate, and plant materials from the re-establishment or establishment site, whenever possible. Seeds with viable embryos should be collected by hand, with scissors, or with clippers, and stored under cool and dry conditions. Substrate should be harvested using a hammer or backhoe to loosen blocks that are at least 6 inches deep, and stored on greenhouse flats wrapped in damp fabric.

All tools should be removed from the site after implementation, except those needed for monitoring purposes.

APPENDIX D (Continued)

2.5 Monitoring

A monitoring schedule will be developed as part of the project design process (see Section 2.3). Monitoring should occur with the highest frequency during and immediately after implementation. These surveys should include the same metrics and descriptions as the baseline evaluation.

Long-term monitoring should include an annual Biological Inspection, and more detailed quantitative and qualitative surveys every 5 years. The Biological Inspection will consist of one or more walk-through surveys that note:

- Hydrology;
- Vegetation composition;
- Presence and location of invasive species;
- Wildlife presence; and
- Condition of habitat features, including changes and/or pending needs.

Surveys should include photo documentation where useful. Summary reports of monitoring results should be submitted to the Implementing Agency by the end of each monitoring year.

The Monitoring Biologist (MB) is responsible for all near- and long-term monitoring of the re-establishment or establishment site. Ideally, the same MB will perform both the baseline evaluation (detailed in Section 2.2) and project monitoring for the duration of the monitoring period. However, a change of the MB can be made in consultation with the Implementing Agency, and with the Implementing Entity's approval at the time of change. The exiting MB will give a tour and introduction of the site to the entering MB.

Duties of the MB include, but are not limited to:

- Monitoring site function, hydrology, and erosion control;
- Monitoring water quality;
- An annual Biological Inspection of the site; collecting data and preparing reports based on this Inspection;
- Monitoring presence, vigor, location, and density of vegetation and biota;
- Evaluating the accumulation of thatch and recommending removal, when necessary;
- Evaluating the presence of newly introduced, non-native, or exotic plant species, and recommending removal, when necessary;

APPENDIX D (Continued)

- Recommending allowable activities on the site, e.g. educational activities, tours, grazing, etc.; and
- Recommending remedial or corrective actions, to be implemented by the Implementing Entity.

2.6 Management

The Implementing Entity is responsible for the near- and long-term management and maintenance of the restoration or establishment site. Long-term management is necessary to ensure that the restoration or establishment project is viable as a wetland or other water habitat in perpetuity. The Implementing Entity's management duties will include, but not be limited to:

- Maintaining fencing and signage;
- Coordinating trash removal;
- Removing thatch and dead vegetative matter to reduce fire hazard;
- Removing and/or managing exotic and invasive plant species, when necessary;
- Coordinating grazing schedules, when applicable;
- Coordinating the annual Biological Inspection by the MB;
- Reviewing monitoring data and performing general inspections; and
- Implementing remedial or corrective action when necessary.

The Implementing Entity will coordinate with the MB to determine when and where remedial or corrective action is necessary and feasible.

APPENDIX D (Continued)

INTENTIONALLY LEFT BLANK

APPENDIX D (Continued)

3 LITERATURE CITED

EPA (Environmental Protection Agency), 2000. *Principles for the Ecological Restoration of Aquatic Resources.* EPA841-F-00-003. Washington D.C.: Office of Water (4501F), EPA. http://www.epa.gov/owow/wetlands/restore/.

NRC (National Research Council). 2001. *Compensating for Wetland Losses under the Clean Water Act*. Washington D.C.: National Academy of Sciences.

NRC. 2005. *Wetlands: Characteristics and Boundaries*. Washington D.C.: National Academy of Sciences.

USACE and US EPA (U.S. Army Corps of Engineers and US Environmental Protection Agency). 2008. 33 CFR Parts 325 and 332 and 40 CFR Part 230 Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. April 10, 2008.

USACE. 2015. *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines.* USACE, South Pacific Division.

APPENDIX D (Continued)

INTENTIONALLY LEFT BLANK

SSHCP South Sacramento Habitat Conservation Plan

FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN







VOLUME I

County Control Number: 2003-0637

State Clearinghouse Number: 2008062030

U.S. Fish and Wildlife Service

Sacramento Fish and Wildlife Office

2800 Cottage Way
Sacramento, CA 95825

County of Sacramento

Planning and Environmental Review Division

827 7th Street, Room 225
Sacramento, CA 95814

February 2018

Lead Agencies
Sacramento County
United States Fish and Wildlife Service

Responsible Agencies
California Department of Fish & Wildlife
City of Galt
City of Rancho Cordova
Sacramento County Water Agency
Capital SouthEast Connector Joint Powers Authority
Central Valley Regional Water Quality Control Board

Cooperating Agencies
US Army Corps of Engineers
US Environmental Protection Agency
California Department of Fish & Wildlife

Final Environmental Impact Statement and Environmental Impact Report for the South Sacramento Habitat Conservation Plan

February 2018

Abstract

This document evaluates the environmental consequences of approving incidental take permits under the federal and state Endangered Species Acts and implementing new urban development and associated infrastructure projects within southern Sacramento County, California, pursuant to a proposed Habitat Conservation Plan. Net benefits to most biological resources and aquatic resources are expected, compared to conventional project-by-project authorization processes. The proposed project and other action-alternatives would have minor impacts to other resources, none of which are significant.

For further information and to submit comments, contact:

Jan C. Knight
Deputy Field Supervisor
U.S. Fish and Wildlife Service
Sacramento Field Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825
(916) 414-6700

Marianne Biner
Senior Planner
County of Sacramento
Office of Planning and Environmental Review
827 7th Street, Room 225
Sacramento, CA 95814
(916) 874-7520
sshcp@saccounty.net

FINAL

Environmental Impact Statement/Environmental Impact Report

for the

South Sacramento Habitat Conservation Plan

Prepared by:

United States Fish and Wildlife Service

Sacramento Fish and Wildlife Office

Conservation Planning Division

and

Sacramento County

Department of Community Development,

Planning and Environmental Review

Prepared with Assistance by:

DUDEK *and* ASCENT ENVIRONMENTAL

FEBRUARY 2018

Suggested Citation:

USFWS (United States Fish and Wildlife Service) and Sacramento County. 2018. *Final Environmental Impact Statement/Environmental Impact Report for the South Sacramento Habitat Conservation Plan*. Available from: County of Sacramento Office of Planning and Environmental Review. Sacramento, California. February 2018.

TABLE OF CONTENTS

Section **Page No.**

ACRONYMS AND ABBREVIATIONS ACR-1

SSHCP EIS/EIR EXECUTIVE SUMMARY ES-1

ES.1 Introduction ES-1
ES.2 EIS/EIR Planning Area ES-2
ES.3 Alternatives Considered and Alternatives Evaluated ES-5
ES.4 Known Issues or Controversy ES-8
ES.5 Summary of Environmental Consequences ES-9

CHAPTER 1 INTRODUCTION/PURPOSE AND NEED 1-1

1.1 SSHCP Overview 1-2
1.1.1 Geographic Scope of the EIS/EIR Planning Area 1-4
1.2 Overview of NEPA and CEQA 1-5
1.2.1 NEPA 1-5
1.2.2 CEQA 1-6
1.2.3 Joint Documentation 1-9
1.3 Purpose, Need, and Objectives 1-9
1.3.1 Background Information 1-10
1.3.2 Purpose and Need Statement 1-18
1.3.3 Objectives 1-18
1.4 EIS/EIR Scope and Content 1-20
1.4.1 Summary of EIS/EIR Scoping Process 1-20
1.4.2 Significant Issues Identified in Public Scoping 1-23
1.5 Decisions to be Made 1-24
1.5.1 U.S. Fish and Wildlife Service 1-24
1.5.2 Sacramento County 1-26
1.5.3 Other Permit Applicants 1-27
1.5.4 U.S. Army Corps of Engineers 1-28
1.5.5 U.S. Environmental Protection Agency 1-31
1.5.6 California Department of Fish and Wildlife 1-33
1.5.7 Central Valley Regional Water Quality Control Board 1-34
1.6 Future Uses of the Final EIS/EIR Document 1-36
1.6.1 U.S. Army Corps of Engineers Future Uses of the EIS/EIR 1-37
1.6.2 Regional Water Quality Control Board future uses of the EIS/EIR 1-38
1.6.3 California Department of Fish and Wildlife Future Uses 1-39
1.6.4 The SSHCP Permit Applicants (Future SSHCP Permittees) Future Uses of the EIS/EIR 1-40
1.6.5 Third-Party Project Proponent Future Uses of the Final EIS/EIR 1-41

1.7 References Cited 1-44

CHAPTER 2 ALTERNATIVES, INCLUDING THE PROPOSED ACTION/PROPOSED PROJECT 2-1

2.1 Approach to Developing Alternatives 2-1
2.1.1 Regulatory Framework for Developing Alternatives 2-1
2.1.2 How the SSHCP Development Process Has Considered Alternatives 2-4
2.1.3 Alternatives Considered 2-9
2.1.4 Alternative Formulation and Screening 2-10
2.1.5 Alternatives Considered and Not Carried Forward for Detailed Analysis 2-13
2.1.6 Alternatives Carried Forward for Detailed Analysis 2-20
2.2 No Action/No Project Alternative 2-23
2.2.1 Future Projects/Activities Likely Under the No Action/ No Project Alternative 2-23
2.2.2 Expected Regulatory Environment Under the No Action/ No Project Alternative 2-25
2.2.3 Loss of Natural Lands Under the No Action/No Project Alternative 2-35
2.2.4 Preservation of Natural Lands Under the No Action/ No Project Alternative 2-39
2.2.5 Preserve Management and Monitoring Under the No Action/ No Project Alternative 2-41
2.3 Proposed Action/Proposed Project 2-41
2.3.1 Expected Regulatory Environment Under the Proposed Action/ Proposed Project 2-42
2.3.2 Permit Term Under the Proposed Action/Proposed Project Alternative 2-47
2.3.3 Covered Activities and Loss of Natural Land Covers Under the Proposed Action/Proposed Project Alternative 2-48
2.3.4 Covered Species Under the Proposed Action/Proposed Project Alternative 2-55
2.3.5 Conservation Strategy under the Proposed Action/Proposed Project Alternative 2-57
2.3.6 SSHCP Preserve Management and Monitoring Programs 2-124
2.3.7 SSHCP and ARP Implementation 2-125
2.4 Reduced Permit Term Alternative 2-126
2.4.1 Expected Regulatory Environment under the Reduced Permit Term Alternative 2-127
2.4.2 Permit Term Under the Reduced Permit Term Alternative 2-132
2.4.3 Covered Activities/Projects Under the Reduced Permit Term Alternative 2-132

2.4.4 Covered Species Under the Reduced Permit Term Alternative 2-133
2.4.5 Conservation Strategy Under the Reduced Permit Term Alternative 2-134
2.4.6 Preserve Management and Monitoring Programs under the Reduced Permit Term Alternative 2-141
2.4.7 HCP Implementation 2-142
2.5 References Cited 2-142

CHAPTER 3 INTRODUCTION TO CHAPTERS 4 THROUGH 17 3-1
3.1 NEPA and CEQA Terms 3-1
3.2 Resource Topics Evaluated in the Remaining Chapters 3-2
3.3 Format and Content of Chapters 4 through 16 3-4
3.4 Previous Planning Area Environmental Reviews 3-5
3.4.1 Sacramento County General Plan 3-6
3.4.2 Galt General Plan 3-7
3.4.3 Rancho Cordova General Plan 3-8
3.4.4 Sacramento Area Council of Governments Metropolitan Transportation Plan and Sustainable Communities Strategy 3-9
3.4.5 Capital Southeast Connector 3-9
3.5 Contents of the Affected Environment/ Environmental Setting Sections of Chapters 4 through 16 3-10
3.6 Contents of Environmental Consequences/Environmental Impact Sections in Chapters 4 through 16 3-11
3.6.1 EIS/EIR Environmental Baseline 3-12
3.6.2 Geographic Study Area of Resource Topics Analyzed in Chapters 4 through 16 3-14
3.6.3 EIS/EIR Study Period 3-15
3.6.4 Addressing Incomplete or Unavailable Information in Chapters 4 through 16 3-15
3.6.5 GIS Methodology Used in Chapters 4 through 16 to Estimate Direct Impacts of Each EIS/EIR Alternative 3-16
3.6.6 Methodology Used in Chapters 4–16 to Estimate Indirect Impacts of EIS/EIR Alternatives 3-18
3.6.7 Specific Assumptions Used in the Environmental Impact Analysis of Each EIS/EIR Alternative 3-23
3.7 Cumulative Effects Analysis in Resource Chapters 4 through 16 3-25
3.7.1 Past and Present Actions in the Planning Area 3-27
3.7.2 Reasonably Foreseeable Other Actions 3-33
3.8 Significance of Impacts That Are Presented in Chapters 4 through 16 3-38
3.8.1 Significance Thresholds 3-38

3.8.2 Impact Findings and Mitigation of Significant Impacts 3-39
3.9 References Cited 3-41

CHAPTER 4 LAND USE 4-1
4.1 Affected Environment/Environmental Setting 4-1
4.1.1 Regulatory Framework 4-1
4.1.2 Existing Conditions 4-15
4.2 Environmental Consequences/ Environmental Impacts 4-36
4.2.1 Methodology for Assessing Impacts of Each Alternative on Land Use 4-36
4.2.2 No Action/No Project Alternative 4-39
4.2.3 Proposed Action/Proposed Project 4-45
4.2.4 Reduced Permit Term Alternative 4-53
4.3 References Cited 4-56

CHAPTER 5 SOILS, GEOLOGY, AND MINERAL RESOURCES 5-1
5.1 Affected Environment/Environmental Setting 5-1
5.1.1 Regulatory Framework 5-1
5.1.2 Planning Area Geologic Environment Existing Conditions 5-9
5.2 Environmental Consequences/ Environmental Impacts 5-37
5.2.1 Methodology for Assessing Impacts of Each Alternative on Soils, Geology, and Mineral Resources 5-37
5.2.2 No Action/No Project Alternative 5-41
5.2.3 Proposed Action/Proposed Project Alternative 5-47
5.2.4 Reduced Permit Term Alternative 5-52
5.3 References Cited 5-58

CHAPTER 6 AGRICULTURE 6-1
6.1 Affected Environment/Environmental Setting 6-1
6.1.1 Regulatory Framework 6-1
6.1.2 Planning Area Agricultural Resources and Activities 6-9
6.2 Environmental Consequences/ Environmental Impacts 6-14
6.2.1 Methodology for Assessing Impacts of Each Alternative on Agricultural Resources 6-14
6.2.2 No Action/No Project Alternative 6-16
6.2.3 Proposed Action/Proposed Project Alternative 6-22
6.2.4 Reduced Permit Term Alternative 6-27
6.3 References Cited 6-32

CHAPTER 7 HYDROLOGY AND WATER QUALITY 7-1
7.1 Affected Environment/Environmental Setting 7-1
7.1.1 Regulatory Framework 7-1

7.1.2 Existing Conditions 7-22
7.2 Environmental Consequences/ Environmental Impacts 7-43
7.2.1 Methodology for Assessing Impacts of Each Alternative on Hydrology and Water Quality 7-43
7.2.2 No Action/No Project Alternative 7-47
7.2.3 Proposed Action/Proposed Project Alternative 7-63
7.2.4 Reduced Permit Term Alternative 7-73
7.3 References Cited 7-83

CHAPTER 8 NATURAL LAND COVER HABITATS AND ASSOCIATED PLANT AND ANIMAL COMMUNITIES 8-1
8.1 Affected Environment/Environmental Setting 8-1
8.1.1 Regulatory Framework 8-1
8.1.2 Existing Conditions 8-13
8.2 Environmental Consequences/ Environmental Impacts 8-36
8.2.1 Methodology for Assessing Impacts of Each Alternative on Natural Land Covers and Natural Communities 8-36
8.2.2 No Action/No Project Alternative 8-40
8.2.3 Proposed Action/Proposed Project Alternative 8-64
8.2.4 Reduced Permit Term Alternative 8-96
8.3 References Cited 8-128

CHAPTER 9 SPECIAL-STATUS SPECIES INCLUDING HCP COVERED SPECIES 9-1
9.1 Environmental Setting/Affected Environment 9-1
9.1.1 Regulatory Framework 9-1
9.1.2 Existing Condition of the Special-Status Species and Their Habitats 9-9
9.2 Environmental Consequences/ Environmental Impacts 9-15
9.2.1 Methodology for Assessing Impacts of Each Alternative on Special-Status Species, Including SSHCP Covered Species 9-15
9.2.2 No Action/No Project Alternative 9-21
9.2.3 Proposed Action/Proposed Project Alternative 9-94
9.2.4 Reduced Permit Term Alternative 9-176
9.3 References Cited 9-253

CHAPTER 10 AQUATIC RESOURCES 10-1
10.1 Affected Environment/Environmental Setting 10-1
10.1.1 Regulatory Framework 10-1
10.1.2 Existing Conditions of Aquatic Resources 10-9
10.2 Environmental Consequences/ Environmental Impacts 10-35
10.2.1 Methodology for Assessing Impacts of Each Alternative on Aquatic Resources 10-35

10.2.2 No Action/No Project Alternative 10-39
10.2.3 Proposed Action/Proposed Project Alternative 10-48
10.2.4 Reduced Permit Term Alternative 10-59
10.3 References Cited 10-69

CHAPTER 11 PALEONTOLOGICAL, CULTURAL, AND HISTORICAL RESOURCES 11-1
11.1 Affected Environment/Environmental Setting 11-1
11.1.1 Regulatory Framework 11-1
11.1.2 Existing Conditions of Paleontological, Cultural, and Historical Resources 11-16
11.2 Environmental Consequences/ Environmental Impacts 11-26
11.2.1 Methodology for Assessing Impacts of Each Alternative on Paleontological, Cultural, and Historical Resources 11-26
11.2.2 No Action/No Project Alternative 11-29
11.2.3 Proposed Action/Proposed Project Alternative 11-36
11.2.4 Reduced Permit Term Alternative 11-40
11.3 References Cited 11-43

CHAPTER 12 PUBLIC SERVICES AND FACILITIES 12-1
12.1 Affected Environment/Environmental Setting 12-1
12.1.1 Regulatory Framework 12-1
12.1.2 Planning Area Public Services and Facilities 12-17
12.2 Environmental Consequences/ Environmental Impacts 12-28
12.2.1 Methodology for Assessing Impacts of Each Alternative on Public Services and Facilities 12-28
12.2.2 No Action/No Project Alternative 12-32
12.2.3 Proposed Action/Proposed Project Alternative 12-48
12.2.4 Reduced Permit Term Alternative 12-64
12.3 References Cited 12-76

CHAPTER 13 TRAFFIC AND CIRCULATION 13-1
13.1 Affected Environment/Environmental Setting 13-1
13.1.1 Regulatory Framework 13-1
13.1.2 Existing Traffic and Circulation 13-7
13.2 Environmental Consequences/ Environmental Impacts 13-15
13.2.1 Methodology for Assessing Effects of Each Alternative on Traffic and Circulation 13-15
13.2.2 No Action/No Project Alternative 13-17
13.2.3 Proposed Action/Proposed Project Alternative 13-22
13.2.4 Reduced Permit Term Alternative 13-25
13.3 References Cited 13-28

CHAPTER 14 AIR QUALITY 14-1
14.1 Affected Environment/Environmental Setting 14-1
14.1.1 Regulatory Framework 14-1
14.1.2 Planning Area Air Quality Conditions 14-7
14.2 Environmental Consequences/ Environmental Impacts 14-13
14.2.1 Methodology for Assessing Impacts of Each Alternative on Air Quality 14-13
14.2.2 No Action/No Project Alternative 14-17
14.2.3 Proposed Action/Proposed Project Alternative 14-26
14.2.4 Reduced Permit Term Alternative 14-32
14.3 References Cited 14-39

CHAPTER 15 GREENHOUSE GASES AND CLIMATE CHANGE 15-1
15.1 Affected Environment/Environmental Setting 15-1
15.1.1 Regulatory Framework 15-1
15.1.2 Greenhouse Gas Emissions and Consequences of Climate Change in the Planning Area 15-7
15.1.3 Attributing Climate Change—Greenhouse Gas Emission Sources 15-9
15.1.4 Effects of Climate Change on the Environment 15-9
15.2 Environmental Consequences/ Environmental Impacts 15-12
15.2.1 Methodology for Assessing Impacts of Each Alternative on Greenhouse Gases and Climate Change 15-12
15.2.2 No Action/No Project Alternative 15-14
15.2.3 Proposed Action/Proposed Project Alternative 15-20
15.2.4 Reduced Permit Term Alternative 15-24
15.3 References Cited 15-29

CHAPTER 16 POPULATION AND HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE 16-1
16.1 Affected Environment/Environmental Setting 16-1
16.1.1 Regulatory Framework 16-1
16.1.2 Population and Socioeconomic Conditions in the Planning Area 16-6
16.2 Environmental Consequences/ Environmental Impacts 16-16
16.2.1 Methodology for Assessing Impacts of Each Alternative on Population and Housing, Socioeconomics, and Environmental Justice 16-16
16.2.2 No Action/No Project Alternative 16-18
16.2.3 Proposed Action/Proposed Project 16-24
16.2.4 Reduced Permit Term 16-26
16.3 References Cited 16-29

CHAPTER 17 OTHER REQUIRED ANALYSES FOR CEQA AND NEPA 17-1
17.1 Significant Effects That Cannot Be Avoided (CEQA and NEPA) 17-1
17.2 Potentially Significant Effects Which Could Be Avoided (CEQA) 17-1
17.3 Effects Found Not to Be Significant (CEQA) 17-2
17.4 Relationship Between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity (NEPA) 17-2
17.5 Irreversible and Irretrievable Commitments of Resources (NEPA)/ Significant Irreversible Environmental Changes (CEQA) 17-4
17.6 Growth Inducement and Related Effects (CEQA) 17-6
17.7 Environmentally Preferable Alternative (NEPA) and Environmentally Superior Alternative (CEQA) 17-6
17.8 Consistency with Executive Orders 17-8
17.8.1 Executive Order 11988 – Floodplain Management 17-8
17.8.2 Executive Order 11190 – Protection of Wetlands 17-8
17.8.3 Executive Order 12898 – Environmental Justice 17-9
17.9 References Cited 17-9

CHAPTER 18 LIST OF PREPARERS 18-1

CHAPTER 19 SUMMARY OF COMMENTS RECEIVED AND RESPONSES TO COMMENTS ON THE DRAFT DOCUMENTS 19-1

APPENDICES

A Summary of Cumulative Impacts to Waters of the United States in the Planning Area
A-1 Transmittal Letter from USACE
A-2 USACE Memorandum on Cumulative Impacts in the SSHCP Plan Area (9/4/2014)
A-3 Higher-Resolution Dataset; Projects from 1999 to 2013
A-4 Lower-Resolution Dataset; Projects from Beginning of Records to 1998
B Summary of Process to Determine the Scope of the EIS/EIR (Scoping)
C Draft Multi-Layered CWA 404 Permit Strategy for future SSHCP Covered Activities
C-1 Draft CWA 404 Permit Strategy
C-2 Draft Programmatic General Permit
C-3 Draft Letter of Permission Procedure
D Impact Avoidance and Minimization Measures (AMMs)
E Alternative Formulation and Screening
F CEQA Environmental Checklist Form
G Supporting Information for the Biological Resources Analyzed in Chapters 8 and 9
G-1 Environmental Stressors from Urban Development Projects and Activities
G-2 Selection of Special-Status Species to be Analyzed in this EIS/EIR
G-3 Species Accounts for Proposed Covered Species

G-4 Covered Species Habitat Models
H Modeling Data and Assumptions for Air Quality and Greenhouse Gas Analyses
I Draft SSHCP Aquatic Resources Program
J Draft Aquatic Resources Protection Ordinance

FIGURES

ES-1 SSHCP EIS/EIR Planning Area ES-3
1-1 South Sacramento Habitat Conservation Plan Area 1-7
1-2 Existing Preserves 1-15
2-1 Preserve Planning Units 2-21
2-2 Proposed Action/Proposed Project HCP Preserve System 2-119
2-3 Reduced Permit Term Alternative HCP Preserves 2-137
4-1 Jurisdictional Boundaries 4-3
4-2 Existing Land Use Designations 4-17
4-3 Mather Airport Wildlife Hazard Conditions 4-19
4-4 Franklin Field Wildlife Hazard Conditions 4-21
4-5 Sacramento Executive Airport Wildlife Hazard Conditions 4-23
4-6 Rancho Murieta Airport Wildlife Hazard Conditions 4-25
4-7 Eagle's Nest Airport Wildlife Hazard Conditions 4-27
5-1 Geographic Landforms 5-11
5-2 Geologic Formations 5-15
5-3 Key Soil Series 5-17
5-4 Naturally Occurring Asbestos 5-31
5-5 MRZ-2 Designated Significant Mineral Deposits in the Planning Area 5-35
6-1 Important Farmlands within Study Area 6-11
6-2 Williamson Act Lands 6-17
7-1 Groundwater Subbasin Boundaries in the Water Forum Agreement 7-9
7-2 Groundwater Contamination Locations and Plumes in the Planning Area 7-27
7-3 Sacramento County Rivers and Streams and HUC 10 Watersheds Located in the Planning Area 7-31
7-4 100-year Floodplain Areas – Sacramento County 7-35
8-1 Existing Distribution of Each Land Cover Within the Planning Area 8-15
8-2 Essential Connectivity Areas 8-33
10-1 Aquatic Resources in the Planning Area 10-13
10-2 HUC 10 Watersheds in the Planning Area 10-23
11-1 Cultural Resource Sensitivity in Sacramento County 11-21
12-1 Existing Public Recreation Sites 12-23
12-2 Planned Trails within the MCRA 12-57

13-1 Transportation System 13-3
13-2 Existing Roadways within Unincorporated Sacramento County 13-9
13-3 Existing Roadways within Galt 13-11
13-4 Existing Roadways within Rancho Cordova 13-13
13-5 Proposed Roadway Crossings through Expected Future Preserves 13-19
16-1 Census Tracts in the Planning Area and Identification of Minority and Low-Income Populations 16-7

TABLES

ES-1 Summary of Impacts and Mitigation ES-11
ES-2 Summary of Impacts to Special-Status Species, Including Covered Species ES-28
2-1 Maximum Losses of Natural Land Categories Under the No Action/ No Project Alternative 2-38
2-2 Minimum Acres of New Preserves Under the No Action/No Project Alternative 2-39
2-3 Covered Activities Included in Each Action Alternative Studied in the EIS/EIR 2-50
2-4 Maximum Direct Impacts (Loss) of Natural Lands Under the Proposed Action/ Proposed Project Alternative 2-54
2-5 Planning Area Special-Status Species Included as Covered Species 2-55
2-6 Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative 2-60
2-7 Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy 2-77
2-8 Minimum Preservation of Natural Land Categories Under the Proposed Action/ Proposed Project Alternative 2-116
2-9 Local Planning Documents and Time Horizons Relevant to the Permit Term 2-127
2-10 Maximum Loss of Natural Land Categories Under the Reduced Permit Term Alternative 2-133
2-11 Minimum Acres of New Preserves Under the Reduced Permit Term Alternative 2-141
3-1 Similar NEPA and CEQA Terms 3-1
4-1 Acreage of Sacramento County, Galt, and Rancho Cordova within the EIS/EIR Planning Area 4-15
4-2 Existing Land Use Designations within the Planning Area 4-30
4-3 Changes to Existing Land Use Designations under the No Action/No Project Alternative 4-39
4-4 Changes to Existing Land Use Designations under the Proposed Action/ Proposed Project Alternative 4-46
4-5 Changes in Existing Land Use Designation under the Reduced Permit Term Alternative 4-53
6-1 Important Farmland Mapping Categories 6-2

6-2 Important Farmland within the Planning Area 6-10
6-3 Impacts on Important Farmland Expected Under the No Action/No Project Alternative 6-16
6-4 Impacts on Important Farmland Expected Under the Proposed Action/ Proposed Project Alternative 6-23
6-5 Impacts on Important Farmland due to Covered Activities under the Reduced Permit Term Alternative 6-28
7-1 Watersheds and Sub-Watersheds of the Planning Area 7-33
7-2 2010 CWA Section 303(d) Pollutants and Sources for the Planning Area 7-38
8-1a Total Acres of Each Land Cover Within the Planning Area 8-17
8-1b Acres of Each Natural Land Cover Already Preserved Within the Planning Area 8-18
8-2 Existing Vernal-Pool Ecosystem Land Covers in the Planning Area 8-30
8-3 Acres of Essential Connectivity Areas (ECAs) Within the Planning Area 8-32
8-4 Acres of Direct Impacts to Each Natural Land Cover Under the No Action/ No Project Alternative 8-41
8-5 Expected Mitigation for Natural Land Cover Impacts Under the No Action/ No Project Alternative 8-43
8-6 Direct and Indirect Effects on the Vernal Pool Ecosystem Land Covers Expected Under the No Action/No Project Alternative 8-46
8-7 Estimated Amounts of Vernal Pool Ecosystem Mitigation Implemented Under the No Action/No Project Alternative 8-46
8-8 Expected Direct Impacts to Natural Land Covers – Proposed Action/Proposed Project Alternative 8-66
8-9 Natural Land Cover Mitigation under the Proposed Action/ Proposed Project Alternative 8-67
8-10 Direct and Indirect Effects on the Vernal Pool Ecosystem under the Proposed Action/Proposed Project Alternative 8-68
8-11 Expected Mitigation for Vernal Pool Ecosystem impacts Under the Proposed Action/Proposed Project Alternative 8-70
8-12 Expected Direct Impacts to Natural Land Covers – Reduced Permit Term Alternative 8-99
8-13 Natural Land Cover Mitigation under the Reduced Permit Term Alternative 8-100
8-14 Direct and Indirect Effects on the Vernal Pool Ecosystem – Reduced Permit Term Alternative 8-101
8-15 Expected Mitigation for Vernal Pool Ecosystem Impacts Under the Reduced Permit Term Alternative 8-103
9-1 South Sacramento Habitat Conservation Plan Covered Species 9-10
9-2 Other Special-Status Plant Species Analyzed in Chapter 9 9-12
9-3 Other Special-Status Wildlife Species Analyzed in Chapter 9 9-14
9-4 Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat under the No Action/No Project Alternative 9-27

9-5 Effects and Modeled Habitat Conservation for Valley Elderberry Longhorn Beetle under the No Action/No Project Alternative 9-30
9-6 Direct Effects and Modeled Habitat Conservation for California Tiger Salamander under the No Action/No Project Alternative 9-33
9-7 Direct Effects and Preservation of Western Spadefoot Modeled Habitat Under the No Action/No Project Alternative 9-37
9-8 Direct Effects and Conservation of Giant Garter Snake Modeled Habitat Under the No Action/No Project Alternative 9-41
9-9 Direct Effects and of Modeled Habitat for Western Pond Turtle Under the No Action/No Project Alternative 9-44
9-10 Direct Effects and Conservation of Cooper's Hawk Modeled Habitat under the No Action/No Project Alternative 9-48
9-11 Direct Effects and Conservation of Tricolored Blackbird Modeled Habitat Under the No Action/No Project Alternative 9-51
9-12 Direct Loss and Conservation of Western Burrowing Owl Modeled Habitat under the No Action/No Project Alternative 9-54
9-13 Direct Effects and Preservation of Ferruginous Hawk Modeled Habitat Under the No Action/No Project Alternative 9-57
9-14 Direct Effects and Conservation of Swainson's Hawk Modeled Habitat under the No Action/No Project Alternative 9-60
9-15 Direct Effects and Conservation for Northern Harrier Modeled Habitat Under the No Action/No Project Alternative 9-63
9-16 Direct Effects and Conservation of White-Tailed Kite Modeled Habitat Under the No Action/No Project Alternative 9-66
9-17 Direct Effects and of Modeled Habitat for Greater Sandhill Crane Under the No Action/No Project Alternative 9-70
9-18 Direct Effects and Conservation of Modeled Habitat for Loggerhead Shrike Under the No Action/No Project Alternative 9-74
9-19 Direct Effects and Conservation of Modeled Habitat for Western Red Bat Under the No Action/No Project Alternative 9-82
9-20 Direct Effects and Conservation of Modeled Habitat for American Badger Under the No Action/No Project Alternative 9-85
9-21 Direct Effects and Modeled Habitat Conservation for Sanford's Arrowhead Under the No Action/No Project Alternative 9-87
9-22 Total Loss of Potentially Suitable Habitat for Other Special-status Plants Under the No Action/No Project Alternative 9-91
9-23 Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat under the Proposed Action/Proposed Project Alternative 9-100

9-24 Direct Effects and Modeled Habitat Conservation for Valley Elderberry Longhorn Beetle Under the Proposed Action/Proposed Project Alternative 9-104
9-25 Direct Effects and Conservation of California Tiger Salamander Modeled Habitat Under the Proposed Action/Proposed Project Alternative 9-108
9-26 Direct Effects and Modeled Habitat Conservation for Western Spadefoot Under the Proposed Action/Proposed Project Alternative 9-112
9-27 Direct Effects and Modeled Habitat Conservation for Giant Garter Snake Under the Proposed Action/Proposed Project Alternative 9-115
9-28 Direct Effects and Modeled Habitat Conservation for Western Pond Turtle Under the Proposed Action/Proposed Project Alternative 9-119
9-29 Direct Effects and Modeled Habitat Conservation for Cooper's Hawk Under the Proposed Action/Proposed Project Alternative 9-122
9-30 Effects and Modeled Habitat Conservation for Tricolored Blackbird Under the Proposed Action/Proposed Project Alternative 9-126
9-31 Direct Effects and Modeled Habitat Conservation for Western Burrowing Owl Under the Proposed Action/Proposed Project Alternative 9-129
9-32 Direct Effects and Modeled Habitat Conservation for Ferruginous Hawk Under the Proposed Action/Proposed Project Alternative 9-132
9-33 Direct Effects and Modeled Habitat Conservation for Swainson's Hawk Under the Proposed Action/Proposed Project Alternative 9-136
9-34 Direct Effects and Modeled Habitat Conservation for Northern Harrier Under the Proposed Action/Proposed Project Alternative 9-139
9-35 Direct Effects and Modeled Habitat Conservation for White-Tailed Kite Under the Proposed Action/Proposed Project Alternative 9-142
9-36 Direct Effects and Modeled Habitat Conservation for Greater Sandhill Crane Under the Proposed Action/Proposed Project Alternative 9-146
9-37 Direct Effects and Modeled Habitat Conservation for Loggerhead Shrike Under the Proposed Action/Proposed Project Alternative 9-151
9-38 Direct Effects and Modeled Habitat Conservation for Western Red Bat Under the Proposed Action/Proposed Project Alternative 9-162
9-39 Direct Effects and Modeled Habitat Conservation for American Badger Under the Proposed Action/Proposed Project Alternative 9-165
9-40 Direct Effects and Modeled Habitat Conservation for Sanford's Arrowhead Under the Proposed Action/Proposed Project Alternative 9-168
9-41 Total Loss of Potentially Suitable Habitat for Other Special-Status Plants Under the Proposed Action/Proposed Project Alternative 9-172
9-42 Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat Under the Reduced Permit Term Alternative. 9-183

9-43 Effects and Modeled Habitat Conservation for Valley Elderberry Longhorn Beetle Under the Reduced Permit Term Alternative 9-187
9-44 Direct Effects and Modeled Habitat Conservation for California Tiger Salamander Under the Reduced Permit Term Alternative 9-190
9-45 Direct Effects and Modeled Habitat Conservation for Western Spadefoot Under the Reduced Permit Term Alternative 9-194
9-46 Direct Effects and Modeled Habitat Conservation for Giant Garter Snake Under the Reduced Permit Term Alternative 9-197
9-47 Direct Effects and Modeled Habitat Conservation for Western Pond Turtle Under the Reduced Permit Term Alternative 9-200
9-48 Direct Effects and Modeled Habitat Conservation for Cooper's Hawk Under the Reduced Permit Term Alternative 9-203
9-49 Direct Effects and Modeled Habitat Conservation for Tricolored Blackbird Under the Reduced Permit Term Alternative 9-206
9-50 Direct Effects and Modeled Habitat Conservation for Western Burrowing Owl Under the Reduced Permit Term Alternative 9-209
9-51 Direct Effects and Modeled Habitat Conservation for Ferruginous Hawk Under the Reduced Permit Term Alternative 9-212
9-52 Direct Effects and Modeled Habitat Conservation for Swainson's Hawk Under the Reduced Permit Term Alternative 9-215
9-53 Direct Effects and Modeled Habitat Conservation for Northern Harrier Under the Reduced Permit Term Alternative 9-218
9-54 Direct Effects and Modeled Habitat Conservation for White-Tailed Kite Under the Reduced Permit Term Alternative 9-221
9-55 Direct Effects and Modeled Habitat Conservation for Greater Sandhill Crane Under the Reduced Permit Term Alternative 9-224
9-56 Direct Effects and Modeled Habitat Conservation for Loggerhead Shrike Under the Reduced Permit Term Alternative 9-229
9-57 Direct Effects and Modeled Habitat Conservation for Western Red Bat Under the Reduced Permit Term Alternative 9-240
9-58 Direct Effects and Modeled Habitat Conservation for American Badger Under the Reduced Permit Term Alternative 9-243
9-59 Direct Effects and Modeled Habitat Conservation for Sanford's Arrowhead Under the Reduced Permit Term Alternative 9-246
9-60 Direct Effects for Special-Status Plant Species Not Covered by the SSHCP Under the Reduced Permit Term Alternative 9-250
10-1 Aquatic Land Covers within the Planning Area 10-10
10-2 Aquatic Resources by Watershed within the Planning Area 10-21
10-3 Functional Analysis Of Aquatic Resources in the Planning Area 10-27

10-4 Estimated Direct Loss of Aquatic Resources Under the No Action/No Project Alternative 10-42
10-5 Estimated Acres of Aquatic Resources Preserved Under the No Action/No Project Alternative 10-45
10-6 Estimated Acres of Aquatic Resources Re-Established/Established Under the No Action/No Project Alternative 10-46
10-7 Estimated Loss of Aquatic Resources Under the Proposed Action/Proposed Project Alternative 10-51
10-8 Estimated Acres of Aquatic Resources Preserved Under the Proposed Action/ Proposed Project Alternative 10-54
10-9 Estimated Acres of Aquatic Resources Re-Established/Established Under the Proposed Action/Proposed Project Alternative 10-56
10-10 Estimated Loss of Aquatic Resources Under the Reduced Permit Term Alternative 10-62
10-11 Estimated Preservation of Aquatic Resources Under the Reduced Permit Term Alternative 10-63
10-12 Estimated Re-Establishment/Establishment of Aquatic Resources Under the Reduced Permit Term Alternative 10-67
11-1 Planning Area Historical Sites that are Currently Listed on the National Register of Historic Places or on the California Register of Historical Resources 11-24
11-2 Types of Cultural Resources Potentially Occurring in the Planning Area 11-25
12-1 Existing Regional Parks and Recreational Facilities 12-22
14-1 Ambient Air Quality Standards 14-3
14-2 Attainment Status Designations for the SVAB 14-12
14-3 Summary of Annual Sacramento Valley Air Basin Air Quality for Nonattainment Pollutants (2012–2014) 14-13
14-4 Federal *De Minimis* Levels 14-15
15-1 2005 Community GHG Emissions Inventory 15-9
16-1 Existing Populations of the Project Proponents and Inside the Planning Area 16-6
16-2 Race and Ethnicity Population Ratios for the Project Proponent Jurisdictions and Inside the Planning Area (2013) 16-11
16-3 2013 Race and Ethnicity Population Ratios by Planning Area Census Tract 16-11
16-4 Income and Poverty Conditions for the Project Proponents and in each Planning Area Census Tract (2013) 16-14
19-1 Comment Letters Numbered in Alphabetical Order 19-2

INTENTIONALLY LEFT BLANK

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
°C	degrees Celsius
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
2020 SRWTP Master Plan	Sacramento Regional Wastewater Treatment Plant Master Plan 2020
AB	Assembly Bill
ADA	Americans with Disabilities Act
AFY	acre-feet per year
AMM	Avoidance and Minimization Measure
amsl	above mean sea level
ARP	Aquatic Resources Program
ATCM	Airborne Toxic Control Measure
BDCP	Bay Delta Conservation Plan
BGOs	biological goals and objectives
BMP	best management practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Occupational Health and Safety Administration
CalEEMod	California Emissions Estimate Model
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDC	California Department of Conservation
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
Central Valley RWQCB	Central Valley Regional Water Quality Control Board
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH_4	methane
CHSRA	California High Speed Rail Authority
CLUP	Comprehensive Land Use Plan
CMP	Coordinated Monitoring Program
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide

Acronym/Abbreviation	Definition
CO_2e	carbon dioxide equivalent
Coalition	Sacramento Valley Water Quality Coalition
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CSD	Community Services District
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
Delta	Sacramento River–San Joaquin River Delta
DWR	California Department of Water Resources
EA	Environmental Assessment
ECM	Environmental Compliance Memorandum
EGCSD	Elk Grove Community Services District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	U.S./federal Endangered Species Act
FBO	fixed base operator
FCAM	Functional/Condition Assessment Method
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
Galt General Plan	*2030 Galt General Plan*
GHG	greenhouse gas
GIS	geographic information system
GPS	Global Positioning System
GVWR	gross vehicle weight rating
GWP	global warming potential
HCP	habitat conservation plan
HFC	hydrofluorocarbon
HMP	Hydromodification Management Plan
HSC	Health and Safety Code
HUC	Hydrologic Unit Code
I-	Interstate
IA	Implementation Agreement
ILF	in-lieu fee
ISS	Interceptor Sequencing Study
ITP	Incidental Take Permit
JPA	Joint Powers Authority
km	kilometers
LAFCO	Local Agency Formation Commission
LAU	Land Analysis Unit
LAWG	Local Agency Working Group

Acronym/Abbreviation	Definition
lb/day	pounds/day
LESA	Land Evaluation and Site Assessment
LID	low-impact development
LIDAR	Light Detection and Ranging
LOP	Letter of Permission
LSA	Lake and Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MCRA	Mather Core Recovery Area
mgd	million gallons per day
MMP	Monitoring and Management Program
MMT	million metric tons
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mpg	miles per gallon
MPO	metropolitan planning organization
MRZ	mineral resource zone
MSAA	Master Streambed Alteration Agreement
msl	mean sea level
MT	metric ton
MTP	Metropolitan Transportation Plan
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCCP	natural community conservation plan
NCIC	North Central Information Center
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide
NO_2	nitrogen dioxide
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
PAC	Public Advisory Committee
Pb	lead
PFC	perfluorocarbon
PG&E	Pacific Gas & Electric Company

Acronym/Abbreviation	Definition
PGP	Programmatic General Permit
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
PMP	Preserve Management Plan
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
ppb	parts per billion
ppm	parts per million
PPU	Preserve Planning Unit
RCRA	Resource Conservation and Recovery Act
Regional San	Sacramento Regional County Sanitation District
RFS	Renewable Fuel Standard
ROD	Record of Decision
ROG	reactive organic gas
RPS	Renewable Portfolio Standard
RPU	Reserve Planning Unit
RT	Regional Transit
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SACOG	Sacramento Area Council of Governments
Sacramento County General Plan	*Sacramento County 2030 General Plan*
SAFCA	Sacramento Area Flood Control Agency
SASD	Sacramento Area Sewer District
SB	Senate Bill
SCAS	Sacramento County Airport System
SCGA	Sacramento Central Groundwater Authority
SCS	Sustainable Communities Strategy
SCT/Link	South County Transit/Link
SCWA	Sacramento County Water Authority
SF_6	sulfur hexafluoride
SFNA	Sacramento Federal Nonattainment Area
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SMFD	Sacramento Metropolitan Fire District
SMUD	Sacramento Municipal Utilities District
SO_2	sulfur dioxide
SOI	sphere of influence
SP	Standard Permit
SQIP	Stormwater Quality Improvement Plan
SR	State Route
SRWTP	Sacramento Regional Wastewater Treatment Plant
SSHCP	South Sacramento Habitat Conservation Plan
SVAB	Sacramento Valley Air Basin

Acronym/Abbreviation	Definition
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TCM	Transportation Control Measure
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
UDA	Urban Development Area
UPA	Urban Policy Area
US 50	U.S. Route 50
USACE	U.S. Army Corps of Engineers
USB	Urban Service Boundary
USFWS	U.S. Fish and Wildlife Service
VMT	vehicle miles travelled
VPIH	vernal pool invertebrate habitat
VWADI	Vernal Wetted Acre Density Index
WDR	waste discharge requirement
WRCC	Western Regional Climate Center
WWTP	wastewater treatment plant

INTENTIONALLY LEFT BLANK

SSHCP EIS/EIR EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This document is the joint Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) for the proposed South Sacramento Habitat Conservation Plan (SSHCP), prepared pursuant to both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The U.S. Fish and Wildlife Service (USFWS) is the lead agency under NEPA and Sacramento County is the lead agency under CEQA for this joint SSHCP EIS and EIR (SSHCP EIS/EIR). Cooperating agencies are U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (USEPA), and California Department of Fish and Wildlife (CDFW).

The SSHCP EIS/EIR evaluates the potential environmental impacts from issuing federal and state endangered-species take permits, and the implementation of a long-term HCP in south Sacramento County. Five local government organizations in south Sacramento County—the Permit Applicants[1]—have applied for incidental take[2] permits (ITPs) from the USFWS under Section 10(a)(1)(B) of the federal Endangered Species Act (ESA) and from the CDFW under Section 2835 of the California Fish and Game Code.

The ITPs issued by the USFWS and CDFW would authorize incidental take of 28 native plant and animal species (Covered Species). Incidental take of these Covered Species would be authorized for defined categories of future activities (Covered Activities), including the planned urban development and associated transportation and infrastructure projects that are anticipated by the Permit Applicants within the Planning Area[3] (Figure ES-1) during the next 50 years. The issuance of ITPs would address and satisfy future regulatory compliance needs of the Plan Permittees and would result in the establishment of a relatively large and interconnected Preserve System in the Planning Area.

As a required component of these ITP applications, the Permit Applicants have prepared the SSHCP, which is an HCP under ESA Section 10. The SSHCP identifies where future projects and activities would likely impact listed species, natural communities, and aquatic resources, and presents a comprehensive regional strategy for the avoidance, minimization, and mitigation of

[1] The Permit Applicants are Sacramento County, Galt, Rancho Cordova, the Sacramento County Water Agency (SCWA), and the Capital Southeast Connector Joint Powers Authority (Connector JPA). Each of these Permit Applicants is a lead agency for CEQA review of the SSHCP EIS/EIR. In addition, the future South Sacramento Conservation Agency (the SSHCP Implementing Entity) will become a Permit Applicant.

[2] Incidental take is generally defined as direct or indirect harm to a species, including habitat loss, which is incidental to an otherwise lawful activity (e.g., land development, improvements to public infrastructure).

[3] The EIS/EIR Planning Area encompasses approximately 317,655 acres within south Sacramento County, and has the same boundaries as the SSHCP Planning Area. The EIS/EIR Planning Area includes Galt and Galt's sphere of influence, and the portion of Rancho Cordova that is located south of U.S. Highway 50. The geographical boundaries of the Planning Area are U.S. Highway 50 and White Rock Road to the north, the Sacramento River levee and County Road J11 (Walnut Grove-Thornton Road) to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and the San Joaquin County to the south.

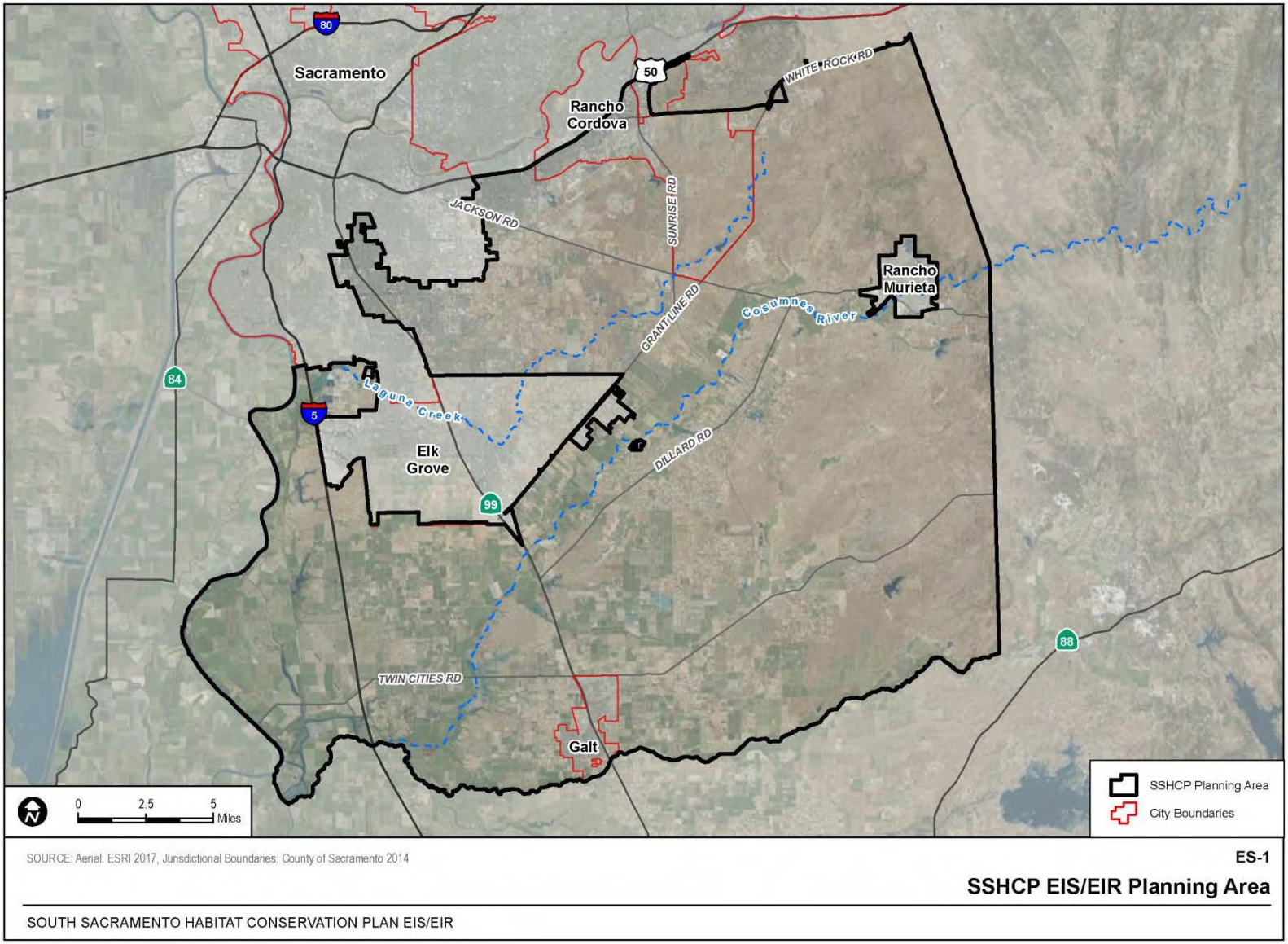
those impacts. SSHCP is accompanied by an Aquatic Resources Program (ARP), which proposes a locally based program for projects that impact aquatic resources to obtain permits under Section 404 of the Clean Water Act (CWA 404). The SSHCP also identifies future Covered Activity impacts to aquatic resources of the Planning Area, and provides a strategy to maximize the avoidance, minimization, and compensatory mitigation of aquatic resource impacts. (see Chapter 2 for a detailed description of the Proposed Action/Proposed Project Alternative and other alternatives considered).This EIS/EIR evaluates the potential impacts of ITP issuance by the USFWS and CDFW; approval and execution of an Implementing Agreement (IA) for the SSHCP; approval and implementation of the SSHCP by Sacramento County and the other Permit Applicants; approval and implementation by USACE of a multilevel CWA Section 404 permitting program for future SSHCP Covered Activity projects and activities; and approval and implementation of the SSHCP ARP by the Permit Applicants, as further discussed in EIS/EIR Section 1.5 (see Chapter 2 for a detailed description of all project alternatives).

The purpose of the EIS component of this joint EIS/EIR is to inform USFWS decision makers and the public of the effects on the human environment that would result from issuance of the ITPs to these local and state entities and from implementation of the proposed SSHCP or an alternative HCP within south Sacramento County. The USFWS will use the EIS/EIR to comply with NEPA for their issuance of ITPs to the Permit Applicants. The purpose of the EIR component of this joint EIS/EIR is to inform Permit Applicant decision makers and the public of the anticipated significant environmental impacts of the proposed project (the SSHCP), measures to mitigate any significant impacts, and reasonable alternatives that could reduce any significant environmental impacts of the proposed project to a less-than-significant level. The EIR will be used by the Permit Applicants to approve the SSHCP in compliance with CEQA.

ES.2 EIS/EIR PLANNING AREA

The Planning Area encompasses approximately 317,655 acres within south Sacramento County, as shown in Figure ES-1. The boundary of the Planning Area was defined by the Permit Applicants using both jurisdictional and ecological factors, and is the area where future projects and activities, conservation actions, and associated incidental take of species would occur under the EIS/EIR alternatives.

Figure ES-1 SSHCP EIS/EIR Planning Area



INTENTIONALLY LEFT BLANK

The Planning Area includes Galt and Galt's sphere of influence, and the portion of Rancho Cordova that is located south of U.S. Highway 50. The geographical boundaries of the Planning Area are U.S. Highway 50 and White Rock Road to the north, the Sacramento River levee and County Road J11 (Walnut Grove-Thornton Road) to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and the San Joaquin County line to the south.

The portions of the Planning Area where future urban-development projects would occur are also discussed as the Urban Development Area (UDA). Sacramento County has previously adopted an Urban Service Boundary (USB) to demarcate the ultimate extent to which the County would provide future urban services, such as sanitary sewer and water supply. Therefore, the portion of the Sacramento County USB that is within the Planning Area is within the UDA. Likewise, the portion of Rancho Cordova's sphere of influences that is within the USB is also part of the Planning Area's UDA. The Planning Area's UDA also includes all lands within Galt and within Galt's sphere of influence (see Figure ES-1). Approximately 67,618 acres of the Planning Area are also within the UDA.

ES.3 ALTERNATIVES CONSIDERED AND ALTERNATIVES EVALUATED

Underlying needs and problems that are currently present within the Planning Area include the large loss of natural land covers and natural communities, including grazing lands and croplands, from urban development and other human activities. The corresponding loss of suitable habitat for native plant and animal species within the Planning Area has led to a desire for a coordinated plan for protecting or conserving the best remaining natural communities in the Planning Area, including aquatic resources, and a desire to streamline the project review and permitting processes for future development projects and activities.

The lead agencies evaluated a range of reasonable project alternatives for an HCP in south Sacramento County to address these underlying needs and problems. Ideas for potential alternatives came from a variety of sources, including the SSHCP development process, the public scoping process under CEQA and NEPA, and input from the lead and cooperating agencies. In addition to the No Action/No Project Alternative, which must be analyzed, two action alternatives were carried forward for detailed analysis in the EIS/EIR because they are practicable, include provisions to reduce impacts, address the existing issues and underlying needs present in the Planning Area, and will achieve the purposes and objectives presented in Section 1.3:

- Alternative 1: No Action/No Project
- Alternative 2: Proposed Action/Proposed Project
- Alternative 3: Reduced Permit Term

Each of these alternatives would occur within the same Planning Area (Figure ES-1).

Alternative 1—No Action/No Project

Under the No Action/No Project Alternative, an HCP for south Sacramento County would not be approved or implemented, and ITPs would not be issued to the Permit Applicants for species impacts from future development projects and activities within the Planning Area. Also, the Permit Applicants would not implement a local ARP or approve associated local aquatic resource protection ordinances. Therefore, the USACE would not develop a CWA 404 permitting strategy for future development projects and activities. In addition, the CDFW would not develop a streamlined permit strategy for streambed impacts of future development projects and activities, and the CDFW would not issue a Master Streambed Alteration Agreement to the Permit Applicants.

Therefore, the No Action/No Project Alternative would continue the conventional project-by-project regulatory reviews in which individual project developers apply for necessary project permits with multiple state and federal resource agencies, and with permit application review proceeding without a systematic, comprehensive process. Individual projects/actions in the Planning Area that require authorization under CWA 404 would continue to obtain USACE authorization through existing types of CWA 404 authorizations, and would continue to comply with requirements for providing compensatory mitigation.

The No Action/No Project Alternative assumes that all lands zoned or ultimately planned/contemplated for urban development in adopted General Plans that are not already currently developed would eventually become developed over the next 50 years.[4] In association with the expected future urban development, the public infrastructure systems, such as water, wastewater, recycled water, stormwater, flood control, solid waste, and utility systems, as well as transportation systems, would be expanded or improved, as described in several local and regional infrastructure agency master plans and/or capital improvement programs.

The vast majority of urban development under the No Action/No Project Alternative would occur within the UDA described in Section ES.2. However, the No Action/No Project Alternative also assumes that it will become increasingly more difficult for new projects to obtain authorizations under ESA or CWA within the area now designated as the Mather Core Recovery Area (MCRA) by the USACE.[5] Consequently, No Action/No Project Alternative also assumes that

[4] Full buildout means all currently undeveloped lands that are zoned for, or are ultimately planned/contemplated for, future urban development (in the adopted general plans of the Permit Applicants) would become developed. However, full buildout will include some open space and conservation lands within the areas planned for urban development. This includes all lands within the Sacramento County USB that are within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), and all lands within Galt's city limits and within Galt's sphere of influence.

[5] The MCRA was defined in the 2005 *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.* Portland, Oregon: USFWS, Region 1.

not all urban development allowed under current zoning could be accommodated within the MCRA, and approximately 1,900 acres of future development could be "displaced" to locations outside the current USB for Sacramento County.

Alternative 2—Proposed Action/Proposed Project

The Proposed Action/Proposed Project (the SSHCP) is a regional, comprehensive plan that establishes a framework for Permit Applicants to comply with state and federal endangered species regulations and with aquatic resource regulations, while accommodating future land use and development included in the general plans of Sacramento County, Galt, and Rancho Cordova.

The SSHCP identifies Covered Activities, which are specific types of projects and activities within the Planning Area that may result in the take of SSHCP Covered Species or loss of aquatic resources. SSHCP Covered Activities implemented within the UDA would include, but are not limited to:

- Activities and projects related to urban development and associated infrastructure, including buildout of the USB as described for the No Action/No Project Alternative.
- The Capital Southeast Connector Project and other planned transportation projects;
- Planned water and wastewater development projects; and
- Maintenance of stream channels in the UDA, such as vegetation and sediment removal.

The SSHCP Conservation Strategy is designed to allow streamlining of Covered Activity compliance with the federal ESA, the California Endangered Species Act (CESA), CWA, Fish and Game Code, and other applicable environmental regulations. The SSHCP Conservation Strategy identifies Biological Goals for Planning Area land covers, natural communities, aquatic resources, and Covered Species, including specific measurable Biological Objectives to achieve each Biological Goal. The SSHCP's Conservation Strategy would include habitat restoration, enhancement and management actions, and adaptive management and monitoring activities. The SSHCP Conservation Strategy would establish and implement a consolidated and interconnected Preserve System in the Planning Area that would preserve ecologically important resources using a landscape or watershed perspective. The SSHCP includes a preserve monitoring and management program and an adaptive management plan.

The Permit Applicants are requesting ESA and CESA ITPs with 50-year permit terms. Under the Proposed Action/Proposed Project Alternative, federal and state ITPs would be issued to the Permit Applicants by the USFWS and CDFW, and the USACE would develop and approve a multilevel CWA 404 permit strategy for the Permit Applicants.

Alternative 3—Reduced Permit Term

This alternative also includes a regional HCP for south Sacramento County, including an ARP; the issuance of 30-year ITPs by USFWS and CDFW; and development of a 30-year multi-level CWA permit

strategy by the USACE for HCP Covered Activities. However, the ITPs and the expedited CWA permit strategy would end at year 30, which generally coincides with the durations of the adopted General Plans and reasonably foreseeable master plan projects for the local jurisdictions. Under the Reduced Permit Term Alternative, the Permit Applicants would implement the same categories of Covered Activities, and request ESA and CESA take coverage for the same Covered Species. Urban development would occur within the UDA (described in Section ES.2), with the only development Covered Activities outside the UDA being road and pipeline infrastructure projects.

The Reduced Permit Term Alternative would implement an HCP Conservation Strategy during the 30-year permit term, which would include the same Biological Goals for the Planning Area as the Proposed Action/Proposed Project Alternative. The Reduced Permit Term Alternative would implement the same Avoidance and Minimization Measures (AMMs) as the Proposed Action/Proposed Project Alternative and would provide additional avoidance measures not included in the No Action/No Project Alternative.

However, the acres of natural land covers, species habitats, and aquatic resources preserved under each of the Measurable Objectives would be less under the Reduced Permit Term Alternative's Conservation Strategy because less urban development would occur during the 30-year permit term of the Reduced Permit Term Alternative, so fewer development fees would be collected to acquire lands for a Preserve System.

ES.4 KNOWN ISSUES OR CONTROVERSY

NEPA regulations and the CEQA Guidelines require the Executive Summary to identify issues raised by agencies and the public. Chapter 1 presents an overview of the EIS/EIR public scoping process. Generally, the issues of concern raised during the 2008 and 2013 public scoping processes included the following:

- The proper geographic scope of the SSHCP and EIS/EIR, such as considering effects in adjacent areas or addressing Elk Grove's sphere of influence.
- Effects of SSHCP implementation on agriculture, including grazing.
- Regulatory topics, such as consistency with USACE mitigation regulations and the potential role of mitigation banks.
- Compliance with air quality regulations and the potential effects of air quality on Covered Species and human health.
- Consistency with planning efforts in the Sacramento/San Joaquin Delta.
- Coordination with the activities and planning of local jurisdictions, agencies, and land management organizations that are not Permit Applicants.
- Adequacy of funding for implementation of the Conservation Strategy.

- Which Covered Activities should be included in the alternatives, and what locations are available for Preserves.
- The analysis of cumulative impacts.
- Use of best-available science and data, such as recent research on tricolored blackbird (*Agelaius tricolor*).
- Questions and suggestions regarding the funding, selection, acquisition, location, and management of Preserve System lands.
- Integration of mosquito and vector control with SSHCP implementation and Preserve System management.
- Integration of the SSHCP with issues of water supply and new urban development.

EIS and EIR summary sections are also required to identify areas of controversy known to the lead agencies. The term "controversy" is defined as circumstances where a substantial dispute exists as to the environmental consequences of an action, and does not refer to the existing of opposition to an action where the environmental effects are relatively undisputed (43 CFR 46.30). A potential area of controversy may be the amount of new urban development that would occur within the MCRA under each alternative evaluated, because each alternative would remove more suitable species habitat within the MCRA than is provided by the species-specific recovery criteria presented in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).[6]

ES.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Tables ES-1, Summary of Impacts and Mitigation, and ES-2, Summary of Impacts to Special-Status Species, Including Covered Species, briefly describe and compare the adverse and beneficial impacts of each alternative evaluated in the SSHCP EIS/EIR, including potential impacts to environmental resources identified during scoping, and potential impacts to other resources analyzed in the EIS/EIR. When comparing the two action alternatives to the No Action/No Project Alternative baseline condition, most of the impacts were determined to be ***Minor Beneficial*** effects or determined to have **No Impact**. Examples of impacts that differed the most between alternatives include the following:

- Impacts to Vernal Pool ecosystem and Valley Grassland land covers under "Natural Land Cover Habitats, and Associated Plant and Animal Communities" (Table ES-1); and

[6] U.S. Fish and Wildlife Service. 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Approved December 15, 2005. U.S. Fish and Wildlife Service, Region 1. Portland, Oregon. Available at: https://www.fws.gov/sacramento/es/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

- Impacts to 11 Vernal Pool species, western spadefoot (*Spea hammondii)*, western pond turtle (*Actinemys marmorata)*, several bird species, and several non-covered plant species under "Special-Status Species Including HCP Covered Species" (Table ES-2).

Based on the analysis in Chapters 4 through 16 and as summarized in Tables ES-1 and ES-2, the Proposed Action/Proposed Project Alternative was identified as the Environmentally Preferable Alternative and Environmentally Superior Alternative. Discussions of each of the identified impacts and any mitigation measures, including pertinent support data, can be found in the resource-topic chapters of the EIS/EIR, Chapters 4 through 16.

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
LAND USE						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • displace urban development outside the Urban Services Boundary (USB), inconsistent with the Sacramento Area Council of Governments (SACOG's) Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and other regional plans, as well as the smart growth policies of the County and Rancho Cordova's adopted General Plans; • place mitigation preserves in areas that would eventually be surrounded by urban development, potentially resulting in conflicts with existing and planned land uses, but management and monitoring activities on new preserves are not expected to be intensive relative to existing conditions, and management and monitoring activities would not result in incompatibility with adjacent land uses or inconsistencies with any applicable planning document; and • potentially increase safety hazards associated with wildlife strikes on aircraft due to wetland re-establishment and establishment within proximity to airports.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • avoid inconsistencies with existing land use plans; • minimize potential conflicts of preserve management and monitoring activities by siting compatible uses near preserves and by providing a coordinated way to minimize incompatibilities with existing or planned land uses, or conflicts with existing plans; and • improve compatibility with airports and minimize potential airport safety hazards by implementing a planning process that coordinates wetlands re-establishment/ establishment with airport planning staff.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • avoid inconsistencies with existing land use plans by avoiding urban development outside the UDA; • minimize potential conflicts of preserve management and monitoring activities by siting compatible uses near preserves and by providing a coordinated way to minimize incompatibilities with existing or planned land uses, or conflicts with existing plans during years 1–30 of the EIS/EIR study period; and • improve compatibility with airports and minimize potential airport safety hazards by implementing a planning process during years 1-30 of the EIS/EIR study period that coordinates wetlands re-establishment/ establishment with airport planning staff.	Minor Beneficial Effect	None required
Cumulative Effects						
Under the No Action/No Project Alternative, approximately 1,900 acres of planned urban development would be shifted or displaced to areas outside the current UDA, probably to areas south of the Elk Grove SOI , or areas near Rancho Murieta. This displaced development of the No Action/No Project Alternative would add to the land use impacts of reasonably foreseeable development in the Elk Grove SOI and Rancho Murieta areas. Because the No Action/No Project Alternative would add to the existing land use plan conflicts of past and present activities, and the reasonably foreseeable future projects, the No Action/No Project Alternative would substantially contribute to the existing significant cumulative impact to land use from past, present and reasonably foreseeable projects present in the Study Area.	Because the Proposed Action/Proposed Project would not conflict with any existing land use plans, the Proposed Action/Proposed Project would have a smaller incremental contribution to the Planning Area's cumulative conflicts with existing land use plans.	Minor Beneficial Cumulative Effect	None required	Because the Reduced Permit Term Alternative would result in less development outside the UDA than the No Action/No Project Alternative, it would have a smaller cumulative contribution to conflicts with existing land use plans.	Minor Beneficial Cumulative Effect	None required
SOILS, GEOLOGY AND MINERAL RESOURCES						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • not substantially increase development on expansive soils, asbestos-containing soils, or areas prone to landslide, as these are not present in the UDA; and • preclude or substantially inhibit the extraction of any mineral resources present within lands that are developed or used for mitigation preserves.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • result in reduced potential for adverse effects from erosion and landslide from development activities and preserve system establishment and establishment; • result in a slightly reduced risk of exposure to naturally occurring asbestos; • result in a slightly more removal of access to important mineral resource s by new urban development or associated infrastructure; and	Minor Beneficial Effect to geological resources, soils, and exposure to geological hazards Less Than Significant Adverse Effect to	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in reduced potential for adverse effects from erosion and landslide from development activities and preserve system establishment; • result in a slightly reduced risk of exposure to naturally occurring asbestos; • result in a slightly more removal of access to important mineral resources by new urban development or associated infrastructure; and	Minor Beneficial Effect to geological resources, soils, and exposure to geological hazards Less Than Significant Adverse Effect to	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
	• result in similar potential for removal of access to important mineral resources by new preserves.	mineral resources access		• result in a similar potential for removal of access to important mineral resources from new preserves.	mineral resources access	
Cumulative Effects						
Projects and activities included in the No Action/No Project Alternative would not have an adverse effect on geology and soils or human exposure to naturally occurring asbestos because of the combination of geologic and soils conditions in the Planning Area and because future projects would comply with applicable regulations and policies. The No Action/No Project Alternative, when considered together with past, present, and reasonably foreseeable other projects, could limit access to aggregate resources that are outside the mapped MRZ-2 significant mineral deposits.	The incremental effects of the Proposed Action/Proposed Project Alternative would have a minor beneficial impact to geology and soils and risk of exposure to naturally occurring asbestos when compared to the incremental effects of the No Action/No Project Alternative baseline condition. Incremental effects of the Proposed Action/Proposed Project Alternative would have a less than significant impact to access to mineral resources when compared to the incremental effects of the No Action/No Project Alternative baseline condition.	Minor Beneficial Cumulative Impact to geology and soils and risk of exposure to naturally occurring asbestos Less than Significant Cumulative Impact to access to mineral resources	None required	The incremental effects of Reduced Permit Term Alternative would have a minor beneficial impact to geology and soils and risk of exposure to naturally occurring asbestos when compared to the incremental effects of the No Action/No Project Alternative baseline condition. Incremental effects of the Reduced Permit Term Alternative would have a less than significant impact to access to mineral resources when compared to the incremental effects of the No Action/No Project Alternative baseline condition.	Minor Beneficial Cumulative Impact to geology and soils and risk of exposure to naturally occurring asbestos Less than Significant Cumulative Impact to access to mineral resources	None required
AGRICULTURE						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in conversion of approximately 32,205 acres of Important Farmland to non-agricultural uses; • result in new land uses that conflict with 4,767 acres of land that have existing Williamson Act contracts; and • result in incompatible uses near existing agricultural uses by displacing 1,900 acres of new urban development to locations outside the UDA.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • result in conversion of approximately 1,100 less acres of Important Farmland to non-agricultural uses; • result in new land uses that conflict with 32 more acres of land that have existing Williamson Act contracts; • result in fewer incompatible uses near existing agricultural uses by not displacing 1,900 acres of new urban development to locations outside the UDA; and • result in fewer incompatible uses near existing agricultural by implementing an AMM that emphasizes placement of compatible uses adjacent to cropland preserves.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in conversion of approximately 1,720 less acres of Important Farmland to non-agricultural uses; • result in land uses that conflict with 133 more acres of land with existing Williamson Act contracts; and • result in fewer incompatible uses near existing agricultural uses by not displacing development outside the UDA and by implementing an AMM during the 30-year permit term that emphasizes placement of compatible uses adjacent to cropland preserves.	Minor Beneficial Effect	None required
Cumulative Effects						
The cumulative effects of planned urban growth on existing Important Farmlands would result in a cumulatively significant and unavoidable adverse impact on agriculture resources. Under the No Action/No Project Alternative, approximately 1,900 acres of planned urban development is expected to be shifted or displaced to locations outside the UDA. Among the areas that are expected to receive this urban development are south of the Elk Grove SOI and near Rancho Murieta. These components of the No Action/No Project Alternative would further increase conflicts with land use plans, and further make a cumulatively considerable (i.e., significant) contribution to the cumulatively significant and unavoidable adverse impacts to agriculture that was identified in the General Plan EIRs for Sacramento County, Galt, and Rancho Cordova.	Because the Proposed Action/Proposed Project Alternative would not result in urban development shifted or displaced to outside the UDA, and would result in more preservation of Important Farmlands and grazing lands as compared to the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative's incremental contribution to cumulative impacts on agriculture resources would be less than that described for the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required	Because the Reduced Permit Term Alternative would avoid urban development outside the UDA and increase preservation of Important Farmlands and grazing lands as compared to the No Action/No Project Alternative, the Reduced Permit Term Alternative's contribution to cumulative impacts on agriculture would also be less than that described for the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
HYDROLOGY AND WATER QUALITY						
Direct and Indirect Effects – Groundwater Hydrology						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in increased groundwater demand for new urban development; and • result in increased impervious surfaces from development, with associated adverse effects to groundwater recharge.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • result in groundwater demand that is consistent with the groundwater demand of the No Action/No Project ; • result in impervious surfaces from development and associated effects to groundwater recharge are consistent with the adverse effect of the No Action/No Project Alternative; • result in greater protection of groundwater recharge from larger and more contiguous preserves; • result in greater protection of groundwater recharge along streams and other waterways from required setbacks and larger setback between new development and natural waterways; and • implement a regional Conservation Strategy that has protection of watersheds and related ecosystem functions (including groundwater recharge) as one of the guiding principles.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in consistent groundwater use; • result in consistent adverse effects to groundwater recharge due to impervious surfaces from development; • result in greater protection of groundwater recharge areas from preserve establishment inside the UDA; and • result in a Conservation Strategy that has protection of watersheds and related ecosystem functions (including groundwater recharge) as one of the guiding principles inside the UDA.	Minor Beneficial Effect	None required
Cumulative Effects - Groundwater Hydrology						
The combination of past, present, and reasonably foreseeable future projects would combine with the No Action/No Project Alternative groundwater use leading to adverse cumulative effects and exceedance of the sustainable yields of the groundwater basins, groundwater level reductions affecting increased pumping energy use, occurrence of dry wells, or land subsidence.	Implementation of the SSHCP Conservation Strategy, including the SSHCP AMMs, the SSHCP ARP, and the interconnected SSHCP Preserve System is expected to result in more consistent and frequent conservation of groundwater recharge compared to the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required	The implementation of an HCP Conservation Strategy, including AMMs, an ARP, and the interconnected Preserve System during the 30-year permit term under the Reduced Permit Term Alternative would result in better conservation of groundwater recharge inside the UDA compared to the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required
Direct and Indirect Effects – Surface Water Hydrology and Flooding						
As compared to the Existing Condition, the No Action/No Project Alternative would: • not substantially increase the existing rate or amount of surface runoff in a manner that would cause flooding or exceed stormwater system capacity; and • not place residences within a flood hazard area, or expose people or structures to a significant risk involving flooding.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • provide greater setbacks of new development from streams, creeks, and minor tributaries, which would maintain existing hydrologic functions of UDA streams and floodplains, and retain more of the stream's floodplain to provide better flood storage and flood flow; • provide greater protection of surface waters in each Planning Area HUC watersheds by consolidating project avoidance and mitigation requirement into contiguous and interconnected preserves. Provide greater avoidance and protection of aquatic resources within the UDA, including in the MCRA portion of the UDA. Assembles a large contiguous Landscape Preserve in the southeast portion of the Planning Area, totaling between 33,500 to 34,000 acres; • require implementation of additional AMMs to avoid or minimize surface hydrologic resources, and requires consistent implementation of surface hydrology AMMs during	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • provide greater setbacks of new development from streams, creeks, and minor tributaries, which would maintain existing hydrologic functions of UDA streams and floodplains, and retain more of the stream's floodplain to provide better flood storage and flood flow; • result in greater and more consistent avoidance of adverse effects to surface hydrology conditions because of overlapping and new AMMs. Requires implementation of additional AMMs to avoid or minimize surface hydrologic resources, and requires consistent implementation of surface hydrology AMMs during all ground disturbing Covered Activities and would provide greater management of indirect impacts of urbanization, such as intrusion from domestic animals and informal trails; and • result in a Conservation Strategy that has protection of watersheds and related ecosystem functions as one of the	Minor Beneficial Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
	all ground disturbing Covered Activities; • result in better management of avoided aquatic resources and aquatic habitat to minimize indirect impacts of adjacent urbanization, and to maintain values and aquatic functions on preserved lands in perpetuity; and • implement a regional Conservation Strategy that has protection of watersheds and related ecosystem functions as one of the guiding principles, while balancing regional housing and development needs.			guiding principles.		
Cumulative Effects - Surface Water Hydrology and Flooding						
Projects and activities included in the No Action/No Project Alternative with potential to affect surface hydrologic conditions are conversion of agricultural and undeveloped lands to new urban development. New urban development projects under the No Action/No Project Alternative would be required to adequately address stormwater runoff and flooding issues. Incremental effects of the No Action/No Project Alternative are individually limited, and would not make a cumulatively considerable contribution.	The implementation of the SSHCP Conservation Strategy, including the interconnected SSHCP Preserve System, the Covered Activity AMMs, and the ARP, would result in larger areas of watershed preservation, consistent and more frequent implementation of AMMs, and require larger setbacks and more conservation of natural waterways compared to the No Action/No Project Alternative. Incremental effects of the Proposed Action/Proposed Project are individually limited, and would not make a cumulatively considerable contribution.	Minor Beneficial Cumulative Effect	None required	The implementation of an HCP Conservation Strategy, including Covered Activity AMMs, and interconnected Preserve System, and an ARP during the 30-year permit term of the Reduced Permit Term Alternative would result in larger areas of watershed preservation, consistent and more frequent implementation of AMMs, and require larger setbacks and more conservation of natural waterways in the UDA when compared to the No Action/No Project Alternative. Consequently, the incremental effects of the Reduced Permit Term Alternative would have a minor beneficial impact to surface hydrology, stormwater runoff, and flooding conditions when compared to the incremental effects of the No Action/No Project Alternative baseline condition. Incremental effects of Reduced Permit Term Alternative are individually limited, and would not make a cumulatively considerable contribution.	Minor Beneficial Cumulative Effect	None required
Direct and Indirect Effects – Surface Water Quality and Groundwater Quality						
As compared to the Existing Condition, the No Action/No Project Alternative would: • not alter the course of local waterways in a manner that results in substantial erosion or sedimentation or result in substantial new sources of pollutants in urban runoff; • not result in migration of contaminants from the lower aquifers, or migration of the contaminant plumes at the groundwater cleanup sites in Sacramento County; • not result in degradation of groundwater quality; • not result in substantially increased levels of contaminants in stormwater runoff from the post-construction activities, cause impairment of the beneficial uses of receiving waters or areas that provide water quality benefit, or cause substantial harm to the biological integrity of the waterways by the discharge of stormwater; and • not substantially increase discharge of stormwater from material storage areas, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • have smaller direct and indirect impacts to surface water quality and to ground water quality; • provide a Conservation Strategy that has protection of watersheds and related ecosystem functions (including water quality) as one of the guiding principles; • provide larger contiguous preserves that would provide better protection to existing surface water quality; and • provide greater setbacks between new development and streams, creeks, and minor tributaries, and provide setbacks between new development and preserves to reduce al direct and indirect water quality effects of new urban development on surface water quality. , better improve or maintain existing water quality through processes such as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion, and would facilitate greater groundwater recharge along creeks and streams.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in smaller direct and indirect impacts to surface water quality and ground water quality; • provide larger contiguous preserves that would provide better protection to existing surface water quality inside the UDA; • provide greater setbacks between new development and streams, creeks, and minor tributaries, and provide setbacks between new development and preserves to reduce all direct and indirect water quality effects of new urban development on surface water quality to better improve or maintain existing water quality through processes such as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion; and • facilitate greater groundwater recharge along creeks and streams.	Minor Beneficial Effect	None required

AGENDA ITEM 11.1

3951

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
Cumulative Effects - Surface Water Quality and Groundwater Quality						
The existing water treatment infrastructure has capacity to accommodate additional wastewater inflows expected from all future planned development in the Planning Area, including the full build-out of the UDA by 2065 assumed under the No Action/No Project Alternative. Therefore, the incremental effects of additional surface water in the Planning Area that would occur under the No Action/No Project Alternative would be individually limited, and would not make a considerable contribution to the downstream significant cumulative Delta water quality impact.	Implementation of the SSHCP Conservation Strategy, including the SSHCP AMMs, the interconnected SSHCP Preserve System and the ARP, are expected to result in greater protection of surface water quality and groundwater quality compared to the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required	The implementation of the Conservation Strategy during the 30-year permit term under the Reduced Permit Term Alternative, including AMMs, the ARP, and the interconnected Preserve System, are expected to result in greater protection of surface water quality and groundwater quality compared to the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required
NATURAL LAND COVER HABITATS, AND ASSOCIATED PLANT AND ANIMAL COMMUNITIES						
Direct and Indirect Effects – Vernal Pool Ecosystem						
As compared to the Existing Condition, the No Action/No Project Alternative would: • directly and indirectly impact approximately 17,949 acres of vernal pool ecosystem, which is approximately 17.4 % of the total 103,210 acres of existing vernal pool ecosystem within the Planning Area; • directly and indirectly impact 9,783 acres of the Mather Core Recovery Area's Vernal Pool Ecosystem, or approximately 54% of what exists in the Mather Core Recovery Area; • preserve approximately 10,406 acres of existing Vernal Pool Ecosystem within the Planning Area as mitigation for projects and activities; • re-establish and/or establish approximately 562 acres of vernal pools and swales on mitigation preserves to mitigate direct impacts (loss) of 562 acres of vernal pools and swales; and • preserve approximately 4,550 acres of the existing 18,117 acres of Vernal Pool Ecosystem within the Mather Core Area.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • directly and indirectly impact 690 fewer total acres of the Planning Area's total vernal pool ecosystem and the associated vernal pool plant and animal communities; • directly and indirectly impact 1,283 fewer acres of the Mather Core Area's vernal pool ecosystem and the associated vernal pool plant and animal communities; • require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects of development projects and activities on the vernal pool ecosystem; • preserve approximately 7,340 more acres of Vernal Pool Ecosystem in the Planning Area; • result in interconnected and more contiguous preserves of vernal pool ecosystem within the Planning Area; and • preserve 934 more acres of the Mather Core Area's vernal pool ecosystem and the associated vernal pool plant and animal communities.	Significant Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • directly and indirectly impact 1,147 more acres of vernal pool ecosystem and associated vernal pool plant and animal communities; • directly and indirectly impact 254 more acres of the Mather Core Area's vernal pool ecosystem and the associated vernal pool plant and animal communities; • require Covered Activities to implement better AMMs to reduce and minimize indirect effects of development projects and activities on the vernal pool ecosystem during the 30-year permit term; • preserve approximately 4,896 more acres of Vernal Pool Ecosystem in the Planning Area, and approximately 2/3 of the preserved Vernal Pool Ecosystem acres would be within an interconnected preserve system established during the 30-year permit term; • establish preserves during the 30-year permit term that would be more interconnected and more contiguous than the preserves established under the No Action/No Project Alternative; and • preserve approximately 1,193 acres less of the Mather Core Area's vernal pool ecosystem and the associated vernal pool plant and animal communities.	Less than Significant Adverse	None required
Cumulative Effects – Vernal Pool Ecosystem						
The incremental effects of the No Action/No Project Alternative would have direct and indirect impacts that would result in an estimated loss of 17,949 acres or approximately 17.4 % of the 103,210 acres of existing vernal pool ecosystem within the Planning Area. Project mitigation under the No Action/No Project Alternative would include an estimated 10,406 acres of preservation and 579 acres of vernal pool habitat re-establishment/establishment within the Planning area. Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to vernal pool ecosystem, when considered together with the significant impacts to vernal pool ecosystem from past, current, and foreseeable future	Overall, the Proposed Action/Proposed Project Alternative would make a slightly smaller contribution to Study Area cumulative effects on the vernal pool ecosystem, when compared to the No Action/No Project Alternative. However, at the scale of Vernal Pool Ecosystem impacts throughout the Study Area, the 690-acre difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different.	No Cumulative Effect	None required	The incremental effects of the Reduced Permit Term Alternative would directly and indirectly impact 19,096 acres vernal pool ecosystem within the Planning Area, which is 1,147 acres more than the total direct and indirect impact expected under the No Action/No Project Alternative. Overall, the Reduced Permit Term Alternative would make a slightly larger contribution to Study Area cumulative effects on the vernal pool ecosystem, when compared to the No Action/No Project Alternative. However, at the scale of Vernal Pool Ecosystem impacts throughout the Study Area, the 1,147-acre difference in impacts under the Reduced Permit Term	No Cumulative Effect	None required

AGENDA ITEM 11.1

3952

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
projects and activities in the Study Area, would be a significant cumulative effect				Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different.		
Direct and Indirect Effects – Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, Open Water						
As compared to the Existing Condition, the No Action/No Project Alternative would: • directly impact 583 acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers and associated plant and animal communities, approximately 5.5% of the existing 10,676 acres of the land covers within the Planning Area; • preserve approximately 24 acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers within the Planning Area; and • re-establish or establish 291 acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers within the Planning Area.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • directly impact 79 fewer acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers and associated plant and animal communities; • require Covered Activity activities and project to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, Open Water natural communities, such as larger setbacks between new development and streams and creeks; • preserve 480 more acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water; • re-establish or establish 213 more acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers within the Planning Area; and • result in more interconnected and contiguous preserves of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers within the Planning Area.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • directly impact 48 fewer acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers and associated plant and animal communities; • require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs to better avoid and minimize indirect effects to Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water natural communities, such as larger setbacks between new development and streams and creeks; • preserve 311 more acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water; • re-establish or establish 128 more acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers within the Planning Area; and • result in more interconnected and more contiguous preserves of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers within the Planning Area.	Minor Beneficial Effect	None required
Cumulative Effects – Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, Open Water						
The incremental impacts of the No Action/No Project Alternative would result in the direct loss of 583 acres, or approximately 5.5 % of the existing Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers and associated natural communities within the Planning Area. Project mitigation for impacts to Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water would continue to be implemented on a project-by-project basis. Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water, when considered together with the significant impacts to Valley Grassland from past, current, and foreseeable future projects and activities in the Study Area, would be a significant cumulative effect.	Overall, the Proposed Action/Proposed Project Alternative would make a slightly smaller incremental contribution the cumulative loss of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water in the Study Area, when compared to the No Action/No Project Alternative. However, at the scale of impacts to these aquatic resources throughout the Study Area, the 79-acre difference in direct impacts, the 480-acre difference in preservation, and the 213-acre difference in re-establishment of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers under the Proposed Action/Proposed Project Alternative when compared to impacts under the No Action/No Project Alternative is not discernibly different.	No Cumulative Effect	None required	Overall, the Reduced Permit Term Alternative would make a slightly smaller contribution the cumulative loss of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water in the Study Area, when compared to the No Action/No Project Alternative. However, at the scale of impacts to these aquatic resources throughout the Study Area, the 535-acre difference in direct impacts, the 311-acre difference in preservation, and the 128-acre difference in re-establishment of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers under the Reduced Permit Term Alternative is not discernibly different from the impacts expected under the No Action/No Project Alternative.	No Cumulative Effect	None required
Direct and Indirect Effects – Riparian Land Covers (Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland)						
As compared to the Existing Condition, the No Action/No Project Alternative would: • directly impact (remove) 554 acres of riparian land covers and their associated natural community within the Planning Area, approximately 7% of the existing 7,951 acres of riparian land covers and riparian plant and animal natural communities present in the Planning Area; and • re-establish or establish 256 acres of Mixed Riparian Woodland and 298 acres of Mixed Riparian Scrub land covers.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • directly impact 37 more acres of Riparian land covers and associated plant and animal communities; • require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Riparian land covers such as larger setbacks between new development and streams and creeks; • preserve 964 acres more of Riparian land covers (Mixed	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • directly impact 56 more acres of Riparian land covers and associated plant and animal communities; • require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs, to better avoid and minimize indirect effects to Riparian land covers and natural communities, such as larger setbacks between new	Minor Beneficial Effect	None required

AGENDA ITEM 11.1

3953

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
	Riparian Woodland and Mixed Riparian Scrub); • re-establish or establish 37 acres more of Riparian land covers (Mixed Riparian Woodland and Mixed Riparian Scrub) within the Planning Area; and • result in more interconnected and contiguous preserves of Riparian land covers within the Planning Area, which would reduce habitat fragmentation effects on the plant and animal community.			development and streams and creeks; • preserve 696 more acres of Riparian land covers; • re-establish or establish 55 more acres of Riparian land covers within the Planning Area; • result in more interconnected and more contiguous preserves of Riparian land covers within the Planning Area.		
Cumulative Effects – Riparian Land Covers (Mixed Riparian Woodland, Mixed Riparian Scrub and Mine Tailing Riparian Woodland)						
The incremental impacts of the No Action/No Project Alternative would result in the direct loss of 554 acres, or approximately 7 % of the existing Riparian land covers within the Planning Area. However, the regulatory environment under the No Action/No Project is expected to require projects to re-establish or establish 554 acres of riparian land covers which, over time, are expected to re-establish the wildlife habitat and plant and animal natural community of the directly impacted riparian land covers. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. Therefore, the incremental impacts of the No Action/No Project Alternative on Riparian land covers, when considered together with the significant impacts to riparian land covers from past and current human activities and the reasonably foreseeable future project within the Study Area, would result in a less than significant cumulative effect.	The incremental impacts of Proposed Action/Proposed Project Alternative would make a slightly similar contribution the cumulative loss of Riparian land covers in the Study Area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of cumulative impacts to riparian resources throughout the Study Area, the 37-acre difference in direct impacts, the 964 acre difference in Riparian preservation, and the 37-acre difference in re-establishment of Riparian land covers is not discernibly different from the impacts expected under the No Action/No Project Alternative.	No Cumulative Effect	None required	Overall, the impacts of Reduced Permit Term Alternative would make a similar contribution the cumulative loss of Riparian land covers in the Study Area, when compared to the No Action/No Project Alternative. In addition, at the scale of cumulative impacts to riparian resources throughout the Study Area, the 56-acre difference in direct impacts, and the 693 acre difference in Riparian preservation, and the 55-acre difference in re-establishment of Riparian land covers is not discernibly different when compared to impacts expected under the No Action/No Project Alternative.	No Cumulative Effect	None required
Direct and Indirect Effects – Valley Grassland						
As compared to the Existing Condition, the No Action/No Project Alternative would: • remove a total of 23,429 acres of Valley Grassland natural community, approximately 17.3% of the existing Valley Grassland within the Planning Area; and • preserve approximately 11,806 acres of Valley Grassland land cover within the Planning Area, which includes the 8,690 acres of Valley Grassland that would be preserved within the Vernal Pool Ecosystem.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • directly impact(remove) 1,415 fewer acres of Valley Grassland land cover and the associated plant and animal communities; • require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Valley Grasslands; • preserve 10,208 acres more Valley Grassland within a large SSHCP Preserve System; and • result in more interconnected and contiguous preserves of Valley Grassland within the Planning Area, which would reduce habitat fragmentation effects on the Valley Grassland plant and animal community.	Significant Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • directly impact 242 more acres of Valley Grassland land covers and associated plant and animal communities; • require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs, to better avoid and minimize indirect effects to Valley Grassland natural communities, such as larger setbacks between new development and preserved land covers, and larger setbacks between new development and streams and creeks; • preserve 6,783 more acres of Valley Grassland land cover; and • result in more interconnected and more contiguous preserves of Valley Grasslands within the Planning Area.	Less than Significant Adverse Effect	None Required
Cumulative Effects – Valley Grassland						
The incremental impact of the No Action/No Project Alternative would result in the direct loss of 23,429 acres of Valley Grassland (21,797 acres in the UDA and 1,632 acres outside the UDA), which would remove approximately 17.3% of the existing Valley Grassland acres within the Planning Area.	The incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution to the cumulative loss of Valley Grassland in the Study Area, when compared to the incremental impact of the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required.	At the scale of impacts to Valley Grassland throughout the Study Area, the 242-acre difference in direct impacts and the 6,783-acre difference in Valley Grassland preservation under the Reduced Permit Term Alternative is not discernibly different from the	No Cumulative Effect	None required.

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to Valley Grassland, when considered together with the significant impacts to Valley Grassland from past, current, and foreseeable future projects and activities in the Study Area, would be a significant cumulative effect.				impacts expected under the No Action/No Project Alternative.		
Direct and Indirect Effects – Blue Oak Woodland and Blue Oak Savanna						
As compared to the Existing Condition, the No Action/No Project Alternative would: • directly impact (remove) 140 acres of Blue Oak Woodland and Blue Oak Savanna land covers and their associated natural communities , approximately 1% of the existing 14,769 acres of combined Blue Oak Woodland and Blue Oak Savanna existing in the Planning Area; and • preserve approximately 70 acres of Blue Oak Woodland and/or Blue Oak Savanna and re-establish or establish approximately 70 acres of Blue Oak Woodland and/or Blue Oak Savanna.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • directly impact 93 acres less Blue Oak Woodland and Blue Oak Savanna and associated plant and animal communities; • require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Blue Oak Woodland and Blue Oak Savanna; • preserve an acreage of Blue Oak Woodland and Blue Oak Savanna in the Planning Area (47 acres) equal to the expected impacts to Blue Oak Woodland and Blue Oak Savanna. By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna preservation in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres); • re-establish and/or establish an acreage of Blue Oak Woodland and Blue Oak Savanna in the Planning Area (47 acres) equal to the expected impacts to Blue Oak Woodland and Blue Oak Savanna to provide no net loss of oak woodlands within the Planning Area. By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna re-establishment or establishment in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres); and • result in more interconnected and contiguous preserves of Blue Oak Woodland and Blue Oak Savanna within the Planning Area, which would reduce habitat fragmentation effects on the Blue Oak Woodland and Blue Oak Savanna plant and animal community.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • directly impact 93 acres less Blue Oak Woodland and Blue Oak Savanna and their associated plant and animal communities; • require Covered Activity projects and activities implemented during the 30-year permit term to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Blue Oak Woodland and Blue Oak Savanna; • preserve an acreage of Blue Oak Woodland and Blue Oak Savanna in the Planning Area (46 acres) that would nearly equal acres of expected impacts to Blue Oak Woodland and Blue Oak Savanna (47 acres). By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna preservation in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres); • re-establish and/or establish an acreage of Blue Oak Woodland and Blue Oak Savanna in the Planning Area (46 acres) that would nearly equal the acres of expected impacts to Blue Oak Woodland and Blue Oak Savanna (47 acres). By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna re-establishment or establishment in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres); and • result in more interconnected and contiguous preserves of Blue Oak Woodland and Blue Oak Savanna within the Planning Area, which would reduce habitat fragmentation effects on the Blue Oak Woodland and Blue Oak Savanna plant and animal community	Minor Beneficial Effect	None required
Cumulative Effects – Blue Oak Woodland and Blue Oak Savanna						
The No Action/No Project Alternative is anticipated to preserve 70 acres and to re-establish 70 acres of Blue Oak Woodland and Blue Oak Savanna, which together is equivalent to the 140 acres expected to be directly impacted (lost) under the No Action/No Project Alternative. Therefore, only 70 acres or approximately 0.5% of the Blue Oak Woodland and Blue Oak Savanna within the Planning Area would be directly impacted (lost), and the past and current impacts to Blue Oak Woodland and Blue Oak Savanna within most of the Study Area have been relatively small. Therefore, the	The incremental impacts of the Proposed Action/Proposed Project Alternative would make a slightly smaller contribution to the cumulative loss of Blue Oak Woodland and Blue Oak Savanna in the Study Area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to Blue Oak Woodland and Blue Oak Savanna throughout the Study Area, the difference in direct impacts and the difference in preservation and re-establishment or establishment of Blue Oak	No Cumulative Effect	None required	Overall, the incremental impacts of the Reduced Permit Term Alternative would make a slightly smaller contribution the cumulative loss of Blue Oak Woodland and Blue Oak Savanna in the Study Area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to Blue Oak Woodland and Blue Oak Savanna throughout the Study Area, the difference in direct impacts and the difference in preservation and re-establishment or establishment of Blue Oak	No Cumulative Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
incremental impact of the No Action/No Project Alternative on Blue Oak Woodland and Blue Oak Savanna, when considered together with the impacts of past, current, and reasonably foreseeable projects, would result in a less than significant cumulative effect.	Woodland and Blue Oak Savanna land covers is not discernibly different.			Woodland and Blue Oak Savanna land covers is not discernibly different.		
Direct and Indirect Effects – Farmland (Croplands and Irrigated Pasture-Grassland)						
As compared to the Existing Condition, the No Action/No Project Alternative would: • directly remove up to approximately 8,484 acres of existing Cropland and Irrigated Pasture-Grassland land covers and their associated plant and animal communities, which is approximately 12.5% of the total existing of these land covers in the Planning Area; and • preserve approximately 7,615 acres of similar resource-category farmland to mitigate direct impacts to Cropland and Irrigated Pasture-Grassland land covers.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • directly impact (remove) 450 fewer acres of Croplands and Irrigated Pasture-Grasslands land cover and the their plant and animal communities; • require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Croplands and Irrigated Pasture-Grasslands; • preserve 2,081 acres more Croplands and Irrigated Pasture-Grasslands (or a similar quality farmland land cover) within a large SSHCP Preserve System; and • result in more contiguous preserves and an interconnected Preserve System in that includes Croplands and Irrigated Pasture-Grasslands within the Planning Area, and which would reduce habitat fragmentation effects on native wildlife in the Planning Area.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • directly impact 354 fewer acres of Cropland and Irrigated Pasture-Grassland land covers and associated wildlife communities; • require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs, to better avoid and minimize indirect effects to Cropland and Irrigated Pasture-Grassland; • preserve 326 more acres of Cropland and Irrigated Pasture-Grassland land covers; • preserve higher quality farmland during the 30-year permit term by mitigating impact to any farmland land cover with the higher quality Cropland or Irrigated Pasture-Grassland; • result in more contiguous and interconnected and preserves of Cropland and Irrigated Pasture-Grassland farmland within a larger Preserve System; and • result in management of Cropland and Irrigated Pasture-Grassland within the Preserve System on a regional basis, and under a comprehensive preserve management program.	Minor Beneficial Effect	None required
Cumulative Effects – Farmland (Croplands and Irrigated Pasture-Grassland)						
The incremental loss of 8,484 acres of Cropland and Irrigated Pasture-Grasslands under the No Action/No Project Alternative would be a significant cumulative effect when considered together with the acres of Cropland and Irrigated Pasture Grassland lost from past and present human activities and the other foreseeable future projects in the Study Area.	The incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution the cumulative loss of Cropland and Irrigated Pasture-Grassland in the Study Area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to Cropland and Irrigated Pasture-Grassland throughout the Study Area, the 450-acre difference in direct impacts and the 2,081-acres difference in the permanent preservation of Cropland and Irrigated Pasture-Grassland land covers is not discernibly different between the Proposed Action/ Proposed Project Alternative and the No Action/No Project Alternative.	No Cumulative Effect	None required	At the scale of impacts to Cropland and Irrigated Pasture-Grassland throughout the Study Area, the 354-acre difference in direct impacts and the 326-acre difference in Cropland and Irrigated Pasture-Grassland preservation under the Reduced Permit Term Alternative is not discernibly different from the impacts expected under the No Action/No Project Alternative.	No Cumulative Effect	None required
Direct and Indirect Effects – Farmland (Orchards/Vineyards)						
As compared to the Existing Condition, the No Action/No Project Alternative would: • directly impact approximately 1,745 acres of existing Orchard and Vineyard land covers and associated plant and animal communities, which is approximately 5.7% of the existing 30,367 acres of Orchard and Vineyard land covers in the Planning Area; and • preserve approximately 1,566 acres of similar quality farmland, which	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • directly impact (remove) 63 fewer acres of Orchards and Vineyards land cover and the their plant and animal communities; • require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • directly impact 119 acres less of Orchards and Vineyards land covers and associated wildlife communities; • require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs, to better avoid and minimize	Minor Beneficial Effect	None required

AGENDA ITEM 11.1

3956

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
equals approximately 90% of the acres of Orchard and Vineyard lost.	indirect effects to Orchards and Vineyards land covers; • preserve 515 acres more farmland, and would preserve farmland within a large SSHCP Preserve System; • mitigate impacts to Orchard and Vineyard land covers by preserving equal acres of Croplands and Irrigated Pasture land covers, which provide much higher quality habitat for the native wildlife community that uses farmland in the Planning Area; and • preserve farmland in larger preserves within an interconnected Preserve System, which would reduce habitat fragmentation effects on native wildlife in the Planning Area.			indirect effects to Orchards and Vineyards; • preserve higher quality farmland during the 30-year permit term by mitigating impact to Orchards and Vineyards with higher quality Cropland or Irrigated Pasture-Grassland; • preserve 381 less acres of Orchards and Vineyards over the 50-year EIS/EIR Study Period; • result in farmland preserves that are more contiguous, more interconnected, and within a larger Preserve System; and • result in management of preserved farmlands on a regional basis within the Preserve System, and under a comprehensive preserve management program.		
Cumulative Effects – Farmland (Orchards/Vineyards)						
Projects and activities implemented under the No Action/No Project Alternative are estimated to result in the direct loss of approximately 1,745 acres of existing Orchard and Vineyard. The regulatory environment of would require the preservation of approximately 1,566 acres of farmland of a similar category, which would permanently preserve those acres of farmland, but would still result in a net loss of 1,745 acres of farmland in the Planning Area. In addition, mitigation for impacts to farmland would continue to occur on a project by project basis, and would likely result of a pattern of farmland preserves that are geographically fragmented. Therefore, the incremental loss of Orchard and Vineyard under the No Action/No Project Alternative, when combined with the effects of past and current projects and the effects of the foreseeable future actions in the Study Area, would likely result in a less than significant cumulative effect to Orchard and Vineyard land covers.	The incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution the cumulative loss of farmland in the Study Area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to farmland throughout the Study Area, the 63-acre difference in direct impacts to Orchard and Vineyard land covers and the 515-acres difference in the preservation of farmland land covers is not discernibly different between the Proposed Action/ Proposed Project Alternative and the No Action/No Project Alternative.	No Cumulative Effect	None required	At the scale of impacts to Orchards and Vineyard throughout the Study Area, the 119-acre difference in direct impacts and the 381-acre difference in Orchards and Vineyard preservation under the Reduced Permit Term Alternative is not discernibly different from the impacts expected under the No Action/No Project Alternative.	No Cumulative Effect	None required
Direct and Indirect Effects – Wildlife Movement Corridors						
As compared to the Existing Condition, the No Action/No Project Alternative would: • impact the extreme northern most portion of the Coyote Creek; • directly and indirectly impact existing wildlife movement and dispersal along Laguna Creek corridor due to planned urban development, and associated human activities and recreation along creeks and streams within the UDA; and • impact Bear Slough-Browns Creek ECAs and the Coyote Creek- Dry Creek ECAs through some rural transportation projects.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • provide a coordinated, interconnected Preserve System designed to provide connectivity between existing preserves and new preserves established under the Proposed Action/Proposed Project; • require new development project to incorporate AMMs that would avoid or minimize effects on riparian corridors used for wildlife movement; • require new development projects inside the UDA and related roadway projects outside the UDA to incorporate wildlife crossing structures at specific locations; and • not result in displaced development outside the UDA, to locations that have a greater potential to affect designated wildlife movement corridors.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • provide a coordinated, interconnected Preserve System designed to provide connectivity between existing preserves and new preserves established under the Reduced Permit Term Alternative; • require new development projects implemented during the 30-year permit term to incorporate AMMs that would avoid or minimize effects on riparian corridors used for wildlife movement; • require new development projects inside the UDA and related roadway projects outside the UDA implemented during the 30-year permit term to incorporate wildlife crossing structures at specific locations; • not result in displaced development outside the UDA, to locations that have a greater potential to affect designated wildlife movement corridors.	Minor Beneficial Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
Cumulative Effects — Wildlife Movement Corridors						
the incremental loss and degradation of wildlife movement and corridors under the No Action/No Project Alternative would be a significant cumulative effect when considered together with the impacts to wildlife movement from by past and current human activities and the foreseeable other projects in the Study Area.	The incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution the cumulative loss of wildlife movement and dispersal in the Study Area, when compared to the incremental impact of the No Action/No Project Alternative. However, at the scale of wildlife movement throughout the Study Area, the difference in movement under the Proposed Action/Proposed Project Alternative when compared to impacts under the No Action/No Project Alternative is not discernibly different.	No Cumulative Effect	None required	The incremental impacts of the Reduced Permit Term Alternative would make a smaller contribution the cumulative loss of wildlife movement and dispersal in the Study Area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of wildlife movement throughout the Study Area, the difference in impacts to wildlife movement under the Reduced Permit Term Alternative when compared to expected impacts to wildlife movement under the No Action/No Project Alternative, is not discernibly different.	No Cumulative Effect	None required
SPECIAL-STATUS SPECIES INCLUDING HCP COVERED SPECIES						
Direct and Indirect Effects						
Refer to Table ES-2 for impact significance for each analyzed species.						
Cumulative Effects						
Refer to Table ES-2 for impact significance for each analyzed species.						
AQUATIC RESOURCES						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in the loss of 821 acres of wetland waters; • result in the loss of 359 other waters; • result in the loss of 427 acres of Riparian land cover types; • in total, result in the loss of 1,607 acres of aquatic resources; and • preserve 1,740 acres of aquatic resources.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • result in the loss of 855 acres of wetland waters, which is 34 more acres than the 821-acre loss anticipated under the No Action/No Project Alternative; • result in the loss of 294 other waters, which is 65 acres less than the 359-acre loss anticipated under the No Action/No Project Alternative; • result in the loss of 464 acres of Riparian land cover types, which is 37 acres more than the 427 acres expected under the No Action/No Project Alternative; • in total, result in the loss of 1,613 acres of aquatic resources, which is 5 acres greater loss of aquatic resources compared to the 1,607-acre loss of the No Action/No Project Alternative; • preserve 2,738 acres of aquatic resources, which is greater by 998 acres compared 1,740 acres under the No Action/No Project Alternative; • require AMMs such as increased Stream Setbacks that would be more protective to aquatic resources relative to the No Action/No project Alternative; • implement the SSHCP and ARP resulting in a greater area of aquatic resources protections and management than the No Action/No Project Alternative; and • improve aquatic resource abundance, diversity, and condition within the Planning Area over that expected under the No Action/No Project Alternative.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in the loss of 931 acres of wetland waters, which is 110 more acres than the 821-acre loss anticipated under the No Action/No Project Alternative; • result in the loss of 315 other waters, which is 44 acres less than the 359-acre loss anticipated under the No Action/No Project Alternative; • result in the loss of 485 acres of Riparian land cover types, which is 55 acres more than the 427 acres expected under the No Action/No Project Alternative; • in total, result in the loss of 1,728 acres of aquatic resources, which is 121 acres greater loss of aquatic resources compared to the No Action/No Project Alternative; • preserve 2,778 acres of aquatic resources, which is greater by 1,038 acres compared 1,740 acres under No Action/No Project Alternative; • require AMMs such as increased Stream Setbacks that would be more protective to aquatic resources relative to the No Action/No project Alternative. However, once the permit term has expired (Years 31–50 of the 50-year EIS/EIR Study Period) projects would be subject to the Avoidance and Minimization Measures of the No Action/Project alternative (which do not include, for example, the expectation of required Stream Setbacks); • implement the SSHCP and ARP for the first 30 years of the study period, and result in a greater area of aquatic resources preserved than the No Action/No Project Alternative; and	Minor Beneficial Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
				• improve aquatic resource abundance, diversity, and condition within the Planning Area over that expected under the No Action/No Project Alternative.		
Cumulative Effects						
Many of the foreseeable other projects and actions would not result in additional losses of aquatic resource functions and services from the study area because they would comply with existing regulatory requirements to avoid and minimize impacts to aquatic resources and to provide compensatory mitigation for unavoidable impacts. However, the foreseeable rural residential developments, the agricultural activities on private lands, and other future activities are likely to result in additional losses and additional adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period	Implementation of the SSHCP Conservation Strategy, including the SSHCP AMMs, the SSHCP ARP, and the interconnected SSHCP Preserve System is expected to result in more consistent and frequent conservation of aquatic resources compared to the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required	Implementation of the SSHCP Conservation Strategy, including the SSHCP AMMs, the SSHCP ARP, and the interconnected SSHCP Preserve System during the first 30 years of the study period is expected to result in more consistent and frequent conservation of aquatic resources compared to the No Action/No Project Alternative.	Minor Beneficial Cumulative Effect	None required
PALEONTOLOGICAL, CULTURAL, AND HISTORICAL RESOURCES						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in damage to cultural resources from construction in areas where cultural resources are present; • result in damage or destruction to historic resources, including structures and sites; and • potentially impact human remains due to ground disturbance during construction.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • not result in disturbance of up to 1,900 acres outside the UDA identified as "moderate" or "high" cultural resource sensitivity by Sacramento County; • provide additional setback preserves along stream, creeks, and riparian areas, which generally have the highest sensitivity for cultural resources in the Planning Area; and • result in similar effects to existing historical resources and paleontological resources.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • not result in disturbance of up to 1,900 acres outside the UDA identified as "moderate" or "high" cultural resource sensitivity by Sacramento County; • provide 30-years of additional protections for stream, creeks, and riparian areas, which generally have the highest sensitivity for cultural resources in the Planning Area; and • result in similar effects on historical resources and paleontological resources.	Minor Beneficial Effect	None required
Cumulative Effects						
Although the policies in the Sacramento County General Plan (Sacramento County 2011) and Rancho Cordova General Plan (Rancho Cordova 2013) are designed to minimize protect impacts to paleontological and cultural resources, additional losses of paleontological and cultural resources would result from the new urban development projects, activities, and actions included in the No Action/No Project Alternative. Therefore, the direct and indirect impacts of the No Action/No Project Alternative would further increase the significant loss of cultural and paleontological resources that already exists in the study area.	Compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would include less development outside the current Sacramento County USB boundary, where cultural resource sensitivity is higher. The Proposed Action/Proposed Project would also include stream setbacks on streams, creeks, and first and second order tributaries to those streams and creeks. Because stream/creek and riparian areas have greater cultural resource sensitivity, these setbacks would reduce the potential for impacts to cultural resources.	Minor Beneficial Cumulative Effect	None required	Compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would not displace or shift urban development outside the current Sacramento County USB boundary where cultural resource sensitivity is moderate or high. The Reduced Permit Term Alternative would also include 30 -years of additional setbacks between new urban development and UDA streams, creeks, and first and second order tributaries to those streams and creeks. Because stream/creek and riparian areas have greater cultural resource sensitivity, the 30 -years of larger and more numerous setbacks are expected to reduce impacts to cultural resources.	Minor Beneficial Cumulative Effect	None required
PUBLIC SERVICES AND FACILITIES						
Direct and Indirect Effects - Law Enforcement, Fire Protection, and Emergency Services						
As compared to the Existing Condition, the No Action/No Project Alternative would: • increase the potential for adverse physical impacts associated with the provision of law enforcement services, fire protection, or emergency services to meet demands of urban development outside the UDA; • increase demand for law enforcement, fire protection, or emergency	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • reduce the potential for adverse physical impacts associated with the provision of law enforcement services, fire protection, or emergency services to meet demands of urban development outside the UDA;	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • reduce the potential for adverse physical impacts associated with the provision of law enforcement services, fire protection, or emergency services to meet demands of urban development outside the UDA;	Minor Beneficial Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
services by displacing urban development to areas remote from existing concentrations of law enforcement services, fire protection, or emergency services; • not change demand for local fire departments or CAL FIRE beyond current levels as a result of preserve management activities; and • not impede delivery of fire, police, and emergency services to preserve areas by improving coordination with local and state service providers.	• reduce demand for law enforcement, fire protection, or emergency services by not resulting in urban development remote from existing concentrations of law enforcement services, fire protection, or emergency services; • not change demand for local fire departments or CAL FIRE beyond current levels as a result of preserve management activities; and • not impede delivery of fire, police, and emergency services to preserve areas by improving coordination with local and state service providers.			• reduce demand for law enforcement, fire protection, or emergency services by not resulting in urban development remote from existing concentrations of law enforcement services, fire protection, or emergency services; • not change demand for local fire departments or CAL FIRE beyond current levels as a result of preserve management activities; and • not impede delivery of fire, police, and emergency services to preserve areas by improving coordination with local and state service providers.		
Cumulative Effects - Law Enforcement, Fire Protection, and Emergency Services						
Development under the No Action/No Project Alternative would include additional demand for police and fire services after the time frame evaluated in General Plan EIRs of the Cities of Rancho Cordova and Galt and the County of Sacramento, ranging from 15 to 35 additional years. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. However, existing funding mechanisms for law enforcement, fire protection, and emergency services would ensure that the new development would also provide new funding for these services.	The Proposed Action/Proposed Project would not include urban development outside the UDA where law enforcement, fire protection, and emergency services are less available. The Proposed Action/Proposed Project would also improve coordination between Preserve Managers and local or state service providers. Therefore, the Proposed Action/Proposed Project would have a smaller incremental contribution to impacts on demand for new facilities or law enforcement services, fire protection, or emergency services as compared to the No Action/No Project alternative.	Minor Beneficial Cumulative Effect	None required	The Reduced Permit Term Alternative would not include urban development outside the UDA where law enforcement, fire protection, and emergency services are less available. The Reduced Permit Term Alternative would also improve coordination between Preserve Managers and local or state service providers and therefore would have a smaller incremental contribution to impacts on demand for new facilities of law enforcement services, fire protection, or emergency services as compared to the No Action/No Project alternative.	Minor Beneficial Cumulative Effect	None required
Direct and Indirect Effects - Water and Wastewater Services						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in impacts from expanding water and wastewater infrastructure to serve urban development urban development outside the UDA; • continue the potential for existing aquatic resources or future preserves to conflict with planned infrastructure development; and • increase the severity of the significant and unavoidable impacts to potable water supply and wastewater treatment identified previously for Sacramento County, Rancho Cordova, and Galt.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • reduce the impacts from expanding water and wastewater infrastructure to serve urban development urban development outside the UDA; • reduce the potential for existing aquatic resources or future preserves to conflict with planned infrastructure development; and • result in similar impacts on adequacy of water supply for full buildout of the project.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • reduce the impacts from expanding water and wastewater infrastructure to serve urban development urban development outside the UDA; • reduce the potential for existing aquatic resources or future preserves to conflict with planned infrastructure development; and • result in similar impacts on adequacy of water supply for full buildout of the project.	Minor Beneficial Effect	None required
Cumulative Effects - Water and Wastewater Services						
Cumulative effects on water and wastewater services not evaluated in the General Plan EIRs of the Cities of Rancho Cordova and Galt and the County of Sacramento would include the additional increment of growth in the Planning Area after the end of their study periods, which range from 15 to 35 years of additional growth and development. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. The additional demand for water and wastewater infrastructure outside the UDA from these projects would be offset through payment of fees by project developers and by rate increases passed on to residents of the Planning Area.	The Proposed Action/Proposed Project would not include urban development outside the UDA where water and wastewater infrastructure are less available, and would have a smaller incremental contribution to impacts on demand for new water or wastewater facilities as compared to the No Action/No Project alternative.	Minor Beneficial Cumulative Effect	None required	The Reduced Permit Term Alternative would not include urban development outside the UDA where water and wastewater infrastructure are less available, and would have a smaller incremental contribution to impacts on demand for new water or wastewater facilities as compared to the No Action/No Project alternative.	Minor Beneficial Cumulative Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
Direct and Indirect Effects - Solid Waste Disposal						
As compared to the Existing Condition, the No Action/No Project Alternative would: • be serviced by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and • not result in a demand for solid waste disposal services that cannot be met by existing or reasonably foreseeable future service capacity.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • be serviced by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and • result in the same demand for solid waste disposal services.	No Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • be serviced by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and • result in the same demand for solid waste disposal services.	No Effect	None required
Cumulative Effects - Solid Waste Disposal						
Cumulative effects to solid waste disposal under the No Action/No Project alternative that were not evaluated in the General Plan EIRs of the Cities of Rancho Cordova and Galt and the County of Sacramento would include the additional increment of growth in the Planning Area after the end of their study periods, which range from 15 to 35 years of additional growth and development. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. The additional demand for solid waste disposal from these projects would be offset through payment of fees by project developers and by rate increases passed on to residents of the Planning Area.	The urban development under the Proposed Action/Proposed Project would accommodate the same population increase as the No Action/No Project Alternative, and would generate approximately the same amount of solid waste.	No Cumulative Effect	None required	The urban development under the Reduced Permit Term Alternative would accommodate the same population increase as the No Action/No Project Alternative and would generate approximately the same amount of solid waste.	No Cumulative Effect	None required
Direct and Indirect Effects - Parks and Recreational Facilities						
As compared to the Existing Condition, the No Action/No Project Alternative would: • increase the potential for substantial adverse physical impacts associated with the provision of park and recreation services outside the UDA; and • allow for development of trails planned in the Sacramento County, Galt, or Rancho Cordova General Plan.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • reduce the potential for substantial adverse physical impacts associated with the provision of park and recreation services outside the UDA, or result in substantial physical deterioration of an existing facility due to increased use; and • allow for development of trails planned in the Sacramento County, Galt, or Rancho Cordova General Plan.	No Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • not result in substantial adverse physical impacts associated with the provision of park and recreation services, or result in substantial physical deterioration of an existing facility due to increased use; and • allow for development of trails planned in the Sacramento County, Galt, or Rancho Cordova General Plan.	No Effect	None required
Cumulative Effects - Parks and Recreational Facilities						
Under the No Action/No Project Alternative, parks and recreational facilities would continue to be developed along with urban development in the cumulative impacts study area, maintaining a similar per capita availability of parks and recreational facilities despite increases in population. This would also be the case for reasonably foreseeable other projects.	Urban development under the Proposed Action/Proposed Project would also increase the Planning Area population and result in increased demand for parks and recreational facilities, but this new urban development would generate fees and taxes to pay for additional parks and recreational facilities. The Proposed Action/Proposed Project Alternative would provide limited park and recreational facility benefits by providing nature trails in some preserves, designed consistent with AMMs NATURE TRAIL-1 through NATURE TRAIL-5.	No Cumulative Effect	None required	Urban development under the Reduced Permit Term Alternative would also increase the Planning Area population and result in increased demand for parks and recreational facilities, but as with the past, present, and reasonably foreseeable future projects, this new urban development would generate fees and taxes to pay for additional parks and recreational facilities. The Reduced Permit Term Alternative would provide limited park and recreational facility benefits by providing nature trails in some preserves established during the 30-year permit term, designed in a manner consistent with AMMs NATURE TRAIL-1 through NATURE TRAIL-5. Additional trails would likely be constructed within preserves that are established as mitigation for project impacts in years 31–50 of the EIS/EIR study period.	No Cumulative Effect	None required
Direct and Indirect Effects - Energy						
As compared to the Existing Condition, the No Action/No Project Alternative would: • increase the potential for impacts associated with building new electric	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • reduce the potential for impacts associated with building new	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • reduce the potential for impacts associated with building new	Minor Beneficial Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
or natural gas infrastructure to meet demands of urban development outside the UDA; • increase the potential for urban development patterns to conflict with regional energy infrastructure plans; and • increase demand for electricity and natural gas service because of increased urban development within the Planning Area.	electric or natural gas infrastructure to meet demands of urban development outside the UDA; • reduce the potential for urban development patterns to conflict with regional energy infrastructure plans; and • result in similar demand for electricity and natural gas service because total amounts of urban development within the Planning Area would be similar.			electric or natural gas infrastructure to meet demands of urban development outside the UDA; • reduce the potential for urban development patterns to conflict with regional energy infrastructure plans; and • result in similar demand for electricity and natural gas service because total amounts of urban development within the Planning Area would be similar.		
Cumulative Effects - Energy						
Cumulative effects to energy not evaluated in the General Plan EIRs of Rancho Cordova, Galt and the Sacramento County would include the additional increment of growth in the Planning Area after the end of their study periods, which range from 15 to 35 years of additional growth and development. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. The additional demand for energy infrastructure outside the UDA from these projects would be offset by rate increases passed on to residents of the Planning Area.	Additional development from urban development under the Proposed Action/Proposed Project would offset its impacts similarly to the No Action/No Project Alternative, through payment of usage fees. Because the Proposed Action/Proposed Project would include an Aquatic Resources Plan and expedited permitting process for aquatic resources, proponents constructing or expanding energy infrastructure would be less likely to have to develop alternative routes to avoid wetlands and waters. Generally, development of utility infrastructure within the Preserve System could occur as long as those projects complied with SSHCP AMMs.	No Cumulative Effect	None required	Additional development from urban development under the Reduced Permit Term Alternative would offset its impacts similarly to the No Action/No Project Alternative, through payment of usage fees. Because the Proposed Action/Proposed Project would include an Aquatic Resources Plan and expedited permitting process for aquatic resources, proponents constructing or expanding energy infrastructure would be less likely to have to develop alternative routes to avoid wetlands and waters. Generally, development of utility infrastructure within the Preserve System could occur as long as those projects complied with SSHCP AMMs.	No Cumulative Effect	None required
Direct and Indirect Effects - Mosquito Abatement						
As compared to the Existing Condition, the No Action/No Project Alternative would: • potentially create more new breeding areas for mosquitos; and • potentially restrict mosquito abatement activities within preserves.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • potentially create more new breeding areas for mosquitos, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health; and • potentially restrict mosquito abatement activities within preserves, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health.	Less Than Significant Adverse Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • potentially create more new breeding areas for mosquitos, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health; and • potentially restrict mosquito abatement activities within preserves, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health.	Less Than Significant Adverse Effect	None required
Cumulative Effects - Mosquito Abatement						
Existing patterns of development have resulted in avoidance of wetlands, establishment of on-site preserves, and on-site wetland establishment projects, which expose residents and employees to potential mosquito hazards. The lead agencies anticipate that avoidance of wetlands, establishment of on-site preserves, and wetland establishment projects would continue to be a common mitigation strategy under the No Action/No Project Alternative. However, funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so any additional demand for mosquito abatement would be met.	The Proposed Action/Proposed Project would contribute to cumulative impacts on mosquito abatement by establishing new aquatic resources and potentially making it more difficult to conduct mosquito abatement activities on preserves. However, the Preserve System would be carefully monitored and managed to avoid the aquatic resource conditions conducive to mosquito breeding. Further, funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so additional demand for mosquito abatement would be met.	Less Than Significant Adverse Cumulative Effect	None required	The Reduced Permit Term Alternative would contribute to cumulative impacts on mosquito abatement by establishing new aquatic resources and potentially making it more difficult to conduct mosquito abatement activities on preserves. However, the conceptual preserve system would be carefully monitored and managed to avoid the aquatic resource conditions conducive to mosquito breeding. Further, funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so additional demand for mosquito abatement would be met.	Less Than Significant Adverse Cumulative Effect	None required
TRAFFIC AND CIRCULATION						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would:	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:	Minor Beneficial Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
• increase vehicle trips, demand on transit to serve outlying areas, and overall demand on the local and regional transportation system by resulting in displacement and shifting of urban development outside the UDA; • increase potential conflicts with future planned roadways, extensions of existing roadways, and roadway widening and improvements that are planned in the Sacramento County, Galt, and Rancho Cordova General Plan Circulation Elements; • result in a minimal amount of additional vehicle trips for management and monitoring of mitigation preserves; and • result in a minimal amount of additional heavy vehicle trips for habitat re-establishment/ establishment on mitigation preserves.	• reduce vehicle trips, demand on transit to serve outlying areas, and overall demand on the local and regional transportation system by not resulting in displacement and shifting of urban development outside the UDA; • reduce potential conflicts with future planned roadways, extensions of existing roadways, and roadway widening and improvements that are planned in the Sacramento County, Galt, and Rancho Cordova General Plan Circulation Elements; • result in a minimal amount of additional vehicle trips for preserve system management and monitoring; and • result in a minimal amount of additional heavy vehicle trips for preserve system habitat re-establishment/establishment.			• reduce vehicle trips, demand on transit to serve outlying areas, and overall demand on the local and regional transportation system by not resulting in displacement and shifting of urban development outside the UDA; • reduce potential conflicts with future planned roadways, extensions of existing roadways, and roadway widening and improvements that are planned in the Sacramento County, Galt, and Rancho Cordova General Plan Circulation Elements; • result in a minimal amount of additional vehicle trips for preserve system management and monitoring; and • result in a minimal amount of additional heavy vehicle trips for preserve system habitat re-establishment/establishment.		
Cumulative Effects						
The future traffic impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative impacts of the No Action/No Project Alternative on existing and future traffic and circulation are identical to the direct and indirect impacts.	The future traffic impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative impacts of the Proposed Project/Proposed Action on existing and future traffic and circulation are identical to the direct and indirect impacts	N/A	None required	The future traffic impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative impacts of the Reduced Permit Term Alternative on existing and future traffic and circulation are identical to the direct and indirect impacts	N/A	None required
AIR QUALITY						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in increased mobile-source criteria pollutant, TAC, and odor emissions, and dust emissions from construction of urban development; • result in increased CO emissions during construction of urban development; • result in increased mobile-source criteria pollutant emissions from operation of urban development; • result in increased emissions of criteria pollutants, TACs, and odors from stationary and area wide sources associated with operation of urban development; • result in increased CO emissions during the operation of urban development; • result in increased exposure of sensitive receptors to mobile source TACs and odors from operation of urban development; • result in increased mobile source emissions from operation of mitigation preserves; and • result in increased exposure of sensitive receptors to TACs, odors, and CO from operation of mitigation preserves.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • result in reduced mobile-source criteria pollutant, TAC, and odor emissions, and dust emissions from construction of urban development and preserve establishment; • result in similar CO emissions during construction of urban development and preserve establishment; • result in reduced mobile-source criteria pollutant emissions from operation of urban development; • result in similar emissions of criteria pollutants, TACs, and odors from stationary and area wide sources associated with operation of urban development; • result in similar CO emissions during the operation of urban development; • result in similar exposure of sensitive receptors to mobile source TACs and odors from operation of urban development; • result in reduced mobile source emissions from preserve system operation; and • result in similar exposure of sensitive receptors to TACs, odors, and CO from preserve system operation.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in reduced mobile-source criteria pollutant, TAC, and odor emissions, and dust emissions from construction of urban development and preserve establishment; • result in similar CO emissions and concentrations during construction of urban development and preserve establishment; • result in reduced mobile-source criteria pollutant emissions from operation of urban development; • result in similar emissions of criteria pollutants, TACs, and odors from stationary and area wide sources associated with operation of urban development; • result in similar CO emissions during the operation of urban development; • result in similar exposure of sensitive receptors to mobile source TACs and odors from operation of urban development; • result in reduced mobile source emissions from preserve system operation; and • result in similar exposure of sensitive receptors to TACs, odors, and CO from preserve system operation.	Minor Beneficial Effect	None required
Cumulative Effects						
The construction, stationary, and mobile source air emissions from these foreseeable other projects were generally included in the analysis of cumulative air emissions impacts incorporated from the General Plan EIRs. These General Plan EIRs identified significant and unavoidable air quality impacts from	Various elements of the Proposed Action/Proposed Project Alternative would reduce emissions of criteria pollutants compared to the No Action/No Project Alternative, including more effective emission reductions from implementation of AMMs and the lack of	Minor Beneficial Cumulative Effect	None required	Various elements of the Reduced Permit Term Alternative would reduce emissions of criteria pollutants compared to the No Action/No Project Alternative, including more effective emission reductions from implementation of AMMs and the lack of urban development being	Minor Beneficial Cumulative Effect	None required

Table ES-1. Summary of Impacts and Mitigation

No Action/No Project Alternative	Proposed Action/Proposed Project Alternative			Reduced Permit Term Alternative		
Impact	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*	*Impact*	*CEQA/NEPA Significance*	*Mitigation Measures*
emissions of criteria pollutants during construction and operation. Consequently, the combination of past, present, and reasonably foreseeable future projects would result in continued significant adverse cumulative air quality effects, with the SVAB likely remaining in non-attainment for ozone, PM10, and PM2.5. As discussed above, the direct and indirect impacts of No Action/No Project Alternative would adversely affect existing air quality through the emissions of criteria pollutants.	urban development being shifted or displaced outside the USB, thereby reducing VMT. The reduced emissions result in the minor beneficial effects identified above, and the Proposed Action/Proposed Project Alternative would make a smaller incremental contribution to any cumulative air quality impacts when compared to the incremental effects of the No Action/No Project Alternative.			shifted or displaced outside the USB, thereby reducing VMT. The reduced emissions result in the minor beneficial effects identified above, and the Reduced Permit Term Alternative would make a smaller incremental contribution to any cumulative air quality impacts when compared to the incremental effects of the No Action/No Project Alternative.		
GREENHOUSE GASES AND CLIMATE CHANGE						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in increased GHG emissions from construction of urban development; • result in increased GHG emissions from mitigation preserve construction/establishment; • result in increased GHG emissions from operations of urban development; • result in increased GHG emissions from the loss of carbon-sequestering terrestrial land covers; and • result in little difference in GHG emissions resulting from mitigation preserve management.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • result in a net reduction in GHG emissions from construction of urban development; • result in net reduction in GHG emissions from preserve system construction/establishment; • result in a net reduction in GHG emissions from operations of urban development; • result in a net reduction in GHG emissions from the loss of carbon-sequestering terrestrial land covers; • result in little difference in GHG emissions from preserve system management; and • result in a preserve system that is more resilient to climate change.	Minor Beneficial Effect	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in a net reduction in GHG emissions from construction of urban development; • result in a net reduction in GHG emissions resulting from operations of urban development; • result in a negligible difference in GHG emissions from the loss of carbon-sequestering terrestrial land covers; • result in little difference in GHG emissions from preserve system construction/ establishment; • result in little difference in GHG emissions from preserve system management; and • result in a preserve system that is more resilient to climate change.	Minor Beneficial Effect	None required
Cumulative Effects						
The GHG emission impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative GHG emission impacts of the No Action/No Project Alternative are identical to the direct and indirect impacts.	The GHG emission impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative GHG emission impacts of the Proposed Action/Proposed Project Alternative are identical to the direct and indirect impacts.	N/A	None required	The GHG emission impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative GHG emission impacts of the Reduced Permit Term Alternative are identical to the direct and indirect impacts.	N/A	None required
POPULATION AND HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE						
Direct and Indirect Effects						
As compared to the Existing Condition, the No Action/No Project Alternative would: • result in conversion of grazing land and farmland to developed land uses, reducing agricultural employment. • not impede meeting current or future residential development needs. • not result in a substantial displacement of housing units or people; and • positively affect low –income and minority populations through establishment of preserves in the UDA.	As compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would: • result in similar population and housing impacts; • result in similar socioeconomic impacts; and • result in similar environmental justice impacts.	No Impact	None required	As compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would: • result in similar population and housing impacts; • result in similar socioeconomic impacts; and • result in similar environmental justice impacts.	Minor Beneficial Effect	None required
Cumulative Effects						
The No Action/No Project Alternative, when considered with past, present, and other reasonably foreseeable projects would result in greater opportunities to live and/or work near quality transit, provide for more access to parks and higher education, and would not displace housing, businesses, or populations.	The incremental direct and indirect effects on population and housing, socioeconomics, and environmental justice under the Proposed Action/Proposed Project Alternative are similar to the incremental effects of the No Action/No Project Alternative.	No Cumulative Impact	None required	The incremental direct and indirect effects on population and housing, socioeconomics, and environmental justice under the Reduced Permit Term Alternative are similar to the incremental effects of the No Action/No Project Alternative.	No Cumulative Impact	None required

Table ES-2. Summary of Impacts to Special-Status Species, Including Covered Species

Species Common Name	Covered Species?	Significance of Impacts to Species Relative to No Action/No Project Alternative Baseline Condition	
		Proposed Action/ Proposed Project	*Reduced Permit Term Alternative*
Vernal Pool Tadpole Shrimp	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Vernal Pool Fairy Shrimp	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Mid-Valley Fairy Shrimp	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Ricksecker's Water Scavenger Beetle	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Dwarf Downingia	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Ahart's Dwarf Rush	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Pincushion Navarretia	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Slender Orcutt Grass	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Sacramento Orcutt Grass	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Boggs Lake Hedge-Hyssop	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Legenere	Y	Significant Beneficial Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Valley Elderberry Longhorn Beetle	Y	Minor Beneficial Effect No Cumulative Effect	No Effect No Cumulative Effect
California Tiger Salamander (Central Valley population)	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Minor Beneficial Effect No Cumulative Effect
Western Spadefoot	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	No Effect No Cumulative Effect
Giant Garter Snake	Y	Minor Beneficial Effect Minor Beneficial Cumulative Effect	No Effect No Cumulative Effect
Western Pond Turtle	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Significant Beneficial Effect Minor Beneficial Cumulative Effect
Cooper's Hawk	Y	Minor Beneficial Effect No Cumulative Effect	Minor Beneficial Effect No Cumulative Effect
Tricolored Blackbird	Y	Significant Beneficial Effect Significant Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Western Burrowing Owl	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Ferruginous Hawk	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Swainson's Hawk	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect

Table ES-2. Summary of Impacts to Special-Status Species, Including Covered Species

Species Common Name	Covered Species?	Significance of Impacts to Species Relative to No Action/No Project Alternative Baseline Condition	
		Proposed Action/ Proposed Project	*Reduced Permit Term Alternative*
Northern Harrier	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Minor Beneficial Effect No Cumulative Effect
White-Tailed Kite	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Minor Beneficial Effect No Cumulative Effect
Greater Sandhill Crane	Y	Minor Beneficial Effect No Cumulative Effect	Minor Beneficial Effect No Cumulative Effect
Lesser Sandhill Crane	N	Minor Beneficial Effect No Cumulative Effect	Minor Beneficial Effect No Cumulative Effect
Loggerhead Shrike	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Grasshopper Sparrow	N	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Song Sparrow (Modesto population)	N	Minor Beneficial Effect No Cumulative Effect	Minor Beneficial Effect No Cumulative Effect
Bank Swallow	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Western Red Bat	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
American Badger	Y	Significant Beneficial Effect Minor Beneficial Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Sanford's Arrowhead	Y	Minor Beneficial Effect Minor Beneficial Cumulative Effect	Minor Beneficial Effect Minor Beneficial Cumulative Effect
Watershield	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Bristly sedge	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Fleshy owl's clover	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Brandegee's clarkia	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Bolander's water-hemlock	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Peruvian dodder	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Tuolumne button-celery	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Stinkbells	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Woolly rose-mallow	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Northern California black walnut	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect

Table ES-2. Summary of Impacts to Special-Status Species, Including Covered Species

Species Common Name	Covered Species?	Significance of Impacts to Species Relative to No Action/No Project Alternative Baseline Condition	
		Proposed Action/ Proposed Project	*Reduced Permit Term Alternative*
Delta tule pea	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Heckard's pepper-grass	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Mason's lilaeopsis	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Delta mudwort	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect
Marsh skullcap	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Side-flowering skullcap	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Suisun Marsh aster	N	Less than Significant Adverse Effect No Cumulative Effect	Significant Beneficial Effect No Cumulative Effect
Saline clover	N	Less than Significant Adverse Effect No Cumulative Effect	Less than Significant Adverse Effect No Cumulative Effect

CHAPTER 1 – INTRODUCTION/PURPOSE AND NEED

This joint Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) (EIS/EIR) evaluates the impacts associated with implementing all elements of the South Sacramento Habitat Conservation Plan (SSHCP or Plan) and issuing an associated Endangered Species Act Incidental Take Permit (ESA ITP) and California Endangered Species Act Incidental Take Permit (CESA ITP).

One purpose of this joint EIS/EIR is to inform decision makers and the public of the effects on the human environment of the approval of the SSHCP, issuance of ITPs to local entities, and the future implementation of the SSHCP. This joint EIS/EIR also provides measures to mitigate impacts and presents reasonable alternatives that could reduce the significant environmental impacts of the proposed action to a less-than-significant level.

This EIS/EIR was prepared pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [U.S.C.] 4321–4347 et seq.), the California Environmental Quality Act (CEQA) (California Public Resources Code, Section 21000 et seq.), the regulations for implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508 and 43 CFR Part 46), and the Guidelines for Implementing CEQA (CEQA Guidelines) (Section 15000 et seq.).

The U.S. Fish and Wildlife Service (USFWS) is the lead agency under NEPA, and Sacramento County (the County) is the lead agency under CEQA in the preparation of this joint EIS/EIR.

The Draft EIS/EIR and Draft SSHCP were released for concurrent public reviews on June 2, 2017, when the USFWS published a Notice of Availability (NOA) for both documents (82 FR 25612), and the County published an NOA for the Draft EIS/EIR with the California State Clearinghouse (control number 2003-0637). Separately, the U.S. Army Corps of Engineers (USACE) released their draft Clean Water Act (CWA) Permitting Strategy for the SSHCP.

Pursuant to ESA Section 10 policy, the USFWS provided a minimum 90-day public review and comment period for both draft documents, which ended on September 5, 2017. A total of 26 comment letters were received on the Draft EIS/EIR, the Draft SSHCP, and the CWA Permitting Strategy. During the 90-day comment period, the lead agencies and the SSHCP Plan Partners jointly conducted three public meetings in Wilton, Rancho Cordova, and Galt, to provide additional opportunities for the public to provide comments on the Draft SSHCP and the Draft EIS/EIR (see NOAs for locations). A total of two comment letters were submitted at these public meetings. An additional 24 comment letters were submitted to the lead agencies during the 90-day public comment period.

The lead agencies prepared responses to comments on the Draft EIS/EIR, and the Plan Partners prepared responses to comments on the Draft SSHCP in collaboration with the USFWS (see Final EIS/EIR Chapter 19). The USACE prepared the responses to comments on their Public Notice (Chapter 19). If a response to a comment on the Draft SSHCP resulted in

changes to the Final SSHCP, those changes were carried into the project description of the Proposed Action/Proposed Project Alternative in the Final EIS/EIR. Likewise, if the response to comments on the USACE Public Notice resulted in changes to the proposed CWA Permit Strategy, those changes were copied into relevant sections of the Final SSHCP, and into the description of the Proposed Action/Proposed Project Alternative in the Final EIS/EIR, as needed. Using this process, the Proposed Action/Proposed Project Alternative that is described and studied in the Final EIS/EIR is consistent with the Final SSHCP. Overall, the environmental impacts of the Proposed Action/Proposed Project Alternative remained similar relative to the impacts described in the Draft EIS/EIR, because the scope of changes to the Proposed Action/Proposed Project Alternative was minimal.

Substantive changes in the Final EIS/EIR are clearly marked. Changes from the Draft EIS/EIR resulting in added text are shown with bold underline. Changes from the Draft EIS/EIR resulting in deleted text are shown with ~~strikethrough~~.

1.1 SSHCP OVERVIEW

The following local agencies are jointly applying for species ITPs from the state and federal Wildlife Agencies (USFWS and California Department of Fish and Wildlife [CDFW]):

- Sacramento County
- The City of Galt
- The City of Rancho Cordova
- The Sacramento County Water Agency (SCWA)
- The Capital Southeast Connector Joint Powers Authority (Connector JPA)
- The future South Sacramento Conservation Agency (SSHCP Implementing Entity).

These six entities are the Permit Applicants. Together, they are applying for an ITP from the USFWS, pursuant to Section 10(a)(1)(B) of the ESA, and for an ITP from the CDFW, pursuant to Section 2081 of the California Fish and Game Code. The ITPs would authorize take[1] of certain

[1] "Take" is defined in the ESA as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting or attempting to engage in any such conduct. "Harass" is defined by the USFWS as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns (which include, but are not limited to, breeding feeding, or sheltering). "Harm" in the definition of take is further defined by USFWS to mean an act which actually kills or injures wildlife; such acts may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding feeding, or sheltering (50 CFR 17.3).

"Take" is defined in Section 86 of the California Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" a threatened or endangered species. Under CESA (which is

state-listed species, certain federally listed species, and other SSHCP Covered Species during the course of implementing otherwise lawful SSHCP Covered Activities that are described in Chapter 2, Alternatives, Including the Proposed Action/Proposed Project. The Permit Applicants are seeking ITPs with a 50-year permit term; however, this EIS/EIR also analyzes an action alternative with a shorter permit term.

The future SSHCP Implementing Entity would be a joint exercise of powers authority (JPA) called the South Sacramento Conservation Agency. This SSHCP Implementing Entity would be composed of a JPA Governing Board (JPA Board), an Implementation Commission, and an executive director and staff to help with day-to-day implementation of the SSHCP. The Implementing Entity would also be a permittee on the state and federal ITPs.

As a required component of the application for an ITP, the Permit Applicants have prepared the SSHCP, a habitat conservation plan (HCP) under Section 10 of the ESA. The SSHCP is intended to support the issuance of both the ESA and the CESA ITPs by providing a long-term conservation plan to minimize impacts to and permanently conserve the native species and all natural communities of the Planning Area, while allowing for planned future urban development and other Covered Activities that comply with local policies and regulations. The SSHCP identifies where future Covered Activities would likely impact Covered Species, natural communities, and aquatic resources, and presents a comprehensive regional strategy for the avoidance, minimization, and mitigation of those impacts.

The Permit Applicants have also prepared the SSHCP Aquatic Resources Plan (the ARP) to accompany the SSHCP, which proposes a locally based program for permitting future SSHCP Covered Activities that impact aquatic resources. The proposed SSHCP identifies future Covered Activity impacts to aquatic resources in the Planning Area, and provides a strategy to maximize the avoidance, minimization, and compensatory mitigation of aquatic resource impacts.

The three Land Use Authority Permit Applicants (i.e., Sacramento County, Galt, and Rancho Cordova) are using the SSHCP and the ARP to request that the USACE develop a (CWA Section 404 permit~~ting~~ strategy for future SSHCP Covered Activities that discharge dredged or fill material to wetlands and other waters of the United States. The Land Use Authority Permit Applicants are also requesting the Central Valley Regional Water Quality Control Board (RWQCB) develop a parallel multilevel CWA Section 401 permitting process for obtaining water quality certifications

included within the California Fish and Game Code), an endangered species is "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range." A threatened species is "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts."

for future SSHCP Covered Activities, and a process for issuing reports of waste discharge under the California Porter-Cologne Water Quality Control Act (Porter-Cologne). In addition, the three Land Use Authority Permit Applicants (i.e., Sacramento County, Galt, and Rancho Cordova) are requesting that the CDFW develop a Master Streambed Alteration Agreement for future SSHCP Covered Activities (see Section 1.5, Decisions to be Made).

1.1.1 Geographic Scope of the EIS/EIR Planning Area

The Permit Applicants began the HCP planning process by identifying the areas where planned future growth and development may occur, and where future growth and development may affect state and federally protected species. The Planning Area is defined as the area in which all SSHCP Covered Activities (projects and activities) and all SSHCP habitat conservation actions, projects, and activities would be implemented, and where all associated incidental take of species would occur. The boundary of the Planning Area was defined by the Permit Applicants using both jurisdictional and ecological factors.

The Planning Area encompasses approximately 317,655 acres within south Sacramento County, as shown on Figure 1-1, South Sacramento Habitat Conservation Plan Area. The Planning Area includes Galt and Galt's sphere of influence, and the portion of Rancho Cordova that is located south of U.S. Highway 50. The geographical boundaries of the Planning Area are U.S. Highway 50 and White Rock Road to the north, the Sacramento River levee and County Road J11 (Walnut Grove-Thornton Road) to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and with the San Joaquin County to the south.

The Planning Area excludes the northern portion of Sacramento County, the portion of Rancho Cordova located north of U.S. Highway 50, the City of Sacramento, Elk Grove, Folsom, sovereign lands of the Miwok Tribe, and the Sacramento County community of Rancho Murieta (see Figure 1-1).

The SSHCP refers to the portion of the Planning Area where future urban development Covered Activities[2] would occur as the "Urban Development Area" (the UDA). Sacramento County has previously adopted an Urban Service Boundary (USB) to demarcate the ultimate extent to which the County would provide future urban services, such as sanitary sewer and water supply. Consequently, the portion of Sacramento County USB that is within the Planning Area is part of the SSHCP's UDA. The portion of the Rancho Cordova's sphere of influence that is within

[2] Covered Activities are future activities and projects over which an ITP permit applicant would have jurisdiction or another form of control, are likely to result in species incidental take, and are reasonably certain to occur over the proposed term of the ITP (USFWS and NOAA 2016). The SSHCP Covered Activities primarily consist of new urban development in the UDA, rural transportation projects and water recycling infrastructure outside the UDA, and management actions on future habitat preserves.

the boundaries of the Planning Area is also part of the UDA. The UDA also includes all lands within Galt and within Galt's sphere of influence (Figure 1-1). Approximately 67,618 acres within the Planning Area are also within the UDA.

The boundaries of the Planning Area also define the Planning Area used in this EIS/EIR. The EIS/EIR uses the term "Planning Area" because, as identified previously, the EIS/EIR evaluates alternatives to the proposed SSHCP. As described in Chapter 2, Section 2.1, Approach to Developing Alternatives, the lead agencies considered alternatives that might have smaller or different Planning Area boundaries. For these reasons, the term "Planning Area" is used in the EIS/EIR and indicates the geographic area for which the EIS/EIR provides analysis. The term "UDA" and the boundaries of the UDA are also used in the definition of the EIS/EIR Planning Area.

1.2 OVERVIEW OF NEPA AND CEQA

1.2.1 NEPA

NEPA requires federal agencies to conduct an environmental review before undertaking any discretionary actions, including any activities they implement, manage, permit, or fund. The NEPA process is intended to help federal officials make decisions that are based on an understanding of the environmental consequences of their decision, and to take actions that protect, restore, and enhance the environment. NEPA requires all federal agencies to solicit and to consider public input and comments on the environmental implications of their proposed actions through the preparation of appropriate documents. All federal agencies must use a systematic and interdisciplinary approach when preparing NEPA documents to ensure the integrated use of the natural and social sciences in planning and in all decision making that may have an impact on the human environment. The Office of the President's Council on Environmental Quality (the CEQ) has prepared NEPA regulations and guidance documents that federal agencies must follow (40 CFR Parts 1500–1508).

The USFWS, as the lead federal lead agency preparing this document, has determined that the issuance of an ITP to the Permit Applicants under Section 10 of the ESA would constitute a discretionary federal action likely to result in a significant effect on the human environment, and, thus, the preparation of an EIS is warranted.

Upon request of the lead agency, other federal agencies that have jurisdiction by law shall be a Cooperating Agency in the preparation of an EIS. Other federal, state, tribal, or local agencies that have special expertise with respect to an environmental issue analyzed in the EIS may be a Cooperating Agency in the preparation of an EIS. The Cooperating Agencies participate in the NEPA process at the earliest possible time; identify issues to be addressed in the EIS; collect and/or assemble necessary resource data; analyze data; develop alternatives; evaluate

alternatives; and estimate effects of implementing each alternative (40 CFR 1501.6; 43 CFR 46.230). A federal cooperating agency may adopt the EIS of a lead agency without recirculating when, after an independent review of the statement, the cooperating agency concludes that its suggestions and comments have been satisfied (40 CFR 1506.3[c]).

The USACE, the U.S. Environmental Protection Agency (EPA), and the CDFW have agreed to be Cooperating Agencies in the preparation of this EIS/EIR because of their jurisdiction by law and because of their special expertise on the environmental issues analyzed in this EIS/EIR.

1.2.2 CEQA

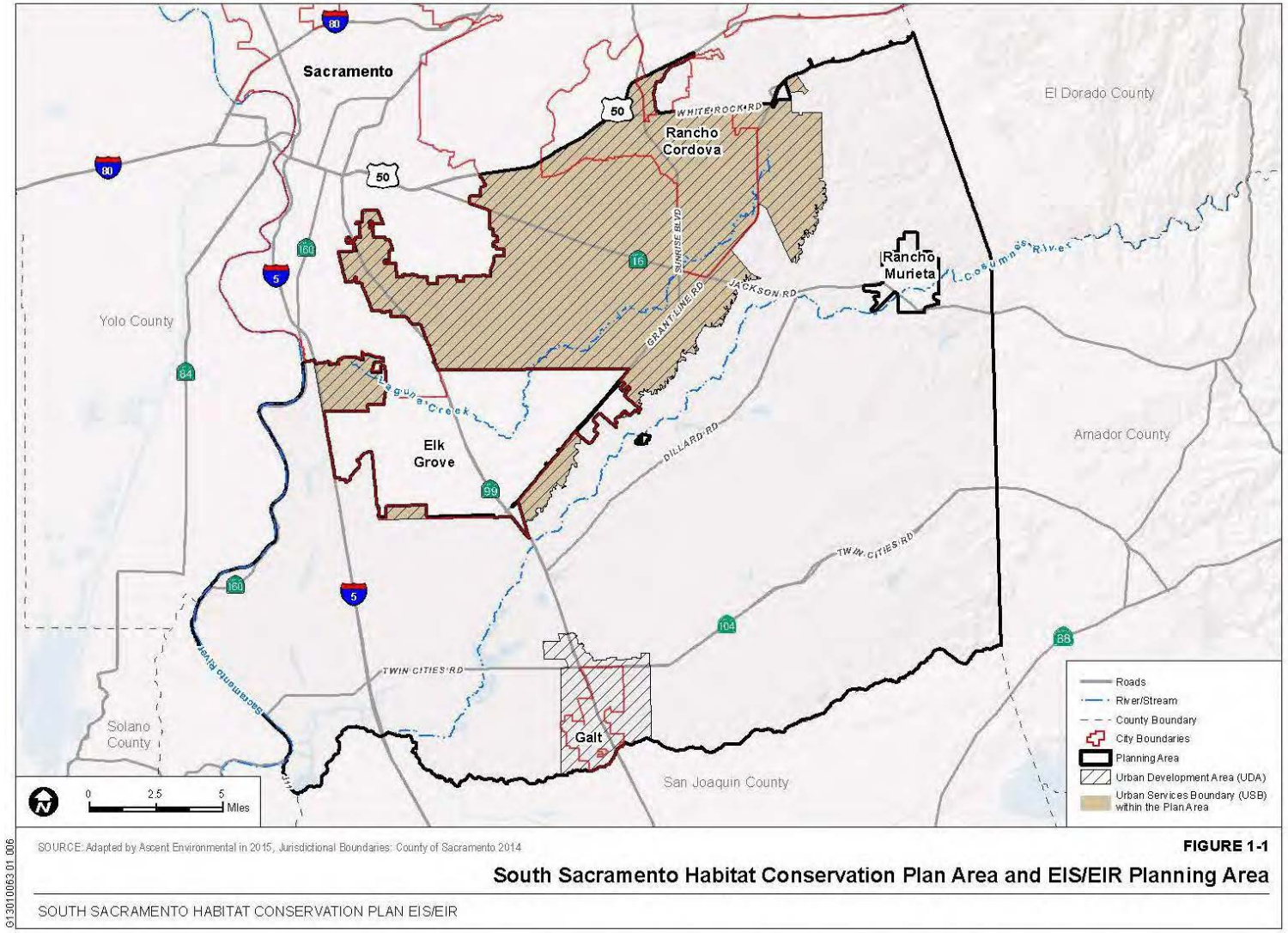
CEQA requires state and local agencies to evaluate the environmental implications of their actions and aims to prevent significant environmental impacts of those actions by requiring agencies, when feasible, to avoid significant environmental impacts or reduce them through the adoption of feasible mitigation measures. Like NEPA, CEQA requires all agencies to consider and publicly disclose the environmental implications of their proposed actions through the preparation of appropriate documents. CEQA requires that the state or local lead agency prepare an EIR when the lead agency determines that a project may have a significant effect on the environment. CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies. Sacramento County is the CEQA lead agency preparing this document and has determined that an EIR must be prepared for the proposed project because implementation of the SSHCP may result in a significant effect on the environment.

In addition to lead agencies, CEQA responsible agencies and CEQA trustee agencies have roles in the environmental review process. A responsible agency under CEQA is a state or local public agency other than the CEQA lead agency that has discretionary approval over all or a part of the project (CEQA Guidelines, Section 15381). A CEQA trustee agency is a state agency that has jurisdiction by law over natural resources affected by a project that are held in trust for the people of California (CEQA Guidelines, 15386).

All of the Permit Applicants are either a CEQA lead agency (Sacramento County) or CEQA responsible agencies (Galt, Rancho Cordova, SCWA, and the Connector JPA), and all Permit Applicants are responsible for discretionary approvals of the SSHCP and would be responsible for the future implementation of the SSHCP.

CDFW is a responsible agency under CEQA because it would approve the SSHCP and would issue a CESA ITP for the state-listed SSHCP Covered Species. In addition, as discussed in Section 1.5.6, the Permit Applicants are requesting that the CDFW develop and approve a programmatic Streambed Alteration Agreement for all future SSHCP Covered Activity projects and activities.

Figure 1-1 South Sacramento Habitat Conservation Plan Area



INTENTIONALLY LEFT BLANK

CDFW is also a trustee agency under CEQA because it has jurisdiction by law over natural resources that would be affected by the operational SSHCP, including the fish and wildlife the state-designated natural communities present in the Planning Area, state-designated rare or endangered native plants, game refuges, and ecological reserves.

The RWQCB is a CEQA responsible agency because it would take action on any associated water quality certifications and/or waste discharge requirements.

Other trustee agencies include the California State Lands Commission with regard to state-owned "sovereign" lands, such as the beds of navigable waters and state school lands, and the California State Department of Parks and Recreation with regard to units of the State Park System.

1.2.3 Joint Documentation

USFWS is a federal governmental agency within the U.S. Department of the Interior. The CEQ NEPA regulations (40 CFR 1506.2), the Department of the Interior NEPA regulations (43 CFR 46.440), and the Department of the Interior Manual (516 DM 4.18), require federal agencies to eliminate duplication between NEPA requirements and state or local environmental requirements by preparing joint documents when possible. Similarly, CEQA and the CEQA Guidelines strongly encourage state and local agencies to prepare a combined EIS/EIR that satisfies both NEPA and CEQA (California Public Resources Code, Section 21083.6; CEQA Guidelines, Section 15222). Given these regulations and guidance, and the efficiencies, cost savings, and other benefits associated with intra-agency collaboration on a joint NEPA/CEQA document, the lead agencies are preparing this joint EIS/EIR.

Although there are many requirements of CEQA and NEPA that are the same or are similar, there are some important terminology differences between the two laws. Table 3-1 in Chapter 3 lists the most common terms under each law and correlates them to terms of the opposite law that are used in a similar manner.

1.3 PURPOSE, NEED, AND OBJECTIVES

NEPA regulations require that each EIS briefly describe the underlying purpose and need to which the lead agency is responding in proposing the alternatives, including the proposed action (40 CFR 1502.13). The "need "for lead agency action refers to an underlying problem or opportunity to which an agency is responding. Often a need is described as a condition requiring relief (i.e., the presence of something not wanted), or is described as the lack of something requisite, desirable, or useful (i.e., the lack of something wanted). The "purpose" refers to a goal or objective that the lead agency is trying to achieve and should be stated, to the extent possible, in terms of desired outcomes (43 CFR 46.420). Often a purpose is described as a goal or an end to be attained. Similarly, CEQA requires an EIR to contain a statement of the

"objectives" sought by the proposed project. The CEQA statement of objectives should include the underlying purpose of the project (CEQA Guidelines, Section 15124[b]).

Identifying the needs, purposes, and objectives of the project and action help the lead agencies develop and determine the range of alternatives to be analyzed, and they provide a basis for the selection of an alternative by the lead agency decision makers (43 CFR 46.420; CEQA Guidelines, Section 15124[b]).

1.3.1 Background Information

Land Cover Conversion, Native Species, and Aquatic Resources

Current habitat conditions in the Planning Area reflect a history of human modification of the pre-European settlement natural landscape. After the founding of Sacramento County in 1850, through the first half of the twentieth century, a dominant human activity in the western part of the Planning Area was the conversion of natural land covers to agricultural row crops (cropland), with a corresponding loss of suitable habitat for many Planning Area native plant and wildlife species. The eastern part of the Planning Area was used primarily for grazing cattle during this period, and cattle grazing continues to dominate this part of the Planning Area. Grazing of natural grasslands does not remove the natural landscape and has little direct effect on aquatic resources, allowing natural grassland ecosystem functions, including vernal pools and vernal pool complexes, to continue.

Sacramento County experienced a rapid increase in population in the 1940s, with a corresponding expansion of urban and suburban development in the Cities of Sacramento, Folsom, and Galt. A second wave of new development occurred between 1950 and 1960 when Sacramento County's population grew by 81%, leading to new urban and suburban development in the south (Florin) and the east (Rancho Cordova), and additional expansions of Sacramento, Folsom, and Galt. The 1960s to 1980s saw moderate but steady increases in population growth, with a corresponding expansion of urban development and urban infrastructure (improved roadways, sewer/water lines, utilities, etc.) farther into the undeveloped southern and eastern portions of the County.

An additional expansion of urban development occurred in the Planning Area between 1997 and 2007. In 1988, approximately 137,000 acres or 41% of the Planning Area was cropland, 156,000 acres or 46% was grazing land, and 18,000 acres or 6% of the Planning Area was developed (DOC 2016). By 2014, the Planning Area had become 37% cropland, 42% grazing land, and 9% developed lands—a decrease of 12,000 acres of cropland, a decrease of 16,000 acres of grazing land, and an approximate 11,000-acre increase in developed land over this 26-year period (DOC 2016). New growth and development is expected to continue in the

south part of Sacramento County, with the rate of new development largely dependent on economic and market conditions.

During each period of rapid urban development, more and more of the pre-European settlement natural land covers and aquatic resources of the Planning Area were converted to urbanized land covers, which typically provide no suitable habitat for native plant or animal species. Urban development in Sacramento County has resulted in an especially high loss of the natural grassland landscapes that support critically endangered vernal-pool habitats (Witham et al. 2014; Witham et al 2005; Holland 2009; Holland and Vollmar 2009). A study of projects in the Planning Area that obtained CWA permits between 1979 and January 2013 found that during this 34-year time period, 991 acres of wetlands and other waters of the United States (i.e., vernal pools, marshes, other wetlands, streams, creeks, and other aquatic resources) were filled (lost) (USACE 2014; see EIS/EIR Appendix A). Most losses of the Planning Area aquatic resources authorized by CWA permits between 1979 and 2013 occurred inside the UDA (829 acres), and 162 acres of loss occurred outside the UDA. Therefore, streams, creaks, and other water bodies inside the UDA have experienced great direct losses, and the waters that remain in the UDA are now exposed to adverse effects from close proximity to development, such as decreased water quality resulting from urban runoff, changes in hydrologic regime, and reductions in habitat quality.

The losses of vernal pools and other natural land covers described previously for Sacramento County also occurred in most of the California Central Valley. Therefore, many of the Planning Area's native plant and animal species have had sufficient declines across their range to warrant listing under the ESA or CESA. For example, the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) was listed as endangered by the USFWS in 1980; the Swainson's hawk (*Buteo swainsoni*) was listed as threatened by CDFW in 1983; the giant garter snake (*Thamnophis gigas*) was listed as threated by CDFW in 1984 and by the USFWS in 1993; greater sandhill crane (*Antigone canadensis tabida*) was listed as threatened by CDFW in 1983, tricolored blackbird (*Agelaius tricolor*) was emergency-listed as threatened by CDFW in 2014 and is being considered for formal threatened or endangered status. Many plant and crustacean species that live only in vernal pools were listed due to the extensive loss of vernal pool habitat over the entire Central Valley, including in the Planning Area (USFWS 2005). The vernal pool tadpole shrimp (*Lepidurus packardi*) and vernal pool fairy shrimp (*Branchinecta lynchi*) were listed as endangered and threatened respectively by USFWS in 1994; slender Orcutt grass (*Orcuttia tenuis*) and Sacramento Orcutt grass (*Orcuttia viscida*), a plant found only in Sacramento County, were listed as threatened and endangered respectively by the USFWS in 1997 and both were listed as endangered by CDFW in 1979; the plant Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), was listed as endangered by CDFW in 1978; and the California tiger salamander (*Ambystoma californiense*) was listed as threatened by USFWS in

2003 and threatened by CDFW in 2010. Suitable habitat for these listed species, and most native plant and animal species, would continue to be lost in the future by new urban development in the Planning Area.

Sacramento County is projected to experience an increase in population from 1,475,381 in 2015 to 2,153,833 by 2060, representing a growth of 678,452 persons (46%) over the next 45-year period (DOF 2015). A large portion of this population growth is expected to occur in southern Sacramento County, within the Planning Area. This expected Planning Area population growth will require new housing, new economic development (businesses), and new supporting infrastructure, such as roads and utilities. To meet the future housing demand of this increasing population, an estimated 245,816 new housing units will be needed in Sacramento County by 2060 (DOF 2015b). If agricultural land in Sacramento County is converted to new urban development at the same rate as in the past (about 0.1 acre per person[3]), then approximately 68,000 acres of existing grazing land and cropland would become urbanized between 2014 and 2060.

The Planning Area local jurisdictions must balance the needs to provide for population growth and associated urban development with the need to continue agricultural production in Sacramento County and the need to protect the native plant and wildlife species and associated terrestrial and aquatic natural communities of Sacramento County.

The Existing Environmental Regulatory Processes

The Planning Area land-use jurisdictions (Sacramento County, Galt, and Rancho Cordova) anticipate that landowners and individuals will continue to request approval of new urban development projects until all remaining undeveloped lands within the UDA have been developed. The land-use jurisdictions also anticipate a continued need to provide new transportation, utility, and other infrastructure facilities inside the UDA, and in the rural areas outside the UDA, to accommodate the anticipated Sacramento County population growth.

In the past, "leapfrog development" has occurred in the Planning Area, where new development is placed in a location distant from existing development. This leapfrog development has resulted in greater costs to local land-use jurisdictions to connect the leapfrog development to existing utility infrastructure; greater vehicle miles travelled since leapfrog development residents must drive farther to reach jobs and services, causing increased adverse traffic and air quality effects; and new urban/agriculture or urban/wildland interfaces, increasing the potential for conflicts between these land uses. The USB, which provides a

[3] This number was derived by dividing the 180,248 acres of urbanized land (DOC 2015) by 1,433,510 residents of Sacramento County in 2012 (DOF 2015b).

geographic limit to where Sacramento County urban services would be delivered, was established, in part, as a mechanism to reduce leapfrog development. The Planning Area land-use jurisdictions seek to develop and promote further mechanisms to encourage an orderly pattern of development extending out from the existing developed areas, focusing development within the UDA and discouraging future leapfrog development.

Currently, urban development projects coordinate with and seek approvals from multiple federal and state agencies for each individual project. This often results in a process that is lengthy, complex, and costly. Common local, state, and federal agency approval efforts include:

- Preparing a biological assessment for the project and consulting with the USFWS under the ESA and/or CDFW under CESA when there are potential effects to threatened or endangered species
- Conducting a wetland delineation and obtaining permits from USACE under Section 404 of the CWA for discharges of dredged and/or fill material into wetlands and other waters of the United States
- Obtaining authorization from the RWQCB under Section 401 of the CWA to support the CWA 404 permit from USACE
- Obtaining authorization from CDFW for modification to a river, stream, or creek through a Streambed Alteration Agreement pursuant to Section 1600 of the California Fish and Game Code.

To obtain all necessary agency approvals, an individual project proponent typically must consult and coordinate with several regulatory agencies, including those identified in the bullet list above, as well as the local land-use authority jurisdiction. Application packages for each agency differ, and similar data may need to be compiled and presented in a different manner for each agency, increasing the time and labor expended by project proponents. A consolidation of permit applications, or increased consistency across separate permit applications, would increase the efficiency of the existing permitting processes.

As project proponents proceed through the different agency approval processes, mitigation requirements of the different laws and statues may also differ or conflict. (For example, aquatic resources [under the jurisdiction of the CWA 404] may also provide habitat for ESA and/or CESA listed species, and mitigation requirements under each law may differ or conflict.) One law may promote avoidance and preservation of resources on the project site, while another law may promote establishment of resource preserves outside the project site. Considerable time and effort may be expended by project proponents and by agency personnel to coordinate and develop a single acceptable project-mitigation approach that is suitable for all project regulatory approvals.

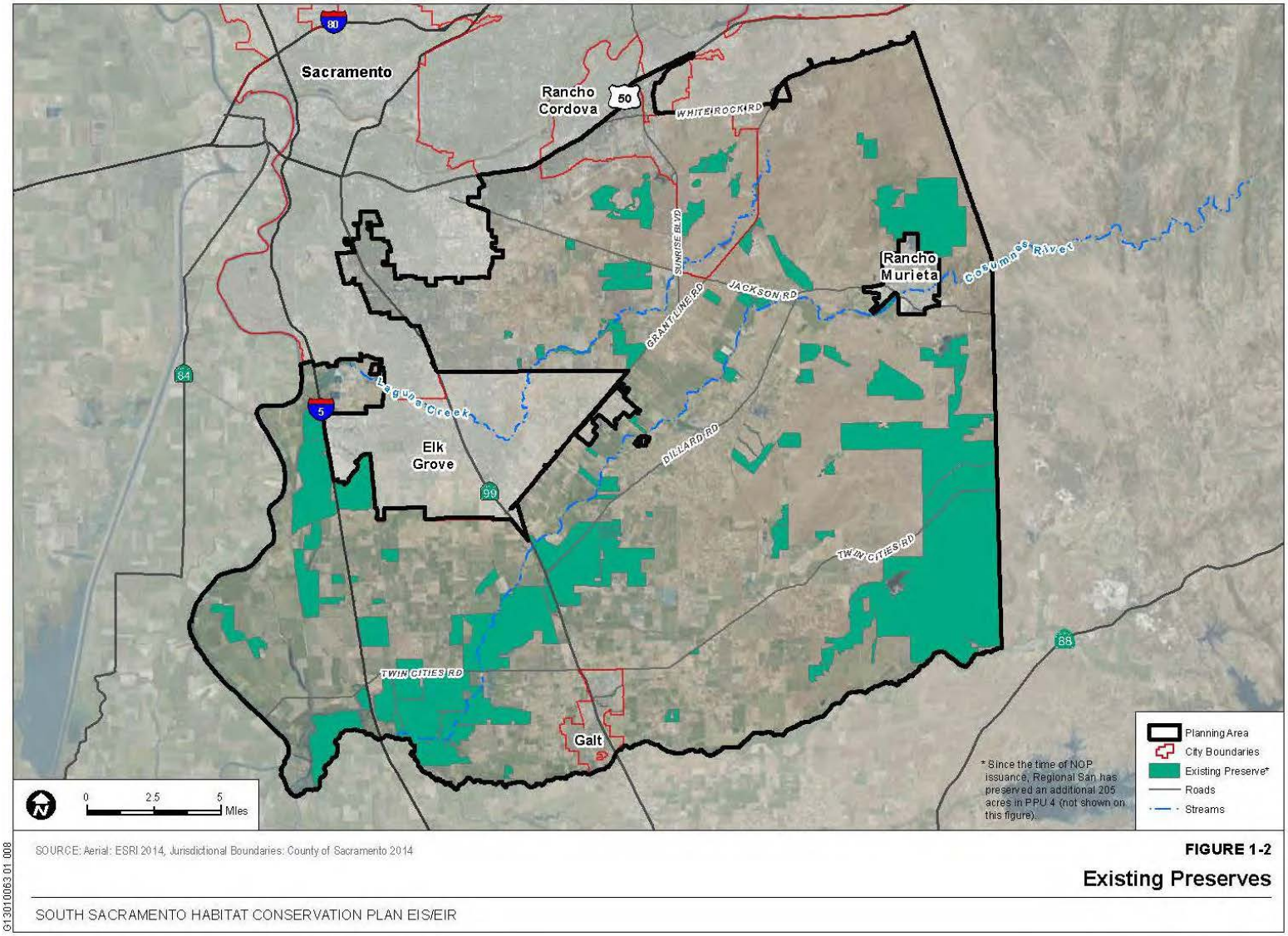
If a project design changes to meet the requirements of one environmental law, the applicant may have to reinitiate discussions with every the other regulatory agency through an iterative and lengthy process to find a project design that meets all regulatory requirements, including the requirements of the local land-use authority's development policies and goals. In many instances, project changes are implemented to comply with one set of regulatory requirements, resulting in the need to coordinate the changes with the other regulatory agencies and potentially triggering recirculation of completed project-level CEQA or NEPA documents, if the project is sufficiently altered.

The current regulatory review process is series of project-by-project individual permitting efforts. Mitigation to compensate for project effects is determined separately for each project, which has resulted in a number of scattered and relatively small-sized preserves located within the project site, or located off-site. Past development projects would often preserve the greatest acres of aquatic resources in the smallest area of a project site to maximize the available area of development and concurrently minimize mitigation costs. Projects often chose mitigation sites with little consideration to the quality of the species habitat in the preserved areas, or the adverse indirect effects of surrounding the preserve with new development, including habitat fragmentation and permanent isolation of preserved populations from other populations of the same species. Where mitigation preserves are isolated and have little connectivity to other areas of remaining natural habitat, the movement and dispersal of wildlife and dispersal of plant seed and propagules decrease as habitat isolation increases. Many of the existing preserves, particularly in the UDA portion of the planning area, are now surrounded by urban development and are isolated from other areas of natural habitat (see Figure 1-2, Existing Preserves).

Similarly, mitigation sites preserved outside of a project site (i.e., were "off site") were often selected by the project proponent based on factors such as existing ownership by the project proponent or the ability to acquire the land at a lower cost, and site selection often did not give high priority to maximizing species habitat values or maintaining habitat connectivity.

Another concern with smaller or isolated preserves is that they may provide habitat for only part of a species' life history needs. As new development occurs around the preserve, eliminating nearby habitat needed for other parts of the life history, the species may no longer use the preserve. For example, the loss of foraging habitat around a preserve may make the nesting or breeding habitat protected in the preserve no longer viable.

Figure 1-2 Existing Preserves



INTENTIONALLY LEFT BLANK

Another outcome of the existing project-by-project review process is that mitigation preserves within the Planning Area are currently monitored and managed by several different entities and organizations, with a range in the quality of monitoring and habitat management. In some cases, required obligations or performance standards have not been met over the long term.

At present, the local land-use jurisdictions do not have a single coordinated plan for protecting or conserving the best of the remaining natural communities, the largest populations of native species, or the existing functions and benefits of the remaining aquatic resources in the Planning Area. If there were a mechanism to define which natural areas are of the highest preservation priority in the Planning Area, as well as high priority within important ecological subdivisions of the Planning Area (such as individual watersheds), then the mitigation efforts of each individual project would be better able to conserve Planning Area native species and their habitats, including species listed under the ESA and CESA, and maintain the existing physical, chemical, and biological functions and services of wetlands in the Planning Area.

A streamlined project review and permitting process that more efficiently integrates the multiple regulatory approval processes could reduce expenditures of the project proponents, the local land-use jurisdictions, and the regulatory agencies. Currently, regulatory agency staff must expend significant time and agency resources to respond to large numbers of individual approvals or permit applications submitted on a project-by-project basis. A streamlined project review and permitting process could also increase regulatory certainty for project proponents and increase agency project review efficiency, support identification of the most environmentally protective project alternatives, and allow more predictability of project budgets and schedules.

In addition, Sacramento County, Rancho Cordova, and Galt want new urban development to include “sound land use” planning principles, which include consolidating development to promote walkable neighborhoods and promote use of mass transit, and support the efficient provision of utilities and infrastructure. A streamlined and integrated project review and permitting process could help the local land-use jurisdictions achieve these principles.

Conclusion

The background information presented above summarizes the needs and goals of the parties involved in the ITP permit application, and also identify underlying problems and opportunities within this Planning Area to which the lead agencies wish to respond. The lead agencies considered the background information presented in Section 1.3.1, as well as the public interest, as they identified the broad purposes and needs and identified the detailed objectives listed in Sections 1.3.2 and 1.3.3.

1.3.2 Purpose and Need Statement

In response to receiving a request for authorization of species incidental take that is expected to result from future housing construction, other new urban development, and new supporting infrastructure within the Planning Area, the USFWS proposes to issue an ITP to the Permit Applicants. A purpose of that proposed federal action is to comprehensively protect and conserve multiple ESA and CESA listed species and other native species; to conserve, enhance, and restore the habitats and ecosystems upon which these native species depend, including aquatic resources and aquatic habitats; and to ensure the long-term survival of these species for the continuing benefit of the American people in Sacramento County, California.

In proposing alternative conservation plans, the lead agencies seek to accommodate the population growth and associated planned housing, economic development, and infrastructure expected within the Planning Area, using a streamlined environmental permitting process, while maintaining the existing richness of native plant and animal species in the south Sacramento County Planning Area and the natural ecosystems and agricultural lands on which these species depend.

1.3.3 Objectives

The following 18 objectives were identified to meet the above-stated purposes and needs:

1. Include an interconnected preserve system throughout the Planning Area that is large enough to maintain in perpetuity each type of natural community that is native to the Planning Area, maintain in perpetuity each type of native plant and animal species present within the Planning Area, and maintain in perpetuity or expand the existing distribution of each native animal and plant species within the Planning Area.
2. Locate preserves in areas that maximize protection of native plant and animal species and the ecosystems on which they depend.
3. Locate preserves in areas that maximize the protection of intact watersheds and watershed functions.
4. Protect large, contiguous blocks of species habitat. Provide habitat linkages between preserves that are wide enough to allow dispersal of individual native animals and plants and allow genetic exchange between species populations.
5. Protect sufficient cropland and irrigated pasture to provide important foraging habitat on which some native animal species now depend (e.g., Swainson's hawk, white-tailed kite).
6. Preserve adequate roosting and foraging habitat for the greater sandhill crane in the area between the existing Stone Lakes National Wildlife Refuge and the existing

Cosumnes River Preserve, to maintain or increase the population of greater sandhill crane over-wintering within the Planning Area.

7. Protect the long-term viability of ranching and farming operations in the Planning Area (consistent with other objectives).
8. Protect all currently documented occurrences and any newly discovered occurrences of Sacramento Orcutt grass, slender Orcutt grass, and Ahart's dwarf rush in the Planning Area.
9. Avoid or minimize impacts to state and federally listed species and their habitats, to the maximum extent practicable.
10. Avoid or minimize impacts to the existing physical, chemical, and biological functions and services of wetlands and streams in the Planning Area to the maximum extent practicable.
11. Achieve no net loss of the existing functions and services of aquatic resources in the Planning Area. Methods used to achieve no net loss may include the re-establishment and establishment of vernal pools and other aquatic land cover types.
12. Include a long-term preserve monitoring and habitat management program sufficient to maintain or improve habitats of targeted native plant and animal species in perpetuity.
13. Support the development and implementation of streamlined aquatic resource permitting programs under CWA 404, CWA 401, Porter-Cologne, and Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) by the federal and state agencies with responsibility for implementing those statutes within the Planning Area.
14. Facilitate the recovery of federally listed species, and provide sufficient preservation of federally designated recovery areas within the Planning Area.
15. Include adequate amount of urban development with associated fees to meet Objectives 1 through 14. In addition, the associated mitigation-fee structure must be practicable, with fees that are analogous to fees collected under other Northern California permitted HCPs that have similar species habitats and similar impacts.
16. Allow an adequate amount of urban development within the currently adopted spheres of influence for Rancho Cordova and Galt, and the currently adopted USB for Sacramento County, to discourage expansion beyond these boundaries and maintain the sound land use planning principles these boundaries encourage (e.g., preventing sprawl outside the USB and leap-frog development; consolidating development to support the efficient provision of utilities and infrastructure; promoting compact mixed-use development that supports viable transit and walkable areas; creating communities with a variety of housing types that support different income levels and socioeconomic conditions; and maintaining compliance with air quality laws and regulations that influence or are influenced by land use decisions such as Assembly Bill 32, Senate Bill 375, and the Clean Air Act).

17. Include as Covered Activities the SSHCP Permit Applicant's transportation, utility, and other infrastructure activities and projects as described in the approved master plans of the SSHCP Permit Applicants (Sacramento County, Galt, Rancho Cordova, SCWA, and Connector JPA).
18. Rely on willing sellers for the purchase of land or easements when establishing habitat preserves; do not include condemnation or eminent domain to meet the project needs, purposes, and objectives.

1.4 EIS/EIR SCOPE AND CONTENT

Under NEPA, the "scope" of an environmental document is defined as the range of actions, the range of alternatives, and the impacts to be considered (40 CFR 1508.25). Actions include any connected actions, any cumulative actions, or any similar actions. The types of impacts must include the direct, indirect, and cumulative impact of all alternatives considered (40 CFR 1508.25). Under CEQA, when soliciting input on the scope of an EIR, the lead agency is seeking information on significant environmental issues to be addressed in the EIR, reasonable alternatives, and mitigation measures (CEQA Guidelines, Section 15082[b]). Under both NEPA and CEQA, the process of gathering input from the public, agencies, and interested parties on the scope of an environmental document prior to its preparation is referred to as "scoping" or the "scoping process."

The scope and content of this EIS/EIR was shaped by the CEQ regulations for implementing NEPA, the requirements for an EIR provided in the CEQA statute and CEQA Guidelines, public and agency comments received during the EIS/EIR scoping process (described further in Sections 1.4.1 and 1.4.2), input from the Cooperating Agencies, input from the interdisciplinary EIS/EIR preparers, and the independent judgment of the lead agencies. Environmental resource topics that were considered for analysis in the EIS/EIR were guided, in part, by the initial study checklist that is provided in Appendix G of the CEQA Guidelines, which was adjusted as part of the scoping process.

The process and outcome for the selection of alternatives/actions is described in Chapter 2. Environmental Impacts and any associated mitigation measures are described within each environmental resource chapter of this EIS/EIR. See Chapter 3, Section 3.2, Resource Topics Evaluated in the Remaining Chapters, for a list of EIS/EIR resource chapters.

1.4.1 Summary of EIS/EIR Scoping Process

Scoping is the process used to determine the content (scope) of an EIS and/or EIR. The scoping process is used to help lead agencies identify the range of actions, alternative actions, potential impacts, mitigation measures, and the significant issues deserving of study in an EIS or EIR.

Scoping also helps lead agencies identify and eliminate from detailed study the issues that are not relevant or that have been analyzed in prior environmental documents or studies, thereby deemphasizing insignificant issues and narrowing the scope of the EIS or EIR (40 CFR 1501.1[d]; 40 CFR 1501.7; 43 CFR 46.235; CEQA Guidelines, Section 15082).

The scoping process includes internal scoping of lead agency interdisciplinary staff experts and external scoping of the public and other agencies. Lead agencies also use scoping to engage state, local, and tribal governments and the public in the early identification of concerns and information relevant to the preparation of the EIS/EIR (43 CFR 46.435).

Tools used to determine the scope of this EIS/EIR included publication of the Notice of Intent (NOI) and Notice of Preparation (NOP) pursuant to NEPA and CEQA, respectively; informal stakeholder and interagency meetings; public scoping meetings; and public workshops.

Public scoping processes for the SSHCP EIS/EIR occurred in 2008 and again in 2013. Elements of each scoping process are briefly summarized below. More detailed scoping summary reports that include copies of the NOIs and NOPs, public scoping meeting materials, and the scoping comments received during the 2008 and 2013 scoping processes are provided in EIS/EIR Appendix B.

Public Scoping Notices and Meetings

In 2008, the scoping process began on June 10 with the publication of the NOI in the Federal Register (pursuant to NEPA) and submittal of the NOP to the State Clearinghouse (pursuant to CEQA). NOPs (and often NOIs for joint NEPA/CEQA documents) are provided to the State Clearinghouse as part of the CEQA review process, and the Clearinghouse distributes the NOPs to various California state agencies. The NOI and NOP notified the public and agencies of the SSHCP; the intent to prepare an EIS/EIR; and the time, date, and location of public scoping meetings. The public was also invited to participate in the scoping process through a variety of media, including e-mail and hard-copy mailers. Display ads of the meeting announcement were also published in the Sacramento Bee (July 1, 2008), Grapevine (July 4, 2008), Galt Herald (July 2, 2008), and River Valley Times (July 2, 2008). In addition, the Elk Grove sent a meeting announcement attached to each resident's utility bill informing them of the scoping meetings.

USFWS, as the NEPA lead agency, and Sacramento County, as the CEQA lead agency, held four joint public scoping meetings on the following dates and times:

- July 8, 2008, from 6:30 p.m. to 8:30 p.m. in Galt
- July 11, 2008, from 10 a.m. to 12:00 p.m. in Sacramento
- July 15, 2008, from 6:30 p.m. to 8:30 p.m. in Rancho Cordova
- July 16, 2008, from 6:30 p.m. to 8:30 p.m. in Elk Grove.

For the four meetings, a total of 79 people signed in as meeting participants. Each meeting began with a brief presentation, followed by an open house-style forum where informational poster boards were available for review and staff from the lead and cooperating agencies were available to answer questions.

In 2013, the draft SSHCP had been further refined, some conditions had changed, and sufficient time had elapsed that the lead agencies felt that a second public scoping process was warranted. Public scoping began on October 28, 2013, with an NOP provided to the State Clearinghouse (pursuant to CEQA) and on November 4, 2013, with the publication of a NOI in the Federal Register (pursuant to NEPA). The NOI and NOP notified the public and agencies of the SSHCP; the intent to prepare an EIS/EIR; the circumstances for initiating the second scoping process; and the time, date, and location of public scoping meetings. The NOI or NOP were mailed to over 200 recipients in and around Sacramento County, including non-profit groups, media outlets, stakeholders, and local and state agencies. A news release for the NOI was also sent to six media outlets and was also available for review on the USFWS's website. The NOP was also posted on a project website developed specifically for the SSHCP.

USFWS, as the NEPA lead agency, and Sacramento County, as the CEQA lead agency, held two joint public scoping meetings on the following dates and times:

- November 20, 2013, from 6:30 p.m. to 8:30 p.m. in Galt
- November 21, 2013, from 2:00 p.m. to 4:00 p.m. in Sacramento.

For the two meetings, a total of 29 people signed in as meeting participants. Each meeting included a brief presentation and an open house forum where informational poster boards were available for review and staff from the lead agencies were available to answer questions.

In 2008 and 2013, the lead agencies also contacted the Native American Heritage Commission (NAHC) to obtain a list of tribes, individuals, and organizations that may have knowledge of heritage lands or other resources of interest that could potentially be affected by implementation of an HCP in the Planning Area. The 2008 and 2013 NOIs and NOPs (EIS/EIR Appendix B) were sent to the NAHC through the standard distribution to state agencies via the California State Clearinghouse, and sent directly to the tribal contacts provided by the NAHC at that time. At the time of this writing, no comments on the NOI and NOP or requests for further consultation were received.

The most recent list received in 2015 from the NAHC provided 19 tribal contacts for south Sacramento County. Copies of the draft EIS/EIR will be mailed directly to the tribal contacts provided by the NAHC. USFWS is conducting outreach to federally recognized tribes in the Planning Area during the EIS/EIR process. This process will be completed and tribal input

considered before the USFWS prepares their Record of Decision. In addition, compliance with Section 106 of the National Historic Preservation Act (NHPA 106) may require USFWS to consult with the State Historic Preservation Officer.

1.4.2 Significant Issues Identified in Public Scoping

During the 2008 scoping process, a total of approximately 80 comment letters, including emails, from individuals, businesses, organizations, and agencies were received. The primary issues identified in these comments include the following:

- The proper geographic scope of the SSHCP and EIS/EIR, such as considering effects in adjacent areas and addressing the Elk Grove sphere of influence
- Effects of plan implementation on agriculture, including grazing
- Regulatory topics such as consistency with USACE mitigation regulations and the potential role of mitigation banks.

During the 2013 scoping process, a total of 84 comments were received via letters, e-mails, written comments provided at scoping meetings, and oral comments provided at scoping meetings and via telephone. The primary issues identified in these comments include the following:

- Compliance with air quality regulations and the potential effects of air quality on Covered Species and human health
- Consistency of the SSHCP with planning efforts in the Sacramento/San Joaquin Delta
- Coordination of the SSHCP with the activities and planning of local jurisdictions, agencies, and land management organizations that are not SSHCP Permit Applicants
- Adequacy of funding for SSHCP implementation
- Consideration of alternatives related to inclusion of Covered Activities and locations available for preserves
- Projects and activities to include in the analysis of cumulative impacts, such as infrastructure impact from the proposed Cordova Hills project and potential development associated with the Elk Grove sphere of influence
- The placement of grazing lands in land cover classifications (agricultural or annual grassland)
- Use of best available science and data, such as recent research on tri-colored blackbird
- Questions and suggestions regarding the funding, selection, acquisition, location, and management of preserve system lands
- Integration of mosquito and vector control with SSHCP implementation and preserve system management

- Integration of the SSHCP with issues of water supply and water rights.

All of the 2008 and 2013 scoping comments were considered by the lead agencies during the development and preparation of the EIS/EIR. However, scoping comments did not identify areas of potential impacts or environmental analyses that were not already anticipated for inclusion in the EIS/EIR by the lead agencies (see Chapter 2, Section 3.2 for a list of resource chapters included in this EIS/EIR). Scoping comments related to potential EIS/EIR alternatives deserving of study are discussed further in Chapter 2.

1.5 DECISIONS TO BE MADE

Implementation of the SSHCP would require permits and approvals from the lead agencies as well as public agencies other than the lead agencies. This section describes the uses of this EIS/EIR by the lead agencies as well as the cooperating and responsible agencies. This section also satisfies the requirements of 40 CFR 1502.25 stating that a Draft EIS shall list all federal permits, licenses, and other entitlements that must be obtained in implementing the proposal.

1.5.1 U.S. Fish and Wildlife Service

USFWS would use the EIS/EIR to comply with NEPA for their issuance of ITPs to the Permit Applicants. As the lead agency under NEPA, USFWS must make a determination whether the EIS/EIR scope and impact analysis is adequate to provide NEPA compliance for its decision whether to issue an ESA Section 10(a)(1)(B) ITP for SSHCP Covered Species. In addition, it must select a preferred EIS/EIR alternative. If USFWS decides to issue the ITP, it would also decide to sign the SSHCP Implementing Agreement. The purpose of an HCP Implementing Agreement, when used, is to ensure that each permittee and all other parties understand their roles and responsibilities under the HCP, ESA ITP, and CESA ITP, and to provide remedies should any party fail to fulfill its obligations (USFWS and NOAA 2016).

ESA Section 10(a)(2)(B) requires that specific permit issuance criteria be met before USFWS may issue ITPs, and the USFWS must decide if those criteria would be met before selecting the EIS/EIR Alternative.

Permit Issuance Criteria

The issuance criteria for an ITP are contained in ESA Section 10(a)(2)(B) and the implementing regulations for ESA (50 CFR 17.22(b)(2) and 50 CFR 17.32[b][2]). These issuance criteria are listed below.

1. All taking of covered species must be incidental to otherwise lawful activities.
2. The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.

3. The applicant will ensure adequate funding for the HCP.
4. The applicant will provide procedures to deal with changed circumstances, including adequate funding to address such changes.
5. The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.
6. The applicant will ensure that other measures that USFWS may require will be provided.
7. The USFWS has received assurances that the HCP will be implemented by the applicants.

An applicant must prepare and submit to USFWS for approval an HCP containing the mandatory elements of Section 10(a)(2)(A) before an ITP can be issued. Accordingly, the HCP must specify the following information.

1. The impact that will likely result from the taking.
2. What steps the applicant will take to monitor, minimize, and mitigate such impacts; the funding available to implement such steps; and the procedures to be used to deal with unforeseen circumstances.
3. What alternative actions to such taking the applicant considered and the reasons why such alternatives are not proposed to be used.
4. Such other measures that USFWS may require as being necessary or appropriate for the purposes of the plan.

The determination as to whether the criteria have been met would be described in USFWS's permit decision package, which includes a Biological Opinion prepared pursuant to Section 7 of ESA, an appropriate final NEPA document, and ESA Findings prepared pursuant to ESA Section 10. These documents are produced and the permit decision package compiled after the NEPA process is completed. The permit decision package would contain the rationale behind USFWS's decision to either approve or deny a Section 10(a)(1)(B) permit application.

USFWS may decide to issue the ITP, which would contain standard permit terms and conditions, and may also contain additional permit terms and conditions appropriate for the operational SSHCP. Alternatively, USFWS may deny the ITP application. Permit denial regulations are explained in 50 CFR 13.21(b).

ESA Section 7

Issuance of an ITP is a federal action, which is subject to Section 7 of ESA. ESA Section 7(a)(2) requires all federal agencies consult with USFWS to ensure that any action "authorized, permitted, funded, or carried out" by any such agency "is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the

destruction or adverse modification" of Critical Habitat. The USFWS Sacramento Field Office would conduct an internal Section 7 consultation with the USFWS Region 8 office concerning its decision to issue ITPs to the SSHCP Permit Applicants. The results of this internal consultation would be documented in a Biological Opinion, which would be prepared by the USFWS Sacramento Field Office after completion of the NEPA process. Although the provisions of ESA Section 7 and ESA Section 10 are similar, Section 7 and its regulations also require an analysis of the HCP's direct and indirect effects, a jeopardy analysis for federally listed plants, and effects on Critical Habitat.

NEPA

Issuance of an ITP is a federal action, which is also subject to NEPA. As discussed in Section 1.2.1, USFWS has determined that issuance of ITPs for the SSHCP, a large regional HCP, is a major federal action likely to result in a significant effect on the environment, and therefore, the preparation of an EIS is warranted. The ESA Section 10's Five-Point Policy (USFWS and NOAA 2000) also requires preparation of an EIS for large regional HCPs. The USFWS's NEPA process would culminate in the preparation of a Record of Decision (ROD), a NEPA document which would document USFWS's final decision on the alternatives analyzed in this joint EIS/EIR.

The USFWS ROD would state the USFWS decision, identify all alternatives considered by the USFWS in reaching that decision~~, and identify the alternative considered to be environmentally preferable by the USFWS~~, **identify the environmentally preferable alternative (see Section 17.7), and identify the USFWS's preferred alternative.** The ROD must discuss preferences among alternatives based on relevant factors including the agency's statutory mission, economic, and technical considerations, and would identify and discuss considerations that were balanced by the USFWS in making its decision and how those considerations entered into the decision. The ROD would state whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and the ROD would require a monitoring and enforcement program be adopted for conservation preserves and any additional mitigation measures.

1.5.2 Sacramento County

The EIS/EIR would be used by the five Permit Applicants to approve the SSHCP in compliance with CEQA. As discussed in Section 1.2.2, Sacramento County is the lead agency under CEQA and would be the first of the Permit Applicants to make a decision to certify that the EIS/EIR impact analysis is adequate to provide CEQA compliance for its decision to approve the SSHCP (or other action alternative). As the lead agency under CEQA, Sacramento County may also need to make Findings of Fact and Statements of Overriding Considerations pursuant to CEQA if one or more significant effects associated with approval of the SSHCP are identified. The County

would also file a Notice of Determination (NOD) upon adopting the SSHCP. In addition, Sacramento County would sign the SSHCP Implementing Agreement.

Once the SSHCP is adopted, as a Permit Applicant with land use authority, Sacramento County would use the information and analysis in the EIS/EIR to support future decisions related to the SSHCP, such as approval of a local SSHCP implementation ordinance or an implementation resolution. The ordinance or resolution would enable the County to enforce the requirements and commitments of the adopted SSHCP.

Sacramento County **and other Land-use Authority Permit Applicants** would also use the information and analysis in the EIS/EIR, as well as additional CEQA documentation if required, in making a decision to approve an aquatic resource protection ordinance that would enable Sacramento County **and other Land-use Authority Permit Applicants** to implement the requirements and commitments of the ARP, ~~including~~ **consistent with** the ~~requirements of a~~ **USACE's proposed issuance of a** CWA 404 programmatic general permit (PGP) ~~to be implemented by Sacramento County and the other Land-use Authority Permit Applicants~~.

As discussed in Section 1.1, each SSHCP Permit Applicant with land use authority is also requesting a Master Streambed Alteration Permit from CDFW for future SSHCP Covered Activities and is requesting a programmatic CWA 401 permit strategy from the RWQCB for future SSHCP Covered Activities (see Sections 1.5.4, 1.5.6, and 1.5.7 regarding these proposed Covered Activity permit strategies).

In addition, the County would use the information and analysis in the EIS/EIR in its decision to create the South Sacramento Conservation Agency, a new Joint Powers Authority that would function as the SSHCP Implementing Entity, as discussed previously in Section 1.1 and in Section 2.3.7.

1.5.3 Other Permit Applicants

Galt and Rancho Cordova. As discussed in Section 1.2.2, each Permit Applicant is a responsible agency under CEQA and would be required to consider the EIS/EIR and make findings, pursuant to CEQA. Galt and Rancho Cordova would use the information and analysis in the EIS/EIR to aid in their decision to adopt the SSHCP (i.e., approve the proposed Plan) and to sign the SSHCP Implementing Agreement. ~~T~~ Galt and Rancho Cordova would each file an NOD upon adopting the SSHCP.

Once the SSHCP is adopted, as Permit Applicants with land use authority, Galt and the Rancho Cordova would use the information and analysis in the EIS/EIR to support future decisions related to the SSHCP, such as approval of their SSHCP implementation ordinance or an

implementation resolution. The respective ordinances or resolutions would enable each city to enforce the requirements and commitments of the adopted SSHCP.

Each of these jurisdictions would also use the information and analysis in the EIS/EIR in making a decision to approve an aquatic resource protection ordinance that would enable each City to implement the requirements and commitments of the ARP, ~~including~~ **consistent with the** requirements of **the Corps' proposed** CWA 404 PGP~~s to be implemented by Rancho Cordova, the Galt, and Sacramento County~~.

As discussed in Section 1.1, each SSHCP Permit Applicant with land use authority is also requesting a Master Streambed Alteration Permit from CDFW for future SSHCP Covered Activities, and is requesting a programmatic CWA 401 permit strategy from the RWQCB for future SSHCP Covered Activities (see Sections 1.5.4, 1.5.6, and 1.5.7 regarding these permit strategies).

In addition, Rancho Cordova and Galt would use the information and analysis in the EIS/EIR in their decision to create the South Sacramento Conservation Agency, a new Joint Powers Authority that would function as the SSHCP Implementing Entity, as discussed previously in Section 1.1 and in Section 2.3.7.

SCWA and the Connector JPA. As Permit Applicants, the SCWA and the Connector JPA are responsible agencies under CEQA and would be required to consider the EIS/EIR and make findings pursuant to CEQA. The SCWA and the Connector JPA would use the information and analysis in the EIS/EIR to aid in their decision whether to adopt the SSHCP, and to decide to sign the SSHCP Implementing Agreement. The SCWA and the Connector JPA would each file an NOD upon adopting the SSHCP.

The SCWA and the Connector JPA do not have authority to approve land-use decisions, and therefore do not need to make decisions related to adoption of an implementing ordinance/resolution, adopting an aquatic resource protection ordinance, or creation of the SSHCP Implementing Entity. As discussed in Section 1.1, the SCWA and the Connector JPA are requesting ITPs only for Covered Activity projects and activities that they directly implement.

1.5.4 U.S. Army Corps of Engineers

The USACE would use the information and analysis in the EIS/EIR in its decision making on a multilevel CWA Section 404 permitting program for future SSHCP Covered Activity projects and activities that discharge dredged or fill material to wetlands and other waters of the United States (see USACE 2015). The proposed multilevel CWA 404 **permit** strategy would draw upon the content of the SSHCP, the ARP, and aquatic resource protection ordinances that would be implemented by the Land-use Authority Permit Applicants (see Section 1.1).

A primary goal of ARP implementation is to achieve an overall no net loss of aquatic resource functions and services in accordance with the USACE and EPA's 2008 Compensatory Mitigation Rule, *33 C.F.R. Parts 325 and 332, Compensatory Mitigation for Losses of Aquatic Resources: Final Rule* (Mitigation Rule). The draft ARP discusses and explains the proposed regional SSHCP Preserve System (and other elements of the SSHCP Conservation Strategy) in terms of a unified watershed strategy for improving the protection and management of Planning Area aquatic resources, and the ARP provides an evaluation of aquatic resources within the Planning Area. The proposed USACE's multilevel CWA 404 permit strategy being developed consists of:

- A PGP, founded on a local aquatic resources protection program and designed to reduce duplication with that program, for future Covered Activities with minimal individual and cumulative effects on aquatic resources. The PGP would be implemented by the three land-use authority Permit Applicants (i.e., Sacramento County, Galt, and Rancho Cordova).
- A regional general permit (RGP), if needed, for future Covered Activities with minimal individual and cumulative effects on aquatic resources that do not ~~fall under~~ **qualify for** the PGP.
- A procedure for issuing Letters of Permission (LOPs) for future Covered Activities with more than minimal effects, but less-than-significant effects, on the human environment, including aquatic resources.
- An abbreviated process for issuing standard permits (SPs) for other Covered Activity impacts that do not qualify for the PGP, RGP, or the LOP procedure.

Each of these permit approaches is summarized in the USACE white paper, *CWA 404 Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan* (EIS/EIR Appendix C), which contains the draft CWA 404 permit instruments (e.g., PGP) and procedures (e.g., LOP).

NEPA

As a cooperating agency on the SSHCP EIS/EIR, the USACE participated in the SSHCP EIS/EIR scoping processes discussed in Section 1.4. The USACE provided information to the lead agencies, and provided input on the sections of the EIS/EIR that concern the topics and issues that the USACE has both special expertise and jurisdiction by law, pursuant to NEPA regulations for cooperating agencies (40 CFR 1501.6; 43 CFR 46.230).

The USACE anticipates that the SSHCP NEPA process will be sufficient to comply with its regulatory mandates necessary to implement a CWA 404 permit strategy, including NEPA; its implementing regulations under 33 CFR Parts 320–332; and EPA's 404(b)(1) Guidelines for the alternatives considered in the SSHCP NEPA process. If the USACE determines that the EIS/EIR NEPA process was not sufficient to develop a permitting strategy, or if there are

substantial changes in the baseline conditions, additional NEPA documentation may be determined by the USACE to be required. As part of its compliance documentation with EPA's 404(b)(1) Guidelines, the USACE will also consider additional information outside of the purview of the NEPA process.

The USACE intends to complete a ROD that would document the agency's decision regarding the CWA 404 permit strategy and bases thereof, including a discussion of alternatives considered and evaluation of the environmental consequences. Findings would be documented in the ROD with regard to all applicable CWA 404 regulations and other applicable laws, including a discussion of public interest review factors considered and the USACE public interest determination (33 CFR 320.4[a]), and a determination of compliance with the Section 404(b)(1) Guidelines (40 CFR 230).

ESA Section 7

The USACE Sacramento District would request one consultation with the USFWS under ESA Section 7 that provides a single Biological Opinion for species take expected in association with all future SSHCP Covered Activities that would utilize the above-described CWA 404 permit strategy. This comprehensive Section 7 consultation would involve a review of all USACE actions under the proposed multilevel CWA permitting strategy for future SSHCP Covered Activities, and would be conducted simultaneously with the development of the SSHCP to assist the USFWS in assessing overall effects on individual species, groups of species, and ecosystems from multiple actions implemented by several parties under the HCP.

~~The USACE and the USFWS would complete this comprehensive and ecosystem-based consultation before the USACE decision to approve or deny the proposed multilevel CWA 404 permitting program.~~

As the final EIS/EIR was prepared, the USFWS continued to coordinate with USACE to discuss the most efficient approach to achieving ESA section 7 compliance for the Corps' section 404 CWA permit strategy for future SSHCP covered activities. This approach will be described and documented prior to the Service's completion of the Record of Decision and issuance of the SSHCP ITP. The intent of USFWS is to provide the Corps with one biological opinion that will reflect compliance with ESA section 7(a)(2) for section 404 CWA permitting of SSHCP Covered Activities, and preclude the need for project-level consultations on individual SSHCP Covered Activities.

NHPA Section 106

Projects and activities authorized by the USACE under CWA 404 must comply with Section 106 of NHPA 106. The NHPA protects cultural resources that are listed or are eligible to be listed on

the National Register of Historic Places. To meet the NHPA 106 requirements for CWA 404 permits for future SSHCP Covered Activities, the USACE may develop a Programmatic Agreement with the State Historic Preservation Office specifically to address NHPA 106 consultations on future SSHCP Covered Activities authorized under CWA 404. If this were to occur, as part of developing a Programmatic Agreement, the USACE would consult with regional Native American tribal contacts, and it may consider establishing a Memorandum of Understanding (MOU) with Native American tribes concerning future coordination and the protection of cultural resources.

1.5.5 U.S. Environmental Protection Agency

Among the roles and responsibilities of the EPA is to review and comment on CWA Section 404 permit applications. The EPA ~~determines appropriateness of~~ **maintains oversight on** CWA 404 permit actions and ~~determines~~ **confirms** consistency of ~~a~~ CWA 404 permit action**s** with **the regulations and policies of** the CWA Section 404 program. ~~If the USACE decides to issue a 404 permit, the EPA may object to the issuance of a permit as part of its review and comment role.~~ Under Section 404(q) of the CWA, and pursuant to a Memorandum of Agreement (MOA) between the ~~s~~**S**ecretary of the Army and the **EPA** ~~a~~**A**dministrator ~~of the EPA~~, if EPA objects to issuance of a Section 404 permit, it may initiate a process where the permit decision is elevated to higher levels of review within USACE and the Department of the Army. If resolution cannot be achieved, EPA may ultimately initiate a "veto" action pursuant to Section 404(q) of the CWA. Section 404(q) requires the following:

> Not later than the one-hundred-eightieth day after the date of enactment of this subsection, the Secretary shall enter into agreements with the Administrator, the Secretaries of the Departments of Agriculture, Commerce, Interior, and Transportation, and the heads of other appropriate Federal agencies to minimize, to the maximum extent practicable, duplication, needless paperwork, and delays in the issuance of permits under this section. Such agreements shall be developed to assure that, to the maximum extent practicable, a decision with respect to an application for a permit under subsection (a) of this section will be made not later than the ninetieth day after the date the notice of such application is published under subsection (a) of this section..

As a result, the Department of the Army entered into MOAs with the EPA, USFWS, and National Marine Fisheries Service related to procedures for elevating policy decisions or permit decision. If a permit decision is elevated to the ~~a~~**A**ssistant ~~s~~**S**ecretary of the Army for ~~c~~**C**ivil ~~w~~**W**orks (ASA-CW) by EPA, USFWS, and National Marine Fisheries Service, ASA-CW will either (1) inform the district engineer to proceed with final action, (2) inform the district engineer to proceed with final action in accordance with case-specific policy guidance, or (3) make a final permit decision in accordance

with 33 CFR 325.8. There isn't a negotiation or resolution process with the agency requesting the elevation under the Section 404(q) MOA. Section 404(c) states the following:

> The Administrator is authorized to prohibit the specification (including the withdrawal of specification) of any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area for specification (including the withdrawal of specification) as a disposal site, whenever he determines, after notice and opportunity for public hearings, that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such determination, the Administrator shall consult with the Secretary. The Administrator shall set forth in writing and make public his findings and his reasons for making any determination under this subsection.

Therefore, under Section 404(c), EPA has the authority to veto permit actions. There is no requirement that EPA go through the process identified in the 404(q) MOA before going through the veto process. Therefore, EPA could veto a permit whether or not it elevated it under Section 404(q).

The EPA ~~would~~ **is** review**ing and commenting on** the USACE's proposed multilevel CWA 404 permit strategy for future SSHCP Covered Activities, including the proposed PGP permit action and **potentially** proposed RGP permit action**, as a Cooperating Agency on this EIS/EIR, and via review of the USACE's public noticing of the draft CWA 404 permit strategy**. If the USACE decide~~d~~**s** to approve and implement the proposed CWA 404 permit strategy ~~for future SSHCP Covered Activities~~, the EPA would **retain its normal** review ~~and determine appropriateness of any~~ **and comment responsibilities in regard to** future abbreviated LOPs or SP~~s~~ **applications** ~~issued~~ for ~~individual~~ SSHCP Covered Activities. ~~During these reviews, the EPA would use the information and programmatic analysis of Planning Area aquatic resources, species habitat, water quality, and hydrology impacts presented in the SSHCP EIS/EIR to the same extent that the USACE used that information and analysis for their decision to issue the PGP, RGP, LOP, and SP permits for SSHCP Covered Activities.~~

EPA also has comment authority under Section 309 of the Clean Air Act and under NEPA Section 102. The EPA would rate the draft SSHCP EIS/EIR and determine if the document is adequate, provides insufficient information, or is inadequate. In addition, EPA would rate the environmental impacts associated with the draft SSHCP EIS/EIR preferred action, with ratings on a scale from a lack of objections, environmental objections, to environmentally unsatisfactory. The rating system would provide a basis upon which EPA would make recommendations to the federal lead agency for improving the draft EIS/EIR.

1.5.6 California Department of Fish and Wildlife

CDFW participated in the preparation of the EIS/EIR as both a CEQA responsible agency and a CEQA trustee agency. The EIS/EIR would serve as the CEQA document that analyzes the regulatory permits issued by CDFW for the SSHCP. As a responsible agency under CEQA, CDFW would be required to consider the EIR for two CDFW decisions, as discussed below.

CESA Species Incidental Take Permit

CDFW would use the EIS/EIR and the SSHCP document in deciding whether to issue a CESA ITP under Section 2081 of the California Fish and Game Code for the incidental take of the SSHCP Covered Species that are listed as threatened or endangered under CESA (see Table 2-5 in Chapter 2).

CDFW would determine whether the information and analysis in the EIS/EIR is adequate to provide CEQA compliance for their CESA permit decision. CDFW would make the appropriate Findings pursuant to CEQA. CDFW would file a CEQA NOD, which would state that it has considered the EIS/EIR and would announce that CDFW has issued the CESA ITP for the SSHCP.

California Fish and Game Code Section 1600 Streambed Alteration Agreement

Section 1600 of the California Fish and Game Code requires that a Lake or Streambed Alteration Application be submitted to the CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW reviews the proposed actions and, if necessary, submits to the applicant a proposal for avoidance and minimization measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the project applicant is called a Lake or Streambed Alteration Agreement.

Covered Activities that require a Streambed Alteration Agreement may also require a CWA Section 404 permit from the USACE. In these instances, the conditions of the CWA Section 404 permit and the Streambed Alteration Agreement may overlap. The Land-use Authority Permit Applicants (Sacramento County, Rancho Cordova, and Galt) are requesting CDFW to enter into a Master Streambed Alternation Agreement (MSAA) or a Long-term Streambed Alternation Permit (LTLSA) to address future Covered Activities occurring within stream zones (defined under Section 1602 of the California Fish and Game Code). The MSAA or LTLSA would be valid for 12 years and would be eligible for a one-time extension for a maximum period of 17 years. For the amount of time remaining under the 50-year SSHCP term following the expiration of the MSAA or LTLSA extension, Sacramento County, Rancho Cordova, and Galt would enter into a new MSAA or LTLSA agreement that would build upon the first agreement.

Under the proposed MSAA or the LTLSA, the Implementing Entity and the CDFW would develop an MOU to expedite CDFW reviews of future Covered Activities. The MOU would describe the Covered Activity permitting framework agreement between CDFW and the Implementing Entity, which is expected to include standardized procedures for Covered Activity avoidance, minimization, and compensatory mitigation requirements for impacts within a stream zone. Under the MOU, CDFW would allow Covered Activity project-proponents to submit a request for verification to the local Land Use Authority Permit Applicants or to the Implementing Entity (whoever has jurisdiction), and the Land Use Permit Applicant or Implementing Entity would act as a "clearinghouse" for the notification forms and would conduct an initial screening process to verify the project's consistency with the SSHCP, the ARP, and the aquatic protection ordinances. The Land Use Permit Applicant or the Implementing Entity would then submit the notification forms to CDFW, who would review the Covered Activity projects under the MOU agreement. Under the MOU, CDFW would collect a fee for each streambed alternation notification submitted by the Implementing Entity, and CDFW would determine whether to use the MSAA (or LTLSA), or to issue an individual Lake or Streambed Alternation Agreement (LSA) for a Covered Activity project.

CDFW would decide whether to develop an MSAA or LTLSA under California Fish and Game Code Section 1600 with the three land-use authority Permit Applicants for future SSHCP Covered Activities. CDFW would consider the information and analysis in the EIS/EIR and make the appropriate Findings of Fact pursuant to CEQA on that decision. CDFW would file a CEQA NOD, which would state that it has considered the EIS/EIR and would announce that it has issued the MSAA or LTLSA.

1.5.7 Central Valley Regional Water Quality Control Board

As a responsible agency under CEQA, the Central Valley RWQCB would determine whether the information and analysis in this EIS/EIR is adequate to provide CEQA compliance for its discretionary decisions associated with the SSHCP.

Assuming the information and analysis of the proposed RWQCB decisions is adequate in the EIS/EIR, the RWQCB would make the appropriate Findings pursuant to CEQA and would file an NOD, which would state that it has considered the EIS/EIR in its decision to approve a programmatic CWA 401 permit strategy for future SSHCP Covered Activities. The RWQCB would use the NOD to disclose this decision.

Programmatic CWA Section 401 Water Quality Certification

Section 401 of the CWA requires any applicant for a federal license or permit conducting an activity that may result in a discharge of a pollutant into wetlands and other waters of the

United States to obtain a certification indicating that the discharge would comply with the state's applicable effluent limitations and water quality standards. In California, the RWQCB administers CWA Section 401 requirements.

Parallel to the USACE's proposed multilevel CWA 404 permit~~ting~~ strategy, the RWQCB has an opportunity to increase the efficiency of their CWA 401 permitting processes for future SSHCP Covered Activities, while improving the protection and management of aquatic resources in the Planning Area. The SSHCP, the ARP, and the aquatic resource protection ordinances could facilitate the Central Valley RWQCB's development of these water quality certification strategies. The SSHCP Conservation Strategy provides aquatic resource avoidance, minimization, and mitigation measures that are consistent with the CWA Sections 404 and 401 implementing regulations and Porter-Cologne.

As discussed in Section 1.1, the SSHCP Permit Applicants are requesting that the RWQCB develop a programmatic Section 401 Water Quality Certification for future Covered Activities that qualify for the USACE's proposed CWA 404 PGP or **(potential)** RGP processes (see Section 1.5.4). As with the USACE's proposed CWA 404 General Permits (PGPs and **[potential]** RGPs), the programmatic 401 Water Quality Certification would authorize those SSHCP activities that cause no more than minimal individual and cumulative adverse impacts to aquatic resources within the Planning Area.

In addition, the RWQCB could adopt a more efficient Water Quality Certification process for the individual Covered Activities that would ~~fall under~~ **qualify for** the USACE's proposed CWA 404 abbreviated LOP ~~process~~ **procedure and/**or ~~the proposed CWA 404~~ abbreviated SP process (see Section 1.5.4).

RWQCB would use the information and analysis in the EIS/EIR when deciding whether to develop and approve (1) a programmatic Section 401 Water Quality Certification program for future Covered Activities with minimal individual and cumulative effects on aquatic resources that would ~~fall under~~ **qualify for** the proposed CWA 404 PGP or **(potential)** RGP ~~processes~~; and (2) when deciding whether to develop a more efficient and shorter process for issuing individual Water Quality Certifications to future Covered Activities that require a CWA 404 LOP or a SP under the USACE's proposed multilevel CWA 404 permit ~~permitting processes~~ **strategy**.

Programmatic Porter-Cologne Act Compliance

Porter-Cologne is California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater. Porter-Cologne grants the State Water Resources Control Board and the RWQCBs power to protect water quality, including authority to adopt plans and policies, to regulate discharges of waste to surface and

groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. Projects that require a CWA Section 401 water quality certification, a CWA Section 404 permit, and/or a Streambed Alteration Agreement may also require a Report of Waste Discharge for wetlands and others waters of the state under the Porter-Cologne Act.

The SSHCP Permit Applicants are requesting that the programmatic CWA 401 Water Quality Certification also satisfy the Report of Waste Discharge requirements under Porter-Cologne when future Covered Activities impact wetlands and other waters of the state. In addition, the SSHCP Permit Applicants are requesting that the RWQCB also adopt a more efficient Waste Discharge Requirement approach for the Covered Activities that do not qualify for the programmatic 401 Water Quality Certification.

RWQCB would also use the information and analysis in the EIS/EIR in deciding whether it would develop a program to issue a Report of Waste Discharge to three land-use authority Permit Applicants (Sacramento County, Rancho Cordova, and Galt) under Porter-Cologne. The Report of Waste Discharge would authorize discharges to surface waters applicable to all, or a subset, of future SSHCP Covered Activities.

RWQCB would make the appropriate Findings pursuant to CEQA and would file an NOD, which would state that it has considered the EIS/EIR for their approval decision, and inform the public that it has developed and approved a multilevel CWA 401 permitting program and Report of Waste Discharge.

1.6 FUTURE USES OF THE FINAL EIS/EIR DOCUMENT

Because many of the SSHCP's Covered Species live part or all of their lives in water bodies, the SSHCP would conserve wetland and stream habitats that are also subject to regulation under Sections 404 and 401 of the CWA, Porter-Cologne, and California Fish and Game Code Section 1600 et eq., pursuant to California's Lake and Streambed Alteration Program. Consequently, the aquatic resources addressed in the SSHCP include those regulated by the USACE, State Water Resources Control Board, Central Valley RWQCB, and CDFW, as well as local zoning and aquatic resource ordinances. Therefore, as discussed in Section 1.5, in addition to seeking ITPs from the USFWS and the CDFW, the SSHCP Permit Applicants are also seeking concurrent and parallel authorizations from other federal and state aquatic-resource regulatory agencies.

This section discusses how the information and analysis presented in the final SSHCP EIS/EIR would be used in the future by federal and state regulatory agencies to enact more efficient permitting processes for future SSHCP Covered Activity projects and activities implemented by third-parties or implemented by the Permit Applicants. These efficiencies would save time and

money for the regulatory agencies and the regulated public, and would facilitate better decision-making processes at the landscape level and at the project level.

1.6.1 U.S. Army Corps of Engineers Future Uses of the EIS/EIR

As described in Section 1.5.4, the USACE Sacramento District will rely on the EIS/EIR to support the agency's decision-making on development and implementation of a complementary CWA 404 permit~~ting~~ strategy that would align with a USFWS-permitted SSHCP (see USACE 2015 and EIS/EIR Appendix C).

As discussed previously, the ARP provides for a multidisciplinary, comprehensive, and programmatic approach to attain permit authorizations for future Covered Activity projects with impacts to the aquatic resources that are regulated by different agencies. This complementary multilevel strategy for permitting future SSHCP Covered Activities would rely upon use of the regional SSHCP Preserve System as one part of a unified watershed strategy for aquatic resource mitigation. This coordinated permitting and mitigation approach is expected to improve aquatic resources protection on a regional scale while providing a balanced approach and a robust strategy for the avoidance, minimization, and compensatory mitigation of aquatic resources.

The SSHCP and the ARP offer opportunities to integrate local land-use planning with regional aquatic-resource protection. The SSHCP and the ARP are expected to increase permitting efficiencies of similar state and federal permits, and to provide greater regulatory certainty for the Land Use Authority Permit Applicants and their third-party project proponents, as discussed in Section 1.6.4. This multidisciplinary permitting approach would include a logical permit-review progression that uses the proposed multilevel CWA 404 permit~~ting~~ strategy. As discussed in Section 1.5.4, the proposed CWA 404 permit~~ting~~ strategy is expected to include multiple permit instruments and/or processes, including a General Permit(s) (PGP, **potential** RGP), and abbreviated LOP **procedure** and **abbreviated** SP process~~es~~.

As discussed in Section 1.5.4, the USACE would request a single ESA Section 7 consultation with the USFWS that would provide ESA compliance for all future Covered Activities authorized by the USACE under the PGP or **(potential)** RGP process(es), and under the abbreviated LOP **procedure** and **abbreviated** SP process~~es~~. With a single Biological Opinion in place that addresses all USACE permit actions for future SSHCP Covered Activities, the current project-by-project "individual" Section 7 consultations between the USACE and USFWS is anticipated, for the most part, to be unnecessary.

Furthermore, as discussed in Section 1.5.4, the USACE may develop a Programmatic Agreement with the State Historic Preservation Office to address NHPA 106 consultations on future SSHCP Covered Activities that are authorized under CWA 404.

The USACE anticipates using the SSHCP EIS/EIR as a programmatic NEPA document during its future CWA 404 permit reviews of SSHCP Covered Activities. The SSHCP EIS/EIR provides a regional-scale, comprehensive, and programmatic analysis of expected impacts to aquatic resources, species habitat, water quality, and hydrology from all planned urban development over a 50-year study period. The USACE anticipates using, to the maximum extent feasible, the 50-year programmatic analyses provided in the EIS/EIR to address NEPA compliance required for the CWA 404 permits issued under each level of the proposed multilevel CWA 404 permit~~ting~~ strategy.

1.6.2 Regional Water Quality Control Board future uses of the EIS/EIR

As discussed in Section 1.5.7, the Central Valley RWQCB would develop a CWA 401 water quality certification strategy for future SSHCP Covered Activities that obtain a CWA 404 permit under the USACE's proposed multilevel CWA 404 permit~~ting~~ strategy for future SSHCP Covered Activities.

The SSHCP EIS/EIR provides a regional-scale and programmatic analysis of impacts to water quality and hydrology expected from implementation of new urban development over a 50-year period. The RWQCB would use the SSHCP EIS/EIR to address CEQA compliance for future CWA 401 permits issued to future Covered Activity projects that obtain a CWA 404 permit under each level of the proposed multilevel CWA 404 permit~~ting~~ strategy.

A programmatic CWA Section 401 Water Quality Certification could be used for the Covered Activity projects that ~~fall under~~ **qualify for** the USACE's proposed PGP or **(potential)** RGP (see Section 1.5.4). If a Covered Activity project qualifies for the USACE's PGP, and the RWQCB has issued a programmatic Section 401 Water Quality Certification for the PGP, the Covered Activity project would already be certified under CWA 401. The proposed programmatic 401 Water Quality Certification would also satisfy the Report of Waste Discharge requirements for Porter-Cologne. In addition, the programmatic Section 401 Water Quality Certification may potentially cover (all or in part) some larger Covered Activity projects that would ~~fall under~~ **qualify for** the USACE's abbreviated LOP ~~process~~ **procedure**, or ~~fall under~~ **qualify for** the abbreviated SP process.

Any Covered Activity project authorized under the proposed CWA Section 401 Water Quality Certification strategy must satisfy the RWQCB's water quality anti-degradation policy, to demonstrate that water quality standards would be maintained in the Planning Area. Covered Activities would demonstrate this by complying with all avoidance, minimization, and mitigation

requirements of the SSHCP. The local Land Use Authority Permit Applicant or the Implementing Entity (whoever has jurisdiction) would review the Covered Activity to assure all measures required by the SSHCP and ARP are met.

The local Land Use Authority Permit Applicant, or the Implementing Entity (whoever has jurisdiction), would evaluate each Covered Activity project submittal. Based on the CWA 404 permit process under which the Covered Activity would likely be processed, the local Land Use Authority Permit Applicant (or the Implementing Entity) would determine the appropriate means through which the project would apply for the associated CWA 401 Water Quality Certification. This initial Land Use Authority Permit Applicant (or the Implementing Entity) screening (vetting) before submittal to the RWQCB is anticipated to result in more efficient and streamlined RWQCB review process of individual CWA 401 Water Quality Certification applications.

This more efficient CWA 401 Water Quality Certification process would save time and costs compared to the current project-by-project permitting process, and would allow the RWQCB to consider individual project impacts from a watershed perspective. The SSHCP's comprehensive and balanced approach to aquatic resource impacts and aquatic resource conservation would provide a greater level of landscape-scale and watershed-scale protection of water quality than is possible under the conventional project-by-project permitting approach under the CWA 404 and CWA 401.

1.6.3 California Department of Fish and Wildlife Future Uses

As discussed in Section 1.5.4, the Permit Applicants are requesting an MSAA or LTLSA from the CDFW for future SSHCP Covered Activities occurring within a stream zone.

The SSHCP and ARP describes procedures for avoidance, minimization, and describes compensatory mitigation requirements for future Covered Activities occurring within a stream zone. Because each Covered Activity would comply with standardized requirements set forth in the SSHCP and ARP, the CDFW would be able to quicken its permitting process using the MOU procedure described in Section 1.5.6.

CDFW would use the SSHCP EIS/EIR to satisfy CEQA requirements for its decision to issue the MSAA or LTLSA, and would use the EIS/EIR for future decisions in individual LSAs issued for some Covered Activity projects. The proposed MOU would enable CDFW to quicken its LSA permitting process for Covered Activity urban development projects that comply with all SSHCP requirements. The CEQA lead agency would be able to incorporate regional, comprehensive, and programmatic analysis of aquatic resources, species habitat, natural communities, water quality, and hydrology from the SSHCP EIS/EIR, which would greatly quicken CDFW review timeline.

The Land Use Authority Permit Applicants would establish a review process to assist CDFW in the efficient processing of individual CWA 401 certifications for proposed Covered Activity projects and activities. Under this process, the Land Use Authority Permit Applicants (or the SSHCP Implementing Entity) would act as the initial "clearinghouse" for project LSA permit applications, in the same manner they would for the CWA 404 permit application reviews. The Land Use Authority Permit Applicant (or the Implementing Entity, as applicable) would screen individual Covered Activity applications to ensure that the proposed project complies with all requirements of the SSHCP and ARP, and the Land Use Authority Permit Applicant would notify the CDFW (pursuant to Section 1600 of the California Fish and Game Code), and would seek an individual LSA or would seek to append the Covered Activity project to an MSAA or LTLSA.

1.6.4 The SSHCP Permit Applicants (Future SSHCP Permittees) Future Uses of the EIS/EIR

In most cases, an individual Covered Activity project or activity would trigger CEQA and require preparation of a CEQA document that analyzes the proposed project or activity. All six of the SSHCP Permit Applicants (the future SSHCP Permittees) could use the final SSHCP EIS/EIR to simplify and streamline preparation of individual project CEQA documents for future Covered Activity projects that they directly implement over the proposed 50-year term of the SSHCP. The SSHCP Permit Applicant would be the CEQA lead agency in the preparation of CEQA documents for Covered Activity projects that they directly implement. The SSHCP EIS/EIR provides regional-scale comprehensive analyses of environmental impacts of all planned urban development within the Planning Area over a 50-year period. The SSHCP Permit Applicants (CEQA lead agencies) would use the analyses presented in the final SSHCP EIS/EIR to simplify and streamline preparation of future CEQA documents for individual Covered Activity projects, especially the comprehensive analyses of impacts to native plant and animal species, natural communities, aquatic resources, water quality, and hydrology.

The three local Land Use Authority Permit Applicants (Sacramento County, Galt, and Rancho Cordova) would also have the ability to extend the species incidental take coverage provided by the SSHCP ITPs to the Covered Activities implemented by third-party project proponents under their jurisdiction. The SSHCP term "third-party project proponents" refers to individuals or organizations that implement a SSHCP Covered Activity under the jurisdiction of a Land Use Authority Permit Applicant (i.e., Sacramento County, Galt, or Rancho Cordova). An example would be a developer (the third-party project proponent) who proposes a development project that is consistent with the requirements of an SSHCP urban development Covered Activity, and the proposed project's approvals or entitlements are subject to the jurisdiction of Sacramento County (a Land-use Authority Permit Applicant). Third-party project proponent uses of the Final EIS/EIR are discussed in Section 1.6.5.

Similarly, the SSHCP Implementing Entity would have the ability to extend incidental take coverage provided by the SSHCP ITPs to "Participating Special Entities" that implement a Covered Activity project under the oversight of the SSHCP Implementing Entity. SSHCP Participating Special Entities are third-party entities that are not under the jurisdiction of a Land Use Authority Permittee. Participating Special Entities might include school districts, reclamation districts, irrigation or water districts, utilities, or other organizations that are not subject to the regulatory authority of a local jurisdiction.

1.6.5 Third-Party Project Proponent Future Uses of the Final EIS/EIR

Because Land Use Authority Permit Applicants (Sacramento County, Galt, and Rancho Cordova) and the SSHCP Implementing Entity have the ability to extend the incidental take coverage provided by the SSHCP ITPs to Covered Activities implemented by third-party project proponents, the third-party project proponents implementing a Covered Activity would not need to prepare ESA Biological Assessment documents, would not need to apply for a CESA take permit, and would avoid the multiple negotiations and multiple project reviews that are currently required for project ESA and CESA compliance under the conventional project-by-project review process. Similarly, third-party project proponents implementing a Covered Activity that impacts wetlands and other waters of the United States or state, for the most part, would not need to apply for individual permits or approvals from each of aquatic resource regulatory agencies that have participated in the development of the SSHCP and the ARP (i.e., USACE and RWQCB under CWA 404 and CWA 401, and CDFW under California Fish and Game Code Section 1600 Lake and Streambed Alteration Program). For the relatively few number of large urban development Covered Activities that would still need a Letter of Permission or Standard Permit under CWA 404 and an individual CWA 401 permit, or an individual California Fish and Game Code Section 1600 Streambed Alteration permit, the process, effort, and time required to obtain those permits would be substantially simplified, abbreviated, and streamlined, relative to the current project-by-project review.

The SSHCP and the ARP provide third-party project proponents with pre-negotiated project-level biological and aquatic-resource Avoidance and Minimization Measures that can be incorporated early into the proposed project's design. Where project impacts are unavoidable, the SSHCP and the ARP permits and authorizations provide third-party project proponents with pre-determined mitigation requirements, which are standardized and are predictable in advance. In addition, the SSHCP and ARP permits and authorizations would provide pre-negotiated mitigation monitoring requirements and methodologies.

Because the final SSHCP EIS/EIR provides a comprehensive and regional-scale analysis of biological resource and aquatic resource impacts from implementation of future urban development planned for the next 50-year period, the effort and cost of preparing future

project-level CEQA documents and project-level NEPA documents could be reduced relative to project CEQA and NEPA documents prepared under the current project-by-project review process. Project-level CEQA and NEPA documents can reference and use the EIS/EIR's regional-scale and 50-year comprehensive and programmatic analysis of future Covered Activity impacts to native plant and animal species, natural communities, aquatic resources, water quality, hydrology, and other environmental resources natural resources, as well as the EIS/EIR's cumulative analysis of impacts to wetlands and other waters in the region.

This incorporation of information and analysis from the SSHCP EIS/EIR is expected to produce better project-level CEQA and NEPA documents and would save third-party project proponents time and reduce costs associated with the preparation of each project-level CEQA or NEPA document. Although the CEQA and NEPA lead agencies determine the scope and the conclusions of a development project's CEQA and/or NEPA document, in most cases the project proponent funds the document preparation.

Compared to the existing, conventional project-by-project CWA permit process, the proposed multilevel CWA 404 permit strategy for future Covered Activities would increase the efficiency of the CWA permitting process; provide for more systematic regional protection of Planning Area aquatic resources; balance the impacts to and conservation of aquatic resources at a regional-scale and at project-scale; and provide a coordinated approach for providing regional avoidance, minimization, and compensation for unavoidable impacts to aquatic resources. With a single, comprehensive ESA Section 7 consultation Biological Opinion that addresses all future Covered Activities authorized under the proposed CWA 404 permit strategy (see Section 1.5.4 and EIS/EIR Appendix C), the conventional project-by-project Section 7 consultations between the USACE and the USFWS for each project CWA permit would, for the most part, be unnecessary. The proposed multilevel CWA 404 permit strategy ~~permitting process~~, envisioned CWA 401 Certification process, and ~~envisioned~~ **potential** programmatic NHPA 106 agreement would be more efficient and would save time and costs, when compared to the conventional project-by-project permitting processes.

Under the proposed multilevel CWA 404 permit strategy ~~for future Covered Activities~~, most future Covered Activity projects requiring a CWA permit could be authorized **under the local programs implemented** by the jurisdictional Land-use Authority Permit Applicant**s** ~~under the~~**, in that most activities would be anticipated to meet the terms and conditions of the USACE's** proposed PGP ~~and would not require the~~**. Thus,** third-party project proponent**s would be most likely to receive a local permit under the ARP and local ordinances, rather than** to seek authorization directly from the USACE ~~or prepare a CWA 404 permit application~~.

As discussed in Section 1.5.4, and in EIS/EIR Appendix C, the **USACE's proposed** abbreviated LOP **procedure** and **abbreviated** SP process for CWA 404 permits would ~~likely~~ be needed for

only a small portion of the larger-scale urban development Covered Activity projects in the Planning Area. The SSHCP, ARP, and the regional, programmatic, and comprehensive analysis of aquatic resources in the Final SSHCP EIS/EIR, would identify appropriate and adequate aquatic resource impact Avoidance and Minimization Measures to assist in compliance with the 404(b)(1) guidelines. The envisioned abbreviated LOP **procedure** and **abbreviated** SP process~~es~~ would ~~largely~~ fulfill (in advance) the requirements of a separate off-site alternatives analysis, so an off-site alternatives analysis would not be required for the assessment of the Least Environmentally Damaging Practicable Alternative, ~~and in the case of SPs,~~ alleviat~~e~~**ing** the necessity of preparing **often** ~~a~~ rigorous off-site alternatives analysis. Therefore, the alternatives analysis necessary under the abbreviated LOP **procedure** and **abbreviated** SP process~~es~~ could be limited to identifying particular Avoidance and Minimization Measures from the SSHCP that are appropriate to apply to the project-site. In addition, the abbreviated LOP **procedure** and **abbreviated** SP process~~es~~ would provide the third-party project proponents with greater regulatory certainty.

NEPA requirements for future Covered Activity projects requiring permits under the abbreviated SP process ~~may be satisfied with a smaller Environmental Assessment-level of review, rather than the EIS-level of review that is typical under the current project-by-project CWA permit process.~~ **would realize greater efficiencies.** ~~Even~~ ~~f~~**F**or future Covered Activity urban development projects proposing potentially significant effects on the human environment~~ and requiring the~~**, for which the Corps determines requires** preparation of an EIS, the ~~proposed~~ SP **abbreviated** process would be ~~greatly abbreviated by relying on the regional, programmatic, and comprehensive analysis in the EIS/EIR.~~ **reduced in terms of process, information requirements, and timing. Please refer to *Appendix* C for additional description of the SP abbreviated process.**

Therefore, the proposed abbreviated LOP **procedure** and **abbreviated** SP process~~es~~ would save project proponents time and costs and would increase regulatory certainty in comparison to the conventional project-by-project processes.

Project Proposals Seeking CWA 401 Water Quality Certification

A parallel permitting process is anticipated for CWA 401 Certification of Covered Activity project proposals, including the potential use of all (or portions) of a programmatic Section 401 Certification. This more efficient CWA 401 Certification process would save project proponents time and costs when compared to the conventional project-by-project permitting process. The envisioned parallel multilevel process for Covered Activity 401 Water Quality Certification would allow greater environmental benefits at the watershed and regional scale.

Project Proposals Seeking a CDFW 1600 Streambed Alteration Agreement

A streamlined permitting process is envisioned for obtaining Streambed Alteration Agreements for Covered Activity project proposals. The Implementing Entity would evaluate the project submittal subnotification forms and conduct the initial screening process to verify project consistency with the SSHCP and the ARP regulatory permitting framework. Once approved by the Implementing Entity, the subnotification forms would then be submitted to CDFW for review and verification. The Final SSHCP EIS/EIR would provide CEQA compliance for these Streambed Alteration Agreements.

1.7 REFERENCES CITED

DOC (Department of Conservation). 2015. *1988-2012 Land Use Summary.* Sacramento, California: DOC, Farmland Mapping and Monitoring Program. Accessed January 30, 2015. http://www.conservation.ca.gov/dlrp/fmmp/Documents/fmmp/pubs/1984-present/sac_1988-Present.xls.

DOC. 2016. Farmland Mapping and Monitoring Program [data]. Sacramento, California: DOC, Farmland Mapping and Monitoring Program. Accessed January 2016. http://www.conservation.ca.gov/dlrp/fmmp/Pages/Index.aspx.

DOF (California Department of Finance). 2015. *Report 90 E-4 Population Estimates for California State and Counties January 1, 1981 to January 1, 1990.* Accessed January 30, 2015. http://www.dof.ca.gov/research/ demographic/reports/estimates/e-4/1981-90/.

Holland, R.F., and Vollmar Consulting. 2009. *Loss of Central Valley Vernal Pools, Land Conversion, Mitigation Requirements, and Preserve Effectiveness*. Auburn, California: Prepared for Placer Land Trust. December 2009. Accessed January 30, 2015. http://www.vernalpools.org/literature.htm.

Holland, R.F. 2009. *California's Great Valley Vernal Pool Habitat Status and Loss*: *Photorevised 2005*. Auburn, California: Prepared for Placer Land Trust. Accessed January 30, 2015.http://www.vernalpools.org/vpreports/Great%20Valley%20Vernal%20Pool%20Distribution_Final.pdf.

USACE (U.S. Army Corps of Engineers). 2014. "Memorandum for Record: Cumulative Impact Analysis for the South Sacramento Habitat Conservation Plan (SPK-1995-00386)." Sacramento, California: U.S. Army Corps of Engineers, Sacramento District. September 4, 2014.

USACE. 2015. *CWA 404 Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan*. December 2015. Sacramento, California: U.S. Army Corps of Engineers, Sacramento District.

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.* Accessed January 30, 2015. http://www.fws.gov/sacramento/es/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

USFWS and NOAA (National Oceanic and Atmospheric Administration). 2000. "Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process (the Five Point Policy)." Federal Register, volume 65, pages 35242–35257. Thursday, June 1, 2000.

USFWS and NOAA. 2016. *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*. Arlington, Virginia: USFWS, Division of Endangered Species. December 21, 2016. Accessed February 9, 2017. https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf.

Witham, C.W., R.F. Holland, and J.E. Vollmar. 2014. *Changes in the Distribution of Great Valley Vernal Pool Habitats from 2005 to 2012*. Sacramento, California: Prepared for the U.S. Fish and Wildlife Service and Bureau of Reclamation CVPIA Habitat Restoration Program under Grant Agreement No. F11AP00169 with Vollmar Natural Lands Consulting. Accessed January 30, 2015. http://www.vernalpools.org/literature.htm.

INTENTIONALLY LEFT BLANK

CHAPTER 2 – ALTERNATIVES, INCLUDING THE PROPOSED ACTION/PROPOSED PROJECT

This chapter presents detailed descriptions of the proposed South Sacramento Habitat Conservation Plan (SSHCP or Plan) for south Sacramento County (the Proposed Action/Proposed Project), the Reduced Permit Term Alternative HCP, and the No Action/No Project Alternative. This chapter also summarizes the approach used to consider and select the alternatives studied in detail, and discusses the alternatives that were considered but are not studied in detail.

The Environmental Impact Study/Environmental Impact Report (EIS/EIR) alternatives accommodate all planned future projects and activities in the Planning Area (Section 1.1.1), as described in the adopted General Plans of Sacramento County and Galt and Rancho Cordova, and the *Capital SouthEast Connector Project EIR* (Section 2.2.1 and Section 3.4).

2.1 APPROACH TO DEVELOPING ALTERNATIVES

2.1.1 Regulatory Framework for Developing Alternatives

National Environmental Policy Act and California Environmental Quality Act

The National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) require that an EIS/EIR evaluate a reasonable range of alternatives to a proposed action, including a no-action alternative. While there is no clear rule for determining a reasonable range, NEPA and CEQA provide guidance that can be used to determine alternatives for consideration in an EIS/EIR.

NEPA regulations identify the alternatives as the “heart” of an EIS (40 CFR 1502.14). Each EIS must devote substantial treatment to each alternative, and present alternatives in comparative form to sharply define the issues and provide a clear basis for choice among options by the decision makers and the public (40 CFR 1502.14). The term “range of alternatives” refers to the alternatives discussed in an environmental document (CEQ 1981, Question 1a). The range of alternatives discussed must include all reasonable alternatives. Reasonable alternatives are those that are both technically and economically practical and feasible and meet the stated purposes and needs of the proposed action (43 CFR 46.420(b); CEQ 1981, Question 2a). The term “range of alternatives” includes other alternatives that were eliminated from detailed study, with a brief discussion of the reasons for eliminating them (40 CFR 1502.14(a); 43 CFR 46.420(c)). What constitutes a reasonable range of alternatives depends on the nature of the proposal and the facts in each case (CEQ 1981, Question 1b). The stated purpose and need for action and the “significant issues” identified during the scoping process will determine the range of alternatives and provide a basis for the selection of an alternative in the decision (43 CFR 43.415[b]; 43 CFR 46.420 [a][2]).

The range of alternatives under CEQA is governed by the rule of reason (14 CCR 15126.6[f]). Alternatives under CEQA must meet most of the basic project objectives, but avoid or substantially lessen any of the significant effects of the proposed project, and must be potentially feasible. In determining whether alternatives are feasible, lead agencies are guided by the following general definition of feasibility found in CEQA Guidelines, Section 15364 (14 CCR 15364): "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." In accordance with CEQA Guidelines, Section 15126.6(f), the lead agency should consider site suitability, economic viability, availability of infrastructure, general plan consistency, other regulatory limitations, jurisdictional boundaries, and the proponent's control over alternative sites in determining the range of feasible alternatives to be evaluated in an EIR. An EIR must briefly describe the rationale for selection and rejection of alternatives and the information that the lead agency relied upon in making the selection. It should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process, and briefly explain the reason for their exclusion (14 CCR 15126.6[c]).

A no-action alternative is required to be considered in an EIS, and a no project alternative is required to be considered in an EIR. A no action/no project alternative allows decision makers to compare the impacts of approving the project (or an alternative) to the expected future conditions if no project or alternative is approved and the activity would not take place.

NEPA regulations require an EIS to include a no-action alternative (40 CFR 1502.14). Where a new project or activity is proposed for implementation, the no-action alternative means "no project," and the no-action alternative looks at the effects of not approving the action under consideration (43 CFR 46.30[1]; 43 CFR 46.30[2]; CEQ 1981, Question 3). The no-action alternative describes the likely future conditions without the project and may also include predictable actions by other persons or entities in addition to the federal agency involved.

Under CEQA, an EIR is required to analyze the no project alternative. CEQA Guidelines Section 15126.6(e)(2) (14 CCR 15126.6[e][2]) indicates that the no project analysis shall discuss the baseline existing conditions at the time of the Notice of Preparation is published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

Clean Water Act

Consideration of alternatives is also required under the Section 404 of the Clean Water Act (CWA 404). Activities that would result in the discharge of dredged or fill material into wetlands and other waters of the United States **may** require authorization from the U.S. Army Corps of

Engineers (USACE) under CWA 404 **(e.g., exempt activities do not require authorization)**. Projects subject to permitting under the CWA 404 must comply with Section 404(b)(1) guidelines (40 CFR, Part 230) for discharge of dredged or fill material into wetlands and other waters of the United States. Section 404(b)(1) guidelines require that:

> except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

The guidelines (40 CFR, Part 230) consider an alternative practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." Practicable alternatives under the guidelines (40 CFR, Part 230) assume that "alternatives that do not involve special aquatic sites are available, unless clearly demonstrated otherwise." The guidelines (40 CFR, Part 230) also assume that "all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise."

Per the USACE's NEPA implementing regulations (33 CFR 325, Appendix B(9)(b)(5)), the alternatives analysis conducted in an EIS should be thorough enough to use for both the public interest review and the Section 404(b)(1) guidelines, where applicable**; however, on a case-by-case basis, additional information may be necessary. As discussed in Section 1.5.4, as part of its compliance documentation with EPA's 404(b)(1) Guidelines, the USACE will also consider additional information outside the purview of the NEPA process for this project.** Under the USACE public interest review, for activities in which there are unresolved conflicts as to resource use, USACE must evaluate the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work (33 CFR 320.4(a)(2)(ii)). As explained in Section 2.1.1, under the Section 404(b)(1) Guidelines, USACE must evaluate the practicability of alternatives in light of the overall project purpose (40 CFR 230.10(a)).

The Plan Permittees are seeking a Section 404 programmatic general permit from the USACE that would apply to the majority of SSHCP Covered Activities requiring CWA 404 authorization. If issued, the programmatic general permit would streamline the CWA 404 permitting process for certain activities covered under the SSHCP that would result in the discharge of dredged or fill material into wetlands and other waters of the United States. As discussed in greater detail in Chapter 1 of this document, other components of a CWA 404 permit strategy coordinated with the SSHCP may include the USACE's issuance of a regional general permit, Letter of Permission procedures, and an abbreviated standard permit process. As it applies to discussing the alternatives

analysis, as part of the ~~evaluation to issue~~ **decision making on issuing** programmatic general permits or regional general permits under CWA 404, USACE must ~~follow~~ **ensure compliance with** the U.S. Environmental Protection Agency's (EPA's) Section 404(b)(1) Guidelines ~~, which in part require that USACE document that the Covered Activities would result in no more than minimal individual and cumulative adverse effects on wetlands and other waters of the United States and that the permitted action is the least environmentally damaging practicable alternative~~.

2.1.2 How the SSHCP Development Process Has Considered Alternatives

The SSHCP has been developed through an iterative process that first began in 1992. Since that time, a range of conservation plan concepts were vetted by the proposed Permit Applicants; by several stakeholder committees; and representatives of the U.S. Fish and Wildlife (USFWS), California Department of Fish and Wildlife (CDFW), USACE, EPA, and the Regional Water Quality Control Board (RWQCB). The Proposed Action/Proposed Project Alternative is the end result of this process. The chronology of SSHCP development is briefly described in the following text.

1992–2006

In 1992, the EPA funded a USACE watershed study to assess the water resource needs of river basins and watersheds in south Sacramento County, including needs relating to ecosystem protection and restoration, flood risk management, watershed protection, water supply, and drought preparedness. In 1993, USFWS and CDFW proposed shifting from a watershed study to a more comprehensive regional resource protection plan, such as an HCP. After an initial assessment confirmed that an HCP in south Sacramento County would be politically, economically, and biologically feasible, further work was conducted to identify possible strategies and economic constraints.

In 1995, an SSHCP Steering Committee was formed to provide public stakeholder input into the development of the program. As initially constituted, this committee consisted of an equal number of members representing the regulatory, agricultural, development, and environmental stakeholders, as well as federal, state, and Sacramento County agency representatives.

In September 1996, the Steering Committee began to meet regularly to provide input regarding the goals and principles that it felt should guide the development of the SSHCP. The Steering Committee also formed two subcommittees to address biological and economic issues and identified members for these stakeholder subcommittees. Experts with local knowledge participated as science advisors to develop background information and baseline data about the Planning Area. In the late 1990s, funding was insufficient to make substantial progress, and work on the SSHCP halted.

In 2002, work began again on the SSHCP, which provides the foundation for the current Plan. Following the incorporation of the City of Elk Grove in 2000 and the City of Rancho Cordova in 2003, the local agencies with land use authority (Sacramento County and the Galt, Rancho Cordova, and Elk Grove) established[1] a strong collaboration to complete the SSHCP process successfully. A committee consisting of the land use authority Permit Applicants—the Local Agency Working Group—was established to consider each jurisdiction's interests in the Plan.

2006–2011

By late 2006, a Preliminary Administrative Draft SSHCP was completed and released to stakeholders for input. The Conservation Strategy of this preliminary plan considered all vernal pools within the Planning Area to have the same habitat value. The Conservation Strategy associated with this assumption is described in Section 2.1.5 as a potential alternative (i.e., "Preserve 50% of all Vernal Pools in the Planning Area"). However, just before the release of the 2006 Preliminary Draft SSHCP, the USFWS released the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Vernal Pool Recovery Plan) (USFWS 2005). The information in the Vernal Pool Recovery Plan prompted the Permit Applicants and stakeholder groups to change the focus of the SSHCP and to place greater conservation value on the vernal pools and other aquatic habitats located within the two vernal pool Core Recovery Areas now designated within the Planning Area (USFWS 2005). Those vernal pool Core Recovery Areas included the Mather Core Recovery Area (MCRA), located almost entirely within the Urban Services Boundary (USB), and the Cosumnes/Rancho Seco Core Recovery Area, located outside the USB in the southeastern portion of the Planning Area (Figure 1-1). The Vernal Pool Recovery Plan established targets for preservation of vernal pool species occurrences and habitat in each vernal pool Core Recovery Area for each species in the Vernal Pool Recovery Plan. The targets established by the Vernal Pool Recovery Plan form the basis of the alternative "Recovery Plan Alternative (Preserve 95% of the Vernal Pools in the MCRA)" that is discussed in Section 2.1.5.

In addition to the information provided by the Vernal Pool Recovery Plan, new information on vernal pool tadpole shrimp (*Lepidurus packardi*) became available (USFWS 2008), which showed much higher densities of vernal pool tadpole shrimp within the MRCA than within any other part of that species' range, including the south part of the Planning Area and the Cosumnes/Rancho Seco Core Recovery Area.

During this period, the previously mentioned Local Agency Working Group evaluated comments and recommendations received from the Steering Committee, the stakeholder subcommittees, and the public. Scientific data on the ecology of the Planning Area was

[1] Note that in the context of this Plan, the word "establish" is synonymous with "create."

updated. Through this process, the list of Covered Species was revised several times after the 2006 Preliminary Draft SSHCP. By 2010, 10 native species had been removed from the 2006 list of Covered Species. Certain native species were removed for one or more of the following three general reasons:

1. New information about the status of the species over the species' range indicated the species is unlikely to be listed under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA) during the proposed permit term.
2. The Plan preparers, Wildlife Agencies, and local species experts were not able to identify areas of breeding, feeding, or sheltering habitat for the species within the Planning Area.
3. The Permit Applicants, the stakeholder groups, and the Wildlife Agencies determined that the species could not be adversely impacted by any of the proposed Covered Activities.

The following native species were considered but removed from the list of SSHCP Covered Species in 2006:

- American peregrine falcon (*Falco peregrinus anatum*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Golden eagle (*Aquila chrysaetos*)
- Long-eared owl (*Asio otus*)
- Merlin (*Falco columbarius*)
- Sharp-shinned hawk (*Accipiter striatus*)
- Short-eared owl (*Asio flammeus)*
- White-faced ibis (*Plegadis chihi*)
- Yellow-breasted chat (*Icteria virens*)
- Ringtail (*Bassariscus astutus*).

Although the Permit Applicants no longer sought incidental take authorization for these species, the Permit Applicants and stakeholder groups recognized that these native species would directly and indirectly benefit from the SSHCP Conservation Strategy.

For the 2010 Administrative Draft SSHCP, the Permit Applicants and stakeholder groups expanded the western boundary of the Planning Area to include agricultural lands located west of Interstate (I-) 5, which would allow the Plan to consider alternative ways to conserve Swainson's hawk (*Buteo swainsoni*) foraging habitat.

The regulatory agencies (USFWS, CDFW, USACE, EPA, and RWQCB) developed a map in 2011 that identified all important aquatic resources and Vernal Pool habitat remaining inside and adjacent to the designated MCRA. This map of aquatic resource conservation was informally called the "blue

line map" but is labeled as the "2011 Agency Conceptual Design" in the maps prepared around that time. This map identified 76% of remaining vernal pools in the MCRA for preservation but did not take into account the feasibility of acquiring these parcels. The 2011 Agency Conceptual Design map formed the basis of an alternative discussed further in Section 2.1.5.

A subsequent map ("2011 USFWS Most-Essential Habitat") was prepared by USFWS staff to identify areas where the most valuable vernal pool species habitat should be preserved in the MCRA, and identified preservation of 49% of Vernal Pool ecosystem landscape that remained in the MCRA in 2011. The 2011 USFWS Most-Essential Habitat map formed the basis of the alternative "Preserve 49% of the Vernal Pools within the MCRA" that is discussed in Section 2.1.5.

2012–Present

From 2012 to the present, several modifications were made to the SSHCP to further refine the document's impacts analysis and to enhance the SSHCP Conservation Strategy. In early 2012, the SSHCP Plan Partners, the regulatory agencies, and a select group of local experts with specific knowledge of SSHCP Covered Species held several meetings to discuss how the SSHCP Conservation Strategy could be crafted to maximize preservation of the Vernal Pool ecosystem within the Urban Development Area (UDA)[2]. The meetings resulted in tentative points of agreement that set the foundation for the SSHCP Conservation Strategy as it is currently described in the SSHCP. The main points of agreement are summarized as follows:

- The approach to conservation within the UDA will be a hybrid approach with the combination of hardline preserves being delineated where preserves could be negotiated with landowners coupled with a criteria-based approach where preserves could not be negotiated with willing landowners at that time.
- Hardline preserves will be shown for five projects (Arboretum, Sun Creek, Cordova Hills, Excelsior Estates [now known as Jackson Township], and New Bridge).
- Criteria are established for three zones within or adjacent to the MCRA. ("Adjacent" is defined as within 1 mile of the existing MCRA boundary.)

[2] As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where new urban development projects or activities could occur under the No Action/No Project Alternative, or where new urban development Covered Activities could occur under the two action alternatives. Therefore, the term "UDA" means all lands within the Sacramento County USB boundary that are also within the Planning Area (this includes lands within the Rancho Cordova city limits that are within the Planning Area); and all lands within Galt's city limits and within the City of Galt's sphere of influence (see Section1.1.1 and Figure 1-1).

- In order to meet regulatory agency concerns that the combined hardline preserve and criteria do not provide sufficient acquisition to mitigate for anticipated take, the Plan will specify that an additional 500 "flexible" acres will be acquired within or adjacent to the MCRA.
- The large Landscape-level preserve outside of the UDA is increased from 10,000 acres to 10,500 acres.
- An ordinance will be drafted and issued concurrently with the Draft EIS/EIR to provide assurances that incompatible practices do not irreparably harm potential resources (particularly Vernal Pool landscapes).

In addition to determining an acceptable approach to conservation within the MCRA because of its importance in the conservation of vernal pool tadpole shrimp, Sacramento Orcutt grass (*Orcuttia viscida*), and slender Orcutt grass (*Orcuttia tenuis*), the Plan Partners and the regulatory agencies also made several adjustments to SSHCP Land Cover Type Classifications. These modifications improved the baseline map that is used to calculate impacts that will result from the implementation of Covered Activities and is used to guide preservation of Covered Species habitat. The changes to the Land Cover Type Classifications include the following:

Low-Density Development Land Cover Type

Initial mapping underrepresented the acres of upland habitats (e.g., Valley Grassland) in areas characterized by small parcels (less than 5 acres in size). Specifically, many backyard areas within agricultural-residential development were mapped as grassland, and a number of larger fields were mapped as Low-Density Development. To correct these errors, all Low-Density Development cover types were reviewed against aerial photos and were adjusted to reflect the correct cover type.

Vernal Swale Land Cover Type

The Vernal Swale land cover type was removed as an SSHCP land use classification. Any feature that was classified as a Vernal Swale was reclassified as a Swale.

Vernal Impoundment Land Cover Type

The Vernal Impoundment land cover type was removed as an SSHCP land use classification. Vernal impoundments outside of the UDA were reclassified as Vernal Pool. Within the UDA, most vernal impoundments were reclassified as Vernal Pool, and some were reclassified as other Seasonal Wetland cover types, where appropriate.

Seasonal Impoundment Land Cover Type

The Seasonal Impoundment land cover type was removed as an SSHCP land use classification. Seasonal impoundments outside of the UDA were reclassified as Seasonal Wetland. Within the

UDA, seasonal impoundments outside of the MCRA were reclassified as Seasonal Wetland or Open Water. Within the MCRA, most seasonal impoundments were reclassified as Vernal Pool.

Stream/Creek (VPIH) Land Cover Type

The Stream/Creek Vernal Pool Invertebrate Habitat (VPIH) land use classification was created to capture VPIH that occurs within stream or creek channels.

During the winter of 2014, the Plan Permittees and the regulatory agencies developed a Vernal Pool watershed map that was prepared to help plan preserves to reduce the indirect impacts to Vernal Pool features covered under the SSHCP. The map is also used to calculate indirect impacts that will result from the implementation of a Covered Activity. The models are specifically designed for the portion of the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf et al. 1998; USFWS 2005) that is located in south Sacramento County.

Final adjustments were made to the Planning Area that included the removal of the Aerojet property and the removal of the City of Elk Grove to accommodate their requests to be dropped from the Plan. These modifications necessitated major adjustments to the Plan, including a new impacts analysis and adjustments to the Conservation Strategy. In addition to the changes mentioned previously, the Plan Partners also made some minor adjustments to the placement of infrastructure within the Planning Area to reduce impacts to Covered Species habitat. These adjustments included the minor realignment of roadways, water supply lines, and sewer lines.

2.1.3 Alternatives Considered

The lead agencies evaluated a range of reasonable project alternatives for an HCP in south Sacramento County. Ideas for potential alternatives came from a variety of sources, including the SSHCP development process, the public scoping process under CEQA and NEPA, and input from the lead and cooperating agencies. The following categories of potential alternatives were considered by the lead agencies. All alternatives considered were different types of conservation plans that varied in the ways described below:

- **Different permit terms**[3]—For example, include a 30-year permit term consistent with the term of the adopted General Plans, or include a longer term consistent with other development scenarios, such as the expected 50-year period needed for "full buildout[4]"

[3] The permit term is the time period in which incidental take associated with all Covered Activities is authorized by the Incidental Take Permits (ITPs), and the time period in which assembly of the Preserve System and all other aspects of the Conservation Strategy must be successfully completed.

[4] "Full buildout" means all currently undeveloped lands that are zoned for, or are ultimately planned/ contemplated for, future urban development (in the adopted general plans of the Permit Applicants) would become developed. Full buildout will include some open space and conservation lands within the areas planned for urban development.

of Sacramento County's approved USB and the other components of the UDA as described in Section 1.1.1.

- **Different Covered Species**—For example, include only species currently listed as threatened or endangered under ESA or CESA, or also include all or some unlisted species that may become listed during the permit term, or also include other species of local concern.
- **Different Planning Area boundary**—Smaller, larger, or differently shaped Planning Area. For example, the Planning Area size could include all undeveloped lands within south Sacramento County, or limit the size of the Planning Area to include only undeveloped lands within Sacramento County's approved USB, or include undeveloped lands within the Elk Grove sphere of influence (SOI), or also include undeveloped lands west of I-5.
- **Different types of Covered Activities**—In addition to covering future urban development and associated infrastructure activities, consider covering other types of activities that are under the jurisdiction of a Permit Applicant, such as the operation and maintenance of their existing facilities within the Planning Area.
- **Different amounts or frequency of Covered Activities**—For example, include greater or smaller amounts of new urban development within each Permit Applicant's jurisdiction.
- **Different Conservation Strategy elements**—Consider different types, locations, total amounts, or frequency of implementing certain conservation measures. For example, include different amounts or different locations of avoidance/preservation of vernal pools and other aquatic resources.

2.1.4 Alternative Formulation and Screening

Project alternatives were identified and screened using three tiers of criteria. Potential alternatives that met the screening criteria in the first tier were carried forward to the second tier, and then those that met the screening criteria in the second tier were carried over to the third tier. Only the alternatives that met the criteria for all three tiers were carried forward in this EIS/EIR for detailed study. EIS/EIR Appendix E contains a detailed description of how and why alternatives were screened from further analysis.

As discussed in Section 2.1.1, NEPA regulations and CEQA Guidelines require that the EIS/EIR include action alternatives that satisfy the following three criteria:

1. Achieves the stated purposes, needs, and objectives
2. Addresses one or more of the significant issues identified during scoping; avoids or substantially lessens potentially significant impacts
3. Is feasible, practicable, and reasonable

Alternatives in the EIS/EIR were screened using the three previously listed criteria, which are described in greater detail below. Alternatives that met those three criteria were then evaluated to be consistent with the guidance in the CWA Section 404(b)(1) Guidelines.

1. Purpose, Needs, and Objectives – First Tier Screening Criteria

The first tier criteria asked if the alternative would achieve the stated purposes, needs, and objectives. A purpose of the proposed federal action is to comprehensively protect and conserve multiple ESA- and CESA-listed species and other native species; to conserve, enhance, and restore the habitats and ecosystems upon which these native species depend, including aquatic resources and aquatic habitats; and to ensure the long-term survival of these species for the continuing benefit of the American people in Sacramento County, California. This purpose and need statement is supported by a list of underlying objectives identified by the lead agencies for the project. Potential alternatives were evaluated through the first tier screening criteria using the following question:

- Would the alternative meet Objectives 1–14 listed in Section 1.3.3?

To advance to the second tier, the answer to most or all of these questions had to be "yes" or "possibly." If the answer to the questions was "no" or "not likely," the alternative was screened out at that point.

2. Significant Issues and Impacts – Second Tier Screening Criteria

The second tier criteria considered whether the potential alternative addresses one or more of the significant issues identified during internal scoping and public scoping and whether the alternative would avoid or substantially lessen any significant adverse environmental effects (see Section 1.4.2). Potential alternatives that advanced to the second tier of screening were evaluated using the following question:

- Would the potential alternative address one or more significant issues related to the proposed action, and would the potential alternative avoid or substantially lessen any of the significant adverse environmental effects of the proposed project?

If the answer to the question was "yes," "possibly," or "unknown," the potential alternative was carried forward for third tier screening. If the answer was "no" or "not likely," then the potential alternative was not carried forward for detailed study in the EIS/EIR.

3. Feasible, Practicable, and Reasonable – Third Tier Screening Criteria

The third tier criteria focused on CEQA's concept of feasibility and NEPA's principle of reasonableness. As discussed in Sections 2.1.1 and 2.1.4, alternatives evaluated in an EIR should be

feasible. CEQA defines a "feasible" alternative as capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors. Under NEPA, reasonable alternatives are technically and economically capable of being accomplished in a successful manner and within a reasonable period of time, taking into account environmental, social, legal, technological, and economic factors.

Therefore, under both CEQA and NEPA, the screening of alternatives can consider economic and social factors, as well as legal and technical feasibility. Project Objectives 15–18 identify planning and development criteria that must be met for an alternative to be considered feasible, practicable, and reasonable. Potential alternatives were evaluated through the third tier screening criteria using the following question:

- Would the alternative meet Objectives 15–18 listed in Section 1.3.3?

If all answers to whether an alternative would achieve all of the third tier screening criteria were "yes" or "possibly," the potential alternative is described in this EIS/EIR. If the answers to any of these questions were "no" or "not likely," the potential alternative was rejected for detailed study, and was not considered further.

Criteria to Determine Compliance of Alternatives with the 404(b)(1) Guidelines

In addition to the previously described CEQA and NEPA considerations, alternatives to adverse effects on the aquatic ecosystem must be evaluated by USACE pursuant with the requirements of the Section 404(b)(1) Guidelines. The alternatives analysis conducted in an EIS should be thorough enough to use for both the public interest review and the Section 404(b)(1) guidelines, where applicable**; however, on a case-by-case basis, additional information may be necessary. As discussed in Section 1.5.4, as part of its compliance documentation with EPA's 404(b)(1) Guidelines, the USACE will also consider additional information outside the purview of the NEPA process for this project**. ~~Under the USACE public interest review, for activities where there are unresolved conflicts as to resource use, USACE must evaluate the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work (33 CFR 320.4(a)(2)(ii)).~~ As explained in Section 2.1.1, under the Section 404(b)(1) Guidelines, USACE must evaluate the practicability of alternatives in light of the overall project purpose (40 CFR 230.10(a)). Under the Section 404(b)(1) Guidelines, USACE must evaluate the following to determine if each alternative is practicable:

- Availability
- Overall project purpose
- Costs
- Logistics
- Existing technology

- Adverse effects on the aquatic ecosystem
- Other significant adverse environmental consequences.

If the answers to the seven questions below were "not likely" or "unknown," the potential alternative is considered in this EIS/EIR. If the answers to any of these seven questions were "likely" or "yes," the potential alternative failed the screening, and consequently, is not considered in detail in this EIS/EIR. The seven questions are as follows:

1. Would the marginal costs of the potential alternative be so substantial that a reasonably prudent public agency would not proceed with the alternative?
2. Would the marginal costs of the potential alternative be so substantial that it would be impractical to proceed with the alternative?
3. Would the potential alternative take so long to implement, compared with the proposed action, that it would not meet the project purpose or objectives within an acceptable time frame?
4. Would the potential alternative require technology or physical components that are clearly technically infeasible based on currently available science and engineering for the scope of the potential alternative?
5. Would construction, operation, and/or maintenance of the potential alternative violate any federal, state, or local statutes or regulations?
6. Would the potential alternative involve an outcome that is clearly undesirable from a policy standpoint in that the outcome could not reflect a reasonable balancing of relevant economic, environmental, social, and technological factors?
7. Would the potential alternative involve an increase in adverse effects to the aquatic ecosystem?

2.1.5 Alternatives Considered and Not Carried Forward for Detailed Analysis

As discussed in Section 2.1.2, a conservation plan for southern Sacramento County has been under development in some form for approximately 20 years. During this time, many alternatives that considered different Planning Area boundaries, protection of different natural resources, different Covered Species, different conservation strategies, and other elements have been considered.

The SSHCP is the culmination of countless revisions and requests from stakeholders and regulators. The alternatives carried forward for detailed analysis include a comprehensive Conservation Strategy that endeavors to strike the balance of preservation, avoidance, minimization, and mitigation to reach economically feasible, beneficial outcomes. The NEPA process and identification of alternatives for the SSHCP has been ongoing with the formulation of

the SSHCP for over a decade. Several alternatives are described in Section 2.1.3. Many of these alternatives were not carried forward because they were not feasible or did not meet the project objectives. Over time, numerous USFWS-, CDFW-, and USACE-recommended avoidance measures were incorporated into the proposed action, and earlier SSHCP versions (alternatives) were not carried forward in favor of an alternative with less adverse impacts than some of the earlier iterations of the SSHCP. For example, over time the currently proposed Stream Setbacks, the protection of micro-watersheds, [5] and different types of utility and road realignments that avoid impacts to species and aquatic resources were added.

The lead agencies screened all potential alternatives following the process outlined in Section 2.1.4. The following sub-sections describe the alternatives considered and not carried forward based on one of the screening criteria outlined previously. These alternatives are organized into two groups: those that were proposed during the multiyear development of the SSHCP, and those that were suggested by commenters during the public scoping of the EIS/EIR (see Section 1.4). EIS/EIR Appendix E presents three tables that provide information regarding the reasons an alternative was not carried forward for detailed study in the EIS/EIR.

All Habitat Preservation and Project Mitigation is Located Outside of the USB

To allow development on all remaining undeveloped lands within Sacramento County's USB boundary, this alternative proposed all species habitat and aquatic resource avoidance, mitigation, and conservation would be located outside of the USB boundary. This was a primary component of the initial Conservation Strategy proposed by the Permit Applicants during the early period of SSHCP preparation (see Section 2.1.2). Under this potential alternative, approximately 28,000 acres of new development and associated infrastructure could occur inside the USB boundary, and all of the more than 30,000 acres of required habitat preservation would occur in the Planning Area outside the USB compared to the proposed action, which includes over 6,900 acres of habitat preservation inside the USB and over 27,500 acres outside the USB (Table 2-8) and assumes the remaining natural land covers within the USB would eventually be urbanized (approximately 33,500 acres; Table 2-4).

This alternative failed the first screening criteria because it would not achieve many of the purposes and objectives identified in Section 1.3.3. Objectives 1, 2, 3, 10, and 11 for maintaining the functions of aquatic resources in the Planning Area would not be achieved. This alternative would not allow for establishment of habitat linkages between new preserves in the USB and existing preserves outside the USB, conflicting with Objective 4. This alternative would not protect occurrences of narrowly distributed plant species such as Sacramento Orcutt grass and

[5] Refer to EIS/EIR Appendix D for AMM STREAM-1, AMM STREAM-2, AMM STREAM-3, AMM UTILITY-1, AMM UTILITY-2, and AMM UTILITY-4.

slender Orcutt grass that are known to occur within the USB, conflicting with Objective 8. Impacts to state and federally listed species and their habitats and impacts to aquatic resources would not be avoided to the maximum extent practicable, conflicting with Objectives 9 and 10. This alternative would not achieve Objective 14 because it would not preserve any of the MCRA, an area necessary for the recovery of 12 Planning Area species (USFWS 2005) and an especially important part of the endangered vernal pool tadpole shrimp range (USFWS 2007a). In addition, limiting preserves to the areas outside the USB would not satisfy the purpose and need to maintain the existing native species richness and natural communities in the Planning Area. For these reasons, this alternative was not carried forward for detailed analysis.

Preserve 50% of All Vernal Pools in the Planning Area

This alternative was considered by the Permit Applicants early in the initial period of SSHCP preparation (prior to the publication of the Vernal Pool Recovery Plan (USFWS 2005)) and would preserve a minimum of 50% of the vernal pools (wetted acres) remaining within the Planning Area at that time within new and existing preserves. This alternative would result in only 285 acres of new Vernal Pool preservation in the Planning Area compared to the proposed action, which would result in almost 1,000 acres of new Vernal Pool preservation and almost 400 acres of re-establishment (Table 8-9) in the Planning Area. The proposed action would preserve approximately 89% (Table 8-8) of the vernal pools within the Planning Area within new and existing preserves. The level of habitat preservation provided by this "Preserve 50%" alternative could not achieve several of the stated purposes and objectives (see Section 1.3). For example, this alternative would not provide sufficient preservation of vernal pools to maintain the existing distribution of native animal and plant species in the Planning Area, and therefore, it would not achieve Objective 1 (Section 1.3). This alternative would not provide sufficient preservation of Vernal Pool habitat to maximize protection of native plant and animal species or their ecosystems, which would not achieve Objective 2. This alternative would also not achieve Objective 3 because it would not provide large blocks of interconnected species habitat. This alternative would not achieve Objective 9 because it would not provide sufficient Vernal Pool preservation to avoid or minimize impacts to state and federally listed species and their habitats to the maximum extent practicable. This alternative may not achieve Objective 11 because it would make it less likely that the project could achieve no net loss of watershed function. In addition, it would not achieve Objective 14 because it would not provide sufficient preservation in the vernal pool Core Recovery Areas that are now designated within the Planning Area (USFWS 2005). For these reasons, this alternative would not achieve the stated purposes and objectives for a conservation plan implemented in south Sacramento County. Therefore, this alternative failed the first screening criteria and was not carried forward for detailed analysis.

Maximize Protection of Vernal Pool Wetted Acres in the MCRA Alternative

This alternative was derived from recovery criteria for the vernal pool tadpole shrimp in the MCRA (USFWS 2005) to maximize protection of Vernal Pool wetted acres within the MCRA. It was thought that vernal pool tadpole shrimp would be a good umbrella species for the purpose of developing potential conservation scenarios for the MCRA because vernal pool tadpole shrimp are distributed in vernal pools throughout the MCRA and co-occur in vernal pools or complexes with other listed or rare species in the MCRA. For the purposes of developing maps for potential conservation scenarios, the Vernal Pool Recovery Plan's criterion of 95% of suitable habitat was equated to wetted acres.

Urban development within Sacramento County continued from 2005 to the present, and projects meeting the regulatory requirements of CWA 404 and ESA received local and federal permits years subsequent to 2005. Due to development that has occurred since initial conception of this alternative, this alternative is no longer feasible based on existing conditions and was not carried forward for detailed analysis.

Preserve 76% of the Total Acreage of the MCRA

In 2011, regulatory agencies participating in the SSHCP planning process worked together to delineate a map of important aquatic resources and Vernal Pool habitat remaining in the MCRA (described in Section 2.1.2 as the "blue line map" or "2011 Agency Conceptual Design"). The Conservation Strategy depicted on this map would preserve 76% of the approximately 24,245-acre MCRA.

The large amount of Vernal Pool ecosystem preservation within the MCRA boundary would limit planned urban development within the USB, which overlaps with the MCRA (County of Sacramento 2011; City of Rancho Cordova 2006). This would shift development pressure to other areas that are currently unplanned for growth, since the development planned within the MCRA/USB occurs simultaneously with other regional planned development. For this reason, restrictions in the MCRA/USB would move development pressure to rural areas that are currently outside the USB and/or adjacent cities. These rural areas are typically large agricultural parcels that often support high-quality aquatic resources and species habitat because the inventory of properties with less constraint have been largely developed or are currently planned for development within the USB and adjacent cities. Therefore, this alternative would not achieve Objective 1 and Objective 5, which require protection of enough habitat to conserve every Planning Area Covered Species, including Swainson's hawk and white-tailed kite (*Elanus leucurus*) foraging habitat.

The 76% requirement for Vernal Pool landscape preservation within the MCRA/USB would reduce the available development fees to pay for acquisition of Cropland and Irrigated Pasture-Grassland in the SSHCP Preserve System or would increase fees. Typically, the land prices within the USB are greater than outside the USB, and the 2011 Agency Conceptual Design map did not consider the cost of acquiring a large percentage of lands within the USB for permanent habitat preservation. Analysis by the Permit Applicants determined that it would be economically infeasible for the SSHCP to acquire all parcels needed to achieve the Conservation Strategy mapped in the 2011 Agency Conceptual Design. Under this alternative, the development fees would be higher than fees charged by other HCPs, thus not achieving Objective 15. This alternative would not meet Objective 16 because it would limit urban development in the USB and potentially result in expansion outside currently adopted SOIs for Galt and Rancho Cordova and the Sacramento County USB. Objective 16 discourages expansion beyond these boundaries to maintain sound land use planning principles (e.g., consolidate development within USB and cities to support the efficient provision of utilities and infrastructure; support viable transit; and maintain compliance with land use and air quality regulations such as Assembly Bill 32, Senate Bill 375, and the Clean Air Act).This alternative may also require exercising of eminent domain to acquire some parcels within the MCRA, which is not consistent with Objective 18.

Because this alternative would not achieve several purposes and objectives (Section 1.3.3), this alternative failed the third screening criteria and was not carried forward for detailed analysis.

Preserve 49% of the Total Acreage of the MCRA

As described in Section 2.1.2, the USFWS developed a MCRA Conservation Strategy map in 2011 called the "2011 USFWS Most-Essential Habitat." This Conservation Strategy map identified the most valuable Vernal Pool habitat within the MCRA. The acreage of the "most-essential" Vernal Pool habitat was calculated to be 49% of the MCRA, or 11,880 acres of Vernal Pool ecosystem, which included preserving approximately 342 wetted acres of vernal pools in the MCRA. This amount of habitat preservation in the MCRA would not accommodate housing needs of the projected population growth in the Planning Area (see background discussion in Section 1.3 for information on projected population growth). Therefore, this potential alternative is not consistent with Objective 16, which requires the SSHCP to accommodate population growth and associated housing, economic development, and infrastructure within the currently adopted USB and SOIs of Galt and Rancho Cordova. In addition, this alternative would not achieve Objective 16 since it would lead to more development outside the USB, which would require the extension of utilities and infrastructure outside the USB; would lead to more urban sprawl with more vehicle trips; and would not promote compact mixed-use development that supports viable transit and walkable areas. The extension of utilities and additional transportation infrastructure

required by potential new development outside the USB would also conflict with Objective 17, which requires that master plans already approved by Sacramento County, Galt, Rancho Cordova, and Sacramento County Water Agency (SCWA) to be included as Covered Activities in any alternative analyzed in detail. These master plans focus on provision of new services to development within the USB and Galt's and Rancho Cordova's SOIs. Because this alternative would not achieve Objectives 16 or 17, it failed the third screening criteria and was not carried forward for detailed analysis.

Remove Lands Outside USB From the Planning Area Boundary

Under this potential alternative, the size of the Planning Area would be smaller. The new Planning Area would include the portion of the current Planning Area that is located within Sacramento County's USB and would exclude the areas of south Sacramento County that are outside the USB boundary. This alternative was identified during the scoping process for the EIS/EIR.

Under this potential alternative, the Planning Area covered by the SSHCP permits would not include the area of south Sacramento County that is outside the USB boundary. Therefore, the Planning Area would be limited to approximately 86,480 acres. Approximately 35,570 acres of that potential 86,480-acre Planning Area are already one of the "developed" land cover types (see Table 8-1), and 10,585 acres are already Cropland, Irrigated Pasture-Grassland, Vineyard, or Orchard. Constraining the Planning Area to the USB boundary would not allow the SSHCP Conservation Strategy to establish large preserves of Vernal Pool ecosystem in the area south of the USB and would prevent the SSHCP from achieving many identified needs, purposes, and objectives (Section 1.3). For example, this alternative could not maintain in perpetuity each type of natural community present in south Sacramento County, as is required by Objective 1. This alternative would not protect large, contiguous blocks of species habitat, as required by Objective 4, and would not allow for full implementation of the existing transportation, utility, and other infrastructure master plans outside the USB, as required by Objective 15. Finally, because this alternative would require all preserves to be established inside the USB, the alternative would not allow sufficient urban development within the currently adopted SOIs for Galt and Rancho Cordova and currently adopted USB for Sacramento County, as required by Objectives 16 and 17. Because this alternative would not achieve several objectives, this alternative was not carried forward for detailed analysis.

Remove Lands West of I-5 from the Planning Area Boundary

Under this potential alternative, the size of the Planning Area would be smaller. The western border of the Planning Area boundary would stop at I-5, and the Planning Area would not include lands west of I-5. This alternative was identified during the scoping process for the EIS/EIR.

This alternative would establish all SSHCP Preserves in the Planning Area located east of I-5 and would not preserve Swainson's hawk foraging habitat or other natural land covers west of I-5 because portions of this area are thought to be at risk from flooding and future sea level rise. However, recent species habitat mapping indicates that the Planning Area west of I-5 (in and around Stone Lakes National Wildlife Refuge [NWR]) provides key roosting habitat for greater sandhill crane (*Grus canadensis tabida*) (USFWS 2007b). Establishment of new SSHCP Preserves west of I-5 could provide substantial benefit to the local greater sandhill crane wintering population by enlarging the roosting areas within Stone Lakes NWR and by preserving linkages to existing foraging habitat along the Cosumnes River corridor. This alternative would not achieve Objective 6, which requires establishment of such greater sandhill crane habitat linkages. Alternatives that preserve habitat only east of I-5 could also prevent the establishment of preserves that are consistent with Objective 2, which directs that preserves be located in areas that maximize protection of native plant and animal species and the ecosystems on which they depend.

In addition, this alternative would not achieve Objective 5 because preserved Cropland and Irrigated Pasture-Grassland would not be sufficient to provide adequate amount of foraging habitat for Swainson's hawk and white-tailed kite. There may not be sufficient willing sellers in the lands east of I-5 that would sell land or conservation easements at an appropriate price to meet all SSHCP habitat preservation objectives, and this alternative may not be able to offset the effects of Covered Activities on Swainson's hawk and on other bird Covered Species.

For these reasons, this alternative would not achieve several of the purposes and objectives listed in Section 1.3.3 and failed the first screening criteria. Therefore, this alternative was not carried forward for detailed analysis.

Reduce Impacts to the Highest-Quality Swainson's Hawk Habitat

This alternative would preserve most of the existing Cropland and Irrigated Pasture-Grassland within Preserve Planning Units (PPUs[6]) 4 and 6 of the Planning Area (Figure 2-1, Preserve Planning Units) to reduce impacts to important Swainson's hawk foraging and nesting habitat. This alternative was suggested at public scoping meetings (Section 1.4), and at those times, the entire SOI for the City of Elk Grove was still included in the Planning Area for the SSHCP. Future urban development in that SOI was expected to result in substantial loss of existing habitat, especially for Swainson's hawk and other special status species that use the Croplands and Irrigated

[6] To assist with development of an adequate SSHCP Conservation Strategy, the Permit Applicants divided the Planning Area into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species resources are present and where habitat preservation would occur (see Figure 1-1 in the SSHCP document). These eight SSHCP PPUs are geographic subdivisions of the Plan Area and were delineated to ensure that adequate Biological Goals and Measurable Objectives would be developed for biological resources in all parts of the Plan Area, including the location and implementation of the SSHCP Preserve System.

Pasture-Grassland that are currently present in much of the Elk Grove SOI. When Elk Grove withdrew from the SSHCP planning effort in 2014, all of the lands that are in Elk Grove's jurisdiction were also removed from the Planning Area. The removal of the current Elk Grove SOI boundaries from the Planning Area greatly reduced the acres of planned new urban development and loss of quality Swainson's hawk habitat requested in the SSHCP's Incidental Take Permits (ITPs). As a result, the alternative would no longer avoid or substantially lessen environmental effects of the proposed project, and it would not address a significant issue related to the proposed action; therefore, the alternative failed the second screening criteria, and analysis of this alternative was not carried forward subsequent to the participation of Elk Grove in the SSHCP.

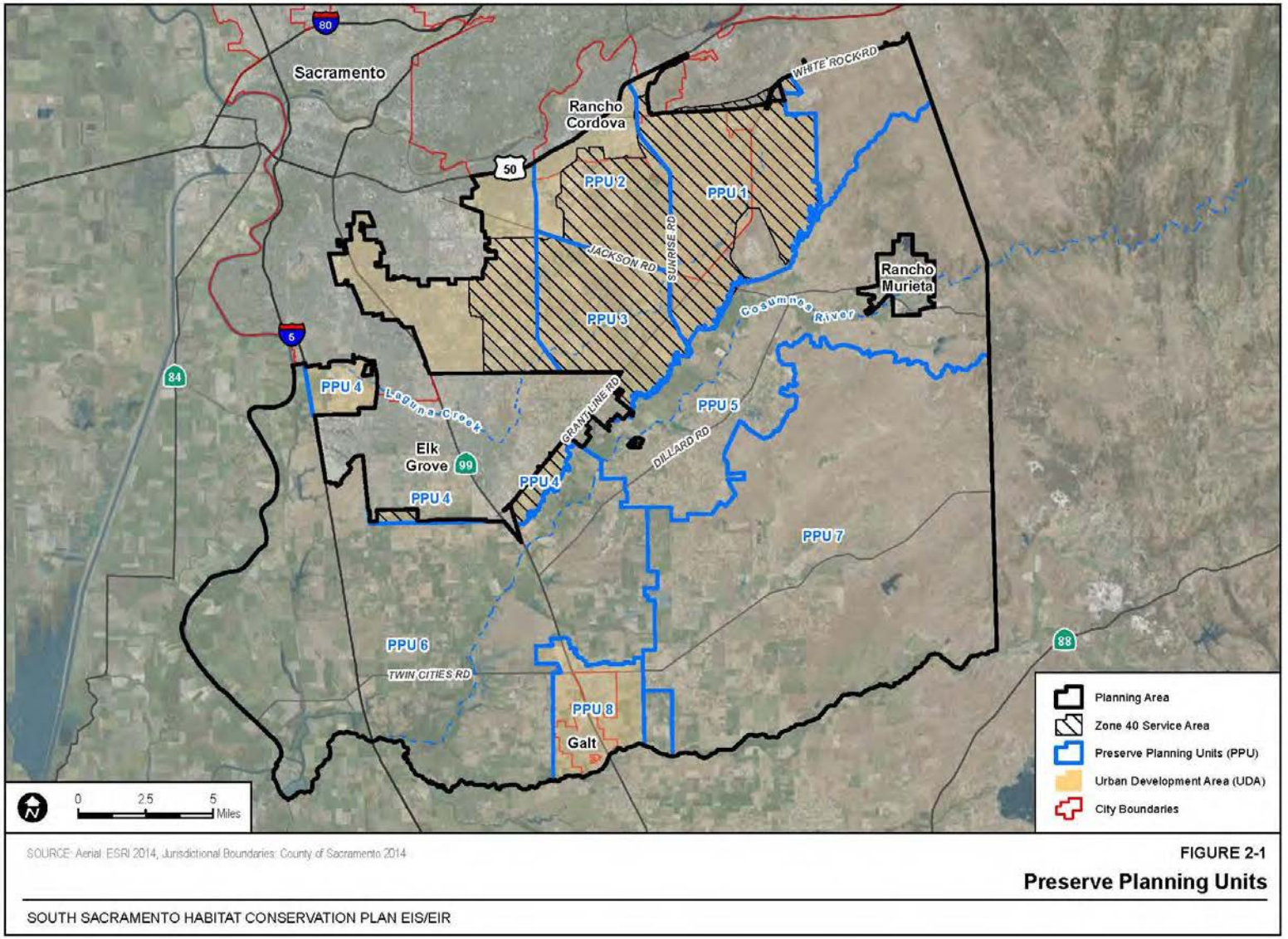
2.1.6 Alternatives Carried Forward for Detailed Analysis

The following two EIS/EIR Action Alternatives were carried forward for detailed analysis in the EIS/EIR because they are practicable, include provisions to reduce impacts, address the existing issues and underlying needs present in the Planning Area, and will achieve the purposes and objectives presented in Section 1.3:

- **Proposed Action/Proposed Project Alternative (Section 2.3).** The Permit Applicants (future Plan Permittees) would implement categories of Covered Activities and a Conservation Strategy over a 50-year permit term. This is described in the SSHCP document that was prepared by the Permit Applicants and will be included in the ESA and CESA incidental-take permit application packages submitted to the USFWS and CDFW.
- **Reduced Permit Term Alternative (Section 2.4).** The Permit Applicants would implement the same categories of HCP Covered Activities as in the proposed SSHCP but over a shorter 30-year incidental-take permit term. The Permit Applicants would implement a similar HCP Conservation Strategy, but this strategy would result in a smaller, less comprehensive preserve system in the Planning Area (relative to the interconnect SSHCP Preserve System described in the Conservation Strategy of the Proposed Action/Proposed Project Alternative).

In addition to the two Action Alternatives studied in this EIS/EIR (i.e., the Proposed Action/Proposed Project Alternative and the Reduced Permit Term Alternative), a No Action/No Project Alternative is studied in detail. As discussed in Section 2.1.1, a No Action/No Project Alternative must be included in any EIS or EIR.

Figure 2-1 Preserve Planning Units



INTENTIONALLY LEFT BLANK

2.2 NO ACTION/NO PROJECT ALTERNATIVE

Under the No Action/No Project Alternative, the SSHCP would not be approved or implemented, and no comprehensive ESA and CESA ITPs would be issued to the Permit Applicants for species impacts resulting from future development projects and activities within the Planning Area.

Also, the local agencies (that are Land Use Authority Permittees under the SSHCP) would not implement a local Aquatic Resources Program (ARP) and associated local aquatic resource protection ordinances. Thus, there would be no local-level aquatic resources permitting program. In addition, the USACE would not develop a strategy for permitting these future projects and activities under CWA 404. Finally, the CDFW would not develop a streamlined permit strategy for the future development projects and activities, and the CDFW would not issue a Master Streambed Alteration Agreement (MSAA) to the Permit Applicants.

Under the No Action/No Project Alternative, project proponents (including local agencies and individual private developers) would continue to apply directly to the resource agencies for permits for species take under the ESA and CESA, as well as for CWA 404 authorizations for projects proposing to discharge dredged or fill material into wetlands and other waters of the United States, and for 401 and CDFW MSAA authorizations. Therefore, the No Action/No Project Alternative would continue the conventional project-by-project project regulatory reviews in which individual project developers apply for necessary project permits independently with each of the resource agencies with application review proceeding in a less systematic, comprehensive fashion.

2.2.1 Future Projects/Activities Likely Under the No Action/ No Project Alternative

The types of future projects and activities expected in the Planning Area under the No Action/No Project Alternative are described in the following text.

Future Urban Development

All lands within the Sacramento County USB are zoned or ultimately planned for urban development, as described in the adopted *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011, 2014a). Similarly, all lands within Galt and the Galt SOI, as well all lands within the Rancho Cordova SOI are zoned or ultimately planned for urban development, as described in those adopted General Plans (Galt 2009; Rancho Cordova 2006) (Figure 1-1).

Five Urban Development Master Plans (Arboretum, Cordova Hills, Jackson Township, NewBridge, and SunCreek) for large urban development projects are currently under preparation or have recently been approved in the UDA. These five Urban Development Master Plans were designed

to comply with SSHCP requirements and include preserves that would likely be similar in size, acreage, and location under the No Action/No Project Alternative.

The No Action/No Project Alternative assumes that all lands zoned or ultimately planned/contemplated for urban development in these five adopted General Plans that are not already currently developed would eventually become developed, which the EIS/EIR terms "full buildout." The Permit Applicants expect full buildout to occur over a 50-year period.

Although all lands within the Sacramento County USB are zoned or ultimately planned for urban development (County of Sacramento 2011, 2014a), not all of the land inside Sacramento County USB has specific urban land use designations at this time.

Full buildout would continue and include some on-site project avoidance of natural land covers[7] through both designated preserves and open space within the boundaries of the urban development projects. Other preserves would continue to be outside the UDA as off-site mitigation for private and public projects inside and outside the UDA.

Expansion, Improvement, Maintenance, and Operation of Public Infrastructure Systems

In association with the expected future urban development, the public infrastructure systems such as water, wastewater, recycled water, stormwater, flood control, solid waste, and utility systems, as well as transportation systems, would be expanded or improved, as described in several local and regional infrastructure agency master plans and/or capital improvement programs (Sacramento Area Sewer District 2010, 2014; Regional San 2000, 2015; SCWA 2005).

Although it is not included in these regional infrastructure plans or capital improvement programs, the South Sacramento County Agriculture and Habitat Lands Recycled Water Project (Regional San 2015) is also assumed to proceed under the No Action/No Project Alternative. This project would include new pumping and water transmission pipelines in the UDA and water distribution pipelines outside the UDA.

The SCWA and the Sacramento Area Flood Control Agency would continue to separately construct water pipeline, pumping station, and flood control infrastructure maintenance and improvements that are not identified in their master plans or capital improvement projects. These miscellaneous minor improvements or maintenance efforts would serve individual

[7] Natural land covers are those SSHCP land cover types that provide habitat for Covered Species and include Blue Oak Savanna, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture-Grassland, Mine Tailings Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Open Water, Orchard, Seasonal Wetland, Stream/Creek, Stream/Creek (VPIH), Swale, Valley Grassland, Vernal Pool, and Vineyard, as discussed in Table 8-1.

development projects or address newly discovered system vulnerabilities. All of the new and existing public infrastructure facilities would be operated and maintained.

Road Improvements

Existing roadways would continue to be expanded and improved in the Planning Area, as discussed in the adopted General Plans. The majority of this expansion and improvement would be within the UDA to serve the transportation needs of new development and increased population. However, roads outside the UDA would also be improved to facilitate transportation between developed areas as follows:

- Road improvements described in the Sacramento County General Plan Circulation Element and associated Transportation Plan map (Sacramento County 2014b)
- Road improvements in the City of Rancho Cordova as directed by the *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (City of Rancho Cordova 2006) and Capital Improvement Plan[8] (Rancho Cordova 2013)
- Road improvements in the City of Galt and its SOI as directed by the *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009)
- Minor roads in the Planning Area that are not specifically identified for expansion or improvement in adopted General Plans of Sacramento County or Galt or Ranch Cordova to serve new and existing development

2.2.2 Expected Regulatory Environment Under the No Action/ No Project Alternative

Permitting and Local Entitlement Process

The No Action/No Project Alternative assumes that new projects and activities would seek entitlements and permits as they do now, following the conventional project-by-project review process. For the local land use agencies (i.e., Sacramento County, Galt, or Rancho Cordova), this process includes the review of building permits, grading permits, and use permits, as well as parcel maps, subdivision maps, specific plans, and master plans. Depending on the project details, some projects would be subject to CEQA review. In addition, individual projects would continue

[8] Capital Improvement Plans or Capital Improvement Programs, commonly referred to as CIPs, are short-range plans (typically over a 5–10 year horizon) that identify capital projects that an organization or public agency expects to develop. The definition of a capital projects can vary, but they generally include all long-lived infrastructure such as water facilities, sewers, streets, parks, and buildings, along with equipment. Utility providers often prepare and maintain utility master plans that are similar to CIPs.

to comply with any applicable policies contained in the adopted General Plans of Sacramento County, Galt, and Rancho Cordova.

Future Project Compliance with ESA and CESA

Under the No Action/No Project Alternative, projects subject to CEQA review would continue to reviewed individually by the CDFW under the conventional project-by-project review process, and projects with the potential to result in the direct take any state-listed species would be required to apply for an individual CESA incidental take permit under Section 2081(b) of the California Fish and Game Code. Similarly, the No Action/No Project Alternative would continue the existing project-by-project ESA-compliance process currently used by development projects and activities within the Planning Area. Currently, the most common way for development projects and activities in this Planning Area to receive their ESA clearance is through an ESA Section 7 consultation initiated by a federal agency, such as USACE, that is making a permit-issuance decision or another discretionary federal decision about the proposed project or activity. For example, **for** projects or activities that ~~could result in the direct fill or discharge to waters of the US must obtain~~ **require** USACE authorization under Section 404 of the Clean Water Act (CWA 404), ~~and~~ the USACE must ensure that the~~ir authorization~~ **permit** decision complies with the ESA. Therefore, the USACE consults with the USFWS and/or the National Marine Fisheries Service (NMFS) on the potential impacts of their permit or authorization decision on federally listed species and designated Critical Habitat. As part of this ESA Section 7 consultation, the USFWS (or NMFS) typically prepares an ESA Section 7 Biological Opinion document, which identifies any species-impact avoidance and minimization requirements, as well as any habitat preservation requirements needed to compensate for the project impacts on federally listed species. The USACE will incorporate the terms, conditions, and requirements of the ESA Section 7 Biological Opinion into the project's CWA 404 permit authorization as a special condition. If the USFWS determines during ESA Section 7 consultation, that the project is likely to jeopardize the continued existence of a federal species, or that the project is likely to result in the destruction or adverse modification of Critical Habitat, that project could not proceed without modifications. However, many of the future projects and activities within the UDA would continue to be implemented without obtaining USACE authorization under CWA 404, and therefore would not be reviewed under ESA Section 7. These projects may continue to receive building permits from Sacramento County, City of Galt, or City of Rancho Cordova for construction in or near habitat for federally listed species, but if the project does not ~~cause~~ **result in a** direct ~~fill or~~ discharge **of dredged or fill material** into waters of the U.S., the project would not be required to request CWA 404 authorization from the USACE. Projects and activities that do not request a CWA 404 authorization are not likely to be reviewed under the ESA, and therefore, the project would not mitigate or compensate impacts to listed species. Especially, indirect impacts to species and species habitat that occur later in time are often unmitigated within the UDA, such as indirect

impacts that result from altered surface and subsurface hydrology (which changes vernal pool inundation regimes), unseasonal landscaping irrigation and nuisance flows in to vernal pool habitat, increased invasive plant species, species disturbance and mortality by domestic dogs and cats, human recreation, increased trash, and increased wildfire frequency. These Planning Area unmitigated indirect impacts generally occur when the aquatic resource and species habitat is located on an adjacent parcel with a different owner, and the aquatic resources are not shown to be part of the pending project when it is reviewed by the local land-use authority (e.g., Sacramento County, Galt, or Rancho Cordova), or there is no CEQA nexus, or no CWA 404 permit or NEPA is required.

As part of the individual project ESA and CESA consultations, USFWS or CDFW are expected to continue requiring projects to implement impact Avoidance and Minimization Measures (AMMs), which may include species surveys conducted using ~~USACE~~ **USFWS** or CDFW protocols, species specific construction timing restrictions (i.e., construction windows), equipment use restrictions, addition of buffers[9] or setbacks to the project design, as well as other project-specific impact avoidance measures.

Currently, USFWS works with individual project proponents to include a "buffer" between the project's footprint and any adjacent species occurrence or species habitat that could be indirectly affected by the project or activity. The width of the buffer/setback needed to effectively avoid or minimize project impacts to species is determined through project-by-project consultations with the USFWS and CDFW, and is based on site-specific conditions.

As a result of each individual consultation with the USFWS and CDFW, different types of ESA and CESA compensation or mitigation would continue to be required by individual projects to offset unavoided project impacts to listed species under the No Action/No Project Alternative:

- The project proponent avoids and permanently preserves species habitat at the project site (i.e., on site preserves), and provides an endowment and a management plan to maintain species habitat on those preserves;
- The project proponent purchases existing habitat in off-site areas, puts a conservation easement on the property, and provides an endowment and a management plan to maintain species habitat on those preserves by a third party (i.e., are "turn-key" preserves);
- In certain cases, the project proponent would be allowed to offset species impacts by purchasing credits at a USFWS or CDFW approved habitat conservation bank;
- or a combination of some or all of the above.

[9] A buffer is the linear distance that a development footprint must be located away from the edge of a natural resource, such as species occurrence, an aquatic resource, or natural lands.

One of the Core Recovery Areas identified in the Vernal Pool Recovery Plan (USFWS 2005) is the MCRA. It is located largely inside Sacramento County's USB and is approximately 24,245 acres in size (Figure 1-2). Species populations and habitat present for which the MCRA is necessary for the recovery of species listed under the ESA, including the Sacramento Orcutt grass, slender Orcutt grass, vernal pool tadpole shrimp, and vernal pool fairy shrimp (*Branchinecta lynchi*), as well as Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*), legenere (*Legenere limosa*), mid-valley fairy shrimp (*Branchinecta mesovallensis*), and western spadefoot (*Spea hammondii*). Recovery Criteria are identified for each of these species in the 2005 Vernal Pool Recovery Plan. The MCRA is designated as a Zone 1 Core Recovery Area (USFWS 2005). Protection of habitat and species occurrences in Zone 1 Core Recovery Areas would support metapopulation dynamics, provide for reintroduction or introduction sites, protect known and undiscovered populations, and prevent the extinction or irreversible decline of several listed species, often including a narrowly endemic species.

The USFWS has tracked loss of habitat for Vernal Pool species within the MCRA since the Vernal Pool Recovery Plan was adopted (Holland 2009). Further, the vernal pool tadpole shrimp, vernal pool fairy shrimp, Sacramento Orcutt grass, and slender Orcutt grass are becoming increasingly imperiled across their range (USFWS 2007b, 2007c, 2008, 2009). The MCRA includes population occurrences and high-quality habitat for each of these species, including the highest densities and largest populations of vernal pool tadpole shrimp present within the species' range (USFWS 2007b). Due to these factors and a need to protect habitat and species population in the MCRA for recovery of Vernal Pool species, the USFWS Sacramento office prioritizes preservation of vernal pools within the MCRA over preservation of vernal pools elsewhere for projects that impact vernal pools within the MCRA.

Therefore, over the next 50 years, the USFWS is expected to require new development projects and activities to provide increasingly greater amounts of compensation for impacts to federal and state-listed species within the MCRA, due to the ongoing and projected level of demand for urban development land use in the MCRA, and corresponding decline in habitat conservation opportunities. Therefore, it would be increasingly difficult for individual project proponents to protect large blocks of suitable habitat when project mitigation (habitat preservation or compensatory mitigation) is a result of set-asides, and/or land acquisition and purchase. Likewise, conservation banks and mitigation banks are typically not economical to establish in areas targeted for urban development where land prices are high, such as the MCRA. Zone 40 is an existing special benefit zone created by the SCWA and established in 1985 and expanded in 2005. Zone 40 is mostly located within Sacramento County's USB, and includes portions of Rancho Cordova and Elk Grove (Figure 2-1). Approximately 21,936 acres of the total 24,245-acre MCRA is within Zone 40 portion of the UDA. A portion of the Zone 40 water supply is provided through the

Freeport Regional Water Project, which diverts surface water from the Sacramento River and conveys it to a treatment plant located within Zone 40.

A 2004 Memorandum of Agreement (MOA) (Sacramento County et al. 2004) was signed between the USFWS, Sacramento County, SCWA, and Regional San to ensure implementation of all conservation commitments and all terms and conditions associated with two USFWS Biological Opinions related to delivery of water to Zone 40 (USFWS 1999a, 2004). The MOA (Sacramento County et al. 2004) states that proposed new residential or commercial development projects within Zone 40 that will use water delivered by the SCWA through the Freeport Regional Water Project will first complete ESA consultation (informal or formal consultation, Section 10 or Section 7) with the USFWS before receiving any project approvals or entitlements from a local land use jurisdiction (e.g., Sacramento County or Rancho Cordova). The MOA requirements were a condition for the Freeport Regional Water Project construction permits. The 2004 MOA identifies conservation measures that the U.S. Bureau of Reclamation, the San Juan Water District, Sacramento County, SCWA, and the City of Folsom will implement to avoid or to mitigate the indirect impacts of delivering Freeport Regional Water Project water to new urban growth within Zone 40 (County of Sacramento et al. 2004). One MOA conservation measure is to expedite the completion of a regional HCP that would include regional conservation measures that could mitigate the indirect effects of providing Freeport Regional Water Project water to the new development planned within the Zone 40 area. However, until a regional HCP is approved, the MOA states that the SCWA will not provide new service[10] from Freeport Regional Water Project facilities to any new building, development project, or new facility until the project proponent has complied with the ESA (Sacramento County et al. 2004). To assure this, Sacramento County and Folsom agreed to withhold all discretionary project approvals (e.g., grading permits and tentative/final map) for new projects intended to receive new service that could result in take of ESA-listed species until the project shows that is has complied with the ESA.

At the time of EIS/EIR preparation, the development projects proposed in the Zone 40 service area have demonstrated to Sacramento County that each proposed development project would have adequate groundwater supply without using surface water delivered by the Freeport Regional Water Project facilities. Therefore, the Zone 40 proposed development projects have obtained or are in the process of obtaining entitlements from Sacramento County (or from other local land use authority) based on the assumed water availability from other sources. Thus, there is no precedent to determine how much ESA mitigation will be required to offset the indirect

[10] For the purpose of this MOA "new service" means service that was not in existence and would not exist absent the Freeport Regional Water Project.

impacts of Freeport Regional Water Project water deliveries to individual new urban development project within Zone 40.

However, because future development projects within Zone 40 must comply with the federal ESA before local land use authorities provide entitlements and discretionary project approvals, the lead agencies assume that the USFWS would begin to have earlier input on project designs within Zone 40. This earlier ESA avoidance and minimization input from the USFWS is expected to result in more effective on-site avoidance and minimization of species impacts under the No Action/No Project Alternative compared to the existing conditions, where projects were sometimes too far along in design to feasibly add the maximum avoidance or preservation species habitats, including vernal pools.

Future Project Compliance with Section 404 of the Clean Water Act

Aquatic resources regulated by CWA 404 often provide habitat for species listed under the CESA and ESA. As discussed above, prior to making a decision on a project's CWA 404 authorization, the USACE must assure that their authorization decision complies with the ESA by consulting with the USFWS (and/or NMFS) under ESA Section 7.

In addition, the USACE must assure that ~~their~~ CWA 404 authorizations comply with Section 106 of the National Historic Preservation Act (NHPA 106). The National Historic Preservation Act protects cultural resources that are listed or are eligible to be listed on the National Register of Historic Places. Therefore, the USACE would continue to consult with the State Historic Preservation Office under NHPA 106, as needed for individual projects that receive CWA 404 authorizations.

Proponents for i~~I~~ndividual projects or activities in the Planning Area that may result in fill or discharge to waters of the U.S. would continue to request CWA 404 authorization from the USACE. The USACE evaluates two types of permits under CWA 404: General Permits (nationwide, regional, and programmatic) and Individual Permits (Letters of Permission and Standard Permits). Under existing regulatory conditions, each project or activity applies individually to USACE for a CWA 404 authorization. For future projects or activities with minimal individual and cumulative environmental impacts, projects would continue to apply for CWA 404 General Permits (nationwide permits, or regional general permits). Projects or activities that result in impacts to aquatic resources that exceed the limits for use of a nationwide permit, do not meet the terms and conditions of a ~~nationwide~~ **general** permit, or are determined to have more than minimal impacts, would continue to require individual permits (standard permits or letters of permission). ~~CWA 404 applications for standard permits would continue to require additional analyses and procedures, and therefore would continue to add time, complexity, and uncertainty to the project schedule and budget.~~

For **proposed** discharges of dredged or fill material authorized under CWA 404, adverse impacts to waters of the U.S (WOUS) must be avoided and minimized to the extent practicable. For unavoidable adverse impacts, compensatory mitigation ~~is~~ **may be** required to replace the loss of functions and services of those wetlands and other waters. In 2008, the USACE and the U.S. Environmental Protection Agency (USEPA) jointly issued regulations for compensatory mitigation titled *Compensatory Mitigation for Losses of Aquatic Resources: Final Rule, 33 CFR Parts 325 and 332* (USACE and USEPA 2008). The term "compensatory mitigation" refers to the restoration, re-establishment establishment, enhancement, and/or preservation of wetlands, streams, or other waters specifically for the purpose of offsetting loss of waters of the US caused by authorized discharges of dredged or fill material.

To determine the amount of CWA 404 compensatory mitigation that is required, the USACE would continue to refer to the 2008 Compensatory Mitigation Rule and use the USACE South Pacific Division's *Standard Operating Procedure for Determination of Mitigation Ratios* (2013) (or compensatory mitigation standards that are in use at the time of the project's CWA 404 permit application review). The amount of compensatory mitigation would continue to be sufficient to replace lost aquatic resource functions and services, to the extent practicable. In cases where functional or condition assessments or other suitable metrics are not used to determine loss of functions and services, a minimum one-to-one acreage or one-to-one linear foot compensation ratio (i.e., a 1:1 mitigation ratio) required by the 2008 Compensatory Mitigation Rule would be ~~used~~ **assumed to be required**.

~~In addition to setting minimum compensatory mitigation amounts, t~~**T**he 2008 Mitigation Rule establishes equivalent standards for types of compensatory mitigation ~~projects~~ **(33 CFR Part 332.2(b))**. The three ~~types of~~ **general options for** compensatory mitigation ~~projects~~ are: ~~use of~~ mitigation bank~~s~~ **credits**, ~~use of~~ in-lieu fee program~~s~~ ~~or~~ **credits**, **and** permittee-responsible mitigation ~~projects~~. Use of mitigation bank~~s~~ **credits** and use of in-lieu fee program~~s~~ **credits** are the preferred forms of CWA 404 compensatory mitigation under the 2008 Mitigation Rule, as they usually involve consolidating compensatory mitigation projects in ecologically appropriate locations using a watershed approach, they consolidate resources~~, and they provide financial planning and scientific expertise (which often is not practical for permittee-responsible mitigation projects)~~, they reduce temporal losses of functions, and they reduce uncertainty over mitigation project success. The 2008 Mitigation Rule would continue to require the USACE to consider compensatory mitigation options in the following order: 1) credits from a mitigation bank; 2) credits from an in-lieu fee program; 3) permittee-responsible mitigation under a watershed approach; 4) permittee-responsible mitigation through on-site and in-kind mitigation and; 5) permittee-responsible mitigation through off-site and/or out-of-kind mitigation.

In the 2011 Record of Decision (ROD) prepared by the USACE for the Sunridge Specific Plan EIS (SPK-2009-00511; USACE 2011), the USACE made a finding that, recognizing a significant cumulative loss of Vernal Pool wetlands within the MCRA, for any future unavoidable impacts to Vernal Pool wetlands within the MCRA, compensatory mitigation shall be:

1. Based on a method for assessing the functions of all wetlands and other waters of the U.S. on the project site;
2. Accomplished at a ratio of greater than 1:1, after considering direct and indirect impacts, temporal loss and difficulties creating vernal pool wetlands; and
3. Located within the MCRA, unless determined impracticable or inappropriate by the Corps.

Because these USACE findings are part of the existing regulatory environment, the above findings are expected to continue under the No Action/No Project Alternative. Therefore, the descriptions of the No Action/No Project Alternative presented in Sections 2.2.3 and 2.2.4 and the No Action/No Project Alternative impact analyses presented in Chapters 4–18 assume that future CWA 404 compensatory mitigation required for vernal pool losses inside the MCRA would be located inside or adjacent to the MCRA boundary. (However, it should be noted that the Sunridge Specific Plan ROD (USACE 2011) requirements apply only to vernal pools and not to other types of waters and aquatic resources, and that finding No. 3 of the Sunridge ROD provides the USACE some flexibility in judgment).

Therefore, as Vernal Pool wetlands within the MCRA continue to be lost, even if compensatory mitigation for lost Vernal Pool wetlands occurs within the MCRA, the USACE could recommend denial of one or more future CWA 404 applications, or the EPA could use their project veto authority under CWA Section 404(c). (It is also noted for clarity that, as part of the CWA 404 program's procedures, the USACE or EPA could make these decisions for other CWA 404 permit applications in other parts of the Planning Area for reasons involving availability of appropriate compensatory mitigation or based on other justifications relating to compliance with CWA 404 regulations).

Future Project Compliance with CWA 401 and Porter-Cologne Water Quality Control Act Project Compliance

Under CWA 401, projects and activities that require authorization of a federal license or permit that may result in the discharge of a pollutant into wetlands and other waters of the United States must also obtain a CWA 401 water quality certification from the state in which the discharge would originate. In California, the EPA has delegated the authority to grant water quality certifications to the State Water Resources Control Board (SWRCB), which are typically processed by the RWQCBs with local jurisdiction. A water quality certification

requires the project or activity to evaluate its potential impacts and implement appropriate measures to protect water quality and to comply with regulatory water quality standards.

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) is California's primary statute governing water quality and water pollution issues with respect to surface water and groundwater. The Porter-Cologne Act grants the SWRCB and the RWQCBs power to protect water quality. The Porter-Cologne Act grants the SWRCB and the RWQCBs authority to adopt plans and policies, to regulate discharges of waste to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants.

The RWQCBs' jurisdiction includes wetlands and other waters of the United States, as well as areas that meet the definition of wetlands and other "waters of the state." Wetlands and other waters of the state are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCBs have the discretion to take jurisdiction over areas not federally protected under CWA 404, provided the areas meet the definition of wetlands and other "waters of the state."

Each project or activity would apply separately to the Central Valley RWQCB for a CWA 401 water quality certification under the No Action/No Project Alternative. The certification would declare that the discharge will comply with applicable provisions of the CWA 401, including water quality standards set by the state pursuant to the Porter-Cologne Act. California's water quality standards specify the designated use of a stream or lake (e.g., for water supply or recreation), pollutant limits necessary to protect the designated use (in the form of numeric or narrative criteria), and policies to ensure that existing water uses will not be degraded by pollutant discharges.

Summary of ESA, CWA 404, and CESA Compliance under the No Action/ No Project Alternative

Project compliance with state and federal laws that pertain to the special-status species and aquatic resources would continue to be achieved through individual consultations and individual permit applications. This individual project-by-project permitting process would continue to result in a project-by-project compensation, including compensatory mitigation for impacts to aquatic resources regulated by CWA 404. While CWA 404 mitigation is often accomplished using conservation and mitigation bank credits (e.g., the 2008 Federal Mitigation Rule puts mitigation banks at the top of its compensatory mitigation hierarchy), there would not likely be as much opportunity for regional coordination of compensatory mitigation as there would be with a regional HCP.

Each project proponent would continue to initiate individual consultations or permit applications with the different regulatory agencies, which currently requires substantial agency time and effort, can delay project implementation, and can add cost to the project.

ESA and CESA violations and unauthorized activities under CWA 404 and/or 401 may not be identified in a timely fashion (or at all) on some projects, particularly at project sites that are not subject to CEQA, such as a building permit for a commercial structure on a parcel with the appropriate commercial zoning. In some cases, these are large lots that may contain wetlands or other habitat for state and/or federally listed species; however, not all impacts to habitat would be identified consistent with ESA, CESA, or CWA requirements. For example, impacts are more likely overlooked on projects that are not subject to CEQA because the potential environmental impacts would not be identified in an Initial Study or EIR, and the proponent may not have the expertise to identify biological resources or understand the regulations, and the project impacts to species or habitat is beyond the purview of the regulators reviewing the building plans.

The cost and time required to obtain individual CWA 404 and ESA authorizations under the No Action/No Project scenario would result in some projects avoiding the requirement to obtain ESA and CWA 404 authorizations by designing the project footprint to avoid direct impact to existing aquatic resources and/or species habitat. For example a subdivision may have an undeveloped remainder lot that contains on-site wetlands. Over time, the avoided aquatic resources would likely be indirectly impacted from the nearby urban developments. This would continue to result in unpermitted (and therefore unmitigated) direct and indirect impacts under the No Action/No Project Alternative.

Future Project Compliance with California Fish and Game Code/Section 1600 Compliance

The No Action/No Project Alternative would continue the existing project-by-project permitting process for Lake and Streambed Alteration Agreements (LSA) under California Fish and Game Code Section 1600. Each project proponent would submit to the CDFW a Streambed Alteration Application for “any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake” (California Fish and Game Code, Section 1602). CDFW would review the proposed project, and if necessary, provide the applicant with a list of suggested measures, which can include development setbacks from the lake or stream, to protect affected fish and wildlife resources. The final proposal would be mutually agreed upon by CDFW and the applicant. This project-by-project process would continue to require project proponents to engage in back-and-forth discussions with CDFW, adding time and expense to their project.

Future Project Compliance with Local Environmental Policies Compliance

Existing natural resource policies that are included in the Sacramento County Code, the Sacramento County General Plan (Sacramento County 2011) and the General Plans for Galt (2009) and Rancho Cordova (2006) would continue to be applied to new projects and activities implemented under the No Action/No Project Alternative.

Sacramento County's existing Swainson's Hawk Ordinance would remain in effect under the No Action/No Project Alternative and would apply to projects and activities implemented both within the USB and outside the USB. This ordinance would continue to provide opportunities for future projects and activities implemented under the No Action/No Project Alternative (Section 2.2.2) to mitigate impacts to Swainson's hawk in two ways: (1) by payment of a fee, or (2) through dedication of conservation land. For projects affecting more than 40 acres of Swainson's hawk habitat, payment of a fee would not be an option. Although any dedicated lands used for Swainson's hawk mitigation must be approved by Sacramento County and CDFW, the Swainson's Hawk Ordinance does not require that the dedicated lands be high-quality habitat or be connected to other preserved lands. Therefore, under the No Action/No Project Alternative, Swainson's hawk mitigation would continue to be uncoordinated and implemented on a project-by-project basis, and would not necessarily be located on high-quality Swainson's hawk habitat.

Sacramento County's General Plan policy encouraging new development to be setback from streams and creeks in the Planning Area (General Plan Policy CO-115) would continue under the No Action/No Project Alternative future condition. This policy suggests 100-foot-wide setbacks, measured from the top of the stream bank to the adjacent development or agricultural activities, and includes two supplemental 50-foot setbacks added to the 100-foot setback. However, setbacks are suggested rather than required under this policy. Project stream setback requirements will continue to be imposed by Sacramento County through individual project CEQA process as mitigation for potential project impacts, and would continue to vary widely from the suggested setbacks listed in Policy CO-115.

2.2.3 Loss of Natural Lands Under the No Action/No Project Alternative

The majority of existing natural lands would be removed in the UDA as a result of new urban development and associated infrastructure envisioned in the adopted Sacramento County General Plan, adopted Rancho Cordova General Plan, and adopted Galt General Plan, as discussed in Section 2.2.1. Natural lands include all land except Aqueducts, Disturbed Land,[11] Low- and High-Density Development, Major Roads, Mine Tailings, and Recreation/Landscaped areas.

[11] The disturbed land cover type is defined as open space areas that have been subject to previous or ongoing disturbances such as along roadsides, trails, and parking lots. Scraped or graded land, gravel mining, and waste

The lead agencies assumed that the No Action/No Project Alternative would include the full buildout over of the UDA[12] the next 50 years, with the exception of approximately 1,900 acres of natural lands now located within the MCRA, as discussed in the following text.

The lead agencies reviewed assumptions about current and expected future regulatory requirements for the MCRA, as described in Section 2.2.2. Based on those future regulatory requirements, the lead agencies estimated approximately how much undeveloped land currently remaining inside the MCRA could reasonably be developed if the Vernal Pool wetland ESA and CESA mitigation requirements for that development also occur within the MCRA, as discussed above in Section2.2.2. The lead agencies also estimated the number of acres of each natural land cover within the MCRA that would be developed under different species and wetland mitigation scenarios over a 50-year period.

Professional judgement was used in modeling conceptual mitigation scenarios under the regulatory environment of the No Action/No Project Alternative described in 2.2.2.The lead agencies considered the requirements for ESA and CWA 404 mitigation that have occurred within Sacramento County since the designation of the MCRA in 2005 (USFWS 2005) and the best available scientific information on the status of the species and aquatic resources in the MCRA.

Using these trends in requirements and best available information, the lead agencies estimated minimum and maximum amounts of development and resultant preserves for ESA and CWA 404 mitigation.

The amounts of resource avoidance and preservation required by the expected regulatory setting in Section 2.2.2 restricts the amount of currently undeveloped land within the UDA that can be built out under the under the No Action/No Project Alternative.

Five large Urban Development Master Plans (Arboretum, Cordova Hills, Jackson Township, NewBridge, and SunCreek) are currently proposed within the UDA. These five Urban Development Master Plans were designed to comply with SSHCP requirements, including the establishment of large on-site preserves ranging in size from 100 to 600 acres. It is likely that preserves for the Urban Development Master Plans would be of similar size and location

disposal sites are included in this land cover type. Disturbed land cover type is vegetated with diverse weedy flora. These areas are of special concern as they tend to harbor and facilitate the spread of invasive plant species. Vascular plant species associated with the disturbed land cover typically include Johnson grass, Canadian horseweed (*Conyza canadensis*), milk thistle, yellow-star thistle (*Centaurea solstitialis*), stinkwort (*Dittrichia graveolens*), and field bindweed (*Convolvulus arvensis*).

[12] "Full Buildout" of the UDA means all currently undeveloped lands that are zoned for, or are ultimately planned/contemplated for future urban development in the adopted general plans of the Permit Applicants would become developed. Full buildout of the UDA will includes some open space and conservation lands within the areas of new urban development.

established under the No Action/No Project Alternative. In some cases, even larger preserves may be required in association with CWA 404 authorizations and associated ESA approvals for these Urban Development Master Plans if there is no comprehensive regional habitat conservation plan. For this reason, one or more of these Urban Development Master Plans may not be developed as proposed due to its inability to acquire adequate land for mitigation.

Instead, the master planned areas may be developed in a manner that avoids CWA 404 permitting requirements by designing the project to be located 50 feet or more outside the existing aquatic resources. Although, the USFWS may expect there to be direct and/or indirect impacts from development this close to aquatic resources, which might support listed species, the development community often does not consult with the USFWS and/or obtain ITPs because the habitat is not on the property owned by the developer and/or they argue that there is no take of species. Consequently, the remaining aquatic resources would not be protected by conservation easements; therefore, there is a potential for impacts to occur that would not happen on a managed preserve, which is fenced and maintained. Typical activities that occur on unmanaged vacant land include spread of invasive plants; illegal dumping; off-road motor vehicle use; and informal trails for runners, hikers, equestrians, BMX, and mountain bike riders. These uses can ultimately result in the unmitigated loss of habitat on natural lands.

If the Urban Development Master Plans are developed with larger preserves than currently proposed, the result would be less urban development within the MCRA/UDA. Under the maximum mitigation scenario modeled by the lead agencies, expected new urban development in the MCRA would occur within a matrix of avoided vernal pools and wetlands and would be less dense than typical urban development; however, the anticipated population growth over the next 50 years and associated housing and development needs would not change (Section 1.2.1). Therefore, the No Action/No Project Alternative assumes that up to 1,900 acres of additional new development would occur in locations outside the current USB. Sacramento County planners identified the following list of four locations outside the USB that would undergo development pressure under the maximum mitigation scenario:

1. Northeast portion of the Planning Area, south of White Rock Road
2. North-central portion of the Planning Area, south of Kammerer Road
3. Rancho Murieta expanding to the west or northwest
4. South-central portion of the Planning Area, expanding the rural towns of Wilton and Herald

In addition, natural lands would be removed outside the UDA as a result of recycled-water pipeline projects, planned road expansions, road widening, intersection improvements, and bridge-crossing improvements. The EIS/EIR assumes that pipeline and road projects outside

the UDA that would be Covered Activities under the Proposed Action/Proposed Project Alternative (Section 2.3.3) would occur under the No Action/No Project Alternative. These road and pipeline projects are described in the adopted General Plans (Sacramento County 2011; Rancho Cordova 2006; Galt 2009) or in other regional planning documents (Connector JPA 2012; Regional San 2015).

For the same reasons described previously for future urban development in the MCRA under the No Action/No Project Alternative, the lead agencies assumed that planned expansions or extensions of roadway improvement projects inside the MCRA may not receive necessary ESA or CWA 404 authorizations, and permit approvals and entitlements if they are unable to avoid vernal pools and other wetlands. If roadway alignments cannot be revised to avoid Vernal Pool or other wetlands, segments of roadways may not be expanded or extended as envisioned by the Circulation Elements of the Sacramento County General Plan and City of Rancho Cordova's General Plan.

Under the scenario of maximum new development in the UDA, of the existing 272,596 acres of natural land covers present within the Planning Area, a maximum of approximately 35,532 acres could be removed by new projects and activities implemented under the No Action/No Project Alternative (Table 2-1). See Chapter 8 and Table 8.4 for more detailed discussion for losses of natural land cover types. Approximately half, or 17,091 acres, of the natural lands lost to new development are expected to be annual grasslands that support vernal pools and swales (i.e., the Vernal Pool ecosystem).

Table 2-1. Maximum Losses of Natural Land Categories Under the No Action/No Project Alternative

Land Cover Category[1]	Maximum Acres Lost		
	Inside UDA (acres)	*Outside UDA (acres)[5, 6]*	*Planning Area Total (acres)*
All natural land covers[2]	32,426	3,106	35,532
Vernal Pool Ecosystem[3] land covers	17,135	553	17,688
Wetland land covers[4] and other water land covers	1,062	118	1,180

1 The rows in the table are not additive because the land cover categories include some overlapping land cover types (e.g., Vernal Pool is included in "all natural land covers," "Vernal Pool Ecosystem land covers," and "wetland land covers and other water land covers."

2 Planning Area land cover types were defined by the SSHCP preparers during development of the SSHCP. To allow for better comparison of impacts between the EIS/EIS alternatives, the EIS/EIR uses these same land covers and definitions in discussions of all alternatives. The natural land covers include Blue Oak Savanna, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture-Grassland, Mine Tailings Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Open Water, Orchard, Seasonal Wetland, Stream/Creek, Stream/Creek (VPIH), Swale, Valley Grassland, Vernal Pool, and Vineyard, as discussed in Table 8-1.

3 Vernal Pool Ecosystem includes three aquatic land cover types (Vernal Pool, Swale, and Stream/Creek (VPIH)) and hydrologically connected Valley Grassland.

4 Wetland land covers and other water land covers include the following aquatic land cover types: Freshwater Marsh, Seasonal Wetland, Open Water, Stream/Creek, Vernal Pool, Swale, and Stream/Creek (VPIH).

5 Under certain future development scenarios (see Section 2.2.3), some of the road and infrastructure projects planned within the MCRA may not occur because lead agencies do not anticipate the impacts to wetlands could be mitigated within the MCRA, as required by the assumptions made for the future regulatory environment of the No Action/No Project Alternative. However, Table 2-1 depicts the maximum development/maximum scenario and includes all potential road and infrastructure.

6 Acres of natural land cover types lost outside the UDA includes the effects of the "displaced development" described in Section 2.2.2.

2.2.4 Preservation of Natural Lands Under the No Action/ No Project Alternative

New preserves established as mitigation for impact**s** to CWA 404 aquatic resources and ESA and CESA threatened and endangered species will continue to be established under the No Action/No Project Alternative to offset impacts of new urban development. This project mitigation would continue to be implemented on a project-by-project~~s~~ basis, and is expected to result in uncoordinated preservation of some species habitats and some natural communities under the No Action/No Project Alternative.

The acres of future habitat preservation for the No Action/No Project Alternative (Table 2-2) were calculated based on the future regulatory environment assumptions described in Section 2.2.2 for new projects in the Planning Area. Table 2-2 presents the No Action/No Project scenario with the highest feasible acres of development in the UDA and the lowest feasible mitigation acres in the UDA, to assure that all potential impacts of the future No Action/No Project Alternative are considered.

As discussed in Section 2.2.2, some of the project mitigation identified in Table 2-2 as required habitat preservation might be provided by projects purchasing credits in existing or new Conservation Banks.

Table 2-2. Minimum Acres of New Preserves Under the No Action/No Project Alternative

Land Cover Category[1]	Preserved Land (acres)		
	Inside UDA (acres)	*Outside UDA (acres)*	*Planning Area Total (acres)*
All natural land covers[2]	6,814	16,616	23,430
Vernal pool ecosystem[3] land covers	5,065	5,341	10,406
Wetland land covers[4] and other water land covers	546	1,753	2,299

1 The rows in the table are not additive because the land cover categories include some overlapping land cover types (e.g., Vernal Pool is included in "all natural land covers," "Vernal Pool Ecosystem land covers," and "wetland land covers and other water land covers."

2 Planning Area land cover types were defined by the SSHCP preparers during development of the SSHCP. To allow for better comparison of impacts between the EIS/EIS alternatives, the EIS/EIR uses these same land covers and definitions in discussions of all alternatives. The natural land covers include Blue Oak Savanna, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture-Grassland, Mine Tailings Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Open Water, Orchard, Seasonal Wetland, Stream/Creek, Stream/Creek (VPIH), Swale, Valley Grassland, Vernal Pool, and Vineyard, as discussed in Table 8-1.

3 Vernal Pool Ecosystem includes three aquatic land cover types (Vernal Pool, Swale, and Stream/Creek (VPIH)) and hydrologically connected Valley Grassland.

4 Wetland land covers and other water land covers include the following aquatic land cover types: Freshwater Marsh, Seasonal Wetland, Open Water, Stream/Creek, Vernal Pool, Swale, and Stream/Creek (VPIH).

In addition to the acres of new preserve identified in Table 2-2, additional acreage of Vernal Pool ecosystem would be avoided by new urban development in the UDA because the lead agencies assume, for purposes of this EIS/EIR, that it may be difficult for new projects to obtain authorizations under ESA or CWA 404 that would allow impacts to these land cover types,

particularly within the MCRA (see also Section 2.2.2). This additional avoided land is not quantified as preserved land because we assume it would not be developed, and it will not be managed, monitored, or protected in perpetuity like a preserve would. It is possible over time that the UDA adjacent development would encroach upon these avoided areas, and activities that do not require local permits, such as gardens, trails, and small outbuildings, might be built within the avoidance areas.

Preserves established for project compensatory mitigation would continue to be established individually under the project-by-project regulatory environment of the No Action/No Project Alternative (Section 2.2.2). Mitigation and conservation banks would continue to be established and credits would be made available for individual projects to mitigate impacts; however, sometimes these banks are geographically distant from the impact, which is of concern for ESA, and, as of the writing of this document, no mitigations credits are available in the MCRA. Locations and sizes of new mitigation preserves would not be coordinated, and new UDA preserves are expected to become surrounded by new urban development in a geographically fragmented pattern, as the buildout of the UDA continues over time (Section 2.2.2). These scattered and isolated new and existing mitigation preserve sites may not maintain hydrologic connectivity and may not be connected by habitat that allows wildlife movement between the preserves. In addition, there would be no comprehensive management and monitoring program of the individual preserves to ensure successful species conservation at a regional scale or at a landscape scale.

The five large Urban Development Master Plans (Arboretum, Cordova Hills, Jackson Township, NewBridge, and SunCreek) may establish similar large, 100- to 600-acre preserves under the No Action/No Project Alternative. However, the individual project preserves are expected to be managed by various entities rather than being managed under one comprehensive, over-arching management plan. For example, weed abatement would not be implemented on a large scale to prevent weed seeds from being transferred back and forth between preserves. Preserve maintenance would not be coordinated, and several individuals would make in efficient repairs as needed. Knowledge and information would not be shared between preserve managers for adaptive management purposes, so mistakes that were identified on one preserve would not be avoided on all other preserves in the Planning Area.

Furthermore, the project-by-project mitigation process that is expected to continue under the No Action/No Project Alternative would continue to provide only incidental conservation benefits for native species that are not already state- or federally listed as threatened or endangered, even those native species that are known to be rare or a species of concern or have other special-species status. Individual project ESA consultations and CESA permit applications would continue to address only federal and state-listed species, limiting the number of species that would benefit from the project's avoidance and preservation of natural land covers.

2.2.5 Preserve Management and Monitoring Under the No Action/No Project Alternative

Under the No Action/No Project Alternative, preserves established as compensation for impacts to ESA/CESA species, or to ~~avoid impacts from discharge of dredged or fill material into wetlands and other waters of the United States,~~ **minimize adverse effects to waters of the U.S., or, in certain circumstances, compensate for the unavoidable loss of waters of the U.S.,** would be managed and monitored according to the requirements of the individual regulatory agencies, under the existing project-by-project review process. Preserve management and monitoring requirements would vary for each individual preserve, but the requirements would be similar to those in place for the ESA or CWA 404 preserves already established in the Planning Area.

Typical preserve management actions related to management and monitoring of preserves under the No Action/No Project Alternative could include but are not limited to**:**

- Vegetation management, including grazing within vernal pool ecosystem preserves;
- Relocation of special-status species;
- Collection and relocation of inocula soil from vernal pools that will be lost to re-established or established vernal pools;
- Collection of seeds and from plants that will be lost;
- Demolition or removal of existing structures on new preserve lands;
- Maintaining access roads;
- Control of non-native species;
- Wildfire management;
- Hazardous materials remediation on new preserve lands;
- Repair of existing fences and other land management facilities; and
- Operations related to water delivery for cattle and other animals used for managing grassland habitats.

Management of preserves could also require creating new dirt and paved roads (including bridges), drilling new wells for livestock water, and installing new fences. Typical preserve monitoring efforts under the No Action/No Project Alternative could include but not be limited to conducting surveys for special-status species and other natural resources within the preserve on a regular basis.

2.3 PROPOSED ACTION/PROPOSED PROJECT

Under the Proposed Action/Proposed Project Alternative, the six Permit Applicants (the future Plan Permittees) would implement the SSHCP over a 50-year period. If USFWS determines that

the proposed SSHCP meets all ESA Section 10 permit issuance criteria, a federal ITP would be issued to the six Permit Applicants by the USFWS for take of Covered Species by future Covered Activities. CDFW would issue a CESA ITP to the six Permit Applicants for take of state-listed Covered Species by future Covered Activities.

The proposed SSHCP is a comprehensive regional plan for conserving wildlife habitat and natural communities, including aquatic resources, in the Planning Area while accommodating the planned future land use and development described the approved General Plans of the Permit Applicants (see Section 2.2.1). The SSHCP is intended to establish and implement a regional program to conserve ecologically important resources in the Planning Area.

The SSHCP would to conserve 28 species of native plants and wildlife in the Planning Area, including 11 that are listed as threatened or endangered under the federal ESA, the CESA, or both. In addition, because so many of the Covered Species live part or all of their lives in water bodies, the SSHCP also helps to protect wetland and stream habitats that are subject to regulation under the federal CWA, the California Fish and Game Code, and California's Porter-Cologne Act.

A summary of the Proposed Action/Proposed Project Alternative is presented in the following text, including a description of the proposed action's Covered Activities, the Covered Species, the Conservation Strategy for the Planning Area, the monitoring program, and the ARP.

2.3.1 Expected Regulatory Environment Under the Proposed Action/Proposed Project

When compared to the future regulatory environment expected under the No Action/No Project Alternative (Section 2.2.2), the future regulatory environment of the Proposed Action/Proposed Project Alternative would differ as described in the following text.

Project Permitting and Local Entitlement Process

The six Permit Applicants (future Plan Permittees) or their third-party project proponents would pay development fees in order to use the SSHCP ITPs. The project development fees would be provided to the Land Use Authority Permittee with jurisdiction over the project site or to the SSHCP Implementing Entity.

The development fees paid by each Covered Activity would be used by the SSHCP Implementing Entity to fund the SSHCP Conservation Strategy.

Project ESA and CESA Compliance

Under the Proposed Action/Proposed Project Alternative, individual Covered Activity projects and activities that comply with the SSHCP would also comply with the ESA and CESA incidental take permits. Third party project proponents implementing a SSHCP Covered Activity project would pay "development fees" to the local Land Use Authority Permittee (i.e., Sacramento County, Galt, or Rancho Cordova), or to the SSHCP Implementing Entity , whoever has jurisdiction over the project site.

The SSHCP Conservation Strategy (see Section 2.3.5 below) provides a regional plan for conserving native species, natural communities, and aquatic resources in the Planning Area. The SSHCP Conservation Strategy was developed by the Permit Applicants and the regulatory agencies to both evaluate and prioritize the regional importance of the existing species habitat and existing aquatic resources in the Planning Area. Therefore, the importance (or lack of importance) of specific Planning Area locations and parcels to the conservation of listed species and ecosystem functions and service on a landscape and watershed basis has already been evaluated by the USFWS, CDFW, and USACE during the development of the SSHCP. In addition, activities and projects implemented under the Proposed Action/Proposed Project Alternative would be less likely to result in unmitigated ESA and CESA impacts due to lack of technical expertise or regulatory oversight, as described in Section 2.2.2 for the No Action/No Project Alternative.

The SSHCP would provide real streamlining for project proponents by significantly reducing the timeline for obtaining local approvals and entitlements, ESA and CESA authorizations, and CWA 404 authorizations. ~~The regulatory environment of the Proposed Action/Proposed Project SSHCP would eliminate the need for project-level consultations with the USFWS under ESAand with CDFW under CESA.~~ **It is also anticipated that project-level consultation with CDFW under CESA would be reduced or eliminated for Covered Species and Covered Activities**. The SSHCP Conservation Strategy would provide individual projects with appropriate impact avoidance and minimization measures, which can be incorporated into the design and implementation of individual projects. Implementation of the SSHCP Conservation Strategy would provide the correct type and amounts of mitigation (in the form of habitat protection, establishment, or re-establishment) for the impacts of individual Covered Activities. The SSHCP Conservation Strategy, rather than an individual project proponent, assumes responsibility for locating and procuring high-quality mitigation sites, establishing conservation easements, and preparing and implementing preserve management and monitoring plans.

The ~~Reduced Permit Term Alternative's~~ SSHCP Conservation Strategy would address cumulative impacts to vernal pool~~s~~ species within the MCRA. ~~Cumulative impacts within the MCRA as defined~~

~~in the Sunridge ROD (see Section 2.2.2) would be addressed through implementation of the SSHCP Conservation Strategy (described below in Section 2.3.5).~~

An approved and permitted SSHCP would meet the 2004 Zone 40 MOU (see Section 2.2.2) requirement for Sacramento County to prepare a regional HCP that addresses the indirect effects of the operational Freeport Regional Water Project and the indirect effect of the Zone 40 water delivery contracts. Therefore, new urban development Covered Activity projects implemented inside Zone 40 seeking entitlements from a local jurisdiction would be able to rely upon the Freeport Regional Water Project as the project's water source, without first obtaining project-level ESA approvals from the USFWS.

Project CWA 404 Compliance

Under the existing regulatory conditions, the USACE cannot authorize a proposed project under CWA 404 until the proposed project is in compliance with the ESA (see Section 2.2.2). Under the Proposed Action/Proposed Project, each Covered Activity that meets the requirements of the SSHCP would be in compliance with the ESA, and any incidental take of federally listed species would be covered by the SSHCP ESA incidental take permits. Therefore, **it is envisioned that in most cases,** the USACE would not be required to ~~intimate~~ **initiate** ESA Section 7 consultation with the USFWS before authorizing a proposed project that is a SSHCP Covered Activity. **There could be exceptions to this process, for example, if some time over the SSHCP permit term USACE authorized a Covered Activity that affected a threatened or endangered species that was not an SSHCP Covered Species.** As stated in Section 1.1, the SSHCP Permit Applicants used the SSHCP Conservation Strategy to prepare a local Aquatic Resources Program (ARP) which proposes a locally based program for permitting future SSHCP Covered Activities that impact aquatic resources, including wetlands and other waters. The Proposed Action/Proposed Project Alternatives includes the implementation of the ARP by the Permit Applicants and associated local aquatic resource protection ordinances.

The ARP relies on (and is consistent with) the SSHCP Conservation Strategy for aquatic habitats, including (1) Covered Activity implementation consistent with the ARP, (2) Covered Activity implementation of SSHCP AMMs that avoid and minimize direct and indirect adverse impacts to Planning Area aquatic resources to the extent practicable, (3) a landscape and watershed based cumulative analysis of expected impacts to wetlands and other waters over the next 50 years, and (4) the avoidance of wetlands and other waters, the minimization of impacts to wetlands and other waters, and the compensatory mitigation of wetlands and other waters planned on landscape and watershed basis, through the Planning Area.

~~As discussed in Section 2.2.2, the existing approach to permitting under CWA 404 provides the regulatory agencies little opportunity to evaluate individual project impacts or proposed~~

~~mitigation within a regional or a watershed scale; thus, the wetland regulatory agencies often have difficulty determining if projects are adequately mitigating for aquatic resource impacts. Under the Proposed Action/Proposed Project Alternative, implementation of the SSHCP Conservation Strategy and the ARP's measures to avoid and minimize impacts to aquatic resources, the Proposed Action/Proposed Project would assure CWA 404 compensatory mitigation for unavoidable impacts to aquatic resources is considered from a watershed-based perspective, and would systematically prioritize compensatory mitigation projects based on anticipated impacts to aquatic resources, considering both watershed- and function-based factors.~~

As discussed in Section 2.2.2, the existing approach to permitting under CWA 404 provides the regulatory agencies little opportunity to evaluate individual project impacts or proposed mitigation within a regional or a watershed scale. Under the Proposed Action/Proposed Project Alternative, implementation of the SSHCP Conservation Strategy and the ARP's mitigation approach (avoidance, minimization, and compensation) would be assumed to assure CWA 404 mitigation (avoidance, minimization, and compensation) is considered from a watershed-based perspective. These provisions, combined with a proposed in-lieu fee program (ILF); as discussed further below), would also systematically prioritize compensatory mitigation projects based on anticipated impacts to aquatic resources, considering both watershed- and function-based factors.

As discussed in EIS/EIR Chapter 10 and in Section 6 of the ARP document (see EIS/EIR Appendix I), the predicted future watershed conditions resulting from implementation of the SSHCP Conservation Strategy and the ARP would maintain or improve the overall aquatic resource abundance, diversity, and condition within the Planning Area. There would not be a net loss of aquatic resources in terms of acreage under the Proposed Action/Proposed Project, and the amount of high-condition resources within the Planning Area would be increased under the Proposed Action/Proposed Project, relative to the existing conditions.

The SSHCP Conservation Strategy and the ARP would provide compensatory mitigation for unavoidable impacts to aquatic resources (i.e., would provide aquatic resource re-establishment or establishment) that conforms to the minimum 1:1 compensatory mitigation ratios required by the 2008 Compensatory Mitigation Rule (see Section 2.2.2 above). Pursuant to the 2008 Compensatory Mitigation rule, the Permit Applicants are requesting the establishment of an in-lieu fee (ILF) program that would work in conjunction with the SSHCP's Covered Activity fee structure. The Permit Applicants (future Plan Permittees) would then be responsible for the CWA 404 compensatory mitigation requirements associated with the Covered Activity projects. The Permit Applicants would submit an ILF program proposal to the USACE and Interagency Review Team (a term described in the 2008 Compensatory Mitigation Rule) for review and processing. As of the writing of this EIS/EIR, the Permit Applicants have already submitted a draft ILF prospectus (in

accordance with 33 CFR 332.8[d][3]) and have received comments from the regulatory agencies that would potentially comprise the ILF's Interagency Review Team.

Under the Proposed Action/Proposed Project Alternative, the USACE has evaluated the Permit Applicants' proposed ARP (see EIS/EIR Appendix I), inclusive of its implementation guidance (as articulated in both the ARP and draft ARP ordinance), and has developed a draft Section 404 CWA permit strategy (see EIS/EIR Appendix C) for the future SSHCP Covered Activities (refer to Section 1.5.2), which is consistent with the USACE's regulations and guidance regarding CWA 404 permit development and issuance criteria.

Project Compliance with Porter Cologne Water Quality Control Act and CWA 401

As discussed above in Section 2.2.2, under CWA 401, and the Porter-Cologne Act projects and activities in California that require authorization of a federal license or permit for the discharge of a pollutant into wetlands and other waters must also obtain a CWA 401 water quality certification from the RWQCB with local jurisdiction

The ARP (see Appendix I) would facilitate the Central Valley RWQCB's development of water quality certification strategies for future SSHCP Covered Activities, in conjunction with USACE's development of a CWA 404 permit~~ting~~ strategy for future Covered Activities (see Appendix C).

Parallel to the USACE's CWA 404 permit~~ting~~ strategy, the RWQCB would have opportunities to increase the efficiency of their CWA 404 permitting processes while improving the protection and management of aquatic resources in the Planning Area. The RWQCB could issue a programmatic CWA 401 water quality certification for the USACE's general permit(s) and could adopt a more efficient water quality certification approach for Covered Activity projects associated with USACE's Letter of Permission and standard permit processes. The RWQCB could also adopt a more efficient waste discharge requirement approach for wetlands and other waters of the state.

California Fish and Game Code Section 1602 Master Lake or Streambed Alteration Agreement

The ARP and SSHCP address future impacts and provides for the conservation of streams and riparian habitat and other water bodies in the Planning Area that are regulated by CDFW. Under the Proposed Action/Proposed Project Alternative, CDFW would work with the land use authority Permit Applicants (Sacramento County, Galt, and Rancho Cordova) to streamline the process used to authorize Covered Activity projects and activities that affect the bed and bank of streams, ponds, and lakes under Section 1602 of the California Fish and Game Code, as discussed in Section 1.5.3.

In the streamlined process, the Land Use Authority Permittee Applicant or the SSHCP Implementing Entity may act as a "clearinghouse" for the notification forms, and would conduct an initial screening process to verify the project's consistency with the SSHCP and ARP, and the aquatic protection ordinances. The Land Use Permit Applicant or the SSHCP Implementing Entity may then submit the Lake or Streambed Alteration (LSA) notification forms to CDFW on the behalf of their third-party project proponents. This would remove the need for project developers to coordinate with CDFW for Section 1600 permits. Prior to processing an LSA Notification, CDFW must collect the fee for each LSA Notification submitted by the SSHCP Implementing Entity or by an individual third-party project proponent. CDFW is solely responsible for determining whether a LSA Agreement is required.

It would also expedite the Section 1600 permitting process because CDFW would have pre-determined that consistency with the regional HCP and ARP satisfies the requirements for a Streambed Alteration Agreement.

Master LSA Agreements and LSA Agreements for Routine Maintenance may be issued individually to the three Land Use Authority Permit Applicants and plan participants for future SSHCP Covered Activities. Prior to issuing any LSA Agreement to an SSHCP Permit Applicant or participant, CDFW will consider the information and analysis in this EIS/EIR, and any additional CEQA information provided at the time of individual project 's CEQA review to make the appropriate Findings of Fact pursuant to CEQA on the decision, and would file a CEQA Notice of Determination.

Local Environmental Policies

The existing Sacramento County Swainson's Hawk Ordinance, discussed in Section 2.2.2, only applies to portions of Sacramento County that are not included in an approved HCP that includes Swainson's hawk as a Covered Species. Therefore, under the Proposed Action/Proposed Project Alternative, the Swainson's Hawk Ordinance would no longer be available as an option for Covered Activity projects to mitigate impacts to Swainson's hawk.

2.3.2 Permit Term Under the Proposed Action/Proposed Project Alternative

The Permit Applicants (Section 1.1) are requesting ESA and CESA ITPs with 50-year permit terms. The Permit Applicants (future Plan Permittees) are requesting this permit term to accommodate all of the planned buildout of the UDA (see Section 2.2.1), as the rural transportation improvement projects and new recycled water conveyance infrastructure located planned outside the UDA, including the Capital Southeast Connector project (refer to Section 2.3.3).The requested term of the ITPs will also provide adequate time for the future SSHCP Implementing Entity (Section 2.3.7) to purchase all lands and easements needed to achieve all parts of the

SSHCP Conservation Strategy, including each SSHCP Biological Goal and the SSHCP Measurable Objectives that implement each Biological Goal.

2.3.3 Covered Activities and Loss of Natural Land Covers Under the Proposed Action/Proposed Project Alternative

SSHCP Covered Activity categories, listed in Table 2-3, include the development, operation, and maintenance of new urban development structures, public facilities, and utilities that are anticipated in the Planning Area by the Permit Applicants and for which incidental take authorization is requested by the Permit Applicants from the Wildlife Agencies (USFWS and CDFW). The SSHCP Conservation Strategy will provide avoidance, minimization, and compensation for impacts to SSHCP Covered Species, habitats, and aquatic resources that would result from implementation of all SSHCP Covered Activities.

SSHCP Covered Activities implemented within the UDA would include activities and projects related to urban development and associated infrastructure on all lands zoned or ultimately planned/contemplated for urban development in adopted General Plans of Sacramento County, Galt, and Rancho Cordova. Covered Activities would also include the Capital Southeast Connector Project and other transportation, water, and wastewater development projects in the UDA. In-stream maintenance in the UDA, including vegetation and sediment removal, would also be a Covered Activity.

Five large Urban Development Master Plans (Arboretum, Cordova Hills, Jackson Township, NewBridge, and SunCreek) are proposed by third-party project proponents within the UDA (Figure 5-4). These Urban Development Master Plans meet the definition of an Urban Development Covered Activity, and the Plan Permittees anticipate that builders purchasing large lots from the Urban Development Master Plan developer will use the SSHCP incidental take permits to obtain project-level authorization under the ESA and CESA ,and to expedite their individual project CWA authorizations. These five Urban Development Master Plans were designed to comply with all SSHCP requirements, including compliance with the SSHCP AMMs listed in this chapter.

Urban development Covered Activities (Table 2-3) would not occur outside of the UDA boundary. Covered Activities allowed outside the UDA are limited to planned infrastructure projects such as roadway improvements and widening, intersection improvements, construction of new recycled water pipelines, and maintenance of existing wastewater projects that provide sewer service to existing communities outside of the UDA.

The SSHCP Covered Activities would be implemented by the Plan Permittees or could be implemented by third parties (e.g., project proponents or private developers) that are subject to the jurisdiction and oversight of a Plan Permittee.

SSHCP Covered Activities would also include implementation of the SSHCP Conservation Strategy (Section 2.3.5), including management and monitoring of the proposed SSHCP Preserve System, and the re-establishment/establishment of aquatic resources within SSHCP Preserves located inside and outside the UDA.

Table 2-3 includes a list and a general description of the SSHCP Covered Activities. See Chapter 5 of the SSHCP document for further information about each of the SSHCP Covered Activities.

Table 2-3. Covered Activities Included in Each Action Alternative Studied in the EIS/EIR[1]

Covered Activity Categories[2]	Description
Urban Development Covered Activities Inside the UDA	
Residential, Commercial, and Industrial Structures	Construction, use, and maintenance of urban, suburban, and agricultural housing, retail centers, office buildings, factories, warehouses, and associated infrastructure. Also includes public service and cultural facilities such as new police and fire stations, convention centers, theaters, museums, hospitals, schools, colleges, libraries, and parking lots. Maintenance activities include the inspection, cleaning, rehabilitation, repair, and/or replacement of buildings, structures, and facilities.
Urban Park and Recreation Facilities	Construction and maintenance of recreational facilities such as regional parks, neighborhood parks, sports fields and facilities, indoor/outdoor sports complexes, recreation trails, community trails, playgrounds, golf courses, campgrounds, nature centers, racetracks, and associated infrastructure, including roads, bridges, restrooms, and parking areas.
Urban Water Supply Facilities	Construction and installation of new potable and recycled water supply facilities (e.g., pumping stations; water treatment facilities; storage facilities; reclamation facilities; and groundwater wells, valves, gates, weirs, and pipelines), extension of existing water pipelines, and removal and maintenance of existing water supply facilities.
Public and Private Utilities	Construction, replacement, augmentation, and maintenance of electric transmission utilities including underground and aboveground electric transmission and distribution lines, substations, access road maintenance, telecommunications lines, natural gas distribution pipelines, and urban solar energy projects. Other energy-generating projects within the UDA may also be determined to be Covered Activities, provided they meet the criteria established for Covered Activities not specifically described in the SSHCP.
Solid Waste Management Facilities	Construction, operation, maintenance, and decommissioning of new transfer stations and operation of new recycling stations within the UDA. Operation and maintenance of existing groundwater extraction and monitoring wells at Kiefer Landfill, as well as the expansion and decommissioning of existing landfills. This Covered Activity would not include operation of landfills.
Wastewater Facilities	Construction, installation, operation, and maintenance of all wastewater facilities in the UDA (e.g., sewage force mains, pumping stations, access facilities, treatment facilities, pipelines, recharge ponds, pipelines, and storage facilities) and all activities that support the provision of wastewater services including collection, diversion, delivery, distribution, conveyance, storage, treatment, and discharge. The extension, removal, replacement, abandonment, and maintenance of existing facilities/pipelines are also included, as are recharge ponds, groundwater wells, and operation and maintenance of existing wastewater projects in the rural communities of Walnut Grove and Courtland outside of the UDA.
Urban Transportation	Construction, realignment, widening, extension, abandonment, and removal of public and private transportation infrastructure (e.g., roadways, railroads, culverts, bridges, bike paths, street lights, roadside drainage, intersections/interchanges, sidewalks, and traffic signals), as well as other activities necessary to implement adopted transportation or capital improvement plans of the Permit Applicants. In-stream activities for transportation improvements including bridges, culverts, or other stream-crossing facility construction, replacement, and repair.

AGENDA ITEM 11.1

4063

Table 2-3. Covered Activities Included in Each Action Alternative Studied in the EIS/EIR[1]

Covered Activity Categories[2]	Description
Flood Control and Stormwater Management in the UDA	All activities that support flood control as described in water drainage, capital improvement, flood control, and storm drain master plans for Sacramento County and Galt and Rancho Cordova. Construction of new facilities and maintenance of new and existing facilities. Stormwater abatement and treatment facilities could include detention basins, stormwater channels, pumping stations, and natural or realigned stream channels. Operations and maintenance activities including vegetation control, silt/sedimentation removal, erosion control, and stream bank stabilization projects.
Stream Channel Modification	The permanent deepening, widening, and rerouting of existing stream channels during urban development, including that associated with construction of water supply, wastewater, and urban transportation infrastructure.
Master Plans Known at the Time of the SSHCP Preparation	Urban development associated with five development projects within the UDA (Arboretum, Cordova Hills Specific Plan, Jackson Township Master Plan, NewBridge Specific Plan, and SunCreek Specific Plan) that were preparing land use plans during SSHCP preparation. These five master plans were designed to comply with SSHCP requirements, including compliance with the Covered Activity descriptions and the SSHCP AMMs.
Capital Southeast Connector	Construction, operation, and maintenance of the Capital Southeast Connector, including but not limited to initial vegetation clearing, grading of the project footprint, pouring of concrete or asphalt, excavation, staging of equipment and materials, compacting soil, and landscaping, as well as operation and maintenance. During construction it may be necessary to temporarily divert stream channels using appropriate measures to avoid or minimize impacts to stream habitat.
Mather Airport Master Plan Development Projects	Development projects at Mather Airport including the maintenance, replacement, and improvements of existing airfields (runway extensions, new taxiways, and aprons) and construction of new airfields, aircraft facilities (aircraft storage facilities, aircraft maintenance facilitates, and jet fuel storage and dispensary facilities), and commercial facilities.
Mining Covered Activities in the UDA	
Mining Projects	Mining activities including surface extraction of rock or mineral resources and construction of associated infrastructure, buildings, and facilities (e.g., surface mining pits, processing sites, and access roads), and construction and operation of detention basins. A total of five surface mines (500 acres) are anticipated to occur within the UDA. The reclamation of previously mined land is also included as a Covered Activity.
Covered Activities Allowed in UDA Preserve Setbacks	
Trails	Construction, operation, and maintenance of paved bike/pedestrian trails may be sited within a Preserve Setback under certain conditions.
Low-velocity Bio-Retention Swales	Construction, operation, and maintenance of a bio-retention swale next to trails designed to hold and remove rainwater runoff from trails, which may be sited within a Preserve Setback under certain conditions.
Fencing	Installation of post and cable, split rail, or other open fencing adjacent to trails within the setback areas, which may be sited within a Preserve Setback under certain conditions.

AGENDA ITEM 11.1

4064

Table 2-3. Covered Activities Included in Each Action Alternative Studied in the EIS/EIR[1]

Covered Activity Categories[2]	Description
Interpretive Signs and Kiosks	Construction, operation, and maintenance of safety and directional signs and kiosks intended to educate trail users about the benefits of the preserve and the importance of the setback to the resources that they are protecting.
Fire Breaks	Construction and maintenance of fire breaks, including shallow tilling or scraping vegetation if required by local fire regulations.
Benches, Shade Structures, and Shade Trees	Installation of benches, shade structures, and trash receptacles along trails if on the outer edge of the trail farthest from the preserve, which may be sited within a Preserve Setback under certain conditions.
Covered Activities Allowed in UDA Stream Setbacks	
Trails	Construction and maintenance of permeable or semi-permeable hiking trails, paved trails, and their associated infrastructure.
Low-Velocity Bio-Retention Swales	Construction, operation, and maintenance of small linear features (swales) located on one or both sides of allowed trails
Crossings Perpendicular to the Stream	New roads, bike/pedestrian trails, railroads, sewer/water pipelines, and public utility transmission lines that cross perpendicular to streams.
Stream Bank Stabilization Projects	Construction of in-stream structures for erosion control and bank stabilization.
Fencing	Installation of post and cable, split rail, or other open fencing along trails to keep users on the trail and out of the Stream Setbacks.
Benches, Shade Structures, and Shade Trees	Installation of benches, shade structures, and trash receptacles along trails if located on the outer edge of the trail farthest from the creek.
Interpretive Signs and Kiosks	Construction, operation, and maintenance of signs and kiosks.
Riparian Re-Establishment or Establishment	Actions associated with re-establishment or establishment of riparian vegetation.
Outfalls	Construction and operation of outfall structures that allow the discharge of stormwater into streams from adjacent urban areas.
Flood Control Structures and Stormwater Management	Construction of detention basins, bio-retention swales, and water quality facilities that are designed to be compatible with the habitat and wildlife values of the adjacent stream corridor.
Septic Systems	Existing subsurface sewage disposal systems. Note: The operation, maintenance, or replacement of entitled or currently existing subsurface sewage disposal systems are not Covered Activities.
Nonconforming Structures	Existing nonconforming structures and nonconforming uses of land subject to specific requirements (see Chapter 5 of the SSHCP).
Rural Transportation Project Covered Activities (Outside the UDA)	
General Activities	Transportation projects consistent with the Circulation Element of Sacramento County General Plan. Construction, operation, and maintenance of roadways are Covered Activities. See Chapter 5 of the SSHCP for a complete list of roadway projects.
Rural Collector Road Improvements (two-lane rural roads)	Roadway widening, increase of shoulder width, and drainage improvements.
Arterial Road Improvements (four-lane roadways)	Roadway widening.
Road Realignment Projects	Rerouting/constructing existing roadways to facilitate more direct or new road connections.

AGENDA ITEM 11.1

4065

Table 2-3. Covered Activities Included in Each Action Alternative Studied in the EIS/EIR[1]

Covered Activity Categories[2]	Description
Road Interchange Projects	Construction of four planned interchange projects.
Recycled Water Project Covered Activities (Outside the UDA)	
Sacramento County Agriculture and Habitat Lands Recycled Water Project (South County Agricultural Program)	Construction and maintenance of facilities (e.g., pumping stations, pipelines, recycled water facilities, groundwater recharge facilities) associated with the South County Agricultural and Habitat Lands Recycled Water Project, plus a small section of pipeline that would provide recycled water to the existing Bartley-Cavanaugh Golf Course.
Covered Activities within SSHCP Preserves	
Preserve Management and Monitoring	Construction, maintenance, and use of facilities needed for preserve management and monitoring, including but not limited to roads, bridges, culverts, fences, gates, wells, stock tanks, and stock ponds.
Habitat Enhancement, Re-Establishment, and Establishment	Enhancement actions including but not limited to improvement of the hydrologic regime of a site to benefit a Covered Species, and vegetation management activities include installing perching poles and bat houses or other nesting/roosting improvements. Habitat re-establishment and establishment actions including but not limited to earth moving; regrading or recontouring of a site; restoring the past hydrologic regime or creating a hydrologic regime; and seeding or planting herbaceous vegetation, trees, shrubs, grasses, or other vegetation.
Species Surveys, Monitoring, Research, and Adaptive Management Activities	Species surveys conducted on preserve lands and on properties identified for potential acquisition, intensive management of habitat for research (e.g., new grazing regimes, controlled burns, cycling crop harvests), and other actions associated with adaptive management activities.
Water Supply for Livestock	New wells and associated infrastructure to provide water for livestock that are used to manage grassland vegetation as part of a preserve's management plan.
Groundwater Monitoring and Extraction Wells	Monitoring of existing and construction of new extraction wells for testing and treating existing contaminated groundwater on Kiefer Landfill Buffer lands.
Pesticide Use for Land Management	Pesticide use if part of an approved Preserve Management Plan (PMP) (e.g., exotic plant or exotic animal control). Only when necessary, pesticide use is allowed (1) within SSHCP Preserves, (2) within Preserve Setbacks, and (3) within road rights-of-way that border preserves.
Detention Basins	In limited situations, stormwater detention basins would be allowed on certain Linkage Preserves.
Low-Impact Nature Trails	Construction, maintenance, and improvement of a limited number of unpaved, low-impact nature trails within the Preserve System. Improvements include removal of upland vegetation, minor grading, directional and educational signs, and benches.

1 The Action Alternatives studied in this EIS/EIR are: 1) The Proposed Action/Proposed Project Alternative (the SSHCP), and 2) the Reduced Permit Term Alternative HCP.

2 Additional details of each Covered Activity category are presented in Chapter 5 of the Draft South Sacramento Habitat Conservation Plan document.

Removal of Natural Lands under the Proposed Action/Proposed Project Alternative

Natural land covers in the Planning Area (see Table 8-1a) would be directly or indirectly impacted by the Covered Activities implemented under the Proposed Action/Proposed Project Alternative.

As with the No Action/No Project Alternative, the Lead Agencies assume that the Proposed Action/Proposed Project Alternative would include the full build out of the UDA over the 50-year permit term. Under the Proposed Action/Proposed Project Alternative, all natural land covers currently present within the UDA will be removed by new urban development except the following:

- Natural lands within existing preserves in the UDA (see Table 8-1b)
- Natural lands within the UDA proposed for inclusion in the SSHCP Preserve System (see Section 2.3.5)
- Natural lands within the UDA expected to be inside minimum 50-foot-wide Preserve Setbacks (see Section 2.3.5)
- Natural lands within the UDA expected to be inside 25-foot wide to 150-foot-wide Stream Setbacks (see Section 2.3.5)

The maximum acres of Planning Area natural land cover directly impacted (removed) under the Proposed Action/Proposed Project Alternative is presented in Table 2-4. For all EIS/EIR Alternatives, direct impacts were calculated using the GIS methodology described in Section 3.6.5.

Table 2-4. Maximum Direct Impacts (Loss) of Natural Lands Under the Proposed Action/Proposed Project Alternative

Land Cover Category[1]	Maximum Acres Lost		
	Inside UDA (acres)	*Outside UDA (acres)*	*All Planning Area (acres)**
All natural land covers[2]	32,059	1,438	33,497
Vernal Pool Ecosystem[3] land covers	16,797	321	17,118
Aquatic resources[4]	1,076	73	1,149

1 The table columns are not additive because the land cover categories include some overlapping land cover types (e.g., Vernal Pool is included in "all natural land covers," "Vernal Pool Ecosystem land covers," and "aquatic resources."

2 Planning Area land cover types are defined in the SSHCP document (Chapter 3). To allow for better comparison of impacts between the EIS/EIS alternatives, the EIS/EIR uses the SSHCP land cover types in discussions of all EIS/EIR alternatives. The SSHCP "natural" land covers include Blue Oak Savanna, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture-Grassland, Mine Tailings Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Open Water, Orchard, Seasonal Wetland, Stream/Creek, Stream/Creek (VPIH), Swale, Valley Grassland, Vernal Pool, and Vineyard, as discussed in Table 8-1 of the EIS/EIR.

3 Vernal Pool Ecosystem is defined by the SSHCP to include three aquatic land cover types (Vernal Pool, Swale, and Stream/Creek (VPIH) and hydrologically connected adjacent Valley Grassland.

4 Aquatic resources include the following SSHCP aquatic land cover types: Freshwater Marsh, Seasonal Wetland, Open Water, Stream/Creek, Vernal Pool, Swale, and Stream/Creek (VPIH).

2.3.4 Covered Species Under the Proposed Action/Proposed Project Alternative

Covered species are species that would be listed on the CESA or ESA ITPs issued by the Wildlife Agencies (CDFW and USFWS), and would be conserved in the Planning Area by the proposed SSHCP Conservation Strategy. The SSHCP proposes 28 special-status species for take coverage under ESA ITP and 8 state-listed species for take coverage under the CESA ITP (Table 2-5).

Table 2-5. Planning Area Special-Status Species Included as Covered Species

Scientific Name Common Name	Protection Status		
	Federal	*State*	*California Native Plant Society*
Invertebrates			
Lepidurus packardi Vernal pool tadpole shrimp	E*	—	—
Branchinecta lynchi Vernal pool fairy shrimp	T*	—	—
Branchinecta mesovallensis Mid-valley fairy shrimp	—	—	—
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	T	—	—
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	—	—	—
Amphibians			
Ambystoma californiense California tiger salamander, (Central Valley population)	T*	T	—
Spea hammondii Western spadefoot	—	CSC	—
Reptiles			
Actinemys marmorata Western pond turtle	—	CSC	—
Thamnophis gigas Giant garter snake	T	T	—
Birds			
Accipiter cooperii Cooper's hawk	—	WL	—
Agelaius tricolor Tricolored blackbird	BCC	E**	—
Athene cunicularia hypugaea Western burrowing owl	BCC	CSC	—
Buteo regalis Ferruginous hawk	BCC	—	—
Buteo swainsoni Swainson's hawk	BCC	T	—
Circus cyaneus Northern harrier	—	CSC	—

Table 2-5. Planning Area Special-Status Species Included as Covered Species

Scientific Name Common Name	Protection Status		
	Federal	*State*	*California Native Plant Society*
Elanus leucurus White-tailed kite	—	CFP	—
Grus canadensis tabida Greater sandhill crane	—	T; CFP	—
Lanius ludovicianus Loggerhead shrike	BCC	CSC	—
Mammals			
Lasiurus blossevillii Western red bat	—	CSC	—
Taxidea taxus American badger	—	CSC	—
Plants			
Downingia pusilla Dwarf downingia	—	—	2.2
Gratiola heterosepala Boggs Lake hedge-hyssop	—	E	1B.2
Juncus leiospermus var. *ahartii* Ahart's dwarf rush	—	—	1B.2
Legenere limosa Legenere	—	—	1B.1
Navarretia myersii Pincushion navarretia	—	—	1B.1
Orcuttia tenuis Slender Orcutt grass	T*	E	1B.1
Orcuttia viscida Sacramento Orcutt grass	E*	E	1B.1
Sagittaria sanfordii Sanford's arrowhead	—	—	1B.2

Status Definitions
Federal:
E= Listed as endangered under the ESA
T= Listed as threatened under the ESA
*= Species has designated ESA Critical Habitat located within the Planning Area
— = No ESA listing
BCC = Bird of Conservation Concern
State:
E = Listed as endangered under CESA
T = Listed as threatened under CESA
** = Under consideration for listing by CDFW as of September 14, 2015
CFP = Fully protected under the California Fish and Game Code
CSC = California species of special concern
WL = CDFW Watch List
— = No CESA or other state status
California Native Plant Society California Rare Plant Rank
1B = Rare, threatened, or endangered in California and elsewhere
2 = Rare, threatened, or endangered in California but more common elsewhere
California Native Plant Society California Rare Plant Rank Threat Ranks
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)

2.3.5 Conservation Strategy under the Proposed Action/Proposed Project Alternative

The Conservation Strategy for the Proposed Action/Proposed Project Alternative includes implementation of AMMs (see Table 2-6 and EIS/EIR Appendix D) during construction and implementation of Covered Activities, achievement of the stated Biological Goals for the Planning Area, and each Measurable Objectives, including the assembly of an interconnected SSHCP Preserve System based on those Measurable Objectives, and a Preserve System Monitoring and Management Program.

Impact Avoidance and Minimization Measures (AMMs)

The SSHCP AMMs also provide new avoidance and minimization measures that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to surface water quality and groundwater quality, compared to the effects of the No Action/No Project Alternative.

Under the Proposed Action/Proposed Project Alternative, all Covered Activities (projects and activities) must incorporate or apply specific SSHCP AMMs during implementation of the Covered Activity (see EIS/EIR Appendix D). The SSHCP AMMS are intended to avoid or minimize direct and indirect impacts of the Covered Activities to Covered Species and Covered Species habitats, including aquatic resources. The SSHCP AMMs include measures to avoid species occurrences and habitat through project design, or through the timing of activities avoid times when a Covered Species could be present, including breeding periods. The SSHCP AMMs may also avoid or minimize the potential for take by reducing effects on Covered Species and other native species by altering construction plans or activities (e.g., modifying construction footprints, covering open trenches, using materials to reduce runoff from construction sites) or by modifying design elements of projects to reduce long term operational effects (e.g., noise, lighting, urban runoff). Many of the SSHCP AMMs also avoid or minimize impacts to wetlands and other waters to a greater extent, including several measures that would require new development to be set back a greater distance from the tops of stream and creek banks.

The SSHCP AMMs include some of the AMMs that projects are required to implement under the existing regulatory conditions (see Section 2.2.2). For example, AMM BMP1 through AMM BMP11 of the Proposed Action/Proposed Project Alternative would be similar to the construction best management practices that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes process for annual review of the effectiveness of each SSHCP AMM, and

a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the SSHCP would result these AMMs being implemented more frequently and consistently at all ground-disturbing activities, than would occur under the No Action/No Project Alternative. The SSHCP AMMs also provide new avoidance and minimization measures that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to species, species habitat and aquatic resources, compared to the effects of the No Action/No Project Alternative.

AMMs similar to those in the species-specific SSHCP AMMs may be required on a project-by-project basis under the No Action/No Project Alternative if required as a condition of the approval of the project entitlements or a permit (e.g., CWA, California Fish and Game Code Section 1600). However, under the Proposed Action/Proposed Project Alternative, there will be more consistent application of AMMs, which will inform the initial design of Covered Activities, so projects will not be delayed due to imposing unexpected AMMs that could require redesign. In addition, more consistent application of AMMs is expected because they would be implemented under the SSHCP comprehensive plan with a process for tracking implementation and effectiveness, rather than implemented under various statutes, regulations, and guidelines, with variability of their application and interpretation.

In addition, since AMMs will be known in advance and incorporated earlier in the design of projects, it is reasonable to assume that there will be greater application of AMMs than under the No Action/No Project Alternative. For example, the AMMs to minimize impacts to streams and creeks (AMMs STREAM-1 through Stream 5) must be applied to all Covered Activities where a stream or creek is located within a project footprint. These AMMs would be critical to the design of a project, such as a rezone and subdivision, because the AMMs require setbacks from streams that are 25–150 feet wide. Because project proponents will be aware of these measures early in the planning process, the setbacks can be accommodated more readily in the overall project plan, including the density and designation of land use zones coupled with economic considerations. In comparison, under the No Action/No Project Alternative, large setbacks can be economically infeasible at the permit stage in cases where zoning has already been approved, because the value of land changes with the zoning. Land approved for RD-5 zoning may be valued at one million dollars an acre compared to the same land zoned Ag-80 may be valued at 50,000 dollars per acre.

Table 2-6 compares SSHCP AMMs avoidance measures expected under the No Action/No Project Alternative. The comparisons are categorized as follows:

- New
- Similar

- More frequently applied.

AMMs are considered "new" if they were not identified in the No Action/No Project Alternative regulatory environment, and although the AMM may be an individual permit condition or condition of approval for an individual project, it is considered to be "new." AMMs are considered to be "similar" if they were identified in the No Action/No Project Alternative regulatory environment and their application would be "similar" to the application under Proposed Action/Proposed Project Alternative scenario. AMMs are considered to be "more frequently applied" if they were identified in some form in the No Action/No Project Alternative regulatory environment, and they are considered to be "more frequently applied" under SSHCP. Explanations of why AMMs would be "more frequently applied" under the Proposed Action/Proposed Project Alternative scenario are discussed previously and listed below:

- Increased knowledge of existing habitat
- Increased early coordination
- Applied more consistently by regulatory programs
- Applied to a greater variety of actions
- Reduced cost.

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
Condition 1		
Condition 1. Avoid and minimize urban development impacts to watershed hydrology and water quality. This condition will require Best Management Practices (BMPs) and low-impact development (LID) AMMs. The LID AMMs apply to all UDA Covered Activities that occur at the parcel, subdivision, or master plan scale.	National Pollutant Discharge Elimination System MS4 Design Measures. Sacramento and South Placer Regions (Stormwater Manual) Guidelines and requirements to reduce urban runoff from new development and redevelopment projects within the region (SSQP 2007).	The SSHCP AMMs are based on existing MS4 permit requirements.
LID-1 (Stormwater Quality) Enforce site design stormwater management.	See description for Condition 1.	*Similar.*
LID-2 (Groundwater Recharge) Consider groundwater recharge when siting preserves.	See description for Condition 1.	*More frequently applied.* Because SSHCP Preserves would be established by the Implementing Entity, the EIS/EIR assumes that increased attention would be paid to groundwater recharge when preserve locations are selected for acquisition.
LID-3 (Natural Site Features) Incorporate natural aquatic features into project design.	See description for Condition 1.	*Similar.*
Condition 2.		
Condition 2. Avoid and minimize urban development direct and indirect impacts to existing preserves and SSHCP Preserves. Applies to all UDA Covered Activities that border an existing preserve or planned SSHCP Preserve.	Most of the AMMs under Condition 2 are not codified in any existing regulations, but they could be required during project-by-project permitting or as design guidelines in specific plans.	—
EDGE-1 (Compatible Land Uses) Locate compatible land uses with less intensive human activity next to preserves.	None.	*New.*
EDGE-2 (Single-Loaded Streets) Streets adjacent to preserves should be single loaded (i.e., only be developed on one side so the preserve is visible from the street).	None.	*New.*

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
EDGE-3 (Preserve Setbacks) Set minimum 50-foot-wide setback outward from the boundary of any existing preserve or planned SSHCP Preserve.	None.	*New.*
EDGE-3a (Setback Recreational Trails) Set maximum 16-foot-wide trail on the side nearest development, with open fencing between setback and trail.	None.	*New.*
EDGE-3b (Setback Firebreaks) Set minimum legal firebreak width within Preserve Setbacks using trail as firebreak if possible.	None.	*New.*
EDGE-3c (Setback Shade Trees and Landscaping) Locate non-invasive, drought-tolerant landscaping between trail and adjacent urban development.	None.	*New.*
EDGE-4 (Locate Stormwater Control Outside Preserves) Direct urban stormwater away from preserve.	None.	*New.* Although MS4 requirements address stormwater control, they do not direct developers to avoid sending stormwater to preserves.
EDGE-5 (Stormwater Control in Preserve Setbacks) Locate within setback nearest development.	None.	*New.*
EDGE-6 (Detention Basins in Linkage Preserves) Design to minimize effects on species.	None.	*New.*
EDGE-7 (Hardpan/Duripan Protection) Avoid disruption or seal.	None.	*New.*
EDGE-8 (Outdoor Lighting) Direct lighting away from preserves.	Sacramento County Zoning Code offers some protection from light and glare for the night sky and residential uses.	*More frequently applied.* Under the SSHCP, outdoor lighting requirements would be applied to any Covered Activity that could direct light onto an existing or new preserve. This would be in addition to the requirements of Sacramento County's Zoning Code.

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
EDGE-9 (Livestock Access to Preserves) Design pick-up delivery facilities to be available and safe and not alter preserve habitat significantly.	Transportation improvement standards require safe ingress and egress.	*More frequently applied.* Under the AMM, focus would be on access for trucks with trailers and routes for such vehicles onto the preserve.
EDGE-10 (Prevent Invasive Species Spread)	Sacramento County Zoning Code restricts use of invasive plants in required landscape plans.	*More frequently applied.* Under the SSHCP, this AMM would be applied to all Covered Activities and not just those that are required to prepare landscape plans.
Condition 3. Implement Construction BMPs		
BMP-1 (Construction Fencing)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-2 (Erosion Control)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-3 (Equipment Storage and Fueling)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-4 (Erodible Materials)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-5 (Dust Control)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.* However, the limitation on using surface water would apply less frequently (e.g., stock ponds could conceivably be used as a water source for dust control).
BMP-6 (Construction Lighting)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-7 (Biological Monitor)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*

AGENDA ITEM 11.1

4075

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
BMP-8 (Training of Construction Staff)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-9 (Soil Compaction)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-10 (Revegetation)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.*
BMP-11 (Speed Limit)	Generally required as a standard BMP by local land use authorities as part of a discretionary permit (grading or building permit).	*Similar.* However, a 10-mile-per-hour speed limit on dirt roads might not always be applied.
Condition 4. Avoid and Minimize Impacts that May Result from the Implementation of Covered Transportation Projects		
ROAD-1 (Road Project Location)	Potentially required as part of ESA, CESA, or CWA permitting or consultation. Although road projects do take into account avoidance of impacts to species, wetlands, and waters, avoidance is not always held to the standard of "maximum extent practicable."	*More frequently applied.* Covered activity road projects would be held to a higher standard of avoidance than under existing regulatory conditions.
ROAD-2 (Wildlife Crossing Structures)	Potentially required as part of ESA or CESA permitting.	*More frequently applied.* Covered activity road projects would be held to a higher standard for wildlife connectivity than under existing regulatory conditions.
ROAD-3 (Roadside Pesticide Use)	The State Department of Pesticide Regulation requires full reporting of pesticide use along roadways. Use is reported monthly to agricultural commissioners who report to the state.	*More frequently applied.* Under the SSHCP, permittees will be responsible for ensuring that pesticide application along roadsides is in compliance with the AMM rather than relying on reporting that may not be consistent. Posting of signs for sensitive areas would also occur more frequently under the SSHCP.
Condition 5. Avoid and Minimize Impacts that Result from Public Use of Low-Impact Nature Trails in Preserves		
NATURE TRAIL-1 (Nature Trail Plan)	None.	*New.*
NATURE TRAIL- 2 (Nature Trail Protection of Duripan)	None.	*New.*
NATURE TRAIL- 3 (Nature Trail Location)	None.	*New.*

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
NATURE TRAIL- 4 (Biological Studies Prior to Nature Trail Design)	None.	*New.*
NATURE TRAIL- 5 (Monitoring of Nature Trail Impacts)	None.	*New.*
Condition 6. Avoid and Minimize Impacts to Existing Vernal Pools when Re-Establishing or Establishing Vernal Pool Wetlands		
RE-ESTABLISHMENT/ ESTABLISHMENT -1 (Vernal Pool)	Existing ESA, CESA, and CWA regulations put oversight for design and construction of re-established/established vernal pools under the responsibility of the USFWS, CDFW, and USACE.	*More frequently applied.* By listing the requirements for a Vernal Pool re-establishment/establishment site in the AMM, the SSHCP would result in increased certainty of methods and results when compared to the existing condition.
RE-ESTABLISHMENT/ ESTABLISHMENT -2 (Vernal Pool Inocula Bank)	None	*New.*
Condition 7. Avoid and Minimize Impacts to Streams and Creeks		
STREAM -1 (Laguna Creek Wildlife Movement Corridor)	None. However, some specific plans or flood control plans may establish setbacks along this reach.	*New.*
STREAM-2 (UDA Stream Setbacks)	None. However, some specific plans or flood control plans may establish setbacks along streams in the UDA.	*New.*
STREAM-3 (Minor Tributaries to UDA Streams)	None. However, some specific plans or flood control plans may establish setbacks along minor tributaries.	*New.*
STREAM-4 (Minimize Effects from Temporary Channel Re-Routing)	Projects would need to receive permits under California Fish and Game Code Section 1600. These would identify requirements to minimize effects on habitat and species in streams and creeks when the channel is temporarily rerouted.	*Similar.* The requirements of this SSHCP AMM would generally be the same as those required under a California Fish and Game Code Section 1600 permit.
STREAM-5 (Design for Stream Channel Re-Routing, Widening, or Deepening)	Projects would need to receive permits under California Fish and Game Code Section 1600. These would identify requirements to minimize effects on habitat and species in streams and creeks when the channel is temporarily rerouted.	*Similar.* The requirements of the SSHCP AMM would be generally the same as those required under a California Fish and Game Code Section 1600 permit.

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
Condition 8. Avoid and Minimize Impacts from Utility and Utility Maintenance Covered Activities		
UTILITY-1 (Avian Collision Avoidance)	Consultation with USFWS and CDFW, as well as adherence to the Avian Power Line Interaction Committee guidelines, are optional on utility projects unless a requirement is made by a local land use authority on a discretionary permit or in association with an ESA or CESA ITPs.	*New.*
UTILITY-2 (Utility Maintenance on Preserves)	Vernal pools receive protection through species avoidance or mitigation under CESA and ESA. However, these protections are not uniformly or consistently applied.	*More frequently applied.* This AMM would be implemented on any SSHCP Preserve.
UTILITY-3 (Trenchless Construction Methods)	Vernal pools receive protection through species avoidance or mitigation under CESA and ESA. However, these protections are not uniformly or consistently applied.	*More frequently applied.* This AMM would be implemented on any SSHCP Preserve.
UTILITY-4 (Siting of Entry and Exit Location)	Vernal pools and riparian woodland receive protection through species avoidance or mitigation under CESA and ESA. However, these protections are not uniformly or consistently applied.	*More frequently applied.* This AMM would be implemented on any SSHCP Preserve.
Condition 9. Avoid and Minimize Impacts that Might Result from Removing or Breaching Levees to Establish or Re-Establish Riparian Habitat		
LEVEE-1 (Preparation of Hydrologic Analysis)	CWA 404 regulations require consideration of flow alterations and related potential indirect impacts, such as effects of flows to downstream properties. Adherence to these regulations necessitates preparation of a hydrologic analysis.	*Similar.*
General Covered Species AMMs		
SPECIES-1 (Litter Removal Program)	None. Similar measures can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
SPECIES-2 (No Pets in Construction Areas)	None. Similar measures can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*

AGENDA ITEM 11.1

4078

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
SPECIES-3 (Take Report)	None. Similar measures can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
SPECIES-4 (Post-Construction Compliance Report)	None. Similar measures can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
Sacramento or Slender Orcutt Grass		
ORCUTT-1 (Orcutt Grass Surveys)	Federal ESA protections would be used; however, surveys would only be conducted for this species if the project is a discretionary action that would prompt Sacramento County or City of Sacramento to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
ORCUTT-2 (Orcutt Grass Protection)	Federal ESA protections would be used; however, this species would only receive protection if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
California Tiger Salamander		
CTS-1 (California Tiger Salamander Daily Construction Schedule)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
CTS-2 (California Tiger Salamander Exclusion Fencing)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
CTS-3 (California Tiger Salamander Monitoring)	Federal ESA protections would be used; however, this species would only receive monitoring if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
CTS-4 (Avoid California Tiger Salamander Entrapment)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
CTS-5 (California Tiger Salamander Encounter Protocol)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
CTS-6 (Erosion Control Materials in California Tiger Salamander Habitat)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
CTS-7 (Rodent Control)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
Western Spadefoot		
WS-1 (Western Spadefoot Work Window)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WS-2 (Western Spadefoot Exclusion Fencing)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WS-3 (Western Spadefoot Monitoring)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*

AGENDA ITEM 11.1

4080

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
WS-4 (Avoid Western Spadefoot Entrapment)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WS-5 (Erosion Control Materials in Western Spadefoot Habitat)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WS-6 (Western Spadefoot Encounter Protocol)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
Giant Garter Snake		
GGS-1 (Giant Garter Snake Surveys)	Federal ESA protections would be used; however, this species would only receive surveys if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
GGS-2 (Giant Garter Snake Work Window)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
GGS-3 (Giant Garter Snake Monitoring)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
GGS-4 (Giant Garter Snake Habitat Dewatering and Exclusion)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
GGS-5 (Avoid Giant Garter Snake Entrapment)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
GGS-6 (Erosion Control Materials in Giant Garter Snake Habitat)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
GGS-7 (Giant Garter Snake Encounter Protocol)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS.	*More frequently applied.* Instead of applying only on discretionary actions, this AMM would apply to any project that would like to use the SSHCP for species coverage.
GGS-8 (Giant Garter Snake Post-Construction Restoration)	Federal ESA protections would be used; however, this species would only receive those protections if the project is a discretionary action that would prompt Sacramento County or city to consult with USFWS. Restoration can also be required under project-by-project permitting efforts by local land use authorities or as part of a California Fish and Game Code Section 1600 or CWA 401/404 permit, but requirements for restorations on projects are not regular or predictable.	*More frequently applied.* Rather than occurring only potentially on projects requiring local land use authority discretionary permits or that obtain a California Fish and Game Code Section 1600 permit or CWA 401/404 permit, this AMM would be applied to any Covered Activity.
Western Pond Turtle		
WPT-1 (Western Pond Turtle Surveys)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WPT-2 (Western Pond Turtle Work Window)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*

AGENDA ITEM 11.1

4082

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
WPT-3 (Western Pond Turtle Monitoring)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WPT-5 (Avoid Western Pond Turtle Entrapment)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WPT-6 (Erosion Control Materials in Western Pond Turtle Habitat)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WPT-8 (Western Pond Turtle Encounter Protocol)	There is no formal protection under ESA or CESA for this species. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*New.*
WPT-9 (Western Pond Turtle Post-Construction Restoration)	There is no formal protection under ESA or CESA for this species. Restoration can be required under project-by-project permitting efforts by local land use authorities or as part of a California Fish and Game Code Section 1600 or CWA 401/404 permit, but requirements for restorations on projects are not regular or predictable.	*More frequently applied.* Rather than occurring only potentially on projects that obtain a California Fish and Game Code Section 1600 permit or CWA 401/404 permit, this AMM would be applied to any Covered Activity.

AGENDA ITEM 11.1

4083

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
Tricolored Blackbird		
TCB-1 (Tricolored Blackbird Surveys)	This species is currently protected under CESA as a candidate for listing and also receives some protection under the Migratory Bird Treaty Act (MBTA). Future listing is uncertain, so required protections may not persist.	*More frequently applied.* Regardless of the listing decision by the Fish and Game Commission, this AMM would be applied to any Covered Activity.
TCB-2 (Tricolored Blackbird Pre-Construction Surveys)	This species is currently protected under CESA as a candidate for listing and also receives some protection under MBTA. Future listing is uncertain, so required protections may not persist.	*More frequently applied.* Regardless of the listing decision by the Fish and Game Commission, this AMM would be applied to any Covered Activity.
TCB-3 (Tricolored Blackbird Nest Buffer)	This species is currently protected under CESA as a candidate for listing and also receives some protection under MBTA. Future listing is uncertain, so required protections may not persist.	*More frequently applied.* Regardless of the listing decision by the Fish and Game Commission, this AMM would be applied to any Covered Activity.
TCB-4 (Tricolored Blackbird Nest Buffer Monitoring)	This species is currently protected under CESA as a candidate for listing and also receives some protection under MBTA. Future listing is uncertain, so required protections may not persist.	*More frequently applied.* Regardless of the listing decision by the Fish and Game Commission, this AMM would be applied to any Covered Activity.
TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves)	This species is currently protected under CESA as a candidate for listing and also receives some protection under MBTA. Future listing is uncertain, so required protections may not persist.	*More frequently applied.* Regardless of the listing decision by the Fish and Game Commission, this AMM would be applied to any Covered Activity.
Swainson's Hawk		
SWHA-1 (Swainson's Hawk Surveys)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
SWHA-2 (Swainson's Hawk Pre-Construction Surveys)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
SWHA-3 (Swainson's Hawk Nest Buffer)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.

AGENDA ITEM 11.1

4084

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
SWHA-4 (Swainson's Hawk Nest Buffer Monitoring)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
Greater Sandhill Crane		
GSC-1 (Greater Sandhill Crane Surveys)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
GSC-2 (Greater Sandhill Crane Pre-Construction Surveys)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
GSC-3 (Greater Sandhill Crane Roosting Buffer)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
GSC-4 (Greater Sandhill Crane Visual Barrier)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
GSC-5 (Greater Sandhill Crane Roosting Buffer Monitoring)	This species is formally protected under CESA and MBTA.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
Western Burrowing Owl		
WBO-1 (Western Burrowing Owl Surveys)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
WBO-2 (Western Burrowing Owl Pre-Construction Surveys)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
WBO-3 (Burrowing Owl Avoidance)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
WBO-4 (Burrowing Owl Construction Monitoring)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
WBO-5 (Burrowing Owl Passive Relocation)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
WBO-6 (Burrowing Owl Timing of Maintenance Activities)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
WBO-7 (Rodent Control)	None.	*New.*
Covered Raptor Species		
RAPTOR-1 (Raptor Surveys)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, THIS AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
RAPTOR-2 (Raptor Pre-Construction Surveys)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
RAPTOR-3 (Raptor Nest/ Roost Buffer)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.
RAPTOR-4 (Raptor Nest/ Roost Buffer Monitoring)	This species is formally protected under MBTA. Protections can be required under project-by-project permitting efforts by local land use authorities but are not regular or predictable.	*More frequently applied.* Instead of potentially being applied only on discretionary actions, this AMM would be applied consistently to any project that would like to use the SSHCP for species coverage.

Table 2-6. Comparison of AMMs Under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative

Proposed Action/Proposed Project Alternative Measure	No Action/No Project Alternative Regulatory Environment	Conclusion of SSHCP AMM Comparison with No Action/No Project Alternative Regulatory Environment
Western Red Bat		
BAT-1 (Winter Hibernaculum Surveys)	None.	*New.*
BAT-2 (Winter Hibernaculum Pre-Construction Surveys)	None.	*New.*
BAT-3 (Winter Hibernaculum Buffer)	None.	*New.*
BAT-4 (Bat Eviction Methods)	None.	*New.*

AGENDA ITEM 11.1

4087

The SSHCP Biological Goals and Their Associated Measurable Objectives and Conservation Actions

Biological Goals provide the broad guiding principles of any HCP Conservation Strategy and must be included in all regional HCPs (USFWS and NMFS 2000). The SSHCP Conservation Strategy is guided by the following five Biological Goals:

- **Biological Goal 1:** Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Planning Area.

  The intent of Biological Goal 1 is to maintain the existing heterogeneity of natural land covers (and their associated geologic formations and landforms) present within the Planning Area, minimize habitat fragmentation, and maintain landscape ecosystem functions by establishing a system of large and interconnected preserves.
- **Biological Goal 2:** Maintain or improve physical, chemical, and biological functions of aquatic resources within the Planning Area.

  The intent of Biological Goal 2 is to avoid or minimize impacts of future Covered Activities on Planning Area aquatic resources and to ensure no net loss of aquatic resources and aquatic functions by preserving existing aquatic resources and by re-establishing or establishing aquatic resources within the Planning Area.
- **Biological Goal 3:** Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.

  The intent of Biological Goal 3 is to ensure that adequate acreage of each natural land cover remains in the Planning Area to provide necessary breeding, foraging, and/or sheltering habitat for the Covered Species and other Planning Area native species that are associated with that land cover type.
- **Biological Goal 4:** Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Planning Area.

  Biological Goal 4 provides appropriate management and monitoring of lands preserved by the SSHCP to ensure that natural communities remain functional in perpetuity for the benefit of Covered Species and other Planning Area native species.
- **Biological Goal 5:** Maintain or expand the existing distribution of each Covered Species within the Planning Area.

  The intent of Biological Goal 5 is to ensure that each Covered Species persists within the Planning Area in perpetuity, and that unoccupied but suitable habitat for each Covered Species is preserved or re-established to provide for future Covered Species population growth and dispersal.

Biological Goals are often "stepped down" to smaller, more understandable and directly Measurable Objectives. Measurable Objectives are a condition to be met or a change to be achieved relative to the existing condition (USFWS and NMFS 2000). Each Measurable Objective should include all of the following: a species or habitat indicator, a location, an action, a quantity/state, and the timeframe needed to achieve the objective. Therefore, Measurable Objectives are quantitative and clearly state a desired result, as shown in Table 2-7. A Biological Goal is achieved by collectively implementing its Measurable Objectives (USFWS and NMFS 2000). For each Measurable Objective, the SSHCP also provides conservation actions that specify how the Measurable Objective would be achieved (Table 2-7). Additional information about the SSHCP Biological Goals, Measurable Objectives, and conservation actions is presented in the SSHCP (Chapter 7).

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Biological Goal 1: Preserve and link intact landscapes that include the highest-quality habitat for Covered Species within the Planning Area.	
Objective L1. Establish a minimum Preserve System of 36,282 acres of natural land covers that preserves 34,495 acres and re-establishes or establishes 1,787 acres of habitat for Covered Species and other native biota as a component of the Preserve System. Of the 34,495 acres of preservation, at least 6,941 acres will be within the UDA. Of the 1,787 acres of re-establishment or establishment, at least 130 acres will be within the UDA. Preserves will be assembled in accordance with the conservation actions in this table.	**Conservation Action L1.1**. The minimum land acquisition required under the SSHCP for natural land cover types is 33,796 acres. Additional minimum land acquisition requirements will apply to some conservation analysis zones and for aquatic land cover types, as described in this table. Actual acquisition of some land cover types will likely be greater than the combined minimum requirements because parcel boundaries typically do not follow ecological boundaries, and the boundaries of acquired parcels will include land cover types that are not specified by acquisition requirements (e.g., minor roads, aqueducts). In addition, qualitative requirements for habitat connectivity or preservation of plant occurrences could require additional acreage. All SSHCP land acquisitions must be accomplished by Year 45 of the permit term to ensure that all preserve lands have at least 5 years to be managed, enhanced, and monitored according to the terms of the SSHCP. This time period will enable the Permitting Agencies to closely monitor the final land acquisitions to ensure that the Implementing Entity will complete the land acquisition strategy and achieve the final Biological Goals and Measurable Objectives. Management of these lands, however, will occur in perpetuity. Refer to objectives under Biological Goal 3 for minimum preservation and re-establishment/establishment requirements for individual SSHCP natural land cover types. Re-establishment/establishment requirements are separate and distinct from preservation requirements and cannot overlap.
Objective L2. Establish a minimum of 11 Linkage Preserves that provide interconnections between the Landscape, Core, Minor, and Satellite Preserves or existing preserves. Linkage Preserves will have a minimum width of 600 feet and will be located as described in Section 7.5. (Minor variations on minimum width may be allowed where there are physical constraints in the environment, in accordance with the process outlined in Chapter 10.)	**Conservation Action L2.1.** The Implementing Entity will acquire lands to link SSHCP Preserves and existing preserves in the Planning Area via Linkage Preserves. Linkage Preserves will have a minimum width of 600 feet. The Implementing Entity will select Linkage Preserve sites considering the following criteria: • Connects SSHCP Preserves together or connects SSHCP Preserve to existing preserves. • Provides known connectivity for Covered Species and other native terrestrial species. • Includes Covered Species modeled habitat.
Biological Goal 2: Maintain or improve physical, chemical, and biological functions of aquatic resources within the Planning Area.	
Objective W1. Ensure that during implementation of Objective L2 (establishing minimum of 11 Linkage Preserves). The Linkage Preserves that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek.	**Conservation Action W1.1.** Implement Stream Setback requirements in the UDA pursuant to Table 5-1 of the SSHCP.

AGENDA ITEM 11.1

4090

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective W2. Covered Activities will implement the following, as outlined in Section 5.4.2: • Incorporate the SSHCP Design Avoidance and Minimization Measures (LID and ROAD AMMs) • Implement ground disturbance AMM BMPs and ROAD AMMs	**Conservation Action W2.1.** Each Urban Development Covered Activity will implement LID AMMs in accordance with Section 5.4.
	Conservation Action W2.2. Each ground-disturbing Covered Activity will implement BMP measures (see Section 5.4).
	Conservation Action W2.3. Each urban development road construction and rural transportation Covered Activity will implement ROAD and BMP measures for road siting, design, pre-construction, construction, post-construction, and maintenance requirements (see Section 5.4).
Objective W3. Ensure Covered Activities will implement Stream Setback requirements in the UDA for creeks and streams, as described in AMMs STREAM-1, STREAM-2, and STREAM-3. Covered Activities will implement Preserve Setback requirements in the UDA as described in AMM EDGE-3.	**Conservation Action W3.1.** Implement AMMs STREAM-1, STREAM-2, STREAM-3, and STREAM-4.
Objective W4. Ensure that aquatic resources are preserved during assembly of the SSHCP Preserve System and are managed in perpetuity (see Objectives VG1, VP1, VP3, VP4, SW1, FWM1, SC1, OW1, and RIP1).	**Conservation Action W4.1.** The Implementing Entity will select preserve sites for Valley Grassland within the Vernal Pool ecosystem considering the following criteria: • Known to include herbaceous native plant species. • Includes Covered Species modeled habitat. • Located adjacent to currently preserved lands. • Located on parcels 20 acres or greater and/or occurring within a larger open space area.
	Conservation Action W4.2. The Implementing Entity will select preserve sites for Vernal Pool and Swale habitat considering the following criteria: • Includes Covered Species modeled habitat. • Has naturally occurring high densities of vernal pools. • Has heterogeneity in vernal pool size, depth, and density. • Contains large or deep vernal pools. • Located adjacent to currently preserved lands. • Contains a soil type that is not currently preserved in the Planning Area or is underrepresented in the Preserve System. Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Can be managed to enhance or restore natural Vernal Pool ecosystem processes.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
	Conservation Action W4.3. The Implementing Entity will select preserve sites for Seasonal Wetland and Stream/Creek (VPIH) habitat considering the following criteria: • Links preserved vernal pools. • Includes Covered Species modeled habitat. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas.
	Conservation Action W4.4. The Implementing Entity will select preserve sites for Freshwater Marsh considering the following criteria: • Includes Covered Species modeled habitat. • Can be managed to enhance or restore natural Freshwater Marsh ecosystem processes.
	Conservation Action W4.5. The Implementing Entity will select preserve sites for Stream/Creek considering the following criteria: • Located in modeled habitat for aquatic Covered Species (particularly giant garter snake and western pond turtle). • Is in proximity to the mouth of the Stream/Creek to benefit giant garter snake and western pond turtle. • Located adjacent to an existing preserve. • Has water present during early spring through mid-fall (April through October). • Can be managed to enhance or restore natural Stream/Creek ecosystem processes.
	Conservation Action W4.6. The Implementing Entity will select preserve sites for Open Water considering the following criteria: • Includes Covered Species modeled habitat. • Can be managed to enhance or restore natural Open Water ecosystem processes.
	Conservation Action W4.7. The Implementing Entity will select preserve sites for riparian land cover types considering the following criteria: • Includes Covered Species modeled habitat. • Located within 3 miles of foraging habitat for bird Covered Species that use riparian habitat for nesting and/or roosting. • Closed canopy consisting of multiple vegetation layers and includes mature trees. • Is large, relatively unfragmented, and connected to Valley Grassland and agriculture areas. • Can be managed to enhance or restore riparian land cover type ecosystem processes.
Objective W5. Ensure that aquatic resources are re-established and/or established during assembly of the SSHCP Preserve System in compliance with conservation actions listed in this table (see Objectives VP2, VP5, SW2, FWM2, OW2, and RIP2).	Refer to Conservation Actions VP2.1, VP 5.1, SW2.1, FWM2.1, OW2.1, and RIP2.1.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective W6. Ensure Covered Activities will avoid a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA.	**Conservation Action W6.1**. Required avoidance will comply with the requirements of AMM STREAM-3.
Objective W7. Ensure that, when re-establishing/establishing vernal pools, swales, and Freshwater Marsh, a minimum of 50 acres of Vernal Pool, 30 acres of Swale, and 50 acres of Freshwater Marsh re-establishment/establishment occur within the Morrison Creek Watershed.	Refer to Conservation Actions VP2.1, VP5.1, and FWM2.1.
Biological Goal 3: Preserve, re-establish, or establish natural land covers (including Cropland and Irrigated Pasture-Grassland) that provide habitat for Covered Species.	
Aquatic	
Objective VG1. Preserve a minimum of 22,014 acres of Valley Grassland land cover within the Vernal Pool Ecosystem. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action VG1.1.** Prioritize selection of preserve sites for Valley Grassland prioritized based on the following criteria: • Located in Vernal Pool ecosystem. • Known to support native herbaceous plants in uplands. • Located adjacent to currently preserved lands. • Located on parcels 20 acres or greater and/or occurring within larger open space area. • Management could enhance natural ecosystem processes of the Vernal Pool landscape.
Objective VP1a. Preserve a minimum of 966 acres of vernal pool in the Planning Area.	**Conservation Action VP1a.1.** Prioritize selection of preserve sites for vernal pools based on the following criteria: • Includes modeled habitat for Vernal Pool Covered Species. • Includes ecosystem functions of the uplands, micro-watersheds, and perched aquifer surrounding the vernal pools that are undisturbed. • Located adjacent to currently preserved lands. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Can be managed to maintain natural Vernal Pool ecosystem processes. • Has available water for grazing animals on preserves. • Depending on what is already preserved in the Planning Area, prioritize either naturally occurring high-density Vernal Pool complexes or more isolated pools to ensure heterogeneity of spatial patterns and connectivity. Depending on what is already preserved in the Planning Area, prioritize preservation of pools with each of the different landforms, geologic formations, floristic assemblages, and vernal pool sizes/depths.

AGENDA ITEM 11.1

4093

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective VP1b. Impacts to vernal pool within or adjacent to (within 1 mile of) the MCRA and Cosumnes/Rancho-Seco Core Recovery Area will be mitigated within or adjacent to (within 1 mile of) the MCRA and/or Cosumnes/Rancho-Seco Core Recovery Area.	**Conservation Action VP1b.1.** Prioritize selection of preserve sites for vernal pools in Core Recovery Areas based on the following criteria: • Is within the MCRA or Cosumnes/Rancho-Seco Recovery Area. • If not within the Core Recovery Areas, is within 1 mile of one of the two Core Recovery Areas. • Includes modeled habitat for Vernal Pool Covered Species. • Ecosystem functions of the uplands, micro-watersheds, and perched aquifer surrounding the vernal pools are undisturbed. • Adjacent to currently preserved lands. • On parcels 20 acres or greater and/or occurs in larger, open space areas. • Can be managed to maintain natural Vernal Pool ecosystem processes. • Depending on what is already preserved in the Plan Area, prioritize either naturally occurring high-density vernal pool complexes or more isolated pools to ensure heterogeneity of spatial patterns and connectivity. • Depending on what is already preserved in the Plan Area, prioritize preservation of pools with each of the different landforms, geologic formations, floristic assemblages, and vernal pool sizes/depths. Has available water for grazing animals on preserves
Objective VP2. Re-establish and/or establish a minimum of 389 acres of functional Vernal Pool, including at least 50 acres within or adjacent to (within 1 mile of) the MCRA.	**Conservation Action VP2.1**. Implement Vernal Pool re-establishment and establishment consistent with the requirements of AMMs RE-ESTABLISHMENT/ESTABLISHMENT-1 and -2. Adhere to specific protocols, described in detail in the ARP, and outlined in Title 33 of the Code of Federal Regulation, Part 325, Sections 332.4(c)(2) through (c)(14), of the USACE's Mitigation Rule.
Objective VP3. Preserve a minimum of 278 acres of Swale. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action VP3.1.** Prioritize selection of preserve sites for Swale or Stream/Creeks (VPIH) based on the following criteria: • Located in Vernal Pool ecosystem. • Links existing preserved Vernal Pool areas. • Includes Covered Species modeled habitat. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas.
Objective VP4. Preserve a minimum of 26 acres of Swale or Stream/Creek (VPIH) land cover type for impacts to the Stream/Creek (VPIH) land cover type. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action VP4.1.** Prioritize selection of preserve sites for Swale or Stream/Creek (VPIH) based on the following criteria: • Located in Vernal Pool ecosystem. • Has Swale preservation preferred over preservation of Stream/Creek (VPIH). • Links existing preserved Vernal Pool areas. • Includes Covered Species modeled habitat.

AGENDA ITEM 11.1

4094

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
	• Located on parcels 20 acres or greater and/or occurs in larger, open space areas.
Objective VP5. Re-establish and/or establish a minimum of 256 acres of Swale or Vernal Pool for impacts to the Swale and Stream/Creek (VPIH) land covers. Re-establishment and/or establishment will occur in accordance with the conservation actions in this table.	**Conservation Action VP5.1.** Prioritize selection of re-establishment/establishment sites for Swale based on the following criteria: • Located in Vernal Pool ecosystem. • Links existing preserved Vernal Pool areas. • Includes Covered Species modeled habitat. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas.
Objective VP6. Re-establish and/or establish a minimum of 300 acres of functional Vernal Pool ecosystem within or adjacent to (within 1 mile of) the MCRA.	Refer to Conservation Action VP2.1.
Objective SW1. Preserve a minimum of 105 acres of Seasonal Wetland. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action SW1.1.** Prioritize selection of preserve sites for Seasonal Wetland based on the following criteria: • Includes Covered Species modeled habitat. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas, to the maximum extent feasible.
Objective SW2. Re-establish and/or establish a minimum of 105 acres of Seasonal Wetland. Re-establishment and/or establishment will occur in accordance with the conservation actions in this table.	**Conservation Action SW2.1.** Prioritize selection of re-establishment and/or establishment sites for Seasonal Wetland based on the following criteria: • Links existing preserved areas of Seasonal Wetland or other aquatic land cover types that provide modeled species habitat. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas, to the maximum extent feasible. • Supports soils and topography modeled for re-establishing and/or establishing Seasonal Wetland.
Objective FWM1. Preserve a minimum of 127 acres of Freshwater Marsh. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action FWM1.1.** Prioritize selection of preserve sites for Freshwater Marsh based on the following criteria: • Includes Covered Species modeled habitat. • Currently exhibits hydrology sufficient to support perennial Freshwater Marsh habitat. • Currently supports emergent vegetation such as tules and cattails.
Objective FWM2. Re-establish and/or establish a minimum of 127 acres of functional Freshwater Marsh. Re-establishment and/or establishment will occur in accordance with the conservation	**Conservation Action FWM2.1**. Prioritize selection of re-establishment and/or establishment sites for Freshwater Marsh based on the following criteria: • Has historically supported Freshwater Marsh habitat. • Has soils and topography consistent with the Freshwater Marsh land cover type modeled for re-establishment and/or establishment of Freshwater Marsh.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
actions in this table.	• Links existing preserve areas of Freshwater Marsh other aquatic land cover types that provide modeled species habitat. • After re-establishment and/or establishment, would provide Covered Species modeled habitat. • Has hydrology sufficient to support perennial Freshwater Marsh habitat or a water source to re-establish historical hydrology of the site.
Objective SC1. Preserve a minimum of 117 acres of the Stream/Creek land cover. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action SC1.1.** Prioritize selection of preserve sites for Stream/Creek based on the following criteria: • Has potential to support Covered Species (particularly giant garter snake and western pond turtle). • Proximity to the mouth of the Stream/Creek. • Adjacent to an existing preserve. • Water present during early spring through mid-fall (April through October). • Management can be used to enhance natural stream and creek ecosystem processes.
Objective SC2. Re-establish and/or establish a minimum of 117 acres of the Stream/Creek land cover. Re-establishment and/or establishment will occur in accordance with the conservation actions in this table.	**Conservation Action SC2.1.** Prioritize selection of re-establishment and/or establishment sites for Stream/Creek based on the following criteria: • Has potential to support Covered Species (particularly giant garter snake and western pond turtle). • Links existing preserve areas of aquatic land cover types that provide modeled species habitat. • Proximity to the mouth of the Stream/Creek. • Adjacent to an existing preserve. • Water present during early spring through mid-fall (April through October). • Management can be used to enhance natural stream and creek ecosystem processes.
Objective OW1. Preserve a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat for Covered Species affected by the loss of Open Water, as determined by the Technical Advisory Committee (TAC)). The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action OW1.1.** Prioritize selection of preserve sites for Open Water based on the following criteria: • Includes Covered Species modeled habitat. Links existing preserved land cover types that provide modeled species habitat. • Management can be used to enhance or restore natural ecosystem processes.
Objective OW2. Re-establish and/or establish a minimum of 155 acres of Open Water (or a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC). Re-establishment and/or establishment	**Conservation Action OW2.1.** Prioritize selection of re-establishment and/or establishment sites for Open Water based on the following criteria: • Links existing preserve areas of aquatic land cover that provide Covered Species modeled habitat. • Management can be used to enhance or restore natural ecosystem processes.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
will occur in accordance with the conservation actions in this table.	
Objective RIP1. Preserve a minimum of 964 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailings Riparian Woodland land cover type. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action RIP1.1.** Prioritize selection of preserve sites for Mixed Riparian Woodland or Mixed Riparian Scrub based on the following criteria: • Includes Covered Species modeled habitat. • Located within 3 miles of foraging habitat for Covered Species that use riparian habitat for nesting and/or roosting. • Has closed canopy consisting of multiple vegetation layers and includes mature trees. • Is large, relatively unfragmented, and connected to Valley Grassland and agriculture areas. • Management can be used to enhance or restore natural ecosystem processes.
Objective RIP2. Re-establish and/or establish a minimum of 591 acres of Mixed Riparian Woodland and/or Mixed Riparian Scrub for impacts to Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailings Riparian Woodland land cover type. Re-establishment and/or establishment will occur in accordance with the conservation actions in this table.	**Conservation Action RIP2.1.** Prioritize selection of re-establishment and/or establishment sites for Mixed Riparian Woodland or Mixed Riparian Scrub based on the following criteria: • Potential re-establishment/establishment sites will fill gaps between existing Mixed Riparian Woodland or Mixed Riparian Scrub land cover sites, or establish a link between existing Riparian Woodland or Mixed Riparian Scrub land cover sites. • Includes Covered Species modeled habitat. • Located within 3 miles of foraging habitat for Covered Species that use riparian habitat for nesting and/or roosting. • Closed canopy consisting of multiple vegetation layers, including mature trees. • Large, unfragmented, and connected to Valley Grassland and agriculture areas. • Management can be used to enhance or restore natural ecosystem processes. • Re-establishment sites will be located along existing riparian corridors where habitat likely existed in the past, such as areas along the Cosumnes River, Deer Creek, South Laguna Creek, Willow Slough, North Badger Creek, South Badger Creek, Deadman's Gulch, or Skunk Creek. • Re-establishment will avoid locations preserved or restored for giant garter snake. • Establishment of riparian communities will avoid locations that historically did not support riparian vegetation. • Establishment of riparian communities will avoid any existing Vernal Pool landscapes. • Re-establishment will use the historical signature of riparian communities and aim to restore the historical conditions. • Re-establishment and establishment sites will be located within an SSHCP Preserve. • Re-establishment and establishment sites will support soils and topography modeled for re-establishment and/or establishment of riparian communities. • Re-established and established riparian communities will be designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Terrestrial	
Objective BOW1. Preserve a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action BOW1.1.** Prioritize selection of preserve sites for Blue Oak Woodland/Savanna that expand on or link to the Deer Creek Hills Preserve to the maximum extent feasible.
Objective BOW2. Re-establish and/or establish a minimum of 47 acres of Blue Oak Woodland and/or Blue Oak Savanna for direct impacts to Blue Oak Woodland and Blue Oak Savanna. Re-establishment and/or establishment will occur in accordance with the conservation actions in this table.	**Conservation Action BOW2.1**. Prioritize selection of re-establishment/establishment sites for Blue Oak Woodland/Savanna that will expand the existing Deer Creek Hills Preserve to the maximum extent feasible or will establish a habitat link between an SSHCP Preserve and the existing Deer Creek Hills Preserve. Any potential re-establishment/establishment sites will fill gaps between existing preserved mixed Blue Oak Woodland or Blue Oak Savanna land covers or would link existing preserved Blue Oak Woodland or Blue Oak Savanna land covers. Re-establishment is preferred over establishment.
Objective AG1. Preserve a minimum of 9,696 acres of Cropland and/or Irrigated Pasture-Grassland, including 1,000 acres outside the 100-year floodplain in accordance with Objective GS6. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	**Conservation Action AG1.1.** The Implementing Entity will select preserve sites with existing agriculture land covers considering certain criteria, including the following: • Contains margins that support suitable nesting trees and/or could support plantings of additional trees and shrubs for future use as nesting or perching habitat and/or habitat for prey. • Contains soils identified in the soil survey of Sacramento County as highly productive. • Has an existing irrigation system that is engineered to provide for crop production. • Supports high prey densities for avian Covered Species or is capable of supporting crops that support high prey densities. • Management can be used to enhance or restore natural ecosystem processes.
Biological Goal 4: Maintain or improve habitat value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved within the Planning Area.	
Objective HAB1. Develop PMPs for the benefit of Covered Species.	**Conservation Action HAB1.1.** Prepare a PMP for each preserve within 1 year of acquisition. The PMPs will identify preserve-specific preservation objectives for Covered Species and habitats and will be consistent with the Preserve System Management Program.
Objective HAB2. Assess whether SSHCP Preserves are being managed and maintained for the benefit of Covered Species.	**Conservation Action HAB2.1.** Individual PMPs will be reviewed periodically (e.g., every 3–5 years) after development in coordination with the Preserve System Management Program. If preserve sites are not meeting habitat success standards as determined by the TAC, modifications, such as remedial actions (e.g., adaptive management) or other additional preservation actions (e.g., adding acreage), will be implemented.

AGENDA ITEM 11.1

4098

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective HAB3. Record management history for preserve parcels as they are obtained. Consider management history when developing an initial PMP.	**Conservation Action HAB3.1.** The Implementing Entity will interview individuals, to the maximum extent feasible, that have been involved in management of acquired parcels. This could include landowners, property managers, ranch managers, and any others with management responsibility. For parcels that are part of a group (e.g., a ranch), separate reports for each parcel do not need to be prepared, but any variation in management treatment between the component parcels should be noted. To the maximum extent feasible, interviews will be audio or video recorded and summarized in a memorandum. Those memoranda will be reviewed, and any relevant information should be included as appendices in the initial and individual PMP. Preserve Managers will not change the management approach from existing management without a sound scientific basis for the change.
Objective HAB4. Develop and implement an early detection and eradication program for invasive species within the Planning Area. The program will include regular weed assessment and mapping within the UDA and a comprehensive weed detection and abatement plan for the Planning Area, including training of road crews to identify and report weeds.	**Conservation Action HAB4.1**. Include invasive plant and wildlife control strategies in all PMPs. These strategies may include site-specific grazing regimes, controlled burning protocols, and mowing/mechanical maintenance guidelines consistent with native plant re-establishment needs, invasive plant and wildlife removal, and consideration of endemic plant and wildlife species population needs.
Objective HAB5. Monitor preserves for edge effects (e.g., weeds, noise, hydrology, litter).	**Conservation Action HAB5.1.** Include in PMPs a requirement to regularly monitor noise and light intensity, frequency and quantity of trash, qualitative hydrology changes, and other issues along a transect from the boundary toward the interior. Preserve Managers will include this information in annual reports, noting any changes in these attributes over time. Quantitative monitoring for edge effects will occur on the same preserves hosting permanent plots for vernal pool plants and invertebrate species, and will be timed to allow for correlational analysis between edge effects and species presence or abundance over the long term.
Objective HAB6. Collect weather data throughout Sacramento County to assist in developing status and trends and tracking climate change and data.	**Conservation Action HAB6.1.** During assembly of the SSHCP Preserve System, install weather stations at selected preserves for fine-scale monitoring of climate trends and combine with data from existing weather stations to provide a comprehensive weather dataset. Preserves will be selected to receive weather stations based on gaps in geographic coverage of existing weather stations in Sacramento County.
Objective HAB7. Monitor vegetation biomass within grassland land covers.	**Conservation Action HAB7.1.** During assembly of Flexible Preserves (Valley Grassland, Blue Oak Savanna), measure vegetation biomass. Measurement will be by releve, residual dry matter, or similar technique. The technique selected will be used consistently across preserves on an annual basis at the end of the growing season (i.e., September or October).
Objective AG2. Of the 9,696 acres preserved under Objective AG1, maintain at least 2,000 of those acres of high-quality foraging crops (such as corn, alfalfa, or wheat) preferred by tricolored blackbird (*Agelaius tricolor*), greater sandhill crane, and the covered raptor species. The	**Conservation Action AG2.1**. Maintain a minimum of 2,000 acres as food plots that are planted with crops that are preferred by avian Covered Species as foraging habitat such as corn, alfalfa, or wheat. Food plots will be distributed throughout PPUs 4, 5, or 6 at a minimum of 10 different locations, none of which will be less than 20 acres.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
2,000 acres will be distributed in strategic locations throughout PPUs 4, 5, or 6 in plots of 20 acres or more. The preserves will be assembled in accordance with the conservation actions in this table and in accordance with Section 7.5.	
Objective AG3. Maintain or increase raptor prey availability and improve raptor foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species.	**Conservation Action AG3.1.** Plant 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other small prey (e.g., amphibians, reptiles) within and on the borders of Cropland Preserves within PPUs 4, 5, and/or 6 to increase prey availability for covered avian species. In total, 100 linear feet of hedgerow will be planted each year until 5,000 linear feet is established within the Planning Area. Planting of hedgerows can be delayed for up to 5 years after issuance of permits to allow time to acquire preserves where hedgerows can be planted. At least 1,000 feet must be planted within 10 years after issuance of permits. Acceptable hedgerow plants include native trees, shrubs, and grasses, as approved by the TAC. Hedgerows must grow to be at least 5 feet in width and must be located on upland areas not prone to inundation from normal irrigation practices. Hedgerows that fail to establish or succumb to disease or other causes will be replaced within 1 year of removal or failure. Providing refuge habitat for prey species adjacent to agricultural settings will allow areas that have been harvested or with temporarily reduced or eliminated populations of prey to re-establish more quickly.
Objective RIP5. Monitor the groundwater table as it relates to status and trends for riparian habitat.	**Conservation Action RIP5.1.** During assembly of the SSHCP Preserve System, identify parcels that have existing water wells. To the maximum extent feasible, obtain history of depth to the groundwater table from property owners or managers. During assembly of the SSHCP Preserve System, take a reading of depth to groundwater at each existing well. Repeat measurement annually at a consistent time of year to allow comparison between years, and monitor any groundwater depletion or recharge.
	Conservation Action RIP5.2. During assembly of the SSHCP Preserve System, ensure availability of water for grazing animals on preserves, Cropland Preserves, and habitat restoration.
Biological Goal 5: Maintain or expand the existing distribution of each Covered Species within the Planning Area.	
Plant Covered Species	
Objective VPP1. Protect one currently documented unpreserved occurrence of Ahart's dwarf rush in the Planning Area. Prior to take of any occurrence of Ahart's dwarf rush, protect six currently unpreserved[13] and "biologically equivalent	**Conservation Action VPP1.1.** Conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when Ahart's dwarf rush is observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of Ahart's dwarf rush, identify one unprotected occurrence of the species and protect the occurrence within a new preserve.

[13] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the SSHCP Planning Area.

AGENDA ITEM 11.1

4100

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
or superior" (as defined by the TAC) occurrences of Ahart's dwarf rush within the Planning Area. After six currently unpreserved occurrences are protected, prior to take of an occurrence of Ahart's dwarf rush, protect one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of Ahart's dwarf rush within the Planning Area.	
Objective VPP2. Prior to take of any occurrence of Boggs Lake hedge-hyssop, protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Boggs Lake hedge-hyssop within the Planning Area.	**Conservation Action VPP2.1**. Conduct surveys in modeled habitat (and suitable habitat identified by the approved biologist at the time of the survey) during the appropriate time of year when Boggs Lake hedge-hyssop is observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of Boggs Lake hedge-hyssop, identify one unprotected occurrence of the species and protect the occurrence within a new preserve.
Objective VPP3. Prior to take of any occurrence of dwarf downingia, protect one currently unpreserved[1] and "biologically equivalent or superior" (as defined by the TAC) occurrence of dwarf downingia within the Planning Area.	**Conservation Action VPP3.1.** Conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when dwarf downingia is observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of dwarf downingia, identify one unprotected occurrence of the species and protect the occurrence within a new preserve.
Objective VPP4. Protect and maintain in perpetuity a minimum of 14 occurrences of legenere within the SSHCP Preserve System. Legenere occurrences will be preserved in accordance with the conservation actions described in this table. Prior to take of any occurrence of legenere, one currently unpreserved and "biologically equivalent or superior" (as defined by the TAC) occurrence of legenere will be preserved and maintained within the Planning Area.	**Conservation Action VPP4.1.** Preserve and maintain in perpetuity at least 14 occurrences of legenere within the SSHCP Preserve System. Conduct surveys in modeled habitat (and suitable habitat identified by the approved biologist at the time of the survey) during the appropriate time of year when legenere is observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of legenere, identify one unprotected occurrence of the species and protect within the occurrence a new preserve.

AGENDA ITEM 11.1

4101

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective VPP5. Prior to take of any occurrence of pincushion navarretia, protect one currently unpreserved[14] and "biologically equivalent or superior" (as defined by the TAC) occurrence of pincushion navarretia within the Planning Area.	**Conservation Action VPP5.1.** Conduct surveys in modeled habitat (and suitable habitat identified by the approved biologist at the time of the survey) during the appropriate time of year when pincushion navarretia is observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of pincushion navarretia, identify one unprotected occurrence of the species and protect the occurrence within a new preserve.
Objective VPP6. Protect and maintain in perpetuity all known currently unprotected occurrences of Sacramento Orcutt grass in the Planning Area to preserve existing distribution and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.	**Conservation Action VPP6.1.** Preserve and maintain in perpetuity all known occurrences of Sacramento Orcutt grass in the Planning Area. Prior to proposed disturbance of a site associated with a Covered Activity, conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when Sacramento Orcutt grass is observable. Over the permit term, all plant surveys will comply with CDFW's most recent survey protocols for sensitive plants. If a species is found, the project proponent will protect the occurrence within a minimum satellite-sized preserve that encloses the entire Vernal Pool watershed. Surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If, after the first year, or any 5-year interval thereafter, Sacramento Orcutt grass is not persisting, the preservation effort will be deemed to have failed. Remediation (e.g., re-establishment at another location) must occur within 1 year after efforts are deemed unsuccessful.
Objective VPP7. Protect and maintain in perpetuity all known currently unprotected occurrences of slender Orcutt grass in the Planning Area to preserve existing distribution and any currently unknown sites discovered in locations subject to an SSHCP Covered Activity.	**Conservation Action VPP7.1.** Preserve and maintain in perpetuity all known occurrences of slender Orcutt grass in the Planning Area. Prior to the proposed disturbance of a site associated with a Covered Activity, conduct surveys in modeled habitat (and suitable habitat identified by the approved project biologist at the time of the survey) during the appropriate time of year when slender Orcutt grass is observable. Over the permit term, all plant surveys will comply with CDFW's most recent survey protocols for sensitive plants. If the species is found, the project proponent will protect the occurrence within a minimum satellite-sized preserve that encloses the entire Vernal Pool micro-watershed. Surveys will be conducted after the first year of preservation and every 5 years thereafter to monitor persistence. If, after the first year, or any 5-year interval thereafter, slender Orcutt grass is not persisting, the preservation effort will be deemed to have failed. Remediation (e.g., re-establishment at another location) must occur within 1 year after efforts are deemed unsuccessful.
Objective SA1. Prior to take of an occurrence of Sanford's arrowhead, protect one currently unpreserved[15] and "biologically equivalent or superior" (as defined by the TAC) occurrence of Sanford's arrowhead within the Planning Area.	**Conservation Action SA1.1.** Conduct surveys in modeled habitat (and suitable habitat identified by the approved biologist at the time of the survey) during the appropriate time of year when Sanford's arrowhead are observable. If detected in an area proposed to be disturbed by a Covered Activity, prior to take of Sanford's arrowhead, identify one unprotected occurrence of the species and protect within a new preserve.

[14] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Planning Area.

[15] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Planning Area.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective SA2. During re-establishment and/or establishment of Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek, translocate impacted Sanford's arrowhead from other sites.	**Conservation Action SA1.2.** The Implementing Entity will select translocation sites for Sanford's arrowhead in emergent marsh vegetation, including the margins of rivers, streams, ponds, reservoirs, irrigation and drainage canals, ditches, stock-ponds, and Freshwater Marsh, considering certain criteria, including the following: • Known to support Sanford's arrowhead. • Proposed for re-establishment/establishment. • Can be re-established to support Sanford's arrowhead populations and natural ecosystem processes.
Aquatic Animal Covered Species	
Objective VPI1. Protect and maintain in perpetuity 1,270 acres of vernal pool tadpole shrimp modeled aquatic habitat within the Planning Area to preserve existing distribution.	**Conservation Action VPI1.1.** The Implementing Entity will select preserve sites containing modeled habitat for vernal pool invertebrates considering certain criteria, including the following: • Includes vernal pool complexes with known occurrences of covered vernal pool invertebrates. • Represents diversity of vernal pool depth, size, density, geologic formations, and soil types within the Planning Area. • Includes vernal pool habitats embedded in Valley Grassland within Vernal Wetland Acre/Density Index Category 1–3 land analysis units that provide high-quality Vernal Pool habitat. • Located adjacency of other suitable habitat. • Has modeled habitat within the USFWS Core Recovery Areas and Critical Habitat for vernal pool invertebrate species.
	Conservation Action VPI1.2. Preserve a minimum of 90% of the watershed of each preserved Vernal Pool and maintain a minimum 50-foot setback outside the preserve boundary.
Objective VPI2. Protect and maintain in perpetuity 1,270 acres of vernal pool fairy shrimp modeled aquatic habitat within the Planning Area to preserve existing distribution.	See Conservation Actions VPI1.1 and VPI1.2.
Objective VPI3. Protect and maintain in perpetuity 1,059 acres of mid-valley fairy shrimp modeled aquatic habitat within the Planning Area to preserve existing distribution.	See Conservation Actions VPI1.1 and VPI1.2.
Objective VPI4. Protect and maintain in perpetuity 1,245 acres of Ricksecker's water scavenger beetle modeled aquatic habitat within the Planning Area to preserve existing distribution.	See Conservation Actions VPI1.1 and VPI1.2.

AGENDA ITEM 11.1

4103

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective VPI5. Ensure that, during implementation of Objective VP2, re-established or established vernal pools are inoculated with soils from impacted vernal pools within 1 mile of re-establishment/ establishment in accordance with the conservation actions in this table.	**Conservation Action VPI5.1:** Implement Vernal Pool re-establishment and establishment consistent with the requirements of AMMs RE-ESTABLISHMENT/ESTABLISHMENT-1 and -2.
Objective CTS1. Preserve at least five occupied California tiger salamander breeding ponds.	**Conservation Action CTS1.1**. The Implementing Entity will select breeding ponds for preservation considering certain criteria, including the following: • Located within USFWS Critical Habitat. • Has surveys that indicate active use of breeding pond within each of prior 3 years. • Has breeding ponds that can sustain inundation for a minimum of 70 days during an average rainfall year. • Has surrounding uplands that no more than 0.5 mile away containing Blue Oak Savanna, Blue Oak Woodland, and Valley Grassland with adequate burrows and refugia sites. • Has no predatory fish and American bullfrog (*Rana catesbeiana)* on site.
Objective CTS2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for California tiger salamander is preserved. Minimum preservation will total 141 acres of aquatic habitat and 1,677 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within California tiger salamander Critical Habitat occurs within California tiger salamander Critical Habitat (see Objectives BOW1, VP1, SW1, and VG1).	**Conservation Action CTS2.1.** Preserve California tiger salamander aquatic habitat (Vernal Pool and Seasonal Wetland). The Implementing Entity will select preserve sites considering certain criteria, including the following: • Located in modeled habitat within USFWS Critical Habitat. • Contains modeled wetlands and surrounding uplands no more than 0.5 mile from aquatic habitat. • Has wetlands that must be able to sustain inundation for a minimum of 70 days during an average rainfall year. • Has permanent impoundments that are appropriate as long as predatory fish and bullfrogs are absent.
	Conservation Action CTS2.2. Preserve California tiger salamander upland habitat (Blue Oak Woodland, Blue Oak Savanna, and Valley Grassland). The Implementing Entity will select preserve sites considering certain criteria, including the following: • Located in modeled habitat within USFWS Critical Habitat. • Contains Blue Oak Savanna, Blue Oak Woodland, and Valley Grassland no more than 0.5 mile from known breeding pond. • Contains burrows that are dry during the summer and fall months in open grassland or under isolated oaks. • Supports fossorial mammals to create upland burrows. • Located within 1.5 miles of Vernal Pool and Seasonal Wetland that are considered aquatic habitat.
	Conservation Action CTS2.3. Preserve California tiger salamander aquatic or upland habitat at a ratio of 1 acre for every 1 acre that is lost (1:1) within PPU 7. Conduct surveys after the first year and every 5 years thereafter to monitor the occupancy of the habitat.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective CTS3. Rural transportation project Covered Activities within California tiger salamander modeled habitat will be designed to allow California tiger salamander movement across the roadway area.	**Conservation Action CTS3.1**. The Implementing Entity will retain an approved biologist to prepare targeted species mobility studies to determine if California tiger salamander mobility between breeding ponds or between breeding ponds and upland refugia will be affected by rural transportation Covered Activities within California tiger salamander modeled habitat. Data relevant to determining California tiger salamander movement must be collected for at least 3 years, and the study will be updated through new data collection and consultation with USFWS and CDFW every 10 years. The mobility study methodology will be prepared in consultation with USFWS and CDFW and will need approval from USFWS and CDFW prior to implementation. The data will be used by the project proponent to select the most appropriate design requirements to maintain and facilitate California tiger salamander movement. Modeled habitat near each of the following roadways will be the subject of targeted species mobility studies for California tiger salamander: • Twin Cities Road east of State Route 99 • Ione Road within PPU 7 • Clay Station Road from Dillard Road south to Sacramento County line with San Joaquin County (Planning Area boundary) After construction is complete, California tiger salamander movement across and along the road will be monitored to assess how their movement changed in response to the project and if additional design considerations will be used as future projects are implemented along the roadway.
Objective WS1. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for western spadefoot is preserved. Minimum preservation will total 1,531 acres of aquatic habitat and 22,044 acres of upland habitat. Ensure that mitigation for modeled high-value habitat impacted within the MCRA or Cosumnes/Rancho Seco Core Recovery Area occurs within the Core Recovery Areas (see Objectives BOW1, VP1, VP3, SW1, SC1, OW1, and VG1).	**Conservation Action WS1.1.** The Implementing Entity will select preserve sites for aquatic and adjacent upland habitat considering certain criteria, including the following: • Habitat is located in the MCRA or Cosumnes/Rancho-Seco Core Recovery Areas. • Aquatic habitat will include temporary pools and drainages. • Aquatic habitat will include quiet streams that form following winter or spring rains. • Upland habitat should surround aquatic breeding sites. • Upland habitat will include friable soils suitable for burrow creation. • Upland habitat will include soils maintaining some degree of moisture. • Aquatic and upland habitat is located away from areas that are subject to vibrations that simulate rainfall, such as roadways with heavy traffic.
Objective WS2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic habitat for western spadefoot is re-established and/or	**Conservation Action WS2.1.** The Implementing Entity will select re-establishment and establishment sites considering certain criteria, including the following: • Habitat is located in the MCRA or Cosumnes/Rancho-Seco Core Recovery Areas. • Aquatic habitat will include temporary pools and drainages.

AGENDA ITEM 11.1

4105

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
established. Minimum re-establishment and/or establishment will total 906 acres of aquatic habitat. Ensure that mitigation for modeled high-value habitat impacted within the MCRA or Cosumnes/Rancho Seco Core Recovery Area occurs within the Core Recovery Areas (see Objectives VP2, SW2, and OW2).	• Habitat will include quiet streams that form following winter or spring rains. • Habitat will include upland habitat available no more than 500 feet away from preserved aquatic habitat. • Habitat will include friable soils suitable for burrow creation. • Habitat will include soils that maintain some degree of moisture. • Site links existing natural land covers that provide Covered Species modeled habitat. • Habitat is located away from areas that are subject to vibrations that simulate rainfall, such as roadways with heavy traffic. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment/establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective GGS1. During assembly of the SSHCP Preserve System, ensure that modeled habitats for giant garter snake are preserved along the following creeks (or other creeks that are determined by the TAC to provide similar giant garter snake habitat value): • Lower Laguna Creek, mainly between Twin Cities Road (State Route 104) and Miess Road • Skunk Creek, which flows into the Cosumnes River northwest of the City of Galt • Willow Creek and tributaries of Badger Creek, which are to the north of the lower Laguna Creek and west of the Folsom South Canal • Badger Marsh Mitigation for impacts to modeled habitats for giant garter snake that occur along Badger Creek and Stone Lakes will occur along these drainages.	**Conservation Action GGS1.1.** The Implementing Entity will select preserve sites for aquatic modeled habitat considering certain criteria, including the following: • Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland located entirely inside or within 0.25 mile of the following reaches: o A prominent drainageway on the Elliot mitigation site, which links to Stone Lakes NWR and is wet year-round. o Drainage canals south of Elk Grove, which have a past occurrence and link to Stone Lakes NWR; the perennial segments of these canals are suitable habitat. o Badger Creek and all other creeks that drain into the marsh at the Cosumnes River Preserve, which are likely high-quality habitat due to proximity and connectivity to a significant population of giant garter snakes; the perennial segments of these creeks are suitable habitat. o The perennial segments of Laguna Creek (south) and tributaries are suitable habitat due to presence of Freshwater Marsh habitat and proximity to known documented occurrences. o The perennial segments of drainages and canals leading from the Cosumnes River Preserve, including Deadman's Gulch, which provides suitable habitat. • Contains adequate water during the snake's active season (early spring through mid-fall) to provide food and cover. • Emergent, herbaceous wetland vegetation for escape cover and foraging habitat during the active season. • Grassy banks and openings in waterside vegetation for basking.
	Conservation Action GGS1.2. The Implementing Entity will select preserve sites with stream reaches that contain upland modeled habitat within 200 feet of the stream, including Mixed Riparian Scrub and Valley Grassland, considering the following criteria: • Contains a stream reach at least 600 feet in length. • Located near foraging and breeding habitat.

AGENDA ITEM 11.1
4106

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Minimum preservation will total 170 acres of giant garter snake high-value aquatic habitat and 2,323 acres of giant garter snake high-value upland habitat (see Objectives AG1, FWM1, SW1, SC1, OW1, RIP1, and VG1).	• Supports higher elevation uplands for cover. • Provides refuge from flood waters during the species' dormant season in the winter. • Contains upland habitat that can link isolated and disjunct giant garter snake aquatic habitat. • Contains a minimum 300-foot setback on at least one side of stream reaches.
Objective GGS2. During assembly of the SSHCP Preserve System, ensure that modeled habitats for giant garter snake are re-established and/or established along the following creeks (or other creeks that are determined by the TAC to provide similar habitat value): • Lower Laguna Creek, mainly between Twin Cities Road (State Route 104) and Miess Road • Skunk Creek, which flows into the Cosumnes River northwest of the City of Galt • Several creeks north of Lower Laguna Creek and west of the Folsom South Canal— Willow Creek and tributaries of Badger Creek • Badger Marsh Mitigation for impacts to modeled habitats for giant garter snake that occur along Badger Creek and Stone Lakes will occur along these drainages. Minimum re-establishment and/or establishment will total 170 acres of high-value aquatic habitat and 134 acres of high-value upland habitat (see Objectives SW2, OW2, and RIP2).	**Conservation Action GGS2.1**. The Implementing Entity will select re-establishment and establishment sites for aquatic habitat that include Freshwater Marsh, Open Water, Stream/Creek, and Seasonal Wetland considering the following criteria: • Contains a supply of perennial water that can maintain emergent vegetation. • Located near (within 250 meters) the mouth of streams/creeks that is near potential upland habitat and adjacent to existing modeled upland habitat. • Can link isolated and disjunct giant garter snake habitat. • Includes re-established sites located along those portions of a stream corridor that have been identified as preserves for giant garter snake that provide upland habitat modeled for aestivation and/or basking at intervals no greater than 600 feet. Giant garter snake habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled habitat defined by the following criteria: • Located in intervals along the stream channel that are no closer to one another than 300 feet. • Are at least 0.2 acre at any given location along the stream channel but not to exceed 1 acre. • Provides perennial aquatic habitat. • Provides emergent vegetation (i.e., tules and/or cattails). • Provides grassy banks and openings in the waterside vegetation (e.g., bulrush, cattails, waterweed, or other floating vegetation). • Supports soils and topography modeled for re-establishing target habitat. • Designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat. • Provides a minimum 300-foot setback on at least one side of re-established stream reaches. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment or establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment/establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
	Conservation Action GGS2.2. The Implementing Entity will select re-establishment or establishment sites for aquatic habitat that include Mixed Riparian Scrub and Valley Grassland considering the following criteria: • Directly connects to (and within 0.25 mile of) aquatic habitat. • Includes higher elevation uplands to provide refuge from flood waters during the species' dormant season in the winter.

AGENDA ITEM 11.1

4107

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
	• Can link isolated and disjunct giant garter snake habitat. • Located along those portions of a stream corridor that have been identified as preserves for giant garter snake that provide upland habitat modeled for aestivation and/or nesting. Giant garter snake habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled habitat defined by the following criteria: • Supports soils and topography modeled for restoring target habitat. • Designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the re-established or established habitat is not meeting re-establishment or establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment or establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective GGS3. Plan Permittees will conduct a study to establish hydrologic baseline conditions along Badger Creek to identify what level of hydrology is necessary to support giant garter snake and to acquire a water source to maintain the minimum level of hydrology during the summer months when agricultural runoff may wane.	**Conservation Action GGS3.1.** Measure hydrologic parameters (e.g., flow rate, temperature) within Badger Creek in locations known to be occupied by giant garter snake. Three monthly hydrologic measurements will be made during the dry season of an average or better rainfall year. Each recording will occur over a full week to identify any regular interruptions in flow or changes in conditions due to diversions or inflows.
	Conservation Action GGS3.2. Acquire water rights adequate to maintain baseline dry season flows within Badger Creek, as determined during measurements obtained pursuant to Conservation Action GGS3.1.
Objective WPT1. During assembly of the SSHCP Preserve System, ensure that modeled aquatic and upland habitat for western pond turtle is preserved. Minimum preservation will total 315.35 acres of aquatic habitat and 10,971 acres of upland habitat (see Objectives FWM1, OW1, RIP1, VG1, BOW1, and SC1).	**Conservation Action WPT1.1.** The Implementing Entity will select preserve sites for aquatic habitat, including Freshwater Marsh, Open Water, and Stream/Creek considering the following criteria: • Contains slow-moving or quiet water with emergent aquatic vegetation and deep pools with undercut banks for refugia. • Contains basking sites such as rocks, logs, matted floating vegetation, terrestrial islands within the aquatic habitat, and human-made debris. • Will allow a minimum 300-foot setback on at least one side of the stream reaches that are preserved for western pond turtle. • Located where a stream reach is at least 600 feet in length.
	Conservation Action WPT1.2. The Implementing Entity will select preserve sites for upland habitat, including Blue Oak Savanna, Blue Oak Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland considering the following criteria: • Allows for a 400-foot setback along both sides of the stream reaches identified for western pond turtle outside of the UDA. • Allows for a 300-foot corridor along each side of North Laguna Creek to the maximum extent feasible, as measured from the ordinary high water mark of the creek, with a minimum stream corridor width of 600 feet plus the width of the creek,

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
	with additional setbacks as defined by local government ordinances. In segments of Laguna Creek where a 300-foot corridor on one side of the creek is not possible due to existing development and constraints, 300 feet may be used as an average for a defined length of the creek. However, the corridor on either side of Laguna Creek will be a minimum of the mapped Federal Emergency Management Agency 100-year floodplain of 2014.
Objective WPT2. During assembly of the SSHCP Preserve System, ensure that modeled aquatic habitat for western pond turtle is re-established and/or established. Minimum re-establishment and/or establishment will total 315 acres of aquatic habitat (see Objectives RIP2, FWM2, and OW2).	**Conservation Action WPT2.1**. The Implementing Entity will select re-establishment and/or establishment sites for foraging and breeding habitat that includes Freshwater Marsh, Open Water, and Stream/Creek considering the following criteria: • Contains slow-moving or quiet water with emergent aquatic vegetation and deep pools with undercut banks for refugia. • Contains or has high potential to create basking sites such as rocks, logs, matted floating vegetation, terrestrial islands within the aquatic habitat, and human-made debris. Western pond turtle aquatic habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled habitat, defined by the following criteria: • Located in intervals along the stream channel that are no closer to one another than 300 feet. • Includes re-establishment or establishment sites within modeled habitat area at least 600 feet in length. • Contains at least 0.2 acre at any given location along the stream channel but will not exceed 1 acre. • Provides perennial aquatic habitat. • Provides emergent vegetation (i.e., tules and/or cattails). • Provides grassy banks and openings in the waterside vegetation (e.g., bulrush, cattails, waterweed, or other floating vegetation). • Supports soils and topography modeled for restoring target habitat. • Designed and constructed to avoid or minimize direct or indirect impacts on existing functioning habitat. • Provides a minimum 300-foot setback on at least one side of restored stream reaches. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment/establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Terrestrial Invertebrate Covered Species	
Objective VELB1. Relocate or replace each impacted elderberry shrub (*Sambucus* spp.) according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (1999b). Mitigation will occur in locations that are not inundated for 2 continuous weeks, as determined by the TAC.	**Conservation Action VELB1.1**. Implement the following measures to avoid or minimize impacts to occupied valley elderberry longhorn beetle habitat: • Conduct protocol-level surveys for valley elderberry longhorn beetle if elderberry shrubs are located within 100 feet of construction activities. • Avoid direct impacts to occupied elderberry shrubs defined as shrubs within 20 feet of construction. • Avoid indirect impacts of occupied elderberry shrubs defined as shrubs between 20 and 100 feet of construction. • Compensate for direct loss of elderberry shrubs according to USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (1999b).

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
	• Conduct surveys after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards of 60% survivorship of occupied shrubs, the effort will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective VELB2. During implementation of riparian habitat re-establishment and/or establishment, strategically include elderberry shrub in the planting palette (see Objective RIP2).	**Conservation Action VELB2.1.** In riparian habitat re-establishment and establishment sites that include modeled habitat for valley elderberry longhorn beetle (i.e., Mixed Riparian Woodland and Mixed Riparian Scrub or Valley Grassland with elderberry shrubs along a riparian corridor), include elderberry shrubs in plantings to create habitat characteristics associated with valley elderberry longhorn beetle occupancy. These characteristics include density of elderberry shrubs, shrub size, number of stems, and range of branch sizes (Talley et al. 2007).
Bird Covered Species	
Objective CH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 974 acres of modeled foraging and nesting habitat for Cooper's hawk is preserved in accordance with the conservation actions described in this table (see Objectives RIP1 and BOW1).	**Conservation Action CH1.1.** The Implementing Entity will select preserve sites for nesting and foraging habitat considering certain criteria, including the following: • Includes Blue Oak Woodland characterized by dense canopy closure (typically stands consisting of at least six trees with sparse ground cover). • Includes stands with trees approximately 26 to 49 feet high and 8 to 20 inches in diameter at breast height. • Has proximity to foraging habitat with dense prey populations. • Located outside of the UDA.
Objective CH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 601 acres of modeled foraging and nesting habitat for Cooper's hawk is re-established and/or established (see Objective RIP2).	**Conservation Action CH2.1.** Refer to Conservation Action RIP2.1. The Implementing Entity will select re-establishment or establishment sites for modeled foraging and nesting habitat considering certain criteria, including the following: • Located near known nesting territories. • Connects disjunct segments of riparian habitats. • Has proximity to modeled foraging areas with abundant prey populations. Cooper's hawk Mixed Riparian Woodland and Mixed Riparian Scrub habitat establishment and re-establishment will occur only where a non-modeled land cover is converted to Mixed Riparian Woodland and Mixed Riparian Scrub. Re-establishment or establishment criteria for modeled Cooper's hawk habitat will also include the following: • Trees will be planted to encourage dense canopy closure of the mature stand. • Planting of 10 acorns for each tree to establish oak trees will occur. • Survivorship of at least six trees pursuant to stand will occur. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the established or re-established habitat is not meeting re-establishment or establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment or establishment efforts must occur within 1 year after efforts are deemed unsuccessful.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective CH3. During assembly of the SSHCP Preserve System, ensure that a minimum of 38 acres of modeled foraging habitat for Cooper's hawk is preserved in accordance with the conservation actions described in this table (see Objectives RIP1 and BOW1).	**Conservation Action CH3.1**. The Implementing Entity will select preserve sites for foraging habitat aquatic modeled habitat considering certain criteria, including the following: • Includes Blue Oak Savannah containing trees approximately 26 to 49 feet high and 8 to 20 inches in diameter at breast height. • Includes presence of dense prey populations. • Located outside of the UDA.
Objective FH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 25,881 acres of modeled foraging habitat for ferruginous hawk is preserved, including 19,625 acres in PPUs 5 and/or 7 (see Objectives AG1, VG1, VP1, VP3, and SW1).	**Conservation Action FH1.1**. The Implementing Entity will select preserve sites for foraging habitat considering certain criteria, including the following: • Known to already support populations of prey species, including rabbits, ground squirrels, and pocket gophers. • Includes moderate to dense vegetative cover (particularly grasses). • Includes topographic variation with shorter vegetation.
Objective FH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for ferruginous hawk is re-established and/or established (see Objectives VP2 and SW2).	**Conservation Action FH2.1.** The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Includes moderate to dense vegetative cover (particularly grasses). • Includes topographic variation with shorter vegetation.
Objective SH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 31,033 acres of modeled foraging habitat for Swainson's hawk is preserved (see Objectives AG1, AG2, SW1, VP1, VP3, and VG1). Ensure that mitigation for high-value modeled habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8.	**Conservation Action SH1.1.** The Implementing Entity will select preserve sites that include foraging habitat considering certain criteria, including the following: • Includes presence of irrigation systems that are engineered to provide for alfalfa production. • Includes agricultural lands that have existing trees or could support plantings of additional trees for future use as Swainson's hawk nest trees. • Located within 3 miles of active nest sites, where the record of the nest site is not older than 5 years, unless confirmed to be currently active by new surveys. • Has proximity to large, contiguous area of open space that provides foraging habitat. • Has proximity to stream riparian corridors containing large trees that potentially provide nesting habitat. Preserves can include sites supporting Vineyard and Orchard as long as vines and trees are removed within 2 years of acquisition.
Objective SH2. At least 2,000 acres of Cropland habitat within high-value habitat within PPUs 4, 6, and 8 will be preserved in fee title to ensure that intensive	**Conservation Action SH2.1.** Preserve 2,000 acres (1:1 ratio) of Cropland habitat within 2 miles of at least two active nesting sites in fee title to ensure that intensive management actions can be taken that may be infeasible on preserve easement lands. Land held in fee title will be restricted to growing fields or row crops. Fee title lands must maintain, at a minimum, an average of 50% of their crop cover type in alfalfa over a period of 5 years. Other crop types or land covers may be substituted for alfalfa if a

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
management actions can be taken. Land held in fee title will be restricted to growing field or row crops. Fee title lands must maintain, at a minimum, an average of 50% of their crop cover-type in alfalfa. Other crop types or land covers may be substituted for alfalfa if the TAC determines that such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa.	Swainson's hawk expert determines that such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa.
Objective SH3. During assembly of the SSHCP Preserve System, ensure a minimum of 746 acres of modeled nesting habitat for Swainson's hawk is preserved (see Objective RIP1).	**Conservation Action SH3.1.** The Implementing Entity will select preserve sites that contain modeled nesting habitat considering certain criteria, including the following: Presently supports nesting activity. Located within or near (preferably within 4.2 miles) productive foraging habitat such as Prime Farmland, Statewide Farmland (most productive), and current agriculture land cover types (i.e., alfalfa; other crop types or land covers may be substituted for alfalfa if the TAC determines that such other crop types or land cover types are of the same or better quality foraging habitat as alfalfa). Support large mature trees (e.g., taller than 50 feet) that are preferred nesting sites. Located in rural areas unlikely to be affected by high levels of human activities.
Objective SH4. During assembly of the SSHCP Preserve System, ensure that a minimum of 373 acres of modeled riparian nesting habitat for Swainson's hawk is re-established and/or established. Ensure that mitigation for modeled nesting habitat impacted within PPUs 4, 6, or 8 occurs within PPUs 4, 6, or 8 (see Objective RIP2).	**Conservation Action SH4.1**. Re-establish or establish riparian habitat along stream or river channels near known nesting territories. Establishment and re-establishment will target areas that connect disjunct segments of riparian habitat to the maximum extent feasible. Surveys will be conducted periodically for 10 years to monitor success, including habitat quality and use by nesting Swainson's hawk. During the first year, established or re-established habitat will be monitored monthly, with more frequent monitoring during summer months or periods of drought to ensure that new plantings are kept moist. During the second and third years, habitat will be monitored quarterly. For the remainder of the monitoring period, restoration habitat will be monitored every 6 months. If there are extended periods of drought within the monitoring period, or if established or re-established habitat becomes flooded for an extended period during the monitoring period, the habitat will be monitored more frequently to assess the impacts of and remediate for these extreme weather conditions. If, after 10 years, the established or re-established habitat is not meeting re-establishment or establishment criteria standards in terms of modeled habitat quality, the efforts will be deemed to have failed. Absence of nesting Swainson's hawks over the 10-year period will not be a criterion for failure as long as the riparian habitat has otherwise achieved the re-establishment or establishment standards. If, at any time during the monitoring period, restored habitat is declining beyond remediation, dying, or dead, efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective SH5. For each of the 36 known nesting trees within the UDA, plant 10 trees	**Conservation Action SH5.1**. Plant nesting trees on properties protected by the SSHCP and within proximity to protected foraging habitat. Tree species will be selected based on known suitability as nesting habitat for Swainson's hawk. To minimize temporal

AGENDA ITEM 11.1
4112

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
that are modeled for Swainson's hawk nesting within SSHCP Preserves. Plant nesting trees on properties protected by the SSHCP within PPUs 4, 6, and 8, and near protected foraging habitat. Tree species will be selected based on known suitability as nesting habitat for Swainson's hawk, and the planted trees must be maintained and/or replaced in perpetuity.	loss, a mix of tree species will be planted at each site to include fast- and slow-growing species. Trees that are acceptable for planting include Fremont's cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), blue oak (*Q. douglasii*), interior live oak (*Q. wislizenii*), western sycamore (*Platanus racemosa*), red willow (*Salix laevigata*), and Northern California black walnut (*Juglans hindsii*). Clusters of five trees must be established and maintained for every 40 acres of agricultural Cropland preserved and must include at least two different species, one of which must be a fast-maturing tree such as Fremont's cottonwood or red willow. Trees will be placed at the edges of agricultural fields. To help ensure survivorship, acorns will be used to establish oak trees, and at least 10 acorns will be planted for each required tree (i.e., if a cluster is to be composed of two cottonwoods and three valley oaks, then 30 valley oak acorns must be planted).
Objective SH6. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for Swainson's hawk is re-established and/or established (see Objective RIP2).	**Conservation Action SH6.1.** The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Includes presence of irrigation systems that are engineered to provide for alfalfa production. • Includes agricultural lands that could support plantings of additional trees for future use as Swainson's hawk nest trees. • Located within 3 miles of active nest sites where the record of the nest site is not older than 5 years, unless confirmed to be currently active by new surveys. • Has proximity to large, contiguous area of open space that provides foraging habitat. • Has proximity to stream riparian corridors containing large trees that potentially provide nesting habitat.
Objective WK1. During assembly of the SSHCP Preserve System, ensure that a minimum of 31,205 acres of modeled foraging habitat for white-tailed kite is preserved (see Objectives VG1, AG1, RIP1, SW1, VP1, VP3, and BOW1).	**Conservation Action WK1.1.** The Implementing Entity will select preserve sites for foraging habitat considering certain criteria, including the following: • Includes agricultural lands that support perennial crops (e.g., alfalfa) rather than annual crops. • Known to be used by white-tailed kite for foraging. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective WK2. During assembly of the SSHCP Preserve System, ensure that a minimum of 974 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is preserved (see Objectives RIP1 and BOW1).	**Conservation Action WK2.1.** The Implementing Entity will select preserve sites for nesting habitat, including Blue Oak Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub, considering certain criteria, including the following: • Includes large, unfragmented patches connected to grassland and agriculture areas known to support high prey densities. • Includes closed canopy consisting of multiple vegetation layers, including mature trees. • Known to support nesting white-tailed kite. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective WK3. During assembly of the SSHCP Preserve System, ensure a minimum of 767 acres of modeled foraging habitat for white-tailed kite is re-established and/or established (see Objectives VP2, RIP2, and SW2).	**Conservation Action WK3.1.** Implement Conservation Actions VP2.1, RIP2.1, and SW2.1. Foraging habitat re-establishment or establishment will involve establishing habitat, including vegetation structure modeled for voles (*Microtus californicus*) where the species historically occurred but no longer exists due to loss of or changes in ecological factors. White-tailed kite foraging habitat re-establishment or establishment will occur only where non-modeled habitat is converted to modeled habitat.
	Conservation Action WK3.2. Re-establish or establish nesting habitat in areas that have a range of riparian plant assemblages that include large trees such as cottonwood and valley oak, as well as an understory of Mixed Riparian Scrub. The Implementing Entity will select re-establishment/establishment sites for nesting habitat considering certain criteria, including the following: • Located along existing riparian corridors where nesting habitat likely existed in the past, such as along the Cosumnes River and Deer Creek. • Located within a new or existing preserve or habitat corridor. Created riparian woodland areas must be able to support a wide variety of species. • Located in areas within at least 0.5 mile of modeled foraging habitat. • Supports soil and topography modeled for restoring target habitat. • Located at least 500 feet from urban land uses, including structures and roads. • Includes avoidance of locations that historically did not support riparian woodland. • Includes avoidance of locations within the existing Vernal Pool landscape. Surveys will be conducted after 1 year and every 5 years thereafter to monitor prey abundance. If, after the first year or any 5-year interval thereafter, the re-established habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective WK4. During assembly of the SSHCP Preserve System, ensure that a minimum of 601 acres of modeled nesting or nesting/foraging habitat for white-tailed kite is re-established and/or established (see Objective RIP2).	See Conservation Action WK2.1.
Objective NH1. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,245 acres of modeled foraging habitat for northern harrier is preserved (see Objectives VG1, AG1, VP1, VP3, FWM1, and SW1).	**Conservation Action NH1.1**. The Implementing Entity will select preserve sites for foraging habitat considering certain criteria, including the following: • Includes open habitats with dense, tall (12 to 38 inches) vegetation. • Known to support high prey densities (small mammals). • On parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially support other Covered Species. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective NH2. During assembly of the SSHCP Preserve System, ensure that a minimum of 30,048 acres of modeled nesting/foraging habitat for northern harrier is preserved (see Objectives VG1 and AG1).	**Conservation Action NH2.1.** The Implementing Entity will select preserve sites for nesting/foraging habitat considering the following criteria: • Includes open habitats with dense, tall (12 to 38 inches) vegetation. • Includes wet or moist sites for nesting. • Known to support high prey densities (small mammals). • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially supports other Covered Species. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective NH3. During assembly of the SSHCP Preserve System, ensure that a minimum of 856 acres of modeled foraging habitat for northern harrier is re-established and/or established (see Objectives VP2, FWM2, and SW2).	**Conservation Action NH3.1.** The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Has historically contained intact foraging habitat. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Could potentially support other Covered Species. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective BO1. Preserve seven occupied western burrowing owl sites (commensurate with 20% of the estimated number of sites within the UDA as of 2014), preserve at least 200 acres of land surrounding each occupied burrow site, and maintain modeled habitat for western burrowing owl within 0.4 mile of breeding sites.	**Conservation Action BO1.1.** The Implementing Entity will select preserve sites that include nesting habitat land cover types considering certain criteria, including the following: • Known to support breeding burrowing owls. • Located within 3 miles of a known nesting site or modeled nesting habitat. • Known to support high rodent populations during the breeding season. • Expands upon or links already preserved lands and will not be bisected by new roadways or incur impacts from any other infrastructure developments. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Potentially support other Covered Species. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
	Conservation Action BO1.2. Preserve modeled nesting habitat within PPUs 4, 6, and/or 8.

AGENDA ITEM 11.1

4115

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective BO2. For each burrowing owl or burrowing owl pair passively excluded, protect 200 acres of modeled habitat for western burrowing owl and establish a ground squirrel (*Spermophilus (Otospermophilus) beecheyi*) colony and augment with artificial burrows as appropriate (determined by TAC). Artificial burrows will be established at appropriate locations throughout the Preserve System pursuant to CDFW (California Department of Fish and Game 2012 guidelines) or as otherwise determined by the TAC.	**Conservation Action BO2.1.** Select preserve sites in areas with known species occurrences and that contain modeled habitat. Manage these locations to maintain the following: o Open, well-drained terrain with low risk of flooding. o Short, sparse vegetation. o Underground burrows or burrow facsimiles. o Modeled foraging habitat within 0.4 mile of breeding sites. o Enhanced foraging habitat quality through the following: ▪ Promoting fossorial mammal populations in areas that are modeled foraging habitat. ▪ Providing sentinel posts or mounds near burrows.
Objective LS1. During assembly of the SSHCP Preserve System, ensure that a minimum of 9,152 acres of modeled foraging habitat for loggerhead shrike is preserved (see Objectives VG1, AG1, SW1, VP1, and VP3).	**Conservation Action LS1.1.** The Implementing Entity will select preserve sites for foraging habitat considering certain criteria, including the following: • Are open with sparse vegetation for foraging. • Available hunting perches with an open view. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Known to support loggerhead shrike and other Covered Species. • Linked or adjacent to currently preserved lands. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective LS2. During assembly of the SSHCP Preserve System, ensure that a minimum of 22,014 acres of modeled nesting/foraging habitat for loggerhead shrike is preserved (see Objectives VG1 and RIP1).	**Conservation Action LS2.1**. The Implementing Entity will select preserve sites for nesting/foraging habitat considering certain criteria, including the following: • Are open with sparse vegetation for foraging interspersed with scattered or isolated low trees or large shrubs for nest sites. • Available hunting perches with an open view. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Known to support loggerhead shrike and other Covered Species. • Linked or adjacent to currently preserved lands. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species.
Objective LS3. During assembly of the SSHCP Preserve System, ensure that a minimum of 592 acres of modeled nesting	**Conservation Action LS3.1.** The Implementing Entity will select re-establishment/establishment sites for nesting habitat considering certain criteria, including the following: • Possess or can be planted with scattered or isolated low trees or large shrubs for nest sites.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
habitat for loggerhead shrike is re-established and/or established (see Objective RIP2).	• Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Has potential to support loggerhead shrike and other Covered Species after re-establishment and/or establishment. • Linked or adjacent to currently preserved lands. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Loggerhead shrike habitat re-establishment will only occur where habitat historically occurred but no longer exists due to loss of or changes in ecological factors.
Objective LS4. During assembly of the SSHCP Preserve System, ensure that a minimum of 965 acres of modeled nesting habitat for loggerhead shrike is preserved (see Objective RIP2).	See Conservation Action LS2.1.
Objective LS5. During assembly of the SSHCP Preserve System, ensure that a minimum of 729 acres of modeled foraging habitat for loggerhead shrike is re-established and/or established (see Objective SW2).	**Conservation Action LS5.1.** The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Has potential to support loggerhead shrike and other Covered Species after re-establishment and/or establishment. • Linked or adjacent to currently preserved lands. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Loggerhead shrike habitat re-establishment will only occur where habitat historically occurred but no longer exists due to loss of or changes in ecological factors.
Objective GS1. During assembly of the SSHCP Preserve System, ensure that a minimum of 257 acres of modeled roosting or roosting/foraging habitat for greater sandhill crane is preserved. Roosting habitat will be preserved and maintained within PPUs 4, 6, and 8, with a minimum of 75% within PPU 6 (see Objectives VP1, SW1, and FWM1).	**Conservation Action GS1.1.** The Implementing Entity will select preserve sites for roosting habitat considering certain criteria, including the following: • Includes known roost sites. • Located within 2 miles of modeled foraging habitat outside the UDA. • Includes 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially supports other Covered Species or where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species. • Located at least 1,000 feet from disturbances such as roads or other operations that may disturb roosting. • Free of fences and power lines. • Has Seasonal Wetland present from September to mid-March. • Supports natural drainage inflows or water delivery mimics natural hydrologic cycles.

AGENDA ITEM 11.1

4117

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective GS2. During assembly of the SSHCP Preserve System, ensure that a minimum of 7,751 acres of modeled foraging habitat for greater sandhill crane is preserved (see Objectives AG1, AG2, and VG1).	**Conservation Action GS2.1**. The Implementing Entity will select preserve sites for foraging habitat considering certain criteria, including the following: • Includes modeled foraging habitat located within 2 miles of known roost sites or modeled roosting habitat outside the UDA. • Located on parcels 20 acres or greater and/or that occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Potentially supports other Covered Species or where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species. • Free of fences and power lines. • Contains available sources of "grit," including gravel and dirt roads or rocky uplands.
Objective GS3. During assembly of the SSHCP Preserve System, ensure that a minimum of 184 acres of modeled roosting habitat or roosting/foraging habitat for greater sandhill crane is established and/or re-established. Re-establish two new roost sites (minimum of 90 acres of Freshwater Marsh/Seasonal Wetland complex each) every 2 miles in the gap between the Cosumnes population and the Stone Lakes' population or other strategic locations if that gap is closed by another HCP or conservation project (see Objectives VP2, SW2, and FWM2).	**Conservation Action GS3.1.** Implement conservation actions for Objectives SW2 and FWM2. Select re-establishment or establishment sites outside the UDA based on the same criteria used for preservation sites in Conservation Actions GS1.1 and GS2.1. Habitat re-establishment and establishment will only occur where it replaces low-quality foraging or roosting habitat, including the following features: • Replacement of unmodeled agriculture uses such as orchards and vineyards with habitats supporting high prey abundance (e.g., vole), including Grassland, suitable Croplands, Irrigated Pasture-Grassland, and Wet Meadow. • Removal of physical structures that can cause collisions during takeoff and flying, including fences, distribution lines, and other built structures. • Removal of human disturbances from otherwise modeled foraging and roosting habitat. • Establishment of suitable hydrologic regimes at roosting sites. • Grit sources near foraging areas.
Objective GS4. Create a visual screen of woody vegetation near human disturbances such as buildings, bridges, and paved roads from permanent roosting habitat within PPU 6. Screens should be located as appropriate to not interfere with habitat usage by greater sandhill crane.	**Conservation Action GS4.1**. Plant visual screens of woody vegetation in known and potential roosting sites within PPU 6 where there are nearby human disturbances, including roads, bridges, and dwellings.
Objective GS5. As part of the 2,000 acres preserved under Objective AG2, establish and maintain 10 food plots in strategic	**Conservation Action GS5.1**. Maintain the 200 acres among the 10 food plots as Irrigated Pasture-Grassland or planted with crops preferred by greater sandhill crane as foraging habitat. Crops may include alfalfa, corn, wheat, or rice. The 10 food plots will be distributed throughout PPU 6 at a minimum of five locations, each at least 20 acres in size. Food plots must be within 1.5 miles

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
locations totaling a minimum of 200 acres within an agricultural setting for greater sandhill crane foraging habitat within PPU 6. Maintain the 200 acres among the 10 food plots as Irrigated Pasture-Grassland or planted with crops preferred by greater sandhill crane as foraging habitat. Crops may include alfalfa, corn, wheat, or rice. Strategic placement of food plots will include locations for food plots in upland areas above the floodplain.	of Irrigated Pasture-Grassland or other pasture and within 2 miles of known roosting sites. Crops must not be harvested or removed until March.
Objective GS6. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,000 acres of high-value modeled foraging habitat for greater sandhill crane outside the 100-year floodplain is preserved (see Objectives VP1, SW1, and FWM1).	**Conservation Action GS6.1.** The Implementing Entity will select preserve sites for high-value foraging habitat outside the 100-year floodplain considering certain criteria, including the following: • Include modeled high-value foraging habitat that is located outside the 100-year floodplain. • Located within 2 miles of known roost sites or modeled roosting habitat outside the UDA. • Located on parcels 20 acres or greater and/or that occurs in larger, open space areas. • Is recorded as supporting greater sandhill crane foraging during previous flood events. • Linked or adjacent to currently preserved lands. • Potentially supports other Covered Species or where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species. • Free of fences and power lines. • Contains available sources of "grit," including gravel and dirt roads or rocky uplands.
Objective TB1. During assembly of the SSHCP Preserve System, ensure that a minimum of 4,149 acres of modeled foraging habitat for tricolored blackbird is preserved (see Objectives AG1, AG2, FWM1, VG1, VP1, VP3, OW1, and SW1).	**Conservation Action TB1.1.** The Implementing Entity will select preserve sites for foraging habitat considering certain criteria, including the following: • Expands on or links already preserved lands and is not bisected by new roadways or incurs impacts from any other infrastructure developments. • Located within 1 mile of a known nesting site or modeled nesting habitat (Note: Intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat). • Contains vegetation with a potential for high insect populations during the breeding season (April through July). • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract tricolored blackbird.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective TB2. During assembly of the SSHCP Preserve System, ensure that a minimum of 27,532 acres of modeled nesting/foraging habitat for tricolored blackbird is preserved, including a minimum of 402 acres of Freshwater Marsh and Seasonal Wetland (see Objectives AG1, AG2, VG1, FWM1, and SW1).	**Conservation Action TB2.1.** The Implementing Entity will select preserve sites for aquatic nesting/foraging habitat, including Seasonal Wetland and Freshwater Marsh land cover types considering certain criteria, including the following: • Has nesting substrate (e.g., tules, cattails) in an extensive area (minimum 2 acres) to accommodate large tricolored blackbird colonies. • Known to currently or historically support a tricolored blackbird colony. • Located within 3 miles of a known foraging site or modeled foraging habitat (Note: Intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat). • Includes Open Water (e.g., canal, lakeshore, or farm pond) within 1,640 feet of nesting substrate to provide a water source for nestlings. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Management for tricolored blackbird will include maintaining young, lush growth of emergent wetland (cattails or tules).
	Conservation Action TB2.2. The Implementing Entity will select preserve sites for upland nesting/foraging habitat, including Cropland, Valley Seasonal Wetland, and Freshwater Marsh land cover types considering certain criteria, including the following: • Has upland nesting substrate (e.g., Himalayan blackberry (*Rubus armeniacus*) thickets) in an extensive area (minimum 2 acres) to accommodate large tricolored blackbird colonies. • Known to currently or historically support a tricolored blackbird colony. • Located within 3 miles of a known foraging site or modeled foraging habitat (note: intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat). • Includes pen water (e.g., canal, lakeshore, or farm pond) within 1,640 feet of nesting substrate to provide a water source for nestlings. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Management for tricolored blackbird will include maintaining young, lush growth of emergent wetland (cattails or tules).
Objective TB3. During assembly of the SSHCP Preserve System, ensure that a minimum of 917 acres of modeled foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2, SW2, OW2, and VP2).	**Conservation Action TB3.1.** Implement Conservation Actions FWM2.1, SW2.1, OW2.1, and VP2.1. The Implementing Entity will select re-establishment/establishment sites for aquatic modeled habitat considering certain criteria, including the following: • Occurs within 1,000 feet of a nesting colony that is occupied at the time of re-establishment/establishment or that was recorded as an occupied nesting colony at any time since 2008. Sources for occupied nesting colonies are the California Natural Diversity Database, Tricolored Blackbird Portal, eBird, or other data sources approved by the Wildlife Agencies. • Includes all or a mix of Irrigated Pasture-Grassland, Cropland, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, Open Water, and/or Valley Grassland, preferably situated within a mosaic of foraging habitat (as opposed to on

AGENDA ITEM 11.1

4120

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
	the edge of foraging habitat) and providing adequate insect prey. Tricolored blackbird habitat establishment/re-establishment will occur only where currently non-modeled habitat is converted to modeled habitat (e.g., conversion of a current non-wetland to a wetland). Modeled nesting substrate includes flooded, thorny, spiny, or "visually" but not actually spiny vegetation. Surveys will be conducted after the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the established or re-established habitat is not meeting re-establishment or establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment or establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective TB4. During assembly of the SSHCP Preserve System, ensure that a minimum of 232 acres of modeled nesting/foraging habitat for tricolored blackbird is re-established and/or established (see Objectives FWM2 and SW2).	**Conservation Action TB4.1.** The Implementing Entity will select re-establishment/establishment sites for nesting/foraging habitat, including Valley Grassland, Seasonal Wetland, and Freshwater Marsh land cover types considering certain criteria, including the following: • Known to historically support a tricolored blackbird colony. • Located within 1 mile of a known foraging site or SSHCP land cover type that provides modeled nesting and foraging habitat (Valley Grassland, Freshwater Marsh, Seasonal Wetland (Section 3.4.5)). Intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat. • Includes Open Water (e.g., canal, lakeshore, or stock pond) to provide water for nestlings within 1,640 feet of area where upland nesting substrate can be re-established and/or established. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract Covered Species. Management for tricolored blackbird will include maintaining young, lush growth of emergent wetland (cattails or tules) or for upland sites, blackberry bushes or other suitable spiny bushes.
Objective TB5. Provide mitigation for loss of any tricolored blackbird nesting colony site that is occupied at the time of Covered Activity implementation or was recorded as an occupied nesting colony at any time since 2008. Sources for occupied nesting colonies are the California Natural Diversity Database, Tricolored Blackbird Portal, eBird, or other data sources approved by the Wildlife Agencies. Minimum mitigation is to protect one extant unprotected occurrence of a nesting colony prior to take of one nesting	**Conservation Action TB5.1.** Protect at least one extant unprotected occurrence of a nesting colony prior to take of one nesting colony of tricolored blackbird. Each of the extant occurrences preserved will meet the following criteria: • Has supported a minimum of 200 individual tricolored blackbirds during one or both of the survey years preceding the project application. • Includes protected nesting substrate (including wetlands that are flooded March to July, and thorny, spiny, or "visually" but not actually spiny vegetation). • Includes open, accessible water within 1,640 feet of the nesting substrate. • Located within 1 mile of at least 500 acres of a known foraging site or SSHCP land cover type that provides modeled nesting and foraging habitat (Valley Grassland, some Cropland, Freshwater Marsh, Seasonal Wetland (Section 3.4.5)). This requirement targets lands with adequate insect forage. Intensive row crops, vineyards, and orchards generally do not provide modeled foraging habitat.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
colony of tricolored blackbird. Ensure that at least five extant tricolored blackbird colonies that were occupied in recent years are maintained and managed within the SSHCP Preserve System.	One or more of the three elements (nesting substrate, access to Open Water as a water source for nestlings, and modeled foraging habitat) may be provided through re-establishment or establishment through Conservation Action TB3.1. If re-establishment is included, surveys will be conducted the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective TB6. Conduct an experimental study to identify management actions to protect tricolored blackbird colonies (e.g., coarse netting to reduce nest predation or impact of pesticides).	**Conservation Action TB6.1.** Select one or more existing tricolored blackbird colonies as experimental populations. If a large colony is available, test several potential feasible management actions within that one colony. If results of experimental treatments indicate a measurable and biologically significant decrease in nest predation or increased fledgling success and that treatments are feasible, include these management actions within PMPs for preserves that include historic or current tricolored blackbird colonies.
Objective TB7. Ensure that at least one large tricolored blackbird colony (i.e., one that has historically (from 1950 onward) supported a minimum of 1,500 individuals) is protected.	**Conservation Action TB7.1.** Each of the large colonies preserved will meet the following criteria: • Has supported a minimum of 1,500 individual tricolored blackbirds during a survey year since 1950. • Includes a protected nesting substrate (including flooded, thorny, spiny, or "visually" but not actually spiny vegetation). • Includes open accessible water to provide a water source for nestlings within 1,640 feet of the nesting substrate. • Includes at least 500 acres of modeled foraging habitat (that may include any combination of irrigated pasture alfalfa, Vernal Pool, Valley Grassland, Seasonal Wetland, Swale, and Freshwater Marsh) providing adequate insect prey within a 1-mile radius of the nesting colony. One or more of the three elements (nesting substrate, access to Open Water, and modeled foraging habitat) may be provided through re-establishment or establishment through Conservation Action TB3.1. If re-establishment is included, surveys will be conducted the first year and every 5 years thereafter to monitor success. If, after the first year or any 5-year interval thereafter, the restored habitat is not meeting re-establishment criteria standards, the efforts will be deemed to have failed. Remediation of failed re-establishment efforts must occur within 1 year after efforts are deemed unsuccessful.
Objective TB8. For any tricolored blackbird nesting colony that is removed by a Covered Activity, re-establish and/or establish three new colonies within SSHCP Preserves. Re-established and/or established colonies can be in aquatic (Freshwater Marsh, Seasonal Wetland) or upland (Annual Grassland) habitat types, and must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands that provide adequate	**Conservation Action TB8.1**. When re-establishing and/or establishing aquatic nesting colony sites, the Implementing Entity will consider the following in their design: • Avoid management of properties for fall and winter waterfowl habitat. Maintain flooded marshes from spring into July through irrigation or impoundment (8–12 inches standing water through spring). As necessary, use graywater or recycled water sources for spring irrigation. • Plant mixture of cattails and tules (cattails more abundant) in Seasonal Wetland and Freshwater Marshes if absent. Manage the wetlands for large patches of cattails (at least 100 feet in width) spaced away from the shoreline. Refresh cattails by mowing/disking or burning, not less than every 3 years in fall and winter. • Protect the colony site from encroachment by trees or high shrubs to eliminate perching sites for avian nest predators. • Select sites for re-establishment/establishment of aquatic nesting habitat that must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands. Agricultural operations or grasslands should ideally be

AGENDA ITEM 11.1

4122

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
foraging opportunities.	protected in SSHCP Preserves, but if not, must be free from pesticide use so that insect populations are not reduced. • Encourage cattle grazing near suitable breeding colony sites if possible. Grazing increases insect abundance and the short grass increases tricolored blackbird access to insects. As an alternative to cattle grazing, conduct prescribed burns every 5 years. The preferred grass height to maintain by grazing is less than15 inches. • Near the aquatic nesting colony site, promote insect production in early spring through irrigation or other methods. Preferred insect prey include grasshoppers and caterpillars, but aquatic insect larvae can also provide food. • Tules or cattails will be cut down or removed after each season to allow for growth of new tules and cattails.
	Conservation Action TB8.2. When re-establishing and/or establishing upland nesting colony sites, the Implementing Entity will consider the following in their design: • Provide native spiny, thorny, thick substrate such as California blackberry (*Rubus ursinus*), prickly lettuce (*Lactuca serriola*), nettles (*Urtica dioica*), California rose (*Rosa californica*), sandbar willow (*Salix exigua*), and mugwort (*Artemisia douglasiana*). • Protect existing patches of non-native Himalayan blackberry and milk thistle (*Silybum marianum*) patches and allow planting in select areas. These provide superior upland habitat compared to native species as they are more thick and spiny. • Protect the colony site from encroachment by trees or high shrubs to eliminate perching sites for avian nest predators. Patches should remain in the open to avoid predator access from trees and shrubs. • Target establishment of high-density patches with height of 4 to 10 feet in existing pastureland and rangeland. Irrigating in March–April can help increase the height and density of the plants if the winter has been dry. • Do not prune or mow patches until after the nesting season. • Select sites for re-establishment/establishment of upland nesting habitat that must be within 0.5 mile of appropriate agricultural forage crops (especially alfalfa) or annual grasslands. Agricultural operations or grasslands should ideally be protected in SSHCP Preserves, but if not, must be free from pesticide use so that insect populations are not reduced. • Ensure a water source is available within 1,500 feet of a target upland colony site throughout the breeding season. Water sources can include ponds, marshes, canals, stock ponds, and streams.
Mammal Covered Species	
Objective AB1. During assembly of the SSHCP Preserve System, ensure that a minimum of 23,171 acres of modeled habitat for American badger is preserved (see Objectives BOW1, VG1, VP1, VP3, and SW1).	**Conservation Action AB1.1.** The Implementing Entity will select preserve sites for modeled habitat considering certain criteria, including the following: • Includes large areas (e.g., relatively undisturbed by human activity). • Supports friable soils. • Known to support high prey densities, particularly ground squirrels and pocket gophers. • Located where management can be used to enhance or re-establish natural ecosystem processes.

AGENDA ITEM 11.1

4123

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective AB2. During Preserve Assembly, ensure that a minimum of 767 acres of modeled habitat for American badger is re-established and/or established (see Objectives VP2 and SW2).	**Conservation Action AB2.1.** The Implementing Entity will select re-establishment/establishment sites for modeled habitat considering certain criteria, including the following: • Includes arge areas (e.g., relatively undisturbed by human activity). • Supports friable soils. • Known to support high prey densities, particularly ground squirrels and pocket gophers. • Located where management can be used to enhance or re-establish natural ecosystem processes.
Objective WR1. During Preserve Assembly, ensure that a minimum of 23,910 acres of modeled foraging habitat for western red bat is preserved (see Objectives BOW1, RIP1, AG1, VG1, VP1, VP3, SW1, OW1, FWM1, and SC1)**.**	**Conservation Action WR1.1.** The Implementing Entity will select preserve sites for foraging habitat considering certain criteria, including the following: • Includes foraging areas known to be used by western red bats. • Located within 2–3 miles of permanent water. • Includes areas known or having potential to support high insect prey densities. • Includes few or no human disturbances. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absent of or few habitat-fragmenting features, including roads and other infrastructure. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.
Objective WR2. During assembly of the SSHCP Preserve System, ensure that a minimum of 841 acres of modeled roosting/foraging habitat for western red bat is preserved (see Objectives BOW1 and RIP1).	**Conservation Action WR2.1**. The Implementing Entity will select preserve sites for roosting/foraging habitat considering certain criteria, including the following: • Includes active roosting sites, especially maternity sites (note that buildings, bridges, and other built structures may be used for roosting). • Located within 2–3 miles of foraging habitat and permanent water. • Includes foraging areas known to be used by western red bat. • Includes areas known or having potential to support high insect prey densities. • Includes few or no human disturbances. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absent of or few habitat-fragmenting features, including roads and other infrastructure. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.

Table 2-7. Biological Goals and Measurable Objectives of the SSHCP Conservation Strategy

Measurable Objectives	Conservation Actions
Objective WR3. During assembly of the SSHCP Preserve System, ensure that a minimum of 1,317 acres of modeled foraging habitat for western red bat is re-established and/or established (see Objectives VP2, SW2, OW2, FWM2, and RIP2).	**Conservation Action WR3.1.** The Implementing Entity will select re-establishment/establishment sites for foraging habitat considering certain criteria, including the following: • Includes areas known or having potential to support high insect prey densities. • Located within 2–3 miles of permanent water. • Includes few or no human disturbances. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absent of or few habitat-fragmenting features, including roads and other infrastructure. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.
Objective WR4. During assembly of the SSHCP Preserve System, ensure that a minimum of 450 acres of modeled roosting/foraging habitat for western red bat is re-established and/or established (see Objective RIP2).	**Conservation Action WR4.1.** The Implementing Entity will select re-establishment/establishment sites for roosting/foraging habitat considering certain criteria, including the following: • Includes areas known or having potential to support high insect prey densities. • Located within 2–3 miles of foraging habitat and permanent water. • Includes few or no human disturbances. • Located on parcels 20 acres or greater and/or occurs in larger, open space areas. • Linked or adjacent to currently preserved lands. • Absent of or few habitat-fragmenting features, including roads and other infrastructure. • Located where management can be used to enhance or re-establish natural ecosystem processes and attract other Covered Species.

Notes:

[1] Includes occurrences in the SSHCP GIS database (January 2014) and any future occurrences found in the Planning Area.

.

SSHCP Preserve System

The Biological Goals and Measurable Objectives of the Proposed Action/Proposed Project Alternative (SSHCP) require the assembly, monitoring, and management of an interconnected SSHCP Preserve System of at least 36,282 acres to conserve species and natural communities currently present within each Planning Area PPU. The SSHCP Preserve System would be incrementally assembled during the 50-year permit term by the SSHCP acquisition of land in fee title and through acquisition of conservation easements.

The SSHCP Preserve System described in the Proposed Action/Proposed Project Alternative includes the following preserve categories:

- **Landscape Preserve:** This category includes preserves that are at least 10,500 acres in size and that contain extensive areas of contiguous natural land covers where natural ecological functions can continue to operate, typically without extensive land management activities. Because existing development has already fragmented much of the remaining habitat within the UDA, the one Landscape Preserve would be located outside the UDA.
- **Core Preserve:** This category includes preserves that are at least 800 acres in size and contain extensive areas of contiguous habitat. The conceptual preserve system would include three Core Preserves in the UDA.
- **Minor Preserve:** This category includes preserves that are between 250 and 800 acres in size that contain populations that are important to the viability of a Covered Species have unusually high biological diversity, and/or have a high concentration of sensitive biological resources. Minor Preserves would be required to connect to existing preserves and/or to the new SSHCP Core Preserves via Linkage Preserves. The conceptual preserve system includes eight Minor Preserves, three of which are located within the UDA.
- **Satellite Preserve:** This category includes preserves that are smaller than Core and Minor Preserves (i.e., less than 250 acres) but contain populations that are important to the viability of a Covered Species in the Planning Area or have a particularly high concentration of sensitive biological resources. Satellite Preserves may not have the biological diversity of Core and Minor Preserves and may or may not be connected to other preserves by habitat linkages due to other planning constraints such as existing development. The conceptual preserve system would include 10 Satellite Preserves, and all but a portion of one would be located in the UDA.
- **Linkage Preserve:** This category includes preserves that are generally more linear-shaped landscape features that connect large habitat blocks (e.g., Core and Minor Preserves) and are designed to provide for dispersal and movement of species between preserve areas and hydrologic connectivity/water quality. These Linkage Preserves would follow stream channels, where possible, to maintain hydrologic connectivity and wildlife movement. The final width and length of each Linkage Preserves would depend on several factors,

including habitat types in the linkage, the ecological function (or functions) the linkage is designed to serve (e.g., overland wildlife movement, drainage), and adjacent land uses. However, the minimum width of any Linkage Preserves is 600 feet. The Preserve System would include 11 Linkage Preserves, most of which would be in the UDA.

- **Wildlife Movement Corridor:** There would be a minimum of two Wildlife Movement Corridor Preserves. The Laguna Creek Wildlife Movement Corridor Preserve is an important landscape feature in PPUs 1 and 3 in the Planning Area, and preservation of habitat along this corridor would be an important way the Preserve System would maintain wildlife movement and habitat for resident wildlife, preserving riparian habitat and maintaining hydrologic connections between preserves inside the UDA. Outside the UDA, the Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve would serve a similar function traversing east to west through PPU 5 and connecting to the Cosumnes River floodplain in PPU 6.
- **Cropland Preserve:** This category includes preserves consisting of existing agricultural lands, mostly located in PPU 6, and have been identified as uniquely important foraging and roosting habitat in the Planning Area for some Covered Species, including Swainson's hawk, white-tailed kite (*Elanus leucurus*), and greater sandhill crane. Cropland Preserves could be any acreage or shape. The Preserve System would include approximately 6,500 acres of Cropland Preserve, most of which would be in the outside the UDA in PPU 6.

In addition to these seven main preserve categories, 500 acres of Flexible Preserve would be added to other SSHCP Preserves or existing preserves in the Planning Area. Flexible Preserves could be of any SSHCP Preserve size category (e.g., Core, Minor, Satellite, Linkage) but must be within 1 mile of the MCRA in PPUs 1, 2, or 3 and adjacent to an SSHCP Preserve or existing preserve. The 500 acres of Flexible Preserve is primarily intended to preserve existing vernal pool ecosystem, but Flexible Preserve could also be used to preserve areas that previously supported vernal pools that can be used for Vernal Pool re-establishment/establishment.

Setbacks

The SSHCP includes two types of setbacks between new urban development and existing natural resources. The first type is a Stream Setback, in which the footprint of a new UDA development project must be set back a certain number of feet from the top of the bank of streams and creeks, as stated in AMMs STREAM-1, STREAM-2, and STREAM-3.

The second type of setback is a Preserve Setback, which is required by AMM EDGE-1, EDGE-2, EDGE-3, under which the footprint of new UDA must be no closer than 50 feet from the boundary of existing and SSHCP Preserves. Preserve Setbacks are required for most Covered Activities in the UDA (refer to Section 2.3.3).

AMM EDGE-3 would provide a Preserve Setback by requiring all UDA development projects and activities be permanently "set back" at least 50 feet outward from the boundary of any existing or conceptual preserve. The lead agencies estimate that approximately 625 acres of habitat will be protected from development of urban structures within Preserve Setback along 105 linear miles of existing and potential preserve boundaries. The natural land covers within the minimum 50-foot-wide Preserve Setbacks would remain in its natural state and function as a transition area between new urban development and the natural resources of the preserves. However, a limited number of specific Covered Activities could be allowed within SSHCP Preserve Setbacks, as described in Table 2-3 in Section 2.3.3.

AMM STREAM-1 and STREAM-2 require that project developers or the Implementing Entity design of Covered Activity shall establish Stream Setbacks surrounding particular streams in the UDA. Stream Setbacks at least 100 feet wide measured from the top of the bank would be established on both sides of the following UDA streams, creeks, and drainages: Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Sun Creek, and the Paseo Central drainage. A Stream Setback of at least 150 feet wide measured from the top of the bank would be established on both sides of Laguna Creek. The primary purpose of a Stream Setback is to minimize indirect effects of adjacent urban development Covered Activities on Planning Area waterway hydrologic functions, including water quality, and to avoid or reduce associated adverse effects on Covered Species aquatic habitats. Finally, under AMM STREAM-3, a 12.5-foot setback would be established from each side of the top of the bank along avoided first- and second-order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Sun Creek, Laguna Creek, and the Paseo Central drainage.

Expected Preserve System Under the Proposed Action/Proposed Project Alternative

Implementation of the SSHCP Conservation Strategy over the 50-year permit term would result in a Preserve System totaling a minimum of 36,282 acres of new preservation, which would then be managed in perpetuity. A project alternative that was not carried forward subsequent to the release of the Notice of Preparation and Notice of Intent anticipated a larger preserve area (50,310 acres). The preserve size was scaled back (along with the UDA) when the City of Elk Grove and Aerojet properties opted out of participation in the SSHCP. Table 2-8 presents a scenario for a conceptual preserve system developed for the SSHCP totaling 36,282 acres of natural land covers. This Preserve System would preserve approximately 18,388 acres of vernal pool ecosystem in the Planning Area, or 51% of the Preserve System.

Table 2-8. Minimum Preservation of Natural Land Categories Under the Proposed Action/ Proposed Project Alternative

Land Cover Category[1]	Preserved Land (acres)		
	Inside UDA (acres)	*Outside UDA (acres)*	*Total (acres)*
All natural land covers[2]	7,030	27,465	34,495
Vernal pool ecosystem[3] land covers	5,618	12,125	17,743
Wetland land covers[4] and other water land covers	605	1,169	1,774

1 The rows in the table are not additive because the land cover categories include some overlapping land cover types (e.g., Vernal Pool is included in "all natural land covers," "Vernal Pool Ecosystem land covers," and "wetland land covers and other water land covers."

2 Planning Area land cover types were defined by the SSHCP preparers during development of the SSHCP. To allow for better comparison of impacts between the EIS/EIS alternatives, the EIS/EIR uses these same land cover types in discussions of all alternatives. The natural land covers include Blue Oak Savanna, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture-Grassland, Mine Tailings Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Open Water, Orchard, Seasonal Wetland, Stream/Creek, Stream/Creek (VPIH), Swale, Valley Grassland, Vernal Pool, and Vineyard, as discussed in Table 8-1.

3 The Vernal Pool Ecosystem includes three aquatic land cover types (Vernal Pool, Swale, and Stream/Creek (VPIH)) and hydrologically connected Valley Grassland.

4 Wetland land covers include the following aquatic land cover types: Freshwater Marsh, Seasonal Wetland, Open Water, Stream/Creek, Vernal Pool, Swale, and Stream/Creek (VPIH).

To assist with development of an adequate SSHCP Conservation Strategy, the Plan Area was further divided into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species resources are present and where habitat preservation would occur (see Figure 2-1). These eight SSHCP PPUs are geographic subdivisions of the Plan Area and were delineated to ensure that adequate Biological Goals for the SSHCP would be developed for biological resources in all parts of the Plan Area, including the location and implementation of the Preserve System.

PPUs 1–3 cover roughly the eastern half of the UDA. PPUs 4–7 cover most of the Planning Area outside the UDA. PPU 8 covers the City of Galt and Galt's SOI. The western portion of the UDA and a small area outside of the UDA in the extreme northeastern portion of the Planning Area are not within PPUs. Although geopolitical or physical landmarks were used to delineate some PPU boundaries, this was done for ease of mapping and to make locating PPU boundaries in the field easier. The PPUs capture specific habitat or agricultural land cover types or areas identified as being important for a specific suite of species. For instance, the Biological Goals and Measurable Objectives (Table 2-7) describe specific requirements for species habitat preservation and aquatic resource re-establishment and establishment in PPUs.

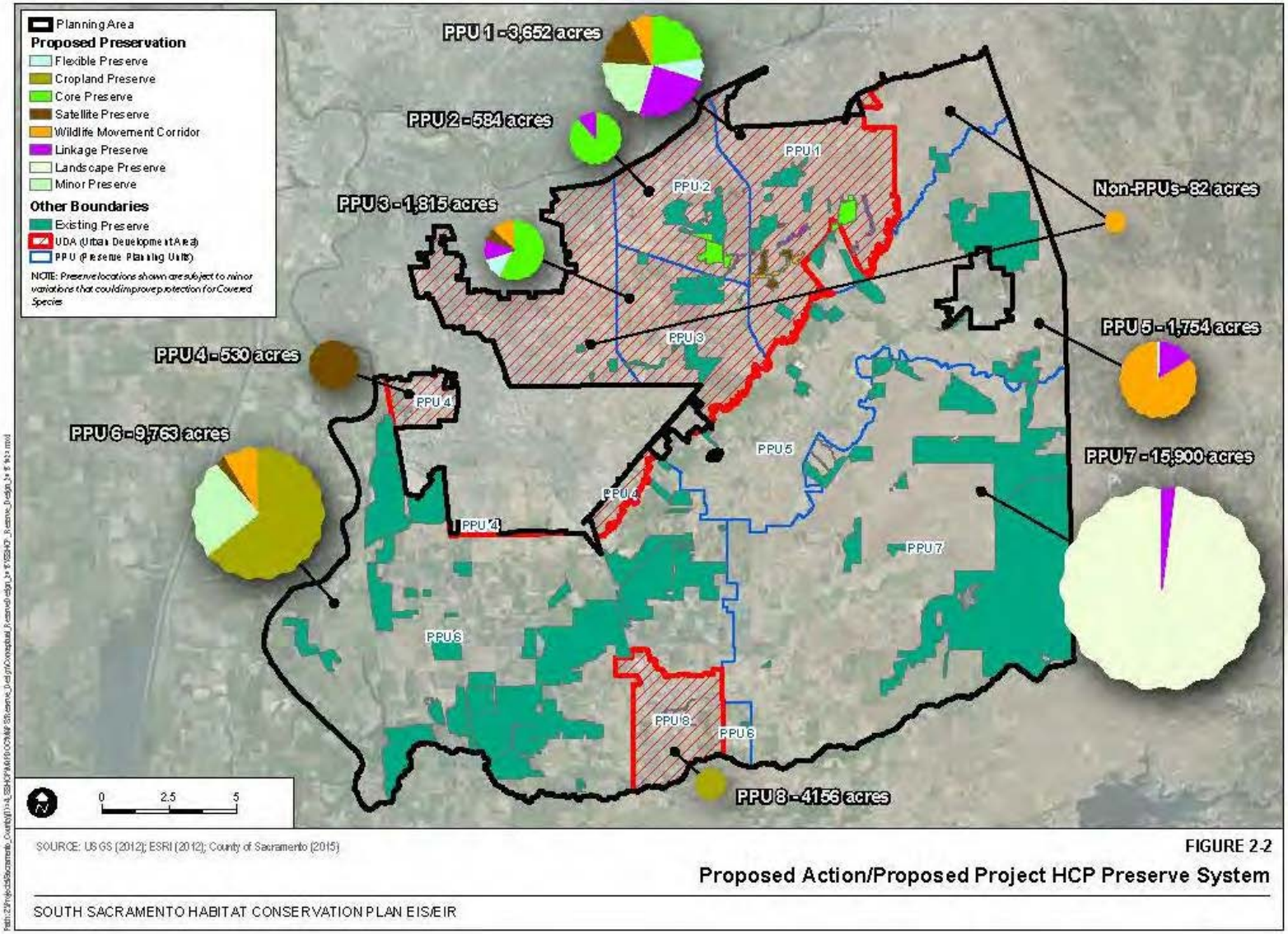
The Proposed Action/Proposed Project Alternative would preserve important corridors for wildlife movement through the Planning Area, the Laguna Creek Wildlife Movement Corridor Preserve and the Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve. These corridors connect across multiple PPUs. The Laguna Creek Wildlife Movement Corridor Preserve would include approximately 520 acres inside the UDA. Approximately 4 miles and 440 acres of the Laguna Creek Wildlife Movement Corridor Preserve would be within PPUs 1 and 3, and the

remaining approximately 1 mile and 82 acres would be in the portion of the UDA that was not included in a PPU. The Laguna Creek Wildlife Movement Corridor Preserve would provide habitat, connectivity, and wildlife movement between the new Core Preserve in PPU 1 and the Core Preserves in PPU 3. The Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve would preserve an extensive area surrounding Deer Creek and the Cosumnes River across PPU 5 from Rancho Murieta southeast to the broader Cosumnes River floodplain in PPU 6. Both of the Wildlife Movement Corridor Preserves would, in addition to facilitating plant and wildlife habitat functions, preserve riparian habitat and maintain hydrologic connections between conceptual preserve areas.

The final spatial configuration of the conceptual preserve system is not known at this time because it would be assembled over time and **would** rely on purchasing lands or easements from buyers who are willing to sell at the time. However, a description of the conceptual preserve is provided in the following text based on the SSHCP Biological Goals and Measurable Objectives and conservation actions specified for each Planning Area PPU. Figure 2-2 displays the conceptual preserve system elements for each Planning Area PPU.

INTENTIONALLY LEFT BLANK

Figure 2-2 Proposed Action/Proposed Project HCP Preserve System



INTENTIONALLY LEFT BLANK

Inside the UDA, existing development has fragmented much of the remaining natural land covers, and planned urban development places further constraints on the possible locations and sizes for preserves. Therefore, the Conservation Strategy in the UDA identifies the highest-quality natural land covers remaining and establishes Linkage Preserves to connect those natural land covers to other new or existing preserves. Three minimum 800-acre Core Preserves would be established inside the UDA. Preserves in the UDA would be well connected. New Linkage Preserves would ensure that habitat connectivity is maintained between the three Core Preserves, three Minor Preserves, nine Satellite Preserves, several existing preserves, and the Laguna Creek Wildlife Movement Corridor Preserve. The locations for some preserves in the UDA were known at the time of SSHCP preparation, and those are shown on Figure 2-2 as "Proposed Preservation." The following text describes the proposed preservation areas:

PPU 1: PP1 is the easternmost portion of the UDA and includes approximately 15,800 acres of the MCRA. New preserves in PPU 1 would include one Core Preserve of approximately 840 acres, three Minor Preserves totaling approximately 785 acres, and seven Satellite Preserves totaling approximately 600 acres. These preserves would be located to enclose intact Vernal Pool ecosystem and known occurrences of rare plants such as Sacramento Orcutt grass and slender Orcutt grass. At least seven new Linkage Preserves totaling approximately 920 acres would also be established in PPU 1 and would connect the new Core, Minor, and Satellite Preserves to each other and to existing preserves.

The conceptual preserve design for PPU 1 would maintain habitat connectivity with the Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve inside PPU 1 and 3 and provide connectivity in the UDA to existing preserves both within and south of the UDA. This connectivity in PPU 1 would be accomplished by portions of a Minor Preserve and a Core Preserve that are mostly located in the UDA portion of PPU 1.

PPU 2: PP2 is an important portion of the MCRA, and is adjacent to the existing Mather Preserve. New preserves in PPU 2 are one Core Preserve of approximately 520 acres as shown on Figure 2-2, and two Linkage Preserves that would connect the new Core Preserve to existing preserves located to the east and south, including a connection across Jackson Highway between PPUs 1 and 3. The new Core Preserve in PPU 2 would preserve the intact Vernal Pool ecosystem and abut the existing Mather Preserve to the north.

PPU 3: PP3 preserves would be acquired to preserve existing high-quality habitat that is present between two large existing preserves (Figure 2-2). This is done to maintain landscape functions of the remaining Vernal Pool ecosystem; capture known occurrences of rare plants such as Sacramento Orcutt grass and slender Orcutt grass; and maintain north–south wildlife movement between Jackson Highway, Laguna Creek, and Calvine

Road in PPU 3. PPU 3 would establish a 1,050-acre Core Preserve. Two Satellite Preserves that would provide connectivity between existing preserves and the Laguna Creek Wildlife Movement Corridor would also be located in PPU 3, and a single Linkage Preserve would connect the new preserves in PPU 3 from Grant Line Road through an area surrounded by a large-lot agricultural residential development to the Cosumnes River/Deer Creek Wildlife Movement Corridor.

PPU 4: PPU 4 is a small area west of Elk Grove and northeast of the Stone Lakes NWR. The goal of PPU 4 would be to augment the existing Stone Lakes NWR. PPU 4 would include preserves totaling approximately 530 acres composed primarily of Valley Grassland that connects to the refuge. Although the total size of this preserve would typically make it a Minor Preserve, it was classified by the Permit Applicants as a Satellite Preserve because it would be fragmented by existing development in the area.

Flexible Preserve: At least 500 acres of Flexible Preserves would be established next to other preserves within the conceptual preserve system or to existing preserves inside the UDA. The purpose of the Flexible Preserve category is to assure that the operational Preserve System is providing the species conservation benefits of functions of the Vernal Pool ecosystem within the MCRA, as anticipated by the Permit Applicants at the time of SSHCP preparation. Flexible Preserve acres would be adjacent to existing or new preserves and must be within the MCRA or located within 1 mile of the MCRA.

Outside the UDA, land is largely undeveloped and composed of large parcels under the existing conditions. This condition would allow the SSHCP Conservation Strategy to assemble larger preserves, such as a more than 10,000-acre Landscape Preserve in PPU 7. The undeveloped nature of the area outside the UDA would also allow the Conservation Strategy to identify areas in PPU 6 for Cropland Preserves in the southwest of the Planning Area that would protect existing agricultural habitat for species such as Swainson's hawk and greater sandhill crane.

PPU 5: PPU 5 is outside the UDA in the west-central part of the Planning Area. Approximately 1,691 acres in PPU 5 would be preserved under the Proposed Action/Proposed Project Alternative. The preserve design focus in PPU 5 would be to provide habitat linkages among preserves both outside and inside the UDA, primarily along the Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve. Approximately 1,500 acres would be preserved in PPU 5 along the Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve, an expanse of Valley Grassland, Riparian, Stream/Creek, and Cropland land cover types enclosing the Cosumnes River that extends for 16 miles in PPU 5 and ranges in width from approximately 500 feet to 1 mile. The Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve in PPU 5 would be

connected to the Laguna Creek Wildlife Movement Corridor Preserve to the northwest in PPU 3 by a wide 260-acre Linkage Preserve.

PPU 6: PPU 6 is outside the UDA in the southwest part of Planning Area. Approximately 9,750 acres would be preserved in PPU 6, and the preserve design focus in PPU 6 would be to preserve existing agricultural lands that provide habitat for the broad-ranging Swainson's hawk, greater sandhill crane, and white-tailed kite. Approximately 8,500 acres of Cropland Preserve in PPU 6 would be established under the Proposed Action/Proposed Project Alternative. Other natural land covers could also be preserved in each Cropland Preserve, but these would be preserved and managed primarily for the benefit of Covered Species that forage in the row crop or irrigated pastures, and would generally be adjacent to existing agricultural fields. Smaller acreages of Riparian, Vernal Pool, and other aquatic land covers would also be preserved in PPU 6. These smaller areas would be managed differently than the Cropland Preserves and would likely be the sites of Vernal Pool re-establishment and/or establishment through conversion of Irrigated Pasture-Grassland or Valley Grassland. Most of these smaller preserves would fill gaps near existing preserves or between existing preserves and conceptual SSHCP Preserves. Approximately 4 miles and 800 acres of the Cosumnes River/Deer Creek Wildlife Movement Corridor would be preserved within PPU 6, connecting to the Cosumnes River/Deer Creek Wildlife Movement Corridor described previously in PPU 5. In PPU 6, the Cosumnes River/Deer Creek Wildlife Movement Corridor would include mostly Mixed Riparian Woodland and agricultural lands.

PPU 7: PPU 7 is located outside the UDA in the southeastern portion of the Planning Area and was delineated to encompass large areas of the Vernal Pool ecosystem in the Cosumnes/Rancho Seco Core Recovery Area. Approximately 15,900 acres would be preserved in PPU 7, including a Landscape Preserve of at least 10,500 acres and 300 acres of Linkage Preserve that would connect the Landscape Preserve to the Cosumnes River/Deer Creek Corridor in PPU 5. The preserve design focus in PPU 7 would be to preserve natural land covers in a large Landscape Preserve. SSHCP Preserves in PPU 7 would target Vernal Pool and Valley Grassland in areas that are adjacent to or near existing preserves, such as the 12,500-acre Chance Ranch.

PPU 8: New habitat preservation in this PPU would include 415 acres of Cropland Preserve located in the northwest of the PPU and in the south of the PPU along Dry Creek. This Cropland Preserve would focus on preserving high-value Swainson's hawk foraging habitat and a greater sandhill crane roosting pond.

2.3.6 SSHCP Preserve Management and Monitoring Programs

The Proposed Action/Proposed Project Alternative would include two separate programs for monitoring and tracking implementation of the SSHCP and the SSHCP Conservation Strategy, including progress toward achieving each SSHCP Biological Goal and Measurable Objective. The two programs are described as follows:

Permit Compliance and AMM Effectiveness Monitoring Program

The first SSHCP monitoring program, the Permit Compliance and AMM Effectiveness Monitoring Program, would track compliance with the Covered Activities and acres of impacts, acres of conservation required by each Measurable Objective, and any other permit term and condition. This program would include the following components:

- **HCP Compliance Monitoring:** HCP Compliance Monitoring would track the status of Covered Activity implementation and Measurable Objective implementation and document that all requirements of the SSHCP and the ITPs are being met.
- **AMM Compliance Monitoring:** AMM Compliance Monitoring would ensure required AMMs are implemented at Covered Activity project sites and implemented correctly. In this way, AMM Compliance Monitoring would ensure that adverse effects of Covered Activities on Covered Species and natural land cover types that provide habitat for Covered Species (including aquatic resources) will not exceed the impacts assumed during the development of the SSHCP.
- **AMM Effectiveness Monitoring:** The effectiveness of AMMs in avoiding or reducing adverse effects of Covered Activities would be tracked through AMM Effectiveness Monitoring. The results of AMM Effectiveness Monitoring would be used to adaptively modify or change AMMs if AMMs are not avoiding or minimizing impacts to Covered Species as anticipated. The adaptive modification of AMMs over the permit term assures that the maximum adverse effects of the SSHCP will not exceed the amounts analyzed by this EIS/EIR.

Preserve System Management and Monitoring Program

The Preserve System Management and Monitoring Program would monitor effectiveness of the SSHCP Preserve System (described in Section 2.3.5) and operational Conservation Strategy to ensure that it is achieving the expected conservation of Covered Species within the Planning Area.

The Preserve System Management and Monitoring Program would also link preserve monitoring results to decisions about adaptive land management action on preserves to improve both management and monitoring for the benefit of Covered Species.

The Proposed Action/Proposed Project Alternative would include a program to manage the Preserve System, described in Section 2.3.5, and to monitor the effectiveness of the land management activities implemented on each individual preserve in the Preserve System.

The Preserve System Management and Monitoring Program would integrate the monitoring results into an adaptive management process to have one cohesive program where monitoring would inform changes in management actions and continually improve Covered Species habitat on each preserve.

The Preserve System Management and Monitoring Program document would provide a single framework document from which the SSHCP Implementing Entity (Section 2.3.7) would develop a separate individual Preserve Management Plan (PMP) for each SSHCP Preserve. The Preserve System Management and Monitoring Program document would be developed by the Implementing Entity within 18 months of permit issuance.

The Preserve System Management and Monitoring Program framework document would include the following:

- A template to be used by the Implementing Entity to prepare initial PMPs for new preserves. Initial PMPs would address immediate short-term management needs such as trash removal, fence repair, and invasive species control.
- A template to be used by each Preserve Manager (Section 2.3.7) to prepare individual PMPs. Each individual PMP would include a "decision tree" for using preserve monitoring data and other data to adjust preserve management actions.
- A comprehensive management and monitoring "toolbox" to be used by the Preserve Manager to prepare and then implement an individual PMP for each preserve in the larger Preserve System. The toolbox would include a set of adaptive management methods that can be used by preserve staff on preserves. The Preserve System Management and Monitoring Program would also provide protocols for routine preserve management actions and activities that could be required for any SSHCP Preserve, including regular patrols, trash removal, fence/gate installation and repairs, and other maintenance activities.

2.3.7 SSHCP and ARP Implementation

Implementation of the SSHCP and ARP would protect ecological diversity and aquatic resource function in Southern Sacramento County, while allowing planned urban growth and development in accordance with approved General Plans and applicable laws.

Responsibility for implementing the permitted SSHCP would jointly rest with all Permit Applicants. SSHCP implementation would be directed by the SSHCP Implementing Entity, a Joint Powers Authority composed of the Sacramento County, Galt, and Rancho Cordova (the Land Use Authority Applicants).

The Implementing Entity would be composed of a Joint Powers Authority Governing Board, an Implementation Committee, and an Executive Director and staff, such as Preserve Managers, to help with day-to-day implementation of the Plan. Refer to Chapter 9.3 of the SSHCP document for further details on the proposed Implementing Entity structure and the responsibilities of each Implementing Entity element.

The ARP would be implemented by the Permit Applicants in conjunction with the SSHCP, for the purpose of improving the protection and management of Planning Area aquatic resources. The SSHCP Conservation Strategy and the ARP assure a watershed-level approach to aquatic resources ~~and~~**,** with a better evaluation of cumulative impacts to aquatic resources. The ARP would be implemented locally**, and would** use the comprehensive, landscape, and project-level Conservation Strategy for aquatic resources, as described in Appendix I.

In the event that circumstances change during implementation of the SSHCP, the SSHCP has identified changed circumstances that are reasonably foreseeable, and provides planned responses to address the changed circumstances, as required by the ESA Section 10 incidental take permit issuance criteria (40 CFR 17.22(b)). SSHCP changed circumstances include floods, drought, changes in water availability, wildfire, invasive species, covered species disease, long-term changes in precipitation and temperature, new species listing, and new designation of Critical Habitat. The planned responses to these events, if needed, would be Covered Activities by the SSHCP. Examples of planned responses include inspections of affected conservation lands within a specific time from the end of the event (e.g., 30 days); evaluation of the extent of the damage; purchasing of additional water supplies, if necessary, to maintain crops supporting habitat functions; and habitat restoration and enhanced recovery of affected habitat area.

2.4 REDUCED PERMIT TERM ALTERNATIVE

The Reduced Permit Term Alternative was carried forward for detailed study because, within the Planning Area, the General Plan durations range from 16 years to more than 30 years (Table 2-9). The lead agencies determined that the underlying needs in the Planning Area and the purposes and objectives of implementing a Habitat Conservation Plan in south Sacramento County could generally be achieved within incidental-take permit terms shorter than the term that requested under the Proposed Action/Proposed Project Alternative. A 30-year permit term is analyzed because that term generally coincides with the durations of the adopted General Plans and other

local planning documents of the Permit Applicants, including most reasonably foreseeable master plan projects in those jurisdictions (see Section 2.1).

Table 2-9. Local Planning Documents and Time Horizons Relevant to the Permit Term

Document	Date Produced	Projection/Time Horizon	Plan Duration
2030 Galt General Plan: Policy Document	2009	2030	16 years
City of Rancho Cordova General Plan	2006	2030/2050	16–36 years
Sacramento County General Plan of 2005–2030	1993; updated 2011	2030	16 years
County of Sacramento General Plan USB	1993	At least until 2060	46 years

Sources: City of Galt 2009; City of Rancho Cordova 2006; County of Sacramento 2011.

As with the Proposed Action/Proposed Project Alternative, this alternative consists of issuance of ITPs by USFWS and CDFW for species take resulting from Covered Activities; the implementation of a HCP Conservation Strategy for the Planning Area by the Permit Applicants, including an ARP; and the development of a CWA 404 permit strategy by the USACE for future Covered Activities that result in fill or discharge to waters of the U.S. However, the term of ITPs and the use of the CWA 404 permit strategy would end after 30 years.

Under the Reduced Permit Term Alternative, the Permit Applicants (future Plan Permittees) would implement the same types or categories of Covered Activities that are discussed in Section 2.3.3. Under the Reduced Permit Term Alternative, the Permit Applicants would request ESA and CESA take coverage for the same Covered Species as listed in Section 2.3.4.

2.4.1 Expected Regulatory Environment under the Reduced Permit Term Alternative

Under the Reduced Permit Term Alternative, a HCP that includes an ARP would allow expedited CESA, ESA, and CWA 404 permitting process**es** for HCP Covered Activities, as was described above for the Proposed Action/Proposed Project Alternative in Section 2.3.1. The implementation of the regional HCP, including implementation of HCP Covered Activities under the ITPs would occur over a 30-year permit term.

The regulatory environment under Reduced Permit Term Alternative would be different from the regulatory environment expected under the No Action/No Project Alternative described in Section 2.2.2. During the 30-year permit term, the Covered Activity permitting and entitlement process would be similar to the process described for the Proposed Action/Proposed Project in Section 2.3.1.

Federal ESA and CESA Compliance

Under the Reduced Permit Term Alternative, an ESA ITP would be issued to the Permit Applicants (the future Plan Permittees) by the USFWS, and a CESA ITP would be issued to the Permit Applicants by the CDFW.

Individual Covered Activity projects and activities that comply with the SSHCP would also comply with the ESA and CESA incidental take permits. Third party project proponents implementing a SSHCP Covered Activity project would pay "development fees" to the local Land Use Authority Permittee (i.e., Sacramento County, Galt, or Rancho Cordova), or to the SSHCP Implementing Entity , whoever has jurisdiction over the project site.

Under the Reduced Permit Term Alternative, the regional HCP would include a Conservation Strategy that provides a regional plan for conserving native species, natural communities, and aquatic resources in the Planning Area. Because the HCP Conservation Strategy was developed by the Permit Applicants and the regulatory agencies, it evaluates and prioritizes the regional importance of the existing species habitat and existing aquatic resources in the Planning Area.

Therefore, the importance (or lack of importance) of a specific Planning Area location or parcel to the conservation of listed species, ecosystem functions, and aquatic resources of the region would have already been determined by USFWS, CDFW, and USACE during the development of the HCP, as described above in Section 2.3.1 for the Proposed Action/Proposed Project Alternative.

Therefore, each project proponent would not need to spend time or money preparing draft and final ESA biological assessment documents, because the ESA consultation on the project's impacts would have been done when the Biological Opinion was prepared for the regional HCP and the ITP was issued.

Further, each Covered Activity that meets the requirements of the SSHCP would be in compliance with the ESA, and any incidental take of federally listed species or impacts to Critical Habitat by the Covered Activity would be covered by the SSHCP ESA incidental take permits. Therefore, **it is envisioned that in most cases,** the USACE would not be required to initiate ESA Section 7 consultation with the USFWS before providing CWA 404 authorizations to a proposed project that is a SSHCP Covered Activity. Similarly, for CESA, a project proponent would not need to consult individually with CDFW, apply for a project-specific species permit from CDFW, negotiate project avoidance measures with CDFW, or negotiate type or amounts of species mitigation with CDFW. These elements of the Reduced Permit Term Alternative would substantially reduce the timeline for the proposed project.

The Reduced Permit Term Alternative's Conservation Strategy would address cumulative impacts to vernal pool~~s~~ **species** within the MCRA. ~~Cumulative impacts within the MCRA~~

~~identified in the Sunridge ROD (see Section 2.2.2) would be are addressed through implementation of the Reduced Permit Term Alternative Conservation Strategy (described below in Section 2.4.5).~~

The Reduced Permit Term Alternative HCP would meet Sacramento County's obligations in the 2004 Zone 40 MOU to prepare a regional HCP that addresses the indirect effects of the operational Freeport Regional Water Project and the Zone 40 water delivery contracts. Therefore, new urban development projects inside Zone 40 that are seek entitlements from a local jurisdiction would be able to rely on the Freeport Regional Water Project as the project's water source, without first obtaining project-level ESA approvals from the USFWS.

CWA 404 Compliance

During the 30-year permit term, Covered Activity compliance with CWA 404 would be similar to the process described in Section 2.3.1 for the Proposed Action/Proposed Project Alternative. Each Covered Activity that meets the requirements of the HCP would be in compliance with the ESA, and any incidental take of federally listed species would be covered by the 30-year ESA incidental take permit. Therefore, **it is envisioned that in most cases** during the 30-year permit term, the USACE would not be required to initiate ESA Section 7 consultation with the USFWS before authorizing a Covered Activity project under CWA 404. This will shorten project timelines and reduce project costs, as was described for the Proposed Action/Proposed Project Alternative.

Under the Reduced Permit Term Alternative, the Permit Applicants would also use the HCP Conservation Strategy to prepare a local Aquatic Resources Program (ARP) which proposes a locally based 30-year program for permitting future HCP Covered Activities that impact aquatic resources, including wetlands and other waters. The HCP Conservation Strategy and the ARP would provide compensatory mitigation (e.g., re-establishment or establishment) for unavoidable impacts to aquatic resources, which provides to the minimum 1:1 compensatory mitigation ratios required by the 2008 Compensatory Mitigation Rule. Pursuant to the 2008 Compensatory Mitigation rule, the Permit Applicants would request the establishment of a 30-year in-lieu fee (ILF) program that would work in conjunction with the HCP's Covered Activity fee structure. The Permit Applicants would then be responsible for the CWA 404 compensatory mitigation requirements of the Covered Activity projects and activities.

Because the HCP Conservation Strategy~~, and the~~ ARP, **and proposed In Lieu Fee program** will allow the USACE and RWQCB the ability to evaluate~~individual project impacts, and evaluate~~ proposed locations for compensatory mitigation using a watershed and regional-scale approach, wetland regulatory agencies would be better able to ~~determine if individual projects are adequately mitigating~~ **plan for adequate compensatory mitigation** for aquatic resource impacts in ecologically

appropriate locations, as was described for the Conservation Strategy of the Proposed Action/Proposed Project Alternative.

Because the ARP would discuss and explain the regional HCP Preserve System (and other elements of the HCP Conservation Strategy) in terms of a unified watershed strategy for improving the protection and management of Planning Area aquatic resources, the ARP allows the USACE to develop a multilevel CWA 404 permit~~ting~~ strategy for the future HCP Covered Activities (similar to the Proposed Action/Proposed Project Alternative). Under the HCP and ARP, the USACE compensatory mitigation decisions can be based on the well-planned regional perspective for compensatory mitigation that is outlined in the Reduced Permit Term HCP and ARP documents.

The HCP and ARP would integrate avoidance, minimization, and compensatory mitigation into a comprehensive uniform regional strategy that would preserve more of the MCRA than would occur under the No Action/No Project Alternative. Aquatic resource compensatory mitigation strategy outlined in the HCP and the ARP would be predictable, and would provide 1:1 mitigation of direct impacts of the Covered Activities

The HCP AMMs implemented during the 30-year permit term would provide equal or stronger AMMs when compared to avoidance measures required by individual projects on a project-by-project basis under the No Action/No Project Alternative.

Project Compliance with Porter Cologne Water Quality Control Act and CWA 401

As discussed above in Section 2.2.2, under CWA 401 and the Porter-Cologne Act, projects and activities in California that require authorization, a federal license, or a permit for the discharge of a pollutant into wetlands and other waters must also obtain a CWA 401 water quality certification from the RWQCB with local jurisdiction.

The HCP and ARP would facilitate the Central Valley RWQCB's development of water quality certification strategies for future SSHCP Covered Activities, in conjunction with USACE's development of a CWA 404 permit~~ting~~ strategy for future Covered Activities (see Appendix C).

Parallel to the USACE's CWA 404 permit~~ting~~ strategy, the RWQCB would have opportunities to increase the efficiency of their CWA 404 permitting processes while improving the protection and management of aquatic resources in the Planning Area. The RWQCB could issue a programmatic CWA 401 water quality certification for the USACE's general permit(s) and could adopt a more efficient water quality certification approach for Covered Activity projects associated with USACE's Letter of Permission and standard permit processes. The RWQCB could also adopt a more efficient waste discharge requirement approach for wetlands and other waters of the state.

California Fish and Game Code Section 1600 Master Streambed Alteration Agreement

The ARP and HCP address future impacts and provides for the conservation of streams and riparian habitat and other water bodies in the Planning Area that are regulated by CDFW. Under the Proposed Action/Proposed Project Alternative, CDFW would work with the land use authority Permit Applicants (Sacramento County, Galt, and Rancho Cordova) to develop a 30-year process to streamline authorization of Covered Activity projects and activities that affect the bed and bank of streams, ponds, and lakes under Section 1602 of the California Fish and Game Code, as discussed in Section 1.5.3.

In the streamlined process, the Land Use Authority Permittee Applicant or the SSHCP Implementing Entity may act as a "clearinghouse" for the notification forms, and would conduct an initial screening process to verify the project's consistency with the SSHCP and ARP, and the aquatic protection ordinances. Under the MSAA or Long-Term Streambed Alteration Agreement scenario, an expedited process of review with CDFW would allow each Covered Activity project proponent to submit a request for verification to the local Land Use Authority Permittees or Implementing Entity, whoever has jurisdiction, who would verify project consistency with the regional HCP and ARP.

The local Land Use Authority Permit Applicant or the HCP Implementing Entity would then submit appropriate paperwork to CDFW, who would review and approve the activity requests under the MSAA or Long-Term Streambed Alteration Agreement. This would remove the need for project developers to coordinate with CDFW for Section 1600 permits. It would also expedite the Section 1600 permitting process because CDFW would have pre-determined that consistency with the regional HCP and ARP satisfies the requirements for a Streambed Alteration Agreement.

Prior to processing a Lake or Streambed Alteration (LSA) Notification, CDFW must collect the fee for each LSA Notification submitted by the SSHCP Implementing Entity or by an individual third-party project proponent. CDFW is solely responsible for determining whether a LSA Agreement is required.

Local Environmental Policies

The existing County Swainson's Hawk Ordinance, discussed in Section 2.2.2, only applies to portions of Sacramento County that are not included in an approved HCP that includes Swainson's hawk as a Covered Species. Therefore, under the Proposed Action/Proposed Project Alternative, the Swainson's Hawk Ordinance would no longer be available as an option for projects to mitigate impacts to Swainson's hawk.

2.4.2 Permit Term Under the Reduced Permit Term Alternative

Within the Planning Area, the General Plan durations range from 16 years to more than 30 years (Table 2-9). The five master plan projects and the Capital Southeast Connector Project are expected to be completed within a 30-year time period. The HCP permit term of 30 years, which coincides with planned development and local General Plans. This permit term is considered by some permitting agencies to be more desirable because uncertainties increased under the longer 50-year permit term. Based on these reasons and the General Plan durations listed in Table 2-9, the lead agencies determined that a 30-year Reduced Permit Term Alternative should be analyzed in this EIS/EIR to inform and support future decisions related to the most appropriate term for the SSHCP. The 30-year permit term would provide adequate time for the HCP Implementing Entity to purchase lands and easements needed for the HCP Preserve System within the USB and monitor wetland re-establishment/establishment performance.

2.4.3 Covered Activities/Projects Under the Reduced Permit Term Alternative

The types or categories of Covered Activities for the Reduced Permit Term Alternative would be the same as described under the Proposed Action/Proposed Project Alternative in Section 2.3.1. Similarly, most of the Covered Activities would implement new urban development, which would be constructed and operated inside the UDA portions of the Planning Area only. In the portion of the Planning Area located outside the UDA, Covered Activities would consist of the same limited number of roadway and recycled water infrastructure projects that are described for the Proposed Action/Proposed Project Alternative in Section 2.3.2.

Removal of Natural Land Covers During the 30-Year Permit Term

As discussed in Section 2.2.2, there are five known master plan developments currently proposed within the MCRA portion of the UDA: Cordova Hills, Arboretum, Jackson Township, NewBridge, and Suncreek. Sacramento County and Rancho Cordova expect these five master plan developments to be completed within the next 30-years. Approximately 5,600 acres of the 24,245-acre MCRA would have new development during the 30-year permit term.

Outside the UDA, the road and pipeline projects described as Covered Activities under the Proposed Action/Proposed Project Alternative, including the Capital Southeast Connector Project, would be completed during the 30-year permit term, pursuant to Sacramento County General Plan Circulation Element and facilities master plans.

The 30 years of construction or implementation of the urban development Covered Activities within the UDA described previously and the other types of regional HCP Covered Activities

expected outside the UDA in the next 30 years would remove a total of approximately 19,275 acres of natural lands in the Planning Area under the Reduced Permit Term Alternative (Table 2-10).

Table 2-10. Maximum Loss of Natural Land Categories Under the Reduced Permit Term Alternative

Land Cover Category[1]	Maximum Acres Lost		
	Inside UDA (acres)	*Outside UDA (acres)*	*Planning Area Total (acres)*
All natural land covers[2]	17,831	1,444	19,275
Vernal pool ecosystem[3] land covers	9,968	322	10,290
Wetland land covers[4] and other water land covers	674	74	748

1 The rows in the table are not additive because the land cover categories include some overlapping land cover types (e.g., Vernal Pool is included in "all natural land covers," "Vernal Pool ecosystem land covers," and "wetland land covers and other water land covers."

2 Planning Area land cover types were defined by the SSHCP preparers during development of the SSHCP. To allow for better comparison of impacts between the EIS/EIS alternatives, the EIS/EIR uses these same land covers and definitions in discussions of all alternatives. The natural land covers include Blue Oak Savanna, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture-Grassland, Mine Tailings Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Open Water, Orchard, Seasonal Wetland, Stream/Creek, Stream/Creek (VPIH), Swale, Valley Grassland, Vernal Pool, and Vineyard, as discussed in Table 8-1.

3 Vernal Pool Ecosystem includes three aquatic land cover types (Vernal Pool, Swale, and Stream/Creek (VPIH)) and hydrologically connected Valley Grassland.

4 Wetland land covers include the following aquatic land cover types regulated under the CWA: Freshwater Marsh, Seasonal Wetland, Open Water, Stream/Creek, Vernal Pool, Swale, and Stream/Creek (VPIH).

The Reduced Permit Term Alternative (i.e., 30-year permit) is 60% of the time frame compared to the 50-year permit term of the Proposed Action/Proposed Project Alternative. Coincidentally, the area[16] projected to be urbanized within the UDA during the 30-year term constitutes approximately 58%–60% of full buildout of the UDA. Therefore, approximately 60% of the development acres assumed in the full buildout scenario would be permitted via the Reduced Permit Term Alternative.

The Reduced Permit Term Alternative would directly impact approximately 1,741 acres of aquatic resources within the UDA and 115 acres of aquatic resources outside the UDA (Table 8-12), which is 122 acres less than direct impacts to aquatic resources under the No Action/No Project Alternative (Table 8-4).

2.4.4 Covered Species Under the Reduced Permit Term Alternative

The Reduced Permit Term Alternative would include the same 28 Covered Species as for the Proposed Action/Proposed Project Alternative (see Table 2-5 for lists of Covered Species). The Reduced Permit Term Alternative, through the implementation of the an HCP Conservation Strategy during the 30-year permit term, including the Biological Goals and Measurable Objectives, implementation of the AMMs, and the ARP would provide additional avoidance

16 This area includes the Five Master Plans, County UPA, Rancho Cordova SOI, and Galt SOI.

measures not included in the No Action/No Project Alternative, which are expected to lessen the potential adverse effects to Covered Species relative to the No Action/No Project Alternative.

2.4.5 Conservation Strategy Under the Reduced Permit Term Alternative

The Reduced Permit Term Alternative includes a 30-year Conservation Strategy, which would include similar Biological Goals for the Planning Area as the Proposed Action/Proposed Project SSHCP. The Biological Goals for the Planning Area under the Reduced Permit Term Alternative would provide the same guiding principles as those identified for the Proposed Action/Proposed Project Alternative in Section 2.3.5, including the permanent conservation of each Covered Species within the Planning Area and the conservation of watershed ecosystem functions (including groundwater recharge) as some of the guiding principles.

However, the Reduced Permit Term Alternative would establish a smaller and less interconnected HCP Preserve System in the Planning Area, but would include a comprehensive preserve management program for those preserves. Active management of the preserve system established during the 30-year permit term of the Reduced Permit Term Alternative combined with 30 years of AMMs and particularly greater setbacks along streams, creeks, and minor tributaries will limit indirect impacts from urbanization, such as spread of invasive plants, establishment of informal trails, and use by people and domestic animals. AMM EDGE-1 requires compatible land uses included in the Covered Activities (e.g., designated open space such as parks and ball fields, detention basins, and other land uses with less-intensive human activity) to be located in areas immediately adjacent to existing or conceptual preserve boundaries. The compatible land uses established during the 30-year permit term will provide buffering of preserves from potential indirect effects of adjacent urban development during the permit term and beyond.

The Reduced Permit Term Alternative would also require each Covered Activity to implement the same resource-impact avoidance and minimization measures (AMMs) that the Proposed Action/Proposed Project Alternative requires. The implementation of these AMMs (see Table 2-6) would reduce direct and indirect impacts of the Covered Activities implemented during the 30-year permit term, when compared to the direct and indirect impacts of the No Action/No Project Alternative.

The Reduced Permit Term Alternative would also require the Permit Applicants to review of AMM effectiveness annually for the 30-year permit term and provide a process to make adaptive changes of any AMM that is not effective at avoiding impacts to aquatic resources or species. This additional layer of oversight of AMM implementation and oversight of AMM effectiveness under the Reduced Permit Term Alternative increases avoidance and minimization of impacts, when compared to the impacts of the No Action/No Project Alternative.

However, less new urban development would occur during the 30-year permit term of the Reduced Permit Term Alternative, and fewer development fees would be collected; thus, fewer financial resources would be available to the HCP to establish a HCP Preserve System within the Planning Area. Therefore, the acres preserved under the Measurable Objectives for Biological Goal No. 3 (to preserve and re-establish/establish natural land covers that provide Covered Species habitat) and Biological Goal No. 4 (to maintain or improve the habitat value of natural land covers that are preserved under Goal 3)) would be less under the Reduced Permit Term Alternative when compared to the Proposed Action/Proposed Project Alternative.

For each Measurable Objective, the SSHCP also provides Conservation Actions that specify how the Measurable Objective would be achieved (Table 2-7).The categories HCP Conservation Actions that would implement each Measurable Objectives in Table 2-7 would be the same for the Reduced Permit Term Alternative. However, Conservation Actions AG2.1, AG3.1, SH2.1, and GS5.1 would match the acreages that would be preserved under the Reduced Permit Term Alternative Measureable Objectives.

Under the Reduced Permit Term Alternative, the Permit Applicants would also use the HCP Conservation Strategy to prepare an Aquatic Resources Plan, as described for the Proposed Action/Proposed Project Alternative.

Expected HCP Preserve System under the Reduced Permit Term Alternative

As compared to the on-site avoidance and preserves that would result from the project-by-project regulatory review expected under the No Action/No Project Alternative, the 30-year term of the Reduced Permit Term Alternative HCP would assemble a more interconnected Preserve System both within and outside the UDA, and that features a larger minimum preserve size and greater habitat connectivity to existing preserves and between new preserves (Figure 2-3).

The Reduced Permit Term Alternative HCP Preserves would total approximately 20,044 acres of natural lands (compared to the approximately 23,430 acres preserved under the No Action/No Project Alternative, and the 34,495 acres of natural lands that would be preserved under the Proposed Action/Proposed Project Alternative). The Reduced Permit Term Alternative would preserve 4,752 acres of natural lands in the UDA (compared to the 7,030 acres preserved in the UDA under the Proposed Action/Proposed Project Alternative and the 6,814 acres preserved under the No Action/No Project Alternative). It should be noted that this comparison of acreages compares preserves established over 30-year period in the Reduced Permit Term Alternative with those established over 50 years in the No Action/No Project Alternative and the Proposed Action/Proposed Project Alternative.

As shown on Figure 2-3, many of the Reduced Permit Term Alternative HCP Preserves in the UDA would be similar in size, location, and connectivity to the UDA preserves described for the conceptual preserve system of the Proposed Action/Proposed Project Alternative (Section 2.3.5).

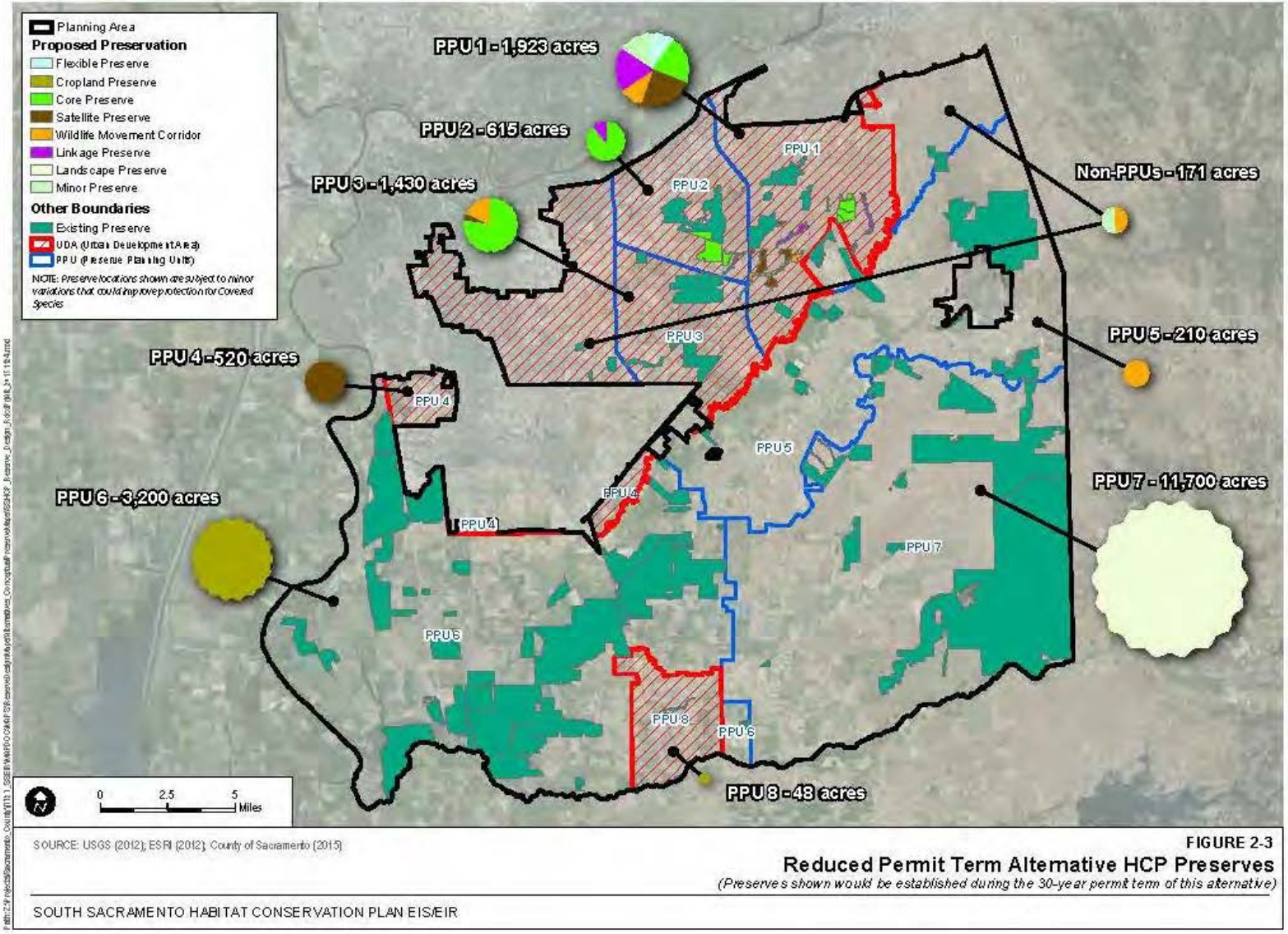
However, less urban development would occur under the Reduced Permit Term Alternative HCP over a 30-year permit term compared to the Proposed Action/Proposed Project Alternative 50-year permit term. As a result, development fees collected will also be less under the Reduced Permit Term Alternative than under the Proposed Action/Proposed Project Alternative.

Under the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative, most of the Preserve System established inside the UDA would be associated with the development of the five large Master Plans discussed in Sections 2.3.3 and 2.3.4. Therefore, the Preserve System established inside the UDA under the Reduced Permit Term Alternative is expected to be very similar to the Preserve System established inside the UDA under the Proposed Action/Proposed Project Alternative.

However, the shorter duration of Reduced Permit Term Alternative and the lower amount of urban development and associated development fees collected by the Reduced Permit Term Alternative HCP would not allow the HCP's Implementing Entity to establish as many acres of new preserves in the Planning Area as would occur under the Proposed Action/Proposed Project Alternative's 50-year permit term, and relatively few new preserves are expected to be established outside the UDA under the Reduced Permit Term Alternative.

As further described in the Reduced Permit Term Alternative's conceptual preserve system description, the shorter duration of Reduced Permit Term Alternative and the lower amount of development fees collected would not allow the Implementing Entity to acquire as much preserve land as under the Proposed Action/Proposed Project Alternative.

Figure 2-3 Reduced Permit Term Alternative HCP Preserves



INTENTIONALLY LEFT BLANK

As noted in Section 2.3.5, the Laguna Creek Wildlife Movement Corridor is a major part of the conceptual preserve system inside the UDA and would provide habitat, connectivity, and wildlife movement between the new Core Preserve in PPU 1 and the Core Preserves in PPU 3. The Laguna Creek Wildlife Movement Corridor would include approximately 520 acres inside the UDA. Approximately 4 miles and 440 acres of the Laguna Creek Wildlife Movement Corridor would be within PPUs 1 and 3, and the remaining approximately 1 mile and 82 acres would be in the portion of the Planning Area that was not included in a PPU (refer to Section 2.3.5). The following text summarizes the PPUs:

PPU 1 is the easternmost portion of the UDA and includes approximately 15,800 acres of the MCRA. New preserves in PPU 1 would include one Core Preserve of approximately 359 acres, three Minor Preserves totaling approximately 271 acres, and seven Satellite Preserves totaling approximately 434 acres. These Preserves would enclose intact Vernal Pool ecosystem and known occurrences of rare plants such as Sacramento Orcutt grass and slender Orcutt grass. At least seven new Linkage Preserves totaling approximately 353 acres would also be established in PPU 1 and would connect the new Core, Minor, and Satellite Preserves to each other and to existing preserves. The small portion of PPU 1 outside the UDA would have no new preserves under the Reduced Permit Term Alternative.

The conceptual preserve design for PPU 1 would maintain habitat connectivity with the Cosumnes River/Deer Creek Wildlife Movement Corridor Preserve inside PPUs 1 and 3 and provide connectivity in the UDA to existing preserves within and south of the UDA. This connectivity in PPU 1 would be accomplished by an approximately 85-acre Flexible Preserve and portions of a Minor Preserve and a Core Preserve that are mostly located in the UDA portion of PPU 1.

PPU 2 is an important portion of the MCRA and is adjacent to the existing Mather Preserve. New preserves in PPU 2 are one Core Preserve of approximately 520 acres, as shown on Figure 2-3, and two Linkage Preserves that would connect the new Core Preserve to existing preserves located to the east and south, including across Jackson Highway between PPUs 1 and 3. The new Core Preserve in PPU 2 would preserve intact Vernal Pool ecosystem and abut the existing Mather Preserve to the north.

PPU 3 preserves would acquire existing, high-quality habitat present between two large existing preserves (Figure 2-3) to maintain landscape functions of the remaining Vernal Pool ecosystem; capture known occurrences of rare plants such as Sacramento Orcutt grass and slender Orcutt grass; and maintain north–south wildlife movement between Jackson Highway, Laguna Creek, and Calvine Road in PPU 3. PPU 3 would establish a

1,025-acre Core Preserve. One Satellite Preserve would provide connectivity between existing preserves and the new Core Preserve.

PPU 4 is a small area west of Elk Grove and northeast of the Stone Lakes NWR. The goal within PPU 4 would be to augment the existing Stone Lakes NWR. PPU 4 would include one preserve totaling approximately 530 acres and composed primarily of Valley Grassland that connects to the Refuge. Although the total size of this preserve would typically make it a Minor Preserve; however, it was classified by the Permit Applicants as a Satellite Preserve because it would be fragmented by existing development in the area.

Flexible Preserve: At least 170 acres of Flexible Preserve would be established next to other preserves within the conceptual preserve system or to existing preserves inside the UDA. The purpose of the Flexible Preserve category is to assure that the operational Preserve System is providing the species conservation benefits of functions of the Vernal Pool ecosystem within the MCRA as anticipated by the Permit Applicants at the time of SSHCP preparation. Flexible Preserve acres would be located adjacent to existing or new preserves and must be within the MCRA or located within 1 mile of the MCRA.

PPU 5 is outside the UDA in the west-central part of the Planning Area. Under the Reduced Permit Term Alternative, new preserves in PPU 5 would be limited to approximately 210 acres of natural land covers along the Cosumnes River/Deer Creek Wildlife Movement Corridor. Most of the Cosumnes River/Deer Creek Wildlife Movement Corridor that would be preserved under the Proposed Action/Proposed Project Alternative would not be preserved under the Reduced Permit Term Alternative.

PPU 6 is outside the UDA in the southwestern part of Planning Area. Approximately 3,200 acres would be preserved in PPU 6 under the Reduced Permit Term Alternative, all of which would be Cropland Preserves. The preserve design focus for these Cropland Preserves would be to preserve existing agricultural lands that provide habitat for the broad-ranging Swainson's hawk, greater sandhill crane, and white-tailed kite. Other natural land covers could also be preserved in each Cropland Preserve, but these would be preserved and managed primarily for the benefit of Covered Species that forage in the row crop or irrigated pastures, and would generally be adjacent to existing agricultural fields.

PPU 7 is located outside the UDA in the southeastern portion of the Planning Area and was delineated to encompass large areas of the Vernal Pool ecosystem in the Cosumnes/Rancho Seco Core Recovery Area. Approximately 11,700 acres would be preserved in PPU 7. The preserve design focus in PPU 7 would be to preserve natural land covers in a large Landscape Preserve. SSHCP Preserves in PPU 7 would target Vernal Pool

and Valley Grassland in areas that are adjacent to or near existing preserves, such as the 12,500-acre Chance Ranch.

PPU 8: New habitat preservation in this PPU would include 48 acres of Cropland Preserve located at the southern edge of the Planning Area just outside Galt, along Dry Creek. This Cropland Preserve would focus on preserving high-value Swainson's hawk foraging habitat and a greater sandhill crane roosting pond.

Given the assumptions for development and preservation described previously, the lead agencies developed a Conservation Strategy for the Reduced Permit Term Alternative. This scenario provides a reasonable estimate of habitat preservation likely to occur, but is only one of many potential ways that development and preservation could proceed under this alternative. Table 2-11 provides a summary of the potential Preserve System by land cover type inside and outside of the UDA for the Reduced Permit Term Alternative.

Table 2-11. Minimum Acres of New Preserves Under the Reduced Permit Term Alternative

Land Cover Category[1]	Preserved Land (acres)		
	Inside UDA (acres)	*Outside UDA (acres)*	*Total (acres)*
All natural land covers[2]	4,752	15,293	20,044
Vernal pool ecosystem[3] land covers	3,674	7,042	10,716
Wetland land covers[4] and other water land covers	404	770	1,174

1 The rows in the table are not additive because the land cover categories include some overlapping land cover types (e.g., Vernal Pool is included in "all natural land covers," "Vernal Pool Ecosystem land covers," and "wetland land covers and other water land covers."

2 Planning Area land cover types were defined by the SSHCP preparers during development of the SSHCP. To allow for better comparison of impacts between the EIS/EIS alternatives, the EIS/EIR uses these land cover definitions in discussions of all alternatives. The natural land covers include Blue Oak Savanna, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture-Grassland, Mine Tailings Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Open Water, Orchard, Seasonal Wetland, Stream/Creek, Stream/Creek (VPIH), Swale, Valley Grassland, Vernal Pool, and Vineyard, as discussed in Table 8-1.

3 Vernal Pool Ecosystem includes three aquatic land cover types (Vernal Pool, Swale, and Stream/Creek (VPIH)) and hydrologically connected Valley Grassland.

4 Wetland land covers include the following aquatic land cover types: Freshwater Marsh, Seasonal Wetland, Open Water, Stream/Creek, Vernal Pool, Swale, and Stream/Creek (VPIH).

2.4.6 Preserve Management and Monitoring Programs under the Reduced Permit Term Alternative

The Reduced Permit Term Alternative would include the Compliance and AMM Effectiveness Monitoring Program and the Preserve System Management and Monitoring Program described in Section 2.3.6 for the Proposed Action/Proposed Project Alternative. As with the Proposed Action/Proposed Project Alternative, management and monitoring of preserves would continue in perpetuity after the end of the permit period.

2.4.7 HCP Implementation

Implementation of the Reduced Permit Term Alternative would occur over a 30-year permit term. The responsibilities of the Permit Applicants (future Plan Permittees) and the proposed structure and organization of the HCP Implementing Entity would be the same as described for the Proposed Action/Proposed Project Alternative above in Section 2.3.7.

2.5 REFERENCES CITED

CEQ (Council of Environmental Quality). 1981. "NEPA's Forty Most Asked Questions." March 16, 1981. Accessed June 27, 2016. https://energy.gov/sites/prod/files/G-CEQ-40Questions.pdf.

Galt. 2009. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Connector JPA (Capital SouthEast Connector Joint Powers Authority). 2012. *Capital SouthEast Connector Project Volume 2 of the Final Program Environmental Impact Report – Revisions to the Draft Program Environmental Impact Report*. SCH No. 2010012066. Mather, California: Connector JPA. In association with Elk Grove, Folsom, Rancho Cordova, El Dorado County, and Sacramento County and technical assistance from ICF International. February 2012. Accessed February 9, 2017. http://www.connectorjpa.net/uploads/8/3/3/5/83350278/capital_sec_v2_final_peir_revised_draft.pdf.

Holland, R.F. 2009. *California's Great Valley Vernal Pool Habitat Status and Loss: Rephotorevised 2005*. Auburn, California: Placer Land Trust. December 2009. Accessed June 28, 2016. http://www.vernalpools.org/vpreports/Great%20Valley%20Vernal%20Pool%20Distribution_Final.pdf.

Keeler-Wolf, T., D.R. Elam, K. Lewis, and S.A. Flint. 1998. *California Vernal Pool Assessment: Preliminary Report*. May 18, 1998. Accessed January 16, 2017. https://nrmsecure.dfg.ca.gov/documents/ContextDocs.aspx?cat=VegCAMP.

Rancho Cordova. 2006. *City of Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2013. *Five-Year Capital Improvement Plan: 2016–2020*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=10838.

Regional San (Sacramento Regional County Sanitation District). 2000. *Bufferlands Master Plan*. Final. Prepared by Carollo Engineers. Sacramento, California: Carollo Engineers. August 2000. Accessed June 28, 2016. http://www.regionalsan.com/bufferlands-master-plan.

Regional San. 2015. *SRCSD/SPA/City of Sacramento Recycled Water Feasibility Study*. Prepared by RMC Water and Environment. Sacramento, California: RMC Water and Environment. June 2014. Accessed online June 28, 2016. http://www.regionalsan.com/sites/main/files/file-attachments/final_spa_feasibility_study.pdf.

Sacramento Area Sewer District. 2010. *Sewer System Capacity Plan: 2010 Update*. Sacramento, California: Sacramento Area Sewer District. November 2011. Accessed June 28, 2016: http://www.sacsewer.com/master-plansewer-system-capacity-plan.

Sacramento Area Sewer District. 2014. *Sewer System Management Plan*. Sacramento, California: Sacramento Area Sewer District. May 14, 2014. Accessed June 28, 2016. http://www.sacsewer.com/sites/main/files/file-attachments/sewer_system_management_plan.pdf.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County. 2014a. "Figure LU1: Land Use & Urban Form Diagram." Sacramento, California: County of Sacramento, Community Planning and Development Department. Map revised June 26, 2014. Accessed June 28, 2016. http://www.cityofsacramento.org/Community-Development/Planning/Online-Library/General%20Plan.

Sacramento County. 2014b. "Circulation Element." *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended May 28, 2014. Accessed January 16, 2017. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan/Circulation%20Element%20Amended%205-28-14.pdf.

Sacramento County, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and U.S. Fish and Wildlife Service. 2004. Memorandum of Agreement. Signed September 7, 2004.

SCWA (Sacramento County Water Agency). 2005. *Zone 40 Water Supply Master Plan*. Prepared by MWH. Sacramento, California: MWH. February 2005. Accessed June 28, 2016. http://www.waterresources.saccounty.net/scwa/Documents/Z40_WSMP.pdf.

SSQP (Sacramento Stormwater Quality Partnership). 2007. Stormwater Quality Design Manual for the Sacramento and South Placer Regions. May 2007. Accessed February 9, 2017. http://www.waterresources.saccounty.net/Documents/SWQ_DesignManual_May07_061207.pdf.

Talley, T.S., E. Fleishman, M. Holyoak, D.D. Murphy, A. Ballard. 2007. "Rethinking a Rare-Species Conservation Strategy in an Urban Landscape: The Case of the Valley Elderberry Longhorn Beetle." *Biological Conservation* 135(1):21–32. February 2007.

USACE (U.S. Army Corps of Engineers). 2011. "Record of Decision: Sunridge Properties." SPK-2009-00511. Sacramento, California: USACE, Sacramento Corps of Engineers. January 25, 2011. Accessed June 28, 2016. http://www.spk.usace.army.mil/Portals/12/documents/regulatory/eis/200900511-ROD.pdf.

USACE. 2013. *12501-SPD Regulatory Program: Standard Operating Procedure for Determination of Mitigation Ratios.* Sacramento, California: U.S. Army Corps of Engineers, South Pacific Division. Approved October 21, 2013. Accessed June 28, 2016. http://www.spa.usace.army.mil/Portals/16/docs/civilworks/regulatory/Mitigation/12501-SPD%20Standard%20Operating%20Procedure%20for%20Determination%20of%20Mitigation%20Ratios.pdf.

USFWS (U.S. Fish and Wildlife Service). 1999a. "Formal Consultation on Water Service Contracts with Sacramento County Water Agency, San Juan Water District, and City of Folsom, Sacramento County, California." 1-1-97-F-0161. Sacramento, California: USFWS, Sacramento Fish and Wildlife Office. March 11, 1999.

USFWS. 1999b. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.* Sacramento, California: USFWS, Sacramento Fish and Wildlife Office. July 9, 1999. Accessed June 28, 2016. https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/Documents/velb_conservation.pdf.

USFWS. 2004. "Formal and Early Section 7 Endangered Species Consultation on the Freeport Regional Water Project, California." 1-1-04-F-0224. Memorandum from Acting Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California. December 10, 2004.

USACE and USEPA (U.S. Army Corps of Engineers and U.S. Environmental Protection Agency). 2008. Compensatory Mitigation for Losses of Aquatic Resources Final Rule. Federal Register, volume 73, pages 19594-19705.

USFWS. 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland, Oregon: USFWS, Region 1. December 15, 2005. Accessed June 28, 2016. http://www.fws.gov/sacramento/ES/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

USFWS. 2007a. *Stone Lakes National Wildlife Refuge Comprehensive Conservation Plan*. Sacramento, California: Fish and Wildlife Service Region 8. January 5, 2007. Accessed June 28, 2016. http://www.fws.gov/uploadedFiles/Region_8/NWRS/Zone_1/Stone_Lakes/Images/PDFs/SL%20CCP%20Final%20low%20res.pdf.

USFWS. 2007b. *Vernal Pool Tadpole Shrimp (*Lepidurus packardi*) 5-Year Review: Summary and Evaluation*. Sacramento, California: USFWS, Sacramento Field Office. September 2007. Accessed June 28, 2016. http://www.fws.gov/sacramento/es/Five-Year-Reviews/es_five-year.htm.

USFWS. 2007c. *Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) 5-Year Review: Summary and Evaluation*. Sacramento, California: USFWS, Sacramento Field Office. September 2007. Accessed June 28, 2016. http://www.fws.gov/sacramento/es/Five-Year-Reviews/es_five-year.htm.

USFWS. 2008. Orcuttia Viscida *(Sacramento Orcutt Grass) 5-Year Review: Summary and Evaluation*. Sacramento, California: USFWS, Sacramento Field Office. June 2008. Accessed June 28, 2016. https://www.fws.gov/ecos/ajax/docs/five_year_review/doc1933.pdf.

USFWS. 2009. *Slender Orcutt Grass (*Orcuttia tenuis*) 5-Year Review: Summary and Evaluation*. Sacramento, California: USFWS, Sacramento Field Office. November 2009. Accessed June 28, 2016. https://ecos.fws.gov/docs/five_year_review/doc3226.pdf.

USFWS and NMFS (National Marine Fisheries Service). 2000. "Notice: Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." June 1, 2000. Federal Register, volume 65, pages 35242–35257. Accessed February 6, 2012. http://www.fws.gov/endangered/esa-library/pdf/final_notice.pdf.

CHAPTER 3 – INTRODUCTION TO CHAPTERS 4 THROUGH 17

The National Environmental Policy Act (NEPA) regulations and the California Environmental Quality Act (CEQA) Guidelines identify required content for Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) documents (40 CFR 1502.10; CEQA Guidelines Sections 15120–15132). However, the format and organization of a NEPA or CEQA document is not mandated by these regulations and guidelines. Chapter 3 explains the format and organization of required EIS and EIR content that will be presented in Chapters 4 through 17.

Chapter 3 also provides a single location for the EIS/EIR to present terms, definitions, and concepts that will be used in the remaining EIS/EIR chapters. Chapters 4 through 17 refer to information presented in Chapter 3 to avoid duplication or repetition of the same information in each of the EIS/EIR resource impact analyses presented in Chapters 4 through 17.

Specific concepts presented in Chapter 3 include discussions of the approach taken, the information used, and general assumptions that will be made to estimate the direct, indirect, and cumulative impacts of each EIS/EIR alternative on the separate resource topics addressed in Chapters 4 through 17.

3.1 NEPA AND CEQA TERMS

As described in Chapters 1 and 2, NEPA and CEQA require analysis of potential environmental effects of proposed actions (and alternatives to those actions) before government agency approval. While many concepts are common to NEPA and CEQA, there are differences between the two in terminology, some of the required content, and certain elements of the impact analyses. Table 3-1 compares NEPA and CEQA terms that will be used in the remaining EIS/EIR chapters.

Table 3-1. Similar NEPA and CEQA Terms

NEPA Term	CEQA Term
Lead Agency	Lead Agency
Cooperating Agency	Responsible Agency Trustee Agency
Environmental Impact Statement (EIS)	Environmental Impact Report (EIR)
Notice of Intent (NOI)	Notice of Preparation (NOP)
Environmental Impact Statement (EIS)	Environmental Impact Report (EIR)
Action	Project
Purpose and Need for Action	Project Objectives
No Action Alternative	No Project Alternative
Affected Environment	Environmental Setting
Environmental Consequences	Environmental Impacts
Environmentally Preferred Alternative	Environmentally Superior Alternative
Notice of Availability (NOA)	Notice of Availability (NOA) Notice of Completion (NOC)
Record of Decision (ROD)	Findings of Fact and Statement of Overriding Considerations/Project Approval Notice of Determination (NOD)

3.2 RESOURCE TOPICS EVALUATED IN THE REMAINING CHAPTERS

Using the scoping processes discussed in Section 1.4, the lead agencies identified the following resource areas as deserving of study in this EIS/EIR. Required content and analysis for each of these resource topics will be presented together, in a single EIS/EIR chapter:

- **Chapter 4—*Land Use*** analyzes effects of each alternative on existing and planned land use conditions, consistency with applicable planning documents, and compatibility with existing and planned land uses. This chapter also includes a land use compatibility analysis of airports in the Planning Area.
- **Chapter 5—*Soils, Geology, and Mineral Resources*** analyzes effects of each alternative on geology, soils, and mineral resources within the Planning Area. Issues addressed include existing geologic and soil conditions, seismic and soils-related hazards (e.g., earthquake, landslide, erosion), accessibility of important mineral resources, and the potential for unsafe human exposure to naturally occurring asbestos.
- **Chapter 6—*Agriculture*** analyzes effects on agricultural resources and agricultural activities within the Planning Area.
- **Chapter 7—*Hydrology and Water Quality*** analyzes effects of each alternative on hydrology and water quality conditions within the Planning Area. The analysis focuses on potential short- and long-term effects of implementing each alternative on drainage, runoff, and pollutant discharges.
- **Chapter 8—*Natural Land Cover Habitat Types, and Associated Plant and Animal Communities*** analyzes effects of each alternative on land cover types, including sensitive natural communities, and the common plant and animal species that use them.
- **Chapter 9—*Special-Status Species, Including HCP Covered Species*** analyzes effects of each alternative on special-status terrestrial and aquatic species occurring in the Planning Area, including the 28 species specifically addressed in the South Sacramento Habitat Conservation Plan (SSHCP) (the SSHCP Covered Species).
- **Chapter 10—*Aquatic Resources*** analyzes effects of each alternative on wetlands and other types of aquatic resources within the Planning Area. The analysis focuses on impacts to aquatic resources that might be jurisdictional under Section 404 of the Clean Water Act (CWA 404); aquatic resources that might be jurisdictional under CWA 401 and/or state of California regulations; and aquatic resources (including riparian areas, lakes, or streambeds) that are jurisdictional or might be jurisdictional under section 1600 of the California Fish and Game Code.
- **Chapter 11—*Paleontological, Cultural, and Historical Resources*** analyzes effects of the alternatives on paleontological, cultural, and historical resources within the Planning Area. For this EIS/EIR, cultural resources include tribal resources.

- **Chapter 12—*Public Services and Facilities*** analyzes effects of each alternative on public services and facilities within the Planning Area. Services and facilities assessed include fire protection, law enforcement, water supply, wastewater treatment, solid waste (landfill capacity), parks and recreation, energy services (natural gas and electricity), and mosquito abatement.
- **Chapter 13—*Traffic and Circulation*** analyzes effects of each alternative on traffic and circulation within the Planning Area. The analysis focuses on impacts to transportation systems that support the movement of goods and people. These systems include roads and freeways that support motorized vehicles; railways; public transit; and non-motorized travel, including bicycles and pedestrians.
- **Chapter 14—*Air Quality*** analyzes effects of each alternative on air quality within the Planning Area. General topics addressed include existing air quality conditions and construction and operational air emissions. Air quality impacts are evaluated for emissions of criteria air pollutants, fugitive dust, toxic air contaminants, and odors.
- **Chapter 15—*Greenhouse Gases and Climate Change*** analyzes effects of each alternative on global climate change, as well as impacts of global climate change on each alternative.
- **Chapter 16—*Population and Housing, Socioeconomics, and Environmental Justice*** analyzes effects of each alternative on population and housing, socioeconomics, and environmental justice within the Planning Area. Included in this chapter is the regulatory setting for population and housing, socioeconomics, and environmental justice, which identifies the laws and policies that govern the decision-making processes of relevant federal, state, and local agencies with a role in implementing the alternatives. This chapter provides an overview of social and economic conditions, demographics, and the characteristics of minority and low-income populations in the Planning Area that are relevant for analysis of environmental justice effects.
- **Chapter 17—*Other Required Analysis for CEQA and NEPA*** identifies significant effects that cannot be avoided, potentially significant effects that could be avoided, and effects found not to be significant; discusses the relationship between short-term uses of the environment and enhancement of long-term productivity; identifies irreversible and irretrievable commitments of resources, as well as significant irreversible environmental changes; discusses growth inducement and related effects; and discusses compliance with relevant executive orders. In addition, the list of EIS/EIR preparers that is required by NEPA regulation and the CEQA Guidelines is presented as EIS/EIR Chapter 18.

Although aesthetic resources and noise are included on the CEQA Guidelines Appendix G Environmental Checklist Form, these issues were not identified during the EIS/EIR internal scoping or the public scoping processes (see Section 1.4) as significant environmental issues deserving of study (40 CFR 1500.4(g)). In addition, the effects of the two EIS/EIR action

alternatives described in Sections 2.3 and 2.4 on aesthetic resources and on noise are anticipated to be essentially the same as anticipated future changes in aesthetics and noise that would occur under the No Action condition (i.e., the future conditions in south Sacramento County if an HCP is not permitted or implemented). Therefore, relative to the expected No Action future conditions, the EIS/EIR action alternatives would not have an effect on future noise or future aesthetic resources (see Initial Study Checklist in Appendix F). Therefore, to help narrow the scope of this EIS/EIR and concentrate on the issues that are truly significant to the decisions in question (pursuant to 40 CFR 15001.1, 40 CFR 1501.1(d), 40 CFR 1501.7(a)(3), and CEQA Guidelines Section 15063(c)(3)), noise and aesthetic resources are not studied further in this EIS/EIR.

3.3 FORMAT AND CONTENT OF CHAPTERS 4 THROUGH 16

Some of the EIS content required by NEPA regulation 40 CFR 1502.10 and some EIR content required by CEQA Guidelines Sections 15120–15132 were presented in EIS/EIR Chapter 1, including a description of the project location, the purpose and need for action and a statement of project objectives, and identification of the decision(s) to be made.

Required descriptions of the alternatives analyzed, including descriptions of the No Action/No Project Alternative and the Proposed Action/Proposed Project Alternative, were presented in EIS/EIR Chapter 2. Chapter 2 also provided brief discussions of the alternatives that were eliminated from detailed study and the reasons for their elimination. NEPA regulations and the CEQA guidelines also require EISs and EIRs to describe the existing environmental conditions present in the vicinity of the proposed project and the alternatives (i.e., the Affected Environment/Environmental Setting), and also require EISs and EIRs to describe and analyze the environmental impacts of the proposed project and each alternative (i.e., the Environmental Consequences/Environmental Impacts). The SSHCP EIS/EIR organizes that content by resource topic as listed in Section 3.2. In this manner, the existing conditions of an environmental resource as well as the potential impacts on that environmental resource will be presented together in one EIS/EIR chapter.

The resource-topic chapters (Chapters 4 through 16) are organized into two primary sections: the Affected Environment/Environmental Setting section and the Environmental Consequences/Environmental Impacts section:

- **Affected Environment/Environmental Setting**
    - ***Regulatory Framework***
    - ***Existing Conditions***

- **Environmental Consequences/Environmental Impacts**
    - ***Methodology for Assessing Impacts of Each Alternative*** on the chapter's resource topic
        - Study Area (if different than the Planning Area)
        - Impact Methodology
        - Significance Criteria and Thresholds of Significance
    - ***No Action/No Project Alternative***
        - Direct and Indirect Effects of the Alternative
        - Cumulative Effects Analysis of the No Action/No Project Alternative
    - ***Proposed Action/Proposed Project Alternative***
        - Direct and Indirect Effects of the Proposed Action/Proposed Project
        - Significance of Direct and Indirect Effects
        - Cumulative Effects of the Proposed Action/Project Alternative
    - ***Reduced Permit Term Alternative***
        - Direct and Indirect Effects of the Alternative
        - Significance of Direct and Indirect Effects
        - Cumulative Effects of the Reduced Permit Term Alternative

3.4 PREVIOUS PLANNING AREA ENVIRONMENTAL REVIEWS

Under certain circumstances, NEPA and CEQA regulations allow information or analysis previously presented in another document to be incorporated by reference into an EIS or EIR. If the analysis and assumptions used in the referenced document are determined by the lead agencies to be appropriate for the EIS/EIR analysis, a brief summary or description of the incorporated information or analysis will be provided, including pertinent page numbers and other relevant identifying information, pursuant to 40 CFR 1502.21, 43 CFR 46.135, and CEQA Guidelines, Section 15150(c).

The sections titled "Environmental Consequences/Environmental Impacts" in Chapters 4 through 16 may incorporate by reference certain information or analysis available from previous environmental documents. Three of these previous documents are the EIRs prepared for the Sacramento County, City of Galt, and City of Rancho Cordova General Plans, which identify policies and land use priorities to guide future development in those jurisdictions. The Sacramento County, Galt, and Rancho Cordova General Plans were updated relatively recently, and those jurisdictions overlap with the EIS/EIR Planning Area, although both the Sacramento County and the Rancho Cordova General Plans include lands that are outside the EIS/EIR Planning Area boundary. The General Plans provide a broad outline of future land use patterns within the

Planning Area. In addition, within the Galt and Rancho Cordova city limits and within Sacramento County's Urban Policy Area (UPA),[1] urban land use designations and intensities are identified.

The urban development Covered Activities that are included in the Proposed Action/Proposed Project Alternative and also included in the Reduced Permit Term Alternative (Sections 2.3 and 2.4) are consistent with future urban development patterns, infrastructure, and other elements described in the three General Plans. The planned future urban development, infrastructure, and the other elements described in the three adopted General Plans were also closely considered by the lead agencies when identifying and describing the No Action/No Project Alternative's activities, projects, and the expected future condition of the Planning Area (Section 2.2).

3.4.1 Sacramento County General Plan

The *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011) includes goals and policies that help ensure that future population growth in the County will have adequate housing, employment, public services, and other necessities (Sacramento County 2011, p. 12). As part of the Sacramento County General Plan, the County adopted two growth boundaries to create a logical progression of urban development—the Urban Services Boundary (USB) and the UPA. The USB indicates the ultimate boundary of the urban area in the unincorporated County, while the UPA defines the area within the USB expected to receive urban levels of public infrastructure and services within the General Plan's 25-year planning period.

Several elements of the Sacramento County General Plan were developed in a manner that anticipated the approval and implementation of an HCP in south Sacramento County (see Sacramento County 2011, Land Use Element, pp. 36, 136–137; Open Space Element, pp. 4, 17, 18; Agricultural Element, p. 9; Conservation Element, pp. 20, 35, 37, 38, 41, 45, 47, 57, 68).

The Sacramento County General Plan Land Use Element policies give priority to residential development on vacant or underutilized sites within existing urban areas that have infrastructure available, support completion of existing planned communities located within the current UPA, and support infill development within the UPA (Policies LU-4 through LU-11). The Land Use Element also contains policies allowing urban development within new growth areas that are contiguous to but outside the existing UPA (Policy LU-3). New growth areas outside the existing UPA can only be developed if the County first approves a specific plan, a comprehensive plan, or other master plan for the new growth areas (Sacramento County 2011,

[1] The Urban Policy Area (UPA) defines the area expected to receive urban levels of public infrastructure and services within the planning horizon by providing the geographic basis for the provision of urban services and infrastructure to the unincorporated County (Sacramento County 2011b).

Land Use Element, p. 35). The Sacramento County General Plan also introduced a new process by which the County would consider requests to expand the UPA; it requires any UPA expansion to meet a series of "smart growth" performance criteria (Sacramento County 2011, Land Use Element Policies LU-119 and LU-120). Although all of the land located between the current UPA boundary and the USB boundary is expected to be developed in the future, the current Sacramento County General Plan does not assign specific land use designations or development density targets to this area.

The *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR) (Sacramento County 2010) analyzed the effects of population growth and urban development that could occur under the General Plan over 25 years. The EIR considered several different alternatives, which included (or excluded) various potential new growth areas for urban development. Ultimately, the County adopted a General Plan that did not include any new growth areas, but instead included policies directing how such areas could be developed following a master planning process; the adopted General Plan most closely resembled the Mixed Use Alternative analyzed in the General Plan EIR. One of the other EIR alternatives, the original staff proposal, included new growth areas within the SSHCP's Urban Development Area (UDA). The inclusion of these new growth areas, primarily within the Jackson Highway corridor (see also Section 3.7.2 regarding proposed future development within the Jackson Highway Corridor), makes this original staff proposal alternative more closely resemble the development scenario assumed by the SSHCP than does the adopted alternative. For this reason, this EIS/EIR utilizes the General Plan EIR analyses associated with the original staff proposal rather than the analyses associated with the Mixed Use Alternative when citing the Sacramento County General Plan EIR. However, the analysis in the General Plan EIR included nearly 300,000 additional acres of Sacramento County that are not included in the SSHCP EIS/EIR Planning Area. Therefore, the significance conclusions presented in the Sacramento County General Plan EIR include impacts from development outside the EIS/EIR Planning Area.

3.4.2 Galt General Plan

The *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009a) contains statements of goals, policies, standards, implementation programs, and quantified objectives that constitute the formal policy of Galt about future land use, development, and environmental quality in Galt and its sphere of influence (SOI) through the year 2030. The Galt General Plan covers an area beyond its current SOI to an area north of Twin Cities Road, which the Galt expects would be annexed to it if needed for development.

The *Final Environmental Impact Report for the 2030 Galt General Plan* (Galt General Plan EIR) (Galt 2009b) analyzed the effects of expected population growth and urban development under the Galt General Plan over 20 years to the year 2030. The Galt General Plan EIR assumed full

buildout[2] within the existing City boundaries (Figure 1-1) by 2030, and assumed that locations of future development would conform to the "Preferred Land Use Diagram" included in the General Plan (Galt 2009b, p. LU-5). The EIR also assumed that a proposed SOI expansion would be approved by the Sacramento Local Agency Formation Commission.

The proposed Galt SOI is within the SSHCP EIS/EIR Planning Area and is part of the UDA,[3] as shown on Figure 1-1.

3.4.3 Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2006a) is the only general plan adopted by Rancho Cordova since Rancho Cordova was incorporated as a new city in 2003. The Rancho Cordova General Plan provides policies to plan for new urban growth over a 20-year period ending in 2030. Similar to the Sacramento County General Plan, the Rancho Cordova General Plan includes a land use map and multiple "elements," each of which includes goals and policies that guide future development, infrastructure, and conservation (Rancho Cordova 2006a). The Rancho Cordova General Plan provides projections for development by 2030, and full buildout of the development allowed by the General Plan within Rancho Cordova and its approved SOI by the year 2050.

The *City of Rancho Cordova General Plan Final Environmental Impact Report* (Rancho Cordova General Plan EIR) (Rancho Cordova 2006b) evaluated effects of the new urban development planned in the City of Rancho Cordova between the year 2006 and 2030, including development of the City's approved SOI. In addition, the Rancho Cordova General Plan EIR also evaluated full buildout of the Rancho Cordova city boundary and full buildout of Rancho Cordova's approved SOI, but did not identify a year when that full buildout would occur.

The study area for the Rancho Cordova General Plan EIR included areas outside the EIS/EIR Planning Area, including the portion of the City north of Highway 50 and the land owned by Aerojet northeast of the Planning Area (see EIS/EIR Planning Area discussion in Section 1.1.1). Therefore, the significance conclusions presented in the Rancho Cordova General Plan EIR include impacts from development outside the EIS/EIR Planning Area.

---

2 "Full Buildout" means all currently undeveloped lands that are zoned for or are ultimately planned/contemplated for future urban development (in the adopted General Plans of the Permit Applicants) would become developed. Full buildout will include some open space and conservation lands within the areas planned for urban development.

3 As discussed in Section1.1.1, the UDA is an area that includes the portion of the Sacramento County Urban Services Boundary (USB) that is located within the EIS/EIR Planning Area, the portion of the incorporated City of Rancho Cordova that is located within the EIS/EIR Planning Area, and all the City of Galt and Galt's Sphere of Influence (SOI) (see Figure 1-1).

3.4.4 Sacramento Area Council of Governments Metropolitan Transportation Plan and Sustainable Communities Strategy

The Sacramento Area Council of Governments (SACOG) Metropolitan Transportation Plan (MTP) is a 20-year regional plan for transportation projects, such as bikeway, road, sidewalk, and transit projects in the six-county region of Sacramento, Yuba, Sutter, Yolo, Placer, and El Dorado Counties. Any transportation projects in the six-county region using federal and state funding must be included in the MTP. Since the adoption of Senate Bill 375 in 2008, each Metropolitan Planning Organization, including SACOG, is also required to include a Sustainable Communities Strategy (SCS) as part of its regional transportation plan. The SCS must demonstrate how development patterns and transportation network, policies, and programs can work together to achieve greenhouse gas emission reduction targets set by the California Air Resources Board for cars and light trucks, if there is a feasible way to do so. The SACOG MTP/SCS was adopted on February 18, 2016 (SACOG 2016a).

The *Final Environmental Impact Report for the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS EIR) (SACOG 2016b) evaluated effects associated with implementation of the MTP/SCS over a 6,036-square-mile plan area. The study area for the MTP/SCS EIR includes the six-county region described above, and the analysis and conclusions reached by the MTP/SCS EIR are based on development and population growth across a much larger area than the EIS/EIR Planning Area.

3.4.5 Capital Southeast Connector

The Capital Southeast Connector is a proposed 35-mile multimodal transportation roadway extending from Interstate 5, south of Elk Grove, northeast through the UDA, to U.S. Highway 50 in El Dorado County. The Capital Southeast Connector will link existing communities in Sacramento and El Dorado Counties, including Elk Grove, Rancho Cordova, Folsom, and El Dorado Hills. Much of the project footprint of the Capital Southeast Connector (26.5 miles) is within the Planning Area.

Generally, the Capital Southeast Connector includes the following project segments:

- A four-lane expressway segment from the Interstate 5/Hood-Franklin Road Interchange easterly along an extension of Kammerer Road to the existing Kammerer Road/ Bruceville Road intersection
- A four- to six-lane thoroughfare segment east of the Kammerer Road/Bruceville Road intersection along Kammerer Road, and then northeast on Grant Line Road to its intersection with Bond Road (note: this road segment is within the UDA)

- A four-lane limited access rural thoroughfare along Grant Line Road from the intersection of Bond Road, northeasterly to the intersection of Calvine Road (note: this road segment is within the UDA)
- A four- to six-lane expressway segment on Grant Line Road from its intersection with Calvine Road, northeasterly to the intersection of White Rock Road, and then on White Rock Road from its intersection with Grant Line Road easterly to the Sacramento County–El Dorado County Line
- A four- to six-lane thoroughfare segment on White Rock Road from the Sacramento County–El Dorado County line northeasterly to the intersection with the U.S. Highway 50 interchange at Silva Valley Parkway (note: this segment and interchange are outside of the Planning Area, so are not SSHCP Covered Activities and are not covered by the SSHCP permits).

The construction and future operation of the 26.5-mile portion of the Capital Southeast Connector located within the Planning Area is a Covered Activity of the two EIS/EIR action alternatives (see Sections 2.3 and 2.4).

The *Capital Southeast Connector Project Final Program Environmental Impact Report* (Connector EIR) (Connector JPA 2012) analyzed effects associated with the selection of a maximum 1,000-foot-wide general alignment along the 35-mile corridor between Interstate 5 in Elk Grove and U.S. Highway 50 in El Dorado County. Project design guidelines were included as assumptions to help define the general scope of the project and estimate potential impacts of the project in the Program EIR, but the document was not intended to provide environmental clearance for full project design, and subsequent project-level analyses will be completed in the future. As described previously, the study area for the Connector EIR included areas outside the EIS/EIR Planning Area; therefore, the significance conclusions presented in the Connector EIR include impacts from project development outside the EIS/EIR Planning Area.

3.5 CONTENTS OF THE AFFECTED ENVIRONMENT/ ENVIRONMENTAL SETTING SECTIONS OF CHAPTERS 4 THROUGH 16

NEPA regulations require that each EIS describe the Affected Environment, defined as the existing environment of the area to be affected by the alternatives under consideration (40 CFR 1502.15). Similarly, under CEQA, each EIR is required to describe the existing Environmental Setting and the physical environmental conditions in the vicinity of the project (from both a local and regional perspective), as it exists at the time the Notice of Preparation (NOP) is published (CEQA Guidelines, Section 15125). As discussed in Section 1.4.1, the NOP for this EIS/EIR was published in 2013.

NEPA regulations and CEQA Guidelines both require the description of the existing environmental conditions be no longer than is necessary to understand and describe the effects of the proposed action/proposed project and the alternatives.

The Affected Environment/Environmental Setting sections of Chapters 4–16 (see preliminary discussion in Section 3.3) include a description of the existing regulatory environment typical in the Planning Area for proposed projects that could affect that resource topic. The Affected Environment/Environmental Setting sections identify the Planning Area's existing laws, regulations, and local policies that apply to that resource topic. Any environmental analyses, studies, or surveys of the resource topic that would be required by the existing Regulatory Framework are explained in this section. In addition, relevant permits, licenses, and other entitlements that must be obtained to implement the alternatives are presented in this section of Chapters 4–16, as required by NEPA regulation 40 CFR 1502.25.

The Affected Environment/Environmental Setting sections also describes the existing physical environmental conditions of that resource within the EIS/EIR Planning Area, and existing conditions within the EIS/EIR study area of that resource topic, if the study area of the resource topic is larger than the EIS/EIR Planning Area (see study area discussion in Section 3.6.2).

3.6 CONTENTS OF ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACT SECTIONS IN CHAPTERS 4 THROUGH 16

As outlined in Section 3.3, the potential environmental impacts of implementing the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative, and the Reduced Permit Term Alternative are presented in separate subsections of each resource-topic chapter (Chapters 4 through 16).

In Chapters 4 through 16, the level of detail used when describing environmental impacts for each resource-topic varies in proportion to their significance, meaning that severe impacts are described in more detail than less consequential impacts, as required by 40 CFR 1502.2(b) and by CEQA Guidelines, Section 15126.2(a). This is intended to help decision makers and the public focus on each alternative's key effects. CEQA requires that an EIR be prepared with a sufficient degree of analysis to provide decision makers with information that enables them to make a decision that intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project under CEQA need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible (CEQA Guidelines, Section 15151).

The analysis of the proposed action and each alternative must include an analysis of the direct, indirect, and cumulative effects of the proposed action or alternative, as well as analysis of the effects of any appropriate mitigation measures and best management practices (43 CFR 46.130a). Under NEPA regulations, those mitigation measures and best management practices can be analyzed either as elements of the alternatives or in a separate discussion of mitigation (43 CFR 46.130a). Because mitigation, conservation, minimization, and avoidance measures are key components of the SSHCP, each of the Environmental Consequences/Environmental Impact sections of Chapters 4–16 concurrently analyze both the adverse impacts of the alternative and the beneficial impacts of the mitigation, conservation, minimization, and avoidance measures that are also included in the description of the alternative (see Section 2.2, 2.3, and 2.4). Under CEQA, an EIR is required to distinguish between the measures that are proposed by project proponents to be included in the project and other mitigation measures that the lead agency determines could reasonably be expected to reduce significant adverse impacts; the EIR is required to identify mitigation measures for each significant environmental effect identified (CEQA Guidelines, Section 15126.4).

Therefore, this EIS/EIR will recommend additional mitigation measures, as appropriate, when an impact determination finds that a significantly adverse effect would result from an action alternative (see additional discussion of impact significance in Section 3.8).

3.6.1 EIS/EIR Environmental Baseline

Under NEPA, the impacts of the proposed action and each alternative are usually discussed and evaluated in comparison to the expected future conditions that would occur without an action/project (CEQ 1981, Question #3; 43 CFR 46.4.15[b][1]). The future conditions without the action/project are the same future environmental conditions described for the No Action Alternative. Therefore, the expected future condition for each of the resource areas studied in this EIS/EIR (see Section 3.2) is described in the No Action/No Project Alternative sections of Chapters 4–16 (see Section 3.3). As indicated in those sections, the expected No Action/No Project's future conditions are always described and discussed relative to the existing conditions of that resource topic.

Under CEQA, the impacts of the proposed project and each alternative are usually described relative to the existing environmental conditions at the time the NOP is issued (CEQA Guidelines, Section 15125(a)). The existing environmental condition of the resources in the Planning Area at the time of NOP issuance are presented in the Affected Environment/ Environmental Setting sections of Chapters 4–16.

However, under both NEPA regulations and the CEQA Guidelines, lead agencies have discretion in some situations to use a different baseline for describing and assessing environmental effects

of a proposed project and alternatives. As discussed previously, the CEQA baseline for describing impacts and assessing significance of project impacts is normally the environmental setting (the existing conditions) at the time an NOP is issued (CEQA Guidelines, Section 15125[a]). However, CEQA case law has clarified that in some situations, this typical approach may not be appropriate. In the 2013 California Supreme Court decision, *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority*, the court clarified that lead agencies preparing EIRs have the discretion to use a future-condition baseline when a comparison to the existing conditions would be misleading or uninformative. That court decision noted the following points: (1) that a CEQA analysis needs to "employ a realistic baseline that will give the public and decision makers the most accurate picture practically possible of the project's likely impacts;" (2) "CEQA imposes no 'uniform, inflexible rule for determination of the existing conditions baseline,' instead leaving to a sound exercise of agency discretion the exact method of measuring the existing environmental conditions upon which the project will operate;" and (3) a lead agency may "omit an analysis of impacts on existing conditions when inclusion of such an analysis would detract from an EIR's effectiveness as an informational document, either because an analysis based on existing conditions would be uninformative or because it would be misleading to decision makers and the public" (*Neighbors for Smart Rail v. Exposition Metro Authority* [2013] 57 Cal.4th 439, 507). Also, the court indicated that "nothing in CEQA law precludes an agency from considering both types of baseline—existing and future conditions—in its primary analysis of the project's significant adverse effects."

For this EIS/EIR, the lead agencies determined that using the existing condition as the baseline to describe and determine the significance of each action alternative's expected impacts would be misleading. This determination was made because the two action alternatives include, as Covered Activities, future urban development and infrastructure projects that are also reasonably expected to occur under the No Action/No Project Alternative. Although the details of this future development are not completely known at this time, it is anticipated that new urban development under all of the EIS/EIR alternatives would accommodate the same population and development growth, and that this urban growth would occur in areas where public infrastructure and services are planned for the 50-year EIS/EIR study period (i.e., within the spheres of influence for the Cities of Galt and Rancho Cordova and within Sacramento County's USB). As a result, the types of new urban development and associated infrastructure would be the same, and the general locations and the acres of new urban development would be very similar for all alternatives. Therefore, using existing conditions as the baseline for describing the effects of each action alternative and for determining the significance of those effects would misrepresent the impacts of the action alternative because that development would occur whether or not an HCP is approved and implemented in south Sacramento County.

Further, the future urban development and infrastructure Covered Activity projects and activities are not part of the "project" under CEQA that is subject to approval by the CEQA lead agency and by the other HCP Permit Applicants (see Section 1.5), are not part of the "project" under CEQA that would be subject to permitting by the California Department of Fish and Wildlife (CDFW) (see Section 1.5), and are not part of the "action" under NEPA that would be subject to permitting by the U.S. Fish and Wildlife Service (USFWS) (see Section 1.5). The EIS/EIR "project" (under CEQA) and "action" (under NEPA) consists of the approval and implementation of the HCP, SSHCP Aquatic Resources Plan (ARP), and issuance of associated take permits, but not the actual construction of or the discretionary entitlements of urban development projects and activities. Thus, the future environmental impacts of new urban development in the Planning Area would not result from the decisions to be made about the Proposed Action/Proposed Project (Section 1.5). For these reasons, the EIS/EIR basis of comparison (the EIS/EIR baseline) for describing the environmental impacts of each action alternative is the future condition of the Planning Area expected to occur under the No Action/No Project Alternative.

3.6.2 Geographic Study Area of Resource Topics Analyzed in Chapters 4 through 16

For most of the resource topics analyzed in Chapters 4–16, the geographic study area for direct, indirect, and cumulative effects of each alternative is the same as the Planning Area boundary (see Section 1.1.1). However, for some resource areas, the study area is larger than the Planning Area because the effects of the Proposed Action/Proposed Project would act synergistically with impacts in the larger area to affect the resource. For example, for EIS/EIR Chapter 14, Air Quality, the impact study area for that resource topic consists of the Sacramento Valley Air Basin because emissions generated in the Planning Area are distributed throughout that air basin. In Chapter 8, Natural Land Cover Habitat Types, and Associated Plant and Animal Communities, the study area for impacts to the vernal-pool land cover and the vernal-pool ecosystem considers cumulative impacts to those aquatic resources within the boundary of the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf et al. 1998; USFWS 2005), which extend beyond the EIS/EIR Planning Area to include other portions of Sacramento County, and portions of Placer, Yuba, San Joaquin, Calaveras, Amador, and Eldorado Counties. For Chapter 9, Special-Status Species, Including HCP Covered Species, the study area for cumulative impacts varies depending on the species because some species have very limited ranges, while others have extensive ranges.

When the study area for a resource topic is different from the Planning Area boundary, the section titled "Methodology for Assessing Impacts of Each Alternative" (see Section 3.3) defines the study area and provides a reasonable explanation for the geographic area used in the cumulative analysis (CEQA Guidelines, Section 15120 [b][3]).

3.6.3 EIS/EIR Study Period

The Proposed Action/Proposed Project requests a 50-year Incidental Take Permit (ITP) permit term (see Section 2.4.1). During the proposed 50-year permit term, all Covered Activities would be constructed, the entire SSHCP Preserve System would be established, and the other parts of the proposed Conservation Strategy would be completed. Therefore, a 50-year EIS/EIR study period is reasonable for the Proposed Action/Proposed Project because that period will cover the amount of time anticipated by the Permit Applicants for full build-out of the UDA to occur, and the amount of time anticipated for assembly of the interconnected SSHCP Preserve System and implementation of the proposed SSHCP Conservation Strategy.

To allow for a coequal analysis of all EIS/EIR alternatives, as required by NEPA regulation (40 CFR 1502.14), the EIS/EIR also uses the same 50-year analysis study period to evaluate the No Action/No Project Alternative and to evaluate the Reduced Permit Term Alternative.

3.6.4 Addressing Incomplete or Unavailable Information in Chapters 4 through 16

CEQA recognizes that drafting an EIR necessarily involves some degree of forecasting. While foreseeing the unforeseeable is not possible, an agency must use its best efforts to determine and disclose all that it reasonably can (CEQA Guidelines, Section 15144). The courts have looked not for perfection but for adequacy, completeness, and a good-faith effort at full disclosure (CEQA Guidelines, Section 15151).

Likewise, NEPA regulations direct that when a lead agency is evaluating a reasonably foreseeable effect in an EIS and there is incomplete or unavailable information, the EIS shall always be clear that such information is lacking (40 CFR 1502.22). Further, if information relevant to a reasonably foreseeable adverse impact cannot be obtained because the means to obtain it are not known, or the costs of obtaining the information are exorbitant, the EIS shall: (1) state that such information is incomplete or is unavailable; (2) state why the missing information is relevant to evaluating the foreseeable adverse impact; (3) summarize the existing information and credible scientific evidence which is relevant to evaluating the reasonably foreseeable adverse impact; and (4) the lead agency's evaluation of the foreseeable adverse impact with incomplete or unavailable information shall be based upon theoretical approaches or methods that are generally accepted in the scientific community (40 CFR 1502.22(b)).

The description of the three EIS/EIR alternatives in Chapter 2, including the types, amounts, locations, and timing of future development forecasted in the Planning Area under each alternative, was based on information obtained from three primary sources: (1) the adopted

General Plans (see Section 3.4); (2) the Master Plan development applications currently being processed by the local land use authorities (see Section 2.2.1 and Table 2-3), and (3) the professional judgment of the planning departments of Sacramento County, Galt, and Rancho Cordova. These sources of information provide the best available information about the types, amounts, locations, and timing of future development expected in the Planning Area under each of the three EIS/EIR alternatives, and they provide the foundation for the impact analysis of each EIS/EIR alternative presented in Chapters 4 through 16.

However, information about the precise amounts, specific locations, and actual timing of future development projects under each EIS/EIR alternative over the 50-year EIS/EIR study period is incomplete. Furthermore, current forecasts of Planning Area economic conditions, population trends, and other factors that stimulate and drive urban development have some uncertainty, so the future population growth and economic conditions over the next 50 years may be different from the current predictions. In addition, as discussed in Section 2.2.2 for the No Action/No Project Alternative, there is also some uncertainty about future regulatory requirements for new development projects within parts of the UDA and how those requirements may affect species habitat and aquatic resource avoidance, minimization, and preservation over the next 50 years.

The EIS/EIR identifies where specific information about the future conditions of an EIS/EIR alternative is incomplete or unavailable at this time. The EIS/EIR then explains how any incomplete or unavailable information was addressed by the lead agencies to forecast the likely future conditions under an EIS/EIR alternative and to determine the environmental impacts of each EIS/EIR alternative.

3.6.5 GIS Methodology Used in Chapters 4 through 16 to Estimate Direct Impacts of Each EIS/EIR Alternative

Direct impacts are effects caused by the action or project and occur at the same time and place as the action or project (40 CFR 1508.8; CEQA Guideline, Section15358). Direct impacts are also discussed as primary impacts under CEQA.

Chapters 4–16 estimate the permanent direct effects of each EIS/EIR alternative using geographical information system (GIS) technology. GIS is a computer and software system designed to collect, store, manage, present, analyze, and manipulate spatial or geographically referenced data (i.e., information or data identified by its location). GIS spatial data represents locations of real objects (such as roads, land use, elevation, vegetation, and waterways) as points, lines, and polygons.

The majority of natural-resource spatial data used by the SSHCP EIS/EIR came from aerial photographs of the Planning Area that were digitized or scanned by the Permit Applicants to

produce digital data sets. Existing spatial data from other sources was also used, including spatial data from the CDFW Natural Diversity Database to locate species survey data and known species occurrences within the Planning Area, maps of streams and creeks from the National Hydrological Dataset, state maps of important farmland, and other publicly available geographic datasets. GIS can be used to combine several spatial datasets to create a new output vector dataset (or new map overlay), which is visually similar to stacking several paper maps of the same area. The new map overlay can be similar to a mathematical Venn diagram of overlays for the same area—for example, a union overlay combines geographic features into a single new output; an intersect overlay defines the area where inputs overlap, and a symmetric difference overlay defines an output that includes the total of both inputs, except for the overlapping areas.

The impact analysis in this EIS/EIR included use of GIS digital map overlays of the planned new urban development and infrastructure footprints expected under the each alternative. The GIS map overlay of urban development projects and activities expected under each EIS/EIR alternative (described in Sections 2.2, 2.3, and 2.4) includes UDA Master Plan development projects and infrastructure projects that are currently in the planning process (see Table 2-9), and the other anticipated urban development and infrastructure discussed in the adopted General Plans (see Section 3.4), including the road and utility infrastructure projects that are planned by Capital Southeast Connector JPA and the Sacramento Regional County Sanitation District.

The EIS/EIR then used GIS technology to compare the spatial data overlay of planned urban development for each EIS/EIR alternative to the spatial data overlays of existing resources for this Planning Area.

Where the GIS comparison of the map overlays showed an intersection or overlap between the alternative's planned-development footprint and an existing environmental resource, the Environmental Consequences/Environmental Impact analysis assumes that the environmental resources present within the area of overlap would be removed, and new urban development would occur in that area. GIS was used to quantify these acres of overlap, and the Environmental Consequences/Environmental Impact analysis analyzed those acres of existing land cover or natural resource as permanently impacted and removed (lost).

The GIS software can make precise calculations. However, the map overlay of the new urban development expected under each alternative included many assumptions about the specific locations, types, timing, quantity, and total area of future urban development and associated infrastructure. As discussed in Section 3.6.4, the assumptions made by the lead agencies to develop the data overlay of each EIS/EIR alternative were based on information from the General Plans described in Section 3.4, on information in the Master Plan development applications currently being processed by the local land use authorities, and on the professional judgment of the planning departments of Sacramento County, Galt, and Rancho Cordova. As

further discussed in Section 3.6.7, these sources of information provide the best available information about the types, amounts, locations, and timing of future urban development in the Planning Area. Use of the best available scientific and commercial information during the preparation of the EIS/EIR is discussed in Section 3.6.7.

3.6.6 Methodology Used in Chapters 4–16 to Estimate Indirect Impacts of EIS/EIR Alternatives

NEPA defines indirect impacts as effects of the action that occur later in time, or are farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8). Similarly, CEQA describes indirect effects as those that are caused by a project but occur later in time or at some distance from the project site, but are still reasonably foreseeable. Indirect impacts are also referred to as secondary effects under CEQA (CEQA Guidelines, Section 15064[d]). CEQA further states that "An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect change in the environment" (CEQA Guidelines, Section 15064 [d][2]).

New urban development and associated new infrastructure are known to produce environmental stressors that can permanently impact existing environmental resources over time and/or can permanently impact environmental resources that are located outside the development project site. As discussed below, these stressors result from urban development's physical changes to existing landscapes and watersheds, removal or changes to existing vegetation, the construction and long-term maintenance of buildings and infrastructure, new or increased human activities of all types, and increased vehicle traffic.

Each EIS/EIR resource chapter (Chapters 4–16) identifies the environmental stressors of the EIS/EIR alternatives that could indirectly impact the resources analyzed in that chapter. For most resources studied in Chapters 4–16, the exact location and the exact quantity or intensity of the future indirect effects that would be caused by those environmental stressors cannot be accurately quantified at this time. Therefore, most indirect impacts of each EIS/EIR alternative are described and analyzed qualitatively in Chapters 4–16. Discussions of the duration, general locations, expected extent, and relative intensity of the indirect effects of each EIS/EIR alternative on the chapter's resource topic are included in each qualitative indirect impact analyses presented in Chapters 4–16.

However, to prepare the Endangered Species Act (ESA) incidental take permit (see Section 1.1), the USFWS must evaluate the total acres of vernal-pool species habitat within the Planning Area that would be permanently impacted, including all indirectly impacted acres. Therefore,

the Environmental Consequences/Environmental Impact sections of Chapter 8 and Chapter 9 also quantify acres of indirect impacts to three aquatic land cover types that provide aquatic habitat for vernal-pool species (i.e., vernal pool, swale, and the stream/creek land cover types). As detailed in Sections 8.2.1 and 9.2.1, the Permit Applicants used LIDAR technology to create digital maps of individual vernal pool microwatersheds from aerial photo data, and then quantified the indirect impacts of each action alternative on vernal pools, swales, and stream/creeks land covers using GIS methodology, as described in Section 3.6.4.

Known environmental stressors of new urban development could result in the following indirect impacts to existing environmental resources.

Hydrologic Alterations. As new development occurs, increased runoff from new impermeable surfaces (e.g., roads, parking lots) and from irrigated landscapes (e.g., yards, sports fields, golf courses) can occur. Urban runoff from developed areas has the potential to add water to the natural hydrologic system and can change the existing hydrographs of creeks, streams, and waterways in the project site and in the surrounding region. Constructing barriers such as berms or raised beds, which are often built to support roadways and railroad tracks, changes hydrology by blocking waterways and creating impoundments where water can collect. These kinds of impoundments can also alter and degrade downgradient waters by fragmenting the local watershed, resulting in premature drying of downstream aquatic resources and can lead to permanent loss of aquatic habitat. Urban development in a part of a watershed may alter the hydrology of the remaining aquatic resources. Long-term effects on water quality caused by runoff from new impermeable surfaces potentially include pollution from petroleum products, fertilizers, pesticides and herbicides, soil erosion, increased turbidity, and increased sedimentation. Soil erosion and chemical and toxic compound pollution (e.g., fuel, oil, lubricants, paints, release agents, and other materials) also affect water quality and aquatic habitats.

Pollution. New urban development increases the potential for point and non-point source pollutants to enter the natural landscape through both surface and subterranean water flows, through windblown trash accumulation, through windblown dispersion of chemicals, and through illegal dumping of industrial and household trash and garden waste in natural areas. Pesticides, herbicides, and fertilizers can enter adjacent landscapes through runoff from irrigated landscapes or from storm events. Contaminants from automobile traffic that collect on roadways, parking lots, and driveways, and enter natural landscapes during storm events include oil, gas, brake dust, and other automobile fluids. Roadway materials, vehicle leaks, and spills in a development also contaminate adjacent or downstream aquatic resources and aquatic and semiaquatic habitats, including riparian habitat. Illegal dumping of unwanted items such as trash, tires, and appliances in natural or open space areas directly crush vegetation and restrict photosynthesis by blocking the sun. Discarded electronics (i.e., e-waste) can introduce various toxic chemicals into the environment, including heavy metals that may leach into soil,

groundwater, and surface waterways. These waste materials may also disrupt natural hydrology by forming obstructions and blocking flows and may create habitat for pest species such as non-native rats.

New urban development and associated increased presence of humans and vehicle use also typically increases air pollution. One effect of air pollution is increased nitrogen deposition (N-deposition), which, in turn, facilitates the growth of non-native plant species and degrades existing habitats of native plant and wildlife species. Future development in the Planning Area will likely increase local sources of nitrogenous air pollutants, primarily due to traffic and new demand for electricity generation.

Pesticides, fertilizers, fungicides, herbicides, and rodenticides used in developed areas may directly affect adjacent or downstream vegetation communities and habitat quality, be directly toxic to species or indirectly toxic to species through prey vectors, or reduce prey abundance. These substances may penetrate open spaces through urban runoff from residential and commercial landscape areas and golf courses, overspray, wind, direct applications in interface areas, soil penetration, and wildlife vectors. Pesticides, for example, can act in several ways—the original pesticide can be toxic, its decomposed elements can be even more toxic, and it can "bioaccumulate," whereby the contaminant concentrates further in each successive link of the food chain, thus reaching higher concentrations at higher levels of the food chain. Fertilizers, as discussed previously, can enter wetland and riparian systems and cause eutrophication (excessive nutrients in water bodies) and result in large algae blooms and can enhance growth of non-native aquatic weeds.

Increased Human Activity and Recreation. These stressors indirectly affect open spaces from increased foot, equestrian, bicycle, and off-road vehicle traffic (including unauthorized uses), and can result in trampled vegetation, compacted soils, impaired hydrology, invasive plant and animal introduction and facilitation, and increased trash and debris. Increases in human activity along the interface of open spaces and new urban development may result in trampling of vegetation and compaction of soils. Trampling of vegetation and compaction of soils can decrease the rate of rainfall interception and evapotranspiration, soil moisture, water penetration pathways, surface flows, and erosion. Recreational off-road vehicle use in particular, especially during the wet season, can create large ruts in natural land covers, damage soil profiles, reduce native vegetative cover, and promote invasion by non-native plants. Off-leash pets may harass and kill wildlife and introduce disease and parasites (e.g., from fecal material). Human and pet presence or activity can alter wildlife behavior and can cause wildlife to permanently avoid suitable habitat areas or abandon occupied nesting/breeding sites. Accidental and intentional wildfire ignitions may also increase from human recreation.

Altered Fire Regimes. Urbanization and changed land uses (e.g., changes in grazing patterns of an open space) can alter natural wildfire regimes by increasing the frequency and intensity of fires, but also change tactical approaches for fighting wildfires. In most cases, wildfires in new urban development are quickly suppressed for public safety and to protect property, but in some cases, wildfires become uncontrollable and catastrophic, in part because past wildfire suppression in increasingly urbanized areas has resulted in much greater fuel loads in open space areas than occurred under pre-development conditions. Altered wildfire regimes, and particularly increased incidence of fires in urbanizing areas, are a result of human activities at the open space–urban interface, including accidental ignitions from sparks from equipment (e.g., mowers striking rocks), cigarettes, children playing with matches, and intentional arson ignitions. However, wildfires may also be ignited by downed or arcing from new power lines, or from cars starting fires along new roadsides.

Traffic and Vehicle Collisions. New roadways and increased capacity of improved roadways can increase the risk of vehicle collisions where wildlife use or attempt to cross roadways, impact current traffic patterns, increase emissions, and affect air quality of the surrounding region.

Invasive Plants and Animals. New development, including new roadways, new utility corridors, and other infrastructure, can increase numbers and promote movement and dispersal of invasive, non-native plant and wildlife species, ultimately changing ecological functions in open spaces and reducing numbers and diversity of native species. As development and infrastructure encroach into natural landscapes, newly disturbed areas and/or the interface between developed areas and native habitats provide an opportunity for invasive plant species to establish and eventually invade natural habitat settings, degrading habitat and potentially expatriating native plant species. Increases in non-native invasive plant species can alter ecosystem processes, such as nutrient cycling, hydrologic cycles, frequencies of wildfires, and erosion and sediment deposition. Invasive plants further interfere in ecosystem functions by outcompeting and displacing native plants and wildlife, providing refuge for non-native animals, and hybridizing with native species.

Mesopredators. An indirect consequence of habitat fragmentation by new development and isolation of habitat by new development is an increase in abundance of urban-adapted or urban-tolerant mesopredators, such as raccoons, skunks, opossums, and foxes (*Urocyon cinereoargenteus*, *Vulpes* spp.). Non-native mesopredators may also include free-roaming stray and feral cats and dogs, which can have the same effects as wild mesopredators. These mesopredator species can outcompete smaller native species for available resources and increase predation rates on the smaller native species, thus reducing the distribution and populations of vulnerable native species in the region.

Aboveground Utilities. New power lines, transmission towers, and utility poles can also cause collisions, entanglements, and electrocution of bats and large birds, especially raptors. Other potential indirect effects associated with operation and maintenance and repair of utility transmission lines are similar to short-term construction-related effects, including hydrologic and water quality alterations, soil erosion, chemical and toxic compounds pollution, dust, noise, vibration, lighting, increased human activity, temporary fencing, accidental clearing, trampling, grading, oak tree root effects, and trash and other debris.

Disease. The increased human and associated pet population can increase the risk of disease transmission to native wildlife. For example, free-ranging domestic cats and dogs can transmit new diseases to wild animals.

Lighting. New lighting may affect wildlife orientation/disorientation and attraction/repulsion, reproduction, and communication at the behavioral and population ecology level, and competition and predation at the community ecology level. Ecological light pollution from new development can include increased ambient light and direct glare from sky glare, lighted buildings, streetlights, and security lights would generally be chronic.

Microclimate Changes. New urban development may introduce microclimate changes at the open space–urban edge, such as alterations in wind, solar radiation and light exposure, and water. Increased wind exposure at the open space–urban interface may result in direct physical damage to natural vegetation (e.g., windpruning and/or loosening of bark) or increase evapotranspiration, reduce humidity, and increase desiccation of plants that require adequate soil moisture for regeneration. Increased wind may also increase dust levels and seed transport, potentially interfering with photosynthesis and introducing non-native species. Alterations in solar radiation and light exposure can have numerous effects on adjacent natural habitats. Daytime temperatures can be higher and nighttime temperatures lower than areas within intact natural vegetation patches, resulting in greater temperature ranges of the soil and increased chance of frost. Soil nutrient cycling, soil moisture retention, invertebrate communities, and predator/prey relations also may be affected by altered soil temperatures. Temperature alterations may also occur in aquatic habitats that exceed species' (e.g., fish, amphibians, or crustaceans) tolerances. Hydrologic alterations and related effects from new development include changes in the rates of rainfall interception and evapotranspiration; changes in soil moisture, water penetration pathways, surface flows, subsurface flows, and soil erosion; movement of salts, nutrients, and pesticides; and habitat alterations for ground-dwelling species.

Habitat Fragmentation and Isolation. New urban development often fragments existing natural lands that provide habitat for native plants and animals. Habitat fragmentation and isolation of plant and wildlife populations, including effects on wildlife movement and dispersal as well as effects on plant pollinators and seed dispersal, may cause extinction of local

populations. At the larger landscape scale, change in regional abundance and distribution of habitat may change the migration and habitat use patterns of some wildlife species, which in turn alters multiple landscape-scale ecological functions. Fragmentation also decreases the functional size of conserved habitat patches. As remaining habitat areas diminish in size, the ratio of vulnerable edge to preserved interior area increases. Increased edge effects heighten species' vulnerability to stochastic disturbances, pollution, and invasion by non-native plant and animal species.

3.6.7 Specific Assumptions Used in the Environmental Impact Analysis of Each EIS/EIR Alternative

The EIS/EIR presents information and assumptions specific to the impact analysis of individual EIS/EIR alternatives here in Chapter 3 to avoid repeating the same information in each resource topic chapter's Environmental Consequences/Environmental Impact analysis for that alternative.

3.6.7.1 Analysis of the No Action/No Project Alternative

As discussed in Section 2.2.2, the No Action/No Project Alternative assumes up to approximately 1,900 acres of new development might be displaced from the current USB and would occur within five areas outside the existing USB (Section 2.2.2). The potential impact of the development displaced to areas outside the USB was estimated based on the existing land cover types present within those five areas.

The No Action/No Project Alternative uses GIS map layers (discussed in Section 3.6.4) to determine the acres of existing land cover types present within these five areas. The No Action/No Project Alternative assumes that the 1,900 acres of new development displaced to these five areas would impact land cover types at the same proportion that those land covers currently exist in those areas. For example, if the five potential displaced development areas currently consist of 40% grassland, then the EIS/EIR analysis assumed 40% of the approximately 1,900 acres of displaced development, or 760 acres, would occur on that existing land cover type.

3.6.7.2 Analysis of the Reduced Permit Term Alternative, After the End of the Permit Term (Years 31–50)

As described in Section 2.4, the Reduced Permit Term Alternative would have a 30-year permit term for the ITPs and expedited CWA permit strategy, during which time the SSHCP would be implemented and the various Covered Activities would be constructed. However, this EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3); this study period extends beyond the end of the permit term for this alternative. Therefore, the analysis of the Reduced Permit Term Alternative also considers the period of time (Years 31–50)

following the end of the permit term. This section describes assumptions specific to this post-permit period of time for the Reduced Permit Term Alternative.

To determine the environmental impacts of the Reduced Permit Term Alternative in Chapters 4–16, the lead agencies assume that at the end of the alternative's proposed 30-year HCP permit term, the existing project-by-project CWA permit process, and the related ESA Section 7 consultation processes (described in Section 2.2.2) would resume again for any additional projects and activities implemented after the end of the 30-year permit term. As discussed in Section 2.2.2, the impact analysis for the Reduced Permit Term Alternative assumes that each new development project implemented after year 30 would again seek individual project-by-project regulatory approvals from multiple local, state, and federal agencies, and there would not be a coordinated approach to designing new preserves or a plan to connect new preserves to existing preserves.

The impact analyses for the Reduced Permit Term Alternative assumes that after the end of the alternative's 30-year permit term, additional urban development would occur inside the UDA, causing full buildout of the UDA by the end of the EIS/EIR's 50-year study period. However, development within the Mather Core Recovery Area (MCRA) portion of the UDA would be limited by the availability of vernal pool resources within the MCRA to serve as mitigation for development impacts because the regulatory environment in years 31–50 of the Reduced Permit Term Alternatives would presumably be similar to the regulatory environment described for the No Project Alternative in Sections 2.2.2 and 2.2.3.

Of the 23,500 acres of the MCRA located within the UDA, approximately 1,300 acres are already developed and approximately 4,600 acres are in existing established preserves. As discussed in Section 2.4, approximately 6,700 acres of the MCRA are expected to be impacted by new urban development during this alternative's 30-year permit term, and approximately 3,800 acres of permanent preserves established within the MCRA during this alternative's 30-year permit term. This would leave approximately 7,100 acres of the MCRA still available for potential future development at year 30.

Based on the Reduced Permit Term Alternative's assumptions for ESA and CWA regulatory requirements in the MCRA for years 31–50 (which are the same regulatory assumptions as for the No Action/No Project Alternative—see Section 2.2.2), the lead agencies estimated how much undeveloped land remaining inside the MCRA (and the rest of the UDA) at year 30 would reasonably be developed by the Reduced Permit Term Alternative in years 31–50 of the EIS/EIR 50-year study period.

Some speculation and assumptions were necessary to estimate acres of future mitigation that could be implemented under the expected MCRA regulatory environment of years 31–50 of the

Reduced Permit Term Alternative. The lead agencies made those assumptions by considering the trends in ESA and CWA mitigation that have occurred within Sacramento County since the designation of the MCRA in 2005 (USFWS 2005), and used the best available scientific information on the status of the species and aquatic resources in the MCRA and elsewhere in the UDA. The lead agencies concluded that further urban development of the MCRA in years 31–50 would be restricted primarily to areas of the MCRA where development could occur without causing direct impacts to vernal pools, largely through the use of on-site avoidance areas and/or on-site preserves.

As with the No Project Alternative (see Section 2.2.3), it is not possible to determine with accuracy a complete picture of possible future urban development and mitigation that would occur in the UDA during years 31–50 of the Reduced Permit Term Alternative. This is because of the incomplete information on individual development projects in the Planning Area over the next 50 years and uncertainty regarding economic conditions and population trends that drive urban development over such a long time. In addition, as discussed in Section 2.2.2 for the No Action/No Project Alternative, there is also uncertainty about future regulatory requirements for new urban development and future increases in avoidance, minimization, and preservation of aquatic resources and species habitats within the UDA over the next 50 years.

3.7 CUMULATIVE EFFECTS ANALYSIS IN RESOURCE CHAPTERS 4 THROUGH 16

NEPA regulations define a cumulative effect as the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7; 43 CFR 46.115). Similarly, CEQA cumulative impacts are defined as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts” (CEQA Guidelines, Section 15355). Under CEQA, the lead agency must consider whether the cumulative impact is significant, and whether a project’s incremental effect, although individually limited, is cumulatively considerable. “Cumulatively considerable” means that the incremental effect of an individual project is significant when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines, Section 15064[h][1]).

As outlined in Section 3.3, the Environmental Consequences/ Environmental Impact analysis of each EIS/EIR Alternative first presents the direct and indirect effects of the alternative on that chapter’s resource topic. Then, those incremental direct and indirect impacts are considered

together with the impact of past, present, and probable (reasonably foreseeable) "other" future projects and activities in a cumulative analysis.

Each cumulative analysis presented in Chapters 4–16 first reviews the effects of all past and present actions on the resource topic analyzed in that chapter. In most chapters, the Existing Condition description presented in the Affected Environment/Environmental Setting section of the chapter(see Section 3.3) has already provided a thorough and adequate description of the impacts of all past and current actions within the chapter's study area. Each cumulative effects analysis then discusses additional impacts that would result from the reasonably foreseeable projects and activities within the chapter's study area, including those described in Section 3.7.2. The cumulative analysis adds the incremental direct and indirect effects expected from the alternative to the aggregate effects of all past and present actions and the reasonably foreseeable future actions.

As stated in CEQA Guidelines Section 15130(b)(1), the following elements are necessary to an adequate discussion of significant cumulative impacts:

A. A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency.
B. A summary of projections contained in an adopted local, regional, or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information. Any such document shall be referenced and made available to the public at a location specified by the lead agency.

Previously approved land use documents, including general plans, specific plans, regional transportation plans, plans for the reduction of greenhouse gas emissions, and local coastal plans, may be used in cumulative impact analysis. A pertinent discussion of cumulative impacts contained in one or more previously certified EIRs may be incorporated by reference (CEQA Guidelines, Section 15130[d]).

The analysis of cumulative impacts is evaluated at a level of detail sufficient for the lead agencies to use as a reasonable basis for decision making in selecting between the alternatives.

3.7.1 Past and Present Actions in the Planning Area

To minimize repetition of information in Chapters 4–16, this section provides a brief summary of these past and ongoing present actions that are relevant to cumulative impact analyses of the EIS/EIR alternatives.

3.7.1.1 Past and Present Agriculture and Urban Development

As described in Section 1.3.1, past development and conversion of natural lands in the Planning Area included the conversion of natural lands to farmland, the subsequent conversion of farmland to urban and rural development, and direct conversion of natural lands in to urban and rural developments.

Urban development in the Planning Area intensified in the 1940s and again between 1950 and 1960, with new growth occurring primarily near the City of Sacramento and in smaller cities such as Folsom, Galt, and Isleton. Urban development continued at a moderate rate between 1960 and 1990, resulting in an expansion of urban land use patterns and infrastructure into the southern and eastern portions of Sacramento County. Development slowed in the early 1990s, picked up again in the early 2000s, and softened or slowed considerably from 2007 to 2012. Since 2012, development activity has again intensified in the Planning Area. In total, urban development comprises approximately 54,000 acres of the Planning Area.

In the eastern portion of the Planning Area, existing agricultural activities primarily consist of ranching and grazing. Livestock grazing of native annual grassland landscapes has altered plant species composition of the grasslands, but has had little effect on the ecology of the grassland landscapes or wildlife species. Appropriately managed grazing and rangeland is compatible with the habitat needs of many species, including vernal pool species.

The central portion of the Planning Area supports more irrigated pasture relative to the eastern portion of the Planning Area, while the southwestern portion of the Planning Area supports more vineyards and croplands. In total, these farming and related activities currently comprise approximately 100,000 acres of the Planning Area (not counting non-irrigated natural grasslands that are often used for grazing).

Croplands in the Planning Area are an altered landscape that retains little of the historical (pre-European settlement) conditions. Formerly consisting of extensive open grasslands, wetlands, broad riparian systems, and oak woodlands, the conversion to cropland has removed most of the historical native communities. The development of row crops, orchards, and vineyards has reduced or eliminated habitat for many native species (especially native plant species) whose habitat requirements are not compatible with these crops.

In addition, the land disturbances associated with past farming practices have contributed to sedimentation of waterways in the Planning Area, and past and current use of fertilizers and pesticides (including rodenticides) have also have contributed to existing water quality issues, which may have directly and indirectly contributed to past aquatic species mortality.

However, while generally supporting less diversity of wildlife compared to most natural landscapes, some cropland types continue to support wildlife and can provide essential breeding, foraging, or roosting habitat for several resident and migrant wildlife species. Although farming has resulted in substantial changes to the historical landscapes in the Planning Area, some cropland provides essential habitat by native wildlife species, including giant garter snake (*Thamnophis gigas*) using agricultural ditches; western pond turtle (*Actinemys marmorata*) using agricultural ditches and canals; Swainson's hawk (*Buteo swainsoni*) foraging in hay, grain, and row crops; burrowing owl (*Athene cunicularia*) using various agricultural types that include ground squirrel (*Sciuridae*) burrows; white-tailed kite (*Elanus leucurus*) foraging in hay and grain; and tricolored blackbird (*Agelaius tricolor*) foraging in hay and grain fields.

Farming and grazing are expected to continue in and around portions of the Planning Area currently used for agriculture (Sacramento County 2011; Rancho Cordova 2006a; Galt 2009a). Farmlands are subject to continuing changes in crop types depending on various factors, including, local, national, and global economic conditions.

3.7.1.2 Past and Present Infrastructure Development and Operation

The agricultural and urban development described in Section 3.7.1.1 has been accompanied by infrastructure to support these land development uses. Some of the major infrastructure constructed and operated in the Planning Area is described below.

Water Supply. Most of the water supply for existing urban development in the Planning Area is sourced from groundwater wells, with a limited amount of surface water used. Groundwater is pumped by individual users and by Planning Area water districts from two groundwater basins that underlay the Planning Area: the Central Area basin and the South (Galt) Area basin. The Central Basin is managed by the Sacramento Central Groundwater Authority, which has also adopted a management plan, consistent with the Sacramento Water Forum objectives, that addresses groundwater decline and quality in the Central Basin. Some of the water purveyors located within the Central Basin rely entirely on groundwater pumping, and some purveyors' production wells have been affected by groundwater decline and contamination.

The surface water supply used by existing urban development in the Planning Area is diverted from the Sacramento River west of the Planning Area and from the American River north of the Planning Area.

A recently constructed and operating major surface water project in the Planning Area is the Freeport Regional Water Project, which includes the following components constructed in the Planning Area between 2007 and 2011:

- Vineyard Surface Water Treatment Plant, a water treatment plant located in central Sacramento County on an 80-acre parcel at the northeast corner of Florin and Knox Roads, and 1 mile east of Bradshaw Road, with existing capacity to treat up to 50 million gallons of drinking water per day and future capacity to treat up to 100 million gallons per day
- A terminal facility located at the point of delivery to the Folsom South Canal
- A canal pumping plant located at the Folsom South Canal terminus
- A series of settling basins
- Four underground pipelines carrying the water from the intake facility to the Vineyard Surface Water Treatment Plant and (via the Folsom South Canal) to the Mokelumne Aqueducts outside the Planning Area.

Surface waters are also diverted from the American River into the Folsom South Canal, a 26.7-mile-long concrete-lined canal that traverses the Planning Area from north to south. The Folsom South Canal, part of the larger Central Valley Project, is used to supply water for irrigation and municipal and industrial use in Sacramento and San Joaquin Counties. With a bottom width of 34 feet and maximum water depth of 17.8 feet, the Folsom South Canal presents a substantial barrier to east–west movement and dispersal of native terrestrial wildlife species in the Planning Area.

Flood Control. Within the UDA, many of the streams have small levees constructed adjacent to the channels, and these streams primarily converge into the Morrison Creek channel near the Sacramento River. Outside the UDA, many streams also have levees constructed adjacent to their channels, and most of these streams converge with the Cosumnes River, which eventually flows into the Mokelumne River. The South County Streams Group Project is a federally authorized flood control project implemented by the U.S. Army Corps of Engineers, Central Valley Flood Protection Board, and Sacramento Area Flood Control Agency for lower Morrison Creek and its principal tributaries (i.e., Florin Creek, Elder Creek, and Unionhouse Creek); the project consists of levee improvements starting south of the town of Freeport, running easterly along the southern edge of the urbanized area, and extending up four creeks. The easternmost portion of improvements planned for Florin Creek and Morrison Creek (east of Highway 99) are within the Planning Area.

Morrison Creek conveys flow to the low-lying Beach/Stones Lake Basin adjacent to the Sacramento River levee, where during wet weather events, most excess flow is pumped into the Sacramento River and some flows drain further south into Snodgrass Slough and to the Mokelumne River.

South of the Morrison Creek system (in the Planning Area outside the USB), important floodplain areas include Deer Creek, Cosumnes River, Laguna Creek (which conveys much of the drainage from the City of Galt), and Dry Creek. These streams are all contained by constructed levees that are managed by local reclamation districts.

Two major dams upstream of the Planning Area allow for storage of upstream runoff for release during the summer season in and downstream of the Planning Area. These dams are Folsom Dam and Nimbus Dam on the American River, both outside the Planning Area to the northeast. The Cosumnes River is unique in that it is the only west-slope Sierra river that does not have a dam constructed on the main-stem of the river.

Urban Wastewater. The large majority of municipal wastewater generated in the UDA is collected and conveyed to the Sacramento Regional Wastewater Treatment Plant (SRWTP) operated by the Sacramento Regional County Sanitation District (Regional San). The SRWTP provides service for 1.4 million people located within the Cities of Sacramento, West Sacramento, Rancho Cordova, Citrus Heights, Elk Grove, and Folsom; unincorporated areas of Sacramento County; and the communities of Courtland and Walnut Grove. The SRWTP currently treats approximately 141 million gallons per day of inflow and produces secondary treated effluent that is discharged to the Sacramento River near the town of Freeport. As a result of permit requirements adopted by the Central Valley Regional Water Quality Control Board in 2010, and subsequent amendments, Regional San is underway with construction of treatment process improvements at the SRWTP for improved contaminant removal performance, including additional nutrient removal (i.e., ammonia and nitrate reduction) and tertiary filtration on a seasonal basis during the dry season to increase pathogen removal (Regional San 2014). Construction of the new SRWTP is scheduled to be completed in 2023.

Also in the Planning Area, the City of Galt wastewater treatment plant currently produces about 2.3 million gallons per day of tertiary treated effluent and discharges to Laguna Creek, which flows to the lower Cosumnes River.

Roadways. Interstate 5 and State Route 99 are two existing major highways running north–south in the western part of the Planning Area. U.S. Highway 50, serving east–west traffic, is located on the northern edge of the Planning Area. State Route 16 (Jackson Road) and State Route 104 (Twin Cities Road) cross the southern part of the Planning Area and provide east–west traffic connectivity.

Other major roadways existing within the Planning Area are four-lane thoroughfares or heavily used two-lane arterial roads, including Folsom Boulevard, White Rock Road, Gerber Road, Kiefer Boulevard, Scott Road, Ione Road, Excelsior Road, Bradshaw Road, Vineyard Road, Elk Grove-Florin Road, South Watt Avenue, French Road, Power Inn Road, Stockton Boulevard, Florin Road, Jackson Highway, Grant Line Road, Calvine Road, Wilton Road, Dillard Road, Clay Station Road, Hood-Franklin Road, Bruceville Road, Franklin Boulevard, and Twin Cities Road .

Within the City of Galt, existing major roadways include a section of Twin Cities Road (State Route 104), Walnut Avenue, Elm Avenue, Simmerhorn Road, Boessow Road (C Street), A Street, New Hope Road, Lincoln Way, and Carillion Boulevard.

Within the portion of the City of Rancho Cordova located within the Planning Area, existing major streets include Sunrise Boulevard, White Rock Road, International Drive/Mather Field Road, Douglas Road, Grant Line Road, Zinfandel Drive, Rancho Cordova Parkway/Jaeger Road, Folsom Boulevard, Nike Road, and Bradshaw Road.

Airports. Two public-use airports are located within the Planning Area—Mather Airport and Franklin Field. Mather Airport, which was formerly the Mather Air Force Base, is located in the UDA portion of the Planning Area and is adjacent to the City of Rancho Cordova. The airport was first constructed in the early 1900s and is currently owned and operated by Sacramento County. Redevelopment activities on the former base property have included airport-related, commercial, and industrial uses (Sacramento County 2010). Mather Airport is surrounded to the north and west by residential and commercial development and to the south and east by undeveloped land and agricultural operations with applications in to the County of Sacramento for master-planned communities. Since its conversion from a military airfield to a public/commercial facility, non-military flights have increased at this facility, specifically air cargo. During 2012, Mather Airport supported 79,786 flight operations, including cargo, general aviation, air taxi, and military. Over the 5 years from 2008 to 2012, an average of 79,535 flight operations occurred annually (FAA 2013). The *Mather Airport Master Plan* update for the continued operation and maintenance of the airport was adopted by the Board of Supervisors in August 2014 (Sacramento County 2014).

Franklin Field is located in southern Sacramento County approximately 1 mile northeast of the intersection of Twin Cities Road and Franklin Boulevard (see Figure 4-4). Franklin Field is currently a public-use airport owned and operated by the County of Sacramento, and was the site of bomber training during World War II. Franklin Field is surrounded by agricultural operations, including row crops and grazing lands. The facility is considered an uncontrolled airport since it does not have an air traffic control tower or personnel. There were approximately 36,000 operations in 2008 at Franklin Field, including flight training. The Airport

Master Plan Working Paper anticipates that operations at this airport will increase over time, reaching approximately 64,000 operations by 2027 (Sacramento County Airport System 2008).

3.7.1.3 Past and Present Mining Operations in the Planning Area

As mentioned in Section 1.3.1, gold has been mined in Sacramento County since 1849 by various lode and placer methods such as hydraulic mining, drift mining, drag-line dredging, and bucket-line dredging. The vast majority of gold recovered in Sacramento County has been from large placer operations. Dredging operations in Sacramento County began in 1899 in the vicinity of Folsom, located northeast of the Planning Area. The Folsom Dredge Field is one of the most extensive historic dredging operations in California. When combined with other dredged and hydraulically mined areas in Sacramento County, an estimated total area of 54.4 square miles was disturbed by placer mining operations in north-central and northeastern Sacramento County, including large areas within the Planning Area. As of 1999, an estimated 80% of these dredged areas Countywide had been reclaimed for other land uses (Division of Mines and Geology 1999). Those remnants that remain in the Planning Area typically support minimal vegetation, but may include bands of the Mine Tailing Riparian land cover type interspersed among or between mounds of dredge spoiling (see Chapter 8 for discussion of Planning Area land cover types).

All of the currently permitted mining operations in unincorporated Sacramento County are located within the Planning Area. Aggregate mining occurs both inside and outside the UDA, with 24 permitted aggregate mines, 21 of which are currently active. Additionally, one application for an additional aggregate mine is being processed by the County. Clay is currently being surface mined in four locations within the County, including along the Cosumnes River, topsoil is currently mined near the Cosumnes River, and there is one existing pumice pit.

The lead agencies anticipate mining in existing permitted locations would continue in the Planning Area inside and outside the UDA for the next 20 to 50 years. Therefore, the impacts of mines in those locations are considered by this EIS/EIR cumulative analysis to be a continuation of present conditions.

3.7.1.4 Past and Present Preservation of Natural Lands in the Planning Area

The Planning Area includes several established existing preserves both inside and outside of the UDA. Existing preserves within the Planning Area total approximately 64,500 acres and include a national wildlife refuge, large and small nature preserves, lands under conservation easements as well as conservation bank lands, and individual mitigation sites preserved in perpetuity by past projects that were authorized or permitted under the CWA, ESA, California Endangered Species Act (CESA), and/or local environmental regulations. Of the approximately

64,500 acres of existing preserves, approximately 3,170 acres are inside the UDA and about 61,330 acres are outside the UDA.

Inside the UDA, most existing preserves occur near the Sacramento Valley Vernal Pool Prairie Preserve, in an area located south of Jackson Highway between Excelsior and Eagles Nest roads and north of Grant Line Road. These include lands under conservation easement or owned by the Sacramento Valley Conservancy, two mitigation banks (Arroyo Seco and Bryte Ranch), and several mitigation sites established by past projects or activities. Other sites with permanent conservation easements are more scattered inside the UDA, including at locations along northern Laguna Creek, locations within the City of Rancho Cordova, and at the Keifer Landfill Bufferlands. In addition, the 2,650 acres of preserved lands at the Sacramento Regional County Sanitation District Bufferlands, located in the western part of the UDA, have "termed" conservation easements, meaning those acres are currently preserved, but might not be preserved in perpetuity. In addition, the ~~2,650~~**2,150** acres of preserved lands at the ~~Sacramento Regional County Sanitation District~~ **Regional San** Bufferlands, located in the western part of the UDA, have "termed" conservation easements, meaning those acres are currently preserved, but might not be preserved in perpetuity.

Outside of the UDA, relatively large areas have been preserved in the Planning Area west of Interstate 5, within the Cosumnes River floodplain, and in the eastern part of the Planning Area outside the UDA. Existing preserves larger than 500 acres include the Stone Lakes National Wildlife Refuge, Deer Creek Hills, Chance Ranch, Borden Ranch, Snyder Preserve, Clay Station Conservation Bank, Laguna Terrace Conservation Bank, Gill Ranch Conservation Bank, Elliot mitigation site, Delta Meadows, Sacramento Municipal Utilities District mitigation bank, and the Cosumnes River Preserve. Smaller conservation sites are distributed within the Cosumnes River and Deer Creek corridor, eastern Sacramento County grasslands, and agricultural lands west of State Route 99. In addition to these relatively large preserves, several smaller mitigation and conservation banks have been authorized by the USFWS and/or U.S. Army Corps of Engineers in the Planning Area outside the UDA.

3.7.2 Reasonably Foreseeable Other Actions

Reasonably foreseeable future "other actions" are actions that would affect the environment in the future, and are not activities that would occur as part of the proposed action and other action alternatives (CEQ 1997). The planned development and infrastructure described in the adopted General Plans and other documents presented in Section 3.4, including the expected "full build-out" of the UDA, are reasonably foreseeable within this Planning Area. However, those future development projects and activities are Covered Activities under the two EIS/EIR action alternatives, and the No Action/No Project Alternative includes similar future urban development projects and activities. Therefore, the EIS/EIR list of reasonably foreseeable future

"other" actions in or near the Planning Area is limited to foreseeable new projects or activities not included as part of the descriptions of the No Action/No Project Alternative (Section 2.2) or the description of the two action alternatives (Sections 2.3 and 2.4).

For this EIS/EIR, reasonably foreseeable future other actions were identified based on information extracted from existing environmental documents, and investigation of future project plans by other state and federal agencies and private entities (CEQA Guidelines, Section 15130[a][1]).

3.7.2.1 Other Urban Development by Elk Grove and by Rancho Murieta

Urban development is expected to continue adjacent to the EIS/EIR Planning Area within the existing boundaries of the community of Rancho Murieta and the City of Elk Grove (Figure 1-1). Although these communities are outside the current Planning Area boundary, past, present, and new urban development in these locations would be included in the cumulative impact study area for several resource topics analyzed in Chapters 4–16, including hydrology, water quality, natural communities, species habitat, wetlands and waters, transportation, air quality, and climate change.

"Rancho Murieta North" was originally proposed in 2014, and an EIR for that new development project is under preparation (Sacramento County 2015). The project would be located on approximately 770 acres, which is most of the remaining land within the Rancho Murieta Planned Development, as approved in 1969. The entire Rancho Murieta Planned Development is outside the EIS/EIR Planning Area. The Rancho Murieta North project would include approximately 300 acres of new residential development, 430 acres of Park/Recreation/Open Space, and 40 acres of General Commercial land uses.

It is reasonably foreseeable that the City of Elk Grove will eventually annex land south and southwest of their current SOI boundary. As of the writing of this EIS/EIR, landowners south of the current Elk Grove city boundary have submitted a proposal to the Local Agency Formation Commission to expand the Elk Grove SOI that includes approximately 1,150 acres of land currently under County jurisdiction (LAFCO 2016). This proposed SOI expansion is located south of Kammerer Road and west of Highway 99, outside the UDA but within the Planning Area. New urban development is proposed for the majority of that approximately 1,150-acre area.

Additionally, the City of Elk Grove has submitted a proposal to LAFCO to simultaneously expand its SOI and annex approximately 560 acres of land southeast of its current boundary (LAFCO 2016). This proposed 560-acre expansion is located within the UDA portion of the Planning Area south of Grantline Road and east of the Union Pacific Railroad tracks, and is currently under County jurisdiction. Under the City of Elk Grove's proposal, this land is intended to be used for public uses, including a large soccer complex.

3.7.2.2 Other Future Rural Residential Development

Low-density rural development would continue to occur outside the UDA within the approximately 19,600 acres of designated Agriculture Residential areas in Sacramento County, consistent with the County's General Plan (Sacramento County 2011). Within areas designated as Agricultural Residential by the Sacramento County General Plan, construction of new residential structures may occur, along with associated grading, landscaping, and accessory structures.

3.7.2.3 Future Agricultural Conversion

Changes in farmland and other agricultural land uses are not proposed as Covered Activities but are reasonably expected to occur in the future in areas outside the UDA that are zoned for agricultural uses. It is not possible, however, to predict how crop types or agricultural uses may change over the 50-year permit term. Nonetheless, some conversion of rangeland that supports Valley Grasslands and Vernal Pool Ecosystem to a more intensively managed agricultural use (such as cropland, vineyards, or orchards) would be expected over the 50-year study period. This conversion of rangeland to orchards or vineyards would include "deep-ripping" of soils, which would remove the existing soil structure that forms the perched aquifer and supports the ecology of the Vernal Pool Ecosystem. Changes to more intensively managed agricultural uses would result in the types of effects similar to those discussed in Section 3.7.1.1 and Appendix G. Grading or construction of new structures to support future changes in agricultural use, such as barns, corrals, and fences, would also be expected in areas zoned for agricultural uses.

3.7.2.4 California High-Speed Rail

Construction of a high-speed train through the Planning Area is a reasonably foreseeable project that could occur within the next 50 years (California High Speed Rail Authority and Federal Railroad Administration 2005; California High Speed Rail Authority 2013). The Federal Railroad Administration and the California High-Speed Rail Authority have adopted a state-wide program EIR/EIS (California High Speed Rail Authority and Federal Railroad Administration 2005), which studied various alignment options for the train system. The exact alignment within Sacramento County is not yet determined, but up to 35 linear miles of the Merced to Sacramento segment of the high-speed rail line could bisect the Planning Area (California High Speed Rail Authority 2013). The standard width of the high-speed rail line's right-of-way would be 600 feet, but the right-of-way width would be substantially wider in locations where the rail line crosses existing roadways. Existing roadways will be elevated and bridges installed where the rail line would cross, requiring rights-of-way of up to 900 feet wide to allow construction of the new roadway embankments and bridge footings (DiGegoria, pers. comm. 2016).

3.7.2.5 Wilton Rancheria Casino

The Miwok tribe is proposing to develop a casino resort at one of two sites in Sacramento County (BIA 2015). As of June 2016, the tribe's preferred site is within the City of Elk Grove outside the Planning Area, but another potential location is on a 282-acre site in the City of Galt SOI. If the Galt SOI site were selected, the casino resort would cover approximately 76 acres of the 282-acre parcel and would include a 12-story hotel tower, convention center, spa, restaurants, and a 110,000-square-foot gambling floor. The project could generate the equivalent of 1,750 full-time jobs and host up to 14,000 patrons per day, according to the Draft EIS prepared for the federal Bureau of Indian Affairs (BIA 2015).

3.7.2.6 California WaterFix

The California WaterFix project (CDWR and USBOR 2015) is a proposed water conveyance facility with three new intakes on the Sacramento River at the western edge of the Planning Area and dual tunnels to convey water to existing state and federal pumping plants located in San Joaquin County. Approximately 12 miles of the proposed pipeline route would be located within the southwestern portion of the Planning Area. California WaterFix was previously part of the Bay Delta Conservation Plan, but the project no longer includes mitigation or conservation activities through an HCP. Instead, the project proponent, the California Department of Water Resources, proposes to mitigate construction and future direct and indirect operation impacts of the California WaterFix project by restoring approximately 2,300 acres of habitat and preserving up to 13,300 acres of habitat in the Delta. The locations of the habitat restoration and preservation associated with California Waterfix are not certain, but most are expected to be located outside the western boundary of the EIS/EIR Planning Area within the legal boundary of the Sacramento-San Joaquin River Delta. However, some California WaterFix project restoration or preservation actions might occur in the southwest part of the EIS/EIR Planning Area in the small portion of the Cosumnes River floodplain that overlaps with the legal boundary of the Sacramento-San Joaquin River Delta (CDWR and USBOR 2015).

3.7.2.7 Preservation of Natural Lands in the Planning Area (Not Project Mitigation)

Other entities are expected to continue to preserve lands within the Planning Area. The existing Stone Lakes National Wildlife Refuge has an 18,000-acre planning boundary that is located in the western part of the Planning Area outside the USB (USFWS 2007). At the time of EIS/EIR preparation, Stone Lakes National Wildlife Refuge has preserved 6,420 acres through fee-title acquisitions and conservation easements. Although there are no official projections about how quickly the refuge would be able to acquire land, the No Action/No Project Alternative assumes that by the end of the 50-year study period, the entire 18,000-acre refuge planning area would

be acquired and preserved by the Stone Lakes National Wildlife Refuge. This addition to Stone Lakes National Wildlife Refuge would provide an additional 11,580 acres of habitat preservation compared to the existing condition.

The Draft EIS/EIR assumes that Stone Lakes National Wildlife Refuge (NWR) would enroll properties at the same rate that it has since its creation. Since the adoption of the approximately 18,000-acre refuge boundary in 1992, Stone Lakes NWR has enrolled 6,550 acres. That amounts to an average rate of acquisition of 262 acres per year. Extending that same rate of acquisition over the proposed 50-year permit term of the SSHCP, Stone Lakes NWR would acquire an additional 13,100 acres. That amount would more than complete the approximately 18,000-acre approved refuge boundary.

The existing Cosumnes River Preserve is located in the south part of the Planning Area, outside the USB. The Cosumnes River Preserve currently preserves approximately 46,000 acres of blue oak woodlands, valley grassland, vernal pool, freshwater marsh, and cropland along the Cosumnes River or in the floodplain of the Cosumnes River. The *Cosumnes River Preserve Management Plan* (Cosumnes River Preserve 2008) describes plans to acquire an additional 5,450 acres of riparian habitat that is currently unprotected along the Cosumnes River by 2028.

Other nongovernmental organizations, such as the Sacramento Valley Conservancy, Audubon Society, and others have previously preserved approximately 13,900 acres in the Planning Area under the existing conditions. The No Action/No Project Alternative assumes that these organizations will continue to preserve lands in the Planning Area, specifically the areas identified on the "Twenty-First Century Open Space Vision" map (Sacramento Valley Conservancy 2014).

There are eight approved mitigation or conservation banks in the Planning Area totaling 5,320 acres. Additional mitigation or conservation banks may be established in the Planning Area during the study period, but specific acreages are not known.

3.7.2.8 Proposed Urban Development in the Planning Area That is Not Included in the EIS/EIR Alternatives

Several properties within the UDA have already obtained local entitlements and have obtained, or are close to obtaining, individual CESA, ESA, and CWA authorizations from the USFWS, CDFW, and U.S. Army Corps of Engineers. These properties include those in the Rio Del Oro Specific Plan area and those in the Mather Field Specific Plan area. Therefore, while these properties are located within the EIS/EIR Planning Area, they are not included in the EIS/EIR impact analyses because future projects and activities within these areas will not obtain their ESA, CESA, or CWA authorizations through the proposed SSHCP or one of the other EIS/EIR alternatives. However, future impacts on these properties will be included in the cumulative impact analysis of each EIS/EIR alternative.

3.8 SIGNIFICANCE OF IMPACTS THAT ARE PRESENTED IN CHAPTERS 4 THROUGH 16

3.8.1 Significance Thresholds

NEPA regulations require that the determination of significance consider both context and intensity of the impacts (40 CFR 1508.27). "Context" means that the significance of an impact must be analyzed in several contexts, including the affected region, locality, affected interests, and society as a whole. "Intensity" refers to the severity of the impact and must consider: (1) both beneficial and adverse effects; (2) the degree to which the action affects public health and safety; (3) unique characteristics of the area, including cultural resources, parks, farmland, wetlands and critical areas; (4) if the effects are likely to be controversial; (5) if there are any unique or unknown risks; (6) if the action is precedent setting; (7) if the action is related to other actions or are cumulatively significant; (8) the degree that the action affects districts, highways, structures, objects eligible for the National Register of Historic Places, or cause loss of scientific, cultural, or historical resources; (9) the degree to which the action affects endangered or threatened species or their critical habitat; and (10) whether the action threatens a violation of federal, state, or local laws or requirements imposed to protect the environment (40 CFR 1508.27).

Under CEQA, a significant impact on the environment is defined as a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by a project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance" (CEQA Guidelines, Section 15382). As provided under CEQA Guidelines Section 15143, and consistent with NEPA regulation 40 CFR 1508.7, each determination of significance will consider the context, intensity or severity of the impact, and probability of occurrence. An economic or social change by itself shall not be considered a significant effect on the environment, but a social or economic change related to a physical change may be considered in determining whether the physical change is significant (CEQA Guidelines, Section 15382). In general, an EIR should define the thresholds of significance and explain the criteria used to judge whether an impact is above or below that threshold (CEQA Guidelines, Section 15064[f]).

A "threshold of significance" is an identifiable quantitative, qualitative, or performance level of a particular environmental effect. Determining whether a project may have significant effect on the environment calls for careful judgement on the part of the lead agencies. The decision should be based to the extent possible on the best available scientific and factual data. However, a single ironclad definition of "significant effect" is not possible because the significance of an effect may vary with setting (CEQA Guidelines, Section 15064[b]). In determining the significance of the environmental effects, the lead agency shall consider direct

and indirect physical changes in the environment that may be caused by the project. Tools for determining the threshold of significance include the CEQA mandatory findings of significance (CEQA Guidelines, Section 15065), Appendix G of the CEQA Guidelines (the model Initial Study Checklist), agency regulatory standards, consultations with other agencies, and a lead agency's specific thresholds of significance.

As outlined in Section 3.3, the Environmental Consequences/Environmental Impact sections of Chapters 4–16 include a Methodology subsection, which explains the criteria considered and identifies the thresholds of significance used to determine the significance of impacts to the resource topics evaluated in that chapter. The criteria used and the thresholds for determining the significance of impacts on each resource topic are based on Appendix G of the CEQA Guidelines, and on the resource-specific sources described in the Methodology section. Some of the Appendix G thresholds were modified where appropriate to meet the circumstances of that resource topic within this Planning Area.

3.8.2 Impact Findings and Mitigation of Significant Impacts

As discussed in Section 1.1, one purpose of an EIS is to provide a full and fair discussion of the environmental impacts, and to inform decision makers and the public of reasonable alternatives (40 CFR 1502.1). Under CEQA, however, the significance of each impact disclosed in an EIR must be determined. CEQA further requires that, whenever possible, agency decision makers must adopt feasible mitigation to avoid or substantially lessen any significant impact (California Public Resources Code, Section 21002).

The impact analyses presented in Chapters 4–16 compare the impacts of each alternative to the thresholds of significance established for that resource topic. As required by CEQA, if an impact meets or crosses a threshold of significance, the EIS/EIR must identify feasible mitigation measures, which could minimize the significant adverse impact. An EIR must also identify those significant environmental effects that can be mitigated but not reduced to a level of insignificance (CEQA Guidelines, Section 15126.2[b]). Therefore, the Environmental Consequences/Environmental Impact analyses in Chapters 4–16 first present a statement of each impact's significance, before considering any additional mitigation measures that might be added by the EIS/EIR. If an impact is found to be significant, then a second statement of each impact's significance is presented after the analysis considers the additional mitigation measures added by the EIS/EIR.

Although NEPA regulations do not require lead agencies to reduce EIS significant impacts to a less-than-significant level, the practice to include feasible mitigation whenever possible to reduce a significant impact is consistent with NEPA's definition of mitigation (40 CFR 1508.20) and is consistent with NEPA regulations requiring agencies to include appropriate mitigation

measures not already included in the description of the proposed action or an alternative (43 CFR 1502.14[f]), and the requirement that the Environmental Consequences section of an EIS must discuss means to mitigate adverse environmental impacts (40 CFR 1502.16[h]).

As discussed in Section 3.6.1, the baseline (the basis of comparison) used in this EIS/EIR to describe and evaluate the significance of each environmental impact of the action alternatives is the No Action/No Project Alternative (i.e., the expected future condition of the Planning Area without an HCP implemented in south Sacramento County).

The potential impact findings used in this EIS/EIR are defined below.

- ***No Impact/Effect*.** This impact would cause no discernible adverse or beneficial change in the physical environment of the chapter's resource topic.
- ***Less Than Significant Adverse Effect.*** This impact would cause a discernible, but not substantial, adverse change in the physical environment of the chapter's resource topic.
- ***Significant Adverse Effect*.** This impact would cause a substantial, or potentially substantial, adverse change in the physical condition of the chapter's resource topic within the area affected. Therefore, the EIS/EIR would identify additional mitigation measures, if feasible, to reduce the adverse impact to less than significant. Impacts are determined to be significant based on the criteria and thresholds of significance identified for that resource topic. Significant impacts fall into two categories: (1) those adverse impacts for which there is feasible mitigation available that would avoid or reduce the environmental impacts to less-than-significant levels, and (2) those adverse impacts for which there is either no feasible mitigation available or for which, even with implementation of feasible mitigation measures, there would remain a significant adverse impact on the environment. Those impacts that cannot be reduced to a less-than-significant level by mitigation are identified as significant and unavoidable adverse effects**.**
- ***Significant and Unavoidable Adverse Effect*.** This impact would cause a substantial adverse change in the environment of the chapter's resource topic and cannot be avoided or mitigated to a less-than-significant level if the action is implemented. Even when the impact finding remains significantly adverse after the application of mitigation measures, the project proponent is still obligated to incorporate all feasible measures to reduce the severity of the impact.
- ***Minor Beneficial Effect*.** The impact would result in a discernible improvement of the chapter's resource topic, when compared to the environmental conditions of the baseline (see Section 3.6.1).
- ***Significant Beneficial Effect*.** The impact would result in a substantial or significant improvement of the chapter's resource topic when compared to the environmental conditions of the baseline (see Section 3.6.1).

3.9 REFERENCES CITED

BIA (Bureau of Indian Affairs). 2015. *Draft Environmental Impact Statement /Tribal Project Environmental Document*: *Wilton Rancheria Fee-To-Trust and Casino Project.* Vol. 1, *EIS*. Sacramento, California: U.S. Department of the Interior, BIA. December 2015. Accessed June 29, 2016. http://www.wiltoneis.com/wp-content/uploads/2015/12/Volume-1-Draft-EIS-Report.pdf.

California High Speed Rail Authority and Federal Railroad Administration. 2005. *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System*. Vol. 1, *Report*. Sacramento, California, and Washington, D.C.: California High-Speed Rail Authority and Federal Railroad Administration. August 2005. Accessed June 29, 2016. http://www.hsr.ca.gov/Programs/Environmental_Planning/EIR_EIS/Vol1.html.

California High Speed Rail Authority. 2013. "California High-Speed Rail Authority: Merced to Sacramento Section" [map]. Sacramento, California: California High-Speed Rail Authority. September 2013. Accessed June 29, 2016. http://www.hsr.ca.gov/docs/newsroom/maps/Merced_to_Sacramento.pdf.

CDWR and USBOR (California Department of Water Resources and U.S. Bureau of Reclamation). 2015. *Bay Delta Conservation Plan/California WaterFix Partially Recirculated Draft EIR/Supplementary Draft EIS*. Prepared by ICF. Sacramento, California: ICF. Accessed June 29, 2016. http://baydeltaconservationplan.com/2015PublicReview/PublicReviewRDEIRSDEIS/PublicReviewRDEIRSDEIS_Links.aspx.

CEQ (Council of Environmental Quality). 1981. "NEPA's Forty Most Asked Questions." March 16, 1981. Accessed June 27, 2016. https://ceq.doe.gov/nepa/regs/40/40p3.htm.

CEQ. 1997. *Considering Cumulative Effects Under the National Environmental Policy Act*. January 1997. Washington, D.C.: CEQ, Executive Office of the President. Accessed June 29, 2016. https://ceq.doe.gov/publications/cumulative_effects.html.

Connector JPA (Capital SouthEast Connector Joint Powers Authority). 2012. *Capital SouthEast Connector Project Final Program Environmental Impact Report*. Vol. 2, *Revisions to the Draft Program Environmental Impact Report*. SCH No. 2010012066. Prepared by ICF in association with the Cities of Elk Grove, Folsom, and Rancho Cordova, the Counties of El Dorado and Sacramento. Sacramento, California: ICF. February 2012. Accessed June 29, 2016. http://www.connectorjpa.net/wp-content/uploads/2012/09/Capital-SEC-V2-Final-PEIR-Revised-Draft.pdf.

Cosumnes River Preserve. 2008. *Cosumnes River Preserve Management Plan.* Final. Prepared by Kleinschmidt Associates. Grass Valley, California: Kleinschmidt Associates. March 2008. Accessed June 29, 2016. http://www.cosumnes.org/about_crp/CH%201%20-%202.pdf.

DiGegroia, John. 2016. Sacramento Fish and Wildlife Office High Speed Rail Biologist, Sacramento, California. Personal comments made to Nina Bicknese (Sacramento Fish and Wildlife Office). September 27, 2016.

Division of Mines and Geology. 1999. *Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Kaolin Clay Resources in Sacramento County, California* by Don Dupras. DMG Open-File Report 99-09. Sacramento, California: Division of Mines and Geology. 1999.

FAA (Federal Aviation Administration). 2013. "ATADS: Airport Operations: Standard Report for Mather Airport, 1/2008 to 12/2012." Accessed July 23, 2013. http://aspm.faa.gov/opsnet/sys/Main.asp.

Galt (City of Galt). 2009a. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *Final Environmental Impact Report for the 2030 Galt General Plan*. Final. SCH No. 2007082092. Prepared by ESA, in association with Mintier Harnish, Applied Development Economics, and Omni Means. Sacramento, California: ESA. March 2009. Accessed June 29, 2016. http://www.saclafco.org/SphereofInfluenceInformation/Documents/galtsoi/sac_024063.pdf.

Keeler-Wolf, T., D.R. Elam, K. Lewis, and S.A. Flint. 1998. *California Vernal Pool Assessment Preliminary Report*. Sacramento, California: State of California Department of Fish and Game. 161 pages.

LAFCO (Sacramento Local Agency Formation Commission). 2016. "Notice of Preparation of a Draft Environmental Impact Report and Notice of Public Scoping Meeting for the Proposed Kammerer Road/Highway 99 Sphere of Influence Amendment (LAFC#07-15)." Sacramento, California: Sacramento LAFCo. March 7, 2016. Accessed October 13, 2016. http://www.saclafco.org/Documents/Notice_of_Preparation_03-07-2016_Website.pdf.

Rancho Cordova (City of Rancho Cordova). 2006a. *Rancho Cordova General Plan.* Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 29, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report.* SCH no. 2005022137. June 2006. Accessed June 29, 2016. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

Regional San (Sacramento Regional County Sanitation District). 2014. *Final Environmental Impact Report for the Sacramento Regional County Sanitation District EchoWater Project*. SCH no. 2012052017. Prepared by Ascent. Sacramento, California: Ascent. Accessed June 30, 2016. http://www.regionalsan.com/post/echowater-final-environmental-impact-report-feir.

SACOG (Sacramento Area Council of Governments). 2016a. *Metropolitan Transportation Plan/Sustainable Communities Strategy*. Sacramento, California: SACOG. February 18, 2016. Accessed June 29, 2016. http://www.sacog.org/general-information/2016-mtpscs.

SACOG. 2016b. *Final Environmental Impact Report for the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy*. SCH No. 2014062060. Sacramento, California: SACOG. January 2016. Accessed June 29, 2016. http://www.sacog.org/general-information/final-2016-mtpscs-environmental-impact-report.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: County of Sacramento Department of Environmental Review and Assessment. April 2010. Accessed June 29, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County. 2014. *Mather Airport Master Plan*. Sacramento, California: Sacramento County Department of Airports. Accessed June 29, 2016. http://www.sacramento.aero/scas/about/planning_design/.

Sacramento County. 2015. "Notice of Preparation of a Draft Environmental Impact Report for Rancho Murieta North." Sacramento, California: County of Sacramento, Department of Community Development. November 2, 2015. Accessed June 29, 2016. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Documents/Rancho%20Murieta%20North/Rancho%20Murieta%20NOP%20NOV%202015.pdf.

Sacramento County Airport System. 2008. *Franklin Field Airport Master Plan: Working Paper Two*. Sacramento, California: Sacramento County Airport System. September 2008. Accessed June 29, 2016. http://www.sacramento.aero/download.php?f=/f72_workingpaper_2.pdf.

Sacramento Valley Conservancy. 2014. "Twenty-First Century Open Space Vision" [map]. March 25, 2014. Accessed June 29, 2016. http://sacramentovalleyconservancy.org/pdf/SVC-MAP-20140325.pdf.

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland, Oregon: USFWS, Region 1. December 15, 2005. Accessed June 28, 2016. http://www.fws.gov/sacramento/ES/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

USFWS. 2007. *Stone Lakes National Wildlife Refuge Comprehensive Conservation Plan*. Sacramento, California: Fish and Wildlife Service Region 8. January 5, 2007. Accessed June 28, 2016. http://www.fws.gov/uploadedFiles/Region_8/NWRS/Zone_1/Stone_Lakes/Images/PDFs/SL%20CCP%20Final%20low%20res.pdf.

CHAPTER 4 – LAND USE

This chapter presents the potential impacts of each Environmental Impact Statement/Environmental Impact Report (EIS/EIR) alternative on existing and planned land use conditions, consistency with applicable planning documents, and compatibility with existing and planned land uses.

This chapter also includes a land use compatibility analysis of Franklin Field and Mather Airport, which are within the Planning Area, and the Sacramento Executive, Rancho Murieta, and Eagle's Nest Airports, which are located outside of but within the vicinity of the Planning Area.

The land use compatibility analysis evaluates the potential for airport safety concerns associated with the implementation of an alternative's activities or projects within any of the adopted airport Comprehensive Land Use Plans (CLUPs).

4.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

This section describes the regulatory and physical environmental setting for land use planning and existing land uses within the Planning Area.

4.1.1 Regulatory Framework

This section includes a summary of applicable federal, state, and local regulations, policies, and the planning documents for those agencies that have land use authority or are involved with land use decisions within the Planning Area. Pursuant to 40 Code of Federal Regulations (CFR) 1502.25, these applicable policies and plans helped to determine the appropriate scope of analysis included in Chapter 4. There are no tribal plans available that pertain to land use in the Planning Area; therefore, tribal plans are not discussed.

4.1.1.1 Federal Regulations and Policies

Wildlife Hazard Mitigation Program, Hazardous Wildlife Attractants

The Federal Aviation Administration (FAA) issued an Advisory Circular titled "Hazardous Wildlife Attractants on or Near Airports" (FAA 2007). The FAA released this Advisory Circular as part of its Wildlife Hazard Mitigation Program. The FAA recommends the guidance in this Advisory Circular for land use planners and developers of projects, facilities, and activities on or near airports. The FAA requires airports that receive federal grant-in-aid assistance to follow this guidance. Three of the airports within the Planning Area (Mather Airport and Franklin Field) or nearby (Sacramento Executive Airport) receive federal grant-in-aid assistance and are therefore subject to these guidelines (FAA 2007).

This Advisory Circular recommends that local planning efforts evaluate the potential for hazardous wildlife attractants on or near airports since wildlife–aircraft collisions are a serious economic and public safety issue and jeopardize future airport expansions. The Advisory Circular provides guidance to assess and address development projects and land use planning near airports with respect to their potential to attract wildlife or increase airport wildlife hazards.[1] Land uses that could attract hazardous wildlife include aquatic resources, agricultural activities, landfills, public parks, and landscaping (FAA 2007). The Advisory Circular recommends that hazardous wildlife attractants be located no closer than 5,000 feet at airports that serve piston-powered aircraft, 10,000 feet between airports that serve turbine-powered aircraft, and 5 miles from airports when the attractant could cause hazardous wildlife movement into or across the approach or departure airspace. The Advisory Circular also contains multiple recommendations on how to minimize hazardous wildlife attractants, such as rapid stormwater detention basin drainage, steep-sided, narrow ponds, and elimination of vegetation (FAA 2007).

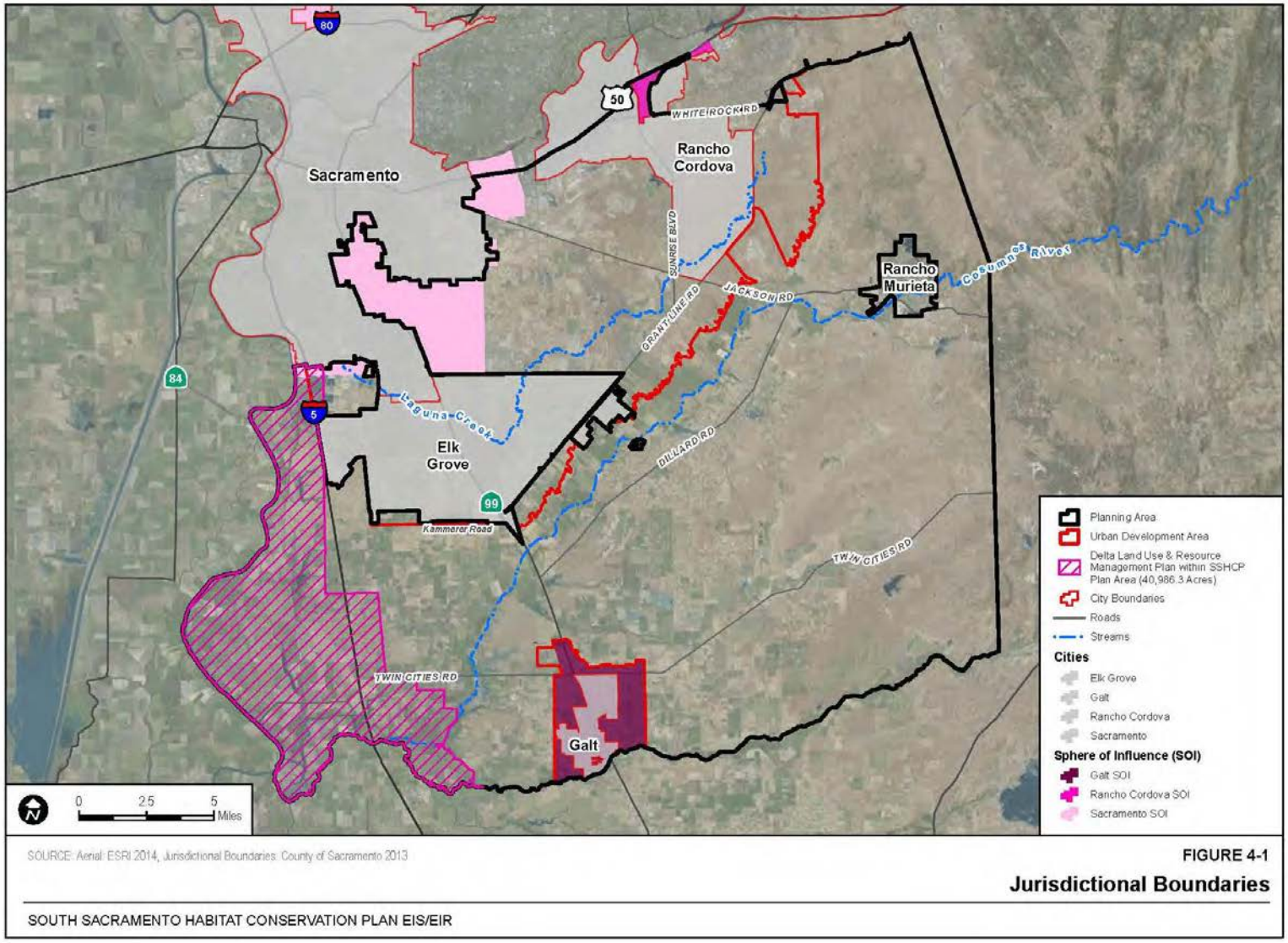
4.1.1.2 State Regulations and Policies

Delta Protection Act and the Land Use and Resource Management Plan for the Primary Zone of the Delta

The islands, marshes, waterways, and lands located at the confluence of the Sacramento River and the San Joaquin River, including the Suisun Marsh, were defined as "the Delta" in 1959 with the passage of the Delta Protection Act (CDWR 1993). The Delta is a network of inland channels and inland "islands" that cover approximately 738,000 acres. The Delta Protection Act ~~identifies a Primary Zone of approximately 500,000 acres where a comprehensive resource management plan, the Delta Plan (Delta Stewardship Council 2013), is applied (see the discussion under the heading "Delta Reform Act of 2009 and the Delta Plan" below).~~ **, originally enacted in 1992, established the Delta Protection Commission and designated the Land Use and Resource Management Plan as a comprehensive resource management plan for the approximately 500,000-acre Primary Zone.** The southwestern-most portion of the Planning Area in Preserve Planning Unit (PPU) 6, totaling approximately 32,000 acres west of Interstate 5, is within the Primary Zone (Figure 4-1). An additional approximately 9,000-acre portion of PPU 6 east of Interstate 5 is within the Delta Secondary Zone. The Secondary Zone is defined by the Delta Protection Act as being within the legal Delta, but is subject to the land use authority of a local government. The Delta Protection Commission comments on projects in the Secondary Zone that have the potential to impact the Primary Zone, but does not have jurisdiction over projects in the Secondary Zone.

[1] Wildlife hazards include airplane collisions with birds (e.g., seagulls, owls, ducks, geese, crows) and mammals (e.g., deer, coyotes).

Figure 4-1 Jurisdictional Boundaries



INTENTIONALLY LEFT BLANK

The Delta Protection Commission prepared the *Land Use and Resource Management Plan for the Primary Zone of the Delta* (Land Use and Resource Management Plan), which was last updated in 2010 (Delta Protection Commission 2010). The Land Use and Resource Management Plan includes policies for development of land within the Primary Zone of the Delta. Within 180 days of the Delta Protection Commission's adopting, updating, or changing the Land Use and Resource Management Plan, local governments must submit amendments to their general plans that make them consistent with the Land Use and Resource Management Plan. Applicable policies from the Land Use and Resource Management Plan are identified below (Delta Protection Commission 2010).

> **Policy P-2:** Local government general plans, as defined in Government Code Section 65300 et seq., and zoning codes shall continue to promote and facilitate agriculture and agriculturally-supporting commercial and industrial uses as the primary land uses in the Primary Zone; recreation and natural resources land uses shall be supported in appropriate locations and where conflicts with agricultural land uses or other beneficial uses can be minimized.
>
> **Policy P-3:** New non-agriculturally oriented residential, recreational, commercial, habitat, restoration, or industrial development shall ensure that appropriate buffer areas are provided by those proposing new development to prevent conflicts between any proposed use and existing adjacent agricultural parcels. Buffers shall adequately protect integrity of land for existing and future agricultural uses and shall not include uses that conflict with agricultural operations on adjacent agricultural lands. Appropriate buffer setbacks shall be determined in consultation with local Agricultural Commissioners, and shall be based on applicable general plan policies and criteria included in Right-to-Farm Ordinances adopted by local jurisdictions.
>
> **Policy P-8:** Local government policies regarding mitigation of adverse environmental impacts under the California Environmental Quality Act may allow mitigation beyond county boundaries, if acceptable to reviewing fish and wildlife agencies and with approval of the recipient jurisdiction, for example in approved mitigation banks or in the case of agricultural loss to mitigation.[2] Mitigation in the Primary Zone for loss of agricultural lands in the Secondary Zone may be appropriate if the mitigation program

[2] This portion of Policy P-2 conflicts with the South Sacramento Habitat Conservation Plan (SSHCP) proposed requirements that Covered Activity mitigation occur within the Planning Area (see EIS/EIR Proposed Action/Proposed Project Alternative description in Section 2.3.5). However, the remainder of Policy P-8 remains applicable to all alternatives analyzed in the EIS/EIR, so Policy P-8 has been retained as part of the regulatory environment considered by the lead agencies when determining the scope of the analysis in Chapter 4, pursuant to 40 CFR 1502.25(b).

supports continued farming in the Primary Zone. California Government Code Section 51256.3 (Assembly Bill 797) specifically allows an agricultural conservation easement located within the Primary or Secondary Zone of the Delta to be related to Williamson Act contract rescissions in any other portion of the secondary zone without respect to County boundary limitations.

Delta Reform Act of 2009 and the Delta Plan

The Delta Reform Act created the Delta Stewardship Council and directed the council to complete the Delta Plan (Delta Stewardship Council 2013). The Delta Plan includes land use policies that encourage the location of new development in areas within the Delta where existing infrastructure is available and land is designated for development (Delta Stewardship Council 2013). Local governments whose jurisdiction falls within the legal boundary of the Delta and Suisun Marsh must certify to the council that certain agency decisions—such as approval of a development project or land use policy—are consistent with the Delta Plan. Individuals who disagree with that certification may file an appeal with the council, and if the appeal is upheld, the project or policy must be revised to enable a new certification to be granted.

Approximately 41,000 acres within the southwestern portion of the Planning Area falls within the Primary Zone or Secondary Zone of the Delta Plan (Delta Stewardship Council 2013).

Relevant policies from the Delta Plan (Delta Stewardship Council 2013) include the following:

Locate New Urban Development Wisely

a. New residential, commercial, and industrial development must be limited to the following areas, as shown in Appendix 6 and Appendix 7 [of the Delta Plan]:
   (1) Areas that city or county general plans as of May 16, 2013, designate for residential, commercial, and industrial development in cities or their spheres of influence;
   (4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove.
b. Notwithstanding subsection (a), new residential, commercial, and industrial development is permitted outside the areas described in subsection (a) if it is consistent with the land uses designated in county general plans as of May 16, 2013, and is otherwise consistent with this element of the Delta Plan.
c. For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E), this policy covers proposed actions that involve new residential, commercial, and industrial development that is not located within the areas described in subsection (a).

d. This policy is not intended in any way to alter the concurrent authority of the Delta Protection Commission to separately regulate development in the Delta's Primary Zone.

Respect Local Land Use When Siting Water or Flood Facilities or Restoring Habitats

a. Water management facilities, ecosystem restoration, and flood management infrastructure must be sited to avoid or reduce conflicts with existing uses or those uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible, considering comments from local agencies and the Delta Protection Commission. Plans for ecosystem restoration must consider sites on existing public lands, when feasible and consistent with a project's purpose, before privately owned sites are purchased. Measures to mitigate conflicts with adjacent uses may include, but are not limited to, buffers to prevent adverse effects on adjacent farmland.
b. For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter [of the Delta Plan], this policy covers proposed actions that involve the siting of water management facilities, ecosystem restoration, and flood management infrastructure.

ER P3. Protect Opportunities to Restore Habitat

a. Within the priority habitat restoration areas depicted in Appendix 5 of the Delta Plan, significant adverse impacts to the opportunity to restore habitat as described in section 5006, must be avoided or mitigated.

b. Impacts referenced in subsection (a) will be deemed to be avoided or mitigated if the project is designed and implemented so that it will not preclude or otherwise interfere with the ability to restore habitat as described in section 5006.

c. Impacts referenced in subsection (a) shall be mitigated to a point where the impacts have no significant effect on the opportunity to restore habitat as described in section 5006. Mitigation shall be determined, in consultation with the California Department of Fish and Wildlife, considering the size of the area impacted by the covered action and the type and value of habitat that could be restored on that area, taking into account existing and proposed restoration plans, landscape attributes, the elevation map shown in Appendix 4, and other relevant information about habitat restoration opportunities of the area.

d. **For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions in the priority habitat restoration areas depicted in Appendix 5 of the Delta Plan. It does not cover proposed actions outside those areas.**

Delta Plan Policy G P1. Delta Plan Policy G P1 requires that actions not exempt from CEQA and subject to Delta Plan regulations must include applicable feasible mitigation measures consistent with those identified in the Delta Plan EIR or substitute mitigation measures that are equally or more effective. Delta Plan Policy G P1 also states that actions subject to Delta Plan regulations must document use of the best available science as relevant to the purpose and nature of the project. Finally, Delta Plan Policy G P1 requires that ecosystem restoration and water management covered actions include adequate provisions for continued implementation of adaptive management, appropriate to the scope of the action. This requirement is satisfied through A) the development of an adaptive management plan that is consistent with the framework described in Appendix 1B of the Delta Plan, and B) documentation of adequate resources to implement the proposed adaptive management plan.

Delta Plan Policies DP P1 and DP P2. Delta Plan Policy DP P1 states that new residential, commercial or industrial development is permitted outside the urban boundaries only if it is consistent with the land use designated in the relevant county general plan. It is intended to strengthen existing Delta communities while protecting farmland and open space, providing land for ecosystem restoration needs, and reducing flood risk. Delta Plan Policy DP P2 states that plans for ecosystem restoration must be sited to avoid or reduce conflicts with existing uses when feasible.

Delta Plan Policy ER P2. Delta Plan Policy ER P2 states that habitat restoration must be consistent with Appendix 3 of the Delta Plan regulations and that restoration will occur at appropriate elevations.

Delta Plan Policy ER R2. This policy states, for the Cosumnes-Mokelumne Confluence: "Allow these unregulated and minimally regulated rivers to flood over their banks during winter and spring frequently and regularly to create seasonal floodplains and riparian habitats that grade into tidal marsh and shallow subtidal habitats."

Delta Plan Policy ER P3. This policy requires that, within the priority habitat restoration areas depicted in Appendix 5 of the Delta Plan, significant adverse impacts to the opportunity to restore habitat must be avoided or mitigated. Much of the overlap between the Legal Delta and the SSHCP Plan Area includes the Cosumnes-Mokelumne Confluence PHRA.

Delta Plan Policies RR P2, RR P3, and RR P4. Policy RR P2 requires flood protection for residential development in rural areas. Policy RR P3 restricts encroachment in floodways. Policy RR P4 restricts encroachment in floodplains, including the Cosumnes-Mokelumne Confluence. Policy RR P4 specifically states that "no encroachment shall be allowed or constructed unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant impact on floodplain values and functions."

Delta Plan Policy ER P5. Policy ER P5 calls for avoiding introductions and habitat improvements for invasive nonnative species or mitigating these potential impacts in a manner that appropriately protects the ecosystem. Analysis on this matter should address both nonnative wildlife species as well as terrestrial and aquatic weeds. To the maximum extent practicable, design of habitat restoration and creation actions should avoid or minimize effects that would lead to the establishment of nonnative invasive species populations on site before relying on mitigation measures. In the event that mitigation is warranted, those mitigation and minimization measures should be equally or more effective than the Delta Plan mitigation measure 4-1.

4.1.1.3 Regional Regulations and Policies

Metropolitan Transportation Plan/Sustainable Communities Strategy

The Sacramento Area Council of Governments (SACOG) is an association that includes the Counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba, as well as 22 cities, including two of the South Sacramento Habitat Conservation Plan (SSHCP) Permit Applicants (the City of Galt and the City of Rancho Cordova). As a metropolitan transportation organization, SACOG is required to prepare a long-range transportation plan for all modes of transportation—including public transit, automobile, bicycles, and pedestrians—every 4 years for the six-county area. SACOG is also required to integrate land use, housing, and transportation strategies into a Sustainable Communities Strategy (SCS) that achieves the California Air Resources Board emissions reduction targets for greenhouse gases.

The *Metropolitan Transportation Plan/Sustainable Communities Strategy 2036* (the 2036 MTP/SCS) (SACOG 2016) was prepared to establish regional access and to identify mobility goals; identify present and future transportation needs, deficiencies, and constraints within the transportation system; analyze potential solutions; estimate available funding; propose investments; and achieve regional targets for reducing greenhouse gas emissions. The 2036 MTP/SCS plan does not present requirements for urban development within the Planning Area; rather, it forms the foundation for regional transportation investments, as described in the *Regional Housing Needs Plan 2013–2021* (SACOG 2012), and provides regional compliance with federal air quality and state greenhouse gas emissions requirements.

Sacramento Region Blueprint Transportation and Land Use Plan

In recognizing future regional environmental effects of continuing the historical pattern of growth in the six-county area—including loss of habitat, agricultural land, and open space, as well as an increase in traffic congestion and pollution— SACOG initiated preparation of the *Sacramento Region Blueprint Transportation and Land Use Plan* in 2002 to identify the region's housing/employment needs through year 2050, and to propose different scenarios for future urban development to accommodate those housing/employment needs. SACOG identified a "base-case" representing development trends at that time and projecting development trends out to year 2050. Alternative future urban development strategies were developed, each implementing differing levels of "smart growth" strategies. After extensive outreach and public involvement, the SACOG Board of Directors adopted the preferred blueprint scenario in December 2004 (SACOG 2004). The preferred blueprint scenario represents a balanced approach that emphasizes infill and revitalization, and relies on smart growth principles to encourage development at higher densities, while offering a wide choice of housing options (SACOG 2004).

Recent SACOG documents, such as the 2036 MTP/SCS (SACOG 2016) described previously, use the preferred blueprint scenario as the land use basis for future transportation investments.

4.1.1.4 Local Regulations, Policies, and Plans

Land uses in the Planning Area are governed by the general plans and other local plans and policies of Sacramento County, Galt, and Rancho Cordova. The general plans of these three jurisdictions guide the location and type of land use by establishing each community's planning goals, objectives, and policies.

Land uses in the Planning Area are also influenced by the 2036 MTP/SCS and by the Airport Land Use Compatibility Plans of each public-use airport located in or adjacent to the Planning Area.

Sacramento County General Plan

The Land Use Element of the adopted *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011) identifies a goal of establishing "an orderly pattern of land use that concentrates urban development, enhances community character and identity through the creation and maintenance of neighborhoods, is functionally linked with transit, promotes public health, and protects Sacramento County's natural, environmental and agricultural resources" (Sacramento County 2011, p. 17).

The Land Use Element also establishes Sacramento County's growth boundary system, which it describes as the "backbone of Sacramento County's urban planning philosophy" (Sacramento County 2011, p. 18). Sacramento County has two growth boundary designations: the Urban Service Boundary (USB), which indicates the ultimate boundary of the urban area in the

unincorporated county and the Urban Policy Area, which identifies the areas where urban development will occur through the year 2030. Please see Chapter 1 for a detailed description of these plan boundaries. While the USB is intended to be a permanent boundary, the Urban Policy Area is adjusted incrementally as needed to ensure that Sacramento County can accommodate anticipated growth throughout the 25-year planning cycle. The area between the two lines is reserved for future urbanization.

As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, the term "UDA" means all lands within Sacramento County's USB boundary that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within Galt's sphere of influence (SOI) (see Figure 1-1).

The Sacramento County General Plan and the current County Urban Policy Area boundary assume that most growth in the unincorporated areas of Sacramento County would occur east of the City of Sacramento, north of the City of Elk Grove, and southwest of the City of Rancho Cordova. In addition, expansion of the Urban Policy Area to create several new communities within the Mather Core Recovery Area (MCRA) (USFWS 2005) was anticipated in the General Plan, which notes that stringent criteria for expanding the Urban Policy Area would require such proposals to demonstrate "high quality design and the creation of complete communities that offer a range of housing, employment, commercial uses, transportation choices and community amenities" (Sacramento 2011, Executive Summary, p. 3).

The Sacramento County General Plan Land Use Element establishes an objective of allowing "Limited agricultural–residential land use expansion outside the USB that does not compromise objectives for protecting prime agricultural lands and open space, and avoids groundwater overdraft and contamination" (Sacramento County 2011, p. 72).

Policies relevant to this EIS/EIR from Sacramento County's Land Use Element include the following (Sacramento County 2011):

> **Policy LU-2:** The County shall maintain an Urban Service Boundary that defines the long-range plans (beyond twenty-five years) for urbanization and extension of public infrastructure and services, and defines important areas for protecting as open space and agriculture.
>
> **Policy LU-15:** Planning and development of new growth areas should be consistent with Sacramento County-adopted Habitat Conservation Plans and other efforts to preserve and protect natural resources.

Policy LU-120: The County shall only consider approval of a proposed Urban Policy Area expansion and/or Master Plan outside of the existing Urban Policy Area if the Board finds that the proposed project is planned and will be built in a manner that meets specific standards such as density, jobs-housing balance, financing, mix of uses, etc., specified in the policy (note: this is a summary of this policy. See pages 124 through 135 of the Land Use Element).

Policy LU-122: The Urban Policy Area is intended to provide an adequate supply of developable land sufficient to accommodate projected growth. The Urban Policy Area shall also include additional preserve lands to ensure an appropriate supply of open space. It is the policy and intent of the County to evaluate the Urban Policy Area at a minimum of five-year intervals, to determine if an expansion is needed to maintain a constant adequate supply of land.

- Guidelines to be considered by the Board in determining the expansion of the Urban Policy Area include:
- Buildout rates by type of use, unit type and density for the previous 5-year period.
- Infill trends and opportunities.
- Population and job growth projections as reflected by a minimum of three independent sources.
- Evidence that the infrastructure capacity and service availability exist or can be extended to the property.
- Evidence that the proposed expansion is consistent with Sacramento County adopted Habitat Conservation Plan goals and objectives, or where such a draft or adopted Plan does not exist, evidence that important natural resources lands, agricultural lands, and open space lands will be protected and integrated into a cohesive and interconnected network of open space within the Urban Policy Area.

Policy LU-127: The County shall not expand the Urban Service Boundary unless:

- There is inadequate vacant land within the USB to accommodate the projected 25-year demand for urban uses; and
- The proposal calling for such expansion can satisfy the requirements of a master water plan as contained in the Conservation Element; and
- The proposal calling for such expansion can satisfy the requirements of the Sacramento County Air Quality Attainment Plan; and
- The area of expansion does not incorporate open space areas for which previously secured open space easements would need to be relinquished; and

- The area of expansion does not include the development of important natural resource areas, aquifer recharge lands or prime agricultural lands;
- The area of expansion does not preclude implementation of a Sacramento County-adopted Habitat Conservation Plan; OR
- The Board approves such expansion by a 4/5ths vote based upon a finding that the expansion would provide extraordinary environmental, social or economic benefits and opportunities to the County.

Galt General Plan

The *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009) Land Use Element establishes a goal of expanding the City of Galt "as necessary in an orderly pattern consistent with economic, social, and environmental needs" (Galt 2009). Several policies include requirements to protect habitat and open space, including areas proposed for development within the Galt's SOI. Galt General Plan policies relevant to this EIS/EIR include the following (Galt 2009):

> **Policy LU-1.10:** The City shall coordinate habitat preservation efforts with Sacramento County to maintain critical species habitat preservation zoning on open space north of the Planning Area[3] and within the proposed South Sacramento County Habitat Conservation Plan. The City shall continue to mitigate impacts on special habitats and endangered species in consultation with applicable Federal and State agencies prior to adoption of the South Sacramento County Habitat Conservation Plan.
>
> **Policy LU-9.1:** The City should participate in regional efforts to establish a permanent agriculture, open space, and wildlife habitat greenbelt between the northern boundary of the Planning Area and the City of Elk Grove.

Rancho Cordova General Plan

The Land Use Element in the *Rancho Cordova General Plan* (Rancho Cordova 2006a) focuses on development of the predominantly urban land uses anticipated within Rancho Cordova's limits, with a vision of creating a "series of walkable neighborhoods, villages, and districts, each with a center of activity that promotes interactions between residents, employees, and visitors." The Rancho Cordova General Plan also recognizes the need to preserve natural resources as an important community feature. It establishes Rancho Cordova's goals of achieving a "balanced

[3] The Galt General Plan uses "Planning Area" to describe the geographic area that will be directly addressed by the General Plan, and typically encompasses the city limits and potentially annexable land within its SOI (Galt 2009, p. 3).

and integrated land use pattern" and participating in the "decision-making on land-use, circulation, and park issues outside the City limits that have an impact on the City" (Rancho Cordova 2006a). Other elements of the Rancho Cordova General Plan do include relevant policies, as noted below.

The Rancho Cordova General Plan Natural Resources Element identifies the Rancho Cordova's specific goals and policies intended to position Rancho Cordova as "a leader in natural resource conservation, managing natural resources to ensure long-term sustainability while evaluating new opportunities and techniques in conservation" (Rancho Cordova 2006a). The Natural Resources Element contains goals related to protecting and preserving diverse wildlife and plant habitat and natural aquatic resources and several supporting policies. Those policies that relate to land use and are relevant to this EIS/EIR are as follows (Rancho Cordova 2006a):

> **Policy NR.1.2:** Conserve Swainson's hawk habitat consistent with State policies and Department of Fish and Wildlife guidelines.
>
> **Policy NR.1.6:** Participate in the development of a habitat conservation plan to address the unique biological resources in Rancho Cordova.

Airport Plans and Guidelines

Three of the public airports located within the Planning Area (Mather Airport, Franklin Field, and Sacramento Executive Airport) have adopted a CLUP. An airport CLUP addresses airport noise, land use compatibility, and safety. The Rancho Murieta Airport and Eagle's Nest Airport (which is located within Amador County, immediately adjacent to the eastern edge of the Planning Area) do not have adopted CLUPs; similar guidance is provided through the *Airport Land Use Commission Policy Plan* (Airport Land Use Commission 1992) and the *California Airport Land Use Planning Handbook* (Airport Handbook) (State of California Department of Transportation 2011). Each of the airport land use plans define compatible and incompatible land uses within three airport safety zones: the "Clear Zone," "Approach–Departure Zone," and "Overflight Zone."[4] Figures 4-3 through 4-7 depict each of the airports and include the limits of the airport, Overflight Zones, and 5-mile radii. There are multiple factors that are included in the airport land use plans that provide direction on compatible land uses adjacent to or nearby airports. Given the nature of the SSHCP as a conservation-planning tool, these airport land use compatibility analyses focus on the presence of or increase/decrease of natural areas that may attract wildlife, either on the

[4] The "Clear Zone" is near the end of the runway and carries the most restrictions in terms of compatible land uses. The "Approach–Departure Zone" is located under the takeoff and landing slopes and is slightly less restrictive than the "Clear Zone" but more restrictive than the "Overflight Zone." The "Overflight Zone" is the area under the air traffic pattern and is the least restrictive (SACOG 1997, p. 30). The "Overflight Zone" roughly corresponds to the "Airport Operations Area," as defined in FAA Advisory Circular 150/5200-33B.

ground or in flight, or result in microclimatic conditions that may affect navigation. In all of the airport land use plans, open space and natural areas, including natural water areas, are compatible only if they do not result in the possibility that a water area may cause ground fog, a wildlife strike hazard from species such as deer or geese that are attracted to grazing opportunities, or a bird–aircraft collision hazard. These plans allow existing incompatible land uses to continue; however, no existing incompatible land use may be changed to another incompatible land use except by a 4/5 majority vote of the County Board of Supervisors.

4.1.2 Existing Conditions

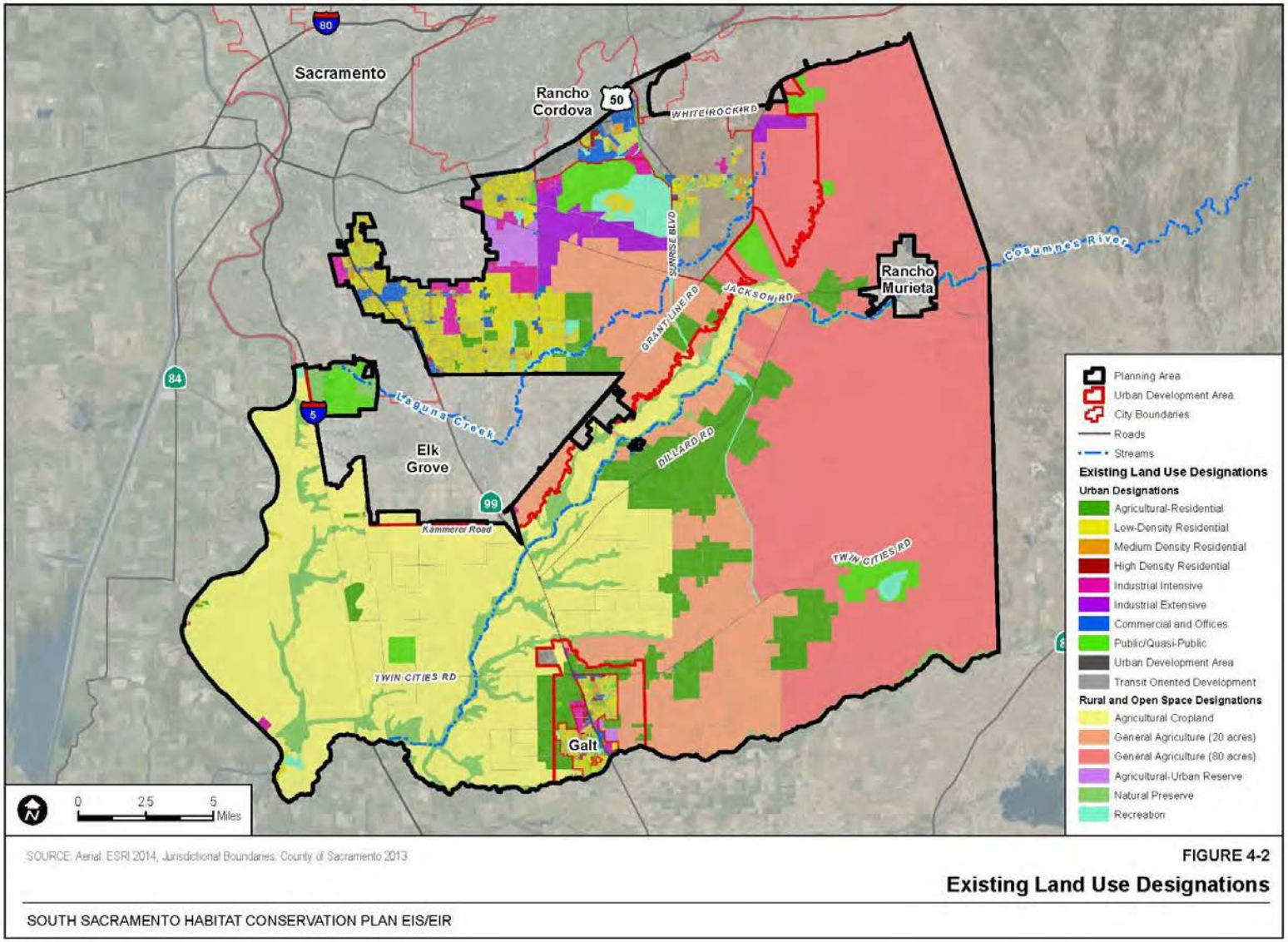
Figure 4-1 illustrates the city and county jurisdictional boundaries, including the SOI for each city, within the EIS/EIR Planning Area. Table 4-1 identifies the acreage of the Planning Area within Sacramento County, Galt, and Rancho Cordova.

Table 4-1. Acreage of Sacramento County, Galt, and Rancho Cordova within the EIS/EIR Planning Area

Jurisdiction	Acreage within the Planning Area
Sacramento County (unincorporated)	307,142
City of Galt	2,009
City of Rancho Cordova	8,504
Total Acres in the Planning Area	**317,655**

INTENTIONALLY LEFT BLANK

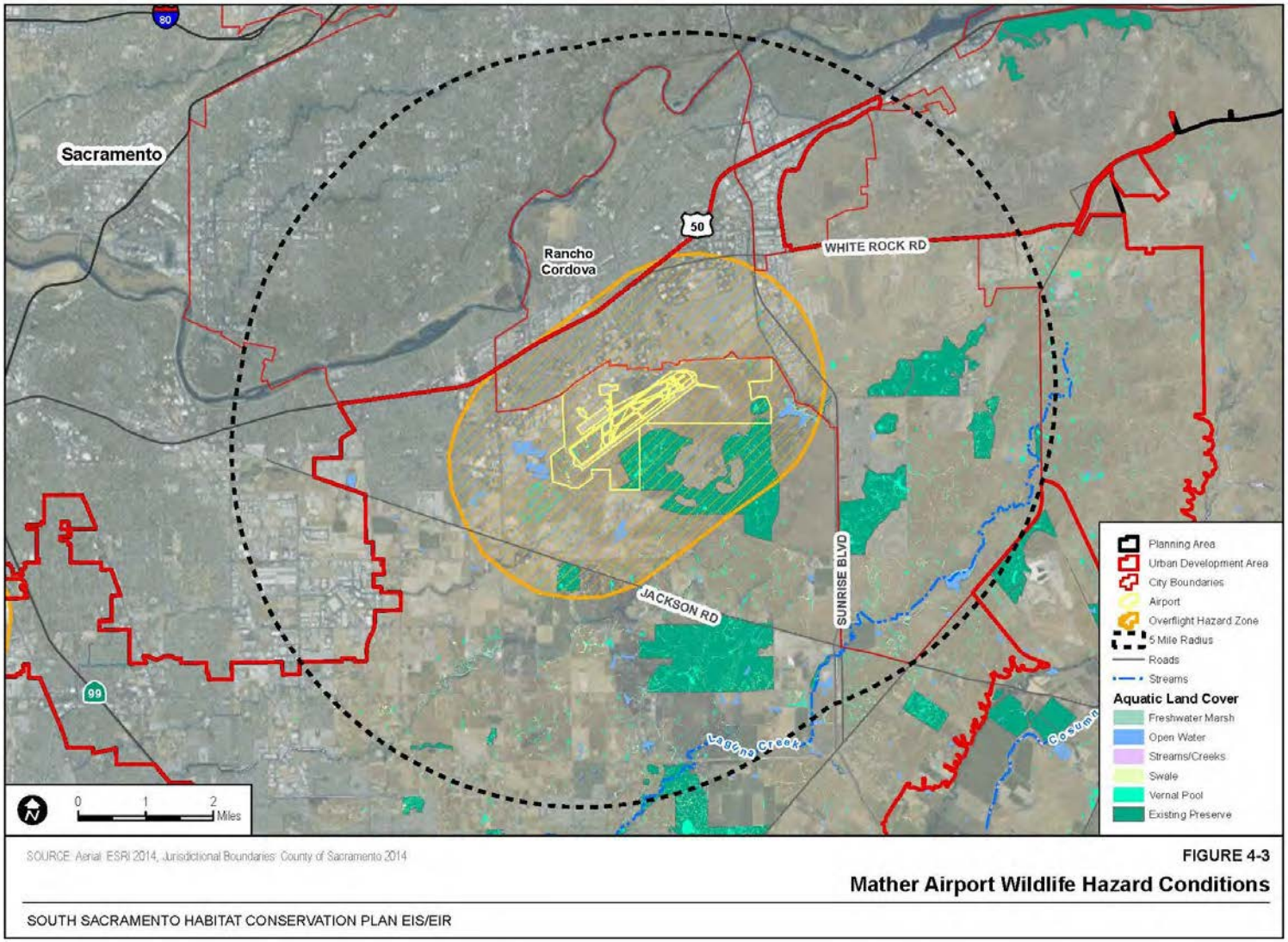
Figure 4-2 Existing Land Use Designations



AGENDA ITEM 11.1
4220

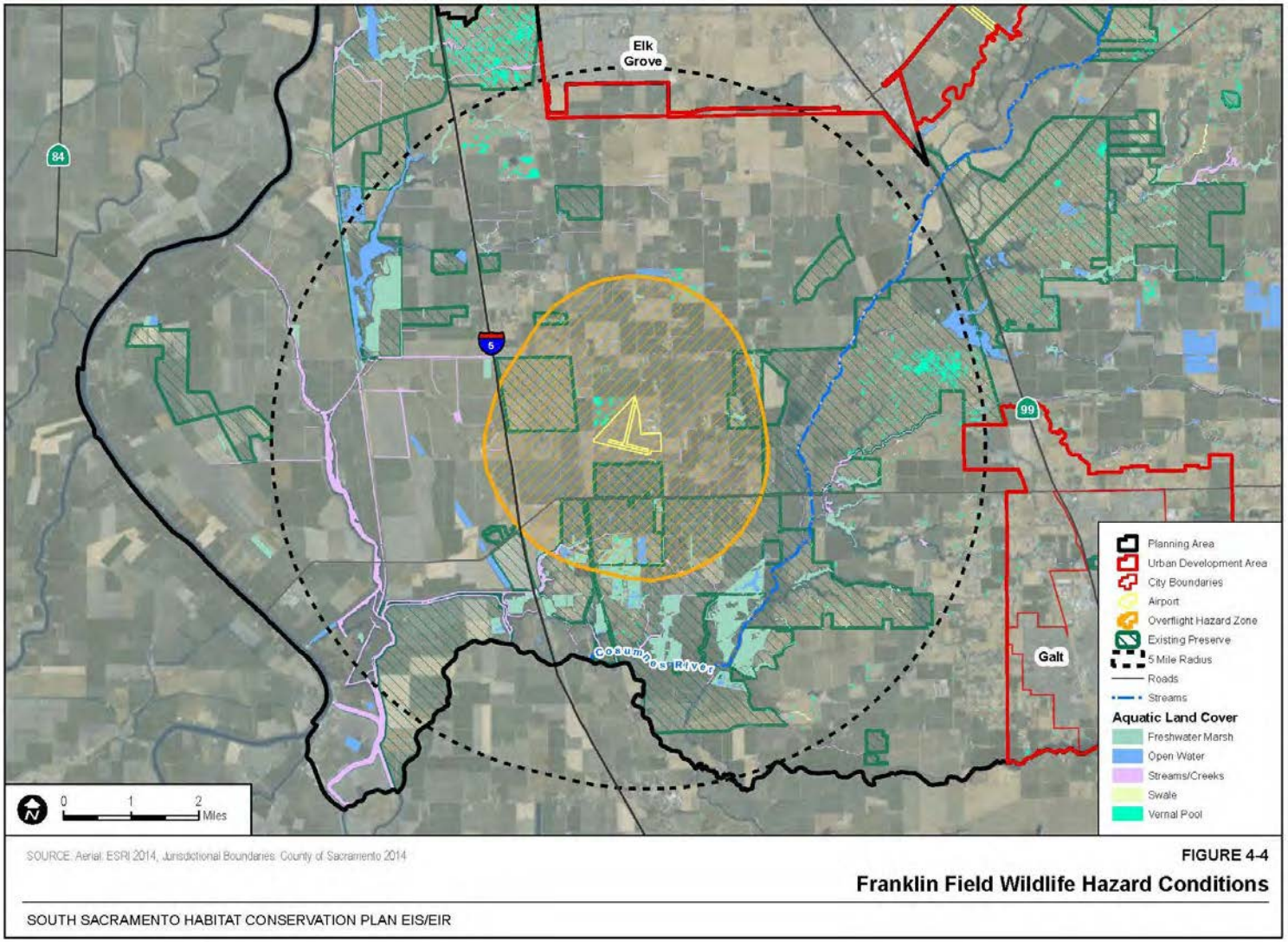
INTENTIONALLY LEFT BLANK

Figure 4-3 Mather Airport Wildlife Hazard Conditions



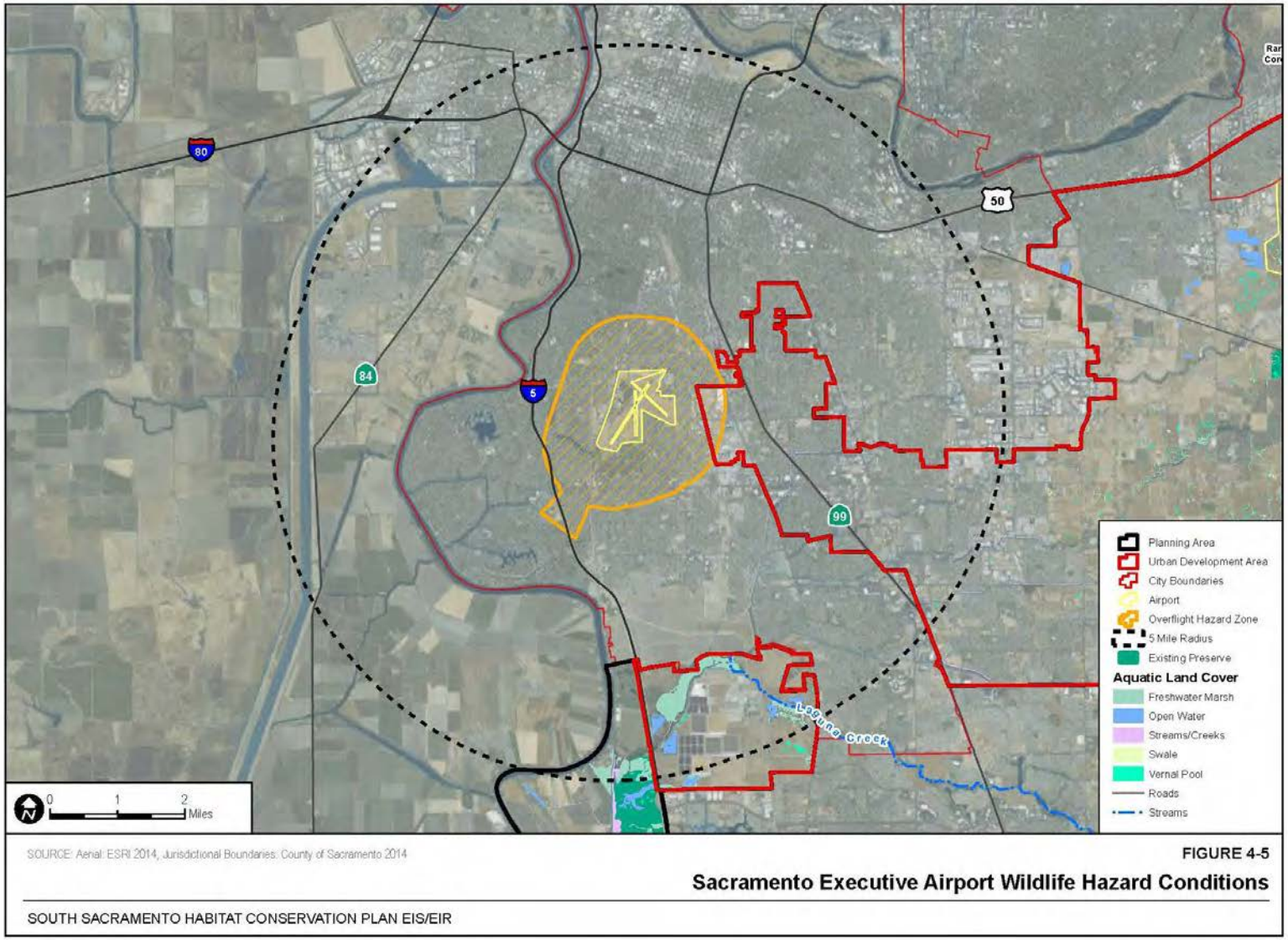
INTENTIONALLY LEFT BLANK

Figure 4-4 Franklin Field Wildlife Hazard Conditions



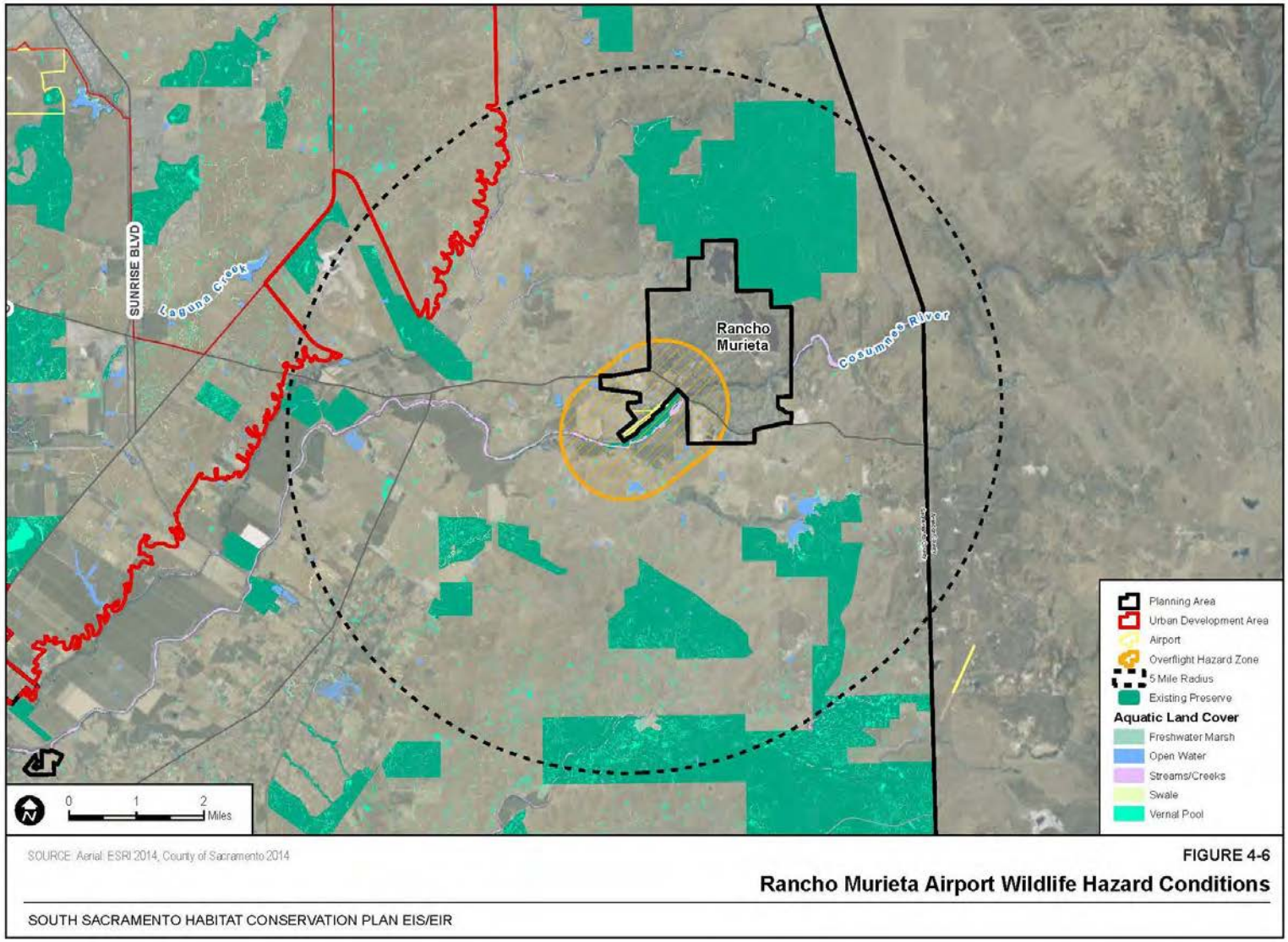
INTENTIONALLY LEFT BLANK

Figure 4-5 Sacramento Executive Airport Wildlife Hazard Conditions



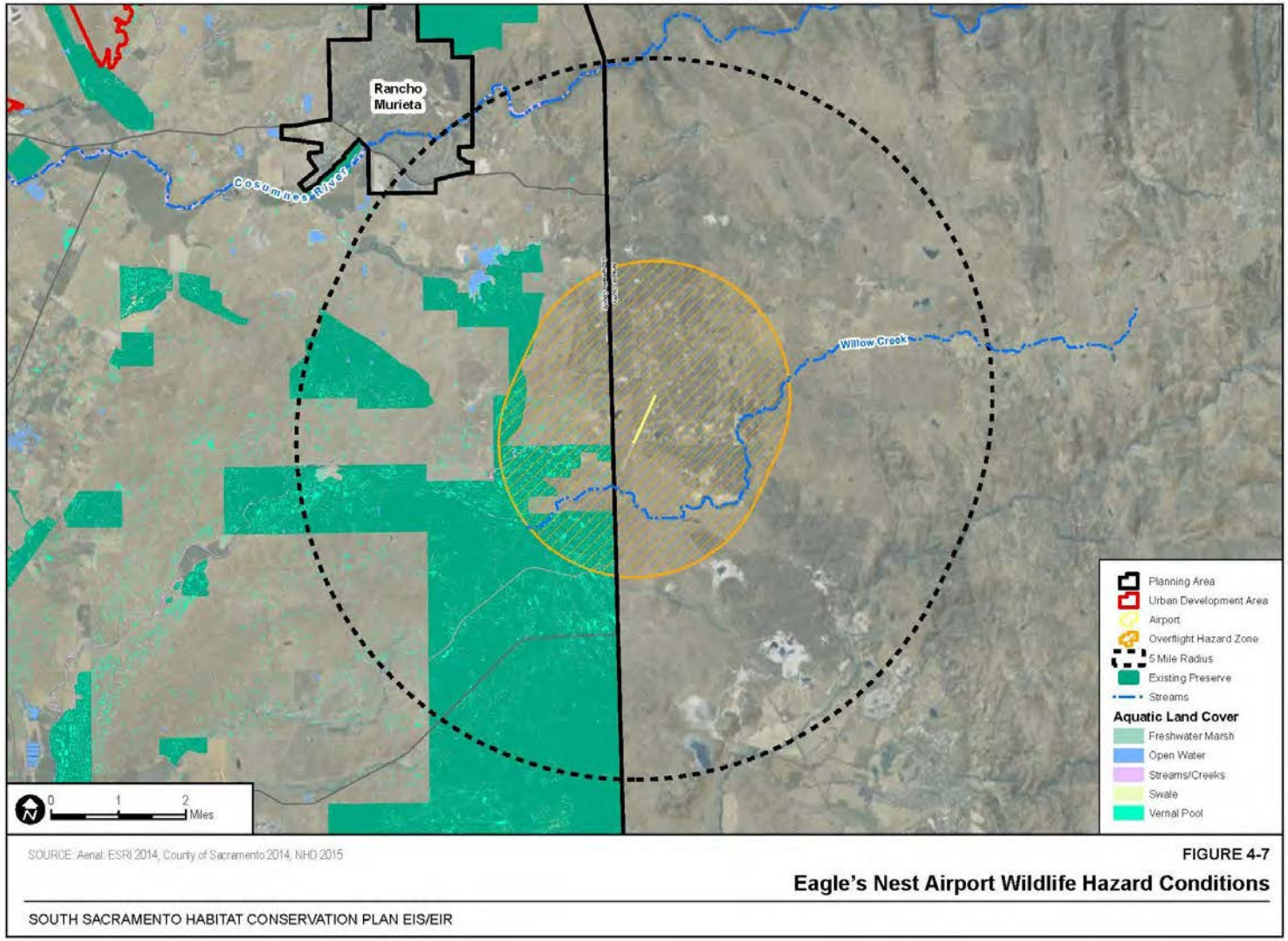
INTENTIONALLY LEFT BLANK

Figure 4-6 Rancho Murieta Airport Wildlife Hazard Conditions



INTENTIONALLY LEFT BLANK

Figure 4-7 Eagle's Nest Airport Wildlife Hazard Conditions



INTENTIONALLY LEFT BLANK

4.1.2.1 Past and Current Land Use in the Planning Area

Sacramento County was formed in 1850 as one of the original 27 counties of the State of California. As discussed in Sections 1.3.1 and 3.7.1, Sacramento County has a strong agricultural history. Agriculture and grazing lands dominated the landscape throughout the early twentieth century. Urbanization increased in the 1940s and again between 1950 and 1960, with new growth occurring primarily near the City of Sacramento and in smaller cities such as Folsom, Galt, and Isleton. Growth continued at a moderate rate between 1960 and 1990, resulting in an expansion of urban land use patterns and infrastructure into the southern and eastern portions of Sacramento County. Development slowed in the early 1990s, picked up again in the early 2000s, and softened or slowed considerably from 2007 to 2009. Approximately 46,000 people lived in the Sacramento metropolitan region in 1900. The population in Sacramento County reached one million between 1980 and 1990, and in 2010 the population was 1.4 million (Sacramento County 2011).

Sacramento County covers approximately 990 square miles and includes seven incorporated cities—Sacramento, Elk Grove, Citrus Heights, Folsom, Galt, Isleton, and Rancho Cordova—and many other unincorporated communities. Communities within the Planning Area, located primarily in the central and western portions of the unincorporated County, typically include land designated for agricultural uses with minimum parcel sizes of 20, 40, or 80 acres. These communities include Alta Mesa, Clay Station, Herald, Point Pleasant, Sloughhouse, and Wilton. These six Planning Area communities are located outside of the UDA, in the southern and eastern portions of the Planning Area, where the Sacramento County General Plan provides for continuation of the historically agricultural-based land use patterns (Sacramento County 2011). Although it is not included in the Planning Area, the unincorporated community of Rancho Murieta is also located in the southeastern portion of Sacramento County outside the UDA (Figure 4-2).

Unincorporated areas of Sacramento County located within the UDA include Florin, Rosemont, Mather, and Vineyard. These areas include existing residential, commercial, and industrial development. The Sacramento County General Plan land use diagram (Sacramento County 2011) indicates that a majority of new urban (residential, commercial, and industrial) land uses would be located north of Elk Grove and east of Sacramento (residential and commercial), while new industrial land uses would be located south of Mather Airport.

4.1.2.2 Land Use Designations in the Planning Area

Table 4-2 provides a summary of the existing land use designations in the Planning Area, also depicted on Figure 4-2. The existing land uses were compiled from the Rancho Cordova, City of Galt, and Sacramento County General Plan land use maps (Sacramento County 2011; Galt 2009; Rancho Cordova 2006a). However, specific land use designations for each Planning Area local jurisdiction were somewhat different. To create a uniform list of Planning Area land use

designations, the EIS/EIR assigned the land use designations used in each general plan to one of the 18 land use designations listed in Table 4-2.

Table 4-2. Existing Land Use Designations within the Planning Area

Land Use Designation[1]	Acres	% of Total Planning Area (approximate)
Agricultural Cropland	82,279	25.9
Agricultural Residential	24,926	7.8
Agricultural Urban Reserve	1,907	0.6
General Agriculture (20 Acres)	38,720	12.2
General Agriculture (80 Acres)	106,692	33.6
Total Agriculture	*254,524*	*80.1*
Low Density Residential	6,263	2.0
Medium Density Residential	687	0.2
High Density Residential	223	0.1
Commercial and Offices	2,272	0.7
Industrial Extensive	4,362	1.4
Industrial Intensive	3,408	1.1
Specific Plan Area	7,008	2.2
Transit Oriented Development	70	0.0
Misc. Urban Development Area[2]	72	0.0
Total Urban	*24,365*	*7.7*
Natural Preserve	18,556	5.8
Public/Quasi-Public	8,896	2.8
Recreation	3,328	1.0
Rights-of-Way[3]	7,986	2.5
Planning Area TOTAL	**317,655**	**100**

1 Land use designations used in Chapter 4 are closely based on the land use designations in Sacramento County 2011.
2 The Misc. Urban Development Area designation is included to capture the entirety of the Planning Area.
3 The "rights-of-way" designation represents areas of roadways, utility corridors, and other areas where a local land use authority has granted rights-of-way, and no land use designation was retained.

SACOG predicts that the region will continue to experience strong growth over the EIS/EIR 50-year study period discussed in Section 3.6.3 (SACOG 2004). SACOG has forecasted that Sacramento County will see an increase in population from 1,223,499 in 2000 to 1,695,498 by 2025 and over 2 million by 2050 (SACOG 2005, 2009, as cited in Sacramento County et al. 2017). The six-county Sacramento region is predicted to see an increase in population from 1,886,165 in 2000 to 2,814,254 in 2025. A large portion of this growth is expected to occur within the Planning Area in southern and eastern Sacramento County (Sacramento County et al. 2017). The general planning processes conducted by Sacramento County, Galt, and Rancho Cordova have taken into account these regional population estimates and have laid out land use frameworks to accommodate this projected population increases. As indicated in Table 4-2, generally, the land use designations for Sacramento County, Galt, and Rancho Cordova include

agriculture (including different parcel sizes and land use intensities), urban development (including different residential densities, commercial, and industrial uses), natural preserve, public or quasi-public, and recreational.

4.1.2.3 Airports

There are two public-use airports located within the Planning Area (Mather Airport and Franklin Field) and another three (Sacramento Executive, Rancho Murieta, and Eagle's Nest) located outside of the Planning Area, but within the project vicinity. In addition, there are several private airports within the Planning Area. Private airports are not part of the national air transportation network and serve private individuals, including agricultural spraying operators. Private airports in the Planning Area vary in size from single dirt airstrips to paved runways with hangars. Private airports in the Planning Area include Boeckmann Ranch Airport, Bottimore Ranch Airport, Flying B Ranch Airport, Flying R Airport, Lucchetti Ranch Airport, Mosier Airport, Mustang Airport, Sky Way Estates Airport, and Van Vleck Airport. All of the private airports are located outside of the UDA.

Mather Airport

Mather Airport, which was formerly the Mather Air Force Base, is located in the UDA portion of unincorporated Sacramento County, adjacent to Rancho Cordova (Figure 4-3). The airport is owned and operated by Sacramento County. Current redevelopment activities on the former base property include airport-related, commercial, and industrial uses (Sacramento County 2010). Mather Airport is bordered to the north and west by residential and commercial development and to the south and east by undeveloped land and agricultural operations.

Water bodies and other land uses that attract birds near Mather Airport include Mather Lake, located in Mather Regional Park approximately 2 miles east of the airport. The American River also flows approximately 3 miles northwest of the airport. Several smaller water bodies are present within Mather Airport's airport safety zone (which includes the Clear, Approach–Departure, and Overflight Zones), as are extensive areas of vernal pools. Within the airport's 5-mile separation zone are additional seasonally wet vernal pool areas to the east and south; the American River to the northwest (as noted above); and other open water/aquatic resources to the west, south, and east, including Laguna Creek. In addition, another bird attractant is the 1,084-acre Kiefer Landfill, located approximately 4.5 miles southeast of the airport.

Since its conversion from a military airfield to a public/commercial facility, non-military operations have increased at this facility, specifically air cargo, as have issues relative to local

development. During 2012, Mather Airport, a controlled airport,[5] supported 79,786 flight operations, including cargo, general aviation, air taxi, and military. Over the 5 years from 2008 to 2012, an average of 79,535 flight operations occurred annually (FAA 2013a). The Mather Airport CLUP (SACOG 1997), as noted above, defines compatible and incompatible land uses within three airport safety zones: Clear Zone, Approach–Departure Zone, and Overflight Zone.[6] Open space and natural areas, including natural water areas, are compatible in all three zones only if they do not result in a possibility that a water area may cause a wildlife hazard. The Mather Airport Master Plan update was adopted by the Board of Supervisors in August 2014.

Franklin Field

Franklin Field is located outside the UDA, in southern Sacramento County, approximately 1 mile northeast of the intersection of Twin Cities Road and Franklin Boulevard (see Figure 4-4). Franklin Field is currently a public-use airport owned and operated by Sacramento County.

Franklin Field is surrounded by agricultural land uses, including row crops and grazing lands. Existing drainage canals separate many of the agricultural fields, and similar canals elsewhere in the Planning Area provide habitat and resources for birds and other wildlife. Stone Lakes National Wildlife Refuge is located less than 5 miles northwest of Franklin Field and contains over 11,000 acres of publicly owned land that comprises freshwater sloughs, wetlands, vernal pools, riparian forest, and grasslands (USFWS 2013). Additional sloughs are located to the east and south of Franklin Field, which ultimately drain into the San Pablo Bay west of Vallejo. Several smaller water bodies are located within Franklin Field's airport safety zone (which includes the Clear, Approach–Departure, and Overflight Zones), as described previously. Within the 5-mile separation zone are additional vernal pool areas to the north and east; streams and drainages along the eastern and western portions of the 5-mile separation zone; the Cosumnes River along the east and south; Stones Lakes National Wildlife Refuge to the west (as noted previously); and other open water/aquatic resources, including freshwater marshes to the south and west.

Franklin Field is considered an uncontrolled airport since it does not have an air traffic control tower or personnel. There were approximately 36,000 operations in 2008 at Franklin Field, including flight training. The Airport Master Plan Working Paper anticipates that operations at this airport will increase over time, reaching approximately 64,000 operations by 2027 (Sacramento County Airport System 2008). Currently, Franklin Field has prepared a CLUP, which was amended in 1992 (SACOG 1992). The Franklin Field CLUP (SACOG 1992), as noted in Section 4.1.1, defines compatible and incompatible land uses within the following same three airport

[5] A controlled airport is an airport that has an operating airport traffic control tower. An uncontrolled airport does not include a traffic control tower.

[6] See footnote 4 for a definition of each zone.

safety zones as the Mather Airport CLUP: Clear Zone, Approach–Departure Zone, and Overflight Zone. Open space and natural areas, including natural water areas, are compatible in all three zones only if they do not result in a possibility that a water area may cause a wildlife hazard.

Sacramento Executive Airport

Sacramento Executive Airport is a controlled general aviation airport located in the City of Sacramento on Freeport Boulevard, outside of but within the vicinity of the Planning Area (Figure 4-5). Over 30 businesses operate at this airport, offering a wide variety of aviation-related services, including a full-service fixed-base operator, flight schools, aircraft maintenance, avionics, and aerial photography (Sacramento County 2010).

Sacramento Executive Airport is completely surrounded by urban development, including residential and commercial land uses. Reichmuth Park is located approximately 1 mile west of the runway, and Bing Maloney golf course is adjacent to the southern edge of the airport. Neither Reichmuth Park nor Bing Maloney golf course contains any water bodies. The Sacramento River is approximately 1.5 miles west of the airport at its closest point. Few aquatic resources are present within the Sacramento Executive Airport's safety zone (which includes the Clear, Approach–Departure, and Overflight Zones). Within the 5-mile separation zone are the Sacramento River and the Sacramento River Deep Water Ship Channel, which are located to the west, and other open water/aquatic resources, including Laguna Creek to the south.

Although Sacramento Executive Airport is located outside of the Planning Area, its area of influence extends into the Planning Area.[7] This airport is approximately 540 acres, and much of it is already developed or in a Clear (Safety) Zone. During 2012, Sacramento Executive Airport supported 88,619 flight operations, including air carrier, air taxi, general aviation, and military. Over the 5 years from 2008 to 2012, an average of 91,784 flight operations occurred annually (FAA 2013b). Sacramento Executive Airport has a CLUP that was amended in 1999 (SACOG 1999). The Sacramento Executive Airport CLUP (SACOG 1999), as noted previously, defines compatible and incompatible land uses within the same three airport safety zones as the Mather Airport CLUP: Clear Zone, Approach–Departure Zone, and Overflight Zone. Open space and natural areas, including natural water areas, are compatible only if they do not result in a possibility that a water area may cause a wildlife hazard.

[7] "Area of Influence" is defined as the airport planning boundaries where height, noise, or safety restrictions are imposed. Height standards for defining obstructions to air navigation are established by the FAA and are defined in Federal Aviation Regulation, Part 77, Objects Affecting Navigable Airspace. Noise restrictions are governed by California Administrative Code, Title 21, Subchapter 6. Airport safety areas are determined by the Airport Land Use Commission. The total area encompassed by these three sets of boundaries is referred to as the "Airport Area of Influence" (SACOG 1999, p. 8).

Rancho Murieta Airport

Rancho Murieta Airport is an uncontrolled airport located approximately 1 mile west of the business district of Rancho Murieta in eastern Sacramento County. The community of Rancho Murieta, including the Rancho Murieta Airport, is excluded from the Planning Area (Figure 4-6). Although this airport is not within the Planning Area, its area of influence extends into the Planning Area. The Rancho Murieta Airport is approximately 76 acres and has been active since 1970.

The airport is predominantly surrounded by residential development or agriculture to the north, east, and west. An existing riparian preserve is located adjacent to and south of the airport as part of the Cosumnes River. Thus, the Cosumnes River, as well as other open water/aquatic resources located to the south and northwest, is a major riparian resource within the Rancho Murieta airport safety zone (which includes the Clear, Approach–Departure, and Overflight Zones). Within the 5-mile separation zone are other creeks, including the continuation of the Cosumnes River, which passes in an east–west direction; vernal pools located in all directions around the airport; and other open water/aquatic resources that are located to the southeast, west, and northwest.

Rancho Murieta Airport has two relatively short runways, which are approximately 3,800 feet long (FAA 2013c), and can only accommodate smaller aircraft. It has no control tower. On average, there are 73 aircraft operations daily (based on data for the 12-month period ending December 2015) (AirNav.Com 2016a). There is no CLUP for this airport, but instead the Airport Land Use Commission Policy Plan (Airport Land Use Commission 1992) governs activity at this facility. This plan, as noted in Section 4.1.1, defines compatible and incompatible land uses within the same three airport safety zones as the Mather Airport CLUP: Clear Zone, Approach–Departure Zone, and Overflight Zone. Open space and natural areas, including natural water areas, are compatible only within all three zones if they do not result in a possibility that a water area may cause a wildlife hazard.

Eagle's Nest Airport

Eagle's Nest Airport is an uncontrolled private airport located approximately 1 mile east of the Planning Area, in the town of Ione in Amador County (Figure 4-7). It has been open since 1988 and covers approximately 600 acres. Low-density commercial and residential land uses composed of grasslands, oak woodlands, and scattered vernal pools are located in proximity and to the west and south of the airport. Willow Creek is approximately 1 mile south of the southern end of the runway. Thus, vernal pools and Willow Creek are aquatic resources within the Eagle's Nest airport safety zone (which includes the Clear, Approach–Departure, and Overflight Zones). Within the 5-mile separation zone are other creeks, including the Cosumnes River to the north; vernal pools located generally in the north, west, and south; and other open water/aquatic resources to the northwest of the airport.

Eagle's Nest Airport has a single 4,000-foot-long runway and is used by smaller aircraft. It has no control tower and averages 21 aircraft operations per week (AirNav.Com 2016b). The lead agencies could not confirm if a CLUP was adopted for this airport but assumes the airport is operating in compliance with the Airport Land Use Commission Policy Plan (Airport Land Use Commission 1992). This plan, as noted previously, defines compatible and incompatible land uses within the same three airport safety zones as the Mather Airport CLUP: Clear Zone, Approach–Departure Zone, and Overflight Zone. Open space and natural areas, including natural water areas, are compatible within all three zones only if they do not result in a possibility that a water area may cause a wildlife hazard.

Airport Hazards

There are many hazards associated with airports that are applicable in regional land use planning. Location of new urban development must be planned in the context of airport height restrictions, noise compatibility, and wildlife hazard considerations. Given the fact that the SSHCP is a conservation planning document, the focus of this analysis is on wildlife hazards.

Birds frequently use airports and surrounding habitats because there is open space, food resources, perches, and often ponds or other aquatic resources. The use of aquatic resources by wildlife in the vicinity of airports depends greatly on the species that are present and their behaviors. Some species are resident year-round, while others are only present during migration in the spring or fall or during summer months. Species that present the greatest wildlife-strike hazard for aircraft include waterfowl and gulls, raptors, blackbirds, and other passerines (Blackwell et al. 2008).

Wildlife collisions with airplanes have increased in frequency as air traffic has increased, with approximately 11,520 wildlife collisions reported in California since 1999 (FAA 2013d). Birds are a management concern for airports, airlines, the military, and wildlife managers. Wildlife strikes on aircraft result in annual damage costs of at least $400 million, the loss of human life, and the deaths of at least 65,000 birds (Sodhi 2002; Blackwell et al. 2008). There has been a marked increase in the incidence of avian strikes in recent decades, which may be attributable to larger, wider-bodied aircraft that are quieter, which makes evasion by birds more difficult (Sodhi 2002).

Therefore, the FAA regulates the management of wildlife attractants within air operation areas to reduce the risk of wildlife collisions. Most (66%) of bird strikes that damaged aircraft occurred less than 500 feet from the ground and within 1.5 miles of the airfield. Almost all (95%) of bird strikes occur within 3,280 feet from the ground and within 11.5 miles of the airfield (Dolbeer 2006). Analysis of this data indicates that the collisions that occur within 1.5 miles of the airfield likely result from birds that reside in the immediate vicinity of the airport.

Although it is not required by regulations or policies, the FAA Office of Airports encourages general aviation airports to conduct wildlife hazard assessments to determine what, if any, measures are needed to reduce wildlife hazards to aircraft. As part of these wildlife hazard assessments, airports would identify potential wildlife attractants within a 5-mile radius of the airport and develop measures to reduce any threats posed to aircraft by the attractant, such as issuing notices to airmen regarding the hazard or changing approach and departure paths to avoid the attractant. This can also include collaborating with the owner or proponent of the attractant to notify the airport when potentially hazardous wildlife, especially migratory waterfowl, are present at off-site locations. The FAA supports general aviation airports by making Airport Improvement Program grants available to conduct a wildlife hazards assessment.

The risk of wildlife strikes is generally increased by the presence of aquatic resources near airports, which attract large waterfowl such as ducks and geese. Waterfowl populations in managed wetlands in Central Valley flood basins can reach extremely dense concentrations, with thousands of large waterfowl covering an area of just a few acres (Silveira 1998). By contrast, vernal pools are generally relatively small, often isolated, wetlands that support only small numbers of waterfowl, shorebirds, and other water birds and only for a short period of time because vernal pools dry quickly. Often, only a single bird or pair of birds is observed at an inundated vernal pool (Silveira 1998). Vernal pools with a large surface area are reported to receive greater waterfowl use than smaller pools (Baker et al. 1992, as cited in Silveira 1998), which may be related to the large pools' longer inundation period.

4.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

4.2.1 Methodology for Assessing Impacts of Each Alternative on Land Use

The change in land use conditions anticipated under each alternative is evaluated and compared to the existing and planned land uses within the Planning Area. Impacts are identified where the actions or projects associated with an EIS/EIR alternative would be incompatible with an existing land use or would conflict with an adopted land use plan.

Potential ways the alternatives could affect land use would be by introducing uses that would be incompatible and/or inconsistent with applicable land use plans, goals, and policies. This includes assessing safety hazards of airports by assessing potential conflicts between proposed activities, including lands proposed for preservation, existing land uses, and goals and policies contained in airport planning documents.

The future projects and activities expected under each EIS/EIR alternative are described in Chapter 2. As discussed in Sections 3.6.5, the EIS/EIR impact methodology uses geographic information system (GIS) datasets that were prepared using the best available information about the amounts and locations of ground disturbance from the future projects and activities

expected under each alternative. The impact analyses presented in Sections 4.2.2, 4.2.3, and 4.2.4 are described using the Planning Area land use designations listed in Table 4-1. The analysis of each alternative also incorporates by reference certain impact analyses from the planning documents listed in Section 3.4. In accordance with NEPA regulation 43 CFR 46.135(b), where a prior analysis is incorporated, the source document, including pertinent page numbers, is cited, and the analysis is briefly described. The study period used in the Chapter 4 impact analyses is described in Section 3.6.3.

In addition, a land use compatibility analysis was also performed for each EIS/EIR alternative to identify potential incompatible uses near airports. The primary consideration was locations of aquatic land covers, which tend to be most attractive for large-bodied birds, including gulls and waterfowl, and which can also cause formation of ground fog. Using GIS, the Overflight Zones for each airport were compared to the potential locations of future preserves. The Overflight Zones identify a 10,000-foot radius from the center of each end of primary surface runways and incorporate the Clear Zone and Approach–Departure Zone. The GIS analysis then evaluated changes to any aquatic land covers within those preserves that would be potentially attractive to birds, resulting in an incompatible use within the aircraft separation zones.

The cumulative analysis of impacts from each EIS/EIR alternative was evaluated using the methodology generally described in Section 3.7. The Sacramento County, Galt, and Rancho Cordova General Plan EIRs (Sacramento County 2010; Galt 2008; Rancho Cordova 2006b) evaluated the cumulative effects of the future urban development planned by that jurisdiction. (However, the Sacramento County General Plan (2011) did not analyze new development outside the current Urban Policy Area boundary but instead established policies for how such future development could be considered.) Where the cumulative impact analysis and assumptions used in a general plan EIR document was determined by the lead agencies to be appropriate for use in the impact analyses of an EIS/EIR alternative, a brief summary or description of the incorporated analysis is provided. As discussed in Section 3.4, the three General Plan EIRs used different study periods ending in 2030 (Galt 2008), 2030 (Rancho Cordova 2006b), and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur within Galt, Rancho Cordova, and Sacramento County in the years after their General Plan EIR study period ends but before this EIS/EIR's study period ends in 2065. Consequently, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Therefore, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of all urban development activities and projects that are included in the description of each EIS/EIR alternative.

The study area used in Chapter 4 for the cumulative analysis of each EIS/EIR alternative on land use is the EIS/EIR Planning Area plus lands within the City of Elk Grove, the City of Elk Grove's SOI, and the community of Rancho Murieta (see Figure 1-1).

Determination of Impact Significance

As discussed in Section 3.8.1, the criteria used to evaluate the significance of each alternative's impacts on land use are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.) and on typical thresholds used to evaluate land use effects and incompatibilities in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse impact would occur if the alternative would:

1. Conflict with any applicable adopted land use plan, policy or regulation of a federal, state or local agency with jurisdiction over the project (including but not limited to a general plan, specific plan or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect;
2. Physically disrupt or divide an established community;
3. Result in a safety hazard for people residing or working in the vicinity of an airport/airstrip;
4. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks; or
5. Displace substantial amount of existing housing, necessitating the construction of replacement housing elsewhere.

Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) does not provide suggested criteria for determining a beneficial effect. The following criteria and thresholds were developed by the lead agencies:

A beneficial effect to land use would occur if the alternative would:

1. Reduce existing conflicts with an applicable adopted land use plan, policy, or regulation of a federal, state, or local agency with jurisdiction over the project (including but not limited to a general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect;
2. Reduce physical disruption or division of an established community;
3. Reduce a safety hazard for people residing or working in the vicinity of an airport/airstrip;
4. Reduce changes in air traffic patterns, including either an increase in traffic levels or a change in location that reduces substantial safety risks; or

5. Reduce displacement of existing housing, necessitating less construction of replacement housing elsewhere.

4.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2.

4.2.2.1 Direct and Indirect Effects of the Alternative

Anticipated changes to the existing land use designations within the Planning Area are shown in Table 4-3.

Table 4-3. Changes to Existing Land Use Designations under the No Action/No Project Alternative

Land Use Designation	Existing Land Use Designations in Planning Area (acres)	Existing % of Planning Area	Land Use Designations Removed from Development (acres)	New Land Use Designations in Planning Area (acres)	New % of Planning Area
Agricultural Cropland	82,279	25.9	2,263	80,016	25.19
Agricultural Residential	24,926	7.8	3,484	21,442	6.75
Agricultural Urban Reserve	1,907	0.6	709	1,198	0.38
General Agriculture (20 Acres)	38,720	12.2	9,528	29,192	9.19
General Agriculture (80 Acres)	106,692	33.6	6,453	100,239	31.56
Total Agriculture	*254,524*	*80.1*	*22,437*	*232,087*	*73.06*
Low Density Residential	6,263	2.0	2,958	3,305	1.04
Medium Density Residential	687	0.2	156	531	0.17
High Density Residential	223	0.1	17	206	0.06
Commercial – Office	2,272	0.7	536	1,736	0.55
Industrial Extensive	4,362	1.4	1,787	2,575	0.81
Industrial Intensive	3,408	1.1	1,139	2,269	0.71
Specific Plan Area	7,008	2.2	3,647	3,361	1.06
Other Mixed-Use Development	142	0.0	45	97	0.03
Urban (Future)[1]	*0*	*0*	*3,794*	*37,484*	*11.80*
Total Urban	*24,365*	*7.7*	*14,079*	*51,564*	*16.23*
Natural Preserve	18,556	5.8	390	18,166	5.72
Public/Quasi-Public	8,896	2.8	1,876	7,020	2.21
Recreation	3,328	1.0	461	2,867	0.90
Rights-of-Way[3]	7,986	2.5	2,035	5,949	1.87
TOTAL[3]	**317,655**	**100.0**	**37,484**	**317,655**	**100.0**

Notes:

1 Urban (future) represents the total area of projected urban development under the No Action/No Project Alternative. The land use designation of these areas after development is not known at this time.

2 The "rights-of-way" designation represents areas of roadways, utility corridors, and other areas where a local land use authority has granted rights-of-way, and no land use designation was retained.

3 Table columns may not total precisely due to rounding.

As described in Section 2.2.2, the urban development expected under the No Action/No Project Alternative (Table 4-3) would occur under the General Plans of Sacramento County, Rancho Cordova, and Galt. The General Plan EIRs, described in Sections 3.4.1, 3.4.2, and 3.4.3, analyzed the compatibility of land uses and consistency with general plan policies within Sacramento County, Galt, and Rancho Cordova. The land use analyses from each of these General Plan EIRs provide the foundation of the impact analysis for the No Action/No Project Alternative. The relevant land use impact analyses from each General Plan EIR are summarized and incorporated by reference below.

The impact analyses presented in the *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR) (Sacramento County 2010) determined the following within Sacramento County:

- Proposed future land uses would not conflict with existing adjacent land use plans or programs or divide an existing community resulting in a less-than-significant impact (Sacramento County 2010, pp. 3-22 to 3-66).
- General plan policies for expansion of the UPA would conflict with some smart growth principles, and the physical effects of the policy conflicts could result in significant impacts related to loss of open space and development outside of the urban environment (Sacramento County 2010, pp. 3-22 to 3-66).
- Displacement of housing due to roadway expansions would result in a less-than-significant impact (Sacramento County 2010, pp. 3-22 to 3-66).
- Compliance with the airport CLUPs would ensure airport safety impacts would be less than significant (Sacramento County 2010, pp. 3-22 to 3-66).
- Planned urban growth within the Jackson Highway Corridor[8] would conflict with "smart growth principles" that direct development towards existing urbanized areas and away from open space, and this urban growth would result in a significant and unavoidable impact to existing land use policy (Sacramento County 2010, pp. 3-22 to 3-66).

The impact analysis presented in the *City of Galt General Plan Update: 2030 Final EIR* (Galt General Plan EIR) (Galt 2008) determined the following within the City of Galt SOI:

- Planned Urban development described in the Galt General Plan (Galt 2009) would not physically divide an established community, or conflict with an adopted land use plan

[8] As described further in Section 3.4.1, the proposed project analyzed within the Sacramento County General Plan EIR assumed development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by the County. However, the County is currently processing Master Plans in the Jackson Highway Corridor, so the referenced conclusions from the proposed project analysis are relevant to the No Action/No Project Alternative.

including a habitat conservation plan, resulting in a less-than-significant impact (Galt 2008, pp. 4-1 to 4-9).

- Planned Urban development along Highway 99 would be located within one mile of Mustang Airport which could result in a land use conflict. The addition of a new policy requiring using the Caltrans Airport Land Use Planning Handbook when reviewing projects within a mile of the airport would reduce impacts to less than significant (Galt 2008, pp. 4-1 to 4-9).

The Galt General Plan EIR did not address displacement of existing housing that would necessitate the construction of replacement housing elsewhere.

The impact analysis presented in the *City of Rancho Cordova General Plan Final EIR* (Rancho Cordova General Plan EIR) (Rancho Cordova 2006b), determined the following within Rancho Cordova:

- New urban development would not divide an established community, conflict with a habitat conservation plan, or result in incompatible land uses based on compliance with general plan land use policies resulting in a less-than-significant impact (Rancho Cordova 2006b, pp. 4.1-1 to 4.1-62).
- Conflicts with other land use plans, policies and regulations would occur with the Mather Airport CLUP, Sacramento County General Plan, and the Mather Field Specific Plan resulting in a significant and unavoidable impact (Rancho Cordova 2006b, pp. 4.1-1 to 4.1-62).
- New urban development would not result in the displacement of existing housing resulting in a less-than-significant impact (Rancho Cordova 2006b, p. 4.3-14).

The 50-year study period for this EIS/EIR ends in 2065, which is after the study periods of the three previously referenced General Plan EIRs. Consequently, additional urban development not analyzed in the three General Plan EIRs would occur between the end of the three General Plan EIRs' analysis periods and the end of the EIS/EIR's study period. This additional development would include the displacement or shifting of 1,900 acres of urban development outside the UDA under the No Action/No Project Alternative (as described in Section 2.2.3) and would result in longer or increased vehicle trips, an increase in air pollutants (Chapter 14), and a potential loss of agricultural land (Chapter 6). Because the No Action/No Project Alternative would be inconsistent with regional transportation plans (Chapter 13) and result in extension of development beyond the existing USB, the No Action/No Project Alternative is inconsistent with the 2036 MTP/SCS (SACOG 2016). Similarly, because the *Sacramento Region Blueprint Transportation and Land Use Plan* (SACOG 2004) emphasizes infill and other revitalization and relies on smart growth principles, the shift or displacement of 1,900 acres of new development to locations beyond the current USB would also conflict with the *Sacramento Region Blueprint Transportation and Land Use Plan*.

Development outside the current UDA would also be inconsistent with Sacramento County and Rancho Cordova's adopted general plans, specifically smart growth policies discussed in Section 4.1.1. For example, Sacramento County's Policy LU-122 (Sacramento County 2011) specifically states the "Urban Policy Area is intended to provide an adequate supply of developable land sufficient to accommodate projected growth," and Sacramento County will "evaluate the UPA at a minimum of five-year intervals, to determine if an expansion is needed to maintain a constant adequate supply of land." Policy LU-127 states that Sacramento County shall not expand the USB unless specific conditions are met or that Sacramento County finds the expansion "would provide extraordinary environmental, social or economic benefits and opportunities to the County" (Sacramento County 2011, pp. 132, 134). The intent of these policies is to ensure any expansion of the UPA or USB is done thoughtfully to avoid inconsistencies with potential impacts to adjacent areas. An inconsistency with smart growth policies would contribute further to the already significant, unavoidable impacts described in the Sacramento County and Rancho Cordova General Plan EIRs discussed previously.

Consistency with the Delta Plan was not analyzed as part of the EIRs for the General Plans of Sacramento County, Galt, and Rancho Cordova. Based on a review of the Delta Plan screening criteria[9] (Delta Stewardship Council 2014) that local land use authorities would use to make this determination and the fact that most new development under the No Action/No Project Alternative would be located outside the southwestern portion of the Planning Area that is within the Primary or Secondary Zones of the Delta Plan, few of the projects and activities implemented under the No Action/No Project Alternative would be subject to Delta Plan consistency. However, urban development outside the UDA could potentially conflict with Policy P-3 that requires buffers between urban development and agricultural operations. This would be a less-than-significant, adverse impact to consistency with adopted plans and policies.

As explained in Section 2.2, under the No Action/No Project Alternative, mitigation for impacts to listed species or existing aquatic resources from new urban development would continue to include avoidance and compensation, including establishment of on-site or off-site preserves. As discussed in Section 2.2.5, management of mitigation preserves and mitigation banks could continue to include a variety of habitat management activities, such as livestock transportation for grazing management, fence repair, and visits by preserve managers for maintenance and monitoring. Many of these preserves established under the No Action/No Project Alternative would be located in the UDA and would eventually be

[9] The screening criteria for this determination are available here: http://deltacouncil.ca.gov/sites/default/files/2014/11/2014-11-25-Covered-Actions-Checklist.pdf

surrounded by urban development. With that proximity to development, preserve management and monitoring activities could result in conflicts with existing and planned land uses. However, under the No Action/No Project Alternative management and monitoring activities on new preserves are not expected to be intensive relative to existing conditions, and management and monitoring activities would not result in incompatibility with adjacent land uses or inconsistencies with any applicable planning document. Therefore, mitigation preserves established under the No Action/No Project Alternative would not be incompatible with adjacent land uses or with any of the planning documents discussed in Section 4.1.1. Consequently, the No Action/No Project Alternative preserves would result in a less-than-significant impact to adjacent land uses and would not be inconsistent with existing planning documents. Agricultural compatibility is analyzed in Section 6.2.2.

Preserves established as mitigation under the No Action/No Project Alternative would not be located within any established community, and the Preserve System would not require physically changing or altering an existing developed area or adding a new population. Therefore, the No Action/No Project Alternative would not disrupt an established community or displace existing housing and would have ***No Impact*** on any established community or existing housing.

Depending on the location, establishment of new on-site or off-site mitigation preserves could contribute to potential safety hazards associated with wildlife strikes on aircraft. In general, the airports within or adjacent to the Planning Area, including Sacramento Executive, Mather, Franklin Field, Rancho Murieta, and Eagle's Nest, are located near urban development, undeveloped lands, and agricultural areas. The urban development that would occur under the No Action/No Project Alternative could eliminate some aquatic resources that currently attract hazardous wildlife, and re-established or established aquatic resources could create new hazardous wildlife attractants. As stated in Section 2.2.2, re-establishment and/or establishment to mitigate for impacts to aquatic resources under the Clean Water Act, Section 404, would typically occur at a 1:1 ratio; therefore, there would be no net change in wetlands acres in the Planning Area from activities and projects authorized under Clean Water Act, Section 404. Aquatic resources could be re-established or established in open space areas within the Overflight Zone to replace those wetlands lost due to development; however, the CLUPs and the Airport Land Use Commission Policy Plan note that open space and natural areas, including natural water areas, are compatible within all the airport safety zones only if the mitigation area does not cause a wildlife hazard (Airport Land Use Commission 1992; State of California Department of Transportation 2011). Therefore, the Clean Water Act, Section 404, compensatory mitigation for project impacts under the No Action/No Project Alternative could increase aquatic resources within existing airport safety zone areas, potentially creating an incompatible use due to increased wildlife hazards. Based

on the FAA's recent interest in projects near airports, the EIS/EIR assumes that local land use authorities in the Planning Area will continue to consider potential wildlife hazards when evaluating proposed projects in their jurisdictions, including wetland establishment and/or re-establishment. However, that oversight by local land use authorities would only occur if the project is subject to CEQA review. Otherwise, the project would likely proceed without consideration to wildlife hazards.

In summary, aquatic resources re-establishment and establishment mitigation expected under the No Action/No Project Alternative could potentially increase the safety hazards associated with wildlife strikes on aircraft if the location of re-established or established aquatic resources creates a greater risk of wildlife strike than the existing aquatic resources that are removed by the new development. However, it is equally likely that new aquatic resource locations will be farther away from airport safety zones. Therefore, the No Action/No Project Alternative would have a less-than-significant impact on airport safety.

4.2.2.2 Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and 4.1.2.1, past and present agricultural operations; urban development; development of agricultural-residential neighborhoods and other rural development; mining operations; and construction of energy, water conveyance, flood control, and transportation infrastructure projects, such as facilities owned and managed by the California Department of Transportation and the Department of Water Resources, have altered land use throughout the study area. These past and present alterations have resulted in the existing conditions of land use described in Section 4.1.2.

The types of reasonably foreseeable future other projects, activities, and actions, described in Section 3.7.2, are similar to the types of past and present actions that occurred in the study area. The reasonably foreseeable future other actions in the study area (see Section 3.7.2 and 4.1.2.1) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in Elk Grove and Rancho Murieta, master planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued development of cultivated agricultural lands, expansion of existing preserves, and development of major infrastructure projects such as the California High-Speed Rail and the California WaterFix (see Section 3.7.2 for details of these projects). Some of these foreseeable "other" future actions are consistent with the existing land use plans discussed in Section 4.1.1.4; however, the buildout of the Elk Grove's future SOI expansion and development north of Rancho Murieta would affect the existing land use designations in the Planning Area outside the UDA. These other foreseeable developments would conflict with Sacramento County General Plan (Sacramento County 2011), the 2036 MTP/SCS (SACOG

2016), and the *Sacramento Region Blueprint Transportation and Land Use Plan* (SACOG 2004), which prioritize locating new development within the existing USB. These inconsistencies of past, present, and reasonably foreseeable future other projects and activities with existing land use plans would be a cumulatively significant adverse impact.

In addition, as discussed in Section 4.2.2, under the No Action/No Project Alternative, approximately 1,900 acres of planned urban development would be shifted or displaced to areas outside the current UDA, which would probably be to areas south of the Elk Grove SOI or areas near Rancho Murieta. This displaced development of the No Action/No Project Alternative would add to the land use impacts of reasonably foreseeable development in the Elk Grove SOI and Rancho Murieta areas. Because the No Action/No Project Alternative would add to the existing land use plan conflicts of past and present activities and the reasonably foreseeable future projects, the No Action/No Project Alternative would substantially contribute to the existing significant cumulative impact to land use from past, present, and reasonably foreseeable projects present in the study area.

4.2.3 Proposed Action/Proposed Project

The Proposed Action/Proposed Project Alternative is described in Section 2.3.

4.2.3.1 Direct and Indirect Effects of the Alternative

Under the Proposed Action/Proposed Project Alternative, approval, issuance of Incidental Take Permits, and implementation of the SSHCP would occur as described in Section 2.3.

As shown in Table 4-4, under the Proposed Action/Proposed Project Alternative, approximately 19.2% of the Planning Area (34,852 acres) would be developed with urban uses during the 50-year study period.

Table 4-4. Changes to Existing Land Use Designations under the Proposed Action/ Proposed Project Alternative

Land Use Designation	Existing Land Use Designations in Planning Area (acres)	Existing % of Planning Area	Land Use Designations Removed from Development (acres)	New Land Use Designations in Planning Area (acres)	New % of Planning Area
Agricultural Cropland	82,279	25.9%	1,601	80,679	25.4%
Agricultural Residential	24,926	7.8%	3,059	21,867	6.9%
Agricultural Urban Reserve	1,907	0.6%	845	1,062	0.3%
General Agriculture (20 Acres)	38,720	12.2%	9,125	29,595	9.3%
General Agriculture (80 Acres)	106,692	33.6%	5,568	101,123	31.8%
Total Agriculture	*254,524*	*80.1%*	*20,198*	*234,325*	*73.8%*
Low Density Residential	6,263	2.0%	3,191	3,071	1.0%
Medium Density Residential	687	0.2%	160	527	0.2%
High Density Residential	223	0.1%	17	206	0.1%
Commercial – Office	2,272	0.7%	528	1,745	0.5%
Industrial Extensive	4,362	1.4%	1,414	2,949	0.9%
Industrial Intensive	3,408	1.1%	1,219	2,190	0.7%
Specific Plan Area	7,008	2.2%	3,420	3,589	1.1%
Other Mixed Use Development	142	0.0%	44	98	0.02%
Urban (Future)[1]	*0*	*0.0%*	*0*	34,852	11.0%
Total Urban	*24,365*	*7.7%*	*9,993*	*49,227*	*19.1%*
Natural Preserve	18,556	5.8%	555	18,001	5.7%
Public/Quasi-Public	8,896	2.8%	1,856	7,040	2.2%
Recreation	3,328	1.0%	457	2,871	0.9%%
Rights-of-Way[2]	7,986	2.5%	1,792	6,192	2.0%
TOTAL[3]	**317,655**	**100.0%**	**34,852**	**317,655**	**100.0%**

Notes:

1 Urban (future) represents the total area of projected urban development under the Proposed Action/Proposed Project Alternative, which would be located primarily within the UDA. The land use designation of these areas after development is not known at this time.

2 The "rights-of-way" designation represents areas of roadways, utility corridors, and other areas where a local land use authority has granted rights-of-way, and no land use designation was retained.

3 Table columns may not total precisely due to rounding.

The Covered Activities of the Proposed Action/Proposed Project Alternative include the same types of urban development projects and activities that are discussed under the No Action/No Project Alternative. However, under the Proposed Action/Proposed Project Alternative, 1,900 acres of urban development would not be "displaced" outside of the UDA. The Proposed Action/Proposed Project Alternative would not result in urban development replacing agricultural lands outside the UDA, and therefore, would not result in the inconsistencies with existing general plans that are described for the No Action/No Project Alternative in Section 4.2.2.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected and coordinated SSHCP Preserve System. Within the UDA, the locations of some individual preserves of the future SSHCP Preserve System are already known because they are proposed as part of pending projects. Both inside and outside of the UDA, other preserves needed to complete the Preserve System would be acquired by following certain criteria to preserve existing habitat for Covered Species, including preservation of currently undeveloped lands that support vernal pools. Although the Proposed Action/Proposed Project Alternative does not identify the specific locations of lands that would be acquired for the Preserve System, it is anticipated that preserves would be located on undeveloped or agricultural lands with high quality habitats or special-status species populations or on lands natural land that connect existing preserve areas. Such potential preserve sites would be non-urbanized and typically outside of established communities, and therefore, it is not anticipated that the establishment of new preserves under the Proposed Action/Proposed Project Alternative would affect established communities.

However, the Proposed Action/Proposed Project Alternative would allow for more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented consistently with the Sacramento County General Plan and the Rancho Cordova General Plan without urban development shifting or being displaced to locations outside the current USB.

The Proposed Action/Proposed Project Alternative has been designed to complement and help implement the goals and policies of the Sacramento County General Plan and of ordinances adopted for the protection of resources, as discussed in Section 4.1.1.4. The Proposed Action/Proposed Project Alternative provides a means to implement several of the policies in the Land Use Elements of the Sacramento County General Plan, Rancho Cordova General Plan, and Galt General Plan, contributing to consistency with these plans. These include, but are not limited to, Sacramento County General Plan Policy CO-58 (Sacramento County 2011), which ensures no net loss of wetlands, riparian woodlands, and oak woodlands, and Sacramento County General Plan Policy CO-65 (Sacramento County 2011), which requires the creation of a network of preserves linked by wildlife movement corridors (see Section 4.1.1.4). The Sacramento County General Plan (Sacramento County 2011) also includes numerous conservation and open space policies to ensure resources and habitat are identified and protected as development occurs and specifically supports the goals and objectives of the SSHCP.

The Galt General Plan (Galt 2008) and the Rancho Cordova General Plan (Rancho Cordova 2006a) include policies designed to protect species habitat and aquatic resources as Galt and Rancho Cordova continue to develop, and the Proposed Action/Proposed Project

Alternative would be consistent with those policies. Specifically, the Galt General Plan (Galt 2008) includes Policy LU-1.10, which requires working with Sacramento County to coordinate habitat preservation efforts, and Policy LU-9.1, which states that Galt will participate in establishing a permanent agriculture, open space, and wildlife habitat greenbelt between Galt and Elk Grove. The Rancho Cordova General Plan (Rancho Cordova 2006a) includes several policies to conserve natural resources within Rancho Cordova and specifically supports the goals and objectives of the SSHCP. Rancho Cordova General Plan Policy NR.1.1 requires the protection of rare, threatened, and endangered species and their habitats in compliance with federal and state law; Rancho Cordova General Plan Policy NR.1.6 requires participation in the development of an HCP; and Rancho Cordova General Plan Policy NR.2.1 requires "no net loss" of wetlands consistent with current federal and state aquatic resource regulations (discussed in Section 4.1.1.4) (Rancho Cordova 2006a).

As discussed in Section 4.1.1, approximately 41,000 acres within the southwestern portion of the Planning Area falls within the Primary Zone of the Delta Plan. The Proposed Action/Proposed Project Alternative's stated biological goals (Section 2.3) are consistent with the Delta Plan policies for restoring, protecting, and enhancing the Delta ecosystem and water supply (Section 4.1.1). Therefore, the Proposed Action/Proposed Project Alternative would be less likely to result in inconsistencies with the Delta Plan, relative to the No Action/No Project Alternative. Because projected urban development described under the adopted general plans would be accommodated within the existing UDA, the Proposed Action/Proposed Project Alternative would result in fewer potential conflicts with existing general plans than under the No Action/No Project Alternative, in which approximately 1,900 acres of planned urban development could be shifted or displaced to areas outside the current USB (see Section 4.4.4).

Further, the Proposed Action/Proposed Project Alternative would implement more of the natural resource protections included in the Sacramento County General Plan (Sacramento County 2011), the Delta Plan (Delta Stewardship Council 2013), and the Land Use and Resource Management Plan for the Primary Zone of the Delta (Delta Protection Commission 2010) compared to the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial*** effect to land use plan compatibility compared to the land use plan compatibility expected under the No Action/No Project Alternative.

As indicated in Section 2.3.5, the Proposed Action/Proposed Project Alternative includes a large, interconnected Preserve System and a comprehensive preserve management program. Most preserve land management activities would maintain existing land uses (e.g., grazing, agriculture), with only minor modifications to enhance quality of species habitat. As with the No Action/No Project Alternative, preserve management under the Proposed Action/Proposed Project Alternative would also include a variety of habitat management activities, including transportation of sheep, goats, or cattle for grazing management; fence repair; wildlife or vegetation surveys; and visits by preserve managers for maintenance and monitoring (Table 2-3, Section 2.3.6). Similar to the No

Action/No Project Alternative, preserves located inside the UDA would eventually be surrounded by urban development. With that proximity to development, preserve management and monitoring have potential to conflict with existing and planned land uses. However, a preserve management plan would be prepared for each SSHCP preserve located inside the UDA, which would avoid or minimize preserve activities potential effects on surrounding areas. The preserve management plan would provide a coordinated way to minimize incompatibilities with existing or planned land uses or conflicts with existing land use plans. Avoidance and Minimization Measure (AMM) EDGE-1 would prioritize compatible adjacent uses next to SSHCP preserves. The Proposed Action/Proposed Project Alternative would include an interconnected Preserve System, which includes larger core preserves (rather than the often smaller and more isolated preserves that would be established without a coordinated process under the No Action/No Project Alternative) (see Section 2.3.5). The Proposed Action/Proposed Project Alternative preserve design would reduce conflicts between urban uses and open space/wildlife uses when compared to the conflicts expected under the No Action/No Project Alternative. Therefore, there would be either no difference to or a minor benefit to (i.e., reduction in) land use impacts from preserve activities under the Proposed Action/Proposed Project Alternative when compared to land use impacts expected under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative preserve system would have a ***Minor Beneficial*** effect on land use plan compatibility relative to the land use plan compatibility of the No Action/No Project Alternative. Agricultural compatibility is analyzed in Section 6.2.3.

The interconnected Preserve System would not be located within any established community, and the Preserve System would not require physically changing or altering an existing developed area or adding a new population. Therefore, the Proposed Action/Proposed Project Alternative would have ***No Impact*** on disrupting an established community or displacing existing housing compared to the No Action/No Project Alternative baseline condition.

The Proposed Action/Proposed Project Alternative includes acquisition, monitoring, and management of a Preserve System. The Preserve System would create habitat to support a variety of natural land covers and species habitats in the Planning Area. The creation or establishment of new aquatic habitats or the re-establishment of aquatic habitats could contribute to the potential for airport safety hazards (e.g., wildlife strikes) to occur. An analysis is provided below that addresses this potential safety concern for airports within or adjacent to the Planning Area (see Figures 4-3 through 4-7 and the existing condition of each Planning Area airport presented in Section 4.1.2).

Aquatic habitat is a focus of the airport wildlife hazard assessment because it has potential to attract water birds that are considered hazardous to aircraft. The assessments include evaluation of the potential for collisions by birds with aircraft above the Planning Area and elsewhere as a result of synergistic effects between new and existing aquatic resources or other wildlife attractants.

As indicated in EIS/EIR Chapters 8 and 10, the Proposed Action/Proposed Project Alternative would prioritize re-establishment/establishment of vernal pools in the MCRA rather than freshwater marsh or open water aquatic resources. As discussed in Section 4.1.2.3, vernal pools hold water for only a few weeks or months and for much shorter periods than freshwater marsh, seasonal wetlands, and other aquatic resources, and thus, attract water birds for less time per year than other wetland types. Therefore, wildlife attractants near Mather Field in the MCRA may be reduced under the Proposed Action/Proposed Project Alternative compared to the No Action/No Project Alternative baseline condition.

Further, AMM AIRPORT-1 indicates that, prior to any re-establishment or establishment of wetlands that would result in a net increase in area of freshwater marsh or open water in the Preserve System or a substantial increase in the proximity of open water or freshwater marsh to airports, an approved biologist must evaluate the proposed establishment/re-establishment activity and the types of wildlife that it will attract (including types/quantities of birds or other wildlife), and provide recommendations on how to reduce wildlife hazards, if feasible. Therefore, AMM AIRPORT-1 would further reduce potential impacts on aircraft hazards and improve the coordination between aquatic resource re-establishment/establishment projects and the Sacramento County Department of Airports.

The Preserve System of the Proposed Action/Proposed Project Alternative would not re-establish or establish aquatic resources within the safety zones of Sacramento Executive Airport. Thus, there would not be an increased risk of wildlife strike hazards at Sacramento Executive Airport compared to the No Action/No Project Alternative baseline condition.

The Proposed Action/Proposed Project Alternative could result in additional preserves being established within the Overflight Zones or 5-mile separation zones for other airports within or adjacent to the Planning Area. Aquatic resources, especially vernal pools, would be re-established and/or established within the Preserve System. The CLUPs and FAA's latest Advisory Circular note that open space and natural areas, including natural wetland areas, are compatible within all the airport safety zones only if wetland areas or preserves do not cause a wildlife hazard. Relative to freshwater marsh or open water wetland, vernal pools rarely hold water, and thus, are only occasionally used by water birds (Silveira 1998). During preserve planning, the planning for re-establishment or establishment of aquatic resources would comply with the policies and regulations of the relevant airport safety zone (see Sections 4.1.1.1, 4.1.1.4, and 4.1.2.1). The Proposed Action/Proposed Project Alternative's adherence to wildlife hazard policies in the CLUPs or FAA Advisory Circular would ensure that established or re-established aquatic resources do not result in wildlife hazards at any Planning Area airport. Potential increases in wildlife strike hazards at these airports would also be reduced through the planning process described for AMM AIRPORT-1 in Chapter 5 of the SSHCP document (EIS/EIR Appendix D).

In addition to wildlife strike hazard, aquatic resources located within the Overflight Zone and/or 5-mile separation zone can generate ground fog. The analysis for the potential of ground fog creation is based on the elevation of the water area, the distance from the runway, and the prevailing winds. AMM AIRPORT-1 in the SSHCP (Appendix D) would ensure that the design of preserve areas, including wetlands, takes into consideration the potential for ground fog creation.

The Proposed Action/Proposed Project Alternative would result in less potential for inconsistencies with the adopted airport CLUPs and other relevant policies relative to inconsistencies expected under the No Action/No Project Alternative condition. The Proposed Action/Proposed Project Alternative would also not increase the risk of wildlife strike hazards at the airports in the Planning Area compared to the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on airport safety when compared to airport safety under the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Impacts

Compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would include the following actions:

- Avoid inconsistencies with existing land use plans
- Minimize potential conflicts of preserve management and monitoring activities by siting compatible uses near preserves and by providing a coordinated way to minimize incompatibilities with existing or planned land uses or conflicts with existing plans
- Improve compatibility with airports and minimize potential airport safety hazards by implementing a planning process that coordinates wetlands re-establishment/establishment with airport planning staff

Therefore, when considering the totality of direct and indirect effects discussed previously, the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects to land use when compared to the No Action/No Project Alternative baseline condition.

4.2.3.2 Cumulative Effects of the Proposed Action/Proposed Project Alternative

As described in Sections 3.7.1 and 4.1.2.1, past and present human activities in the Planning Area converted much of the historically undeveloped lands to agricultural use, and then some of that agricultural use has been converted to developed land. These and other past and present human activities are reflected in the acres of existing land use described in Table 4-2.

The types of reasonably foreseeable future other projects, activities, and actions described in Section 3.7.2 are similar to the types of past and present actions that occurred in the Planning

Area. These foreseeable "other" projects, activities, and actions include new urban development within the City of Elk Grove and within Rancho Murieta, master planned developments in the UDA named "Rio Del Oro" (3,828 acres) and "Mather South" (885 acres) further rural residential development outside the UDA, continued urban development on cultivated agricultural lands, expansion of existing preserves, and development of major infrastructure projects such as the California High-Speed Rail and the California WaterFix.

Two of the reasonably foreseeable future projects described in Section 3.7, the buildout of the City of Elk Grove's future SOI expansion and new development north of Rancho Murieta, would ultimately affect the planned land uses outside the UDA. These two foreseeable other projects would conflict with the Sacramento County General Plan (Sacramento County 2011), the 2036 MTP/SCS (SACOG 2016), and the *Sacramento Region Blueprint Transportation and Land Use Plan* (SACOG 2004), which are all land use planning documents that prioritize new urban development within the existing USB. The types and amounts of urban development Covered Activities (including associated transportation and recycled water Covered Activities) described under the Proposed Action/Proposed Project Alternative (Section 2.3.3) are very similar to the planned urban development described within the General Plans for Sacramento County, Galt, and Rancho Cordova. The changes in land use designations to allow the urban development and infrastructure Covered Activities of the Proposed Action/Proposed Project Alternative would be consistent with the 2036 MTP/SCS, the *Sacramento Region Blueprint Transportation and Land Use Plan*, and the Delta Plan because they would confine urban development to the UDA. Further, the changes in land use designations under the Proposed Action/Proposed Project Alternative to allow urban development and infrastructure Covered Activities are consistent with the Sacramento County, Galt, and Rancho Cordova General Plan land use policies that encourage development projects to evaluate conservation to minimize or avoid impacts to biological resources.

As identified in Section 4.2.2, the incremental impacts of the No Action/No Project Alternative on existing land use designations, when considered together with changes to land use designations resulting from past, present, and reasonably foreseeable projects and activities in the cumulative study area, would have a significant adverse cumulative effect on land use by conflicting with up to six existing land use plans. As discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the two action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Because the Proposed Action/Proposed Project Alternative would not conflict with any existing land use plans, the Proposed Action/Proposed Project Alternative would have a smaller incremental contribution to the Planning Area's cumulative conflicts with existing land use plans. Therefore, the Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect when compared to the No Action/No Project Alternative baseline condition.

4.2.4 Reduced Permit Term Alternative

The Reduced Permit Term Alternative is described in Section 2.4.

4.2.4.1 Direct and Indirect Effects of the Alternative

As described in Section 2.4, the Reduced Permit Term Alternative would include similar types of new urban development as the No Action/No Project Alternative (Section 4.2.2) and the Proposed Action/Proposed Project Alternative (Section 4.2.3).

As shown in Table 4-5, under the Reduced Permit Term Alternative, approximately 16.2% of the Planning Area (37,398 acres) would be developed with urban uses by the end of the 50-year study period.

Table 4-5. Changes in Existing Land Use Designation under the Reduced Permit Term Alternative

Land Use Designation	Existing Land Use Designations in Planning Area (acres)	Existing % of Planning Area	Land Use Designations Removed from Development (acres)	New Land Use Designations in Planning Area (acres)	New % of Planning Area
Agricultural Cropland	82,279	25.9	1,667	80,612	25.4
Agricultural Residential	24,926	7.8	3,232	21,694	6.8
Agricultural Urban Reserve	1,907	0.6	845	1,062	0.3
General Agriculture (20 Acres)	38,720	12.2	9,811	28,909	9.1
General Agriculture (80 Acres)	106,692	33.6	6,476	100,216	31.6
Total Agriculture	*254,524*	*80.1*	*22,031*	*232,493*	*73.2*
Low Density Residential	6,263	2.0	3,166	3,097	1.0
Medium Density Residential	687	0.2	160	527	0.2
High Density Residential	223	0.1	17	206	0.06
Commercial – Office	2,272	0.7	528	1,744	0.6
Industrial Extensive	4,362	1.4	1,752	2,609	0.8
Industrial Intensive	3,408	1.1	1,219	2,189	0.7
Specific Plan Area	7,008	2.2	3,524	3,484	0.1
Other Mixed Use Development	142	0.0	44	98	0.03
Urban (Future)	**0**	**0**	**0**	37,398	11.8
Total Urban[1]	*24,365*	*7.7*	*10,412*	*51,351*	*16.2*
Natural Preserve	18,556	5.8	552	18,004	5.7
Public/Quasi-Public	8,896	2.8	1,867	7,030	2.2
Recreation	3,328	1.0	475	2,853	0.9
Rights-of-Way[2]	7,986	2.5	2,061	5,925	1.9
TOTAL[3]	**317,655**	**100.0**	**37,398**	**317,655**	**100.0**

Note: The GIS mapping exercise conducted for the Reduced Permit Term Alternative was focused on identifying the areas of development impacts to natural land covers and did not include all potential redevelopment of existing developed land covers.

1 Urban (future) represents the total area of projected urban development under the Proposed Action/Proposed Project Alternative, which would be located primarily within the UDA .The land use designation of these areas after development is not known at this time.

2 The "rights-of-way" designation represents areas of roadways, utility corridors, and other areas where a local land use authority has granted rights-of-way, and no land use designation was retained.

3 Tables may not total precisely due to rounding.

Under the Reduced Permit Term Alternative, new urban development would occur inside the UDA, as directed by the General Plans of Sacramento County, Rancho Cordova, and Galt, and no new urban development would "shift" or be displaced to areas outside the UDA. The Reduced Permit Term Alternative would result in only 210 acres of less direct impact to natural land covers than the No Action/No Project Alternative. However, 896 acres more of direct impacts to natural land covers would occur in the MCRA portion of the UDA, and 597 acres more of direct impacts to natural land covers would occur in the UDA outside the MCRA when compared to the direct impacts of the No Action/No Project Alternative. Compared to the No Action/No Project Alternative, 406 fewer acres of lands with agricultural land use designations would be changed to urban development under the Reduced Permit Term Alternative (Table 4-5). By avoiding a shift or a displacement of new development to areas outside the UDA, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on compatibility with existing land use plans when compared to the No Action/No Project Alternative baseline condition.

As with the No Action/No Project Alternative, preserve management activities under the Reduced Permit Term Alternative would include grazing management, fence repair, trash removal, mowing and/or vegetation removal to control thatch and invasive species, and visits by preserve managers for maintenance and monitoring. These activities would neither conflict with applicable land use policies from Sacramento County or Galt and Rancho Cordova nor would they physically divide an existing community or displace residents. However, the preserve system established during the 30-year Reduced Permit Term Alternative would have more intensive management and monitoring than the preserves established during the same period of the No Action/No Project Alternative. Many of the preserves under the Reduced Permit Term Alternative would be located in the UDA and thus, would be near urban development. The management and monitoring of these preserves could result in some conflicts with existing or planned land uses. However, a preserve management plan would be prepared for each preserve and would take into account how preserve activities affect surrounding areas. That preserve management plan would provide a coordinated way to minimize incompatibilities with existing or planned land uses or conflicts with existing plans. AMM EDGE-1 would prioritize compatible adjacent uses next to preserves established during the 30-year permit term. Overall, there would be either no difference or a minor benefit in land use impacts from preserve activities when compared to the No Action/No Project Alternative. Therefore, the preserve system would have a ***Minor Beneficial*** effect on land use plan compatibility compared to the No Action/No Project Alternative baseline condition. Agricultural compatibility is analyzed in Section 6.2.4.

Potential impacts on wildlife strike hazard to aircraft would be essentially the same for years 1–30 as for the Proposed Action/Proposed Project Alternative (Section 4.2.3). Effects on aircraft strike hazard would be reduced through implementation of AMM AIRPORT-1, which

would ensure coordination between airport planners and the entities siting wetland re-establishment/establishment projects. From years 31–50, the potential impacts would be essentially the same as for the No Action/No Project Alternative (Section 4.2.2). Because of the enhancement coordination with airport planners during the 30-year permit term, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on wildlife strike hazard compared to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Impacts

Compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would include the following actions:

- Avoid inconsistencies with existing land use plans by avoiding urban development outside the UDA
- Minimize potential conflicts of preserve management and monitoring activities by siting compatible uses near preserves and by providing a coordinated way to minimize incompatibilities with existing or planned land uses or conflicts with existing plans during years 1–30 of the EIS/EIR study period
- Improve compatibility with airports and minimize potential airport safety hazards by implementing a planning process during years 1–30 of the EIS/EIR study period that coordinates wetlands re-establishment/establishment with airport planning staff

Therefore, when considering the totality of direct and indirect effects discussed previously, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to land use compared to the No Action/No Project Alternative baseline condition.

4.2.4.2 Cumulative Effects of the Alternative

As described in the No Action/No Project Alternative, the Planning Area has transitioned from undeveloped land to agriculture to developed land, and this transition is reflected in the land use designations described in Table 4-2. The adopted General Plans of Sacramento County, Galt, and Rancho Cordova have attempted to minimize the adverse effects of future urban development land use changes (e.g., increased traffic, increased loss of agricultural lands) through zoning and land use designations that minimize incompatible land uses (Section 4.1.1).

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area, including additional urban development in Elk Grove and Rancho Murieta, master planned development at Rio Del Oro and Mather South, further rural residential development outside the UDA, continued development of

cultivated agricultural lands, expansion of existing preserves, and development of major infrastructure projects such as the California High-Speed Rail and the California WaterFix.

The buildout of the City of Elk Grove's future SOI expansion and the development north of Rancho Murieta, which are reasonably foreseeable future projects in Section 3.7, would affect the ultimate land use mixture outside the UDA. These developments would conflict with the Sacramento County General Plan, MTP/SCS, and the *Sacramento Region Blueprint Transportation and Land Use Plan*, which prioritize development within the existing USB.

Urban development (including transportation and recycled water Covered Activities) described under the Reduced Permit Term Alternative is very similar to urban development included within the General Plans of Sacramento County, Galt, and Rancho Cordova General Plans and would be consistent with the 2036 MTP/SCS, the *Sacramento Region Blueprint Transportation and Land Use Plan*, and the Delta Plan, which provide frameworks for coordinated land use planning. Further, the Reduced Permit Term Alternative is consistent with the Sacramento County, Galt, and Rancho Cordova General Plan land use policies that encourage development projects to evaluate conservation to minimize or avoid impacts to biological resources.

As identified in Section 4.2.2, the land use changes outside the UDA under the No Action/No Project Alternative, when considered together with land use changes resulting from past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on land use by conflicting with existing land use plans. The Proposed Action/Proposed Project Alternative has been designed to complement and help implement the goals and policies of the Sacramento County General Plan and of ordinances adopted for the protection of resources, as discussed in Section 4.1.1.4 and other chapters of this EIS/EIR.

However, this EIS/EIR evaluates the impacts of the No Action/No Project Alternative relative to the existing conditions but evaluates the impacts of the two action alternatives relative to the future conditions expected under the No Action/No Project Alternative (see Section 3.6.1). Because the Reduced Permit Term Alternative would result in less development outside the UDA than the No Action/No Project Alternative, it would have a smaller cumulative contribution to conflicts with existing land use plans. Therefore, the Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect when compared to the No Action/No Project Alternative baseline condition.

4.3 REFERENCES CITED

AirNav.Com. 2016a. "Rancho Murieta Airport." Airports. Accessed November 3, 2016. www.airnav.com.

AirNav.Com. 2016b. "Eagle's Nest Airport." Airports. Accessed November 3, 2016. www.airnav.com.

Airport Land Use Commission. 1992. *Airport Land Use Commission Policy Plan*. Sacramento, California: Airport Land Use Commission. Amended December 1992.

Blackwell, B.F., L.M. Schafer, D.A. Helon, and M. A. Linnell. 2008. "Bird Use of Stormwater-Management Ponds: Decreasing Avian Attractants on Airports." *Landscape and Urban Planning* 86:162–170.

CDWR (California Department of Water Resources). 1993. *Sacramento San Joaquin Delta Atlas*. Sacramento, California: State of California Department of Water Resources.

Delta Protection Commission. 2010. *Land Use and Resource Management Plan for the Primary Zone of the Delta*. Sacramento, California: Delta Protection Commission. Adopted February 25, 2010. Accessed July 6, 2016. http://www.delta.ca.gov/res/docs/LURMP/Land%20Use%20and%20Resource%20Management%20Plan%202.25.10_.pdf.

Delta Stewardship Council. 2013. *The Delta Plan: Ensuring a Reliable Water Supply for California, a Healthy Delta Ecosystem, and a Place of Enduring Value*. Sacramento, California: Delta Stewardship Council. Accessed June 30, 2016. http://deltacouncil.ca.gov/delta-plan-0.

Dolbeer, R.A. 2006. "Height Distribution of Birds Recorded by Collisions with Civil Aircraft." USDA National Wildlife Research Center – Staff Publications. Paper 500.

FAA (Federal Aviation Administration). 2007. "Hazardous Wildlife Attractants on or Near Airports." Advisory Circular No. 150/5200-33B. August 28, 2007. Accessed June 30, 2016. http://www.faa.gov/documentLibrary/media/advisory_circular/150-5200-33B/150_5200_33b.pdf.

FAA. 2013a. "ATADS: Airport Operations: Standard Report for Mather Airport, 1/2008 to 12/2012." Accessed July 23, 2013. http://aspm.faa.gov/opsnet/sys/Main.asp.

FAA. 2013b. "ATADS: Airport Operations: Standard Report for Sacramento Airport, 1/2008 to 12/2012." Accessed July 23, 2013. http://aspm.faa.gov/opsnet/sys/Main.asp.

FAA. 2013c. "ATADS: Airport Operations: Standard Report for Rancho Murieta Airport, 1/2008 to 12/2012." Accessed July 23, 2013. http://aspm.faa.gov/opsnet/sys/Main.asp.

FAA. 2013d. "Bird Strikes in California Since 1999." FAA Wildlife Strike Database.

Galt. 2008. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. Prepared by Environmental Science Associates. Sacramento, California: Environmental Science Associates. July 2008. Accessed June 28, 2016. http://www.ci.galt.ca.us/index.aspx?page=786.

Galt. 2009. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Rancho Cordova. 2006a. *Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report.* SCH no. 2005022137. June 2006. Accessed June 29, 2016. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

SACOG (Sacramento Area Council of Governments). 1992. *Franklin Field Comprehensive Land Use Plan*. Sacramento, California: SACOG Airport Land Use Commission. Amended December 1992. Accessed June 30, 2016. http://www.sacog.org/sites/main/files/file-attachments/franklin_field_clup_amend_dec_1992_-_93-016.pdf.

SACOG. 1997. *Mather Airport Comprehensive Land Use Plan*. Sacramento, California: SACOG Airport Land Use Commission. May 1997. Accessed June 30, 2016. http://www.sacog.org/sites/main/files/file-attachments/mather_airport_clup_may_1997_-_97-011.pdf.

SACOG. 1999. *Sacramento Executive Airport Comprehensive Land Use Plan*. Sacramento, California: SACOG Airport Land Use Commission. Amended May 1999. Accessed June 30, 2016. http://www.sacog.org/sites/main/files/file-attachments/sacramento_executive_airport_clup_amend_may_1999_-_99-013.pdf.

SACOG. 2004. "Discussion Draft Blueprint Preferred Scenario for 2050 Map and Growth Principles." Accessed July 6, 2016. http://www.sacregionblueprint.org/sacregionblueprint/the_project/principles.pdf.

SACOG. 2012. *Regional Housing Needs Plan 2013–2021*. Sacramento, California: SACOG. Adopted September 20, 2012. Available at: http://www.sacog.org/sites/main/files/file-attachments/adopted_sacog_rhnp_092012_0.pdf.

SACOG. 2016. *Metropolitan Transportation Plan/Sustainable Communities Strategy*. Sacramento, California: SACOG. Adopted February 18, 2016. Accessed June 30, 2016. http://www.sacog.org/sites/main/files/file-attachments/mtpscs_complete.pdf.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: Sacramento Department of Environmental Review and Assessment. April 2010. Accessed June 29, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030.* Sacramento, California: Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County, City of Rancho Cordova, City of Galt, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Southeast Connector Joint Powers Authority. 2017. *Draft South Sacramento Habitat Conservation Plan*. February 2017. Sacramento, California.

Sacramento County Airport System. 2008. "Franklin Field Airport Master Plan Working Paper One." June 2008.

Silveira, J.G. 1998. "Avian Uses of Vernal Pools and Implications for Conservation Practice." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*, edited by C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 92–106. Sacramento, California: California Native Plant Society.

Sodhi, N.S. 2002. "Competition in the Air: Birds Versus Aircraft." *The Auk* 119(3):587–595.

State of California Department of Transportation. 2011. *California Airport Land Use Planning Handbook*. Sacramento, California: State of California Department of Transportation, Division of Aeronautics. October 2011. Accessed February 24, 2015. http://www.dot.ca.gov/hq/planning/aeronaut/documents/alucp/AirportLandUsePlanningHandbook.pdf.

USFWS. 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland, Oregon: USFWS, Region 1. December 15, 2005. Accessed June 28, 2016. http://www.fws.gov/sacramento/ES/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

USFWS (U.S. Fish and Wildlife Service). 2013. "About the Refuge." Stone Lakes National Wildlife Refuge. January 23, 2013. Accessed June 30, 2016. https://www.fws.gov/refuge/Stone_Lakes/about.html.

CHAPTER 5 – SOILS, GEOLOGY, AND MINERAL RESOURCES

This chapter presents the existing conditions and the potential effects of each Environmental Impact Statement/Environmental Impact Report (EIS/EIR) alternative on geology, soils, and mineral resources. Issues analyzed include existing geology and geologic conditions; soil conditions; seismic and soils hazards from earthquake, landslide, and erosion; important mineral resources; and naturally occurring asbestos. However, paleontological resources, the potential occurrence of which is closely related to geologic features, are addressed in EIS/EIR Chapter 11, Paleontological, Cultural, and Historical Resources.

Geology and geologic conditions are the result of processes occurring over millions of years involving large-scale changes in physical landforms such as the formation of the Sierra Nevada or the filling of valleys from erosion. The effects of past geologic process are reflected in an area's topography, the types of deep underlying soil or rock present, and conditions such as the presence or absence of seismic faults. The analysis of soils includes conditions near the ground surface, typically no deeper than 10 feet. Processes that develop soils, such as erosion of surrounding rock material and inputs of organic material from vegetation, usually occur within a timescale of tens of thousands of years. Environmental impact documents analyze geology and soils because they are related to issues such as earthquake risk, erosion potential, and naturally occurring health hazards such as naturally occurring asbestos. These types of issues can be important factors in a project's siting, design, and implementation.

Mineral resources are marketable materials that are extracted from the earth, such as precious metals, petroleum products such as natural gas and oil, and sand and gravel used for construction. Environmental impact documents analyze mineral resources because a project or activity, such as placing housing over a gravel deposit suitable for construction aggregate, can limit or prevent future access to these resources.

5.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

As discussed in Chapter 3, Section 3.5, Contents of the Affected Environment/Environmental Setting Sections of Chapters 4 through 16, this section describes the existing regulatory conditions and the existing physical conditions of the geology, soils, and mineral resources within the Planning Area, and the existing conditions of hazards related to earthquakes, landslides and erosion, and naturally occurring asbestos.

5.1.1 Regulatory Framework

There are several federal, state, and local agency requirements that apply to soils, geological resources, and/or mineral resources within the Planning Area. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, issuance of permits permitting, or implementation of the alternatives analyzed in

this EIS/EIR. This section also identifies any relevant federal permits or other entitlements that must be obtained prior to implementing the alternatives. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 5.2, Environmental Consequences/Environmental Impacts (40 CFR 1502.25).

5.1.1.1 Federal

International Building Code

The design and construction of engineered facilities in California must comply with the requirements of the International Building Code (International Code Council 2014) and the adoptions to that code adopted by the State of California (see California Building Standards Code below).

Clean Water Act

The federal Clean Water Act (CWA) is discussed in detail in Chapters 7 and 10. However, because CWA Sections 401 and 402 are directly relevant to grading activities, it is also discussed here in Chapter 5.

Under CWA Section 401, projects and activities that may result in the discharge of a pollutant into wetlands and other waters of the United States and require authorization by federal license or federal permit must first obtain a CWA Section 401 water quality certification from the state in which the discharge would originate. In California, the U.S. Environmental Protection Agency has delegated the authority to grant water quality certifications to the State Water Resources Control Board, which are typically processed by the Regional Water Quality Control Boards with local jurisdiction. A water quality certification requires the project or activity to evaluate its potential impacts and implement appropriate measures to protect water quality and comply with regulatory water quality standards.

Under CWA Section 402 (CWA 402), the National Pollutant Discharge Elimination System (NPDES) program regulates the discharge of waste into wetlands and other waters of the United States. The NPDES permit regulations apply to broad categories of discharges, including point-source municipal wastewater discharges and nonpoint-source stormwater runoff. NPDES permits typically identify the following:

- Effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge
- Prohibitions on discharges not specifically allowed under the permit

- Provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities

The California State Water Resources Control Board administers the NPDES permit program in California. Projects that disturb 1 or more acres of soil must obtain coverage under the state's NPDES General Permit for Discharges of Storm Water Associated with Construction Activity. A stormwater pollution prevention plan must be developed and implemented that provides specific construction-related best management practices (BMPs) to prevent soil erosion and loss of topsoil. The required components and BMPs commonly included in a stormwater pollution prevention plan are described in greater detail in Chapter 7, Hydrology and Water Quality.

5.1.1.2 State

California Building Code

The California Building Code (CBC) (24 CCR) is based on the International Building Code. The International Building Code Seismic Zone Map of the United States places the Planning Area within Seismic Hazard Zone III, which corresponds to an area that may experience damage due to earthquakes having moderate intensities of V or more on the Modified Mercalli Scale, which corresponds to maximum momentum magnitudes of 4.9 or greater. The CBC has been modified for California conditions with more detailed and/or more stringent regulations. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the CBC. The CBC identifies seismic factors that must be considered in a structural design. For example, Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, while Chapter 18A regulates construction on unstable soils, such as expansive soils and areas subject to liquefaction. Appendix J of the CBC regulates grading activities, including drainage and erosion control.

Alquist-Priolo Earthquake Fault Zoning Act

The intent of the Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code, Section 2621–2630) is to reduce the risk to life and property from surface fault rupture during earthquakes by regulating construction in active fault corridors and prohibiting the location of most types of structures intended for human occupancy across the traces of active faults in California. The act defines criteria for identifying active faults, giving legal support to terms such as active and inactive, and establishing[1] a process for reviewing building proposals in Earthquake Fault Zones. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate

[1] Note that in the context of this Plan, the word "establish" is synonymous with "create."

that proposed buildings would not be constructed across active faults. However, no Alquist-Priolo Zones are mapped within the Planning Area (CGS 2017).

Seismic Hazards Mapping Act

The intent of the Seismic Hazards Mapping Act (PRC Section 2690–2699.6) is to reduce damage resulting from earthquakes in California. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. The act's provisions are similar in concept to those of the Alquist-Priolo Act: the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped Seismic Hazard Zones. Seismic Hazard Zones must incorporate standards specified by California Geological Survey (CGS) Special Publication 117a, *Guidelines for Evaluating and Mitigating Seismic Hazards* (CGS 2008). However, no Seismic Hazard Zones are mapped in the Planning Area.

Surface Mining and Reclamation Act

The State of California Surface Mining and Reclamation Act (SMARA) (California Public Resources Code Sections 2710–2719), is the primary regulation governing mining operations and mine reclamation. Its purposes are to ensure that adverse environmental effects are prevented or minimized; mined lands are reclaimed to a useable condition; production and conservation of minerals are encouraged while giving consideration to recreational, ecological, and aesthetic values; and residual hazards to public health and safety are eliminated. Local agencies are responsible for ensuring compliance with SMARA requirements for mine operation and reclamation.

SMARA mandates that the Mineral Resources Project, which is administered by the CGS and provides objective geologic expertise and information about California's diverse non-fuel mineral resources, classify lands throughout the state that contain regionally significant mineral resources (California Public Resources Code, Division 2, Chapter 9, Section 2710 et seq.). Through the SMARA Mineral Land Classification Project, the State Geologist identifies and maps mineral resources of the state (not including oil and gas) to show where economically significant mineral deposits occur and where they are likely to occur based upon the best available scientific data (CDOC 2007).

Mineral resources classified under the Mineral Land Classification Project include metals; industrial minerals; and construction aggregate, which includes sand, gravel, and crushed stone. Special emphasis has been given to construction aggregate because it is the state's most important mineral commodity in terms of tonnage, value, and societal infrastructure. Local

agencies are required to use the classification information when developing local land use plans and when making land use decisions (CDOC 2007).

SMARA also requires the State Geologist to classify lands within California based on mineral resource availability. The State Geologist is responsible for classifying lands subject to urban development by Mineral Resource Zones (MRZs) according to the presence or absence of significant sand, gravel, stone, or other deposits of value that may be suitable for mining. The process is based solely on underlying geology without regard to existing land use or land ownership. The primary goal of mineral land classification is to ensure that local government decision makers recognize and consider the mineral potential of the land before making land use decisions that could preclude mining.

The CGS has established the following MRZ classification system to denote both the location and significance of key extractive resources:

- **MRZ-1** – Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence
- **MRZ-2** – Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists
- **MRZ-3** – Areas containing mineral deposits, the significance of which cannot be evaluated from existing data
- **MRZ-4** – Areas where available information is inadequate for assignment to any other MRZ zone

Asbestos Airborne Toxic Control Measure (for Construction, Grading, Quarrying, and Surface Mining Operations

The California Air Resources Board has adopted an Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR 93105). This statewide regulation requires use of control measures to minimize emissions of asbestos-laden dust. The Asbestos Airborne Toxic Control Measure applies to any size construction project although there are more stringent mitigation requirements for projects that exceed 1 acre. Naturally occurring asbestos is known to be present in eastern Sacramento County (CDOC 2006). In the Planning Area, the Sacramento Metropolitan Air Quality Management District has regulatory authority to ensure compliance with the Asbestos Airborne Toxic Control Measure.

5.1.1.3 Local

Sacramento County

Sacramento County 2030 General Plan

The *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011) Safety Element includes goals, objectives, and policies related to seismic and geologic hazards; the Agricultural Element includes goals, objectives, and policies that address the conservation of soil resources; and the Conservation Element addresses extraction of mineral resources. Applicable goals and policies include the following:

Goal: Minimize the loss of life, injury, and property damage due to seismic and geological hazards.

Policy SA-1: The County shall require geotechnical reports and impose the appropriate mitigation measures for new development located in seismic and geologically sensitive areas.

Policy SA-3: The County shall support efforts by Federal, State, and other local jurisdictions to investigate local seismic and geological hazards and support those programs that effectively mitigate these hazards.

Policy SA-4: The County shall prohibit development on ground surfaces which exceed 40 percent in slope, such as the bluff areas along the American River. Development shall be set back from these slopes at a distance established by the Zoning Code.

Goal: Protect important farmlands from conversion and encroachment and conserve agricultural resources.

Policy AG-28: The County shall actively encourage conservation of soil resources.

Goal: Mineral resources protected for economic extraction with minimal adverse impacts.

Policy CO-38: Sewer interceptor and trunk alignments shall be routed to avoid areas planned for aggregate resource mining to the extent practical. Where such alignments are impractical, they shall be designed to minimize aggregate resources which would be precluded from mining, and make reasonable attempt to preserve the future use of mined areas for flood control or recharge purposes.

Policy CO-39: Surface mining operations shall be subject to appropriate mitigation measures and shall avoid creating any significant nuisances, hazards, and adverse

environmental impacts, unless the Board of Supervisors makes the findings to override as required by [the California Environmental Quality Act] CEQA Guidelines Section 15091.

Policy CO-41: Surface mining shall not be allowed without adequate plans for reclamation of mined areas. Reclamation plans should be based on a plan for post-mining land use that is consistent with the land use strategies of the General Plan.

Policy CO-44: Due to the predicted shortages of aggregates in Sacramento County, mining of mineral resources within the Urban Services Boundary (USB) is encouraged, where consistent with Habitat Conservation Plans or other County initiated conservation programs and where such mining does not preclude successful completion of these plans, to avoid the potential loss of these mineral resources as a result of potential urban development. This policy is not intended to preclude mining outside the USB.

Sacramento County Land Grading and Erosion Control Ordinance

The Sacramento County Land Grading and Erosion Control Ordinance (Sacramento County Code, Chapter 16.44) was established to minimize damage to surrounding properties and public rights-of-way; limit degradation to the water quality of watercourses; and avoid disrupting drainage system flow during clearing, grubbing, grading, filling, and excavating activities. The ordinance establishes administrative procedures, minimum standards of review, and implementation and enforcement procedures for the control of erosion and sedimentation that are directly related to land grading activities.

Sacramento County NPDES Municipal Stormwater Permit Program

Stormwater discharges to the municipal separate storm sewer systems in Sacramento County and the Cities of Sacramento, Galt, Rancho Cordova, Elk Grove, Folsom, and Citrus Heights are regulated under an NPDES Municipal Stormwater Permit issued by the Central Valley Regional Water Quality Control Board (Order No. R5-2015-0023, NPDES No. CAS082597). This NPDES permit is renewed every 5 years, most recently in April 2015. Ground-disturbing projects or activities within these jurisdictions must implement required BMPs to avoid or reduce stormwater run-off, soil erosion, and the corresponding discharge of pollutants to downstream surface waters, to the maximum extent practicable. The Sacramento County NPDES permit is discussed in more detail in Chapter 7.

2030 Galt General Plan

The *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009a) contains goals and policies in the Safety and Seismic, Public Facilities and Services, and Conservation Elements to minimize risk from seismic and geologic hazards, limit erosion and siltation, and

express the community's priorities regarding mining activities. Applicable goals and policies include the following:

Goal SS-2: To minimize the loss of life, injury, hardships, and property damage due to seismic and geological hazards.

Policy SS-2.1: Geologic and Soils Information. The City of Galt shall require soils reports for new projects and use the information to determine appropriate permitting requirements.

Policy SS-2.2: Seismically-Engineered Public Structures. The City of Galt should ensure that all existing and future public structures, such as buildings and water storage tanks, are of sufficient construction to withstand seismically induced ground shaking and related geologic hazards.

Policy SS-2.3: Grading/Erosion Control. The City of Galt shall require grading and erosion control plans to be prepared by a qualified engineer or land surveyor.

Goal PSF-4: To collect and dispose of stormwater in a manner that protects the city's residents and property from the hazards of flooding, manage stormwater in a manner that is safe and environmentally sensitive, and enhances the environment.

Policy PFS-4.5: Grading During the Rainy Season. The City of Galt shall prohibit grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of storm drainage facilities.

Policy PFS-4.6: Erosion Control Plan. The City of Galt requires new development projects to prepare an erosion control plan.

Goal COS-4: To preserve and enhance open space lands to maintain the natural resources of the Galt area.

Policy COS-4.7: Mining Activities. The City of Galt shall prohibit mining activities in the City limits and strongly oppose mining activity proposals within the Galt General Plan Planning Area.

Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2006a) contains goals and policies in the Safety Element to minimize risk from seismic and geologic hazards and in the Natural Resources Element to address mineral extraction. Applicable goals and policies include the following:

Goal S.3: Reduce the Risk of Adverse Effects to Residents or Businesses as a Result of Geologic or Seismic Instability.

Policy S.3.1: Support efforts by federal, State, and local jurisdictions to investigate local seismic and geologic hazards and support those programs that effectively mitigate these hazards.

Policy S.3.2: Ensure that new structures are protected from damage caused by geologic and/or soil conditions to the greatest extent feasible.

Goal NR.6: Support the Environmentally Sensitive Extraction of Minerals and the Subsequent Reclamation of Mined Areas.

Policy NR.6.1: Ensure that the environmental effects of mining and reclamation on aquifers, streams, scenic views, and surrounding residential uses are prevented or minimized.

Policy NR.6.3: While mining activities are anticipated to be phased out within the City of Rancho Cordova, the City recognizes the right of these uses to continue and will require setbacks, buffers, screening, and other appropriate measures to allow for the continued operation of mining activities.

5.1.2 Planning Area Geologic Environment Existing Conditions

This section provides information on existing locations and condition of geologic resources, surface soils, and minerals in the Planning Area, as well as the existing geological hazards in the Planning Area.

Additional information about the interrelationships between Planning Area landforms, geologic formations, and associated soils is included to provide context for discussions and analysis of vernal pools and other aquatic resources that will be presented in subsequent chapters in this EIS/EIR, including Chapter 8 (Natural Land Cover Habitats, and Associated Plant and Animal Communities), Chapter 9 (Special-Status Species Including HCP Covered Species), and Chapter 10 (Aquatic Resources).

The present landscape of Sacramento County has been shaped over time by the ongoing processes of erosion and deposition. Material eroded from the ancestral Sierra Nevada, formed over 100 million years ago, was deposited in an ancient sea that once occupied the Sacramento Valley floor. The Sacramento Valley is the area of the Central Valley north of the Sacramento–San Joaquin River Delta that is drained by the Sacramento River. Approximately 10 million to 15 million years ago, tectonic uplifts altered the geomorphology of the Sierra Nevada. Glaciation, volcanism, and erosion followed the uplifting, adding layers of sediment to the Sacramento Valley floor. Under the present geologic conditions, the alteration of the local geomorphology

continues through stream erosion of the Sacramento Valley sediments and subsequent deposition in adjacent floodplains (Sacramento County 2011).

These past processes are evident in the topography of the Planning Area, which is generally flat in the central and western portions of the Planning Area, and transitions to rolling hills in the eastern portion approaching the Sierra Nevada foothills.

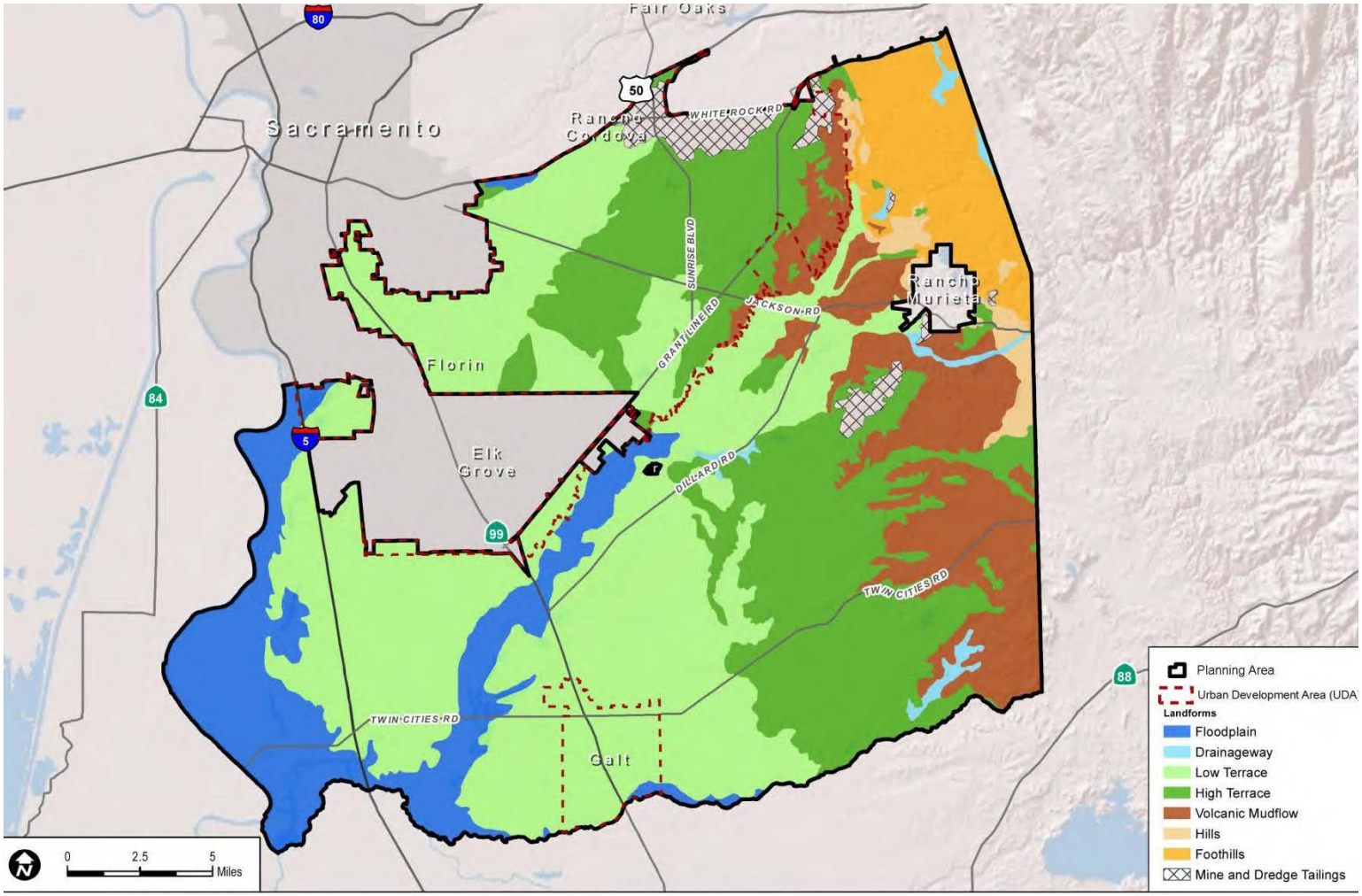
Planning Area Geomorphic Provinces. The Planning Area is located within portions of two distinct geomorphic provinces. A geomorphic province is an area that has a relatively consistent geologic origin and erosional/depositional history. The majority of the Planning Area lies within the Great Valley Province, which extends from Redding in the north to approximately Bakersfield in the south and is bounded by the coastal mountain ranges on the west and the Sierra Nevada to the east (CGS 2002). The Great Valley Province is generally flat and low-lying, consisting largely of alluvial and sedimentary deposits that have been eroded from the adjacent mountain ranges and that make up the Sacramento Valley floor. The eastern region of Sacramento County lies within the Sierra Nevada Province, and is differentiated from the Great Valley Province portion of the Planning Area by the presence of outcroppings of metamorphic rock strata, increasing elevations, and undulating topography (CGS 2002).

Planning Area Landforms. A landform is a geomorphological unit and is largely defined by its surface form and location in the landscape. As part of the terrain, a landform is an element of topography. Landforms are categorized by characteristic physical attributes such as elevation, slope, orientation, stratification, rock exposure, and soil type. The development of the existing landforms in the Planning Area took place during the Pleistocene (1.6 million to 10,000 years ago) and Holocene (10,000 to 200 years ago) Epochs.

The seven predominant landforms in the Planning Area are floodplain (low and high), drainageway, low terrace, high terrace, volcanic mudflow, hills, and foothills (Figure 5-1) (Jones and Stokes 1990; USDA 1993; Smith and Verrill 1998). These landforms are discussed below in order of their geographic placement on the landscape from the lowest elevation (newest surfaces) to highest elevation (oldest surfaces).

Figure 5-1 also identifies mine and dredge tailings, which is not a natural landform. These are human-formed features in Sacramento County that are composed almost entirely of rounded river rock that was excavated from ancient riverbeds during gold mining activities in the early 1900s through approximately 1960. The dredged rock, after being processed to extract the gold, was disposed of in large rows or piles at several locations in the Planning Area (Figure 5-1).

Figure 5-1 Geographic Landforms



SOURCE: County of Sacramento 2014, CA Geologic Survey 1981

FIGURE 5-1

Geographic Landforms

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN EIS/EIR

INTENTIONALLY LEFT BLANK

Planning Area Geologic Formations. Each of the seven geomorphological landforms in the Planning Area (discussed previously) also supports specific geologic surficial deposits (geological formations). A geologic formation is a geomorphic feature on the Earth's surface during an episode of landscape development. Geologic formations are differentiated by various criteria, including age, physical structure, layering of materials, compaction, texture, depositional history, geomorphology, and soil-profile development (Smith and Verrill 1998). The geologic formations described below are from the Geologic Map of the Sacramento Quadrangle prepared by the CGS (CGS 1981) (see Figure 5-2). Like Figure 5-1, Figure 5-2 also identifies areas of human-created mine and dredge tailings, which are not a natural geologic formation.

As discussed in the introduction to Section 5.1.2, Planning Area Geologic Environmental Existing Conditions, the locations and ecology of vernal pools are closely correlated to the geologic formation and soils. Of the 17 geologic formations found within the Planning Area, 15 contain vernal pools. Of the 15 Planning Area geologic formations that contain vernal pools, there are 5 primary geologic formations that support the majority of vernal pools remaining in the Planning Area: the Laguna, Riverbank, Modesto-Riverbank, Mehrten, and Valley Springs Formations. These five formations are each described in detail in Sections 5.1.2.2 to 5.1.2.5, beginning with Planning Area geologic formations with the most vernal pool acres to the geologic formations with the fewest vernal pool acres.

Planning Area Soils. Many different kinds of soils are found within the Planning Area with a wide range of characteristics, including depth to rock, the presence of hardpans, erodibility, clay content, and soil slopes. Soils in the Planning Area vary from very deep, nearly level alluvial soils to undulating shallow soils over restrictive duripans or clay-rich soil horizons to shallow hilly soils overlying bedrock. These soils also vary from well-drained to poorly drained mineral soils, and to a lesser extent, organic soils. Individual soil units are organized into map units called soil associations, which consist of soil units of the same texture and composition that occur in a geographic position (USDA 1993).

Planning Area soils series with support vernal pools are soils that include an impermeable layer. The impermeable soil layer can be formed of claypan, a cemented hardpan (duripan), rock, or a combination of these. Certain soil series in the Planning Area consistently coincide with the occurrence of vernal pools. Most of the soil series with vernal pools are strongly associated with a specific geologic formation, although some soil series may occur on two or more geologic formations. The six most prominent soil series within the Planning Area are discussed in Sections 5.1.2.2 to 5.1.2.5. The locations of these key Planning Area soil series are shown in Figure 5-3.

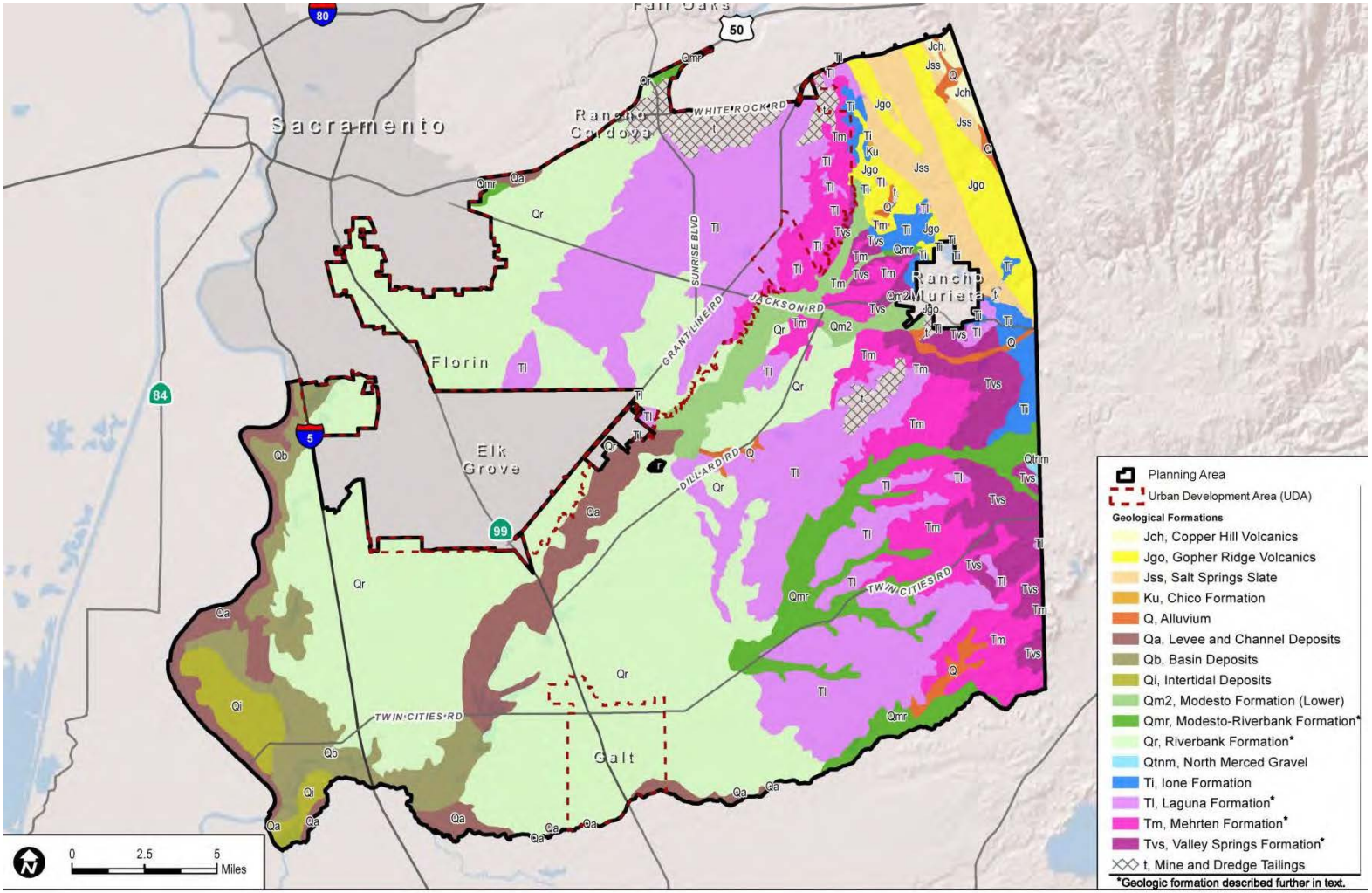
5.1.2.1 Floodplain Landform (Low and High Floodplains)

The youngest and lowest landform surface in the Planning Area is the low floodplains. This is an active surface with component landforms that include nearly level floodplains bordering the Sacramento, American, and Cosumnes Rivers; each river's tributaries; and the many smaller channels in the Planning Area. The low floodplains are frequently inundated unless they are protected by levees or upstream dams. The landscape is dynamic as new channels are formed and old channels become inactive. Alluvium moving downstream on the low floodplains in the Planning Area has buried older geomorphic surfaces. High floodplains are also an active surface but somewhat older than the low floodplains. Unless protected by human-made levees or upstream dams, all floodplains occasionally or frequently flood. The components of this surface include backswamps, which are the sections of floodplain where silts and clays settle out; the edges of backswamps; and natural levees and floodplains along the rivers and other channels. All of these surface components are nearly level (Jones and Stokes 1990; USDA 1993; Smith and Verrill 1998). Vernal pools are not found on the Floodplain Landform within the Planning Area.

5.1.2.2 Drainageway Landform and Geologic Formations

The drainageway landform is composed of relatively recent alluvial deposits at the base of toe slopes (i.e., depositional material at the base of a slope) and of stream terraces (i.e., deposits of old floodplain material oriented parallel to the stream) adjacent to floodplains and incised channels of active waterways, and occur on top of other older geologic formations. These are the second-youngest landform surfaces in the Planning Area and are present where active streams, creeks, and rivers traverse the other landforms found in the Planning Area. Consequently, vernal pools that formed on drainageway deposits are relatively young but are often associated with another older vernal pool type on the adjacent higher ground and terraces (terrace landforms are discussed below). In contrast to vernal pools found on the low terrace, high terrace, and mudflow landforms, the vernal pools found on the drainageway landform fill and drain relatively rapidly and may depend more on overland runoff and direct precipitation to maintain their hydrology (Jones and Stokes 1990). Soils above the restricting claypan or hardpan layers in these pool types may be too deep for perched water tables (i.e., an area of saturated soil near the ground surface and separated from deeper groundwater aquifers by an impermeable layer of rock, clay, or other material) to become exposed in shallow vernal pools. Additionally, the basins of these types of pools are often shallow, increasing susceptibility to evaporation, or slightly sloped, which encourages drainage.

Figure 5-2 Geologic Formations



SOURCE: County of Sacramento 2014, CA Geologic Survey 1981

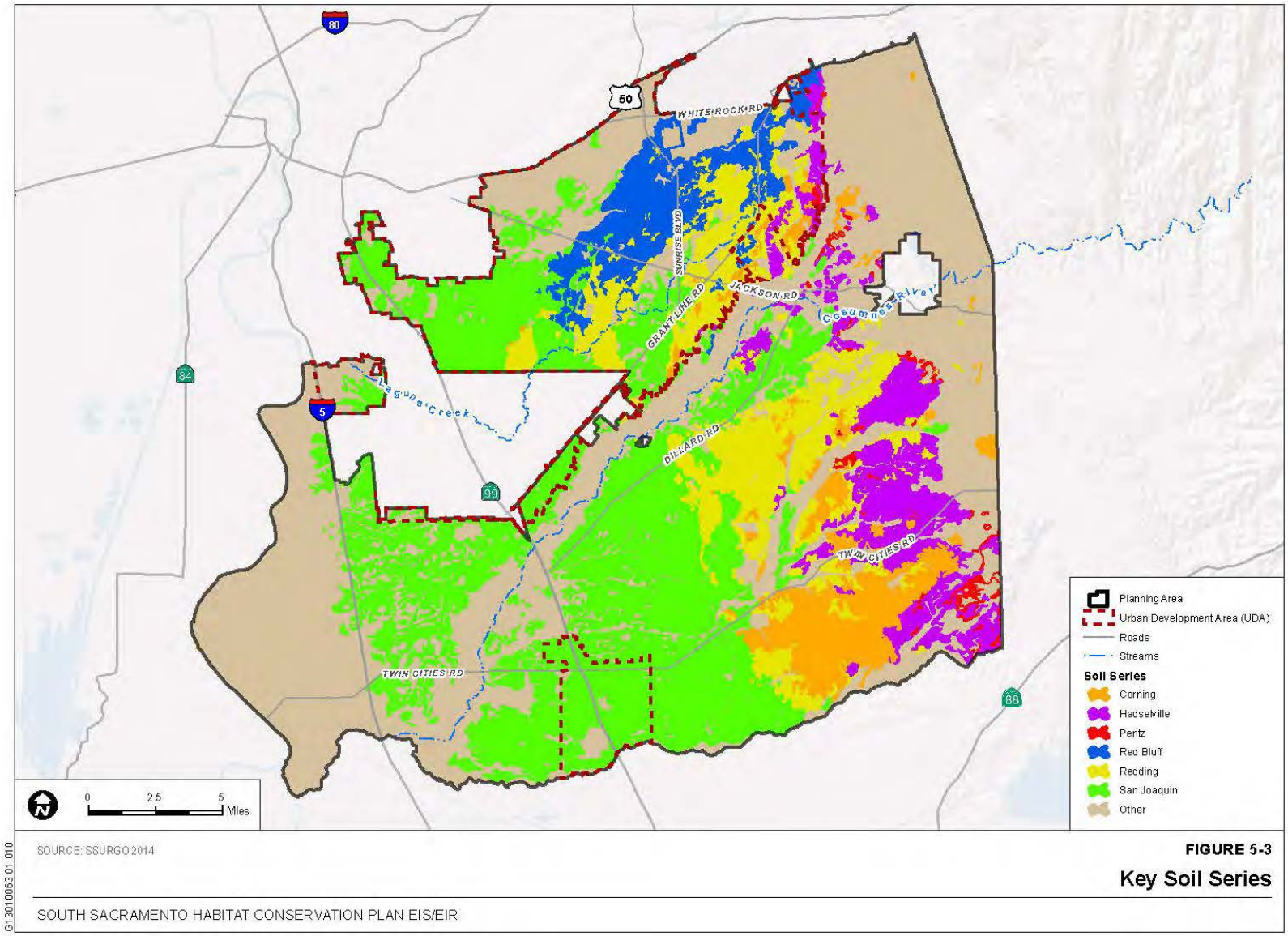
FIGURE 5-2

Geologic Formations

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN EIS/EIR

INTENTIONALLY LEFT BLANK

Figure 5-3 Key Soil Series



INTENTIONALLY LEFT BLANK

Modesto-Riverbank Geologic Formation

The Modesto-Riverbank Formations (i.e., Modesto Formation (lower) and Modesto-Riverbank Formation) are dominantly andesitic, late- to middle-Pleistocene alluvium composed of gravel, sand, silt, and clay derived from deposition from various streams (CGS 1981). The Modesto-Riverbank Formations are generally confined to the southeastern portion of the Planning Area forming on either side of Laguna Creek (south) and its tributaries, and on either side of Dry Creek. Widths vary from approximately 0.25 mile wide along the tributaries of Laguna Creek (south) to about 1 mile wide along the main channel of Laguna Creek and Dry Creek. These formations extend west from the Planning Area's boundary with Amador County to a nondescript area east of Galt.

There are a number of soil series that are associated with the Modesto-Riverbank Formations, including, but not limited to, the Corning complex, Hicksville loam, Madera loam, Redding gravelly loam, and Tehama loam (CGS 1981).

The Modesto-Riverbank Formations cover the fifth largest area in the Planning Area, with a total of 14,688 acres, with 567 acres inside the Urban Development Area (UDA[2]) and 14,121 acres outside the UDA. It comprises nearly 5% of the total Planning Area.

The Modesto-Riverbank Formations encompass 5,272 or about 9% of the total number of vernal pools within the Planning Area. All 5,272 vernal pools occurring on this formation are outside of the UDA. The Modesto-Riverbank Formations rank fourth in importance in terms of total number of vernal pools. Approximately 11% (503 acres) of the total vernal pool acreage within the entire Planning Area occurs on the Modesto-Riverbank Formations. All 503 acres of Modesto-Riverbank formation vernal pools are found outside of the UDA.

5.1.2.3 Low Terrace Landform, Geologic Formations, and Soil Series

Low terraces (also referred to as "young terrace"), are of relatively recent geologic origin (Jones and Stokes 1990). They contain late Pleistocene-age (100,000 years ago) geomorphic surfaces that are underlain by older stream alluvium. Low terrace landforms occur on the broad, nearly level plain of alluvial deposits that make up the Sacramento Valley floor. Low terrace landforms are relatively young when compared to the high terrace or the mudflow landforms (Smith and

[2] As discussed in Section 1.1.1, Geographic Scope of the EIS/EIR Planning Area, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, the term "UDA" means all lands within Sacramento County's USB boundary that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within Galt's sphere of influence (see Figure 1-1).

Verrill 1998). Low terrace soils are younger and not as well developed when compared to high terrace landforms, but have been forming long enough to have undergone significant pedogenesis (soil forming processes), and claypans and duripans are common.

Vernal pools occur extensively in certain areas of the low terraces. Low terrace soils commonly form seasonal "perched aquifers" (the same as the perched water table identified previously in the description of the drainageway landform). Vernal pools found within the low terrace landforms do not exhibit the same richness of flora or specialized species when compared to vernal pools on high terrace landforms. Most young terrace sites have been plowed, graded, or heavily grazed because of the arable soils that are present and the proximity to reliable water. This and the relatively young age of the vernal pools may also account for the unspecialized flora in these pools in the Planning Area. Many low terrace pools are shallow or have poorly defined basins.

Riverbank Geologic Formation

The Riverbank Formation is located on the low (young) terrace landform. The Riverbank Formation was deposited on a plain of stream alluvium that has been partially dissected. The upper surface of this plain, in most places, represents the upper surface of the Riverbank Formation. The upper surface is characterized by a gently undulating surface. In the vicinity of Elk Grove, the Riverbank Formation is about 10 miles wide from west to east. To the east, it laps onto older materials composed of the Laguna Formation. To the west, it is in turn overlain by younger alluvial materials. The Riverbank Formation is generally confined to the central and western portions of the Planning Area and occurs on either side of the Cosumnes River.

The Riverbank Formation is the largest geologic formation in the Planning Area, with a total of 122,228 acres (35,401 acres inside the UDA and 86,827 acres outside the UDA). It comprises just over 38% of the total Planning Area (Figure 5-2). Although the Riverbank Formation dominates the Planning Area, large portions have been converted for agriculture or developed for urban uses because of the arable soils that are present and the proximity to reliable water. In addition, most undeveloped portions of the Riverbank Formation were plowed or leveled in the past. Consequently, young-terrace vernal pools are not as common in the Planning Area as the extent of the Riverbank Formation might suggest (Jones and Stokes 1990).

Soils with claypans and duripans are common in the Riverbank Formation, as are vernal pools (Smith and Verrill 1998). As discussed below, the San Joaquin soil series is most closely associated with the Riverbank Formation. Other associated soil series in the Planning Area include Redding, Red Bluff, and Corning.

The Riverbank Formation encompasses 12,367, or 20%, of the total number of vernal pools within the Planning Area, with 2,800 located inside the UDA and 9,567 outside the UDA. The Riverbank Formation ranks second in total number of Planning Area vernal pools.

Approximately 34% (1,533 acres) of the total vernal pool acres within the entire Planning Area occurs on the Riverbank Formation, with 289 acres of vernal pool within the UDA and 1,244 acres outside the UDA.

Soil Series

San Joaquin. The San Joaquin soil series is the most extensive vernal pool soil in the Planning Area. This soil series, as well as other soils with which it is geographically associated (e.g., Fiddyment, Galt, Madera, and Rocklin), developed in the Riverbank Formation on young (low) alluvial terraces along the eastern flank of the Central Valley (in the later Pleistocene, 100,000 to 200,000 years old). San Joaquin soils formed in old alluvium on hummocky topography. A cemented hardpan (duripan) typically 2 feet to 4 feet beneath the surface restricts roots and water percolation. The soil series consists of well-drained and moderately well-drained soils above the duripan that formed in alluvium derived from mixed but dominantly granitic rock sources. Seasonal perched aquifers form above the duripan. The San Joaquin series is found on undulating low terraces with slopes of 0% to 9%. Some areas have been leveled. San Joaquin soils account for approximately 17% of soils within Sacramento County, and San Joaquin soil complexes comprise an additional 8%, for a total of approximately 25% of Sacramento County. San Joaquin soils are the predominant soil series on the Riverbank Formation occurring on both the high floodplain and low terrace landforms in Sacramento County.

Vernal pools tend to form in mound-intermound areas and depressional features within the San Joaquin soil series. Together, the San Joaquin, Redding, and Corning soil series are the primary soils for northern hardpan vernal pools. However, there are several dozen additional soil series (but of more limited distribution) that share the cemented duripan, reddish color, and landscape position that characterize northern hardpan vernal pool soils (Solomeshch et al. 2007).

5.1.2.4 High Terrace Landform, Geologic Formations, and Soil Series

The high terrace landform (also referred to as “old terrace”) is restricted to the east side of the Central Valley (Smith and Verrill 1998; Jones and Stokes 1990; Reiner and Swenson 2000). The high terrace landform was laid down from 600,000 to over 1 million years ago in the mid- to early Pleistocene to late Pliocene (5 million years ago), and lies topographically above low terraces. In the Planning Area, high terraces are ancient deposits of the Pleistocene-era American River, which was located south of its present-day site (Jones and Stokes 1990). Very strong soil development has occurred in relatively flat areas on these terraces where the geomorphic

surfaces are very old. The most pronounced erosion-induced mound-depression microtopography and vernal pool landscapes are found on the high terraces. Similar to the low terrace landform, the soil-restrictive layers form perched aquifers in high terrace landform soils. The soils and vernal pools of the high terrace landform have essentially been developing for more than a half-million years. Consequently, the high terrace landform exhibits well-developed soils and floristically rich habitat. Vernal pools on high terrace landforms typically support more specialized species than vernal pools found within any other landform (Jones and Stokes 1990).

In the Planning Area, the high terrace landform supports the Laguna Formation and Arroyo Seco gravels. Little of the Arroyo Seco gravels have been farmed because irrigation water is lacking and many sites are not arable. Consequently, vernal pools are abundant on level surfaces. However, much of the Planning Area with Laguna Formation high-terrace pools was dryland farmed with wheat or oats for relatively short periods in the past. This activity appears to have had little effect on vernal pools in some areas, such as at the Sunrise-Douglas development area, while in other areas the plowing appears to have disrupted surface hydrology (Jones and Stokes 1990).

Laguna Geologic Formation

The Laguna Formation is located on the High Terrace Landform (Smith and Verrill 1998; Jones and Stokes 1990; Reiner and Swenson 2000). The Laguna Formation, ranging in age from late Miocene to early Pliocene, rests over the older Mehrten Formation (described below). The Laguna Formation is composed of interbedded alluvial gravel, sand, and silt deposited from ancient river channels draining from the Sierra Nevada range, including the Feather, Yuba, American, Cosumnes, and Merced Rivers (Helley and Harwood 1985).

The exposed Laguna Formation occurs in a band several miles wide running north to south along the eastern half of the Planning Area. The Laguna Formation is exposed in the eastern and central portions of the Planning Area. The formation's eastern outcrop extends northward from Dry Creek (southern boundary of the Planning Area), where its area of exposure is about 6 miles wide, to its northernmost exposure along Meiss Road. Its central outcrop extends northward from Deer Creek to its northernmost exposure along U.S. Route 50. The Redding soil series and Red Bluff-Redding complex are the characteristic soil series associated with the Laguna Formation north of the Cosumnes River (soils types are described further below). South of the Cosumnes River to the headwaters of Badger Creek, the Redding series and Red Bluff-Redding complex are the main soils, and they give way to Corning and Hadselville-Pentz complexes south of Badger Creek to Dry Creek at the Sacramento–San Joaquin County line.

The Laguna Formation is the second-most extensive geologic formation in the Planning Area, totaling 61,282 acres (23,608 acres are inside the UDA and 37,674 acres are outside the UDA). It comprises just over 19% of the total Planning Area.

The Laguna Formation ranks first in total number of Planning Area vernal pools. The Laguna Formation encompasses 26,684 vernal pools or 43% of the total number of vernal pools within the Planning Area. Of the 26,684 vernal pools occurring on this formation, 7,734 are located inside the UDA and 18,950 are outside the UDA.

The Laguna Formation supports a variety of vernal pool sizes and densities, including some of the greatest vernal pool densities and most of the very large vernal pools remaining within the Planning Area, primarily within the UDA portion of the Planning Area (Dittes et al. 2007). Dittes et al. 2007 also found significantly lower density of vernal pools, smaller sizes of individual vernal pools, and a different category of "vernal pool complexes" on Laguna Formation soils located outside of the UDA when compared to vernal pools on Laguna Formation soils inside the UDA. Approximately 34% (1,554 acres) of the total vernal pool acreage within the entire Planning Area occurs on the Laguna Formation: 603 acres within the UDA and 951 acres outside the UDA.

Soil Series

Red Bluff. The Red Bluff soil series consists of very deep, well-drained loamy mineral soils formed in high (older) terraces of the Laguna Formation. Red Bluff soils are dominant on high and intermediate terraces and have 0% to 9% slopes in elevations of 75 to 1,500 feet above mean sea level (amsl). Soil horizons nearest the surface may have maximum clay contents of 3% to 10%, and deeper soil horizons have clay content ranging from 27% to 60%. The restrictive layer in the Red Bluff series is claypan at a depth of approximately 35 inches (Jones and Stokes 1990). A high content of clay, reddish color, and a significant amount of iron and manganese staining distinguish these soils from other soils in the Planning Area. The soil between a depth of 7 and 21 inches is dry in all parts from June to October, and moist in some or all parts the rest of the year. Red Bluff soils are among the oldest soils in Sacramento County. Parent materials for Red Bluff soils are gravelly and cobbly alluvium from mixed sources and laid down by an ancestral channel of the American River. This parent material consists of rounded pebbles and cobbles including dark metamorphic, quartzitic, and volcanic rocks in a granitic sand matrix. These American River channel pebbles are approximately 600,000 years old, consequently, they are of mid-Pleistocene age. Soils on hills in the eastern part of Sacramento County also are estimated to be of mid-Pleistocene age.

Corning. Corning soils are gravelly loam formed from the Laguna Formation and Arroyo Seco gravels on high terraces and terrace remnant landforms. Corning soils are characterized by mound-intermound microrelief and on smooth terrace side slopes. They are very deep. They

are well drained on the mounds and moderately well drained in the intermound areas. Typically, the surface layer is gravelly fine sandy loam. The restrictive layer is a claypan at approximately 28 inches in depth (Jones and Stokes 1990). The substratum is stratified gravelly sandy clay loam and gravelly sandy loam. It formed in old valley fill from mixed sources. Typically, the surface layer is reddish-brown, yellowish-red, and red gravelly loam about 22 inches thick. The subsoil is red and dark red clay about 18 inches thick. The substratum to a depth of 60 inches is strong brown clay loam. Permeability is very slow. Surface runoff is slow or medium. The hazard of erosion is slight or moderate. After intense rainstorms, the soil is saturated for a short time. Slopes are 0% to 30%. Elevations are 75 to 1,300 feet amsl. Slopes are 0% to 30%. The soils formed in gravelly alluvium derived from mixed rock sources.

Redding. Redding and Corning soil series developed on older, higher alluvial terrace landforms of the Laguna Formation (Pliocene to early-Pleistocene age). The Corning soil series is described in the previous paragraph. The Redding soil series is a well-drained, gravelly loam mineral soil that is moderately deep over a hardpan and supports primarily annual grassland. It formed in gravelly old valley fill from mixed sources but primarily derives from the Laguna Formation. The hardpan occurs at a depth of 2 to 4 feet below surface level. The series is found on nearly level or dissected and undulating to hilly high terraces. Slopes are 0% to 30%.

Typically, the Redding series surface layer is strong brown gravelly loam about 7 inches thick. The upper part of the subsoil is yellowish-red loam and gravelly loam. The lower part is a claypan of reddish brown and yellowish-red gravelly clay about 8 inches thick, at about 20 inches depth with a weighted average clay content of 35% to 60%. Below this to a depth of 66 inches is a very gravelly hardpan that is strongly cemented with silica. Therefore, the Redding soil series restrictive layer is both a claypan and a hardpan. In some areas, the surface layer is gravelly sandy loam, loam, or sandy loam. The shrink–swell potential is high. Surface runoff is very slow or slow. The hazard of water erosion is slight to moderate. Permeability is very slow in the Redding soil. Water is perched above the claypan/hardpan for short periods after seasonal rainfall in winter and early spring. The soil between depths of 4 and 18 inches is usually dry all of the time from June until September or early October and is moist in some or all parts the rest of the year. Redding soils are on nearly level or dissected and undulating to hilly high terraces. Microrelief may be hummocky. Gravel and cobbles tend to concentrate in the intermound in hummocky areas. Vernal pools are common in areas with slopes of 0% to 3%. Elevations are 40 to 2,000 feet amsl. This soil is used as rangeland or for dryland crops such as wheat. Redding soils may provide wetland functions and services.

Redding soils account for approximately 6% of Sacramento County, predominantly in the eastern portion of Sacramento County. Redding soils are the predominant soil series occurring on the Laguna Formation on low and high terraces.

5.1.2.5 Volcanic Mudflow Landform Geologic Formations and Soil Series

The northern Sierra Nevada was once covered by extensive volcanic mudflows believed to have arisen east of the sierra crest. These ancient mudflow formations were exposed at the base of the Sierra Nevada foothills, and then overlain by a thin soil derived from alluvial material, colluvial material (a loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope), and eroded elements of the parent mudflow parent material (Jones and Stokes 1990). The mudflow landform ranges in age from early Pleistocene to Oligocene (37 to 24 million years ago) (Smith and Verrill 1998; Jones and Stokes 1990). The mudflow formation exists today as low, nearly level to gently sloping ridges and fans along the eastern edge of the Planning Area. The mudflow formation is characterized by a thin, shallow layer of soil over impermeable bedrock.

In the Planning Area, areas of the mudflow landform support the Mehrten Formation and the Valley Springs Formation (see geologic formation discussion below). Valley Springs formed in the Oligocene, and Mehrten formed in the Miocene (10 to 25 million years ago) or Pliocene. Soils on the mudflow formation are shallow, extremely rocky, excessively drained by surface runoff and high water infiltration rates, and underlain by impervious mudflow that impedes the downward movement of water and upon which a perched aquifer periodically forms during the wet season (Jones and Stokes 1990).

Mehrten Geologic Formation

The Mehrten Formation consists of eroded, high-standing remnants of volcanic mudflow fans that were deposited during the Pliocene and Miocene and is located on the volcanic mudflow landform. Vernal pools tend to be located on the western edge of the Mehrten Formation in the Sacramento Valley because the eastern portion increases in slope, precluding development of soil processes that formed vernal pools (Smith and Verrill 1998). Vernal pools classified as Northern Volcanic Mudflow Vernal Pools (Sawyer and Keeler-Wolf 1995) are often found on Mehrten Formation soils. Several outcrops of the Mehrten Formation are exposed in a discontinuous band that runs north–south in the eastern portion of the Planning Area in a stratum that underlies the Laguna Formation and overlies the Valley Springs Formation. The exposed band of the Mehrten Formation extends from the south County boundary at Dry Creek, where it is about 4 miles wide, north to U.S. Route 50, where it is less than 1 mile wide.

In the Planning Area, the Mehrten Formation is characterized by the mound-intermound soil series and complexes such as Hadselville-Pentz, Red Bluff-Redding, Corning-Redding, and Pardee-Rancho Seco. The Corning-Redding and Red Bluff-Redding complexes are predominant north of the Cosumnes River, while the Hadselvill-Pentz and Pardee-Rancho Seco complexes are predominant south of the Cosumnes River.

The Mehrten Formation is the third largest of the exposed geologic formations in the Planning Area, with a total of 26,459 acres (3,863 acres inside the UDA and 22,596 acres outside the UDA). It comprises just over 8% of the total Planning Area.

The Mehrten Formation encompasses 10,275 vernal pools, or about 17% of the total number of vernal pools within the Planning Area, with 648 located inside the UDA and 9,627 outside the UDA. The exposed Mehrten Formation ranks third in total number of vernal pools in the Planning Area. In addition, approximately 11% (478 acres) of the total vernal pool acreage within the Planning Area occurs on the Mehrten Formation, with 32 acres of vernal pool in the UDA and 446 acres outside the UDA.

Valley Springs Geologic Formation

The Valley Springs Formation is also on the mudflow landform but is slightly older than the Mehrten Formation. The Valley Springs Formation is made up of eroded, high-standing remnants of rhyolitic (a fine-grained volcanic rock similar to granite) volcanic mudflow fans that were deposited 20–35 million years ago. Vernal pools tend to be located on the western edge of the formation in the Sacramento Valley because the eastern portion increases in slope, precluding soil processes that allow vernal pool development (Smith and Verrill 1998).

The Valley Springs Formation is exposed along the southeastern portion of the Planning Area from the southeastern corner along Dry Creek, northward to the headwaters of Carson Creek. The formation is generally exposed over an area from 1 to 2 miles in width. Its widest exposure is along Arkansas Creek, where it is exposed for about 4 miles from east of Ione Road, west to the Cosumnes River. There may be expansive clays present, especially in fine-grained material. The Amador-Gillender, Hadselville-Pentz, and Pardee-Rancho Seco soil complexes predominate on the Valley Springs Formation.

The Valley Springs Formation is the seventh largest geologic formation exposed in the Planning Area, with a total of 13,690 acres, 141 acres inside the UDA and 13,549 acres outside the UDA. It comprises just over 4% of the total Planning Area.

The Valley Springs Formation contains 4,139 vernal pools, or about 7% of the total number of vernal pools within the Planning Area. Of the 4,139 vernal pools occurring on this formation, 10 are located inside the UDA and 4,129 are outside the UDA. The Valley Springs Formation ranks fifth in importance in terms of total number of Planning Area vernal pools. Approximately 6% (265 acres) of the total vernal pool acreage within the Planning Area occurs on the Valley Springs Formation. With the exception of 0.16 acre, almost all of the vernal pool acreage on this formation occurs outside of the UDA.

Soil Series

Pentz. The Pentz soil series consists of shallow loamy, well-drained soils formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments primarily from the Mehrten Formation on exposed, upturned edges of mudflow formations at the base of the Sierra Nevada foothills (Jones and Stokes 1990). Pentz soils form mound-intermound microrelief and are found on hills and on backslopes of hills. Pentz soils are on the mound position. Slopes are 2% to 50%. The restrictive layer is bedrock. Much of the soil is dry in most years from May 15 to October 15, is moist in all parts from December 1 to May 1, and moist in some parts the rest of the year. The weighted average clay content ranges from 10% to 20%. Coarse fragments are subrounded or rounded metamorphic rock, quartz, or quartzite. Content of coarse fragments is 0% to 35%, with 0% to 25% cobbles or stones. Organic matter in the upper 7 inches mixed is 1% to 3%. Pentz soils are on undulating to hilly hills and on steep backslopes of hills, with mound-intermound microrelief. The microrelief is most strongly expressed on slopes of less than 20%. Elevation is 110 to 600 feet amsl.

The Pentz soil is shallow and well drained. Typically, the surface layer is brown fine sandy loam about 9 inches thick. The subsoil also is brown fine sandy loam. It is about 7 inches thick. Weakly consolidated tuffaceous sandstone is at a depth of about 16 inches. In some areas, the surface layer is gravelly sandy loam, sandy loam, or loam. In other areas, a thin hardpan caps the bedrock. Permeability is moderately rapid in the Pentz soil. Runoff is medium. The hazard of water erosion is slight or moderate.

Hadselville. The Hadselville soil series consists of very shallow loamy, moderately well-drained intermound soils formed in material weathered from weakly consolidated basic andesitic tuffaceous sediments (compacted volcanic ash varying in size from fine sand to coarse gravel) primarily from the Mehrten Formation on exposed, upturned edges of mudflow formations at the base of the Sierra Nevada foothills (Jones and Stokes 1990). The Hadselville and Pentz soils (Pentz soils are described above) are on hills with a mound-intermound microrelief topography. Hadselville soils are in the intermound position, and slopes are 2% to 30%. Soil depth ranges from 4 to 10 inches. The restrictive layer is bedrock. The soil is dry at the bottom depth in most years for a period of 120 to 150 days from May 15 to October 1, moist in all parts for a period of 135 to 165 days from November 15 to April 15, and moist in some parts the rest of the year. Organic matter content ranges from 1% to 2% throughout the profile and is higher than the underlying material. Elevation is 110 to 350 feet amsl.

The Hadselville soil is very shallow and moderately well drained. Typically, the surface layer is grayish-brown sandy loam about 7 inches thick. Weakly consolidated tuffaceous sandstone is at a depth of about 7 inches. In some areas, the surface layer is gravelly sandy loam. In other

areas, a thin hardpan caps the bedrock. Permeability is moderately rapid in the Hadselville soil. Runoff is very slow or medium. The hazard of water erosion is slight or moderate.

5.1.2.6 Hill Landform

A hill landform has a raised surface above a surrounding level plain and is distinguished by its sloping sides and defined peak. Hill landforms can be formed through the geologic processes of faulting and erosion. Within the Planning Area, both processes likely played a role in the formation of the hill landform, which is associated with the Pliocene (5 million years ago) uplift of the Sierra Nevada mountains to the east of the Planning Area. These processes continue to shape the hill landform into present day. Within the Planning Area, the hill landform can be found in a narrow band immediately west of the foothills (Figure 5-1). As shown in Figure 5-2, the Ione Formation, an Eocene-age (55 to 33 million years ago) weathered sedimentary formation primarily comprises the hill landform in the Planning Area (Smith and Verrill 1998; Creely and Force 2007). Vernal pools are not found on the hill landform within the Planning Area.

5.1.2.7 Foothill Landform

The foothill landform is a surface defined by a gradual increase in elevation at the base of a mountain range. They form the transition zone between hills and higher elevation mountains. The foothill landform is associated with the Pliocene (5 million years ago) uplift of the Sierra Nevada mountains to the east of the Planning Area and is found along the far eastern margin of the Planning Area (Figure 5-1). Uplift from active geologic faults, erosion, and dissection by active stream channels draining the mountain range are the primary forces that shape this landform. Vernal pools are not found on the foothill landform. Within the Planning Area, the Copper Hill Volcanic, Gopher Ridge Volcanic, and Salt Springs Slate geologic formations are found on the foothill landform (Figure 5-2).

5.1.2.8 Existing Hazards

Soil Subsidence

Subsidence is the gradual settling or sinking of the Earth's surface with little or no horizontal motion. Lands in Sacramento County may be affected by five types of subsidence: compaction of unconsolidated soils by earthquake shaking, compaction by heavy structures, the erosion of peat soils, peat oxidation, and fluid withdrawal. As discussed below, the likelihood for substantial seismic activity in the Planning Area is low; thus, earthquake shaking is not a major source of subsidence. Subsidence in peat soils from heavy structures has not been an issue in the Planning Area. The pumping of water for residential, commercial, and agricultural uses from aquifers is the most common cause of subsidence in the Planning Area via the fluid

withdrawal mechanism. Known subsidence areas occur in the far western portions of Sacramento County, including the portion of the Planning Area west of Interstate (I)-5 (see Figure II-7 of the Sacramento County General Plan [Sacramento County 2011]). Although subsidence has caused substantial problems in portions of the Delta and in the San Joaquin Valley, it is not a major concern in the Planning Area.

Expansive Soils

Expansive soils contain shrink-swell clays that are capable of absorbing water. As water is absorbed, the clays increase in volume. This change in volume is capable of exerting enough force on subsurface portions of buildings and other structures to damage foundations and underground utilities. Damage can also occur as the soils dry and contract.

Expansive soils are associated with approximately one-third of all soil types in Sacramento County. However, in the Planning Area, only the Valley Springs Formation (Figure 5-2) is described as having the potential to contain expansive soils (Sacramento County 2010). Expansive soils are largely composed of clays, which greatly increase in volume when water is absorbed and shrink when dried. Expansive soils are primarily of concern for building foundations that may rise during the rainy season and fall during the dry season in response to the clay's action. If soil movement varies under different parts of the building, the result is that foundations crack, structural portions of the building are distorted, and doors and windows are warped so that they do not function properly (Sacramento County 2010).

Landslides

A landslide is the downhill movement of masses of earth material under the force of gravity. The factors contributing to landslide potential are steep slopes, unstable terrain, and proximity to earthquake faults. This process typically involves the surface soil and an upper portion of the underlying bedrock. As discussed above, expansive soils tend to shrink and swell in response to moisture content changes. When expansive soils are located on slopes, gravity tends to work the soil downslope during this shrinking and swelling process. Movement may be very rapid or so slow that a change of position can be noted only over a period of weeks or years (creep). The size of a landslide can range from several square feet to several square miles.

Almost all of the topography in the Planning Area is relatively flat and would not be subject to landslides. In the Planning Area, only a narrow strip along the eastern boundary of Sacramento County, east of Rancho Murieta and north of the Cosumnes River, is considered by the Sacramento County to have landslide potential (Sacramento County 2011). As identified above, expansive soils may contribute to landslide risk where they occur on slopes. Only the Valley Springs Formation has the potential to contain expansive soils, and occurrences of the Valley

Spring Formation (Figure 5-2) are south and west of landslide potential area identified by Sacramento County. This indicates that the locations of the Valley Springs Formation are not on steep enough slopes for the potential expansive soils to increase landslide risk.

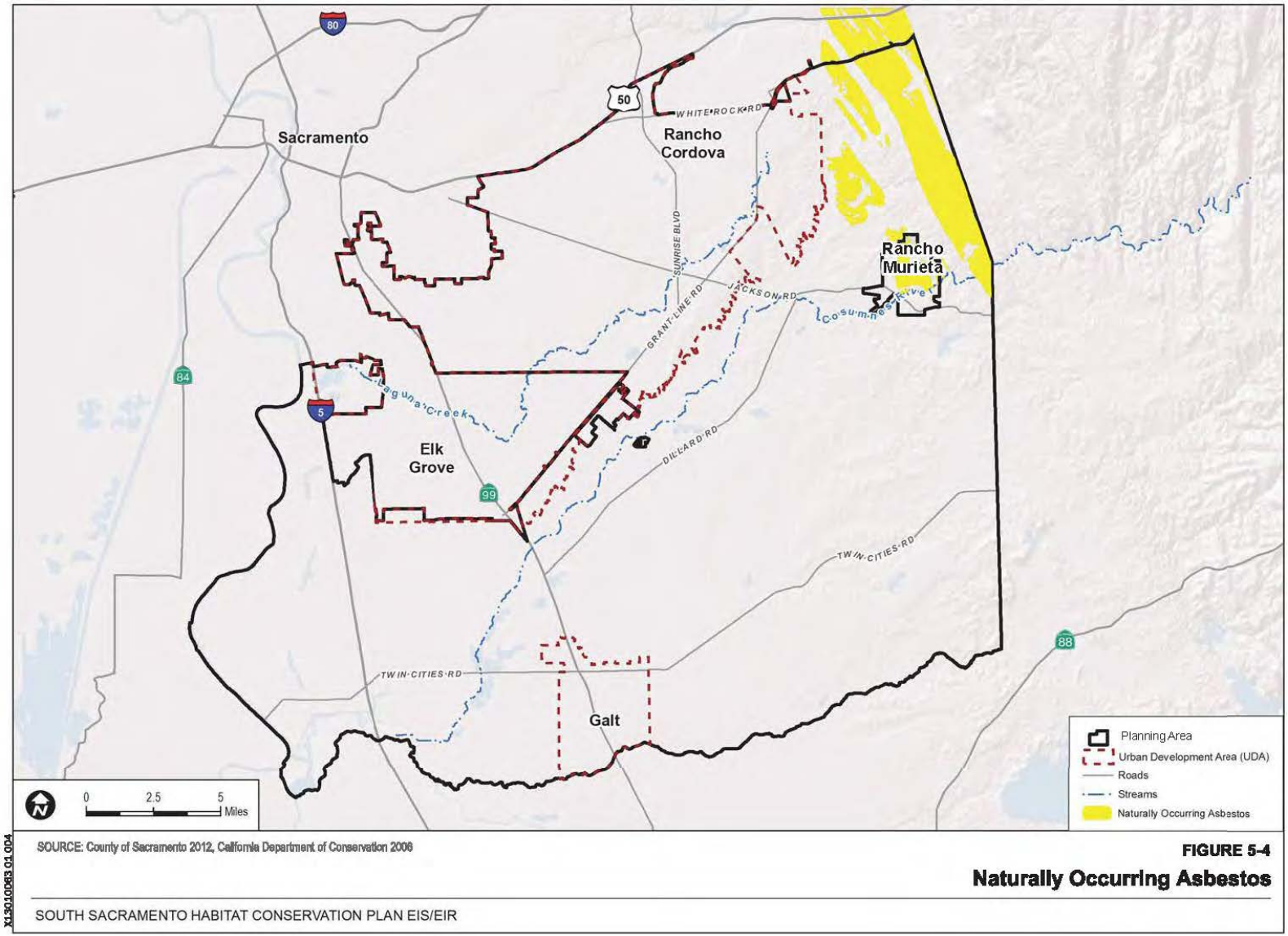
Naturally Occurring Asbestos

Asbestos is a naturally occurring mineral that is classified as a known human carcinogen. In California, serpentinite and ultramafic rock (two specific rock types) may contain asbestos minerals, especially near fault zones. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock.

Asbestos poses a health risk only when it becomes friable, which means that it can be easily broken into tiny pieces, which can then be become airborne and then inhaled. All types of asbestos are hazardous and may cause lung disease and cancer. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading, and at quarry operations (broken or crushed serpentinite and ultramafic rocks) (Sacramento County 2010). All of these activities may have the effect of releasing potentially harmful asbestos into the air.

The Sacramento Metropolitan Air Quality Management District has determined that naturally occurring asbestos is present within areas of eastern Sacramento County (SMAQMD 2006). Sacramento Metropolitan Air Quality Management District commissioned the CGS to test for and map all areas of potential naturally occurring asbestos within eastern Sacramento County (CDOC 2006). The map depicts locations within eastern Sacramento County that are known to or likely to contain naturally occurring asbestos (Figure 5-4). Locations of naturally occurring asbestos in the Planning Area are associated with the foothill landform discussed in Section 5.1.2.7, Foothill Landform (Figure 5-2). Based on available California Department of Conservation information, the western and central portions of the Planning Area, including the UDA, are unlikely to contain naturally occurring asbestos (CDOC 2000) (Figure 5-4).

Figure 5-4 Naturally Occurring Asbestos



INTENTIONALLY LEFT BLANK

Geologic Hazards

Seismicity and Earthquake

The intensity of seismic shaking, or strong ground motion, during an earthquake is dependent on the distance and direction from the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions of the surrounding area. Ground shaking could potentially result in the damage or collapse of buildings, levees, and other structures. Most earthquakes occur along faults, which are fractures or geological areas of weakness, along which rocks on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that may have taken place suddenly and/or by slow creep over many years.

No major active faults transect Sacramento County (CDOC 2013), and Sacramento County has experienced relatively little seismic activity. While it is possible for the Planning Area to be subject to seismic shaking, the probability for seismic shaking in the Planning Area is low (CGS 2008).

Soil Liquefaction

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid. Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits are susceptible to liquefaction, while clayey silts and silty clays are generally stable under the influence of seismic ground shaking (CGS 2008). Liquefaction poses a hazard to engineered structures. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining or basement walls, and slope instability. Sites underlain by relatively loose sandy soils and saturated deposits of fill combined with a shallow groundwater table, which typically are located in alluvial river valleys/basins and floodplains, are susceptible to liquefaction.

Sacramento County has two areas that may pose liquefaction problems: the downtown area of Sacramento and lands within the legal Delta (Sacramento County 2011). The Planning Area excludes Sacramento but includes a small portion of the legal Delta (see Section 4.1.1.2, State Regulations and Policies, and Figure 4-1). Approximately 40,986 acres of the Planning Area are within the legal Delta, and therefore, are subject to potential liquefaction. The legal Delta in the Planning Area is located west of I5, and an adjacent portion of the Cosumnes and Mokelumne River floodplain east of I-5 (in the southwestern portion of the Planning Area) (Figure 4-1). However, as stated in the preceding section, the Planning Area has very small seismic risk, and associated risk of soil liquefaction damage is also very small.

5.1.2.9 Existing Mineral Resources

As discussed in Section 5.1.1, Regulatory Framework, the State Mining and Geology Board has designated certain mineral deposits as being regionally significant to satisfy future needs. The California Geological Survey has designated the majority of the Planning Area as MRZ-3, i.e., areas containing mineral deposits, the significance of which cannot be evaluated from existing data.

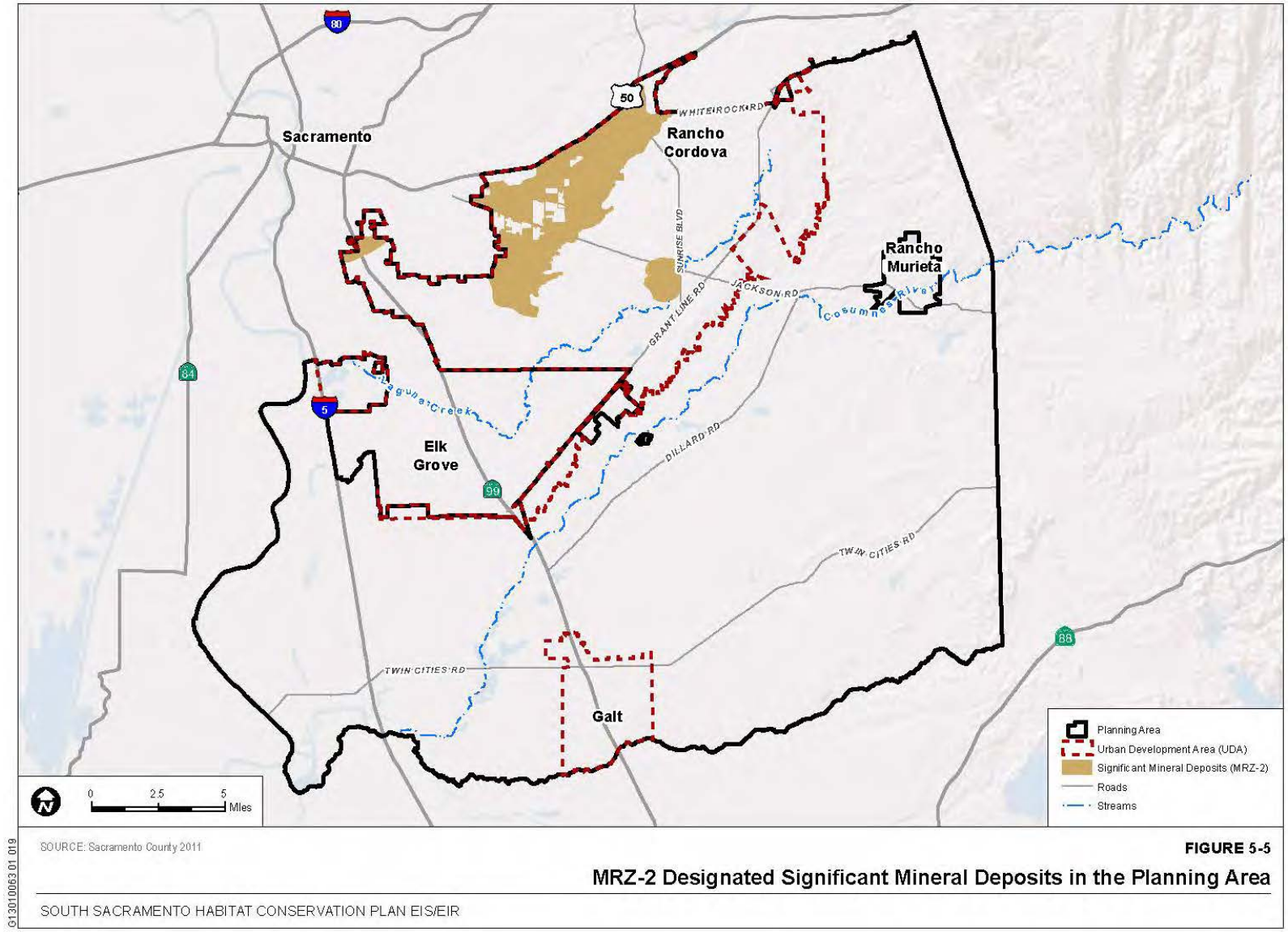
A few areas located within the eastern and southwestern portions of the Planning Area are designated as MRZ-1—areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence.

Two primary locations within the UDA portion of the Planning Area are designated as MRZ-2 (Figure 5-5)—areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists. The larger area is located along the north–central boundary of the Planning Area, and a smaller area is located northwest of the intersection of Sunrise Boulevard and Grant Line Road. These are areas that are known to contain substantial aggregate resources. The primary mineral resource in the Planning Area that is currently in production is aggregate. As discussed in Section 3.7.1.3, Past and Present Mining Operations in the Planning Area, there are several active aggregate mining operations both inside and outside the UDA, with 24 permitted aggregate mines, 21 of which are currently active. Additionally, one application for an additional aggregate mine is being processed by Sacramento County. The presence of aggregate mines outside the UDA indicates that there are commercially viable aggregate resources in locations designated MRZ-3.

Clay is currently being surface mined in four locations within Sacramento County, including along the Cosumnes River. Topsoil is currently mined near the Cosumnes River, and there is one existing pumice pit.

Other known Planning Area mineral resources that have, or could, support commercial operations include gold, silver, lignite, natural gas, and petroleum (Sacramento County 2011).

Figure 5-5 MRZ-2 Designated Significant Mineral Deposits in the Planning Area



INTENTIONALLY LEFT BLANK

5.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

5.2.1 Methodology for Assessing Impacts of Each Alternative on Soils, Geology, and Mineral Resources

This section describes and analyzes the potential impacts of each EIS/EIR alternative on the geologic conditions, soil conditions, and mineral resources, and geological hazards within the Planning Area. Potential ways that an EIS/EIR alternative could affect these resources include soil erosion or loss of access to important soil, geologic, or mineral resources. The impact analysis also evaluates whether an EIS/EIR alternative could affect human exposure to naturally occurring asbestos or to existing seismic and soils hazards (e.g., earthquake, landslide).

The projects and activities expected under each EIS/EIR alternative, including expected or conceptual preserves, are described in Chapter 2, Alternatives, Including the Proposed Action/Proposed Project. As discussed in Chapter 3, Section 3.6.5, GIS Methodology Used in Chapters 4–16 to Estimate Direct Impacts of Each EIS/EIR Alternative, the EIS/EIR impact methodology uses geographic information system (GIS) datasets that were prepared using the best available information about the amounts and locations of ground disturbance from future projects and activities expected under each alternative. GIS datasets of Planning Area soils, geology, and mineral resources, and datasets of geological hazards were prepared using existing studies and using best available state and local sources of information, summarized above in Sections 5.1.1 and 5.1.2. The GIS methodology was used to compare these datasets and to quantitatively estimate the direct impacts of each EIS/EIR alternative on the resources and hazards studied in Chapter 5.

As discussed in Section 5.1.2, the natural geologic conditions, landforms, and soils within the "mine and dredge tailings" areas shown on Figures 5-1, 5-2, and 5-3 have been substantially altered by past human activities. Therefore, potential impacts of the EIS/EIR alternatives on the "mine and dredge tailings" areas are not discussed in Section 5.2.2, No Action/No Project Alternative; Section 5.2.3, Proposed Action/Proposed Project Alternative; or Section 5.2.4, Reduced Permit Term Alternative.

The analysis of each EIS/EIR alternative in Section 5.2 assumes that new building and facility construction implemented under each alternative would comply with the applicable federal, state, and local regulations and policy requirements for structural design, construction techniques, and other aspects of the engineering and construction process, discussed previously in Section 5.1.1. The study period and the study area used in the Chapter 5 impact analyses are described in Section 3.6.2, Geographic Study Area of Resource Topics Analyzed in Chapters 4 Through 16, and Section 3.6.3, EIS/EIR Study Period. The lead agencies determined

that an appropriate geographic scale for evaluating the impacts of each EIS/EIR alternative on soils, geology, and mineral resources should include the entire Planning Area.

As discussed in Section 3.7, Cumulative Effects Analysis in Resource Chapters 4 through 16, the Chapter 5 cumulative analyses of impacts to soils, geology, and mineral resources will consider the effects of past and present urban development within in the Planning Area (see Existing Conditions in Section 5.1.2) and will consider future impacts expected from reasonably foreseeable "other" projects in the Planning Area (see Section 3.7). The cumulative analysis of each EIS/EIR alternative will then determine if the incremental impacts of the alternative on soils, geology, and mineral resources would be significant (i.e., cumulatively considerable).

However, adverse effects on geology and soils are generally site specific rather than regional in nature; therefore, the geologic effects of multiple projects over large distances typically do not interact. However, if multiple actions or projects are proposed in close proximity, they may combine cumulatively, such as if erosion generated by two adjacent projects creates a larger cumulative, downstream erosion impact.

Given the low seismic risk in the Planning Area, the site-specific nature of seismic impacts, and the fact that any new urban development occurring within the Planning Area would be subject to, at a minimum, uniform site development and construction standards consistent with the CBC, cumulative impacts resulting from seismic risks are not considered further in Sections 5.2.2, 5.2.3, or 5.2.4.

As discussed Section 3.4, Previous Planning Area Environmental Reviews, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Sacramento County 2010[3]; Galt 2009b; Rancho Cordova 2006b) analyzed direct and cumulative impacts of urban growth planned within each jurisdiction, including impacts to geological resources and hazards. When the impact analysis or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief summary or description of the incorporated information or analysis is provided in Sections 5.2.2, 5.2.3, and 5.2.4.

As discussed in Section 3.4, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b), 2030 (Rancho Cordova 2006b), and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur within Galt, Rancho Cordova, and

[3] As described further in Section 3.4.1, Sacramento County General Plan, the proposed project analyzed within the Sacramento County General Plan EIR assumed development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by Sacramento County. However, Sacramento County is currently processing land use entitlements in the Jackson Highway Corridor, so the referenced conclusions from the proposed project analysis are relevant to the No Action/No Project Alternative.

Sacramento County in the years after each General Plan EIR study period ends but before this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of all urban development activities and projects that are included in the description of each EIS/EIR alternative.

5.2.1.1 Determination of Impact Significance

As discussed in Section 3.8.1, Significance Thresholds, the criteria used to evaluate the significance of each alternative's impacts on soils, geology, and mineral resources are based on Appendix G of the CEQA Guidelines and on typical thresholds used to evaluate effects to soils, geology, and mineral resources in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse effect could occur if the alternative would:

1. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
   - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault,
   - Strong seismic ground shaking,
   - Seismic-related ground failure, including liquefaction, or
   - Landslides;
2. Result in substantial soil erosion or the loss of topsoil;
3. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the action/project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
4. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
5. Result in unsafe exposure to naturally occurring asbestos;
6. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
7. Result in the obstruction of access to, or the removal of mineral resources. In particular, for aggregate resources, obstruction to access or removal of mineral resources delineated on a local general plan, specific plan, or other land use plan.

Appendix G of the CEQA Guidelines does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial effect could occur if the alternative would:

1. Discernibly reduce compared to a baseline environmental condition, exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
   - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
   - Strong seismic ground shaking;
   - Seismic-related ground failure, including liquefaction;
   - Landslides; or
   - Unstable geologic units or soils that would become unstable and potentially result in landslide, lateral spreading, subsidence, liquefaction or collapse.
2. Discernibly reduce the potential for soil erosion or the loss of topsoil, or be discernibly more protective of topsoil, compared to a baseline environmental condition;
3. Discernibly reduce, compared to a baseline environmental condition, the amount of new urban development located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
4. Discernibly reduce or avoid unsafe exposure to naturally occurring asbestos compared to a baseline environmental condition;
5. Discernibly reduce, compared to a baseline environmental condition, the amount of new urban development located on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
6. Discernibly increase access to, or the removal of mineral resources, compared to a baseline environmental condition. In particular, for aggregate resources, increase access to or removal of mineral resources delineated on a local general plan, specific plan, or other land use plan.

The impact analysis for the three EIS/EIR alternatives will consider the context, intensity, and severity of potential impacts to each of these impact criteria and will present separate determinations of significance addressing each of these criteria.

5.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2, No Action/No Project Alternative, of Chapter 2.

5.2.2.1 Direct and Indirect Effects of the Alternative

Much of the estimated future urban development expected under the No Action/No Project Alternative (Section 2.2) is also described and analyzed in the Sacramento County General Plan, the Galt General Plan, and the Rancho Cordova General Plan (see Section 3.4 and Section 5.2.1, Methodology for Assessing Impacts of Each Alternative on Soils, Geology, and Mineral Resources).

As discussed in Section 5.2.1, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR) (Sacramento County 2010) determined that any impacts of planned future development on the existing geology and soil resources of Sacramento County would be less than significant because future projects would comply with applicable regulations and policies (Sacramento County 2010, pp. 13-24 to 13-36). However, the impact analysis presented in the Sacramento County General Plan EIR determined that future development would permanently obstruct access to existing mineral resources of Sacramento County, and this adverse impact would be significant and unavoidable (Sacramento County 2010, pp. 13-27 to 13-28). In addition, the EIR impact analysis determined that adverse impacts of future development in areas of Sacramento County with naturally occurring asbestos would be less than significant because all future development projects would comply with applicable regulations discussed on page 11-75 of the Sacramento County General Plan EIR (Sacramento County 2010).

The impact analysis presented in the *City of Rancho Cordova General Plan Final Environmental Impact Report* (Rancho Cordova General Plan EIR) (Rancho Cordova 2006b) similarly determined that impacts of future development to existing geology and soil resources would also be less than significant based on the combination of geologic and soils conditions in the Planning Area and because future projects would comply with applicable regulations and policies (Rancho Cordova 2006b, pp. 4.8-19 to 4.8-26). The impact analysis in the Rancho Cordova General Plan EIR also determined that impacts of future development on existing mineral resources would be significant and unavoidable because future development would permanently obstruct access to existing mineral resources (Rancho Cordova 2006b, pp. 4.8-26 to 4.8-27). The Rancho Cordova General Plan EIR does not analyze impacts resulting from future development in naturally occurring asbestos areas because soil types that could contain

naturally occurring asbestos are not found in the Planning Area. The impact analysis presented in the *City of Galt General Plan Update: 2030 Final EIR* (Galt General Plan EIR) (Galt 2009b), found that any adverse impacts from future development on the existing geology and soil resources, and on seismic hazards within Galt and the Galt sphere of influence (SOI) would be less than significant because future development projects would implement the general plan policies identified in the Galt General Plan EIR (Galt 2009b, pp. 8-24 to 8-25 and 10-13). The Galt General Plan EIR does not analyze impacts of future development on mineral resources as no mineral resources would be affected by General Plan Implementation or impacts resulting from exposure to naturally occurring asbestos because soil types that could contain naturally occurring asbestos are not found in the Planning Area.

As stated above in Section 5.2.1, the 50-year study period for this EIS/EIR extends to 2065, beyond the study periods for these three General Plans (to 2030 for Galt and Rancho Cordova and to 2050 for Sacramento County). The lead agencies anticipate that new urban development projects would continue to “build out" all of the UDA through the end of the EIS/EIR 50-year study period (2065). Therefore, additional urban development beyond that anticipated in the General Plans can be expected to occur within Galt, Rancho Cordova, and Sacramento County. The regulatory, geological, and soils conditions that support the less than significant impact conclusions for soils and geology in the three General Plan EIRs would continue to apply for buildout of the UDA. For example, as identified in Section 5.1.2.8, Existing Hazards, there are no locations that could contain expansive soils or naturally occurring asbestos in the UDA and no areas of landslide risk.

In addition, future development projects that would occur over the EIS/EIR 50-year study period but that were not explicitly addressed in the Galt, Rancho Cordova, or Sacramento County General Plan EIRs would comply with the General Plan regulations and policies for soils and geology (Section 5.1.1.3, Local). An example is the Capital Southeast Connector Project (see Section 3.4.5, Capital Southeast Connector), which was not originally contemplated in the Sacramento County General Plan (Sacramento County 2011), but is included in the project description for the No Action/No Project Alternative. The Capital SouthEast Connector Project EIR identified potentially significant adverse impacts in areas subject to liquefaction and erosion (Connector JPA 2012). However, the Capital Southeast Connector Project would implement site-specific mitigation to reduce these adverse impacts to less than significant (Connector JPA 2012, pp. 8-9 to 8-11). The significant and unavoidable adverse impacts of planned urban development on mineral resources identified in the Sacramento County and Rancho Cordova General Plan EIRs would also occur under the No Action/No Project Alternative. The additional urban development included in the No Action/No Project Alternative beyond that anticipated in the Rancho Cordova and Sacramento County General Plans, particularly any additional development in designated

MRZ-2 significant mineral deposits (Figure 5-5) would result in further potential for future development to permanently obstruct access to existing mineral resources.

Shifted or displaced development. As explained in Section 2.2.2, Expected Regulatory Environment Under the No Action/No Project Alternative, and Section 2.2.3, Loss of Natural Lands Under the No Action/No Project Alternative, the regulatory environment of the No Action/No Project Alternative is expected to restrict the ability of local jurisdictions to permit up to approximately 1,900 acres of urban development planned in the Mather Core Recovery Area (MCRA), and therefore, this future development could shift or be displaced to areas outside of Sacramento County's USB boundary. Sacramento County planners identified four locations outside the USB where this development may shift or be displaced: (1) in the northeast portion of the Planning Area, south of White Rock Road; (2) in the north-central portion of the Planning Area, south of Kammerer Road; (3) in the east-central portion of the Planning Area, expanding Rancho Murieta to the west or northwest; and (4) in the south-central portion of the Planning Area, expanding the rural towns of Wilton and Herald.

Locations No. 2 and 4 are in topographically flat areas, far from locations potentially containing expansive soils (Figure 5-2), naturally occurring asbestos (Figure 5-4), or significant mineral deposits (Figure 5-5). If any development is shifted or displaced to these locations, impacts from this development on soils, geology, and mineral resources would be less than significant based on the combination of physical conditions in these locations and because future projects would comply with applicable regulations and policies.

If any of the 1,900 acres of planned development is shifted or displaced from the MCRA to the northeast portion of the Planning Area outside the USB, Locations No. 1 and 3 identified above, new development in these areas would encounter steeper topography compared to land within the MCRA and, therefore, has a greater risk of causing erosion. Neither location intersects the Sacramento County identified landslide risk area, but portions of the area northwest of Rancho Murieta contains the Valley Spring Formation (Figure 5-2) that could contain expansive soils. However, this impact analysis of the No Action/No Project Alternative assumes that all future development projects would comply with applicable policies and regulations identified in the General Plans for Rancho Cordova and Sacramento County (see Section 5.1.1.3). Consequently, any adverse effects of new development on the existing geology, soils, risk of soil erosion, and risk of expansive soils would be less than significant, similar to the determinations made in the General Plan EIRs for Rancho Cordova and Sacramento County.

If development displaced from the MCRA is shifted to locations to the northeast portion of the Planning Area, Locations No. 1 and 3 identified above, that new development would also be more likely to encounter areas of natural occurring asbestos (Figure 5-4). However, risks to human health under the No Action/No Project Alternative would be less than significant

because future development projects implemented anywhere within Sacramento County must comply with applicable policies and regulations discussed in Section 5.1.1.3 and in the Sacramento County General Plan EIR (Sacramento County 2010 p. 11-75).

Any of the 1,900 acres development that would shift from the MCRA to areas outside Sacramento County USB boundary could also preclude or inhibit access to mineral resources under, or near where the shifted development occurs. However, there are no designated MRZ-2 significant mineral deposits (Figure 5-5) in the four potential locations for where development might be shifted or displaced outside the USB under the No Action/No Project Alternative (see Section 2.2.3 and Section 5.1.2). There are no designated MRZ-2 significant mineral deposits anywhere outside the USB. Therefore, the 1,900 acres of shifted or displaced development, or any other elements of the No Action/No Project Alternative outside the USB, would not add to the significant impacts to mineral resource access that were identified in the General Plan EIRs discussed above.

Project mitigation and conservation expected under the No Action/No Project Alternative are described in Section 2.2.2 Expected Regulatory Environment Under the No Action/No Project Alternative; Section 2.2.4, Preservation of Natural Lands Under the No Action/ No Project Alternative; and Section 2.2.5, Preserve Management and Monitoring Under the No Action/No Project Alternative. Purchasing of credits at an approved mitigation bank or through an established in-lieu fee program, or establishing on-site or off-site mitigation Preserves, would not result in activities that could increase seismic risk, landslide risk, erosion potential, unsafe exposure to naturally occurring asbestos, or other effects to geology and soils.

Furthermore, project compensatory-mitigation activities associated with the re-establishment or establishment of vernal pools and other aquatic resources on Preserves may require use of heavy equipment and grading or excavation of soil to depths up to 3 feet, which could increase potential for erosion to occur or could mobilize naturally occurring asbestos. However, re-establishment/establishment of vernal pools would occur only on specific soil types that form seasonal perched aquifers (see Chapter 8), which are not found on steep slopes. Therefore, vernal pool and other aquatic resources re-establishment and establishment activities would not occur on steep slopes that are susceptible to erosion and would be unlikely to disturb rock types containing naturally occurring asbestos found in the northeastern part of Sacramento County (Exhibit 5-4). In addition, where aquatic resources re-establishment and establishment activities are of sufficient size to require a County grading permit (over an acre of disturbance or over 300 cubic yards of soil are moved), implementation of existing policies and regulations related to construction would be required (see Section 5.1.1.3), which would prevent significant adverse effects resulting from erosion. If an aquatic resources re-establishment/establishment project were to be undertaken in an area that contains rock types containing naturally occurring asbestos, applicable regulations and policies to prevent hazardous exposure to

naturally occurring asbestos would be implemented. Therefore, the less than significant conclusion for adverse effects from erosion and from naturally occurring asbestos presented in the General Plan EIRs would not be changed by these mitigation activities. The less than significant conclusion for adverse effects from erosion and from naturally occurring asbestos from the General Plan EIRs remains applicable to the impacts from erosion and from naturally occurring asbestos expected under the No Action/No Project Alternative.

However, the establishment of on-site or off-site mitigation Preserves could preclude or substantially inhibit the extraction of any mineral resources present within the lands that are preserved. The impacts to mineral resources presented in the General Plan EIRs (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006b) included impacts from the various categories of open-space that would be required by the jurisdiction, including on-site parks, outdoor recreation areas, green belts, and any on-site mitigation Preserves. However, the impact analyses in the General Plan EIRs may not have considered impacts to mineral resources present at any off-site mitigation preserve sites. Although policies in the Sacramento County General Plan (Sacramento County 2011) and Rancho Cordova General Plan (Rancho Cordova 2006a) are designed to preserve access to mineral resources, and the location of future off-site preserves under the No Action/No Project Alternative may be reviewed by the applicable jurisdiction, there is the potential for future off-site mitigation preserves to be located in an area with mineral resources. This may result in some additional loss of access to mineral resources. Therefore, the significant and unavoidable adverse effects to mineral resources identified in the Sacramento County and the Rancho Cordova General Plan EIRs continues to be applicable to the mineral-resource impacts expected under the No Action/No Project Alternative.

5.2.2.2 Cumulative Effects of the No Action/No Project Alternative

The past and present urban development and associated infrastructure projects and human activities discussed in Section 3.7.1 have altered the EIS/EIR Planning Area geologic resources, including surface soils, landforms, and landscapes; altered access to important minerals resources; and have altered human exposure to naturally occurring asbestos and human exposure to soils hazards from earthquake, landslide, and erosion. These past and present alterations have resulted in the existing conditions of Planning Area described in Section 5.1.2. The effects of the past and present actions on soils and geology in the study area represent a less than significant adverse effect on the soils and geology within the study area. However, the effects of the past and present actions represent a significant adverse effect on access to important mineral resources in the study area. The past and present actions described in Section 3.7.1 have increased the potential for human exposure to naturally occurring asbestos, but various policies and regulations minimize the risk for exposure resulting in a less than significant adverse effect.

The types of future reasonably foreseeable "other" projects, activities, and actions, described in Section 3.7.2, Reasonably Foreseeable Other Actions, are similar to the types of past and present actions that occurred in the study area. The other reasonably foreseeable future actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in the Elk Grove SOI and in Rancho Murieta, development of the Wilton Rancheria Casino, master planned developments named Rio Del Oro and Mather South inside the UDA, further rural residential development outside the UDA, continued urban development of cultivated agricultural lands, major infrastructure projects such as California High-Speed Rail and California WaterFix, and expansion of the existing National Wild Refuge and the Cosumnes River Preserve (see Section 3.7.2 for details of these projects). Like the activities analyzed in the General Plan EIRs for Galt, Rancho Cordova, and Sacramento County, these reasonably foreseeable other projects would comply with applicable regulations and policies addressing geology and soils and human exposure to naturally occurring asbestos. Either through implementation of applicable regulations and policies, or because a future reasonably foreseeable other project does not affect a particular resource, for example, urban development in the Elk Grove SOI does not intersect any rock types that could contain natural occurring asbestos, the reasonably foreseeable other projects would not contribute to adverse effects on geology and soils or human exposure to naturally occurring asbestos. None of the future reasonably foreseeable other projects intersect areas mapped as MRZ-2 significant mineral deposits (Figure 5-5); however, the Rio Del Oro and Mather South master planned developments are very close to these designated deposits. As identified earlier in Section 5.1.2.9, Existing Mineral Resources, the presence of aggregate mines outside the UDA in the Planning Area indicates that there are commercially viable aggregate resources in locations designated MRZ-3. Therefore, these master planned developments, or other future reasonably foreseeable other projects, could limit access to aggregate resources that are outside the mapped MRZ-2 significant mineral deposits. Therefore, they may contribute to the significant adverse effect on access to mineral resources in the study area. As described above, projects and activities included in the No Action/No Project Alternative would not have an adverse effect on geology and soils or human exposure to naturally occurring asbestos because of the combination of geologic and soils conditions in the Planning Area and because future projects would comply with applicable regulations and policies. Therefore, when the incremental effects of the No Action/No Project Alternative are viewed in connection with the effects of the past, present, and reasonably foreseeable future other actions, the No Action/No Project Alternative would not cause, or make a considerable contribution, to a significant cumulative impact on geology and soils or human exposure to naturally occurring asbestos. The No Action/No Project Alternative would result in a ***Less Than Significant Adverse Cumulative*** effect to geology and soils or human exposure to naturally occurring asbestos.

As also described previously, the direct and indirect impacts of No Action/No Project Alternative would adversely affect access to mineral resources. Therefore, when the incremental effects of the No Action/No Project Alternative are viewed in connection with the effects of the past, present, and reasonably foreseeable future other actions, the No Action/No Project Alternative would make a considerable contribution, to a significant cumulative impact on access to mineral resources. The No Action/No Project Alternative would result in a ***Significant Adverse Cumulative*** effect to access to mineral resources.

5.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3, Proposed Action/Proposed Project.

5.2.3.1 Direct and Indirect Effects of the Alternative

As described in Section 2.3.3, Covered Activities and Loss of Natural Land Covers Under the Proposed Action/Proposed Project Alternative, the Proposed Action/Proposed Project Alternative Covered Activities include the same types of urban development as the No Action/No Project Alternative. Covered Activities under the Proposed Action/Proposed Project Alternative would result in urban development projects and activities on approximately 33,500 acres of natural landscapes in the Planning Area (Section 2.3.3). A large majority of this urban development, approximately 32,000 acres, would occur inside the UDA. The remaining roughly 1,500 acres of natural land covers removed outside the UDA would result, in large part, from various transportation and infrastructure projects. None of the urban development, transportation, or infrastructure projects inside or outside the UDA intersect landslide risk areas identified by Sacramento County (see Section 5.1.2.8) or locations that could contain naturally occurring asbestos (Figure 5-4). Projects and activities included in the Proposed Action/Proposed Project Alternative would comply with applicable regulations and policies to minimize erosion, seismic risk, and other geology and soils impacts. Some urban development in the UDA would occur over areas designated as MRZ-2 significant mineral deposits containing aggregate (Figure 5-5), preventing future access to the aggregate in these locations.

Under the Proposed Action/Proposed Project Alternative, there are approximately 2,000 fewer acres of new urban development projects on natural landscapes than the No Action/No Project Alternative. Therefore, there is less potential for urban development to expose native soils during construction and contribute to risks of erosion, although implementation of applicable regulations and policies under all alternatives substantially decreases the risk of harmful erosion.

The Proposed Action/Proposed Project Alternative includes urban development Covered Activities within the MCRA portion of the UDA to be implemented consistent with the approved

Sacramento County and Rancho Cordova General Plans without urban development shifting or being displaced to locations outside the UDA (Section 2.3.3). As a result, none of the new urban development of the Proposed Action/Proposed Project Alternative could occur in areas outside the UDA where there is naturally occurring asbestos, or where topography can increase the risk of erosion (Figures 5-3 and 5-4). The potential increased risks of erosion and human exposure to naturally occurring asbestos identified in Section 5.2.2.1, Direct and Indirect Effects of the Alternative, for the No Action/No Project Alternative, for the two potential displaced development locations in the northeast portion of the Planning Area, would not occur under the Proposed Action/Proposed Project Alternative.

The SSHCP includes Avoidance and Minimization Measures (AMMs) that would be included in all Covered Activity projects and activities implemented over the 50-year permit term (Table 2-6). SSHCP AMMs BMP-1, BMP-4, and BMP-9 would require development projects and activities s to implement BMPs that control erosion and erodible materials and implement soil compaction BMPs. As discussed above in Sections 5.1.1 and 5.2.2, the No Action/No Project Alternative's projects and activities would implement construction standard BMPs, which are similar to these SSHCP BMP AMMs. However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative includes processes for annual review of AMM effectiveness and a process for making adaptive changes to an AMM that is not effective at avoiding impacts to soils and geology. This additional layer of oversight of AMM implementation and AMM effectiveness under the Proposed Action/Proposed Project Alternative increases avoidance and minimization of impacts to geology and soils from construction activities. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to soils and geology, compared to the effects of the No Action/No Project Alternative.

Differences in the locations of development in the UDA between the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative are primarily within the MCRA. Only small portions of the MCRA intersect with lands designated as MRZ-2 significant mineral deposits. The increased amount of urban development in the MCRA under the Proposed Action/Proposed Project Alternative could result in a slight increase in development over designated MRZ-2 significant mineral deposits.

Preserves. As discussed in Section 2.3.5, Conservation Strategy Under the Proposed Action/Proposed Project Alternative, the Proposed Action/Proposed Project Alternative includes the establishment of an interconnected Preserve System in the Planning Area, and a comprehensive Preserve management program that would be implemented in perpetuity. The

Preserve System under the Proposed Action/Proposed Project Alternative would be more contiguous and more connected over the Planning Area than the project-by-project Preserves that would be established under the No Action/No Project Alternative.

However, the number, size, and configuration of future Preserves is not an important factor in determining the effects of any EIS/EIR alternative on geology and soils because most preserve activities have little to no potential to generate adverse effects to geological resources and soils.

Where aquatic resource re-establishment and establishment is undertaken on Preserves, if earth moving is required, there is increased potential for erosion. Also, if earth moving is conducted where rock types that contain naturally occurring asbestos occur, there could be an increased risk of human exposure to naturally occurring asbestos. However, as discussed in Section 5.2.2.1 for aquatic resources re-establishment and establishment under the No Action/No Project Alternative, it is highly unlikely that these activities would occur in locations with steep slopes susceptible to erosion, or where naturally occurring asbestos might be encountered. This would also apply to aquatic resource re-establishment and establishment under the Proposed Action/Proposed Project Alternative. Applicable policies and regulations that would minimize erosion and potential mobilization of naturally occurring asbestos would be enforced across all alternatives. However, under the Proposed Action/Proposed Project Alternative, SSHCP AMMs that call for implementation of BMPs that control erosion and erodible materials, and soil compaction BMPs would be applied to earth moving associated with aquatic resource re-establishment/establishment, potentially further lessening possible adverse effects from soil erosion.

The SSHCP Preserve System would preclude the extraction of any mineral resources located under the new Preserves. Therefore, there is the potential for the loss of access to mineral resources as a result of future Preserves. However, there are only very small areas considered for Preserves under the SSHCP that intersect with designated MRZ-2 significant mineral deposits (Figure 5-5). If any Preserves established under the Proposed Action/Proposed Project Alternative were located on designated MRZ-2 significant mineral deposits, the area affected would be minor. Because the precise locations of all Preserves is not known at this time, it cannot be determined whether the Proposed Action/Proposed Project Alternative would result in more or less acres of Preserves established over designated MRZ-2 significant mineral deposits compared to the No Action/No Project Alternative. However, given that there are limited locations suitable for Preserves in the MRZ-2 area due to past disturbance and development over much of the area, it is unlikely that there would be substantial differences between the two alternatives.

Therefore, because the Proposed Action/Proposed Project Alternative will not shift or displace development outside the USB, because fewer acres of natural landscapes would be developed,

and because the SSHCP AMMs provide additional mechanisms to minimize effects from soil erosion during ground-disturbing activities, the Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial*** effect on geology and soils and risks to human health from naturally occurring asbestos when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Increased urban development in the MCRA under the Proposed Action/Proposed Project Alternative compared to the No Action/No Project Alternative could result in a slight increase in development over designated MRZ-2 significant mineral deposits. The potential for Preserve lands to limit access to MRZ-2 significant mineral deposits would not be substantially different between the two alternatives. Therefore, the Proposed Action/Proposed Project Alternative would result in a ***Less Than Significant Adverse*** effect on access to mineral resources when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

5.2.3.2 Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would result in the following:

- Reduced potential for adverse effects from erosion and landslide from development activities and Preserve System establishment and establishment
- A slightly reduced risk of exposure to naturally occurring asbestos
- A slightly more removal of access to important mineral resources by new urban development or associated infrastructure
- Similar removal of access to important mineral resources by new Preserves

Therefore, after considering the significance of effects from the Proposed Action/Proposed Alternative on all of the geological resources impact-criteria, the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects to Planning Area geological resources, soils, and human exposure to geological hazards compared to the impacts that would occur under the No Action/No Project Alternative baseline condition. The Proposed Action/Proposed Project Alternative would result in a ***Less Than Significant Adverse*** effect to access to mineral resources when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

5.2.3.3 Cumulative Effects of the Alternative

The effect of past, present, and reasonably foreseeable future actions on soils, geology, and mineral resources were described above in Section 5.2.2. As discussed in Section 5.2.2, the

incremental effects of the No Action/No Project Alternative on geology and soils and exposure to naturally occurring asbestos were determined to be less than significant and not contribute to a significant adverse cumulative impact when viewed in connection with the effects of the past, present, and foreseeable other projects. The incremental effects of the No Action/No Project Alternative on access to mineral resources were determined to be significant and contribute to a significant adverse cumulative impact when viewed in connection with the effects of the past, present, and foreseeable other projects.

As discussed in Section 5.2.3.2, Significance of Direct and Indirect Effects, the Proposed Action/Proposed Project Alternative would result in reduced impacts to geology and soils (i.e., erosion potential and landslide risk) and reduced potential for exposure to naturally occurring asbestos compared to the No Action/No Project Alternative. Consequently, the incremental effects of the Proposed Action/Proposed Project Alternative would have a minor beneficial impact to geology and soils and risk of exposure to naturally occurring asbestos compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of Proposed Action/Proposed Project Alternative are individually limited and would not make a cumulatively considerable contribution to any adverse cumulative impact of the past, present, and reasonably foreseeable future projects. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect to geology and soils and risk of exposure to naturally occurring asbestos compared to the No Action/No Project Alternative baseline condition.

As described in Section 5.2.3.2, the effects of the Proposed Action/Proposed Project Alternative on access to mineral resources from urban development would be slightly more than those identified for the No Action/No Project Alternative. Effects from Preserve activities would be similar to those identified for the No Action/No Project Alternative. Consequently, the incremental effects of the Proposed Action/Proposed Project Alternative would have a less than significant impact to access to mineral resources when compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of Proposed Action/Proposed Project Alternative are individually limited and would not make a cumulatively considerable contribution to the significant adverse effect of the past, present, and reasonably foreseeable future projects when compared to the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative would result in a ***Less than Significant Cumulative*** effect to access to mineral resources compared to the No Action/No Project Alternative baseline condition.

5.2.4 Reduced Permit Term Alternative

As described in Section 2.3.3, the Reduced Permit Term Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative.

Under the Reduced Permit Term Alternative, the core of the Preserve System established inside the UDA would be associated with the development of five large land use entitlements, as discussed in Section 2.3.4, Covered Species Under the Proposed Action/Proposed Project Alternative, for the Reduced Permit Term Alternative, and also discussed in Section 2.3.3 for the Proposed Action/Proposed Project Alternative. Because the core of the Preserve System inside the UDA under both EIS/EIR action alternatives is associated with the same five large land use entitlements, approximately 70% of the UDA Preserves established under the Reduced Permit Term Alternative would have similar sizes, boundaries, and locations as the UDA Preserves established under the Proposed Action/Proposed Project Alternative. However, the shorter duration of the Reduced Permit Term Alternative—and the smaller amount of urban development and associated development fees collected by the Reduced Permit Term Alternative HCP—would not allow the SSHCP Implementing Entity to establish as many acres of new Preserves in the Planning Area as would occur under the Proposed Action/Proposed Project Alternative's 50-year permit term. Therefore, fewer new Preserves would be established under the Conservation Strategy of the Reduced Permit Term Alternative. This difference would be especially pronounced outside the UDA.

As described in Section 2.4, Reduced Permit Term Alternative, the federal Endangered Species Act and California Endangered Species Act Incidental Take Permits and the CWA permit strategy for SSHCP Covered Activities would be valid only during the 30-year permit term of the Reduced Permit Term Alternative HCP, and the Reduced Permit Term Alternative HCP's Conservation Strategy would be implemented only during this 30-year term. The urban development Covered Activities and Conservation Strategies associated with the five land use entitlements would be implemented inside the UDA during this 30-year period. However, the EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3), so the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, as described in Section 3.6.7.2, Analysis of the Reduced Permit Term Alternative, After the End of the Permit Term (Years 31–50), the EIS/EIR analysis of the Reduced Permit Term Alternative also considers future urban development that is not part of the project description of the Reduced Permit Term Alternative but is still expected to occur within the Planning Area after the end of the permit term (i.e., in Years 31–50 of the EIS/EIR study period).

As described in Section 3.6.7.2, Analysis of the Reduced Permit Term Alternative, After the End of the Permit Term (Years 31–50), project mitigation Preserves established after the end of the

30-year Reduced Permit Term Alternative would be established under a project-by-project process for obtaining individual authorizations under the CWA, federal Endangered Species Act, California Endangered Species Act, and Section 1600 of the California Fish and Game Code. Consequently, mitigation Preserves established in Years 31–50 of the EIS/EIR study period would not be established using a regional, landscape-based approach that balances new urban development with the need for conservation, as would be provided by an HCP. Therefore, much of the Preserve System inside the UDA would be very similar under the two action alternatives, but the Preserve System outside the UDA would be substantially different between the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, it is unlikely that mitigation Preserves established outside the UDA would be contiguous or would be interconnected, and it is unlikely that a large, contiguous 10,500-acre landscape-size Vernal Pool Preserve would be established in the southwestern portion of the Planning Area. Likewise, the No Action/No Project Alterative also would not result in contiguous, interconnected Preserves outside the UDA, and would not establish a 10,500-acre Vernal Pool Preserve in the Planning Area. In these ways, the new mitigation Preserves established outside the UDA under the Reduced Permit Term Alternative and the No Action/No Project Alternative would be similar.

5.2.4.1 Direct and Indirect Effects of the Alternative

As described in Section 2.4.4, Covered Species Under the Reduced Permit Term Alternative, the Reduced Permit Term Alternative would include similar types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative. Covered Activities under the Reduced Permit Term Alternative would result in urban development projects and activities on approximately 19,300 acres of natural landscapes in the Planning Area (Section 2.4.4). A large majority of this urban development, approximately 17,000 acres would occur inside the UDA. The remaining roughly 1,500 acres of natural land covers removed outside the UDA would result, in large part, from various transportation and infrastructure projects. None of the urban development, transportation, or infrastructure projects inside or outside the UDA intersect landslide risk areas identified by Sacramento County (see Section 5.1.2.8, Existing Hazards) or locations that could contain naturally occurring asbestos (Figure 5-4). Projects and activities included in the Proposed Action/Proposed Project Alternative would comply with applicable regulations and policies to minimize erosion, seismic risk, and other geology and soils impacts. Some urban development in the UDA would occur over areas designated as MRZ-2 significant mineral deposits containing aggregate (Figure 5-5), preventing future access to the aggregate in these locations. Under the Reduced Permit Term Alternative, there are approximately 18,500 fewer acres of new urban development projects on natural landscapes than the No Action/No Project Alternative. Therefore, there is less potential for urban development to expose native soils during construction and contribute to risks of

erosion, although implementation of applicable regulations and policies under all alternatives substantially decreases the risk of harmful erosion.

The Reduced Permit Term Alternative includes urban development Covered Activities within the MCRA without urban development shifting or being displaced to locations outside the UDA (Section 2.4.3, Covered Activities/Projects Under the Reduced Permit Term Alternative). As a result, none of the new urban development under the Reduced Permit Term Alternative would occur in areas outside the UDA where there is naturally occurring asbestos or where topography can increase the risk of erosion (Figures 5-3 and 5-4). The potential increased risks of erosion and human exposure to naturally occurring asbestos identified in Section 5.2.2.1 for the No Action/No Project Alternative for the two potential displaced development locations in the northeast portion of the Planning Area, would not occur under the Reduced Permit Term Alternative.

During the 30-year permit term under the Reduced Permit Term Alternative, AMMs like those included in the SSHCP would be included in all Covered Activity project and activities implemented within the Planning Area. As summarized in Table 2-6 in Chapter 2 of this EIS/EIR, AMMs BMP-1, BMP-4, and BMP-9 would require development projects and activities to implement BMPs that control erosion and erodible materials, and to implement soil compaction BMPs. As discussed above in Sections 5.1.1 and 5.2.2, the No Action/No Project Alternative's projects and activities would implement construction standard BMPs that are similar to these SSHCP BMP AMMs. However, implementation of the AMMs under the Reduced Permit Term Alternative would include additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM. The Reduced Permit Term Alternative would include processes for annual review of AMM effectiveness and for making adaptive changes to an AMM that is not effective at avoiding impacts to soils and geology. This additional layer of oversight of AMM implementation and AMM effectiveness during the 30-year permit term under the Reduced Permit Term Alternative increases avoidance and minimization of impacts to geology and soils from construction activities. The AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to soils and geology compared to the effects of the No Action/No Project Alternative.

Differences in the locations of development in the UDA between the Reduced Permit Term Alternative and the No Action/No Project Alternative are primarily within the MCRA. Only small portions of the MCRA intersect with lands designated as MRZ-2 significant mineral deposits. The increased amount of urban development in the MCRA under the Reduced Permit Term Alternative could result in a slight increase in development over designated MRZ-2 significant mineral deposits.

Preserves. The Reduced Permit Term Alternative includes an interconnected Preserve System established during the 30-year permit term and a comprehensive Preserve management program for those Preserves to be implemented in perpetuity. The Preserve System established during the 30-year permit term under the Reduced Permit Term Alternative would be consolidated and linked (similar to the Proposed Action/Proposed Project Alternative). As described in Section 2.4.5, Conservation Strategy Under the Reduced Permit Term Alternative, in Chapter 2, continued establishment of a coordinated Preserve management and monitoring program would cease after the end of the 30-year permit term. The interconnected Preserve System established during the permit term would remain intact, whereas future mitigation Preserves established during Years 31–50 of the EIS/EIR study period would not be established in as consolidated a manner and would resemble mitigation Preserve establishment patterns under the No Action/No Project Alternative. The resulting scenario would be such that a portion of Preserves would reflect a more interconnected Preserve System, although fewer acres as compared to the Proposed Action/Proposed Project Alternative, and a portion would reflect an establishment pattern like the No Action/No Project Alternative.

As described above for the Proposed Action/Proposed Project Alternative, the number, size, and configuration of future Preserves would not be an important factor in determining effects on geology and soils because most Preserve activities have little to no potential to generate adverse effects to geology and soils, and Preserves would be established consistent with applicable regulations (see Section 5.1.1) under all alternatives.

Where aquatic resource re-establishment and establishment is undertaken on Preserves, if earth moving is required, there is increased potential for erosion. Also, if earth moving is conducted where rock types that contain naturally occurring asbestos occur, there could be an increased risk of human exposure to naturally occurring asbestos. However, as discussed in Section 5.2.2.1, Direct and Indirect Effects of the Alternative, for aquatic resources re-establishment and establishment under the No Action/No Project Alternative, it is highly unlikely that these activities would occur in locations with steep slopes susceptible to erosion, or where naturally occurring asbestos might be encountered. This would also apply to aquatic resource re-establishment and establishment under the Reduced Permit Term Alternative. Applicable policies and regulations that would minimize erosion and potential mobilization of naturally occurring asbestos would be enforced across all alternatives. However, during the 30-year permit term under the Reduced Permit Term Alternative, AMMs that call for implementation of BMPs that control erosion and erodible materials, and soil compaction BMPs would be applied to earth moving associated with aquatic resource re-establishment/establishment, potentially further lessening possible adverse effects from soil erosion.

The Preserve System created as part of the Reduced Permit Term Alternative would preclude the extraction of any mineral resources located under the new Preserves. Therefore, there is

the potential for the loss of access to mineral resources as a result of future Preserves. However, there are only very small areas considered for Preserves under the Reduced Permit Term Alternative that intersect with designated MRZ-2 significant mineral deposits (Figure 5-5). If any Preserves established under the Reduced Permit Term Alternative were located on designated MRZ-2 significant mineral deposits, the area affected would be minor. Because the precise locations of all Preserves are not known at this time, it cannot be determined whether the Reduced Permit Term Alternative would result in more or less acres of Preserves established over designated MRZ-2 significant mineral deposits compared to the No Action/No Project Alternative. However, given that there are limited locations suitable for Preserves in the MRZ-2 area due to past disturbance and development over much of the area, it is unlikely that there would be substantial differences between the two alternatives.

Therefore, because the Reduced Permit Term Alternative will not shift or displace development outside the USB, because fewer acres of natural landscapes would be developed, and because implementation of AMMs during the 30-year permit term provides additional mechanisms to minimize effects from soil erosion during ground-disturbing activities, the Reduced Permit Term Alternative would result in a ***Minor Beneficial*** effect on geology and soils and risks to human health from naturally occurring asbestos when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Increased urban development in the MCRA under the Reduced Development Alternative compared to the No Action/No Project Alternative could result in a slight increase in development over designated MRZ-2 significant mineral deposits. The potential for Preserve lands to limit access to MRZ-2 significant mineral deposits would not be substantially different between the two alternatives. Therefore, the Reduced Permit Term Alternative would result in a ***Less Than Significant Adverse*** effect on access to mineral resources when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

5.2.4.2 Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would result in the following:

- Reduced potential for adverse effects from erosion and landslide from development activities and Preserve System establishment
- A slightly reduced risk of exposure to naturally occurring asbestos
- Slightly more removal of access to important mineral resources by new urban development or associated infrastructure
- A similar potential for removal of access to important mineral resources from new Preserves

Therefore, after considering the significance of effects from the Reduced Permit Term Alternative on all of the geological resources impact criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to Planning Area geological resources, soils, and human exposure to geological hazards compared to the impacts that would occur under the No Action/No Project Alternative baseline condition. The Reduced Permit Term Alternative would result in a ***Less Than Significant Adverse*** effect to access to mineral resources compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

5.2.4.3 Cumulative Effects of the Alternative

The effect of past, present, and reasonably foreseeable future actions on soils, geology, and mineral resources were described in Section 5.2.2. As discussed in Section 5.2.2, the incremental effects of the No Action/No Project Alternative on geology and soils and exposure to naturally occurring asbestos were determined to be less than significant and not contribute to a significant adverse cumulative effect when viewed in connection with the effects of the past, present, and foreseeable other projects. The incremental effects of the No Action/No Project Alternative on access to mineral resources were determined to be significant and contribute to a significant adverse cumulative effect when viewed in connection with the effects of the past, present, and foreseeable other projects.

As discussed in Section 5.2.4.2, the Reduced Permit Term Alternative would result in reduced impacts to geology and soils (i.e., erosion potential and landslide risk) and reduced potential for exposure to naturally occurring asbestos compared to the No Action/No Project Alternative. Consequently, the incremental effects of the Reduced Permit Term Alternative would have a minor beneficial effect to geology and soils and risk of exposure to naturally occurring asbestos compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of Reduced Permit Term Alternative are individually limited and would not make a cumulatively considerable contribution to any adverse cumulative impact of the past, present, and reasonably foreseeable future projects. The Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect to geology and soils and risk of exposure to naturally occurring asbestos compared to the No Action/No Project Alternative baseline condition.

As described in Section 5.2.4.2, the effects of the Reduced Permit Term Alternative on access to mineral resources from urban development would be slightly more than those identified for the No Action/No Project Alternative. Effects from Preserve activities would be similar to those identified for the No Action/No Project Alternative. Consequently, the incremental effects of the Reduced Permit Term Alternative would have a less than significant effect to access to mineral resources when compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of the Proposed Action/Proposed Project

Alternative are individually limited and would not make a cumulatively considerable contribution to the significant adverse effect of the past, present, and reasonably foreseeable future projects when compared to the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative would result in a ***Less than Significant Cumulative*** effect to access to mineral resources compared to the No Action/No Project Alternative baseline condition.

5.3 REFERENCES CITED

CDOC (California Department of Conservation). 2000. *A General Location Guide for Ultramafic Rocks in California-Areas More Likely to Contain Naturally Occurring Asbestos*. Open-File Report 2000-19. Sacramento, California: Department of Conservation, Division of Mines and Geology. August 2000. Accessed February 2017. ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf.

CDOC. 2006. *Relative Likelihood for the Presence of Naturally Occurring Asbestos in Eastern Sacramento County, California*. Special Report 192. Sacramento, California: CDOC. Accessed September 2015. http://www.airquality.org/StationarySources/Documents/East_Sac_County_SR192Report.pdf#search=%22Relative%20likelihood%20for%20the%20presence%20of%20naturally%20occurring%20asbestos%20in%20eastern%20Sacramento%20County%2C%20California%22.

CDOC. 2007. *Surface Mining and Reclamation Act and Associated Regulations*. Surface Mining and Reclamation Act of 1975. CDOC, Office of Mine Reclamation. January 2007. Accessed April 27, 2010. http://www.conservation.ca.gov/smgb/Regulations/Documents/SMGB%20stats%20and%20regs2015%202.pdf.

CDOC. 2013. "Regulatory Maps." Sacramento, California: CDOC. Accessed September 2015. http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm.

CGS (California Geological Survey). 1981. "Regional Geologic Map No. 1A, Sacramento" [map]. 1:250,000. Sacramento, California: CGS.

CGS. 2002. *California Geomorphic Provinces*. Note 36. California Department of Conservation, CGS. December 2002. Accessed April 27, 2016. http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/note_36/Documents/note_36.pdf.

CGS. 2008. "Earthquake Shaking Potential for California" [map]. Prepared by D. Branum, S. Harmsen, E. Kalkan, M. Petersen, and C. Wills. Map Sheet 48. Revised 2008. Accessed February 8, 2017. http://www.conservation.ca.gov/cgs/information/publications/ms/Documents/MS48_revised.pdf#search=Branum.

CGS. 2017. "Seismic Hazard Zonation Program." Accessed February 8, 2017. http://www.conservation.ca.gov/cgs/shzp/Pages/Index.aspx.

Connector JPA (Capital Southeast Connector Joint Powers Authority). 2012. *Capitol SouthEast Connector Project Program Environmental Impact Report*. February 2012.

Creely, S. and E.R. Force. 2007. *Type Region of the Ione Formation (Eocene), Central California: Stratigraphy, Paleogeography, and Relation to Auriferous Gravels.* Open-File Report 2006-1378, version 1.0. Accessed February 8, 2017. https://pubs.usgs.gov/of/2006/1378/.

Dittes, J.D., J.L. Guardino, and R.A. Radmacher. 2007. "A GIS-Based Vernal Wetland Acre/Density Index (VWADI) for Classification and Conservation of Vernal Pool/Annual Grassland Landscapes in California's Great Central Valley." In *Vernal Pool Landscapes: Studies from the Herbarium, Number 14*, 125–141, edited by R.A. Schising and D.R. Alexander. Chico, California: California State University, Chico.

Galt. 2009a. *2030 Galt General Plan: Policy Document.* Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *City of Galt General Plan Update: 2030 Final EIR*. Final. SCH No. 2007082092. Prepared by Environmental Science Associates, in association with Mintier Harnish, Applied Development Economics, and Omni Means. Sacramento, California: Environmental Science Associates. March 2009. Accessed June 29, 2016. http://www.saclafco.org/SphereofInfluenceInformation/Documents/galtsoi/sac_024063.pdf.

Helley, E.J., and D.S. Harwood. 1985. "Geologic Map of Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California" [map]. 1:62,500. U.S. Geological Survey Miscellaneous Field Studies Map MF-1790. Accessed June 24, 2015. http://pubs.usgs.gov/mf/1985/1790/.

International Code Council. 2014. *2015 International Building Code*. Albany, New York: Delmar Publishers. May 30, 2014. Accessed May 2016. http://codes.iccsafe.org/app/book/toc/2015/I-Codes/2015%20IBC%20HTML/index.html.

Jones and Stokes. 1990. *Sacramento County Vernal Pools: Their Distribution, Classification, Ecology, and Management*. Prepared for the County of Sacramento, Planning and Community Department. Sacramento, California: Jones and Stokes Inc.

Rancho Cordova. 2006a. *City of Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report*. SCH No. 2005022137. Rancho Cordova, California: City of Rancho Cordova. June 2006. Accessed June 29, 2016. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

Reiner, R., and R. Swenson. 2000. "Saving Vernal Pools in the Cosumnes River Watershed." *Fremontia* 27:4(1).

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105. SCH No. 2007082086. Sacramento, California: Sacramento County, Department of Environmental Review and Assessment. April 2010. Accessed June 30, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030.* Sacramento, California: Sacramento County, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *Manual of California Vegetation*. Sacramento, California: California Native Plant Society.

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2006. "Natural Occurring Asbestos in Eastern Sacramento County Parcels" [map]. Prepared by SMAQMD. Sacramento, California: SMAQMD. July 10, 2006. Accessed February 8, 2017. http://www.airquality.org/StationarySources/Documents/NOA_Parcels_redux.pdf.

Smith, D.W., and W.L. Verrill. 1998. "Vernal Pool-Soil-Landform Relationships in the Central Valley, California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems: Proceedings from a 1996 Conference*, edited by C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 1–14. Based on a conference held at the Hilton Hotel, Sacramento, California, June 19–21, 1996. Sacramento, California: California Native Plant Society. 0-943460-37-9.

Solomeshch, A.I., M.G. Barbour, and R.F. Holland. 2007. "Vernal Pools." In *The Terrestrial Vegetation of California,* 394–424. 3rd ed. California: University of California Press. July 17, 2007.

USDA (U.S. Department of Agriculture). 1993. *Soil Survey of Sacramento County, California*. USDA Soil Conservation Service, in cooperation with the Regents of the University of California (Agricultural Experiment Station). Sacramento California: USDA. April 1993. Accessed September 2015. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA067/0/sacramento.pdf.

INTENTIONALLY LEFT BLANK

CHAPTER 6 – AGRICULTURE

This chapter presents the existing conditions and the potential environmental effects of each Environmental Impact Statement/Environmental Impact Report (EIS/EIR) alternative on the agricultural resources and agricultural activities within the Planning Area. The agricultural resources discussed and analyzed in this chapter include farmlands such as row crops, orchards, and vineyards and the Planning Area's natural grasslands that are used for grazing and other agricultural activities.

6.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

6.1.1 Regulatory Framework

This section includes a summary of applicable federal, state, and local regulations; policies for the agencies that have regulatory responsibilities for the protection of agricultural resources; and activities within the Planning Area. Pursuant to Title 40 of the Code of Federal Regulations, Section 1502.25, these applicable policies and plans helped to determine the appropriate scope of analysis included in Chapter 4, Land Use. This section discusses the basic responsibilities of these agencies, explains the relevant agency regulations, and describes the planning documents that are relative to the Planning Area.

6.1.1.1 Federal

Farmland Protection Policy Act of 1984

The Farmland Protection Policy Act requires federal agencies to consider how their activities or responsibilities that involve financing or assisting construction of improvement projects or acquiring, managing, or disposing federal land and facilities may affect farmland. Planned development or infrastructure projects must assess their potential effects on the loss or conversion of farmland.

The federal lead agency must consult with the U.S. Department of Agriculture's Natural Resources Conservation Service to complete a Land Evaluation and Site Assessment for the affected area. As part of the Land Evaluation and Site Assessment process, the federal lead agency is responsible for coordinating completion of the Farmland Conversion Impact Rating Form with the Natural Resources Conservation Service. A Land Evaluation and Site Assessment process may be required for some of projects, and if required, is prepared at the time an application for development is filed with the lead agency.

Safe Harbor Agreements

Private property owners can voluntarily enter into a Safe Harbor Agreement with the U.S. Fish and Wildlife Service and engage in activities that are beneficial to endangered species on their property. In turn, property owners are provided assurances that new land use restrictions will not be required on the property, even if the population of listed species on the subject property increases. The assurances are provided by the U.S. Fish and Wildlife Service through an Enhancement of Survival Permit issued to the property owner and under the authority of Section 10(a)(1)(A) of the federal

Endangered Species Act. This permit authorizes incidental take of species that may result from actions undertaken by the landowner under the Safe Harbor Agreement, provided that the landowner is following the provisions of said agreement by providing a net conservation benefit that contributes to the recovery of the subject Covered Species. The contribution toward recovery varies from case to case. The Safe Harbor Agreement does not have to provide permanent conservation for the enrolled property. Safe Harbor Agreements would be applicable for lands within the Planning Area where protected species or protected habitat are present.

6.1.1.2 State

Farmland Mapping and Monitoring Program (FMMP)

The State of California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) produces maps and statistical data for use in analyzing impacts to agricultural resources in the state (CDOC 2013). The FMMP Important Farmland Maps include the defined mapping categories listed in Table 6-1.

Table 6-1. Important Farmland Mapping Categories

Category	Definition
Prime Farmland (P)	Farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
Farmland of Statewide Importance (S)	Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
Unique Farmland (U)	Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the 4 years prior to the mapping date.
Farmland of Local Importance (L)	Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
Grazing Land (G)	Land on which the existing vegetation is suited to the grazing of livestock.
Urban and Built-Up Land (D)	Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, and public administration uses; railroad and other transportation yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment; water control structures; and other developed purposes.
Other Land (X)	Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres. Vacant and non-agricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.
Water (W)	Perennial water bodies with an extent of at least 40 acres.

Source: CDOC 2013.

California Land Conservation Act (Williamson Act)

The California Land Conservation Act, commonly referred to as the Williamson Act, is the state's primary program for restricting the uses of agricultural and open space lands to farming and ranching. The Williamson Act is a voluntary program that offers reduced property taxes on lands that have been placed under a Williamson Act contract, which requires that the land remain available for agricultural use for a minimum of 10 years.

Land Use and Resource Management Plan for the Primary Zone of the Delta

Policies contained in the Agricultural chapter of the *Land Use and Resource Management Plan for the Primary Zone of the Delta* (Delta Protection Commission 2010) relevant to the EIS/EIR alternatives apply to the areas of the EIS/EIR Planning Area that are west of Interstate 5. Relevant policies include the following (Delta Protection Commission 2010):

> **Policy P-2:** Conversion of land to non-agriculturally-oriented uses should occur first where productivity and agricultural values are lowest.
>
> **Policy P-4:** Support agricultural programs that maintain economic viability and increase agricultural income in accordance with market demands, including but not limited to wildlife-friendly farming, conservation tillage and non-tillage.
>
> **Policy P-5:** Local governments shall encourage implementation of the necessary plans and ordinances to: maximize agricultural parcel size; reduce subdivision of agricultural lands; protect agriculture and related activities; protect agricultural land from conversion to non-agriculturally-oriented uses. An optimum package of regulatory and incentive programs could include: (1) an urban limit line; (2) minimum parcel size consistent with local agricultural practices and needs; (3) strict subdivision regulations regarding subdivision of agricultural lands to ensure that subdivided lands will continue to contain agriculturally-oriented land uses; (4) require adequate buffers between agricultural and non-agricultural land uses particularly residential development outside but adjacent to the Primary Zone; (5) an agriculture element of the general plan; (6) a Right-to-Farm ordinance; and (7) a conservation easement program.
>
> **Policy P-6:** Encourage acquisition of agricultural conservation easements from willing sellers as mitigation for projects within each county. Promote use of environmental mitigation in agricultural areas only when it is consistent and compatible with ongoing agricultural operations and when developed in appropriate locations designated on a countywide or Delta-wide habitat management plan.

Policy P-7: Encourage management of agricultural lands which maximize wildlife habitat seasonally and year-round, through techniques such as fall and winter flooding, leaving crop residue, creation of mosaic of small grains and flooded areas, wildlife friendly farming, controlling predators, controlling poaching, controlling public access, and others.

Policy P-8: Encourage the protection of agricultural areas, recreational resources and sensitive biological habitats, and the reclamation of those areas from the destruction caused by inundation.

California Right to Farm Act

The "Right to Farm Act" (California Civil Code Sections 3482.5, 3482.6, 3483, and 3484 collectively) is a statewide agricultural protection act. Similar to Sacramento County Code Chapter 14.05 (the Right to Farm Ordinance, discussed below), the Right to Farm Act helps protect agricultural operations, activities, facilities, etc. from nuisance complaints. Unlike the County Code, the Right to Farm Act has a broader sweep of protections with the intention of shielding agricultural processing activities, operations, and facilities, such as the processing of dairy products, the production of wine, the processing of meat and egg products, the drying of fruits and grains, the packing and cooling of fruits and vegetables, and the processing for wholesale and retail markets of agricultural products. The Planning Area has many of these processing facilities and operations. The Right to Farm Act prevails over contrary provisions of any city or county ordinance.

6.1.1.3 Local

Sacramento County General Plan

The *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011) includes an Agriculture Element, which identifies Sacramento County's overall agricultural goals of protecting the County's agricultural lands, maintaining the productivity of those lands, and promoting/supporting agricultural activities as an integral part of the Sacramento County economy. The Agriculture Element also includes specific Objectives and Implementation Measures to allow achievement of the stated goals.

The Sacramento County General Plan's Conservation Element (Sacramento County 2011) also contains goals and policies related to agriculture. Specifically, this element directs that preserves established[1] to protect ecological resources should be planned and managed to avoid conflicts with adjacent agricultural activities. It also directs that sensitive habitat areas on public lands should be protected from exposure to pesticides and other similar chemical applications.

[1] Note that in the context of this Plan, the word "establish" is synonymous with "create."

Finally, this element notes that ranching and grazing may be compatible activities with preserves established to protect and conserve vernal pool habitat and that native vegetative habitats should be protected from improper grazing activities on public lands.

The Sacramento County General Plan Agriculture Element contains the following policies relevant to agriculture in the Planning Area (Sacramento County 2011):

> **Policy AG-1:** The County shall protect Prime, Statewide Importance, Unique and Local Importance farmlands located outside of the [urban services boundary] USB from urban encroachment.
>
> **Policy AG-3:** The County shall permit agricultural uses on buffers, provided such uses are conducted in a manner compatible with urban uses. Buffers shall be used to separate farming practices incompatible with adjacent urban uses. Any homeowners' association or similar entity within the development shall assist in determining compatible use. Buffers shall not adversely conflict with agricultural uses on adjoining property.
>
> **Policy AG-5:** Projects resulting in the conversion of more than fifty (50) acres of farmland shall be mitigated within Sacramento County, except as specified in the following text, based on a 1:1 ratio, for the loss of the following farmland categories through the specific planning process or individual project entitlement requests to provide in-kind or similar resource value protection (such as easements for agricultural purposes):
>
> - Prime, Statewide Importance, Unique, Local Importance, and Grazing farmlands located outside the USB;
> - Prime, Statewide Importance, Unique, and Local Importance farmlands located inside the USB.
>
> The Board of Supervisors retains the authority to override impacts to Unique, Local, and Grazing farmlands, but not with respect to Prime and Statewide farmlands.
>
> However, if that land is also required to provide mitigation pursuant to a Sacramento County endorsed or approved Habitat Conservation Plan (HCP), then the Board of Supervisors may consider the mitigation land provided in accordance with the HCP as meeting the requirements of this section including land outside of Sacramento County.[2]

[2] Note: This policy is not tied to any maps contained in the Agriculture Element. Instead, the most current Important Farmland map from the Department of Conservation should be used to calculate mitigation.

Policy AG-10: The County shall balance the protection of Prime, Statewide Importance, Unique, and Local Importance farmlands and farmlands with intensive agricultural investments with the preservation of natural habitat so that the protection of farmland can also serve to protect habitat.

Policy AG-11: Cooperation shall be encouraged between landowners of Prime, Statewide Importance, Unique, and Local Importance farmlands or land with intensive agricultural investments and landowners of natural resource preserves, including mitigation banks, mitigation sites, and wildlife refuges, so that both habitat preservation and standard farming practices mutually benefit.

Policy AG-12: The County will cooperate with landowners of agriculturally zoned properties to promote the placing of natural preserve/mitigation amenities on land, such as trees and other biota enhancing improvement, by making sure amenities are assets to both the natural preserve/mitigation areas and agriculture practices.

Policy AG-13: Indemnification against property losses from recreational users should be provided to agricultural property owners adjacent to mitigation banks, environmental mitigation sites, wildlife refuges, or other natural resource preserves provided loss is proven to be a direct and exclusive result of new recreational access provided by the establishment of, and occurring through, such sites, and provide law enforcement access to such sites.

Policy AG-14: The County shall initiate intergovernmental agreements with state and federal wildlife management authorities in order to mitigate loss of Prime, Statewide Importance, Unique, and Local Importance farmlands or land with intensive agricultural investment due to natural habitat conversion.

Policy AG-15: The County shall pursue opportunities to create mitigation banks, environmental mitigation sites, wildlife refuges, or other natural resource preserves wherein substantial agricultural activities that are compatible with protection of high habitat values continue, but incompatible activities and conversion for development are precluded by conservation easements.

Policy AG-16: Maintain private ownership by coordinating with non-profit organizations to acquire conservation easements for preserving farmlands.

Policy AG-17: The establishment of conservation easements combining preservation of agricultural uses, habitat values, and open space on the same property should be encouraged where feasible.

Policy AG-19: Recreational trails shall be designed in cooperation with adjacent property owners to minimize adverse impacts on farming practices.

Policy AG-20: Public recreation trails adjacent to permanent agriculture shall be designed to provide appropriate vehicle access for law enforcement needs.

Policy AG-21: The County encourages the preservation of Prime, Statewide Importance, Unique, and Local Importance farmlands, including opposing any residential or commercial development for the Cosumnes River or Deer Creek riparian areas which are not compatible with agricultural uses.

Policy AG-22: If land within the Cosumnes River watershed is developed for non-agricultural purposes, the County should actively pursue easement dedication for equestrian trails and bikeways within such development as a condition of approval.

Policy AG-23: The County seeks to minimize agricultural/trail-user conflicts by recommending and seeking buffer zones between trails and nearby agricultural land and by locating trails away from the Cosumnes and Deer Creek riparian areas.

Policy AG-25: Outside the Urban Service Boundary, the County shall encourage landowners to enter into Williamson Act contracts or, as appropriate, to rescind Notices of Nonrenewal. Provide support to keep property in the Williamson Act by allowing agricultural-friendly land use practices that include additional economic incentives, and support replacing existing Williamson Act contracts with amended contracts that include agricultural-friendly land use practices.

Policy AG-28: The County shall actively encourage conservation of soil resources.

Sacramento County Code

The Sacramento County Code Chapter 14.05 (2016) establishes the County's "Right-to-Farm" ordinance, which states the right of landowners to continue agricultural activities in the vicinity of non-agricultural land uses. The ordinance prioritizes commercially productive agricultural land uses and protects these uses from potential issues of land use compatibility that may arise due to the development of non-agricultural land uses adjacent to existing agricultural land. The agricultural activity, operation, or facility must have been in operation for more than 3 years, not been declared a nuisance at the time it began, and operate consistently with accepted agricultural customs and standards in order to be protected under the ordinance.

Galt General Plan

The Conservation Element of the *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009a) identifies agricultural lands surrounding Galt as a valuable component of the City's open space resources, and establishes a goal of preserving and enhancing these lands. The policy included in the Galt General Plan that addresses agricultural lands includes the following (Galt 2009a):

> **Policy COS-4.1:** Prime Agricultural Land Preservation. The City shall work to preserve prime agricultural lands surrounding the Planning Area from future development by creating a clear and sensitive urban transition to minimize land use conflicts and protect long-term agriculture.

The Galt Municipal Code does not include a "Right-to-Farm" ordinance or other mechanism to protect agricultural uses if land use compatibility issues arise.

Rancho Cordova General Plan

Rancho Cordova has only a limited amount of agricultural land, and the *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2006a) recognizes that most areas that currently support agriculture within the City limits will be developed with urban and suburban uses. The Rancho Cordova General Plan includes policies and measures that recognize the right of existing agricultural uses to continue as long as the landowner/farmers desire, to minimize land use conflicts/impacts to urban and agricultural uses through the use of buffers and other similar methods, and to mitigate for the loss of farmland through the preservation of an equal amount of land that is of equal or higher agricultural value.

Applicable policies in the Rancho Cordova General Plan include the following (Rancho Cordova 2006a):

> **Policy LU.1.8:** While agricultural uses are anticipated to be phased out within the City limits, the City recognizes the right of these uses to continue as long as their individual owners/farmers desire.
>
> **Policy LU.1.9:** The City shall require development to protect 1 acre of existing farmland of equal or higher quality for each acre of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance that would be converted to non-agricultural uses. This protection may consist of the establishment of farmland conservation easements, farmland deed restrictions, or other appropriate farmland conservation in perpetuity, but may also be utilized for compatible wildlife conservation efforts. The farmland to be preserved shall be located within Sacramento County and must have adequate water

supply to support agricultural use. As part of the consideration of land areas proposed to be protected, the City shall consider the benefits of preserving farmlands in proximity to other protected lands.

Policy LU.1.10: The City shall ensure that the following standards are met regarding agricultural conservation easement content:

- Provisions of an accurate legal document that prohibits any activity that substantially impairs or diminishes the agricultural productivity of the land;
- Protection of any existing water rights necessary to maintain agricultural uses and retain such water rights for ongoing use on the agricultural land; and
- Interests in the agricultural land shall be held in trust by the City and/or an entity acceptable to the City, in perpetuity.

Rancho Cordova Municipal Code

The Rancho Cordova Municipal Code Chapter 14.05 (2016) establishes a "Right-to-Farm" ordinance protecting agricultural land uses in the vicinity of non-agricultural land uses. While agricultural production may generate noise, odor, dust, and other undesirable effects to adjacent non-agricultural land uses, the ordinance considers these effects acceptable in the furtherance of General Plan goals intended to preserve and enhance agricultural production. The agricultural activity, operation, or facility must have been in operation for more than 3 years, not been declared a nuisance at the time it began, and operate consistent with accepted agricultural customs and standards to be protected under the ordinance. Chapter 23.904 of the Rancho Cordova Municipal Code (2016) sets forth development and operating standards for agricultural activities to mitigate potential adverse effects of agricultural activities on adjacent and surrounding land uses.

6.1.2 Planning Area Agricultural Resources and Activities

This section describes the existing agricultural resources (farmland) and activities (i.e., active farming or grazing) that occur within the EIS/EIR Planning Area. In the eastern portion of the Planning Area, agricultural activities primarily consist of ranching and grazing. The central portion of the Planning Area supports more irrigated pasture and grassland. The southwestern portion of the Planning Area supports more vineyards and croplands and includes the Cosumnes River floodplain. Figure 6-1 shows the locations of Important Farmlands within the Planning Area.

6.1.2.1 Important Farmlands

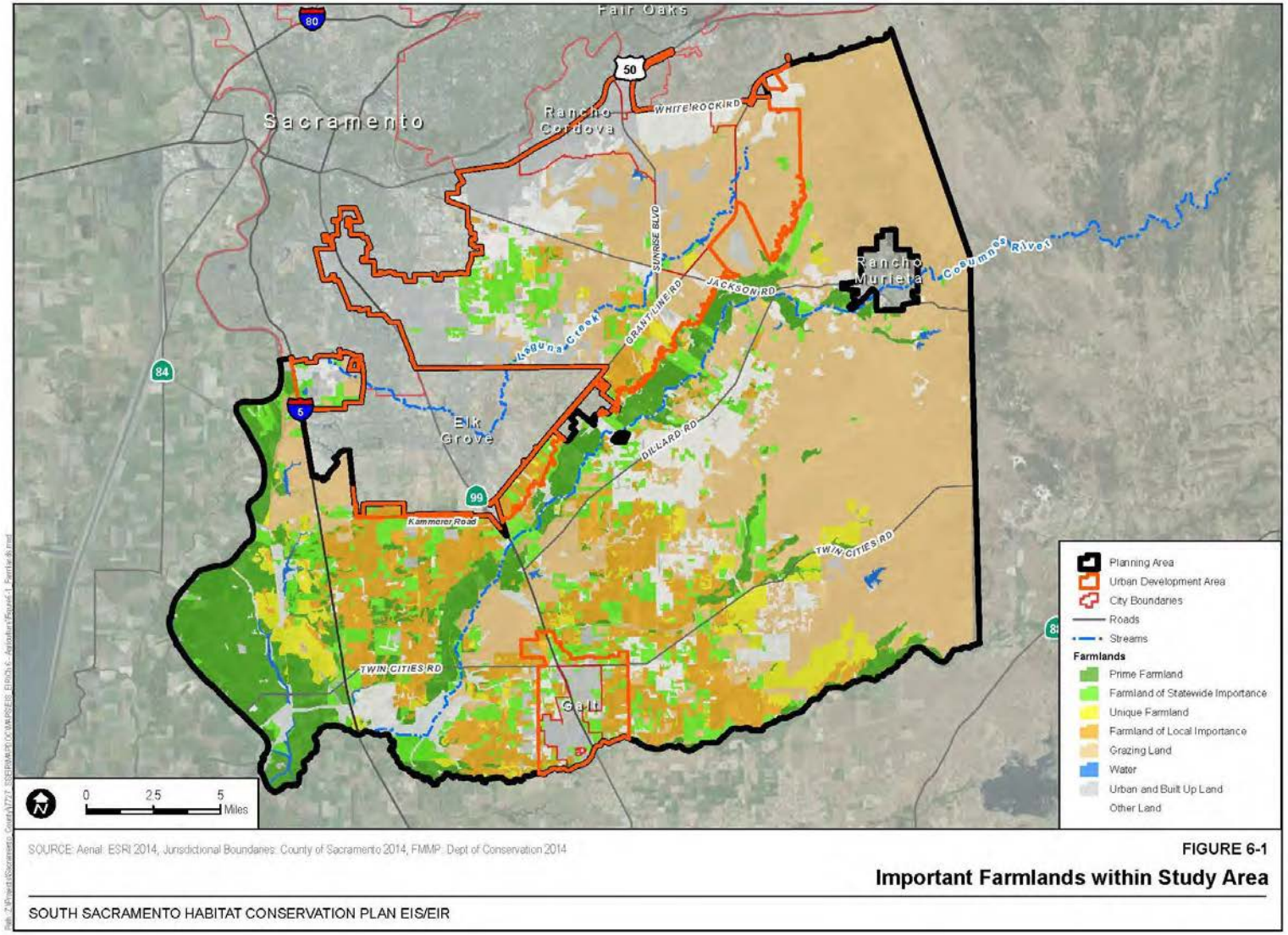
According to current FMMP data (CDOC 2014), approximately 256,832 acres of the 317,655-acre Planning Area are considered Important Farmland (Table 6-2). As indicated on Figure 6-1, more than half of this Important Farmland is used for grazing lands and is not actively cultivated.

Table 6-2. Important Farmland within the Planning Area

Agricultural Land	Area of Each Farmland Type (acres)			
	Sacramento County	*Rancho Cordova*	*Galt*	*Total for Planning Area*
Prime Farmland	35,769	15	35	35,819
Unique Farmland	13,899	159	0.4	14,058
Farmland of Statewide Importance	39,653	22	248	39,923
Farmland of Local Importance	32,611	242	379	33,231
Grazing Land	128,858	4,867	76	133,801
Total	**250,790**	**5,305**	**737**	**256,832**

Source: CDOC 2014.

Figure 6-1 Important Farmlands within Study Area



AGENDA ITEM 11.1
4336

INTENTIONALLY LEFT BLANK

6.1.2.2 Types of Agricultural Activities

A variety of agricultural activities occur within the Planning Area, primarily outside the Urban Development Area (UDA).[3] In general, these activities include cultivation of row crops, irrigated pasture, fruit and nut orchards, and vineyards. Agricultural lands within the Planning Area can generally be described as follows:

- **Row and Field Crops:** Many row and field crops are concentrated in the portion of the Cosumnes River floodplain that is in the southwest of the Planning Area. Row and field crops include all non-orchard and non-vineyard agricultural crops, such as rice and other small grains, corn, tomatoes, melons, peppers, safflower, sunflower, and short-term perennial crops (e.g., asparagus, alfalfa).
- **Irrigated Pasture and Grasslands:** Irrigated pasture and grasslands occur in a scattered distribution generally in the central portion of the Planning Area. Irrigated pasture and grasslands includes hay production (wheat, oats, clovers, mixed grasses), seasonal summer pasture for livestock (primarily cattle), and year-round pasture for livestock (primarily cattle or horses). Seasonal pasture appears to be the most common use. Irrigated pasture and grasslands are typically seeded, cut/grazed, and reseeded on a regular basis on an approximately 5- to 7-year cycle before the fields are left fallow to rest and the cycle is started over again. Irrigated pasture and grasslands do not encompass dry grazing, as noted in the following text.
- **Fruit and Nut Orchards:** Orchards are scattered throughout the Planning Area, with the largest concentration along the western boundary. Fruit tree orchards include apples, cherries, pears, apricots, chestnuts, kiwi, nectarines, olives, peaches, and plums. Nut tree orchards include walnuts, almonds, pecans, pistachios, and chestnuts.
- **Vineyards:** Vineyards are located in many areas of the Planning Area, with concentrations north and south of Twin Cities Road in Preserve Planning Unit 7, west of Interstate 5 in Preserve Planning Unit 6, and near the UDA boundary southeast of Grant Line Road. In Sacramento County, vineyards are primarily established for wine grape production, with some minor table grape producers. Vineyards are primarily "clean cultivated," meaning no other vegetation is allowed to grow between the rows or on the edges of fields and irrigation ditches.

[3] As discussed in Section 1.1.1, Geographic Scope of the EIS/EIR Planning Area, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, UDA means all lands within Sacramento County's USB boundary that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within Galt's sphere of influence (SOI) (see Figure 1-1).

In addition to these agricultural lands, ranchers use extensive areas of non-irrigated valley grassland within the Planning Area for livestock grazing.

6.1.2.3 Williamson Act Lands

Approximately 139,890 acres within the Planning Area is currently under active Williamson Act contracts (CDOC 2016). Approximately 10,400 acres of these active contracts is identified for nonrenewal. Figure 6-2 shows lands under Williamson Act contracts that are in the Planning Area.

6.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

6.2.1 Methodology for Assessing Impacts of Each Alternative on Agricultural Resources

This section describes the potential impacts of the actions and projects associated with each EIS/EIR alternative on the agricultural resources and activities in the Planning Area. Potential ways that the EIS/EIR alternatives could affect agricultural resources or activities include converting agricultural lands designated as Important Farmland to a developed land cover type or limiting or eliminating the ability of active farming or grazing activities to continue.

As discussed in Section 3.6.4, Addressing Incomplete or Unavailable Information in Chapters 4 through 16, geographic information system methodology was used to quantitatively estimate the direct impacts of each EIS/EIR alternative on Important Farmland and on lands with Williamson Act contracts. Geographic information system datasets of future projects and activities expected under each EIS/EIR alternative were digitally overlaid (compared) to separate geographic information system datasets of FMMP of Important Farmlands and Williamson Act lands.

~~It is appropriate to consider impacts to certain environmental resources within the context of other impacts occurring in the surrounding landscape, community, or region (see Section 3.6.2, Geographic Study Area of Resource Topics Analyzed in Chapters 4 through 16).~~

The study area used to analyze direct and indirect effects of the alternatives on agriculture is the Planning Area. The lead agencies determined that an appropriate geographic scale for evaluating the **cumulative** impacts of each EIS/EIR alternative on agriculture lands and activities should include all agricultural resources and activities within the Sacramento Area Council of Government's six-county region (SACOG 2016), which includes all of Sacramento, Placer, El Dorado, Sutter, Yolo, and Yuba Counties.

As discussed in Section 3.7, Cumulative Effects Analysis in Resource Chapters 4 through 16, the Chapter 6 cumulative analyses of impacts to agriculture resources will consider (1) the effects of past and present urban development within in the Planning Area (see Existing Conditions in Section 6.1.2, Planning Area Agricultural Resources and Activities) and within the larger six-county study area, and (2) future impacts expected from other reasonably foreseeable projects in the Planning Area (see Section 3.7) and other reasonably foreseeable projects within the larger six-county study area. The cumulative analysis of each EIS/EIR alternative will then consider whether the incremental impacts of the alternative on agricultural resources and agricultural activities would be significant (i.e., would be cumulatively considerable).

As discussed in Section 3.4, Previous Planning Area Environmental Reviews, and Section 6.1.1.3, Local, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006b) analyzed direct and cumulative impacts of urban growth planned within their jurisdictions, including impacts to agricultural resources and agricultural activities. When the impact analyses or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief summary or description of the incorporated information or analysis is provided in Sections 6.2.2, No Action/No Project Alternative; 6.2.3, Proposed Action/Proposed Project Alterative; and 6.2.4, Reduced Permit Term Alternative.

As discussed in Section 3.8.1, Significance Thresholds, the criteria used to evaluate the significance of each alternative's impacts on agricultural resources and activities are based on the California Environmental Quality Act (CEQA) Guidelines (Appendix G) (14 CCR 15000 et seq.) and on typical thresholds used to evaluate agricultural impacts in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse impact could occur if the alternative would:

1. Convert more than 50 acres of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Farmland of Local Importance, Grazing Land, or areas containing prime soils to uses not conducive to agricultural production;
2. Conflict with an existing Williamson Act contract; or
3. Introduce incompatible uses in the vicinity of existing agricultural uses.

The CEQA Guidelines (Appendix G) (14 CCR 15000 et seq.) does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial impact could occur if the alternative would:

1. Restore more than 50 acres of agricultural production in areas containing prime soils;
2. Reduce or eliminate a conflict with an existing Williamson Act contract; or

3. Reduce or eliminate incompatible uses in the vicinity of existing agricultural uses.

The impact analysis for the three EIS/EIR alternatives will consider the context, intensity, and severity of potential impacts to each of these agricultural resource impact criteria and will present a separate determination of significance for each of these criteria.

6.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2, No Action/No Project Alternative.

6.2.2.1 Direct and Indirect Effects of the Alternative

Under the No Action/No Project Alternative, future urban development and associated infrastructure would convert approximately 30,570 acres of the approximately 256,832 acres of existing Important Farmland in the Planning Area to non-agricultural uses (Table 6-3). Nearly all of these impacts would be within the UDA. However, as explained in Section 2.2, approximately 1,900 acres of planned urban development would be shifted or displaced to locations outside the UDA under the No Action/No Project Alternative. Conversion (loss) of Important Farmland to a developed land cover type and conflicts between existing agricultural activities and new urban uses would occur on these 1,900 acres of "displaced" urban development.

Table 6-3. Impacts on Important Farmland Expected Under the No Action/No Project Alternative

Important Farmland Type	Existing Acres within Planning Area	Acres Removed from Agricultural Use Under This Alternative	New Total within Planning Area at the End of Study Period (acres)
Prime Farmland	35,819	398	35,421
Unique Farmland	14,058	742	13,316
Farmland of Statewide Importance	39,923	6,636	33,287
Farmland of Local Importance	33,231	7,165	26,066
Grazing Land[1]	133,801	17,264	116,537
Total	**256,832**	**32,205**	**224,627**

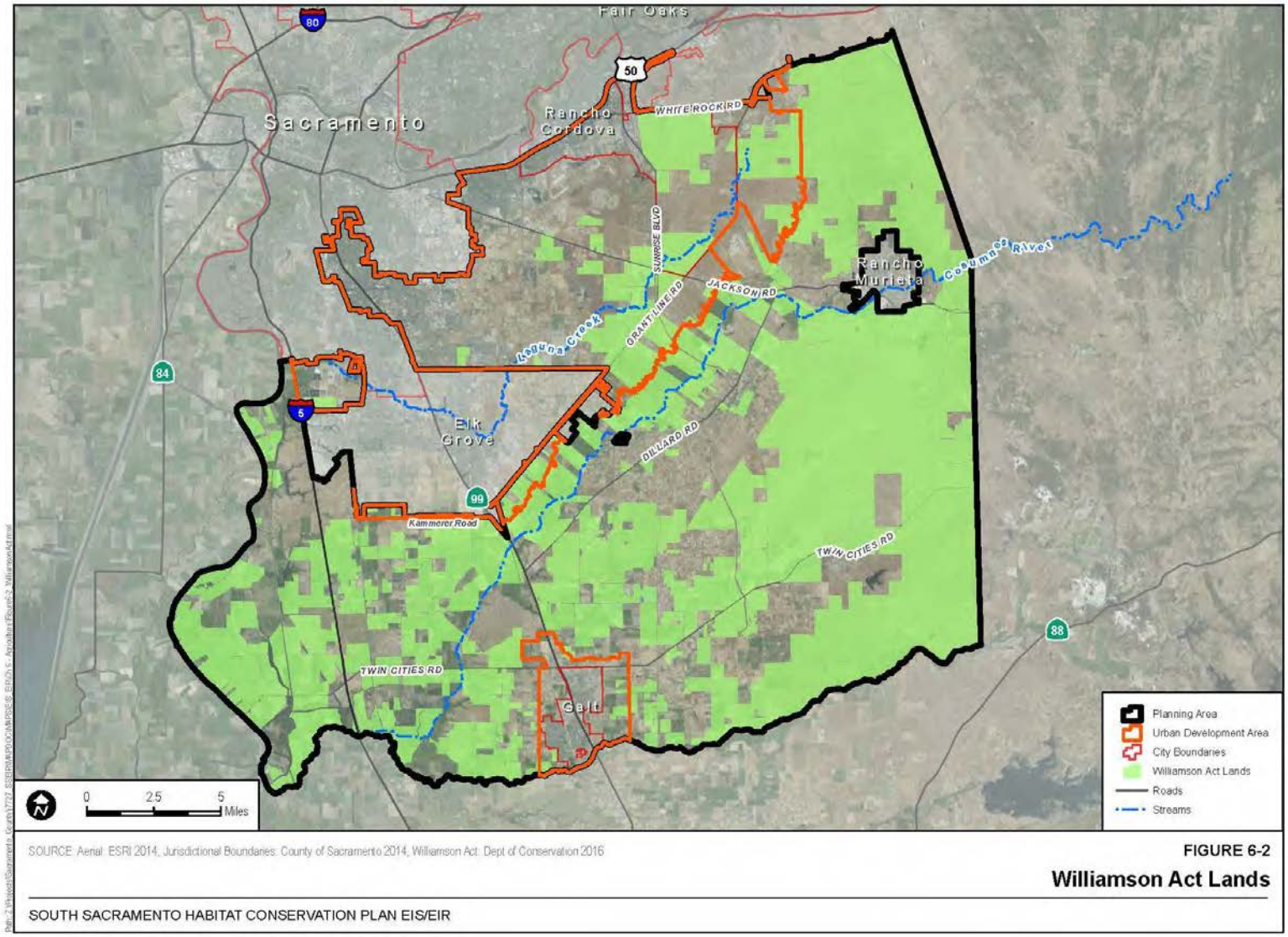
Source: CDOC 2014.

[1] The Sacramento County General Plan Policies (2011) do not require mitigation for impacts to Grazing Land within the USB according to Policy AG-5. However, these acres are still included in the impact total because they are mapped as Important Farmland.

The effects on agriculture of future urban development within Sacramento County, Galt, and Rancho Cordova were evaluated in the analysis of the General Plan EIRs discussed in Section 3.4 and Section 6.1.1, Federal (Sacramento County 2011; Galt 2009b; Rancho Cordova 2006b).

As discussed in Section 6.2.1, Methodology for Assessing Impacts of Each Alternative on Agricultural Resources, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

Figure 6-2 Williamson Act Lands



INTENTIONALLY LEFT BLANK

The impact analysis presented in the *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR) (Sacramento County 2010) determined the following within Sacramento County:

- Future development within Sacramento County would result in conversion of 8,645 acres of Important Farmland,[4] beyond the level than can be mitigated through in-kind mitigation; this would be a significant and unavoidable adverse impact (Sacramento County 2010, pp. 3-47 to 3-60)
- The encouragement of non-renewal of Williamson Act contracts is considered a significant adverse impact (Sacramento County 2010, pp. 3-47 to 3-60)

The Sacramento County General Plan EIR (Sacramento County 2010) did not address compatibility of designated land uses (e.g., residential) with adjacent agricultural uses.

The impact analysis presented in the *City of Galt General Plan Update: 2030 Final EIR* (Galt General Plan EIR) (Galt 2009b) determined the following within the Galt sphere of influence (SOI):

- Planned development consistent with the Galt General Plan would convert up to 3,200 acres of Important Farmland, a significant and unavoidable adverse impact (Galt 2009b, pp. 8-25 to 8-28)
- Impacts to any lands under Williamson Act contracts would be less than significant adverse; however, planned development in the Galt SOI would require annexation and re-zoning of parcels under Williamson Act contracts (Galt 2009b, pp. 8-25 to 8-28)
- Impacts associated with introducing incompatible land uses in the vicinity of existing agricultural uses would be less than significant adverse with implementation of the Galt General Plan policies that would protect agricultural uses and establish a green belt (Galt 2009b, pp. 8-25 to 8-28)

The impact analysis presented in the *City of Rancho Cordova General Plan Final Environmental Impact Report* (Rancho Cordova General Plan EIR) (Rancho Cordova 2006b) determined the following within Rancho Cordova:

- Conversion of most if not all of the Important Farmlands in the City due to planned development would result in a significant and unavoidable adverse impact (Rancho Cordova 2006b, pp. 4.2-17 to 4.2-24)

[4] As described further in Section 3.4.1, Sacramento County General Plan, the proposed project analyzed within the Sacramento County General Plan EIR assumed development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by the County. However, the County is currently processing land use entitlements in the Jackson Highway Corridor, so the referenced conclusions from the proposed project analysis are relevant to the No Action/No Project Alternative.

- Urban development would surround the one parcel in the City under a Williamson Act contracts, impeding the ability of the landowner to farm the land according to the Williamson Act contract and potentially violating the contract; this would result in a significant and unavoidable adverse impact (Rancho Cordova 2006b, pp. 4.2-17 to 4.2-24)
- Agriculture/urban interface conflicts such as farm equipment and vehicle conflicts on area roadways, potential trespassing and vandalism to active farmlands, and growth pressures on farmland near urban uses in the City would occur resulting in a significant and unavoidable adverse impact (Rancho Cordova 2006b, pp. 4.2-17 to 4.2-24)

As discussed in Section 3.4 and Section 6.1.3, Local, the three General Plan EIRs used different study periods ending in 2030 (Galt 2009b), in 2030 (Rancho Cordova 2006b), and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3, EIS/EIR Study Period). Therefore, additional urban development can be expected to occur within Galt, Rancho Cordova, and Sacramento County in the years after their General Plan EIR study periods end and when this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

The conversion of Important Farmlands to developed uses would contribute further to the already significant, unavoidable indirect adverse impacts to agricultural resources from new incompatible uses described in the environmental documents for the General Plans of Sacramento County, Galt, and Rancho Cordova. The description of the No Action/No Project Alternative (Section 2.2) assumes that project compliance with the existing General Plan policies, such as Sacramento County General Plan Policies AG-5 and AG-25 and Rancho Cordova General Plan Policy LU.1.9, as well as compliance with existing agricultural protection ordinances identified in Section 6.1.1, Regulatory Framework, would continue under the No Action/No Project Alternative, and these local policies and ordinances would reduce but not eliminate indirect impacts related to incompatible land uses.

As explained in Section 2.2.2, under the No Action/No Project Alternative, mitigation for impacts to listed species or aquatic resources from new urban development that cannot be avoided would continue to require avoidance, minimization, and compensatory mitigation. As discussed in Section 2.2.2, project Clean Water Act Section 404 compensatory mitigation and/or federal Endangered Species Act and California Endangered Species Act mitigation under the No Action/No Project Alternative could include purchase of credits in existing mitigation banks,

payment of in-lieu fees, and establishment of on-site or off-site preserves by the Permittees. High-priority locations for project mitigation preserves would include sites that have soils and hydrology that support vernal pools or that include riparian areas. These high-priority mitigation sites could contain Important Farmland or be under active Williamson Act contracts. However, mitigation preserves would not result in the loss of farmland or farming activities to developed uses, but instead, change how the land is used (e.g., fallow versus active farming). Therefore, including agricultural lands within mitigation preserves, including Important Farmland agricultural lands, would not require mitigation under existing Sacramento County, Galt, or Rancho Cordova policies. Potential impacts from allowing incompatible uses to be developed adjacent to existing agricultural lands would be mitigated, if necessary, through compliance with applicable Sacramento County, Galt, or Rancho Cordova General Plan policies.

On-site or off-site mitigation preservation could also include foraging habitat for species such as Swainson's hawk (*Buteo swainsoni*) or greater sandhill crane (*Grus canadensis*). As discussed in Chapter 9, Special-Status Species Including HCP Covered Species, habitat for these species includes open fields that contain row or field crops and grazing land. Species conservation easements on these agricultural lands may include restrictions that limit the type of crops grown or harvest times to ensure appropriate species habitat is preserved within the conservation easement. Conservation easements proposed on lands under existing Williamson Act contracts would be reviewed to ensure the terms of the contract do not conflict with the language of the conservation easement. Therefore, any limitation on types of crops and/or harvest times that are included in a new conservation easement would not result in significant adverse effects to Important Farmland or Williamson Act contracts.

Therefore, under the No Action/No Project Alternative, habitat re-establishment/establishment would not result in ***No Impact*** to agricultural operations.

6.2.2.2 Cumulative Effects of the No Action/No Project Alternative

As discussed in Section 3.7.1, Past and Present Actions in the Planning Area, and Section 6.2.1, past and present urban development and associated infrastructure project and activities in the EIS/EIR Planning Area have replaced much of the land historically used for agricultural production, especially within the UDA portion of the EIS/EIR Planning Area. Other developing areas within the study area (see Section 6.2.1) such as the Cities of Davis, El Dorado Hills, Yuba City, and Wheatland have also replaced formerly productive agricultural lands with urban development land covers.

Reasonably foreseeable future projects in the EIS/EIR Planning Area that could remove Important Farmland include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the Wilton Rancheria Casino, and construction of the

California High-Speed Rail and the California WaterFix projects (Section 3.7.2, Reasonably Foreseeable Other Actions). Outside the EIS/EIR Planning Area in the remainder of the study area, SACOG (2016) projects that urban development, rural residential development, and transportation projects have the potential to impact 2,466 acres of Prime Farmland, 746 acres of Unique Farmland, and 2,243 acres of Farmland of Statewide Importance for a combined potential impact to 5,455 acres of FMMP-designated farmland.

To address the loss of farmland, many state and local laws and requirements to protect farmland resources have been enacted (see Section 6.1.1). In Sacramento County, these requirements prescribe actions such as a 1:1 replacement for projects that convert more than 50 acres of Important Farmland and the encouragement to support the Williamson Act program to ensure a temporary protection of farmland resources. Based on Sacramento County General Plan Policy AG-5 (Sacramento County 2011), each conversion of less than 50 acres of Important Farmland as part of present and reasonably foreseeable actions would be considered a less-than-significant adverse impact not requiring mitigation. However, the cumulative effects of multiple conversions of less than 50 acres of Important Farmland would be cumulatively significant. Significant adverse cumulative effects from current and reasonably foreseeable future activities would be identified and mitigated according to General Plan policies. However, even with these policies in place, as indicated in the incorporated impact analysis from the General Plan EIRs for Sacramento County (2010), Galt (2009b), and Rancho Cordova (2006b), the cumulative effects of planned urban growth on existing Important Farmlands would result in a cumulatively significant and unavoidable adverse impact on agriculture resources.

Under the No Action/No Project Alternative, approximately 1,900 acres of planned urban development is expected to be shifted or displaced to locations outside the UDA. The areas expected to receive this urban development include south of the Elk Grove SOI and near Rancho Murieta. These components of the No Action/No Project Alternative would further increase conflicts with land use plans and make a cumulatively considerable (i.e., significant) contribution to the cumulatively significant and unavoidable adverse impact to agriculture that was identified in the General Plan EIRs for Sacramento County (2010), Galt (2009b), and Rancho Cordova (2006b). Therefore, the No Action/No Project Alternative would result in a significant and unavoidable adverse cumulative effect to agricultural resources and agricultural activities.

6.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3, Proposed Action/Proposed Project Alternative.

6.2.3.1 Direct and Indirect Effects of the Proposed Action/Proposed Project Alternative

Under the Proposed Action/Proposed Project Alternative, Covered Activity projects and activities would convert approximately 31,105 acres of the approximately 256,832 acres of Important Farmland in the Planning Area to non-agricultural uses (Table 6-4). As discussed in Section 2.3, nearly all of these effects would be within the UDA. Of the approximately 31,105 acres of Important Farmland that would be converted to a non-agricultural use under the Proposed Action/Proposed Project Alternative, approximately 4,799 acres are under an active Williamson Act contract.

The remainder of Important Farmland in the Planning Area, including approximately 225,727 acres outside the UDA, would not be adversely affected by the Proposed Action/Proposed Project Alternative, including 9,642 acres of Cropland and Irrigated Pasture-Grassland that would be conserved as part of the SSHCP Preserve System (see the following text).

Table 6-4. Impacts on Important Farmland Expected Under the Proposed Action/Proposed Project Alternative

Important Farmland Type	Existing Acres within Planning Area	Acres Removed from Agricultural Use Under this Alternative	New Total within Planning Area at End of Study Period (acres)
Prime Farmland	35,819	275	35,544
Unique Farmland	14,058	1,004	13,054
Farmland of Statewide Importance	39,923	6,049	33,874
Farmland of Local Importance	33,231	7,743	25,488
Grazing Land[1]	133,801	16,035	117,766
Total	**256,832**	**31,105**	**225,727**

Source: CDOC 2014.

[1] The Sacramento County General Plan (Sacramento County 2011) does not require mitigation for impacts to Grazing Land within the USB according to Policy AG-5. However, these acres are still included in the impact total because they are mapped as Important Farmlands.

As described in Section 2.3, the Proposed Action/Proposed Project Alternative would allow urban development Covered Activities within the Mather Core Recovery Area portion of the UDA to be implemented consistently with the approved Sacramento County and Rancho Cordova General Plans without urban development shifting or being displaced to locations outside the UDA. As a result, Important Farmland converted to urban uses outside the UDA would be less under the Proposed Action/Proposed Project Alternative than under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on agricultural resources and activities compared to the No Action/No Project Alternative baseline condition.

As indicated in Section 2.3, under the Proposed Action/Proposed Project Alternative, cropland conservation easements or preserves would be established to allow for continued agricultural production on areas that provide foraging and nesting habitat for several Covered Species, including Swainson's hawk, white-tailed kite (*Elanus leucurus*), and greater sandhill crane.

The Proposed Action/Proposed Project Alternative would preserve approximately 9,642 acres of Cropland and Irrigated Pasture-Grassland under conservation easements or in-fee titles from willing sellers (as part of the approximately 36,038 acres of natural land covers included within the Preserve System). The protected Cropland and Irrigated Pasture-Grassland would generally be located outside the UDA and west of State Route 99 in the Cosumnes River floodplain. ~~Avoidance and Minimization Measure (AMM) EDGE-1 would prioritize compatible adjacent uses next to SSHCP Preserves, such as parks, nature trails, roads, or other uses that would not convert or introduce incompatible land uses or conflict with any existing Williamson Act contracts.~~ Some of the land included within the Preserve System may include Important Farmland or land currently enrolled in a Williamson Act contract; however, establishment of preserves would not convert Important Farmland to developed uses or prevent farmers/ranchers from using their agricultural land for agricultural purposes. Therefore, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect to agriculture resources and agricultural activities relative to the No Action/No Project Alternative baseline condition. Further, under the Proposed Action/Proposed Project Alternative, the "Right-to-Farm" ordinances and General Plan policies enacted by Sacramento County and Rancho Cordova (described in Section 6.1.1) would also still apply and protect agricultural operations from indirect effects of urban development and incompatible uses.

Much, if not all, of the Cropland Preserves would include Important Farmland. That would also be true for many acres of other preserve types established under the Proposed Action/Proposed Project Alternative. Similarly, many of the areas protected under conservation easement or in fee-title preserves would be under a Williamson Act contract. Each Williamson Act contract is unique, and some may restrict the possible terms allowed for a conservation easement. If a conservation easement were proposed for land that is in a Williamson Act contract, the future Permittees would review the specifics of the Williamson Act contract to ensure that the establishment of a conservation easement is allowable.

Cropland Preserves would be established primarily by purchase of conservation easements from willing landowners. The conservation easement would identify the types of crops to provide habitat for Covered Species, timing for harvest, crop rotations, or other measures that benefit targeted Covered Species, as agreed to in the conservation easement purchase and as described in the SSHCP document. Active agricultural lands placed under a conservation easement would be kept in active agricultural use. Management plans would be developed

with landowners and would be periodically reviewed, which could provide landowners the opportunity to adaptively manage land management activities.

Of the Important Farmland included in the proposed SSHCP Preserve System, a substantial amount would be located on lands that the state's FMMP designates as Grazing Land (CDOC 2013, 2014). Generally, grazing on SSHCP Preserves would continue because grazing is beneficial for the Vernal Pool Ecosystem (see Chapter 8, Natural Land Cover Habitat Types and Associated Plant and Animal Communities). Existing grazing leases or licenses on the properties that become part of the SSHCP Preserve System would remain in effect, and the current grazing regimen would be continued until a Preserve Management Plan (Section 2.3.6, SSHCP Preserve Management and Monitoring Programs) is prepared. The Preserve Management Plan would specify the timing of grazing, how many animals can graze at one time, the duration of grazing, and how much vegetation should be present on a grazed area, and would be reviewed annually with the livestock operator. Therefore, establishment of preserves under the Proposed Action/Proposed Project Alternative would not convert Important Farmland to developed uses or prevent farmers/ranchers from using their agricultural land for agricultural purposes. A small amount of Cropland or Irrigated Pasture-Grassland may be converted to an aquatic resource land cover type from the re-establishment or establishment of Riparian Woodland, Vernal Pools, or Seasonal Wetlands under the Proposed Action/Proposed Project Alternative. Although these changes in land cover type are not considered agricultural conversion under the Sacramento County, Galt, or Rancho Cordova General Plans, under the Proposed Action/Proposed Project Alternative, the change in land cover would be mitigated as a loss of species habitat. Establishment of preserves under the Proposed Action/Proposed Project Alternative would have ***No Impact*** on agriculture, which is the same for preserves established under the No Action/No Project Alternative baseline condition.

Preservation, re-establishment/establishment, and management of species habitat may result in the expansion (colonization or increased numbers) of some Covered Species. The SSHCP includes a Good Neighbor Program (refer to Chapter 11 in the SSHCP document) that extends Incidental Take Permit coverage for willing participants on any agricultural lands within 0.5 mile of an SSHCP Preserve. Therefore, this would be a ***Minor Beneficial*** effect to agricultural activities relative to the No Action/No Project Alternative baseline condition.

6.2.3.2 Significance of Direct and Indirect Effects

Compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would result in the following:

- Conversion of approximately 1,100 fewer acres of Important Farmland to non-agricultural uses

- New land uses that conflict with 32 more acres of land that have existing Williamson Act contracts
- Fewer incompatible uses near existing agricultural uses by not displacing 1,900 acres of new urban development to locations outside the UDA
- Fewer incompatible uses near existing agricultural by implementing an AMM that emphasizes placement of compatible uses adjacent to Cropland Preserves

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative on all of the agricultural resource impact criteria, the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects to agriculture when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

6.2.3.3 Cumulative Effects of the Proposed Action/Proposed Project Alternative

As described in Sections 3.7, past and present urban development projects and activities have resulted in loss of Important Farmland in the study area. The EIRs prepared for the Sacramento County, Galt, and Rancho Cordova General Plans (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006b) concluded that development consistent with these plans would result in significant and unavoidable adverse cumulative impacts to Important Farmland.

Reasonably foreseeable future projects that could remove additional Important Farmland include expansion of the Rancho Murieta development, urban development in the Elk Grove SOI, development of the Wilton Rancheria Casino, and construction of the California High-Speed Rail and the California WaterFix projects. Outside the EIS/EIR Planning Area in the remainder of the study area, SACOG (2016) projects that urban development, rural residential development, and transportation projects have the potential to impact 2,466 acres of Prime Farmland, 746 acres of Unique Farmland, and 2,243 acres of Farmland of Statewide Importance for a combined potential impact to 5,455 acres of FMMP designated farmland.

Present and reasonably foreseeable other projects in the Planning Area would comply with policies of Sacramento County, Galt, and Rancho Cordova described in Section 6.1.1. Those policies are designed to protect agricultural resources and require agencies or project proponents to mitigate for the loss of Important Farmland, which would provide a mechanism to ensure that potential impacts associated with the loss of farmland are appropriately addressed. However, the loss of Important Farmland from past, present, and reasonably foreseeable future projects under the Proposed Action/Proposed Project Alternative would still be considered cumulatively significant adverse, which is the same as the cumulative impact analysis of the No Action/No Project Alternative.

Urban development under the Proposed Action/Proposed Project Alternative would contribute to cumulative impacts by converting 32,060 acres of natural land in the UDA, including areas with Important Farmland. Compared to the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative would not result in shifting or displacement of new development to areas located outside the UDA, such as south of the Elk Grove SOI where nearly all of the land is currently in agricultural production. In addition, the Proposed Action/Proposed Project Alternative would result in mitigation for all Covered Activity impacts to agricultural lands. Under the No Action/No Project Alternative, existing Sacramento County General Plan Policy AG-5 (Sacramento County 2011) only requires mitigation for loss of agricultural lands for projects converting more than 50 acres of Important Farmland. Therefore, urban development under the Proposed Action/Proposed Project Alternative would have a smaller incremental contribution to cumulative impacts on agriculture and agricultural activities than the No Action/No Project Alternative baseline condition.

Establishment and management of preserves under the Proposed Action/Proposed Project Alternative would not contribute substantially to cumulative effects on agriculture because any changes to existing agricultural operations within SSHCP Preserves would be minor and would not substantially change agricultural use of study area croplands. Further, compared to the No Action/No Project Alternative baseline conditions, the Proposed Action/Proposed Project Alternative would preserve 10,000 acres more of Valley Grassland outside the UDA in perpetuity, and these 10,000 acres would be kept available for grazing.

Because the Proposed Action/Proposed Project Alternative would not result in urban development shifted or displaced to outside the UDA, and would result in more preservation of Important Farmlands and grazing lands as compared to the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative's incremental contribution to cumulative impacts on agriculture resources would be less than that described for the No Action/No Project Alternative in Section 6.2.2.2, Cumulative Effects of the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial Cumulative*** effect on agriculture compared to the No Action/No Project Alternative baseline condition.

6.2.4 Reduced Permit Term Alternative

The Reduced Permit Term Alternative is described in Section 2.4, Reduced Permit Term Alternative. Section 6.2.4.1, Direct and Indirect Effects of the Alternative, presents separate determinations for each of the adverse and beneficial criterion (listed in Section 6.2.1). Section 6.2.4.2, Significance of Direct and Indirect Effects, weighs all of those separate determinations to present one "bottom-line" determination statement for the significance of the direct and indirect effects of the Reduced Permit Term Alternative on agriculture. Finally, Section 6.2.4.3,

Cumulative Effects of the Reduced Permit Term Alternative, describes the cumulative effects of past, present, and reasonably foreseeable other projects in the cumulative study area, and then considers the incremental contribution made by the Reduced Permit Term Alternative to those cumulative effects.

6.2.4.1 Direct and Indirect Effects of the Alternative

Under the Reduced Permit Term Alternative, Covered Activities would convert approximately 30,485 acres of the approximately 256,946 acres of Important Farmland in the Planning Area to non-agricultural uses (Table 6-5). Of the approximately 30,485 acres of Important Farmland that would be converted to a non-agricultural use under the Reduced Permit Term Alternative, approximately 4,900 acres are currently under an active Williamson Act contract.

The remainder of Important Farmland in the Planning Area, including acres of active cropland that would be conserved as part of the Preserve System established during the 30-year permit term, would not be adversely affected by the Reduced Permit Term Alternative.

Table 6-5. Impacts on Important Farmland due to Covered Activities under the Reduced Permit Term Alternative

Important Farmland Type	Existing Acres within Planning Area	Impacts on Each Farmland Type (acres)			New Total within Planning Area (acres)
		Years 1–30	*Years 31–50*	*Total*	
Prime Farmland	35,731	237	83	321	35,410
Unique	14,060	274	464	738	13,322
Farmland of Statewide Importance	39,998	1,280	4,746	6,027	33,971
Farmland of Local Importance	33,316	4,751	2,167	6,917	26,399
Grazing Land[1]	133,841	9,570	6,912	16,482	117,358
Total	**256,946**	**16,113**	**14,372**	**30,485**	**226,460**

Source: CDOC 2014.

1. The Sacramento County General Plan (Sacramento County 2011) does not require mitigation for impacts to Grazing Land in the USB according to Policy AG-5. However, these acres are still included in the impact total because they are mapped as Important Farmland.

Under the Reduced Permit Term Alternative, approximately 896 acres more of natural land covers within in the Mather Core Recovery Area would be directly impacted, and 597 acres more of direct impacts to natural land covers in the UDA outside the Mather Core Recovery Area compared to the No Action/No Project Alternative would occur. As described in Section 2.4, the Reduced Permit Term Alternative would allow urban development Covered Activities within the Mather Core Recovery Area portion of the UDA to be implemented consistent with the approved Sacramento County and Rancho Cordova General Plans, without urban development shifting or being displaced to locations outside the UDA. As a result, acres of Important Farmland

changed to urban development would be less under the Reduced Permit Term Alternative as compared to the No Action/No Project Alternative. Therefore, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on Important Farmland as compared to the impacts of the No Action/No Project Alternative baseline condition.

Under the Reduced Permit Term Alternative, the "Right-to-Farm" ordinances and General Plan policies enacted by Sacramento County and Rancho Cordova (described in Section 6.1.1) would apply and would protect agricultural operations from indirect effects of urban development during the EIS/EIR 50-year study period, including the 30-year permit term of the Reduced Permit Term Alternative. ~~Additional protections for agricultural operations would be provided by the Reduced Permit Term Alternative during the 30-year permit term by AMM EDGE-1, which would limit incompatible uses adjacent to Cropland Preserves~~. This would be ~~a ***Minor Beneficial impact***~~ ***No Impact*** to agricultural resources and agricultural activities relative to the No Action/No Project Alternative.

Much, if not all, of the Cropland Preserves would include Important Farmland. That would also be true for many acres of other preserve types established under the Reduced Permit Term Alternative. Similarly, many of the areas protected under conservation easement or in fee-title preserves would be under a Williamson Act contract. Each Williamson Act contract is unique, and some may restrict the possible terms allowed for a conservation easement. If a conservation easement were proposed for land that is in a Williamson Act contract, the future Permittees would review the specifics of the Williamson Act contract to ensure that the establishment of a conservation easement is allowable.

Of the Important Farmland included in the Reduced Permit Term Alternative's Preserve System, a substantial amount would be located on lands that the state's FMMP designates as Grazing Land (CDOC 2013, 2014). This would include the large landscape-scale preserve outside the UDA. Generally, grazing on SSHCP Preserves would continue because grazing is beneficial for the Vernal Pool Ecosystem (see Chapter 8). Existing grazing leases or licenses on the properties that receive conservation easements or are purchased in fee-title for SSHCP Preserves would remain in effect, and the current grazing regime would be continued until a management plan was prepared for the preserve. The Preserve Management Plan would specify the timing of grazing, how many animals can graze at one time, the duration of grazing, and how much vegetation should be present on a grazed area, and would be reviewed annually with the livestock operator. Therefore, establishment of preserves under the Reduced Permit Term Alternative would not convert Important Farmland to developed uses or prevent farmers/ranchers from using their agricultural land for agricultural purposes.

Cropland Preserves established during the 30-year permit term would be in large blocks to allow for continued agricultural production and would be protected through purchase of conservation

easements or fee-title purchases from willing sellers. Cropland Preserves established during the 30-year permit term (as part of the approximately 30,646 acres of natural land covers included within the Preserve System during the permit term) would include approximately 11,334 acres of row crops and Irrigated Pasture-Grassland. The Cropland Preserves would be almost entirely outside the UDA.

As outlined in Section 2.4.3, Covered Activities/Projects Under the Reduced Permit Term Alternative, after the 30-year permit term expires, mitigation preserves would continue to be established on a project-by-project basis as project mitigation for impacts to aquatic resources or listed species. It is expected that Cropland Preserves established after the end of the 30-year permit term (during Years 31–50 of the EIS/EIR 50-year study period) would comply with Sacramento County's Swainson's hawk ordinance to mitigate project effects on Swainson's hawk habitat. During Years 31–50 of the EIS/EIR 50-year study period, Sacramento County's agricultural protection ordinance (Section 6.1.2) would also continue to require that impacts to Important Farmland be mitigated by preserving Important Farmlands, preferably outside the USB boundary, when more than 50 acres are impacted by a project.

~~AMM EDGE-1 would prioritize compatible adjacent uses next to SSHCP Preserves, such as parks, nature trails, roads, or other uses that would not convert or introduce incompatible land uses or conflict with any existing Williamson Act contracts.~~ Some of the land included within the Preserve System may include important farmland or land currently enrolled in a Williamson Act contract; however, establishment of preserves would not convert Important Farmland to developed uses or prevent farmers/ranchers from using their agricultural land for agricultural purposes. Therefore, establishment of preserves under the Reduced Permit Term Alternative would have ***No Impact*** on agriculture compared to the No Action/No Project Alternative baseline condition.

Preservation, re-establishment/establishment, and management of species habitat may result in the expansion (colonization or increased numbers) of some Covered Species. As in the Proposed Action/Proposed Project Alternative, the Reduced Permit Term Alternative would include a Good Neighbor Program (refer to Chapter 11 in the SSHCP document) that extends Incidental Take Permit coverage for willing participants for any agricultural lands within 0.5 mile of an SSHCP Preserve. Therefore, this would be a ***Minor Beneficial*** effect to agricultural activities relative to the No Action/No Project Alternative baseline condition.

6.2.4.2 Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would result in the following:

- Conversion of approximately 1,720 fewer acres of Important Farmland to non-agricultural uses

- Land uses that conflict with 133 more acres of land with existing Williamson Act contracts
- Fewer incompatible uses near existing agricultural uses by not displacing development outside the UDA and by implementing an AMM during the 30-year permit term that emphasizes placement of compatible uses adjacent to Cropland Preserves

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on all of the agricultural resource impact criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to agriculture compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

6.2.4.3 Cumulative Effects of the Reduced Permit Term Alternative

As described in Section 3.7, past and present urban development projects and activities have resulted in loss of Important Farmland in the agricultural resource study area. The EIRs prepared for the Sacramento County, Galt, and Rancho Cordova General Plans *(*Sacramento County 2010, Galt 2009b, Rancho Cordova 2006b) concluded that current and future development consistent with these plans would result in significant and unavoidable adverse impacts to Important Farmland (Sacramento County 2010, pp. 3-47 to 3-60; Galt 2009b, pp. 8-25 to 8-28; Rancho Cordova 2006b, pp. 4.2-17 to 4.2-24).

Reasonably foreseeable future projects, not included in the description of this alternative, that could remove additional Important Farmland include expansion of the Rancho Murieta development, urban development in the Elk Grove SOI, development of the Wilton Rancheria Casino, and construction of the California High-Speed Rail and the California WaterFix projects (see Section 3.7.2). SACOG (2016) projects that outside the EIS/EIR Planning Area in the remainder of the study area, urban development, rural residential development, and transportation projects have the potential to impact 2,466 acres of Prime Farmland, 746 acres of Unique Farmland, and 2,243 acres of Farmland of Statewide Importance for a combined potential impact to 5,455 acres of FMMP-designated farmland.

To address the loss of farmland, many state and local laws and requirements to protect farmland resources have been enacted (see Section 6.1.1). For example, in Sacramento County, these requirements prescribe actions such as a 1:1 replacement for projects that convert more than 50 acres of Important Farmland and the encouragement to support the Williamson Act program to ensure a temporary protection of farmland resources. Based on the Sacramento County General Plan Policy AG-5 (2011), each conversion of less than 50 acres of Important Farmland as part of present and reasonably foreseeable actions would be considered a less-than-significant adverse impact not requiring mitigation. However, the cumulative effects of multiple conversions of less than 50 acres of Important Farmland would be cumulatively significant. Significant adverse cumulative effects from current and reasonably foreseeable

future activities would be identified and mitigated according to General Plan policies. However, even with these policies in place, the cumulative effects of past, present, and reasonably foreseeable other projects on existing Important Farmland would result in a cumulatively significant adverse impact on agriculture resources.

Urban development under the Reduced Permit Term Alternative would contribute to cumulative impacts by converting approximately 35,367 acres of natural land, including areas with Important Farmland. Compared with the No Action/No Project Alternative, the Reduced Permit Term Alternative would not result in shifting or displacement of development to areas located outside the UDA, such as south of the Elk Grove SOI where nearly all of the land is currently in agricultural production. In addition, the Reduced Permit Term Alternative would result in mitigation for any Covered Activity impacts to agricultural lands during the 30-year permit term. Under the No Action/No Project Alternative, existing Sacramento County General Plan Policy AG-5 (2011) only requires mitigation for loss of agricultural lands for projects converting more than 50 acres of Important Farmland. Therefore, urban development under the Reduced Permit Term Alternative would have a smaller incremental contribution to cumulative impacts on agriculture and agricultural activities than the No Action/No Project Alternative baseline condition.

Establishment and management of mitigation lands, preserves, and open space under the Reduced Permit Term Alternative would not contribute substantially to cumulative effects on agriculture because the minor restrictions on agricultural operations within SSHCP Cropland Preserves would not substantially change agricultural use of Planning Area croplands. Further, under the Reduced Permit Term Alternative, more than 22,014 acres of Valley Grassland outside the UDA would be preserved during the 30-year permit term in perpetuity and kept available for grazing in compliance with an approved Preserve Management Plan.

Because the Reduced Permit Term Alternative would avoid urban development outside the UDA and increase preservation of Important Farmland and grazing lands compared to the No Action/No Project Alternative, the Reduced Permit Term Alternative's contribution to cumulative impacts on agriculture would also be less than that described for the No Action/No Project Alternative. Thus, the Reduced Permit Term Alternative would have a ***Minor Beneficial Cumulative*** effect to agriculture compared to the cumulative impact analysis of the No Action/No Project Alternative baseline condition.

6.3 REFERENCES CITED

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

CDOC (California Department of Conservation). 2013. "Important Farmland Map Categories." California Department of Conservation, Farmland Mapping and Monitoring Program. Accessed May 16, 2013. http://www.conservation.ca.gov/dlrp/fmmp/mccu/Pages/map_categories.aspx.

CDOC. 2014. "Sacramento County, 2014" [GIS data]. California Department of Conservation, Farmland Mapping and Monitoring Program. Accessed May 13, 2016. ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/2014/.

CDOC. 2016. "Sacramento County Williamson Act FY 2015/2016" [map]. 1:100,000. Sacramento, California: Department of Conservation, Division of Land Resources Protection. Accessed May 13, 2016. ftp://ftp.consrv.ca.gov/pub/dlrp/wa/Sacramento_15_16_WA.pdf.

Delta Protection Commission. 2010. "Agriculture." In *Land Use and Resource Management Plan for the Primary Zone of the Delta*. Sacramento, California: Delta Protection Commission. Adopted February 25, 2010. Accessed July 6, 2016. http://www.delta.ca.gov/res/docs/LURMP/Land%20Use%20and%20Resource%20Management%20Plan%202.25.10_.pdf.

Galt. 2009a. *2030 Galt General Plan Policy Document*. Final. Prepared by Mintier Harnish, in association with Environmental Science Associates, Applied Development Economics, and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *City of Galt General Plan Update: 2030 Final EIR*. Final. SCH No. 2007082092. Prepared by Environmental Science Associates, in association with Mintier Harnish, Applied Development Economics, and Omni Means. Sacramento, California: Environmental Science Associates. March 2009. Accessed June 29, 2016. http://www.saclafco.org/SphereofInfluenceInformation/Documents/galtsoi/sac_024063.pdf.

Rancho Cordova. 2006a. *City of Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report*. SCH No. 2005022137. Rancho Cordova, California: City of Rancho Cordova. June 2006. Accessed June 29, 2016. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

Rancho Cordova. 2016. *Rancho Cordova Municipal Code*. Last updated December 19, 2016. Accessed January 2017. http://www.codepublishing.com/CA/RanchoCordova/.

SACOG (Sacramento Area Council of Governments). 2016. *SACOG Handbook for 2016*. Sacramento, California: SACOG. Accessed November 23, 2016. http://www.sacog.org/sites/main/files/file-attachments/sacog_handbook_2016.pdf.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105. SCH No. 2007082086. Sacramento, California: Sacramento County, Department of Environmental Review and Assessment. April 2010. Accessed June 29, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County. 2016. *Sacramento County Code*. Last updated July 2016. Accessed January 26, 2017. http://qcode.us/codes/sacramentocounty/.

CHAPTER 7 – HYDROLOGY AND WATER QUALITY

Chapter 7 presents the existing conditions and analyzes the effects of each Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) alternative on groundwater hydrology, surface water hydrology, and the water quality of surface waters and groundwater.

The hydrology and water quality of the rivers, streams, creeks, and ephemeral drainages of the Planning Area are discussed and analyzed here in Chapter 7, but these land covers are also discussed and analyzed as natural habitat for native plants and animals in Chapter 8, Natural Land Cover Habitats and Associated Plant and Animal Communities, and in Chapter 10, Aquatic Resources, as aquatic resources regulated by the Clean Water Act, California Porter-Cologne Act, and by other federal, state, or local regulations and policies.

7.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

7.1.1 Regulatory Framework

Several federal, state, regional, and local agencies regulate project effects to hydrology and water quality within the Planning Area. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, permitting, or implementation of the alternatives analyzed in this EIS/EIR. This section also identifies any relevant federal permits or other entitlements that must be obtained before implementing the alternatives. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 7.2 (40 CFR 1502.25).

7.1.1.1 Federal and State

The federal and state regulations relevant to Planning Area project and activity effects on floodplain management and surface water quality are addressed together because the state is generally delegated authority to implement and enforce the federal regulations.

National Flood Insurance Program/Executive Order 11988 (Floodplain Management)

The Federal Emergency Management Agency (FEMA) is responsible for determining flood elevations based on available studies. Pursuant to the National Flood Insurance Program Final Rule, FEMA is also responsible for developing the Flood Insurance Rate Maps, which are used in the National Flood Insurance Program. The Flood Insurance Rate Maps denote the location of the federal 100-year flood area, 500-year flood area, and the base flood elevation. In a 100-year floodplain, there is a 1% chance of flooding in a given year, and in a 500-year floodplain, there is a 0.2% chance of flooding in a given year. If an area is within a 100-year floodplain, flood insurance is required by most mortgage companies. FEMA's existing 100-year floodplain map of the Planning Area is discussed below in Section 7.1.2. Under the National Flood Insurance Program, local land-use authority agencies typically cannot approve urban residential and

nonresidential development structures proposed within the regulatory floodplain (typically the 100-year floodplain), if that development is subject to, or results in, flood water over 1 foot in elevation. In addition, local land-use authority agencies cannot approve development in delineated floodways within the floodplain.

Executive Order 11988 (Carter 1977) applies to federally funded projects or activities and requires federal agencies to recognize the significant values of floodplains, avoid development within the 100-year floodplain where feasible, minimize and reduce flooding hazards, and consider the public benefits that would be realized from restoring and preserving floodplains.

State Plan of Flood Control

The Central Valley Flood Protection Act of 2008 (authorized by Senate Bill 5) directed the California Department of Water Resources (DWR) and the Central Valley Flood Protection Board to prepare a comprehensive flood protection plan for the California Central Valley. The resulting State Plan of Flood Control (DWR 2010) established a system-wide approach to improving flood management in the areas currently receiving some amount of flood protection from existing federal, state, and local flood control facilities. In addition, the State Plan of Flood Control provides recommended structural and nonstructural means for improving performance and eliminating the deficiencies of flood management facilities, while also addressing ecosystem and other water-related issues. The flood legislation also established the 200-year flood event (flood with a 1-in-200 chance of occurring in any year) as the minimum level of flood protection to be provided in urban and urbanizing areas. Additionally, cities and counties in the Central Valley must incorporate the data, policies, and implementation measures of the State Plan of Flood Control into their general plans (see discussion of Planning Area general plans in Section 3.4, Previous Planning Area Environmental Reviews). Development within designated floodways and floodplains must acquire an encroachment permit from the Central Valley Flood Protection Board.

Rivers and Harbor Act

The Rivers and Harbors Act addresses projects and activities in navigable waters and harbor and river improvements. Section 14 of the Rivers and Harbors Act (33 U.S.C. 408) provides that the secretary of the Army, on recommendation of the chief of engineers, may grant permission of the temporary or permanent occupation or alteration of any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States so long as the occupation or alteration is not injurious to the public interest and will not impair the usefulness of the project. This permission will be granted by an appropriate real estate instrument in accordance with existing real estate regulations. Reviews under 33 U.S.C. 408 are conducted by the U.S. Army

Corps of Engineers (USACE) Sacramento District's Flood Protection and Navigation Section. The USACE responses are provided to the Central Valley Flood Protection Board.

Clean Water Act

The Clean Water Act (CWA) is the federal statute addressing surface water quality; it does not address either groundwater or water quantity. It was enacted with the goal of restoring and maintaining "the chemical, physical, and biological integrity of the Nation's waters," which includes surface waters that are either navigable or connected to navigable water (33 U.S.C. 1251 et seq.). The CWA prohibits discharge of pollutants to surface waters from point and nonpoint sources unless authorized by appropriate permits. The law authorizes the U.S. Environmental Protection Agency (EPA) to set point-source effluent limitations for industry and publicly owned treatment works, and requires states (or U.S. EPA in the event of a state default) to set water quality standards for contaminants in surface waters. The provisions of the CWA are administered and regulated in the Planning Area primarily by the U.S. EPA, California EPA, USACE, and the State Water Resources Control Board (SWRCB).

Under CWA Section 303(d), states are required to develop lists of water bodies that would not attain water quality standards after implementation of required levels of treatment by point-source dischargers (municipalities and industries). CWA 303(d) requires that the state develop a total maximum daily load (TMDL) for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings for point and nonpoint sources, with consideration of background loadings and a margin of safety to the allowable load.

Under CWA Section 402, the National Pollutant Discharge Elimination System (NPDES) program regulates the discharge of waste into waters of the United States. NPDES permit regulations apply to broad categories of discharges, including point-source municipal wastewater discharges and nonpoint-source stormwater runoff. NPDES permits typically identify the following:

- Effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge;
- Prohibitions on discharges not specifically allowed under the permit; and
- Provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

Under CWA Section 401, projects and activities that require federal authorization for the discharge of a pollutant into waters of the United States under CWA Section 404 must also obtain

a CWA Section 401 water quality certification from the state in which the discharge would originate. In California, U.S. EPA has delegated the authority to grant water quality certifications to the SWRCB, which are typically processed by the Regional Water Quality Control Boards with local jurisdiction. The Planning Area is located within the jurisdiction of the Central Valley Regional Water Quality Control Board (Central Valley RWQCB). A water quality certification requires the project or activity to evaluate its potential impacts and implement appropriate measures to protect water quality and comply with regulatory water quality standards. The issuance of CWA 404 authorizations by the USACE for the discharge of dredged and fill materials into waters of the United States is a typical federal action that requires CWA Section 401 water quality certification.

National Toxics Rule and California Toxics Rule

In 1992, pursuant to the CWA, the U.S. EPA promulgated the National Toxics Rule criteria to establish numeric criteria for priority toxic pollutants for California. At the time the National Toxics Rule was established, it provided water quality standards for 42 pollutants that were not covered under California's statewide water quality regulations. Additionally, a 1994 court order revoked California's statewide water quality control plan for priority pollutants. U.S. EPA subsequently developed and promulgated additional numeric water quality criteria for priority pollutants with the adoption of the California Toxics Rule (U.S. EPA 2000). The California Toxics Rule "carried forward" the promulgated criteria of the National Toxics Rule, thereby providing a single document listing California's fully adopted and applicable water quality criteria for 126 priority pollutants.

Porter–Cologne Water Quality Control Act

The Porter–Cologne Water Quality Control Act is the principal law regulating water quality in California; it also incorporates many provisions of the federal CWA. This act established the SWRCB and nine regions, each overseen by RWQCBs, for protection of the quality of the state's surface and groundwater supplies and enforcement of the CWA. Water quality control plans (i.e., "Basin Plans") for each region identify beneficial uses of water to be protected, and they establish water quality objectives necessary to support the designated beneficial uses of water resources. Basin Plans also contain implementing pollution control and resource management actions needed to maintain existing water quality conditions and bring water bodies into compliance with water quality objectives where impaired. Under the Porter–Cologne Water Quality Control Act, waste discharges that occur to water or land that have potential to affect water quality may be issued Waste Discharge Requirements by the Central Valley RWQCB, or they may be waived if the waste discharge does not significantly affect water quality.

The Planning Area is located within the jurisdiction of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) (CVRWQCB 2015a). The Basin Plan contains specific numeric water quality objectives for designated constituents of concern in surface water bodies. Constituents of concern generically refer to any type of physical property, chemical, or biological parameter in a water body (e.g., coliform bacteria, dissolved oxygen, pH, pesticides, electrical conductivity, total dissolved solids, temperature, turbidity, and trace elements) that may adversely affect a beneficial use (e.g., drinking water quality, industrial and agricultural water supplies, aquatic life, recreation). The Basin Plan includes numeric water quality objectives that apply basin-wide, as well as specific objectives applicable only in certain surface water bodies or portions of water bodies. Additionally, the Basin Plan contains narrative basin-wide surface water quality objectives that specify broad water quality goals and minimum acceptable water quality conditions.

Groundwater quality objectives specified in the Basin Plan (CVRWQCB 2015a) consist primarily of the statewide drinking water quality standards set forth in Title 22 of the California Code of Regulations. The Title 22 primary drinking water quality standards specify the maximum allowable concentrations for numerous constituents for the protection of human health (e.g., bacterial, inorganic compounds, trace metal, and organic parameters). Title 22 secondary drinking water standards are set for constituents of concern that pose nuisance, taste, or odor concerns (e.g., salinity, iron, manganese).

The state's antidegradation policy (SWRCB Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California) is designed to maintain high-quality waters in the state. The antidegradation policy requires protection of all existing beneficial uses that existed in 1968 at the time of the policy adoption, and it specifies that degradation of high-quality water is only permissible when it is demonstrated to the SWRCB that beneficial uses would not be unreasonably affected, and the highest quality water consistent with the maximum benefit to the state would be achieved.

California NPDES General Construction Stormwater Permit

The SWRCB adopted a statewide general NPDES permit for stormwater discharges associated with construction activity (Construction General Permit) in Order No. 2009-0009-DWQ (as amended by revised orders 2010-0014-DWQ and 2012-006-DWQ). The Construction General Permit applies to projects that involve soil disturbance of more than 1 acre, and includes specific requirements based on the "risk level" of erosion at the site. The risk level is dependent on the project's sediment runoff risk and risk to receiving water bodies. Obtaining coverage under the Construction General Permit requires filing of a Notice of Intent and preparing and implementing a stormwater pollution prevention plan, which specifies best management

practices (BMPs) to reduce or eliminate construction-related sediment and other pollutants in stormwater as well as non-stormwater discharges.

Central Valley RWQCB Irrigated Lands Regulatory Program

The Irrigated Lands Regulatory Program is administered by the Central Valley RWQCB to regulate discharges from irrigated agricultural lands. The Irrigated Lands Regulatory Program is relevant to the scope of the impact assessments presented in Section 7.2 because it addresses water quality for substantial areas of land that might contribute to waste discharges that contribute to surface and groundwater conditions. The Central Valley RWQCB issues Waste Discharge Requirements to "third party" organizations of growers, which are designed to protect surface water and groundwater quality.

The Sacramento Water Quality Coalition is an organization of commercial agricultural operators (including nurseries and managed wetlands) in the northern Sacramento Valley, including the Planning Area. The Sacramento Water Quality Coalition was issued Waste Discharge Requirements under the Irrigated Lands Regulatory Program (Order R5-2014-0030-R1) (CVRWQCB 2015b). The Waste Discharge Requirements include development and implementation of constituent-specific Surface Water/Groundwater Quality Management Plans when monitoring indicates exceedances of water quality objectives.

7.1.1.2 Regional

The Water Forum Agreement

The Water Forum Agreement is an agreement established in 2000 among local governments, municipal water purveyors, agricultural water districts, businesses, and citizen groups in Sacramento County, western Placer County, and western El Dorado County. The purpose of the Water Forum Agreement is to facilitate these stakeholders' ability to provide for reliable and safe water supplies, economic health, and planned development through the year 2030 while preserving the fishery, wildlife, recreational, and aesthetic values of the Lower American River. The Water Forum Agreement includes seven elements addressing surface water diversions, groundwater management, dry-year water supplies, water conservation, and instream flow standards and habitat management for the Lower American River (Sacramento City-County Office of Metropolitan Water Planning 1999).

Management of available groundwater resources in response to the future municipal (including industrial) and agricultural demands for groundwater is a key component of the Water Forum Agreement (and the Water Forum successor efforts), which have resulted in active groundwater planning and management efforts in the Planning Area and surrounding communities. The safe yield of an aquifer refers to the amount of groundwater that can be

used without resulting in adverse effects, such as wells going dry, land subsidence, and groundwater quality degradation. The safe yields of the Central and South Groundwater Basins (Figure 7-1) were identified in the Water Forum Agreement as 273,000 acre-feet per year (AFY) and 115,000 AFY, respectively. The Sacramento Central Groundwater Authority was formed and developed a groundwater management plan for the Central Basin (MWH et al. 2006). The South Area Water Council developed a similar groundwater management plan for the South Basin (Robertson-Bryan Inc. and WRIME 2011).

Sacramento Region NPDES Municipal Stormwater Permit

Sacramento County and the Cities of Sacramento, Galt, Rancho Cordova, Elk Grove, Folsom, and Citrus Heights are co-permittees under a single NPDES Municipal Stormwater Permit for stormwater discharges to their separate municipal storm sewer systems (Central Valley RWQCB Order No. R5-2015-0023, NPDES No. CAS082597). This stormwater discharge NPDES permit is renewed every 5 years, most recently in April 2015. The seven jurisdictions formed the Sacramento Stormwater Quality Partnership to cooperatively implement a Stormwater Quality Improvement Plan (SQIP), which was last updated in 2009 (2009 SQIP) (Sacramento County et al. 2009). The stormwater discharge NPDES permit requires ground-disturbing projects and activities to implement BMPs that avoid or reduce stormwater runoff, soil erosion, and the discharge of pollutants to surface waters to the "maximum extent practicable," which is the performance standard specified in the CWA Section 402(p). Stormwater runoff from urbanized areas (i.e., also known as urban runoff) generally increases as development of additional impervious surfaces occur (e.g., pavement, roofs) that reduces infiltration of rainfall into the soil.

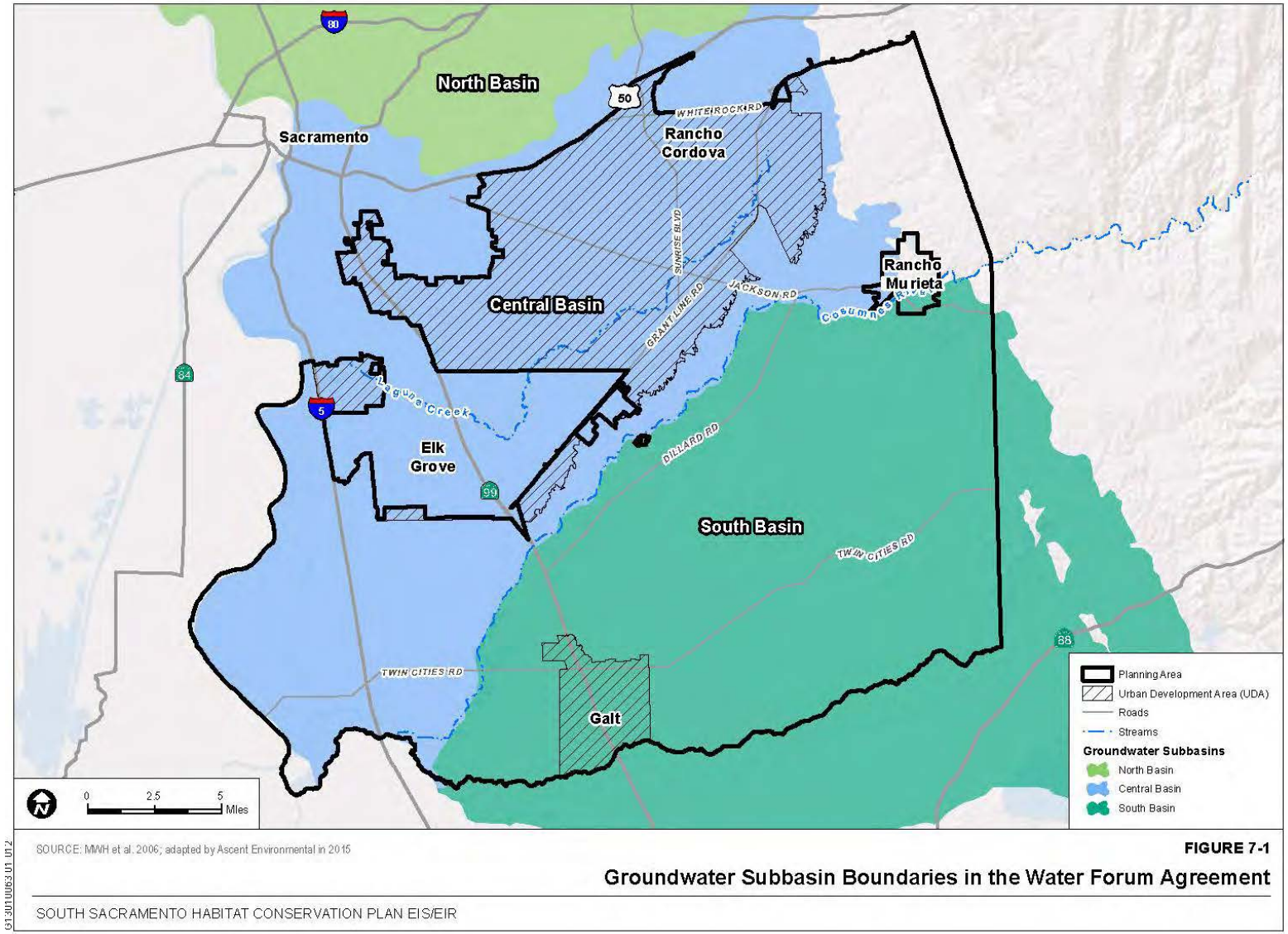
The 2009 SQIP describes the cooperatively implemented stormwater management actions of the Sacramento Stormwater Quality Partnership, as well as the individual stormwater agency programs. The 2009 SQIP addresses six minimum control elements: (1) public education and outreach, (2) public involvement and participation, (3) detection and elimination of illicit discharges, (4) construction stormwater control, (5) postconstruction stormwater control for new development and redevelopment, and (6) pollution prevention/good housekeeping for municipal operations. The 2009 SQIP identifies activities under each program element, performance standards, implementation schedule with milestones, and specific monitoring and assessment activities. The Sacramento Stormwater Quality Partnership develops and implements annual work plans, provides program management, identifies targeted pollutant reduction goals, and conducts commercial/industrial inspections public outreach, monitoring, effectiveness assessments, and reporting activities. The individual local jurisdictions also implement stormwater quality improvement activities, oversee construction of stormwater control facilities, conduct compliance activities, and review new development projects for planning and implementation of appropriate postconstruction stormwater controls.

Sacramento Stormwater Quality Partnership agencies implement construction site management program BMPs that avoid or minimize the amount of erosion, pollutant discharges, and urban runoff and off-site sedimentation resulting from individual development-project construction sites, which helps protect the water quality. Construction management is typically accomplished by each NPDES permittee through code enforcement at the planning and design review stages, ensuring project construction site compliance with the SWRCB's statewide NPDES Construction General Permit, and local enforcement of construction activities.

The Stormwater Quality Partnership has conducted planning and developed approaches and requirements for new development and significant redevelopment postconstruction stormwater control measures. The Sacramento Stormwater Quality Partnership jurisdictions have also prepared and adopted new development standards, developed improved guidance for design of source and treatment control measures specific to Sacramento conditions, added General Plan policies and actions for water quality and watershed protection, and conducted pollutant removal effectiveness studies of proprietary devices and control strategies. Stormwater quality design standards were first developed by the Sacramento Stormwater Quality Partnership in 2007, and most recently updated in the 2014 *Stormwater Quality Design Manual* (Sacramento Stormwater Quality Partnership 2014), which addresses stormwater runoff system hydrology and water quality design requirements for development and significant redevelopment projects.

Pursuant to its stormwater discharge NPDES permit, the Sacramento Stormwater Quality Partnership also developed a Hydromodification Management Plan in 2011 and updated it in October 2017, and it will be integrated into each NPDES permittee's development standards following approval by the Central Valley RWQCB. Hydromodification is defined in the NPDES permit as the "change in the natural watershed hydrologic processes and stormwater runoff characteristics (i.e., interception, infiltration, overland flow, interflow, and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport" (Sacramento Stormwater Quality Partnership 2017)). In terms of the regulatory responsibility of the NPDES permit, hydromodification is primarily concerned with the increases in the magnitude, frequency, volume, and duration of stormwater runoff as a result of urban development that typically increases the amount of impervious surfaces that prevent infiltration of rainfall into the soil and increases amounts of stormwater runoff. The Hydromodification Management Plan outlines stormwater facility design approaches to minimize the changes in stormwater runoff, which in turn better protects receiving streams from increased potential for erosion and other adverse impacts.

Figure 7-1. Groundwater Subbasin Boundaries in the Water Forum Agreement



AGENDA ITEM 11.1
4368

INTENTIONALLY LEFT BLANK

The Coordinated Monitoring Program (CMP), a joint effort of the Sacramento Regional County Sanitation District (Regional San) and the Sacramento Stormwater Quality Partnership, has conducted comprehensive monitoring to evaluate the effects of urban runoff on water quality in the American River and Sacramento River since 1991, and at selected urban tributary stream locations routinely since 2003 (including two locations in Laguna Creek within the Urban Development Area (UDA) portion of the Planning Area). The intent of the CMP is to provide compliance with the NPDES Municipal Stormwater Permit and high-quality data that can be used to support development and implementation of water quality policies and regulations for urban runoff in the Sacramento area. Although the CMP data includes areas extending beyond the Planning Area, the CMP data provides comprehensive information that is representative of ambient and seasonal water quality conditions in the Planning Area.

7.1.1.3 Local

Sacramento County 2030 General Plan

The Agriculture (AG), Circulation (CI), Safety (SA), and Conservation (CO) elements of the *Sacramento County General Plan of 2005*-2030 (Sacramento County General Plan) (Sacramento County 2011) specify goals and objectives for hydrology and water quality management and protection in the Planning Area. Applicable policies include the following:

> **Policy AG-29:** The County shall minimize flood risks to agricultural lands resulting from new urban developments.
>
> **Policy CI-65:** Incorporate Low Impact Design (LID) techniques to the greatest extent feasible to improve water quality, runoff and erosion control, infiltration, groundwater recharge, visual aesthetics, etc.
>
> **Policy SA-5:** A comprehensive drainage plan for major planning efforts shall be prepared for streams and their tributaries prior to any development within the 100-year floodplain defined by full watershed development without channel modifications.
>
> **Policy SA-10:** Fill within the 100-year floodplain of creeks outside of the Urban Service Boundary is permissible to accommodate structures (e.g., residential, commercial, accessory) and septic systems, and only when the Board of Supervisors finds that the fill will not impede water flows or stormwater runoff capacity. Such development shall not cause an increase in base flood elevation of the 100-year floodplain exceeding 0.10 feet, unless analysis clearly indicated that the physical and/or economic use of adjacent property within the floodplain would not be adversely affected. A permit is required if the fill is within the jurisdiction of the Central Valley Flood Protection Board.

Policy SA-14: The County shall require, when deemed to be physically or ecologically necessary, all new urban development and redevelopment projects to incorporate runoff control measures to minimize peak flows of runoff and/or assist in financing or otherwise implementing Comprehensive Drainage Plans.

Policy SA-16: Deny creation of parcels that do not have buildable areas outside the 100-year floodplain unless otherwise allowed in the Floodplain Management Ordinance.

Policy SA-17: For residential zoning, the area outside the 100-year floodplain must be contiguous or reasonably situated to provide buildable area for a residence and associated structures. Examples of structures include swimming pools, sheds, barns, detached garages, and other outbuildings that are normally associated with residential development. There may be exceptions (such as the Delta area) as allowed in the Floodplain Management Ordinance.

Policy SA-22: Areas within a 100-year floodplain shall not be upzoned to a more intensive use unless and until a Master Drainage Plan is prepared that identifies areas of the floodplain that may be developed.

Policy CO-7: Support the Water Forum Agreement Groundwater Management Element. Prior to approving any new development, a water supply plan shall be approved that demonstrates consistency with an adopted groundwater management plan.

Policy CO-8: Applicants proposing developments in areas with significant groundwater recharge characteristics shall evaluate the impact of said development on groundwater recharge and quality. This evaluation should recognize criteria defined in any broader Countywide determination and/or evaluation of groundwater recharge areas.

Policy CO-10: Support local watershed initiatives that enhance groundwater recharge.

Policy CO-11: Support local groundwater management efforts that are consistent with the Water Forum Agreement Groundwater Management Element.

Policy CO-12: Support groundwater recharge in surface mining reclamation plans where feasible.

Policy CO-22: Support water management practices that are responsive to the impacts of Global Climate Change such as groundwater banking and other water storage projects.

Policy CO-23: Development approval shall be subject to a finding regarding its impact on valuable water-supported ecosystems.

Policy CO-24: Comply with the Sacramento NPDES Municipal Stormwater Permit.

Policy CO-25: Support the preservation, restoration, and creation of riparian corridors, wetlands, and buffer zones.

Policy CO-26: Protect areas susceptible to erosion, natural water bodies, and natural drainage systems.

Policy CO-27: Support surface water quality monitoring programs that identify and address causes of water quality degradation.

Policy CO-28: Comply with other water quality regulations and NPDES permits as they apply to County projects or activities, such as the State's Construction General Permit and Aquatic Pesticides Permit.

Policy CO-29: Continue to support the County's participation in regional NPDES Municipal Permit compliance activities through collaborative efforts such as the Sacramento Stormwater Quality Partnership.

Policy CO-30: Require development projects to comply with the County's stormwater development/design standards, including hydromodification management and low impact development standards, established pursuant to the NPDES Municipal Permit.

Policy CO-31: Require property owners to maintain all required stormwater measures to ensure proper performance for the life of the project.

Policy CO-32: Support programs and activities conducted by watershed groups and citizen volunteers that help to ensure compliance with the NPDES Municipal Permit by increasing public awareness and encouraging stewardship of water resources.

Policy CO-88: Where removal of riparian habitat is necessary for channel maintenance, it will be planned and mitigated so as to minimize unavoidable impacts upon biological resources.

Policy CO-89: Protect, enhance and maintain riparian habitat in Sacramento County.

Policy CO-93: Discourage fill in the 100-year floodplain (Please also refer to CO-117).

Policy CO-94: Development within the 100-year floodplain and designated floodway of Sacramento streams, sloughs, creeks or rivers shall be:

- Consistent with policies to protect wetlands and riparian areas; and
- Limited to land uses that can support seasonal inundation.

Policy CO-95: Development within the 100-year floodplain should occur in concert with the development of the Floodplain Protection Zone (please refer to Land Uses Adjacent to Rivers and Streams for information on this Zone).

Policy CO-100: Encourage construction of structures for flood control and stormwater quality purposes using currently approved scientific methods to prevent erosion and stabilize the banks.

Policy CO-101: Stabilize the banks of rivers and streams in a manner that increases flood protection and increases riparian habitat functions.

Policy CO-105: Channel modification projects shall be considered for approval by the Board of Supervisors only after conducting a noticed public hearing examining the full range of alternatives, relative costs and benefits, and environmental, economic, and social benefits.

Policy CO-106: Realigned or modified channels should retain topographic diversity including maintaining meandering characteristics, varied berm width, naturalized side slope, and varied channel bottom elevation.

Policy CO-107: Maintain and protect natural function of channels in developed, newly developing, and rural areas.

Policy CO-109: Channel modifications should not prevent minimum water flows necessary to protect and enhance fish habitats, native riparian vegetation, water quality, or ground water recharge.

Policy CO-111: Channel modifications shall retain wetland and riparian vegetation whenever possible or otherwise recreate the natural channel consistent with the historical ecological integrity of the stream or river.

Policy CO-112: The use of concrete and impervious materials is discouraged where it is inconsistent with the existing adjacent watercourse and overall ecological function of the stream.

Policy CO-114: Protect stream corridors to enhance water quality, provide public amenities, maintain flood control objectives, preserve and enhance habitat, and offer recreational and educational opportunities.

Policy CO-115: Provide setbacks along stream corridors and stream channels to protect riparian habitat functions.

Policy CO-116: Encourage filter strips using appropriate native vegetation and substrate along riparian streambanks adjacent to irrigated croplands.

Policy CO-117: Public roads, parking, and associated fill slopes shall be located outside of the stream corridor, except at stream crossings and for purposes of extending or setting back levees. The construction of public roads and parking should utilize structural materials to facilitate permeability. Crossings shall be minimized and be aesthetically compatible with naturalistic values of the stream channel.

Policy CO-118: Development adjacent to waterways should protect the water conveyance of the system, while preserving and enhancing the riparian habitat and its function.

Policy CO-119: Preserve and enhance the Laguna Creek Parkway.

Policy CO-121: No grading, clearing, tree cutting, debris disposal or any other despoiling action shall be allowed in rivers and streams except for normal channel maintenance, restoration activities, and road crossings.

Policy CO-122: River and stream maintenance should allow natural vegetation in and along the channel to assist in removal of nutrients, pollutants, and sediment and to increase bank stabilization, while minimizing impacts on conveyance.

Policy CO-126: Prohibit obstruction or underground diversion of natural waterways.

Sacramento County Floodplain Management Ordinance, Improvement Standards, and Local Floodplain Management Plan

To participate in the National Flood Insurance Program, Sacramento County has adopted a Floodplain Management Ordinance that meets FEMA's standards and accompanying Improvement Standards, as well as the Local Floodplain Management Plan. The ordinance defines what types of development activities are allowed and how proposed development may be permitted with the intent of managing flooding to reduce damage to structures and infrastructure and to minimize the risk of human casualties. Land development activities within designated flood hazard areas (whether mapped by FEMA or a local floodplain management

agency) must obtain a Floodplain Management Permit from the Sacramento County Department of Water Resources. The Floodplain Management Ordinance specifies base flood elevation and flood proofing requirements for individual projects involving residential and nonresidential structures. For larger master plan development projects, stormwater runoff plans must be prepared to identify the existing base flood elevations and the post-project flood elevation conditions of the site, and pre- and post-project stormwater drainage channels and features, and assure that no adverse effects occur upstream or downstream of the site. Sacramento County imposes a policy of no net loss of floodplain storage volume as a result of development in the floodplains typical of the streams located in the Planning Area. Thus, development in flood hazard areas may need to offset any loss of floodwater storage space caused by placement of fill and structures in a floodplain by creating/excavating an equivalent volume of ground from below the base flood elevation. This can be accomplished by filling in the floodplain and compensating for the loss of flood storage by building a detention basin. Floodplain size is directly related to the overall health of a stream. Floodplains absorb and store floodwaters, reducing velocity and allow for the slow release to the stream. Floodplain trees and plants filter sediments and pollutants, and they help to anchor the riverbanks, preventing erosion and providing shade to reduce water temperatures.

Floodplains for many local water bodies and waterways are not mapped by FEMA because the focus of the FEMA Flood Insurance Rate Maps is to provide information for insurance programs. Some rural areas of the eastern part of Sacramento County with watersheds that are less than 1 square mile in size have not been mapped by FEMA. However, these local 100-year floodplains are still identified by Sacramento County and regulated by the provisions of the Sacramento County Floodplain Management Ordinance. Local floodplains in Sacramento County are typically mapped either in response to an area having flooding problems, or in response to a request by a property owner to make modifications to their parcel.

2030 Galt General Plan

The Conservation and Open Space (COS) and Public Facilities and Services (PFS) elements of *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009) include policies that address design and implementation of future urban development to manage flood control, stormwater runoff, and protection of water quality and biological resource values associated with riparian corridors and floodplains. Applicable policies include the following:

> **Policy COS-1.1:** Flood Control. The City shall require adequate natural floodway design to assure flood control in areas where stream channels have been modified and to foster stream enhancement, improved water quality, recreational opportunities, and groundwater recharge.

Policy COS-1.2: Flood Protection Ordinance. The City shall continue to implement the City's flood protection ordinance.

Policy COS-1.3: Inter-Agency Coordination. The City shall cooperate with FEMA, California Department of Water Resources, and other appropriate local, State, and Federal agencies to address local and regional flood issues.

Policy COS-1.4: Storm Flow Impacts. The City will continue to ensure, through the development review process, that future developments do not increase peak storm flows and do not cause flooding of downstream facilities and properties.

Policy COS-1.5: Water Quality Control Board Regulations Compliance. The City shall continue to comply with the Central Valley RWQCB's regulations concerning the operation of the City's wastewater treatment plant.

Policy COS-1.6: Underground Storage Tank Law Compliance. The City shall provide continued compliance with the Underground Storage Tank Law and all other laws relating to water quality.

Policy COS-1.7: Stormwater Quality Protection. The City shall, through the development review process, ensure compliance with federal and state stormwater quality standards and regulations.

Policy COS-1.8: Septic System Discouragement. The City shall protect groundwater resources by protesting urban development with septic systems in the unincorporated County on parcels less than 2 acres on the west side of the Planning Area and less than 5 acres on the north and east side of the Planning Area.

Policy COS-1.10: Ecological Features Retention. The City shall retain to the extent feasible the ecological features of the creeks, sloughs, and rivers in their natural state.

Policy COS-1.12: Best Management Practices. The City shall require all new development and redevelopment to implement BMPs to reduce pollutants to the maximum extent practicable. Additionally, the City shall require, as part of its Storm Water NPDES Permit and ordinances, to implement the Grading Plan, Erosion Control Plan, and Pollution Prevention Plan (SWPPP) during construction activities of any improvement plans, new development, and redevelopment projects for reducing pollutants to the maximum extent practicable.

Policy COS-1.14: Floodplain Dedication. The City should require property owners and developers to dedicate land within 100-year floodplains to the City, or other City-

designated entity for biological mitigation credit or similar purpose, when a development project is approved. In addition to the land requirement, the City should require public access adjacent to these areas, but outside the 100 year flood plain, via bicycle and pedestrian trails and related amenities with appropriate signage.

Policy COS-1.17: Floodplain Visual Accessibility. The City shall require visual accessibility to floodplains via direct, single frontage roadways, along the length of any particular stream and associated floodplain section being developed (on both sides).

Policy PFS-2.2: Groundwater Protection. The City should protect the groundwater basin from overdraft from city use of groundwater. To this end, the City shall study, working closely with other public and private entities as deemed appropriate, the safe yield[1] of the groundwater basin. Water management programs such as conjunctive use[2] and recharge programs should also be considered. The City should use this information to determine the most appropriate long-term water supply to serve Galt.

Policy PFS-2.3: Surface Water Protection. The City shall protect surface water resources, including rivers, creeks, streams, sloughs, and marshes, from development impacts.

Policy PFS-3.1: Treatment Facilities Safety. The City shall ensure that sewage treatment plant operations and sludge disposal do not result in a health or safety hazard to persons, wildlife, or livestock.

Policy PFS-3.4: Sewage Treatment. The City shall oppose urban development within the sphere of influence which is not sewered and shall oppose the use of "package treatment plants." Urban development should be considered as less than 2 acre parcels on the west side of the Planning Area and less than 5 acre parcels on the north and east side of the Planning Area.

Policy PFS-3.9: Expand Use of Reclaimed Water. The City shall encourage the use of tertiary treated wastewater for irrigation of agricultural lands, large landscaped areas, and recreation/open space areas within close proximity to the City's Waste Water Treatment Plant to help ensure ongoing compliance with Central Valley RWQCB requirements.

[1] Safe yield (also known as sustainable yield) is generally defined as the amount of groundwater that can be used from a groundwater basin (or specific aquifer) on a long-term annual average basis while maintaining a balance with the amount of groundwater (or aquifer) recharge from water sources.

[2] Conjunctive use is generally defined as the planned joint use of surface and groundwater to improve overall water supply reliability.

Policy PFS-4.3: Stormwater Quality. The City shall ensure compliance with federal and state clean water standards by continuing to monitor and enforce provisions to control non-point source and point source water pollution contained in the U.S. Environmental Protection Agency NPDES program.

Policy PFS-4.4: Project Design. The City should encourage project designs that minimize drainage concentrations and impervious surfaces.

Policy PFS-4.5: Grading During the Rainy Season. The City shall prohibit grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of storm drainage facilities.

Policy PFS-4.6: Erosion Control Plan. The City shall require new development projects to prepare an erosion control plan.

Policy PFS-4.7: Mitigating Stormwater Runoff. The City shall require projects that have significant impacts on the quantity and quality of surface water runoff to incorporate mitigation measures for impacts related to urban runoff.

Policy PFS-4.9: Detention Requirements. The City should require detention storage with measured release to ensure that the capacity of downstream creeks and sloughs would not be exceeded.

City of Galt Floodplain Management Regulations

Title 19 of Galt's Municipal Code establishes the City's requirements for floodplain management. It includes regulations to:

A. Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities.
B. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction.
C. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters.
D. Control filling, grading, dredging, and other development which may increase flood damage.
E. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Rancho Cordova General Plan

The Safety (S) Element of the *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2013) addresses flooding, stormwater runoff, and groundwater quality and establishes goals, policies, and actions related to supporting efforts to limit the potential for community flooding from the Cosumnes River or American River, discouraging new development in areas likely to flood, and preventing further groundwater contamination. The Natural Resources (NR) Element addresses current groundwater contamination issues associated with the Aerojet property, which is designated by the U.S. EPA as a Superfund site because the contamination has the potential to adversely affect human health and/or the environment. Applicable policies include the following:

> **Policy S.2.1:** Support and encourage efforts to limit and reduce the potential for community flooding from the Cosumnes or American Rivers.
>
> **Policy S.2.2:** Manage the risk of flooding by discouraging new development located in an area that is likely to flood.
>
> **Policy S.2.3:** Discourage the creation of new parcels when the presence of easements, floodplain, marsh, or riparian habitat, and/or other features would leave insufficient land to build and operate structures. This policy shall not apply to open space lots specifically created for dedication to the City or another appropriate party for habitat protection, flood control, drainage, or wetland maintenance.
>
> **Policy S.2.4:** Ensure that adequate drainage exists for both existing and new development.
>
> **Policy NR.3.2:** In general, the City will encourage the preservation of existing location, topography, and meandering alignment of natural creeks. The modification, re-creation, and realignment of creek corridors shall recreate the character of the natural creek corridor to the extent feasible, appropriate, and consistent with other City policies. Channelization and the use of concrete within creek corridors shall be discouraged, but is not prohibited.
>
> **Policy NR.3.3:** Encourage the creation of secondary flood control channels where the existing channel supports extensive riparian vegetation.
>
> **Policy NR.5.2:** Encourage the use of treated wastewater to irrigate parks, golf courses, and landscaping.
>
> **Policy NR.5.3:** Protect surface and ground water from major sources of pollution, including hazardous materials contamination and urban runoff.

Policy NR.5.4: Prevent contamination of the groundwater table and surface water, and remedy existing contamination to the extent practicable.

Policy NR.5.5: Minimize erosion to stream channels resulting from new development in urban areas consistent with State law.

Policy NR.5.7: Continue to cooperate and participate with the County, other cities, and the Regional Water Quality Control Board regarding compliance with the joint National Pollutant Discharge Elimination System Permit (NPDES No. CAS082597) or any subsequent permit and support water quality improvement projects in order to maintain compliance with regional, state, and federal water quality requirements.

Policy NR.5.8: The City shall require groundwater impact evaluations be conducted for the Grant Line West, Westborough, Aerojet, Glenborough, Mather and Jackson Planning Areas to determine whether urbanization of these areas would adversely impact groundwater remediation activities associated with Mather and Aerojet prior to the approval of large-scale development. Should an adverse impact be determined, a mitigation program shall be developed in consultation with applicable local, state, and federal agencies to ensure remediation activities are not impacted. This may include the provision of land areas for groundwater remediation facilities, installation/extension of necessary infrastructure, or other appropriate measures.

Local Stormwater Runoff, Grading, and Erosion Control Ordinances and Municipal Code Requirements

Sacramento County, Rancho Cordova, and Galt all include stormwater runoff, grading, and erosion control requirements within their municipal codes and ordinances. These ordinances serve to minimize adverse on-site and off-site effects of construction activities to degradation of the water quality, and the disruption of stormwater drainage caused by clearing, grubbing, grading, filling, and excavating land. The ordinances establish administrative procedures, minimum standards of review, and implementation and enforcement procedures for stormwater runoff, grading, and erosion control activities. The oversight of land development within the jurisdictions of these local agencies occurs during their project planning and reviews where they ensure project compliance with the ordinances, as well as with the construction-related plans and policies developed by the Sacramento Stormwater Quality Partnership to comply with their NPDES Municipal Stormwater Permit.

7.1.2 Existing Conditions

This section provides information on the existing conditions of groundwater hydrology; groundwater quality; surface water hydrology, including surface water runoff, urban runoff, and summer runoff; surface water quality; and municipal wastewater within the Planning Area.

7.1.2.1 Groundwater Hydrology Conditions

The Planning Area is entirely within the 20,000-square-mile Central Valley Aquifer[3] System, which stretches from north of Redding to south of Bakersfield. The Central Valley Aquifer System is categorized into three sub-regions by DWR, and the Planning Area overlies two of them—the Sacramento Valley Groundwater Basin and the San Joaquin Valley Groundwater Basin (DWR 2003). The Planning Area north of the Cosumnes River overlies the South American River groundwater sub-basin, and the Planning Area south of the Cosumnes River overlies the Cosumnes sub-basin of the San Joaquin Valley Basin. The groundwater sub-basins underlying the Planning Area were also further categorized for the Water Forum Agreement process (Section 7.1.1.2) based on a combination of hydrologic features and municipal or water agency boundaries. With minor exceptions, the Planning Area north of the Cosumnes River is within the Water Forum Agreement's Central Basin, and south of the Cosumnes is in the Water Forum Agreement's South Basin (see Figure 7-1).

The geology of the Sacramento and San Joaquin basins are defined by deposits of continental origin (alluvial deposits eroded from the ancestral Sierra Nevada Mountains and ancient mudflows believed to have arisen east of the Sierra crest) that extend to about 20,000 feet below ground surface and overlie older marine sediments (DWR 2003). The Planning Area includes an upper layer of relatively young and unconsolidated floodplain deposits and alluvium to a depth of about 100 feet. Underlying the floodplain deposits, much of the Planning Area is characterized by are unconsolidated and poorly consolidated alluvial deposits of the Riverbank, Modesto-Riverbank, Modesto, and Laguna geologic formations, which extend to a depth of about 300 feet near the Sacramento River, and slope upward to the eastern margin of the Planning Area where these sediments contact the bedrock of the Sierra Nevada foothills (see Figure 5-2). The Modesto-Riverbank/Riverbank/Laguna formations are important freshwater aquifers in the Planning Area for shallow domestic and agricultural water supply wells, consisting of interlaced layers of coarse deposits along with variable amounts of sand, silt, and clay. Underlying the alluvial Riverbank/Laguna/Modesto-Riverbank formations is the deeper Mehrten Formation, an ancient volcanic mudflow now exposed at the base of the Sierra Nevada foothills (see Section 5.1.2.5, Volcanic Mudflow Landform Geologic Formations and Soil

[3] An aquifer is generally defined as a groundwater bearing zone of the earth's crust.

Series). The Mehrten Formation also serves as an important freshwater aquifer for the Planning Area, primarily for larger municipal and agricultural water supply wells. The Mehrten Formation extends to a depth of about 2,000 feet near the Sacramento River, and is separated from the overlying alluvial formations by a discontinuous clay layer that restricts groundwater movement between the overlying alluvial aquifer and the Mehrten Formation aquifer.

Groundwater in the Central basin and South basin (Figure 7-1) is the primary source of water for municipal and agricultural uses in the Planning Area (Robertson-Bryan Inc. and WRIME 2011; SCWA 2004). Most domestic groundwater wells in the Planning Area pump from aquifers (i.e., groundwater-bearing zone of the earth's crust) within the alluvial formations and pump from depths less than 200 feet deep. However, large capacity agricultural and municipal water supply wells are typically installed into the Mehrten Formation and pumped from depths up to 600 feet or more.

With population growth, increased municipal and industrial water use, and the advent of intensive irrigated agricultural activities in the Planning Area beginning in the 1940s (see Section 1.3, Purpose, Need, and Objectives), the depth to the saturated zones of the alluvial aquifers (i.e., groundwater table or groundwater level) across the Planning Area decreased from the 1940s through about 1980, and then generally stabilized at that level in the succeeding 20 years, leading up to the development of the Water Forum Agreement in 2000 (Sacramento City-County Office of Metropolitan Water Planning 1999; RMC Inc. 2014). However, during the drought of 1987–1992, rate of aquifer recharged was low, and groundwater levels across the Central Basin declined about 15 feet on average (Sacramento City-County Office of Metropolitan Water Planning 1999). After the end of the drought in 1992 through about 2007, groundwater levels generally recovered to the previous mid-1980s level. Since about 2007, groundwater levels in some wells have declined from extensive use of groundwater (RMC Inc. 2014; Robertson-Bryan Inc. and WRIME 2011). The extensive use of groundwater has also resulted in a large cone of groundwater depression (i.e., an area of lower groundwater levels relative to groundwater level in the surrounding areas of the aquifer, resulting from groundwater pumping) located west of Elk Grove in the Central basin, and a similar cone of depression east of Galt in the South basin. There is currently no evidence of substantial or adverse land surface subsidence in the Central Basin or South Basin as a result of these lowered groundwater levels (RMC Inc. 2014; Robertson-Bryan Inc. and WRIME 2011).

As discussed in Section 7.1.1.2, the Water Forum Agreement (established in 2000) and the South Basin Groundwater Management Plan identified the safe yield of the Central Basin as 273,000 AFY, and the safe yield of the South Groundwater Basin as 115,000 AFY. Estimates of groundwater extraction from the Central Basin were about 233,000 AFY in 2011 and 253,000 AFY in 2012, averaging about 243,000 AFY per year (RMC Inc. 2014). Groundwater extraction in the South Basin was approximately 115,000 AFY each year from 2000 to 2004. However, in

general, groundwater use had been less than the sustainable yield target, over the longer time period of 1980 to 2004 (Robertson-Bryan and WRIME 2011).

Additionally, current climate changes and related uncertainty in future precipitation and runoff conditions in the Central Valley and upper watersheds of the Sierra Nevada mountains is expected to affect existing and future water supply conditions, including groundwater in the Planning Area and surrounding region. Hydrologic modeling of the Sacramento County region was conducted by the Regional Water Authority to evaluate future land uses anticipated to occur under the Galt, Rancho Cordova, and Sacramento County General Plans, using projected 2030 urban and agricultural water demands and estimated effects of future climate change (Regional Water Authority 2013). The modeling indicates that, in contrast to modeling results for the Water Forum Agreement and the Zone 40 Water Supply Master Plan EIR (described above), the average annual municipal demand would increase by about 4,000 AFY and available surface water supplies could be reduced by up to 33,000 AFY (including water delivery cutbacks imposed to meet drought-related state water conservation regulations), compared to modeled future conditions without climate change. The modeling assumes that groundwater pumping would be used to make up the shortfall, which would occur primarily to meet agricultural demands, resulting in average groundwater level reductions by up to about 20 feet in agricultural areas. Groundwater would be sufficient to meet future water demands in normal water years based on the water rights and contracts of all water purveyors. However, future water shortages in single and multiple dry-year scenarios could be a concern to the water purveyors for long-term groundwater availability.

Additionally, current predictions for future climate change include warmer average air temperatures and somewhat less annual average precipitation over the long term in the Central Valley and in the Sierra Nevada Mountains, which contribute runoff to the streams in the Planning Area (i.e., primarily Deer Creek, Cosumnes River, and Dry Creek) (RMC Inc. 2015). However, the intensity and amount of rainfall during individual storm events is predicted to increase from climate change, and the amount of precipitation as snowfall in the Sierra Nevada Mountains east of the Planning Area will decrease. The combination of less snowfall, warmer temperatures currently expected to result in less Sierra Mountain snow fall in the winter, earlier Sierra Mountain snowmelt runoff in the spring, increased winter rainfall intensity in the Planning Area, and increased Sierra watershed areas exposed to rain rather than snow may result in increased downstream flood flows and flood volumes, including in the American River and Sacramento River that are adjacent to the Planning Area.

As discussed in Section 5.2.1, Methodology for Assessing Impacts of Each Alternative on Soils, Geology, and Mineral Resources, the Laguna, Riverbank, Modesto-Riverbank, Mehrten, and Valley Springs geologic formations include soils with an impermeable subsurface soil layer formed of cemented hardpan (duripan), claypan, rock, or a combination of these (Figure 5-2).

Winter rains saturate the upper soil layers, forming a seasonal perched aquifer that persists through the winter rainy season. This is an important category of groundwater in the analysis of the EIS/EIR alternatives because the Planning Area vernal pools and vernal pool ecosystems depend on the seasonal formation of the soil perched aquifer (see Section 8.1.2, Existing Conditions). However, the seasonal perched aquifers are not used for water supplies.

7.1.2.2 Groundwater Quality

Groundwater quality refers to the chemical and physical properties of groundwater, which affects the uses of the groundwater. Groundwater quality in the aquifers of the Planning Area's alluvial geologic- formations and groundwater quality in the deeper aquifer of the volcanic Mehrten Formation, with few exceptions, are suitable for municipal, industrial, and agricultural water supply uses, which are the main uses of groundwater in the Planning Area (Sacramento City-County Office of Metropolitan Water Planning 1999). Groundwater quality in the seasonal perched aquifers is not discussed in Chapter 7 because this groundwater is not used for water supplies.

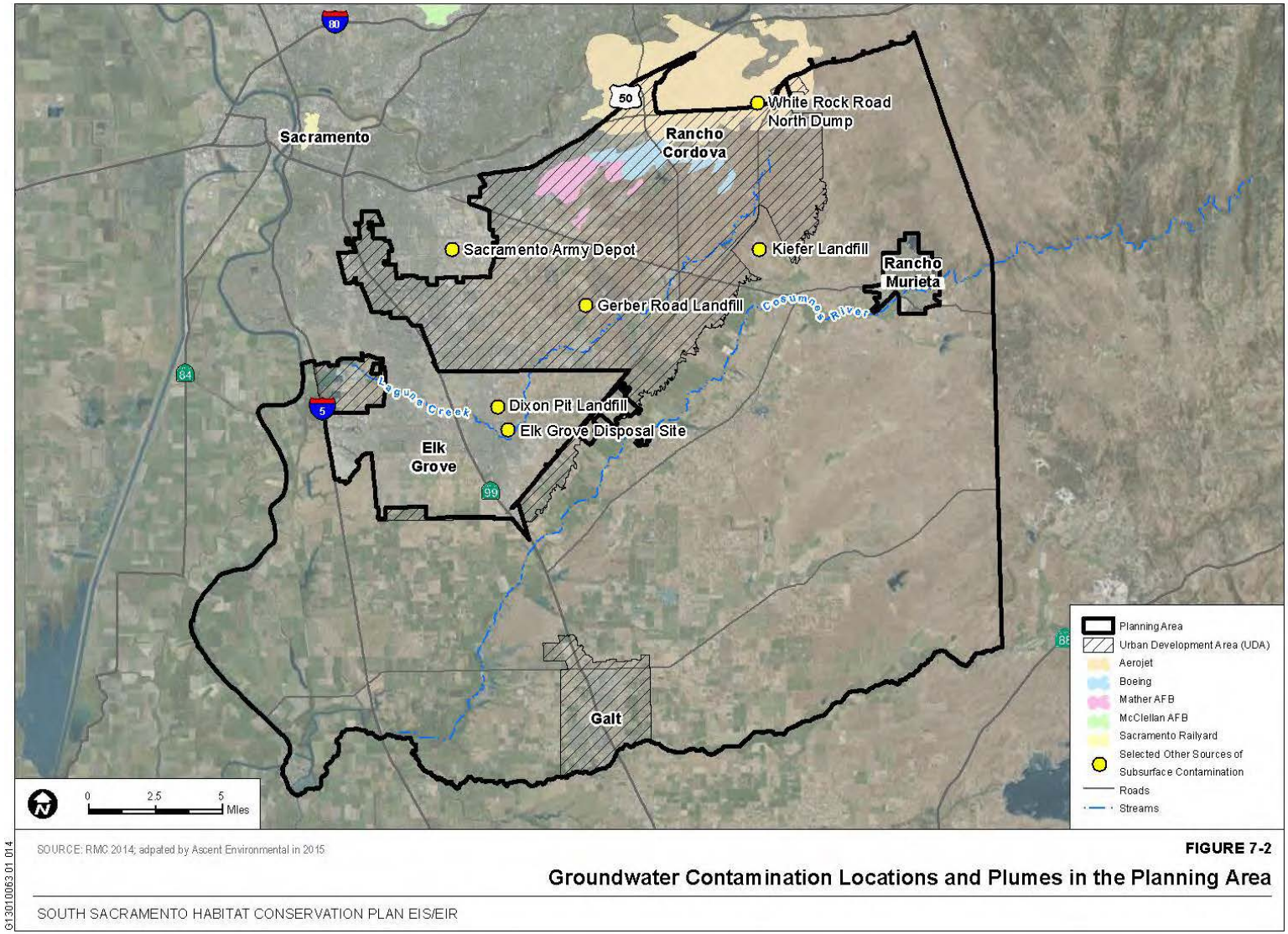
Throughout the Planning Area, the large majority of constituents of concern regulated by Title 22 of the California Code of Regulations (Section 7.1.1.1) are present in groundwater at concentrations below drinking water standards. However, arsenic, which is a contaminant of concern for public health, is present in some locations of the geologic formation aquifers and the aquifer of the Mehrten Formation (RMC Inc. 2014). Galt has wellhead treatment systems installed on several of its municipal wells to remove arsenic (Galt 2009). Elevated levels of iron, manganese, and odor also are present in the Mehrten Formation groundwater at levels above the secondary drinking water quality standards for taste and odor (RMC Inc. 2014). Groundwater data collected by the Sacramento County Water Agency and Galt have shown that lower groundwater levels, such as the cones of groundwater depression in southern Sacramento County, may result in the migration of poorer-quality groundwater from the deeper Mehrten Formation to the overlying alluvial-formation aquifer, where it may increase manganese and arsenic (Sacramento County 2010).

Groundwater management actions implemented by municipal water purveyors to manage arsenic and manganese include well-head treatment systems, blending water sources with elevated and low concentrations to achieve compliance, or abandoning affected wells. Groundwater in the alluvial formation aquifers and the Mehrten Formation aquifer is typically low in total dissolved solids. Municipal water purveyors also manage total dissolved solids to achieve the Title 22 secondary drinking water standards for taste. Salinity intrusion from groundwater in the Delta does not occur in the Central Basin or in the South Basin (Figure 7-1) under the existing conditions (RMC Inc. 2014; Robertson-Bryan and WRIME 2011).

In addition to the naturally occurring groundwater constituents of concern (e.g., dissolved oxygen, pH, electrical conductivity, total dissolved solids, temperature, turbidity, and trace elements), there are six specific locations within or very near the UDA portion of the Planning Area where groundwater contamination has occurred as a result of past industrial activities. Substantial groundwater cleanup actions are being implemented to prevent or minimize movement of these contaminants, and prevent or minimize further degradation of groundwater quality (Figure 7-2). The U.S. EPA Superfund program was used at several of these locations to address cleanup activities for remediation of soil contamination and containment and treatment of contaminated groundwater. The groundwater contamination is known either by the company name associated with the industrial waste disposal activities or by geographical locations, as follows: Aerojet (property that also includes the White Rock Road-North Dump landfill), the former Mather Air Force Base (Mather AFB), and Boeing (property that also includes the Inactive Rancho Cordova Test Site) (Figure 7-2). The former Sacramento Army Depot is a federal Superfund cleanup site located outside of the Planning Area boundary but is shown on Figure 7-2 because it is nearby and within the same Central Groundwater Basin as the Planning Area. Figure 7-2 also shows the general footprint of the existing plumes of elevated contaminants in the groundwater near the Aerojet, Boeing, and Mather AFB locations, as mapped with groundwater data collected through 2007 (Sacramento Central Groundwater Authority 2014). The plumes of contamination spread in the groundwater as a result of contaminant diffusion, natural groundwater flow, and groundwater flow that is induced by local groundwater pumping.

The existing cleanup activities at the other soil and groundwater contamination locations in the Planning Area (Figure 7-2) have regulatory oversight provided by state agencies (Central Valley Regional Water Board and California Department of Toxic Substances Control). The existing cleanup activities at the active Kiefer Landfill and the inactive Gerber Road landfill contamination locations and are managed by the Sacramento County Department of Waste Management and Recycling. The Dixon Pit and Elk Grove landfills are locations of groundwater contamination located near the UDA portion of Planning Area in the Central Basin. The groundwater contaminants at these four landfill sites are a result of the solid waste disposal activities that occurred before federal and state regulations that now exclude disposal of hazardous waste in landfills, and they now require clay-lined or geotextile-lined landfill disposal areas and other measures that prevent percolation of contaminants to groundwater, prevent rainwater infiltration, and require the collection and treatment of landfill leachate.

Figure 7-2. Groundwater Contamination Locations and Plumes in the Planning Area



INTENTIONALLY LEFT BLANK

Of the six groundwater-contamination locations in or near the UDA, the most extensive areas of groundwater contamination are associated with the former Aerojet and Boeing operations (see Figure 7-2). Past rocket-development activities at these areas involved the surface discharge of rocket fuels and other waste products, which were carried by rainwater infiltration and percolation into the groundwater table. Groundwater constituents of concern discharged at the former Aerojet and Boeing operations include volatile organic carbon compounds, solvents (e.g., trichloroethylene, Freon, chloroform), and other compounds associated with rocket fuels (i.e., perchlorate and N-nitrosodimethylamine). Aerojet is currently monitoring groundwater quality and is operating numerous groundwater extraction wells and treatment systems that remove contaminants from the pumped groundwater. Aerojet discharges an average of 49.2 million gallons per day (mgd) of treated groundwater to the American River north of the Planning Area, and to multiple local streams in the UDA (e.g., Morrison Creek, Alder Creek, Buffalo Creek, and unnamed stormwater drainage channels) under an NPDES permit issued by the Central Valley RWQCB and last revised in December 2013 (Order R5-2013-0155).

Existing groundwater extraction wells and treatment systems are also operated in and around the Mather AFB property (Figure 7-2). Soil and groundwater contamination at Mather AFB occurred in association with past air base operations and maintenance activities, including waste pits, landfills, and leaking tanks that discharged petroleum oils and lubricants, solvents, and protective coatings. Groundwater extraction and treatment systems at Mather AFB primarily pump, treat, and reinject the treated water into the groundwater, but one system discharges approximately 0.5 mgd of treated water per day to Mather Lake (a man-made pond on the eastern side of the former base property). A recent annual monitoring report for the Mather AFB groundwater cleanup process indicates that the extraction wells are successfully stopping the spread of the contaminant plumes in the Central Basin (U.S. EPA 2015a).

The other groundwater contamination locations and plumes shown in Figure 7-2 affect relatively small areas compared to the much larger and complex contaminant issues at the Aerojet and Mather AFB properties. Extraction wells and treatment activities at the Sacramento Army Depot were completed, and the site is not a concern for further groundwater contamination (U.S. EPA 2015b).

The Keifer Landfill site involves groundwater contamination with volatile organic compounds associated with a former unlined landfill disposal area. The existing Keifer Landfill groundwater cleanup activities include the pumping of groundwater by extraction wells, groundwater treatment, and discharge of approximately 1.0 mgd of treated water per day to Deer Creek under an NPDES permit issued to by the Central Valley RWQCB and last revised in Order R5-2013-0002.

Water quality information for seasonal perched groundwater in the Planning Area has not been studied. However, as discussed in Chapter 8, because of proximity to existing urban development, several areas of perched seasonal groundwater within the UDA are susceptible to water quality degradation from infiltration of surface contaminants carried by urban runoff sources within the watershed of the perched groundwater.

7.1.2.3 Surface Water Hydrology

This section describes the existing condition of surface streams in the Planning Area and their watersheds. As discussed further in Section 10.1.2, Existing Conditions of Aquatic Resources, watersheds in the United States are delineated using a hierarchical system, which divides the United States into 21 regions, 221 sub-regions, 378 hydrologic accounting units, and 2,264 cataloging units (USGS 2013). Each hydrologic unit is identified by a unique Hydrologic Unit Code (HUC) consisting of 2 to 12 digits, which define successively smaller units within the classification system (USGS and NRCS 2009; USGS and NRCS 2013).

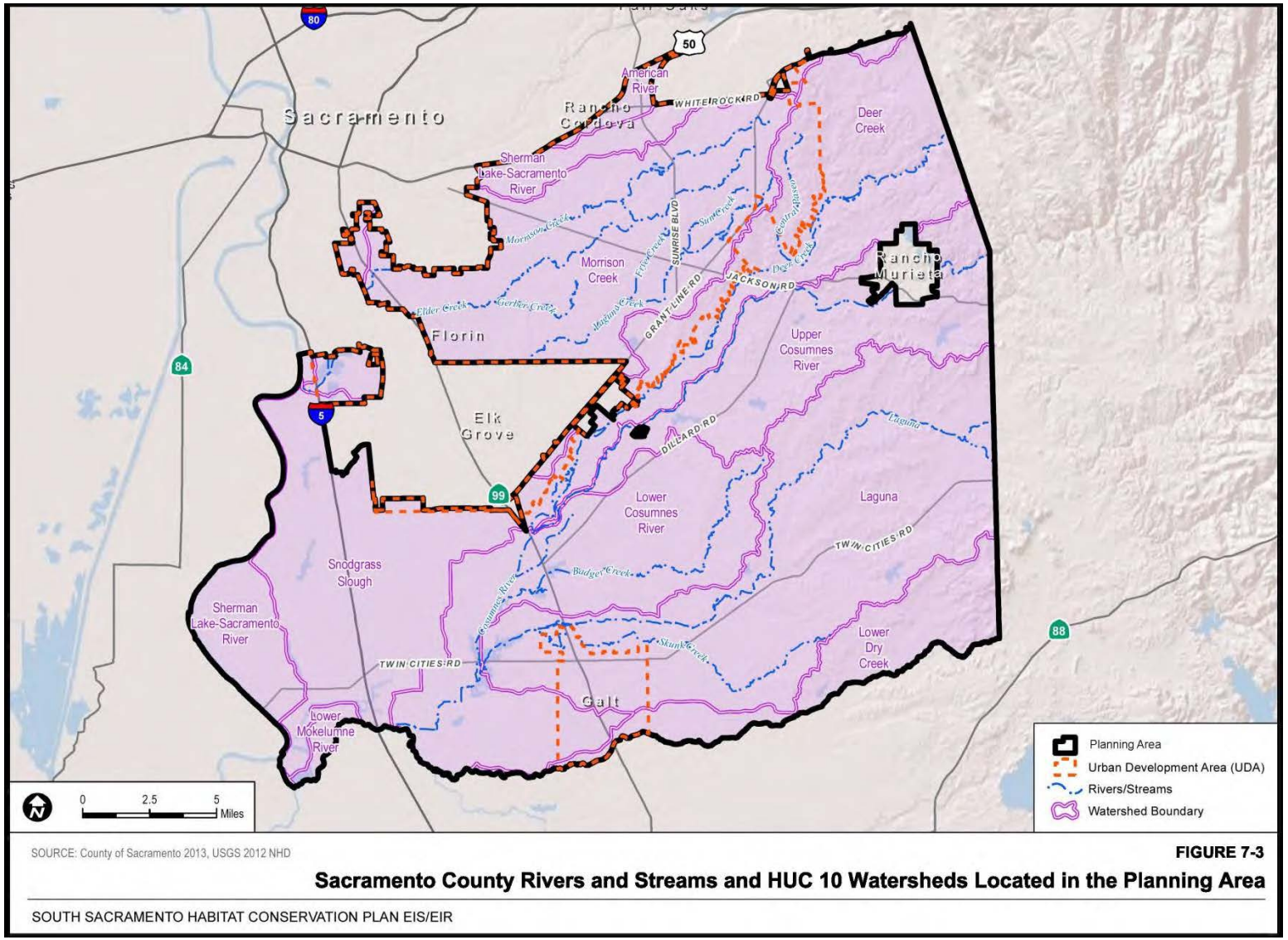
At the 10-digit HUC level, the Planning Area includes a portion or the entirety of 10 different watersheds (Figure 7-3). The small, northernmost portion of the Planning Area is within the Lower American River watershed and drains north to the American River. The north (largest) UDA portion of the Planning Area is primarily located within the Morrison Creek Watershed, which drains west through the City Elk Grove to ~~Beech~~ **Beach** Lake and the Sacramento River.

Portions of three HUC 10 watersheds located in the southeastern and south-central portion of the Planning area (i.e. Sherman Lake-Sacramento River, Snodgrass Slough, and Lower Consumes River) are within the legal Delta. Snodgrass Slough, the lower reaches of the Cosumnes River, and the section of the Mokelumne River bordering the Planning Area are tidally influenced (Figure 7-3).

Table 7-1 shows the names of the 10 Planning Area HUC 10 watersheds and associated HUC 12 watershed (i.e., smaller sub-watersheds), which are named by the largest waterway within the watershed or sub-watershed. Table 7-1 also presents the total size of each HUC 12 sub-watershed and the acres of each HUC 12 sub-watershed within the Planning Area.

Many of the waterways occurring in the Planning Area's HUC 12 watersheds are typically ephemeral with periods of no streamflow during the dry summer months, or only intermittently flow in the dry summer months. However, some of these historically ephemeral or intermittent waterways now have some water flow throughout the year as a result of irrigation run-off from urbanized areas, and from the discharges discussed in Section 7.1.2.2 (e.g., groundwater treatment discharges to drainages and tributaries of Morrison Creek, Alder Creek, Buffalo Creek, Deer Creek, American River, and Mather Lake, as well as the Galt municipal wastewater discharges to the Cosumnes River).

Figure 7-3. Sacramento County Rivers and Streams and HUC 10 Watersheds Located in the Planning Area



INTENTIONALLY LEFT BLANK

Table 7-1. Watersheds and Sub-Watersheds of the Planning Area

Watershed (HUC 10)	Sub-Watershed(s) (HUC 12)	Total Acres in Sub-Watershed	Acres of Sub-Watershed within the Planning Area	% of Sub-Watershed within the Planning Area
American River	Lower American River	30,063	3,158	11%
	Upper American River	35,358	8,929	25%
Deer Creek	Lower Deer Creek	29,043	28,741	99%
	Carson Creek	20,773	11,021	53%
	Upper Deer Creek	33,166	7,067	21%
Laguna[1]	Middle Laguna	26,128	26,128	100%
	Upper Laguna	13,883	5,925	43%
	Willow Creek	14,377	377	3%
	Lower Laguna	31,149	31,149	100%
	Hadselville Creek	12,612	11,756	93%
Lower Cosumnes River	Badger Creek	13,835	13,835	100%
	North Fork Badger Creek	10,985	10,985	100%
	Grizzly Slough–Cosumnes River	22,492	22,492	100%
Lower Dry Creek	Liberty Cemetery–Dry Creek	12,667	4,489	35%
	Loch Lane–Dry Creek	24,572	13,568	55%
Lower Mokelumne River	South Mokelumne River–Mokelumne River	26,802	293	1%
	Hog Slough	30,375	3	0%
	Murphy Creek–Mokelumne River	39,395	1,707	4%
Morrison Creek	Lower Morrison Creek	10,383	7,018	68%
	Elder Creek	14,038	12,917	92%
	Laguna Creek[1]	30,784	29,514	96%
	Upper Morrison Creek	27,583	20,894	76%
Sherman Lake–Sacramento River	Beaver Lake–Sacramento River	28,434	9,254	33%
Snodgrass Slough	Sacramento Drainage Canal	14,134	14,134	100%
	South Stone Lake–Snodgrass Slough	37,652	37,580	100%
Upper Cosumnes River	Town of Wilton–Cosumnes River	16,451	16,451	100%
	Arkansas Creek–Cosumnes River	22,405	15,581	70%
	Indian Creek–Cosumnes River	24,116	46	0%

Source: USGS and NRCS 2013

[1] There are two Laguna Creeks in the Planning Area. The first Laguna Creek crosses the UDA and is a tributary to Morrison Creek and the Sacramento River. The second Laguna Creek is larger, located in the south part of the Planning Area, and is a tributary to the Cosumnes River and the Mokelumne River.

As discussed in Section 7.1.1.1, FEMA designates and delineates 100-year floodplain areas. The FEMA-designated 100-year floodplain areas in the Planning Area are primarily adjacent to major rivers, streams, and creeks of the Planning Area (Figure 7-4). However, FEMA 100-year floodplain mapping may not include small rural watersheds that are less than 1 square mile in size.

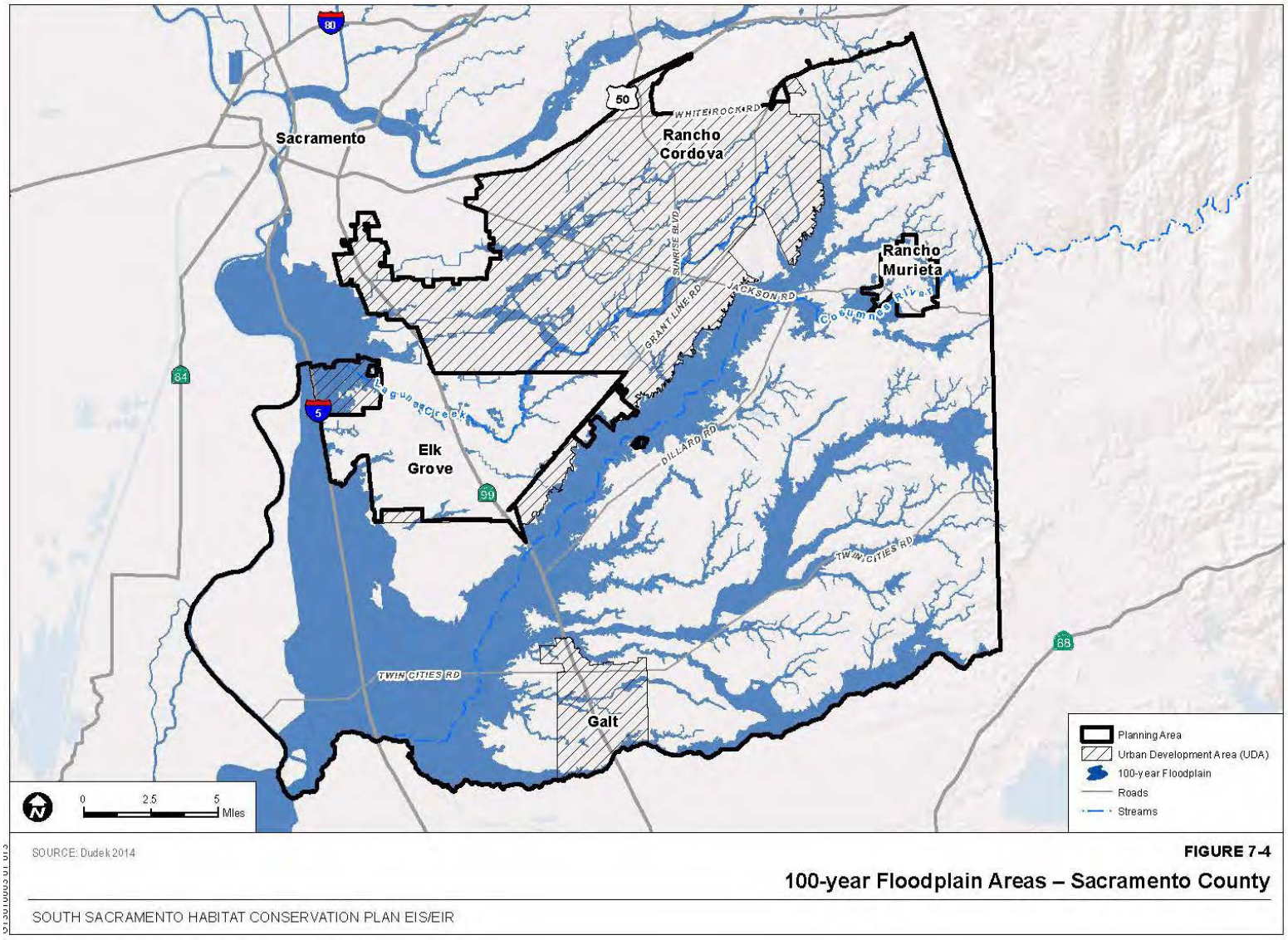
Within the UDA portion of the Planning Area, many of the streams have levees adjacent to the channels and primarily converge into the Morrison Creek channel, which is also contained within levees to its confluence with the Sacramento River. The South County Streams program of the Sacramento Area Flood Control Agency involves planning, construction, and operation of floodplain management facilities for Morrison Creek and its principal tributaries (i.e., Florin Creek, Elder Creek, the first Laguna Creek,[4] and Unionhouse Creek) (Figure 7-3). The Sacramento Area Flood Control Agency's flood control facilities are mostly located in the lower reaches of these streams where the increased rates and volumes of channel flows during storm events combine to create potential flooding situations, which are then managed through appropriately sized levees, constructed channels, and pump stations to safely contain the flows. Morrison Creek conveys flow to the low-lying Beach Lake basin adjacent to the Sacramento River levee, where during wet weather events most excess flow is pumped into the Sacramento River near Clarksburg, but some flows drain south into Snodgrass Slough and to the Mokelumne River (Figure 7-3).

South of Morrison Creek in the Planning Area, floodplain areas include Deer Creek, Cosumnes River, Badger Creek, the second Laguna Creek,[4] Skunk Creek, and Dry Creek on the south border of Sacramento County and the Planning Area. Most stormwater runoff from Galt is conveyed into the second Laguna Creek (Figure 7-3).

The existing stormwater facilities within the UDA were designed consistent with County and City requirements to include sufficient capacity. Urban drainage systems present in Galt, Rancho Cordova, and Sacramento County have been designed to ensure that people or structures would not be exposed to significant adverse flood hazards. Community designs typically include stormwater detention basins, underground drainage infrastructure, culverts and bridges in waterways, modifications of stream channels, and construction of new drainage channels. Detention basins with properly sized outlet pipes are required by local jurisdictions to provide flood control to limit discharge to receiving waters to the same flow rates within the tributaries as the existing condition flow rates.

[4] There are two Laguna Creeks in the Planning Area. The first Laguna Creek crosses the UDA and is a tributary to Morrison Creek and the Sacramento River. The second Laguna Creek is larger, located in the south part of the Planning Area, and is a tributary to the Cosumnes River and the Mokelumne River.

Figure 7-4. 100-year Floodplain Areas – Sacramento County



INTENTIONALLY LEFT BLANK

Natural bank erosion typically occurs intermittently as waterways meander or shift within their floodplain, and is a normal part of all fluvial ecosystems. Periodic erosion of the stream bank maintains patches of young riparian vegetation throughout the stream system, which provides habitat required by many riparian plant and animal species. However, natural waterway meandering and associated bank erosion in the UDA and other locations of the Planning Area have been prevented or minimized to create stability for land uses that are located in proximity to the stream bank. Currently, setbacks between new urban development and the banks of a stream or other natural waterway are not required in most land use zones, provided there is no existing flood hazard. Typically, only minor setbacks were required by local jurisdictions during the land use planning processes of most development projects within the Planning Area. Many natural waterways in the UDA and in other locations of the Planning Area have been physically modified to remain a relatively narrow corridor, and natural waterway meandering and associated ecosystem processes no longer occur.

Most streams and other waterways that run through existing communities within the UDA are now surrounded by urban activities. During the land use planning process, stream corridors have been incorporated with recreational land uses such as trails, parks, and golf courses; other times, stream corridors are designated as narrow strips of open space with no required setbacks from buildings or streets.

Many Planning Area streams are armored with concrete or rock slope protection to prevent downcutting and bank erosion. Without adequate setbacks, natural waterways rarely remain in their natural state in urban areas, since the natural hydrology changes, and downcutting and bank erosion occurs. Bank erosion and downcutting can be accelerated if upstream areas are channelized, which can increase the speed of flows and result in accelerated downstream erosion. In addition, banks can erode more quickly when people and domestic animals access the streams for recreation such as fishing, picnics, swimming, and playing fetch with water-loving dogs. In time, tree roots that once stabilized the banks become exposed and erosion accelerates, causing the stream to widen or change course. If adequate setbacks from buildings and roads were not incorporated into an urban stream corridor, the solution was to shore up the banks with concrete or rock slope protection to keep the stream in the narrow designated area. The installation of erosion control has typically included the removal of vegetation. Therefore, adverse impacts to the natural hydrologic function of streams have occurred in urban areas even in cases where the natural streambed was originally avoided. This is particularly true in cases where there are no designated setbacks from urban uses, and/or there is no management of the stream corridor designed to prevent adverse impacts to the stream from encroaching human activity. Without adequate setbacks, adverse impacts to the natural hydrologic function of streams will continue to occur within the Planning Area.

7.1.2.4 Surface Water Quality

Water quality conditions of the Planning Area surface waters are affected by conditions in the watersheds, including weather and temperature, groundwater inputs, atmospheric deposition, animal wastes, urban contaminants and emissions, seasonal rainwater runoff, and climatic patterns (e.g., droughts). The principal sources of potential contaminant discharges to surface waters in the Planning Area are associated with human-related activities and include urban stormwater runoff, agricultural runoff, and municipal wastewater treatment plant discharges.

Four waterways in the Planning Area (Morrison Creek, Elder Creek, Deer Creek, and the lower Cosumnes River), as well as the lower Sacramento River immediately downstream of the Planning Area, do not meet CWA Section 303(d) water quality standards and are included in the SWRCB's current list impaired water bodies (SWRCB 2011). The constituents of concern include legacy organochlorine pesticides products (i.e., no longer sold in the United States but present in soil and very resistant to decay in the environment), and diazinon and chlorpyrifos, which were banned for residential use in California (Table 7-2). Mercury is also a legacy constituent of concern that was used for gold mining in the Sierra Nevada Mountains and is present in waterways outside the Planning Area, including the Sacramento River and the legal Delta (Table 7-2).

Information about the existing conditions for the constituents of concern and contaminant sources for surface waters in the Planning Area are discussed below.

Table 7-2. 2010 CWA Section 303(d) Pollutants and Sources for the Planning Area

Pollutant/Stressor	Listed Source
Morrison Creek	Diazinon, pentachlorophenol, pyrethroid pesticides, sediment toxicity
Elder Creek	Chlorpyrifos, diazinon, pyrethroid pesticides, sediment toxicity
Deer Creek	Iron
Cosumnes River (below Michigan Bar; partly in Delta Waterways, eastern portion)	Escherichia coli (E. coli), invasive species
Sacramento River (Knights Landing to Delta)	Chlordane, DDT, dieldrin, mercury, polychlorinated biphenyl compounds (PCBs), unknown toxicity
Sacramento River–San Joaquin River Delta	Chlorpyrifos, DDT, diazinon, electrical conductivity, Group A (organochlorine) pesticides, invasive species, mercury, PCBs, unknown toxicity

Source: SWRCB 2011

Urban Runoff

Urban stormwater runoff and irrigation runoff may contain a wide variety of potentially harmful constituents of concern that can adversely affect beneficial uses in receiving waters, including aquatic life, recreational opportunities (e.g., aesthetics, fishing, swimming), and human health. Constituents of concern include elevated temperature discharges, organic oxygen demanding

substances, petroleum hydrocarbons, pathogens, pesticides, and trace metals. Urban runoff can enter and affect water bodies, including rivers, streams, creeks, marshes, swales, and vernal pools.

Contaminants accumulate on the ground surface in urban environments during California's summer dry season. In the winter wet season, surface runoff during the initial rainfall mobilize and transport those contaminants as a "first flush" effect, which refers to the typically higher concentrations of contaminants during the initial stormwater runoff events of the wet season.

Urban development increases impervious surfaces, which increases the volume of stormwater runoff to centralized drainage systems and can result in increased rates and volumes of runoff to receiving waters. This change in the hydrologic condition relative to the pre-development hydrologic condition is hydromodification, a process that can increase erosion in receiving waterways and increase sedimentation in downstream water bodies. Changes in surface runoff (i.e., drainage of land, changes in flow paths), hydromodification, and resulting erosion and channel scour can lead to the loss of riparian and aquatic resources, and result in water quality changes such as increased stream temperatures and reduced natural contaminant removal processes (e.g., settling and deposition, bacterial decay). Hydromodification can also redirect water away from aquatic habitats such as vernal pools and other wetlands, resulting in drying and lower habitat quality.

The most recent 2013/2014 CMP annual monitoring report prepared by the Regional San and Sacramento Stormwater Quality Partnership organization evaluated water quality in samples collected during three wet-weather events and one dry-weather period (Larry Walker Associates 2014). Ambient and stormwater quality conditions are evaluated in the annual report for a wide range of constituents of concern, typically within categories of compounds that are indicative of background conditions, increased soil erosion, and urban and industrial sources (e.g., automotive petroleum products, pet wastes, pesticides, fertilizers). The CMP report indicates that concentrations of most constituents of concern in the American River and Sacramento River are below (i.e., consistent with) applicable water quality objectives for drinking water and for aquatic life protection as a result of typically low constituent concentrations (i.e., low mineral content, organic matter, toxic metals, organic compounds, and pesticides) (Larry Walker Associates 2014). However, seasonal wet weather water quality conditions can exhibit temporary occurrences of elevated turbidity, suspended solids, pathogen indicator bacteria, and trace metals (e.g., copper and lead) and common use pesticides. For urban tributary streams, the data for wet weather samples indicate frequent detection of elevated concentrations of copper, polycyclic aromatic hydrocarbon compounds, and E. coli bacteria relative to applicable water quality objectives (Larry Walker Associates 2014, 2013).

Additionally, the Sacramento Stormwater Quality Partnership prepared an effectiveness assessment report of the stormwater management program being implemented for the NPDES

Municipal Stormwater Permit (Sacramento Stormwater Quality Partnership 2013), which summarized the findings of a decade of CMP monitoring data for constituents of concern in urban runoff including the sources, fate and transport characteristics, and status and trends with respect to applicable regulatory water quality objectives, as follows:

- Exceedances of water quality standards in the American River and Sacramento River are rare to infrequent.
- Water quality exceedances observed in the American River and Sacramento River are generally not linked to urban stormwater runoff discharges or sources.
- Long-term trends of either increasing or decreasing concentrations of most constituents of concern in urban stormwater runoff are not discernible in older urban areas; however, aquatic toxicity in urban tributaries appears to have decreased significantly over the monitoring period.
- The concentrations of most constituents of concern in urban stormwater runoff from newer developments are lower than runoff from older urban areas, indicating that new development design standards are effective in minimizing constituent of concern discharges.
- Urban tributaries are no longer impaired by diazinon and chlorpyrifos.
- Investigations of actions to control contaminant sources from entering stormwater for a variety of constituents of concern indicate the following:
    - Sediment control BMPs will help reduce the discharges of copper, lead, zinc, mercury, pathogens, polycyclic aromatic hydrocarbons, and other sediment-bound pollutants.
    - Mercury-containing products such as fluorescent lamps are the largest source of mercury in urban runoff; however, mercury discharges are very minor compared to legacy sources of mercury already in the waterways.
    - Sources of bacterial pathogen indicators are difficult to quantify; however, wild animals are likely to constitute a significant, yet largely uncontrollable, source.
    - The major source of copper in urban watersheds is brake pad wear.
    - The major source of pesticides is legal application of insecticides by licensed pest control operators. Pesticides also are the most important and only consistent source of aquatic toxicity in urban runoff.

Agricultural Runoff

Potential water quality sources and constituents of concern in the Planning Area include drainage and wet weather stormwater runoff from areas of irrigated agricultural and pasture land. Constituents of concern include suspended sediment and turbidity associated with routine soil disturbances (e.g., tilling, grazing), organic matter, organic oxygen demanding substances,

fertilizer nutrients (e.g., nitrogen and phosphorus), pesticides, and pathogens. Agricultural runoff can enter and affect off-site water bodies, including rivers, streams, and wetlands.

Agricultural operators in the Sacramento Valley Water Quality Coalition fund a receiving water-quality monitoring program for compliance with the Waste Discharge Requirements issued under the Central Valley RWQCB's Irrigated Lands Regulatory Program (CVRWQCB 2015b). The receiving water quality monitoring program collects water samples at 35 stream sites to study potential water quality effects of agricultural activities, including sites in the lower Cosumnes River, the second Laguna Creek (tributary to Cosumnes River), and Dry Creek in the south part of the Planning Area (Figure 7-2). The Sacramento Valley Water Quality Coalition's monitoring program collects samples quarterly, or monthly during the primary agricultural growing season, and includes periodic monitoring of wet weather conditions at all 35 stream sites. Samples are evaluated for water column and sediment toxicity; physical and conventional parameters in water and sediment; organic carbon, pathogen indicator bacteria, nutrients, and trace metals in water; and pesticides in water and sediment.

Based on Sacramento Valley Water Quality Coalition's monitoring data collected from 2005 through 2013, there are no major water quality problems associated with agricultural discharges or managed wetlands discharges in the Sacramento River Basin (Larry Walker Associates 2015). The majority of observed concentrations that are elevated relative to a water quality objective have been with conventional non-toxic constituents of concern (i.e., conductivity, temperature, dissolved oxygen, E. coli, pH, and nutrients [total ammonia and nitrate]). The monitoring data also indicate that in many of these instances, the observed exceedances may be substantially affected by natural processes and sources in the area (e.g., hydrology, temperature, algae growth) rather than agricultural activity. Concentrations are less frequently elevated for constituents such as copper (or other metals), pesticides, aquatic toxicity, and sediment toxicity when observed. In the 2013/2014 annual data, analysis of 56 receiving water sample sites for pesticides (i.e., organophosphate, carbamate, organochlorine, benzophenyl, and pyrethroid) and a variety of herbicides resulted in detection of 14 different compounds (Larry Walker Associates 2015). Approximately 70% of the samples had no detections of pesticides, and 98% of all pesticide tests were below analytical detection limits. Exceedances of objectives for three registered pesticides (chlorpyrifos, diazinon, and malathion) and DDT (or a DDT breakdown product) was observed in six Sacramento Valley Water Quality Coalition monitoring samples. Statistically significant toxicity was not observed in any of the 330 water column samples evaluated from 17 sample sites in 2013/2014. However, sediment toxicity was observed in five samples from three sample sites based on the 10-day percent survival toxicity test for Hyallela species. Only two of the sediment samples exhibited statistically significant toxicity above the threshold established for the program (i.e., ≥20%

reduction compared to the control), and follow-on testing indicated the pyrethroid pesticide bifenthrin as likely contributing to the observed sediment toxicity.

The Sacramento Valley Water Quality Coalition also evaluates long-term trends that may indicate long-term water quality degradation. Based on an assessment of 624 sample site-parameter combinations, a total of 31 results (i.e., approximately 5% of the beginning number of evaluations) were determined to have significant trends suggesting potential for long-term degradation to be occurring. Most of the significant trends were for physical parameters (i.e., conductivity, dissolved oxygen, pH, temperature, total organic carbon, and total suspended solids). Some of the parameters with trends (i.e., higher conductivity and pH, and lower dissolved oxygen) corresponded to dry year types with lower streamflow and higher temperatures, indicating that the conditions are likely affected primarily by background weather and hydrology rather than agricultural activity.

Contaminants contributed from agricultural activity and runoff in the Planning Area (e.g., pesticides, suspended sediment, pathogens, and nutrients) can affect surface water and groundwater quality. As noted in Table 7-2, numerous streams in the Planning Area and the Delta are listed as impaired by several constituents originating from urban or agricultural runoff sources.

Municipal Wastewater

As discussed in Section 7.1.1.1, municipal wastewater discharges are regulated by the Central Valley RWQCB through the NPDES permit program to ensure that the discharges comply with applicable surface water quality standards designed to protect aquatic life, municipal water supply, and other beneficial uses. Relative to background river concentrations, municipal wastewater discharges may contain elevated levels of salinity, organic matter, trace metals, synthetic organic compounds, human pathogens, and unregulated or emerging constituents of concern (e.g., pharmaceuticals, personal care products, and endocrine-disrupting compounds).

The large majority of municipal and industrial wastewater generated in Planning Area is generated in the UDA, and is collected and conveyed westward through sanitary sewer systems to the Sacramento Regional Wastewater Treatment Plant operated by Regional San. The Sacramento Regional Wastewater Treatment Plant provides wastewater collection and treatment for 1.4 million people inside and outside the Planning Area, including people in the cities of Sacramento, West Sacramento, Rancho Cordova, Citrus Heights, Elk Grove, and Folsom; unincorporated areas of Sacramento County; and the communities of Courtland and Walnut Grove. The Sacramento Regional Wastewater Treatment Plant currently treats approximately 141 mgd of inflow and produces secondary treated effluent, which is discharged to the Sacramento River near the town of Freeport. As a result of permit requirements adopted by the Central Valley RWQCB in 2010 and subsequent amendments, the Regional San is currently

constructing treatment process improvements at the Sacramento Regional Wastewater Treatment Plant, including additional nutrient removal (i.e., ammonia and nitrate reduction) and tertiary filtration on a seasonal basis during the dry season to increase pathogen removal (Ascent Environmental Inc. 2014). Construction of facility improvements at the Sacramento Regional Wastewater Treatment Plant is scheduled to be completed in 2023.

Galt also owns and operates a wastewater treatment plant in the Planning Area. Galt's wastewater treatment plant complies with the Central Valley RWQCB's regulations concerning the operation of the City's wastewater treatment plant. The Galt wastewater treatment plant currently produces about 2.3 mgd of tertiary treated effluent per day, and it discharges that treated effluent to the Laguna Creek that is a tributary to the lower Cosumnes River (Figure 7-3).

Urban development in the Planning Area contributes to wastewater discharge from Galt and the Sacramento Regional Wastewater Treatment Plant that affects the downstream Sacramento River and the Delta water quality conditions. Additionally, Delta water quality is affected by the municipal water demands in the Planning Area that are served by Water Forum Agreement purveyors with surface water from the American River basin. Use of American River basin surface water, along with other water diversions from Central Valley rivers and the Delta, contribute to reduced flows in the Lower American River flow, lower Sacramento River, and Delta inflow. Existing Delta water quality conditions assessed in operations modeling for the California WaterFix EIR/EIS (USBR and DWR 2015) indicate that the western Delta in particular is affected by elevated salinity levels that adversely affect municipal and agricultural water supplies. The California WaterFix EIR/EIS also indicates that existing Delta water quality conditions are adversely affected by mercury, dissolved organic carbon, dissolved oxygen, selenium, and Microcystis algae.

7.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

7.2.1 Methodology for Assessing Impacts of Each Alternative on Hydrology and Water Quality

The Environmental Consequences/Environmental Impact section identifies the potential impacts of the actions and projects associated with each EIS/EIR alternative on the groundwater hydrology, surface water hydrology, and the water quality of surface waters and groundwater in the Planning Area. The Chapter 7 analysis for each EIS/EIR alternatives relies on existing planning documents that have projected regional water demand.

Potential ways that the EIS/EIR alternatives could impact surface waters and groundwater hydrology and water quality include direct and indirect impacts from construction and

operations related to new urban development in the UDA, and the related transportation projects and other infrastructure projects outside the UDA that are expected to occur under each EIS/EIR alternative.

The future projects and activities expected under each EIS/EIR alternative are described in Chapter 2, Alternatives, Including the Proposed Action/Proposed Project. As discussed in Section 3.6.5, GIS Methodology Used in Chapters 4–16 to Estimate Direct Impacts of Each EIS/EIR Alternative, the EIS/EIR impact methodology uses geographic information system (GIS) datasets that were prepared using the best available information about the amounts and locations of ground disturbance from the future projects and activities expected under each alternative.

As discussed in Section 3.4 and in Section 7.1.1.3, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Sacramento County 2010; Galt 2009; Rancho Cordova 2006a) analyzed direct and cumulative impacts of urban growth planned within their jurisdictions, including impacts to surface waters and groundwater hydrology and water quality. When the impact analysis or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief summary or description of the incorporated information or analysis is provided in Sections 7.2.2, 7.2.3, and 7.2.4.

However, as discussed in Section 3.4, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2008), in 2050 (Rancho Cordova 2006a), and 2030 (Sacramento County 2010), and the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3, EIS/EIR Study Period). As discussed in Section 3.4, the EIRs for Rancho Cordova General Plan and the Galt General Plan analyzed full buildout of those jurisdictions. However, additional urban development can be expected to occur within Sacramento County during the 35 years after the General Plan EIR study period ended, and before this EIS/EIR's study period ends in 2065. Consequently, the impact analyses and conclusions incorporated from the Sacramento County General Plan EIR may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative presented in Chapter 2. Therefore, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the three General Plan EIRs, along with the effects of all urban development activities and projects that are included in the description of each EIS/EIR alternative.

In addition to analysis and conclusions incorporated by reference from the three General Plan EIRs, relevant information and analysis of operations-related hydrologic effects and water quality effects of existing water and wastewater infrastructure projects in the Planning Area were incorporated into the analysis of the EIS/EIR alternatives from these final EIRs: *The Water Forum Proposal EIR* (Sacramento City-County Office of Metropolitan Water Planning 1999), *The 2002 Zone 40 Water Supply Master Plan EIR* (SCWA 2004), and *The Sacramento Regional County*

Sanitation District EchoWater Project EIR (Ascent Environmental Inc. 2014). In accordance with NEPA regulation 43 CFR 46.135(b), where a prior analysis is incorporated, the source document, including pertinent page numbers, is cited and the analysis is briefly described.

As discussed in Section 3.6.2, Geographic Study Area of Resource Topics Analyzed in Chapters 4 Through 16, it is appropriate to consider impacts to some environmental resources within the context of other impacts occurring to the resource within the surrounding landscape, community, or region. The General Plan EIRs and the three EIRs prepared for existing water and wastewater infrastructure projects in the Sacramento County region, by necessity, also addressed effects that would occur over a spatial area that extends beyond the Planning Area boundary. These local and regional hydrology and water quality effects are applicable to the cumulative impact analysis of each EIS/EIR alternative within the Planning Area because the local and regional changes to hydrology and water quality will occur as a result of the shared water resources and water/wastewater infrastructure among the municipal agencies in the urbanized areas of Sacramento County and western Placer and El Dorado Counties. In addition, the existing stormwater drainage and flood control facilities (i.e., levees, pump stations) discussed in Section 7.1.2.3 were developed based on watershed, level of development, watershed size, history, and trends in problem conditions. Several of the HUC 10 watershed boundaries discussed in Section 7.1.2 extend beyond the EIS/EIR Planning Area boundary (Figure 7-2). Consequently, the analysis of cumulative impacts to hydrology and water quality extends beyond the Planning Area. Accordingly, the lead agencies determined that an appropriate geographic scale for evaluating the impacts of each EIS/EIR alternative on surface water and water quality should include the Planning Area, the area of each HUC 10 watershed discussed in Section 7.1.2, the area of Sacramento County located outside the Planning Area, and the western portions of Placer and El Dorado Counties.

As discussed in Section 3.7, Cumulative Effects Analysis in Resource Chapters 4 through 16, the Chapter 7 cumulative analyses of impacts to surface waters and groundwater hydrology and water quality will consider the effects of past and present urban development within in the Planning Area (see existing conditions in Section 6.1.2, Planning Area Agricultural Resources and Activities) and within the larger study area, as well as impacts expected from reasonably foreseeable “other” projects in the Planning Area (see Section 3.7) and foreseeable “other” projects within the larger study area. The cumulative analysis of each EIS/EIR alternative will then consider whether the incremental impacts of the alternative on surface waters and groundwater hydrology and water quality would be significant (i.e., would be cumulatively considerable). The reasonably foreseeable “other” projects within the larger study area include the proposed Bay Delta Conservation Plan/California WaterFix EIR/EIS (USBR and DWR 2015).

The current effects and expected future effects of climate change were also considered in the analysis of cumulative impacts, using information presented in the American River Basin Integrated Regional Water Management Plan (Regional Water Authority 2013).

7.2.1.1 Determination of Impact Significance

As discussed in Section 3.8.1, Significance Thresholds, the criteria used to evaluate the significance of impacts expected from each EIS/EIR alternative on hydrology and water quality are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, and on typical thresholds used to evaluate hydrology and water quality impact in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse impact would occur if the alternative would:

1. Result in a violation of any water quality standard or waste discharge requirement;
2. Substantially deplete groundwater supplies or substantially interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);
3. Substantially alter the existing drainage pattern of an area, including through the modification of the course of a stream or river in a manner that would result in substantial erosion, siltation, and/or environmental harm;
4. Substantially alter the existing drainage pattern of an area and/or substantially increase the rate or amount of stormwater runoff in a manner that would result in flooding on- or off-site;
5. Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems.
6. Create or contribute to runoff water which would provide substantial additional sources of polluted runoff. Additional sources of polluted runoff or other degradation of water quality would be considered substantial if it is not in compliance with an applicable NPDES permit, or there is a net increase in any other pollution source of a CWA 303d impaired waterway;
7. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map, or other flood hazard delineation map;
8. Place structures within a 100-year flood hazard area that would impede or redirect flood flows;
9. Expose people or structures to a substantial risk of loss, injury or death involving flooding; or

Appendix G of the CEQA Guidelines does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial impact could occur if the alternative would:

1. Discernibly reduce the consumption of groundwater or discernibly increase the potential for groundwater infiltration/recharge;
2. Discernibly reduce changes in existing drainage pattern of an area, including reducing modification of the course of a stream or river that would discernibly reduce or avoid erosion, siltation, and/or environmental harm;
3. Discernibly reduce changes to existing drainage pattern of an area or discernibly reduce the rate of stormwater runoff to avoid flooding on or off site;
4. Avoid or discernibly reduce runoff that would exceed the capacity of existing or planned stormwater drainage systems;
5. Avoid or discernibly reduce polluted runoff or discernibly Improve surface water quality; or
6. Discernibly improve groundwater quality.

The impact analysis for the three EIS/EIR alternatives will consider the context, intensity, and severity of potential impacts to each of these hydrology and water quality impact-criteria, and will present separate determinations of significance addressing each of these criteria.

7.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2, No Action/No Project Alternative.

7.2.2.1 Groundwater Hydrology Effects of the No Action/No Project Alternative

Direct and Indirect Effects of the Alternative

As discussed in Section 2.2.3, Loss of Natural Lands Under the No Action/No Project Alternative, new urban development would occur on approximately 32,424 acres of existing natural land covers within the portion of UDA located north of the Cosumnes River as well as the portion of the UDA in the Galt sphere of influence (SOI). This planned urban development would increase impervious surfaces (e.g., buildings, roads, and parking lots) within the Upper Morrison Creek, Lower Morrison Creek, Elder Creek, Laguna Creek, and the Beaver Lake–Sacramento River HUC 12 watersheds in the north-central part of the Planning Area, and increase impervious surfaces in a portion of the Lower Cosumnes River and the Laguna watersheds in the south-central portion of the Planning Area.

This development and increase in impervious surfaces is expected to reduce the amount of rainfall infiltration through the soil relative to existing rainfall infiltration rates in those

watersheds, and would reduce the existing rate of groundwater recharge in the UDA portion of the Central Basin. Additionally, population growth from the approximately 32,424 acres of new development under the No Action Alternative would increase municipal and industrial water demands, and much of that demand may be met by groundwater.

The potential indirect adverse hydrologic effects of concern associated with reduced recharge and increased groundwater use include reduced long-term groundwater availability, increased depth of groundwater pumping and power consumption, reduced well yields and wells going dry, and land subsidence.

The remainder of this assessment analyzes the effects of the No Action/No Project Alternative on groundwater hydrology groundwater modeling studies in the Planning Area (which include effects of changes to impervious surfaces and groundwater supply uses) and the General Plan EIRs.

Groundwater is, and would continue to be, a primary water source used for municipal, industrial, and agricultural water supply in the Planning Area over the EIS/EIR study period (RMC Inc. 2014; Robertson-Bryan and WRIME 2011). Future groundwater hydrology will primarily be affected by future municipal and industrial uses because agricultural land uses are not expected to increase.

Within the northern portion of the UDA (the portion of the UDA that is within the Urban Services Boundary of Sacramento County) (Figure 1-1), most of the future planned urban development included in the No Action/No Project Alternative is within Sacramento County's Zone 40 water supply system service area, with smaller areas of the UDA lying within water service areas of Sacramento, Golden State Water Company, and California American Water Company. The *2002 Zone 40 Water Supply Master Plan* (SCWA and MWH 2005) plans future water supply facilities for about 47,000 acres of the 86,000-acre Zone 40 service area, which is the area within the Planning Area, with the majority of future planned urban development. Groundwater modeling conducted for the Zone 40 Water Supply Master Plan (and more recent modeling for water resource management and planning in the Central Basin [RMC Inc. 2014]), along with groundwater modeling for the South Basin (Robertson-Bryan and WRIME 2011), provide the best available information for describing the effects of the future No Action/No Project Alternative on future groundwater hydrologic conditions in the Planning Area.

The Zone 40 system is designed for conjunctive use of both surface water and groundwater, with maximum surface water use and minimal use of groundwater during wet years, which allows groundwater table in the aquifer to recover. During drier years when surface water is insufficient for municipal and industrial water demands, groundwater is used to a greater extent.

Groundwater modeling results for Zone 40 indicate that for the future 2030 condition, average groundwater levels in the northern region of the Zone 40 area would decrease and eventually stabilize at lower levels (compared to the 2000 baseline conditions) as a result of increased municipal groundwater uses, and the existing groundwater extraction, treatment, and discharge operations at the Aerojet, Mather AFB, and Boeing Superfund sites in Zone 40 (SCWA 2004). However, the existing groundwater cone of depression near Elk Grove would diminish by 2030, with groundwater levels modeled to rise by about 10 feet compared to the 2000 baseline conditions. The groundwater modeling for Zone 40 considered municipal and agricultural water demands for the entire Central Basin (Figure 7-1), which are projected to increase to about 450,000 AFY by 2030 compared to a baseline demand of about 375,000 AFY in 2000 (SCWA 2004; MWH et al. 2006).

In the South Basin (Figure 7-1), new urban development in Galt is projected to result in increased groundwater use up to 9,900 AFY in 2030 compared to the current use of approximately 5,900 AFY (Carollo Engineers 2013). As discussed in Section 7.1.2.1, the portion of the Planning Area within the South Basin is dominated by rural agricultural lands, where the future groundwater demand and supply balance is expected to remain similar to existing conditions. However, the South Basin is expected to have an increase in the acreage of vineyards that will be irrigated with drip irrigation systems, which is expected to reduce groundwater use compared to most other types of irrigated agriculture (Robertson-Bryan Inc. and WRIME 2011). Groundwater modeling indicates that current groundwater use in the South Basin is currently approximately 114,800 AFY and will decrease by an estimated 1,200 AFY in the future and remain consistent with the South Basin sustainable groundwater yield target established in the Water Forum Agreement (Robertson-Bryan Inc. and WRIME 2011). The current groundwater levels in the cone of depression near Galt are expected to remain similar to the baseline 1996 groundwater levels existing at the time of the *Water Forum Proposal EIR* (Robertson-Bryan Inc. and WRIME 2011).

The effects of future planned urban development on the existing groundwater conditions within the Planning Area were also evaluated in the Sacramento County and Galt General Plan EIRs (Sacramento County 2011; Galt 2009) based on the modeling results presented above; however, no groundwater hydrology impacts were identified for Rancho Cordova's General Plan. The relevant impact analysis and conclusions are summarized below and incorporated by reference:

- Significant and unavoidable groundwater hydrology impacts could occur in the Central Basin due to additional urban development planned for the Jackson Highway Corridor New Growth Area, from the planned Grant Line East New Growth Area, and from the

planned Easton New Growth Area (Sacramento County 2010, p. 6-53, Chapter 65, Water Supply). The effects of the water demands to groundwater will be assessed prior to approval of those projects pursuant to Senate Bill 610 and Senate Bill 221, which require a determination that the groundwater is reasonably available to meet demand. The analysis will be included in the CEQA document for the development projects and considered prior to approval of the development. The future water demands and impervious surfaces of these development areas were not considered in the 2002 Zone 40 Water Supply Master Plan or associated groundwater modeling.

- Significant and unavoidable groundwater hydrology impacts could occur in the South Basin due to long-term use of groundwater to meet municipal water demands, and reduced groundwater recharge, that would result in a net deficit in the existing aquifer volume or a lowering of the existing local groundwater levels (Galt 2008, p. 8-3, Chapter 8, Natural Resources).

As discussed in Section 7.2.1, additional urban development can be expected to occur within Sacramento County during the 35 years after the end of the Sacramento County General Plan EIR study period in 2050, and before the end of this EIS/EIR's study period in 2065 (see Section 3.6.3). Therefore, impacts of the No Action/No Project Alternative on existing groundwater conditions would be nearly identical to the significant and unavoidable impacts to groundwater hydrology identified in the General Plan EIRs (Sacramento County 2011; Galt 2009) at 2050. The lead agencies anticipate that the No Action/No Project Alternative impacts to groundwater from additional urban development after 2030 would be similar in nature but potentially greater due to additional population and increased municipal water demand. Therefore, the additional impacts of the No Action/No Project Alternative would further contribute to the significant and unavoidable impacts identified in the General Plan EIRs.

In addition, as discussed in Section 2.2.2, up to approximately 1,900 acres of planned urban development could be shifted or displaced to one or more locations outside the current Sacramento County Urban Service Boundary (USB) boundary under the No Action/No Project Alternative. This change in location of impervious surfaces and municipal groundwater use that would occur from the displaced development also was not considered in the groundwater modeling used in the Sacramento County General Plan EIR. However, the total municipal and agricultural water demand expected in the Planning Area would not change because of the displaced development. The displaced development may result in slightly more future

[5] The Sacramento County General Plan EIR analyzed development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by Sacramento County. However, Sacramento County is currently processing Master Plans in the Jackson Highway Corridor, so the incorporated analysis and conclusions are relevant to the No Action/No Project Alternative.

groundwater use in the South Basin and slightly less groundwater use in the Central Basin. However, the 1,900 acres of displaced development is a relatively small area compared to the total size of the Planning Area. Therefore, the displacement of 1,900 acres of planned development to locations adjacent to the current Sacramento County USB boundary would not be expected to substantially change the conclusions presented in the General Plan EIRs. In addition, as discussed in Section 2.2.1, the South Sacramento County Agriculture and Habitat Lands Recycled Water Project (Regional Sanitation 2015) is also assumed to proceed under the No Action/No Project Alternative. This project would increase agriculture use of recycled water by approximately 50,000 AFY in the southwestern portion of the Planning Area outside the UDA, which is expected to reduce agricultural groundwater-pumping in that portion of the Central Basin by a similar amount (RMC Inc. 2015) (Figure 7-1). However, the Regional Water Authority's climate change modeling (Regional Water Authority 2013) used in the General Plan EIRs did not include the reduced groundwater pumping expected under this recycled water program. Therefore, the potential beneficial effects of the Recycled Water Project element of the No Action/No Project Alternative on the projected Central Basin groundwater levels, including the cone of groundwater depression located west of Elk Grove, are uncertain.

Establishment of preserves to mitigate development projects impacts under the Endangered Species Act (ESA), California Endangered Species Act (CESA), or CWA Section 404 would not be expected to directly or indirectly result in adverse changes to groundwater hydrologic conditions because groundwater use would not increase. In addition, the existing rainwater infiltration and associated groundwater recharge occurring at preserved lands would likely continue on those lands in perpetuity.

No Action/No Project Cumulative Effects on Groundwater Hydrology

As discussed in Section 3.7.1, Past and Present Actions in the Planning Area, past and present urban development, municipal use of groundwater, and irrigated agricultural uses of groundwater, have adversely impacted groundwater recharge and groundwater tables in the study area. These past and present alterations have resulted in the groundwater existing conditions described in Section 7.1.2.1. The past and present extensive use of municipal and agricultural water remain within the designated sustainable yields for the Central Basin and South Basin established by the Water Forum Agreement and the South Basin Groundwater Management Plan, which allows relatively lower groundwater levels compared to historical conditions, and existence of groundwater cones of depression. The types of future reasonably foreseeable "other" projects, activities, and actions, described in Section 3.7.2, Reasonably Foreseeable Other Actions, are similar to the types of past and present actions that occurred in the study area. The other reasonably foreseeable future actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in the Elk Grove SOI and in Rancho

Murieta, development of the Wilton Rancheria Casino, master planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued urban development of cultivated agricultural lands, major infrastructure projects such as California High-Speed Rail and the California WaterFix, and expansion of the existing National Wild Refuge and the Cosumnes River Preserve (see Section 3.7.2 for details of these projects). The water demands of these foreseeable other projects were generally included in the analysis of cumulative groundwater hydrology impacts incorporated from the General Plan EIRs. Hydrologic modeling of the entire Sacramento County region was conducted by the Regional Water Authority to evaluate future 2030 land uses anticipated to occur under the three General Plans, projected 2030 urban and agricultural water demands, and estimated effects of future climate change (Regional Water Authority 2013). The modeling assumes that groundwater would be used to make up the shortfall, which would occur primarily to meet agricultural demands, resulting in average groundwater level reductions by up to about 20 feet in agricultural areas. Groundwater would be sufficient to meet future water demands in normal water years based on the water rights and contracts of all water purveyors. However, future water shortages in single and multiple dry-year scenarios could be a concern for long-term groundwater availability. Consequently, the combination of past, present, and reasonably foreseeable future projects could result in groundwater use that may lead to significant cumulative effects to exceedance of the sustainable yields of the groundwater basins, groundwater level reductions affecting increased pumping energy use, occurrence of dry wells, or land subsidence.

The groundwater basins underlying the Planning Area are large and defined by the major hydrologic barriers of the American River to the north of the Central Basin, the Sacramento River to the west of the Central Basin, Dry Creek to the south of the South Basin, and the upgradient and bedrock formations of the Sierra Nevada Mountains to the east of these basins (Figure 7-1). Therefore, the existing/cumulative groundwater hydrology conditions in the Planning Area are generally localized to effects within these basins.

As discussed previously, the direct and indirect impacts of No Action/No Project Alternative would adversely affect existing groundwater conditions. However, the effects of future urban development/agricultural water demand in the Planning Area have been considered in the groundwater modeling studies of the Central and South Groundwater Basins. Therefore, the incremental contribution of the No Action/No Project Alternative effects would be significant and cumulatively considerable, when viewed in connection with the cumulative effects of the past projects, current projects, and probable other projects on the groundwater hydrology of the study area. The No Action/No Project Alternative's incremental effects are determined to be significant and cumulatively considerable, when viewed in connection with the significant cumulative impact of the past, present, and foreseeable other projects in the study area.

7.2.2.2 Surface Water Hydrology and Flooding Effects of the No Action/ No Project Alternative

Direct and Indirect Effects of the No Action/No Project Alternative

This impact analysis addresses the direct and indirect effects to surface hydrology, stormwater runoff, and flooding under the No Action/No Project Alternative. New urban development in the Planning Area would increase the amount of impervious surfaces in the UDA, and thus reduce the amount of rainfall infiltration into the soil, resulting in the potential for increased stormwater runoff, and in hydrologic changes to downstream or receiving waters.

Urban development stormwater facilities must be designed consistent with Sacramento County, Rancho Cordova, or Galt requirements (see Section 7.1.1) to include sufficient capacity. New development projects and activities under the No Action/No Project Alternative will not exceed the capacity of existing or planned urban stormwater drainage systems.

Designs for new master plan or specific plan developments would continue to include significant grading to moderate topographic changes in order to create level building areas, proper drainage, and adequate line of site for roads, which will continue to alter existing localized drainage conditions inside the UDA. New development projects and activities under the No Action/No Project Alternative would continue to include detention basins; underground drainage infrastructure; culverts and bridges in waterways; modifications of stream channels; construction of new drainage channels; and, often, encroachments into, or losses of, wetlands and other waters, riparian areas, and floodplains.

Detention basins with properly sized outlet pipes will be required to provide flood control and to slow discharges to receiving waters such that the receiving waters maintain the same flow rates within the tributaries as the pre-project condition flow rates. Therefore, the additional impervious surface area associated with build out of the UDA under the No Action/ No Project Alternative would not necessarily result in increased flooding or changes to the existing hydrology in UDA streams.

Under the No Action/No Project Alternative, setbacks between new urban development and the banks of a stream or other natural waterway will not be required in most Planning Area land use zones (see Chapter 4, Land Use), provided there is no existing flood hazard. At the most, only minor setbacks between new development and streambanks would be required by local jurisdictions during the land use planning processes of future development projects and activities within the Planning Area. Many of the remaining natural sections of streams and waterways in the UDA (Section 7.1.2.3) will be physically modified to remain a relatively narrow and stable corridor. Once stabilized, these streams and waterways will no longer meander over

time, reducing or eliminating many fluvial ecosystem processes currently present in these waterway sections.

Most remaining natural waterways within the UDA would become surrounded by urban activities under the No Action/No Project Alternative. During the local land use planning process, recreational land uses such as trails, parks, and golf courses stream corridors may be incorporated into these stream corridors. Most stream corridors would be narrow strips of open space with no required setbacks from buildings or streets.

Many natural waterways in the UDA may become armored with concrete or rock protection to prevent channel downcutting and bank erosion. Other natural waterways channels may be left in a natural state. The installation of erosion control would typically include removal of vegetation. Therefore, adverse impacts to the natural hydrologic and ecosystem functions of UDA streams may occur even in cases where the natural stream channel was originally avoided. In addition, newly urbanized stream channels and stream corridors would not be managed to prevent adverse impacts to the stream from encroaching human activity. Without adequate setbacks, adverse impacts to the natural hydrologic function of streams are expected to occur within the UDA under the No Action/No Project Alternative.

The effects on surface hydrology, stormwater runoff, and flooding from planned urban development within Sacramento County, Galt, and Rancho Cordova were evaluated in the analysis of the General Plan EIRs discussed in Section 3.4 and Section 7.2.1 (Sacramento County 2011; Galt 2009; Rancho Cordova 2006b). As discussed in Section 7.2.1, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative:

- The planned urban development described in the Sacramento County General Plan through the year 2030 would be implemented in compliance with Sacramento County's Floodplain Management Ordinance, Improvement Standards, and General Plan policies. Therefore, planned development would not substantially increase the existing rate or amount of surface runoff in a manner that would cause flooding or exceed stormwater system capacity, thus resulting in a less-than-significant impact (Sacramento County 2010, p. 7-25, Chapter 7, Hydrology and Water Quality).
- Planned urban development would be implemented in compliance with Sacramento County's Floodplain Management Ordinance, Improvement Standards, and Sacramento County General Plan policies would ensure that no residences are placed within a flood hazard area, and that people or structures would not be exposed to a significant risk involving flooding, thus resulting in a less than significant impact (Sacramento County 2010, p. 7-45, Chapter 7, Hydrology and Water Quality).

- The Galt General Plan EIR determined that housing construction within a 100-year flood hazard area, or other structures that could impede or redirect flood flows, is a less-than-significant impact. Galt, in accordance with its policies, would preserve floodplain areas, limit development in hazardous areas, and implement a Storm Drainage Master Plan and a Pavement Management Plan to ensure that adequate levels of stormwater drainage infrastructure are provided (Galt 2008, p. 6-27, Chapter 6, Public Facilities).
- The exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam, is a less-than-significant impact in the Galt General Plan EIR (Galt 2008, p. 6-28, Chapter 6, Public Facilities).
- The Rancho Cordova General Plan contains policies and action items that adequately address stormwater drainage and flooding issues from planned new urban development. Therefore, the increased impervious surfaces, altered drainage conditions, and altered stormwater runoff rates (which could result in flooding effects) of planned urban development, would result in a less-than-significant impact (Rancho Cordova 2006a, p. 4.9-41, Chapter 4.9, Hydrology and Water Quality).

As discussed in Section 3.4 and in Section 7.2.1, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009), in 2050 (Rancho Cordova 2006a), and 2030 (Sacramento County 2010)—and the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). The Galt and Rancho Cordova General Plan EIRs analyzed buildout of their jurisdictions. However, additional urban development would occur within Sacramento County after the 2030 end of the General Plan EIR study period, until the expected buildout of the UDA at end of this EIS/EIR's study period in 2065. Consequently, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of the additional urban development activities and projects included in the description of each EIS/EIR alternative. The lead agencies extrapolated that the impacts of the additional urban development in the latter part of the 50-year EIS/EIR study period, including potential increases to stormwater runoff, stream and drainage channel modifications, or additional encroachment in floodplains, would be similar to the impacts of urban development implemented in the early part of the EIS/EIR study period, which was analyzed in the General Plan EIRs. Because existing regulations related to flood control and stormwater management (see Section 7.1.1) would continue over the 50-year EIS/EIR study period of the No Action/No Project Alternative, the impacts of new urban development constructed in the latter part of the EIS/EIR study period would also result in ***Less Than Significant Adverse*** effects to stormwater runoff, stormwater system capacity, flooding, flood hazards, flood flows, drainage, and stream channels, as was identified in the General Plan EIRs for new development implemented in the early part of the EIS/EIR study period. Structures and the human environment would not be

exposed to undue risk of flooding; natural watersheds and streams would continue to be modified within the UDA to fit within designated areas of communities.

Additionally, as described in Section 2.2.2, up to approximately 1,900 acres of planned urban development could be shifted or displaced from inside the MCRA to one or more locations outside the current Sacramento County USB boundary under the No Action/No Project Alternative. This displacement of new urban development would also shift the location of impervious surfaces outside the current USB boundary. Consequently, stormwater runoff-related effects within the MCRA boundary could be reduced compared to the effects described in the General Plan EIRs. However, the impervious surfaces constructed in the areas of displaced development would be expected to result in similar effects to stormwater runoff, and similar changes to stormwater drainage infrastructure as described in the General Plan EIRs, and would not substantially change the types or severity of hydrology, stormwater runoff, or flooding effects identified and analyzed in the three General Plan EIRs (see bullets above). The displaced urban development assumed in the No Action/No Project Alternative would contribute to, but would not substantially change, the ***Less Than Significant Adverse*** effects on surface hydrology, stormwater runoff, and flooding identified in the three General Plan EIRs.

Establishment of preserves under the No Action/No Project Alternative to mitigate development project-impacts under ESA, CESA, or CWA Section 404 would not be expected to directly or indirectly result in adverse changes to surface hydrology, stormwater runoff, or flooding conditions because the amount of any increase in impervious surfaces, or alteration of surface drainage features or stormwater runoff conditions, would likely be minimal at any one site.

No Action/No Project Cumulative Effects on Surface Water Hydrology and Flooding

As discussed in Section 3.7.1 and in Section 7.1.2, past and present urban development projects and activities have constructed impervious surfaces, re-aligned channels, and constructed other encroachments (e.g., bridges, culverts). These past and present alterations have resulted in the existing surface water hydrology conditions in the Planning Area (see Section 7.1.2). The effects of the past and present actions on surface water hydrology in the Planning Area were described in Section7.2.2.2 and represent a significant adverse impact on the surface water hydrologic conditions within the study area.

The types of future reasonably foreseeable “other” projects, activities and actions, described in Section 3.7.2, are similar to the types of past and present actions that have occurred in the study area. The other reasonably foreseeable future actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in the Elk Grove SOI and in Rancho Murieta, development of the Wilton Rancheria Casino, master planned developments inside the UDA named Rio Del Oro

and Mather South, further rural residential development outside the UDA, continued urban development of cultivated agricultural lands, major infrastructure projects such as California High-Speed Rail and the California WaterFix, and expansion of the existing National Wild Refuge and the Cosumnes River Preserve (see Section 3.7.2 for details of these projects). These reasonably foreseeable other projects have potential to effect existing surface hydrology, stormwater runoff, and flooding conditions. Additionally, predictions for future climate change include increased winter rainfall intensity in the Planning Area and increased Sierra Mountain areas exposed to rain rather than snow, which may result in increased downstream flood flows and frequency of flood volumes. However, as described in Section 7.1.1.3, the General Plans contain policies and implementation programs that require new urban development to adequately address stormwater runoff and flooding issues, considering both current and future hydrologic conditions and current and future infrastructure conditions.

Projects and activities included in the No Action/No Project Alternative (see Section 2.2.1, Future Projects/Activities Likely Under the No Action/No Project Alternative) with potential to affect surface hydrologic conditions are conversion of agricultural and undeveloped lands to new urban development. As described above and in Section 7.1.1, new urban development projects under the No Action/No Project Alternative would be required to adequately address stormwater runoff and flooding issues. Therefore, when the incremental effects of the No Action/No Project Alternative are viewed in connection with the effects of the past, present, and reasonably foreseeable future other actions, the No Action/No Project Alternative would not cause, or make a considerable contribution to, the significant cumulative impact on surface hydrology, stormwater runoff, or flooding conditions of the study area. The No Action/No Project Alternative would result in a ***Less Than Significant Adverse Cumulative*** effect on groundwater hydrology.

7.2.2.3 Surface Water Quality and Groundwater Quality Effects of the No Action/No Project Alternative

Direct and Indirect Effects of the No Action/No Project Alternative

This section describes the expected indirect effects on surface water quality and groundwater quality under the No Action/No Project Alternative as discussed in Section 2.2.1. The planned urban development under the No Action/No Project Alternative includes construction activities with potential to result in temporary discharges to surface water or impacts to groundwater quality in the Planning Area. Urban development construction activities typically involve vegetation removal, grubbing and grading, excavation, and a variety of other construction activities that may result in exposure of disturbed sites to rainfall and stormwater runoff events. If not conducted with appropriate stormwater quality control measures, construction activities can result in soil erosion and/or runoff of contaminants such as suspended sediment,

petroleum hydrocarbons, and other construction materials (e.g., concrete, paints, and coatings) to off-site or downstream areas. Other contaminants discharged in construction site runoff may include toxic organic compounds in petroleum products and trace metals (e.g., copper, zinc).

Potential indirect water quality effects of new urban development and infrastructure after construction is completed could include increased urban stormwater runoff into receiving waters, increased municipal wastewater discharges from the Sacramento Regional Wastewater Treatment Plant to the Sacramento River, and increased municipal wastewater from Galt discharged into the Cosumnes River. Inside the UDA, planned urban development has potential to increase stormwater runoff that discharges of stormwater contaminants that may adversely affect surface water and groundwater quality. Urban stormwater runoff often includes contaminants such as potentially toxic compounds (e.g., petroleum hydrocarbons, household pesticides, and trace metals [copper]), oxygen-demanding substances, nutrients, pet wastes, and trash, which would adversely water quality of Planning Area receiving waters, primarily in the UDA where new urban development will occur. The effects of the future planned urban development and infrastructure on surface water and groundwater quality were evaluated in the three General Plan EIRs (Galt 2009; Rancho Cordova 2006b; and Sacramento County 2011). The relevant conclusions from each of these EIRs are summarized below:

- The future development impacts on urban runoff and impacts from new sources of pollutants is a less than significant impact because compliance with Sacramento County Stormwater Ordinance, implementation of low-impact development (LID) standards, and construction runoff control measures would ensure that new development would not alter the course of local waterways in a manner that results in substantial erosion or sedimentation or result in substantial new sources of pollutants in urban runoff (Sacramento County 2010, p. 7-56, Chapter 7, Hydrology and Water Quality).
- The potential for municipal water supply groundwater pumping to result in migration of contaminants from the lower aquifers, or migration of the contaminant plumes at the groundwater cleanup sites in Sacramento County, is a less than significant impact. Compliance with Title 22 drinking water quality requirements by water purveyors would ensure that any extracted groundwater for distribution is treated to the appropriate standard (Sacramento County 2010, p. 6-71, Chapter 6, Water Supply).
- The impacts of new urban development on changes in the volume of stormwater runoff or to cause increases in stream bank and channel erosion is a less than significant impact because Galt General Plan policies, programs, and mitigation measures will be implemented (Galt 2008, p. 6-22, Chapter 6, Public Facilities and Services). Galt's mitigation for any unavoidable impacts includes monitoring and enforcement provisions to control nonpoint and point source water pollution requirements of the NPDES

Municipal Stormwater Permit, as well as continued implementation of its Stormwater Management Plan in coordination with the Stormwater Quality Partnership agencies.

- The new urban development has potential to result in increased levels of contaminants in stormwater runoff from the postconstruction activities, cause impairment of the beneficial uses of receiving waters or areas that provide water quality benefit, or cause substantial harm to the biological integrity of the waterways by the discharge of stormwater is a less than significant impact with implementation of Galt's General Plan policies, programs, and mitigation measures described in the bullet above (Galt 2008, p. 6-26, Chapter 6, Public Facilities).
- The urban development to result in increased discharge of stormwater from material storage areas, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas is a less than significant impact with implementation of Galt's General Plan policies, programs, and mitigation measures described above in the first bullet (Galt 2008, p. 6-29, Chapter 6, Public Facilities).
- The potential for urban development to result in the discharge of polluted runoff that could cause harm to the biological integrity of waterways, exceed water quality standards, or otherwise substantially degrade surface water quality is a less than significant impact with implementation of Rancho Cordova's General Plan policies, programs, and mitigation measures (Rancho Cordova 2006a, p. 4.9-34, Chapter 4.9, Hydrology and Water Quality). In addition to the General Plan policies that generally address land use requirements and prevention/treatment provisions for stormwater and groundwater contamination, Rancho Cordova adopted mitigation measures to (a) continue coordination and implementation of the 2009 SQIP for the NPDES Municipal Stormwater Permit, and (b) require future land uses that utilize hazardous materials or generate hazardous wastes to provide adequate containment facilities to ensure that surface water and groundwater resources are protected.
- The potential for urban development to result in the degradation of groundwater quality is a less than significant impact with implementation of Rancho Cordova's General Plan policies, programs, and mitigation measures (Rancho Cordova 2006a, p. 4.9-39, Chapter 4.9, Hydrology and Water Quality). In addition to the General Plan policies that generally address measures to prevent groundwater contamination and require cleanup actions, Rancho Cordova's mitigation measure requires development project proponents to determine whether urbanization of these areas would adversely affect the Aerojet/Mather AFB groundwater remediation activities prior to Rancho Cordova's approval of large-scale development.

As discussed in Section 3.4 and Section 7.2.1, the Galt and Rancho Cordova General Plan EIRs analyzed buildout of their jurisdictions. However, additional urban development would occur within Sacramento County during the 35-year period after the end of the General Plan EIR study period (2030) and the buildout of the UDA expected at end of this EIS/EIR's study period in 2065. Consequently, the lead agencies considered the impact analysis and conclusions incorporated by reference from the General Plan EIRs, along with the effects of the additional urban development activities and projects included in the description of the No Action/No Project Alternative. The lead agencies extrapolated that the impacts of the additional urban development in the latter part of the 50-year EIS/EIR study period, including potential increases to nonpoint and point source waste discharges, and stormwater runoff effects would be similar to the impacts of urban development implemented in the early part of the EIS/EIR study period, which was analyzed in the General Plan EIRs. However, because existing regulations related to surface water quality and groundwater quality—including local ordinance requirements in the General Plans (Section 7.1.1.3), the NPDES Municipal Stormwater Permit provisions to minimize and avoid contaminant discharges, and the Central Valley RWQCB regulations for development of appropriate municipal wastewater treatment and disposal (Sections 7.1.1.2 and 7.1.1.3)—would continue over the 50-year EIS/EIR study period, the impacts of new urban development constructed in the latter part of the EIS/EIR study period would continue to result in ***Less Than Significant Adverse*** effects on surface water quality and groundwater quality, as was identified in the General Plan EIRs.

Additionally, as described in Section 2.2.2, Expected Regulatory Environment Under the No Action/No Project Alternative, up to approximately 1,900 acres of planned urban development could be shifted or displaced from inside the MCRA to one or more locations outside the current Sacramento County USB boundary under the No Action/No Project Alternative. This displacement of new urban development would also shift locations of potential discharges of contaminants from temporary construction activities and from long-term urban stormwater runoff to locations outside the current USB boundary. However, the approximately 1,900 acres of displaced development is relatively small compared to the total acres of planned new development analyzed in the General Plan EIRs, and the existing regulations related to surface water quality and groundwater quality (see Section 7.1.1) would also apply to urban development within areas of displaced development over the 50-year EIS/EIR study period.

The continued establishment of preserves under the No Action/No Project Alternative to mitigate development project impacts under ESA, CESA, or CWA Section 404 would not be expected to directly or indirectly result in adverse changes to surface water quality or groundwater. Projects that reestablish or establish aquatic resources on preserves would implement BMPs to avoid soil erosion or discharges of contaminants. Consequently, new

preserves and preserve activities would not be expected to exceed water quality objectives or degrade existing water quality.

Therefore, the No Action/No Project Alternative would not substantially change the types or severity of surface water and groundwater quality impacts identified in the General Plan EIRs. Consequently, the No Action/No Project Alternative would not change the less than significant surface water and groundwater quality impacts described in the General Plan EIR documents listed above.

No Action/No Project Cumulative Effects on Surface Water Quality and Groundwater Quality

As discussed in Sections 3.7.1 and 7.2.1, past and present urban development and associated infrastructure projects and activities in the EIS/EIR Planning Area have adversely altered water quality from agricultural and urban runoff with contaminants potentially harmful to aquatic life, human health, and harmful to recreational beneficial uses in surface water bodies (e.g., pesticides, petroleum products, trace metals, pathogens, nutrients, and suspended sediment) and groundwater quality for municipal uses. Urban development in the Planning Area has contributed to wastewater discharge from the Sacramento Regional Wastewater Treatment Plant to the Sacramento River and Delta. Contaminants have also been contributed from agricultural runoff in the Planning Area (e.g., pesticides, suspended sediment, pathogens, and nutrients). Additionally, downstream water quality is also affected by the municipal water demands in the Planning Area that are served by Water Forum Agreement purveyors with surface water from the American River basin. Use of American River basin surface water, along with other water diversions from Central Valley rivers and the Delta, contribute to reduced flows in the Lower American River flow, lower Sacramento River, and Delta inflow. These past and present alterations have resulted in the existing conditions of surface water quality and groundwater quality described above in Sections 7.1.2.2 and 7.1.2.4, and they represent a significant adverse impact on water quality in the study area.

The types of future reasonably foreseeable “other” projects, activities, and actions, described in Section 3.7.2, are similar to the types of past and present actions that occurred in the study area. The other reasonably foreseeable future actions in the study area (see Sections 3.7.2 and 4.1.2.1, Past and Current Land Use in the Planning Area) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in Elk Grove and Rancho Murieta, master planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued development of cultivated agricultural lands, and development of major infrastructure projects such as California High-Speed Rail and the California WaterFix (see Section 3.7.2 for details of these projects). These reasonably foreseeable other projects have potential to affect existing surface water quality and existing groundwater quality. However, these foreseeable projects and activities would be required

to meet the existing regulations and local policies for surface water quality and groundwater quality, as described in Section 7.1.1. Moreover, implementation of agricultural water quality monitoring and management programs for the Irrigated Lands Regulatory Program would be expected to result in improved water quality in ongoing agricultural drainage discharges in the Planning Area, compared to existing conditions.

Projects and activities included in the No Action/No Project Alternative (see Section 2.2.1) affecting surface water quality and groundwater quality would consist primarily of additional conversion of agricultural and undeveloped lands to urban development (and displaced development) and the related changes in urban and agricultural runoff of contaminants, as well as additional municipal water uses of groundwater and surface water supply sources in the Planning Area. As noted above, new urban development projects in the Planning Area (including development displaced to areas outside the existing USB) would be required to meet existing regulations and policies for water quality, including urban stormwater runoff controls and construction BMPs to meet stormwater quality regulatory requirements of the NPDES Municipal Stormwater Permit. Therefore, they are not expected to adverse contribute to the existing surface water quality or groundwater quality in the Planning Area. Additionally, as noted above, increased groundwater use in the Planning Area is not expected to adversely affect migration of contaminants from lower aquifers, or migration of the contaminant plumes at the groundwater cleanup sites in Sacramento County.

However, the additional municipal water uses projected by the Water Forum Agreement purveyors, including future development in the Planning Area, was considered in the recent modeling for the California WaterFix EIR/EIS (USBR and DWR 2015), which concluded that addition municipal water uses in the Central Valley and the WaterFix facilities operations will result in additional reductions to Delta inflow, and additional reductions in inflow from climate change will result in salinity intrusion in the western Delta. Consequently, the WaterFix EIR/EIS identifies that significant and unavoidable cumulative water quality effects are expected to continue to occur downstream from the Planning Area in the Delta for salinity parameters, mercury, dissolved organic carbon, selenium, and Microcystis algae (USBR and DWR 2015). However, the operational EchoWater Project will improve effluent water quality discharged from the Sacramento Regional Wastewater Treatment Plant to the Sacramento River for flows of up to 181 mgd, and the EchoWater Project has increased capacity to accommodate additional wastewater inflows expected from all future planned development in the Planning Area, including the full buildout of the UDA by 2065 assumed under the No Action/No Project Alternative. After the Regional San's EchoWater Project is fully operational, the contribution of the No Action/No Project Alternative to increased quantity of treated effluent and increased contaminant discharges to the downstream Sacramento River and Delta water quality were determined to be less than significant (Ascent Environmental 2014).

Therefore, the incremental effects of additional surface water in the Planning Area that would occur under the No Action/No Project Alternative would be individually limited and would not make a considerable contribution to the significant cumulative effect on downstream Delta water quality.

7.2.3 Proposed Action/Proposed Project Alternative

As described in Table 2-3 located in Section 2.3.3, Covered Activities and Loss of Natural Land Covers Under the Proposed Action/Proposed Project Alternative, the Proposed Action/Proposed Project Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative. As discussed in Section 2.3.3, the locations of UDA new urban development under the Proposed Action/Proposed Project Alternative would differ slightly, primarily related to the Conservation Strategy of the Proposed Action, which would consolidate project ESA, CESA, and CWA Section 404 into a managed interconnected South Sacramento Habitat Conservation Plan (SSHCP) Preserve System.

As discussed in Section 2.3.1, the Proposed Action/Proposed Project Alternative would allow urban development Covered Activities within the MCRA portion of the UDA to be implemented consistent with planned urban development described in the approved Sacramento County and Rancho Cordova General Plans, without urban development shifting or being displaced to locations outside the current USB boundary. Therefore, the Proposed Action/Proposed Project Alternative does not assume that approximately 1,900 acres of new urban development would be shifted or "displaced" to locations outside of the current USB boundary for Sacramento County.

As discussed in Section 2.3.5, Conservation Strategy under the Proposed Action/Proposed Project Alternative, and Table 2-6, one of the major benefits of the Proposed Action/Proposed Project Alternative to Planning Area hydrology and water quality compared to impacts expected under the No Action/No Project Alternative are the SSHCP Avoidance and Minimization Measures (AMMs) that will be implemented under each urban development Covered Activity project or activity, particularly the SSHCP AMMs related to Stream Setbacks (see Condition 7 AMMs, including STREAM-1, STREAM-2, and STREAM-3), which are described in EIS/EIR Appendix D).

7.2.3.1 Groundwater Hydrology Effects of the Proposed Action/ Proposed Project Alternative

Direct and Indirect Effects of the Alternative

The Proposed Action/Proposed Project Alternative includes full buildout of the UDA, without urban development Covered Activities occurring outside the UDA. Therefore, the potential for incidental changes in location of groundwater demand in the Central Basin and South Basin

identified for the No Action/No Project Alternative (Section 7.2.2.1) would not occur under the Proposed Action/Proposed Project Alternative. However, no significant impacts in groundwater use or groundwater recharge were identified for the No Action/No Project Alternative, including the effects of the displaced development.

The Proposed Action/Proposed Project Alternative includes a Conservation Strategy that has protection of watersheds and related ecosystem functions (including groundwater recharge) as one of the guiding principles. The SSHCP and Aquatic Resources Program (ARP) includes AMM LID-2, which requires the Implementing Entity to prioritize locations that are suitable for groundwater recharge incorporation when siting SSHCP Preserves containing Riparian, Open Water, or Freshwater Marsh SSHCP land cover types.

AMM LID-2 is not included in the No Action/No Project Alternative; therefore, there is a beneficial Impact associated with groundwater recharge under the Proposed Action/Proposed Project Alternative compared to the No Action/No Project Alternative baseline condition. The Proposed Action/Proposed Project Alternative provides greater preservation of aquatic resources and greater reestablishment and establishment of wetlands and other waters, and it provides greater management of preserved, reestablished, and establish aquatic resources relative to the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative would result in better surface water conditions relative to the No Action/No Project Alternative, which would also benefit groundwater recharge and groundwater hydrology, relative to the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- Result in groundwater demand that is consistent with the groundwater demand of the No Action/No Project Alternative.
- Result in impervious surfaces from development and associated effects to groundwater recharge consistent with the adverse effect of the No Action/No Project Alternative.
- Result in greater protection of groundwater recharge from larger and more contiguous preserves.
- Result in greater protection of groundwater recharge along streams and other waterways from required setbacks and larger setback between new development and natural waterways.
- Implement a regional Conservation Strategy that has protection of watersheds and related ecosystem functions (including groundwater recharge) as one of the guiding principles.

Therefore, after considering the impacts from the Proposed Action/Proposed Project Alternative on each of the impact criteria for groundwater hydrology, the Proposed Action/Proposed Project would result in ***Minor Beneficial*** effects on groundwater hydrology, when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Proposed Action/Proposed Project Cumulative Effects on Groundwater Hydrology

The effects of past, present, and reasonably foreseeable other projects on groundwater hydrology in the Planning Area are described in Section 7.2.2.1, and represent a significant adverse cumulative impact on the groundwater hydrologic conditions within the study area. As discussed in Section 7.2.2.1, the incremental effects of the No Action/No Project Alternative were determined to be significant and cumulatively considerable, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As described herein, implementation of the SSHCP Conservation Strategy, including the SSHCP AMMs, SSHCP ARP, and interconnected SSHCP Preserve System is expected to result in more consistent and frequent conservation of groundwater recharge compared to the No Action/No Project Alternative. Consequently, the incremental effects of Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on groundwater hydrology when compared to the incremental effects of the No Action/No Project Alternative baseline condition; therefore, the Proposed Action/Proposed Project does not result in a cumulatively considerable contribution to the significant adverse cumulative impacts on groundwater hydrology. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative Effect*** on groundwater hydrology compared to the No Action/No Project Alternative baseline condition.

7.2.3.2 Surface Water Hydrology and Flooding Effects of the Proposed Action/ Proposed Project Alternative

Direct and Indirect Effects of the Alternative

As described in Section 2.3.3, the Proposed Action/Proposed Project Alternative Covered Activities include the same types of urban development anticipated under the No Action/No Project Alternative. Under the Proposed Action/Proposed Project Alternative, the approval, issuance of Incidental Take Permits, and the implementation of the SSHCP would occur as described in Section 2.3, Proposed Action/Proposed Project. As described in Section 2.3.3, the Proposed Action/Proposed Project Alternative Covered Activities include the same types of urban development as those anticipated under the No Action/No Project Alternative. Approximately 32,059 acres of existing natural land covers would be converted to a developed land cover type inside the UDA, primarily within the Morrison Creek HUC 10 watershed.

Outside the UDA, associated infrastructure and transportation improvement projects outside would directly impact approximately 1,438 acres of natural land cover types, primarily in parts of Snodgrass Slough, Lower Cosumnes River, Upper Cosumnes River, and Laguna watersheds (Table 8-8 and Figure 7-3).

However, the Proposed Action/Project Alternative includes a Conservation Strategy that has protection of watersheds and their surface hydrologic functions as a guiding principle. SSHCP Biological Goal 2 would maintain or improve physical, chemical, and biological functions of aquatic resources within the Planning Area. As discussed in Section 2.3.5, Conservation Strategy under the Proposed Action/Proposed Project Alternative, the proposed SSHCP Conservation Strategy includes an interconnected and coordinated SSHCP Preserve System where further development of the watershed would not occur, and would include thousands of acres of surface waters (including vernal pool systems, seasonal wetlands, streams and creeks, riparian zones, marshes, and open water). The SSHCP Preserve System would be used by the ARP as part of a unified watershed strategy of avoidance, minimization, and compensatory mitigation for the Planning Area.

Inside the UDA and Morrison Creek watershed, approximately 7,030 acres of natural land covers would be permanently protected and managed (Table 8-9) through the designation of relatively large and contiguous Core, Minor, Satellite, and Linkage Preserves that would protect 605 acres of wetlands and other waters, as well as 74 acres of riparian land covers. In addition, one of the objectives of the Proposed Action/Proposed Project Alternative is to protect an additional 1,200 acres along the Laguna Creek Corridor located in the UDA. However, the majority of the total 34,495-acre SSHCP Preserve System (27,465 acres) will be located outside the UDA and would preserve agricultural lands and natural landscapes with natural intact sources of surface and sub-surface water influx and outflow.

The SSHCP Conservation Strategy outside the UDA within the Laguna Watershed would protect approximately 2,059 acres of surface waters by establishing a large Landscape Preserve on approximately 14,493 acres of contiguous preserves in the Laguna Creek watershed and portions of the Upper Cosumnes River Watershed to the north and the Lower Dry Creek to the south (Figure 7-3). This 14,493-acre SSHCP Landscape Preserve would will be located strategically to connect with and build upon the existing 12,500-acre Chance Ranch in the eastern part of the Laguna Watershed, resulting in a total contiguous Landscape preserve of between 33,500 and 34,000 acres in the southeastern portion of the Planning Area (Figure 7-3). In the southwestern portion of the Planning Area, approximately 610 acres of agricultural lands adjacent to the river and creek floodplains would be preserved in the Snodgrass Slough, Sherman Lake-Sacramento River, and Lower Consumes River Watersheds.

In addition to assembling a large network of interconnected preserves that preserve natural corridors and provide large blocks of contiguous habitat, the SSHCP Conservation Strategy includes AMMs that would be incorporated into the design of the SSHCP Covered Activities, or would be implemented during the construction and implementation of the SSHCP Covered Activities. These AMMs include requiring each development Covered Activity to incorporate LID design measures, implement BMPs during construction, comply with siting and design requirements, and provide setbacks between new urban development and existing streams and waterways (Stream and Preserve Setbacks) (see Table 2-6 and Appendix D). Additionally, the SSHCP ARP includes the same AMMs and mitigation requirements as the SSHCP Conservation Strategy. The proposed SSHCP Conservation Strategy and the ARP provide the following benefits to surface water resources and regional surface water functions:

a. Provides a regional approach to balance conservation of aquatic resources and new urban development within the Planning Area;
b. Avoids and minimizes impacts to aquatic resources to the greatest extent practicable;
c. Implements compensatory mitigation of aquatic resources at a landscape level to protect watersheds; and
d. Achieves an overall no net loss of aquatic resources functions and services.

The proposed SSHCP requires hydrologic resource AMMs (see Table 2-6 and Appendix D) be implemented during design, construction, and operation of urban development Covered Activities and projects within the Planning Area. For example, AMM LID-3 requires Covered Activities to incorporate avoidance of project-site natural aquatic features (such as creeks and streams) into the project design to retain natural hydrologic patterns and to retain habitat of aquatic Covered Species and other native species. Implementation of AMM LID-3 also preserves project site natural features to avoid or minimize adverse changes to existing surface hydrologic conditions.

AMM STREAM-1 would result in a minimum 300-foot-wide wildlife movement corridor along the northern Laguna Creek inside the UDA by requiring Covered Activities to be setback a minimum of 150 feet from the top of the bank on both sides of the creek. AMM STREAM-2 would require setbacks of 100 feet from the top of stream banks at Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Central Paseo, and Sun Creek in the UDA. AMM STREAM-3 would require a 25-foot setback of new urban development from the stream banks of all first- and second-order streams (minor tributaries) in the UDA. The primary objective of the Stream Setback AMMs is to reduce urban runoff and sediment and nutrient inputs from surface flows in new urban areas, to protect existing stream hydrology, and to protect water quality and habitat downstream. In addition, the Stream Setback AMMs would minimize physical modifications of stream channels, thereby reducing potential adverse changes to natural

hydrologic functions. As discussed in Section 7.2.2.2, there are no requirements for urban development projects to include these large setbacks under the No Action/No Project Alternative, except in areas that are zoned for open space. Existing regulations, including the Sacramento County Floodplain Management Ordinance, would continue to protect floodplains (see Section 7.1.1). However, as with the No Action/No Project Alternative, construction could still occur within an existing floodplain as long as the structure or facility does not cause or intensify flooding.

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project Alternative are similar to the standard BMP (e.g., erosion control measures) requirements that would be implemented during construction activities under the No Action/No Project Alternative. However, the Proposed Action/Proposed Project includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project includes process for annual review of AMM effectiveness, and adaptive changes of any AMMs that are not fully effective at avoiding impacts to aquatic resources or species. This additional layer of oversight of AMMs implementation and effectiveness under the Proposed Action/Proposed Project Alternative increases avoidance and minimization of impacts to surface water hydrology and aquatic resources from construction activities.

The SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative, including the Biological Goals and Measurable Objectives, the SSHCP AMMs, and the ARP, provide additional measures not included in the No Action/No Project Alternative that are expected to reduce adverse effects to surface hydrology in the UDA and Planning Area when compared to the impacts to surface hydrology resources that would occur under No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- Provide greater setbacks of new development from streams, creeks, and minor tributaries, which would maintain existing hydrologic functions of UDA streams and floodplains, and retain more of the stream's floodplain to provide better flood storage and flood flow.
- Provide greater protection of surface waters in each Planning Area HUC watershed by consolidating project avoidance and mitigation requirement into contiguous and interconnected preserves. Provide greater avoidance and protection of aquatic resources within the UDA, including in the MCRA portion of the UDA. Assemble a large

contiguous Landscape Preserve in the southeast portion of the Planning Area, totaling between 33,500 to 34,000 acres.

- Require implementation of additional AMMs to avoid or minimize surface hydrologic resources, and require consistent implementation of surface hydrology AMMs during all ground-disturbing Covered Activities.
- Result in better management of avoided aquatic resources and aquatic habitat to minimize indirect impacts of adjacent urbanization, and to maintain values and aquatic functions on preserved lands in perpetuity.
- Implement a regional Conservation Strategy that has protection of watersheds and related ecosystem functions as one of the guiding principles, while balancing regional housing and development needs.

Therefore, after considering the impacts from the Proposed Action/Proposed Project Alternative on all of the impact criteria for surface hydrology resources, the impacts of the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects to surface hydrologic resources when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects on Surface Water Hydrology and Flooding

The cumulative effect of past actions, present actions, and the reasonably foreseeable other actions on surface waters, stormwater runoff, and erosion in the study area were described in Section 7.2.2.2 and represent a significant adverse cumulative impact on the groundwater hydrologic conditions within the study area. As discussed in Section 7.2.2.2, because existing regulations related to flood control and stormwater management would continue over the 50-year EIS/EIR study period (see Section 7.1.1), the incremental effects of the No Action/No Project Alternative were determined to be individually limited and would result in a less than significant impacts to the existing surface hydrology, stormwater runoff, stormwater system capacity, flooding, flood hazards, flood flows, drainage, and stream channels, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed here in Section 7.2.3.2, the implementation of the SSHCP Conservation Strategy, including the interconnected SSHCP Preserve System, the Covered Activity AMMs, and the ARP, would result in larger areas of watershed preservation, consistent and more frequent implementation of AMMs, and would require larger setbacks and more conservation of natural waterways compared to the No Action/No Project Alternative. Consequently, the incremental effects of the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on surface hydrology, stormwater runoff, and flooding conditions when compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the

incremental effects of Proposed Action/Proposed Project are individually limited and would not make a cumulatively considerable contribution to the significant adverse impact of the past, present, and reasonably foreseeable future projects. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial*** cumulative effect to surface water hydrology and flooding compared to the No Action/No Project Alternative baseline condition.

7.2.3.3 Surface Water Quality and Groundwater Quality Effects of the Proposed Action/Proposed Project Alternative

Direct and Indirect Effects of the Alternative

Under the Proposed Action/Proposed Project Alternative, the approval, issuance of Incidental Take Permits, and implementation of the SSHCP would occur as described in Section 2.3. As described in Section 2.3, the Proposed Action/Proposed Project Covered Activities includes the same types of urban development as those anticipated under the No Action/No Project Alternative. As discussed in Chapter 8, approximately 32,059 acres of existing natural land covers would be converted to a developed land cover type by the urban development Covered Activities inside the UDA. Associated infrastructure and transportation improvement projects outside the UDA would directly impact approximately 1,438 acres of natural land cover types.

However, the Proposed Action/Project Alternative includes a Conservation Strategy that has protection of watersheds and their surface hydrologic functions as a guiding principle (SSHCP Biological Goal 2). As discussed in Section 2.3.5, the SSHCP Conservation Strategy includes an interconnected and coordinated SSHCP Preserve System that would preserve 7,030 acres of natural land covers inside the UDA and 27,465 acres outside the UDA. These preserve acres include thousands of acres of surface waters and areas of groundwater recharge.

The SSHCP Conservation strategy and the ARP would better minimize adverse water quality effects of urban development, compared to the No Action/No Project Alternative. The SSHCP requires each Covered Activity to implement SSHCP AMMs (see Table 2-6 and Appendix D). The AMMs for aquatic resources, particularly the establishment of setbacks at streams, creeks, and minor tributaries, combined with the active management of the large and interconnected SSHCP Preserve System, would limit indirect impacts to surface waters from new urban development such as spread of invasive plants, trespassing by people and domestic animals, and unauthorized trails. The AMM measures BMP-1 through BMP-4 and BMP-9 and BMP-10 require Covered Activities to implement construction BMPs to protect water quality through appropriate sediment and pollution control devices and practices.

The AMMs LID-1, LID-2, and LID-3 require the project design of urban development Covered Activities to incorporate avoidance of aquatic features such as creeks and streams, and to

design urban stormwater runoff management to avoid discharges of contaminants from completed development. As discussed in Section 7.2.3.2 for the Proposed Action/Proposed Project, the AMMs STREAM-1 through STREAM-5 requires setbacks between streams and new urban development. Stream setback widths required by these AMMs range from 25 to 150 feet from top of bank. As discussed in Section 7.2.2.2, the No Action/No Project Alternative has no requirements for all new urban development projects to include these large setbacks, except in areas that are zoned for open space. In addition, AMM EDGE-1 encourages new urban development Covered Activities to locate compatible land uses adjacent to new and existing SSHCP preserves, including parks, ball fields, detention basins, open space, and other land uses that have minimal ground disturbance. The soil surfaces in a compatible land use area may be re-contoured, but the soil restrictive layer will remain undamaged and most of the soil profile above the restrictive layer will remain intact. Therefore, AMM EDGE-1 places a larger buffer between deep construction grading and surface hydrology, maintains more of the seasonal perched aquifer, and maintains more of the microwatersheds of aquatic resources and species habitat present within a preserves. AMM EDGE-3 also requires setbacks between new UDA urban development and new or existing preserves, and these Preserve Setbacks are expected to contain aquatic resources. These stream and Preserve Setbacks requirements would reduce indirect impacts of operational urban developments on surface water quality and groundwater quality. In addition, the natural vegetation remaining within the setbacks acts to hold or settle out pollutants or silt rather than discharging to the stream or waterway. Setbacks help to maintain the natural floodplains of the stream or waterway, reducing erosion and sedimentation of streams. AMM EDGE-2 requires single-loaded streets adjacent to preserves, which provides a wider set back from human activities, allows more visibility of the preserve, and will reduce potential water quality impacts that would result from illegal dumping or trespassing with off-road vehicles. Therefore, both the stream and the Preserve Setback AMMs required under the Proposed Action/Proposed Project Alternative would reduce potential direct and indirect water quality effects of new urban development, better improve or maintain existing water quality through processes such as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion, and facilitate greater groundwater recharge along creeks and streams, when compared to compared to the effects expected under the No Action/No Project Alternative.

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project Alternative are similar to the construction best management practices that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, as well as annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This

additional oversight and guidance provided by the SSHCP would result in water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The SSHCP AMMs also provide new avoidance and minimization measures that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects on surface water quality and groundwater quality, compared to the effects of the No Action/No Project Alternative.

As discussed above in the analysis of surface waters, the Proposed Action/Proposed Project Alternative would also establish a watershed-based, interconnected, and coordinated Preserve System in the Planning Area, which would include a comprehensive preserve management program implemented in perpetuity. The more contiguous and more interconnected design of the regional SSHCP Preserve System, as well as the coordinated management of preserves in the SSHCP Preserve System, would provide greater benefits to water quality compared to the uncoordinated, smaller, and more scattered and isolated individual preserves of the No Action/No Project Alternative. The regional, watershed-based conservation provided by the SSHCP Preserve System, the SSHCP Conservation Plan, and the ARP would better protect upper watersheds, water quality of surface waters, and water quality of groundwater. The Proposed Action/Proposed Project Alternative would reduce adverse effects on surface water quality and groundwater quality relative to the effects of No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- Have smaller direct and indirect impacts to surface water quality and to groundwater quality.
- Provide a Conservation Strategy that has protection of watersheds and related ecosystem functions (including water quality) as one of the guiding principles.
- Provide larger contiguous preserves that would provide better protection to existing surface water quality.
- Provide greater setbacks between new development and streams, creeks, and minor tributaries, and provide setbacks between new development and preserves to reduce al direct and indirect water quality effects of new urban development on surface water quality. It would also improve or maintain existing water quality through processes such as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion, and it would facilitate greater groundwater recharge along creeks and streams.

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative on all of the surface water quality and groundwater quality related impact criteria, the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects on surface water quality and groundwater quality when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects on Surface Water Quality and Groundwater Quality

The effects of past, present, and reasonably foreseeable other projects on surface water quality and groundwater quality in the Planning Area were described in Section 7.2.2.3 and represent a significant adverse cumulative impact on the surface water quality and groundwater quality within the study area. As discussed in Section 7.2.2.3, the incremental effects of the No Action/No Project Alternative were determined not to be cumulatively considerable when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed herein, implementation of the Proposed Action/Proposed Project Alternative's Conservation Strategy, including the SSHCP AMMs, the interconnected SSHCP Preserve System, and the ARP are expected to result in greater protection of surface water quality and groundwater quality compared to the No Action/No Project Alternative. Consequently, the Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial*** cumulative effect to surface water quality and groundwater quality compared to the No Action/No Project Alternative baseline condition.

7.2.4 Reduced Permit Term Alternative

As described in Section 2.3.3, the Reduced Permit Term Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative.

Under both the Reduced Permit Term Alternative and Proposed Action/Proposed Project Alternative, most of the Preserve System established inside the UDA would be associated with the development of the five large Master Plans discussed in Sections 2.3.3 and 2.3.4. Therefore, the Preserve System established inside the UDA under the Reduce Permit Term Alternative is expected to be very similar to the Preserve System established inside the UDA under Proposed Action/Proposed Project Alternative.

However, the shorter duration of Reduced Permit Term Alternative and the lower amount of urban development and associated development fees collected by the Reduced Permit Term Alternative would not allow the HCP's Implementing Entity to establish as many acres of new preserves in the Planning Area as would occur under the Proposed Action/Proposed Project

Alternative's 50-year permit term. In addition, relatively few new preserves are expected to be established outside the UDA under the Reduced Permit Term Alternative.

As described in Section 3.6.7.2, Analysis of the Reduced Permit Term Alternative, After the End of the Permit Term (Years 31–50), the ESA and CESA Incidental Take Permits and the CWA permit strategy for future Covered Activities would be valid only during the 30-year permit term, and the Reduced Permit Term Alternative HCP would be implemented only during this 30-year term. The urban development Covered Activities and conservation actions associated with the five Master Plans would be implemented inside the UDA during this 30-year period. However, the EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3), and the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, the analysis of the Reduced Permit Term Alternative also considers urban development that is not part of the project description of the Reduced Permit Term Alternative, but is expected to occur within the Planning Area after the end of the permit term (i.e., in years 31–50 of the EIS/EIR study period).

Project mitigation preserves established after the end of the Reduced Permit Term Alternative 30-year permit term would be established following an individual project-by-project process for obtaining authorizations under the CWA, ESA, CESA, and Section 1600 of the California Fish and Game Code. Preserves established in years 31–50 of the EIS/EIR study period would not be established using a regional, watershed-based approach that balances new urban development with the need for conservation of groundwater hydrology, surface water hydrology, water quality of surface waters, and groundwater quality, as would be provided by the SSHCP Preserve System, the SSHCP Conservation Plan, and the ARP under the Proposed Action/Proposed Project Alternative. Therefore, it is unlikely that a landscape-level preserve would be established in the Planning Area under the Reduced Permit Term Alternative.

7.2.4.1 Groundwater Hydrology Effects of the Reduced Permit Term Alternative

Direct and Indirect Effects of the Alternative

As described in Section 2.4.4, Covered Species Under the Reduced Permit Term Alternative, the Reduced Permit Term Alternative would include similar types of new urban development and infrastructure as those anticipated under the No Action Alternative. Similar to the Proposed Action/Proposed Project Alternative, the displacement of planned urban development to areas outside of the County's existing USB expected under the No Action/No Project Alternative would not occur under the Reduced Permit Term Alternative. Therefore, the potential changes in location of groundwater use between the Central Basin and South Basin identified for the No Action/No Project Alternative would not occur under the Reduced Permit Term Alternative.

However, no significant changes in groundwater use or recharge associated with the displaced development were identified for the No Action/No Project Alternative.

As described in Section 2.4.5, Conservation Strategy Under the Reduced Permit Term Alternative, the Reduced Permit Term Alternative includes an interconnected Preserve System established during the 30-year permit term and a comprehensive preserve management program for those preserves. The establishment and management of this Preserve System during the 30-year permit term would include the same Conservation Strategy as the SSHCP, which includes the protection of watersheds and related ecosystem functions (including groundwater recharge) as one of the guiding principles. However, without a comprehensive regional HCP during years 31–50 of the 50-year EIS/EIR study period, preserves established after the end of the term would not implement AMMs for groundwater recharge, and would not include a comprehensive HCP management and Conservation Strategy.

Covered Activities implemented during the 30-year permit term would include AMMs. For example, AMM LID-2 requires the Implementing Entity to prioritize locations that are suitable for groundwater recharge incorporation when siting preserves for Riparian, Open Water, or Freshwater Marsh land cover types. However, without a comprehensive regional HCP for years 31–50 of the EIS/EIR study period, the preserves outside the UDA would not be subject to AMMs for groundwater recharge or for a comprehensive HCP management and Conservation Strategy.

During the 30-year permit term, the Reduced Permit Term Alternative provides for greater wetland preservation and would provide better management of preserves, relative to the No Action/No Project Alternative. This would provide a 30-year improvement in surface water conditions that would also benefit groundwater recharge and hydrology. Therefore, overall, the Reduced Permit Term Alternative results in a ***Minor Beneficial*** effect on groundwater recharge and hydrology inside the UDA when comparing the Reduce Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Result in consistent groundwater use.
- Result in consistent adverse effects to groundwater recharge due to impervious surfaces from development.
- Result in greater protection of groundwater recharge areas from preserve establishment inside the UDA.

- Result in a Conservation Strategy that has protection of watersheds and related ecosystem functions (including groundwater recharge) as one of the guiding principles inside the UDA.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on all of groundwater hydrology related impact criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to groundwater hydrology when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Reduced Permit Term Cumulative Effects of the Alternative on Groundwater Hydrology

The cumulative effect of past, present, and reasonably foreseeable future actions on groundwater hydrology for the No Action/No Project Alternative are described in Section 7.2.2. Effects of land use changes in the Planning Area that would occur from past, present, and reasonably foreseeable future projects would result in a significant adverse cumulative impact on groundwater hydrologic conditions.

The implementation of an HCP Conservation Strategy, including AMMs, an ARP, and the interconnected Preserve System during the 30-year permit term under the Reduced Permit Term Alternative would result in better conservation of groundwater recharge inside the UDA compared to the No Action/No Project Alternative. Consequently, the Reduced Permit Term Alternative has a ***Minor Beneficial*** effect on groundwater hydrology compared to the No Action/No Project Alternative baseline condition; therefore, it does not result in a considerable contribution to the adverse cumulative impacts to groundwater hydrology. The Proposed Action/Proposed Project Alternative results in a ***Minor Beneficial*** cumulative effect on groundwater hydrology compared to the No Action/No Project Alternative baseline condition.

7.2.4.2 Surface Hydrology, Stormwater Runoff, and Flooding Effects of the Reduced Permit Term Alternative

Direct and Indirect Effects of the Alternative

As described in Section 2.4.3, Covered Activities/Projects Under the Reduced Permit Term Alternative, the Reduced Permit Term Alternative Covered Activities include the same types of urban development as under the No Action/No Project Alternative. The Reduced Permit Term Alternative would directly impact approximately 1,741 acres of aquatic resources within the UDA and 115 acres of aquatic resources outside the UDA (Table 8-12), which is 122 acres less than direct impacts to aquatic resources under the No Action/No Project Alternative (Table 8-4).

As described in Section 2.4.5, the Reduced Permit Term Alternative includes a 30-year Conservation Strategy that would establish an interconnected and coordinated SSHCP Preserve System inside the UDA portion of the Planning Area, as well as a comprehensive preserve management program for those preserves. The establishment and management of this Preserve System during the 30-year permit term would include the same Conservation Strategy as the SSHCP, which includes the protection of watersheds and related ecosystem functions (including groundwater recharge) as one of the guiding principles. The Reduced Permit Term Alternative would include the same aquatic resource avoidance, minimization, and compensation measures that the Proposed Action/Proposed Project Alternative provides. These elements of the Reduced Permit Term Alternative would provide the following benefits to aquatic resources and regional aquatic function:

a. Provide a regional, balanced conservation and development approach for aquatic resources located within the Planning Area;
b. Minimize impacts to aquatic resources to the greatest extent practicable;
c. Implement compensatory mitigation at a landscape level to protect watersheds; and
d. Achieve an overall no net loss of aquatic resources functions and services.

Inside the UDA and Morrison Creek watershed, approximately 501 acres of natural land covers would be permanently protected and managed (Table 8-13) through the designation of relatively large and contiguous Core, Minor, Satellite, and Linkage Preserves that would protect 414 acres of wetlands and other waters, and 87 acres of riparian land covers. In addition, one of the objectives of the Proposed Action/Proposed Project Alternative is to permanently protect the Laguna Creek Corridor located in the UDA. However, the majority of the total 30,771-acre SSHCP Preserve System (25,936 acres) will be located outside the UDA, and would preserve agricultural lands and natural landscapes with natural intact sources of surface and sub-surface water influx and outflow.

During the 30-year permit term of the Reduced Permit Term Alternative, the implementation of several surface hydrology AMMs (see Table 2-6 of this EIS/EIR) during urban development Covered Activities within the UDA would better protect and benefit surface hydrology conditions relative to the impacts of the No Action/No Project Alternative. AMM LID-3 would require new urban development to incorporate preservation of a site's natural aquatic features (such as creeks and streams) into project design to retain natural hydrologic patterns and to retain habitat that might be used by Covered Species. Implementation of LID-3 would result in preservation of project site natural features, which would avoid or minimize adverse changes to existing surface hydrologic conditions inside the UDA.

AMM STREAM-1 results in a minimum 300-foot-wide wildlife movement corridor for Laguna Creek by requiring Covered Activities to be setback 150 feet from the top of the bank on both sides. AMM STREAM-2 requires setbacks of 100 feet from the stream banks of Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Central Paseo, and Sun Creek. STREAM-3 requires 25-foot setback from the stream banks of minor tributaries in the UDA. There are not requirements for large setback under the No Action/No Project Alternative except in areas that are zoned for open space or designated on a project-by-project basis. Existing regulations protect the floodplain; however, construction can still occur within an existing floodplain as long as it does not cause or intensify flooding. This can be accomplished by filling in the floodplain and compensating for the loss of flood storage by building a detention basin. AMMs STREAM-1, STREAM-2, and STREAM-3 would protect stream hydrology. Floodplains are related to the overall health of a stream. Floodplains absorb and store floodwaters, and they reduce velocity and allow for the slow release to the stream. Floodplain trees and plants filter sediments and pollutants, and they help to anchor the riverbanks preventing erosion and providing shade to reduce water temperatures. Stream setback requirements minimize physical modifications of stream channels, thereby reducing potential adverse changes to natural hydrologic functions inside the UDA. As discussed in Section 7.2.2.2, there are no requirements for urban development projects to include these large setbacks under the No Action/No Project Alternative, except in areas zoned for open space.

Active management of the Preserve System established during the 30-year permit term of the Reduced Permit Term Alternative, combined with 30 years of AMMs, particularly greater setbacks along streams, creeks, and minor tributaries will limit indirect impacts from urbanization such as spread of invasive plants, establishment of informal trails, and use by people and domestic animals. EDGE-1 requires compatible land uses included in the Covered Activities (e.g., designated open space such as parks and ball fields, detention basins, and other land uses with less-intensive human activity) to be located in areas immediately adjacent to existing or planned preserve boundaries. The compatible land use will provide additional buffering of preserves from potential indirect effects of adjacent urban development. The soil surfaces in a compatible land use area may be re-contoured, provided that the soil restrictive layer remains undamaged and most of the soil profile above the restrictive layer remains intact.

AMM BMP-1 through AMM BMP-11 of the Reduced Permit Term Alternative are similar to the standard best management practices (e.g., erosion control measures) requirements that would be implemented during construction activities under the No Action/No Project Alternative. However, the Reduced Permit Term Alternative includes 30 years of additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Reduced Permit Term Alternative includes process for annual review of AMM effectiveness for a 30-year period, as well as a process to make adaptive changes

of any AMM that is not fully effective at avoiding impacts to aquatic resources or species. This additional layer of oversight of AMMs implementation and effectiveness under the Reduced Permit Term Alternative increases avoidance and minimization of impacts to surface water hydrology and aquatic resources from construction activities.

Benefits resulting from permanent preserve establishment and management of preserves in perpetuity under the 30-year permit term of the Reduced Permit Term Alternative would not apply to any new preserves established during years 31–50 of the 50-year EIS/EIR study period, when the process for projects to establish mitigation preserves would be more similar to the No Action/No Project Alternative.

The Reduced Permit Term Alternative, through the implementation of an HCP Conservation Strategy during the 30-year permit term, including the Biological Goals and Objectives, implementation of the AMMs, and the ARP would provide additional surface water hydrology avoidance measures not included in the No Action/No Project Alternative, which are expected to lessen the potential adverse effects to surface hydrologic conditions relative to the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Provide greater setbacks of new development from streams, creeks, and minor tributaries, which would maintain existing hydrologic functions of UDA streams and floodplains, and retain more of the stream's floodplain to provide better flood storage and flood flow.
- Result in greater and more consistent avoidance of adverse effects on surface hydrology conditions because of overlapping and new AMMs. It would also require implementation of additional AMMs to avoid or minimize surface hydrologic resources, as well as consistent implementation of surface hydrology AMMs during all ground-disturbing Covered Activities. Moreover, it would provide greater management of indirect impacts of urbanization, such as intrusion from domestic animals and informal trails.
- Result in a Conservation Strategy that has protection of watersheds and related ecosystem functions as one of the guiding principles.

Therefore, after considering the of the Reduced Permit Term Alternative on each surface hydrology impact-criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to surface hydrologic resources, when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Reduced Permit Term Cumulative Effects on Surface Water Hydrology and Flooding

The cumulative effect of past actions, present actions, and the reasonably foreseeable other actions on surface waters, stormwater runoff, and erosion in the study area were described in Section 7.2.2.2, and represent a significant adverse cumulative impact on the groundwater hydrologic conditions within the study area. As discussed in Section 7.2.2.2, because existing regulations related to flood control and stormwater management would continue over the 50-year EIS/EIR study period (see Section 7.1.1), the incremental effects of the No Action/No Project Alternative were determined to be individually limited, and would result in a less than significant impacts to the existing surface hydrology, stormwater runoff, stormwater system capacity, flooding, flood hazards, flood flows, drainage, and stream channels, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed here in Section 7.2.4.2, implementation of an HCP Conservation Strategy, including Covered Activity AMMs, and interconnected Preserve System, and an ARP during the 30-year permit term of the Reduced Permit Term Alternative would result in larger areas of watershed preservation, consistent and more frequent implementation of AMMs, and require larger setbacks and more conservation of natural waterways in the UDA when compared to the No Action/No Project Alternative. Consequently, the incremental effects of the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect to surface hydrology, stormwater runoff, and flooding conditions when compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of Reduced Permit Term Alternative are individually limited and would not make a cumulatively considerable contribution to the significant adverse impact of the past, present, and reasonably foreseeable future projects. The Proposed Action/Proposed Project would result in a ***Minor Beneficial*** cumulative effect to surface water hydrology and flooding inside the UDA compared to the No Action/No Project Alternative baseline condition.

7.2.4.3 Surface Water Quality and Groundwater Quality Effect of the Reduced Permit Term Alternative

As described in Section 2.4.3, the Reduced Permit Term Alternative Covered Activities include the same types of urban development anticipated under the No Action/No Project Alternative.

The Reduced Permit Term Alternative, during the 30-year permit term, includes a Conservation Strategy that has protection of watersheds and their surface hydrologic functions as a guiding principle (Biological Goal 2). As discussed in Section 2.4.3, the Reduced Permit Term Alternative includes an interconnected and coordinated Preserve System and a 30-year implementation of an ARP that would better minimize adverse water quality effects of urban development compared to the No Action/No Project Alternative. The 30-year permit term would also require

each Covered Activity to implement AMMs (see Table 2-6 and Appendix D). The AMMs for aquatic resources, particularly the establishment of setbacks at streams, creeks, and minor tributaries, combined with the active management of the large and interconnected SSHCP Preserve System, would limit indirect impacts to surface waters from new urban development such as spread of invasive plants, trespassing by people and domestic animals, and unauthorized trails. AMMs BMP-1 through BMP-4 and BMPs 9 and 10 would require Covered Activities to implement construction BMPs to protect water quality through appropriate sediment and pollution control devices and practices.

AMMs LID-1, LID-2, and LID-3 require the project design of urban development Covered Activities to incorporate avoidance of aquatic features such as creeks and streams, and to design urban stormwater runoff management to avoid discharges of contaminants from completed development projects.

AMMs STREAM-1 through STREAM-5 require setbacks between streams and new urban development. Stream setback widths required by these AMMs range from 25 to 150 feet from top of bank. As discussed above in Section 7.2.2.2, the No Action/No Project Alternative has no requirements for all new urban development projects to include these large setbacks, except in areas that are zoned for open space. In addition, AMM EDGE-1 encourages new urban development Covered Activities to locate compatible land uses adjacent to new and existing preserves, including parks, ball fields, detention basins, open space, and other land uses that have minimal ground disturbance. The soil surfaces in a compatible land use area may be re-contoured, but the soil restrictive layer will remain undamaged and most of the soil profile above the restrictive layer will remain intact. Therefore, AMM EDGE-1 places a larger buffer between deep construction grading and the surface hydrology, maintains more of the seasonal perched aquifer, and maintains more of the microwatersheds of aquatic resources and species habitat present within a preserves. AMM EDGE-3 provides setbacks from preserves, which will likely contain aquatic resources. These stream and Preserve Setbacks would reduce indirect impacts of operational urban developments on surface water quality and groundwater quality. In addition, the natural vegetation remaining within the setbacks act to hold or settle out pollutants or silt rather than discharging to the stream or waterway. Setbacks help to maintain the natural floodplains of the stream or waterway, which reduces erosion and sedimentation of streams. AMM EDGE-2 requires single-loaded streets adjacent to preserves, which provides a wider setback from human activities, allows more visibility of the preserve, and will reduce potential water quality impacts that would result from illegal dumping or trespassing with off-road vehicles. Therefore, both the stream and the Preserve Setback AMMs required under the Reduced Permit Term Alternative would reduce potential direct and indirect water quality effects of new urban development, better improve or maintain existing water quality through processes such as filtration and/or trapping of contaminants

such as sediment or toxicants and prevention of erosion, and would facilitate greater groundwater recharge along creeks and streams, when compared to compared to the effects expected under the No Action/No Project Alternative.

AMM BMP-1 through AMM BMP-11 of the Reduced Permit Term Alternative would be similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, as well as annual reporting of the effectiveness of each AMM. The Reduced Permit Term Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM, and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the SSHCP would result in water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The SSHCP AMMs also provide new avoidance and minimization measures that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to surface water quality and groundwater quality, compared to the effects of the No Action/No Project Alternative.

The Reduced Permit Term Alternative, during the 30-year permit term, would also establish a watershed based interconnected Preserve System in the UDA, as well as a comprehensive preserve management program that is implemented in perpetuity. The more contiguous and more interconnected design of the Preserve System would be beneficial to water quality compared to the preservation that would provide greater benefits to water quality compared to the uncoordinated, smaller, and more scattered and isolated individual preserves of the No Action/No Project Alternative. The Reduced Permit Term would reduce adverse effects to surface water quality and groundwater quality relative to the effects of No Action/No Project Alternative.

Significance of Direct and Indirect Effects on Water Quality

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Result in smaller direct and indirect impacts to surface water quality and groundwater quality.
- Provide larger contiguous preserves that would provide better protection to existing surface water quality inside the UDA.
- Provide greater setbacks between new development and streams, creeks, and minor tributaries. It would also provide setbacks between new development and preserves

to reduce all direct and indirect water quality effects of new urban development on surface water quality to better improve or maintain existing water quality through processes such as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion.

- Facilitate greater groundwater recharge along creeks and streams.

Therefore, after considering the impacts from the Reduced Permit Term Alternative on all of surface water quality and groundwater quality impact criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to surface water and groundwater quality when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects on Surface Water Quality and Groundwater Quality

The effect of past, present, and reasonably foreseeable future actions on surface water quality and groundwater quality in the Planning Area were described in Section 7.2.2.3 and represent a significant adverse cumulative impact on the surface water quality and groundwater quality within the study area. As discussed in Section 7.2.2.3, the incremental effects of the No Action/No Project Alternative were determined to be significant and cumulatively considerable, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

Implementation of the Conservation Strategy during the 30-year permit term under the Reduced Permit Term Alternative, including AMMs, the ARP, and the interconnected Preserve System, are expected to result in greater protection of surface water quality and groundwater quality compared to the No Action/No Project Alternative. Consequently, the Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial*** cumulative effect to surface water quality and groundwater quality compared to the No Action/No Project Alternative baseline condition.

7.3 REFERENCES CITED

Ascent Environmental Inc. 2014. *Final Environmental Impact Report for the Sacramento Regional County Sanitation District EchoWater Project*. State Clearinghouse no. 2012052017. Prepared for the Sacramento Regional County Sanitation District. Sacramento, California: Ascent Environmental Inc. September 2014.

Carollo Engineers. 2013. *City of Galt 2010 Urban Water Management Plan*. Sacramento, California: Carollo Engineers. May 2013.

Carter, J. 1977. Executive Order 11988, Floodplain Management. Federal Register, Volume 42, Page 26921.

CVRWQCB (Central Valley Regional Water Quality Control Board). 2015a. *Water Quality Control Plan (Basin Plan) for Sacramento River Basin and San Joaquin River Basin*. Rancho Cordova, California.

CVRWQCB. 2015b. *Order R5-2104-0030-R1: Waste Discharge Requirements General Order for Growers in the Sacramento River Watershed that are Members of a Third-Party Group*. Originally issued March 2014 and Revised June 2015. Rancho Cordova, California. Available at: http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2014-0030-r1.pdf.

DWR (California Department of Water Resources). 2003. *California's Groundwater, Bulletin 118, Update 2003*. October 2003. Sacramento, California. Available at: http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003_/bulletin118_entire.pdf.

DWR. 2010. *Central Valley Flood Management Planning Program, State Plan of Flood Control, Descriptive Document*. November 2010. Sacramento, California. Available at: http://www.water.ca.gov/cvfmp/docs/DRAFT_SPFC_Descriptive_Doc_20100115.pdf.

Galt. 2008. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. July 2008.

Galt. 2009. *2030 Galt General Plan*. Adopted April 2009.

Larry Walker Associates. 2013. "Technical Memorandum, Sacramento Coordinated Water Quality Monitoring Program Receiving Water Monitoring Annual Data Review 2012/2013." Davis, California: Larry Walker Associates. September 2013.

Larry Walker Associates. 2014. "Technical Memorandum, Sacramento Coordinated Water Quality Monitoring Program Receiving Water Monitoring Annual Data Review 2013/2014." Davis, California: Larry Walker Associates. August 2014.

Larry Walker Associates. 2015. *Sacramento Valley Water Quality Coalition Monitoring and Reporting Program, 2014 Annual Monitoring Report*. Davis, California: Larry Walker Associates. May 2015.

MWH, Water Forum, and Sacramento County Water Agency. 2006. *Central Sacramento County Groundwater Management Plan*. Prepared for Sacramento Central Groundwater Authority. February 2006. Available at: http://www.scgah2o.org/Pages/default.aspx.

Rancho Cordova. 2006a. *General Plan Draft Environmental Impact Report*. March 2006.

Rancho Cordova. 2006b. *Rancho Cordova General Plan*. Adopted June 26, 2006.

Rancho Cordova. 2013. *City of Rancho Cordova General Plan Final EIR*. Available at: http://www.cityofranchocordova.org/index.aspx page=298#a3.

Regional Sanitation. 2015. *SRCSD/SPA/City of Sacramento Recycled Water Feasibility Study*. Prepared by RMC Water and Environment. Sacramento, California. Accessed online June 28, 2016. http://www.regionalsan.com/sites/main/files/file-attachments/final_spa_feasibility_study.pdf.

Regional Water Authority. 2013. *American River Basin Integrated Regional Water Management Plan, 2013 Update*. Sacramento, California.

RMC Inc. 2014. *Basin Management Report 2011-2012. Prepared for the Sacramento Central Groundwater Authority. Sacramento, California*. Available at: http://www.scgah2o.org/Pages/default.aspx.

RMC Inc. 2015. *Sacramento Regional County Sanitation District/City of Sacramento Recycled Water Feasibility Study*. Sacramento, California. January 2015. Available at: http://www.regionalsan.com/sites/main/files/file-attachments/20150109_srcsd-spa-saccity_rwfs_complete.pdf.

Robertson-Bryan Inc. and WRIME. 2011. *South Basin Groundwater Management Plan*. Prepared for the South Area Water Council. Elk Grove, California. October 2011. Available at: http://www.sscawa.org/sscawa/projectdocs/SOUTH_BASIN_GMP_FINAL_2011.pdf.

Sacramento Central Groundwater Authority. 2014. *Basin Management Report 2011-2012*. Sacramento, California. August 2014.

Sacramento City-County Office of Metropolitan Water Planning. 1999. *Final Environmental Impact Report for the Water Forum Proposal*. SCH no. 95082041. Prepared by EDAW. Sacramento, California.

Sacramento County, City of Sacramento, City of Citrus Heights, City of Elk Grove, City of Folsom, City of Galt, and City of Rancho Cordova. 2009. *Stormwater Quality Improvement Plan. Prepared for the Central Valley Regional Water Quality Control Board*. November 2009. Available at: http://www.beriverfriendly.net/documents/.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: County of Sacramento Department of Environmental Review and Assessment. April 2010. Accessed June 29, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento Stormwater Quality Partnership. 2013. *Report of Waste Discharge and Long Term Effectiveness Assessment*. Prepared for State of California Regional Water Quality Control Board Central Valley Region. Sacramento, California. March 2013.

Sacramento Stormwater Quality Partnership. 2014. *Sacramento Region Stormwater Quality Design Manual*. May 2014.

Sacramento Stormwater Quality Partnership. 2017. *Sacramento Region Stormwater Quality Design Manual*. October 2017.

SCWA (Sacramento County Water Agency). 2004. *Final Environmental Impact Report for the 2002 Zone 40 Water Supply Master Plan*. SCH no. 2002122068.

SCWA and MWH. 2005. *Zone 40 Water Supply Master Plan*. Sacramento, California. February 2005.

SWRCB (State Water Resources Control Board). 2011. "2010 CWA Section 303(d) List of Water Quality Limited Segments." Approved by USEPA on December 23, 2011. Available: http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/impaired_waters_list/index.shtml#currentrpt.

USBR and DWR (U.S Bureau of Reclamation and California Department of Water Resources). 2015. *Bay Delta Conservation Plan/California WaterFix Recirculated DEIR and Supplemental DEIS*. Sacramento, California.

USEPA (U.S. Environmental Protection Agency). 2000. The California Toxics Rule (Federal Register 65, No. 97, 31682-31719).

USEPA. 2015a. Mather Air Force Base Superfund Site Remedial Action Status Information. Pacific Southwest Region 9 online information. Accessed November 17, 2015 at: http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/BySite/Mather%20Air%20Force%20BaseOpenDocument.

USEPA. 2015b. Sacramento Army Depot Superfund Site Remedial Action Status Information. Pacific Southwest Region 9 online information. Accessed November 17, 2015: http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/3dec8ba3252368428825742600743733/6c9f7ab1af90f80688257007005e943e!OpenDocument.

USGS and USDA NRCS (U.S. Geological Survey and U.S. Department of Agriculture, Natural Resources Conservation Service. 2009. "Federal Guidelines, Requirements, and Procedures for the National Watershed Boundary Dataset." Chapter 3 of Section A, Federal Standards, Book 11, Collection and Delineation of Spatial Data. Accessed June 1, 2015. http://pubs.usgs.gov/tm/tm11a3/pdf/TM11-A3.pdf.

USGS (U.S. Geological Survey). 2013. National Hydrography GIS Dataset. Accessed May 2013. http://nhd.usgs.gov/.

USGS and NRCS. 2013. *Federal Standards and Procedures for the National Watershed Boundary Dataset (WBD)*. 4th ed. Techniques and Methods 11–A3, 63 p. Available at: http://pubs.usgs.gov/tm/tm11a3/.

INTENTIONALLY LEFT BLANK

CHAPTER 8 – NATURAL LAND COVER HABITATS AND ASSOCIATED PLANT AND ANIMAL COMMUNITIES

This chapter presents the environmental effects of each Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) Alternative on the Planning Area natural land covers, including effects on the community of native plant and native animal species that that naturally co-occur within each land cover and use the land cover as habitat. As discussed in Section 8.1.2, Chapter 8 will use the same land cover classification system that is used in the South Sacramento Habitat Conservation Plan (SSHCP) document. Certain natural land covers analyzed in Chapter 8 are also classified by the State of California as "special-status natural communities."

Some of the species in the plant and animal communities that that live together in each land cover are protected or are otherwise considered to have special-status by a federal, state, or local environmental law, regulation, or policy. These "special status species" are e briefly mentioned in Chapter 8, but each is more fully analyzed in Chapter 9, Special-Status Species, Including HCP Covered Species, of this EIS/EIR.

Some of the natural land covers analyzed in Chapter 8 are also aquatic resources that are regulated by the federal Clean Water Act (CWA) and by the state's Porter-Cologne Water Quality Control Act. These aquatic land covers are analyzed in Chapter 8 as natural communities and species habitat. However, they are also analyzed separately in Chapter 10, Wetlands and Waters, in the context of the CWA and other statutes, regulations, and local policies that also regulate these land covers as aquatic resources.

8.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

8.1.1 Regulatory Framework

There are several federal, state, and local agency requirements that apply to the evaluation of natural communities and native species habitats. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, issuance of permits, or implementation of the alternatives analyzed in this EIS/EIR. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 8.2.

Federal Statutes and Regulations

Federal Endangered Species Act

As discussed in Section 9.1.1, the federal Endangered Species Act (ESA) and subsequent amendments provide for the conservation of federally endangered and threatened species, and species that are candidates for listing, and the habitat on which the species depend. The U.S.

Fish and Wildlife Service (USFWS) Sacramento Fish and Wildlife Office has jurisdiction over the federally listed plants, wildlife, and freshwater fish within the Planning Area.

Clean Water Act

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," which are defined at 33 Code of Federal Regulations (CFR) 328.3 and at 40 CFR 230.3. CWA 404 permits must be issued by the U.S. Army Corps of Engineers (USACE) to projects and activities that discharge dredge or fill material into wetlands and other waters of the U.S. The USACE delineates and verifies waters of the United States, including wetlands at each project or activity site, through jurisdictional determinations (33 CFR 328.3, 40 CFR 230.3).

Projects or activities that result in discharge of dredge or fill into waters of the United States must obtain a permit from the USACE under Section 404. General permits include nationwide permits, regional general permits, or programmatic general permits. Individual permits include letters of permission or standard permits. General permits are issued by the USACE for categories of projects that are substantially similar in nature and have minimal environmental impacts, both individually and cumulatively. Individual permits are issued for projects that do not qualify for a general permit (i.e., that is expected to have more than a minimal adverse environmental impact).

Projects and activities must avoid and minimize direct impacts to waters of the United States, to the extent practicable. Aquatic resources are often avoided within on-site preserves. For unavoidable impacts, compensatory mitigation is required to replace the loss of waters of the United States functions. Compensatory mitigation includes re-establishment and establishment. **Re-establishment** is a form of environmental restoration in which there is manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning the natural/historical functions to a former aquatic resource**. Establishment** is the manipulation of the physical, chemical, or biological characteristics of a site with the goal of developing a new aquatic resource where it did not previously exist. Pursuant to 40 CFR 230, the word "establish" is synonymous with "create" in this EIS/EIR.

In 2008, the USACE and the U.S. Environmental Protection Agency (EPA) jointly issued regulations for compensatory mitigation titled *Compensatory Mitigation for Losses of Aquatic Resources: Final Rule, 33 CFR Parts 325 and 332* (USACE and USEPA 2008)(2008 Compensatory Mitigation Rule). The term "compensatory mitigation" includes the restoration, re-establishment, establishment, enhancement, and/or preservation of wetlands, streams, or other aquatic resources specifically for the purpose of offsetting losses to these aquatic resources caused by authorized discharges of dredged or fill material into waters of the United States. The 2008 Compensatory Mitigation Rule seeks to improve the planning, implementation, and management

of wetland and stream compensatory mitigation projects by emphasizing a watershed approach in selecting compensatory mitigation project locations, requiring measurable and enforceable ecological performance standards with regular monitoring, and specifying the components of a complete compensatory mitigation plan.

If compensatory mitigation is required to offset unavoidable impacts to aquatic resources, the amount of compensatory mitigation must be sufficient to replace lost aquatic resource functions and services, to the extent practicable. In cases where functional or condition assessments or other suitable metrics are not used, a minimum 1-to-1 acreage or 1-to-1 linear foot compensation ratio must be used.

There are three forms of CWA 404 compensatory mitigation used within the Planning Area:

1. **Mitigation Bank:** A site, or suite of sites, where resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by Department of the Army permits. In general, a mitigation bank sells compensatory mitigation credits to CWA 404 permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument.
2. **In-Lieu Fee Program:** A program that conducts the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental agencies or nonprofit natural resources management entity by CWA 404 permittees to satisfy compensatory mitigation requirements for their USACE permits. Similar to a mitigation bank, an in-lieu fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor. The operation and use of an in-lieu fee program are governed by an in-lieu fee program instrument.
3. **CWA Permittee-Responsible Mitigation:** An aquatic resource restoration, establishment, enhancement, and/or aquatic resource preservation activity undertaken by the CWA 404 permittee to provide compensatory mitigation: 1) permittee-responsible compensatory mitigation established under a watershed approach; 2) permittee-responsible compensatory mitigation through on-site and in-kind mitigation; and 3) permittee-responsible compensatory mitigation through off-site and/or out-of-kind mitigation.

CWA Section 401. To comply with Section 401 of the CWA, any project that receives permit under CWA Section 404 also needs to obtain a certification that the discharge will comply with the state's applicable effluent limitations and water quality standards. In California, the appropriate Regional Water Quality Control Board (RWQCB) administers CWA 401. The Central Valley RWQCB administers CWA 401 within the Planning Area.

State Statutes and Regulations

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code, Section 2050 et seq.) prohibits the taking of species listed as threatened or endangered under the act, or candidates for listing, except as authorized by state law. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the CESA definition of take does not include "harm" or "harass," which is included in the ESA definition. As a result, the threshold for take is higher under CESA than under ESA.

Section 2081 of CESA states that take of an endangered, threatened, or candidate species may be authorized by the California Department of Fish and Wildlife (CDFW) if the impacts of the take are incidental to an otherwise lawful activity, are "minimized and fully mitigated," and do not "jeopardize the continued existence of [the] species." Any mitigation measures imposed under CESA must be measures "roughly proportional in extent to the impact of the authorized taking on the species."

Natural Community Conservation Planning Act

The Natural Communities Conservation Planning (NCCP) Act was established by the California Legislature, is directed by the Department of Fish and ~~Game~~ **Wildlife**, and is being implemented by the state, and public and private partnerships to protect habitat in California. The intent of the act is to promote long-term protection of plants, animals, and natural communities through landscape-level planning while still allowing compatible land use and local economic activity (California Fish and Game Code, Section 2800 et seq.; Morey and Ikeda 2001; Pollak 2001). As opposed to the single species interpretation of the federal ESA and CESA, this act aims at protecting many species using a regional ecosystem approach to habitat preservation. The Natural Communities Conservation Planning Act is designed to provide for conservation of ecosystems, including all of their components, whether they are rare or common, rather than a strategy of addressing impacts to rare taxa on a piecemeal, individual development project basis (Pollak 2001). By preserving larger areas of important habitat, it is hoped that common taxa will not become rare in the future (Lazar and Bjerke 2014).

Survey of California Vegetation

Natural communities have been considered part of the Natural Heritage conservation triad, along with plants and animals of conservation significance, since the state inception of the California Natural Heritage program in 1979 (CDFW 2016). In 2007, the State Legislature required CDFW to develop and maintain a vegetation mapping standard for the state (California Fish and Game Code Section 1940). This standard is manifested in the Survey of California Vegetation and implemented by the Vegetation Classification and Mapping Program (VegCAMP). VegCAMP focuses on

developing and maintaining maps and the classification of all vegetation and habitats in the state to support conservation and management decisions at the local, regional, and state levels. The California Natural Diversity Database (CNDDB) continues to include occurrences of rare natural communities despite the fact that funding for the natural communities part of the program was cut in the mid-1990s. Since that time, no new occurrences of natural communities have been added. However, the importance of maintaining the natural communities layer in the CNDDB has not diminished. Many of the 2,500+ individual occurrences of the 96 natural communities with occurrences in the CNDDB still have significance for conservation and their existence is considered in the California Environmental Quality Act (CEQA) environmental review process along with occurrences of plants and animals tracked by the CNDDB. Since 1999,CDFW's VegCAMP has undertaken the classification and mapping of vegetation throughout the state and also has assumed the role of standardizing vegetation nomenclature for California to comply with the National Vegetation Classification System standards. Many vegetation types included in the current list match well with existing CNDDB natural community elements, which were based on Holland (1986). However, there is a complex relationship between the CNDDB natural community elements and today's view of vegetation classification — in some cases, there is a one-to-one relationship, but in most there is a many-to-one or many-to-many relationship. Furthermore, in most cases no recent surveys have been made of the old CNDDB natural community occurrences to ascertain the proper identity based on today's National Vegetation Classification System classification standards. CDFW continues to refine the mapping and classification of the state's vegetation. This will take some time. In the meantime, CDFW continues to include all of the old CNDDB natural Community elements in the current Natural Communities List (CDFW 2016).

Section 1602 Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by the CDFW under Sections 1600 et seq. of the California Fish and Game Code. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by CDFW, or use any material from the streambeds, without first notifying CDFW of such activity and obtaining a Lake or Streambed Alteration Agreement authorizing such activity. "Stream" can be defined as a body of flowing water and the landform that conveys it, including water sources and adjoining landscape elements that are byproducts of and affected by interactions with flowing water without regard to size, duration or timing of flow.

Porter–Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act requires that each of the nine RWQCBs in California prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and

point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCBs' jurisdiction includes waters of the United States and areas that meet the definition of "waters of the state." Waters of the state are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCBs have the discretion to take jurisdiction over aquatic areas not federally protected under CWA Section 404 provided they meet the definition of "waters of the state." The Porter-Cologne Water Quality Control Act is discussed in more detail in Section 10.1.1 of this EIS/EIR.

Oak Woodland Protection

Section 21083.4 of the California Public Resources Code requires counties to determine if a project within their jurisdiction is expected to result in conversion of oak woodlands that would have a significant adverse effect on the environment. If the lead agency determines that a project would result in a significant adverse effect on oak woodlands, mitigation measures to reduce the significant adverse effect of converting oak woodlands to other land uses are required.

Protection for Common Bird Nests and Common Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptor (e.g., hawks, owls, eagles, and falcons), including their nests or eggs. Section 3513 of the California Fish and Game Code codifies the federal Migratory Bird Treaty Act.

Local Regulations and Policies

Sacramento County General Plan of 2005–2030

The *Sacramento County General Plan* of 2005-2030 (Sacramento County General Plan)(Sacramento County 2011) Conservation Element includes goals, objectives, and over 100 policies related to the management and preservation of natural resources (policies CO-19 through CO-140 under Section V, Vegetation and Wildlife). The following is a summary of the policies relevant to the Planning Area natural communities (land covers) and their associated plant and animal species.

> **Policies CO-19 to CO-32:** Provide for a safe, reliable water supply while protecting the beneficial uses of waters for the State of California by protecting water quality and water-supported ecosystems through preservation, restoration, and creation of riparian and wetlands habitats and buffers to protect water quality from erosion.

Policies CO-58 through CO-63: Support the management and restoration of wetland and riparian habitat, native habitat, and special-status species habitat. The Sacramento County General Plan calls for no net loss of wetlands, riparian woodlands, and oak woodlands.

Policies CO-83 and CO-86: Establish and limit land uses in vernal pool habitat preserves.

Policies CO-88 through CO-92: Support protection and enhancement of riparian habitat and promote the increase of native woodlands and riparian scrub along select waterways.

Policies CO-93 through CO-95: Maintain the natural character of the 100-year floodplain by limiting fill and excavation.

Policies CO-96 through CO-101: Promote the maintenance of bank stabilization on river and waterways and riparian functionality.

Policies CO-102 through CO-104: Promote the conservation and protection of the Cosumnes River and Mokelumne River corridors.

Policies CO-114 through CO-124: Protect stream corridors from an action that would degrade water quality and require maintenance of vegetation to allow for high water quality.

Policies CO-138 through CO-140: Require the preservation and protection of non-oak trees occurring in riparian habitats, especially those trees used by Swainson's hawks (*Buteo swainsonii*), and the protection of native trees other than oaks from development. Policies CO-138 through CO-140 also require that the removal of native oaks be compensated through canopy replacement or replanting.

In addition to the Conservation Element, the General Plan Agricultural Element contains policies that protect certain agricultural land covers (AG-1 though AG-6), as discussed previously in Section 6.1.1.3:

Policy AG-1: The County shall protect Prime, Statewide Importance, Unique and Local Importance farmlands located outside of the USB [urban services boundary] from urban encroachment.

Policy AG-3: The County shall permit agricultural uses on buffers, provided such uses are conducted in a manner compatible with urban uses. Buffers shall be used to separate farming practices incompatible with adjacent urban uses. Any homeowners' association or similar entity within the development shall assist in determining compatible use. Buffers shall not adversely conflict with agricultural uses on adjoining property.

Policy AG-5: Projects resulting in the conversion of more than fifty (50) acres of farmland shall be mitigated within Sacramento County, except as specified in the paragraph below, based on a 1:1 ratio, for the loss of the following farmland categories through the specific planning process or individual project entitlement requests to provide in-kind or similar resource value protection (such as easements for agricultural purposes):

- Prime, Statewide Importance, Unique, Local Importance, and Grazing farmlands located outside the USB;
- Prime, Statewide Importance, Unique, and Local Importance farmlands located inside the USB.

The Board of Supervisors retains the authority to override impacts to Unique, Local, and Grazing farmlands, but not with respect to Prime and Statewide farmlands.

Sacramento County Swainson's Hawk Ordinance

Chapter 16.130 of Title 16 of the Sacramento County Code addresses the reduction in Swainson's hawk foraging habitat within unincorporated Sacramento County. Participating in the County's Swainson's Hawk Mitigation Program, which is voluntary, is one option for mitigating the loss of foraging habitat within unincorporated areas of the County. Under this program, mitigation for impacts less than 40 acres can be achieved by paying a mitigation fee or providing replacement habitat (title or easement to suitable Swainson's hawk mitigation lands on a per-acre basis); mitigation for impacts of 40 acres or greater can be achieved only by providing replacement habitat under this program.

Sacramento County Tree Ordinance and Tree Preservation Ordinance

The Sacramento County Tree Ordinance (Chapter 19.04 of Title 19 of the County Code) establishes guidelines for the planting, removal, and protection of public trees as well as specially protected trees such as heritage or landmark trees within Sacramento County. A public tree is defined by the ordinance as "a tree or shrub planted or maintained, or both, by the County on an easement, planting easement, street, county park or public premises." A heritage tree is defined by the ordinance as "a California oak tree growing on any land (in unincorporated area) of Sacramento County, including privately owned land, with a trunk sixty inches or greater in girth measured four and one-half feet above the ground." A landmark tree is defined by the ordinance as "an especially prominent or stately tree on any land (in the unincorporated area) in Sacramento County, including privately owned land." The disturbance of any public tree without a permit is prohibited and special protection of landmark and heritage trees is required.

The Sacramento County Tree Preservation Ordinance (Chapter 19.12 of Title 19 of the County Code) establishes measures to preserve and protect native oak trees within the designated urban area. A native oak tree is defined by the ordinance as any valley oak (*Quercus lobata*), interior live oak (*Q. wislizenii*), blue oak *(Q. douglasii*), or oracle oak *(Q. morehus*) having at least one trunk of 6 inches or more in diameter measured 4.5 feet above the ground, or a multi-trunked native oak tree having an aggregate diameter of 10 inches or more measured 4.5 feet above the ground. The ordinance prohibits native oak tree removal or ground-disturbance activities within the dripline of a native oak tree, without a tree permit, unless authorized as a condition of a discretionary project such as a subdivision map, rezone, or conditional use permit. The ordinance establishes decision criteria for ascertaining whether or not oak tree removal should be permitted, along with development control measures intended to mitigate damage to oak trees caused by land development. The ordinance also establishes a Tree Preservation Fund to be used for tree planting and preservation programs and public education programs regarding trees.

2030 Galt General Plan

The *2030 Galt General Plan* (Galt General Plan) (Galt 2009) includes goals and policies that encourage the protection of important habitats and commit the city to address the effects of urban development on these habitats. Applicable Policies in the Galt General Plan include the following:

> **Policy COS-2.1:** Sensitive Species Protection: The City should require minimization of impacts to protect mature trees, vernal pools, and any threatened endangered or other sensitive species when approving new development.
>
> **Policy COS-2.2:** Wetland and Riparian Communities Management: The City shall support the protection, restoration, expansion, and management of wetland and riparian plant communities for passive recreation, groundwater recharge, and wildlife habitat.
>
> **Policy COS-2.3:** Biologically Sensitive Area Development: The City should require new development in areas that are known to have particular value for biological resources to maximize preservation of sensitive vegetation and wildlife habitat.
>
> **Policy COS-2.4:** Federal, State, and Local Statutes Compliance: The City shall review development proposals in accordance with applicable Federal, State, and local statutes protecting special-status species and jurisdictional wetlands.
>
> **Policy COS-2.5:** Mitigation Measures Imposition: The City shall take into consideration mitigation standards and policies of resource and regulatory agencies with jurisdiction over biological resources (e.g., USFWS, CDFW, etc.).

Policy COS-2.6: Biological Surveys: On sites that have the potential to contain critical or sensitive habitats or special species, the City shall require the project applicant to have the site surveyed by a qualified biologist. A report on the findings of this survey shall be submitted to the City as part of the application process.

Policy COS-2.7: Regional Habitat Conservation Efforts Coordination: The City shall continue to coordinate efforts with Sacramento County to develop the South Sacramento Habitat Conservation Plan.

Policy COS-3.1: Riparian Protection: The City should require the protection of existing riparian vegetation along stream courses in the city.

Policy COS-3.2: Mature Tree and Woodland Preservation: The City shall encourage retention of mature trees and woodlands to the maximum extent possible.

Policy COS-4.1: Prime Agricultural Land Preservation. The City shall work to preserve prime agricultural lands surrounding the Planning Area from future development by creating a clear and sensitive urban transition to minimize land use conflicts and protect long-term agriculture.

Galt Tree Ordinances

Chapter 12.28 of the City of Galt Municipal Code requires written permission and approval for the cutting or removal of oak trees or public trees on public and private property unless certain provisions such as emergencies apply. A public tree is any tree with one-half or more of its trunk or branches on or above public land. An oak tree is defined as including, but not limited to, valley oak, interior live oak, blue oak, or oracle oak having at least one trunk of 6 inches in diameter measured 4 feet above the ground, or multi-trunks with an aggregate diameter of 8 inches or more measured 4 feet above ground. Minimum development control measures are suggested such as not disturbing the ground within the driplines of protected trees. Grading within the dripline of oak trees is not permitted unless specifically authorized. A tree preservation fund is established and is expected to be contributed to in lieu of a project planting replacement trees and is used for the planting, enhancement, maintenance and/or monitoring of trees on publicly owned property, easements, or rights-of-way. Specific details apply for ground disturbance within a protected tree's dripline.

Rancho Cordova General Plan

The *Rancho Cordova General Plan* (Rancho Cordova 2006) Natural Resources Element includes various goals and policies that encourage the protection of important habitats and guide mitigation for impacts to these habitats that cannot be avoided. There is also a policy that

functions much like tree ordinances adopted by other jurisdictions. Applicable policies in the General Plan include the following:

Policy NR.1.1: Protect rare, threatened, and endangered species and their habitats in accordance with State and federal law.

Policy NR.1.2: Conserve Swainson's hawk habitat consistent with State policies and Department of Fish and Game guidelines.

Policy NR.1.6: Participate in the development of a habitat conservation plan to address the unique biological resources in Rancho Cordova.

Policy NR.1.8: The City shall encourage creation of habitat preserves that are immediately adjacent to each other in order to provide interconnected open space areas for animal movement.

Policy NR.1.9: The City shall require that impacts to riparian habitats be mitigated at a no net loss of existing function and value based on field survey and analysis of the riparian habitat to be impacted. No net loss be accomplished by avoidance of the habitat, restoration of existing habitat, or creation of new habitat, or through some combination of the above.

Policy NR.1.10: The City shall avoid the placement of new roadways within habitat preserves to the maximum extent feasible.

Policy NR.1.11: In such cases where habitat preserves are crossed by a roadway, or where two adjacent preserves are separated by a roadway, the roadway shall be designed or updated with wildlife passable fencing separating the roadway from the preserve and/or shall incorporate design features that allow for the movement of wildlife across or beneath the road without causing a hazard for vehicles and pedestrians on the roadway.

Policy NR.2.1: Require mitigation that provides for "no net loss" of wetlands consistent with current State and federal policies.

Policy NR.2.2: Ensure that direct and indirect effects to wetland habitats are minimized by environmentally sensitive project siting and design, to the maximum extent feasible.

Policy NR.2.5: The City shall require that drainage improvements that discharge into areas of wetlands to be preserved are, to the maximum extent feasible, designed to

mimic the undeveloped surface water flow conditions of the area in terms of seasonality, volume, and flow velocity.

Policy NR.3.1: Coordinate with property owners and local interest groups, such as the Sacramento Urban Creeks Council, to restore, enhance, and preserve creeks in Rancho Cordova.

Policy NR.3.4: Encourage projects that contain wetland preserves or creeks, or are located adjacent to wetland preserves or creeks, to be designed for visibility and, as appropriate, access.

Policy NR.4.1: Conserve native oak and landmark tree resources for their historic, economic, aesthetic, educational, and environmental value.

Policy NR.4.4: Prior to the approval of any public or private development project in areas identified or assumed to contain trees, the City shall require that a determinate survey of trees species and size be performed. If any native oaks or other native trees six inches or more in diameter at breast height (dbh), multi-trunk native oaks or native trees of 10 inches or greater dbh, or non-native trees of 18 inches or greater dbh that have been determined by a certified arborist to be in good health are found to occur, such trees shall be avoided if feasible. If such trees cannot be avoided, the project applicant shall do one of the following:

- All such trees shall be replaced at an inch-for-inch ratio. A replacement tree planting plan shall be prepared by a certified arborist or licensed landscape architect and shall be submitted to the City of Rancho Cordova for approval prior to removal of trees; or
- The project applicant shall submit a mitigation plan that provides for complete mitigation of the removal of such trees in coordination with the City of Rancho Cordova. The mitigation plan shall be subject to the approval of the City.

If the City of Ranch Cordova adopts a tree preservation ordinance at any time in the future, any future development activities shall be subject to that ordinance instead.

Policy LU.1.9: The City shall require development to protect 1 acre of existing farmland of equal or higher quality for each acre of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance that would be converted to non-agricultural uses. This protection may consist of the establishment of farmland conservation easements, farmland deed restrictions, or other appropriate farmland conservation in perpetuity, but may also be utilized for compatible wildlife conservation efforts. The farmland to be

preserved shall be located within Sacramento County and must have adequate water supply to support agricultural use. As part of the consideration of land areas proposed to be protected, the City shall consider the benefits of preserving farmlands in proximity to other protected lands.

8.1.2 Existing Conditions

This section provides information on the existing condition of each Planning Area natural land cover, as well as the existing condition of the plant and wildlife community that occurs in each Planning Area land cover. A "community" is a naturally occurring group of organisms belonging to a number of different species that live together in the same habitat or same area and interact through trophic and spatial relationships; a community is typically characterized by reference to the dominant plant species that give the community structure (Allaby 2010, Lincoln et al. 1998).

The land cover classifications used in the EIS/EIR are the same Planning Area land covers defined in the Draft SSHCP document, which are a modified version of the natural communities described in CDFW's Manual of California Vegetation (Sawyer and Keeler-Wolf 1995). See the Draft SSHCP document Appendix E1 for a summary of the information and methodology used by the Permit Applicants to map existing SSHCP land covers within the Planning Area (Sacramento County et al. 2017).

Under the land cover classifications used in the SSHCP document, there are 17 "natural" land covers within the Planning Area. The natural land covers provide habitat for different communities of native plant and native wildlife species (see Section 8.1.2.1). Under the land cover classifications used in the SSHCP document, there are also eight "developed" land covers that were created by past and current human activities in the Planning Area (Table 8-1a). These eight developed land covers do not provide natural or important habitat for native plant and wildlife communities. Consequently, the developed land covers are not discussed further in Chapter 8, and any impacts from the EIS/EIR alternatives to areas of existing developed land covers are not analyzed in this chapter. However, because some of the Planning Area's special-status bird species occasionally use trees or other features within certain "developed" land covers, Chapter 9 will include some of the developed land covers in the analyses of the Planning Area's special-status species.

As discussed previously in Section 3.7.1, the Planning Area has been affected by past and current agriculture activities, urban development projects, infrastructure projects, and mining operations. These past and present activities have affected the existing distribution and existing conditions of the natural land covers and their associated natural communities that are present in the Planning Area (Figure 8-1).

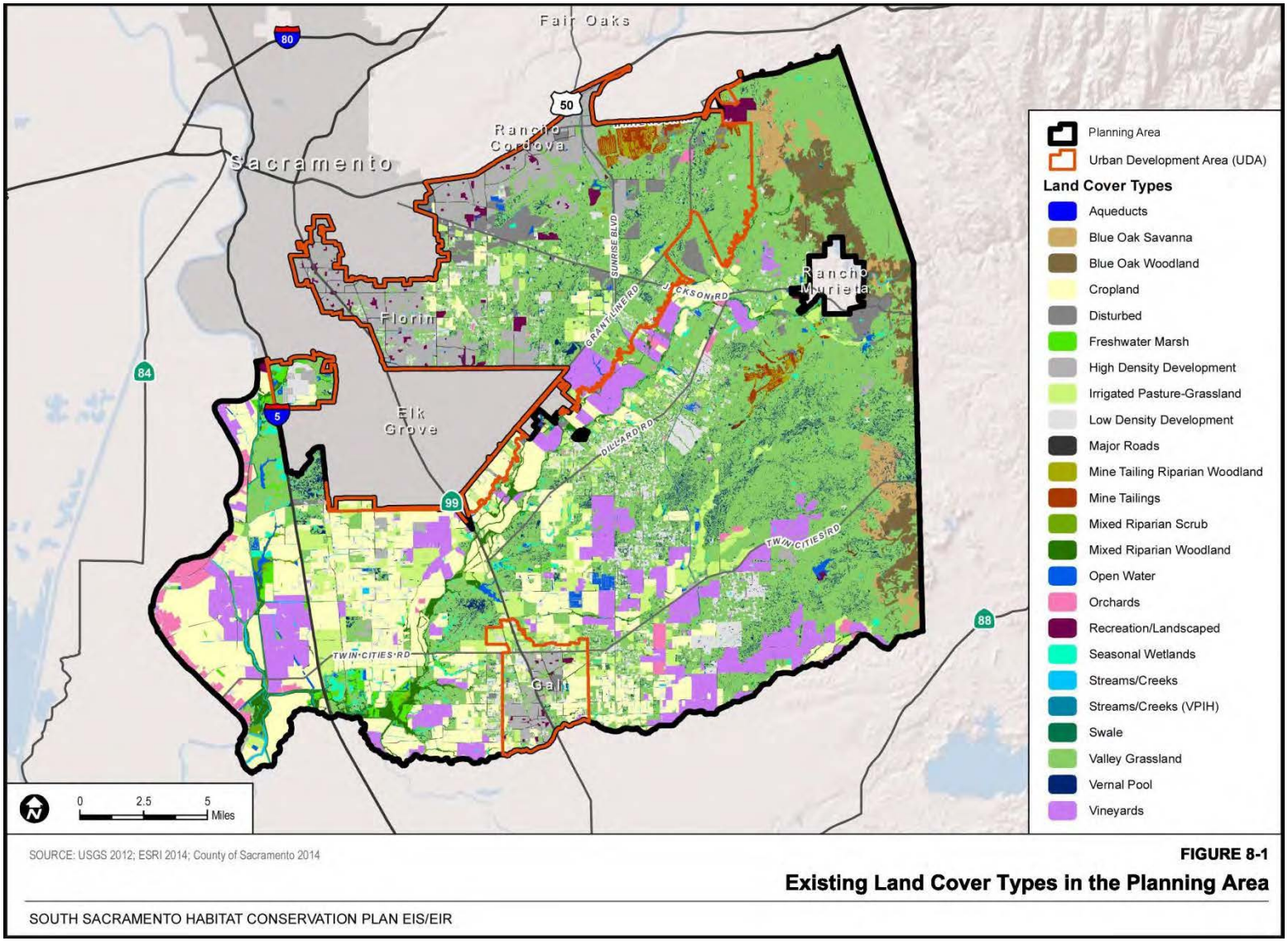
8.1.2.1 Natural Land Covers

As discussed previously, there are 17 natural SSHCP land covers in the Planning Area, totaling approximately 272,596 acres (Table 8-1a). Each of the 17 natural land covers provide important habitat for an associated community of native plant and wildlife species.

The following section includes a brief description of each natural land cover, discusses the existing acres and general locations of each land cover within the Planning Area, and describes the general condition of each natural land cover in the Planning Area. Figure 8-1 shows the existing distribution of each natural land cover in the Planning Area, and Table 8-1a lists the acres of each natural land cover within the Planning Area.

Of the approximately 272,596 acres of natural land covers within the Planning Area, approximately 64,000 acres (approximately 19% of the Planning Area) are within existing preserves (Figure 1-2). The Planning Area's existing preserves include wildlife refuges, nature preserves, lands under conservation easements, open space, mitigation banks, and individual mitigation sites established by past projects. Table 8-1b, Existing Natural Land Covers Already Preserved within the Planning Area, lists the total acreage of each land cover within existing preserves.

Figure 8-1 Existing Distribution of Each Land Cover Within the Planning Area



AGENDA ITEM 11.1
4462

INTENTIONALLY LEFT BLANK

Table 8-1a. Total Acres of Each Land Cover Within the Planning Area

Land Cover	Existing Acres in Planning Area	Percentage of the 317,655-acre Planning Area
Natural Land Covers		
Aquatic Land Covers		
Wetlands and Other Waters		
Vernal Pool*	4,536	1.4%
Swale*	1,252	0.4%
Seasonal Wetland*	2,600	0.8%
Freshwater Marsh*	2,954	0.9%
Stream/Creek - Vernal Pool Invertebrate Habitat (VPIH)*	73	0.02%
Stream/Creek*	2,778	0.9%
Open Water*	2,344	0.7%
Total Wetlands & Other Waters	*16,537*	*5.1%*
Riparian Land Covers		
Mixed Riparian Woodland*	5,856	1.8%
Mixed Riparian Scrub*	1,454	0.5%
Mine Tailing Riparian Woodland*	641	0.2%
Total Riparian	*7,951*	*2.5%*
Terrestrial Land Covers		
Natural Uplands		
Valley Grassland	135,152	42.5%
Blue Oak Savanna*	5,637	1.8%
Blue Oak Woodland*	9,132	2.9%
Total Natural Uplands	*149,921*	*47.2%*
Farmlands		
Cropland	51,829	16.3%
Orchard	3,907	1.2%
Vineyard	26,460	8.3%
Irrigated Pasture Grassland	15,991	5.0%
Total Farmlands	*98,187*	*30.9%*
Developed Land Covers		
Aqueduct	264	0.1%
Disturbed	6,288	2.0%
High-Density Development	13,073	4.1%
Low-Density Development	18,608	5.9%
Major Roads	2,764	0.9%
Mine Tailings	1,098	0.3%
Recreation/Landscaped	2,180	0.7%
Not Mapped	784	0.2%
Total Developed Lands	*45,059*	*14.2%*

* Indicates land cover that is considered sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations; see Section 8.1.2.3.

Table 8-1b. Acres of Each Natural Land Cover Already Preserved Within the Planning Area

Land Cover	Acres Preserved in the Planning Area	Percentage of Existing Acres Preserved within the Planning Area**
Aquatic Land Covers		
Wetlands and Other Waters		
Vernal Pool*	1,978	44%
Swale*	353	28%
Seasonal Wetland*	1,320	51%
Freshwater Marsh*	1,757	59%
Stream/Creek (Vernal Pool Invertebrate Habitat)*	10	14%
Stream/Creek*	557	20%
Open Water*	720	31%
Total Wetlands & Other Waters	*5,975*	*35%*
Riparian Land Covers		
Mixed Riparian Woodland*	2,058	35%
Mixed Riparian Scrub*	453	31%
Mine Tailing Riparian Woodland*	26	4%
Total Riparian	*2,537*	*23%*
Terrestrial Land Covers		
Natural Uplands		
Valley Grassland	35,288	26%
Blue Oak Savanna*	2,964	53%
Blue Oak Woodland*	4,260	47%
Total Natural Uplands	*42,512*	*42%*
Farmlands		
Cropland	10,348	20%
Orchard	212	5%
Vineyard	878	3%
Irrigated Pasture Grassland	927	6%
Total Farmlands	*12,365*	*9%*
Total	**64,108**	**23%**

* Indicates land cover that is considered sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations; see Section 8.1.2.3.

** Percentage of the existing acres of the land cover within the Planning Area, presented in Table 8-1a, which is already preserved.

Aquatic Land Covers

Vernal Pool Land Cover

Vernal pools are shallow surficial depressions that temporarily fill with water during winter and spring rains, but desiccate in the early dry summer months. As discussed in Appendix G-1, vernal pools occur as small poorly drained depressions in some Valley Grasslands and are perched above an impermeable or very slowly permeable soil horizon (Smith and Verrill 1998).

The hydrologic regime and seasonal inundation of a vernal pool is too short and unpredictable to support aquatic plant species, but is long enough to eliminate upland plant species. This characterizes vernal pools as ephemeral wetlands, and differentiates them from other aquatic ecosystems (Solomeshch and Holland 2007).

Most of California, including the Planning Area, has a Mediterranean climate that is characterized by hot, dry summers followed by a mild, wet winter. As discussed in Appendix G-1, soils in the Vernal Pool Ecosystems of the Planning Area typically become wetted in November and remain saturated during the winter and early spring, but dry by summer.

As discussed in Chapter 5, Planning Area vernal pools are located on several geological surfaces with soils that include a low-permeability layer such as a claypan, hardpan (e.g., silica-cemented duripans), a mudflow, or bedrock (Rains et al. 2006). Because vernal pools are associated with specific landforms, geologic formations, and soils (Smith and Verrill 1998), vernal pools tend to be clustered at the landscape scale, forming vernal pool complexes (Rains et al. 2006, USFWS 2006). A vernal pool's frequency of ponding, filling, draining, and ponding depth and ponding duration is primarily affected by characteristics of the vernal pool's watershed, including the underlying geology, the landform, the nature of the soil's water-restricting layer, and the soil depth above the soil's water-restricting layer. Vernal pool community structure (i.e., the type, number, and relative abundance of species) is largely determined by the vernal pool's physical makeup (e.g., size, depth, substrate, water chemistry) and the vernal pool's hydrology—the presence or absence of certain species and different patterns of species dominance can be indicative of physical and hydrologic differences among vernal pools (Holland and Jain 1988). Vernal pools in the Planning Area exhibit a variety of size, depth, soil, and water chemistry. Key physical parameters include pool drainage area, slope, soil type, soil structure and depth, pool size and depth, timing of the pool hydrologic cycle, and hydrologic interconnectivity. Most vernal pools in the Planning Area are broadly classified as Northern Hardpan vernal pools and Northern Volcanic Mudflow vernal pools (Jones and Stokes 1990, Sawyer and Keeler-Wolf 1995). In addition, a less specialized vernal pool type with generally lower species richness is found on Drainageway formation soils within the Planning Area. The vernal pools present in the Planning Area can be further classified by the presence or absence of certain dominant or less abundant vernal pool plant species (Sawyer and Keeler-Wolf 1995, Barbour et al. 2007, Sawyer et al. 2009).

Northern Volcanic Mudflow vernal pools occur on ancient mudflows called lahars. These pools are small, form in irregular depressions in gently sloping surfaces, and are often rocky and shallow. Water chemistry is mixo-saline, fresh (Sawyer and Keeler-Wolf 1995). As discussed in Chapter 5, Northern Volcanic Mudflow vernal pools are found on in the Planning Area on the Mehrten and Valley Springs formation in rocky soil series and complexes such as Hadselville-Pentz, Red Bluff-Redding, Corning-Redding, Amador-Gillender, and Pardee-Rancho Seco (Jones and Stokes 1990). Mudflow vernal pools in the Planning Area are hydrologically complex; in

some areas, vernal pools are in complex reticulated drainage networks with a high density of interconnected pools, swales, and ephemeral drainages (Jones and Stokes 1990). The seasonal hydrology of Northern Volcanic Mudflow vernal pools includes a perched water table (see Section 3.2.3), but the vernal pool hydrology is relatively "flashy" (i.e., pools fill and drain relatively rapidly). Northern Volcanic Mudflow vernal pools contain relatively rich flora that includes several vernal pool obligate species. The species richness and ecological complexity of Northern Volcanic Mudflow pools in the Planning Area exceed that of the Young-Terrace Northern Hardpan pools and the Drainageway vernal pools in the Planning Area. Possible explanations of the rich (less specialized) flora of Northern Volcanic Mudflow pools include the recent origin of the pools and their quickly changing or "flashy" hydrology. Mudflow pools fill and drain rapidly and are expected to be less stressful to most plant life than pools that remain flooded for extended periods, such as the Old-Terrace Northern Hardpan vernal pools (Jokerst 1990, Jones and Stokes 1990). Dominant plant species including California goldfields (*Lasthenia californica*), dwarf blennosperma (*Blennosperma nana*), round woollyheads (*Psilocarphus brevissimus*), two-crowned downingia (*Downingia bicornuta*), water pygmy (*Crassula aquatica*), and/or whiteflower navarretia (*Navarretia leucocephala*) are expected to be present with other herbs and grasses.

Northern Hardpan vernal pools form on alluvial terraces in old, acidic, nutrient-depleted soils with iron-silicate cemented soil layer (see Chapter 5). These soils often exhibit well-developed mound-intermound topography to form aggregations of pools and "mima mounds." Water chemistry is mixo-saline fresh (Sawyer and Keeler-Wolf 1995, USFWS 2005). Northern Hardpan vernal pools typically have a conductivity of 40 to 70 mhos per 1 centimeter, which is similar to oligotrophic high Sierra lakes (Keeley and Zedler 1998, Williamson et al. 2005). Water in hardpan vernal pools is not only low in dissolved salts, but also in dissolved nitrogen. For example, Rains et al. (2006) reported that, during the growing season, nitrate and phosphate concentrations were below detection limits (i.e., 0.006 milligrams per liter (mg/L) and 0.03 mg/L, respectively), and the amount of ammonium was negligible (0.1 mg/L). Within the Planning Area, Northern Hardpan vernal pools occur on the low (younger) terrace Riverbank Formation soil series (e.g., San Joaquin, Galt, Madera, Tehama), as well as on the high (older) terrace Laguna Formation and Arroyo Seco gravels (e.g. Corning, Redding, Red Bluff, Mokelumne soil series). Vernal pools occur extensively on both landforms types (Jones and Stokes 1990). Dominant plant species may include bladder clover (*Trifolium depauperatum*), coyote-thistle (*Eryngium vaseyi*), Fremont gold-fields (*Lasthenia fremontii*), dwarf downingia (*Downingia pusilla*), popcorn flower (*Cryptantha microstachys*), rose meadowfoam (*Limnanthes douglasii* ssp. *rosea*), and water pygmy (*Crassula aquatic)*.

High-Terrace Northern Hardpan vernal pools (e.g., on Corning and Redding soil series) are the most complex type of vernal pool in the Planning Area because of their rich and varied flora,

presence of special-status plant and invertebrate species, and complex hydrology, and because they often occur in areas with complex, highly convoluted interspersions of several soil types. Soils on high-terrace landform sites varies over short distances such that sites in proximity to each other is expected to have entirely different restricting layer types, depth, and vernal pool plant community. High-Terrace Northern Hardpan vernal pools are floristically rich and dominated by vernal pool obligate plant species (true "specialists") and typically support special-status vernal pool species. The tremendous age and the geographic location of High-Terrace Northern Hardpan pools may explain their rich and highly specialized flora (Jones and Stokes 1990). In addition, little of the high-terrace landform has been farmed in the Planning Area because irrigation water is lacking, and many sites are not arable. Some high-terrace vernal pool areas were dryland farmed in the past with wheat or oats; this type of farming appears to have had little effect on high-terrace vernal pools. However, on other formations, dryland farming has disrupted vernal pool surface hydrology. Consequently, High-Terrace Northern Hardpan vernal pools are relatively abundant in the Planning Area (Jones and Stokes 1990).

The Planning Area's **Low-Terrace Northern Hardpan vernal pools** (e.g., on San Joaquin soils) are of relatively recent geologic origin, which may explain their relatively unspecialized flora. The flora of Low-Terrace Northern Hardpan vernal pools often includes non-native plants, low species richness, scarcity of vernal pool obligate species, and low numbers of special-status plants. Most of the low terrace sites in the Planning Area have been plowed, graded, or heavily grazed because of their arable soils and proximity to reliable water; this may also account for their less specialized flora, relative to the flora of the High-Terrace Northern Hardpan pools. However, Low-Terrace Northern Hardpan vernal pools serve an important function as habitat for shorebirds, waterfowl, and raptors because of their location in the central portion of the valley along the Sacramento River (Jones and Stokes 1990; Silveira 1998).

Drainageway vernal pools are located on no particular Planning Area geologic formation, but formed on recent alluvial deposits that are adjacent to the incised channels of active watercourses. Consequently, Drainageway vernal pools are interspersed throughout the other three vernal pool types present in the Planning Area. Drainageway vernal pools fill and drain more rapidly than other Planning Area vernal pools, and are likely to depend more on overland runoff and direct precipitation to maintain their hydrology when compared to the other Planning Area vernal pool types (Jones and Stokes 1990).

All vernal pools support endemic plants and animals that are adapted to living under the extreme wet and dry annual hydrology of vernal pools. All vernal pool plant species live their entire lifecycle within 1 year, but have seeds that can remain dormant for many years. This allows vernal pool plant species to survive years of reduced winter rainfall and drought when pools partially fill with water or do not fill at all. Similarly, species of crustaceans, insects, and amphibians that occur in vernal pools are adapted to the extreme annual hydrology. Vernal

pools in the Central Valley and this Planning Area have historically supported four amphibian species: California tiger salamander (*Ambystoma californiense*), western spadefoot (*Spea hammondii*), western toad (*Anaxyrus boreas*), and the Pacific chorus frog (*Pseudacris regilla*) (Anderson 2013). However, recent estimates of the abundance and distribution of these amphibian species in the Sacramento Valley Vernal Pool Region indicate that most of these species are in steep decline or virtually extirpated from this region. Today, the Pacific chorus frog is often the most abundant, if not the only amphibian species, found within California's vernal pools (Anderson 2013). More than 22 species of freshwater crustaceans in occur in Planning Area vernal pools, including three species of fairy shrimp, six copepod species, several species of water fleas, several types of clam shrimp, seed shrimp, and tadpole shrimp (Poirier 2012), as well as flatworms, snails, insect larva, and aquatic beetles (Calderaro 2011).

Vernal pools were once widespread across the Central Valley and in this Planning Area. However, because of past agricultural and urban development in the Central Valley (see Section 3.7.1), much of the vernal pool landscape and its associated species, including vernal pool plants and vernal pool crustaceans, have disappeared from large portions of their historical range (Holland 2009; Witham et al. 2014; USACE 2014).

Vernal pools are also used by common or non-specialized wildlife species including migratory birds and resident insect species, including native bumblebees and other pollinators. In addition, upland wildlife species associated with the Valley Grasslands that surround vernal pools also forage in or disperse through vernal pools, especially when pools are dry (see the Valley Grassland and Vernal Pool Ecosystem discussions later in this section).

As discussed in Section 8.1.2.2, the Vernal Pool land covers in the Planning Area are hydrologically and ecologically connected to the Swale, Valley Grassland, and Stream/Creek (Vernal Pool Invertebrate Habitat (VPIH)) land covers, which are described below.

Swale Land Cover

In the Planning Area, Swales are shallow gently sloping narrow seasonal drainages found in flat to gently rolling Valley Grassland on soils with an impermeable layer, and are always in association with vernal pools. The movement of surface water between vernal pools can occur in a network of surface "swales" (Solomeshch and Holland 2007). As discussed in Appendix G-1, most Planning Area vernal pools begin to fill with water only after the soil becomes saturated from winter rainfall, and seasonal "perched aquifer" forms in the upper part of the soil profile (above the soil restrictive layer). After the soil becomes saturated and vernal pools fill, Swales may convey surface water during and after winter rainstorms. In this manner, swales function as conduits between vernal pools that provide movement of water and dispersal of vernal pool plant and animal propagules (e.g., pollen, seeds, cysts, eggs, and spores), and also function as

conduits for movement of juvenile and adult vernal pool vertebrate species, such as California tiger salamander and western spadefoot. Swales support many of the native plant species that are also found within vernal pools.

Generally, the Swale land cover provides intermittent habitat for portions of the life cycle of many of the vertebrate and crustacean species that occur in the vernal pool land cover, including Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii)*, dwarf downingia, pincushion navarretia (*Navarretia myersii*), mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp (*Lepidurus packardi*), Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*), and western spadefoot. In addition to these special-status species, Swales also support more common vernal pool plant and animal species, and often support some plant species that are also found in the surrounding Valley Grasslands.

As indicated in Section 8.1.2.2, the Swale land cover is connected ecologically and hydrologically to Vernal Pools and the adjacent Valley Grassland upland, and many Swales also discharge to and are hydrologically connected with the Stream/Creek (VPIH)) land cover.

Stream/Creek (VPIH)

In this Planning Area, the Stream/Creek (VPIH) land cover consists of intermittent drainages which convey water only after rain events (i.e., are ephemeral) and are located within the Vernal Pool Ecosystem (see section 8.1.2.2). Unlike the Swale land cover, the Stream/Creek (VPIH) land cover is less likely to support plant species that also occur within vernal pools; the vegetation of the Stream/Creek (VPIH) land cover is usually dominated by Valley Grassland plant species. However, many vernal pool invertebrate crustaceans, including mid-valley fairy shrimp and vernal pool fairy shrimp, can be found within the Stream/Creek (VPIH) land cover, especially in places where water ponds between storm events. Dominant plant and wildlife species of the Stream/Creek (VPIH) land cover include species associated with Vernal Pools, Swales, and Valley Grasslands. As discussed in Section 8.1.2.2, the Stream/Creek (VPIH) land cover is only located in the Vernal Pool Ecosystem.

Valley Grassland Land Cover

The Valley Grassland land cover in the Planning Area is currently dominated by naturalized non-native annual grasses, but also includes some native and naturalized forbs (see Section 3.7.1). Non-native annual grasses that dominate this land cover include wild oats (*Avena fatua*), soft chess (*Bromus hordeaceus*), ripgut brome (*B. diandrus*), red brome (*B. madritensis* ssp. *rubens*), wild barley (*Hordeum* spp.), and foxtail fescue (*Vulpia myuros*). Common forbs of this land cover include broadleaf filaree (*Erodium botrys*), redstem filaree (*E. cicutarium*), turkey mullein (*Eremocarpus setigerus*), true clovers (*Trifolium* spp.), and bur clover (*Medicago polymorpha*)

(Kie 2005; Sawyer and Keeler-Wolf 1995). Native plant species comprise a small portion of the current annual grassland flora in the Sacramento Valley, including the Planning Area. For example, purple needlegrass (*Stipa pulchra*) can be found as the dominant grass (i.e., comprising greater than 20% cover) in small patches along ridgetops of low-lying hills in the eastern portion of Sacramento County.

Common native mammal species found in the Planning Area's valley grasslands community include mule deer (*Odocoileus hemionus*), as well as rodents such as California ground squirrels (*Otospermophilus beecheyi*), California pocket mice (*Chaetodipus californicus*), and black-tailed jack rabbits (*Lepus californicus*). Common predators include the coyote (*Canis latrans*) and western rattlesnakes (*Crotalus viridis*). Native bird species that utilize these open, grassy areas include horned lark (*Eremophila alpestris*), northern harrier (*Circus cyaneus*), and western meadowlark (*Sturnella neglecta*). Invertebrate populations also provide an abundant food source, such as pallid-winged grasshoppers (*Trimerotropis pallidipennis*) and devastator grasshopper (*Melanoplus devastator).*

As discussed in Section 8.1.2.2, approximately 97,349 acres of the total 135,152 acres of Valley Grassland present within the Planning Area (approximately 72%) (Table 8-2) are believed to be ecologically and hydrologically associated with Vernal Pools and Swales, and are a part of the Vernal Pool Ecosystem.

Stream/Creek Land Cover

The Stream/Creek land cover includes linear aquatic features such as rivers, streams, creeks, and drainages that are intermittent or perennial. Species expected to co-occur within the Stream/Creek land cover include predatory birds such as common mergansers (*Mergus merganser*) and belted kingfisher (*Megaceryle alcyon*), which feed on the smaller fish that reside in the perennial creeks such as smaller age class brown trout (*Salmo trutta*), bluegill (*Lepomis macrochirus*), and small mouth bass (*Micropterus dolomieu*). Other fish that reside in the perennial Stream/Creek land cover include common carp (*Cyprinus carpio*), Sacramento pikeminnows (*Ptychocheilus grandis*), and riffle sculpin (*Cottus gulosus*). Many of the terrestrial species that occur in the streams and creek community also use the adjacent Riparian land covers, as described below for the Riparian land cover's natural community. Aquatic invertebrates such as aquatic insects, insect larvae, crustaceans, and mollusks are also important elements of the natural community associated with this land cover.

Seasonal Wetland Land Cover

The Seasonal Wetland land cover includes ephemeral wetlands that pond during the winter rainy season and usually become dry by late summer or fall, but may pond water year-round in

some years. Many exist only because of man-made alterations of the landscape that caused water to pond longer or sometimes pond year round, for example, stock ponds that dry during the summer during most years are Seasonal Wetlands, whereas perennial stock ponds would be considered Open Water. Seasonal Wetlands support herbaceous hydrophytic plant species that may also occur in with perennial marshes and lakes. The Seasonal Wetland land cover occurs in isolated patches throughout this Planning Area, as well as on the edges of the Stream/Creek land cover, and edges of rivers, ponds, lakes, and reservoirs (Open Water land cover). Depending on water depth and duration, Seasonal Wetlands provide breeding habitat for a large number of amphibian species, including the California tiger salamander, western spadefoot, bullfrogs (*Bufo borealis)*, and Pacific treefrog (*Pseudacris regilla*). As with other seasonal and perennial waterbodies, the insects, crustaceans, mollusks (e.g., snails), and vegetation associated with this habitat provide important forage and habitat for migratory shorebirds and songbirds, as well as attracting upland wildlife such as mice, mule deer, coyote, raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*).

Freshwater Marsh Land Cover

Most of California's freshwater marshes occur in the Sacramento Valley and Sacramento–San Joaquin Delta regions. Therefore, the majority of Freshwater Marsh land cover in the Planning Area occurs along the perennial Cosumnes River and Deer Creek corridors. Freshwater marsh is also found on the margins of some streams and margins of the Open Water land covers.

Freshwater Marsh is typically dominated by perennial, herbaceous, hydrophytic plant species such as cattails (*Typha* spp.), tules (*Scirpus* spp.), and other emergent plant species, and is generally found along the edges of the Open Water land covers such as ponds, lakes, and rivers. Freshwater Marsh supports a diverse animal community. Prey species include insects, insect larvae, crustaceans, mollusks, birds, and mammals. For example, waterfowl feed on the abundant aquatic invertebrate populations associated with emergent Freshwater Marsh. The emergent vegetation also provides breeding habitat and shelter for red-winged blackbird (*Agelaius phoeniceus*). Swans, geese, and a variety of ducks visit the Freshwater Marshes for breeding, nesting, rearing young, and feeding. Muskrat (*Ondatra zibethicus*) use marsh plants for denning and feed on rushes, tule, cattails, crayfish, and snails.

Open Water Land Cover

Open Water land covers are perennial aquatic features, including natural or man-made ponds (e.g., stock ponds), lakes, and reservoirs. The Open Water community may include no vegetation, or may include rooted aquatic plants or non-rooted plants, such as algae, floating pondweeds, duckweeds, and other aquatic plants. The Open Water land cover is found throughout the Planning Area. Open Water features existing in the Planning Area are largely

unnamed, with the exception of Blodgett Reservoir inside the Urban Development Area (UDA[1]) and Rancho Seco Lake outside the UDA. Wastewater treatment facilities are classified in Table 8-1a as High-Density Development, though the treatment ponds themselves are classified as Open Water. Standing water found within the Recreation/Landscaped and High-Density Development land covers were mapped as part of the surrounding land cover.

Wildlife species of the Open Water community include warmwater fishes such as common carp, largemouth bass (*Micropterus salmoides*), goldfish (*Carassius auratus*), green sunfish (*Lepomis cyanellus)*, crayfish, ducks, geese, swans, and other migratory waterfowl. Aquatic invertebrates of the Open Water community (e.g., insects, insect larvae, crustaceans, and mollusks) act as prey for many of these species.

Riparian Land Covers

Riparian land covers are associated with Planning Area streams, creeks, or drainages and typically occur in the zone between the Active Stream Channel and Adjacent Upland land covers. The land cover classification system defines Riparian land covers by their associated trees and shrubs. The natural community of the Riparian land covers contains a great diversity of wildlife, including beaver (*Castor canadensis*), as well as providing foraging and sheltering habitat for species such as mule deer, and foraging and breeding habitat for many species of birds. The majority of the Planning Area wildlife species use the Riparian land covers as habitat for at least some portion of their life cycle.

In portions of the Planning Area that are already developed, riparian corridors are usually the only remaining natural land covers remaining for necessary breeding, nesting, denning, resting, sheltering, and foraging behaviors. The three categories of Riparian land covers are described below.

Mixed Riparian Woodland. The Mixed Riparian Woodland land cover is distinguishable by an open canopy layer dominated by tall Fremont cottonwood trees. Beneath this open layer, a moderately dense mid-canopy layer is composed of tree species such as Oregon ash (*Fraxinus latifolia*), Goodding's willow (*Salix gooddingii*), walnut (*Juglans* spp.), valley oak (*Quercus lobata*), and box elder (*Acer negundo*). In some areas, a subcanopy of dense riparian scrub

[1] As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where new urban development projects or activities could occur under the No Action/No Project Alternative, or where new urban development Covered Activities could occur under the two action alternatives. Therefore, the term "UDA" means all lands within the Sacramento County USB boundary that are also within the Planning Area (this includes lands within the Rancho Cordova city limits that are within the Planning Area) and all lands within Galt's city limits and within Galt's sphere of influence (see Section 1.1.1 and Figure 1-1).

dominated by willow species including arroyo willow (*S. lasiolepis*) and sandbar willow (*S. exigua*) is present.

Mixed Riparian Scrub. The Mixed Riparian Scrub land cover is interspersed with Mixed Riparian Woodlands in the floodplains of waterways throughout the Planning Area. This land cover often consists of an open-to-dense shrubby thicket dominated by a mixture of sandbar willow, arroyo willow, red willow (*S. laevigata*), and immature stands of Mixed Riparian Woodland tree species. Some of the more open canopy Mixed Riparian Scrub stands support an understory of native and non-native species, including wild rose (*Rosa californica*), wild grape (*Vitis californica*), perennial pepperweed (*Lepidium latifolium*), Himalayan blackberry (*Rubus discolor*), curly dock (*Rumex crispus*), and various non-native grasses.

Mine Tailing Riparian Woodland. The Mine Tailing Riparian Woodland land cover was defined by the SSHCP document for this Planning Area. It is distributed in a network of relatively narrow linear areas that naturally established in abandoned man-made mine tailing surface deposits within the Planning Area (see Figure 8-1). This land cover contains many of the same trees and the same native wildlife species commonly found in Mixed Riparian Woodland and Mixed Riparian Scrub land covers, described previously.

Terrestrial Land Covers

Blue Oak Woodland and Blue Oak Savanna Land Covers

Patches of Blue Oak Woodland and Blue Oak Savanna land covers are located in the eastern portion of the Planning Area near the Sacramento County border. Blue Oak Woodland and Blue Oak Savanna comprise approximately 5% of the Planning Area. Blue oaks are typically drought-tolerant, and unlike interior live oaks, are deciduous, dropping their leaves during periods of extreme moisture stress. This survival trait may explain the observed patterns of blue oak distribution, with blue oaks occupying drier, shallower, and more well-drained soils than interior live oaks or valley oaks (McDonald 1985, Sawyer and Keeler-Wolf 1995). In general, the SSHCP differentiates and maps Blue Oak Woodland land cover and Blue Oak Savanna by their tree-cover densities.

These woodlands and associated grasslands support a community of plants and animals that is similar to the community also found in the Valley Grassland land cover. Mule deer, woodpeckers, small rodents, and other species forage on the acorns produced each fall. Other species such as red fox (*Vulpes vulpes*) and gray fox (*Urocyon cinereoargenteus*), striped skunk, and coyote are attracted to the prey existing in these woodlands. The structure of the larger oak trees, which includes cavities, knots, and large limbs, provide nesting and roosting opportunities for many resident and migratory raptors and birds such as red-tailed hawk (*Buteo*

jamaicensis), western screech owl (*Megascops kennicottii*), great horned owl (*Bubo virginianus*), oak titmouse (*Baeolophus inornatus*), and western kingbird (*Tyrannus verticalis*).

Blue Oak Woodland. The Blue Oak Woodland land cover is distinguished by a blue oak-dominated overstory and an understory dominated by annual grasses. Blue Oak Woodland is distinguished from Blue Oak Savanna by the higher density of trees in the overstory canopy. Blue Oak Woodland is characterized by greater than 10% tree cover. Generally, Blue Oak Woodlands in the Planning Area have an open canopy, although the canopy could be nearly closed on better-quality sites.

Blue Oak Savanna. The Blue Oak Savanna land cover is characterized by grasslands with a very sparse tree canopy (less than 10% canopy cover) dominated mainly by blue oaks (USFS 1980, Sawyer and Keeler-Wolf 1995). Forbs and wildflowers typical of annual and perennial grasslands typically provide groundcover beneath the scattered trees.

Farmland Land Covers

There are four land covers associated with active farming operations: Cropland, Orchard, Vineyard, and Irrigated Pasture-Grassland. Agricultural activities also occur on the Valley Grassland and the Blue Oak Savanna land covers described above, including cattle grazing and ranching operations. However, the physical ecology, the biology, the plant and animal communities, and the extent of past disturbance in Croplands, Orchard, Vineyard, and Irrigated Pasture-Grasslands differ from those in Valley Grassland and Blue Oak Savanna. Therefore, Valley Grassland and Blue Oak Savanna are considered separately above, and not included here with farmlands.

Croplands, Vineyard, and Orchard provide food and habitat for insects, nesting/roosting opportunities for avian species, and protection for rodents and small mammals. Many of these bird and mammal species utilize these farmlands for foraging because small mammal prey are common in these land covers. Native terrestrial wildlife species associated with Planning Area farmlands include coyote, red fox, cottontail rabbits (*Sylvilagus audubonii*), deer mice (*Peromyscus maniculatus*), valley pocket gophers (*Thomomys bottae*), house mice (*Mus mus*), common bats species such as Yuma myotis (*Myotis yumanensis*), and western meadowlark (*Sturnella neglecta*), and red-winged blackbird.

Cropland (Row and Field Crops). The Cropland land cover includes all non-orchard and non-vineyard agricultural crops. Cropland includes annual row and field crops (e.g., small grains, corn, tomatoes, melons, peppers, safflower, sunflower) and short-term perennial crops (e.g., asparagus). Rice is a row crop grown in Sacramento County, but seldom in the Planning Area. However, small fields of rice have recently been planted on the existing Cosumnes River Preserve.

Irrigated Pasture–Grassland. The irrigated pasture–grassland land cover is defined as agricultural cropland in which a mix of perennial grasses and perennial legumes normally provide 100% ground cover. The Irrigated Pasture-Grassland land cover includes hay production (alfalfa, clovers, and mixed grasses), seasonal summer pasture for livestock (primarily cattle), and year-round pasture for livestock (primarily cattle or horses). The height of vegetation varies, according to season and livestock stocking levels, from a few inches to 2 or more feet on fertile soils before grazing. Alfalfa fields in the Planning Area are especially rich source of prey for hawks and other raptors, including Swainson's hawk, as well as greater sandhill crane. (Pasture on natural landscapes that are not irrigated and are used for ranching are discussed under the Valley Grassland natural land cover).

Orchard (Fruit and Nut Orchards). The Orchard land cover has limited habitat value for most native species, but habitat for western red bat (*Lasiurus blossevillii*) is used by raptor species for perching. Orchard crops in the Planning Area include apples, cherries, pears, almonds, walnuts, pistachios, apricots, chestnuts, kiwi, nectarines, olives, peaches, pecans, and plums.

Vineyard. Vineyards are composed of grape plants planted in rows, usually supported on wood and wire trellises. Vineyards are primarily "clean cultivated," meaning no other vegetation is allowed to grow between the rows or on the edges of fields and irrigation ditches, which provides habitat for a limited number of native plants and wildlife. However, some Planning Area vineyards use "environmentally friendly" management practices including bat boxes, raptor perches, and owl boxes to encourage presence of these species and reduce insect and predation damage.

8.1.2.2 The Vernal Pool Ecosystem in the Planning Area

As discussed above in Section 8.1.2.1 and in Appendix G, complexes of vernal pools occur within the Valley Grassland land cover of the Planning Area. Vernal pools within a complex are connected by the seasonal perched aquifer that forms between the soil surface and the sub-surface restricting layer, and are also connected by intermittingly flowing surface swales. Recent hydrological studies show that vernal pools do not simply fill from direct precipitation nor do they empty solely by evapo-transpiration. Instead, lateral subsurface flow imparts a high degree of connectivity among pools. Once the soils have become saturated, water moves laterally above the impervious horizon, moving from hillocks into pools and vice-versa, ultimately draining downslope within a single watershed to become late-season stream or riverine flow (Hanes et al. 1990, Hanes and Stromberg 1998, Rains et al. 2005). This perched aquifer slows or "buffers" changes to pool water volume and determine pool water chemistry (Hanes et al 1990; Barbour et al. 2007). See the longer discussion of Planning Area vernal pool hydrology and ecology presented in Appendix G-1.

The Vernal Pool and Swale land covers in this Planning Area cannot exist absent the adjacent uplands. Essential vernal pool ecology and functions (such as the seasonal hydrologic cycle, nutrient cycling, water chemistry, and food chain support) are closely tied to the surrounding Valley Grassland uplands. The SSHCP Permit Applicants have identified areas where the vernal-wetland land covers (i.e., Vernal Pool, Swale, and Stream/Creek (VPIH)) are ecologically and hydrologically connected with the adjacent Valley Grassland land cover. Of the total 135,152 acres of Valley Grassland within the Planning Area (Table 8-1a), approximately 97,349 acres are assumed to be hydrologically connected with vernal pools and swales (Table 8-2). Taken together, the Valley Grassland, Vernal Pool, Swale, and Stream/Creek (VPIH) land covers in these areas comprise the Vernal Pool Ecosystem. Existing acres of the Valley Grassland, Vernal Pool, Swale, and Stream/Creek (VPIH) land covers within the Vernal Pool Ecosystem are shown in Table 8-2.

Table 8-2. Existing Vernal-Pool Ecosystem Land Covers in the Planning Area

Land Cover	Existing Acres in Planning Area	Percentage of the 317,655-acre Planning Area
Aquatic Land Covers		
Vernal Pool*	4,536	1.4%
Swale*	1,252	0.4%
Stream/Creek (VPIH)*	73	0.02%
Terrestrial Covers		
Valley Grassland	97,349	30.7%
Total	**103,210**	**17.4%**

* Indicates land cover that is considered sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations; see Section 8.1.2.3.

Of the existing 103,210 acres of Vernal Pool Ecosystem within the Planning Area, approximately 18,117 acres of Vernal Pool Ecosystem are within the designated Mather Core Recovery Area (MCRA) (USFWS 2008), located almost entirely within the UDA. In addition, approximately 38,514 acres of Vernal Pool Ecosystem are within the designated Cosumnes/Rancho-Seco Core Recovery Area (C/RS) (USFWS 2008), located in the southeastern portion of the Planning Area.

8.1.2.3 Sensitive Natural Communities

Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations. CDFW maintains a list of plant communities that are native to California (CDFG 2010). Within that list, CDFW has identified special-status natural communities, which are of limited distribution statewide or within a county or region and often vulnerable to environmental effects of projects. As discussed previously in Section 8.1.1, the Aquatic Resources land covers (including the Wetland and Other Waters land covers and the Riparian land covers), are also protected by the state under Fish and Game Code Sections 1600 to

1607. Land covers that are expected to be waters of the United States are considered by the EIS/EIR to be special-status and include the Wetland and Other Waters land covers. As discussed above in Section 8.1.1, the importance of protecting and preserving wetland and riparian natural communities is recognized in the Sacramento County, Rancho Cordova, and Galt General Plan policies. As discussed previously in Section 8.1.1, native oaks and oak woodlands are also provided varying levels of protection under state law and local regulations and policies.

The 11 Planning Area land covers that are discussed as sensitive natural communities in the EIS/EIR are Vernal Pool, Swale, Seasonal Wetland, Freshwater Marsh, Stream/Creek (VPIH), Stream/Creek, Open Water, Mixed Riparian Scrub, Mixed Riparian Woodland, Riparian Blue Oak Woodland, and Blue Oak Savannah.

8.1.2.4 Existing Wildlife Movement Corridors

The natural land covers within the Planning Area support local and regional movement and dispersal of wildlife, and are also important for species that use the Planning Area during their spring and fall migrations. The existing wildlife movement corridors are important to both resident and migratory species because they allow individual animals to travel between Planning Area feeding, sheltering, or breeding resources on a daily or seasonal basis. For example, one area may provide important foraging habitat in spring, while another provides forage in fall. Also, individuals or groups of a species may move on a daily basis between locations within the Planning Area that provide suitable nighttime cover and other locations for foraging. Existing corridors are wide and continuous between blocks of habitat and allow movement by native terrestrial species to occur with reduced risk of predation (e.g., cover is provided within the movement corridor) and reduced risk of adverse human interactions. For example, remaining riparian-woodland corridors along streams and creeks in UDA allow movement of wildlife through developed areas. In the Planning Area, riparian corridors exist along the Cosumnes River and Dry Creek outside the UDA, along Laguna Creek inside the UDA, and along many other smaller creeks and streams inside the UDA.

CDFW and the California Department of Transportation developed the California Essential Habitat Connectivity Project to map and assess important wildlife habitat linkages (Spencer et al. 2010). The goal of the Essential Habitat Connectivity Project was to identify large remaining blocks of intact habitat or natural landscape at a coarse spatial scale, and model linkages (Essential Connectivity Areas (ECAs)) between them that are important to maintain as movement corridors for wildlife. These corridors or ECAs are vital for maintaining native biodiversity within the remaining intact habitat of California, included in and connected by these corridors. This coarse-scale, statewide map was based primarily on the ecological integrity of vegetation communities over a very large region, rather than the specific movement and other life history requirements of particular species. Because of the connection of large, intact expanses of remaining habitat, these designated corridors provide migratory pathways and/or stopovers for many wildlife species.

Four designated ECAs are located within, or adjacent to, the Planning Area (Figure 8-2). There are a total of 119,992 acres of ECAs mapped within the Planning Area (Table 8-3), which is approximately 35% of the 317,655-acre Planning Area. These ECAs contain areas that vary in "permeability," which is defined as the lack of resistance to wildlife movement based in part on land cover type, existing roads, and terrain (Spencer et al. 2010). The 119,992 acres of ECAs within the Planning Area are comprised mostly of areas of intact natural land covers (see Table 8-3). However, areas of rural-residential development in south Sacramento County, which support more fragmented natural land covers, are also included within the boundary of certain ECAs (Figure 8-2). Some existing habitat preserves present in the Planning Area are within ECAs (e.g., Stone Lakes National Wildlife Area, the Cosumnes River Preserve, the Deer Creek Hills Oak Woodland Preserve, Rancho Seco Recreation Area, and Howard Ranch) (Figure 8-2).

The existing riparian corridor along Laguna Creek inside the UDA, and portions of the existing riparian corridor along the Cosumnes River outside the UDA, were not included in the ECAs. Regardless, these waterways continue to support relatively narrow but continuous riparian cover (Figure 8-1), and currently provide important east-west movement corridors for terrestrial wildlife.

Mule deer herds and other wildlife in the Planning Area utilize the relatively large and intact remaining blocks of habitat within the ECA and other corridors for movement, cover, and forage. The following summary of information on deer herds located within the Planning Area is adapted from CDFW data (2014a). Deer herds within the Planning Area are in the Motherlode Deer Management Unit, which includes the Sacramento Valley Deer Herd and the Placerville Deer Herd. These herds are located in deer zones A-North and D-5 according to the California Deer Zone Map (CDFW 2014a). The subspecies of deer in zone D-5 consists of the Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and California mule deer (*Odocoileus hemionus californicus*). Deer in the western portion and lower elevations of zone D-5, which includes the majority of the Planning Area, are considered resident deer because they do not make long seasonal migrations. However, local movement within the Planning Area is important for accessing locations with suitable forage, cover, and fawning areas. Examples of the natural land covers within in the Planning area that are commonly utilized by deer include Blue Oak Woodland and Blue Oak Savanna, Valley Grassland, Seasonal Wetland, and Riparian land covers along watercourses, which provide cover and/or forage and also provide corridors for movement.

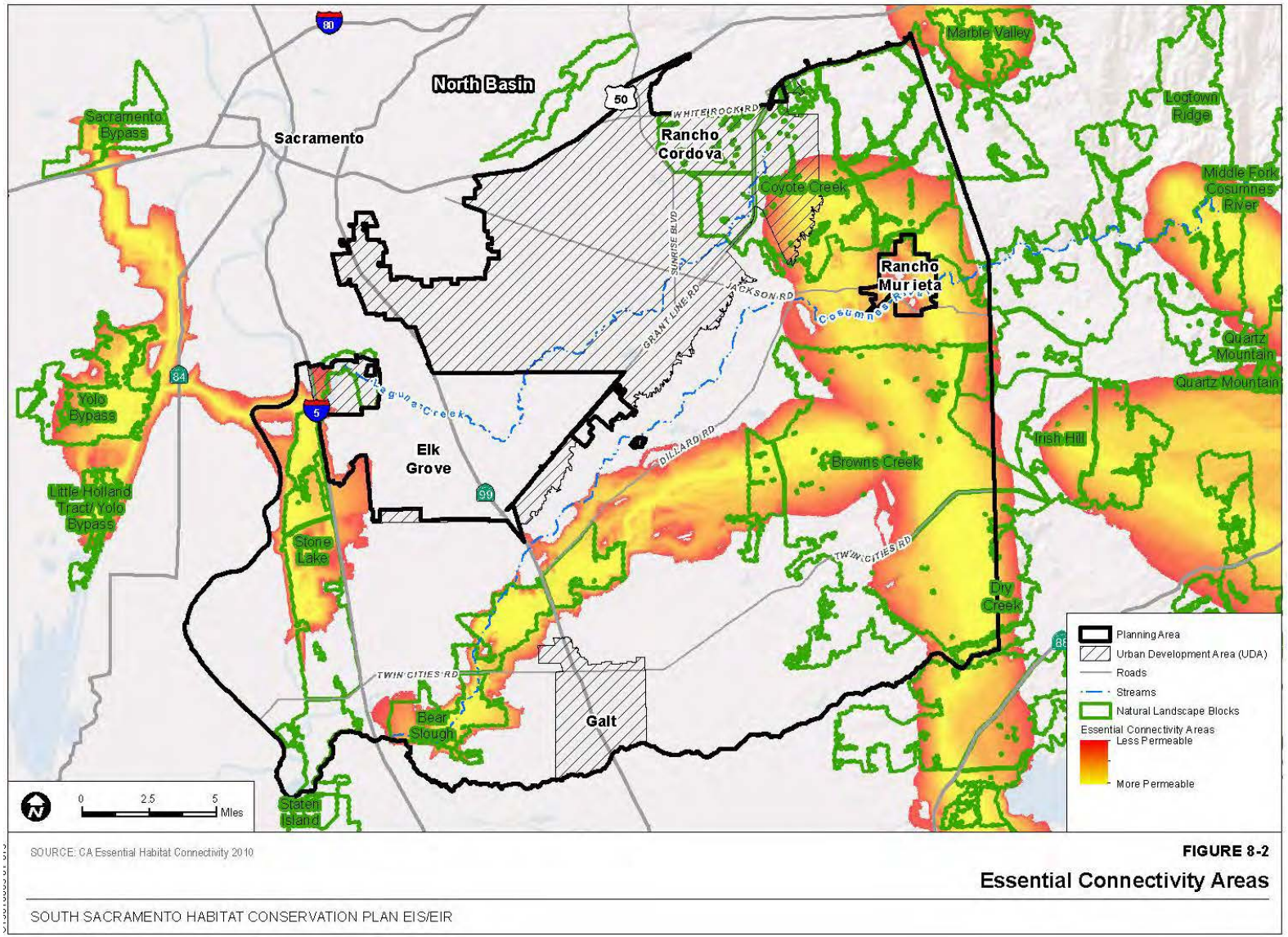
Table 8-3. Acres of Essential Connectivity Areas (ECAs) Within the Planning Area

Essential Connectivity Area	Total ECA Acres	Acres in Planning Area*	% in Planning Area
Stone Lake – Yolo Bypass	25,723	14,308	56
Bear Slough – Browns Creek	43,878	43,789	100
Marble Valley – Sawtooth Ridge	260,035	68	0.3
Duck Creek North Fork – Coyote Creek	126,166	64,196	51

Sources: Spencer et al. 2010; CDFW 2017.

* The ECAs overlap. Inconsistency between the total acres of ECAs in this table and the total ECA acreage in the text above is because of this overlap. .

Figure 8-2 Essential Connectivity Areas



AGENDA ITEM 11.1

4480

INTENTIONALLY LEFT BLANK

The Planning Area, like most of the California Central Valley, is located within the Pacific Flyway, which is identified by the USFWS, CDFW, and agencies to be a migratory pathway for waterfowl. The Pacific Flyway extends from the North Slope of Alaska south to Central and South America. Each year at least one billion birds migrate north and south along this corridor to reach nesting and wintering grounds depending on the season and the species. Birds that migrate through the Planning Area include waterbirds such as black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), greater sandhill crane (*Grus canadensis tabida*), lesser sandhill crane (*Grus canadensis canadensis*), Ross' goose (*Chen rossii*), white-fronted goose (*Anser albifrons*), Canada goose (*Branta canadensis*), tundra swan (*Cygnus columbianus*), and numerous species of ducks and shorebirds. Within the Planning Area, the existing Wetland and Riparian natural land covers on the Stone Lakes National Wildlife Refuge, the existing Cosumnes River Preserve, and the ~~Sacramento Regional Sanitation District Buffer Lands~~ **Regional San Bufferlands** provide foraging and sheltering habitats for migratory water birds using the Pacific Flyway. Agricultural fields and pastures near these wetland areas provide foraging opportunities for many of these species. In addition to waterfowl and wading birds, natural land cover within the Planning Area supports migration of many raptor species, such as ferruginous hawk (*Buteo regalis*) and rough-legged hawk (*Buteo lagopus*), as well as song birds such as American goldfinch (*Spinus tristis*) and Wilson's warbler (*Cardellina pusilla*).

8.1.2.5 Wildlife Nursery Sites

Examples of native wildlife nursery sites include colonial bat maternity roosts, blue and great egret rookeries, and nest sites for other colonially nesting bird species. Known locations of nest and nursery sites from the CNDDB (CDFW 2014b) within the Planning Area consist of two bank swallow cavity congregations found on the bank of the Cosumnes River near Rancho Murieta, three black-crowned night heron (*Nycticorax nycticorax*) rookeries (at Fishhead Lake and ~~Nicholas~~ **Nicolaus** Pond within the UDA and along a tributary of Badger Creek outside the UDA), three double-crested cormorant (*Phalacrocorax auritus*) rookeries (one at Stone Lake and two in the UDA along lower Morrison Creek and at Black Crown Lake), and four great blue heron (*Ardea herodias*) and great egret (*Ardea alba*) rookeries (North Stone Lake, along the North Fork of Badger Creek, along lower Morrison Creek in the UDA, and along the Cosumnes River near Rancho Murieta). Riparian land cover within the Planning Area along creek and streams with mature riparian communities serve as nursery sites for these and other similar species. Although no CNDDB records were found for bat maternity roosts in the Planning Area, maternity roost for species such as Yuma myotis (*Myotis yumanensis*) and Brazilian free-tailed bats (*Tadarida brasiliensis*) are likely present in the Planning Area. These maternity roosts are found within old buildings, mines, caves, bridges, and large snags or cavities in woodlands (riparian and oak).

8.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

8.2.1 Methodology for Assessing Impacts of Each Alternative on Natural Land Covers and Natural Communities

This Environmental Consequences/Environmental Impact section describes the potential impacts of each EIS/EIR alternative on the Planning Area's natural land covers and the plant and animal natural communities associated with that land cover. Therefore, the analysis of impacts to a natural land cover includes analysis of vegetation, wildlife habitat, and native species, including common species, game species, and migratory species that use that land cover with in this Planning Area.

As discussed in Section 3.6.3, the EIS/EIR analyzes the potential impacts of each alternative over a relatively long 50-year study period. Consequently, Chapter 8 does not analyze temporary impacts on lands that are expected to become a permanent urban development later in the study period. This avoids "double counting" acres of temporary impacts and acres of permanent impacts on the same parcel or area of land.

As discussed in Section 8.1.2, some of the natural land covers contain more than one CDFW natural community. Where a land cover contains one or more natural communities identified as rare or "special status" by CDFW (CDFG 2010), then impacts to the entire land cover are included in the analysis of the sensitive natural community. As discussed in Section 8.1.2, the land covers within the Vernal Pool Ecosystem function together as a single ecosystem. Therefore, Chapter 8 analyzes impacts to Vernal Pool, Swale, Stream/Creek (VPIH), and Valley Grassland in the Vernal Pool Ecosystem together.

The future projects and activities expected under each EIS/EIR alternative are described in Chapter 2: they include the construction and future operation of new urban development inside the UDA and a smaller amount of related infrastructure projects outside the UDA. As discussed in Section 3.6.5, the EIS/EIR impact methodology uses geographic information system (GIS) datasets that were prepared using the best available information about the amounts and locations of future urban development projects and related activities expected under each EIS/EIR alternative.

New urban development and infrastructure activities under all EIS/EIR Alternatives (including ground disturbance and construction, the operation of new buildings and facilities, and increased human activity) will produce physical, chemical, and biotic "stressors" that can inhibit or constrain productivity of individual organisms, the productivity of a species population, and productivity at the natural community level or ecosystem level (Freedman 2015). Potential physical stressors likely to

result from new urban development include kinetic energy, such as blasting, use of heavy machinery, other noise, and trampling. Potential chemical stressors can include gasses (such as carbon dioxide, ozone, sulphur dioxide, etc.), metals (such as lead or mercury), different types of pesticides, or excessive nutrients. Potential biological stressors from new urban development can be natural in origin (such as herbivory, predation, or parasitism), or they can be anthropogenic, for example, when trees, habitat, or animals are harvested or removed. Anthropogenic biological stressors also can also be indirect, such as when an invasive non-native species or pathogen is introduced into a community. Environmental stressors can be from single disturbance events or can be chronic in their exposure. In addition, these different environmental stressors interact with each other to impact individuals in a species (Freedman 2015). Section 3.6 and Appendix G-1 summarize the types of environmental stressors expected from the types of projects and activities implemented under all EIS/EIR alternatives. Depending on the sensitivity of a natural community's plant and animal species to a given stressor, the natural land covers could be impacted to different extents.

The new urban development and infrastructure activities implemented under all EIS/EIR alternatives would directly impact Planning Area natural land covers and communities by permanently converting natural land covers to a developed land-cover type (Table 8-1a). This chapter quantifies the acres of each land cover expected to be directly impacted (lost) under each EIS/EIR alternative, and qualitatively describes and evaluates the corresponding direct loss of habitat and the plant and animal populations that occupied those acres.

As discussed in Section 3.6.6 and in Appendix G-1, the environmental stressors resulting from new urban development can also produce permanent indirect impacts that occur later in time or occur beyond the footprint of a project, such as later changes in the hydroperiod of an aquatic land cover or subsequent impacts to species populations after habitat become fragmented from new development. The indirect effects of each alternative on most of the Planning Area natural land covers (see Table 8-1a) will be described and analyzed qualitatively in this chapter by considering both the extent of the environmental stressors that would result from implementing alternative and the likely responses of each natural community and land cover to those environmental stressors, based on the best available biological information and agency expertise (see Section 3.6.6). However, expected indirect impacts to the three aquatic land covers that are within the Vernal Pool Ecosystem (i.e., Vernal Pools, Swales, and Stream/Creek (VPIH)) will be quantitatively described and analyzed in this chapter to provide analysis need for the agency decisions discussed in Section 1.5.

Vernal Pool Ecosystem Indirect Effects. Urban development activities within the watersheds of Vernal Pools, Swales, or Stream/Creek (VPIH) could indirectly change the existing hydrologic regime and ecology of those aquatic land covers over time. Vernal pool plant and animal species are especially vulnerable to indirect changes to the natural hydrologic regime of a Vernal Pool Ecosystem because both the timing of filling, water depth, and the period of inundation will dictate

whether the vernal pool's species will be able to germinate, survive, and reproduce (see discussion of Planning Area vernal pool hydrology and ecology presented in Appendix G). The EIS/EIR will estimate acres of indirectly impacted Vernal Pools, Swales, and Stream/Creek (VPIH) land covers using Light Detection and Ranging data (LIDAR data) available for the Planning Area. LIDAR images differ from aerial photography of land surfaces because they are created by using laser light to collect dense point-datasets of the land surfaces and produce highly accurate topographic and geospatial information about the land surface. This detailed LIDAR topographic data was used by the Permit Applicants to map the surface watershed-boundary of each vernal pool present within the UDA portion of the Planning Area (see Appendix E in the Draft SSHCP document for more information about use of LIDAR (Sacramento County et al. 2017)). As discussed in Sections 3.6.5 and 3.6.6, GIS technology and software was used to compare a GIS overlay of each vernal pool micro-watershed with a GIS overlay of future development and activities expected under that EIS/EIR alternative. GIS software programs were then used to quantify the area of overlap in each vernal pool watershed. Where future urban development intersected with 10% or more of an individual vernal pool watershed, the EIS/EIR assumes that the existing hydrologic regime of that individual vernal pool would permanently change over time (see discussion of Planning Area vernal pool hydrology in Appendix G-1). Changes to existing vernal pool hydrology would also change the existing ecology and habitat of the vernal pool and would permanently impact the natural community of native plant and animal species in the vernal pool. Therefore, the EIS/EIR quantified the acres of vernal pools with direct impacts to 10% or more of their microwatershed as acres of indirectly impacted Vernal Pool land cover. The LIDAR and GIS methodology used to estimate acres of indirectly impacted Vernal Pool, Swale, and Stream/Creek (VPIH) is explained further in Appendix E of the Draft SSHCP document (Sacramento County et al. 2017). This LIDAR data and GIS methodology was used to quantify indirect impacts under the 50-year permit term of the Proposed Action/Proposed Project Alternative and under the 30-year permit term of the Reduced Permit Term Alternative.

However, the computer analysis used to compare the LIDAR data of each vernal pool's microwatershed to the GIS overlay of planned urban development requires significant expertise, computer time, and resources. Consequently, it was not feasible for the EIS/EIR to use the LIDAR data to quantify potential indirect impacts of the No Action/No Project Alternative on the aquatic land covers within the Vernal Pool Ecosystem. In addition, it was not feasible for the EIS/EIR to also use the LIDAR data to quantify indirect impacts to the Vernal Pool Ecosystem that may occur after the end of the 30-year permit term in the latter part of the 50-year EIS/EIR study period (see Section 3.6.3 for discussion of the EIS/EIR study period). In the portions of the UDA where the LIDAR dataset and computer analysis could not be used to estimate vernal pool indirect effects of the No Action/No Project Alternative, or to estimate vernal pool indirect impacts of after the end of the Reduced Permit Term Alternative's 30-year permit, GIS methodology was used to delineate a 250-foot-wide zone around each Vernal Pool, Swale, or Stream/Creek (VPIH). Consistent with many ESA Section 7 consultations conducted within this Planning Area, any development activities within this 250-foot-wide zone were assumed to result in indirect impacts to the hydrology and ecology of the

Vernal Pool, Swale, or Stream/Creek (VPIH) land covers. GIS overlays of future development scenarios for these alternatives were compared to GIS overlays of the Vernal Pools, Swales, and Stream/Creek (VPIH). Where future development would occur inside the 250-foot-wide zone, the EIS/EIR quantified those Vernal Pools, Swales, or Stream/Creek (VPIH) as indirectly impacted. However, in the certain portions of the Planning Area where future new development under the No Action/No Project Alternative or after the 30-year term of the Reduced Permit Term Alternative was expected to be identical to the Proposed Action/Proposed Project Alternative, the results of the LIDAR analysis for those areas of the UDA were incorporated into to the impact analyses of the No Action/No Project Alternative and the impact analysis of the Reduced Permit Term Alternative.

As discussed in Section 3.6.3, the EIS/EIR analyzes the potential impacts of each alternative over a relatively long 50-year study period. Consequently, this chapter does not analyze temporary impacts on lands that are expected to become a permanent urban development later in the study period. This avoids "double counting" acres of temporary impacts and acres of permanent impacts on the same parcel or area of land.

study area. As discussed in Section 3.6.2, it is appropriate to consider incremental impacts to some environmental resources within the context of other impacts occurring to that resource within the surrounding landscape, community, or region. The lead agencies determined that an appropriate geographic scale for evaluating the incremental impacts resulting from each EIS/EIR alternative on most natural land covers and natural communities should extend beyond the boundary of the EIS/EIR Planning Area to consider impacts to the same land cover/natural community within the rest of Sacramento County, and within adjacent San Joaquin, Amador, Eldorado, Yolo, Solano, Sutter, and Placer Counties. However, incremental impacts to the Vernal Pool land cover and the Vernal Pool Ecosystem will consider cumulative impacts to those land covers within the Southeastern Sacramento Valley Vernal Pool Region, which includes most of Sacramento County and portions of San Joaquin, Calaveras, Amador, Eldorado, Placer, and Yuba Counties (Keeler-Wolf et al. 1998, USFWS 2005).

Determination of Impact Significance

Significance Criteria

As discussed in Section 3.8, the criteria used to evaluate the significance of each alternative's impacts on natural land covers and natural communities is based on CEQA Guidelines Appendix G (14 CCR 15000 et seq.) and on typical thresholds used to evaluate effects on these resources in recent EIRs prepared by the County. Based on these sources, a significant adverse impact would occur on a natural land cover and its associated plant and animal communities if the alternative would:

- Have a substantial adverse effect on any riparian or other special-status natural community identified in local or regional plans, policies, regulations, or by the U.S. Fish and Wildlife Service or California Department of Fish and Wildlife;

- Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a preservation policy or ordinance that protects a land cover such as oak woodland;
- Substantially reduce the habitat of a wildlife species within its range; or cause a native wildlife population to drop below self-sustaining levels; or threaten to eliminate the entirety of a plant or animal community.

Appendix G of the CEQA Guidelines does not provide suggested criteria for determining a beneficial effect. The following significance criteria and thresholds were developed by the lead agencies. A beneficial effect to land use would occur if the alternative would:

- Have a discernable beneficial effect on any riparian or other special-status natural community identified in local or regional plans, policies, regulations, or by the U.S. Fish and Wildlife Service or California Department of Fish and Wildlife;
- Have a discernable beneficial effect on the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or improve the use of native wildlife nursery sites;
- Reduce conflicts with any local policies or ordinances protecting biological resources, such as a preservation policy or ordinance that protects a land cover such as oak woodland;
- Substantially improve the habitat of a wildlife species within its range; or cause the size of a native wildlife population to substantially increase; or protect the entirety of a plant or animal community.

8.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2 of Chapter 2.

The estimated direct loss of each natural land cover expected from the No Action/No Project Alternative future activities and projects are presented in Table 8-4 and are analyzed below. As discussed in Section 2.2.3 and Section 3.6.7, the No Action/No Project Alternative assumes that approximately 1,900 acres of new development would be “displaced” to areas outside the current USB boundary. The estimated acres of each natural land cover that would be directly impacted within these 1,900 acres were included in the Table 8-4 totals.

Table 8-4. Acres of Direct Impacts to Each Natural Land Cover Under the No Action/No Project Alternative

Land Cover	Direct Effects within UDA (acres)	Direct Effects outside UDA (acres))	Total Direct Impacts (acres)	Existing Acres in Planning Area	Percent of Existing Acres Directly Affected
Aquatic Land Covers					
Wetlands And Other Waters					
Vernal Pool*	279	43	322	4,536	7.1%
Swale*	235	5	240	1,252	19.2%
Stream/Creek (VPIH)*	35	0	35	73	47.9%
Seasonal Wetland*	101	14	115	2,600	4.4%
Freshwater Marsh*	132	12	144	2,954	4.9%
Stream/Creek*	114	35	149	2,778	5.4%
Open Water*	166	9	175	2,344	7.5%
Total Wetland and Other Waters	*1,062*	*118*	*1,180*	*16,537*	*5.5%*
Riparian					
Mixed Riparian Woodland*	107	40	147	5,856	2.5%
Mixed Riparian Scrub*	184	5	189	1,454	13.0%
Mine Tailing Riparian Woodland*	218	0	218	641	34.0%
Total Riparian	*509*	*45*	*554*	*7,951*	*6.9%*
Total Aquatic Resources	**1,571**	**163**	**1,734**	**24,448**	**7.1%**
Terrestrial Land Covers					
Natural Uplands					
Valley Grassland	21,797	1,632	23,429	135,152	17.3%
Blue Oak Woodland*	0	54	54	9,132	0.6%
Blue Oak Savanna*	2	84	86	5,637	1.5%
Total Natural Uplands	*21,799*	*1,770*	*23,569*	*149,921*	*15.7%*
Farmland					
Cropland	5,004	699	5,703	51,829	11.0%
Irrigated Pasture-Grassland	2,506	275	2,781	15,991	17.4%
Orchard	201	19	220	3,907	5.6%
Vineyard	1,345	180	1,525	26,460	5.8%
Total Farmland	*9,056*	*1,173*	*10,229*	*98,187*	*10.4%*
Total Terrestrial Land Covers	**30,855**	**2,943**	**33,798**	**248,108**	**13.6%**
TOTAL NATURAL LAND COVERS	**32,426**	**3,106**	**35,532**	**272,596**	**13.0%**

* Indicates land cover that is considered sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations; see Section 8.1.2.3.

Table 8-5 presents the estimated acres of each natural land cover that would be preserved as mitigation by future projects and activities implemented under the No Action/No Project Alternative's expected regulatory environment (Section 2.2.2). Table 8-5 includes acres of

expected land cover preservation (i.e., impact avoidance) under ESA, CESA, and CWA, as well as acres of re-establishment and establishment of Aquatic land covers under CWA 404.

The re-establishment and establishment acres of aquatic resources presented Table 8-5 reflect the lead agency assumption that the requirements of 2008 Compensatory Mitigation Rule to be re-established or established to replace lost aquatic resource functions and services at a minimum one-to-one acreage or one-to-one linear foot compensation-ratio would continue under the No Action/No Project Alternative. Table 8-5 assumes that compensatory mitigation for direct impact to Vernal Pools and Swales would occur within the Planning Area. However, it is assumed compensatory mitigation for the other Aquatic land covers (Stream/Creek (VPIH), Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water) would continue to occur primarily by purchase of credits at an approved mitigation bank or an in-lieu fee program. However, several mitigation banks and in-lieu fee programs with service areas that overlap the Planning Area actually re-establish, establish, or enhance wetlands or other waters at locations outside the Planning Area. Therefore, Table 8-5 assumes that only one-half the necessary compensatory mitigation for direct impacts to Stream/Creek (VPIH), Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water would occur inside the Planning Area.

In addition, Table 8-5 assumes that required compensatory mitigation for direct impacts to the Mine Tailing Riparian land cover would be provided by re-establishing the higher quality Mixed Riparian Woodland or Mixed Riparian Scrub Riparian land covers. In addition, mitigation for direct loss of Farmland land cover could be met by the preservation of any Farmland land cover within a similar resource category (i.e., Prime farmland, Statewide Importance farmland, Unique Farmland, Local Importance farmland, and Grazing farmlands).

Table 8-5. Expected Mitigation for Natural Land Cover Impacts Under the No Action/No Project Alternative

Land Cover	Preserved Acres in the Planning Area			Re-establishment & Establishment Acres in the Planning Area**
	Inside UDA	*Outside UDA*	*Total*	
Aquatic Land Covers				
Wetlands and Other Waters				
Vernal Pool*	164	866	1,030	322
Swale*	81	592	673	240
Stream/Creek (VPIH)*	13	0	13	17
Seasonal Wetland*	0	8	8	57
Freshwater Marsh*	0	16	16	72
Stream/Creek*	0	0	0	75
Open Water*	0	0	0	87
Total Wetland and Other Waters	*258*	*1,482*	*1,740*	*870*
Riparian				
Mixed Riparian Woodland*	0	0	0	256
Mixed Riparian Scrub*	0	0	0	298
Mine Tailing Riparian Woodland*	0	0	0	0
Total Riparian	*0*	*0*	*0*	*554*
Terrestrial Land Covers				
Natural Uplands				
Valley Grassland	5,215	6,591	11,806	0
Blue Oak Woodland*	0	27	27	27
Blue Oak Savanna*	15	28	43	43
Total Natural Uplands	*5,230*	*6,646*	*11,876*	*70*
Farmland				
Cropland	0	5,119	5,119	0
Irrigated Pasture-Grassland	0	2496	2,496	0
Orchard	0	197	197	0
Vineyard	0	1,369	1,369	0
Total Acres of Farmland	*0*	*9,181*	*9,181*	*0*
Total Terrestrial Land Covers	**5,230**	**15,827**	**21,057**	**70**
TOTAL NATURAL LAND COVERS	**5,488**	**17,309**	**22,797**	**1,494**

* Indicates a land cover type that is sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, State, or from local laws or regulations.

** The re-establishment/establishment acres in this column are in addition to the preservation acres presented in the previous column.

8.2.2.1 Vernal Pool Ecosystem (Valley Grassland, Vernal Pool, Swale, and Stream/ Creek [VPIH])

As discussed earlier in Section 8.1.2.2, The Vernal Pool Ecosystem in the Planning Area, this chapter consolidates the discussion and analysis of impacts to the four land covers within the

Vernal Pool Ecosystem because those land covers function together as a single ecosystem (also see Appendix G-1). As discussed in Section 8.2.1, indirect impacts to the Vernal Pool Ecosystem is described qualitatively for the Valley Grassland land cover, but is described both qualitatively and quantitatively for the Vernal Pool, Swale, and Stream/Creek (VPIH) land covers.

Direct and Indirect Effects of the Alternative

The loss of habitat from new development and related infrastructure under the No Action/No Project Alternative are estimated to result in direct impacts to approximately 17,688 acres of Vernal Pool Ecosystem, and result in indirect impacts to approximately 261 acres of Vernal Pool Ecosystem land covers and their associated plant and animal communities (Table 8-6). The total 17,949 acres of directly and indirectly impacted Vernal Pool Ecosystem is approximately 17.4% of the existing 103,210 acres of Vernal Pool Ecosystem land covers in the Planning Area.

The majority of the direct and indirect impacts to the Vernal Pool Ecosystem will occur inside the UDA, where most new urban development will occur (see Section 2.2). Future UDA urban development projects and activities under the No Action/No Project Alternative (see Section 2.2.1) would result in an estimated direct loss of 17,135 acres and the indirect loss of 261 acres of the Vernal Pool Ecosystem and the habitat that those acres provide for the vernal pool plant and animal communities (Table 8-6).

As discussed above in Section 8.1.2.2, most of the Mather Core Recovery Area (MCRA) is located inside the UDA. Of the approximately 18,117 existing acres of Vernal Pool Ecosystem within the MCRA, approximately 9,570 acres are expected to be directly impacted (removed), and an additional 213 acres are expected to be indirectly impacted (9,783 acres total, or approximately 54% of the MCRA's Vernal Pool Ecosystem).

As discussed in Section 2.2.1, rural transportation and water recycling projects that support the planned urban development are expected to occur outside the UDA. Projects and activities outside the UDA, including potential impacts from the estimated 1,900 acres of "displaced development" (see Section 2.2.3), are expected to directly impact (remove) 553 acres of existing Vernal Pool Ecosystem land covers outside the UDA (Table 8-6).

Of the approximate 38,514 acres of Vernal Pool Ecosystem within the C/RS, approximately 53 acres would be directly impacted, and 0.2 acre would be indirectly impacted by the rural transportation Covered Activities planned outside the UDA (0.14%).

The environmental stressors likely to result from the urban development projects and activities implemented under the No Action/No Project Alternative are described in Section 8.2.1, in Appendix G, and in Section 3.6.6. The following discussion qualitatively describes the expected indirect effects of the No Action/No Project Alternative's environmental stressors on the Planning Area's Vernal Pool Ecosystem plant and animal communities.

Most indirect effects of the No Action/No Project Alternative to the Vernal Pool Ecosystem are described qualitatively in Section 8.2.2. However, the indirect impact to the existing hydrology and ecology of Vernal Pools, Swales, and Stream/Creek (VPIH) land covers are qualitatively estimated. As discussed in Section 8.2.1, the plants and animals of the Vernal Pool Ecosystem are especially vulnerable to impacts of activities that alter the hydrology of the watershed that support the seasonal perched aquifer of a Vernal Pool Ecosystem. As presented in Table 8-6, urban development projects and activities under the No Action/No Project Alternative are expected to indirectly affect the existing hydrology and ecology of 261 acres of Vernal Pool Ecosystem land covers, in addition to the expected 17,688 total acres of direct impacts to the Vernal Pool Ecosystem (Table 8-6). Most of the 261 acres of indirect impact to the Vernal Pool Ecosystem land covers would occur inside the UDA where almost all new urban development activities would occur.

Because it would permanently add impermeable surfaces in the UDA, urban development is expected to result in increased urban runoff relative to existing conditions, especially during storm events. Such increases have potential to result in increased sediment loads in Stream/Creek (VPIH), and alterations of stream/creek hydrology (see Section 7.2.2). Also, additional new development may permanently increase the potential for exposure to chronic discharge of non-point source pollutants, such as grease, oil, fertilizers, and lawn pesticides, to Vernal Pool Ecosystems, potentially harming vernal pool crustaceans, other vernal pool animals, or altering plant community composition. However, project compliance with existing regulatory requirements (see Sections 8.1.1 and 7.1.1) is expected to avoid these indirect effects (see Sections 7.2.2.2 and 7.2.2.3).

New urban development inside the UDA under the No Action/No Project Alternative would also indirectly impact Vernal Pool Ecosystem land covers by increasing the presence of invasive plants through species escaping from new landscaping and disturbed areas, which are more easily colonized by invasive plants (see Appendix G-1). These invasive plants would impact Vernal Pool Ecosystems in the UDA by outcompeting native species and by using more water than native species, thereby shortening the vernal pool ponding period (see discussion of the vernal pool hydrologic cycle in Appendix G-1).

New urban development under the No Action/No Project Alternative is also expected to result in an increased wildfire frequency on vernal pools inside the UDA due to increased ignition sources related to human activities, and increases in invasive plant abundance, which generates more wildfire fuel than non-invasive plant species. Wildfire is a natural part of the ecology of the Vernal Pool Ecosystem's Vernal Pools, Swales, and Valley Grassland land covers, so additional low-intensity fires alone would not adversely impact the existing conditions of those land covers. However, increased fire frequency would require more intensive fire suppression activities to protect newly developed areas, including disking and bulldozing of emergency firebreaks and increased vehicle traffic and human activity (see Section 12.2.2), which are likely to directly and indirectly impact the Vernal Pool Ecosystem and its associated plant and animal communities.

Therefore, the quantified impacts to vernal pool species habitat and natural community (including direct and indirect loss) would total 17,949 acres, which is approximately 17.4% of the total 103,210 acres of existing Vernal Pool Ecosystem within the Planning Area (see Table 8-6).

Table 8-6. Direct and Indirect Effects on the Vernal Pool Ecosystem Land Covers Expected Under the No Action/No Project Alternative

Land Cover	Direct Impacts within the UDA (acres)	Direct Impacts Outside the UDA (acres)	Indirect Effects (acres)	Total Impacts (acres)	Existing Acres in 317,655-acre Planning Area	Percent of Existing Acres Directly or Indirectly Impacted
Valley Grassland (in Vernal Pool Ecosystem)	16,586	505	Described Qualitatively	17,091	97,349	17.6%
Vernal Pool	279	43	193	515	4,536	11.4%
Swale	235	5	61	301	1,252	24.0%
Stream/Creek (VPIH)	35	0	7	42	73	57.6%
Vernal Pool Ecosystem Total Impacts	**17,135**	**553**	**261**	**17,949**	**103,210**	**17.4%**

The regulatory environment under the No Action/No Project Alternative (see Section 2.2.2) would require urban development projects and activities that undergo environmental review under CEQA or the National Environmental Policy Act, and/or require ESA, CESA, or CWA regulatory authorization to avoid and minimize impacts to the maximum extent possible, and to provide compensatory mitigation for impacts the Vernal Pool Ecosystem that cannot be avoided. Mitigation provided by individual projects and activities are expected to preserve approximately 10,406 acres of existing Vernal Pool Ecosystem within the Planning Area. Approximately 562 acres of Vernal Pools and Swales would also be re-established or established (created) on these Preserves to mitigate direct impacts (loss) of 562 acres of Vernal Pools and Swales (Table 8-7).

Table 8-7. Estimated Amounts of Vernal Pool Ecosystem Mitigation Implemented Under the No Action/No Project Alternative

Land Cover	Preserved Land (acres)			Re-establishment & Establishment Acres In the Planning Area**
	Inside UDA	*Outside UDA*	*Total*	
Valley Grassland (in Vernal Pool Ecosystem)*	4,807	3,883	8,690	0
Vernal Pool*	164	866	1,030	322
Swale*	81	592	673	240
Stream/Creek (VPIH)*	13	0	13	17[a]
Total Vernal Pool Ecosystem Land Covers	**5,065**	**5,341**	**10,406**	**579**

* Indicates a land cover that is sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations; see Section 8.1.2.3.

** The re-establishment/establishment acres in this column are in addition to the preservation acres presented in the previous column.

[a] As discussed above, the Section 8.2.2 analysis assumes CWA 404 compensatory mitigation for this land cover would utilize mitigation banks or in-lieu-fee programs, resulting in approximately half of compensatory mitigation acres occurring outside the EIS/EIR Planning Area.

As discussed above in Section 8.1.2.2, most of the MCRA is located inside the UDA. Of the approximately 18,117 acres of Vernal Pool Ecosystem within the MCRA, 4,550 acres (24%) would be preserved by the Proposed Action/Proposed Project Alternative.

Cumulative Effects of the Alternative

A substantial amount of vernal pool habitat has been converted for human uses, in spite of federal regulations protecting wetlands. Vernal Pool Ecosystem loss occurs from direct destruction and modification of pools due to filling, grading, disking, leveling, paving, and other activities, as well as modification of surrounding uplands, which alters vernal pool watersheds and the supporting upland ecosystem. Remaining Vernal Pool Ecosystems have also become highly fragmented across the study area. Habitat fragmentation degrades the function and services of remaining Vernal Pool Ecosystems, and decreases the potential for vernal pool aquatic and upland species to persist over the long term.

The approximately 7 million acres of Central Valley Vernal Pool Ecosystem present in the 1800s have been significantly reduced, first by agricultural development and mineral extraction, and more recently by urban expansion (Holland 2009). Beginning around the mid-1800s, the primary loss of Vernal Pool Ecosystem was from conversion to agriculture and water conveyance and storage projects (Frayer et al. 1989; Kreissman 1991). Holland (1998) estimated approximately 967,600 acres of remaining vernal pool habitat in California, an 87% reduction in the original habitat acreage. Holland (2009) subsequently estimated that approximately 13% more of the vernal pool grassland identified in baseline mapping had been lost as of 2005.

In most instances, habitat losses have gone unmitigated, either proceeding without required authorization(s) such as a CWA 404 permit and associated Section 7(a)(2) consultation, or in instances where direct filling of waters of the United States have been avoided, thus not triggering the CWA permitting process or the CWA's Section 7 process. However, even in the instances of authorized activities, the mitigation measures typically required through regulatory authorization only serve to reduce the overall rate of habitat loss; a net loss of existing habitat remains (Holland 2009; Marty 2005). Based on observed loss rates, Holland (2009) estimated that Vernal Pool Ecosystem grasslands outside of preserves could be lost from the Central Valley by 2087.

The Southeastern Sacramento Valley Vernal Pool Region includes much of Sacramento County and Placer County, and portions of San Joaquin, Calaveras, Eldorado, and Yuba Counties. The Southeastern Sacramento Valley Vernal Pool Region includes two zone one core recovery areas (MCRA and C/RS in Sacramento County) and two zone two core areas (Beale and Western Placer County). Vernal Pool Ecosystem losses range from 0.9% to 8.84%. In 1998, Keeler-Wolf et al. estimated that the Southeastern Sacramento Valley Vernal Pool Region contains

approximately 15% of the remaining Vernal Pool Ecosystem California. Based on Holland (2009) mapping data, approximately 108,964 acres of Vernal Pool Ecosystem, or 12% of the total 2009 remaining Vernal Pool Ecosystem, is in the Southeastern Sacramento Valley Vernal Pool Region. This equates to an approximate 20% reduction in Vernal Pool Ecosystem within the Southeastern Sacramento Valley Vernal Pool Region from the early 1990s to 2005 (which is considerably higher than the cumulative total loss of 13% across the Central Valley of California). Rapid urbanization in Placer County accounts for much of the higher-than-average observed losses in the Southeastern Sacramento Valley Vernal Pool Region. From 1994 to 2005, 17,113 acres of Vernal Pool Ecosystem (35%) within Placer County was lost. In contrast, an estimated 6,598 acres, 12%, were lost in Sacramento County from 1993 to 2005, which is similar to the total proportion of vernal pool grassland loss estimated by Holland (2009) across the Central Valley in the same time period.

Losses in Sacramento County occurred primarily from 1993 to 2005, when a total of 6,598 acres of vernal pool grassland were lost at a rate of 1.5% per year, with 3,267 acres (12.6%) removed by new urban development; 2,193 acres (5.6%) removed by new vineyards and orchard; 416 acres (2.4%) removed by new agricultural-residential development; 420 acres (2.4%) removed by new plowed farmland; and 456 acres (2.3%) removed by new alfalfa, irrigated pasture, or other agricultural activities (Holland 2009). More recently, in 2010 approximately 1,000 acres of vernal pool grassland in southeastern Sacramento County, within the C/RS, were lost through conversion to vineyard and agriculture (Holland 2009).

As discussed in Section 3.7.1, the natural land covers and their associated plant and animal communities within the Planning Area have been fragmented and lost because of past development, especially within the UDA. These land cover losses have removed a significant amount of the historical pre-settlement acres of Vernal Pool Ecosystem in the study area, including the associated vernal pool plant and animal communities. In the MCRA, Holland (2009) identified approximately 13,543 acres of extant Vernal Pool Ecosystem in 2005. Approximately 1,434 acres of Vernal Pool Ecosystem (22% of habitat loss countywide), were lost in what is now the MCRA, primarily to urbanization (Holland 2009). An additional 315 acres of vernal pool grassland were lost in the first quarter of 2006 subsequent to the 2005 high-resolution imagery used by Holland (2009), for a total of 1,749 acres of Vernal Pool Ecosystem from the MCRA through March 2006. This is a 13% loss within the MCRA over the 8-year period, or 1.63% annually, similar to losses countywide. An additional 278 acres of vernal pool grassland (not mapped by Holland (2009)) were lost within the Sunrise Douglas (Sunridge) urban planning area concurrent or subsequent to the MCRA being designated. In total, 2,027 acres of Vernal Pool Ecosystem have been lost from the MCRA through 2006. It is worth noting that losses in the MCRA since its designation have already exceeded what is recommended by the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon, which is to protect 95% of suitable vernal pool branchiopod habitat in this Core Area.

However, a review of the USACE's CWA 404 project authorizations within the Planning Area between 1979 and 2013 indicated a small net gain of waters of the United States within individual projects authorized under CWA 404 (USACE 2014), although this gain was not determined individually for aquatic land covers within the Vernal Pool Ecosystem. Existing regulations and policies (Section 8.1.1) would reduce project impacts to Vernal Pool Ecosystem aquatic land covers primarily though avoidance (preservation) and secondarily though compensatory re-establishment/establishment (creation) of wetlands and other waters (see Sections 2.2.4 and 10.1.1). These CWA 404 requirements (for avoidance, minimization, and compensatory mitigation of aquatic resources) by projects and activities that are subject to CWA 404 permitting is expected to continue for the future projects and activities of the No Action/No Project Alternative, and for the "other" reasonably foreseeable future actions described in Section 3.7.2. As such, future actions subject to CWA 404 permitting would likely result in no net loss of Vernal Pool land cover acres from those projects. As discussed in Section 2.2.4 under the No Action/No Project Alternative, mitigation to compensate for future project and activity impacts to Vernal Pool Ecosystem land covers would continue to be undertaken primarily on a project-by-project basis, would likely continue to be geographically fragmented, and would not conserve Vernal Pool Ecosystems at a landscape scale.

The incremental effects of the No Action/No Project Alternative would have direct and indirect impacts that would result in an estimated loss of 17,949 acres or approximately 17.4 % of the 103,210 acres of existing Vernal Pool Ecosystem within the Planning Area. Project mitigation under the No Action/No Project Alternative would include an estimated 10,406 acres of preservation and 579 acres of vernal pool habitat re-establishment/establishment within the Planning area.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to Vernal Pool Ecosystem, when considered together with the significant impacts to Vernal Pool Ecosystem from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

8.2.2.2 Aquatic Land Covers (Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water)

As discussed in Section 8.1.2.1, the plant and animal communities associated with Aquatic land covers Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water differ in composition, but provide similar aquatic habitats, have similar ecology, and have similar susceptibility to the environmental stressors described in Appendix G-1. Therefore, Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural land covers are analyzed together in this chapter (see Section 8.2.1). As discussed in Section 8.1.2, Seasonal Wetland,

Freshwater Marsh, Stream/Creek, and Open Water communities are considered sensitive natural communities.

Direct and Indirect Effects of the Alternative

As discussed in Section 8.1.2.1, approximately 10,676 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities are present in the Planning Area (Table 8-1a).

Activities and development projects expected under the No Action/No Project Alternative (Section 2.2.1) are estimated to result in direct loss of approximately 583 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities. This total loss includes approximately 513 acres lost from new development within the UDA, and 70 acres lost from activities, projects, and displaced development outside of the UDA (Table 8-4). The estimated loss is approximately 5.5% of the existing 10,676 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water within the Planning Area.

The potential environmental stressors that are expected to result from the projects and activities implemented under the No Action/No Project alternative are described in Appendix G. The discussion below qualitatively describes the expected effects of the No Action/No Project's environmental stressors on the Planning Area's Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers and their plant and animal natural communities.

By permanently increasing the extent of impermeable surfaces, urban development in the UDA has potential to result in increased runoff relative to existing conditions, especially during storm events. Such increases could result in increased sediment loads in Seasonal Wetland, Freshwater Marsh, and Open Water land covers, and alter downstream hydrology in the Stream/Creek land cover in the UDA. Also, addition of new development is expected to permanently increase discharge of point and non-point source pollutants, such as grease, oil, fertilizers, and lawn pesticides, to Seasonal Wetland, Freshwater Marsh, Open Water, and flowing Stream/Creek land covers, relative to the existing conditions, potentially impacting the physical and biotic characteristics of the habitat and the associated natural community, including increases in sediments, chemical toxicity, and excessive nutrients. However, compliance with existing regulatory requirements (see Sections 8.1.1 and 7.1.1) is expected to avoid the indirect effects (see Sections 7.2.2.2 and 7.2.2.3).

The regulatory environment under the No Action/No Project Alternative would continue existing regulatory requirements for these four land covers (see Section 2.2.2 and Section 8.1.1), which would require urban development projects and activities that undergo environmental review under CEQA or the National Environmental Policy Act, and/or require

ESA, CESA, or CWA regulatory authorization to avoid and minimize impacts to the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers to the maximum extent possible, and to provide compensatory mitigation for losses of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers that cannot be avoided. This mitigation would be implemented on a project-by-project basis (see Section 2.2), and is expected to preserve approximately 24 acres and re-establish or establish 291 acres of these Aquatic Resource land covers within the Planning Area (Table 8-5).

Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and Section 8.1.2, past development in the Planning Area has removed a significant amount of the historical Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities within the study area, fragmenting much of the existing Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek that remains in the study area (see Section 8.1.2.1 above).

However, a review of the USACE's CWA 404 project authorizations within the Planning Area between 1979 and 2013 indicated a small net gain of waters of the United States within individual project sites authorized under CWA 404 (USACE 2014), although this gain was not determined individually for Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek. Existing regulations and policies (Section 8.1.1) would reduce individual project impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water Aquatic land covers primarily though avoidance (preservation) and secondarily though compensatory re-establishment/establishment (creation) of wetlands and other waters (see Section 2.2.4 and Section 8.1.1). The CWA 404 regulatory requirements (for avoidance, minimization, and compensatory mitigation) for projects and activities that are subject to CWA 404 permitting is expected to continue for the future projects and activities of the No Action/No Project Alternative, and for the "other" reasonably foreseeable future actions (described in Section 3.7.2). In addition, other regulations and policies described previously in Section 8.1.1, including Section 1600 of the California Fish and Game Code, would also minimize loss in acreage of Stream/creek in the Planning Area from the projects and activities that will occur under the No Action/No Project alternative, as well as for the "other" reasonably foreseeable future actions (described in Section 3.7.2).

The incremental impacts of the No Action/No Project Alternative would result in the direct loss of 583 acres, or approximately 5.5%, of the existing Seasonal Wetlands Freshwater Marsh, Stream/Creek, and Open Water land covers and associated natural communities within the Planning Area. Project mitigation for impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water would continue to be implemented on a project-by-project basis. Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to

Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water, when considered together with the significant impacts to Valley Grassland from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

8.2.2.3 Riparian Land Covers (Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland)

As discussed in Section 8.1.2.1, Planning Area Riparian land covers include Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland. The Riparian land covers are considered sensitive natural communities (Section 8.1.2.3). As discussed in Section 8.2.1, indirect impacts to the Riparian land covers are described qualitatively.

Direct and Indirect Effects of the Alternative

The new development and related infrastructure projects and activities expected under the No Action/No Project Alternative are estimated to directly impact (remove) 554 acres of Riparian land covers and their associated natural communities within the Planning Area (Table 8-4). The majority of this loss (approximately 509 acres) would be within the UDA, with an additional 45 acres from rural transportation projects associated with new urban development in the UDA, and the 1,900 acres of planned urban development expected to be displaced outside of the UDA (see Section 2.2.3). The estimated total of 554 acres lost represents approximately 7% of the existing 7,951 acres of Riparian land covers and riparian plant and animal natural communities present in the Planning Area.

The environmental stressors that may result from new urban development are discussed in Section 8.2.1 and in Appendix G-1. The following impact analysis qualitatively describes the expected indirect effects of the No Action/No Project Alternative's environmental stressors on the Riparian land covers and their plant and animal natural communities.

By permanently increasing the extent of impermeable surfaces, urban development in the UDA has potential to result in increased runoff relative to existing conditions, especially during storm events. Such increases could result in stream bank erosion, increased sediment loads downstream, and alterations of downstream hydrology, which could remove or physically damage the surrounding riparian habitat. Also, additional new development is expected to permanently increase the potential for long-term discharge of point and non-point source pollutants such as grease, oil, fertilizers, and lawn pesticides into streams and creeks, which would increase the quantity of pollutants within Riparian land covers and adversely affect the riparian plant and animal communities. However, compliance with existing regulatory requirements (see Sections 8.1.1 and 7.1.1) is expected to avoid the indirect effects (see the analysis in Sections 7.2.2.2 and 7.2.2.3).

The plant and animal communities associated with riparian land covers are also expected to be indirectly impacted from increased the presence of invasive plants, which colonize downstream Riparian land covers through the highly effective transport of plant parts, seeds, and other propagules in flowing water of streams and creeks associated with the Riparian land covers. Invasive plant species have potential to dominate the riparian communities where they become established, excluding native herbaceous and woody riparian vegetation and degrading habitat conditions for wildlife species of the riparian natural community that depend on that native riparian vegetation.

New urban development is also expected to result in an increased wildfire frequency in Riparian land covers inside the UDA due to increased potential for ignitions occurring from greater human presence and human activities. Should wildfires be of sufficient intensity to result in high levels of mortality to mature riparian vegetation, the Riparian land covers and associated natural community would be adversely affected for many years, until sufficient regrowth occurs to again support the natural plant and animal communities.

Development projects that undergo environmental review under NEPA or CEQA, or that require CDFW, CWA, or local authorizations, would be required to avoid and minimize impacts to riparian areas and to provide compensatory mitigation for direct impact impacts to Riparian land covers (see Section 8.1.1). Mitigation for riparian impacts would occur on a project-by-project basis, as required by separate regulatory agencies and local jurisdictions. The No Action/No Project Alternative is expected to re-establish or establish 256 acres of Mixed Riparian Woodland and 298 acres of Mixed Riparian Scrub land covers. As discussed in the introduction to Section 8.2.2, impacts to the Mine Tailing Riparian Woodland land cover are expected to be mitigated by re-establishment or establishment of Mixed Riparian Woodland or Mixed Riparian Scrub within the Planning Area. The re-establishment or establishment of 554 acres of Riparian land covers (Table 8-5) equals the expected direct loss of 554 acres of riparian land covers (Table 8-4).

Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and Section 8.1.2, past human activities in the study area have removed a significant amount of the Mixed Riparian Woodland and Mixed Riparian Scrub and their associated plant and animal communities once present in the study area. As discussed in Section 8.1.2.1 *Existing Conditions*, much of the riparian land covers remaining in the study area have been disturbed to different degrees, and have been indirectly affected by habitat fragmentation, change in stream hydrographs, and increased human disturbance in the study area.

In addition to the effects from past and current human activities, the reasonably foreseeable future activities expected within the Planning Area (Section 3.7) could result in loss of Riparian land covers, as well as indirect impacts to Riparian land covers (e.g., habitat fragmentation,

change in stream hydrographs, increased human disturbance). The types of future, reasonably foreseeable "other" projects, activities, and actions, described in Section 3.7.2, are similar to the types of past and present actions that occurred in the study area. The other reasonably foreseeable, future actions in the study area (see Sections 3.7.2 and 4.1.2.1) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in Elk Grove and Rancho Murieta, master-planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued development of cultivated agricultural lands, expansion of existing preserves, and development of major infrastructure projects, such as California High-Speed Rail and California WaterFix (see Section 3.7.2 for details about these projects). In addition, as discussed in Section 2.2.3, approximately 1,900 acres of planned urban development would be shifted or displaced to areas outside the current UDA under the No Action/No Project Alternative, probably to areas south of the Elk Grove sphere of influence or areas near Rancho Murieta.

The effects of past, present, and reasonably foreseeable other projects on the Riparian land covers in the study area are described in Section 8.2.2.1 and represent a significant adverse cumulative impact on the Riparian land covers within the study area. The incremental impacts of the No Action/No Project Alternative would result in the direct loss of 554 acres, or approximately 7%, of the existing Riparian land covers within the Planning Area. However, the regulatory environment under the No Action/No Project Alternative is expected to require projects to re-establish or establish 554 acres of Riparian land covers, which, over time, are expected to re-establish the wildlife habitat and plant and animal natural community of the directly impacted Riparian land covers. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation.

Therefore, the incremental impacts of the No Action/No Project Alternative on Riparian land covers, when considered together with the significant impacts to riparian land covers from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

8.2.2.4 Valley Grassland

As discussed in Section 8.1.2, approximately 135,152 acres of Valley Grassland are present in the Planning Area, including Valley Grassland that is present both inside and outside of the Vernal Pool Ecosystem (Table 8-1a), and including ranching and grazing agricultural lands. As discussed in Section 8.1.2, Valley Grassland provide habitat for large number of native wildlife species (e.g., small mammals, mule deer, western meadowlark, and red-winged blackbird; foraging for hawks and other raptors; and wintering sandhill cranes). The impacts to Valley

Grassland as a part of the Vernal Pool Ecosystem are also analyzed under impacts to the Vernal Pool Ecosystem (Section 8.2.2.1).

Direct and Indirect Effects of Alternative

Urban development projects and activities under the No Action/No Project Alternative (Section 2.2.2) are estimated to remove a total of 23,429 acres of Valley Grassland natural community within the Planning Area (Table 8-4). The majority of this loss would be within the UDA (approximately 21,797 acres) where most of the new urban development activities would occur. Approximately 1,632 acres of Valley Grassland would be impacted by planned infrastructure projects and activities located outside of the UDA and from the development expected to be displaced to areas outside the current USB boundaries under the No Action/No Project Alternative (Section 2.2.3).The estimated total loss of Valley Grassland would be approximately 17.3% of the existing Valley Grassland within the Planning Area (Section 8.1.2.1).

The environmental stressors resulting from new urban development can also produce permanent indirect impacts that occur later in time or occur beyond the project site (see Section 3.6.6 and Appendix G-1). The No Action/No Project Alternative would indirectly impact the plant and animal communities of the Valley Grassland land cover by resulting in habitat fragmentation, chronic ground vibration, chronic nighttime lighting, increased wildfire frequency, increased colonization by weedy plant species, and increased human activity, especially to the grasslands within the UDA.

The regulatory environment under the No Action/No Project Alternative (Section 8.1.1) would require mitigation for direct impacts to the Valley Grassland land cover and associated plant and animal communities for projects that undergo environmental review under CEQA. This mitigation would primarily occur as a result of mitigation requirements for loss of foraging habitat for associated special-status species, such as Swainson's hawk, and as a result of mitigation requirements for impacts to important farmland, including mitigation for loss of grazing land of more than 50 acres outside of the County of Sacramento's USB (also see the Section 8.2.2.1 analysis of Valley Grassland that is also located within the Vernal Pool Ecosystem).

The mitigation for impacts to Valley Grassland under the No Action/No Project Alternative would occur on a project-by-project basis and is anticipated to include preservation of approximately 11,806 acres of Valley Grassland land cover within the Planning Area, which includes the 8,690 acres of Valley Grassland that would be preserved within the Vernal Pool Ecosystem. This expected 11,806 acres of Valley Grassland preservation is roughly half the total 23,429 acres of the direct impacts (losses) to Valley Grassland land cover expected under the No Action/No Project Alternative.

Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and above in Section 8.1.2, Valley Grassland once covered the majority of the Planning Area, except along waterway riparian corridors and in areas of oak woodlands. However, much of the Valley Grassland has been lost from the study area, and remaining areas are often fragmented because of past and current human activities.

In addition to the effects from past and current human activities, the reasonably foreseeable future activities (Section 3.7) are expected to result in additional loss and fragmentation of Valley Grassland land cover in the study area. The types of future, reasonably foreseeable "other" projects, activities, and actions, described in Section 3.7.2, are similar to the types of past and present actions that occurred in the study area. The other reasonably foreseeable, future actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in Elk Grove and Rancho Murieta, master-planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued development of cultivated agricultural lands, expansion of existing preserves, and development of major infrastructure projects, such as California High-Speed Rail and California WaterFix (see Section 3.7.2 for details about these projects). In addition, as discussed in Section 2.2.3, approximately 1,900 acres of planned urban development would be shifted or displaced to areas outside the current UDA under the No Action/No Project Alternative, probably to areas south of the Elk Grove sphere of influence, or areas near Rancho Murieta that are currently dominated by Valley Grassland. The effects of past, present, and reasonably foreseeable other projects on Valley Grassland in the study area represent a significant adverse cumulative impact on the Valley Grassland within the study area.

The incremental impact of the No Action/No Project Alternative would result in the direct loss of 23,429 acres of Valley Grassland (21,797 acres in the UDA and 1,632 acres outside the UDA), which would remove approximately 17.3% of the existing Valley Grassland acres within the Planning Area. As under the existing conditions (Section 8.1.1), the regulatory environment of the No Action/No Project alternative would not require project mitigation to re-establish or establish Valley Grassland. However, project mitigation is expected to permanently preserve 11,806 acres of Valley Grassland, which is approximately half the amount of Valley Grassland that is expected to be directly impacted (lost) under the No Action/No Project Alternative. As discussed in Section 2.2.4, preserves of Valley Grassland would continue to be implemented on a project-by-project basis, and individual grassland preserves would likely be relatively small and geographically fragmented.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to Valley Grassland, when considered together with the significant impacts to Valley Grassland

from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

8.2.2.5 Blue Oak Woodland and Blue Oak Savanna

The Blue Oak Woodland land cover and the Blue Oak Savanna land cover are considered together because the plants and animals of both communities overlap considerably (see Section 8.1.2.1), and each land cover has the same regulatory requirements (Section 8.1.1). Blue Oak Woodland and Blue Oak Savanna land covers are sensitive natural communities (see discussion of individual land covers in Section 8.1.2). As discussed in Section 8.2.1, indirect impacts to the Blue Oak Woodland and Blue Oak Savanna land covers is described qualitatively.

Direct and Indirect Effects of the Alternative

The new development and related infrastructure projects and activities expected under the No Action/No Project Alternative are estimated to directly impact (remove) 140 acres of Blue Oak Woodland and Blue Oak Savanna land covers and their associated natural communities within the Planning Area (Table 8-4). The majority of these impacts (54 acres of Blue Oak Woodland and 84 acres of Blue Oak Savanna) would occur outside of the UDA where most of the existing Blue Oak Woodland and Blue Oak Savanna is present (Section 8.1.2.1). Relatively few acres of Blue Oak Woodland and Blue Oak Savanna exist within the UDA, and only 2 acres of Blue Oak Savanna would be impacted and no Blue Oak Woodland acres would be impacted within the UDA. The estimated total of 140 acres of direct impacts is approximately 1% of the existing 14,769 acres of combined Blue Oak Woodland and Blue Oak Savanna existing in the Planning Area (Table 8-1).

The environmental stressors that may result from new urban development are discussed in Section 8.2.1 and in Appendix G-1. The environmental stressors resulting from new urban development can also produce permanent indirect impacts that occur later in time or occur beyond the project site (Section 3.6.6). The No Action/No Project Alternative would indirectly impact the plant and animal communities of the Blue Oak Woodland and Blue Oak Savanna land covers by increasing habitat fragmentation, wildfire frequency, and colonization by weedy plant species.

Wildfire is a natural part of the Blue Oak Woodland and Blue Oak Savanna ecosystem, and low-intensity fires would likely burn under the oak canopy and not adversely Blue Oak Woodland and Blue Oak Savanna land covers or the associated plant and animal communities. However, with decades of fire suppression, the amount of fuel has built up to levels that would increase the intensity of wildfires. Should wildfires be of sufficient intensity to result in high levels of mortality to blue oaks, these land covers and associated plant and animal communities would be adversely affected for many years, until sufficient regrowth occurs to again support the natural plant and animal communities. New urban development is expected to result in an

increased wildfire frequency inside the UDA due to increased potential for ignitions associated with greater human presence and activities. However, because this increased risk of wildfire will occur primarily inside the UDA, there should be little or no harm to existing Blue Oak Woodland and Blue Oak Savanna land covers.

The regulatory environment under the No Action/No Project Alternative (Section 8.1.1) would require projects that undergo environmental review under CEQA or require approvals or entitlements from a local jurisdiction to provide compensatory mitigation for direct impacts (losses) of Blue Oak Woodland and Blue Oak Savanna trees and land covers. This mitigation would be implemented on a project-by-project basis and would be guided by the Oak Woodlands Conservation Act (Senate Bill 1334), and the oak tree compensation policies in the Conservation Element of the Sacramento County General Plan. Mitigation provided under the No Action/Project Alternative is estimated to preserve 70 acres of Blue Oak Woodland and/or Blue Oak Savanna and re-establish or establish approximately 70 acres of Blue Oak Woodland and/or Blue Oak Savanna. Because mitigation for impact to Blue Oak Woodland and Blue Oak Savanna would continue to be implemented on a project-by-project basis under the No Action/No Project Alternative (Section 2.2.4), preserves and compensatory mitigation sites would likely be geographically fragmented.

Cumulative Effects of the Alternative

As discussed in Section 8.1.2, the existing 14,769 acres of Blue Oak Woodland and Blue Oak Savanna natural communities within the Planning Area are located primarily outside the UDA, and are relatively undisturbed and unfragmented by past and current human activities. However, past residential development around Rancho Murieta has removed and fragmented some of the Blue Oak Woodland and Blue Oak Savanna natural communities in that location (Sacramento County 2011). Overall, past and current effects on Blue Oak Woodland and Blue Oak Savanna in the study area have been relatively small.

The reasonably foreseeable future activities (Section 3.7.3) could directly impact some existing Blue Oak Woodland and Blue Oak Savanna land covers in the study area, additional new urban development in Rancho Murieta, a master-planned development inside the UDA named Rio Del Oro, further rural residential developments outside the UDA, continued development of cultivated agricultural lands, and development of major infrastructure projects such as California High-Speed Rail (see Section 3.7.2 for details of these projects). In addition, as discussed in Section 2.2.3, approximately 1,900 acres of planned urban development would be shifted or displaced to areas outside the current UDA under the No Action/No Project Alternative, probably to areas south of the Elk Grove sphere of influence or areas near Rancho Murieta where Blue Oak Woodland and Blue Oak Savanna are present. The effects of past, present, and reasonably foreseeable other projects on Blue Oak Woodland and Blue Oak Savanna in the study area represent a significant adverse

cumulative impact on the Blue Oak Woodland and Blue Oak Savanna land covers within the study area. However, these foreseeable other projects and activities in the County would typically be required to preserve or re-establish any affected Blue Oak Woodlands under the no-net-loss policy for oak woodlands in the Conservation Element of the Sacramento County General Plan and the Sacramento County Tree Ordinance (Chapter 19.04 of Title 19 of the County Code). While the general plans of Galt and Rancho Cordova also contain tree protection policies (see Section 9.1.1), there is little if any Blue Oak Woodland or Blue Oak Savanna land covers within these jurisdictions.

The No Action/No Project Alternative is anticipated to preserve 70 acres and to re-establish 70 acres of Blue Oak Woodland and Blue Oak Savanna, which together is equivalent to the 140 acres expected to be directly impacted (lost) under the No Action/No Project Alternative. Therefore, only 70 acres or approximately 0.5% of the Blue Oak Woodland and Blue Oak Savanna within the Planning Area would be directly impacted (lost), and the past and current impacts to Blue Oak Woodland and Blue Oak Savanna within most of the study area have been relatively small. Therefore, the incremental impact of the No Action/No Project Alternative on Blue Oak Woodland and Blue Oak Savanna, when considered together with the impacts of past, current, and reasonably foreseeable projects, would result in a ***Less Than Significant Cumulative*** effect.

8.2.2.6 Farmland (Croplands and Irrigated Pasture-Grassland)

As discussed in Section 8.1.2, Cropland and Irrigated Pasture-Grassland are included in the Natural land cover category because they provide habitat for a native wildlife community (e.g., cottontail rabbits, other small mammals, mule deer, western meadowlark, red-winged blackbird; foraging for hawks and other raptors; and wintering sandhill cranes), and support some native trees and other native plants on the margins of fields or in hedgerows. There are approximately 67,820 acres of the Cropland and Irrigated Pasture-Grassland land covers in the Planning Area.

Direct and Indirect Effects of the Alternative

Future development projects and activities under the No Action/No Project Alternative are estimated to directly remove up to approximately 8,484 acres of existing Cropland and Irrigated Pasture-Grassland land covers and their associated plant and animal communities, which is approximately 12.5% of the total existing of these land covers in the Planning Area. Approximately 7,510 acres Cropland and Irrigated Pasture-Grassland are expected to be directly impacted (lost) in the UDA, where most new urban development activities would occur (Table 8-4). Approximately 974 acres would be directly impacted (lost) outside the UDA from infrastructure projects associated with new urban development and from the 1,900 acres of planned development expected to be displaced to areas outside the current Sacramento County USB boundary (see Section 2.2.3).

Environmental stressors associated with new urban development may cause indirect impacts later in time or beyond the project site (Section 3.6.6 and in Appendix G-1). Environmental stressors that could affect Cropland and Irrigated Pasture-Grassland native plant and animal communities include habitat fragmentation, increased wildfire frequency, increased colonization by weedy plant species, and increased human activity.

The regulatory environment under the No Action/No Project Alternative (Section 8.1.1) would require projects that undergo CEQA and projects that obtain local approvals or entitlements to provide mitigation for project impacts to Cropland and Irrigated Pasture-Grassland land covers. This mitigation would be implemented on a project-by-project basis and would be guided by the agricultural protection policies in the Sacramento County, Rancho Cordova, and Galt General Plans (see Section 8.1.1). Impacts to agricultural land covers, including Cropland and Irrigated Pasture-Grassland, could be mitigated by preserving any agricultural land cover of a similar resource category (e.g., Prime Farmland, Statewide Importance Farmland, Unique Farmland, or Local Importance Farmland).

The No Action/No Project Alternative would permanently preserve approximately 7,615 acres of similar resource-category farmland to mitigate direct impacts to Cropland and Irrigated Pasture-Grassland land covers (Table 8-5), which equals approximately 90% of the Cropland and Irrigated Pasture-Grassland acres lost (Table 8-4). However, a net loss of 7,510 acres of existing Cropland and Irrigated Pasture-Grasslands would still occur in the Planning Area.

Cumulative Effects of the Alternative

As discussed in Section 1.3.1, Section 3.7.1, and Section 8.1.2, past and current urban development within the study area has removed substantial amounts of Cropland and Irrigated Pasture-Grasslands since the 1920s. The other reasonably foreseeable, future actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in Elk Grove and Rancho Murieta, master-planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, expansion of existing preserves, additional conversions of Croplands and Irrigated Pasture to other Farmland land covers such as vineyards and orchards, and development of major infrastructure projects such as California High-Speed Rail and California WaterFix (see Section 3.7.2 for details about these projects). In addition, as discussed in Section 2.2.3, approximately 1,900 acres of planned urban development would be shifted or displaced to areas outside the current UDA under the No Action/No Project Alternative, probably to areas near Rancho Murieta or to areas south of the Elk Grove sphere of influence that currently support Cropland and Irrigated Pasture Grassland. These reasonably foreseeable “other” future actions are anticipated to result in additional loss of Cropland and Irrigated Pasture-Grasslands within the study area. As discussed in Section

8.1.1, current regulations will require these foreseeable other projects to provide some farmland preservation as mitigation for losses of farmland, but this mitigation would not replace the acres of lost farmland.

Projects and activities implemented under the No Action/No Project Alternative are estimated to result in the direct loss of approximately 8,484 acres of Cropland and Irrigated Pasture-Grassland, and the expected regulatory environment of the No Action/No Project (Section 2.2.2) would require the preservation of approximately 7,615 acres of similar quality farmland, which would permanently preserve farmland but would still result in a net loss of farmland in the Planning Area and study area. Mitigation for impacts to farmland would continue to occur on a project-by-project basis, and would likely result in a pattern of farmland preserves that are geographically fragmented.

Therefore, the incremental loss of 8,484 acres of Cropland and Irrigated Pasture-Grasslands under the No Action/No Project Alternative would be a ***Significant Cumulative*** effect when considered together with the acres of Cropland and Irrigated Pasture Grassland lost from past and present human activities and the other foreseeable future projects in the study area.

8.2.2.7 Farmland (Orchard/Vineyard)

As discussed in Section 8.1.2, Orchard and Vineyard are included in the Natural land cover category because they provide habitat for native wildlife (e.g., perching raptors, other native birds, roosting western red bats, small mammals). There are approximately 30,367 acres of Orchard and Vineyard land covers and their associated plant and animal communities in the Planning Area.

Direct and Indirect Effects of the Alternative

Future urban development projects and activities under the No Action/No Project Alternative are estimated to remove up to approximately 1,745 acres of existing Orchard and Vineyard land covers and associated plant and animal communities, which is approximately 5.7% of the existing 30,367 acres of Orchard and Vineyard land covers in the Planning Area. Approximately 1,546 acres Orchard and Vineyard are expected to be directly impacted (lost) in the UDA, where most new urban development activities would occur (Table 8-4). Approximately 199 acres would be directly impacted (lost) outside the UDA from infrastructure projects associated with new urban development and from the 1,900 acres of planned development expected to be displaced to areas outside the current Sacramento County USB boundary (see Section 2.2.3).

Environmental stressors associated with new urban development may cause indirect impacts later in time or beyond the project site (see Section 3.6.6 and Appendix G-1). Environmental stressors that could affect Orchard and Vineyard native plant and animal communities include

habitat fragmentation, increased wildfire frequency, increased colonization by weedy plant species, and increased human activity.

The regulatory environment under the No Action/No Project Alternative (Section 8.1.1) would require projects that undergo CEQA review and projects that obtain local approvals or entitlements to provide mitigation for project impacts to Orchard and Vineyard land covers. This mitigation would be implemented on a project-by-project basis and would be guided by the agricultural protection policies in the Sacramento County, Rancho Cordova, and Galt General Plans (see Section 8.1.1). Impacts to Agricultural land covers, including Orchard and Vineyard, could be mitigated by preserving any Farmland land cover of similar value (e.g., Prime Farmland, Statewide Importance Farmland, Unique Farmland, or Local Importance Farmland).

Approximately 1,566 acres of similar quality farmland would be preserved under the No Action/No Project Alternative, which equals approximately 90% of the acres of Orchard and Vineyard lost (Table 8-5).

Cumulative Effects of the Alternative

As summarized in Section 1.3.1, Section 3.7.1, and Section 8.1.2, past and current urban development has removed Orchard and Vineyard land covers. However, in recent years, Vineyard land covers have also been created in the Planning Area by the conversion of Annual Grassland, Cropland, Irrigated Pasture, or Orchard Agricultural lands into the Vineyard land cover.

The other reasonably foreseeable, future actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in Elk Grove and Rancho Murieta, master-planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, expansion of existing preserves, and development of major infrastructure projects such as California High-Speed Rail and California WaterFix (see Section 3.7.2 for details about these projects). In addition, as discussed in Section 2.2.3, approximately 1,900 acres of planned urban development would be shifted or displaced to areas outside the current USB under the No Action/No Project Alternative, probably to areas near Rancho Murieta or to areas south of the Elk Grove sphere of influence. These reasonably foreseeable "other" future actions are anticipated to directly impact additional Orchard and Vineyard land covers within the study area. As discussed in Section 8.1.1, current regulations will require many of these foreseeable other projects to mitigate losses of Orchard and Vineyard by preserving the same acres of a Farmland land cover that is of the same category (e.g., Prime Farmland, Statewide Importance Farmland, Unique Farmland or Local Importance). However, the foreseeable agricultural land conversions discussed in Section 3.7.2 are expected to create additional acres of vineyard within the Planning Area.

Projects and activities implemented under the No Action/No Project Alternative are estimated to result in the direct loss of approximately 1,745 acres of existing Orchard and Vineyard. The regulatory environment of the No Action/No Project (Section 2.2.2, Section 8.1.1) would require the preservation of approximately 1,566 acres of farmland of a similar category, which would permanently preserve those acres of farmland but would still result in a net loss of 1,745 acres of farmland in the Planning Area. In addition, mitigation for impacts to farmland would continue to occur on a project-by-project basis and would likely result in a pattern of farmland preserves that are geographically fragmented.

Therefore, the incremental loss of Orchard and Vineyard under the No Action/No Project Alternative, when combined with the effects of past and current projects and the effects of the foreseeable future actions in the study area, would likely result in a ***Less Than Significant Cumulative*** effect to Orchard and Vineyard land covers.

8.2.2.8 Wildlife Movement Corridors

Direct and Indirect Effects of the Alternative

As shown in Figure 8-2 and Table 8-3, there are four ECAs either partially or wholly within the Planning Area. As discussed in Section 2.2.1, the majority of planned urban development under the No Action/No Project Alternative would occur within in the UDA, but only the extreme northern most portion of the Coyote Creek ECA is in the UDA and could be impacted (Figure 8-2).

The expected locations of planned recycled water pipeline infrastructure located outside the UDA and south of Elk Grove are not within an ECA, and would have little or no impact on wildlife movement. However, some rural transportation projects outside the UDA would occur within the Bear Slough-Browns Creek ECAs and the Coyote Creek-Dry Creek ECAs. These rural transportation projects include road widening, which would likely reduce the ability of wildlife to move within the ECA. In addition, the 1,900 acres of new development displaced to areas outside the UDA (Section 2.2.1) could occur within the Coyote Creek-Dry Creek ECA north of Rancho Murieta, which would reduce the ability of wildlife to move in those ECAs.

As discussed in Section 8.1.2, Laguna Creek inside the UDA and the Cosumnes River outside the UDA currently have relatively narrow but continuous riparian cover for long distances and provide important east–west movement corridors for terrestrial wildlife in the Planning Area (Figure 8-1). Planned urban development, and associated human activities and recreation along creeks and streams within the UDA are expected to directly and indirectly affect the existing wildlife movement and dispersal along Laguna Creek corridor (see Section 8.1.2.4).

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2 and Section 8.1.1) would require new development projects that undergo CEQA to avoid substantial impacts to wildlife movement, but only if migration of a listed species could be affected.

However, new development projects that require authorizations under ESA, CESA, or CWA would be required to avoid and minimize impacts to wildlife movement corridors to the maximum extent possible. As discussed in Section 2.2.4 under the No Action/No Project Alternative, these avoidance and minimization measures (AMMs) would continue to be implemented on a project-by-project basis, resulting in mitigation that would likely be geographically fragmented and may not continue to provide wildlife movement through the Planning Area.

Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and Section 8.1.2, Natural land cover has been lost and fragmented as a result of past urban and suburban development within the Planning Area, which has reduced the ability for many wildlife species to move or disperse across the Planning Area and the larger study area.

The types of future, reasonably foreseeable "other" projects and actions, described in Section 3.7.2, are similar to the types of past and present actions that have occurred in the study area. The other reasonably foreseeable, future actions in the study area (see Sections 3.7.2 and 4.1.2.1) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in Elk Grove and Rancho Murieta, master-planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued development of cultivated agricultural lands, expansion of existing preserves, and development of major infrastructure projects such as California High-Speed Rail and California WaterFix (see Section 3.7.2 for details about these projects), and would continue to result in loss of Natural land covers. The foreseeable expansion of Rancho Murrieta could reduce the Coyote Creek ECA, and the additional low-density rural development expected within areas designated as Agricultural-Residential in the Sacramento County General Plan could impact movement in the Brown's Creek-Bear Slough ECA (Figure 8-2). If any of the foreseeable future infrastructure projects discussed in Section 3.7.2 would be located in a designated ECA or in another existing wildlife movement corridor, additional cumulative impacts to species movement could occur.

Therefore, the incremental loss and degradation of wildlife movement and corridors under the No Action/No Project Alternative would be a ***Significant Cumulative*** effect when considered together with the impacts to wildlife movement from by past and current human activities and the foreseeable other projects in the study area.

8.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3.3. As described in Section 2.3.3, the Proposed Action/Proposed Project Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project

Alternative. New urban development implemented under any EIS/EIR alternative could result in the same types of environmental stressors (see Appendix G). Both the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative include full buildout of the UDA.[2] However, the locations of new urban development in the UDA under the Proposed Action/Proposed Project Alternative are expected to differ slightly from the No Action/No Project Alternative, primarily because the Proposed Action/Proposed Project Alternative would consolidate the ESA, CESA, and CWA 404 mitigation requirements of future projects and activities (the SSHCP Covered Activities) to form a managed and interconnected SSHCP Preserve System (see Section 2.3.5). The interconnected network of Preserves in the SSHCP Preserve System would preserve and manage Natural land covers and their natural communities in perpetuity throughout the Planning Area.

In addition, the Proposed Action/Proposed Project Alternative would allow implementation of urban development within the MCRA portion of the UDA to be consistent with planned development described in the approved Sacramento County and Rancho Cordova General Plans, without approximately 19,000 acres of new urban development shifting or being displaced to locations outside the current USB boundary. Therefore, the Proposed Action/Proposed Project Alternative would have more urban development within the MCRA and within the UDA than under the No Action/No Project Alternative, because approximately 1,900 acres of new urban development would not shift or be displaced to locations outside of the current Sacramento County USB boundary.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative's Conservation Strategy also includes both landscape-level and project-level SSHCP impact AMMs (SSHCP AMMs), which would be incorporated into the design and or the implementation of each Covered Activity to avoid or minimize impacts to sensitive land covers and natural communities to the greatest extent practicable. The SSHCP AMMs include siting requirements, incorporation of low-impact development (LID) elements into project designs, incorporation of setback between waterways and new development (Stream Setbacks), incorporation of setbacks between preserved natural areas and new development (Preserve Setbacks), species-specific avoidance measures, and the use of best management practices (BMPs) during all ground-disturbing Covered Activities (see details of each SSHCP AMM in Appendix D).

Table 8-8 presents the direct impacts (loss) of each Natural land cover inside and outside the UDA under the Proposed Action/Proposed Project Alternative. Table 8-9 presents the acres of each Natural land cover expected to be preserved by the SSHCP Preserve System (see Section

[2] "Full buildout" of the UDA means all currently undeveloped lands that are zoned for, or are ultimately planned/contemplated for future urban development in the adopted general plans of the Permit Applicants would become developed. Full buildout of the UDA will include some open space and conservation lands within the areas of new urban development.

2.3.5). Table 8-8 also presents acres of each Natural land cover that would be re-established or established within the proposed SSHCP Preserve System.

Table 8-8. Expected Direct Impacts to Natural Land Covers – Proposed Action/Proposed Project Alternative

Land Cover	Direct Effects within UDA (acres)	Direct Effects outside UDA (acres)	Total Direct Impacts (acres)	Existing Acres in Planning Area	Percent of Existing Acres Affected
Aquatic Land Covers					
Wetlands and Other Waters					
Vernal Pool*	355	34	389	4,536	8.6%
Swale*	233	1	234	1,252	18.8%
Stream/Creek (VPIH)*	22	0	22	73	30.1%
Seasonal Wetland*	102	3	105	2,600	4.0%
Freshwater Marsh*	119	8	127	2,954	4.3%
Stream/Creek*	91	26	117	2,778	4.2%
Open Water*	154	1	155	2,344	6.6%
Total Wetlands and Other Waters	**1076**	**73**	**1149**	**16,537**	**6.9%**
Riparian					
Mixed Riparian Woodland*	147	37	184	5,856	3.1%
Mixed Riparian Scrub*	186	3	189	1,454	13.0%
Mine Tailing Riparian Woodland*	218	0	218	641	34.0%
Total Riparian	**551**	**40**	**591**	**7,951**	**7.4%**
Total Aquatic Land Covers	**1627**	**113**	**1740**	**24,488**	**7.1%**
Terrestrial Land Covers					
Natural Uplands					
Valley Grassland	21,346	668	22,014	135,152	16.3%
Blue Oak Woodland*	0	9	9	9,132	0.1%
Blue Oak Savanna*	3	35	38	5,637	0.7%
Farmland					
Cropland	4,922	363	5,285	51,829	10.2%
Irrigated Pasture-Grassland	2,594	155	2,749	15,991	17.2%
Orchard	191	16	207	3,907	5.3%
Vineyard	1,376	79	1,455	26,460	5.5%
Total Farmland	**9,083**	**613**	**9,696**	**98,187**	**9.9%**
Total Terrestrial	**30,432**	**1325**	**31,757**	**248,108**	**12.8%**
GRAND TOTAL	**32,059**	**1,438**	**33,497**	**272,596**	**12.8%**

Notes:

* Indicates land cover that is considered sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations; see Section 8.1.2.3.

Table 8-9. Natural Land Cover Mitigation under the Proposed Action/ Proposed Project Alternative

Land Cover	SSHCP Preserve System (acres)			Re-establishment/ Establishment (acres)*
	Inside UDA	*Outside UDA*	*Total*	
Aquatic Land Covers				
Wetlands and Other Waters				
Vernal Pool	210	756	966	389
Swale	93	185	278	256
Stream/Creek (VPIH)	26	0	26	0
Seasonal Wetland	56	49	105	105
Freshwater Marsh	127	0	127	127
Stream/Creek	23	94	117	117
Open Water	70	85	155	155
Total Wetland and Other Waters	*605*	*1,169*	*1,774*	*1149*
Riparian				
Mine Tailing Riparian Woodland	1	217	218	0
Mixed Riparian Scrub	23	355	3784	298
Mixed Riparian Woodland	50	318	368	293
Total Riparian Land Covers	*74*	*890*	*964*	*591*
Total Aquatic Resources	**679**	**2,059**	**2,738**	**1,740**
Terrestrial Land Covers				
Natural Uplands				
Valley Grassland	5,743	16,271	22,014	0
Blue Oak Woodland	0	9	9	9
Blue Oak Savanna	15	23	38	38
Farmlands				
Cropland	376	5,740	6,116	0
Irrigated Pasture-Grassland	217	3,363	3,580	0
Orchard	0	0	0	0
Vineyard	0	0	0	0
Total Terrestrial Land Covers	**6,351**	**25,406**	**31,757**	**47**
Total Natural Land Covers	7,030	27,465	34,495	**1,787**

Note:
* The re-establishment/establishment acres within this column are in addition to the preservation acres included in the previous column.

8.2.3.1 Vernal Pool Ecosystem (Valley Grassland, Vernal Pool, Swale, Stream/ Creek [VPIH])

As discussed in Section 8.1.2.2, this chapter discusses and analyzes impacts to the four land covers within the Vernal Pool Ecosystem together, because those land covers function together as a single ecosystem (also see Appendix G-1). As discussed in Section 8.2.1, indirect impacts to the Vernal Pool Ecosystem is described qualitatively for the Valley Grassland land cover, but is described both qualitatively and quantitatively for the Vernal Pool, Swale, and Stream/Creek (VPIH) land covers.

Direct and Indirect Effects of the Alternative

The Covered Activity projects and activities implemented under the Proposed Action/Proposed Project Alternative would directly impact approximately 17,118 acres of Vernal Pool Ecosystem (Table 8-10). This is 572 acres less than the anticipated 17,690 acres of Vernal Pool Ecosystem expected to be directly impacted under the No Action/No Project Alternative (Section 8.2.2).

Table 8-10. Direct and Indirect Effects on the Vernal Pool Ecosystem under the Proposed Action/Proposed Project Alternative

Land Cover	Direct Loss Within the UDA (acres)	Direct Loss Outside the UDA (acres	Indirect Effects (acres)	Total impacts (acres)	Total Existing in Planning Area (acres)	Percent of Existing impacted in Planning Area
Valley Grassland (in Vernal Pool Ecosystem)	16,187	286	Qualitative only	16,473	97,349	16.9%
Vernal Pool	355	34	95	484	4,536	10.7%
Swale	233	1	44	278	1,252	22.2%
Stream/Creek (VPIH)	22	0	4	26	73	35.6%
Grand Total	**16,797**	**321**	**143**	**17,261**	**103,210**	**16.7%**

As discussed in Section 8.1.2.5, most of the MCRA is located inside the UDA. Of the approximately 18,117 existing acres of Vernal Pool Ecosystem within the MCRA, approximately 8,387 acres are expected to be directly impacted (removed), and an additional 113 acres are expected to be indirectly impacted by the Proposed Action/Proposed Project Alternative (8,500 total). Of the approximate 38,514 acres of Vernal Pool Ecosystem within the C/RS, approximately 53 acres would be directly impacted, and 0.2 acre would be indirectly impacted by the rural transportation Covered Activities planned outside the UDA.

Specific SSHCP AMMs (see Section 2.2.2 and Appendix D) will minimize the direct and indirect impacts of the Covered Activities on the Aquatic land covers of the Vernal Pool Ecosystem. The SSHCP AMMs include limiting ground disturbance to the construction footprint; implementing erosion-control BMPs during ground disturbance and siting roads and utilities outside of sensitive areas (BMP-1, BMP-2, BMP-3, ROAD-1, and UTILITY-4); and implementing BMPs that control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training (BMP-8), and implement speed limits on the construction site (BMP-11). Indirect impacts to Stream/Creek and Vernal Pool water quality and hydrology would be minimized by AMM LID-1 through LID-3 and EDGE-4 through EDGE-7.

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project Alternative are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Proposed Action/Proposed Project Alternative would result in AMMs that are implemented more frequently and more consistently at all ground-disturbing activities, than the AMMs that would occur in new urban development projects under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to the Aquatic land covers of the Vernal Pool Ecosystem, compared to the effects of the No Action/No Project Alternative on the Vernal Pool Ecosystem.

Therefore, the environmental stressors that result from urban development (Appendix G) are expected to indirectly impact the hydrology, ecology, and species habitat within 143 acres of Vernal Pools, Swales, and Stream/Creek VPIH (Table 8-10), which is 118 acres less than the Vernal Pools, Swales, and Stream/Creek VPIH expected to be indirectly impacted under the No Action/No Project Alternative (Table 8-6).

The total 17,261 acres of directly and indirectly impacted Vernal Pool Ecosystem is approximately 16.7% of the existing 103,210 acres of Vernal Pool Ecosystem land covers in the Planning Area (Table 8-2 and Table 8-10). This expected total impact to the Vernal Pool Ecosystem under the Proposed Action/Proposed Project Alterative is 688 acres less than the total 17,949 acres of Vernal Pool Ecosystem impacts estimated for the No Action/No Project Alternative (Section 8.2.2).

The SSHCP Preserve System implemented under the Proposed Action/Proposed Project Alternative (Section 2.3.5) would preserve approximately 17,743 acres of Vernal Pool Ecosystem (Table 8-11). This would preserve 7,337 acres more than the 10,406 acres of Vernal Pool Ecosystem expected to be preserved under the No Action/No Project Alternative (Table 8-7). The Preserve System under the Proposed Action/Proposed Project Alternative would be designed to achieve the stated SSHCP Biological Goals and Measurable Objectives for the Planning Area's Vernal Pool Ecosystem (see Table 2-7). As discussed in Section 2.3.5, the individual Proposed Action/Proposed Project Alternative Preserves would be larger, contiguous, and interconnected, and would be consistently managed in perpetuity throughout the Planning Area. Consequently, each acre of Vernal Pool Ecosystem preserved under the Proposed

Action/Proposed Project Alternative would better maintain the existing habitat values and existing ecology of the Planning Area's Vernal Pool Ecosystems, when compared to the individual preserves that would be established on a project-by-project basis under the No Action/No Project Alternative.

As discussed in Section 8.1.2.2, most of the MCRA is located inside the UDA. Of the approximately 18,117 acres of Vernal Pool Ecosystem within the MCRA, 5,484 acres (30%) would be preserved by the Proposed Action/Proposed Project Alternative. Of the approximately 38,514 acres of Vernal Pool Ecosystem within the C/RS, approximately 15,294 acres (40%) would be preserved by the Proposed Action/Proposed Project Alternative.

Table 8-11. Expected Mitigation for Vernal Pool Ecosystem impacts Under the Proposed Action/Proposed Project Alternative

Land Cover	SSHCP Preserve System (acres)			Re-establishment/ Establishment (acres)
	Inside UDA	*Outside UDA*	*Total*	
Valley Grassland (in Vernal Pool Ecosystem)	5,289	11,184	16,473	0
Vernal Pool	210	756	966	389
Swale	93	185	278	256
Stream/Creek (VPIH)	26	0	26	0*
Total Vernal Pool Ecosystem Land Covers	**5,618**	**12,125**	**17,743**	**645**

* Compensatory mitigation for direct loss of 22 acres of Stream/Creek (VPIH) will be by re-establishment or establishment of Swale, which has been added to the 234 acres of compensatory mitigation for direct loss of Swale.

The SSHCP AMMs implemented under the Proposed Action/Proposed Project Alternative would be more effective at minimizing indirect impacts of new urban development on the existing hydrology and ecology of the Vernal Pool Ecosystem (see AMMs EDGE-1 through EDGE-10 and Appendix D) than the project-by-project impact AMMs that would be implemented for the No Action/No Project Alternative (Table 2-6).

Potential indirect impacts to the Vernal Pool Ecosystem from other environmental stressors, such as increased human activity and from habitat fragmentation (Appendix G), would also be minimized by the SSHCP AMMs, including EDGE-1 through EDGE-3, ROAD-1, ROAD-2 NATURE TRAIL-1 through NATURE TRAIL-4, STREAM-1 through STREAM-5, and UTILITY-2 through UTILITY-4. The potential for urban development to allow invasive species to more easily colonize SSHCP Preserves would be minimized by EDGE-10 and ROAD-3. In addition, when an SSHCP Preserve is located next to a new urban development, the development would include Preserve access-points designed to minimize impacts to the Vernal Pool Ecosystem that can be caused by the loading and unloading of livestock used to manage Valley Grasslands of preserved Vernal Pool Ecosystem (EDGE-9).

In addition to preserving 17,743-acres of Vernal Pool Ecosystem Aquatic land covers, the Proposed Action/Proposed Project Alternative would re-establish or establish 645 acres of Vernal Pool Ecosystem Aquatic land covers (Table 8-11) within the SSHCP Preserve System. Potential Impacts to existing vernal pools from the establishment of new vernal pools within an SSHCP Preserve would be minimized by SSHCP AMMs (see Re- establishment/Establishment AMMs described in Appendix D).

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- directly and indirectly impact 690 fewer total acres of the Planning Area's total Vernal Pool Ecosystem and the associated vernal pool plant and animal communities;
- directly and indirectly impact 1,283 fewer acres of the MCRA's Vernal Pool Ecosystem and the associated vernal pool plant and animal communities;
- require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects of development projects and activities on the Vernal Pool Ecosystem;
- preserve approximately 7,340 more acres of Vernal Pool Ecosystem in the Planning Area;
- result in interconnected and more contiguous Preserves of Vernal Pool Ecosystem within the Planning Area; and
- preserve 934 more acres of the MCRA's Vernal Pool Ecosystem and the associated vernal pool plant and animal communities.

Therefore, the Proposed Action/Proposed Project Alternative's incremental impact to the Vernal Pool Ecosystem and natural community is a ***Significant Beneficial*** effect, when compared to the No Action/No Project Alternative incremental impacts on vernal pools ecosystem and natural community.

Cumulative Effects on the Vernal Pool Ecosystem from the Propose Action/Proposed Project

The effects of past, present, and reasonably foreseeable other projects on the Vernal Pool Ecosystems in the study area were described in Section 8.2.2.1, and represent a significant adverse cumulative impact on the Vernal Pool Ecosystem within the study area. The incremental effects of the No Action/No Project Alternative, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area, were determined to be significant (see Section 8.2.2.1).

As discussed in this section, implementation of the SSHCP Conservation Strategy (including the SSHCP AMMs, the SSHCP Aquatic Resources Program, and the interconnected SSHCP Preserve System) is expected to result in larger areas of Vernal Pool Ecosystem preservation, more consistent and more frequent implementation of AMMs, and larger setbacks between new development in the UDA and preserved Vernal Pool Ecosystems within the UDA, when compared to the No Action/No Project Alternative. The incremental effects of the Proposed Action/Proposed Project Alternative would result in the direct and indirect loss of 17,261 acres of Vernal Pool Ecosystem within the Planning Area, which is 690 acres fewer than the loss under the No Action/No Project Alternative. Overall, the Proposed Action/Proposed Project Alternative would make a slightly smaller contribution to study area cumulative effects on the Vernal Pool Ecosystem, when compared to the No Action/No Project Alternative. However, at the scale of Vernal Pool Ecosystem impacts throughout the study area, the 690-acre difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. As discussed in Section 8.2.2.1, the impacts of the No Action/No Project Alternative on the Vernal Pool Ecosystem, when considered together with the impacts to Vernal Pool Ecosystem from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on the Vernal Pool Ecosystem. However, this EIS/EIR evaluates the future impacts of the two Action Alternatives relative to the future conditions expected under the No Action/No Project Alternative (see Section 3.6.1). Therefore, because the incremental effects of the Proposed Action/Proposed Project Alternative on the study area Vernal Pool Ecosystem is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative*** effect when compared to the No Action/No Project Alternative baseline condition.

8.2.3.2 Aquatic Land Covers (Seasonal Wetland, Freshwater Marsh, Stream/Creek, Open Water)

As discussed in Section 8.1.2.1, the plant and animal communities associated with Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water Aquatic land covers differ in composition but have similar ecological processes, aquatic habitats, and susceptibility to the environmental stressors of new urban development (described in Appendix G-1), and are analyzed together in this chapter. As discussed in Section 8.1.2.1, Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water communities are also considered “sensitive” natural communities.

Direct and Indirect Effects of the Proposed Action/Proposed Project Alternative

The acres of direct impacts from the Covered Activity projects and activities of the Proposed Action/Proposed Project Alternative on the Seasonal Wetland, Freshwater Marsh,

Stream/Creek, and Open Water land covers is approximately 504 acres (Table 8-8). This direct loss would be 79 acres less than the 583 acres of direct impact to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities that would be lost under the No Action/No Project Alternative.

Covered Activity projects and activities implemented under the Proposed Action/Proposed Project Alternative would implement the following SSHCP AMMs to avoid or minimize direct impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers by limiting ground disturbance to the construction footprint; implementing erosion-control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-2, BMP-3, ROAD-1, UTILITY-4); requiring construction BMPs that avoid and minimize impacts to water quality and limit stormwater and pollutant runoff (BMP-2), limit impacts of oil and fuel spills (BMP-3), limit deposit of erodible materials into waterways (BMP-4), control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training on litter control and other requirements of the SSHCP (BMP-8), restore temporarily disturbed areas (BMP-9), revegetate cut slopes (BMP-10), and implement speed limits on the construction site (BMP-11) (see Appendix D).

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project Alternative are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the SSHCP would result in AMMs that are implemented more frequently and more consistently at all ground-disturbing activities, than the AMMs that would occur in new urban development projects under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers, compared to the effects of the No Action/No Project Alternative on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers.

Other SSHCP AMMs would avoid and minimize indirect effects of SSHCP Covered Activities on water quality and hydrology of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water communities including AMM LID-1 through LID-3, and EDGE-4 through EDGE-6 (Appendix D). Potential impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water communities from increased human activity and from habitat fragmentation

would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2 NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project Alternative (Table 2-6), the SSHCP AMMs would better reduce indirect impacts on aquatic land covers. For example, STREAM-1 through STREAM-3 would require wider setbacks between natural waterways and new development, thereby providing greater protection of existing water quality and species habitats of Stream/Creek and other aquatic resources.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected SSHCP Preserve System within the Planning Area and a comprehensive SSHCP Preserve System management program to maintain and adaptively manage the SSHCP Preserve System in perpetuity. The Preserve System under the Proposed Action/Proposed Project Alternative would be more contiguous and maintain greater hydrologic connectivity than the project-by-project preserves that would be established under the No Action/No Project Alternative. The SSHCP Preserve system under the Proposed Action/Proposed Project Alternative would be designed to achieve the stated SSHCP Biological Goals and Measurable Objectives for the Planning Area's Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities (Table 2-7).

The Proposed Action/Proposed Project Alternative would impact approximately 504 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers (Table 8-8), but would mitigate these unavoidable impacts by preserving approximately 504 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area, and also by re-establishing or establishing an additional 504 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area (Table 8-9). By comparison, the No Action/No Project Alternative is expected to mitigate impact by re-establishing or establishing approximately 291-acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area, and would preserve only 24 acres of these land covers within the Planning Area (Table 8-5).

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- directly impact 79 fewer acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers and associated plant and animal communities;
- require Covered Activity activities and projects to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Seasonal

Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities, such as larger setbacks between new development and streams and creeks;

- preserve 480 more acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water;
- re-establish or establish 213 more acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area; and
- result in more interconnected and contiguous Preserves of Seasonal Wetlands, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area.

Therefore, the Proposed Action/Proposed Project Alternative's impact to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers would be a ***Minor Beneficial*** effect, when compared to the impacts of the No Action/No Project Alternative on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers of the Planning Area.

Cumulative Effects on Impacts to Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water Landcovers

The effects of past, present, and reasonably foreseeable other projects on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities within the study area were described in Section 8.2.2.2 and represent a significant adverse cumulative impact on Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water within the study area. As discussed in Section 8.2.2.2, the incremental effects of the No Action/No Project Alternative were determined to be significant when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed in this section, the incremental effects of the Proposed Action/Proposed Project Alternative would result in the loss of 504 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area, which is 79 acres less than the loss expected under the No Action/No Project Alternative.

Implementation of the SSHCP Conservation Strategy is expected to preserve 480 more acres and re-establish 213 more acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water within the Planning Area, and would result in consistent and more frequent implementation of AMMs, such as wider stream setbacks, that would reduce indirect impacts to remaining Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural land covers when compared to the No Action/No Project Alternative.

Overall, the Proposed Action/Proposed Project Alternative would make a slightly smaller incremental contribution to the cumulative loss of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water in the study area when compared to the No Action/No Project

Alternative. However, at the scale of impacts to these aquatic resources throughout the study area, the 79-acre difference in direct impacts, the 480-acre difference in preservation, and the 213-acre difference in re-establishment of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers under the Proposed Action/Proposed Project Alternative when compared to impacts under the No Action/No Project Alternative is not discernibly different.

As discussed in Section 8.2.2.2, the impacts of the No Action/No Project Alternative on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water resources. However, as discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Proposed Action/Proposed Project Alternative on the study area's Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative*** effect (when compared to the No Action/No Project Alternative baseline condition.

8.2.3.3 Riparian Land Covers (Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland)

As discussed in Section 8.1.2.1, the Planning Area's three Riparian land covers are Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland. The Riparian land covers are sensitive natural communities (Section 8.1.2.3).

Direct and Indirect Effects of the Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative would directly impact (remove) approximately 184 acres of Mixed Riparian Woodland, approximately 189 acres of Riparian Scrub, and approximately 218 acres of Mine Tailing Riparian Woodland, for a total of 591 acres of Riparian land cover directly impacted within the Planning Area (Table 8-8). This loss of Riparian land cover is 37 acres more than the No Action/No Project Alternative's expected loss of 554 acres.

Covered Activity projects and activities implemented under the Proposed Action/Proposed Project Alternative would implement the following SSHCP AMMs to avoid or minimize direct impacts to the Riparian land covers by limiting ground disturbance to the construction footprint, implementing erosion-control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-3, ROAD-1, and UTILITY-4), and by the implementation of AMMs requiring construction BMPs that avoid and minimize impacts to water quality and limit stormwater and pollutant runoff (BMP-2), limit impacts of oil and fuel spills (BMP-3), limit deposit of erodible

materials into waterways (BMP-4), control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training on litter control and other requirements of the SSHCP (BMP-8), restore temporarily disturbed areas (BMP-9), revegetate cut slopes (BMP-10), and implement speed limits on the construction site (BMP-11) (see Appendix D a description of each AMM).

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the SSHCP would result in AMMs that are implemented more frequently and more consistently at all ground-disturbing activities, than the AMMs that would occur in new urban development projects under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6).

Other SSHCP AMMs that would avoid and minimize indirect effects of SSHCP Covered Activities on water quality and hydrology of Riparian land covers include AMM LID-1 through LID-3, and EDGE-4 through EDGE-6 (Appendix D). Potential impacts to Riparian natural communities from increased human activity and from habitat fragmentation would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project alternative (Table 2-6), the SSHCP AMMs would better reduce indirect impacts on Riparian land covers. For example, STREAM-1 through STREAM-3 would require wider setbacks between natural waterways and new development, thereby providing greater protection of Riparian land covers adjacent to streams and creeks. The SSHCP AMMs implemented under the Proposed Action/Proposed Project Alternative would be more effective at minimizing indirect impacts of new urban development on Riparian land covers than the project-by-project impact AMMs that would be implemented for the No Action/No Project alternative (Table 2-6).

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected SSHCP Preserve System within the Planning Area and a comprehensive SSHCP Preserve System management program to maintain and adaptively manage the SSHCP Preserve System in perpetuity. The Preserve System under the Proposed Action/Proposed Project Alternative would be more contiguous and maintain greater connectivity between

riparian areas than the project-by-project Preserves that would be established under the No Action/No Project Alternative.

The SSHCP Preserve System under the Proposed Action/Proposed Project Alternative would be designed to achieve the stated SSHCP Biological Goals and Measurable Objectives for the Planning Area's Riparian land covers (Table 2-7). The SSHCP Conservation Strategy and the SSHCP Preserve System is expected to preserve approximately 964 acres of Riparian land covers, of which 74 acres are inside the UDA and 890 acres are outside the UDA (Table 8-9). By comparison, the No Action/No Project Alternative is not expected to preserve any Riparian land covers (Table 8-5). In addition to preserving 946 acres of Riparian land covers, the Proposed Action/Proposed Project Alternative would also re-establish or establish 591 acres of Mixed Riparian Woodland and Mixed Riparian Scrub within the SSHCP Preserve System (Table 8-9), an amount that equals the expected direct loss of 591 acres of Riparian land covers (Table 8-8). Because Mine Tailing Riparian Woodland land cover provides relatively low habitat value, functions, and services, impacts to the Mine Tailing Riparian Woodland land cover would be mitigated by preservation and by re-establishment of the higher quality, more natural Mixed Riparian Woodland or Mixed Riparian Scrub land covers.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- directly impact 37 more acres of Riparian land covers and associated plant and animal communities;
- require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Riparian land covers such as larger setbacks between new development and streams and creeks;
- preserve 964 acres more of Riparian land covers (Mixed Riparian Woodland and Mixed Riparian Scrub);
- re-establish or establish 37 acres more of Riparian land covers (Mixed Riparian Woodland and Mixed Riparian Scrub) within the Planning Area; and
- result in more interconnected and contiguous preserves of Riparian land covers within the Planning Area, which would reduce habitat fragmentation effects on the plant and animal communities.

Therefore, the Proposed Action/Proposed Project Alternative's impact to Riparian land covers and the associated plant and animal communities would be a ***Minor Beneficial*** effect, when

compared to the impacts of the No Action/No Project Alternative on Riparian land covers of the Planning Area.

Cumulative Effects of the Alternative

The effects of past, present, and reasonably foreseeable other projects on the Riparian land covers and natural communities within the study area were described in Section 8.2.2.3 and represent a significant adverse cumulative impact on the Riparian land covers within the study area. As discussed in Section 8.2.2.3, the incremental effects of the No Action/No Project Alternative were determined to have a less than significant cumulative adverse effect on riparian land covers in the study area, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed in this section, the Proposed Action/Proposed Project Alternative would result in the incremental loss of 591 acres of Riparian land covers within the Planning Area, which is 37 acres greater than the loss under the No Action/No Project Alternative.

However, the implementation of the SSHCP Conservation Strategy, including the SSHCP Preserve System, is expected to preserve 964 more acres and re-establish 37 more acres of Riparian land covers within the Planning Area, and would result in consistent and more frequent implementation of AMMs that would reduce indirect impacts to Riparian land covers when compared to the No Action/No Project Alternative.

Overall, the incremental impacts of Proposed Action/Proposed Project Alternative would make a slightly similar contribution to the cumulative loss of Riparian land covers in the study area when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of cumulative impacts to riparian resources throughout the study area, the 37-acre difference in direct impacts, the 964 acre difference in Riparian preservation, and the 37-acre difference in re-establishment of Riparian land covers is not discernibly different from the impacts expected under the No Action/No Project Alternative.

As discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Proposed Action/Proposed Project Alternative on the study area's Riparian land covers is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative*** effect when compared to the No Action/No Project Alternative baseline condition.

8.2.3.4 Valley Grassland

As discussed in Section 8.1.2, approximately 135,152 acres of Valley Grassland are present in the Planning Area, which includes Valley Grassland acres that are located both inside and outside of the Vernal Pool Ecosystem (Table 8-1), and Valley Grassland in ranching and grazing agricultural use. (The impacts to Valley Grassland as a part of the Vernal Pool Ecosystem are also analyzed under impacts to the Vernal Pool Ecosystem in Section 8.2.3.1.)

Direct and Indirect Effects of the Proposed Action/Proposed Project Alternative

New urban development and associated infrastructure projects implemented under the Proposed Action/Proposed Project Alternative would directly impact (remove) approximately 22,014 acres (16.3%) of the Planning Area's Valley Grasslands (Table 8-8). This loss of Valley Grassland is 1,415 acres less than the No Action/No Project Alternative expected loss of 23,429-acres of Valley Grassland.

Covered Activity projects and activities implemented under the Proposed Action/Proposed Project Alternative would implement SSHCP AMMs to avoid or minimize direct impacts to Valley Grassland, including limiting ground disturbance to the construction footprint, implementing erosion control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-3, ROAD-1, and UTILITY-4), and by implementing AMMs requiring construction BMPs that avoid and minimize stormwater and pollutant runoff (BMP-2), limit impacts of oil and fuel spills (BMP-3), limit deposit of erodible materials into waterways (BMP-4), control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training on litter control and other requirements of the SSHCP (BMP-8), restore temporarily disturbed areas (BMP-9), revegetate cut slopes (BMP-10), and implement speed limits on the construction site (BMP-11) (see Appendix D for a description of each AMM).

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts. This additional oversight and guidance provided by the SSHCP would result in AMMs that are implemented more frequently and more consistently at all ground-disturbing activities, than the AMMs that would occur in new urban development projects under the No Action/No

Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6).

Other SSHCP AMMs that would avoid and minimize indirect effects of SSHCP Covered Activities on Valley Grassland and the associated plant and animal communities include AMM LID-1 through LID-3, and EDGE-4 through EDGE-6 (Appendix D). Potential direct and indirect impacts to Valley Grassland plant and animal communities from increased human activity and from habitat fragmentation would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project alternative (Table 2-6), the SSHCP AMMs would better reduce indirect impacts on this land cover. For example, STREAM-1 through STREAM-3 would require wider setbacks between natural waterways and new development, thereby providing greater protection of all land covers adjacent to streams and creeks. The SSHCP AMMs implemented under the Proposed Action/Proposed Project Alternative would be more effective at minimizing indirect impacts of new urban development on Valley Grassland land cover than the project-by-project impact AMMs that would be implemented for the No Action/No Project Alternative (Table 2-6).

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected SSHCP Preserve System within the Planning Area and a comprehensive SSHCP Preserve System management program to maintain and adaptively manage the SSHCP Preserve System in perpetuity (Section 2.3.5). The SSHCP Preserve system would be designed to achieve the stated SSHCP Biological Goals and Measurable Objectives for the Planning Area's Valley Grasslands (Table 2-7). The SSHCP Preserve System would include approximately 22,014 acres of Valley Grassland and the associated plant and animal natural community (Table 8-9). This is 10,208 acres more Valley Grassland preserved than the 11,806 acres expected to be preserved under the No Action/No Project Alternative. The SSHCP Preserve System established under the Proposed Action/Proposed Project Alternative would also be more contiguous and maintain greater connectivity between preserves of Valley Grassland than the project-by-project mitigation preserves that would be established under the No Action/No Project Alternative.

Potential indirect effects of new urban development on Valley Grasslands within the SSHCP Preserve System would be avoided or minimized by other SSHCP AMMs required by the Proposed Action/Proposed Project Alternative. The effects of invasive weedy species would be minimized by EDGE-10 and ROAD-3, and the effects of expected increased wildfire frequency would be minimized by EDGE-3b (see Appendix D for a description of all SSHCP AMMs).

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- directly impact (remove) 1,415 fewer acres of Valley Grassland land cover and the associated plant and animal communities;
- require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Valley Grasslands;
- preserve 10,208 acres more Valley Grassland within a large SSHCP Preserve System; and
- result in more interconnected and contiguous preserves of Valley Grassland within the Planning Area, which would reduce habitat fragmentation effects on the Valley Grassland plant and animal communities.

Therefore, the Proposed Action/Proposed Project Alternative's impact to Valley Grassland land cover and the associated plant and animal communities would be a ***Significant Beneficial*** effect, when compared to the impacts of the No Action/No Project Alternative on Valley Grassland land covers of the Planning Area.

Cumulative Impacts to Valley Grassland from the Proposed Action/Proposed Project

The effects of past, present, and reasonably foreseeable other projects on the Valley Grassland natural community within the study area were described above in Section 8.2.2.4 and represent a significant adverse cumulative impact on the Valley Grassland within the study area. As discussed in Section 8.2.2.2, , the incremental direct and indirect impacts of No Action/No Project Alternative to Valley Grassland, when considered together with the significant impacts to Valley Grassland from past, current, and foreseeable future projects and activities in the study area, would be a significant cumulative effect.

As discussed here in Section 8.2.3.4, the Proposed Action/Proposed Project Alternative would result in the incremental loss of 22,014 acres of Valley Grassland and associated plant and animal communities within the Planning Area, which is 1,415 acres less than the loss expected under the No Action/No Project Alternative. Implementation of the SSHCP Conservation strategy is expected to preserve 10,208 acres more Valley Grassland within the Planning Area and would result in consistent and more frequent implementation of AMMs that would better avoid and minimize indirect impacts to the Valley Grassland natural community.

Overall, the incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution to the cumulative loss of Valley Grassland in the study area when compared to the incremental impact of the No Action/No Project Alternative.

As discussed in Section 8.2.2.4, the impacts of the No Action/No Project Alternative on Valley Grasslands, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on Valley Grassland. However, as discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the Proposed Action/Proposed Project Alternative has fewer impacts and preserves substantially more Valley Grassland than the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in a ***Minor Beneficial*** effect when compared to the No Action/No Project Alternative baseline condition.

8.2.3.5 Blue Oak Woodland and Blue Oak Savanna

The Blue Oak Woodland land cover and the Blue Oak Savanna land cover are considered together because the plants and animals of both communities overlap considerably (see Section 8.1.2.1), and each land cover has the same regulatory requirements (see Section 8.1.1). Blue Oak Woodland and Blue Oak Savanna land covers are sensitive natural communities (see discussion of individual land covers in Section 8.1.2). As discussed in Section 8.2.1, indirect impacts to the Blue Oak Woodland and Blue Oak Savanna land covers is described qualitatively.

Direct and Indirect Effects of the Proposed Action/Proposed Project Alternative

New urban development and associated infrastructure projects implemented under the Proposed Action/Proposed Project Alternative would directly impact (remove) approximately 9 acres of Blue Oak Savanna and approximately 38 acres of Blue Oak Savanna, for a combined loss of 47 acres (Table 8-8). This would be approximately 93 acres less than the 140 acres of Blue Oak Woodland and Blue Oak Savanna direct impacts expected under the No Action/No Project Alternative (Table 8-4).

Covered Activity projects and activities implemented under the Proposed Action/Proposed Project Alternative would implement relevant SSHCP AMMs to avoid or minimize direct impacts to Blue Oak Woodland and Blue Oak Savanna, including limiting ground disturbance to the construction footprint, implementing erosion-control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-3, ROAD-1, and UTILITY-4), and by implementation of AMMs requiring construction BMPs that avoid and minimize stormwater and pollutant runoff (BMP-2), limit impacts of oil and fuel spills (BMP-3), limit deposit of erodible materials into waterways (BMP-4), control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training on litter control and other requirements of the SSHCP (BMP-8), restore temporarily disturbed areas (BMP-9), revegetate cut slopes (BMP-10), and implement speed limits on the construction site (BMP-11) (see Appendix D for a description of each AMM).

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project Alternative are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts. This additional oversight and guidance provided by the SSHCP would result in AMMs that are implemented more frequently and more consistently at all ground-disturbing activities than the AMMs that would occur in new urban development projects under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6).

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected SSHCP Preserve System within the Planning Area and a comprehensive SSHCP Preserve System management program to maintain and adaptively manage the SSHCP Preserve System in perpetuity (Section 2.3.5). The SSHCP Preserve system would be designed to achieve the stated SSHCP biological goals and measurable objectives for the Planning Area's Blue Oak Woodland and Blue Oak Savanna (Table 2-7).

The Proposed Action/Proposed Project Alternative is expected to both preserve 47 acres of Blue Oak Woodland and Blue Oak Savanna and to re-establish or establish 47 acres of Blue Oak Woodland and Blue Oak Savanna within the Planning Area (Table 8-9), amounts that equal the expected direct impact (loss) of 47 acres within the Planning Area. In comparison, the 70 acres re-established/established under the No Action/No Project Alternative would replace only half of the acres of Blue Oak Woodland and Blue Oak Savanna lost under that alternative. In addition, the preservation and re-establishment of Blue Oak Woodland and Blue Oak Savanna under the Proposed Action/Proposed Project Alternative would occur in the SSHCP Preserve System, which would be more contiguous and maintain greater connectivity between Blue Oak Woodland and Blue Oak Savanna land covers than the project-by-project mitigation preserves that would be established under the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- directly impact 93 fewer acres of Blue Oak Woodland and Blue Oak Savanna and associated plant and animal communities;

- require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Blue Oak Woodland and Blue Oak Savanna;
- provide acres of Blue Oak Woodland and Blue Oak Savanna preservation in the Planning Area (47 acres) equal to the acres of expected impacts to Blue Oak Woodland and Blue Oak Savanna. By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna preservation in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres).
- the would provide acres of Blue Oak Woodland and Blue Oak Savanna re-establishment or establishment in the Planning Area (47 acres) equal to the acres of expected impacts to Blue Oak Woodland and Blue Oak Savanna to provide no net loss of oak woodlands within the Planning Area. By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna re-establishment or establishment in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres).
- result in more interconnected and contiguous Preserves of Blue Oak Woodland and Blue Oak Savanna within the Planning Area, which would reduce habitat fragmentation effects on the Blue Oak Woodland and Blue Oak Savanna plant and animal communities.

Therefore, the Proposed Action/Proposed Project Alternative's impacts to Blue Oak Woodland and Blue Oak Savanna and their associated plant and animal communities would be a ***Minor Beneficial*** effect, when compared to the impacts of the No Action/No Project Alternative on Blue Oak Woodland and Blue Oak Savanna land covers of the Planning Area.

Cumulative Impacts to Blue Oak Woodland and Blue Oak Savanna from the Proposed Action/Proposed Project

The effects of past, present, and reasonably foreseeable other projects on the Blue Oak Woodland and Blue Oak Savanna natural community within the study area were described in Section 8.2.2.5 and represent a significant adverse cumulative impact on Blue Oak Woodland and Blue Oak Savanna within the study area. As discussed in Section 8.2.2.5, the incremental direct and indirect impacts of the No Action/No Project Alternative to Blue Oak Woodland and Blue Oak Savanna, when considered together with the significant impacts to Blue Oak Woodland and Blue Oak Savanna from past, current, and foreseeable future projects and activities in the study area, would be a significant cumulative effect.

As discussed in this section, the Proposed Action/Proposed Project Alternative would result in the incremental loss of 47 acres of Blue Oak Woodland and Blue Oak Savannah and associated plant and animal communities within the Planning Area, which is 93 acres less than the loss of Blue Oak Woodland and Blue Oak Savannah expected under the No Action/No Project Alternative. The

implementation of the SSHCP Conservation Strategy in the Proposed Action/Proposed Project Alternative would preserve 47 acres of Blue Oak Woodland and Blue Oak Savanna, an amount equal to the acres of expected impacts. The No Action/No Project Alternative would also re-establish or establish 47 acres of Blue Oak Woodland and Blue Oak Savanna, an amount also equal to the acres of expected impacts. By comparison, the No Action/No Project Alternative would preserve 70 acres Blue Oak Woodland and Blue Oak Savanna and re-establish or establish 70 acres Blue Oak Woodland and Blue Oak Savanna, amounts that are only half of the expected 140 acres of impacts to Blue Oak Woodland and Blue Oak Savanna.

Overall, the incremental impacts of the Proposed Action/Proposed Project Alternative would make a slightly smaller contribution to the cumulative loss of Blue Oak Woodland and Blue Oak Savanna in the study area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to Blue Oak Woodland and Blue Oak Savanna throughout the study area, the difference in direct impacts and the difference in preservation and re-establishment or establishment of Blue Oak Woodland and Blue Oak Savanna land covers is not discernibly different.

As discussed in Section 8.2.2.5, the impacts of the No Action/No Project Alternative on Blue Oak Woodland and Blue Oak Savanna, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on Blue Oak Woodland and Blue Oak Savanna. However, as discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Proposed Action/Proposed Project Alternative on Blue Oak Woodland and Blue Oak Savanna are not discernibly different from the incremental effects of the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative would result in ***No Cumulative*** effect (when compared to the No Action/No Project Alternative baseline condition.

8.2.3.6 Farmland (Croplands/Irrigated Pasture-Grasslands)

As discussed in Section 8.1.2.1 above, Cropland and Irrigated Pasture-Grasslands are included in the Natural land cover category because they provide habitat for native wildlife (e.g., cottontail rabbits, mule deer, western meadowlark, and red-winged black bird). There are approximately 67,820 acres of Cropland and Irrigated Pasture-Grassland land covers and associated plant and animal communities in the Planning Area. As discussed in Section 8.1.2.1, pasture that is not irrigated and used for ranching and grazing is analyzed in the Valley Grassland land cover.

Direct and Indirect Effects of the Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is expected to directly impact (remove) approximately 8,034 acres of Cropland and Irrigated Pasture-Grasslands (Table 8-8). This is 450

acres less than the approximately 8,484 acres expected to be lost under the No Action/No Project Alternative.

Covered Activity projects and activities implemented under the Proposed Action/Proposed Project Alternative would implement SSHCP AMMs to avoid or minimize direct impacts to Cropland and Irrigated Pasture-Grasslands, including limiting ground disturbance to the construction footprint, implementing erosion control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-3, ROAD-1, and UTILITY-4), and by implementing AMMs requiring construction BMPs that avoid and minimize stormwater and pollutant runoff (BMP-2), limit impacts of oil and fuel spills (BMP-3), limit deposit of erodible materials into waterways (BMP-4), control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training on litter control and other requirements of the SSHCP (BMP-8), restore temporarily disturbed areas (BMP-9), revegetate cut slopes (BMP-10), and implement speed limits on the construction site (BMP-11) (see Appendix D for a description of each AMM).

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project Alternative are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts. This additional oversight and guidance provided by the SSHCP would result in AMMs that are implemented more frequently and more consistently at all ground-disturbing activities than the AMMs that would occur in new urban development projects under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6).

Other SSHCP AMMs that would avoid and minimize indirect effects of SSHCP Covered Activities on the native wildlife community in Cropland and Irrigated Pasture-Grassland include AMM LID-1 through LID-3, and EDGE-4 through EDGE-6 (see Appendix D). Potential direct and indirect impacts to Cropland and Irrigated Pasture-Grassland plant and animal communities from increased human activity and from habitat fragmentation would be minimized by AMMs EDGE-1 through EDGE-3, EDGE-8, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project Alternative (Table 2-6), the SSHCP AMMs would better reduce indirect impacts on these land covers. For example, STREAM-1 through STREAM-3 would require wider setbacks between natural waterways and new development, and wider setbacks between new Preserves and new development, thereby providing greater

protection of all adjacent land covers. The SSHCP AMMs implemented under the Proposed Action/Proposed Project Alternative would be more effective at minimizing indirect impacts on Croplands and Irrigated Pasture-Grasslands than the project-by-project impact AMMs that would be implemented of the No Action/No Project Alternative (Table 2-6).

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected SSHCP Preserve System within the Planning Area and a comprehensive SSHCP Preserve System management program to maintain and adaptively manage the SSHCP Preserve System in perpetuity (Section 2.3.5). The SSHCP Preserve system would be designed to achieve the stated SSHCP biological goals and measurable objectives for the natural communities that utilize Croplands and Irrigated Pasture-Grasslands, including the Planning Area's Swainson's hawk and wintering sandhill crane populations (Table 2-7).

Because the Orchard and Vineyard land covers provide relatively low habitat value for the native wildlife community that uses farmlands as habitat, the Proposed Action/Proposed Project Alternative would mitigate direct impacts to any Farmland land cover by preserving the same acreage of either Cropland or Irrigated Pasture-Grassland land covers. The SSHCP Preserve System would include approximately 9,696 acres of Croplands and Irrigated Pasture-Grasslands (Table 8-9). This would be 1,212 acres more than the 8,484 acres of farmland expected to be preserved under the No Action/No Project Alternative. The farmland Preserves of Cropland or Irrigated Pasture-Grassland established under the Proposed Action/Proposed Project Alternative would be more contiguous, maintain greater habitat connectivity between Preserves, and provide better habitat for native wildlife species than the farmland preserves established on a project by project basis under the No Action/No Project Alternative.

Potential indirect effects of new urban development on Cropland and Irrigated Pasture-Grassland Preserves within the SSHCP Preserve System would be avoided or minimized by other SSHCP AMMs required by the Proposed Action/Proposed Project Alternative. For example, the potential for increased invasive species would be minimized by EDGE-10 and ROAD- 3, and the effects of expected increased wildfire frequency would be minimized by EDGE-3b (see Appendix D for a description of all SSHCP AMMs).

The Preserve System implemented under the Proposed Action/Proposed Project Alternative (Section 2.3.5) would include approximately 9,696 acres of Cropland and Irrigated Pasture-Grassland (Table 8-9). This area is 2,081 acres more than the total 7,615 acres of Cropland and Irrigated Pasture-Grassland that could be preserved under the No Action/No Project Alternative (Table 8-5). In addition, as discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would preserve Cropland and Irrigated Pasture-Grassland within an interconnected SSHCP Preserve System throughout the Planning Area, and would include a comprehensive, in-perpetuity, preserve management program. In addition, the SSHCP Preserve System under the Proposed Action/Proposed Project Alternative would result in larger individual Preserves and

greater connectivity of Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- directly impact(remove) 450 fewer acres of Cropland and Irrigated Pasture-Grassland land cover and their plant and animal communities;
- require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Cropland and Irrigated Pasture-Grassland;
- preserve 2,081 acres more Cropland and Irrigated Pasture-Grassland (or a similar quality Farmland land cover) within a large SSHCP Preserve System; and
- result in more contiguous Preserves and an interconnected Preserve System that includes Cropland and Irrigated Pasture-Grassland within the Planning Area and which would reduce habitat fragmentation effects on native wildlife in the Planning Area.

Therefore, the Proposed Action/Proposed Project Alternative's impact to Cropland and Irrigated Pasture-Grassland land is a ***Minor Beneficial*** effect when compared to the No Action/No Project Alternative impacts on Cropland and Irrigated Pasture-Grassland land covers and farmland wildlife community.

Cumulative Impacts to Cropland and Irrigated Pasture-Grassland from the Proposed Action/Proposed Project Alternative

The effects of past, present, and reasonably foreseeable other projects on the Cropland and Irrigated Pasture-Grassland natural communities within the study area were described in Section 8.2.2.6. Also as discussed in Section 8.2.2.6, the incremental direct and indirect impacts of the No Action/No Project Alternative on Cropland and Irrigated Pasture-Grassland, when considered together with the impacts to Cropland and Irrigated Pasture-Grassland from past, current, and foreseeable future projects and activities in the study area, would result in a significant cumulative effect.

As discussed in this section, the Proposed Action/Proposed Project Alternative would result in the incremental loss of 8,034 acres of Cropland and Irrigated Pasture-Grassland and associated plant and animal communities within the Planning Area, which is 450 acres less than the loss expected under the No Action/No Project Alternative. The implementation of the SSHCP Conservation strategy is expected to preserve 2,081 more acres of Cropland and Irrigated Pasture-Grassland within the Planning Area within an interconnected SSHCP Preserve System and would result in consistent and more frequent implementation of AMMs that would better avoid and minimize

indirect impacts to the natural communities associated with Cropland and Irrigated Pasture-Grassland land covers.

Overall, the incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution to the cumulative loss of Cropland and Irrigated Pasture-Grassland in the study area when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to Cropland and Irrigated Pasture-Grassland throughout the study area, the 450-acre difference in direct impacts and the 2,081-acres difference in the permanent preservation of Cropland and Irrigated Pasture-Grassland land covers is not discernibly different between the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative.

As discussed in Section 8.2.2.6, the impacts of the No Action/No Project Alternative on Cropland and Irrigated Pasture-Grassland, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on Cropland and Irrigated Pasture-Grassland. However, as discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Proposed Action/Proposed Project Alternative on Cropland and Irrigated Pasture-Grassland are not discernibly different from the incremental effects of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative*** effect when compared to the No Action/No Project Alternative baseline condition.

8.2.3.7 Farmland (Orchard/Vineyard)

As discussed in Section 8.1.2, Orchard and Vineyard are included in the Natural land cover category because they provide habitat for native wildlife (e.g., small mammals, perching raptors, other native birds, roosting western red bats). There are approximately 30,367 acres of Orchard and Vineyard land covers and the associated plant and animal communities in the Planning Area.

Direct and Indirect Effects of the Alternative

The Proposed Action/Proposed Project Alternative is expected to directly impact (remove) approximately 1,662 acres of Orchard and Vineyard (Table 8-8). This loss is 63 acres less than the approximately 1,725 acres of Orchard and Vineyard estimated to be lost under the No Action/No Project Alternative.

Covered Activity projects and activities implemented under the Proposed Action/Proposed Project Alternative would implement SSHCP AMMs to avoid or minimize direct impacts to

Orchard and Vineyard, including limiting ground disturbance to the construction footprint, implementing erosion-control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-3, ROAD-1, and UTILITY-4), and by implementing AMMs requiring construction BMPs that avoid and minimize stormwater and pollutant runoff (BMP-2), limit impacts of oil and fuel spills (BMP-3), limit deposit of erodible materials into waterways (BMP-4), control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training on litter control and other requirements of the SSHCP (BMP-8), restore temporarily disturbed areas (BMP-9), revegetate cut slopes (BMP-10), and implement speed limits on the construction site (BMP-11) (see Appendix D for a description of each AMM).

AMM BMP-1 through AMM BMP-11 of the Proposed Action/Proposed Project are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts. This additional oversight and guidance provided by the SSHCP would result in AMMs that are implemented more frequently and more consistently at all ground-disturbing activities than the AMMs that would occur in new urban development projects under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6).

Other SSHCP AMMs that would avoid and minimize indirect effects of SSHCP Covered Activities on the native wildlife community in Orchard and Vineyard include AMM LID-1 through LID-3, and EDGE-4 through EDGE-6 (see Appendix D). Potential direct and indirect impacts to Orchard and Vineyard natural communities from increased human activity and from habitat fragmentation would be minimized by AMMs EDGE-1 through EDGE-3, EDGE-8, ROAD-1, ROAD-2 NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project Alternative (Table 2-6), the SSHCP AMMs would better reduce indirect impacts on these land covers. For example, STREAM-1 through STREAM-3 would require wider setbacks between natural waterways and new development, and wider setbacks between new Preserves and new development, thereby providing greater protection of all adjacent land covers. The SSHCP AMMs implemented under the Proposed Action/Proposed Project Alternative would be more effective at minimizing indirect impacts on Orchard and Vineyard than the project-by-project impact AMMs that would be implemented for the No Action/No Project Alternative (Table 2-6).

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected SSHCP Preserve System within the Planning Area and a comprehensive SSHCP Preserve System management program to maintain and adaptively manage the SSHCP Preserve System in perpetuity (Section 2.3.5). The SSHCP Preserve system would be designed to achieve the stated SSHCP Biological Goals and Measurable Objectives for the native species that utilize farmlands (Table 2-7). However, the SSHCP Preserve System would not preserve any acres of Orchard or Vineyard land covers. Because the Orchard and the Vineyard land covers provide relatively low habitat value for the native wildlife community that uses farmlands as habitat, the Proposed Action/Proposed Project Alternative would instead mitigate direct impacts to Orchards and Vineyards by preserving the same acreage of either Cropland or Irrigated Pasture-Grassland land covers (Table 8-9). Therefore, the 9,696 acres of farmland Preserves established under the Proposed Action/Proposed Project Alternative would be more contiguous, maintain greater habitat connectivity between Preserves, and provide better habitat for native wildlife species than the farmland preserves established on a project–by-project basis under the No Action/No Project Alternative. In addition, farmland Preserves established by the Proposed Action/Proposed Project Alternative would be operated to provide or improve habitat for target native species of concern. In addition, indirect effects of new urban development on farmland would be avoided or minimized by SSHCP AMMs. For example, the potential for increased invasive species would be minimized by EDGE-10 and ROAD-3, and the effects of expected increased wildfire frequency would be minimized by EDGE-3b (see Appendix D for a description of all SSHCP AMMs). The total 9,696 acres of Farmland land covers preserved under the Proposed Action/Proposed Project Alternative (Table 8-9) would equal the anticipated direct impact to Farmland land covers under Proposed Action/Proposed Project Alternative (Table 8-8), and this farmland preservation is 515 acres more than the 9,181-acres of farmlands preserved under the No Action/No Project Alternative (Table 8-5).

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- directly impact(remove) 63 fewer acres of Orchard and Vineyard land covers and their plant and animal communities;
- require Covered Activities to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Orchard and Vineyard land covers;
- preserve 515 acres more farmland and would preserve farmland within a large SSHCP Preserve System;
- mitigate impacts to Orchard and Vineyard land covers by preserving equal acres of Cropland and Irrigated Pasture-Grassland land covers, which provide much higher

quality habitat for the native wildlife community that uses farmland in the Planning Area; and

- preserve farmland in larger Preserves within an interconnected Preserve System, which would reduce habitat fragmentation effects on native wildlife in the Planning Area.

Therefore, the Proposed Action/Proposed Project Alternative's impacts to Orchard and Vineyard land covers and farmland wildlife community is a ***Minor Beneficial*** effect when compared to the No Action/No Project Alternative impacts on Orchard and Vineyard land covers and farmland wildlife community.

Cumulative Impacts to Orchards and Vineyards by the Proposed Action/ Proposed Project

The effects of past, present, and reasonably foreseeable other projects on the Orchard and Vineyard land covers within the study area were described in Section 8.2.2.7. Also as discussed in section 8.2.2.7, the incremental impacts of the No Action/No Project Alternative on Orchard and Vineyard land covers, when considered together with the impacts to Orchard and Vineyard from past, current, and foreseeable future projects and activities in the study area, would result in a less than significant cumulative effect to Orchard and Vineyard land covers.

As discussed here in Section 8.2.3.7, the Proposed Action/Proposed Project Alternative would result in the incremental loss of 1,662 acres of Orchard, Vineyard, and associated plant and animal communities within the Planning Area (Table 8-8), which is 63 acres less than the loss expected under the No Action/No Project Alternative (Table 8-4). The implementation of the SSHCP Conservation strategy is expected to preserve 515 more acres of farmland within a large interconnected Preserve System, would preserve farmland with much higher habitat value than the impacted Orchard and Vineyard land covers, and would result in consistent and more frequent implementation of AMMs that would better avoid and minimize indirect impacts to the farmland land covers and wildlife natural communities.

Overall, the incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution to the cumulative loss of farmland in the study area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to farmland throughout the study area, the 63-acre difference in direct impacts to Orchard and Vineyard land covers and the 515 acres difference in the preservation of farmland land covers is not discernibly different between the Proposed Action/ Proposed Project Alternative and the No Action/No Project Alternative.

As discussed in Section 8.2.2.6, the impacts of the No Action/No Project Alternative on Orchard and Vineyard land covers, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would have a less than

significant adverse cumulative effect on Orchard and Vineyard. However, as discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Proposed Action/Proposed Project Alternative on Orchard and Vineyard is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative*** effect when compared to the No Action/No Project baseline condition.

8.2.3.8 Wildlife Movement Corridors

Direct and Indirect Effects of the Alternative

As shown in Figure 8-2 and Table 8-3, there are four ECAs either partially or wholly within the Planning Area. The majority of development under the Proposed Action/Proposed Project Alternative would occur within in the UDA (see Section 2.3.3) and could only impact the extreme northern most portion of the Duck Creek North Fork - Coyote Creek ECA.

Outside the UDA, no recycled water pipeline Covered Activities would be located within an ECA. However, rural transportation Covered Activity projects are anticipated to occur within the Stone Lake – Yolo Bypass, Bear Slough – Browns Creek, and Duck Creek North Fork – Coyote Creek ECAs. These rural transportation projects include road-widening projects, which could reduce the ability of wildlife to move across these roadways and within these ECAs. The types of rural transportation Covered Activities included under the Proposed Action/Proposed Project Alternative are similar to the types of rural transportation projects included under the No Action/No Project Alternative; however, additional roadway development is expected under the No Action/No Project Alternative to serve the 1,900 acres of new urban development that is expected to be displaced outside of the existing USB boundary under the No Action Alternative (see Section 2.2.3).

Potential direct effects of future rural transportation Covered Activities under the Proposed Action/Proposed Project Alternative would occur from new or expanded roadways that would increase the size of existing movement barriers or create new barriers to terrestrial wildlife movement. However, all Covered Activities implemented under the Proposed Action/Proposed Project Alternative would incorporate SSHCP AMMs, which would reduce habitat fragmentation and also require roadway projects to incorporate structures that would allow native wildlife to cross under improved or new roadways. SSHCP AMMs that would help to maintain existing wildlife movement include EDGE-1 through EDGE-3, and ROAD-1 through ROAD-3. Several SSHCP AMMs (STREAM-1 through STREAM-5) would also require larger setbacks between existing waterways and new development relative to the No Action/No Project Alternative. These wider setbacks between new development in the UDA and existing waterways would allow continued wildlife movement in

these riparian corridors. The SSHCP AMMs would also reduce other environmental stressors associated with urban development (see Appendix G-1) to better avoid or minimize indirect impacts on wildlife movement, relative to the No Action/No Project Alternative.

In addition, the Proposed Action/Proposed Project Alternative would allow urban development within the MCRA portion of the UDA to be consistent with the planned development described in the approved Sacramento County and Rancho Cordova General Plans, without approximately 19,000 acres of new urban development being displaced to locations outside the current USB boundary (see Section 2.2.3). Because the Proposed Action/Proposed Project Alternative would not result in the displacement of planned urban development to locations outside of the UDA, the expected No Action/No Project Alternative impacts to the Duck Creek North Fork – Coyote Creek ECA would not occur under the Proposed Action/Proposed Project Alternative.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected 34,494-acre SSHCP Preserve System within the Planning Area (Table 8-9), and a comprehensive SSHCP Preserve System management program to maintain and adaptively manage the SSHCP Preserve System in perpetuity (Section 2.3.5). The SSHCP Preserve System would be designed to achieve the stated SSHCP Biological Goals and Measurable Objectives for wildlife movement, including maintaining wildlife movement and dispersal through the Planning Area, including inside the UDA and outside the UDA (Table 2-7).

Significance of Direct and Indirect Effects of the Alternative

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- provide a coordinated, interconnected Preserve System designed to provide connectivity between existing preserves and new Preserves established under the Proposed Action/Proposed Project Alternative;
- require new development project to incorporate AMMs that would avoid or minimize effects on riparian corridors used for wildlife movement;
- require new development projects inside the UDA and related roadway projects outside the UDA to incorporate wildlife crossing structures at specific locations; and
- not result in displaced development outside the UDA to locations that have a greater potential to affect designated wildlife movement corridors.

Therefore, the Proposed Action/Proposed Project Alternative's impact to wildlife movement corridors would be ***Minor Beneficial*** effect when compared to the No Action/No Project Alternative impacts on wildlife movement in the Planning Area.

Cumulative Impacts to Wildlife Movement from the Proposed Action/Proposed Project

The effects of past, present, and reasonably foreseeable other projects on wildlife movement in the study area were described above in Section 8.2.2.8 and represent a significant adverse cumulative impact on wildlife movement within the study area. As discussed in Section 8.2.2.8, the incremental direct and indirect impacts of No Action/No Project Alternative on existing wildlife movement and dispersal would be a significant cumulative effect, when considered together with the significant impacts to wildlife movement from past, current, and foreseeable future projects and activities in the study area.

As discussed in this section, the Proposed Action/Proposed Project Alternative would provide an interconnected Preserve System in the Planning Area, which would not occur under the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative would require wider setbacks between development and waterways, preserving wider riparian movement corridors when compared to the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would require roadway projects to include AMMs that would provide wildlife undercrossing at specific locations.

Overall, the incremental impacts of the Proposed Action/Proposed Project Alternative would make a smaller contribution to the cumulative loss of wildlife movement and dispersal in the study area, when compared to the incremental impact of the No Action/No Project Alternative. However, at the scale of wildlife movement throughout the study area, the difference in movement under the Proposed Action/Proposed Project Alternative when compared to impacts under the No Action/No Project Alternative is not discernibly different.

As discussed in Section 8.2.2.8, the impacts of the No Action/No Project Alternative on wildlife movement and dispersal, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect. However, as discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Proposed Action/Proposed Project Alternative on wildlife movement in the study area is not discernibly different from the incremental effects of the No Action/No Project Alternative on wildlife movement in the study area, the Proposed Action/Proposed Project Alternative would result in ***No Cumulative*** effect (when compared to the No Action/No Project baseline condition).

8.2.4 Reduced Permit Term Alternative

The Reduced Permit Term Alternative is described in Section 2.4. The Reduced Permit Term Alternative includes the same types of new urban development and infrastructure as those

anticipated under the No Action/No Project Alternative (see Section 2.4.3). New urban development implemented under any EIS/EIR alternative could result in the same types of environmental stressors (see Appendix G). The ESA and CESA incidental take permits and the CWA permit strategy for HCP Covered Activities would be valid only during the 30-year permit term of the Reduced Permit Term Alternative, and the Reduced Permit Term Alternative's Conservation Strategy would be implemented only during this 30-year term (see Section 2.4.1). The development of five large master plans within the UDA (see Sections 2.3.3 and 2.3.4) are expected to occur during the 30-year permit term. Under the Reduced Permit Term Alternative, the core of the SSHCP Preserve System inside the UDA would be associated with those five large master plans (see Sections 2.3.3 and 2.4.3). Because the core of the Preserve System inside the UDA under both EIS/EIR action alternatives is associated with the same five large master plans, approximately 70% of the UDA Preserves established under the Reduced Permit Term Alternative would have similar sizes, boundaries, and locations as the UDA Preserves established under the Proposed Action/Proposed Project Alternative. However, the shorter duration of the Reduced Permit Term Alternative—and the smaller amount of urban development and associated development fees collected under the Reduced Permit Term Alternative—would not allow the HCP's Implementing Entity to establish as many acres of new Preserves in the Planning Area as would occur under the Proposed Action/Proposed Project's 50-year permit term. Therefore, fewer new Preserves would be established under the Conservation Strategy of the Reduced Permit Term Alternative. This difference in acres of Natural land cover preservation would be especially pronounced outside the UDA.

This EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3), so the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, as described in Section 3.6.7.2, the EIS/EIR analysis of the Reduced Permit Term Alternative also considers future urban development that is not part of the project description of the Reduced Permit Term Alternative, but is still expected to occur within the Planning Area after the end of the permit term (i.e., in years 31–50 of the EIS/EIR Study Period). As described in Section 3.6.7.2, project mitigation Preserves established after the end of the 30-year Reduced Permit Term Alternative would be established under the existing project-by-project process for obtaining individual authorizations under CWA, ESA, CESA, and Section 1600 of the California Fish and Game Code. Consequently, mitigation Preserves established in years 31–50 of the EIS/EIR study period would not be established using a regional, landscape-based approach that balances the need for new urban development with the need for resource conservation, as would be provided by an HCP. Therefore, much of the Preserve System inside the UDA would be very similar under the two action alternatives, but the Preserve System outside the UDA would be substantially different between the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, it is unlikely that mitigation preserves established outside the

UDA would be contiguous or would be interconnected, and it is unlikely that a large, contiguous 10,500-acre landscape-size vernal pool Preserve would be established in the southwestern portion of the Planning Area. Likewise, the No Action/No Project Alterative also would not result in contiguous, interconnected preserves outside the UDA, and would not establish a 10,500-acre vernal-pool Preserve in the Planning Area. In these ways, the new mitigation Preserves established outside the UDA under the Reduced Permit Term Alternative and the No Action/No Project Alternative would be similar.

Table 8-12 presents the direct impacts (loss) of each natural land cover inside and outside the UDA expected under the Reduced Permit Term Alternative. Table 8-13 presents the acres of each natural land cover expected to be preserved under the Reduced Permit Term Alternative. Table 8-8 also presents acres of each Natural land cover that would be re-established or established under the Reduced Permit Term Alternative.

Table 8-12. Expected Direct Impacts to Natural Land Covers – Reduced Permit Term Alternative

Land Cover	Direct Effects within UDA (acres)	Direct Effects outside UDA (acres)	Total Direct Impacts (acres)	Existing Acres in Planning Area	Percent of Existing Acres Affected
Aquatic Land Covers					
Wetlands and Other Waters					
Vernal Pool*	379	34	413	4,536	9%
Swale*	268	2	270	1,252	22%
Streams/Creeks (VPIH)*	28	0	28	73	38%
Seasonal Wetland*	107	4	111	2,600	4%
Freshwater Marsh*	129	8	137	2,954	5%
Streams/Creeks*	97	25	122	2,778	4%
Open Water*	164	1	165	2,344	7%
Total Wetlands and Other Waters	*1,172*	*74*	*1,246*	*16,537*	*8%*
Riparian					
Mixed Riparian Woodland*	159	38	197	5,856	3%
Mixed Riparian Scrub*	191	3	194	1,454	13%
Mine Tailing Riparian Woodland*	219	0	219	641	34%
Total Riparian	*569*	*41*	*610*	*7,951*	*8%*
Total Aquatic Land Covers	**1,741**	**115**	**1,856**	**24,488**	**8%**
Terrestrial Land Covers					
Natural Uplands					
Valley Grassland	23,002	669	23,671	135,152	18%
Blue Oak Woodland*	0	9	9	9,132	0.1%
Blue Oak Savanna*	9	29	38	5,637	0.7%
Total Natural Uplands	*23,011*	*707*	*23,718*	*149,921*	*16%*
Farmland					
Cropland	5,102	363	5,465	51,829	11%
Irrigated Pasture-Grassland	2,509	156	2,665	15,991	17%
Orchard	209	16	225	3,907	6%
Vineyard	1,350	80	1,430	26,460	5%
Total Farmland	*9,170*	*615*	*9,785*	*98,187*	*10%*
Total Terrestrial Land Covers	**32,181**	**1322**	**33,503**	**248,108**	**14%**
GRAND TOTAL	**33,921**	**1,437**	**35,358**	**272,596**	**13%**

Notes:

* Indicates land cover type that is considered sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations; see Section 8.1.2.3.

Table 8-13. Natural Land Cover Mitigation under the Reduced Permit Term Alternative

Land Cover	HCP Preserve System (acres)			Re-establishment/ Establishment (acres)*
	Inside UDA	*Outside UDA*	*Total*	
Aquatic Land Covers				
Wetlands and Other Waters				
Vernal Pool**	101	1,098	1,199	413
Swale**	57	478	535	228
Stream/Creek (Vernal Pool Invertebrate Habitat)**	16	0	16	8
Seasonal Wetland**	55	15	70	**91**
Freshwater Marsh**	100	0	100	**119**
Stream/Creek**	41	81	122	**105**
Open Water**	43	0	43	104
Total Wetland and Other Waters	*413*	*1,672*	*2,085*	*1,068*
Riparian				
Mine Tailing Riparian Woodland**	0	5	5	0
Mixed Riparian Scrub**	33	317	350	303
Mixed Riparian Woodland**	54	284	338	306
Total Riparian Land Covers	*87*	*606*	*693*	*609*
Total Aquatic Resources	**500**	**2,278**	**2,778**	**1,677**
Terrestrial Land Covers				
Natural Uplands				
Valley Grassland	4,066	14,523	18,589	0
Blue Oak Woodland**	0		9	9
Blue Oak Savanna**	15	22	37	37
Total Natural Uplands	*4,081*	*14,554*	*18,635*	*46*
Farmlands				
Cropland	221	5,078	5,299	0
Irrigated Pasture-Grassland	32	2,610	2,642	0
Orchard	0	10	10	0
Vineyard	0	1,175	1,175	0
Total Farmland	*253*	*8,873*	*9,126*	*0*
Total Terrestrial Land Covers	**4,334**	**23,427**	**27,761**	**46**
TOTAL NATURAL LAND COVERS	**4,834**	**25,705**	**30,539**	**1,723**

* The re-establishment/establishment acres in this column are in addition to the preservation acres presented in the previous column.

* * Indicates a land cover type that is sensitive. Sensitive natural communities are those that receive specific recognition or legal protection under federal, state, or local laws or regulations.

8.2.4.1 Vernal Pool Ecosystem

As discussed in Section 8.1.2.2, impacts to the four land covers within the Vernal Pool Ecosystem land covers are discussed and analyzed together because they function together as a single ecosystem (also see discussion in Appendix G-1). Indirect impacts to the Vernal Pool Ecosystem is described qualitatively for the Valley Grassland land cover, but is described both

qualitatively and quantitatively for the Vernal Pool, Swale, and Stream/Creek (VPIH) land covers (see Section 8.2.1).

Direct and Indirect Effects of the Alternative

The Reduced Permit Term Alternative would directly impact approximately 18,825 acres of Vernal Pool Ecosystem (Table 8-14) over the EIS/EIR 50-year permit term. This is 1,135 acres more than the anticipated 17,690 acres of Vernal Pool Ecosystem expected to be directly impacted under the No Action/No Project Alternative over the EIS/EIR 50-year permit term (Table 8-6, Section 8.2.2).

Table 8-14. Direct and Indirect Effects on the Vernal Pool Ecosystem – Reduced Permit Term Alternative

Land Cover	Direct Loss Within the UDA (acres)	Direct Loss Outside the UDA (acres)	Indirect Effects (acres)	Total Impacts (acres)	Total Existing in 317,655-acre Planning Area	Percent of Existing Impacted in Planning Affected
Valley Grassland (in Vernal Pool Ecosystem)	17,828	286	Described Qualitatively	18,114	97,349	18.6%
Vernal Pool	379	34	186	599	4,536	13.2%
Swale	268	2	77	347	1,252	27.7%
Stream/Creek (VPIH)	28	0	8	36	73	49.3%
Vernal Pool Ecosystem Total Impacts	**18,503**	**322**	**271**	**19,096**	**103,210**	**18.5%**

As discussed in Section 8.1.2.5, most of the MCRA is located inside the UDA. Of the approximately 18,117 existing acres of Vernal Pool Ecosystem within the MCRA, approximately 9,800 acres are expected to be directly impacted (removed), and an additional 237 acres are expected to be indirectly impacted by the Reduced Permit Term Alternative, for a total of 10,037 acres (55% of the MCRA's Vernal Pool Ecosystem).

During the 30-year permit term, SSHCP Covered Activities implemented during the permit term would include relevant SSHCP AMMs to avoid or minimize direct and indirect impacts on the Vernal Pool Ecosystem (see Section 2.4.5). The SSHCP AMMs (see Appendix D) include limiting ground disturbance to the construction footprint, implementing erosion-control BMPs during any ground disturbance, and siting roads and utilities outside of sensitive areas (BMP-1, BMP-2, BMP-3, ROAD-1, and UTILITY-4); and implementing BMPs that control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training (BMP-8), and implement speed limits on the

construction site (BMP-11). Indirect impacts to Stream/Creek and Vernal Pool water quality and hydrology would be minimized by AMM LID-1 through LID-3 and EDGE-4 through EDGE-7.

AMM BMP-1 through AMM BMP-11 are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM implemented during the 30-year permit term. The Reduced Permit Term Alternative would also include annual review of the effectiveness of each SSHCP AMM implemented during the permit term and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Reduced Permit Term Alternative would result in BMPs and water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The AMMs implemented during the 30-year permit term also include new AMMs that would not occur under the No Action/No Project Alternative, and these new measures are expected to lessen the potential adverse effects to the Aquatic land covers of the Vernal Pool Ecosystem, compared to the effects of the No Action/No Project Alternative on the Vernal Pool Ecosystem.

Therefore, the environmental stressors that result from urban development (see Appendix G) are expected to indirectly impact the hydrology, ecology, and species habitat within 271 acres of Vernal Pools, Swales, and Stream/Creek (VPIH) (Table 8-14), which is 10 acres less than indirect impacts to Vernal Pools, Swales, and Stream/Creek (VPIH) expected under the No Action/No Project Alternative (Table 8-6).

The total 19,096 acres of directly and indirectly impacted Vernal Pool Ecosystem is approximately 18.5% of the existing 103,210 acres of Vernal Pool Ecosystem land covers in the Planning Area (Table 8-2, Table 8-14). This expected total impact to the Vernal Pool Ecosystem under the Reduced Permit Term Alternative is 1,147 acres more than the total 17,949 acres of Vernal Pool Ecosystem impacts estimated for the No Action/No Project Alternative (Table 8-6, Section 8.2.2).

The Reduced Permit Term Alternative is expected to preserve approximately 15,302 acres of Vernal Pool Ecosystem land covers over the EIS/EIR's 50-year study period (Table 8-15), which would include an expected 10,716 acres of Vernal Pool Ecosystem within the HCP Preserve System established during the 30-year permit term, and 4,590 acres preserved on a project-by-project basis as ESA mitigation (after the end of the permit term). The total acres of Vernal Pool Ecosystem preservation under the Reduced Permit Term Alternative is approximately 4,896 acres greater than the 10,406 acres of Vernal Pool Ecosystem preservation expected under the No Action/No Project Alternative. In addition, because the 10,716 acres preserved during the

first 30 years of the Reduced Permit Term Alternative would be within a more contiguous and interconnected HCP Preserve System, these acres of preserved Vernal Pool Ecosystem would better maintain the existing habitat values and existing ecology of the Vernal Pool Ecosystem, when compared the individual Preserves that would be established on a project-by-project basis under the No Action/No Project Alternative.

The SSHCP AMMs implemented during the 30-year permit would be more effective at minimizing indirect impacts of new urban development on the existing hydrology and ecology of the Vernal Pool Ecosystem (see AMMs EDGE -1 through EDGE-10 in Appendix D) than the project-by-project impact AMMs that would be implemented of the No Action/No Project Alternative.

Potential indirect impacts to the Vernal Pool Ecosystem from other environmental stressors, such as increased human activity and habitat fragmentation would be minimized during the 30-year permit term by EDGE-1 through EDGE-3, EDGE-8, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-4, STREAM-1 through STREAM-5, and UTILITY-2 through UTILITY-4. The potential for urban development to allow invasive species to more easily colonize SSHCP Preserves would be minimized by EDGE-10 and ROAD-3. In addition, when a Vernal Pool Ecosystem Preserve is located next to a new urban development during the permit term, the development would include Preserve access-points designed to minimize impacts to the Vernal Pool Ecosystem that can be caused by the loading and unloading of livestock used to manage Valley Grasslands of preserved Vernal Pool Ecosystem (EDGE-9).

In addition to preserving 15,302 acres of Vernal Pool Ecosystem aquatic land covers, the Reduced Permit Term Alternative would re-establish or establish 649 acres of Vernal Pool Ecosystem Aquatic land covers (Table 8-15). Potential Impacts to existing vernal pools from the establishment of new vernal pools within a preserved Vernal Pool Ecosystem would be minimized by AMMs (see RE-ESTABLISHMENT/ ESTABLISHMENT AMMs described in Appendix D).

Table 8-15. Expected Mitigation for Vernal Pool Ecosystem Impacts Under the Reduced Permit Term Alternative

Land Cover	Preserved Land (acres)			Re-establishment/ Establishment (acres)
	Inside UDA	*Outside UDA*	*Total*	
Valley Grassland (in Vernal Pool Ecosystem)	3,550	10,002	13,552	0
Vernal Pool	101	1,098	1,199	413
Swale	57	478	535	228
Stream/Creek (VPIH)	16	0	16	8
Total Vernal Pool Ecosystem	**3,724**	**11,578**	**15,302**	**649**

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- directly and indirectly impact 1,147 more acres of Vernal Pool Ecosystem and associated vernal pool plant and animal communities;
- directly and indirectly impact 254 more acres of the MCRA's Vernal Pool Ecosystem and the associated vernal pool plant and animal communities;
- implement better AMMs to reduce and minimize indirect effects of development projects and activities on the Vernal Pool Ecosystem during the 30-year permit term;
- preserve approximately 4,896 more acres of Vernal Pool Ecosystem in the Planning Area, and approximately two-thirds of the preserved Vernal Pool Ecosystem acres would be within an interconnected Preserve System established during the 30-year permit term;
- establish Preserves during the 30-year permit term that would be more interconnected and more contiguous than the Preserves established under the No Action/No Project Alternative; and
- preserve approximately 1,193 acres less of the MCRA's Vernal Pool Ecosystem and the associated vernal pool plant and animal communities.

Therefore, the Reduced Permit Term Alternative's incremental impact to the Vernal Pool Ecosystem and natural communities would be a ***Less Than Significant Adverse*** effect when compared to the No Action/No Project Alternative incremental impacts on the Vernal Pool Ecosystem and natural communities.

Cumulative Effects on the Vernal Pool Ecosystem from the Reduced Permit Term Alternative

The effects of past, present, and reasonably foreseeable other projects on the Vernal Pool Ecosystem within the study area were described in Section 8.2.2.1 and represent a significant adverse cumulative impact on the Vernal Pool Ecosystem within the study area. The incremental effects of the No Action/No Project Alternative, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area, were determined to be significant (see Section 8.2.2.1).

The incremental effects of the Reduced Permit Term Alternative would directly and indirectly impact 19,096 acres of Vernal Pool Ecosystem within the Planning Area, which is 1,147 acres more than the total direct and indirect impact expected under the No Action/No Project Alternative. Overall, the Reduced Permit Term Alternative would make a slightly larger contribution to study area cumulative effects on the Vernal Pool Ecosystem, when compared to

the No Action/No Project Alternative. However, at the scale of Vernal Pool Ecosystem impacts throughout the study area, the 1,147-acre difference in impacts under the Reduced Permit Term Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. As discussed in Section 8.2.2.1, the impacts of the No Action/No Project Alternative on the Vernal Pool Ecosystem, when considered together with the impacts to Vernal Pool Ecosystem from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on the Vernal Pool Ecosystem. However, this EIS/EIR evaluates the future impacts of the two action alternatives relative to the future conditions expected under the No Action/No Project Alternative (see Section 3.6.1). Therefore, because the incremental effects of the Reduced Permit Term Alternative on the study area Vernal Pool Ecosystem is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect when compared to the No Action/No Project baseline condition.

8.2.4.2 Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water

As discussed in Section 8.1.2.1, the plant and animal communities associated with Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water Natural land covers differ in composition, but provide similar aquatic habitats, have similar ecology, and have similar susceptibility to the environmental stressors described in Appendix G-1. Therefore, Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water Natural land covers are analyzed together in Chapter 8 (Section 8.2.1). As discussed in Section 8.1.2.1, Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water communities are also considered “sensitive” natural communities.

Direct and Indirect Effects of the Alternative

The acres of direct impacts under the Reduced Permit Term Alternative on natural communities of the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers would be approximately 535 acres (Table 8-12). This loss is 48 acres less than the loss of approximately 583 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers and associated plant and animal communities under the No Action/No Project Alternative.

All HCP Covered Activities implemented during the 30-year permit term would incorporate relevant SSHCP AMMs to avoid or minimize direct and indirect impacts on the Aquatic land covers, including the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water (see Section 2.4.5). The SSHCP AMMs (see Appendix D) include limiting ground disturbance to the construction footprint, implementing erosion-control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-2, ROAD-1, and UTILITY-4); and implementing BMPs

that control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training (BMP-8), and implement speed limits on the construction site (BMP-11). Indirect impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water water-quality and hydrology would be minimized by AMM LID-1 through LID-3, and EDGE-4 through EDGE-7.

AMM BMP-1 through AMM BMP-11 are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM implemented during the 30-year permit term. The Reduced Permit Term Alternative would also include annual review of the effectiveness of each SSHCP AMM implemented during the permit term and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Reduced Permit Term Alternative would result in BMPs and water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The AMMs implemented during the 30-year permit term also include new AMMs that would not occur under the No Action/No Project Alternative, and these new measures are expected to lessen the potential adverse effects to the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers compared to the effects of the No Action/No Project Alternative on these aquatic natural communities.

Other SSHCP AMMs that would avoid and minimize indirect effects of the SSHCP Covered Activities on water quality and hydrology of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water communities include AMM LID-1 through LID-3, and EDGE-4 through EDGE-6 (Appendix D). Potential impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water communities from increased human activity and from habitat fragmentation would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project Alternative (Table 2-6), the HCP AMMs would better reduce indirect impacts on aquatic land covers during the 30-year permit term. For example, STREAM-1 through STREAM-3 would require wider setbacks between natural waterways and new development, thereby providing greater protection of existing water quality and species habitats of Stream/Creek and other aquatic resources. Therefore, the environmental stressors that result from urban development (see Appendix G) implemented during the 30-year permit term are expected to be smaller in extent and result in fewer indirect impacts to the existing hydrology, ecology, and species habitat of Seasonal Wetland,

Freshwater Marsh, Stream/Creek, and Open Water land covers, when compared to the environmental stressors of new urban development implemented under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to preserve approximately 335 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers and associated plant and animal communities over the EIS/EIR's 50-year study period (Table 8-13). This is a larger area than the 24 acres estimated to be preserved under the No Action/No Project Alternative (Table 8-5). In addition, the acres preserved during the 30-year term of the Reduced Permit Term Alternative would be within a more contiguous and interconnected HCP Preserve System (see Section 2.4.4). Therefore, these preserved acres would better maintain the existing habitat values and existing ecology of the preserved Seasonal Wetland, Freshwater Marsh, Stream and Creek, and Open Water, when compared the individual Preserves that would be established on a project-by-project basis under the No Action/No Project Alternative.

In addition to preserving 335 acres of Seasonal Wetlands, Freshwater Marsh, Streams/Creeks, and Open Water land covers, the Reduced Permit Term Alternative would re-establish or establish 419 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area (Table 8-13). This is 128 acres more than the 291 acres re-establishment or establishment of these land covers expected in the Planning Area under the No Action/No Project Alternative (Table 8-5), primarily because compensatory mitigation for impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers during the 30-year permit term would occur at HCP Preserves or mitigation banks located within the Planning Area.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- directly impact 48 fewer acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers and associated plant and animal communities;
- would require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs to better avoid and minimize indirect effects to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities, such as larger setbacks between new development and streams and creeks;
- would preserve 311 more acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water;

- would re-establish or establish 128 more acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area; and
- would result in more interconnected and more contiguous Preserves of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area.

Therefore, the Reduced Permit Term Alternative's impact to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers would be **a Minor Beneficial** effect, when compared to the impacts of the No Action/No Project Alternative on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers of the Planning Area.

Cumulative Impacts to Seasonal Wetland, Freshwater Marsh, Streams and Creeks, and Open Water

The effects of past, present, and reasonably foreseeable other projects on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities within the study area were described in Section 8.2.2.2 and represent a significant adverse cumulative impact on the Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water within the study area. As discussed in Section 8.2.2.2, the incremental effects of the No Action/No Project were determined to be significant when viewed in connection with the effects of the past, current, and foreseeable other projects in the study area.

As discussed in this section, the incremental effects of the Reduced Permit Term Alternative would result in the direct loss of 535 acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers within the Planning Area, which is 48 acres less than the losses expected under the No Action/No Project Alternative.

In addition, as discussed previously, the SSHCP Conservation Strategy implemented during the 30-year permit term would require Covered Activities to incorporate AMMs, such as increased setbacks between waterways and new urban development. These additional AMMs would be consistently implemented and monitored, and would reduce the number and extent of environmental stressors that result from urban development to avoid or minimize indirect impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural land covers of the Planning Area, when compared to is the extent of indirect impacts anticipated under the No Action/No Project Alternative. The implementation of the Reduced Permit Term Alternative's Conservation Strategy is also expected to preserve 311 more acres and to re-establish 128 more acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water within the Planning Area, when compared to the No Action/No Project Alternative.

Overall, the Reduced Permit Term Alternative would make a slightly smaller contribution to the cumulative loss of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water in the study area when compared to the No Action/No Project Alternative. However, at the scale of impacts to these aquatic resources throughout the study area, the 535-acre difference in direct impacts, the 311-acre difference in preservation, and the 128-acre difference in re-establishment of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water land covers under the Reduced Permit Term Alternative is not discernibly different from the impacts expected under the No Action/No Project Alternative. As identified in Section 8.2.2.2, the incremental impacts to Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water from the No Action/No Project Alternative, when considered together with the acres of Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water impacted from past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on these land covers. As discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the two action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Reduced Permit Term Alternative on the study area's Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water natural communities is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect when compared to the future No Action/No Project Alternative condition.

8.2.4.3 Riparian Land Covers (Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland)

Planning Area Riparian land covers include Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland land covers. These riparian land covers are considered "sensitive natural communities" (see discussion of individual land covers in Section 8.1.2.3).

Direct and Indirect Effects of the Reduced Permit Term Alternative

The Reduced Permit Term Alternative is expected to directly impact (remove) 610 acres of Riparian land covers, which is 56 acres more than the loss of 554 acres of Riparian land covers expected under the No Action/No Project Alternative (Table 8-12).

All SSHCP Covered Activities implemented during the 30-year permit term of the Reduced Permit Term Alternative would incorporate relevant SSHCP AMMs to avoid or minimize direct and indirect impacts on the Riparian land covers and natural communities (see Section 2.4.5 and Appendix D).

The following AMMs would minimize direct impacts by limiting ground disturbance to the construction footprint; implementing erosion-control BMPs and siting roads and utilities outside of sensitive areas (BMP-1, BMP-2, ROAD-1, and UTILITY-4); and implementing BMPs

that control construction dust (BMP-5), limit construction lighting in adjacent natural habitats (BMP-6), require biological monitoring (BMP-7), require worker awareness training (BMP-8), and implement speed limits on the construction site (BMP-11).

AMM BMP-1 through AMM BMP-11 are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM implemented during the 30-year permit term. The Reduced Permit Term Alternative would also include annual review of the effectiveness of each SSHCP AMM implemented during the 30-year permit term and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Reduced Permit Term Alternative would result in BMPs and water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The AMMs implemented during the 30-year permit term also include new AMMs that would not occur under the No Action/No Project Alternative, and these new measures are expected to lessen the potential adverse effects to the Riparian Water land covers compared to the effects of the No Action/No Project Alternative.

Other AMMs which would avoid and minimize indirect effects of the Reduced Permit Term Alternative on water quality and hydrology of Riparian land covers include AMM LID-1 through LID-3, and EDGE-4 through EDGE-7 (Appendix D). Potential indirect impacts to Riparian land covers from increased human activity and from habitat fragmentation would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project Alternative (Table 2-6), the SSHCP AMMs would better reduce indirect impacts on Aquatic land covers during the 30-year permit term. For example, STREAM-1 through STREAM-3 would require wider setbacks between natural waterways and new development, thereby providing greater protection of existing water quality and species habitats of Riparian land covers and other aquatic resources. Therefore, the environmental stressors caused by new urban development (see Appendix G) are expected to be smaller in extent and would result in fewer indirect impacts to the existing hydrology, ecology, and species habitat the Riparian land covers, when compared to the environmental stressors of new urban development implemented under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to preserve approximately 696 acres of Riparian land covers and associated plant and animal communities over the EIS/EIR's 50-year study period (Table 8-13). By comparison, the No Action/No Project Alternative is not expected to

preserve any Riparian land covers (Table 8-5). In addition, the acres of Riparian land covers preserved during the 30-year term of the Reduced Permit Term Alternative would be within a contiguous and interconnected SSHCP Preserve System (see section 2.4.4), which would help to maintain the existing habitat values and existing ecology of the preserved Riparian land covers. In addition to preserving 696-acres of Riparian land covers, the Reduced Permit Term Alternative would re-establish or establish 609 acres of Riparian land covers within the Planning Area (Table 8-13). This is 55 acres more than the 554 acres of re-establishment or establishment of these land covers expected in the Planning Area under the No Action/No Project Alternative (Table 8-5).

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- directly impact 56 more acres of Riparian land covers and associated plant and animal communities;
- require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs, to better avoid and minimize indirect effects to Riparian land covers and natural communities, such as larger setbacks between new development and streams and creeks;
- preserve 696 more acres of Riparian land covers;
- re-establish or establish 55 more acres of Riparian land covers within the Planning Area; and
- result in more interconnected and more contiguous Preserves of Riparian land covers within the Planning Area.

Therefore, the Reduced Permit Term Alternative's impact to Riparian land covers and the associated plant and animal communities would be a ***Minor Beneficial*** effect, when compared to the impacts of the No Action/No Project Alternative on Riparian land covers of the Planning Area.

Cumulative Effects of the Alternative

The effects of past, present, and reasonably foreseeable other projects on the Riparian land covers and natural communities within the study area were described above in Section 8.2.2.3, and represent a significant adverse cumulative impact on the Riparian land covers within the study area. As discussed in Section 8.2.2.3, the incremental effects of the No Action/No Project Alternative were determined to have a less than significant cumulative adverse effect on riparian land covers in the study area when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As in this section 8.2.4.3, the incremental effects of the Reduced Permit Term Alternative would result in the loss of 610 acres of Riparian land covers within the Planning Area, which is 56 acres greater than the loss under the No Action/No Project Alternative. However, the Reduced Permit Term Alternative is expected to preserve 606 acres more and re-establish 55 more acres of Riparian land covers within the Planning Area, and would result in consistent and more frequent implementation of AMMs that would reduce indirect impacts to Riparian land covers when compared to the No Action/No Project Alternative.

Overall, the impacts of Reduced Permit Term Alternative would make a similar contribution to the cumulative loss of Riparian land covers in the study area, when compared to the No Action/No Project Alternative. In addition, at the scale of cumulative impacts to riparian resources throughout the study area, the 56-acre difference in direct impacts, the 693 acre difference in Riparian preservation, and the 55-acre difference in re-establishment of Riparian land covers is not discernibly different when compared to impacts expected under the No Action/No Project Alternative.

As discussed in Section 8.2.2.3, the incremental impacts of the No Action/No Project Alternative on the Riparian land covers, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would be less than significant, and the No Action/No Project Alternative would have a less than significant cumulative adverse effect on riparian land covers in the study area. As discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Reduced Permit Term Alternative on the study area's Riparian land covers and natural communities is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect (when compared to the No Action/No Project Alternative baseline condition.

8.2.4.4 Valley Grassland

As discussed in Section 8.1.2, approximately 135,152 acres of Valley Grassland are present in the Planning Area, which includes Valley Grassland acres that are located both inside and outside of the Vernal Pool Ecosystem (Table 8-1) and all Valley Grassland in ranching and grazing agricultural use. (The impacts to Valley Grassland as a part of the Vernal Pool Ecosystem are also analyzed under impacts to the Vernal Pool Ecosystem (Section 8.2.4.1).

Direct and Indirect Effects of the Reduced Permit Term Alternative

The Reduced Permit Term Alternative is expected to directly impact (remove) 23,671 acres of Valley Grassland (Table 8-12), which is 242 acres more than the loss of 23,429 acres of Valley Grassland expected under the No Action/No Project Alternative (Table 8-4).

All SSHCP Covered Activities implemented during the 30-year permit term of the Reduced Permit Term Alternative would incorporate relevant SSHCP AMMs, which would avoid or minimize direct and indirect impacts of the Covered Activities on the Valley Grassland natural community (see Section 2.4.5 and Appendix D).

AMMs that would minimize direct impacts include limiting ground disturbance to the construction footprint, implementing erosion control BMPs (BMP-1 through BMP-4), siting roads and utilities outside of sensitive areas include (ROAD-1, and UTILITY-4), controlling construction dust (BMP-5), limiting construction lighting adjacent natural habitats (BMP-6), requiring biological monitors (BMP-7), requiring worker awareness training (BMP-8), and implementing speed limits on the construction site (BMP-11).

AMM BMP-1 through AMM BMP-11 are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM implemented during the 30-year permit term. The Reduced Permit Term Alternative would also include annual review of the effectiveness of each SSHCP AMM implemented during the 30-year permit term, and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Reduced Permit Term Alternative would result in BMPs and water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The AMMs implemented during the 30-year permit term also include new AMMs that would not occur under the No Action/No Project Alternative, and these new measures are expected to lessen the potential adverse effects to the Valley Grasslands compared to the effects of the No Action/No Project Alternative.

Potential indirect impacts to Valley Grasslands from increased human activity and from habitat fragmentation would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project Alternative (Table 2-6), the SSHCP AMMs would reduce the extent of environmental stressors caused by new urban development (see Appendix G-1) and would result in fewer indirect impacts to the existing ecology and species habitat of Valley Grassland land covers, when compared to the new urban development implemented under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to preserve approximately 18,589 acres of Valley Grassland and associated plant and animal communities over the EIS/EIR's 50-year study period (Table 8-13), which is 6,783 acres more than the 11,806 acres of Valley Grassland

estimated to be preserved under the No Action/No Project Alternative (Table 8-5). In addition, the acres preserved during the 30-year term of the Reduced Permit Term Alternative would be within a more contiguous and interconnected SSHCP Preserve System (see section 2.4.4), which would better maintain the existing habitat values and existing ecology of the preserved Valley Grassland, when compared the individual Valley Grassland Preserves that would be established on a project-by-project basis under the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- directly impact 242 more acres of Valley Grassland land covers and associated plant and animal communities;
- require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs, to better avoid and minimize indirect effects to Valley Grassland natural communities, such as larger setbacks between new development and preserved land covers and larger setbacks between new development and streams and creeks;
- preserve 6,783 more acres of Valley Grassland land cover; and
- result in more interconnected and more contiguous Preserves of Valley Grasslands within the Planning Area.

Therefore, the Reduced Permit Term's impact to Valley Grassland and the associated plant and animal communities would be a ***Less Than Significant Adverse*** effect, when compared to the impacts of the No Action/No Project Alternative on Valley Grassland land covers of the Planning Area.

Cumulative Effects on Valley Grassland from the Reduced Permit Term Alternative

The effects of past, present, and reasonably foreseeable other projects on the Valley Grassland land covers and natural communities within the study area were described in Section 8.2.2.4 and represent a significant adverse cumulative impact on the Valley Grassland within the study area. As discussed in Section 8.2.2.4, the incremental effects of the No Action/No Project Alternative were determined to have a significant cumulative adverse impact on Valley Grassland in the study area, when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed here in Section 8.2.4.4, the incremental effects of the Reduced Permit Term Alternative would result in the loss of 23,671 acres of Valley Grassland within the Planning Area, which is 242 acres greater than the loss under the No Action/No Project Alternative.

In addition, as discussed previously, the SSHCP Conservation Strategy implemented during the 30-year permit term would require Covered Activities to incorporate additional AMMs, such as increased setbacks between Preserves and new urban development. These AMMs would be consistently implemented and monitored and would reduce the number and extent of environmental stressors that result from urban development to avoid or minimize indirect impacts to Valley Grassland natural communities when compared to the extent of indirect impacts anticipated under the No Action/No Project Alternative. The implementation of the Reduced Permit Term Alternative's Conservation Strategy is also expected to preserve 6,783 more acres of Valley Grassland in the Planning Area when compared to the No Action/No Project Alternative.

However, at the scale of impacts to Valley Grassland throughout the study area, the 242-acre difference in direct impacts and the 6,783-acre difference in Valley Grassland preservation under the Reduced Permit Term Alternative is not discernibly different from the impacts expected under the No Action/No Project Alternative. As identified in Section 8.2.2.4, the incremental impacts to Valley Grassland from the No Action/No Project Alternative would have a significant adverse cumulative effect on Valley Grassland when considered together with the Valley Grasslands impacted from past, present, and reasonably foreseeable projects and activities in the study area. As discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the two action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Reduced Permit Term Alternative on the study area's Valley Grassland is not discernibly different from the incremental effects of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect when compared to the future No Action/No Project Alternative condition.

8.2.4.5 Blue Oak Woodland and Blue Oak Savanna

The Blue Oak Woodland land cover and the Blue Oak Savanna land cover are considered together because the plants and animals of both communities overlap considerably (see Section 8.1.2.1), and each land cover has the same regulatory requirements (Section 8.1.1). Blue Oak Woodland and Blue Oak Savanna land covers are "sensitive natural communities" (see discussion of individual land covers in Section 8.1.2). As discussed in Section 8.2.1, indirect impacts to the Riparian land covers is described qualitatively.

Direct and Indirect Effects of the Alternative

The Reduced Permit Term Alternative is expected to directly impact (remove) 47 acres of Blue Oak Woodland and Blue Oak Savanna (Table 8-12), which is 93 acres less than the loss of 140 acres of Blue Oak Woodland and Blue Oak Savanna under the No Action/No Project Alternative (Table 8-4).

All SSHCP Covered Activities implemented during the 30-year permit term of the Reduced Permit Term Alternative would incorporate the relevant SSHCP AMMs (described in Appendix

D), which would avoid or minimize direct and indirect impacts of the Covered Activities on the Blue Oak Woodland and Blue Oak Savanna natural communities (see Section 2.4.5).

AMMs that would minimize direct impacts include limiting ground disturbance to the construction footprint, implementing erosion control BMPs (BMP-1 through BMP-4), siting roads and utilities outside of sensitive areas (ROAD-1, and UTILITY-4), controlling construction dust (BMP-5), limiting construction lighting adjacent natural habitats (BMP-6), requiring biological monitors (BMP-7), requiring worker awareness training (BMP-8), and implementing speed limits on the construction site (BMP-11).

AMM BMP-1 through AMM BMP-11 are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM implemented during the 30-year permit term. The Reduced Permit Term Alternative would also include annual review of the effectiveness of each SSHCP AMM implemented during the 30-year permit term and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Reduced Permit Term Alternative would result in BMPs and water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The AMMs implemented during the 30-year permit term also include new AMMs that would not occur under the No Action/No Project Alternative, and these new measures are expected to lessen the potential adverse effects to Blue Oak Woodland and Blue Oak Savanna natural communities compared to the effects of the No Action/No Project Alternative.

Potential indirect impacts to Blue Oak Woodland and Blue Oak Savanna from increased human activity and from habitat fragmentation would be minimized by AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5 and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project alternative (Table 2-6), the SSHCP AMMs would reduce the extent of environmental stressors caused by new urban development (see Appendix G-1) and would result in fewer indirect impacts to the existing ecology and species habitat of Blue Oak Woodland and Blue Oak Savanna Grassland land covers when compared to the impacts expected under the No Action/No Project Alternative.

As shown on Table 8-13, the Reduced Permit Term Alternative is expected to both preserve 46 acres of Blue Oak Woodland and Blue Oak Savanna and to re-establish or establish 46 acres of Blue Oak Woodland and Blue Oak Savanna within the Planning Area, which are amounts that nearly equal the expected acres of direct impact (loss) of 47 acres within the Planning Area (Table

8-12). In comparison, the 70 acres re-established/established under the No Action/No Project Alternative would replace only half of the acres of Blue Oak Woodland and Blue Oak Savanna lost under that alternative (Tables 4-4 and 8-5). In addition, the preservation and re-establishment of Blue Oak Woodland and Blue Oak Savanna would occur in the interconnected Preserve System established during the 30-year permit term, which would maintain greater connectivity between Blue Oak Woodland and Blue Oak Savanna land covers than the project-by-project mitigation preserves that would be established under the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- directly impact 93 acres less Blue Oak Woodland and Blue Oak Savanna and their associated plant and animal communities;
- require Covered Activity projects and activities implemented during the 30-year permit term to implement better and more consistently implemented AMMs to avoid and minimize indirect effects to Blue Oak Woodland and Blue Oak Savanna;
- preserve 46 acres of Blue Oak Woodland and Blue Oak Savanna in the Planning Area, which would nearly equal acres of expected impacts to Blue Oak Woodland and Blue Oak Savanna (47 acres). By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna preservation in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres).
- re-establish or establish 46 acres of Blue Oak Woodland and Blue Oak Savanna in the Planning Area, which would nearly equal the acres of expected impacts to Blue Oak Woodland and Blue Oak Savanna (47 acres). By comparison, the acreage of Blue Oak Woodland and Blue Oak Savanna re-establishment or establishment in the Planning Area under the No Action/No Project Alternative (70 acres) is only half of the expected impacts to Blue Oak Woodland and Blue Oak Savanna (140 acres).
- result in more interconnected and contiguous Preserves of Blue Oak Woodland and Blue Oak Savanna within the Planning Area, which would reduce habitat fragmentation effects on the Blue Oak Woodland and Blue Oak Savanna plant and animal communities.

Therefore, the Reduced Permit Term Alternative's impacts to Blue Oak Woodland and Blue Oak Savanna and their associated plant an animal communities would be **a *Minor Beneficial*** effect, when compared to the impacts of the No Action/No Project Alternative on Blue Oak Woodland and Blue Oak Savanna land covers of the Planning Area.

Cumulative Impacts to Blue Oak Woodland and Blue Oak Savanna from the Reduced Permit Term Alternative

The effects of past, present, and reasonably foreseeable other projects on the Blue Oak Woodland and Blue Oak Savanna land covers and natural communities within the study area were described in Section 8.2.2.5 and represent a significant adverse cumulative impact on the Blue Oak Woodland and Blue Oak Savanna within the study area. As discussed in Section 8.2.2.5, the incremental effects of the No Action/No Project Alternative were determined to have a significant cumulative adverse impact on Blue Oak Woodland and Blue Oak Savanna in the study area when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed in this section, the incremental effects of the Reduced Permit Term Alternative would result in the loss of 47 acres of Blue Oak Woodland and Blue Oak Savanna within the Planning Area, which is 93 acres less than the loss under the No Action/No Project Alternative. The Reduced Permit Term Alternative would preserve 46 acres of Blue Oak Woodland and Blue Oak Savanna, an amount nearly equal to the acres of expected impacts. The No Action/No Project Alternative would also re-establish/establish 46 acres of Blue Oak Woodland and Blue Oak Savanna, an amount also nearly equal to the acres of expected impacts. By comparison, the No Action/No Project Alternative would preserve 70 acres of Blue Oak Woodland and Blue Oak Savanna and re-establish or establish 70 acres Blue Oak Woodland and Blue Oak Savanna, which are each only half of the expected 140 acres of impacts to Blue Oak Woodland and Blue Oak Savanna.

Overall, the incremental impacts of the Reduced Permit Term Alternative would make a slightly smaller contribution to the cumulative loss of Blue Oak Woodland and Blue Oak Savanna in the study area, when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of impacts to Blue Oak Woodland and Blue Oak Savanna throughout the study area, the difference in direct impacts and the difference in preservation and re-establishment or establishment of Blue Oak Woodland and Blue Oak Savanna land covers is not discernibly different.

As discussed in Section 8.2.2.5, the impacts of the No Action/No Project Alternative on Blue Oak Woodland and Blue Oak Savanna, when considered together with the impacts from the past, present, and reasonably foreseeable projects and activities in the study area, would have a significant adverse cumulative effect on Blue Oak Woodland and Blue Oak Savanna. However, as discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Reduced Permit Term Alternative on Blue Oak Woodland and Blue Oak Savanna are not discernibly different from the incremental effects of the No

Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect (when compared to the No Action/No Project Alternative baseline condition.

8.2.4.6 Farmland (Cropland/Irrigated Pasture-Grassland)

As discussed in Section 8.1.2, Cropland and Irrigated Pasture-Grassland are included in the Natural land cover category because they provide habitat for a native wildlife community (e.g., cottontail rabbits, other small mammals, mule deer, western meadowlark, and red-winged black bird; foraging for hawks and other raptors; and wintering sandhill cranes), and support some native trees and other native plants on the margins of fields or in hedgerows. There are approximately 67,820 acres of the Cropland and Irrigated Pasture-Grassland land covers in the Planning Area.

Direct and Indirect Effects of the Alternative

The Reduced Permit Term Alternative is expected to directly impact (remove) 8,130 acres of Cropland and Irrigated Pasture-Grassland (Table 8-12), which is 354 acres less than the loss of 8,484 acres of Cropland and Irrigated Pasture-Grassland expected under the No Action/No Project Alternative (Table 8-4).

All SSHCP Covered Activities implemented during the 30-year permit term of the Reduced Permit Term Alternative would incorporate relevant SSHCP AMMs, which would avoid or minimize direct and indirect impacts of the Covered Activities on the Cropland and Irrigated Pasture-Grassland wildlife communities (see Section 2.4.5 and Appendix D).

AMMs that would minimize direct impacts include limiting ground disturbance to the construction footprint, implementing erosion control BMPs (BMP-1 through BMP-4), siting roads and utilities outside of sensitive areas include (ROAD-1, and UTILITY-4), controlling construction dust (BMP-5), limiting construction lighting adjacent natural habitats (BMP-6), requiring biological monitors (BMP-7), requiring worker awareness training (BMP-8), and implementing speed limits on the construction site (BMP-11).

AMM BMP-1 through AMM BMP-11 are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented, and annual reporting of the effectiveness of each AMM implemented during the 30-year permit term. The Reduced Permit Term Alternative would also include annual review of the effectiveness of each SSHCP AMM implemented during the 30-year permit term and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Reduced Permit Term Alternative would result in BMPs

and water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The AMMs implemented during the 30-year permit term also include new AMMs that would not occur under the No Action/No Project Alternative, and these new measures are expected to lessen the potential adverse effects to Cropland and Irrigated Pasture-Grassland compared to the effects of the No Action/No Project Alternative.

Potential indirect impacts to Cropland and Irrigated Pasture-Grassland from increased human activity and from habitat fragmentation would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project alternative (Table 2-6), the HCP AMMs would reduce the extent of environmental stressors caused by new urban development (see Appendix G-1) and would result in fewer indirect impacts to the existing ecology and species habitat of Cropland and Irrigated Pasture-Grassland when compared to the new urban development implemented under the No Action/No Project Alternative.

During the 30-year permit term, impacts to any Farmland land cover would be mitigated by preserving the Cropland or the Irrigated Pasture-Grassland land covers (which provide much higher quality foraging and roosting habitat for native raptor species, sandhill cranes, and other native wildlife species, when compared to other Farmland land covers). In comparison, the No Action/No Project Alternative would mitigate impacts to the Farmland land covers by preserving any "similar category" of farmland, as discussed in Section 8.2.2.6. The No Action/No Project alternative would preserve 7,615 acres of farmland during the EIS/EIR's 50-year study period. In comparison, the Reduced Permit Term Alternative would preserve approximately 7,941 acres of Cropland and Irrigated Pasture-Grassland, and also preserve approximately 1,185 acres of Orchard and Vineyard (Table 8-13).

Of the total 7,941 acres of Cropland and Irrigated Pasture-Grassland preserved over the 50-year study period of the Reduced Permit Term Alternative, approximately 5,559 acres (70%) would be preserved within a large and interconnected SSHCP Preserve System established during the 30-year permit term (see Section 2.4.4), and approximately 2,382 acres would be preserved on a project-by-project basis after the end of the permit term, as mitigation for individual projects and activities. Each acre of Cropland and Irrigated Pasture-Grassland preserved within the interconnected SSHCP Preserve System (see Section 2.4.4) would provide greater habitat value than the farmlands preserved under the No Action/No Project Alternative because of the Preserve System would provide higher habitat connectivity and include a comprehensive preserve management program that would manage the land covers to maintain existing farming operations and improve wildlife habitat.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- directly impact 354 fewer acres of Cropland and Irrigated Pasture-Grassland land covers and associated wildlife communities;
- require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs, to better avoid and minimize indirect effects to Cropland and Irrigated Pasture-Grassland;
- preserve 326 more acres of Cropland and Irrigated Pasture-Grassland land covers;
- preserve higher quality farmland during the 30-year permit term by mitigating impact to any Farmland land cover with the higher quality Cropland or Irrigated Pasture-Grassland;
- result in more contiguous and interconnected and Preserves of Cropland and Irrigated Pasture-Grassland farmland within a larger Preserve System; and
- manage Cropland and Irrigated Pasture-Grassland within the Preserve System on a regional basis and under a comprehensive preserve management program.

Therefore, the Reduced Permit Term Alternative's impact to Cropland and Irrigated Pasture-Grasslands and their associated native wildlife communities would be **a *Minor Beneficial*** effect, when compared to the impacts of the No Action/No Project Alternative on Cropland and Irrigated Pasture-Grassland land covers of the Planning Area.

Cumulative Analysis Impacts to Cropland and Irrigated Pasture-Grassland from the Reduced Permit Term Alternative

The effects of past, present, and reasonably foreseeable other projects on Cropland and Irrigated Pasture-Grassland within the study area were described above in Section 8.2.2.6, and represent a significant adverse cumulative impact on the Cropland and Irrigated Pasture-Grassland within the study area. As discussed in Section 8.2.2.6, the incremental effects of the No Action/No Project Alternative were determined to be a significant cumulative effect when viewed in connection with the effects of the past, present, and foreseeable other projects in the study area.

As discussed in this section, the incremental effects of the Reduced Permit Term Alternative would result in the direct loss of 8,130 acres of Cropland and Irrigated Pasture-Grassland within the Planning Area, which is 354 acres less than the expected loss of Cropland and Irrigated Pasture-Grassland under the No Action/No Project Alternative. In addition, as discussed previously, the HCP Conservation Strategy implemented during the 30-year permit term would

require Covered Activities to incorporate additional AMMs. These AMMs would be consistently implemented and monitored and would reduce the number and extent of environmental stressors that result from urban development to avoid or minimize indirect impacts to Cropland and Irrigated Pasture-Grassland natural communities, when compared to the extent of indirect impacts anticipated under the No Action/No Project Alternative. The implementation of the Reduced Permit Term Alternative is also expected to preserve 326 more acres of Cropland and Irrigated Pasture-Grassland when compared to the No Action/No Project Alternative. The Preserve System would also result in larger farmland Preserves and greater connectivity of farmland Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

However, at the scale of impacts to Cropland and Irrigated Pasture-Grassland throughout the study area, the 354-acre difference in direct impacts and the 326-acre difference in Cropland and Irrigated Pasture-Grassland preservation under the Reduced Permit Term Alternative is not discernibly different from the impacts expected under the No Action/No Project Alternative. As identified in Section 8.2.2.6, the incremental impacts to Cropland and Irrigated Pasture-Grassland from the No Action/No Project Alternative would have a significant adverse cumulative effect on Cropland and Irrigated Pasture-Grassland, when considered together with the Cropland and Irrigated Pasture-Grasslands impacted from past, present, and reasonably foreseeable projects and activities in the study area. As discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the two action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Reduced Permit Term Alternative on the study area's Cropland and Irrigated Pasture-Grasslands are not discernibly different from the incremental effects of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect when compared to the future No Action/No Project Alternative condition.

8.2.4.7 Farmland (Orchard/Vineyard)

As discussed in Section 8.1.2, Orchard and Vineyard are included in the natural land cover category because they provide habitat for native wildlife (e.g., small mammals, perching raptors, other native birds, and roosting western red bats). There are approximately 30,367 acres of Orchard and Vineyard land covers and the associated plant and animal communities in the Planning Area.

Direct and Indirect Effects of the Reduced Permit Term Alternative

The Reduced Permit Term Alternative is expected to directly impact (remove) approximately 1,685 acres of Orchard and Vineyard (Table 8-13). This loss is 119 acres more than the

approximately 1,566 acres of Orchard and Vineyard estimated to be lost under the No Action/No Project Alternative (Table 8-4).

All SSHCP Covered Activities implemented during the 30-year permit term of the Reduced Permit Term Alternative would incorporate relevant SSHCP AMMs, which would avoid or minimize direct and indirect impacts of the Covered Activities on the Orchard and Vineyard wildlife communities (see Section 2.4.5 and Appendix D).

AMMs that would minimize direct impacts include limiting ground disturbance to the construction footprint, implementing erosion control BMPs (BMP-1 through BMP-4), siting roads and utilities outside of sensitive areas (ROAD-1, and UTILITY-4), controlling construction dust (BMP-5), limiting construction lighting adjacent natural habitats (BMP-6), requiring biological monitors (BMP-7), requiring worker awareness training (BMP-8), and implementing speed limits on the construction site (BMP-11).

AMM BMP-1 through AMM BMP-11 are similar to the construction BMPs that would be implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM implemented during the 30-year permit term. The Reduced Permit Term Alternative would also include annual review of the effectiveness of each SSHCP AMM implemented during the 30-year permit term, and a process to make adaptive changes to any AMM that was not fully effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the Reduced Permit Term Alternative would result in BMPs and water quality AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The AMMs implemented during the 30-year permit term also include new AMMs that would not occur under the No Action/No Project Alternative, and these new measures are expected to lessen the potential adverse effects to the Orchard and Vineyard compared to the effects of the No Action/No Project Alternative.

Potential indirect impacts to Orchard and Vineyard from increased human activity and from habitat fragmentation would be minimized by the AMMs EDGE-1 through EDGE-3, EDGE-8, EDGE-10, ROAD-1, ROAD-2, NATURE TRAIL-1 through NATURE TRAIL-5, STREAM-1 through STREAM-5, and UTILITY-2 (see Appendix D for a description of AMMs). Relative to the AMMs implemented by individual projects under the No Action/No Project alternative (Table 2-6), the HCP AMMs would reduce the extent of environmental stressors caused by new urban development (see Appendix G-1) and would result in fewer indirect impacts to the existing ecology and species habitat of Orchard and Vineyard, when compared to the new urban development implemented under the No Action/No Project Alternative.

The Reduced Permit Term Alternative could preserve up to 1,185 acres of Orchard and Vineyard over the EIS/EIR's 50-year study period (Table 8-13), which is 381 acres less than the 1,566 acres of Orchard and Vineyard that could be preserved under the No Action/No Project Alternative (Table 8-5).

During the 30-year permit term of the Reduced Permit Term Alternative, impacts to any Farmland land cover, including Orchard and Vineyard, would be mitigated by preserving Cropland or Irrigated Pasture-Grassland land covers, which provide much higher quality habitat for native wildlife species than other Farmland land covers. In comparison, the No Action/No Project Alternative would mitigate impacts to Farmland land covers by preserving any "similar category" of farmland, as discussed in Section 8.2.2.6 (e.g., Prime Farmland, Statewide Importance Farmland, Unique Farmland, or Local Importance Farmland).

In addition, the acres preserved during the 30-year term of the Reduced Permit Term Alternative would be within a more contiguous and interconnected HCP Preserve System (see Section 2.4.4), which would better maintain the existing habitat values of the preserved Orchard and Vineyard when compared the individual farmland Preserves that would be established on a project-by-project basis under the No Action/No Project Alternative.

After the end of the 30-year permit term, mitigation for additional project impacts to Orchard and Vineyard during the 50-year EIS/EIR Study Period would again occur on a project-by-project basis and would mitigate impacts to Orchard and Vineyard by preserving acres of "similar category" farmland. Therefore, the preservation of 1,185-acres of Orchard and Vineyard expected under the Reduced Permit Term Alternative would occur after the end of the 30-year permit term.

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- directly impact 119 acres less of Orchard and Vineyard land covers and associated wildlife communities;
- require Covered Activity activities and projects implemented during the 30-year permit term to incorporate better and more consistently implemented AMMs to better avoid and minimize indirect effects to Orchard and Vineyard;
- preserve higher quality farmland during the 30-year permit term by mitigating impacts to Orchard and Vineyard with higher quality Cropland or Irrigated Pasture-Grassland.
- preserve 381 less acres of Orchard and Vineyard over the 50-year EIS/EIR study period;

- result in farmland Preserves that are more contiguous, more interconnected, and within a larger Preserve System; and
- manage preserved farmlands on a regional basis within the Preserve System and under a comprehensive preserve management program.

Therefore, the Reduced Permit Term's impact to Orchard and Vineyard and their associated native wildlife communities would be a ***Minor Beneficial*** effect when compared to the impacts of the No Action/No Project Alternative on Orchard and Vineyard land covers of the Planning Area.

Cumulative Impacts to Orchards and Vineyards from the Reduced Permit Term Alternative

The effects of past, present, and reasonably foreseeable other projects on Orchard and Vineyard within the study area were described in Section 8.2.2.7 and represent a significant adverse cumulative effect on Orchard and Vineyard within the study area. As discussed in Section 8.2.2.7, the incremental effects of the No Action/No Project on Orchard and Vineyard were determined to result in a less than significant cumulative effect when viewed in connection with the effects of the past, present, and foreseeable other projects in

As discussed here in Section 8.2.4.7, the incremental effects of the Reduced Permit Term Alternative would result in the direct loss of 1,685 acres of Orchard and Vineyard within the Planning Area, which is 119 acres greater than the loss under the No Action/No Project Alternative. In addition, as discussed above, the HCP Conservation Strategy implemented during the 30-year permit term would require Covered Activities to incorporate additional AMMs. These AMMs would be consistently implemented and monitored, and would reduce the number and extent of environmental stressors that result from urban development to avoid or minimize indirect impacts to Orchard and Vineyard, when compared to the extent of indirect impacts anticipated under the No Action/No Project Alternative. The implementation of the Reduced Permit Term Alternative is also expected to preserve 381 fewer acres of Orchard and Vineyard when compared to the No Action/No Project Alternative, because impacts to Orchard and Vineyard during the 30-year permit term would be mitigated by preserving other farmland land covers that provide better wildlife habitat (i.e., Cropland and Irrigated Pasture Grassland). The HCP Preserve System established during the 30-year permit term would result in larger farmland preserves, and greater connectivity of farmland preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

However, at the scale of impacts to Orchard and Vineyard throughout the study area, the 119-acre difference in direct impacts and the 381-acre difference in Orchard and Vineyard preservation under the Reduced Permit Term Alternative is not discernibly different from the impacts expected under the No Action/No Project Alternative. As identified in Section 8.2.2.7, the incremental impacts to Orchard and Vineyard from the No Action/No Project Alternative

have a significant adverse cumulative effect on Orchard and Vineyard, when considered together with the Orchard and Vineyard impacted from past, present, and reasonably foreseeable projects and activities in the study area. As discussed in Section 3.6.1, this EIS/EIR evaluates the future impacts of the two action alternatives relative to the future conditions expected under the No Action/No Project Alternative. Therefore, because the incremental effects of the Reduced Permit Term Alternative on the study area's Orchard and Vineyard are not discernibly different from the incremental effects of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect when compared to the future No Action/No Project Alternative condition.

8.2.4.8 Wildlife Movement Corridors

Direct and Indirect Effects of the Reduced Permit Term Alternative

As shown in Figure 8-2 and Table 8-2 above, there are four ECAs either partially or wholly within the Planning Area. The majority of development under the Reduced Permit Term Alternative would occur within in the UDA (see Section 2.4.3) and only impact the extreme northern most portion of the Duck Creek North Fork – Coyote Creek ECA.

Outside the UDA, no recycled water pipeline Covered Activities anticipated during the 30-year permit term would be located within an ECA. However, rural transportation Covered Activity projects during the 30-year permit term are anticipated to occur within the Stone Lake – Yolo Bypass, Bear Slough – Browns Creek, and Duck Creek North Fork – Coyote Creek ECAs. These rural transportation projects include road-widening projects, which could reduce the ability of wildlife to move across these roadways and within these ECAs. The types of rural transportation Covered Activities included under the Reduced Permit Term Alternative are similar to the types of rural transportation projects included under the No Action/No Project Alternative outside the UDA. However, additional roadway development is expected under the No Action/No Project Alternative to serve the 1,900-acres of new urban development that is expected to be displaced outside of the existing USB boundary under the No Action Alternative (see Section 2.2.3).

Potential direct effects of future rural transportation Covered Activities under the Reduced Permit Term Alternative would occur from the new or expanded roadways, which would increase the size of existing movement barriers or create new barriers to terrestrial wildlife movement. However, all Covered Activities implemented during the 30-year permit term of the Reduced Permit Term Alternative would incorporate SSHCP AMMs, which would reduce habitat fragmentation and also require roadway projects to incorporate structures that would allow native wildlife to cross under improved or new roadways. SSHCP AMMs implemented during the 30-year permit term would help to maintain existing wildlife movement, including AMMs EDGE-1 through EDGE-3, and ROAD-1 through ROAD-3 (See Appendix D).

Several SSHCP AMMs (STREAM-1 through STREAM-5) would also require larger setbacks between existing waterways and new development relative to the No Action/No Project Alternative. These wider setbacks between new development in the UDA and existing waterways would allow continued wildlife movement in the UDA's riparian corridors. The SSHCP AMMs implemented during the 30-year permit term would also reduce other environmental stressors associated with urban development (see Appendix G-1) to better avoid or minimize indirect impacts on wildlife movement, relative to the No Action/No Project Alternative.

In addition, the Reduced Permit Term Alternative would allow urban development within the MCRA portion of the UDA to be consistent with the planned development described in the approved Sacramento County and Rancho Cordova General Plans, without approximately 19,000 acres of new urban development being displaced to locations outside the current USB boundary (see Section 2.2.3). Because the Reduced Permit Term Alternative would not result in the displacement of planned urban development to locations outside of the UDA, the expected No Action/No Project impacts to the Duck Creek North Fork – Coyote Creek ECA would not occur under the Reduced Permit Term Alternative.

As discussed in Section 2.3.5, the Reduced Permit Term Alternative would include an interconnected 27,761-acre HCP Preserve System within the Planning Area (Table 8-13) and a comprehensive HCP Preserve System management program to maintain and adaptively manage the HCP Preserve System in perpetuity (Section 2.4.5). The HCP Preserve System would be designed to achieve the identified SSHCP Biological Goals and Measurable Objectives for wildlife movement, including maintaining wildlife movement and dispersal through the Planning Area, including inside the UDA and outside the UDA (Section 2.4.5, Table 2-7).

Significance of Direct and Indirect Effects

In summary, when compared to the expected No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- provide a coordinated, interconnected Preserve System designed to provide connectivity between existing preserves and new Preserves established under the Reduced Permit Term Alternative;
- require new development projects implemented during the 30-year permit term to incorporate AMMs that would avoid or minimize effects on riparian corridors used for wildlife movement;
- require new development projects inside the UDA and related roadway projects outside the UDA implemented during the 30-year permit term to incorporate wildlife crossing structures at specific locations; and

- not result in displaced development outside the UDA to locations that have a greater potential to affect designated wildlife movement corridors.

Therefore, the Reduced Permit Term Alternative's impact to wildlife movement corridors would be a ***Minor Beneficial*** effect when compared to the No Action/No Project Alternative impacts on wildlife movement in the Planning Area.

Cumulative Impacts to Wildlife Movement from the Reduced Permit Term Alternative

The effects of past, present, and reasonably foreseeable other projects on wildlife movement in the study area were described in Section 8.2.2.8 and represent a significant adverse cumulative impact on wildlife movement within the study area. As discussed in Section 8.2.2.8, the incremental direct and indirect impacts of the No Action/No Project Alternative on existing wildlife movement and dispersal would be a significant cumulative effect when considered together with the significant impacts to wildlife movement from past, current, and foreseeable future projects and activities in the study area.

As discussed here in Section 8.2.4.8, the Reduced Permit Term Alternative would provide an interconnected Preserve System in the Planning Area, which would not occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would require wider setbacks between development and waterways, preserving wider riparian movement corridors when compared to the No Action/No Project. In addition, the Reduced Permit Term Alternative would require roadway projects to include AMMs that would provide wildlife undercrossings at specific locations.

Overall, the incremental impacts of the Reduced Permit Term Alternative would make a smaller contribution to the cumulative loss of wildlife movement and dispersal in the study area when compared to the incremental impacts of the No Action/No Project Alternative. However, at the scale of wildlife movement throughout the study area, the difference in impacts to wildlife movement under the Reduced Permit Term Alternative when compared to expected impacts to wildlife movement under the No Action/No Project Alternative, is not discernibly different. Therefore, because the incremental effects of the Reduced Permit Term Alternative on wildlife movement in the study area is not discernibly different from the incremental effects of the No Action/No Project Alternative on wildlife movement in the study area, the Reduced Permit Term Alternative would result in ***No Cumulative*** effect when compared to the No Action/No Project Alternative baseline condition.

8.3 REFERENCES CITED

Allaby, M. 2010. *Oxford Dictionary of Ecology*. 4th ed. New York, New York: Oxford University Press Inc.

Anderson, I. 2013. "Effects of *Pseudacris regilla* Tadpole Density on a California Vernal Pool Community." Thesis; California State University, Sacramento.

Barbour, M.G., A.I. Solomeshch, and J.J. Buck. 2007. *Classification, Ecological Characterization, and Presence of Listed Plant Taxa of Vernal Pool Associations in California.* Prepared for the U.S. Fish and Wildlife Service and University of California – Davis. Agreement/Study No. 814205G238 and UCD Account No. 3-APSF026, Subaccount No. FMGB2. May 15, 2007.

Calderaro, Angela. 2011. "Physical and Chemical Factors that Affect Diversity of Aquatic Invertebrates in Vernal Pools in Sacramento County, California." Master's thesis; California State University, Sacramento.

CDFG (California Department of Fish and Game). 2010. *Natural Communities List*. Wildlife and Habitat Data Analysis Branch, Vegetation Classification and Mapping Program. Accessed December 14, 2017. https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/List.

CDFW (California Department of Fish and Wildlife). 2014a. Deer Management Program, 2014 Deer Zone Information: General Deer Hunting Information for Zones D-5 and A-North. Accessed December 14, 2017. https://www.wildlife.ca.gov/Hunting/Deer.

CDFW. 2014b. California Natural Diversity Database (CNDDB). Sacramento, California: CDFW, Biogeographic Data Branch. https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data.

CDFW. 2016. "Natural Communities." CDFW, Biogeographic Data Branch. Accessed September 29, 2016.https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/List.

CDFW. 2017. "California Essential Habitat Connectivity Project." Accessed December 12, 2017. https://www.wildlife.ca.gov/conservation/planning/connectivity/CEHC.

Frayer, W.E., D.D. Peters, and H.R. Pywell. 1989. *Wetlands of the California Central Valley: Status and Trends 1939 to mid-1980's*. Portland, Oregon: U.S. Fish and Wildlife Service, Portland.

Freedman, B. 2015. "Ecological Effects of Environmental Stressors." Oxford Research Encyclopedia, Environmental Science. September 2015. Accessed December 15, 2017, environmentalscience.oxfordre.com.

Galt. 2009. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Hanes, W.T., Hecht, B., and L.P. Stromberg. 1990. "Water Relationships of Vernal Pools in the Sacramento region, California." In *California Vernal Pool Plants: Their Habitat and Biology*, edited by D.H. Ikeda and R.A. Schlisin, 49–60. *Studies from the Herbarium* 8, California State University, Chico.

Hanes, W.T. and L.P. Stromberg L.P. 1998. "Hydrology of Vernal Pools on Non-volcanic Soils in the Sacramento Valley." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*, edited by C.W. Witham, .T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 38–49. Sacramento, California: California Native Plant Society.

Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California.* California Department of Fish and Game, Nongame-Heritage Program. October 1986.

Holland, R. and S. Jain. 1988. "Vernal Pools." In *Terrestrial Vegetation of California*, edited by M. Barbour and J. Major, 515–533. California Native Plant Society, Special Publication Number 9.

Holland, R.F. 1998. *Changes in Great Valley Vernal Pool Distribution from 1989 to 1997*. Prepared for the California Department of Fish and Game-Heritage Program.

Holland, Robert F. 2009. *California's Great Valley Vernal Pool Habitat Status and Loss: Rephotorevised 2005*. Prepared for Placer Land Trust.

Jokerst, J.D. 1990. "Floristic Analysis of Volcanic Mudflow Vernal Pools." In *Vernal Pool Plants, Their Habitat and Biology*, edited by D.H. Ikeda and R.A. Schlising, 1–29. *Studies from the Herbarium*, California State University, Chico.

Jones and Stokes. 1990. *Sacramento Vernal Pools, Their Distribution, Classification, Ecology, and Management.* Prepared for Sacramento Planning and Community Development Department.

Keeley, J.E. and P.H. Zedler. 1998. *Characterization and Global Distribution of Vernal Pools.* In *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*, edited by C.W. Witham, .T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 1–14. Sacramento, California: California Native Plant Society.

Kie, J. 2005. Annual Grassland. California Wildlife Habitat Relationships System. California Department of Fish and Game, California Interagency Wildlife Task Group. Accessed October 15, 2016. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67384

Kreissman, B. 1991. California: An Environmental Atlas and Guide. Bear Klaw Press: Davis, CA. p 81.Lazar, K.A. and J.M. Bjerke. 2014. "Past, Present, and Future of Native Plant Conservation within the California Department of Fish and Wildlife." *California Fish and Game* 100(1):12-18.

Lincoln, R., G. Boxshall, and P. Clark. 1998. *A Dictionary of Ecology, Evolution, and Systematics*.2nd ed. Cambridge, England: University of Cambridge Press.

Marty, J.T. 2005. Effects of Cattle Grazing on Diversity in Ephemeral Wetlands. Conservation Biology 19: 1626-1632.

McDonald, P.M. 1985. *Distributional Data on Quercus douglasii Hook & Arn. Fagaceae – Beech Family*. U.S. Department of Agriculture, Forest Service – Northeastern Area. St. Paul, Minnesota. Revised 1998. http://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/quercus/douglasii.htm.

Morey, S., and D. Ikeda. 2001. Conserving Plants with Laws and Programs Under the Department of Fish and Game. In *Inventory of Rare and Endangered Plants of California*, 6th ed., edited by D. Tibor, 12–16. California Native Plant Society, Sacramento, California.

NCCPA (Natural Community Conservation Planning Act). 1991. California Fish and Game Code, 2011 edition, Sections 2800-2835. Available at: http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=fgc.

NCWA (Northern California Wildlife Association). 2015. "Birds and the Pacific Flyway." Accessed January 21, 2015. http://www.norcalwater.org/efficient-water-management/birds-and-pacific-flyway/.

Pollak, D. 2001. *Natural Community Conservation Planning (NCCP), the Origins of an Ambitious Experiment to Protect Ecosystems*. Part 1. Sacramento, California: California Research Bureau.

Poirier, P.A. 2012. *Physical and Chemical Correlates of Sacramento County Vernal Pool Crustaceans*. Thesis; University of The Pacific, Stockton, California.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. "The Role of Perched Aquifers in Hydrological Connectivity and Biogeochemical Processes in Vernal Pool Landscapes." *Hydrological Processes* 20:1157-1175.

Rancho Cordova. 2006. *City of Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County, Rancho Cordova, Galt, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Capital Southeast Connector Joint Power Authority. 2017. *Draft South Sacramento Habitat Conservation Plan*. February 2017. Sacramento, California.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. Sacramento, California: California Native Plant Society.

Sawyer, J.O, T. Keeler-Wolf, and J. Evens. 2009. *A Manual of California Vegetation*. Sacramento, California: California Native Plant Society.

Silveira, J.G. 1998. Avian Uses of Vernal Pools and Implications for Conservation Practice. Pages 92–106 *in:* C.W. Witham et al. (eds.), *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, CNPS, Sacramento, California.

Smith, D.W. and W.L. Verril. 1998. "Vernal Pool-Soil-Landform Relationships in the Central Valley, California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*, edited by C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 15–23. Sacramento, California: California Native Plant Society.

Solomeshch, A., and R. Holland. 2007. "Vernal Pools." In *Terrestrial Vegetation of California*, 3rd ed., edited by M. Barbour, T. Keeler-Wolf, and A. Schoenherr, 394–424. http://www.jstor.org/stable/10.1525/j.ctt1pnqfd.19.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. *California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California.* Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

USACE (U.S. Army Corps of Engineers). 2014. *Memorandum for Record: Cumulative Impact Analysis for the South Sacramento Habitat Conservation Plan Area (SPK-1995-00386).* Sacramento, California: USACE Sacramento Engineer District, California South Branch. Signed September 9, 2014.

USFS (U.S. Forest Service). 1980. *California Wildlife and Their Habitats: Western Sierra Nevada.* Technical coordination by J. Verner and A.S. Boss. General Technical Report PSW-GTR-37. Berkeley, California: USFS, Pacific Southwest Forest and Range Experiment Station. http://www.treesearch.fs.fed.us/pubs/27514.

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland, Oregon: USFWS, Region 1. Approved December 15, 2005. http://www.fws.gov/sacramento/ES/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

USACE (United States Army Corps of Engineers). 2014. *Memorandum for Record: Cumulative Impact Analysis for the South Sacramento Habitat Conservation Plan Area (SPK-1995-00386).* USACE Sacramento Engineer District, California South Branch, Sacramento California. Signed September 9, 2014. 39 pages.

Williamson, R.J., G.E. Fogg, M.C. Rains, and T.H. Harter. 2005. Hydrology of Vernal Pools at Three Sites, Southern Sacramento Valley. Report to California Department of Transportation. Project F 2001 IR 20. University of California, Davis. 88 pages. http://www. dot.ca.gov/research/environmental/docs/vernal_pools_report_fin al.pdf.

Witham, C.W., R.F. Holland and J.E. Vollmar. 2014. Changes in the Distribution of Great Valley Vernal Pool Habitats from 2005 to 2012. Sacramento, CA. Report prepared for the U.S. Fish and Wildlife Service and Bureau of Reclamation CVPIA Habitat Restoration Program under Grant Agreement No. F11AP00169 with the USFWS.

INTENTIONALLY LEFT BLANK

CHAPTER 9 – SPECIAL-STATUS SPECIES INCLUDING HCP COVERED SPECIES

This chapter presents the potential effects of each alternative on special-status species occurring in the Planning Area, including the 28 species specifically addressed in the Draft South Sacramento Habitat Conservation Plan (SSHCP) as "Covered Species."

Special-status species are plants and animals that are legally protected under state and/or federal law, or species that are considered sufficiently rare or unique that they are given special consideration by state and/or federal resource agencies or by recognized conservation organizations. See Appendix G for a discussion of the criteria used by the Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) to determine which Planning Area special-status species would be addressed in Chapter 9.

The SSHCP land cover types are referenced in this chapter to discuss Planning Area suitable habitat for individual special-status species. However, the existing conditions and potential impacts of each EIS/EIR alternative on each Planning Area land cover as a natural community were analyzed in Chapter 8 of this EIS/EIR.

9.1 ENVIRONMENTAL SETTING/AFFECTED ENVIRONMENT

9.1.1 Regulatory Framework

This section outlines the regulatory framework that would apply to potential impacts of the alternatives to special-status species, including Covered Species. The summaries of statutes, regulations, and policies that are provided below focus on information relevant to the scope of the impact analysis presented in this chapter. Pursuant to Title 40 of the Code of Federal Regulations (CFR), Section 1502.25 (40 CFR 1502.25), the applicable statutes, regulations, and policies helped to determine the appropriate scope of analysis included in Chapter 9.

9.1.1.1 Federal

Federal Endangered Species Act

The federal Endangered Species Act (ESA) provides a means whereby the ecosystems upon which endangered and threatened species depend may be conserved (16 USC 1531). The terms "conserve," "conserving," and "conservation" mean to use, and the use of all, methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to ESA are no longer necessary. The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over plants, wildlife, and freshwater fish listed under ESA.

Section 9 of ESA prohibits any person from "taking" an endangered or threatened fish or wildlife species. Take, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap,

capture, or collect or to attempt to engage in any such conduct" (Section 3(18)). Take of threatened species is also prohibited under Section 9 unless otherwise authorized by federal regulations. Additionally, Section 9 prohibits removing, cutting, and maliciously damaging or destroying plants listed under ESA on sites that are under federal jurisdiction.

Under federal regulations, "harm" is further defined by USFWS to include acts or habitat modification or degradation that create the likelihood of injury or actually result in death or injury to listed species by significantly disrupting normal behavior patterns or by impairing essential behavioral patterns, including but not limited to, breeding, feeding, or sheltering (50 CFR 17.3).

Incidental take of listed species may be authorized under Section 10 of ESA. Incidental take is species take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (50 CFR 17.3). Section 10 of ESA requires the issuance of an incidental take permit before any nonfederal action may be taken that would potentially harm, harass, injure, kill, capture, collect, or otherwise hurt (i.e., take) any individual of an endangered or threatened species. The permit requires preparation and implementation of a habitat conservation plan (HCP) that would minimize and mitigate the take of covered species to the maximum extent practicable.

Federal entities may receive authorization for take of a listed species through Section 7 of ESA if a determination is made (considering effects on the species and minimization and mitigation measures) that the action is not likely to jeopardize the continued existence of any species listed under ESA, or result in the destruction or adverse modification of the species' designated critical habitat.

Section 3 of ESA defines critical habitat as: (1) the specific areas within the geographical area occupied by a species at the time it is listed in accordance with the act, on which are found those physical or biological features, essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. Critical habitat designations affect only federal agency actions or federally funded or permitted activities. Critical habitat designations do not affect activities by private landowners if there is no federal funding or authorization. Federal agencies are required to avoid destruction or adverse modification of designated critical habitat.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act makes it unlawful to pursue, hunt, take, capture, collect, kill or sell migratory birds, feathers, eggs, and nests. The statute does not discriminate between live or dead birds and also grants full protection to any bird parts, including feathers, eggs and nests. The current list of species protected by the Migratory Bird Treaty Act can be found in 50

CFR 10.13. The list includes nearly all migratory birds native to the United States. Over 800 species are currently on the list.

Executive Order 13186

Executive Order 13186 of 2001 assists compliance with the Migratory Bird Treaty Act by directing each federal agency taking actions that would have or would likely have a negative impact on migratory bird populations to work with USFWS to develop a memorandum of understanding to promote the conservation of migratory bird populations. Protocols developed under the memorandum of understanding must include the following agency responsibilities: (1) avoid and minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting federal agency actions; (2) restore and enhance habitat of migratory birds, as practicable; and (3) prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

9.1.1.2 State

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code, Section 2050 et seq.) prohibits the taking of species listed as threatened or endangered under the act, or candidates for listing, except as authorized by state law. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include "harm" or "harass," which is included in the ESA definition. As a result, the threshold for take is higher under CESA than under ESA.

CESA Section 2081 states that take of an endangered, threatened, or candidate species may be authorized by the California Department of Fish and Wildlife (CDFW) if the impacts of the take are incidental to an otherwise lawful activity, are "minimized and fully mitigated," and do not "jeopardize the continued existence of [the] species." Any mitigation measures imposed under CESA must be measures "roughly proportional in extent to the impact of the authorized taking on the species."

California Fully Protected Species

Fully protected species are addressed in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take unless a natural community conservation plan is prepared; therefore take is not authorized under the SSHCP.

Protection for Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptor (e.g., hawks, owls, eagles, and falcons), including their nests or eggs. Section 3513 of the California Fish and Game Code codifies the federal Migratory Bird Treaty Act, discussed previously.

California Native Plant Protection Act

The California Native Plant Protection Act provides protection to endangered and "rare" plant species, subspecies, and varieties of wild native plants in California. The California Native Plant Protection Act's definition of "endangered" and "rare" closely parallel the CESA definitions of "endangered" and "threatened" plant species.

Oak Woodlands Conservation Act

The Oak Woodlands Conservation Act (Senate Bill 1334), Section 21083.4 of the California Public Resources Code, requires counties to determine if a project within their jurisdiction may result in loss of oak woodlands that would have a significant adverse effect on the environment. If the lead agency determines that a project would result in a significant adverse effect on oak woodlands, mitigation measures to avoid or minimize the significant adverse effect of converting oak woodlands to other land uses are required.

9.1.1.3 Local

Sacramento County General Plan of 2005–2030

The *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011) Conservation Element includes goals, objectives, and over 100 policies related to the management and preservation of natural resources (policies CO-19 through CO-140 under Section V, Vegetation and Wildlife). The following is a summary of the policies relevant to special-status species. These policies either directly relate to special-status species or address habitats that are important to special-status species.

> **Policies CO-19 to CO-32:** Provide for a safe, reliable water supply while protecting beneficial uses by protecting water quality and water-supported ecosystems through preservation, restoration, and creation of riparian and wetlands habitats and buffers to protect water quality from erosion.

Policies CO-58 through CO-63: Support the management and restoration of wetland and riparian habitat, native habitat, and special-status species habitat. The general plan calls for no net loss of wetlands, riparian woodlands, and oak woodlands.

Policies CO-75 through 81: Support the preservation, enhancement, and restoration of special-status species habitat in Sacramento County to aid in the recovery of these species through maintenance of viable populations and wildlife corridors, managing vegetation on public lands to encourage native species, and controlling access and protecting sensitive habitat.

Policies CO-83 and CO-86: Establish and limit land uses in vernal pool habitat preserves.

Policies CO-88 through CO-92: Support protection and enhancement of riparian habitat and promote the increase of native woodlands and riparian scrub along select waterways.

Policies CO-96 through CO-101: Promote the maintenance of bank stabilization on river and waterways and riparian functionality.

Policies CO-102 through CO-104: Promote the conservation and protection of the Cosumnes River and Mokelumne River corridors.

Policies CO-114 through CO-124: Protect stream corridors from an action that would degrade water quality and require maintenance of vegetation to allow for high water quality.

Policies CO-138 through CO-140: Require the preservation and protection of heritage and landmark trees, especially those used by Swainson's hawks (*Buteo swainsoni*) in riparian areas, the protection of native trees other than oaks from development, and a no net loss of oak woodland canopy area. The section also requires compensation for removal of native oaks and native non-oaks, and provides mitigation measures for compensation.

Sacramento County Swainson's Hawk Ordinance

Chapter 16.130 of Title 16 of the Sacramento County Code addresses the reduction in Swainson's hawk foraging habitat within unincorporated Sacramento County (County). Participating in the County's Swainson's Hawk Mitigation Program, which is voluntary, is one option for mitigating the loss of foraging habitat within unincorporated areas of the County. Under this program, mitigation for impacts less than 40 acres can be achieved by paying a mitigation fee or providing replacement habitat (title or easement to suitable Swainson's hawk mitigation lands on a per-

acre basis); mitigation for impacts of 40 acres or greater can be achieved only by providing replacement habitat under this program.

Sacramento County Tree Preservation and Protection Ordinance

The Sacramento County Tree Preservation and Protection Ordinance, Chapter 19.12 of Title 19 of the Sacramento County Code, requires the protection of all native oak trees having a single trunk of 6 inches diameter at breast height (dbh) or greater, or with multiple trunks having an aggregate diameter of 10 inches dbh or greater. A native oak tree is defined by the ordinance as any of the following: valley oak (*Quercus lobata*), interior live oak (*Quercus wislizenii*), blue oak (*Quercus douglasii*), or oracle oak (*Quercus morehus*). The removal of any protected native oaks trees must be authorized through a removal permit. Grading is limited beneath oak trees within their dripline, and any protected oak trees damaged during construction would require mitigation as specified in the ordinance. Exceptions to this ordinance are provided within various categories of developed areas.

2030 Galt General Plan Policy Document

The *2030 Galt General Plan Policy Document* (Galt General Plan)(Galt 2009) Conservation Element includes goals and policies that encourage the protection of important habitats and commit the city to address the effects of urban development on these habitats. The following are policies relevant to special-status species. These policies either directly relate to special-status species or address habitats that are important to special-status species.

> **Policy COS-2.1:** Sensitive Species Protection: The City should require minimization of impacts to protect mature trees, vernal pools, and any threatened endangered or other sensitive species when approving new development.
>
> **Policy COS-2.2:** Wetland and Riparian Communities Management: The City shall support the protection, restoration, expansion, and management of wetland and riparian plant communities for passive recreation, groundwater recharge, and wildlife habitat.
>
> **Policy COS-2.3:** Biologically Sensitive Area Development: The City should require new development in areas that are known to have particular value for biological resources to maximize preservation of sensitive vegetation and wildlife habitat.
>
> **Policy COS-2.4:** Federal, State, and Local Statutes Compliance: The City shall review development proposals in accordance with applicable Federal, State, and local statutes protecting special-status species and jurisdictional wetlands.

Policy COS-2.5: Mitigation Measures Imposition: The City shall, in its role as lead agency, take into consideration mitigation standards and policies of resource and regulatory agencies with jurisdiction over biological resources (e.g., USFWS, CDFW, etc.).

Policy COS-2.6: Biological Surveys: On sites that have the potential to contain critical or sensitive habitats or special species, the City shall require the project applicant to have the site surveyed by a qualified biologist. A report on the findings of this survey shall be submitted to the City as part of the application process.

Policy COS-2.7: Regional Habitat Conservation Efforts Coordination: The City shall continue to coordinate efforts with Sacramento County to develop the South Sacramento Habitat Conservation Plan.

Galt Tree Ordinances

Chapter 12.28 of the Galt Municipal Code requires written permission and approval for the cutting or removal of oak trees or public trees on public and private property unless certain provisions such as emergencies apply. A public tree is any tree with one-half or more of its trunk or branches on or above public land. An oak tree is defined as including, but not limited to, valley oak, interior live oak, blue oak, or oracle oak having at least one trunk of 6 inches in diameter measured 4 feet above the ground, or multi-trunks with an aggregate diameter of 8 inches or more, measured 4 feet above ground. Minimum development control measures are suggested such as not disturbing the ground within the driplines of protected trees. Grading within the dripline of oak trees is not permitted unless specifically authorized. A tree preservation fund is established in lieu of replacement trees and could be used as mitigation for damage or removal of protected trees. Specific details apply for ground disturbance within a protected tree's dripline.

Rancho Cordova General Plan

The *Rancho Cordova General Plan* (Rancho Cordova 2006) Natural Resources Element includes various goals and policies relevant to special-status species, as well as a policy that functions much like tree ordinances adopted by other jurisdictions. The following are policies relevant to special-status species. These policies either directly relate to special-status species or address habitats that are important to special-status species.

Policy NR.1.1: Protect rare, threatened, and endangered species and their habitats in accordance with State and federal law.

Policy NR.1.2: Conserve Swainson's hawk habitat consistent with State policies and Department of Fish and Game guidelines.

Policy NR.1.6: Participate in the development of a habitat conservation plan to address the unique biological resources in Rancho Cordova.

Policy NR.1.8: The City shall encourage creation of habitat preserves that are immediately adjacent to each other in order to provide interconnected open space areas for animal movement.

Policy NR.1.9: The City shall require that impacts to riparian habitats be mitigated at a no net loss of existing function and value based on field survey and analysis of the riparian habitat to be impacted. No net loss may be accomplished by avoidance of the habitat, restoration of existing habitat, or creation of new habitat, or through some combination of the above.

Policy NR.1.10: The City shall avoid the placement of new roadways within habitat preserves to the maximum extent feasible.

Policy NR.1.11: In such cases where habitat preserves are crossed by a roadway, or where two adjacent preserves are separated by a roadway, the roadway shall be designed or updated with wildlife passable fencing separating the roadway from the preserve and/or shall incorporate design features that allow for the movement of wildlife across or beneath the road without causing a hazard for vehicles and pedestrians on the roadway.

Policy NR.2.1: Require mitigation that provides for “no net loss” of wetlands consistent with current State and federal policies.

Policy NR.2.2: Ensure that direct and indirect effects to wetland habitats are minimized by environmentally sensitive project siting and design, to the maximum extent feasible.

Policy NR.2.5: The City shall require that drainage improvements that discharge into areas of wetlands to be preserved are, to the maximum extent feasible, designed to mimic the undeveloped surface water flow conditions of the area in terms of seasonality, volume, and flow velocity.

Policy NR.3.1: Coordinate with property owners and local interest groups, such as the Sacramento Urban Creeks Council, to restore, enhance, and preserve creeks in Rancho Cordova.

Policy NR.4.1: Conserve native oak and landmark tree resources for their historic, economic, aesthetic, educational, and environmental value.

Policy NR.4.4: Prior to the approval of any public or private development project in areas identified or assumed to contain trees, the City shall require that a determinate survey of trees species and size be performed. If any native oaks or other native trees six inches or more in diameter at breast height (dbh), multitrunk native oaks or native trees of 10 inches or greater dbh, or non-native trees of 18 inches or greater dbh that have been determined by a certified arborist to be in good health are found to occur, such trees shall be avoided if feasible. If such trees cannot be avoided, the project applicant shall do one of the following:

All such trees shall be replaced at an inch-for-inch ratio. A replacement tree planting plan shall be prepared by a certified arborist or licensed landscape architect and shall be submitted to the City of Rancho Cordova for approval prior to removal of trees;

or,

The project applicant shall submit a mitigation plan that provides for complete mitigation of the removal of such trees in coordination with the City of Rancho Cordova. The mitigation plan shall be subject to the approval of the City.

If the City of Rancho Cordova adopts a tree preservation ordinance at any time in the future, any future development activities shall be subject to that ordinance instead.

9.1.2 Existing Condition of the Special-Status Species and Their Habitats

This section provides information on special-status species in the Planning Area including SSHCP Covered Species along with the status of each species and their occurrence and acreage of modeled habitat within the Planning Area. Although conditions across a species' range influence factors such as whether it is listed as threatened or endangered, actions and alternatives evaluated in this EIS/EIR are limited to the Planning Area. Therefore, the lead agencies have determined that the primary focus for evaluating the effects of each EIS/EIR alternative on special-status species and their habitats is the Planning Area.

Additional details on the species considered but not further analyzed in this EIS/EIR are provided in Appendix G.

9.1.2.1 Existing Condition of the SSHCP Covered Species

Table 9-1 shows the current regulatory status of the 28 SSHCP Covered Species, and more information on each species, including natural history information, modeled habitat, species occurrences, and Critical Habitat and recovery plan information where applicable, is provided in Appendix G.

Table 9-1. South Sacramento Habitat Conservation Plan Covered Species

Scientific Name/Common Name	Status			Existing Conditions	
	ESA (Federal)	*CESA (State)*	*CNPS CRPR Rank*	*Documented Occurrences in Planning Area*	*Existing Modeled Habitat in Planning Area (acres)*
Invertebrates					
Lepidurus packardi Vernal pool tadpole shrimp (VPTS)	E*	—	—	851	103,210
Branchinecta lynchi Vernal pool fairy shrimp (VPFS)	T*	—	—	581	103,210
Branchinecta mesovallensis Mid-valley fairy shrimp (MVFS)	—	—	—	37	53,638
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle (RWSB)	—	—	—	8	103,137
Desmocerus californicus dimorphus Valley elderberry longhorn beetle (VELB)	T	—	—	156	7,878
Amphibians					
Ambystoma californiense California tiger salamander (CTS), (Central Valley population)	T*	T	—	31	89,794
Spea hammondii Western spadefoot (WST)	—	CSC	—	41	163,342
Reptiles					
Thamnophis gigas Giant garter snake (GGS)	T	T	—	14	35,159
Actinemys marmorata Western pond turtle (WPT)	—	CSC	—	19	117,201
Birds					
Accipiter cooperii Cooper's hawk (COHA)	—	WL	—	20	22,646
Agelaius tricolor Tricolored blackbird (TRIC)	BCC	E**	—	36	212,632
Athene cunicularia hypugaea Western burrowing owl (BUOW)	BCC	CSC	—	97	213,106
Buteo regalis Ferruginous hawk (FEHA)	BCC	—	—	26	159,491
Buteo swainsoni Swainson's hawk (SWHA)	BCC	T	—	410	213,223
Circus cyaneus Northern harrier (NOHA)	—	CSC	—	70	210,318
Elanus leucurus White-tailed kite (WHKI)	—	CFP	—	62	230,042
Grus canadensis tabida Greater sandhill crane (SACR)	—	T; CFP	—	210	89,764
Lanius ludovicianus Loggerhead shrike (LOSH)	BCC	CSC	—	34	215,246

Table 9-1. South Sacramento Habitat Conservation Plan Covered Species

Scientific Name/Common Name	Status			Existing Conditions	
	ESA (Federal)	*CESA (State)*	*CNPS CRPR Rank*	*Documented Occurrences in Planning Area*	*Existing Modeled Habitat in Planning Area (acres)*
Mammals					
Lasiurus blossevillii Western red bat (WRB)	—	CSC	—	7	177,732
Taxidea taxus American badger (AMB)	—	CSC	—	9	149,137
Plants					
Downingia pusilla Dwarf downingia (DWDO)	—	—	2B.2	10	24,261
Juncus leiospermus var. *ahartii* Ahart's dwarf rush (ADR)	—	—	1B.2	2	25,136
Navarretia myersii Pincushion navarretia (PINA)	—	—	1B.1	48	57,438
Gratiola heterosepala Boggs Lake hedge-hyssop (BLHH)	—	E	1B.2	31	37,000
Legenere limosa Legenere (LEG)	—	—	1B.1	62	50,973
Orcuttia tenuis Slender Orcutt grass (SLOG)	T*	E	1B.1	4	34,492
Orcuttia viscida Sacramento Orcutt grass (SAOG)	E*	E	1B.1	40	34,492
Sagittaria sanfordii Sanford's arrowhead (SAAR)	—	—	1B.2	64	52,823

Status Definitions

Federal

E = listed as endangered under the ESA
T = listed as threatened under the ESA
* = species has designated Critical Habitat located within the Planning Area.
— = no federal status
BCC = Bird of Conservation Concern, USFWS 2008

State

E = listed as endangered under CESA
T = listed as threatened under CESA
** = Candidate for listing by CDFW
CFP = fully protected under the California Fish and Game Code
CSC = species of special concern in California
WL = Watch List
— = no state status

California Native Plant Society (CNPS) California Rare Plant Rank (CRPR)

1B = Rare, threatened, or endangered in California and elsewhere
2B = Rare, threatened, or endangered in California but more common elsewhere

CRPR Threat Ranks

0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Moderately threatened in California (moderate degree/immediacy of threat)

9.1.2.2 Existing Condition of the Other Special-Status Plant Species

Table 9-2 summarizes the regulatory status, occurrence within the Planning Area, and acres of existing modeled habitat for 18 other special-status plant species that are analyzed in Chapter 9.

Table 9-2. Other Special-Status Plant Species Analyzed in Chapter 9

***Scientific Name*/ Common Name**	**Status**			**Existing Conditions**	
	ESA (Federal)	*CESA (State)*	*CNPS CRPR Plant Rank*	*CNDDB or Calflora records within Planning Area*	*Existing Modeled Habitat in Planning Area (acres)*
Brasenia schreberi Watershield	—	S2	2B.3	Y	5,554
Carex comosa Bristly sedge	—	S2	2B.1	Y	11,342
Castilleja campestris var. *succulenta* Fleshy owl's clover	T	E/S2	1B.2	N	5,554
Clarkia biloba ssp. *brandegeeae* Brandegee's clarkia	—	S4	4.2	N	14,769
Cicuta maculata var. *bolanderi* Bolander's water-hemlock	—	S2	2B.1	Y	19,293
Cuscuta obtusiflora var. *glandulosa* Peruvian dodder	—	—	2B.2	Y	5,554
Eryngium pinnatisectum Tuolumne button-celery	—	S2	1B.2	Y	20,557
Fritillaria agrestis Stinkbells	—	S3	4.2	Y	149,921
Hibiscus lasiocarpos var. *occidentalis* Woolly rose-mallow	—	S2	1B.2	Y	5,554
Juglans hindsii Northern California black walnut	—	S1	1B.1	Y	7,951
Lathyrus jepsonii var. *jepsonii* Delta tule pea	—	S2	1B.2	Y	5,554
Lepidium latipes var. *heckardii* Heckard's pepper-grass	—	S2	1B.2	Y	135,152
Lilaeopsis masonii Mason's lilaeopsis	—	S2	1B.1	Y	13,505
Limosella australis Delta Mudwort	—	S2	2B.1	Y	13,505
Scutellaria galericulata Marsh skullcap	—	S1	2B.2	Y	5,554
Scutellaria lateriflora Side-flowering skullcap	—	S1	2B.2	Y	5,554
Symphyotrichum lentum Suisun marsh aster	—	S2	1B.2	Y	5,554

Table 9-2. Other Special-Status Plant Species Analyzed in Chapter 9

Scientific Name/ Common Name	Status			Existing Conditions	
	ESA (Federal)	*CESA (State)*	*CNPS CRPR Plant Rank*	*CNDDB or Calflora records within Planning Area*	*Existing Modeled Habitat in Planning Area (acres)*
Trifolium hydrophilum Saline clover	—	S2	1B.2	Y	146,494

Sources:
Records noted are from the California Natural Diversity Database (CNDDB) (CDFW 2015a) and CalFlora database (CalFlora 2015). Elevation in the Planning Area is from -5 to 670 feet.

Status Definitions
Federal
T = listed as threatened under the ESA
— = no federal status
.

State
E = listed as endangered under CESA
T = listed as threatened under CESA
S1 = Critically Imperiled by the State
S2 = Imperiled by the State
S3 = Vulnerable by the State
S4 = Apparently Secure by the State
— = no state status

California Native Plant Society (CNPS) California Rare Plant Rank (CRPR)
1B = Rare, threatened, or endangered in California and elsewhere
2B = Rare, threatened, or endangered in California, but more common elsewhere
4 = Plants of limited Distribution – Watch List

CRPR Threat Ranks
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Moderately threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

9.1.2.3 Existing Conditions of the Other Special-Status Animal Species

Table 9-3 summarizes the regulatory status, occurrence within the Planning Area, and acres of existing modeled habitat for four other special-status bird and mammal species that are analyzed in Chapter 9.

Table 9-3. Other Special-Status Wildlife Species Analyzed in Chapter 9

Scientific Name/ Common Name	Status		Existing Conditions	
	ESA (Federal)	*CESA (State)*	*CNDDB Records within Planning Area*	*Existing Modeled Habitat in Planning Area (acres)*
Birds				
Ammodramus savannarum Grasshopper sparrow (nesting)	—	CSC	Y	151,143
Grus canadensis canadensis Lesser sandhill crane (wintering)	—	CSC	N	89,712
Melospiza melodia Song sparrow (Modesto population)	—	CSC	Y	7,008
Riparia riparia Bank Swallow (nesting)	—	T	Y	n/a

Sources: CNDDB = California Natural Diversity Database
The federal and state status of species primarily is based on the Special Animals List (October 2015) (CDFW 2015b).

Status Definitions
Federal
— = no federal status

State
T = listed as threatened under CESA
CSC = Species of special concern (no formal protection other than California Environmental Quality Act consideration)

9.1.2.4 Designated Critical Habitat

The following special-status species are federally listed and have designated Critical Habitat (see Section 9.1.1) within the Planning Area.

- Vernal pool tadpole shrimp (*Lepidurus packardi*) (36,156 acres of Critical Habitat in Planning Area)
- Vernal pool fairy shrimp (*Branchinecta lynchi*) (36,156 acres of Critical Habitat in Planning Area)
- California tiger salamander (*Ambystoma californiense*) (Central Valley population) (10,192 acres of Critical Habitat in Planning Area)
- Slender Orcutt grass (*Orcuttia tenuis*) (1,061 acres of Critical Habitat in Planning Area)
- Sacramento Orcutt grass (*Orcuttia viscida*) (30,936 acres of Critical Habitat in Planning Area)
- Fleshy owl's clover (*Castilleja campestris* var. *succulenta*) (51 acres of Critical Habitat in Planning Area)

A further description of the Critical Habitat for these species is presented in Appendix G. The total impacts of each alternative on species habitat within the designated critical habitat are presented in Section 9.2.

Recovery Plan Species

The following special-status species analyzed in Chapter 9 are included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005); vernal pool tadpole shrimp, vernal pool fairy shrimp, mid-valley fairy shrimp (*Branchinecta mesovallensis)*, western spadefoot (*Spea hammondii)*, Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii)*, Boggs Lake hedge-hyssop (*Gratiola heterosepala*), legenere (*Legenere limosa)*, Sacramento Orcutt grass, and slender Orcutt grass.

In addition, the California tiger salamander (Central Valley population) is covered by the *Draft Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander* (USFWS 2016).

The impacts of each alternative on species habitat present within Core Recovery Areas where designated are presented in Section 9.2 where applicable.

The USFWS published a a new recovery plan for giant garter snake (*Thamnophis gigas*) in late 2017 (USFWS 2017). The giant garter snake recovery plan includes giant garter snake recovery areas (recovery units) within the Planning Area portion of the Cosumnes-Mokelumne Basin population of giant garter snake, which is south of the American River and east of Interstate 5, and within the small portion of the Delta Basin giant garter snake population, which is located in the Planning Area west of Interstate 5.

9.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

9.2.1 Methodology for Assessing Impacts of Each Alternative on Special-Status Species, Including SSHCP Covered Species

The general methodologies for assessing the impacts of each alternative are discussed in Chapter 3. That discussion is summarized here along with the specific methods related to the analysis of the impacts of each alternative to special-status species, including SSHCP Covered Species. The projects and activities expected under each alternative, including expected or planned preserves, are described in Chapter 2. Potential impacts of each alternative were analyzed using a 50-year study period, as discussed in Section 3.6.3.

As discussed generally in Sections 3.6.5 and 3.6.6, the lead agencies estimated the direct and the indirect impacts of each alternative using geographic information system (GIS) map-layers of the best available information about the projects and activities included in each alternative (see Chapter 2), GIS data sets of each SSHCP land-cover type, and GIS data sets of habitat models developed for 28 species (Appendix G). The impact to special-status species was based

on impacts to their modeled habitat, which would result in a conservative overestimate of impacts to the species as not all modeled habitat is actually used by the species.

The direct and indirect impacts of each alternative on the special-status species are discussed and analyzed here. Implementation of Covered Activities, including urban development, can produce "environmental stressors" or "impact mechanisms," such as changes in hydroperiod of vernal pools and habitat fragmentation. Different species respond to each environmental stressor in different ways. Take occurs when an environmental stressor kills or injures an individual of the species; when the environmental stressor significantly disrupts normal behavior patterns of individuals, including normal feeding, breeding, or sheltering behaviors; or the environmental stressor significantly modifies or degrades habitat, impairing the essential behavior patterns of individuals, including normal feeding, breeding, or sheltering behaviors. The number of individuals of each species in the Urban Development Area (UDA[1]) and in other parts of Planning Area is not known for the following reasons: there have been few comprehensive surveys of any species in this Planning Area; there are limitations with the data that is available (e.g., the California Natural Diversity Database); many of the special-status species are small and/or cryptic in some or all stages of their life history (e.g. branchiopods);, many of the special-status species spend most of their lives underground; some species move around a lot and/or migrate annually; and most of the special-status plant species and the special-status vernal pool invertebrates are evolutionarily adapted to huge differences in annual rainfall, so individuals can be present (e.g., in the seed bank or as cysts in the soil)without being visible every year. Also, take was estimated over a 50-year period, with uncertainties regarding when or where specific Covered Activities will occur. Therefore, it would be infeasible to quantify or estimate the exact number individuals of each special-status species that would be subject to direct and indirect impacts from the projects and activities implemented under each alternative. Therefore, acres of direct and indirect species modeled habitat under each alternative were used as a surrogate for the number of individuals of each species that implementing the alternative would impact (take).

Direct impact to species and species habitat would result from the removal and loss of modeled species habitat during construction of new urban development and transportation projects, or from other projects and activities that result in permanent ground disturbance and habitat loss.

Some direct impacts may occur for only a relatively short duration and have temporary effects on a certain biological resource. Temporary effects to special-status species would also occur from

[1] As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, the term "UDA" means all lands within the County's Urban Service Boundary that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within Galt's sphere of influence (see Figure 1-1).

stressors such as urban development project construction-noise, nighttime lighting of construction sites, movement and activities of persons or equipment in a construction site, or soil and vegetation disturbance at a construction site or equipment staging area where the disturbed habitat could be returned to pre-project conditions within a year after construction is complete. Temporary effects in this chapter are described and analyzed qualitatively, by evaluating the expected environmental stressors/impact mechanisms of the alternatives' projects/actions and evaluating the likely response of a species to those environmental stressors based on the best available information on the biology and ecology of each species and agency expertise.

Indirect impacts to species and species habitat could result from new urban development and transportation projects. For example, implementation of activities and projects in the watershed or upstream that cause increased stormwater discharge and higher pollutant loads might adversely affect downstream water quality and habitat for the western pond turtle (*Actinemys marmorata*). As another example, development projects can damage duripan that is required for the perched aquifer that supports the vernal pool ecosystem, which would increase water loss from the system, reducing the hydroperiod of the vernal pools and adversely affecting the habitat for vernal pool tadpole shrimp. As a final example, residential development can increase lighting of adjacent natural areas, which may adversely affect habitat for the primarily nocturnal American badger (*Taxidea taxus*). As described in Section 3.6.8, the indirect impacts on vernal pool special-status species and their habitats are analyzed quantitatively in this chapter.

The following methods were used to quantify indirect effects on vernal pool ecosystem aquatic land covers for all three EIS/EIR alternatives.

The quantified indirect effects calculations for the Proposed Action/Proposed Project Alternative were conducted during preparation of the SSHCP using LIDAR data available for the Planning Area. LIDAR is an optical remote-sensing technique that uses laser light to densely sample the surface of the Earth, producing highly accurate locational and topographic information. The LIDAR data was used to identify the watershed boundaries for vernal pool aquatic land covers. GIS was then used to overlay covered activity development locations over the vernal pool aquatic land cover watersheds. Where proposed development overlapped with 10% or more of the watershed, the associated vernal pool aquatic land covers were considered subject to indirect effects. The methodology is explained further in Appendix E of the SSHCP. The LIDAR analysis requires significant time and resources, and it was not feasible to recreate this process for the No Action/No Project Alternative and the Reduced Permit Term Alternative.

In portions of the Planning Area where the development scenario for the No Action/No Project Alternative and Reduced Permit Term Alternative matched the Proposed Action/Proposed

Project Alternative, the results of the LIDAR analysis for these locations was applied to the No Action/No Project Alternative and Reduced Permit Term Alternative.

To calculate remaining indirect effects on aquatic vernal pool land covers for the No Action/No Project Alternative and years 31–50 of the 50-year EIS/EIR study period of the Reduced Permit Term Alternative, GIS was used to create a 250-foot-wide radius around all identified development under each alternative (radius method). Any vernal pool aquatic land covers that overlapped with this radius were considered potentially subject to indirect effects. This broad brush approach places a much larger area of vernal pool aquatic land covers in locations potentially subject to indirect effects than the LIDAR method described above. Therefore, to promote a more equitable comparison between alternatives, various refinements and conversion factors were developed, based on comparisons between the results of the LIDAR and GIS analyses, to generate indirect effects using the buffer method that better paralleled results that would be expected from the LIDAR method.

For the 30-year permit term under the Reduced Permit Term Alternative, where the LIDAR methodology could not be applied, indirect effects were calculated using the buffer method described above, but with refinements and conversion factors specific to the conditions of this portion of the Reduced Permit Term Alternative. For example, a 200-foot buffer extending from the mapped development boundary, rather than 250-foot buffer, was used to take into account the requirements for a minimum 50-foot setback between development and Preserve boundaries included during this early period of the Reduced Permit Term Alternative.

To calculate indirect effects on vernal pool aquatic land covers for the 1,900 acres of shifted or displaced development included as part of the No Action/No Project Alternative, the EIS/EIR used a proportional analysis similar to that described in Section 3.6.7 for direct effects. However, for the indirect effects analysis, the acreages of Vernal Pools and Swales that were already assumed to be directly affected were removed from the inventory of land cover types that could be subject to indirect effects.

The indirect effects on species that utilize other aquatic and terrestrial habitats are described and analyzed qualitatively, by evaluating the expected environmental stressors/impact mechanisms of the alternatives' projects/actions and evaluating the likely response of a species to those environmental stressors based on the best available information on the biology and ecology of each species and agency expertise.

Potential temporary and permanent impacts for each alternative were analyzed based on the anticipated development projects and Preserve establishment, management, and maintenance over the 50-year study period, as described in Section 3.6.3. The lead agencies also assume buildout of urban development as described in Chapter 2, which includes the assumption that

some urban development would be shifted or displaced outside the UDA under the No Action/No Project Alternative.

As described in Section 2.2.3, it is estimated that approximately 1,900 acres of urban development will shift to other locations on undeveloped land outside the UDA under the No Action/No Project Alternative. The methods used to determine potential impacts to land covers from this shifted or displaced development are discussed in Section 3.6.7. To determine the impacts of this shifted or displaced development on special-status species, it was assumed that any impact from shifted or displaced development on land covers within a given species habitat model would be an impact to the species, and the acreage of these impacts were added to the total modeled impact on the species.

Avoidance and Minimization Measures (AMMs) included in the SSHCP (see Table 2-6) would be applied to all Covered Activity projects and activities implemented over the 50-year permit term under the Proposed Action/Proposed Project Alternative, and over the 30-year permit term of the Reduced Permit Term Alternative. AMMs that would reduce impacts to species considered in this chapter are identified in each impact discussion below. As discussed in Section 2.3.5, the No Action/No Project Alternative's projects and activities would implement various best practices that are similar to many of the SSHCP AMMs. However, the Proposed Action/Proposed Project Alternative and the Reduced Permit Term Alternative (the action alternatives) include additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM. These alternatives include processes for annual review of AMM effectiveness and a process making adaptive changes to an AMM that is not fully effective at avoiding impacts. This additional layer of oversight of AMM implementation and AMM effectiveness under the action alternatives increases avoidance and minimization of various impacts. The SSHCP AMMs also provide new avoidance and minimization measures that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen many potential adverse effects compared to the effects of the No Action/No Project Alternative.

Calculations of direct effects to species modeled habitat under the Proposed Action/Proposed Project Alternative and the Reduced Permit Term Alternative assume that the AMMs that avoid and minimize direct impacts to modeled species habitat, including BMP-1 (Construction Fencing), BMP-3 (Equipment Storage and Fueling), BMP-9 (Soil Compaction), and Road-1 (Road Project Location) (Table 2-6) would be effective.

Cumulative effects of each alternative are analyzed consistent with the methodology described in Section 3.7. The cumulative analysis of each EIS/EIR alternative considers whether the incremental impacts of the alternative on each species would be significant (i.e., cumulatively considerable).

9.2.1.1 Determination of Impact Significance

Significance Criteria

As discussed in Section 3.8.1, the criteria used to evaluate the significance of each alternative's impacts on special-status species, including Covered Species, are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, and on typical thresholds used to evaluate effects on these resources in recent EIRs prepared by Sacramento County. Based on these sources, a significant impact would occur if the alternative would:

1. Have a substantial adverse effect, either directly, or through habitat modifications, on any species identified as a special-status species in local or regional plans, policies, or regulations, or by the U.S. Fish and Wildlife Service or California Department of Fish and Wildlife;
2. Reduce the number or restrict the range of a rare, threatened, or endangered plant or animal;
3. Conflict with any local policies or ordinances protecting biological resources; or
4. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Appendix G of the CEQA Guidelines does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial effect could occur if the alternative would:

1. Reduce direct or indirect effects on any species identified as a special-status species in local or regional plans, policies, or regulations, or by the U.S. Fish and Wildlife Service or California Department of Fish and Wildlife compared to a baseline environmental condition;
2. Have a lesser reduction in numbers or restriction in range of a rare, threatened, or endangered plant or animal compared to a baseline environmental condition;
3. Increase the number, range, or area of local occurrence of any species identified as a special-status species in local or regional plans, policies, or regulations, or by the U.S. Fish and Wildlife Service or California Department of Fish and Wildlife compared to a baseline environmental condition;
4. Reduce or eliminate conflicts with any local policies or ordinances protecting biological resources; or
5. Reduce or eliminate conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The impact analysis for the three EIS/EIR Alternatives will consider the context, intensity, and severity of potential impacts to each of these impact-criteria and will present a determination of significance applicable to each of these criteria.

Issues Not Evaluated Further

This section identifies significance criteria for special-status species that are not carried forward into the impact analysis and provides the reasoning for this determination.

There are currently no other HCPs within the Planning Area. Therefore, implementation of any of the alternatives would not conflict with an adopted HCP or natural community conservation plan, or other approved local, regional, or state HCP within the Planning Area.

The following are adopted regional conservation plans that cover areas that are either adjacent to, or near the Planning Area:

- San Joaquin County Multi-Species Habitat Conservation Plan and Open Space Plan (SJCOG 2000)
- Natomas Basin HCP (Natomas Basin Conservancy 2003)
- Metro Airport HCP (Natomas Basin Conservancy 2001)

The Planning Area does not overlap with the plan areas of these plans or any other approved and permitted HCP; therefore, implementation of any EIS/EIR alternative would not conflict with any approved HCP. The significance criteria of potential conflict with the provisions of an adopted HCP or natural community conservation plan, or other approved local, regional, or state HCP (Section 9.2.1) could not occur under any alternative, so is not evaluated further in this EIS/EIR.

9.2.2 No Action/No Project Alternative

The No Action/No Project Alternative's future projects, activities, and expected future regulatory environment are described in Section 2.2 of Chapter 2.

9.2.2.1 Effects on Vernal Pool Invertebrate/Plant Species and Habitat

The following 11 vernal pool invertebrate and plant species are considered together in this analysis due to their dependence on the vernal pool ecosystem; vernal pool tadpole shrimp, vernal pool fairy shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*), dwarf downingia (*Downingia pusilla*), Ahart's dwarf rush, pincushion navarretia (*Navarretia myersii*), slender Orcutt grass, Sacramento Orcutt grass, Boggs Lake hedge-hyssop, and legenere. While the individual natural history, habitat requirements,

modeled habitat, and documented occurrences in the Planning Area differ for these species (see Appendix G), the direct impact mechanisms and environmental stressors that cause temporary impacts are the same.

Direct and Indirect Effects of the Alternative

Projects and activities under the No Action/No Project Alternative (Section 2.2.1) would permanently remove modeled habitat for vernal pool invertebrate and plant species through development and related infrastructure. While the majority of the urban development would occur within the UDA, transportation and other infrastructure projects would occur outside the UDA. In addition, the regulatory environment under the No Action/No Project Alternative is expected to result in shifted or displaced development outside of the UDA (Section 2.2.3), which would result in additional direct impacts to vernal pool ecosystem and therefore, impacts on some vernal pool invertebrate and plant species. These acres of shifted or displaced development are included in the direct impact acres shown in Table 9-4 for each species below.

Vernal pool invertebrate and plant species near proposed construction activities under the No Action/No Project Alternative will be adversely affected by several temporary construction-related effects (Appendix G) that will result in additional disturbance to habitat or additional harm to vernal pool invertebrate plant and animal species. Generally, these temporary effects will occur within the project boundary or road right-of-way area.

As discussed previously for direct impacts, the majority of indirect impacts under the No Action/No Project Alternative would occur within the UDA, as a result of urban development, with the exception of infrastructure projects and shifted or displaced development. The various environmental stressors that may result from activities under the No Action/No Project Alternative and that would result in indirect effects on vernal pool invertebrate and plant species, potential take of individuals, and degradation of vernal pool species habitat are described here and in Appendix G.

Vernal pool ecosystems and the invertebrate and plant species that are dependent on them are especially vulnerable to hydrologic alteration, because the timing and period of inundation can dictate whether these plants and invertebrates are able to reproduce. An impervious soil layer hydrologically connects land cover types to form the vernal pool ecosystem. Development under the No Action/No Project Alternative may indirectly affect the hydrology of remaining vernal pool ecosystem land covers, and the invertebrate and plant species that depend on them, in three major ways: (1) by permanently interrupting connection to surface water flows from up-gradient swales; (2) by damaging or permanently interrupting hydrologic connections to the perched water table; and (3) by puncturing the impermeable layer within the micro-watershed, permanently increasing rate of water loss from the remaining vernal pool

ecosystem and its associated perched aquifer, and allowing that water to drain into deeper groundwater tables.

Permanently increasing the extent of impermeable surfaces, urban development, and roads may result in increased runoff, especially during storm events. Such increases can result in increased inundation periods for vernal pools, and alterations of downstream hydrology in streams and creeks with vernal pool invertebrate habitat (VPIH). Also, addition of new development may permanently increase the potential for ongoing discharge of point and non-point source pollutants such as grease, oil, fertilizers, and lawn pesticides in creeks and streams with VPIH and other connected waters within the vernal pool ecosystem. An overall increase in the quantity of pollutants, including sediment reaching streams and creeks with VPIH through higher runoff from urban development, as a result of the No Action/No Project Alternative may impact the physical characteristics of the aquatic habitats within the vernal pool ecosystem and result in harm to vernal pool invertebrates and plants.

Changes in the wildlife community structure as a result of increased inundation in vernal pools and other habitat within the vernal pool ecosystem brought on by urban and road runoff can result in the presence of fish species that act as predators on vernal pool invertebrates, reducing vernal pool invertebrate populations.

Development could also impact vernal pool invertebrate and plant species by increasing the presence of invasive plants through species escaping from landscaping. These invasive plants could impact the vernal pool ecosystem by outcompeting native vernal pool plant species and changing the hydrology of the vernal pool ecosystem, shortening the vernal pool ponding period, which in turn could interfere with reproduction of vernal pool invertebrates and plants.

Development may result in an increased wildfire frequency due to increased ignition sources. Wildfire is a natural part of the ecosystem, and low intensity fires would not adversely impact vernal pool invertebrates or plants. However, increased fire frequency would require more fire suppression activities around developed areas that would result in ground disturbance, which would result in habitat removal and additional changes in hydrology that would impact vernal pool invertebrates and plants.

Development under the No Action/No Project Alternative would likely result in habitat fragmentation that would inhibit dispersal of vernal pool invertebrates, and seed dispersal and movement of pollinators for vernal pool plant species. Habitat fragmentation can also increase the impact of other indirect environmental stressors listed here (e.g., urban runoff, invasive plants) on vernal pool invertebrates and vernal pool plant species by increasing the area of impact by these stressors relative to the area of the intact habitat patch.

The previously discussed indirect effects on vernal pool invertebrate and plant species under the No Action/No Project Alternative are analyzed both qualitatively for Valley Grassland land cover type and quantitatively for the other land cover types that make up the vernal pool ecosystem (shown in the impact tables for each species below).

The No Action/No Project Alternative is estimated to result in approximately 17,688 acres of direct impacts to modeled habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp (Table 9-4). Indirect effects on vernal pool tadpole shrimp and vernal pool fairy shrimp modeled aquatic habitat are anticipated to result in approximately an additional 261 acres of impacts. The total impact of the No Action/No Project Alternative on vernal pool tadpole shrimp and vernal pool fairy shrimp modeled habitat within the Planning Area is expected to be approximately 17,949 acres.

Of the vernal pool tadpole shrimp and vernal pool fairy shrimp habitat loss, approximately 9,015 acres would occur within the Mather Core Recovery Area (MCRA), which would affect approximately 50% of the modeled habitat within the MCRA. There would also be approximately 54 acres lost within the Cosumnes/Rancho-Seco Core Recovery Area (C/RS), which would affect approximately 0.1% of modeled habitat within the C/RS.

The No Action/Project Alternative is also expected to remove approximately 886 acres of Critical Habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp in Critical Habitat Unit 13 and approximately 80 acres in Critical Habitat Unit 14a for a total of approximately 966 acres of Critical Habitat lost.

The No Action/No Project Alternative is expected to remove 90 of the 851 documented occurrences of vernal pool tadpole shrimp and 31 of the 581 documented occurrences of vernal pool fairy shrimp in the Planning Area.

Projects and activities under the No Action/No Project Alternative are estimated to remove approximately 13,042 acres of modeled habitat for mid-valley fairy shrimp within the Planning Area. In addition to this direct impact, 178 acres of indirect impact would also occur for a total impact of approximately 13,220 acres on mid-valley fairy shrimp modeled habitat within the Planning Area. This total impact would affect approximately 25% of the total modeled habitat within the Planning Area (Table 9-4).

Of the mid-valley fairy shrimp habitat loss, approximately 6,846 acres would occur within the MCRA, which would affect approximately 48% of modeled habitat within the MCRA. There would also be approximately 42 acres lost within the C/RS, which would affect approximately 0.4% of modeled habitat within the C/RS.

The No Action/No Project Alternative is expected to remove 5 of the 37 documented occurrences of mid-valley fairy shrimp in the Planning Area.

Activities under the No Action/No Project Alternative would cause direct impacts to approximately 17,653 acres of Ricksecker's water scavenger beetle modeled habitat to development and related infrastructure. In addition to this direct impact, approximately 254 acres of indirect impact would also occur for a total impact of approximately 17,907 acres on Ricksecker's water scavenger beetle modeled habitat. The total impact to Ricksecker's water scavenger beetle modeled habitat would be approximately 17% of the existing modeled habitat in the Planning Area (Table 9-4).

The No Action/No Project Alternative is not expected to remove any of the eight documented occurrences of Ricksecker's water scavenger beetle in the Planning Area.

The No Action/No Project Alternative future urban development and related infrastructure would cause direct impacts through the loss of approximately 2,004 acres of modeled habitat for dwarf downingia. In addition to this direct impact, approximately 34 acres of indirect impact would also occur for a total impact of approximately 2,038 acres on dwarf downingia modeled habitat. The total impact to dwarf downingia modeled habitat would be approximately 8% of the existing modeled habitat in the Planning Area (Table 9-4).

The No Action/No Project Alternative is not expected to remove any of the 10 documented occurrences of dwarf downingia in the Planning Area.

The No Action/No Project Alternative would cause permanent loss of approximately 7,930 acres of land cover types suitable for Ahart's dwarf rush due to development and related infrastructure. In addition to this direct impact, 131 acres of indirect impact would also occur for a total impact of approximately 8,061 acres on Ahart's dwarf rush modeled habitat. The total impact to Ahart's dwarf rush modeled habitat would be approximately 32% of the existing modeled habitat in the Planning Area (Table 9-4).

The No Action/No Project Alternative is not expected to remove the two occurrences of Ahart's dwarf rush in the Planning Area.

The No Action/No Project Alternative would cause loss of approximately 8,337 acres of modeled habitat for pincushion navarretia resulting from development and related infrastructure. In addition to this direct impact, approximately 100 acres of indirect impact would also occur for a total impact of approximately 8,437 acres on pincushion navarretia modeled habitat. The total impact to pincushion navarretia modeled habitat would be approximately 15% of the existing modeled habitat in the Planning Area (Table 9-4).

The No Action/No Project Alternative is not expected to remove any of the 48 occurrences of pincushion navarretia in the Planning Area.

The No Action/No Project Alternative would result in an estimated permanent loss of approximately 7,654 acres of land cover types suitable for slender Orcutt grass and Sacramento Orcutt grass resulting from development and related infrastructure. In addition to this direct impact, approximately 108 acres of indirect impact would also occur for a total impact of approximately 7,762 acres on for slender Orcutt grass and Sacramento Orcutt grass modeled habitat. This total impact would be approximately 22% of the total modeled habitat within the Planning Area (Table 9-4).

Of the slender Orcutt grass and Sacramento Orcutt grass habitat loss, approximately 5,018 acres would occur within the MCRA, which would affect approximately 48% of modeled habitat within the MCRA. There would also be approximately 22 acres lost within the C/RS, which would affect approximately 0.1% of modeled habitat within the C/RS.

The No Action/Project alternative is also expected to impact approximately 710 acres of Critical Habitat for Sacramento Orcutt grass in Critical Habitat Unit 2 and approximately 64 acres in Critical Habitat Unit 3 for a total of approximately 774 acres of Critical Habitat lost. Approximately 710 acres of Critical Habitat for slender Orcutt grass would also be lost in Critical Habitat Unit 6.

The No Action/No Project Alternative is expected to remove 2 of the 40 occurrences of Sacramento Orcutt grass and none of the 4 occurrences of slender Orcutt grass in the Planning Area.

The No Action/No Project Alternative would result in loss of approximately 9,126 acres of modeled habitat for Boggs Lake hedge-hyssop resulting from development and related infrastructure. In addition to this direct impact, approximately 122 acres of indirect impact would also occur for a total impact of approximately 9,248 acres on Boggs Lake hedge-hyssop modeled habitat. The total impact to Boggs Lake hedge-hyssop modeled habitat would be approximately 25% of the existing modeled habitat in the Planning Area (Table 9-4).

The No Action/No Project Alternative is expected to remove 2 of the existing 31 occurrences of Boggs Lake hedge-hyssop in the Planning Area.

The No Action/No Project Alternative would cause loss of approximately 11,146 acres of land cover types suitable for legenere from development and related infrastructure. In addition to this direct impact, approximately 137 acres of indirect impact would also occur for a total impact of approximately 11,283 acres on legenere modeled habitat. The total impact to legenere modeled habitat would be approximately 22% of the existing modeled habitat in the Planning Area (Table 9-4).

The No Action/No Project Alternative is expected to remove 1 of the 62 documented occurrences of legenere in the Planning Area.

Table 9-4. Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat under the No Action/No Project Alternative

Land Covers Included in the Species Modeled Habitat	Total Within Planning Area (acres)						
	Existing Modeled Habitat (total acres)	*Direct Impacts*	*Indirect Impacts*	*Total Impacts*	*% of the Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Vernal Pool Tadpole Shrimp and Vernal Pool Fairy Shrimp							
Valley Grassland	97,349	17,091	Qualitative	17,091	17.6%	11,806	0
Vernal Pool	4,536	322	193	515	11.4%	1,030	322
Swale	1,252	240	61	301	24.0%	673	240
Streams/Creeks (VPIH)	73	35	7	42	57.5%	13	17
Total Modeled Habitat	**103,210**	**17,688**	**261**	**17,949**	**17.4%**	**13,522**	**579**
Mid-Valley Fairy Shrimp							
Valley Grassland	50,061	12,577	Qualitative	12,577	25.1%	6,071	0
Vernal Pool	2,818	271	141	412	14.6%	824	271
Swale	759	194	37	231	30.4%	462	194
Total Modeled Habitat	**53,638**	**13,042**	**178**	**13,220**	**24.6%**	**7,357**	**465**
Ricksecker's Water Scavenger Beetle							
Valley Grassland	97,349	17,091	Qualitative	17,091	17.6%	11,806	0
Vernal Pool	4,536	322	193	515	11.4%	1,030	322
Swale	1,252	240	61	301	24.0%	602	240
Total Modeled Habitat	**103,137**	**17,653**	**254**	**17,907**	**17.4%**	**10,244**	**562**
Dwarf Downingia							
Valley Grassland	22,241	1,888	Qualitative	1,888	8.5%	2,697	0
Vernal Pool	1,661	75	24	99	6.0%	198	75
Swale	359	41	10	51	14.2%	102	41
Total Modeled Habitat	**24,261**	**2,004**	**34**	**2,038**	**8.4%**	**2,997**	**116**
Ahart's Dwarf Rush							
Valley Grassland	23,885	7,704	Qualitative	7,704	32.3%	2,896	0
Vernal Pool	937	128	107	235	25.1%	470	128
Swale	314	98	24	122	38.9%	244	98
Total Modeled Habitat	**25,136**	**7,930**	**131**	**8,061**	**32.1%**	**3,610**	**226**
Pincushion Navarretia							
Valley Grassland	54,967	8,133	Qualitative	8,133	14.8%	6,666	0
Vernal Pool	1,844	104	78	182	9.9%	364	104
Swale	627	100	22	122	19.5%	244	100
Total Modeled Habitat	**57,438**	**8,337**	**100**	**8,437**	**14.7%**	**7,274**	**204**
Slender Orcutt Grass and Sacramento Orcutt Grass							
Valley Grassland	33,265	7,530	Qualitative	7,530	22.6%	4,034	0
Vernal Pool	1,227	124	108	232	18.9%	464	124
Total Modeled Habitat	**34,492**	**7,654**	**108**	**7,762**	**22.5%**	**4,498**	**124**

Table 9-4. Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat under the No Action/No Project Alternative

Land Covers Included in the Species Modeled Habitat	Total Within Planning Area (acres)						
	Existing Modeled Habitat (total acres)	*Direct Impacts*	*Indirect Impacts*	*Total Impacts*	*% of the Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Boggs Lake Hedge-Hyssop							
Valley Grassland	35,115	8,919	Qualitative	8,919	25.4%	4,258	0
Vernal Pool	1,531	183	122	305	19.9%	610	183
Seasonal Wetland	354	24	Qualitative	24	6.8%	8	24
Total Modeled Habitat	**37,000**	**9,126**	**122**	**9,248**	**25.0%**	**4,876**	**207**
Legenere							
Valley Grassland	47,527	10,884	Qualitative	10,884	22.9%	5,764	0
Vernal Pool	2,560	216	137	353	13.8%	706	216
Seasonal Wetland	886	46	Qualitative	46	5.2%	8	46
Total Modeled Habitat	**50,973**	**11,146**	**137**	**11,283**	**22.1%**	**6,478**	**262**

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to vernal pool invertebrate and plant species for projects that undergo environmental review under the National Environmental Policy Act (NEPA) or CEQA. The anticipated compensation would be required on a project-by-project basis and would include preservation and re-establishment/establishment of vernal pool invertebrate and plant habitat that would often not be part of a coordinated and linked Preserve System. The acres that are expected to be conserved under the under the No Action/No Project Alternative for each of the 11 vernal pool invertebrate and plant species are shown in their respective species tables above. This result is likely a conservative overestimate as the future regulatory environment used for the No Action/No Project Alternative assumes greater preservation and re-establishment/establishment relative to project impacts than is typically called for today.

Cumulative Effect of the Alternative

The modeled habitat for vernal pool invertebrate and plant species has been lost, degraded, and fragmented by past and present urban and suburban development, associated infrastructure, agriculture, development of agricultural-residential neighborhoods and other rural development, and mining operations within the Planning Area, as described in Section 3.7.1. The effects of the these past and present projects on vernal pool invertebrate and plant species and their habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area, including urban

development in Elk Grove and Rancho Murieta, further rural residential development, continued development of cultivated agricultural lands, and development of infrastructure projects such as California High-Speed Rail and California WaterFix. Although not every reasonably foreseeable future action would affect vernal pool invertebrate and plant species, as a whole these actions would result in the continued loss of modeled habitat and in indirect impacts (e.g., habitat fragmentation, change in vernal pool hydrology) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under ESA and Clean Water Act (CWA) requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for vernal pool invertebrate and plant species. In addition to these mitigation requirements for replacement of land covers that are modeled habitat, vernal pool tadpole shrimp, vernal pool fairy shrimp, Boggs Lake hedge-hyssop, slender Orcutt grass, and Sacramento Orcutt grass are listed under ESA and/or CESA, and additional avoidance, minimization, and mitigation requirements for suitable and occupied habitat would be applied.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct and indirect impacts to modeled vernal pool invertebrate and plant species habitat. The modeled aquatic habitat that would be preserved and would be re-established/established under the No Action/No Project Alternative would exceed the acreage of modeled aquatic habitat lost for vernal pool invertebrate and plant species; however, upland habitat loss would typically exceed the amount preserved. Under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to vernal pool invertebrate and plant species, when considered together with the significant impacts to vernal pool invertebrate and plant species from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

9.2.2.2 Effects on Valley Elderberry Longhorn Beetle and Its Habitat

The description of valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) along with species occurrences within the Planning Area can be found in Appendix G. Modeled habitat within the Planning Area for valley elderberry longhorn beetle is Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub above sea level.

This species is dependent on elderberry shrubs (*Sambucus glauca, S. mexicana, S. caerulea*), which are primarily associated with riparian habitats within the Planning Area, to host the larval stage of its lifecycle.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would result in the direct impacts due to the loss of approximately 554 acres of modeled valley elderberry longhorn beetle habitat to development and related infrastructure. The majority of this loss (approximately 509 acres) is expected to occur within the UDA, though development outside of the UDA would also result in loss of modeled species habitat (approximately 45 acres) including impacts from shifted or displaced development (see Section 9.1.2). The implementation of this alternative would directly affect approximately 7% of the existing modeled habitat within the Planning Area (Table 9-5).

Table 9-5. Effects and Modeled Habitat Conservation for Valley Elderberry Longhorn Beetle under the No Action/No Project Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing Modeled Habitat*	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Mine Tailing Riparian Woodland	641	218	34.0%	0	0
Mixed Riparian Woodland	5,785	147	2.5%	0	256
Mixed Riparian Scrub	1,452	189	13.0%	0	298
Total Modeled Habitat	**7,878**	**554**	7.0%	**0**	**554**

Indirect effects due to activities under the No Action/No Project Alternative are analyzed qualitatively for individual species, and as discussed previously for direct impacts, the majority of indirect impacts would occur within the UDA, as a result of urban development. However, these impacts would also occur to a lesser extent outside of the UDA. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to valley elderberry longhorn beetle and modeled habitat for the species.

Changes to hydrology (e.g., changes in stream and creek flows), and reductions in water quality as a result of increased urban and road runoff that may contain petroleum products, pesticides and herbicides can kill elderberry shrubs through water stress and toxicity, thereby removing habitat for valley elderberry longhorn beetle.

Development could also increase the presence of invasive plants within modeled habitat for valley elderberry longhorn beetle through species escaping from landscaping and by increasing

disturbed areas (e.g., user-created trails) often colonized by invasive plants. Invasive plants could impact valley elderberry longhorn beetle's host plant by outcompeting elderberry shrubs and replacing native riparian plant species with species more susceptible to wildfire.

Populations of medium-sized predators that are tolerant of human disturbance could reduce the population of seed-dispersing birds, thereby reducing the number of new elderberry shrubs that can establish, while potential increases in invasive animals (e.g., Argentine ant (*Linepithema humile*)) as a result of increased runoff and irrigation may increase predation on valley elderberry longhorn beetle larvae.

Also, increased development may lead to the increased use of pesticides that can move into adjacent riparian habitat and could possibly result in mortality of valley elderberry longhorn beetle.

Lastly, habitat fragmentation as a result of loss of modeled habitat for valley elderberry longhorn beetle could restrict movement of adults between remaining patches of elderberry shrubs. Habitat fragmentation can also increase the impact of other indirect environmental stressors listed here (e.g., predation, invasive plants and animals) on valley elderberry longhorn beetle by increasing the area of impact from these stressors relative to the area of the remaining habitat patch.

Temporary effects (Section 3.6.5 and Section 9.1.2) that result from ground-disturbing construction activities under the No Action/No Project Alternative may result in temporary reduction of habitat quality and loss of individual valley elderberry longhorn beetle caused by trampling, construction dust, and other actions that could adversely affect elderberry host plants.

The No Action/No Project Alternative is not expected to remove any of the 156 occurrences of valley elderberry longhorn beetle in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to valley elderberry longhorn beetle for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would include re-establishment/establishment of 554 acres of valley elderberry longhorn beetle modeled habitat within the Planning Area, which equals the direct impact to valley elderberry longhorn beetle modeled habitat under the No Action/No Project Alternative.

Cumulative Effect of the Alternative

Valley elderberry longhorn beetle habitat has been lost, degraded, and fragmented by past and present urban and suburban development, associated infrastructure, agriculture, development of agricultural–residential neighborhoods and other rural development, and mining operations

within the Planning Area, as described in Section 3.7.1. The effects of these past and present projects on valley elderberry longhorn beetle and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area, including urban development in Elk Grove and Rancho Murieta, further rural residential development, continued development of cultivated agricultural lands, and development of infrastructure projects such as California High-Speed Rail and California WaterFix. Although not every reasonably foreseeable future action would affect valley elderberry longhorn beetle, as a whole these actions would result in the continued loss of valley elderberry longhorn beetle habitat, as well as indirect impacts (e.g., habitat fragmentation, changes in hydrology) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation would occur at a no net loss of acreage, due to combined ESA requirements and Sacramento County General Plan policies protecting riparian land cover types. In addition to these mitigation requirements for replacement of land covers that are modeled habitat, valley elderberry longhorn beetle is listed under ESA, and additional avoidance, minimization, and mitigation requirements for suitable and occupied habitat would be applied.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (554 acres) and indirect impacts to modeled valley elderberry longhorn beetle habitat. The modeled habitat preserved (554 acres) and re-established/established (554 acres) under the No Action/No Project Alternative would equal the acreage of modeled habitat lost. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on valley elderberry longhorn beetle, when considered together with the significant impacts to valley elderberry longhorn beetle from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.3 Effects on California Tiger Salamander (Central Valley Population) and Its Habitat

As discussed in Appendix G, upland underground refugia habitats for this species within the Planning Area are Valley Grassland, Blue Oak Woodland, and Blue Oak Savanna, where the

California tiger salamander inhabits ground squirrel and other burrows or soil cracks and crevices, up to 1.3 miles from aquatic breeding habitat. Breeding habitat within the Planning Area is the Vernal Pool and Seasonal Wetland land covers located south of the Cosumnes River and east of Highway 99.

Direct and Indirect Effects of the Alternative

The implementation of the No Action/No Project Alternative would result in the direct loss of approximately 1,772 acres of modeled upland habitat and the direct loss of approximately 71 acres of modeled aquatic breeding habitat for California tiger salamander (Table 9-6). These impacts would be both within the UDA in Galt and outside the UDA, including impacts from shifted or displaced development (see Section 9.1.2).

Table 9-6. Direct Effects and Modeled Habitat Conservation for California Tiger Salamander under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing Modeled Habitat	*Direct Effect*	*Indirect Effect*	*Total Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Upland Habitat							
Blue Oak Savanna	3,322	48	Qualitative	48	1.4%	24	24
Blue Oak Woodland	3,774	45	Qualitative	45	1.2%	23	22
Valley Grassland	78,274	1,679	Qualitative	1,679	2.1%	9,492	0
Total Upland Habitat	*85,369*	*1,772*	*Qualitative*	*1,772*	*2.1%*	*9,539*	*46*
Aquatic Habitat							
Vernal Pool	3,033	67	4	71	2.3%	142	67
Seasonal Wetland	1,391	4	Qualitative	4	2.4%	8	4
Total Aquatic Habitat	*4,425*	*71*	*4*	*75*	*2.3%*	*150*	*71*
Total Modeled Habitat	**89,794**	**1,843**	**4**	**1,847**	**2.1%**	**9,689**	**117**

The No Action/No Project would result in impacts to approximately 53 acres of upland habitat and 7 acres of aquatic breeding habitat within the C/RS.

The No Action/No Project Alternative would also result in indirect impacts of 4 acres of California tiger salamander Vernal Pool modeled habitat. Indirect effects for the remaining land cover types of modeled habitat are analyzed qualitatively below. As with the direct impacts discussed previously, these indirect impacts would be within the UDA in Galt and outside the UDA. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on

those stressors that may result in indirect impacts to California tiger salamander and modeled habitat for the species.

Altered hydrology of vernal pools as a result of impacts to the duripan and other factors (see Appendix G) may reduce the hydroperiod of vernal pools which could make the habitat unsuitable for California tiger salamander breeding. Sedimentation as a result of urban and road runoff can also deposit sediment into seasonal wetlands and decrease depth and hydroperiod, with the same effects on breeding habitat as described for vernal pools.

Impacts to California tiger salamander may also occur due to increased ground vibration from transportation projects (e.g., causing abandonment of burrows), and lighting from urban development (e.g., disruption of nightly movement patterns).

Increased human activity resulting from nearby development could impact remaining modeled habitat use due to factors such as increased trash, soil compaction, and trampling of vegetation.

Adjacent development could also increase the presence of invasive plants and animals in modeled aquatic habitat. Invasive plants can increase water use in the ecosystem, shortening the hydroperiod of vernal pools and interfering with reproduction of California tiger salamander. Introductions of invasive animals such as bullfrogs (*Lithobates catesbeianus*) could increase predation on California tiger salamander eggs, larvae and juveniles. Increased medium sized predators that are associated with urban development could also increase predation risk to juveniles and adults during overland migration.

The use of pesticides and fertilizers in and adjacent to new development in the Planning Area would degrade breeding habitat by decreasing water quality, causing impacts on the vernal pool ecosystem and possibly result in mortality of eggs and larval California tiger salamander.

Development may result in an increased wildfire frequency due to increased ignition sources. Wildfire is a natural part of the ecosystem, and low intensity fires would not adversely impact California tiger salamander modeled habitat. However, increased fire frequency would require more fire-suppression activities around developed areas that would result in ground disturbance, which would result in habitat removal and additional changes in vernal pool hydrology that would impact California tiger salamander modeled breeding habitat.

Increases in the number of roads and traffic associated with development can cause mortality of California tiger salamander from vehicle collisions as adults migrate between upland habitat and aquatic breeding sites, and when juveniles disperse from breeding ponds to upland habitat.

Fragmentation of upland modeled habitat by new development could inhibit access to other areas of modeled habitat by restricting adult movement to suitable breeding habitat and by restricting dispersal of juveniles out of breeding ponds. Habitat fragmentation can also increase the impact of other indirect environmental stressors listed here (e.g., altered hydrology, invasive animals) on California tiger salamander by increasing the area of impact from these stressors relative to the area of the intact habitat patch.

Temporary effects (Section 3.6.5 and Section 9.2.1) that result from ground-disturbing construction activities under the No Action/No Project Alternative may result from stressors (Appendix G) such as temporary construction lighting, temporary construction noise, and temporary ground vibration that could result in take of individual California tiger salamanders under the No Action/No Project Alternative.

The Planning Area includes 10,193 acres of designated Critical Habitat (USFWS 2005) for California tiger salamander. None of the 10,193 acres of designated Critical Habitat within the Planning Area for the species would be removed under the No Action/No Project Alternative.

The No Action/No Project Alternative is not expected to remove any of the 31 occurrences California tiger salamander in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to California tiger salamander for projects that undergo environmental review under NEPA and CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in 9,689 acres of preservation and 117 acres of re-establishment/establishment of California tiger salamander modeled habitat.

Cumulative Effect of the Alternative

California tiger salamander habitat has been lost, degraded, and fragmented by past and present urban and suburban development, associated infrastructure, agriculture, development of agricultural–residential neighborhoods, and other rural development within the Planning Area, as described in Section 3.7.1. The effects of these past and present projects on California tiger salamander and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area, including further rural residential development, continued development of cultivated agricultural lands, and development of infrastructure projects such as California High-Speed Rail and California WaterFix. Although not every reasonably foreseeable future action would affect California tiger salamander, as a whole these actions would result in the continued loss of California tiger

salamander habitat and in indirect impacts (e.g., habitat fragmentation, change in vernal pool hydrology, increased human disturbance) to remaining modeled habitat. For future projects and activities subject to CEQA or NEPA, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for California tiger salamander. Mitigation for impacts on Blue Oak Woodland and Blue Oak Savanna land cover types that are modeled habitat would also typically occur due to policies protecting these land cover types in the Sacramento County General Plan. In addition to these mitigation requirements for replacement of land covers that are modeled habitat, California tiger salamander is listed under ESA and CESA, and additional avoidance, minimization, and mitigation requirements for suitable and occupied habitat would be applied.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 1,843 acres) and indirect (approximately 4 acres) of impacts to modeled California tiger salamander habitat. The modeled habitat preserved (approximately 9,689 acres) under the No Action/No Project Alternative would exceed the acreage of modeled habitat lost, and the aquatic habitat re-established/established would equal the aquatic habitat lost. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to California tiger salamander, when considered together with the significant impacts to California tiger salamander from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

9.2.2.4 Effects on Western Spadefoot Toad and Its Habitat

Modeled habitat for western spadefoot in the Planning Area includes portions of the Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, Vernal Pool, Seasonal Wetland, Swale, Open Water, and Stream/Creek land covers above sea level. The terrestrial habitats within 1 mile of aquatic habitat are included in the habitat model as they are used by western spadefoot for foraging and estivation (similar to hibernation), during the dry season.

Direct and Indirect Effects of the Alternative

Direct loss of western spadefoot modeled habitat under the No Action/No Project Alternative would be approximately 1,036 acres of aquatic habitat, and 23,550 acres of upland habitat, which would impact approximately 15.7% and 7.7% of the existing modeled upland and aquatic habitat in the Planning Area respectively (Table 9-7).

Of the western spadefoot modeled habitat loss, approximately 9,336 acres would occur within the MCRA, which would affect approximately 50.3% modeled habitat within the MCRA. There would also be approximately 56 acres lost within the C/RS, which would affect approximately 0.1% of modeled habitat within the C/RS.

Table 9-7. Direct Effects and Preservation of Western Spadefoot Modeled Habitat Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing Modeled Habitat	*Direct Effect*	*Indirect Effect*	*Total Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Upland Habitat							
Blue Oak Savanna	5,637	86	Qualitative	86	1.5%	43	43
Blue Oak Woodland	9,132	54	Qualitative	54	0.6%	27	27
Valley Grassland	135,094	23,410	Qualitative	23,410	17.3%	11,806	0
Total Upland Habitat	*149,863*	*23,550*	*Qualitative*	*23,550*	*15.7%*	*11,876*	*70*
Aquatic Habitat							
Vernal Pool	4,536	322	193	515	11.4%	1,030	322
Swale	1,252	240	61	301	24.0%	673	240
Seasonal Wetland	2,600	115	Qualitative	115	4.4%	8	57
Open Water	2,344	175	Qualitative	175	7.5%	0	87
Streams/Creeks	2,674	149	Qualitative	149	5.6%	0	75
Streams/Creeks (VPIH)	73	35	7	42	57.5%	13	17
Total Aquatic Habitat	*13,479*	*1,036*	*261*	*1,297*	*9.6%*	*1,724*	*798*
Total Modeled Habitat	**163,342**	**24,586**	**261**	**24,847**	**15.2%**	**13,600**	**868**

The No Action/No Project Alternative would also result in approximately 261 acres of indirect effects to western spadefoot modeled aquatic habitat, as well as indirect effects to modeled upland habitat. These indirect effects are analyzed qualitatively below. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to western spadefoot and modeled habitat for the species.

Altered hydrology of vernal pools as a result of impacts to the duripan and other factors (see Appendix G) may reduce the hydroperiod of vernal pools, which could make the habitat unsuitable for western spadefoot breeding. Sedimentation as a result of urban and road runoff can also deposit sediment into seasonal wetlands and decrease depth and hydroperiod, with the same effects on breeding habitat as described for vernal pools.

Impacts to western spadefoot may also occur due to increased ground vibration from transportation projects (e.g., causing abandonment of burrows) and lighting from urban development (e.g., disruption of nightly movement patterns).

Increased human activity resulting from nearby development could impact remaining modeled habitat use due to factors such as increased trash, soil compaction, and trampling of vegetation.

Adjacent development could also increase the presence of invasive plants and animals in modeled aquatic habitat. Invasive plants can increase water use in the ecosystem, shortening the hydroperiod of vernal pools and interfering with reproduction of western spadefoot. Introductions of invasive animals such as bullfrogs could increase predation on all life stages of western spadefoot in and around breeding habitat. Increased abundance of medium-sized predators that are associated with urban development could also increase predation risk to juveniles and adults during overland migration.

The use of pesticides and fertilizers in adjacent new development would degrade breeding habitat by decreasing water quality causing impacts on the vernal pool ecosystem and possibly result in mortality of eggs and larval western spadefoot.

Development may result in an increased wildfire frequency due to increased ignition sources. Wildfire is a natural part of the ecosystem, and low-intensity fires would not adversely impact western spadefoot modeled habitat. However, increased fire frequency would require more fire suppression activities around developed areas that would result in ground disturbance, which would result in habitat removal and additional changes in vernal pool hydrology that would impact western spadefoot modeled breeding habitat.

Increases in the number of roads and traffic associated with development can cause mortality of western spadefoot from vehicle collisions as adults migrate between upland habitat and aquatic breeding sites, and when juveniles disperse from breeding ponds to upland habitat.

Fragmentation of upland modeled habitat by new development could inhibit access to other areas of modeled habitat by restricting adult movement to suitable breeding habitat and by restricting dispersal of juveniles out of breeding ponds. Habitat fragmentation can also increase the impact of other indirect environmental stressors listed here (e.g., altered hydrology,

invasive animals) on western spadefoot by increasing the area of impact from these stressors relative to the area of the intact habitat patch.

Temporary environmental stressors that result from ground-disturbing construction activities under the No Action/No Project Alternative may result in temporary impacts (Section 3.6.5 and Section 9.1.2) to western spadefoot. These stressors (Appendix G) can include, but are not limited to, temporary construction lighting, temporary construction noise, and temporary ground vibration that could result in impacts to individual western spadefoot.

The No Action/No Project Alternative is expected to remove 5 of the 41 occurrences of western spadefoot in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to western spadefoot modeled habitat for projects that undergo environmental review under NEPA or CEQA, or that require some other authorization. The anticipated mitigation would be required on a project-by-project basis and would result in preservation of approximately 11,876 acres of upland habitat and 1,724 acres of aquatic habitat, which would exceed the aquatic habitat lost. The No Action/No Project Alternative would also result in re-establishment/establishment of 868 acres of modeled habitat, which would be less than the aquatic habitat lost.

Cumulative Effect of the Alternative

Western spadefoot toad habitat has been lost, degraded, and fragmented by past and present urban and suburban development, associated infrastructure, agriculture, development of agricultural–residential neighborhoods, and other rural development within the Planning Area, as described in Section 3.7.1. The effects of these past and present projects on western spadefoot and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area, including urban development in Elk Grove and Rancho Murieta, further rural residential development, continued development of cultivated agricultural lands, and development of infrastructure projects such as California High-Speed Rail and California WaterFix. Although not every reasonably foreseeable future action would affect western spadefoot, as a whole these actions would contribute to the ongoing habitat loss. However, for future projects and activities subject to CEQA and NEPA review, these impacts would typically be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for western spadefoot.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would have direct and indirect impacts resulting in impacts to 24,586 acres of modeled western spadefoot habitat. The No Action/No Project Alternative would include the preservation (13,600 acres) of total modeled habitat, which would be less than the estimated loss of habitat, and re-establishment/establishment of aquatic habitat, which would also be less than the loss of that habitat type. Additionally, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on western spadefoot, when considered together with the significant impacts to western spadefoot from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.5 Effects on Giant Garter Snake and Its Habitat

The life history, acres of existing modeled habitat, and documented occurrences of giant garter snake in the Planning Area are described in Appendix G. All giant garter snake modeled habitat in this Planning Area is located between sea level and an elevation of 230 feet. Aquatic modeled habitats for foraging and movement, and aquatic modeled habitat for winter refugia habitat is identified within and adjacent to the following specific Planning Area drainages, of which only Laguna Creek is within the UDA:

- The prominent drainageway (Stream/Creek) on the Elliot mitigation site, which links to Stone Lakes National Wildlife Refuge and is wet year-round.
- All drainage canals (Stream/Creek) south of Elk Grove, which have a past documented occurrence of giant garter snake and link to Stone Lakes National Wildlife Refuge; the perennial segments of these canals are suitable habitat.
- All parts of Badger Creek (Stream/Creek) and all other creeks that drain into the marsh at the Cosumnes River Preserve; the perennial segments of these creeks are suitable habitat.
- The perennial segments of Laguna Creek (south) and tributaries (Stream/Creek), which are suitable habitat due to presence of Freshwater Marsh habitat and proximity to documented occurrences.
- The perennial segments of drainages and canals (Stream/Creek) leading from the Cosumnes River Preserve including Deadman's Gulch, which provides suitable habitat.

In addition to these specific Stream/Creek drainages, the habitat model includes all Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland land covers that are within 0.25 mile of these drainages that have the potential for supporting giant garter snake. Upland winter refugia habitat within the Planning Area consists of mixed riparian scrub and valley grassland, within a distance of 0.25 mile from modeled aquatic habitat.

Direct and Indirect Effects of the Alternative

Loss of modeled giant garter snake habitat due to implementation of projects and activities under the No Action/No Project Alternative would be approximately 2,314 acres of modeled upland habitat (8.3% of existing) and approximately 187 acres of modeled aquatic habitat (2.6 % of existing) (Table 9-8). Of this habitat loss, approximately 1,600 acres would occur within the UDA, and approximately 901 acres would occur outside of the UDA, including impacts from shifted or displaced development (see Section 9.1.2).

Table 9-8. Direct Effects and Conservation of Giant Garter Snake Modeled Habitat Under the No Action/No Project Alternative

Habitat Model	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Upland Habitat					
Mixed Riparian Scrub	1,044	134	12.8%	0	134
Valley Grassland	26,825	2,180	8.1%	3,253	0
Total Upland Habitat	*27,869*	*2,314*	*8.3%*	*3,253*	*134*
Aquatic Habitat					
Seasonal Wetland	1,625	41	2.5%	8	21
Freshwater Marsh	2,589	80	3.1%	16	40
Open Water	1,282	28	2.2%	0	14
Streams/Creeks	1,794	38	2.1%	0	38
Total Aquatic Habitat	*7,290*	*187*	*2.6%*	*24*	*81*
Total Modeled Habitat	**35,159**	**2,501**	**7.1%**	**3,277**	**215**

The No Action/No Project Alternative would also result in indirect effects to giant garter snake and its habitat. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to giant garter snake and modeled habitat for the species.

Increased urban runoff from impervious surfaces under the No Action/No Project Alternative could increase water depth in waterways that support giant garter snake, flooding the small mammal burrows used for winter shelter by giant garter snake. In addition, the pesticides and fertilizers that may be contained in this runoff may reduce prey populations.

Ongoing vibration and noise from urban development and associated transportation infrastructure can disturb movement patterns and cause abandonment of burrows, basking sites, and cover habitat.

Introductions of invasive animals such as bullfrogs in occupied giant garter snake habitat could increase predation on young giant garter snake. Increased numbers of medium-sized predators that are associated with urban development could also increase predation risk to juveniles and adults in upland habitats.

Increased wildfire as a result of the increased ignition sources associated with urban development could result in loss of cover habitat, as well as reduce potential prey in upland habitats until such time as the habitat returns to its pre-fire state.

Fragmentation of upland modeled habitat by new development could inhibit access to other areas of modeled habitat by restricting adult movement between aquatic habitats and upland burrows. Habitat fragmentation can also increase the impact of other indirect environmental stressors listed here (e.g., water quality, invasive animals) on giant garter snake by increasing the area of impact from these stressors relative to the area of the intact habitat patch.

The No Action/No Project Alternative is not expected to remove any of the 14 documented occurrences of giant garter snake in the Planning Area.

Temporary effects (Section 3.6.5 and Section 9.1.2) that result from ground-disturbing construction activities under the No Action/No Project Alternative may result from stressors (Appendix G) such as temporary construction lighting, temporary construction noise, and temporary ground vibration that could result in disturbance of individual giant garter snakes under the No Action/No Project Alternative.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for giant garter snake for projects that undergo environmental review under NEPA and CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in preservation of modeled habitat of approximately 3,253 acres of upland habitat and 24 acres of aquatic habitat. In addition, there is estimated to be 134 acres of re-establishment/establishment of modeled upland habitat and 81 acres of aquatic habitat.

Cumulative Effect of the Alternative

Giant garter snake habitat has been lost and fragmented by past urban and suburban development, associated infrastructure, and farming within the Planning Area, as described in Section 3.7.1. The effects of these past and present projects on giant garter snake and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect giant garter snake, as a whole these actions would result in the continued loss of giant garter snake habitat and in indirect impacts (e.g., habitat fragmentation, increased urban runoff, increased human disturbance) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA review, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for giant garter snake. Mitigation for impacts on Mixed Riparian Scrub land cover that is modeled habitat would typically occur at a no net loss of acreage due to policies in the Sacramento County General Plan protecting riparian land cover types. In addition to these mitigation requirements for replacement of land covers that are modeled habitat, giant garter snake is listed under ESA and CESA, and additional avoidance, minimization, and mitigation requirements for suitable and occupied habitat would be applied.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (2,501 acres) and indirect impacts to modeled giant garter snake habitat. The modeled habitat re-established/established (215 acres) under the No Action/No Project Alternative would be less than the modeled riparian and aquatic habitat lost. The No Action/No Project Alternative would also result in approximately 3,277 acres of modeled habitat preserved, which exceeds the modeled habitat lost. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on giant garter snake, when considered together with the significant impacts to giant garter snake from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.6 Effects on Western Pond Turtle and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of western pond turtle in the Planning Area are described in Appendix G.

The aquatic land cover types that are considered suitable habitat for western pond turtle are Streams/Creeks above sea level, and Freshwater Marsh and Open Water within 0.25 mile of a modeled Stream/Creek. Land cover types that provide suitable upland habitat are Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland above sea level and within 0.25 mile of suitable aquatic habitat.

Direct and Indirect Effects of the Alternative

The estimated loss of habitat under the No Action/No Project Alternative is approximately 11,783 acres of upland and approximately 377 acres of aquatic habitat. This habitat loss would remove approximately 10.6% of the upland and approximately 5.9% of aquatic habitat for western pond turtle remaining in the Planning Area (Table 9-9). Of this habitat loss, approximately 10,432 acres occurs within the UDA, and approximately 1,728 acres occurs outside of the UDA, including impacts from shifted or displaced development (see Section 9.1.2).

Table 9-9. Direct Effects and of Modeled Habitat for Western Pond Turtle Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Upland Habitat					
Blue Oak Woodland	7,610	54	0.7%	27	27
Blue Oak Savanna	4,825	83	1.7%	42	42
Valley Grassland	91,580	11,328	12.4%	8,000	0
Mine Tailing Riparian Woodland	306	41	13.4%	0	0
Mixed Riparian Woodland	5,347	144	2.7%	0	164
Mixed Riparian Scrub	1,178	133	11.3%	0	154
Total Upland Habitat	*110,846*	*11,783*	*10.6%*	*8,069*	*387*
Aquatic Habitat					
Freshwater Marsh	2,240	111	5.0%	16	56
Open Water	1,441	117	8.1%	0	59
Stream/Creek	2,674	149	5.6%	0	75
Total Aquatic Habitat	*6,355*	*377*	*5.9%*	*16*	*190*
Total Modeled Habitat	**117,201**	**12,160**	**10.4%**	**8,085**	**577**

The No Action/No Project Alternative would also result in indirect effects to western pond turtle and its habitat. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to western pond turtle and modeled habitat for the species.

Altered hydrology and water quality degradation will adversely affect the suitability of aquatic habitats to support foraging and movement pathways. Altered hydrology will adversely affect western pond turtle by affecting water levels and movement through aquatic pathways to other aquatic habitats and dispersal of juvenile turtles to other habitats.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, which is likely to contain petroleum products, pesticides, and other toxins that may reduce water quality within modeled aquatic habitat and may injure or kill western pond turtle when exposed to toxins either through direct contact or by ingesting contaminated prey items.

Increased human activity (including trash, debris, pets, off-highway vehicles, trampling, and just the presence of humans) in the vicinity of suitable aquatic habitats (Stream/Creek, Freshwater Marsh, and Open Water) and adjacent upland (estivation) habitats will adversely affect western pond turtle. Since western pond turtle is very shy and cryptic, just the presence of humans and other activities near aquatic habitats can adversely affect western pond turtle foraging and basking activities. Increased human activity will also indirectly affect overwintering sites (where they bury themselves in loose soil until the weather warms) and nest sites (where hatchlings may reside for several months following emergence).

As with many amphibians and reptiles, western pond turtle is sensitive to vibration and noise. Vibration and noise issues will indirectly affect the use of aquatic and upland habitats by western pond turtle (e.g., disruption of movement patterns and basking and foraging activities, disturbance of nest sites where hatchlings may reside for several months following emergence or abandonment of nest sites, and disturbance of upland overwintering sites where they bury themselves in loose soil until the weather warms). Depending on the proximity of the vibration source, western pond turtle may abandon sites and move further away from the vibration source, which can make them more susceptible to predation. Since western pond turtle is sensitive to disturbance, noise can disturb basking sites and potentially overwintering sites.

Increased numbers of medium-sized predators associated with increased development could increase predation risk and mortality of western pond turtle.

Habitat fragmentation and isolation will have several adverse effects on western pond turtle although this species will move short distances through upland habitats to reach other suitable aquatic habitats, even though they prefer to move along aquatic pathways. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of foraging and nesting habitat within the UDA exposed to edge effects from adjacent land uses.

The No Action/No Project Alternative is not expected to remove any of the 19 documented occurrences of western pond turtle in the Planning Area.

Temporary effects (Section 3.6.5 and Section 9.1.2) that result from ground-disturbing construction activities under the No Action/No Project Alternative may result from stressors (Appendix G) such as temporary construction lighting, temporary construction noise, and temporary ground vibration that could result in disturbance of individual western pond turtle.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to western pond turtle habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in approximately 577 acres of modeled habitat re-establishment/establishment and approximately 8,085 acres of modeled habitat preservation for western pond turtle (approximately 8,069 acres of upland habitat and approximately 16 acres of aquatic habitat). As discussed in Section 2.2.4, this habitat conservation would be implemented on a project-by-project basis and would often not be part of a coordinated and linked Preserve System.

Cumulative Effect of the Alternative

Western pond turtle habitat has been lost, degraded, and fragmented by past and present urban and suburban development, associated infrastructure, agriculture, development of agricultural–residential neighborhoods and other rural development, and mining operations within the Planning Area, as described in Section 3.7.1. The effects of these past and present projects on western pond turtle and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect western pond turtle, as a whole these actions would contribute to the ongoing habitat loss. However, for future projects and activities subject to CEQA and NEPA review, these impacts would typically be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under CWA requirements would ensure that there would be no

net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for western pond turtle.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would have direct and indirect impacts resulting in the loss of 12,160 acres of modeled western pond turtle habitat. The No Action/No Project Alternative would include the preservation (approximately 8,085 acres) and re-establishment/establishment (approximately 577 acres) of modeled habitat, both of which are less than the acres lost. Additionally, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on western pond turtle, when considered together with the significant impacts to western pond turtle from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.7 Effects on Cooper's Hawk and Its Habitat

The life history, habitat requirements, documented occurrences and existing acres of modeled habitat of Cooper's hawk (*Accipiter cooperii*) in the Planning Area are described in Appendix G.

Cooper's hawk modeled habitat within the Planning Area includes Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub above sea level. Modeled nesting habitat within the Planning Area is Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub above sea level. The species also has been known to nest in urban areas.

Direct and Indirect Effects of the Alternative

Permanent loss of Cooper's hawk modeled habitat would occur under the No Action/No Project Alternative from new urban development and related infrastructure including approximately 607 acres of combined nesting/foraging habitat and 86 acres of foraging habitat for total loss of approximately 693 acres (Table 9-10). Of this habitat loss, approximately 521 acres would occur within the UDA and approximately 172 acres would occur outside of the UDA, including impacts from shifted or displaced development (see Section 9.1.2).

Table 9-10. Direct Effects and Conservation of Cooper's Hawk Modeled Habitat under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Nesting/Foraging Habitat					
Blue Oak Woodland	9,132	54	0.6%	27	27
Mine Tailing Riparian Woodland	641	218	34.0%	0	0
Mixed Riparian Woodland	5,785	146	2.5%	0	255
Mixed Riparian Scrub	1,451	189	13.0%	0	298
Total Nesting/Foraging Habitat	*17,009*	*607*	*3.6%*	*27*	*580*
Foraging Habitat					
Blue Oak Savanna	5,637	86	1.5%	43	43
Total Foraging Habitat	*5,637*	*86*	*1.5%*	*43*	*43*
Total Modeled Habitat	**22,646**	**693**	**3.1%**	**70**	**623**

The No Action/No Project Alternative would also result in indirect effects to Cooper's hawk and its habitat which are analyzed qualitatively below. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to Cooper's hawk and modeled habitat for the species.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, especially during storm events. Such increases can result in stream bank erosion, increased sediment loads downstream, and alterations of downstream hydrology which can remove or physically damage the surrounding riparian habitat that is modeled nesting habitat for Cooper's hawk.

Development may result in an increased wildfire frequency due to increased potential for ignitions associated with greater human presence and activities. Wildfire is a natural part of the ecosystem, and riparian and blue oak modeled Cooper's hawk habitat can recover quickly from low intensity fires. However with decades of fire suppression, the amount of fuel may have built up to levels that would increase the intensity of wildfires. Should wildfires be of sufficient intensity to result in high levels of mortality to riparian trees and oaks, this would result in a removal of nesting and foraging habitat for Cooper's hawk until sufficient regrowth occurs.

Noise, lighting, and human activity associated with urban development could degrade remaining modeled habitat by disturbing nesting activity of Cooper's hawk adjacent to development.

Increased numbers of medium-sized predators associated with increased development could reduce the numbers of each prey species. The increased use of pesticides (e.g., rodenticides) in adjacent developed parcels could also decrease prey availability.

New aboveground powerlines would pose a risk of electrocution to all raptors. However, the relatively small size of a Cooper's hawk, when compared to other raptors, may decrease this risk. Also, where new and improved transportation routes intersect with remaining modeled habitat, the increases in traffic and roads could cause a subsequent increase in mortality of Cooper's hawk.

Habitat fragmentation by new urban development may increase the distance required for Cooper's hawk to move between remaining modeled nesting and foraging habitat, increasing the time away from the nest, which can result in reduced nest success. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of foraging and nesting habitat within the UDA exposed to edge effects from adjacent land uses.

In addition, construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on Cooper's hawk primarily during nesting. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in nest disturbance or failure, and injure or kill individual Cooper's hawks. These temporary stressors can also result in disturbance of foraging behavior that can result in reduced nest success and result in injury to, or death of, individual Cooper's hawks.

The No Action/No Project Alternative is expected to remove two of the 20 documented occurrences of Cooper's hawk in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to Cooper's hawk for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would re-establish/establish approximately 623 acres of modeled habitat, and preserve an additional approximately 70 acres of Cooper's hawk modeled habitat, 27 acres of the combined nesting/foraging habitat, and 43 acres of foraging habitat.

Cumulative Effect of the Alternative

The land cover types that make up Cooper's hawk habitat within the Planning Area have been lost, degraded, and fragmented by past and present urban and suburban development and

associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on Cooper's hawk and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect Cooper's hawk, as a whole these actions would contribute to ongoing habitat loss and indirect impacts (e.g. habitat fragmentation, increased human disturbance) to remaining modeled habitat. However, for future projects and activities subject to CEQA and NEPA review, these impacts would typically be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 693 acres) and indirect impacts to modeled Cooper's hawk habitat. The modeled habitat preserved (approximately 70 acres) and re-established/established (approximately 623 acres) under the No Action/No Project Alternative would be less than the acreage of modeled habitat lost. Additionally, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on Cooper's hawk, when considered together with the significant impacts to Cooper's hawk from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.8 Effects on Tricolored Blackbird and Its Habitat

The natural history, occurrences, and habitat use in the Planning Area for tricolored blackbird (*Agelaius tricolor*) is described in Appendix G. Modeled foraging habitat within the Planning Area is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, and Open Water above sea level. Modeled nesting habitat within the Planning Area is Cropland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh above sea level.

Direct and Indirect Effects of the Alternative

Permanent loss of tricolored blackbird modeled habitat under the No Action/No Project Alternative through development and related infrastructure would remove approximately 29,389 acres of existing modeled nesting/foraging habitat (15.6% of existing) and

approximately 3,518 acres of foraging habitat (14.6% of existing) (Table 9-11). Total loss of species modeled habitats would be approximately 32,907 acres (15.5% of existing). Of this habitat loss, approximately 30,219 acres would occur within the UDA, and approximately 2,688 acres would occur outside of the UDA, including impacts from shifted or displaced development (Section 9.1.2).

Table 9-11. Direct Effects and Conservation of Tricolored Blackbird Modeled Habitat Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-established/Established*
Nesting/Foraging Habitat					
Valley Grassland	135,112	23,428	17.3%	11,806	0
Cropland	47,905	5,703	11.9%	5,119	0
Seasonal Wetland	2,600	115	4.4%	8	57
Freshwater Marsh	2,922	143	4.9%	16	72
Total Nesting/ Foraging Habitat	*188,539*	*29,389*	*15.6%*	*16,949*	*129*
Foraging Habitat					
Irrigated Pasture-Grassland	15,991	2,781	17.4%	2,496	0
Vernal Pool	4,536	322	7.1%	1,030	322
Swale	1,222	240	19.6%	602	240
Open Water	2,344	175	7.4%	0	87
Total Foraging Habitat	*24,093*	*3,518*	*14.6%*	*4,199*	*649*
Total Modeled Habitat	**212,632**	**32,907**	**15.5%**	**21,148**	**778**

The No Action/No Project Alternative would also result in indirect effects to tricolored blackbird and its habitat, which are analyzed qualitatively below. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to tricolored blackbird and modeled habitat for the species.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, which is likely to contain petroleum products, pesticides, and other toxins that may reduce water quality within modeled nesting and foraging habitat and may injure or kill tricolor blackbird when the birds are exposed to toxins either through direct contact or by ingesting contaminated prey items.

Human activity associated with urban development could degrade remaining modeled nesting habitat by disturbing nesting activity of tricolored blackbird adjacent to development.

The increased use of pesticides in adjacent developed parcels could decrease prey availability in remaining modeled foraging habitat, reduce nesting success and in some cases injury and death of individuals.

Changes to the wildlife community included an increase in medium-sized predators that are often associated with development could increase predation on tricolored blackbird nesting colonies and result in the injury and death of individuals.

Habitat fragmentation by new urban development may increase the distance required for tricolored blackbird to move between nesting colonies and remaining modeled foraging habitat, which can result in reduced nest success and abandonment of nest colonies. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of modeled habitat within the UDA exposed to edge effects from adjacent land uses.

Construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on tricolored blackbird, primarily during nesting, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in disturbance or abandonment of nesting colonies and injury or death of individual tricolored blackbirds.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to tricolored blackbird habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in approximately 778 acres of re-establishment/establishment of modeled habitat, approximately 21,148 acres of preservation of modeled habitat, approximately 16,949 acres of nesting and foraging land covers, and approximately 4,199 of foraging only land covers for tricolored blackbird.

Cumulative Effect of the Alternative

The land cover types that make up modeled tricolored blackbird habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1.

In addition to past and current development effects, reasonably foreseeable future activities within the Planning Area (Section 3.7.2) would result in continued loss of tricolored blackbird modeled habitat, as well as indirect impacts (e.g. habitat fragmentation, increased urban runoff, increased human disturbance) to remaining modeled habitat, although for projects

subject to CEQA and NEPA review these impacts would likely be mitigated under the future regulatory environment Section 2.2.2.

The expected impacts of the No Action/No Project Alternative on tricolored blackbird modeled habitat total approximately 32,907 acres. It is expected that due to the regulatory environment under the No Action/No Project Alternative approximately 778 acres of modeled habitat would be re-established/ established. In addition under the No Action/No Project Alternative, approximately 21,148 acres of modeled habitat would be preserved, although this preservation and the aforementioned re-establishment/establishment would occur on a project-by-project basis and would often not be part of a coordinated Preserve System.

Therefore, the incremental impacts of the No Action/No Project Alternative on tricolored blackbird, when considered together with the significant impacts to tricolored blackbird from past and current human activities and the reasonably foreseeable future project within the study area, would result in a significant cumulative effect.

9.2.2.9 Effects on Western Burrowing Owl and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat within the Planning Area for western burrowing owl (*Athene cunicularia hypugaea*) are described in Appendix G. Modeled foraging habitat within the Planning Area is Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Stream/Creek (VPIH) above sea level. Modeled nesting habitat within the Planning Area is Valley Grassland, Blue Oak Savanna, Cropland, and Irrigated Pasture-Grassland above sea level. Western burrowing owl may also occur in disturbed land covers when there are open areas with sufficient suitable burrow structures for nesting; however, these land covers were not included in the western burrowing owl species model because these burrow features are often removed with development activities.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would result in permanent loss of western burrowing owl habitat from new development and related infrastructure. These activities and projects would remove approximately 31,999 acres of existing modeled nesting/foraging habitat (15.6 % of existing) (Table 9-12). Of this habitat loss, approximately 29,310 acres would occur within the UDA, and approximately 2,689 acres would occur outside of the UDA, including impacts from shifted or displaced development (Section 9.1.2). Approximately 712 acres of wintering habitat would also be directly impacted under the No Action/No Project Alternative, for a total loss of approximately 32,711 acres.

Table 9-12. Direct Loss and Conservation of Western Burrowing Owl Modeled Habitat under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Wintering Habitat					
Vernal Pool	4,536	322	7.1%	1,030	322
Seasonal Wetland	2,600	115	4.4%	8	57
Swale	1,252	240	19.2%	673	240
Stream/Creek (VPIH)	73	35	47.9%	13	17
Total Wintering Habitat	*8,461*	*712*	*8.4%*	*1,724*	*636*
Nesting/Foraging Habitat					
Cropland	47,905	5,703	11.9%	5,119	0
Irrigated Pasture-Grassland	15,991	2,781	17.4%	2,496	0
Valley Grassland	135,112	23,429	17.3%	11,806	0
Blue Oak Savanna	5,637	86	1.5%	43	43
Total Nesting/ Foraging Habitat	*204,645*	*31,999*	*15.6%*	*19,464*	*43*
Total Modeled Habitat	**213,106**	**32,711**	**15.3%**	**21,188**	**679**

The No Action/No Project Alternative would also result in indirect impacts to modeled western burrowing owl habitat, which is analyzed here qualitatively. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The discussion below focuses on those stressors that may result in indirect impacts to western burrowing owl and modeled habitat for the species.

Human activity associated with urban development could degrade remaining modeled nesting/foraging habitat by increasing interactions between domestic dogs and western burrowing owl, which can result disturbance of burrows and harassment of owls adjacent to development.

Changes to the wildlife community included an increase in medium-sized predators that are often associated with urban development, such as raccoons, which could increase predation on burrowing owl and result in the injury and death of individuals. Increases of prey species associated with urban development such as pigeons may result in increased transmission of disease to western burrowing owl, leading to injury or death.

The increased use of pesticides in adjacent developed parcels could decrease prey availability in remaining modeled nesting/foraging habitat, reduce nesting success, and in some cases cause injury and death of individuals.

The increase in traffic associated with new development may result in increased mortality of western burrowing owl as a result of a greater number of vehicle collisions.

While habitat fragmentation may increase the distance required for western burrowing owl to move between nest burrows and remaining modeled foraging habitat, western burrowing owl often forage in the areas surrounding the nesting burrow reducing this impact. Habitat fragmentation would increase the influence of other stressors by increasing the amount of modeled habitat within the UDA exposed to edge effects from adjacent land uses.

Ground-disturbing construction activities under the No Action/No project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on nesting western burrowing owl, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction ground vibration and increased human presence may result in disturbance or abandonment of burrows and injury or death of individual western burrowing owl.

There are 97 documented occurrences of western burrowing owl within the Planning Area. Projects and activities implemented as a result of the No Action/No Project Alternative would remove 10 of these occurrences.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to western burrowing owl for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in re-establishment/establishment of approximately 679 acres of modeled habitat (consisting of approximately 43 acres of nesting/foraging habitat and 636 acres of wintering habitat), and preservation of approximately 21,188 acres of modeled habitat (consisting of approximately 19,464 acres of nesting/foraging habitat and 1,724 acres of wintering habitat) for western burrowing owl.

Cumulative Effect of the Alternative

The land cover types that make up western burrowing owl modeled habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on western burrowing owl and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect western burrowing owl, as a whole these actions would contribute to the ongoing habitat loss. However, for future projects and activities subject to NEPA or CEQA, these impacts would typically be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would have direct and indirect impacts resulting in the loss of 32,711 acres of western burrowing owl modeled habitat. The regulatory environment under the No Action/No Project Alternative is anticipated to result in the re-establishment/establishment approximately 43 acres of modeled Blue Oak Savanna modeled habitat and an additional 636 acres of western burrowing owl wintering habitat. In addition under the No Action/No Project Alternative, approximately 21,188 acres of modeled habitat would be preserved, although this preservation and the aforementioned re-establishment/establishment would occur on a project-by-project basis and would often not be part of a coordinated Preserve System.

Therefore, the incremental impacts of the No Action/No Project Alternative on western burrowing owl, when considered together with the significant impacts to western burrowing owl from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.10 Effects on Ferruginous Hawk and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of ferruginous hawk (*Buteo regalis*) are discussed in Appendix G. Ferruginous hawk is not known to nest in the Planning Area and do not regularly breed in California, but utilize open grasslands and agricultural areas for winter foraging. Suitable habitat within the Planning Area is represented by Valley Grassland, Irrigated Pasture-Grassland, Vernal Pool, Seasonal Wetland, and Swale land cover types located above sea level.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would result in permanent direct loss of approximately 26,887 acres of ferruginous hawk habitat through loss of habitat to development and related infrastructure (16.9% of existing removed) (Table 9-13). Of this habitat loss, approximately 24,918 acres would occur within the UDA, and approximately 1,969 acres would occur outside of the UDA.

Table 9-13. Direct Effects and Preservation of Ferruginous Hawk Modeled Habitat Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Foraging Habitat					
Valley Grassland	135,112	23,429	17.3%	11,806	0
Irrigated Pasture-Grassland	15,991	2,781	17.4%	2,496	0
Seasonal Wetland	2,600	115	4.4%	8	57
Vernal Pool	4,536	322	7.1%	1,030	322
Swale	1,252	240	19.2%	602	240
Total Modeled Habitat	**159,491**	**26,887**	**16.9%**	**15,942**	**619**

In addition to direct effects, the No Action/No Project Alternative would also result in indirect impacts to modeled ferruginous hawk foraging habitat, which is analyzed here qualitatively. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to ferruginous hawk and modeled foraging habitat.

Stressors such as changes to hydrology and water quality due to urban runoff, increased use of pesticides, and increases in abundance of medium-sized predators associated with urban areas may impact modeled foraging habitat by adversely affecting aquatic vegetation and prey availability.

New development would likely result in increased traffic and vehicle collisions, and the use of aboveground electrical lines that pose an electrocution risk. Both of these stressors both may increase mortality of ferruginous hawk.

Increased human activity resulting from nearby development could degrade habitat suitability in remaining habitat by disturbing foraging behavior.

Habitat fragmentation by new urban development may increase the distance required for ferruginous hawk to move between remaining patches of modeled foraging habitat, which can result in increased energy use and decreased health. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of modeled habitat within the UDA exposed to edge effects from adjacent land uses.

Temporary effects (Section 3.6.5 and Section 9.1.2) on foraging habitat quality from construction activities under the No Action/No Project are expected to occur due to environmental stressors (Appendix G); temporary trampling of vegetation, construction noise and lighting, increased human presence during construction, and construction debris.

Of 26 documented occurrences of ferruginous hawks in the Planning Area, none are expected to be removed by implementation of the No Action/No Project Alternative.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to ferruginous hawk modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in the re-establishment/establishment of approximately 619 acres of modeled habitat and the preservation of approximately 15,942 acres of modeled habitat for ferruginous hawk.

Cumulative Effect of the Alternative

Ferruginous hawk habitat has been lost, degraded, and fragmented by past and present urban and suburban development, associated infrastructure, agriculture, development of agricultural–residential neighborhoods and other rural development, and mining operations within the Planning Area, as described in Section 3.7.1. The effects of these past and present projects on ferruginous hawk and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect ferruginous hawk, as a whole these actions would contribute to the ongoing habitat loss. However, for future projects and activities subject to CEQA and NEPA review, these impacts would typically be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for ferruginous hawk.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would have direct and indirect impacts resulting in the loss of 26,887 acres of modeled ferruginous hawk habitat. The No Action/No Project Alternative would include the preservation of modeled habitat (approximately 15,942 acres), which would be less than the anticipated loss of habitat, and re-establishment/establishment of modeled habitat (approximately 619 acres). Under the

No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on ferruginous hawk, when considered together with the significant impacts to ferruginous hawk from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.11 Effects on Swainson's Hawk and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of Swainson's hawk are discussed in Appendix G. Modeled foraging habitat within the Planning Area is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale above sea level and below 500 feet. Modeled nesting habitat is mixed Riparian Woodland and Mixed Riparian Scrub above sea level and below 500 feet.

High-value habitat for Swainson's hawk is defined by the SSHCP as modeled foraging habitat occurring in the western portion of the Planning Area. The majority of documented occurrences of Swainson's hawk in the Planning Area are located outside of the UDA in the western portion of the Planning Area, where the foraging habitat is of high quality due to the relative abundance of prey species in that area. While nesting of Swainson's hawk has occurred in urbanized areas, it is very uncommon, and developed land covers are not included in the Swainson's hawk nesting habitat model.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would remove approximately 336 acres of nesting habitat (4.6% of existing) and approximately 32,888 acres of foraging habitat (15.4% of existing) in the Planning Area (Table 9-14). Of this habitat loss, approximately 30,212 acres would occur within the UDA, and approximately 2,676 acres would occur outside of the UDA.

Table 9-14. Direct Effects and Conservation of Swainson's Hawk Modeled Habitat under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Nesting Habitat					
Mixed Riparian Woodland	5,785	147	2.5%	0	147
Mixed Riparian Scrub	1,449	189	13.0%	0	189
Total Nesting Habitat	*7,234*	*336*	*4.6%*	*0*	*336*
Foraging Habitat					
Valley Grassland	133,705	23,391	17.5%	11,806	0
Cropland	47,905	5,703	11.9%	5,119	0
Irrigated Pasture-Grassland	15,991	2,781	17.4%	2,496	0
Vernal Pool	4,536	322	7.1%	1,030	322
Seasonal Wetland	2,600	115	4.4%	8	57
Swale	1,252	240	19.1%	602	240
Total Foraging Habitat	*205,989*	*32,552*	*15.8%*	*21,061*	*619*
Total Modeled Habitat	**213,223**	**32,888**	**15.4%**	**21,061**	**955**

In addition to direct effects, the No Action/No Project Alternative would also result in indirect impacts to modeled Swainson's hawk nesting and foraging habitat, which is analyzed here qualitatively. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to Swainson's hawk and modeled nesting and foraging habitat.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, especially during storm events. Such increases can result in stream bank erosion, increased sediment loads downstream, and alterations of downstream hydrology, which can remove or physically damage the surrounding riparian habitat that is modeled nesting habitat for Swainson's hawk.

Development may result in an increased wildfire frequency due to increased potential for ignitions associated with greater human presence and activities. Wildfire is a natural part of the ecosystem, and riparian modeled Swainson's hawk habitat can recover quickly from low-intensity fires. However, with decades of fire suppression the amount of fuel may have built up to levels that would increase the intensity of wildfires. Should wildfires be of sufficient intensity

to result in high levels of mortality to riparian trees, this would result in a removal of nesting habitat for Swainson's hawk until sufficient regrowth occurs.

Noise, lighting, and human activity associated with urban development could degrade remaining modeled nesting habitat by disturbing nesting activity of Swainson's hawk adjacent to development, potentially causing nest abandonment.

Increased numbers of medium-sized predators associated with increased development could reduce the numbers of each prey species. The increased use of pesticides (e.g., rodenticides) in adjacent developed parcels could also decrease prey availability.

New aboveground powerlines would pose a risk of electrocution to Swainson's hawk. Also, where new and improved transportation routes intersect with remaining modeled habitat, the increases in traffic and roads could cause a subsequent increase in mortality of Swainson's hawk from vehicle collisions.

Habitat fragmentation by new urban development may increase the distance required for Swainson's hawk to move between remaining modeled nesting and foraging habitat, increasing the time away from the nest, which can result in reduced nest success. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of foraging and nesting habitat within the UDA exposed to edge effects from adjacent land uses.

In addition, construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on Swainson's hawk, primarily during nesting, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in nest disturbance or failure and injure or kill individual Swainson's hawks. These temporary stressors can also result in disturbance of foraging behavior that can result in reduced nest success and result in the injury to, or death of, individual Swainson's hawks.

The No Action/No Project Alternative is expected to remove 35 of the 410 documented occurrences of Swainson's hawks in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to Swainson's hawk modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in approximately 955 acres of modeled habitat re-establishment/establishment (approximately 336 acres of nesting habitat and approximately 619 acres of foraging habitat), and approximately 21,061 acres of modeled habitat preservation for Swainson's hawk (consisting entirely of foraging habitat). As discussed in Section 2.2.4, this

habitat conservation would be implemented on a project-by-project basis and would often not be part of a coordinated and linked Preserve System.

Cumulative Effect of the Alternative

The land cover types that make up Swainson's hawk modeled habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on Swainson's hawk and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect Swainson's hawk, as a whole these actions would contribute to ongoing habitat loss and indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining modeled habitat, although for projects subject to CEQA and NEPA review these impacts would likely be mitigated under the future regulatory environment described in Section 2.2.2, which would include protection for the species under CESA and the mitigation guidelines of the CWA, Sacramento County Swainson's Hawk Ordinance, and Sacramento County General Plan.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would have direct and indirect impacts resulting in the loss of 32,888 acres of modeled Swainson's hawk habitat. The No Action/No Project Alternative would include the preservation of modeled habitat (approximately 21,061 acres), which would be less than the estimated loss of habitat, and re-establishment/establishment of modeled habitat (approximately 955 acres). Under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on Swainson's hawk, when considered together with the significant impacts to Swainson's hawk from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.12 Effects on Northern Harrier and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of northern harrier (*Circus cyaneus*) are discussed in Appendix G. Modeled foraging habitat within the Planning Area is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Freshwater Marsh above sea level. Modeled nesting habitat is Cropland, Irrigated Pasture-Grassland, and Valley Grassland above sea level.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would remove approximately 31,913 acres of nesting/foraging habitat for northern harrier (16.0% of existing) and approximately 821 acres of foraging habitat (7.6% of existing) (Table 9-15). Of this habitat loss, approximately 30,054 acres would occur within the UDA and approximately 1,859 acres would occur outside of the UDA.

Table 9-15. Direct Effects and Conservation for Northern Harrier Modeled Habitat Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Nesting/Foraging Habitat					
Valley Grassland	135,112	23,429	17.3%	11,806	0
Cropland	47,905	5,703	11.9%	5,119	0
Irrigated Pasture-Grassland	15,991	2,781	17.4%	2,496	0
Total Nesting/Foraging Habitat	*199,008*	*31,913*	*16.0%*	*19,421*	*0*
Foraging Habitat					
Vernal Pool	4,536	322	8.0%	1,030	322
Seasonal Wetland	2,600	115	4.4%	8	57
Freshwater Marsh	2,922	144	4.9%	16	72
Swale	1,252	240	19.1%	602	240
Total Foraging Habitat	*11,310*	*821*	*7.6%*	*1,656*	*691*
Total Modeled Habitat	**210,318**	**32,734**	**15.6%**	**21,077**	**691**

In addition to direct effects, the No Action/No Project Alternative would also result in indirect impacts to modeled northern harrier nesting and foraging habitat, which is analyzed here qualitatively. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion

focuses on those stressors that may result in indirect impacts to northern harrier and modeled nesting and foraging habitat.

Noise, lighting, and human activity associated with urban development could degrade remaining modeled nesting habitat by disturbing nesting activity of northern harrier adjacent to development, potentially causing nest abandonment.

Increased numbers of medium-sized predators associated with increased development could reduce the numbers of each prey species. The increased use of pesticides (e.g., rodenticides) in adjacent developed parcels could also decrease prey availability.

New aboveground powerlines would pose a risk of electrocution to northern harrier. Also, where new and improved transportation routes intersect with remaining modeled habitat, the increases in traffic and roads could cause a subsequent increase in mortality of northern harrier from vehicle collisions.

Habitat fragmentation by new urban development may increase the distance required for northern harrier to move between remaining modeled nesting and foraging habitat, increasing the time away from the nest, which can result in reduced nest success. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of foraging and nesting habitat within the UDA exposed to edge effects from adjacent land uses.

In addition, construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on northern harrier, primarily during nesting, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in nest disturbance or failure, and may injure or kill individual northern harrier. These temporary stressors can also result in disturbance of foraging behavior that can result in reduced nest success and result in the injury or death of individual northern harriers.

The No Action/No Project Alternative is expected to remove two of the 70 documented occurrences of northern harrier in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to northern harrier modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in approximately 691 acres of modeled habitat re-established/established, approximately 21,077 acres of preservation of modeled habitat preserved:, approximately 19,421 acres of nesting/foraging habitat, and approximately 1,656 acres of foraging habitat.

Cumulative Effect of the Alternative

The land cover types that make up northern harrier modeled habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on northern harrier and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect northern harrier, as a whole these actions would result in the continued loss of northern harrier habitat, as well as indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA review, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2, which would include protection for the species under Section 3503 of the California Fish and Game Code. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for northern harrier.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 32,734 acres) and indirect impacts to modeled northern harrier habitat. The modeled habitat preserved (21,077 acres) under the No Action/No Project Alternative would be less than the acreage of modeled habitat lost. In addition, the No Action/No Project Alternative would result in approximately 691 acres of modeled habitat re-established/established. Under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on northern harrier, when considered together with the significant impacts to northern harrier from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.13 Effects on White-Tailed Kite and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of white-tailed kite (*Elanus leucurus*) are discussed in Appendix G. Modeled foraging habitat within the Planning Area is Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley

Grassland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, and Swale above sea level. Modeled nesting habitat within the Planning Area is Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub above sea level. The majority of the 62 documented occurrences of this species within the Planning Area are outside the UDA, and the majority of those are located in the western portion of the Planning Area (Appendix G).

Direct and Indirect Effects of the Alternative

Thee No Action/No Project Alternative would remove approximately 419 acres of white-tailed kite nesting habitat (2.9% of existing), approximately 189 acres of nesting/foraging habitat (13.0% of existing), and approximately 32,676 acres of foraging habitat (15.3% of existing) for a total of approximately 33,284 acres lost (Table 9-16). Of this habitat loss, approximately 30,407 acres would occur within the UDA, and approximately 2,877 acres would occur outside of the UDA.

Table 9-16. Direct Effects and Conservation of White-Tailed Kite Modeled Habitat Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/Establishment*
Nesting Habitat					
Blue Oak Woodland	9,132	54	0.6%	27	27
Mixed Riparian Woodland	5,785	147	2.5%	0	256
Mine Tailing Riparian Woodland	641	218	34.0%	0	0
Total Nesting Habitat	*15,558*	*419*	*2.9%*	*27*	*283*
Nesting/Foraging Habitat					
Mixed Riparian Scrub	1,451	189	13.0%	0	298
Total Nesting/Foraging Habitat	*1,451*	*189*	*13.0%*	*190*	*298*
Foraging Habitat					
Valley Grassland	135,112	23,429	17.3%	11,806	0
Cropland	47,905	5,703	11.9%	5,119	0
Irrigated Pasture-Grassland	15,991	2,781	17.4%	2,496	0
Blue Oak Savanna	5,637	86	1.5%	43	43
Vernal Pool	4,536	322	6.9%	1,030	322
Seasonal Wetland	2,600	115	4.4%	8	57
Swale	1,252	240	19.1%	602	240
Total Foraging Habitat	*213,033*	*32,676*	*15.3%*	*21,104*	*662*
Total Modeled Habitat	**230,042**	**33,284**	**14.5%**	**21,321**	**1,243**

In addition to direct effects, the No Action/No Project Alternative would also result in indirect impacts to modeled white-tailed kite nesting and foraging habitat, which is analyzed here qualitatively. As with the direct impacts discussed previously, the greatest impact of these

indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on stressors that may result in indirect impacts to white-tailed kite and modeled nesting and foraging habitat where it is adjacent to urban development and transportation projects.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, especially during storm events. Such increases can result in stream bank erosion, increased sediment loads downstream, and alterations of downstream hydrology, which can remove or physically damage the surrounding riparian habitat that is modeled nesting habitat for white-tailed kite.

Development may result in an increased wildfire frequency due to increased potential for ignitions associated with greater human presence and activities. Wildfire is a natural part of the ecosystem and riparian and blue oak woodland modeled white-tailed kite habitat can recover quickly from low-intensity fires. However, with decades of fire suppression, the amount of fuel may have built up to levels that would increase the intensity of wildfires. Should wildfires be of sufficient intensity to result in high levels of mortality to riparian trees and oaks, this would result in a removal of nesting and foraging habitat for white-tailed kite until sufficient regrowth occurs.

Noise, lighting, and human activity associated with urban development could degrade remaining modeled nesting habitat by disturbing nesting activity of white-tailed kite adjacent to development, potentially causing nest abandonment.

Increased numbers of medium sized predators associated with increased development could reduce the numbers of each prey species. The increased use of pesticides (e.g., rodenticides) in adjacent developed parcels could also decrease prey availability.

New aboveground powerlines would pose a risk of electrocution to white-tailed kite. Also, where new and improved transportation routes intersect with remaining modeled habitat, the increases in traffic and roads could cause a subsequent increase in mortality of white-tailed kite from vehicle collisions.

Habitat fragmentation by new urban development may increase the distance required for white-tailed kite to move between remaining modeled nesting and foraging habitat, increasing the time away from the nest, which can result in reduced nest success. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of foraging and nesting habitat within the UDA exposed to edge effects from adjacent land uses.

In addition, construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on white-tailed kite primarily during

nesting, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in nest disturbance or failure, and may injure or kill individual white-tailed kite. These temporary stressors can also result in disturbance of foraging behavior that can result in reduced nest success and result in the injury or death of individual white-tailed kite. While nest failure may be caused by construction activities, it is expected that any activity under CEQA would include protection measures for this fully protected species as there is no mechanism within the Fish and Game Code to authorize take of individuals of fully protected species under these circumstances (Section 9.1.1).

The No Action/No Project Alternative is expected to remove 8 of the 62 documented occurrences of white-tailed kite in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to white-tailed kite modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in approximately 1,243 acres of modeled habitat re-established/established, and approximately 21,321 acres of modeled habitat preservation for white-tailed kite, consisting of approximately 27 acres of nesting habitat, approximately 190 acres of nesting/foraging habitat, and approximately 21,104 acres of foraging habitat. As described in Section 2.2.4, this modeled habitat conservation would be implemented on a project-by-project basis and would often not be part of a coordinated and linked Preserve System.

Cumulative Effect of the Alternative

White-tailed kite modeled habitat within the Planning Area has been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described for Section 3.7.1. The effects of these past and present projects on white-tailed kite and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect white-tailed kite, as a whole these actions would result in the continued loss of white-tailed kite habitat and indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining modeled habitat, although for projects subject to CEQA and NEPA review these impacts would likely be mitigated under the future regulatory environment Section 2.2.2, which would include protection for the species as a fully protected species under the California Fish and Game Code. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would

be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for white-tailed kite.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 33,284 acres) and indirect impacts to modeled white-tailed kite habitat. The modeled habitat preserved (approximately 21,321 acres) under the No Action/No Project Alternative would be less than the acreage of modeled habitat lost. In addition, the No Action/No Project Alternative would re-establish/establish approximately 1,243 acres of modeled habitat. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on white-tailed kite, when considered together with the significant impacts to white-tailed kite from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.14 Effects on Greater Sandhill Crane and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of greater sandhill crane (*Grus canadensis tabida*) are discussed in Appendix G. Greater sandhill crane is listed as threatened under CESA and is a fully protected species under the California Fish and Game Code. Modeled roosting habitat is Vernal Pool, Seasonal Wetland, and Freshwater Marsh above sea level and within 2 miles of documented greater sandhill crane occurrences. Modeled foraging habitat within the Planning Area is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh within 1.75 miles of modeled roosting habitat and above sea level.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative project and activities would remove a total of approximately 9,499 acres of modeled habitat for greater sandhill crane, of which approximately 76 acres is roosting habitat, approximately 138 acres is roosting/foraging habitat, and approximately 9,285 acres is foraging habitat (Table 9-17). Of this modeled habitat loss, approximately 7,210 acres would occur within the UDA, and approximately 2,289 acres would occur outside of the UDA.

Table 9-17. Direct Effects and of Modeled Habitat for Greater Sandhill Crane Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing Modeled Habitat	*Direct Effect*	*Indirect Effect*	*Total Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment /Establishment*
Roosting/Foraging Habitat							
Seasonal Wetland	1,877	63	Qualitative	63	3.4%	8	32
Freshwater Marsh	2,610	75	Qualitative	75	2.9%	16	38
Total Roosting/Foraging Habitat	*4,487*	*138*	*Qualitative*	*138*	*3.1%*	*24*	*70*
Roosting Habitat							
Vernal Pool	1,156	76	117	193	6.6%	386	76
Total Roosting Habitat	*1,156*	*76*	*117*	*193*	*6.6%*	*386*	*76*
Foraging Habitat							
Cropland	42,628	4,080	Qualitative	4,080	9.6%	3,662	0
Valley Grassland	30,585	3,444	Qualitative	3,444	11.3%	2,671	0
Irrigated Pasture-Grassland	10,908	1,761	Qualitative	1,761	16.1%	1,580	0
Total Foraging Habitat	*84,121*	*9,285*	*Qualitative*	*9,285*	*11.0%*	*7,913*	*0*
Total Modeled Habitat	**89,764**	**9,499**	**117**	**9,616**	**10.6%**	**8,323**	**146**

In addition to direct effects, the No Action/No Project Alternative would also result in indirect impacts to modeled greater sandhill crane roosting habitat (117 acres) and foraging habitat, which is analyzed here qualitatively. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to greater sandhill crane roosting and foraging habitat.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, which could cause alterations of downstream hydrology and could modify water depths around roosting habitat causing abandonment of roost sites. Urban runoff also can contain petroleum products, pesticides, and other chemicals that can degrade water quality and potentially harm greater sandhill crane directly or by contaminating food sources.

Chronic noise from new development and transportation infrastructure can cause abandonment of roost sites and avoidance of foraging habitat by greater sandhill crane. New development may also increase human activities, including recreational activities within

roosting and foraging habitat for greater sandhill crane that can result in the abandonment of roosts and avoidance of foraging habitat.

New development can also have the potential to spread disease to greater sandhill crane as a result of the increased presence of humans and pets within roosting and foraging habitat.

Where new and improved transportation routes intersect with modeled habitat, the increases in traffic and roads could cause a subsequent increase in mortality of greater sandhill crane from vehicle collisions.

Habitat fragmentation by new urban development may limit suitability of remaining modeled greater sandhill crane roosting habitat in small habitat patches. Habitat fragmentation can also increase the distance required for greater sandhill crane to move between remaining modeled roosting and foraging habitat, increasing the energy demands required to forage. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of modeled foraging and roosting habitat exposed to edge effects from adjacent land uses.

In addition, construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on greater sandhill crane and are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence in the vicinity of roost sites may result in roost abandonment and disturbance of foraging, which would be a disruption of normal behavior that could result in injury to greater sandhill crane. While roost abandonment may be caused by construction activities, it is expected that any activity under CEQA would include protection measures for this fully protected species as there is no mechanism within the Fish and Game Code to authorize take of individuals of fully protected species under these circumstances (Section 9.1.1).

The majority of documented occurrences of greater sandhill crane in the Planning Area are outside the UDA in the western portion of the Planning Area (Appendix G). The No Action/No Project Alternative is expected to remove 62 of the 70 documented occurrences of greater sandhill cranes in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to greater sandhilll crane modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in approximately 146 acres of modeled habitat re-establishment/establishment, and approximately 8,323 total acres of modeled habitat preservation for greater sandhill crane, including approximately 24 acres of

roosting/foraging habitat, approximately 386 acres of roosting habitat, and approximately 7,913 acres of foraging habitat.

Cumulative Effect of the Alternative

Greater sandhill crane modeled habitat within the Planning Area has been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure described in Section 3.7.1. The effects of these past and present projects on greater sandhill crane and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect greater sandhill crane, as a whole these actions would result in the continued loss of greater sandhill crane habitat, as well as indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining modeled habitat, although for projects subject to CEQA and NEPA review, these impacts would likely be mitigated under the future regulatory environment described Section 2.2.2, which would include protection for the species as a fully protected species under the California Fish and Game Code.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (9,499 acres) and indirect (117 acres) impacts to modeled greater sandhill crane habitat for a total impact of 9,616 acres. The modeled habitat preserved (8,323 acres) would be less than the acreage of modeled habitat lost. In addition, the No Action/No Project Alternative would result in 146 acres of modeled habitat re-established/established. Under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on greater sandhill crane, when considered together with the significant impacts to greater sandhill crane from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.15 Effects on Lesser Sandhill Crane and Its Habitat

Basic habitat information for lesser sandhill crane (*Grus canadensis canadensis*) within the Planning Area is found in Appendix G. The land cover types in the Planning Area that are utilized by lesser sandhill crane are the same as those for greater sandhill crane above.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would result in the same acres of habitat loss as discussed previously for greater sandhill crane (see Table 9-17). New development and transportation infrastructure would have indirect effects on lesser sandhill crane that would also be the same as those discussed for greater sandhill crane. In addition, construction activities under the No Action/No Project Alternative may result in temporary effects as discussed for greater sandhill crane.

The habitat preserved under the No Action/No Project Alternative for lesser sandhill crane would be the same as that for greater sandhill crane.

Cumulative Effect of the Alternative

The cumulative effects on lesser sand hill crane would be similar to those described previously for greater sandhill crane; that is, there would be a ***Significant Adverse Cumulative*** effect when considering the No Action/No Project Alternative with past, present, and reasonably foreseeable future projects.

9.2.2.16 Effects on Loggerhead Shrike and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of loggerhead shrike (*Lanius ludovicianus*) are discussed in Appendix G. The SSHCP modeled foraging habitat within the Planning Area is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale above sea level. Modeled nesting habitat within the Planning Area is Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland above sea level.

Direct and Indirect Effects of the Alternative

Activities under the No Action/No Project Alternative are anticipated to result in loss of loggerhead shrike habitat to development and related infrastructure. Activities would remove approximately 554 acres of nesting habitat, approximately 23,429 acres of nesting/foraging habitat, and approximately 9,161 acres of foraging habitat (Table 9-18). Of this habitat loss, approximately 30,431 acres would occur within the UDA, and approximately 2,713 acres would occur outside of the UDA.

Table 9-18. Direct Effects and Conservation of Modeled Habitat for Loggerhead Shrike Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing Modeled Habitat	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Nesting Habitat					
Mixed Riparian Woodland	5,785	147	2.5%	0	256
Mixed Riparian Scrub	1,424	189	13.0%	0	298
Mine Tailing Riparian Woodland	641	218	34.0%	0	0
Total Nesting Habitat	*7,850*	*554*	*7.0%*	*0*	*554*
Nesting/Foraging Habitat					
Valley Grassland	135,112	23,429	17.3%	11,806	0
Total Nesting/Foraging Habitat	*135,112*	*23,429*	*17.3%*	*11,806*	*0*
Foraging Habitat					
Cropland	47,905	5,703	11.9%	5,119	0
Irrigated Pasture-Grassland	15,991	2,781	17.4%	2,496	0
Vernal Pool	4,536	322	6.9%	1,030	322
Seasonal Wetland	2,600	115	4.4%	8	57
Swale	1,252	240	19.1%	602	240
Total Foraging Habitat	*72,284*	*9,161*	*12.7%*	*9,255*	*619*
Total Modeled Habitat	**215,246**	**33,144**	**15.4%**	**21,061**	**1,173**

The No Action/No Project Alternative would also result in indirect effects to loggerhead shrike and its habitat which are analyzed qualitatively below. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The discussion below focuses on those stressors that may result in indirect impacts to loggerhead shrike and modeled habitat for the species.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, especially during storm events. Such increases can result in stream bank erosion, increased sediment loads downstream, and alterations of downstream hydrology, which can remove or physically damage the surrounding riparian habitat that is modeled nesting habitat for loggerhead shrike.

Development may result in an increased wildfire frequency due to increased potential for ignitions associated with greater human presence and activities. Wildfire is a natural part of the ecosystem, and riparian loggerhead shrike habitat can recover quickly from low-intensity fires. However, with decades of fire suppression, the amount of fuel may have built up to levels that

would increase the intensity of wildfires. Should wildfires be of sufficient intensity to result in high levels of mortality to riparian vegetation, this would result in a removal of nesting habitat for loggerhead shrike until sufficient regrowth occurs.

The increased use of pesticides (e.g., rodenticides, insecticides) that may occur within adjacent developed parcels could also decrease prey availability within remaining foraging habitat for loggerhead shrike.

Habitat fragmentation by new urban development within the UDA may reduce the patch size of remaining modeled habitat to the point where the habitat is no longer suitable for loggerhead shrike. Also, habitat fragmentation can result in an increase in the distance required for loggerhead shrike to move between remaining modeled nesting and foraging habitat, increasing the time away from the nest, which can result in reduced nest success. Also, habitat fragmentation would increase the influence of other stressors by increasing the amount of foraging and nesting habitat within the UDA exposed to edge effects from adjacent land uses.

In addition, construction activities under the No Action/No project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on loggerhead shrike, primarily during nesting, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in nest disturbance or failure and may injure or kill individual loggerhead shrike. These temporary stressors can also result in disturbance of foraging behavior that can result in reduced nest success and in the injury or death of individual loggerhead shrikes.

The No Action/No Project Alternative is not expected to remove any of the 34 documented occurrences of loggerhead shrike in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to loggerhead shrike modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in re-establishment/establishment of approximately 1,173 acres of modeled habitat and approximately 21,061 acres of modeled habitat preservation for loggerhead shrike. The acres preserved under the No Action/No Project Alternative would often not be part of a coordinated and linked Preserve System, but rather preserved on a project-by-project basis as described in Section 2.2.4.

Cumulative Effect of the Alternative

The land cover types that make up loggerhead shrike modeled habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these

past and present projects on loggerhead shrike and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect loggerhead shrike, as a whole these actions would result in the continued loss of loggerhead shrike habitat, as well as indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA review, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for loggerhead shrike.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 33,144 acres) and indirect impacts to modeled loggerhead shrike habitat. The modeled habitat preserved (approximately 21,061 acres) would be less than the acreage of modeled habitat lost. In addition the No Action/No Project Alternative would result in approximately 1,173 acres of modeled habitat re-established/established. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental impacts of the No Action/No Project Alternative on loggerhead shrike, when considered together with the significant impacts to loggerhead shrike from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.17 Effects on Grasshopper Sparrow and Its Habitat

Basic habitat information and documented occurrence in the Planning Area for grasshopper sparrow (*Ammodramus savannarum*) are described in Appendix G. The EIS/EIR considers potentially suitable habitat within the Planning Area to be Irrigated Pasture-Grassland and Valley Grassland above sea-level.

Direct and Indirect Effects of the Alternative

Estimated losses of habitat potentially suitable for grasshopper sparrow under the No Action/No Project Alternative consist of approximately 2,781 acres of Irrigated Pasture and approximately 23,429 acres of Valley Grassland for a total land cover loss of approximately 26,210 acres. Of this habitat loss, approximately 24,301 acres would occur within the UDA, and approximately 1,909 acres would occur outside of the UDA.

The No Action/No Project Alternative is also expected to result in permanent indirect effects on grasshopper sparrow and potentially suitable habitat, which may result in degradation of remaining habitat and disturbance or loss of individuals. These impacts are analyzed qualitatively here. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The following discussion focuses on those stressors that may result in indirect impacts to grasshopper sparrow and potentially suitable habitat for the species.

Noise, lighting, and human activity associated with urban development could degrade remaining modeled nesting habitat by disturbing nesting activity of grasshopper sparrow adjacent to development, potentially causing nest abandonment. Increased human activity can also increase the numbers of pests and medium-sized predators in modeled habitat which could result in increased nest predation on the ground-nesting grasshopper sparrow.

Habitat fragmentation would increase the influence of other stressors by increasing the amount of potentially suitable habitat within the UDA exposed to edge effects from adjacent land uses.

In addition, construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on grasshopper sparrow, primarily during nesting, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in nest disturbance or failure and injure or kill individual grasshopper sparrow. These temporary stressors can also result in disturbance of foraging behavior that can result in reduced nest success and result in the injury or death of individual grasshopper sparrows.

The No Action/No Project Alternative would result in approximately 14,302 acres of preservation of land covers that provide suitable habitat for grasshopper sparrow through project mitigation. This habitat preservation would be implemented on a project-by-project basis and would often not be part of a coordinated and linked Preserve System.

Cumulative Effect of the Alternative

The Valley Grassland and Irrigated Pasture Grassland that make up potentially suitable habitat for grasshopper sparrow within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1.

In addition to past and current development effects, reasonably foreseeable future activities within the Planning Area (Section 3.7.2) would result in continued loss of grasshopper sparrow habitat, as well as indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining habitat. Neither of the land cover types that make up grasshopper sparrow habitat are subject to stringent mitigation requirements that would substantially avoid, minimize, or compensate for losses, though grasshopper sparrow is a California Species of Concern and additional mitigation may be required as a result of CEQA review of individual projects.

The expected impacts of the No Action/No Project Alternative on grasshopper sparrow potentially suitable habitat total approximately 26,210 acres. The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) may require mitigation for impacts on grasshopper sparrow suitable habitat for projects that undergo environmental review under NEPA and CEQA, which is estimated to result in the preservation of approximately 14,302 acres of potentially suitable habitat, although this preservation would occur on a project-by-project basis and would often not be part of a coordinated Preserve System.

Therefore, the incremental impacts of the No Action/No Project Alternative on grasshopper sparrow, when considered together with the significant impacts to grasshopper sparrow from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect.

9.2.2.18 Effects on Song Sparrow (Modesto Population) and Its Habitat

Basic habitat information for song sparrow (*Melospiza melodia*) within the Planning Area is found in Table 9-3 and Appendix G. The land cover types in the Planning Area that are utilized by song sparrow are Seasonal Wetland, Freshwater Marsh, and Mixed Riparian Scrub above sea level.

Direct and Indirect Effects of the Alternative

The estimated potentially suitable song sparrow habitat loss due to loss of these land cover types under the No Action/No Project Alternative would total approximately 448 acres.

The No Action/No Project Alternative would also result in indirect effects to song sparrow and its habitat, which are analyzed qualitatively below. As with the direct impacts discussed

previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The discussion below focuses on those stressors that may result in indirect impacts to song sparrow and potentially suitable habitat for the species.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, which is likely to contain petroleum products, pesticides, and other toxins that may reduce water quality within modeled nesting and foraging habitat and may injure or kill song sparrow when the birds are exposed to toxins either through direct contact or by ingesting contaminated prey items.

Human activity associated with urban development could degrade remaining modeled nesting habitat by disturbing nesting activity of song sparrow adjacent to development.

The increased use of pesticides in adjacent developed parcels could decrease prey availability in remaining modeled foraging habitat, reduce nesting success, and in some cases cause injury and death of individuals.

Changes to the wildlife community, including an increase in abundance of medium-sized predators that are often associated with development, could increase predation on song sparrow resulting in the injury and death of individuals.

Habitat fragmentation by new urban development may increase the distance required for song sparrow to move between remaining suitable nesting and foraging habitat, which can result in reduced nest success. In addition, habitat fragmentation would increase the influence of other stressors by increasing the amount of suitable habitat within the UDA exposed to edge effects from adjacent land uses.

Construction activities under the No Action/No Project Alternative are expected to have temporary effects (Section 3.6.5 and Section 9.1.2) on song sparrow, primarily during nesting, which are analyzed qualitatively here. Temporary environmental stressors (Appendix G) such as construction noise, construction lighting, and increased human presence may result in disturbance, injury, or death of individual song sparrow.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to song sparrow modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in re-establishment/establishment of 318 acres of modeled habitat and 24 total acres of preservation of song sparrow habitat, which equals the habitat loss under this alternative.

Cumulative Effect of the Alternative

The land cover types that make up song sparrow potentially suitable habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1.

In addition to past and current development effects, reasonably foreseeable future activities within the Planning Area (Section 3.7.2) would result in continued loss of song sparrow potentially suitable habitat, as well as indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining potentially suitable habitat, although for projects subject to CEQA and NEPA review these impacts would likely be mitigated under the future regulatory environment described Section 2.2.2.

The expected impacts of the No Action/No Project Alternative on song sparrow potentially suitable habitat total approximately 448 acres. The regulatory environment under the No Action/No Project Alternative is anticipated to result in the re-establishment/establishment approximately 318 acres of potentially suitable habitat. In addition, under the No Action/No Project Alternative, approximately 24 acres of potentially suitable habitat would be preserved, although this preservation and the aforementioned re-establishment/establishment would occur on a project-by-project basis and often not be part of a coordinated Preserve System.

Therefore, the incremental impacts of the No Action/No Project Alternative on song sparrow, when considered together with the significant impacts to song sparrow from past and current human activities and the reasonably foreseeable future projects within the study area, would result in a ***Significant Cumulative*** effect

9.2.2.19 Effects on Bank Swallow and Its Habitat

Basic habitat information and occurrence within the Planning Area of bank swallow (*Riparia riparia*) are described in Appendix G. Bank swallow is associated with large cut banks in riverine habitats and sand bluffs where it builds nest burrows, and with surrounding areas that it uses for foraging habitat.

Direct and Indirect Effects of the Alternative

Documented occurrences within the Planning Area are along the Cosumnes River between Rancho Murieta and Sloughhouse. The expected loss of bank swallow nesting habitat under the No Action/No Project Alternative is analyzed qualitatively, because the land cover definition does not specifically consider exposed stream banks and other features required by this species for nesting colonies. However, there are no activities under the No Action/No Project

Alternative expected to result in the loss of exposed stream banks along the Cosumnes River or in the loss of foraging habitat within close proximity to known nest colonies.

Activities under the No Action/No Project Alternative are not likely to result in permanent indirect and temporary effects on bank swallow or the preservation of habitat through mitigation.

Cumulative Effect of the Alternative

Past flood control and bank stabilization projects in the Planning Area discussed in Section 3.7.1 have reduced nesting habitat for bank swallow, and foraging habitat has been lost, degraded, and fragmented by urban and suburban development and associated infrastructure.

Reasonably foreseeable future activities within the Planning Area under the No Action/No Project Alternative are not expected to result in the loss of exposed stream banks along the Cosumnes River or in the loss of foraging habitat within close proximity to known nest colonies.

Therefore, the incremental impact of the No Action/No Project Alternative on bank swallow, when considered together with the impacts of past, current, and reasonably foreseeable projects, would result in a ***Less Than Significant Cumulative*** effect.

9.2.2.20 Effects on Western Red Bat and Its Habitat

Habitat use, natural history, and documented occurrences of western red bat (*Lasiurus blossevillii*) within the Planning Area are described in Appendix G. Modeled foraging habitat within the Planning Area is Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, Open Water, and Stream/Creek above sea level. Modeled roosting habitat within the Planning Area is Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, and Mixed Riparian Woodland above sea level.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would result in the removal of approximately 24,763 acres of foraging habitat and approximately 725 acres of roosting/foraging habitat for western red bat (Table 9-19), the majority of this loss (approximately 23,535 acres) would be within the UDA. The habitat shown (Table 9-19) are only those natural land covers that may be used by the species and is an underestimation of total habitat remaining, as western red bat is known to roost and forage in developed areas with sufficient mature tree cover, and those acres are not included in the analysis. While newly developed acres under the No Action/No Project Alternative may contain trees that could provide habitat for western red bat in the future, given

the time for newly planted trees to mature, newly developed acres are considered habitat loss in this analysis.

Table 9-19. Direct Effects and Conservation of Modeled Habitat for Western Red Bat Under the No Action/No Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Modeled Habitat Lost*	*Habitat Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Foraging Habitat					
Valley Grassland	135,112	23,429	17.3%	11,806	0
Vernal Pool	4,536	322	7.1%	1,030	322
Seasonal Wetlands	2,600	115	4.4%	8	57
Freshwater Marsh	2,922	144	4.9%	16	72
Stream/Creek	2,674	149	5.6%	0	75
Open Water	2,344	175	7.5%	0	87
Mixed Riparian Scrub	1,451	189	13.0%	0	298
Swale	1,252	240	19.1%	602	240
Total Foraging Habitat	*152,891*	*24,763*	*16.2%*	*13,462*	*1,151*
Roosting/Foraging Habitat					
Blue Oak Woodland	9,132	54	0.9%	27	27
Mixed Riparian Woodland	5,785	147	2.5%	0	256
Blue Oak Savanna	5,637	86	1.5%	43	43
Orchards	3,646	220	6.0%	197	0
Mine Tailing Riparian Woodland	641	218	34.0%	0	0
Total Roosting/Foraging Habitat	*24,841*	*725*	*3.0%*	*267*	*326*
Total Modeled Habitat	**177,732**	**25,488**	**14.3%**	**13,729**	**1,477**

The No Action/No Project Alternative would also result in indirect effects to western red bat and its habitat, which are analyzed qualitatively below. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The discussion below focuses on those stressors that may result in indirect impacts to western red bat and modeled habitat for the species.

By permanently increasing the extent of impermeable surfaces, urban development may result in increased runoff, which is likely to contain petroleum products, pesticides, and other toxins that may reduce water quality within modeled foraging habitat and may injure or kill western red bat that are exposed to toxins either through direct contact or by ingesting contaminated prey items. The increased use of pesticides (e.g., insecticides) that may occur within adjacent

developed parcels could also decrease prey availability within remaining foraging habitat for western red bat.

Development may result in an increased wildfire frequency due to increased potential for ignitions associated with greater human presence and activities. Wildfire is a natural part of the riparian and oak woodland ecosystem, and western red bat habitat can recover quickly from low-intensity fires. However, with decades of fire suppression, the amount of fuel may have built up to levels that would increase the intensity of wildfires. Should wildfires be of sufficient intensity to result in high levels of mortality to riparian vegetation or oaks, this would result in a removal of roosting and foraging habitat for western red bat until sufficient regrowth occurs.

Changes to the wildlife community included an increase in medium sized predators that are often associated with development as well as pets that could increase predation on western red bats.

Habitat fragmentation by new urban development within the UDA may increase the distance required for western red bat to move between remaining modeled roosting and foraging habitat, increasing energy demands. Also, habitat fragmentation would increase the influence of other stressors by increasing the amount of foraging and roosting habitat within the UDA exposed to edge effects from adjacent land uses.

Construction activities under the No Action/No Project Alternative may also result environmental stressors (Appendix G) that can temporarily reduce habitat quality and impact individual western red bats. These stressors include vegetation and tree removal, which can result in the abandonment of roost sites.

The No Action/No Project Alternative is expected to remove three of the seven documented occurrences of western red bats in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to western red bat modeled habitat for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in the re-establishment/establishment of approximately 1,477 acres of modeled habitat, approximately 13,729 total acres of modeled habitat preservation for western red bat, approximately 13,462 acres of foraging habitat, and approximately 267 acres of roosting/foraging habitat. The acres conserved under the No Action/No Project Alternative would often not be part of a coordinated and linked Preserve System, but rather would be conserved on a project-by-project basis as described in Section 2.2.4.

Cumulative Effect of the Alternative

The land cover types that make up western red bat modeled habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on western red bat and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect western red bat, as a whole these actions would result in the continued loss of western red bat habitat, as well as indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA, review these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2. Mitigation for impacts of future projects and activities under ESA and CWA requirements would ensure that there would be no net loss of acreage, function, and/or value for aquatic land covers that are modeled habitat for western red bat.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 25,488 acres) and indirect impacts to modeled western red bat habitat. The modeled habitat preserved (approximately 13,729 acres) would be less than the acreage of modeled habitat lost. In addition, the No Action/No Project Alternative would result in approximately 1,477 acres of modeled habitat re-established/established. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to western red bat, when considered together with the significant impacts to western red bat from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

9.2.2.21 Effects on American Badger and Its Habitat

Habitat use, natural history, known occurrences, and existing acres of modeled habitat in the Planning Area of American badger are described in Appendix G. Modeled habitat is Blue Oak Savanna, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale above sea level.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would result in the loss of approximately 24,192 acres of American badger modeled habitat to development and related infrastructure (Table 9-20). The majority of this loss of modeled habitat would occur within the UDA (23,134 acres) due to the intersection of urban development with modeled habitat in this area.

Table 9-20. Direct Effects and Conservation of Modeled Habitat for American Badger Under the No Action/No Project Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing*	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/ Establishment*
Valley Grassland	135,112	23,429	17.34%	11,806	0
Blue Oak Savanna	5,637	86	1.53%	43	43
Vernal Pool	4,536	322	7.12%	1,030	322
Seasonal Wetland	2,600	115	4.42%	8	57
Swale	1,252	240	19.09%	602	240
Total Modeled Habitat	**149,137**	**24,192**	**16.22%**	**13,489**	**662**

The No Action/No Project Alternative would also result in indirect effects to American badger and its habitat, which are analyzed qualitatively below. As with the direct impacts discussed previously, the greatest impact of these indirect effects would be within the UDA due to the intersection of development and suitable habitat in that area. The various environmental stressors that may result from activities under the No Action/No Project Alternative are described in Appendix G. The discussion below focuses on those stressors that may result in indirect impacts to American badger and modeled habitat for the species.

Alterations to hydrology can reduce prey availability in aquatic habitats areas by impacting aquatic vegetation. The increased use of pesticides in adjacent developed parcels (i.e., rodenticides) along with an increase in medium-sized predators that are often associated with urban settings could also reduce prey availability.

Chronic ground vibration, noise, lighting, and increased human activity resulting from nearby development could disturb foraging activity and result in abandonment of burrows. New development would also increase traffic, which could result in increased vehicle collisions and injury and death of American badger.

Habitat fragmentation due to loss of habitat to development would increase the influence of other stressors (e.g., human activity) by increasing the amount of habitat exposed to edge effects from adjacent urban development within the UDA.

Construction activities under the No Action/No Project Alternative may also result in temporary reduction in foraging habitat quality and disturbance of individual American badger, which could lead to reproductive failure. These effects would be caused by stressors (Appendix G) including trampling of vegetation, construction vibration, construction noise and lighting, increased human presence, and trash and debris.

The No Action/No Project Alternative is not expected to remove any of the nine documented occurrences of American badger in the Planning Area.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to American badger for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in the re-establishment/establishment of approximately 662 acres of modeled habitat and approximately 13,489 acres of preservation of modeled habitat for American badger through project mitigation requirements for the project-by-project regulatory compliance. As discussed in Section 2.2.4, the acres conserved under the No Action/No Project Alternative would often not be part of a coordinated and linked Preserve System, but rather would be conserved on a project-by-project basis.

Cumulative Effect of the Alternative

The land cover types that make up American badger modeled habitat within the Planning Area have been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on American badger and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect American badger, as a whole these actions would result in the continued loss of American badger habitat, as well as indirect impacts (e.g., habitat fragmentation, increased human disturbance) to remaining modeled habitat. For future

projects and activities subject to CEQA and NEPA review, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 24,192 acres) and indirect impacts to modeled American badger habitat. The modeled habitat preserved (approximately 13,489 acres) would be less than the acreage of modeled habitat lost. In addition the No Action/No Project Alternative would result in approximately 662 acres of modeled habitat re-established/established. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to American badger, when considered together with the significant impacts to American badger from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

9.2.2.22 Effects on Sanford's Arrowhead and Its Habitat

Documented occurrences within the Planning Area of Sanford's arrowhead (*Sagittaria sanfordii*) are provided in Appendix G. Modeled habitat for Sanford's arrowhead is all Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek above sea level that coincides with specific slopes and soils.

Direct and Indirect Effects of the Alternative

The No Action/No Project Alternative would result in the permanent loss of approximately 12,065 acres of Sanford's arrowhead modeled habitat due to development and related infrastructure (Table 9-21). Of this loss approximately 10,844 acres would occur within the UDA.

Table 9-21. Direct Effects and Modeled Habitat Conservation for Sanford's Arrowhead Under the No Action/No Project Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing*	*Direct Effect*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Re-establishment/Establishment*
Freshwater Marsh	2,044	119	5.8%	16	60
Open Water	1,086	80	7.4%	0	40
Seasonal Wetlands	1,425	81	5.7%	8	41
Streams/Creeks	893	109	12.2%	0	55
Valley Grassland	47,375	11,676	24.6%	5,883	0
Total Modeled Habitat	**52,823**	**12,065**	**22.8%**	**5,907**	**196**

As discussed previously for direct impacts, the majority of indirect impacts to Sanford's arrowhead under the No Action/No Project Alternative would occur within the UDA as a result of urban development. The various environmental stressors that may result from activities under the No Action/No Project Alternative and that would result in indirect effects on Sanford's arrowhead and its habitat described here and in Appendix G.

By permanently increasing the extent of impermeable surfaces, urban development and roads may result in increased runoff, especially during storm events. Such increases can result in increased inundation periods for seasonal wetlands and alterations of downstream hydrology in streams and creeks. Also, addition of new development may permanently increase the potential for ongoing discharge of pollutants such as grease, oil, fertilizers, and lawn pesticides within habitat for Sanford's arrowhead, which could degrade modeled habitat.

Development could also impact Sanford's arrowhead by increasing the presence of invasive plants through species escaping from landscaping, which could outcompete Sanford's arrowhead.

Development may result in an increased wildfire frequency due to increased ignition sources. Wildfire is a natural part of the ecosystem, and low-intensity fires would not adversely impact Sanford's arrowhead. However, increased fire frequency would require more fire suppression activities around developed areas that would result in ground disturbance, which would result in habitat removal.

Development under the No Action/No Project Alternative would likely result in habitat fragmentation that would inhibit seed dispersal and movement of pollinators for Sanford's arrowhead. Habitat fragmentation can also increase the impact of other indirect environmental stressors listed here (e.g., urban runoff, invasive plants) on Sanford's arrowhead by increasing the area of impact from these stressors relative to the area of the intact habitat patch.

There are 64 documented occurrences in the Planning Area, most of which occur outside the UDA. Of these occurrences, six would be lost to development under the No Action/No Project Alternative.

The regulatory environment under the No Action/No Project Alternative (Section 2.2.2) would require mitigation for impacts to Sanford's arrowhead for projects that undergo environmental review under NEPA or CEQA. The anticipated mitigation would be required on a project-by-project basis and would result in the re-establishment/establishment of approximately 196 acres of modeled habitat and approximately 5,907 acres of preservation of modeled habitat for Sanford's arrowhead though project mitigation requirements for the project-by-project regulatory compliance.

Cumulative Effect of the Alternative

Sanford's arrowhead modeled habitat within the Planning Area has been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on American badger and its habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect Sanford's arrowhead, as a whole these actions would result in the continued loss of American badger habitat, as well as indirect impacts (e.g., habitat fragmentation, increased urban runoff) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA review these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct (approximately 12,065 acres) and indirect impacts to modeled Sanford's arrowhead habitat. The modeled habitat preserved (approximately 5,907 acres) under the No Action/No Project Alternative would be less than the acreage of modeled habitat lost. In addition the No Action/No Project Alternative would result in approximately 196 acres of modeled habitat re-established/established. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to Sanford's arrowhead, when considered together with the significant impacts to Sanford's arrowhead from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

9.2.2.23 Effects on Other Special-Status Plant Species and Their Habitat

There are 18 special-status plant species with potential to occur in the Planning Area that are not covered by the SSHCP and are analyzed here (Table 9-2). Information on the process to select these species, their habitat associations, and occurrence in the Planning Area is provided in Appendix G. These plant species are predominately associated with five SSHCP land cover categories: Vernal Wetlands, Non-vernal Wetlands, Riparian Habitats, Blue Oak Woodland and

Savanna, and Valley Grassland. The No Action/No Project Alternative is expected to result in loss of land covers that provide suitable habitat for these species as shown in Table 9-22.

Direct and Indirect Effects of the Alternative

New development and transportation infrastructure would have indirect effects on special-status plant species not covered by the SSHCP that would be the same type and character as those discussed for Sanford's arrowhead previously. Effects may include increased exposure to pollutants and increased presence of invasive plant species, with the addition of specific environmental stressors on vernal pool hydrology (see the analysis of vernal pool invertebrates and plants in Section 9.2.2.1) that would indirectly adversely impact those special-status plant species analyzed here that are modeled to occur within the vernal pool ecosystem (e.g., bristly sedge (*Carex comosa*), Bolander's water-hemlock (*Cicuta maculata* var. *bolanderi*), Tuolumne button-celery (*Eryngium pinnatisectum*), and saline clover (*Trifolium hydrophilum*)). In addition, construction activities under the No Action/No Project Alternative may result in temporary effects as discussed for Sanford's arrowhead in Section 9.2.2.23.

Table 9-22. Total Loss of Potentially Suitable Habitat for Other Special-status Plants Under the No Action/No Project Alternative

Plant Name (status)*	Total Planning Area (acres)								
	Loss of Potentially Suitable Habitat (direct and indirect)					*Total Habitat Loss*	*% of Existing Potentially Suitable Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment/ Establishment*
	Vernal Wetlands	*Non-vernal Wetlands*	*Riparian*	*Blue Oak Woodland /Savanna*	*Valley Grassland*				
Watershield (State S2)	—	259	—	—	—	259	4.6%	24	129
Bristly sedge (State S2)	562	259	—	—	—	821	7.2%	1,656	691
Fleshy owl's clover (Federal - T; State - E)	—	259	—	—	—	259	4.6%	24	129
Brandegee's clarkia (State S2)	—	—	—	140	—	140	0.9%	70	70
Bolander's water-hemlock (State S2)	562	259	554	—	—	1,375	7.1%	1,656	1,245
Peruvian dodder (CRPR 2B.2)	—	259	—	—	—	259	4.6%	24	129
Tuolumne button-celery (State S2)	562	—	—	140	—	702	3.4%	1,702	632
Stinkbells (State S3)	—	—	—	140	23,429	23,569	15.7%	11,876	70
Woolly rose-mallow (State S2)	—	259	—	—	—	259	4.6%	24	129
Northern California black walnut (State S1)	—	—	554	—	—	554	7.0%	0	554
Delta tule pea (State S2)	—	259		—	—	259	4.6%	24	129
Heckard's pepper-grass (State S2)	—	—	—	—	23,429	23,429	17.3%	11,806	0
Mason's lilaeopsis (State S2)	—	259	554	—	—	813	6.0%	24	683
Delta mudwort (State S2)	—	259	554	—	—	813	6.0%	24	683
Marsh skullcap (State S1)	—	259		—	—	259	4.6%	24	129

Table 9-22. Total Loss of Potentially Suitable Habitat for Other Special-status Plants Under the No Action/No Project Alternative

Plant Name (status)*	Total Planning Area (acres)								
	Loss of Potentially Suitable Habitat (direct and indirect)					*Total Habitat Loss*	*% of Existing Potentially Suitable Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment/ Establishment*
	Vernal Wetlands	*Non-vernal Wetlands*	*Riparian*	*Blue Oak Woodland /Savanna*	*Valley Grassland*				
Side-flowering skullcap (State S1)	—	259	—	—	—	259	4.6%	24	129
Suisun marsh aster (State S2)	—	259	—	—	—	259	4.6%	24	129
Saline clover (State S2)	562	259	—	—	23,429	24,250	16.6%	13,462	691

Modeled Habitat Definitions:
Vernal Wetlands: Vernal Pool, Swale
Non-vernal Wetlands: Freshwater Marsh, Seasonal Wetland
Riparian: Mine Tailing Riparian Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland

For species with state or federal status no CRPR listing used.
Status Definitions
Federal:
E = listed as endangered under the ESA
T = listed as threatened under the ESA

State:
E = listed as endangered under CESA
T = listed as threatened under CESA
S1 = Critically Imperiled by the State
S2 = Imperiled by the State
S3 = Vulnerable by the State

California Rare Plant Rank (CRPR)
1A = Presumed extirpated in California and either rare or extinct elsewhere
1B = Rare, threatened, or endangered in California and elsewhere
2A = Presumed extirpated in California, but more common elsewhere
2B = Rare, threatened, or endangered in California, but more common elsewhere
3 = Plants which need more information and on the Review list
4 = Plants of limited Distribution – Watch List

CRPR Threat Ranks
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Moderately threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

The No Action/No Project Alternative is expected to result in conservation of habitat for these special-status plants through project-by-project mitigation required by existing policies and regulations (Section 9.1.1), and would often not be part of a coordinated and linked Preserve System (Section 2.2.4). The acres of estimated habitat conservation for each species are shown in Table 9-22.

Critical habitat has been designated for fleshy owl's clover (*Castilleja campestris* var. *succulenta)* south of Dry Creek at the extreme southern edge of the Planning Area. The No Action/No Project Alternative is not expected to impact any of this designated Critical Habitat for fleshy owl's clover.

Cumulative Effect of the Alternative

Potentially suitable habitat within the Planning Area for special-status plants not covered by the SSHCP has been lost, degraded, and fragmented by other past and present urban and suburban development and associated infrastructure as described in Section 3.7.1. The effects of these past and present projects on special-status plants and their habitat are reflected in the current conditions for the species as discussed in Appendix G.

Reasonably foreseeable future actions, as described in Section 3.7.2, consist of actions that are similar in nature to the past and present actions in the Planning Area. Although not every reasonably foreseeable future action would affect special-status plants, as a whole these actions would result in the continued loss of special-status plant habitat, as well as indirect impacts (e.g., habitat fragmentation, increased urban runoff) to remaining modeled habitat. For future projects and activities subject to CEQA and NEPA review, these impacts would be mitigated under the regulatory environment described in Sections 9.1.1 and 2.2.2.

As discussed previously in this impact section, the development and related infrastructure under the No Action/No Project Alternative would result in direct and indirect impacts to modeled special-status plant species habitat (Table 9-22). The modeled habitat preserved under the No Action/No Project Alternative would, in most cases, be less than the acreage of modeled habitat lost. In addition for species other than Heckard's pepper-grass (*Lepidium latipes* var. *heckardii*), the No Action/No Project Alternative would also re-establish/establish modeled habitat. However, under the No Action/No Project Alternative, preserved and re-established/established habitat would often be geographically fragmented and not adaptively managed to provide conservation at a landscape scale due to the project-by-project nature of the mitigation. This mitigation scenario would increase indirect effects such as habitat fragmentation and would result in a decrease in the value of modeled habitat for the species.

Therefore, the incremental direct and indirect impacts of No Action/No Project Alternative to other special-status plants, when considered together with the significant impacts to other special-status plants from past, current, and foreseeable future projects and activities in the study area, would be a ***Significant Cumulative*** effect.

9.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3.

9.2.3.1 Effects on Vernal Pool Invertebrate/Plant Species and Habitat

As was the case for the No Action/ No Project Alternative above, the following 11 vernal pool invertebrate and plant species are considered together in the analysis of the Proposed Action/Proposed Project due to their dependence on the vernal pool ecosystem: vernal pool tadpole shrimp, vernal pool fairy shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, dwarf downingia, Ahart's dwarf rush, pincushion navarretia, slender Orcutt grass, Sacramento Orcutt grass, Boggs Lake hedge-hyssop, and legenere.

While the individual natural history, habitat requirements, modeled habitat, and documented occurrences in the Planning Area differ for these species (Appendix G), the direct impact mechanisms (environmental stressors) that cause temporary impacts are the same.

Direct and Indirect Effects of the Alternative

Projects and activities under the Proposed Action/Proposed Project (Section 2.3.3) would permanently remove modeled habitat for vernal pool invertebrate and plant species through development and related infrastructure resulting in direct impacts to vernal pool invertebrate and plant species. While the majority of the urban development and direct impacts would occur within the UDA, transportation and other infrastructure projects resulting in direct impacts would occur outside the UDA. The direct impact acres that would occur under the Proposed Action/Proposed Project Alternative for each species are shown in Table 9-23 and discussed below.

Vernal pool invertebrate and plant species near proposed construction activities under the Proposed Action/Proposed Project Alternative will be adversely affected by several temporary construction-related effects (Appendix G) that will result in disturbance to habitat or harm to vernal pool invertebrate plant and animal species. Generally, these temporary effects will occur within the project boundary or road right-of-way area, which is quantified in the direct effects and the area of indirect impacts to each species in the impact tables below.

As discussed previously for direct impacts, the majority of indirect impacts to vernal pool invertebrate and plant species under the Proposed Action/Proposed Project Alternative would

occur within the UDA, as a result of urban development, although there would be indirect impacts as a result of transportation and other infrastructure projects occurring outside the UDA. The environmental stressors that would trigger indirect impacts under the Proposed Action/Proposed Project Alternative are the same in type and character as those discussed in the impact discussion for vernal pool invertebrate and plant species under the No Action/No Project Alternative in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires covered activities to implement the following AMMs relevant to vernal pool invertebrate and plant species; LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-7 (Hardpan/Duripan Protection), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3 (Roadside Pesticide Use), RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool), UTILITY-2 (Utility Maintenance), UTILITY-3 (Trenchless Construction Methods), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Compared to the project avoidance and minimization measures of the No Action/Project Alternative, these SSHCP AMMs would reduce indirect impacts on vernal pool invertebrate and plant species. For example, EDGE-3 establishes a 50-foot setback from the edge of established preserves to minimize indirect effects on Preserve lands, while EDGE-7 would not allow covered activities that could damage duripan within the Preserve Setback to protect the perched aquifer that maintains hydrologic conditions in the vernal pool ecosystem. The indirect impact acres that would occur under the Proposed Action/Proposed Project for each species are shown in Table 9-23 and discussed below.

The maximum anticipated loss of species modeled habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp modeled habitat due to direct impacts would be approximately 17,117 acres (Table 9-23). Indirect effects on vernal pool tadpole shrimp and vernal pool fairy shrimp modeled aquatic habitat are anticipated to result in additional approximately 142 acres of impacts. The total impact, including direct and indirect impacts, of the Proposed Action/Proposed Project Alternative on vernal pool tadpole shrimp and vernal pool fairy shrimp modeled habitat is expected to be approximately 17,259 acres.

Of the modeled vernal pool tadpole shrimp and vernal pool fairy shrimp habitat loss, approximately 8,500 acres would occur within the MCRA, which would affect approximately 46.9% of the modeled habitat within the MCRA. There would also be approximately 53 acres lost within the C/RS, which would affect approximately 0.1% of modeled habitat within the

C/RS. This is a smaller area lost within the MCRA and an approximately equal area lost within the C/RS when compared to the No Action/No Project Alternative.

The total impact of approximately 17,259 acres under the Proposed Action/Proposed Project Alternative on vernal pool tadpole and vernal pool fairy shrimp habitat is approximately 690 acres less than the approximately 17,949 acres of total impact estimated for the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is also expected to remove approximately 695 acres of Critical Habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp in Critical Habitat Unit 13 and approximately 51 acres in Critical Habitat Unit 14a for a total of approximately 746 acres of Critical Habitat lost. This loss is approximately 220 acres less than the approximately 966 acres of designated Critical Habitat that would be removed under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is expected to remove 112 of the 851 documented occurrences of vernal pool tadpole shrimp in the Planning Area, which would be 22 more occurrences than would be removed under the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative is also expected to remove 49 of the 581 documented occurrences of vernal pool fairy shrimp in the Planning Area, which would be 18 more occurrences than would be removed under the No Action/No Project Alternative.

The maximum anticipated direct loss of species modeled habitat for mid-valley fairy shrimp under the Proposed Action/Proposed Project would be approximately 12,553 acres, primarily within the UDA. In addition, indirect impacts on modeled habitat would be approximately 106 acres. The total impacts on modeled habitat, including direct and indirect impacts, would be approximately 12,639 acres within the Planning Area (Table 9-23). Of this habitat loss, approximately 6,280 acres would occur within the MCRA, which would affect approximately 43% of modeled habitat within the MCRA. There would also be approximately 41 acres lost within the C/RS, which would affect approximately 0.4% of modeled habitat within the C/RS. This is a smaller area lost within the MCRA and an approximately equal area lost within the C/RS when compared to the No Action/No Project Alternative.

The total impact area of 12,639 acres for mid-valley fairy shrimp under the Proposed Action/Proposed Project is approximately 581 acres less than the estimated 13,220 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project Alternative is expected to remove 10 of the 37 occurrences of mid-valley fairy shrimp in the Planning Area, which would be 5 more occurrences than would be removed under the No Action/No Project Alternative.

Activities under the Proposed Action/Proposed Project Alternative would cause direct impacts to approximately 17,095 acres of Ricksecker's water scavenger beetle modeled habitat to development and related infrastructure. In addition to this direct impact, approximately 138 acres of indirect impact would also occur for a total impact, direct and indirect combined, of 17,233 acres on Ricksecker's water scavenger beetle modeled habitat. The total impact to Ricksecker's water scavenger beetle modeled habitat would be approximately 16.6% of the existing modeled habitat in the Planning Area (Table 9-23).

The total impact area of 17,233 acres for Ricksecker's water scavenger beetle modeled habitat under the Proposed Action/Proposed Project is approximately 674 acres less than the estimated 17,907 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project Alternative is not expected to remove any of the eight occurrences of Ricksecker's water scavenger beetle in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative future urban development and related infrastructure would cause direct impacts through the loss of approximately 1,963 acres of modeled habitat for dwarf downingia. In addition to this direct impact, approximately 19 acres of indirect impact would also occur for a total impact of approximately 1,982 acres on dwarf downingia modeled habitat. The total impact, including direct and indirect impacts, to dwarf downingia modeled habitat would be approximately 8.1% of the existing modeled habitat in the Planning Area (Table 9-23).

The total impact area of 1,982 acres for dwarf downingia modeled habitat under the Proposed Action/Proposed Project is approximately 56 acres less than the estimated 2,038 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project Alternative is not expected to remove any of the 10 documented occurrences of dwarf downingia in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative would cause permanent loss of approximately 7,332 acres land cover types suitable for Ahart's dwarf rush due to development and related infrastructure. In addition to this direct impact, approximately 71 acres of indirect impact would also occur for a total impact (direct and indirect impacts combined) of approximately 7,403 acres on Ahart's dwarf rush modeled habitat. The total impact to Ahart's dwarf rush modeled habitat would be approximately 29.2% of the existing modeled habitat in the Planning Area (Table 9-23).

The total impact area of 7,403 acres for Ahart's dwarf rush modeled habitat under the Proposed Action/Proposed Project is approximately 658 acres less than the estimated 8,061 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project Alternative is not expected to remove either of the two occurrences of Ahart's dwarf rush in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative would cause loss of approximately 8,201 acres of modeled habitat for pincushion navarretia resulting from development and related infrastructure. In addition to this direct impact, approximately 57 acres of indirect impact would also occur for a total impact (direct and indirect impacts combined) of approximately 8,258 acres on pincushion navarretia modeled habitat. The total impact to pincushion navarretia modeled habitat would be approximately 14.3% of the existing modeled habitat in the Planning Area (Table 9-23).

The total impact area of 8,258 acres for pincushion navarretia modeled habitat under the Proposed Action/Proposed Project is approximately 179 acres less than the estimated 8,437 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project Alternative is not expected to remove any of the 48 occurrences of pincushion navarretia in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative would result in an estimated permanent loss of approximately 7,139 acres of land cover types suitable for slender Orcutt grass and Sacramento Orcutt grass resulting from development and related infrastructure. In addition to this direct impact, approximately 48 acres of indirect impact would also occur for a total impact, including both direct and indirect impacts, of approximately 7,187 acres on slender Orcutt grass and Sacramento Orcutt grass modeled habitat. This total impact would be approximately 20.7% of the total modeled habitat within the Planning Area (Table 9-23). Of this habitat loss, approximately 4,683 acres would occur within the MCRA, which would affect approximately 44.8% of modeled habitat within the MCRA. There would also be approximately 21 acres lost within the C/RS, which would affect approximately 0.1% of modeled habitat within the C/RS. This is a smaller area lost within the MCRA and an approximately equal area lost within the C/RS when compared to the No Action/No Project Alternative.

The total impact area of 7,187 acres for slender Orcutt grass and Sacramento Orcutt grass modeled habitat under the Proposed Action/Proposed Project is approximately 575 acres less than the estimated 7,762 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project alternative is also expected to impact approximately 235 acres of Critical Habitat for Sacramento Orcutt grass in Critical Habitat Unit 2 and approximately 13 acres in Critical Habitat Unit 3, for a total of approximately 248 acres of Critical Habitat lost. This loss of Critical Habitat would be approximately 526 acres less than the 774 acres that is estimated to occur under the No Action/No Project Alternative.

Approximately 235 acres of Critical Habitat for slender Orcutt grass would also be lost in Critical Habitat Unit 6, which would be approximately 475 acres less than the 710 acres of Critical Habitat estimated to be lost under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is expected to remove 1 of the 40 occurrences of Sacramento Orcutt grass and none of the 4 occurrences of slender Orcutt grass in the Planning Area, which would be one fewer occurrence than would be removed under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative would result in loss of approximately 8,672 acres of modeled habitat for Boggs Lake hedge-hyssop resulting from development and related infrastructure. In addition to this direct impact, approximately 52 acres of indirect impact would also occur for a total impact (direct and indirect impacts combined) of approximately 8,724 acres on Boggs Lake hedge-hyssop modeled habitat. The total impact to Boggs Lake hedge-hyssop modeled habitat would be approximately 23.8% of the existing modeled habitat in the Planning Area (Table 9-23).

The total impact area of 8,724 acres for Boggs Lake hedge-hyssop modeled habitat under the Proposed Action/Proposed Project is approximately 524 acres less than the estimated 9,248 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project Alternative is expected to remove four of the existing 31 occurrences of Boggs Lake hedge-hyssop in the Planning Area, which would be two more occurrences than would be removed under the No Action/No Project Alternative.

The No Action/No Project Alternative would result in loss of approximately 10,713 acres of modeled habitat for legenere resulting from development and related infrastructure. In addition to this direct impact, approximately 65 acres of indirect impact would also occur for a total impact (direct and indirect impacts combined) of approximately 10,778 acres on legenere modeled habitat. The total impact to legenere modeled habitat would be approximately 21.1% of the existing modeled habitat in the Planning Area (Table 9-23).

The total impact area of 10,778 acres for legenere modeled habitat under the Proposed Action/Proposed Project is approximately 505 acres less than the estimated 11,283 acres of total loss under the No Action/No Project Alternative (Table 9-4).

The Proposed Action/Proposed Project Alternative is expected to remove 2 of the existing 62 occurrences of legenere in the Planning Area, which would be 1 more occurrence than would be removed under the No Action/No Project Alternative.

Table 9-23. Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing Modeled Habitat	*Direct Impacts*	*Indirect Impacts*	*Total Impacts*	*% of Existing Habitat lost*	*Modeled Habitat Preservation*	*Modeled Habitat Established/ Re-established*
Vernal Pool Tadpole Shrimp and Vernal Pool Fairy Shrimp							
Valley Grassland	97,349	16,472	Qualitative	16,472	16.9%	22,014	0
Vernal Pool	4,536	389	94	483	10.6%	966	389
Swale	1,252	234	44	278	22.2%	278	256*
Stream/Creek (VPIH)	73	22	4	26	30.1%	26	0*
Total Modeled Habitat	**103,210**	**17,117**	**142**	**17,259**	**16.6%**	**23,284**	**645**
Mid-Valley Fairy Shrimp							
Valley Grassland	50,061	12,006	Qualitative	12,006	24.0%	10,493	0
Vernal Pool	2,818	337	71	408	11.9%	603	336
Swale	759	190	35	225	25.0%	201	210*
Total Modeled Habitat	**53,638**	**12,553**	**106**	**12,639**	**23.4%**	**11,297**	**546**
Ricksecker's Water Scavenger Beetle							
Valley Grassland	97,349	16,472	Qualitative	16,472	16.9%	22,014	0
Vernal Pool	4,536	389	94	483	8.6%	966	389
Swale	1,252	234	44	278	18.8%	278	234
Total Modeled Habitat	**103,137**	**17,095**	**138**	**17,233**	**16.6%**	**23,258**	**623**
Dwarf Downingia							
Valley Grassland	22,241	1,823	Qualitative	1,823	8.2%	3,733	0
Vernal Pool	1,661	94	13	107	5.7%	186	95
Swale	359	46	6	52	12.8%	56	46
Total Modeled Habitat	**24,261**	**1,963**	**19**	**1,982**	**8.1%**	**3,975**	**141**
Ahart's Dwarf Rush							
Valley Grassland	23,885	7,093	Qualitative	7,093	29.7%	11,949	0
Vernal Pool	937	149	51	200	15.9%	478	149
Swale	314	90	20	110	28.7%	165	90
Total Modeled Habitat	**25,136**	**7,332**	**71**	**7,403**	**29.2%**	**12,592**	**239**

Table 9-23. Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing Modeled Habitat	*Direct Impacts*	*Indirect Impacts*	*Total Impacts*	*% of Existing Habitat lost*	*Modeled Habitat Preservation*	*Modeled Habitat Established/ Re-established*
Pincushion Navarretia							
Valley Grassland	54,967	7,987	Qualitative	7,987	14.5%	13,945	0
Vernal Pool	1,844	118	36	154	6.3%	514	95
Swale	627	96	21	117	15.3%	183	46
Total Modeled Habitat	**57,438**	**8,201**	**57**	**8,258**	**14.3%**	**14,642**	**141**
Sacramento Orcutt Grass							
Valley Grassland	33,265	6,991	Qualitative	6,991	21.0%	13,945	0
Vernal Pool	1,227	148	48	196	12.1%	514	148
Total Modeled Habitat	**34,492**	**7,139**	**48**	**7,187**	**20.7%**	**14,459**	**148**
Slender Orcutt Grass							
Valley Grassland	33,265	6,991	Qualitative	6,991	21.0%	9,332	0
Vernal Pool	1,227	148	48	196	12.1%	378	148
Total Modeled Habitat	**34,492**	**7,139**	**48**	**7,187**	**20.7%**	**9,710**	**148**
Boggs Lake Hedge-Hyssop							
Valley Grassland	35,115	8,419	Qualitative	8,419	24.0%	8,657	0
Vernal Pool	1,531	240	52	292	19.1%	382	239
Seasonal Wetland	354	13	Qualitative	13	3.7%	35	13
Total Modeled Habitat	**37,000**	**8,672**	**52**	**8,724**	**23.4%**	**9,074**	**252**
Legenere							
Valley Grassland	47,527	10,401	Qualitative	10,401	21.9%	11,061	0
Vernal Pool	2,560	276	65	341	13.3%	512	95
Seasonal Wetland	886	36	Qualitative	36	4.1%	42	35
Total Modeled Habitat	**50,973**	**10,713**	**65**	**10,778**	**21.1%**	**11,615**	**130**

* Under SSHCP Objective VP5, re-establishment/establishment to mitigate effects to Stream/Creek (VPIH) will be in the form of Swale, which has been added to the acres necessary to mitigate effects to Swale.

The Conservation Strategy that would be implemented under the Proposed Action/Proposed Project Alternative would result in the acres of modeled habitat preserved and re-established/established for vernal pool invertebrates and plants shown in Table 9-23.

The modeled habitat re-established/established under the Proposed Action/Proposed Project Alterative for pincushion navarretia (approximately 141 acres) and legenere (approximately 130

acres) is smaller than under the No Action/No Project Alternative (approximately 204 acres and 262 acres respectively), although the acres preserved under the Proposed Action/Proposed Project are larger for both species.

For all other vernal pool invertebrates and plants covered by the SSHCP, the acres preserved and acres re-established/established under the Proposed Action/Proposed Project Alternative would exceed the acres preserved and acres re-established/established under the No Action/No Project Alternative.

The Conservation Strategy also includes Biological Goals and Measurable Objectives that would direct the modeled habitat preservation associated with Covered Activities for vernal pool invertebrates and plants within the Planning Area. These biological objectives would include maintenance or improvement of habitat value for vernal pool invertebrates and plants by minimizing indirect effects on modeled habitat within preserves (e.g., development of Preserve management plans and requirements for developments to include setback widths to limit edge effects). The No Action/No Project Alternative would preserve and re-establish/establish vernal pool invertebrate and plant habitat listed in Table 9-4; however, this habitat preservation would not be in an as effectively linked Preserve System, nor would it follow the objectives of the Conservation Strategy as would be implemented under the Proposed Action/Proposed Project Alternative.

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would result in the loss of a smaller area of habitat for vernal pool invertebrate and plant species within the Planning Area when compared to the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve and re-establish/establish more habitat than what is estimated for the No Action/No Project Alternative. The Proposed Action/Proposed Project would also impact a smaller area within the MCRA, compared to the No Action/No Project Alternative, and an equal area within the C/RS, although preservation within the MCRA would also be less than the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative would impact a smaller area of Critical Habitat for vernal pool tadpole shrimp, vernal pool fairy shrimp, slender Orcutt grass, and Sacramento Orcutt grass than the No Action/ No Project Alternative.

The Proposed Action/Project Preserve System would provide some larger vernal pool ecosystem preserves, and increased Preserve connectivity, over the project-by-project mitigation under the No Action/No Project Alternative, maintaining existing vernal pool ecosystem function, which benefits vernal pool invertebrate and plant species.

Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would result in the avoidance or minimization of indirect and temporary effects on vernal pool invertebrate and plant modeled habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative's impact to 11 vernal pool invertebrate and plant species is a ***Significant Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/ No Project baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of a smaller area of habitat for vernal pool invertebrate and plant species within the Planning Area when compared to the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of vernal pool invertebrate and plant species and would preserve additional acres of modeled habitat that exceed the preservation under the No Action/No Project Alternative within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Proposed Action/Proposed Project Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to vernal pool invertebrate and plant species and be operated under a comprehensive preserve management program.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for 11 vernal pool invertebrates and plant species than would occur under the No Action/No Project Alternative. However, at the scale of vernal pool invertebrate and plant species impacts

throughout the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to these species. The Proposed Action/Proposed Project Alternative would result in ***No Cumulative Effect*** to these 11 vernal pool invertebrate and plant species compared to the No Action/No Project Alternative baseline condition.

9.2.3.2 Effects on Valley Elderberry Longhorn Beetle and Its Habitat

The description of valley elderberry longhorn beetle along with modeled species habitat and documented occurrences within the Planning Area can be found in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of species modeled habitats for valley elderberry longhorn beetle is approximately 591 acres, primarily within the UDA due to the intersection of urban development and modeled habitat in this area. This would result in the loss of approximately 7.5% of the existing habitat within the Planning Area (Table 9-24). This would be greater than the anticipated 554 acres removed by activities under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is expected to remove one of the existing 156 occurrences of valley elderberry longhorn beetle in the Planning Area, whereas no occurrences would be removed under the No Action/No Project Alternative.

Table 9-24. Direct Effects and Modeled Habitat Conservation for Valley Elderberry Longhorn Beetle Under the Proposed Action/Proposed Project Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing Modeled Habitat*	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Mine Tailing Riparian Woodland	641	218	34%	218	218*
Mixed Riparian Woodland	5,785	184	3.2%	368	184
Mixed Riparian Scrub	1,452	189	13.0%	378	189
Total Modeled Habitat	**7,878**	**591**	**7.5%**	**1,170**	**591**

* All of the required mitigation acreage to offset losses of Mine Tailing Riparian Woodlands would occur within either Mixed Riparian Scrub or Mixed Riparian Woodland (Table 2-7).

Indirect impacts to valley elderberry longhorn beetle would also occur from the environmental stressors that result from the Proposed Action/Proposed Project Alternative. The indirect effects of these environmental stressors on valley elderberry longhorn beetle are described and

analyzed qualitatively in the valley elderberry longhorn beetle impact discussion for the No Action/No Project Alternative in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires Covered Activities to implement the following AMMs that are relative to valley elderberry longhorn beetle habitat; LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3 (Roadside Pesticide Use), STREAM-1 (Laguna Creek Wildlife Corridor), STREAM-2 (UDA Stream Setbacks), STREAM-3 (Minor Tributaries to UDA Streams), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), and NATURE TRAIL-5 (Monitoring of Trail Impacts) (Table 2-6). Relative to the project avoidance and minimization measures of the No Action/Project Alternative, these SSHCP AMMs would further avoid and minimize indirect impacts on valley elderberry longhorn beetle. For example, STREAM-1 though STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled habitat.

There are no species AMMs for valley elderberry longhorn beetle; however, AMMs required of Covered Activities would avoid or minimize temporary direct effects on valley elderberry longhorn beetle and modeled habitat. For example, STREAM-1 through STREAM-3 would require greater setbacks than under the No/Action Alternative thereby increasing protection of riparian modeled habitat, and reducing temporary effects under the Proposed Action/Proposed Project Alternative to be less than under the No Action/No Project.

The Proposed Action/Proposed Project Alternative would include the re-establishment/ establishment of approximately 591 acres of modeled habitat for valley elderberry longhorn beetle (Table 9-24), which would equal the loss under the alternative. This is approximately 37 acres more re-establishment/establishment than would be expected under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative would also preserve approximately 1,170 acres within the Preserve System, while no modeled habitat preservation is anticipated under the No Action/No Project Alternative. The Conservation Strategy also provides two specific objectives for valley elderberry longhorn beetle: the relocation and replacement of damaged or lost elderberry shrubs, and the inclusion of elderberry shrubs in general riparian re-establishment/establishment projects. These objectives would mitigate impacts to individual elderberry shrubs on which this species depends.

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would directly impact approximately 38 acres more modeled habitat for valley elderberry longhorn beetle within the Planning Area than would the No Action/No Project Alternative. Both alternatives would achieve no net loss of acreage of modeled habitat through mitigation; however, the Proposed Action/Proposed Project Alternative would preserve considerably more habitat (approximately 1,170 acres) than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would result in avoidance of indirect and temporary effects on valley elderberry longhorn beetle individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

The Proposed Action/Proposed Project Alternative's impact would be similar to that of the No Action/No Project Alternative but would provide more benefit to the species when considering the additional 1,170 acres of habitat preserved. Therefore, based on the significance criteria in Section 9.2.1, there would be a ***Minor Beneficial*** effect on valley elderberry longhorn beetle when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of 591 acres of modeled valley elderberry longhorn beetle habitat within the Planning Area, which is 38 acres greater than the loss than under the No Action/No Project Alternative. However, as discussed previously, both alternatives are anticipated to mitigate these losses to a no net loss of acreage. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of valley elderberry longhorn beetle and would preserve additional acres of valley elderberry longhorn beetle habitat that exceed the preservation under the No Action/No Project Alternative by 1,170 acres within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous

and more connected preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual preserves in the Preserve System under the Proposed Action/Proposed Project Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to valley elderberry longhorn beetle and be operated under a comprehensive preserve management program.

The incremental effects of the Proposed Action/Proposed Project Alternative would not be significantly different than the incremental effects that would be occur under the No Action/No Project Alternative for valley elderberry longhorn beetle. The Proposed Action/Proposed Project Alternative would result in a ***No Cumulative Effect*** to valley elderberry longhorn beetle compared to the No Action/No Project Alternative baseline condition.

9.2.3.3 Effects on California Tiger Salamander (Central Valley Population) and Its Habitat

The life history, habitat requirements, known occurrences, and existing acres of modeled California tiger salamander (Central Valley population) habitat in the Planning Area are described in detail in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated direct loss of species modeled habitats for California tiger salamander is approximately 1,677 acres of upland habitat and approximately 80 acres of aquatic breeding habitat for the species (Table 9-25). These losses would be 2.0% of the existing modeled upland and 1.8% of the existing modeled aquatic habitat in the Planning Area. Impacts to upland habitat acres are approximately 95 acres less, while impacts to aquatic habitat are approximately 5 acres more than the acres of expected direct impact from the No Action/No Project Alternative of approximately 1,772 acres of upland and approximately 75 acres of aquatic habitat (Table 9-6). This may be due to the majority of California tiger salamander habitat occurring within the UDA in Galt and outside of the UDA in locations where the anticipated development under the two alternatives are very similar in size and scope.

The Proposed Action/Proposed Project Alternative is not expected to remove any of the existing 31 occurrences of California tiger salamanders in the Planning Area; there would also be no occurrences removed under the No Action/No Project Alternative.

Table 9-25. Direct Effects and Conservation of California Tiger Salamander Modeled Habitat Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing	*Direct Effect*	*Indirect Effect*	*Total Effect*	*% of Existing Modeled Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Upland Habitat							
Blue Oak Savanna	3,322	0	Qualitative	0	0.0%	33	0
Blue Oak Woodland	3,774	0	Qualitative	0	0.0%	0	0
Valley Grassland	78,274	1,677	Qualitative	1,677	2.1%	16,144	0
Total Upland Habitat	*85,369*	*1,677*	*Qualitative*	*1,677*	*2.0%*	*16,177*	*0*
Aquatic Habitat							
Vernal Pool	3,033	57	2	59	1.9%	762	58
Seasonal Wetland	1,391	21	Qualitative	21	1.5%	105	21
Total Aquatic Habitat	*4,425*	*79*	*2*	*80*	*1.8%*	*867*	*79*
Total Modeled Habitat	**89,794**	**1,756**	**2**	**1,757**	**2.0%**	**17,062**	**79**

The loss of modeled habitat within the C/RS would be approximately 52 acres, including 46 acres of upland habitat and 6 acres of aquatic habitat. This loss of modeled habitat is approximately equal to the estimated 60 acres of habitat loss within the C/RS under the No Action/No Project Alternative.

None of the 10,193 acres of Critical Habitat for the species in the Planning Area would be lost under the Proposed Action/Proposed Project Alternative. As discussed in Section 9.2.3, the No Action/No project Alternative also would not remove designated Critical Habitat for California tiger salamander.

Indirect effects on modeled California tiger salamander habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects would be the same in type and character as those discussed and analyzed qualitatively for the No Action/No Project in Section 9.2.2. The total quantified indirect effects under the Proposed Action/Proposed Project Alternative would be approximately 4 acres. This would be approximately equal to the quantified indirect impact of 4acres under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs by Covered Activities that are relative to California tiger salamander; LID-1 (Stormwater Quality), LID-3(Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside

Preserves),EDGE-5 Stormwater Control in Preserve Setbacks), EDGE-7 (Hardpan/Duripan Protection), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design) NATURE TRAIL-5 (Monitoring of Trail Impacts), ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3(Roadside Pesticide Use), RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool), RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank), UTILITY-2 (Utility Maintenance), UTILITY-3 (Trenchless Construction Methods), UTILITY-4 (Siting of Entry and Exit Location), and CTS-7 (Rodent control) (Table 2-6). Relative to the project avoidance and minimization measures of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on California tiger salamander. For example, ROAD-2 would require wildlife crossing structures and maintain connectivity between modeled habitats, while CTS-7 would limit rodent control to developed portions of project sites allowing for burrow creation that provides habitat for California tiger salamander. While both of these AMMs may be applied to projects under the No Action/No Project Alternative, they would likely be applied less frequently and not within all modeled habitat.

There are general AMMs that would avoid or minimize temporary effects to California tiger salamander, and species-specific AMMs that would further avoid or minimize temporary impacts on this species: CTS-1(California Tiger Salamander Daily Construction Schedule), CTS-2 (California Tiger Salamander Monitoring), CTS-3 (California Tiger Salamander Exclusion Fencing), CTS-4 (trench protection), CTS-5 (Encounter Protocol), and CTS-6 (erosion control materials) (Table 2-6). Temporary effects under the Proposed Action/Proposed Project Alternative are expected to be less than under the No Action/No Project Alternative as discussed at the beginning of Section 9.2.3.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 17,062 acres of modeled habitat for California tiger salamander. This is greater than the estimated 9,689 acres of modeled habitat preservation under the No Action/No Project Alternative. Of this preserved habitat, approximately 14,435 acres of upland habitat and approximately 752 acres of aquatic habitat are located within the C/RS.

The Conservation Strategy also includes the re-establishment/establishment of approximately 79 acres of modeled California tiger salamander aquatic habitat, which would be fewer acres of re-establishment/establishment than the approximately 117 acres estimated for the No Action/No Project Alternative.

The Conservation Strategy includes the implementation of biological objectives related to California tiger salamander habitat and the species itself within the Planning Area. In addition to the preservation and re-establishment of habitat, the Conservation Strategy would

implement biological objectives related to California tiger salamander that would guide the modeled habitat preservation of habitat for the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 90 fewer acres of habitat for California tiger salamander within the Planning Area than are estimated for the No Action/No Project Alternative, as well as slightly fewer acres in the C/RS. In addition, the Proposed Action/Proposed Project Alternative would preserve considerably more habitat than what is estimated for the No Action/No Project Alternative overall, as well as within the C/RS. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on California tiger salamander individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on California tiger salamander when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative described in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 1,757 acres of modeled California tiger salamander habitat within the Planning Area, which is approximately 90 acres less than the loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as limitations on rodent control, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of California tiger salamander and would preserve additional acres

of California tiger salamander habitat that exceed the preservation under the No Action/No Project Alternative by approximately 7,373 acres within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area on California tiger salamander than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse impacts on this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect on California tiger salamander compared to the No Action/No Project Alternative baseline condition.

9.2.3.4 Effects on Western Spadefoot and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of western spadefoot in the Planning Area are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitats for western spadefoot is approximately 22,043 acres of upland habitat and approximately 1,022 acres of aquatic breeding habitat for the species (Table 9-26). These habitat losses would equal approximately 14.7% of the upland and 7.6% of aquatic habitat for western spadefoot in the Planning Area. This loss is less than the estimated 1,036 acres of aquatic habitat loss and less than the estimated 23,550 acres of upland habitat loss under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is expected to remove 4 of the existing 41 occurrences of western spadefoot in the Planning Area, which would be 3 fewer occurrences than would be removed under the No Action/No Project Alternative.

Table 9-26. Direct Effects and Modeled Habitat Conservation for Western Spadefoot Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing	*Direct Effect*	*Indirect Effect*	*Total Habitat Lost*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Upland Habitat							
Blue Oak Savanna	5,637.	38	Qualitative	38	0.7%	38	38
Blue Oak Woodland	9,132	9	Qualitative	9	0.1%	9	9
Valley Grassland	135,094	21,996	Qualitative	21,996	16.3%	22,014	0
Total Upland Habitat	*149,863*	*22,043*	*Qualitative*	*22,043*	*14.7%*	*22,061*	*47*
Aquatic Habitat							
Vernal Pool	4,536	389	94.28	483	8.6%	966	389
Swale	1,252	234	43.69	278	18.7%	278	256*
Seasonal Wetland	2,600	105	Qualitative	105	4.0%	105	105
Open Water	2,344	155	Qualitative	155	6.6%	155	155**
Stream/Creek	2,674	117	Qualitative	117	4.4%	117	117
Stream/Creek (VPIH)	73	22	3.57	26	30.1%	26	0*
Total Aquatic Habitat	*13,479*	*1,022*	*141.54*	*1,164*	*7.6%*	*1,647*	*1,022*
Total Modeled Habitat	**163,342**	**23,065**	**141.54**	**23,207**	**14.1%**	**23,708**	**1,069**

* Under SSHCP Objective VP5, re-establishment/establishment to mitigate effects to Stream/Creek (VPIH) will be in the form of Swale, which has been added to the acres necessary to mitigate effects to Swale.

** Acres of Open Water Habitat re-established/established will occur as either Freshwater Marsh or Seasonal Wetland

Indirect effects on modeled western spadefoot habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs by Covered Activities that are relative to western spadefoot: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-7 (Hardpan/Duripan Protection), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), NATURE TRAIL-1(Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design) NATURE TRAIL-5 (Monitoring of Trail Impacts),

ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3 (Roadside Pesticide Use), RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool), RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank), UTILITY-2 (Utility Maintenance), UTILITY-3 (Trenchless Construction Methods), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project avoidance and minimization measures of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on western spadefoot. For example, ROAD-2 would require wildlife crossing structures and maintain connectivity between modeled habitats, and EDGE-4 would require that stormwater runoff be directed away from Preserves which would limit exposure of western spadefoot within Preserves to urban runoff that may contain pesticides and petroleum products. While both of these AMMs may be applied to projects under the No Action/No Project Alternative, they would likely be applied less frequently.

There are general construction AMMs that would be required of Covered Activities that would avoid or minimize temporary effects to western spadefoot (Table 2.6), along with species-specific AMMs that would further avoid or minimize temporary impacts on this species: WS-1 (Western Spadefoot Design Surveys), WS-2 (Western Spadefoot Work Window), WS-3 (Western Spadefoot Monitoring), WS-4 (Trench Protection), WS-5 (Erosion Control Materials), and WS-6 (Encounter Protocol) (Table 2-5). These construction and species-specific AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary effects under the Proposed Action/Proposed Project Alternative on western spadefoot are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 23,708 acres of modeled habitat for western spadefoot. This modeled habitat preservation would be more than the 13,600 acres of western spadefoot modeled habitat estimated to be conserved under the No Action/No Project Alternative. This acreage preserved under the No Action/No Project Alternative would not be part of an organized Preserve System.

The Conservation Strategy would also establish/re-establish approximately 47 acres of upland habitat and 1,022 acres of aquatic habitat for western spadefoot. The Conservation Strategy would implement biological objectives that support modeled habitat conservation for the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed above, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

The Proposed Action/Proposed Project Alternative is also estimated to preserve 5,176 acres of upland habitat and 520 acres of aquatic habitat located within the MCRA, and approximately

14,436 acres of upland habitat and 1,013 acres of aquatic habitat located within the C/RS for western spadefoot.

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would directly and indirectly adversely affect approximately 1,640 fewer acres of habitat for western spadefoot within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Proposed Action/Proposed Project Alternative would preserve approximately 10,108 more acres of modeled habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would result in reduce avoid or minimized indirect and temporary effects on western spadefoot individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on western spadefoot when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative in Section 9.2.2.

The Proposed Action/Proposed Project Alternative would result in the loss of 23,065 acres of modeled western spadefoot habitat within the Planning Area, which is 1,379 acres less than the loss than under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as limitations on stormwater runoff to Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of western spadefoot. Although the Conservation Strategy would preserve 10,108 more acres of western spadefoot habitat than under the No Action/No Project Alternative, those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for western spadefoot than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect to the western spadefoot compared to the No Action/No Project Alternative baseline condition.

9.2.3.5 Effects on Giant Garter Snake and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat for giant garter snake in the Planning Area are described in detail in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for giant garter snake under the Proposed Action/Proposed Project Alternative total approximately 2,358 acres, including approximately 2,189 acres of upland habitat and 169 acres of aquatic habitat for the species (Table 9-27). These would equal the loss of approximately 7.9% of the upland and 2.3% of aquatic habitat in the Planning Area. The loss of modeled habitat under the Proposed Action/Proposed Project Alternative is less than the approximately 2,501 acres lost under the No Action/No Project Alternative.

Table 9-27. Direct Effects and Modeled Habitat Conservation for Giant Garter Snake Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Upland Habitat					
Mixed Riparian Scrub	1,044	135	12.9%	105	134
Valley Grassland	26,825	2,054	7.7%	5,013	0
Total Upland Habitat	*27,869*	*2,189*	*7.9%*	*5,118*	*134*
Aquatic Habitat					
Seasonal Wetland	1,625	39	2.4%	100	39
Freshwater Marsh	2,589	71	2.7%	127	71
Open Water	1,282	25	2.0%	62	25*
Stream/Creek	1,794	34	1.9%	117	34
Total Aquatic Habitat	*7,290*	*169*	*2.3%*	*406*	*169*
Total Modeled Habitat	**35,159**	**2,358**	**6.7%**	**5,524**	**303**

* Acres of Open Water habitat re-establishment/establishment will occur as a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of open water, as determined by the Technical Advisory Committee (TAC).

The Proposed Action/Proposed Project Alternative is not expected to remove any of the existing 14 occurrences of giant garter snakes in the Planning Area; there would also be no occurrences removed under the No Action/No Project Alternative.

Indirect effects to giant garter snake and its habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs by Covered Activities that are relative to giant garter snake: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 Stormwater Control in Preserve Setbacks), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design) NATURE TRAIL-5 (Monitoring of Trail Impacts), ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3 (Roadside Pesticide Use), STREAM-2 (UDA Stream Setbacks), STREAM-3 (Minor tributaries to UDA Streams), UTILITY-2 (Utility Maintenance), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project avoidance and minimization measures of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on giant garter snake. For example, STREAM-2 and STREAM-3 would increase setback distances on UDA streams and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled habitat.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative. These stressors and impacts would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). Covered activities would be required to implement general construction AMMs as well as species-specific AMMs that would avoid or minimize temporary effects to giant garter snake: GGS-1 (Giant Garter snake Design Surveys), GGS-2 (Giant Garter snake Work Window), GGS-3 (Giant Garter snake Monitoring), GGS-4 (Giant Garter snake Habitat Dewatering and Exclusion), GGS-5 (Trench Protection), GGS-6 (Erosion Control Materials), GGS-7 (Encounter Protocol), and GGS-8 (Giant Garter Snake Post-Construction Restoration) (Table 2-6). These construction and species-specific AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary effects under the Proposed Action/Proposed Project Alternative on giant garter snake are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 5,524 acres of giant garter snake modeled habitat, including approximately 5,118 acres of upland habitat and approximately 406 acres of aquatic habitat. This modeled habitat conservation would exceed the estimated total of approximately 3,253 acres of modeled upland and 24 acres of modeled aquatic habitat preservation under the No Action/No Project Alternative. The Conservation Strategy also would establish/re-establish a total of approximately 303 acres of giant garter snake upland and aquatic habitat, compared to 215 acres under the No Action/No Project Alternative, and would implement specific biological objectives for modeled habitat conservation of the species in the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed above, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would adversely affect approximately 143 fewer acres of modeled habitat for giant garter snake within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 2,247 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on giant garter snake individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on giant garter snake when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 2,358 acres of modeled giant garter snake habitat within the Planning Area, which is approximately 143 fewer acres than the loss than

under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy would also include Biological Goals and Measureable Objectives specific to the conservation of giant garter snake. In addition, the Conservation Strategy would preserve approximately 2,247 more acres of giant garter snake habitat than under the No Action/No Project Alternative, and those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for giant garter snake than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect to giant garter snake compared to the No Action/No Project Alternative baseline condition.

9.2.3.6 Effects on Western Pond Turtle and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of western pond turtle in the Planning Area are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for the western pond turtle is approximately 10,972 acres, including approximately 10,656 acres of upland habitat and approximately 316 acres of aquatic habitat (Table 9-28). This would equal approximately 9.6% of the upland and 5.0% of aquatic habitat for the species in the Planning Area. This is less than the expected loss under the No Action/No Project Alternative of approximately 12,160 acres, including approximately 11,783 of upland and approximately 377 acres of aquatic habitat.

The Proposed Action/Proposed Project Alternative is expected to remove 1 of the existing 19 occurrences of western pond turtle in the Planning Area, which would be the same number of occurrences as would be removed under the No Action/No Project Alternative.

Indirect effects to western pond turtle and its habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project in Section 9.2.2 above.

Table 9-28. Direct Effects and Modeled Habitat Conservation for Western Pond Turtle Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area(acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Upland Habitat					
Blue Oak Woodland	7,610	9	0.1%	0	9
Blue Oak Savanna	4,825	35	0.7%	34	35
Valley Grassland	91,580	10,256	11.2%	12,319	0
Mine Tailing Riparian Woodland	306	41	13.4%	37	41*
Mixed Riparian Woodland	5,347	170	3.2%	368	170
Mixed Riparian Scrub	1,178	145	12.3%	14	145
Total Upland Habitat	*110,846*	*10,656*	*9.6%*	*12,772*	*400*
Aquatic Habitat					
Freshwater Marsh	2,240	95	4.2%	127	95
Open Water	1,441	104	7.2%	86	104**
Stream/Creek	2,674	117	4.4%	117	117
Total Aquatic Habitat	*6,355*	*316*	*5.0%*	*330*	*316*
Total Modeled Habitat	**117,201**	**10,972**	**9.4%**	**13,102**	**716**

* Acres of Mine Tailing Riparian habitat re-establishment/establishment will occur as either Mixed Riparian Woodland and/or Mixed Riparian Scrub.

** Acres of Open Water habitat re-establishment/establishment will occur as a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of open water, as determined by the TAC.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs by Covered Activities that are relative to western pond turtle: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design) NATURE TRAIL-5 (Monitoring of Trail Impacts), ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3 (Roadside Pesticide Use), STREAM-1 (Laguna Creek Setback), STREAM-2 (UDA Stream Setbacks), STREAM-3 (Minor tributaries to UDA Streams) UTILITY-2 (Utility Maintenance), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project avoidance and minimization measures of the No Action/Project Alternative, these SSHCP AMMs would avoid and minimize indirect

impacts on western pond turtle. For example, STREAM-1, STREAM-2, and STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative. These stressors and impacts would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). Covered activities would be required to implement general construction AMMs, and species-specific AMMs that would avoid or minimize temporary effects to western pond turtle: WPT-1 (Western Pond Turtle Design Surveys), WPT-2 (Western Pond Turtle Work Window), WPT-3 (Western Pond Turtle Monitoring), WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion), WPT-5 (Trench Protection), WPT-6 (Erosion Control Materials) and WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit), WPT-8 (Western Pond Turtle Encounter Protocol), and WPT-9 (Post-Construction Restoration (Table 2-6). These construction and species-specific AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary effects under the Proposed Action/Proposed Project Alternative on western pond turtle are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 13,102 acres of habitat for western pond turtle, including approximately 12,772 acres of upland habitat and approximately 330 acres of aquatic habitat. This modeled habitat conservation would exceed the estimated 8,085 acres of western pond turtle habitat, including approximately 8,069 of upland and approximately 16 acres of aquatic habitat conserved under the No Action/No Project Alternative, which would be the result of project-by-project mitigation. In addition, the Conservation Strategy under the Proposed Action/Proposed Project would establish/re-establish approximately 716 acres of upland and aquatic habitat for western pond turtle, compared to approximately 577 acres under the No Action/No Project Alternative, and includes specific biological objectives for the conservation of the species in the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,188 fewer acres of habitat for western pond turtle within the Planning Area than is estimated for the No

Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 5,017 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on western pond turtle individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Beneficial*** effect on western pond turtle comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 10,972 acres of modeled western pond turtle habitat within the Planning Area, which is approximately 1,188 fewer acres than the loss than under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of western pond turtle. Although the Conservation Strategy would preserve approximately 5,017 more acres of western pond turtle habitat than under the No Action/No Project Alternative, those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for western pond turtle than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to

significant adverse cumulative impacts on this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect to western pond turtle compared to the No Action/No Project Alternative baseline condition.

9.2.3.7 Effects on Cooper's Hawk and Its Habitat

Appendix G describes the life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of Cooper's hawk in the Planning Area.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for Cooper's hawk is approximately 638 acres, including approximately 600 acres of nesting/foraging habitat (approximately 3.5% of existing), and approximately 38 acres of foraging habitat (approximately 0.7% of existing) (Table 9-29). These percentages do not take into account the use of developed areas for nesting by Cooper's hawk, which if taken into account would increase the percentage of remaining existing habitat. This is smaller than the estimated loss of 693 acres under the No Action/No Project Alternative. The difference in habitat loss between the two alternatives consists of additional impact to mixed riparian and mixed riparian nesting/foraging habitat under the Proposed Action/Proposed Project Alternative.

The Proposed Action/Proposed Project Alternative is expected to remove 4 of the existing 20 occurrences of Cooper's hawk in the Planning Area, which would be two more occurrences than would be removed under the No Action/No Project Alternative.

Table 9-29. Direct Effects and Modeled Habitat Conservation for Cooper's Hawk Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Nesting/Foraging Habitat					
Blue Oak Woodland	9,132	9	0.1%	0	9
Mixed Riparian Woodland	5,785	184	3.2%	368	184
Mixed Riparian Scrub	1,451	189	13.0%	378	189
Mine Tailing Riparian Woodland	641	218	34.0%	218	218*
Total Nesting/Foraging Habitat	*17,009*	*600*	*3.5%*	*964*	*600*
Foraging Habitat					
Blue Oak Savanna	5,637	38	0.7%	47	38
Total Foraging Habitat	*5,637*	*38*	*0.7%*	*47*	*38*
Total Modeled Habitat	**22,646**	**638**	**2.8%**	**1,011**	**638**

* Habitat Re-establishment/establishment for Mine Tailing Riparian Woodland can be either Mixed Riparian Woodland or Mixed Riparian Scrub.

Indirect impacts on Cooper's hawk modeled habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects and the environmental stressors that cause them are the same in type and character as those discussed and analyzed qualitatively for Cooper's hawk under the No Action/No Project Alternative (Section 9.2.2).

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to Cooper's hawk: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Stormwater Basins in Preserves), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), and UTILITY-1 (Avian Collision Avoidance). Relative to the project avoidance and minimization measures of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on Cooper's hawk. For example, STREAM-1, STREAM-2, and STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled nesting/foraging habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require general construction AMMs and AMMs specific to covered raptor species: RAPTOR-1 (Raptor Design Surveys), RAPTOR-2 (Raptor Pre-Construction Surveys), RAPTOR-3 (Raptor Nest/Roost Buffer), and RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring) (Table 2-6). These construction and raptor-specific AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on Cooper's hawk are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 1,011 acres of modeled Cooper's hawk habitat, including approximately 964 acres of nesting/foraging habitat and approximately 47 acres of foraging habitat. This modeled habitat preservation would exceed the estimated 70 acres of preservation under the No Action/No Project Alternative, which would occur as a result of project-by-project mitigation. The Conservation Strategy also would establish/re-establish a total of approximately 638 acres of habitat for Cooper's

hawk, as compared to approximately 623 acres under the No Action/No Project Alternative, and implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 55 fewer acres of habitat for Cooper's hawk within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve 924 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on Cooper's hawk individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on Cooper's hawk when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 638 acres of modeled Cooper's hawk habitat within the Planning Area, which is approximately 55 fewer acres than the loss than under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives that would benefit Cooper's hawk. In addition, the Conservation Strategy would preserve approximately 924 more acres of Cooper's hawk habitat than under the No Action/No Project Alternative, and

those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for Cooper's hawk than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Proposed Action/Proposed Project Alternative would result in ***No Cumulative Effect*** to Cooper's hawk compared to the No Action/No Project Alternative baseline condition.

9.2.3.8 Effects on Tricolored Blackbird and Its Habitat

The natural history, habitat use, and documented occurrences in the Planning Area for tricolored blackbird are given in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for tricolored blackbird is approximately 31,058 acres, including approximately 27,531 acres of nesting/foraging habitat (approximately 14.6% of existing), approximately 3,527 acres of foraging habitat (approximately 14.6% of existing) (Table 9-30). This is a smaller area than the estimated habitat loss under the No Action/No Project Alternative of 32,907 acres, including 29,389 acres of nesting/foraging and 3,518 acres of foraging habitat.

Table 9-30. Effects and Modeled Habitat Conservation for Tricolored Blackbird Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Nesting/Foraging Habitat					
Valley Grassland	135,112	22,014	16.3%	22,014	0
Cropland	47,905	5,285	11.0%	6,947	0
Seasonal Wetland	2,600	105	4.0%	105	105
Freshwater Marsh	2,922	127	4.3%	127	127
Total Nesting/Foraging Habitat	*188,539*	*27,531*	*14.6%*	*29,193*	*232*
Foraging Habitat					
Irrigated Pasture-Grassland	15,991	2,749	17.2%	2,749	0
Vernal Pool	4,536	389	8.6%	966	389
Swale	1,222	234	19.1%	278	234
Open Water	2,344	155	6.6%	155	155*
Total Foraging Habitat	*24,093*	*3,527*	*14.6%*	*4,148*	*778*
Total Modeled Habitat	**212,632**	**31,058**	**14.6%**	**33,341**	**1,010**

* Acres of Open Water habitat re-establishment/establishment will occur as a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of open water, as determined by the TAC.

Indirect impacts to tricolored blackbird modeled habitat would occur under the Proposed Action/Proposed Project Alternative, which would be the same type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to tricolored blackbird: LID-1(Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), BMP-2 (Erosion Control), BMP-9 (Soil Compaction), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), RE-ESTABLISHMENT/ ESTABLISHMENT-1 (Vernal Pool), UTILITY-1 (Avian Collision Avoidance), UTILITY-4 (Siting of Entry and Exit Location), and TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves) (Table 2-6). Relative to the project AMMs of the No Action/Project Alternative, these SSHCP AMMs would avoid and minimize indirect impacts on tricolored blackbird. For example, EDGE-4 would require that stormwater runoff be directed away from Preserves, which would

limit exposure of tricolor blackbird within Preserves to urban runoff that may contain pesticides and petroleum products. TCB-5 would restrict the use of pesticides on Preserves between January 1 and July 15, further reducing exposure of tricolored blackbird to pesticides. While these AMMs may be applied to projects under the No Action/No Project Alternative, they would likely be applied less frequently.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require general construction AMMs and species-specific AMMs: TCB-1 (Tricolored Blackbird Design Surveys), TCB-2 (Tricolored Blackbird Pre-Construction Surveys), TCB-3 (Tricolored Blackbird Nest Buffer), and TCB-4 (Tricolored Blackbird Nest Buffer Monitoring) (Table 2-6). These construction and raptor-specific AMMs may also be applied under the No Action/No Project Alternative. However, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on tricolored blackbird are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 33,341 acres of habitat for tricolored blackbird, including approximately 29,193 acres of nesting/foraging habitat and approximately 4,148 acres of foraging habitat. This modeled habitat conservation would be greater than the estimated 21,148 acres under the No Action/No Project Alternative, which would occur as a result of project-by-project mitigation. The Conservation Strategy also would establish/re-establish a total of approximately 1,010 acres of habitat for tricolored blackbird and implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously, and objectives to maintain or improve habitat value and preserve high-quality habitat (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,849 fewer acres of habitat for tricolored blackbird within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 12,193 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize

indirect and temporary effects on tricolored blackbird individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on tricolored blackbird when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 31,058 acres of modeled tricolored blackbird habitat within the Planning Area, which is approximately 1,849 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as limitations on stormwater runoff, to Preserves that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of tricolored blackbird. In addition, the Conservation Strategy would preserve approximately 12,193 more acres of tricolored blackbird habitat than under the No Action/No Project Alternative, those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for tricolored blackbird than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Significant Beneficial Cumulative Effect*** for tricolored blackbird compared to the No Action/No Project Alternative baseline condition.

9.2.3.9 Effects on Western Burrowing Owl and Its Habitat

Habitat use, natural history, and occurrence within the Planning Area for western burrowing owl are found in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat under the Proposed Action/Proposed Project is approximately 30,836 acres (14.7% of existing) (Table 9-31). This is smaller than the estimated modeled habitat loss under the No Action/No Project Alternative of 32,711 acres.

The Proposed Action/Proposed Project Alternative is expected to remove 19 of the existing 97 occurrences of western burrowing owls in the Planning Area, which would be 9 more occurrences than would be removed under the No Action/No Project Alternative.

Table 9-31. Direct Effects and Modeled Habitat Conservation for Western Burrowing Owl Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Wintering Habitat					
Vernal Pool	4,536	389	8.6%	966	389
Seasonal Wetland	2,600	105	4.0%	105	105
Swale	1,252	234	18.7%	278	256
Stream/Creek (VPIH)	73	22	30.1%	26	0
Total Wintering Habitat	*8,461*	*750*	*8.9%*	*1,375*	*750*
Nesting/Foraging Habitat					
Cropland	47,905	5,285	11.0%	6,947	0
Irrigated Pasture-Grassland	15,991	2,749	17.2%	2,749	0
Valley Grassland	135,112	22,014	16.3%	22,014	0
Blue Oak Savanna	5,637	38	0.7%	47	38
Total Nesting/Foraging Habitat	*204,645*	*30,086*	*14.7%*	*31,757*	*38*
Total Modeled Habitat	**213,106**	**30,836**	**—**	**33,132**	**788**

Indirect impacts on western burrowing owl modeled habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects and the environmental stressors that cause them are the same in type and character as those discussed and analyzed qualitatively for western burrowing owl under the No Action/No Project Alternative (Section 9.2.2).

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant western burrowing owl: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Stormwater Basins in Preserves), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), RE-ESTABLISHMENT/ ESTABLISHMENT-1 (Vernal Pool), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), and UTILITY-1 (Avian Collision Avoidance) (Table 2-6). Relative to the project AMMs of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on western burrowing owl. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled burrowing owl habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require general construction AMMs, and AMMs specific to western burrowing owl that would also be required: WBO-1 (Burrowing Owl Design Surveys), WBO-2 (Burrowing Owl Pre-Construction Survey), WBO-3 (Burrowing Owl Avoidance), WBO-4 (Burrowing Owl Construction Monitoring), WBO-5 (Burrowing Owl Passive Relocation), and WBO-6 (Burrowing Owl Timing of Maintenance) (Table 2-6). These construction and species-specific AMMs may also be applied under the No Action/No Project Alternative. However, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on western burrowing owl are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include a total of approximately 33,132 acres of modeled habitat for western burrowing owl. This modeled habitat preservation would exceed the approximately 21,188 acres estimated under the No Action/No Project Alternative. The Conservation Strategy would also establish/re-establish a total of approximately 788 acres of habitat for western burrowing owl, and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed

previously, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for P Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,875 fewer acres of modeled habitat for western burrowing owl within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 11,944 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on western burrowing owl individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on western burrowing owl when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 30,836 acres of modeled western burrowing owl habitat within the Planning Area, which is approximately 1,875 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of western burrowing owl. In addition, the Conservation Strategy would preserve approximately 11,944 more acres of western burrowing owl habitat than under the No Action/No Project Alternative, and those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would

result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for western burrowing owl than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for western burrowing owl compared to the No Action/No Project Alternative baseline condition.

9.2.3.10 Effects on Ferruginous Hawk and Its Habitat

The life history, suitable habitat, and documented occurrences in the Planning Area of ferruginous hawk are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for ferruginous hawk under the Proposed Action/Proposed Project is approximately 25,491 acres of foraging habitat (16% of existing) (Table 9-32). This is less than the expected loss under the No Action/No Project Alternative of approximately 26,887 acres.

The Proposed Action/Proposed Project Alternative is expected to remove 1 of the existing 26 occurrences of ferruginous hawk in the Planning Area, whereas no occurrences would be removed under the No Action/No Project Alternative.

Table 9-32. Direct Effects and Modeled Habitat Conservation for Ferruginous Hawk Under the Proposed Action/Proposed Project Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing*	*Direct Effect*	*% of Existing Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Foraging Habitat					
Valley Grassland	135,112	22,014	16.3%	22,014	0
Irrigated Pasture-Grassland	15,991	2,749	17.2%	2,749	0
Seasonal Wetland	2,600	105	4.0%	105	105
Vernal Pool	4,536	389	8.6%	966	389
Swale	1,252	234	18.7%	278	234
Total Modeled Habitat	**159,491**	**25,491**	**16.0%**	**26,112**	**728**

Indirect impacts on modeled foraging habitat for ferruginous hawk would also occur under the Proposed Action/Proposed Project Alternative. These indirect impacts and the stressors that cause them are the same type and character as the impacts and stressors discussed and analyzed qualitatively in the species impact discussion in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs by Covered Activities that are relevant to ferruginous hawk: LID-1 (Stormwater Quality) LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Detention Basins in Linkage Preserves), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), RE-ESTABLISHMENT/ ESTABLISHMENT-1 (Vernal Pool), UTILITY-1 (Avian Collision Avoidance), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project AMMs of the No Action/Project Alternative, these SSHCP AMMs would avoid and minimize indirect impacts on ferruginous hawk. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled ferruginous hawk foraging habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require general construction AMMs (Table 2.6). These construction AMMs may also be applied under the No Action/No Project Alternative. However, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on ferruginous hawk are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 26,112 acres of habitat for ferruginous hawk. This modeled habitat conservation would be greater than the approximately 15,942 acres estimated under the No Action/No Project Alternative, which would be the result of project-by-project mitigation. The Conservation Strategy would also establish/re-establish a total of approximately 728 acres of habitat for ferruginous hawk, and would also implement biological objectives to conserve the

species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,396 fewer acres of habitat for ferruginous hawk within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Proposed Action/Proposed Project Alternative would preserve 10,168 more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on ferruginous hawk individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on ferruginous hawk when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 25,491 acres of modeled ferruginous hawk habitat within the Planning Area, which is approximately 1,396 acres less than the loss than under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as Preserve Setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of ferruginous hawk and would preserve additional acres of ferruginous hawk habitat that would be approximately 10,168 acres greater than the preservation under the No Action/No Project Alternative. Additionally, the preservation under the Proposed Action/Proposed Project Alternative would be within a systematic, coordinated

Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Proposed Action/Proposed Project Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to ferruginous hawk and be operated under a comprehensive preserve management program.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for ferruginous hawk than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for ferruginous hawk compared to the No Action/No Project Alternative baseline condition.

9.2.3.11 Effects on Swainson's Hawk and Its Habitat

The life history, suitable habitat, and documented occurrences in the Planning Area of Swainson's hawk are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of Swainson's hawk modeled habitat under the Proposed Action/Proposed Project would be approximately 31,112 acres; including 373 acres of nesting habitat (approximately 5.2% of existing) and 30,739 acres of foraging habitat (approximately 14.9% of existing) (Table 9-33). This is less than the estimated loss under the No Action/No Project Alternative totaling approximately 32,888 acres, including 336 acres of nesting and 32,552 acres of foraging habitat.

The Proposed Action/Proposed Project Alternative is expected to remove 53 of the existing 410 occurrences of Swainson's hawk in the Planning Area, which would be 13 more occurrences than would be removed under the No Action/No Project Alternative.

Indirect reductions in habitat quality for Swainson's hawk would also occur under the Proposed Action/Proposed Project Alternative. These indirect impacts and the stressors that cause them are the same type and character as the impacts and stressors discussed and analyzed qualitatively in the species impact discussion in Section 9.2.2.

Table 9-33. Direct Effects and Modeled Habitat Conservation for Swainson's Hawk Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Nesting Habitat					
Mixed Riparian Woodland	5,785	184	3.2%	368	184
Mixed Riparian Scrub	1,449	189	13.0%	378	189
Total Nesting Habitat	*7,234*	*373*	*5.2%*	*746*	*373*
Foraging Habitat					
Valley Grassland	133,705	21,977	16.4%	22,014	0
Cropland	47,905	5,285	11.0%	6,947	0
Irrigated Pasture-Grassland	15,991	2,749	17.2%	2,749	0
Vernal Pool	4,536	389	8.6%	966	389
Seasonal Wetland	2,600	105	4.0%	105	105
Swale	1,252	234	18.7%	278	234
Total Foraging Habitat	*205,989*	*30,739*	*14.9%*	*33,059*	*728*
Total Modeled Habitat	**213,223**	**31,112**	**14.6%**	**33,805**	**1,101**

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs; LID-1 (Stormwater Quality) LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Detention Basins in Linkage Preserves), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool), and UTILITY-1 (Avian Collision Avoidance) (Table 2-6). For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled Swainson's hawk habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require the application of general construction and species-specific AMMs: SWHA-1 (Swainson's Hawk

Design Surveys), SWHA-2 (Swainson's Hawk Pre-Construction), SWHA-3 (Swainson's Hawk Nest Buffer), and SWHA-4 (Swainson's Hawk Nest Buffer Monitoring) (Table 2-6). These construction and Swainson's hawk AMMs may also be applied under the No Action/No Project Alternative. However, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on Swainson's hawk are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include a total of approximately 33,805 acres of habitat for Swainson's hawk, including approximately 746 acres of nesting and 33,059 acres of foraging habitat. This modeled habitat preservation would exceed the estimated 21,061 acres of conservation under the No Action/No Project Alternative that would result from project-by-project mitigation. The Conservation Strategy would also establish/re-establish approximately 373 acres of nesting and 728 acres of foraging habitat, and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,776 fewer acres of habitat for Swainson's hawk within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 12,744 more acres of modeled habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on Swainson's hawk individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on Swainson's hawk when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 31,112 acres of modeled Swainson's hawk habitat within the Planning Area, which is approximately 1,776 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of Swainson's hawk. In addition, the Conservation Strategy would preserve approximately 12,744 more acres of Swainson's hawk habitat than under the No Action/No Project Alternative, those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for Swainson's hawk than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for Swainson's hawk compared to the No Action/No Project Alternative baseline condition.

9.2.3.12 Effects on Northern Harrier and Its Habitat

The life history, suitable habitat, and documented occurrences in the Planning Area of northern harrier are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for northern harrier under the Proposed Action/Proposed Project would be approximately 30,903 acres, including approximately 30,048 acres of nesting/foraging habitat (approximately 15.1% of existing) and approximately 855 acres of foraging habitat (approximately 7.6% of existing) (Table 9-34). This is greater than the

estimated total loss of 32,734 acres of northern harrier habitat, including 31,913 acres of nesting/foraging and 821 acres of foraging habitat under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is expected to remove 8 of the existing 70 occurrences of northern harrier in the Planning Area, which would be 3 more occurrences than would be removed under the No Action/No Project Alternative.

Table 9-34. Direct Effects and Modeled Habitat Conservation for Northern Harrier Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Nesting/Foraging Habitat					
Valley Grassland	135,112	22,014	16.3%	22,014	0
Cropland	47,905	5,285	11.0%	6,947	0
Irrigated Pasture-Grassland	15,991	2,749	17.2%	2,749	0
Total Nesting/Foraging Habitat	*199,008*	*30,048*	*15.1%*	*31,710*	*0*
Foraging Habitat					
Vernal Pool	4,536	389	8.6%	966	389
Seasonal Wetland	2,600	105	4.0%	105	105
Freshwater Marsh	2,922	127	4.3%	127	127
Swale	1,252	234	18.7%	278	234
Total Foraging Habitat	*11,310*	*855*	*7.6%*	*1,476*	*855*
Total Modeled Habitat	**210,318**	**30,903**	**14.7%**	**33,186**	**855**

Indirect impacts on northern harrier modeled habitat and individuals would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects and the environmental stressors that cause them are the same in type and character as those discussed and analyzed qualitatively for northern harrier under the No Action/No Project Alternative (Section 9.2.2).

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to northern harrier: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Stormwater Basins in Preserves), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), and UTILITY-1 (Avian Collision Avoidance) (Table 2-6). Relative to the project AMMs of the No Action/Project

alternative, these SSHCP AMMs would avoid and minimize indirect impacts on northern harrier. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled northern harrier habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require general construction AMMs and AMMs specific to covered raptor species: RAPTOR-1 (Raptor Design Surveys), RAPTOR-2 (Raptor Pre-Construction Surveys), RAPTOR-3 (Raptor Nest/Roost Buffer), and RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring) (Table 2-6). These construction and raptor-specific AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on northern harrier are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include a total of approximately 33,186 acres of habitat for northern harrier, including 31,710 acres of nesting/foraging and 1,476 acres of foraging habitat. This modeled habitat preservation would exceed the estimated 21,077 acres of modeled habitat preservation under the No Action/No Project Alternative, which would be the result of project-by-project mitigation. The Conservation Strategy would also establish/re-establish approximately 855 acres of foraging habitat for northern harrier and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,831 fewer acres of habitat for northern harrier within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 12,109 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on northern harrier individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided above, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on northern harrier when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 30,903 acres of modeled northern harrier habitat within the Planning Area, which is approximately 1,831 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of northern harrier. In addition, the Conservation Strategy would preserve approximately 12,109 more acres of northern harrier habitat than under the No Action/No Project Alternative, those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for northern harrier than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for northern harrier compared to the No Action/No Project Alternative baseline condition.

9.2.3.13 Effects on White-Tailed Kite and Its Habitat

The life history, suitable habitat, and documented occurrences in the Planning Area of white-tailed kite are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated total loss of white-tailed kite modeled habitat under the Proposed Action/Proposed Project would be approximately 31,319 acres, including approximately 376 acres of nesting habitat (approximately 2.4% of existing), approximately 189 acres of nesting/foraging habitat (approximately 13.0% of existing), and approximately 30,754 acres of foraging habitat (approximately 14.4% of existing) (Table 9-35). This would be less than the estimated total loss under the No Action/No Project Alternative of approximately 33,284 acres, including 419 acres of nesting, 189 acres of nesting/foraging, and 32,676 acres of foraging habitat.

The Proposed Action/Proposed Project Alternative is expected to remove 12 of the existing 62 occurrences of white-tailed kite in the Planning Area, which would be one more occurrence than would be removed under the No Action/No Project Alternative.

Table 9-35. Direct Effects and Modeled Habitat Conservation for White-Tailed Kite Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Nesting Habitat					
Blue Oak Woodland	9,132	9	0.1%	0	9
Mixed Riparian Woodland	5,785	149	2.6%	368	184
Mine Tailing Riparian Woodland	641	218	34.0%	218	218*
Total Nesting Habitat	*15,558*	*376*	*2.4%*	*586*	*411*
Nesting/Foraging Habitat					
Mixed Riparian Scrub	1,451	189	13.0%	169	189
Total Nesting/Foraging Habitat	*1,451*	*189*	*13.0%*	*169*	*189*
Foraging Habitat					
Valley Grassland	135,112	21,954	16.2%	22,014	0
Cropland	47,905	5,285	11.0%	5,285	0
Irrigated Pasture-Grassland	15,991	2,749	17.2%	2,749	0
Blue Oak Savanna	5,637	38	0.7%	47	37
Vernal Pool	4,536	389	8.6%	966	389
Seasonal Wetland	2,600	105	4.0%	105	105
Swale	1,252	234	18.7%	278	234
Total Foraging Habitat	*213,033*	*30,754*	*14.4%*	*31,444*	*765*
Total Modeled Habitat	**230,042**	**31,319**	**13.6%**	**32,319**	**1,365**

* Habitat re-establishment/establishment for Mine Tailing Riparian Woodland can be either Mixed Riparian Woodland or Mixed Riparian Scrub.

Indirect impacts on white-tailed kite modeled habitat and individuals would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects and the environmental stressors that cause them are the same in type and character as those discussed

and analyzed qualitatively for white-tailed kite under the No Action/No Project Alternative (Section 9.2.2).

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to white-tailed kite: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Stormwater Basins in Preserves), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), and UTILITY-1 (Avian Collision Avoidance) (Table 2-6). Relative to the project AMMs of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on white-tailed kite. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled white-tailed kite habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require general construction AMMs, and AMMs specific to covered raptor species would also be required: RAPTOR-1 (Raptor Design Surveys), RAPTOR-2 (Raptor Pre-Construction Surveys), RAPTOR-3 (Raptor Nest/Roost Buffer), and RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring) (Table 2-6). These construction and raptor-specific AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on white-tailed kite are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include a total of approximately 32,319 acres of habitat for white-tailed kite, including approximately 586 acres of nesting habitat, approximately 169 acres of nesting/foraging habitat, and approximately 31,444 acres of foraging habitat. This modeled habitat preservation is greater than estimated for the No Action/No Project Alternative of a combined 21,321 acres of habitat types, which would occur as a result of project-by-project mitigation.

The Conservation Strategy would also establish/re-establish approximately 1,365 acres of habitat for white-tailed kite, and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed above, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,965 fewer acres of habitat for white-tailed kite within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 10,998 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on white-tailed kite individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on white-tailed kite when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described previously for the No Action/No Project Alternative (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 31,319 acres of modeled white-tailed kite habitat within the Planning Area, which is approximately 1,965 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of white-tailed kite. In addition, the Conservation Strategy would

preserve approximately 10,998 more acres of white-tailed kite than under the No Action/No Project Alternative, and those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for white-tailed kite than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for white-tailed kite compared to the No Action/No Project Alternative baseline condition.

9.2.3.14 Effects on Greater Sandhill Crane and Its Habitat

The life history, suitable habitat, and documented occurrences in the Planning Area of greater sandhill crane are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of greater sandhill crane modeled habitat under the Proposed Action/Proposed Project would be approximately 7,942 acres, including 66 acres of roosting, 124 acres of roosting/foraging, and 7,752 acres of foraging habitat (Table 9-36). Of this total, approximately 7,116 acres are within the UDA and only approximately 826 acres are outside of the UDA where high-quality habitat is located. The total loss of modeled habitat is less than the estimated total loss of 9,616 acres under the No Action/No Project Alternative, of which 2,289 acres would occur outside of the UDA where high-quality habitat is located.

The Proposed Action/Proposed Project Alternative is expected to remove 63 of the existing 70 occurrences of greater sandhill crane in the Planning Area, which is 1 more occurrence that would be removed under the No Action/No Project Alternative.

Table 9-36. Direct Effects and Modeled Habitat Conservation for Greater Sandhill Crane Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing	*Direct Effect*	*Indirect Effect*	*Total Habitat Lost*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Roosting/Foraging Habitat[1]							
Seasonal Wetland	1,877	51	Qualitative	51	2.7%	105	52
Freshwater Marsh	2,610	73	Qualitative	73	2.8%	127	73
Total Roosting/Foraging Habitat	*4,487*	*124*	*Qualitative*	*124*	*2.8%*	*232*	*125*
Roosting Habitat							
Vernal Pool	1,156	59	7	66	5.7%	37	59
Total Roosting Habitat	*1,156*	*59*	*7*	*66*	*5.7%*	*37*	*59*
Foraging Habitat[2]							
Cropland	42,628	3,764	Qualitative	3,764	8.8%	6,700	0
Valley Grassland	30,585	2,469	Qualitative	2,469	8.1%	1,671	0
Irrigated Pasture-Grassland	10,908	1,519	Qualitative	1,519	13.9%	1,680	0
Total Foraging Habitat	*84,121*	*7,752*	*Qualitative*	*7,752*	*9.2%*	*10,051*	*0*
Grand Total	**89,764**	**7,935**	**7**	**7,942**	**8.8%**	**10,320**	**184**

1 Modeled roosting habitat includes these communities within 2 miles of greater sandhill crane occurrences in the Planning Area.
2 Modeled foraging habitat includes these communities within 1.75 miles of modeled roosting habitat.

The Proposed Action/Proposed Project Alternative would have approximately 7 acres of indirect effects on greater sandhill crane roosting habitat, as compared to approximately 117 acres of indirect effects on roosting habitat under the No Action/No Project Alternative. Indirect effects to other habitat types and individuals would also occur under the Proposed Action/Proposed Project Alternative; these indirect effects and the environmental stressors that cause them are the same in type and character as those discussed and analyzed qualitatively for greater sandhill crane under the No Action/No Project Alternative (Section 9.2.2).

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to greater sandhill crane; LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3(Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), BMP-2 (Erosion Control), BMP-9 (Soil Compaction), ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education),

RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool), UTILITY-1 (Avian Collision Avoidance), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project AMMs of the No Action/Project Alternative, these SSHCP AMMs would avoid and minimize indirect impacts on greater sandhill crane. For example, EDGE-4 would require that stormwater runoff be directed away from Preserves, which would limit exposure of greater sandhill crane within Preserves to urban runoff that may contain pesticides and petroleum products and that can adversely affect the hydrology of vernal pool roosting habitat.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative will require general construction AMMs and species-specific AMMs: GSC-1 (Greater Sandhill Crane Design Surveys), GSC-2 (Greater Sandhill Crane Pre-Construction Surveys), GSC-3 (Greater Sandhill Crane Roosting Buffer), GSC-4 (Greater Sandhill Crane Visual Barrier), and GSC-5 (Greater Sandhill Crane Roost Buffer Monitoring) (Table 2-6). These construction and species-specific AMMs may also be applied under the No Action/No Project Alternative. However, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on tricolored blackbird are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 10,320 acres of modeled habitat for greater sandhill crane. This modeled habitat preservation exceeds the 8,323 acres estimated under the No Action/No Project Alternative. The Conservation Strategy would also establish/re-establish approximately 184 acres of habitat for greater sandhill crane. Furthermore, the Conservation Strategy would also implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed above, and objectives to maintain or improve habitat value and preserve high-quality habitat (at least 2,000 acres of preserved foraging habitat would be high-quality foraging habitat).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,557 fewer acres of habitat for greater sandhill crane within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 1,997 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also

included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on greater sandhill crane individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on greater sandhill crane when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative previously (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 7,942 acres of modeled greater sandhill crane habitat within the Planning Area, which is approximately 1,557 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of greater sandhill crane. In addition, the Conservation Strategy would preserve 1,997 more acres of greater sandhill crane modeled habitat than under the No Action/No Project Alternative; those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for greater sandhill crane than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Proposed Action/Proposed Project Alternative would result in ***No Cumulative Effect*** for greater sandhill crane compared to the No Action/No Project Alternative baseline condition.

9.2.3.15 Effects on Lesser Sandhill Crane and Its Habitat

Basic Habitat use and occurrence within the Planning Area for lesser sandhill crane are described in Appendix G.

Direct and Indirect Effects of the Alternative

The land cover types in the Planning Area that are utilized by lesser sandhill crane are the same as those for greater sandhill crane (Table 9-36) described in Section 9.2.3.14, as is the expected acres of habitat loss under the Proposed Action/Proposed Project Alternative. New development and transportation infrastructure would have indirect effects on lesser sandhill crane that would be the same as those discussed previously for greater sandhill crane . In addition, construction activities under the Proposed Action/Proposed Project Alternative may result in temporary effects as discussed previously for greater sandhill crane.

The Proposed Action/Proposed Project Alternative would include the implementation of the AMMs discussed for greater sandhill crane that would also avoid or minimize indirect impacts lesser sandhill crane. Temporary impacts would also be avoided or minimized by the construction and species AMMs discussed in Section 9.2.3.14 for greater sandhill crane. Although the greater sandhill crane species-specific AMMs would not apply to projects where only lesser sandhill crane is present, due to the habitat overlap of the two species, both would benefit from the application of these species-specific AMMs.

The lesser sandhill crane modeled habitat preserved under the Proposed Action/Proposed Project Alternative and the relation of that modeled habitat preservation to the No Action/No Project Alternative would be the same as that for greater sandhill crane.

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,557 fewer acres of habitat for lesser sandhill crane within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 1,997 more acres of habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on lesser sandhill crane individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously,

the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on lesser sandhill crane when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 7,942 acres of modeled lesser sandhill crane habitat within the Planning Area, which is approximately 1,557 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of greater sandhill crane, which would also benefit lesser sandhill crane. In addition, the Conservation Strategy would preserve 1,997 more acres of lesser sandhill crane modeled habitat than under the No Action/No Project Alternative, and those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for lesser sandhill crane than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. The Proposed Action/Proposed Project Alternative would result in ***No Cumulative Effect*** for lesser sandhill crane compared to the No Action/No Project Alternative baseline condition.

9.2.3.16 Effects on Loggerhead Shrike and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of loggerhead shrike are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for loggerhead shrike would be approximately 31,367 acres, including approximately 591 acres of nesting (approximately 7.5% of existing), approximately 22,014 acres of nesting/foraging (approximately 16.3% of existing), and approximately 8,762 acres of foraging habitat (approximately 12.1% of existing) (Table 9-37). This is less than the estimated total loss under the No Action/No Project Alternative of approximately 33,144 acres.

The Proposed Action/Proposed Project Alternative is not expected to remove any of the existing 34 occurrences of loggerhead shrike in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

Table 9-37. Direct Effects and Modeled Habitat Conservation for Loggerhead Shrike Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Nesting Habitat					
Mixed Riparian Woodland	5,785	184	3.2%	368	184
Mixed Riparian Scrub	1,424	189	13.3%	378	189
Mine Tailing Riparian Woodland	641	218	34.0%	218	218
Total Nesting Habitat	*7,850*	*591*	*7.5%*	*964*	*591*
Nesting/Foraging Habitat					
Valley Grassland	135,112	22,014	16.3%	21,014	0
Total Nesting/Foraging Habitat	*135,112*	*22,014*	*16.3%*	*21,014*	*0*
Foraging Habitat					
Cropland	47,905	5,285	11.0%	6,947	0
Irrigated Pasture-Grassland	15,991	2,749	17.2%	2,749	0
Vernal Pool	4,536	389	8.6%	966	389
Seasonal Wetland	2,600	105	4.0%	105	105
Swale	1,252	234	18.7%	278	234
Total Foraging Habitat	*72,284*	*8,762*	*12.1%*	*11,045*	*728*
Grand Total	**215,246**	**31,367**	**14.6%**	**34,023**	**1,319**

Indirect impacts on loggerhead shrike modeled habitat and individuals would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects and the environmental stressors that cause them are the same in type and character as those discussed and analyzed qualitatively for loggerhead shrike under the No Action/No Project Alternative (Section 9.2.2).

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to loggerhead shrike: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Stormwater Basins in Preserves), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), STREAM-1 (Laguna Creek Setback), STREAM-2 (UDA Stream Setbacks), and UTILITY-1 (Avian Collision Avoidance) (Table 2-6). Relative to the project avoidance and minimization measures of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on loggerhead shrike. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled loggerhead shrike habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative would require general construction AMMs and AMMs specific to covered raptor species: RAPTOR-1 (Raptor Design Surveys), RAPTOR-2 (Raptor Pre-Construction Surveys), RAPTOR-3 (Raptor Nest/Roost Buffer), and RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring) (Table 2-6). These construction and raptor-specific AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on loggerhead shrike are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include a total of approximately 34,023 acres of habitat for loggerhead shrike. This modeled habitat preservation would exceed the estimated 21,061 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy would also establish/re-establish a total of approximately 1,319 acres of habitat for loggerhead shrike and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed above, and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,777 fewer acres of habitat for loggerhead shrike within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 12,962 more acres of habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on loggerhead shrike individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided above, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on loggerhead shrike when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 31,367 acres of modeled loggerhead shrike habitat within the Planning Area, which is approximately 1,777 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives beneficial to the conservation of loggerhead shrike. In addition, the Conservation Strategy would preserve approximately 12,962 more acres of loggerhead shrike modeled habitat than under the No Action/No Project Alternative; those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for loggerhead shrike than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for loggerhead shrike compared to the No Action/No Project Alternative baseline condition.

9.2.3.17 Effects on Grasshopper Sparrow and Its Habitat

Basic habitat information for grasshopper sparrow within the Planning Area is found in Appendix G.

Direct and Indirect Effects of the Alternative

Estimated losses of potentially suitable grasshopper sparrow habitat under the Proposed Action/Proposed Project Alternative would consist of approximately 2,749 acres of Irrigated Pasture and approximately 22,014 acres of Valley Grassland for a total land cover loss of approximately 24,763 acres. Of this habitat loss, approximately 23,938 acres would occur within the UDA, and 825 acres would occur outside of the UDA. This is less than the estimated loss of potentially suitable grasshopper sparrow habitat under the No Action/No Project Alternative of approximately 26,210 acres.

Indirect impacts on potentially suitable grasshopper sparrow habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects and the environmental stressors that cause them are the same in type and character as those discussed and analyzed qualitatively for grasshopper sparrow under the No Action/No Project Alternative (Section 9.2.2).

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to grasshopper sparrow: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3(Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5(Stormwater Control in Preserve Setbacks), EDGE-6 (Stormwater Basins in Preserves), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), and UTILITY-1 (Avian Collision Avoidance) (Table 2-6). Relative to the project AMMs of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on grasshopper sparrow. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project

Alternative, thereby increasing protection of modeled grasshopper sparrow habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative will require general construction AMMs be applied to Covered Activities (Table 2-6). These construction AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on grasshopper sparrow are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 24,763 acres of potentially suitable grasshopper sparrow habitat. This would be a greater amount of preserved potentially suitable habitat than the estimated 14,302 acres preserved under the No Action/No Project Alternative that would result from project-by-project mitigation.

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,447 fewer acres of potentially suitable habitat for grasshopper sparrow within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Proposed Action/Proposed Project Alternative would preserve approximately 10,461 more acres of potentially suitable habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on grasshopper sparrow individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on grasshopper sparrow when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 24,763 acres of potentially suitable grasshopper sparrow habitat within the Planning Area, which is approximately 1,447 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining potentially suitable habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives beneficial to the conservation of grasshopper sparrow. The Conservation Strategy would preserve approximately 10,461 more acres of grasshopper sparrow potentially suitable habitat than under the No Action/No Project Alternative. Additionally, those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for grasshopper sparrow than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for grasshopper sparrow compared to the No Action/No Project Alternative baseline condition.

9.2.3.18 Effects on Song Sparrow (Modesto Population) and Its Habitat

Basic habitat information for song sparrow within the Planning Area is found in Appendix G.

Direct and Indirect Effects of the Alternative

The anticipated loss of potentially suitable habitat for song sparrow would be approximately 105 acres of Seasonal Wetland, 127 acres of Freshwater Marsh, and 189 acres of Mixed Riparian Scrub, which totals approximately 421 acres and is less than the 448 acres estimated under the No Action/No Project Alternative.

Indirect impacts to song sparrow potentially suitable habitat would occur under the Proposed Action/Proposed Project Alternative which would be the same type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to song sparrow: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), BMP-2 (Erosion Control), BMP-9 (Soil Compaction), ROAD-1(Road Project Location), ROAD-3(Roadside Pesticide Use), NATURE TRAIL-1(Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool), UTILITY-1 (Avian Collision Avoidance), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project AMMs of the No Action/Project Alternative, these SSHCP AMMs would avoid and minimize indirect impacts on song sparrow. For example, EDGE-4 would require that stormwater runoff be directed away from Preserves, which would limit exposure of song sparrow within Preserves to urban runoff that may contain pesticides and petroleum products. While this AMM may be applied to projects under the No Action/No Project Alternative it would likely be applied less frequently.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative will require general construction AMMs be applied to Covered Activities (Table 2-6). These construction AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on song sparrow are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include a total of approximately 421 acres of potentially suitable song sparrow habitat. This exceeds the estimated 24 acres under the No Action/No Project Alternative that would occur on a project-by-project basis.

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 27 fewer acres of potentially suitable habitat for song sparrow within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 397 acres more potentially suitable habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on song sparrow individuals and potentially suitable habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on song sparrow when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 421 acres of potentially suitable song sparrow habitat within the Planning Area, which is approximately 27 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining potentially suitable habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives beneficial to the conservation of song sparrow. The Conservation Strategy would preserve approximately 397 more acres of song sparrow potentially suitable habitat than under the No Action/No Project Alternative, and those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for song sparrow than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. The Proposed Action/Proposed Project Alternative would result in ***No Cumulative Effect*** for song sparrow compared to the No Action/No Project Alternative baseline condition.

9.2.3.19 Effects on Bank Swallow and Its Habitat

Basic habitat information for bank swallow within the Planning Area is found in Appendix G.

Direct and Indirect Effects of the Alternative

Bank swallow is associated with large cut banks in riverine habitats and sand bluffs where it builds nest burrows, and with surrounding areas that it uses for foraging. The two documented occurrences within the Planning Area are along the Cosumnes River between Rancho Murieta and Sloughhouse. The potential loss of bank swallow nesting habitat from Preserve Covered Activities within the Cosumnes River/Deer Creek Corridor where it occurs is analyzed qualitatively, as the land cover level analysis performed does not include the specific features required by this species for nesting colonies. Preserve Covered Activities under the Proposed Action/Proposed Project Alternative that remove cut banks through use of bank stabilization techniques to restore historical hydrologic conditions or activities that remove foraging habitat within proximity to nest colonies would result in impacts to bank swallow.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to bank swallow: LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), BMP-2 (Erosion Control), BMP-9 (Soil Compaction), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool), UTILITY-1 (Avian Collision Avoidance), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project AMMs of the No Action/Project Alternative, these SSHCP AMMs would avoid and minimize indirect impacts on song sparrow. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of bank swallow foraging habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative will require general construction AMMs be applied to Covered Activities (Table 2-6). These construction AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on bank swallow are expected to be less than under the No Action/No Project Alternative.

The majority of nesting and foraging habitat in the Planning Area would likely be preserved within the Cosumnes River/Deer Creek Corridor under the Proposed Action/Proposed Project Alternative.

Significance of Direct and Indirect Effects

Preserve Covered Activities within the Cosumnes River/Deer Creek Corridor implemented under the Proposed Action/Proposed Project Alternative would potentially impact known nesting colonies of bank swallow within the Planning Area in contrast to the No Action/No Project Alternative. However, the Proposed Action/Proposed Project Alternative would preserve considerably more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on bank swallow individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Proposed Action/Proposed Project Alternative on bank swallow would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Proposed Action/Proposed Project Alternative would have a ***Less Than Significant Adverse*** effect on bank swallow when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, Preserve Covered Activities may occur within the Cosumnes River/Deer Creek Corridor, such as the use of bank stabilization techniques to restore

historical hydrologic conditions, or Preserve Covered Activities may remove foraging habitat near nest colonies in the area. There are no proposed activities under the No Action/No Project Alternative in that area that would likely adversely affect these nest colonies. However, the AMMs that would be required by the SSHCP would likely reduce impacts from Preserve Covered Activities.

The Conservation Strategy would include Biological Goals and Measureable Objectives that would benefit bank sparrow foraging habitat and would preserve a greater area of bank swallow habitat than the preservation under the No Action/No Project Alternative. In addition the preservation under the Proposed Action/Proposed Project Alternative would be within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative. The individual preserves in the Preserve System under the Proposed Action/Proposed Project Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to bank swallow and be operated under a comprehensive preserve management program.

The incremental effects of the Proposed Action/Proposed Project Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative would result in ***No Cumulative Effect*** to bank swallow compared to the No Action/No Project Alternative baseline condition.

9.2.3.20 Effects on Western Red Bat and Its Habitat

The habitat requirements, documented occurrences, and existing acres of modeled habitat of western red bat in the Planning Area are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of western red bat modeled habitat would be approximately 23,986 acres, including 23,330 acres of foraging (approximately 15.3% of existing) and approximately 656 acres of roosting/foraging habitat (approximately 2.6% of existing). This is less than the estimated loss under the No Action/No Project Alternative of approximately 25,488 acres. The percentage of habitat remaining shown in Table 9-38 only applies to those natural land covers listed and is an underestimation of total habitat remaining. Western red bat is known to roost and forage in developed areas with mature trees and those acres are not included in the analysis.

The Proposed Action/Proposed Project Alternative is expected to remove six of the existing seven occurrences of western red bat in the Planning Area, which would be three more occurrences than would be removed under the No Action/No Project Alternative.

Table 9-38. Direct Effects and Modeled Habitat Conservation for Western Red Bat Under the Proposed Action/Proposed Project Alternative

Modeled Habitat	Total (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Foraging Habitat					
Valley Grassland	135,112	22,014	16.3%	22,014	0
Vernal Pool	4,536	389	8.6%	966	389
Seasonal Wetlands	2,600	105	4.0%	105	105
Freshwater Marsh	2,922	127	4.3%	127	127
Stream/Creek	2,674	117	4.4%	117	117
Open Water	2,344	155	6.6%	155	155*
Mixed Riparian Scrub	1,451	189	13.0%	378	189
Swale	1,252	234	18.7%	278	234
Total Foraging Habitat	*152,891*	*23,330*	*15.3%*	*24,140*	*1,316*
Roosting/Foraging Habitat					
Blue Oak Woodland	9,132	9	0.1%	0	9
Mixed Riparian Woodland	5,785	184	3.2%	368	184
Blue Oak Savanna	5,637	38	0.7%	47	38
Orchards	3,646	207	5.7%	207	0
Mine Tailing Riparian Woodland	641	218	34.0%	218	218**
Total Roosting/Foraging Habitat	*24,841*	*656*	*2.6%*	*840*	*449*
Grand Total	**177,732**	**23,986**	**13.5%**	**24,980**	**1,765**

* Acres of Open Water habitat re-establishment/establishment will occur as a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

** Habitat re-establishment/establishment for Mine Tailing Riparian Woodland can be either Mixed Riparian Woodland or Mixed Riparian Scrub.

Indirect impacts to western red bat modeled habitat would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects are the same in type and character as those discussed and analyzed qualitatively in the species impact discussion in Section 9.2.2 above.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs that are relevant to western red bat: LID-1 (Stormwater Quality) LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Detention Basins in Linkage Preserves), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location),

NATURE TRAIL-4 (Biological Studies Prior to Trail Design) NATURE TRAIL-5 (Monitoring of Trail Impacts), NATURE TRAIL-6 (Trail Public Education), and UTILITY-1 (Avian Collision Avoidance) (Table 2-6). Relative to the project AMMs of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on western red bat. For example, STREAM-1, STREAM-2, and STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled roosting habitat from indirect impacts.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative will require covered activities implement general AMMs and species-specific AMMs: BAT-1 (Maternity Roost Design Surveys), BAT-2 (Maternity Roost Pre-Construction Surveys, BAT-3 (Maternity Roost Buffer), and BAT-4 (Bat Eviction Methods) (Table 2-6). These construction AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on western red bat are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 24,980 acres of modeled habitat for western red bat. This modeled habitat preservation would be greater than the estimated 13,729 acres under the No Action/No Project Alternative. The Conservation Strategy would also establish/ re-establish a total of approximately 1,765 acres of habitat for western red bat, and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed above, and objectives to maintain or improve habitat value (e.g., development of preserve management plans, and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,502 fewer acres of modeled habitat for western red bat within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 11,251 acres more modeled western red bat habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or

minimize indirect and temporary effects on western red bat individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on western red bat when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 23,986 acres of modeled western red bat habitat within the Planning Area, which is approximately 1,502 fewer acres than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives beneficial to the conservation of western red bat. The Conservation Strategy would preserve approximately 11,251 more acres of western red bat modeled habitat than under the No Action/No Project Alternative, and those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for western red bat than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for western red bat compared to the No Action/No Project Alternative baseline condition.

9.2.3.21 Effects on American Badger and Its Habitat

The species description of American badger within the Planning Area is provided in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for American badger would be approximately 22,780 acres, or approximately 15.3% of the existing modeled habitat in the Planning Area (Table 9-39). This is less than the 24,192 acres estimated under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is not expected to remove any of the existing nine occurrences of American badger in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

Table 9-39. Direct Effects and Modeled Habitat Conservation for American Badger Under the Proposed Action/Proposed Project Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing*	*Direct Effect*	*% of Existing Habitat Lost*	Total Habitat Preservation	Total Habitat Re-establishment and/or Establishment
Valley Grassland	135,112	22,014	16.3%	22,014	0
Blue Oak Savanna	5,637	38	0.7%	38	38
Vernal Pool	4,536	389	8.6%	966	389
Seasonal Wetland	2,600	105	4.0%	105	105
Swale	1,252	234	18.7%	278	234
Grand Total	**149,137**	**22,780**	**15.3%**	**23,401**	**766**

Indirect effects on American badger would also occur under the Proposed Action/Proposed Project Alternative. These indirect effects are the same in type and character as those discussed for the species in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs relevant to American badger: LID-1 (Stormwater Quality) LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves), EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-6 (Stormwater Basins in Preserves), EDGE-8 (Outdoor Lighting), EDGE-9 (Livestock Access to Preserves), EDGE-10 (Prevent Invasive Species Spread), ROAD-1 (Road Project Location), ROAD-2 (Wildlife Crossing Structures), ROAD-3 (Roadside Pesticide Use), BMP-9 (Soil Compaction), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design), NATURE TRAIL-5 (Monitoring of Trail Impacts), and NATURE TRAIL-6 (Trail Public Education) (Table 2-6). Relative to the project

AMMs of the No Action/Project alternative, these SSHCP AMMs would avoid and minimize indirect impacts on American badger. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled American badger habitat from indirect impacts.

The Proposed Action/Proposed Project Alternative will also have temporary impacts on American badger, which would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). The Proposed Action/Proposed Project Alternative will require general construction AMMs be applied to Covered Activities (Table 2-6). These construction AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on American badger are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include approximately 23,401 acres of habitat for American badger. This modeled habitat preservation would be more than the estimated 13,489 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy would also establish/re-establish a total of approximately 766 acres of habitat and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously and objectives to maintain or improve habitat value (e.g., development of preserve management plans and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact 1,412 fewer acres of habitat for American badger within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Proposed Action/Proposed Project Alternative would preserve 9,912 more acres of habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on American badger individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously,

the Proposed Action/Proposed Project Alternative would have a ***Significant Beneficial*** effect on American badger when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 22,780 acres of modeled American badger habitat within the Planning Area, which is approximately 1,412 acres less than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as setbacks from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives beneficial to the conservation of American badger. The Conservation Strategy would preserve approximately 9,912 more acres of American badger modeled habitat than under the No Action/No Project Alternative. Additionally, those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for American badger than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for American badger compared to the No Action/No Project Alternative baseline condition.

9.2.3.22 Effects on Sanford's Arrowhead and Its Habitat

The habitat requirements of Sanford's arrowhead and information on documented occurrences in the Planning Area are provided in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of Sanford's arrowhead modeled habitat would be approximately 10,620 acres, or 20.1% of existing modeled habitat in the Planning Area (Table 9-40). The majority of that effect would be on Valley Grassland within the UDA. This is less than the estimated loss of 12,065 acres under the No Action/No Project Alternative.

The Proposed Action/Proposed Project Alternative is expected to remove 12 of the existing 64 occurrences of Sanford's arrowhead in the Planning Area, which would be 6 more occurrences than would be removed under the No Action/No Project Alternative.

Table 9-40. Direct Effects and Modeled Habitat Conservation for Sanford's Arrowhead Under the Proposed Action/Proposed Project Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing*	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Freshwater Marsh	2,044	103	5.0%	127	103
Open Water	1,086	68	6.3%	23	68*
Seasonal Wetlands	1,425	72	5.1%	87	72
Streams/Creeks	893	83	9.3%	117	83
Valley Grassland	47,375	10,294	21.7%	11,735	0
Grand Total	**52,823**	**10,620**	**20.1%**	**12,089**	**326**

* Acres of Open Water habitat re-establishment/establishment will occur as a land cover that provides equivalent or better habitat value for Covered Species affected by the loss of Open Water, as determined by the TAC.

Indirect effects on Sanford's arrowhead would occur under the Proposed Action/Proposed Project Alternative. These indirect effects are the same in type and character as those discussed for the species in Section 9.2.2.

The Proposed Action/Proposed Project Alternative requires implementation of the following AMMs by Covered Activities that are relative to Sanford's arrowhead: LID-1 (Stormwater Quality), LID-3 (Natural Site Features), EDGE-1 (Compatible Land Uses), EDGE-2 (Single Loaded Streets), EDGE-3 (Preserve Setbacks), EDGE-4 (Locate Stormwater Control Outside Preserves),EDGE-5 (Stormwater Control in Preserve Setbacks), EDGE-10 (Prevent Invasive Species Spread), BMP-9 (Soil Compaction), NATURE TRAIL-1 (Trail Plan), NATURE TRAIL-2 (Hardpan/Duripan Protection), NATURE TRAIL-3 (Trail Location), NATURE TRAIL-4 (Biological Studies Prior to Trail Design) NATURE TRAIL-5 (Monitoring of Trail Impacts), ROAD-1 (Road Project Location), ROAD-3 (Roadside Pesticide Use), STREAM-1 (Laguna Creek Setback), STREAM-2 (UDA Stream Setbacks), STREAM-3 (Minor tributaries to UDA Streams), UTILITY-2 (Utility Maintenance), and UTILITY-4 (Siting of Entry and Exit Location) (Table 2-6). Relative to the project AMMs of the No Action/Project alternative, these SSHCP AMMs would avoid

and minimize indirect impacts on Sanford's arrowhead. For example, STREAM-1, STREAM-2, and STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative. These setbacks would minimize the indirect impact to stream and creek modeled habitat for Sanford's arrowhead.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative. These stressors and impacts would be the same in type and character as those discussed and analyzed qualitatively for the species under the No Action/No Project Alternative (Section 9.2.2). Covered Activities would be required to implement general construction AMMs that would avoid or minimize temporary effects to Sanford's arrowhead (Table 2-6). These construction AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on Sanford's arrowhead are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would include a total of approximately 12,089 acres of habitat for Sanford's arrowhead. This modeled habitat preservation would exceed the estimated 5,907 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy would also establish/re-establish a total of approximately 326 acres of habitat, and would implement biological objectives to conserve the species within the Planning Area. These objectives would include the implementation of the AMMs and the Preserve System discussed previously, and objectives to maintain or improve habitat value (e.g., development of preserve management plans, and requirements for Preserve width to limit edge effects).

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact approximately 1,445 fewer acres of habitat for Sanford's arrowhead within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would preserve approximately 6,182 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid or minimize indirect and temporary effects on Sanford's arrowhead individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Proposed Action/Proposed Project Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on Sanford's arrowhead when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would result in the loss of approximately 10,620 acres of modeled Sanford's arrowhead habitat within the Planning Area, which is approximately 1,445 fewer acres than the estimated loss under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Proposed Action/Proposed Project Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives beneficial to the conservation of Sanford's arrowhead. The Conservation Strategy would preserve approximately 6,182 more acres of Sanford's arrowhead modeled habitat than under the No Action/No Project Alternative, and those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

The incremental effects of the Proposed Action/Proposed Project Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for Sanford's arrowhead than would occur under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect for Sanford's arrowhead compared to the No Action/No Project Alternative baseline condition.

9.2.3.23 Effects on Special-Status Plant Species Not Covered by the SSHCP and Their Habitat

There are 18 special-status plant species with potential to occur in the Planning Area that are not covered by the SSHCP (Table 9-2) and are analyzed here. Information on the process to select these species, their habitat associations, and occurrence in the Planning Area is provided

in Appendix G. These plant species are predominately associated with five SSHCP land cover categories: Vernal Wetlands, Non-vernal Wetlands, Riparian Habitats, Blue Oak Woodland and Savanna, and Valley Grassland.

Direct and Indirect Effects of the Alternative

The maximum modeled habitat loss under Proposed Action/Proposed Project Alternative is expected to be less than the loss under the No Action/No Project Alternative for 12 species (watershield (*Brasenia schreberi*), fleshy owl's clover, Brandegee's clarkia (*Clarkia biloba* ssp. *brandegeeae*), Peruvian dodder (*Cuscuta obtusiflora* var. *glandulos*a), stinkbells, woolly rose-mallow (*Hibiscus lasiocarpos* var. *occidentalis*), Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Heckard's pepper-grass, marsh skullcap (*Scutellaria galericulata*), side-flowering skullcap (*Scutellaria lateriflora*), Suisun Marsh aster (*Symphyotrichum lentum*), and saline clover) and greater for the remaining 6 species (Table 9-41).

Table 9-41. Total Loss of Potentially Suitable Habitat for Other Special-Status Plants Under the Proposed Action/Proposed Project Alternative

Total Planning Area (acres)									
	Loss of Potentially Suitable Habitat (direct and indirect)						*% of Existing Potentially Suitable Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment/ Establishment*
*Plant Name (status)**	*Vernal Wetlands*	*Non-vernal Wetlands*	*Riparian*	*Blue Oak Woodland/ Savanna*	*Valley Grassland*	*Total Habitat Loss*			
Watershield (State S2)	—	232	—	—	—	232	4.2%	232	232
Bristly sedge (State S2)	761	232	—	—	—	993	8.8%	1,476	855
Fleshy owl's clover (Federal - T; State - E)	—	232	—	—	—	232	4.2%	232	232
Brandegee's clarkia (State S2)	—	—	—	47	—	47	0.3%	47	47
Bolander's water-hemlock (State S2)	761	232	591	—	—	1,584	8.2%	2,440	1,446
Peruvian dodder (CRPR 2B.2)	—	232	—	—	—	232	4.2%	232	232
Tuolumne button-celery (State S2)	761	—	—	47	—	808	3.9%	1,291	670
Stinkbells (State S3)	—	—	—	47	22,014	22,061	14.7%	22,061	47
Woolly rose-mallow (State S2)	—	232	—	—	—	232	4.2%	232	232
Northern California black walnut (State S1)	—	—	591	—	—	591	7.4%	964	591
Delta tule pea (State S2)	—	232	—	—	—	232	4.2%	232	232
Heckard's pepper-grass (State S2)	—	—	—	—	22,014	22,014	16.3%	22,014	0
Mason's lilaeopsis (State S2)	—	232	591	—	—	823	6.1%	1,196	823

Table 9-41. Total Loss of Potentially Suitable Habitat for Other Special-Status Plants Under the Proposed Action/Proposed Project Alternative

Total Planning Area (acres)									
	Loss of Potentially Suitable Habitat (direct and indirect)						*% of Existing Potentially Suitable Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment/ Establishment*
*Plant Name (status)**	*Vernal Wetlands*	*Non-vernal Wetlands*	*Riparian*	*Blue Oak Woodland/ Savanna*	*Valley Grassland*	*Total Habitat Loss*			
Delta mudwort (State S2)	—	232	591	—	—	823	6.1%	1,196	823
Marsh skullcap (State S1)	—	232	—	—	—	232	4.2%	232	232
Side-flowering skullcap (State S1)	—	232	—	—	—	232	4.2%	232	232
Suisun marsh aster (State S2)	—	232	—	—	—	232	4.2%	232	232
Saline clover (State S2)	761	232	—	—	22,014	23,007	15.7%	23,490	855

For species with state or federal status, no CRPR listing used.

* **Status Definitions**

Federal

E = listed as endangered under the ESA

T = listed as threatened under the ESA

State

E = listed as endangered under CESA

T = listed as threatened under CESA

S1 = Critically Imperiled by the State

S2 = Imperiled by the State

S3 =Vulnerable by the State

California Rare Plant Rank (CRPR)

2B = Rare, threatened, or endangered in California, but more common elsewhere

CRPR Threat Ranks

0.2 = Moderately threatened in California (moderate degree/immediacy of threat)

Indirect and temporary effects on these special-status plant species would be similar to those listed for Sanford's arrowhead in Section 9.2.2, such as increased exposure to pollutants and increased presence of invasive plant species, and are analyzed qualitatively for the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative would include the implementation of the AMMs discussed previously for Sanford's arrowhead that would also avoid or minimize indirect impacts to the special-status plants analyzed here.

Temporary construction stressors and impacts would occur under the Proposed Action/Proposed Project Alternative. These stressors and impacts would be the same in type and character as those discussed and analyzed qualitatively for Sanford's arrowhead under the No Action/No Project Alternative (Section 9.2.2), with the addition of specific environmental stressors on vernal pool hydrology (see the analysis of vernal pool invertebrates and plants in Section 9.2.2.1) that would indirectly adversely impact those special-status plant species analyzed here that are modeled to occur within the vernal pool ecosystem (e.g., bristly sedge, Bolander's water-hemlock, Tuolumne button-celery, and saline clover). Covered activities would be required to implement general construction AMMs that would avoid or minimize temporary effects to special-status plant species. These construction AMMs may also be applied under the No Action/No Project Alternative; however, oversight of AMM implementation and monitoring of AMM effectiveness by the Implementing Entity for the SSHCP would increase the avoidance and minimization of impacts. For this reason, temporary impacts under the Proposed Action/Proposed Project Alternative on the special-status plants analyzed here are expected to be less than under the No Action/No Project Alternative.

The Preserve System under the Proposed Action/Proposed Project Alternative would preserve and establish/re-establish habitat for special-status plants not covered by the SSHCP. In addition, the Conservation Strategy would implement biological objectives for Covered Species that would benefit non-covered plant species. The acres preserved under the Proposed Action/Proposed Project Alternative exceed the acres preserved under the No Action/No Project Alternative for all but three species (bristly sedge, Brandagee's clarkia, and Tuolumne button-celery).

Critical Habitat has been designated for fleshy owl's clover south of Dry Creek at the extreme southern edge of the Planning Area. The Proposed Action/Proposed Project Alternative is not expected to impact any of this designated Critical Habitat for fleshy owl's clover.

Significance of Direct and Indirect Effects

The Proposed Action/Proposed Project Alternative would impact a greater number of acres of habitat for 6 special-status plant species within the Planning Area than is estimated for the No Action/No Project Alternative and fewer acres for the remaining 12 species. However, the Proposed

Action/Proposed Project Alternative would preserve more habitat than what is estimated for the No Action/No Project Alternative for four of the six species with a greater impact and fewer for only one that has a smaller impact. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Proposed Action/Proposed Project Alternative that would avoid and minimize indirect and temporary effects on special-status plant species individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Proposed Action/Proposed Project Alternative on these special-status plant species would not be substantially different to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Proposed Action/Proposed Project Alternative would have a ***Less Than Significant Adverse*** effect on the special-status plant species not covered by the SSHCP when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Proposed Action/Proposed Project Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Proposed Action/Proposed Project Alternative would impact a greater number of acres of habitat for 6 special-status plant species within the Planning Area than is estimated for the No Action/No Project Alternative, and fewer acres for the remaining 12 species.

The Conservation Strategy would include Biological Goals and Measureable Objectives that would benefit special-status plant species habitat and would preserve more habitat than what is estimated for the No Action/No Project Alternative for four of the six species with a greater impact and fewer for only one that has a smaller impact. In addition the preservation under the Proposed Action/Proposed Project Alternative would be within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual preserves in the Preserve System under the Proposed Action/Proposed Project Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to special-status plant species and be operated under a comprehensive preserve management program.

The incremental effects of the Proposed Action/Proposed Project Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project

Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. The Proposed Action/Proposed Project Alternative would result in ***No Cumulative Effect*** to the special-status plant species not covered by the SSHCP compared to the No Action/No Project Alternative baseline condition.

9.2.4 Reduced Permit Term Alternative

As described in Section 2.4.3, the Reduced Permit Term Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative.

Under the Reduced Permit Term Alternative, the core of the Preserve System established inside the UDA would be associated with the development of five large Master Plans, as discussed in Section 2.3.4 for the Reduced Permit Term Alternative, and as discussed in Section 2.3.3 for the Proposed Action/Proposed Project Alternative. Because the core of the Preserve System inside the UDA under both EIS/EIR action alternatives is associated with the same five large Master Plans, approximately 70% of the UDA Preserves established under the Reduced Permit Term Alternative would have similar sizes, boundaries, and locations as the UDA Preserves established under the Proposed Action/Proposed Project Alternative. However, the shorter duration of the Reduced Permit Term Alternative—and the smaller amount of urban development and associated development fees collected by the Reduced Permit Term Alternative—would not allow the HCP's Implementing Entity to establish as many acres of new Preserves in the Planning Area as would occur under the Proposed Action/Proposed Project's 50-year permit term. Therefore, fewer new Preserves would be established under the Conservation Strategy of the Reduced Permit Term Alternative. This difference would be especially pronounced outside the UDA.

As described in Section 2.4, the ESA and CESA incidental take permits and the CWA permit strategy for HCP Covered Activities would be valid only during the 30-year permit term of the Reduced Permit Term Alternative, and the Reduced Permit Term Alternative's Conservation Strategy would be implemented only during this 30-year term. The urban development Covered Activities and conservation strategies associated with the five Master Plans would be implemented inside the UDA during this 30-year period. However, the EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3), so the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, as described in Section 3.6.7.2, the EIS/EIR analysis of the Reduced Permit Term Alternative also considers future urban development that is not part of the project description of the Reduced Permit Term Alternative, but is still expected to occur within the Planning Area after the end of the permit term (i.e., in years 31–50 of the EIS/EIR study period).

As described in Section 3.6.7.2, project mitigation Preserves established after the end of the 30-year Reduced Permit Term Alternative would be established under a project-by-project process for obtaining individual authorizations under CWA, ESA, CESA, and Section 1600 of the California Fish and Game Code. Consequently, mitigation Preserves established in years 31–50 of the EIS/EIR study period would not be established using a regional, landscape-based approach that balances new urban development with the need for conservation, as would be provided by an HCP. Therefore, much of the Preserve System inside the UDA would be very similar under the two action alternatives, but the Preserve System outside the UDA would be substantially different between the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, it is unlikely that mitigation Preserves established outside the UDA would be contiguous or would be interconnected, and it is unlikely that a large, contiguous 10,500-acre landscape-size vernal pool Preserve would be established in the southwestern portion of the Planning Area. Likewise, the No Action/No Project Alternative also would not result in contiguous, interconnected Preserves outside the UDA and would not establish a 10,500-acre vernal-pool preserve in the Planning Area. In these ways, the new mitigation Preserves established outside the UDA under the Reduced Permit Term Alternative and the No Action/No Project Alternative would be similar.

9.2.4.1 Effects on Vernal Pool Invertebrate/Plant Species and Habitat

As was the case for the No Action/No Project Alternative discussed previously, the following 11 vernal pool invertebrate and plant species are considered together in the analysis of the Reduced Permit Term Alternative due to their dependence on the vernal pool ecosystem: vernal pool tadpole shrimp, vernal pool fairy shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, dwarf downingia, Ahart's dwarf rush, pincushion navarretia, slender Orcutt grass, Sacramento Orcutt grass, Boggs Lake hedge-hyssop, and legenere. While the individual natural history, habitat requirements, modeled habitat, and documented occurrences in the Planning Area differ for these species (and are found in Appendix G), the direct impact mechanisms and environmental stressors that cause temporary impacts are the same.

Direct and Indirect Effects of the Alternative

Projects and activities under the Reduced Permit Term Alternative (Section 2.4.3) would permanently remove modeled habitat for vernal pool invertebrate and plant species through development and related infrastructure resulting in direct impacts to vernal pool invertebrate and plant species. While the majority of the urban development would occur within the UDA, transportation and other infrastructure projects would occur outside the UDA. The direct impact acres that would occur under the Reduced Permit Term Alternative for each species are shown in Table 9-42 and discussed below.

Vernal pool invertebrate and plant species near proposed construction activities under the Reduced Permit Term Alternative will be adversely affected by several temporary construction-related effects (Appendix G) that will result in additional disturbance to habitat or additional harm to vernal pool invertebrate plant and animal species. Generally, these temporary effects will occur within the project boundary or road right-of-way area (quantified in the direct effects and the area of indirect impacts to each species in the impact tables below).

As discussed above for direct impacts, the majority of indirect impacts to vernal pool invertebrate and plant species under the Reduced Permit Term Alternative would occur within the UDA as a result of urban development, although there would be indirect impacts as a result of transportation and other infrastructure projects outside the UDA. The environmental stressors that would trigger indirect impacts under the Reduced Permit Term Alternative are the same in type and character as those discussed in the impact discussion for vernal pool invertebrate and plant species under the No Action/No Project Alternative in Section 9.2.2 above.

The Reduced Permit Term Alternative requires Covered Activities to implement the AMMs that would be applied during the permit term and are listed in the vernal pool invertebrate and plant species analysis in Section 9.2.3.

Relative to the project AMMs of the No Action/No Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on vernal pool invertebrate and plant species. For example, EDGE-3 establishes a 50-foot setback from the edge of established Preserves to minimize indirect effects on Preserve lands, while EDGE-7 would not allow Covered Activities that could damage duripan within the Preserve Setback to protect the perched aquifer that maintains hydrologic conditions in the vernal pool ecosystem. The indirect impact acres that would occur under the Reduced Permit Term Alternative for each species are shown in Table 9-42 and discussed below.

Some of the elements of the AMMs described previously would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The maximum anticipated loss of species modeled habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp due to direct impacts would be approximately 18,825 acres (Table 9-42). Indirect effects on vernal pool tadpole shrimp and vernal pool fairy shrimp modeled aquatic habitat are anticipated to result in additional approximately 271 acres of impacts. The total impact, including direct and indirect impacts, of the Reduced Permit Term Alternative on

vernal pool tadpole shrimp and vernal pool fairy shrimp modeled habitat is expected to be approximately 19,096 acres. This total impact exceeds the 17,949 acres of total impact estimated for the No Action/No Project Alternative by approximately 1,147 acres (Table 9-4).

Of the direct habitat loss, approximately 9,800 acres would occur within the MCRA, which would affect approximately 53% of the modeled habitat within the MCRA. There would also be approximately 53 acres lost within the C/RS, which would affect approximately 0.1% of modeled habitat within the C/RS. This is greater than the habitat loss estimated within the MCRA and equal to the loss within the C/RS estimated for the No Action/No Project Alternative.

The Reduced Permit Term Alternative is also expected to remove approximately 725 acres of Critical Habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp in Critical Habitat Unit 13 and approximately 80 acres in Critical Habitat Unit 14a for a total of approximately 805 acres of Critical Habitat lost. This loss is 161 acres less than the approximately 966 acres of designated Critical Habitat that would be removed under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to remove 94 of the 851 documented occurrences of vernal pool tadpole shrimp in the Planning Area, which would be 4 more occurrences than would be removed under the No Action/No Project Alternative. The Reduced Permit Term Alternative is also expected to remove 39 of the 581 documented occurrences of vernal pool fairy shrimp in the Planning Area, which would be 8 more occurrences than would be removed under the No Action/No Project Alternative.

The maximum anticipated direct loss of species modeled habitat for mid-valley fairy shrimp under the Reduced Permit Term Alternative would be approximately 13,774 acres, primarily within the UDA. In addition, indirect impacts on modeled habitat would be approximately 148 acres. The total impact to modeled habitat, including direct and indirect impacts, would be 13,921 acres (Table 9-42). This exceeds the approximately 13,220 acres of total impact estimated for the No Action/No Project Alternative (Table 9-4) by approximately 701 acres.

Of the direct habitat loss, approximately 7,252 acres would occur within the MCRA, which would affect approximately 40.0% of modeled habitat within the MCRA. There would also be approximately 41 acres lost within the C/RS, which would affect approximately 0.1% of modeled habitat within the C/RS. This is less than the 48% of habitat loss estimated within the MCRA and 0.4% of habitat loss within the C/RS estimated for the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to remove 4 of the 37 occurrences of mid-valley fairy shrimp in the Planning Area, which would be 1 fewer occurrence than would be removed under the No Action/No Project Alternative.

Activities under the Reduced Permit Term Alternative would cause direct impacts to approximately 18,797 acres of Ricksecker's water scavenger beetle modeled habitat to development and related infrastructure. In addition to this direct impact, approximately 263 acres of indirect impact would also occur for a total impact (direct and indirect combined) of approximately 19,060 acres on Ricksecker's water scavenger beetle modeled habitat. The total impact to Ricksecker's water scavenger beetle modeled habitat would be approximately 18.5% of the existing modeled habitat in the Planning Area (Table 9-42). The total impact to Ricksecker's water scavenger beetle modeled habitat under the Reduced Permit Term Alternative would be approximately 1,153 acres greater than the approximately 17,907 acres that is estimated to occur under the No Action/No Project Alternative (Table 9-4).

The Reduced Permit Term Alternative is not expected to remove any of the eight occurrences of Ricksecker's water scavenger beetle in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The Reduced Permit Term Alternative future urban development and related infrastructure would cause direct impacts through the loss of approximately 2,139 acres of modeled habitat for dwarf downingia. In addition to this direct impact, approximately 30 acres of indirect impact would also occur for a total impact of approximately 2,167 acres on dwarf downingia modeled habitat. The total impact, including direct and indirect impacts, to dwarf downingia modeled habitat would be approximately 9% of the existing modeled habitat in the Planning Area (Table 9-42). The total impact to dwarf downingia modeled habitat under the Reduced Permit Term Alternative would be approximately 129 acres greater than the approximately 2,038 acres of impact estimated to occur under the No Action/No Project Alternative (Table 9-4).

The Reduced Permit Term Alternative is not expected to remove any of the 10 documented occurrences of dwarf downingia in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The Reduced Permit Term Alternative would cause permanent loss of approximately 8,031 acres land cover types suitable for Ahart's dwarf rush due to development and related infrastructure. In addition to this direct impact, approximately 98 acres of indirect impact would also occur for a total impact (direct and indirect impacts combined) of approximately 8,130 acres on Ahart's dwarf rush modeled habitat. The total impact to Ahart's dwarf rush modeled habitat would be approximately 32.3% of the existing modeled habitat in the Planning Area (Table 9-42). The total impact to Ahart's dwarf rush modeled habitat under the Reduced Permit Term Alternative would be approximately 69 acres greater than the approximately 8,061 acres estimated to occur under the No Action/No Project Alternative (Table 9-4).

The Reduced Permit Term Alternative is not expected to remove the two occurrences of Ahart's dwarf rush in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The Reduced Permit Term Alternative would cause loss of approximately 8,854 acres of modeled habitat for pincushion navarretia resulting from development and related infrastructure. In addition to this direct impact, approximately 96 acres of indirect impact would also occur, for a total impact (direct and indirect impacts combined) of approximately 8,950 acres on pincushion navarretia modeled habitat. The total impact to pincushion navarretia modeled habitat would be approximately 15.6% of the existing modeled habitat in the Planning Area (Table 9-42). The total impact to pincushion navarretia modeled habitat under the Reduced Permit Term would be approximately 513 acres greater than the approximately 8,437 acres estimated to occur under the No Action/No Project Alternative (Table 9-4).

The Reduced Permit Term Alternative is not expected to remove any of the 48 occurrences of pincushion navarretia in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

The No Action/No Project Alternative would result in an estimated permanent loss of approximately 7,858 acres of modeled habitat for slender Orcutt grass and Sacramento Orcutt grass resulting from development and related infrastructure. In addition to this direct impact, approximately 80 acres of indirect impact would also occur for a total impact, including both direct and indirect impacts, of approximately 7,938 acres on for slender Orcutt grass and Sacramento Orcutt grass modeled habitat. This total impact would be approximately 23% of the total modeled habitat within the Planning Area (Table 9-42). The total impact to slender Orcutt grass and Sacramento Orcutt grass modeled habitat under the Reduced Permit Term Alternative would be approximately 176 acres greater than the approximately 7,762 acres under the No Action/No Project Alternative (Table 9-4).

Of this modeled habitat loss, approximately 5,295 acres would occur within the MCRA, which would affect approximately 50.6% of modeled habitat within the MCRA. There would also be approximately 21 acres lost within the C/RS, which would affect approximately 0.1% of modeled habitat within the C/RS. This is greater than the habitat loss estimated within the MCRA and equal to the loss within the C/RS estimated for the No Action/No Project Alternative.

The Reduced Permit Term Alternative is also expected to impact approximately 553 acres of Critical Habitat for Sacramento Orcutt grass in Critical Habitat Unit 2 and approximately 64 acres in Critical Habitat Unit 3 for a total of approximately 618 acres of Critical Habitat lost. This loss of Critical Habitat would be approximately 156 acres less than the approximately 774 acres estimated to occur under the No Action/No Project Alternative.

Approximately 553 acres of Critical Habitat for slender Orcutt grass would also be lost in Critical Habitat Unit 6, which would be approximately 157 acres less than the approximately 710 acres of Critical Habitat lost by the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to remove 2 of the 40 occurrences of Sacramento Orcutt grass and none of the 4 occurrences of slender Orcutt grass in the Planning Area, which is equal to the occurrences that would be removed under the No Action/No Project Alternative.

The Reduced Permit Term Alternative would result in loss of approximately 9,618 acres of modeled habitat for Boggs Lake hedge-hyssop resulting from development and related infrastructure. In addition to this direct impact, approximately 105 acres of indirect impact would also occur for a total impact (direct and indirect impacts combined) of approximately 9,723 acres on Boggs Lake hedge-hyssop modeled habitat. The total impact to Boggs Lake hedge-hyssop modeled habitat would be approximately 26% of the existing modeled habitat in the Planning Area (Table 9-42). This total impact under the Reduced Permit Term would be approximately 475 acres greater than the approximately 9,248 acres estimated to occur under the No Action/No Project Alternative (Table 9-4).

The Reduced Permit Term Alternative is expected to remove 3 of the existing 31 occurrences of Boggs Lake hedge-hyssop in the Planning Area, which would be 1 more occurrence than would be removed under the No Action/No Project Alternative.

The No Action/No Project Alternative would result in loss of approximately 11,680 acres of modeled habitat for legenere resulting from development and related infrastructure. In addition to this direct impact, 110 acres of indirect impact would also occur for a total impact (direct and indirect impacts combined) of 11,790 acres on legenere modeled habitat. The total impact to legenere modeled habitat would be approximately 23.1% of the existing modeled habitat in the Planning Area (Table 9-42). This total impact under the Reduced Permit Term would be 507 acres greater than the 11,283 acres estimated to occur under the No Action/No Project Alternative (Table 9-4).

The Reduced Permit Term Alternative is expected to remove 2 of the existing 62 occurrences of legenere in the Planning Area, which would be 1 more occurrence than would be removed under the No Action/No Project Alternative.

Table 9-42. Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat Under the Reduced Permit Term Alternative.

Modeled Habitat	Total Planning Area (acres)						
	Total Existing Modeled Habitat (acres)	*Direct Impacts*	*Indirect Impacts*	*Total Impacts*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Establishment/ Re-establishment*
Vernal Pool Tadpole Shrimp and Vernal Pool Fairy Shrimp							
Valley Grassland	97,349	18,114	Qualitative	18,114	18.6%	18,589	0
Vernal Pool	4,536	413	186	599	13.2%	1,199	413
Swale	1,252	270	77	347	27.7%	535	228
Stream/Creek (VPIH)	73	28	8	36	49.3%	16	8
Total Modeled Habitat	**103,210**	**18,825**	**271**	**19,096**	**18.5%**	**15,969**	**649**
Mid-Valley Fairy Shrimp							
Valley Grassland	50,061	13,203	Qualitative	13,203	26.4%	9,559	0
Vernal Pool	2,818	354	114	467	16.6%	934	354
Swale	759	217	34	251	33.1%	377	217
Total Modeled Habitat	**53,638**	**13,774**	**148**	**13,921**	**26.0%**	**10,870**	**571**
Ricksecker's Water Scavenger Beetle							
Valley Grassland	97,349	18,114	Qualitative	18,114	18.6%	18,589	0
Vernal Pool	4,536	413	186	599	13.2%	1,199	413
Swale	1,252	270	77	347	27.7%	495	228
Total Modeled Habitat	**103,137**	**18,797**	**263**	**19,060**	**18.5%**	**20,323**	**641**
Dwarf Downingia							
Valley Grassland	22,241	1,988	Qualitative	1,988	8.9%	4,246	0
Vernal Pool	1,662	96	24	119	7.2%	238	96
Swale	359	55	6	60	16.7%	90	55
Total Modeled Habitat	**24,262**	**2,139**	**30**	**2,167**	**9%**	**4,574**	**151**
Ahart's Dwarf Rush							
Valley Grassland	23,885	7,775	Qualitative	7,775	32.6%	4,560	0
Vernal Pool	937	156	32	189	20.2%	378	156
Swale	314	100	66	166	52.9%	249	100
Total Modeled Habitat	**25,136**	**8,031**	**98**	**8,130**	**32.3%**	**5,187**	**256**
Pincushion Navarretia							
Valley Grassland	54,967	8,634	Qualitative	8,634	15.7%	10,496	0
Vernal Pool	1,844	111	73	184	10.0%	368	111

Table 9-42. Direct/Indirect Impacts and Conservation of Vernal Pool Invertebrate and Plant Modeled Habitat Under the Reduced Permit Term Alternative.

Modeled Habitat	Total Planning Area (acres)						
	Total Existing Modeled Habitat (acres)	*Direct Impacts*	*Indirect Impacts*	*Total Impacts*	*% of Existing Habitat Lost*	*Modeled Habitat Preservation*	*Modeled Habitat Establishment/ Re-establishment*
Swale	627	109	23	132	21.1%	198	109
Total Modeled Habitat	**57,438**	**8,854**	**96**	**8,950**	**15.6%**	**11,062**	**220**
Slender Orcutt Grass and Sacramento Orcutt Grass							
Valley Grassland	33,265	7,704	Qualitative	7,704	23.2%	6,352	0
Vernal Pool	1,227	154	80	234	19.1%	468	154
Total Modeled Habitat	**34,492**	**7,858**	**80**	**7,938**	**23.0%**	**6,820**	**154**
Boggs Lake Hedge-Hyssop							
Valley Grassland	35,115	9,352	Qualitative	9,352	27.1%	6,705	0
Vernal Pool	1,532	250	105	355	23.2%	710	250
Seasonal Wetland	354	16	Qualitative	16	4.5%	10	13
Total Modeled Habitat	**37,001**	**9,618**	**105**	**9,723**	**26.3%**	**7,425**	**263**
Legenere							
Valley Grassland	47,526	11,356	Qualitative	11,356	23.9%	9,075	0
Vernal Pool	2,559	286	110	396	15.5%	792	286
Seasonal Wetland	886	38	Qualitative	38	4.3%	24	31
Total Modeled Habitat	**50,971**	**11,680**	**110**	**11,790**	**23.1%**	**9,891**	**317**

The Reduced Permit Term Alternative would result in the acres of modeled habitat preserved and re-established/established for vernal pool invertebrates and plants shown in Table 9-42 above. The modeled habitat preservation for all vernal pool invertebrate and plant species under the Reduced Permit Term Alternative would exceed that estimated under the No Action/No Project Alternative.

The Conservation Strategy also includes Biological Goals and Measurable Objectives that would direct the modeled habitat preservation associated with Covered Activities for vernal pool invertebrates and plants within the Planning Area. These Biological Goals and Measurable Objectives would include maintenance or improvement of habitat value for vernal pool invertebrates and plants by minimizing indirect effects on modeled habitat within preserves (e.g., development of preserve management plans and requirements for developments to include setback widths to limit edge effects). The No Action/No Project Alternative would

preserve vernal pool invertebrate and plant habitat listed previously; this habitat preservation would not be in a linked Preserve System, nor would it follow the objectives of the Conservation Strategy as would be implemented under the Reduced Permit Term Alternative.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would result in loss of a larger area of habitat for all 11 vernal pool invertebrate and plant species within the Planning Area when compared to the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve more habitat than what is estimated for the No Action/No Project Alternative for these vernal pool invertebrate and plant species.

Multiple AMMs are also included in the Reduced Permit Term Alternative that would result in the avoidance or minimization of indirect and temporary effects on vernal pool invertebrate and plant modeled habitat and provide an additional mechanism for impact avoidance and oversight.

The Reduced Permit Term Alternative would impact a smaller area of Critical Habitat for vernal pool tadpole shrimp, vernal pool fairy shrimp, slender Orcutt grass, and Sacramento Orcutt grass than the No Action/ No Project Alternative.

The Reduced Permit Term Alternative would also impact a greater area within the MCRA and an equal area within the C/RS compared to the No Action/No Project Alternative.

The Reduced Permit Term Alternative Preserve System would provide some larger vernal pool ecosystem Preserves and increased Preserve connectivity over the project-by-project mitigation under the No Action/No Project Alternative, maintaining existing vernal pool ecosystem function, which benefits vernal pool invertebrate and plant species.

Therefore, the Reduced Permit Term Alternative's impact to all vernal pool invertebrate and plant species would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, effects from the Reduced Permit Term Alternative on vernal pool invertebrates and plant species would be a ***Less Than Significant Adverse*** effect when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

The Reduced Permit Term Alternative would result in loss of a larger area of habitat for all 11 vernal pool invertebrate and plant species within the Planning Area when compared to the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve considerably more habitat than what is estimated for the No Action/No Project Alternative for these species.

In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

During the 30-year permit term of the Reduced Permit Term Alternative, modeled habitat preservation would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual preserves established in the Preserve System during the 30-year permit term of the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to vernal pool invertebrate and plant species and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** on the vernal pool invertebrate and plant species compared to the No Action/No Project Alternative baseline condition.

9.2.4.2 Effects on Valley Elderberry Longhorn Beetle and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of valley elderberry longhorn beetle are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of valley elderberry longhorn beetle modeled habitat would be approximately 610 acres, primarily within the UDA or 7.7% of the existing modeled habitat in the Planning Area (Table 9-43). This would be greater than the estimated direct impact of 554 acres for the No Action/No Project Alternative.

The Reduced Permit Term Alternative is not expected to remove any of the existing 156 occurrences of valley elderberry longhorn beetle in the Planning Area; there would also be no occurrences removed under the No Action/No Project Alternative.

Table 9-43. Effects and Modeled Habitat Conservation for Valley Elderberry Longhorn Beetle Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Total Habitat Re-establishment and/or Establishment*
Mine Tailing Riparian Woodland	641	219	34.2%	5	0
Mixed Riparian Woodland	5,785	197	3.41	338	306
Mixed Riparian Scrub	1,452	194	13.4%	350	303
TOTAL	**7,878**	**610**	**7.7%**	**693**	**609**

Indirect and temporary impacts to valley elderberry longhorn beetle would also occur under the Reduced Permit Term Alternative. These effects are listed in the species impact discussion in Section 9.2.2. The Reduced Permit Term Alternative requires Covered Activities implement the AMMs that would be applied during the permit term are listed in the valley elderberry longhorn beetle analysis in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on valley elderberry longhorn beetle. For example, STREAM-1 though STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled habitat.

Some of the elements of the AMMs described above and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The Reduced Permit Term Alternative would result in approximately 598 acres of preservation, which is greater than the zero acres estimated for the No Action/No Project Alternative. The Conservation Strategy also would re-establish/establish 609 acres of valley elderberry longhorn beetle habitat and provides for two specific objectives for valley elderberry longhorn beetle that would be implemented during the permit term: the relocation and replacement of damaged or lost elderberry shrubs and the inclusion of elderberry shrubs in riparian re-establishment/establishment projects as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 56 more acres of habitat for valley elderberry longhorn beetle within the Planning Area than is estimated for the No Action/No Project Alternative; however, the Reduced Permit Term and the No Action/No Project Alternative would both re-establish/establish an equal number of acres to result in a no net loss of acreage for the species. Also, the Reduced Permit Term Alternative would preserve approximately 598 more of modeled habitat, while the No Action/No Project Alternative is estimated to preserve none. Additionally, the Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs, such as increased stream setbacks, are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on valley elderberry longhorn beetle individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on valley elderberry longhorn beetle would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, the Reduced Permit Term Alternative would have ***No Effect*** on valley elderberry longhorn beetle when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in the loss of approximately 610 acres of modeled valley elderberry longhorn beetle habitat within the Planning Area, which is approximately 56 acres greater than the loss than under the No Action/No Project Alternative. However, as discussed previously, both alternatives are anticipated to mitigate these losses to a no net loss of acreage. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30-years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of valley elderberry longhorn beetle. The Reduced Permit Term Alternative would

result in the preservation of 598 more acres of valley elderberry longhorn beetle habitat than under the No Action/No Project Alternative. In addition, this modeled habitat preservation would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to valley elderberry longhorn beetle and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to valley elderberry longhorn beetle compared to the No Action/No Project Alternative baseline condition.

9.2.4.3 Effects on California Tiger Salamander (Central Valley Population) and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of California tiger salamander (Central Valley population) in the Planning Area are described in detail in Appendix G.

The maximum anticipated direct loss of modeled habitats for California tiger salamander would be approximately 1,761 acres of upland (2.2% of existing) and approximately 85 acres of aquatic habitat (1.9% of existing), for a total of 1,846 acres of direct loss to modeled habitat (Table 9-44). These impacts would be very similar to the estimated direct impact from the No Action/No Project Alternative of approximately 1,847 acres.

The Reduced Permit Term Alternative is not expected to remove any of the existing 31 occurrences of California Tiger salamander in the Planning Area; there would also be no occurrences removed under the No Action/No Project Alternative.

Table 9-44. Direct Effects and Modeled Habitat Conservation for California Tiger Salamander Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing	*Direct Effect*	*Indirect Effect*	*Total Habitat Lost*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Upland Habitat							
Blue Oak Savanna	3,322	0	Qualitative	0	0.0%	0	0
Blue Oak Woodland	3,774	0	Qualitative	0	0.0%	0	0
Valley Grassland	78,274	1,761	Qualitative	1,761	*2.2%*	14,946	0
Total Upland Habitat	*85,369*	*1,761*	*Qualitative*	*1,761*	*2.1%*	*14,946*	*0*
Aquatic Habitat							
Vernal Pool	3,033	58	0	58	*1.9%*	116	58
Seasonal Wetland	1,391	27	Qualitative	27	*1.9%*	17	22
Total Aquatic Habitat	*4,425*	*85*	*0*	*85*	*1.9%*	*133*	*80*
Grand Total	**89,794**	**1,846**	**0**	**1,846**	***2.1%***	**15,079**	**80**

The Reduced Permit Term Alternative is expected to result in the loss of approximately 46 acres of upland habitat and 6 acres of aquatic habitat within the C/RS. This is 7 acres less than the expected habitat loss under the No Action/No Project Alternative.

None of the 10,193 acres of designated Critical Habitat for the species is expected to be removed under the Reduced Permit Term Alternative or the No Action/No Project Alternative.

Indirect effects on modeled California tiger salamander habitat would also occur under the Reduced Permit Term Alternative. These indirect effects would be the same in type and character as those discussed and analyzed qualitatively for the No Action/No Project in Section 9.2.2. There would be no quantified indirect effects under the Reduced Permit Term Alternative, which would be approximately 4 acres less than the quantified indirect impact under the No Action/No Project Alternative.

The Reduced Permit Term Alternative requires Covered Activities during the permit term to implement the AMMs listed in the California tiger salamander analysis in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on valley elderberry longhorn beetle. For example, ROAD-2 would require wildlife crossing structures and maintain connectivity between modeled habitats, while CTS-7 would limit rodent control to developed portions of project sites, allowing for burrow creation that provides habitat for California tiger salamander. While both of

these AMMs may be applied to projects under the No Action/No Project Alternative, they would likely be applied less frequently and not within all modeled habitat.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on California tiger salamander modeled habitat that would occur under the Reduced Permit Term Alternative are the same in type and character as those analyzed for the species under the No Action/No Project Alternative in Section 9.2.2. The AMMs that would be applied during the permit term to avoid or minimize these temporary effects are listed in the species analysis for the Proposed Action in Section 9.2.3. This would result in reduced temporary impacts to California tiger salamander when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would include preservation of approximately 15,079 acres of habitat for California tiger salamander. This is greater than the estimated 9,689 acres of modeled habitat preservation under the No Action/No Project Alternative. The Reduced Permit Term Alternative would also re-establish/establish 80 acres of modeled habitat for California tiger salamander.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately the same number of acres of habitat for California tiger salamander within the Planning Area as is estimated for the No Action/No Project Alternative, and an equal number of acres within the C/RS. However, the Reduced Permit Term Alternative would result in preservation of approximately 5,390 acres more modeled habitat for California tiger salamander than is estimated to result from the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid or minimize indirect and temporary effects on California tiger salamander individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the

Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on California tiger salamander when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described above for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in the loss of approximately 1,846 acres of modeled California tiger salamander beetle habitat within the Planning Area, which is approximately 1 acre smaller than the loss than under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 year of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of California tiger salamander. The Reduced Permit Term Alternative would result in preservation of additional acres of California tiger salamander habitat that exceed the preservation under the No Action/No Project Alternative by approximately 5,390 acres. During the 30-year permit term of the Reduced Permit Term Alternative, this preservation would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to California tiger salamander and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for California tiger salamander than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** for California tiger salamander compared to the No Action/No Project Alternative baseline condition.

9.2.4.4 Effects on Western Spadefoot and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of western spadefoot in the Planning Area are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated direct loss of modeled habitats for western spadefoot would be approximately 23,719 acres of upland habitat (approximately 15.8% of existing) and approximately 1,107 acres of aquatic breeding habitat (approximately 9.5% of existing) for the species, for a total direct loss of 24,826 acres of modeled habitat (Table 9-45). This exceeds the estimated loss of 24,586 acres of modeled habitat under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to remove 3 of the existing 41 occurrences of western spadefoot in the Planning Area, which would be 4 fewer occurrences than would be removed under the No Action/No Project Alternative.

Indirect effects on modeled western spadefoot habitat would also occur under the Reduced Permit Term Alternative. These indirect effects would be the same in type and character as those discussed and analyzed qualitatively for the No Action/No Project in Section 9.2.2. There would be approximately 177 acres of quantified indirect effects under the Reduced Permit Term Alternative, which would be approximately 84 acres less than the quantified indirect impact under the No Action/No Project Alternative. The total impact, direct impact and indirect impact combined, to western spadefoot under the Reduced Permit Term Alternative would be approximately 25,003 acres, which is greater than the estimated total impact under the No Action/No Project Alternative of 24,847 acres (Table 9-7).

Table 9-45. Direct Effects and Modeled Habitat Conservation for Western Spadefoot Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing	*Direct Effect*	*Indirect Effect*	*Total Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Upland Habitat							
Blue Oak Savanna	5,637	38	Qualitative	38	0.7%	37	37
Blue Oak Woodland	9,132	9	Qualitative	9	0.1%	9	9
Valley Grassland	135,094	23,671	Qualitative	23,671	17.5%	18,589	0
Total Upland Habitat	*149,863*	*23,719*	*Qualitative*	*23,719*	*15.8%*	*18,635*	*46*
Aquatic Habitat							
Vernal Pool	4,536	413	130	543	12.0%	1,086	413
Swale	1,252	269	40	309	24.7%	503	227
Seasonal Wetland	2,600	110	Qualitative	110	4.2%	70	91
Open Water	2,344	165	Qualitative	165	7.0%	43	104
Stream/Creek	2,674	122	Qualitative	122	4.6%	122	105
Stream/Creek (VPIH)	73	28	7	35	47.9%	16	8
Total Aquatic Habitat	*13,479*	*1,107*	*177*	*1,284*	*9.5%*	*1,840*	*948*
Grand Total	**163,342**	**24,826**	**177**	**25,003**	**15.3%**	**20,475**	**994**

The Reduced Permit Term Alternative requires Covered Activities implement the AMMs that would be applied during the permit term; they are listed in the western spadefoot analysis in Section 9.2.3.

Relative to the project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on western spadefoot. For example, ROAD-2 would require wildlife crossing structures and maintain connectivity between modeled habitats, and EDGE-4 would require that stormwater runoff be directed away from Preserves, which would limit exposure of western spadefoot within Preserves to urban runoff that may contain pesticides and petroleum products. While both of these AMMs may be applied to projects under the No Action/No Project Alternative, they would likely be applied less frequently.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP

would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on western spadefoot and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2, The AMMs that would be required during the permit term that would reduce these temporary effects on western spadefoot during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to western spadefoot when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would include preservation of approximately 20,475 acres of modeled habitat for western spadefoot, which would be greater than the 13,600 acres of modeled habitat estimated to be conserved under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would establish/re-establish approximately 994 acres of modeled habitat for western spadefoot, along with Biological Goals and Measurable Objectives that support modeled habitat preservation for the species within the Planning Area as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 156 more acres of habitat for western spadefoot within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 6,875 acres more habitat than what is estimated for the No Action/No Project Alternative. In addition, the Preserve System implemented during the permit term would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid or minimize indirect and temporary effects on western spadefoot modeled habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on western spadefoot would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have ***No Effect*** on western spadefoot when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described previously for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 25,001 acres of western spadefoot modeled habitat within the Planning Area, which is approximately 156 acres greater than the total impact under the No Action/No Project Alternative. However, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as increased stream setbacks and setbacks to avoid impacts to vernal pool hydrology, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of western spadefoot, and the Reduced Permit Term Alternative would result in approximately 6,875 more acres of western spadefoot habitat preserved than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to western spadefoot and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Impact*** to western spadefoot compared to the No Action/No Project Alternative baseline condition.

9.2.4.5 Effects on Giant Garter Snake and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of giant garter snake in the Planning Area are described in detail in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitats for giant garter snake would be approximately 2,506 acres, including approximately 2,319 acres of upland habitat (approximately 8.3% of existing) and approximately 187 acres of aquatic habitat (approximately 2.6% of existing) (Table 9-46). This is approximately 5 acres greater than the estimated 2,501 total acres lost under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is not expected to remove any of the existing 14 occurrences of giant garter snake in the Planning Area; there would also be no occurrences removed under the No Action/No Project Alternative.

Table 9-46. Direct Effects and Modeled Habitat Conservation for Giant Garter Snake Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Upland Habitat					
Mixed Riparian Scrub	1,044	134	12.8%	167	167
Valley Grassland	26,825	2,185	8.1%	5,122	0
Total Upland Habitat	*27,869*	*2,319*	*8.3%*	*5,289*	*167*
Aquatic Habitat					
Seasonal Wetland	1,625	41	2.5%	27	34
Freshwater Marsh	2,589	80	3.1%	58	69
Open Water	1,282	28	2.2%	7	18
Streams/Creeks	1,794	38	2.1%	38	33
Total Aquatic Habitat	*7,290*	*187*	*2.6%*	*130*	*154*
Grand Total	**35,159**	**2,506**	**7.1%**	**5,419**	**321**

Indirect effects on giant garter snake modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of HCP AMMs during the permit term would reduce indirect impacts on giant garter snake. For example, STREAM-2 and STREAM-3 would increase setback distances on UDA streams and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled habitat.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on giant garter snake and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on giant garter snake during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to giant garter snake when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would include preservation of approximately 5,419 acres of modeled habitat for giant garter snake. This modeled habitat preservation is 2,142 acres greater than that estimated for the No Action/No Project Alternative of 3,277 acres. The Conservation Strategy implemented during the permit term would establish/re-establish approximately 321 acres of upland and aquatic habitat for giant garter snake, and implement specific biological objectives for the modeled habitat preservation of the species in the Planning Area as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact 5 acres more habitat for giant garter snake within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Reduced Permit Term Alternative would preserve approximately 2,142 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System established during the permit term would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid or minimize indirect and temporary effects on giant garter snake individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact on giant garter snake would be similar to that of the No Action/No Project Alternative, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Reduced Permit Term Alternative would have ***No Effect*** on giant

garter snake when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in the loss of approximately 2,506 acres of modeled giant garter snake habitat within the Planning Area, which is 5 acres greater than the loss than under the No Action/No Project Alternative. In addition, the HCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy also would include Biological Goals and Measureable Objectives specific to the conservation of giant garter snake. The Reduced Permit Term Alternative would result in preservation of approximately 2,142 more acres of giant garter snake habitat than under the No Action/No Project Alternative; those acres would be preserved within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative.

The incremental effects of the Reduced Permit Term Alternative on giant garter snake would be similar to the effects that would occur under the No Action/No Project Alternative. Therefore, the Reduced Permit Term Alternative would result in ***No Effect*** for giant garter snake compared to the No Action/No Project Alternative baseline condition.

9.2.4.6 Effects on Western Pond Turtle and Its Habitat

The life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of western pond turtle in the Planning Area are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated direct loss of modeled habitats for the species would be approximately 11,356 acres, including approximately 11,022 acres of upland habitat (9.9% of existing) and approximately 334 acres of aquatic habitat(5.3% of existing) (Table 9-47). This is

less than the total estimated loss under the No Action/No Project Alternative of 12,160 acres, including 11,783 of upland and 377 acres of aquatic habitat.

The Reduced Permit Term Alternative is not expected to remove any of the existing 19 occurrences of western pond turtle in the Planning Area, which would be the 1 fewer occurrence than would be removed under the No Action/No Project Alternative.

Table 9-47. Direct Effects and Modeled Habitat Conservation for Western Pond Turtle Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Upland Habitat					
Blue Oak Woodland	7,610	9	0.1%	9	9
Blue Oak Savanna	4,825	35	0.7%	35	35
Valley Grassland	91,580	10,605	11.6%	12,596	0
Mine Tailing Riparian Woodland	306	41	13.4%	5	0
Mixed Riparian Woodland	5,347	183	3.4%	230	241
Mixed Riparian Scrub	1,178	149	12.6%	204	195
Total Upland Habitat	*110,846*	*11,022*	*9.9%*	*13,079*	*480*
Aquatic Habitat					
Freshwater Marsh	2,240	104	4.6%	76	90
Open Water	1,441	108	7.5%	28	68
Stream/Creek	2,674	122	4.6%	122	105
Total Aquatic Habitat	*6,355*	*334*	*5.3%*	*226*	*263*
Grand Total	**117,201**	**11,356**	**9.7%**	**13,239**	**679**

Indirect effects on western pond turtle modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/No Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on western pond turtle. For example, STREAM-2 and STREAM-3 would increase setback distances on UDA streams and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled habitat.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices

and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on western pond turtle and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on western pond turtle during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to western pond turtle when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in the preservation of approximately 13,079 acres of upland habitat and 226 acres of aquatic habitat. This 13,239 acres total modeled habitat preservation would be greater than the estimated modeled habitat preservation under the No Action/No Project Alternative of 8,085 acres. The Conservation Strategy implemented during the permit term would establish/re-establish approximately 679 acres of upland and aquatic habitat for western pond turtle, and implement specific biological objectives for the modeled habitat preservation of the species in the Planning Area as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 804 fewer acres of habitat for western pond turtle within the Planning Area than is estimated for the No Action/No Project Alternative. In addition, the Reduced Permit Term Alternative would preserve approximately 5,154 more acres of western pond turtle modeled habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid or minimize indirect and temporary effects on western pond turtle individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided above, the Reduced Permit Term Alternative would have a ***Significant Beneficial*** effect on western pond turtle when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in the loss of 11,356 acres of modeled western pond turtle habitat within the Planning Area, which is 804 acres less than the loss than under the No Action/No Project Alternative. In addition, the HCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the permit term also would include Biological Goals and Measureable Objectives specific to the conservation of western pond turtle. The Reduced Permit Term Alternative would result in the preservation of approximately 5,154 more acres of western pond turtle habitat than under the No Action/No Project Alternative. In addition, preservation that occurs during the 30-year permit term of the Reduced Permit Term Alternative would be within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives similar to those of the SSHCP applicable to western pond turtle and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for western pond turtle than would occur under the No Action/No Project Alternative. Therefore, the Reduced Permit Term Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect for western pond turtle compared to the No Action/No Project Alternative baseline condition.

9.2.4.7 Effects on Cooper's Hawk and Its Habitat

Appendix G describes the life history, habitat requirements, documented occurrences, and existing acres of modeled habitat of Cooper's hawk in the Planning Area.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of species modeled habitat for Cooper's hawk would be approximately 657 acres, including approximately 619 acres of nesting/foraging habitat (3.6% of existing), and approximately 38 acres of foraging habitat (0.7% of existing) (Table 9-48). These percentages do not take into account the use of developed areas for nesting by Cooper's hawk, which if taken into account would increase the percentage of remaining existing habitat. This loss of modeled habitat is less than the estimated loss of 693 acres under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to remove 2 of the existing 20 occurrences of Cooper's hawk in the Planning Area, which would be the same number of occurrences as would be removed under the No Action/No Project Alternative.

Table 9-48. Direct Effects and Modeled Habitat Conservation for Cooper's Hawk Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Habitat Re-establishment and/ or Establishment*
Nesting/Foraging Habitat					
Blue Oak Woodland	9,132	9	0.1%	9	9
Mine Tailing Riparian Woodland*	641	219	34.2%	5	0
Mixed Riparian Woodland	5,785	197	3.4%	338	306
Mixed Riparian Scrub	1,451	194	13.4%	350	303
Total Nesting/Foraging Habitat	*17,009*	*619*	*3.6%*	*702*	*618*
Foraging Habitat					
Blue Oak Savanna	5,637	38	0.7%	37	37
Total Foraging Habitat	*5,637*	*38*	*0.7%*	*37*	*37*
Grand Total	**22,646**	**657**	**2.9%**	**739**	**655**

* Habitat re-establishment/establishment for Mine Tailing Riparian Woodland can be either Mixed Riparian Woodland or Mixed Riparian Scrub.

Indirect effects on Cooper's hawk modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on Cooper's hawk. For example, STREAM-2 and STREAM-3 would increase setback distances on UDA streams and minor tributaries over what would be required under the No Action/No Project Alternative, increasing protection of riparian modeled habitat.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on Cooper's hawk and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on Cooper's hawk during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to Cooper's hawk when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in preservation of approximately 702 acres of nesting/foraging habitat and 37 acres of foraging habitat, which would be more than the 70 acres estimated for the No Action/No Project Alternative. Additionally, the Conservation Strategy implemented during the permit term would also, establish/re-establish a total of approximately 655 acres of habitat for Cooper's hawk and would implement biological objectives to conserve the species within the Planning Area as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 36 fewer acres of habitat for Cooper's hawk within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Reduced Permit Term Alternative would preserve approximately 632 more acres of modeled habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid or minimize indirect and temporary effects on Cooper's hawk individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided above, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on Cooper's hawk when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described above for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to 657 acres of Cooper's hawk modeled habitat within the Planning Area, which is 36 acres less than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as increased stream setbacks, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of Cooper's hawk. The Reduced Permit Term Alternative would result in preservation of 632 more acres of Cooper's hawk habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to Cooper's hawk and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for Cooper's hawk than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in a ***Significant Beneficial Cumulative Effect*** for Cooper's hawk compared to the No Action/No Project Alternative baseline condition.

9.2.4.8 Effects on Tricolored Blackbird and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area for tricolored blackbird are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitats for tricolored blackbird would be approximately 33,206 acres, including approximately 29,694 acres of nesting/foraging habitat (15.8% of existing) and approximately 3,512 acres of foraging habitat (14.5% of existing) (Table 9-49). This is greater than the estimated habitat loss under the No Action/No Project Alternative of 32,907 acres, including 29,389 acres of nesting/foraging and 3,518 acres of foraging habitat.

Indirect effects on tricolored blackbird modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Table 9-49. Direct Effects and Modeled Habitat Conservation for Tricolored Blackbird Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/ or Establishment*
Nesting/Foraging Habitat					
Valley Grassland	135,112	23,671	17.5%	18,589	0
Cropland	47,905	5,465	11.4%	5,299	0
Seasonal Wetland	2,600	110	4.2%	70	91
Freshwater Marsh	2,922	137	4.7%	100	119
Total Nesting/Foraging Habitat	*188,539*	*29,694*	*15.8%*	*24,058*	*210*
Foraging Habitat					
Irrigated Pasture-Grassland	15,991	2,665	16.7%	2,642	0
Vernal Pool	4,536	413	9.1%	1,199	413
Swale	1,222	269	22.0%	495	216
Open Water	2,344	165	7.0%	43	104
Total Foraging Habitat	*24,093*	*3,512*	*14.5%*	*4,379*	*733*
Grand Total	**212,632**	**33,206**	**15.6%**	**28,437**	**943**

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on tricolored blackbird. For example, EDGE-4 would require that stormwater runoff be directed away from Preserves, which would limit exposure of tricolor blackbird within Preserves to urban runoff that may contain pesticides and petroleum products. TCB-5 would restrict the use of pesticides on Preserves between January 1 and July 15, further reducing exposure of tricolored blackbird to

pesticides. While these AMMs may be applied to projects under the No Action/No Project Alternative, they would likely be applied less frequently.

Some of the elements of the AMMs described above and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on tricolored blackbird and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on tricolored blackbird during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to tricolored blackbird when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in preservation of approximately 24,058 acres of nesting/foraging habitat and approximately 4,739 acres of foraging habitat. This modeled habitat preservation exceeds the estimated 21,148 total acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would also establish/ re-establish approximately 943 acres of habitat for tricolored blackbird and implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 299 acres more modeled habitat for tricolored blackbird within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 2,910 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid or minimize indirect and temporary effects on tricolored blackbird individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on tricolored blackbird would be similar to that of the No Action/No Project Alternative, and based on the significance

criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on tricolored blackbird when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described above for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 33,206 acres of tricolored blackbird modeled habitat within the Planning Area, which is approximately 299 acres greater than the total impact under the No Action/No Project Alternative. However, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of tricolored blackbird. The Reduced Permit Term would result in the preservation of approximately 2,910 more acres of tricolored blackbird habitat than the preservation under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to tricolored blackbird and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to tricolored blackbird compared to the No Action/No Project Alternative baseline condition.

9.2.4.9 Effects on Western Burrowing Owl and Its Habitat

Habitat use, natural history, and documented occurrences within the Planning Area for western burrowing owl are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitat for western burrowing owl would be approximately 32,972 acres (15.5% of existing) (Table 9-50). This is greater than the expected habitat loss under the No Action/No Project Alternative of 32,711 acres.

The Reduced Permit Term Alternative is expected to remove 11 of the existing 97 occurrences of western burrowing owl in the Planning Area, which would be 1 more occurrence than would be removed under the No Action/No Project Alternative.

Indirect effects on western burrowing owl modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Table 9-50. Direct Effects and Modeled Habitat Conservation for Western Burrowing Owl Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Wintering Habitat					
Vernal Pool	4,536	413	9.1%	1,199	413
Seasonal Wetland	2,600	111	4.3%	70	91
Swale	1,252	270	21.6%	535	228
Stream/Creek (VPIH)	73	28	38.4%	16	8
Total Wintering Habitat	*8,461*	*822*	*9.7%*	*1,820*	*740*
Nesting/Foraging Habitat					
Cropland	47,905	5,465	11.4%	5,299	0
Irrigated Pasture-Grassland	15,991	2,665	16.7%	2,642	0
Valley Grassland	135,112	23,671	17.5%	18,589	0
Blue Oak Savanna	5,637	38	0.7%	37	37
Total Nesting/Foraging Habitat	*204,645*	*32,150*	*15.7%*	*26,567*	*37*
Total Modeled Habitat	**213,106**	**32,972**	**15.5%**	**28,387**	**777**

Relative to the typical project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on western burrowing owl. For

example, EDGE-3 would require 50-foot setback distances between urban development and Preserves which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled burrowing owl habitat from indirect impacts.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on western burrowing owl and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on western burrowing owl during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to western burrowing owl when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in the preservation of approximately 28,387 acres of modeled habitat. This exceeds the estimated 21,188 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would establish/re-establish a total of approximately 777 acres of habitat for western burrowing owl and would implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 261 acres more modeled habitat for western burrowing owl within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 7,199 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on western burrowing owl individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on western burrowing owl would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on western burrowing owl when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to 32,972 acres of western burrowing owl modeled habitat within the Planning Area, which is 261 acres greater than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of western burrowing owl. The Reduced Permit Term Alternative would result in the preservation of approximately 7,199 more acres of western burrowing owl habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to western burrowing owl and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to western burrowing owl compared to the No Action/No Project Alternative baseline condition.

9.2.4.10 Effects on Ferruginous Hawk and Its Habitat

The life history, suitable habitat in the Planning Area, and documented occurrences of ferruginous hawk are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of species modeled habitat for ferruginous hawk would be approximately 27,130 acres of foraging habitat (17.2% of existing) (Table 9-51). This is greater than the expected loss under the No Action/No Project Alternative of 26,887 acres.

The Reduced Permit Term Alternative is not expected to remove any of the existing 26 occurrences of ferruginous hawk in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

Table 9-51. Direct Effects and Modeled Habitat Conservation for Ferruginous Hawk Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Remaining*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Foraging Habitat					
Valley Grassland	135,112	23,671	17.5%	18,589	0
Irrigated Pasture-Grassland	15,991	2,665	16.7%	2,642	0
Seasonal Wetland	2,600	111	4.3%	70	91
Vernal Pool	4,536	413	9.1%	846	413
Swale	1,252	270	21.6%	495	216
Total Foraging Habitat	**159,491**	**27,130**	**17.0%**	**22,642**	**720**

Indirect effects on ferruginous hawk modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on ferruginous hawk. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled ferruginous hawk habitat from indirect impacts.

Some of the elements of the AMMs described above and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on ferruginous hawk and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on ferruginous hawk during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to ferruginous hawk when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in the preservation of approximately 22,642 acres of nesting/foraging habitat. This exceeds the estimated 15,942 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would establish/re-establish a total of approximately 720 acres of habitat for ferruginous hawk and implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 243 acres more modeled habitat for ferruginous hawk within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 6,700 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on ferruginous hawk individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on ferruginous hawk would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on ferruginous hawk when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 27,439 acres of ferruginous hawk modeled habitat within the Planning Area, which is approximately 553 acres greater than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of ferruginous hawk. The Reduced Permit Term Alternative would result in the preservation of approximately 389 more acres of ferruginous hawk habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to ferruginous hawk and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to ferruginous hawk compared to the No Action/No Project Alternative baseline condition.

9.2.4.11 Effects on Swainson's Hawk and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of Swainson's hawk are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of modeled habitats for Swainson's hawk would be approximately 32,986 acres, including approximately 391 acres of nesting habitat (5.4% of

existing) and approximately 32,595 acres of foraging habitat (15.8% of existing) (Table 9-52). This exceeds the estimated loss under the No Action/No Project Alternative, which totals approximately 32,888 acres, including 336 acres of nesting and 32,552 acres of foraging habitat.

The Reduced Permit Term Alternative is expected to remove 37 of the existing 410 occurrences of Swainson's hawk in the Planning Area, which would be 2 more occurrences than would be removed under the No Action/No Project Alternative.

Table 9-52. Direct Effects and Modeled Habitat Conservation for Swainson's Hawk Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Total Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Nesting Habitat					
Mixed Riparian Woodland	5,785	197	3.4%	229	250
Mixed Riparian Scrub	1,449	194	13.4%	241	242
Total Nesting Habitat	*7,234*	*391*	*5.4%*	*470*	*492*
Foraging Habitat					
Valley Grassland	133,705	23,671	17.7%	18,589	0
Cropland	47,905	5,465	11.4%	5,299	0
Irrigated Pasture-Grassland	15,991	2,665	16.7%	2,642	0
Vernal Pool	4,536	413	9.1%	1,199	413
Seasonal Wetland	2,600	111	4.2%	70	91
Swale	1,252	270	21.6%	495	216
Total Foraging Habitat	*205,989*	*32,595*	*15.8%*	*28,294*	*720*
Grand Total	**213,223**	**32,986**	**15.5%**	**28,764**	**1,212**

Indirect effects on Swainson's hawk modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on Swainson's hawk. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled Swainson's hawk habitat from indirect impacts.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements

implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on Swainson's hawk and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on Swainson's hawk during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to Swainson's hawk when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in the preservation of approximately 28,764 acres of modeled habitat, which exceeds the estimated 21,061 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would establish/re-establish a total of approximately 1,212 acres of habitat for Swainson's hawk, and implement biological objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 1,098 acres more modeled habitat for Swainson's hawk within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 7,703 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on Swainson's hawk individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on Swainson's hawk would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse Impact*** on Swainson's hawk when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described previously for the No Action/No Project Alternative above (Section 9.2.2).

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to 32,986 acres of Swainson's hawk modeled habitat within the Planning Area, which is 1,098 acres greater than the total impact estimated under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of Swainson's hawk. The Reduced Permit Term Alternative would result in the preservation of approximately 7,703 more acres of Swainson's hawk habitat than the preservation under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to Swainson's hawk and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to Swainson's hawk compared to the No Action/No Project Alternative baseline condition.

9.2.4.12 Effects on Northern Harrier and Its Habitat

Habitat use, natural history, and documented occurrences within the Planning Area for northern harrier are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of species modeled habitats totals approximately 32,732 acres, including approximately 31,801 acres of nesting/foraging habitat (16.1% of existing) and approximately 931 acres of foraging habitat (8.2% of existing) (Table 9-53). This is slightly less than the estimated total loss of approximately 32,734 acres of northern harrier habitat, including approximately 31,913 acres of nesting/foraging and approximately 821 acres of foraging habitat under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is expected to remove 4 of the existing 70 occurrences of northern harrier in the Planning Area, which would be two more occurrences than would be removed under the No Action/No Project Alternative.

Table 9-53. Direct Effects and Modeled Habitat Conservation for Northern Harrier Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Nesting/Foraging Habitat					
Valley Grassland	135,112	23,671	17.5%	18,589	0
Cropland	47,905	5,465	11.4%	5,299	0
Irrigated Pasture-Grassland	15,991	2,665	16.7%	2,642	0
Total Nesting/Foraging Habitat	*199,008*	*31,801*	*16.0%*	*26,530*	*0*
Foraging Habitat					
Vernal Pool	4,536	413	9.1%	1,199	413
Seasonal Wetland	2,600	111	4.3%	70	91
Freshwater Marsh	2,922	137	4.7%	100	119
Swale	1,252	270	21.6%	495	216
Total Foraging Habitat	*11,310*	*931*	*8.2%*	*1,864*	*839*
Grand Total	**210,318**	**32,732**	**15.6%**	**28,394**	**839**

Indirect effects on northern harrier modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on northern harrier. For example, EDGE-3 would require 50-foot setback distances between urban development and

Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled northern harrier habitat from indirect impacts.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on northern harrier and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on northern harrier during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to northern harrier when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in preservation of approximately 28,394 acres of modeled habitat. This exceeds the estimated 21,077 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would establish/re-establish a total of approximately 839 acres of habitat for northern harrier and would implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 2 acres less modeled habitat for northern harrier within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Reduced Permit Term Alternative would preserve approximately 7,317 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on northern harrier individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on Cooper's hawk

when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct impacts to 32,732 acres of northern harrier modeled habitat within the Planning Area, which is 2 acres less than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of northern harrier. The Reduced Permit Term Alternative would result in the preservation of approximately 7,317 more acres of northern harrier habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative. The individual preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to northern harrier and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for northern harrier than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** for northern harrier compared to the No Action/No Project Alternative baseline condition.

9.2.4.13 Effects on White-Tailed Kite and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of white-tailed kite are discussed in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated total loss of modeled habitats for white-tailed kite would be approximately 33,252 acres, including approximately 425 acres of nesting habitat (2.7% of existing), 194 acres of nesting/foraging habitat (13.4% of existing), and approximately 32,633 acres of foraging habitat (15.3% of existing) (Table 9-54). This is less than the estimated total loss under the No Action/No Project Alternative of approximately 33,284 acres.

Table 9-54. Direct Effects and Modeled Habitat Conservation for White-Tailed Kite Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Nesting Habitat					
Blue Oak Woodland	9,132	9	0.1%	9	9
Mixed Riparian Woodland	5,785	197	3.4%	338	306
Mine Tailing Riparian Woodland	641	219	34.2%	5	0
Total Nesting Habitat	*15,558*	*425*	*2.7%*	*352*	*315*
Nesting/Foraging Habitat					
Mixed Riparian Scrub	1,451	194	**13.4%**	350	303
Total Nesting/Foraging Habitat	*1,451*	*194*	*13.4%*	*350*	*303*
Foraging Habitat					
Valley Grassland	135,112	23,671	17.5%	18,589	0
Cropland	47,905	5,465	11.4%	5,299	0
Irrigated Pasture-Grassland	15,991	2,665	16.7%	2,642	0
Blue Oak Savanna	5,637	38	0.7%	37	37
Vernal Pool	4,536	413	9.1%	1,199	413
Seasonal Wetland	2,600	111	4.3%	70	91
Swale	1,252	270	21.6%	495	216
Total Foraging Habitat	*213,033*	*32,633*	*15.3%*	*28,331*	*757*
Grand Total	**230,042**	**33,252**	**14.5%**	**29,033**	**1,375**

Indirect effects on white-tailed kite modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the

species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on white-tailed kite. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled white-tailed kite habitat from indirect impacts.

Some of the elements of the AMMs described above and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on white-tailed kite and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on white-tailed kite during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to white-tailed kite when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in the preservation of approximately 29,033 acres of modeled habitat. This exceeds the estimated 21,321 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would establish/re-establish a total of approximately 1,375 acres of habitat for white-tailed kite and would implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 32 fewer acres of modeled habitat for white-tailed kite within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Reduced Permit Term Alternative would preserve 7,712 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on white-tailed kite individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on Cooper's hawk when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 33,252 acres of white-tailed kite modeled habitat within the Planning Area, which is approximately 32 fewer acres than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of white-tailed kite. The Reduced Permit Term Alternative would result in the preservation of approximately 7,712 more acres of white-tailed kite habitat than the preservation under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to white-tailed kite and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for white-tailed kite than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** for white-tailed kite compared to the No Action/No Project Alternative baseline condition.

9.2.4.14 Effects on Greater Sandhill Crane and Its Habitat

Appendix G discusses the habitat use, natural history, and documented occurrences of greater sandhill crane in the Planning Area.

Direct and Indirect Effects of the Alternative

The maximum anticipated direct loss of species modeled habitats for greater sandhill crane would be approximately 8,271 acres (9.7% of existing), including approximately 59 acres of roosting, approximately 131 acres of roosting/foraging, and approximately 8,081 acres of foraging habitat (Table 9-55). This is less than the estimated total loss of 9,499 acres under the No Action/No Project Alternative.

Table 9-55. Direct Effects and Modeled Habitat Conservation for Greater Sandhill Crane Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)						
	Total Existing	*Direct Effect*	*Indirect Effect*	*Total Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Roosting/Foraging Habitat[1]							
Seasonal Wetland	1,877	58	Qualitative	58	3.2%	80	58
Freshwater Marsh	2,610	73	Qualitative	73	2.8%	53	64
Total Roosting/ Foraging Habitat	*4,487*	*131*	*Qualitative*	*131*	*3.0%*	*133*	*122*
Roosting Habitat							
Vernal Pool	1,156	59	83	142	12.3%	284	59
Total Roosting Habitat	*1,156*	*59*	*83*	*142*	*12.3%*	*284*	*59*
Foraging Habitat[2]							
Cropland	42,628	3,876	Qualitative	3,876	9.1%	3,758	0
Valley Grassland	30,585	2,534	Qualitative	2,534	8.3%	4,206	0
Irrigated Pasture-Grassland	10,908	1,671	Qualitative	1,671	15.3%	1,654	0
Total Foraging Habitat	*84,121*	*8,081*	*Qualitative*	*8,081*	*9.6%*	*9,618*	*0*
Grand Total	**85,277**	**8,271**	**83**	**8,354**	**9.6%**	**10,035**	**181**

1 Modeled roosting habitat includes these communities within 2 miles of greater sandhill crane occurrences in the Planning Area.
2 Modeled foraging habitat includes these communities within 1.75 miles of modeled roosting habitat.

Indirect effects on modeled greater sandhill crane habitat would also occur under the Reduced Permit Term Alternative. These indirect effects would be the same in type and character as those discussed and analyzed qualitatively for the No Action/No Project in Section 9.2.2. There would be 83 acres of quantified indirect effects under the Reduced Permit Term Alternative, which would be approximately 34 acres less than the quantified indirect impact under the No Action/No Project Alternative.

The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3. Relative to the project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on greater sandhill crane. For example, EDGE-4 would require that stormwater runoff be directed away from Preserves, which would limit exposure of greater sandhill crane within Preserves to urban runoff that may contain pesticides and petroleum products and that can adversely affect the hydrology of vernal pool roosting habitat.

Some of the elements of the AMMs described above and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on greater sandhill crane modeled habitat that would occur under the Reduced Permit Term Alternative are the same in type and character as those analyzed for the species under the No Action/No Project Alternative in Section 9.2.2. The AMMs that would be applied during the permit term to avoid or minimize these temporary effects are listed in the species analysis for the Proposed Action in Section 9.2.3. This would result in reduced temporary impacts to greater sandhill crane when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in preservation of approximately 10,035 acres of modeled habitat, which would be more than the estimated 8,323 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would also establish/re-establish approximately 181 acres of habitat for greater sandhill crane and would implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact 1,262 fewer acres of modeled habitat for greater sandhill crane within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Reduced Permit Term Alternative would preserve 1,712 more acres of habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would also provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and

temporary effects on greater sandhill crane individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on greater sandhill crane when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct (approximately 8,271 acres) and indirect (approximately 83 acres) impacts for a total impact of approximately 8,354 acres to greater sandhill crane modeled habitat within the Planning Area, which is approximately 1,262 acres less than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of greater sandhill crane. The Reduced Permit Term Alternative would result in the preservation of approximately 1,712 more acres of greater sandhill crane habitat than the preservation under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to greater sandhill crane and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for greater sandhill

crane than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** for greater sandhill crane compared to the No Action/No Project Alternative baseline condition.

9.2.4.15 Effects on Lesser Sandhill Crane and Its Habitat

Habitat associations and occurrence information for lesser sandhill crane in the Planning Area is provided in Appendix G.

Direct and Indirect Effects of the Alternative

The land cover types in the Planning Area that are utilized by lesser sandhill crane are the same as those previously identified for greater sandhill crane, as is the expected acres of potentially suitable habitat loss under the Reduced Permit Term Alternative.

New development and transportation infrastructure would have indirect effects on lesser sandhill crane that would be the same as those discussed previously for greater sandhill cranee. In addition, construction activities under the Reduced Permit Term Alternative may result in temporary effects as discussed for greater sandhill crane.

The Reduced Permit Term Alternative would include the implementation of the AMMs discussed previously for greater sandhill crane that would also avoid or minimize indirect impacts lesser sandhill crane during the permit term. Temporary impacts would also be avoided or minimized by the construction and species AMMs discussed for greater sandhill crane during the permit term. Although the greater sandhill crane species-specific AMMs would not apply to projects where only lesser sandhill crane is present, due to the habitat overlap of the two species both would benefit from the application of these species-specific AMMs.

The potentially suitable lesser sandhill crane habitat preserved under the Reduced Permit Term Alternative and the relation of that habitat preservation to the No Action/No Project Alternative would be the same as that for greater sandhill crane.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 1,262 fewer acres of potentially suitable habitat for lesser sandhill crane within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Reduced Permit Term Alternative would preserve approximately 1,712 more acres of habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would also provide some larger Preserves and increased

Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on lesser sandhill crane individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided above, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on lesser sandhill crane when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct (approximately 8,271 acres) and indirect (approximately 83 acres) impacts for a total impact of approximately 8,534 acres to lesser sandhill crane potentially suitable habitat within the Planning Area, which is approximately 1,262 acres less than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of greater sandhill crane that would also benefit lesser sandhill crane. The Reduced Permit Term Alternative would also result in the preservation of approximately 1,712 more acres of lesser sandhill crane habitat than the preservation under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to lesser sandhill crane and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for lesser sandhill crane than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** for lesser sandhill crane compared to the No Action/No Project Alternative baseline condition.

9.2.4.16 Effects on Loggerhead Shrike and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of loggerhead shrike are described Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated total loss of loggerhead shrike modeled habitat is approximately 33,516 acres of modeled habitat (Table 9-56). This is greater than the estimated loss under the No Action/No Project Alternative of approximately 33,144 acres.

Table 9-56. Direct Effects and Modeled Habitat Conservation for Loggerhead Shrike Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Nesting Habitat					
Mixed Riparian Woodland	5,785	197	3.4%	338	306
Mixed Riparian Scrub	1,424	194	13.6%	350	303
Mine Tailing Riparian Woodland	641	219	34.2%	5	0
Total Nesting Habitat	*7,850*	*610*	*7.8%*	*693*	*609*
Nesting/Foraging Habitat					
Valley Grassland	135,112	23,982	17.7%	24,096	0
Total Nesting/Foraging Habitat	*135,112*	*23,982*	*17.7%*	*24,096*	*0*
Foraging Habitat					
Cropland	47,905	5,465	11.4%	18,589	0
Irrigated Pasture-Grassland	15,991	2,665	16.7%	2,642	0
Vernal Pool	4,536	413	9.1%	1,199	413
Seasonal Wetland	2,600	111	4.3%	70	91
Swale	1,252	270	21.6%	495	216
Total Foraging Habitat	*72,284*	*8,924*	*12.3%*	*22,995*	*720*
Grand Total	**215,246**	**33,516**	**15.6%**	**47,784**	**1,329**

The Reduced Permit Term Alternative is not expected to remove any of the existing 34 occurrences of loggerhead shrike in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

Indirect effects on loggerhead shrike modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project avoidance and minimization measures of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on loggerhead shrike. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled loggerhead shrike habitat from indirect impacts.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on loggerhead shrike and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on loggerhead shrike during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to loggerhead shrike when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would include preservation of approximately 47,784 acres of modeled habitat. This exceeds the estimated 21,061 acres of modeled habitat preservation under the No Action/No Project Alternative. The Conservation Strategy implemented during the permit term would establish/re-establish a total of approximately 1,329 acres of habitat for loggerhead shrike, and implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 372 acres more modeled habitat for loggerhead shrike within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve 26,723 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on loggerhead shrike individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on loggerhead shrike would be slightly more than that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on loggerhead shrike when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 33,516 acres of loggerhead shrike modeled habitat within the Planning Area, which is approximately 372 acres greater than the total impact under the No Action/No Project Alternative. However, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of loggerhead shrike. The Reduced Permit Term Alternative includes preservation of approximately 26,723 more acres of loggerhead shrike habitat than the preservation under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is

anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to loggerhead shrike and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to loggerhead shrike compared to the No Action/No Project Alternative baseline condition.

9.2.4.17 Effects on Grasshopper Sparrow and Its Habitat

Habitat associations and occurrence information for grasshopper sparrow within the Planning Area is provided in Appendix G.

Direct and Indirect Effects of the Alternative

Estimated losses of potentially suitable habitat under the Reduced Permit Term Alternative would consist of approximately 2,665 acres of Irrigated Pasture-Grassland and approximately 23,671 acres of Valley Grassland for a total land cover loss of approximately 26,336 acres. Of this habitat loss, approximately 25,511 acres would occur within the UDA, and approximately 825 acres would occur outside of the UDA. This is greater than the loss of potentially suitable grasshopper sparrow habitat under the No Action/No Project Alternative of 26,210 acres.

Indirect effects on potentially suitable grasshopper sparrow habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on grasshopper sparrow. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of potentially suitable grasshopper sparrow habitat from indirect impacts.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP

would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on grasshopper sparrow and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on grasshopper sparrow during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to grasshopper sparrow when compared with the No Action/No Project Alternative under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would include preservation of approximately 21,231 acres of potentially suitable grasshopper sparrow habitat, and implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3. This exceeds the estimated 14,302 acres of potentially suitable habitat preservation under the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 126 acres more potentially suitable habitat for grasshopper sparrow within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 6,929 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on grasshopper sparrow individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on grasshopper sparrow would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on grasshopper sparrow when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct impacts to approximately 26,336 acres of potentially suitable grasshopper sparrow habitat within the Planning Area, which is approximately 126 acres greater than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives that would benefit conservation of grasshopper sparrow. The Reduced Permit Term Alternative would result in the preservation of approximately 6,929 more acres of potentially suitable grasshopper sparrow habitat than the preservation under the No Action/No Project Alternative. In addition, the habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to grasshopper sparrow and be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to grasshopper sparrow compared to the No Action/No Project Alternative baseline condition.

9.2.4.18 Effects on Song Sparrow (Modesto Population) and Its Habitat

Habitat associations and occurrence information for song sparrow in the Planning Area is provided in Appendix G. The land cover types in the Planning Area that are utilized by song sparrow are Seasonal Wetland, Freshwater Marsh, and Riparian Scrub.

Direct and Indirect Effects of the Alternative

The anticipated loss of potentially suitable habitat for song sparrow would be approximately 111 acres of Seasonal Wetland, approximately 137 acres of Freshwater Marsh, and approximately 194 acres of Mixed Riparian Scrub, which totals approximately 442 acres and is less than the approximately 448 acres estimated under the No Action/No Project Alternative.

Indirect effects on potentially suitable song sparrow habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on song sparrow. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of potentially suitable song sparrow habitat from indirect impacts.

Some of the elements of the AMMs described above and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on song sparrow and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on song sparrow during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to song sparrow when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in approximately 520 acres of modeled habitat preservation and would implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3. This exceeds the estimated 24 acres of modeled habitat preservation under the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact 6 fewer acres of potentially suitable habitat for song sparrow within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 496 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and

temporary effects on song sparrow individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on song sparrow when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 442 acres of potentially suitable song sparrow habitat within the Planning Area, which is approximately 6 fewer acres than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives that would benefit conservation of song sparrow. The Reduced Permit Term Alternative would result in preservation of approximately 496 more acres of song sparrow habitat than the preservation under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative. The individual preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to song sparrow and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for song sparrow than would occur under the No Action/No Project Alternative. However, at the scale of the

study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** for song sparrow compared to the No Action/No Project Alternative baseline condition.

9.2.4.19 Effects on Bank Swallow and Its Habitat

Habitat associations and occurrence information for bank swallow in the Planning Area is provided in Appendix G. Bank swallow is associated with large cut banks in riverine habitats and sand bluffs, where it builds nest burrows, and with surrounding areas that it uses for foraging. The two documented occurrences of nesting colonies within the Planning Area are along the Cosumnes River between Rancho Murieta and Sloughhouse.

Direct and Indirect Effects of the Alternative

The potential loss of bank swallow nesting habitat from Preserve Covered Activities and other activities under the Reduced Permit Term Alternative are analyzed qualitatively. Under this alternative, the entire Cosumnes River/Deer Creek Corridor would not be part of the Preserve System, and it is uncertain if these nesting colonies would be part of a Preserve. Should the nesting colonies be part of a Preserve, Preserve Covered Activities that remove cut banks though use of bank stabilization techniques, or that remove potential foraging habitat within proximity to nest colonies, would result in impacts to bank swallow. If the nesting colonies are not part of a Preserve, then no other Covered Activities under the Reduced Permit Term are likely to adversely affect these nesting colonies. Projects and activities under the No Action/No Project Alternative would not likely remove cut banks though use of bank stabilization techniques, or remove foraging habitat within proximity to nest colonies or result in impacts to bank swallow.

Indirect effects on potentially suitable bank swallow habitat may occur under the Reduced Permit Term Alternative, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on bank swallow. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of potentially suitable bank swallow habitat from indirect impacts.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements

implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on bank swallow habitat and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.. The AMMs that would be required during the permit term that would reduce these temporary effects on bank swallow during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to bank swallow when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period. The total acreage of potentially suitable bank swallow habitat preserved under the Reduced Permit Term Alternative is analyzed qualitatively. However, the majority of nesting and foraging habitat in the Planning Area is likely within the Cosumnes River/Deer Creek Corridor, and it is uncertain where the acres that would be preserved as part of the corridor would be located under this alternative.

Significance of Direct and Indirect Effects

Preserve Covered Activities within the Cosumnes River/Deer Creek Corridor implemented under the Reduced Permit Term Alternative would potentially impact known nesting colonies of bank swallow within the Planning Area in contrast to the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve more potentially suitable habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid or minimize indirect and temporary effects on bank swallow individuals and habitat, and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on bank swallow would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on bank swallow when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, if Preserve covered activities occur near known nest colonies, the Reduced Permit Term Alternative would result in greater direct and indirect impacts to potentially suitable bank swallow habitat within the Planning Area than under the No Action/No Project Alternative. However, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as stream and Preserve Setbacks, that would reduce indirect impacts to remaining potentially suitable habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives that would benefit conservation of bank swallow. The Reduced Permit Term Alternative would preserve more acres of bank swallow habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to bank swallow and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to bank swallow compared to the No Action/No Project Alternative baseline condition.

9.2.4.20 Effects on Western Red Bat and Its Habitat

Habitat use, natural history, documented occurrences, and existing acres of modeled habitat in the Planning Area of western red bat are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated direct loss of western red bat modeled habitat totals approximately 25,771 acres of modeled habitat. This exceeds the estimated loss under the No Action/No

Project Alternative of approximately 25,488 acres. The percentage of habitat remaining shown in Table 9-57 only applies to those natural land covers listed and is an underestimation of total habitat remaining. Western red bat is known to roost and forage in developed areas and those acres are not included in the analysis.

The Reduced Permit Term Alternative is expected to remove three of the existing seven occurrences of western red bat in the Planning Area, which would be equal to the occurrences that would be removed under the No Action/No Project Alternative.

Table 9-57. Direct Effects and Modeled Habitat Conservation for Western Red Bat Under the Reduced Permit Term Alternative

Modeled Habitat	Total Planning Area (acres)				
	Total Existing	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Foraging Habitat					
Valley Grassland	135,112	23,671	17.5%	18,589	0
Vernal Pool	4,536	413	9.1%	1,199	413
Seasonal Wetlands	2,600	111	4.3%	70	91
Freshwater Marsh	2,922	137	4.7%	100	119
Stream/Creek	2,674	122	4.6%	122	105
Open Water	2,344	165	7.0%	43	104
Mixed Riparian Scrub	1,451	194	13.4%	350	303
Swale	1,252	270	21.6%	495	216
Total Foraging Habitat	*152,891*	*25,083*	*16.4%*	*20,968*	*1,351*
Roosting/Foraging Habitat					
Blue Oak Woodland	9,132	9	0.1%	9	9
Mixed Riparian Woodland	5,785	197	3.4%	338	306
Blue Oak Savanna	5,637	38	0.7%	37	37
Orchards	3,646	225	6.2%	10	0
Mine Tailing Riparian Woodland	641	219	34.2%	5	0
Total Roosting/Foraging Habitat	*24,841*	*688*	*2.8%*	*399*	*352*
Grand Total	**177,732**	**25,771**	**14.5%**	**21,367**	**1,703**

Indirect effects on western red bat modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on western red bat. For

example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled western red bat habitat from indirect impacts.

Some of the elements of the AMMs described above and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on western red bat and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on western red bat during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to western red bat when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would result in the preservation of approximately 21,367 acres of modeled habitat. This exceeds the estimated 13,729 total acres of modeled habitat preservation under the No Action/No Project Alternative. During the permit term, the Conservation Strategy would establish/re-establish a total of approximately 1,703 acres of habitat for western red bat and would implement Biological Goals and Measurable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 283 acres more modeled habitat for western red bat within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 7,638 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on western red bat individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on western red bat would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less than Significant Adverse*** effect on western red bat when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct impacts to approximately 25,771 acres of western red bat modeled habitat within the Planning Area, which is approximately 283 acres greater than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of western red bat. The Reduced Permit Term Alternative would Preserve approximately 7,638 more acres of western red bat habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to western red bat and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to western red bat compared to the No Action/No Project Alternative baseline condition.

9.2.4.21 Effects on American Badger and Its Habitat

Habitat use, natural history, known occurrences, and existing acres of modeled habitat in the Planning Area of American badger are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated direct loss of American badger modeled habitat totals approximately 24,503 acres (Table 9-58). This exceeds the 24,192 acres estimated under the No Action/No Project Alternative.

The Reduced Permit Term Alternative is not expected to remove any of the existing nine occurrences of American badger in the Planning Area; no occurrences would be removed under the No Action/No Project Alternative.

Table 9-58. Direct Effects and Modeled Habitat Conservation for American Badger Under the Reduced Permit Term Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing*	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/or Establishment*
Valley Grassland	135,112	23,671	17.5%	18,589	0
Blue Oak Savanna	5,637	38	0.7%	37	37
Vernal Pool	4,536	413	9.1%	1,199	413
Seasonal Wetland	2,600	111	4.3%	70	91
Swale	1,252	270	21.6%	495	216
GRAND TOTAL	**149,137**	**24,503**	**16.4%**	**20,390**	**757**

Indirect effects on American badger modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project Alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on American badger. For example, EDGE-3 would require 50-foot setback distances between urban development and Preserves, which would not be required under the No Action/No Project Alternative, thereby increasing protection of modeled American badger habitat from indirect impacts.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices

and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on American badger and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on American badger during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to American badger when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would include the preservation of approximately 20,390 acres of habitat. This modeled habitat preservation is greater than the estimated 13,489 total acres of modeled habitat preservation under the No Action/No Project Alternative. During the permit term, the Conservation Strategy would establish/re-establish a total of approximately 757 acres of habitat and would implement biological objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 311 acres more modeled habitat for American badger within the Planning Area than is estimated for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would preserve approximately 6,901 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on American badger individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on American badger would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on American badger when compared to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 24,503 acres of American badger modeled habitat within the Planning Area, which is approximately 311 acres greater than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of American badger. The Reduced Permit Term Alternative would Preserve approximately 6,901 acres more American badger habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to American badger and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Impact*** to American badger compared to the No Action/No Project Alternative baseline condition.

9.2.4.22 Effects on Sanford's Arrowhead and Its Habitat

The habitat requirements and known occurrences of Sanford's arrowhead in the Planning Area are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum anticipated loss of Sanford's arrowhead modeled habitat totals approximately 11,835 acres (Table 9-59). The majority of that effect would be on valley grasslands within the UDA. This loss of modeled habitat is less than the estimated loss of 12,065 acres under the No Action/No Project Alternative.

Table 9-59. Direct Effects and Modeled Habitat Conservation for Sanford's Arrowhead Under the Reduced Permit Term Alternative

	Total Planning Area (acres)				
Modeled Habitat	*Total Existing*	*Direct Effect*	*% of Existing Habitat Lost*	*Habitat Preservation*	*Habitat Re-establishment and/ or Establishment*
Freshwater Marsh	2,044	113	5.5%	82	98
Open Water	1,086	72	6.6%	19	45
Seasonal Wetlands	1,425	75	5.3%	47	62
Stream/Creek	893	87	9.7%	87	75
Valley Grassland	47,375	11,488	24.2%	6,516	0
Grand Total	**52,823**	**11,835**	**22.4%**	**6,751**	**280**

The Reduced Permit Term Alternative is expected to remove 4 of the existing 64 occurrences of Sanford's arrowhead in the Planning Area, which would be 2 fewer occurrences than would be removed under the No Action/No Project Alternative.

Indirect effects on Sanford's arrowhead modeled habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on Sanford's arrowhead. For example, STREAM-1, STREAM-2, and STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative. These setbacks would minimize the indirect impact to stream and creek modeled habitat for Sanford's arrowhead.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP

would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on Sanford's arrowhead and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on Sanford's arrowhead during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to Sanford's arrowhead when compared with the No Action/No Project Alternative, under which AMMs would not be required of development projects for the full 50-year analysis period.

The Reduced Permit Term Alternative would include preservation of approximately 6,751 acres of habitat. This modeled habitat preservation is more than the estimated 5,907 acres of modeled habitat preservation under the No Action/No Project Alternative. During the permit term, the Conservation Strategy would establish/re-establish a total of approximately 280 acres of habitat for Sanford's arrowhead and would implement Biological Goals and Measureable Objectives as discussed in Section 9.2.3.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact approximately 230 acres less modeled habitat for Sanford's arrowhead within the Planning Area than is estimated for the No Action/No Project Alternative. Additionally, the Reduced Permit Term Alternative would preserve approximately 844 acres more habitat than what is estimated for the No Action/No Project Alternative. The Preserve System would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included during the 30-year permit term of the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on Sanford's arrowhead individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the Reduced Permit Term Alternative would have less impact, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on Sanford's arrowhead when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would result in direct and indirect impacts to approximately 11,835 acres of Sanford's arrowhead modeled habitat within the Planning Area, which is approximately 230 acres less than the total impact under the No Action/No Project Alternative. In addition, the SSHCP Conservation Strategy implemented under the Reduced Permit Term Alternative would include AMMs, such as requirements to direct stormwater away from Preserves, that would reduce indirect impacts to remaining modeled habitat compared to what is anticipated from the No Action/No Project Alternative.

The Conservation Strategy implemented during the first 30 years of the Reduced Permit Term Alternative also would include Biological Goals and Measureable Objectives specific to the conservation of Sanford's arrowhead. However, the Reduced Permit Term Alternative would preserve approximately 844 acres more Sanford's arrowhead habitat than under the No Action/No Project Alternative. In addition, the modeled habitat preservation that would occur during the 30-year permit term of the Reduced Permit Term Alternative would occur within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to Sanford's arrowhead and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for Sanford's arrowhead than would occur under the No Action/No Project Alternative. Therefore, the Reduced Permit Term Alternative does not result in a cumulatively considerable contribution to significant adverse cumulative impacts to this species. The Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect for Sanford's arrowhead compared to the No Action/No Project Alternative baseline condition.

9.2.4.23 Effects on Special-Status Plant Species Not Covered by the SSHCP and Their Habitat

The habitat requirements, documented occurrences, and existing acres of potentially suitable habitat in the Planning Area for the 18 special-status plant species that are not covered by the SSHCP are described in Appendix G.

Direct and Indirect Effects of the Alternative

The maximum habitat loss under Reduced Permit Term Alternative is expected to be less than under the No Action/No Project Alternative for nine species (watershield, fleshy owl's clover, Brandegee's clarkia, Peruvian dodder, woolly rose-mallow, Delta tule pea, marsh skullcap, side-flowering skullcap, and Suisun Marsh aster) and greater for the remaining nine species (bristly sedge, Bolander's water hemlock, Tuolomne button-celery, stinkbells, Northern California black walnut, Heckard's pepper-grass, Mason's lilaeopsis, Delta mudwort, and saline clover) (Table 9-60).

Indirect effects on potentially suitable special-status plant species habitat may occur under the Reduced Permit Term, which would be the same in type and character as the indirect effects analyzed for the species in Section 9.2.2. The AMMs that would be required during the permit term are discussed for the species in Section 9.2.3.

Relative to the project AMMs of the No Action/Project alternative, the implementation of SSHCP AMMs during the permit term would reduce indirect impacts on special-status plant species. For example, STREAM-1, STREAM-2, and STREAM-3 would increase setback distances on Laguna Creek, UDA streams, and minor tributaries over what would be required under the No Action/No Project Alternative. These setbacks would minimize the indirect impact to stream and creek modeled habitat for special-status plant species.

Some of the elements of the AMMs described previously and in Section 9.2.3 would also be implemented under the No Action/No Project Alternative as part of standard best practices and/or regulatory requirements (see Table 2-6). However, for those AMM elements implemented across alternatives, the additional oversight and guidance provided by the SSHCP would result in the requirements of these AMMs being implemented more frequently and consistently across the Planning Area.

The temporary effects on special-status plant species and potential loss of individuals that may occur under the Reduced Permit Term would be the same in type and character as those analyzed qualitatively in the species impact discussion in Section 9.2.2. The AMMs that would be required during the permit term that would reduce these temporary effects on special-status plant species during the permit term are listed for the species in Section 9.2.3. This would result in reduced temporary impacts to special-status plant species when compared with the No Action/No Project Alternative under which AMMs would not be required of development projects for the full 50-year analysis period.

Table 9-60. Direct Effects for Special-Status Plant Species Not Covered by the SSHCP Under the Reduced Permit Term Alternative

Total Planning Area (acres)								
	Potentially Suitable Habitat loss (direct and indirect) Reduced Permit Term Alternative							
*Plant Name (status)**	*Vernal Wetlands*	*Non-vernal Wetlands*	*Riparian*	*Blue Oak Woodland/ Savanna*	*Valley Grassland*	*Total Loss*	*Potentially Suitable Habitat Preservation*	*Potentially Suitable Habitat Re-establishment/ Establishment*
Watershield (State S2)	—	248	—	—	—	248	170	210
Bristly sedge (State S2)	683	248	—	—	—	931	1,864	839
Fleshy owl's clover (Federal - T; State - E)	—	248	—	—	—	248	170	210
Brandegee's clarkia (State S2)	—	—	—	47	—	47	46	46
Bolander's water-hemlock (State S2)	683	248	610		—	1,541	2,557	1,448
Peruvian dodder (CRPR 2B.2)	—	248	—		—	248	170	210
Tuolumne Button-celery (State S2)	683	—	—	47	—	730	1,740	675
Stinkbells (State S3)	—	—	—	47	23,671	23,718	18,635	46
Woolly rose-mallow (State S2)	—	248	—	—	—	248	170	210
Northern California black walnut (State S1)	—		610	—	—	610	693	609
Delta tule pea (State S2)	—	248	—	—	—	248	170	210
Heckard's pepper-grass (State S2)	—		—	—	23,671	23,671	18,589	0
Mason's lilaeopsis (State S2)	—	248	610	—	—	858	863	819
Delta mudwort (State S2)	—	248	610	—	—	858	863	819
Marsh skullcap (State S1)	—	248	—	—	—	248	170	210
Side-flowering skullcap (State S1)	—	248	—	—	—	248	170	210
Suisun marsh aster (State S2)	—	248	—	—	—	248	170	210
Saline clover (State S2)	683	248	—	—	23,671	24,602	20,453	839

For species with state or federal status no CRPR listing used.

* **Status Definitions**

Federal
E = listed as endangered under the ESA
T = listed as threatened under the ESA

State
E = listed as endangered under CESA
T = listed as threatened under CESA
S1 = Critically Imperiled by the State
S2 = Imperiled by the State
S3 = Vulnerable by the State

California Rare Plant Rank (CRPR)
2B = Rare, threatened, or endangered in California, but more common elsewhere

CRPR Threat Ranks
0.2 = Moderately threatened in California (moderate degree/immediacy of threat)

The Reduced Permit Term Alternative would preserve and establish/re-establish habitat for special-status plants not covered by the SSHCP. In addition, during the permit term, the Conservation Strategy would implement Biological Goals and Measurable Objectives for covered species that would benefit non-covered plant species as discussed in Section 9.2.3. The acres of modeled habitat preservation under the Reduced Permit Term Alternative are greater than the acres preserved under the No Action/No Project Alternative for 17 species. Only for Brandegee's clarkia would the Reduced Permit Term Alternative result in fewer acres preserved than under the No Action/No Project Alternative.

Critical habitat has been designated for fleshy owl's clover south of Dry Creek at the extreme southern edge of the Planning Area. The Reduced Permit Term Alternative is not expected to impact any of this designated Critical Habitat for fleshy owl's clover.

Significance of Direct and Indirect Effects

The Reduced Permit Term Alternative would impact a greater number of acres of habitat for nine species-status plant species (bristly sedge, Bolander's water hemlock, Tuolomne button-celery, stinkbells, Northern California black walnut, Heckard's pepper-grass, Mason's lilaeopsis, Delta mudwort, and saline clover) within the Planning Area than is estimated for the No Action/No Project Alternative, and fewer acres for the remaining nine species (watershield, fleshy owl's clover, Brandegee's clarkia, Peruvian dodder, woolly rose-mallow, Delta tule pea, marsh skullcap, side-flowering skullcap, and Suisun Marsh aster).

However, the Reduced Permit Term Alternative would preserve more habitat than what is estimated for the No Action/No Project Alternative for all special-status plant species, with the exception of Brandegee's clarkia. The Preserve System implemented during the permit term would provide some larger Preserves and increased Preserve connectivity, improving ecosystem function. Multiple AMMs are also included in the Reduced Permit Term Alternative that would avoid and minimize indirect and temporary effects on special-status plant species individuals and habitat and provide an additional mechanism for impact avoidance and oversight.

Therefore, the overall impact of the Reduced Permit Term Alternative on bristly sedge, Brandegee's clarkia, Bolander's water hemlock, Tuolomne button-celery, stinkbells, Northern California black walnut, Heckard's pepper-grass, Mason's lilaeopsis, Delta mudwort, and saline clove would be similar to that of the No Action/No Project Alternative, and based on the significance criteria in Section 9.2.1, impacts from the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on these species when compared to the No Action/No Project Alternative baseline condition.

Therefore, the Reduced Permit Term Alternative would have less impact on watershield, fleshy owl's clover, Peruvian dodder, woolly rose-mallow, Delta tule pea, marsh skullcap, side-flowering skullcap, and Suisun Marsh aster, and using the significance criteria presented in Section 9.2.1 and the impact analysis provided previously, the Reduced Permit Term Alternative would have a ***Significant Beneficial*** effect on these species when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Cumulative Effect of the Alternative

The contribution of past, present, and reasonably foreseeable future projects to cumulative effects under the Reduced Permit Term Alternative would generally be the same as described for the No Action/No Project Alternative in Section 9.2.2.

As discussed previously in this impact section, the Reduced Permit Term Alternative would impact a greater number of acres of habitat for 9 species-status plant species (bristly sedge, Bolander's water hemlock, Tuolomne button-celery, stinkbells, Northern California black walnut, Heckard's pepper-grass, Mason's lilaeopsis, Delta mudwort, and saline clover) within the Planning Area than is estimated for the No Action/No Project Alternative and fewer acres for the remaining 9 species (watershield, fleshy owl's clover, Brandegee's clarkia, Peruvian dodder, woolly rose-mallow, Delta tule pea, marsh skullcap, side-flowering skullcap, and Suisun Marsh aster).

The Conservation Strategy implemented during the 30-year permit term of the Reduced Permit Term Alternative would include Biological Goals and Measureable Objectives that would benefit special-status plant species habitat. The Reduced Permit Term Alternative would preserve more habitat than what is estimated for the No Action/No Project Alternative for all special-status species with the exception of Brandegee's clarkia. In addition, the preservation under the Reduced Permit Term Alternative would be within a systematic, coordinated Preserve System implemented at the watershed scale. The Preserve System would result in more contiguous and more connected Preserves than is anticipated from the project-by-project mitigation under the No Action /No Project Alternative. The individual Preserves in the Preserve System under the Reduced Permit Term Alternative would also be subject to the Biological Goals and Measurable Objectives of the SSHCP applicable to special-status plant species and would be operated under a comprehensive preserve management program.

The incremental effects of the Reduced Permit Term Alternative on bristly sedge, Brandegee's clarkia, stinkbells, Northern California black walnut, Heckard's pepper-grass, Mason's lilaeopsis, Delta mudwort, and saline clover would not be significantly different than the incremental effects that would occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in ***No Cumulative Effect*** to these species compared to the No Action/No Project Alternative baseline condition. The incremental effects of the Reduced

Permit Term Alternative would result in less of an incremental contribution to the cumulative impact within the Planning Area for watershield, fleshy owl's clover, Bolander's water-hemlock, Peruvian dodder, Tuolumne button-celery, Woolly rose-mallow, Delta tule pea, marsh skullcap, side-flowering skullcap, and Suisun Marsh aster than would occur under the No Action/No Project Alternative. However, at the scale of the study area, the incremental difference in impacts under the Proposed Action/Proposed Project Alternative compared to impacts under the No Action/No Project Alternative is not discernibly different. Therefore, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** for these species compared to the No Action/No Project Alternative baseline condition.

9.3 REFERENCES CITED

Calflora. 2015. Calflora: Information on California Plants for Education, Research, and Conservation. Berkeley, California: The Calflora Database. Accessed December 8, 2015. http://www.calflora.org/.

CDFW (California Department of Fish and Wildlife). 2015a. Element Occurrence Query. California Natural Diversity Database (CNDDB). RareFind, Version 5 (Commercial Subscription). Sacramento, California: CDFW, Biogeographic Data Branch. Accessed December 8, 2015. s://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data.

CDFW. 2015b."Special Animals List." California Natural Diversity Database. CDFW, Biogeographic Branch. September 2015. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline.

CNPS (California Native Plant Society). 2015. *Inventory of Rare and Endangered Plants*. Online ed. Version 7-10b. Sacramento, California: CNPS. December 8, 2015. http://www.cnps.org/inventory.

Galt. 2009. *2030 Galt General Plan Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Natomas Basin Conservancy. 2001. *Habitat Conservation Plan for the Metro Air Park Project in the Natomas Basin.* Prepared by Thomas Reid Associates. Palo Alto California: Thomas Reid Associates. July 2001. http://www.natomasbasin.org/helpful-documents/2003-nbhcp-related-documents/.

Natomas Basin Conservancy. 2003. *Final Natomas Basin Habitat Conservation Plan*. Prepared by the City of Sacramento, Sutter County, and Natomas Basin Conservancy, in association with Reclamation District Number 1000 and the Natomas Central Mutual Water Company. Sacramento, California. April 2003. Accessed December 4, 2017. http://www.natomasbasin.org/helpful-documents/2003-nbhcp-related-documents/.

Rancho Cordova. 2006. *City of Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Sacramento County. 2011. *Sacramento County General Plan of 2005-2030*. Prepared by the Community Planning & Development Department. Sacramento, California. Adopted November 9, 2011. Accessed December 4, 2017. http://www.per.saccounty.net/LandUseRegulationDocuments/Pages/GeneralPlanUpdate.aspx.

Sacramento County, Rancho Cordova, Galt, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Capital Southeast Connector Joint Powers Authority. 2017. *Draft South Sacramento Habitat Conservation Plan*. February 2017. Sacramento, California.

Shuford, W. D., and Gardali, T., editors. 2008. *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California*. Studies of Western Birds no. 1. California: Western Field Ornithologists (Camarillo) and California Department of Fish and Game (Sacramento). February 4, 2008. Accessed March 21, 2011. http://www.dfg.ca.gov/wildlife/nongame/ssc/birds.html.

SJCOG (San Joaquin Council of Governments). 2000. *San Joaquin County Multiple Species Habitat Conservation and Open Space Plan*. November 14, 2000. Accessed December 4, 2017. http://www.sjcog.org/94/Habitat.

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland, Oregon: USFWS. Approved December 15, 2005. Accessed February 6, 2012. http://www.fws.gov/sacramento/es/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

USFWS. 2008. *Birds of Conservation Concern*. Arlington, Virginia: USFWS, Division of Migratory Bird Management. December 2008. Accessed July 26, 2010. https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php.

USFWS. 2017. *Recovery Plan for Giant Garter Snake* (Thamnophis gigas). Sacramento, California: USFWS Region 8. https://ecos.fws.gov/docs/recovery_plan/20170928_Signed%20Final_GGS_Recovery_Plan.pdf

USFWS. 2016. *Draft Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander* (Ambystoma californiense). Sacramento, California: USFWS Region 8. March 11, 2016. Accessed December 4, 2017. https://www.fws.gov/sacramento/outreach/2016/3-11/docs/DRAFT_RP_CTS-20160113.pdf.

INTENTIONALLY LEFT BLANK

CHAPTER 10 – AQUATIC RESOURCES

Chapter 8 discussed the Planning Area's Aquatic land cover types as natural communities that provide habitat for native species, and Chapter 9 discussed the Planning Area's Aquatic land cover types as modeled habitat for special-status species. However, Chapter 10 will discuss and analyze the Aquatic land cover types within the context of the statutes, regulations, and local policies that regulate aquatic resources.

As discussed in Chapter 8, the Planning Area includes 10 Aquatic land cover types that are composed of, or contain, aquatic features (Table 8-1). For the purposes of the Chapter 10 analysis, these 10 land cover types are considered potentially jurisdictional aquatic resources under the Clean Water Act (CWA). Chapter 10 will analyze these 10 land covers within 3 aquatic resource categories: (1) Wetlands, (2) Other Waters, and (3) Riparian. As discussed in Section 10.1.1, Regulatory Framework, the Wetlands and the Other Waters land covers include **potentially jurisdictional** waters of the United States ~~that are~~ regulated under CWA Section 404 (CWA 404) and CWA Section 401 (CWA 401). The 10 Aquatic land covers also include waters of the state that are regulated under the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) and include riparian areas, waterways, streambeds, lakes, and other aquatic resources that are regulated under the California Fish and Game Code.

Chapter 10 describes the existing conditions and presents the environmental effects of each Environmental Impact Statement/Environmental Impact Report (EIS/EIR) alternative on the Planning Area's Aquatic land covers and on their functions and their services. "Functions" are the physical, chemical, and biological processes that occur in ecosystems. "Services" are the benefits that human populations receive from aquatic ecosystem functions (33 CFR 332.2).

Information and analysis of aquatic resources is provided in this chapter to assist the U.S. Army Corps of Engineers (USACE), the Central Valley Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW) in the decisions to be made (see Sections 1.5 and 1.6).

10.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

10.1.1 Regulatory Framework

To determine the scope of analysis needed in this chapter and to identify permits and other authorizations that must be obtained in implementing the EIS/EIR alternatives (40 CFR 1502.25), the lead agencies reviewed existing laws, regulations, plans, and policies. This section includes a summary of federal, state, and local statues, regulations, and policies that apply to aquatic resources, including wetlands and other waters of the United States and state and riparian land covers that are present within the Planning Area.

Federal Statues and Regulation

Clean Water Act Section 404 Implementation in the Planning Area

CWA 404 regulates the discharge of dredged and fill materials into the waters of the United States as defined in the Code of Federal Regulations (Title 33, Section 328.3 and Title 40, Section 230.3). Permits are issued under CWA 404 by USACE to projects and activities that discharge dredge or fill material into wetlands and other waters of the United States**.** USACE delineates and verifies waters of the United States, including wetlands at each project or activity site, through jurisdictional determinations (33 CFR 328.3, 40 CFR 230.3).

USACE evaluates the following two types of permits under CWA 404: (1) general permits (nationwide, regional, and programmatic), and (2) individual permits (letters of permission and standard permits). General permits are issued by USACE on a nationwide or regional basis for a category or categories of activities when (1) those activities are substantially similar in nature and cause only minimal individual and cumulative environmental impact; or (2) the general permit would result in avoiding unnecessary duplication of the regulatory control exercised by another federal, state, or local agency provided it has been determined that the environmental consequences of the action are individually and cumulatively minimal (33 CFR 322.2[f]). Individual permits are evaluated on a case-by-case basis for activities that do not qualify for a general permit (i.e., that may have more than a minimal adverse environmental impact).

For discharge of dredged or fill material authorized under CWA 404, adverse impacts to waters of the United States must be avoided and minimized to the extent practicable. For unavoidable impacts, compensatory mitigation ~~is~~ **may be** required to replace the loss of waters of the United States functions. In 2008, USACE and the U.S. Environmental Protection Agency jointly issued regulations for compensatory mitigation titled *Compensatory Mitigation for Losses of Aquatic Resources: Final Rule, 33 CFR Parts 325 and 332* (2008 Compensatory Mitigation Rule) (73 FR 19594–19705). The term "compensatory mitigation" refers to the restoration, establishment,[1] enhancement, and/or preservation of wetlands, streams, or other aquatic resources specifically for the purpose of offsetting losses to these aquatic resources caused by authorized discharges of dredged or fill material into waters of the United States. The 2008 Compensatory Mitigation Rule seeks to improve the planning, implementation, and management of wetland and stream compensatory mitigation projects by emphasizing a watershed approach in selecting compensatory mitigation project locations, requiring measurable and enforceable ecological performance standards with regular monitoring, and specifying the components of a complete compensatory mitigation plan.

[1] Note that in the context of this Plan, the word "establish" is synonymous with "create."

If compensatory mitigation is required to offset unavoidable impacts to aquatic resources, the amount of compensatory mitigation must be sufficient **to the extent practicable** to replace lost aquatic resource functions and services~~, to the extent practicable~~ **(33 CFR 332.3[f][1])**. In cases where functional or condition assessments or other suitable metrics are not used, a minimum one-to-one acreage or one-to-one linear foot compensation ratio must be used.

~~In addition to setting minimum compensatory mitigation amounts,~~ ~~t~~**The** 2008 Compensatory Mitigation Rule establishes equivalent standards for **types of** aquatic resource compensatory mitigation ~~projects~~ regardless of whether they are conducted by mitigation banks, in-lieu fee programs, or permittees **(33 CFR 332.2[b])**. There are the following three ~~forms~~ **general options** for compensatory mitigation:

1. **Mitigation Bank:** A site or suite of sites where resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for to provide compensatory mitigation for impacts authorized by U.S. Department of the Army permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument.
2. **In-Lieu Fee Program:** A program that conducts the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental agencies or non-profit natural resources management entity by permittees to satisfy compensatory mitigation requirements for their USACE permits. Similar to a mitigation bank, an in-lieu fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor. The operation and use of an in-lieu fee program are governed by an in-lieu fee program instrument.
3. ~~**CWA**~~ **Permittee-Responsible Mitigation:** An aquatic resource restoration, establishment, enhancement, and/or preservation activity undertaken by the permittee (or an authorized agent or contractor) to provide compensatory mitigation for which the permittee retains full responsibility.

Use of mitigation banks and in-lieu fee programs is the preferred form of compensatory mitigation under the 2008 Compensatory Mitigation Rule since they usually involve the consolidation of compensatory mitigation projects where ecologically appropriate and the use of a watershed approach, consolidation of resources, ~~provide financial planning and scientific expertise (which often is not practical for permittee-responsible mitigation projects),~~ reduction of temporal losses of functions, and reduction of uncertainty over mitigation project success. The 2008 Compensatory Mitigation Rule requires the district engineer to consider compensatory

mitigation options in the following order: (1) Credits from a mitigation bank; (2) credits from an in-lieu fee program; (3) permittee-responsible mitigation under a watershed approach; (4) permittee-responsible mitigation through on-site and in-kind mitigation; and (5) permittee-responsible mitigation through off-site and/or out of kind mitigation. However, this preference hierarchy may be overridden in cases where forms of mitigation lower on the preference hierarchy are determined to better serve the aquatic resource needs of a watershed and are documented in the administrative record.

Clean Water Act Section 401

To comply with CWA 401, any project or activity that may result in a discharge of a pollutant into waters of the United States under CWA 404 must obtain a certification that the discharge will comply with the state's applicable effluent limitations and water quality standards. In California, the U.S. Environmental Protection Agency has delegated the authority to grant water quality certifications to the State Water Resources Control Board, which are typically processed by RWQCBs with local jurisdiction. The Planning Area is located within the jurisdiction of the Central Valley RWQCB. A water quality certification requires the project or activity to evaluate its potential impacts, implement appropriate measures to protect water quality, and comply with regulatory water quality standards. The issuance of CWA 404 authorizations by USACE for the discharge of dredged and fill materials into waters of the United States is a typical federal action that requires CWA 401 water quality certification.

Clean Water Act Section 402

The National Pollutant Discharge Elimination System (NPDES) program under CWA Section 402 (CWA 402) regulates the discharge of waste into waters of the United States. NPDES permit regulations apply to broad categories of discharges, including point-source municipal wastewater discharges and nonpoint-source stormwater runoff. NPDES permits typically identify the following:

- Effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge
- Prohibitions on discharges not specifically allowed under the permit
- Provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities

The California State Water Resources Control Board administers the NPDES permit program in California. Projects that disturb 1 or more acres of soil must obtain coverage under the state's NPDES General Permit for Discharges of Storm Water Associated with Construction Activity. A stormwater pollution prevention plan must be developed and implemented to provide specific construction-related best management practices (BMPs) to prevent soil erosion and loss of

topsoil. The required components and BMPs commonly included in a stormwater pollution prevention plan are described in Chapter 7.

Executive Order 11990, Protection of Wetlands

Executive Order 11990 (President Carter 1977), Protection of Wetlands, states that measures should be taken to "avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative."

State Statutes and Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act is California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater. The Porter-Cologne Act grants the State Water Resources Control Board and RWQCBs power to protect water quality. The Porter-Cologne Act grants the State Water Resources Control Board and RWQCBs authority to adopt plans and policies, regulate discharges of waste to surface and groundwater, regulate waste disposal sites, and require cleanup of discharges of hazardous materials and other pollutants.

The RWQCBs' jurisdiction includes areas that meet the definition of "waters of the state," which includes areas that are also waters of the United States. The waters of the state are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCBs have the discretion to take jurisdiction over areas not under the jurisdiction of CWA 404, provided the areas meet the definition of "waters of the state."

California Fish and Game Code, Section 1602 (Lake or Streambed Alteration Agreements)

The California Fish and Game Code (Section 1602) requires any entity to notify CDFW before beginning any project or activity that may substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake. If CDFW determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared.

Local Policies and Regulations

Sacramento County General Plan of 2005–2030

The Sacramento County General Plan of 2005–2030 (Sacramento County General Plan) provides a broad framework and direction for land use planning in Sacramento County. The Sacramento County General Plan contains a set of goals, policies, and programs that address important

community issues and natural resource protection. It is the basis for land use and public policy decisions made by the Board of Supervisors and other policy makers. As a long-term guide for future growth, the Sacramento County General Plan helps both Sacramento County leaders and residents make decisions about development projects.

The Sacramento County General Plan Conservation Element (Sacramento County 2011) includes goals and policies related to wetlands, waters of the United States and state, and riparian habitat. Applicable policies include the following (Sacramento County 2011):

> **Policy CO-58:** Ensure no net loss of wetlands, riparian woodlands, and oak woodlands.
>
> **Policy CO-59:** Ensure mitigation occurs for any loss of or modification to the following types of acreage and habitat function:
>
> - vernal pools,
> - wetlands,
> - riparian,
> - native vegetative habitat, and
> - special status species habitat.
>
> **Policy CO-63:** Vernal pools, wetlands, and streams within identified preserves shall not be drained, excavated, or filled for the purpose of converting the land to another use. If fill or modification is required for Drainage Master Plans, stormwater quality or levee maintenance, creation or restoration of an equal amount must occur within the boundaries of the preserve to achieve no net loss consistent with policy CO-58.
>
> **Policy CO-83:** Preserve a representative portion of vernal pool resources across their range by protecting vernal pools on various geologic landforms, vernal pools that vary in depth and size, and vernal pool complexes of varying densities, in order to maintain the ecological integrity of a vernal pool ecosystem.
>
> **Policy CO-84:** Ensure that vernal pool preserves are large enough to protect vernal pool ecosystems that provide intact watersheds and an adequate buffer, have sufficient number and extent of pools to support adequate species populations and a range of vernal pool types.
>
> **Policy CO-85:** Utilize proper vernal pool restoration techniques as approved by USFWS [U.S. Fish and Wildlife Service], CDFW, and USACE.

Policy CO-86: Limit land uses within established preserves to activities deemed compatible with maintenance of the vernal pool resource, which may include ranching, grazing, scientific study, and education.

Policy CO-89: Protect, enhance and maintain riparian habitat in Sacramento County.

Policy CO-111: Channel modifications shall retain wetland and riparian vegetation whenever possible or otherwise recreate the natural channel consistent with the historical ecological integrity of the stream or river.

Policy CO-115: Provide setbacks along stream corridors and stream channels to protect riparian habitat functions:

- A functional setback of at least 100 feet and measured from the outside edge of the stream bank should be retained on each side of a stream corridor that prohibits development or agricultural activity. This buffer is necessary to protect riparian functions by allowing for the filtering of sediment, pesticides, phosphorus and nitrogen, organic matter and other contaminates that are known to degrade water quality. This buffer also provides for the protection of vegetation along the stream bank which provides bank stability, erosion control and flood attenuation.
- A transitional setback of at least 50 feet in width beyond the functional buffer should be retained along all stream corridors. This buffer is necessary to protect hydrogeomorphic functions that regulate water temperature, regulate micro-climate, maintain channel complexity and retain hydrologic flow regimes. This buffer also provides corridors to facilitate the movement of wildlife.
- An extended setback of at least 50 feet in width beyond the transitional setback should be retained along all stream corridors. This setback will allow for recreational uses such as bike, pedestrian and/or equestrian trails and will allow for the placement of infrastructure such as water and sewer lines.

Policy CO-124: Maintain and manage rivers and streams to encourage special status species.

2030 Galt General Plan: Policy Document

Galt's *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009a) contains goals and policies in the Conservation and Open Space Element regarding protection and management of wetlands, waters of the United States and state, and riparian habitat. Applicable policies include the following:

Policy COS-1.10: Ecological Features Retention: The City shall retain to the extent feasible the ecological features of the creeks, sloughs, and rivers in their natural state.

Policy COS-1.11: Riparian Corridor Protection: The City shall endeavor to protect, preserve, and improve riparian corridors.

Policy COS-1.13: No Net Loss of Wetlands: The City shall review development proposals in accordance with applicable local, state, and federal statutes protecting jurisdictional wetlands (Section 404 of CWA) and require that new developments have no net loss of existing wetland habitats.

Policy COS-2.2: Wetland and Riparian Communities Management: The City shall support the protection, restoration, expansion, and management of wetland and riparian plant communities for passive recreation, groundwater recharge, and wildlife habitat.

Policy COS-2.4: Federal, State, and Local Statutes Compliance: The City shall review development proposals in accordance with applicable federal, state, and local statutes protecting special-status species and jurisdictional wetlands.

Policy COS-3.1: Riparian Protection: The City should require the protection of existing riparian vegetation along stream courses in the city.

Policy COS-4.4: Open Space Protection: The City shall, where appropriate, permanently protect as open space areas of natural resource value, including wetlands preserves, riparian corridors, woodlands, and floodplains.

City of Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2023) contains goals and policies in the Natural Resources Element to address protection of wetlands, waters of the United States and state, and riparian habitat. Applicable policies include the following:

Policy NR.1.9: The City shall require that impacts to riparian habitats be mitigated at a no net loss of existing function and value based on field survey and analysis of the riparian habitat to be impacted. No net loss may be accomplished by avoidance of the habitat, restoration of existing habitat, or creation of new habitat, or through some combination of the above.

Policy NR.2.1: Require mitigation that provides for “no net loss” of wetlands consistent with current state and federal policies.

Policy NR.2.2: Ensure that direct and indirect effects to wetland habitats are minimized by environmentally sensitive project siting and design, to the maximum extent feasible.

Policy NR.2.3: Work with private and non-profit conservation organizations to ensure competitive pricing for mitigation bank credits by allowing government agencies, non-profit organizations, and private landowners to establish vernal pool preserves, designate mitigation areas, create and restore vernal pools, and sell credits to developers for off-site mitigation.

Policy NR.3.4: Encourage projects that contain wetland preserves or creeks, or are located adjacent to wetland preserves or creeks, to be designed for visibility and, as appropriate, access.

10.1.2 Existing Conditions of Aquatic Resources

Section 10.1.2, Existing Conditions of Aquatic Resources, describes the existing conditions of each aquatic resource land cover type present in the Planning Area, including existing functions and existing services of the aquatic resource.

The Planning Area's 10 Aquatic land cover types have been placed in the following 3 aquatic resource categories: (1) Wetlands, (2) Other Waters, and (3) Riparian (Table 10-1, Aquatic Land Covers within the Planning Area). Because the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1992) is the wetland classification system used by USACE and the U.S. Environmental Protection Agency, this chapter also classifies the 10 South Sacramento Habitat Conservation Plan (SSHCP) Aquatic land cover types in terms of the Cowardin wetland classification system. Existing locations of the Planning Area Aquatic land covers are shown on Figure 10-1, Aquatic Resources in the Planning Area.

Wetlands in the Planning Area

Wetlands are defined in the Code of Federal Regulations (Title 33, Part 328.3) as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. Areas that meet three wetland delineation criteria (hydrophytic vegetation, hydric soil types, and wetland hydrology) may be under the authority of CWA 404 pending USACE verification of wetland boundaries and jurisdictional analysis. The following three SSHCP Aquatic land cover types support the vegetation, soil types, and hydrology conditions that typically meet the CWA definition of a wetland: (1) Vernal Pool, (2) Seasonal Wetland, and (3) Freshwater Marsh. In addition, some Swale land covers in the Planning Area sometimes meet the three wetland delineation criteria, as discussed below.

Table 10-1. Aquatic Land Covers within the Planning Area

Land Cover Type	Existing Acres in Planning Area	Percentage of the 317,655-Acre Planning Area
Wetland Waters		
Vernal Pool	4,536	1.4%
Swale	1,252	0.4%
Seasonal Wetland	2,600	0.8%
Freshwater Marsh	2,954	0.9%
Total Wetland Waters	*11,342*	***3.50%*** ~~*3.6%*~~
Other Waters		
Stream/Creek (VPIH) (Ephemeral)	73	0.02%
Stream/Creek (Intermittent and Perennial)	2,778	0.9%
Open Water	2,341	0.7%
Total Other Waters	*5,192*	***1.62%*** ~~*1.6%*~~
Riparian		
Mixed Riparian Woodland	5,805	1.8%
Mixed Riparian Scrub	1,274	0.4%
Mine Tailing Riparian Woodland	641	0.2%
Total Riparian	*7,720*	*2.4%*
Total	**24,254**	**4.80%** ~~**7.7%**~~

Note: VPIH = vernal pool invertebrate habitat

Vernal Pool Wetlands

Approximately 4,536 acres of vernal pools remain within the Planning Area (Table 10-1). Vernal pool locations are associated with specific types of landforms, geologic formations, and soils. Therefore, vernal pools tend to be clustered at the landscape scale (Smith and Verrill 1998). As discussed in Section 5.1.2 and Section 8.1.2, Planning Area vernal pools are found on four different landforms and associated geologic formations. The characteristics of the landforms and the geologic formation and soil conditions determined how the vernal pools developed, the general density and sizes of vernal pools in a vernal pool complex, and ultimately the water chemistry and hydrologic regime of each vernal pool. Consequently, different geological formations in the Planning Area support vernal pools that may look similar after filling with water but differ physically and biologically. Vernal pools are a type of seasonal wetland, and the closest Cowardin classification for Planning Area vernal pools is "Palustrine, Emergent Wetland, Nonpersistent."

Seasonal Wetlands

Approximately 2,600 acres of Seasonal Wetland land cover is present within the Planning Area (Table 10-1). As discussed in Section 8.1.2, seasonal wetlands are defined in this EIS/EIR as wetlands that pond water for an extended period during a portion of the year, generally

filling during the rainy winter season, then dry relatively slowly, typically in the summer or early fall. Seasonal wetlands in the Planning Area tend to ~~be isolated features that~~ occur within moderate to large depressional features along streams, creeks, and rivers; along the edges of open water; or scattered within the Valley Grassland land cover. In addition, some impounded drainages; excavated stock ponds; and graded ~~or,~~ excavated, **or otherwise disturbed** former vernal pools within the Planning Area may also be Seasonal Wetland. The Seasonal Wetland land cover is often characterized by herbaceous annual and perennial species such as curly dock (*Rumex crispus*), sedges (*Carex* spp.), nutsedges (*Cyperus* spp.), spikerushes (*Eleocharis* spp.), and occasionally cattail (*Typha* spp.). The Cowardin classification for Seasonal Wetland is "Palustrine, Emergent Wetland, Nonpersistent."

Freshwater Marsh Wetlands

Approximately 2,954 acres of Freshwater Marsh is present within the Planning Area (Table 10-1). As discussed in Section 8.1.1, Freshwater Marsh is dominated by perennial emergent herbaceous plant species such as cattail, tule (*Schoenoplectus acutus* var. *occidentalis*), and other emergent hydrophytic (water-loving) plant species. The Freshwater Marsh land cover is generally found at the edges of other Planning Area aquatic resources such as ponds, lakes, and rivers. Freshwater marshes are perennial wetlands but will periodically drawdown to expose moist soil in some dry years.

The majority of Freshwater Marsh in the Planning Area occurs along the Cosumnes River and Deer Creek, located in the southern portion of the Planning Area. However, areas of Freshwater Marsh are also found along other perennial creeks and streams and on the margins of the Open Water land cover throughout the Planning Area (Figure 10-1). Freshwater Marsh is a type of wetland, and the Cowardin classification for Freshwater Marsh is "Palustrine, Emergent Wetland, Persistent."

Swales

The Planning Area includes approximately 1,252 acres of Swale (Table 10-1). Swales are shallow ephemeral surface drainages found in association with vernal pools and vernal pool complexes.

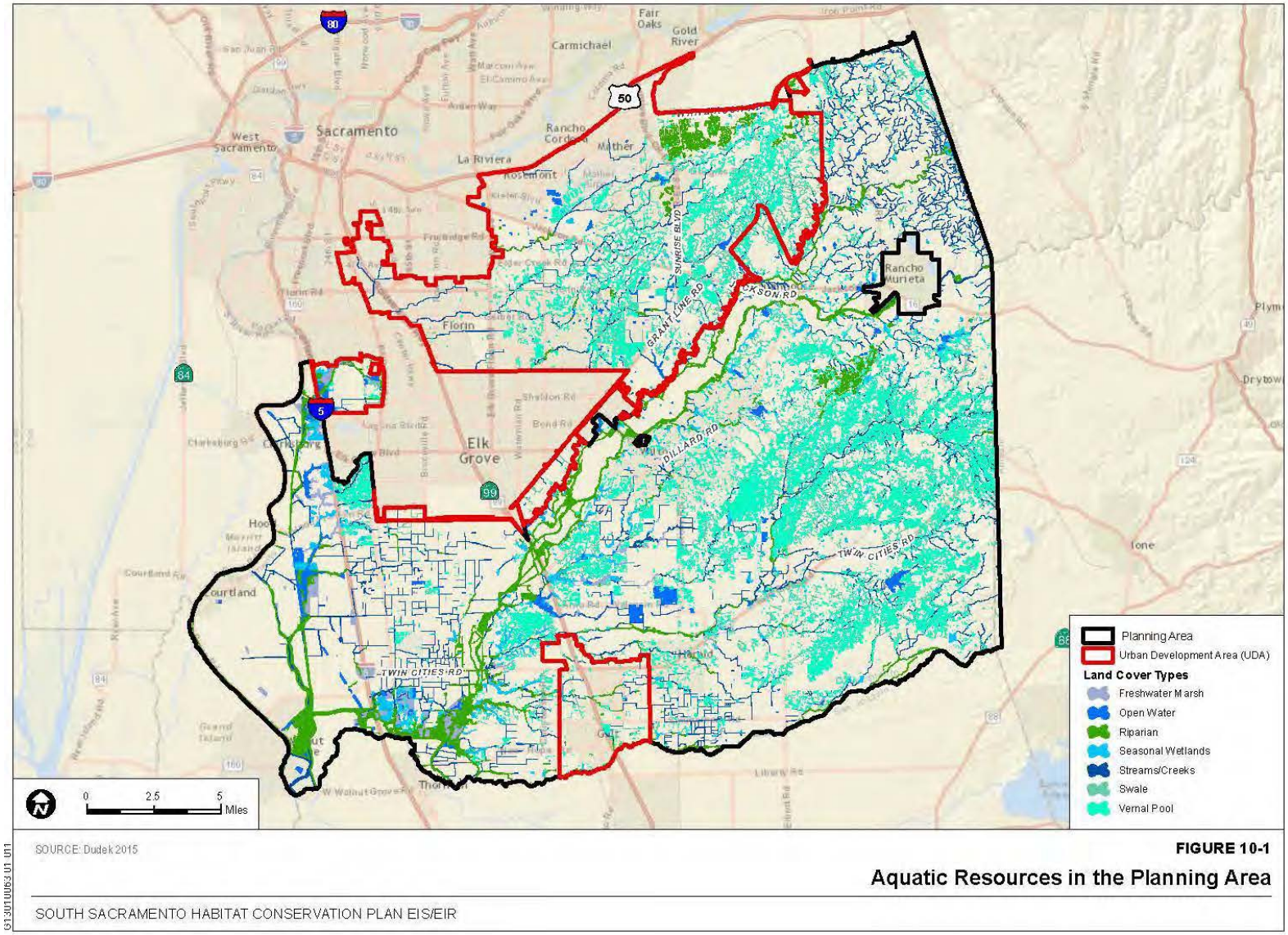
The movement of surface water between vernal pools can occur in a network of narrow and intermittent surface "swales" (Solomeshch et al. 2007). In many vernal pool landscapes, including those in the Planning Area, surface water flows through integrated ephemeral swales to other vernal pools, and ultimately **may flow in**to a seasonal stream. Consequently, vernal pool landscapes comprise the upper watershed position of many stream systems (Rains et al. 2006). Due to the integrated hydrologic nature of vernal pool landscapes, disturbance of

upgradient vernal pools may have appreciable impacts on hydrologic and biogeochemical processes in ~~all~~ downgradient vernal pools and streams (Rains et al. 2008).

In a study of Mather Regional Park vernal pools, Rains et al. (2006) found that vernal pools filled only after soil layers above the claypan/duripan became saturated by seasonal rainfall in mid-December. During subsequent storm events, outflows to surface swales occurred, and lower vernal pools received ephemeral flows through interconnecting swales from upgradient vernal pools. Surface swale connections between vernal pools were maintained for approximately 10% to 60% of the days during which vernal pool water was present, with the longer periods of connectivity occurring between vernal pools located lower on the landscape. At no time was overland flow of rainwater observed delivering water from uplands directly to vernal pools (Rains et al. 2006, 2008).

All Swale land cover acres are directly associated with Planning Area vernal pools. Any Planning Area shallow surface drainages not directly connected or associated with a vernal pool or vernal pool complex were not mapped as “Swale” land cover under the SSHCP land cover classification system (see Chapter 3 of the SSHCP document). Some Swale land covers mapped in the Planning Area might include small shallow depressional features that pond water for longer periods during rainy seasons. Therefore, sections of some swales may be considered “vernal pool wetland” for CWA 404 purposes. The closest Cowardin classification for the Swale land covers in the Planning Area is “Riverine, Intermittent, Nontidal.”

Figure 10-1 Aquatic Resources in the Planning Area



INTENTIONALLY LEFT BLANK

Other Waters in the Planning Area

Three of the SSHCP land cover types (Stream/Creek, Stream/Creek Vernal Pool Invertebrate Habitat [VPIH] and Open Water) are generally defined as "other waters" in the CWA 404 definition of waters of the United States (33 CFR 328.3).

Stream and Creek (Stream/Creek)

The Planning Area includes approximately 2,778 acres of Stream/Creek land cover (Table 10-1). As discussed in Section 8.1.2, the Stream/Creek land cover in the Planning Area includes the Cosumnes River, the large streams located in the Urban Development Area (UDA)[2] such as Laguna Creek, and the many smaller intermittent and perennial creeks located throughout the Planning Area (Figure 10-1). Consequently, the Stream/Creek land cover can occur adjacent to riparian aquatic resources or may occur within any of the Terrestrial land cover types, including Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, the Farming land cover types, and the Developed land cover types (see Table 8-1a, Figure 8-2, and Figure 10-1). The Cowardin classification for the Stream/Creek land cover in the Planning Area is "Riverine, Perennial or Intermittent, Nontidal."

As discussed in Section 7.1.2, some sections of the streams and creeks inside the UDA now have perennial flow in most years because of summer runoff from urban irrigation, discharges of treated groundwater existing groundwater-contamination cleanup activities~~)~~, and other ~~unseasonal~~ human-caused water sources.

Most streams in the Planning Area are valley floor streams characterized by slow-moving water, except after rain events, and often carry substantial sediment loads as a result of land disturbances. Some reaches of tributaries in the eastern portion of the Planning Area flow over gently sloping terrain and have more of a pool and riffle structure.

Due to relatively small size and location among urban and farming or rangeland uses, the functions and services of most creeks in the Planning Area have been substantially affected from adverse water quality, invasive species, vegetation removal, or other indirect impacts of urban development. However, Planning Area creeks still provide habitat for many native

[2] As discussed in Section 1.1.1, the term "UDA" is used by the EIS/EIR to discuss all lands where new urban development projects or activities could occur under the No Action/No Project Alternative, or where new urban development Covered Activities could occur under the two action alternatives. Therefore, the term "UDA" means all lands within the Sacramento County USB boundary that are also within the Planning Area (this includes lands within the Rancho Cordova city limits that are within the Planning Area); and all lands within Galt's city limits and within the City of Galt's sphere of influence (see Section1.1.1 and Figure 1-1).

species and important ecological functions, especially where the streams and creeks are associated with other riparian and wetland communities.

As discussed in Section 3.7.1, over the last 150 years, there have been substantial human-caused alterations of streams and creeks in the Planning Area, including straightening and deepening of creek channels; construction of levees, dams, and other impoundments; installation of riprap and concrete walls; and vegetation clearing. These changes have adversely affected many stream and creek area functions by separating active channels from their natural floodplains, altering natural flow patterns, and disrupting many other dynamic physical processes that maintain stream and creek functions. In addition to adverse effects on hydrologic functions of Planning Area streams and creeks, these watershed modifications have also reduced overall habitat functions in these areas since negative impacts from disturbances such as urban development and vegetation clearing lead to decreased abundances and altered distributions of plant and animal species.

Stream and Creek Vernal Pool Invertebrate Habitat (Stream/Creek [VPIH])

The Planning Area includes approximately 73 acres of Stream/Creek (VPIH) land cover (Table 10-1). As discussed in Section 8.1.2, the Stream/Creek (VPIH) land cover type is defined in the SSHCP document as an intermittent drainage that conveys water after rain events (i.e., is ephemeral), is dominated by grassland plant species, and can provide habitat for vernal pool crustaceans. The Stream/Creek (VPIH) land cover type occurs within the Mather Core Area in association with the Vernal Pool and Swale land covers. Unlike the Swale land cover type, the Stream/Creek (VPIH) land cover is less likely to support plant species also found in vernal pools. However, the Stream/Creek (VPIH) land cover is known to provide movement and dispersal habitat for plant seeds/propagules and movement and dispersal habitat for vernal pool crustaceans, including mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp (*Branchinecta lynchi*), and the vernal pool tadpole shrimp (*Lepidurus packardi*). The Stream/Creek (VPIH) land cover can also provide intermittent breeding habitat for some vernal pool crustaceans in depressional features of the drainage that pond water between storm events. The Cowardin classification for all Stream/Creeks land covers in the Planning Area is "Riverine, Intermittent, Nontidal."

Although Stream/Creek (VPIH) is typically vegetated, it is included in the Other Waters land covers because it may not support conditions that meet the three-part definition of a wetland. However, it may still be considered a water of the United States**, or it may not be considered a water of the United States (e.g., neither a stream nor a wetland).**

Open Water

The SSHCP Open Water land cover type is scattered throughout the Planning Area and covers a total of 2,341 acres (Table 10-1) (Figure 10-1). The Open Water land cover type consists of perennial aquatic features, such as natural or constructed ponds, lakes, and reservoirs. Open water may contain no vegetation or non-rooted aquatic vegetation, such as algae, floating pondweeds, and other plants. Along shorelines, rooted, emergent vegetation may occur, forming Freshwater Marsh. The Cowardin classification is "Riverine and Limnetic, Unconsolidated Bottom, Nontidal." The largest open water features within the Planning Area are found on or near the Cosumnes River and Deer Creek. These open water features are largely unnamed with the exception of Blodgett Reservoir inside the UDA and Rancho Seco Lake outside the UDA.

Riparian Areas

CWA regulations define "riparian areas" as lands adjacent to streams, lakes, estuarine, and marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems through which surface and sub-surface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, other waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality (33 CFR 330.1–330.6). Riparian areas are distinguished by gradients in biophysical conditions, ecological processes, and biota and include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence) (NRC 2002). Riparian areas in the Planning Area ~~are including~~ **include** Mixed Riparian Woodland, Mixed Riparian Shrub, and the Minetailing Riparian land covers. The Cowardin classification for Mixed Riparian Woodland land cover and Mixed Riparian Shrub land cover is "Palustrine, Forested or Scrub/Shrub Wetland."

Over the last 150 years, there have been substantial anthropogenic alterations of the riparian areas along streams and creeks that support riparian plant and animal communities in the Central Valley. Anthropogenic alterations have resulted from by agriculture activities, rangeland use, and urban development (Katibah 1984), including the straightening and deepening of channels; construction of levees, dams, and other impoundments; installation of riprap and concrete walls; vegetation clearing; and other alterations. In the Planning Area, these alterations have often resulted in riparian vegetation occurring as small intermittent patches, usually as small clusters of trees and shrubs, or a thin strip of riparian vegetation that is only one or two trees wide.

In the eastern portion of the Planning Area, there are cottonwoods in some streamside locations. Along other streams, there is little or no woody riparian vegetation because streams

and creeks located in the Valley Grassland and Vernal Pool land covers are dominated by non-woody vegetation that exhibits little vegetation structure in the riparian zone along the stream and the adjacent uplands. In valley grassland riparian areas, there may be patchy distribution of mixed riparian scrub. Some streams in the urbanized UDA portions of the Planning Area are currently lined by concrete or bounded by concrete walls and support little or no riparian plant species, while others support narrow, relatively young, riparian vegetation with a mix of trees, shrubs, grasses, and sometimes seasonal wetlands.

As described in Section 8.1.2.1, there are three Riparian land cover types identified by the Permit Applicants within the Planning Area: Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodlands (Figure 10-1). These three woody Riparian land cover types currently total approximately 7,720 acres (Table 10-1).

The Mixed Riparian Woodland land cover type in the Planning Area is dominated by Fremont cottonwood trees (*Populus fremontii* ssp. *fremontii*) and may include Oregon ash (*Fraxinus latifolia*), Goodding's willow (*Salix gooddingii*), California black walnut (*Juglans californica* var. *hindsii*), or valley oak (*Quercus lobata*). In some areas, an understory of box elder (*Acer negundo*) or willow species, including arroyo willow (*Salix lasiolepis*) and sandbar willow (*Salix exigua*), may be present. A shrub layer may also present in the Mixed Riparian Woodland land cover type, particularly along the northern boundary of the Planning Area, and include species such as blue elderberry (*Sambucus mexicana*), Himalayan blackberry (*Rubus discolor*), coyote-brush (*Baccharis pilularis*), wild rose briar (*Rosa californica*), and California wild grape (*Vitis californica*). The ground layer is sparsely to densely vegetated with herbaceous species. Invasive weeds have colonized portions of the mixed riparian woodland in the Planning Area and giant reed (*Arundo donax*). Approximately 5,805 acres of the Planning Area is Mixed Riparian Woodland land cover (Table 10-1).

The Mixed Riparian Scrub land cover type is interspersed in riparian areas between Mixed Riparian Woodland and Annual Grassland land covers in the floodplains of waterways throughout Sacramento County. Approximately 1,274 acres of the Mixed Riparian Scrub land cover type is present in the Planning Area (Table 10-1). In the Planning Area, this land cover type consists of open-to-dense shrubby thickets dominated by a mixture of sandbar willow, arroyo willow, red willow (*Salix laevigata*), and immature stands of mixed riparian woodland tree species. Stands of riparian scrub in the Planning Area also support native and non-native species, including wild rose briar, California wild grape, perennial pepper weed (*Lepidium latifolium*), Himalayan blackberry, curly dock, and various non-native grasses. The highest-quality existing riparian areas in the Planning Area are outside the UDA along the Cosumnes River and Deer Creek (Figure 10-1). The Mixed Riparian Woodland present along the lower Cosumnes River is relatively wide and characterized by a multilayered vegetation structure, including an overstory of cottonwood, California sycamore (*Platanus racemosa*), and valley oak; an understory of narrow-leaf willow (*Salix*

exigua var. *exigua*), California and Himalayan blackberry, and California wild grape; and a patchy herbaceous layer of grasses, forbs, and sedges.

As discussed in Section 8.1.1, the Mine Tailing Riparian Woodland land cover type occurs as relatively narrow strips distributed among older mine tailings (Figure 8-1), and covers approximately 641 acres within the Planning Area (Table 10-1). This land cover type contains some of the plant species commonly found in the Mixed Riparian Woodlands and the Mixed Riparian Scrub land covers, such as Fremont cottonwood, blue elderberry, willow (*Salix* spp.), and coyote-brush. There are large areas of Mine Tailing Riparian Woodland land cover in the Planning Area, including approximately 219 acres of Mine Tailing Riparian Woodland in the northern portion of the Planning Area and approximately 345 acres of Mine Tailing Riparian Woodland just south of the Cosumnes River in the eastern portion of the Planning Area.

Existing Amounts (Abundance) of Each Aquatic Resource

As of 2015, there are approximately 24,254 acres of Aquatic land covers in the Planning Area (Table 10-2, Aquatic Resources by Watershed within the Planning Area). These 24,254 acres of aquatic resources are located within 1 or more of the Planning Area's 10 watersheds (see Section 7.1.2). Watersheds in the United States are delineated using a hierarchical system, which divides the United States into 21 regions, 221 subregions, 378 hydrologic accounting units, and 2,264 cataloging units (USGS 2013). Each hydrologic unit is identified by a unique Hydrologic Unit Code (HUC) consisting of 2 to 12 digits to define successively smaller units within the classification system (USGS 2013; USGS and NRCS 2013).

At the 10-digit HUC level, the Planning Area includes a portion or the entirety of 10 different watersheds (Figure 7-3). As also discussed in Section 7.1.2, the 10 Planning Area watersheds are American River (HUC 1802011102), Deer Creek (HUC 1804001305), Laguna Creek (HUC 1804001307), Lower Cosumnes River (HUC 1804001308), Lower Dry Creek (HUC 1804001209), Lower Mokelumne River (HUC 1804001211), Morrison Creek (HUC 1802016304), Sherman Lake–Sacramento River (HUC 1802016307), Snodgrass Slough (HUC 1804001210), and Upper Cosumnes River (HUC 1804001306) (Figure 10-2, HUC 10 Watersheds in the Planning Area). One additional watershed, Cache Slough, intersects the Planning Area but only comprises 6 acres in the Planning Area and, therefore, is not discussed in this chapter.

The Morrison Creek (located inside the UDA) and the Laguna Creek watershed (located in the south-southeastern parts of the Planning Area) cover approximately 37% of the Planning Area. The next three largest watersheds (Deer Creek, Lower Cosumnes River, and Snodgrass Slough) cover 41% of the Planning Area, resulting in the five largest watersheds draining approximately 78% of the Planning Area.

The watersheds containing the greatest abundance of aquatic resources are Snodgrass Slough and Lower Cosumnes River. The watersheds containing the least amounts of aquatic resources are the American River, Sherman Lake–Sacramento River, and Lower Mokelumne River.

The most abundant Aquatic Resources land covers within the Planning Area are Mixed Riparian Woodland and Vernal Pool (Table 10-2). The least abundant are Stream/Creek (VPIH) (likely due to the narrow width of these ephemeral creeks) and Mine Tailing Riparian Woodland.

Table 10-2. Aquatic Resources by Watershed within the Planning Area

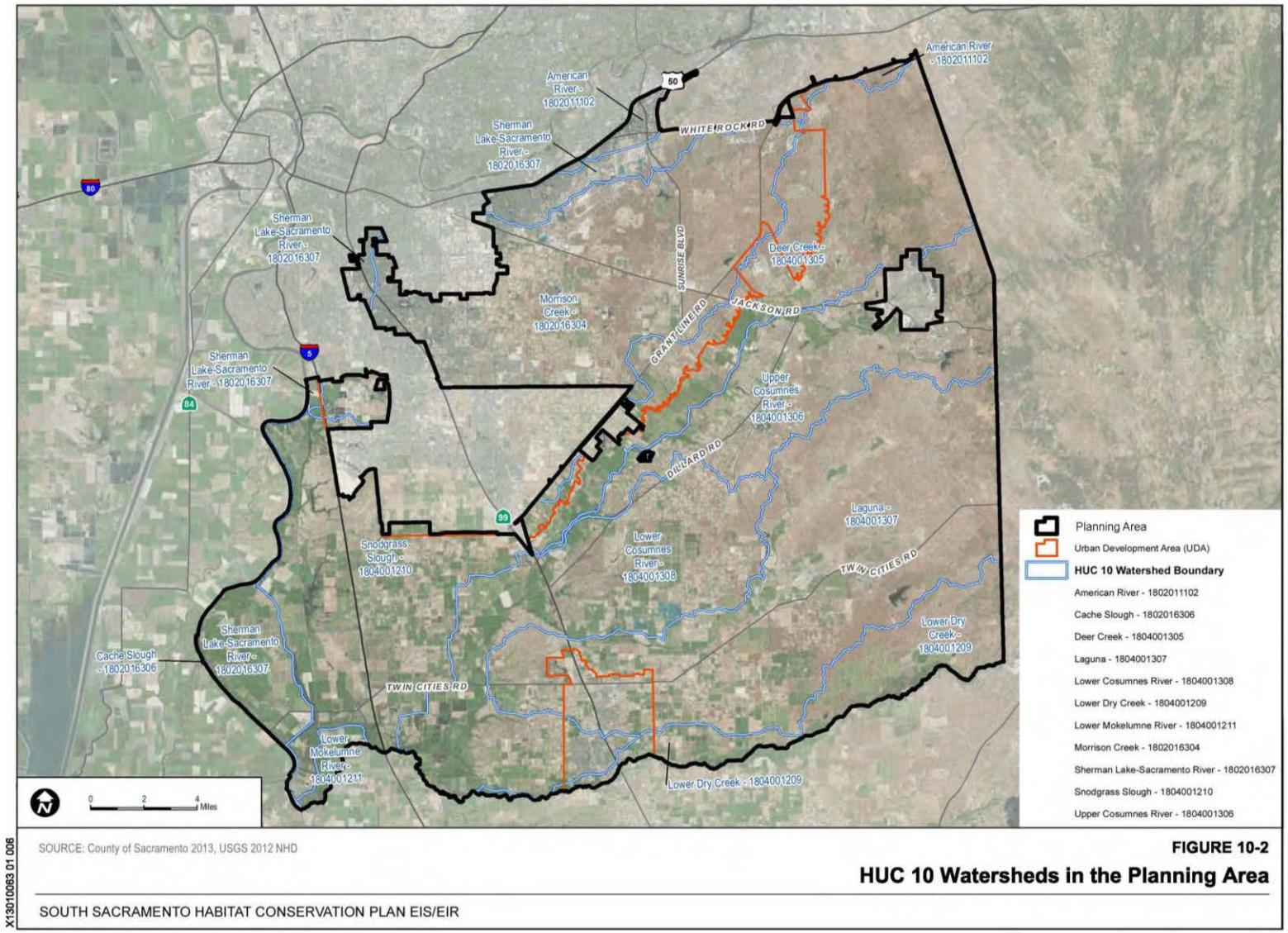
Land Cover Type	Acres per Watershed										Total
	American River	*Deer Creek*	*Laguna Creek*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne River*	*Morrison Creek*	*Sherman Lake–Sacramento River*	*Snodgrass Slough*	*Upper Cosumnes*	
Wetlands											
Vernal Pool	7	274	1,917	619	203	<1	766	5	421	324	4536
Seasonal Wetland	22	129	418	616	117	0	107	0	782	409	2,600
Swale	3	160	428	144	65	0	359	2	10	81	1,252
Freshwater Marsh	2	38	167	1,127	47	21	370	40	1,030	112	2,954
Total Wetland Waters	*34*	*601*	*2,930*	*2,506*	*432*	*21*	*1602*	*47*	*2,243*	*926*	*11,342*
Other Waters											
Open Water	3	200	297	663	9	3	157	9	720	280	2,341
Stream/Creek (Intermittent and Perennial)	5	228	416	345	78	68	123	24	1,141	350	2,778
Stream/Creek (VPIH) (Ephemeral)	0	19	0	0	0	0	54	0	0	0	73
Total Other Waters	*8*	*447*	*713*	*1,008*	*87*	*71*	*334*	*33*	*1,861*	*630*	*5,192*
Riparian											
Mine Tailing Riparian Woodland	48	41	158	17	0	0	129	2	0	246	641
Mixed Riparian Scrub	0	80	58	272	47	2	57	130	528	100	1,274
Mixed Riparian Woodland	<1	836	262	1,877	401	196	157	51	1,292	733	5,805
Total Riparian	*48*	*957*	*478*	*2,166*	*448*	*198*	*343*	*183*	*1,820*	*1,079*	*7,720*
Grand Total	**90**	**2,005**	**4,121**	**5,680**	**967**	**290**	**2,279**	**263**	**5,924**	**2,635**	**24,254**

AGENDA ITEM 11.1

4858

INTENTIONALLY LEFT BLANK

Figure 10-2 HUC 10 Watersheds in the Planning Area



INTENTIONALLY LEFT BLANK

The total acreage of aquatic resources reported in the Aquatic Resources Program (ARP) is approximately 232 acres less than the total acreage of aquatic resources reported in the SSHCP (SSHCP Plan Partners 2017). This is due to the following three factors: (1) the use of different geographic information system (GIS) processes that result in fractional differences in acreage totals; (2) rounding; and 3) some of the acreage of Riparian land cover types reported in the SSHCP are considered non-jurisdictional because they are mitigation sites composed of created or restored riparian habitat. Non-jurisdiction aquatic resources are not discussed in the ARP. It is this last factor that accounts for the majority of the difference in reported aquatic resources acreage between the ARP and the SSHCP.

Of the 10 watersheds in the Planning Area, the Snodgrass Slough and the Lower Cosumnes River watersheds have the most acres of aquatic resources, and the American River, Sherman Lake–Sacramento River, and Lower Mokelumne River watersheds contain the least acreage of aquatic resources.

The Mixed Riparian Woodland and Vernal Pool land covers are the most abundant aquatic resources in the Planning Area. The Stream/Creek (VPIH) and Mine Tailing Riparian Woodland land covers are the least abundant aquatic resource in the Planning Area (Table 10-1).

Existing Quality of Aquatic Resources (Functions and Services)

Modification of natural landscapes (i.e., vegetation, topography, and hydrology) is one of the prime human impacts on waters and watersheds. Altering natural landscapes for development purposes, resource extraction, or recreation can affect collection, storage, and discharge functions of a watershed. Changes in the landscape resulting from these human activities can increase sedimentation and erosion, increase or redirect natural runoff, and alter hydrologic regimes, including timing of flows and groundwater recharge. In addition, land use modification or conversion can change the way a watershed is used by individual species or species communities, including their distribution and abundance within a watershed (i.e., habitat function) and can directly or indirectly affect the chemical reactions required for the watershed to sustain itself. Introduction of pollutants into the watershed can happen directly through agricultural activities and runoff from impervious surfaces in more urbanized areas. As discussed in Chapter 7, an increase of impervious surfaces has caused significant changes to the quality and quantity of the stormwater runoff, leading to degraded stream and watershed systems; an increased quantity of stormwater for stream process to absorb sedimentation; and an increased pollutant load carried by the stormwater. Land development threatens the remaining vernal pool ecosystem directly through destruction and fragmentation of habitat. However, loss of habitat may also indirectly affect the remaining areas by increasing the likelihood of other threats (e.g., habitat fragmentation, hydrologic alteration, invasion by noxious species, changes in land management options/practices,

pollution, inadequate mitigation measures). Non-native annual grasses of Mediterranean origin now dominate the uplands associated with vernal pool complexes in California. The transition from native vegetation to exotics began with European settlement and was hastened by years of drought and overgrazing during the late 1800s. Some suggest that rapid evapo-transpiration of water and built-up thatch from non-native grass species (e.g., foxtail chess [*Bromus madritensis*], Italian ryegrass (*Lolium multiflorum*), Mediterranean barley [*Hordeum marinum* ssp. *gussoneanum*], medusahead [*Elymus caput-medusae*], soft brome [*Bromus hordeaceus*]) may indirectly affect vernal pool species by lessening the amount of water entering the system through surface and sub-surface flow (Marty 2005; Robins and Vollmar 2002). The effects of thatch buildup in uplands may negatively affect obligate vernal pool bee pollinators as well. Thick stands of mulch may also impede juvenile California tiger salamander (*Ambystoma californiense*) and western spadefoot (*Spea hammondii*) during their migrations from their aquatic pool habitat to the upland areas and burrows used for summer activity and aestivation. Barbed awns and seed coats on non-native grasses can also injure or kill mammals by becoming lodged in their ears, eyes, throats, and fur.

An assessment of the existing functions and services of each Planning Area Aquatic land cover was prepared by the Permit Applicants (Dudek 2016a). The existing quality of the aquatic resources within in the Planning Area was assessed based on the following factors: acres of the aquatic resource, primary adjacent land cover, secondary adjacent land cover, and aquatic resource type. For each Aquatic land cover type, a functional score was assigned to each of these factors based on ability to maintain or improve the following aquatic functions: (1) provide habitat for special-status aquatic species; (2) improve or maintain water quality through such processes as filtration and/or trapping of contaminants, such as sediment or toxicants, and prevention of soil erosions; and (3) improve hydrology through storing floodwaters or flood flow modifications, or by facilitating groundwater recharge. Habitat was evaluated based on the existing ability of a Planning Area Aquatic Resources land cover to support aquatic wildlife and plant species, especially special-status aquatic species. Water quality was evaluated based on the existing ability to improve or maintain water quality through processes such as filtration and/or trapping of contaminants, such as sediment or toxics, and prevention of erosion. Hydrology was evaluated based on the existing ability of the aquatic resource to facilitate groundwater recharge and store floodwaters through beneficial flood storage and flood flow modifications (Dudek 2016a). The Functional Assessment of the Planning Area provided an overall functional score of (1) very low, (2) low, (3) moderate, or (4) high for each wetland, other waters, and riparian aquatic resource. Table 10-3 summarizes the current acreages of each Functional/Condition Assessment Method score for each Wetlands, Other Waters, and Riparian Aquatic Resources land cover type in the Planning Area.

Table 10-3. Functional Analysis Of Aquatic Resources in the Planning Area

Land Cover Type	(4) High *Acres*	(3) Moderate *Acres*	(2) Low *Acres*	(1) Very Low *Acres*	Total
Wetland					
Vernal Pools	3,067	1,312	157	0	4536
Seasonal Wetland	1,396	1,019	185	0	2,600
Swales	945	302	5	0	1,252
Freshwater Marsh	988	1,697	269	0	2,954
Total Wetland	*6,396*	*4,330*	*616*	*0*	*11,342*
Other Waters					
Open Water	298	1,206	821	16	2,341
Stream/Creek (Intermittent and Perennial)	841	1,759	177	1	2,778
Stream/Creek (VPIH) (Ephemeral)	44	27	2	0	73
Total Other Waters	*1,183*	*2,992*	*1,000*	*17*	*5,192*
Riparian					
Mine Tailing Riparian Woodland	68	364	183	26	641
Mixed Riparian Scrub	112	820	298	44	1,274
Mixed Riparian Woodland	521	3,710	1,555	19	5,805
Total Riparian	*701*	*4,894*	*2,036*	*89*	*7,720*
Grand Total	**8,280**	**12,216**	**3,652**	**106**	**24,254**

Of the four wetland land cover types, the existing vernal pools have the greatest acreage of high function features (approximately 3,067 high function acres out of 4,536 total Vernal Pool acres). Seasonal Wetlands, Swales, and Freshwater Marsh land covers also have a relatively large number of high function acreages (approximately 1,396 acres, 945 acres, and 988 acres, respectively). The mixed riparian woodland and the open water aquatic resources have the most acres of low function score features (approximately 1,555 acres and 821 acres, respectively) in the Planning Area. However, the Planning Area overall does not have large acreages of very low functional condition aquatic resources (approximately 106 acres total across all 10 Aquatic Resources land cover types).

Current conditions of the aquatic resources can be further examined at the watershed (HUC-10) level. The existing habitat, water quality, and hydrology functions of each Planning Area watershed (Dudek 2016a) were based on the results of a watershed study (Dudek 2016b). The watershed study results were used to develop appropriate functional scores for wetlands and other waters occurring in each HUC-10 watershed based on special-status species occurrences within each HUC-10 (habitat function score), the percentage of natural land cover within each HUC-10 (water quality function score), and the percentage of impervious surface within each HUC-10 (hydrology functional score).

The Deer Creek, Laguna Creek, Lower Cosumnes River, Lower Dry Creek, Morrison Creek, and Upper Cosumnes River watersheds were found to contain a majority of moderate to high condition aquatic resources. Of these, the watersheds with the greatest proportion of high function aquatic resources are the Laguna Creek and Morrison Creek watersheds. The American River, Lower Mokelumne River, Sherman Lake–Sacramento River, and Snodgrass Slough watersheds currently contain no high function aquatic resources, and the resources are mostly low to moderate in condition (Figure 10-2). The Sherman Lake–Sacramento River watershed contains the greatest acreage of very low condition aquatic resources and has the highest proportion of low condition resources. The following discussion summarizes aquatic resources existing condition acreages by watershed.

American River Watershed

Approximately 12,060 acres, or approximately 23%, of the 53,360-acre American River watershed is located within the Planning Area (Figure 10-2). This watershed makes up 3.2% of the entire Planning Area and is located in the northern portion of the Planning Area. A little more than half of the watershed contains non-habitat land cover types, which primarily include High-Density Development and Mine Tailings. The remaining undeveloped land consists of Valley Grassland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Blue Oak Woodland, Blue Oak Savanna, and Mixed Riparian Scrub land covers. Aquatic resources account for approximately 130 acres, or approximately 1%, of the American River watershed. Impervious surfaces cover approximately 3,080 acres, or 26%, of the watershed within the Planning Area.

The American River watershed includes documented occurrences for 10 of the 28 Covered Species, including Boggs Lake hedge-hyssop (*Gratiola heterosepala*), tricolored blackbird (*Agelaius tricolor*), Cooper's hawk (*Accipiter cooperii*), Swainson's hawk (*Buteo swainsoni*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp, vernal pool tadpole shrimp, white-tailed kite (*Elanus leucurus*), burrowing owl (*Athene cunicularia*), and northern harrier (*Circus cyaneus*). However, approximately 58% of the American River watershed has been influenced by human activities, with over half of the watershed dominated by the aforementioned non-habitat land covers. Subsequently, in combination with making up only 3% of the Planning Area, the portions of the American River watershed within the Planning Area do not support a high overall percentage of the Covered Species occurrences (2%) in the Planning Area.

Current Conditions – Due to the low percentage of Covered Species occurrences, the American River watershed has a score of −3 for its habitat function. It has a moderate percentage of natural land cover, resulting in a water quality score of +1. It has a relatively large amount of impervious surface, resulting in a hydrology function score of −2 (Dudek 2016a).

Deer Creek Watershed

The Deer Creek watershed bisects the Planning Area, extending from the northeastern edge to halfway into the Planning Area (Figure 10-2). Of the 82,980 acres of the watershed, 46,810 acres (56%) are within the Planning Area. A majority (93%) of the watershed contains "habitat" land covers, which includes agriculture. Terrestrial land covers (32,980 acres and 70% of the watershed), consisting primary of Valley Grassland (25,450 acres and 54% of the watershed), account for the majority of the watershed. Other Terrestrial land covers include Blue Oak Savanna and Blue Oak Woodland (14% of the watershed), Mixed Riparian Woodland, Mixed Riparian Scrub, Mine Tailing Riparian Woodland, and Valley Oak Riparian (0.02% of the watershed). Approximately 20% (9,940 acres) of the watershed consists of lands used for agricultural purposes, and 7% (3,300 acres) qualify for the non-habitat land cover type. The remaining 2% of the watershed (1,070 acres) consists of aquatic resources such as streams and creeks, open water, and vernal pools. Impervious surfaces cover approximately 370 acres, or only 1%, of the watershed within the Planning Area.

The Deer Creek watershed includes documented occurrences for 16 of the 28 Covered Species, including Boggs Lake hedge-hyssop, Sacramento Orcutt grass (*Orcuttia viscida*), Sanford's arrowhead (*Sagittaria sanfordii*), burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike (*Lanius ludovicianus*), northern harrier, Swainson's hawk, tricolored blackbird, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, western pond turtle (*Actinemys marmorata*), western spadefoot, and white-tailed kite. This watershed contains 6% of the known occurrences for these 16 Covered Species and a substantial percentage of occurrences for 2 of the Covered Species, including 49% of the Sacramento Orcutt grass records and 20% of the ferruginous hawk records. Covered Species have been recorded throughout the watershed, with the majority occurring along hydrologic features and within aquatic or terrestrial habitat. A cluster of vernal pool species records occurs along the border of the Deer Creek and Morrison watersheds east of the intersection of Grant Line Road and Keifer Boulevard.

Current Conditions – The Deer Creek watershed has a relatively low percentage of Covered Species occurrences and, therefore, had a score of -2 for its habitat function. However, it has a high percentage of natural land cover, resulting in a water quality score of +3. It also has a low percentage of impervious surface, resulting in a hydrology function score of +3 (Dudek 2016a).

Laguna Creek Watershed

The Laguna Creek watershed is approximately 98,150 acres, of which 75,350 acres are within the Planning Area, and makes up 20% of the Planning Area (Figure 10-2). It is located in the southeastern portion of the Planning Area and contains virtually all of the mapped land cover

types in the Planning Area. The majority (91%) of the Laguna Creek watershed is undeveloped. Combined, Valley Grassland, Blue Oak Savanna, and Blue Oak Woodland account for 61% (approximately 46,310 acres) of the land covers in the watershed and 68% of the "natural" land covers, including agriculture. Agriculture accounts for 24% (approximately 17,730 acres) of the land covers in the Planning Area. The Laguna Creek watershed also supports all of the Aquatic land cover types except wetland restoration, including approximately 2,820 acres of Vernal Pool, Seasonal Wetland, and Swale; approximately 420 acres of Stream/Creek; and almost 300 acres of Open Water. Non-habitat land cover types compose only 9% of the watershed, with Low-Density Development accounting for 61% of the non-habitat land cover types. Impervious surfaces cover approximately 2,010 acres, or 3%, of the watershed within the Planning Area.

The Laguna Creek watershed includes documented occurrences for 22 of the 28 Covered Species, reflecting both its large size and diversity of land cover types. Covered Species documented in the watershed include dwarf downingia (*Downingia pusilla*), legenere (*Legenere limosa*), pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Sacramento Orcutt grass, vernal pool fairy shrimp, Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*), vernal pool tadpole shrimp, mid-valley fairy shrimp, California tiger salamander, western spadefoot, western pond turtle, giant garter snake (*Thamnophis gigas*), Cooper's hawk, burrowing owl, loggerhead shrike, northern harrier, ferruginous hawk, greater sandhill crane (*Grus canadensis tabida*), Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat (*Lasiurus blossevillii*). This watershed has the highest percentage (26%) of known occurrences for Covered Species after the Morrison Creek watershed, including 17% of the vernal pool covered plant occurrences and 40% of the vernal pool invertebrate occurrences.

Current Conditions – The Laguna Creek watershed has a relatively high percentage of Covered Species occurrence, yielding a habitat function score of +2. It also has a high percentage of natural land cover, resulting in a water quality score of +3, and a low percentage of impervious surface, resulting in a hydrology function score of +3 (Dudek 2016a).

Lower Cosumnes River Watershed

The Lower Cosumnes River watershed is 47,310 acres and entirely located within the south-central portion of the Planning Area (Figure 10-2). This watershed consists primarily of Terrestrial and Agricultural land covers, accounting for 81% of the land covers in the watershed. The Terrestrial category is dominated by valley grasslands (14,610 acres), which accounts for approximately 31% of the total Terrestrial land cover in the watershed. Agricultural areas total 21,220 acres and are the largest land covers in the Lower Cosumnes River watershed. Approximately 7% (3,510 acres) of the watershed is Aquatic land covers, including Seasonal Wetlands, Open Water, Freshwater Marsh, Vernal Pools, Wetland Restoration, Streams and Creeks and Swales. Approximately 12% (5,710 acres) of the watershed is non-habitat land cover

dominated by Low-Density Development (3,990 acres) and High-Density Development (1,260 acres). Impervious surfaces cover approximately 1,650 acres, or only 3%, of the watershed.

The Lower Cosumnes River watershed includes documented occurrences for 19 of the 28 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, valley elderberry longhorn beetle, California tiger salamander, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite. This watershed contains 10% of the Planning Area's known occurrences of Covered Species.

Current Conditions – The Lower Cosumnes River watershed has a relatively low percentage of Covered Species occurrence, which gives it a habitat function score of -2. It has a mid-range percentage of natural land cover, resulting in a water quality score of 0. It has a low percentage of impervious surface, yielding a hydrology function score of +3 (Dudek 2016a).

Lower Dry Creek Watershed

The Lower Dry Creek watershed is located along the southern edge of the Planning Area. Approximately 50% of the watershed is located within the Planning Area (Figure 10-2). The watershed has very little non-agricultural development. Of the 18,570 acres in the watershed, approximately 56% are Terrestrial land covers and 38% are Agricultural land covers. Valley grasslands dominate the Terrestrial land cover in the watershed, comprising 14,610 of the 16,880 acres mapped as terrestrial. The majority (92%) of agricultural areas are cropland and vineyards. Aquatic and non-habitat land covers each make up approximately 3% of the remaining acreage within the watershed. Impervious surfaces cover approximately 140 acres, or 1%, of the watershed within the Planning Area.

The Lower Dry Creek watershed includes documented occurrences for 9 of the 28 Covered Species, including legenere, pincushion navarretia, vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, western spadefoot, northern harrier, Swainson's hawk, and tricolored blackbird. Overall, the watershed only contains 2% of the Covered Species occurrences, but it does contain 33% of the pincushion navarretia occurrences (16 of 49) and 19% of the California tiger salamander occurrences (6 of 29).

Current Conditions – Due to the low percentage of Covered Species occurrence, the Lower Dry Creek watershed has a habitat function score of -3. However, it has a relatively high percentage of natural land cover, which gives it a water quality score of +2. Its low percentage of impervious surface gives it a hydrology function score of +3 (Dudek 2016a).

Lower Mokelumne River Watershed

Although the Lower Mokelumne River watershed is more than 66,200 acres in size, only 3% of the watershed is located in the far southwestern corner of the southern Planning Area, and the watershed accounts for only 0.5% of the Planning Area (Figure 10-2). The small portion of this watershed located within the Planning Area is primarily made up of Agricultural land covers, specifically Cropland. The remaining acreage includes Mixed Riparian Scrub and Mixed Riparian Woodland, Aquatic land covers, and some residential areas. Impervious surfaces cover approximately 30 acres, or 1%, of the watershed within the Planning Area.

The Lower Mokelumne River watershed only contains three documented occurrences of one Covered Species: Sanford's arrowhead. This species is located on the boundary of the Planning Area within the Mokelumne River. Similar to the Lower Dry Creek watershed, the lack of occurrences of Covered Species within this watershed may be attributed to large amounts of land that have been converted for agricultural purposes. In addition, only a small portion of the watershed is actually located within the Planning Area. Due to its small size within the Planning Area, the Lower Mokelumne River watershed includes less than 1% of the modeled habitat for Covered Species.

Current Conditions – The Lower Mokelumne River watershed has a habitat function score of -3 due to its low percentage of species occurrence. It has a relatively low percentage of natural land cover, resulting in a water quality function score of -2. However, its low percentage of impervious surface yields a hydrologic function score of +3 (Dudek 2016a).

Morrison Creek Watershed

The Morrison Creek watershed is located within the northern half of the Planning Area and inside the UDA (Figure 10-2). Of the 82,790 acres that compose this watershed, 70,320 acres, or 85%, are located within the Planning Area and almost entirely inside the UDA. This is the second largest watershed in the Planning Area (second to the Laguna Creek watershed). Because it is located in the urbanizing portion of Sacramento County, approximately 45% of the watershed has already been developed and contains non-habitat land covers, primarily High-Density Development. Agriculture accounts for approximately 7% of the watershed. Terrestrial (44%) and Aquatic (4%) land covers account for the remaining land covers in the Morrison Creek watershed. Valley Grassland accounts for about 96% of the Terrestrial land cover. This watershed also supports all of the Aquatic land cover types, including approximately 890 acres of Vernal Pool, 430 acres of Swale, and 230 acres of Seasonal Wetland, which is embedded in Valley Grassland. Laguna Creek (north) is a significant east–west landscape feature that plays a prominent role in conservation. Impervious surfaces cover approximately 18,260 acres, or 26%, of the watershed. Along with the American River (26% impervious surfaces) and Sherman Lake–

Sacramento River (31% impervious surfaces) watersheds, the Morrison Creek watershed has one of the three highest percentages of impervious surfaces in the Planning Area. Reflecting both its large size and more urbanized character, it also has the highest amount of impervious surface acreage in the Planning Area, with Snodgrass Slough having the second highest amount at approximately 7,670 acres.

The Morrison Creek watershed includes documented occurrences for 26 of the 28 Covered Species despite substantial urbanization. Covered Species documented in the watershed include Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*), Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass (*Orcuttia tenuis*), Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, western spadefoot, giant garter snake, western pond turtle, American badger (*Taxidea taxus*), and western red bat. This watershed has the highest percentage (33%) of known occurrences for Covered Species in the Planning Area, including 50% of both the covered vernal pool plants and vernal pool invertebrate occurrences. Due to the large area of vernal pools (almost 900 acres and second only to the Laguna Creek watershed), swale, and seasonal wetlands, vernal pool flora and fauna are the most important biological resources in the watershed.

Current Conditions – Because the Morrison Creek watershed contains the highest percentage of Covered Species occurrences, it has a habitat function score of +3. It has a moderate percentage of natural land cover, yielding a water quality function score of +1. It has a relatively large amount of impervious surface, giving it a hydrologic function score of -2 (Dudek 2016a).

Sherman Lake–Sacramento River Watershed

The Sherman Lake–Sacramento River watershed is located in the extreme western portion of the Planning Area, with approximately 29% located within the Planning Area (Figure 10-2). The watershed intersects the Planning Area in four separate locations that together compose approximately 5% of the Planning Area, including a large area along the northern portion of the Planning Area, a small area in the northwestern corner of the Planning Area, and two areas along the western portion of the Planning Area. The Sherman Lake–Sacramento River watershed in the Planning Area is dominated by human activities. Together, non-habitat and Agricultural land cover types account for 91% of the land covers in the watershed. Of these two land cover types, High-Density Development and Cropland contain the largest acreages at 5,360 and 5,440 acres, respectively, accounting for 58% of the total land covers in the watershed within the Planning Area. The Sherman Lake–Sacramento River watershed contains the Aquatic land cover types mapped within the Planning Area but in small amounts ranging from 2 to 40

acres and totaling 110 acres. Terrestrial land covers, primarily Valley Grassland, compose the remaining acreage, totaling 1,450 acres, or 8%, in the watershed within the Planning Area. Impervious surfaces cover approximately 5,690 acres, or 31%, of the watershed, which is the highest percentage of the watersheds in the Planning Area.

The Sherman Lake–Sacramento River watershed includes documented occurrences for 9 of the 28 Covered Species, including Sanford's arrowhead, vernal pool fairy shrimp, burrowing owl, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat. Overall, the watershed accounts for only 1% of the Covered Species occurrences in the Planning Area. The majority (91%) of the Sherman Lake–Sacramento River watershed is developed or agriculture, which is reflected in the relatively small number of Covered Species with occurrences in the watershed compared to several of the other watersheds.

Current Conditions – The Sherman Lake–Sacramento River watershed has the lowest scores (-3) for all three functions as a result of its low percentage of Covered Species occurrence, its low percentage of natural land cover, and its high percentage of impervious surface (Dudek 2016a).

Snodgrass Slough Watershed

The Snodgrass Slough watershed is the third largest watershed in the Planning Area behind the Laguna Creek and Morrison Creek watersheds and is entirely contained within the western portion of the Planning Area (Figure 10-2). Approximately 54% of the watershed is agriculture, of which approximately 66% are croplands; croplands cover approximately 35% of the entire watershed. Non-habitat land cover types, dominated by High-Density Development, account for 22% of the watershed. Terrestrial habitat, dominated by Valley Grassland (78%), Mixed Riparian Scrub, Mixed Riparian Woodland, and woodland restoration, covers approximately 16% of the watershed. The Snodgrass Slough watershed accounts for the highest acreage of Aquatic land cover within the Planning Area. Approximately 4,220 acres of the watershed supports the Aquatic land cover types mapped within the Planning Area, and represents 24% of the aquatic habitat in the Planning Area. Impervious surfaces cover approximately 7,670 acres, or 15%, of the watershed. Although this watershed has a relatively smaller proportion of impervious surfaces compared to the American River and Morrison Creek watersheds at 26% and Sherman Lake–Sacramento River watershed at 31%, it has a substantially higher level of impervious surfaces than the remaining watersheds, which range from 1% to 3%.

The Snodgrass Slough watershed includes documented occurrences for 19 of the 28 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater

sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, American badger, and Yuma myotis. This watershed contains 13% of known occurrences for Covered Species in the Planning Area, third only to the Morrison Creek (35%) and Laguna Creek (26%) watersheds.

Current Conditions – The Snodgrass Slough watershed has a moderate to low percentage of Covered Species occurrences, resulting in a habitat function score of -1. It has a relatively low percentage of natural land cover, which gives it a water quality score of -2. It has a mid-range percentage of impervious surface, yielding a hydrologic function score of 0 (Dudek 2016a).

Upper Cosumnes River Watershed

The Upper Cosumnes River watershed is located in the east-central portion of the Planning Area, which encompasses approximately 51% (32,000 acres) of the watershed (Figure 10-2). The majority of the watershed in the Planning Area (21,220 acres, or 66%), consists of terrestrial habitat dominated by valley grassland. Agricultural areas compose approximately 11%, and aquatic areas compose approximately 5% of the watershed in the Planning Area. Non-habitat land cover, primarily Low-Density Development, covers the remaining 18% of the watershed. Impervious surfaces cover approximately 340 acres, or 1%, of the watershed.

The Upper Cosumnes River watershed includes documented occurrences for 14 of the 28 Covered Species, including legenere, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, western spadefoot, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat. This watershed contains 9% of documented occurrences of Covered Species within the Planning Area. Most notably, the watershed contains 153 of the 156 known occurrences (98%) of valley elderberry longhorn beetle, with the largest concentration of occurrences along the Cosumnes River just south of Rancho Murieta.

Current Conditions – The Upper Cosumnes watershed has a relatively low percentage of Covered Species occurrences, which gives it a habitat function score of -2. However, it has a high percentage of natural land cover and a low percentage of impervious surface, yielding respective water quality and hydrologic function scores of +3 (Dudek 2016a).

10.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

10.2.1 Methodology for Assessing Impacts of Each Alternative on Aquatic Resources

This section describes the potential impacts of the projects and activities associated with each EIS/EIR alternative on the 10 Planning Area land covers that are potential jurisdictional aquatic

resources. Chapter 10 will analyze these 10 land covers within three aquatic resource categories: (1) Wetlands, (2) Other Waters, and (3) Riparian (see Table 10-1).

The future projects and activities expected under each EIS/EIR alternative are described in Chapter 2. As discussed in Section 3.6.5, the EIS/EIR impact methodology uses GIS datasets that were prepared using the best available information on the amounts and locations of ground disturbance from the future projects and activities expected under each alternative.

As discussed in Sections 3.6.5 and 3.6.6, direct impacts are effects caused by an action or project and occur at the same time and place as the action or project (40 CFR 1508.8; 14 CCR 15358). Indirect impacts are caused by an action or project but occur later in time or are farther removed in distance from the project site but are still reasonably foreseeable (40 CFR 1508.8; 14 CCR 15064(d)). Chapters 8 and 9 previously quantified indirect effects for the Vernal Pool, Swale, and Stream/Creek (VPIH) land covers as natural communities and species habitat, but Chapter 10 focuses on effects to these Aquatic land covers in the context of the CWA and Section 1600 of the California Fish and Game Code. Both statutes consider direct alteration, fill, or removal of aquatic resources, as well as the indirect impacts to the functions and services of each aquatic resource.

Activities and projects implemented under each EIS/EIR alternative could directly impact Planning Area aquatic resources by (1) removing an Aquatic land cover type by excavating, filling,[3] draining, or flooding the Aquatic land cover; or (2) converting an Aquatic land cover type to a Terrestrial or a Developed land cover type (see Table 8-1a). The direct impacts to aquatic resources discussed in Chapter 10 are a permanent loss of the acres of the impacted aquatic resource, including loss of the existing functions and services of those impacted acres.

Indirect impacts to aquatic resources would occur when activities or projects implemented under an EIS/EIR alternative adversely alter the existing physical, biological, or ecological characteristics of an aquatic resource, either later in time or farther removed in distance from the project site. Indirect impacts to aquatic resources may become evident over a period of time (weeks, months, or years) and/or occur in aquatic resources located outside the project site or located downstream from the project site. Activities and actions implemented under each EIS/EIR alternative could indirectly impact Planning Area aquatic resources by (1) altering the surface hydrology or sub-surface hydrology in the watershed of the aquatic resource; (2) introducing particulate matter, sediments, pollutants, or toxins to the aquatic resource or the watershed of the aquatic resource; or (3) increasing other threats (e.g., colonization by weedy and noxious species, habitat fragmentation, changes in land management options/practices,

[3] Direct adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody.

thatch buildup, inadequate mitigation measures). The indirect impacts discussed in Chapter 10 are permanent impacts to the physical, biological, or the ecological characteristics of an aquatic resource that provide habitat elements for aquatic species. However, those indirect impacts might not decrease the acres of the impacted aquatic resource or remove the functions and services of the impacted aquatic resource.

As discussed in Section 3.6.4, GIS methodology was used to quantitatively estimate the direct impacts (losses) of aquatic resources from each EIS/EIR alternative; GIS datasets of future projects and activities expected under each EIS/EIR alternative were digitally overlaid (compared) with separate GIS datasets of each Aquatic land cover type (Table 10-1). In addition, the potential indirect impacts of each action alternative on the Vernal Pool, Swale, and Stream/Creek (VPIH) land covers were quantified and provided in this chapter using the GIS methodology described in Section 3.6.5 and 3.6.6. However, the potential indirect impacts of each alternative on the other Aquatic Resources land covers (i.e., Seasonal Wetland, Freshwater Marsh, Stream/Creek, Open Water, Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland) are described and analyzed qualitatively, as discussed in Section 3.6.6.

As discussed in Section 3.6.2, it is appropriate to consider impacts to some environmental resources within the context of other impacts occurring to the resource within the surrounding landscape, community, or region. Several of the HUC 10 watershed boundaries discussed in Section 10.1.2 extend beyond the EIS/EIR Planning Area boundary (Figure 10-2). Accordingly, the lead agencies determined that an appropriate geographic scale for evaluating the impacts of each EIS/EIR alternative on aquatic resources should include the Planning Area and all areas of each HUC 10 watershed discussed above in Section 10.1.2, including the areas located outside the Planning Area boundary.

As discussed in Sections 3.4 and 10.1.1, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006) analyzed direct and cumulative impacts of urban growth planned within their jurisdictions, including impacts to aquatic resources. When the impact analysis or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief description of the incorporated information or analysis is provided in Sections 10.2.2, 10.2.3, and 10.2.4. However, as discussed in Section 3.4, the three General Plan EIRs used different study periods ending in 2030 (Galt 2009b), 2050 (Rancho Cordova 2006), and 2030 (Sacramento County 2010), respectively, and the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). As discussed in Section 3.4, the EIRs for the Rancho Cordova General Plan and the Galt General Plan analyzed full buildout of those jurisdictions. However, additional urban development is expected to occur within Sacramento County during the 35 years after the General Plan EIR study period ends in 2030 and before this EIS/EIR's study

period ends in 2065. Consequently, the impact analyses and conclusions incorporated from the *Sacramento County General Plan Update Final EIR* (Sacramento County General Plan EIR) may not have considered all of the future urban development that is included in the description of each EIS/EIR alternative (refer to Chapter 2). Therefore, the lead agencies considered the impact analysis and conclusions incorporated by reference from the three General Plan EIRs and the effects of all urban development activities and projects that are included in the description of each EIS/EIR alternative.

As discussed in Section 3.7, the cumulative analyses of impacts to aquatic resources in this chapter will consider (1) the effects of past and present (current) urban development within in the Planning Area (see the existing conditions in Section 10.1.2) and within the larger study area, and (2) future impacts expected from reasonably foreseeable other projects in the Planning Area (see Section 3.7) and foreseeable other projects within the larger study area. The cumulative analysis of each EIS/EIR alternative will then consider whether the incremental impacts of the alternative on aquatic resources would be significant (i.e., would be cumulatively considerable). ~~t~~**T**he cumulative analyses of each alternative in this chapter incorporates information about the past**, present, and reasonably foreseeable** impacts to wetlands and other waters from projects and activities within the SSHCP Planning Area that have been authorized under CWA 404 between 1979 and January 2013 by the USACE Sacramento District Regulatory Division (USACE 2014) (EIS/EIR Appendix A). The USACE 2014 report quantifies the total acres of direct loss of wetlands and other waters ~~from individual discharges of dredged or fill material~~ from past CWA 404 actions within the Planning Area~~, to the extent reasonable and practical~~. The USACE 2014 report also quantifies acres of preservation, re-establishment, and establishment of wetlands and other waters ~~undertaken~~ **provided** as compensatory mitigation for ~~authorized CWA 404 fill discharges~~ **loss of waters** between 1979 and January 2013. The USACE 2014 report also quantifies acres of wetlands and other waters that have been permanently preserved by the establishment of USACE-approved mitigation banks between 1979 and January 2013. The USACE 2014 report also considered ~~the progress of currently proposed projects in the CWA 404 permitting process, and the likelihood of a proposed project ultimately being implemented, to help identify~~ reasonably foreseeable ~~future~~ CWA 404 actions and ~~their foreseeable~~ **associated** **estimated** impacts to ~~the wetlands and the other water land covers~~ **waters of the United States**.

10.2.1.1 Determination of Impact Significance

As discussed in Section 3.8.1, the criteria used to evaluate the significance of impacts expected from each EIS/EIR alternative on ~~hydrology and water quality~~ **aquatic resources** are based on the California Environmental Quality Act Guidelines (14 CCR 15000 et seq.) and on typical thresholds used to evaluate impacts to aquatic resources in recent EIRs prepared by

Sacramento County. Based on these sources, a significant impact to the Planning Area's aquatic resources would occur if the alternative would:

- Have a substantial adverse effect on any riparian or other sensitive natural community identified in local or regional plans, local policies, or by state or federal regulations.
- Have a substantial adverse direct or indirect effect on aquatic resources.

The California Environmental Quality Act Guidelines (Appendix G) does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial impact could occur if the alternative would:

- Discernibly reduce adverse effects on riparian or other sensitive natural communities identified in local or regional plans, policies, or regulations or by CDFW or the U.S. Fish and Wildlife Service.
- Discernibly reduce adverse direct or indirect effects to aquatic resources.

The impact analysis for the three EIS/EIR alternatives considers the context, intensity, and severity of potential impacts to each of these impact criteria and presents separate determinations of significance addressing each of these criteria.

10.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2.1 of Chapter 2.

10.2.2.1 Direct and Indirect Effects of the No Action/No Project Alternative

As discussed in Section 10.2.1, much of the estimated total 35,532 acres of future urban development expected under the No Action/No Project Alternative (Section 2.2) is also described and analyzed in the Sacramento County General Plan, Galt General Plan, and Rancho Cordova General Plan (see Sections 3.4 and 10.2.1).

The Sacramento County General Plan EIR (Sacramento County 2010) determined that impacts of planned future development on ~~wetland and riparian~~ **aquatic** resources would be less than significant (Sacramento County 2010, pp. 8-31 through 8-34) because future projects would continue to comply with the existing regulations and policies discussed in Section 10.1.1. **In the Sacramento County General Plan EIR, the term "wetland" is used to encompass a variety of aquatic habitats, including both jurisdictional and non-jurisdictional wetlands and streams (i.e., aquatic habitats that could be affected through alteration of the bed and bank) (County of Sacramento 2010, p. 8-32).**

The *City of Rancho Cordova General Plan EIR* (Rancho Cordova General Plan EIR) (Rancho Cordova 2006) determined that impacts of future development to aquatic resources would be significant and unavoidable (Rancho Cordova 2006, "Biological Resources," pp. 4.10-48 through 4.10-56).

The *City of Galt General Plan Update: 2030 Final EIR* (Galt General Plan EIR) (Galt 2009b) found that impacts from future development to aquatic resources within Galt would be significant and unavoidable (Galt 2008, pp. 8-16 through 8-20 in the Draft EIR [Galt 2008], the Final EIR did not reprint these conclusions).

The adverse impacts of planned urban development on aquatic resources identified in the Sacramento County, Rancho Cordova, and Galt General Plan EIRs and summarized above would also occur under the No Action/No Project Alternative, and the information, analyses, and conclusions from the three General Plan EIRs are incorporated here by reference.

As discussed in Sections 3.4 and 10.2.1, the Galt and the Rancho Cordova General Plan EIRs analyzed buildout of their jurisdictions. However, additional urban development would occur within Sacramento County during the 35-year period after the end of the General Plan EIR study period (2030) and the buildout of the UDA expected at end of this EIS/EIR's study period in 2065. Consequently, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs and the effects of the additional urban development activities and projects included in the description of the No Action/No Project Alternative. The lead agencies extrapolated from the impacts of the urban development implemented in the early part of the EIS/EIR study period (the period analyzed in the General Plan EIRs) the estimated impacts from the additional urban development that will occur in the remaining years of the 50-year EIS/EIR study period. The lead agencies assumed that impacts to aquatic resources from new urban development constructed in the latter part of the EIS/EIR study period would continue to result in significant and unavoidable impacts to wetlands, other waters, and riparian areas.

As discussed in Section 2.2.3, new urban development would occur on approximately 32,426 acres of existing natural land covers under the No Action/No Project Alternative. This new urban development would **be assumed to** directly impact (i.e., ~~be~~ permanently impact~~ed~~, according to the assumptions stated for direct impacts in Section 10.2.1) **aquatic resources**. Of the currently existing 24,254 acres of aquatic resources mapped in the Planning Area, implementation of the No Action/No Project Alternative would result in an estimated direct loss of approximately of 1,607 (6.6%) of **the** ~~its~~ current amount of aquatic resources (Table 10-3~~ and Table 10-5~~). The 1,607 acres of direct loss of aquatic resources within the Planning Area under the No Action/No Project Alternative includes all three categories of aquatic

resources (see Table 10-4, Estimated Direct Loss of Aquatic Resources Under the No Action/No Project Alternative).

In addition, as described in Section 2.2.2, up to 1,900 acres of future planned urban development could be shifted or displaced from inside the Mather Core Recovery Area (located primarily within the Morrison Creek watershed) to one or more locations outside the current Sacramento County Urban Service Boundary (USB) (possibly to areas near Rancho Murieta in the Deer Creek watershed or south of the Elk Grove sphere of influence in the Upper Cosumnes River or the Snodgrass Slough watersheds), which could directly impact up to 50 acres of aquatic resources located outside the current USB boundary.

Table 10-4. Estimated Direct Loss of Aquatic Resources Under the No Action/No Project Alternative

Land Cover Type	Acres per Watershed										Displaced Development	Total
	American River	*Deer Creek*	*Laguna Creek*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne River*	*Morrison Creek*	*Sherman Lake–Sacramento River*	*Snodgrass Slough*	*Upper Cosumnes*		
Wetland Waters												
Vernal Pool	4	27	31	14	8	0	214	5	5	3	11	**322**
Seasonal Wetland	0	10	17	2	4	0	66	0	6	0	10	**115**
Swale	1	65	5	2	1	0	160	1	1	0	4	**240**
Freshwater Marsh	1	2	7	1	1	0	118	0	7	1	6	**144**
Total Wetland Waters	*6*	*104*	*60*	*19*	*14*	*0*	*558*	*6*	*19*	*4*	*31*	*821*
Other Waters												
Open Water	0	74	2	0	0	0	88	0	1	0	10	**175**
Stream/Creek (Intermittent and Perennial)	1	12	14	6	0	0	82	4	18	1	11	**149**
Streams/Creeks (VPIH) (Ephemeral)	0	7	0	0	0	0	28	0	0	0	0	**35**
Total Other Waters	*1*	*93*	*16*	*6*	*0*	*0*	*198*	*4*	*19*	*1*	*21*	*359*
Riparian												
Mine Tailing Riparian Woodland	48	40	0	0	0	0	128	2	0	0	0	**218**
Mixed Riparian Scrub	0	2	5	4	2	0	42	4	1	0	2	**62**
Mixed Riparian Woodland	0	15	9	17	13	0	82	3	2	5	1	**147**
Total Riparian	*48*	*57*	*14*	*21*	*15*	*0*	*252*	*9*	*3*	*5*	*3*	*427*
Grand Total	**55**	**254**	**90**	**46**	**29**	**0**	**1,008**	**19**	**41**	**10**	**55**	**1,607**

AGENDA ITEM 11.1

4879

As discussed in Sections 2.2.1 and 3.4, the No Action/No Project Alternative includes the full development, or "full buildout," of all lands presently zoned or ultimately planned/contemplated for urban development. These lands are discussed in Section 1.1.1 and on Figure 1-1 as the UDA. Most of the UDA area is within the Morrison Creek watershed (Figure 10-2); therefore, most future aquatic resource impacts from planned urban development (1,008 acres of the expected total 1,607 acres of impacts) would occur in the Morrison Creek watershed (Table 10-4). Smaller portions of the northern UDA area are within the Deer Creek and Sherman Lake–Sacramento River watersheds, where 254 acres and 19 acres of aquatic resources would be impacted, respectively. The southern UDA area is located in and around the Galt (Figure 1-1) and includes relatively small portions of the Laguna Creek, the Lower Cosumnes River, and the Dry Creek watersheds (Figure 10-2). Approximately 90 acres of aquatic resources would be directly impacted in the Laguna Creek watershed, 46 acres would be directly impacted in the Lower Cosumnes River watershed, and 29 acres would be directly impacted in the Lower Dry Creek watershed (Table 10-4).

As defined in Section 3.4.2, "full buildout" of the UDA will include some open space lands and some mitigation or conservation lands within the area planned for future urban development. The aquatic resources remaining within those open space, mitigation, or conservation lands would not be directly impacted (e.g., filled, removed, or changed to another Aquatic land cover type) by the expected "full buildout," but those aquatic resources could become indirectly impacted by adjacent development or by development anywhere within the same landscape or watershed.

In addition to direct losses of aquatic resources, planned urban development under the No Action/No Project Alternative would also indirectly impact existing aquatic resources. Section 3.6.6 and Appendix G summarize the different types of indirect impact mechanisms (environmental stressors) that can result from the construction and the operation of urban development projects and activities. Urban development projects can cause indirect impacts to aquatic resources present in nearby open spaces and conservation lands by increasing the presence of invasive plant species that escape from urban landscaping and by disturbing areas that become colonized by weedy and invasive plants. These invasive plants are known to adversely affect the natural hydrology and the habitat quality of aquatic resources by outcompeting native species, by blocking infiltration of rainwater in vernal pool soils, by changing the hydrology of vernal pools and other wetlands, and by using more water than native grassland species, which shortens the ponding period of vernal pools. The functions and services of vernal pool wetlands are especially vulnerable to indirect changes to the natural hydrologic regime of the vernal pool ecosystem because both the timing of vernal pool fill and period of vernal pool inundation dictate whether vernal pool plants and crustaceans are able to germinate or hatch, survive, and reproduce in the relatively short winter wet season (see

discussion of vernal pool hydrology and ecology in Appendix G). As discussed in Appendix G, an impervious soil layer in Planning Area vernal pool landscapes results in the formation of a seasonal "perched aquifer," which hydrologically connects vernal pools, swales, and stream/creek aquatic features within a landscape. New urban development projects and activities under the No Action/No Project Alternative implemented in vernal pool landscapes are expected to indirectly impact the functions and services of the vernal landscape in the following ways: by permanently damaging or interrupting the hydrologic connections of the perched aquifer; by interrupting or altering the formation of the perched aquifer, which allows soil to saturate, pools to fill, and swales to connect and flow to downgradient vernal pools; and by puncturing the impermeable soil hardpan (duripan) layer in a portion of a vernal pool landscape, permanently disrupting the existing hydrology of some or all of that landscape (see discussion of vernal pool hydrology and ecology **in** Appendix G). As discussed in Section 3.6.6, the EIS/EIR qualitatively describes and analyzes indirect impacts to most aquatic resources. However, three of the Planning Area aquatic resources (vernal pools, swales, and stream/creek [VPIH]) also provide habitat for federally listed vernal pool crustaceans and are analyzed in greater detail. As discussed in Sections 8.2.1 and 9.2.1, the Permit Applicants used LIDAR technology and GIS methodology to quantify acres of Vernal Pool, Swale, and Stream/Creeks (VPIH) land covers that could be indirectly impacted by changes to surface or sub-surface hydrology within their watersheds.

The project-by-project compensatory mitigation process expected under the No Action/No Project Alternative is described in Section 2.2.4. As discussed in Section 10.1.1, new development projects and activities implemented under the No Action/No Project Alternative that require authorizations from USACE under CWA 404 would comply with the 2008 Compensatory Mitigation Rule (73 FR 19594–19705), including appropriate mitigation ratios for unavoidable impacts to aquatic resources. Compensatory mitigation ratios ~~and amounts~~ to offset unavoidable impacts to aquatic resources would be determined by considering the factors used in the USACE South Pacific Division *Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios* (Mitigation Ratios Procedure) **or other policy guidance in effect at the time**, as discussed in Section 10.1.1. New urban development projects and activities could establish on-site or off-site mitigation preserves, purchase credits at an approved mitigation bank, or purchase mitigation credits through an established in-lieu fee program.

Table 10-5, Estimated Acres of Aquatic Resources Preserved Under the No Action/No Project Alternative, provides the estimated acreages of Aquatic Resources land cover types that would be preserved under the No Action/No Project Alternative inside the UDA and outside the UDA. As discussed in Section ~~2, 2.2.4~~**2.2.3**, the lead agencies described the future No Action/No Project Alternative by estimating the minimum and maximum amounts of new urban development that could occur over a 50-year period inside the UDA under various mitigation

scenarios. Under the scenario with the largest feasible acres of new development and the smallest feasible acres of aquatic resource mitigation feasible, an estimated 1,740 acres of aquatic resources would be preserved in the Planning Area as project mitigation under the No Action/No Project Alternative (Table 10-5). **Table 10-5 identifies 0 acres of riparian land cover preservation under the No Action/No Project Alternative. This is because it is assumed that under the No Action/No Project Alternative all mitigation for unavoidable losses of riparian land covers would be achieved through re-establishment/establishment of mixed riparian scrub and mixed riparian woodland and not through preservation of existing riparian land covers (see Table 10-6, Estimated Acres of Aquatic Resources Re-Established/Established Under the No Action/No Project Alternative).**

Table 10-5. Estimated Acres of Aquatic Resources Preserved Under the No Action/No Project Alternative

Land Cover Type	Preserved Land (acres)		
	Inside UDA	*Outside UDA*	*Total*
Wetland Waters			
Vernal Pool	164	866	1,030
Seasonal Wetland	0	8	8
Swale	81	592	673
Freshwater Marsh	0	16	16
Total Wetland Waters	*245*	*1,482*	*1,727*
Other Waters			
Open Water	0	0	0
Stream/Creek (Intermittent and Perennial)	0	0	0
Stream/Creek (VPIH) (Ephemeral)	13	0	13
Total Other Waters	*13*	*0*	*13*
Riparian			
Mine Tailing Riparian Woodland	0	0	0
Mixed Riparian Scrub	0	0	0
Mixed Riparian Woodland	0	0	0
Total Riparian	*0*	*0*	*0*
Total Preserved	**258**	**1,482**	**1,740**

Notes: UDA = Urban Development Area; VPIH = vernal pool invertebrate habitat

Mitigation preserves (permittee-responsible mitigation) could occur within a project/activity site or occur outside a project/activity site. These preserves would include aquatic resources that have been avoided in accordance with regulatory requirements to first avoid and minimize direct and/or indirect impacts to aquatic resources. Smaller, on-site preserves located in proximity to new development tend to be more isolated from other natural lands and more susceptible to indirect effect mechanisms identified previously.

Individual on-site project preserves located in proximity to new development are expected to become surrounded by new urban development and isolated from other natural lands, and the existing functions and services of aquatic resources on those preserves would be **more likely to be** adversely impacted by the urban development indirect effect mechanisms discussed in Chapter 8 and Appendix G.

Table 10-6. Estimated Acres of Aquatic Resources Re-Established/Established Under the No Action/No Project Alternative

Land Cover Type	Re-Establishment/Establishment Mitigation (acres)
Wetland Waters	
Vernal Pool	322
Seasonal Wetland	57
Swale	240
Freshwater Marsh	72
Total Wetland Waters	*691*
Other Waters	
Open Water	87
Stream/Creek (Intermittent and Perennial)	75
Stream/Creek (VPIH) (Ephemeral)	17
Total Other Waters	*179*
Riparian	
Mine Tailing Riparian Woodland	0
Mixed Riparian Scrub	298
Mixed Riparian Woodland	256
Total Riparian	*554*
Total Preserved	**1,424**

Note: VPIH = vernal pool invertebrate habitat

The action of preserving existing aquatic resources would have no direct effect on the existing aquatic resources that are present inside or outside of the preserve. However, ground-disturbing actions necessary to re-establish/establish aquatic resources, especially vernal pools, on preserved land could result in indirect effects on existing natural aquatic resources. For example, some established (created) vernal pools have changed the existing hydrology of vernal pool landscapes in which they were created, impacting natural vernal pools within the same watershed. Construction activities associated with the re-establishment/establishment of aquatic resources generally include but are not limited to regrading or re-contouring of a site, typically up to 3 feet in depth for vernal pools, and seeding.

As discussed in Sections 2.2.2, 2.2.4, and 8.2.2, the No Action/No Project Alternative would also result in an estimated 1,424 acres of re-establishment or establishment of aquatic resources

(Table 10-6). **As described in Section 8.2.2, the re-establishment/establishment acres of aquatic resources presented in Table 10-6 reflect the lead agencies' assumption that the requirements of the 2008 Compensatory Mitigation Rule to be re-established/established to replace lost aquatic resource functions and services at a minimum one-to-one acreage or one-to-one linear foot compensation ratio would continue under the No Action/No Project Alternative. It is assumed in Table 10-6 that compensatory mitigation for direct impact to Vernal Pools and Swales would occur within the Planning Area. However, compensatory mitigation for the other Aquatic land covers (Stream/Creek [VPIH], Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water) is assumed to continue to occur primarily by purchasing credits at an approved mitigation banks or through an in-lieu fee program. However, several mitigation banks and in-lieu fee programs with service areas that overlap the Planning Area actually re-establish, establish, or enhance wetlands or other waters at locations outside the Planning Area. Therefore, Table 8-5 assumes that only half of the necessary compensatory mitigation for direct impacts to Stream/Creek (VPIH), Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water would occur inside the Planning Area.**

10.2.2.2 Cumulative Analysis of the No Action/No Project Alternative

As discussed in Sections 8.1.2 and 8.2.2, riparian woodlands, vernal pool wetlands, freshwater marsh wetlands, and other waters were once widespread across the Central Valley and in the Planning Area. Past human activities and projects, including farming operations; urban development inside the UDA; development of agricultural-residential neighborhoods in some areas outside the UDA; past mining operations; and the construction of associated energy, water conveyance, and transportation infrastructure projects (see Sections 3.7.1 and 10.1.2), have removed aquatic resources from the Planning Area and adversely altered the natural physical and biological processes of other aquatic resources, especially within the UDA portions of the Planning Area. The effects of past and of present (current) activities on Planning Area aquatic resources have resulted in the existing conditions described above in Section 10.1.2. These conditions represent an existing significant impact on aquatic resources within the EIS/EIR Planning Area and the larger resource study area.

The types of future foreseeable (probable) other projects, activities, and actions described in Section 3.7.2 are similar to the types of past activities and projects that have occurred in the study area. These foreseeable other projects and activities include new urban development projects within the City of Elk Grove and within the community of Rancho Murieta; proposed master planned developments within the UDA named "Rio Del Oro" (3,828 acres) and "Mather South" (885 acres); further rural residential development outside the UDA; continued urban development on currently cultivated agricultural lands; expansion of existing nature preserves, including the Stone Lakes National Wildlife Refuge and the Cosumnes River Preserve; and

construction of major infrastructure projects such as California High-Speed Rail and the California WaterFix.

A review of the USACE's CWA 404 project authorizations within the Planning Area between 1979 and 2013 indicated a small net gain of waters of the United States within individual project sites authorized under CWA 404 (USACE 2014). The foreseeable other projects that are subject to CWA 404 authorizations would also comply with existing regulatory requirements to avoid and minimize impacts to aquatic resources and provide compensatory mitigation for unavoidable impacts (see Section 10.1.1). Therefore, many of the foreseeable other actions discussed in Section 3.7.2 would not result in a loss of wetlands or other waters. Other existing regulations and policies described in Section 10.1.1, including Section 1602 of the California Fish and Game Code and policies of the three General Plans, would require the reasonably foreseeable other projects that are subject to the California Environmental Quality Act or local entitlements to avoid and minimize impacts to Riparian land covers and provide no net loss of riparian acres (see Section 10.1.1). Consequently, many of the foreseeable other projects and actions discussed in Section 3.7.2 would not result in additional losses of aquatics resource functions and services from the study area. However, the foreseeable rural residential developments, the agricultural activities on private lands, and **certain** other future activities **may not always trigger the regulations and policies listed above, and in those** cases, are likely to result in additional losses and adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period.

As described previously, ~~implantation~~**implementation** of the No Action/No Project Alternative is assumed to meet **the requirements of the 2008 Compensatory Mitigation Rule, and aquatic resources would be re-established/established to replace lost aquatic resource functions and services at a minimum one-to-one acreage or one-to-one linear foot compensation ratio. Compensatory mitigation under this alternative could occur inside and outside the Planning Area. With the resulting no net loss of aquatic resource functions and services, ~~W~~w**hen the incremental direct and indirect effects of the No Action/No Project Alternative are viewed in connection with the effects of the past, present, and reasonably foreseeable future other projects and actions, the incremental effects of the No Action/No Project Alternative would not make a considerable contribution to the existing significant cumulative impact on aquatic resources within the study area.

10.2.3 Proposed Action/Proposed Project Alternative

As described in Section 2.3.3, the Proposed Action/Proposed Project Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative. However, the locations of new urban development in the UDA under the Proposed Action/Proposed Project Alternative are expected to differ slightly from the No Action/No

Project Alternative, primarily because the Proposed Action/Proposed Project Alternative would consolidate the federal Endangered Species Act (ESA), California Endangered Species Act, and CWA 404 mitigation requirements of future projects and activities (Covered Activities) to form a managed and interconnected SSHCP Preserve System (see Section 2.3.5). The SSHCP and ARP would establish a network of Preserve Planning Units in the Planning Area that would preserve special-status species and their natural communities in perpetuity. Preservation of these natural communities includes many types of waters of the United States and waters of the state, riparian buffer areas, and adjacent upland areas. In addition, the Proposed Action/Proposed Project Alternative would allow urban development Covered Activities within the Mather Core Recovery Area portion of the UDA to be implemented consistent with planned urban development described in the approved Sacramento County and Rancho Cordova General Plans without urban development shifting or being displaced to locations outside the current USB boundary. Therefore, the Proposed Action/Proposed Project Alternative would allow for more urban development within the Mather Core Recovery Area than the No Action/No Project Alternative because approximately 1,900 acres of new urban development would not shift or be displaced to locations outside of the current Sacramento County USB boundary. Consequently, both the No Action/No Project Alternative and the Proposed Action/Proposed Project Alternative assume a full buildout of the UDA,[4] but new urban developments would not occur outside the current USB boundary under the Proposed Action/Proposed Project Alternative.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative's Conservation Strategy also includes landscape-level and project-level SSHCP Avoidance and Minimization Measures (SSHCP AMMs), which would be incorporated into the design or the implementation of each Covered Activity to avoid and minimize impacts to aquatic resources to the greatest extent practicable. The SSHCP AMMs include siting requirements, incorporation of low-impact development measure (LID) elements in project designs, incorporation of Stream Setbacks and Preserve Setbacks in project design, species-specific avoidance measures, and use of BMPs during ground disturbing Covered Activities (see Appendix D for details on each AMM).

10.2.3.1 Direct and Indirect Effects of the Alternative

As discussed in Section 10.1.2, approximately 24,254 acres of aquatic resources is present in the Planning Area (Table 10-1). Implementation of the Proposed Action/Proposed Project Alternative would directly impact (direct loss of) approximately 1,613 acres of aquatic resources, leaving approximately 22,611 acres (92.2% of existing condition) of aquatic

[4] "Full buildout" means all currently undeveloped lands that are zoned for or ultimately planned/contemplated for future urban development (in the adopted General Plans of the Permit Applicants) would become developed. Full buildout would include some open space and mitigation preserves or other conservation lands within the areas planned for urban development.

resources in the Planning Area (Table 10-7, Estimated Loss of Aquatic Resources Under the Proposed Action/Proposed Project Alternative).

The total 1,613 acres of direct loss of aquatic resources within the Planning Area includes all three categories of aquatic resources (see Table 10-7), including the direct loss of 855 acres of the Wetland Waters land cover types. This direct loss of wetland waters is approximately 34 acres greater than the 821 acres of direct loss of wetland waters anticipated under the No Action/No Project Alternative (Tables 10-4 and 10-7). In addition, the Proposed Action/Proposed Project Alternative would result in the direct loss of 294 acres of other waters, which would be 65 acres less than the 359 acres that is anticipated to be lost under the No Action/No Project Alternative (Tables 10-4 and 10-7). Also, the Proposed Action/Proposed Project Alternative would result in the total direct loss of 464 acres of Riparian land cover types, which would be 37 acres greater than the 427 acres of loss estimated for the No Action/No Project Alternative (Tables 10-4 and 10-7).

The Morrison Creek watershed (see Section 7.1.2 and Figure 10-2) is within the UDA, where future urban development Covered Activities would occur. Therefore, the Morrison Creek watershed would lose the most acres of aquatic resources compared to other Planning Area watersheds. Approximately 994 (619 acres of Wetland Waters, 156 acres of Other Waters, and 219 acres of Riparian land covers) acres of Morrison Creek aquatic resources would be lost under the Proposed Action/Proposed Project Alternative (Table 10-7).

Because the types of urban development implemented under the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative are similar, the sources of indirect impacts (e.g., impact mechanisms or environmental stressors) that result from the construction and operation of urban development would be similar in type to those described previously for the No Action/No Project Alternative (e.g., altered surface or sub-surface hydrology, contaminated surface runoff, invasive species) (see Section 10.2.2.1).

Table 10-7. Estimated Loss of Aquatic Resources Under the Proposed Action/Proposed Project Alternative

Land Cover Type	Acres per Watershed										Total
	American River	*Deer Creek*	*Laguna Creek*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne River*	*Morrison Creek*	*Sherman Lake–Sacramento River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Wetland Waters											
Vernal Pools	5	33	31	14	10	0	283	5	5	3	389
Seasonal Wetland	0	10	15	4	1	0	68	0	7	0	105
Swale	1	62	2	3	1	0	163	1	1	0	234
Freshwater Marsh	1	2	8	1	2	0	105	0	7	1	127
Total Wetland Waters	*7*	*107*	*56*	*22*	*14*	*0*	*619*	*6*	*20*	*4*	*855*
Other Waters											
Open Water	1	71	2	0	0	0	80	0	1	0	155
Streams/ Creeks (Perennial or Intermittent)	1	12	14	6	3	0	57	4	19	1	117
Streams/ Creeks (VPIH) (Ephemeral)	0	3	0	0	0	0	19	0	0	0	22
Total Other Waters	*2*	*86*	*16*	*6*	*3*	*0*	*156*	*4*	*20*	*1*	*294*
Riparian											
Mine Tailing Riparian Woodland	48	40	0	0	0	0	128	2	0	0	218
Mixed Riparian Scrub	0	2	5	4	10	0	36	4	1	0	62
Mixed Riparian Woodland	0	15	9	17	78	0	55	3	2	5	184
Total Riparian	*48*	*57*	*14*	*21*	*88*	*0*	*219*	*9*	*3*	*5*	*464*
Grand Total	**57**	**250**	**86**	**49**	**105**	**0**	**994**	**19**	**43**	**10**	**1,613**

AGENDA ITEM 11.1

4888

The Proposed Action/Proposed Project Alternative's Conservation Strategy (Section 2.3.5) included~~d~~**s** required impact AMMs that would reduce or eliminate many of the impact mechanisms (environmental stressors) that indirectly impact aquatic resources functions and services. The Proposed Action/Proposed Project Alternative would require the following SSHCP AMMs to be applied to Covered Activities (these AMMs are also included in the ARP; details on the AMMs are provided in Appendix D of this EIS/EIR): BMP-1, BMP-2, BMP-3, BMP-4, BMP-5, BMP-9, Road-1, LID-1 through LID-3, EDGE-1 through EDGE-7, EDGE-9, EDGE-10, ROAD-1 through ROAD-3, NATURE TRAIL-1, NATURE TRAIL-2, NATURE TRAIL-4, STREAM-1 through STREAM-5, and UTILITY-2 through UTILITY-4 (see Table 2-6 and Appendix D for a description of all SSHCP AMMs). Relative to the AMMs of individual projects and activities implemented under the No Action/No Project Alternative, these SSHCP AMMs would better reduce indirect impacts on aquatic resources. For example, STREAM-1 through STREAM-3 would require wider Stream Setbacks between streams and new development than those required under the No Action/No Project Alternative regulatory environment, thereby providing greater protection of existing water quality and species habitats in stream/creek and other aquatic resources downstream. On-site project requirements to maintain hydrologic conditions, minimize effects on downstream hydrology through stormwater retention and other measures (LID), perform mandatory construction monitoring near Covered Species aquatic habitat, and perform mandatory implementation of erosion-control measures during project construction "scale up" such that the overall Planning Area would have reduced indirect impacts compared to the No Action/No Project Alternative.

BMP-1 through BMP-11 of the Proposed Action/Proposed Project Alternative are similar to the construction BMPs that would be implemented with projects under the No Action/No Project Alternative (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM. The Proposed Action/Proposed Project Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM and a process to make adaptive changes to any AMM that was not effective at avoiding impacts to water quality and aquatic habitats. This additional oversight and guidance provided by the SSHCP would result in the BMP AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to surface-water quality compared to the effects of the No Action/No Project Alternative.

Biological Goals and Measurable Objectives provide the broad guiding principles of a habitat conservation plan's (HCP's) operating Conservation Strategy and are required in all HCPs. The

stated Measureable Objectives of each Biological Goal are included as conditions in an HCP's permit. The primary components of the SSHCP Conservation Strategy are six Biological Goals for the operational SSHCP and the specific Measurable Objectives that would achieve each of the six SSHCP Biological Goals. As discussed in Section 7.3.2 of the Draft SSHCP document, SSHCP Biological Goal #2 is to "maintain or improve the existing physical, chemical, and biological functions of the aquatic resources located within the Planning Area." The stated intent of SSHCP Biological Goal #2 is to avoid or minimize impacts of future Covered Activities on Planning Area aquatic resources and to ensure no net loss of aquatic resources and aquatic functions by preserving existing aquatic resources and by re-establishing or establishing aquatic resources within the Planning Area.

SSHCP Biological Goal #2 and its Measurable Objectives prescribe a number of requirements that would benefit streams and creeks within the Planning Area. It requires increased avoidance of creeks in the UDA compared to the No Action/No Project Alternative (avoidance of a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA). It also requires establishment of Stream Setbacks, which are not currently a requirement within the Planning Area. Avoided creeks (including ephemeral streams) would have minimum setback requirements based on specific objectives of the overall ~~mitigation~~ **Conservation** ~~s~~**S**trategy. Additionally, aquatic resources preserved within the SSHCP Preserve System would be managed into perpetuity.

The SSHCP Conservation Strategy would create a Preserve System that would preserve and link the highest-quality natural land covers, cropland, and irrigated pasture-grassland within the Planning Area (described in detail in the SSHCP in Chapter 7, Section 7.2.2.1), with a Preserve System 32,426 acres in size, ~~and~~ 26,236 acres of which would be located outside the UDA. Avoidance and minimization of aquatic resources would be accomplished through preserve design and assembly, which includes protecting the rarest types and highest-functioning aquatic resources (e.g., vernal pools, streams, certain seasonal wetlands) and implementing inter-preserve connectivity. The SSHCP Preserve System would be designed to protect watershed functions, maintaining existing hydrologic regimes through linked preserves and setback requirements. This preserve design would be important to aquatic resources and their existing and potential beneficial uses and to the maintenance of aquatic-resource-dependent/associated plants and wildlife. It would also be designed to preserve natural upland landscapes associated with streams and wetland features for maintaining aquatic resource dependent/associated species.

The Proposed Action/Proposed Project Alternative would establish a coordinated and interconnected 33,426-acre SSHCP Preserve System in the Planning Area (see Section 2.3.5). The SSHCP Preserve System would contain at least 2,738 acres of Aquatic Resources land cover types (Table 10-8). The Proposed Action/Proposed Project Alternative would result in the preservation of

1,476 acres of Wetland Waters land cover types. This preservation of wetland waters would be 251 acres less than the 1,727 acres that are anticipated **to be preserved** under the No Action/No Project Alternative (Table 10-5). The Proposed Action/Proposed Project Alternative would result in the preservation of 298 acres of Other Water land cover types. This preservation of other waters would be 285 acres more than the 13 acres of other waters that are anticipated to be preserved under the No Action/No Project Alternative (Table 10-5).

Table 10-8. Estimated Acres of Aquatic Resources Preserved Under the Proposed Action/Proposed Project Alternative

Land Cover Type	Preserved Land (acres)		
	Inside UDA	*Outside UDA*	*Total*
Wetland Waters			
Vernal Pool	210	756	966
Seasonal Wetland	56	49	105
Swale	93	185	278
Freshwater Marsh	127	0	127
Total Wetland Waters	*486*	*990*	*1,476*
Other Waters			
Open Water	70	85	155
Stream/Creek (Intermittent and Perennial)	23	94	117
Stream/Creek (VPIH) (Ephemeral)	26	0	26
Total Other Waters	*119*	*179*	*298*
Riparian			
Mine Tailing Riparian Woodland	0[a]	0[a]	0[a]
Combined Mixed Riparian Scrub and Mixed Riparian Woodland	74[a]	890[a]	964[a]
Total Riparian	*74*	*890*	*964*
Total Preserved	**679**	**2,059**	**2,738**

Note: UDA = Urban Development Area

[a] Impacts to Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland would be mitigated by preserving any combination of Mixed Riparian Scrub and/or Mixed Riparian Woodland.

The Conservation Strategy of the Proposed Action/Proposed Project Alternative would preserve 964 acres of Riparian land cover types. Preservation of Riparian land cover under the No Action/No Project Alternative is not expected (Table 10-5).

The SSHCP's Conservation Strategy includes the re-establishment/establishment of 1,740 acres of Aquatic Resources land covers to compensate for unavoidable impacts (see Table 10-9, Estimated Acres of Aquatic Resources Re-established/Established Under the Proposed Action/Proposed Project Alternative). Section 7.3.2 of the SSHCP identifies the SSHCP Goals and Objectives, which establish minimum compensatory mitigation requirements for aquatic resources. For example, SSHCP Biological Goal #2's Measurable Objective W5 includes a

minimum 1:1 ratio, including land-cover-specific re-establishment/establishment ratios. As required by SSHCP Biological Goal #2, a minimum 1:1 re-establishment/establishment ratio would be required for all Covered Activities directly impacting wetlands, other waters, and riparian, and the re-establishment/establishment would occur within the SSHCP Preserve System. The Proposed Action/Proposed Project Alternative would result in the re-establishment/establishment of each of the three categories of aquatic resources (Table 10-9). These re-establishment/establishment amounts would ensure that the minimum one-to-one acreage and linear foot compensation ratios required per the 2008 Compensatory Mitigation Rule (33 CFR 332.3[f]) are met.

The compensatory mitigation ratios listed in the ARP are based on a landscape-level assessment of the diversity, abundance, and condition of aquatic resources types that occur in the Planning Area. The compensatory mitigation ratios are also designed to be consistent with USACE's 2008 Compensatory Mitigation Rule and to consider the factors used for determining compensatory mitigation requirements as required for processing Department of the Army permits under Section 404 of the CWA (Mitigation Ratios Procedure).

~~The ARP compensatory mitigation ratios are based upon factors consistent with the federal mitigation rule. The purpose of the ARP compensatory mitigation ratios strategy is to proactively offset unavoidable impacts to aquatic resources and maintain or improve physical, chemical, and biological functions of aquatic resources within the Planning Area.~~

As previously mentioned, two key components of the SSHCP Conservation Strategy are the Jump-Start and Stay-Ahead provisions (described in detail in Chapter 9, Section 9.5.5, of the SSHCP). These components of the SSHCP Conservation Strategy were developed to address the temporal loss consideration described in the Mitigation Ratios Procedure. Jump-Start and Stay-Ahead provisions require impacts to be mitigated in advance of Covered Activity project implementation and ensure that SSHCP Preserve System assembly would keep pace with urban development and make steady progress toward assembling the entire conceptual SSHCP Preserve System. Implementation of these provisions would ensure that lost aquatic resource functions are replaced ahead of Covered Activity project impacts, avoiding temporal loss.

Table 10-9. Estimated Acres of Aquatic Resources Re-Established/Established Under the Proposed Action/Proposed Project Alternative

Land Cover Type	Re-Establishment/Establishment Mitigation (acres)
Wetland Waters	
Vernal Pool	389
Seasonal Wetland	105
Swale	256
Freshwater Marsh	127
Total Wetland Waters	*877*
Other Waters	
Open Water	155
Stream/Creek (Intermittent and Perennial)	117
Stream/Creek (VPIH) (Ephemeral)	0[a]
Total Other Waters	*272*
Riparian	
Mine Tailing Riparian Woodland	0[b]
Combined Mixed Riparian Scrub and Mixed Riparian Woodland	591
Total Riparian	*591*
Total Re-Established/Established	**1,740**

Notes:

[a] Re-establishment and/or establishment to mitigate effects on Stream/Creeks (VPIH) would be Swale, which is included in the approximately 256 acres shown for Swale.

[b] Mine Tailing Riparian Woodland would be mitigated re-establishing or establishing Mixed Riparian Scrub or Mixed Riparian Woodland.

Because the Proposed Action/Proposed Project Alternative would result in greater impacts to aquatic resources, the ~~a~~ total acreage of re-established/established aquatic resources would be greater under the Proposed Action/Proposed Project Alternative (Table 10-9) than the No Action/No Project Alternative (Table 10-6). The No Action/No Project Alternative results in 1,424 acres of re-establishment/establishment mitigation **in the Planning Area (see Section 10.2.2 for an explanation of the use of mitigation banks and in-lieu fee programs and potential for some compensatory mitigation to be located outside the Planning Area)**, and the Proposed Action/Proposed Project Alternative results in 1,740 acres of re-establishment/establishment mitigation **in the Planning Area**. For both alternatives, the amount of re-establishment/establishment is directly tied to the amount of impact, with each acre of land cover loss resulting in **at least** 1 acre of establishment**/**re-establishment. For the No Action/No Project Alternative, this minimum one-to-one acreage is assumed based on the requirements of the 2008 Compensatory Mitigation Rule (33 CFR 332.3[f]). For the Proposed Project Alternative, it is a direct requirement of SSHCP Biological Goal #2, which would also provide compliance with the minimum standards of the 2008 Compensatory Mitigation Rule. Therefore, both alternatives result in no net loss of acreage of aquatic resources.

Mitigation for direct loss of Mine Tailing Riparian Woodland land cover would re-establish/establish Mixed Riparian Woodland or Mixed Riparian Scrub land covers. This mitigation strategy would replace Mine Tailing Riparian, a constructed land cover (see Section 8.1.2), with the natural Mixed Riparian Woodland or Mixed Riparian Scrub land covers. In addition, impacts to the Open Water land cover (which in the Planning Area consists largely of stock ponds, impoundments, and other constructed features ~~([~~[see Section 8.1.2~~)~~]]), would be mitigated though the preservation and re-establishment/establishment of either Freshwater Marsh or Seasonal Wetlands land covers. Impacts to the Stream/Creek (VPIH) land cover would be mitigated though the preservation or re-establishment/establishment of the Vernal Pool land cover. Because compensatory mitigation for impact to Mine Tailing Riparian Woodland, Open Water, and the Stream/Creek (VPIH) land cover would not be in kind, these land covers would decrease relative impacts expected under the No Action/No Project Alternative. However, the re-establishment/establishment of total riparian communities and total wetland and other waters would result in a no net loss of acreage.

As discussed previously, implementation of the SSHCP Conservation Strategy, including the Preserve System and AMMs, the ARP, and ~~a~~ proposed state and federal aquatic resource permitting approaches for future Covered Activities (described in Section 1.5), would result in a comprehensive regional approach to avoidance, minimization, and compensation of adverse impacts to aquatic resources (Section 2.3.5).

Similar to the No Action/No Project Alternative, aquatic resources directly and indirectly ~~lost~~ **impacted** under the Proposed Action/Proposed Project Alternative would be mitigated to achieve no net loss of aquatic resources acreage, functions, and services.

The SSHCP Conservation Strategy also includes the goal to "maintain or improve physical, chemical, and biological functions of aquatic resources within the Planning Area." The SSHCP Preserve System would result in larger individual preserves, and greater connectivity of preserves than is anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

Also, the Conservation Strategy and ARP include goals and objectives to re-establish/establish aquatic resources to compensate for unavoidable adverse impacts, including direct loss of aquatic resources, that remain after AMMs (e.g., watershed-scale planning, project-scale AMMs) have been applied. The Conservation Strategy and ARP would preserve 81 less acres of aquatic resources than the anticipated amount of preservation under the No Action/No Project Alternative; however, the preservation under the Conservation Strategy and ARP would be implemented with a systematically coordinated Preserve System that also considers watersheds. The Preserve System would result in larger individual preserves and greater connectivity of preserves than anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

In addition, as discussed previously, the SSHCP Conservation Strategy and ARP implemented under the Proposed Action/Proposed Project Alternative would include re-establishment/establishment, preservation, and AMMs, such as Stream Setbacks, that would reduce direct and indirect adverse impacts of project to aquatic resources compared to effects of the No Action/No Project Alternative.

Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would include the following:

- Result in the loss of 855 acres of wetland waters, which is 34 acres more than the 821-acre loss anticipated under the No Action/No Project Alternative
- Result in the loss of 294 acres of other waters, which is 65 acres less than the 359-acre loss anticipated under the No Action/No Project Alternative
- Result in the loss of 464 acres of Riparian land cover types, which is 37 acres more than the 427 acres expected under the No Action/No Project Alternative
- In total, result in the loss of 1,613 acres of aquatic resources, which is a 6-acre greater loss of aquatic resources compared to the 1,607-acre loss of the No Action/No Project Alternative (Table 10-4)
- Preserve 2,738 acres of aquatic resources, which is greater by 998 acres compared to 1,740 acres under the No Action/No Project Alternative
- Require AMMs, such as increased Stream Setbacks, that would be more protective to aquatic resources relative to the No Action/No Project Alternative
- Implement the SSHCP and ARP and result in a greater area of aquatic resources protections and management than the No Action/No Project Alternative
- Improve aquatic resources abundance, diversity, and condition within the Planning Area over that expected under the No Action/No Project Alternative

Therefore, after considering the impacts from the Proposed Action/Proposed Alternative on each of the impact criteria for aquatic resources (Section 10.2.1.1), the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects to aquatic resources compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

10.2.3.2 Cumulative Effects of the Proposed Action/Proposed Project Alternative

The effects of past~~,~~ **and** present~~, and reasonably foreseeable other~~ projects on aquatic resources in the Planning Area were described in Section 10.2.2.2 and represent a significant adverse cumulative impact on the aquatic resources within the study area. **A subset of the reasonably foreseeable other projects (e.g., foreseeable rural residential developments, agricultural activities on private lands) is likely to result in additional losses and additional adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period. However,** ~~A~~as discussed in Section 10.2.2.2, when the incremental direct and indirect effects of the No Action/No Project Alternative are viewed in connection with the significant adverse effects of the past, present, and reasonably foreseeable future other projects and actions, the incremental effects of the No Action/No Project Alternative would not make a considerable contribution to the existing significant cumulative impact on aquatic resources within the study area. Therefore, the No Action/No Project Alternative would result in a ***Less Than Significant Adverse*** effect.

As discussed previously, the implementation of the SSHCP Conservation Strategy, including the SSHCP AMMs, SSHCP ARP, and interconnected SSHCP Preserve System, is expected to result in more consistent and frequent conservation of aquatic resources compared to the No Action/No Project Alternative. Consequently, the incremental effects of the Proposed Action/Proposed Project Alternative would have a minor beneficial impact to aquatic resources compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of the Proposed Action/Proposed Project Alternative are individually limited and would not make a cumulatively considerable contribution to the significant adverse cumulative impacts of the past, present, and reasonably foreseeable future other projects on aquatic resources. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect to aquatic resources compared to the No Action/No Project Alternative baseline condition.

10.2.4 Reduced Permit Term Alternative

As described in Section 2.3.3, the Reduced Permit Term Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative.

Under the Reduced Permit Term Alternative, the core of the Preserve System established inside the UDA would be associated with the development of five large Master Plans (discussed in Section 2.3.4 for the Reduced Permit Term Alternative and Section 2.3.3 for the Proposed Action/Proposed Project Alternative). Because the Preserve System inside the UDA under both EIS/EIR action alternatives is associated with the same five large Master Plans, approximately 70% of the UDA preserves established under the Reduced Permit Term

Alternative would have similar sizes, boundaries, and locations as the UDA preserves established under the Proposed Action/Proposed Project Alternative. However, the shorter duration of the Reduced Permit Term Alternative—and the smaller amount of urban development and associated development fees collected by the Reduced Permit Term Alternative—would not allow the Reduced Permit Term Alternative to establish as many acres of new preserves in the Planning Area as would occur under the Proposed Action/Proposed Project Alternative's 50-year permit term. Therefore, fewer new preserves would be established under the ~~c~~**C**onservation ~~s~~**S**trategy of the Reduced Permit Term Alternative. This difference would be especially pronounced outside the UDA.

As described in Section 2.4, the ESA and California Endangered Species Act Incidental Take Permits and the CWA permit strategy for HCP Covered Activities would be valid only during the 30-year permit term of the Reduced Permit Term Alternative, and the Reduced Permit Term Alternative's ~~c~~**C**onservation ~~s~~**S**trategy would be implemented only during this 30-year term. The urban development Covered Activities and Conservation Strategies associated with the five Master Plans would be implemented inside the UDA during this 30-year period. However, the EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3), and the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, as described in Section 3.6.7.2, the EIS/EIR analysis of the Reduced Permit Term Alternative also considers future urban development that is not part of the project description of the Reduced Permit Term Alternative but is still expected to occur within the Planning Area after the end of the permit term (i.e., in Years 31–50 of the EIS/EIR study period).

As described in Section 3.6.7.2, project mitigation preserves established after the end of the 30-year Reduced Permit Term Alternative would be established under a project-by-project process for obtaining individual authorizations under CWA, ESA, California Endangered Species Act, and Section 1600 of the California Fish and Game Code. Consequently, mitigation preserves established in Years 31–50 of the EIS/EIR study period would not be established using a regional, landscape-based approach that balances new urban development with the need for conservation, which would be provided by an HCP. Therefore, much of the Preserve System inside the UDA would be very similar under the two action alternatives, but the Preserve System outside the UDA would be substantially different between the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, it is unlikely that mitigation preserves established outside the UDA would be contiguous or interconnected, and it is unlikely that a large, contiguous, 10,500-acre, landscape-size Vernal Pool Preserve would be established in the southwestern portion of the Planning Area. Likewise, the No Action/No Project Alterative also would not result in contiguous, interconnected preserves outside the UDA and would not establish a 10,500-acre Vernal Pool Preserve in the Planning Area. In these ways, the new mitigation

preserves established outside the UDA under the Reduced Permit Term Alternative and the No Action/No Project Alternative would be similar.

Direct and Indirect Effects of the Reduced Permit Term Alternative

As discussed in Section 2.4.3, the Covered Activities implemented under the 30-year Reduced Permit Term Alternative would include similar types of urban development expected under the No Action/No Project Alternative. Similar to the Proposed Action/Proposed Project Alternative, the displacement of planned urban development to areas outside of the County's existing USB expected under the No Action/No Project Alternative would not occur under the Reduced Permit Term Alternative. Therefore, the potential changes in location of aquatic resources identified for the No Action/No Project Alternative would not occur under the Reduced Permit Term Alternative. However, no significant changes in aquatic resources use associated with the displaced development were identified for the No Action/No Project Alternative.

~~The Reduced Permit Term Alternative would directly impact approximately 1,097 acres of aquatic resources during the 30 year permit term (Table 10-10). In the remaining 20 years of the 50-year EIS/EIR Study Period (Section 3.6.3) an estimated additional 758 acres of aquatic resources would be lost. Over the EIS/EIR 50-year study period, the Reduced Permit Term Alternative would result in the direct loss of approximately 1,856 acres of aquatic resources in the Planning Area (Table 10-8). This direct loss of aquatic resources is 124 acres greater than the direct loss of approximately 1,732 acres of aquatic resources under the No Action/No Project Alternative (Table 10-2).~~

The Reduced Permit Term Alternative would ~~also~~ result in the direct loss of 931 acres of Wetland Waters land cover types (Table 10-10, Estimated Loss of Aquatic Resources Under the Reduced Permit Term Alternative). This direct loss of wetland waters would be 110 acres greater than the 821 acres that is anticipated to be lost under the No Action/No Project Alternative (Table 10-4). The Reduced Permit Term Alternative would result in the direct loss of 315 acres of other waters. This direct loss of other waters would be 44 acres less than the 359 acres that is anticipated to be lost under the No Action/No Project Alternative (Table 10-4). The Reduced Permit Term Alternative would result in the direct loss of 482 acres of Riparian land cover types. This direct loss of Riparian land cover types would be 55 acres greater than the 427 acres that is anticipated to be lost under the No Action/No Project Alternative (Table 10-4).

Because most of the HCP Preserve System in the UDA would be established during the 30-year permit term, the locations of aquatic resources preservation by watershed would be similar under the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, the watershed with the largest direct loss of aquatic resources would continue to be the Morrison Creek watershed, with a total of 1,088 acres of direct loss (Table 10-10), which is 80 acres more than the Morrison Creek watershed direct losses of 1,008 acres under the No Action/No Project Alternative (Table 10-4).

Table 10-10. Estimated Loss of Aquatic Resources Under the Reduced Permit Term Alternative

Land Cover Type	Acres per Watershed										Total
	American River	*Deer Creek*	*Laguna Creek*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne River*	*Morrison Creek*	*Sherman Lake–Sacramento River*	*Snodgrass Slough*	*Upper Cosumnes*	
Wetland Waters											
Vernal Pool	4	29	31	14	10	0	312	5	5	3	413
Seasonal Wetland	0	8	17	5	6	0	68	0	7	0	111
Swale	1	75	5	3	1	0	183	1	1	0	270
Freshwater Marsh	1	2	8	1	2	0	115	0	7	1	137
Total Wetland Waters	*6*	*114*	*61*	*23*	*19*	*0*	*678*	*6*	*20*	*4*	*931*
Other Waters											
Open Water	1	73	2	0	0	0	88	0	1	0	165
Stream/Creek (Intermittent and Perennial)	1	12	14	6	2	0	63	4	19	1	122
Stream/Creek (VPIH) (Ephemeral)	0	8	0	0	0	0	20	0	0	0	28
Total Other Waters	*2*	*93*	*16*	*6*	*2*	*0*	*171*	*4*	*20*	*1*	*315*
Riparian											
Mine Tailing Riparian Woodland	48	40	0	0	0	0	129	2	0	0	*219*
Mixed Riparian Scrub	0	1	5	4	10	0	41	4	1	0	*66*
Mixed Riparian Woodland	0	14	9	17	78	0	69	3	2	5	197
Total Riparian	*48*	*55*	*14*	*21*	*88*	*0*	*239*	*9*	*3*	*5*	*482*
Grand Total	**56**	**262**	**91**	**50**	**109**	**0**	**1,088**	**19**	**43**	**10**	**1,728**

Notes: VPIH = vernal pool invertebrate habitat

AGENDA ITEM 11.1

4899

~~The Reduced Permit Term Alternative would result in the loss of 931 acres of wetland waters, which is 110 more acres than the 821-acre loss anticipated under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in the loss of 315 other waters, which is 44 acres less than the 359-acre loss anticipated under the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in the loss of 485 acres of Riparian land cover types, which is 55 acres more than the 427 acres expected under the No Action/No Project Alternative. In total, the Reduced Permit Term Alternative would result in the loss of 1,728 acres of aquatic resources, which is 121 acres more than the loss of aquatic resources under the No Action/No Project Alternative (Table 10-4); however, preservation of aquatic resources under the Reduced Permit Term Alternative, as discussed below, is greater by 1,038 acres compared to the No Action/No Project Alternative.~~

During the 30-year permit term, the SSHCP Conservation Strategy and ARP would implement aquatic resources preservation under the same Biological Goal and Measureable Objectives discussed previously for the Proposed Action/Proposed Project Alternative. Following the reduced permit term (Years 31–50 of the 50-year EIS/EIR study period), the preservation of aquatic resources would be expected to occur under the regulatory ~~guidelines~~ **framework** described for the No Action/No Project Alternative (Section 2.2.4). The acres preserved under the 30-year Reduced Permit Term Alternative are shown in Table 10-11.

Table 10-11. Estimated Preservation of Aquatic Resources Under the Reduced Permit Term Alternative

Land Cover Type	Preservation (acres)		
	Inside UDA	*Outside UDA*	*Total*
Wetland Waters			
Vernal Pool	101	1,098	1,199
Seasonal Wetland	55	15	70
Swale	57	478	535
Freshwater Marsh	100	0	100
Total Wetland Waters	*313*	*1,591*	*1,904*
Other Waters			
Open Water	43	0	43
Stream/Creek (Intermittent and Perennial)	41	81	122
Stream/Creek (VPIH) (Ephemeral)	16	0	16
Total Other Waters	*100*	*81*	*181*
Riparian			
Mine Tailing Riparian Woodland	0	5	5
Mixed Riparian Scrub	33	317	350
Mixed Riparian Woodland	54	284	338
Total Riparian	*87*	*606*	*693*
Grand Total	**500**	**2,278**	**2,778**

Notes: UDA = Urban Development Area; VPIH = vernal pool invertebrate habitat

The Reduced Permit Term Alternative would preserve 2,778 acres of aquatic resources in the Planning Area, which is 1,038 acres more than anticipated to be preserved under the No Action/No Project Alternative (1,740 acres) (Table 10-4).

The Reduced Permit Term Alternative would result in the preservation of 1,904 acres of Wetland Water land cover. This preservation of wetland waters would be 177 acres greater than the 1,727 acres that are anticipated under the No Action/No Project Alternative (Table 10-5).

The Reduced Permit Term Alternative would result in the preservation of 181 acres of Other Water land cover types. This preservation of waters would be 168 acres greater than the 13 acres that are anticipated under the No Action/No Project Alternative (Table 10-5).

The Reduced Permit Term Alternative would result in the preservation of 693 acres of Riparian land cover types. This preservation of Riparian land cover types are not anticipated under the No Action/No Project Alternative (Table 10-5).

During the permit term, as discussed for the Proposed Action/Proposed Project Alternative, re-establishment/establishment to compensate for unavoidable impacts to aquatic resources would be considered from a watershed approach and systematically prioritize re-establishment/establishment mitigation projects based on anticipated benefits to aquatic resources, considering both watershed- and function-based factors. The Conservation Strategy implemented during the 30-year permit term of the Reduced Permit Term Alternative would result in the re-establishment/establishment of 1,677 acres of aquatic resources in the Planning Area (Table 10-12, Estimated Re-Establishment/Establishment of Aquatic Resources Under the Reduced Permit Term Alternative).

Comparing Table 10-12 to Table 10-6, the Reduced Permit Term Alternative results in the following re-establishment/establishment: 160 acres more of Wetland Waters; 38 acres more of Other Waters; and 55 acres more Riparian land covers than that estimated for the No Action/No Project Alternative. The differences would likely be greater because the acreages are for a 30-year permit compared to a 50-year period under the No Action/No Project Alternative.

The Conservation Strategy implemented during the permit term would require AMMs, such as increased Stream Setbacks, that would be more protective to aquatic resources relative to the No Action/No project Alternative. Once the permit term has expired (Years 31–50) projects would be subject to the AMMs of the No Action/No Project Alternative.

In addition to direct losses of aquatic resources, planned urban development under the Reduced Permit Term No Action/No Project Alternative would also indirectly impact existing

aquatic resources. Section 3.6.6 and Appendix G summarize the different types of indirect impact mechanisms (environmental stressors) that can result from the construction and operation of urban development projects and activities.

As described previously in the analysis of the No Action/No Project Alternative, the functions and services of aquatic resources may be indirectly impacted by these stressors. During the 30-year permit term, the AMMs discussed in Table 2-6 and Appendix D would be applied to all HCP Covered Activities~~.~~. The AMMs applied during the permit term would better reduce direct and indirect impacts to aquatic resources compared to the AMMs implanted on a project-by-project basis under the No Action/No Project Alternative. Once the ~~5~~3**0**-year permit term has expired (Years 31–50 of the 50-year EIS/EIR study period)**,** individual urban development projects would comply with ESA, California Endangered Species Act, and CWA 404 on a project-by-project basis.

BMP-1 through BMP-11 of the Reduced Permit Term Alternative would be similar to the construction BMPs for projects implemented under the No Action/No Project Alternative (see Table 2-6). However, the Reduced Permit Term Alternative includes 30 years of additional on-site monitoring and measurement of the effectiveness of each AMM implemented and annual reporting of the effectiveness of each AMM. The Reduced Permit Term Alternative also includes a process for annual review of the effectiveness of each SSHCP AMM for a 30-year period and a process to make adaptive changes to any AMM that was not effective at avoiding impacts to water quality and aquatic resources. This additional oversight and guidance provided by the SSHCP would result in BMP AMMs being implemented more frequently and consistently at all ground-disturbing activities than would occur under the No Action/No Project Alternative. The SSHCP AMMs also provide new AMMs that would not occur under the No Action/No Project Alternative (Table 2-6), and these new measures are expected to lessen the potential adverse effects to surface-water quality and groundwater quality compared to the effects of the No Action/No Project Alternative.

During the permit term, the Reduced Permit Term Alternative would implement the SSHCP Conservation Strategy and ARP, which would work synergistically to preserve and re-establish/establish aquatic resources to provide compensatory mitigation for the direct loss of these resources at a 1:1 ratio as a result of implementing Covered Activities. Once the permit term has expired, preservation and re-establishment/establishment to mitigate for direct loss of aquatic resources as a result of project implementation would still be required to meet regulatory requirements in place at that time, which are expected to be mitigated at least at a 1:1 ratio but would occur on a project-by-project basis as discussed in Section 2.4.5. The Reduced Permit Term would achieve a no net loss of acres of aquatic resources function and value. The No Action/No Project Alternative would also be anticipated to result in no net loss of aquatic resources function and value (Section 10.2.2).

The ARP and SSHCP Conservation Strategy under the Reduced Permit Term Alternative contains the same Biological Goal #2 and associated Measureable Objectives, which would benefit aquatic resources and result in the preservation of 2,778 acres of aquatic resources in the Planning Area, which is a 1,038-acre larger area than the 1,740 acres that is expected to be preserved under the No Action/No Project Alternative. As discussed previously for expected re-establishment/establishment of aquatic resources, the preservation of aquatic resources that would be expected to occur during the permit term would be guided by the SSHCP Conservation Strategy and ARP. After the 30-year permit term concludes, preservation of aquatic resources would be accomplished on an individual project-by-project basis as discussed in Section 2.4.5.

The SSHCP Conservation Strategy and associated ARP that would be implemented during the first 30 years of the Reduced Permit Term Alternative would include re-establishment/establishment, preservation, and AMMs, such as increased Stream Setbacks, that would reduce direct and indirect adverse impacts to aquatic resources compared to what is anticipated from the No Action/No Project Alternative. In addition, the Conservation Strategy and the ARP implemented during the permit term also include goals and objectives to re-establish/establish aquatic resources to compensate for loss of aquatic resources at a no net loss level. During the permit term, the Conservation Strategy and ARP would preserve additional acres of aquatic resources that exceed the preservation acres under the No Action/No Project Alternative within a systematically coordinated Preserve System implemented at the watershed scale. The Preserve System implemented during the permit term would result in larger individual preserves and greater connectivity of preserves than anticipated from the project-by-project mitigation under the No Action/No Project Alternative.

Table 10-12. Estimated Re-Establishment/Establishment of Aquatic Resources Under the Reduced Permit Term Alternative

Land Cover Type	Re-Establishment/Establishment (acres)
Wetland Waters	
Vernal Pool	413
Seasonal Wetland	91
Swale	228
Freshwater Marsh	119
Total Wetland Waters	*851*
Other Waters	
Open Water	104
Stream/Creek (Intermittent and Perennial)	105
Stream/Creek (VPIH) (Ephemeral)	8
Total Other Waters	*217*
Riparian	
Mine Tailing Riparian Woodland	0
Mixed Riparian Scrub	303
Mixed Riparian Woodland	306
Total Riparian	*609*
Grand Total	**1,677**

Note: VPIH = vernal pool invertebrate habitat

Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would include the following:

- Result in the loss of 931 acres of wetland waters, which is 110 acres more than the 821-acre loss anticipated under the No Action/No Project Alternative.
- Result in the loss of 315 acres of other waters, which is 44 acres less than the 359-acre loss anticipated under the No Action/No Project Alternative.
- Result in the loss of 482 acres of Riparian land cover types, which is 55 acres more than the 427 acres expected under the No Action/No Project Alternative.
- In total, result in the loss of 1,728 acres of aquatic resources, which is 121 acres greater loss of aquatic resources compared to the No Action/No Project Alternative (Table 10-4).
- Preserve 2,778 acres of aquatic resources, which is greater by 1,038 acres compared 1,740 acres under No Action/No Project Alternative.
- Require AMMs, such as increased Stream Setbacks, that would be more protective to aquatic resources relative to the No Action/No Project Alternative. However, once the permit term has expired (Years 31–50 of the 50-year EIS/EIR study period),

projects would be subject to the AMMs of the No Action/No Project Alternative (which do not include, for example, the expectation of required Stream Setbacks).

- Implement the SSHCP and ARP for the first 30 years of the study period and result in a greater area of aquatic resources preserved than the No Action/No Project Alternative.
- Improve aquatic resource abundance, diversity, and condition within the Planning Area over that expected under the No Action/No Project Alternative.

Therefore, after considering the impacts from the Reduced Permit Term Alternative on each of the impact criteria for aquatic resources (Section 10.2.4), the Reduced Permit Term Alternative would result in a ***Minor Beneficial*** effect to aquatic resources compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Analysis of the Alternative

The effects of past~~,~~ **and** present~~, and reasonably foreseeable other~~ projects on aquatic resources in the Planning Area were described in Section 10.2.2.2 and represent a significant adverse cumulative impact on the aquatic resources within the study area. **A subset of the reasonably foreseeable other projects (e.g., foreseeable rural residential developments, agricultural activities on private lands) are likely to result in additional losses and additional adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period. However,** ~~A~~**a**s discussed in Section 10.2.2.2, when the incremental direct and indirect effects of the No Action/No Project Alternative are viewed in connection with the significant adverse effects of the past, present, and reasonably foreseeable future other projects and actions, the incremental effects of the No Action/No Project Alternative would not make a considerable contribution to the existing significant cumulative impact on aquatic resources within the study area. Therefore, the No Action/No Project Alternative would result in a ***Less Than Significant Adverse*** effect.

As discussed in this section, the 30-year implementation of the HCP ~~c~~**C**onservation ~~s~~**S**trategy, including the HCP AMMs, the HCP ARP, and the interconnected HCP Preserve System, is expected to result in more consistent and frequent conservation of aquatic resources compared to the No Action/No Project Alternative. Consequently, the incremental effects of Reduced Permit Term Alternative would have a minor beneficial impact to aquatic resources compared to the incremental effects of the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of Reduced Permit Term Alternative are also individually limited and would not make a cumulatively considerable contribution to the significant adverse cumulative impacts of the past, present, and reasonably foreseeable future other projects on aquatic resources. The Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect to aquatic resources compared to the No Action/No Project Alternative baseline condition.

10.3 REFERENCES CITED

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

33 CFR 322.1–322.5. Permits for Structures or Work in or Affecting Navigable Waters of the United States.

33 CFR 328.1–328.5. Definition of Waters of the United States.

33 CFR 330.1–330.6. Nationwide Permit Program.

33 CFR 332.1–332.8. Compensatory Mitigation for Losses of Aquatic Resources.

40 CFR 230.1–231.98. Section 404(B)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material.

40 CFR 1500–1508. Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act and Index to Parts 1500 through 1508. In Chapter V, Council on Environmental Quality. November 28, 1978.

73 FR 19594–19705. Final Rule: "Compensatory Mitigation for Losses of Aquatic Resources Final Rule. Federal Register." April 10, 2008.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. La Roe. 1992. *Classification of Wetlands and Deepwater Habitats of the United States.* FWS/OBS-79/31. U.S. Fish and Wildlife Service, Washington DC. December 1979. Reprinted 1992. Accessed January 2018. http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf.

Dudek. 2016a. *Draft Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program*. Prepared for Sacramento County. September 2016. Sacramento, California: Dudek. 1,796 pages.

Dudek. 2016b. *Draft Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program*. Prepared for Sacramento County. September 2016. Sacramento, California: Dudek. 145 pages.

Galt. 2008. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. Prepared by Environmental Science Associates. Sacramento, California: Environmental Science Associates. July 2008. Accessed January 2018. http://www.ci.galt.ca.us/index.aspx?page=786.

Galt. 2009a. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed January 2018. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *Final Environmental Impact Report for the 2030 Galt General Plan*. Final. SCH No. 2007082092. Prepared by ESA, in association with Mintier Harnish, Applied Development Economics, and Omni Means. Sacramento, California: ESA. March 2009. Accessed June 29, 2016. http://www.saclafco.org/SphereofInfluenceInformation/Documents/galtsoi/sac_024063.pdf.

Katibah, E.F. 1984. "A Brief History of the Riparian Forest in the Central Valley of California." Pages 23–29 in *California Riparian Systems: Ecology Conservation and Productive Management*, edited by R.E. Warner and K.M. Hendrix.

Marty, J.T. 2005. "Effects of cattle grazing on diversity in ephemeral wetlands." *Conserv. Biol*. 19: 1626-1632

NRC (National Research Council). 2002. *Riparian Areas: Functions and Strategies for Management*. NRC, Division on Earth and Life Sciences, Board on Environmental Studies and Toxicology, Water Science and Technology Board, Committee on Riparian Zone Functioning and Strategies of Management. Washington, D.C.: National Academy Press.

President Carter (President Jimmy Carter). 1977. Executive Order 11990 of May 24, 1977: "Protection of Wetlands." Federal Register, volume 42, page 26961. https://www.archives.gov/federal-register/codification/executive-order/11990.html.

Rains, M.C., G.E. Fogg, T.H. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. "The Role of Perched Aquifers in Hydrological Connectivity and Biogeochemical Processes in Vernal Pool Landscapes, Central Valley, California." *Hydrological Processes* 20: 1157–1175.

Rains, M.C., R.A. Dahlgren, G.E. Fogg, T. Harter, and R.J. Williamson. 2008. "Geological Control of Physical and Chemical Hydrology in California Vernal Pools." *Wetlands* 28(2): 347–362.

Rancho Cordova. 2006. *General Plan Draft Environmental Impact Report*. SCH No. 2005022137. March 2006. Accessed January 2018. http://www.cityofranchocordova.org/home/showdocument?id=11097.

Rancho Cordova. 2013. *City of Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed January 2018. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Robins, J.D. and J.E. Vollmar. 2002. "Livestock grazing and vernal pools." J.E. Vollmar (Ed.), *Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands*. , Berkeley, California: Vollmar Consulting.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: Sacramento County, Department of Environmental Review and Assessment. April 2010. Accessed January 2018. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: Sacramento County, Community Planning and Development Department. Amended November 9, 2011. Accessed January 2018. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx.

Smith, D.W. and W.L. Verrill. 1998. "Vernal pool-soil landform relationships in the Central Valley, California." Pages 15-23 in C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren, Jr. and R. Ornduff (Editors). *Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference*. Sacramento, California: California Native Plant Society.

Solomeshch, A.I., M.G. Barbour, and R.F. Holland. 2007. *Vernal Pools: Terrestrial Vegetation of Californi*a, 3rd ed. Berkeley, California: University of California Press. 394–424.

SSHCP Plan Partners (Sacramento County, City of Rancho Cordova, City of Galt, Sacramento County Water Agency, the Southeast JPA Connector, and the Sacramento Regional County Sanitation District). 2017. *Draft SSHCP Aquatic Resources Program*. Prepared with assistance from Dudek. Sacramento, California: Sacramento County. February 2017.

USACE (U.S. Army Corps of Engineers). 2014. Me*morandum for Record: Cumulative Impact Analysis for the South Sacramento Habitat Conservation Plan Area (SPK-1995-00386)*. Sacramento, California: USACE Sacramento Engineer District, California South Branch. Signed September 9, 2014. 39 pages.

USDA and NRCS (U.S. Department of Agriculture and Natural Resources Conservation Service). 1993. *Soil Survey of Sacramento County, California*. Published by USDA NRCS, in cooperation with the Regents of the University of California. April 1993. Accessed January 2018. https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA067/0/sacramento.pdf

USGS (U.S. Geological Survey). 2013. "National Hydrography GIS Dataset." Accessed January 2018. http://nhd.usgs.gov/.

USGS and NRCS. 2013. *Federal Standards and Procedures for the National Watershed Boundary Dataset (WBD): Chapter 3 of Section A, Federal Standards, Book 11, Collection and Delineation of Spatial Data*. 4th ed. Accessed January 2018. https://pubs.usgs.gov/tm/11/a3/pdf/tm11-a3_4ed.pdf.

CHAPTER 11 – PALEONTOLOGICAL, CULTURAL, AND HISTORICAL RESOURCES

This chapter presents the environmental effects of each Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) alternative on paleontological resources and on cultural and historical resources. Paleontological resources are fossilized remains of plants and animals and may include bones, teeth, shells, and leaves found in geologic (rock) formations.

Historical resources are defined by the State of California as "any object, building, structure, site, area, or place, which is historically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (Public Resource Code (PRC) section 5021.1(b)). Similarly, the term "historic property" is defined under the National Historic Preservation Act (NHPA) to include any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. The term "historic property" includes artifacts, records, and material remains that are related to and located within such properties. Properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization may also be historic properties eligible for inclusion in the NRHP (36 CFR 800.16(l)(1)).

The term "cultural resources" covers a wider range of resources than "historical resources" and "historic properties," such as sacred sites, archeological collections, or archaeological sites not eligible for the federal NRHP or not eligible for the California Register of Historical Resources (CRHR). Cultural resources can include prehistoric archaeological sites, prehistoric artifacts, and tribal cultural resources.[1]

11.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

This section describes the regulatory and physical environmental setting for paleontological, cultural, and historical resources within the Planning Area.

11.1.1 Regulatory Framework

Several federal, state, and local agency requirements apply to the identification, avoidance, and treatment of paleontological, cultural, and historical resources within the Planning Area. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, permitting, or implementation of the alternatives analyzed in this EIS/EIR. This section also identifies any relevant federal permits or other entitlements that must

[1] Under the California Environmental Quality Act (CEQA), a tribal cultural resource is defined as a site feature, place, cultural landscape, sacred place, or object, which is of cultural value to a tribe and is either: (1) on or eligible for the CRHR or a local historic register, or (2) the CEQA lead agency, at its discretion, chooses to treat the resource as a tribal cultural resource.

be obtained prior to implementing the alternatives. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 11.2 (40 CFR 1502.25).

11.1.1.1 Federal

National Environmental Policy Act

The definition of "effects" in the National Environmental Policy Act (NEPA) regulations includes adverse and beneficial effects on historic and cultural resources (40 CFR 1508.8). Therefore, the "Environmental Consequences" section of an EIS (see 40 CFR 1502.16(f)) must analyze potential effects to historic or cultural resources that could result from the proposed action and each alternative. As discussed in Section 3.8, in considering whether an alternative may "significantly affect the quality of the human environment," a federal agency must consider, among other things:

- Unique characteristics of the geographic area such as proximity to historic or cultural resources (40 CFR 1508.27(b)(3)), and
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)).

Therefore, because historic properties are a subset of "cultural resources," they are one aspect of the "human environment" defined by NEPA regulations. The NEPA regulations also require that "To the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related surveys and studies required by the National Historic Preservation Act (40 CFR 1502.25(a))."

The federal government has a unique relationship with Indian tribes derived from the Constitution of the United States, treaties, Supreme Court decisions, and federal statutes. Consultation with an Indian tribe must recognize the government-to-government relationship between the federal government and Indian tribes, and should be conducted in a sensitive manner respectful of tribal sovereignty (36 CFR 800.2(c)(2)(ii)(B) and (C)). Under NEPA, federal agencies are encouraged to consult with Indian tribes early in the NEPA planning process, and to invite Indian tribes to be cooperating agencies in preparation of an EIS, when potential effects are on a reservation or affect tribal interests. Tribal consultations under NEPA can include effects to treaty, trust, and other natural resource issues, as well as to cultural resources in general, whether or not they meet the specific definition of historic property under the NHPA. The NEPA review of an action may also include the federal government's responsibilities under Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; EO 13175, Consultation and

Coordination with Indian Tribal Governments; the American Indian Religious Freedom Act; and related statutes and policies that have a consultation component.

National Historic Preservation Act

The NHPA (16 U.S.C. 470 et seq.) establishes the nation's policy for historic preservation and sets in place a program for the preservation of historic properties. Pursuant to the NHPA, the State Historic Preservation Officer (SHPO) advises and assists, as appropriate, federal agencies in carrying out their historic preservation responsibilities. Section 106 of the NHPA (NHPA 106) requires federal agencies to take into account the effects of their undertakings on cultural resources that are, or may be, eligible for inclusion in the NRHP. An undertaking is a project, activity, or program under the direct or indirect jurisdiction of a federal agency. Such jurisdiction includes funding an action in whole or in part; carrying out an action by or on behalf of a federal agency; issuance of a federal permit, license, or approval; and state or local regulation administered under a delegation or approval by a federal agency. As such, implementation of a habitat conservation plan (HCP) and issuance of an Endangered Species Act (ESA) Incidental Take Permit are an undertaking and subject to compliance with NHPA 106. Other federal actions, including issuing authorizations or permits or under the Clean Water Act (CWA), must also fulfill the requirements of NHPA 106.

NHPA 106 also requires federal agencies to afford the SHPO, tribal historic preservation officers, and the public a reasonable opportunity to comment on their undertakings. The U.S. Fish and Wildlife Service (USFWS) may use the public involvement procedures under NEPA or under other program requirements to satisfy NHPA public involvement requirements. The USFWS is also responsible for providing a project description as well as an effects analysis and determination to the SHPO and to any affected Tribes. Cultural resources are a relevant factor in a NEPA analysis, and both NHPA and NEPA regulations encourage coordination and incorporation of NHPA consultation with the NEPA process. There is overlap, but there are also differences, in the implementing regulations for NHPA 106 (36 CFR 800) and implementing regulations for NEPA (40 CFR 1500–1508; 43 CFR 46) with regard to conducting an effects analysis. Section 6 of the NHPA addresses potential effects to historic properties associated with the federal undertaking (36 CFR 800.16(y)), while NEPA considers a broader categories of resources that includes historic properties and other aspects of the human environment (40 CFR 1508.14; 40 CFR 1508.8(b)).

The USFWS's responsibilities under NHPA 106 are to identify historic properties that may be affected, and to take into account the effect of issuance of an Incidental Take Permit and implementing the HCP conservation program on these properties. The implementing regulations for NHPA 106 (at 36 CFR Part 800), define how the USFWS can meet these requirements through a consultation process. The goal of consultation is to identify historic

properties potentially affected by the federal undertaking, assess its effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties. The regulations implementing NHPA 106 require federal agencies to consult the SHPO, and these stakeholders:

- Tribal Historic Preservation Officers, if applicable;
- Federally recognized Indian tribes, including Native villages and Native Hawaiian organizations, if applicable;
- Local governments, if the action may affect historic properties within their jurisdiction;
- Applicants for federal permits, licenses, or assistance;
- Representatives from interested organizations, private citizens, and the public; and
- The Advisory Council on Historic Properties (ACHP) when circumstances warrant its participation.

Federal agencies and these consulting parties strive to reach agreement on measures to avoid, minimize, and mitigate adverse effects on historic properties and to find a balance between project goals and preservation objectives. Because NHPA regulations allow the federal agencies to coordinate with other programs, in states with cultural resource requirements that meet NHPA goals, the state consultations can be incorporated into USFWS reviews to minimize duplicative effort by the USFWS and HCP permit applicants. In California, the Office of Historic Preservation reviews projects and programs to ensure that they comply with federal and state historic preservation laws, and that projects are planned in ways that avoid, minimize or mitigate adverse effects to cultural or historical resources.

Compliance with the NHPA 106 process involves the following steps (see 36 CFR 800 Subpart B):

- Initiate consultation and public involvement, including with Tribal Historic Preservation Officer(s) if applicable.
- Identify the area of potential effect (APE).
- Identify historic properties.
- Evaluate historic properties.
- Assess effects on historic properties.
- Resolution of Adverse Effects Consult with the SHPO regarding adverse effects on historic properties, resulting in a memorandum of agreement (MOA).
- Coordinate with requirements of NEPA review.
- Submit the MOA to the federal ACHP.
- Proceed in accordance with the MOA.

A key step in the process is determination of the "area of potential effects" associated with a potential undertaking (i.e., a proposed HCP). 36 CFR 800.16(d) defines the APE as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking." The APE includes the areas where the USFWS would authorize take; areas where the USFWS influenced the project through negotiation of the avoidance, minimization, and mitigation measures; and activities associated with their implementation.

The regulations for implementing NHPA 106 directs the USFWS to make a "reasonable and good faith effort" to identify historic properties in consultation with the SHPO, the Tribal Historic Preservation Officers, and tribes, taking into consideration the magnitude and nature of the undertaking and degree of Federal involvement"(36 CFR 800.4(b)(1)). The identification effort includes, but is not limited to, a scientific literature review of the previous archaeological, historical, and historic structural resource information for a given APE.

The NHPA 106 process normally concludes with an agency finding of "no historic properties affected," "no adverse effect," or "adverse effects" that are resolved through avoidance, minimization, or mitigation." For undertakings with adverse effects, the federal agency usually executes a legally binding document, an MOA or Programmatic Agreement, that stipulates the resolution of adverse effects agreed to by the signatories. In the rare circumstances where there is a failure to reach an agreed-upon solution, the ACHP issues formal advisory comments to the head of the federal agency, and the head of the agency must then take into account and respond to those comments.

NHPA under CWA 404 Actions: The permitting or authorization of projects by the U.S. Army Corps of Engineers (USACE) under CWA 404 is a federal undertaking that is subject to compliance with NHPA 106. The USACE follows procedures contained in 33 CFR 325, Appendix C (*Procedures for the Protection of Historic Properties*) to fulfill the requirements set forth in the NHPA, in other applicable historic preservation laws, and in presidential directives as they relate to the regulatory program of the USACE (33 CFR Parts 320-334). In addition to the requirements of the NHPA, all historic properties are also subject to consideration under the USACE's NEPA processes (33 CFR Part 325, Appendix B), and the USACE's public interest review requirements contained in 33 CFR 320.4. Therefore, historic properties are included as a factor in the district engineer's decision on each CWA 404 permit application.

If the project or activity is found to have an "adverse effect" on NRHP-designated historic properties, the district engineer will coordinate with the SHPO to seek ways to avoid or reduce effects on designated historic properties. At any time during CWA 404 permit processing, the district engineer may consult with the involved parties to discuss and consider

possible alternatives or measures to avoid or minimize adverse effects of a proposed activity in accordance with the procedures described in 33 CFR Part 325, Appendix C. If the consultation results in a mutual agreement among the SHPO, the permit applicant, and the district engineer regarding the treatment of designated historic properties, then the district engineer may formalize that agreement either through special conditions added to the CWA 404 permit and/or by signing an MOA with these parties. Such MOA will constitute the comments of the SHPO and the ACHP. The criteria involved in making an adverse effect determination are described fully in 33 CFR Part 325, Appendix C.

In making the decision about a permit application, in accordance with 33 CFR 320.4, the USACE district engineer shall weigh all factors, including the effects of the undertaking on historic properties and any comments of the ACHP and the SHPO, and any views of other interested parties. The district engineer will add permit conditions to avoid or reduce effects on historic properties that he determines are necessary in accordance with 33 CFR 325.4. In reaching his determination, the district engineer will consider the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716). If the district engineer concludes that permitting the project would result in the irrevocable loss of important scientific, prehistoric, historical, or archeological data, the district engineer, in accordance with the Archeological and Historic Preservation Act, will advise the Secretary of the Interior of the extent to which the data may be lost if the undertaking is permitted, any plans to mitigate such loss that will be implemented, and the permit conditions that will be included to ensure that any required mitigation occurs.

NHPA and Tribes. Under the NHPA, consultation with Indian tribes and Native Hawaiian organizations is mandatory. These consultations focus on identifying and evaluating historic properties, assessing effects, and, where appropriate, resolving adverse effects to those properties. Consultation is required with any Indian tribe or Native Hawaiian organization that may attach religious and cultural significance to historic properties that may be affected by a proposed undertaking, regardless of whether the property is located on or off tribal lands. Tribal consultation under NEPA can include effects to treaty, trust, and other natural resource issues, as well as to cultural resources in general, whether or not they meet the specific definition of a historic property under the NHPA.

Federal Land Policy Management Act

The Federal Land Policy Management Act (43 U.S.C. 1701 et seq.) requires the Secretary of the Interior to manage public lands in such a way that will protect the quality of scientific, scenic, historical, and archaeological values.

Antiquities Act

The Antiquities Act (16 U.S.C. 431 et seq.) establishes criminal penalties for unauthorized destruction or appropriation of "any historic or prehistoric ruin or monument, or any object of antiquity" on federal lands.

Executive Order 11593, Protection and Enhancement of the Cultural Environment

Executive Order 11593 (President Nixon 1971) requires federal agencies to administer cultural properties under their control and to initiate measures necessary to direct federal agency policies, plans, and programs in such a way that federally owned sites are preserved and maintained. In addition, this Executive Order also required federal agencies, in consultation with the ACHP (16 U.S.C. 4701), to institute procedures to ensure that federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance.

Executive Order 13007, Indian Sacred Sites

Executive Order 13007 (President Clinton 1996) requires federal land-managing agencies to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, to: (1) accommodate access to and ceremonial use of Native American sacred sites by Native American religious practitioners, and (2) avoid adversely affecting the physical integrity of such sacred sites. It also requires federal agencies to maintain confidentiality of sacred sites where appropriate.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act (16 U.S.C. 1996) establishes a national policy to protect and preserve the inherent right of Native Americans and other indigenous groups to exercise their freedom to believe, express, and exercise their traditional religions, including, but not limited to, access to religious sites, use and possession of sacred objects, and freedom to worship through ceremonial and traditional rites. Federal agencies must obtain the views of Indian leaders and consider when a proposed land use might conflict with traditional Native American religious beliefs or practices and seek to avoid unnecessary interference with Native American religious practices during the implementation of an action. Potential conflict between an action and Native American religious practices does not bar federal agencies from approving a proposed land use or carrying out a proposed action.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (Public Law 101–601; 25 U.S.C. 3001 et seq.) describes the rights of Native American lineal descendants and Native American

tribes with respect to the treatment, repatriation, and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, with which they can show a relationship of lineal descent or cultural affiliation. One major purpose of this act (Sections 5–7) is to require that federal agencies and museums receiving federal funds inventory holdings of Native American human remains and funerary objects and provide written summaries of other cultural items. Once lineal descent or cultural affiliation has been established, lineal descendants normally make the final determination about the disposition of cultural items. Disposition may take many forms from reburial to long-term curation, according to the wishes of the lineal descendent(s) or culturally affiliated tribe(s).

The second major purpose of the act is to provide greater protection for Native American burial sites and more careful control over the removal of Native American human remains, funerary objects, sacred objects, and items of cultural patrimony on federal and tribal lands. The act requires that Native American tribes be consulted whenever archaeological investigations encounter, or are expected to encounter, Native American cultural items or when such items are unexpectedly discovered on federal or tribal lands (Section 3). Excavation or removal of any such items also must be done under procedures required by the Archaeological Resources Protection Act (Section 3(c)(1)).

Archaeological and Historic Preservation Act

The Archaeological and Historic Preservation Act (16 U.S.C. 469–469c2) "specifically provides for the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of …any alteration of the terrain caused as a result of any federal construction project or federally licensed activity or program." Because the project includes issuance of federal permits under the ESA and CWA, this act would apply to the action alternatives. Under this act, a federal agency may request the Secretary of the Interior to undertake the recovery, protection, and preservation of historical and archeological data (including preliminary survey, or other investigation as needed, and analysis and publication of the reports resulting from such investigation), or it may, with funds appropriated for such project, program, or activity, undertake such activities.

Archaeological Resources Protection Act

The Archaeological Resources Protection Act (16 U.S.C. 470a et seq.) provides civil and criminal penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource located on public lands or Indian lands unless permitted in accordance with Section 4 of the Archaeological Resources Protection Act.

11.1.1.2 State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) of 1970, as amended, (PRC Section 21000), requires state and local agencies to identify and reduce, if feasible, significant effects of land use decisions, including those to cultural resources.

CEQA Guidelines (Sections 1427, 15064.4(b), 15064.5, 15064.7, 15126.4, and Appendix G, Section V) collectively recognize the potential effects of development to resources and the need for preservation. Under CEQA, public agencies must consider the effects of their actions on both "historical resources" and "unique archaeological resources." Pursuant to CEQA, Section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." CEQA, Section 21083.2, requires agencies to determine whether proposed projects would have effects on "unique archaeological resources."

"Historical resource" is a CEQA term with a defined statutory meaning (PRC Section 21084.1 and CEQA Guidelines, Sections 15064.5(a) and 15064.5(b)). The definition includes any resource listed in or determined to be eligible for listing in the CRHR (see below).

The CEQA Guidelines, Section 15064.5(c), also provide specific guidance on the treatment of archaeological resources, depending on whether they meet the definition of a historical resource or the definition of a unique archaeological resource. If the site meets the definition of a unique archaeological resource, it must be treated in accordance with the provisions of PRC Section 21083.2.

CEQA Guidelines, Section 15064.5(e), requires that excavation activities be stopped whenever human remains are uncovered and that the County coroner be called in to assess the remains. If the County coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, the lead agency must consult with the appropriate Native Americans, if any, as identified in a timely manner by the NAHC. CEQA Guidelines, Section 15064.5, directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Discretionary projects would be subject to environmental review consistent with CEQA. As part of the CEQA review process, the local land use authority (e.g., Sacramento County, Galt, or Rancho Cordova) would make a determination as to whether a project-level cultural resource analysis is warranted. The project-level analysis could include, for example, a cultural records and literature search, pedestrian surveys, architectural analysis, extended phase one

evaluations, including subsurface testing programs, and/or data recovery operations. During future CEQA review of projects, any potential site-specific effects on cultural resources would be identified, and any necessary avoidance or mitigation measures to reduce potential effects would be recommended, as appropriate.

The EIS/EIR cultural resources study follows the basic guidelines presented in PRC Section 5024.1; CEQA Guidelines Section 15064.5, and Sections 21083.2 and 21084.1 of the CEQA statute (described below).

California Public Resources Code Section 5024.1

PRC Section 5024.1 authorizes the establishment of the CRHR. The purpose of the register is to maintain listings of the state's historical resources and to indicate which properties are to be protected from substantial adverse change. The criteria for listing resources on the California Register were expressly developed to be in accordance with previously established criteria developed for listing on the NRHP. See NRHP eligibility criteria at 40 CFR 60.4.

In order to be determined eligible for listing in the CRHR, a property must be significant at the local, state, or national level under one or more of four significance criteria:

- Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.
- Associated with the lives of persons important to local, California, or national history.
- Embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of a master or possesses high artistic values.
- Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

California Public Resources Code, Section 5021.1

PRC Section 5021.1 provides a definition for such things as a "historical resource" and "substantial adverse change" (to such resources). Historical resources are defined as "any object, building, structure, site, area, or place, which is historically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (PRC 5021.1(b)).

California Public Resources Code, Section 5097.5

PRC Section 5097.5 provides that unlawful removal or destruction of archaeological or paleontological resources from sites on public land is a misdemeanor, except with the express permission of the public agency having jurisdiction over the lands. As used in this section, "public lands" is defined as "lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or agency thereof."

California Public Resources Code, Section 5097.98

PRC Section 5097.98 discusses the procedures to be followed upon the discovery of human remains, including immediately securing the site of the remains and establishing a safe distance around them to allow for negotiation between the land owner and consulting tribal parties.

California Public Resources Code, Sections 5097.99 and 5097.991

PRC Sections 5097.99 and 5097.991 establish that unlawful removal of Native American items of cultural patrimony or human remains is a felony, and that it is the policy of the state to repatriate Native American human remains and grave goods.

Senate Bill 297

Senate Bill 297 addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction; and establishes the NAHC to resolve disputes regarding the disposition of such remains. This bill has been incorporated into the CEQA Guidelines (Section 15064.5(e)).

Assembly Bill 52

Assembly Bill 52 expands the provisions CEQA (PRC Section 21000) to provide California Native American tribes, including those that are not federally recognized, an opportunity to engage in formal consultation with public agencies considering approval of projects that could result in impacts to "tribal cultural resources." Assembly Bill 52 applies to projects with a Notice of Preparation of an EIR, or a Negative Declaration or Mitigated Negative Declaration issued on or after July 1, 2015 (note, because the Notice of Preparation associated with this EIS/EIR was released prior to July 1, 2015, the lead agency is not required to comply with this new regulation).

Health and Safety Code

Section 7050.5 of the Health and Safety Code establishes that any person who "knowingly mutilates, disinters, wantonly disturbs, or willfully removes any human remains in or from any

location" without authority of the law is guilty of a misdemeanor. In the event of discovery of any human remains outside of a cemetery, there shall be no further excavation or disturbance until the County coroner is notified. If the coroner determines the remains are Native American, or believes they may be Native American, the NAHC shall be notified within 24 hours.

11.1.1.3 Local

Sacramento County General Plan

The *Sacramento County General Plan Conservation Element* (Sacramento County 2011) states under Section VI, Cultural Resources, the following goal and six objectives that address the protection of cultural resources within the County:

> **Goal:** Promote the inventory, protection, and interpretation of the cultural heritage of Sacramento County, including historical and archaeological settings, sites, buildings, features, artifacts and/or areas of ethnic historical, religious or socio-economic importance.
>
> **Objectives:**
>
> 1. Comprehensive knowledge of archaeological and historic site locations.
> 2. Attention and care during project review and construction to ensure that cultural resource sites, either previously known or discovered on the project site, are properly protected with sensitivity to Native American values.
> 3. Structures with architectural or historical importance preserved to maintain contributing design elements.
> 4. Known cultural resources protected from vandalism, unauthorized excavation, or accidental destruction.
> 5. Properly stored and classified artifacts for ongoing study.
> 6. Public awareness and appreciation of both visible and intangible historic and cultural resources.

The Conservation Element contains the following policies that help implement the goal and objectives, as well as address paleontological resources:

> **CO-150:** Utilize local, state and national resources, such as the North Central Information Center (NCIC), to assist in determining the need for a cultural resources survey during project review.
>
> **CO-153:** Refer projects with identified archaeological and cultural resources to the Cultural Resources Committee to determine significance of resource and recommend

appropriate means of protection and mitigation. The Committee shall coordinate with the Native American Heritage Commission in developing recommendations.

CO-154: Protection of significant prehistoric, ethnohistoric, and historic sites within open space easements to ensure that these resources are preserved in situ for perpetuity.

CO-155: Native American burial sites encountered during preapproved survey or during construction shall, whenever possible, remain in situ. Excavation and reburial shall occur when in situ preservation is not possible or when the archaeological significance of the site merits excavation and recording procedure. On-site reinterment shall have priority. The project developer shall provide the burden of proof that off-site reinterment is the only feasible alternative. Reinterment shall be the responsibility of local tribal representatives.

CO-157: Monitor projects during construction to ensure crews follow proper reporting, safeguards, and procedures.

CO-158: As a condition of approval of discretionary permits, a procedure shall be included to cover the potential discovery of archaeological resources during development or construction.

CO-159: Request a Native American Statement as part of the environmental review process on development projects with identified cultural resources.

CO-161: As a condition of approval for discretionary projects, require appropriate mitigation to reduce potential impacts where development could adversely affect paleontological resources.

CO-162: Projects located within areas known to be sensitive for paleontological resources should be monitored to ensure proper treatment of resources and to ensure crews follow proper reporting, safeguards, and procedures.

CO-163: Require that a certified geologist or paleoresources consultant determine appropriate protection measures when resources are discovered during the course of development and land altering activities.

CO-169: Restrict the circulation of cultural resource location information to prevent potential site vandalism. This information is exempt from the "Freedom of Information Act."

Galt General Plan

The *Galt General Plan Policy Document* (Galt General Plan) (Galt 2009) includes two goals and the following policies that address the protection of cultural and paleontological resources within the City.

Goal HRE-1: To preserve and maintain sites and structures that serve as significant, visible connections to Galt's social, cultural, economic, and architectural history.

Goal HRE-4: To encourage the identification, protection, and enhancement of Galt's archaeological resources for their cultural values.

HRE-4.1: Archaeological Resource Surveys. For future development projects on previously unsurveyed lands, the City requires that a project applicant have a qualified archaeologist conduct the following activities: (1) conduct a record search at the North Central Information Center located at California State University, Sacramento and other appropriate historical repositories, (2) conduct field surveys where appropriate, and (3) prepare technical reports, where appropriate, meeting California Office of Historic Preservation Standards (Archaeological Resource Management Reports). These requirements shall be completed prior to the approval of the specific project.

HRE-4.2: Native American Resources. The City shall consult with Native American representatives regarding cultural resources to identify locations of importance to Native Americans, including archaeological sites and traditional cultural properties. Consistent with State requirements, consultation shall occur at the onset of an amendment to the City's General Plan or a specific plan.

HRE-4.3: Discovery of Archaeological Resources. In the event that archaeological/ paleontological resources are discovered during site excavation, the City shall require that grading and construction work on the project site be suspended until the significance of the features can be determined by a qualified archaeologist/paleontologist. The City will require that a qualified archaeologist/paleontologist make recommendations for measures necessary to protect a site or to undertake data recovery, excavation, analysis, and curation of archaeological/paleontological materials.

HRE-4.4: Discovery of Human Remains. Consistent with CEQA Guidelines (Section 15064.5), if human remains of Native American origin are discovered during development project construction, it is necessary to comply with state laws relating to the disposition of Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (Public Resources Code Sec. 5097). If any human remains are discovered or recognized in any location on the project site, there shall be no further excavation or

disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

a. The Sacramento County Coroner/Sheriff has been informed and has determined that no investigation of the cause of death is required; and
b. If the remains are of Native American origin,
    1. The descendants of the deceased Native Americans have made a timely recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98, or
    2. The Native American Heritage Commission was unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the commission.

Rancho Cordova General Plan

The *Rancho Cordova General Plan* (Rancho Cordova 2006a) includes one goal, one policy, and two actions that address the protection of cultural and paleontological resources within Rancho Cordova.

Goal CHR.1: Identify and preserve the history of Rancho Cordova for future generations.

CHR.1.3: Establish review procedures for development projects that recognize the history of the area in conjunction with state and federal laws.

Action CHR.1.3.1. Require historic resources and paleontological studies (e.g., archaeological and historical investigations) for all applicable discretionary projects, in accordance with CEQA regulations. The studies should identify paleontological, historic, or cultural resources in the project area, determine their eligibility for inclusion in the California Register of Historical Resources, and provide mitigation measures for any resources in the project area that cannot be avoided.

Action CHR.1.3.2. Incorporate the following two conditions in applicable permits for all discretionary projects:

The Planning Department shall be notified immediately if any cultural resources (e.g., prehistoric or historic artifacts) or paleontological resources (e.g., fossils) are uncovered during construction. All construction must stop in vicinity of the find and an archaeologist that meets the Secretary of the Interior's Professional Qualifications

Standards in prehistoric or historical archaeology or a paleontologist shall be retained to evaluate the finds and recommend appropriate action.

The Planning Department shall be notified immediately if any human remains are uncovered and all construction must stop in vicinity of the find. The Planning Division shall notify the County Coroner according to Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the procedures outlined in CEQA Section 15064.5 (d) and (e) shall be followed.

Paleontological Resources

Consideration of paleontological resources is required by CEQA, as described above. However, no state or local agencies have specific jurisdiction over paleontological resources. No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earth moving on state or private land. However, Sacramento County, Galt, and Rancho Cordova each have General Plan policies/actions that address the protection of paleontological resources.

11.1.2 Existing Conditions of Paleontological, Cultural, and Historical Resources

This section provides a brief cultural history of the general region, including a description of prehistoric trends, ethnographic populations (i.e., Native Americans), and the historical context (Euro-American settlement and development). These descriptions provide context to understand the type, existing conditions, and general areas where cultural resources may be present in the Planning Area.

The existing "affected environment" that is reviewed under NEPA includes aesthetic, historic, and cultural resources, as these terms are commonly understood. As stated earlier, the "cultural resources" that are part of the existing affected environment of a study area include a broader array of properties than just the "historic properties" defined by Section 106. Section 106 is concerned exclusively with impacts to historic properties (prehistoric or historic districts, sites, buildings, structures, objects, and properties of traditional religious and cultural importance to an Indian tribe) that meet the NRHP criteria (40 CFR 60.4). Therefore, cultural resources that are not eligible for listing in the NRHP must also be included and considered in a NEPA review. These could include resources such as cultural institutions, resources that embody cultural practices, or sacred sites that do not otherwise meet the federal definition of a historic property.

11.1.2.1 Paleontological Resources

There are at least five recorded sites in Sacramento County that have revealed fossil vertebrate remains dating back to 100,000 years ago, including one location within the Planning Area at the Teichert aggregate plant on Kiefer Boulevard (Sacramento County 2011). A search of the University of California, Berkeley, Museum of Paleontology collections database conducted for the Rancho Cordova General Plan EIR (Rancho Cordova 2006b) did not identify any evidence of the existence of paleontological resources or potential resources in Rancho Cordova or in the Rancho Cordova sphere of influence (Rancho Cordova SOI).

As discussed in Section 5.1.2, most of the Planning Area is directly underlain by alluvial and sedimentary deposits that have been eroded from the adjacent mountain ranges and that make up the Sacramento Valley floor. While many of these deposits are too young to support paleontological resources, the soils below these deposits may be older and more sensitive for paleontological resources. Older Quaternary deposits of the Pleistocene age, such as the Modesto–Riverbank Formation, are widespread in the County and have been known to include paleontological resources.

11.1.2.2 Regional Prehistoric Context

The earliest known occupants of the Planning Area are from the Pre-Archaic Period (10,000–8,500 BC) based on fossil remains found in deep alluvial sediments. These fossils indicated the presence of large game animals that were likely hunted for food (Connector JPA 2012). Few archaeological sites from this period have been found in California, suggesting a small, widely dispersed population. These population conditions are likely influenced by the fact that the final Ice Age of the Pleistocene (1.8 million to about 10,000 years ago) was just ending; however, glaciers still existed in the Sierra Nevada, and conditions in general were much cooler and wetter than today, making the mountains an inhospitable habitat for humans (Chartkoff and Chartkoff 1984, as cited in Sacramento County 2012).

With the end of the Pleistocene, during the Early to Middle Archaic Period (8,500–4,000 BC), the climate began a warming and drying trend that lasted for several thousand years. People adapted to these changes by shifting their foraging emphasis away from hunting and increasing their use of plant resources, as evidenced by a marked increase in the presence of plant processing tools on archaeological sites dated to this time period. Another major change in subsistence came in the Late Archaic Period (4,000–2,000 BC) with the discovery of a method to remove the tannins from acorns, allowing this nearly ubiquitous nut to become a staple food for the indigenous people of California. It allowed people to gather and store large surpluses of food, which led to an increase in group size and population densities along with a less nomadic lifestyle. Sophisticated cultures developed in the Planning Area,

comparable to those found in farming areas in other parts of North America (Chartkoff and Chartkoff 1984, as cited in Sacramento County 2012).

Prehistoric sites, some of which are known to contain human remains, are located in the Planning Area along the American River, as well as elsewhere in the County (Rancho Cordova 2006b).

11.1.2.3 Local Prehistoric Context

The earliest evidence of the prehistoric inhabitants of the Planning Area comes from a single, deeply buried site in the bank of Arcade Creek (located just north of the Planning Area boundary), which contained grinding tools and large, stemmed projectile points. The points and grinding implements suggest an occupation date of sometime between 6,000 and 3,000 BC (Wallace 1978, as cited in Sacramento County 2012). However, it was not until after about 3,500 BC, in the late Archaic Period, that people began to move into the San Joaquin and Sacramento Valleys in any significant numbers (Chartkoff and Chartkoff 1984, as cited in Sacramento County 2012).

The earliest permanent settlement of the Delta region of the Sacramento River is called the Windmiller Tradition and is known primarily from burial sites containing relatively elaborate grave goods (Chartkoff and Chartkoff 1984, Ragir 1972, Wallace 1978, as cited in Sacramento County 2012). The Windmiller Tradition reflects the amplification of cultural trends begun in the Middle Archaic, as seen in the proliferation of finished artifacts, such as projectile points, shell beads, and pendants. Stone mortars and pestles, milling stones, and bone tools such as fishhooks, awls, and pins are also present. Based on linguistic evidence, it has been suggested that the Windmiller culture was ancestral to several historic tribes in the Central Valley, including the Penutian-speaking Nisenan. The Windmiller Tradition lasted until about 1,000 BC. Around 1,000 BC, subsistence strategies in the Planning Area changed to reliance on acorns and salmon (Chartkoff and Chartkoff 1984, Elsasser 1978, as cited in Sacramento County 2012). Culturally, this has been dubbed the Cosumnes Tradition (1,700 BC–AD 500), and appears to be an outgrowth of the Windmiller Tradition (Ragir 1972, as cited in Sacramento County 2012).

11.1.2.4 Tribal Presence in the Planning Area

The Planning Area is located within the territory that could have been occupied by the ethnographic Nisenan or Plains Miwok (Sacramento County 2012).

Nisenan. The Planning Area is in the southwestern portion of the territory occupied by the Nisenan. The Nisenan lived along the Sacramento River, primarily in large villages with populations of several hundred each. Between the Sacramento River and the foothills, the grassy plains were largely unsettled, used mainly as a foraging ground. Residence was generally centered around the residence of the husband's family or tribe, but couples had choice in the matter (Wilson and Towne 1978, as cited in Sacramento County 2012). Politically, the Nisenan

were divided into "tribelets," made up of a primary village and a series of outlying hamlets, presided over by a more-or-less hereditary chief (Kroeber 1976, Wilson and Towne 1978, as cited in Sacramento County 2012).

Plains Miwok. At the time of European contact, the Eastern (Plains) Miwok tribe occupied the Planning Area and vicinity. Archaeological investigations at sites on South Stone Lake (CA-SAC-65 and CA-SAC-145) indicate a considerable reliance on fishing for subsistence among the prehistoric populations. Each Plains Miwok tribelet was an independent political entity and functioned primarily within recognized tribelet boundaries. Large, multilineal villages were concentrated on rises along watercourses. In addition to gathering resources, the Plains Miwok obtained wild tobacco, planted tobacco seeds, and cultivated the plants (Schulz and Simons 1973, Schulz et al. 1979, as cited in Sacramento County 2010).

The only federally recognized tribe in the Planning Area is the Wilton Rancheria, which are descendants of the Plains Miwok. The Wilton Rancheria became federally recognized in 2009. The tribe's indigenous territory encompasses Sacramento County. The Wilton Rancheria occupies approximately 39 acres near the community of Wilton, and the 39acre area is excluded from the Planning Area because it is sovereign tribal land. Four other tribes located outside the Planning Area could have an interest in cultural resources located within the Planning Area. These are the United Auburn Indian Community (Nisenan and Miwok), the Ione Band of Miwok Indians (Miwok), the Buena Vista Rancheria (Miwok), and the Shingle Springs Band of Miwok Indians (Nisenan and Miwok).

11.1.2.5 European Settlement History and Context

The Spanish arrived on the central California coast in 1769, and by 1776, the Miwok territory bordering the Nisenan on the south had been explored by Jose Canizares. In 1808, Gabriel Moraga crossed Nisenan territory, and in 1813, a major battle was fought between the Miwok and the Spaniards near the mouth of the Cosumnes River. Though the Nisenan appear to have escaped being removed to missions by the Spanish, they were not spared the ravages of European diseases. California became part of Mexico in 1821, when Mexico achieved its independence from Spain. In 1827, American trapper Jedediah Smith traveled along the Sacramento River and into the San Joaquin Valley to meet other trappers of his company who were camped there, but no permanent settlements were established by these fur trappers (Thompson & West 1880, as cited in Sacramento County 2012). In 1833, an epidemic (probably malaria) raged through the Sacramento Valley, killing an estimated 75% of the native population. When John Sutter erected his fort at the future site of Sacramento in 1839, he had little difficulty getting the few Nisenan survivors to settle nearby. As discussed in Section 1.3.1, the discovery of gold in 1848 at Sutter's Mill, near the Nisenan village of Colluma (now Coloma) on the south fork of the American River in El Dorado County, drew thousands of miners to the region, and led to widespread killing of Nisenan tribal members and the virtual destruction of traditional Nisenan culture. By the 1930s, no Nisenan remained who could

remember the days before the arrival of the Euro-Americans (Wilson and Towne 1978, as cited in Sacramento County 2012).

The town of Sacramento was laid out by John Sutter in the fall of 1848, and developed as a supply center for gold miners (Gudde 1969, as cited in Sacramento County 2012). California became a state in 1850, as a result of the major increase in population that resulted from the gold rush of 1849 (Old Sacramento Foundation Inc. 2001, Lawson 2002, as cited in Sacramento County 2012). The Sacramento Valley Railroad was completed from Sacramento to Folsom in 1856 (FEDSHRA 2007, as cited in Sacramento County 2012). It facilitated shipment of goods from Sacramento to the mining areas to the east.

As discussed in Section 1.3.1, as the population in California continued to increase after the Gold Rush, so did the expansion of agricultural lands (both grazing and croplands) in the Planning Area, both to feed California residents and as a profitable export industry. During the early part of the twentieth century, agricultural and grazing lands dominated the landscape of Sacramento County interrupted only by small pockets of urbanization. By the 1940s and 1950s after World War II, Sacramento County experienced a rapid increase in population relative to before the war, with a majority of new urban and suburban development occurring within the Planning Area near the City of Sacramento and in smaller cities such as Folsom and Galt.

11.1.2.6 Potential for Cultural Resources to be Discovered in the Planning Area

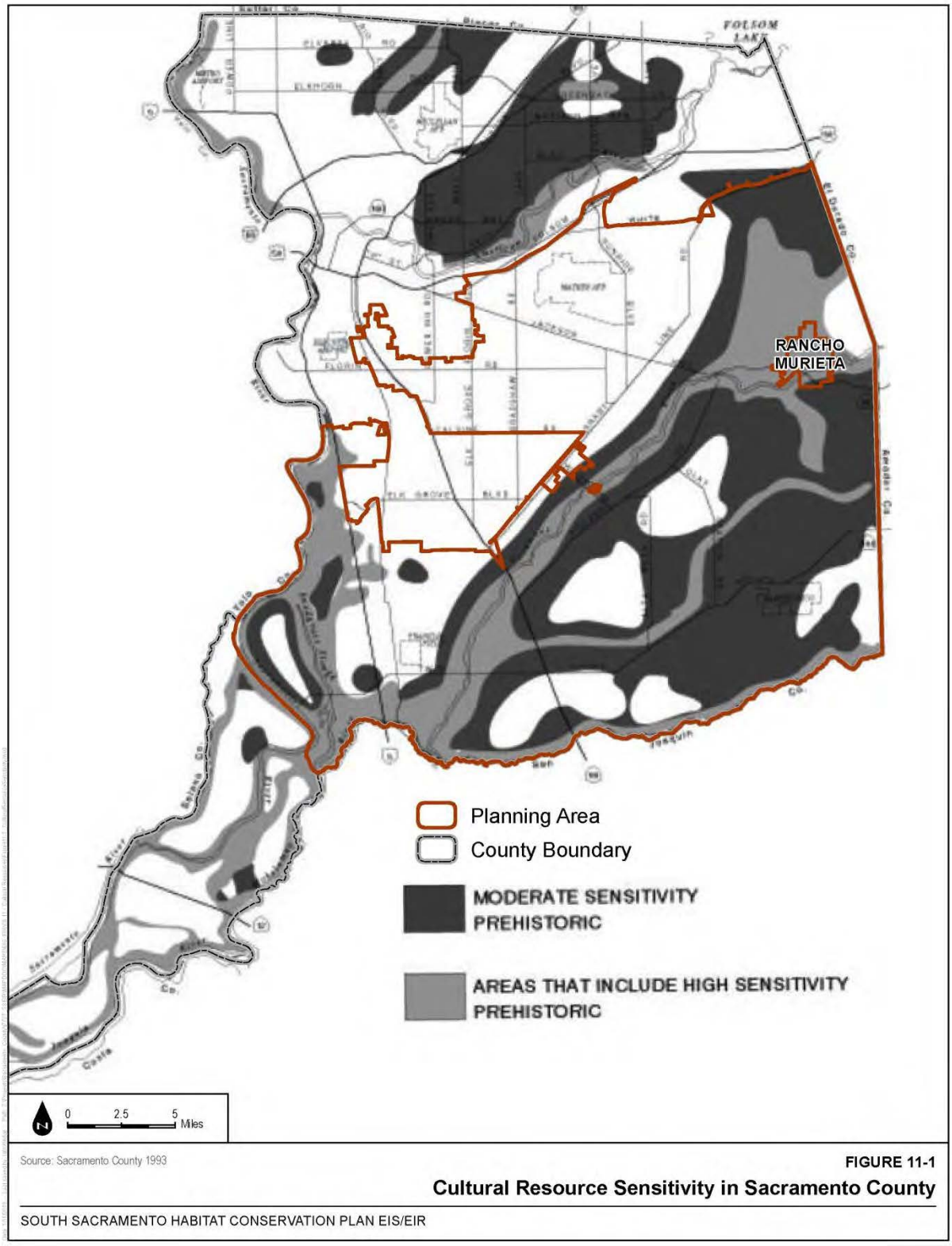
Based on the brief review presented above, the lead agencies expect that various types of cultural resources, including historic properties, may be encountered within the Planning Area.

According to the Sacramento County General Plan, the portions of the Planning Area that are likely or extremely likely to contain high sensitivity and moderate sensitivity[2] for existing prehistoric sites are located near the larger water courses (see Figure 7-4), such as the Cosumnes River and Laguna Creek, Snodgrass Slough, Beach and Stone Lakes, and in the legal Delta area[3] (Figure 11-1) (Sacramento County 2010). Therefore, land cover types with high sensitivity for prehistoric cultural resources include the stream/creek land cover type, the natural riparian land cover types (mixed riparian woodland and mixed riparian scrub), and the valley grassland uplands near these larger waterways. These are consistent with the areas identified by Sacramento County as being moderate or high sensitivity for cultural resources (Figure 11-1) (Sacramento County 1993). Out of the 627 previously recorded prehistoric resources in the unincorporated areas of the County, 7 are currently listed on the NRHP and/or the CRHR.

[2] A copy of a 1993 map was included in the *Sacramento County General Plan of 2005–2030* (Sacramento County 2011), with no changes. Cultural resources sensitivity is another way to describe the likelihood of cultural resources being present within a particular area.

[3] As defined in the Delta Protection Act (Section 12220 of the State Water Code), and shown on Figure 4-1.

Figure 11-1 Cultural Resource Sensitivity in Sacramento County



INTENTIONALLY LEFT BLANK

A records search conducted for the Rancho Cordova General Plan EIR (Rancho Cordova 2006b) identified eight prehistoric sites and one prehistoric/historic site within Rancho Cordova and its SOI. Most of the prehistoric sites in Rancho Cordova and its SOI are located along the American River outside the Planning Area and along creeks both inside and outside the Planning Area. Some of the sites in Rancho Cordova or its SOI are known to contain human remains, and several of the prehistoric sites in Rancho Cordova or its SOI are eligible for inclusion in the NRHP and the CRHR. Archival research conducted for the Galt General Plan EIR indicates that most prehistoric settlement in Galt and the Galt SOI was focused within 1,000 feet of major waterways, especially the Cosumnes River, and along the Dry Creek corridor (Galt 2008a).

Known historical sites in the Planning Area, including historic properties listed on or known to be eligible for the NRHP, tend to be concentrated in developed areas. These include areas along old travel routes such as the Jackson Highway, the Central California Traction Railroad, and the Southern Pacific Railroad routes, and along rivers and in streambeds. The Planning Area, including Galt, Rancho Cordova, and the unincorporated areas of Sacramento County, has 18 historical sites listed on the NRHP and/or the CRHR (Table 11-1). Although there are only 15 historical resources currently listed on the NRHP and 3 on the CRHR, several other sites that have been determined eligible for listing but have never gone through the formal process of officially listing the resource in the NRHP and/or the CRHR. The 18 resources that are currently listed consist of historical structures, such as the Brewster Building in Galt, historic ranches, and large multi-component historic districts, such as the Walnut Grove Chinese-American Historical District.

Table 11-1. Planning Area Historical Sites that are Currently Listed on the National Register of Historic Places or on the California Register of Historical Resources

Name on NRHP or CRHR	Listing	Location	Date Listed/Notes
Alta Mesa Farm Bureau Hall	NRHP #86003577	10195 Alta Mesa Road, Wilton	January 7, 1987 The hall was destroyed by fire in 1987, although the detached restroom building still stood
American River Grange Hall No. 172	NRHP #96001079	2720 Kilgore Road, Rancho Cordova	October 10, 1996
Brewster Building	NRHP #00000981	201 Fourth St., Galt	August 16, 2000
Brewster House	NRHP #78000740	206 Fifth St., Galt	June 23, 1978
John Stanford Brown House	NRHP #04000733	13950 CA 160, Walnut Grove	July 28, 2004
Delta Meadows Site	NRHP #71000175	Locke	November 5, 1971
Fifteen Mile House–Overland Pony Express Route	CRHR #698	White Rock & Gold Valley Roads, Rancho Cordova	September 11, 1959
Grave of Alexander Hamilton Willard	CRHR #657	Franklin Cemetery, Franklin	September 26, 1958
Imperial Theatre	NRHP #82000980	Market St., Walnut Grove	October 29, 1982
Isleton Chinese and Japanese Commercial Districts	NRHP #91000297	Bounded by River Road and Union, E, and H Sts., Isleton	March 14, 1991
Locke Historic District	NRHP #71000174	Bounded on the west by the Sacramento River, on the north by Locke Road, on the east by Alley St., and on the south by Levee St., Isleton	May 6, 1971
Rosebud Ranch	NRHP #79000521	North of Hood	December 31, 1979
Runyon House	NRHP #00001270	12865 River Road, Courtland	October 27, 2000
Sheldon Grist Mill	CRHR #439	Meiss Road and Hwy 16, Sloughhouse	June 2, 1949
Walnut Grove Chinese–American Historic District	NRHP #90000484	Bounded by C, Tyler, and Bridge Sts., and River Road, Walnut Grove	March 22, 1990
Walnut Grove Commercial/Residential Historic District	NRHP #90000551	Browns Alley and River Road., Walnut Grove	April 12, 1990
Walnut Grove Gakuen Hall	NRHP #80000837	Pine and C Sts., Walnut Grove	June 17, 1980
Walnut Grove Japanese–American Historic District	NRHP #90000483	Bounded by Winnie St., Tyler St., C St., and River Road, Walnut Grove	March 22, 1990

Some prehistoric and historical cultural resources are buried and would only be discovered by activities and projects that include earth-moving activities. As discussed in Section 11.2.1, prior environmental documents prepared for projects proposed in the Planning Area, including the Cordova Hills EIR (Sacramento County 2012) and the Capital SouthEast Connector Project EIR (Connector JPA 2012), identified prehistoric and historic-era cultural

resources within their proposed project footprints that were not listed on the NRHP or CRHR. Therefore, it is likely that other unknown cultural resources are present within the undeveloped areas of the Planning Area. Table 11-2 includes types of cultural resources expected to be present within the currently undeveloped portions of the Planning Area. Considering the long and complex history of human settlement in the Planning Area, historical resources that may be encountered are diverse, including buildings, structures, and objects, as well as historical and archaeological sites and artifacts. Descriptions of these general types of cultural resources are provided in Table 11-2.

Table 11-2. Types of Cultural Resources Potentially Occurring in the Planning Area

Resource Type	Description	Example
Building	Structures created principally to shelter or assist in carrying out any form of human activity. May also refer to a historically and functionally related unit (e.g., courthouse and jail).*	Houses, barns, churches, factories, and hotels.
Structure	The term "structure" is used to describe a construction made for a functional purpose rather than creating human shelter.	Mines, bridges, and tunnels.
Object	The term "object" is used to describe those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed, as opposed to a building or a structure. Although it may be moveable by nature or design, an object is associated with a specific setting or environment. Objects should be in a setting appropriate to their significant historic use, role, or character. Objects that are relocated to a museum are not eligible for listing in the CRHR.	Fountains, monuments, maritime resources, sculptures, and boundary markers.
Site	A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historical, cultural, or archaeological value regardless of the value of any existing building, structure, or object. A site need not be marked by physical remains if it is the location of a prehistoric event, and if no buildings, structures, or objects marked it at that time.	Trails, designed landscapes, battlefields, habitation sites, Native American ceremonial areas, rock art, historic period refuse deposits, and archaeological remains of historic period settlement.
Isolates	An isolate is a cultural item (typically found in archaeological contexts), that does not meet the criteria used to define a site.	Isolates may include prehistoric artifacts such as arrow points or milling stones, historic items such as bottle glass, and even certain ranching features such as cattle troughs if they are designated by the study as isolated features.

Note: * It is common to consider buildings over 50 years in age as potentially eligible as a historic resource; however, regulations do not restrict younger buildings from being designated as historic resources.

11.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

11.2.1 Methodology for Assessing Impacts of Each Alternative on Paleontological, Cultural, and Historical Resources

The Environmental Consequences/Environmental Impact section identifies and describes the potential impacts of the actions and projects associated with each EIS/EIR alternative on the paleontological, cultural, or historical resources in the Planning Area. Potential ways that the EIS/EIR alternatives could directly impact cultural resources would be through ground-disturbing activities (e.g., construction of new urban development or associated infrastructure), which could disturb unknown subsurface cultural resources. The projects and activities expected under each alternative are described in Chapter 2.

No systematic archaeological survey of Sacramento County has been conducted, including the 317,655-acre EIS/EIR Planning Area (Figure 1-1). However, records searches were conducted to prepare the Sacramento County, Rancho Cordova, and Galt General Plans and to prepare the impact analysis in the General Plan EIRs (see Section 3.4); to prepare the other EIRs described in Section 3.4; and to prepare EIRs for the five large Master Plans (see Sections 2.3.3 and 2.3.4). In addition, cultural resource studies conducted for individual projects within the Planning Area were reviewed, and the Sacramento County planning staff was consulted.

The Sacramento County General Plan EIR analyzed impacts of urban development within approximately 307,142 acres of the Planning Area; the Rancho Cordova General Plan EIR analyzed impacts of urban development within approximately 42,944 acres of the Planning Area; and the Galt General Plan EIR analyzed impacts of urban development within approximately 7,354 acres of the Planning Area.[4] The Sacramento County General Plan mapped general locations of cultural resource sensitivity within the Planning Area (Figure 11-1). Similarly, the Rancho Cordova General Plan EIR (Rancho Cordova 2006b) mapped areas of cultural sensitivity in zones around each creek and stream in that study area. The Galt General Plan EIR (Galt 2008a) noted that riparian areas were especially sensitive for cultural resources, but did not attempt to map areas of cultural sensitivity.

Two approaches were used to estimate the effects of each EIS/EIR alternatives on cultural resources. First, the map from the Sacramento County General Plan (Figure 11-1) was used to estimate the potential for urban development to disturb cultural resources in the Planning Area. To do that, the expected locations of planned and expected future urban development

[4] Because the Sacramento County General Plan EIR analyzed impacts within the Galt SOI and a portion of Rancho Cordova, there is approximately 33,000 acres of overlap between the area analyzed in the Sacramento General Plan EIR and the Galt and Rancho Cordova General Plan EIRs.

for each alternative (Chapter 2) were compared to the map from the Sacramento County General Plan (Figure 11-1), and areas where planned and expected future urban development overlapped with areas of moderate or high cultural resource sensitivity were noted. In addition, geographic information system (GIS) methodology (Section 3.6.5), which was used to quantitatively estimate the direct impacts of each EIS/EIR alternative on land cover types with higher cultural resource sensitivity (Section 11.1.2.6). To do this, GIS datasets of future projects and activities expected under each EIS/EIR alternative were digitally overlaid (compared) to GIS datasets of stream/creek and riparian land covers land cover types.

However, these analyses only quantify or describe the potential impacts to areas previously determined by the County to have high cultural resource sensitivity. Although these analyses are useful to identify differences between the alternatives, additional cultural resources can be "unknown" or undiscovered because the Planning Area has been inhabited or used by Native American peoples for many thousands of years. Therefore, it is possible or even likely that all of the areas historically inhabited or used by the Plains Miwok or Nisenan tribes have not been discovered. In addition, artifacts or human remains also could have also been transported to future development sites from outside the areas of known habitation by natural forces such as floods or animals, or included in fill material that was excavated from one area and deposited in another during construction activities. Accordingly, site-specific studies must be conducted to increase confidence about the cultural resources present a future urban development project sites; however, even after a site-specific study is done, unknown resources could still be unearthed during ground-disturbing construction activities. Therefore, although the EIS/EIR analysis of each alternative notes when an alternative would result in less disturbance to culturally sensitive areas, the EIS/EIR cannot conclude that the alternative would necessarily result in less impact to cultural resources.

In addition, as discussed in Section 3.4 and earlier in Section 11.1.1.3, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006b) analyzed direct and cumulative impacts of urban growth planned within their jurisdictions, including impacts to paleontological, cultural, and historical resources. When the impact analysis or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief summary or description of the incorporated information or analysis is provided in Sections 11.2.1, 11.2.2, or 11.2.3.

It is appropriate to consider impacts to some environmental resources within the context of other impacts occurring in the surrounding landscape, community, or region (see Section 3.6.2). The lead agencies determined that an appropriate geographic scale for evaluating the impacts of each EIS/EIR alternative on cultural and historic resources should include the Sacramento Area Council of Government's six-county region (SACOG 2016), which includes Sacramento,

Placer, El Dorado, Sacramento, Sutter, Yolo, and Yuba Counties. This cumulative study area was selected to capture the combined historic territories of the Plains Miwok and the Nisenan Native American tribes (refer to Section 11.1.2.4).

As discussed in Section 3.7, the Chapter 11 cumulative analyses of impacts to paleontological and cultural resources will consider: (1) the effects of past and present urban development within the Planning Area (see Existing Conditions in Section 11.1.2) and within the larger six-county study area, and (2) future impacts expected from reasonably foreseeable "other" projects in the Planning Area (see Section 3.7) and reasonably foreseeable "other" projects within the larger six-county study area. The cumulative analysis of each EIS/EIR alternative will then consider whether the incremental impacts of the alternative on paleontological and cultural resources would be significant (i.e., cumulatively considerable).

As discussed previously in Sections 1.6.4 and 3.6.1, the description and scope of each EIS/EIR alternative (Chapter 2) does not include local approvals or entitlements for individual, site-specific, urban development projects or activities. Accordingly, the analysis presented in this EIS/EIR does not provide project-level CEQA or NEPA coverage for the impacts of future Covered Activities on paleontological, cultural, or historical resources, and this EIS/EIR does not function as a programmatic or umbrella CEQA or NEPA document for regional development and infrastructure projects. This EIS/EIR evaluates only the adverse and beneficial environmental effects associated with the decisions of the lead agencies that are described in Section 1.5.

11.2.1.1 Determination of Impact Significance

As discussed in Section 3.8.1, the criteria used to evaluate the significance of each alternative's impacts on paleontological, cultural, and historical resources are based on Appendix G of the CEQA Guidelines, the definition of adverse impact under NHPA 106 (see 36 CFR 800.5(a)(1)), and on typical thresholds used to evaluate impacts in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse impact could occur if the alternative would:

1. Result in a substantial adverse change in the significance of a historical or archaeological resource, as defined as defined in CEQA Guidelines Section 15064.5.
2. Directly or indirectly alter any of the characteristics of a historic property that qualifies the property for listing in the NRHP, in a manner that would diminish the integrity of the historic property's location, design, setting, materials, workmanship, feeling, or association.
3. Disturb any human remains, including those interred outside of formal cemeteries.
4. Directly or indirectly destroy a unique paleontological resource or site.

Appendix G of the CEQA Guidelines does not provide suggested criteria for determining a beneficial effect. The following criteria were developed by the lead agencies. A beneficial impact could occur if the alternative would:

1. Discernibly reduce adverse changes in the significance of a historical or archaeological resource, as defined as defined in CEQA Guidelines Section 15064.5.
2. Discernibly reduce alteration of the characteristics and integrity of a property that may qualify it for listing in the NRHP, as defined in 40 CFR 60.4.
3. Discernibly reduce disturbance of any human remains, including those interred outside of formal cemeteries.
4. Discernibly reduce direct or indirect destruction of a unique paleontological resource or site.

The impact analysis for the three EIS/EIR alternatives will consider the context, intensity, and severity of potential impacts to each of these paleontological and cultural resources impact criteria, and will present a separate determination of significance for each of these criteria.

11.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2.

11.2.2.1 Direct and Indirect Effects of the Alternative

Much of the estimated total 35,532 acres of future urban development expected under the No Action/No Project Alternative (Section 2.2) is also described and analyzed in the Sacramento County General Plan, the Galt General Plan, and the Rancho Cordova General Plan (see Section 3.4 and Section 11.2.1). Therefore, many of the cumulative effects on paleontological and cultural resources from future urban development within the Chapter 11 study area, including the Planning Area, were evaluated in the General Plan EIRs and the other EIRs listed in Section 3.4.

As discussed in Section 3.4 and in Section 11.2.1, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b), in 2050 (Rancho Cordova 2006b), and 2030 (Sacramento County 2010), and the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). The Galt and Rancho Cordova General Plan EIRs analyzed buildout of their jurisdictions. However, additional urban development would occur within Sacramento County after the 2030 end of the General Plan EIR study period, until the expected buildout of the Urban

Development Area (UDA)[5] at end of this EIS/EIR's study period in 2065. Consequently, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of the additional urban development activities and projects included in the description of each EIS/EIR alternative. The lead agencies extrapolated that the impacts of the additional urban development in the latter part of the 50-year EIS/EIR study period, including potential impacts to paleontological and cultural resources, would be similar to the impacts of urban development implemented in the early part of the EIS/EIR study period, which was analyzed in the General Plan EIRs.

The impact analysis presented in the *City of Galt General Plan Update: 2030 Final EIR* (Galt General Plan EIR)(Galt 2009b), determined that within the City of Galt and the Galt SOI:

- Historic resources, including structures and sites in the City's downtown area, may be vulnerable to urban development projects and activities associated with the planned buildout described in the Galt General Plan. The General Plan policies establish a framework for the preservation of Galt's historic resources and promote historic preservation, which will help avoid, minimize, and mitigate project impacts to historical resources. However, even with project implementation of the Galt General Plan policies, the Galt General Plan EIR determined that impacts of planned urban development are significant and unavoidable;
- Cultural resources, paleontological resources, and/or human remains could be damaged or inadvertently unearthed during ground-disturbing activities associated with the planned buildout described in the Galt General Plan. However, future project compliance with state laws and with the Galt General Plan policies that promote the protection of these resources (see Section 11.1.1) would ensure impacts to existing cultural resources, paleontological resources, or human remains would be less than significant (Galt 2008, pp. 9-1 to 9-8).

The Galt General Plan EIR assumed full buildout of the existing Galt city limits and the Galt SOI by the end of the General Plan EIR's study period.

[5] As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, the term "UDA" means all lands within the County's Urban Service Boundary (USB) that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within the City of Galt's SOI (see Figure 1-1).

The *City of Rancho Cordova General Plan Final EIR* (Rancho Cordova General Plan EIR) (Rancho Cordova 2006b), determined that within Rancho Cordova and its SOI:

- Existing historic resources and cultural resources may be vulnerable to urban development projects and activities associated with the planned buildout described in the Rancho Cordova General Plan. Compliance with Rancho Cordova General Plan policies that promote the protection of these resources (see Section 11.1.1) would help to reduce impacts to historic resources and cultural resources. However, even with project implementation of the Rancho Cordova General Plan policies, the Rancho Cordova General Plan EIR determined that impacts to prehistoric and historic cultural resources, and human remains would be significant and unavoidable (Rancho Cordova 2006c, pp. 4.11-5 to 4.11-19).
- Paleontological resources could be damaged or inadvertently unearthed during ground-disturbing activities associated with the planned buildout described in the Rancho Cordova General Plan. Future project compliance with Rancho Cordova General Plan policies that promote the protection of these resources (see Section 11.1.1) would ensure impacts to paleontological resources would be reduced to less than significant (Rancho Cordova 2006c, pp. 4.11-5 to 4.11-19).

The Rancho Cordova General Plan EIR assumed full buildout of Rancho Cordova and the Rancho Cordova SOI by the end of the General Plan EIR's study period.

The impact analysis presented in the *Capital SouthEast Connector Project Final Program Environmental Impact Report* (Connector EIR) (Connector JPA 2012), determined that construction and operation of the Capital Southeast Connector:

- Could result in significant impacts to cultural resources from construction in areas where cultural resources are present. Project-level mitigation measures identified in the Connector EIR would reduce these impacts to less than significant; however, in areas of the Capital Southeast Connector right-of-way footprint where avoidance of cultural resources is not possible, impacts would remain significant and unavoidable (Connector JPA 2012, pp. 6-13 to 6-15).
- Could result in significant impacts to human remains due to ground disturbance during construction. A mitigation measure requiring construction to stop if human remains are encountered would reduce this potential impact to less than significant (Connector JPA 2012, pp. 6-15 to 6-16).

The impact analysis presented in the *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR) (Sacramento County 2010), determined that within Sacramento County:

- Historic resources and cultural resources may be vulnerable to planned urban development projects and activities associated with buildout of the Sacramento County General Plan. Compliance with Sacramento County General Plan policies would avoid or minimize impacts to cultural resources associated with future planned development in unincorporated Sacramento County. However, direct and indirect impacts would still occur to existing cultural and historic resources, resulting in a significant and unavoidable impact.
- Impacts to important cultural resources existing in areas identified in the Sacramento County General Plan EIR as "new growth areas," (includes the Jackson Highway Corridor[6] and Grant Line East area), would also result in significant and unavoidable impacts.
- Paleontological resources may be at risk for unintentional destruction during construction of planned urban development (residential, commercial, and industrial), during construction of associated infrastructure; and during the expansion of existing mining operations, resulting in significant and unavoidable impacts (Sacramento County 2010, pp. 15-22 to 15-34).

The Sacramento County General Plan EIR analyzed the effects of ground-disturbing projects and activities resulting from infill development of all acreage within the current 223,193-acre Urban Policy Area, combined with development in two "New Growth Areas" that total approximately 20,000 acres.[7] Approximately 43,719 acres of the current Urban Policy Area overlaps with the EIS/EIR Planning Area. However, the Sacramento County General Plan EIR did not address the potential to disturb human remains.

As discussed earlier, additional urban development would occur within Sacramento County after the 2030 end of the Sacramento County General Plan EIR study period, until the expected full buildout of the UDA at end of this EIS/EIR's study period in 2065. This additional urban development within the UDA would result in additional effects on existing cultural, historical,

[6] The Sacramento County General Plan EIR's proposed project (Sacramento County 2010) included development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by Sacramento County. However, Sacramento County is currently processing proposed Master Plans in the Jackson Highway Corridor, so the conclusions of the Sacramento County General Plan EIR's analysis of this proposed project are applicable to the EIS/EIR No Action/No Project Alternative.

[7] The two "New Growth Areas" were Jackson Highway Corridor (approximately 12,000 acres) and Grant Line East (approximately 8,000 acres). The Jackson Highway Corridor encompasses land on the northern and southern sides of Highway 16, beginning at South Watt Avenue and ending at Sunrise Boulevard. Grant Line East begins on the eastern side of Grant Line Road and ends at the Sacramento County USB.

and paleontological resources present in the Planning Area, especially inside the UDA where all new urban development would occur. The areas of highest cultural sensitivity in Sacramento County are generally along the larger waterways, which are located outside the UDA (Figure 11-1)(Sacramento County 1993). However, as described in Section 11.1.2.6, unknown cultural resources have potential to be present anywhere in the Planning Area. Therefore, the additional urban development (which would occur after the 2030 end of the Sacramento County General Plan EIR study period, until the buildout of the UDA at end of this EIS/EIR's study period in 2065) would add to the already significant and unavoidable effects on cultural resources previously identified in the Sacramento County General Plan EIR, described earlier.

Additionally, as explained above and in Section 2.2.2, approximately 1,900 acres of planned urban development would be shifted or displaced from inside the Mather Core Recovery Area (MCRA) to one or more locations outside the current Sacramento County USB boundary under the No Action/No Project Alternative. Based on the map of prehistoric cultural resource sensitivity in Sacramento County (Figure 11-1):

- The potential displacement areas in the northeast of the Planning Area and east of Galt have moderate prehistoric cultural resource sensitivity.
- The area surrounding Rancho Murieta and the area near Wilton have high prehistoric cultural resources sensitivity.
- The area south of Elk Grove has low prehistoric cultural resource sensitivity.

By shifting or displacing development from the MCRA (an area of low prehistoric cultural resource sensitivity), to areas with moderate or high prehistoric cultural sensitivity, the No Action/No Project Alternative could result in more impact to prehistoric cultural resources than was analyzed in the Sacramento County General Plan EIR. However, this impact analysis of the No Action/No Project Alternative assumes that all future development projects would comply with applicable policies and regulations identified in the General Plans for Rancho Cordova and Sacramento County (see Section 11.1.1.3).

All future projects and activities that require local permits, approvals, or entitlements (e.g., planning entitlements such as rezones, lot line splits, and subdivision maps) over the 50-year EIS/EIR study period would be required to comply with the Sacramento County, Galt, or Rancho Cordova policies for paleontological and cultural resources (see Section 11.1.1.3). These local policies require future projects to avoid or minimize impacts to cultural, paleontological, or historical resources. If full avoidance of cultural, paleontological, or historical resources is not feasible, Sacramento County, Galt, or Rancho Cordova policies require projects to incorporate additional mitigation measures before permits or entitlements. Examples of project-level mitigation measures to address unavoidable impacts to paleontological and cultural resources include data recovery, curation of recovered materials, repatriation of human remains and/or grave goods, and documentation of

results. In some cases, these mitigation measures would fully mitigate for the effects of a project. However, for many individual projects, the effects on cultural resources would remain significantly adverse after mitigation. Therefore, the No Action /No Project Alternative, including the 1,900 acres of displaced development outside the UDA and the expected buildout of the UDA over the 50-year EIS/EIR study period, would add to the already significant impacts to paleontological, cultural, and historic resources that were identified in the Sacramento County, Galt, and Rancho Cordova General Plan EIRs presented earlier.

As discussed in Section 2.2.2 and 2.2.4, individual projects and activities implemented under the No Action/No Project Alternative would continue to establish new mitigation preserves to meet requirements of ESA, California Endangered Species Act, CWA, and local environmental policies. A total of 23,430 acres of existing natural land covers would be permanently preserved under the No Action/No Project Alternative (Table 2-2). The establishment of new on-site or off-site mitigation preserves alone would not adversely impact paleontological or cultural resources present at the new preserve sites. Likewise, the purchase of credits at an approved mitigation bank, or through an established in-lieu fee program, would not adversely impact paleontological or cultural resources.

As discussed in Section 2.2.4, and Section 8.2.2, approximately 380 acres of stream/creek, freshwater marsh, and riparian land cover types would be preserved under the No Action/No Project Alternative. These aquatic resource land cover types generally have high sensitivity for prehistoric cultural resources (Section 11.1.2.6), and preserving them would prevent adverse effects of constructing new urban development and on the cultural and historic resources that might be present. Approximately 554 acres of riparian land covers would be re-established or established in Planning Area riparian areas under the No Action/No Project alternative (Table 8-5). The re-establishment of a riparian plant community is primarily by planting of tree, shrub, and herbaceous species, and results in minimal ground disturbance.

However, the establishment or re-establishment of 562 acres of vernal pools and swales as compensatory mitigation for projects and activities implemented under the No Action/No Project Alternative (Table 8-5) would require use of heavy equipment, and may require grading or excavation of soil to depths up to 3 feet, which has potential to impact existing paleontological or cultural resources. However, the re-establishment/establishment of vernal pools and swales would occur only on the specific soil types that form seasonal perched aquifers (see Chapter 8), and these soil types are typically not located in floodplains, where cultural resource sensitivity is highest. In addition, these small areas of shallow grading are less likely to disturb unknown cultural resources than the deeper grading that occurs with new urban development projects. Furthermore, future urban development projects and activities would comply with the regulations and local policies and regulations discussed in Section 11.1.1.3 and in the General Plan EIRs, and these existing regulations and policies would

continue to ensure that re-establishment or establishment of wetlands and other waters would not adversely affect cultural resources. Therefore, habitat re-establishment and establishment of vernal pools and swales on mitigation preserves is expected to have a ***Less Than Significant Adverse*** effect on existing cultural, paleontological, or historical resources.

In summary, the additional urban development from buildout of the UDA during the 50-year EIS/EIR study period and the effects of the approximately 1,900 acres of urban development that would be displaced to areas outside the UDA, would result in significant and unavoidable impacts to paleontological, cultural and historic resources. Therefore, the ***Significant and Unavoidable Adverse*** effects to paleontological, cultural, and historic resources identified in the Sacramento County, Galt, and the Rancho Cordova General Plan EIRs would continue under the No Action/No Project Alternative.

11.2.2.2 Cumulative Effects of the Alternative

The past and present urban development and associated infrastructure projects and human activities discussed in Section 3.7.1 and in Section 11.1.2 have damaged or destroyed paleontological and cultural resources within the EIS/EIR Planning Area, especially within the UDA. These past and present alterations have resulted in the existing conditions of the Planning Area (see Section 5.1.2), and represent a significant adverse impact on cultural resources from past and present development. Historical, cultural, and paleontological resources in other parts of the cumulative study area such as Yolo County and Sutter County have also been damaged by ground-disturbing activities of urban development.

The types of reasonably foreseeable "other" projects, activities, and actions described in Section 3.7.2, are similar to the types of past and present actions that occurred in the study area. The foreseeable other actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in the Elk Grove SOI and in Rancho Murieta, development of the Wilton Rancheria Casino, master planned developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued urban development of cultivated agricultural lands, major infrastructure projects such as California High-Speed Rail and the California WaterFix, and expansion of the existing National Wild Refuge and the Cosumnes River Preserve (see Section 3.7.2) These reasonably foreseeable other projects in the study area are expected to further impact paleontological and cultural resources. The combined impacts of the past, present, and reasonably foreseeable future projects are a significant cumulative impact to paleontological and cultural resources in the study area.

As discussed in the Section 11.2.2.1 direct and indirect analysis of the No Action/No Project, future projects and activities under the No Action/No Project Alternative would continue to implement applicable regulations and policies discussed in Section 11.1.1. However, although the policies in the Sacramento County General Plan (Sacramento County 2011) and Rancho Cordova General Plan (Rancho Cordova 2006a) are designed to minimize protect impacts to paleontological and cultural resources, additional losses of paleontological and cultural resources would result from the new urban development projects, activities, and actions included in the No Action/No Project Alternative. Therefore, the direct and indirect impacts of the No Action/No Project Alternative would further increase the significant loss of cultural and paleontological resources that already exists in the study area. Therefore, the incremental impacts to cultural and paleontological resources from the No Action/No Project Alternative are significant and cumulatively considerable, and would make a considerable contribution to the previously identified significant cumulative impacts on cultural and paleontological resources from the past, present, and reasonably foreseeable other projects.

11.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3.

11.2.3.1 Direct and Indirect Effects of the Alternative

As discussed in Section 2.3, Covered Activities under the Proposed Action/Proposed Project Alternative include the same types of urban development that are anticipated under the No Action/No Project Alternative. Covered Activities implemented under the Proposed Action/Proposed Project would result in new urban development projects and activities on approximately 33,500 acres of existing natural landscapes in the Planning Area (see Section 2.3.3), which is approximately 2,000 fewer acres of new urban development projects on natural landscapes than the No Action/No Project Alternative.

As discussed in Section 2.3.1, the Proposed Action/Proposed Project Alternative would allow urban development Covered Activities within the MCRA portion of the UDA to be implemented consistent with the approved Sacramento County and Rancho Cordova General Plans, without urban development shifting or being displaced to up to four locations outside the current USB boundary. Therefore, the Proposed Action/Proposed Project Alternative does not assume that approximately 1,900 acres of new urban development would be shifted or "displaced" to locations outside of the current USB boundary for Sacramento County. As discussed in Section 11.2.2.2, the four areas where urban development might be displaced under the No Action/No Project are areas of moderate or high sensitivity for cultural resources (Figure 11-1). Therefore, the Proposed Action/Proposed Project may result in fewer disturbances to cultural resources relative to the impact of the No Action/No Project Alternative baseline condition. However,

unknown cultural resources could be present anywhere in the Planning Area (Section 11.2.1), so the EIS/EIR does not assume that effects on cultural resources would be less under the Proposed Action/Proposed Project than under the No Action/No Project Alternative.

As discussed in Section 11.1.1, existing regulations and policies that apply to paleontological and cultural resources, including historic properties and human remains, will continue to be required of urban development Covered Activities over the 50-year permit term.

As discussed in Section 1.5.4, the USACE is developing a multilevel CWA Section 404 permitting program for future SSHCP Covered Activity projects and activities that discharge dredged or fill material to waters of the United States, which would be a federal undertaking under the NHPA. To meet the NHPA 106 requirements, the USACE may develop a Programmatic Agreement with the SHPO specifically to address NHPA 106 compliance for future SSHCP Covered Activities authorized under CWA 404. If this were to occur, as part of developing a Programmatic Agreement, the USACE would also consult with regional Native American tribal contacts, and may consider establishing a MOU with Native American tribes concerning future coordination on the protection of cultural resources. Compared to the impacts expected under the No Action/No Project baseline condition, the MOU developed as part of this process would provide equal or better protection for cultural resources and human remains. The other existing federal, state, and local regulatory requirements would provide protection for paleontological resources and historical resources.

As discussed in Section 2.3.5, the conservation strategy of the Proposed Action/Proposed Project Alternative would include a 36,027-acre interconnected and coordinated SSHCP Preserve System, with 7,162 acres preserved inside the UDA, and 36,027 acres preserved outside the UDA. Any paleontological and cultural resources located within the SSHCP Preserve System would be protected from urban development and associated infrastructure projects. As noted in Section 11.2.2, individual mitigation preserves established under the No Action/No Project Alternative would also protect paleontological and cultural resources. However, under the Proposed Action/Proposed Project, approximately 2,740 acres of stream/creek and riparian habitat would also be protected in preserves, which is approximately three times the acreage of these culturally sensitive areas preserved under the No Action/No Project Alternative.

In addition, under the Proposed Action/Proposed Project, additional stream setback areas would be established between new urban development and UDA streams, creeks, and first and second order tributaries to those streams and creeks. Avoidance and Minimization Measure (AMM) AMM STREAM-2 would require new urban development to be at least 100 feet from the top of each bank of several creeks in the Planning Area, even for creek reaches that are not within preserves. AMM STREAM-1 would require minimum 150-foot setbacks from the top of each bank along Laguna Creek in the UDA. Although the project-by-project approvals and

project mitigation that would occur under the No Action/No Project Alternative (Section 2.2.4) may include some setbacks from creeks and streams, the setbacks required under the Proposed Action/Proposed Project would be larger and would apply to more streams and creeks than the setbacks under the No Action/No Project Alternative. The greater setbacks under the Proposed Action/Proposed Project would limit disturbance of soils in floodplains and riparian areas, which are the areas with the greatest potential for cultural resource presence in the Planning Area (Sacramento County 1993, 2011; Rancho Cordova 2006a; Galt 2008b). The establishment of the Preserve System and requirements for larger stream setbacks would be a ***Minor Beneficial*** effect as compared to the No Action/No Project Alternative baseline condition,

As described for the No Action/No Project Alternative in Section 11.2.2, vernal pool and swale re-establishment/establishment activities on preserves would include land disturbances up to 3 feet depth. However, the acreage of re-established/established wetlands and other waters, and re-established/established riparian land covers under the Proposed Action/Proposed Project would total approximately 1,740-acres, approximately 50% more acres of re-established/established aquatic resources than under the No Action/No Project Alternative. The additional acreage of re-establishment/establishment under the Proposed Action/Proposed Project would increase the risk of disturbance of unknown cultural resources on preserves, as compared to the No Action/No Project Alternative. However, the re-establishment/ establishment of vernal pools and swales would continue to occur only on the specific soil types that form seasonal perched aquifers (see Chapter 8), and these soil types are typically not located in floodplains or riparian areas, where cultural resource sensitivity is highest. In addition, these small areas of shallow grading are less likely to disturb unknown cultural resources than the deeper grading that occurs with new urban development projects. Furthermore, future urban development projects and activities would continue to comply with the regulations and local policies and regulations discussed in Section 11.1.1.3 and in the General Plan EIRs, and these existing regulations and policies would continue to ensure that re-establishment or establishment of aquatic resources would not significantly affect known or unknown cultural resources in the SSHCP Preserve System. In addition, the amount of ground disturbance associated with re-establishment/establishment projects on preserves would remain minimal compared to the ground disturbance from urban development. Therefore, aquatic resource re-establishment/establishment under the Proposed Action/Proposed Project would continue to have a ***Less than Significant Adverse*** effect on paleontological, cultural, and historical resources, when compared to the impacts of the No Action/No Project Alternative baseline condition.

11.2.3.2 Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- Not result in disturbance of up to 1,900 acres outside the UDA identified as "moderate" or "high" cultural resource sensitivity by Sacramento County;
- Provide additional setback preserves along stream, creeks, and riparian areas, which generally have the highest sensitivity for cultural resources in the Planning Area;
- Result in similar effects to existing historical resources and paleontological resources.

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative on all of the impact criteria for paleontological, cultural, and historical resources listed above in Section 11.2.1.1, the Proposed Action/Proposed Project overall would result in a ***Minor Beneficial*** effect to Planning Area paleontological, cultural, and historical resources, when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

11.2.3.3 Cumulative Effects of the Proposed Action/Proposed Project

The effects of past, present, and the reasonably foreseeable other projects on paleontological, cultural, and historical resources in the Planning Area were described above in Section 11.2.2.2, and represent a significant adverse cumulative impact on the paleontological, cultural, and historical resources within the study area. As discussed in Section 11.2.2.1, the incremental direct and indirect effects of the No Action/No Project Alternative were determined to be significant and to be cumulatively considerable, when viewed in connection with the effects of the past, present, and reasonably foreseeable other projects in the study area.

As discussed here, the implementation of the Proposed Action/Proposed Project SSHCP conservation strategy, including the SSHCP AMMs, the SSHCP Aquatics Resources Plan, and the interconnected SSHCP Preserve System is expected to reduce the potential for impacts to cultural resources as compared to the No Action/No Project Alternative. Compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would include less development outside the current Sacramento County USB boundary, where cultural resource sensitivity is higher. The Proposed Action/Proposed Project would also include stream setbacks on streams, creeks, and first and second order tributaries to those streams and creeks. Because stream/creek and riparian areas have greater cultural resource sensitivity, these setbacks would reduce the potential for impacts to cultural resources. Consequently, the incremental effects of the Proposed Action/Proposed Project would have a minor beneficial impact to paleontological, cultural and historical resources when compared to the incremental effects of the No Action/No

Project Alternative baseline condition; therefore, the Proposed Action/Proposed Project does not result in a cumulatively considerable contribution to the significant adverse cumulative impacts on paleontological, cultural, and historical resources. The Proposed Action/Proposed Project would result in a ***Minor Beneficial Cumulative*** effect to paleontological, cultural, and historical resources compared to the No Action/No Project baseline condition.

11.2.4 Reduced Permit Term Alternative

The Reduced Permit Term Alternative is described in Section 2.4.

11.2.4.1 Direct and Indirect Effects of the Alternative

As described in Section 2.4.3 and Section 3.6.3, the Reduced Permit Term Alternative would include similar types of development in the UDA as the No Action/No Project Alternative. Over the 50-year EIS/EIR study period, the Reduced Permit Term Alternative would result in new urban development projects and activities on approximately 35,358 acres of existing natural land covers in the Planning Area (Table 8-12).

As discussed in Section 2.4.1, the Reduced Permit Term Alternative would allow urban development within the MCRA portion of the UDA to be consistent with the approved Sacramento County and Rancho Cordova General Plans, without urban development shifting or being displaced to up to four locations outside the current USB boundary. Therefore, the Reduced Permit Term Alternative does not assume that approximately 1,900 acres of new urban development would be shifted or "displaced" to locations outside of the current USB boundary for Sacramento County. As discussed above in section 11.2.2, the four areas where urban development might be displaced under the No Action/No Project Alternative are areas of moderate or high sensitivity for cultural resources (Figure 11-1). By not resulting in shifting or displacement of 1,900 acres of urban development to areas outside the UDA, the Reduced Permit Term Alternative would result in fewer disturbances of the areas identified by the County as having moderate or high cultural sensitivity (Figure 11-1) as compared to the No Action/No Project Alternative. However, as explained above in Section 11.2.1, unknown cultural resources could be present anywhere in the Planning Area, so the EIS/EIR does not assume that effects on cultural resources would necessarily be less under the Reduced Permit Term Alternative than under the No Action/No Project Alternative.

The existing regulations and local policy requirements discussed in Section 11.1.1 for cultural resources and human remains, if encountered during ground disturbance, would continue under the Reduced Permit Term Alternative. To meet the requirements of Section 106 for CWA permits, the USACE and the local jurisdictions could develop a Programmatic Agreement for Section 106 consultations with the SHPO in effect during the 30-year permit term of the

Reduced Permit Term Alternative. As part of developing a Programmatic Agreement, the USACE would consult with the local Native American tribes, which may include establishing an MOU with Native American tribes concerning future coordination and the protection of cultural resources. The MOU developed as part of this process would provide equal or better protection for cultural resources and human remains during the 30-year permit term than currently occurs. The other existing federal, state, and local regulatory requirements would provide protections for paleontological resources and historical resources.

As discussed in Section 2.4.5, the Reduced Permit Term Alternative would include an interconnected and coordinated preserve system, established during the 30-year permit term. Any paleontological, cultural, or historical resources present within the SSHCP Preserve System would not be disturbed or destroyed by future urban development. Relative to the No Action/No Project Alternative baseline condition, the 30-year Preserve System would result in a ***Minor Beneficial*** effect to paleontological, cultural, or historical resources.

However, during years 31–50 of the EIS/EIR study period, project ESA, California Endangered Species Act, and CWA mitigation preserves would be established under the uncoordinated, project-by-project process that currently occurs under the existing conditions and under the No Action/No Project Alternative. Any cultural, paleontological, or historical resources located within these on-site or off-site mitigation preserves would not be directly disturbed by new urban development. In addition, approximately 1,512 acres of stream/creek and riparian land covers would be preserved over the 50-year EIS/EIR study period, approximately double the acreage of these culturally sensitive areas that would be preserved under the No Action/No Project Alternative over the 50-year EIS/EIR study period. As in the No Action Alternative's expected regulatory environment (Section 2.2.2), project use of mitigation and conservation banks to meet CWA404 requirements has become common since 2008, and is expected to continue during years 31–50 of the Reduced Permit Term's 50 year study period)

In addition, during the 30-year permit term of the Reduced Permit Term Alternative, stream setbacks would be established that would require new urban development inside the UDA to be at least 50 feet from the top of the bank of many creeks in the Planning Area, even for creeks that are not within preserves. For the Laguna Creek in the UDA, development setbacks would be a minimum of 150 feet from the top of each bank during the 30-year permit term. Although project-by-project ESA and CWA authorizations under the existing conditions and under the No Action/No Project Alternative may requires small setbacks from creeks, the setbacks required under the Reduced Permit Term Alternative during the 30-year permit term would be larger, and would occur on more streams and creeks than under the No Action/No Project Alternative. The larger stream and creek setbacks established during the 30-year permit of the Reduced Permit Term Alternative would reduce disturbance of soils in riparian areas, which have the greatest cultural resource sensitivity (Sacramento County 1993, 2011; Rancho

Cordova 2006a; Galt 2008b). The Preserve System and requirements for stream setbacks during the 30-year permit term would be a ***Minor Beneficial*** effect as compared to the No Action/No Project Alternative baseline condition.

As for the No Action/No Project Alternative, aquatic resource re-establishment/establishment activities on preserves could involve land disturbance up to 3 feet deep to construct re-established/established vernal pool wetlands and swales, or for re-establishment/ establishment of other waters. However, the acreage of re-establishment/establishment of aquatic resources and riparian land covers under the Reduced Permit Term Alternative would be approximately 40% more than that under the No Action/No Project Alternative. The additional acreage of re-establishment/establishment under the Reduced Permit Term Alternative would increase the risk of disturbance of unknown cultural resources as compared to the No Action/No Project Alternative. However, Covered Activity projects and activities implemented during the 30-year permit term, and during the 50-year EIS/EIR study period, would continue to be required to comply with the existing cultural resource regulations and local policies described above in Section 11.1.1. Therefore, habitat re-establishment/ establishment under the Reduced Permit Term Alternative would continue to have ***Less Than Significant Adverse*** effects on paleontological, cultural, and historical resources when compared to the No Action/No Project Alternative baseline condition.

11.2.4.2 Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Not result in disturbance of up to 1,900 acres outside the UDA identified as “moderate” or “high” cultural resource sensitivity by Sacramento County;
- Provide 30-years of additional protections for stream, creeks, and riparian areas, which generally have the highest sensitivity for cultural resources in the Planning Area;
- Result in similar effects on historical resources and paleontological resources.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on all of the impact criteria for paleontological, cultural, and historical resources listed in Section 11.2.1, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to paleontological, cultural, and historical resources when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

11.2.4.3 Cumulative Effects of the Alternative

The effects of past, present, and reasonably foreseeable other projects on paleontological, cultural, and historical resources in the Planning Area are described in Section 11.2.2.1, and represent a significant adverse cumulative impact on the paleontological, cultural, and historical resources within the Study Area. As discussed in Section 11.2.2.1, the direct and indirect incremental effects of the No Action/No Project were determined to be significant and cumulatively considerable, when viewed in connection with the effects of the past, present, and foreseeable other projects in the Study Area.

As discussed here, the implementation of the Reduced Permit Term Alternative's conservation strategy, including the SSHCP AMMs, the SSHCP Aquatics Resources Plan, and the interconnected SSHCP Preserve System is expected to reduce the impacts to cultural resources when compared to the No Action/No Project Alternative. Compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would not displace or shift urban development outside the current Sacramento County USB boundary where cultural resource sensitivity is moderate or high (Figure 11-1). The Reduced Permit Term Alternative would also include 30 years of additional setbacks between new urban development and UDA streams, creeks, and first and second order tributaries to those streams and creeks. Because stream/creek and riparian areas have greater cultural resource sensitivity, the 30 years of larger and more numerous setbacks are expected to reduce impacts to cultural resources. Consequently, the direct and indirect incremental effects of the Reduced Permit Term Alternative would have a minor beneficial impact to paleontological, cultural, and historical resources when compared to the incremental effects of the No Action/No Project Alternative baseline condition; therefore, the Reduced Permit Term Alternative would not result in a cumulatively considerable contribution to the significant adverse cumulative impacts on paleontological, cultural, and historical resources. The Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect to paleontological, cultural, and historical resources, when compared to the No Action/No Project Alternative baseline condition.

11.3 REFERENCES CITED

Connector JPA (Capital SouthEast Connector Joint Powers Authority). 2012. *Capital SouthEast Connector Project Program Environmental Impact Report*. Vol. 2, *Revisions to the Draft Program Environmental Impact Report*. SCH No. 2010012066. Prepared by ICF in association with the Cities of Elk Grove, Folsom, and Rancho Cordova, the Counties of El Dorado and Sacramento. Sacramento, California: ICF. February 2012. Accessed June 29, 2016. http://www.connectorjpa.net/wp-content/uploads/2012/09/Capital-SEC-V2-Final-PEIR-Revised-Draft.pdf.

Galt. 2008a. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. Prepared by Environmental Science Associates. Sacramento, California: Environmental Science Associates. July 2008. Accessed June 28, 2016. http://www.ci.galt.ca.us/index.aspx?page=786.

Galt. 2008b. *2030 Galt General Plan Existing Conditions Report*. Final. Prepared by Mintier & Associates, RACESTUDIO, Environmental Science Associates, Applied Development Economics, and Omni-Means Inc. Sacramento, California: Mintier & Associates. November 2005. Accessed June 30, 2016. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9879.

Galt. 2009. *2030 Galt General Plan Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

President Nixon (President Richard Nixon). 1971. Executive Order 11593 of May 13, 1971: "Protection and Enhancement of the Cultural Environment." Federal Register, volume 36, page 8921. Accessed June 30, 2016. http://www.archives.gov/federal-register/codification/executive-order/11593.html.

President Clinton (President William J. Clinton). 1996. Executive Order 13007 of May 29, 1996: "Indian Sacred Sites." Federal Register, volume 61, page 26771. Accessed June 30, 2016. https://www.gpo.gov/fdsys/pkg/FR-1996-05-29/pdf/96-13597.pdf.

Rancho Cordova. 2006a. *Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report.* SCH no. 2005022137. June 2006. Accessed June 29, 2016. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

SACOG (Sacramento Area Council of Governments). 2016. *Final Environmental Impact Report for the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy*. SCH No. 2014062060. Sacramento, California: SACOG. January 2016. Accessed June 29, 2016. http://www.sacog.org/general-information/final-2016-mtpscs-environmental-impact-report.

Sacramento County. 1993. *Conservation Element of the Sacramento General Plan of 2005–2030*. Sacramento, California: Planning and Community Development Department, General and Advance Planning Section. December 15, 1993. Accessed June 30, 2016. http://worldcat.org/arcviewer/1/CBG/2007/06/06/0000066211/viewer/file20.pdf.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: County of Sacramento Department of Environmental Review and Assessment. April 2010. Accessed June 29, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030.* Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County. 2012. *Cordova Hills Final Environmental Impact Report.* Sacramento, California: County of Sacramento. January 9, 2012. Accessed June 30, 2016. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/CordovaHills.aspx.

INTENTIONALLY LEFT BLANK

CHAPTER 12 – PUBLIC SERVICES AND FACILITIES

This chapter presents the environmental effects of each Environmental Impact Statement (EIS)/ Environmental Impact Report (EIR) alternative on public services and facilities within the Planning Area. Services and facilities assessed include fire protection, law enforcement, water supply, wastewater treatment, solid waste (landfill capacity), parks and recreation, energy services (natural gas and electricity), and mosquito abatement.

12.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

This section describes the regulatory and physical environmental setting for traffic and circulation within the Planning Area.

12.1.1 Regulatory Framework

Several federal, state, and local agency requirements apply to public services and facilities within the Planning Area. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, issuance of permits, or implementation for the alternatives analyzed in this EIS/EIR. This section also identifies any relevant federal permits or other entitlements that must be obtained prior to implementing the alternatives. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 12.2, Environmental Consequences/Environmental Impacts (40 CFR 1502.25). The statutes, regulations, policies, and agency planning documents pertaining to each public service or facility are presented separately.

12.1.1.1 Fire Protection and Emergency Services

State

Petroleum Safety Orders. In accordance with 8 CCR 6773, "Fire Protection and Fire Equipment," the California Occupational Safety and Health Administration has established minimum standards for fire suppression and emergency medical services. The standards include, but are not limited to, guidelines on the handling of highly combustible materials; fire hose sizing requirements; restrictions on the use of compressed air; access roads; and the testing, maintenance, and use of all firefighting and emergency medical equipment.

Emergency Response/Evacuation Plans. The State of California passed legislation authorizing the Office of Emergency Services to prepare a Standard Emergency Management System program, which sets forth measures by which a jurisdiction should handle emergency disasters. Noncompliance with the Standard Emergency Management System program could result in the state withholding disaster relief from the noncomplying jurisdiction in the event of an emergency disaster.

Local

Sacramento County General Plan. Applicable goals and policies from the Public Facilities Element of the *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) that address fire protection services include the following:

Fire Protection and Emergency Services

Goal: Efficient and effective fire protection and emergency response serving existing and new development.

Fire Hazards

Goal: Minimize the loss of life, injury, and property damage due to fire hazards.

Policy SA-24: The County shall require, unless it is deemed infeasible to do so, the use of both natural and mechanical vegetation control in lieu of burning or the use of chemicals in areas where hazards from natural cover must be eliminated, such as levees and vacant lots (Sacramento County 2011).

Galt General Plan. Applicable goals and policies from the Public Facilities Element of the *Galt General Plan: Policy Document* (Galt General Plan) that address fire protection services include the following:

Fire Protection and Emergency Medical Services

Policy PFS-7.1: Fire Protection. The City shall continue to support the Cosumnes Community Services District Fire Department for fire protection and emergency medical service capable of meeting the needs of the community based on the benefit received. In addition, the City shall work with the Cosumnes Community Services District regarding necessary public fire facilities, equipment, and operational costs for the provision of fire prevention, fire protection, and emergency medical services to Galt residents (Galt 2009a).

Rancho Cordova General Plan. The Safety Element of the *Rancho Cordova General Plan* (Rancho Cordova General Plan) includes policies for fire protection. The applicable policy is as follows:

Policy S.9.1: Cooperate with the Sacramento Metropolitan Fire District (SMFD) to reduce fire hazards, assist in fire suppression, and ensure efficient emergency medical response (Rancho Cordova 2006a).

12.1.1.2 Law Enforcement

Local

Sacramento County General Plan. The applicable goal from the Public Facilities Element of the Sacramento County General Plan that addresses law enforcement is shown below:

Law Enforcement

> **Goal**: Adequate Sheriff Services and Facilities for the Unincorporated Areas of Sacramento County (Sacramento County 2011).

Galt General Plan. Law enforcement is addressed in the Galt General Plan Public Facilities and Services Element. The applicable policy is as follows:

> **Policy PFS-6.2:** Police Protection. The City should continue to provide adequate police protection and law enforcement by maintaining a police department capable of meeting the needs of the community (Galt 2009a, p. PFS-8).

Rancho Cordova General Plan. The Rancho Cordova General Plan Safety Element includes policies for law enforcement. The applicable policy is as follows.

> **Policy S.8.1:** Monitor and review the level of police staffing provided in the City to ensure that sufficient staffing and resources are available to serve local needs (Rancho Cordova 2006a).

12.1.1.3 Water Supply

Federal

Safe Drinking Water Act. The Safe Drinking Water Act gives the U.S. Environmental Protection Agency (EPA) the authority to set standards for contaminants in drinking water supplies. The EPA establishes primary regulations for the control of contaminants that affected public health and secondary regulations for compounds that affect the taste, odor, and aesthetics of drinking water. Under the provisions of the Safe Drinking Water Act, the California Department of Health Services has the primary enforcement responsibility. Title 22 of the California Administrative Code establishes Department of Health Services authority, and stipulates state drinking water quality and monitoring standards.

State

California Department of Water Resources. The Department of Water Resources is responsible for the preparation of the California Water Plan, management of the State Water Project, protection and restoration of the Sacramento–San Joaquin River Delta, regulation of dams, and provision of flood protection and other functions related to surface water and groundwater resources. The California Water Plan evaluates different combinations of regional and statewide resource management strategies to reduce water demand, increase water supply, reduce flood risk, improve water quality, and enhance environmental and resource stewardship. The California Water Plan is updated every 5 years; the latest version was updated in 2013.

California Department of Public Health. Recycled water regulations are administered by both San Francisco Bay Regional Water Quality Control Board (RWQCB) and the California Department of Public Health (CDPH). The regulations governing recycled water are found in a combination of sources, including the Health and Safety Code, Water Code, and Titles 22 and 17 of the California Code of Regulations (CCR). Issues related to the treatment and distribution of recycled water are generally under the permitting authority of RWQCB, while issues related to use and quality of recycled water are the responsibility of CDPH.

Title 22 of the CCR, Division 4, Environmental Health, Chapters 1 through 3, outline California's health laws related to recycled water. The intent of these regulations is to ensure protection of public health associated with the use of recycled water. The regulations establish acceptable levels of constituents in recycled water for a range of uses and assurance of reliability in the production of recycled water. The State Water Resources Control Board (SWRCB) has jurisdiction over the distribution of recycled wastewater and the enforcement of Title 22 regulations. Chapter 3, Article 3, of Title 22 indicates that disinfected tertiary-recycled water can be used for surface irrigation of food crops (including edible root crops, where the recycled water comes into contact with the edible portion of the crop), parks and playgrounds, school yards, residential landscaping, and unrestricted-access golf courses. Orchards and vineyards where the recycled water does not come into contact with the edible portion of the crop must be treated at least to un-disinfected secondary level for surface irrigation (CCR Section 60304).

State Water Resources Control Board. The SWRCB administers state water rights and water quality functions. The SWRCB and its nine RWQCBs administer water rights and enforce pollution control standards. The SWRCB is responsible for the granting of water rights permits and licenses through an appropriation process following public hearings and appropriate environmental review by applicants and responsible agencies. In granting water right permits and licenses, the SWRCB must consider all beneficial uses, including water for downstream human and environmental uses.

Central Valley Regional Water Quality Control Board. The Central Valley RWQCB is responsible for preparation and implementation of basin water quality plans consistent with the Clean Water Act and enforcement of those plans to ensure that local water quality is protected. The Central Valley RWQCB may become involved in water services programs as a responsible agency with respect to project impacts on downstream beneficial uses.

Local

Sacramento County General Plan. Applicable goals and policies from the Public Facilities Element of the Sacramento County General Plan that address water service include the following:

Water Facilities

Goal: Water facilities developed in an environmentally sound, economically efficient, and financially equitable manner.

Policy PF-1: New water facilities shall be planned to minimize impacts to in-stream water flow in the Sacramento and American Rivers.

Policy PF-2: Municipal and industrial development within the Urban Service Boundary but outside of existing water purveyors' service areas shall be served by either annexation to an existing public agency providing water service or by creation or extension of a benefit zone of the SCWA (Sacramento County 2011).

Galt General Plan. Water service is addressed in the Galt General Plan Public Facilities and Services Element. The applicable policy is as follows:

Water Services, Treatment, and Delivery

Policy PFS-2.9: Water services. The City shall monitor water demand growth trends to anticipate water service needs (Galt 2009a).

Rancho Cordova General Plan. The Rancho Cordova General Plan Infrastructure, Services, and Finance Element includes policies for water services, including the following:

Policy ISF.2.4: Ensure that water services and delivery systems are available in time to meet the demand created by new development, or are guaranteed to be built by bonds or securities.

Policy ISF.2.5: Ensure that water flow and pressure are provided at sufficient levels to meet domestic, commercial, industrial, and firefighting needs (Rancho Cordova 2006a).

12.1.1.4 Wastewater

Federal

Clean Water Act. The federal Clean Water Act (CWA) prohibits the discharge of pollutants to navigable waters from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Discharge of treated wastewater to surface water of the United States, including wetlands, requires an NPDES permit. In California, the RWQCBs administer the issuance of these federal permits. Obtaining an NPDES permit requires preparation of detailed information, including characterization of wastewater sources, treatment processes, and effluent quality.

State

Porter–Cologne Water Quality Control Act. The Porter–Cologne Water Quality Control Act requires the SWRCB to adopt water quality control plans and set waste discharge requirements for discharges into surface and groundwater. The Central Valley RWQCB is responsible for administering and enforcing waste discharge requirements, permits, and water quality control plans.

Local

~~**Sacramento Regional Wastewater Treatment Plant Master Plan 2020.** The *Sacramento Regional Wastewater Treatment Plant Master Plan 2020* (2020 SRWTP Master Plan; Regional San 2008) identifies wastewater treatment facility needs for a 20-year planning period through the year 2020. The 2020 SRWTP Master Plan provides a phased program of recommended facilities to accommodate planned growth while at the same time maintaining treatment reliability, meeting future regulatory requirements, and optimizing costs. To meet this goal, the 2020 SRWTP Master Plan integrates overall strategies for wastewater treatment, effluent management, and biosolids disposal into an effective wastewater treatment management program. The 2020 SRWTP Master Plan proposes that treatment facility expansion occur in stages or phases as the sewage generated by the population increases (Regional San 2008).~~

~~**Interceptor System Master Plan 2000.** The *Interceptor System Master Plan 2000* (Interceptor System Master Plan; Regional San 2000) identifies existing and future capacity needs in the regional interceptor system and provide a strategic approach to plan for near-term and long-term improvements needed for the regional wastewater conveyance system. The Interceptor System Master Plan updates and refines regional conveyance facilities, service area, growth projections, and the existing system's response to rainfall; provides dynamic modeling; estimates the cost of facilities; identifies right-of-way acquisition needs; and identifies near- and long-term improvements required for regional wastewater conveyance. The Interceptor~~

~~System Master Plan uses land use and population projections based on the Sacramento Area Council of Governments Blueprint criteria and the land use plans of the member jurisdictions. The Interceptor System Master Plan also provides wastewater flow estimates, information on hydraulic modeling, and interceptor design criteria, and identifies conveyance systems and policies to accommodate planned growth (Regional San 2000).~~

Sacramento Regional County Sanitation District EchoWater Project. As a result of permit requirements adopted by the Central Valley RWQCB in 2010, as amended by orders of the Central Valley RWQCB and the SWRCB in 2011, 2012, 2013, and 2014, Sacramento Regional County Sanitation District (Regional San) is required to reduce total nitrogen and ammonia levels in its effluent substantially below existing concentrations. Biological nutrient removal is in progress to meet ammonia and nitrate effluent limitations. Regional San is also required to install tertiary filtration treatment for pathogen removal. Full compliance with the adopted and amended permit is required by May 2021 for ammonia and nitrate removal and May 2023 for filtration-related requirements.

Regional San Interceptor Sequencing Study. The Interceptor Sequencing Study (ISS) was prepared to determine Regional San's long-term needs to provide sanitary sewer service to a growing Sacramento region. The ISS evaluated proposed interceptor facilities identified in Regional San's previous planning document, the *Interceptor System Master Plan 2000* (Regional San 2000), to determine if there were other alternatives including delaying, realigning, or eliminating proposed interceptors. The ISS performed the following six tasks: 1) re-evaluated planning area growth predictions; 2) identified alternative flow-generation criteria based on projected population densities and anticipated future flow per household; 3) developed additional modeling capabilities to evaluate conservative and realistic flow conditions; 4) prepared multiple interceptor sewer service alternatives; 5) evaluated recycled water alternatives, including satellite treatment and scalping facilities; 6) prepared a cost analysis for the top interceptor alternatives.

The ISS provides a high-level evaluation of interceptor alternatives and identifies interceptor alignment corridors as well as anticipated capacity needs and interceptor pipe sizes. Proposed projects will be further evaluated through Regional San's asset management program and must be approved by the Project Authorization Committee before requesting approval from the Regional San Board of Directors to begin environmental review and project implementation. The Regional San Board of Directors adopted the ISS in February 2013.

Sacramento Area Sewer District Sewer System Management Plan. The Sacramento Area Sewer District (SASD) Sewer System Management Plan is a system-wide living management plan for the operation, maintenance, expansion, repair, and replacement of SASD's sewer collection system. The intent of this document is to be a day-to-day working management plan that also

meets the requirements of the Statewide General Waste Discharge Requirements Water Quality Order No. 2006-0003 approved on May 2, 2006, D: Provisions, no. 13 (D13).

Sacramento Area Sewer District Sewer System Capacity Plan 2010 Update. This is a high-level planning and dynamic sewer capacity plan that addresses existing, mid-range, and buildout sewer capacity needs. Existing capacity needs are based on SASD's current sewer system conditions. The mid-range capacity needs are based on plans to provide sewer service to SASD's service area within the next 10 years. The buildout capacity needs are based on providing sewer service to the entire SASD service area, which corresponds to Sacramento County's Urban Service Boundary (USB) with the exception of the areas served by the City of Sacramento, the City of Folsom, and the Rancho Murieta Community Services District.

Sacramento County General Plan. Applicable goals and policies from the Public Facilities Element of the Sacramento County General Plan that address wastewater are as follows:

Wastewater Collection and Treatment

Goal: Treatment plant, regional interceptors and trunk system expansion completed prior to construction in urban expansion areas and/or flows reaching critical capacity limits.

Policy PF-9: Design trunk and interceptor systems to accommodate flows generated by full urban development at urban densities within the ultimate service area. System design may take into consideration land that cannot be developed for urban uses due to long-term circumstances including but not limited to conservation easements, floodplains, public recreation areas etc. This could include phased construction where deferred capital costs are appropriate.

Goal: Establish limits on extension of public sewer service in the unincorporated area to ensure long-term availability of conveyance and treatment capacity, cost-effective use of revenues and support open space preservation objectives (Sacramento County 2011).

Galt General Plan. Sewer services are addressed in the Galt General Plan Public Facilities and Services Element. Applicable goals and policies are as follows:

Wastewater Collection, Treatment, Disposal, and Reuse

Policy PFS-3.7: Compliance with the Clean Water Act. The City shall comply with the requirements of the Clean Water Act with the intent of minimizing the discharge of pollutants to surface waters.

Policy PFS-3.9: Expand use of Reclaimed Water. The City shall encourage the use of tertiary treated wastewater for irrigation of agricultural lands, large landscaped areas,

and recreation/open space areas within close proximity to the City's WWTP to help ensure ongoing compliance with RWQCB requirements (Galt 2009a).

Rancho Cordova General Plan. The Rancho Cordova General Plan Infrastructure, Services, and Finance Element applicable policy for sewer services is as follows:

> **Policy ISF.2.4:** Ensure that sewage conveyance and treatment capacity are available in time to meet the demand created by new development, or are guaranteed to be built by bonds or other sureties (Galt 2009a).

12.1.1.5 Solid Waste

Federal

Resource Conservation and Recovery Act. The Resource Conservation and Recovery Act (RCRA) was enacted to protect human health and the environment from potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. Under RCRA, the EPA has the authority to control hazardous wastes from "cradle to grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous wastes. RCRA also sets a framework for the management of nonhazardous solid wastes. RCRA enables the EPA to address underground storage tanks storing petroleum and other hazardous substances. RCRA authorizes states to develop and enforce their own waste management programs; the state programs must be approved and authorized by the EPA.

State

California Integrated Waste Management Act. The California Integrated Waste Management Act mandates a focus on the conservation of natural resources. Cities and counties are required to create comprehensive source reduction, recycling, and composting programs. The goal of these programs is to reduce the amount of waste sent to landfills by 50%. The act also requires counties to prepare an Integrated Waste Management Plan. The California Integrated Waste Management Act shifts the emphasis from landfill disposal toward waste reduction, recycling, and composting whenever possible. This approach conserves natural resources, saves energy, decreases pollution, and provides new jobs in the waste industry.

The California Integrated Waste Management Act established the following priorities for waste management: waste reduction, recycling and composting, controlled combustion of waste to generate electricity, and landfilling.

Public Resources Code Division 30/California Code of Regulations Title 14. These regulations establish minimum standards for solid waste handling and disposal, and clarify local responsibilities for enforcement of these standards. Local enforcement agencies have the primary responsibility for ensuring the correct operation and closure of solid waste facilities in the state. They also have responsibilities for guaranteeing the proper storage and transportation of solid wastes. The Sacramento County Environmental Management Department is authorized as the local enforcement agency under Division 30 of the Public Resources Code and Title 14 of the California Code of Regulations.

Local

Sacramento County General Plan. Applicable goals and policies from the Public Facilities Element of the Sacramento County General Plan that address solid waste are as follows:

Solid Waste Services and Facilities

Goal: Land use compatibility with all solid waste facilities.

> **Policy PF-21:** Property buffering the County landfill shall remain in agricultural, recreational or other open space uses and extend at least 2,000 feet in all directions, measured from the landfill's permitted boundary, unless the Department of Waste Management and Recycling determines that the use is compatible with landfill operations and the Board of Supervisors makes the finding that the uses are compatible with the existing or future operations of the landfill (Sacramento County 2011).

Galt General Plan. Solid waste is addressed in the Galt General Plan Public Facilities and Services Element. The applicable policy is as follows.

Solid Waste Collection and Disposal

> **Policy PFS-5.3:** Solid Waste Facilities. The City shall require that all solid waste facilities be located in areas free of incompatible land uses and prohibit future incompatible land uses on surrounding lands (Galt 2009a).

Rancho Cordova General Plan. The policy in the Rancho Cordova General Plan Natural Resources Element applicable to solid waste is as follows.

> **Policy NR.8.1:** Support recycling efforts by developing a set of programs to educate residents on recycling and provide recycling services (Rancho Cordova 2006a).

12.1.1.6 Parks and Recreation

State

Quimby Act. The Quimby Act states that the legislative body of a city or county may, by ordinance, require the dedication of land or impose a requirement of the payment of fees in lieu thereof, or a combination of both, for park or recreational purposes as a condition to the approval of a tentative or parcel map. The Quimby Act only applies to the acquisition of new parkland and does not apply to the physical development of new park facilities or associated operations and maintenance costs. The Quimby Act effectively preserves open space needed to develop parkland and recreational facilities; however, the designation of parks and other recreational facilities is subject to discretionary approval and is evaluated on a case-by-case basis with new residential development. The Quimby Act also finds that a minimum of 3 acres, up to a maximum of 5 acres, of park area is required per 1,000 persons.

Local

Sacramento County General Plan. Applicable goals and policies from the Public Facilities Element of the Sacramento County General Plan that address parks and recreation are as follows:

Local and Regional Park Acquisition, Development, and Maintenance

Goal: Adequate and well-funded local and regional park facilities serving existing and newly developing neighborhoods.

Policy PF-122: To help assure that local recreation and park district Master Plan standards for levels of service may be achieved and maintained, the County may require new development to dedicate land, pay in-lieu fees, development impact fees, or otherwise contribute a fair share to the acquisition and development of parks and recreation facilities. For development in infill areas where land dedication may not be practical, the County in cooperation with the affected park district may explore creative alternatives for providing park and recreation facilities.

Policy PF-123: At a minimum, new residential developments approved by the County shall provide sites for local parks for their prospective residents consistent with the Quimby Act and the land dedication standards for each local recreation and park district adopted by Sacramento County in Chapter 22.40 of the Sacramento County Code. These requirements may be satisfied by land dedication, payment of fees in lieu of dedication, or on-site improvements per the provisions of Chapter 22.40, which will be regularly updated to reflect changing demography. These include the baseline standard of three

acres of land for parks per 1,000 residents or in cases where existing parklands within a park district exceed three acres per 1,000 population, that higher ratio shall be the standard for new developments up to a maximum of five acres of land for parks per 1,000 residents based on calculations specified in SCC Chapter 22.40.

Policy PF-124: Consistent with its infill development standards and mixed use Commercial Corridor plans, the County in consultation with the local recreation and park districts shall encourage new infill and Corridor development projects to provide small plazas, pocket parks, civic spaces, and other gathering places that are available to the public to help encourage pedestrian activity, meet recreational needs and service standards consistent with Smart Growth principles.

Policy PF-125: The County shall promote the provision of on-site recreational amenities and gathering places that are available to the public by large scale development projects and may consider providing incentives such as density bonuses or increases in building coverage for that purpose.

Policy PF-126: Encourage local park districts to develop user fee supporting recreation programs for those activities that go beyond providing for basic recreation needs. Examples include sports leagues, tennis and other court complexes, leisure enrichment classes for all ages, aquatic centers and splash parks, and community centers.

Policy PF-127: Require new residential developments to participate in park O & M financing mechanisms where established by local park districts or the County.

Policy PF-128: Encourage park development adjacent to school sites and the formation of joint use agreements between school and park districts.

Policy PF-129: In cooperation with local park districts and County Regional Parks, the County shall assist in establishing permanent financing systems for the purpose of supporting an adequate level of park services and maintenance (Sacramento County 2011).

Sacramento County Pedestrian Master Plan. The Sacramento County Pedestrian Master Plan (SACDOT 2007) was conceived to improve pedestrian safety and access on public streets within the unincorporated portions of Sacramento County. The goal is to optimize the pedestrian experience, to provide safe and usable pedestrian facilities for all pedestrians, and to assure compliance with all federal, state, and local regulations and standards. The Pedestrian Master Plan identifies a number of pedestrian projects within the Planning Area, including sidewalks/ asphalt walkways along Dillard Road, Twin Cities Road, and Latrobe Road. The Pedestrian Master Plan focuses only on public streets and not on off-road trails.

Galt General Plan. Parks and recreation are addressed in the Galt General Plan Public Facilities and Services Element. Applicable goals and policies are as follows:

Parks and Recreational Open Space

Policy PFS-8.1: Parks/Resident Ratio. The City shall require new development to provide for park acreages at a minimum of 5 acres/1,000 acres and make land acquisition for parks and open space a recreation priority.

Policy PFS-8.11: Park Linkages. The City shall encourage pedestrian and bicycle trail linkages between parks, open space areas, wildlife habitat, and significant community activity centers.

Policy PFS-8.12: Natural Resource Protection in Park and Open Space Design. The City shall incorporate natural resource protection, wildlife habitat, and stormwater quality techniques into parks and open space design to encourage sustainability (Galt 2009a).

Rancho Cordova General Plan. The Rancho Cordova General Plan Open Space, Parks, and Trails Element includes policies for parks and recreation. Applicable goals and policies are as follows:

Goal OSPT.3: Create a system of pedestrian and bicycle trails that maximize usage while providing places for walking and bicycling without conflicts with motor vehicles.

Policy OSPT.2.3: Maximize the potential benefits of natural resource mitigation lands within urban development.

Policy OSPT.3.1: Develop a trails system that provides for maximum connectivity, so that all trails are linked for greater use as recreational and travel routes (Rancho Cordova 2006a).

12.1.1.7 Energy

Local

Sacramento County General Plan. Applicable objectives and policies from the Public Facilities Element of the Sacramento County General Plan that address energy are as follows:

General Energy Facility Policy

Objective: Minimize the health, safety, aesthetic, cultural, agricultural and biological impacts of energy facilities in Sacramento County.

Policy PF-69: Cooperate with the serving utility to minimize the potential adverse impacts of energy production and distribution facilities to environmentally sensitive areas by, when possible, avoiding siting in the following areas:

- Wetlands.
- Permanent marshes.
- Riparian habitat.
- Vernal pools.
- Oak woodlands.
- Historic and/or archaeological sites and/or districts

Electric Distribution Policy

Objective: Ensure the provision or safe, reliable, efficient and economical electric service while minimizing potential land use conflicts, and health, safety, environmental, and aesthetic impacts of transmission facilities.

Policy PF-83. New transmission corridors should be identified in all master plans created for new growth areas.

Policy PF-84. New transmission lines constructed within existing and planned urban areas should utilize existing transmission corridors whenever practical. Secondary preferred locations are adjacent to railway and freeway corridors when feasible.

Policy PF-85. To minimize visual impacts and protect the county's visual and aesthetic resources new bulk substations should be located in industrial and non-retail commercial areas when possible. To further minimize visual intrusion and potential land use conflicts, substations shall be enclosed with site-appropriate security fence in concert with a landscaped setback along all public street frontages.

Policy PF-89. Wherever feasible, utilize existing transmission poles to accommodate new overhead transmission lines. If practical, existing and future transmission corridors should be shared by more than one utility company subject to the Northern California Joint Pole Agreement.

Policy PF-90. Transmission rights-of-way should avoid bisecting parcels wherever possible.

Policy PF-91. Careful consideration shall be taken when transmission lines cross farmland. The crossing of prime or statewide importance farmland with

transmission lines should be avoided whenever possible. In those cases when crossing farmland in these categories is unavoidable, the County should recommend routing of the lines along the periphery of the site as the preferred alternative.

Policy PF-92. Transmission lines should avoid to the greatest extent possible, cultural resources and biological resources such as wetlands, permanent marshes, riparian habitats, vernal pools, and oak woodlands. When routed through such areas, transmission lines should have maximum line spans and cross at the narrowest points which involve minimal cutting and cropping of vegetation, maintaining the drainage regime of wetland basins. Additionally, when feasible, such routes should be maintained to serve as biological dispersion corridors between areas of high biodiversity.

Policy PF-95. Transmission lines should avoid paralleling recreation areas, historic areas, rural scenic highways, landscaped corridors, drainage basins, wetland mitigation, tree planting, and designated federal or state wild and scenic river systems, although these areas may be considered as options if facilities already exist there.

Policy PF-101. Route new overhead sub-transmission lines within existing transmission line corridors, along railroad tracks, or major roadways. In an effort to reduce the visual impact of new lines combine circuits on existing 69 kV power poles, wherever feasible.

Natural Gas Production and Distribution Facility Policy

Objective: Distribute natural gas safely and efficiently, and withdraw underground gas reserves in an environmentally sensitive manner.

Policy PF-113. Route new high pressure gas mains within railway and electric transmission corridors, along collector roads, and wherever possible, within existing easements. If not feasible these gas mains shall be placed as close to the easement as possible.

Coordination With Energy Providers

Objective: Well-planned and timely siting of efficiently operating energy delivery facilities.

Policy PF-117. All Community Plans shall include an Energy Facility Siting Element which indicates the location of existing and planned energy facilities. Community Plan Siting Elements and SMUD's Electric Study Plans for the corresponding area shall be consistent.

Policy PF-118. All tentative subdivision maps should identify the location of all utility easements sufficient to accommodate existing and future needs as determined by SMUD and PG&E (Sacramento County 2011).

Galt General Plan. Gas and electric services are addressed in the Galt General Plan Public Facilities and Services Element. The applicable policy is as follows:

> **Policy PFS-11.4:** Coordination with Utility Providers. The City should coordinate with gas and electricity service providers to locate and design gas and electric systems to minimize environmental and other impacts to existing and future residents (Galt 2009a).

Rancho Cordova General Plan. The Rancho Cordova General Plan Infrastructure, Services, and Finance Element includes no applicable goals or objectives.

12.1.1.8 Mosquito Abatement

Federal

Mosquito Abatement for Safety and Health Act. The Mosquito Abatement for Safety and Health Act authorizes grants through the Centers for Disease Control and Prevention for mosquito programs to prevent mosquito-borne diseases. It also requires the National Institute of Environmental Health Sciences to conduct or support research into methods for controlling the populations of insects and vermin that transmit deadly diseases to humans.

State

Mosquito Abatement and Vector Control District Law Act (California Health and Safety Code, Section 2000–2007). The Mosquito Abatement and Vector Control District Law Act was adopted to help protect people from health risks associated with mosquitos. The act provides the basis for creating Mosquito Abatement Districts throughout the state, including the Sacramento–Yolo Mosquito and Vector Control District that covers the Planning Area.

California Mosquito-Borne Virus Surveillance and Response Plan. This plan describes an enhanced surveillance and response program for mosquito-borne viruses in the State of California. Implementation obligations are shared across the California Department of Public Health, the Mosquito and Vector Control Association of California, and the University of California at Davis.

Local

Sacramento County General Plan. The applicable policy from the Conservation Element of the Sacramento County General Plan that addresses mosquito abatement is as follows:

> **Policy CO-71:** Development design shall help protect natural resources by:
>
> - Minimizing total built development in the floodplain, while designing areas of less frequent use that can support inundation to be permitted in the floodplain,

- Ensuring development adjacent to stream corridors and vernal pools provide, where physically reasonable, a public street paralleling at least one side of the corridor with vertical curbs, gutters, foot path, street lighting, and post and cable barriers to prevent vehicular entry.
- Projects adjacent to rivers and streams shall integrate amenities, such as trail connectivity, that will serve as benefits to the community and ecological function.
- Siting of wetlands near residential and commercial areas should consider appropriate measures to minimize potential for mosquito habitation.
- Development adjacent to steam corridors and vernal pools shall be designed in such a manner as to prevent unauthorized vehicular entry into protected areas (Sacramento County 2011).

Galt General Plan. The Galt General Plan does not contain any policies related to mosquito abatement.

Rancho Cordova General Plan. The Rancho Cordova General Plan Natural Resources Element includes the following policy applicable to mosquito abatement:

> **Policy NR.5.6:** Incorporate Storm Water, Urban Runoff, and Wetland Mosquito Management Guidelines and Best Management Practices into the design of water retention structures, drainage ditches, swales, and the construction of mitigated wetlands in order to reduce the potential for mosquito-borne disease transmission (Rancho Cordova 2006a).

12.1.2 Planning Area Public Services and Facilities

This section describes the existing fire and law enforcement, parks and recreational facilities, and water and wastewater infrastructure that serve the Planning Area. Solid waste disposal, energy facilities, and existing mosquito abatement activities are also described.

12.1.2.1 Fire Protection and Emergency Services

Fire protection service in the Planning Area is provided by the following independent districts: the Sacramento Metropolitan Fire District, Cosumnes Community Services District, Wilton Fire District, Herald Fire District Walnut Grove Fire Protection District, and Courtland Fire District. All fire districts provide emergency medical rescue and fire protection services. Some districts also provide advanced life support via fire department ambulances, paramedic squads, and/or by assigning firefighter/paramedics to fire engines. Most of the calls fire districts receive are for medical-related aid; a minor portion of the calls are for fire suppression (Sacramento County

2011). The California Department of Forestry and Fire Protection (CAL FIRE) provides fire protection and other emergency services for the easternmost portion of the Planning Area.

12.1.2.2 Law Enforcement

Law enforcement in the Planning Area is provided by the Sacramento County Sheriff's Department in the unincorporated areas, and within city limits, by the Galt Police Department and Rancho Cordova Police Department. In the Prairie City State Vehicular Recreation Area (described below under Parks and Recreation), California State Park Rangers who are fully sworn peace officers provide law enforcement.

12.1.2.3 Water Supply

The Sacramento County Water Agency (SCWA) is the largest water purveyor for the Planning Area. The SCWA is currently divided into eight zones. Within the Planning Area, Zones 40 and 41 overlap each other and provide water service to the portions of the Planning Area within the USB. Water for both urban land uses and non-urban demand (i.e., agriculture) is taken from surface water and local groundwater aquifers. Recycled water makes up a small percentage of the total supply within Sacramento County (Sacramento County 2010). Groundwater serving SCWA Zone 40 is provided from the Central Groundwater Basin and South Groundwater Basin. The County's Water Forum Agreement allocates a long-term supply of up to 40,900 acre-feet of groundwater per year (AFY) for Zone 40 (Sacramento County 2000). Surface water is supplied from three sources: a water rights permit issued by the SWRCB (21,700 AFY), Central Valley Project water services contracts (39,551 AFY), and wholesale water via an agreement between SCWA and Sacramento County (9,300 AFY).

SCWA has adopted a Water System Infrastructure Plan for Zone 40 (SCWA 2006), which describes the infrastructure needed to meet current and future demand as described in the Water Services Master Plan for Zone 40 (SCWA 2005). The purpose of the Water System Infrastructure Plan is to describe and quantify the facilities necessary to extract, treat, convey, and retail/wholesale groundwater; purchase wholesale water from the City of Sacramento for retail to Zone 40 customers; and treat, convey, and retail/wholesale surface water at the Vineyard Surface Water Treatment Plant (SCWA 2006). Connections between the Vineyard Surface Water Treatment Plant and customers throughout the Planning Area make up the majority of the infrastructure proposed in the infrastructure plan. Future water treatment plants, storage tanks, and pipelines are also proposed in the southeastern portion of the Planning Area (SCWA 2006).

Other water service districts located in the Planning Area include Galt and Folsom, California American Water Company, Golden State Water Company, Florin County Water District,

Fruitvale Vista Water Company, Tokay Park Water District, Omochumne–Hartnell Water District, Galt Irrigation District, Clay Water District, and Sacramento Municipal Utilities District (SMUD) Rancho Seco. These water districts and SCWA operate distribution infrastructure throughout the Planning Area. Improvements to pipelines and other underlying infrastructure are generally tied to specific development projects.

The U.S. Bureau of Reclamation operates Folsom Dam, Nimbus Dam, and the Folsom South Canal. Although the Bureau of Reclamation's original purpose was to provide for the reclamation of arid and semiarid lands in the west, its current mission covers a wider range of interrelated functions. These functions include providing municipal and industrial water supplies through the Central Valley Project: generating hydroelectric power; providing irrigation water for agriculture; improving water quality, flood control, and river navigation; providing river regulation and control and fish/wildlife enhancement; offering water-based recreation opportunities; and conducting research on a variety of water-related topics.

Regional San currently owns and operates a 5-million-gallon-per-day (mgd) water reclamation facility that has been producing Title 22 tertiary-recycled water since 2003. The water reclamation facility is located within the Sacramento Regional Wastewater Treatment Plant (SRWTP) property in Elk Grove. Regional San uses a portion of the recycled water at the SRWTP and the rest is wholesaled to the SCWA. SCWA retails the recycled water, primarily for landscape irrigation use, to select customers in Elk Grove outside the Planning Area. Regional San is not a water purveyor and any potential use of recycled water in the Planning Area must be coordinated between the key stakeholders, e.g., land use jurisdictions, water purveyors, users, and the recycled water producers.

12.1.2.4 Wastewater

The SASD and Regional San provide sewer service within the portions of unincorporated County in the USB and Rancho Cordova. Some locations within the Planning Area rely on on-site septic systems for wastewater treatment. The SASD is responsible for the construction and maintenance of sewer trunk lines, which convey wastewater to Regional San's system of interceptor lines. Regional San operates the SRWTP. ~~The SRWTP is a high-purity oxygen-activated sludge facility; it is permitted to treat an average dry weather flow of 181 million gallons per day (mgd) and a daily peak wet weather flow of 392 mgd (Sacramento County 2010). The majority of the treated wastewater is dechlorinated and discharged into the Sacramento River.~~ ~~The SRWTP is located in the westernmost portion of the Planning Area, just south of the community of Freeport.~~ **The SRWTP provides secondary treatment using an activated sludge process. The design of the SRWTP and interceptor system was balanced to have SRWTP facilities accommodate some of the wet weather flows while minimizing idle SRWTP facilities during dry weather. Regional San designed the SRWTP to accommodate**

some wet weather flows with the storage basins and interceptors designed to accommodate the remaining wet weather flows. The SRWTP is located in the westernmost portion of the Planning Area, just south of the community of Freeport. The Central Valley RWQCB issued an NPDES permit to Regional San in December 2010. In adopting the new discharge permit, the RWQCB required Regional San to meet significantly more restrictive treatment levels over its current levels. Regional San began the necessary activities, studies, and projects to meet the permit conditions in August of 2014. Regional San must complete construction of the new treatment facilities to achieve the permit and settlement requirements by May 2021 for ammonia and nitrate and May 2023 to meet these pathogen requirements. The main SASD collection system includes over 2,800 miles of sewer pipelines ranging in size from 4 to 75 inches in diameter. Regional San interceptors are a large system of pipes up to 10 feet in diameter, which carry wastewater directly to the SRWTP (Sacramento County 2010).

~~Regional San adopted the 2020 SRWTP Master Plan to identify wastewater treatment and facility needs. The Master Plan identifies treatment facilities, conveyance, and storage facilities necessary to serve anticipated population growth within the Sacramento metropolitan area and meet regulatory requirements related to discharge quality (Regional San 2008).~~ Regional San has also adopted the Interceptor Master Plan 2000, which specifies regional conveyance facility improvements (Regional San 2000) **that were further investigated in the Regional San ISS adopted in 2013**.

~~In October 2008, SASD adopted the Sewerage Facilities Expansion Master Plan Update (SASD 2008), which operates as a companion document to the SASD's Sewerage Facilities Expansion Master Plan (SASD 2004).~~ **The *2010 SASD System Capacity Plan Update* (SASD 2010) also contains** ~~I~~**i**mprovements ~~are proposed in these documents~~ to meet the demand of development anticipated within the USB (Sacramento County 2011).

The Galt Public Works Department operates Galt's sanitary sewer collection system and the wastewater treatment plant (WWTP). Galt's collection system consists of collection lines and trunk lines ranging in size from 4 to 24 inches in diameter. Sewage is lifted by sanitary sewer lift stations and placed in a 2-mile-long, 16-inch-diameter force main where it is transported to Galt's WWTP, located north of the City (Galt 2008). The WWTP has a design capacity of 3.0 mgd; however, the location and design of the plant would allow expansion to 6.0 mgd (Galt 2008). Treated water is discharged to Laguna Creek during the winter and to ponds used to irrigate land surrounding the WWTP during the summer.

Improvements to the sewer collection and treatment system are presented in Galt's Adopted Capital Improvement Program 2010–2015 (Galt 2010). These improvements include regular collection infrastructure replacement and upgrades to the City's WWTP. Galt requires new

development projects to include constructing the sanitary sewer collection system associated with the projects.

12.1.2.5 Solid Waste

The Sacramento County Department of Waste Management and Recycling provides solid waste services to the unincorporated portions of Sacramento County. The County owns and operates the 1,084-acre Kiefer Landfill, which is located in the northern portion of the Planning Area, north of the community of Sloughhouse (Sacramento County 2015). Kiefer Landfill is classified as a Class III municipal solid waste landfill facility and is permitted to accept general residential, commercial, and industrial refuse for disposal, including municipal solid waste, construction and demolition debris, green materials, agricultural debris, dead animals, and other designated debris (Sacramento County 2010). The Sacramento Regional Solid Waste Authority has certified three construction and demolition debris sorting facilities to meet the construction waste diversion rates required under the California Green Building Code: Florin-Perkins Public Disposal, L&D Landfill, and Sierra Waste (Sacramento Regional Solid Waste Authority 2015). Rancho Cordova also disposes of municipal solid waste at Kiefer Landfill.

Residential and commercial solid waste in Galt is collected by California Waste Recovery Systems and delivered to the Materials Recovery Facility in Galt to capture recyclable material. All material that is not recyclable is disposed of at a number of different landfills, including Arvin Sanitary Landfill (Kern County); Foothill Sanitary Landfill, Forward Landfill Inc., and North County Landfill (all in San Joaquin County); and L&D Landfill and Kiefer Landfill (both in Sacramento County).

12.1.2.6 Parks and Recreational Facilities

In the Planning Area, recreation services are provided by a mix of park districts, Sacramento County service areas, the County's regional park system, and the California Department of Parks and Recreation. Services within Galt are provided by Galt's Parks and Recreation Department. County Service Areas 4B (Wilton–Cosumnes) and 4D (Galt–Herald) provide park and recreation services in the eastern section of the Planning Area. The Cordova and Southgate Recreation and Park Districts provide service in the northern section of the Planning Area. County Service Area 4C (Delta) provides facilities and service in the southwestern portion of the Planning Area.

State and Regional Parks

Figure 12-1 indicates the location of the larger parks, recreation areas, and public golf courses within the Planning Area. The characteristics of these facilities are summarized in Table 12-1.

Table 12-1. Existing Regional Parks and Recreational Facilities

Facility Name	Acreage	Inside or Outside the UDA?	Owners/Managers	Activities
Cosumnes River Preserve[a]	±50,000	Outside	The Nature Conservancy, BLM, CDFW, Sacramento County, DWR, Ducks Unlimited, CSLC	Habitat preservation, agriculture, recreation, limited hunting and fishing
Deer Creek Hills[a]	±4,060	Outside	Sacramento Valley Conservancy, Sacramento County, CDFW, DPR	Habitat preservation, cattle grazing, recreation
Mather Regional Park	±1,600	Inside	Sacramento County	Vernal pool habitat, recreation
McFarland Ranch	±35	Outside	Sacramento County, Galt Area Historical Society	Recreation, education
Prairie City State Vehicular Recreation Area	±836	Outside	DPR Off-Highway Motor Vehicular Recreation Division	Recreation (off-highway vehicle use)
Rancho Seco Recreational Area[a]	±400	Outside	SMUD	Recreation
Stone Lakes National Wildlife Refuge[a,c]	±18,000	Outside	Sacramento County, USFWS	Habitat preservation, limited wildlife viewing
Mather Golf Course	±212	Inside	Sacramento County	Golf course
Cordova Golf Course	±81	Inside	Cordova Recreation and Park District	Golf course
Bradshaw Ranch Golf Course	±20	Inside	Privately owned	Golf course
Bartley Cavanaugh Golf Course	±95	Outside	Privately owned	Golf course
Dry Creek Ranch Golf Course	±5.5[b]	Outside	Privately owned	Golf course

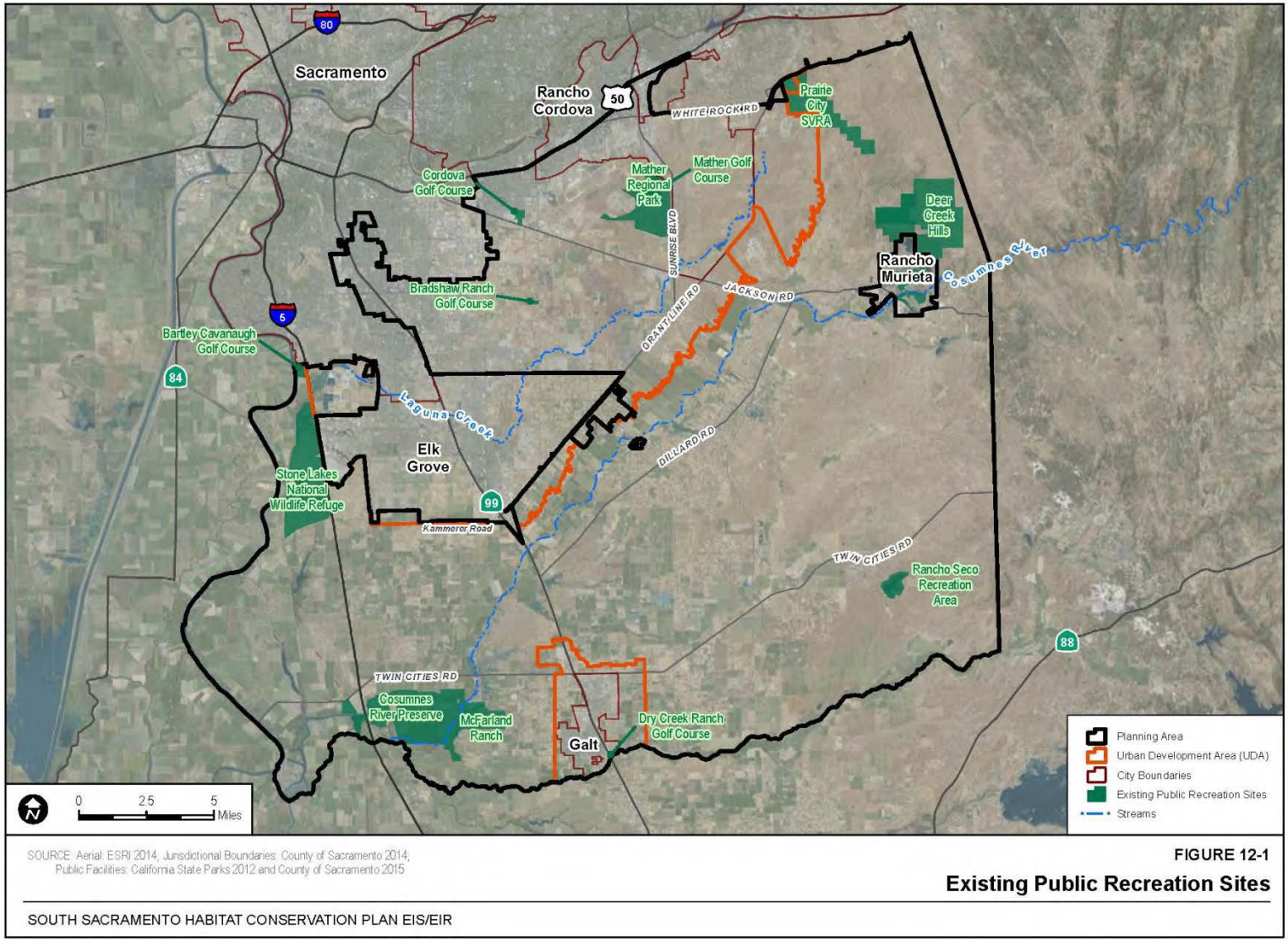
UDA = Urban Development Area; BLM = Bureau of Land Management; CDFW = California Department of Fish and Wildlife; DWR = California Department of Water Resources; CSLC = California State Lands Commission; DPR = California Department of Parks and Recreation; SMUD = Sacramento Metropolitan Utilities District; USFWS – U.S. Fish and Wildlife Service.

[a] Facilities that are considered part of the existing Preserve System.

[b] Acreage within the Planning Area (remaining acreage is outside the Planning Area).

[c] **Stone Lakes National Wildlife Refuge has an approved boundary of approximately 18,000 acres within the Planning Area. At the time of EIS/EIR preparation, approximately 6,420 acres within that boundary have been acquired for the National Wildlife Refuge.**

Figure 12-1 Existing Public Recreation Sites



INTENTIONALLY LEFT BLANK

Cosumnes River Preserve. This more than 50,000-acre preserve is centered on the Cosumnes River outside the USB. The property consists of wildlife habitat and agricultural lands owned by The Nature Conservancy, Bureau of Land Management, California Department of Fish and Wildlife, the County, California Department of Water Resources, Ducks Unlimited, and the California State Lands Commission (Cosumnes River Preserve 2015). The Cosumnes River Preserve allows hiking, kayaking, hunting, and fishing.

Deer Creek Hills. This oak woodlands preserve area is located outside the USB, north of Rancho Murieta. The 4,062-acre preserve is owned by the Sacramento Valley Conservancy, the County, California Department of Fish and Wildlife, and the California Department of Parks and Recreation. Preserve uses include habitat preservation, cattle grazing, and public use including hiking and mountain biking (Sacramento County and Sacramento Valley Conservancy 2011).

Mather Regional Park. This regional park, located within the USB and owned by Sacramento County, consists of approximately 1,600 acres. The park contains recreational uses, including picnic areas and trails, and also provides vernal pool habitat. The park is adjacent to the 169-acre Mather Golf Course.

McFarland Ranch. This historical "living history" ranch is owned by the County and managed by the Galt Area Historical Society. The park contains the former home of John McFarland, a prominent rancher who gave Galt its name, as well as the surrounding 35 acres of land. The ranch currently serves to educate regional schools and families about pioneer life at the turn of the century (Galt Area Historical Society 2015).

Prairie City State Vehicular Recreation Area. The 836-acre state facility is located outside the USB, but within the Planning Area. This state recreation area allows the use of off-highway vehicles and other passive recreational resources (DPR 2015).

Rancho Seco Recreational Area. This 400-acre recreational area surrounding Rancho Seco Lake is owned by SMUD and is open to the public for recreational activities, including camping and hiking (SMUD 2015a).

Stone Lakes National Wildlife Refuge. The purpose of this 18,000-acre refuge, owned and operated by the U.S. Fish and Wildlife Service, is to preserve and protect two rare natural Central Valley lakes and their surrounding riparian habitat and grassland areas. The property lies within the Sacramento–San Joaquin Delta as well as within the Pacific Flyway, thereby providing wintering grounds for a variety of waterfowl and other migratory birds, as well as habitat for indigenous species such as Swainson's hawk (*Buteo swainsoni*), giant garter snake (*Thamnophis gigas*), and the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). The

property also contains a number of cultural resource sites. Stone Lakes National Wildlife Refuge also provides recreational trails and guided hiking and kayaking tours.

Local Parks

Numerous neighborhood and community parks exist within the Planning Area, primarily within developed residential communities. These facilities are operated by the park districts and County service areas described previously.

Golf Courses

There are numerous golf courses within the Planning Area. A description of these recreational amenities is provided below.

Mather Golf Course. This County-owned 212-acre golf course is located adjacent to Mather Regional Park, inside the USB. Like Mather Regional Park, Mather Golf Course is located on the former Mather Air Force Base. Mather Golf Course was one of the first golf courses in California to become fully designated as a Certified Audubon Cooperative Sanctuary.

Bradshaw Ranch Golf Course. This 20-acre golf course is located south of Jackson Highway and north of Gerber Road within the Planning Area. This golf course is privately owned and operated.

Bartley Cavanaugh Golf Course. This 95-acre golf course is located in the community of Freeport, west of Interstate 5, within the Planning Area. This golf course is privately owned and managed.

Dry Creek Ranch Golf Course. Located in Galt, a portion of this golf course is located just south of the Planning Area. The course is privately owned and operated.

12.1.2.7 Energy

SMUD and Pacific Gas & Electric Company (PG&E) provide electricity services to the Planning Area. SMUD serves a population of 1.4 million users in a 900-square-mile service area. SMUD derives its power from a variety of sources, including biomass, geothermal, solar, wind, hydroelectric, and natural gas (SMUD 2014). SMUD operates the gas-powered Cosumnes Power Plant and the Upper American River Project (SMUD 2015b). In 2013, SMUD generated 10,467 gigawatt-hours of electricity (CEC 2015).

PG&E's power is generated in fossil-fueled plants, hydroelectric powerhouses, geothermal generators, solar energy facilities, and a nuclear power plant.[1] PG&E also buys power from

[1] PG&E's Diablo Canyon Power Plant is planned for closure in 2026.

independent power producers and other utilities. According to its website, PG&E provides service to approximately 5.4 million customers in Northern and Central California and has approximately 18,616 miles of interconnected transmission lines and 141,215 miles of distribution lines (PG&E 2016). PG&E's services are provided in accordance with California Public Utilities Commission rules and regulations. PG&E also supplies natural gas to homes and businesses in the Planning Area.

Kiefer Landfill operates a gas-to-energy plant (which collects gas from decaying garbage and converts it into energy) that powers 8,900 homes in the Sacramento area (Sacramento County 2015).

SMUD and PG&E operate a variety of existing energy facilities within the Urban Development Area (UDA).[2] Expansions to infrastructure and/or construction of new facilities are generally tied to new development.

12.1.2.8 Mosquito Abatement

The Sacramento–Yolo Mosquito and Vector Control District (District) provides mosquito and other vector surveillance and control services in compliance with the state's Mosquito Abatement and Vector Control District Law Act (California Health and Safety Code, Sections 2000–2007). Recognizing that organisms such as mosquitos can serve as vectors of human disease pathogens, the District acts to minimize public health risks by controlling vector populations in Sacramento and Yolo Counties.

Mosquito and vector control is based on an integrated pest management approach, including public information and education, surveillance, biological control, physical control, and microbial and chemical control. Biological control consists of the use of living organisms to reduce pest population levels. Biological control efforts use predators (like mosquitofish (*Gambusia affinis*) or guppy (*Poecilia reticulata*)), parasites, or pathogens to attack the harmful vector. Physical control measures reduce environmental conditions that support vectors, such as standing water, wetlands/irrigated farmland, and contained areas of water. Examples of physical control practices include promoting effective drainage; controlling emergent vegetation; promoting the appropriate timing of irrigation; and encouraging mosquito-reduction best management practices (BMPs) in urban, agricultural, and conservation areas

[2] As discussed in Section 1.1.1, Geographic Scope of the EIS/EIR Planning Area, the term Urban Development Area is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, the term "UDA" means all lands within the County's USB that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within the City of Galt's sphere of influence (see Figure 1-1).

(Sacramento–Yolo Mosquito and Vector Control District 2013). The Ecological Management Department of the District has developed a BMP manual for land-use-specific mosquito reduction activities (Sacramento–Yolo Mosquito and Vector Control District 2008). Microbial and chemical control methods use chemical compounds such as insecticides to reduce mosquito populations. Microbial/chemical control methods are typically applied when other methods have been unsuccessful or when rapid disruption of disease spread is needed (Sacramento–Yolo Mosquito and Vector Control District 2013).

The District makes inspections and responds to customer requests for service. Surveillance research provides information on mosquito and vector dynamics in Sacramento and Yolo Counties to guide effective control practices. The District also conducts regular educational outreach (Sacramento–Yolo Mosquito and Vector Control District 2013).

12.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

12.2.1 Methodology for Assessing Impacts of Each Alternative on Public Services and Facilities

Impacts on public services and facilities were assessed on the basis of the alternatives, and the existing services or facilities provided within the Planning Area. Impacts are identified where the actions or projects associated with the alternative would affect the ability of the service providers to provide necessary services now as well as in the future. As described in Section 3.6.1, EIS/EIR Environmental Baseline, impacts of the No Action/No Project Alternative were determined using a baseline of existing conditions. The impacts of the two Action Alternatives were evaluated using a baseline of the No Action/No Project future condition. Potential ways that alternatives could affect the ability of service providers would be by increasing service demand, encouraging growth in areas where services are not available to accommodate that growth, impeding the ability of service providers to deliver services, impeding development of planned expansion areas, or damaging existing or planned infrastructure. The projects and activities expected under each alternative, including establishment of preserves, are described in Chapter 2, Alternatives, Including the Proposed Action/Proposed Project Alternative.

The locations of future preserves, vernal pools, and wetland waters could require developers to adjust the routes of future public infrastructure within the Mather Core Recovery Area (MCRA). To identify areas where these adjustments might be required, the lead agencies used GIS methodology, described in Section 3.6.5, GIS Methodology Used in Chapters 4–16 to Estimate Direct Impacts of Each EIS/EIR Alternative, to identify where infrastructure related to water

supply, sewer services, and landfill space expected under each alternative could intersect with future preserve locations, vernal pools, or wetlands.

To identify potential impacts of the No Action/No Project Alternative on mosquito abatement programs, for each alternative the lead agencies quantified the acres of vernal pools and other aquatic land cover types that would be protected within preserves or re-established/ established for compensatory mitigation. The lead agencies assumed that mosquito abatement activities would be limited within these protected resources, so that application of pesticides or introduction of predatory species such as mosquitofish would not be allowed.

As discussed in Section 3.7, Cumulative Effects Analysis in Resource Chapters 4 through 16, the Chapter 12 cumulative analyses of impacts to public services and facilities will consider (1) the effects of past and present urban development in the Planning Area (see Section 12.1.2, Planning Area Public Services and Facilities), and (2) future impacts expected from reasonably foreseeable other projects in the Planning Area (see Section 3.7). The cumulative analysis of each EIS/EIR alternative will then consider whether the incremental impacts of the alternative on public services and facilities would be significant (i.e., cumulatively considerable).

As discussed in Section 3.4, Previous Planning Area Environmental Reviews, the EIR documents previously prepared for the General Plans of Sacramento County and Galt and Rancho Cordova (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006b) analyzed direct and cumulative impacts of urban growth planned within their jurisdictions, including impacts to public services and facilities. When the impact analysis or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief summary or description of the incorporated information or analysis is provided in Sections 12.2.2, 12.2.3, and 12.2.4.

However, as discussed in Section 3.4, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2008; Rancho Cordova 2006b) and 2050 (Sacramento County 2010)—and the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3, EIS/EIR Study Period). As discussed in Section 3.4, the EIRs for the Rancho Cordova General Plan and Galt General Plan analyzed full buildout of those jurisdictions. However, additional urban development can be expected to occur in Sacramento County during the 35 years after the General Plan EIR study period ended, and before this EIS/EIR's study period ends in 2065. Consequently, the impact analyses and conclusions incorporated from the *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR) may not have considered all of the future urban development that is included in the Chapter 2 project description of each EIS/EIR alternative. Therefore, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the three General Plan EIRs along

with the effects of all urban development activities and projects that are included in the description of each EIS/EIR alternative.

The lead agencies determined that the study area for determining the cumulative impacts of each alternative on public services and utilities varies depending on the service.

The cumulative study area for each resource area topic is defined below.

- **Fire Protection.** Cumulative study area is the Planning Area, which includes combined service areas for the Sacramento Metropolitan Fire District, Cosumnes Community Services District, Wilton Fire District, Herald Fire District, Walnut Grove Fire Protection District, Courtland Fire District, and CAL FIRE.
- **Law Enforcement.** Cumulative study area is the Planning Area, which includes areas under the jurisdiction of the Sacramento County Sheriff Department, Galt Police Department, and Rancho Cordova Police Department.
- **Water Supply.** Cumulative study area is the combined service areas of SCWA, Galt and Folsom, California American Water Company, Golden State Water Company, Florin County Water District, Fruitvale Vista Water Company, Tokay Park Water District, Omochumne–Hartnell Water District, Galt Irrigation District, Clay Water District, and SMUD Rancho Seco.
- **Wastewater Treatment.** Cumulative study area is the combined service area of SASD and Regional San.
- **Solid Waste.** Cumulative study area is the combined service areas of Kiefer Landfill (Sacramento County); Arvin Sanitary Landfill (Kern County); Foothill Sanitary Landfill, Forward Landfill Inc., and North County Landfill (San Joaquin County); and L&D Landfill (Sacramento County).
- **Parks and Recreation.** Cumulative study area is the Planning Area, which includes the service area of the County's regional park system; Galt's Parks and Recreation Department; County Service Areas 4B (Wilton–Cosumnes), 4D (Galt–Herald), and 4C (Delta); and the Cordova and Southgate Recreation and Park Districts.
- **Energy.** Cumulative study area is the combined service area for SMUD (electricity) and the portion of the PG&E (natural gas and electricity) service area that includes Sacramento County.
- **Mosquito Abatement.** Cumulative study area is the jurisdictional boundary of the Sacramento–Yolo Mosquito and Vector Control District, which includes over 2,000 square miles in Sacramento and Yolo Counties.

As discussed in Section 3.8.1, Significance Thresholds, the criteria used to evaluate the significance of each alternative's impacts on public services and facilities are based on

Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.) and on typical thresholds used to evaluate impacts in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse impact could occur if the alternative would:

1. Result in substantial adverse physical impacts associated with the provision of law enforcement services or fire protection;
2. Result in substantial adverse physical impacts associated with the provision of emergency services;
3. Result in inadequate water supply for full buildout of the project;
4. Result in inadequate wastewater treatment and disposal facilities for full buildout of the project;
5. Result in substantial adverse physical impacts associated with the construction of new water supply or wastewater treatment and disposal facilities or expansion of existing facilities;
6. Result in substantial adverse physical impacts associated with the provision of park and recreation services, or result in substantial physical deterioration of an existing facility due to increased use;
7. Result in a service demand that cannot be met by existing or reasonably foreseeable future service capacity;
8. Be serviced by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs;
9. Result in substantial adverse physical impacts associated with the provision of electric or natural gas service; or
10. Create new breeding areas for mosquitos or interfere with existing mosquito abatement activities to the extent that public health would be substantially affected.

Appendix G of the CEQA Guidelines does not provide suggested criteria for determining a beneficial effect. The following criteria were developed by the lead agencies. A beneficial impact could occur if the alternative would:

1. Improve or increase provision of law enforcement services or fire protection;
2. Improve or increase provision of emergency services;
3. Increase water supply at full buildout of the project;
4. Improve or increase capacity of wastewater treatment and disposal facilities at full buildout of the project;
5. Reduce adverse physical impacts associated with the construction of new water supply or wastewater treatment and disposal facilities or expansion of existing facilities;

6. Reduce adverse physical impacts associated with the provision of park and recreation services, or reduce physical deterioration of an existing facility that could be caused by increased use;
7. Reduce a service demand that cannot be met by existing or reasonably foreseeable future service capacity;
8. Reduce solid waste disposal needs in an area with served by a landfill with insufficient permitted capacity;
9. Reduce adverse physical impacts associated with the provision of electric or natural gas service; or
10. Reduce breeding areas for mosquitos or improve existing mosquito abatement activities to the extent that public health would be beneficially affected.

The impact analysis for the three EIS/EIR alternatives will consider the context, intensity, and severity of potential impacts to each of these impact criteria and will present a separate determination of significance for each of these criteria.

12.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2.

12.2.2.1 Law Enforcement, Fire Protection, and Emergency Services

Direct and Indirect Effects of the Alternative

The effects of future urban development and the increased demand for public services and facilities in Sacramento County and Galt and Rancho Cordova, including the Planning Area, were evaluated in the analysis of the EIRs listed in Section 3.4. As discussed in Section 12.2.1, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR; County of Sacramento 2010) determined that within Sacramento County:

- Increased demand on law enforcement and fire and emergency services for the entire County, including portions outside the Planning Area, would result in less than significant impacts through buildout of the general plan (Sacramento County 2010, pp. 4-19 to 4-41). General plan policies direct that law enforcement services maintain a particular ratio of officers to population. Any new proposed development would, under discretion of the Board of Supervisors, be required to pay mitigation fees to fund

adequate fire protection and emergency medical response if existing methods of financing are inadequate.

The impact analysis presented in the *Final Environmental Impact Report for the 2030 Galt General Plan* (Galt General Plan EIR; Galt 2009b), determined that within Galt's sphere of influence (SOI):

- Increased demand for law enforcement would be less than significant with mitigation. Future response times for fire protection and emergency services would be significant and unavoidable with mitigation (Galt 2008, pp. 6-5 to 6-47). The Galt General Plan EIR found this impact significant and unavoidable because addressing staffing and facility needs for fire protection would require cooperation and funding from entities other than Galt.

The impact analysis presented in the *City of Rancho Cordova General Plan Final EIR* (Rancho Cordova General Plan EIR; Rancho Cordova 2006b), determined that within Rancho Cordova:

- Increased demand for fire protection services and law enforcement would be less than significant (Rancho Cordova 2006b, pp.12-28 to 12-109).

As discussed in Section 3.4 and Section 12.2.1, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b; Rancho Cordova 2006b) and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur in Sacramento County and Galt and Rancho Cordova in the years after their General Plan EIR study periods end and until this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs and the Capital Southeast Connector EIR, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

Additional urban development in the Planning Area beyond that considered in the previous EIRs would result in additional demand for law enforcement, fire, and emergency services in the Planning Area. Anticipated future urban development would be consistent with the goals and policies listed in Section 12.1.1, specifically Galt General Plan Policies PFS-7.1 and PFS-6.2, which state that Galt shall continue to support the Cosumnes Community Services District Fire Department, emergency medical services, and police department to meet the needs of the

community; Rancho Cordova General Plan Policy S.9.1, which ensures that Rancho Cordova cooperates with the Sacramento Metropolitan Fire District to reduce fire hazards; and Rancho Cordova General Plan Policy S.8.1, which ensures that the City provides adequate police services to ensure sufficient staffing and resources are available to serve local needs. The lead agencies anticipate that the additional demand in the final 15 (for Rancho Cordova) to 35 years (for Sacramento County) of the EIS/EIR study period would result in less than significant impacts to fire protection and law enforcement in the jurisdictions of Sacramento County and Rancho Cordova. In addition, less than significant impacts would occur to law enforcement in Galt. However, development in Galt and the Galt SOI over the final 35 years of the EIS/EIR study period would add a further burden to the fire protection resources in Galt, incrementally adding to an impact that was identified as significant and unavoidable (Galt 2008).

As explained in Section 2.2, approximately 1,900 acres of planned urban development would be shifted or displaced to locations outside the UDA under the No Action/No Project Alternative. As more development occurs adjacent to open space, the risk of wildfire posing a danger to people and property would increase, as would the likelihood of a human-initiated wildfire. Fire suppression, fuel reduction, and fire planning efforts of local fire departments would continue, and assistance with wildland fires from CAL FIRE would continue (USFS 2015). The presence of additional urban development outside the UDA under the No Action/No Project Alternative would result in increased demand for fire protection services. However, new urban development outside the UDA would, under the discretion of the Board of Supervisors, be required to pay mitigation fees to fund adequate police, fire protection, and emergency medical response if existing methods of financing are inadequate.

As explained in Section 2.2, No Action/No Project Alternative, under the No Action/No Project Alternative, mitigation for impacts to listed species or wetlands from new urban development would continue to include avoidance and compensation, including establishment of on-site or off-site preserves. Preserve management could include a variety of habitat management activities, such as fence repair, transport of livestock for grazing management, and maintenance and monitoring visits from Preserve Managers. These types of activities would not generate an increase in demand for police services. However, many of these preserves established under the No Action/No Project Alternative would be located in the UDA and would eventually be surrounded by urban development. Vandalism, trespassing, and illegal hunting could occur in areas set aside for preserves, especially for preserves near urban development and preserves without active management. However, those same lands could also be subject to vandalism, trespassing, or illegal hunting under existing conditions. Therefore, the presence of preserves would not increase the need for law enforcement and thus would not result in the need to hire new officers or construct new stations.

Because some preserves would likely be established in remote or rural areas, wildland fires could be a concern. Fire suppression, fuel reduction, and fire planning efforts of local fire departments would continue, and assistance with wildland fires from CAL FIRE would also continue (USFS 2015). Preserves established as mitigation for urban development impacts under the No Action/No Project Alternative may also use prescribed fire to manage grassland biomass and improve habitat values. Prescribed burns provide ecological benefits, including nutrient recycling and the removal of weeds and other unwanted species. Unlike wildfire, prescribed burns occur at pre-designated locations and times for maximum control and are intended to reduce the amount of vegetative fuels that could produce a larger, uncontrolled fire with a greater chance of threatening human communities. The Cosumnes Community Services District, Sacramento County, and CAL FIRE issue burn permits that control the scope, location, and timing of prescribed burns. In order to regulate air quality impacts associated with burning activities, the Sacramento Metropolitan Air Quality Management District schedules planned burn days. Prescribed burns would occur on scheduled burn days to minimize air quality impacts. CAL FIRE and other local fire protection agencies would need to oversee these controlled burns in order to maximize safety of human communities and habitat benefits. Adherence to existing controlled burn policies would minimize impacts associated with prescribed burns. The overall increase in demand for fire protection services associated with development analyzed in the General Plan EIRs captures the small increase in fire protection needs from preserve activities. Any prescribed burning activities under the No Action/No Project Alternative would be highly regulated and would not substantially increase demand for local fire departments or CAL FIRE beyond current levels.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, Reasonably Foreseeable Other Actions, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for law enforcement, fire protection, and emergency services. Existing funding mechanisms have ensured that law enforcement, fire protection, and emergency services were expanded to meet that demand.

Reasonably foreseeable other future projects in the cumulative study area that would further increase demand for law enforcement, fire protection, and emergency services include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. This reasonably foreseeable development would be subject to the same, or similar, funding mechanisms to ensure that law enforcement, fire protection, and emergency services are expanded to meet demand. Therefore, the effects of past, present, and reasonably foreseeable other future projects would have a less than significant adverse cumulative effect on law enforcement, fire protection, and emergency services.

Development under the No Action/No Project Alternative would include additional demand for police and fire services after the time frame evaluated in General Plan EIRs of Rancho Cordova and Galt and Sacramento County, ranging from 15 to 35 additional years. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. However, existing funding mechanisms for law enforcement, fire protection, and emergency services would ensure that the new development would also provide new funding for these services. The additional increment of development under the No Action/No Project Alternative to the effects of past, present, and reasonably foreseeable other projects would result in a less than significant adverse cumulative effect on law enforcement, fire protection, and emergency services.

12.2.2.2 Water and Wastewater Services

Direct and Indirect Effects of the Alternative

The effects of future urban development and the increased demand for potable water service and wastewater treatment in Sacramento County and Galt and Rancho Cordova, including the Planning Area, were evaluated in the analysis of the EIRs listed in Section 3.4. As discussed in Section 12.2.1, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the Sacramento County General Plan EIR (Sacramento County 2010) determined that within Sacramento County:

- Increased demand for water supply within Zone 40 and in the California American Water Company's South Area would be significant and unavoidable and the increase in water demand would require new treatment facilities and pipelines that would also result in significant and unavoidable impacts. Impacts to groundwater recharge from increases in impervious surfaces were determined to be significant and unavoidable (Sacramento County 2010, pp. 6-22 to 6-87).
- Increased demand for water supply outside Zone 40 and the California American Water Company's South Area would be less than significant with implementation of a policy that requires that availability of water supply be demonstrated for a new development before building permits are issued (Sacramento County 2010, p. 6-53).
- The increase in demand for sewer treatment would result in significant unavoidable impacts because flows would exceed permitted capacity even with policy compliance (Sacramento County 2010, pp. 5-12 to 5-22). ~~However, this finding was based on pending litigation at the time of the Sacramento General Plan EIR that brought into question the ability of Regional San to expand its wastewater treatment capacity. That~~

~~litigation was resolved and Regional San is now in the process of constructing a tertiary treatment facility that will expand their permitted capacity to accommodate projected development in the Planning Area. With this new information, the lead agencies expect that the previously identified significant unavoidable impact to sewer treatment would be revised to less than significant~~. **At this time, there are no plans to expand the capacity of Regional San facilities beyond the existing permitted capacity, so this impact would remain significant and unavoidable.**

The impact analysis presented in the Galt General Plan EIR (Galt 2009b) determined that within the Galt SOI:

- Increased demand for water supply would be less than significant because with water conservation programs, buildout of the general plan would not in itself trigger the need for new or expanded surface water supply entitlements and future demands would be met through additional groundwater pumping (Galt 2008, pp. 6-5 to 6-47).
- Increased demand for wastewater treatment would result in significant and unavoidable impacts because flows would exceed permitted capacity at the City's wastewater treatment plant, even with compliance with general plan policies, and the City could not identify a timeframe for the needed upgrades to the plant (Galt 2008, pp. 6-5 to 6-47).

The impact analysis presented in the Rancho Cordova General Plan EIR (Rancho Cordova 2006b) determined that within Rancho Cordova:

- Increased demand for adequate water supply and treatment would result in significant and unavoidable impacts because projected development would require additional treatment capacity, storage capacity, and other conveyance facilities to meet the projected water demands (Rancho Cordova 2006b, pp. 12-28 to 12-109).
- Increased demand for wastewater treatment would be significant and unavoidable despite recommended mitigation because projected development would substantially increase wastewater flows and require additional infrastructure and may require additional treatment capacity to accommodate anticipated demands (Rancho Cordova 2006b, pp. 12-28 to 12-109).

As discussed in Section 3.4 and Section 12.2.1, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b; Rancho Cordova 2006b) and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur in Sacramento County and Galt and Rancho Cordova in the years after their General Plan EIR study periods end and until this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban

development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs and the Connector EIR, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

Additional urban development would result in additional demand for potable water service and wastewater treatment in the Planning Area. The lead agencies anticipate that this additional increment of development in the Planning Area through 2065 would increase the severity of the significant and unavoidable impacts to potable water supply and wastewater treatment identified previously for Sacramento County, Rancho Cordova, and Galt.

Additionally, as explained previously in this chapter and in Section 2.2.2, Expected Regulatory Environment Under the No Action/No Project Alternative, approximately 1,900 acres of planned urban development would be shifted or displaced from inside the MCRA to one or more locations outside the current Sacramento County USB boundary under the No Action/No Project Alternative. This displaced urban development may be located in areas that are not currently served by adequate water or wastewater infrastructure and would thus require construction of new water or wastewater infrastructure outside the current USB boundary.

Under the No Action/No Project Alternative, there would be no comprehensive aquatic resource permitting program in place. New water or wastewater infrastructure projects would have to seek individual permits and authorizations to fill or impact wetlands and other waters. The permit requirements may include avoidance of wetlands or waters or preserves that are located within the routes of planned pipelines or other infrastructure. Depending on the other constraints of the infrastructure project, such avoidance could make a planned pipeline or infrastructure project infeasible.

As explained in Section 2.2, projects impacting wetlands and waters under the No Action/No Project Alternative would continue to mitigate those impacts through avoidance, minimization of impacts, and compensatory mitigation, including establishment of on-site or off-site preserves. Preserve management could include a variety of habitat management activities, such as repairing fences, trash removal, and mowing and/or vegetation removal to control thatch and invasive species. Re-establishment and establishment projects implemented as mitigation could require supplemental water, typically for 2–3 years while new plantings are established. This water is often drawn from on-site wells or taken from non-potable recycled water sources. In general, preserves would require very little water and would not require a connection to potable water or sewer lines.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for water and wastewater services from SCWA, Galt and Folsom, California American Water Company, Golden State Water Company, Florin County Water District, Fruitvale Vista Water Company, Tokay Park Water District, Omochumne–Hartnell Water District, Galt Irrigation District, Clay Water District, SMUD Rancho Seco, SASD, and Regional San. Existing funding mechanisms have ensured that water and wastewater services were expanded to meet that demand.

Reasonably foreseeable future projects in the cumulative study area that would further increase demand for water and wastewater services include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. Existing funding mechanisms would also ensure that water and wastewater services are expanded to meet that new demand. New development could not be permitted by local land use authorities unless it could demonstrate availability of an adequate water supply. Therefore, the effects of past, present, and reasonably foreseeable other future projects would have a less than significant adverse cumulative effect on water and wastewater services.

Cumulative effects on water and wastewater services not evaluated in the General Plan EIRs of Rancho Cordova and Galt and Sacramento County would include the additional increment of growth in the Planning Area after the end of their study periods, which range from 15 to 35 years of additional growth and development. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. The additional demand for water and wastewater infrastructure outside the UDA from these projects would be offset through payment of fees by project developers and by rate increases passed on to residents of the Planning Area. Therefore, the additional increment of development under the No Action/No Project Alternative, when added to the effects of past, present, and reasonably foreseeable other projects, would result in a less than significant adverse cumulative effect on water and wastewater services.

12.2.2.3 Solid Waste Disposal

Direct and Indirect Effects of the Alternative

The effects of future urban development and the increased demand for solid waste disposal in Sacramento County and Galt and Rancho Cordova, including the Planning Area, were evaluated in the analysis of the EIRs listed in Section 3.4. As discussed in Section 12.2.1, the relevant

analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the Sacramento County General Plan EIR (Sacramento County 2010) determined that within Sacramento County:

- The increase in demand for solid waste disposal within the entire County, including portions outside the Planning Area, would result in less than significant impacts because buildout of the general plan would not require expansion of Kiefer Landfill. No impacts from construction of new solid waste facilities would occur (Sacramento County 2010, p. 4-21).

The impact analysis presented in the Galt General Plan EIR (Galt 2009b) determined that within Galt and the Galt SOI:

- Increase in solid waste may exceed available landfill capacity by 2030, and the availability of disposal options after that time is unknown, so the EIR concluded that impacts would be significant and unavoidable. The permitted capacities of landfills serving Galt do not appear to have been considered in the analysis (Galt 2008, pp. 6-5 to 6-47).

The impact analysis presented in the Rancho Cordova General Plan EIR (Rancho Cordova 2006b) determined that within Rancho Cordova:

- Available landfill capacity would be available to serve buildout of the General Plan, resulting in a less than significant impact (Rancho Cordova 2006b, pp. 12-28 to 12-109).

As discussed in Section 3.4 and Section 12.2.1, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b; Rancho Cordova 2006b) and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur within Galt and Rancho Cordova and Sacramento County in the years after their General Plan EIR study periods end and until this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs and the Connector EIR, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

That additional urban development would result in additional demand for solid waste disposal in the Planning Area. The lead agencies anticipate that this additional increment of development in the Planning Area through 2065 could result in further exceedance of solid waste disposal

facilities for Galt. However, as noted previously, the analysis of solid waste impacts in the Galt General Plan EIR was very conservative, reaching a conclusion that impacts were significant and unavoidable mostly due to uncertainty. Kiefer Landfill would accommodate solid waste resulting from buildout of the Sacramento County General Plan and Rancho Cordova General Plan. Preserve establishment, management, and monitoring activities under the No Action/No Project Alternative would generate little to no solid waste.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for solid waste disposal. Existing funding mechanisms have ensured that landfills and solid waste handling facilities were expanded to meet that demand.

Reasonably foreseeable future projects in the cumulative study area that would further increase demand for solid waste disposal include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. Existing funding mechanisms would also ensure that solid waste disposal is expanded to meet that new demand.

Cumulative effects to solid waste disposal under the No Action/No Project alternative that were not evaluated in the General Plan EIRs of Rancho Cordova and Galt and Sacramento County would include the additional increment of growth in the Planning Area after the end of their study periods, which range from 15 to 35 years of additional growth and development. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. The additional demand for solid waste disposal from these projects would be offset through payment of fees by project developers and by rate increases passed on to residents of the Planning Area. Therefore, the additional increment of development under the No Action/No Project Alternative, when added to the effects of past, present, and reasonably foreseeable other projects, would result in a less than significant adverse cumulative effect on solid waste disposal.

12.2.2.4 Parks and Recreational Facilities

Direct and Indirect Effects of the Alternative

The effects of future urban development on increased demand for parks and recreational facilities in Sacramento County and Galt and Rancho Cordova, including the Planning Area, were evaluated in the analysis of the EIRs listed in Section 3.4. As discussed previously in Section 12.2.1, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the Sacramento County General Plan EIR (Sacramento County 2010) determined that within Sacramento County:

- Increased demand on parks and recreation within the entire County, including portions outside the Planning Area, would result in less than significant impacts through buildout of the general plan, because general plan policies and ordinances would ensure that funding is available to construct new parks and recreational facilities to meet demand (Sacramento County 2010, pp. 4-19 to 4-41).

The impact analysis presented in the Galt General Plan EIR (Galt 2009b) determined that within the Galt SOI:

- Compliance with general plan policies and implementation programs would ensure that impacts to parks would be less than significant, because new parks and recreational facilities would be constructed as needed to meet demand (Galt 2008, pp. 6-44 to 6-47).

The impact analysis presented in the Rancho Cordova General Plan EIR (Rancho Cordova 2006b) determined that within Rancho Cordova:

- Increased demand on parks and recreation due to urban development would result in a less than significant impact, because general plan policies and ordinances would ensure that funding is available to construct new parks and recreational facilities to meet demand (Rancho Cordova 2006b, pp. 12-28 to 12-109).

As discussed in Section 3.4 and Section 12.2.1, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b; Rancho Cordova 2006b) and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur in Sacramento County and Galt and Rancho Cordova in the years after their General Plan EIR study periods end and until this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs and the Connector EIR, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

Additional urban development under the No Action/No Project Alternative, especially the 1,900 acres of development shifted or displaced outside the UDA, would result in additional demand for parks and recreational areas in the Planning Area. However, the lead agencies anticipate that existing development fee programs in the Planning Area, such as those required under

County Policy PF-123 or Galt Policy PFS-8.1, would allow for establishment of new parks and recreational facilities to meet this additional demand.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the EIS/EIR Planning Area, especially within the UDA, increasing demand for parks and recreational areas. As discussed in Section 12.1.2, a substantial amount of parkland acquisition and development has occurred in the Planning Area along with the urban development. These parks provide diverse recreational opportunities to residents in the Planning Area and surrounding areas. Although some portions of the parks are strictly managed for preservation (e.g., Deer Creek Preserve), most areas are managed for passive and active recreational uses such as hiking, biking, picnicking, boating, camping, and off-road vehicle use.

Reasonably foreseeable future projects in the EIS/EIR Planning Area that would further increase demand for parks and recreational areas include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. The effects of the demand for parks and recreational facilities from past, present, and reasonably foreseeable other projects would not be cumulatively considerable (i.e., significant).

Under the No Action/No Project Alternative, parks and recreational facilities would continue to be developed along with urban development in the cumulative impacts study area, maintaining a similar per capita availability of parks and recreational facilities despite increases in population. Therefore, the additional increment of development under the No Action/No Project Alternative, when added to the effects of past, present, and reasonably foreseeable other projects, would result in a less than significant adverse cumulative effect on parks and recreational facilities.

12.2.2.5 Energy

Direct and Indirect Effects of the Alternative

The effects of future urban development on increased demand for energy and energy infrastructure in Sacramento County and Galt and Rancho Cordova, including the Planning Area, were evaluated in the analysis of the EIRs listed in Section 3.4. As discussed in Section 12.2.1, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the Sacramento County General Plan EIR (Sacramento County 2010) determined that within Sacramento County:

- Increased demand on energy services would result in less than significant impacts through buildout of the general plan because any needed energy infrastructure would be constructed in developed areas (Sacramento County 2010, pp. 4-19 to 4-41).

The impact analysis presented in the Galt General Plan EIR (Galt 2009b) determined that within the Galt SOI:

- Impacts to electricity and natural gas consumption from buildout of the general plan would be less than significant because future development would occur in an area currently served with adequate supplies of both electricity and gas service, and compliance with City policies would improve energy conservation (Galt 2008, pp. 6-5 to 6-47).

The impact analysis presented in the Rancho Cordova General Plan EIR (Rancho Cordova 2006b) determined that within Rancho Cordova:

- Impacts to electricity and natural gas would be less than significant because the City is required to ensure that sufficient capacity for electrical and natural gas service is available, and would coordinate with service providers to ensure that occurs. Construction of needed infrastructure would be located within roadways and other public rights-of-way to minimize construction impacts (Rancho Cordova 2006b, pp. 4.12-28 to 4.12-109).

As discussed in Section 3.4 and Section 12.2.1, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b; Rancho Cordova 2006b) and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur in Sacramento County and Galt and Rancho Cordova in the years after their General Plan EIR study periods end and until this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs and the Connector EIR, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

That additional increment of urban development would result in additional demand for energy in the Planning Area, which the lead agencies anticipate could be met by energy providers. Further, due to improved energy conservation, energy use per capita or per building square

foot would be less than existing levels by 2065. As explained in Section 2.2, approximately 1,900 acres of planned urban development would be shifted or displaced to locations outside the UDA under the No Action/No Project Alternative. That shifted or displaced development would require extension of natural gas and electrical infrastructure to areas that currently support agricultural operations or natural land covers. The construction activities needed to install the necessary electrical and natural gas infrastructure could result in removal of natural land covers.

Under the No Action/No Project Alternative, compliance with the CWA or federal Endangered Species Act may require that new subsurface natural gas and electrical infrastructure avoid areas with high densities of aquatic resources or species habitat. Energy providers would have to develop alternative routing for that energy infrastructure, which would likely be more expensive than if they were able to impact the wetland areas. This additional cost to provide energy infrastructure could increase energy prices in the Planning Area.

Preserve activities would not include development or land uses that consume substantial electrical or natural gas energy resources. Therefore, preserve activities under the No Action/No Project Alternative would not significantly increase demand on the existing energy system.

Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and Section 12.2.1, past and present urban development and associated infrastructure projects and activities have occurred in the EIS/EIR Planning Area, especially within the UDA. Energy demands of these past and present projects and activities have been met by energy providers through additional energy generation and development of new energy transmission infrastructure.

Reasonably foreseeable future projects in the EIS/EIR Planning Area that would further increase energy demand include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the Wilton Rancheria Casino, construction of the high-speed rail, and the California WaterFix projects (Section 3.7.2).

The additional increment of energy demand generated by these reasonably foreseeable other projects would be accommodated by utility providers by purchasing additional electricity or natural gas on the open market and by constructing additional infrastructure. Any additional infrastructure required for these projects would be developed by the utility providers and would generally be located within existing County, city, or utility rights-of-way to minimize impacts. The cumulative effects of the demand for energy and energy infrastructure from past, present, and reasonably foreseeable other projects would not be cumulatively considerable (i.e., significant).

Cumulative effects to energy not evaluated in the General Plan EIRs of Rancho Cordova and Galt and Sacramento County would include the additional increment of growth in the Planning Area after the end of their study periods, which range from 15 to 35 years of additional growth and development. That additional development would include 1,900 acres of urban development displaced or shifted outside the UDA. The additional demand for energy infrastructure outside the UDA from these projects would be offset by rate increases passed on to residents of the Planning Area. Therefore, the additional increment of development under the No Action/No Project Alternative added to the effects of past, present, and reasonably foreseeable other projects would result in a less than significant adverse cumulative effect on energy.

12.2.2.6 Mosquito Abatement

Direct and Indirect Effects of the Alternative

The presence of mosquitos could affect future urban development within the UDA, resulting in potential impacts on demand for mosquito abatement services. Currently the Sacramento–Yolo Mosquito and Vector Control District performs a variety of services to reduce the risk of vector-transferred disease, including the preparation of integrated pest management approaches, public outreach, mosquito and vector surveillance, and vector control activities such as aerial spraying, as described in Section 12.1.2. These activities would continue under the No Action/No Project Alternative, and may be expanded to control mosquito populations in currently undeveloped areas as urban development moves closer to existing wetlands.

Mitigation for the impacts of development on waters and wetlands would include the re-establishment or establishment of vernal pools and other wetlands, especially within or near the MCRA. Healthy vernal pools that have adequate hydrology, native vegetation, and invertebrates are not a breeding ground for mosquitos. In these healthy pools, other invertebrates eat the mosquito larvae and prevent most mosquitos from hatching. Further, vernal pools in the Planning Area that have natural hydrology are typically dry by early June, preventing mosquito breeding in the summer. This means that vernal pools could provide mosquito breeding opportunities in the late spring only when rain events occur and are immediately followed by a warming trend (over 75°F). However, many varieties of mosquitos will reproduce in artificial containers that collect water, such as tires, buckets, flower pots, and bird baths that are not refreshed regularly. Similarly, re-established and established vernal pools and other wetlands could provide breeding habitat for mosquitos if they are not managed to ensure that hydrology, vegetation, and resident fauna are consistent with the characteristics of healthy vernal pools. Because there would not be a comprehensive management plan designed to oversee vernal pool areas (some of which may be located within open space areas in developed communities), there is the potential for existing unhealthy pools and unhealthy

re-established and established vernal pools and other wetlands to provide the right conditions for mosquitos to breed.

To control mosquitos, wetlands are sometimes drained, insecticides are applied to stagnant waters, or aerial spraying is done by the Sacramento–Yolo Mosquito and Vector Control District in areas where mosquitos are particularly abundant. Chemicals applied to kill mosquitos/eggs would likely also kill vernal pool branchiopods. Mosquito-eating fish that are introduced by the Sacramento–Yolo Mosquito and Vector Control District or by private landowners also eat vernal pool branchiopods. Because these traditional control agents would severely impact the health of the vernal pool ecosystems and the listed species that re-established vernal pools are designed to support, it is highly likely that mosquito abatement activities would be restricted in these preserve areas. However, the Sacramento–Yolo Mosquito and Vector Control District's primary goal is to protect public health and welfare by managing mosquito populations so they do not present a risk to the surrounding community. If mosquito populations pose a significant public nuisance or when emergency control measures are needed to rapidly disrupt or terminate the transmission of disease to humans, the District will respond by spraying using either hand sprayers, truck-mounted sprayers, or aircraft for aerial spraying. The District does not include any provisions where spraying would be restricted (Sacramento–Yolo Mosquito and Vector Control District 2009).

Cumulative Effects of the Alternative

Past and present projects and activities in the cumulative study area relevant to mosquito abatement include many decades of urban development within a natural floodplain that contains many seasonal wetlands and other waters. Mitigation for impacts of past and present urban development has included avoidance of wetlands, establishment of on-site preserves, and on-site establishment of wetlands. This development and mitigation pattern has exposed residents of urban development to mosquito populations that breed in wetland areas and in poorly designed or managed stormwater systems.

Reasonably foreseeable other projects such as urban development in the Elk Grove SOI or Rancho Murieta (Section 3.7.2) and elsewhere in the cumulative study area, such as the community of Natomas, the City of Folsom, or the City of Davis, would increase human populations near existing wetlands and vernal pools. In addition, this urban development would increase impermeable surfaces and contribute urban runoff to drainage structures that can stagnate and create breeding habitat for mosquitos. However, this urban development in the cumulative study area would also remove wetlands and vernal pools, potentially reducing existing breeding areas for mosquitos. Under most circumstances, creation or expansion of mosquito breeding habitat can be avoided or minimized through proper planning and design or maintenance elements. Increased demand on the Sacramento–Yolo Mosquito and Vector Control District for mosquito

abatement services would be offset through increased funding of the District. The District is funded through property taxes and other assessments based on property value, and urban development of currently undeveloped land would substantially increase the assessed value of parcels. That increased parcel value would increase property taxes, and thus increase funding for the District. Therefore, less than significant adverse cumulative impacts would result from past, present, and reasonably foreseeable other projects.

Urban development under the No Action/No Project Alternative would contribute to cumulative impacts on mosquito abatement similar to that described under the reasonably foreseeable future projects. As noted previously, existing patterns of development have resulted in avoidance of wetlands, establishment of on-site preserves, and on-site wetland establishment projects, which expose residents and employees to potential mosquito hazards. The lead agencies anticipate that avoidance of wetlands, establishment of on-site preserves, and wetland establishment projects would continue to be a common mitigation strategy under the No Action/No Project Alternative. However, funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so any additional demand for mosquito abatement would be met. Therefore, the incremental contribution of the No Action/No Project Alternative to cumulative impacts would not be considerable, and implementation of this alternative would result in a less than significant adverse cumulative effect.

12.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3.

12.2.3.1 Law Enforcement, Fire Protection, and Emergency Services

Direct and Indirect Effects of the Alternative

Covered Activities under the Proposed Action/Proposed Project Alternative include the types of urban development that are anticipated under the No Action/No Project Alternative. However, the Proposed Action/Proposed Project Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented in a manner consistent with the approved general plans of Sacramento County and Rancho Cordova and Galt, with the only Covered Activity urban development beyond the UDA being road and pipeline projects that would also occur under the No Action/No Project Alternative. This may slightly reduce demand for new fire and police facilities to serve new urban development because new development would be nearer to existing fire stations and police stations. Therefore, urban development under the Proposed Action/Proposed Project

would have a ***Minor Beneficial*** effect on law enforcement, fire protection, and emergency services as compared to the No Action/No Project Alternative baseline condition.

Preserve management under the Proposed Action/Proposed Project Alternative would require a variety of habitat management activities, including grazing management, repairing fences, wildlife or vegetation surveys, trash removal, mowing and/or vegetation removal to control thatch and invasive species, and overall maintenance and monitoring. The preserve management strategy proposed in the SSHCP includes use of prescribed burns. As described for the No Action/No Project Alternative, prescribed burning activities under the Proposed Action/Proposed Project would be highly regulated and would not substantially increase demand for local fire departments or CAL FIRE beyond current levels. Therefore, management of the Preserve System under the Proposed Action/Proposed Project would have ***No Effect*** on fire protection as compared to the No Action/No Project Alternative baseline condition.

SSHCP Preserves would maintain areas of natural land cover that could result in an increase in wildfire hazards. As described for the No Action/No Project Alternative, there could be instances where fire suppression is required due to a wildfire or illegal activities that require law enforcement, but these would be indirect effects of the preserves. Law enforcement, medical, rescue, firefighting, and other emergency service providers would be allowed access to SSHCP Preserves to carry out operations necessary for the health, safety, and welfare of the public. As required by Section 11.4.3.2 of the SSHCP, the Implementing Entity would develop Memoranda of Understanding with all applicable fire agencies to be included with each Preserve Management Plan that identify appropriate response and fire suppression techniques, including access points, priority locations for fire camps, firebreak construction, water uptake, use of chemical retardants, heavy equipment operation, and post-fire cleanup. Firebreaks would be allowed inside Preserve Setbacks when necessary, and would comply with applicable local codes. This coordination and planning with fire, police, and emergency service providers would result in a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- Reduce the potential for adverse physical impacts associated with the provision of law enforcement services, fire protection, or emergency services to meet demands of urban development outside the UDA;

- Reduce demand for law enforcement, fire protection, or emergency services by not resulting in urban development remote from existing concentrations of law enforcement services, fire protection, or emergency services;
- Not change demand for local fire departments or CAL FIRE beyond current levels as a result of preserve management activities; and
- Not impede delivery of fire, police, and emergency services to preserve areas by improving coordination with local and state service providers.

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Project on the impact criteria for law enforcement, fire protection, and emergency services, the Proposed Action/Proposed Project would result in ***Minor Beneficial*** effects on law enforcement, fire protection, and emergency services when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for law enforcement, fire protection, and emergency services. Existing funding mechanisms have ensured that law enforcement, fire protection, and emergency services were expanded to meet that demand.

Reasonably foreseeable other future projects in the cumulative study area that would further increase demand for law enforcement, fire protection, and emergency services include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin.

The Proposed Action/Proposed Project would not include urban development outside the UDA where law enforcement, fire protection, and emergency services are less available. The Proposed Action/Proposed Project would also improve coordination between Preserve Managers and local or state service providers. Therefore, the Proposed Action/Proposed Project would have a smaller incremental contribution to impacts on demand for new facilities or law enforcement services, fire protection, or emergency services as compared to the No Action/No Project alternative. Therefore, because the incremental effect of the Proposed Action/Proposed Project on law enforcement, fire protection, and emergency services would be somewhat less than the incremental effect of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in a ***Minor Beneficial Cumulative*** **effect** (when compared to the future No Action/No Project baseline condition).

12.2.3.2 Water and Wastewater Services

Direct and Indirect Effects of the Alternative

The Proposed Action/Proposed Project Alternative Covered Activities include the urban development that are anticipated under the No Action/No Project Alternative, including the construction, maintenance, and operation of water supply**, recycled water,** and wastewater facilities. Future urban development under the Proposed Action/Proposed Project would be consistent with the goals and policies listed in Section 12.1.1 that require local agencies to design water and wastewater infrastructure to accommodate the increase in demand; ensure that water flow and pressure meet domestic, commercial, industrial and fire suppression needs; and comply with the CWA. However, under the Proposed Action/Proposed Project, urban development would not be shifted or displaced to areas outside the UDA (Section 2.3) that may not be served by existing water or wastewater infrastructure. The Proposed Action/Proposed Project would not result in the impacts associated with expanding infrastructure outside the UDA that would occur under the No Action/No Project Alternative. Therefore, urban development under the Proposed Action/Proposed Project would have a ***Minor Beneficial*** effect on water and wastewater infrastructure needs as compared to the No Action/No Project Alternative baseline condition.

Subsurface sewage disposal systems currently exist within the area proposed as the Laguna Creek Wildlife Movement Corridor. These systems are not Covered Activities under the SSHCP, but would be "grandfathered in" and allowed to remain in the Laguna Creek Wildlife Movement Corridor once the corridor is established. Parcels already entitled for installation of subsurface sewage disposal systems at the time of permit issuance would be allowed in the Laguna Creek Wildlife Movement Corridor. Operation, maintenance, and replacement of existing and entitled subsurface sewage disposal systems are not Covered Activities, but would be allowed in the Laguna Creek Wildlife Movement Corridor (Sacramento County 2016). These septic systems would also be allowed under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Preserve System would have ***No Effect*** on water and wastewater infrastructure as compared to the No Action/No Project Alternative baseline condition.

Under the Proposed Action/Proposed Project, project proponents constructing or expanding water and wastewater pipelines would not necessarily have to develop alternative routes to avoid wetlands and waters in the Preserve System, whereas under the No Action/No Project Alternative, pipelines would be more likely to have to route around wetlands, other waters, and preserves. New ~~water or~~ wastewater facilities could be expanded or extended **within the MCRA under the Proposed Action/Proposed Project Alternative** as envisioned by the ~~2020 SRWTP Master Plan (Regional San 2008) within the MCRA for the Proposed Action/Proposed Project.~~ **Regional San ISS and EchoWater Project**. **New water facilities could be expanded or extended as envisioned in the SCWA Water Supply Master Plans.** Horizontal drilling would be used

where the lines might impact waters and wetlands, which would limit the construction impacts to the entrance and exit locations of the pipeline. Using this method would minimize potential impacts to wetland areas. Specifically, Avoidance and Minimization Measures (AMMs) UTILITY-3 and UTILITY-4 require the use of trenchless construction methods to avoid impacts to preserves, and siting of entry/exit locations to minimize impacts to vernal pool soils, vernal pools, and Riparian Woodland areas (SSHCP Chapter 5). Implementation of new infrastructure could be expanded as envisioned by the Sacramento County and Rancho Cordova General Plans in compliance with AMMs EDGE-1, EDGE-8, BMP-1 through BMP-11, STREAM-1 through STREAM-5, and UTILITY-1 and UTILITY-2. Implementation of the Proposed Action/Proposed Project would not adversely impact the ability of service providers to extend water and wastewater infrastructure, and service would be continued to be provided as outlined in the service district providers' planning documents (Radmacher, pers. comm. 2015). Therefore, the Proposed Action/Proposed Project Alternative would be less likely than the No Action/No Project Alternative to limit planned infrastructure development. The Proposed Action/Proposed Project Preserve System would result in ***Minor Beneficial*** effects on water and wastewater infrastructure when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Preserve management and monitoring activities under the Proposed Action/Proposed Project would not require substantial water, nor would there be a need for any wastewater treatment. The preserve activities would depend on on-site wells or water brought to the site, and would not require any new water or wastewater connections. Therefore, the Proposed Action/ Proposed Project Preserve System would result in ***No Effect*** on demand for water treatment, water supply, and wastewater treatment when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- Reduce the impacts from expanding water and wastewater infrastructure to serve urban development urban development outside the UDA;
- Reduce the potential for existing aquatic resources or future preserves to conflict with planned infrastructure development; and
- Result in similar impacts on adequacy of water supply for full buildout of the project.

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Project on the impact criteria for water and wastewater services, the Proposed Action/ Proposed Project would result in ***Minor Beneficial*** effects on water and wastewater services

when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for water and wastewater services. Existing funding mechanisms, including payment of fees by project developers and rate increases passed on to residents of the Planning Area, have ensured that water and wastewater services were expanded to meet that demand.

Reasonably foreseeable other future projects in the cumulative study area that would further increase demand for water and wastewater services include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. The additional demand for water and wastewater infrastructure from these projects would also be offset through payment of fees by project developers, and by rate increases passed on to residents of the Planning Area. Therefore, the effects of past, present, and reasonably foreseeable other future projects would have a less than significant cumulative effect on water and wastewater services.

The Proposed Action/Proposed Project would not include urban development outside the UDA where water and wastewater infrastructure are less available. Therefore, because the incremental effect of the Proposed Action/Proposed Project on water or wastewater facilities would be somewhat less than the incremental effect of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in **a *Minor Beneficial Cumulative*** effect (when compared to the future No Action/No Project baseline condition).

12.2.3.3 Solid Waste Disposal

Direct and Indirect Effects of the Alternative

The Proposed Action/Proposed Project Alternative Covered Activities include the types of urban development that are anticipated under the No Action/No Project Alternative. The urban development under the Proposed Action/Proposed Project would accommodate the same population increase as the No Action/No Project Alternative, and would generate approximately the same amount of solid waste. Future urban development would be consistent with the goals and policies listed in Section 12.1.1 that require that only compatible land uses be located near solid waste facilities and that recycling programs be developed to educate residents. Therefore, the Proposed Action/Proposed Project would result in ***No Effect*** on demand for solid waste disposal when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Establishment, management, and monitoring of the SSHCP Preserves would not increase demand for solid waste service. Overall, there would be no difference in impacts to landfills from preserve activities when compared to similar preserve activities under the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Preserve System would result in ***No Effect*** on demand for solid waste disposal when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- Be serviced by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and
- Result in the same demand for solid waste disposal services.

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Project on the impact criteria for solid waste disposal, the Proposed Action/Proposed Project would result in ***No Effect*** on solid waste disposal when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for solid waste disposal. Existing funding mechanisms such as development fees or usage fees paid to the solid waste service providers have ensured that landfills and solid waste handling facilities were expanded to meet that demand.

Reasonably foreseeable future projects in the cumulative study area that would further increase demand for solid waste disposal include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. Existing funding mechanisms would also ensure that solid waste disposal is expanded to meet that new demand. The effects of the demand for solid waste disposal from past, present, and reasonably foreseeable other projects would not be cumulatively considerable (i.e., significant).

The urban development under the Proposed Action/Proposed Project would accommodate the same population increase as the No Action/No Project Alternative, and would generate approximately the same amount of solid waste. Therefore, because the incremental effect of the Proposed Action/Proposed Project on solid waste disposal would not be discernibly

different from the incremental effect of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative Effect*** (when compared to the future No Action/No Project baseline condition).

12.2.3.4 Parks and Recreational Facilities

Direct and Indirect Effects of the Alternative

The Proposed Action/Proposed Project Alternative Covered Activities include the types of urban development that are anticipated under the No Action/No Project Alternative. The urban development under the Proposed Action/Proposed Project would accommodate the same population increase as the No Action/No Project Alternative, and would generate approximately the same amount of demand for parks and recreational facilities. The lead agencies anticipate that future urban development would be consistent with the goals and policies listed in Section 12.1.1, including those such as County Policy PF-122 and PF-123, or Galt Policy PFS-8.1, that establish fees that new development projects must pay to support parks and recreational facility development. However, the Proposed Action/Proposed Project Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented in a manner consistent with the approved general plans of Sacramento County and Rancho Cordova and Galt. By not shifting or displacing urban development outside the UDA, the Proposed Action/Proposed Project would reduce the demand for new park and recreational facilities in areas outside the UDA. Therefore, urban development under the Proposed Action/Proposed Project would have a ***Minor Beneficial*** effect on parks and recreational facilities as compared to the No Action/No Project Alternative baseline condition.

Future recreational facilities, including trails, would be permitted in the Preserve Setbacks and in some of the Preserve System. For preserve areas within the USB, a 50-foot setback would be established in accordance with AMM EDGE-3 (Table 2-7) to allow a transition between development and the preserves. AMM NATURE TRAIL-1 through NATURE TRAIL-5 provide requirements for the construction of trails adjacent to preserve areas. Setbacks would also be required around streams and creeks in the UDA (AMM STREAM-1 and STREAM-2), and trails would also be allowed in those Stream Setbacks.

Other trails are proposed as part of developments in the UDA. For example, the Cordova Hills project includes a paved bicycle/pedestrian trail that bisects the preserve area (Core Preserve C1). As shown on Figure 12-2, trails are proposed around most of the SSHCP Preserve areas, with trails crossing the Laguna Creek Wildlife Preserve and the proposed Linkage Preserve L2. Trails adjacent to and crossing any preserves would be required to comply with the AMMs

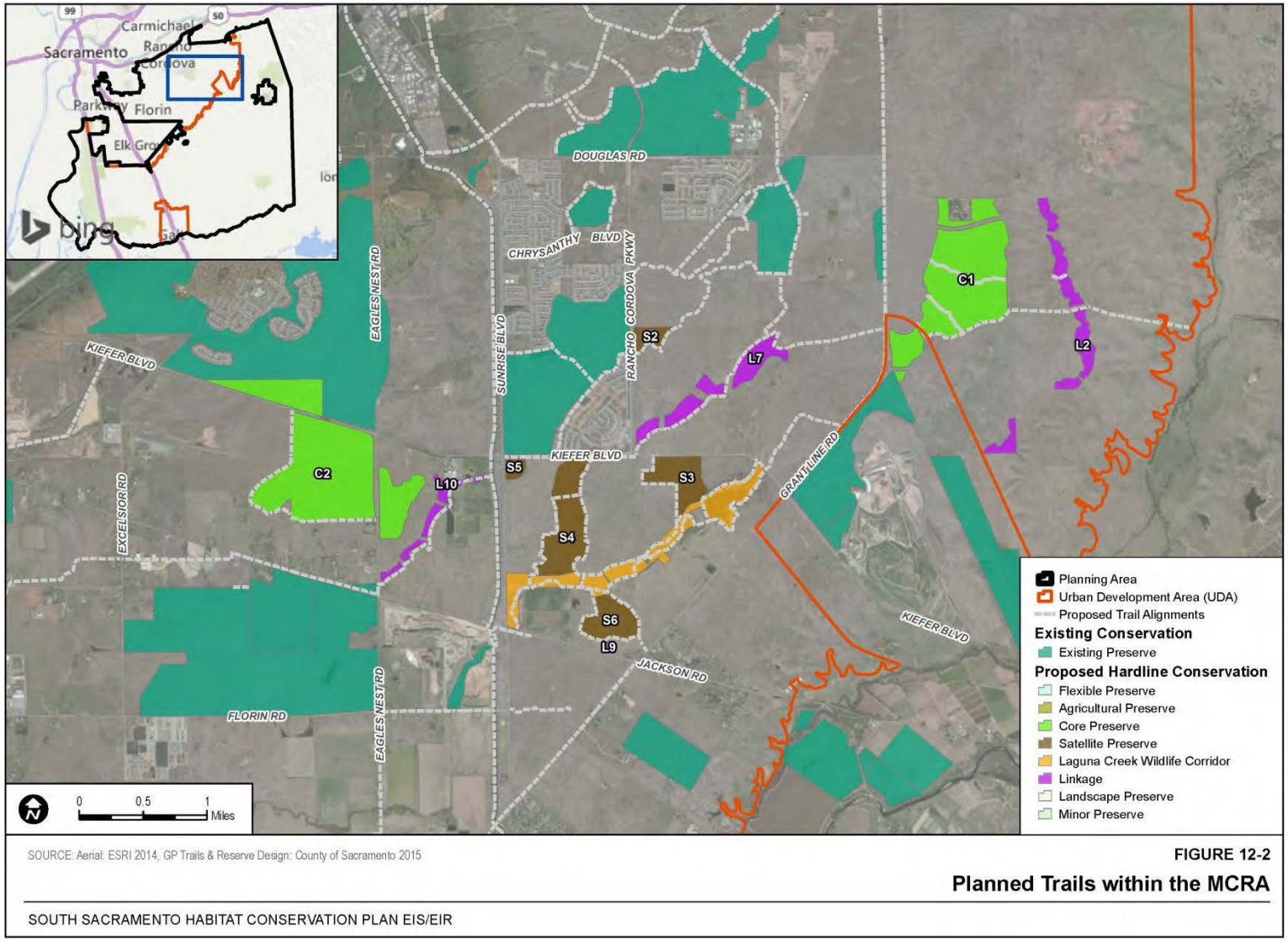
listed previously to protect the preserve from disturbance due to proximity to developed areas. Provided they comply with those AMMs, new trails and trail extensions that are planned in the Sacramento County, Galt, or Rancho Cordova General Plan Public Facilities or Open Space, Parks, and Trails Elements or in bicycle or pedestrian plans would not be affected by the establishment of an interconnected preserve system. Therefore, the Proposed Action/Proposed Project Preserve System would have ***No Effect*** on parks and recreational facilities as compared to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- Reduce the potential for substantial adverse physical impacts associated with the provision of park and recreation services outside the UDA, or result in substantial physical deterioration of an existing facility due to increased use; and
- Allow for development of trails planned in the Sacramento County, Galt, or Rancho Cordova General Plan.

Figure 12-2 Planned Trails within the MCRA



SOURCE: Aerial: ESRI 2014, GP Trails & Reserve Design: County of Sacramento 2015

FIGURE 12-2

Planned Trails within the MCRA

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN EIS/EIR

INTENTIONALLY LEFT BLANK

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Project on the impact criteria for parks and recreational facilities, the Proposed Action/ Proposed Project would result in ***Minor Beneficial*** effects on parks and recreational facilities when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

Section 12.1.2 describes the substantial amount of parkland acquisition and development that has occurred in the Planning Area. These parks provide diverse recreational opportunities to residents in the Planning Area and surrounding areas. Although some portions of the parks are strictly managed for preservation (e.g., Deer Creek Preserve), most areas are managed for passive and active recreational uses such as hiking, biking, picnicking, boating, camping, and off-road vehicle use.

Reasonably foreseeable other future projects such as urban development in the Elk Grove SOI or expansion of Rancho Murieta, as described in Section 3.7, would increase the population in the Planning Area and increase demand for parks and recreational facilities. However, this development would generate fees and taxes that would pay for additional parks and recreational facilities in the Planning Area to meet these additional needs.

Urban development under the Proposed Action/Proposed Project would also increase the Planning Area population and result in increased demand for parks and recreational facilities, but this new urban development would generate fees and taxes to pay for additional parks and recreational facilities. The Proposed Action/Proposed Project Alternative would provide limited park and recreational facility benefits by providing nature trails in some preserves, designed consistent with AMMs NATURE TRAIL-1 through NATURE TRAIL-5. Therefore, because the incremental effect of the Proposed Action/Proposed Project on parks and recreational facilities would not be discernibly different from the incremental effect of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative Effect*** (when compared to the future No Action/No Project baseline condition).

12.2.3.5 Energy

Direct and Indirect Effects of the Alternative

Covered Activities under the Proposed Action/Proposed Project Alternative include the types of urban development that are anticipated under the No Action/No Project Alternative. However, under the Proposed Action/Proposed Project urban development would not be displaced or shifted to areas outside the UDA (Section 2.3) that may not be served by existing natural gas or electrical infrastructure. Impacts associated with expanding natural gas and electrical supply

infrastructure to serve urban development would be somewhat less under the Proposed Action/Proposed Project Alternative than the No Action/No Project Alternative. Therefore, urban development under the Proposed Action/Proposed Project would have a ***Minor Beneficial*** effect on energy as compared to the No Action/No Project Alternative baseline condition.

Energy infrastructure under the Proposed Action/Proposed Project could be expanded, extended, or located as envisioned by the Sacramento County and Rancho Cordova General Plans' Public Facilities Elements and local energy providers' master plans. The SSHCP Preserve System would not require the construction of energy infrastructure; therefore, the SSHCP would not create any physical impacts associated with construction of new energy infrastructure. The regional energy infrastructure plans follow the growth and land use plans laid out in the general plans, and the Proposed Action/Proposed Project Alternative would be consistent with these general plans. Therefore, urban development under the Proposed Action/Proposed Project would have a ***Minor Beneficial*** effect on planned development of energy infrastructure as compared to the No Action/No Project Alternative baseline condition.

SSHCP Preserve management and maintenance activities under the Proposed Action/Proposed Project would not generate an increase in demand for energy because they would not introduce new urban uses or people. Therefore, the Proposed Action/Proposed Project Preserve System would have ***No Effect*** on energy demand or planned development of energy infrastructure as compared to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- Reduce the potential for impacts associated with building new electric or natural gas infrastructure to meet demands of urban development outside the UDA;
- Reduce the potential for urban development patterns to conflict with regional energy infrastructure plans; and
- Result in similar demand for electricity and natural gas service because total amounts of urban development within the Planning Area would be similar.

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative on the energy impact criteria, the Proposed Action/Proposed Project would result in ***Minor Beneficial*** effects on energy when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and Section 12.2.1, past and present urban development and associated infrastructure projects and activities have occurred in the EIS/EIR Planning Area, especially within the UDA. Energy demands of these past and present projects and activities have been met by energy providers through additional energy generation and development of new energy transmission infrastructure.

Reasonably foreseeable future projects in the EIS/EIR Planning Area that would further increase energy demand include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the Wilton Rancheria Casino, construction of the high-speed rail, and the California WaterFix projects (Section 3.7.2).

The additional increment of energy demand generated by these reasonably foreseeable other projects would be accommodated by utility providers by purchasing additional electricity or natural gas on the open market and by constructing additional infrastructure. Any additional infrastructure required for these projects would be developed by the utility providers and would generally be located within existing County, city, or utility rights-of-way to minimize impacts. The effects of the demand for energy and energy infrastructure from past, present, and reasonably foreseeable other projects would constitute a less than significant cumulative effect.

The additional development from urban development under the Proposed Action/Proposed Project would offset its impacts similarly, through payment of usage fees. Because the Proposed Action/Proposed Project would include an Aquatic Resources Plan and expedited permitting process for aquatic resources, proponents constructing or expanding energy infrastructure would be less likely to have to develop alternative routes to avoid wetlands and waters. Generally, development of utility infrastructure within the Preserve System could occur as long as those projects complied with SSHCP AMMs. Therefore, because the incremental effect of the Proposed Action/Proposed Project on energy would not be discernibly different from the incremental effect of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in ***No Cumulative Effect*** (when compared to the future No Action/No Project baseline condition).

12.2.3.6 Mosquito Abatement

Direct and Indirect Effects of the Alternative

Covered Activities under the Proposed Action/Proposed Project Alternative include the types of urban development that are anticipated under the No Action/No Project Alternative. However, the Proposed Action/Proposed Project Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow

urban development Covered Activities within the MCRA and the rest of the UDA to be implemented consistent with the approved general plans of Sacramento County and Rancho Cordova and Galt, with the only Covered Activity urban development beyond the UDA being road and pipeline projects that would also occur under the No Action/No Project Alternative. Funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so any additional demand for mosquito abatement would be met. There is no reason to expect that urban development under the Proposed Action/Proposed Project would result in greater or less exposure to mosquitos for people than the No Action/No Project Alternative. Impacts associated with the potential for urban development to create breeding areas for mosquitos or increase human populations near mosquito breeding areas would be largely the same as described for the No Action/No Project Alternative (Section 12.2.2.6, Mosquito Abatement). Therefore, urban development under the Proposed Action/Proposed Project would have ***No Effect*** on mosquito abatement as compared to the No Action/No Project Alternative baseline condition.

The Proposed Action/Proposed Project Preserve System would include the re-establishment and establishment of 389 acres of vernal pools, approximately 67 more acres than under the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative would also re-establish and/or establish 387 more acres of seasonal wetland, freshwater marsh, and/or open water within the Planning Area compared to the No Action/No Project Alternative. Re-established and/or established aquatic resources would be closely monitored to ensure that they meet success criteria as agreed on by the U.S. Army Corps of Engineers and that they remain functional as habitat for Covered Species. There is a potential for unhealthy existing or re-established/established aquatic resources to create an environment conducive to mosquito breeding. The coordinated monitoring and management program under the Proposed Action/ Proposed Project would reduce the chances that existing, re-established, or established aquatic resources would be unhealthy and provide breeding habitat for mosquitos by controlling species such as the non-native plant *Glyceria declinata*. Therefore, the Proposed Action/ Proposed Project Preserve System would result in a ***Less Than Significant Adverse*** effect on mosquito abatement when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project would:

- Potentially create more new breeding areas for mosquitos, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health.

- Potentially restrict mosquito abatement activities within preserves, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health.

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative on the mosquito abatement impact criteria, the Proposed Action/Proposed Project would result in ***Less Than Significant Adverse*** effects on mosquito abatement when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

Past and present projects and activities in the cumulative study area relevant to mosquito abatement include many decades of urban development within a natural floodplain that contains many seasonal wetlands and other waters. Mitigation for impacts of past and present urban development has included avoidance of wetlands, establishment of on-site preserves, and on-site establishment of wetlands. This development and mitigation pattern has exposed residents of urban development to mosquito populations that breed in wetland areas and in poorly designed or managed stormwater systems.

Reasonably foreseeable other projects such as urban development in the Elk Grove SOI or Rancho Murieta (Section 3.7.2) and elsewhere in the cumulative study area, such as the community of Natomas, the City of Folsom, or the City of Davis, would increase human populations near existing wetlands and vernal pools. In addition, this urban development would increase impermeable surfaces and contribute urban runoff to drainage structures that can stagnate and create breeding habitat for mosquitos. However, this urban development in the cumulative study area would also remove wetlands and vernal pools, potentially reducing existing breeding areas for mosquitos. Under most circumstances, creation or expansion of mosquito breeding habitat can be avoided or minimized through proper planning and design or maintenance elements. Increased demand on the Sacramento–Yolo Mosquito and Vector Control District for mosquito abatement services would be offset through increased funding of the District. The District is funded through property taxes and other assessments based on property value, and urban development of currently undeveloped land would substantially increase the assessed value of parcels. That increased parcel value would increase property taxes and thus increase funding for the District. Therefore, less than significant adverse cumulative impacts would result from past, present, and reasonably foreseeable other projects.

The Proposed Action/Proposed Project would contribute to cumulative impacts on mosquito abatement by establishing new aquatic resources and potentially making it more difficult to conduct mosquito abatement activities on preserves. However, the Preserve System would be carefully monitored and managed to avoid the aquatic resource conditions conducive to

mosquito breeding. Further, funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so additional demand for mosquito abatement would be met. Therefore, because the incremental effect of the Proposed Action/Proposed Project on mosquito abatement would be somewhat more than the incremental effect of the No Action/No Project Alternative, the Proposed Action/Proposed Project would result in a ***Less Than Significant Adverse Cumulative*** effect (when compared to the future No Action/No Project baseline condition).

12.2.4 Reduced Permit Term Alternative

The Reduced Permit Term Alternative is described in Section 2.4.

12.2.4.1 Law Enforcement, Fire Protection, and Emergency Services

Direct and Indirect Effects of the Alternative

Covered Activities under the Reduced Permit Term Alternative include the types of urban development that are anticipated under the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented in a manner consistent with the approved general plans of Sacramento County and Rancho Cordova and Galt, with the only Covered Activity urban development beyond the UDA being road and pipeline projects that would also occur under the No Action/No Project Alternative. This may slightly reduce demand for new fire and police facilities to serve new urban development because new development would be nearer to existing fire stations and police stations. Therefore, urban development under the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on law enforcement, fire protection, and emergency services as compared to the No Action/No Project Alternative baseline condition.

Preserve management under the Reduced Permit Term Alternative would require a variety of habitat management activities, including grazing management, repairing fences, wildlife or vegetation surveys, trash removal, mowing and/or vegetation removal to control thatch and invasive species, and overall maintenance and monitoring. Preserve management under the Reduced Permit Term Alternative would include use of prescribed burns. As described for the No Action/No Project Alternative, prescribed burning activities under the Reduced Permit Term Alternative would be highly regulated and would not substantially increase demand for local fire departments or CAL FIRE beyond current levels. Therefore, management of the Preserve System under the Reduced Permit Term Alternative would have ***No Effect*** on fire protection as compared to the No Action/No Project Alternative baseline condition.

SSHCP Preserves would maintain areas of natural land cover that could result in an increase in wildfire hazards. As described for the No Action/No Project Alternative, there could be instances where fire suppression is required due to a wildfire or illegal activities that require law enforcement, but these would be indirect effects of the preserves. Law enforcement, medical, rescue, firefighting, and other emergency service providers would be allowed access to SSHCP Preserves to carry out operations necessary for the health, safety, and welfare of the public. As required by Section 11.4.3.2 of the SSHCP, the Implementing Entity would develop Memoranda of Understanding with all applicable fire agencies to be included with each Preserve Management Plan that identify appropriate response and fire suppression techniques, including access points, priority locations for fire camps, firebreak construction, water uptake, use of chemical retardants, heavy equipment operation, and post-fire cleanup. Firebreaks would be allowed inside Preserve Setbacks when necessary, and would comply with applicable local codes. This coordination and planning with fire, police, and emergency service providers would result in a ***Minor Beneficial*** effect when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Reduce the potential for adverse physical impacts associated with the provision of law enforcement services, fire protection, or emergency services to meet demands of urban development outside the UDA;
- Reduce demand for law enforcement, fire protection, or emergency services by not resulting in urban development remote from existing concentrations of law enforcement services, fire protection, or emergency services;
- Not change demand for local fire departments or CAL FIRE beyond current levels as a result of preserve management activities; and
- Not impede delivery of fire, police, and emergency services to preserve areas by improving coordination with local and state service providers.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on the impact criteria for law enforcement, fire protection and emergency services, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects on law enforcement, fire protection, and emergency services when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for law enforcement, fire protection, and emergency services. Existing funding mechanisms have ensured that law enforcement, fire protection, and emergency services were expanded to meet that demand.

Reasonably foreseeable other future projects in the cumulative study area that would further increase demand for law enforcement, fire protection, and emergency services include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin.

The Reduced Permit Term Alternative would not include urban development outside the UDA where law enforcement, fire protection, and emergency services are less available. The Reduced Permit Term Alternative would also improve coordination between Preserve Managers and local or state service providers and therefore would have a smaller incremental contribution to impacts on demand for new facilities of law enforcement services, fire protection, or emergency services as compared to the No Action/No Project alternative. Therefore, because the incremental effect of the Reduced Permit Term Alternative on law enforcement, fire protection, and emergency services would be somewhat less than the incremental effect of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect (when compared to the future No Action/No Project baseline condition).

12.2.4.2 Water and Wastewater Services

Direct and Indirect Effects of the Alternative

Covered Activities under the Reduced Permit Term Alternative include the types of urban development that are anticipated under the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented consistent with the approved general plans of Sacramento County and Rancho Cordova and Galt, with the only Covered Activity urban development beyond the UDA being road and pipeline projects that would also occur under the No Action/No Project Alternative. The Reduced Permit Term Alternative would not result in the impacts associated with expanding infrastructure outside the UDA that would occur under the No Action/No Project Alternative. Therefore, urban

development under the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on water and wastewater infrastructure needs as compared to the No Action/No Project Alternative baseline condition.

Project proponents constructing or expanding water and wastewater pipelines during the 30-year permit term of the Reduced Permit Term Alternative would not necessarily have to develop alternative routes to avoid wetlands and waters. New ~~water or~~ wastewater facilities could be expanded or extended **within the MCRA under the Reduced Permit Term Alternative** as envisioned by the ~~SRWTP Master Plan 2020 (Regional San 2008) within the MCRA and would not be adversely affected by the establishment of preserves under the Reduced Permit Term Alternative.~~ **Regional San ISS and EchoWater Project. New water facilities could be expanded or extended as envisioned by the SCWA Water Supply Master Plans.** Covered Activity water and wastewater infrastructure projects within the MCRA are all planned for completion by the end of year 30. In years 31–50 of the EIS/EIR study period, the SSHCP permits would expire, and there would be no comprehensive plan in place to mitigate potential project impacts to aquatic resources and special-status species associated with construction of new wastewater infrastructure in the Planning Area. Therefore, in years 31–50 of the EIS/EIR study period projects would again be required to mitigate impacts on a project-by-project basis, and CWA 404 and federal Endangered Species Act mitigation for project impacts in the MCRA would require greater levels of avoidance and preservation to be in the MCRA. However, the MCRA and any required wastewater infrastructure would have been largely developed during the 30-year permit term. Construction of any wastewater infrastructure outside the MCRA that would occur during years 31–50 of the EIS/EIR study period would be able mitigate impacts on a project-by-project basis, as described for the No Action/No Project Alternative. This would be a ***Minor Beneficial*** effect on water and wastewater infrastructure, as compared to the No Action/No Project Alternative baseline condition.

The Reduced Permit Term Alternative would assemble a preserve system in the Planning Area during the 30-year permit term, but planned water and wastewater infrastructure could be extended through preserves using horizontal directional drilling in adherence with SSHCP AMMs. Implementation of AMMs EDGE-1, EDGE-8, BMP-1 through BMP-11, STREAM-1 through STREAM-5, and UTILITY-1 through UTILITY-4 during the 30-year permit term could affect design and construction of infrastructure. Relative to the No Action/No Project Alternative, this would be a ***Minor Beneficial*** effect.

Preserve management and monitoring activities under the Reduced Permit Term Alternative would not require substantial water, nor would there be a need for any wastewater treatment. The preserve activities would depend on on-site wells or water brought to the site, and would not require any new water or wastewater connections. Therefore, the Reduced Permit Term Alternative preserve system would result in ***No Effect*** on demand for water treatment, water

supply, and wastewater treatment when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Reduce the impacts from expanding water and wastewater infrastructure to serve urban development urban development outside the UDA;
- Reduce the potential for existing aquatic resources or future preserves to conflict with planned infrastructure development; and
- Result in similar impacts on adequacy of water supply for full buildout of the project.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on the impact criteria for water and wastewater services, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects on water and wastewater services when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for water and wastewater services. Existing funding mechanisms, including payment of fees by project developers and rate increases passed on to residents of the Planning Area, have ensured that water and wastewater services were expanded to meet that demand.

Reasonably foreseeable other future projects in the cumulative study area that would further increase demand for water and wastewater services include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. The additional demand for water and wastewater infrastructure from these projects would also be offset through payment of fees by project developers, and by rate increases passed on to residents of the Planning Area. Therefore, the effects of past, present, and reasonably foreseeable other future projects would have a less than significant cumulative effect on water and wastewater services.

The Reduced Permit Term Alternative would not include urban development outside the UDA where water and wastewater infrastructure are less available, and would have a smaller incremental contribution to impacts on demand for new water or wastewater facilities as compared to the No Action/No Project alternative. Therefore, because the incremental effect of

the Reduced Permit Term Alternative on water or wastewater facilities would be somewhat less than the incremental effect of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect (when compared to the future No Action/No Project baseline condition).

12.2.4.3 Solid Waste Disposal

Direct and Indirect Effects of the Alternative

The Reduced Permit Term Alternative includes the types of urban development that are anticipated under the No Action/No Project Alternative. The urban development under the Reduced Permit Term Alternative would accommodate the same population increase as the No Action/No Project Alternative, and would generate approximately the same amount of solid waste. Future urban development would be consistent with the goals and policies listed in Section 12.1.1 that require that only compatible land uses be located near solid waste facilities and that recycling programs be developed to educate residents. Therefore, the Reduced Permit Term Alternative would result in ***No Effect*** on demand for solid waste disposal when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Establishment, management, and monitoring of the preserves under the Reduced Permit Term Alternative would not increase demand for solid waste service. Overall, there would be no difference in impacts to landfills from preserve activities when compared to similar preserve activities under the No Action/No Project Alternative. Therefore, the Reduced Permit Term Alternative preserves would result in ***No Effect*** on demand for solid waste disposal when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Be serviced by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and
- Result in the same demand for solid waste disposal services.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on the impact criteria for solid waste disposal, the Reduced Permit Term Alternative would result in ***No Effect*** on solid waste disposal when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.2, substantial past and present urban development has occurred in the cumulative study area, especially within the USB of Sacramento County, increasing demand for solid waste disposal. Existing funding mechanisms such as development fees or usage fees paid to the solid waste service providers have ensured that landfills and solid waste handling facilities were expanded to meet that demand.

Reasonably foreseeable future projects in the cumulative study area that would further increase demand for solid waste disposal include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the City of Folsom south of US 50, and additional development in the Natomas Basin. Existing funding mechanisms would also ensure that solid waste disposal is expanded to meet that new demand. The effects of the demand for solid waste disposal from past, present, and reasonably foreseeable other projects would not be cumulatively considerable (i.e., significant).

The urban development under the Reduced Permit Term Alternative would accommodate the same population increase as the No Action/No Project Alternative and would generate approximately the same amount of solid waste. Therefore, because the incremental effect of the Reduced Permit Term Alternative on solid waste disposal would not be discernibly different from the incremental effect of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** (when compared to the future No Action/No Project baseline condition).

12.2.4.4 Parks and Recreational Facilities

Direct and Indirect Effects of the Alternative

The Reduced Permit Term Alternative includes the types of urban development that are anticipated under the No Action/No Project Alternative. The urban development under the Reduced Permit Term Alternative would accommodate the same population increase as the No Action/No Project Alternative and would generate approximately the same amount of demand for parks and recreational facilities. However, the Reduced Permit Term Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented in a manner consistent with the approved general plans of Sacramento County and Rancho Cordova and Galt. By not shifting or displacing urban development outside the UDA, the Reduced Permit Term Alternative would reduce the demand for new park and recreational facilities in areas outside the UDA. Therefore, urban development

under the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on parks and recreational facilities as compared to the No Action/No Project Alternative baseline condition.

The Reduced Permit Term Alternative would implement AMMs such as EDGE-1, EDGE-3, EDGE-3a, and NATURE TRAIL-1 through NATURE TRAIL-5 that would provide standards for design and operation of trails within the preserve areas. Public access on trails through preserve areas would be limited by AMMs NATURE TRAIL-1 through NATURE TRAIL-5, and most would not be open to unguided public access. Provided they comply with those AMMs, new trails and trail extensions that are planned in the Sacramento County, Galt, or Rancho Cordova General Plan Public Facilities or Open Space, Parks, and Trails Elements or in bicycle or pedestrian plans would not be affected by the establishment of an interconnected preserve system. Therefore, the Reduced Permit Term Alternative would have ***No Effect*** on parks and recreational facilities as compared to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Not result in substantial adverse physical impacts associated with the provision of park and recreation services, or result in substantial physical deterioration of an existing facility due to increased use; and
- Allow for development of trails planned in the Sacramento County, Galt, or Rancho Cordova General Plan.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on the impact criteria for parks and recreational facilities, the Reduced Permit Term Alternative would result in ***No Effect*** on parks and recreational facilities when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

Section 12.1.2 describes the substantial amount of parkland acquisition and development that has occurred in the Planning Area. These parks provide diverse recreational opportunities to residents in the Planning Area and surrounding areas. Although some portions of the parks are strictly managed for preservation (e.g., Deer Creek Preserve), most areas are managed for passive and active recreational uses such as hiking, biking, picnicking, boating, camping, and off-road vehicle use.

Reasonably foreseeable other future projects such as urban development in the Elk Grove SOI or expansion of Rancho Murieta, as described in Section 3.7, would increase the population in the

Planning Area and increase demand for parks and recreational facilities. However, this development would generate fees and taxes that would pay for additional parks and recreational facilities in the Planning Area to meet these additional needs.

Urban development under the Reduced Permit Term Alternative would also increase the Planning Area population and result in increased demand for parks and recreational facilities, but as with the past, present, and reasonably foreseeable future projects, this new urban development would generate fees and taxes to pay for additional parks and recreational facilities. The Reduced Permit Term Alternative would provide limited park and recreational facility benefits by providing nature trails in some preserves established during the 30-year permit term, designed in a manner consistent with AMMs NATURE TRAIL-1 through NATURE TRAIL-5. Additional trails would likely be constructed within preserves that are established as mitigation for project impacts in years 31–50 of the EIS/EIR study period. Therefore, because the incremental effect of the Reduced Permit Term Alternative on parks and recreational facilities would not be discernibly different from the incremental effect of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** (when compared to the future No Action/No Project baseline condition).

12.2.4.5 Energy

Direct and Indirect Effects of the Alternative

The Reduced Permit Term Alternative includes the types of urban development that are anticipated under the No Action/No Project Alternative. However, under the Reduced Permit Term Alternative, urban development would not be displaced or shifted to areas outside the UDA (Section 2.3) that may not be served by existing natural gas or electrical infrastructure. Impacts associated with expanding natural gas and electrical supply infrastructure to serve urban development would be somewhat less under the Reduced Permit Term Alternative than the No Action/No Project Alternative. Therefore, urban development under the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on energy as compared to the No Action/No Project Alternative baseline condition.

Energy infrastructure under the Reduced Permit Term Alternative could be expanded, extended, or located as envisioned by the Sacramento County and Rancho Cordova General Plans' Public Facilities Elements and local energy providers' master plans. The regional energy infrastructure plans follow the growth and land use plans laid out in the general plans, and the Reduced Permit Term Alternative would be consistent with these general plans. Therefore, urban development under the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on planned development of energy infrastructure as compared to the No Action/No Project Alternative baseline condition.

Similar to the No Action/No Project Alternative, preserve management and maintenance activities would not generate an increase in demand for energy because they do not introduce new urban uses or people. Therefore, the Reduced Permit Term Alternative preserves would have ***No Effect*** on energy demand or planned development of energy infrastructure as compared to the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Reduce the potential for impacts associated with building new electric or natural gas infrastructure to meet demands of urban development outside the UDA;
- Reduce the potential for urban development patterns to conflict with regional energy infrastructure plans; and
- Result in similar demand for electricity and natural gas service due to similar total amounts of urban development within the Planning Area.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on the energy impact criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects on energy when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

As discussed in Section 3.7.1 and Section 12.2.1, past and present urban development and associated infrastructure projects and activities have occurred in the EIS/EIR Planning Area, especially within the UDA. Energy demands of these past and present projects and activities have been met by energy providers through additional energy generation and development of new energy transmission infrastructure.

Reasonably foreseeable future projects in the EIS/EIR Planning Area that would further increase energy demand include expansion of Rancho Murieta development, urban development in the Elk Grove SOI, development of the Wilton Rancheria Casino, construction of the high-speed rail, and the California WaterFix projects (Section 3.7.2).

The additional increment of energy demand generated by those reasonably foreseeable other projects would be accommodated by utility providers by purchasing additional electricity or natural gas on the open market and by constructing additional infrastructure. Any additional infrastructure required for these projects would be developed by the utility providers and would generally be located within existing County, city, or utility rights-of-way to minimize

impacts. The effects of the demand for energy and energy infrastructure from past, present, and reasonably foreseeable other projects would be a less than significant cumulative effect.

The additional development from urban development under the Reduced Permit Term Alternative would offset its impacts similarly, through payment of usage fees. Because the Reduced Permit Term Alternative would include an Aquatic Resources Plan and expedited permitting process for aquatic resources, proponents constructing or expanding energy infrastructure would be less likely to have to develop alternative routes to avoid wetlands and waters. Generally, development of utility infrastructure within the SSHCP preserve system could occur, as long as those projects complied with SSHCP AMMs. Therefore, because the incremental effect of the Reduced Permit Term Alternative on energy would not be discernibly different from the incremental effect of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in ***No Cumulative Effect*** (when compared to the future No Action/No Project baseline condition).

12.2.4.6 Mosquito Abatement

Direct and Indirect Effects of the Alternative

Covered Activities under the Reduced Permit Term Alternative include the types of urban development that are anticipated under the No Action/No Project Alternative. However, the Reduced Permit Term Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented in a manner consistent with the approved general plans of Sacramento County and Rancho Cordova and Galt, with the only Covered Activity urban development beyond the UDA being road and pipeline projects that would also occur under the No Action/No Project Alternative. Funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so any additional demand for mosquito abatement would be met. There is no reason to expect that urban development under the Reduced Permit Term Alternative would result in greater or less exposure to mosquitos for people than the No Action/No Project Alternative. Therefore, impacts associated with the potential for urban development to create breeding areas for mosquitos or increase human populations near mosquito breeding areas would be largely the same as described for the No Action/No Project Alternative (Section 12.2.2.6). Therefore, urban development under the Reduced Permit Term Alternative would have ***No Effect*** on mosquito abatement as compared to the No Action/No Project Alternative baseline condition.

The Reduced Permit Term Alternative includes a preserve system established during the 30-year permit term and a comprehensive preserve management program for those preserves.

The Reduced Permit Term Alternative would include the re-establishment and establishment of 413 acres of vernal pools, approximately 91 more acres than under the No Action/No Project Alternative. The Reduced Permit Term Alternative would also re-establish and/or establish 213 more acres of seasonal wetland, freshwater marsh, and/or open water within the Planning Area compared to the No Action/No Project Alternative. Re-established and/or established aquatic resources would be closely monitored to ensure that they meet success criteria as agreed on by the U.S. Army Corps of Engineers and that they remain functional as habitat for Covered Species. There is a potential for unhealthy existing or re-established/established aquatic resources to create an environment conducive to mosquito breeding. The coordinated monitoring and management program under the Reduced Permit Term Alternative would reduce the chances that existing, re-established, or established aquatic resources would be unhealthy and provide breeding habitat for mosquitos by controlling species such as the non-native plant *Glyceria declinata*. Therefore, the Reduced Permit Term Alternative preserve system would result in a ***Less Than Significant Adverse*** effect on mosquito abatement when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Potentially create more new breeding areas for mosquitos, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health; and
- Potentially restrict mosquito abatement activities within preserves, but would include monitoring and management to ensure that aquatic resources do not generate substantial populations of mosquitos and affect public health.

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on the mosquito abatement impact criteria, the Reduced Permit Term Alternative would result in ***Less Than Significant Adverse*** effects on mosquito abatement when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

Cumulative Effects of the Alternative

Past and present projects and activities in the cumulative study area relevant to mosquito abatement include many decades of urban development within a natural floodplain that contains many seasonal wetlands and other waters. Mitigation for impacts of past and present urban development has included avoidance of wetlands, establishment of on-site preserves,

and on-site establishment of wetlands. This development and mitigation pattern has exposed residents of urban development to mosquito populations that breed in wetland areas and in poorly designed or managed stormwater systems.

Reasonably foreseeable other projects such as urban development in the Elk Grove SOI or Rancho Murieta (Section 3.7.2) and elsewhere in the cumulative study area, such as the community of Natomas, the City of Folsom, or the City of Davis, would increase human populations near existing wetlands and vernal pools. In addition, this urban development would increase impermeable surfaces and contribute urban runoff to drainage structures that can stagnate and create breeding habitat for mosquitos. However, this urban development in the cumulative study area would also remove wetlands and vernal pools, potentially reducing existing breeding areas for mosquitos. Under most circumstances, creation or expansion of mosquito breeding habitat can be avoided or minimized through proper planning and design or maintenance elements. Increased demand on the Sacramento–Yolo Mosquito and Vector Control District for mosquito abatement services would be offset through increased funding of the District. The District is funded through property taxes and other assessments based on property value, and urban development of currently undeveloped land would substantially increase the assessed value of parcels. That increased parcel value would increase property taxes and thus increase funding for the District. Therefore, less than significant adverse cumulative impacts would result from past, present, and reasonably foreseeable other projects.

The Reduced Permit Term Alternative would contribute to cumulative impacts on mosquito abatement by establishing new aquatic resources and potentially making it more difficult to conduct mosquito abatement activities on preserves. However, the preserve system would be carefully monitored and managed to avoid the aquatic resource conditions conducive to mosquito breeding. Further, funding for mosquito abatement would continue to be provided by the additional property taxes and other assessments on new development, so additional demand for mosquito abatement would be met. Therefore, because the incremental effect of the Reduced Permit Term Alternative on mosquito abatement would be somewhat more than the incremental effect of the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in a ***Less Than Significant Adverse Cumulative*** effect (when compared to the future No Action/No Project baseline condition).

12.3 REFERENCES CITED

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

CEC (California Energy Commission). 2015. "Sacramento Municipal Utility District 2013 Electricity Consumption." Accessed August 28, 2015. http://ecdms.energy.ca.gov/elecbyutil.aspx.

Cosumnes River Preserve. 2015. "About the Cosumnes River Preserve." Accessed February 5, 2015. http://www.cosumnes.org/about-the-preserve/.

DPR (California Department of Parks and Recreation). 2015. "Prairie City SVRA." Off-Highway Motor Vehicular Recreation webpage. Accessed February 5, 2015. http://ohv.parks.ca.gov/?page_id=1221.

Galt. 2008. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. Prepared by Environmental Science Associates. Sacramento, California: Environmental Science Associates. July 2008. Accessed June 28, 2016. http://www.ci.galt.ca.us/index.aspx?page=786.

Galt. 2009a. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *Final Environmental Impact Report for the 2030 Galt General Plan.* SCH No. 2007082092. Prepared by Mintier Harnish, ESA, Applied Development Economics, and Omni-Means for the City of Galt. March 2009.

Galt. 2010. *Recommended Capital Improvement Program 2010–2015*. Accessed June 28, 2016. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=3782.

Galt Area Historical Society. 2015. "The McFarland Living History Ranch." Accessed February 5, 2015. http://www.galthistory.org/history/mcfar.htm.

PG&E (Pacific Gas & Electric). 2016. "Company Profile." Accessed June 28, 2016. https://www.pge.com/en/about/company/profile/index.page.

Radmacher, R. 2015. Personal communication re: potential project impacts on the ability of service providers to extend water and wastewater infrastructure and continuing to provide service as outlined in the service district providers' planning documents.

Rancho Cordova. 2006a. *Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report.* SCH no. 2005022137. June 2006. Accessed June 29, 2016. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

Regional San (Sacramento Regional County Sanitation District). 2000. *Interceptor System Master Plan 2000: Final Draft Executive Summary*. Prepared by Black & Veatch Corporation. Sacramento, California: Black & Veatch Corporation. Accessed June 28, 2016. http://www.regionalsan.com/sites/main/files/file-attachments/final_draft_executive_summary.pdf.

SACDOT (County of Sacramento Department of Transportation). 2007. *Sacramento County Pedestrian Master Plan*. Prepared by Dowling Associates Inc. and Moore Iacofano Goltsman Inc., in association with All Traffic Data, Sprinkle Consulting Inc. and the Hoyt Company. April 2007. Accessed February 18, 2016. http://www.sacdot.com/Documents/A%20to%20Z%20Folder/Pedestrian%20Master%20Plan/SAC_PED_PLAN_FINAL__042807_Small.pdf.

Sacramento County. 2000. *Water Forum Agreement*. January 2000. Accessed November 30, 2015. http://www.waterforum.org/wp-content/uploads/2015/09/WF_Agreement_Compiled.pdf.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: Sacramento County Department of Environmental Review and Assessment. April 2010. Accessed June 29, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: Sacramento County, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County. 2015. "Kiefer Landfill." Sacramento County, Waste Management and Recycling. Accessed November 30, 2015. http://www.wmr.saccounty.net/Pages/KieferLandfill.aspx.

Sacramento County and Sacramento Valley Conservancy. 2011. *Deer Creek Hills Preserve Master Plan*. Final version. Adopted October 25, 2011. Accessed June 28, 2016. http://www.sacramentovalleyconservancy.org/admin/upload/MP_Final_.pdf.

Sacramento Regional Solid Waste Authority. 2015. "Certified Construction and Demolition (C&D) Sorting Facilities." Accessed November 30, 2015. http://www.swa.saccounty.net/Pages/CDDebrisSortingFacilities.aspx.

Sacramento–Yolo Mosquito and Vector Control District. 2008. *Mosquito Reduction Best Management Practices*. Accessed June 28, 2016. http://www.fightthebite.net/download/ecomanagement/SYMVCD_BMP_Manual.pdf.

Sacramento–Yolo Mosquito and Vector Control District. 2009. "Spraying Update." June 28, 2016. http://www.fightthebite.net/spraying-update/.

Sacramento–Yolo Mosquito and Vector Control District. 2013. *2013 Annual Report.* Accessed June 28, 2016. http://www.fightthebite.net/download/annualreport/AnnualReport2013.pdf.

SASD (Sacramento Area Sewer District). 2004. *Sewerage Facilities Expansion Master Plan*. Sacramento, California: SASD. May 2004.

SASD. 2008. *Sewerage Facilities Expansion Master Plan Update*. Sacramento, California: SASD.

SCWA (Sacramento County Water Agency). 2005. *Zone 40 Water Services Master Plan*. Sacramento, California: SCWA. February 2005. Accessed June 28, 2016. http://www.waterresources.saccounty.net/Zone%2040/Z40_WSMP.pdf.

SCWA. 2006. *Zone 40 Water System Infrastructure Plan*. Prepared by Sacramento County Water Agency and MWH Americas Inc. Sacramento, California: SCWA. April 2006. Accessed June 28, 2016. http://www.waterresources.saccounty.net/Pages/Reports-WSIP.aspx.

SMUD (Sacramento Municipal Utilities District). 2014. "Power Content Label." Accessed June 30, 2016. https://www.smud.org/assets/documents/pdf/Power-Content-Label-full.pdf.

SMUD. 2015a. "Rancho Seco Recreational Area." Accessed November 30, 2015. https://www.smud.org/en/about-smud/community/recreational-areas/rancho-seco-lake.htm.

SMUD. 2015b. "Where We Get Your Power." Accessed November 30, 2105. https://www.smud.org/en/about-smud/company-information/power-sources/index.htm.

USFS (U.S. Forest Service). 2015. "Managing Wildland Fires: Prescribed Fire." *Fire and Aviation Management Webpage*. Accessed February 5, 2015. http://www.fs.fed.us/fire/management/rx.html.

INTENTIONALLY LEFT BLANK

CHAPTER 13 – TRAFFIC AND CIRCULATION

This chapter presents the environmental effects of each Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) alternative on traffic and circulation within the Planning Area. The analysis focuses on impacts to transportation systems that support the movement of goods and people. These systems include roads and freeways that support motorized vehicles; railways; public transit; and nonmotorized travel, including bicycles and pedestrians.

Environmental effects on airports are addressed in Chapter 4, Land Use. Environmental effects on recreation trails are discussed in Chapter 12, Public Services and Facilities, as a component of the recreation facilities available in the Planning Area.

13.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

This section describes the regulatory and physical environmental setting for traffic and circulation within the Planning Area.

13.1.1 Regulatory Framework

Several federal, state, and local agency requirements apply to traffic and circulation within the Planning Area. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, issuance of permits, or implementation of the alternatives analyzed in this EIS/EIR. This section also identifies any relevant federal permits or other entitlements that must be obtained prior to implementing the chosen alternative. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 13.2 (40 CFR 1502.25).

13.1.1.1 Federal and State

California Department of Transportation

In California, the Federal Highway Administration has delegated some authority for the federal highway system to the California Department of Transportation (Caltrans). Therefore, Caltrans is responsible for the planning of, operating, and maintaining the federal and state highway systems within the Planning Area (e.g., Interstate [I] 5 and State Route [SR] 99). The role of Caltrans has also evolved to oversee funding and technical assistance for passenger rail and public transit throughout the state. Any potential encroachment by development or infrastructure projects onto the land or the rights-of-way of Caltrans must be reviewed and approved by Caltrans. Planned development or infrastructure projects, such as some SSHCP transportation Covered Activities, must be reviewed by Caltrans to assess potential effects on the operation and safety of the federal or state highway system, as well as to local roads, railroads, public transit, and aeronautics facilities under Caltrans' authority.

The Caltrans SR-99 and I-5 Corridor System Management Plan (Caltrans 2009) and the SR-99 Transportation Corridor Concept Report (Caltrans 2010) provide long-range planning for SR-99 and I-5 within Sacramento, Sutter, and Butte Counties over the next 20 years.

California Public Utilities Commission

In addition to the role the California Public Utilities Commission plays in overseeing energy facilities in California (see Chapter 12), it also oversees the safety of railroads, rail crossings, and light-rail transit systems, including highway rail crossings, and has permit authority over all new rail crossings.

13.1.1.2 Regional

Sacramento Area Council of Governments

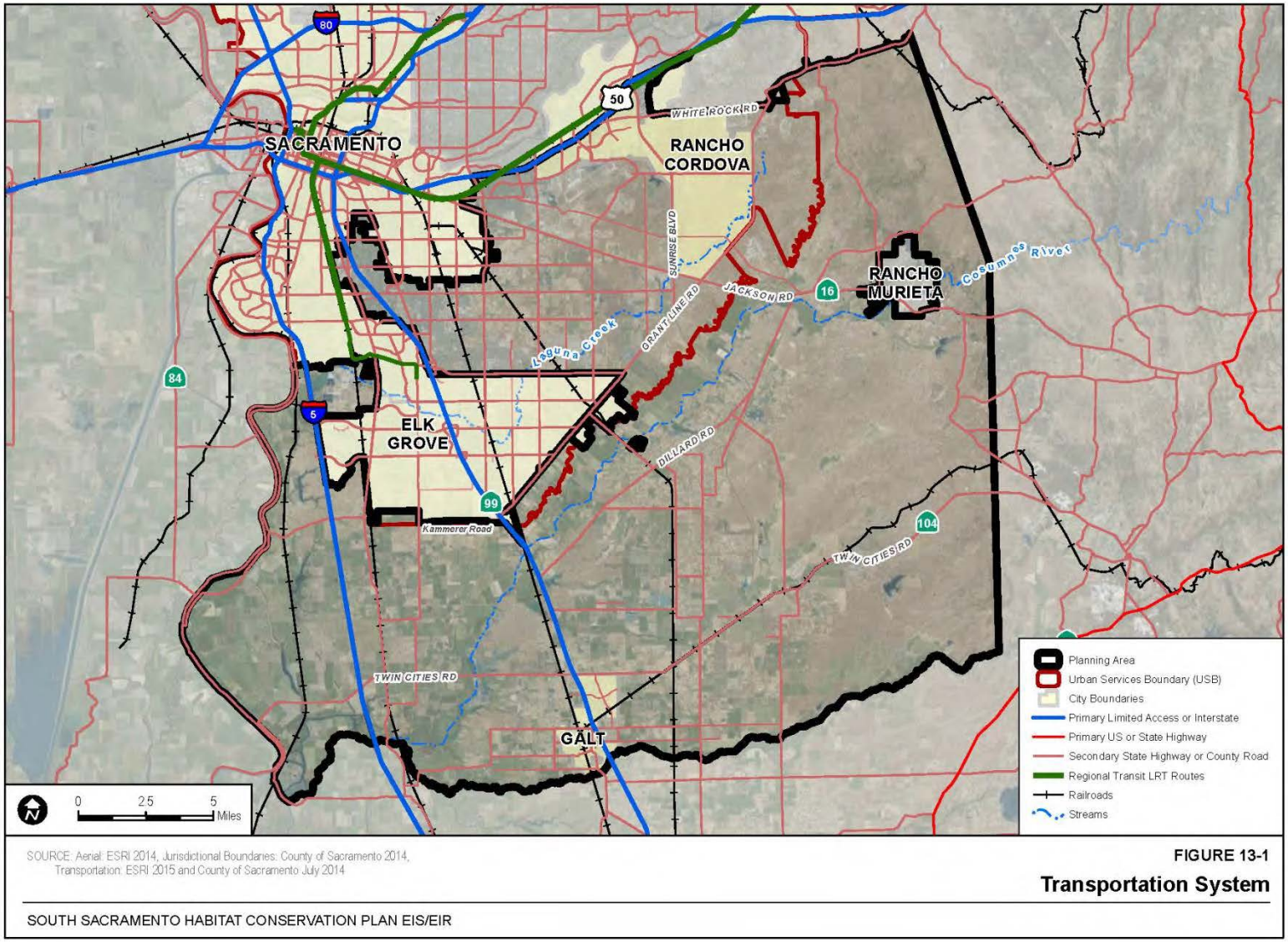
The Sacramento Area Council of Governments (SACOG) is an association that includes the Counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba, as well as 22 cities, including the proposed Plan Permittees of Galt and Rancho Cordova. As a metropolitan transportation organization, SACOG is required to prepare a long-range transportation plan for all modes of transportation—including public transit, automobiles, bicycles, and pedestrians—every 4 years for the six-county area. Refer to Section 3.4.4 for a description of the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) 2035 (SACOG 2016a) and its associated EIR (SACOG 2016b).

Sacramento Regional Transit District

The Sacramento Regional Transit District oversees bus and light-rail transit within the region, covering a 418-square-mile service area that includes Sacramento, Elk Grove, Citrus Heights, Rancho Cordova, and Folsom, as well as unincorporated Sacramento County. The existing passenger light-rail transit system consists of the Blue Line, Green Line, and Gold Line. The Gold Line and Blue Line link the northern, eastern, and southern areas in Sacramento County to downtown Sacramento. The Green Line serves downtown Sacramento. A small portion of the Gold Line is within the Planning Area (running roughly parallel to U.S. Highway 50 within the Urban Services Boundary [USB]) (see Figure 13-1, Transportation System).

In addition, the Sacramento Regional Transit District provides bus service between Sacramento and Rancho Cordova, and recently opened the Blue Line extension from the Meadowview Station south to Cosumnes River College in Sacramento (Sacramento County Regional Transit 2015). See Section 13.1.2 for more detail regarding the existing bus and light-rail transit system within the Planning Area.

Figure 13-1 Transportation System



AGENDA ITEM 11.1
5038

INTENTIONALLY LEFT BLANK

13.1.1.3 Local

Sacramento County

The Sacramento County Department of Transportation is responsible for the planning, construction, maintenance, and operation of streets, roads, and bike trails in the unincorporated areas of Sacramento County.

Sacramento County provides Improvement Standards (Sacramento County 2006) that regulate and guide the design and construction of streets, highways, alleys, and roadway drainage systems. Design parameters include specifications for turning movements, intersections, lighting, sidewalks, landscaping, emergency vehicle access, and clearance. The Improvement Standards provide detailed design specifications to ensure that all Sacramento County roadways meet safety and functionality requirements by roadway type.

Sacramento County's Standard Construction Specifications (Sacramento County 2008) provides specific guidance to ensure safe vehicle, pedestrian, and bicycle access is provided for development projects that affect roadways and public safety. The Standard Construction Specifications also addresses traffic control for construction work that affects roadway access, and requires project proponents to prepare a traffic control plan consistent with the current California Manual on Uniform Traffic Control Devices.

Sacramento County 2030 General Plan Circulation Element. The Sacramento County General Plan Circulation Element (Sacramento County 2011a) outlines a transportation system that will move people and goods in a safe, efficient way that minimizes environmental effects, supports urban land uses, and serves rural needs. The Circulation Element contains goals, policies, and implementation programs that apply to Sacramento County's transportation system.

Pedestrian Master Plan. The Sacramento County Pedestrian Master Plan (SACDOT 2007) identifies methods to improve pedestrian connectivity and pedestrian safety within the public right-of-way within unincorporated Sacramento County.

Bicycle Master Plan. The Sacramento County Bicycle Master Plan (Sacramento County 2011b) identifies existing and planned bicycle routes throughout Sacramento County. The Bicycle Master Plan was developed to serve the recreational and transportation needs of the public, and to reduce the amount of vehicle emissions and therefore improve air quality (Sacramento County 2011b). Class II bikeways are present along some roadways within the Planning Area. The Bicycle Master Plan anticipates that future bikeways would be developed concurrently with planned urban development within the Sacramento County USB.

Galt

Galt follows the guidance of the Sacramento County Improvement Standards and Standard Construction Specifications, as discussed earlier (Galt 2012). However, in some cases, Galt modified these standards to better fit its needs. Galt's Improvement Standards ensure that roadway safety and access for all modes of transportation occur during the design phase and once an improvement project is underway (Galt 2007).

2030 Galt General Plan Circulation Element. The Circulation Element in the Galt General Plan (Galt 2009a) includes goals, policies, and actions designed to guide and implement Galt's future circulation system as it grows. Goals and policies address the roadway network, transit facilities and services, and bicycle and pedestrian facilities, including lands within the Planning Area.

Galt Bicycle Transportation Plan. The Galt Bicycle Transportation Plan encourages development of Galt's future bikeway network, consistent with the Galt General Plan (Galt 2009a). The Galt Bicycle Transportation Plan (Galt 2011) includes planned Class II bike lanes within Galt's sphere of influence and the Planning Area to connect to existing bicycle facilities.

Rancho Cordova

Similar to Galt, Rancho Cordova follows the Sacramento County Improvement Standards and Standard Construction Specifications discussed earlier (Rancho Cordova 2015). In addition, Rancho Cordova has prepared general guidance on the design, width, and geometry of different roadway types, intersections, overpasses, pedestrian and bikeway facilities, and street signs (Rancho Cordova 2015). Chapter 22.110 of the Rancho Cordova Municipal Code also includes design and improvement standards for all types of roadways within Rancho Cordova to ensure that all roads are designed to be functional and to allow the safe passage of all modes of transportation.

Rancho Cordova General Plan Circulation Element. The Rancho Cordova General Plan Circulation Element (Rancho Cordova 2006a) establishes goals, policies, and actions that will guide Rancho Cordova's future circulation system, including the roadway network, transit facilities and services, and bicycle and pedestrian facilities within the USB.

Transit Master Plan. The purpose of the Transit Master Plan (Rancho Cordova 2006b) is to provide a multimodal approach to support mobility as presented in the General Plan. The Transit Master Plan outlines a system of city, neighborhood, and regional services.

Bicycle Master Plan. The Rancho Cordova Bicycle Master Plan (Rancho Cordova 2011) maps a system of bike paths and bike lanes that encourages bicycle commuting and recreational activities. This Bicycle Master Plan focuses on expanding the existing bicycle network (see

Section 13.1.2) in developed areas and outside of existing developed areas within the USB to provide bicycle access to existing and future activity centers, light-rail, and the existing American River Parkway. The Bicycle Master Plan describes and maps future bike routes and regional bicycle trails along Upper Laguna Creek and in the eastern and southern portions of Rancho Cordova, east of Sunrise Boulevard, in coordination with future development plans.

13.1.2 Existing Traffic and Circulation

This section describes the existing roadway network, transit system, and bikeway system that serve the Planning Area. Figure 13-1 shows the major roadways, light-rail transit, and heavy-rail transportation network in and around the Planning Area. (Due to the scale of the map, it does not include local roadways or bikeway facilities in the Planning Area.)

13.1.2.1 Existing Roadway Network in the Planning Area

Major Roadways

Major roadways carry large volumes of vehicle traffic in the Planning Area and typically connect cities and communities. I-5 and SR-99 are the two major highways running north–south in the Planning Area. U.S. Highway 50, serving east–west traffic, is located on the northern edge of the Planning Area. SR-16 (Jackson Road) and SR-104 (Twin Cities Road) cross the Planning Area and also provide east–west connectivity (see Figure 13-2, Existing Roadways within Unincorporated Sacramento County).

Other major roadways within the Planning Area are four-lane thoroughfares or heavily used two-lane arterial roads, including Folsom Boulevard, White Rock Road, Gerber Road, Kiefer Boulevard, Scott Road, Ione Road, Excelsior Road, Bradshaw Road, Vineyard Road, Elk Grove-Florin Road, South Watt Avenue, French Road, Power Inn Road, Stockton Boulevard, Florin Road, Jackson Highway, Grant Line Road, Calvine Road, Wilton Road, Dillard Road, Clay Station Road, Hood-Franklin Road, Bruceville Road, Franklin Boulevard, and Twin Cities Road (see Figure 13-2).

Within Galt, existing major roadways include Twin Cities Road (SR-104), Walnut Avenue, Elm Avenue, Simmerhorn Road, Boessow Road (C Street), A Street, New Hope Road, Lincoln Way, and Carillion Boulevard (see Figure 13-3, Existing Roadways within Galt).

Within the portion of Rancho Cordova located within the Planning Area, existing major streets include Sunrise Boulevard, White Rock Road, International Drive/Mather Field Road, Douglas Road, Grant Line Road, Zinfandel Drive, Rancho Cordova Parkway/Jaeger Road, Folsom Boulevard, Nike Road, and Bradshaw Road (see Figure 13-4, Existing Roadways within Rancho Cordova).

Local Roadways

Local roadways include smaller collector streets, residential streets, and unimproved agricultural roads. Examples of local roadways in the eastern portion of the Planning Area within and outside of the USB include Eagles Nest Road, Latrobe Road, and numerous agricultural roads. Examples of local roadways in Galt include McFarland Street, Pringle Avenue, and F Street. Examples of local roads in Rancho Cordova include Jaeger Road, Nike Road, and Fitzgerald Road.

13.1.2.2 Public Transit in the Planning Area

The Sacramento Regional Transit District operates a bus and light-rail transit system in the Sacramento County area. A short segment of the light-rail system enters and exits the north end of the Planning Area in Rancho Cordova around where Sunrise Avenue crosses U.S. Highway 50. No adopted plans identify additional future light-rail routes within the Planning Area.

Galt and Rancho Cordova both provide bus service that consists of intercity service; connections to light-rail transit system stations; and service to Lodi, Elk Grove, and Sacramento.

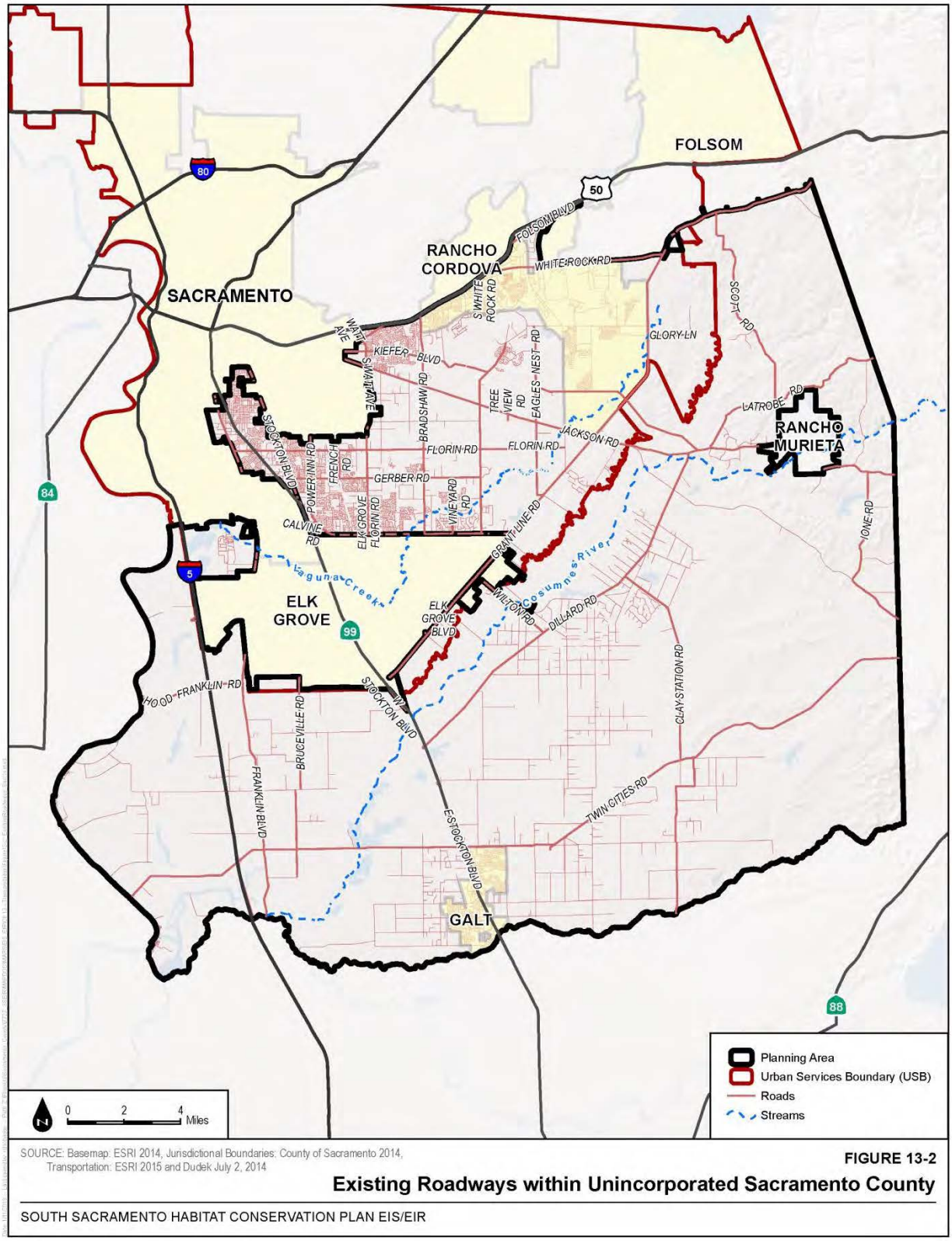
13.1.2.3 Bicycle Network in the Planning Area

Existing bicycle facilities within the Planning Area consist of Class I, Class II, and Class III facilities. Class I Bikeways provide a separated right-of-way for the exclusive use of bicycles and pedestrians, with crossflow by motorists minimized. Class II Bikeways (Bike Lanes) provide a striped lane for bicycles on a street or highway. Class III Bikeways (Bike Routes) provide for shared use with pedestrian or motor vehicle traffic.

13.1.2.4 Railroads in the Planning Area

In addition to the existing light-rail transit system operated by the Sacramento Regional Transit District, rail service in the Planning Area is operated by Union Pacific, which provides freight service, and Amtrak, which provides passenger service. Existing major rail lines are shown in Figure 13-1. There are approximately 154 railroad crossings at existing roadways within the Planning Area (CPUC 2012). Of these, more than 100 are at-grade crossings, meaning that the roadway and railroad tracks are not separated by an overcrossing.

Figure 13-2 Existing Roadways within Unincorporated Sacramento County



SOURCE: Basemap: ESRI 2014, Jurisdictional Boundaries: County of Sacramento 2014, Transportation: ESRI 2015 and Dudek July 2, 2014

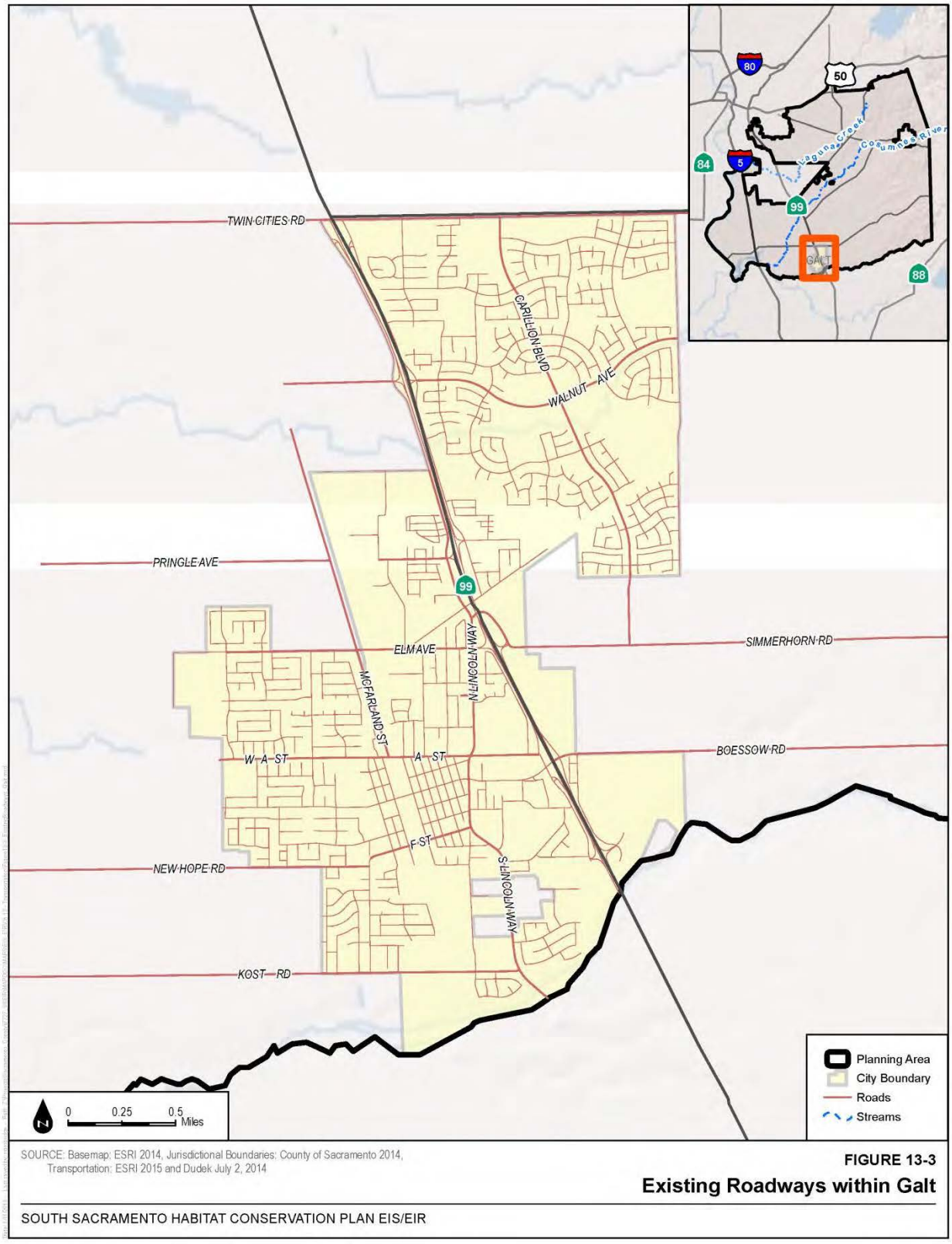
FIGURE 13-2

Existing Roadways within Unincorporated Sacramento County

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN EIS/EIR

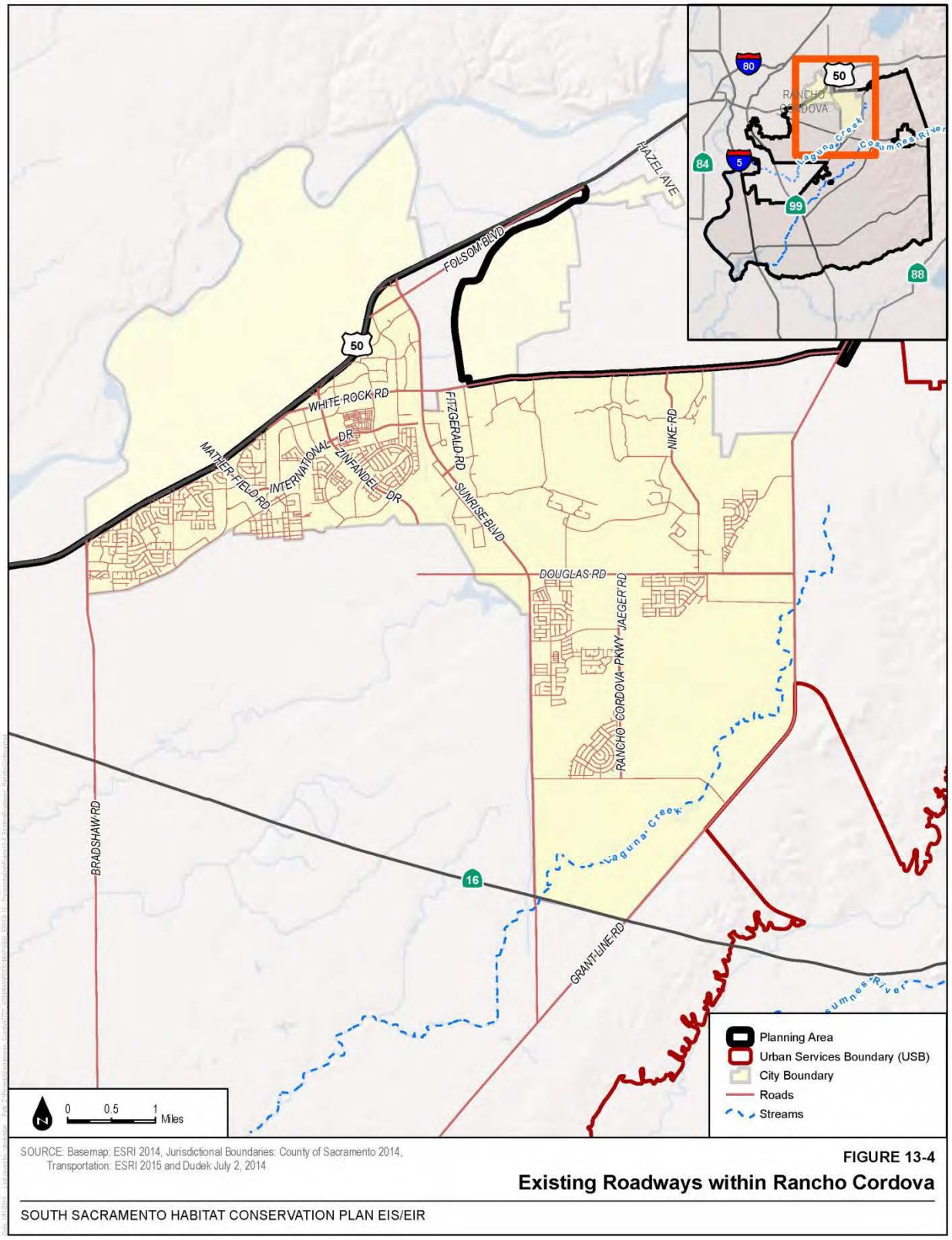
INTENTIONALLY LEFT BLANK

Figure 13-3 Existing Roadways within Galt



INTENTIONALLY LEFT BLANK

Figure 13-4 Existing Roadways within Rancho Cordova



INTENTIONALLY LEFT BLANK

13.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

13.2.1 Methodology for Assessing Effects of Each Alternative on Traffic and Circulation

As described in Section 3.6, the Environmental Consequences/Environmental Impacts section describes the potential impacts of the actions and projects associated with each EIS/EIR alternative on transportation and circulation in the Planning Area. As described in Section 3.6, impacts of the No Action/No Project Alternative are described and analyzed relative to the existing conditions (see Section 13.1.2, above). The impacts of the two action alternatives were described and analyzed relative to the expected No Action/No Project Alternative future conditions (see Section 3.6.1).

Potential ways that an EIS/EIR alternative could affect the transportation system would be by increasing overall usage of the system, encouraging growth in areas where the transportation system is not designed to accommodate that growth, impeding development of planned transportation infrastructure, or damaging existing or planned transportation infrastructure.

The locations of vernal pools and other aquatic resources could require adjustments to the routes of planned roadways within the Mather Core Recovery Area (MCRA) under some alternatives. To identify areas where these adjustments might be required, the lead agencies used GIS methodology, described in Section 3.6.5. Potential impacts to existing transportation plans from establishing new preserves (see Sections 2.2.2, 2.3.1, and 2.4.1) were also determined for each alternative using the GIS methods described in Section 3.6.5.

The level of additional vehicle trips assumed for preserve activities under each alternative was estimated, including expected re-establishment/establishment of vernal pools and other aquatic landcovers, and preserve maintenance activities. The lead agencies then qualitatively determined if the transportation infrastructure could accommodate this temporary traffic increase and determined if substantial congestion or safety issues could occur.

Because traffic patterns and transportation facilities are interconnected over a large region, the lead agencies determined that the study area for determining the cumulative effects of each EIS/EIR alternative on traffic and transportation resources should extend beyond the EIS/EIR Planning Area boundary (see discussion in Section 3.6.2). The lead agencies determined that the SACOG six-county region (Sacramento, Yolo, Sutter, Yuba, Placer, and El Dorado Counties) is the appropriate study area for evaluating cumulative effects to traffic and transportation resources. The effects on traffic and circulation of future urban development within the six-county region, including past, present, and reasonably foreseeable future projects, were

evaluated in the analysis of the EIRs mentioned in Section 3.4 (Connector JPA 2012; Galt 2009b; Rancho Cordova 2006c; SACOG 2016b; Sacramento County 2010). The traffic impact analyses included in each of these EIRs used SACOG traffic models, and thus reflected regional traffic impacts. Due to the interconnected nature of the transportation system within the six-county region, planning-level transportation impact analyses take into account vehicle trip generation from land uses within the larger region and, therefore, reflect the cumulative condition. For this reason, the description of existing and future traffic conditions in each alternative is the cumulative condition. Therefore, a separate cumulative effects discussion is not included for any alternative in this chapter.

As discussed in Section 3.8.1, the criteria used to evaluate the significance of each alternative's effects on traffic and circulation are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, and on typical thresholds used to evaluate effects in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse effect could occur if the alternative would:

1. Result in a substantial increase in traffic compared to baseline traffic volumes and the capacity of the road system;
2. Result in a substantial adverse impact to public safety on area roadways;
3. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks);
4. Result in a substantial adverse impact to access and/or circulation;
5. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system;
6. Conflict with an applicable congestion management program;
7. Substantially increase hazards due to design features or incompatible uses; and/or
8. Result in inadequate emergency access.

Appendix G of the CEQA Guidelines does not provide suggested criteria for determining a beneficial effect. The following criteria were developed by the lead agencies. A beneficial effect could occur if the alternative would:

1. Result in a substantial decrease in traffic compared to the baseline traffic volumes and the capacity of the road system;
2. Result in improved public safety on area roadways;
3. Reduce existing conflicts with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks);
4. Result in improved access and/or circulation;

5. Reduce existing conflicts with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system;
6. Reduce an existing conflict with an applicable congestion management program;
7. Substantially reduce hazards due to design features or incompatible uses; and/or
8. Result in improved emergency access.

The impact analysis for the three EIS/EIR alternatives consider the context, intensity, and severity of potential effects to each of the impact criteria above, and present a separate determination of significance for each of these criteria.

13.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2 of Chapter 2.

13.2.2.1 Direct and Indirect Effects of the Alternative

The effects on traffic and circulation of future urban development within the six-county region, including the Planning Area, were evaluated in the analysis of the EIRs mentioned in Section 3.4. As discussed above in Section 13.2.1, the relevant analyses from each of these EIRs are summarized and incorporated by reference into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the Final Environmental Impact Report: Sacramento County General Plan Update[1] (Sacramento County General Plan EIR) (Sacramento County 2010) determined that within Sacramento County:

- Increased traffic and resulting demand on the circulation network would result in significant unavoidable impacts to roadway levels of service and transit, and
- Urban development envisioned in the Sacramento County General Plan and associated traffic would not adversely affect bicycle and pedestrian facilities or transportation-related safety issues, resulting in less-than-significant impacts to public safety (Sacramento County 2010, pp. 1-20 to 1-26, and pp. 9-1 to 9-93).

[1] As described further in Section 3.4.1, the proposed project analyzed within the Sacramento County General Plan EIR assumed development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by Sacramento County. However, Sacramento County is currently processing Master Plans in the Jackson Highway Corridor, so the referenced conclusions from the proposed project analysis are relevant to the No Action/No Project Alternative.

The impact analysis presented in the City of Galt General Plan Update: 2030 Final EIR (Galt General Plan EIR) (Galt 2009b), determined that within the Galt sphere of influence:

- Urban development described in the Galt's General Plan would result in significant unavoidable impacts to the existing street system and traffic would exceed Galt's level of service standard through planning horizon year 2030, and
- Urban development would not result in significant impacts to regional transportation facilities through compliance with policies contained in the Land Use, Circulation, and Conservation and Open Space Elements of the Galt General Plan (Galt 2008, pp. 5-17 to 5-25).

The Galt General Plan EIR did not address transportation-related safety issues (Galt 2009a).

The impact analysis presented in the City of Rancho Cordova General Plan Final EIR (Rancho Cordova General Plan EIR) (Rancho Cordova 2006c), determined that within Rancho Cordova:

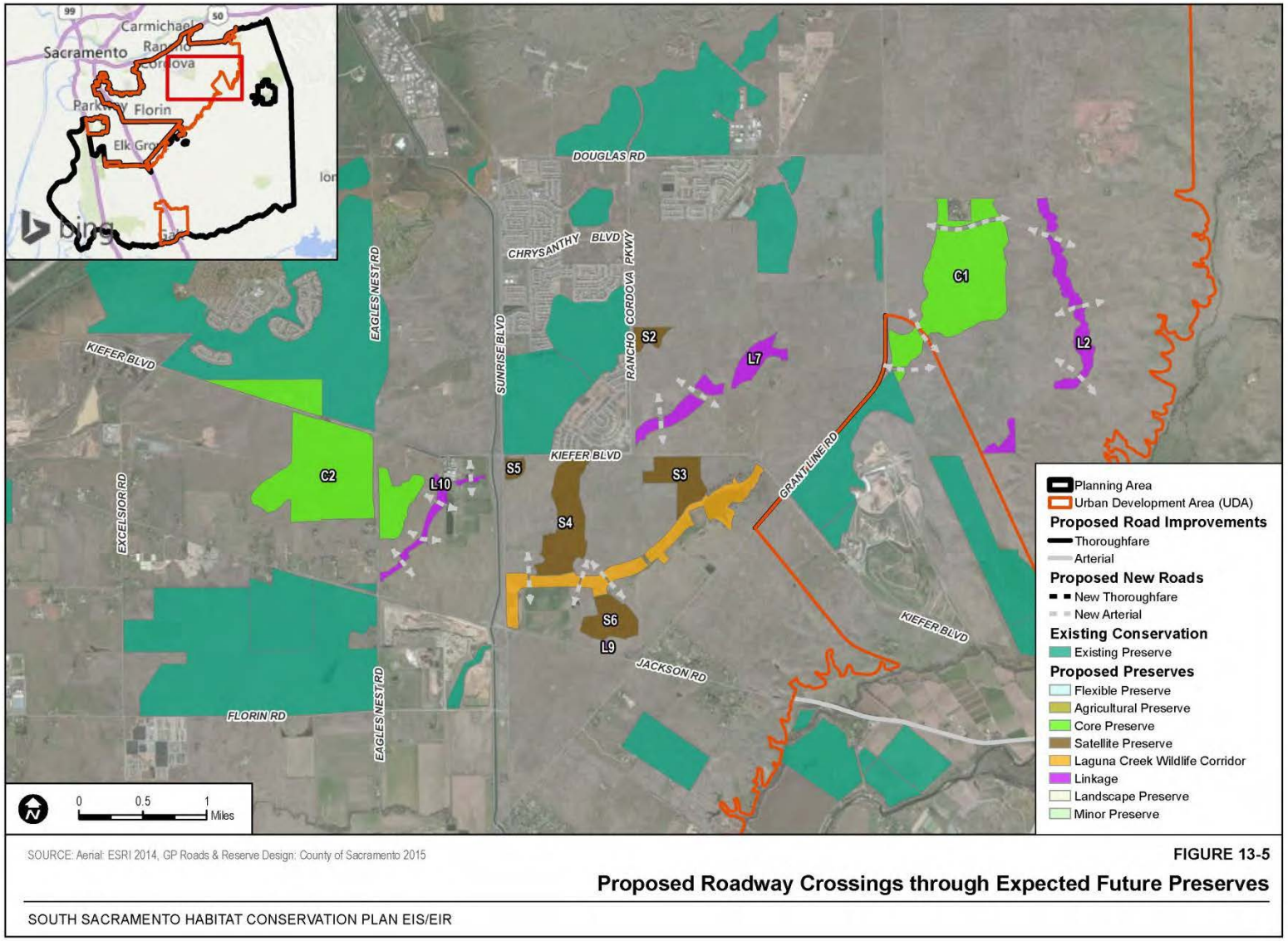
- New urban development would increase demand on the existing circulation network as well as generate an increase in traffic that would result in significant unavoidable impacts to roadway levels of service through the planning horizon year of 2050, and
- Less-than-significant impacts would occur to transit, pedestrian, and bicycle systems through compliance with General Plan policies and actions. In addition, safety conflicts would be less than significant with Rancho Cordova General Plan policies and actions (Rancho Cordova 2006c, pp. 4.5-6 to 4.5-60).

The type and extent of effects to the existing transportation system of smaller developing communities within the SACOG six-county region are described in the SACOG MTP/SCS EIR as being similar to the impacts identified in the Sacramento County General Plan EIR, Galt General Plan EIR, and Rancho Cordova General Plan EIR, and were also determined to be significant and unavoidable (SACOG 2016b).

The impact analysis presented in the Capital SouthEast Connector Final Program EIR (Connector JPA 2012) determined that the Capital Southeast Connector (shown in Figure 13-5, Proposed Roadway Crossings through Expected Future Preserves) would do the following:

- Result in significant unavoidable impacts to level of service and traffic volumes on nearby roadway segments and intersections during operation.
- Result in less-than-significant impacts on local freeways, pedestrian and bicycle facilities, and transit due to increased traffic volumes, and therefore level of service.
- Not result in transportation-system-related safety impacts (Connector JPA 2012, pp. 16-1 to 16-66).

Figure 13-5 Proposed Roadway Crossings through Expected Future Preserves



INTENTIONALLY LEFT BLANK

As discussed in Section 3.4 and above Section 13.1.1.3, the three General Plan EIRs used different study periods: ending in 2030 (Galt 2009b; Rancho Cordova 2006c) and 2050 (Sacramento County 2010). The 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Additional urban development can be expected to occur within Galt, Rancho Cordova, and Sacramento County in the years after their General Plan EIR study periods end, and until this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in this EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

The additional urban development that would occur after the study periods of the EIRs described above end would result in additional impacts on local and regional circulation systems because the projected increase in vehicle trips would exceed the capacity of the existing and planned roadways.

As explained in Section 2.2, approximately 1,900 acres of planned urban development would be shifted or displaced to locations outside the Urban Development Area (UDA)[2] under the No Action/No Project Alternative. This shifted or displaced development would be remote from commercial and employment centers such as Sacramento and Rancho Cordova, and would result in longer or increased vehicle trips, greater demand on transit to serve outlying areas, and increased overall demand on the local and regional transportation system. Increased vehicle trips and vehicle miles traveled would contribute further to the already significant, unavoidable effects to existing traffic, circulation, transportation facilities, and transit described in the EIRs above (Connector JPA 2012; Galt 2009b; Rancho Cordova 2006c; SACOG 2016b; Sacramento County 2010).

As explained in Section 2.2.2, under the No Action/No Project Alternative, mitigation for effects to listed species or aquatic resources from new urban development would continue to require avoidance, minimization, and compensatory mitigation for effects that cannot be avoided. As discussed in Section 2.2.2, project Clean Water Act 404 compensatory mitigation and/or federal and California Endangered Species Act mitigation under the No Action/No Project Alternative

[2] As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, the term "UDA" means all lands within Sacramento County's Urban Services Boundary that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within Galt's sphere of influence (see Figure 1-1).

could include purchase of credits at existing mitigation banks, payment of in-lieu fees, and/or establishment of on-site or off-site preserves by the permittee. Under the No Action/No Project Alternative, there would be no comprehensive plan in place to mitigate potential project impacts to aquatic resources and special-status species associated with construction or expansion of roadways in the Planning Area. Projects would be required to mitigate impacts on a project-by-project basis, and mitigation for project impacts in the MCRA would require greater levels of avoidance and preservation. If mitigation sites are not available in the MCRA, some road projects in the MCRA may not be able to proceed. If segments of roadways are not expanded or extended as envisioned by Sacramento County's and Rancho Cordova's General Plan Circulation Elements, increased congestion on and reduced functionality of these regional circulation systems may occur. This would be a significant adverse effect to existing transportation and circulation plans.

Management of preserves established under the No Action/No Project Alternative would include a variety of habitat management activities that would cause vehicle trips, such as transporting livestock for grazing management, repairing fences, and visits by preserve managers for maintenance and monitoring. Some habitat re-establishment or establishment activities may also require heavy equipment and the associated crews to use local roadways. These activities would result in localized, temporary effects to the local roadway and bikeway systems. However, vehicle trips associated with preserves would be infrequent and intermittent, would occur throughout the day, and would not be focused on peak traffic periods (i.e., commute hours). In addition, these preserve operation and maintenance activities would be similar in frequency, location, and intensity to the existing agricultural and ranching activities that occur on the lands under existing conditions. The minimal increase in traffic from preserve activity would not add appreciably to the significant and unavoidable effects identified in the General Plan EIRs.

13.2.2.2 Cumulative Effects of the Alternative

As described in Section 13.2.1, the future traffic effects analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative effects of the No Action/No Project Alternative on existing and future traffic and circulation are identical to the direct and indirect effects described in Section 13.2.2.1.

13.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3.

13.2.3.1 Direct and Indirect Effects of the Alternative

Covered Activities under the Proposed Action/Proposed Project Alternative include the types of urban development that are anticipated under the No Action/No Project Alternative. However, the Proposed Action/Proposed Project Alternative would result in more development in the MCRA than the No Action/No Project Alternative (refer to Section 2.2.2). This would allow urban development Covered Activities within the MCRA and the rest of the UDA to be implemented consistent with the approved general plans of Galt, Rancho Cordova, and Sacramento County, with the only Covered Activity urban development beyond the UDA being road and pipeline projects that would also occur under the No Action/No Project Alternative. As a result, vehicle trips, demand on transit to serve outlying areas, and overall demand on the local and regional transportation system would be lower under the Proposed Action/Proposed Project Alternative than under the No Action/No Project Alternative. Urban development under the Proposed Action/Proposed Project Alternative would have a ***Minor Beneficial*** effect on traffic and circulation compared to the No Action/No Project Alternative baseline condition.

The Proposed Action/Proposed Project Alternative includes design requirements for future roadways. Avoidance and Minimization Measure (AMM) ROAD-1 would require transportation Covered Activities to adjust alignment of roadways to avoid aquatic resources and Covered Species habitat to the maximum extent feasible. AMM ROAD-2 would require construction of wildlife crossing structures when roadway projects occur in the vicinity of the Preserve System. Implementation of these AMMs could influence roadway safety, function, or operation. However, all roadway projects would be subject to the design standards of Galt, Rancho Cordova, and Sacramento County (Section 13.1.1). These standards ensure that roadway Covered Activities would be designed to maintain or provide roadway function and operation, and meet all safety requirements for vehicle, transit, and bicycle movement. There would be ***No Impact*** to traffic and circulation compared to the No Action/No Project Alternative baseline condition.

Under the Proposed Action/Proposed Project Alternative, project proponents constructing or expanding roadways in the MCRA would not be required to mitigate effects to aquatic resources or Covered Species habitat within the MCRA, as would occur under the No Action/No Project Alternative (see Sections 2.2.2 and 2.3.1). This difference would make it more likely that road projects in the MCRA under the Proposed Action/Proposed Project Alternative could be implemented consistent with Sacramento County and Rancho Cordova General Plans compared to the No Action/No Project Alternative. This would be a ***Minor Beneficial*** effect on conflicts with adopted transportation plans compared to the No Action/No Project Alternative baseline condition.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include an interconnected and coordinated SSHCP Preserve System. The Preserve System would allow for the passage of planned roadways. In some instances, the roadway would be allowed to bisect an SSHCP Preserve. For example, the proposed Sun Creek Preserve (Linkage Preserve L7), the Laguna Creek Wildlife Movement Corridor Preserve, and Core Preserve C2 would be bisected by the extension of future roadways through each of these planned preserves (Figure 13-5). Therefore, future planned roadways, extensions of existing roadways, and roadway widening and improvements that are planned in the Sacramento County, Galt, and Rancho Cordova General Plan Circulation Elements would not be affected by the establishment of an interconnected Preserve System. Further, by allowing transportation infrastructure to be developed according to adopted plans, the Proposed Action/Proposed Project Alternative would not increase hazards by requiring changes in roadway design features or adversely affect emergency access. As discussed above in Section 13.2.1 under the No Action/No Project Alternative, planned roadways may need to be designed to avoid aquatic resources because those projects could not receive permits or authorizations to fill or remove wetlands and other waters. Therefore, the Proposed Action/No Project Alternative Preserve System would have a ***Minor Beneficial*** effect on conflicts with adopted transportation plans compared to the No Action/No Project Alternative.

Preserve management under the Proposed Action/Proposed Project Alternative would require a variety of habitat management activities, including transporting sheep, goats, or cattle for grazing management; repairing fences; wildlife or vegetation surveys; and other visits by preserve managers for maintenance and monitoring, all of which would entail vehicle trips in or around preserve areas. These trips would be few and intermittent, would occur throughout the day, and would not be focused on peak traffic periods (i.e., commute hours). Preserve management under the Proposed Action/Proposed Project Alternative would be more intensive than under the No Action/No Project Alternative. Therefore, preserve management under the Proposed Action/Proposed Project Alternative would result in a greater increase in vehicle trips compared to management of mitigation preserves expected under the No Action/No Project Alternative. However, the relative increase in trips would be minimal compared to existing traffic volumes, and the Proposed Action/Proposed Project Alternative Preserve System would have a ***Less Than Significant Adverse*** effect on traffic volumes, public safety, access, and circulation compared to the No Action/No Project Alternative baseline condition.

Habitat re-establishment/establishment activities in the Preserve System would generate vehicle trips, including heavy truck trips. Because the Proposed Action/Proposed Project Alternative would include more re-establishment/establishment than the No Action/No Project Alternative baseline condition, more vehicle trips would be generated. These activities could result in localized, temporary impacts to the local roadway and bikeway systems by introducing heavy equipment. However, these activities would be infrequent and short-term, and it is

unlikely that construction-related vehicle trips would occur during peak hours. Re-establishment or establishment of habitat would not result in a substantial increase in traffic; affect public safety on area roads; increase hazards due to design features or incompatible uses; or conflict with adopted plans, policies, or ordinances. Habitat re-establishment/ establishment under the Proposed Action/Proposed Project Alternative would be a ***Less Than Significant Adverse*** effect on traffic and circulation compared to the No Action/No Project Alternative baseline condition.

13.2.3.2 Significance of Direct and Indirect Effects

Compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- Reduce vehicle trips, demand on transit to serve outlying areas, and overall demand on the local and regional transportation system by not resulting in displacement and shifting of urban development outside the UDA;
- Reduce potential conflicts with future planned roadways; extensions of existing roadways; and roadway widening and improvements that are planned in the Sacramento County, Galt, and Rancho Cordova General Plan Circulation Elements;
- Result in a minimal amount of additional vehicle trips for Preserve System management and monitoring; and
- Result in a minimal amount of additional heavy vehicle trips for Preserve System habitat re-establishment/establishment.

Therefore, after considering the significance of effects from the Proposed Action/Proposed Alternative on all of the traffic and circulation criteria, the Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial*** effect to traffic and circulation compared to the effects that would occur under the No Action/No Project Alternative baseline condition.

13.2.3.3 Cumulative Effects of the Alternative

As described in Section 13.2.1, future traffic effects analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative impacts of the Proposed Project/Proposed Action Alternative on existing and future traffic and circulation are identical to the direct and indirect impacts described in Section 13.2.3.1.

13.2.4 Reduced Permit Term Alternative

The Reduced Permit Term Alternative is described in Section 2.4.

13.2.4.1 Direct and Indirect Effects of the Alternative

As described in Section 2.4, the Reduced Permit Term Alternative would include similar types of new urban development as the No Action/No Project Alternative (Section 13.2.2). Under the Reduced Permit Term Alternative, all new urban development would occur inside the UDA, as directed by the general plans of Sacramento County, Rancho Cordova, and Galt, and no new urban development would "shift" or be displaced to areas outside the UDA. As a result, vehicle trips, demand on transit to serve outlying areas, and overall demand on the local and regional transportation system would be lower under the Reduced Permit Term Alternative than under the No Action/No Project Alternative. Urban development under the Reduced Permit Term Alternative would have a ***Minor Beneficial*** effect on traffic and circulation compared to the No Action/No Project Alternative baseline condition.

Covered Activity transportation infrastructure projects within the MCRA are all planned for completion by the end of the 30-year permit term, but their actual completion may not occur until beyond 30 years depending on a number of factors. Some planned Covered Activity transportation infrastructure projects outside the MCRA are anticipated by Sacramento County and other transportation planners after Year 30. However, transportation infrastructure projects in the MCRA are expected to be permitted during the 30-year permit term, and would be able to use the Reduced Permit Term Habitat Conservation Plan to mitigate impacts. Construction or routing of transportation infrastructure projects would not be limited by the acreage of vernal pools in the MCRA that are available for preservation. Expansion or extension of roadways as envisioned by the Rancho Cordova and Sacramento County General Plan Circulation Elements (Rancho Cordova 2006a; Sacramento County 2011a) would not be adversely affected by the establishment of preserves under the Reduced Permit Term Alternative. This would be a ***Minor Beneficial*** effect compared to the No Action/No Project Alternative.

Implementation of AMMs ROAD-1 and ROAD-2 during the 30-year permit term, requiring adjustment of roadway alignments to avoid aquatic resources and construction of wildlife crossing structures, could affect roadway safety, function, and/or operation. However, all roadway projects would be subject to the design standards of Sacramento County, Galt, and Rancho Cordova (Section 13.1.1). These standards would ensure that roadway Covered Activities would be designed to maintain or provide roadway function and operation, and meet all safety requirements for vehicle, transit, and bicycle movement. There would be ***No Impact*** to traffic and circulation compared to the No Action/No Project Alternative baseline condition.

The preserves established during the 30-year permit term would be interconnected but would be designed to allow the completion of planned roadways. Planned roadways in the Planning Area should be mostly completed by the end of the 30-year permit term, so preserves established as mitigation on a project-by-project basis in Years 31–50 of the EIS/EIR study

period would not accommodate future roadways crossing preserves. The Reduced Permit Term Alternative would allow transportation infrastructure to be developed according to adopted plans, and it would not increase hazards due to roadway design features or incompatible uses, or adversely affect emergency access. Therefore, the Reduced Permit Term Preserve System would have ***No Impact*** on conflicts with adopted transportation plans compared to the No Action/No Project Alternative.

Preserve management during the 30-year permit term of the Reduced Permit Term Alternative would be more intensive than under the No Action/No Project Alternative, resulting in a small increase in trips compared to the No Action/No Project Alternative. Management of preserves established after the 30-year permit term would likely undergo less management and monitoring than preserves established during the permit term and would generate fewer trips. Regardless, traffic and circulation impacts from preserve management activities would be minimal in the context of traffic from urban development. Preserve management under the Reduced Permit Term Alternative would have a ***Less Than Significant Adverse*** effect on traffic volumes, public safety, access, and circulation compared to the No Action/No Project Alternative baseline condition.

Habitat re-establishment/establishment activities in the Preserve System would generate vehicle trips, including heavy truck trips. Because the Reduced Permit Term Alternative would include more re-establishment/establishment than the No Action/No Project Alternative baseline condition, more related vehicle trips would be generated. These activities could result in localized, temporary impacts to the local roadway and bikeway systems by introducing heavy equipment. However, these activities would be infrequent and short-term, and it is unlikely that construction-related vehicle trips would occur during peak hours. Re-establishment or establishment of habitat would not result in a substantial increase in traffic; affect public safety on area roads; increase hazards due to design features or incompatible uses; or conflict with adopted plans, policies, or ordinances. Habitat re-establishment/establishment under the Reduced Permit Term Alternative would be a ***Less Than Significant Adverse*** effect on traffic volumes, public safety, access, and circulation compared to the No Action/No Project Alternative baseline condition.

13.2.4.2 Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would do the following:

- Reduce vehicle trips, demand on transit to serve outlying areas, and overall demand on the local and regional transportation system by not resulting in displacement and shifting of urban development outside the UDA;

- Reduce potential conflicts with future planned roadways, extensions of existing roadways, and roadway widening and improvements that are planned in the Sacramento County, Galt, and Rancho Cordova General Plan Circulation Elements;
- Result in a minimal amount of additional vehicle trips for Preserve System management and monitoring; and
- Result in a minimal amount of additional heavy vehicle trips for Preserve System habitat re-establishment/establishment.

Therefore, after considering the significance of effects from the Reduced Permit Term Alternative on all of the traffic and circulation impact criteria, the Reduced Permit Term Alternative would result in a ***Minor Beneficial*** effect to traffic and circulation compared to the effects that would occur under the No Action/No Project Alternative baseline condition.

13.2.4.3 Cumulative Effects of the Alternative

As described in Section 13.2.1, the future traffic effects analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative effects of the Reduced Permit Term Alternative on existing and future traffic and circulation are identical to the direct and indirect effects described in Section 13.2.4.1.

13.3 REFERENCES CITED

Caltrans (California Department of Transportation). 2009. *State Route 99/Interstate 5 Corridor Management Plan*. Caltrans District 3, Corridor System Management Plan. May 2009. Accessed June 30, 2016. http://www.dot.ca.gov/hq/tpp/corridor-mobility/CSMPs/d3_CSMPs/i-5_sr-99/I5_SR99_final_csmp_FINAL.pdf.

Caltrans. 2010. "State Route 99 Transportation Corridor Concept Report." August 3, 2010. Accessed June 30, 2016. http://www.dot.ca.gov/dist3/departments/planning/tcr/tcr99.pdf.

Connector JPA (Capital Southeast Connector Joint Powers Authority). 2012. *Capital SouthEast Connector Project Program Environmental Impact Report*. Final version. SCH No. 2010012066. February 2012. Accessed June 28, 2016. http://www.connectorjpa.net/final-program-environmental-impact-report-now-available/.

CPUC (California Public Utilities Commission). 2012. "List of Rail Crossings." July 2012. Accessed May 13, 2013. http://www.cpuc.ca.gov/PUC/safety/Rail/Crossings/crossinginventory.htm.

Galt. 2007. "City of Galt Improvement Standards and Required Notes." Version July 3, 2007. City of Galt, California: City of Galt Public Works Department. Accessed June 30, 2016. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=85.

Galt. 2008. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. Prepared by Environmental Science Associates. Sacramento, California: Environmental Science Associates. July 2008. Accessed June 28, 2016. http://www.ci.galt.ca.us/index.aspx?page=786.

Galt. 2009a. *2030 Galt General Plan: Policy Document*. Final version. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed September 16, 2015. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *Final Environmental Impact Report for the 2030 Galt General Plan*. SCH No. 2007082092. Prepared by Mintier Harnish, Environmental Science Associates, Applied Development Economics, and Omni-Means. Accessed June 30, 2016. http://www.saclafco.org/SphereofInfluenceInformation/Documents/galtsoi/sac_024063.pdf.

Galt. 2011. *City of Galt Bicycle Transportation Plan 2011*. Adopted 2011. Prepared by Omni-Means Engineers Planners. Roseville, California: Omni-Means Engineers Planners. Accessed June 30, 2016. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=5368.

Galt. 2012. "City of Galt, California: Standards and Specifications." Accessed September 11, 2015. http://www.ci.galt.ca.us/index.aspx?page=133.

Rancho Cordova. 2006a. *Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *Transit Master Plan*. Prepared by HDR. Adopted August 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=80.

Rancho Cordova. 2006c. *General Plan Draft Environmental Impact Report*. SCH No. 2005022137. March 2006. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11097.

Rancho Cordova. 2011. *Bicycle Master Plan*. Adopted March 2011. Accessed June 28, 2016. http://www.cityofranchocordova.org/home/showdocument?id=11099.

Rancho Cordova. 2015. "Public Works Development Services & Permitting." Accessed September 21, 2015. http://www.cityofranchocordova.org/index.aspx?page=155.

SACDOT (County of Sacramento Department of Transportation). 2007. *Sacramento County Pedestrian Master Plan*. Prepared by Dowling Associates Inc. and Moore Iacofano Goltsman Inc., in association with All Traffic Data, Sprinkle Consulting Inc., and the Hoyt Company. Sacramento, California: Dowling Associates Inc. and Moore Iacofano Goltsman Inc. April 2007. Accessed February 18, 2016. http://www.sacdot.com/Documents/A%20to%20Z%20Folder/Pedestrian%20Master%20Plan/SAC_PED_PLAN_FINAL__042807_Small.pdf.

SACOG (Sacramento Area Council of Governments). 2016a. *Metropolitan Transportation Plan/Sustainable Communities Strategy*. Sacramento, California: SACOG. February 18, 2016. Accessed June 29, 2016. http://www.sacog.org/general-information/2016-mtpscs.

SACOG. 2016b. *Final Environmental Impact Report for the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy*. SCH No. 2014062060. Sacramento, California: SACOG. January 2016. Accessed June 29, 2016. http://www.sacog.org/general-information/final-2016-mtpscs-environmental-impact-report.

Sacramento County. 2006. *County of Sacramento Municipal Services Agency Improvement Standards*. Sacramento, California: County of Sacramento, Municipal Services Agency. October 1, 2006. Accessed June 28, 2016. http://www.engineering.saccounty.net/Documents/Improvement%20Standards%202006.pdf.

Sacramento County. 2008. *Standard Construction Specifications*. Sacramento, California: County of Sacramento, Municipal Services Agency. Revised January 2008. Accessed June 28, 2016. http://www.saccountyspecs.saccounty.net/Documents/PDF%20Documents%202008/CompleteSpec/2008CompleteSpec.pdf.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: County of Sacramento Department of Environmental Review and Assessment. April 2010. Accessed June 29, 2016. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011a. *Sacramento County General Plan of 2005–2030.* Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed June 28, 2016. http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

Sacramento County. 2011b. *Sacramento County Bicycle Master Plan*. Prepared by Fehr & Peers, mt, and Alta Planning + Design. Sacramento, California: Fehr & Peers, mt, and Alta Planning + Design. Adopted April 2011. Accessed June 28, 2016. http://www.sacdot.com/Documents/A%20to%20Z%20Folder/Bikeways/AdoptedSacCountyBMP_04.27.11.pdf.

Sacramento County Regional Transit. 2015. "Blue Line to Cosumnes River College." Accessed September 10, 2015. http://www.sacrt.com/BLNowOpen.stm.

INTENTIONALLY LEFT BLANK

CHAPTER 14 – AIR QUALITY

This chapter presents the potential effects of each alternative on air quality within the Planning Area. General topics addressed include existing air quality conditions and construction and operational air emissions. Air quality impacts are evaluated for emissions of criteria air pollutants, fugitive dust, toxic air contaminants (TACs), and odors. These terms and general effects of various pollutants are described in Section 14.1.2, Planning Area Air Quality Conditions.

14.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

14.1.1 Regulatory Framework

The regulatory responsibilities for the protection of air quality within the Planning Area include several federal, state, regional, and local agencies. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, issuance of permits, or implementation of the alternatives analyzed in this Environmental Impact Statement/Environmental Impact Report (EIS/EIR). This section also identifies any relevant federal permits or other entitlements that must be obtained prior to implementing the alternatives. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 14.2, Environmental Consequences/Environmental Impacts (40 CFR 1502.25).

14.1.1.1 Federal

The primary legislation that governs federal air quality regulations is the Clean Air Act. The Clean Air Act delegates primary responsibility with implementing national air quality programs to the U.S. Environmental Protection Agency (EPA).

The Clean Air Act required the EPA to establish[1] national ambient air quality standards. As shown in Table 14-1, EPA has established primary and secondary national ambient air quality standards for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead.

If an area does not meet the national ambient air quality standards, federal clean air planning requirements specify that states develop and adopt State Implementation Plans, which are air quality plans showing how air quality standards will be attained. In California, the EPA has delegated authority to prepare State Implementation Plans to the California Air Resources Board (CARB), which has delegated that authority to individual air districts.

14.1.1.2 State

California Air Resources Board

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and implementation of the California Clean Air Act. The California

[1] Note that in the context of this Plan, the word "establish" is synonymous with "create."

Clean Air Act required CARB to establish California ambient air quality standards (Table 14-1). CARB has established California ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the previously mentioned criteria air pollutants.

In addition to the pollutants described previously, TACs are regulated primarily through the Tanner Air Toxics Act (Assembly Bill 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Assembly Bill 2588, Chapter 1252, Statutes of 1987). Assembly Bill 1807 set a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of hazardous air pollutants as TACs. Most recently, particulate-matter exhaust from diesel engines (diesel PM) was added to CARB's list of TACs. PM_{10} is considered a surrogate for diesel PM and, therefore, is the pollutant used to describe TAC emissions in this analysis.

CARB has adopted an asbestos Airborne Toxic Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations (17 CCR 93105). This statewide regulation requires use of control measures to minimize emissions of asbestos-laden dust. The ATCM applies to any size construction project although there are more stringent mitigation requirements for projects that exceed 1 acre.

Naturally occurring asbestos is known to be present in eastern Sacramento County (CDOC 2006). See Chapter 5, Soils, Geology, and Mineral Resources, for more information on the locations of naturally occurring asbestos in the Planning Area (Figure 5-4). Further, the Sacramento Metropolitan Air Quality Management District (SMAQMD) has regulatory authority to ensure compliance with the asbestos ATCM.

14.1.1.3 Local

Sacramento Metropolitan Air Quality Management District

At the local level, SMAQMD is the primary agency responsible for planning to meet federal and state ambient air quality standards in the Planning Area. SMAQMD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws. SMAQMD has jurisdiction over the Planning Area, which is within the Sacramento Valley Air Basin (SVAB).

SMAQMD also enforces air quality regulations, educates the public about air quality, and implements a number of programs to provide incentives for the replacement or retrofit of older diesel engines and to influence land use development in Sacramento County. Other local jurisdictions within the Planning Area include Sacramento County, Galt, and Rancho Cordova. Each jurisdiction currently has adopted General Plans that contain goals and policies relating to the

reduction of air pollution (these are listed in the following text). Generally, the goals and policies require new development within these jurisdictions to comply with SMAQMD California Environmental Quality Act (CEQA) guidance and thresholds of significance (SMAQMD 2014).

Table 14-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California[a,b]	National[c]	
			Primary[b,d]	*Secondary*[b,e]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	—[e]	Same as primary standard
	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	
CO	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	Same as primary standard
	8-hour	9 ppm (10 mg/m^3)[f]	9 ppm (10 mg/m^3)	
NO_2[g]	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	53 ppb (100 µg/m^3)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	—
SO_2	24-hour	0.04 ppm (105 µg/m^3)	—	—
	3-hour	—	—	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	—
PM_{10}	Annual arithmetic mean	20 µg/m^3	—	Same as primary standard
	24-hour	50 µg/m^3	150 µg/m^3	
$PM_{2.5}$	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
	24-hour	—	35 µg/m^3	Same as primary standard
Lead	Calendar quarter	—	1.5 µg/m^3	Same as primary standard
	30-day average	1.5 µg/m^3	—	—
	Rolling 3-month average	—	0.15 µg/m^3	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	No national standards	
Sulfates	24-hour	25 µg/m^3		
Vinyl chloride[f]	24-hour	0.01 ppm (26 µg/m^3)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Source: CARB 2017.

Notes: µg/m^3 = micrograms per cubic meter; CO = carbon monoxide; km = kilometers; NO_2 = nitrogen dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; ppb = parts per billion; ppm = parts per million; SO_2 = sulfur dioxide

a California standards for ozone, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b Concentration expressed first in units in which it was issued. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

c National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

d National primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

e National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] CARB has identified lead and vinyl chloride as TACs with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sacramento County

Sacramento County 2030 General Plan

The *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011) Air Quality Element includes goals, objectives, and policies related to the protection of air quality in the County. Applicable policies include the following (Sacramento County 2011):

> **Policy AQ-1:** New development shall be designed to promote pedestrian/bicycle access and circulation to encourage community residents to use alternative modes of transportation to conserve air quality and minimize direct and indirect emission of air contaminants.
>
> **Policy AQ-3:** Buffers and/or other appropriate mitigation shall be established on a project-by-project basis and incorporated during review to provide for protection of sensitive receptors from sources of air pollution or odor. [C]ARB's "Air Quality and Land Use Handbook: A Community Health Perspective", and SMAQMD's approved Protocol (Protocol for Evaluating the Location of Sensitive Land uses Adjacent to Major Roadways) shall be utilized when establishing these buffers.
>
> **Policy AQ-4:** Developments which meet or exceed thresholds of significance for ozone precursor pollutants as adopted by SMAQMD, shall be deemed to have a significant environmental impact. An Air Quality Mitigation Plan shall be submitted to the County of Sacramento prior to project approval, subject to review and recommendation as to technical adequacy by SMAQMD.
>
> **Policy AQ-10:** Encourage vehicle trip reduction and improved air quality by requiring development projects that exceed the SMAQMD's significance thresholds for operational emissions to provide on-going, cost-effective mechanisms for transportation services that help reduce the demand for existing roadway infrastructure.
>
> **Policy AQ-11:** Encourage contractors operating in the county to procure and to operate low-emission vehicles, and to seek low emission fleet status for their off-road equipment.
>
> **Policy AQ-12:** Minimize air pollutant emissions from Sacramento County facilities and operations.

Policy AQ-13: Use [C]ARB and SMAQMD guidelines for Sacramento County facilities and operations to comply with mandated measures to reduce emissions from fuel consumption, energy consumption, surface coating operations, and solvent usage.

Policy AQ-14: Support SMAQMD's development of improved ambient air quality monitoring capabilities and the establishment of standards, thresholds and rules to more adequately address the air quality impacts of plans and proposals proposed by the County.

Policy AQ-16: Prohibit the idling of on-and off-road engines when the vehicle is not moving or when the off-road equipment is not performing work for a period of time greater than five minutes in any one-hour period.

Policy AQ-17: Promote optimal air quality benefits through energy conservation measures in new development.

Policy AQ-19: Require all feasible reductions in emissions for the operation of construction vehicles and equipment on major land development and roadway construction projects.

Policy AQ-20: Promote Cool Community strategies to cool the urban heat island, reduce energy use and ozone formation, and maximize air quality benefits by encouraging four main strategies including, but not limited to: plant trees, selective use of vegetation for landscaping, install cool roofing, and install cool pavements.

Policy AQ-21: Support SMAQMD's particulate matter control measures for residential wood burning and fugitive dust.

2030 Galt General Plan

The *2030 Galt General Plan: Policy Document* (Galt General Plan) Conservation Element (Galt 2009a) includes goals, objectives, and policies related to the protection of air quality. Applicable policies include the following (Galt 2009a):

Policy COS-5.1: Vehicle Emission Reduction Programs: The City should support land use, transportation management, infrastructure, and environmental planning programs that reduce vehicle emissions and improve air quality.

Policy COS-5.2: Walkable Design: The City shall require subdivision and site plan designs to maximize pedestrian and bicycle circulation and promote street designs that strongly encourage biking and walking.

Policy COS-5.6: SMAQMD Coordination: The City shall coordinate with SMAQMD on the review of proposed development projects. The City shall use SMAQMD Guide to Air Quality Assessment for determining and mitigating project air quality impacts and related thresholds of significance for use in environmental documents.

Policy COS-5.9: Air Quality Mitigation Measures: The City shall enforce construction and operation related air quality mitigation measures adopted through the CEQA process.

Policy COS-5.10: New Development Operational Emission Reductions: The City shall require all new development projects which have the potential to result in significant operational air quality impacts (exceeding SMAQMD adopted thresholds), to incorporate design or operational features that result in a reduction in emissions equal to 15 percent from the level that would be produced by an unmitigated project, based upon feasible mitigation under CEQA.

Policy COS-5.11: Construction Mitigation Measures: The City shall require developers to implement dust suppression measures as well as the applicable standard construction mitigation measures associated with exhaust [oxides of nitrogen] NO_x and PM_{10} reduction in accordance with the current SMAQMD CEQA Guide to Air Quality Assessment.

Policy COS-5.12: Construction Mitigation Fees: The City shall require developers to comply with the current SMAQMD construction mitigation fee offset program.

Policy COS-5.13: Air Pollution Control Technology: The City shall follow the rules and regulations as adopted by the SMAQMD to maintain healthful air quality and high visibility standards. These measures shall be applied to new development approvals and permit modifications as appropriate.

Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2013) Air Quality Element includes goals, objectives, and policies related to the protection of air quality. Applicable policies include the following (Rancho Cordova 2013):

Policy AQ.1.2: Evaluate projects for compliance with state and federal ambient air quality standards and the SMAQMD thresholds of significance.

Policy AQ.1.5: Require odor impact analyses be conducted for evaluating new development requests that either could generate objectionable odors that may violate SMAQMD Rule 402 or any subsequent rules and regulations regarding objectionable odors near sensitive receptors or locate new sensitive receptors near existing sources of objectionable odors.

Should objectionable odor impacts be identified, odor mitigation shall be required in the form of setbacks, facility improvements or other appropriate measures.

Policy AQ.2.2: Encourage mixed-use developments that put residences in close proximity to services, employment, transit, schools, and civic facilities/services.

Policy AQ.2.4: Maximize air quality benefits through selective use of landscaping vegetation that is low in emission of volatile organic compounds, and through re-vegetation of appropriate areas.

Policy AQ.2.5: Utilize the guidelines in the [C]ARB Compatibility and Land Use Handbook: A Community Health Perspective when evaluating new development requests that either would generate toxic air contaminant emissions near sensitive receptors or locate new sensitive receptors near existing sources of air toxic emissions or order to minimize health hazards, and implement all feasible best available control technology, as required by SMAQMD.

Policy AQ.4.1: Promote improved air quality benefits through energy conservation measures for new and existing development.

Policy AQ.4.2: Support vehicle improvements and the use of clean vehicles that reduce emissions and improve air quality.

Policy AQ.4.3: Support SMAQMD's program of retrofitting construction equipment to reduce air pollution.

14.1.2 Planning Area Air Quality Conditions

This section provides information on criteria pollutants and the health effects of these pollutants and describes the existing air quality conditions in the Planning Area.

14.1.2.1 Pollutants and Effects

Concentrations of criteria air pollutants are used to indicate the quality of the ambient air. A brief description of key criteria air pollutants in the SVAB is provided in the following text, including emission source types and health effects. For descriptions of health effects, "acute" refers to effects of short-term exposures to criteria air pollutants, usually at fairly high concentrations, whereas "chronic" refers to effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations.

Ozone

Ozone is a photochemical oxidant (a molecule whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air but is formed through complex chemical reactions between precursor emissions of reactive organic gasses (ROG) and NO_X in the presence of sunlight. ROGs are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels.

Emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Emissions of ROG and NO_x decreased from 2000 to 2010 and are projected to continue decreasing from 2010 to 2035 (CARB 2013).

Acute health effects include increased respiration and pulmonary resistance, including cough, pain, shortness of breath, and lung inflammation. Chronic health effects include permeability of respiratory epithelia and possibility of permanent lung impairment.

Carbon Monoxide

CO is a colorless, odorless gas produced by incomplete combustion of fuels (i.e., motor vehicle exhaust). Acute health effects include headache, dizziness, fatigue, nausea, vomiting, and eventually death. Chronic health effects include permanent heart and brain damage.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions (EPA 2017).

Acute health effects include coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis (inflammation of the lung tissue) or pulmonary edema (fluid accumulation in the lungs), breathing abnormalities, cough, chest pain, rapid heartbeat, and ultimately death. Chronic health effects include chronic bronchitis and decreased lung function.

Sulfur Dioxide

SO_2 is a gaseous compound of sulfur and oxygen. Sources of SO_2 include coal and oil combustion, refineries, and pulp and paper mills. Acute health effects include irritation of upper respiratory tract and increased asthma symptoms. There is insufficient evidence linking SO_2 exposure to chronic health impacts.

Particulate Matter

PM with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. This size particle is of concern because it is small enough to reach deep into the lungs. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2013). $PM_{2.5}$ includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{10} and $PM_{2.5}$ emissions in the SVAB are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion (CARB 2013).

Direct emissions of PM_{10} are projected to remain relatively constant through 2035. Direct emissions of $PM_{2.5}$ have steadily declined in the SVAB between 2000 and 2010 and are projected to increase slightly through 2035.

Acute health risks include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, and premature death. Chronic effects include alterations to the immune system and cancer formation.

Lead

Lead is a relatively soft and chemically resistant metal. Lead is present in small particles as a result of a variety of industrial activities. Acute effects include developmental disruptions in fetuses and children. Chronic effects include neurological, endocrine, and cardiovascular damage.

Toxic Air Contaminants

A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, the high toxicity or health risk of TACs may pose a threat to public health even at low concentrations.

According to the California Almanac of Emissions and Air Quality (CARB 2013), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being diesel PM. Diesel PM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1 and 3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Based on receptor modeling techniques, the CARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB in the year 2000. Since 1990, the health risk associated with diesel PM has been reduced by 52%. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (CARB 2013).

14.1.2.2 Existing Air Quality Conditions

Regional Air Quality

The Planning Area is located within Sacramento County, California, which is within the SVAB. The SVAB also includes all of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, Yolo, and Yuba Counties; the western portion of Placer County; and the eastern portion of Solano County. The ambient concentrations of air pollutants are determined by the amount of emissions released by the sources of air pollutants and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed in the following text.

Climate and Meteorology

The SVAB is a relatively flat area bordered by the northern Coast Ranges to the west and the northern Sierra Nevada to the east. Air flows into the SVAB through the Carquinez Strait, the

only breach in the western mountain barrier, and moves across the Sacramento River–San Joaquin River Delta from the San Francisco Bay area.

The Mediterranean climate type in the SVAB is characterized by hot, dry summers and cool, rainy winters. During the summer, daily temperatures range from 50 degrees Fahrenheit (°F) to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature. Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest, during the winter months. More than half the total annual precipitation falls during the winter rainy season (November through February); the average winter temperature is a moderate 49°F. Also characteristic of SVAB winters are periods of dense and persistent low-level fog, which is most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture-laden breezes from the south to dry land flows from the north.

The mountains bordering the eastern and western sides of the SVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. The highest frequency of poor air movement occurs in the fall and winter when high-pressure cells are present over the SVAB. The lack of surface wind during these periods, combined with the reduced vertical flow caused by a decline in surface heating, reduces the influx of air and leads to the concentration of air pollutants under stable metrological conditions. Surface concentrations of air pollutants are highest when these conditions occur in combination with agricultural burning activities or with temperature inversions, which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

May through October is ozone season in the SVAB. This period is characterized by poor air movement in the mornings with the arrival of the Sacramento River–San Joaquin River Delta sea breeze from the southwest in the afternoons. In addition, longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between ROG and NO_X, which result in ozone formation. Typically, the Sacramento River–San Joaquin River Delta breeze transports air pollutants northward out of the SVAB; however, a phenomenon known as the Schultz Eddy prevents this from occurring during approximately half of the time from July to September. The Schultz Eddy phenomenon causes the wind to shift southward and blow air pollutants back into the SVAB. This phenomenon exacerbates the concentration of air pollutant emissions in the area and contributes to the area violating the ambient air quality standards.

The local meteorology of the Planning Area is represented by measurements recorded at the Western Regional Climate Center Sacramento 5 ESE station. The normal annual precipitation is approximately 18 inches. January temperatures range from a normal minimum of 40°F to a normal maximum of 53.5°F. July temperatures range from a normal

minimum of 59.2°F to a normal maximum of 92°F (WRCC 2015). The predominant wind direction is from the south (WRCC 2002).

Local Air Quality

The Clean Air Act requires the EPA to classify areas in the country as attainment or nonattainment with respect to each criteria air pollutant, dependent on whether the areas meet the national standards. In addition, the CARB makes area designations within California for state ambient air quality standards. The SVAB is in nonattainment for the national and state ozone standards, the state PM_{10} standard, and the national and state $PM_{2.5}$ standards. The attainment status of each pollutant within the SVAB (which includes the Planning Area) for both the California ambient air quality standards and national ambient air quality standards are shown in Table 14-2.

Table 14-2. Attainment Status Designations for the SVAB

Pollutant	National Standard	State Standard
Ozone	Nonattainment (1-hour)[a] classification = severe	Nonattainment (1-hour) classification = serious[b]
	Nonattainment (8-hour)[c] classification = severe	Nonattainment (8-hour)
	Nonattainment (8-hour)[d] classification = severe	
PM_{10}	Attainment (24-hour)	Nonattainment (24-hour)
		Nonattainment (annual)
$PM_{2.5}$	Nonattainment (24-hour)	(No state standard for 24-hour)
	Unclassified/attainment (annual)	Nonattainment (annual)
CO	Attainment (1-hour)	Attainment (1-hour)
	Attainment (8-hour)	Attainment (8-hour)
NO_2	Unclassified/attainment (1-hour)	Attainment (1-hour)
	Unclassified/attainment (annual)	Attainment (annual)
SO_2	(Attainment pending) (1-hour)	Attainment (1-hour)
		Attainment (24-hour)
Lead (particulate)	Unclassified/attainment (3-month rolling average)	Attainment (30-day average)
Hydrogen sulfide	No national standard	Unclassified (1-hour)
Sulfates		Attainment (24-hour)
Visibility-reducing particles		Unclassified (8-hour)

Source: SMAQMD 2013.

Notes: CO = carbon monoxide; NO_2 = nitrogen dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide

[a] Air quality meets federal 1-hour ozone standard (77 FR 64036–64039). The EPA revoked this standard, but some associated requirements still apply. SMAQMD attained the standard in 2009. SMAQMD has requested the EPA recognize attainment to fulfill the requirements.

[b] Per California Health and Safety Code, Section 40921.5(c), the classification is based on 1989–1991 data and, therefore, does not change.

[c] 1997 standard.

[d] 2008 standard.

Criteria air pollutant concentrations are measured at several monitoring stations in the SVAB. In general, the ambient air quality measurements from these stations are representative of the air quality in and around the Planning Area. Table 14-3 summarizes

the air quality data from the last 3 years (2012–2014) for pollutants in nonattainment within the SVAB, including the frequency of exceedances of applicable federal and state air quality standards. CARB and EPA use this type of monitoring data to designate an area's attainment status for criteria air pollutants.

Table 14-3. Summary of Annual Sacramento Valley Air Basin Air Quality for Nonattainment Pollutants (2012–2014)

Averaging Time	2012	2013	2014
Ozone[a]			
Maximum concentration (1-hour/8-hour average ppm)	0.122/0.107	0.12/0.088	0.11/0.085
Number of days national standard exceeded (8-hour)	46	12	23
Number of days state standard exceeded (1-hour /8-hour)	22/75	8/32	12/49
Fine Particulate Matter (PM_{10})[a]			
Maximum concentration (24-hour µg/m^3)	96.7	96.4	125.3
Number of days national standard exceeded (estimates/measured)	0/0	*/0	*/0
Number of days state standard exceeded (estimated/measured[b])	18.7/3	23.3/21	13.2/13
Respirable Particulate Matter ($PM_{2.5}$)[a]			
Number of days national standard exceeded (24-hour measured[b])	3.1	13.0	4.0
High annual state standard designation value	15	14	13
Maximum concentration (24-hour µg/m^3)	123.3	75.6	190.2

Source: CARB 2014.

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million; * = insufficient data to determine value

[a] Data for ozone and $PM_{2.5}$ based on Sacramento County summary tables. Data for PM_{10} based on the T Street Site located at 1309 T Street, Sacramento California, 95814.

[b] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Estimated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

14.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

14.2.1 Methodology for Assessing Impacts of Each Alternative on Air Quality

Air quality impacts are typically evaluated in terms of temporary emissions, most commonly associated with construction activities, and operational emissions, such as those resulting from land use development, increased mobile-source emissions, or additional and new stationary emission sources, such as industrial facilities. The alternatives were evaluated in the context of the planned urban development, land use patterns within the Planning Area, and emissions sources associated with them (e.g., stationary, mobile, area). Impacts were identified where the actions associated with the alternative would result in new or additional emissions of concern.

The projects and activities included in each alternative, including the conceptual preserve, are described in Chapter 2, Alternatives, Including the Proposed Action/Proposed Project. Potential temporary and permanent air quality impacts for each alternative were analyzed based on the anticipated development projects and preserve establishment, management, and maintenance over the 50-year EIS/EIR study period, as described in Section 3.6.3.

Specific to emissions from preserve establishment/re-establishment, emissions from construction- and operational-related activities were quantified using the California Emissions Estimate Model. Modeling was for an estimated high-activity day implementing habitat establishment/re-establishment and used conservative assumptions (i.e., assumptions that would lead to higher emissions) so as to not underestimate emissions from this activity. For example, the modeling assumed that approximately 385 acres of habitat establishment/re-establishment would be completed in a single year, which is roughly 20% of the total habitat establishment/re-establishment required for each alternative over the entire 50-year study period. This is above what would actually be expected to occur as each alternative is implemented over time. The modeling included the use of heavy-duty equipment for earth movement and grading and operational-related vehicle use. Model assumptions and parameters are included in Appendix H, Modeling Data and Assumptions for Air Quality and Greenhouse Gas Analyses.

Cumulative effects are analyzed consistently with the methodology described in Section 3.7, Cumulative Effects Analysis in Resource Chapters 4 through 16.

By nature, pollutants emitted into the air are a regional issue since emissions from multiple sources over a large regional area combine to create the overall air quality conditions. However, the types of emissions and sources within each air basin are regulated through local agencies. As described previously, SMAQMD regulates emissions and sources within the SVAB. Further, significance thresholds determined by SMAQMD are designed to ensure compliance with state air quality planning efforts. Thus, the planning framework is structured such that compliance with regional planning efforts and regulations would ensure compliance with state and federal efforts as well. As such, the lead agencies determined that an appropriate geographic scale for evaluating the cumulative impacts of each EIS/EIR alternative on air quality resources should include air emissions occurring within the SVAB as regulated by SMAQMD.

As discussed in Section 3.4, Previous Planning Area Environmental Reviews, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006) analyzed direct and cumulative impacts of urban growth planned within each jurisdiction, including impacts to air quality. When the impact analyses or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief summary or description of the incorporated information or analysis is

provided in Sections 14.2.2, No Action/No Project Alternative; 14.2.3, Proposed Action/Proposed Project Alternative; and 14.2.4, Reduced Permit Term Alternative.

14.2.1.1 Determination of Impact Significance

For the air quality analysis in this chapter, the evaluation of the significance of air quality effects considers both a federal conformity analysis process and more typical specific significance criteria found in other chapters of this EIS/EIR. Both are described in the following text.

Federal Conformity Analysis

A non-transportation project located in a nonattainment or maintenance area must undergo a general conformity analysis in accordance with Title 40 of the Code of Federal Regulations, Section 93, to ensure that the project does not:

- Cause or contribute to new violations or any standard in any area
- Increase the frequency or severity of an existing violation of any standard
- Delay timely attainment of any standard requiring interim emission reduction or other milestones

As a part of the general conformity process, a conformity analysis is required if a federal action satisfies one of the following two conditions:

- The action's direct and indirect emissions have the potential to emit one or more of the six criteria pollutants at or above emission rates in Table 14-4.
- The action's direct and indirect emissions of any criteria pollutant represent 10% of a nonattainment or maintenance area's total emissions inventory for that pollutant.

Table 14-4. Federal *De Minimis* Levels

Pollutant	Federal Attainment Classification	*De Minimis* Level (Tons/Year)
Ozone (VOC[a])	Severe nonattainment	25
Ozone (NO_x)	Severe nonattainment	25
CO	Attainment	NA
PM_{10}	Attainment	NA
$PM_{2.5}$	Nonattainment	100
Lead	Attainment	NA

Notes: CO = carbon monoxide; NA = not applicable; NO_x = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter; PM_{10} = coarse, respirable, or inhalable particulate matter

[a] Volatile organic compounds (VOCs) are similar to ROG; however, VOC is the term used in the federal conformity analysis regulations for this component of ozone precursors.

If the total direct emissions associated with the action are below the *de minimis* levels indicated in Table 14-4, general conformity requirements do not apply; the action is considered in

conformity and would not result in an adverse impact. Because the air basin encompassing the Planning Area is in attainment (based on federal standards) for the criteria pollutants indicated in Table 14-4 except ozone (severe nonattainment status) and $PM_{2.5}$ (nonattainment status), a conformity analysis for ozone and $PM_{2.5}$ must be completed for the alternatives.

Significance Criteria

As discussed in Section 3.8.1, Significance Thresholds, the criteria used to evaluate the significance of each alternative's impacts on air quality are based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) and typical thresholds used to evaluate effects on air quality in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse impact could occur if the alternative would:

1. Conflict with or obstruct implementation of the applicable air quality plan.
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.
4. Expose sensitive receptors to pollutant concentrations in excess of standards.
5. Create objectionable odors affecting a substantial number of people.

Thresholds provided by the SMAQMD are used to further define applicable air quality standards. Based on numeric criteria used by the SMAQMD, a significant adverse impact would occur if the alternative would:

1. Cause construction-generated criteria air pollutant or precursor emissions to exceed the SMAQMD-recommended thresholds of 85 pounds/day (lb/day) for NO_X, 80 lb/day and 14.6 tons/year for PM_{10}, and 82 lb/day and 15 tons/year for $PM_{2.5}$.
2. Result in a net increase in long-term operational criteria air pollutant or precursor emissions that exceed the SMAQMD-recommended thresholds of 65 lb/day for ROG and NO_X, 80 lb/day and 14.6 tons/year for PM_{10}, and 82 lb/day and 15 tons/year for $PM_{2.5}$.
3. Result in long-term operational local mobile-source CO emissions that would violate or contribute substantially to concentrations that exceed the 1-hour California ambient air quality standards of 20 ppm or the 8-hour California ambient air quality standards of 9 ppm.
4. Expose sensitive receptors to a substantial increase in TAC emissions that exceed 10 in 1 million for carcinogenic risk (i.e., the risk of contracting cancer) and/or a noncarcinogenic hazard index of 1.0 or greater.

Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial impact could occur if the alternative would:

1. Result in a net reduction in criteria pollutant emissions compared to a baseline environmental condition.
2. Result in a net reduction in TAC emissions compared to a baseline environmental condition.
3. Reduce the exposure of sensitive receptors to pollutants compared to a baseline environmental condition.
4. Prevent or eliminate the generation of objectionable odors affecting a substantial number of people, or reduce the number of people exposed to an objectionable odor.

The impact analysis for the three EIS/EIR alternatives considers the context, intensity, and severity of potential impacts to each of these air quality impact criteria and presents a determination of significance applicable to each of these criteria.

14.2.1.2 Significance Criteria That Will Not be Evaluated Further

This section identifies topics related to air quality and the significance criteria that are not carried forward into the impact analysis and provides the reasoning for this determination.

Naturally occurring asbestos is known to be present in eastern Sacramento County. As previously discussed, CARB adopted an ATCM to control exposure to asbestos from construction, grading, quarrying, and surface-mining operations (17 CCR 93105). Compliance with the requirements of the ATCM would avoid any potential impacts associated with naturally occurring asbestos. Further, the release of naturally occurring asbestos and associated impacts are discussed in Chapter 5. This issue is not discussed further in this chapter.

Controlled burns may be required in habitat preserves under any of the alternatives as a plant-pest management tool. Open burns are regulated through SMAQMD by Rule 407. Controlled burns would be infrequent (typically up to once annually at a limited number of preserves and not every year), and before initiating a controlled burn, an open burn permit must be obtained from SMAQMD. Burn implementation must comply with all permit requirements to limit air emissions. Further, controlled burns would not be a primary plant-pest control method, with other options, such as managed grazing, available. This issue is not discussed further in this chapter.

14.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2, No Action/No Project Alternative, in Chapter 2 of this EIS/EIR.

14.2.2.1 Direct and Indirect Effects of the Alternative

Construction Emissions

Much of the future urban development included in the No Action/No Project Alternative is described in the General Plans of Sacramento County, Galt, and Rancho Cordova (see Section 2.2.1, Future Projects/Activities Likely Under the No Action/No Project Alternative).

Construction associated with future development could result in emissions of criteria air pollutants, TACs, and odors. Activities such as the construction of new urban and rural developments and the required infrastructure (e.g., roads, utilities) to support these developments would generate ozone precursors (NO_x and ROG), particulate matter (PM_{10} and $PM_{2.5}$), and odors and TACs associated with diesel exhaust (i.e., PM_{10}) from the use of heavy-duty construction equipment. Local mobile CO emissions could result from construction vehicle exhaust associated with worker commute vehicles and operations of heavy equipment. Fugitive dust emissions of PM_{10} and $PM_{2.5}$ would occur as a result of grading activities, earth movement, and vehicle movement on unpaved surfaces.

The impact analysis presented in the *Sacramento County General Plan Update Final EIR* (Sacramento County 2010, pp. 11-1 through 11-118) determined the following within Sacramento County:[2]

- Construction-related emissions of criteria air pollutants (ROG, NO_X, PM_{10}, and $PM_{2.5}$) would be considered significant and unavoidable
- Construction-related exposure of sensitive receptors to TACs would be less than significant

The *Sacramento County General Plan Update Final EIR* did not explicitly evaluate odor from construction activities.

The impact analysis presented in the *City of Galt General Plan Update Final EIR* (Galt 2009b, pp. 10-38 to 10-58), determined the following within Galt:

- Construction-related emissions of criteria air pollutants (ROG, NO_X, PM_{10}, and $PM_{2.5}$) would be considered significant and unavoidable
- Construction-related exposure of sensitive receptors to TACs would be significant and unavoidable
- Construction-related odors would be considered less than significant

[2] As described further in Section 3.4.1, the proposed project analyzed within the *Sacramento County General Plan EIR* assumed development within a designated "Jackson Highway Corridor New Growth Area" that was not part of the alternative ultimately selected by Sacramento County. However, Sacramento County is currently processing master plans in the Jackson Highway Corridor; therefore, the referenced conclusions from the proposed project analysis are relevant to the No Action/No Project Alternative.

The impact analysis presented in the *City of Rancho Cordova General Plan Final EIR* (Rancho Cordova 2006, pp. 4.6-1 to 4.6-39), determined the following within Rancho Cordova:

- Construction-related emissions of criteria air pollutants (ROG, NO_X, PM_{10}, and $PM_{2.5}$) would be considered significant and unavoidable
- Construction-related exposure of sensitive receptors to TACs would be significant and unavoidable
- Construction-related odors would be considered less than significant

As discussed in Section 3.4, the three General Plan EIRs used different study periods ending in 2030 (Galt 2008), 2030 (Rancho Cordova 2006), and 2050 (Sacramento County 2010), respectively. However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur within Galt, Rancho Cordova, and Sacramento County in the years after each General Plan EIR study period ends but before this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of all urban development activities and projects that are included in the description of each EIS/EIR alternative.

As explained in Section 2.2.2, Expected Regulatory Environment Under the No Action/ No Project Alternative, the regulatory environment of the No Action/No Project Alternative is expected to restrict the ability of local agencies to permit approximately 1,900 acres of future urban development in the Mather Core Recovery Area (MCRA), and this future urban development would be shifted or displaced to one or more of the areas of undeveloped land outside of the Urban Services Boundary (USB) discussed in Section 2.2.3, Loss of Natural Lands Under the No Action/No Project Alternative.

Development shifted or displaced outside of the USB could result in construction worker commute and vendor haul trips being longer in distance, resulting in higher vehicle miles traveled (VMT), relative to what would be expected if urban development was confined to the USB. An increase in regional VMT associated with construction trips would result in increased exhaust emissions of ROG, NOx, PM_{10}, $PM_{2.5,}$ odor (exhaust odors), and TACs. Construction-related emissions as a result of increased vehicle trips and VMT would contribute further to the already significant unavoidable impacts to existing air quality described in the documents referenced previously.

Regarding emissions of local mobile CO, CO concentrations that could result in significant effects may occur at intersections experiencing extreme delays and congestion, typically over 31,600 vehicles per hour (SMAQMD 2014). However, mobile CO emissions are expected to decrease per VMT over time due to cleaner burning fuels and improved vehicle engine technology. The No Action/No Project Alternative would be expected to result in increases in regional VMT associated with construction worker trips (associated with urban development and mitigation preserve construction) as a result of longer travel distances between construction sites. However, this would not result in substantial increases in congestion at any one intersection because trips would be dispersed throughout the region rather than concentrated in any one area, and construction activity and associated trips would be spread over the 50-year study period because individual projects are constructed over time.

Under the No Action/No Project Alternative, new urban development would continue to include mitigation actions to offset impacts to listed species, wetlands, and other regulated natural resources, including on-site or off-site mitigation preserves (Sections 2.2.1 and 2.2.2). Mitigation for unavoidable impacts could also continue to occur through purchasing credits at a mitigation or conservation bank approved by the applicable resource agencies (e.g., U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers), by payment into an in-lieu fee program, on-site project developer–responsible mitigation, or off-site project developer–responsible mitigation.

Where on-site and off-site project developer responsible mitigation preserves are established (constructed) under the No Action/No Project Alternative, they would typically be established in an uncoordinated project-by-project manner. This would often result in smaller, more isolated preserves predominantly located within the MCRA and elsewhere in the USB since projects would establish on-site mitigation preserves associated with resource avoidance areas and only establish off-site mitigation preserves for resource impacts that could not be avoided. Emissions associated with establishment/construction of mitigation preserves would be evaluated on a project-by-project basis and, therefore, have not been specifically described within the General Plan EIRs.

Activities associated with the establishment of habitat mitigation preserves would vary depending on the type of preserve. A preserve intended solely to protect existing habitat might require little work to shift the existing use to preserve. However, a preserve that includes habitat establishment/re-establishment would include minor construction activities, such as earth movement and grading. Both types of preserves could require fence installation, installation of interpretive features, and other minor work. The use of heavy equipment for grading and earth moving could result in exhaust emissions (ROG, NOx, PM, CO) and mobilization of fugitive dust (i.e., PM_{10} and $PM_{2.5}$).

Although specific details regarding the size of mitigation preserves and types of construction activities under the No Action/No Project Alternative are not known, as stated in Section 14.2.1, Methodology for Assessing Impacts of Each Alternative on Air Quality, an estimate of emissions was conducted based on conservative assumptions of preserve size and likely construction equipment that would be used (e.g., trucks, loaders, backhoes) for a preserve involving habitat establishment/re-establishment. Refer to Appendix H for information on the assumptions entered into the emissions modeling.

Based on the modeling conducted, mitigation preserve establishment during periods of maximum activity could result in emissions of up to 75 lb/day of NO_x, 12.5 lb/day of PM_{10}, and 6.9 lb/day of $PM_{2.5}$ from the use of heavy equipment, worker commute trips, and vendor haul trips. Emissions from ROG were quantified and included in Appendix H of this EIS/EIR, but SMAQMD does not have a construction threshold for ROG; therefore, it is not evaluated here. This level of emissions would not exceed applicable SMAQMD thresholds of significance of 82 lb/day for NO_x. With regards to PM_{10} and $PM_{2.5}$, SMAQMD requires incorporation of all available emissions and dust control measures as a threshold of significance for projects subject to CEQA review. Where establishment of individual on-site and off-site preserves are implemented as mitigation under the No Action/No Project Alternative, preserve establishment would occur on a project-by-project basis, and projects of sufficient scale and impacts to require mitigation preserve establishment would likely also undergo CEQA review. Therefore, all aspects of these projects, including mitigation preserve establishment, would likely be required to include all available dust control measures/best management practices (BMPs) required by SMAQMD for projects subject to CEQA. However, all projects within the SMAQMD jurisdiction, even those not subject to CEQA review, would be subject to SMAQMD rules adopted for the purpose of reducing fugitive dust emissions (e.g., Rules 401, 402, and 403). Nonetheless, based on the conservative emissions modeling, dust emissions would be relatively minor and, therefore, would not contribute significantly to the existing nonattainment status of the SVAB. Thus, based on the relatively low emissions of PM_{10} and $PM_{2.5,}$ because any potential grading or earth moving would be subject to currently adopted rules to reduce dust, and because no emissions thresholds related to criteria pollutants would be exceeded, construction-related emissions associated with mitigation preserve establishment would not result in new or additional impacts to air quality.

Regarding exposure of sensitive receptors to TACs, odors, and local CO, construction activities associated with mitigation preserve establishment would be relatively minor and temporary. As such, exposure would be minimal and would not result in excessive exposure at any one receptor for an extended period of time.

Operational Emissions

Operations associated with future development could result in emissions of criteria air pollutants, TACs, and odors. Emissions of criteria air pollutants would be associated with mobile (on-road and off-road vehicles), area-wide, and stationary sources associated with proposed development. TAC and odor emissions would be associated with operational-related mobile and stationary sources, such as diesel exhaust on roadways and various developments, such as dry cleaners, gas stations, and other industrial or commercial land uses.

The impact analysis presented in the *Sacramento County General Plan Update Final EIR* (Sacramento County 2010, pp. 11-1 through 11-118) determined the following within Sacramento County:

- Operational-related emissions of criteria air pollutants (ROG, NO_x, PM_{10}, and $PM_{2.5}$) would be significant and unavoidable.
- Operational-related (on and off road mobile) emissions of criteria air pollutants (ROG, NO_x, PM_{10}, and $PM_{2.5}$) would be significant and unavoidable.
- Operational-related mobile CO emissions would be less than significant.
- Operational-related emissions of TACs from mobile sources would be significant and unavoidable.
- Operational-related emissions of TACs from stationary sources would be significant and unavoidable.

The Sacramento County General Plan Update Final EIR (Sacramento County 2010) did not explicitly evaluate odor emissions.

The impact analysis presented in the *City of Galt General Plan Update Final EIR* (Galt 2008, pp. 10-38 to 10-58) determined the following within Galt:

- Operational-related (stationary, area-wide) emissions of criteria air pollutants (ROG, NO_x, PM_{10}, and $PM_{2.5}$) would be significant and unavoidable.
- Operational-related (on and off road mobile) emissions of criteria air pollutants (ROG, NO_x, PM_{10}, and $PM_{2.5}$) would be significant and unavoidable.
- Operational-related mobile CO emissions would be less than significant.
- Operational-related emissions of TACs from mobile sources would be significant and unavoidable.
- Operational-related odor emissions would be considered less than significant.
- Operational-related emissions of TACs from stationary sources would be significant and unavoidable.

The impact analysis presented in the *City of Rancho Cordova General Plan Final EIR* (Rancho Cordova 2006, pp. 4.6-1 to 4.6-39) determined the following within Rancho Cordova:

- Operational-related (stationary, area-wide) emissions of criteria air pollutants (ROG, NO_x, PM_{10}, and $PM_{2.5}$) would be significant and unavoidable.
- Operational-related (on and off road mobile) emissions of criteria air pollutants (ROG, NO_x, PM_{10}, and $PM_{2.5}$) would be significant and unavoidable.
- Operational-related mobile-CO emissions would be less than significant.
- Operational-related emissions of TACs from mobile sources would be significant and unavoidable.
- Operational-related emissions of TACs from stationary sources would be less than significant.
- Operational-related odor emissions would be considered less than significant.

As stated previously, the General Plan EIRs analyzed the effects of urban development through a period between 2030 and 2050; however, the lead agencies anticipate that urban development projects would continue through the end of the EIS/EIR 50-year study period (2065). Therefore, the lead agencies extrapolated that the significant and unavoidable air quality impacts identified in the EIRs would continue to be significant and unavoidable as additional urban development is implemented. However, less-than-significant CO and odor impacts would remain less than significance according to the reasons described in the following text.

Operational-related mobile-source emissions would be associated with vehicular exhaust as a function of VMT within the Planning Area. Most VMT would be generated by urban development in the Planning Area. As described previously and in Section 2.2.2, the regulatory environment of the No Action/No Project Alternative is expected to restrict the ability of local agencies to permit approximately 1,900 acres of future urban development in the MCRA, and this future urban development would be shifted or displaced to one or more of the areas of undeveloped land outside of the USB, as described in Section 2.2.3. Urban development shifted or displaced outside of the USB could result in longer or increased vehicle trips and, therefore, increase mobile-source emissions of ROG, NO_x, PM_{10}, $PM_{2.5}$, odor, and TACs relative to what would occur if urban development was confined to the USB. Increased mobile-source emissions would contribute further to the already significant unavoidable impacts to air quality described in the documents listed previously. Regarding emissions of mobile CO, as stated previously, CO concentrations that could result in significant effects may occur at intersections experiencing extreme delays and congestion, typically over 31,600 vehicles per hour (SMAQMD 2014). However, mobile CO emissions are expected to decrease per VMT over time due to cleaner burning fuels and improved vehicle engine technology. Although regional VMT may increase as a result of dispersed development patterns anticipated under the No Action/No Project

Alternative, regional VMT would be spread throughout the region and would not result in increases in congestion at any one intersection of sufficient scale to cause adverse CO concentrations. No substantial increases in mobile CO would be anticipated.

The shifted or displaced urban development under the No Action/No Project Alternative would not result in an overall change in stationary emission sources compared to what is identified in the General Plan EIRs listed previously because it is assumed that, although the location of some urban development might change, the overall types and amounts of development would generally remain the same. Therefore, the emissions of TACs, odors, and criteria air pollutant from stationary sources under the No Action/No Project Alternative would remain similar to the impacts described previously for each jurisdiction.

Operational emissions associated with mitigation preserve management include mobile-source exhaust emissions (i.e., vehicle trips) associated with visits by Preserve Managers/crews for maintenance and monitoring and transporting livestock for grazing management specific to mitigation preserve management activities. Additionally, depending on the specifics of the activities associated with mitigation preserve maintenance, several pieces of heavy equipment and the associated crews may infrequently use local roadways, resulting in on- and off-site exhaust emissions and fugitive dust. These activities could result in localized, temporary emissions. Mitigation preserves may be established on existing grazing or agricultural lands. For impact analysis purposes, maximum day vehicle trips and emissions associated with mitigation preserve operations are estimated as additional to the continuation of existing agricultural operations that are not specific to mitigation preserve management; however, during most days, the level of activity would not be substantially different from typical agricultural and range management occurring on the land prior to being established as a mitigation preserve. The types of activities on existing rangeland and farmland are similar to what would occur on mitigation preserves established on these land types, such as fence installation or repair, access road maintenance, and drainage repairs.

Although specific details regarding the mitigation preserve activities or operational/maintenance trip numbers are not known, an estimate of preserve operational emissions was calculated based on conservative assumptions of preserve numbers, size, activities that would take place, and equipment that would be used for those activities. The emissions modeling represents a maximum day of mitigation preserve operation and maintenance, where an estimated 159 vehicle trips and 32 hours of heavy-duty equipment use would occur, such as a day when heavy maintenance or repairs (e.g., landscape contouring, drainage infrastructure repairs, alteration of graded access roads) are needed along with regular operations. During the majority of days over the 50-year EIS/EIR study period, the amount of mitigation preserve management activity and attendant vehicle trips and heavy-duty equipment operations would be much less and not substantially different from activities

associated with agricultural and rangeland operations and management on lands prior to being established as mitigation preserves. The maximum activity estimate is intended to be conservative to avoid the risk of understating the impacts of the alternative. Refer to Appendix H for more information on the emissions modeling assumptions for the alternatives.

Based on the modeling conducted, preserve maintenance and operations during periods of high activity could result in 19 lb/day of NO_x and up to 3.5 lb/day of ROG emissions. Emissions of PM_{10} would be 2 lb/day and $PM_{2.5}$ 1 lb/day. This level of emissions would not exceed applicable SMAQMD thresholds of significance of 65 lb/day for NO_x or ROG. Regarding PM_{10} and $PM_{2.5}$, emissions from regular mitigation preserve operations and maintenance activities, such as fence repair, firebreak mowing, and management of grazing animals, would be minor, and as shown by the modeling, would not exceed 2 lb/day. Preserve operational- and maintenance-related activities would not result in substantial dust emissions; therefore, they would not contribute to the existing nonattainment status of the SVAB.

With regards to exposure of sensitive receptors to TACs, odors, and local CO, activities associated with mitigation preserve operations and maintenance under this alternative would be relatively minor and temporary and similar to existing rangeland and farmland operations. As such, exposure would be minimal and would not result in excessive exposure at any one receptor for an extended period of time.

14.2.2.2 Cumulative Effects of the Alternative

Emissions from past and present urban development, agricultural activities, and other stationary and mobile emission sources in the SVAB have resulted in the existing air quality conditions described in Section 14.1.2.2, Existing Air Quality Conditions. The existing nonattainment status for ozone, PM_{10}, and $PM_{2.5}$ indicate a significant adverse impact on air quality from these past and present emission sources.

The types of future reasonably foreseeable "other" projects, activities, and actions, described in Section 3.7.2, Reasonably Foreseeable Other Actions, are similar to the types of past and present actions that occurred in the study area. The other reasonably foreseeable future actions in the study area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in the Elk Grove sphere of influence and in Rancho Murieta, development of the Wilton Rancheria Casino, master planned developments inside the Urban Development Area (UDA)[3]

[3] As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, "UDA" means all lands within Sacramento County's USB boundary that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within the City of Galt's sphere of influence (see Figure 1-1).

named “Rio Del Oro” and “Mather South,” further rural residential development outside the UDA, continued urban development of cultivated agricultural lands, major infrastructure projects such as California High-Speed Rail and the California WaterFix, and expansion of the existing National Wild Refuge and the Cosumnes River Preserve (see Section 3.7.2 for details of these projects). Some of these foreseeable projects, such as urban development in the Elk Grove sphere of influence, would result in criteria pollutant emissions during construction and from mobile and stationary sources during operation. Large infrastructure projects would likely have a larger proportion of emissions during construction versus operation, and in the case the California High-Speed Rail Project, could result in a net reduction in emissions during operation. Expansion of refuges and preserves would result in relatively minor emissions compared to other categories of foreseeable projects. However, in total, the reasonably foreseeable future projects would result in increased emissions of criteria pollutants into the SVAB and result in an incremental contribution to significant adverse effects on air quality.

The construction, stationary, and mobile-source air emissions from these foreseeable other projects were generally included in the analysis of cumulative air emissions impacts incorporated from the General Plan EIRs. These General Plan EIRs identified significant and unavoidable air quality impacts from emissions of criteria pollutants during construction and operation. Consequently, the combination of past, present, and reasonably foreseeable future projects would result in continued significant adverse cumulative air quality effects, with the SVAB likely remaining in nonattainment for ozone, PM_{10}, and $PM_{2.5}$.

As discussed previously, the direct and indirect impacts of No Action/No Project Alternative would adversely affect existing air quality through the emissions of criteria pollutants. Therefore, the No Action/No Project Alternative incremental effects are determined to be significant and cumulatively considerable when viewed in connection with the significant cumulative impact of the past, present, and foreseeable other projects in the study area.

14.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3, Proposed Action/Proposed Project.

14.2.3.1 Direct and Indirect Effects of the Alternative

Construction Emissions

The Proposed Action/Proposed Project Alternative includes types of urban development similar to those anticipated under the No Action/No Project Alternative; therefore, the sources and types of emissions associated with construction of this development would also be similar to those described for the No Action/No Project Alternative. However, the Proposed

Action/Proposed Project Alternative does not include the MCRA regulatory requirements of the No Action/No Project Alternative (refer to Section 2.2.2); this provides the opportunity for urban development Covered Activities within the MCRA to be implemented consistent with the Sacramento County and Rancho Cordova General Plans without development occurring outside the USB. As a result, a portion of construction worker commute and vendor haul trips between future construction sites for development could be shorter in distance compared to the No Action/No Project Alternative. This would result in lower VMT and, therefore, reduced exhaust emissions of ROG, NO_x, and PM, under the Proposed Action/Proposed Project Alternative compared to the No Action/No Project Alternative.

Further, the SSHCP includes Avoidance and Minimization Measures (SSHCP AMMs) that would be included in all Covered Activity projects and activities over the 50-year permit term. As summarized in Table 2-6 of this EIS/EIR, SSHCP AMMs BMP-5, BMP-9, and BMP-11 would require implementation of BMPs to control dust emissions by watering disturbance sites, returning disturbed areas to pre-project conditions and limiting vehicle travel speed. Several elements of these SSHCP AMMs would also be implemented under the No Action/No Project Alternative as part of standard best practices or regulatory requirements (see Table 2-6). However, the Proposed Action/Proposed Project Alternative includes additional on-site monitoring and measurement of the effectiveness of each SSHCP AMM implemented and annual reporting of the effectiveness of each SSHCP AMM. The Proposed Action/Proposed Project Alternative includes processes for annual review of SSHCP AMM effectiveness and a process to make adaptive changes to an SSHCP AMM that is not effective for avoiding impacts to air quality. This additional layer of oversight of SSHCP AMM implementation and SSHCP AMM effectiveness under the Proposed Action/Proposed Project Alternative increases avoidance and minimization of impacts to air quality from dust emissions during construction activities.

The potential adverse effects from construction emissions identified previously for the No Action/No Project Alternative future condition without the SSHCP would still occur under the Proposed Action/Proposed Project Alternative but to a lesser extent because of the reduced vehicle trips resulting from not having urban development shifted or displaced outside the MCRA and more effective reductions in dust emissions resulting from SSHCP AMMs BMP-5, BMP-9, and BMP-11. This would result in a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Regarding emissions of localized mobile CO, the potential for individual intersections to experience sufficient vehicle trips per hour to result in adverse CO concentrations is not appreciably different between the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative. Although the Proposed Action/Proposed Project Alternative is expected to result in decreases in regional VMT associated with construction worker trips as a result of shorter travel distances between construction sites, this would not result in changes to

congestion or delays at intersections sufficient to appreciably alter CO concentrations because trips would be dispersed throughout the region and spread over the 50-year EIS/EIR study period; that is, as described previously for the No Action/No Project Alternative, no potential adverse effects from CO emissions are anticipated for the No Action/No Project Alternative future condition without the SSHCP, which would still be the case with implementation of the SSHCP under the Proposed Action/Proposed Project Alternative. Therefore, there would be ***No Impact*** when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include the establishment of an interconnected Preserve System in the Planning Area and a comprehensive preserve management program that would be implemented in perpetuity. The Preserve System under the Proposed Action/Proposed Project Alternative would be more contiguous and more connected than the preserves that would be established under the No Action/No Project Alternative. Preserve establishment could include a variety of activities during construction that would result in emissions. Activities associated with the construction/establishment of preserves under the Proposed Action/Proposed Project Alternative would be the same as those described for the No Action/No Project Alternative. However, under the Proposed Action/Proposed Project Alternative, preserves would often be larger, more frequently linked, and established/constructed by the SSHCP Implementing Entity rather than by different entities on a project-by-project basis. The SSHCP AMMs described above for development would also apply to relevant preserve activities (e.g., grading for vernal pool establishment/re-establishment). Therefore, the Proposed Action/Proposed Project Alternative, through the SSHCP AMMs, provides for more effective reductions in dust emissions during implementation of preserve activities relative to the No Action/No Project Alternative. This would be a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

In addition to on-site emissions associated with heavy equipment and earth movement at preserve sites, construction and worker vehicle trips would also result in mobile-source emissions associated with the establishment of preserves. As a result of a more contiguous and connected Preserve System, construction-related vehicular trips associated with vendor and worker trips for preserve establishment/construction could be fewer because of a smaller number of “job sites” and coordinated preserve activities directed by the SSHCP Implementing Entity. This would result in fewer mobile-source emissions; that is, construction-related mobile-source emissions as identified for the No Action/No Project Alternative future condition associated with mitigation preserve activities without the SSHCP would still occur but potentially to a lesser extent with implementation of the SSHCP under the Proposed Action/Proposed Project Alternative. This

would be a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Operational Emissions

The Proposed Action/Proposed Project Alternative Covered Activities include types of urban development consistent with those anticipated under the No Action/No Project Alternative. However, under the Proposed Action/Proposed Project Alternative, urban development would not be shifted or displaced outside of the USB. Therefore, operational-related vehicular trips associated with development would be shorter, resulting in fewer mobile-source emissions; that is, potential significant adverse effects from operation of development identified previously for the No Action/No Project Alternative future condition without the SSHCP would also occur, but to a lesser extent, with implementation of the SSHCP under the Proposed Action/Proposed Project Alternative. This would be a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

As identified previously, the types of urban development under Proposed Action/Proposed Project Alternative would be consistent with those identified for the No Action/No Project Alternative. Therefore, stationary and area-wide sources of TACs, odors, and criteria air pollutants (e.g., ROG, NO_x, PM_{10}, and $PM_{2.5}$) associated with operation of the Proposed Action/Proposed Project Alternative would be similar to those described for the No Action/No Project Alternative. Adverse effects from emissions of TACs and criteria air pollutants from stationary and area-wide sources described for the No Action/No Project Alternative would also apply to the Proposed Action/Proposed Project Alternative. However, no significant potential adverse effects from generation of odors are anticipated for either alternative. Thus, with respect to TACs, odors, and stationary and area-wide sources of criteria air pollutants, there would be ***No Impact*** when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Regarding emissions of localized mobile CO, for the reasons described for construction emissions associated with the Proposed Action/Proposed Project Alternative (i.e., there would be no changes in operations of individual intersection of sufficient scale to result in harmful CO concentrations), there would be ***No Impact*** when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

As a result of development being confined to the UDA under the Proposed Action/Proposed Project Alternative, regional VMT associated with urban development may be redirected to other roadways throughout the Planning Area relative to the No Action/No Project Alternative. Thus, individual receptors that may be exposed to mobile-source TACs and odors may not be

the same under the two alternatives. However, because the overall duration, types, and numbers of trips past any particular receptor resulting from urban development would be similar, overall mobile-source TAC and odor generation and related exposure impacts in the Planning Area would also be similar; that is, potential adverse effects from operational-related mobile-sources of TACs and odors as described for the No Action/No Project Alternative would also occur for the Proposed Action/Proposed Project Alternative. However, no significant potential adverse effects from generation of, or exposure to, odors are anticipated for either alternative. Thus, with respect to mobile-source TACs and odors, there would be ***No Impact*** when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Activities associated with the operation and maintenance of preserves under the Proposed Action/Proposed Project Alternative would be very similar to those described for the No Action/No Project Alternative. However, under the Proposed Action/Proposed Project Alternative, preserves would often be larger, more frequently linked, and managed by the SSHCP Implementing Entity rather than by different entities on a project-by-project basis. As a result of a more contiguous and connected Preserve System with larger preserves overall, operational-related vehicular trips associated with maintenance and worker trips for preserve maintenance could be fewer because of a smaller overall number of individual preserves to be visited. Trips to multiple preserves could also be consolidated as personnel directed by the SSHCP Implementing Entity would have activities to perform at multiple preserves and could drive to multiple preserves in a single vehicle "trip." However, preserve management under the Proposed Action/Proposed Project Alternative would be more intensive than under the No Action/No Project Alternative, resulting in an increase in trips to implement the more active management strategy compared to the No Action/No Project Alternative. Therefore, overall, operational-related mobile-source emissions associated with preserve activities for the Proposed Action/Proposed Project Alternative would be similar to those identified previously for the No Action/No Project Alternative. This would be a ***Less Than Significant Adverse*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

As identified for the No Action/No Project Alternative, exposure of sensitive receptors to TACs, odors, and local CO from mitigation preserve operations would be relatively minor and temporary. As such, exposure would be minimal and would not result in excessive exposure at any one receptor for an extended period of time. For the same reasons described for mobile-source emissions resulting from Preserve System operations, this conclusion would not change for the Proposed Action/Proposed Project Alternative. Therefore, there would be ***No Impact*** when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

General Conformity

With regards to general conformity *de minimis* levels, the net change in peak annual emissions between the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative would be subject to the General Conformity Rule. These emissions include construction-related mobile sources and operational-related mobile, stationary, and area-wide sources, as described for the Proposed Action/Proposed Project Alternative.

As discussed previously, construction and operational emissions associated with the Proposed Action/Proposed Project Alternative would be similar or reduced compared to the No Action/No Project Alternative. As such, implementation of the Proposed Action/Proposed Project Alternative would not result in a net increase in emissions that would be subject to general conformity. Therefore, the Proposed Action/ Proposed Project Alternative would be exempt from general conformity (i.e., assumed to conform).

14.2.3.2 Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would result in the following:

- Reduced mobile-source criteria pollutant, TAC, and odor emissions and dust emissions from construction of urban development and preserve establishment
- Similar CO emissions during construction of urban development and preserve establishment
- Reduced mobile-source criteria pollutant emissions from operation of urban development
- Similar emissions of criteria pollutants, TACs, and odors from stationary and area-wide sources associated with operation of urban development
- Similar CO emissions during the operation of urban development
- Similar exposure of sensitive receptors to mobile-source TACs and odors from operation of urban development
- Reduced mobile-source emissions from Preserve System operation
- Similar exposure of sensitive receptors to TACs, odors, and CO from Preserve System operation

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative on the air quality impact criteria, the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects to air quality compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

14.2.3.3 Cumulative Effects of the Alternative

The effects of past, present, and reasonably foreseeable other projects on air quality in the SVAB were described in Section 14.2.2.2, Cumulative Effects of the Alternative, and represent a significant adverse cumulative impact on air quality within the SVAB. As discussed in Section 14.2.2.2, the incremental effects of the No Action/No Project Alternative were determined to be significant and cumulatively considerable when viewed in connection with the effects of the past, present, and foreseeable other projects in the SVAB.

Various elements of the Proposed Action/Proposed Project Alternative would reduce emissions of criteria pollutants compared to the No Action/No Project Alternative, including more effective emission reductions from implementation of SSHCP AMMs and the lack of urban development being shifted or displaced outside the USB, reducing VMT. The reduced emissions result in the minor beneficial effects identified previously, and the Proposed Action/Proposed Project Alternative would make a smaller incremental contribution to any cumulative air quality impacts compared to the incremental effects of the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative does not result in a cumulatively considerable (i.e., significant) contribution to the significant adverse cumulative impacts on air quality. The Proposed Action/Proposed Project Alternative would result in a ***Minor Beneficial Cumulative*** effect to air quality compared to the No Action/No Project Alternative baseline condition**.**

14.2.4 Reduced Permit Term Alternative

As described in Section 2.3.3, Covered Activities and Loss of Natural Land Covers Under the Proposed Action/Proposed Project Alternative, the Reduced Permit Term Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative.

Under the Reduced Permit Term Alternative, the core of the Preserve System established inside the UDA would be associated with the development of five large Master Plans, as discussed in Section 2.3.4, Covered Species Under the Proposed Action/Proposed Project Alternative, for the Reduced Permit Term Alternative and Section 2.3.3 for the Proposed Action/Proposed Project Alternative. Because the core of the Preserve System inside the UDA under both EIS/EIR action alternatives is associated with the same five large Master Plans, approximately 70% of the UDA preserves established under the Reduced Permit Term Alternative would have similar sizes, boundaries, and locations as the UDA preserves established under the Proposed Action/Proposed Project Alternative. However, the shorter duration of the Reduced Permit Term Alternative, as well as the smaller amount of urban development and associated development fees collected by the Reduced Permit Term SSHCP, would not allow the SSHCP Implementing Entity to establish as many acres of new preserves in the Planning Area as would occur under the Proposed Action/Proposed Project

Alternative's 50-year permit term. Therefore, fewer new preserves would be established under the Conservation Strategy for the Reduced Permit Term Alternative. This difference would be especially pronounced outside the UDA.

As described in Section 2.4, Reduced Permit Term Alternative, the federal Endangered Species Act and the California Endangered Species Act incidental take permits and the Clean Water Act permit strategy for SSHCP Covered Activities would be valid only during the 30-year permit term of the Reduced Permit Term SSHCP, and the Reduced Permit Term SSHCP Conservation Strategy would be implemented only during this 30-year term. The urban development Covered Activities and Conservation Strategies associated with the five master plans would be implemented inside the UDA during this 30-year period. However, the EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3); therefore, the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, as described in Section 3.6.7.2, Analysis of the Reduced Permit Term Alternative, After the End of the Permit Term (Years 31–50), the EIS/EIR analysis of the Reduced Permit Term Alternative also considers future urban development that is not part of the project description of the Reduced Permit Term Alternative but is still expected to occur within the Planning Area after the end of the permit term (i.e., in Years 31–50 of the EIS/EIR study period).

As described in Section 3.6.7.2, project mitigation preserves established after the end of the 30-year Reduced Permit Term Alternative would be established under a project-by-project process for obtaining individual authorizations under the Clean Water Act, federal Endangered Species Act, California Endangered Species Act, and Section 1600 of the California Fish and Game Code. Consequently, mitigation preserves established in Years 31–50 of the EIS/EIR study period would not be established using a regional, landscape-based approach that balances new urban development with the need for conservation, which would be provided by an HCP. Therefore, much of the Preserve System inside the UDA would be very similar under the two action alternatives, but the Preserve System outside the UDA would be substantially different between the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, it is unlikely that mitigation preserves established outside the UDA would be contiguous or interconnected, and it is unlikely that a large, contiguous, 10,500-acre, landscape-sized Vernal Pool Preserve would be established in the southwestern portion of the Planning Area. Likewise, the No Action/No Project Alterative would not result in contiguous, interconnected preserves outside the UDA or establish a 10,500-acre Vernal Pool Preserve in the Planning Area. In these ways, the new mitigation preserves established outside the UDA under the Reduced Permit Term Alternative and the No Action/No Project Alternative would be similar.

14.2.4.1 Direct and Indirect Effects of the Alternative

Construction Emissions

The Reduced Permit Term Alternative includes types of urban development similar to those anticipated under the No Action/No Project Alternative; therefore, the sources and types of emissions associated with construction of this development would also be similar to those described previously for the No Action/No Project Alternative. However, the Reduced Permit Term Alternative does not include the MCRA regulatory requirements of the No Action/No Project Alternative (refer to Section 2.2.2). This provides the opportunity for urban development Covered Activities within the MCRA to be implemented consistently with the Sacramento County and Rancho Cordova General Plans without development occurring outside the USB. As a result, a portion of construction worker commute and vendor haul trips between future construction sites for development could be shorter in distance compared to the No Action/No Project Alternative. This would result in lower VMT and, therefore, reduced mobile-source emissions of ROG, NO_x, and PM under the Reduced Permit Term Alternative compared to the No Action/No Project Alternative.

Further, during the 30-year permit term under the Reduced Permit Term Alternative, AMMs like those included in the SSHCP would be included in all Covered Activity projects and activities within the Planning Area. As summarized in Table 2-6 of this EIS/EIR, SSHCP AMMs BMP-5, BMP-9, and BMP-11 would require implementation of BMPs to control dust emissions during construction by watering disturbance sites, returning disturbed areas to pre-project conditions, and limiting vehicle travel speed. Several of the elements of these SSHCP AMMs would also be implemented under the No Action/No Project Alternative as part of standard BMPs or regulatory requirements (see Table 2-6). However, the Reduced Permit Term Alternative would include additional on-site monitoring and measurement of the effectiveness of each SSHCP AMM implemented and annual reporting of the effectiveness of each SSHCP AMM. The Reduced Permit Term Alternative would include processes for annual review of SSHCP AMM effectiveness and a process that makes adaptive changes to an SSHCP AMM that is not effective at avoiding impacts to air quality. This additional layer of oversight of SSHCP AMM implementation and SSHCP AMM effectiveness under the Reduced Permit Term Alternative increases avoidance and minimization of impacts to air quality from dust emissions during construction activities.

The potential adverse effects from construction emissions identified previously for the No Action/No Project Alternative future condition would still occur under the Reduced Permit Term Alternative but to a lesser extent because of the reduced vehicle trips resulting from not having urban development shifted or displaced outside the MCRA and more effective reductions in dust emissions resulting from SSHCP AMMs BMP-5, BMP-9, and BMP-11. This

would result in a ***Minor Beneficial*** effect when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Regarding emissions of localized mobile CO, the potential for individual intersections to experience sufficient vehicle trips per hour to result in adverse CO concentrations is not appreciably different between the Reduced Permit Term Alternative and the No Action/No Project Alternative. The Reduced Permit Term Alternative would result in decreases in regional VMT associated with construction worker trips as a result of shorter travel distances between construction sites. However, these reductions in VMT would not result in changes to congestion or delays at intersections sufficient to appreciably alter CO concentrations because trips would be dispersed throughout the region and spread over the 50-year EIS/EIR study period. That is, as described previously for the No Action/No Project Alternative, no potential adverse effects from CO emissions are anticipated for the No Action/No Project Alternative future condition, which would still be the case with implementation of the Reduced Permit Term Alternative. Therefore, there would be ***No Impact*** when comparing the construction CO emissions and concentrations under the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

The Reduced Permit Term Alternative includes an interconnected Preserve System established during the 30-year permit term and a comprehensive preserve management program for those preserves to be implemented in perpetuity. The Preserve System established during the 30-year permit term under the Reduced Permit Term Alternative would be consolidated and linked (similar to the Proposed Action/Proposed Project Alternative). As described in Section 2.4.5, Conservation Strategy Under the Reduced Permit Term Alternative, in Chapter 2, continued establishment of a coordinated preserve management and monitoring program would cease after the end of the 30-year permit term. The interconnected Preserve System established during the permit term would remain intact, whereas future mitigation preserves established during Years 31–50 of the EIS/EIR study period would not be established in an as consolidated manner and would resemble mitigation preserve establishment patterns under the No Action/No Project Alternative. The resulting scenario would be such that a portion of preserves would reflect a more interconnected Preserve System, although with fewer acres compared to the Proposed Action/Proposed Project Alternative, and a portion would reflect an establishment pattern like the No Action/No Project Alternative.

Impacts to air quality from preserve establishment during the 30-year permit term under the Reduced Permit Term Alternative would be similar to those identified previously for the Proposed Action/Proposed Project Alternative; therefore, a minor beneficial effect to air quality (e.g., mobile-source emissions, dust emissions) would occur during this time when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition. During Years 31–50 of the 50-year EIS/EIR study period, project-by-project mitigation for impacts to listed species would resemble the No Action/No Project Alternative. During this

period, impacts to air quality from mitigation preserve establishment under the Reduced Permit Term Alternative would be very similar to those that would occur under No Action/No Project Alternative. Given the reduced emissions resulting from preserve establishment during the 30-year permit term, over the total 50-year EIS/EIR study period, the Reduced Permit Term Alternative would result in an overall ***Minor Beneficial*** effect to air quality resulting from preserve establishment compared to the No Action/No Project Alternative baseline condition.

Operational Emissions

The Reduced Permit Term Alternative includes types of urban development consistent with those anticipated under the No Action/No Project Alternative. However, under the Reduced Permit Term Alternative, urban development would not be shifted or displaced outside of the USB. Therefore, operational-related vehicular trips associated with development would be shorter, resulting in fewer mobile-source emissions. That is, potential significant adverse effects from operation of development identified previously for the No Action/No Project Alternative future condition would also occur but to a lesser extent with implementation of the Reduced Permit Term Alternative. This would be a ***Minor Beneficial*** effect when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

As identified previously, the types of urban development under the Reduced Permit Term Alternative would be consistent with those identified for the No Action/No Project Alternative. Therefore, stationary and area-wide sources of TACs, odors, and criteria air pollutants (e.g., ROG, NO_x, PM_{10}, and $PM_{2.5}$) associated with operation of the Reduced Permit Term Alternative would be similar to those described for the No Action/No Project Alternative. Adverse effects from emissions of TACs and criteria air pollutants from stationary and area-wide sources described previously for the No Action/No Project Alternative would also apply to the Reduced Permit Term Alternative. However, no significant potential adverse effects from generation of odors are anticipated for either alternative. Thus, with respect to TACs, odors, and stationary and area-wide sources of criteria air pollutants, there would be ***No Impact*** when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Regarding emissions of localized mobile CO, for the reasons described previously for construction emissions associated with the Reduced Permit Term Alternative (i.e., there would be no changes in operations of individual intersections of sufficient scale to result in harmful CO concentrations), there would be ***No Impact*** when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

As a result of development being confined to the UDA under the Reduced Permit Term Alternative, regional VMT associated with urban development may be redirected to other roadways throughout the Planning Area relative to the No Action/No Project Alternative. Thus,

individual receptors that may be exposed to mobile-source TACs and odors may not be the same under the two alternatives. However, because the overall duration, types, and numbers of trips past any particular receptor resulting from urban development would be similar, overall mobile-source TAC and odor generation and related exposure impacts in the Planning Area would also be similar. That is, potential adverse effects from operational-related mobile-sources of TACs and odors as described previously for the No Action/No Project Alternative would also occur for the Reduced Permit Term Alternative. However, no significant potential adverse effects from generation of or exposure to odors are anticipated for either alternative. Thus, with respect to mobile-source TACs and odors, there would be a ***No Impact*** when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Impacts to air quality from the management and operation of preserves established during the 30-year permit term under the Reduced Permit Term Alternative would be similar to those identified previously for the Proposed Action/Proposed Project Alternative; therefore, a minor beneficial effect to air quality (e.g., mobile-source emissions, dust emissions) would occur when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition. Management and operation of mitigation preserves established during Years 31–50 of the 50-year EIS/EIR study period would resemble the No Action/No Project Alternative. Impacts to air quality from the operation and management of these mitigation preserves included in the Reduced Permit Term Alternative would be very similar to those that would occur under No Action/No Project Alternative. Given the reduced preserve operations and management emissions resulting from the preserves established during the 30-year permit term, the Reduced Permit Alternative would result in an overall ***Minor Beneficial*** effect to air quality resulting from preserve operation and management compared to the No Action/No Project Alternative baseline condition.

As identified for the No Action/No Project Alternative, exposure of sensitive receptors to TACs, odors, and local CO from mitigation preserve operations would be relatively minor and temporary. As such, exposure would be minimal and would not result in excessive exposure at any one receptor for an extended period of time. For the same reasons described previously in Sections 14.2.2 and 14.2.3 for mobile-source emissions resulting from Preserve System operations, this conclusion would not change for the Reduced Permit Term Alternative. Therefore, there would be ***No Impact*** when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

General Conformity

Regarding general conformity *de minimis* levels, the net change in peak annual emissions between the Reduced Permit Term Alternative and the No Action/No Project Alternative would be subject to the General Conformity Rule. These emissions include construction-related mobile

sources and operational-related mobile, stationary, and area-wide sources, as described previously for the Reduced Permit Term Alternative.

As discussed previously, construction and operational emissions associated with the Reduced Permit Term Alternative would either be similar or reduced compared to the No Action/No Project Alternative. As such, implementation of the Reduced Permit Term Alternative would not result in a net increase in emissions that would be subject to general conformity. Therefore, the Reduced Permit Term Alternative would be exempt from general conformity (i.e., assumed to conform).

14.2.4.2 Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would result in the following:

- Reduced mobile-source criteria pollutant, TAC, and odor emissions and dust emissions from construction of urban development and preserve establishment
- Similar CO emissions and concentrations during construction of urban development and preserve establishment
- Reduced mobile-source criteria pollutant emissions from operation of urban development
- Similar emissions of criteria pollutants, TACs, and odors from stationary and area-wide sources associated with operation of urban development
- Similar CO emissions during the operation of urban development
- Similar exposure of sensitive receptors to mobile-source TACs and odors from operation of urban development
- Reduced mobile-source emissions from Preserve System operation
- Similar exposure of sensitive receptors to TACs, odors, and CO from Preserve System operation

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on the air quality impact criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to air quality compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

14.2.4.3 Cumulative Effects of the Alternative

The effects of past, present, and reasonably foreseeable other projects on air quality in the SVAB were described in Section 14.2.2.2 and represent a significant adverse cumulative impact on air quality within the SVAB. As discussed in Section 14.2.2.2, the incremental effects of the No Action/No Project Alternative were determined to be significant and cumulatively

considerable when viewed in connection with the effects of the past, present, and foreseeable other projects in the SVAB.

Various elements of the Reduced Permit Term Alternative would reduce emissions of criteria pollutants compared to the No Action/No Project Alternative, including more effective emission reductions from implementation of SSHCP AMMs and the lack of urban development being shifted or displaced outside the USB, thereby reducing VMT. The reduced emissions result in the minor beneficial effects identified previously, and the Reduced Permit Term Alternative would make a smaller incremental contribution to any cumulative air quality impacts compared to the incremental effects of the No Action/No Project Alternative. Therefore, the Reduced Permit Term Alternative does not result in a cumulatively considerable (i.e., significant) contribution to the significant adverse cumulative impacts on air quality. The Reduced Permit Term Alternative would result in a ***Minor Beneficial Cumulative*** effect to air quality compared to the No Action/No Project Alternative baseline condition.

14.3 REFERENCES CITED

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

17 CCR 93105. Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations.

40 CFR 1502.1–1502.25. Environmental Impact Statement.

77 FR 64036–64039. Final rule: "Determination of Attainment of the 1-Hour Ozone National Ambient Air Quality Standards in the Sacramento Metro Nonattainment Area in California." October 18, 2012.

CARB (California Air Resources Board). 2013. "The California Almanac of Emissions and Air Quality – 2013 Edition." Last reviewed May 21, 2014. Accessed December 2017. http://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm.

CARB. 2014. "Top 4 Summary." Accessed December 2017. http://www.arb.ca.gov/adam/topfour/topfour1.php.

CARB. 2017. "Ambient Air Quality Standards." Reviewed December 19. 2017. Accessed December 2017. http://www.arb.ca.gov/desig/desig.htm.

CDOC (Department of Conservation). 2006. *Relative Likelihood for the Presence of Naturally Occurring Asbestos in Eastern Sacramento County, California*. Special Report 192. Prepared by California Department of Conservation, California Geological Survey.

EPA (U.S. Environmental Protection Agency). 2017. "Criteria Air Pollutants." Last updated October 17, 2017. Accessed December 2017. https://www.epa.gov/criteria-air-pollutants.

Galt. 2008. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. Prepared by Environmental Science Associates. Sacramento, California: Environmental Science Associates. July 2008. Accessed December 2017. http://www.ci.galt.ca.us/index.aspx?page=786.

Galt. 2009a. *2030 Galt General Plan: Policy Document.* Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed December 2017. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *Final Environmental Impact Report for the 2030 Galt General Plan.* SCH No. 2007082092. Prepared by Mintier Harnish, ESA, Applied Development Economics, and Omni-Means for the City of Galt. March 2009.

Rancho Cordova. 2006. *City of Rancho Cordova General Plan Final Environmental Impact Report.* SCH No. 2005022137. June 2006. Accessed December 2017. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

Rancho Cordova. 2013. *Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Accessed December 2017. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: County of Sacramento Department of Environmental Review and Assessment. April 2010. Accessed December 2017. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Accessed December 2017. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx.

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2013. "Air Quality Standards Attainment Status." Accessed December 2017. http://www.airquality.org/Air-Quality-Health/Air-Quality-Pollutants-and-Standards.

SMAQMD. 2014. "CEQA Guide to Air Quality Assessment." Accessed December 2017. http://www.airquality.org/Residents/CEQA-Land-Use-Planning/CEQA-Guidance-Tools.

WRCC (Western Regional Climate Center). 2002. "Prevailing Wind Direction." Accessed December 2017. http://www.wrcc.dri.edu/htmlfiles/westwinddir.html.

WRCC. 2015. "Sacramento 5 ESE, California: Period of Record Monthly Climate Summary." January 2015. Accessed December 2017. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7633.

INTENTIONALLY LEFT BLANK

CHAPTER 15 – GREENHOUSE GASES AND CLIMATE CHANGE

This chapter presents the potential effects of each alternative on global climate change and impacts of global climate change on the alternatives. General topics addressed include construction- and operational-related greenhouse gas (GHG) emissions. An explanation of what GHGs are, how they contribute to climate change, and how climate change affects the environment is provided in Section 15.1.2, Greenhouse Gas Emissions and Consequences of Climate Change in the Planning Area.

15.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

15.1.1 Regulatory Framework

The regulatory responsibilities for reducing emissions of GHGs and combatting the impacts of climate change include several federal, state, regional, and local agencies. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, permitting, or implementation of the alternatives analyzed in this Environmental Impact Statement/Environmental Impact Report (EIS/EIR). This section also identifies any relevant federal permits or other entitlements that must be obtained prior to implementing the alternatives. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 15.2, Environmental Consequences/Environmental Impacts (40 CFR 1502.25).

15.1.1.1 Federal

Supreme Court Ruling

The U.S. Environmental Protection Agency is the federal agency responsible for implementing the federal Clean Air Act and its amendments. The Supreme Court of the United States ruled on April 2, 2007, that carbon dioxide (CO_2), a GHG contributing to global climate change (see Section 15.1.2), is an air pollutant as defined under the Clean Air Act, and that the U.S. Environmental Protection Agency has the authority to regulate emissions of GHGs. The ruling in this case resulted in the U.S. Environmental Protection Agency taking steps to regulate GHG emissions and lent support for state and local agencies' efforts to reduce GHG emissions.

President's Council on Environmental Quality Guidance

On December 18, 2014, the President's Council on Environmental Quality released draft guidance for public comment that described how federal departments and agencies should consider the effects of climate change and GHG emissions as a result of proposed actions. The guidance explains that agencies should consider both the potential effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the implications of climate

change for the environmental effects of a proposed action. The draft guidance also provided a numeric emissions level for consideration, identifying that, if emissions from a federal action exceed 25,000 metric tons of carbon dioxide equivalent (MT CO_2e), a qualitative and quantitative assessment of a proposed action would be meaningful to decision makers and the public. For actions where emissions are below the 25,000 MT CO_2e/year reference point, quantitative analysis of GHG emissions is not recommended unless it is easily accomplished based on available tools and data.

The Council on Environmental Quality finalized its nonregulatory guidance on GHG emissions and the effects of climate change in the National Environmental Policy Act reviews in August 2016 (CEQ 2016). The final guidance no longer includes the 25,000 MT CO_2e emissions reference point. The final guidance removes identification of any quantitative emissions limit and instead advises federal agencies to consider the GHG emissions caused by federal actions, adapts the agency's actions to consider climate change effects throughout the process, and addresses these issues in the agency's procedures.

15.1.1.2 State

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea level. To combat those concerns, the Executive Order established[1] total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

As described below, legislation was passed in 2006 (Assembly Bill [AB] 32) to limit GHG emissions to 1990 levels by 2020 with continued "reductions in emissions" beyond 2020, but no specific additional reductions were enumerated in the legislation. Further, Senate Bill (SB) 375 (sustainable community strategies [SCS]/transportation) established goals for emissions from light-duty truck and automobiles for 2020 and 2035.

A recent California Appellate Court decision, *Cleveland National Forest Foundation v. San Diego Association of Governments* (November 24, 2014), further examined the executive order and whether it should be viewed as having the equivalent force of a legislative mandate for specific emissions reductions. The case has been accepted for review by the California Supreme Court and, therefore, is not currently considered a precedent.

[1] Note that in the context of this Plan, the word "establish" is synonymous with "create."

Assembly Bill 32: Global Warming Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006 (AB 32). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 also requires that these reductions (California Health and Safety Code, Section 38551):

(a) . . . shall remain in effect unless otherwise amended or repealed.

(b) It is the intent of the Legislature that the statewide GHG limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020.

(c) The (Air Resources Board) shall make recommendations to the Governor and the Legislature on how to continue reductions of GHG emissions beyond 2020.

Climate Change Scoping Plan

In December 2008, the California Air Resources Board (CARB) adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 118 million metric tons (MMT) of CO_2e (further explained in Section 15.1.2) emissions, or approximately 21.7% from the state's projected 2020 emission level of 545 MMT CO_2e under a business-as-usual scenario (this is a reduction of 47 MMT CO_2e, or almost 10%, from 2008 emissions). CARB's original 2020 projection was 596 MMT CO_2e, but the current 545 MMT CO_2e 2020 projection takes into account the economic downturn that occurred in 2008 and associated reductions in statewide GHG emissions (CARB 2011). The Scoping Plan reapproved by CARB in August 2011 includes the Final Supplement to the Scoping Plan Functional Equivalent Document, which further examined various alternatives to Scoping Plan measures. The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. CARB estimates the largest reductions in GHG emissions to be achieved by 2020 will be by implementing the following measures and standards (CARB 2011):

- Improved emissions standards for light-duty vehicles (estimated reductions of 26.1 MMT CO_2e)
- The Low-Carbon Fuel Standard (15.0 MMT CO_2e)
- Energy efficiency measures in buildings and appliances (11.9 MMT CO_2e)
- A renewable portfolio and electricity standards for electricity production (23.4 MMT CO_2e) and the Cap-and-Trade Regulation for certain types of stationary emission sources (e.g., power plants)

In May 2014, CARB released, and has since adopted, the *First Update to the Climate Change Scoping Plan* to identify the next steps in reaching AB 32 goals and evaluate the progress that has been made between 2000 and 2012 (CARB 2014a). According to the update, California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014a). The update also reports the trends in GHG emissions from various emission sectors.

The update summarizes sector-specific actions needed to stay on the path toward the Executive Order S-3-05 2050 target. While the update acknowledges certain reduction targets by others (such as in the Copenhagen Accord), it stops short of recommending a specific target for California, instead acknowledging that mid-term targets need to be set "consistent with the level of reduction needed [by 2050] in the developed world to stabilize warming at 2 °C [degrees Celsius] (3.6 °F [degrees Fahrenheit]) [above pre-industrial levels]."

Actions are recommended for the energy sector, transportation (clean cars, expanded zero-emission vehicle program, fuels policies), land use (compliance with regional sustainability planning targets), agriculture, water use (more stringent efficiency and conservation standards, runoff capture), waste (elimination of organic material disposal, expanded recycling, use of Cap-and-Trade Program), green building (strengthening of Green Building Standards), and other sectors. Many of the actions that result in meeting targets will need to be driven by new or modified regulations.

Executive Order B-30-15

On April 20, 2015, Governor Edmund G. Brown Jr. signed Executive Order B-30-15 to establish a California GHG reduction target of 40% below 1990 levels by 2030. California is on track to meet or exceed the current target of reducing GHG emissions to 1990 levels by 2020, as established in the California Global Warming Solutions Act of 2006 (SB 32 discussed previously). California's new emission reduction target of 40% below 1990 levels by 2030 will make it possible to reach the ultimate goal of reducing emissions 80% below 1990 levels by 2050.

Senate Bill 32 of 2016

In August 2016, Governor Brown signed SB 32, which serves to extend California's GHG reduction programs beyond 2020. SB 32 amended the California Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40% below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by the governor's Executive Order B-30-15 for 2030, which set the next interim step in the state's continuing efforts to pursue the long-term target expressed in Executive Orders S-3-05 and B-30-15 of 80% below 1990 emissions levels by 2050.

Senate Bill 375: Statutes of 2008

SB 375, signed into law by Governor Schwarzenegger in 2008, requires regional transportation plans, developed by metropolitan planning organizations, to incorporate an SCS that will achieve GHG emission reduction targets set by the CARB.

The Sacramento Area Council of Governments (SACOG) serves as the metropolitan planning organization for Sacramento, Placer, El Dorado, Yuba, Sutter, and Yolo Counties, excluding those lands located in the Lake Tahoe Basin. The Planning Area is located within Sacramento County and includes Galt and Rancho Cordova. SACOG adopted its Metropolitan Transportation Plan (MTP)/SCS 2035 in 2016. SACOG was tasked by CARB to achieve a 9% per capita reduction compared to 2012 emissions by 2020 and a 16% per capita reduction by 2035, which CARB confirmed the region would achieve by implementing its SCS (CARB 2013). The 2016 MTP/SCS forecasts land use development by community types: Center and Corridor Communities, Established Communities, Developing Communities, Rural Residential Communities, and Lands Not Identified for Development in the 2016 MTP/SCS study period (SACOG 2016a). CARB is currently in the process of updating the GHG reduction targets pursuant to the provisions of SB 375.

The Planning Area includes Sacramento County, Galt, and Rancho Cordova, which are jurisdictions with areas slated for development in the SCS growth projections.

15.1.1.3 Local

Sacramento Metropolitan Air Quality Management District

The Planning Area is entirely within the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). The SMAQMD's *Guide to Air Quality Assessment in Sacramento County* establishes analysis expectations with regard to GHG emissions in California Environmental Quality Act (CEQA) documents, such as EIRs, for projects in the SMAQMD's jurisdiction (SMAQMD 2016). SMAQMD recommends that an analysis of potential impacts of project-generated GHG emissions should include a description of GHGs, summary of existing regulations, and discussion of GHG emissions sources in the Planning Area. The guidelines further state that the analysis should quantify the mass emissions associated with project construction and operation. SMAQMD has adopted thresholds of significance, which are further described in Section 15.2.1, Methodology for Assessing Impacts of Each Alternative on Greenhouse Gases and Climate Change.

Sacramento County

Sacramento County Climate Action Plan

In 2009, Sacramento County began a multiphase Climate Action Plan to meet the state's targets for GHG reductions. The Climate Action Plan Strategy and Framework Document was adopted

on November 9, 2011, by the Sacramento County Board of Supervisors, and the Government Operations Climate Action Plan was adopted on September 11, 2012. The plan includes a GHG inventory for the entire Sacramento County (discussed further below), a GHG emission reduction target, and goals and implementation measures developed to help Sacramento County reach these targets. Reduction strategies address GHG emissions associated with transportation and land use, energy, water, waste management and recycling, and agriculture and open space. Although parts of the plan encompass countywide emissions issues, the focus of the currently adopted plan is on Sacramento County facilities and operations. Sacramento County is currently working to update and expand the Climate Action Plan to address countywide emissions sources.

Sacramento County 2030 General Plan

The *Sacramento County General Plan of 2005–2030* (Sacramento County General Plan) (Sacramento County 2011) includes the following policy in the Land Use Element related to reducing GHG emissions in Sacramento County:

> **Policy LU-115:** It is the goal of the County to reduce GHG emissions to 1990 levels by the year 2020. This shall be achieved through a mix of State and local action.

2030 Galt General Plan

The *2030 Galt General Plan: Policy Document* (Galt General Plan) (Galt 2009a) contains numerous policies related to GHG emission reduction. However, only the following three are applicable to the analysis in this EIS/EIR:

> **Policy COS-7.1:** Greenhouse Gas Emission Reduction: The City shall reduce GHG emissions from City operations as well as from private development in compliance with the California Global Warming Act of 2006 and any applicable State regulations. To accomplish this, the City will coordinate with SMAQMD and [C]ARB in developing a GHG Emissions Reduction Plan that identifies GHG emissions within the City as well as ways to reduce those emissions. The plan will parallel the requirements adopted by [C]ARB specific to this issue. Specifically, the City will work with the SMAQMD to include the following key items in the plan:
>
> - Inventory all known, or reasonably discoverable, sources (both public and private) of GHG in the City;
> - Inventory estimated 1990 GHG emissions based on available data, the current level, those projected for the 2020 milestone year (consistent with AB 32), and that projected for the year 2030;

- Set a target for the reduction of emissions attributable to the City's discretionary land use decisions and its own internal government operations, and;
- Identify specific actions that will be undertaken by the City to meet the emission reduction targets set by the City.

Policy COS-7.2: Statewide Global Warming Solutions Support: The City should monitor and support the efforts of [C]ARB, under AB 32, to formulate mitigation strategies, if any that may be implemented by local government. If and when any such strategies become available, the City should consider whether to implement them in some form, such as, for example, by imposing new mitigation measures on new development. If the City Council, after seeking public input on the subject, chooses to implement any such measures it considers to be feasible and desirable, the City's commitment may take the form of a new ordinance, resolution, or other type of policy document.

Policy COS-7.3: Motor Vehicle Trip Reduction: The City shall encourage strategic land use patterns for businesses that reduce the number and length of motor vehicle trips and/or encourage alternative modes of travel.

Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2006a) does not have any policies related to GHG emissions or global climate change; however, the Rancho Cordova General Plan does include the following policies within the Air Quality Element that would result in reductions in GHG emissions:

Policy AQ.4.1: Promote improved air quality benefits through energy conservation measures for new and existing development.

Policy AQ.4.2: Support vehicle improvements and the use of clean vehicles that reduce emissions and improve air quality.

15.1.2 Greenhouse Gas Emissions and Consequences of Climate Change in the Planning Area

This section provides information on GHGs and their effect on climate change.

Certain gases in the Earth's atmosphere, classified as GHGs, play a critical role in determining the Earth's surface temperature. Solar radiation enters the Earth's atmosphere from space. A portion of the radiation is absorbed by the Earth's surface, and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the Earth as low-frequency infrared radiation. The Earth has a much lower temperature than the Sun;

therefore, the Earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6). Different gases have varying global warming potential and therefore are commonly normalized based on each gasses' global warming potential and expressed as CO_2e (i.e., the global warming potential of each gas is converted to the equivalent global warming potential for CO_2). Human-caused emissions of these GHGs in excess of natural ambient concentrations are widely regarded as being responsible for intensifying the greenhouse effect, which has led to a trend of unnatural warming of the Earth's climate, known as global climate change or global warming. It is *extremely unlikely* that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered (i.e., taken out of gaseous form in the atmosphere and bound into a solid or liquid) by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54% is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46% of human-caused CO_2 emissions remains stored in the atmosphere (IPCC 2013).

Similarly, impacts of GHGs are realized globally as opposed to localized air quality effects of criteria air pollutants and toxic air contaminants. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known. However, the quantity is enormous, and no single project alone would measurably contribute to a noticeable change in the global average temperature or to global, local, or micro climates. From the standpoint of a National Environmental Policy Act and CEQA impact analysis, GHG impacts to global climate change are inherently cumulative, and the key question is whether a project's contribution to the impact is "cumulatively considerable" in combination with other sources.

15.1.3 Attributing Climate Change—Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial and agricultural emissions sectors (CARB 2014b). In California, the transportation sector is the largest emitter of GHGs followed by electricity generation (CARB 2014b). Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices, landfills, and wastewater treatment plants. N_2O, an even more potent GHG, is also largely attributable to agricultural practices and soil management. Carbon sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (absorption of the molecules into the liquid medium), respectively, which are two of the most common processes for removing CO_2 from the atmosphere.

15.1.3.1 Existing Emissions Inventory

A GHG emissions inventory was conducted in 2009 for Sacramento County, including Galt and Rancho Cordova (Sacramento County 2009). The inventory was developed based on 2005 data and quantified baseline emissions by sector for the included jurisdictions. Total emissions for each jurisdiction within the Planning Area are shown in Table 15-1.

Table 15-1. 2005 Community GHG Emissions Inventory

Jurisdiction	CO2e (MT)
Sacramento County	13,938,537
Galt	172,428
Rancho Cordova	557,943

Source: Sacramento County 2009.
Notes: CO2e = carbon dioxide equivalent; MT = metric tons

15.1.4 Effects of Climate Change on the Environment

According to the IPCC, global average temperature is expected to increase by 3°F to 7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2007). According to the California Natural Resources Agency, temperatures in California are projected to increase 2°F to 5°F by 2050 and by 4°F to 9°F by 2100 (CNRA 2012).

Other environmental resources could be indirectly affected by the accumulation of GHG emissions and resulting rise in global average temperature. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. According to

the California Energy Commission (2012), the snowpack portion of the state's water supply could potentially decline 30% to 90% by the end of the twenty-first century. An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the snowpack of the Sierra Nevada until spring would flow into the Central Valley concurrently with winter storm events. This scenario would place more pressure on California's levee/flood control system.

As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced depending on the favored temperature and moisture regimes of each species. In the worst cases, some species could become extinct or be extirpated from the state if suitable conditions are no longer available (CNRA 2012).

Changes in precipitation patterns and increased temperatures could also alter the distribution and character of natural vegetation and associated moisture content of plants and soils. An increase in frequency of extreme heat events and drought are also expected. These changes are expected to lead to increased frequency and intensity of wildfires (CNRA 2012).

However, attempting to predict the response of any one particular species, habitat, or ecosystem to climate change, particularly when considering a specific geographic area, would require significant speculation. Assumptions would need to be made regarding the type and extent of changes in climatic conditions in the area of interest (e.g., average maximum temperature, average minimum temperature, volume and timing of precipitation, changes in wind patterns), as well as the response of the organism or ecosystem to these changes. For example, while the Mediterranean climate of mild wet winters and hot dry summers is conducive to the formation of vernal pools, climate may not be integral to vernal pool formation. As defined by Keeley and Zelder (1998), vernal pool habitat is defined by the source of water, duration of inundation, and the timing of these phases. According to Keeley and Zelder (1998), as long as conditions support (1) inundation during periods wherein temperature is sufficient for plant growth, followed by (2) a brief, water-logged terrestrial stage that proceeds (3) extreme, extended soil desiccation, climate type is not integral to the formation of vernal pools. It is unknown to what extent these parameters would need to change to substantially affect the long-term viability of vernal pools in the Planning Area.

The potential effects from climate change on vernal pools in the Planning Area may ultimately prove to be important. However, California has experienced climatic variation throughout geologic time and vernal pool species survived and evolved under these changing conditions. Various paleontological records, including evaluation of tree rings, pollen deposits, and salinity records support these findings. For example, California experienced a dry period between 10,000 and 5,000 years ago that is associated with deglaciation combined with influences from the Milankovitch solar maximum (i.e., a period of intense solar activity when increased solar

energy reached the earth) (Minnich 2007, p. 59; Malamud-Roam et. al. 2006, p. 1,576). Limited growth of bristlecone pine trees (*Pinus longaeva*) during this period, as observed through the study of tree rings, supports the conclusion that water was scarce. Additionally, pollen deposits sampled at an assortment of high elevation meadows indicate a more open forest containing a greater number of shrubs than the current forests of the Sierra Nevada. Records of high salinity within the San Francisco Estuary at this time also correspond with dryer conditions in the watershed because less runoff would allow more salt water intrusion into the estuary.

Following this dry period, California experienced an extended wet period. From 5,000 years ago to 3,500 years ago, paleontological evidence suggests an increase in precipitation coinciding with a reduction in the strength of wind-driven upwelling off the coast of California. During this period, the salinity of the San Francisco Estuary was relatively low, and tree rings within these dates are thicker, which is indicative of higher precipitation rates. Glaciers also began forming in the Sierra Nevada where they had previously been absent during the early Holocene; therefore, temperatures are thought to be cooler (Minnich 2007, p. 61).

A shift back to a drier climate then occurred, extending from approximately 2,050 to 650 years ago (i.e., approximately 1,350 AD), culminating in an additional period of global cooling known as the Little Ice Age from 1,250 to 1,750 AD (Malamud-Roam et. al. 2006, p. 1,584). Tree ring chronologies indicate a moderately cool period extending from the seventeenth century to the early nineteenth century, followed by relatively stable climatic conditions during the twentieth century.

Therefore, while current climate change projections trend towards a generally hotter, drier climate, there is evidence that the state has experienced these conditions before, with vernal pools persisting through these periods. However, other variables, such as stresses from degradation of water quality or human disturbance, could alter how vernal pools respond to future hotter and drier conditions relative to similar past climatic conditions. Given the amount of uncertainty and number of variables involved, it would be speculative to attempt to predict the future effects of climate change on any particular species or ecosystem in the Planning Area.

Another outcome of global climate change is sea-level rise. Sea level rose approximately 7 inches during the last century, and it is predicted to rise an additional 7 to 22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007). The California Natural Resources Agency projects that sea levels along California will rise 5 to 24 inches by 2050 and 17 to 66 inches by 2100 (CNRA 2012). However, the Planning Area is approximately 90 miles inland, and although some of the southwestern portions of the Planning Area are near sea-level, they are protected by levees and other flood control features.

15.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

15.2.1 Methodology for Assessing Impacts of Each Alternative on Greenhouse Gases and Climate Change

GHG emissions are typically categorized by direct (e.g., emissions directly emitted from a source, such as vehicle tailpipe emissions) and indirect (e.g., emissions that occur off site, such as energy consumption from a local utility). The alternatives were evaluated in the context of the planned urban development, land use patterns within the Planning Area, and emissions sources associated with them (e.g., stationary, mobile). Impacts were identified where the actions or projects associated with the alternative would result in new or additional GHG emissions.

There are multiple ways that alternatives could increase GHG emissions, such as by increasing regional vehicle miles traveled (VMT) and, thus, mobile-source CO_2; increasing other fossil fuel consumption, such as for energy production; and decreasing the amount of CO_2 sequestered in vegetation. GHG emissions would occur during both construction and operations. Construction and operations could also result in the use of heavy duty equipment, which would be a source of exhaust. The projects and activities expected under each alternative, including expected or conceptual preserves, are described in Chapter 2, Alternatives, Including the Proposed Action/Proposed Project. Potential impacts of the alternatives were analyzed using a 50-year study period, as discussed in Section 3.6.3, EIS/EIR Study Period.

Potential impacts from GHG emissions from each alternative were analyzed based on the anticipated development projects and preserve establishment, management, and maintenance over the 50-year study period, as described in Section 3.6.3.

Specific to emissions from preserve establishment, emissions from construction- and operational-related activities were quantified using the California Emissions Estimate Model. Modeling was for an estimated high activity day implementing habitat establishment/re-establishment and used conservative assumptions (i.e., assumptions that would lead to higher emissions) so as not to underestimate emissions from this activity. For example, the modeling assumed that approximately 385 acres of habitat establishment/re-establishment would be completed in a single year, which is roughly 20% of the total habitat establishment/re-establishment required for each alternative over the entire 50-year study period. The parameters of the model represent what would be expected to occur as each alternative is implemented over time. The modeling included the use of heavy-duty equipment for earth movement and grading, as well as operational-related vehicle use. Model assumptions and parameters are included in Appendix H, Modeling Data and Assumptions for Air Quality and Greenhouse Gas Analyses.

As described previously, GHG emissions are global pollutants and, therefore, contribute to a global, not local or regional, problem; however, the regulatory framework in California is such

that SMAQMD regulates local emissions and sources within the Sacramento Valley Air Basin with the intent to achieve the region's fair share of GHG emission reduction such that state GHG reduction targets (i.e., goals set by the Scoping Plan) are met. As such, significance thresholds determined by SMAQMD and other local agencies (e.g., Sacramento County) are designed to ensure compliance with state GHG reduction planning efforts. The emissions attributable to each alternative result from activities that occur in the Planning Area. Therefore, the lead agencies determined that the appropriate geographic scale for evaluating GHG emissions is the Planning Area.

Based on the global nature of GHG emissions, the global climate change analysis is inherently cumulative. No single action or project would emit sufficient GHGs to result in a change in Earth's climate. Therefore, GHG emissions identified for a single action or project are inherently an expression of that action's or project's contribution to the cumulative effect of global climate change. Direct and indirect emissions as a result of any alternative evaluated in this EIS/EIR would be a cumulative contribution to a global issue. For these reasons, the description of direct and indirect effects for each alternative reflects the alternative's contribution to cumulative impacts. A separate cumulative impact discussion is not needed for any alternative in this chapter.

As discussed in Section 3.4, Previous Planning Area Environmental Reviews, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Sacramento County 2010; Galt 2009b; Rancho Cordova 2006b) analyzed direct and cumulative impacts of urban growth planned within the respective jurisdictions. The Sacramento County and Galt General Plan EIRs identified effects related to GHG emissions, while the Rancho Cordova General Plan EIR did not. When the impact analysis or conclusions provided in the General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR Alternatives, a brief summary or description of the incorporated information or analysis is provided in Sections 15.2.2, No Action/No Project Alternative; 15.2.3, Proposed Action/Proposed Project Alternative; and 15.2.4, Reduced Permit Term Alternative.

15.2.1.1 Determination of Impact Significance

Significance Criteria

As discussed in Section 3.8.1, Significance Thresholds, the criteria used to evaluate the significance of each alternative's GHG and climate change impacts are based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) and on typical thresholds used to evaluate effects on global climate change in recent EIRs prepared by Sacramento County. Based on these sources, a significant adverse impact would occur if the alternative would:

1. Generate GHG emissions, either directly or indirectly, that may have a significant effect on the environment.

2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

SMAQMD currently recommends that lead agencies use mass emission thresholds of significance for evaluating construction- and operational-related GHG emissions and stationary sources. Projects with GHG emissions that are below the thresholds are considered to be consistent with AB 32 and CARB's Climate Change Scoping Plan goal to reduce GHG emissions. Thus, compliance with these thresholds would ensure compliance with CEQA, Appendix G, thresholds as described previously and will be applied to the South Sacramento Habitat Conservation Plan (SSHCP). These thresholds are the following:

- Construction phase of projects: 1,100 MT CO_2e/year
- Operational phase of projects: 1,100 MT CO_2e/year
- Stationary source projects: 10,000 MT CO_2e/year

Appendix G of the CEQA Guidelines does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial impact could occur if the alternative would:

1. Result in a net reduction in GHG emissions compared to a baseline environmental condition.

The impact analysis for the three EIS/EIR Alternatives considers the context, intensity, and severity of potential impacts to each of these GHG and climate change impact criteria and presents a determination of significance applicable to each of these criteria.

15.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2, No Action/No Project Alternative, of Chapter 2.

15.2.2.1 Direct and Indirect Effects of the Alternative

Construction Emissions

Much of the future urban development included in the No Action/No Project Alternative is described in the General Plans of Sacramento County, Galt, and Rancho Cordova (see Section 3.4).

Construction associated with future development could result in GHG emissions from the use of heavy-duty construction equipment and from construction vehicle (i.e., worker commute vehicles and haul truck trips) exhaust.

The impact analysis presented in the *Final Environmental Impact Report: Sacramento County General Plan Update* (Sacramento County General Plan EIR) (Sacramento County 2010, pp., 12-1 to 12-42) determined the following within Sacramento County:

- Construction-related GHG emissions would be considered significant and unavoidable.[2]

The impact analysis presented in the *City of Galt General Plan Update: 2030 Final EIR* (Galt General Plan EIR) (Galt 2009b) determined the following within Galt:

- Construction-related GHG emissions would be considered significant and unavoidable.

The *City of Rancho Cordova General Plan Final Environmental Impact Report* (Rancho Cordova General Plan EIR) (Rancho Cordova 2006b) did not explicitly evaluate impacts associated with GHG emissions; however, type and character of urban development within Rancho Cordova would be similar to that described for Sacramento County and Galt (e.g., residential, commercial). As such, it is expected that impacts associated with GHG emissions and global climate change in Rancho Cordova would be similar to those described for Sacramento County and Galt.

As discussed in Section 3.4, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b), 2030 (Rancho Cordova 2006b), and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur within Galt, Rancho Cordova, and Sacramento County in the years after each General Plan EIR study period ends but before this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR Alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of all urban development activities and projects that are included in the description of each EIS/EIR Alternative.

As explained in Section 2.2.2, Expected Regulatory Environment Under the No Action/No Project Alternative, the regulatory environment of the No Action/No Project Alternative is expected to restrict the ability of local agencies to permit approximately 1,900 acres of future urban development in the Mather Core Recovery Area (MCRA), and this future urban development would be shifted or displaced to one or more of the areas of undeveloped land

[2] As described further in Section 3.4.1, the proposed project analyzed within the Sacramento County General Plan EIR assumed development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by Sacramento County. However, Sacramento County is currently processing land use entitlements in the Jackson Highway Corridor; therefore, the referenced conclusions from the proposed project analysis are relevant to the No Action/No Project Alternative.

outside the Urban Service Boundary (USB) discussed in Section 2.2.3, Loss of Natural Lands Under the No Action/No Project Alternative.

Urban development shifted or displaced outside of the USB could result in construction worker commute and vendor haul trips being longer in distance, resulting in higher VMT (and associated GHG mobile-source emissions) relative to what would be expected if urban development was confined to the USB. An increase in regional VMT associated with construction trips would result in increased emissions of GHGs. Construction-related GHG emissions as a result of increased vehicle trips and VMT would contribute further to the already significant unavoidable impacts to global climate change described in the EIRs referenced previously.

Under the No Action/No Project Alternative, new urban development would continue to include mitigation actions to offset impacts to listed species, wetlands, and other regulated natural resources, including off-site or on-site mitigation preserves (See Section 2.2.2). Mitigation for unavoidable impacts could also continue to occur through purchasing credits at a mitigation or conservation bank approved by the applicable resource agencies (e.g., U.S. Fish and Wildlife Service or U.S. Army Corps of Engineers), by payment into an in-lieu fee program, on-site project developer–responsible mitigation, or off-site project developer–responsible mitigation.

Under the No Action/No Project Alternative, mitigation preserves would frequently be established (constructed) in an uncoordinated manner by multiple entities. This would often result in smaller, more isolated preserves mostly located within the MCRA and elsewhere in the USB since some projects would establish on-site mitigation preserves for resource impacts that could not be avoided. Emissions associated with establishment/construction of mitigation preserves would be evaluated on a project-by-project basis and, therefore, have not been described within the referenced General Plan EIRs.

Establishment of mitigation preserves would include minor construction activities, such as earth movement and grading, fence installation, and other minor work. The use of heavy equipment for grading and earth moving could result in exhaust GHG emissions. Although specific details regarding the size of mitigation preserves and types of construction activities are not known, an estimate of GHG emissions was conducted based on conservative assumptions of preserve numbers, size, and likely construction equipment that would be used (e.g., trucks, loaders, backhoes). Refer to Appendix H for detailed assumptions. Based on the modeling conducted, preserve establishment and/or re-establishment could result in up to 397 MT CO_2 per year from the use of heavy-duty equipment, worker commute, and vendor haul trips. This level of emissions would not exceed applicable SMAQMD thresholds of significance of 1,100 MT CO_2 per year and, therefore, would not further contribute to already existing significant and unavoidable cumulative GHG impacts.

Operational Emissions

Operational-related GHG emissions associated with future development would originate from mobile and stationary sources (e.g., electricity). To characterize impacts on global climate change resulting from operation of urban development, the same documents described in Section 3.4 are referenced here. Impacts are summarized below.

The impact analysis presented in the Sacramento County General Plan EIR (Sacramento County 2010, pp., 12-1 to 12-42) determined the following within Sacramento County:

- Operational-related GHG emissions would be considered significant and unavoidable.
- Impacts on urban development from climate change would also be significant and unavoidable.

The impact analysis presented in the Galt General Plan EIR (Galt 2009b) determined the following within Galt:

- Operational-related GHG emissions would be considered significant and unavoidable.

The Galt General Plan EIR (Galt 2009b) did not evaluate impacts from climate change on urban development. However, because Galt is located within Sacramento County, the same climate changes and associated effects (e.g., precipitation pattern changes, increases fire, decreases snow pack, sea-level rise) that would occur within Sacramento County would also occur in Galt. As such, impacts to these areas would be the same as those described for Sacramento County.

The Rancho Cordova General Plan EIR (Rancho Cordova 2006b) did not evaluate operational-related impacts from GHG emissions or impacts from climate change on urban development. However, urban development within Rancho Cordova would be similar to that described for Sacramento County and Galt (e.g., residential, commercial). As such, it is expected that impacts associated with to GHG emissions and global climate change in Rancho Cordova would be similar to those described for Sacramento County and Galt. Further, because Rancho Cordova is located within Sacramento County, the same climate changes and associated effects (e.g., precipitation pattern changes, increases fire, decreases snow pack, sea-level rise) that would occur within Sacramento County would also occur in Rancho Cordova. As such, impacts to these areas would be the same as those described for Sacramento County.

The impact analysis presented in the 2016 MTP/SCS Final EIR (SACOG 2016b) determined the following within the SACOG Planning Area:

- The GHG impacts resulting from land use changes and transportation improvements identified in the 2016 MTP/SCS that are associated with achieving the SB 375 GHG emissions reduction targets are considered less than significant.

Implementation of the No Action/No Project Alternative would result in operational-related mobile-source emissions associated with vehicular exhaust as a function of VMT traveled within the Planning Area (e.g., as a result of urban development). As stated previously, the previously referenced EIRs analyzed the effects of urban development through a period between 2030 and 2050; however, the lead agencies anticipate that urban development projects would continue through the end of the EIS/EIR 50-year study period (2065). Therefore, the lead agencies extrapolated that the significant and unavoidable GHG impacts identified in the EIRs would continue to be significant and unavoidable as additional urban development is implemented.

Similar to what was described previously for construction emissions, urban development shifted or displaced outside of the USB could result in resident and employee commute trips being longer in distance, resulting in higher VMT (and associated GHG mobile-source emissions) relative to what would be expected if urban development was confined to the USB. An increase in regional VMT associated with operational trips would result in increased emissions of GHGs. Operation-related GHG emissions as a result of increased vehicle trips and VMT would contribute further to the already significant unavoidable impacts to global climate change described in the EIRs referenced previously.

In addition to mobile-source GHG emissions, urban development would result in the conversion of undeveloped carbon-sequestering terrestrial land covers (e.g., agriculture/cropland land, oak woodlands, grasslands) to developed land, decreasing the total sequestering capacity of land within the Planning Area. This would result in a net increase in GHG emissions. Based on Table 8-4, Acres of Direct Impacts to Each Natural Land Cover Under the No Action/No Project Alternative, in Chapter 8, Natural Land Cover Habitat Types and Associated Plant and Animal Communities, and as shown in Appendix H, expected urban development could result in a loss of 34,352 acres of vegetated carbon-sequestering land. It is estimated that this would amount to approximately 772 MT/year of CO_2e that would have otherwise continued to be sequestered by the undeveloped land. The loss of carbon sequestering land, resulting primarily from urban development, would be part of the already significant and unavoidable impacts in the referenced EIRs. See Appendix H for land coverage and carbon sequestration calculations.

Operational emissions associated with mitigation preserve management include mobile-source exhaust emissions associated with transportation of livestock for grazing management specific to preserve management activities and visits by Preserve Managers/crews for maintenance and monitoring. Additionally, depending on the specifics of the habitat re-establishment or establishment activity, several pieces of heavy equipment and the associated crews may use local roadways, resulting in on- and off-site exhaust emissions. Most days, vehicle trips and heavy equipment use on mitigation preserves under the No Action/No Project Alternative would not be substantially different from the daily vehicle trips and heavy equipment activities associated with typical existing rangeland and farmland uses. The types of activities are similar (e.g., fence installation or repair, access road maintenance, drainage repairs) between the No Action/No Project Alternative and existing conditions on the mitigation preserve lands and rangeland or farmland. However, for extra activities specific to the use of the land as a mitigation preserve, these activities could result in additional GHG emissions throughout the Planning Area.

Although specific details regarding the specific mitigation preserve activities or operational/maintenance trip number are not known, an estimate of emissions was conducted based on conservative assumptions of preserve numbers, size, activities that would take place and equipment that would be used for those activities (e.g., trucks, loaders, backhoes). Refer to Appendix H for detailed assumptions. The emissions modeling represents a maximum day of preserve operation and maintenance, assuming both vehicle maintenance trips and operation of heavy-duty equipment, such as a day when heavy maintenance or repairs (e.g., landscape contouring, drainage infrastructure repairs, alteration of graded access roads) are needed along with regular operations. During the majority of days over the 50-year EIS/EIR study period, the amount of mitigation preserve management activity and attendant vehicle trips and heavy-duty equipment operations would be much less and not substantially different from activities associated with agricultural and rangeland operations undertaken on lands prior to being established as a mitigation preserve. The maximum activity estimate is intended to be conservative to avoid the risk of understating the impacts of the alternative. Based on the modeling conducted, preserve maintenance and operational activities could result in up to 180 MT CO_2 per year. This level of emissions would not exceed applicable SMAQMD thresholds of significance of 1,100 MT CO_2 per year. Operational activities associated with mitigation preserve management would not result in substantial GHG emissions.

15.2.2.2 Cumulative Effects of the Alternative

As described in Section 15.2.1, the GHG emission impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative GHG emission impacts of the No Action/No Project Alternative are identical to the direct and indirect impacts described in Section 15.2.2.1, Direct and Indirect Effects of the Alternative.

15.2.3 Proposed Action/Proposed Project Alternative

The Proposed Action/Proposed Project Alternative is described in Section 2.3.

15.2.3.1 Direct and Indirect Effects of the Alternative

Construction Emissions

As described in Section 2.3.3, the Proposed Action/Proposed Project Alternative Covered Activities include types of urban development similar to those anticipated under the No Action/No Project Alternative; however, under the Proposed Action/Proposed Project Alternative, urban development would not be shifted or displaced outside of the USB.

Construction associated with future development could result in GHG emissions from the use of heavy-duty construction equipment and from construction vehicle (i.e., worker commute vehicles and haul truck trips) exhaust. Because the Proposed Action/Proposed Project Alternative includes types of urban development consistent with those anticipated under the No Action/No Project Alternative, the sources and types of GHG emissions associated with construction of development, such as the operation of heavy-duty construction equipment, would be the same as those described for the No Action/No Project Alternative; however, the Proposed Action/Proposed Project Alternative does not include the MCRA regulatory requirements of the No Action/No Project Alternative (refer to Section 2.2.2). This provides the opportunity for urban development Covered Activities within the MCRA to be implemented consistent with the Sacramento County and Rancho Cordova General Plans without the 1,900 acres of shifted or displaced urban development occurring outside the USB under the No Action/No Project Alternative. As a result, a portion of construction worker commute and vendor haul trips between future construction sites for development could be shorter in distance compared to the No Action/No Project Alternative. This would result in lower VMT and, therefore, reduced exhaust emissions of GHGs under the Proposed Action/Proposed Project Alternative compared to the No Action/No Project Alternative.

The potential adverse effects from construction emissions identified above for the No Action/No Project Alternative future conditions within the Planning Area would still occur under the Proposed Action/Proposed Project Alternative but to a lesser extend under the Proposed Action/Proposed Project Alternative because of the reduced vehicle trip lengths resulting from not having urban development shifted or displaced outside the MCRA. This would result in a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

As discussed in Section 2.3.5, Conservation Strategy Under the Proposed Action/Proposed Project Alternative, the Proposed Action/Proposed Project Alternative would include the

establishment of an interconnected Preserve System in the Planning Area and a comprehensive preserve management program that would be implemented in perpetuity. The Preserve System under the Proposed Action/Proposed Project Alternative would be more contiguous and connected than the mitigation preserves that would be established under the No Action/No Project Alternative. Preserve establishment and management could include a variety of activities during construction that would result in emissions.

Activities that would generate GHG emissions associated with the construction/establishment of individual preserves under the Proposed Action/Proposed Project Alternative would be the same as those described for the No Action/No Project Alternative, such as vehicle trips and operation of heavy equipment for grading. However, under the Proposed Action/Proposed Project Alternatives, overall preserves would be larger and better linked and established/constructed by the SSHCP Implementing Entity rather than by different entities.

In addition to on-site emission associated with heavy equipment at preserve sites, construction and worker vehicle trips would also result in mobile-source emissions associated with the establishment of preserves. As a result of a more contiguous and connected Preserve System, construction-related vehicular trips associated with vendor and worker trips for preserve establishment/construction could be fewer because of a smaller number of "job sites" and coordinated preserve activities directed by the SSHCP Implementing Entity. This would result in fewer mobile-source GHG emissions. Construction-related mobile-source emissions as identified above for the No Action/No Project Alternative future condition associated with mitigation preserve activities would still occur but potentially to a lesser extent under the Proposed Action/Proposed Project Alternative. This would be a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Operational Emissions

As described previously for the No Action/No Project Alternative, potential significant adverse effects from operational GHG emissions from stationary and mobile sources are anticipated for urban development under the No Action/No Project Alternative future condition. These conclusions would still be the case under the Proposed Action/Proposed Project Alternative. However, under the Proposed Action/Proposed Project Alternative, 1,900 acres of urban development would not be shifted or displaced outside of the USB. Therefore, operational related vehicular trips associated with development would be shorter, resulting in fewer mobile-source GHG emissions. Therefore, potential significant adverse effects from operation of development identified previously for the No Action/No Project Alternative future condition would also occur but to a lesser extent under the Proposed Action/Proposed Project Alternative. This would be a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

In addition to mobile-source GHG emissions, urban development would result in the conversion of undeveloped carbon-sequestering terrestrial land covers (e.g., agriculture/cropland land, oak woodlands, grasslands) to developed land, decreasing the total sequestering capacity of land within the Planning Area. This would result in a net increase in GHG emissions. Based on Table 8-8, Expected Direct Impacts to Natural Land Covers – Proposed Action/Proposed Project Alternative, and as shown in Appendix H, expected urban development could result in a loss of 32,348 acres of vegetated carbon-sequestering land under the Proposed Action/Proposed Project Alternative. This would amount to approximately 745 MT/year of CO_2 that would have otherwise continued to be sequestered by the undeveloped land. Compared to the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative would result in approximately 2,004 fewer acres of vegetated land converted to non-carbon sequestering land. Compared to the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative would result in approximately 27 MT/year of CO_2 less emissions from changes in carbon-sequestrating land coverage. The total loss in carbon sequestration (i.e., 745 MT/year of CO_2) would be substantially below applicable GHG thresholds of 1,100 MT CO_2/year. Because net annual GHG emissions associated with the loss of carbon-sequestering land would be slighter lower under the Proposed Action/Proposed Project Alternative relative to the No Action/No Project Alternative, this would be a ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

Activities associated with the operation and maintenance of preserves under the Proposed Action/Proposed Project Alternative, such as monitoring and maintenance, would be similar to those described for the No Action/No Project Alternative; however, under the Proposed Action/Proposed Project Alternative, overall, preserves would be larger and better linked, and managed by the SSHCP Implementing Entity rather than by different entities. As a result of a more contiguous and connected Preserve System with larger preserves overall, operational-related vehicular trips associated with maintenance and work trips for preserve maintenance could be fewer because of a smaller overall number of individual preserves to be visited. Trips to multiple preserves could also be consolidated as personnel directed by the SSHCP Implementing Entity would have activities to perform at multiple preserves and could drive to multiple preserves in a single vehicle “trip.” However, preserve management under the Proposed Action/Proposed Project Alternative would be more intensive than under the No Action/No Project Alternative, with more management and monitoring activities implemented on an annual basis. This would result in an increase in trips as compared to the No Action/No Project Alternative to implement the more active management strategy. Therefore, overall operational-related mobile-source emissions associated with preserve activities for the Proposed Action/Proposed Project Alternative would be similar to those identified above for the No Action/No Project Alternative future condition without the SSHCP. This would be a ***Less***

Than Significant Adverse effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

As discussed previously in Section 15.1.4, Effects of Climate Change on the Environment, climate change may result in various effects to precipitation amounts and patterns, temperature, snow pack, and sea-level rise. These changes may result in effects to Preserve Systems. However, as described previously, given the amount of uncertainty and number of variables involved, it would be speculative to attempt to predict the future effects of climate change on any particular species or ecosystem in the Planning Area. Although, if adverse effects from climate change were to occur in preserves, the typically larger and more interconnected preserves associated with the Proposed Action/Proposed Project Alternative would be more resilient to changing climatic conditions than the often smaller and more isolated mitigation preserves associated with the No Action/No Project Alternative. This would result in ***Minor Beneficial*** effect when comparing the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

15.2.3.2 Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would result in the following:

- A net reduction in GHG emissions resulting from construction of urban development
- Net reduction in GHG emissions resulting from Preserve System construction/establishment
- A net reduction in GHG emissions resulting from operations of urban development
- A net reduction in GHG emissions resulting from the loss of carbon-sequestering terrestrial land covers
- Little difference in GHG emissions resulting from Preserve System management
- A Preserve System that is more resilient to climate change

Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative related to the GHG and climate change impact criteria, the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects to GHG emissions and climate change compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

15.2.3.3 Cumulative Effects of the Alternative

As described in Section 15.2.1, the GHG emission impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative GHG emission impacts of the Proposed

Action/Proposed Project Alternative are identical to the direct and indirect impacts described in Section 15.2.3.1, Direct and Indirect Effects of the Alternative. Therefore, after considering the significance of impacts from the Proposed Action/Proposed Alternative on GHG emissions and climate change, the Proposed Action/Proposed Project Alternative would result in ***Minor Beneficial*** effects compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

15.2.4 Reduced Permit Term Alternative

As described in Section 2.3.3, the Reduced Permit Term Alternative includes the same types of new urban development and infrastructure as those anticipated under the No Action/No Project Alternative.

Under the Reduced Permit Term Alternative, the core of the Preserve System established inside the UDA would be associated with the development of five large land use entitlements, as discussed in Section 2.3.4, Covered Species Under the Proposed Action/Proposed Project Alternative, for the Reduced Permit Term Alternative and in Section 2.3.3 for the Proposed Action/Proposed Project Alternative. Because the core of the Preserve System inside the UDA under both EIS/EIR action alternatives is associated with the same five large land use entitlements, approximately 70% of the UDA preserves established under the Reduced Permit Term Alternative would have similar sizes, boundaries, and locations as the UDA preserves established under the Proposed Action/Proposed Project Alternative. However, the shorter duration of the Reduced Permit Term Alternative—and the smaller amount of urban development and associated development fees collected by the Reduced Permit Term Alternative—would not allow the SSHCP Implementing Entity to establish as many acres of new preserves in the Planning Area as would occur under the Proposed Action/Proposed Project Alternative's 50-year permit term. Therefore, fewer new preserves would be established under the Conservation Strategy of the Reduced Permit Term Alternative. This difference would be especially pronounced outside the UDA.

As described in Section 2.4, Reduced Permit Term Alternative, the ESA and CESA Incidental Take Permits and the CWA permit strategy for HCP Covered Activities would be valid only during the 30-year permit term of the Reduced Permit Term Alternative, and the Reduced Permit Term Alternative's Conservation Strategy would be implemented only during this 30-year term. The urban development Covered Activities and Conservation Strategies associated with the five land use entitlements would be implemented inside the UDA during this 30-year period. However, the EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3); therefore, the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, as described in Section 3.6.7.2, Analysis of the Reduced Permit Term Alternative, After the End of the Permit Term

(Years 31–50), the EIS/EIR analysis of the Reduced Permit Term Alternative also considers future urban development that is not part of the project description of the Reduced Permit Term Alternative but is still expected to occur within the Planning Area after the end of the permit term (i.e., in Years 31–50 of the EIS/EIR study period).

As described in Section 3.6.7.2, mitigation preserves established after the end of the 30-year Reduced Permit Term Alternative would be established under a project-by-project process for obtaining individual authorizations under CWA, ESA, CESA, and Section 1600 of the California Fish and Game Code. Consequently, mitigation preserves established in Years 31–50 of the EIS/EIR study period would not be established using a regional, landscape-based approach that balances new urban development with the need for conservation, as would be provided by an HCP. Therefore, much of the Preserve System inside the UDA would be very similar under the two action alternatives, but the Preserve System outside the UDA would be substantially different between the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, it is unlikely that mitigation preserves established outside the UDA would be contiguous or interconnected, and it is unlikely that a large, contiguous, 10,500-acre, landscape-size Vernal Pool Preserve would be established in the southwestern portion of the Planning Area. Likewise, the No Action/No Project Alterative would not result in contiguous, interconnected preserves outside the UDA and would not establish a 10,500-acre Vernal Pool Preserve in the Planning Area. In these ways, the new mitigation preserves established outside the UDA under the Reduced Permit Term Alternative and the No Action/No Project Alternative would be similar.

15.2.4.1 Direct and Indirect Effects of the Alternative

Construction Emissions

As described in Section 2.4.3, Covered Activities/Projects Under the Reduced Permit Term Alternative, the Reduced Permit Term Alternative Covered Activities include types of urban development similar to those anticipated under the No Action/No Project Alternative; however, under the Reduced Permit Term Alternative, urban development would not be shifted or displaced outside of the USB.

Construction associated with future development could result in GHG emissions from the use of heavy-duty construction equipment and construction-vehicle (i.e., worker commute vehicles and haul truck trips) exhaust. Because the Reduced Permit Term Alternative includes types of urban development consistent with those anticipated under the No Action/No Project Alternative, the sources and types of GHG emissions associated with construction of development, such as the operation of heavy-duty construction equipment, would be the same as described for the No Action/No Project Alternative; however, the Reduced Permit Term

Alternative does not include the MCRA regulatory requirements of the No Action/No Project Alternative (refer to Section 2.2.2). This provides the opportunity for urban development Covered Activities within the MCRA to be implemented consistent with the Sacramento County and Rancho Cordova General Plans without the 1,900 acres of shifted or displaced urban development occurring outside the USB under the No Action/No Project Alternative. As a result, a portion of construction worker commute and vendor haul trips between future construction sites for development could be shorter in distance compared to the No Action/No Project Alternative. This would result in lower VMT and, therefore, reduced exhaust emissions of GHGs under the Reduced Permit Term Alternative compared to the No Action/No Project Alternative.

The potential adverse effects from construction emissions identified above for the No Action/No Project Alternative future conditions within the Planning Area would still occur under the Reduced Permit Term Alternative but to a lesser extent under the Reduced Permit Term Alternative because of the reduced vehicle trip lengths resulting from not having urban development shifted or displaced outside the MCRA. This would result in a ***Minor Beneficial*** effect when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

As discussed in Section 2.4.5, Conservation Strategy Under the Reduced Permit Term Alternative, the Reduced Permit Term Alternative includes a Preserve System established during the 30-year permit term and a comprehensive preserve management program implemented in perpetuity for those preserves. The Preserve System established during the 30-year permit term under the Reduced Permit Term Alternative would be more consolidated and linked than for the No Action/No Project Alternative. As outlined in Section 2.4.5 in Chapter 2, further establishment of a coordinated preserve management and monitoring program would cease after the end of the 30-year permit term; however, the preserves established in a consolidated manner during the permit term would remain intact, whereas future (i.e., beyond the 30-year permit term) mitigation preserves would not be established in such a manner. The mitigation preserves under the Reduced Permit Term Alternative established during Years 31–50 of the 50-year EIS/EIR study period would resemble preserve establishment patterns under the No Action/No Project Alternative.

As described previously for the Proposed Action/Proposed Project Alternative, overall GHG emissions associated with preserve establishment are considered similar for the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative. Because the Reduced Permit Term Alternative implements aspects of both alternatives in the same manner as described previously for each alternative, overall GHG emissions associated with preserve establishment under the Reduced Permit Term Alternative would be similar to emissions from the other two alternatives. Because GHG emissions from preserve establishment under the Reduced Permit Term Alternative would, overall, be similar to those describe for the No

Action/No Project Alternative, a ***Less Than Significant Adverse*** effect to climate change would occur when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Operational Emissions

As described previously for the No Action/No Project Alternative, potential significant adverse effects from operational GHG emissions from stationary and mobile sources are anticipated for urban development under the No Action/No Project Alternative future condition. These conclusions would still be the case under the Reduced Permit Term Alternative. However, under the Reduced Permit Term Alternative, 1,900 acres of urban development would not be shifted or displaced outside of the USB. Therefore, operational related vehicular trips associated with development would be shorter, resulting in fewer mobile-source GHG emissions; that is, potential significant adverse effects from operation of development identified above for the No Action/No Project Alternative future condition would also occur but to a lesser extent under the Reduced Permit Term Alternative. This would be a ***Minor Beneficial*** effect when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

Urban development under the Reduce Permit Term Alternative would also result in the conversion of undeveloped terrestrial carbon-sequestering terrestrial land covers (e.g., agriculture/cropland land, oak woodlands, grasslands) to developed land, decreasing the total sequestering capacity of land within the Planning Area. This would result in a net increase in GHG emissions. Based on Table 8-12, Expected Direct Impacts to Natural Land Covers – Reduced Permit Term Alternative, and as shown in Appendix H, expected urban development could result in a loss of approximately 34,113 acres of vegetated carbon-sequestering land under the Reduced Permit Term Alternative. This would amount to approximately 771 MT/year of CO_2 that would have otherwise continued to be sequestered by the undeveloped land. Compared to the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in 239 fewer acres of vegetated land converted to non-carbon sequestering land. Compared to the No Action/No Project Alternative, the Reduced Permit Term Alternative would result in approximately 1 MT/year of CO_2 fewer emissions from changes in carbon-sequestrating land coverage.

This small difference in emissions resulting from 239 fewer acres of terrestrial carbon-sequestering land being converted is because some land cover types sequester more carbon than others. As shown in Appendix H, riparian woodland habitats are estimated to result in approximately 0.74 MT of carbon sequestered in the woody vegetation per acre per year. However, other land covers, such as annual grasslands, quickly reach an equilibrium between carbon sequestered in the growing vegetation and carbon released back into the atmosphere through decomposition of dead vegetation. Therefore, grassland land covers were assumed to

result in no net increases in carbon sequestration over time. That is, for this analysis, grasslands were assumed to sequester 0 MT of carbon per acre per year. The calculations of carbon sequestration potential reflect these conditions, as shown in Appendix H.

The total loss in carbon sequestration for the Reduced Permit Term Alternative (i.e., 771 MT/year of CO_2) would be below the applicable GHG thresholds of 1,100 MT CO_2/year. Because net annual GHG emissions associated with the loss of carbon-sequestering land would be negligibly lower under the Reduced Permit Term Alternative relative to the No Action/No Project Alternative, there would be ***No Impact*** when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

As described previously for the Proposed Action/Proposed Project Alternative, overall GHG emissions associated with preserve operations are considered similar for the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative. Because the Reduced Permit Term Alternative implements aspects of both alternatives in the same manner as described previously for each alternative, overall GHG emissions associated with preserve operations under the Reduced Permit Term Alternative would be similar to emissions from the other two alternatives. Because GHG emissions from preserve operations under the Reduced Permit Term Alternative would, overall, be similar to those describe for the No Action/No Project Alternative, a ***Less Than Significant Adverse*** effect on climate change would occur when comparing the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

As discussed previously in Section 15.1.4, climate change may result in various effects to precipitation amounts and patterns, temperature, snow pack, and sea-level rise. These changes may result in effects to Preserve Systems. However as described previously, given the amount of uncertainty and number of variables involved, it would be speculative to attempt to predict the future effects of climate change on any particular species or ecosystem in the Planning Area. If adverse effects from climate change were to occur in preserves, the typically larger and more interconnected preserves established during the 30-year permit term under the Reduced Permit Term Alternative would be more resilient to changing climatic conditions than the smaller and more isolated mitigation preserves associated with the No Action/No Project Alternative. This would result in ***Minor Beneficial*** effect compared to the No Action/No Project Alternative baseline condition.

15.2.4.2 Significance of Direct and Indirect Effects

In summary, compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would result in the following:

- A net reduction in GHG emissions resulting from construction of urban development
- A net reduction in GHG emissions resulting from operations of urban development

- A negligible difference in GHG emissions resulting from the loss of carbon-sequestering terrestrial land covers
- Little difference in GHG emissions resulting from Preserve System construction/establishment
- Little difference in GHG emissions resulting from Preserve System management
- A Preserve System that is more resilient to climate change

Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative related to the GHG and climate change impact criteria, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects to GHG emissions and climate change compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

15.2.4.3 Cumulative Effects of the Alternative

As described in Section 15.2.1, the GHG emission impacts analyzed in this EIS/EIR are, by definition, cumulative. Therefore, cumulative GHG emission impacts of the Reduced Permit Term Alternative are identical to the direct and indirect impacts described in Section 15.2.4.1. Therefore, after considering the significance of impacts from the Reduced Permit Term Alternative on GHG emissions and climate change, the Reduced Permit Term Alternative would result in ***Minor Beneficial*** effects compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

15.3 REFERENCES CITED

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

40 CFR 1502.1–1502.25. Environmental Impact Statement.

California Health and Safety Code, Sections 38550–38551. Division 25.5: California Global Warming Solutions Act of 2006; Part 3: Statewide Greenhouse Gas Emissions Limit.

CARB (California Air Resources Board). 2011. *Status of Scoping Plan Recommended Measures*. Accessed December 2017. http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf.

CARB. 2013. *Facts About California's Sustainable Communities Plans*. Last revised October 2, 2013. Accessed December 2017. https://www.arb.ca.gov/cc/sb375/scag_fact_sheet.pdf.

CARB. 2014a. *First Update to the Climate Change Scoping Plan: Building on the Framework Pursuant to AB 32, the California Global Warming Solutions Act of 2006*. May 2014. Accessed December 2017. https://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

CARB. 2014b. *California Greenhouse Gas Inventory for 2000–2012—by Category as Defined in the 2008 Scoping Plan*. Last Updated March 24, 2014. Accessed December 2017. https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2012/ghg_inventory_scopingplan_00-12_2014-03-24.pdf.

CEC (California Energy Commission). 2012. *Our Changing Climate: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California*. Publication CEC-500-2012-007. Last updated July 31, 2012.

CEQ (President's Council on Environmental Quality). 2016. *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Review*. August 1, 2016. Accessed December 2017. https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf.

CNRA (California Natural Resources Agency). 2012. *Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks of Climate Change in California: A Summary on the Third Assessment from the California Climate Change Center*. CEC-500-2012-007. July 2012. Accessed December 2017. http://www.water.ca.gov/waterplan/docs/cwpu2013/Final/vol4/climate_change/05Climate_Action_Team_3_Assesment.pdf.

Galt. 2009a. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with Environmental Science Associates, Applied Development Economics, and Omni Means. Sacramento, California: Mintier Harnish. April 2009. Accessed December 2017. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *City of Galt General Plan Update: 2030 Final EIR*. Final. SCH No. 2007082092. Prepared by Environmental Science Associates, in association with Mintier Harnish, Applied Development Economics, and Omni Means. Sacramento, California: Environmental Science Associates. March 2009. Accessed December 2017. http://www.saclafco.org/SphereofInfluenceInformation/Documents/galtsoi/sac_024063.pdf.

IPCC (Intergovernmental Panel on Climate Change). 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Geneva, Switzerland: IPCC. February 2007.

IPCC. 2013. "Carbon and Other Biogeochemical Cycles." In *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva, Switzerland: IPCC. Accessed December 2017. http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf.

Keeley, J.E., and H. Zedler. 1998. "Characterization and Global Distribution of Vernal Pools." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems: Proceedings from a 1996 Conference*, edited by C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 1–14. 0-943460-37-9. Based on a conference held at the Hilton Hotel, Sacramento, California, June 19–21, 1996. Sacramento, California: California Native Plant Society.

Malamud-Roam, F.P., B. Lynn Ingram, M. Hughes, and J.L. Florsheim. 2006. "Holocene Paleoclimate Records from a Large California Estuarine System and its Watershed Region: Linking Watershed Climate and Bay Conditions." *Quaternary Science Reviews* 25:1570–1598. Accessed December 2017. http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/ccwd/spprt_docs/ccwd_malamud_roam_etal_2006.pdf.

Minnich, R.A. 2007. "Climate, Paleoclimate, and Paleovegetation." In *Terrestrial Vegetation of California*, 3rd ed., edited by M.G. Barbour, T. Keeler-Wolf, and A.S. Schoenherr, 43–70. Oakland, California: University of California Press. Accessed December 2017. http://earthsciences.ucr.edu/docs/chapter2.pdf.

Rancho Cordova. 2006a. *City of Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Accessed December 2017. http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report*. SCH No. 2005022137. Rancho Cordova, California: City of Rancho Cordova. June 2006. Accessed December 2017. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

SACOG (Sacramento Area Council of Governments). 2016a. *Metropolitan Transportation Plan/Sustainable Communities Strategy: Building a Sustainable System*. Sacramento, California: SACOG. Adopted February 18, 2016. Accessed December 2017. http://www.sacog.org/sites/main/files/file-attachments/mtpscs_complete.pdf.

SACOG. 2016b. *Final Environmental Impact Report for the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy*. SCH No. 2014062060. Sacramento, California: SACOG. January 2016. Accessed December 2017. http://www.sacog.org/general-information/final-2016-mtpscs-environmental-impact-report.

Sacramento County. 2009. *Greenhouse Gas Emissions Inventory for Sacramento County*. Prepared by ICF Jones & Stokes. Sacramento, California: ICF Jones & Stokes.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105. SCH No. 2007082086. Sacramento, California: Sacramento County, Department of Environmental Review and Assessment. April 2010. Accessed December 2017. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030.* Sacramento, California: Sacramento County, Community Planning and Development Department. Amended November 9, 2011. Accessed December 2017. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx.

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2016. *Guide to Air Quality Assessment in Sacramento County*. Adopted December 2009. Last Revised September 2016. Accessed December 2017. http://www.airquality.org/Residents/CEQA-Land-Use-Planning/CEQA-Guidance-Tools.

CHAPTER 16 – POPULATION AND HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE

This chapter provides an overview of the existing social and economic conditions, demographics, and the characteristics of minority and low-income populations in the Planning Area that are relevant for the analysis of environmental justice, and presents the potential effects of each Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) alternative on population and housing, socioeconomics, and environmental justice within the Planning Area.

An evaluation of population and housing focuses on the potential for projects and actions to remove or displace existing housing and the availability of, and demand for, housing relative to the size of the population.

Socioeconomics considers how the economic changes resulting from a project or action affect the human population in the area, such as changes in the number or type of jobs or changes in tax generation affecting the provision of government services.

As described in Sections 16.1.1 and 16.1.2, the core of an environmental justice analysis determines whether a project or an action would result in disproportionately high and adverse effects on minority or low-income populations. The adverse effects can be physical or economic.

16.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

This section describes the regulatory and environmental setting for population and housing, socioeconomics, and environmental justice.

16.1.1 Regulatory Framework

There are several federal, state, and local agency requirements that apply to the evaluation of population and housing, socioeconomics, and/or environmental justice. This section summarizes the statutes, regulations, policies, and agency planning documents that are relevant to the approval, issuance of permits, or implementation of the alternatives analyzed in this EIS/EIR. To the extent possible, the analyses or studies required by these regulations and policies are integrated into the environmental effects analyses presented in Section 16.2 (40 CFR 1502.25).

16.1.1.1 Federal

National Environmental Policy Act

The National Environmental Policy Act (NEPA) regulations require an effects analysis to consider social and economic effects, whether those effects are direct, indirect, or cumulative (40 CFR 1508.8). However, social and economic effects by themselves do not require preparation of an

EIS document. An EIS is prepared to analyze the natural and physical environment and the relationship of people with that environment. When economic or social effects are interrelated to natural or physical environmental effects, then an EIS must discuss all of those effects on the human environment (40 CFR 1508.14). Therefore, if a lead agency determines that there may be a sufficient effect on the physical or natural environment that an EIS is the proper NEPA document to prepare, then social and economic effects must be quantified and analyzed if the social and economic effects may be interrelated to the effects on the natural or physical environment.

Environmental Justice in Minority Populations and Low-Income Populations

President Clinton signed Executive Order 12898 (Clinton 1994) to underscore that provisions of existing environmental and civil rights statues can help ensure that all communities and persons of the nation live in a safe and healthy environment. Under Executive Order 12898, each federal agency must identify and address, as appropriate and as required by NEPA, any disproportionately high and adverse human health, economic, social, and environmental effects of its programs, policies, or actions on minority or low-income populations. Each federal agency must make achieving environmental justice part of its mission.

The document *Environmental Justice Guidance Under the National Environmental Policy Act* (CEQ 1997) defined the terms minority and low-income to include:

- **A minority** is defined as individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. However, individuals of Hispanic background can also identify themselves as any racial group because Hispanic is an ethnicity based on a shared language, Spanish—not a racial identity.
- **Low-income populations** in an affected area are identified with the annual poverty thresholds from the U.S. Census Bureaus' *Current Population Reports, Series P-60 on Income and Poverty* (CEQ 1997). The *Current Population Reports, Series P-60 on Income and Poverty* is an annual report prepared by the U.S. Census Bureau. The most recent report was published in 2016 (Proctor et al. 2016). The report, among other data, identifies income levels for individuals and different-sized families, and if the individual or family earns below that level, they are considered in poverty. The Council on Environmental Quality identifies that these poverty thresholds should be used to define low-income populations.

Environmental Compliance Memorandum 95-3 (ECM 95-3) describes federal agency responsibilities under the Department of the Interior environmental justice policy. ECM 95-3 states: "Therefore, henceforth all environmental documents should specifically analyze and

evaluate the impacts of any proposed projects, actions or decisions on minority and low-income populations and communities, as well as the equity of the distribution of benefits and risks of those decisions." In addition, ECM 95-3 also states: "If a federal action is expected to have either an insignificant impact or no impact on minority/low-income populations, the NEPA document prepared for the action, under the scoping section in an environmental impact statement, should specifically state that the proposed project or action was considered during scoping and/or planning and is expected to have either insignificant impact or no impact, direct or indirect, with reasons given."

16.1.1.2 State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines require analysis of a proposed project's potential effects on population growth and housing supply. However, CEQA does not require a discussion of socioeconomic effects except where they would result in physical changes, and states that economic or social effects "shall not be treated as significant effects on the environment. An EIR may trace a chain of cause and effect from a proposed decision on a project through anticipated economic or social changes resulting from the project to physical changes caused in turn by the economic or social changes. The intermediate economic or social changes need not be analyzed in any detail greater than necessary to trace the chain of cause and effect. The focus of the analysis shall be on the physical changes" (CEQA Guidelines, Section 15131).

16.1.1.3 Local

Sacramento County 2030 General Plan

The *Sacramento County 2030 General Plan* (Sacramento County General Plan) (Sacramento County 2011) includes goals, objectives, and policies related to socioeconomics and environmental justice. Applicable policies include the following:

> **Policy CI-23:** Consider the transit needs of senior, disabled, low-income, and transit-dependent persons in making recommendations regarding transit services.
>
> **Policy LU-45:** Mix affordable housing units with market rate units to the extent feasible, as opposed to building segregated affordable housing developments.
>
> **Policy ED-1:** Achieve complete communities that have enough land capacity to accommodate the development of general commercial, industrial, and office uses which support community needs in all areas of the County.

Policy ED-8: Create plans for new growth areas with a mix of land uses, including a balance of residential and employment (jobs-housing balance) as well as providing for neighborhood-oriented services and diverse commercial amenities to serve a broader portion of the population.

Policy ED-10: Revitalize distressed and aging commercial corridors by developing mixed-use centers and urban villages along corridors to improve community quality of life, optimize economic development, balance land uses, and foster the opportunity to accommodate a portion of the anticipated future growth.

Policy ED-19: Support and encourage the maintenance and growth of commercial agricultural businesses in Sacramento County.

Policy ED-29: Strive to further the County's economic base through cooperative efforts of local businesses and agencies.

Policy ED-34: Identify and attract industries that are consistent with the County's goal of economic vitality and providing a high quality of life.

Policy ED-36: Pursue new developments and businesses that add to the County's economic base, particularly those that generate sales tax and property tax revenue.

Policy ED-37: Assist local firms in the trade and service sectors to expand their existing markets.

Policy ED-38: Identify and recruit new firms that supply or otherwise support businesses already located in the Sacramento area.

2030 Galt General Plan

The *2030 Galt General Plan* (Galt General Plan) (Galt 2009a) includes goals, objectives, and policies related to socioeconomics and environmental justice. Applicable policies include the following:

Policy LU-10.1: Environmental Justice. The City shall ensure the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of land use and environmental laws, regulations, and policies. The City shall ensure that no part of the community suffers disproportionately from adverse human health or environmental effects, and all people live in clean, healthy, and sustainable communities.

Policy LU-10.2: Equal Public Participation. The City shall ensure that all community residents have an opportunity for public participation in the decision-making process.

Policy LU-10.3: Equitable Distribution of New Public Facilities and Services. The City shall plan for the equitable distribution of new public facilities and services that increase and enhance the community's quality of life.

Policy LU-10.4: Location of Industrial Facilities. The City shall provide for the location of industrial facilities and uses that pose a significant hazard to human health and safety in a manner that seeks to avoid proximity to schools or residential dwellings.

Policy ED-4.1: Business Retention and Expansion (BRE) Priority. The City should prioritize local business retention by focusing BRE resources on retaining and expanding those businesses that already serve as significant sources for jobs and/or tax revenue for the City.

Policy C-5.3: ADA Compliance. The City shall consider the transit needs of senior, disabled, minority, low-income, and transit-dependent persons in making decisions regarding transit services and in compliance with the Americans with Disabilities Act.

Rancho Cordova General Plan

The *Rancho Cordova General Plan* (Rancho Cordova General Plan) (Rancho Cordova 2006a) includes goals, objectives, and policies related to the socioeconomics and environmental justice. Applicable policies include the following:

Policy H.1.1: Improve the City's jobs-housing balance through ensuring that housing development in Rancho Cordova provides opportunities for all income levels in order to serve the full range of available and projected jobs in the City.

Policy H.2.1: Encourage private investment to increase property values and resale prices.

Policy H.2.7: Preserve housing units at risk of losing affordability status for units that are subsidized with federal, state, or local funds.

Policy H.7.4: Require non-residential development to provide for the affordable housing needs generated or contributed to by their development.

Policy ED.1.5: Heavy industrial uses should include transitions in intensity, buffers, or other methods to reduce potential impacts on residential uses. Buffers may include land designated for other uses, such as light industry, commercial, or open spaces. The ten-acre minimum parcel size shall apply until the land is zoned to an M-1, M-2, MP, or GC designation.

Policy ED.1.8: Provide a variety of housing types in Rancho Cordova to support a diverse economy, including workforce housing, move-up housing, and executive housing.

Policy ED.7.1: Provide support that makes it attractive and profitable for private sector developers to produce infill development. At the same time, encourage infill development that is attractive to potential residents and beneficial to existing residents.

Policy ED.8.1: Increase the number of jobs that go to Rancho Cordova residents by coordinating economic development efforts with employment placements.

16.1.2 Population and Socioeconomic Conditions in the Planning Area

Information on existing population and socioeconomic conditions in this section is based primarily on data published by the U.S. Census Bureau. The U.S. Census Bureau compiles data by county, city, and census tract. A census tract is a permanent geographic area, typically smaller than a city or county, recognized by the U.S. Census Bureau, to allow the collection and analysis of census data at a more refined geographic scale. Once established, census tract boundaries are rarely changed to support the comparison of census data collected in each tract over time. Census tracts that overlap with the Planning Area are shown in Figure 16-1.

The Planning Area is a geographic boundary unique to this EIS/EIR (see Section 1.1.1). The census tracts used by the Census Bureau do not directly correspond to the boundaries of the Planning Area. Therefore, census tract data was used for tracts that are completely, or mostly, within the Planning Area boundary (see Figure 16-1). Because the census tract boundaries do not exactly correspond to the Planning Area boundary, the population and socioeconomic data provided for the Planning Area should be considered as an estimate based on the best available information.

16.1.2.1 Resident Population Size

All of Sacramento County (County) has approximately 1.4 million residents (Table 16-1). The Planning Area portion of the County has approximately 240,000 residents, with most of those individuals living in unincorporated County areas and the other portion in Galt and Rancho Cordova (Table 16-1).

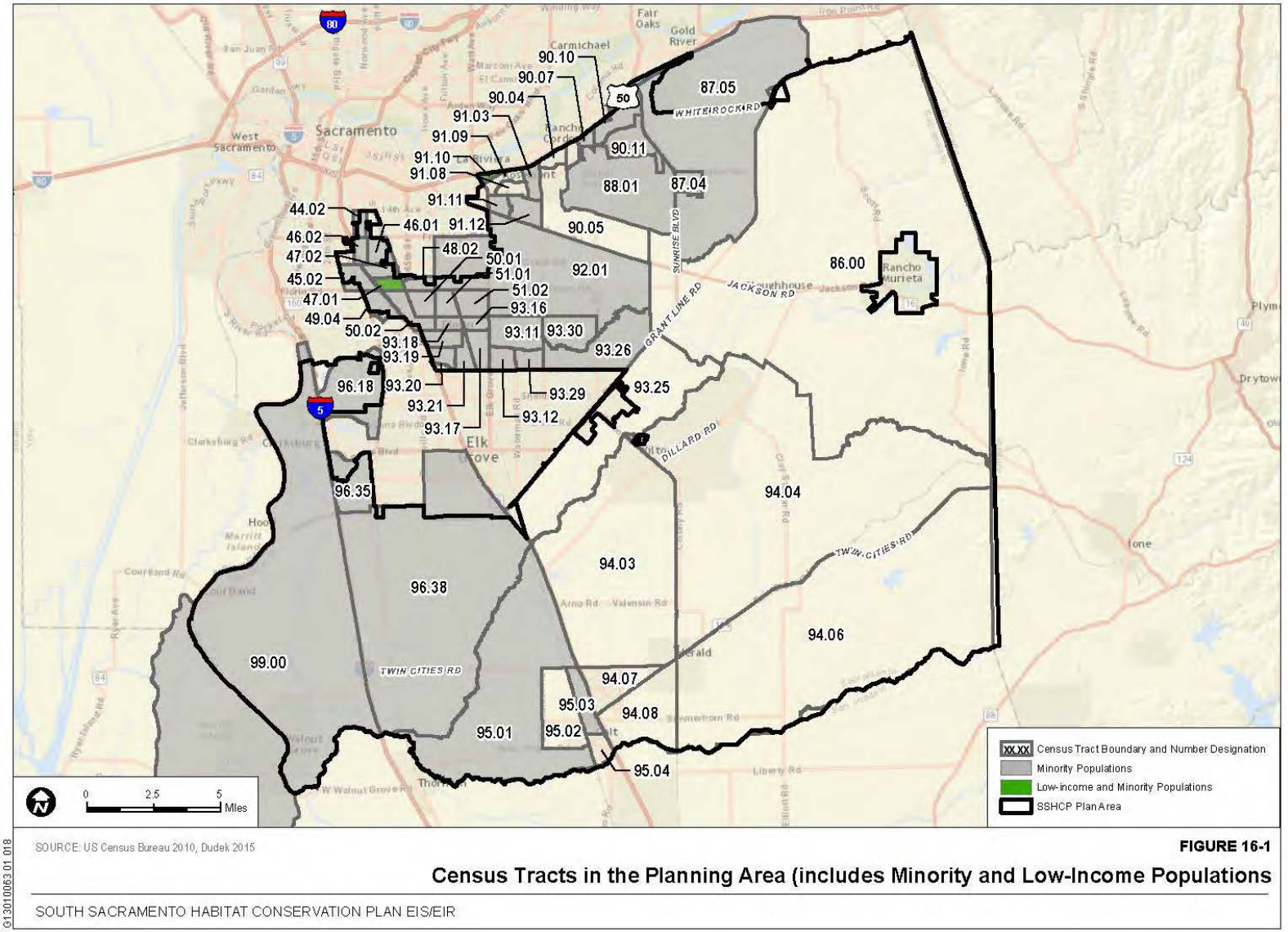
Table 16-1. Existing Populations of the Project Proponents and Inside the Planning Area

Project Proponents with Jurisdiction	Population
Sacramento County	1,435,207
Galt	23,997
Rancho Cordova	66,027
Total for Planning Area*	**242,133**

Source: U.S. Census Bureau 2013a

* Planning Area population was estimated using data from census tracts that were located completely or mostly within the Planning Area and includes Galt and Rancho Cordova and portions of unincorporated Sacramento County.

Figure 16-1 Census Tracts in the Planning Area and Identification of Minority and Low-Income Populations



INTENTIONALLY LEFT BLANK

16.1.2.2 Race and Ethnicity

The term "race" refers to the race categories used by the Census Bureau when collecting data on the U.S. population. The seven race categories used by the Census Bureau are identified in Table 16-2. The Census Bureau also provides individuals the opportunity to identify as Hispanic or Latino, which is an ethnicity or ethnic identity and not a race. A person of any race may also identify as Hispanic or Latino. Hispanic or Latino persons are those of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin. The term "minority" is defined in Section 16.1.1.1. Persons of any race identified by the Census Bureau except for "white alone," and persons identifying as Hispanic or Latino ethnicity are considered a minority. Minorities currently comprise 64.5% of the overall population in the Planning Area, a higher proportion of minority residents relative to the total population in all of Sacramento County (53.1%) (U.S. Census Bureau 2013a). In addition, the Planning Area has a higher proportion of minority residents relative to the overall populations than Galt and Rancho Cordova (48.9% and 47.9%, respectively).

Because individuals can identify as both a race and by Hispanic or Latino ethnicity when providing information to the Census Bureau, there is the potential to count one individual two times when compiling minority population data. In order to show minority populations without double-counting those who identify as both Hispanic or Latino ethnicity and as a particular race on census questionnaires, Table 16-2 shows the percentage of the Planning Area population that identifies themselves as either Hispanic or Latino of any race, or identifies themselves as one or more races not of Hispanic or Latino origin, but does not record any individuals in more than one category.

Within the Planning Area, there is no distinct racial or ethnic majority. In individual census tracts in the Planning Area, 13 out of 52 census tracts have a white majority (not shaded in Table 16-3). Two census tracts have a majority of Hispanic or Latino peoples (shaded in dark grey in Table 16-3). All other census tracts do not have more than 50% of any one racial or ethnic group. Forty census tracts would be considered as minority populations under Executive Order 12898 as "the cumulative percentage of minorities within the affected community is greater than 50 percent." These 40 census tracts are shaded grey in Table 16-3, and as shown in Figure 16-1, are located within Rancho Cordova, portions of Galt, the unincorporated County between the City of Sacramento and Elk Grove, and the area directly south of Elk Grove.

16.1.2.3 Income and Poverty

In 2013, the most recent year for which data is available from the Census Bureau, the nationwide poverty threshold (sometimes referred to as the "poverty line") for a family/household of four people was $23,834 (U.S. Census Bureau 2013b). The median

household income in the County as a whole is well above the poverty line at $55,064; however, 13.4% of families and 17.6% of individuals live below the nationwide poverty line. Most census tracts in the Planning Area have median household incomes above the poverty line. There are two census tracts in the Planning Area with a median household income below the four-person poverty threshold (shaded green in Table 16-4). These are located in unincorporated Sacramento County, near its boundary with the City of Sacramento (see Figure 16-1). These census tracts are also locations where minorities make up more than 50% of the population.

Table 16-2. Race and Ethnicity Population Ratios for the Project Proponent Jurisdictions and Inside the Planning Area (2013)

Place	Hispanic or Latino (of any race)	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Two or More Races
Sacramento County	21.8%	47.9%	9.7%	0.5%	14.4%	1.0%	0.3%	4.5%
Galt	19.2%	51.1%	2.7%	0.3%	1.4%	0.7%	0.3%	1.2%
Rancho Cordova	42.3%	52.1%	10.1%	0.3%	12.0%	0.9%	0.2%	5.2%
Planning Area*	28.0%	36.5%	10.7%	0.5%	19.0%	1.1%	0.3%	4.0%

Source: U.S. Census Bureau 2013a

* Planning Area population was estimated using data per census tracts that were completely or mostly within the Planning Area and includes Galt and Rancho Cordova and portions of unincorporated Sacramento County.

Table 16-3. 2013 Race and Ethnicity Population Ratios by Planning Area Census Tract

Census Tract	Hispanic or Latino (of any race)	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Two or More Races	Percent Minority (non-white)
44.02	58.6%	13.2%	10.3%	0.0%	12.3%	0.0%	0.5%	5.1%	87%
45.02	45.6%	19.0%	11.2%	0.0%	15.0%	6.4%	0.5%	2.2%	81%
46.01	47.4%	21.6%	9.5%	0.0%	19.2%	0.0%	0.0%	2.3%	78%
46.02	48.9%	26.5%	13.1%	0.5%	6.6%	1.2%	0.4%	2.7%	74%
47.01	50.5%	14.4%	13.1%	0.8%	19.6%	0.3%	0.0%	1.3%	86%
47.02	46.4%	15.6%	13.2%	0.0%	18.1%	0.6%	0.0%	6.2%	84%
48.02	33.0%	20.7%	11.1%	0.1%	29.3%	0.7%	0.0%	5.2%	79%
49.04	33.8%	31.9%	11.1%	0.2%	18.2%	0.2%	0.3%	4.4%	68%
50.01	37.4%	13.9%	13.1%	0.7%	27.1%	2.2%	0.0%	5.6%	86%
50.02	25.0%	29.6%	19.4%	1.9%	15.9%	3.2%	0.0%	4.9%	70%
51.01	29.2%	25.7%	17.7%	0.0%	23.1%	1.4%	0.0%	2.9%	74%
51.02	29.2%	30.9%	10.3%	1.7%	22.5%	0.0%	0.1%	5.3%	69%

Table 16-3. 2013 Race and Ethnicity Population Ratios by Planning Area Census Tract

Census Tract	Hispanic or Latino (of any race)	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Two or More Races	Percent Minority (non-white)
86	7.8%	75.6%	5.9%	2.2%	4.1%	0.0%	0.9%	3.5%	24%
87.04	16.0%	37.9%	6.2%	0.3%	35.6%	0.0%	0.0%	4.0%	62%
87.05	12.4%	46.1%	8.4%	0.0%	23.3%	0.8%	1.0%	7.9%	54%
88.01	17.7%	42.9%	11.0%	0.3%	19.6%	2.8%	0.0%	5.7%	57%
90.04	18.9%	51.7%	16.1%	1.7%	6.1%	2.0%	0.2%	3.3%	48%
90.05	13.5%	53.6%	14.1%	1.8%	11.2%	0.6%	0.0%	5.1%	46%
90.07	28.8%	38.2%	22.0%	0.7%	7.6%	0.0%	0.2%	2.6%	62%
90.1	16.6%	38.9%	15.3%	0.0%	22.3%	1.4%	0.0%	5.5%	61%
90.11	12.7%	43.1%	3.3%	0.4%	36.2%	1.8%	0.3%	2.2%	57%
91.03	17.8%	48.2%	17.8%	0.0%	11.0%	0.0%	0.0%	5.2%	52%
91.08	13.9%	56.8%	8.2%	0.0%	13.2%	0.3%	0.0%	7.5%	43%
91.09	14.7%	53.3%	12.2%	0.0%	8.5%	0.0%	0.3%	10.9%	47%
91.1	26.4%	24.9%	35.9%	0.4%	5.6%	0.7%	3.4%	2.8%	75%
91.11	37.7%	35.2%	7.0%	0.0%	16.9%	0.0%	0.0%	3.1%	65%
91.12	25.7%	47.5%	12.0%	0.0%	11.4%	0.0%	0.0%	3.4%	52%
92.01	22.1%	41.9%	3.3%	1.1%	24.5%	1.5%	0.0%	5.6%	58%
93.11	24.0%	31.2%	8.0%	1.6%	32.4%	0.1%	0.1%	2.6%	69%
93.12	18.0%	32.6%	14.4%	0.4%	31.7%	0.5%	0.1%	2.3%	67%
93.16	13.7%	16.6%	11.6%	1.6%	46.7%	0.5%	0.0%	9.3%	83%
93.17	21.1%	30.8%	18.3%	0.1%	21.7%	0.0%	1.5%	6.2%	69%
93.18	25.6%	18.0%	13.3%	2.8%	26.3%	8.3%	0.0%	5.7%	82%
93.19	23.1%	10.4%	13.2%	0.0%	42.0%	2.5%	0.0%	8.8%	90%
93.2	34.9%	15.1%	10.8%	0.0%	30.2%	2.7%	0.2%	6.0%	85%
93.21	20.8%	25.3%	14.5%	0.3%	32.8%	2.2%	0.0%	4.1%	75%
93.25	10.3%	79.3%	0.0%	0.0%	10.3%	0.0%	0.0%	0.0%	21%

Table 16-3. 2013 Race and Ethnicity Population Ratios by Planning Area Census Tract

Census Tract	Hispanic or Latino (of any race)	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Two or More Races	Percent Minority (non-white)
93.26	12.5%	45.1%	5.8%	0.0%	32.4%	0.0%	0.0%	4.2%	55%
93.29	33.4%	20.8%	23.3%	0.4%	19.6%	0.0%	0.0%	2.5%	79%
93.3	18.7%	41.7%	7.2%	0.2%	30.2%	0.0%	1.4%	0.6%	58%
94.03	28.9%	63.9%	0.0%	0.0%	5.9%	0.2%	0.6%	0.5%	36%
94.04	15.3%	71.9%	0.6%	0.8%	6.4%	0.0%	1.0%	4.1%	28%
94.06	13.5%	79.1%	3.1%	0.2%	2.0%	0.0%	0.8%	1.3%	21%
94.07	42.6%	51.4%	1.4%	0.1%	1.2%	1.4%	0.5%	1.3%	49%
94.08	26.7%	62.2%	5.5%	0.0%	4.0%	0.0%	0.3%	1.3%	38%
95.01	61.7%	36.3%	0.1%	0.1%	1.5%	0.0%	0.0%	0.2%	64%
95.02	30.9%	60.7%	5.8%	0.4%	1.0%	0.0%	0.2%	1.0%	39%
95.03	46.4%	47.9%	0.1%	1.4%	2.2%	0.8%	0.0%	1.2%	52%
95.04	40.9%	57.5%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	42%
96.18	19.1%	32.2%	11.0%	0.0%	26.6%	6.1%	0.0%	5.0%	68%
96.35	18.9%	23.9%	20.6%	0.0%	31.7%	1.5%	0.0%	3.4%	76%
96.38	25.2%	36.5%	20.2%	0.9%	14.3%	0.2%	0.0%	2.7%	64%
99	41.7%	44.7%	0.0%	1.2%	9.7%	0.1%	0.5%	2.2%	55%

Source: U.S. Census Bureau 2013a

Notes: Grey shading = Minority population under Executive Order 12898 as "the cumulative percentage of minorities within the affected community is greater than 50%"

Dark grey shading = majority of Hispanic or Latino peoples

No shading = White majority

* Planning Area population was estimated using data per census tracts that were completely or mostly within the Planning Area and includes Galt and Rancho Cordova and portions of unincorporated Sacramento County.

Table 16-4. Income and Poverty Conditions for the Project Proponents and in each Planning Area Census Tract (2013)

Place/Census Tract	Median Household Income ($)	Percent Families with Total Income Below Poverty Level	Percent Individuals Below Poverty Level
Sacramento County	55,064	13.4%	17.6%
Galt	57,100	14.4%	19.5%
Rancho Cordova	52,152	13.6%	17.8%
44.02	27,556	45.2%	50.2%
45.02	26,224	45.3%	47.2%
46.01	25,007	36.3%	40.8%
46.02	31,845	23.4%	31.5%
47.01	17,133	51.2%	59.4%
47.02	32,931	23.5%	29.0%
48.02	34,428	27.5%	40.5%
49.04	45,588	8.1%	14.1%
50.01	46,372	21.3%	24.7%
50.02	25,313	21.2%	30.4%
51.01	34,368	34.2%	35.1%
51.02	48,445	11.8%	14.8%
86	97,472	2.9%	4.2%
87.04	93,814	6.9%	8.7%
87.05	107,768	1.4%	5.0%
88.01	81,538	15.5%	17.3%
90.04	58,173	11.3%	14.0%
90.05	44,760	11.9%	19.0%
90.07	43,333	21.3%	29.8%
90.1	46,496	14.9%	21.4%
90.11	95,146	2.1%	3.9%
91.03	56,200	13.8%	14.8%
91.08	62,820	6.7%	9.5%
91.09	72,230	4.0%	10.1%
91.1	21,788	40.4%	41.7%
91.11	48,892	18.0%	20.1%

Table 16-4. Income and Poverty Conditions for the Project Proponents and in each Planning Area Census Tract (2013)

Place/Census Tract	Median Household Income ($)	Percent Families with Total Income Below Poverty Level	Percent Individuals Below Poverty Level
91.12	62,140	16.3%	19.2%
92.01	42,650	22.2%	24.9%
93.11	73,932	9.8%	13.8%
93.12	66,964	11.9%	18.7%
93.16	60,417	11.9%	13.3%
93.17	66,816	12.5%	16.6%
93.18	62,132	15.1%	16.2%
93.19	53,154	14.1%	18.4%
93.2	47,650	15.4%	19.4%
93.21	69,969	12.3%	13.3%
93.25	71,690	1.7%	8.3%
93.26	111,170	1.9%	3.5%
93.29	61,625	13.9%	14.6%
93.3	85,365	5.6%	6.8%
94.03	76,176	15.7%	17.1%
94.04	79,643	15.5%	14.9%
94.06	87,844	1.6%	7.8%
94.07	66,809	12.9%	14.6%
94.08	77,361	3.0%	17.8%
95.01	44,958	19.8%	22.8%
95.02	66,726	8.3%	15.0%
95.03	39,504	15.4%	25.1%
95.04	50,167	25.0%	34.3%
96.18	77,276	8.2%	7.4%
96.35	93,347	2.7%	3.6%
96.38	70,605	4.6%	7.4%
99	60,833	8.7%	14.7%

Source: U.S. Census Bureau 2013c
Note: Green shading = A median household income below the four-person poverty guideline

16.2 ENVIRONMENTAL CONSEQUENCES/ ENVIRONMENTAL IMPACTS

16.2.1 Methodology for Assessing Impacts of Each Alternative on Population and Housing, Socioeconomics, and Environmental Justice

The effects of each EIS/EIR alternative on population and housing, socioeconomics, and environmental justice are described and analyzed qualitatively, as discussed in Section 3.6. The projects and activities expected under each alternative, including expected or conceptual preserves, are described in Chapter 2.

The lead agencies determined that an appropriate geographic study scale for evaluating the effects on population and housing, socioeconomics, and environmental justice of each EIS/EIR alternative is the Planning Area as this is the location where physical changes in the environment resulting from the alternatives could affect these resources. However, as stated in Section 16.1.2, the available data used to support the analysis is sometimes presented for the County as a whole, or by census tract. Therefore, by necessity, the impact analysis considers the data using these geographic boundaries, which, in some cases, extends beyond the boundaries of the Planning Area.

Potential effects from each alternative were analyzed based on the best available information about types and locations of new urban development projects and activities. The impact analyses incorporate by reference relevant impact analyses from the three planning documents and the EIRs discussed Section 3.4.

Environmental justice effects are evaluated using the guidance, methodology, and definitions established by Executive Order 12898, and by the Council on Environmental Quality publications and guidance documents identified in Section 16.1.1. Topics considered under the environmental justice analysis include all the resource topics analyzed in this EIS/EIR (see Section 3.2).

The first step of an environmental justice analysis includes identifying areas where a minority or low-income population exists within the Planning Area. Using census tracts, which are the smallest geographic unit available for this kind of data, these areas were identified using the following criteria:

- The cumulative percentage of minorities within a census tract is greater than 50%; or
- The median household income for a census tract is below the national poverty line established by the Census Bureau (U.S. Census Bureau 2013b).

The second step of an environmental justice analysis requires the identification of a “high and adverse” human health, economic, social, and/or environmental effect. The Council on

Environmental Quality indicates that when determining whether the effects are high and adverse, federal agencies are to consider whether the risks or rates of impact on the human environment "are significant or above generally accepted norms" (CEQ 1997). Typically, a significant adverse effect identified in a NEPA document is treated as a high and adverse effect in an environmental justice analysis.

The final step of an environmental justice analysis requires a finding on whether a minority or low-income population is disproportionately affected by a high and adverse effect. A high and adverse effect is considered to disproportionately affect a minority or low-income population if the effect on that population appreciably exceeds the overall effect, risk of effect, or rate of effect to the general population (CEQ 1997).

Cumulative effects are analyzed consistent with the methodology described in Section 3.7 and consider whether the incremental effects of the alternative on population and housing, socioeconomics, and environmental justice would be significant (i.e., cumulatively considerable).

As discussed in Section 3.4, the EIR documents previously prepared for the General Plans of Sacramento County, Galt, and Rancho Cordova (Galt 2009b; Rancho Cordova 2006b; Sacramento County 2010) analyzed direct and cumulative impacts of urban growth planned within each jurisdiction, including effects to population and housing. When the impact analysis or conclusions provided in these General Plan EIR documents were determined by the lead agencies to be appropriate for use in the analysis of the EIS/EIR alternatives, a brief summary or description of the incorporated information or analysis is provided below. As described further in Section 16.2.1.1, these EIRs, being CEQA documents, did not include an analysis of environmental justice. The evaluation of environmental justice is a NEPA requirement.

16.2.1.1 Determination of Impact Significance

As discussed in Section 3.8.1, the criteria used to evaluate the significance of each alternative's effects on population and housing, on socioeconomics, or on environmental justice are based on Appendix G of the CEQA Guidelines, and on typical thresholds used to evaluate effects to population and housing in recent EIRs prepared by Sacramento County, and typical thresholds used to evaluate effects on socioeconomics and environmental justice in similar EIS/EIRs for habitat conservation plans. Based on these sources, a significant adverse effect could occur if the alternative would:

1. Displace substantial numbers of residences in the Planning Area;
2. Create a substantial demand for additional housing that could not be sustained within the Planning Area;
3. Substantially displace or disrupt businesses;
4. Substantially reduce property tax revenue;

5. Cause a disproportionately high and adverse human health, economic, social, or environmental impact on a minority population; or
6. Cause a disproportionately high and adverse human health, economic, social, or environmental impact on a low-income population.

Appendix G of the CEQA Guidelines does not provide suggested criteria for evaluating a beneficial effect. The following criteria were developed by the lead agencies. A beneficial effect could occur if the alternative would:

1. Displace fewer residences in the Planning Area compared to a baseline environmental condition;
2. Alleviate or reduce an unsustainable housing demand within the Planning Area;
3. Displace fewer businesses, or result in less disruption to businesses compared to a baseline environmental condition;
4. Result in less of a reduction in property tax revenue, or increase property tax revenue, compared to a baseline environmental condition; or
5. Reduce or eliminate a disproportionately high and adverse human health, economic, social, or environmental impact on minority or low-income populations compared to a baseline environmental condition.

The impact analysis for the three EIS/EIR alternatives will consider the context, intensity, and severity of potential effects to population and housing, socioeconomics, and environmental justice, and will present a determination of significance applicable to each of these criteria.

16.2.2 No Action/No Project Alternative

The No Action/No Project Alternative is described in Section 2.2.1 of Chapter 2.

16.2.2.1 Direct and Indirect Effects of the Alternative

Much of the future urban development included in the No Action/No Project Alternative is described in the General Plans of Sacramento County, Galt, and Rancho Cordova (see Section 2.2.1).

Under the No Action/No Project Alternative, grazing land and farmland would be converted to developed land uses. These changes would be accompanied by a transition of jobs and tax revenues from grazing and farming uses to jobs and tax revenues from urban uses. Many of the activities would also result in temporary increases in construction-related employment. Although this is expected to result in an overall benefit to employment and tax revenues, there could be a decline in the businesses associated with agricultural activity.

Under the No Action/No Project Alternative individual urban development projects would continue to provide mitigation to offset effects to listed species, wetlands, and other regulated

natural resources. Mitigation for unavoidable effects to listed species, wetlands, and other regulated natural resources would continue to occur through purchasing credits at a mitigation or conservation bank approved by the applicable regulatory agencies (e.g., U.S. Army Corps of Engineers and/or U.S. Fish and Wildlife Service), when project proponents pay into an existing Clean Water Act (CWA) 404 in-lieu fee program, provide on-site project proponent responsible mitigation, or provide off-site project proponent responsible mitigation (see Sections 2.2.1 and 2.2.2). The CWA 404 in-lieu fee program would need to meet the requirements of the 2008 CWA Compensatory Mitigation Rule. Once the program is established, the in-lieu fee program Implementing Entity would collect funds from project proponents when their projects result in fill of aquatic resources. The funds would then be used by the Implementing Entity to complete required compensatory mitigation (i.e., wetland re-establishment and establishment).

Biological mitigation activities expected under the No Action/No Project Alternative (described in more detail in Section 2.2) are expected to maintain existing land uses, such as continuing grazing or crop production on a mitigation preserve, consistent with existing wildlife habitat on the site. However, farmland could be purchased for a mitigation preserve and a portion converted to wetland or riparian habitat. The labor required to implement re-establishment/ establishment of aquatic resources and aquatic habitat would have short-term economic value. However, once the farmland is converted to another land cover, the labor force needed to operate the remaining farmland could be reduced. Tax revenues could decline because farmland acres could be taken out of production. However, only a relatively small portion of existing farmland in the Planning Area would be taken out of production to support establishment of mitigation preserves. It is more likely that mitigation preserves would be established on properties with lower land values, such as grazing lands. Mitigation preserves for habitats such as vernal pools can continue to support grazing operations, and therefore maintain employment and tax revenues at similar levels and prevent socioeconomic effects.

As discussed in Section 16.1.2, minority individuals make up more than 50% of the total population in many portions of the County, especially within the Urban Development Area (UDA).[1] As seen on Figure 16-1, minority communities reside in the Planning Area within Rancho Cordova, portions of Galt, the unincorporated County between the City of Sacramento and Elk Grove, and the area directly south of Elk Grove. Only two census tracts have a median household income below the poverty line. These are also communities where minorities make up more than 50% of the population.

[1] As discussed in Section 1.1.1, the term Urban Development Area (UDA) is used by the EIS/EIR to discuss all lands where urban development Covered Activity projects or activities could occur under the action alternatives. Therefore, the term "UDA" means all lands within the County's Urban Service Boundary that are also within the Planning Area (including lands within the Rancho Cordova city limits that are within the Planning Area), all lands within Galt's city limits, and all lands within Galt's sphere of influence (see Figure 1-1).

As explained in Section 2.2.2, the regulatory environment of the No Action/No Project Alternative is expected to restrict the ability of local agencies to permit approximately 1,900 acres of future urban development in the Mather Core Recovery Area (MCRA), and this future development would be shifted or displaced to one or more of the areas of undeveloped land outside of the Urban Service Boundary (USB). This development would occur in areas not currently considered as low-income or minority.

Although some urban development would be shifted or displaced from the MCRA to other locations under the No Action/No Project Alternative, the alternative includes a sufficient amount of urban development and associated infrastructure to meet the development objectives ultimately planned/contemplated in the adopted general plans of Sacramento County, Galt, and Rancho Cordova. Therefore, implementation of the No Action/No Project Alternative would not be an impediment to meeting current or future residential development needs.

The No Action/No Project Alternative could have various adverse effects on human health and the environment, as identified in the No Action/No Project Alternative impact discussions in Chapters 4 through 15 of this EIS/EIR. As discussed in Section 16.2.1, resource topics considered under this environmental justice analysis includes all the resource topics analyzed in this EIS/EIR (see Section 3.2). New urban development is planned for areas that intersect where minority and low-income populations reside and with that development comes both the potential for effects on human health and the environment as well as beneficial effects resulting from the proximity of urban services, parks, schools, employment opportunities, and transit. In addition, minority populations are spread across multiple locations in the planning area, indicating that minority populations are not concentrated in particular locations where they are disproportionately exposed to high and adverse human health, economic, social, and or environmental effects. Furthermore, the County and city general plans include policies that consider low-income and minority populations.

Preserves and other activities that would be implemented to mitigate for the negative effects of urban development, typically do not negatively impact human populations. Mitigation preserves provide for natural areas that could have a beneficial effect on individuals living or working near a preserve. Beneficial effects of mitigation preserves could include recreation opportunities, visual relief from urban development, and enjoyment of nature. Benefits of trails and some other positive preserve externalities are discussed in Chapter 12. Under the No Action/No Project Alternative, some mitigation preserves would be included in the UDA as projects are developed and some projects would include on-site preserves as mitigation. This would provide a beneficial effect as these mitigation preserves would be created within the UDA where many of the low-income and minority communities reside. The locations of off-site preserves would be dependent on the type of habitat mitigation required and available land.

The potential effects related to population and housing were analyzed in the general plan EIRs for the County and the cities. As discussed in Section 16.2.1, the relevant conclusions from each of these general plan EIRs are summarized below and incorporated into the analysis of the No Action/No Project Alternative.

The impact analysis presented in the *Sacramento County General Plan Update Final EIR* (Sacramento County 2010), determined that within Sacramento County:

- Impacts associated with division or disruption of an established community and displacement of housing, were considered to be less than significant (Sacramento County 2010, pp. 1-2, 3-60, 3-61, 3-72, 3-76 to 3-78).[2]

The impact analysis presented in the *City of Galt General Plan Update: 2030 Final EIR* (Galt 2009b), determined that within Galt:

- Impacts to social or economic impacts were not found to have a physical impact on the environment nor would the changes in the environment result in adverse impacts on social or economic concerns (Galt 2009b, pp. 6-10 and 7-1).

The impact analysis presented in the *City of Rancho Cordova General Plan Final EIR* (Rancho Cordova 2006b), determined that within Rancho Cordova:

- Impacts potentially contributing to a substantial displacement of housing units or people as a result of implementation of the General Plan were found to be less than significant (Rancho Cordova 2006b, p. 4.3-14).

As discussed in Section 3.4, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009b), in 2030 (Rancho Cordova 2006b), and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Therefore, additional urban development can be expected to occur within Galt, Rancho Cordova, and Sacramento County in the years after each General Plan EIR study period ends, but before this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, when determining the significance of each impact described in the EIS/EIR, the lead agencies considered the impact analysis and the conclusions incorporated by reference

[2] The Sacramento County General Plan EIR analyzed development within a designated "Jackson Highway Corridor New Growth Area" that was not a part of the alternative ultimately selected by the County. However, the County is currently processing Master Plans in the Jackson Highway Corridor, so the referenced conclusions are relevant to the No Action/No Project Alternative.

from the General Plan EIRs, along with the effects of all urban development activities and projects that are included in the description of each EIS/EIR alternative.

The above EIRs, being CEQA documents, did not include an analysis of environmental justice and whether the general plans would result in a disproportionately high and adverse effect on minority or low-income populations. Each of the general plans includes policies that would reduce effects to minority or low-income populations, such as considering low-income populations for transit and housing; providing for affordable housing units; ensuring most residential units are close to amenities; and reducing incompatibilities associated with land use, noise, air quality, and other potential conflicts. Galt included a specific section in the city's general plan to address fair treatment of all persons in the city with an emphasis on ensuring no part of the community "suffers disproportionately from adverse human health or environmental effects" (Galt 2009a, Land Use Element, p. LU-21).

The general plan EIRs also did not address tax revenue or business displacement. However, each of the general plans includes policies that would reduce negative effects to businesses and revenue, including protecting farmland and agricultural uses, addressing property and sales taxes, business retention and attraction, economic development, urban revitalization, and other relevant topics.

16.2.2.2 Cumulative Effects of the Alternative

Past and present urban development projects in Sacramento County and the Planning Area have resulted in the existing population and housing, socioeconomic, and environmental justice conditions described in Section 16.1.2. There are only two census tracts in the planning area identified as containing a low-income population. There are multiple census tracts supporting minority populations. These minority populations are spread across multiple locations in the planning area, indicating that minority populations are not concentrated in any particular location where they are disproportionately exposed to high and adverse human health, economic, social, and or environmental effects. These conditions indicate that there is not an existing significant adverse cumulative environmental justice impact in the Planning Area. There is also no indication of substantial displacements of housing or businesses or other adverse populations and housing effects.

The types of future reasonably foreseeable "other" projects, activities, and actions, described in Section 3.7.2, are similar to the types of past and present actions that have occurred in the Planning Area. The other reasonably foreseeable future actions in the Planning area (see Section 3.7.2) that were not included in the Section 2.2.2 description of the No Action/No Project Alternative include additional new urban development in the Elk Grove sphere of influence and in Rancho Murieta, development of the Wilton Rancheria Casino, master planned

developments inside the UDA named Rio Del Oro and Mather South, further rural residential development outside the UDA, continued urban development of cultivated agricultural lands, major infrastructure projects such as California High-Speed Rail and the California WaterFix, and expansion of the existing National Wild Refuge and the Cosumnes River Preserve (see Section 3.7.2). Population and housing effects from these foreseeable other projects were generally included in the analysis of impacts incorporated from the General Plan EIRs. These General Plan EIRs identified less-than-significant adverse effects related to population and housing. When considered together, the effects of the past, present, and foreseeable other projects on population and housing within this Planning Area are not a significant cumulative impact.

The regional scale analysis provided in the Sacramento Area Council of Governments *2016 Metropolitan Transportation Plan/Sustainable Communities Strategy* (the 2016 MTP/SCS) (SACOG 2016a) (described in Section 3.4.4) provides relevant information for evaluating the cumulative effects of the No Action/No Project Alternative. The 2016 MTP/SCS plans for future transportation projects while considering expected development and population growth in the region. The *Final Environmental Impact Report for the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS EIR) (SACOG 2016b) found that there would be a less-than-significant effect from implementation of the MTP/SCS on population and housing.

Similar to the General Plan EIRs, the MTP/SCS EIR did not include an analysis on environmental justice or socioeconomics. However, the 2016 MTP/SCS itself did include an analysis of environmental justice (SACOG 2016a). Chapter 8 of the 2016 MTP/SCS discusses how low-income and minority residents were considered in the planning effort, and how the 2016 MTP/SCS would serve those residents. The 2016 MTP/SCS found that 62% of the low income and minority populations lived in transit priority areas and 82% of the jobs were in the transit priority areas, providing minority, and low-income residents with greater opportunities to live and/or work near quality transit and provides for more access to parks and higher education. This supports a conclusion that the combination of past, present, and reasonably foreseeable future projects do not represent a significant cumulative effect on environmental justice.

As discussed in Section 16.2.2.1, the incremental direct and indirect effects of the No Action/No Project Alternative would not have an adverse effect on population and housing, socioeconomics, or environmental justice. Therefore, when the incremental effects of the No Action/No Project Alternative are viewed in connection with the effects of the past projects, current projects, and the effects of foreseeable other actions, the effects of the No Action/No Project Alternative would not cause, or make a considerable contribution, to a significant adverse cumulative effect on population and housing, socioeconomics, or environmental justice. The No Action/No Project Alternative would result in a ***Less Than Significant Adverse Cumulative*** effect to population and housing, socioeconomics, and environmental justice.

16.2.3 Proposed Action/Proposed Project

16.2.3.1 Direct and Indirect Effects of the Alternative

As described in Section 2.3.3, the Proposed Action/Proposed Project Covered Activities include types and intensities of urban development similar to those anticipated under the No Action/No Project Alternative.

Under the Proposed Action/Proposed Project Alternative, urban development would not be shifted or displaced to areas outside of the current Sacramento County USB boundary (Figure 1-1). As described in Section 16.2.2.1, this displacement was shown to not have a negative effect on population and housing, socioeconomics, or environmental justice under the No Action/No Project Alternative. Therefore, impacts as a result of urban development Covered Activities under the Proposed Action/Proposed Project Alternative, which do not include the shifted/displaced development, would be largely the same as those described for urban development under the No Action/No Project Alternative. In addition, like the No Action/No Project Alternative, the Proposed Action/Proposed Project Alternative includes a sufficient amount of urban development and associated infrastructure to meet the development objectives planned/contemplated in the adopted general plans of Sacramento County, Galt, and Rancho Cordova. Therefore, the Proposed Action/Proposed Project Alternative would not be an impediment to meeting current or future residential development needs. Because of the lack of significant adverse population and housing, socioeconomic, and environmental justice impacts from urban development under both the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative, and the overall similarity in effects across both alternatives, there would be ***No Impact*** from the Proposed Action/Proposed Project Alternative relative to the impacts expected under the No Action/No Project Alternative baseline condition.

As discussed in Section 2.3.5, the Proposed Action/Proposed Project Alternative would include the establishment of an interconnected SSHCP Preserve System in the Planning Area, which includes a comprehensive preserve management program that would be implemented in perpetuity. The Preserve System under the Proposed Action/Proposed Project Alternative would be more contiguous and more connected than the mitigation preserves established under the project-by-project regulatory approval process of the No Action/No Project Alternative. The SSHCP Preserve System and Preserve management activities would not have substantial negative impacts on population and housing, socioeconomics, or environmental justice, similar to what was described for the No Action/No Project Alternative. Benefits provided by access to preserves by minority and low-income populations could be slightly greater under the No Action/No Project Alternative because more numerous but less connected preserves are expected to be located in the UDA, closer to census tracts with

minority or low-income populations. Because the large landscape-level preserves would occur outside the UDA under the Proposed Action/Proposed Project Alternative, the benefits to minority and low-income populations could be slightly less because of greater distance between some preserves and these populations. However, this does not constitute a high and adverse effect on minority or low-income populations. Overall, because of the lack of significant adverse population and housing, socioeconomic, and environmental justice impacts from Preserve System establishment and operation under both the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative, and the overall similarity in effects of the Proposed Action/Proposed Project Alternative and the No Action/No Project Alternative, there would be ***No Impact*** when comparing the urban development under the Proposed Action/Proposed Project Alternative to the No Action/No Project Alternative baseline condition.

16.2.3.2 Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Proposed Action/Proposed Project Alternative would:

- Result in similar population and housing impacts;
- Result in similar socioeconomic impacts; and
- Result in similar environmental justice impacts.

Therefore, after considering the significance of effects from the Proposed Action/Proposed Alternative on population and housing, socioeconomics, and environmental justice, the Proposed Action/Proposed Project Alternative would result in ***No Impact*** when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

16.2.3.3 Cumulative Effects of the Alternative

The effects of past, present, and reasonably foreseeable other projects on population and housing, socioeconomics, and environmental justice were described in Section 16.2.2.2, and there is no significant adverse cumulative effect on these issue areas existing in Sacramento County or the Planning Area. As discussed in Section 16.2.2.2, the incremental effects of the No Action/No Project Alternative were determined to be less than significant (individually limited) and not cumulatively considerable, when viewed in connection with the effects of the past projects, other current projects, and the foreseeable other projects.

As identified in Sections 16.2.3.1 and 16.2.3.2, the incremental direct and indirect effects on population and housing, socioeconomics, and environmental justice under the Proposed Action/Proposed Project Alternative are similar to the incremental effects of the No Action/No Project Alternative. Therefore, the Proposed Action/Proposed Project Alternative would result

in no impact when compared to the effects that would occur under the No Action/No Project Alternative baseline condition. Therefore, the incremental effects of Proposed Action/Proposed Project Alternative are individually limited, and do not result in a contribution to an existing cumulative effect. The Proposed Action/Proposed Project Alternative would result in ***No Cumulative Impact*** to population and housing, socioeconomics, and environmental justice, compared to the effects under the No Action/No Project Alternative baseline condition.

16.2.4 Reduced Permit Term

The Reduced Permit Term Alternative would include the same types of new urban development and infrastructure projects and activities as those anticipated under the No Action/No Project Alternative.

Under the Reduced Permit Term Alternative, the core of the Preserve System located inside the UDA would be associated with the development of five large Master Plans, as discussed in Chapter 2 for the Reduced Permit Term Alternative and for the Proposed Action/Proposed Project Alternative. Because the core of the Preserve System inside the UDA under both EIS/EIR action alternatives is associated with the same five large Master Plans, approximately 70% of the UDA preserves established under the Reduced Permit Term Alternative would have similar sizes, boundaries, and locations as the UDA preserves established under the Proposed Action/Proposed Project Alternative. However, the shorter duration of the Reduced Permit Term Alternative—and the smaller amount of urban development and associated development fees collected by the Reduced Permit Term Alternative—would not allow the Habitat Conservation Plan's (HCP's) Implementing Entity to establish as many acres of new preserves in the Planning Area as would occur under the Proposed Action/Proposed Project Alternative's 50-year permit term. Therefore, fewer new preserves would be established under the Conservation Strategy of the Reduced Permit Term Alternative. This difference would be especially pronounced outside the UDA.

As described in Section 2.4, the federal and state Environmental Species Act Incidental Take Permits and the CWA permit strategy for future SSHCP Covered Activities would be valid only during the 30-year permit term of the Reduced Permit Term Alternative, and the Reduced Permit Term Alternative's Conservation Strategy would be implemented only during this 30-year term. The urban development Covered Activities and conservation strategies associated with the five Master Plans would be implemented inside the UDA during this 30-year period. However, the EIS/EIR uses a 50-year analysis study period to evaluate all alternatives (see Section 3.6.3), so the EIS/EIR study period extends beyond the end of the 30-year permit term for the Reduced Permit Term Alternative. Therefore, as described in Section 3.6.7.2, the EIS/EIR analysis of the Reduced Permit Term Alternative also considers future urban development that is not part of the project description of the

Reduced Permit Term Alternative, but is still expected to occur within the Planning Area after the end of the permit term (i.e., in Years 31–50 of the EIS/EIR Study Period).

As described in Section 3.6.7.2, project mitigation preserves established after the end of the 30-year Reduced Permit Term Alternative would be established under a project-by-project process for obtaining individual authorizations under the CWA, federal and state Environmental Species Acts, and Section 1600 of the California Fish and Game Code. Consequently, mitigation preserves established in Years 31–50 of the EIS/EIR study period would not be established using a regional, landscape-based approach that balances new urban development with the need for conservation, as would be provided by an HCP. Therefore, much of the Preserve System inside the UDA would be very similar under the two action alternatives, but the Preserve System outside the UDA would be substantially different between the Reduced Permit Term Alternative and the Proposed Action/Proposed Project Alternative. Under the Reduced Permit Term Alternative, it is unlikely that mitigation preserves established outside the UDA would be contiguous or would be interconnected, and it is unlikely that a large, contiguous 10,500-acre landscape-size vernal pool preserve would be established in the southwestern portion of the Planning Area. Likewise, the No Action/No Project Alterative also would not result in contiguous, interconnected preserves outside the UDA, and would not establish a 10,500-acre vernal-pool preserve in the Planning Area. In these ways, the new mitigation preserves established outside the UDA under the Reduced Permit Term Alternative and the No Action/No Project Alternative would be similar.

16.2.4.1 Direct and Indirect Effects of the Alternative

The Reduced Permit Term Alternative includes types of urban development similar to those anticipated under the No Action/No Project Alternative. However, the Reduced Permit Term Alternative does not include the regulatory requirements within the MCRA portion of the UDA, as expected under the No Action/No Project Alternative (refer to Section 2.2.2). Therefore, future urban development within the MCRA under the Reduced Permit Term Alternative would be implemented consistent with the Sacramento County and Rancho Cordova General Plans, without development being displaced or shifted to locations outside the USB. As described in Section 16.2.2.1 for the No Action/No Project Alternative (where urban development would be shifted or displaced outside the USB), and as described in Section 16.2.3.1 for the Proposed Action/Proposed Project (where all urban development occurs within the USB), the Reduced Permit Term Alternative is expected to have no significant adverse effects on population and housing, socioeconomics, or environmental justice. Because of the lack of significant adverse population and housing, socioeconomic, and environmental justice effects from urban development under both the Reduced Permit Term Alternative and the No Action/No Project Alternative, and the overall similarity in effects in both alternatives, there would be ***No Impact***

of the Reduced Permit Term when comparing the impacts of the Reduced Permit Term Alternative to the No Action/No Project Alternative baseline condition.

The Reduced Permit Term Alternative includes a consolidated and interconnected Preserve System, which would be established during the 30-year permit term, and a comprehensive preserve management program to be implemented in perpetuity. The Preserve System established during the 30-year permit term under the Reduced Permit Term Alternative would be smaller than the SSHCP Preserve System that would be established under the Proposed Action/Proposed Project Alternative, especially outside the UDA. As described in Section 2.4.5, the interconnected Preserve System established during the 30-year permit term of the Reduced Permit Term Alternative would remain intact. However, future mitigation required of new urban development implemented after the end of the permit term would not be established in an organized, consolidated manner, as would occur under the No Action/No Project Alternative.

As described in Section 16.2.2.1 for the No Action/No Project Alternative, and in Section 16.2.3.1 for the Proposed Action/Proposed Project Alternative, the preserves established under both of these alternatives would not result in significant adverse effects on population and housing, on socioeconomics, or on environmental justice. Therefore, the Preserve System established under the Reduced Permit Term Alternative, which would reflect elements of both the No Action/No Project Alternative and the Proposed Action/Proposed Project Alternatives, also would not result in significant adverse effects on population and housing, socioeconomics, or environmental justice. Because the establishment and operation of preserves under Reduced Permit Term Alternative and under the No Action/No Project Alternative would not impact population and housing, socioeconomic, and environmental justice, there would be ***No Impact*** of the Reduced Permit Term Alternative when compared to the No Action/No Project Alternative baseline condition.

16.2.4.2 Significance of Direct and Indirect Effects

In summary, when compared to the No Action/No Project Alternative baseline condition, the Reduced Permit Term Alternative would:

- Result in similar population and housing impacts;
- Result in similar socioeconomic impacts; and
- Result in similar environmental justice impacts.

Therefore, after considering the significance of impacts of the Reduced Permit Term Alternative on population and housing, socioeconomics, and environmental justice, the Reduced Permit

Term Alternative would result in ***No Impact,*** when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition.

16.2.4.3 Cumulative Effects of the Alternative

The effects of past, present, and reasonably foreseeable other projects on population and housing, socioeconomics, and environmental justice were described in Section 16.2.2.2, which determined that there is no significant adverse cumulative effects on these issue areas in Sacramento County or the Planning Area. As discussed, the incremental effects of the No Action/No Project Alternative were determined to be less than significant and not cumulatively considerable, when viewed in connection with the effects of the past, present, and foreseeable other projects.

As identified in Sections 16.2.4.1 and 16.2.4.2, the direct and indirect effects on population and housing, socioeconomics, and environmental justice under the Reduced Permit Term Alternative are similar to the effects under the No Action/No Project Alternative. The similarities in direct and indirect effects are sufficient to conclude that the Reduced Permit Term Alternative would result in No Impact when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition. Consequently, the incremental contribution of the Reduced Permit Term Alternative to cumulative effects on population and housing, socioeconomics, and environmental justice would also be similar to the No Action/No Project Alternative. Therefore, the Reduced Permit Term Alternative does not result in a cumulatively considerable (i.e., significant) contribution to cumulative impacts on population and housing, socioeconomics, and environmental justice. The Reduced Permit Term Alternative would result in ***No Cumulative Impact*** to population and housing, socioeconomics, and environmental justice compared to the No Action/No Project Alternative baseline condition.

16.3 REFERENCES CITED

CEQ (Council on Environmental Quality). 1997. *Environmental Justice Guidance Under the National Environmental Policy Act*. Executive Office of the President. Washington, D.C. Accessed July 1, 2016. https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf.

Clinton, W.J. 1994. Executive Order 12898 of February 11, 1994, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Federal Register volume 59, pages 7,629–7,633.

Galt. 2009a. *2030 Galt General Plan*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California: Mintier Harnish. April 2009. http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Galt. 2009b. *Final Environmental Impact Report for the 2030 Galt General Plan. Final. SCH No. 2007082092*. Prepared by ESA, in association with Mintier Harnish, Applied Development Economics, and Omni Means. Sacramento, California: ESA. March 2009. Accessed June 29, 2016. http://www.saclafco.org/SphereofInfluenceInformation/Documents/galtsoi/sac_024063.pdf.

Proctor, Bernadette D., Jessica L. Semega, and Melissa A. Kollar. 2016. U.S. Census Bureau, Current Population Reports, P60-256(RV), *Income and Poverty in the United States: 2015*, U.S. Government Printing Office, Washington, D.C.

Rancho Cordova. 2006a. *Rancho Cordova General Plan*. Adopted June 26, 2006.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report*. SCH no. 2005022137. June 2006. http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

SACOG (Sacramento Area Council of Governments). 2016a. *2016 Metropolitan Transportation Plan/Sustainable Communities Strategy: Building a Sustainable System.* Adopted February 18, 2016. http://www.sacog.org/sites/main/files/file-attachments/mtpscs_complete.pdf.

SACOG. 2016b. *Final Environmental Impact Report for the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy*. SCH No. 2014062060. Sacramento, California: SACOG. January 2016. http://www.sacog.org/general-information/final-2016-mtpscs-environmental-impact-report.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. Sacramento, California: County of Sacramento Department of Environmental Review and Assessment. April 2010. http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030.* Adopted November 9, 2011.

U.S. Census Bureau. 2013a. "DP05: ACS Demographic and Housing Estimates. 5-year Estimates. 2009–2013 5-Year American Community Survey" [data in table viewer]. Accessed November 6, 2015. http://factfinder.census.gov/.

U.S. Census Bureau. 2013b. Poverty Thresholds for 2013 by Size of Family and Number of Related Children Under 18 Years. http://www.census.gov/hhes/www/poverty/data/threshld/index.html.

U.S. Census Bureau. 2013c. "DP03: Selected Economic Characteristics. 5-year Estimates. 2009–2013 5-Year American Community Survey" [data in table viewer]. Accessed November 6, 2015. http://factfinder.census.gov/.

INTENTIONALLY LEFT BLANK

CHAPTER 17 – OTHER REQUIRED ANALYSES FOR CEQA AND NEPA

The California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) require that Environmental Impact Reports (EIRs) prepared under CEQA and Environmental Impact Statements (EISs) prepared under NEPA include certain analyses, in addition to the analyses already presented in the preceding EIS/EIR resource chapters.

The additional analyses required under NEPA and CEQA are in many cases similar; therefore, the additional NEPA and CEQA required analyses presented in this chapter are combined, where appropriate.

17.1 SIGNIFICANT EFFECTS THAT CANNOT BE AVOIDED (CEQA AND NEPA)

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe any significant impacts that cannot be avoided or minimized to a less-than-significant level with the implementation of feasible mitigation measures. Similarly, Section 40 CFR 1502.16 of the Council on Environmental Quality's NEPA regulations requires an EIS to discuss and disclose any adverse environmental effects that cannot be avoided.

The Executive Summary and Chapters 4 through 16 of this EIS/EIR provide a comprehensive identification of the significant environmental effects of the action alternatives, including the level of significance after mitigation (if needed). When compared to the No Action/No Project baseline condition, there are no significant and unavoidable project-specific or cumulative impacts to any environmental resource studied in the EIS/EIR, for either action alternative.

17.2 POTENTIALLY SIGNIFICANT EFFECTS WHICH COULD BE AVOIDED (CEQA)

Chapters 4 through 16 of this EIS/EIR provide a comprehensive identification and evaluation of the environmental impacts for the Proposed Action/Proposed Project Alternative and Reduced Permit Term Alternative. Cumulative impacts are also evaluated in Chapters 4 through 16, following the approach outlined in Section 3.4 of this EIS/EIR. Each impact included in this EIS/EIR is also listed in the Executive Summary. As compared to the No Action/No Project baseline condition, there are no project-specific or cumulative impacts requiring mitigation for either action alternative.

17.3 EFFECTS FOUND NOT TO BE SIGNIFICANT (CEQA)

The EIS/EIR identified no significant effects for either action alternative, relative to the effects expected under the No Action/No Project baseline condition, for any resource topic studied in Chapters 4 through 16 of the EIS/EIR, including each of the following chapter topics:

- Land Use
- Soils, Geology, and Mineral Resources
- Agriculture
- Hydrology and Water Quality
- Natural Communities, Land Cover Habitat Types, and Common Plant and Animal Species
- Special-Status Species, Including HCP Covered Species
- Aquatic Resources
- Paleontological, Cultural, and Historical Resources
- Public Services and Facilities
- Traffic and Circulation
- Air Quality
- Greenhouse Gases and Climate Change
- Population and Housing, Socioeconomics, and Environmental Justice

17.4 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY (NEPA)

In accordance with NEPA (42 U.S.C. 4332) and NEPA regulations (40 CFR 1502.16 and 43 CFR 46.415), an EIS must include a discussion of the relationship between the short-term uses of man's environment and the maintenance and enhancement of long-term productivity.

This information is provided in each EIS because the agency decision-maker and members of the public must have a clear sense of what they are gaining or losing in the short term, and in the long term. The terms "short term" and "long term" are defined differently for each EIS and each resource area, taking into account the scope of the proposed alternatives and resource-specific information. Therefore, each resource studied has its own definitions of "short term" and "long term" (Freeman 1992). For example, "long term" would be quite different for a project within eastern vs. western U.S. forests—eastern forests can grow to maturity in 80 to 100 years, but western forests would take two or three times as long to reach maturity.

For this EIS, short-term uses of the environment would be those occurring during construction of urban development and other project types described in Sections 2.2.1, 2.3.3, and 2.4.3 of this EIS/EIR. Most of the activities analyzed in the EIS/EIR would have an impact on long-term productivity, either of the built environment or the natural or agricultural environment. In this way, construction of a commercial or residential structure would be a short-term use of the environment, but the occupation of that structure and the removal of natural land cover types by urban development would affect long-term productivity.

In the short-term, a wide range of urban development and infrastructure projects would be constructed under the environmental commitments and requirements of the action alternatives. Urban development under the action alternatives would be as envisioned in the General Plans of Sacramento County, Galt, and Rancho Cordova. These plans consider both short-term uses of the environment as well as long-term maintenance of the built environment like transportation or water infrastructure. As such, the local short-term impacts and use of resources by the action alternatives are consistent with the maintenance and enhancement of long-term productivity of the built environment.

Although some urban development and infrastructure projects would result in a loss of habitat, take of sensitive species, increased air emissions, transportation impacts, as well as other impacts described in Chapters 4 through 16 of this EIS/EIR, these activities would be undertaken pursuant to a Habitat Conservation Plan (HCP). A conservation strategy is included in each action alternative, and is designed to ensure that the long-term productivity in the Planning Area is maintained, even with the short-term uses of the environment that would occur from implementing the Covered Activities of either action alternative. The two action alternatives (Sections 2.3.5 and 2.4.5) include a regional conservation strategy to avoid, minimize, and mitigate for impacts on sensitive species, natural communities, wetlands and waters, and balance environmental and economic development needs on a regional and landscape scale. Implementation of the HCP's comprehensive and balanced approach to natural resource preservation would provide a greater level of landscape- and watershed-scale protection of natural resources than would be possible under the No Action/No Project Alternative's project-by-project individual authorizations under the U.S. Endangered Species Act, California Endangered Species Act, Clean Water Act Sections 404 and 401, and the California Fish and Game Code 1600 programs. The two action alternatives also include "get ahead and stay ahead" provisions for preservation of lands to ensure that the long-term conservation and enhancement measures are in place before the short-term impacts of Covered Activities occur.

17.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES (NEPA)/SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES (CEQA)

The CEQA Guidelines (Section 15126.2(c)) mandate EIRs discuss any significant irreversible environmental effects that would be caused by a proposed project. The analysis required under this section must consider whether the project would have primary and secondary impacts that would generally commit future generations to similar uses, involve a large commitment of nonrenewable resources, unjustifiably consume resources (i.e., use energy or water wastefully), or involve the uses in which irreversible damage could result from any potential accidents associated with the project.

In accordance with NEPA Section 102 (42 U.S.C. 4332) and NEPA regulations, an EIS must discuss any irreversible or irretrievable commitment of resources that would be involved in the proposed project, should it be implemented (40 CFR 1502.16, 43 CFR 46.415). In general, "irreversible" commitments of resources are those that cannot be reversed, and "irretrievable" commitment of resources are those that are lost for a period of time. Examples of irreversible commitments include the extinction of a species, the mining of ore, and use of fossil fuels. An example of an irretrievable comment is the establishment of a utility right-of-way where timber productivity on the right-of-way is lost over the time that the right-of-way remains (Freeman 1992). Furthermore, this regulation specifically requires each EIS to discuss the energy requirements and energy conservation potential for each alternative, including mitigation measures (40 CFR 1502.16(e)). Likewise, each EIS must discuss the natural resource and depletable resource requirements of each alternative, and discuss the potential of each alternative to conserve natural and depletable resources, including mitigation measures (40 CFR 1502.16(f)).

Irreversible environmental changes attributable to planned urban development were analyzed in the following sections of the three General Plan EIRs discussed in Section 3.4:

- Chapter 12, Section 12.4, Significant Irreversible Environmental Changes, in the *Galt General Plan Update: 2030 Final Environmental Impact Report* (Galt 2008)
- Chapter 7, Section 7.2 7, Significant Irreversible Environmental Effects, in the *City of Rancho Cordova General Plan Final EIR* (Rancho Cordova 2006b)
- Chapter 17, Irreversible Environmental Changes, in the *Sacramento County General Plan Update Final EIR* (Sacramento County 2010)

The three General Plan EIRs analyzed the potential for urban development to result in the permanent conversion of currently undeveloped open space and agricultural land areas to become residential, commercial, industrial, office, public, and recreational land covers. All three

alternatives would result in additional urbanization of Sacramento County, Galt, and Rancho Cordova, and all three alternatives would result in irreversible and irretrievable commitment of existing agricultural land covers and other natural land covers to urban development, and loss of productive agricultural resources and natural resources. In addition, development under the General Plans would irreversibly commit building materials and energy resources to the construction and maintenance of such development. Finally, construction of new urban development consistent with the three General Plans, under any of the EIS/EIR alternatives would result in the consumption of fossil fuels such as natural gas and gasoline, as well as commit limited renewable resources, such as water.

As discussed in Section 3.4, the three General Plan EIRs used different study periods—ending in 2030 (Galt 2009), in 2030 (Rancho Cordova 2006b), and 2050 (Sacramento County 2010). However, the 50-year study period for this EIS/EIR ends in 2065 (Section 3.6.3). Additional urban development can be expected to occur within Galt, Rancho Cordova, and Sacramento County in the years after their General Plan EIR study periods end, and until this EIS/EIR's study period ends in 2065. Therefore, the impact analyses and conclusions incorporated from the three General Plan EIRs may not have considered all of the future urban development that is included in the project description of each EIS/EIR alternative. Consequently, additional irreversible commitments of resources and significant irreversible environmental changes would occur that were not analyzed in the General Plan EIRs. The lead agencies considered the impact analysis and the conclusions incorporated by reference from the General Plan EIRs, along with the effects of all urban development activities and projects included in the description of each EIS/EIR alternative.

As discussed in Section 3.6.7, only the No Action/No Project Alternative would result in the displacement or shifting of 1,900 acres of planned development to areas located outside the current Sacramento County Urban Services Boundary (USB). Therefore, the two action alternatives would result in fewer vehicle miles traveled (VMT) than the No Action/No Project Alternative (see Chapter 13, Traffic and Circulation). Consequently, the commitment of fossil fuel resources is expected to be slightly lower for each of the two action alternatives when compared to the No Action/No Project Alternative baseline condition, because of the smaller VMT.

As discussed in Chapter 2, new Preserves would be established under each of the alternatives to mitigate the effects of future urban development on species, waters, and the natural environment. Establishment of Preserves, whether purchased in fee title or easements, would not be an irreversible or irretrievable commitment of natural resources. However, establishment of Preserves under each of the alternatives would result in a minor irreversible commitment of fossil fuels to perform surveys and construct relatively small habitat re-establishment/establishment projects. However, the habitat Preserves would

continue existing ranching or farming operations on the preserved lands, so the new Preserve operation and maintenance vehicle trips would be replacing vehicle trips currently occurring under the existing agricultural operations. Therefore, vehicle trips and consumption of fossil fuels would not be discernably different from the new Preserves.

17.6 GROWTH INDUCEMENT AND RELATED EFFECTS (CEQA)

The CEQA Guidelines require the analysis of a project's potential to induce growth. Specifically, Section 15126.2(d) requires that environmental documents "discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth-inducing impacts can occur if a project would induce urban growth either directly or indirectly in the surrounding environment. Furthermore, Section 15126.2(d) of the CEQA Guidelines states that "[i]t must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

The action alternatives would not have any direct growth-inducing impacts because no development would be specifically authorized by either action alternative. As discussed previously in Sections 1.6.4 and 3.6.1, the description and scope of each EIS/EIR alternative (Chapter 2) does not include local approvals or entitlements for individual urban development projects or activities. Accordingly, the analysis presented in this EIS/EIR does not provide project-level CEQA or NEPA coverage for the impacts of future Covered Activities on inducement of urban growth. The action alternatives would not directly cause growth to occur, but rather would accommodate growth that is already planned in the urban growth boundaries by the approved General Plans (Sacramento County 2011; Galt 2009; Rancho Cordova 2006a). However, the action alternatives would provide a mechanism for individual future development projects to comply with the federal Endangered Species Act, California Endangered Species Act, and the Clean Water Act. Therefore, the two action alternatives would not remove a barrier to growth, but would expedite the regulatory and local approvals of future individual development projects and activities. This is an indirect growth-inducing effect of each action alternative.

17.7 ENVIRONMENTALLY PREFERABLE ALTERNATIVE (NEPA) AND ENVIRONMENTALLY SUPERIOR ALTERNATIVE (CEQA)

NEPA regulations requires that the Record of Decision (ROD) on a final EIS must identify all alternatives that were considered by the agency in reaching its decision, and specify the alternative or alternatives that were considered to be environmentally preferable (40 CFR 1505.2(b)). Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and

enhances historic, cultural, and natural resources (CEQ 1981).The identification of the environmentally preferable alternative may involve difficult judgements, particularly when one environmental value must be balanced against another environmental value. Normally, the lead agency will select and identify the environmentally preferable alternative in the EIS document (CEQ 1981; 43 CFR 46.450). The public and other agencies reviewing a draft EIS can assist the lead agency in identifying the environmentally preferable alternative by providing their views in comments on the draft EIS. However, the lead agency must identify the environmentally preferable alternative in each ROD.

The CEQA Guidelines (Section 15126.6(e)(2)) require that an environmentally superior alternative be identified among the alternatives considered. The CEQA Guidelines do not define "environmentally superior;" however, the environmentally superior alternative is generally defined as the alternative that would result in the least adverse environmental impacts to the project site and surrounding area, based on the analysis included in the EIR.

The impacts of each EIS/EIR alternative on the different elements of the human environment analyzed in Chapters 4 through 16 are compiled and summarized in Tables ES-1 and ES-2 of the Executive Summary. The Proposed Action/Proposed Project Alternative would provide the greatest level of preservation of remaining natural communities in the Planning Area, particularly outside the current USB boundary. Preservation of these natural communities would provide greater preservation of habitat for Planning Area native species, better conservation of Planning Area special-status species, including the Covered Species, and more preservation of aquatic resources. The Proposed Action/Proposed Project Alternative would provide more linkages and wider linkages to existing Preserves, maintaining wildlife movement corridors as well as hydrologic connectivity. For all of these reasons, the benefits to native species, natural communities, and watersheds would therefore be greatest under the Proposed Action/Proposed Project Alternative. In addition, the Proposed Action/Proposed Project Alternative would establish Avoidance and Minimization Measures (AMMs) that would provide new and enhanced methods to avoid and minimize impacts to wetlands and other waters, including requirements that urban development be set back 50–150 feet from the banks of each stream and creek in the Planning Area. These AMMs would better reduce potential direct and indirect impacts to existing stream hydrology, water quality, and downstream habitat as compared to the expected protections under the No Action/No Project Alternative. The Proposed Action/Proposed Project Alternative would also have minor beneficial effects to land use compatibility (Chapter 4), the protection of agricultural resources (Chapter 6), hydrology and water quality (Chapter 7), cultural resources (Chapter 11), demand for expanded public services and facilities (Chapter 12), transportation planning and transportation infrastructure (Chapter 13), air quality (Chapter 14), and greenhouse gases (Chapter 15). Therefore, the Proposed Action/Proposed Project Alternative is the environmentally preferable alternative

under NEPA and the environmentally superior alternative under CEQA. **Consequently, the USFWS has also identified the Proposed Action/Proposed Project Alternative as the USFWS's preferred alternative.**

17.8 CONSISTENCY WITH EXECUTIVE ORDERS

17.8.1 Executive Order 11988 – Floodplain Management

As discussed in Section 7.1.1.1, Executive Order 11988 (Floodplain Management), requires federal agencies to prepare floodplain assessments for proposed federal actions located in or affecting floodplains. An agency proposing to conduct an action in a floodplain must consider alternatives to avoid adverse effects and incompatible development in the floodplain. If the only practicable alternative involves siting in a floodplain, the agency must minimize potential harm to or development in the floodplain and explain why the action is proposed in the floodplain.

Under the two action alternatives, the Implementing Entity would implement stream restoration actions within floodplains and active floodways (see Section 2.3.5 and Section 2.4.5). The Implementing Entity would take appropriate precautions to ensure that stream restoration projects implemented under either action alternative do not have adverse effects to floodplains (see Chapter 7). This would include implementation of AMM LEVEE-1, which would require the Implementing Entity to conduct a hydrologic analysis to ensure that riparian restoration and other habitat restoration activities will not result in an increase in flood stage elevations or flood risk on lands outside the Preserve. Because the lands would be managed consistent with the stated HCP biological goals and objectives, which would not conflict with floodplain management, no floodplain impacts are expected.

17.8.2 Executive Order 11190 – Protection of Wetlands

As discussed in Section 10.1.1, Executive Order 11990 (Protection of Wetlands), requires federal agencies to prepare wetland assessments for federal actions located in or affecting wetlands. Agencies must avoid undertaking new construction in wetlands unless no practicable alternative is available and the proposed action includes all practicable measures to minimize harm to wetlands.

The action alternatives have been designed to avoid and minimize impacts on wetlands and other aquatic resources, and mitigate for impacts that cannot be avoided. As described in Section 2.3.5, the South Sacramento Habitat Conservation Plan (SSHCP) includes specific biological goals and measureable objectives for aquatic resources, and the Conservation Strategy includes a range of specific AMMs to avoid and minimize impacts to these resources (see Section 2.3.5).

17.8.3 Executive Order 12898 – Environmental Justice

As discussed in Section 16.1.1, Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority and Low-Income Populations), requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations and communities. Potential impacts related to environmental justice are discussed in Chapter 16.

Executive Order 12898 includes the requirement for federal agencies to ensure effective public participation and access to information. Consequently, a key component of compliance with Executive Order 12898 is outreach to potentially affected minority and/or low-income populations to discover issues of importance that may not otherwise be apparent. Outreach to affected communities has been conducted as part of the decision-making process for the SSHCP and alternatives. This outreach is described in Chapter 1 of this EIS/EIR.

17.9 REFERENCES CITED

CEQ (Council on Environmental Quality) 1981. NEPA's forty most asked questions. Federal Register, volume 46, page 18027.

Freeman, L.H. 1992. How to write quality EISs and EAs; guidelines for NEPA documents. Published by Shipley Associates, Bountiful, Utah.

Galt. 2008. *City of Galt General Plan Update: 2030 Draft Environmental Impact Report*. Prepared by Environmental Science Associates. Sacramento, California. July 2008. Available at: http://www.ci.galt.ca.us/index.aspx?page=786.

Galt. 2009. *2030 Galt General Plan: Policy Document*. Final. Prepared by Mintier Harnish, in association with ESA and Omni Means. Sacramento, California. Available at: http://www.ci.galt.ca.us/Modules/ShowDocument.aspx?documentid=9877.

Rancho Cordova. 2006a. *Rancho Cordova General Plan*. Rancho Cordova, California: City of Rancho Cordova, Public Works Department. Adopted June 26, 2006. Available at: http://www.cityofranchocordova.org/home/showdocument?id=11075.

Rancho Cordova. 2006b. *City of Rancho Cordova General Plan Final Environmental Impact Report*. Published by City of Rancho Cordova, California. SCH no. 2005022137. June 2006. Available at: http://www.cityofranchocordova.org/Index.aspx?page=104#a3.

Sacramento County. 2010. *Final Environmental Impact Report: Sacramento County General Plan Update*. Control Number 2002-GPB-0105, SCH No. 2007082086. April 2010. Published by County of Sacramento Department of Environmental Review and Assessment, Sacramento, California. Available at: http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchDocuments.aspx.

Sacramento County. 2011. *Sacramento County General Plan of 2005–2030*. Sacramento, California: County of Sacramento, Community Planning and Development Department. Amended November 9, 2011. Available at: http://www.per.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan-Update/Final%202030%20General%20Plan_sm.pdf.

CHAPTER 18 – LIST OF PREPARERS

As required by 40 CFR 1502.17, the following individuals prepared a particular analysis, background papers, or were primarily responsible for the preparation of the basic components of the Environmental Impact Statement (EIS)/Environmental Impact Report (EIR).

Name and Professional Title	Qualifications	Years of Professional Experience	Analysis or Content of EIS/EIR
USFWS Sacramento Fish and Wildlife Office *(Lead Agency)*			
Nina Bicknese *Senior Wildlife Biologist*	M.S. Wetland Ecology B.S. Biology	30	Scope of document; oversight of NEPA content; identification of reasonable alternatives; formulation of alternatives; oversight of natural resource content and analysis; review and technical editing
Sacramento County (Lead Agency)			
Catherine Hack *County Environmental Coordinator/Principal Planner*	B.S. Range Management	32	Scope of document; oversight of CEQA content; identification of reasonable alternatives; formulation of alternatives; document review and technical editing; project management.
Marianne Biner *Senior Environmental Analyst/Planner*	B.A. Environmental Studies	16	Scope of document; oversight of CEQA content; identification of reasonable alternatives; formulation of alternatives; technical editing; project management.
USACE Sacramento District (Cooperating Agency)			
Mary Pakenham-Walsh *Senior Project Manager, Regulatory Division*	M.S. Ecology B.S. Biology	21	Review and development of information about waters, other wetlands, or the CWA within Chapters 1, 2, 7, 10, 11; preparation of Appendix C (Draft CWA 404 Permit Strategy); preparation of Appendix A (CWA Cumulative-Impact Report).
Kate Dadey *Chief of California South Branch, Regulatory Division.*	B.S. Civil Engineering; M.S. Ocean Engineering; PhD Geological Oceanography	25	Identification of reasonable alternatives including the No Action Alternative; review and approval of Appendix A (CWA Cumulative-Impact Report).
Dudek (Lead consultant for preparing EIS/EIR Chapters 2, 3, 4, 6, 11, 12, 13, 17, 18, and Executive Summary)			
Sarah Lozano *Principal-in-Charge/Project Manager*	M.R.P., Regional Planning; B.A., Environmental Science and History; American Institute of Certified Planners (AICP)	18	Review of Chapters 2, 3, 4, 6, 11, 12, 13, 17. Oversight of document preparation and production.

Name and Professional Title	Qualifications	Years of Professional Experience	Analysis or Content of EIS/EIR
Mike Henry *Deputy Project Manager*	Ph.D. Ecology, Evolution and Marine Biology; B.S. Aquatic Biology	16	Primary author of Chapters 2, 3, 11, 12, 17. Prepared project description (Chapter 2) and the methods for impact analysis (Chapter 3). Edited description of existing setting and wrote analysis of impacts for public services and facilities (Chapter 12) and traffic/circulation (Chapter 13). Senior review and editing of analysis of impacts to land use (Chapter 4), agriculture (Chapter 6), and cultural resources (Chapter 11). Prepared analysis of other CEQA and NEPA requirements in Chapter 17. Prepared Executive Summary and associated tables. Oversight of document preparation and production.
Christine Kronenberg *Senior Environmental Planner*	M.C.P., City Planning; B.A,. Political Science; AICP	20	Described existing setting and draft impact analysis for land use (Chapter 4), and agriculture (Chapter 6).
Anita Hayworth *Senior Biologist*	Ph.D., Ecology; M.S., Avian Sciences; B.S., Ecology, Ethology, and Evolution	40	Described aircraft bird strike hazard in the existing setting, and identified potential impacts related to bird strike hazard in Chapter 4 (Land Use).
Brian Grattidge *Senior Environmental Planner*	M.A., Political Science; B.A., International Relations	20	Prepared initial drafts of the existing setting and impact analysis for public utilities and services (Chapter 12) and traffic and circulation (Chapter 13).
Micah Hale *Senior Archaeologist*	Ph.D., Anthropology; Register of Professional Archaeologists (RPA)	20	Provided initial drafts of the existing setting and impact analysis for cultural resources (Chapter 11). Provided expert review of chapter revisions.
Tyler Friesen *GIS Technician*	B.A., Geography (Minor: Environment and Society); Specialized training: GPS for GIS, June 2009; LIDAR in ArcGIS 10.1, February 2013	6	Calculations of impact acres and conservation acres for each EIS/EIR Alternative using GIS; prepared figures for Chapter 2, 3, 4, 6, and 13.
Rachel Strobridge *GIS Technician*	B.A., Geography; GIS Vocational Certificate	2	Assisted in preparing figures for Chapter 2, 3, 4, 6, and 13.
Becky Golden-Harrell *Publications Manager*	M.S., Marketing; B.A., English	15	Editorial review..
Steve Taffolla *Editorial Lead*	B.A., English	8	Editorial review.
Amy Seals *Technical Editor*	M.A., English	16	Editorial review.
Devin Brookhart *Publications Specialist Lead*	B.A., Political Science, Public Law Emphasis	7	Formatting of all chapters.

Name and Professional Title	Qualifications	Years of Professional Experience	Analysis or Content of EIS/EIR
Ascent Environmental (Lead consultant for preparing EIS/EIR Chapters 1, 5, 7, 8, 9, 10, 14, 15, and 16)			
Curtis Alling *Principal-in-Charge*	M.A., Natural Resources Planning and Development; B.S., Wildlife Science	35	Oversight of technical analysis and impact analysis for Chapters 5, 7, 8, 9, 14 and 15. Evaluation of alternatives. NEPA/CEQA compliance.
Sean Bechta *Project Manager*	B.S., Wildlife Biology	25	Oversight of technical analysis and impact analysis for Chapters 5, 7, 8, 9, 14 and 15. Development and evaluation of alternatives. NEPA/CEQA compliance. Cumulative effects.
Elizabeth Boyd *Deputy Project Manager*	M.C.P, City Planning; B.A., Geography	16	Described existing setting and analyzed impacts to population, housing, socioeconomics and environmental justice (Chapter 16). Described results of public scoping in Scoping Summary (Appendix B).
Ted Thayer *Wildlife Biologist*	M.S., Biology; B.S., Biology	15	Described existing setting and analyzed impacts to hydrology and water quality (Chapter 7), natural land covers and associated species habitats (Chapter 8), special status species (Chapter 9), and aquatic resources (Chapter 10). Also prepared the supporting information for biological resource analysis in Appendix G. Primary author for Chapters 7, 8, 9, 10, and Appendix G.
Dimitri Antoniou *Environmental Planner*	M.S., City and Regional Planning; B.S., Environmental Management and Protection	7	Described existing setting and analyzed impacts to air quality (Chapter 14) and greenhouse gases (Chapter 15), including modeling of criteria air pollutants carbon dioxide equivalents. Also prepared supporting analysis in Appendix H.
Stephanie Rasmussen *Environmental Planner*	B.S., Environmental Biology and Management	13	Described existing setting and analyzed impacts to geological resources, soils and minerals (Chapter 5).
Lisa Merry *GIS Specialist*	M.S., Environmental Science and Management; B.S., Environmental Biology and Management	6	Calculated impacts to species habitat using GIS, and prepared figures for Chapters 5, 7, 8, 9, 10, and 16.
Robertson-Bryan Inc.			
Michael Bryan *Managing Partner*	Ph.D., Toxicology and Fisheries Biology	30	Oversight of impact analysis for hydrology and water quality (Chapter 7).
Jeff Lafer *Water Quality Specialist*	M.S., Environmental Science	26	Described existing setting and analyzed impacts to hydrology and water quality (Chapter 7).

INTENTIONALLY LEFT BLANK

CHAPTER 19 – SUMMARY OF COMMENTS RECEIVED AND RESPONSES TO COMMENTS ON THE DRAFT DOCUMENTS

INTRODUCTION

As summarized in Chapter 1, the Draft Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) and Draft South Sacramento Habitat Conservation Plan (SSHCP) were released for concurrent public reviews on June 2, 2017, when the U.S. Fish and Wildlife Service (USFWS) published a Notice of Availability (NOA) for both documents (82 FR 25612), and Sacramento County published an NOA for the Draft EIS/EIR with the California State Clearinghouse (control number 2008062030). Separately, the U.S. Army Corps of Engineers (USACE) released their draft Clean Water Act (CWA) Permitting Strategy for the SSHCP.

Pursuant to federal Endangered Species Act (ESA) Section 10 policy, the USFWS provided a minimum 90-day public review and comment period for both draft documents, which ended on September 5, 2017. A total of 26 comment letters were received on the Draft EIS/EIR, the Draft SSHCP, and the Clean Water Act Permitting Strategy.

During the 90-day comment period, the lead agencies and the SSHCP Plan Partners jointly conducted three public meetings in Wilton, Rancho Cordova, and Galt, to provide additional opportunities for the public to provide comments on the Draft SSHCP and the Draft EIS/EIR (see NOAs for locations). A total of two comments letters were submitted at these public meetings.

The Draft SSHCP and the Proposed Action/Proposed Project Alternative in the Draft EIS/EIR describe a proposed multi-tiered approach for permitting future SSHCP Covered Activities under Section 404 of the CWA (CWA Permit Strategy). Therefore, as required by CWA regulations, the USACE also posted a Public Notice on June 2, 2017, to announced a 30-day comment period on the proposed USACE action titled: *Public Notice SPK-1995-00386*: *Proposed Section 404 Clean Water Act Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan, Sacramento, California* (USACE Public Notice). Attachment 2 of the USACE Public Notice is identical to Appendix C of the Draft EIS/EIR.

Public comments were received on the Draft EIS/EIR, the Draft SSHCP, and the USACE Public Notice. Table 19-1 presents a numbered list of all comment letters received, in alphabetical order. Each numbered comment letter is included in this chapter.

Each letter has been annotated to distinguish each comment within the letter. The annotation assigns a number code for each response to comment (RTC). The RTC comment code is the number assigned to the comment letter, followed by the number assigned to the comment within the letter. The RTC code is also labeled as *SSHCP*, *EIS/EIR, or CWA* to indicate if the comment was on the Draft SSHCP, the Draft EIS/EIR, or the USACE Public Notice.

The lead agencies prepared the RTCs on the Draft EIS/EIR, and the Plan Partners prepared RTCs on the Draft SSHCP in collaboration with the USFWS. The USACE prepared the RTCs on their Public Notice. If a response to a comment on the Draft SSHCP resulted in changes to the Final SSHCP, those changes were carried into the project description of the Proposed Action/Proposed Project Alternative in the Final EIS/EIR. Likewise, if the response to comments on the USACE Public Notice resulted in changes to the proposed CWA Permit Strategy, those changes were copied into relevant sections of the Final SSHCP, and into the description of the Proposed Action/Proposed Project Alternative in the Final EIS/EIR, as needed. Using this process, the Proposed Action/Proposed Project Alternative that is described and studied in the Final EIS/EIR is consistent with the Final SSHCP.

Any changes in the Final EIS/EIR are clearly marked. Additions to the Draft EIS/EIR are shown with **bold underline.** Changes from the Draft EIS/EIR resulting in deleted text are shown with ~~strikethrough~~.

A total of 361 comments and responses to comments (RTCs) are presented below in Chapter 19. The number of discrete comments shown in the table below totals to greater than 361 because some discrete comments applied to more than one of the documents. Approximately 125 of the responses resulted in a change to the Final SSHCP or the Final EIS/EIR. However, most of the changes in the Final SSHCP or Final EIS/EIR were confined to minor factual corrections and minor text clarifications. The changes made in response to comments did not alter impact analyses or any of the conclusions presented in Chapters 4 through 16 of the Final EIS/EIR.

TABLE 19-1. COMMENT LETTERS NUMBERED IN ALPHABETICAL ORDER

Comment Letter Number	Commenter (Representing)	Number of Discrete Comments		
		On SSHCP	On CWA Permitting Strategy	On EIS/EIR
1	Bryan Plant (representing Brookfield Sacramento Holdings LLC)	0	2	0
2	Carol Witham and the California Native Plant Society	14	0	3

Comment Letter Number	Commenter (Representing)	Number of Discrete Comments		
		On SSHCP	On CWA Permitting Strategy	On EIS/EIR
3	Cay C Goude and Eric S Goude	37	0	23
4	City of Elk Grove	12	0	0
5	City of Elk Grove	0	0	15
6	Delta Protection Commission	0	0	3
7	Delta Stewardship Council	2	0	20
8	Earl Seaberg	1	0	0
9	Environmental Council of Sacramento, Habitat 2020, the Sierra Club, the Institute for Ecological Health, and Save our Sandhill Cranes	99	0	2
10	Eugene Rose	1	0	0
11	Friends of Swainson's Hawk	21	0	5
12	Institute for Ecological Health	0	1	0
13	Law Offices of Gregory D. Thatch (representing Cordova Hills LLC)	7	0	0
14	Michael Mahon	21	0	0

Comment Letter Number	Commenter (Representing)	Number of Discrete Comments		
		On SSHCP	On CWA Permitting Strategy	On EIS/EIR
15	Pacific Legal Foundation	9	0	0
16	Sacramento Regional County Sanitation District (Regional San)	1	0	24
17	Sacramento County Agricultural Commissioner	0	0	10
18	Sacramento County Farm Bureau	10	0	8
19	Sacramento Metropolitan Air Quality Management District	0	0	3
20	Sacramento Metropolitan Utility District (SMUD)	5	0	0
21	Taylor & Wiley (representing Tsakopolous Investments)	1	1	0
22	Taylor & Wiley (representing Tsakopolous Investments)	0	1	0
23	U.S. Army Corps of Engineers	0	0	26

Comment Letter Number	Commenter (Representing)	Number of Discrete Comments		
		On SSHCP	On CWA Permitting Strategy	On EIS/EIR
24	U.S. Environmental Protection Agency	2	2	0
25	U.S. Environmental Protection Agency	2	0	3
26	Wilton Rancheria	0	5	0
	Total	**243**	**12**	**145**

LETTER 1 BRYAN PLANT, ON BEHALF OF BROOKFIELD SACRAMENTO HOLDINGS LLC (CWA PERMIT STRATEGY)

From: Brian Plant
To: Pakenham-Walsh, Mary R CIV USARMY CESPK (US)
Cc: John Norman (John.Norman@brookfieldrp.com); Stacey McKinley (stacey.mckinley@gmail.com)
Subject: [Non-DoD Source] SPK - Proposed CWA 404 Permit Strategy - South Sacramento Habitat Conservation Plan
Date: Monday, July 24, 2017 1:50:16 PM

Dear Ms. Pakenham-Walsh: On behalf of Brookfield Sacramento Holdings LLC which owns and develops property in Sacramento and Placer Counties and is a stakeholder in the Natomas Basin Habitat Conservation Plan and the proposed Placer County Conservation Plan, please accept these comments on the proposed Clean Water Act permitting strategy for the South Sacramento Habitat Conservation Plan (Corps Action ID SPK-1995-00386). The proposed permitting strategy describes a three-tiered approach to CWA permitting for the SSHCP covered activities: 1) a programmatic general permit (PGP) to be implemented via local ordinance which includes conditions limiting its use to fill activities that do not exceed either 2 acres or waters or 1.5 acres fill of vernal pools within the Mather Core Recovery Area; 2) a Letter of Permission (LOPs) for "more than minimal" but less than significant effects on the human environment, including aquatic resources; and 3) an "abbreviated" process for issuing standard permits for activities that "may have" a significant impact on the human environment.

The proposed permitting process and the limitations imposed provide little incentive for projects moving forward within the SCCHCP plan area. One of the major benefits of habitat conservation planning and the use of HCPs is to provide certainty for stakeholders and to allow regulatory permit streamlining in addition to the certainty that key resources are preserved in significant quantities. While the Corps District recognizes these benefits, the permit program as currently proposed does not go far enough in reaching the goal of permitting certainty. In particular, the 2-acre limitation for use of the proposed PGP appears arbitrary and is too low for meaningful streamlining of the CWA permit process. The regional conservation planning efforts underpinning the SSHCP and protections afforded the aquatic environment under the SSHCP should ensure that proposed fill greater than 2-acres would have less than minimal individual and cumulative effects. In fact, the District should consider any covered activity that follows the requirements of the SSHCP (avoidance, minimization and compensatory mitigation as part of the conservation strategy) would have less than minimal individual and cumulative impacts on the aquatic environment. All other activities should be covered by the proposed abbreviated process for issuing standard permits. 1.1

Further, the current process as described is unnecessarily vague. Specifically, the description of the process for the LOP and SP process affords little insight into the process envisioned for permitting under those two scenarios. For the SP process, all that is described is the threshold that certain projects that "may" have a significant impact under NEPA would not be entitled to permit treatment under PGP, RGP or LOP. No specifics are given, despite the fact that there is meaningful information prepared under the draft SSHCP to more specifically describe that threshold. Likewise, some description at this point should be possible for how on-site adequate avoidance, minimization and mitigation can be achieved under the SP process. 1.2

Thank you for the opportunity to comment on this critically important component of the SSHCP and by implication ongoing HCP planning efforts such as Placer County Conservation Plan. If you have any questions, please don't hesitate to call me.

Sincerely,

Brian J. Plant
Of Counsel

RMM
REMY | MOOSE | MANLEY LLP
555 Capitol Mall, Suite 800 | Sacramento, CA 95814

P (916) 443-2745 x 233 | F (916) 443-9017
bplant@rmmenvirolaw.com | Blockedwww.rmmenvirolaw.com

CONFIDENTIALITY NOTICE: This electronic mail message and any attachments are intended only for the use of the addressee(s) named above and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If you are not an intended recipient, or the employee or agent responsible for delivering this e-mail to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you received this e-mail message in error, please immediately notify the sender by replying to this message or by telephone. Thank you.

Please consider the environment before printing this email.

RTC 1.1 (CWA Permit Strategy) – With regard to the concern that the permit program "as currently proposed does not go far enough in reaching the goal of permitting certainty," the proposed CWA 404 Permit Strategy substantially increases certainty, based on several anticipated efficiencies noted in the permit strategy, inclusive of explanations of key procedural elements (e.g., no off-site alternatives analysis would be required for standard permits), and the proposed locally driven aquatic permit program that would be authorized under clearly demarcated terms and conditions described in the USACE's (draft) Programmatic General Permit (PGP). Additionally, there is no quantitative threshold for "far enough" in this context; that said, the USACE has sought through the draft CWA 404 Permit Strategy, and is committed to continuing to seek, the highest levels of certainty and streamlining that are practicable while ensuring compliance with the CWA 404 regulations and related laws and policies (e.g., NEPA).

With regard to the concern that a 2-acre threshold for the proposed PGP "appears arbitrary and is too low for meaningful streamlining…," terms and conditions for the USACE's general permits are subject to the best professional judgment of the USACE, in light of their primary function of ensuring minimal individual and cumulative adverse effects to the environment based on use of the general permit they are associated with. For example, USACE headquarters has relied on a 0.5-acre threshold of loss of waters of the U.S. applying to several renditions of the ubiquitously utilized Nationwide Permits; while this threshold does not apply to all Nationwide Permits (NWPs), it is the most common loss of waters threshold across the NWP program. By extension, a regionally applicable proposed threshold of 2 acres for the proposed PGP is four times larger than 0.5 acre, while aquatic resources in this region of California tend to be valuable given the cumulative loss of resources over time, provision of habitat for state- and/or federal-listed species, and other functions and services. The USACE used key documents as the basis for identification of an upper acreage threshold for loss of waters of the U.S. in the proposed PGP, inclusive of its cumulative impact assessment, avoidance, minimization, and compensatory mitigation measures in the SSHCP, the compensatory mitigation outlook (including a proposed in-lieu fee program) for activities that would be authorized under the proposed PGP, the Plan Partners' Aquatic Resources Program (ARP) and (draft) local ARP ordinances, and consideration of what would be a reasonable upper limit of loss of waters of the U.S. to ensure impacts of activities authorized by the PGP would result in no more than minimal individual and cumulative adverse effects to the environment.

With regard to the statement that any Covered Activity should be considered to have "less than minimal individual and cumulative impacts on the aquatic environment," while all Covered Activities would be assumed to follow the avoidance, minimization, and mitigation provisions of the SSHCP per the comment, this would not ensure that the resulting impacts of all Covered Activities could meet this threshold, which applies only to general permits in the USACE's Regulatory Program.

RTC 1.2 (CWA Permit Strategy) – With regard to the statement that the CWA 404 permit "process as described is unnecessarily vague," with specific reference to the description of the Letter of Permission (LOP) and abbreviated standard permit (SP) processes, the LOP process is defined in specifics in the (updated) draft LOP procedure

contained in the Final EIS/EIR. The comment appears to focus more on concerns for more specificity to be provided in the abbreviated SP process outlook. In response to this concern, the USACE is updating the proposed CWA 404 permit process to include more specificity and clarification on the abbreviated SP process (e.g., a new stand-alone document in addition to the summary provided in the CWA 404 Permit Strategy overview document in Appendix C of the EIS/EIR). Clarification provided includes a reference to the Regulatory Program's implementing regulations for NEPA (33 CFR Part 325, Appendix B). Similar to existing practices for evaluating permit applications that do not fit under a general permit authority, the USACE would review the proposed project for its appropriate level of NEPA analysis, in the context of it being a covered project under the SSHCP inclusive of SSHCP-required avoidance, minimization, and compensatory mitigation requirements. If a project "…may have a significant impact on the human environment, and require the preparation of an EIS under NEPA," this case-by-case project-level decision provides a clear threshold (i.e., an EIS is required), triggering the need to evaluate the permit under the abbreviated SP process vs. under the LOP procedure. Wording has been added to the CWA Permit Strategy (Final EIS/EIR Appendix C) to clarify the EIS requirement threshold for the SP process, and case-by-case process of evaluating future permit applications in accordance with Appendix B of the USACE's Public Notice SPK-1995-00386. Lastly, the comment indicates there should be some description of how on-site avoidance, minimization, and mitigation can be achieved under the SP process.

LETTER 2 CAROL WITHAM AND THE CALIFORNIA NATIVE PLANT SOCIETY (SSHCP AND EIS/EIR)

Carol W. Witham, *consulting*
1141 37th Street, Sacramento CA 95816
(916) 452-5440, (916) 761-7886
carolwwitham@gmail.com

September 5, 2017

Environmental Coordinator
County of Sacramento
Office of Planning and Environmental Review
827 7th Street, Room 225
Sacramento, CA 95814

via email SSHCP@saccounty.net

Jan C. Knight, Deputy Field Supervisor
U.S. Fish and Wildlife Service
Sacramento Field Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

via email jan_knight@fws.gov

RE: South Sacramento Habitat Conservation Plan
Control Number: 2003-0637
State Clearinghouse Number: 2008062030

On behalf of the Sacramento Valley Chapter of the California Native Plant Society and myself, thank you for the opportunity to review and provide comments upon this important step forward in providing a framework for regional conservation planning in Sacramento County.

The Sacramento Valley Chapter of CNPS has been highly involved in participating in and commenting upon land use decisions at all levels that affect vernal pool ecosystems in Sacramento County. Chapter volunteers serve on the South Sacramento Habitat Conservation Plan (SSHCP) steering committee and biological subcommittee. Chapter volunteers serve on a stakeholders group to determine land use planning for the former Mather Air Force Base and its vernal pool grassland ecosystem. Chapter volunteers serve on local land trust boards, steering committees, and management committees. Chapter volunteers have testified at innumerable planning commission, board of supervisors, and city council meetings on projects that impact vernal pool resources. The Sacramento Valley Chapter of CNPS has long viewed the general area proposed for development under the SSHCP as the "Yellowstone" of vernal pool landscapes in Sacramento County.

I have been personally involved in this planning process since 1996 when I served as chair of an early technical advisory committee. Since then, I have devoted innumerable hours attending meetings of various biological subcommittees and providing comments on draft materials. I have voluntarily provided my expertise on multiple aspects of the vernal pool species and landscapes addressed in this plan. My participation has been both as a representative of the California Native Plant Society and as a recognized expert in vernal pool species ecology and landscape management.

The comments provided below are primarily general in nature and related to the SSHCP document. Detailed comments are not provided as they are too numerous to be compiled into a comment letter. Suffice it to say that there are internal inconsistencies within the document, omitted numerical values, incomplete sentences, and other rather simple errors. Perhaps significant, there are numerous references to the ARP which is not included as an appendix to the SSHCP, and the Orcutt grass in the proposed S-1 of PPU-1 is still listed as the wrong species. 2.1 2.2

SSHCP COMMENTS

The document language needs to be strengthened in order to ensure covered plant species mitigation actually occurs. Important goals, objectives and actions outlined in Table 7-1 (and other tables within Chapter 7) are not carried through the remainder of the document. This is particularly true for implementation of Goal 5 and its related objectives and actions for covered plants. Examples include: 2.3

- While Section 5.4.2 discusses AMMs for covered plant species (PLANTS-1 and PLANTS-2), they are not as specific as the objectives outlined in Table 7-1. Additionally, Tables 6-3 (summary of AMMs), 8-2 (AMM compliance monitoring) and 8-3 (AMM effectiveness monitoring) don't even mention PLANTS-1 and PLANTS-2 and do not include any of the the important conservation information from Goal 5 related to the covered plants. These omissions i) undervalue the importance of doing plant surveys prior to any covered activity approval, and ii) fail to measure success of the conservation objectives. 2.4

- Section 6.6 (effects of covered activities) is confusing because there are no specified limits on take as described in Section 7. Instead it just talks about limiting indirect and temporary effects through AMMs, but again with no mention of PLANTS-1 and PLANTS-2. This section would benefit from a few sentences for each of the covered plant species that spells out the limitations on take and the focus on preserving known occurrences (protect X populations before any take by covered activities). 2.5

On a similar note, the SSHCP document should clearly state that a satellite preserve will be created to protect a covered plant if no other populations can be found to preserve and fulfill the objectives under Goal 5. This may be implied by the information in Table 7-1, but needs to be clearly detailed in the text. This could be modeled after similar requirements for the Orcutt grasses. 2.6

Section 7.6.2.1 and Table 7-18 are inconsistent in the number of populations that must be preserved prior to allowing take of Ahart's dwarf rush (page 7-121). Six populations must be protected before any take can occur. After that, another population needs to be protected for each population proposed for take. This section also fails to recognize that grazing and conservation of populations of Ahart's dwarf rush may be incompatible. 2.7

Section 7.6.2.4 and Table 7-26 (plus the pertinent section of Table 7-1) are confusing about the exact nature of the conservation strategy for Legenere. There is discussion of both a minimum of 14 occurrences (text has 15 occurrences) and preserving one for take of one. Is the plan assuming that the seven within the hard line preserves immediately allows take of seven other populations? 2.8

For Bogg's Lake hedge-hyssop, dwarf downingia, (possibly) legenere, pincushion navarretia and Sanford's arrowhead, it appears that the SSHCP considers 50% preservation of known occurrences to be a satisfactory mitigation ratio. While this will prevent extinction, it is unlikely to contribute toward recovery or prevent the need to list some of these species at a future date. 2.9

Chapter 8 is very disappointing. It defers development of programs, procedures, techniques, criteria and formats to future dates ranging from 6 to 18 months after approval of the SSHCP. These are to be developed by the Implementing Entity and presumably approved by the Agencies. This deferment completely circumvents the public process by implying that the to-be-developed materials will be adequate. It is especially troubling that population studies and the definition of take for the covered plant species are being deferred to a later date and will not be subject to public review. 2.10

Chapter 8 does not sufficiently stress the importance of obtaining information on historic management practices before adding a parcel (or group of parcels) to the Preserve system. More detail on this requirement should be spelled out in both Chapter 8 and Appendix F (as that documentation will be prepared before or at the time of acquisition). Obtaining the historic record should be part of the due diligence process prior to obtaining a parcel for inclusion in the Preserve system. This requirement also needs to be spelled out in sections that discuss land dedication as the mitigation being proposed by third parties. It is important to obtain the historic information as early 2.11

as possible in the land acquisition process while it is still fresh in the mind of the current owner/manager/livestock operator.

DEIS/DEIR COMMENTS

I find the alternatives analysis somewhat baffling. I am not sure that current economics and projected population growth support the assumption that projects and infrastructure development (at the same level as proposed under the SSHCP) would occur under the No Action/No Project Alternative. 2.12

GENERAL COMMENTS

It is unfortunate that the County of Sacramento does not embrace smart growth principals to the extent that they would limit new development to the edges of existing cities. Adhering to this type of growth pattern would allow significantly more habitat to be preserved within the UDA and would reduce many other environmental stressors (e.g. air quality) present in the region. 2.13

After spending 20 years working on this planning process, I am disappointed that during the past several years the entire project has been commandeered to cater to five large-scale, leap-frog developments. It is unfortunate that future projects, many of which will be more economically and environmentally appropriate, will have to fill the gap to complete the SSHCP conservation strategy. 2.14

And finally, while I remain a stanch supporter of regional conservation planning, I am no longer sure that the SSHCP as currently formulated will actually achieve more or better conservation that project-by-project permitting. This is particularly important to consider in light of the USACE Record of Decision for the Sunridge Projects. 2.15

Sincerely,

Carol W. Witham

RTC 2.1 (SSHCP) – We have attempted to identify and correct inconsistencies, omitted numerical values, and incomplete sentences in the Final SSHCP. Without more details regarding these issues, it is not possible to respond further.

RTC 2.2 (SSHCP and EIS/EIR) – The draft Aquatic Resourced Program (ARP) is Appendix I to the EIS/EIR. It was included as an appendix to the EIS/EIR instead of the SSHCP because, though the documents are consistent, they may be subject to different timeframes for revisions, amendments, or other changes. Therefore, it was simplest to separate them in this way. References to the draft ARP have been added to the Final SSHCP where appropriate. In addition, the reference to slender Orcutt grass (*Orcuttia tenuis*) in Satellite Preserve S-1 has been changed in Final SSHCP Section 7.5.1 to correctly identify the species as Sacramento Orcutt grass (*Orcuttia viscida)*.

RTC 2.3 (SSHCP) – The comment states that plant avoidance and minimization measures (AMMs) identified in Chapter 5 of the Draft SSHCP were not appropriately discussed in Chapters 6 and 7. References to AMMs ORCUTT-1 and ORCUTT-2 have been added to the two Orcutt Covered Species analyses in Section 7.6.2 of the Final SSHCP. AMMs PLANT-1 and PLANT-2 have been added to all other plant Covered Species analyses in Section 7.6.2 of the Final SSHCP.

AMMs PLANT-1 and PLANT-2 have been added to Tables 6-3, 8-2, and 8-3 in the Final SSHCP as suggested by the comment. Table 8-3 in the Final SSHCP also now identifies how the compliance and effectiveness of these AMMs will be monitored.

RTC 2.4 (SSHCP) – Refer to response to Comment 2.3. The operational SSHCP will place appropriate importance on plant surveys. By adding the two plant AMMs (PLANT-1 and PLANT-2) to these tables, they are included in the compliance and effectiveness monitoring that will be conducted for the SSHCP.

RTC 2.5 (SSHCP) – Refer to response to Comment 2.3.

The limitations on take are species objectives that first appear in Table 7-1 in Chapter 7 because that is when the effects of the Conservation Strategy are analyzed. Chapter 6 examines the effects of the Covered Activities, without the measurable objectives of the Conservation Strategy.

RTC 2.6 (SSHCP) – Text has been added to Section 7.6.2 clarifying that Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), dwarf downingia (*Downingia pusilla*), pincushion navarretia (*Navarretia myersii)*, and legenere (*Legenere limosa*) occurrences would be protected in a minimum satellite-sized preserve. In addition, conservation actions for preservation of Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, pincushion navarretia, and legenere now state that the minimum preserve size to protect an occurrence of these species is satellite-sized.

RTC 2.7 (SSHCP) – The text in Section 7.6.2.1 of the Final SSHCP has been corrected to reflect that prior to take of any occurrence of Ahart's dwarf rush, **six** currently unpreserved and "biologically equivalent or superior" (as defined by the Technical

Advisory Committee [TAC]) occurrences of Ahart's dwarf rush within the Plan Area will be preserved. In addition, text has been added to Section 7.6.2.1 reflecting the text in Objective VPP1:

"After six currently unpreserved occurrences are protected, prior to take of an occurrence of Ahart's dwarf rush, one currently unpreserved and 'biologically equivalent or superior' (as defined by the TAC) occurrence of Ahart's dwarf rush will be preserved within the Plan Area."

As described in Section 8.3.1, each individual Preserve Management Plan (PMP) will outline the activities that can occur in each Preserve. Based on monitoring results, animals used in grazing on Preserves, as well as the timing or patterns of grazing, will be managed for the benefit of the Preserve and Covered Species. Text has been added to Section 7.6.2.1 in the Final SSHCP noting that grazing may be incompatible with Ahart's dwarf rush.

RTC 2.8 (SSHCP) – Section 6.6.4 of the Draft SSHCP indicates that Covered Activities will directly impact two documented occurrences of legenere within the Urban Development Area (UDA) (one in Preserve Planning Unit [PPU] 1 and one in PPU 3) and will indirectly impact three documented occurrences of legenere within the UDA (one in PPU 1 and two in PPU 3).

Objective VPP4 in Table 7-1 of the Final SSHCP has been revised to reflect that 15 occurrences of legenere will be conserved. The comment asks whether 50% preservation of legenere in the Plan Area will achieve the Conservation Strategy for the species. The Plan Preparers took into account the fact that several occurrences of this species are already protected in existing Preserves in the Plan Area. Further, populations outside the UDA will not necessarily be taken, even though they may not be within a Preserve. The Plan Area also does not enclose the entire range of the species. These factors, taken together, support the Conservation Strategy's conclusion that implementation of the SSHCP is mitigation to the maximum extent possible. The comment also asks whether preservation of seven legenere within the Preserve System will allow for take of seven legenere from Covered Activities. That interpretation is correct.

RTC 2.9 (SSHCP) – As described in Section 7.6 of the Draft SSHCP, an occurrence of each of these Covered Species must be conserved prior to take of an occurrence. The SSHCP Conservation Strategy will benefit each of these species by maintaining them within their current distribution in the Plan Area, by maintaining or re-establishing their historical distribution in the Plan Area, and by providing for the re-establishment and establishment of additional habitat for these species in the Plan Area. Moreover, the SSHCP Preserves will maintain connectivity between existing occurrences and modeled habitat. Implementation of the SSHCP will benefit each of these Covered Species. These activities will assist in species recovery.

RTC 2.10 (SSHCP) – Chapter 8 provides the criteria by which each program and procedure and plan shall be prepared, including by whom, and how compliance and success will be assessed. The implementation schedule for these programs is included

in the Draft SSHCP in Section 9.11, Table 9-3. Chapter 8 of the Draft SSHCP includes sufficient detail on the required types, timing, and methods of monitoring to allow the EIS/EIR to analyze its effectiveness. For example, Table 8-2 in the Draft SSHCP identifies for each AMM: (1) what we need to know to assess compliance, (2) how we would monitor what we need to know, (3) when and how often that monitoring would occur, and (4) what protocols or methods need to be developed in order to achieve that required monitoring. Similar tables are presented for compliance monitoring of the Conservation Strategy (Table 8-1), effectiveness monitoring of the AMMs (Table 8-3), and effectiveness of the Conservation Strategy (Table 8-4). This chapter was prepared with direct involvement of an agency committee and representatives of environmental groups such as ECOS, California Native Plant Society, Sierra Club, and the Institute for Ecological Health. It was decided that rather than preparing a detailed program as part of the SSHCP, it was preferable to prepare a programmatic template that could guide development of detailed programs, procedures, and plans within 6 to 18 months following plan adoption. Since potential properties to be incorporated in the Preserve System are not yet known, preparation of detailed plans, programs, and management and monitoring procedures at this stage may not ensure accuracy in measuring Preserve System performance in the future. Thus, the performance standards described above will guide development of the plans and must be met as a requirement of the SSHCP and permit conditions. This will be done in an open public process with full engagement of a Technical Advisory Committee (TAC) made up of plan partners, agency representatives, and stakeholders, including the environmental, landowner, and development community. Further, the programs and procedures will undergo public disclosure and adoption by the Implementation Committee. All meetings of the Implementation Committee will be called, noticed, held, and conducted in compliance with the provisions of the Ralph M. Brown Act, Government Code Section 54950 et seq. Individual Preserve Management Plans based on these programs will also be developed in coordination with the TAC.

RTC 2.11 (SSHCP) – The SSHCP Implementing Entity understands the importance of recording the management history on all properties that will be incorporated into the Preserve System. Management history will be recorded when a Preserve Documentation Report (PDR) is prepared. A PDR is prepared for each property that is being considered for acquisition by the SSHCP Implementing Entity. Table 8-1 in Section 8.2.1 of the SSHCP describes how Objective HAB3 will be implemented. Objective HAB3: “Record management history for Preserve parcels as they are obtained. Consider management history when developing initial preserve management approach.”

Sections 8.3.1 and 8.3.4.2 in the Draft SSHCP also describe the process for preparation of a Preserve Management Plan (PMP) for each Preserve. Each initial PMP must document the management history for each parcel (via records, interviews of ranch managers or landowners, etc.). The importance of documenting existing and historical management of Preserve properties has been noted in several locations in the Final SSHCP, including Section 9.4.2, where the process for acquiring preserve land is described.

RTC 2.12 (EIS/EIR) –The analysis in the EIS/EIR does not generate new estimates of population growth and development within the Plan Area. These estimates are based

on growth assumptions contained in the general plans of Sacramento County, Rancho Cordova, and Galt, plus additional development that might occur within the county's Urban Service Boundary (USB). The USB is the ultimate future growth boundary adopted by the county in its 1993 general plan update. The EIS/EIR alternatives assumptions include similar growth for each alternative using the estimates endorsed by the County and cities through their general planning processes.

RTC 2.13 (SSHCP and EIS/EIR) – The SSHCP and EIS/EIR do not establish new projections or assumptions about population growth in southern Sacramento County. Assumptions about growth projections underlying these documents are made in general plans developed in accordance with the local land use planning process, which includes public comment and which ultimately are approved by local elected officials. The SSHCP Plan Preparers cannot modify or change the County's or the City's land use planning decisions or processes. For example, the Sacramento County General Plan includes a USB that identifies an area where urban development is anticipated to occur. The SSHCP uses the USB as the basis for its UDA. Limiting new development to the edges of a city would not ultimately limit the total amount of development that is anticipated to occur under the County's General Plan and therefore would not result in additional preservation within the UDA.

RTC 2.14 (SSHCP) – The Plan Partners recognize and appreciate the important contributions this commenter has made to the SSHCP planning process over many years. It is assumed that the comment is referring to five large-scale master plans that are within the SSHCP's UDA, two of which are already approved and three of which are in the entitlement approval process. Because these projects were seeking land use entitlements while the SSHCP was being developed, it was necessary to incorporate these five master plans into the SSHCP planning process as SSHCP Covered Activities, even as they each pursued their own permits from the resource agencies. Each of the five master plans was required to set aside significant on-site preserves, which became the "hard-line" preserves of the SSHCP Conservation Strategy. As development of SSHCP progressed, there was opportunity to also apply SSHCP AMMs to the master plans to satisfy the SSHCP's Conservation Strategy. These "hard line preserves" are the only Preserve areas that can be mapped at this time, but are not the only Preserves that SSHCP will create within the UDA.

Where the County or cities were actively working with project applicants that were required to prepare a master plan per County or city General Plan Policy and that Master Plan was within the SSHCP's Plan Area, the County or cities, along with the wildlife agencies, worked with the project applicant to design on-site Preserves consistent with the SSHCP's Conservation Strategy. Project applicants required to provide on-site Preserves will receive credit for their on-site Preserves towards their mitigation obligations.

It is accurate to suggest that future projects will benefit from the SSHCP's streamlined permitting process and will contribute to the establishment of the SSHCP's Conservation Strategy.

RTC 2.15 (SSHCP) – The comment questions whether the SSHCP will achieve more or better conservation than would occur under the project-by-project permitting that currently occurs. While it is not possible to forecast how requirements under project-by-project permitting could change over the permit term (e.g., mitigation ratios), the SSHCP Preserve System would include more consistent and rigorous qualification for Preserve properties, consistent management and monitoring across the Preserve System, a single local agency with oversight and decision-making authority, and many other benefits as laid out in Section 1.1.2 of the Draft SSHCP. As noted in the ARP that is included as Appemdix I to the EIS/EIR, the SSHCP would also be integrated with an ARP that would support watershed-level conservation of aquatic resources.

LETTER 3 CAY C GOUDE AND ERIC S GOUDE (SSHCP AND EIS/EIR)

August 29, 2017

To: Sacramento County Environmental Coordinator and Sacramento Fish and Wildlife Service

From: Cay C. Goude and Eric S. Goude

Subject: South Sacramento HCP and EIR/EIS

These comments pertain both to the South Sacramento HCP and Draft EIR/EIS and must be addressed in both revised documents. First, we find these documents to be inadequate and difficult to understand. This comment letter will identify certain topic areas that are especially concerning. Based on the level of concerns and the documents inadequacies they should be revised and recirculated as new Draft documents. Although we applaud the goal of addressing conservation on a large scale this Plan will not result in overall conservation of the covered species and will NOT mitigate to the maximum extent practicable the impacts to these covered species. 3.1 3.2 3.3

ALTERNATIVES

The Alternatives are inadequate in scope. The documents discounts a larger percentage of preserves within the USB/UDA based on no real analysis. Basically it was discounted because developers own certain parcels within the area. In addition, there is no systematic analysis or alternative that would preclude piece meal and leap frog development within the USB/UDA and no analysis on how this would be precluded. The analysis must be revised to address these concerns. The 50 percent retention of lands to be preserved within the USB/UDA should be the preferred alternative which would allow for greater conservation. However, even this alternative should only allow development within City boundaries, not as part of the County. For example, development should occur systematically from Rancho Cordova City limits on the north or from City of Sacramento on the Plan's western boundary. Sacramento County should not continue to act like they are City. An analysis must be done that identifies the range of development within the greater geographic area and their cumulative impacts. Currently there are large scale development within Natomas, El Dorado Hills, Folsom and Placer County. There is not enough incoming population to sustain this large 3.4 3.5 3.6 3.7

1

demographic growth. This influx of home building again makes the need for this development within the remaining open space of Sacramento County questionable. This development should be addressed within the entire context of this Plan for all impacts including air quality, water availability, potential flooding, loss of open space and agricultural land and natural resources. All documents must be revised to address the concerns provided in this letter. 3.7 cont'd 3.8

PERMIT TERM

The Permit Term proposed is 50 years. This is totally inappropriate since all the County Planning and City Planning documents do not extend for this period of time. In addition, based on climate change and other unforeseen factors having the permit term be so far into the future does not make sense. The Permit Term should be based on the Planning Documents current length. There is no justification for this permit duration and this must be provided in new draft documents. This HCP is not a NCCP and although it tries to mirror a NCCP in terminology it is a mitigation plan which makes the risk to the covered species even more precarious and therefore there is a need for shorter permit term. 3.9

COVERED ACTIVITIES

It appears that the analysis considers everything developed within the USB/UDA except for some preserves. However, the analysis does not include the Jackson Road proposed enlargement which includes both lane enlargement and numerous traffic lights. In fact at the scoping meeting, we were told this road enlargement was not being considered by the County, but a month later it was being discussed by the County, as reported in the Sacramento Bee. The proposed Jackson Road modifications are only being considered because of the proposed development within this HCP. Therefore, the impacts to the local communities that will be adversely impacted, loss of economic development for towns within Amador County, traffic time, air quality and other factors must be addressed. Jackson Road enlargement is an interrelated and an interdependent impact that must be considered as part of the HCP and EIR/EIS. Also, there is no analysis of the adverse impacts to the listed salmonid species or delta smelt. Although water to support this large level of development may have been considered as part of the "Fazio" water deal, much has changed since the time of that analysis and since the conclusion of the biological opinion for this water contract. Numerous new developments are relying on this limited resource that were never 3.10 3.11 3.12 3.13 3.14 3.15 3.16 3.17

2

envisioned and since the development of the "Fazio" biological opinion the status of the species has also declined. This analysis did not even consider climate change and adverse effects to all the covered species as well as salmonids and delta smelt. In essence, if you have a one gallon bucket of water that was enough for one person to use that same bucket will not support 100 people. Therefore, the revised documents must consider the impacts to salmonid species and the delta smelt. The covered activities states that there will be a need for additional wells and pipelines and that these the details will be analyzed in future environmental documents. But there is no analysis of the impact to the already depleted ground water aquifer. There are numerous ranches, nurseries and homeowners that would be adversely impacted from these wells. For example, three wells were developed as a "temporary" use for the Sunrise Douglas development along Excelsior roads. These wells are still being used although they were expected not to be in used in the future. How will these wells be used and is there truly adequate water supply for the large development proposed. The impacts to ground water resources must be evaluated and more details analyzed on the locations and potential impacts. The Mather development is stated that it is being developed independently but it seems you are relying on their proposed conservation. Is this a covered activity or not? In addition, within your EIS/EIR you state the following, "For this EIS/EIR, the lead agencies determined that using the existing condition as the baseline to describe and determine the significance of each action alternative's expected impacts would be misleading. This determination was made because the two action alternatives include, as Covered Activities, future urban development and infrastructure projects that are also reasonably expected to occur under the No Action/No Project Alternative. Although the details of this future development are not completely known at this time, it is anticipated that new urban development under all of the EIS/EIR alternatives would accommodate the same population and development growth, and that this urban growth would occur in areas where public infrastructure and services are planned for the 50-year EIS/EIR study period (i.e., within the spheres of influence for the Cities of Galt and Rancho Cordova and within Sacramento County's USB). As a result, the types of new urban development and associated infrastructure would be the same, and the general locations and the acres of new urban development would be very similar for all alternatives. Therefore, using existing conditions as the baseline for describing the effects of each action alternative and for determining the significance of those effects would misrepresent the impacts of the action alternative because that development

3.17 cont'd
3.18
3.19
3.20
3.21
3.22
3.23
3.24
3.25

3

would occur whether or not an HCP is approved and implemented in south Sacramento County. Further, the future urban development and infrastructure Covered Activity projects and activities are not part of the "project" under CEQA that is subject to approval by the CEQA lead agency and by the other HCP Permit Applicants (see Section 1.5), are not part of the "project" under CEQA that would be subject to permitting by the California Department of Fish and Wildlife (CDFW) (see Section 1.5), and are not part of the "action" under NEPA that would be subject to permitting by the U.S. Fish and Wildlife Service (USFWS) (see Section 1.5). The EIS/EIR "project" (under CEQA) and "action" (under NEPA) consists of the approval and implementation of the HCP, SSHCP Aquatic Resources Plan (ARP), and issuance of associated take permits, but not the actual construction of or the discretionary entitlements of urban development projects and activities. Thus, the future environmental impacts of new urban development in the Planning Area would not result from the decisions to be made about the Proposed Action/Proposed Project (Section 1.5). For these reasons, the EIS/EIR basis of comparison (the EIS/EIR baseline) for describing the environmental impacts of each action alternative is the future condition of the Planning Area expected to occur under the No Action/No Project Alternative." It appears that your analysis does not address individual impacts under CEQA nor any infrastructure. We are confused how your EIS can be sufficient without this analysis. We do not agree that you can conclude that existing condition is the same as your baseline. If individual projects were proposed outside of this proposed HCP they would be developed as economics allowed, infrastructure developed and have detailed site specific mitigation proposal that would have details of site-specific conditions. It is our belief that over time this most likely would result in greater conservation or avoidance due to various factors some economic and some environmental. The revised Documents must analyze the baseline separately from the existing condition.

3.25 cont'd

3.26

3.27

COVERED SPECIES

Many of the covered plant species and the tadpole shrimps known occurrences are only within the USB/UDA or significantly so, but most of the mitigation is proposed outside their known occurrences. It is unclear how your proposed preserves match with the needs of the Vernal Pool Recovery Plan and designated critical habitat. An analysis for each species where applicable should be done to demonstrate how you will not preclude recovery or have adversely modified

3.28

3.29

4

critical habitat. This type of analysis should also be done for all the species where it is unclear that there are known occurrences outside the USB/UDA. All covered species must be treated as a listed species, so simply doing preconstruction surveys for example for burrowing owls or tri-colored blackbirds without assurance that you have mitigated for their occurrence in not acceptable. How will you ensure that you have mitigate for each of these covered species to the maximum extent practicable? It is not sufficient to simply say you are acquiring preserves within modeled habitat without knowledge if they occur on site. Again this is not a NCCP. In addition, your mapping is inadequate for emergent marshes along Jackson road where there is a large known tri-colored blackbird colony. Your mapping needs to be revised with more recent information and this occurrence noted. It seems that your modeled habitat is overly broad when it comes to various covered species due to the lack of known occurrences. The Plan could result in preservation of vernal pool grasslands without the species occurring within these preserves and ultimately the destruction of the known occurrences. Again the Plan must be revised to address this concern. 3.30 3.31 3.32

MITIGATION

We are totally baffled what the actual mitigation is for a project that is proposed within the USB/UDA. It appears where there are known developers you simply used their proposed preserve designs as their mitigation. However, what if a future project is proposed that has vernal pools and listed species, what is the mitigation? It is totally confusing to determine if this Plan has sufficient funding mechanisms to meet the mitigation requirements. Many of the properties within the USB/UDA will not be developed but the Plans treat all lands within this area as lands to be developed. This is an erroneous assumption, any individual's lands that are currently not owned by a developer should NOT be considered as developed within these revised documents. We have not found any information on how you plan to fund the plan, how fees are collected or other information on how you would actually propose to stay-ahead and how the funds increase over time. Do you actually have a mechanism for jump-start? Possibly this is in some appendix within the EIE/EIS but it must be within the overall information presented within the HCP. The mitigation plan for a HCP is the heart of the document and should be treated with sufficient depth and understanding for each species. It is important that the public understand and interpret the intent 3.33 3.34 3.35 3.36 3.37

5

and ramifications of the proposed Plan and draft EIR/EIS. The Plan includes vague Biological Goals and Objectives but by definition they are Goals and Objectives without sufficient detail to determine how you will pay for their implementation and with language that allows discretion if they will be implemented. The connections of the various preserves within the Hard Scale preserves are insufficient and there are numerous large vernal pool complexes that were not avoided. What was your basis for the lines for the Hard Scale preserves? The Hard Scale preserves must be enlarged and interconnected and where feasible attached to a stream corridor. The stream corridors are also inadequate, each stream especially Elder and Morrison Creeks must have a corridor and setback similar to Laguna Creek. In addition, the preserves proposed on Mather should be shown to see if they are connected to any of the Hard Scale Preserves. We are not going to individually address each biological goal and objective since without an overall understanding of the actual mitigation for the proposed project it would be useless.

3.37 cont'd
3.38
3.39
3.40
3.41
3.42
3.43
3.44

We could have provided additional specific comments but there are so many glaring deficiencies it did not seem prudent. Again, we are very supportive of good conservation efforts and large scale planning, however this plan and the draft EIR/EIS are insufficient.

3.45

Sincerely,

Cay C. Goude and Eric S. Goude

Cay C. Goude

10685 Jackson Road

Sacramento, CA 95830

6

RTC 3.1 (SSHCP and EIS/EIR) – Each comment in the letter has been reviewed for its applicability to the SSHCP and the EIS/EIR. If a change is needed to one or both documents, those changes have been made in the documents and noted in the response to the comment.

RTC 3.2 (SSHCP and EIS/EIR) – This comment makes a general statement that the SSHCP and EIS/EIR are inadequate and difficult to understand, and that the documents should be recirculated. Please refer to responses to specific concerns in subsequent comments in this comment letter. Based on the responses to comments and analysis contained in the SSHCP and EIS/EIR, no new information has been identified that would result in substantial changes or revisions to the conclusions of the documents that may necessitate recirculation.

RTC 3.3 (SSHCP) – As pointed out in the comment, the SSHCP does address conservation on a large scale. Based on the analysis contained in Chapter 7 of the SSHCP, the Plan Preparers believe that the SSHCP would mitigate to the maximum extent practicable the impacts to Covered Species. Please refer to responses to specific concerns in subsequent comments in this comment letter.

RTC 3.4 (EIS/EIR) – The process used to screen potential alternatives is described in Chapter 2 and Appendix E of the Draft EIS/EIR. Each potential alternative was assessed for its ability to satisfy the purpose, need, and objectives identified for the project in Section 1.3 of the Draft EIS/EIR. Please refer to the response to Comment 5.3 regarding the range of alternatives analyzed in the Draft EIS/EIR.

RTC 3.5 (EIS/EIR) –The comment requests that the EIS/EIR analyze how “piecemeal” or “leap-frog” development patterns during the permit term would affect resources. The EIS/EIR did not examine the effects of this development pattern because each of the alternatives assumes that the USB and UDA would be fully “built out” by the end of the proposed 50-year permit term. With that assumption, all of the resources within the UDA that are not already preserved or proposed to be preserved under the SSHCP are assumed to be impacted, and would need to be mitigated. The comment also requests that an alternative be analyzed that would preclude that pattern of development. The growth and development that is anticipated under the SSHCP is governed not by the SSHCP itself, but by the current and future General Plans of Sacramento County, Rancho Cordova, and Galt. The growth pattern described in the comment, with most development occurring within the UDA, is the pattern that was planned for in those General Plans. Actual development under the SSHCP will proceed in accordance with general and specific plans that have or will be circulated for public review and comment and accepted or rejected by local elected officials. Please refer to response to Comment 5.6 regarding the range of alternatives analyzed in the EIS/EIR.

RTC 3.6 (EIS/EIR) – Any alternative studied in the EIS/EIR cannot supersede or replace the general plan planning process, nor provide the local land use entitlements required to construct or implement the Covered Activities. The boundaries of the USB and UDA were decided by Sacramento County through the general plan planning process and other planning efforts that involve public comment and approval by local elected

officials, and the SSHCP and the EIS/EIR alternatives must be consistent with those plans. Therefore, consistency with the general plan of the land use authority permittees was used as a screening criterion for alternatives, as shown in Appendix E of the Draft EIS/EIR. Please refer to Section 3.4 of the Draft EIS/EIR for a summary of the general plans that are relevant to the Plan Area, and from which analyses were incorporated by reference in the Draft EIS/EIR resource area sections. Refer also to response to Comment 3.5 regarding the growth and development projections used in the EIS/EIR.

RTC 3.7 (SSHCP and EIS/EIR) – Cumulative impacts of development in the County, and when appropriate within larger study areas, including Folsom and other counties within the Sacramento Area Council of Governments (SACOG) five-county region, were analyzed in the Draft EIS/EIR and incorporated by reference in the EIS/EIR from the General Plan EIRs of Sacramento County, Rancho Cordova, and Galt. Some of the key sections where this more regional study area were considered, include Agriculture (refer to Section 6.2.2.2 in the Draft EIS/EIR), and Population, Housing, and Socioeconomics (refer to Section 16.2.2.2 in the Draft EIS/EIR). The SSHCP relies on general plan growth boundaries as opposed to population projections. The County uses the USB to identify their ultimate area of urbanization. The USB was established in the 1993 General Plan and was largely based on geographic limits to growth, such as floodplains. Further, the lead agencies are not aware of any studies that demonstrate regional development is exceeding projected population growth.

RTC 3.8 (SSHCP and EIS/EIR) – Development within the region, when relevant to the resource area being analyzed, is included in the analysis of cumulative impacts provided in Chapters 4, 6, 7, 9, 10, 12, 13, 14, and 15 of the Draft EIS/EIR. Refer to response to Comment 3.6 regarding the cumulative study area used for the EIS/EIR.

RTC 3.9 (SSHCP) – Justification for the 50-year permit term is provided in Chapter 1, Section 1.2.3, of the Draft SSHCP.

The Plan Preparers reviewed comparable HCPs within the State of California and found that a 50-year permit term is not uncommon. For instance, HCPs currently being prepared in Yolo and Placer Counties are also seeking a 50-year permit term. Approved plans in Santa Clara County and San Joaquin County, as well as the Natomas Basin HCP and the North County Multiple Habitat Conservation Program in San Diego County, were granted 50-year permits. Moreover, the Western Riverside County Multiple Species Habitat Conservation Plan and Coachella Valley Multiple Species Habitat Conservation Plan were both granted a 75-year permit term.

Nonetheless, the Draft SSHCP EIS/EIR analyzes an alternative with a 30-year permit term, the Reduced Permit Term Alternative. Refer to Section 2.4 of the Draft EIS/EIR for a detailed description of that assumption. As stated in Section 17.7 of the Draft EIS/EIR, the SSHCP (Proposed Action/Proposed Project Alternative) was determined to be the environmentally preferable alternative under NEPA, and the environmentally superior alternative under CEQA.

RTC 3.10 (SSHCP and EIS/EIR) – Modifications to Jackson Highway are Covered Activities in the SSHCP and the direct and indirect effects of that and other rural transportation projects are analyzed in the Draft EIS/EIR for all resource areas. As with other rural transportation project Covered Activities, modifications to Jackson Highway are approved pursuant to the circulation element of Sacramento County's 2030 General Plan. These improvements were proposed and vetted through a public participation process and approved by local elected officials. The SSHCP does not replace or supercede the local land use planning process. Refer to the list of rural transportation projects in Section 5.2.3 of the SSHCP, and shown on Figure 5-5 in the Draft SSHCP.

RTC 3.11 (SSHCP and EIS/EIR) – Refer to response to Comment 3.10. The Plan Preparers are not aware of why the Jackson Highway modifications would have been presented in that scoping meeting as not part of the SSHCP Covered Activities.

RTC 3.12 (SSHCP and EIS/EIR) – Refer to response to Comment 3.10.

RTC 3.13 (SSHCP and EIS/EIR) – Refer to response to Comment 3.10 regarding Jackson Highway modifications as Covered Activities. As noted in response to Comment 3.10, these modifications are approved pursuant to the circulation element of Sacramento County's 2030 General Plan. The cumulative impacts of those Covered Activities were analyzed in the Sacramento County General Plan EIR, and the analyses were incorporated by reference in the Draft EIS/EIR, as appropriate. Therefore, whether or not the SSHCP goes forward, such modifications are expected to occur.

RTC 3.14 (SSHCP and EIS/EIR) – Refer to response to Comment 3.10.

RTC 3.15 (SSHCP and EIS/EIR) – The potential for the action alternatives to affect listed fish species was considered in Table 1.2.2 of Appendix F to the Draft EIS/EIR. As identified in the table, although habitat for some listed fish species may exist in the Planning Area, there is low likelihood of take from the alternatives because these areas are outside of the UDA. For some species, there is also a very low probability for individuals to be present in the habitat available in the Planning Area. Regarding the delta smelt (*Hypomesus transpacificus*) and listed salmonids in the Delta, the County of Sacramento will use water from its Central Valley Project (CVP) contract in Zone 40, which includes the majority of the SSHCP Plan Area, in accordance with schedules and limits imposed through Bureau of Reclamation's annual CVP water allocation process. Effects on listed fishes in the Delta, including delta smelt and listed salmonids, of diverting that water for use in Zone 40 are addressed in other environmental documents and biological opinions on CVP and State Water Project water operations and are outside the scope of this proposed action.

RTC 3.16 (SSHCP and EIS/EIR) – The Draft EIS/EIR discusses the implications of the Zone 40 Memorandum of Understanding (MOU) in Section 2.2.2. Completion of the SSHCP fulfills a commitment of Sacramento County in their Freeport/Fazio Biological Opinion to address the cumulative impacts of development supported by that new water supply. If a project's water use might impact anadromous fish or delta smelt, the project proponent would have to receive separate incidental take coverage for those species. Effects on listed fishes in the Delta, including anadromous fish, of diverting that water

for use in Zone 40, are addressed in other environmental documents and biological opinions on CVP and State Water Project water operations and are outside the scope of this proposed action. Refer also to response to Comment 3.15.

RTC 3.17 (SSHCP and EIS/EIR) – Refer to response to Comment 3.15 regarding impacts on listed fish species, and refer to response to Comment 3.16 regarding the Freeport/Fazio Biological Opinion.

RTC 3.18 (SSHCP and EIS/EIR) – The SSHCP and the Draft EIS/EIR considered the potential future impacts of climate change in the analysis of impacts and the Conservation Strategy. For example, SSHCP Section 11.3 describes how climate change was accounted for in the measurable objectives, and Section 11.4.3 identifies how the Conservation Strategy would be adjusted for climate change changed circumstances. The EIS/EIR presents the effects of climate change on the Planning Area in Section 15.1.2, and the effects of the alternatives on greenhouse gases and climate change throughout Section 15.2. Refer also to response to Comment 3.16.

RTC 3.19 (SSHCP and EIS/EIR) – Future development in the North Service Area (NSA) is planned to take surface water from the Freeport Regional Water Authority (FRWA) intake on the Sacramento River. This water will be diverted at the intake, treated at the Vineyard Surface Water Treatment Plant, and distributed throughout Zone 40. Sacramento County Water Agency has rights to the surface water supply and planned and existing infrastructure to be able to run the conjunctive use program. The 2016 Water Storage Investment Program (WSIP) describes an “NSA Phase A” water line from the Vineyard Surface Water Treatment Plant that connects to the NSA. This line could serve future new development if and when the development occurs up to the unused capacity in the pipeline itself. To serve existing and future planned development, the Sacramento County Water Agency (SCWA) has the capability to deliver surface water in the NSA in place of using the well field termed the “Excelsior Well Field” that is described in the comment. While the well field is still there to provide conjunctive use for the NSA as our surface water contracts and rights are perfected, surface water can be delivered to existing customers in the NSA.

Conjunctive-use reliance on the well field will diminish over time as water rights and contracts are perfected and the well field will no longer serve groundwater to the NSA. Growth in the NSA service area will require another pipeline from the surface water treatment plant. This pipeline will deliver surface water in the NSA.

The SSHCP does not propose to change the water allocations included in the Freeport/Fazio Biological Opinion; therefore, there is no need for new analysis of the effects from that agreement. Refer to response to Comment 3.15 regarding impacts on listed fish species, and refer to response to Comment 3.16 regarding the Freeport/Fazio Biological Opinion. SCWA’s current water situation is described in the 2016 WSIP (http://www.waterresources.saccounty.net/Zone%2040/WSIP%202016%20Final%20Report%20Website.pdf), as well as in the 2015 Urban Water Management Plan (http://www.waterresources.saccounty.net/Documents/2015%20UWMP.pdf#search=uwmp). Both of these documents describe the implementation of the preferred alternative

of the vineyard surface water treatment plant described in the 2005 Zone 40 Water Supply Master Plan (http://www.waterresources.saccounty.net/Zone%2040/Z40_WSMP.pdf).

RTC 3.20 (SSHCP) –Construction of water pipelines is a Covered Activity and is analyzed in the EIS/EIR. Groundwater wells, water pipelines in the UDA, and new recycled water pipelines outside the UDA are included in all alternatives studied in the EIS/EIR, including the No Action/No Project Alternative. Therefore, the SSHCP is not requiring these actions and this future water infrastructure is not caused by either action alternative.

RTC 3.21 (EIS/EIR) – Covered Activity impacts to groundwater hydrology, as they relate to issuance of the take permits, are analyzed in Sections 7.2.2.1, 7.2.3.1, and 7.2.4.1 of the Draft EIS/EIR. Extensive discussion of the future No Action/No Project baseline condition for groundwater and surface water hydrology in the Planning Area was provided in Section 7.2.2.1 of the Draft EIS/EIR. That future condition takes into account the existing impacts of past and present projects in the Planning Area, which are further considered in the cumulative analysis of the action alternatives in Sections 7.2.3.2 and 7.2.4.2 of the Draft EIS/EIR.

RTC 3.22 (EIS/EIR) – Refer to response to Comment 3.21. The commenter notes wells on Excelsior Road that are being used for longer or more intensely than expected. The Plan Preparers appreciate this information. However, use of groundwater wells in this area is consistent with the Freeport/Fazio Biological Opinion, was part of the No Action/No Project baseline condition for the Draft EIS/EIR as described in Section 7.2.2.1, as well as the cumulative analysis of groundwater use in the Draft EIS/EIR (Section 7.2.3.2).

RTC 3.23 (EIS/EIR) – Refer to response to Comment 3.21.

RTC 3.24 (SSHCP) – The Mather Field Specific Plan is not a Covered Activity. Essentially, the SSHCP treats that area as neither impacted nor preserved. As stated in the SSHCP in Chapter 5 in the footnote on page 5-3, “The Mather Field Specific Plan is still pursuing its own Endangered Species Act (ESA) consultation with the U.S. Fish and Wildlife Service and a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers; however, the SSHCP Chapter 6 effect analysis treats parcels within the boundary of the Mather Field Specific Plan the same as parcels with existing ESA incidental take authorization and other entitlements.”

RTC 3.25 (EIS/EIR) – The comment largely repeats the justification for the use of the No Action/No Project baseline condition as the CEQA baseline for the action alternatives, which was provided in Section 3.6.1 of the Draft EIS/EIR. The comment also states that the EIS/EIR does not evaluate the impacts of individual projects. The SSHCP EIS/EIR, as with all environmental documents analyzing regional HCPs, is a program-level document. Nonetheless, it does evaluate the impacts of individual Covered Activity project footprints, such as the Capital Southeast Connector, other road projects outside the UDA, and known development projects within the UDA. For other development expected to occur over the permit term, the EIS/EIR made assumptions

regarding the locations, types, and intensities of development based on the adopted general plans of the land use jurisdictions.

RTC 3.26 (EIS/EIR) –The No Action/No Project Alternative describes the effects of a future condition without an HCP, relative to the existing conditions at the time the Notice of Preparation (NOP) was issued. That is, CEQA provides that the environmental setting as it exists when the NOP is issued should "normally" be treated as the baseline for gauging the changes to the environment that will be caused by the project (CEQA Guidelines, Section 151259[a]). However, a lead agency may elect to use a different baseline if there is a reasonable basis for doing so. (*Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.App.4th 439, 447). In most NEPA analyses, the action alternatives are compared to those future No Action/No Project conditions so that the effects of the alternatives can be determined. The justification for using the future conditions under the No Action/No Project Alternative as the CEQA baseline is provided in Section 3.6.1 of the Draft EIS/EIR.

RTC 3.27 (EIS/EIR) – Refer to response to Comment 3.26 regarding the CEQA baseline. The comment also questions whether the SSHCP will achieve more or better conservation than would occur under the project-by-project permitting that currently occurs. While it is not possible to forecast how requirements under project-by-project permitting could change over the permit term (e.g., mitigation ratios), the SSHCP Preserve System would include more consistent and rigorous qualification for Preserve properties, consistent management and monitoring across the Preserve System, a single local agency with oversight and decision-making authority, and many other benefits as laid out in Section 1.1.2 of the Draft SSHCP. As noted in the ARP that is included as Appendix I to the EIS/EIR, the SSHCP would also be integrated with an ARP that would support watershed-level conservation of aquatic resources.

RTC 3.28 (SSHCP) – Analyses of impacts to Critical Habitat and recovery plan implementation for each vernal pool species are included in the Draft SSHCP, Chapter 6. Chapter 7 of the Draft SSHCP describes the amount of preservation proposed in each Critical Habitat Unit and Core Recovery Area, as well as the consistency of the SSHCP with the Recovery Plan For Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005). If appropriate, findings of jeopardy and adverse modification will be part of the USFWS Endangered Species Act consultation and findings that must be completed before a permit for SSHCP can be issued.

RTC 3.29 (SSHCP) – Refer to response to Comment 3.28.

RTC 3.30 (SSHCP) – Covered Species occupancy will be a critical factor used when assessing a potential Preserve parcel for acquisition. The Conservation Strategy also includes specific requirements to preserve known tricolored blackbird (*Agelaius tricolor*) colonies and occupied burrowing owl (*Athene cunicularia*) burrow sites. Refer to Table 7-1 in the SSHCP and the biological goals, measurable objectives, and conservation actions therein and species-specific avoidance and minimization measures in Chapter 5.

RTC 3.31 (SSHCP) – The measurable objectives for each species include preservation of modeled habitat, re-establishment/establishment of habitat, and in many cases, preservation of known occurrences. For example, for tricolored blackbird, objective TB5 requires any project impacting a tricolored blackbird colony to preserve a colony of at least 200 individuals in an SSHCP Preserve. Objective TB7 requires that at least one large colony (>1,500 individuals) be preserved in the SSHCP Preserve System. For burrowing owl, objective BO1 requires that seven occupied western burrowing owl sites be preserved within the SSHCP Preserve System, including at least 200 acres around each occupied burrow site, and with preserved modeled foraging habitat within at least 0.4 mile of the preserved burrow site. Regarding alleged omissions in the mapping, there are limitations to mapping an area as large as the SSHCP Plan Area including limited access to many parcels of land and limited resources available with which to ground truth the entire SSHCP plan area. The SSHCP maps are intended to serve as a general representation of what is actually on the ground. Updates to the map will be made as site-specific surveys are prepared as part of a land use application and acquisition of habitat for conservation. Please refer to Chapter 10, section 10.4.2 of the Draft SSHCP *"Components of the SSHCP Permit Application Package"* for a description of maps that must be prepared for each project.

RTC 3.32 (SSHCP) – The broadness of species habitat modeling will be to the benefit of covered species, because impacts to modeled habitat will require mitigation even if covered species are not detected. Any project proposing to use the SSHCP will need to conduct species surveys and wetland delineations, as appropriate for the property, and the Implementing Entity will compile a biological resources letter report based on the site-specific surveys to document the resources present on the project site. The presence of covered species will also be used to identity and evaluate potential preserves. For example, the presence of vernal pool invertebrates will be one of the criteria used when evaluating potential preserve acquisitions (refer to Conservation Action VPI1.1 in the Draft SSHCP). In addition, a Preserve Documentation Report (PDR) must be prepared for each potential land acquisition. The PDR will include species occurrence information obtained from site surveys conducted by the SSHCP Implementing Entity and will include species occurrence information from database searches. The information contained in the PDR will be used to help decide which parcels will be acquired.

RTC 3.33 (SSHCP) – It is assumed that the comment is referring to five large scale master plans that are within the SSHCP's Urban Development Area, two of which are already approved and three of which are in the entitlement approval process. Because these projects were seeking land use entitlements while the SSHCP was being developed it was necessary to incorporate these five master plans into the SSHCP planning process as SSHCP Covered Activities, even as they each pursued their own permits from the resource agencies. Each of the five master plans was required to set aside significant on-site preserves, which became the "hard-line" preserves of the SSHCP Conservation Strategy. As development of SSHCP progressed there was opportunity to also apply SSHCP avoidance and minimization measures to the master plans to satisfy the SSHCP's Conservation Strategy. These "hard line preserves" are

the only preserve areas that can be mapped at this time, but are not the only preserves that SSHCP will create within the UDA.

Where the County or cities were actively working with project applicants that were required to prepare a master plan per County or city General Plan Policy and that Master Plan was within the SSHCP's Plan Area, we along with the wildlife agencies worked with the project applicant to design on-site preserves consistent with the SSHCP's Conservation Strategy. Project applicants required to provide on-site preserves will receive credit for their on-site preserves towards their mitigation obligations. Additional consideration of avoidance of resources on-site will come through the Clean Water Act permitting process for the SSHCP plan area.

For the scenario described in the comment, projects that wish to use SSHCP take coverage for their covered activities will have to conduct specific studies on their site, pay development fees and potentially dedicate land. This process is described in Section 10 of the Draft SSHCP.

RTC 3.34 (SSHCP) – The comment questions whether the SSHCP has adequate funding mechanisms to meet mitigation requirements. A complete funding analysis that demonstrates the feasibility of implementing the Conservation Strategy is provided in Chapter 12 *Economic Analysis and Funding Program.* Please note that the SSHCP does not treat all lands within the UDA as developed. The effects analysis (See Chapter 6, Section 6.4.2) excludes the following lands that are within the UDA: 1) existing preserves; 2) planned SSHCP Preserves; 3) stream and preserve setbacks; 4) proposed projects with existing ESA Incidental Take authorization and other required entitlements; and 5) properties within 8,660 acres of the approximately 9,160 acres of already-subdivided parcels (defined as large lot sizes of 0.5 to 4.5 acres for the purposes of this effect analysis) primarily west of Excelsior Road in the UDA. The comment also requests that the SSHCP not assume properties within the UDA will be developed unless they are proposed for development or are owned by a developer. The SSHCP was designed to be consistent with the general plans and urban service boundaries of Sacramento County, Rancho Cordova, and Galt, and the land uses that were adopted through those extensive public processes. By assuming that the UDA would be largely built out during the permit term, the EIS/EIR also analyzed a "worst case" scenario for most resource areas.

RTC 3.35 (SSHCP) – Chapter 12 *Economic Analysis and Funding Program* provides information on how the plan will be funded, Chapters 9 *Implementation* and 10 *SSHCP Permit Application Process* provide details on how fees are calculated and collected. A detailed explanation of the Jump-Start and Stay-Ahead Program is explained in Chapter 9, Section 9.4.6 *Jump-Start and Stay Ahead Provisions.* A detailed description for how fees are adjusted can be found in Chapter 12, Section 12.4.3.2 *Development Fee Adjustment Program.*

RTC 3.36 (SSHCP) – A detailed description of the Jump-Start and Stay-Ahead Program can be found in Chapter 9, Section 9.4.6 *Jump-Start and Stay Ahead Provisions.* Additional references to this section have been added to Section 7 of the Final SSHCP.

RTC 3.37 (SSHCP) – A detailed explanation of the Conservation Strategy is provided in SSHCP Chapter 7.

RTC 3.38 (SSHCP) – The biological goals are indeed broad by design, and measurable objectives represent the next level with quantifiable conservation targets (see 65 FR 35242). The way the objectives will be implemented is described in the Conservation Actions shown in Table 7-1. Implementation and funding of the HCP is described in Sections 9, 10, and 12 in the Draft SSHCP. Additional references to these sections have been added to Section 7 of the Final SSHCP.

RTC 3.39 (SSHCP) – Linkage Preserves are designed to maintain connectivity between existing preserves and SSHCP Preserves, providing for wildlife movement and, in many cases, hydrological connections between Preserves. Their ultimate size and dimensions (i.e., width and length of the linkage) will depend on several factors, including habitat types in the linkage, the ecological function(s) the linkage is designed to serve (e.g., overland wildlife movement, drainage), and adjacent land uses. The Linkage Preserves will need to be wide enough to support the suite of species expected to use the linkage, including movement habitat for more mobile species and "live-in" habitat for more sedentary species, and to provide adequate setbacks from adjacent land uses and potential edge effects, including invasive species, runoff, pollutants, lighting, and noise. Pursuant to Objective L2, the Linkage Preserves inside the UDA will have minimum widths of approximately 600 feet, except where this minimum width is not possible due existing physical constraints such as adjacent existing land uses or ownership constraints.

RTC 3.40 (SSHCP) – The boundaries of the "hardline" preserves were determined through analysis of the biological resources available on the properties, and were adjusted and refined over several years through discussions between the landowners, the land use authority jurisdictions, the Wildlife Agencies, and other responsible agencies such as USACE. Refer to Response to Comment 3.41 regarding the widths of linkage preserves in the UDA.

RTC 3.41 (SSHCP) – Refer to response to Comment 3.40 regarding the boundaries of the hardline preserves. The comment also requests that hardline preserves be connected by linkages and connected to stream corridors. The SSHCP Conservation Strategy recognizes the value of habitat linkage, and thus all of the hardline preserves will be connected by linkages (Chapter 7, see Objective L2). Connections were made to stream corridors when that was feasible, but based on the covered species for the SSHCP and their limited use of stream corridors that was not a primary consideration in preserve design.

RTC 3.42 (SSHCP) – The setback width for Laguna Creek was determined using different parameters than the setback widths for other creeks. The SSHCP implementing Entity anticipates that species will continue to occur within the Laguna Creek Corridor. Setback widths are typically much larger along creeks when species protection is an objective of the setback. In contrast, the setbacks for Elder and Morrison Creeks have been established for purposes of protecting water quality.

Setbacks for water quality are typically smaller than setbacks that have been established for species protection.

RTC 3.43 (SSHCP) – There are several maps contained within the SSHCP that show the preserve on Mather in relation to “hardline” preserves. Chapter 7, Figure 7-2 Existing Preserves and SSHCP Planned Hardline Preserves is one such map.

RTC 3.44 (SSHCP) – The Conservation Strategy for the SSHCP is summarized in page 7-1 and 7-2 of the Draft SSHCP, and would be accomplished through implementation of the measurable objectives in Table 7-1 of the Draft SSHCP, which includes detailed conservation actions directing how the measurable objectives would be achieved. The bulk of the Conservation Strategy involves assembling a Preserve System, as described in Sections 7.4 and 7.5 of the Draft SSHCP. Development fees would be collected from entities using the SSHCP permits, and those development fees would fund property acquisition and other parts of the Conservation Strategy.

RTC 3.45 (SSHCP) – The comment does not provide any additional specific comments and thus no further responses are feasible.

LETTER 4 CITY OF ELK GROVE (SSHCP)



ELK GROVE

September 5, 2017

VIA USPS and EMAIL

Richard Radmacher
Senior Planner
County of Sacramento
827 7th Street, Room 225
Sacramento, CA 95814

RE: Draft South Sacramento Habitat Conservation Plan

Dear Mr. Radmacher,

The City of Elk Grove (City) has reviewed the draft South Sacramento Habitat Conservation Plan (SSHCP). City staff has also had the opportunity to meet with you to discuss our understanding the SSHCP and the City's concerns. The following outlines these concerns and requested changes to the SSHCP that the City believes will improve the Plan and make it more clear for the County, the City, and other parties and agencies to implement if the Plan is adopted. These items are in addition to the comments on the draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR), which are provided under separate cover, with this letter as an attachment. 4.1

1. Applicability to Areas Outside of the Urban Development Area

The SSHCP is very clear on its applicability to Covered Activities within the designated Urban Development Area (UDA), providing a streamlined process for Incidental Take, Section 404 permitting, Section 401 permitting, and 1602 permitting. However, the document could be more direct in stating that proposed activities outside of the UDA, while subject to the standard permitting process, are not precluded by the HCP. The City suggests adding the following discussion as a new Section 1.2.5, along with similar language in an appropriate location in Chapter 9 (Implementation): 4.2

1.2.5 Areas Outside the UDA
As discussed, the SSHCP provides a streamlined permitting process for Covered Activities within the Urban Development Area identified in the Plan. This does not preclude activities from occurring outside of the Urban Development Area, provided they obtain the legally required local, State, and Federal permits and approvals otherwise and customarily required, including mitigation for impacts to the environment caused by those activities. In other words, development outside of the Urban Development Area is not provided any direct benefits from this HCP. Any required mitigation should also include a consult with the HCP's Implementing Entity for maximum species benefit, but to the final decision shall be made by the applicable Lead Agency to complete pursuant to their thresholds and regulations.

The City also suggests that Section 1.2.1 (Geographic Scope of the Plan Area) be updated to read: 4.3

The Plan Area is functionally divided into two components: inside and outside of an Urban Development Area (UDA). Inside the UDA is predominately where ~~all proposed urbanization will occur~~ Covered Activities under this Plan will occur, and therefore, where most incidental take will occur. There will also be some habitat preservation within the UDA. The "inside the UDA" component totals 67,618 acres within the Plan Area. Geographically, the UDA is the portion of the Sacramento County Urban Services Boundary (USB), the incorporated Cities of Rancho Cordova and Galt, and Galt's Sphere of Influence that are also within the Plan Area (see Figure 1-1) as these are the Plan Partners for the SSHCP. The Plan Area component located outside of the UDA totals 250,038 acres. No urban development is covered under

the SSHCP outside of the UDA. A limited amount of incidental take is requested for specific infrastructure projects and for species conservation activities proposed outside of the UDA.

4.3 cont'd

2. Implementation After Annexation

As Sacramento County is aware, there are multiple Sphere of Influence Amendment applications pending before the Sacramento Local Agency Formation Commission (LAFCo) relative to Elk Grove. Some of these are within the HCP's UDA, while others are not. For those that are within the UDA, the City's understanding is that Covered Activities would still benefit from the HCP after annexation.

Chapter 1 implies that an annexing agency would become a Third Party Participating Special Entity, availing themselves of the mitigation benefits of the HCP. However, in the definition of Third Party Participating Special Entities the City of Elk Grove is not specifically listed as a covered entity. However, it is also not under the jurisdiction of a Land Use Authority Permittee which may be the intent for the Third Party Participating Special Entity. The HCP gives examples of school districts, reclamation districts, irrigation or water districts, utilities or other organizations that are not subject to the regulatory authority of a local jurisdiction. The City of Elk Grove technically qualifies under the definition but the definition needs clarification.

4.4

City staff also found a separate but related discussion on this matter in Section 15.13 of Appendix C (Implementing Agreement), which states that when a jurisdiction that is not a Plan Permittee is annexed land within the UDA they would work with the Implementing Entity and the USFWS to become a Plan Permittee. This appears to be a more valid approach than the Third Party Participating Special Entity as it recognizes the City as a land use agency like the County and other cities. Therefore, the City requests that:

- Sections 9.2 and 9.2.1 be updated to reflect the language in Section 15.13 of the Implementing Agreement, identifying that other land use agencies can become Plan Permittees as a result of annexation upon executing of the Implementing Agreement by the annexing agency.
- Chapter 1 and Section 10.2.3 be updated to identify that other agencies may become Plan Permittees as a result of annexation.
- Section 15.13 of the Implementing Agreement needs to be simplified such that the annexing agency shall sign the Implementing Agreement and become a member of the Implementing Entity Joint Powers Authority.

4.5

3. Biological Resources Analysis Contains Errors and Establishes a Bad Precedence

Major sections of the Biological Resources Setting in Chapter 3 are based upon habitat modeling that relies on inaccurate or incomplete species information. For example, the giant garter snake (GGS) habitat map indicates habitat south of Kammerer Road, when prior analysis of this area determined that it is not GGS habitat and the ditches relied upon in the analysis are not connected to known populations. Technical information on this matter was sent to you by our staff on August 17, 2017 and is attached for your reference. The City appreciates that you are working with our technical staff to address these issues.

4.6

The City is concerned that the lack of detailed species studies as the foundation for the habitat models is resulting in overly broad models that site the species in areas where they just do not occur. As a result, it appears that the preservation targets are not biologically defensible. As a conservation plan, the SSHCP could be misunderstood as a definitive resource habitat and could set an improper precedent for projects not covered by the HCP. More should be added to the draft HCP, particularly in Chapter 3, to clarify the intent of this information and that it is only applicable within the SSHCP and is not a resource in determining potential impacts outside the HCP.

4.7

4. Laguna Creek Wildlife Corridor

Section 7.5.1.6 describes a wildlife movement corridor along Laguna Creek that would be extended from PPU 3 to Elk Grove. The City is interested in learning more about this concept and what benefits and impacts there may be from extending the corridor into the City. I invite you to provide City staff with any additional information on this topic, and, thereafter, a meeting with City and County staff may be appropriate to further explore this matter.

4.8

5. Preserve System Outside the UDA

Based on recent discussion between City and County staff, the City understanding of Section 7.5.2 is that the planned preserve system outside of the UDA is not precisely defined and will instead be determined by the Implementing Agency as mitigation lands are acquired. Given the presence of existing preserves along the Cosumnes River, the City understands that the expansion of preserves from this framework will be the overall objective, within the Biological Goals and Measurable Objectives. Ultimately, the preservation acreages by Preserve category by Preserve Planning Unit (PPU) must be achieved; unless a shifting of acreage between PPUs is specifically approved and within the 15% rule outlined in Section 7.5.2.

The target preserve acreage within each PPU needs to be clarified, specifically identifying the percentage of the total available land (unencumbered by an existing preserve). For example, PPU 6 identifies a target of 9,750 SSHCP preserve acres, which appears to be 14.5% of the total 67,120 acres available. However, the City understands from our meeting on August 16, 2017 and Table 7-84 that for some species, such as sandhill crane, lands that are below sea level are not to be used for mitigation. Therefore, the target preserve acreage may actually be closer to 30% of the total available land. This kind of disclosure would be beneficial. 4.9

Additionally, the City believes that an additional discussion to Chapter 7 relative to non-SSHCP preserves should occur. This discussion should address the intent and objectives of the Implementing Entity in coordinating with others that are acquiring preserves inside the various PPUs for the common benefit of the species. For example, should the City annex lands south of Kammerer Road, the SSHCP would not provide a mitigation process and this project would have to obtain its own permits and mitigation. The City is supportive of a consultation process to ensure that the City and HCP are not competing cross interests. 4.10

6. Plan Amendments

As you are aware, the City's existing General Plan contemplates development south of Kammerer Road and outside of the UDA. The pending General Plan Update will include more details on the City's vision for these areas, as well as outline the City's approach to considering development and annexation applications. Included in this discussion, the City is considering a draft policy/program that, in concept, is as follows:

> *Identify an advance mitigation program for critical habitat for special-status species known to occur within the Study Areas. A proposed project determined to have a significant impact to habitat for special-status species must implement applicable mitigation measures established in the program, including but not limited to land dedication (which may be located either inside or outside the Study Area) or fee payment.* 4.11

Given this, the City is interested in what future opportunities there are to incorporate these study areas into the SSHCP through a future amendment. While the SSHCP cannot provide guarantees that an amendment would occur, the City is interested in understanding the interest in the Plan Permittees and the Permitting Agencies in engaging in this dialogue once the HCP is adopted. In that context, the SSHCP should provide more details on the process for amendment and how amendments are considered in the context of the conservation strategy and preserve system.

The City encourages the County to reevaluate the SSHCP in light of the comments made herein, and to revise the SSHCP accordingly.

Thank you for considering the City's concerns. We are available to answer any questions or discuss these issues in more detail. The City reserves the right to provide further information, comment, and analysis on the SSHCP prior to its approval. 4.12

Sincerely,

Laura S. Gill

Laura S. Gill, City Manager

Attachment: Biological Resource Data

RTC 4.1 (SSHCP) – The comments provided in this letter from the City of Elk Grove are acknowledged and have been carefully considered. Responses to these comments are provided below and changes considered warranted resulting from the comments are referenced in the SSHCP text.

RTC 4.2 (SSHCP) – New language has been inserted in to Section 1.2.1 *"Geographic Scope of the Plan Area"* (page 1-8) in the Final SSHCP to explain that the SSHCP does not preclude non-SSHCP activities from occurring outside of the UDA.

Language was not included regarding how decisions will be made concerning required mitigation outside of the SSHCP as this is beyond the scope of the SSHCP. However information has been added in response to comment 4.5 below on how such areas outside the UDA may eventually be amended in to the plan.

RTC 4.3 (SSHCP) – Section 1.2.1 *"Geographic Scope of the Plan Area"* has been modified in the Final SSHCP to include edits similar to those suggested.

RTC 4.4 (SSHCP) – Language has been added to Section 9.3.1, page 9-13 of the Final SSHCP to make it clear that land use jurisdictions (e.g. City of Elk Grove) that are not local Land Use Authority Permittees can participate in the SSHCP as Participating Special Entities if their projects are otherwise consistent with the requirements set forth in the SSHCP, especially as described in Section 10.4 of the Final SSHCP.

RTC 4.5 (SSHCP) – Unincorporated (i.e., currently County land) within the UDA is covered under the SSHCP, and the SSHCP and EIS/EIR assumed that covered activities would cause take in those areas. If the City of Elk Grove annexes those lands, they could apply to use the SSHCP take coverage as a Participating Special Entity. An area outside the UDA (e.g., areas south of Kammerer Road) is not assumed in the SSHCP or EIS/EIR to be impacted by the SSHCP and the City of Elk Grove would need to seek a major amendment to the SSHCP to become a Plan Permittee in order to get take coverage through the SSHCP permits if they were to annex those lands. Section 15.13 of the Implementing Agreement (Appendix C to the Final SSHCP) has been revised to read: "If an agreement can be reached, that jurisdiction shall become a Plan Permittee after executing an addendum to this Agreement and complying with Section 9.10.3 of the SSHCP."

RTC 4.6 (SSHCP) –The species models presented in the SSHCP are based on the best scientific information available at the time the models were developed and all species models, including the giant gartersnake model, were vetted with the wildlife agencies and an advisory group made up of local species experts.

In regards to the specific comment concerning the giant gartersnake species model, it must be noted that the species model section of the SSHCP (Chapter 3, Section 3.4) clearly states that the models were developed to identify suitable habitat for the species, and not to indicate current species occupancy. The Biological Opinion (BO) and the Biological Assessment (BA) attached to the BO on the proposed Kammerer Road

Extension Project were offered as evidence that the area south of the current Elk Grove City limits is not suitable habitat.

While both the Kammerer Road Extension Project BO and BA conclude that giant gartersnakes are not likely to occupy the area, both the BO and the BA suggest that the area in question is suitable habitat for giant gartersnake, which is the main purpose of the species model. Therefore we do not see this example as evidence to support the assertion that the SSHCP species models are inaccurate.

RTC 4.7 (SSHCP) – See response to Comment 4.6. The purpose of the species models is to identify suitable habitat, not occupied habitat. Habitat does not have to be occupied to be suitable. The species habitat models were developed as part of the SSHCP Conservation Strategy to help the Plan Preparers quantify impacts to covered species from implementation of Covered Activities, and the models are intended to be used in conjunction with SSHCP implementation. It is outside the purview of the SSHCP to speculate how other parties might view the habitat models outside of the context of SSHCP. Regarding the defensibility of the preservation targets, Chapter 7 of the SSHCP analyzes the effectiveness of the proposed preservation targets and whether they would effectively mitigate for the effects of Covered Activities.

RTC 4.8 (SSHCP) – The Plan Partners welcome interagency collaboration and would be happy to discuss the Laguna Creek Wildlife Corridor with the City of Elk Grove.

RTC 4.9 (SSHCP) – The city's understanding of SSHCP Section 7.5.2 is correct. The precise location of preserves, other than hardline preserves, is not identified in the SSHCP. This is intentional because only the proponents of hardline preserves have currently committed their lands to the SSHCP Conservation Strategy. Showing lands held by private owners who have not confirmed their intent to enroll in the SSHCP Preserve System would not be appropriate, and similar restrictions on mapping have been followed in other regional HCPs (e.g., Santa Clara HCP). The comment also requests that the SSHCP present the amount of available land in each PPU in terms of the unencumbered land (those lands without an existing preserve, and above sea level). The City is correct that none of the preserves in the SSHCP Preserve System will be below sea level. This was accounted for in the maps of modeled habitat for each species. Tracking the inventory of available lands as directed in the comment is something the Implementing Entity will do during monitoring and reporting of the permitted SSHCP. The Implementing Entity, following the criteria as set forth in the SSHCP, will acquire habitat for the Preserve System. The SSHCP will attempt to build from existing preserves where possible, but is not restricted to only acquiring lands that are adjacent to existing preserves.

RTC 4.10 (SSHCP) – Refer to response to comment 4.11 below regarding the process to be followed if the City wished to use the SSHCP to mitigate impacts from developing south of Kammerer Road. The Plan Preparers agree that coordination between the City and Implementing Entity when acquiring preserve lands will be useful, and look forward to future discussions about how to ensure that coordination occurs. However, those

types of discussions will be on a case-by-case basis and the plan preparers chose not formalize that process in the SSHCP.

RTC 4.11 (SSHCP) – Language has been added to Chapter 9 of the SSHCP to make it clear that land use jurisdictions (e.g. City of Elk Grove) that are not local Land Use Authority Permittees can participate in the SSHCP as Participating Special Entities assuming that their projects are otherwise consistent with the permitting process for covered activities in the SSHCP. Please refer to Section titled “Implementing Entity Responsibility in Reviewing Participating Special Entities Requests for Take Authorization” in Section 9.3.1 of the Final SSHCP.

However, an area outside the UDA (e.g., areas south of Kammerer Road) is not assumed in the SSHCP or EIS/EIR to be impacted and the City of Elk Grove would need to seek a major amendment to the SSHCP to become a Plan Permittee in order to get take coverage through the SSHCP permits if they were to annex those lands. The County welcomes open dialog regarding the City’s potential future participation in the SSHCP and encourages the City to contact the County and the SSHCP Implementing Entity when they are ready to discuss such opportunities. As noted, the SSHCP Plan Permittees cannot provide a guaranteed outcome, but nonetheless welcome the dialog.

RTC 4.12 (SSHCP) – The comment requests that the County evaluate the SSHCP to determine whether or not it is sufficient. The comment also notes the City’s availability to discuss the issues noted in the comment letter in greater detail. The lead agencies have determined that the SSHCP is sufficient, and will not be recirculated.

LETTER 5 CITY OF ELK GROVE (SSHCP AND EIS/EIR)



ELK GROVE

September 5, 2017

VIA USPS and EMAIL

Jan C. Knight
Deputy Field Supervisor
United States Fish and Wildlife Service
Sacramento Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Richard Radmacher
Senior Planner
County of Sacramento
827 7th Street, Room 225
Sacramento, CA 95814

RE: South Sacramento Habitat Conservation Plan Draft EIS/EIR

Dear Ms. Knight and Mr. Radmacher,

The City of Elk Grove (City) has reviewed the draft South Sacramento Habitat Conservation Plan (SSHCP) and accompanying draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). While the SSHCP may be an important plan for the mitigation of habitat of protected species under State and Federal regulations, the City has many concerns with both the Plan and the accompanying EIS/EIR. The following summarizes our concerns on the environmental analysis, and attached are comments we have provided directly to Sacramento County on the content of the Plan. Our hope is that these concerns can be addressed in a timely and effective manner for the benefit of both the SSHCP and the City. 5.1

1. **The Definition of the Project Area should be clarified.**
The EIR/EIS makes use of the term "Planning Area" (Section 1.1.1), defined as "the area in which all SSHCP Covered Activities (projects and activities) and all SSHCP habitat conservation actions, projects, and activities would be implemented, and where all associated incidental take of species would occur. .., The Planning Area encompasses approximately 317,655 acres within south Sacramento County, as shown on Figure 1-1, South Sacramento Habitat Conservation Plan Area." However, Figure 1-1, and other figures throughout the EIS/EIR, do not use the term Planning Area, rather referring to the term "SSHCP Plan Area." It appears the two are synonymous. The City recommends that this terminology be clarified throughout both the EIS/EIR and the SSHCP. Any suggestion that the Planning Area is limited to just the Urban Development Area, or some other lesser area, should be clarified and corrected. 5.2

2. **The Project Objectives Improperly Seek to Constrain Local Land Use Authority.**
Section 1.3.3 of the EIS/EIR identifies objectives for the Project. Specifically, objective 16 states:

> *Allow an adequate amount of urban development within the currently adopted spheres of influence for Rancho Cordova and Galt, and the currently adopted USB for Sacramento County, to discourage expansion beyond these boundaries and maintain the sound land use planning principles these boundaries encourage (e.g., preventing sprawl outside the USB and leap-frog development; consolidating development* 5.3

to support the efficient provision of utilities and infrastructure; promoting compact mixed use development that supports viable transit and walkable areas; creating communities with a variety of housing types that support different income levels and socioeconomic conditions; and maintaining compliance with air quality laws and regulations that influence or are influenced by land use decisions such as Assembly Bill 32, Senate Bill 375, and the Clean Air Act).

The City objects to inclusion of this objective. As stated in the Plan, the HCP is not a land use plan and cannot be a land use plan. The establishment of this objective appears to contradict this central tenant by "discouraging" and limiting development beyond the boundaries of the member jurisdictions and other local agencies. It is not the HCP's place to limit growth. Rather, the HCP creates a streamlined process towards mitigating impacts within the HCP's Urban Development Area (see Draft SSHCP, page 1-6, third paragraph, where it is stated "It should be noted that the SSHCP is not a land use document."). Asserting this objective makes a statement suited for a land use authority contrary to the authority of an HCP. 5.3 cont'd

For the HCP to reflect future limits of growth, it would need to incorporate additional analysis, such as the City's 2003 General Plan, which includes opportunities for future development south of Kammerer Road. The City's pending 2018 General Plan Update will refine this discussion, focusing on the area between Kammerer Road and Eschinger Road, and will include programmatic concepts for future development capacity and the organizing principles for future land use planning. The SSHCP must factor in the City's General Plan and the forthcoming updated policies. As noted below, the EIS/EIR excludes valuable information from the City's General Plan, including future growth policies, making the document insufficient.

3. The EIR/EIS Makes Improper Development Assumptions.

Section 1.5 discusses the permit issuance criteria for the applicable resource agencies under an HCP. Section 1.5.1 specifically lists the permit criteria for the U.S. Fish and Wildlife Service, including criteria 7, which states "The USFWS has received assurances that the HCP will be implemented by the applicants." The EIS/EIR appears to rely on the assumption that all developable lands within the Urban Development Area will be developed within the timeframe of the HCP permit (50-years), providing sufficient revenue to allow for the establishment of the targeted preserve acreage within the various Preserve Planning Units. However, the City is unable to identify any justification within the EIS/EIR that this will occur. Therefore, the EIS/EIR should be updated to include the necessary discussion to disclose what would occur if not all lands within the Urban Development Area were developed and contributed towards the SSHCP financing plan. 5.4

4. The EIS/EIR Ignores the City's Planning Efforts.

Section 1.6.4 states that "The SSHCP EIS/EIR provides regional scale comprehensive analyses of environmental impacts of all planned urban development within the Planning Area over a 50-year period." Similar language is also present in Section 1.6.5. These statements are simply not true. Since 2003, the City of Elk Grove's General Plan has identified future development potential south of Kammerer Road and Grant Line Road. Additionally, the Sacramento Area Council of Governments Blueprint shows some development occurring south of Kammerer Road in a post-2050 condition. The SSHCP ignores these facts and excludes areas south of Kammerer Road from the Urban Development Area. Thus, basing the analysis solely on the Sacramento County General Plan and/or the General Plan of Rancho Cordova or Galt does not provide a complete analysis of the cumulative condition and potentially sets the EIS/EIR up for failure. See additional discussion below. 5.5

5. Clarification of Status of an Entity upon Annexation

It is not clear if an entity becomes a Third Party Participating Special Entity or a Plan Permittee upon annexation. As provided in our comments to Sacramento County (attached), the discussion in both the SSHCP and the EIS/EIR regarding Third Party Participating Special Entities needs to be clarified. Specifically, page 1-39 and 1-40 discuss the concept of Participating Special Entities and how they are not under the jurisdiction of a Land Use Authority Permittee. Given the potential for areas in Preserve Planning Unit 4 to be annexed into the City of Elk Grove, the list of potential Participating Special Entities should be expanded to specifically identify "other land use agencies through approved annexations." The list that is present now is very limiting even though there is some implication that it was intended to be inclusive. The SSHCP's ability to successfully meet its goal of conserved property within a given PPU would require a definition of any public agency not currently 5.6

a Participating Permittee to be included if it becomes the land use authority for a given area and how that inclusion would specifically occur.

5.6 cont'd

6. The EIS/EIR Does Not Adequately Analyze a Reasonable Range of Project Alternatives.
A key component of an EIR is a discussion of a reasonable range of project alternatives. (Pub. Res. Code § 21002.1(a) & § 21100(b)(4).) An EIR must "describe a range of reasonable alternatives to the project, which would feasibly attain most of the basic objectives of the project . . . and evaluate the comparative merits of the alternatives." (14 Cal. Code Regs. § 15126.6.) CEQA requires that one of the alternatives to the proposed project be the "no project" alternative. (14 Cal. Code Regs. § 15126.6(e).)

An adequate alternatives analysis is necessary to foster meaningful public participation. (*Laurel Heights Improvement Ass'n v. Regents of the University of California* (1988) 47 cal.3d 376, 403 "*Laurel Heights I.*") As to any project alternatives, "it is the project proponent's responsibility to provide an adequate discussion of alternatives. That responsibility is not dependent in the first instance on a showing by the public that there are feasible alternatives." (*Id.* at 405.) A "scant" and abbreviated discussion of alternatives is inadequate. (*Id.*)

The discussion of alternatives is not limited solely to those deemed "feasible" by the project proponents. (*San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 737.) "Even if alternatives are rejected, an EIR must explain why each suggested alternative either does not satisfy the goals of the proposed project, does not offer substantial environmental advantages or cannot be accomplished." (*Ibid.*) The fact that the project proponent hopes to adopt a particular alternative, and even perhaps made substantial investments in hopes of a particular alternative, is not determinative. (*Kings County Farm Bureau v. City of Hanford, supra*, 221 Cal.App.3d at 736.) "If the agency finds certain alternatives to be infeasible, its analysis must explain in meaningful detail the reasons and facts supporting that conclusion." (*Marin Municipal Water District v. KG Land California Corporation* (1991) 235 Cal.App.3d 1652, 1664.) A discussion of alternatives which omits relevant, crucial information, "subvert[s] the purposes of CEQA and is legally inadequate." (*San Joaquin Raptor, supra*, 27 Cal.App.4th at 739.)

5.7

The EIS/EIR purports to present three alternatives for detailed analysis. (EIS/EIR at ES-5, §§ 2.2-2.4.) In reality, however, the EIS/EIR only presents one project alternative for analysis. This is because one of the alternatives is the Proposed Project itself, and one of the alternatives is the CEQA-mandated "no project" alternative. The only true alternative is the Reduced Permit Term alternative. Analyzing only one true project alternative violates the CEQA principle of analyzing a "range of reasonable alternatives," making the EIS/EIR legally deficient.

Section 2.1.3 of the EIS/EIR contains a scant discussion of other potential alternatives, including "Different Planning Area boundary," Different types of Covered Activities," and "Different amounts or frequency of Covered Activities." Section 2.1.4 purports to describe the screening process for consideration of alternatives, and Section 2.1.5 identifies alternatives considered and not carries forward for detailed analysis. Nowhere, for instance, in Section 2.1.5 is an alternative with a larger Urban Development Area discussed. The introduction to the section discusses that alternatives that did not meet the project objectives were rejected. However, CEQA does not require that all project objectives be achieved for all alternatives. Moreover, the detailed set of 18 project objectives set forth at section 1.3.3, including objective 16 discussed above, improperly constrained the alternatives analysis and had the effect of causing certain otherwise potentially feasible alternatives to be rejected from further consideration. Where, as here, the EIS/EIR provides an "artificially narrow" set of objectives prejudicing meaningful consideration of alternatives, the alternatives analysis is deficient. (*North Coast Rivers Alliance v. Kawamura* (2015) 243 Cal.App.4th 657, 667-670.)

7. The EIS/EIR ignores the City's General Plan.
Section 3.4 discusses information presented in prior documents that may be incorporated in the EIS/EIR. This section identifies the General Plans and accompanying Environmental Impact Reports for the County of Sacramento and the Cities of Rancho Cordova and Galt, as well as the SACOG Metropolitan Transportation Plan/Sustainable Communities Strategy and the Capital Southeast Connector JPA. However, the section neglects to include the City of Elk Grove General Plan and its EIR, which do address portions of the Planning

5.8

Area. The City's policies identify future development south of Kammerer Road and these potential actions should have been considered as part of the EIS/EIR. 5.8 cont'd

8. Improper Assumptions are Made Concerning Development Occurring Outside of the Urban Development Area.

Various sections of the EIS/EIR, including 2.2.2, 3.6, and 3.7, discuss assumptions used in the No Project and Project alternatives. Specifically, the EIS/EIR states that under the No Project Alternative 1,900 acres outside of the Urban Development Area would be developed. The basis for this assumption is that under the permit process provided under the No Project there would be development pressures elsewhere in the Planning Area (likely Elk Grove) that extend the footprint of development. However, the assumption ignores the policies of the City's General Plan and pending Sphere of Influence Amendment requests for Elk Grove. A more reasonable and justifiable assumption is that the 1,900 acres described would be in addition to the City's General Plan. Otherwise, the assumption would need to be justified by a market analysis and alternative land use assumptions, which are beyond the scope and authority of an HCP. 5.9

The EIS/EIR also mentions that the pending Sphere of Influence Amendment in Elk Grove is part of the basis for other Reasonably Foreseeable Actions (Section 3.7.2). The list is, however, incomplete as it neglects to include the City's larger policy framework for expansion beyond the pending applications. A more reasonable assumption would be to include all lands from Kammerer Road to Eschinger Road, consistent with the City's 2013 SOI application, which was based upon the 2003 General Plan policies.

9. The EIS/EIR Contains Flawed Methodology for Assessing Impacts.

Section 4.2.1 describes the assumptions used for the cumulative analysis in the EIS/EIR and includes that statement "The study area used in Chapter 4 for the cumulative analysis of each EIS/EIR alternative on land use is the EIS/EIR Planning Area plus lands within the City of Elk Grove, the City of Elk Grove's SOI, and the community of Rancho Murieta." Because the City's SOI is currently coterminous with the City limits (though amendments are pending before the Local Agency Formation Commission) and based upon other discussions in Chapters 1, 2, and 3, the City must conclude that the reference in this section is to the 2013 SOI application. With that being the case, the Project and the EIS/EIR are flawed in that they do not identify the areas between Kammerer Road and Eschinger Road as part of the Urban Development Area. In order to maintain consistency with the City's General Plan, the documents must be modified to reflect this land use policy direction. 5.10

10. The EIS/EIR Contains an Incomplete Discussion of the Regulatory Framework.

Section 4.1.1 describes the regulatory framework under which the Project is being considered. Section 4.1.1.4 identifies relevant Local Regulations, Policies, and Plans. The agencies listed in this section are limited to the County of Sacramento and the Cities of Rancho Cordova and Galt. Elk Grove is noticeably absent. The City's adopted General Plan includes a General Plan Planning Area that extends beyond the existing City limits to the Cosumnes River. To ignore this policy framework and the potential annexation of lands that are within the Project area into the City is short-sighted and does not provide the appropriate level of disclosure obligated under CEQA. Given that the General Plan is adopted City policy and that the City has previously pursued SOI amendments in this area, it is reasonable to assume that annexations may occur within the timeframe of the HCP permit. The relationship of the Elk Grove General Plan and the SSHCP must be discussed in the EIS/EIR. 5.11

11. The EIR/EIS Should Contain SB-5 and 200-year Floodplain Analysis.

Chapter 7 (Hydrology and Water Quality) should be updated to include an analysis of consistency with State Senate Bill 5 (Machado), looking at the impact of flooding that has a 1-in-200 chance of occurring in any given year (i.e., a 200-year storm event). State law limits the ability of local land use agencies in approving new development within the 200-year floodplain. This legislation could impact the development areas within the Morrison and Laguna Creek corridors (among others), potentially requiring additional impacts to waterways in constraining the 200-year floodplain beyond those analyzed in the Project, or limiting the potential development area. If the development area becomes further constrained this could create pressure for development outside the Urban Development Area within the timeframe of the SSHCP. This goes back to the viability of the range of alternatives considered in the EIS/EIR as potentially being inadequate. 5.12

12. The EIS/EIR Lacks a Basis for its Conclusions on Transportation Impacts.
Chapter 13 addresses potential transportation impacts of the proposed Project, concluding that the proposed Project would result in reduced impacts when compared to the No Project. This conclusion appears to be based upon the assumed relocation of 1,900 acres of development from the Urban Development Area to areas outside of the Urban Development Area. However, no assumptions are presented on the types of land uses projected to occur in this area. Transportation impacts can only be fully understood in the context of the planned land uses. According to the City's Traffic Engineer, Ryan Chapman, TE, the mix of uses, densities, and distances between destinations can significantly influence the potential impacts on Level of Service and Vehicle Miles Traveled. Because the EIS/EIR lacks this information the conclusions presented are without evidence and are therefore unjustified.

5.13

13. The Greenhouse Gas (GHG) Emissions Impacts Analysis is Deficient.
Similar to the Transportation Impacts, the EIS/EIR provides a very broad discussion of potential GHG impacts and concludes that simply because more land is developed under the Project alternative within the County's Urban Service Boundary than under the No Project Alternative the Project is superior. However, no technical analysis is presented to justify this statement. Because of the interrelationships between land uses and the role they play on transportation system requirements it is possible that, depending upon location, development within the Urban Development Area under the Project has a greater impact on GHG. A technical analysis is required to substantiate these claims.

5.14

Conclusion

The City encourages the lead agencies to reevaluate the sufficiency of the EIS/EIR in light of the comments made herein, to revise the EIS/EIR to correct the identified deficiencies, and, as necessary to recirculate a revised EIS/EIR.

Thank you for considering the City's concerns. We are available to answer any questions or discuss these issues in more detail. The City reserves the right to provide further information, comment, and analysis on the EIS/EIR prior to the approval of the project.

5.15

Sincerely,

Laura S. Gill

Laura S. Gill, City Manager
City of Elk Grove

Attachments: Comments on the Draft SSHCP, to: Richard Radmacher, Senior Planner, County of Sacramento

RTC 5.1 (EIS/EIR) – The comment contains introductory statements expressing concern about the SSHCP and EIS/EIR. No responses are necessary.

RTC 5.2 (EIS/EIR) –The term Plan Area refers to the SSHCP Plan Area in the Proposed Action Alternative. As described in Chapter 2, Section 2.1, Approach to Developing Alternatives, the lead agencies considered alternatives that might have smaller or different Planning Area boundaries. Therefore, the same term could not be used for some of the other alternatives considered, and could not be used for the No Action/No Project Alternative as there would be no "Plan"; therefore an alternative term "Planning Area" was used to refer to the same area in other alternatives studied in the EIS/EIR. Typically the two terms are intentionally used in different scenarios; for example, if a figure is conveying information about the Proposed Action Alternative, it will identify the "SSHCP Plan Area"; and where a figure is conveying information applicable to one of the other alternatives studied in the EIS/EIR, the term "Planning Area" is used. However, Figures in the Final EIS/EIR have been reviewed and revised as necessary to more consistently use the proper term based on the EIS/EIR alternative described by the Figure. Sentences containing the term "Planning Area" were also reviewed to ensure they did not suggest that the term "Planning Area" is limited to just the UDA.

RTC 5.3 (EIS/EIR) – The referenced objective is intended to reflect the policies and spirit of the land use plans for the local land use authority permittees. One of the key purposes of the SSHCP is to provide incidental take coverage for urban development within an area commonly accepted by the land use authority permittees as the appropriate limit of urban development.

RTC 5.4 (EIS/EIR) – The EIS/EIR analyzes the effects of the Proposed Action and alternatives in compliance with NEPA and CEQA, and is not the document that presents all permit issuance criteria for the USFWS permitting process. The SSHCP funding assurances required to satisfy the permit issuance criteria are provided in Section 12 of the Draft SSHCP. Regarding the development assumptions for full buildout of the UDA, the SSHCP and EIS/EIR do not establish new projections or assumptions about population growth in southern Sacramento County. Assumptions about growth projections underlying these documents are made in general plans developed in accordance with the local land use planning process, which includes public comment and which ultimately are approved by local elected officials. The SSHCP Plan Preparers cannot modify or change the County's or the City's land use planning decisions or processes. For example, the Sacramento County General Plan includes an Urban Service Boundary that identifies an area where urban development is anticipated to occur. The SSHCP uses the USB as the basis for its Urban Development Area.

RTC 5.5 (EIS/EIR) – The areas referenced lie outside the current city of Elk Grove limits and Sphere of influence (SOI) of Elk Grove, although they have been the subject of a previous 2013 SOI application to LAFCO, and a current smaller SOI application to LAFCO. While the City currently holds no legal land use jurisdictional authority over these properties (which are currently under the jurisdiction of the County), it is recognized that all or a portion of the area contained in the current SOI application could

become part of the City of Elk Grove depending on the ultimate decision made by LAFCO on the existing application Despite this uncertainty, and the fact that the City of Elk Grove is not a proposed permittee under the SSHCP, nor is the area south of Kammerer Road within the County's Urban Service Boundary or the SSHCP's Urban Development Area, the Draft EIS/EIR did assume in its analysis of cumulative effects that areas south of Kammerer Road and other portions of Elk Grove's SOI request could be annexed into the City of Elk Grove and developed during the 50-year study period. This is described in Section 3.7.2.1 of the Draft EIS/EIR.

RTC 5.6 (SSHCP and EIS/EIR) – Language has been added to Chapter 9 of the SSHCP to make it clear that land use jurisdictions (e.g. City of Elk Grove) that are not local Land Use Authority Permittees can participate in the SSHCP as Participating Special Entities assuming that their projects are otherwise consistent with the permitting process for covered activities in the SSHCP. As detailed below, unincorporated (i.e., currently County land) within the UDA is covered under the SSHCP, and the SSHCP and EIS/EIR assumed that covered activities would cause take in those areas. If the City of Elk Grove annexes those lands, they could apply to use the SSHCP take coverage as a Participating Special Entity. An area outside the UDA (e.g., areas south of Kammerer Road) is not assumed in the SSHCP or EIS/EIR to be impacted and the City of Elk Grove would need to seek a major amendment to the SSHCP to become a Plan Permittee in order to get take coverage through the SSHCP permits if they were to annex those lands. New text has been added to Section 9.10 explaining how a new Permittee could be added to the SSHCP permits.

RTC 5.7 (EIS/EIR) – As required by both CEQA and NEPA, the Draft EIR/EIS discusses a range of reasonable alternatives in Chapter 2 of the EIR/EIS. (See CEQA Guidelines, Section 15126(a); 40 CFR 1502.14.) The County and the USFWS, as lead agencies, have the discretion to determine how many alternatives constitute a reasonable range. (See *Center for Biological Diversity v. Department of Fish & Wildlife* (2015) 234 Cal.App.4th 214, 256 ["[I]f a reasonable basis for the choices the agency makes is found in the EIR or elsewhere in the record, a reviewing court will defer to the agency's selection of alternatives." (citations omitted)]; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 556; 43 CFR 46.420(b) [noting that reasonable alternatives are those that are both technically and economically practical and feasible and meet the stated purposes and needs of the proposed action].) Although an infinite number alternatives and variations could be identified, neither EIRs nor EISs are required to evaluate ***all*** possible alternatives or "consider an alternative whose effect cannot be reasonably ascertained and whose implementation remote and speculative." (CEQA Guidelines, Section 15126.6(f)(3); see also 40 CFR 1502.14(a).)

For these reasons, the alternatives analysis in the Draft EIR/EIS focuses on those options that could feasibly be implemented and which, if implemented, would have the potential to reduce or avoid any significant adverse environmental effects associated with implementation of the SSHCP, met most of the basic SSHCP objectives, and are potentially feasible. The selection of alternatives is discussed in Chapter 2, summarized in section 2.1.4 of the Draft EIR/EIS, and more fully analyzed in Appendix E. In addition to considering a No Action/No Project Alternative, the Draft EIR/EIS analyzed the

Proposed Action/Proposed Project Alternative (section 2.3), through which the Permit Applicants (future Plan Permittees) would implement categories of Covered Activities and a Conservation Strategy over a 50-year permit term. In addition, under the Reduced Permit Term Alternative (section 2.4), the Permit Applicants would seek Take coverage for the same Covered Activities but for a shorter 30-year incidental-take permit term.

Contrary to the suggestion in the comment, the three alternatives identified in the Draft EIR/EIS were chosen to foster informed decision-making and public participation, and thus constituted a "reasonable range" within the meaning of CEQA. In addition to analyzing two EIS/EIR Action Alternatives, the Draft EIS/EIR analyzed a No Action/No Project Alternative. The Two Action alternatives were carried forward for detailed analysis in the EIS/EIR because they are practicable, include provisions to reduce impacts, address the existing issues and underlying needs present in the Planning Area, and will achieve the purposes and objectives presented in Section 1.3 of the Draft EIR/EIS.

As analyzed in section 2.3, under Proposed Action/Proposed Project Alternative, the Permit Applicants (future Plan Permittees) would implement categories of Covered Activities and a Conservation Strategy over a 50-year permit term. This was described in the SSHCP document that was prepared by the Permit Applicants and will be included in the ESA and CESA incidental-take permit application packages submitted to the USFWS and CDFW. Under the second Reduced Permit Term Alternative, the Permit Applicants would implement the same categories of HCP Covered Activities as in the proposed SSHCP but over a shorter 30-year incidental-take permit term. The Permit Applicants would implement a similar HCP Conservation Strategy, but this strategy would result in a smaller, less comprehensive preserve system in the Planning Area (relative to the interconnect SSHCP Preserve System described in the Conservation Strategy of the Proposed Action/Proposed Project Alternative). After a thorough analysis of these options, the Draft EIR/EIS concludes that the Proposed Action/Proposed Project is the environmentally preferable alternative under NEPA and the environmentally superior alternative under CEQA. (See Draft EIR/EIS, Section 17.7.)

The Draft EIR/EIS's alternatives analysis fully complies with CEQA and NEPA. The SSHCP is the culmination of countless revisions and requests from stakeholders and regulators over a multi-decade process. The alternatives carried forward for detailed analysis include a comprehensive Conservation Strategy that endeavors to strike the balance of preservation, avoidance, minimization, and mitigation to reach economically feasible, beneficial outcomes. The NEPA process and identification of alternatives for the SSHCP has been ongoing with the formulation of the SSHCP for over a decade. Several alternatives are described in Section 2.1.3, for example. Many of these alternatives were not carried forward because they were not feasible or did not meet the project objectives. Over time, numerous USFWS-, CDFW-, and USACE-recommended avoidance measures were incorporated into the proposed action, and earlier SSHCP versions (alternatives) were not carried forward in favor of an alternative with less adverse impacts than some of the earlier iterations of the SSHCP. (Draft EIR/EIS, p. 2-14.) For example, over time the currently proposed Stream Setbacks, the protection of micro-watersheds, and different types of utility and road realignments that avoid impacts to species and aquatic resources were added.

The lead agencies screened all potential alternatives following the process outlined in Section 2.1.4. The following sub-sections describe the alternatives considered and not carried forward based on one of the screening criteria outlined previously. These alternatives were organized into two groups: those that were proposed during the multiyear development of the SSHCP, and those that were suggested by commenters during the public scoping of the EIS/EIR (see Section 1.4). Draft EIS/EIR Appendix E presents three tables that provide information regarding the reasons an alternative was not carried forward for detailed study in the EIS/EIR. As this extensive analysis demonstrates, the EIR/EIS fully analyzed a range of reasonable alternatives.

With regard to the Commenter's suggestion in the first sentence of paragraph 3 of section 6 regarding feasible alternatives, a lead agency may exclude from an EIR alternatives that it concludes are not potentially feasible. (See *Save San Francisco Bay Association v San Francisco Bay Conservation & Development Commission* (1992) 10 Cal.App.4th 908, 922 (EIR need not examine alternatives that are so speculative, contrary to law, or economically catastrophic as to exceed realm of feasibility). In many cases, lead agencies include alternatives in an EIR that, after further evaluation, are determined to be infeasible and not meriting detailed analysis. In such a case, CEQA case law provides that the agency should explain the reason for the agency's determination. (*San Joaquin Raptor/Wildlife Rescue Center v County of Stanislaus* (1994) 27 Cal.App.4th 713, 737; see also *Sierra Club v City of Orange* (2008) 163 Cal.App.4th 523, 545, 547 (upholding EIR that explained why three alternatives were eliminated from detailed consideration in EIR).

Here, as discussed in Section 2.1.2 of the Draft EIR/EIS and noted above, a conservation plan for southern Sacramento County has been under development in some form for approximately 20 years. During this time, many alternatives that considered different Planning Area boundaries, protection of different natural resources, different Covered Species, different conservation strategies, and other elements have been considered. During the preparation of the Draft EIR/EIS, the lead agencies screened all potential alternatives following the process outlined in Section 2.1.4 and discussed above. Consistent with CEQA, this analysis sets forth why the County decided not to proceed with these alternatives, and fully complies with CEQA's informational requirements. (See Draft EIR/EIS, pp. 2-14 to 2-19.)

An EIR need not consider all potential alternatives to a project. As set forth above, an EIR need only discuss a "reasonable range" of alternatives (CEQA Guidelines, Section 15126.6[a]). With regard to the comment's suggestion of a specific, larger UDA alternative, we presume, as set forth in other comments (see comments 5.2, 5.4, 5.5, 5.7 and 5.9), the comment is referring to lands south of Kammerer Road that are outside the current city limits and Sphere of influence (SOI) of Elk Grove. A larger UDA related to the 2013 LAFCO SOI application by Elk Grove was considered during preparation of the SSHCP when the City of Elk Grove was a plan permittee. CDFW expressed concerns about feasibility of the larger UDA related to potential impact on habitat inventory for Swainson's hawk and the inability of the City of Elk Grove to guarantee that the mitigation from development in that area could be funded since they did not have land use authority. The City of Elk Grove decided to withdraw from the

SSHCP at that time due to these considerations. Thus, the County is the land use jurisdiction that currently governs land use decisions south of Kammerer Road. Because the area south of Kammerer Road is not within the County's Urban Service Boundary it was not included within the SSHCP's Urban Development Area.

Further, creation of a larger USB would require General Plan revision, public comment, and action by the County Board of Supervisors. It isn't feasible for the EIS/EIR to consider a hypothetical future action that is not reasonably foreseeable and that is not something the County can unilaterally propose outside of its planning process.

With the above considerations, the suggestion of an expanded UDA alternative did not meet the feasibility test required to be considered within the reasonable range of alternatives. Further the alternative would not meet the requirement of reducing impacts in comparison to the proposed action, since it would result in greater impacts to high value Swainson's hawk habitat in comparison to the proposed SSHCP.

Finally, consistent with CEQA's informational purpose, the comment is correct that alternatives must be able to implement most basic project objectives, but they do not have to implement all of them. (*Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal.App.4th 477. The EIR's analysis should focus on alternatives that can eliminate or reduce significant environmental impacts even if they would impede attainment of project objectives to some degree or be more costly. 14 Cal Code Regs §15126.6(b). The alternatives discussed must, however, be able to attain most of the basic objectives of the project. 14 Cal Code Regs §15126.6(a). There is no requirement that the alternatives included in an EIR satisfy every basic objective of the project. (*California Native Plant Society v City of Santa Cruz* (2009) 177 CA4th 957, 991.) Moreover, a lead agency has broad discretion to formulate project objectives. *California Oak Found. v Regents of University of California* (2010) 188 Cal.App.4th 227, 276 ("CEQA does not restrict an agency's discretion to identify and pursue a particular project designed to meet a particular set of objectives").

An EIR need not, however, present alternatives that are incompatible with the project's fundamental purpose. (See *In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1165 [holding that an EIR need not study an alternative that "cannot achieve the project's underlying fundamental purpose"].) Accordingly, an agency may structure the alternatives analysis for an EIR based on a reasonable definition of the project's underlying purpose and need not study alternatives that cannot achieve that fundamental goal. (*Id.* at 1166.) Here, as discussed above and in Section 2.1.1, the EIS/EIR includes action alternatives that satisfy the following three criteria: (1) achieves the stated purposes, needs, and objectives; (2) addresses one or more of the significant issues identified during scoping; avoids or substantially lessens potentially significant impacts; and (3) is feasible, practicable, and reasonable. The EIS/EIR identifies over 18 comprehensive project objectives intended to implement the SSHCP's fundamental purpose of providing for development while conserving the environment. (See Draft EIS/EIR, Section 1.3.3.) That is, in response to receiving a request for authorization of species incidental take that is expected to result from future housing construction, other new urban development, and new supporting

infrastructure within the Planning Area, the USFWS proposes to issue an ITP to the Permit Applicants. Therefore the Project objectives were properly drafted in order to obtain the ITP and are not overly broad.

RTC 5.8 (EIS/EIR) – Refer to response to Comment 5.5.

RTC 5.9 (EIS/EIR) – One of the areas that is identified as potentially receiving a portion of the "displaced development" under the No Action/No Project Alternative is the area south of the existing City of Elk Grove jurisdiction. Whether that area is under County jurisdiction or Elk Grove jurisdiction at the time of development is not relevant to the impact analyses, which look at effects on the ground to the examined resource areas. Regarding the remainder of the City of Elk Grove's 2013 SOI application, that application was not approved and the City does not have a pending SOI application for those areas. Therefore, the EIS/EIR did not include City annexation of those lands as reasonably foreseeable. Refer also to responses to Comments 5.5 and 5.10.

RTC 5.10 (EIS/EIR) – Refer to response to Comment 5.5.

RTC 5.11 (EIS/EIR) – The regulatory environment includes only those that have regulatory authority or land use planning authority over the Planning Area. Therefore, entities that are adjacent to the Planning Area but outside it, such as the City of Sacramento, the City of Folsom, and the City of Elk Grove are not included in the regulatory environment. The City of Elk Grove's potential future sphere of influence modifications and other projects are considered appropriately in the cumulative analyses throughout the document.

RTC 5.12 (EIS/EIR) – At the time the Draft EIS/EIR was prepared, the impact assessment criteria provided in Appendix G of the State CEQA Guidelines identified the 100-year flood hazard area as a suitable criteria. The current State CEQA Guidelines retain this 100-year flood hazard criteria. As stated in Section 7.2.1 of the EIS/EIR;

> "The significance criteria used to evaluate the significance of each alternative's impacts on hydrology and water quality are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.), and on typical thresholds used to evaluate hydrology and water quality effects in recent EIRs prepared by the County."

This approach to identifying significance criteria is used consistently in each impact analysis chapter in the EIS/EIR and is consistent with the requirements of CEQA and NEPA.

The comment describes a potential scenario where lack of a 200-year level of flood protection in some areas could limit future development, and therefore adversely affect implementation of the SSHCP. This scenario requires significant speculation given that multiple jurisdictions and agencies are actively improving flood protection systems to support future planned development, and in some cases, individual project proponents can provide their own flood protection improvements.

RTC 5.13 (EIS/EIR) – The mix of uses can certainly affect transportation options, mode selection, vehicle trips, and vehicle miles traveled. As explained in Section 2.2 of the EIS/EIR, the approximately 1,900 acres of urban development that is estimated to be

displaced outside the UDA would provide housing for projected population growth within the County. The mix of commercial and other land uses that would accompany the residential development are not critical to determine that regional transportation impacts would be greater, with this additional residential development remote from the existing employment centers within the UDA as described in Section 13.2.2.1 of the EIS/EIR. This level of analysis is suitable for a programmatic analysis like the subject EIS/EIR.

RTC 5.14 (EIS/EIR) – As stated in response to Comment 5.13, the mix of land uses can certainly affect transportation options, mode selection, vehicle trips, and vehicle miles traveled (VMT). All of these transportation issues, and in particular VMT, affect mobile source GHG emissions, one of the primary sources of GHG emissions. As explained in Section 2.2 of the EIS/EIR, the approximately 1,900 acres of urban development that is estimated to be displaced outside the UDA would provide housing for projected population growth within the County. The mix of commercial and other land uses that would accompany the residential development are not critical to determine that regional VMT would be greater with this additional development remote from the existing employment centers within the UDA as described in Section 15.2.2 of the EIS/EIR. As stated in Section 15.2.2 for both mobile source construction emissions and mobile source operational emissions;

> "Development displaced outside of the USB could result in construction worker commute and vendor haul trips being longer in distance, resulting in higher VMT (and associated GHG mobile-source emissions), relative to what would be expected if urban development was confined to the USB. An increase in regional VMT associated with construction trips would result in increased emissions of GHGs. Construction-related GHG emissions as a result of increased vehicle trips and VMT would contribute further to the already significant, unavoidable impacts to global climate change described in the EIRs referenced above."
>
> "Similar to what is described above for construction emissions, development displaced outside of the USB could result in resident and employee commute trips being longer in distance, resulting in higher VMT (and associated GHG mobile-source emissions), relative to what would be expected if urban development was confined to the USB. An increase in regional VMT associated with operational trips would result in increased emissions of GHGs. Operation-related GHG emissions as a result of increased vehicle trips and VMT would contribute further to the already significant, unavoidable impacts to global climate change described in the EIRs referenced above."

This level of analysis is suitable for a programmatic analysis like the subject EIS/EIR.

RTC 5.15 (EIS/EIR) – The comment requests that the lead agencies evaluate the EIS/EIR to determine whether or not it is sufficient, and to recirculate if necessary. The comment also notes the City's availability to discuss the issues noted in the comment letter in greater detail. The lead agencies have determined that the EIS/EIR is sufficient, and will not be recirculated.

LETTER 6 DELTA PROTECTION COMMISSION (EIS/EIR)

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

DELTA PROTECTION COMMISSION
2101 Stone Blvd., Suite 210
West Sacramento, CA 95691
(916) 375-4800 / FAX (916) 376-3962
www.delta.ca.gov

Skip Thomson, Chair
Solano County Board of Supervisors

Oscar Villegas, Vice Chair
Yolo County Board of Supervisors

Don Nottoli
Sacramento County Board of Supervisors

Chuck Winn
San Joaquin County Board of Supervisors

Diane Burgis
Contra Costa County Board of Supervisors

Juan Antonio Banales
Cities of Contra Costa and Solano Counties

Christopher Cabaldon
Cities of Sacramento and Yolo Counties

Susan Lofthus
Cities of San Joaquin County

George Biagi, Jr.
Central Delta Reclamation Districts

Justin van Loben Sels
North Delta Reclamation Districts

Robert Ferguson
South Delta Reclamation Districts

Brian Kelly
CA State Transportation Agency

Karen Ross
CA Department of Food and Agriculture

John Laird
CA Natural Resources Agency

Brian Bugsch
CA State Lands Commission

Ex Officio Members

Honorable Susan Talamantes Eggman
California State Assembly

Honorable Cathleen Galgiani
California State Senate

September 5, 2017

Jan C. Knight
Deputy Field Supervisor
US Fish and Wildlife Service
Sacramento Field Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Marianne Biner
Senior Planner
County of Sacramento
Office of Planning and Environmental Review
827 7th Street, Room 225
Sacramento, CA 95814

Re: Draft Environmental Impact Statement and Environmental Impact Report for the South Sacramento Habitat Conservation Plan (SCH# 2008062030)

Dear Ms. Biner and Ms. Knight:

Thank you for providing the Delta Protection Commission (Commission) the opportunity to review the Draft Environmental Impact Statement and Environmental Impact Report for the South Sacramento Habitat Conservation Plan (Project EIS/EIR). The Project is a regional approach to conserving species and issuing incidental take permits under the federal and State Endangered Species Acts while implementing new urban development and associated infrastructure projects within southern Sacramento County.

The Commission is a state agency charged with ensuring orderly, balanced conservation and development of Delta land resources and improved flood protection. Proposed local government projects within the Primary Zone of the Legal Delta must be consistent with the Commission's *Land Use and Resource Management Plan* (LURMP). Proposed US Fish and Wildlife Service (USFWS) actions are not subject to consistency requirements with the LURMP since the Project is sponsored by a federal agency. However, the Commission reviewed the project for possible impacts on the resources of the Primary Zone. 6.1

The Commission is supportive of projects that protect the natural resources of the Delta while preserving agriculture as a critical part of the region's economy. We appreciate the USFWS's and County's efforts to review the Project for compliance with LURMP policies, particularly those related to agriculture, flood protection, natural resources, and recreation. We urge the USFWS and County to prioritize use of existing public lands for habitat and to consider incentives for private landowners to provide habitat where possible. 6.2

The Draft EIR/EIS provides a thorough and mostly accurate description of the Commission and the LURMP. However, there is one instance where there appears to be confusion regarding the overlapping jurisdiction of the Commission and the Delta Stewardship Council. In a section called "Delta Protection Act and the Land Use and Resource Management Plan for the Primary Zone of the Delta", the Draft EIR/EIS states that:

> *...The Delta Protection Act identifies a Primary Zone of approximately 500,000 acres where a comprehensive resource management plan, the Delta Plan (Delta Stewardship Council 2013), is applied (see the discussion under the heading "Delta Reform Act of 2009 and the Delta Plan" below)... (p. 4-2)* 6.3

The Delta Protection Act, originally enacted in 1992, established the Commission and the LURMP as a comprehensive resource management plan for the Primary Zone. The Delta Reform Act of 2009 created the Delta Stewardship Council and required the preparation of the *Delta Plan*, which applies to the Primary Zone as well as the Secondary Zone and Suisun Marsh. The Commission's authority over "development" projects in the Primary Zone (Public Resources Code Section 29723(a)) is based on the Delta Protection Act and is enforced through consistency with the LURMP.

Thank you for the opportunity to provide input. Please contact Blake Roberts, Senior Environmental Planner, at (916) 375-4237 for any questions regarding the comments provided.

Sincerely,

Erik Vink
Executive Director

cc: Don Nottoli, Sacramento County Board of Supervisors

RTC 6.1 (EIS/EIR) –The County appreciates the Commission's thoughtful comments.

RTC 6.2 (EIS/EIR) – The SSHCP includes mechanisms for preservation of existing public lands and private lands. Incentives for landowners to preserve habitat would be provided through purchase of conservation easements, as explained in Section 9 of the SSHCP.

RTC 6.3 (EIS/EIR) –The text from Section 4.1.1.2 of the Final EIS/EIR has been revised as follows:

> The Delta Protection Act, **originally enacted in 1992, established the Delta Protection Commission and designated the Land Use and Resource Management Plan as a comprehensive resource management plan for the approximately 500,000-acre Primary Zone.** ~~identifies a Primary Zone of approximately 500,000 acres where a comprehensive resource management plan, the Delta Plan (Delta Stewardship Council 2013), is applied (see the discussion under the heading "Delta Reform Act of 2009 and the Delta Plan" below).~~

LETTER 7 DELTA STEWARDSHIP COUNCIL (SSHCP AND EIS/EIR)

DELTA STEWARDSHIP COUNCIL
A California State Agency

980 NINTH STREET, SUITE 1500
SACRAMENTO, CALIFORNIA 95814
HTTP://DELTACOUNCIL.CA.GOV
(916) 445-5511

Chair
Randy Fiorini

Members
Frank C. Damrell, Jr.
Patrick Johnston
Susan Tatayon
Skip Thomson
Ken Weinberg
Michael Gatto

Executive Officer
Jessica R. Pearson

September 5, 2017

Todd Smith, Acting Environmental Coordinator
County of Sacramento
Office of Planning and Environmental Review
827 7th Street, Room 225
Sacramento, CA 95814

Via email: smithtodd@saccounty.net

RE: Draft Environmental Impact Statement/Environmental Impact Report for the South Sacramento Habitat Conservation Plan, SCH#2008062030

Dear Mr. Smith:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR) for the South Sacramento Habitat Conservation Plan (SSHCP). The Delta Stewardship Council (Council) applauds Sacramento County's (County) efforts to improve certainty and efficiencies in environmental permitting and protection of open space, habitat, and agriculture. We support the intent to develop a comprehensive plan to ensure the long-term viability of 28 plant and wildlife species. 7.1

The Council appreciates and recognizes many of the additions made in response to our previous comment letter, dated December 2013. Below we offer additional information on the Delta Plan Consistency Certification process that we hope will be useful. We also highlighted several Delta Plan regulatory policies that are commonly relevant to habitat restoration projects and provided a few recommendations. We anticipate that this work can be a foundation upon which the County prepares a Delta Plan consistency certification. As the SSHCP is implemented over the 50-year permit term, the Council recommends that any covered activities located within the Legal Delta or the Preserve Planning Unit (PPU 6) are consistent with the Delta Plan. These activities should consider the guidance provided below with regard to Consistency Determination. 7.2

"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."
– CA Water Code §85054

Comments on the Draft EIS/EIR

The Draft EIS/EIR identifies that SSHCP overlaps with roughly 40,980 acres of the Legal Delta. Although the majority of covered activities will be implemented within the Urban Development Area (UDA), the Draft EIS/EIR also defines two categories of covered activities (Rural Transportation projects and Recycled Water projects) that will be constructed outside the UDA, as well as covered activities related to the management and improvement of species habitats within the proposed Preserve Systems.

We appreciate that the Draft EIS/EIR (Appendix D) defines mitigation and avoidance measures for covered species and habitat that will be affected by the covered activities identified in the SSHCP. Table 8-8 displays the direct impacts of covered activities for each natural land cover type outside the UDA, totaling 1,438 acres. Section 7.2.3.2 states that outside the UDA, associated infrastructure and transportation improvement projects would directly impact the natural land cover in parts of the Lower Cosumnes River. 7.3

The Delta Plan established six habitat restoration areas in the Delta, of which the Cosumnes-Mokelumne Confluence, is located within the SSHCP Plan Area. Delta Plan Policy ER P3 calls for protecting opportunities to restore habitat in these areas. We recommend that the Final EIR analysis include the impact of any urbanization or permanent agricultural easements on the opportunity to restore priority habitat areas within the Delta Plan's Consumnes-Mokelumne Confluence area. Potential mitigation measures could include elevating facilities so that water can flow underneath to allow for future restoration of habitats depended on tides or periodic flooding, or locating facilities at the edge of the restoration area, rather than in the middle, to improve opportunities for restoring habitat connectivity. For more information, please refer below to the section "Restore Habitat in a Manner Consistent with the Delta Plan." 7.4

We appreciate that the Draft EIS/EIR quantifies the areal extent of the proposed UDAs and discusses any potential impacts to agricultural resources. We recognize that under the Proposed Actions/Proposed Project Alternative that 1,900 acres of urban development would not be "displaced" outside the UDA. However, as discussed in section 4.2.3.1, "both inside and outside of the UDA, other preserves are needed to complete the Preserve System and would be acquired by preserving under-developed or agricultural lands." Additionally, Elk Grove's Sphere of Influence, as part of the UDA, slightly overlaps with the Legal Delta. Please review the Delta Plan land use policies discussed in more detail below in the section "Land Use Conflicts". 7.5

Under 7.2.3.2 of the Draft EIS/EIR, "Outside the UDA, associated infrastructure and transportation improvement projects would directly impact 1,438 acres of natural land cover types, primarily parts of Lower Cosumnes River." The Delta Plan contains three polices that relate to flood protection, encroachment in floodways, and encroachment on floodplains, which should be considered in this analysis. Please refer below to the section "Hydrology" for more detail on these policies. 7.6

In addition, while we appreciate that the Delta Reform Act's regulatory framework is added under the *Affected Environmental/Environmental Setting 4.1.1.2 State Regulations and Policies*, we recommend that you include the Delta Plan Policies that reflect the sections below in the forthcoming final EIS/EIR as part of the "Affected Environmental/Environmental Setting" sections for:

- Chapter 6 – Agriculture
- Chapter 7 – Hydrology
- Chapter 8 – Natural Land Cover Habitats, and Associated Plant and Animal Communities
- Chapter 9 – Special Status Species Including HCP Covered Species
- Chapter 10 – Aquatic Resources

7.7

Delta Plan Covered Actions and Consistency Certification

The mission of the Council is to promote the coequal goals of water supply reliability and ecosystem restoration in a manner that protects and enhances the unique values of the Delta as an evolving place (Water Code section 85054). The Council has a legally enforceable management framework for the Delta and Suisun Marsh called the Delta Plan, which applies a common sense approach based on the best available science to achieve the coequal goals. The Council was granted specific regulatory and appellate authority under the Delta Reform Act over certain actions that take place in whole or in part in the Delta or Suisun Marsh. The Council exercises that authority through the development and implementation of the Delta Plan.

According to the Delta Reform Act, state or local agencies approving, funding or carrying out projects, plans, or programs, upon determining their project is a "covered action" subject to regulations of the Delta Plan, must certify consistency of the project with the Delta Plan policies (Water Code section 85225). Based on the plan description, Council staff believes your plan meets the definition of a covered action. Generally, the California Environmental Quality Act (CEQA) lead agency, which in this case would be Sacramento County, would complete the Certification of Consistency.

7.8

Again as projects under the SSHCP are further developed and implemented over the 50-year permit term, future project activities should consider the guidance provided in this document with regard to Consistency Determination. Council staff looks forward to working with, and providing early consultation to, project proponents as these projects are developed.
As previously stated, the Council appreciates that the Draft EIS/EIR appears to address many of the policies highlighted from the December 2013 comment letter. To better support your Certification of Consistency, we encourage you to review our recommendations and revisit the following Delta Plan policies before filing:

7.9

Mitigations Measures: Delta Plan Policy **G P1** (23 Cal. Code Regs. section 5002) requires that actions not exempt from CEQA and subject to Delta Plan regulations must include applicable feasible mitigation measures consistent with those identified in the Delta Plan Program EIR or substitute mitigation measures that are equally or more effective. Mitigation Measures in the Delta Plan's Mitigation and Monitoring Report Program is available at: (http://deltacouncil.ca.gov/sites/default/files/documents/files/Agenda%20Item%206a_attach%202.pdf) 7.10

Best Available Science and Adaptive Management: Delta Plan Policy **G P1** also states that actions subject to Delta Plan regulations must document use of best available science as relevant to the purpose and nature of the project. The regulatory definition of "best available science" is provided in Appendix 1A of the Delta Plan (http://deltacouncil.ca.gov/sites/default/files/2015/09/Appendix%201A.pdf). 7.11

Delta Plan Policy **G P1** also requires that ecosystem restoration and water management covered actions include adequate provisions for continued implementation of adaptive management, appropriate to the scope of the action. This requirement is satisfied through A) the development of an adaptive management plan that is consistent with the framework described in Appendix 1B of the Delta Plan (http://deltacouncil.ca.gov/sites/default/files/2015/09/Appendix%201B.pdf) and B) documentation of adequate resources to implement the proposed adaptive management plan. Since the SSHCP will be primarily funded through development fees, then it is expected that funding of monitoring and adaptive management for habitat restoration and creation of projects will be assured. 7.12

We recommend that the County's template for restoration plans require that such projects have an adaptive management strategy consistent with the framework in Appendix 1B of the Delta Plan. This could help to streamline consultation and consistency determination for projects implemented under the SSHCP.

The Delta Science Program's Adaptive Management Liaisons are available to provide further consultation and guidance to help the County with the appropriate application of best available science and adaptive management. Please contact Darcy Austin (Darcy.Austin@deltacouncil.ca.gov) of the Delta Science Program. 7.13

Land Use Conflicts: Policies related to locating new urban development wisely, and respecting local land use when siting water or flood facilities or restoring habitats. Delta Plan Policy **DP P1** (23 Cal. Code Regs. section 5010) states that new residential, commercial, or industrial development is permitted outside the urban boundaries only if it is consistent with the land use designated in the relevant county general plan. It is intended to strengthen existing Delta communities while protecting farmland and open space, providing land for ecosystem restoration needs, and reducing flood risk. Delta Plan Policy **DP P2** (23 Cal Code Regs. 7.14

section 5011) states that plans for ecosystem restoration must be sited to avoid or reduce conflicts with existing uses when feasible. 7.14 cont'd

Restore Habitat in a Manner Consistent with the Delta Plan: As mentioned above, we recommend that the Final EIR analysis include the impact to these types of habitat within the Delta Plan's Consumnes-Mokelumne Confluence area[1]. Delta Plan Policy **ER P2** (23 Cal. Code Regs. section 5006) states that habitat restoration must be consistent with Appendix 3 of the Delta Plan regulations and that restoration will occur at appropriate elevations. Appendix 3, which is an excerpt from the 2011 Draft Ecosystem Restoration Program Conservation Strategy, provides a vision for a mosaic of different habitat types within the Delta including open water, subsided lands, floodplains, and upland areas. It also includes a vision for use of Delta agricultural lands to support special-status wildlife species. (http://deltacouncil.ca.gov/sites/default/files/2015/09/Appendix%203.pdf) 7.15

Further guidance is provided by Delta Plan Recommendation **ER R2**, which states, for the Consumnes-Mokelumne Confluence, "Allow these unregulated and minimally regulated rivers to flood over their banks during winter and spring frequently and regularly to create seasonal floodplains and riparian habitats that grade into tidal marsh and shallow subtidal habitats." 7.16

Delta Plan Policy **ER P3** (23 Cal. Code Regs. section 5007) requires that, within the priority habitat restoration areas (PHRAs) depicted in Appendix 5 of the Delta Plan, significant adverse impacts to the opportunity to restore habitat must be avoided or mitigated. Much of the overlap between the Legal Delta and the SSHCP Plan Area includes the Consumnes-Mokelumne Confluence PHRA. (http://deltacouncil.ca.gov/sites/default/files/2015/09/Appendix%205.pdf) 7.17

Hydrology: As described above, please consider Delta Plan Policy **RR P2** (23 Cal. Code Regs. section 5013) which requires flood protection for residential development in rural areas, Policy **RR P3** (23 Cal. Code Regs. section 5014) restricts encroachment in floodways, and Policy **RR P4** (23 Cal. Code Regs. section 5015) restricts encroachments in floodplains, including the Cosumnes-Mokelumne Confluence[2]. Policy **RR P4** states that "no encroachment shall be allowed or constructed unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant impact on floodplain values and functions." 7.18

Invasive Species: Delta Plan Policy **ER P5** (23 Cal. Code Regs. section 5009) calls for avoiding introductions and habitat improvements for invasive nonnative species or mitigating these potential impacts in a manner that appropriately protects the ecosystem. Analysis on this matter should address both nonnative wildlife species as well as terrestrial and aquatic weeds. To the maximum extent practicable, design of habitat restoration and creation actions should avoid or minimize effects that would lead to the establishment of nonnative invasive species 7.19

[1] The boundaries of the priority habitat restoration areas are depicted in Appendix 5 of the Delta Plan regulations.
[2] RR P4 refers to the "Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the Department of Water Resources or U.S. Army Corps of Engineers."

populations on site before relying upon mitigation measures. In the event that mitigation is warranted, those mitigation and minimization measure should be equally or more effective with the Delta Plan Mitigation Measures 4-1. http://deltacouncil.ca.gov/sites/default/files/documents/files/Agenda%20Item%206a_attach%202.pdf. 7.19 cont'd

Finally, the level of detail included in the SSHCP certification filing should be consistent with the programmatic nature of the document. As specific projects or proposed activities which fall within whole or part of the Legal Delta are scoped and implemented, they would also seek consistency following the Council's guidelines. A way to better support the process is to include the information needed to support the certification of Delta Plan consistency within the EIS/EIR, as noted above, potentially including a draft certification as an appendix to the Final EIS/EIR. 7.20

Closing Comments

The Council is supportive of the SSHCP and its efforts to promote recovery of listed species and natural landscapes. We would like to work with you to ensure the consistency of the SSHCP with the Delta Plan and we look forward to continued coordination to further our related efforts. We are available to continue discussions about how to ensure that your Plan is consistent with the Delta Plan as you proceed in the next stages of your Plan approval process. I encourage you to contact my staff Ron Melcer (Ronald.Melcer@deltacouncil.ca.gov) or Megan Brooks (Megan.Brooks@deltacouncil.ca.gov) with your questions, comments, or concerns.

Sincerely,

C. Enos-Nobriga

Cassandra Enos-Nobriga
Deputy Executive Officer
Delta Stewardship Council

RTC 7.1 (EIS/EIR) – Comment noted. The County appreciates the Council's thoughtful comments.

RTC 7.2 (EIS/EIR) – Refer to responses to Comments 7.3 through 7.19.

RTC 7.3 (EIS/EIR) – Comment noted. The Draft EIS/EIR does state that Rural Transportation Projects and Recycled Water projects would be constructed outside the UDA. The Rural Transportation Projects are shown in Figure 5-5 of the SSHCP, and Recycled Water projects are shown on Figure 5-6 of the SSHCP. Note that no Recycled Water projects are proposed within the legal Delta.

RTC 7.4 (EIS/EIR) – Comment noted. Although the SSHCP includes the Delta Plan's Cosumnes-Mokelumne Confluence area, the SSHCP does not cover urban development in that area. Rural Transportation Projects within the legal Delta will be subject to the requirements of the Delta Plan, including the policies noted in Section 4 of the Draft EIS/EIR. Section 7.5.2 of the SSHCP describes the expected SSHCP Preserve System in PPU 6, where a portion of the Cosumnes-Mokelumne Confluence area overlaps with the Planning Area. None of the Preserve System concepts considered by the Plan Permittees have included preservation within the Delta Plan's Cosumnes-Mokelumne Confluence area. The Preserve design focus for PPU 6 is preserving existing agricultural lands that provide habitat for several of the broad-ranging Covered Species, most notably Swainson's hawk and greater sandhill crane. Policy ER-P3 has been added to Section 4.1.1.2 of the Draft EIS/EIR as a relevant policy under "Delta Reform Act of 2009 and the Delta Plan":

ER P3. Protect Opportunities to Restore Habitat

a. Within the priority habitat restoration areas depicted in Appendix 5 of the Delta Plan, significant adverse impacts to the opportunity to restore habitat as described in section 5006, must be avoided or mitigated.

b. Impacts referenced in subsection (a) will be deemed to be avoided or mitigated if the project is designed and implemented so that it will not preclude or otherwise interfere with the ability to restore habitat as described in section 5006.

c. Impacts referenced in subsection (a) shall be mitigated to a point where the impacts have no significant effect on the opportunity to restore habitat as described in section 5006. Mitigation shall be determined, in consultation with the California Department of Fish and Wildlife, considering the size of the area impacted by the covered action and the type and value of habitat that could be restored on that area, taking into account existing and proposed restoration plans, landscape attributes, the elevation map shown in Appendix 4, and other relevant information about habitat restoration opportunities of the area.

d. For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions in the priority habitat restoration areas depicted in Appendix 5 of the Delta Plan. It does not cover proposed actions outside those areas.

RTC 7.5 (EIS/EIR) – The SSHCP would indeed include acquisition of preserves on existing agricultural land or rangeland. The impacts of these preserve acquisitions on agricultural land use, including potential limitations on the types of future agricultural use on those preserves, are analyzed extensively in Section 6 of the Draft EIS/EIR. Regarding Elk Grove's proposed SOI expansion, the Draft EIS/EIR considered those expansions as part of the cumulative environment. The overlap of the UDA with the Legal Delta is noted in the Draft EIS/EIR in Section 4, Land Use. Refer to response to comment 7.14 regarding other Delta Plan land use policies.

RTC 7.6 (EIS/EIR) – Refer to response to Comment 7.18.

RTC 7.7 (EIS/EIR) – Comment noted. The Delta Plan policies noted in the subsequent comments have been added to Chapters 6, 7, 8, 9, and 10 of the Final EIS/EIR, as noted in responses to Comments 7.11, 7.14, 7.15, 7.16, 7.17, 7.18 and 7.19.

RTC 7.8 (EIS/EIR) – Comment noted. The County has communicated with the Delta Stewardship Council and will provide the necessary documentation for a Certification of Consistency regarding the SSHCP.

RTC 7.9 (EIS/EIR) – Comment noted. Future Covered Activity projects will comply with the Delta Plan, taking into account the guidance provided in this comment letter and the description of the regulatory environment provided in the Final EIS/EIR.

RTC 7.10 (EIS/EIR) – Comment noted. Covered Activity projects located within the Delta Plan area that are not exempt from CEQA will be subject to a Certification of Consistency with the Delta Plan, including an analysis of how implementation of the SSHCP AMMs and Conservation Strategy by the project are equally or more effective. Sections 10.2.1 and 10.2.3 of the Final SSHCP have been revised to state that covered activity projects would be subject to consistency determination with the Delta Plan on a project-level basis.

RTC 7.11 (EIS/EIR) –The Draft SSHCP uses the best available science in assessing impacts of future Covered Activities and the mitigation provided by the Conservation Strategy. For example, as described in Section 3.4 of the Draft SSHCP, the Plan Permittees worked with local species experts and wildlife agency biologists to define and map Covered Species suitable habitat in this Plan Area by using the best available information about the life history and biology of each Covered Species and locations in the Plan Area known to support the species or where the species has been observed. The application of the best available science in the development of the SSHCP is consistent with the requirements of Delta Plan Policy G P1. Delta Plan Policy G P1 has been added to Section 4.1.1.2 of the Final EIS/EIR as a relevant policy under "Delta Reform Act of 2009 and the Delta Plan":

> **Delta Plan Policy G P1. Delta Plan Policy G P1 requires that actions not exempt from CEQA and subject to Delta Plan regulations must include applicable feasible mitigation measures consistent with those identified in the Delta Plan EIR or substitute mitigation measures that are equally or**

more effective. Delta Plan Policy G P1 also states that actions subject to Delta Plan regulations must document use of the best available science as relevant to the purpose and nature of the project. Finally, Delta Plan Policy G P1 requires that ecosystem restoration and water management covered actions include adequate provisions for continued implementation of adaptive management, appropriate to the scope of the action. This requirement is satisfied through A) the development of an adaptive management plan that is consistent with the framework described in Appendix 1B of the Delta Plan, and B) documentation of adequate resources to implement the proposed adaptive management plan.

RTC 7.12 (EIS/EIR) – The Proposed Action Alternative (SSHCP) requires adaptive management through implementation of the SSHCP Preserve System Monitoring and Management Program, as described in Section 8.3.4 of the Draft SSHCP. This adaptive management approach is consistent with the requirements of Delta Plan Policy G P1. The funding plan and assurances for implementation of the SSHCP, including adaptive management, were described in Section 12.3.3 of the Draft SSHCP.

RTC 7.13 (SSHCP and EIS/EIR) – Comment noted. The Plan Preparers have met with the Delta Stewardship Council during preparation of the SSHCP and were aware of the referenced Delta Plan adaptive management framework. The SSHCP Preserve System Monitoring and Management Program (described in Chapter 8 of the SSHCP) would be consistent and complimentary.

RTC 7.14 (EIS/EIR) – The Proposed Action Alternative (SSHCP) is intended to facilitate location of new urban development in accordance with local land use authority planning. Delta Plan Policies DP P1 and DP P2 have been added to Section 4.1.1.2 of the Draft EIS/EIR as relevant policies under “Delta Reform Act of 2009 and the Delta Plan”:

Delta Plan Policies DP P1 and DP P2. Delta Plan Policy DP P1 states that new residential, commercial or industrial development is permitted outside the urban boundaries only if it is consistent with the land use designated in the relevant county general plan. It is intended to strengthen existing Delta communities while protecting farmland and open space, providing land for ecosystem restoration needs, and reducing flood risk. Delta Plan Policy DP P2 states that plans for ecosystem restoration must be sited to avoid or reduce conflicts with existing uses when feasible.

RTC 7.15 (SSHCP and EIS/EIR) – Comment noted. The SSHCP Conservation Strategy in the EIS/EIR Proposed Action Alternative does not envision habitat restoration projects within the Cosumnes-Mokelumne Confluence Area because the lands within that area are not consistent with the Conservation Actions that guide habitat establishment/ reestablishment in the SSHCP (refer to Table 7-1 in the Final SSHCP). However, the Implementing Entity will ensure that if habitat re-establishment/ establishment projects do occur within that area, they will consistent with the Delta Plan regulations. Sections 10.2.1 and 10.2.3 of the Final SSHCP have been revised to state that covered activity projects would be subject to consistency determination with the

Delta Plan on a project-level basis. Delta Plan Policy ER P2 been added to Section 4.1.1.2 of the Final EIS/EIR as a relevant policy under "Delta Reform Act of 2009 and the Delta Plan":

> **Delta Plan Policy ER P2. Delta Plan Policy ER P2 states that habitat restoration must be consistent with Appendix 3 of the Delta Plan regulations and that restoration will occur at appropriate elevations.**

RTC 7.16 (EIS/EIR) – Delta Plan Policy ER R2 has been added to Section 4.1.1.2 of the Draft EIS/EIR as a relevant policy under "Delta Reform Act of 2009 and the Delta Plan":

> **Delta Plan Policy ER R2. This policy states, for the Cosumnes-Mokelumne Confluence: "Allow these unregulated and minimally regulated rivers to flood over their banks during winter and spring frequently and regularly to create seasonal floodplains and riparian habitats that grade into tidal marsh and shallow subtidal habitats."**

RTC 7.17 (EIS/EIR) – Delta Plan Policy ER P3 has been added to Section 4.1.1.2 of the Draft EIS/EIR as a relevant policy under "Delta Reform Act of 2009 and the Delta Plan":

> **Delta Plan Policy ER P3. This policy requires that, within the priority habitat restoration areas depicted in Appendix 5 of the Delta Plan, significant adverse impacts to the opportunity to restore habitat must be avoided or mitigated. Much of the overlap between the Legal Delta and the SSHCP Plan Area includes the Cosumnes-Mokelumne Confluence PHRA.**

RTC 7.18 (EIS/EIR) – Delta Plan Policies RR P2, RR P3, and RR P4 have been added to Section 4.1.1.2 of the Final EIS/EIR as relevant policies under "Delta Reform Act of 2009 and the Delta Plan":

> **Delta Plan Policies RR P2, RR P3, and RR P4. Policy RR P2 requires flood protection for residential development in rural areas. Policy RR P3 restricts encroachment in floodways. Policy RR P4 restricts encroachment in floodplains, including the Cosumnes-Mokelumne Confluence. Policy RR P4 specifically states that "no encroachment shall be allowed or constructed unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant impact on floodplain values and functions."**

RTC 7.19 (EIS/EIR) – Preserve Management Plans under the SSHCP, as described in Chapter 8 of the Final SSHCP, would include specific prescriptions to avoid introduction of non-native species and remove those that are already present. Delta Plan Policy ER P5 has been added to Section 4.1.1.2 of the Final EIS/EIR as a relevant policy under "Delta Reform Act of 2009 and the Delta Plan":

> **Delta Plan Policy ER P5. Policy ER P5 calls for avoiding introductions and habitat improvements for invasive nonnative species or mitigating these potential impacts in a manner that appropriately protects the ecosystem.**

Analysis on this matter should address both nonnative wildlife species as well as terrestrial and aquatic weeds. To the maximum extent practicable, design of habitat restoration and creation actions should avoid or minimize effects that would lead to the establishment of nonnative invasive species populations on site before relying on mitigation measures. In the event that mitigation is warranted, those mitigation and minimization measures should be equally or more effective than the Delta Plan mitigation measure 4-1

RTC 7.20 (EIS/EIR) –The Plan Permittees have not included a draft certification as an appendix to the Final EIS/EIR. However, during SSHCP preparation the requirements of the Delta Plan were taken into consideration, and EIS/EIR Proposed Alternative (SSHCP) is generally consistent with the Delta Plan. Therefore, for those few SSHCP Covered Activities that would occur with the Legal Delta, consistency should not require substantial additional effort beyond that specified in the SSHCP Conservation Strategy.

LETTER 8 EARL SEABERG (SSHCP)

SSHCP South Sacramento Habitat Conservation Plan

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the proposed South Sacramento Habitat Conservation Plan. The space below may be used to provide comments on the Draft EIS/EIR. Please focus your review on the sufficiency of the document regarding the identification of environmental impacts and methods to avoid or mitigate those impacts.

WETLAND EXCHANGE REMOVES HABITAT & SPECIES FROM LOCAL NEIGHBORHOODS WHEN IN-FILL PROJECTS OCCUR. THIS REDUCES LOCAL BIO-DIVERSITY. 8.1

WOULD YOU LIKE TO BE ADDED TO THE SSHCP MAILING LIST? ☒ Yes ☐ No

If so, please provide your contact information.

Name: EARL SEABERG

Title and Organization/Business (if applicable) :

Email address: ESEABERG75@GMAIL.COM

Mailing address: 7708 POLO CROSSE AVE., SACRAMENTO CA 95829

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Office of Planning and Environmental Review, ATTN: Environmental Coordinator, 827 7th Street, Room 225, Sacramento, CA 95814

RTC 8.1 (SSHCP) –The SSHCP would allow planned urban development in the UDA and infrastructure projects outside the UDA to proceed, while preserving in perpetuity key habitats in the UDA and extensive areas outside the UDA. This balance was identified by the plan preparers as the most effective way to conserve the covered species while allowing the development planned in the General Plans of Sacramento County, Rancho Cordova, and Galt to proceed. Some take of wetlands will occur within the SSHCP's UDA and some of this take will occur as a result of infill projects. However, the SSHCP Conservation Strategy is designed to maintain species and habitat biodiversity. See Chapter 7 of the SSHCP.

LETTER 9 ENVIRONMENTAL COUNCIL OF SACRAMENTO, HABITAT 2020, THE SIERRA CLUB, THE INSTITUTE FOR ECOLOGICAL HEALTH, AND SAVE OUR SANDHILL CRANES (SSHCP AND EIS/EIR)



September 5, 2017

Attention: Rich Radmacher, Senior Planner
Sacramento County Planning Department
827 7th Street, Sacramento, CA 95814
Delivered via email to: radmacherr@saccounty.net

Comments on the public draft of the South Sacramento Habitat Conservation Plan

These comments are presented on behalf of the Environmental Council of Sacramento (ECOS), Habitat 2020, the Sierra Club, the Institute for Ecological Health, and Save Our Sandhill Cranes.

ECOS' mission is to achieve regional and community sustainability and a healthy environment for existing and future residents. Its membership organizations include: 350 Sacramento, Breathe California of Sacramento-Emigrant Trails, Friends of Stone Lakes National Wildlife Refuge, International Dark-Sky Association, Preservation Sacramento (formerly known as Sacramento Old City Association), Resources for Independent Living, Inc. (RIL), Sacramento Audubon Society, Sacramento Housing Alliance (SHA), Sacramento Natural Foods Co-op, Sacramento Valley Chapter of the California Native Plant Society, Sacramento Vegetarian Society, Save Our Sandhill Cranes (SOS Cranes), Save the American River Association (SARA), SEIU Local 1000 (Environmental Committee), Sierra Club Sacramento Group, The Green Democratic Club of Sacramento, and the Wellstone Progressive Democrats of Sacramento.

Habitat 2020 (H2020) is a coalition of environmental organizations collaborating on common issues in and affecting, the Sacramento region. Members of Habitat 2020 include the Sacramento Audubon Society, California Native Plant Society, Friends of the Swainson's Hawk, Save the American River Association, Save Our Sandhill Cranes, Sierra Club Sacramento Group, Friends of Stone Lakes National Wildlife Refuge and the Sacramento Area Creeks Council.

The Institute for Ecological Health promotes the conservation of rural landscapes, regional conservation plans, Smart Growth, an end to urban-suburban sprawl, and a Land Ethic for the 21st Century.

1

The Sierra Club is arguably the preeminent grassroots environmental group in the United States. Its mission is *to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives.*

Save Our Sandhill Cranes (SOS Cranes) is a non-profit organization dedicated to maintaining open-space habitat and the conservation of the California Central Valley's Sandhill Crane populations through education, outreach, and community activism.

Members of ECOS, Habitat 2020, the Institute for Ecological Health, Save Our Sandhill Cranes, and the Sierra Club have participated as stakeholders in the preparation of the SSHCP for many years, some since its inception over two decades ago. This included years of work by the Biological Subcommittee developing major components of the HCP. They were also consistent participants in the Regulatory Agency Working Group meetings during the final years of Plan preparation. These comments on the SSHCP, and all of its appendices, reflect those long years of involvement and participation in the preparation of this HCP. We are grateful to have been included in the process of preparation and for the willingness of the Plan preparers and the regulatory agencies to hear out our concerns and suggestions along the path of Plan preparation. Many of those concerns and suggestions were addressed and are clearly evident within this draft of the Plan. These comments are intended to further strengthen the Plan. And, this letter endorses the comments by the Friends of the Swainson's Hawk. 9.1

All comments pertain to the published draft of the SSHCP, and its appendices, and only share a nexus with the DEIR/S analysis where the DEIR/S might need to be adjusted to accommodate changes in the SSHCP. Efforts have been made to provide accurate pagination citations to aid in locating and addressing the comments. Given the structure of the document, where information is presented with different focuses (e.g. habitat and cover type working down to species specific.), and is also imbedded within multiple different inter related levels of goals, objectives and actions that often overlap (e.g. that pertain to and address impacts to different habitat resources and that are recycled and added to for addressing species impact), efforts were not made to locate every place where a comment or recommendation might pertain. And, the inherent difficulty in working with such an interconnected document is acknowledged. 9.2

The comments included in this letter are not necessarily presented in the order of importance or priority, and they fall into a couple of general categories: large overarching concerns that are not particularly imbedded in one aspect of the Plan or its corresponding environmental documentation (these concerns do not necessarily have explicit pagination locations), and more specific concerns related to language or the lack of language in the Plan. In some instances these categories overlap. 9.3

Efforts were made to house comments within the context of a particular chapter of the Plan where possible and appropriate. Recommendations for changing or adding language will be highlighted by the use of a bold sequentially ordered number in blue, followed by a blue asterisk (*), to clearly identify them. 9.3 cont'd

THE VERNAL POOL COMPROMISE THAT IS THE SSHCP

And a brief little history lesson

At its very root, the SSHCP is a compromise for vernal pools. On the one hand there is the current strategy of trying to milk the maximum project-by-project mitigation out of projects that will take vernal pool resources inside the already constrained landscape inside the UDA. On the other, would be the effort to try and protect entire extant vernal pool landscapes outside the UDA while it is still possible, and before those resources have to contend with the constraints already squeezing those inside the UDA. The SSHCP is constructed on the latter being the better approach, and this was not an arbitrary decision.

When Plan preparation completely stalled out five to six years ago, very frank discussions were held about this compromise, and about which approach made the most sense for the long-term sustainability of vernal pool resources in our region. To no small degree, the environmentalists involved in these discussions helped push the point that the opportunity to save a large intact vernal pool landscape outside the UDA was too important an opportunity to pass up. A compromise was reached whereby additional vernal pools would be saved, beyond those already agreed upon inside the UDA, in hard line and flexible preserves. As well, it was recognized that there has already been some significant degradation outside the UDA of the very vernal pool resources that the Plan was hoping to save in this compromise. It was fairly clear that if the current rate of degradation continued, it might come to pass that there would not be sufficient or adequate vernal pool resources left to have made the compromise worthwhile. And from this emerged the idea of the grading ordinance, which was supposed to dramatically limit the chances that significantly more resources would be destroyed outside the UDA because, for new ground disturbances (basically non-ongoing farming disturbances), it would be necessary to get a grading permit from the County of Sacramento. 9.4

Politics being what they are, the grading ordinance morphed into a wetlands protection ordinance, which is supposed to do three new things: 1.) It requires the County to take a more active role in protecting wetland resources; 2.) It requires landowners to mitigate for any intentional or accidental destruction of wetland resources; 3.) It requires a permit for any disturbance to wetlands or their micro watershed. The ordinance is better than nothing and it is good that the County is taking a larger role in wetlands protection, but the USACE is already responsible for dealing with illegal destruction of wetland resources, and it is not immediately obvious if having the County involved in enforcement will save additional resources. The hope would be that the requirement of a wetlands disturbance permit would 9.5

stop the destruction around vernal pools from deep ripping for vineyards, or other conversions of grasslands to agriculture. As well, it is great that the ordinance spells out that any destruction will have to be mitigated, which is so costly that it should be a decent deterrent. But, again, this is not actually that different from what the eventual outcome would be with enforcement by USFWS or USACE. And, mitigation for those lost resources would further deplete the remaining vernal pool inventory available for mitigating the impacts of covered activities inside the UDA. So, there can be no real expectation that things will be any different than they currently are in terms of ILLEGAL destruction of wetlands resources, and those that want to pursue the legal destruction of wetlands will still have a process available to do so, albeit a very expensive process.

9.5 cont'd

Whereas it is good that the County will be taking on greater responsibility, there is still the problem of whether or not the vernal pool resources are still going to be there when they are needed for mitigation, and for building the vernal pool preserves outside the UDA. This contention was clearly presented to the Plan preparers and to their credit they came up with the intelligent approach of trying to tie up enough of the vernal pool landscape outside of the UDA before implementation of the Plan begins, using temporary conservation easements tied to options agreements, with the hope that this would result in the problem largely receding. But, this would be contingent on robust language in the option agreement/s, such that the option would still be actionable far enough into the future that those vernal pool resources would still be available for mitigation when needed, rather than having lapsed and not much to show for the effort remaining. 1* The option/s language will be critical to the success of the Plan, and it should undergo an intensive and extensive legal review by the permitting agencies and other interested parties to verify that it is adequate to ensure the success of the Plan.

9.6

The Agricultural-Residential issue

Agricultural-residential development outside the UDA is not a covered activity in the Plan. But obviously the entitlement of this type of development has a direct effect on the inventory for the Plan, and potentially on the creation of the Preserves if entitlements are given within a projected Preserve site. The County will be a permit holder for the Incidental Take Permit, which means they have a vested interest in maintaining inventory and not disrupting Preserve creation. But that does not necessarily mean that success of the Plan will be given priority over allowing new entitlements for new Agricultural-Residential or other development. 2* It would be appropriate, as part of rolling the plan out and making the various changes to the general plans of the ITP permit holders, to add language to the Sacramento County General Plan that addresses this concern - "SSHCP inventory concerns and needs, and preserve creation priorities, will take precedence over new entitlement applications for activities not covered by the SSHCP outside the UDA." It would be a perversion if uncovered activities ended up with priority over covered activities and their mandated mitigations.

9.7

4

Effects Assessment and Level of Take (Chapter 6)

Overarching Concerns

Effect of pesticide use on agricultural preserve lands

Consideration was given to the impact of direct application of pesticides on certain specific covered species, but the focus was on timing of application rather than the nature of the pesticides used. As well, sufficient consideration was not given to the ongoing and long term impact of pesticides on prey insects for covered species. Consistent application of pesticides has the undisputed effect of diminishing insect populations in the area of treatment, and if we are relying on agricultural preserves for the sustenance of some of the covered species that routinely consume insects, this is an obvious problem. 9.8

Using label requirements for application of pesticides would not take into account growing evidence of a problem related to a particular pesticide, such as is the current case with neonicotinoids. 3* If preserve management cannot be sufficiently responsive to indications of a potential problem with a specific pesticide being used on an agricultural preserve, then we risk the failure of our agricultural preserves because they might not be able to provide viable functioning habitat for covered species in an increasingly constrained landscape. The game is lost if we cannot rely on the agricultural preserves to provide fully functioning habitat. 9.9

4* Similarly, the effects assessment must consider the ongoing and cumulative impact of pesticide use on the prey insects of the covered species within the agricultural preserves since the vast majority of agricultural preserves will be acquired with conservation easements, which will limit the ability to do more intensive management and directly address the pesticide issue. Looking at the effects of direct pesticide application on covered species, and avoiding that direct application by timing of application, does not address the ongoing and long term impact on the natural insect community that some of the covered species rely on for sustenance. 9.10

A review of the agricultural preserve easement language indicates only language pertaining to timing of application. We fully acknowledge the need to have language in the easements that is flexible enough to allow agriculture to be sustainable on the preserves. But, we also need the flexibility to quickly address potential problems, and not have to wait years before scientific verification proves out an actual problem after real damage was allowed to happen. This somewhat delicate balance needs to be struck if we are going to be able to rely on our agricultural preserves in perpetuity. 9.11

5

5* As well, measure Road-3 needs to have the full suite of vertebrate covered species, that rely on insects for part of their diet added to the covered species list there (Loggerhead Shrike, White Tailed Kite, Tricolored Blackbird, Greater Sandhill Crane, Western Burrowing Owl and Western Red Bat...). 9.12

6*It might also be useful to avoid use of the word "pesticide" altogether in the Effects chapter in preference to the more specific terms of "insecticide" and "herbicide. " This would help to refine what the relevant effects would be for specific covered species. 9.13

Lighting

Consideration was given to the effect of light on certain covered species, but the consideration and analyses did not extend to the insect prey of those species. Night lighting has been well documented to attract insects. Both construction lighting and urban lighting in developments have the potential to lure insects to them, and in many cases this will result in luring insects off of the preserves. 7* Some consideration and measures or actions need to be provided to avoid disruption of insect prey species on the preserves, and the resultant impact to the covered species that rely upon those prey insects. 9.14

General comment on table numbering

8* Where are table 6-94 and 6-95? Would it not be better to have sequential numbering without numerical gaps? 9.15

<u>More Specific Concerns</u>

Night Lighting and Covered Beetle Species

Table 6-2, (Covered Species Vulnerability to Environmental Stressors, page 6-28), indicates that the Ricksecker's Water Scavenger Beetle and the Valley Elderberry Longhorn beetle are both susceptible to the temporary environmental stress of construction lighting, and the permanent environmental stress of lighting. But for EDGE-8, Table 6-3 (Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals, page 6-35), neither of the two covered beetle species are mentioned in the list of covered species affected - only the vertebrates are mentioned. The same holds true for construction lighting in BMP-6 on page 6-37 where again only vertebrate species are considered. We were able to find no scientific literature that indicated that the Ricksecker's Water Scavenger Beetle and the Valley Elderberry Longhorn Beetle are not attracted to night lighting. As well, the insect prey of the Ricksecker's Water Scavenger Beetle would presumably be attracted to night lighting and potentially lured off of the preserves. 9.16

6

In Table 6-51 (Permanent Indirect Effects on Ricksecker's Water Scavenger Beetle, page 6-205), lighting is presented as having no effect on this species and therefore requires no reduction of an effect despite being listed in Table 6-2 as being a stressor for this species. The same is true for the Valley Elderberry Longhorn Beetle in Table 6-54 (Permanent Indirect Effects on Valley Elderberry Longhorn Beetle, page 6-13), despite also being listed in table 6-2 as an environmental stressor for this species. 9.17

9* The two covered beetle species will need to be added to the list of species targeted in EDGE-8, and 10* tables 6-51 and 6-54 need to be updated to reflect lighting effects. 11* And, LIDs should be considered that address the fact that certain lighting frequencies are very powerful attractants for insects, whereas others are not. 12* And, for the Ricksecker's Water Scavenger Beetle, lighting will need to be considered in the context of wildlife community alterations, and the impact of insect prey for this species being lured off of the preserves by night lighting. This will need to be analyzed and mitigated with new conservation measures and actions. 9.18 9.19 9.20 9.21

Western Burrowing Owl

13* There was no discussion or AMMS offered to deal with rodenticide applications on ground squirrel colonies. 9.22

Rodenticides

14* Language is needed to prohibit use of rodenticides on any preserve. This is an important AMM for all of the raptors, the owl, as well as the American badger. And, certain rodenticides are fatal to raptors, which may eat a rodent made sick by consumption of rodenticide. D-Con is one such rodenticide. There are probably others. We have additional concerns that persons applying pesticides and rodenticides often ignore or do not understand the instructions on the product container regarding avoidance of poisoning non-target critters. 9.23 9.24

Loggerhead Shrike

Lighting and Pesticide Concerns

Table 6-92 (Permanent indirect Effects on Loggerhead Shrike 9, page 6-49) discusses potential indirect lighting effects on the shrike, but no mention or consideration is given to the effects of lighting on the insects that they consume. See earlier general discussion on this concern. Table 6-93 (Temporary Effects to Loggerhead Shrike) also does not consider the impact of construction lighting on insect prey species. 15* These will need to be added to table 6-3 and 16* specific AMMs presented, such as LIDs restricting light frequencies that attract insects. 9.25 9.26

7

In table 6-3 (Summary of AMMs that Minimize Effects of Environmental Stressors on Covered Species Modeled Habitats and Individuals, page 6-49), measure TCB-5 (Timing of Pesticide Uses and Harvest Timing on Agricultural Preserves) considers only the effect of pesticides being applied directly onto covered species or its prey insects during the breeding season, and not the overall and long term effects of pesticides on the insect prey base that covered species rely upon in the agricultural preserves. 9.27

In table 6-92 (Permanent Indirect Effects on Loggerhead Shrike, page 6-351) for the environmental stressor of "Pesticides and Fertilizers," the discussion of "Potential Indirect Effect on Species" states that: "Adverse effects on Loggerhead Shrikes, their prey ... from insecticides/pesticides ... will be avoided through the implementation of AMMS." The only AMMs that we were able to locate in Table 6-3 that mention pesticides are ROAD-3 (page 6-36) and TCB-5 (page 6-49), and neither of these AMMs address anything beyond the timing of application of pesticide. As such, the current draft of the SSHCP does not present measures to avoid or minimize the adverse effects associated with pesticide use on Loggerhead Shrike insect prey. 17* A more robust consideration of this issue will need to be added to table 6-3 with specific AMMs to address this issue. 9.28

Tricolored Blackbird

Lighting and Pesticide Concerns

The concerns just mentioned for Loggerhead Shrike are identical for the Tricolored Blackbird. As mentioned, TCB-5 (page 6-49) only addresses timing and 18* this will need to be expanded to address longer term effects on prey species and 19* additional AMMs will need to be added to this table. 9.29

Table 6-99 (Permanent Indirect Effects on Tricolored Blackbird, page 3-373) will need to consider effects of lighting on insect prey, and for pesticides (page 3-376). 20* A more robust consideration of this issue will need to be added to table 6-3 with 21* specific AMMs to address this issue as it pertains to effects on insect prey species. 9.30

Greater Sandhill Crane

The pesticides concerns mentioned for the two passerine species are also relevant for the crane. Table 6-96 (Permanent Indirect Effects on Greater Sandhill Crane, (page 6-364) also mentions relying upon AMMs to deal with pesticides that are not in evidence in the SSHCP beyond timing of application. 22* This will need to be corrected. 9.31

Western Red Bat

23* For this species there are the same issues again with both lighting and pesticides. 9.32

8

American Badger

24* There were no suggested AMMs to deal with rodenticides, which are commonly applied to ground squirrel colonies. 9.33

Conservation Strategy (chapter 7)

Overarching Concerns

Very little regarding specific conservation actions for some species 9.34

It is understood that a major pillar of the conservation strategy for many of the covered species in the SSHCP is to conserve the habitats that they use in order to make up for the habitats that will be taken for urbanization or other projects, which is basically the way most mitigations for CESA and FESA would proceed on a project-by-project basis. The regional approach to Preserve Design in the SSHCP is a significant improvement over project-by-project approaches, though. Given the regional paradigm of the SSHCP, it is also a real opportunity to perform conservation actions that directly benefit individual species. But for many of the covered species presented in Chapter 7, it looks more like the general habitat biological goals and objectives were shoehorned into the species specific biological goals and measureable objectives, whether or not they were exactly relevant, with very little additional added conservation actions that are specific to conserving individual covered species. 25* It would be worthwhile to carefully review the species' specific tables and ensure that all of the habitat goals referred to there are fully relevant, and, where appropriate, 26* add species specific actions to benefit individual species - an example of this might be adding specific perch construction or planting requirements for Loggerhead Shrike as part of Goal 4 (page 7-274). 9.35

Sea level rise and land acquisition priorities in PPU 6

For the southwestern part of the Plan area, PPU 6, we have concerns about the long-term viability of a large percentage of this area because of global climate change and sea level rise. Attached as addenda 1 thru 3 are some draft mapping models that the Nature Conservancy worked on as part of their participation in the Greater Sandhill Crane Technical Advisory Committee (Crane TAC) and the work that committee is doing to craft a conservation strategy for the Sandhill Crane, starting in the geography of the Delta and its immediate surroundings. The Crane TAC is a coalition of state and federal wildlife regulatory agency folks, preserve and refuge managers, crane biologists, environmentalists, and wildlife ecologists. The Crane TAC aims to foster the collaborative long-term conservation and recovery of Greater Sandhill Cranes by: identifying and recommending monitoring and research; providing guidance on habitat protection, restoration, and management; and promoting outreach and education. One priority of the Crane TAC is to develop a Delta region conservation strategy for the Greater Sandhill Crane. The conservation strategy will present recommended actions for private and public landowners to improve 9.36

9

Greater Sandhill Crane habitat in the Delta region. The methods and recommendations described in the strategy will be incorporated into a statewide conservation strategy for Greater Sandhill Crane and ultimately provide a template for developing a Greater Sandhill Crane recovery plan.

9.36 cont'd

The draft mapping models in the first three addenda attempt to present: current crane usage areas, the areas likely to be impacted by very moderate sea level rise, and the resultant change in areas that should be considered for conservation considering both current usage and threat to low lying areas. The draft models were not adjusted for population density, and incorporating this will likely shift some of the lowland priorities, but it should have no effect on priority of upland areas since these were elevated in priority because of their relative safety in terms of sea level rise and their current proximity to active roost sites.

The concern, illustrated by the attached maps, is that over the 50 year permit period there will likely be a marked rise in sea level in at least PPU 6 of the Plan Area. Global Climate Change is considered in Chapter 11 and we will discuss this also in our review of that chapter. But, for the purposes of Chapter 7's conservation strategy, we feel that it is important to highlight this issue. As well, we have concerns that the 1000 acres of upland (outside of the floodplain) habitat acquisitions for the Greater Sandhill Crane may not be adequate given the severity of the potential loss of already conserved habitat for this species in the lowland areas of the North Delta most susceptible to sea level rise. We are heartened by the fact that the specific language for the upland habitat for the crane states that a MINIMUM of 1000 acres will be acquired, but 27* we also feel that some additional verbiage should be included to indicate that: "the effects of sea level rise on low lying areas of PPU 6 may necessitate a shift over time to greater conservation and acquisition focus on the areas elevated outside of the floodplain." These lands will be significantly more expensive because of the speculative price pressure of potential urbanization, but given the potential prognosis for the long-term viability of lowland conservation areas in the North Delta, they may be the only areas that provide suitable habitat in perpetuity.

9.37

Outdated Species Accounts

Because of the extraordinary amount of time that it took to complete the SSHCP, over two decades, the species accounts, that were current when they were written, have become out of date and there were insufficient funds to update them for this public draft. This is an issue that will be discussed further later on in this comment letter. What is germane to the discussion of Chapter 7 is that the species accounts would typically feed into the Conservation Strategy by providing the important natural history basis for individual species that the conservation strategy is then built off of. We note that, though the species accounts were not updated, the Conservation Strategy has taken advantage of up to date scientific literature and species occurrence data in the construction of the strategy. We looked for occurrences where the strategy suffered from outdated resources and have

9.38

10

attempted to point those out. There may well be more occurrences that were missed. 9.38 cont'd

Need to update references

28* Several very important and useful references have become recently available that would be valuable for this Plan and for the Conservation Strategy. A far from exhaustive list would include: The new HCP handbook (Dec. 2016), the revised draft giant garter snake recovery plan, Final California Tiger Salamander recovery plan for central portion of range June 2017), and "Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (May 2017). It will be important to have the advantage of these resources and others. 9.39

A general comment about organization

29* It might make sense to present the species using current phylogenetic ordering (like in any modern field guide). When searching for Tricolored Blackbirds, one would not expect to see Greater Sandhill Cranes inserted in between the two passerine species (Loggerhead Shrike and Tricolored Blackbird). 9.40

<u>More specific concerns</u>

Preserve Management Plans HAB1.1

In preparing the preserve management plan (page 7-26 Action HAB 1-1, 8-149 etc.) for a conservation easement, 30* it is essential to work closely with the landowner. The benefits from working closely with the owner include access to the landowner's knowledge of the property, as well as their possible ideas for helping species. Also it will build trust in the broader agricultural and ranching community and will hopefully result in more landowners being willing to sell easements. 9.41

On page 7-27 in Table 7-1, for Conservation Action HAB 7-1, 31* the vegetation measurement prescribed for Flexible Preserves should be for all non-agricultural preserves, and not just Flexible Preserves. This measurement used consistently across all non-agricultural preserves would provide essential knowledge for preserve management. 9.42

Greater Sandhill Crane

GS3.1 included in Table 7-1 (Biological Goals. Measurable Objectives, and Conservation Actions, page 7-46) lists the following as a conservation action for the Greater Sandhill Crane: "Replacement of unmodeled agricultural uses such as orchards and vineyards with habitats supporting high prey density (e.g. vole), including grassland, suitable Croplands..." We assume that the reference to voles resulted from an erroneous cutting and pasting from conservation actions from one of the raptor species (Northern Harrier, Swainson's hawk, or White Tailed Kite...). 9.43

11

Voles are hardly a staple for the Greater Sandhill Crane and 32* it would be far more appropriate to focus on replacing orchards and vineyards with "high value foraging habitat" such as corn or rice. 9.44

This brings up a concern about how "high value foraging habitat" for the Greater Sandhill Crane is defined. For GS5.1 in Table 7.1 (page 7-47), alfalfa is offered as a crop preferred by Greater Sandhill Crane. Presumably this preference attribute was taken from the Appendix B species account for Greater Sandhill Crane (Appendix B 539 -540).

> Ivey (pers. Comm.) rated agricultural crops in the Plan Area in order of Importance. Rice and corn were rated the highest, followed by winter wheat and irrigated pasture. Alfalfa was the next highest rated crop, followed by hay, dryland pasture and row crops.

This ranking of alfalfa is somewhat outdated. Ivey, Herzinger, and Hardt prepared a report for the Nature Conservancy in 2014 titled: "Conservation Priorities and Best Management practices for wintering Sandhill Cranes in the Central Valley of California." It is included as addendum 4 to this comment letter. On page 40 to 41 of the report it states:

> Greaters rarely used alfalfa in the Delta, in contrast to Lessers, which often favored alfalfa through the winter season (Ivey 2015). Similarly, Greaters avoided alfalfa in the Sacramento Valley studies (Littlefield 2002, Shaskey 2012). Although alfalfa appears important to Lessers, this crop should not be considered a major food source for Greaters in a conservation-planning context. However, alfalfa should be encouraged in crane landscapes in the San Joaquin Valley, where Lessers dominate the crane flocks. 9.45

We are concerned that, if alfalfa is considered in the Plan as a "high value foraging habitat" for the Greater Sandhill Crane, it will be all too easy to fold conservation action GS5.1 (page 7-47) of maintaining food plots for the crane into alfalfa cover type preservation requirements for the Swainson's hawk. 33* GS5.1 should be changed to state that: "Crops should be corn or rice preferentially, and potentially wheat or other suitable crop types depending on the current crop mosaic in the Plan area."

The last sentence of GS5.1 (SSHCP 7-47) states that: "Crops must not be harvested or removed until March." 34* It would be useful to include some verbiage that crops like corn should be knocked over at a height, and as early as possible in the season, to maximize the benefit and to give access to cranes, while still impeding geese from exploiting the resource. 9.46

For GS6.1 of Table 7-1(SSHCP page 7-47), the fourth bullet point, listed as a criteria to be considered (and we appreciate that this is a criteria to be considered rather than a requirement, and that it is only one of a list to be considered) for selecting Preserve sites for high value foraging habitat outside of the 100 year floodplain, 9.47

includes sites "recorded as supporting greater sandhill crane foraging during previous flood events." We understand the intent of this criteria, but we have three concerns about it. The first concern is that records for crane usage are very limited during flood events and therefore do not necessarily capture where they are foraging during such stochastic events. Secondly, the vast majority of the lands above the floodplain in question are privately held, and it has only been possible to determine if cranes are present in a given area from roadside observations, which would limit the ability to accurately determine if cranes are using a particular parcel. Thirdly, cranes are only likely to use habitat and crop types that are consistent with their natural history regardless of flooding. Parcels that have been planted in crop types that are not suitable for cranes are not going to get usage, and therefore might not be considered even though they would be used for foraging if a more appropriate crop were present.

The easiest answer to these concerns is that the fourth bulleted criteria is only one of six that will be considered, and it is not a strict requirement. And there still remains the difficult assessment of which criteria carry the most weight when making a selection. And arguably, the most important criteria besides, actually being outside of the floodplain, is that it is located within 2 miles of a roost site. But, given the very real likelihood of sea level rise, which is presented in chapter 11, many of the current crane roost sites might not function in perpetuity. If they fail due to sea level rise, presumably a new site will be selected nearby that exhibits the attributes they require for a roost site. This will have the outcome of permanently shifting the Plan area crane population to higher ground which means they would have the options of routinely foraging to the north below the city of Elk Grove, and to the east, continuing past the city of Galt. And this is the real crux of the problem with the fourth bulleted criteria point: how do we address sea level rise using crane natural history and their current usage of the landscape as a guide?

9.47
cont'd

Given that Greater Sandhill Cranes forage within two miles of their roost sites, and that they exhibit extremely high fidelity for their roost sites, immediate individual population range usage adjustments within the Plan area due to roosting loss from sea level rise should be considered in 2-mile increments. What is the nearest suitable viable roost site within two miles and what are its corresponding foraging grounds? If the goal is to shift cranes to habitats they can use in perpetuity as a response to rising sea levels, it would make sense to look at geographic pathways to do that in two-mile increments. The third map attached as an addendum to this comment letter attempts to do that as it highlights upland forage areas within the Plan area that are north as well as east of the current population strongholds for cranes in the north Delta.

It is important to note that the map presents the paradox of the current crane conservation landscape. The historically most important conservation targets for cranes, appropriate habitats within 2 miles of high usage roost sites, are the very same targets that will potentially get the crane into trouble, as sea levels rise, because of their elevations. The map suggests that a balanced approach is

13

potentially going to be the most appropriate going forward, where efforts continue to be made to preserve habitats that become available within that two mile radius of high usage roost sites, while simultaneously focusing on what it will take to secure permanent long term habitat for the crane outside of the north Delta. The 1000 acres action item outside of the floodplain called for in this Plan is something that can begin to address that shift in conservation priorities for the crane. As such, it is important to provide appropriate guidance in this Plan as to how to make that shift. 9.47 cont'd

The Sandhill Crane TAC, that has already been discussed in the context of overarching concerns for this chapter (and it is important to remember that USFWS and CDFW are on this committee), would be an appropriate committee to help the implementers of the SSHCP to formulate and refine a response to the seal level rise issue that can make the most effective and beneficial use of the required MINIMUM 1000 acres of conservation required for the crane outside of the floodplain. 35* As such, we recommend that an additional bullet point be added that reads: "Coordinate with relevant conservation entities, and the wildlife agencies, to determine the most effective acquisitions to deal with potential geographic shifts for the Greater Sandhill Crane population within the SSHCP Plan area in anticipation of, and as a result of, sea level rise." 9.48

A couple of small corrections in the treatment of Greater Sandhill Cranes in section 7.6.2.26 (starting on SSHCP page 7-277): 36* tenth line from the top on page 7-283 – cranes do not nest in the Plan area and this should be changed to "roosting and foraging;" 37* last paragraph discussion of re-establishment and/or establishment (page 7-282) should focus more upon the importance of waste grain than that of invertebrates since those waste grains make up the majority of the food consumed by cranes in the Plan area – invertebrates should be mentioned, but not to the exclusion of waste grains. 9.49

Tricolored Blackbird

For this species in particular we have the concerns already expressed about pesticide use that can have deleterious effects on their prey insects. Reading all of the conservation actions, and knowing that there are, as of now, insufficient AMMS to deal with this issue, it was difficult to see success as an outcome. 38* More robust insecticide AMMs need to be established for the agricultural preserves if this species is to persist in the Plan area. 9.50

The conservation action TB5.1 in Table 7-1 (Biological Goals, Measurable Objectives, and Conservation Actions, page 7-51) states "Protect at least one extant unprotected occurrence of a nesting colony prior to the take of one nesting colony of tricolored blackbird." The first listed criteria for selecting the extant unprotected nesting colony is that it has supported a minimum of 200 individual tricolored blackbirds during one or both of the surveys for the two years preceding the project application. Having a 200-bird minimum is not a bad thing, but as written, a colony of tens of thousands of blackbirds could be taken and then replaced with a colony of 9.51

14

300 birds. 39* This criteria should be reworded to require that the protected colony contain a minimum of 200 individual blackbirds, and contain at least an equivalent number of blackbirds as in the colony taken. If this or an equivalent change is not made, abuses of this conservation action will be possible. Similar corrections need to be made to TB5 in Table 7-787 (page 7-288) and the first paragraph of page 7-291. 9.51 cont'd

In the latest statewide survey for which data is available, there were over 22,000 tricolored blackbirds breeding in Sacramento County, most of which were in the SSHCP Plan area. As a result, 40* we need a sufficiently robust conservation strategy, and no large colonies should be taken until we have substantial conservation of large colonies within the preserve system. 9.52

For Objective TB6 of Table 7-87 (Biological Goals and Measurable Objectives Applicable to Tricolored Blackbird) 41* an experimental study of the effects of pesticides on Tricolored Blackbirds should not be a prerequisite before more stringent requirements for pesticide use on agricultural preserves. For insecticides in particular, it does not take an experiment to conclude that eradication of the main prey of the blackbird will have severe negative effects. Dr. Meese at UC Davis has been sounding the alarm bells for some time about the severity of the insecticide problem for the Tricolored Blackbird. Experiments to determine insecticides that do not have such negative consequences on the blackbird would be merited, but this would take a very long time to establish conclusively and should not predetermine or put off insecticide policies for the agricultural preserves. 9.53

Loggerhead Shrike

On page 7-276 it is stated that: "if large trees are planted in hedgerows, they can provide Loggerhead Shrike perches and potentially nesting habitat." 42* The reference to perching and nesting habitat in large trees should be removed because Shrikes use shrubs and small trees for nesting (nests 2 ½ to 4 feet above ground), including thorny shrubs, and they use low perches, including fence posts, for hunting. 9.54

43* Specific conservation actions should be included for the Loggerhead Shrike, like providing artificial or natural perches. Hoping that the required 10,000 linear feet of hedgerows will resolve or help the problem is quite different than targeted specific actions. The same is true for Loggerhead Shrike nesting habitat. 9.55

Swainson's Hawk

There is no mention of the standing CDFW requirement that Swainson's Hawk mitigation acquisitions are supposed to be above sea level. 44* This requirement should be added to the relevant conservation objectives and their associated conservation actions such as SH1 (page 7-39), SH2, SH3 (page 7-40), and SH6 (page 7-41). 9.56

15

For the 2000 acres of cropland to be preserved in fee title, according to conservation objective SH2 in Table 7-1 (Measurable objectives and Conservation Actions), it is unclear how this interacts with the 200 acres of intensively managed crops required for Greater Sandhill Cranes. Was an assumption made that the alfalfa requirement for Swainson's Hawk (a minimum of 50% of the 2000 acres) would satisfy the crane objective (200 acres of feeding plots) based on an outdated species account that incorrectly identified alfalfa as a suitable crop type for crane foraging? If this was the case, it may be necessary to look at the non alfalfa plantings in that 2000 acres and determine if it is possible to site at least 200 acres of them for the co-benefit of the crane and the Swainson's Hawk, keeping in mind that the ideal crop for the crane (corn and rice) is not the ideal crop for the Swainson's hawk, and vice versa; and keeping in mind that they need to be within acceptable distances for roosting cranes as well as nesting Swainson's hawks. The somewhat disjointed way that the various acreages are presented in Chapter 7 makes it difficult to determine how much of one species' conservation can be satisfied simultaneous to that of another species who relies upon the same habitat. 9.57

It is the contention of some of the long-term stakeholders in the Plan preparation that originally it was going to be 2000 of intensive management acres for Swainson's Hawk and then an additional 200 acres of food plots for the crane. 45* The final SSHCP should include these separate 2000 and 200 acres, with their very different functions. 9.58

White Tailed Kite

In the discussion in 7.6.2.21, starting on page 255 of the SSHCP, there is mention of benefits that would accrue to the species through planting of trees in agricultural settings, as well as the benefit of hedgerows. On page 7-260 it states: 9.59

> Similarly, planting trees in agricultural settings should increase the number of suitable nest and perching sites near foraging habitats, and plant hedgerows should increase habitat for prey species and prey availability. Additionally, if large trees are planted in hedgerows, they will provide white tailed kite nesting habitat in addition to increased prey habitat values.

There seems to be no mention of these underlying biological objectives or goals in table 7-76 (Biological Goals and Measurable Objectives Applicable to White Tailed Kite, page 7-258)." 46* Measurable objectives should have been included on page 7-258 in Goal 4 (Maintain or improve value of natural land covers (including Cropland and Irrigated Pasture-Grassland) that are preserved in the Plan Area). At a minimum AG3 should have been added which contains the 10,000 linear feet of hedgerow requirement. And, 47* a new related biological goal should be added for the planting of a specific number of trees in agricultural settings. Surely, "if" large trees are planted in hedgerows they will provide the aforementioned benefit. But, "if" they are not planted then no benefit will accrue. 48* Measureable objectives are needed here for tree planting to benefit White Tailed Kites, and they should be 9.60

16

included in Table 7-76 on page 7-258. This is another example of where species' specific measures are lacking.	9.60 cont'd
Burrowing Owl	
Burrowing Owl conservation has been a difficult effort to get on top of for the HCPs already in implementation phase in Northern California. As a general note, 49* where Burrowing Owl persist within the UDA, irrespective of whether or not they happen to be in Preserves, efforts need to be made to conserve those occurrences - see attached for addendum 5 which is a PowerPoint that discusses the need to also focus conservation for Burrowing Owls within HCP Plan areas on where they currently persist, which can often be in very unexpected urban settings, rather than where they "should" persist (i.e. expensive preserves featuring enticements for them).	9.61
For BO 2.1 in Table 7-1 on page 7-44, 50* we recommend that an additional conservation action be added to the last bullet point ("Enhance foraging habitat quality through") - namely: "Create rock piles near nest burrows."	9.62
Miscellaneous	
For VPP 1.1, on page 7-28, 51* protecting 6 occurrences of Ahart's Dwarf Rush may require establishing new occurrences.	9.63
On page 7-43, we wonder if NH1 and NH2 should be merged?	9.64
For table 712 on page 7-103, 52* This looks like a John Diddes analysis table, and he must get proper credit if that is the case.	9.65
Monitoring and Management Programs (Chapter 8)	
Monitoring for "how the species is doing"	
Beyond the annual plants and invertebrate status and trends monitoring, there is not much "how is the species doing?" monitoring for the rest of the species (page 8-106). 53* The Plan will need this information for nearly all of the species to ensure that Conservation actions and Preserve Management Actions are working. In some cases it will be possible to tie into larger monitoring efforts such as the statewide Tricolored Blackbird surveys or the extensive Swainson's Hawk nest surveys for Sacramento county area.	9.66
Pesticides/Insecticides	
Consistent with earlier comments regarding pesticide/insecticide use on agricultural preserves, we believe that the reliance on timing of pesticide use, as is presented in TCB-5 (page 8-80), is not adequate to address the effect on insect prey	9.67

17

species. 54*A far more robust AMM is needed, as has been mentioned, and 55* a more thorough assessment will then also be needed to ensure that the agricultural preserves have sufficient insect prey species to support covered species (such as Tricolored Blackbird, Loggerhead Shrike, Greater Sandhill Crane, and Western Red Bat…). 9.68

Miscellaneous

For GSC-3 (page 8-81), 56* for the assessment of the crane roost buffer it is unclear why nesting would be mentioned given that cranes don't nest in the Plan area. What needs to be assessed is compliance with the establishment of a .5-mile roosting setback. 9.69

For Section 8.4: "Data Management and Reporting," 57* it would be useful to include information, or a process, or a contact, for getting access to the data repository for scientific and other uses. 9.70

For section 8.4.1: "Annual Reports," 58* it would also be important to include the available inventory (in acres) remaining for each cover type/habitat type in the Plan Area. This is important because the Plan implementers need to track how much potential inventory is still available for their mitigation purposes, as well as to understand what other land use activities not covered by the SSHCP may do to that inventory. The same holds true for those who might make discretionary entitlement decisions for uncovered activities in the Plan area. 9.71

For Table 8-4, starting with page 8-126, there are several rows, in the column headed "when and how often," where "5 years for surveys including staff observation in annual reports" appears. What does "5 years for surveys mean," every five years or something else? 9.72

Implementation (Chapter 9)

Governing structure and responsibilities

For the second paragraph of "Implementing Entity Responsibilities in Reviewing Third Party Requests for Take Authorization" (page 9-12), 59* it would be prudent to also include inventory as one of the things that the Implementing Entity tracks and provides to Plan Permitees and Land Use Authority Permitees as they process third party applications for take. 9.73

For section 9.3.4 (Technical Advisory Committee/Interagency Review Team, page 9-18), we recommend adding another responsibility for the TAC/IRT, which would be: 60* "review relevant new scientific studies and reports for applicability in Preserve management." It will be important for successful management of the preserves, including adaptive management, to be able to refer to and learn from new developments and studies that are relevant to the covered species and the conservation actions being implemented on the preserves, as well as for priority 9.74

18

considerations for new property acquisitions. 9.74 cont'd

On the same page (9-18), after the bullets detailing the responsibilities and duties of the TAC/IRT, it states:

> As discussed previously in section 9.3.1, the JPA Board or Implementation Committee is ultimately responsible for approving the aforementioned plans and actions, and the Permitting Agencies will have approval authority over those plans and actions with the exception of property transactions for satisfying the Conservation Strategy.

As near as we can make out, no other entity has the ability to veto a property transaction that the Implementing Entity plans to approve. The wildlife agencies (also referred to as Permitting Agencies) have the ability to review "SSHCP land easement acquisitions, land dedications, and acquisition of mitigation or conservation bank credits" (page 9-14, last bullet point of section 9.3.2). But here there is no mention of approval, just review. The TAC/IRT also is tasked with "reviewing SSHCP property transactions for satisfying the Conservation Strategy such as land or easement acquisitions... " (Page 9-18, third bullet point in section 9.3.4). 9.75

We are very concerned about the absence of any balance of power when it comes to approval of acquisitions. We had originally pushed for a completely autonomous Conservancy structure that implemented the Plan to avoid any political interference. As presented we have the opposite, politicians in charge of the implementation of the Plan. We understand the argument that since the Permit Holders are on the line for the implementation of the Plan they need to have ultimate say over Plan implementation. Interestingly, one of the elements that underlies that argument is that the Permit Holders would not necessarily trust a third party conservancy to carry out implementation correctly and they would be liable, and therefore they want that responsibility themselves. Similarly, we do not necessarily trust that the JPA will carry out the implementation of the Plan in a politics free environment and that they will never approve an acquisition for political rather than biological and conservation reasons. 9.76

The only way that conflicts of interest and political maneuvering can be addressed is if there is a robust system of checks and balances within the governing structure. 61* Either, preferably both, the Permitting Agencies (USFWS, CDFW, USACE...) and/or the TAC/IRT needs to have approval authority of acquisitions, and any other property transactions. If only one were given this oversight, it would likely make the most sense to rely upon the TAC/IRT for this since the Permitting Agencies sit on that committee/team. Without this balance of power, and built in checks and balances, the Plan will risk potential political abuse over the next 50 years – such as sub standard habitat being passed off as high quality as a political favor to a particularly generous constituent. We consider this issue to be of the UTMOST importance, and absent an effort to address the concern in the governing structure, 9.77

it will be difficult for us to support the Plan. 9.77 cont'd

It is very important that stakeholder representatives be on the TAC – their active involvement will be essential to the long term success of the HCP- and we appreciate that they have been included. 9.78

Acquisitions

On page 9-23: "Reselling Acquired Lands after Establishing Conservation Easements" is predicated on the Conservation Strategy working effectively with only 15% of Preserve lands outside the UDA being held in fee title. The fee title lands would allow for more intensive management, and more of this might be necessary depending on conditions within the Plan area. Maintaining as much land as possible in agriculture and ranching is important to the success of conservation efforts in the Plan area because a sustainable agricultural and ranching economy helps preserve the important agricultural component in the habitat mosaic of the Plan area, and most of that component will be outside of the confines of the SSHCP conservation strategy. But as important as agriculture and ranching are, it is important to use language in the Plan that allows the flexibility to adjust the ratio of fee title and conservation easement if it is deemed necessary for the conservation of the covered species. 62* The 15% should be considered an important goal, but a goal that is not subservient to successfully implementing the Conservation Strategy. If adaptive management and changes in conditions on the ground in the SSHCP require more intensive management, the Plan should not be limited by prescriptive language that precludes it from adjusting the ratio. 9.79

Early Enrollment Program

For section 9.4.5 63* it would be prudent to discuss how priority of acquisition will proceed for those enrolled. The early enrollment program is a very clever and effective way to get landowners to participate early in the life of the Plan, and it will help to conceptually build the Preserves on the landscape before there is adequate money to buy the needed parcels. In order for the enrollees to have a reasonable experience, and not lose heart while they wait for their property to be paid for, it is imperative that a very clear and a very fair and transparent process is laid out for how and when enrolled properties will be paid for. For the purposes of the success of the Plan, it will be very important to prioritize individual properties within the context of the overall Conservation Strategy to maximize the conservation benefit that will accrue to the Plan. But, for the enrollees, it is important that, whatever that prioritization scheme ends up being, it is enforced consistently and without bias or prejudice. The only way that it will be clear to enrollees, if that is actually the case, is if the process is transparently laid out at the time of enrollment. 9.80

Gifts of Land

Section 9.4.7: "Gifts of Land" 64* does not explicate if a gift of land that fits into the SSHCP Conservation Strategy and Preserve creation strategy could be accepted and 9.81

20

then used for mitigation for a third party application. Also, 65* there is no discussion or explanation of how or if there would be the same level of monitoring, operation and management activities as found on preserves in the SSHCP, 66* or how long term management would be paid for. 67* It would be very important to consider any gift of land in the context of Appendix J (Additional Voluntary Conservation) and make sure that any gift of land did not satisfy the goals found there before it was denied. As well, land that did not come with an endowment could conceivably get a grant to cover that cost through Appendix J efforts.

9.81 cont'd

Preserve Setbacks

The Plan dispatches with any requirement for preserves outside of the UDA to consider setbacks because it states that those preserves currently exist in an open space context and don't need them, which is true for now. It seems to be a missed opportunity, though, not to consider the potential impacts of agricultural residential projects that could easily crop up immediately adjacent to a preserve. 68* Would it not be prudent to include some language detailing what an acceptable buffer/setback would be for the preserves outside the UDA? As well, 69* language in the General Plan would also be appropriate for delineating such buffers/setbacks for preserves within the county. The language needs to require a restriction for county approval of AG RES to include 200 foot no human activity buffer next to any preserve lands.

9.82

Setbacks that are outside the preserves per-se will be owned and managed by various entities, including home-owners associations. In order to ensure that the setbacks are properly managed according to the HCP requirements, 70* there also need to be conservation easements that restrict usage of setbacks and require necessary management measures. The HCP implementing entity must have enforcement power over the setbacks to ensure proper management.

9.83

What is not a problem today can be solved much more easily than when it is a problem tomorrow.

9.84

Data Repository Development and Maintenance

For section 9.8 (Data Repository Development and Maintenance, page 9-40) 71* it would be good to refer to our comment for Section 8.4 (Data Management and Reporting) which suggested that it would be useful to include information, or a process, or a contact, for getting access to the data repository for scientific and other uses. A huge amount of expense will go into collecting the data within the repository and it would be appropriate and beneficial to allow that data to be made available for scientific study, conservation management, and other purposes.

9.85

21

Future Land Use Planning Changes

Section 9.10.4 (Future Land Use Planning Changes, page 9-47) states: "changes in land use designations or regulations do not trigger preparation of a minor modification or an amendment to the SSHCP, if the changes would not directly or indirectly effect completion of the SSHCP Conservation Strategy." This section instills confusion rather than clarity and relies on the interpretation of "directly or indirectly." A definite result of future land use planning changes will be the loss of inventory for the SSHCP. 72* This section should explain at what point the loss of inventory becomes a problem for the SSHCP. At a minimum, this section should provide a minimum feasibility for acquisition bar for understanding "directly or indirectly." As an example: "If the land use policy changes will result in the loss of inventory such that the feasibility of acquisition, for the SSHCP for the lands it needs in the same PPU as the proposed land use planning changes, is higher than 15%, then a modification or amendment will be required." The issue of feasibility for acquisition has already been a contentious one in the SSHCP plan area for attempted changes in land use planning. 9.86

Implementation Schedule and Deadlines

For section 9.11, (Implementation Schedule and Deadlines, page 9-48) and Table 9-3 (Schedule for Major Implementation Tasks, page 9-49), 73* it would be appropriate to add "Update Species Accounts" to the tasks, and to do so in the "prior permit" time period if money can be secured. Those accounts will be very important for providing the important natural history background for the species covered in the Plan and will aid in many of the Conservation actions required. 9.87

Changed and Unchanged Circumstances – Assurances (Chapter 11)

Public Notification of Land Acquisitions

For 11.1.6 (Public Notification of Land Acquisitions), it is quite confusing to read about the private nature of negotiations, between landowners and the SSHCP Implementing Entity etc., and find absolutely nothing about public notification in this section. It is appropriate for such negotiations to be private and it is heartening to see that "the Technical Advisory Committee must approve the transaction (see Chapter 9, Section 9.3.4)" despite the fact the section referred to only stipulates that the TAC/IRT would be reviewing the transaction. This approval language should be kept, and Chapter 9, section 9.3.4 should be changed to reflect that the TAC/IRT will also be tasked with approving the transaction, as suggested in an earlier comment on that section. And, given the title of 11.1.6 74* there should be discussion about the public notification of land acquisitions. The maximum amount of transparency is obviously appropriate after the transactions have been approved, and the more information available to the public, the better for the Plan as it will have yet another level and layer of scrutiny and watchdogging. 9.88

22

Projected Climate Change Impacts in California

In section 11.3.1 the changed circumstance assumed for sea level rise is 12 to 18 inches by 2050, and 21 to 55 inches by 2100 in the SSHCP Plan area. As mentioned in earlier comments, this sea level rise will be most problematic for PPU6. And as also mentioned previously, the MINIMUM of 1000 acres of upland forage (foraging grounds outside of the 100 year floodplain) in and near PPU6 is a good start in addressing the need for Sandhill Cranes and other species to shift their populations to higher ground. Given the severity of the anticipated sea level rise, and the fact that much of the Delta is at or below sea level, it will be important to consider the need to secure enough suitable habitat above the higher sea level elevation that will be established as the ocean rises, and not rely completely on the Delta's existing levees which are aging and likely far too extensive to replace. There is no need to adjust the PPU specific acquisition targets to contend with sea level rise, but 75* there will likely need to be a shift over the Plan's 50-year implementation period towards prioritizing less vulnerable areas for acquisition. It would also seem reasonable to expect some species in the broader Delta ecosystem, including huge amounts of territory outside the Plan area, to abandon areas that become permanently inundated as a result of sea level rise, and that at least a portion of those species and individuals may well have to squeeze into the remaining upland areas of PPU 6 and other nearby PPUs. 9.89

In Table 11-1: Evaluation and Ranking of Covered Species Sensitivity to Climate Change (page 11-19) it is hard to rectify the sensitivity ranking for Greater Sandhill Crane sensitivity determinations with their natural history. The Greater Sandhill crane is extremely philopatric to its roost and foraging sites when it winters in the SSHCP Plan area, and this is exactly why conservation priorities for the crane are within 2 miles of their roost sites in the Conservation Strategy of this Plan. The table correctly ranks the crane's sensitivity to habitat specialization/habitat changes as high. Physiological tolerance is ranked as unknown, and for dispersal activity, and changes in food availability; it is given a low sensitivity. This is surprising because the sea level rise numbers presented have the ability to wipe out the vast majority of the existing preserved lands for the crane – refer to the map in addendum number 2 for a depiction of this. This means that an extremely philopatric species will potentially be uprooted and the closest available upland forage areas (and Greater Sandhill Cranes definitely prefer areas that they are familiar with, e.g. within two miles of their roost sites), of which the Plan is preserving 1000 acres, also just happen to be some of the most desired for urbanization in the region, which means agricultural production may well be quite constrained. So, despite the omnivorous nature of the crane, food could be a very serious problem if the abundant waste grains they have become accustomed to are largely gone in the Plan area. 9.90

We would argue that the overall sensitivity ranking for the Greater Sandhill Crane to sea level rise is extremely high. And given that the other manifestations of climate change will present additional difficulties on top of sea level rise, overall sensitivity 9.91

23

would increase even further. 76* As such the overall sensitivity should be changed to "high." Dealing with where Greater Sandhill Cranes are going to persist in the Plan area is likely going to be one of the big implementation challenges of the SSHCP. 9.91 cont'd

Economic Analysis and Funding Program

The Home Price Index (HPI) that will be used to adjust inflation annually for the acquisition category of fees (page 12-20, Automatic Adjustment of Development Fees to Account for Inflation) is not going to be the best benchmark to adjust inflation in land prices. During the huge market downturn that hit the real estate markets particularly hard last decade, raw land prices were not tracking anywhere near that of the plummeting residential market. 9.92

A general comment for both the annual adjustment of acquisition fees, and the periodic audit and adjustment, is that at any given point in the Plan there would be better information available on the ground as a result of the recent land appraisals and purchases than would ever be available using what becomes a quickly irrelevant reliance on an annual adjustment or even potentially older periodic adjustment. It does not make a lot of sense to rely solely on these predetermined adjustment timeframes when the market can fluctuate dramatically in between those timeframes. This Plan has a very robust Get Ahead Stay Ahead (GASA) component such that at no point in the implementation process should there be any mystery as to what the land acquisition costs actually are because that land is already available in the Plan as part of GASA, or it is in the early enrollment program, or it is being dedicated. In all of these cases the cost of the land either is (enrollment) or was (GASA) the cost of the land, and that value will or should be verified through an appraisal. 77* It would seem a whole lot more efficient to go with what is known, than to make a guess and then adjust that guess every year automatically based on a loosely associated market indicator, and then conduct an audit every three or five years to concretize a market picture at the time of the audit. 9.93

Appendices

Appendix B, species accounts.

As has already been suggested, the species accounts are woefully outdated and desperately need to be updated. 78* The accounts should be updated as soon as money, allows, ideally prior to permit issuance, and they should particularly focus on new knowledge about species ecology that is pertinent to management, as well as new management ideas and new knowledge of species occurrences. 79* The species accounts should be updated periodically during the 50 year permit period. 9.94

80* Specific biologists, such as John Diddes, developed the existing accounts in this appendix and it is essential that they receive credit. 9.95

24

This 588-page document needs a navigation system for individual species. The present system (pops up along left hand margin) is individual pages and of no use. 9.96

Appendix D1

Some thought should be given as to whether subordinating a mortgage or other interest to the Conservation Easement is adequate protection. There seems to be presupposition that lenders, whether institutional or personal, are going to act rationally, and that is potentially a mistake given the extraordinarily irrational things that lenders have done in recent history (things that dragged down the entire global economy). 81* As such it might be worth considering, at least for the initial purchase, that proceeds from the easement sale be used first and foremost by the seller to pay down any liens such that the total debt on the property is not greater than the residual value of the property after the easement is recorded. This could easily be done during, and be a requirement of, escrow. 9.97

Appendix J

This is a very important addition to the overall conservation effort embodied in the SSHCP. What is not clear is if changes to the voluntary conservation actions and targets laid out in this appendix would need to go through the same "modification" or "amendment "process as those for the mandatory conservation actions. Ideally, increases to the voluntary targets as a result of successful implementation of the voluntary goals would be embraced as beneficial to the overall success of the SSHCP and would require no "process" beyond review by the TAC/IRT. Would the JPA be able to veto changes in the voluntary conservation? Some guidance here would be appropriate. 9.98

CONCLUSION

Thank you for the opportunity to share these comments and concerns and we look forward to working with you to address them in the language of the SSHCP, and to help make this important Plan a conservation success for our region. 9.99

Sincerely,



Sean Wirth, Conservation Chair, Mother Lode Chapter, Sierra Club



Brandon Rose, president, Environmental Council of Sacramento

25

John Hopkins, president Institute for Ecological Health

Mike Savino, president, Save Our Sandhill Cranes

Rob Burness, co-chair Habitat 2020

RTC 9.1 (SSHCP) – The plan preparers recognize the contributions of the commenters to the development of the SSHCP. We appreciate your further comments. Please refer to responses to specific comments below.

RTC 9.2 (SSHCP and EIS/EIR) – The SSHCP and EIS/EIR have been revised as appropriate in response to the comments provided in the letter. Please refer to responses to specific comments below.

RTC 9.3 (SSHCP and EIS/EIR) – Reponses to comments assign the same importance to comments regardless of their position in the comment letter. We appreciate the effort to organize comments.

RTC 9.4 (SSHCP) – The comment provides the commenters view on the history of the SSHCP and discussions surrounding the "grading ordinance."

RTC 9.5 (SSHCP) – The comment describes the proposed wetlands protection ordinance and expresses concern that the new ordinance will not stop illegal removal of vernal pools.

RTC 9.6 (SSHCP) – The Plan Partners acknowledge the importance of option agreements or similar legal instruments in achieving the biological goals and measurable objectives of the SSHCP. The Plan Partners have been actively engaged in securing conservation easements with willing sellers prior to plan adoption. The partners are also employing legal instruments similar to option agreements such as successive Purchase and Sale Agreements to secure commitments from willing sellers for potential purchase of additional conservation easements in the future. Such instruments are undergoing thorough legal review, and are designed to provide commitments that important resources are protected while giving the SSHCP Implementing Entity enough time to generate fees with which to acquire these resources. The goal of this process is to allow funding to become available to complete the purchase before the agreements lapse.

RTC 9.7 (SSHCP) – Comment noted. The County and other permittees will take into account the SSHCP and its Conservation Strategy in their future land use planning efforts and will require SSHCP consistency for development. However, the County does not intend to modify the General Plan out of cycle.

RTC 9.8 (SSHCP) – Section 5.2.7 of the Draft SSHCP states that pesticides are to be used for purposes of land management only:

> "Pesticide use for SSHCP Preserve management is covered under the CESA Incidental Take Permit, but not the ESA Incidental Take Permit. Pesticide use is allowed only when necessary to achieve the SSHCP Biological Goals and Measurable Objectives (e.g., exotic plant or exotic animal control). When necessary, pesticide use is allowed within SSHCP Preserves, within Preserve Setbacks, and within road ROWs that border SSHCP Preserves. As discussed in Chapter 8, Preserve Management Plans will be prepared for each SSHCP Preserve. Each Preserve Management Plan will identify processes to identify,

> document, evaluate, and then control invasive and other exotic target species by combining biological, cultural, physical, and chemical tools in a way that will minimize environmental risks. Pesticide use as part of a Preserve management strategy is not expected to adversely affect Covered Species over the Permit Term because pesticide use will be limited, and pesticide use will strictly comply with the pesticide label and all other applicable federal, state, and local laws pertaining to the use, safety, storage, disposal, and reporting of pesticides."

SSHCP Section 8.3 describes the monitoring and management requirements of the SSHCP, including adaptive management feedback loops for achieving the Biological Goals and Measurable Objectives of the SSHCP. Based on the adaptive management feedback loops of monitoring and management, when pesticide use for purposes of land management is allowed by an individual Preserve Management Plan, the activity will be monitored and will be adaptively modified on a preserve-by-preserve basis. We welcome the involvement of the TAC in developing an effective way to track the effects of the minimal pesticide use that may occur on certain SSHCP preserves, and to ensure that this pesticide use does not further contribute to the ongoing cumulative impacts of Plan Area pesticide use on the insect prey base, which you discussed in your comments.

RTC 9.9 (SSHCP) – See the response to Comment 9.8.

RTC 9.10 (SSHCP) –See the response to Comment 9.8.

RTC 9.11 (SSHCP) – Also see the response to Comment 9.8.

RTC 9.12 (SSHCP) – Measure ROAD-3 provides examples of where road signs might be posted to provide a warning to applicators of pesticides that they are near sensitive habitat for covered plant or other covered species occurrences that could be impacted by pesticide use. AMM ROAD-3 has been revised in Final SSHCP Section 5.4.1 to include reference to areas that provide habitat for vertebrates that rely on insects for part of their diet.

RTC 9.13 (SSHCP) – The term pesticide includes the more specific terms insecticide and herbicide. It has been retained in the Final SSHCP because the specific meaning is clear based on the context.

RTC 9.14 (SSHCP) – Lighting from new development is noted as an indirect effect to many covered species in the effects analysis of Section 6 in the Draft SSHCP (e.g., Table 6-63 for western spadefoot). For measures that would reduce the effects of lighting from new development in the UDA, see Section 5.4.1 of the Draft SSHCP; urban lighting is addressed by AMM EDGE-8:

> **"EDGE-8 (Outdoor Lighting):** All outdoor lighting in Urban Development Covered Activity projects will be designed to minimize light pollution into existing and planned Preserves, except where a Land Use Authority Permittee determines lighting is necessary for public safety or security. Minimization measures may include light fixture placement (e.g., as low to the ground as possible), lamp designs (e.g.,

> shielding, low glare, or no lighting), directing light away from Preserves, or other means to avoid or minimize light pollution. The Third-Party Project Proponent will use the best information available at the time of project design to minimize effects of light pollution on target SSHCP Covered Species (e.g., western spadefoot (*Spea hammondii*) and Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i))."

The Draft SSHCP assumed that EDGE-8 would be effective at reducing lighting effects to an acceptable level, considering the width of UDA preserve setbacks, but would not eliminate all lighting effects on covered species in the UDA, including insect prey of covered species. Also, most of the SSHCP preserve acres will be in rural areas of Sacramento County, so few of the SSHCP preserves would be impacted by artificial lighting from UDA development. Temporary effects of construction lighting, including effect on insect prey of covered species, are addressed by AMM BMP-6 in the Draft SSHCP:

> **"BMP-6 (Construction Lighting):** Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will direct all temporary construction lighting (e.g., lighting used for security or nighttime equipment maintenance) away from adjacent natural habitats, and particularly Riparian and Wetland habitats and wildlife movement areas."

RTC 9.15 (SSHCP) – Tables 6-94 and 6-95 are provided on pages 6-358 and 6-359 respectively in the Draft SSHCP, and are in sequential order.

RTC 9.16 (SSHCP) – The list of covered species in Table 6-3, for Conditions EDGE-8 and BMP-6 has been amended in the Final SSHCP to include Ricksecker's water scavenger beetle and valley elderberry longhorn beetle. Refer also to response to Comment 9.14 regarding effects on insect prey of covered species.

RTC 9.17 (SSHCP) – Tables 6-51, 6-52, 6-54 and 6-55 have been updated in the Final SSHCP to reflect that lighting could cause mortality to Ricksecker's water scavenger beetle and valley elderberry longhorn beetle as a result of exhaustion, attraction of predators, or disruption of biological cycles.

RTC 9.18 (SSHCP) – Valley elderberry longhorn beetle has been added to the list of species identified in EDGE-8 in the Final SSHCP. Ricksecker's water scavenger beetle was already listed in EDGE-8.

RTC 9.19 (SSHCP) – See response to Comment 9.17.

RTC 9.20 (SSHCP) – See response to Comment 9.15.

RTC 9.21 (SSHCP) – See responses to Comments 9.14 and 9.17.

RTC 9.22 (SSHCP) – Refer to response to Comment 9.23 regarding usage of rodenticides in general. Text has been added to Final SSHCP Table 6-89 regarding effects of rodenticides on western burrowing owl, and how those impact might be avoided or minimized.

RTC 9.23 (SSHCP) – The comment requests that the SSHCP prohibit all use of rodenticides on SSHCP preserves, due to their adverse secondary effects on Swainson's hawk and other raptors. Section 5.2.8 of the Draft SSHCP describes pesticide use as a Covered Activity is to be used for purposes of land management only:

> "Pesticide use is allowed in Preserves only to achieve the SSHCP Biological Goals and Measurable Objectives (e.g., exotic plant or exotic animal control). Preserve Management Plans (see Chapter 8) will prescribe an integrated pesticide use process as a Preserve management tool, modeled after the California Department of Fish and Wildlife's pesticide use approval process (CDFW Forms 679 and 680). At a minimum, this will include compliance with pesticide label instructions and state and local laws. Use must also comply with existing injunctions related to the use of pesticides."

If the Implementing Entity determines that rodenticide use is necessary and appropriate on a preserve parcel, the rodenticide use will be included in the parcel's proposed Preserve Management Plan. As discussed in Section 9.3.4 of the SSHCP, each Preserve Management Plan is subject to review and approval by the TAC, which would include members from the environmental community and wildlife agencies. In general, the Plan Preparers expect that usage of rodenticides will not be warranted or allowed on SSHCP preserves. However, in order to maintain a pool of willing sellers of conservation easements on Plan Area agricultural lands, the Plan Preparers could not completely prohibit their use within all of the SSHCP Preserve System. If the TAC does approve an individual Preserve Management Plan that allows use of rodenticides, that usage would be subject to limitations described in the PMP on timing and area of application, amounts to be used, and acceptable rodenticides. If appropriate, those restrictions could be incorporated into the conservation easement.

RTC 9.24 (SSHCP) – See the response to Comment 9.23.

RTC 9.25 (SSHCP) – Text has been added to Table 6-92 noting that lighting could attract insects upon which the loggerhead shrike preys. See response to Comment 9.14. Within Section 5.4.1 of the SSHCP, urban lighting is addressed by EDGE-8:

> **"EDGE-8 (Outdoor Lighting):** All outdoor lighting in Urban Development Covered Activity projects will be designed to minimize light pollution into existing and planned Preserves, except where a Land Use Authority Permittee determines lighting is necessary for public safety or security. Minimization measures may include light fixture placement (e.g., as low to the ground as possible), lamp designs (e.g., shielding, low glare, or no lighting), directing light away from Preserves, or other means to avoid or minimize light pollution. The Third-Party Project Proponent will use the best information available at the time of project design to minimize effects of light pollution on target SSHCP Covered Species (e.g., western spadefoot (*Spea hammondii*) and Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i))."

And construction lighting is addressed by BMP-6 in the SSHCP:

> **"BMP-6 (Construction Lighting):** Plan Permittees and Third-Party Project Proponents implementing ground-disturbing Covered Activities will direct all temporary construction lighting (e.g., lighting used for security or nighttime equipment maintenance) away from adjacent natural habitats, and particularly Riparian and Wetland habitats and wildlife movement areas."

Refer also to response to Comment 9.14 regarding effects on insect prey of Covered Species.

RTC 9.26 (SSHCP) – Text has been added to Table 6-93 noting that lighting could attract insects upon which the loggerhead shrike preys. Table 6-93 of the Draft SSHCP includes BMP-6 for lighting. Refer also to response to Comment 9.14 regarding effects on insect prey of covered species.

RTC 9.27 (SSHCP) – See the response to Comments 9.8 and 9.28.

RTC 9.28 (SSHCP) – The comment requests changes to Table 6-3, which lists the SSHCP AMMs and the environmental stressors that would be reduced by each of the AMMs. The specific request is for new AMMs that would reduce impacts of pesticide use on insect prey for loggerhead shrike. Refer to response to Comment 9.63 regarding use of pesticides on Preserves, and how they might be controlled during SSHCP implementation. The text in Final SSHCP Table 6-92 regarding potential indirect effects on loggerhead shrike have been revised to state that the AMMs would minimize, rather than avoid those impacts.

RTC 9.29 (SSHCP) – See the response to Comment 9.30.

RTC 9.30 (SSHCP) – Text has been added to Final SSHCP Table 6-99 noting that lighting could attract insects upon which the tricolored blackbird preys. The text in Table 6-99 regarding potential indirect effects on tricolored blackbird from pesticides have been revised to state that the AMMs would minimize, rather than avoid those impacts.

RTC 9.31 (SSHCP) – See the response to Comment 9.68.

RTC 9.32 (SSHCP) – Text has been added to Final SSHCP Table 6-105 noting that lighting could attract insects upon which the western red bat preys. The text in Final SSHCP Table 6-105 regarding potential indirect effects on western red bat from pesticides have been revised to state that the AMMs would minimize, rather than avoid those impacts. See also response to Comments 9.68 below.

RTC 9.33 (SSHCP) – See the response to Comment 9.23.

RTC 9.34 (SSHCP) – See the response to Comment 9.35.

RTC 9.35 (SSHCP) – As described in Section 7.6 of the Draft SSHCP, the SSHCP will benefit each of the Covered Species by maintaining their current distribution in the Plan

Area, by maintaining or re-establishing their historical distribution in the Plan Area, and by providing for the re-establishment and establishment of additional habitat for these species in the Plan Area. Moreover, the SSHCP Preserves will maintain connectivity between existing occurrences and suitable existing habitat. Implementation of the SSHCP will benefit each of these Covered Species. Regarding the specific example of adding perches or specific plantings for loggerhead shrike, the Plan Preparers believe this should be included as part of an adaptive management program developed during the first 6 to 18 months of the SSHCP permit, but do not need to be included as measurable objectives because they are not necessary for species habitat.

RTC 9.36 (SSHCP) – Comment noted, and thank you for providing the attached materials. Please refer to responses to comments below that relate to the Crane TAC's draft mapping models.

RTC 9.37 (SSHCP) – Comment noted. However, the circumstance that is described in the comment is considered an "Unforeseen Circumstance" in the SSHCP. As stated in Section 11.4.3.1: "If sea level rise and flooding exceeds SSHCP projections such that preserved lands acquired for benefit of greater sandhill crane can no longer provide suitable roosting habitat for greater sandhill cranes, that sea-level rise or flooding would constitute an unforeseen circumstance." The sea level rise projections and other climate change-related projections were those currently in use by the state of California at the time of SSHCP preparation, as described in Section 11.3.1 of the Draft SSHCP. Exceedance of these projections, such as that described in the comment, was reasonably considered to be an "Unforeseen Circumstance" in the SSHCP.

RTC 9.38 (SSHCP) – Section 3.4 of the Draft SSHCP describes the process of developing habitat models for all 28 Covered Species. The purpose of the models is to define and map suitable habitat for each Covered Species in the Plan Area. The Plan Permittees, wildlife agency biologists and local species experts used the best available information to define and map Covered Species suitable habitat.

Updating the Species Accounts is not necessary to achieve the Conservation Goals and Objectives of the SSHCP. The information in the Species Accounts provides useful and detailed background for the Conservation Strategy, but was not relied upon in isolation when preparing the Conservation Strategy. In addition to the Species Accounts in Appendix B, the species models and the Conservation Strategy took into account the best available information available during SSHCP preparation related to: "species' needs for breeding, feeding, and sheltering at each life history stage; information from Plan Area species-surveys; documented species-occurrences within the Plan Area; and information on species range, including soil type associations and elevation limits."

RTC 9.39 (SSHCP) – The documents referenced in the comment were published after the Notice of Preparation as issued and the SSHCP was drafted. The USFWS 2016 HCP Handbook is a guidance document for the USFWS and the SSHCP is the applicant's document. The USFWS will consider the other documents and recovery plans mentioned prior to making their decision on the issuance of the ITP.

RTC 9.40 (SSHCP) – The species are presented alphabetically by common name within their taxonomic groups. We do not believe it would be worth the cost to reorganize the contents of the HCP by phylogenetic ordering.

RTC 9.41 (SSHCP) – Table 8-1 in Section 8.2.1 of the Draft SSHCP describes how Objective HAB3 will be implemented. Objective HAB3: "Record management history for Preserve parcels as they are obtained. Consider management history when developing initial preserve management approach."

Section 8.3.1 of the Draft SSHCP describes the process for preparation of a PMP for each Preserve. Each initial PMP must document the management history for each parcel (via records, interviews of ranch managers or landowners, etc.).

RTC 9.42 (SSHCP) – For Conservation Action HAB7.1, text has been revised in the Final SSHCP to require that vegetation biomass be measured for all non-agricultural preserves.

RTC 9.43 (SSHCP) – For Conservation Action GS3.1, text has been revised as suggested in the Final SSHCP. "Invertebrates" has been inserted in place of "voles".

RTC 9.44 (SSHCP) – Refer to response to Comment 9.43.

RTC 9.45 (SSHCP) – For Conservation Action GS5.1, text has been revised in the Final SSHCP to indicate a preference for corn and rice.

RTC 9.46 (SSHCP) – For Conservation Action GS5.1, text in the Final SSHCP has been revised as suggested.

RTC 9.47 (SSHCP) –Balancing the importance of the various Conservation Actions during selection of parcels for acquisition, or re-establishment/establishment sites, will be one of the most important roles of the TAC. We appreciate the expertise of the commenters and hope that they will continue to be closely involved with the Implementing Entity throughout implementation of the SSHCP.

RTC 9.48 (SSHCP) – Refer to response to Comments 9.37 and 9.47.

RTC 9.49 (SSHCP) – Section 9.3.4 of the Draft SSHCP describes the membership, formation and responsibilities of the SSHCP TAC. As the comment points out, USFWS and CDFW staff will be members of the SSHCP TAC. In addition, "Other entities with expertise in any of the topics to be discussed by the TAC, including representatives of the building industry, the agricultural community, the scientific community, and the environmental community, may also be invited to participate in TAC meetings." The Sandhill Crane TAC is encouraged to reach out to the SSHCP TAC upon formation to express their interest in participating. The requested text has been regarding accounting for sea level rise in preserve acquisitions for greater sandhill crane has been added to the conservation actions for measurable objectives GS1, GS2, GS5, and GS6 in the Final SSHCP.

RTC 9.50 (SSHCP) – Text in Section 7.6.2.25 of the Final SSHCP has been revised to change nesting to roosting and foraging. The importance of managing the re-established/established habitat to allow access to waste grains has also been noted in Section 7.6.2.25 of the Final SSHCP.

RTC 9.51 (SSHCP) – See the response to Comment 9.68.

RTC 9.52 (SSHCP) – Colony sizes vary widely in Sacramento County from year-to-year. Although the example of 10,000 birds provided in the comment was a hypothetical case, note that none of the 16 colonies detected as occupied in Sacramento County in 2017 exceeded 4,000 individuals (Meese 2017). The tricolored blackbird survey does tend to underrepresent Sacramento Valley populations because it is taken early in the breeding season (and misses re-nesting attempts which are more common Sacramento County). However, the survey results will often demonstrate that a colony has 1,000+ individuals one year, then just a few hundred, then none, then back to hundreds. For example, the site at Bradshaw Christian had 1 bird observed in 2011, then 12,000 in 2014, then none in 2017. This extreme variability means that it is very difficult to confidently identify “large” colonies. However, setting a minimum threshold of 200 individuals would ensure that the sites that only hosted transient, unsuccessful nesting attempts would be unlikely to be considered appropriate for preservation. In addition, the Conservation Strategy would require that colonies be preserves where foraging habitat would remain available, which is critical for this species. Colonies generally have multiple nesting habitat sites available in any given year, and will select the site with the least ongoing disturbance and best access to foraging habitat with large insects available. Preserving colonies without preserving their foraging habitat will likely lead to the nesting habitat being abandoned. The Conservation Strategy will also be re-establishing/establishing both aquatic and upland nesting habitat on Preserves (biological objective TB8), with an emphasis on doing so near high-quality foraging habitat. The Plan Preparers believe that the Conservation Strategy for tricolored blackbird will be effective as presented in the Draft SSHCP, and have therefore not made the requested changes to the Final SSHCP.

RTC 9.53 (SSHCP) – The comment states that no large colonies should be taken by covered activities until several large colonies are preserved in the Preserve System. It is highly likely that early enrollment and the jump start provision of the Conservation Strategy will result in additional preservation of existing colonies in the Preserve System before colonies are impacted. . Also note the response to Comment 9.52.

RTC 9.54 (SSHCP) – See the responses to Comments 9.25 through 9.28 and 9.68.

RTC 9.55 (SSHCP) – Section 7.6.2.24 has been revised in the Final SSHCP to remove the word “large” referenced in the comment.

RTC 9.56 (SSHCP) – Section 7.6.2.24 in the Draft SSHCP addresses the creation and preservation of nesting and foraging habitat through Conservation Objectives LS1 through LS5. Regarding the specific example of adding perches or specific plantings for loggerhead shrike, the Plan Preparers believe this should be included as part of an

adaptive management program developed during the first 6 to 18 months of the SSHCP permit, but does not need to be included as a measurable objective. Measurable objectives consist of broader targets for habitat preservation or establishment, rather than requiring that specific features be present.

RTC 9.57 (SSHCP) – Language has been added to table 7-1, under (Objective L1 conservation actions) in the Final SSHCP to state that "Acquisitions of land below sea level are prohibited". Language has also been added to Section 9.4.2 *Process for Acquisition of Preserve Land* to state that land below sea level will not be considered for acquisition.

RTC 9.58 (SSHCP) – The 2,000 acres of cropland to be preserved in accordance with Conservation Objective SH2 is in addition to the 200 acres to be managed for greater sandhill cranes.

RTC 9.59 (SSHCP) – Measurable objective SH2 in the Draft SSHCP includes 2,000 acres of intensively managed high-value habitat for Swainson's hawk. Measurable objective GS5 includes 200 acres of food plots, which would be a subset of the 2,000 acres preserved under measurable objective AG2, not those under objective SH2.

RTC 9.60 (SSHCP) – Conservation Objectives AG2 and AG3 have been added to Table 7-76 in the Final SSHCP.

RTC 9.61 (SSHCP) – Conservation Objective AG3 requires the planting of 10,000 linear feet of hedgerows. This is not an optional activity but a required objective.

> **"Objective AG3.** Maintain or increase raptor prey availability and improve raptor foraging habitat by strategically planting 10,000 linear feet of shrub or other substrate that provides cover and refugia for fossorial mammals and other prey species."

This existing objective has been added to the list of objectives in Table 7-76 of the Final SSHCP. Regarding planting of trees in hedgerows, that will be at the discretion of the TAC based on the conservation measures associated with AG3. Conservation measure AG3.1 states" Acceptable hedgerow plants include native trees, shrubs, and grasses as approved by the TAC."

RTC 9.62 (SSHCP) – Burrowing owl occurrences will be conserved in accordance with the Biological Goals and Objectives described in Chapter 7 of the Draft SSHCP as part of a larger preserved landscape. Additional burrowing owl occurrences may be avoided in the UDA (i.e., not impacted by development) by individual projects, but these will not be incorporated into the SSHCP Preserve System.

RTC 9.63 (SSHCP) – This text has been added to Conservation Action BO2.1 in the Final SSHCP.

RTC 9.64 (SSHCP) – The comment notes that there may not be six known occurrences of Ahart's dwarf rush present in the Plan Area to be preserved, and that implementation of Objective VPP1 may require establishment of at least one new occurrence.

RTC 9.65 (SSHCP) – Conservation Objective NH1 in the Draft SSHCP identifies a conservation goal of 1,245 acres of modeled foraging habitat for northern harrier. Conservation Objective NH2 identifies a conservation goal of 30,048 acres of modeled nesting/foraging habitat for northern harrier. Modeled foraging habitat for norther harrier is different than modeled nesting/foraging habitat. Therefore these conservation goals remain identified in two Conservation Objectives (NH1 and NH2) in the Final SSHCP.

RTC 9.66 (SSHCP) – John Dittes and Josephine Guardino are responsible for developing the unique and creative method of classifying vernal pools within the SSHCP Plan Area using a vernal pool acre/density index. Credit for this innovative approach is given on page 7-9. While Table 7-12 was created using information derived from the methodology that John and Josephine developed, the table is not from their work.

RTC 9.67 (SSHCP) – The monitoring is tied to the Conservation Goals and Objectives, which focus more on preservation, management and monitoring of modeled habitat. The SSHCP will benefit each of the Covered Species by maintaining their current distribution in the Plan Area, by maintaining or re-establishing their historical distribution in the Plan Area, and by providing for the re-establishment and establishment of additional habitat for these species in the Plan Area. Moreover, the SSHCP Preserves will maintain connectivity between existing occurrences and suitable existing habitat. Implementation of the SSHCP will benefit each of these Covered Species.

RTC 9.68 (SSHCP) – The comment requests additional restrictions on pesticide used on SSHCP preserves, and that insect prey populations be monitored to ensure that preserved foraging habitat remains suitable for covered species such as tricolored blackbird, loggerhead shrike, greater sandhill crane, and western red bat. Section 5.2.8 of the Draft SSHCP describes pesticide use as a Covered Activity is to be used for purposes of land management only:

> "Pesticide use is allowed in Preserves only to achieve the SSHCP Biological Goals and Measurable Objectives (e.g., exotic plant or exotic animal control). Preserve Management Plans (see Chapter 8) will prescribe an integrated pesticide use process as a Preserve management tool, modeled after the California Department of Fish and Wildlife's pesticide use approval process (CDFW Forms 679 and 680). At a minimum, this will include compliance with pesticide label instructions and state and local laws. Use must also comply with existing injunctions related to the use of pesticides."

If the Implementing Entity determines that pesticide use is appropriate on a preserve parcel, it will include that allowance within a proposed Preserve Management Plan. The Preserve Management Plan is subject to review and approval by the TAC, which would include members from the environmental community and wildlife agencies. The Implementing Entity expects that usage of pesticides will not be warranted or allowed on most SSHCP preserves. However, in order to maintain a pool of willing sellers of conservation easements on agricultural lands, the Plan Preparers could not completely prohibit their use within the SSHCP Preserve System. If the TAC does approve a Preserve Management Plan that includes use of pesticides, that usage would be subject to limitations in the PMP on timing

and area of application, amounts to be used, and acceptable pesticides. If appropriate, those restrictions could be incorporated into the conservation easement. This clarification has been added to Section 5.3 of the Final SSHCP.

RTC 9.69 (SSHCP) – Table 8-2 has been revised in the Final SSHCP to change nest to roost for GSC-3.

RTC 9.70 (SSHCP) – Section 9.8 of the Draft SSHCP states that "the data repository will allow for future expansion and integration with an external database (e.g., linkage to agency or other GIS map libraries)." Thus, outside users may contact the Implementing Entity with data requests. This clarification has been added to Section 9.8 of the Final SSHCP.

RTC 9.71 (SSHCP) – The comment requests that the Implementing Entity track the available inventory of SSHCP land covers remaining in the Plan Area. Many of the objectives in Table 8-1 of the Draft SSHCP require monitoring of inventory on an ongoing and annual basis (e.g., Objective AG2, Objective VPI1). New text is provided in the Final SSHCP (Sections 8.2.1 and 9.8) clarifying that the SSHCP monitoring program will track the inventory of each SSHCP land cover type remaining in the Plan Area, and that the data repository will make that data available.

RTC 9.72 (SSHCP) – Five years for surveys means surveys will be conducted every 5 years.

RTC 9.73 (SSHCP) – See response to Comment 9.71.

RTC 9.74 (SSHCP) – This text has been added to Section 9.3.4.

RTC 9.75 (SSHCP) – If the TAC/IRT does not approve the plans and actions, the individual property cannot be acquired and incorporated into the Preserve System. This is reflected in the TAC responsibilities described in the Draft HCP in Section 9.3.4.

RTC 9.76 (SSHCP) – See response to Comment 9.75.

RTC 9.77 (SSHCP) – See response to Comment 9.75. The TAC/IRT will have approval authority over preserve property acquisitions. The wildlife agencies will be a part of the TAC/IRT and will exercise their authority through those entities. This will provide a powerful "check and balance" to ensure that preserve acquisitions are driven by the Conservation Strategy and not by political or other considerations that do not benefit the covered species.

RTC 9.78 (SSHCP) – Comment noted. The Plan Preparers recognize the importance of stakeholder representation and authority on the TAC. This structure is described in SSHCP Section 9.3.4 and is critical for the success of the SSHCP.

RTC 9.79 (SSHCP) – Comment noted. The text on page 9-23 of the Draft SSHCP allows for flexibility with respect to the 15%, and applies to lands outside the UDA. The percent held in fee title could be higher than 15% in the UDA. If there is a future need to

provide more species management, the TAC would have to consider, with full participation from the agricultural community, whether an increase in fee title ownership is appropriate.

RTC 9.80 (SSHCP) –.New text has been added to Section 9.4.5 of the Final SSHCP clarifying how early enrollment properties will be prioritized for acquisition by the Implementing Entity.

RTC 9.81 (SSHCP) – Language has been added in Section 9.4.7 of the Final SSHCP to clarify that gifted land can be incorporated in the Preserve System consistent with the SSHCP Conservation Strategy and can be used to meet Conservation Strategy requirements. Gifted lands cannot, however be used to offset the mitigation needs of a project applicant. Language has also been added to clarify that gifted lands must be monitored and managed consistent with the SSHCP's monitoring and management protocols and guidelines, and that funding for a long-term endowment must be identified prior to accepting gifted lands. Language has also been added in Section 9.4.7 of the Final SSHCP suggesting that gifted land could be considered in the context of Appendix J, but that the Implementing Entity must identify a funding source for long-term management and monitoring of gifted lands prior to accepting them.

RTC 9.82 (SSHCP) – The comment requests that the SSHCP include a 200-foot setback between existing SSHCP preserves and new AG/RES development outside the UDA. AG/RES development is not a SSHCP Covered Activity, so the HCP has no mechanisms to require setbacks within those projects. Preserves outside the UDA would be primarily acquired through conservation easements, and that conservation easement cannot extend onto adjacent properties. When a conservation easement is acquired and no development is existing or planned nearby, there is no mechanism that would allow the Implementing Entity to establish a 200-foot setback or any other sized setback. There is a process for the TAC to determine whether an internal buffer area should be established in a preserve outside the UDA, depending on adjacent land uses and other considerations.

RTC 9.83 (SSHCP) – Chapter 9, page 9-34, provides language that requires that a Preserve Setback easement and management plan be recorded for each preserve setback inside the UDA. The language also specifies that the easement give the SSHCP Implementing Entity the ability to enforce restrictions within the UDA Preserve Setbacks. Regarding the request for setbacks between new AG/RES projects and existing SSHCP preserves outside the UDA, refer to response to Comment 9.82.

RTC 9.84 (SSHCP) – Comment noted.

RTC 9.85 (SSHCP) – See response to Comment 9.70. Section 9.8 of the Final SSHCP has been revised to clarify that outside entities such as scientists or conservation groups will be able to request monitoring data from the Implementing Entity. As discussed in Section 9.8 of the Final SSHCP, the Implementing Entity expects to develop a simple form that can be completed for each request and sent electronically to

the Implementing Entity. Depending on the request, access could be granted to the data repository or data from a specific time period could be provided.

RTC 9.86 (SSHCP) – The terms “directly” and “indirectly” have been removed from the text in Section 9.10.4. Language has been inserted in Section 9.10.3.4 of the Final SSHCP to clarify that the SSHCP TAC will be responsible for deciding when changes in land use designations or regulations would result in impacts to SSHCP Covered Species modeled habitat or when changes would affect completion of the SSHCP Conservation Strategy. Also see response to Comment 9.71 regarding Plan Area land cover inventories.

RTC 9.87 (SSHCP) – Section 3.4 of the Draft SSHCP describes the process of developing habitat models for all 28 Covered Species. The purpose of the models is to define and map suitable habitat for each Covered Species in the Plan Area. The Plan Permittees, wildlife agency biologists and local species experts used the best available information to define and map Covered Species suitable habitat.

Updating the Species Accounts is not necessary to achieve the Conservation Goals and Objectives of the SSHCP. The information in the Species Accounts provides useful and detailed background for the Conservation Strategy, but was not relied upon in isolation when preparing the Conservation Strategy. In addition to the Species Accounts in Appendix B, the species models took into account the best available information related to: “species’ needs for breeding, feeding, and sheltering at each life history stage; information from Plan Area species-surveys; documented species-occurrences within the Plan Area; and information on species range, including soil type associations and elevation limits.”

RTC 9.88 (SSHCP) – Language has been added to Section 11.1.6 of the Final SSHCP that clarifies the notification process. In addition language has been added to Section 9.3.4 in the Final SSHCP that clarifies the SSHCP TAC’s role for approving land acquisitions. Also see response to Comment 9.75.

RTC 9.89 (SSHCP) – Comment noted. SSHCP priorities for preserve acquisition will be determined through the TAC. That process will allow the Implementing Entity to incorporate the best available information about flood sensitivity of potential preserve acquisitions. If Preserve locations are no longer providing suitable upland forage for greater sandhill cranes, new preserve lands will need to be acquired so that the measurable objective can be achieved.

RTC 9.90 (SSHCP) – The sensitivity ratings for dispersal ability and changes in food availability for greater sandhill crane have been updated to be consistent with the natural history information presented in the comment. As a result, the overall sensitivity rating for the species has been increased to “High”. Refer to Table 11-1 in the Final SSHCP. As noted in the comment, the Conservation Strategy already accounted for these factors, so the changes in the table did not result in any changes to Conservation Strategy.

RTC 9.91 (SSHCP) – Refer to response to Comment 9.90.

RTC 9.92 (SSHCP) – The HPI index was selected as an inflation index because it was "a well-regarded public data source with relevant geographic coverage." (SSHCP p. 12-20) The SSHCP also includes a comprehensive development fee audit every three years during the first 15 years of SSHCP implementation, and following completion of each of those audits the development fees can be adjusted to reflect refined cost estimates. Therefore, it is not necessary to assemble a separate private inflation index for the Plan Area.

RTC 9.93 (SSHCP) – Refer to response to Comment 9.92.

RTC 9.94 (SSHCP) – Section 3.4 of the Draft SSHCP describes the process of developing habitat models for all 28 Covered Species. The purpose of the models is to define and map suitable habitat for each Covered Species in the Plan Area. The Plan Permittees, wildlife agency biologists and local species experts used the best available information to define and map Covered Species suitable habitat.

Updating the Species Accounts is not necessary to achieve the Conservation Goals and Objectives of the SSHCP. The information in the Species Accounts provides useful and detailed background for the Conservation Strategy, but was not relied upon in isolation when preparing the Conservation Strategy. In addition to the Species Accounts in Appendix B, the species models used the best available scientific information related to: species' needs for breeding, feeding, and sheltering at each life history stage; information from Plan Area species-surveys; documented species-occurrences within the Plan Area; information on species range, including soil type associations and elevation limits, and the expertise of the wildlife agencies.

RTC 9.95 (SSHCP) – The authors of the species accounts are credited in a new introduction leading into Appendix B of the Final SSHCP. Thank you for bringing this oversight to our attention.

RTC 9.96 (SSHCP) – The species are presented alphabetically by common name within their taxonomic groups. The PDF for Appendix B has been revised to be navigable by species, as suggested.

RTC 9.97 (SSHCP) – Comment noted. However, the suggestion provided in the comment would be onerous for landowners, and the Plan Permittees have determined that it would limit the pool of willing sellers to an unacceptable level.

RTC 9.98 (SSHCP) – The voluntary additional conservation laid out in preliminary form in SSHCP Appendix J would not be a condition of the Incidental Take Permit conditions or the SSHCP. Voluntary additional conservation will be adopted separately by the Plan Permittees, and as such will not be bound by the same requirements for modification and amendment as the HCP and ITPs.

RTC 9.99 (SSHCP) – Thank you for your cooperation in development of the SSHCP.

LETTER 10 EUGENE ROSE (SSHCP)

SSHCP South Sacramento Habitat Conservation Plan

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the proposed South Sacramento Habitat Conservation Plan. The space below may be used to provide comments on the Draft EIS/EIR. Please focus your review on the sufficiency of the document regarding the identification of environmental impacts and methods to avoid or mitigate those impacts.

Would be great if there was a Conservation Interpretive Center. A perfect site would be the undeveloped "Nature Area" at C.W. Dillard Elementary School.

A partnership with the Elk Grove Unified School District would be beneficial to Conservation/Habitat Agencies, the Region as well as an educational component to the Community and School Districts. The site located at C.W. Dillard Elementary School is a little under 10 Acres and has been neglected over recent years. I suggest the Sheriff's work detail could be part of development of Trails & Such. 10.1

WOULD YOU LIKE TO BE ADDED TO THE SSHCP MAILING LIST? ❑ Yes ❑ No

If so, please provide your contact information.

Name: Eugene Rose

Title and Organization/Business (if applicable): Wilton Resident

Email address: rosaranch@ frontiernet.net

Mailing address: 12217 Keating Rd Wilton, California 95693

Phone: (916) 687-6349

Please submit your comments to a project representative or mail to: Office of Planning and Environmental Review, ATTN: Environmental Coordinator, 827 7th Street, Room 225, Sacramento, CA 95814

RTC 10.1 (SSHCP) – Thank you for the suggestion. The Implementing Entity will retain this information for use in future planning.

LETTER 11 FRIENDS OF SWAINSON'S HAWK (SSHCP AND EIS/EIR)

Friends of the Swainson's Hawk
www.swainsonshawk.org 8867 Bluff Lane, Fair Oaks, CA 95628 swainsonshawk@sbcglobal.net 916-769-2857

September 5, 2017

Attention: Rich Radmacher, Senior Planner
Sacramento County Planning Department
827 7th Street, Sacramento, CA 95814
Delivered via email to: radmacherr@saccounty.net

Comments, public draft of the South Sacramento Habitat Conservation Plan and EIS/EIR

Friends of the Swainson's Hawk is a citizen advocacy group for this state listed species, and we support habitat conservation planning as a preferred method for mitigating the impacts of development on multiple species. We have been engaged in habitat conservation planning and evaluation of mitigation for impacts of development on California's Swainson's Hawk population since 1995. We fully endorse the letter submitted by Habitat 2020 and partners on this plan. We have additional comments below.

FOSH prepared "Swainson's Hawk Mitigation Evaluation Project Phase 1 Executive Report – South Sacramento County and Elk Grove, California," (2010) and "A Review of the City of Rancho Cordova Swainson's Hawk CEQA Mitigation Program," (2011) both studies by Melinda Bradbury, to evaluate and present recommendations regarding the mitigation programs in South County for impacts to the Swainson's Hawk. These evaluations help set the context of current project by project mitigation efforts and also identify some problems in implementation that hopefully will be corrected with the adoption of the proposed South Sacramento County HCP. It is essential that the HCP avoid the problems identified in these studies, specifically, 11.1

- Not all mitigation properties meet the criteria of the program;
- Not all projects required to mitigate do mitigate;
- Not all requirements are enforceable;
- Not all funding is guaranteed.

In particular, the guarantees and quality standards in the HCP program must be enforceable and the enforcement path should be clear and unambiguous.

1. SSCHCP Approval of Mitigation Properties Lacks Fundamental Biological Integrity; No Enforcement Mechanism for Biological Criteria for Mitigation Land Acquisition; Assure CDFW Role.

At present, the California Department of Fish and Wildlife (formerly CDFG) plays an important role in the approval of mitigation lands under the County ordinance (Sacramento County Code Chapter 16.130 SWAINSON'S HAWK IMPACT MITIGATION FEES). Specifically, 11.2

1

". . . the Board of Supervisors deems it necessary to restrict the scope of possible mitigation sites to parcels that are located within the geographical foraging area of the Swainson's Hawk in the unincorporated County outside the Urban Services Boundary, and that are owned and/or managed by a conservation organization at locations that are acceptable to DFG." And

"ii. The land to be preserved shall be deemed suitable Swainson's Hawk foraging habitat by DFG and the County, which shall make all reasonable efforts to either accept or reject the proposed land as suitable within fifteen (15) business days. However, failure to act within such time shall not be deemed as acceptance or rejection of the proposed land. For each request for approval by the County and DFG, there must be an approved rezone or development project and corresponding MMRP identified for which the proposed mitigation site is to be used.

iii. The project applicant shall transfer said easement(s) or title to the County, DFG and a third party conservation organization as acceptable to the County and DFG. The County may, at its discretion, waive the requirement for a third party conservation organization to be party to the easement or fee title. Such third party conservation organizations shall be characterized by non-profit 501(c)(3) status with the Internal Revenue Service and be acceptable to both the County and DFG."

11.2 cont'd

Under the SSCHCP, the wildlife agencies are not given the authority to approve or disapprove mitigation land acquisitions. They will not be able to enforce the biological criteria for land acquisition in the implementation of the plan. This is a very big mistake and inconsistent with both past practice in the County and in the Natomas Basin HCP. We cannot support a plan that does not rely on acquisition approval by the wildlife agencies as a core implementation principle.

We also believe that all acquisitions should be include a conservation easement to CDFW to ensure continuity of preservation in the event that the HCP governance fails.

11.3

2. Consistency of SSHCP with USFWS 2016 HCP Handbook and CDFW 2016 Swainson's Hawk Status Report

a) There should be a finding of consistency of the document with the USFWS 2016 HCP Handbook. We are surprised to find that this is not part of the EIR/EIS review of relevant policy documents.

b) The species account for Swainson's Hawk is seriously out of date. In 2016 the CDFW and Fish and Wildlife Commission adopted a new status report for Swainson's Hawk. This report provides a firm basis for an up to date Swainson's Hawk species account for the SSHCP. We are attaching this report to our comment letter and recommend that it be included in the HCP and that the policies in the HCP be consistent with this status report. We have pointed out some inconsistencies below.

11.4

3. Effects Analysis and Biological Effectiveness Monitoring Lack Fundamental Scientific Soundness and Guarantees. (Effects Analysis, Chapter 6 and Monitoring, Chapter 8)

a) The HCP does not establish a baseline for the Swainson's Hawk breeding population for the monitoring program, nor does it establish an adequate monitoring program. Appendix G-3 Species Account, Swainson's Hawk is both out of date and fails to appropriately utilize the data available to estimate the nesting sites inside and outside the UDA.

11.5

We do disagree with the Species Account – Appendix B of SSCHCP 22.4.3, which says ". . . it is not possible to estimate the number of nesting Swainson's hawk pairs is in the Plan Area based on the available data. Therefore, population trends for the area cannot be assessed at this time."

While the HCP claims it cannot estimate nesting population, numerous nesting studies have been conducted and are included in the HCP graphic of SWHA occurrences. Clearly the nesting population can be estimated and a baseline established for the monitoring program. We believe this is required for a scientifically sound implementation and enforcement program for the HCP.

"Monitoring distribution and abundance of nesting Swainson's hawks in the Sacramento Valley and Sacramento River Delta, California" (Dan L. Gifford, Paul S. Hofmann, Adrienne A. Truex, and David H. Wright* California Department of Fish and Game, North Central Region, 1701 Nimbus Road, Suite A, Rancho Cordova, CA 95670) identified 707 active nesting sites in the core territory bounded by Chico and Tracy, including Sacramento, San Joaquin, Yolo and Solano Counties and demonstrated that nesting sites are clustered. These sites were added to the California Natural Diversity Database. The authors noted that "Subsequent surveys (Estep 2007a, b, 2008, 2009; Anderson et al. 2007) have established the Central Valley's significance to the species and established its importance to the conservation of Swainson's hawk in California." (p. 8) Sites identified in those surveys are also in the database used in preparation of the SSCHCP. While the CNDDB contains duplicate nesting sites (known as alternative nesting sites for a pair), multiple sites for one pair can be identified by the close proximity of the alternative nest sites. The preparers of the HCP have the duty to make a good faith estimate of the baseline of nesting pairs in the study area. 11.6

The HCP also does not establish a monitoring program, deferring this important implementation element to future decisions by the governing body of the HCP. We support an annual monitoring program, such as that conducted by the Natomas Basin Conservancy, to be able to separate short term from long term trends.

CDFW found that:

> "Raptors may experience year-to-year changes or fluctuations in their population numbers due to a variety of factors including changes in prey abundance, habitat, and weather. In order to detect long-term changes over time (i.e. trends) in California's Swainson's Hawk population, it is necessary to collect data over a sufficient number of years to span any short-term population fluctuations or cycles (Hatfield et al. 1996; Newton 1998; Lewis and Gould 2000)." (p. 18, Status Report, 2016) 11.7

b) We object to the estimate of take based on high value habitat only when many nest sites inside the USB are not located in high quality habitat and will ultimately fail because of urbanization and the loss of adequate foraging habitat. (Section 6.4.2.1 Page 6-58) The HCP is intended to mitigate for impacts on species and to support sustaining threatened species in the wild. The HCP should be clear about the expected loss of nesting habitat inside the UPA, including within the City of Elk Grove which is not part of the HCP but is part of the nesting and foraging habitat of the South Sacramento population of Swainson's Hawks. 11.8

c) The HCP is deficient in its estimate of take of Swainson's Hawk nesting sites, nesting habitat and in its mitigation for loss of nesting habitat. After 50 years, what is the expected breeding population, number of active nest sites, and fledglings expected in the Plan area? 11.9

While the HCP states that most nesting habitat is in riparian areas, clearly from Figure 3-25, most nesting sites are not in riparian areas. CDFW 2016 Status Report states that "Swainson's Hawks often nest peripheral to riparian systems. They will also use lone trees in agricultural fields or pastures and roadside trees when available and adjacent to suitable foraging habitat.: The data available to preparers contains nesting site locations so that a more definitive statement could be made about nesting habitat in South Sacramento County. 11.10

The HCP ignores the loss of nesting habitat due to road maintenance and expansion. For example, on Page 6-301, the HCP seems to ignore the fact that nesting trees are often along roadways and maintenance and expansion of rural roadways will have significant unrecognized impact on nest sites and nesting habitat. It fails to identify existing roadside nest sites and the expected loss of these sites. 11.11

The HCP mitigation program does not provide for mitigation of loss of nesting habitat along roadsides. Relying solely on preservation of riparian areas will not sustain the nesting habitat in the Plan area. 11.12

3. The HCP presents ambiguous representations of high quality habitat and fails to exclude land below sea level from eligible mitigation lands. We have pointed out previously to staff that graphics representing high quality habitat for Swainson's Hawk could be misinterpreted and requested more definitive graphics in the final plan. Likewise, we failed to find a specific prohibition of land below sea level for mitigation for upland species, a prohibition that has long been the practice by CDFW in approving mitigation parcels. 11.13

Upland mitigation lands should not only not be located below sea level, they should be distant from anticipated sea level rise to ensure permanent availability as quality foraging habitat. Why is not all Swainson's Hawk foraging habitat preservation required to be above the 100 year floodplain? 11.14

4. EIR/EIS does not address direct and cumulative impacts adequately. 11.15

a. Four counties account for 70-80 percent of the Central Valley population of the Swainson's Hawk (CDFW, Status Report, 2016, p. 17): Sacramento, Yolo, San Joaquin and Solano. The cumulative impact of this HCP and other conservation plans and mitigation programs in that range should be addressed in the environmental review document. 11.16

b. EIS 9-21 addresses the issue of conflict with other HCPs. It does not address compatibility with the City of Elk Grove Swainson's Hawk Mitigation Program. The two programs have the same receiving area for mitigation land. Nor were we able to find the discussion of the cumulative impacts of the two mitigation programs on the ability of each to meet its required mitigation objectives. The SSCHCP does not include data on the Swainson's Hawk population in the approved development area of the City of Elk Grove and the required Swainson's Hawk mitigation land that will be preserved to mitigate for this development by the City of Elk Grove. Therefore there is no opportunity to assess whether the feasibility of acquisition for both programs jointly. 11.17

c. 8.1.2.5 Wildlife Nursery Sites (Page 8-35) does not acknowledge the key role of Swainson's Hawk nesting in SSHCP planning area for the survival of the species in California. 11.18

d. What assurances are there that the South Sacramento County Swainson's Hawk breeding population can be sustained with less than 10,000 acres of preserved agricultural land? 11.19

5. The HCP lacks some fundamental guarantees for the quality of the mitigation program. 11.20

a. All HCP conservation easements should be approved by California Department of Fish and Wildlife to assure consistency with the Department's guidance and current practice for mitigating impacts on listed species. 11.21

b. Conservation easements should prohibit the use of rodenticides on mitigation properties.

Application of anticoagulant rodenticide (AR) is a known threat to raptors due to ingestion of poisoned prey. Numerous field monitoring studies on raptor species indicate lethal and sublethal impacts of AR exposure (Stone et al. 2003, Murray 2011, Thomas et al. 2011, Christensen et al. 2012). Pesticide use throughout the Swainson's Hawk's range, specifically targeting ground squirrels, may also impact Swainson's Hawks and cause secondary poisoning. (CDFW Status Review of Swainson's Hawk in California, April 11, 2016, pp. 12-13) 11.22

c. Mitigation lands should not be located near wind energy facilities if they preserve foraging or nesting habitat for raptors. See CDFW Status Review of Swainson's Hawk in California, 2016, p. 12. The permittees should also agree not to approve wind energy facilities next to preserves where foraging or nesting of raptors is expected. 11.23

d. There needs to be required buffers to protect mitigation lands from negative impacts of neighboring residential development (AG/RES development). If mitigation lands are located adjacent to AG/RES, the HCP should require a 200 foot offset of the mitigation property from the residential property to be included in the easement. While normal agricultural operations are expected in neighboring properties, County approval of residential uses next to preserve areas will downgrade their mitigation value to the species being protected. There needs to be a provision in the Implementation Agreement that no permittee will allow residential development outside the UPA without providing a 200 foot buffer easement to protect adjacent properties from impacts on wildlife of residential uses. 11.24

Please keep us informed regarding review of our comments, future public review of the proposed HCP and EIS/EIR, and public hearings. We prefer to receive email notification of public review documents and hearings at swainsonshawk@sbcglobal.net. 11.25

Thank you for this opportunity to comment.

Judith Lamare, Ph.D. Co-Chair, James P. Pachl, Co-Chair

C: Tina Bartlett, Tanya Sheya, CDFW

Attached: CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE WILDLIFE AND FISHERIES DIVISION NONGAME WILDLIFE PROGRAM 1812 Ninth Street Sacramento, California 95814, "Status Review: SWAINSON'S HAWK (Buteo swainsoni) IN CALIFORNIA" FIVE-YEAR STATUS REPORT Reported to: California Fish and Game Commission

Other References:

Jim Estep, Estep Environmental Consulting, Distribution, Abundance, and Habitat Associations of Swainson's Hawk (2007) (results of 2006 census level surveys in South Sacramento County) and The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (Buteo swainsoni) in the City of Elk Grove, California (2009) (results of census level surveys within City limits in 2008); Monitoring Swainson's Hawk (Buteo swainsoni) Nesting Activity in South Sacramento County Results of 2008 Surveys (follow up survey of 2006 study by Jim Estep).

Todd Gardner, 2005 and 2009 Nesting Survey Sites.

RTC 11.1 (SSHCP) – The comment notes several factors that could affect the effectiveness of the SSHCP Conservation Strategy in mitigating covered activity impacts to Swainson's hawk. Section 9.3 of the Final SSHCP identifies all of the participants involved in implementation of the SSHCP, and provides an overview of each participant's responsibilities and duties. The Implementing Entity is responsible for ensuring that preserves containing habitat for Swainson's hawk and other covered species meet the criteria of the program, that each covered activity's impacts on Swainson's hawk and other covered species will be mitigated in accordance with the requirements of the SSHCP, that all requirements are enforced, and that funding requirements for conservation of Swainson's hawk and the other covered species are met through the fee program. The Implementing Entity would prepare annual reports for the Wildlife Agencies demonstrating how each of these critical factors are being met. In the event that any of these factors are not being met, the Implementing Entity would involve the TAC, including members of the environmental community, in determining how the issues can be resolved.

RTC 11.2 (SSHCP) – The comment notes that the Draft SSHCP was unclear about the role of the Wildlife Agencies is approving property acquisitions for the SSHCP Preserve System. Section 9.3.4 of the Final SSHCP has been revised to make it clear that the TAC, which in addition to members of the environmental community would also include all Permitting Agencies (e.g., U.S. Fish and Wildlife Service and California Department of Fish and Wildlife), have approval authority over preserve acquisitions.

RTC 11.3 (SSHCP) – The comment requests that CDFW hold a conservation easement on all SSHCP preserves. Section 9.4.3 of the Final SSHCP contains language that states the following "The Implementing Entity will hold in perpetuity all conservation easements it purchases or accepts from a landowner. In addition, all conservation easements will have a third-party enforcement beneficiary (CDFW and/or USFWS)." This provides a superior alternative to CDFW holding the conservation easement since it allows both Wildlife Agencies to enforce the conservation easement, If the Implementing Entity were to fail, the conservation easements would be transferred to the successor agency.

RTC 11.4 (SSHCP and EIS/EIR) – The comment suggests that the SSHCP and EIS/EIR should account for consistency with the NOAA and USFWS December 2016 HCP Handbook. The NOAA and USFWS December 2016 HCP Handbook and CDFW 2016 Swainson's Hawk Status Report were published after the Draft SSHCP and Draft EIS/EIR was completed. As part of their permit decision process, the USFWS will review the Final SSHCP in detail to assure that it contains all necessary HCP content, and that it meets each of the ESA Section 10 permit issuance criteria, as described in the 2016 HCP Handbook.

The comment also states that the habitat models for Swainson's hawk is out of date and should be checked for consistency with the CDFW 2016 Swainson's Hawk Status Report. That report was published after the Draft SSHCP and Draft EIS/EIR was completed. Section 3.4 of the SSHCP describes the process of developing habitat models for all 28 Covered Species. The purpose of the models is to define and map

potential habitat for each Covered Species in the Plan Area. The Plan Permittees, wildlife agency biologists and local species experts used the best available information to define and map Covered Species potential habitat, including Swainson's hawk nesting information provided by the commenter. In addition to the Species Accounts in Appendix B, the species models took into account the best available information related to: species' needs for breeding, feeding, and sheltering at each life history stage; information from Plan Area species-surveys; documented species-occurrences within the Plan Area; information on species range, including soil type associations and elevation limits, and the expertise of CDFW staff. This information included information relating to the Swainson's hawk. Examples of this information include newer data received from Jim Estep regarding locations of Swainson's hawk nest trees, expert input from Todd Gardner of CDFW regarding both the habitat requirements and recommended conservation measures for Swainson's hawk. Nonetheless, as new information becomes available regarding the needs of Swainson's hawk and the effectiveness of the proposed Conservation Strategy, monitoring results will be used to adaptively manage the preserves for maximum benefit to the species. In summary, the species models and species accounts were adequately up-to-date to serve their purpose in the SSHCP, and implementation of the SSHCP will adequately account for new information as it becomes available.

RTC 11.5 (SSHCP) – The comment states that the SSHCP does not establish a baseline for the Swainson's hawk breeding population. Although useful baseline data is available for Swainson's hawk and would be incorporated into the SSHCP Preserve Management and Monitoring programs, many covered species have scant data available on their population sizes or distributions within the Plan Area. Therefore, as described in Section 8.3.3.2.1 of the Draft SSHCP, the first 10 years of SSHCP implementation would include intensive surveys within the Preserve System to establish a solid record of baseline conditions for each covered species in the Preserve System. As new properties are acquired, surveys would be conducted to establish baseline conditions for covered species on those properties. Regarding the age of the information in the species accounts, please refer to response to Comment 11.4.

RTC 11.6 (SSHCP) – The comment requests that the SSHCP include a baseline for nesting Swainson's hawk pairs in the Plan Area. Such a baseline would be necessary if the SSHCP monitoring program proposed to directly monitor the nesting population. However, the SSHCP monitoring program does not include directly monitoring the nesting population, as this can vary from year to year. Rather, the SSHCP incorporates goals and objectives that focus on preserving Swainson's hawk breeding and foraging habitat in an integrated regional manner, consistent with the SSHCP Mission Statement (Section 1.1.1). Therefore, the SSHCP does not include a baseline for nesting Swainson's hawk pairs.

Table 8-1 in Section 8.2.1 of the Final SSHCP provides a framework for compliance monitoring for the Covered Species, including Swainson's hawk. The table outlines the monitoring activities that will assess compliance with and progress towards the measurable conservation objectives for Swainson's hawk. The measurable objectives for Swainson's hawk are focused on preserving, managing, and monitoring sufficient

breeding and foraging habitat for the species (see Chapter 7 of the Final SSHCP for more information on the SSHCP biological goals and objectives for Swainson's Hawk).

With respect to the Swainson's hawk Species Account, see the response to Comment 11.4. The Species Accounts were one of many sources used to develop species habitat models.

RTC 11.7 (SSHCP) – The comment states concern about the lack of a comprehensive monitoring and management plan in the Draft SSHCP. As stated in Section 8.1 of the Draft SSHCP, Chapter 8 describes the framework for the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program. The chapter outlines "the monitoring and management protocols and standards that the Implementing Entity will use to prepare Individual Preserve Management Plans (PMPs) and SSHCP Annual Reports." The SSHCP Implementing Entity, Plan Permittees, the Permitting Agencies, and the future SSHCP Technical Advisory Committee (TAC) will provide input on the development of the SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program. As stated in Section 9.11, the Implementing Entity will finalize these two Programs in the first 18 months after permit issuance. These programs, procedures and plans will be developed in full coordination with the TAC and will undergo public disclosure and adoption by the Implementation Committee. All meetings of the Implementation Committee will be called, noticed, held and conducted in compliance with the provisions of the Ralph M. Brown Act, Government Code section 54950 et seq. Individual Preserve Management Plans based on these programs will also be developed in coordination with the TAC. The intent is to maintain SSHCP Compliance and AMM Monitoring Program and the SSHCP Preserve System Monitoring and Management Program as "living" documents, to be periodically reviewed and updated to reflect the most current scientific and agency consensus. Certainly components of both monitoring programs will be conducted on an annual basis as well as on both shorter and longer timeframes, depending on the nature of the monitoring.

RTC 11.8 (SSHCP) – The comment objects to only considering impacts to Swainson's hawk nesting trees within high-value habitat. The SSHCP does not do this. Rather the goal of the SSHCP is to emphasize preservation of high-value habitat and to minimize impacts to high-value habitat. Impacts to Swainson's hawk are analyzed and would be mitigated regardless of whether the impact occurred in high-value habitat or other modeled Swainson's hawk habitat. The referenced text in Section 6.4.2.1 of the Draft SSHCP discusses how high-value habitat was determined, but does not state that impacts to high-value habitat are the only ones considered. For example, refer to Table 6-78 and Table 6-79 in the Draft SSHCP. Table 6-78 shows impacts to all Swainson's hawk modeled habitat, while Table 6-79 shows impacts to only the high-value Swainson's hawk modeled habitat (a subset of the impacts shown in Table 6-78).

The comment also requests that the SSHCP include discussions of potential take of Swainson's hawk nest trees outside the Plan Area. The SSHCP evaluates the impacts of the Covered Activities. These Covered Activities do not extend in the City of Elk Grove. Section 9.2.3.11 of the Draft EIS/EIR does address cumulative impacts to

Swainson's hawk, and the scope of the cumulative analysis includes habitat within the City of Elk Grove.

RTC 11.9 (SSHCP) – Regarding the adequacy of the SSHCP impact analysis and mitigation, the impacts analysis in Section 6.6.20 of the Draft SSHCP describes impacts to 373 acres of nesting habitat, as well as individual nest sites. Section 7.6.2.20 describes biological objectives SH3, SH4, and SH5 for the conservation of 746 acres of modeled nesting habitat, 373 acres of modeled riparian nesting habitat, and a replacement ratio of 10:1 for nesting trees removed within the UDA.

The comment also requests that the SSHCP estimate the effects of the Conservation Strategy on Swainson's hawk at the end of the 50-year permit term. See the responses to Comments 11.6 and 11.7 regarding monitoring. 1

RTC 11.10 (SSHCP) –The comment requests that the SSHCP broaden its description of nesting habitat for Swainson's hawk to include isolated trees in agricultural landscapes, as well as roadside trees. Section 3.4.5, page 3-107 of the Draft SSHCP does state: "Swainson's hawk's nests are also found well away from waterways in lone trees in fields and pastures, in trees along roadside edges, in small groves, around farm buildings, and in some urban areas. Nest trees can also be found in proximity to farm buildings (Bloom 1980; Swolgaard 2004), often in large, well-established, exotic tree species or relict natives." The comment also states that Figure 3-25 demonstrates that most nesting trees in the Plan Area are not in riparian areas. However, at the scale of Figure 3-25, it is not possible to draw the conclusion that most nesting sites are associated within riparian areas.

As shown in Figure 3-25 the density of nesting locations within the UDA is much lower than the density of nesting locations outside the UDA. In addition, the HCP takes into account the loss of individual trees with Species Objective SH5, which requires a replacement ratio of 10:1 for each nesting trees removed within the UDA. The analysis of the Conservation Strategy determined that the overall strategy for Swainson's hawk, including this replacement ratio, coupled with the minimal removal of roadside and other trees associated with covered activities outside the UDA, should ensure that Swainson's hawk maintains its general distribution and population within the Plan Area.

RTC 11.11 (SSHCP) – The SSHCP is a regional habitat conservation plan, and cannot feasibly map and quantify individual trees within the Plan Area. However, at the time of individual Covered Activity project development and/or road maintenance and expansion within the UDA, the loss of individual trees is addressed by Objective SH5, which requires a replacement ratio of 10:1 for nesting trees removed within the UDA (see Table 7-1 of the Final SSHCP).

Outside the UDA, the loss of nesting trees would only be associated with road maintenance and expansion covered activities. The SSHCP Conservation Strategy will preserve large expanses of valley grassland and agricultural landscapes outside the UDA, many of which would contain existing or suitable Swainson's hawk nest trees. Therefore, although quantifying preservation of a certain number of nest trees outside

the UDA is not a stated SSHCP measurable objective for the Swainson's hawk conservation strategy, many nest trees outside the UDA will be preserved through the SSHCP Conservation Strategy. The Final SSHCP has been revised in Section 7.6.2.20 to better explain how the SSHCP Conservation Strategy will mitigate impacts to Swainson's hawk nesting habitat to the maximum extent practicable. Occupied Swainson's hawk nesting trees within the Plan Area, including outside the UDA, would be avoided through implementation of AMMs that include survey and setback requirements for nesting trees adjacent to development and road Covered Activities: SWHA-1 (Swainson's Hawk Surveys), SWHA-2 (Swainson's Hawk Pre-Construction Surveys), SWHA-3 (Swainson's Hawk Nest Buffer), and SWHA-4 (Swainson's Hawk Nest Buffer Monitoring). These AMMs are described in Section 5.4.2, pages 5-104 to 5-105 of the Final SSHCP. The setback requirements in SWHA-3 and SWHA-4 will generally avoid potential adverse edge effects from development by minimizing the contact zone between construction activities and habitat used for nesting and foraging by Swainson's hawk.

RTC 11.12 (SSHCP) – The comment notes that the SSHCP does not require planting of new trees for each Swainson's hawk nest tree removed by roadway Covered Activities outside the UDA. See responses to Comments 11.11 and 11.2. The SSHCP Conservation Strategy will preserve large expanses of intact valley grassland and high quality agricultural landscapes outside the UDA, many of which contain existing and suitable Swainson's hawk nest trees. Although the number of nest trees to be preserved outside the UDA is not included as a SSHCP measurable objective, many nest trees outside the UDA will be preserved by the SSHCP Conservation Strategy. The Final SSHCP has been revised to include this discussion in Section 7.6.2.20.

The SSHCP also provides mitigation at a ratio of 10:1 for the loss of any nesting trees within the UDA, including nesting trees along roadways. This mitigation ratio is set at a high level to offset the impacts of temporal loss, because the new trees will require several years to reach a size to be suitable as Swainson's hawk nest trees. The replacement trees would be planted outside the UDA, so that nest tree availability would be increased within preserved foraging habitat.

RTC 11.13 (SSHCP) – The comment states that it is difficult to identify high-quality habitat for Swainson's hawk in SSHCP figures. At the regional scale of the SSHCP, it is neither feasible nor necessary to show highly detailed versions of these figures. Individual covered activity applications and parcels proposed for acquisition will be subject to detailed surveys and analysis, and it is during those times that high-quality habitat would be definitively identified.

The comment also notes difficulty in locating language prohibiting preserve acquisitions that are below sea level. Language has been added to Final SSHCP Table 7-1, under (Objective L1 conservation actions) to state that "Acquisitions of land below sea level are prohibited." Because Objective L1 applies to all preserve acquisitions, this clarifies the requirements. Language has also been added to Final SSHCP Section 9.4.2 *Process for Acquisition of Preserve Land* to state that land below sea level will not be considered for acquisition.

RTC 11.14 (SSHCP) – The comment requests that all preserve land for Swainson's hawk be located above the 100-year floodplain. The SSHCP Implementing Entity will pursue land acquisitions that would persist as foraging habitat. When potential land acquisitions are identified, they will be vetted by the SSHCP Technical Advisory Committee. This Committee will take the long-term viability of property into consideration prior to acquisition. Areas that are within the 100-year floodplain provide valuable foraging habitat for Swainson's hawk. Swainson's hawks generally use the Plan Area from March to September when risk of flooding is low to non-existent. In addition, requiring all Swainson's hawk foraging habitat to be above the 100-year floodplain would severely constrain the Preserve System and would reduce habitat heterogeneity.

RTC 11.15 (EIS/EIR) – Detailed responses to this comment are provided in response to Comments 11.16 through 11.19.

RTC 11.16 (EIS/EIR) – The comment requests that the EIS/EIR analyze the cumulative effects of the SSHCP and other conservation plans and mitigation plans on Swainson's hawk in Sacramento, Yolo, San Joaquin, and Solano counties. As indicated in Draft EIS/EIR Section 1.1.1, *Geographic Scope of the EIS/EIR Planning Area*, the term "Planning Area" is used in the EIS/EIR and indicates the geographic area for which the EIS/EIR provides analysis. In other words, the evaluation of direct, indirect, and cumulative effects of the alternatives considered in the EIS/EIR focusses on the defined Planning Area as shown in Figure 1-1 and described in Section 1.1.1. The list of reasonably foreseeable other actions provided in Section 3.7, *Cumulative Effects Analysis in Resource Chapters 4 Through 16*, maintains this approach and includes projects and actions either within the Planning Area, or surrounded or almost surrounded by the Planning Area (Rancho Murieta and City of Elk Grove). A lead agency is given discretion under NEPA and CEQA to define the geographic limits of the cumulative impact analysis. A lead agency does not need to always consider every potential future action that might in some way contribute to a cumulative effect. For example, for the cumulative effect of climate change, an EIS/EIR need list every global project or action that may emit greenhouse gases. Rather, CEQA provides that an agency has discretion to apply its expertise in selecting an appropriate assessment area. (See *City of Long Beach v. Los Angeles Unified School District* (2009) 176 Cal.App.4th 889.) That is, CEQA states that an EIR should provide an explanation supported by evidence for the geographic area used in the analysis. (See State CEQA Guidelines, § 15130(b)(3).) An analysis of cumulative impacts under NEPA is similar, in that the decision and extent and effect of cumulative effects "and particularly identification of the geographic area within which they may occur, is a task assigned to the special competency of the appropriate agencies." (See *Kleppe v. Sierra Club* (1976) 427 U.S. 390; *Selkirk Conservation Alliance v. Forsgren* (9th Cir. 2003) 336 F.3d 944.) Here, the Planning Area provides a sufficient geographic area to identify and disclose cumulative impacts and conduct the cumulative impact analysis at a level of detail sufficient for the lead agencies to use as a reasonable basis for decision making in selecting between the alternatives. With this established geographic limit for the reasonably foreseeable other actions, actions in surrounding counties, including other conservation plans and mitigation programs, are appropriately not considered in the cumulative impact analysis in the EIS/EIR.

RTC 11.17 (EIS/EIR) – The comment considers a scenario where the SSHCP and City of Elk Grove Swainson's Hawk Mitigation Program (Elk Grove Program) might "compete" for Swainson's hawk mitigation lands in the Planning Area. Multiple entities seeking mitigation or conservation lands in the same area is a common occurrence. Under existing conditions, these entities include various local jurisdictions, project proponents, and conservation organizations that seek and establish mitigation and conservation programs in the Planning Area. This would continue under the No Action/No Project Alternative. Under the No Action/No Project Alternative, the Elk Grove Program would continue to "compete" with the various entities for conservation/ mitigation lands. If the available supply of conservation/mitigation lands declines under the No Action/No Project, there are various market responses that may occur, for example; supply and demand principles may result in the price for conservation/ mitigation lands going up, resulting in more willing sellers and an increase in supply; some entities seeking conservation/mitigation lands (e.g., mitigation banks, conservation organizations) may expand their search area to locations with more available land; or development and other actions that result in the need for mitigation lands may be limited. Given the multiple possible market responses to "competition" for mitigation lands, it would require significant speculation to attempt to project, with any specificity, the future results of the Elk Grove Program competing with the various other conservation/mitigation programs for Swainson's hawk conservation/mitigation lands under the No Action/No Project Alternative. It would also be very speculative for the No Action/No Project to attempt to determine whether any entities' conservation actions would result in acquisition of conservation/mitigation lands becoming infeasible for another entity.

RTC 11.18 (EIS/EIR) – The comment requests that Section 8.1.2.5 of the Final EIS/EIR acknowledge the importance of the Plan Area for Swainson's hawk nesting and survival. However, the referenced section is focused on species that are colonial nesters, which does not apply to Swainson's hawk.

RTC 11.19 (SSHCP) – The comment questions whether the SSHCP can assure a sustained population of Swainson's hawk in southern Sacramento County with the level of proposed preservation of agricultural lands (approximately 10,000 acres). The Swainson's hawk habitat preserved under the SSHCP would be in addition to the several thousands of acres of habitat already preserved, as well as the substantial areas of habitat that are expected to remain in agricultural production. Note that the SSHCP does not cover urban development outside the UDA, so even though much of the agricultural land would not be SSHCP preserve, that does not mean it would be developed. The conservation analysis in Section 7.6.2.20 of the Draft SSHCP concludes that Swainson's hawk populations would remain sustainable and that the species distribution in the Plan Area would be maintained.

RTC 11.20 (SSHCP) – Please refer to response to Comment 11.7.

RTC 11.21 (SSHCP) – The comment states that all conservation easements should be approved by CDFW. Template SSHCP conservation easements are provided in SSHCP Appendix D. These easements have been approved by the USFWS and

CDFW. SSHCP Section 9.4.3 Conservation Easements provides that "Reasonable variations from the template may be allowed to address site-specific constraints. CDFW and USFWS, along with the Implementing Entity, must review and approve any modifications to the template easement."

RTC 11.22 (SSHCP) – The comment requests that the SSHCP prohibit all use of rodenticides on SSHCP preserves, due to their adverse secondary effects on Swainson's hawk and other raptors. Section 5.2.8 of the Draft SSHCP describes pesticide use as a Covered Activity that is to be used for purposes of land management only:

> "Pesticide use is allowed in Preserves only to achieve the SSHCP Biological Goals and Measurable Objectives (e.g., exotic plant or exotic animal control). Preserve Management Plans (see Chapter 8) will prescribe an integrated pesticide use process as a Preserve management tool, modeled after the California Department of Fish and Wildlife's pesticide use approval process (CDFW Forms 679 and 680). At a minimum, this will include compliance with pesticide label instructions and state and local laws. Use must also comply with existing injunctions related to the use of pesticides."

If the Implementing Entity determines that rodenticide use is necessary and appropriate on a preserve parcel, the rodenticide use will be included in the parcel's proposed Preserve Management Plan. As discussed in Section 9.3.4 of the SSHCP, each Preserve Management Plan is subject to review and approval by the TAC, which would include members from the environmental community and wildlife agencies. In general, the Plan Preparers expect that usage of rodenticides will not be warranted or allowed on SSHCP preserves. However, in order to maintain a pool of willing sellers of conservation easements on Plan Area agricultural lands, the Plan Preparers could not completely prohibit their use within all of the SSHCP Preserve System. If the TAC does approve an individual Preserve Management Plan that allows use of rodenticides, that usage would be subject to limitations described in the PMP on timing and area of application, amounts to be used, and acceptable rodenticides. If appropriate, those restrictions could be incorporated into the conservation easement.

RTC 11.23 (SSHCP) – The comment requests that the SSHCP prohibit establishment of Swainson's hawk mitigation areas adjacent to existing wind energy facilities. This has been added to Table 7-1 in the Final SSHCP as one of the conservation actions associated with measurable objectives SH1, SH3, and SH6. Note also that SSHCP Section 5.3 specifies that wind energy facilities are not Covered Activities under the SSHCP; however, the SSHCP cannot impose requirements on the plan permittees regarding non-covered activity projects. The CEQA document for a future wind energy project would be required to analyze project impacts on existing SSHCP preserves when the CEQA document is prepared.

RTC 11.24 (SSHCP) – The comment requests that a 200-foot buffer be required between preserves outside the UDA and any agricultural/residential development. Please see response to Comments 9.77 and 9.78.

RTC 11.25 (SSHCP) – The comment requests that FOSH be kept updated regarding review of the comments and future public review of the HCP, EIS/EIR, and public hearings. An email address for correspondence is also provided. These preferences have been noted. The Plan Preparers and Wildlife Agencies also thank FOSH for their engagement and careful review of the SSHCP over many years.

LETTER 12 INSTITUTE FOR ECOLOGICAL HEALTH (CWA PERMIT STRATEGY)

Institute for Ecological Health

409 Jardin Place, Davis, California 95616 · Ph/fax 530-756-6455 · ieh@cal.net

www.instituteforecologicalhealth.org

July 1 2017

Board of Directors

President
John Hopkins

Vice President
Glenda Edwards

Secretary / Treasurer
Vicki Lee

Directors

Dave Forrest

Ron Bottorff

Michael Vasey

Mary Pakenham-Walsh, Senior Project Manager
US Army Corps of Engineers, Sacramento District
1325 J Street, Room 1350
Sacramento, CA 95814-2992

Re: Public Notice SPK-1995-00386. Proposed Section 404 Clean Water Act Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan, Sacramento County, CA

Dear Mary Pakenham-Walsh:

Thank you for providing the various materials and an opportunity to comment.

Thank you also for the Corps' ongoing commitment to permit alignment and streamlining with respect to the South Sacramento HCP and all the work that the Corps has done over many years to make this outcome possible.

Overall these are excellent permitting approaches which we support strongly.

One suggestion for The Letters of Permission Submittal Material Criteria (page 2)

Please add a requirement that the project complies with any applicable terms and conditions contained in the SSHCP. This is more comprehensive than "ratios specified in the *Compensatory Mitigation Standards* specified in the local ARP ordinance" and mirrors the requirement in the PGP document (terms of authorization, item 3). 12.1

Sincerely

John Hopkins
President.

Land, People, and Nature — New Solutions for a New Century

RTC 12.1 (CWA Permit Strategy) – The comment regarding support for the proposed approach to CWA 404 permitting is noted.

The comment regarding a suggestion for adding a qualification criterion to the LOP procedure (pg. 2 of draft LOP procedure) "…that the project complies with any applicable terms and conditions in the SSHCP…" is noted. However, the prior section of the LOP procedure, "Proposed Categories of Activities," states that activities authorized under a LOP must comply with the SSHCP's terms and conditions, including implementation of "…applicable and appropriate avoidance and minimization measures contained in Chapter 5 of the SSHCP, and other applicable terms and conditions as contained in the SSHCP." Therefore, modifications to the qualification criteria section of the LOP procedure are not required.

LETTER 13 LAW OFFICES OF GREGORY D. THATCH, REPRESENTING CORDOVA HILLS LLC (SSHCP)

LAW OFFICES OF
GREGORY D. THATCH
1730 I Street, Suite 220
SACRAMENTO, CA 95811-3017
Telephone (916) 443-6956
Facsimile (916) 443-4632
www.thatchlaw.com

GREGORY D. THATCH
LARRY C. LARSEN
RYAN M. HOOPER

WASHINGTON, DC OFFICE
1225 I Street, Suite 250
WASHINGTON, DC 20005-3914
Telephone (202) 289-3912
Facsimile (202) 289-8683

August 30, 2017

VIA ELECTRONIC MAIL ONLY

County of Sacramento,
Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814
Email:SSHCP@saccounty.net

RE: South Sacramento Habitat Conservation Plan

Dear Coordinator:

This office represents Cordova Hills, LLC ("Cordova Hills"). Consistent with the June 2, 2017 Notice of Availability of the Proposed Habitat Conservation Plan for South Sacramento, County, California ("SSHCP"), we submit the following limited comments. Our comments are set forth in the order in which the matters appear within the text of the SSHCP.

CHAPTER 8 – SSHCP MONITORING AND MANAGEMENT PROGRAMS

Habitat Re-Establishment/Establishment Plans (p. 8-151)

This limited section of the SSHCP acknowledges that a stand-alone Habitat Re-Establishment/Establishment Plan will be developed and "will be consistent with the requirements of the ARP (Appendix J)." The reference to Appendix J is in error and confusing. The ARP (Aquatic Resources Plan) is actually Appendix I (not Appendix J) to the Draft EIS/Draft EIR – it is not an appendix of the SSHCP. We also noticed that Table 8-4 (p. 8-110, *et seq.*) includes several references to the ARP as Appendix J). In all cases, we believe the reference should be to "Appendix I of the Draft EIS/EIR." We also suggest that a detailed review of all references to appendices, figures and tables be made to confirm that any changes in numbering of these matters is properly reflected. 13.1 13.2

CHAPTER 12 – ECONOMICS ANALYSIS AND FUNDING PROGRAM

Table 12-3: Habitat Re-establishment/Establishment Costs (p. 12-8)

This table reflects the estimated success rates for various forms of re-establishment and establishment of land-cover types. Cordova Hills is especially concerned that the 65% success rate estimate for vernal pools is artificially low, which results in higher fees than would otherwise be 13.3

required. While we acknowledge that this rate appears to be based upon John Zanzi's experience over thirty years (see fn. 5 on p. 12-8), there is no actual explanation of what the 65% number is based on. If this success rate is based on an average success rate of projects over the last thirty years, it will vastly understate the success rates of more recent efforts. Re-establishment and establishment of vernal pools has become much more successful over the last ten years, due to advances in technology and understanding of the science behind vernal pool success. Experts with whom we have consulted place the success rate for the re-established and established vernal pools in more recent times at well above 65%. Cordova Hills recommends that the success rate estimates for vernal pool re-establishment/establishment be carefully reviewed to assure accuracy and, thereby, better reflect per-acre costs as set forth in Table 12.3. 13.3 cont'd

Related to this issue is the corresponding text in the paragraph immediately preceding Table 12-3. The text includes the following incomplete sentence when referencing Table 12-3:

"In particular, re-established/established vernal pool habitat projects (see Table 12-3 for assumed success rates)." 13.4

This incomplete textual reference should be corrected so that the reader might better understand the reference and the relationship between the textual discussion and the ensuing Table 12-3.

Table 12-5: Development Fees Used in the SSHCP Economic Model (p. 12-19)

This table identifies the Preservation Fee and Re-Establishment/Establishment Fee related to each land cover type, but neglects to identify the various components that make up this fee, including land acquisition, endowment, monitoring, changed circumstances, agricultural enhancement and SSHCP plan development. Without this information, it is not possible for applicants to estimate how much they may owe when they are conveying already purchased land that has been re-established/established, endowed, and already monitored. This additional information should be contained in Table 12-5 or, perhaps, in a separate table breaking down the components of Table 12.5. 13.5

12.4.3.1: Land Dedication in Lieu of Development Fees (p. 12-19)

The missing information from Table 12-5 (see previous comment) is compounded by the limited text in this Section, which immediately follows Table 12-5 and fails, again, to identify how land dedication will impact the amount of the fee owed. While this section does state that "development fees will be adjusted by excluding some portion of the land acquisition component of the development fee," it does not quantify the amount of this adjustment. Moreover, there is no explanation of why only "some portion of the land acquisition component" will be adjusted. It appears that, with no land acquisition necessary with respect to land that is dedicated, there should be no land acquisition component left to pay. 13.6

APPENDIX K: Project-Specific Avoidance and Minimization Measures (p. K-3)

SSHCP Appendix K discusses project specific Avoidance and Minimization Measures for five separate Master Plans/Specific Plans, one of which is Cordova Hills. The Cordova Hills discussion is taken from Appendix A of the Cordova Hills biological opinion. While the biological opinion confirms that any discrepancy between Appendix A of that opinion and the SSHCP will be controlled by Appendix A (thus superseding any conflicting language in Appendix K of the SSHCP), a simple correction of a minor error in Appendix K of the SSHCP would render both appendices consistent. On Page K-3, there is a minor error in the last sentence of **BAT-1 (Winter Hibernaculum Surveys)**. The sentence should be revised to read as follows (new text in *italics*; deleted text in ~~strikeout~~): 13.7

"No further surveys for ~~tri-colored blackbirds~~ *bat hibernaculum* are required."

On behalf of Cordova Hills, we thank you for the opportunity to comment on the SSHCP and look forward to continuing dialogue as this project moves toward consideration and approval by the various agencies involved.

Very truly yours,

Gregory D. Thatch

GDT:ll
T6542

cc: Ron Alvarado, Cordova Hills, LLC
Mark Hanson, Cordova Hills, LLC
Ben Watson, Madrone Ecological Consulting

RTC 13.1 (SSHCP) – The proposed corrections have been made to Final SSHCP Chapter 8.

RTC 13.2 (SSHCP) – The Final SSHCP document has been reviewed to ensure that all references to appendices, figures, and tables are correct.

RTC 13.3 (SSHCP) – The SSHCP preparers reviewed a range of literature (e.g., Schlatter et al. 2016[1]) and discussed with other area experts before settling on the 65% value for the success rate of vernal pool re-establishment/establishment. While we recognize that some recent efforts may appear to be performing well, we have noticed a lack of consistent performance standards across vernal pool re-establishment/ establishment projects that make it difficult to assess whether the projects have truly been "successful" by the standards of the SSHCP. Therefore, we have retained the likely conservative 65% success rate listed in the SSHCP, which has been vetted by the Wildlife Agencies and USACE. However, if experience during implementation of the SSHCP or from other area projects suggests that this rate is too low, the re-establishment/establishment fee could be adjusted following one of the fee audits, which would be conducted every three years during the first 15 years of the SSHCP and less frequently thereafter.

RTC 13.4 (SSHCP) – The sentence has been completed in the Final SSHCP to read as follows: "In particular, re-established/established vernal pool habitat projects **have historically been challenging relative to other wetland projects** (see Table 12-3 for assumed success rates).[2]

RTC 13.5 (SSHCP) – Additional detail has been provided in Table 12-5 of the Final SSHCP clarifying which portion of the fee relates to land acquisition (for preserve establishment) or re-establishment/establishment (for habitat re-establishment/ establishment projects) versus what portion of the fee is for other expenses. Further detailed breakdowns are also provided in the revised Appendix I to the SSHCP.

RTC 13.6 (SSHCP) – New text in Section 12.4.3.1 of the Final SSHCP explains how the mitigation fee will be adjusted to reflect land dedication by a project proponent.

RTC 13.7 (SSHCP) – The proposed corrections to Appendix K have been made in the Final SSHCP.

---

[1] Schlatter, K.J., A. M Faist, and S.K. Collinge. 2016. Using performance standards to guide vernal pool restoration and adaptive management. Restoration Ecology Vol. 24, No. 2., pp. 145-152.

LETTER 14 MICHAEL MAHON (SSHCP)

Michael D. Mahon Comment
on South Sacramento Habitat Conservation Plan

The South Sacramento Habitat Conservation Plan (HCP) calls for a joint powers authority (JPA) to administer a complex, expensive 50-year monitoring and habitat management plan for the benefit of the people of Sacramento County. It also claims the alleged benefits of simplifying the application process with federal agencies for incidental take permits under the ESA and NEPA, speeding up development. The proponents claim it is a novel structure, among the first of its kind in the country. It is fundamentally flawed for several reasons. 14.1

First, **it is an unconstitutional tax**. The HCP sets about creating an extraordinary, expensive, perpetual wildlife preserve and bureaucratic complex, theoretically at the expense of only those who choose to develop parcels in the area and the subsequent owners of that property. If potential developers are to be required to set aside land for habitat, the purchase and dedication of that land should be separate from the extraordinary scheme in the HCP, conducting periodic studies, and preparing bureaucratic reports in perpetuity. **The HCP sets out uncommon and unreasonable burdens for a longer time period compared to other mitigation plans, which have common and reasonable burdens for less time.** It is also highly speculative what the values associated with property, especially mitigation property, will be in the future, and it is *per se* not reasonable to make assumptions of land value on a 50+ year time horizon, so any plan based upon such assumptions is also *per se* not reasonable. 14.2 14.3 14.4

The present funding mechanism for the South Sacramento Habitat Conservation Plan agency constitutes a tax, not merely a development fee *per se*, as it funds items which go beyond that which are normally considered related to development. The recent 6-1 California Supreme Court case, *Jacks v. City of Santa Barbara*, 3 Cal. 5th 248; 2017 Cal. LEXIS 4769, is highly instructive on which local charges are to be considered taxes. Since 2010 and Proposition 26, the California Constitution has been amended to provide the definition of a tax: "'tax' means any levy, charge, or exaction of any kind imposed by a local government" (Cal. Const., art. XIII C, § 1, subd. (e)), except (1) a charge imposed for a specific benefit or privilege received only by those charged, **which does not exceed its reasonable cost**, (2) a charge for a specific government service or product provided directly to the payor and not provided to those not charged, **which does not exceed its reasonable cost**, (3) charges for **reasonable regulatory costs** related to the issuance of licenses, permits, investigations, inspections, and audits, and the enforcement of 14.5 14.6

agricultural marketing orders, ... (6) **charges imposed as a condition of developing property**, and (7) property-related assessments and fees as allowed under article XIII D. **The local government bears the burden of establishing the exceptions.** (Cal. Const., art. XIII C, § 1, subd. (e), emphasis added.)

14.6 cont'd

Jacks follows and affirms the reasoning of *Sinclair Paint*, 15 Cal.4th 866. "Although [Sinclair Paint], focused on restrictions imposed by Proposition 13, its analysis of the characteristics of fees that may be imposed without voter approval remains sound... **According to Proposition 218's findings and declarations, "Proposition 13 was intended to provide effective tax relief and to require voter approval of tax increases. However, local governments have subjected taxpayers to excessive tax, assessment, fee and charge increases that ... frustrate the purposes of voter approval for tax increases ...** ." (Prop. 218, § 2, reprinted at Historical Notes, 2B West's Ann. Cal. Const. (2013) foll. art. XIII C, § 1, p. 363, italics added [in *Jacks*].) As relevant here, this finding reflects a concern with excessive fees, not fees in general." *Jacks* continues, citing the Historical Notes of Proposition 26, "**to ensure the effectiveness of these constitutional limitations, [Proposition 26] defines a 'tax' ... so that neither the Legislature nor local governments can circumvent these restrictions on increasing taxes by simply defining new or expanded taxes as 'fees.'**"

14.7

The Court in *Jacks* summarized three categories of charges that are fees rather than taxes, and therefore are not subject to the voter approval requirements of Proposition 13: first, special assessments may be imposed "in amounts reasonably reflecting the value of the benefits conferred by improvements." (*Sinclair Paint*, at p. 874); second, development fees, which are charged for building permits and other privileges, are not considered taxes "**if the amount of the fees bears a reasonable relation to the development's probable costs to the community and benefits to the developer**." (*Sinclair*, at p. 875, emphasis added.) The Court echoes the Constitution and applies the standard of reasonable relationship to development fees, just as is provided for special benefits, government products, and various investigations charged by the local governments. The Court continues, citing to the historical record of Proposition 218 which provides that "**[Proposition 218] shall be liberally construed to effectuate its purposes of limiting local government revenue and enhancing taxpayer consent**," and later concludes, "**To the extent fees exceed a reasonable amount in relation to the benefits or costs underlying their imposition, they are taxes.**" *Jacks* at p. 268, citing *Sinclair Paint*, at p. 881.

14.8

My position, simplified, is that a significant portion of the fees charged under the HCP are beyond the reasonable amount chargeable as development fees, and are therefore to be considered taxes. *Sinclair* at p. 875 cites a string of cases concerning development fees. None of these involves a permanent, comprehensive environmental preserve and permanent bureaucracy the likes of which is detailed in the HCP. The present HCP goes too far. **As its proponents maintain, it is a novel approach**, without significant precedent, and in my view it is **therefore ripe for constitutional scrutiny**. Specifically, the perpetual cycles of measurement and verification, with unlimited potential for expansion in scope, are not reasonable. 14.9

Second among its fundamental flaws, **the Plan provides funding for activities outside the 50-year Permit Term**. To the extent it does so, some $62 million or more for the non-plan years, at least, can only be seen as a tax. Section 12.3.7 of the HCP provides, "The development fees include a contribution to a non-wasting endowment designed to generate sufficient interest to cover the ongoing annual costs beyond the 50-year Permit Term." In other words, **the Plan wants to fund similar activities outside the permit term, but will charge during the permit term** to fund those activities indefinitely, and it is unclear how that is reasonably related to the permitting activity; *ergo* it is a tax. 14.10

Third, the HCP protects more species than are currently listed by the federal and state endangered species acts (ESAs). **Of the 28 species chosen as "Covered Species," three-fifths are not threatened or endangered on either the federal or state ESA**. In a very straightforward way, three fifths of the HCP is not for purposes beyond what has been agreed nationally and statewide to be reasonable, i.e., protection of listed species under the federal and state endangered species acts. In various presentations, **proponents of the HCP have stressed they have narrowed the list of species from initial wish lists of more than 100 species down to 28, but the fact remains the list is still 255% as large as it would be had the list been kept to the ordinary, reasonable boundaries of the ESAs**. Any margin of expense beyond protecting listed species would be an unconstitutional tax, and the burden should be on the proponents to delineate how much expense is required for protecting the listed endangered and threatened species only versus the gamut of "Covered Species." 14.11

It is also unclear from the published materials what the economic effect of mitigating for particular species that may be on particular parcels would be versus the aggregating plan, covering all 28 species. It is unclear why a developer of parcels that may have, for example, only one species should pay to protect 28 species, 17 of which are not listed, 14.12

and also to endow a permanent bureaucracy theoretically protecting all 28. It is unclear what the marginal cost or benefit would be for protecting 27 additional species when that developer could otherwise mitigate simply with the dedication of a similar one-species parcel and no permanent bureaucracy. **Why, theoretically obligated to shield one species under current regulation, is a developer required to purchase the panoply for all 28 species?** 14.12 cont'd

It is unclear why future developers of parcels, thirty years down the line, let us imagine, with one protected species, in a very different part of the county should inherit the bills linked to a vast and extensive preserve, decades of M&V reports, new plans, updates, a half dozen or so full-time JPA executives, dozens of expensive scientific contractors, etc. Why do developers and speculators in Rancho Cordova and the land immediately around highly sensitive, multi-species habitat who want to develop or to collect a windfall right now benefit, and others not situated in the current, immediate wave of development suffer unknown burdens under a new bureaucracy when they might otherwise have been able to mitigate inexpensively? 14.13

In summary of the first three reasons why the HCP is an unconstitutional tax: the Plan is too large in scope of work; the Plan covers too much time; the Plan covers too many species. Each is a fatal, unconstitutional flaw, and since each is vital to the Plan, the Plan cannot be saved by amendment. However, the list of objections continues, several of which are also likely fatal to the Plan: 14.14

Fourth, the **50-year term is outside the authority provided by Government Code §50060.5(a)** "a local agency may, by ordinance or by resolution adopted after notice and hearing, establish a district to provide for the improvement or maintenance of natural habitat. The local agency may perform those functions or contract with the state, another local agency, or a special district to perform those functions. ***If a local agency establishes a district, it may provide for the levy of assessments for not more than 30 years*** to pay the cost and incidental expenses of implementing a long-term natural habitat maintenance plan approved by the Department of Fish and Game pursuant to Section 2901 of the Fish and Game Code." (Emphasis added.) If there is other authority for the SSHCP and its 50-year fee authority, I would be interested in specifics. However, this JPA looks like a §50060 *et seq*. entity, walks like one, quacks like one... **If there is some other theory of the JPA, it is an artificial taxonomy to be disregarded** by the Court, whereas the real purpose of the JPA is to establish a habitat maintenance district contemplated and restrained by the cited Government Code. 14.15

Fifth, **any unconstitutional tax threatened by the County of Sacramento, and particularly the HCP as proposed, has takings implications under the United States Constitution's 5th Amendment jurisprudence, especially *Dolan v. City of Tigard*, 512 US 374 (1994), and *Nollan v. California Coastal Commission*, 483 U.S. 825 (1987)**. The clear line of cases establishes the principal that any unfair burden placed upon taxpayers or applicants for a permit can cross the line into a federally unconstitutional taking, apart from a California unconstitutional tax. 14.16

Sixth, **insufficient detail of the financial planning and development assumptions, on a year-by-year basis, have been provided to the public**. It imposes long-term financial and development consequences without allowing careful review of the details. Despite being over 1400 pages long, the document is heavy on the biology and conservation measures and light on the financial implications. As development encroaches, the viability of certain uses changes over time, as do values, and the highest and best use of parcels. **The nexus study, referenced in the primary materials, has not been made available**. 14.17

Seventh, it appears that a great portion of **mitigation land** in the Urban Services Boundary, based on critical habitat, **is in Rancho Cordova and/or the immediate vicinity** (with the largest actual portion in the southern extreme portion of the county, not at all in the path of development), and it is **unclear why property in other areas should be burdened** by the enormous scheme contemplated in the HCP. Why not just limit the HCP to Rancho Cordova and the large preserve area there, plus the giant area outside the path of growth in the southern extreme part of the county? If there is a locus of costs and benefits, it should be right there in Rancho Cordova, not the whole South County. 14.18

Eighth, **the plan does not provide protection against incidental take for agricultural activities in the non-developed / agricultural area**. A handful of **powerful developers and land speculators are getting incidental take permits, essentially being excused** from real harm to endangered species, but farmers–engaged in activities which have been carried out on their lands for upwards of 150 years, and which clearly benefit some protected species, such as the Swainson's hawk–**farmers are still subject to incredible fines and penalties which only stand to increase in likelihood because of the developers' use of lands and the subsequent concentration of remaining habitat. The public has a right to know all of the past and present negotiations with the developers and land speculators which has been conducted by the plan proponents**, especially Rancho Cordova and the County of Sacramento, including exactly how much these few 14.19

insiders stand to profit from their developments and especially the mitigation land sale windfall. 14.19 cont'd

Ninth, it is unclear why Elk Grove, Folsom, and Rancho Murieta are not included. **Elk Grove is as populous today as Sacramento was in 1960, and its continued growth is at least as relevant to most of the South County as anything in Rancho Cordova. The community deserves a clearly stated reason for Elk Grove's non-inclusion and the anticipated effects**, published directly alongside the Plan documents, from both the HCP proponents as well as the City of Elk Grove. The same could be said for Folsom, Rancho Murieta, and even the City of Sacramento. 14.20

Finally, it is unclear the benefit of trying to adopt the plan and actually creating a new government entity will benefit the citizens more than the county and cities themselves proceeding without the new JPA and without the perpetual funding mechanism. **The HCP will potentially burden at least three generations of owners of agricultural land in the future, but it appears geared to benefit primarily others, namely those who are set to develop right now, the permanent bureaucracy, and the critter constituency that would like an extraordinary, local expansion to the federal and state ESAs to include 17 non-endangered, non-threatened species.** 14.21

Michael D. Mahon
9951 Grant Line Road
Elk Grove, California 95624
(916) 539-1226; mdmahon@mdmahon.com

RTC 14.1 (SSHCP) – This comment is introductory in nature and contains the commenter's characterization of the South Sacramento Habitat Conservation Plan (the "Plan" or "SSHCP"). The plan preparers do not believe the SSHCP or its structure are "fundamentally flawed." Without any additional detail supporting this claim, no further response is feasible.

RTC 14.2 (SSHCP) – The Development Impact Fees (the "Fees") required under the Plan fall under an exemption to the definition of a "tax" under Article XIII C, section 1(e)(6) of the California Constitution, which exempts fees "imposed as a condition of property development." While such Fees must still comply with the Mitigation Fee Act, set forth in Government Code Section 66000 et seq., Sacramento County (the "County") has provided evidence through the nexus study ("Study") demonstrating that each condition required for imposition of mitigation fees or development impact fees under the Mitigation Fee Act has been met.

RTC 14.3 (SSHCP) –The Plan Preparers reviewed regional habitat conservation plans (incorrectly termed mitigation plans in the comment) within the state of California and found that a 50-year permit term is not uncommon. For instance, habitat conservation plans currently being prepared in Yolo and Placer County are also seeking a 50-year permit term. Approved plans in Santa Clara County and San Joaquin County, as well as the Natomas Basin Habitat Conservation Plan and the North County Multiple Habitat Conservation Program in San Diego County, were granted 50-year permits. Moreover, the Western Riverside County Multiple Species Habitat Conservation Plan and Coachella Valley Multiple Species Habitat Conservation Plan were both granted a 75-year permit term.

RTC 14.4 (SSHCP) – In addition to completing an economic analysis of Plan implementation (see Chapter 12 of the Draft SSHCP), the County commissioned a fee nexus study (Study) analyzing the proposed Fees. As explained in more detail in the Study, the Fees would be adopted in accordance with the SSHCP, which is a habitat conservation plan that is "specifically adopted to ensure that new development mitigates for its impacts under the federal Endangered Species Act, the California Endangered Species Act, the Clean Water Act, and other associated environmental regulations." The nature of the development in question will necessarily affect the environment upon which it is constructed, and the Study provides for this connection as well as an allocation of costs based on expected impact.

The Study also describes the method that would be used to allocate Fees to various covered activities. Because the cost to preserve or re-establish/establish land covers vary, the schedule provides different Fees based on where the development is located (e.g., land covers present, wetland types present). The Fees are calculated on a per-acre basis, to ensure that the total Fees are proportional to the impact of the individual development project. Thus, the Fees are structured to ensure that no developer pays more than their development's specific impact, taking into account the land cover and size of development.

The Study further provides details on compliance with the specific findings that are required under the Mitigation Fee Act. As a result of allowing for development on the property subject to the Plan, the County is required to ensure that adequate funding for the Plan will be provided. (16 U.S.C. 1539(a)(2)(B)(iii).) The funding will be used to provide for conservation actions required to be undertaken by Plan participants, and to fund mitigation actions identified under the Plan, including habitat acquisition, habitat re-establishment/establishment, habitat management and monitoring, and program administration costs.

The fees are necessary because in order to obtain an incidental take permit under the ESA, the applicant must demonstrate that it will ensure adequate funding for implementation of the program. One of the ways to ensure funding is to apply fees to development that will affect the species covered under the Plan.

Moreover, Chapter 12 of the Draft SSHCP includes a detailed economic analysis of SSHCP implementation. The SSHCP economic analysis and associated cost estimates were based on the best information available. Information used in the cost analysis includes, but is not limited to, the estimated acres of impact of future Covered Activities (Chapter 6), estimated costs of the HCP habitat preservation and implementing re-establishment/establishment requirements, costs of land by location of the proposed SSHCP Preserve System (Chapter 7), estimated costs of anticipated Preserve System management and monitoring activities (Chapter 8), the staffing and overhead costs of the proposed HCP implementation structure (Chapter 9), and estimated costs of addressing any future changed circumstances (Chapter 11).

The SSHCP cost analysis relies on a detailed financial spreadsheet model (see Appendix I of the Draft SSHCP) to track costs and funding requirements associated with SSHCP implementation. The model assesses SSHCP conservation requirements and generates a set of cost estimates, organized by SSHCP land cover type categories. The cost analysis relies on many data sources. Key steps taken were as follows:

1. The analysis of SSHCP costs considered a hypothetical “Preferred SSHCP Preserve System” that indicated the approximate location and SSHCP land cover type that could be acquired by the SSHCP.
2. A land valuation exercise identified estimated per-acre land costs based on the land’s location within the Plan Area, and the SSHCP land cover type anticipated for acquisition.
3. A review of cost assumptions for habitat re-establishment/establishment, management, monitoring, and other costs yielded additional cost estimates by SSHCP land cover type.
4. Costs were aggregated to identify the total funding needed for implementation of the SSHCP Preserve System.
5. Development fees were derived by determining the total cost of mitigation per acre impacted by Covered Activities for each SSHCP land cover type.

Generally, estimates were informed by literature reviews, independent research, and input from land managers experienced with habitat preservation and re-establishment/ establishment in Northern California, as well as a review of cost models in similar "regional" habitat conservation plans that have already been permitted by the U.S. Fish and Wildlife Service (See Draft Plan, p. 12-2.) The values presented in the analysis represented the best available cost estimates based on the information currently available. (See Draft Plan, p. 12-2.) Shortly after Plan implementation begins and actual cost data is available, the Implementing Entity proposes to compare the cost assumptions made in this economic analysis with the cost of implementing the SSHCP. (Id.) If actual costs of Plan implementation are inconsistent with the economic analysis, development fees will be adjusted to bring the development fees in line with the observed cost of implementing the SSHCP. (Id.) The development fees will be reviewed on a regular and ongoing basis, and updated if necessary to reflect actual implementation costs. Refer also to response to Comment 9.87.

RTC 14.5 (SSHCP) – The Fee is not a tax. In 2010, largely as a response to the holding in Sinclair Paint Co. v. State Bd. Of Equalization (1997) 15 Cal.4th 866, which is discussed further below in Comment 5.7, Proposition 26 was adopted by the voters. Among other things, Proposition 26 provided clarity to the definition of a "tax" under the State Constitution by adding subdivision (e) to Article XIII C, section 1. Specifically, Proposition 26 states that any fee, exaction, charge, or otherwise, imposed by a local government, is a "tax" requiring voter approval, unless such levy meets one of seven specifically enumerated exemptions. The exemption that relates to the SSHCP is subsection 6:

> (6) A charge imposed as a condition of property development.

RTC 14.6 (SSHCP) – The referenced decision is not relevant to the issue of development impact fees. The comment cites to the Supreme Court's decision in Jacks v. City of Santa Barbara (2017) 3 Cal.5th 248. Jacks addresses whether charges imposed for entrance to or use of local government property are exempt from the definition of a "tax" under Cal. Const. art. XIII C, sec. 1(e)(4). Jacks does not provide any meaningful discussion of development impact fees exempt under Cal. Const. art. XIII C, sec. 1(e)(6) and thus is not applicable here.

RTC 14.7 (SSHCP) – See response to Comment 14.6. Moreover, Articles XIII C and XIII D were added to the California Constitution pursuant to Proposition 218, and reinforce the requirement that general and special taxes require voter approval (as well as providing special requirements for property related fees, charges and assessments). What was missing from this legislation, however, was the definition of what constitutes a "tax." This became a significant issue in Sinclair Paint Co. v. State Bd. Of Equalization (1997) 15 Cal.4th 866, upon which the Comment heavily relies. As the comment correctly states, the types of fees and charges that are generally exempt from classification as a "tax" include development impact fees "if the amount of the fees bears a reasonable relation to the development's probable costs to the community and benefits to the developer." (Id. at 874.)

In Sinclair Paint, Sinclair Paint Company argued that a fee imposed pursuant to the Childhood Lead Poisoning Prevention Act of 1991 for services relating to children suffering from lead poisoning, was a "tax" because the revenues do not reimburse the state for special benefits conferred on manufacturers of lead-based products, nor compensate it for government privileges or services to those manufacturers. The Supreme Court rejected Sinclair Paint's argument, holding instead that the challenged fee fell within a "third recognized category" of fee that did not depend on government conferred benefits or privileges: a regulatory fee. A regulatory fee requires the fee payer to bear a fair share of the cost of mitigating the adverse effects their products created in the community. (Id. at 875-76.) As a result, the comment's discussion of Sinclair Paint is not relevant to the imposition of the Fees.

RTC 14.8 (SSHCP) – See responses to Comments 14.6 and 14.7.

RTC 14.9 (SSHCP) – See responses to Comments 14.6 and 14.7. Moreover, the imposition of mitigation fees is not a novel approach. With the passage of Proposition 13, the limits on general revenues for new infrastructure have resulted in new development being held responsible for its share of public improvements, and both the use and levels of impact fees have grown substantially.

The comment references several cases that are referenced on page 875 of the Sinclair Paint Co. v. State Bd. Of Equalization (1997) 15 Cal.4th 866 decision. As the Sinclair court noted, each of these cases stands for the proposition that "development fees exacted in return for . . . government privileges are not special taxes if the amount of the fees bears a reasonable relation to the development's probable costs to the community and benefits to the developer." (Sinclair, supra, 15 Cal.4th at 875 [citing Shapell Industries, Inc. v. Governing Board 1991) 1 Cal.App.4th 218; Bixel Associates v. City of Los Angeles (1989) 216 Cal.App.3d 1208; California Building Industry Association v. Governing Bd. of the Newhall School District of Los Angeles (1988) 206 Cal.App.3d 212; Russ Building Partnership v. City & County of San Francisco (1987) 199 Cal.App.3d 1496; Beaumont Investors v. Beaumont-Cherry Valley Water District (1985) 165 Cal.App.3d 227; Mills v. County of Trinity (1980) 108 Cal.App.3d 656; Ehrlich v. City of Culver City (1996) 12 Cal.4th 854, 898.) As these cases illustrate, and as demonstrated here through the Study and as discussed further in detail in response to Comment 14,4, the development impact fee fully complies with the Mitigation Fee Act and long-accepted means of mitigating for the impacts of proposed projects.

RTC 14.10 (SSHCP) – The SSHCP entails much more than the Permit. The Permit is granted to provide Endangered Species Act compliance for projects on lands within the Plan Area. However, the purpose of the SSHCP is to mitigate the impacts on Covered Species. In order to accomplish this goal, funds acquired through the Fee will be used to fund an endowment to ensure that conserved lands continue to provide the habitat and ecological processes necessary to support Covered Species in perpetuity, and that the funds collected are sufficient for such purposes. Importantly, as stated, mitigation is only necessary because of the Covered Activities occurring within the Plan Area, and those Covered Activity proponents are thus required under the Plan to pay their proportional share to mitigate such impacts. Nothing about ensuring that the impacts of

Covered Activities are mitigated in the future would otherwise render legally adopted mitigation fees as “taxes.”

RTC 14.11 (SSHCP) – The comment questions why the SSHCP includes as covered species several species that are not listed under the ESA. Permit applicants can choose to include unlisted species in an HCP. For the SSHCP, the Plan Permittees wished to develop a robust conservation plan that provides benefits to the key species, habitats, and landscapes that will be permanently impacted by planned development in the Plan Area. Under Section 10 of the ESA, there are also important advantages to including currently unlisted species. For example, the Plan Permittees will be entitled to “No Surprises” protection; should one of those currently unlisted species become listed in the future, no additional mitigation requirements would be imposed during the permit term. The unlisted species covered by the SSHCP are also typically the subject of local or state requirements for mitigation under CEQA for other local policies, and the robust mitigation provided by the SSHCP can satisfy these requirements without the need for additional mitigation. The SSHCP can address threats to unlisted species before a listing is needed and the other provisions of the ESA take effect. Additionally, some species have overlapping habitat needs and thus can benefit from “economies of scale” provided by an HCP, without increasing an applicant’s mitigation obligations. Regarding the comment’s statement that the SSHCP development fees are an “unconstitutional tax”, please refer to responses to Comments 14.2 to 14.10.

RTC 14.12 (SSHCP) – The impacts that the SSHCP are mitigating are regional in nature. For that reason, habitat conservation planning requires a regional solution, with a regional fee, rather than an individual project-by-project permitting solution. The concept of purchasing small, unattached piecemeal properties located throughout the participating agencies’ jurisdictions in order to provide habitat located near to each and every development project would not be conducive to the survival of most endangered species. As documented in the SSHCP, it is a basic principal of conservation biology that large habitat blocks be conserved and that these blocks and other Conservation Area areas must be contiguous and connected. (See Draft SSHCP, Chapter 7.) Habitat fragmentation reduces in size and isolates areas of habitat for species. As habitats become increasingly isolated, species migration, immigration, and dispersal become less common or impossible, thereby limiting or preventing opportunities for populations to exchange individuals and genetic information, escape inhospitable habitats, and recolonize areas. Ultimately, these effects can result in disappearance of the species in the fragmented habitat patches. Habitat fragmentation can also alter natural ecosystem functions such as pollination as well as how habitat recovers from fires, flooding, or other r stochastic environmental events (e.g., pest outbreaks) that species have adapted to over their evolutionary history. The SSHCP Conservation Strategy minimizes habitat fragmentation by focusing on the establishment of large Preserves, on a region-wide basis by linking existing preserves and SSHCP Preserves together to allow wildlife movement. Only by accruing financial resources such as impact fees on a regional-wide basis and utilizing these monies to purchase those critical sites throughout the region that are best suited (or most appropriately priced) for habitat purposes can the region's endangered species be best protected with the limited funding sources available.

The provisions of the SSHCP will provide mitigation for future impacts of planned urban, rural, and regional infrastructure development on the species identified in the SSHCP. (See Draft SSHCP, 9.2.1.)The SSHCP will allow participating jurisdictions to "take" the plant and animal species identified in the SSHCP through the agencies' local land use planning and development review processes. These take authorizations would be granted in recognition of the mitigating effects of the coordinated conservation system planned by the SSHCP.

RTC 14.13 (SSHCP) –It is the County's view that the key benefit to future development within the boundary of the Plan is the availability of assurances to SSHCP participants about the level of mitigation that will be expected over the life of the Plan. In other words, the HCP permittees are provided with long-term assurances, through the No Surprises Rule, that the terms of the SSHCP will be adhered to and that no further mitigation requirements will be imposed.

Regarding comments about the cost of the plan, please refer to Chapter 12 of the SSHCP and Appendix E which provide detailed analysis of the costs and fee structure.

RTC 14.14 (SSHCP) – See responses to Comments 14.2 through 14.13.

RTC 14.15 (SSHCP) – California Government Code section 50060.5 provides limitations specifically applicable to special benefit assessment districts, empowered with the authority to levy assessments on real property for the special benefit conferred. This authority relates to special benefits associated with improvement or maintenance of natural habitat. Such assessments would be subject to the limitations under Article XIII D, section 4 of the California Constitution governing assessments, and would be levied on an ongoing basis to pay for ongoing improvements.

However, the Fees are not being charged as a part of the formation of such a District, nor is such a District being proposed. There is no assessment being proposed on property owners of land subject to the SSHCP, and the SSHCP does not call for an ongoing special benefit assessment to be charged. As such, this Article of the Government Code, including the 30 year time limitation for the levy of assessments, has no applicability to the Plan or the Fees, which are one-time charges levied as a condition to develop property on land subject to the SSHCP.

RTC 14.16 (SSHCP) – Through the Study, the County has provided evidence demonstrating that the requirements under Dolan v. City of Tigard (1994) 512 U.S. 374, and Nollan v. California Coastal Commission (1987) 483 U.S. 825, have been met. The Mitigation Fee Act was enacted in large part as a response to Nollan, and requires various findings to demonstrate a nexus between the mitigation fee and the impact of the particular development, as well as proportionality of the mitigation fee to the impact. As explained in detail above, the County has provided evidence demonstrating that both of these nexuses have been met. No taking occurs where the Fees are related both in nature and extend to the impact of the proposed development. (Dolan, 512 U.S. at 390.)

RTC 14.17 (SSHCP) – As explained in response to Comment 14.4, the County commissioned a Study analyzing the Fees and the SSHCP. An analysis of the economic impacts associated with the Plan can be found in Chapter 12 of the Draft SSHCP as well.

RTC 14.18 (SSHCP) – The SSHCP was prepared by five local agencies, including the County, City of Galt, City of Rancho Cordova, Sacramento County Water Agency, and the Southeast Connector Joint Powers Authority. These five local agencies, plus the future SSHCP Implementing Entity (to be named the South Sacramento Conservation Agency), are collectively applying for Incidental Take Permits and are referred to in the Plan as "Plan Permittees". It is these entities that worked collectively to establish the boundaries of the Plan, and it is these entities that want the protections it would provide. The growth and development that is anticipated by the SSHCP is governed not by the SSHCP itself, but by the General Plans of the Sacramento County, Rancho Cordova, and Galt. The growth pattern described in the comment, with most development occurring within the UDA, is the pattern that was planned for in those General Plans. For certain resources that are not found outside the UDA, such as rare plants and vernal pool tadpole shrimp habitat, preserves must be established within the UDA. In general, however, establishing preserves outside the UDA will ensure that the General Plans can be effectively implemented by the land use authority permittees.

RTC 14.19 (SSHCP) – As provided for in Section 5.2.7 of the Draft SSHCP, certain agricultural activities, such as tilling fields, harvesting crops, and grazing are covered activities when they are consistent with provisions of an SSHCP Conservation Easement (see Section 9.4.3 of the Draft SSHCP) and are consistent with an SSHCP Preserve Management Plan (see Chapter 8). Incidental take coverage for agricultural practices on public or private land inside or outside the UDA, if needed, may require an amendment to the SSHCP and its permits, or require individually and independently acquired Incidental Take Permits. (Draft SSHCP, Section 5.3.) Specifically, all agricultural practices on public or private land inside or outside the UDA are not covered by the SSHCP permits unless such actions (1) occur on an SSHCP Preserve and are an SSHCP Covered Activity (as described in Section 5.2.7, SSHCP Preserve System Covered Activities), or (2) occur on a property under an SSHCP Conservation Easement and are an SSHCP Covered Activity described in Section 5.2.7. (Draft SSHCP, Section 5.3.)

The County provides information to the public regarding property negotiations with landowners when an agreement is ready for action by the Board of Supervisors. Negotiations may include a non-disclosure agreement that prohibits the County from making certain information public until a negotiated agreement is scheduled to be presented to the Board of Supervisors in a public hearing. The terms of any negotiated agreement will be made available to the public prior to the County Board of Supervisors approval of agreements to purchase property or easements. These procedures for publishing agendas and providing public notice of Board hearings provides interested parties time to review and comment on the proposed agreement.

RTC 14.20 (SSHCP) – As discussed in Response 14.18, the SSHCP was developed and prepared by five local agencies. These agencies, plus the future SSHCP Implementing Entity, make up the proposed "Plan Permittees." These are also the agencies that have voluntarily agreed to participate in the Plan if and when it is approved. The City of Elk Grove was formerly included as a Plan Permittee but elected to leave the SSHCP. The cities of Folsom and Sacramento were not considered as Plan Permittees because their City boundaries are either largely built out or do not have the need for the ESA and CESA permitting provided by the SSHCP. The community of Rancho Murieta would also not have need of the permits associated with the SSHCP and the County determined it did not make sense to include it in the Plan Area.

RTC 14.21 (SSHCP) – This comment contains the commenter's characterization of the regulatory composition of the Plan, as well as underlying policy recommendations related to the Plan, to which no response is required. (See responses to Comments 14.11, 14.12, 14.13, 14.18, and 14.19.)

LETTER 15 PACIFIC LEGAL FOUNDATION (SSHCP)



PACIFIC LEGAL FOUNDATION

September 5, 2017

County of Sacramento
Office of Planning and Environmental Review
Attention: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814

Via Email: sshcp@saccounty.net

Jan C. Knight
Deputy Field Supervisor
Sacramento Fish & Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Re: Comments on South Sacramento Habitat Conservation Plan

To Whom It May Concern:

Pacific Legal Foundation submits the following comments on the proposed South Sacramento Habitat Conservation Plan (HCP), for the Plan Proponents' consideration in determining if and how to proceed. Pacific Legal Foundation is a national non-profit public interest law firm, providing pro bono representation in state and federal courts to property owners and others whose constitutional and other rights are impaired by government action. Based on our review of the Plan and readily available related documents, we are pleased to provide the following comments. These comments primarily focus on federal Endangered Species Act issues and related constitutional limits.

The Plan imposes development fees, and appears to impose land use restrictions on at least some ongoing activities, in order to prevent possible take of species that are federally listed only as threatened, *i.e.* Vernal Pool Fairy Shrimp, Valley Elderberry Longhorn Beetle, California Tiger Salamander, Giant Garter Snake, and Slender Orcutt Grass. The Endangered Species Act only applies the take prohibition categorically to species listed as endangered. 16 U.S.C. § 1538(a)(1)(B). The Act allows the Service to apply the take prohibition to threatened species only on a case by case basis. 16 U.S.C. § 1538(a)(1)(G). The Service illegally extended the take prohibition to all threatened species by regulation. 50 C.F.R. § 17.31(a). The Plan therefore illegally imposes development fees and land use restrictions to address take concerns that are improper under the ESA. *See generally*, Jonathan Wood, *Take It to the Limit: The Illegal Regulation Prohibiting the Take of Any Threatened Species under the Endangered Species Act*, 33 Pace Envtl. L. Rev. 23 (2015). 15.1

HEADQUARTERS: 930 G Street | Sacramento, CA 95814 | (916) 419-7111 | FAX (916) 419-7747
ATLANTIC: 8645 N. Military Trail, Suite 511 | Palm Beach Gardens, FL 33410 | (561) 691-5000 | FAX (561) 691-5006
DC: 3033 Wilson Boulevard, Suite 700 | Arlington, VA 22201 | (202) 888-6881 | FAX (202) 888-6855
HAWAII: P.O. Box 3619 | Honolulu, HI 96811 | (808) 733-3373 | FAX (808) 733-3374
NORTHWEST: 10940 NE 33rd Place, Suite 210 | Bellevue, WA 98004 | (425) 576-0484 | FAX (425) 576-9565
LIBERTY CLINIC: Chapman University, Fowler School of Law | 1 University Drive | Orange, CA 92866 | (714) 591-0490
ALASKA: (907) 278-1731 | OREGON: (503) 241-8179

E-MAIL: plf@pacificlegal.org
WEB SITE: www.pacificlegal.org

The Plan imposes conditions and restrictions for the protection of Valley Elderberry Longhorn Beetle and its designated habitat. That species was proposed for delisting as the result of a Service status review concluding that ESA protection was no longer warranted. 77 Fed. Reg. 60238 (Oct. 2, 2012). The Service withdrew its proposed rule to delist the Beetle based on concerns that the information on which the status review was based was stale, and lack of funds to update that information. 79 Fed. Reg. 55874 (Sept. 17, 2014). Rather than dedicating development fees to protection of habitat for a species that still likely warrants delisting, the Plan should dedicate funding to completing the necessary update to the Service's available information, with a view to allowing the Service to delist the species. 15.2

The Plan works through the acquisition of conservation easements on existing farmlands in the Plan area, some of which are within existing designated critical habitat for some of the federally listed species covered by the plan. The Act imposes only a prohibition against removal of listed endangered plant species from areas under federal jurisdiction. Some have claimed in previous litigation that areas protected by the Clean Water Act are within the Endangered Species Act's term "areas under Federal jurisdiction." 16 U.S.C. § 1538(a)(2)(B). The Plan Proponents and the Service should disclose the Service's position on whether conservation easements acquired to provide incidental take protection under the Act are "under Federal jurisdiction" for purposes of whether the removal prohibition for endangered plants will then apply to farms whose owners sell conservation easements. 15.3

The Plan does not appear to permit any incidental take from ongoing farming and other activities, and appears to provide no explanation for this omission. Subsequent iterations of the draft should address this oversight and consideration should be given for providing such protection. This is especially true given that the basic mechanism of the plan is to use development fees to buy conservation easements that will lock in current land uses and operations, seemingly without Incidental Take Protection for most if not all of those land uses. 15.4

The Plan does not appear to yield any benefits for property owners whose land is currently designated as critical habitat. Have the plan proponents addressed this issue with the Service, and if not, then why not? What is the benefit of the Plan to anyone not seeking a development permit or engaging in a covered project if the Plan will not result in meaningful reform of existing critical habitat? 15.5

The Plan documents appear to state that projects which require discretionary approvals from the County or the Cities of Galt and Rancho Cordova, are not necessarily provided incidental take permission as the result of the Plan. The Plan Proponents should explain why this is so, and what the benefit of the Plan actually is to anyone within the Plan area other than the proponents of those projects specifically listed as covered actions under the Plan. If the Service is not even bound to the illusory "no surprises" commitment of an HCP as to these project proponents, then there seems 15.6

to be little if any value to the Plan for anyone but the proponents of the specifically listed public projects. 15.6 cont'd

Have the Plan Proponents advised the public or covered project proponents that the Ninth Circuit has held the "no surprises assurances" of an HCP to be non-binding on the Service? *See Bear Valley Mut. Water Co. v. Jewell*, 790 F.3d 977 (9th Cir. 2015). If the no surprises assurance is the primary benefit of the Plan, how will the Proponents ensure that Service keeps its end of the commitment? Conversely, have the Plan Proponents considered or discussed with the Service any changed circumstances provisions for the Plan that would relieve either the Plan Proponents or individual project proponents of the Plan's obligations if the Service exercises its current legal authority to impose new requirements in excess of the Plan? Will project proponents have any recourse against the Plan Proponents if the Service does not honor the Plan? 15.7

The Plan appears to impose a suite of potential land use restrictions (*i.e.* for protection of streams and other environmental resources outside of the Plan's proposed Preserve system) that may be imposed on existing, conforming, and vested land uses, in potential violation of the Due Process Clause of the United States Constitution. Under the Fifth Amendment's Due Process Clause, vested conforming land uses cannot be restricted without compliance with the land owners' right to fair notice and an adjudicatory hearing. Interference with existing conforming uses may also result in the obligation to pay just compensation under the same Amendment's Takings Clause. 15.8

The Plan imposes development fees without clearly disclosing the relationship between the fees and those species for whose habitat the fees will be spent. While the Nexus Study (not locatable on the website) referenced in the economic analysis may address this issue, the available plan documents do not appear to make any detailed allocation of fees based on which species any given project would impact. Thus, it appears that a general per acre fee is being imposed, which is then used to acquire habitat protections for more than 2 dozen species, regardless of which species (or their habitat) is actually impacted by the project on which the uniform fee is charged. For example, if a project has elderberry beetle impacts but no vernal pool species impacts, is the project still charged the full development fee? If this is the case, then at least some portion of the fee lacks an essential nexus with the project, and violates *Nollan v. Cal. Coastal Comm'n*, 483 U.S. 825 (1987). Further, the development fee also appears to violate *Dolan v. City of Tigard*'s requirement of an individualized (*i.e.*, project by project) assessment of whether the fee is roughly proportional to the project's impacts. 512 U.S. 374 (1994). The Plan proponents should also recall that they will bear the burden in court of demonstrating both the essential nexus and rough proportionality required by *Nollan* and *Dolan*. 15.9

Thank you for the opportunity to submit these comments. If you have any questions, please feel free to contact Anthony L. Francois at Pacific Legal Foundation, at TFrancois@pacificlegal.org or (916) 419-7111.

Sincerely,

ANTHONY L. FRANCOIS
Attorney
Pacific Legal Foundation
930 G Street
Sacramento, California 95814
Telephone: (916) 419-7111
Facsimile: (916) 419-7747
Email: TFrancois@pacificlegal.org

RTC 15.1 (SSHCP) – The Plan is a streamlined process for complying not only with the federal ESA, but also CESA, CEQA, and NEPA. As the EIS/EIR describes, the SSHCP has been designed to complement and help implement the goals and polices of, among other local regulatory structures, the Sacramento County General Plan (Draft EIS/EIR, page 4-45). The Joint Powers Authority (JPA) formed in connection with the Plan is part of a cooperative organizational structure for implementing the SSHCP. As analyzed in the EIS/EIR, the Plan does not limit member agencies' land use authority. Land use decisions are made through the local planning processes of the Land Use Authority Permittees. The JPA will not have the authority to prevent a Permittee from approving a discretionary project. The JPA will provide the primary policy direction for implementing the SSHCP, for public participation in the decision-making process, and staff assistance to help Permittees with Plan compliance. As a result, implementation of the Plan will have no impact upon existing, conforming, or vested land uses.

Moreover, as explained in response to Comment 5.12, by its very nature, habitat conservation planning usually requires a regional solution. Only by accruing financial resources, such as impact fees on a regional-wide basis and utilizing these monies to purchase those critical sites throughout the region that are best suited (or most appropriately priced) for habitat purposes can the region's endangered species be best protected with the limited funding sources available.

Additionally, for the reasons set forth in responses to Comments 5.2 through 5.10, the fees associated with implementing the SSHCP do not amount to an unconstitutional tax.

Please also see response to Comment 15.2.

RTC 15.2 (SSHCP) – The comment notes that VELB was proposed for delisting. However, it is not appropriate to address the listing/delisting process under 16 U.S.C. 1533 within the scope of the SSHCP and its supporting documents. As noted in the USFWS and NOAA Fisheries' *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*, "The Service requires applicants to include as HCP covered species all ESA-listed wildlife species for which incidental take is reasonably certain to occur, unless take is addressed through a separate ESA mechanism (e.g., section 7 consultation with another Federal agency, separate incidental take permit, etc.), or to explain or demonstrate in the HCP why take is not anticipated or will be avoided during implementation of covered activities (e.g., inclusion of measures that will avoid potential for take)" (USFWS and NOAA Fisheries 2016, page 7-2).

There are also important advantages to implementing the provisions of Section 10 of the ESA in a manner that encourages the development of plans that benefit a variety of species, including both listed and other rare and vulnerable unlisted species within a selected habitat area. As explained in the USFWS and NOAA Fisheries' *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*, multispecies planning can increase the biological value of HCPs by providing early, proactive consideration of the needs of both listed and unlisted species (USFWS and NOAA Fisheries 2016, page 1-2). HCPs are often used to address threats to many species

before a listing is needed and the other provisions of the ESA take effect (USFWS and NOAA Fisheries 2016).

RTC 15.3 (SSHCP) – The commenter is correct that all lands acquired for the SSHCP Preserve System will require the recordation of a conservation easement, even lands that are held in fee title by the Implementing Entity (Draft SSHCP, Section 9.4.3). Within the UDA, most of the SSHCP Preserve System is expected to be held in fee title by the Implementing Entity. Outside the UDA, the Implementing Entity intends to minimize the amount of fee title acquisition for the SSHCP Preserve System. Therefore, most of the SSHCP Preserve System outside the UDA will be in the form of conservation easements where the land is not owned by the Implementing Entity.

Importantly, the terms of the easements and prices paid for easements will vary depending on the purpose of the easement and the degree to which the easement restricts land uses (Draft SSHCP, Section 9.4.3). The Implementing Entity, as opposed to the USFWS, will hold in perpetuity all conservation easements it purchases or accepts from a landowner. In addition, all conservation easements will have a third-party enforcement beneficiary (CDFW and/or USFWS). Conservation easements will contain provisions that allow the Implementing Entity to manage the encumbered property if it becomes necessary, such as if a property is abandoned by the owner.

With regard to 16 U.S.C. 1538 a (2)(B), USFWS' current policy is explained in the USFWS and NOAA Fisheries' *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*, which states the ESA "prohibits damage or destruction of plants listed as endangered on Federal property or on non-Federal lands when doing so in knowing violation of any State law or regulation, or in the course of any violation of State criminal trespass law" (USFWS and NOAA Fisheries 2016, page 1-8).

RTC 15.4 (SSHCP) – See response to Comment 14.19.

RTC 15.5 (SSHCP) – The SSHCP provides a process under which the Permittees and third parties receiving incidental take authorization can fully comply with the federal ESA requirements for species covered in the Plan. The ITP itself does not address designated Critical Habitat. Designated Critical Habitat is addressed through the federal action of issuing the ITP by the intra-service Section 7 consultation. Prior to issuance of the ITP, the USFWS will conduct an intra-service Section 7 consultation to determine how the SSHCP will affect the designated Critical Habitat in the Plan Area. To issue an ITP, the USFWS must ensure that SSHCP proposed activities would not destroy or adversely modify species' designated Critical Habitat (range-wide), meaning that the designated Critical Habitat would no longer remain functional to service its intended recovery role. (Draft SSHCP, p. 6-3.) It is possible for the USFWS to permit an HCP that authorizes land use or development activities within an area designated as Critical Habitat, provided the HCP proposed activities will not appreciably diminish the capability of the designated Critical Habitat to fulfill its intended role in the recovery of listed species.

This comment also contains the commenter's opinions as to why the Plan may not be beneficial. The Plan will benefit any party that seeks take authorization. The key benefit to future development within the boundary of the Plan, including in areas already designated as Critical Habitat, is the availability of assurances to SSHCP participants about the level of mitigation that will be expected over the life of the Plan. In other words, the SSHCP permittees are provided with long-term assurances, through the No Surprises Rule, that the terms of the Plan will be adhered to and that no further mitigation requirements will be imposed.

RTC 15.6 (SSHCP) – The commenter is incorrect (see Draft SSHCP Section 9.2.1). The three Land Use Authority Permittees are the County of Sacramento, City of Galt, and City of Rancho Cordova. Upon issuance of the SSHCP and Section 2081 permit by the Wildlife Permitting Agencies, the Plan Permittees will be issued federal ESA and CESA permits for incidental take of Covered Species (Draft SSHCP Section 9.2.1). The benefit of such an approach is that these entities are able to retain their land use authority, while also ensuring that the Plan is appropriately implemented.

For Covered Activities conducted by a Land Use Authority Permittee, the Land Use Authority Permittee will be responsible for ensuring that the Covered Activity conforms to the requirements of the SSHCP and the ITPs, following the process for using take authorization, as described in SSHCP Chapter 10, SSHCP Permit Application Process.

The Land Use Authority Permittee will be responsible for determining when a Covered Activity that occurs within its jurisdiction, including one of its own projects, is eligible to use the SSHCP. If the Land Use Authority Permittee determines that a Covered Activity is eligible to use the SSHCP, the Land Use Authority Permittee can extend incidental take coverage provided by the Plan's ESA and CESA ITPs to the Covered Activity within its jurisdiction.

RTC 15.7 (SSHCP) – This comment contains the commenter's characterization of the Ninth Circuit Court of Appeals' decision in Bear Valley Mutual Water Company v. Jewel (9th Cir. 2015) 790 F.3d 977. As explained by the court in that opinion, "[t]he 'No Surprises Rule' provides that once a permit has been issued pursuant to a habitat conservation plan, and assuming that the terms of the underlying plan are being implemented, the permittee 'may remain secure regarding the agreed upon cost of conservation and mitigation.' [Citations omitted]. In other words, the [USFWS] may not require permittees to pay for additional conservation and mitigation measures absent 'unforeseen circumstances.'" (Id. at 992 [citations omitted].) The court did not hold that the No Surprises Rule was not binding on the USFWS, as the critical habitat designation at issue in that case did not contain additional measures beyond those covered by the relevant HCP. Thus, the County respectfully disagrees with the commenter's characterization of the Ninth Circuit's decision.

RTC 15.8 (SSHCP) – As stated in response to comment 15.1, the HCP does not subject existing land owners to new regulatory restrictions. The Plan is a streamlined process for complying with the mandates of ESA, CESA, CEQA, and NEPA. As the

EIR/EIS describes, the SSHCP has been designed to complement and help implement the goals and polices of, among other local regulatory structures, the Sacramento County General Plan. (Draft EIS/EIR page 4-45.) As a result, implementation of the plan will have no impact upon existing, conforming, or vested land uses.

RTC 15.9 (SSHCP) – The County has provided ample evidence demonstrating that the requirements under Dolan v. City of Tigard (1994) 512 U.S. 374, and Nollan v. California Coastal Commission (1987) 483 U.S. 825, have been met. The Mitigation Fee Act was enacted in large part as a response to Nollan, and requires various findings to demonstrate a nexus between the mitigation fee and the impact of the particular development, as well as proportionality of the mitigation fee to the impact. As explained in detail in response to Comments 14.2 through 14.4, the County has provided evidence demonstrating that both of these nexuses have been met. No taking occurs where the fees are related both in nature and extend to the impact of the proposed development (Dolan, 512 U.S. at 390).

LETTER 16 SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT (REGIONAL SAN) (SSHCP AND EIS/EIR)

REGIONALSAN
TAKING THE WASTE OUT OF WATER
Sacramento Regional County Sanitation District

Main Office
10060 Goethe Road
Sacramento, CA 95827-3553
Tel: 916.876.6000
Fax: 916.876.6160

Treatment Plant
8521 Laguna Station Road
Elk Grove, CA 95758-9550
Tel: 916.875.9000
Fax: 916.875.9068

Board of Directors
Representing:
County of Sacramento
County of Yolo
City of Citrus Heights
City of Elk Grove
City of Folsom
City of Rancho Cordova
City of Sacramento
City of West Sacramento

Prabhakar Somavarapu
District Engineer

Ruben Robles
Director of Operations

Christoph Dobson
Director of Policy & Planning

David O'Toole
Director of Internal Services

Joseph Maestretti
Chief Financial Officer

Claudia Goss
Public Affairs Manager

www.regionalsan.com

Printed on Recycled Paper

Marianne Biner, Senior Planner
County of Sacramento
Office of Planning and Environmental Review
827 7th Street, Room 225
Sacramento, CA 95814

Subject: Draft Environmental Impact Statement and Draft Environmental Impact Report for the South Sacramento Habitat Conservation Plan

Dear Ms. Biner:

Sacramento Regional County Sanitation District (Regional San) has the following comments regarding the subject document:

- Fig 1-2: Regional San has preserved 205 acres in the southwest portion of the Bufferlands through a conservation easement with Sac Valley Conservancy. 16.1
- Figures 2-1, 2-2, and 2-3: Label the portion of PPU-4 east of Grant Line Road. 16.2
- 2.3.5 Page 2-120, PPU 4: The majority of PPU 4 is comprised of the Regional San property including the Bufferlands surrounding the Sacramento Regional Wastewater Treatment Plant (SRWTP). Fig 2-2 and the textual description envisions PPU 4 including approximately 530 acres of preserves consisting primarily of Valley Grasslands. Regional San desires to utilize its Bufferlands to participate in the SSHCP and has currently identified 59 acres of riparian forest habitat and 25 acres of non-vernal pool wetland to support the SSHCP Jumpstart program. Regional San has further identified a variety of habitat types on the Bufferlands that are not currently protected in perpetuity. Regional San believes that this acreage could be used as preserve for the SSHCP, but must not allow this use to impact the operations and maintenance of the SRWTP. A conservation easement on District property should not preclude the District's ability to temporarily disturb the subject property with maintenance and construction activity (i.e. underground utility maintenance, repair, and installation) that does not permanently alter the habitat protected by the easement. Minor permanent impacts (i.e. manholes, blow off valves, utility poles, etc.) should also be permissible in the conservation easement area so long as the impact does not significantly alter the protected habitat. To ensure compatibility with Plant operations, any future encumbrance of Regional San property for the SSHCP will be subject to approval by the Regional San Board of Directors. 16.3 16.4

SSHCP Draft EIS/Draft EIR Comment Letter
Page 2

- 2.4.5: The preserved acreage in PPU 4 depicted in Figure 2-3 does not match the text description of PPU 4 on page 2-138 (747 acres versus 530 acres). The HCP identified PPU 4 to be comprised of 445 acres of valley grassland, 34 acres of wetland waters, 6 acres of non-wetland waters, and 42 acres of riparian (527 total acres). If the acreage is increased under this alternative, please explain the rationale. 16.5
- 3.7.1.4: Define Sacramento Regional County Sanitation District as Regional San. The listed acreage for the Bufferlands of 2,650 has been cited in many planning documents but is not consistent with Regional San's current key statistics which describes the Bufferlands as 2,150 acres. 16.6
- 3.7.2.7: The assumption that the Stone Lakes National Wildlife Refuge (SLNWR) will have preserved its entire 18,000 acre project boundary area within 50 years should be checked with the refuge and appropriately cited. 16.7
- Fig. 6-2: While at one time enrolled in the Williamson Act, the parcels in the southern portion of the Regional San Bufferlands have been removed from the Williamson Act. The effort to remove these parcels occurred in 2016. 16.8
- 7.1.2.1: The Regional San South County Ag Recycled Water Project will have a significant effect on ground water in the Central Basin and warrants discussion within Ground Water Hydrology section. 16.9

  7.1.2.3: Change "Beech Lake" to "Beach Lake". 16.10
- 8.1.1: The NCCP is directed by the California Department of Fish and Wildlife. 16.11
- 8.1.2.4: Change "Sacramento Regional Sanitation District Buffer Lands" to "Regional San Bufferlands". 16.12
- 8.1.2.5: Change "Nicholas" to "Nicolaus". 16.13
- Table 12.1: SLNWR is listed as 18,000 of existing preserve. The footnote should more accurately qualify this as acreage within the project boundary. Chapter 3 denotes 6,420 acres of land within the refuge as currently preserved. 16.14
- 12.1.1: This section does not present any regulatory information related to the provision of recycled water. Construction, operation, and maintenance of recycled water infrastructure is a covered activity in the SSHCP document and should be covered in the EIS/EIR. 16.15
- 12.1.1.4, page 12-6: A portion of the information in this section is outdated and should be revised to reflect the following:
  - The Sacramento Regional Wastewater Treatment Plant Master Plan 2020 has been superseded by the Regional San EchoWater Project. As a result of permit requirements adopted by the Central Valley Regional Water Quality Control Board (CVRWQCB) in 2010, as amended by orders of the CVRWQCB and the State Water Resources Control Board (SWRCB) in 2011, 2012, 2013, and 2014, the District is required to reduce total nitrogen and ammonia levels in its effluent substantially below existing concentrations. Biological nutrient removal (BNR) is under construction to meet ammonia and nitrate effluent limitations. The District is also required to install tertiary filtration treatment for pathogen removal. Full compliance with the adopted and amended permit is required by 16.16

May 2021 for ammonia and nitrate removal and May 2023 for filtration-related requirements. 16.16 cont'd

- The Interceptor System Master Plan 2000 has been superseded by the Regional San Interceptor Sequencing Study (ISS). The Interceptor Sequencing Study (ISS) was prepared to determine Regional San's long term needs to provide sanitary sewer service to a growing Sacramento region. The ISS evaluated proposed interceptor facilities identified in Regional San's previous planning document, the SRCSD Interceptor System Master Plan 2000, to determine if there were other alternatives including delaying, realigning, or eliminating proposed interceptors. The ISS performed the following six tasks; 1) re-evaluated planning area growth predictions, 2) identified alternative flow generation criteria based on projected population densities and anticipated future flow per household, 3) developed additional modeling capabilities to evaluate conservative and realistic flow conditions, 4) prepared multiple interceptor sewer service alternatives, 5) evaluated recycled water alternatives including satellite treatment and scalping facilities, 6) prepared a cost analysis for the top interceptor alternatives. 16.17

  The ISS provides a high level evaluation of interceptor alternatives and identifies interceptor alignment corridors as well as anticipated capacity needs and interceptor pipe sizes. Proposed projects will be further evaluated through the District's asset management program and must be approved by the Project Authorization Committee before requesting approval from the Regional San Board of Directors to begin environmental review and project implementation. The Regional San Board of Directors adopted the ISS in February 2013. The ISS is located on the Regional San website at http://www.regionalsan.com/ISS.

- 12.1.2.3: Regional San currently owns and operates a 5-mgd Water Reclamation Facility (WRF) that has been producing Title 22 tertiary recycled since 2003. The WRF is located within the SRWTP property in Elk Grove. Regional San uses a portion of the recycled water at the SRWTP and the rest is wholesaled to the Sacramento County Water Agency (SCWA). SCWA retails the recycled water, primarily for landscape irrigation use, to select customers in the City of Elk Grove. Regional San is not a water purveyor and any potential use of recycled water in the project area must be coordinated between the key stakeholders, e.g. land use jurisdictions, water purveyors, users, and the recycled water producers. 16.18

- 12.1.2.4, page 12-18: Information in this section is outdated and should be revised to reflect the following:

  - The Sacramento Regional Wastewater Treatment Plant Master Plan 2020 has been superseded by the Regional San EchoWater Project. The SRWTP provides secondary treatment using an activated sludge process. The design of the SRWTP and interceptor system was balanced to have SRWTP facilities accommodate some of the wet weather flows while minimizing idle SRWTP facilities during dry weather. Regional San designed the SRWTP to accommodate some wet weather flows with the storage basins and interceptors designed to accommodate the remaining wet weather flows. 16.19

    The Central Valley Regional Water Quality Control Board (Water Board) issued an NPDES Discharge Permit to Regional San in December 2010. In adopting the new Discharge Permit, the Water Board required Regional San to meet significantly more

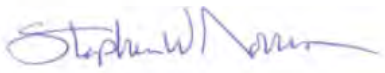
restrictive treatment levels over its current levels. Regional San began the necessary activities, studies, and projects to meet the permit conditions in August of 2014. Regional San must complete construction of the new treatment facilities to achieve the permit and settlement requirements by May 2021 for ammonia and nitrate and May 2023 to meet these pathogen requirements. 16.19 cont'd

- The SASD Sewerage Facilities Expansion Master Plan and 2008 SASD Sewerage Facilities Expansion Master Plan Update have been superseded by the 2010 SASD System Capacity Plan Update. Please remove any references to the superseded master plans. 16.20

- 12.2.2.2, page 12-34, 3rd bullet: Regional San was in litigation with the CVRWQCB and the SWRCB over aspects of the NPDES permit that result in the need for tertiary filters. On August 8, 2014, CVRWQCB adopted an order that modified the permit filtration-related requirements and the litigation was dismissed and resolved. The permitted capacity of the SRWTP was not required to be increased and remains at 181 mgd. 16.21
- 12.2.3.2: The Proposed Action/Proposed Project Alternative Covered Activities also include construction, maintenance, and operation of recycled water activities. 16.22
- 12.2.3.2, 3rd paragraph: Reference to 2020 SRWTP Master Plan should be removed. The Regional San ISS and EchoWater Project would guide the extension of new wastewater facilities. The SCWA Water Supply Master Plans would guide new water facilities. 16.23
- 12.2.4.2, 2nd paragraph: Reference to 2020 SRWTP Master Plan should be removed. The Regional San ISS and EchoWater Project would guide the extension of new wastewater facilities. The SCWA Water Supply Master Plans would guide new water facilities. 16.24

If you have any questions or require additional information, please contact me at (916) 876-6053 or norriss@sacsewer.com.

Sincerely,



Stephen Norris
Senior Civil Engineer

RTC 16.1 (EIS/EIR) – Comment noted. However, because the referenced conservation easement was not recorded until 2016, it is not part of the baseline used for analysis in the EIS/EIR. That baseline was set at issuance of the Notice of Preparation for the EIS/EIR in 2014. Nonetheless, a note has been added to Figure 1-2 that references the 205 acres of additional existing preservation in PPU 4.

RTC 16.2 (EIS/EIR) – Figures 2-1, 2-2, and 2-3 have been revised to show that the small areas east of Grant Line Road are part of PPU 4.

RTC 16.3 (EIS/EIR) – Comment noted. The Implementing Entity will ensure that the referenced property is considered for early enrollment in the Preserve System, provided it meets the necessary criteria.

RTC 16.4 – (SSHCP and EIS/EIR) – It is possible that all or a portion of the referenced property could be enrolled as preserve in the SSHCP Preserve System. However, the activities described in the comment are not covered activities in preserves. Therefore, if the property is enrolled in the future Preserve System the boundaries may exclude the locations that Regional San needs to disturb for maintenance and construction. Each Conservation Easement would be negotiated independently and may include conditions or allowances that would not be in place on another preserve property.

RTC 16.5 (EIS/EIR) – The acreage shown on Figure 2-3 in the Draft EIS/EIR was in error. The value for PPU 4 has been corrected to 520 acres in the Final EIS/EIR, consistent with the text description of PPU 4 preserves in the Draft EIS/EIR.

RTC 16.6 (EIS/EIR) – The referenced text in Section 3.7.1.4 has been edited as shown below in the Final EIS/EIR:

> In addition, the ~~2,650~~**2,150** acres of preserved lands at the ~~Sacramento Regional County Sanitation District~~ **Regional San** Bufferlands, located in the western part of the UDA, have “termed” conservation easements, meaning those acres are currently preserved, but might not be preserved in perpetuity.

RTC 16.7 (EIS/EIR) – Comment noted. The EIS/EIR preparers were unable to get confirmation from Stone Lakes NWR on the feasibility of acquiring the remaining acreage to complete the approved NWR boundaries. Therefore, Section 3.7.2.7 of the Draft EIS/EIR assumed that Stone Lakes NWR would enroll properties at the same rate that it has since its creation. Since the adoption of the approximately 18,000-acre refuge boundary in 1992, Stone Lakes NWR has enrolled 6,550 acres. That amounts to an average rate of acquisition of 262 acres per year. Extending that same rate of acquisition over the proposed 50-year permit term of the SSHCP, Stone Lakes NWR would acquire an additional 13,100 acres. That amount would more than complete the approximately 18,000-acre approved refuge boundary. These assumptions have been added to the text in Section 3.7.2.7 with the following text:

> **The Draft EIS/EIR assumes that Stone Lakes NWR would enroll properties at the same rate that it has since its creation. Since the adoption of the approximately 18,000-acre refuge boundary in 1992, Stone Lakes NWR has**

enrolled 6,550 acres. That amounts to an average rate of acquisition of 262 acres per year. Extending that same rate of acquisition over the proposed 50-year permit term of the SSHCP, Stone Lakes NWR would acquire an additional 13,100 acres. That amount would more than complete the approximately 18,000-acre approved refuge boundary.

RTC 16.8 (EIS/EIR) – Comment noted. However, the existing conditions evaluated in the EIS/EIR were based on the date of the NOP issuance, which was 2014. Nonetheless, the removal of the subject parcels from Williamson Act contract has been noted and would be included in the SSHCP data repository.

RTC 16.9 (EIS/EIR) – Construction, operation, and maintenance of recycled water pipelines is an SSHCP Covered Activity. The adverse and beneficial effects of the South County Ag Program were analyzed in the Draft EIS/EIR for the EIS/EIR action alternatives that are described in EIS/EIR Chapter 2 (as well as in the No Action Alternative).

As described in the No Action Alternative in EIS/EIR Chapter 2, the South County Ag Program would have a beneficial effect on groundwater relative to the existing conditions. We commend Regional San for taking action to improve groundwater conditions in South Sacramento County, and therefore, much of the SSHCP Plan Area. The analysis in Section 7.2.2.1 of the Final EIS/EIR has been revised to include the potential beneficial effects of the South County Ag Program to groundwater supplies.

RTC 16.10 (EIS/EIR) – The requested correction has been made in Section 7.1.2.3 of the Final EIS/EIR:

> The north (largest) UDA portion of the Planning Area is primarily located within the Morrison Creek Watershed, which drains west through the City Elk Grove to ~~Beech~~ **Beach** Lake and the Sacramento River.

RTC 16.11 (EIS/EIR) – The requested correction has been made in Section 8.1.1 of the Final EIS/EIR:

> The Natural Communities Conservation Planning (NCCP) Act was established by the California Legislature, is directed by the Department of Fish and ~~Game~~ **Wildlife**, and is being implemented by the state, and public and private partnerships to protect habitat in California.

RTC 16.12 (EIS/EIR) – The requested correction has been made in Section 8.1.2.4 of the Final EIS/EIR:

Within the Planning Area, the existing wetland and riparian natural land covers on the Stone Lakes National Wildlife Refuge, the existing Cosumnes River Preserve, and the ~~Sacramento Regional Sanitation District Buffer Lands~~ **Regional San Bufferlands** provide foraging and sheltering habitats for migratory water birds using the Pacific Flyway.

RTC 16.13 (EIS/EIR) – The requested correction has been made in Section 8.1.2.4 of the Final EIS/EIR:

> Known locations of nest and nursery sites from the California Natural Diversity Database (CNDDB) (CDFW 2014b) within the Planning Area consist of: two bank swallow cavity congregations found on the bank of the Cosumnes River near Rancho Murieta; three black-crowned night heron rookeries (at Fishhead Lake and ~~Nicholas~~ **Nicolaus** Pond within the UDA, and along a tributary of Badger Creek outside the UDA); three double-crested cormorant (*Phalacrocorax auritus*) rookeries (one at Stone Lake, and two in the UDA along lower Morrison Creek and at Black Crown Lake); and, four great blue heron (*Ardea herodias*) and great egret (*Ardea alba*) rookeries (North Stone Lake, along the North Fork of Badger Creek, along lower Morrison Creek in the UDA, and along the Cosumnes River near Rancho Murieta).

RTC 16.14 (EIS/EIR) – A new table note has been added to Final EIS/EIR Table 12-1 that reads as follows:

> **[c] Stone Lakes NWR has an approved boundary of approximately 18,000 acres within the planning area. At the time of EIS/EIR preparation, approximately 6,420 acres within that boundary have been acquired for the NWR.**

In addition, table note references have been added to “Stone Lakes National Wildlife Refuge” in Final EIS/EIR Table 12-1.

RTC 16.15 (EIS/EIR) – The comment is correct that construction, operation, and maintenance of recycled water pipelines is an SSHCP Covered Activity and was analyzed in the Draft EIS/EIR. Information regarding regulation of recycled water has been added to Section 12.1.1.3 of the Final EIS/EIR:

> **California Department of Public Health. Recycled water regulations are administered by both San Francisco Bay RWQCB and the California Department of Public Health (CDPH). The regulations governing recycled water are found in a combination of sources, including the Health and Safety Code, Water Code, and Titles 22 and 17 of the California Code of Regulations (CCR). Issues related to the treatment and distribution of recycled water are generally under the permitting authority of RWQCB, while issues related to use and quality of recycled water are the responsibility of CDPH.**
>
> **Title 22 of the CCR, Division 4, Environmental Health, Chapters 1 through 3 outline California’s health laws related to recycled water. The intent of these regulations is to ensure protection of public health associated with the use of recycled water. The regulations establish acceptable levels of constituents in recycled water for a range of uses and assurance of reliability in the production of recycled water. The SWRCB has jurisdiction over the distribution of recycled wastewater and the enforcement of Title 22**

regulations. Chapter 3, Article 3 of Title 22 indicates that disinfected tertiary recycled water can be used for surface irrigation of food crops (including edible root crops, where the recycled water comes into contact with the edible portion of the crop), parks and playgrounds, school yards, residential landscaping, and unrestricted-access golf courses. Orchards and vineyards where the recycled water does not come into contact with the edible portion of the crop must be treated at least to undisinfected secondary level for surface irrigation (CCR Section 60304).

RTC 16.16 (EIS/EIR) – The referenced text in Section 12.1.1.4 of the Draft EIS/EIR has been updated in the Final EIS/EIR as follows:

~~Sacramento Regional Wastewater Treatment Plant Master Plan 2020.~~ ~~The *Sacramento Regional Wastewater Treatment Plant Master Plan 2020* (2020 SRWTP Master Plan; Regional San 2008) identifies wastewater treatment facility needs for a 20-year planning period through the year 2020. The 2020 SRWTP Master Plan provides a phased program of recommended facilities to accommodate planned growth while at the same time maintaining treatment reliability, meeting future regulatory requirements, and optimizing costs. To meet this goal, the 2020 SRWTP Master Plan integrates overall strategies for wastewater treatment, effluent management, and biosolids disposal into an effective wastewater treatment management program. The 2020 SRWTP Master Plan proposes that treatment facility expansion occur in stages or phases as the sewage generated by the population increases (Regional San 2008).~~

Sacramento Regional County Sanitation District EchoWater Project. As a result of permit requirements adopted by the Central Valley RWQCB in 2010, as amended by orders of the Central Valley RWQCB and the SWRCB in 2011, 2012, 2013, and 2014, Sacramento Regional County Sanitation District (Regional San) is required to reduce total nitrogen and ammonia levels in its effluent substantially below existing concentrations. Biological nutrient removal is in progress to meet ammonia and nitrate effluent limitations. Regional San is also required to install tertiary filtration treatment for pathogen removal. Full compliance with the adopted and amended permit is required by May 2021 for ammonia and nitrate removal and May 2023 for filtration-related requirements.

RTC 16.17 (EIS/EIR) – The referenced text in Section 12.1.1.4 of the Draft EIS/EIR has been updated in the Final EIS/EIR as follows:

~~Interceptor System Master Plan 2000.~~ ~~The *Interceptor System Master Plan 2000* (Interceptor System Master Plan; Regional San 2000) identifies existing and future capacity needs in the regional interceptor system and provide a strategic approach to plan for near-term and long-term improvements needed for the regional wastewater conveyance system. The Interceptor System Master Plan updates and refines regional conveyance facilities, service area, growth projections, and the existing system's response to rainfall; provides dynamic modeling; estimates the~~

~~cost of facilities; identifies right-of-way acquisition needs; and identifies near- and long-term improvements required for regional wastewater conveyance. The Interceptor System Master Plan uses land use and population projections based on the Sacramento Area Council of Governments Blueprint criteria and the land use plans of the member jurisdictions. The Interceptor System Master Plan also provides wastewater flow estimates, information on hydraulic modeling, and interceptor design criteria, and identifies conveyance systems and policies to accommodate planned growth (Regional San 2000).~~

Regional San Interceptor Sequencing Study (ISS). The Interceptor Sequencing Study (ISS) was prepared to determine Regional San's long term needs to provide sanitary sewer service to a growing Sacramento region. The ISS evaluated proposed interceptor facilities identified in Regional San's previous planning document, the SRCSD Interceptor System Master Plan 2000, to determine if there were other alternatives including delaying, realigning, or eliminating proposed interceptors. The ISS performed the following six tasks; 1) re-evaluated planning area growth predictions, 2) identified alternative flow generation criteria based on projected population densities and anticipated future flow per household, 3) developed additional modeling capabilities to evaluate conservative and realistic flow conditions, 4) prepared multiple interceptor sewer service alternatives, 5) evaluated recycled water alternatives including satellite treatment and scalping facilities, 6) prepared a cost analysis for the top interceptor alternatives.

The ISS provides a high level evaluation of interceptor alternatives and identifies interceptor alignment corridors as well as anticipated capacity needs and interceptor pipe sizes. Proposed projects will be further evaluated through the District's asset management program and must be approved by the Project Authorization Committee before requesting approval from the Regional San Board of Directors to begin environmental review and project implementation. The Regional San Board of Directors adopted the ISS in February 2013.

RTC 16.18 (EIS/EIR) – The following text has been added to Section 12.1.2.3 of the Final EIS/EIR:

Regional San currently owns and operates a 5 mgd Water Reclamation Facility (WRF) that has been producing Title 22 tertiary recycled since 2003. The WRF is located within the SRWTP property in Elk Grove. Regional San uses a portion of the recycled water at the SRWTP and the rest is wholesaled to the Sacramento County Water Agency (SCWA). SCWA retails the recycled water, primarily for landscape irrigation use, to select customers in the City of Elk Grove outside the Planning Area. Regional San is not a water purveyor and any potential use of recycled water in the project area must be coordinated between the key stakeholders, e.g. land use jurisdictions, water purveyors, users, and the recycled water producers.

RTC 16.19 (EIS/EIR) – The referenced text in Section 12.1.2.4 of the Draft EIS/EIR has been updated in the Final EIS/EIR as follows:

> Regional San operates the SRWTP. **The SRWTP provides secondary treatment using an activated sludge process. The design of the SRWTP and interceptor system was balanced to have SRWTP facilities accommodate some of the wet weather flows while minimizing idle SRWTP facilities during dry weather. Regional San designed the SRWTP to accommodate some wet weather flows with the storage basins and interceptors designed to accommodate the remaining wet weather flows. The SRWTP is located in the westernmost portion of the Planning Area, just south of the community of Freeport.**
>
> **The Central Valley Regional Water Quality Control Board RWQCB issued an NPDES Discharge Permit to Regional San in December 2010. In adopting the new Discharge Permit, the RWQCB required Regional San to meet significantly more restrictive treatment levels over its current levels. Regional San began the necessary activities, studies, and projects to meet the permit conditions in August of 2014. Regional San must complete construction of the new treatment facilities to achieve the permit and settlement requirements by May 2021 for ammonia and nitrate and May 2023 to meet these pathogen requirements.**
>
> ~~The SRWTP is a high-purity oxygen-activated sludge facility; it is permitted to treat an average dry weather flow of 181 million gallons per day (mgd) and a daily peak wet weather flow of 392 mgd (Sacramento County 2010). The majority of the treated wastewater is dechlorinated and discharged into the Sacramento River. The SRWTP is located in the westernmost portion of the Planning Area, just south of the community of Freeport.~~ The main SASD collection system includes over 2,800 miles of sewer pipelines ranging in size from 4 to 75 inches in diameter. Regional San interceptors are a large system of pipes up to 10 feet in diameter, which carry wastewater directly to the SRWTP (Sacramento County 2010).
>
> ~~Regional San adopted the 2020 SRWTP Master Plan to identify wastewater treatment and facility needs. The Master Plan identifies treatment facilities, conveyance, and storage facilities necessary to serve anticipated population growth within the Sacramento metropolitan area and meet regulatory requirements related to discharge quality (Regional San 2008).~~ Regional San has also adopted the Interceptor Master Plan 2000, which specifies regional conveyance facility improvements (Regional San 2000) **that were further investigated in the Regional San Interceptor Sequencing Study (ISS) adopted in 2013.**

RTC 16.20 (EIS/EIR) – The referenced text in Section 12.1.2.4 of the Draft EIS/EIR has been updated in the Final EIS/EIR as follows:

> ~~In October 2008, SASD adopted the Sewerage Facilities Expansion Master Plan Update (SASD 2008), which operates as a companion document to the SASD's Sewerage Facilities Expansion Master Plan (SASD 2004).~~ **The 2010 SASD System Capacity Plan Update (SASD 2010) also contains** ~~I~~**i**mprovements ~~are~~

~~proposed in these documents~~ to meet the demand of development anticipated within the USB (Sacramento County 2011).

RTC 16.21 (EIS/EIR) – The referenced text in Section 12.2.2.2 of the Draft EIS/EIR has been updated in the Final EIS/EIR as follows:

- The increase in demand for sewer treatment would result in significant unavoidable impacts because flows would exceed permitted capacity even with policy compliance (Sacramento County 2010, pp. 5-12 to 5-22). **At this time there are no plans to expand the capacity of Regional San facilities beyond the existing permitted capacity, so this impact would remain significant and unavoidable.** ~~However, this finding was based on pending litigation at the time of the Sacramento General Plan EIR that brought into question the ability of Regional San to expand its wastewater treatment capacity. That litigation was resolved and Regional San is now in the process of constructing a tertiary treatment facility that will expand their permitted capacity to accommodate projected development in the Planning Area. With this new information, the lead agencies expect that the previously identified significant unavoidable impact to sewer treatment would be revised to less than significant~~.

RTC 16.22 (EIS/EIR) – The referenced text in Section 12.2.3.2 of the Draft EIS/EIR has been revised in the Final EIS/EIR as follows:

> The Proposed Action/Proposed Project Alternative Covered Activities include the urban development that are anticipated under the No Action/No Project Alternative, including the construction, maintenance, and operation of water supply**, recycled water,** and wastewater facilities.

RTC 16.23 (EIS/EIR) – The referenced text in Section 12.2.3.2 of the Draft EIS/EIR has been revised in the Final EIS/EIR as follows:

> New ~~water or~~ wastewater facilities could be expanded or extended **within the MCRA under the Proposed Action/Proposed Project Alternative** as envisioned by the ~~2020 SRWTP Master Plan (Regional San 2008)~~ **Regional San ISS and EchoWater Project**. **New water facilities could be expanded or extended as envisioned in the SCWA Water Supply Master Plans.** ~~within the MCRA for the Proposed Action/Proposed Project.~~

RTC 16.24 (EIS/EIR) – The referenced text in Section 12.2.4.2 of the Draft EIS/EIR has been revised in the Final EIS/EIR as follows:

> New ~~water or~~ wastewater facilities could be expanded or extended **within the MCRA under the Reduced Permit Term Alternative** as envisioned by the ~~SRWTP Master Plan 2020 (Regional San 2008)~~ **Regional San ISS and EchoWater Project**~~within the MCRA and would not be adversely affected by the establishment of preserves under the Reduced Permit Term Alternative.~~ **New water facilities could be expanded or extended as envisioned by the SCWA Water Supply Master Plans.**

LETTER 17 SACRAMENTO COUNTY AGRICULTURAL COMMISSIONER (EIS/EIR)

Agricultural Commissioner/
Director of Weights & Measures
Juli D. Jensen, Agricultural Commissioner

County of Sacramento

County Executive
Nav Gill

Assistant County Executive
Nancy Newton

August 31, 2017

Jan C. Knight
Deputy Field Supervisor
US Fish and Wildlife Service
Sacramento Fish & Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Leighann Moffitt
County of Sacramento
Office of Planning and Environmental Review
827 7th Street, Room 225
Sacramento, CA 95814

RE: Comments on the South Sacramento Habitat Conservation Plan Draft Environmental Impact Statement/ Draft Environmental Impact Report

Dear Ms. Knight and Ms. Moffitt,

The following comment letter is based upon the information contained in the South Sacramento Habitat Conservation Plan (SSHCP) Draft Environmental Impact Statement (DEIS)/Environmental Impact Report (DEIR), dated March 2017. Most of the content in this letter will be referring to Chapter 6 – Agriculture, of the SSHCP DEIS/DEIR, which contains information regarding existing agricultural protections, conditions and potential impacts to agricultural resources and activities within the SSHCP Planning Area. Items mentioned below are areas of the DEIS/DEIR that may need more clarification and/or analysis for a more comprehensive and transparent environmental document.

The California Right to Farm Act (Civil Code Section 3482.5) is an existing agricultural protection.
One of the County's existing protective measures for agriculture is the Sacramento County Code Chapter 14.05, the Right to Farm Ordinance, as described in Chapter 6 [page 6-7]. The DEIS/DEIR fails to mention California's agricultural protection act, California Civil Code Section 3482.5, "The Right to Farm Act". Similar to the County's Code, Civil Code Section 3482.5(a)(1) helps protect agricultural operations, activities, facilities, etc. from nuisance complaints. Unlike the County Code, Civil Code Section 3482.6 (a) has a broader sweep of protections with the intention of shielding agricultural processing activities, operations, and facilities, such as the processing of dairy products, the production of wine, the processing of meat and egg products, the drying of fruits and grains, the packing and cooling of fruits and vegetables, and the processing for wholesale or retail markets of agricultural products. Sacramento has many of these processing facilities and operations among its agricultural resource lands. The State Right to Farm Act prevails over contrary provisions of any city or county ordinance (Civil Code in Sections 3482.5(d) and 3482.6(d)). This act warrants mentioning in the DEIS/DEIR as an existing agricultural protection. 17.1

4137 Branch Center Rd. • Sacramento, California 95827-3823 • phone (916) 875-6603 • fax (916) 875-6150 •
www.agcomm.saccounty.net

The SSHCP Preserve System should be analyzed further, in lieu of existing land conservation policies and existing land conservation programs.

The DEIS/DEIR mentions Rancho Cordova's General Plan Policy LU.1.10 as an existing agricultural protection policy. It states, "The City shall ensure that the following standards are met regarding agricultural conservation easement content: provisions of an accurate legal document that prohibits any activity that substantially impairs or diminishes the agricultural productivity of the land..." How is this policy affected by the Proposed Action/Proposed Project Alternative? The DEIS/DEIR states that approximately 9,642 acres of Cropland and Irrigated Pasture-Grassland would be conserved as part of the SSHCP Preserve System. These conservation easements would limit the types of crops that could be grown, when crops could be harvested, and specific farming activities based on the specific habitat being preserved. On grazing lands, a Preserve Management Plan would determine the specificity of the grazing operation and may limit or restrict historical grazing activities. Some of these restrictions could be in direct conflict with Rancho Cordova's GP Policy LU.1.10 and depending on the agricultural operation, historical use of the land, and other factors, the SSHCP Preserve System could have beneficial impacts to agriculture, no impact to agriculture, or negative impacts to agriculture. The DIES/DEIR states that the establishment of preserves would not prevent farmers/ranchers from using their agricultural land for agricultural purposes and therefore would have a *Minor Beneficial* effect to agriculture resources and activities. Other existing land trust programs and the County's Williamson Act Contract program (supported by Sacramento County General Plan Policy AG-25) currently function as conservation programs and help protect agricultural lands from development pressures. The DEIS/DEIR does not contemplate possible restrictions on agricultural land as a negative impact and should conduct further analysis of this scenario. Sacramento County General Plan Policy AG-14 states, "The County shall initiate intergovernmental agreements with state and federal wildlife management authorities in order to mitigate loss of Prime, Statewide Importance, Unique, and Local Importance farmlands or land with intensive agricultural investment due to natural habitat conversion." If the SSHCP Preserve System converts these important agricultural lands to native habitat, has the DEIS/DEIR contemplated a mitigation measure according to GP Policy AG-14? 17.2 17.3

Current, existing FMMP data should be used in the DEIS/DEIR analysis.

Chapter 6, Section 6.1.2.1 refers to important farmland data from the California Department of Conservation, dated 2014 and refers to it as "current". The analysis should be using 2016 FMMP data, as it is the most current data available. 17.4

The DEIS/DEIR uses the entire SACOG area to determine project impacts to agricultural land. The only agricultural land that will be impacted by the SSHCP project will be those lands within Sacramento County.

Section 6.2.1 explains the methodology used in determining the Project impacts to agriculture. Although the SSHCP encompasses a well-defined area and the area to be used as mitigation for development within the Urban Development Area (UDA) is well defined, the agricultural area being assessed for agricultural impacts includes the entire SACOG region (the counties of Sacramento, Placer, El Dorado, Sutter, Yolo, and Yuba). According to the SSHCP, agricultural lands outside of the SSHCP area, will not be targeted for mitigation purposes. Only those lands, the majority of which are agricultural lands in the southern portion of Sacramento County, will be considered for preservation/conservation easement purposes. By including the entire SACOG region for impact considerations, the impacts to agricultural lands within the SSHCP area will be diluted. 17.5

4137 Branch Center Rd. • Sacramento, California 95827-3823 • phone (916) 875-6003 • fax (916) 875-6150

A more comprehensive analysis of existing Williamson Act contracted lands would enhance the accuracy of the DEIS/DEIR.

One of the Significant Thresholds identified by the DEIS/DEIR, used to evaluate an impact to agriculture, is whether the activity would conflict with an existing Williamson Act Contract [page 6-14]. The DEIS/DEIR states that many of the areas protected under conservation easement or in fee-title preserves would be under a Williamson Act Contract. The DEIS/DEIR needs to conduct further analysis on existing Williamson Act contracted lands. There may be a few contracts that allow open space uses, but the majority of the contracts may state that open space, as defined in California Government Code Section 51201(o) is not a compatible use. Whether or not a Williamson Act Contract would allow open space uses would be relevant information for this analysis, as the SSHCP depends on the use of these lands for mitigation of development within the UDA. 17.6

Avoidance and Minimization Measure (AMM) EDGE-1 may have a negative impact on agricultural lands.

Agricultural lands encumbered by Williamson Act Contracts with intensive agricultural activities may be affected by neighboring preserves by Avoidance and Minimization Measure (AMM) EDGE-1, which would prioritize compatible adjacent uses next to SSHCP Preserves, such as parks, nature trails, roads, or other uses. The DEIS/DEIR states that these uses would not convert or introduce incompatible land uses or conflict with existing Williamson Act contracted land [page 6-23]. This may or may not be the case and would depend on the Williamson Act Contract and the use of the land. The DEIS/DEIR assumes that nature trails, parks, roads, etc. are compatible uses adjacent to agricultural lands, but agricultural activities can be negatively affected by adjacent or nearby parks, nature trails, roads, etc. These uses can limit the use of the agricultural land by restricting normal farming practices, such as the application of pesticides. Sacramento County General Plan Policy AG-23 further supports this concept, "The County seeks to minimize agricultural/trail-user conflicts by recommending and seeking buffer zones between trails and nearby agricultural land..." 17.7

The DEIS/DEIR needs a more comprehensive analysis in regards to the impacts of the SSHCP on Sacramento County's agricultural lands.

Lastly, the DEIS/DEIR concludes that the Proposed Action/Proposed Project Alternative would result in *Minor Beneficial* effects to agriculture when compared to the impacts that would occur under the No Action/No Project Alternative baseline condition. The DEIS/DEIR, bases this statement on a couple of conclusions; one is the implementation of AMM EDGE-1, which, as discussed above could have a negative effect on agricultural operations. It also bases this analysis on a conclusion that the Proposed Action/Proposed Project Alternative would prevent 1,900 acres of agricultural land from being plowed under by new urban development outside of the UDA. How does the SSHCP prevent jurisdictions like the Cities of Elk Grove and Galt from expanding their Sphere of Influence? Does the SSHCP prevent private developers from proposing development outside of the UDA? To make the statement that these two items would result in beneficial effects to agriculture is misleading. It is the opinion of the Agricultural Commissioner's Office that the DEIS/DEIR discussion needs to be more encompassing of all scenarios. Under varying circumstances the SSHCP could have positive effects on agriculture, as it could offer another tool for preserving agricultural lands in perpetuity, especially grazing lands; the SSHCP could have no effect on agriculture, if the Plan's Preserves conserved existing natural habitat in areas buffered from intensive agricultural operations; and the SSHCP could have negative effects on agriculture, by significantly limiting a farmer's ability to make decisions or act in a timely fashion, in regards to their agricultural operation. The Agricultural Commissioner's Office respectfully requests that further, in-depth analysis occurs regarding the environmental impacts of the SSHCP on Sacramento County's agricultural lands, existing agricultural operations and future agricultural opportunities. 17.8 17.9 17.10

4137 Branch Center Rd. • Sacramento, California 95827-3823 • phone (916) 875-6603 • fax (916) 875-6150

The Agricultural Commissioner's Office thanks you for the opportunity to comment and is available to assist, in any capacity, with further development of the SSHCP.

Respectfully Submitted,

Chris J. Flores
Chief Deputy Agricultural Commissioner

And

Juli D. Jensen
Agricultural Commissioner

Cc: Sacramento County Farm Bureau

4137 Branch Center Rd. • Sacramento, California 95827-3823 • phone (916) 875-6603 • fax (916) 875-6150

RTC 17.1 (EIS/EIR) – The California Right to Farm Act (California Civil Code 3482.5) has been added to the Final EIS/EIR in Section 6.1.1.2.

The following text has been inserted in Final EIS/EIR Section 6.1.1.2 to address Comment 17.1.

> **California Right to Farm Act**
>
> **The "Right to Farm Act" (California Civil Code Sections 3482.5, 3482.6, 3483, and 3484 collectively) is a statewide agricultural protection act. Similar to Sacramento County Code Chapter 14.05 (the Right to Farm Ordinance, discussed below), the Right to Farm Act helps protect agricultural operations, activities, facilities, etc. from nuisance complaints. Unlike the County Code, the Right to Farm Act has a broader sweep of protections with the intention of shielding agricultural processing activities, operations, and facilities, such as the processing of dairy products, the production of wine, the processing of meat and egg products, the drying of fruits and grains, the packing and cooling of fruits and vegetables, and the processing for wholesale and retail markets of agricultural products. The Planning Area has many of these processing facilities and operations. The Right to Farm Act prevails over contrary provisions of any city or county ordinance.**

RTC 17.2 (EIS/EIR) – Comment noted. However, the spirit of Rancho Cordova General Plan Policy LU.1.10 was to ensure that agricultural lands with conservation easements would remain agriculturally productive. As described in the Rancho Cordova General Plan EIR Section 4.2, very little of Rancho Cordova is underlain by soils of high value for row crops or other intensive agriculture. Most of the agricultural activity in Rancho Cordova consists of dry crop farming or grazing. Management of SSHCP agricultural preserves would ensure that agricultural lands could remain in production, while pursuing parallel goals of maximizing habitat value within the constraints of the agricultural operations allowable under the easement. Preserve management plans would be developed with landowners and would be periodically reviewed, which could provide landowners the opportunity to adaptively manage land management activities. The conservation easement for agricultural lands will also make farmers eligible for monetary payments for the purpose of agricultural enhancement (Draft SSHCP, page 9-23, "Agricultural Enhancements on Easements"). Therefore, we do not believe the conservation easements proposed by the SSHCP would "substantially impair or diminish the agricultural productivity of the land…". For grazed grasslands, the SSHCP recognizes that responsible grazing practices, as used by most ranchers in the Plan Area, provide benefits to the covered species and should be allowed to continue on SSHCP Preserves. As part of Preserve establishment, the SSHCP Implementing Entity will collect information from ranchers on the historic and existing grazing practices on the land, and will ensure that beneficial grazing will continue on the subject property in perpetuity.

RTC 17.3 (EIS/EIR) – The SSHCP does not propose conversion of important agricultural lands to native habitat. As stated on page 6-24 of the Draft EIS/EIR, a small

amount of Cropland or Irrigated Pasture-Grassland may be converted to an aquatic resource land cover type from the re-establishment or establishment of Riparian Woodland, Vernal Pools, or Seasonal Wetlands under the Proposed Action/Proposed Project Alternative. Although these changes in land cover type are not considered agricultural conversion under the Sacramento County, Galt, or Rancho Cordova General Plans, under the Proposed Action/Proposed Project Alternative, the change in land cover would be mitigated as a loss of species habitat. Conservation easements would be placed on agricultural land cover types to ensure that agricultural production continues on the subject properties, consistent with the biological goals and objectives of the HCP (Table 7-1 in the SSHCP). As stated on page 6-23 of the Draft EIS/EIR, each Williamson Act contract is unique, and some may restrict the possible terms allowed for a conservation easement. If a conservation easement were proposed for land that is in a Williamson Act contract, the future Permittees would review the specifics of the Williamson Act contract to ensure that the establishment of a conservation easement is allowable.

RTC 17.4 (EIS/EIR) – At the time that section of the document was prepared, the 2014 FMMP data was the most current available. Since that analysis was completed, the 2016 FMMP data became available. While CEQA states that the existing conditions described in the EIR reflect the conditions at the time of NOP issuance (Title 14 California Code of Regulations, Chapter 3, Article 9, Section 15125(a)), the EIR preparers have nonetheless reviewed the 2016 FMMP dataset and found that the changes in agricultural uses within the planning area from the 2014 FMMP dataset are not substantial, and would not result in changes in the analysis or conclusions.

RTC 17.5 (EIS/EIR) – The study area of the SACOG six-county region described in Section 6.1.2.1 of the Draft EIS/EIR was only used to establish the cumulative conditions. The analysis of each alternative's impacts on agriculture in Sections 6.2.2.1, 6.2.3.1, and 6.2.4.1 describes only the impacts to agriculture within the planning area. The text in Section 6.2.1 of the Final EIS/EIR has been corrected to make that clear. The text changes are shown below:

> ~~It is appropriate to consider impacts to certain environmental resources within the context of other impacts occurring in the surrounding landscape, community, or region (see Section 3.6.2, Geographic Study Area of Resource Topics Analyzed in Chapters 4 through 16).~~ **The study area used to analyze direct and indirect effects of the alternatives on agriculture is the Planning Area.** The lead agencies determined that an appropriate geographic scale for evaluating the **cumulative** impacts of each EIS/EIR alternative on agriculture lands and activities should include all agricultural resources and activities within the Sacramento Area Council of Government's six-county region (SACOG 2016), which includes all of Sacramento, Placer, El Dorado, Sutter, Yolo, and Yuba Counties.

RTC 17.6 (EIS/EIR) – The Draft EIS/EIR bases its conclusion of Minor Beneficial effect on the following: "Some of the land included within the Preserve System may include Important Farmland or land currently enrolled in a Williamson Act contract; however, establishment of preserves would not convert Important Farmland to developed uses or

prevent farmers/ranchers from using their agricultural land for agricultural purposes." (page 6-23). The operating agricultural preserves would not be maintained as "open space" as defined by California Government Code 51201(o)[3], because the SSHCP would not seek to "preserve its natural characteristics, beauty, or openness" but rather would keep the lands in active agricultural production. Further, as stated in Section 6.1.2.3 of the Draft EIS/EIR, "approximately 139,890 acres within the Planning Area is currently under active Williamson Act contracts (CDOC 2016). Approximately 10,400 acres of these active contracts is identified for nonrenewal." The SSHCP would provide an additional incentive for active contracts to be renewed, because the lands would be able to draw benefits from both the Williamson Act contract and the SSHCP conservation easement.

RTC 17.7 (EIS/EIR) – As stated on page 5-68 of the SSHCP, the AMMs of Condition 2, include AMM EDGE-1 referred to in the comment, would only apply to UDA Covered Activities that border existing preserves or planned preserves. Because the SSHCP would not seek conservation easements on agricultural lands in the UDA, this AMM would not affect agricultural operations in the Planning Area. References to AMM EDGE-1 in Chapter 6 have been removed from the Final EIS/EIR.

RTC 17.8 (EIS/EIR) – Refer to response to Comment 17.7. References to AMM EDGE-1 in Chapter 6 have been removed from the Final EIS/EIR.

RTC 17.9 (EIS/EIR) – The SSHCP does not prevent urban development outside the UDA, as it is not a land use plan and has no such authority. However, urban development project proponents outside the UDA would not be able to use the coverage provided under the SSHCP Incidental Take Permits, nor any of its expedited permitting processes for impacts to waters or aquatic resources. This would be true for private developers, for non-permittees like the City of Elk Grove, or even for permittees like the City of Galt. However, the SSHCP EIS/EIR does predict that by allowing greater density of development within the UDA, the SSHCP would reduce the likelihood that urban development would occur outside the UDA. The EIS/EIR assumes that the planning area would accommodate the same amount of urban development under any of the alternatives, so the variable would be where that development would occur.

RTC 17.10 (EIS/EIR) – Please refer to the responses to comment 17.7 and comment 17.9. These explain much of the basis for the EIS/EIR's conclusion that impacts to agricultural operations outside the UDA would be reduced as compared to the No Action/No Project Alternative. The EIS/EIR acknowledges the uncertainty inherent in its long-term analysis (Section 3.6.4 in the Draft EIS/EIR) but makes a good-faith effort to describe future conditions in the planning area based on adopted general plans and policy direction from planning area jurisdictions. With regard to the effects of the

[3] "Open-space use" is the use or maintenance of land in a manner that preserves its natural characteristics, beauty, or openness for the benefit and enjoyment of the public, to provide habitat for wildlife…" (California Government Code 51201(o))

conservation easements on agricultural landowners, it would be entirely up to each farmer/landowner to choose to sell a conservation easement on their property to the Implementing Entity. If the farmer/landowner believes that they would be better served by not doing so, the SSHCP does not contain any instruments that would enable a permittee to force them to place a conservation easement on their land. Therefore, the Plan Preparers do not believe that additional analysis of HCP impacts to Sacramento County's agricultural lands, operations or opportunities is required.

LETTER 18 SACRAMENTO COUNTY FARM BUREAU (SSHCP AND EIS/EIR)

SACRAMENTO COUNTY FARM BUREAU

PUTTING THE FOOD ON YOUR FORK SINCE 1917

September 1, 2017

Jan C. Knight
Deputy Field Supervisor
U.S. Fish and Wildlife Service
Sacramento Field Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Marianne Biner
Senior Planner
County of Sacramento
Office of Planning and Environmental Review
827 7th Street, Room 225
Sacramento, C A95814

RE: Comments on the Draft Environmental Impact Statement (DEIS) and Environmental Impact Report (DEIR) for the South Sacramento Habitat Conservation Plan (SSHCP).

Dear Ms. Knight and Ms. Biner;

On behalf of the Board of Directors of the Sacramento County Farm Bureau (Farm Bureau), we are providing the following comments to the Draft SSHCP EIR/EIS. Farm Bureau has been engaged in the development of the SSHCP for over 10 years and has provided numerous comments and many hours of stakeholder involvement during those years.

Farm Bureau is a non-governmental, non-profit grassroots organization with a purpose of protecting and promoting Sacramento County agriculture and the farmers and ranchers who steward and contribute nearly $470 million in farm gate sales to a larger food and agriculture economy. Sacramento County contributes to a region in which is noted as America's Farm to Fork Capital. This regional distinction is well deserved as the Region has the climate and soils that are only found in a few other places in the world. To have a viable and productive working landscape, farmers and ranchers must have the flexibility to manage their farming operations for market conditions, weather, soil, water availability, regulations, etc. When a farmer sees a diminution in his ability to operate for optimal food and fiber production, then the farming business model is compromised leading to reduced economic returns. Habitat conservation programs can adversely impact agricultural productivity by limiting the farmer's ability to make decisions and respond to changing conditions over time. 18.1

The SSHCP provides very little benefit or assurances to agriculture and places a disproportionate burden of habitat mitigation on working agricultural lands, that in many cases already provide significant habitat, species conservation, and watershed benefits. The SSHCP DEIR/DEIS fails to acknowledge and 18.2

responsibly address the SSHCP's far-reaching negative impact on agriculture in the larger, long-term context of the County's urbanizing landscape for the following reasons: 18.2 cont'd

The DEIR/DEIS uses three criteria to evaluate agricultural impacts for the Significance Thresholds [Page 6-14]—yet none of these criteria address the most devastating impact on agriculture with respect to conservation easements and in-fee-title agricultural land acquisition. The Proposed Action/Proposed Project Alternative suggests establishment of preserves would not convert Important Farmland to developed uses or prevent farmers/ranchers from using their agricultural land for agricultural purposes [page 6-23]. 18.3

However, the objectives of the SSHCP, as enforced through the Agriculture Conservation Easement, places responsibility to identity, preserve, protect, enhance, monitor and restore in perpetuity the Conservation Values of the Property entirely on the farmer/rancher. 18.4

Under the SSHCP, the farmer/rancher would be prohibited from converting any annual crop not historically planted on the property or approved in writing. In addition, various crops and agricultural activities—including feedlots, orchard, vineyards, artichokes, asparagus, sod, rice, safflower, or cotton—are specifically prohibited. The Conservation Easement would also limit the farmer's ability to use biocides that have not been 'historically used.' The Conservation Easement would identify the timing for harvest, crop rotations, and other measures to benefit the targeted species. 18.5

It is also unclear if routine and ongoing agricultural practices are allowed under the SSCHP. For example, routine agricultural activities whose status is thrown into limbo by the Conservation Easement include, without limitation, discing, chiseling, ripping, landplaning, laser leveling, harrowing, spraying, planting, seeding, etc. 18.6

The DEIR/DEIS suggests that there is no Impact on agriculture as the Proposed Action/Proposed Project Alternative would not prevent farmers/ranchers from using their agriculture land for agriculture purposes. Farm Bureau strongly disagrees in light of all of the many significant, restrictions associated with the Conservation Easement as described. While a narrow view of the SSHCP when compared to the No Action/No Project Alternative might conclude that there is some minor benefit to agriculture, as the plan might in theory limit some of the conversion of agriculture land to urban development. However, Farm Bureau submits that any supposed "minor benefit" of the SSHCP when compared to the No Action Alternative is far outweighed, in a negative sense, by the overall loss of agricultural use, operational flexibility, crop choice, and long-term economic viability. 18.7

Policy AG-5 in the Sacramento County General Plan was established to mitigate for the impacts to farmland. However, as interpreted in the SSHCP, the objective of that policy is taken to mean mitigation for habitat impacts that just happens to have some incidental agricultural use as farmland/cropland. This does not satisfy Policy AG-5 and development activities that impact farmland should be mitigated for solely in relation to the loss of farmland. Moreover, such application of Policy AG-5 fails to fulfill the spirit of Policy AG-5 in terms of land quality and productivity, as SSHCP reserve lands will, by definition, be more constrained and less economically productivity lands when compared to conventional farmland. 18.8

Similarly, Farm Bureau renews its objection to the SSHCP proposed allowance of out-of-County mitigation. Specifically, to address project impacts in reasonable proximity to the environmental where they occur, and to maintain proper controls on proposed in-county development, farmland those impacts must be mitigated for within the County boundary. Biological mitigation must not be out-sourced to outside areas as a way to reduce market costs of land acquisition and protection, while artificially clearing the way for unbridled in-county farmland conversion and habitat degradation. 18.9

Because the SSHCP would not shift or displace contemplated development to areas outside the UDA, such as south of the Elk Grove SOI, the DEIR/DEIS concludes the SSHCP's effect on agriculture will be a minor beneficial cumulative effect. However, this conclusion ignores the fact the City of Elk Grove has withdrawn from the SSHCP, while the City's General Plan update independently identifies several, 18.10

extensive areas of consideration for future development outside of their SOI and outside of the County UDA. The DEIR/DEIS therefore overstates and mischaracterizes this supposed benefit of reduced urban development outside of the UDA, south of Elk Grove as proven by the City of Elk Grove's General Plan update. Left unaddressed, this omission constitutes a major flaw in the SSHCP, legally, biologically and in terms of actual plan implementation. 18.10 cont'd

The 50-year permit exceeds the County's General Plan Update 2030 by 20 years. As a result, the SSHCP becomes a *de facto* land use planning document by prejudging covered projects that have not been publicly vetted through the county's normal land use planning process. This improperly short-circuits the transparency, oversight, accountability, deliberative process that this process normally provides. Instead, the SSHCP should limit its term to the known planning horizon with potential option revisit as that planning horizon moves gradually into the future. 18.11

Turning to the EIR/S, Farm Bureau was very disappointed to discover that the SSHCP's Alternative Screening process looked only at the pros and cons from a biological/species conservation standpoint without in any way considering other impacts, including agriculture. 18.12

Moreover, the DEIR/DEIS fails to disclose and analyze the true impact of the SSHCP on agriculture under the No Project, Proposed Action/Proposed Project Alternative, or Reduced Permit Term Alternatives. 18.13
Instead, the whole brunt and burden of the responsibility to recover species is placed on the rural, working landscapes already significantly impaired by regulatory stresses, market volatility and the high cost of doing business. The SSHCP is a vehicle that allows developers to have a streamlined and cost effective process to advance development projects while at the same time places 100% of the habitat responsibility on farmers and ranchers. All of this makes the SSHCP an extremely unattractive proposition for the County's once thriving, but now greatly challenged remaining agriculture industry. 18.14
Instead of the SSHCP, Farm Bureau recommends pursuing on slow-growth compact pattern of development, with full and transparent public engagement, within the context of the County's and Cities traditional land use planning and permitting authorities. In contrast to the SSHCP, which is in fact a fast-track approval for unbridled development in the guise of a species protection plan, such a go-it-slow traditional elected official- and stakeholder-driven approach would *actually* protect and preserve the South County's remaining natural habitats and open space lands, within the rural and agricultural landscape within which they exist. If species protection is the actual goal, Farm Bureau believes this and not the SSHCP is the responsible and effective approach. 18.15

Thank you for the opportunity comment on the SSHCP EIR/S. While we object to the SSHCP as a effective vehicle and long-term vision for our County, Farm Bureau looks forward to continuing opportunities to engage in the County's process. 18.16

Sincerely,

Virginia Hemly Chabbra
President

Bill Bird
Executive Director

cc. Sacramento County Supervisor, Don Nottoli
Sacramento County Ag Commissioner, Juli Jensen

RTC 18.1 (SSHCP) – The SSHCP provides assurances that land will only be acquired by the Implementing Entity for the SSHCP Preserve System from willing sellers. In addition the Implementing Entity will not use condemnation or eminent domain to acquire property. Should farmers or ranchers determine that selling an easement to the SSHCP Implementing Entity is not in their best interest then they will not be required to do so.

The SSHCP Plan preparers do not agree that conservation easements are so restrictive that they will adversely impact agricultural operations. It is estimated that there is over 60,000 acres of land already protected under conservation easements within the SSHCP Plan Area, much of which is active agricultural land including grazing and farming.

Management of SSHCP agricultural preserves would ensure that agricultural lands remain in production, while pursuing parallel goals of maximizing habitat value within the constraints of the agricultural operations allowable under the easement. Preserve management plans would be developed with landowners and would be periodically reviewed, which could provide landowners the opportunity to adaptively manage land management activities. The conservation easement for agricultural lands will also make farmers eligible for monetary payments for the purpose of agricultural enhancement (Draft SSHCP, page 9-23, "Agricultural Enhancements on Easements," and page 12-13 "Agricultural Enhancement Funding"). For grazed grasslands, the SSHCP recognizes that responsible grazing practices, as used by most ranchers in the Plan Area, provide benefits to the covered species and should be allowed to continue on SSHCP Preserves. As part of Preserve establishment, the SSHCP Implementing Entity will collect information from ranchers on the historic and existing grazing practices on the land, and will ensure that beneficial grazing will continue on the subject property in perpetuity.

RTC 18.2 (SSHCP) – Agricultural lands are a vital component of the SSHCP Conservation Strategy because working agricultural lands do provide valuable habitat for many species as well watershed benefits, as your comment states. Refer to Final SSHCP Section 11.1, *Assurances for Private Landowners*. The SSHCP would not have negative impacts on agriculture in Sacramento County for the reasons discussed in the response to Comment 18.1, as well as responses to comments 18.3 through 18.15 below.

RTC 18.3 (EIS/EIR) – The significance criteria used in the Draft EIS/EIR are the same as those used in other County CEQA documents, and are derived from State guidance (CEQA Guidelines, Appendix G).

RTC 18.4 (SSHCP) – The statement made that the SSHCP "places responsibility to identity (sic), preserve, protect, enhance, monitor and restore in perpetuity the Conservation Values of the Property entirely on the farmer/rancher" is not correct. As stated in SSHCP Section 9.4.3 and in the sample Conservation Easement on Agricultural Lands (Appendix D2 of the Final SSHCP), the grantor of a conservation easement will be responsible for managing the land in accordance with the conservation easement, but assessment, enhancement, or monitoring will be the responsibility of the grantee. In the case of conservation easements for agricultural lands, the management of the property will consist of continuing to conduct agricultural activities on the property that are consistent with the requirements of the easement.

RTC 18.5 (SSHCP) – The comment is correct that in agreeing to sell a conservation easement on their property, an agricultural landowner may agree to continue historic practices or use practices that are approved in advance by the Implementing Entity. The alternative approved practices can be either those listed in the conservation easement document, or those approved on a case-by-case basis. If an agricultural landowner does not wish to be bound by these restrictions, they are under no obligation to sell a conservation easement on their property. The SSHCP does not include any means by which a permittee could force them to place a conservation easement on their land, and cannot use eminent domain (Final SSHCP Sections 11.1.1 and 11.1.3).

RTC 18.6 (SSHCP) – The comment is correct that in exchange for payment for the Conservation Easement, an agricultural landowner must agree to certain restrictions on the activities that will occur on that property. These few restrictions have been carefully selected because they are those known to significantly impact the habitat value of agricultural lands, the preservation of which is the purpose of the Conservation Easement. The intent of a Conservation Easement would be that most routine historical agricultural activities could continue on the parcel, because those parcels selected for easements would be those that have good habitat value because they have not been extensively subjected to the restricted practices in the past. Nonetheless, it is possible that the Conservation Easement could disallow some activities that have previously occurred on the property. As stated in response to Comment 18.5, selling a Conservation Easement is entirely voluntary and if a landowner does not wish to be subject to these restrictions, they are under no obligation to be.

RTC 18.7 (SSHCP) – The comment is correct that agricultural landowners who choose to sell a Conservation Easement on their property may have less operational flexibility and crop choice than those who do not. The amount paid to the agricultural landowner for the Conservation Easement is intended to offset this, and to allow these continuing agricultural activities to remain economically viable over the long-term. As stated in response to Comment 18.5, selling a Conservation Easement is entirely voluntary and if a landowner does not wish to be subject to these restrictions, they are under no obligation to be.

RTC 18.8 (SSHCP and EIS/EIR) – General Plan Policy AG-5 makes no mention of the specific agricultural activities occurring on preserved or impacted farmlands, and relies strictly on their classification as prime, statewide importance, unique, local importance, and grazing. Policy AG-5 reads as follows:

“Projects resulting in the conversion of more than fifty (50) acres of farmland shall be mitigated within Sacramento County, except as specified in the paragraph below, based on a 1:1 ratio, for the loss of the following farmland categories through the specific planning process or individual project entitlement requests to provide in-kind or similar resource value protection (such as easements for agricultural purposes):

- Prime, statewide importance, unique, local importance, and grazing farmlands located outside the USB;

- Prime, statewide importance, unique, and local importance farmlands located inside the USB.

The Board of Supervisors retains the authority to override impacts to Unique, Local, and Grazing farmlands, but not with respect to Prime and Statewide farmlands.

However, if that land is also required to provide mitigation pursuant to a Sacramento County endorsed or approved Habitat Conservation Plan (HCP), then the Board of Supervisors may consider the mitigation land provided in accordance with the HCP as meeting the requirements of this section including land outside of Sacramento County[4].

Note: This policy is not tied to any maps contained in the Agricultural Element. Instead, the most current Important Farmland map from the Department of Conservation should be used to calculate mitigation."

As provided for in Policy AG-5 the stacking of agriculture and conservation easements is permissible. In addition, the SSHCP requires that impacts to farmland be mitigated by protecting farmland at a 1:1 ratio. We believe that this does comply with Policy AG-5.

RTC 18.9 (SSHCP) – Sacramento County General Plan Policy AG-5 does allow for farmland mitigation outside the County when it is part of a County-adopted HCP. However, the comment incorrectly states that the SSHCP proposes out-of-County mitigation. As stated in Section 1.2.1 of the Final SSHCP, the SSHCP Plan Area is limited to the south part of Sacramento County. Preservation of agricultural lands outside the SSHCP Plan Area would not meet the requirements of the SSHCP, and is neither proposed nor expected to occur under the SSHCP. All SSHCP mitigation and conservation actions must occur inside the SSHCP Plan Area.

RTC 18.10 (EIS/EIR) – The Draft EIS/EIR does consider development in proposed Elk Grove SOI expansions totaling 1,710 acres in its analysis of cumulative effects, as described in Section 3.7.2.1. The Draft EIS/EIR also analyzes, as part of the No Action/No Project Alternative, development within County jurisdiction outside the UDA just south of Elk Grove. That development would be in addition to the City of Elk Grove's SOI development and is assumed to occur in response to the No Action/No Project Alternative's increased difficulty in permitting development in the Mather Core Recovery Area. Therefore, it is incorrect to state that the EIS/EIR ignores the effects of development south of the City of Elk Grove. The benefits to agriculture identified in the EIS/EIR analysis of the Proposed Action/Proposed Project are the reduced likelihood of scattered development in predominantly agricultural areas, outside the UDA.

RTC 18.11 (SSHCP and EIS/EIR) – The full justification for the proposed 50-year ITP permit terms is provided in Section 1.2.3 of the SSHCP, and repeated in the description of

---

[4] Note that the SSHCP permit will not accommodate mitigation land outside the Plan Area (e.g., outside Sacramento County) without amendment and additional environmental review.

the Proposed Action/Proposed Project Alternative in Section 2.3.2 of the EIS/EIR. However, Section 2.4.2 of the Draft EIS/EIR also analyzes the effects of an HCP with a 30-year permit term, the Reduced Permit Term Alternative.

The SSHCP would not supersede or replace the general plan planning process, nor provide the local land use entitlements required to construct or implement the covered activities. Therefore, it is incorrect to state that the SSHCP becomes the de facto land use planning document for the Plan Area. Refer also to response to Comment 3.6.

RTC 18.12 (EIS/EIR) – The alternatives screening process examined the ability of each potential alternative to meet the direction of the Purpose and Need Statement and the Project Objectives listed in EIS/EIR Sections 1.3.1 and 1.3.3. These specifically state that alternatives should "maintain the existing richness of agricultural lands", and should "protect the long-term viability of ranching and farming operation in the Planning Area". Draft EIS/EIR Appendix E).

RTC 18.13 (EIS/EIR) – The Draft EIS/EIR analyzes impacts on agriculture in a manner consistent with CEQA, using the significance criteria suggested in the CEQA guidelines and commonly used by Sacramento County. Please refer to responses to comments 18.1, 18.4, 18.5, 18.6, 18.7, and 18.10 for responses to the comments on the Draft EIS/EIR analysis of agricultural resources.

RTC 18.14 (SSHCP) – While it is acknowledged that much of the SSHCP Conservation Strategy would take place on working grazing lands and working farmlands, these would only be with willing sellers of conservation easements. Establishment of SSHCP conservation easements will focus on maintaining the viability of the existing ranching and farming activities while conserving the habitat value of the property's working landscape. The SSHCP provides a mechanism by which farmers and ranchers can be financially compensated for continuing the existing agricultural practices that are maintaining habitat for covered species. As stated in response to Comment 18.5, selling a Conservation Easement to the SSHCP is entirely voluntary and if a landowner does not wish to be part of the SSHCP, they are under no obligation to be. As discussed in response to Comment 18.1, a SSHCP conservation easement on working agricultural lands will also make farmers eligible for monetary payments for the purpose of agricultural enhancement on their properties. Examples of what the payments can be used for include the installation of repair of wells, fences, barns, drainage/irrigation system; demolition of structures, and clearing of land that does not impact wetland or riparian habitats.

RTC 18.15 (SSHCP/EIS-EIR) – The Draft EIS/EIR estimated the future land development without the SSHCP (the No Action/No Project Alternative), and compared it to expected land development with the SSHCP in place (Proposed Action/Proposed Project). The SSHCP would result in a pattern of development and habitat preservation that would cause fewer and less significant impacts than maintaining the status quo. Please also note the following:

- The SSHCP will not increase the acres of development in the County— the same acres of development will are projected to occur even if the SSHCP is not approved and implemented (i.e. the No Action/No Project condition).

- The SSHCP does not have the ability to affect or change the existing County and City policies on slow-growth, or change existing County and City policies on compact pattern of development.
- The SSHCP would not change existing CEQA and local requirements to have a full and transparent public engagement prior to County or City decisions on individual future land development projects—the existing public engagement processes will still happen under the SSHCP.
- The development of the proposed SSHCP was entirely driven by stakeholders that own land, work, and live in the Plan Area. The entities representing every Plan Area stakeholder and all relevant regulatory agencies negotiated the proposed SSHCP over approximately 15 years to reach this effective and responsible approach to conservation in south Sacramento County.
- The SSHCP will protect and preserve much of south Sacramento County's remaining natural habitat and open space lands and protect and preserve the rural working agricultural landscapes within which they exist.

RTC 18.16 (SSHCP) – Thank you for your comment. The SSHCP Plan Partners welcome the Farm Bureau's continued participation in the SSHCP process.

LETTER 19 SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

August 18, 2017

SENT VIA EMAIL

Todd Smith, Acting Environmental Coordinator
Office of Planning and Environmental Review
County of Sacramento
827 7th Street, Room 225
Sacramento, CA 95814

Jan C. Knight, Deputy Field Supervisor
Sacramento Fish & Wildlife Office Programs
Sacramento Fish & Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

RE: Draft Environmental Impact Statement/Environmental Impact Report for the South Sacramento Habitat Conservation Plan

Dear Mr. Smith and Ms. Knight:

Thank you for providing an opportunity for the Sacramento Metropolitan Air Quality Management District (SMAQMD) to review and comment on the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the South Sacramento Habitat Conservation Plan (SSHCP). We review and provide comments through the lead agency planning, environmental and entitlement processes with the goal of reducing adverse air quality impacts and ensuring compliance with the California Environmental Quality Act (CEQA). We offer the following comments to ensure air quality impacts are adequately analyzed, disclosed and mitigated.

1. Consistency with Existing Plans
The SMAQMD appreciates the work done by the SSHCP staff on the Draft EIS/EIR to evaluate the SSHCP with existing plans, especially those that reduce criteria air pollutants and greenhouse gases (GHG). 19.1

2. Short-term Construction Emissions of Criteria Air Pollutants and Precursors
Based on the modeling conducted, short-term construction related emissions are not expected to exceed the SMAQMD thresholds of significance for criteria pollutants and ozone precursors for any of the three alternatives that were analyzed. SMAQMD appreciates the discussion in the Draft EIS/EIR regarding best management practices for reducing PM_{10} and $PM_{2.5}$ emissions and SMAQMD rules, even for projects not subject to CEQA review. 19.2

3. Greenhouse Gases and Vehicle Miles Traveled
Vehicle miles traveled (VMT) is directly linked to both GHG emissions and criteria air pollution. Reducing VMT is an important component toward meeting clean air and greenhouse gas reduction goals. SMAQMD commends SSHCP staff on analyzing the potential impacts of future urban development being shifted to areas of undeveloped land outside the urban services boundary, which could result in longer commuter trips and higher VMT. Based on the modeling conducted, construction and operational emissions of GHG are not expected to exceed the SMAQMD thresholds of significance for the creation and maintenance of mitigation preserves for any of the three alternatives. 19.3

Thank you for your consideration of these comments. If you have any questions, please contact me at 916-874-6267 or JChan@airquality.org.

Regards,

Joanne Chan
Air Quality Planner/Analyst

c: Paul Philley, AICP, Program Supervisor – CEQA & Land Use Planning Section, SMAQMD
Karen Huss, Air Quality Planner/Analyst, SMAQMD

777 12th Street, 3rd Floor ▪ Sacramento, CA 95814-1906
916/874-4800 ▪ 916/874-4899 Fax
www.airquality.org

RTC 19.1 (EIS/EIR) – The comment expresses appreciation for the Draft EIS/EIR evaluating the SSHCP in the context of existing plans, particularly those that reduce criteria air pollutants and greenhouse gases (GHGs).

RTC 19.2 (EIS/EIR) – The comment is correct in its description of short-term construction related emissions impacts. The comment expresses appreciation for the inclusion of emission reduction rules and best management practices (BMPs) in the EIS/EIR.

RTC 19.3 (EIS/EIR) – The comment is correct in its description of the GHG emissions analysis in the EIS/EIR. The comment expresses appreciation for the evaluation of urban development location and VMT provided in the EIS/EIR.

LETTER 20 SACRAMENTO METROPOLITAN UTILITY DISTRICT (SMUD) (SSHCP)

Powering forward. Together.

SMUD

Sent Via E-Mail

September 6, 2017

Environmental Coordinator
Sacramento County
827 7th Street, Room 225
Sacramento, CA 95814
SSHCP@saccounty.net

Subject: South Sacramento Habitat Conservation Plan Draft Environmental Impact Statement/ Environmental Impact Report
(Control No: 2003-0637/ Clearinghouse No. 2008062030)

To Whom It May Concern:

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity to provide comments on the South Sacramento Habitat Conservation Plan (Project) Draft Environmental Impact Statement/ Environmental Impact Report (DEIS/EIR). SMUD is the primary energy provider for Sacramento County and the proposed Project area. SMUD's vision is to empower our customers with solutions and options that increase energy efficiency, protect the environment, reduce global warming, and lower the cost to serve our region. As a Responsible Agency, SMUD aims to ensure that the proposed Project limits the potential for significant environmental effects on SMUD facilities, employees, and customers.

It is our desire that the Project DEIS/EIR will acknowledge any Project impacts related to the following:

- Overhead and or underground transmission and distribution line easements. Please view the following links on smud.org for more information regarding transmission encroachment:
  - https://www.smud.org/en/business/customer-service/support-and-services/design-construction-services.htm
  - https://www.smud.org/en/do-business-with-smud/real-estate-services/transmission-right-of-way.htm
- Utility line routing

20.1

SMUD has existing overhead/underground facilities on or adjacent to the Project Planning Area. Based on our review of the DEIS/EIR and our understanding of the proposed Project, SMUD encourages the County to consider the following:

1. SMUD is also preparing a habitat conservation plan, the permit area for which overlaps with the Project Planning Area. It doesn't appear that the two HCPs will conflict with each other though the plans have similar Covered Activities, as it

20.2

relates to utility infrastructure. SMUD may explore opportunities to participate in the South Sac HCP as a Participating Special Entity, as appropriate. 20.2 cont'd

2. As it relates to rural transportation projects and covered activities, SMUD asks that the permitting agencies consider any impacts associated with relocating SMUD facilities to accommodate the project, as part of the project. 20.3
3. Additionally, as it relates to preserve development, SMUD may have existing infrastructure within or along the preserve areas. SMUD has a requirement to maintain its facilities and would need to continue to access these areas and maintain its facilities in accordance with our easements. Any new conservation easements placed on preserve areas will need to accommodate SMUD's easements. 20.4

SMUD would like to be involved with discussing the above areas of interest as well as discussing any other potential issues. We aim to be partners in the efficient and sustainable delivery of the proposed Project. Please ensure that the information included in this response is conveyed to the Project planners and the appropriate Project proponents. 20.5

Environmental leadership is a core value of SMUD and we look forward to collaborating with you on this Project. Again, we appreciate the opportunity to provide input on this DEIS/EIR. If you have any questions regarding this letter, please contact Emily Bacchini at emily.bacchini@smud.org or (916)732-6334.

Sincerely,

Angela C. McIntire
Regional & Local Government Affairs
Sacramento Municipal Utility District
6301 S Street, Mail Stop A313
Sacramento, CA 95817
angela.mcintire@smud.org

Cc: Emily Bacchini, SMUD

RTC 20.1 (SSHCP) – Each individual project that uses permit coverage under the SSHCP will need to ensure that they analyze and appropriately mitigate any impacts to utility line easements or utility line routing. Refer to response to Comment 20.4 regarding utility line easements and routing on SSHCP preserves.

RTC 20.2 (SSHCP) – We agree that there appears to be no conflict between the HCP that SMUD is developing and the SSHCP. The SSHCP Plan Partners welcomes SMUD to participate in the SSHCP as a Participating Special Entity.

RTC 20.3 (SSHCP) – Chapter 5 of the Final SSHCP has been revised to clarify that utility relocation associated with road projects is a covered activity. Any utility relocations would be in the right-of-way outside Preserves, so this would be a Covered Activity only outside Preserves.

RTC 20.4 (SSHCP) – Chapter 5 of the Draft SSHCP identifies maintenance of existing infrastructure on SSHCP preserves as a SSHCP Covered Activity. Section 5.2.7 of the SSHCP includes the following language: "Repair and maintenance of existing utility facilities within planned SSHCP Preserves, including electrical, natural gas, water, wastewater, and cell tower facilities, are SSHCP Covered Activities, when implemented consistent with the utility's existing ROW easements." This language would apply to SMUD easements, and demonstrate that SMUD activities in Preserves would be not only accommodated but could be SSHCP Covered Activities if SMUD desires.

RTC 20.5 (SSHCP) – This comment letter has been provided to all SSHCP Plan Partners. In addition, the comment letters and responses are published in the Final EIS/EIR so that they can be reviewed by the general public and all stakeholder groups. The County looks forward to working with SMUD in the future to ensure the compatibility of resource protection and provision of energy service to the region.

LETTER 21 TAYLOR & WILEY, REPRESENTING TSAKOPOULOS INVESTMENTS (SSHCP AND CWA PERMIT STRATEGY)

TAYLOR & WILEY
A PROFESSIONAL CORPORATION
ATTORNEYS
500 CAPITOL MALL, SUITE 1150
SACRAMENTO, CALIFORNIA 95814

TELEPHONE: (916) 929-5545
TELEFAX: (916) 514-8942

JOHN M. TAYLOR
JAMES B. WILEY
JESSE J. YANG
KATE A. WHEATLEY
MATTHEW S. KEASLING

Via E-Mail and U.S. Mail

September 5, 2017

County of Sacramento
Office of Planning and Environmental Review
Attn: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814
sshcp@saccounty.net

Re: Comments on Draft South Sacramento Habitat Conservation Plan and Environmental Impact Report/Environmental Impact Statement

To whom it may concern:

On behalf of Tsakopoulos Investments, we commend Sacramento County and its partners for their work developing the Draft South Sacramento Habitat Conservation Plan (Plan). We believe that the Plan offers a streamlined approach to permitting which has the potential to result in more expeditious permit decisions and better assurances for the regulated community, while protecting the highest quality habitat in an ecologically beneficial manner.

We offer one comment for the record based upon our review of the Draft Plan. From the perspective of the development community, an essential component of the SSHCP is the associated Section 404 Clean Water Act Permit Strategy (404 Strategy) drafted by the U.S. Army Corps of Engineers (Corps). The 404 Strategy would include an abbreviated process for issuing standard Section 404 permits (SPs) for activities which may have a "significant impact on the human environment and require the preparation of an EIS under NEPA." However, neither the SSHCP nor the 404 Strategy—as those documents are currently drafted—provides detail about the anticipated requirements for projects utilizing the SP. It is our understanding, based upon conversations with the County and the Corps, that the 404 Strategy will require that any projects utilizing the SP be designed consistent with the SSHCP Conservation Strategy, including the dedication of "hard line" preserves, and that, if this occurs, no substantial additional on-site avoidance/preserve dedication will be required of these projects. Based upon this understanding, we are supportive of the Plan and 404 Strategy. 21.1

Very truly yours,

Kate A. Wheatley

cc: Angelo G. Tsakopoulos

RTC 21.1 (SSHCP and CWA Permit Strategy) – Please see the response to Comment 1.2. In addition the fundamental processing requirements of SPs would follow the USACE's regulations (primarily found in 33 CFR Part 325), inclusive of the content requirements for a complete application, public noticing, and additional content and procedural elements of permit evaluation. Distinguishing aspects of the SSHCP-aligned abbreviated SP process are provided in the form of the USACE's most informed-to-date outlook (see Appendix C), and formalized commitments to the process outlook would be provided in the USACE's ROD for the SSHCP EIS. The ROD, for example, would formally document the USACE's outlook provided in Appendix C with regard to requiring only on -site alternatives analysis of project alternatives as part of the abbreviated SP process.

In response to the question regarding on-site avoidance/preserve dedication for projects evaluated under the abbreviated SP process designed consistent with the SSHCP's Conservation Strategy, the CWA 404 permit strategy assumes all projects authorized under CWA 404 in alignment with the SSHCP would need to be designed consistent with the SSHCP's Conservation Strategy, and in this context the USACE would not require substantial additional on-site avoidance/preserve dedication. The hard line preserve requirements are consistent with the SSHCP Conservation Strategy's requirements. The CWA 404 abbreviated SP process looks to the SSHCP's requirements to help support justification of key CWA 404 compliance elements such as avoidance and minimization of impacts to aquatic resources at a plan-wide level, consistent with the US EPA's Section 404(b)(1) Guidelines in a regional conservation planning framework. In the case of the hard line preserves, the preserves are a key requirement of the SSHCP Conservation Strategy, and are also consistent with the requirements of other regulatory agencies (including the USACE) involved with the SSHCP and project-level reviews for the projects associated with the hard line preserves. For proposed hard line preserves and other types of SSHCP preserves, the USACE may request minor adjustments in preserve and/or setback (e.g., stream setbacks as required by the SSHCP and ARP) boundaries in support of project-level compliance with the Section 404(b)(1) Guidelines. For example, a stream setback of 25 ft. may encompass all but a 5-foot-wide swath of adjacent wetland to the subject stream. The USACE envisions in this type of situation the potential to request a slightly wider setback (at least where the adjacent wetland occurs), consistent with the avoidance and minimization guidance contained in the Section 404(b)(1) Guidelines. Due to site- and project-specific considerations in applying the Section 404(b)(1) Guidelines, this example is provided not as a decision rule, but as just an example of a type of minor adjustment that may be sought in association with project evaluations under the abbreviated SP process.

Clarification regarding analysis of on-site project alternatives required to comply with the provisions of EPA's Section 404(b)(1) Guidelines has been added to the updated CWA 404 permit strategy (Final EIS/EIR Appendix C). The on-site alternatives analysis must support a project-specific determination of the Least Environmentally Damaging Practicable Alternative (LEDPA) to support compliance with the Section 404(b)(1) Guidelines at the project-specific level. As described in Appendix C, the USACE's abbreviated SP permit decisions would be tiering from the SSHCP EIS, inclusive of recognition of plan-level avoidance, minimization, and mitigation.

LETTER 22 TAYLOR & WILEY, REPRESENTING TSAKOPOULOUS INVESTMENTS (CWA PERMIT STRATEGY)

From:	Kate Wheatley
To:	Pakenham-Walsh, Mary R CIV USARMY CESPK (US)
Cc:	agtesq@tsakvest.com
Subject:	[Non-DoD Source] Comments on Public Notice SPK-1995-00386: Proposed Section 404 Clean Water Act Permit Strategy Aligned with SSHCP
Date:	Friday, June 30, 2017 7:19:16 PM

Dear Ms. Pakenham-Walsh:

Thank you for the opportunity to comment on the Proposed Section 404 Clean Water Act Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan (Proposed Permit Strategy), posted June 2, 2017. On behalf of Tsakopoulos Investments, we commend the Sacramento District for its work developing a more streamlined approach to permitting under the Clean Water Act. This Proposed Permit Strategy, coupled with the South Sacramento HCP (SSHCP), has the potential to result in more expeditious permit decisions and better assurances for the regulated community, while better protecting the highest quality aquatic resources in an ecologically beneficial manner.

We offer one comment for the Corps' consideration: the Proposed Permit Strategy mentions an abbreviated process for issuing standard permits (SPs) for activities which may have a "significant impact on the human environment and require the preparation of an EIS under NEPA." However, unlike the programmatic general permit (PGP) and letter of permission (LOP) that are also described in the Proposed Permit Strategy, no details are provided about the anticipated process and requirements for this SP (e.g., how will the Corps decide which projects qualify for use of an LOP, as opposed to a SP? What type of alternatives analysis will be required for projects utilizing this SP?) The Proposed Permit Strategy indicates that the final EIS for the SSHCP will include more details on process and timelines for the SP abbreviated process, but this does not allow interested parties a meaningful opportunity to provide input about the Strategy as it pertains to these SPs. The Corps should provide these details now so that members of the public can review and provide comments for the Corps' consideration prior to the Corps' adoption of its Record of Decision and implementation of the Proposed Permit Strategy.

22.1

Thank you, again, for the opportunity to comment on the Proposed Permit Strategy. Please feel free to contact me with any questions.

Kate Wheatley

Kate A. Wheatley

TAYLOR & WILEY

500 Capitol Mall, Suite 1150

Sacramento, CA 95814

916.929.5545

CAUTION: THE INFORMATION CONTAINED IN THIS ELECTRONIC E-MAIL AND ANY ACCOMPANYING DOCUMENT(S) IS INTENDED ONLY FOR THE USE OF THE ADDRESSEE AND MAY BE CONFIDENTIAL, MAY BE PRIVILEGED (ATTORNEY-CLIENT, ATTORNEY WORK PRODUCT, RIGHT TO PRIVACY) AND MAY CONSTITUTE INSIDE INFORMATION. IF ANY READER OF THIS COMMUNICATION IS NOT THE INTENDED RECIPIENT, OR THE EMPLOYEE OR AGENT THAT IS RESPONSIBLE FOR DELIVERING THE COMMUNICATION TO THE INTENDED RECIPIENT, UNAUTHORIZED USE, DISCLOSURE OR COPYING IS STRICTLY PROHIBITED, AND MAY BE UNLAWFUL. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, PLEASE IMMEDIATELY NOTIFY US AT (916) 929-5545, AND DELETE THE ORIGINAL MESSAGE FROM YOUR ELECTRONIC MAIL BOX.

RTC 22.1 (CWA Permit Strategy) – With regard to the question concerning level of detail provided for the proposed abbreviated SP process, including distinguishing criteria for LOPs vs. abbreviated SP permits, and anticipated requirements associated with conducting alternatives analyses, please see response to comments 1.2 and 21.1. The CWA 404 Permit Strategy (Appendix C to the Draft EIS/EIR) discloses as much detail and certainty on specifications, processes and timing goals for the various permit types as is known to the USACE, prior to finalizing the permit strategy in response to public input on the EIS and referral to the SSHCP Plan Partners' final draft ARP and ARP ordinance.

LETTER 23 U.S. ARMY CORP OF ENGINEERS (EIS/EIR)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

August 30, 2017

Regulatory Division (SPK-1995-00386)

Ms. Jan C. Knight
Deputy Field Supervisor
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Dear Ms. Knight:

We have reviewed the U.S. Fish and Wildlife Service (USFWS) Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the proposed South Sacramento Habitat Conservation Plan (SSHCP). The Corps has jurisdiction within the proposed range of alternatives under the authority of Section 404 of the Clean Water Act (CWA 404) for the discharge of dredged or fill material into waters of the United States. Per 40 CFR 1501.6, the Corps is a cooperating agency on the EIS under the National Environmental Policy Act (NEPA), and, as described in the Draft EIS document, has provided consistent and substantive input on the Draft EIS and associated documents assessed by the Draft EIS (e.g., draft SSHCP).

Although our office was able to review prior administrative draft version of the Draft EIS, our review of the public Draft EIS identified the opportunity to clarify a limited number of key procedural and/or regulation- or guidance-based portions of the document. These clarification opportunities are primarily related to new and/or revised text (since the time of our last administrative draft review of a subject chapter) in areas of the document that describe complex existing and/or proposed CWA 404-related matters. The clarifications identified below are substantive in nature, and we believe changes to the Draft EIS and/or a response to these comments should be included in the Final EIS. Additional, minor clarifications will be provided by submittal of edits under our role as a cooperating agency, by the end of September. Thank you for the opportunity to provide the following comments on the Draft EIS.

Chapter 1:

1. Section 1.6.5 (pg. 1-42, first full paragraph): In our most recent administrative draft review of Chapter 1, we recommended deletion of three paragraphs, within which the subject of this comment occurs. We noted in our review that the passage had been previously commented on in a prior draft review and remained inaccurate. Therefore, we request the following clarification be added, and are available to work with the USFWS to address any questions in this regard. 23.1

As described in Appendix C to the DEIS, proposed projects reviewed under our draft standard permit (SP) abbreviated process are anticipated to be those that have potentially significant impacts and require the preparation of an EIS, rather than an environmental assessments (as currently stated in the subject text of the Draft EIS). Prior to finalization of the CWA 404 permit strategy, it would be pre-decisional for us to determine whether certain SP applications would not require the preparation of an EIS, however it is anticipated that the majority of SP applications for SSHCP covered projects would require an EIS. Lastly, we retain discretion to determine the appropriate level of NEPA analysis (environmental assessment, or EIS) based on a case-by-case review, consistent with NEPA regulations (40 CFR 1500) and our NEPA implementing regulations (33 CFR 230 and 33 CFR Part 325, Appendix B). As accurately described in the subject paragraph, key efficiencies would be operative since the Corps would be able to refer to programmatic-level approaches to compliance with NEPA, the 404(b)(1) Guidelines, and the Corps' public interest review requirements within the SSHCP EIS, and determinations related to these documented in our (future) Record of Decision for the EIS. 23.1 cont'd

Therefore, please revise the subject paragraph to read: *"NEPA requirements for future Covered Activity projects requiring permits under the SP abbreviated process would realize greater efficiencies. For future Covered Activity urban development* projects *proposing potentially significant effects on the human environment, for which the Corps determines requires preparation of an EIS, the SP abbreviated process would be reduced in terms of process, information requirements, and timing. Please refer to Appendix C for additional description of the SP abbreviated process."*

Chapter 2:

2. Section 2.1.1 (pg. 2-2, last paragraph): Some activities that result in a discharge of dredged and/or fill material into waters of the U.S. are exempt under CWA 404(f). Therefore, we request the paragraph be revised to state: "Activities that would result in the discharge of dredged or fill material into wetlands and other waters of the United States *may* require authorization..." 23.2

3. Section 2.1.1 (pg. 2-3, second full paragraph): Please add a new sentence after the first sentence ending in "...where applicable" to align with the information in Chapter 1 of the Draft EIS (Section 1.5.4, second paragraph of pg. 1-29) regarding the Corps' intention to review additional information outside the purview of NEPA to support a determination of compliance with the Section 404(b)(1) Guidelines in our future Record of Decision for the EIS, as follows: "However, on a case-by-case basis, additional information may be necessary. For this project, as part of its compliance documentation with EPA's 404(b)(1) Guidelines, the USACE will also consider additional information outside the purview of the NEPA process." While our NEPA implementing regulations guide that the alternatives analysis in an EIS should be thorough enough to support the Corps' compliance determinations with the 404(b)(1) Guidelines, case-by-case determinations still apply. We notified the lead agency and SSHCP plan proponents of the need for additional supporting information for a compliance determination with the 404(b)(1) Guidelines in discussions and electronic mail in early 2016, and feel it is important to clearly and consistently disclose this outlook in the NEPA document. 23.3

4. Section 2.1.4 (pg. 2-12, last paragraph): Please refer to Comment #3, above, and add the same sentence after the existing sentence ending in "…where applicable." 23.4

5. Section 2.2.2 (pg. 2-31, second full paragraph): Please edit for accuracy the last sentence to read "…a minimum one-to-one acreage or one-to-one linear foot ratio (i.e., a 1:1 mitigation ratio) required by the 2008 Compensatory Mitigation Rule would be assumed to be required." It is pre-decisional to indicate that a specific mitigation ratio "would be used." 23.5

6. Section 2.2.2 (pg. 2-31, third/last full paragraph [and general comment]): We recommended in prior administrative draft reviews that several compensatory mitigation-related areas of text use rule citations for increased clarity. We formally request that specific areas of the Federal Mitigation Rule (33 CFR Part 332; "rule") referred to in the Draft EIS text be cited. In the subject paragraph, we recommend the final sentence starting with "The 2008 Mitigation…" cite the applicable part of the rule (33 CFR Part 332.3(b)), and condense the compensatory mitigation options into the three general types described in the rule (mitigation bank credits, in-lieu fee program credits and permittee-responsible mitigation). Lastly, we request that the following portion of sentence in the same paragraph be deleted, as it is inaccurate due to the rule's requirements (e.g., financial assurance provisions) for any type of proposed compensatory mitigation project: "and they provide financial planning and scientific expertise (which is often not practical for permittee-responsible mitigation projects)…" 23.6

7. Section 2.3.1 (pg. 2-43, second full paragraph): This paragraph indicates that the SSHCP would eliminate the need for project-level Section 7 Endangered Species Act consultations. Prior to the Corps' request of, and the USFWS's (future envisioned) programmatic biological opinion (BO) associated with the Corps' CWA 404 permit strategy, notification requirements are as of yet unknown. As a federal action agency, the Corps is obligated to initiate consultation under Section 7 of the ESA, unless an ESA instrument (e.g., programmatic BO) explicitly negates the requirement to do so for proposed CWA 404 actions under the authority of the subject instrument. We request a clarification be made in the Final EIS of notification/non-notification options in alignment with the USFWS's anticipated outlook for the programmatic BO. 23.7

8. Section 2.3.1 (pg. 2-43, third full paragraph): This paragraph as currently written is inaccurate in terms of saying the SSHCP's Conservation Strategy would "address cumulative impacts to vernal pool wetlands within the Mather Core Recovery Area (MCRA)." The Corps is available to work with the USFWS to modify the existing wording in this paragraph to ensure accuracy. The wording needs to be amended to focus on the SSHCP's envisioned ability to address the ROD's vernal pool mitigation-related requirements in a distinct yet adequate manner than the existing regulatory environment. 23.8

9. Section 2.3.1 (pg. 2-44, first full paragraph): Please see Comment #7, above, in regard to future envisioned Section 7 ESA consultation requirements. 23.9

10. Section 2.3.1 (pg. 2-44, third full paragraph): There are a few inaccurate statements in the paragraph as currently written. We request the text be modified to read as follows, deleting a few inaccurate passages: "...watershed scale. Under the Proposed Action/Proposed Project Alternative, implementation of the SSHCP Conservation Strategy and the Aquatic Resource Program's (ARP's) mitigation approach (avoidance, minimization and compensation) would be assumed to assure CWA 404 mitigation (avoidance, minimization and compensation) is considered from a watershed-based perspective. The above-mentioned provisions, combined with a proposed in-lieu fee program (ILF); as discussed further below), would also systematically prioritize..." 23.10

11. Section 2.4.1 (pg. 2-126, sixth paragraph): Please see Comment #7, above, in regard to future envisioned Section 7 ESA consultation requirements. 23.11

12. Section 2.4.1 (pg. 2-127, second full paragraph): Please see Comment #7, above, in regard to future envisioned Section 7 ESA consultation requirements. Recommend addressing wording as per Comment #7, with option to add "..., and consultation, if required under the terms of a programmatic BO, would be highly streamlined" within the second sentence of the paragraph after "...would be in compliance with the ESA..." 23.12

13. Section 2.4.1 (pg. 2-127, fourth full paragraph): There are two inaccurate statements in this paragraph regarding individual project impact and/or mitigation assessment, and the role of the proposed ILF should be identified alongside the SSHCP and ARP at the beginning of the paragraph. Please delete "...evaluate individual project impacts, and..." and replace "...to determine if individual projects are adequately mitigation for aquatic resource impacts..." with "to plan for and manage/monitor appropriate compensatory mitigation for aquatic resource impacts..." 23.13

Chapter 10:

14. Section 10.1.1 (pg. 10-2, third paragraph): To obtain accuracy please add the words "may be" instead of "is" in the third line of the paragraph reading "compensatory mitigation [may be] required..." Compensatory mitigation requirements are assessed on a case-by-case basis in accordance with CWA 404 regulations and implementation guidance. 23.14

15. Section 10.1.1 (pg. 10-3, starting with first full paragraph): To obtain accuracy please delete the beginning of the first sentence ("In addition to setting minimum compensatory mitigation amounts..."). Similar to the request provided in Comment #6, please ensure accuracy of the three mitigation type definitions with wording in the 2008 Federal Mitigation Rule, such that there is reduced risk of paraphrasing a regulatory definition, and add the applicable citations from the "definitions" section of the rule (33 CFR Part 332.2). For example, the rule's definitions do not contain the term "CWA Permittee-Responsible Mitigation," but rather "permittee-responsible mitigation." Lastly, in the last paragraph on pg. 10-3, please see Comment #6 regarding the three main types of compensatory mitigation and a related rule citation. In past reviews, we have recommended using language and citations that are as close as possible to that contained in the rule itself. We reiterate this recommendation in this letter. 23.15

16. Section 10.1.2 (pg. 10-13, first paragraph): Please delete the phrase "...be isolated features that..." in the sentence reading "Seasonal Wetlands in the Planning Area..." There are CWA 404 jurisdictional authority implications associated with the word "isolated" that could be misconstrued from usage of the word in the context of an ecological type of description. 23.16

17. Section 10.1.2 (pg. 10-14, first paragraph, second line from top of page): Please add the phrase "may flow into" after the word "ultimately." Similar to Comment #16, this not only provides flexibility for various ecological/hydrological scenarios that exist on the ground, but avoids making a rigid statement regarding hydrologic connectivity of vernal pools to downstream waters. Hydrological connectivity is assessed on a case-by-case basis, and similar to Comment #16, has implications for CWA 404 jurisdictional authority. 23.17

18. Section 10.1.2 (pg. 10-23, first paragraph): This paragraph was newly added since our most recent review of the administrative draft Chapter 10 (and draft ARP, which the paragraph refers to). The text discusses that that ARP contains approximately 232 acres fewer aquatic resources than the SSHCP, due to three factors. The first two factors are mechanistic (e.g., digital mapping techniques, rounding). The third factor described is "[S]ome of the acreage of riparian land cover types reported in the SSHCP are considered non-jurisdictional as they are mitigation sites comprised of created or restored riparian habitat. Non-jurisdictional resources are not discussed in the ARP." Please note we will review the draft ARP as contained in the Draft EIS and provide comments to the SSHCP Plan Partners. The ARP's project-level implementation relies upon case-by-case verification of the amount, type, and boundary of aquatic resources and/or completion of a jurisdictional determination by our office when covered projects are proposed under the SSHCP. Without a case-specific determination by our office, we believe it is inappropriate to eliminate over 200 acres of potential aquatic resources from the ARP. 23.18

19. Section 10.2.2.1 (pg. 10-38, second-to-last paragraph): The EIS uses the term "aquatic resources" for the most part, to describe three types of resources (wetlands, streams, riparian). In this paragraph regarding the Sacramento County General Plan Update Final Environmental Impact Report (EIR), a determination of less than significant impacts to "wetland and riparian resources" as made in the Final EIR is described. It is unclear whether the Final EIR addressed streams. We recommend, if the Final EIR does address streams, the Final EIS is updated to include this information, and if the Final EIR does not address streams, the Final EIS assess the effects of the proposed action and other alternatives on streams, and determine the significance of those effects. 23.19

20. Section 10.2.2.1 (pg. 10-42, first paragraph): The paragraph discusses appropriate compensatory mitigation ratios for CWA 404, which previously in the document have been described as a minimum of 1:1. The No Action/No Project Alternative is described as compliant with the 2008 Federal Mitigation Rule. However, Table 10-4 indicates there would be 1,607 acres of loss of aquatic resources under this alternative, and Table 10-6 indicates there would be 1,424 acres of aquatic resources re-established or established. Including, for instance, 821 acres of wetland waters lost, yet only 691 acres of this same cover type "gained" (Tables 10-4 and 10-6, respectively). Please clarify how the 23.20

No Action/No Project Alternative would meet minimum compensatory mitigation ratio requirements (i.e., 1:1 ratio, unless there is a functional/condition assessment).

21. Section 10.2.2.2 (pgs. 10-44 to 10-45): There was a substantial editing of this section (Cumulative Analysis of the No Action/No Project) since our most recent review of the administrative draft Chapter 10. The Draft EIS identifies that impacts to wetlands within the SSHCP have been and are significant. However, the Draft EIS identifies that for the No Action and Proposed Action, past, present, and reasonably foreseeable future actions would not contribute to these significant effects. However, insufficient rationale has been provided for this determination. We recommend the Final EIS provide specific rationale regarding the cumulative effects of past, present, and reasonably foreseeable future actions on wetlands, taking into account any mitigation measures included as part of the No Action or Proposed Action, or added as mitigation measures of the EIS. 23.21

22. Section 10.2.3.1 (pg. 10-51, first paragraph): We note the preservation of non-wetland types of waters of the U.S. for the No Action/No Project Alternative has been substantially reduced since our previous review of the EIS, including the expectation stated in this paragraph that there would be no preservation of riparian land cover under the No Action/No Project Alternative. We request that the Final EIS clarify assumptions supporting this expectation. 23.22

23. Section 10.2.3.1 (pg. 10-52, bottom paragraph): Please see Comment #20 in regard to the statement made in this paragraph on the 1:1 compensatory mitigation ratio question for the No Action/No Project Alternative. Also, it may be recommended to add the phrase "at least" before "...one acre of establishment/re-establishment" in the paragraph, since the Proposed Action/Proposed Project's mitigation acreage is higher than the loss acreage (1,740 vs. 1,613 acres, respectively). 23.23

24. Section 10.2.3.2 (pg. 10-55, first paragraph): The cumulative effects discussion cites the No Action/No Project Alternative vs. the Proposed Action/Proposed Project Alternative in the header. Similar to Comment #21, the basis for the cumulative effects determination on pg. 10-45 is not fully clear from the rationale provided. 23.24

25. Section 10.2.4 (pg. 10-57, second full paragraph): The Reduced Permit Term Alternative is indicated to impact 1,097 acres of aquatic resources, citing Table 10-10; however, the total impact in Table 10-10 is 1,728 acres, which appears inconsistent. Also, the estimate for 758 acres of additional aquatic resources lost in the "remaining 20 years" of the 50-year EIS study period would be helpful to display in tabular form in the Final EIS, so that it can be better understood which types of aquatic resources may be impacted at what "rates" (e.g., by year 30, and in years 31-50). 23.25

26. Section 10.2.4 (pgs. 10-63 to 10-64). Please see Comment #24; this comment is repeated for the Reduced Permit Term Alternative. 23.26

We take our role as a cooperating agency on the SSHCP EIS very seriously, and appreciate the opportunity to provide the above comments. As specified in the comments, the requested clarifications in the EIS will result in a Final EIS that more accurately

describes the regulatory framework (and certain more specific mechanisms within) that the Corps would be operating under, for all three alternatives considered in the EIS. We would be glad to assist with any remaining questions as regards existing and/or proposed CWA 404 regulatory frameworks in relation to the SSHCP.

If you have any questions or wish to arrange to meet and discuss these comments, please contact Mary Pakenham-Walsh at 1325 J Street, Room 1350, Sacramento, California 95814, by email at *Mary.R.Pakenham-Walsh@usace.army.mil*, or telephone at (916) 557-7718. Please refer to identification number SPK-1995-00386 in any correspondence concerning this project. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/Missions/Regulatory.aspx*.

Sincerely,

Michael S. Jewell
Chief, Regulatory Division

cc:
Mr. Richard Radmacher, Senior Planner, Sacramento County Department of Water Resources, RadmacherR@saccounty.net
Mr. Joseph Morgan, U.S. Environmental Protection Agency, Region 9, morgan.joseph@epamail.epa.gov
Mr. Jason Gerdes, U.S. Environmental Protection Agency, Region 9, Gerdes.Jason@epamail.epa.gov

RTC 23.1 (EIS/EIR) – The edit has been made as requested in the comment. The referenced paragraph in Section 1.6.5 of the Final EIS/EIR now reads as shown below:

> NEPA requirements for future Covered Activity projects requiring permits under the abbreviated SP process **would realize greater efficiencies.** ~~may be satisfied with a smaller Environmental Assessment-level of review, rather than the EIS-level of review that is typical under the current project-by-project CWA permit process. Even~~ f**F**or future Covered Activity urban development projects proposing potentially significant effects on the human environment**, for which the Corps determines requires** ~~and requiring the~~ preparation of an EIS, the ~~proposed~~ SP **abbreviated** process would be **reduced in terms of process, information requirements, and timing. Please refer to *Appendix* C for additional description of the SP abbreviated process.** ~~greatly abbreviated by relying on the regional, programmatic, and comprehensive analysis in the EIS/EIR.~~

Similar text discussing the USACE's proposed Permit Strategy in Sections 1.5.4, 1.6.1, and Chapter 2 of the Final EIS/EIR was also edited in response to this comment.

RTC 23.2 (EIS/EIR) – The edit has been made as requested in the comment. The referenced paragraph in Section 2.1.1 of the Final EIS/EIR now reads as shown below:

> Consideration of alternatives is also required under the Section 404 of the Clean Water Act (CWA 404). Activities that would result in the discharge of dredged or fill material into wetlands and other waters of the United States **may** require authorization…

RTC 23.3 (EIS/EIR) – The edit has been made as requested in the comment. The referenced paragraph in Section 2.1.1 of the Final EIS/EIR now reads as shown below:

> Per the USACE's NEPA implementing regulations (33 CFR 325, Appendix B(9)(b)(5)), the alternatives analysis conducted in an EIS should be thorough enough to use for both the public interest review and the Section 404(b)(1) guidelines, where applicable**; however, on a case-by-case basis, additional information may be necessary. As discussed in Section 1.5.4, as part of its compliance documentation with EPA's 404(b)(1) Guidelines, the USACE will also consider additional information outside the purview of the NEPA process for this project.** Under the USACE public interest review, for activities in which there are unresolved conflicts as to resource use, USACE must evaluate the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work (33 CFR 320.4(a)(2)(ii)). As explained in Section 2.1.1, under the Section 404(b)(1) Guidelines, USACE must evaluate the practicability of alternatives in light of the overall project purpose (40 CFR 230.10(a)).

RTC 23.4 (EIS/EIR) – The edit has been made as requested in the comment. The referenced paragraph in Section 2.1.4 of the Final EIS/EIR now reads as shown below:

In addition to the previously described CEQA and NEPA considerations, alternatives to adverse effects on the aquatic ecosystem must be evaluated by USACE pursuant with the requirements of the Section 404(b)(1) Guidelines. The alternatives analysis conducted in an EIS should be thorough enough to use for both the public interest review and the Section 404(b)(1) guidelines, where applicable**; however, on a case-by-case basis, additional information may be necessary. As discussed in Section 1.5.4, as part of its compliance documentation with EPA's 404(b)(1) Guidelines, the USACE will also consider additional information outside the purview of the NEPA process for this project**.

RTC 23.5 (EIS/EIR) – The edit has been made as requested in the comment. The referenced text in Section 2.2.2 of the Final EIS/EIR now reads as shown below:

In cases where functional or condition assessments or other suitable metrics are not used to determine loss of functions and services, a minimum one-to-one acreage or one-to-one linear foot compensation ratio (i.e., a 1:1 mitigation ratio) required by the 2008 Compensatory Mitigation Rule would be **assumed to be required** ~~used~~.

RTC 23.6 (EIS/EIR) – The edit has been made as requested in the comment. The edits also reflect input provided on similar text in Comment 23.15. The referenced paragraph in Section 2.2.2 now reads as shown below. Instances of similar text elsewhere in the Final EIS/EIR have been edited in a similar manner.

~~In addition to setting minimum compensatory mitigation amounts,~~ t**T**he 2008 Mitigation Rule establishes equivalent standards for types of compensatory mitigation ~~projects~~ **(33 CFR Part 332.2(b))**. The three **general options**~~types of~~ **for** compensatory mitigation ~~projects~~ are: ~~use of~~ mitigation bank~~s~~ **credits**, ~~use of~~ in-lieu fee program~~s~~ **credits**, **and** ~~or~~ permittee-responsible mitigation ~~projects~~. Use of mitigation bank~~s~~ **credits** and use of in-lieu fee program~~s~~ **credits** are the preferred forms of CWA 404 compensatory mitigation under the 2008 Mitigation Rule, as they usually involve consolidating compensatory mitigation projects in ecologically appropriate locations using a watershed approach, they consolidate resource~~s, and they provide financial planning and scientific expertise (which often is not practical for permittee-responsible mitigation projects)~~, they reduce temporal losses of functions, and they reduce uncertainty over mitigation project success. The 2008 Mitigation Rule would continue to require the USACE to consider compensatory mitigation options in the following order: 1) credits from a mitigation bank; 2) credits from an in-lieu fee program; 3) permittee-responsible mitigation under a watershed approach; 4) permittee-responsible mitigation through on-site and in-kind mitigation and; 5) permittee-responsible mitigation through off-site and/or out of kind mitigation.

RTC 23.7 (EIS/EIR) – The text referenced in the comment has been edited in Section 2.3.1 of the Final EIS/EIR as shown below:

> The SSHCP would provide real streamlining for project proponents by significantly reducing timeline for obtaining local approvals and entitlements, ESA and CESA authorizations, and CWA 404 authorizations. **It is also anticipated project level consultation** with CDFW under CESA **would be reduced or eliminated for Covered Species and Covered Activities**.

Text was also added to Section 1.5.4 of the Final EIS/EIR as shown below:

> **As the final EIS/EIR was prepared, the USFWS continued to coordinate with USACE to discuss the most efficient approach to achieving ESA section 7 compliance for the Corps' section 404 CWA permit strategy for future SSHCP covered activities. This approach will be described and documented prior to the Service's completion of the Record of Decision and issuance of the SSHCP ITP. The intent of USFWS is to provide the Corps with one biological opinion that will reflect compliance with ESA section 7(a)(2) for section 404 CWA permitting of SSHCP Covered Activities, and preclude the need for project level consultations on individual SSHCP covered activities.**

RTC 23.8 (EIS/EIR) – Discussion of the Sunridge ROD in the referenced paragraph was misplaced under the section heading Project ESA and CESA Compliance. The paragraph in Section 2.3.1 of the Final EIS/EIR was edited as shown below to focus on ESA rather than CWA compliance.

> The ~~Reduced Permit Term Alternative's~~ **SSHCP** Conservation Strategy would address cumulative impacts to vernal pool~~s~~ **species** within the MCRA. ~~Cumulative impacts within the MCRA as defined in the Sunridge ROD (see Section 2.2.2) would be addressed through implementation of the SSHCP Conservation Strategy (described below in Section 2.3.5).~~

The comment letter does not identify that the same text is repeated in Section 2.4.1 in reference to the Reduced Permit Term Alternative. Similar edits were made in that section to provide a consistent description of both action alternatives.

RTC 23.9 (EIS/EIR) – See the response to Comment 23.7.

RTC 23.10 (EIS/EIR) – The edit has been made as requested in the comment. The referenced paragraph in Section 2.3.1 of the Final EIS/EIR now reads as shown below:

> As discussed in Section 2.2.2, the existing approach to permitting under CWA 404 provides the regulatory agencies little opportunity to evaluate individual project impacts or proposed mitigation within a regional or a watershed scale~~; thus, the wetland regulatory agencies often have difficulty determining if projects are adequately mitigating for aquatic resource impacts~~. Under the Proposed Action/Proposed Project Alternative, implementation of the SSHCP

Conservation Strategy and the ARP's **mitigation approach (avoidance, minimization and compensation) would be assumed to** ~~measures to avoid and minimize impacts to aquatic resources, the Proposed Action/Proposed Project would~~ assure CWA 404 ~~compensatory~~ mitigation **(avoidance, minimization and compensation)** ~~for unavoidable impacts to aquatic resources~~ is considered from a watershed-based perspective~~,~~**. These provisions, combined with a proposed in-lieu fee program (ILF); as discussed further below),** ~~and~~ would **also** systematically prioritize compensatory mitigation projects based on anticipated impacts to aquatic resources, considering both watershed- and function-based factors.

RTC 23.11 (EIS/EIR) –. Compliance with ESA Section 7(a)(2) for USACE's 404 CWA permitting of Covered Activities under the Reduced Permit Term Alternative would be achieved in the same manner as described for the Proposed Action/Proposed Project. See response to Comment 23.7.

RTC 23.12 (EIS/EIR) – The text in Section 2.4.1 of the Final EIS/EIR referenced in the comment now reads as shown below. Also see responses to Comments 23.7 and 23.9.

During the 30-year permit term, Covered Activity compliance with CWA 404 would be similar to the process described in Section 2.3.1 for the Proposed Action/Proposed Project Alternative. Each Covered Activity that meets the requirements of the HCP would be in compliance with the ESA, and any incidental take of federally listed species would be covered by the 30-year ESA incidental take permit. Therefore, **it is envisioned that in most cases** during the 30-year permit term, the USACE would not be required to initiate ESA Section 7 consultation with the USFWS before authorizing a Covered Activity project under CWA 404. This will shorten project timelines and reduce project costs, as was described for the Proposed Action/Proposed Project Alternative.

RTC 23.13 (EIS/EIR) – The edit has been made as requested in the comment. The referenced paragraph in Section 2.4.1 of the Final EIS/EIR now reads as shown below:

Because the HCP Conservation Strategy**,** ~~and the~~ ARP, **and proposed In Lieu Fee program** will allow the USACE and RWQCB the ability to evaluate~~individual project impacts, and evaluate~~ proposed locations for compensatory mitigation using a watershed and regional-scale approach, wetland regulatory agencies would be better able to **plan for adequate compensatory mitigation** ~~determine if individual projects are adequately mitigating~~ for aquatic resource impacts in ecologically appropriate locations, as was described for the Conservation Strategy of the Proposed Action/Proposed Project Alternative.

RTC 23.14 (EIS/EIR) – The edit has been made as requested in the comment. The referenced text in Section 10.1.1 of the Final EIS/EIR now reads as shown below:

> For discharge of dredged or fill material authorized under CWA 404, adverse impacts to waters of the United States (WOUS) must be avoided and minimized to the extent practicable. For unavoidable impacts, compensatory mitigation ~~is~~ **may be** required to replace the loss of WOUS functions. In 2008, the USACE and the U.S. Environmental Protection Agency (USEPA) jointly issued regulations for compensatory mitigation titled *Compensatory Mitigation for Losses of Aquatic Resources: Final Rule, 33 CFR Parts 325 and 332* (USACE and USEPA 2008).

RTC 23.15 (EIS/EIR) – The edit has been made as requested in the comment. The edits also reflect input provided on similar text in Comment 23.6. The referenced text in Section 10.1.1 of the Final EIS/EIR now reads as shown below. Instances of similar text elsewhere in the EIS/EIR have been edited in a similar manner.

> ~~In addition to setting minimum compensatory mitigation amounts,~~ **t**~~T~~**The** 2008 Compensatory Mitigation Rule establishes equivalent standards for **types of** aquatic resource compensatory mitigation ~~projects~~ regardless of whether they are conducted by mitigation banks, in-lieu fee programs, or permittees **(33 CFR Part 332.2(b))**. There are three **general options**~~forms~~ of compensatory mitigation:
>
> 1. **Mitigation Bank:** a site, or suite of sites, where resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by Department of the Army permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument.
> 2. **In-Lieu Fee Program:** conducts the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental agencies or non-profit natural resources management entity by permittees to satisfy compensatory mitigation requirements for their Corps permits. Similar to a mitigation bank, an in-lieu fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor. The operation and use of an in-lieu fee program are governed by an in-lieu fee program instrument.
> 3. ~~**CWA**~~ **Permittee-Responsible Mitigation:** an aquatic resource restoration, establishment, enhancement, and/or preservation activity undertaken by the permittee (or an authorized agent or contractor) to provide compensatory mitigation for which the permittee retains full responsibility.
>
> Use of mitigation banks and use of in-lieu fee programs are the preferred forms of compensatory mitigation under the 2008 Compensatory Mitigation

Rule as they usually involve consolidating compensatory mitigation projects where ecologically appropriate and use a watershed approach, consolidate resources, ~~provide financial planning and scientific expertise (which often is not practical for permittee-responsible mitigation projects),~~ reduce temporal losses of functions, and reduce uncertainty over mitigation project success. The 2008 Mitigation Rule requires the district engineer to consider compensatory mitigation options in the following order: 1) Credits from a mitigation bank; 2) Credits from an in-lieu fee program; 3) Permittee-responsible mitigation under a watershed approach; 4) Permittee-responsible mitigation through on-site and in-kind mitigation; 5) Permittee-responsible mitigation through off-site and/or out of kind mitigation. However, this preference hierarchy may be overridden in cases where forms of mitigation lower on the preference hierarchy are determined to better serve the aquatic resource needs of a watershed and are documented in the administrative record.

RTC 23.16 (EIS/EIR) – The edit has been made as requested in the comment. The referenced text in Section 10.1.2 of the Final EIS/EIR now reads as shown below:

Seasonal Wetlands in the Planning Area tend to ~~be isolated features that~~ occur within moderate to large depressional features along streams, creeks, and rivers; along the edges of open water, or scattered within the Valley Grassland land cover.

RTC 23.17 (EIS/EIR) – The edit has been made as requested in the comment. The referenced text in Section 10.1.2 of the Final EIS/EIR now reads as shown below:

The movement of surface water between vernal pools can occur in a network of narrow and intermittent surface “swales” (Solomeshch et al. 2007). In many vernal pool landscapes, including those in the Planning Area, surface water flows through integrated ephemeral swales to other vernal pools, and ultimately **may flow in**to a seasonal stream. Consequently, vernal pool landscapes comprise the upper watershed position of many stream systems (Rains et al. 2006).

RTC 23.18 (EIS/EIR) – The comment identifies text in the EIS/EIR that provides an explanation for why the draft ARP contains approximately 232 fewer acres of aquatic resources than the SSHCP. The comment states that USACE will review the ARP and provide comments to the SSHCP Plan Partners regarding this topic. The SSHCP Plan Partners appreciate the opportunity to further coordinate with USACE on the ARP, as well as the SSHCP and the EIS/EIR.

RTC 23.19 (EIS/EIR) – The Sacramento County General Plan Update Final EIR (Sacramento County General Plan EIR) (Sacramento County 2010) appears to use the term “wetland” fairly loosely to encompass a variety of aquatic habitat types. Although not explicitly stated, streams appear included in this “wetland” category as a list of potential impact mechanisms to wetlands includes “alteration of the bed and bank”. The

Draft EIS/EIR text in Section 10.2.2.1 referenced in the comment has been edited to read as shown below:

> The *Sacramento County General Plan Update Final EIR* (Sacramento County General Plan EIR) (Sacramento County 2010) determined that impacts of planned future development on wetland and riparian resources would be less than significant (County of Sacramento 2010, pp. 8-31 through 8-34) because future projects would continue to comply with the existing regulations and policies discussed above in Section 10.1.1. **In the Sacramento County General Plan EIR, the term "wetland" is used to encompass a variety of aquatic habitats, including both jurisdictional and non-jurisdictional wetlands and streams (i.e., aquatic habitats that could be affected through alteration of the bed and bank) (County of Sacramento 2010, p. 8-32).**

RTC 23.20 (EIS/EIR) – Text is provided in Chapter 8, *Natural Communities, Land Covers and Common Plant and Animal Species*, that explains why the loss of aquatic resources in Table 10-4 is greater than the acreage of aquatic resources re-established or established shown in Table 10-6. As described on page 8-42 of Chapter 8:

> The re-establishment and establishment acres of aquatic resources presented Table 8-5 reflect the Lead Agency assumption that the requirements of 2008 Compensatory Mitigation Rule to be re-established or established to replace lost aquatic resource functions and services at a minimum one-to-one acreage or one-to-one linear foot compensation-ratio would continue under the No Action/No Project Alternative. Table 8-5 assumes that compensatory mitigation for direct impact to Vernal Pools and Swales would occur within the Planning Area. However, compensatory mitigation for the other aquatic land covers (Stream/Creek VPIH, Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water) is assumed would continue to occur primarily by purchase of credits at an approved mitigation banks or an in-lieu fee program. However, several mitigation banks and in-lieu fee programs with service areas that overlap the Planning Area actually re-establish, establish, or enhance wetlands or other waters at locations outside the Planning Area. Therefore, Table 8-5 assumes that only one-half the necessary compensatory mitigation for direct impacts to Stream/Creek VPIH, Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water would occur inside the Planning Area.

The same acreages of aquatic resources impacts provided in Table 10-4 are provided in Table 8-4 and the same acreages of aquatic resources re-establishment and establishment provided in Table 10-6 are provided in Table 8-5. However, Chapter 10 of the Draft EIS/EIR did not include the explanatory text from Chapter 8. Text similar to that cited in the comment has been added to Chapter 10 of the Final EIS/EIR to further explain how acreages of compensatory mitigation were calculated under the No Action/No Project Alternative.

RTC 23.21 (EIS/EIR) – The evaluation of cumulative impacts for the No Action/No Project Alternative in Section 10.2.2.2 identifies that the combination of past and

present activities and projects have resulted in the existing condition regarding aquatic resources, and concludes that these combined past and present actions and projects have resulted in an existing significant cumulative impact on aquatic resources within the EIS/EIR Planning Area, and the larger resource study area. The Draft EIS/EIR does not conclude that the combination of past, present, and reasonably foreseeable future actions would not contribute to this significant effect, but only concludes:

1. many of the foreseeable other projects and actions discussed in Section 3.7.2 would not result in additional losses of aquatics resource functions and services from the study area;
2. a subset of the reasonably foreseeable future projects (e.g., foreseeable rural residential developments, agricultural activities on private lands) are likely to result in additional losses and additional adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period; and
3. the incremental effects of the No Action/No Project Alternative would not make a considerable contribution to the existing significant cumulative impact on aquatic resources within the study area.

Conclusion #1 is supported by the identification of regulations and policies applicable to the reasonably foreseeable future projects that would result in the protection of aquatic resources and the implementation of compensatory mitigation, and the results of the review of USACE's CWA 404 project authorizations within the Planning Area between 1979 and 2013.

Conclusion #2 is clarified with the following edits to text in Section 10.2.2.2:

> However, the foreseeable rural residential developments, the agricultural activities on private lands, and **certain** other future activities **may not always trigger the regulations and policies listed above, and in those** cases are likely to result in additional losses and additional adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period.

Conclusion #3 is clarified with the following edits to the last paragraph in Section 10.2.2.2. The explanation for meeting the one-to-one mitigation standard provided above in response to Comment 20 supports the added text provided below.

As described above, ~~implantation~~**implementation** of the No Action/No Project Alternative is assumed to meet **the requirements of the 2008 Compensatory Mitigation Rule and aquatic resources would be re-established or established to replace lost aquatic resource functions and services at a minimum one-to-one acreage or one-to-one linear foot compensation-ratio. Compensatory mitigation, under this alternative could occur both inside and outside the Plan Area. With the resulting no net loss of aquatic resource functions and services,** ~~W~~**w**hen the incremental direct and indirect effects of the No Action/ No Project Alternative are

viewed in connection with the effects of the past, present, and reasonably foreseeable future other projects and actions, the incremental effects of the No Action/No Project Alternative would not make a considerable contribution to the existing significant cumulative impact on aquatic resources within the study area.

RTC 23.22 (EIS/EIR) – Text identifying why it was assumed that there would be no riparian land cover preservation under the No Action/No Project Alternative has been added as shown in the paragraph below from the analysis of the No Action/No Project Alternative in Section 10.2.2.1 of the Final EIS/EIR.

> Table 10-5 provides the estimated acreages of aquatic resource land cover types that would be preserved under the No Action/No Project Alternative inside the UDA and outside the UDA. As discussed in Section 2.2.**3**~~2, 2.2.4~~, the lead agencies described the future No Action/No Project Alternative by estimating the minimum and maximum amounts of new urban development that could occur over a 50-year period inside the UDA under various mitigation scenarios. Under the scenario with the largest feasible acres of new development and the smallest feasible acres of aquatic-resource mitigation feasible, an estimated 1,740 acres of aquatic resources would be preserved in the Planning Area as project mitigation under the No Action/No Project Alternative (Table 10-5). **Table 10-5 identifies 0 acres of riparian land cover preservation under the No Action/No Project Alternative. This is because it is assumed that under the No Action/No Project Alternative all mitigation for unavoidable losses of riparian land cover would be achieved through re-establishment/ establishment of mixed riparian scrub and mixed riparian woodland land covers (see Table 10-6) and not by preservation of existing riparian land covers.**

RTC 23.23 (EIS/EIR) – See response to Comment 23.20. In addition, the Draft EIS/EIR text in Section 10.2.3.1 referenced in the comment has been edited in the Final EIS/EIR to read as shown below:

> Because the Proposed Action/Proposed Project Alternative would result in greater impacts to aquatic resources, the ~~a~~ total acreage of re-established/established aquatic resources would be greater under the Proposed Action/Proposed Project Alternative (Table 10-9) than that under the No Action/No Project Alternative (Table 10-6). The No Action/No Project Alternative results in 1,424 acres of re-establishment/establishment mitigation **in the Planning Area (see Section 10.2.2 for an explanation of the use of mitigation banks and in-lieu fee programs and potential for some compensatory mitigation to be located outside the Planning Area)**, and the Proposed Action/Proposed Project results in 1,740 acres of re-establishment /establishment mitigation **in the Planning Area**. For both alternatives, the amount of re-establishment/establishment is directly tied to the amount of impact, with each acre of land cover loss resulting in **at least** 1 acre of establishment**/**re-establishment. For the No Action/No Project Alternative, this

minimum one-to-one acreage is assumed based on the requirements of the 2008 Compensatory Mitigation Rule (33 CFR 332.3(f)).

RTC 23.24 (EIS/EIR) – The Draft EIS/EIR text in Section 10.2.3.2 referenced in the comment has been edited in the Final EIS/EIR to read as shown below. This text correlates with edits made in response to Comment 23.20.

> The effects of past **and** ~~,~~ present~~, and reasonably foreseeable other~~ projects on aquatic resources in the Planning Area were described above in Section 10.2.2.2, and represent a significant adverse cumulative impact on the aquatic resources within the study area. **A subset of the reasonably foreseeable other projects (e.g., foreseeable rural residential developments, agricultural activities on private lands) are likely to result in additional losses and additional adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period. However,** ~~A~~**a**s discussed in Section 10.2.2.2, when the incremental direct and indirect effects of the No Action/No Project Alternative are viewed in connection with the significant adverse effects of the past, present, and reasonably foreseeable future other projects and actions, the incremental effects of the No Action/No Project Alternative would not make a considerable contribution to the existing significant cumulative impact on aquatic resources within the study area. Therefore, the No Action/No Project alternative would result in a ***Less Than Significant Adverse Impact***.

RTC 23.25 (EIS/EIR) – The paragraph in question was mistakenly retained from an earlier version of Chapter 10 and has been deleted in the Final EIS/EIR. Prior to completing the Draft EIS/EIR, the USFWS and the County made the determination to not separate the effects of the Reduced Permit Term Alternative between the first 30-year and remaining 20-year portions of the study period. Effects of the Reduced Permit Term Alternative are expressed for the entire alternative.

RTC 23.26 (EIS/EIR) – The Draft EIS/EIR text in Section 10.2.4 referenced in the comment has been edited in the Final EIS/EIR to read as shown below. This text correlates with edits made in response to Comments 23.20 and 23.24.

> The effects of past **and** ~~,~~ present~~, and reasonably foreseeable other~~ projects on aquatic resources in the Planning Area were described above in Section 10.2.2.2, and represent a significant adverse cumulative impact on the aquatic resources within the study area. **A subset of the reasonably foreseeable other projects (e.g., foreseeable rural residential developments, agricultural activities on private lands) are likely to result in additional losses and additional adverse impacts to existing aquatic resources within the resource study area over the 50-year EIS/EIR study period. However,** ~~A~~**a**s discussed in Section 10.2.2.2, when the incremental direct and indirect effects of the No Action/No Project Alternative are viewed in connection with the significant adverse effects of the past, present, and reasonably foreseeable future other projects and actions, the incremental effects of the No Action/No Project Alternative would not make a considerable contribution

to the existing significant cumulative impact on aquatic resources within the study area. Therefore, the No Action/No Project alternative would result in a ***Less Than Significant Adverse Impact***.

LETTER 24 U.S. ENVIRONMENTAL PROTECTION AGENCY (SSHCP AND CWA PERMIT STRATEGY)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Michael Jewell
Regulatory Division Chief
U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814

Subject: Public Notice (PN) SPK-1995-00386, Proposed Section 404 Clean Water Act Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan, Sacramento County, CA

Dear ~~Mr. Jewell:~~ MIKE

Thank you for the opportunity to comment on the subject PN dated June 2nd, 2017. EPA continues to support the development of integrated regional aquatic resource and species habitat conservation strategies which enhance conservation of ecosystem functions and values while providing increased regulatory certainty to the public. The three-part permitting strategy described in this public notice applies to the Covered Activities defined in the South Sacramento Habitat Conservation Plan (SSHCP) and its associated Aquatic Resources Plan (ARP). It is EPA's opinion that the avoidance and minimization measures and preserve establishment approach set out in the SSHCP and ARP will result in improved aquatic resource conservation in the plan area, and that the proposed permitting strategy is consistent with the 404(b)(1) Guidelines [40 CFR 230.10]. 24.1

Of crucial importance to the success of the SSHCP and ARP will be the development and implementation of a regional species habitat and aquatic resources monitoring program to ensure that conservation objectives are being met and aquatic resource functions are being preserved. Chapter 8 of the Draft SSHCP outlines several benchmarks which need to be achieved in the first 18 months of Plan implementation. In working towards these goals, consulting with EPA, the California Wetlands Monitoring Workgroup, and any other sources of regional expertise in aquatic resources monitoring is highly recommended. 24.2

Thank you for the opportunity to provide comments on the Public Notice. Please have your project manager contact Joseph Morgan with any questions at (415) 972-3309, or morgan.joseph@epa.gov.

Sincerely,

Paul Amato
Acting Supervisor
Wetlands Office

Printed on Recycled Paper

Cc:
Mary Pakenham-Walsh, Corps of Engineers Sacramento Office
Jennifer Norris, U.S. Fish and Wildlife Service
Tina Bartlett, California Department of Fish and Wildlife
Nichole Morgan, Central Valley Regional Water Quality Control Board

RTC 24.1 (SSHCP and CWA Permit Strategy) – Comments regarding support for development of an "integrated regional aquatic resource and species habitat conservation strategies," with improved aquatic resource conservation in the SSHCP Plan Area resulting, and indicating consistency of the proposed Permit Strategy with the Section 404(b)(1) Guidelines, are noted.

RTC 24.2 (SSHCP and CWA Permit Strategy) – Comments regarding the importance of the SSHCP's monitoring program, as referenced in Chapter 8 of the SSHCP and encouraged to draw upon sources of regional expertise in monitoring of aquatic resources, are noted.

LETTER 25 U.S. ENVIRONMENTAL PROTECTION AGENCY (SSHCP AND EIS/EIR)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

September 5, 2017

Ms. Jan C. Knight
Deputy Field Supervisor
Sacramento Fish and Wildlife Office
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, California 95825

Subject: Draft Environmental Impact Statement for the South Sacramento Habitat Conservation Plan, Sacramento County, California (EIS No. 20170092)

Dear Ms. Knight:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement (EIS) for the South Sacramento Habitat Conservation Plan (SSHCP) pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The EPA commends the U.S. Fish and Wildlife Service (Service) and the County of Sacramento on the release of the draft SSHCP. The development of the SSHCP has been a study in dedicated and thoughtful land use and conservation planning. Crafting it required convening a diverse group of stakeholders, conducting extensive fieldwork, and synthesizing data across a range of scientific disciplines. We appreciate that EPA was invited to be a cooperating agency early in the development of the SSHCP, and the Service's close coordination with EPA throughout its preparation. EPA strongly supports the SSHCP and its core Conservation Strategy, including the commitment to create a landscape-scale network of interconnected preserves, and the requirement for Covered Activities to incorporate low impact development design measures such as stream and preserve setbacks. The remainder of this letter provides suggestions for your consideration as you prepare the Final EIS for the SSHCP. 25.1

EPA suggests that the Service include additional information in the Final EIS regarding the proposed Capital Southeast Connector project (Southeast Connector). The Draft EIS identifies the Southeast Connector project as a Covered Activity under the SSHCP, but does not provide a project-level analysis. Such an analysis would include a demonstration of project-specific avoidance and minimization of impacts to waters of the U.S. The information to support a project-level analysis appears to be readily available, given that an Environmental Impact Report (EIR) was prepared for that project to comply with the California Environmental Quality Act. EPA suggests that the Final EIS disclose when the Southeast Connector would be built and how it would be permitted under Clean Water Act Section 404 (i.e., in segments or as one complete project per the description in the prior EIR), and identify the NEPA lead agency, as well as any other government agencies that would be involved and what each of those agencies' roles and responsibilities would be (include Caltrans, U.S. Army Corps of Engineers, the Joint Powers Authority, EPA, and any other potentially involved agencies). To further promote a shared understanding of the remaining approvals needed and facilitate more efficient project delivery, we 25.2

suggest that the Service convene an interagency meeting with the above-listed agencies before publication of the Final EIS.

The success of the SSHCP and Aquatic Resources Plan will depend, in part, on the development and implementation of a regional species habitat and aquatic resources monitoring program to ensure that conservation objectives are being met and aquatic resource functions preserved. Chapter 8 of the Draft SSHCP outlines several benchmarks that need to be achieved in the first 18 months of implementation. We suggest that the Service consult with EPA, the California Wetlands Monitoring Workgroup (CWMW), and other institutions with regional expertise in aquatic resources monitoring, to achieve these implementation goals. The CWMW's efforts towards developing an integrated framework to coordinate water quality and wildlife monitoring in California HCPs/NCCPs may be of particular relevance. 25.3

The DEIS does not identify the Service's preferred alternative. It is EPA's policy to rate each alternative when a preferred alternative is not identified. Based on our review of the DEIS, we have rated each of the action alternatives as *Lack of Objections* (LO) (see the enclosed "Summary of EPA Rating Definitions"). We concur with the Service's identification of the Proposed Action/Proposed Project as the environmentally preferable alternative. 25.4

We appreciate the opportunity to review this Draft EIS, and are available to discuss our comments. When the Final EIS is released for public review, please send one hard copy and one CD to the address above (mail code: ENF-4-2). If you have any questions, please contact me at 415-972-3521, or contact Jason Gerdes, the lead reviewer for this project. Mr. Gerdes can be reached at 415-947-4221 or gerdes.jason@epa.gov. 25.5

Sincerely,

Kathleen Martyn Goforth, Manager
Environmental Review Section

Enclosure: Summary of EPA Rating Definitions

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. Because of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment

RTC 25.1 (SSHCP) –The Plan Preparers appreciate the guidance and technical assistance provided by the U.S. EPA during preparation of the SSHCP.

RTC 25.2 (EIS/EIR) – The lead agencies acknowledge the request from EPA to include additional information regarding the proposed Capital Southeast Connector project (Southeast Connector). The Southeast Connector is a planned 34-mile roadway through the southern area of Sacramento County and into western El Dorado County, connecting Elk Grove, Rancho Cordova, Folsom and El Dorado Hills. The Connector project will be constructed in five segments based on geographic and jurisdictional boundaries, roadway classification, adjacent community characteristics, projected traffic demand, and potential financing opportunities. As described on the Connector website, creation of these segments is guided by the National Environmental Policy Act (NEPA) and Council on Environmental Quality guidance for independent utility and logical termini. For increased flexibility related to the timing of funding availability, the five segments are also broken down into smaller sub-segments – identified as 1, 2, or 3 – based on the existing roadway network and Connector roadway classifications.

The five segments and sub-segments of the Connector are as follows:

--A1 – I-5 Hood Franklin Interchange to Bruceville Road

--A2 – Bruceville to CA-99

--B1 – CA-99 to Waterman

--B2 – Waterman to Bradshaw

--B3 – Bradshaw to Bond

--C – Bond to Calvine

--D1 – Calvine Road to SR-16 Jackson Highway

--D2 – SR-16 Jackson Highway to White Rock/Grant Line Road

--D3 - White Rock to El Dorado County line

--E1- El Dorado to Latrobe (outside the Plan Area, not a Covered Activity)

--E2 - Latrobe Road to US-50 (outside the Plan Area, not a Covered Activity)

--E3 - US-50 to Silva Valley (outside the Plan Area, not a Covered Activity)

As stated in the SSHCP in Section 5.2.1:

> "The entire footprint of the Capital Southeast Connector within the boundaries of Sacramento County is included in the SSHCP Plan Area, and activities related to the connector are SSHCP Covered Activities. Although the City of Folsom is not a Plan Permittee, the planned improvements to White Rock Road inside the Plan

> Area and the area needed for the expansion of White Rock Road as part of the Capital Southeast Connector or independently by a Plan Permittee are within the SSHCP Plan Area, and activities related to White Rock Road are SSHCP Covered Activities."

The EIS/EIR analyzes the effects of the segments within the Plan Area as Covered Activities, and the portions outside the Plan Area in El Dorado County are analyzed as part of the cumulative impact analysis. The segments of the Southeast Connector within Sacramento County are also analyzed as part of the No Action/No Project Alternative. The Connector has incorporated the SSHCP Conservation Strategy and Avoidance and Minimization Measures (AMMs) into its design and commitments, including SSHCP AMM ROAD-2, which provides for numerous wildlife crossings along the corridor. For example the previously prepared D2 segment mitigated negative declaration (as posted on the Connector website) and the NEPA Environmental Assessment (in preparation with the California Department of Transportation as lead agency) have incorporated several of the SSHCP AMMs, as will other project level environmental analyses for various segments when they are prepared.

Timing for construction of the Connector segments in the Plan Area, while difficult to predict precisely, could take up to 20 years and will depend primarily on funding availability. The NEPA lead agency for each of the segments will also depend in part on whether federal funding, a federal authorization, or a federal permit is involved. The California Department of Transportation has been granted authority by the Federal Highway Commission to serve as the NEPA lead agency for federal highway projects in California, including the D2 segment, and is also the NEPA lead agency for other segments that have initiated local approvals such asthe A1/A2 and D3/E1 segments. While it is not possible to predict exactly how future CWA Section 404 permitting would be sought for each segment, it will be in compliance with the USACE's draft Section 404 permit strategy (Appendix C of the Final EIS/EIR). In regards to project-specific avoidance and minimization of impacts to waters of the U.S., future Section 404 CWA permit evaluation by the USACE would follow the terms, conditions, and procedures described in the USACE's (draft) Section 404 CWA permit strategy for SSHCP covered projects. The USACE's permit strategy includes provisions for additional project-specific avoidance and minimization of impacts to waters of the U.S. as part of the abbreviated standard permit process (as described in Appendix C to the Final EIS/EIR).

For coverage under the PGP, applicants would need to substantiate avoidance and minimization of impacts to waters of the U.S. to the maximum extent practicable. As stated in the draft PGP, this would be considered satisfied when project applicants have designed and implemented activities to comply with all applicable avoidance and minimization measures contained in the SSHCP and the applicable local ARP ordinance. For the LOP and abbreviated standard permit processes, applicants would also need to incorporate all applicable avoidance and minimization measures contained in the SSHCP. Additionally, the USACE would consider project-level information in its evaluation of on-site avoidance and minimization of impacts to waters of the U.S. This includes information provided by the applicant regarding how the project has been designed to avoid and minimize impacts to waters of the U.S., and consideration of the site-specific landscape

context of the project. Where, for example, a project lies in close proximity to a stream, with a required SSHCP setback and potentially an adjacent wetland, the USACE envisions requiring minor adjustments (e.g., a wider stream setback).

The County, USFWS, and USACE welcome the opportunity to discuss the approvals of individual Connector segments located in the Plan Area with the EPA as a means to promote a greater understanding and more efficient project delivery for the Connector project, as the commenter suggests.

RTC 25.3 (SSHCP) –.The SSHCP Implementing Entity looks forward to coordinating with the U.S. EPA and the California Wetlands Monitoring Workgroup in the first 18 months of SSHCP implementation to gain information regarding the development of the regional species habitat and aquatic species monitoring and management protocols discussed in Chapter 8 of the Final SSHCP.

RTC 25.4 (EIS/EIR) – Section 17.7 of the Final EIS/EIR now identifies the Proposed Action/Proposed Project Alternative as the USFWS' preferred alternative.
We appreciate the EPA's concurrence that the Proposed Action/Proposed Project Alternative is also the environmentally preferable alternative.

RTC 25.5 (EIS/EIR) – The U.S. EPA's request for distribution of the Final EIS/EIR to EPA Region 9 has been noted.

LETTER 26 WILTON RANCHERIA (CWA PERMIT STRATEGY)

Wilton Rancheria

9728 Kent Street, Elk Grove, CA 95624

Monday, June 19, 2017

Mary R. Pakenham-walsh
1325 J Street
Sacramento Ca 95814

JUL 24 2017

RE: SPK 1995-00386 South Sacramento Habitat Conservation Plan

Dear Mary R. Pakenham-walsh,

Thank you for your letter dated June 2, 2017 regarding the proposed project. Wilton Rancheria ("Tribe") is a federally-recognized Tribe as listed in the Federal Register, Vol. 74, No. 132, p. 33468-33469, as "Wilton Rancheria of Wilton, California". The Tribe's Service Delivery Area ("SDA") as listed in the Federal Register, Vol. 78, No. 176, p. 55731, is Sacramento County. However, the Tribe's ancestral territory spans from Sacramento County to portions of the surrounding Counties. The Tribe is concerned about projects and undertakings that have potential to impact resources that are of cultural and environmental significance to the tribe.

After review of your letter we have determined the project lies within the Tribe's ancestral territory. We appreciate the opportunity to comment on this and any other projects within the Tribe's ancestral territory that may be in your jurisdiction. 26.1

The Environmental Resources Department would like to receive any cultural resources assessments or other assessments that have been completed on all or part of the project's area of potential effect (APE), and area surrounding the APE including, but not limited to:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:
    - A listing of any and all known cultural resources have already been recorded on or adjacent to the APE;
    - Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response; 26.2
    - If the probability is low, moderate, or high that cultural resources are located in the APE or area surrounding the APE.
    - Whether the records search indicates a low, moderate or high probability that unrecorded cultural resources are located in the potential APE or area surrounding the APE; and
    - If a field investigation survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

Ph: 916-683-6000 | Fax: 916-683-6015 | www.wiltonrancheria-nsn.gov

- ✦ The Tribe shall be present at any field investigation surveys conducted on the Applicants behalf. 26.2 cont'd

2. The results of any archaeological inventory survey that was conducted, including:
   - Any reports that may contain site forms, site significance, and suggested mitigation measures.
   - Any reports or inventories found under the Native American Graves Protection and Repatriation Act.
     - ✦ All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure in accordance with Government Code Section 6254.10. All Wilton Rancheria correspondences shall be kept under this confidential section and only shared between the Tribe and lead agency. 26.3
3. The results of any Sacred Lands File (SLF) check conducted through Native American Heritage Commission. The request form can be found at http://www.nahc.ca.gov/slf_request.html. USGS 7.5-minute quadrangle name, township, range, and section required for the search. 26.4
4. Any ethnographic studies conducted for any area including all or part of the potential APE or areas surrounding the APE; and
5. Any geotechnical reports regarding all or part of the potential APE or areas surrounding the APE.
   - ✦ The Tribe shall be notified before any geotechnical testing is planned. Geotechnical testing has potential to impact Tribal Cultural Resources and should be part of this consultation. 26.5

The information gathered will provide us with a better understanding of the project and will allow the Tribe to compare your records with our database.

Thank you again for taking these matters into consideration, if you have any questions please contact Ed Silva, Tribal Resources Coordinator via email at esilva@wiltonrancheria-nsn.gov.

Sincerely,

Antonio Ruiz

Antonio Ruiz, Jr.
Cultural Resources Officer
Wilton Rancheria

RTC 26.1 (CWA Permit Strategy) – The comment, in response to the USACE's June 2017 public notice "Proposed Section 404 Clean Water Act Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan," regarding the project (SSHCP) lying within the Wilton Rancheria's ("Tribe's") ancestral territory is noted.

RTC 26.2 (CWA Permit Strategy) - The comment, in response to the USACE's June 2, 2017, public notice referenced in response to comment 26.1 requests copies of any record searches and/or cultural reports that have been completed within the project's "area of potential effect" (APE). Chapter 11 of the SSHCP EIS/EIR describes existing conditions and environmental consequences of the proposed project. As stated in Section 11.2.1 of the EIS/EIR, no systematic survey of the 317,655-acre SSHCP Plan Area has been done. As described in Section 11.2.3 of the EIS/EIR, the proposed project (SSHCP) would include a multilevel CWA 404 permit strategy (as contained in the June 2, 2017 public notice, and also Appendix C to the SSHCP EIS/EIR). Authorization of individual projects under the CWA 404 permit strategy would require compliance with Section 106 of the National Historic Preservation Act, and related laws and policies concerning Tribal consultation. In addition, as explained in Section 10.4.2.7 of the final SSHCP, all future SSHCP covered projects and activities would comply with Section 106, including the SSHCP Covered Activities that do not utilize the USACE's Section 404 CWA Permit Strategy aligned with the SSHCP.

RTC 26.3 (CWA Permit Strategy) – Please see the response to Comment 26.2.

RTC 26.4 (CWA Permit Strategy) – Please see the response to Comment 26.2.

RTC 26.5 (CWA Permit Strategy) – Please see the response to Comment 26.2.

INTENTIONALLY LEFT BLANK

EIS/EIR APPENDIX A

Summary of Cumulative Impacts to Waters of the United States in the Planning Area

Appendix A-1. Transmittal Letter from USACE

Appendix A-2. USACE Memorandum on Cumulative Impacts in the SSHCP Plan Area (9/4/2014)

Appendix A-3. Higher-Resolution Dataset; Projects from 1999 to 2013

Appendix A-4. Lower-Resolution Dataset; Projects from Beginning of Records to 1998

EIS/EIR APPENDIX A-1

Transmittal Letter from USACE

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

September 8, 2014

Regulatory Division SPK-1995-00386

Richard Radmacher, Senior Planner
County of Sacramento,
Department of Water Resources
827 7th Street, Room 230
Sacramento, CA 95814

Dear Mr. Radmacher:

Please find enclosed copies (both hardcopy and e-copy) of our Memorandum for Record (MFR) titled *Cumulative Impact Analysis for the South Sacramento Habitat Plan Area* (dated September 4, 2014).

The MFR provides a summary of the U.S. Army Corps of Engineers, Sacramento District's evaluation of cumulative impacts to waters of the United States within the South Sacramento Habitat Conservation Plan (SSHCP) Area, as determined by our office's review of past, present and reasonably foreseeable Regulatory Program actions. Information from this study is recommended to be utilized as a component of the cumulative impacts section under development as part of the SSHCP's Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

Please refer to identification number SPK-1995-00386 in any correspondence concerning this project. If you have any questions, please contact Mary Pakenham-Walsh at the U.S. Army Corps of Engineers, Regulatory Division, California South Branch, 1325 J Street, Room 1350, Sacramento, California 95814-2922, by email at *Mary.R.Pakenham-Walsh@usace.army.mil*, or telephone at 916-557-7718. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/Missions/Regulatory.aspx*.

Sincerely,

Kathleen A. Dadey, Ph.D
Chief, CA South Branch
Regulatory Division

Enclosure

cc: (w/ encl):

Mr. Paul Jones, U.S. Environmental Protection Agency, jones.paul@epamail.epa.gov
Ms. Nina Bicknese, U.S. Fish and Wildlife Service, Sacramento Office, Nina_Bicknese@fws.gov
Ms. Elizabeth Lee, California Regional Water Quality Control Board, Central Valley Region, Elizabeth.Lee@waterboards.ca.gov
Mr. Todd Gardner, California Department of Fish and Game, Region 2, Todd.Gardner@wildlife.ca.gov
Mr. Paul Junker, Mr. Paul Junker, Planning Director, City of Rancho Cordova, pjunker@cityofranchocordova.org
Mr. Taro Echiburu, Planning Director, City of Elk Grove, techiburu@elkgrovecity.org

EIS/EIR APPENDIX A-2

USACE Memorandum on Cumulative Impacts in the SSHCP Plan Area (9/4/2014)

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

MEMORANDUM FOR RECORD

SUBJECT: Cumulative Impact Analysis for the South Sacramento Habitat Conservation Plan Area (SPK-1995-00386)

1. **Introduction:** This document provides a summary of the U.S. Army Corps of Engineers, Sacramento District's evaluation of cumulative impacts to waters of the United States (WOUS) within the South Sacramento Habitat Conservation Plan (SSHCP) Area (also known as Plan or Plan Area; hereafter also referred to as "study area"), as determined by our review of past, present and reasonably foreseeable Regulatory Program actions (hereafter, "Regulatory actions").

   An evaluation of cumulative impacts of a proposed activity on the human environment is required under the National Environmental Policy Act (NEPA), and is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

   Please note that this analysis (hereafter called "study) considers cumulative impacts solely for aquatic resources, including impacts attributable to the collective effect of a number of individual discharges of dredged or fill material associated with authorized and unauthorized activities (UA) known to the Corps. This study is intended to be utilized as a component of a comprehensive cumulative impact analysis under development for the SSHCP's Environmental Impact Statement/Environmental Impact Report (EIS/EIR), which is intended to evaluate the full range of potential cumulative effects of the proposed SSHCP (for additional information about the EIS/EIR, see Section 3).

2. **Location:** The study area encompasses approximately 374,000 acres within southern Sacramento County, and includes unincorporated Sacramento County, and the cities of Galt and Rancho Cordova. The geographical boundaries of the Plan Area are U.S. Highway 50 to the north, the Sacramento River east levee and County Road J11 to the west, and the Sacramento County line to the east and south. The study

area excludes the cities of Sacramento, Elk Grove[1], Folsom, the lands of the Miwok tribe, and the Sacramento County community of Rancho Murieta (see **Figure 1, Appendix A**).

3. **Activity Description:** The proposed activity is the SSHCP, a habitat conservation plan (HCP) that would cover the 374,000-acre study area described above. The SSHCP is currently under preparation by a group of six local jurisdictions, who, with the addition of an HCP implementing entity (not yet formed), will be the "Plan Permittees" in coordination with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW). The "Plan Permittees" consist of: the County of Sacramento, City of Rancho Cordova, City of Galt, Capital Southeast Connector Joint Powers Authority, Sacramento Regional County Sanitation District, Sacramento County Water Agency, and a (to be formed) SSHCP Implementing Entity.

   The Plan would include a conservation strategy developed to benefit 30 plant and animal species, referred to as "covered species." In addition, the Plan would serve as part of the Plan Partners' application for a 30- or 50-year incidental take permit (ITP) under section 10(a)(1)(B) of the federal Endangered Species Act (ESA). If issued, the ITP would authorize the incidental take of seven covered federally-listed plant and animal species. A separate ITP, if issued, would cover six state-listed species under the authority of the California Endangered Species Act[2] (CESA, administered by the CDFW). Due to overlapping state/federal designations, there are a total of 10 species that are federal- and/or state-listed. If issued, both ITPs would provide take coverage for "covered activities" implemented by the Plan Partners. Examples of "covered activities" include, but are not limited to, private development projects, transportation facilities, utility and public works projects, recreation facilities, and future habitat management activities.

   The covered activities proposed by the Plan Partners in the SSHCP would directly affect a maximum total of approximately 42,243 acres of land (overall) within the study area[3]. Most of these direct effects (an estimated 40,000 acres) would occur within the 123,000-acre urban development area (UDA). Additionally, in the SSHCP, the Plan Partners propose to preserve or restore 49,930 acres of land within the study area. In combination with existing preserve lands, this would result in a larger, interconnected habitat preserve system of approximately 113,623 acres[3].

   Independent of this study, the most recent, comprehensive data available to-date describing the SSHCP's proposed impacts to WOUS is represented in *Chapter 6.0,*

[1] The SSHCP Plan Area boundaries were updated nearly 1 ½ years into the Corps' cumulative impact analysis study (in late April, 2014). The Corps was in final data processing stages for the study at this time. Therefore, project data within the City of Elk Grove is included in this analysis. As a region of rapid-paced development in Sacramento County, inclusion of data from the City of Elk Grove serves to inform cumulative impacts in the northwestern portion of the study area. Additionally, the end-users of this study have the ability to query the electronic geodatabase (Appendix C) to estimate cumulative impacts without the inclusion of project data from within the City of Elk Grove. The revised Plan Area boundary is shown on Figure 1, in addition to the pre-April, 2014 study area boundary used for this analysis.

[2] California Fish and Game Code, Section 2050 et seq.

[3] According to the Notice of Intent to prepare a joint EIS/Environmental Impact Report (EIR), published in the Federal Register (Nov. 3, 2013) by the USFWS. As the SSHCP continues to progress toward finalization, it is noted that these acreages may be revised.

Effects of the July 2013 administrative draft SSHCP. Table 6-2, *Direct Effects to Native and Naturalized Land Cover Types Within and Outside the UDA* summarizes the Plan's anticipated direct effects to each of the "land cover types," including aquatic resources (e.g. seasonal wetlands and vernal pools).

Table 6-2 of the administrative draft SSHCP estimates that a maximum of approximately 5,477 acres of potential waters would be directly affected. Of these direct effects, up to 1,163 acres would be to wetland "land cover types" (consistent with the terms used in *Table 6-2*, "Freshwater Marsh," "Seasonal Wetland," "Vernal Pool," and "Swale"), up to 3,674 acres would be to potential wetland cover type ("Irrigated Pasture-Grassland") for a total of 4,837 acres of wetland/potential wetland cover types, and up to 643 acres would be to stream and open water cover types ("Ephemeral Streams," "Streams/Creeks," and "Open Water").

It is noted here that the maximum estimated direct effects identified in Table 6-2 of the administrative draft SSHCP include both temporary and permanent effects to aquatic resources. In addition, this table does not identify whether the aquatic resources are WOUS subject to Corps' jurisdiction, nor does it identify the extent to which the direct effects would result in a "loss" of WOUS. See Section 4(a) of this document for clarification of the usage of the term "loss" (of WOUS) in this document.

The SSHCP requires evaluation under NEPA. The USFWS is serving as the lead agency for the EIS component of an EIS/EIR that would describe, in accordance with NEPA requirements, the underlying purposes, needs, and objectives for developing, approving and implementing the SSHCP, including identifying alternatives to the proposed plan, describing the existing environment, and analyzing the potential effects of each alternative on the environment.

One of the SSHCP's goals is to streamline the existing development-permitting process with regard to, at minimum, reviews associated with federally-listed plant and animal species. In addition, the SSHCP is proposing to include an Aquatic Resources Program (ARP) that would describe actions expected to avoid, minimize and compensate for impacts of "covered activities" to WOUS. The proposed ARP would facilitate the Corps' development of a permitting strategy for the SSHCP, under Section 404 of the Clean Water Act. The Corps' role in the EIS as a cooperating agency includes meetings and document review to provide input on the Corps' jurisdiction, authorities, and other applicable Regulatory Program guidance, such as procedural considerations for future regulatory reviews of projects.

4. Purpose of this Cumulative Impact Analysis: This study has been conducted to assess, to the extent reasonable and practical, the cumulative impact to the aquatic ecosystem[4] within the study area attributable to the collective effect of individual discharges of dredged or fill material associated with authorized and unauthorized actions. To accomplish this, the Corps:

[4] This description of cumulative impacts to the aquatic ecosystem is similar to that found in Section 404(b)(1) [40 CFR 230.11(a)].

a. Determined the approximate extent (i.e., acreage) of loss[5] of WOUS from past, present and reasonably foreseeable future Regulatory actions within the study area;

b. Determined the approximate extent of compensatory mitigation of WOUS associated with past, present and reasonably foreseeable Regulatory actions in the study area; and,

c. Determined the general extent to which loss and/or compensatory mitigation of WOUS attributable to past, present and reasonably foreseeable Regulatory actions in the study area exhibited geographic association relative to the UDA.

From the above data, several sub-categories of data were analyzed to inform general patterns and trends in Regulatory actions relevant to the cumulative impact analysis. For example, one of the data queries resulted in a frequency distribution of relative levels of permanent impact to waters resulting from past and present Regulatory actions. Another data query addressed geographic patterns of impacts to waters resulting from Regulatory actions, relative to the UDA.

5. Geographic and Temporal Scopes of Analysis: The geographic (review area) and temporal scopes considered in this cumulative impact analysis (CIA) are described in this section.

a. Geographic Scope: The geographic scope for this CIA consists of the SSHCP Plan Area, as described in Sections 1 and 2 of this document. The study area is depicted in **Figure 1** (**Appendix A**), and includes all or portions of ten 10-digit Hydrologic Unit Code (HUC) watersheds within the study area (see **Figure 2**, **Appendix A**). For purposes of this study, it was determined to be appropriate to utilize portions of the 10-digit HUC watersheds that conformed to the boundaries of the SSHCP's Plan Area, rather than entire watersheds or larger (e.g., 8-digit) HUCs, based on the following rationale:

(1) Utilizing entire 10-digit HUCs that extend outside of the SSHCP Plan Area would have increased the review area from 374,000 acres to 866,922 acres, and the number of Regulatory actions to review from 1627 to an estimated 3,286[6]. To balance study resources (e.g., time and cost) with accomplishing the study's purpose at an appropriate level of detail, it was determined that use of entire 10-digit HUCs that extended beyond the Plan Area was not practicable. Following on this logic, utilizing 8-digit HUCs (which would result in a substantially larger review area and greater number of Regulatory actions than utilizing entire 10-digit HUCs) would exacerbate limitations on study resources.

[5] "Loss" of WOUS in this document follows the definition provided in the 2012 Nationwide Permits effective March 19, 2012 (FR Vo. 77, No. 34, p. 10289).
[6] This estimate was obtained by querying the ORM2 database; the query was conducted by the Corps' Institute for Water Resources (IWR), which provides nationwide ORM2 database support for the Regulatory Division.

(2) In addition to resource limitations, the Council of Environmental Quality's (CEQ) handbook *Considering Cumulative Effects Under the National Environmental Policy Act*, published in January 1997, suggests that for water impacts, that "watershed boundaries are useful for cumulative effects analysis" and that one way to determine the geographic boundary is to "consider the distance an effect can travel." Extending the study area for up to 23[7] miles outside of the SSHCP Plan Area for the 10-digit HUCs and an even greater distance for the 8-digit HUCs, would result in consideration of impacts to waters that are often off-stream (e.g., vernal pools) in the study region, and while likely resulting in cumulative effects to downstream waters, quantifying the magnitude of such impacts is, we believe, likely too speculative to be meaningful in the context of this analysis.

It was further determined that the study area boundary should be adjusted to exclude projects within the primary channels of the Sacramento River and Mokelumne River. The majority of projects on these rivers include those that primarily affect fish species (e.g. dock installation, levee repair), which are not covered in the SSHCP. While levee repair projects could potentially affect some HCP-covered species, the "loss of waters" is often minimal as a result of typical levee work, such as rip-rap placement.

b. Temporal Scope: The temporal scope for this analysis extends from approximately 35 years in the past (to the beginning of the Corps' Regulatory action documented file history in the study area, which was 1979) to the "reasonably foreseeable" future.

Reasonably foreseeable actions were not explicitly defined in terms of years (e.g., 5, 10 or 20), since time frames cannot be predicted. As an example, the Sacramento District has to-date been involved in re-authorizing several projects that had been previously authorized before or during the economic downturn in the latter part of the 2000-2010 decade. For purposes of this analysis, reasonably foreseeable projects were considered to be those that:

- Have applications that are currently being evaluated by the Corps;
- Have applications that have been withdrawn from Corps evaluation, but based on available information, may be reactivated within the reasonably foreseeable future;
- The Corps has received information that an application is anticipated to be submitted in the reasonably foreseeable future. This may include, for example, a scheduled or completed pre-application meeting for the project, a request for comments from the Corps on a project's EIR.

[7] Boundaries of some HUC-10 watersheds would extend as much as 23 miles toward the southwest, and approximately 20 miles toward the east.

6. Methodology: This section describes the procedures followed in conducting this study. The first step of the CIA involved identifying Regulatory actions and data categories of relevance to the analysis.

a. Data Setup and Acquisition

(1) Relevant data categories to populate from Regulatory actions were identified, taking into consideration the level of resolution available in files and/or database history for actions. A master spreadsheet was created in Microsoft Excel reflecting data structure and categories.

(2) The appropriate temporal scale for data collection, and project status (past, present, reasonably foreseeable) was confirmed (see also Section 5.b, above). The decision was made to combine "past " and "present" projects, interpreted as all projects the Corps has finalized, due to the size of the study area and number of actions. Separating these categories would have involved researching the status of projects previously finalized. This would have involved substantial resources to accomplish, and was not relevant to the key questions to be addressed by this CIA.

(3) Study area base mapping was set up in ArcGIS 10.0 Desktop geographic information system (GIS) software by importing externally-sourced geographic features including the study area boundary, UDA, and 10-digit HUC watershed boundaries.

(4) Utilizing ArcGIS, Regulatory actions within the ORM2 database were compared against the study area boundary, and actions located inside the study area boundary were identified. This generated a raw, comprehensive list of Regulatory actions. The ORM2 database contains actions originating from both ORM2 (post-July 2007), and the previous database, RAMS.

(5) A geodatabase was constructed from the raw list of Regulatory actions resulting from the step above, that summarized Regulatory actions by identification number, unique geometry type (polygon, line, point), type of action (e.g., permit, UA, mitigation bank), impact/mitigation acreage, and status (e.g., pending, finalized). This resulted in an initial data set consisting of 1627 Regulatory actions, which were in turn related to 713 (unique) project numbers[8].

(6) Refinement of the initial data was conducted, including:

(a) River-based projects such as docks were eliminated from the database by adjusting the study area boundary inward to the east and north

[8] Many Regulatory project numbers have several associated actions, for example, SPK-2000-00010 may have a permit action, a permit modification action, and a UA action. All of these actions generate a separate "row" in the dataset, with relevant baseline, impact and/or mitigation data.

banks of the Sacramento and Mokelumne Rivers, respectively (see Section 5.b).

(b) A number of projects were identified where the associated project location (confirmed by file research) differed from what was recorded in the Corps database. If a project location was determined to be located outside of the study area, it was removed.

(c) Projects having no potential[9] for impact losses or mitigation gains were identified and removed.

These steps resulted in a final data set of 540 unique project numbers and 1400 associated Regulatory actions.

b. Data Review and Compilation

(1) After the steps described in Section 6.a were completed, the final set of 540 unique project numbers and associated 1400 Regulatory actions, populated with the "raw" database-generated data (see Section 6.a[5]), was exported to Excel.

(2) For each of the 540 Regulatory project numbers, the associated Regulatory project file was located and researched, either in hardcopy or digital (older file actions have been converted to PDF format for archiving). Because of the high potential for inconsistency of data resolution and clarity in database records, in order to get the most accurate estimates of impacts and mitigation, every file associated with the 540 Regulatory projects was reviewed.

For each Regulatory action, raw data populating the Excel spreadsheet (derived from the ArcGIS table export described above in 6.b[1]) was updated, as necessary, with information acquired from the associated project file.

File review included reviewing available data from in prior cumulative impact studies conducted by the Corps within the study area[10]. A substantial effort was made to evaluate all available electronic and hardcopy data for Regulatory actions within the study area, at the most efficient level of effort necessary to accomplish the study's objectives.

[9] "No potential" for purposes of this study means that the database record for the project met both of the following two criteria: 1) There was no impact or mitigation record associated with the project, and 2) All actions associated with the project were of a type that would not be associated with impacts (e.g., pre-application, no permit required). This two-criteria test did not remove any projects for which an ORM2 impact or mitigation entry existed, even if the recorded impact values were 0. Any project having an ORM2 impact or mitigation entry was included in the final geodatabase, and was reviewed individually to confirm impact and/or mitigation values.

[10] *Residences of Murieta Hills (*SPK-2005-00305*), Glenborough at Easton and Easton Place (*SPK-2004-00515*, Florin-Vineyard Specific Plan Area (*SPK-2004-00244 & SPK-2009-00080*), and Sunridge Properties (*SPK-2009-00511*).*

All data were input directly into Excel spreadsheets. As file review was conducted, data gaps (resulting when the initial file review failed to provide sufficient information regarding impacts and/or mitigation) were "flagged" on the spreadsheets to address during a final data QA/QC stage.

(3) Based on an overview of both database- and file-generated data in terms of relative raw data quality, it was determined appropriate to create two separate datasets from the refined (see Section 6.a[6]) raw dataset of 1400 Regulatory actions, representing 540 unique project numbers. During file review, it became apparent that the information regarding impacts and mitigation in older projects was not as specific as the information available for projects completed more recently (e.g. a project authorized in 1996 may not specify the type impact, the type of aquatic resource impacted, or the type of mitigation required, whereas a project from 2011 would contain that information). Because of the discrepancy in the quality of data, an accurate comparison could not be made. Therefore, the data were divided according to the following criteria:

(a) The first dataset (hereafter, "higher-resolution" dataset), consists primarily of projects from 1999 to January 2013. The higher-resolution dataset contains the highest level of data available that is relevant to this study, an achievable standard based on the higher quality of the generally more recent file and database documentation. This dataset identifies the amount of each type of waters impacted (e.g., wetlands vs. streams), includes project-related mitigation required by both the Corps and associated with USFWS Sec. 7 ESA consultations, and includes the location of required mitigation relative to the UDA. This dataset also includes several reasonably foreseeable projects. Data categories in the higher-resolution dataset are summarized in **Table 1** (**Appendix B**).

(b) The second dataset (hereafter, "lower-resolution" dataset), consists primarily of projects from the beginning of the Corps' record to 1998. This dataset contains substantially less data than that obtained for the higher-resolution data set. This dataset does not identify the amount of each type of waters impacted, does not include project-related USFWS mitigation, and does not provide the location of mitigation. The dataset does include the total amount of waters impacted and mitigation required by the Corps. In addition to older Regulatory actions, this dataset also includes several reasonably foreseeable projects. Reasonably foreseeable projects exhibit varying levels of project description detail, and all related data is, at best, pre-decisional. Data categories in the higher-resolution dataset are summarized in **Table 2**, **Appendix B**.

(4) In the final stages of data collection, the lower-resolution dataset was combined with a copy of the higher-resolution dataset to create a single,

"complete lower-resolution" (CLR) dataset that exhibits the same categories used by the lower-resolution dataset. Therefore, two datasets were analyzed for the purposes of this study, the higher-resolution dataset (as described above), and the CLR dataset. The CLR dataset was created in order to compare "apples to apples" across the full temporal scope of the study. Higher-resolution data could be combined into broader categories, but lower-resolution data was not able to consistently be made more precise. Thus the CLR dataset is able to meaningfully describe broader categories of data.

c. Decision Rules and Assumptions for the Higher-resolution Dataset

As described in Section 6.b(3), data for this study is contained within two datasets, higher-resolution and CLR. The following section describes decision rules and assumptions for the higher-resolution dataset, which contains the higher quality data. Please see Section 6.d for decision rules and assumptions for the CLR dataset.

(1) Excel table structure: In the higher-resolution dataset, some Regulatory file numbers have multiple rows associated with them. This may be because a single Regulatory file number has multiple related Regulatory actions (e.g., one file number had one action resulting in a Nationwide [NWP] verification, and several years later, an individual permit [IP] was issued for a different action associated with the same project), or because data needed to be kept separated during review for the sake of clarity (e.g., USFWS requirements associated with ESA Section 7 consultation). After the initial data set-up, hardcopy or electronic files of those Regulatory file numbers with multiple actions were reviewed, and the tables were updated appropriately. In some cases, information was consolidated into a single row (e.g., permit modification actions that did not introduce changes to impact/mitigation acreages).

(2) Recording Delineated Acres: To simplify the analysis as much as possible but utilize relevant categories, Delineated Acres consisted of four aquatic resource types: Wetlands, Streams, Other, and Unknown. The acreage of an aquatic resource type was only included in one of these categories if: a) it was determined jurisdictional, AND (b) a Regulatory action on the site resulted in a permanent or temporary impact. Only one set of delineated acreage figures was recorded per Regulatory project number, so the Excel spreadsheets contain many rows without delineation acreage/figures. An additional category was created to record acreage of any features that were determined to be non-jurisdictional (e.g., isolated). This category was not broken down by aquatic resource type; it is an undifferentiated summation of acreage determined to be non-jurisdictional waters.

(a) "Wetlands" included all types of wetlands, for example, vernal pools, seeps, seasonal wetlands, freshwater marsh, and swales. Further

subdivision of the wetland category was determined to be unreasonably resource-consuming, and in some cased impossible due to the lack of documentation (particularly in older files). Given that the entire data set could not be consistently differentiated by wetland type, the decision was to not address just a portion of it.

(b) "Streams" included ephemeral, intermittent and perennial streams, creeks, and rivers. Ditches (if determined to be jurisdictional) were also included in the stream category. While some ditches may have wetland characteristics in addition to (or instead of) stream characteristics, separating ditches that are categorized as wetlands from ditches categorized as streams was determined to be unreasonably resource-consuming, and in some cases impossible due to the lack of documentation (particularly in older files).

(c) "Other" included ponds, retention/detention basins (if determined to be jurisdictional), and open water (if not obviously in one of the two categories of [a] or [b], above).

(d) "Unknown" included delineated acreage that was determined to be jurisdictional, but for which the specific aquatic resource type (e.g., seasonal wetland) was unknown based on the lack of specificity available in file documentation.

(e) If a JD was verified and a Corps action resulted in temporary and/or permanent impacts to WOUS, but the amount of delineated acres could not be determined, then an estimate of delineated acres was assumed to equal the sum of impacts (temporary and permanent) and, if applicable, any identified on-site preservation requirements.

(f) If delineated acreage was known and any of the above aquatic resource types were specified, but it was unknown exactly how many acres of each aquatic resource type was delineated, the known delineated acreage was divided evenly between the four aquatic resource types.

(3) Recording Impacts to WOUS:

(a) This study focused on permanent impacts that resulted in a "loss of" WOUS[11]. Permanent impacts were recorded for each of the four aquatic resource types identified in Section 6.c(2).

(b) Temporary impacts to waters were not recorded as part of this analysis, since once restored, temporary impacts do not result in a loss of WOUS.

[11] As defined in the Corps' 2012 Reissuance of Nationwide Permit (FR Vol. 77, No. 34, p. 10289, February 21, 2012).

(c) Impacts to waters recorded as "permanent" in Regulatory actions were typically assumed to result in a loss of WOUS. In more obvious cases in which permanent impacts appeared to not result in a loss of WOUS, the data were recorded in a separate category of "permanent impact, not loss of WOUS." Examples include outfall replacements within approximately the same footprint as an existing outfall, rip-rap installation, impacts associated with certain types of maintenance, and dredging. The Corps' ORM2 database only recently (in 2011) included a waters impact data field that specified "permanent impact, not a loss of WOUS." Regulatory actions prior to this time were flagged, then individually reviewed to determine if an associated impact belonged in this particular data category.

(d) Regulatory actions involving stream realignments were assumed to have resulted in permanent impact (loss of WOUS); an equal accompanying acreage of stream establishment was entered in the dataset to offset the loss resulting from the realignment, unless the record indicated differently (e.g., establishment of the same, less, or more waters in the new stream alignment.

(4) Recording Mitigation and Activities Increasing and/or Preserving WOUS:

(a) This study focused on compensatory mitigation required by special condition of DA authorizations, and other forms of "gain" in WOUS acreage within the study area (e.g., wetland re-establishment done under the authorization of NWP 27). It also acknowledges preservation (which does not result in a gain of WOUS acreage, however does afford more protection against future potential impacts) that was required in association with Regulatory actions[12]. A "gain" in WOUS involves establishment and/or re-establishment (i.e., restoration) of waters, most typically wetlands. In the higher-resolution dataset, mitigation also includes establishment/re-establishment and preservation of waters required by the USFWS as an outcome of Section 7 consultation under the ESA (a key distinction from the CLR dataset; see Section 6.b(3)(a). Compensatory mitigation requirements were recorded for each aquatic resource type category, or as "unknown" if file information failed to yield sufficient information regarding the type of waters involved in mitigation. Other types of mitigation not resulting in new acreage of WOUS were also recorded, as described below.

(b) If permanent impacts were identified for a Regulatory action, and file information indicated that compensatory mitigation was required, but

[12] Typically, preservation requirements associated with Regulatory actions include preservation acreage required by the USFWS as a condition of compliance with the ESA vis-à-vis Section 7 consultation. Another typical example of preservation requirements is permittee-responsible on-site preserves that include "avoided" waters and associated uplands (e.g., demarcated as an outlot, drainage corridor, etc. of a subdivision).

the acreage of the compensatory mitigation was unknown, the assumption was made that compensatory mitigation consisted of establishment of an in-kind aquatic resource type at a 1:1 ratio (e.g., if permanent impacts to 1 acre of wetlands was authorized, it was assumed that the compensatory mitigation requirement was for the establishment/re-establishment of 1 acre of wetlands). This assumption was not applied to UAs (finalized, or pending resolution), due to the less predictable nature of enforcement cases. If mitigation was not indicated in the database and/or Regulatory action for a UA, then its mitigation fields were left blank.

(c) Mitigation location was recorded relative to the UDA (inside UDA, outside UDA, or outside of study area). If the mitigation location could not be determined based on available information, it was recorded as "unknown."

(d) For Regulatory actions for which compensatory mitigation was required in the form of payment into an in-lieu fee program (ILF), the type of ILF was recorded as either "Wetland" or "Stream," based on file information. If the type of ILF mitigation was unknown based on file information, an assumption was made that the ILF payment was for in-kind mitigation (i.e., the same as the type of waters impacted). During the Regulatory permitting process, ILF requirements are often calculated by applying a ratio (determined on a project-specific basis) to an established cost-per-acre of resource type. For example, a project impacting 0.10-acre of wetlands may have been mitigated for at a 3:1 ratio, such that the required ILF fee was equivalent to purchasing 0.30-acre of wetlands. Due to historical challenges in determining the certainty, type and location of projects actually constructed using the ILF funds, the decision was made to conservatively document the amount of compensatory mitigation for projects that required payment into an ILF, as being equal to the acreage of authorized impact. Using the example above, the figure recorded for this study would have been 0.10-acre. It was also assumed that mitigation location for compensatory mitigation required through the payment into an ILF fund was best characterized as "unknown."

(e) For Regulatory actions in which the requirement of the DA authorization provided a choice that required compensatory mitigation be done in the form of *either* purchase of bank credits *or* payment into an ILF, when the outcome of that decision was unknown based on file information, the assumption was made that bank credits had been purchased. Consistent with Section 6.c(4)(c), mitigation location was recorded as "unknown."

(f) Other types of compensatory mitigation (e.g., enhancement) were recorded in an "other mitigation" category with associated acreage.

(g) Incorporation of mitigation required by the USFWS as a result of Section 7 ESA consultation (as noted above, this assessment was only made for this [higher-resolution] dataset, not for the CLR dataset), when:

(i) In general, if a Regulatory action had an associated Section 7 ESA BO, it was reviewed for potential mitigation requirements (specifically, involving aquatic habitats) that may either have overlapped with, or have been in addition to, Corps Regulatory-required mitigation. If a Regulatory action had an associated letter of concurrence (instead of a BO) as a result of a determination that the action was not likely to adversely affect Federally-listed threatened and/or endangered species, no further review was conducted (as an informal consultation letter of concurrence does not require compensatory mitigation).

(ii) If preservation was recorded as a mitigation requirement, this was often (but not always) in association with a USFWS Sec. 7 ESA consultation action. This study recognizes that USFWS-required preservation may address indirect as well as direct impacts to aquatic habitats for species. Our analysis did not commit resources to parsing out indirect vs. direct impacts as a basis for requiring preservation; the resulting outcome of preserved acres was determined to be the most relevant metric.

(iii) Mitigation for the federally-threatened giant garter snake (*Thamnophis gigas*) was considered when a Regulatory action contained a BO that required it. Wetland establishment was generally estimated to be one-third of the acreage requirement expressed in the project's BO (e.g., if the BO required 9 acres of giant garter snake habitat establishment, the recorded acreage of freshwater marsh establishment was 3 acres). This is based on the habitat ratios outlined in the *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California*[13]. If the BO specified an aquatic acreage requirement that differed from the one-third estimate, the acreage required by the BO was entered into this data category.

(h) If a Regulatory action contained "as-built" drawings for compensatory mitigation, the acreage of WOUS reported on the as-builts was

[13] Sacramento Fish and Wildlife Office, USFWS, dated November 13, 1997, which requires that for every 1 acre of aquatic habitat established for giant garter snake, 2 acres of surrounding upland habitat for giant garter snake are also included.

recorded for mitigation, rather than the acreage required by the action's authorization. The as-builts were assumed to provide the most accurate record of compensatory mitigation, if available.

(i) All mitigation was assumed to have been completed and to be functioning successfully (e.g., constructed, or mitigation bank credits purchased). Resource limitations prevented confirming the compliance status of mitigation across the data set (see also Section 9 of this document).

(5) Treatment of mitigation sites including mitigation banks and permittee-responsible mitigation sites:

(a) Mitigation sites were individually reviewed to determine whether any on-site established/re-established aquatic resource acreage was documented as having been utilized as compensatory mitigation for other projects. If this was determined to be the case, all established/re-established aquatic resource acreage was removed from the mitigation site record in the database, unless that acreage was associated with a "self-mitigating" activity (i.e., an impact from the mitigation project itself, that was mitigated by the project's own establishment/re-establishment acreage). All other data categories were left unchanged. If a mitigation site had no acreage being utilized as compensatory mitigation for other projects, its record was left unchanged. Rationale for these decisions is as follows:

(i) A general analysis using the above-identified records in an unmodified state would result in "double-counting" establishment/re-establishment acreage alongside mitigation acreage that was reported for the projects "using" the establishment/re-establishment acreage for their own required compensatory mitigation. In a sense, these other projects "debit" acreage available at the mitigation sites.

(ii) Calculating the exact amount of "debited" and remaining acres for each mitigation site was beyond the scope of this study. A decision was made to conservatively estimate the overall mitigation acreage by removing all established/re-established acres from the records of mitigation sites *confirmed as* having been utilized (in full, or in part) as compensatory mitigation by other projects (excepting self-mitigating acreage, as described above).

(b) Unaltered records for all mitigation banks and permittee-responsible mitigation sites located within the study area have been placed in separate tables for review if needed.

(6) Treatment of linear projects: The dataset was scanned for linear projects (e.g., transportation projects), which were recognized to have the potential to span the study area boundary. Geometry and database information was reviewed for linear projects with permanent impacts of more than 0.5 acre. This resulted in confirming that no linear projects exceeding 0.5 acre of impacts were contained in the dataset. No further action was necessary given that confirmation.

(7) Treatment of Related Regulatory actions. In cases in which a Regulatory action became merged with another action, an attempt was made to not double-count associated information, by summarizing data from the merged actions as appropriate. An example of this scenario includes several unique Regulatory actions falling under a larger "Specific Plan Area" or other master planning area (e.g., Suncreek). In such cases, data were typically merged into one row/master project number, with annotations in the datasheet's "notes" field, as appropriate.

d. Decision Rules and Assumptions for the CLR Dataset:

As described in Section 6.b(3), data for this study are contained within two datasets, higher-resolution and CLR. The following section describes decision rules and assumptions for the CLR dataset, which exhibits the lower degree of resolution. Please see Section 6.c for decision rules and assumptions for the higher-resolution dataset.

(1) Excel table structure: As described in Section 6.c(1) for the higher-resolution dataset, in the CLR dataset, some Regulatory file numbers have multiple rows associated with them. Please refer to Section 6.c(1) for explanation.

(2) Recording Delineated Acres: For the CLR data set, delineated acres is a catch-all category, and is not broken into individual aquatic resource types (e.g., wetlands, streams) due to inconsistent data availability. Similar to the higher-resolution dataset, delineated acres of aquatic resources were only recorded if: (a) it was determined jurisdictional, AND (b) a Regulatory action on the site resulted in a permanent or temporary impact. Only one set of delineated acreage figures was recorded per Regulatory file. A separate catch-all aquatic resources category was created to record acreage of any features that were determined to be non-jurisdictional (e.g., isolated).

(3) Recording Impacts to WOUS:

(a) Permanent impacts were recorded in one catch-all category of waters.

(b) Temporary impacts to waters were not recorded as part of this analysis, since once restored, temporary impacts do not result in a loss of WOUS.

(c) Impacts to waters recorded as “permanent” in Regulatory actions were assumed to result in a loss of WOUS.

(d) Regulatory actions involving stream realignments were assumed to have resulted in a permanent impact (loss of WOUS); an equal accompanying acreage of stream establishment was entered in the dataset to offset the loss resulting from the realignment, unless the record indicated differently (e.g., establishment of the same, less, or more waters in the new stream alignment.

(4) Recording Mitigation and Activities Increasing and/or Preserving WOUS:

(a) This study focused on compensatory mitigation required by special condition of DA authorizations and other forms of “gain” in WOUS acreage within the study area. It also includes an acknowledgement of preservation (which does not result in a gain of WOUS acreage, however does afford more protection against future potential impacts) that was required in association with Regulatory actions. A “gain” in WOUS involves establishment and/or re-establishment of waters, most typically wetlands. For this dataset, compensatory mitigation requirements were recorded in catch-all waters categories for establishment/re-establishment or preservation types of mitigation. Other types of mitigation not resulting in new acreage of WOUS were also recorded, as described below.

(b) If permanent project impacts were known for a Regulatory action, and compensatory mitigation was obviously required, but the acreage of the compensatory mitigation was unknown, the assumption was made that compensatory mitigation consisted of establishment of an in-kind aquatic resource type at a 1:1 ratio (e.g., if permanent impacts to 1 acre of wetlands was authorized, it was assumed that the compensatory mitigation requirement was for the establishment/re-establishment of 1 acre of wetlands).

(c) The CLR dataset did not include the location of compensatory mitigation, thus no assumptions were made about mitigation location.

(d) Other types of compensatory mitigation (e.g., enhancement) were recorded in an “other mitigation” category, including associated acreage.

(e) As a combination of the higher-resolution and lower-resolution datasets, the CLR dataset is mixed in terms of documenting mitigation

required by the USFWS. Records associated with the higher-resolution dataset were reviewed for applicable USFWS-related mitigation. Records associated with the lower-resolution dataset (as described in Section 6.b[3][b]) were not reviewed for applicable USFWS-related mitigation. As a result of the mixture of both types of records in the CLR dataset, any query done for purposes of this study on that dataset would under represent USFWS-related mitigation.

(f) If a Regulatory action contained "as-built" drawings for compensatory mitigation, the acreage of WOUS reported on the as-builts was recorded for mitigation, rather than the mitigation acreage required by the action's authorization. The as-builts were assumed to provide the most accurate record of mitigation results, if available.

(g) All mitigation was assumed to have been completed and to be functioning successfully (e.g., constructed, or mitigation bank credits purchased). Resource limitations prevented confirming the compliance status of mitigation across the data set (see also Section 9 of this document).

(5) Treatment of mitigation sites including mitigation banks and permittee-responsible mitigation sites: Please see Section 6.c(5).

(6) Treatment of linear projects: Please see Section 6.c(6).

(7) Treatment of Related Regulatory actions: Please see Section 6.c(7).

7. Cumulative Impact Results: From the beginning of the Corps' record (1979) to 2013, 1627 Regulatory actions were reviewed for this analysis. After the initial data culling procedures described in Section 6.a, the number of actions eligible for inclusion in the study dropped to 1400. These actions are in turn related to 540 unique project numbers. The majority of these were permit actions. Other fairly common actions included pre-application, UAs, and mitigation bank development.

In accordance with the study's two datasets, higher-resolution and CLR, results are presented separately for each. Results for past and present projects are presented for each dataset (the CLR dataset serves as the most comprehensive summary; results are not additive between the two datasets). Results for reasonably foreseeable projects are presented in the format of just the CLR dataset (again, as the most complete summary). An acknowledgment of limited impacts and mitigation documented in the record using alternative quantifications (e.g., cubic yards, dollars) or types of activity (e.g., enhancement of WOUS) are also presented in the format of just the CLR dataset.

A summary of the types (e.g., NWPs) of past and present, and reasonably foreseeable Regulatory actions resulting in a loss of WOUS is provided just for the CLR dataset, since it is the most comprehensive of the two datasets.

a. Past and Present Projects - Higher-resolution Dataset:

(1) Summary of delineated acres: Delineated acres for past and present projects in the higher-resolution dataset includes approximately 1,190 acres of wetlands, 309 acres of streams, 124 acres of other types of waters, and 5 acres of "unknown" (total of 1627 acres) (**Table 3, Appendix B**).

(2) Summary of loss of WOUS: For past and present projects in the study area, the Corps has authorized the placement of fill material (resulting in permanent loss of WOUS) into approximately 218 acres of WOUS (**see Table 3**). This includes approximately 152 acres of wetlands, 46 acres of streams, 18 acres of other types of waters, and 2 acres of "unknown." Loss of WOUS in and out of the UDA is summarized in **Table 3**; approximately 89% (193 acres) of loss of WOUS as a result of Regulatory projects occurred within the UDA, and 11% (25 acres) of loss of WOUS occurred outside the UDA. As noted in the methods section, this analysis did not address temporary impacts that did not result in the loss of WOUS.

(3) Summary of Activities Increasing and/or Preserving WOUS for past and present projects: Information by aquatic resource types is summarized in **Table 3**.

(a) Acres of WOUS established/re-established ("gained" acreage): A total of 496 acres of WOUS (all types) were established/re-established, including: 97 acres inside the UDA, 275 acres outside of the UDA (but in the study area), 58 acres outside of the study area, and 66 acres in unknown locations. This represents all types of mitigation, including banks and other types of mitigation sites (see Section 6.c[5] and **Table 3**). The total of 496 acres of established/re-established WOUS associated with Regulatory projects is considered to be the most reliable minimum "gained" acreage of WOUS for purposes of this study, due to the consideration of double-counting discussed in Section 6.c(5).

Of establishment/re-establishment in known locations (430 acres; all types), 97 acres (22.6%) of WOUS were established/re-established within the UDA, and 333 acres (77.4%) of WOUS were established/re-established outside of the UDA either in, or out of the study area. Considering only wetlands (other types of waters are also shown on **Table 3**), of a total of 399 acres with known location information, 74 acres (18.7%) of wetlands were established/re-established within the UDA, and 324 acres (81.3%) of wetlands were established/re-established outside of the UDA, either in or out of the study area.

(b) Acres of WOUS preserved (no "gain"): A total of 422 acres of WOUS (all types) were preserved (219 acres in, and 130 acres outside of UDA) as a result of all types of mitigation, including banks (and other types of) mitigation sites (see Section 6.c[5]) (see **Table 3**). In addition to the 130 acres preserved outside of the UDA, another 21 acres were preserved outside of the study area, and 52 acres were preserved in unknown locations (based on the extent of file information; this includes the potential to be located outside of the study area). The total of 422 acres of preserved WOUS associated with Regulatory projects is considered to be the most reliable minimum preserved acreage of WOUS, due to the consideration of double-counting discussed in Section 6.c(5). Some additional insights into this data include:

Of WOUS preservation in known locations (370 acres; all types), 219 acres (59.3%) of WOUS were preserved in the UDA, and 151 acres (40.7%) of WOUS were preserved outside of the UDA and either in, or out of the study area. Considering only wetlands (other types of waters are also shown on **Table 3**), of a total of 315 acres with known location information, 172 acres (54.8%) of wetlands were preserved within the UDA, and 142 acres (45.2%) of wetlands were preserved outside of the UDA, either in or out of the study area.

(4) Net gain/loss of WOUS as a result of past and present projects within the study area associated with Regulatory projects[14]: Considering the above-described results, as summarized in **Table 3**, there has been approximately 218 acres of loss of (all types of) WOUS, and 496 acres of gain (establishment/re-establishment) of (all types of) WOUS. Therefore, there has been a net gain of approximately 278 acres of WOUS within the study area associated with past and present Regulatory projects (**Table 3**).

Specific to types of WOUS, wetlands exhibited a net gain of 313 acres, streams a net loss of 18 acres, other types of waters a net loss of 16 acres, and "unknown" types of waters, zero net loss. The data show a distinct pattern of net loss within the UDA, and in the case of wetlands, net gain outside of the UDA (both in and out of the study area). Within the UDA, there was a net loss of 59 acres of wetlands. Outside of the UDA (both in and out of the study area), there was a net gain of 307 acres of wetlands. Loss of streams and other types of waters within the UDA does not appear to be offset by gains in these types of waters outside of the UDA. Implications may include the relative difficulty of creating/restoring streams and other waters to offset permanent loss.

[14] Note: The net gain/loss assessment is limited to Regulatory actions, not a study-area wide analysis of baseline WOUS conditions (for example, based on remote sensing using National Wetland Inventory maps, and/or a series of historical aerial images. The assessment is limited in applicability to the Regulatory actions reviewed for this study. See also Section 8 of this document (Limitations).

b. Past and Present Projects - CLR Dataset

(1) Summary of delineated acres: Delineated acres for past and present projects in the CLR dataset includes approximately 2766 acres of WOUS (per Section 6.d[2][a], WOUS are not separated into aquatic resource types). Please see the CLR dataset results summary in **Table 4** (**Appendix B**).

(2) Summary of loss of WOUS: For past and present projects in the study area, the Corps has authorized the placement of fill material (resulting in permanent loss of WOUS) into approximately 772 acres of WOUS (all types; per Section 6.d[2], WOUS are not separated into aquatic resource types). Loss of WOUS within and outside of the UDA is summarized in **Table 4**; approximately 82.4% (636 acres) of loss of WOUS as a result of Regulatory projects occurred within the UDA, and 17.7% (137 acres) of loss occurred outside of the UDA. **Figure 3** (**Appendix A**) shows the "impact intensity" within the study area. This is a GIS-generated visualization, combining the geographic "density" of Regulatory projects and relative level of impact to WOUS associated with the projects.

Due the size of this study, and the fact that one project number may contain several Regulatory actions, it is not practicable to accurately report results in terms of the number of permits or other applicable actions. However, a summary of the types (e.g., NWPs) of past and present Regulatory actions, and the relative contribution of the type of Regulatory action to loss of WOUS, can be accurately described. For past and present projects, of the 772[15] acres of loss of the WOUS:

(a) SP actions resulted in 607 acres of loss of WOUS;

(b) Letter of Permission (LOP) actions resulted in 17 acres of loss of WOUS;

(c) NWP actions resulted in 147 acres of loss of WOUS;

(d) UA actions resulted in 2 acres of loss of WOUS.

Table 5 (**Appendix B**) summarizes some alternative quantifications of impacts to WOUS (e.g., reported in linear feet or cubic yards) associated with Regulatory projects. This information is provided for completeness as it was documented during review of Regulatory actions.

(3) Summary of Activities Increasing and/or Preserving WOUS for past and present projects:

[15] Due to rounding, the below acreages when added, total 773 acres; this is noted as a rounding issue, not a mathematical error.

(a) Acres of WOUS established/re-established ("gained" acreage): A total of 1,137 acres of WOUS (all types) were established/re-established as a result of all types of mitigation, including banks and other types of mitigation sites (see Section 6.d[4]). This is considered to be the most reliable minimum "gained" acreage of WOUS, due to the consideration of double-counting discussed in Section 6.c(5). Please note that as described in Section 6.d(4)(c), the CLR dataset did not include georeferencing of mitigation location, thus mitigation-related WOUS acreage gains are not described relative to being in/out of the UDA.

(b) Acres of WOUS preserved (no "gain"): A total of 996 acres of WOUS (all types) were preserved as a result of all types of mitigation, including banks and other types of mitigation sites (see Section 6.d[4]). This is considered to be the most reliable minimum preserved acreage of WOUS, due to the consideration of double-counting discussed in Section 6.d(5). Please note that as described above, the CLR dataset did not include georeferencing of mitigation location, thus mitigation-related WOUS acreage preservation is not described relative to being in/out of the UDA.

Table 5 summarizes some other forms of compensatory mitigation for impacts to WOUS associated with Regulatory projects. This information is provided for completeness as it was documented during review of Regulatory actions.

(4) Net gain/loss of WOUS as a result of past and present projects associated with Regulatory projects: Considering the above-described results, approximately 773 acres of loss of WOUS and 1,137 acres of gain (establishment/re-establishment; preserved acreage of waters does not contribute to gain, thus is not considered), there has been a net gain of approximately 365 acres of WOUS as a result of past and present Regulatory projects (**Table 4**). Geographic patterns associated with net gain/loss were not assessed for the CLR dataset (assessment was only conducted for loss, as noted above).

c. Reasonably Foreseeable Projects - CLR Dataset

(1) Preliminary review was conducted for approximately 44 projects obtained from the ORM2 database as potentially reasonably foreseeable projects. As a result of the review, 36 projects were determined to indeed be reasonably foreseeable. The remaining 8 projects were determined to be too speculative, not meeting one or more of the parameters for reasonably foreseeable projects summarized in Section 5.b; these 8 projects were thus determined not to be reasonably foreseeable.

(2) Summary of loss of WOUS: The results of reviewing the reasonably foreseeable projects are presented in **Table 6** (**Appendix B**). If all of the reasonably foreseeable projects are implemented, available file information

indicates that there would be a loss of up to 349 acres of WOUS (all types), consisting of 193 acres (55%) inside the UDA, and 156 acres (45%) outside the UDA.

Due the size of this study, and the fact that one project number may contain several Regulatory actions, it is not practicable to accurately report results in terms of the number of permits or other applicable actions. However, a summary of the types (e.g., NWPs) of reasonably foreseeable Regulatory actions, and the relative contribution of the type of Regulatory action to loss of WOUS, can be accurately described. For reasonably foreseeable projects, of the up to 349 acres of projected loss of the WOUS:

(a) SP actions, if all projects are implemented, would result in up to 203 acres of loss of WOUS;

(b) Pre-application actions, if all projects are implemented, would result in up to 128 acres of loss of WOUS;

(c) UA actions, if resolved with the documented loss of WOUS available in the project records, would be confirmed as resulting in up to 17 acres of loss of WOUS.

(3) Summary of "gain" and preservation of WOUS: Available file information indicates that to offset the loss of WOUS described above, 398 acres of WOUS (all types) would be established/re-established, and 248 acres of WOUS (all types) would be preserved (**Table 6**).

(4) Net gain/loss of WOUS attributable to reasonably foreseeable Regulatory projects: As shown in **Table 6**, available file information indicates that there would be 47 acres of net gain of WOUS (all types) if all 36 reasonably foreseeable projects were implemented. Geographic patterns associated with net gain/loss were not assessed for the CLR dataset (assessment was only conducted for loss, as noted above).

(5) There were 18 reasonably foreseeable projects with at least 1 acre of projected[16] loss of waters (range = 1 to 128 acres; average = 22 acres, median = 10 acres), as summarized in **Table 7** (**Appendix B**). If all 18 of these reasonably foreseeable projects are implemented in the future, approximately 350 acres of WOUS may be permanently lost.

(6) In addition to available file information that was reviewed in order to project anticipated "gain" and preservation of WOUS associated with reasonably foreseeable projects, an assumption is made that based on the requirements of mitigation-related regulations found in 33 CFR 332, and the EPA's Section 404(b)(1) Guidelines (40 CFR 230), future projects authorized by the Corps would require avoidance and minimization of

[16] Based on current design; future modifications of project design could alter impact estimates.

WOUS to the maximum extent practicable. For unavoidable discharges of fill material into WOUS, it is expected that compensatory mitigation for the loss of the functions of WOUS within the study area would be required. Commensurate with guidance found in the Corps' mitigation regulations, the required mitigation ratio would generally be at least 1:1.

(7) In addition to the projects already known and reviewed for this study, the Regulatory Program receives permit applications for projects (of various sizes) without having any prior knowledge regarding the project's planning. Thus, it is anticipated that an as-of-yet unknown variety of actions (e.g., residential, commercial and infrastructure) will be proposed in the future within the study area, resulting in additional impacts to WOUS that have not been projected as part of this study.

8. Limitations of this Cumulative Impact Analysis: This study was conducted to estimate the "loss of WOUS" in the study area resulting from Regulatory actions in the past, present and reasonably foreseeable future. The following limitations apply to this study:

a. This analysis covers actions identified within the Corps' database, and does not include impacts that occurred without a permit (or associated investigation of a potential unauthorized activity), or other activities that occurred within the knowledge of the Corps', impacts that occurred as a result of exempt activities in accordance with 33 CFR 323.4 (i.e. normal farming practices), impacts that occurred prior to the enactment of the Clean Water Act, or impacts that occurred after the passage of the Clean Water Act, but before information was documented in the Corps' database (see Section 5.b).

b. The data set for this analysis was queried in January 2013. As such, it represents a recent "snapshot" of past and present actions, but would not account for every project that was authorized from 2013 to present, particularly if the action was a new (i.e., 2013 or 2014) action rather than a pending action present in our database when the query was completed in 2013.

c. To the best of our knowledge, reasonably foreseeable projects that meet the inclusion criteria for the CIA have been included in this analysis. The Regulatory Program conducts pre-application meetings and receives new permit applications on nearly a weekly basis, therefore there will inevitably be certain projects that are "in the pipeline" that are not included within this study.

d. This analysis did not take into account relative functions or services of either lost or mitigation WOUS, only acreages. Nor did it take into account potential adverse impacts to functions/services of waters that were temporarily impacted or otherwise not "lost." Related, due to limitations in wetland nomenclature (see Sections 6.c[2][a] and 6.d[2]), impact/mitigation distinctions were not made between seasonal wetlands and "vernal pool" types of seasonal wetlands. Although non-vernal pool seasonal wetlands often provide potential habitat for

vernal pool plant and animal species, not all seasonal wetlands provide these habitats.

e. This analysis assumes that compensatory mitigation has been completed and is successfully functioning, inclusive of mitigation banks from which credits have been purchased, mitigation by purchase of ILF credits, and/or permittee-responsible mitigation. The breadth of this analysis did not offer the ability to confirm mitigation compliance status on a case-by-case basis. However, part of the Corps' Regulatory Program involves mitigation compliance, and it is known that at any given time, there are projects that have been authorized whose associated mitigation has not yet met full compliance. See also Sections 6.c(4)(i) and 6.d(4)(g).

f. This analysis only looks at Corps Regulatory projects, and only evaluates cumulative impacts to WOUS. It does not evaluate any other factors (e.g. air quality, traffic, etc) which may have cumulative impacts, nor does it take into consideration the actions of other agencies.

g. Since this analysis looks only at Corps Regulatory projects (i.e., not inclusive of Corps Civil Works projects), involving an extensive effort due to the study area's size and level of activity in the Sacramento area, it does not include a full baseline assessment of inventoried waters, for example, the USFWS's National Wetland Inventory (NWI) (www.http://www.fws.gov/wetlands/) and/or the (regionally-based) Six County Aquatic Resources Inventory (SCARI) (www.http://mapping.sacog.org/scari/). The Corps assumes that future users of this analysis can incorporate a remote sensing baseline inventory and draw relevant comparisons.

9. Appendices:

a. **Appendix A:** Figures

b. **Appendix B:** Tables

c. **Appendix C:** Geodataset (Electronic Appendix)

PREPARED BY:

Mary R. Pakenham-Walsh — 9/4/14
Mary R. Pakenham-Walsh
Senior Project Manager, CA South Branch
Date

Zachary J. Fancher — 9/4/14
Zachary J. Fancher
Project Manager, CA North Branch
Date

REVIEWED BY:

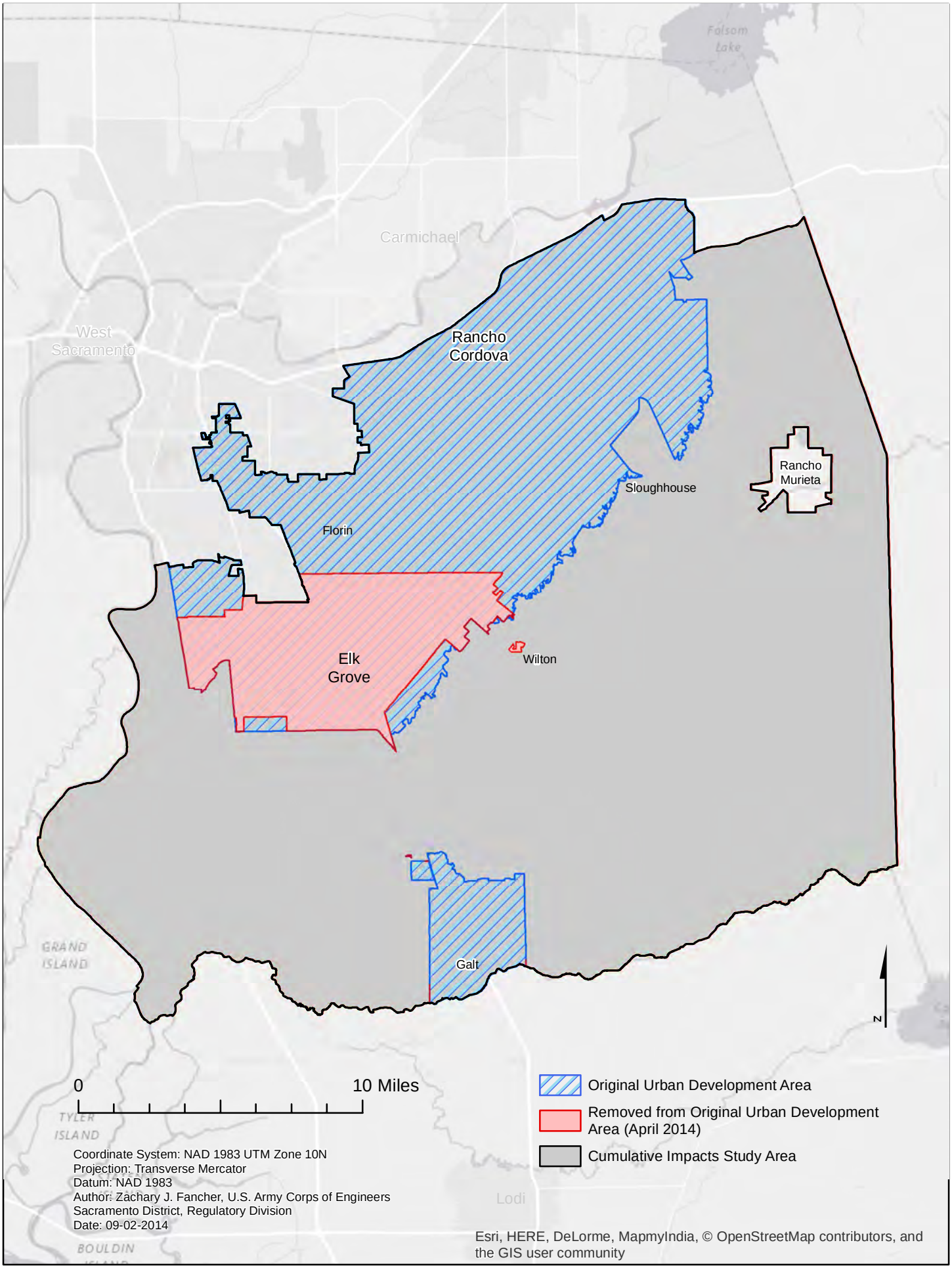
Lisa M. Gibson — 9/4/14
Lisa M. Gibson
Senior Project Manager, CA South Branch
Date

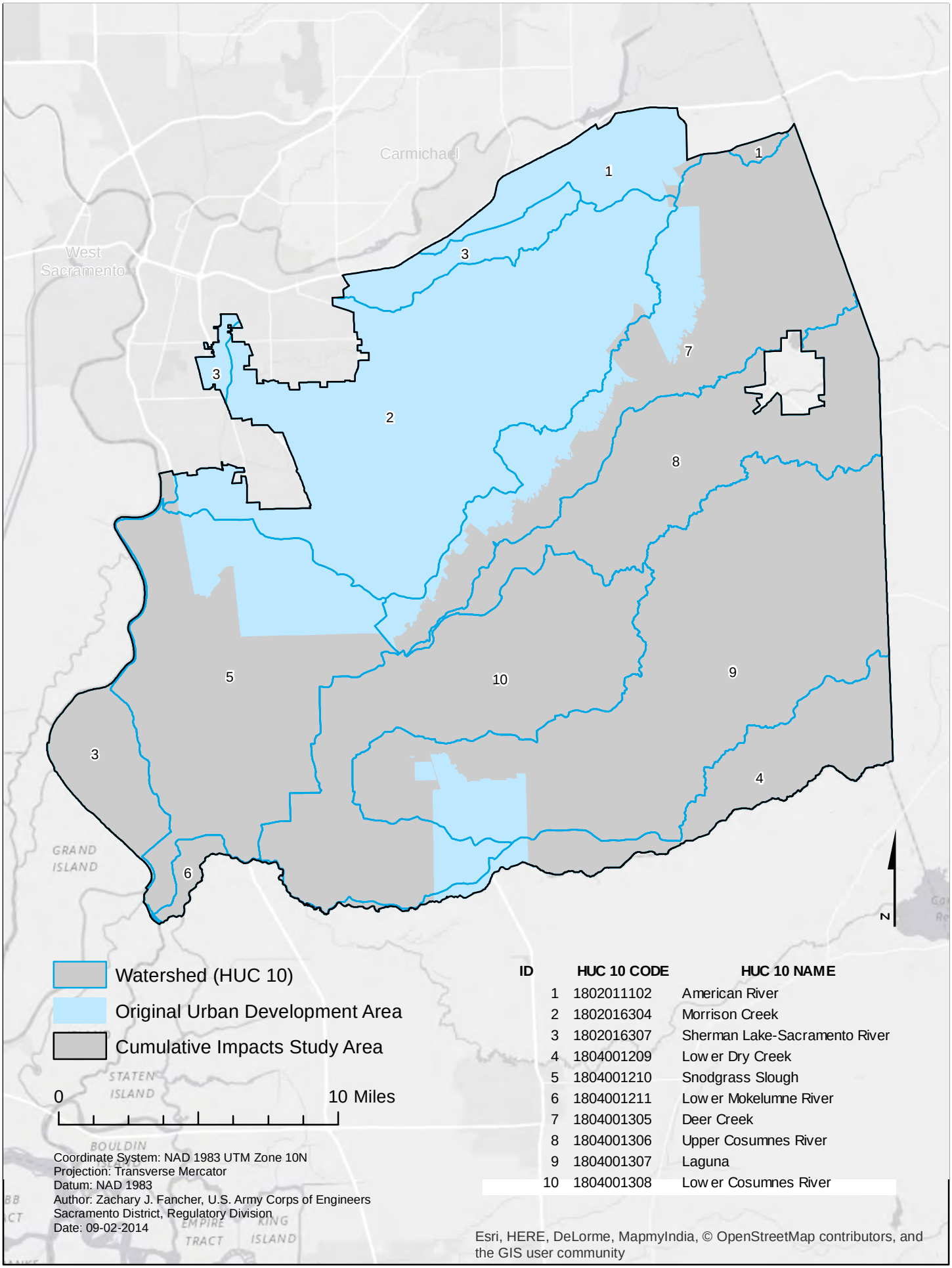
REVIEWED AND APPROVED BY:

4 Sept 2014
Kathleen A. Dadey
Chief, CA South Branch
Date

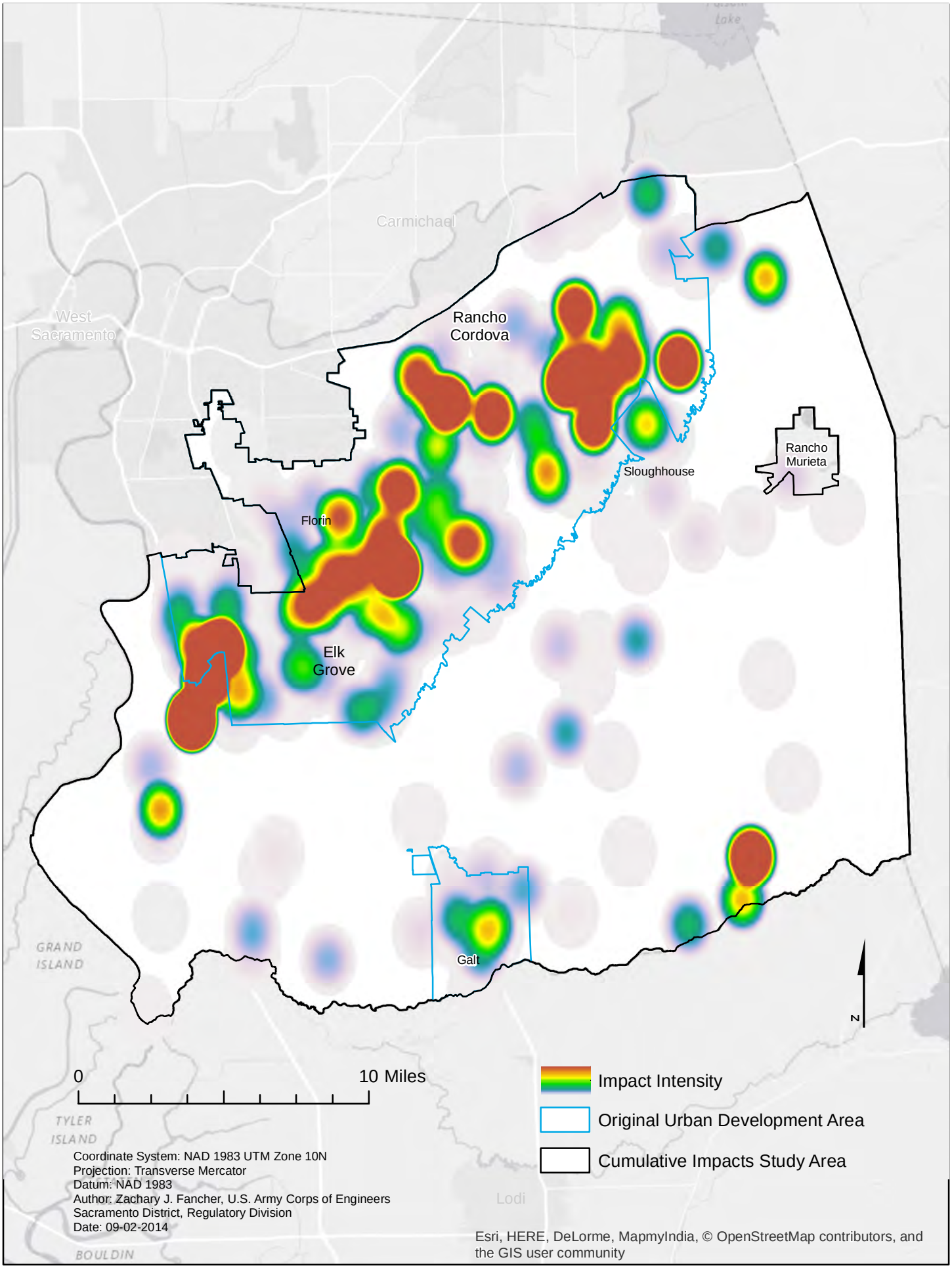
APPENDIX A

FIGURES


Folsom Lake
Carmichael
West Sacramento
Rancho Cordova
Rancho Murieta
Sloughhouse
Florin
Elk Grove
Wilton
Galt
GRAND ISLAND
TYLER ISLAND
BOULDIN
Lodi
N
0
10 Miles
Original Urban Development Area
Removed from Original Urban Development Area (April 2014)
Cumulative Impacts Study Area
Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: NAD 1983
Author: Zachary J. Fancher, U.S. Army Corps of Engineers
Sacramento District, Regulatory Division
Date: 09-02-2014
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community



ID	HUC 10 CODE	HUC 10 NAME
1	1802011102	American River
2	1802016304	Morrison Creek
3	1802016307	Sherman Lake-Sacramento River
4	1804001209	Lower Dry Creek
5	1804001210	Snodgrass Slough
6	1804001211	Lower Mokelumne River
7	1804001305	Deer Creek
8	1804001306	Upper Cosumnes River
9	1804001307	Laguna
10	1804001308	Lower Cosumnes River


Carmichael
West Sacramento
Rancho Cordova
Rancho Murieta
Sloughhouse
Florin
Elk Grove
Galt
GRAND ISLAND
TYLER ISLAND
BOULDIN
Lodi
N
0
10 Miles
Impact Intensity
Original Urban Development Area
Cumulative Impacts Study Area
Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: NAD 1983
Author: Zachary J. Fancher, U.S. Army Corps of Engineers
Sacramento District, Regulatory Division
Date: 09-02-2014
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

APPENDIX B

TABLES

Table 1: Higher-Resolution Dataset Data Categories

Category (As Termed in Database)	Description
DA Number	Dept. of the Army File number associated with action
Past and Present or Reasonably Foreseeable	Appropriate time category for action
Action Status - Finalized, Pending or Withdrawn	Status of action in Regulatory Program
Permit or Action Type	Type of action, e.g., NWP, LOP
Project Name	Project name that is associated with the action
Isolated or Non-Jurisdictional Waters Present (Y/N)	Y/N on isolated or other non-jurisdictional waters associated with the action (all water types)
Isolated or Non-Jurisdictional Waters Total Acres	If isolated or other non-jurisdictional waters present, the acreage
Delineated Acres Stream Linear	Acreage of delineated stream features, including ditches
Delineated Acres Wetland	Acreage of delineated wetlands (including vernal pools)
Delineated Acres Other	Acreage of delineated other types of waters, including but not limited to ponds
Delineated Acres Unknown Resource (Water) Type	Acreage of delineated waters of an unknown type
Permanent Impact Not a Loss Present (Y/N)	Y/N if action involved a permanent impact that did not result in a loss of WOUS
Permanent Impact Not a Loss Total Acres	If a permanent impact did not result in a loss of WOUS, the impact acreage was reported here (all water types)
Loss Acres Stream Linear	Acreage of loss of stream (including ditches) types of WOUS
Loss Acres Wetland	Acreage of loss of wetland types of WOUS
Loss Acres Other	Acreage of loss of other types of WOUS
Loss Acres Unknown Resource Type	Acreage of loss of unknown types of WOUS
ILF Compensation Acres Stream Linear	Acreage of ILF compensation in the form of stream types of WOUS
ILF Compensation Acres Wetland	Acreage of ILF compensation in the form of wetland types of WOUS
Creation Mitigation Acres Stream Linear	Acreage of establishment (creation) and/or re-establishment (restoration) of stream types of WOUS
Creation Mitigation Acres Wetland	Acreage of establishment (creation) and/or re-establishment (restoration) of wetland types of WOUS
Creation Mitigation Acres Other	Acreage of establishment (creation) and/or re-establishment (restoration) of other types of WOUS
Creation Mitigation Acres Unknown Resource (Water) Type	Acreage of establishment (creation) and/or re-establishment (restoration) of unknown types of WOUS
Creation Relative to UDA (In/Out/Unknown)	Acreage of establishment (creation) and/or re-establishment (restoration) in/out/unknown location relative to UDA

Table 1: Higher-Resolution Dataset Data Categories

Category (As Termed in Database)	Description
Preservation Mitigation Acres Stream Linear	Acreage of preservation of stream types of WOUS
Preservation Mitigation Acres Wetland	Acreage of preservation of wetland types of WOUS
Preservation Mitigation Acres Other	Acreage of preservation of other types of WOUS
Preservation Mitigation Acres Unknown Resource Type	Acreage of preservation of unknown types of WOUS
Preservation Relative to UDA (In/Out/Unknown)	Acreage of preservation in/out/unknown location relative to UDA
Specifics for Mitigation Not in Other Categories	Notes field for mitigation not in other categories

Table 2: Complete Lower-Resolution (CLR) Dataset Data Categories

Category (As Termed in Database)	Description
DA Number	Dept. of the Army File number associated with action
Past and Present or Reasonably Foreseeable	Appropriate time category for action
Action Status - Finalized, Pending or Withdrawn	Status of action in Regulatory Program
Permit or Action Type	Type of action, e.g., NWP, LOP
Project Name	Project name that is associated with the action
Isolated or Non-Jurisdictional Waters Present (Y/N)	Y/N on isolated or other non-jurisdictional waters associated with the action (all water types)
Isolated or Non-Jurisdictional Waters Total Acres	If isolated or other non-jurisdictional waters present, acreage (all water types)
Delineated Acres WOUS	Acreage of delineated WOUS (all water types)
Permanent Impact Not a Loss Present (Y/N)	Y/N if action involved a permanent impact that did not result in a loss of WOUS
Permanent Impact Not a Loss Total Acres	If a permanent impact did not result in a loss of WOUS, the impact acreage was reported here (all water types)
Loss Acres WOUS	Acreage of loss of WOUS (all types)
Creation Mitigation Acres WOUS	Acreage of establishment (creation) and/or re-establishment (restoration) of WOUS (all water types)
Preservation Mitigation Acres WOUS	Acreage of preservation of WOUS (all water types)
Specifics for Mitigation Not in Other Categories	Notes field for mitigation not in other categories
Alternative Impact Quantifications	Recorded alternative impact quantifications (e.g., reporting in cubic yards instead of acreage)

Table 3: Higher-Resolution Dataset Results Summary (Past and Present Projects)

Data Category	Type of Water				
	Wetlands	Streams (Acres)	Other Types of Waters	Unknown (UK)	Total: All Water Types
Delineated Acres					
In UDA:	405.38	153.46	64.02	0.10	622.95
Out UDA:	783.51	155.38	60.28	4.50	1003.68
Total:	1188.89	308.84	124.30	4.60	1626.63
Acres of Loss					
In UDA:	133.74	41.16	18.26	0.01	193.16
Out UDA:	17.98	4.89	0.01	1.80	24.68
Total:	151.72	46.05	18.27	1.81	217.84
Acres of Impact (Not a Loss)					
In UDA:	N/A	N/A	N/A	N/A	0.96
Out UDA:	N/A	N/A	N/A	N/A	6.85
Total:	N/A	N/A	N/A	N/A	7.81
Acres Loss Isolated/Non-Jurisdictional Waters					
In UDA:	N/A	N/A	N/A	N/A	35.30
Out UDA:	N/A	N/A	N/A	N/A	0.96
Total :	N/A	N/A	N/A	N/A	36.26
Mitigation					
Acres Restoration/Creation					
In UDA:	74.66	20.21	2.17	0.00	97.04
Out UDA:	272.04	1.37	0.00	1.80	275.21
Out of Study Area:	52.51	5.20	0.10	0.00	57.80
Location Unknown:	65.08	1.13	0.00	0.00	66.21
Total:	464.28	27.91	2.27	1.80	496.26
Mitigation					
Acres Preservation					
In UDA:	172.40	38.85	8.06	0.00	219.30
Out UDA:	121.44	3.34	4.89	0.00	129.67
Out of Study Area:	20.90	0.00	0.00	0.00	20.90
Location Unknown:	52.33	0.00	0.00	0.00	52.33
Total:	367.08	42.19	12.95	0.00	422.21
Acres ILF Mitigation					
Total:	7.64	0.27	0.00	0.00	7.91
Acres Net Gain/Loss					
In UDA:	-59.08	-20.95	-16.09	-0.01	-96.12
Out UDA (In Study Area):	254.06	-3.52	-0.01	0.00	250.53
Out UDA (In + Out of Study Area):	306.57	1.68	0.09	0.00	308.34
***Total (All Locations):**	320.21	-17.86	-16.01	-0.01	286.33

*** These figures are not location-dependent. "Total" equals all restoration/creation whether location is known or unknown, plus ILF mitigation, minus all loss whether in or out of the UDA.**

Table 4: Complete Lower-Resolution (CLR) Dataset Results Summary (Past and Present Projects)

Data Category	All Types of Waters (ac)
Delineated Acres	
In UDA:	1396.93
Out UDA:	1368.92
Total:	2765.85
Acres of Loss	
In UDA:	635.83
Out UDA:	136.66
Total:	772.49
Acres of Impact (Not a Loss)	
In UDA:	0.97
Out UDA:	7.13
Total :	8.10
Acres Loss Isolated/Non-Jurisdictional Waters	
In UDA:	75.27
Out UDA:	0.96
Total:	76.23
Mitigation	
Total Acres Restoration/Creation:	1137.22
Total Acres Preservation:	996.00
Acres Net Gain (Total acres Restoration/Creation) - (Total acres loss jurisdictional waters):	364.73

Table 5: Complete Lower-Resolution (CLR) Dataset Alternative Impact Quantifications and "Other" Types of Mitigation (Past and Present Projects)

Alternative Impact Quantifications*		
Amount	**Unit**	**Type**
6000	Linear Feet	Dredge/Excavation in Stream
1940	Linear Feet	Impact Not Loss (Rip-Rap/Bulkhead) to Stream
2652	Cubic Yards	Dredge/Excavation in Stream
915	Cubic Yards	Fill in Stream
55,000	Cubic Yards	Fill in Unknown Water Type
997	Tons	Rip-Rap in Stream
"Other" Types of Mitigation Quantifications*		
Amount	**Unit**	**Type**
$2,100	U.S. Dollars	Stone Lakes Wildlife Fund for GGS Habitat Creation
2.248	**	Fund for Creating Wetland
0.834	**	Fund for Preserving Wetland
0.387	**	Credits OR Fund for Creating Wetland
0.592	**	Credits OR Fund for Preserving Wetland
1.321	Acres	Rehabilitate Wetland Out of UDA
1.113	Acres	Rehabilitate Stream Out of UDA
4.74	Acres	Enhance Wetland In UDA
430.65	Acres	Enhance Wetland Out UDA
0.473	Acres	Enhance Stream In UDA
16.91	Acres	Enhance Stream Out UDA
2.708	Acres	Riparian Habitat Out UDA
1.38	Acres	Splittail Shallow Water Habitat Out of UDA

* Each row is a separate and distinct impact, unrelated to any other row.

** Unit is assumed to be representative of acres mitigation.

Table 6: Reasonably Foreseeable Projects Summary (Complete Lower-Resolution [CLR] Dataset)

Data Category	All Types of Waters (ac)
Estimated Acres Loss of WOUS	
In UDA:	192.96
Out UDA:	155.63
Total:	348.59
Proposed Mitigation	
Total Acres Restoration/Creation:	395.32
Total Acres Preservation:	255.04
Acres Net Gain:	46.73

Table 7: Reasonably Foreseeable Projects with Projected Loss of At Least One Acre

Project Name	Estimated Impacts (Loss) - Waters of the U.S. (ac)
Capital Southeast Connector	127.60
Mather Specific Plan (Multiple Projects)	48.28
Cordova Hills	39.63
Arboretum	30.13
Excelsior Estates	28.77
Suncreek EIS	19.13
The Ranch at Sunridge	10.48
Stoneridge Quarry	10.42
Calosso Property - UA	10.29
Teichert - Aspen VIII & IX	4.95
East Sacramento Ranch	4.48
Clay Station Properties, LLC - UA	4.00
Vineyard Investors Associates - UA	3.33
Teichert Aggregates Quarry	3.15
Douglas Jaeger Widening	1.51
Emerald Estates	1.06
Total:	**347.22**

APPENDIX C

GEODATABASE

EIS/EIR APPENDIX A-3

Higher-Resolution Dataset;
Projects from 1999 to 2013

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
199000244		Finalized	NWP 26	HACKARD-MULLANEY LAND INVESTMENTS	Same as Shadowbrook (1999-110, 2003-105). Delineation for all of these is included here only.			0.42	0.57					0.42	0.32					0.42	0.47			IN						
199000244		Finalized	NWP 26 Inclusion	HACKARD-MULLANEY LAND INVESTMENTS	Row for addl off site mit.			0	0	0	0										0.4			UK						
199900060		Finalized	LOP	FRANKLIN BLVD/THORNTON RD BRIDGE REPLACE	Approx half of project is in study area. Affects wetlands. Mokolumne, south side of study area. 0.74 "riparian habitat" credits and 1.38 shallow water hab credits for splittail both OUT STUDY AREA.			2.23	1.27					0.22	0.34															0.74 "riparian habitat" credits and 1.38 "shallow water habitat" credits for splittail both OUT STUDY AREA
199900069		Finalized	NWP 26	REMINGTON ESTATES	Records Holding 1037120. There is a BO.			0.75	0.13					0.75	0.13						0.75			UK						
199900069		Finalized	NWP 26 Inclusion	REMINGTON ESTATES	Row for FWS reqd mit			0	0	0	0										0.13			UK		0.26			UK	
199900110		Finalized	NWP 26	SHADOWBROOK SUBDIVISION	See 199000244. This is the same project, delineated acres are included in 199000244, not here. FWS mitigation was the only mitigation. All contents of this file have been transferred to 200700602.			0	0	0	0				0.257						0.257			OUT		0.514			IN	
199900110		Finalized	NWP 26 Inclusion	SHADOWBROOK SUBDIVISION	Row for GGS amendment (33% used). Fund.			0	0	0	0																			0.09 (Create wet) GGS FUND
199900118		Finalized	NWP 26	HARRIS RANCH	This project is the same as 1999-00312. Data is recorded here, but 99-00312 is likely the current file number (all it contains is a modification). There is an indication that applicant wanted to put remainder of wetland on-site into a preserve, but there is no record of vehicle to do so, therefore no on-site preservation was recorded here. Records Holding 1037122				13.33						0.96						0.63			OUT						
199900118		Finalized	NWP 26 Inclusion	HARRIS RANCH	Row for FWS reqd mit			0	0	0	0										0.33			OUT		1.82			OUT	
199900195		Finalized	PREAPPCONS	COSUMNES CORRECTIONAL FACILITY FENCE	No action in record.			0	0	0	0																			
199900200		Finalized	NWP 14	MATHER SANITARY SEWER SYSTEM REHAB	No physical records. Sec 7 consult was initiated, for 0.06 permanent and 4.6 indirect, to (wet). No response or further info in record. Conservative estimate of FWS reqd mit was logged, but is actually uk.				4.66						0.06															
199900200		Finalized	NWP 14 Inclusion	MATHER SANITARY SEWER SYSTEM REHAB	Row for assumed 1:1, 2:1 FWS reqd mit.			0	0	0	0										0.06			UK		0.12			UK	
199900212		Finalized	NWP 12	LAGUNA CREEK WATERLINE CROSSING - AKT	Temp impacts only.			0.3																						
199900299		Finalized	SP	GRANT LINE ROAD/SR 99 INTERCHANGE IMPROV	See 200701064. Impact and delineation info is confusing. Best estimates made from conflicting sources.			0.073	1.547					0.073	1.3512					0.09	2.54			OUT STUDY AREA						
199900299		Finalized	SP Inclusion	GRANT LINE ROAD/SR 99 INTERCHANGE IMPROV	Row for FWS reqd mit.			0	0	0	0										0.89			UK		1.78			UK	
199900299		Finalized	SP PERMITMOD	GRANT LINE ROAD/SR 99 INTERCHANGE IMPROV	Delineated a combo of temp and permanent impacts.			0.046						0.033							0.04			OUT STUDY AREA						
199900312		Finalized	NWP 26	HARRIS RANCH	Same project as 1999-00118. Data is recorded there, though this number is likely the current file number. Records Holding 1037128			0	0	0	0																			
199900412		Finalized	NWP 26, 7	BOND ROAD FAMILY FITNESS CENTER OUTFALL	Records Holding 1037130. FWS mit is only mit. 0.04 perm imp (wet) not a loss.				0.04			Y	0.04								0.01			UK		0.02			UK	
199900412		Finalized	NWP 26, 7 Inclusion	BOND ROAD FAMILY FITNESS CENTER OUTFALL	Row for GGS mit (33.3% used), but was to be paid into PRES fund.			0	0	0	0																			0.03 (Preserve Wet) paid into GGS FUND
199900436		Finalized	NWP 7	LIVE OAK NORTH DRAINAGE IMPROVEMENT	Records Holding 1037132			0.94						0.94						1.01				IN						
199900437		Finalized	NWP 26	SUMMERGATE PROPERTY NWP 26 REQUEST	Records Holding 1037132. FWS mit was only mit.				0.31						0.31						0.31			UK		0.62			UK	
199900439		Finalized	NWP 26	OAK BROOK APARTMENT COMPLEX-SPANOS,FOLSO	Delineation is estimated, from impacts.				0.02						0.02															
199900449		Finalized	UNAUTHACT	HOBDAY ROAD AND WOODS ROAD HOUSE CONSTRU	No Further action. Records Holding 1037132				4.242						0.112															
199900459		Finalized	NWP 26	RIO CONSUMES CORRECTIONAL PERIMETER	Records Holding 1037133. FWS mit was only mit reqd.				0.72						0.26						0.046			UK		0.092			UK	

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
199900501		Finalized	NPR	RANCHO SECO PHOTOVOLTAIC EXPANSION	X			0	0	0	0																			
199900516		Finalized	SP	ELK GROVE CREEK DRAINAGE	File on shelf.			6.8	0.43					0.81	0.044					1				IN		3.07			IN	
199900516		Finalized	SP Inclusion	ELK GROVE CREEK DRAINAGE	Row for FWS reqd mit, for SP.			0	0	0	0										0.044			UK		0.202			UK	
199900534		Finalized	NWP 26	SHELDON POINTE, UNIT #2 - SACRAMENTO CO	X				0.18						0.18															
199900590		Finalized	SP	Rio Del Oro - EIS	Addl 12.224 wet, and 0.721 other, isolated. All filled.	Y	12.945	5.145	47.947	3.54				3.3	21.7	2.9					13.288			IN	10.88	58.14	7.13		IN	2.98 (wet) enhance IN
199900590		Finalized	SP Inclusion	Rio Del Oro - EIS	Row for addl Corps Reqd mit.			0	0	0	0										13			OUT						
199900618		Finalized	NWP 7	SHADOWBROOK OUTFALL, SACRAMENTO CO	Records Holding 1037169. No info in electronic files. Outfall considered 0.002 perm impact (str), not a loss.			0.002				Y	0.002																
199900653		Finalized	SP	FRANKLIN MEADOWS PROPERTY	Records Holding 1037170.			0.06	0.03	0.98				0.06	0.03	0.98					1.04			OUT						
199900653		Finalized	SP Inclusion	FRANKLIN MEADOWS PROPERTY	Row for FWS reqd mit.			0	0	0	0										0.03			OUT		0.06			OUT	
199900712		Finalized	SP	SILVER SPRINGS EAST (LOT P)	This project appears completed in ORM, but I believe was actually denied (confusion here). 2005-00325 is the "new" version of this file, but all actions currently withdrawn. Check to make sure no data is double counted between these two. Also, 2000-00780 is the mitigation property on which the creation mit would be performed for Lot P. There were previously existing wetlands onsite - check if these should be included as pres mit, and that they are not double counted.				10.78						10.78						10.78			OUT STUDY AREA		20			OUT STUDY AREA	
200000006		Finalized	NWP 26	MATHER AIRPORT CARGO EXPANSION	Records Holding 1037174. KATE SAID IGNORE. FWS mit was only mit. Note, delineated acreage includes all of 1997-00650. DO NOT put delineated acres in 1997-650.			0.62	1.11						1.01						1.01			OUT		2.1			IN	
200000025		Finalized	SP	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	See 2003--00550. JD record unclear. Record extremely convoluted. Best available info. Non jurisdictional acreage AT LEAST 0.91 acres (wet). Portions of the delineated and impact figures may be outside SSHCP boundary, but isolating those figures is too difficult.	Y	0.91	19.467	64.717					1.894	11.761					1.408	8.407			OUT STUDY AREA						
200000025		Finalized	SP Inclusion	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	Row for addl. Corps mit.			0	0	0	0										0.972			IN						
200000025		Finalized	SP Inclusion	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	Row for addl. FWS mit.			0	0	0	0									2.75				OUT STUDY AREA						
200000025		Finalized	SP Inclusion	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	Row for addl. Corps mit.			0	0	0	0									1.13	10.1135			UK						
200000055		Finalized	UNAUTHACT	KOSCHNER PROPERTY	No significant discharge. Closed.			0	0	0	0																			
200000085		Finalized	NWP 14, 3	UNION PACIFIC RAILROAD GALT TO NEED	Records Holding 1037177. Only mitigation was FWS mit.			1.47	0.6					1.25	0.222						1.72			OUT		3.44			OUT	
200000085		Finalized	NWP 14, 3 Inclusion	UNION PACIFIC RAILROAD GALT TO NEED	Row for GGS mit (30% used)			0	0	0	0										0.51			OUT STUDY AREA						
200000147		Finalized	NWP 26	BEAZER-MCGEE PROPERTY	Data is estimated based on applicant proposal. BO unavailable. Corps did not require mit in addition to FWS requirements.				0.067						0.067						0.067			UK		0.134			UK	
200000163		Finalized	NWP 14	FOLSOM BLVD. WIDENING	Records Holding 1037179			0.013	0.081						0.035						0.06			UK						
200000163		Finalized	NWP 14 Inclusion	FOLSOM BLVD. WIDENING	Row for acreage increase via culvert construction.			0	0	0	0										0.009			IN						
200000203		Finalized	LOP	SHELDON ESTATES PROJECT	File Loc UK, no regulator assigned. A BO exists, but no copy available., Reqmts UK. Logged data from best available info. Conservative estimate of 1:1, 2:1 FWS reqd mit used.			0.732	0.576						0.576										0.732				IN	
200000203		Finalized	LOP Inclusion	SHELDON ESTATES PROJECT	Row for FWS reqd mit. Conservative estimate of 1:1, 2:1 FWS reqd mit used.			0	0	0	0										0.576			UK		1.152			UK	

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200000227		Finalized	NWP 39	SADDLE CREEK AND PRINGLE AVENUE	File Loc UK, no regulator assigned. There is a BO, reqmts UK. Logged data from best available info.			0.47						0.47						0.47					OUT					
200000232		Finalized	NWP 14	KNUTSON ROAD	Records Holding 1037193.				0.095						0.095						0.095				UK		0.19			UK	
200000244		Finalized	UNAUTHACT	ABEID PROPERTY	Vountary Restoration. Temp impact only. Records Holding 1037194. Delineated acres estimated from temp impact.				0.01												0.01				UK						
200000251		Finalized	PREAPPCONS	SUNRIDGE 530 (fka SUNRIDGE VILLAGE & PEERY-ARRILLAGA)	Same as 2004-00707. FRC box 077-2013-0772_6_of_10. Confusing because one SP was supposedly complete, yet everything else including all 2004-00707 have been withdrawn.			0	0	0	0																				
200000260				STRAWBERRY CREEK REALIGNMENT AT CALVINE	DA Number not found, File Loc UK.			0	0	0	0																				
200000298		Finalized	NWP 27	CONSUMNES RIVER SALMONID BARRIER PROJECT	FRC box 077-2013-0772_7_of_10. Temp impacts only. No mit in record. Unable to determine delineated area (no figure for temp impacts. Zeroed, as data unavailable.			0	0	0	0																				
200000332		Finalized	PREAPPCONS	WAEGELL FAMILY RANCH - TRAXLER'S HILL	X			0	0	0	0																				
200000403		Finalized	NWP 3, 33	LAGUNA CREEK PIPELINE	Records Holding 1037198. Appears all impacts temporary, no special conditions.			0.03																							
200000426		Finalized	NWP 13	MAHON LEVEE STABILIZATION	Records Holding 1037199. Str impacts only, 225 linear feet rip-rap is only info. 0.0268 perm impact (str) considered not a loss. Reveg is only mitigation. Delineated figure 225 x 160 (channel width), converted to acres. Impacts figure comes from assumed 1 cy per linear foot (1x5.197x5.197), so surface area is 5.197x225= 1169 sq ft.			0.83				Y	0.0268																	
200000445		Finalized	NWP 39	KAPALUA ESTATES	On-site str acres is net increase via widened channel. Newly widened channel is preserved also, total of 2.56 acres.			0.98	0.22						0.22					1.58				IN	0.98				IN	
200000445		Finalized	NWP 39 Inclusion	KAPALUA ESTATES	Row for Corps reqd off site mit.			0	0	0	0										0.47			OUT STUDY AREA						
200000470	RF	Pending	DEVMBA	NICOLAUS RANCH-W.FLINT MITIGATION AREA	Addl 1.6 acre pond, and 0.04 acre ditch non-jurisdictional. Creation acres are still proposed at time of this recording.	Y	1.64	1.93													36.75				OUT						
200000501		Finalized	NWP 3, 33	COSUMNES RIVER PIPELINE	Records Holding 1037202. Temp impacts only, to 200 linear feet of (str). Multiplied by channel width at location (85ft) to get rough acreage.			0.39																							
200000523		Finalized	PREAPPCONS	SUNRISE COMMUNITY PLAN/WETLANDS PRESERVE	No Records			0	0	0	0																				
200000634		Finalized	NWP 23	HWY. 16 GAP CLOSURE PROJECT	In study area. Records Holding 1037205.				0.364	0.014					0.088	0.014					0.18				OUT						
200000635		Finalized	SP	WRIGHT PARK (FKA TRIBUTARY POINTE)	Creation component likely satisfied both FWS and Corps reqs (VP creation).				1.49						0.42						0.42				UK		1.07			IN	
200000635		Finalized	SP Inclusion	WRIGHT PARK (FKA TRIBUTARY POINTE)	Row for FWS reqd mit.			0	0	0	0																3.22			UK	
200000636		Finalized	NWP 39, 7	ELK GROVE UNIFIED SCHOOL DISTRICT/ALBIAN	Unclear how much of onsite preserve is what resource type. It is known that there are wet and str features in preserve, so total acres resources were divided by 2.			0.3	0.3					0.01	0.08				0.09								0.16	0.16			IN	
200000636		Finalized	NWP 39, 7 Inclusion	ELK GROVE UNIFIED SCHOOL DISTRICT/ALBIAN	Row for FWS reqd mit.			0	0	0	0										0.08				UK						0.16 (Preserve Wet) via CNLM Fund.
200000644		Finalized	NWP 39	KYLE'S READY MIX	FWS mit requirements only.			0.04	0.36						0.06						0.112				OUT		1.264			IN	
200100007		Finalized	SP	BRADSHAW 6 INTERCEPTOR	Only 2.13 temp impacts (Corps), but significant habitat impacts and mit (FWS). 0.4 (wet) Corps creation mit was covered by FWS mit.			3.39	4.23																						0.473 enhanc (str) in Morrison Creek Watershed (in/out?)
200100007		Finalized	SP Inclusion	BRADSHAW 6 INTERCEPTOR	Row for FWS reqd mit.			0	0	0	0										3.012				OUT		9.405			OUT	
200100007		Finalized	SP Inclusion	BRADSHAW 6 INTERCEPTOR	Row for FWS reqd GGS habitat. (33.3% used)			0	0	0	0										5.34				OUT						

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200100008		Finalized	UNAUTHACT	SILVA PROPERTY	Likely a violation that needs investigation. However, this action has been "temporarily closed due to no time or resources". 5 year limit has passed. Zeros logged, as there is no info to record.			0	0	0	0																			
200100012		Finalized	NWP 3	FLORES DAM REPAIR	File loc UK. Dam repair. For retention of fill, originally Unauth. Figures come from best available data.			0.16						0.16							0.16				UK						
200100041		Finalized	LOP	COSUMNES PRESERVE PARKING LOT & TRAIL	File Loc UK. There was compensatory mitigation, though unclear how much. Assumption made of 1:1 creation on Cosumnes Preserve lands. Potential FWS mit (if any) was not considered.						4.503						1.8					1.8	OUT						
200100046		Finalized	NPR	MEISS ROAD BRIDGE REMOVAL	X			0	0	0	0																			
200100048		Finalized	NWP 39, 7	PARKLAND/BUSTED FLAT RANCH-SACRAMENTO CO	Records Holding 1037210.				0.242						0.242						0.23			OUT						0.39 Riparian habitat OUT. Riparian habitat (not aquatic resource) was in lieu of buffers.
200100048		Finalized	NWP 39, 7 Inclusion	PARKLAND/BUSTED FLAT RANCH-SACRAMENTO CO	Row for FWS reqd mit.			0	0	0	0										0.01			OUT		0.02			IN	
200100062		Finalized	SP	POWELL PROPERTY / ROBBINS VILLAGE UNIT 4	File loc UK.				1.044	0.46					1.044	0.46					1.024			UK						
200100062		Finalized	SP Inclusion	POWELL PROPERTY / ROBBINS VILLAGE UNIT 4	Row for FWS and Corps Reqd mit.			0	0	0	0										0.004			UK		0.008			UK	
200100101		Finalized	SP	SUNRISE DOUGLAS 2 MASTER FILE	Appears this file is just a JD, impacts probably in other projects.			0	0	0	0																			
200100114		Finalized	SP	ZINFANDEL VILLAGES-SACRAMENTO CO	File loc UK.			0.82	1.21					0.29	1.21					0.09				IN	0.82				IN	
200100114		Finalized	SP Inclusion	ZINFANDEL VILLAGES-SACRAMENTO CO	Row for Corps reqd mit.			0	0	0	0										0.45			OUT						
200100114		Finalized	SP Inclusion	ZINFANDEL VILLAGES-SACRAMENTO CO	Row for Corps and FWS reqd mit.			0	0	0	0										4.84			UK		1.21			UK	
200100134		Finalized	NPR	EAST FRANKLIN SPECIFIC PLAN-SACRAMENTO	X			0	0	0	0																			
200100151		Finalized	NWP 39, 13	TAMARINDO SUBDIVISION	Records Holding 1037249.			1.83	0.137					0.028	0.103															0.748 riparian habitat OUT of STUDY AREA. Riparian habitat (not a wet resource) was in lieu of buffers.
200100151		Finalized	NWP 39, 13 Inclusion	TAMARINDO SUBDIVISION	Row for FWS reqd mit.			0	0	0	0										0.137			UK		0.274			UK	
200100154		Finalized	SP	TRIBUTARY POINT VILLAGE 4B, ROAD X'ING	RH 1037249. Delineated figure from impacts, since no other info is available.			0.07						0.07							0.07			OUT STUDY AREA						
200100177		Finalized	NWP 14	FOLSOM SRA-GRANITE BAY RECREATIONAL	File loc UK, Will? Electronic record sparse.						0.099						0.006													
200100184				KIEFER LANDFILL BUFFER LANDS	No ORM, electronic or paper record. Extensive research cannot find evidence of this Project # or file.			0	0	0	0																			
200100195		Finalized	SP	WILDHAWK/DUNMORE PROPERTY	File Loc UK. FWS mit served as Corps reqd mit.				1.83						1.83						1.83			UK		3.66			UK	
200100223		Finalized	PREAPPCONS	SACRAMENTO STORMWATER MAINTENANCE	File Loc UK. No electronic or ORM data.			0	0	0	0																			
200100230		Finalized	SP	Sunridge Specific Plan Properties EIS - SUNRIDGE VILLAGE	FWS mit served as Corps reqd mit.			0.22	1.88	0.89				0.22	1.88	0.89					3.38			OUT		9.18			IN	
200100252		Finalized	SP	SUNRIDGE PARK (AKA RONENBERG PROPERTY)	FWS mit served as Corps reqd mit.			0.42	1.58					0.28	1.53						3.39			OUT	0.12	0.07			IN	
200100252		Finalized	SP Inclusion	SUNRIDGE PARK (AKA RONENBERG PROPERTY)	Row for addl Corps reqd mit.			0	0	0	0															10.4			IN	
200100263		Finalized	NWP 29	MCNAIR PROPERTY	Records Holding 1037252. Data is currently best of available electronic info.				2.3						0.01						0.01			OUT						
200100307		Finalized	NWP 5	DELTA CROSS CHANNEL FLOW MONITORING STA	Records Holding 1037253. No impacts, no delineation record.			0	0	0	0																			
200100403		Finalized	NWP 39	MEADOWS RANCHETTES	ATF			0.795	0.736					0.066	0.144						0.32			OUT STUDY AREA	0.702	0.588			IN	
200100403		Finalized	NWP 39 Inclusion	MEADOWS RANCHETTES	Row for FWS reqd mit. (GGS 33.3%)			0	0	0	0																			0.171 (create wet) FUND. GGS 33.3%
200100407		Finalized	NWP 7	EMERALD PARK COMPANY UNIT 22	0.03 perm imp (str) not a loss.			0.03				Y	0.03																	
200100434		Finalized	SP	R&B ELK GROVE GILLIAM GAP CHANNEL DEVEL.	5.38 (wet) isolated, will be filled. File location UK, Finan? Delineation not available. Delineation figures are estimated from impacts figures.	Y	5.38	4.76	4.42	0.69				4.76	4.42	0.69					11.67			UK						
200100434		Finalized	SP Inclusion	R&B ELK GROVE GILLIAM GAP CHANNEL DEVEL.	Row for FWS reqd mit.			0	0	0	0										3.58			UK		7.16			UK	
200100435		Finalized	SP	QUAIL RIDGE / FORMERLY BILBY 105	0.03 (wet) isolated. File location UK. Best info available.	Y	0.03	0.82	1.37					0.82	1.37						1.75			UK						

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200100435		Finalized	SP Inclusion	QUAIL RIDGE / FORMERLY BILBY 105	Row for addl FWS reqd mit.			0	0	0	0										0.44			UK		0.88			UK	
200100441		Finalized	NWP 39	MATHER EAST	X			0.25	2.82					0.06	0.33						0.13			UK	0.19	2.49			IN	
200100441		Finalized	NWP 39 Inclusion	MATHER EAST	Row for corps and FWS reqd mit.			0	0	0	0										0.2			UK		1.6			UK	
200100447		Finalized	NWP 39	MOHAMED ACRES	Corps and FWS reqd mit were unified.				0.14						0.14						0.14			UK		0.28			UK	
200100448		Finalized	SP	MONTELENA DJ ENTERPRISES SUNRIDGE	1.23 acre non-jurisdictional (other) - will be filled. Includes previous project numbers 1994-00212, 1994-00211, 1994-00159, 1994-00158, 1994-00157, 1993-00406.	Y	1.23	0.02	15.28	1.17				0.019	10.047	1.167					19.31			OUT		9.12			IN	
200100491		Finalized	NPR	BONACCI PROPERTY	JD only			0	0	0	0																			
200100531		Finalized	NWP 3	COSUMNES RIVER FLASHBOARD DAM REPAIR	0.227 perm imp (str) not a loss. Earlier NWP 3 exists, unable to determine from file what impacts were.			2.631				Y	0.227																
200100559		Finalized	SP	GALT RIVER OAKS	X			2.32	0.26					0.41	0.25						0.11			UK	1.94	0.01			IN	
200100559		Finalized	SP Inclusion	GALT RIVER OAKS	Row for the channel reroute creation acreage.			0	0	0	0									0.43				IN						
200100559		Finalized	SP Inclusion	GALT RIVER OAKS	Row for addl FWS and Corps reqd mit.			0	0	0	0										0.25			OUT		0.5			UK	
200100562		Finalized	SP	EAST FRANKLIN NORTH DRAINAGE	X			7.8						0.51						1.78				IN						
200100562		Finalized	SP Inclusion	EAST FRANKLIN NORTH DRAINAGE	Row for addl Corps reqd mit.			0	0	0	0										3.4			OUT						
200100562		Finalized	SP Inclusion	EAST FRANKLIN NORTH DRAINAGE	Row for FWS reqd mit. (0.51 GGS creation was fully aquatic)			0	0	0	0										0.51			UK						
200100584		Pending	SP	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Rows for this project are really SP MOD for a previously authorized SP. Figures are the most likely outcome. Since project was already authorized, considered complete, not RF. Modification is not yet completed. Figures deviate slightly from originally permitted SP.			0.4	11.41	14.64				0.03	6.17	1.88					5.05			OUT STUDY AREA	0.37	5.23			IN	
200100584		Pending	SP Inclusion	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Row for addl creation (increase in pond area). Proposed, not required.			0	0	0	0											2.08		IN						
200100584		Pending	SP Inclusion	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Row for addl Corps reqd mit.			0	0	0	0										8.57			OUT						
200100584		Pending	SP Inclusion	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Row for addl FWS reqd pres mit. Creation was covered via Corps create requirement.			0	0	0	0															12.54			OUT	
200100605		Finalized	NPR	GREGG RETAINING WALL	X			0	0	0	0																			
200100624		Finalized	PREAPPCONS	WILDLANDS SNODGRASS SLOUGH MITIGATION	Records Holding 1037258. No electronic records. ORM has no useful data. Preapp only.			0	0	0	0																			
200100633		Finalized	SP	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Addl perm imp 0.54 (wet) isolated	Y	0.54	1.6	8.58					1.6	4.24						4.33			OUT STUDY AREA		4.34			IN	
200100633		Finalized	SP Inclusion	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Row for addl Corps reqd mit.			0	0	0	0								2.59					IN		5.32			IN	
200100633		Finalized	SP Inclusion	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Addl row for addl Corps reqd mit.			0	0	0	0														4.13	1.4			IN	
200100633		Finalized	SP Inclusion	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Addl row for FWS reqd mit.			0	0	0	0															0.9			OUT STUDY AREA	0.45 Create wet (VP Conservation Fund)
200100641		Finalized	NWP 39	BACKER PROPERTY-LENNAR COMMUNITIIES	On-site preservation acreage is assumed to be remainder of resources after impact. No specific info in file.			0.34						0.13							0.13			OUT	0.21				IN	0.83 (Riparian Habitat) credit, OUT uda
200100708		Finalized	NWP 39	BISHOP RANCH SUBDIVISION	X			0.26	0.04						0.04										0.26				IN	
200100708		Finalized	NWP 39 Inclusion	BISHOP RANCH SUBDIVISION	FWS mit served as Corps reqd mit.			0	0	0	0										0.04			OUT		0.08			IN	
200100710		Finalized	SP	SMUD COSUMNES POWER PLANT	X			18.097	20.863	8.12				0.352	0.955						1.95			OUT STUDY AREA						
200100710		Finalized	SP Inclusion	SMUD COSUMNES POWER PLANT	Addl row for FWS reqd mit, including GGS creation mit. (33.3% rule used).			0	0	0	0										13.833			OUT		19.7			OUT	
200100710		Finalized	SP Inclusion	SMUD COSUMNES POWER PLANT	For addl Corps and FWS reqd mit. Note creation component satified both Corps and FWS vp mit requirements.			0	0	0	0										3			OUT STUDY AREA						
200100710		Finalized	SP Inclusion	SMUD COSUMNES POWER PLANT	Addl row for FWS reqd mit as per amended BO.			0	0	0	0										0.291			UK		0.196			UK	
200100744		Finalized	SP	GALAXIDAS/BILBY RANCH PROPERTY	X				0.39						0.39						0.39			OUT						
200100763		Finalized	NWP 32	Chester Drive Property	Creation mit component (on this line) satisfied both Corps and FWS requirements.				1.06	0.95					0.313	0.539					0.653			OUT STUDY AREA		0.747	0.411		IN	
200100763		Finalized	NWP 32 Inclusion	Chester Drive Property	Row for addl FWS reqd mit.			0	0	0	0										0.626			IN						
200200094		Finalized	NWP 14, 7	CHANCELLOR ESTATES	X			1.23						0.045						0.12				OUT STUDY AREA						

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200200236		Finalized	NWP 39	KINGSBRIDGE SUBDIVISION	X				4.48						0.43						1.07			OUT STUDY AREA		4.05				IN	1.76 (wet) enhanced IN
200200236		Finalized	NWP 39 Inclusion	KINGSBRIDGE SUBDIVISION	Row for FWS reqd mit.			0	0	0	0															4.25			IN	
200200402		Finalized	NWP 3	BLODGETT DAM REPAIR PROJECT	Impacts to (str), but how much is not clear. Also, no delineation. Logged as zeros, info not available.			0	0	0	0																			
200200410		Finalized	PREAPPCONS	NORTH VINEYARD STATION SPECIFIC PLAN	Pre-App only. Looking at projects 2003-00245, 2003-00251, 1993-00651.			0	0	0	0																			
200200487		Finalized	LOP	SUN RIVER PROPERTY / WETLAND RESTORATION				76.2	321.2						10.97					0.8	25.36			OUT					16.91 (str), and 319.15 (wet) enhanced OUT.
200200523		Finalized	NWP 39	R&B EAST MEADOW PROJECT	Creation mit credits satisfied both Corps and FWS requirements.				0.06						0.06						0.06			OUT STUDY AREA		0.12				IN	
200200527		Finalized	NWP 39	R&B ALBIANI PROPERTY	0.005 (wet) isolated. NFWF payment was accepted by FWS as suitable to meet their creation requirement. FWS preservation credits were put on this row.	Y	0.005		0.081						0.081				0.136								0.27			UK	
200200537		Withdrawn	SP	MORVAI PROPERTY-NORTH VINEYARD STATION	This permit appears to have been withdrawn for the time being. ORM does not reflect this. Delineation and impact info available.			0	0	0	0																			
200200538		Finalized	SP	SHELDON ROAD/STATE ROUTE 99 INTERCHANGE	X			0.307	2.423					0.17	0.5						1.14			OUT STUDY AREA						
200200538		Finalized	SP Inclusion	SHELDON ROAD/STATE ROUTE 99 INTERCHANGE	Row for addl Corps reqd mit.			0	0	0	0								0.19					IN						
200200538		Finalized	SP Inclusion	SHELDON ROAD/STATE ROUTE 99 INTERCHANGE	Row for addl FWS reqd mit.			0	0	0	0										1.101			UK		2.99			UK	
200200561	RF	Pending	EIS	MATHER FIELD MASTER EIS	See 200900880. Also, all permits withdrawn and are now part of 2009-00525 through 00530. Delineated waters for all of these projects is logged here.			10.14	80.5																					
200200568		Finalized	SP	Sunridge Specific Plan Properties EIS - DOUGLAS ROAD 98	X			0.08	3.83					0.08	3.83						3.91			OUT		7.82			OUT	
200200568		Finalized	SP Inclusion	Sunridge Specific Plan Properties EIS - DOUGLAS ROAD 98	Row for addl FWS reqd mit.			0	0	0	0															7.82			OUT	
200200577		Withdrawn	NWP	NGUYEN CHURCH	PM unable to contact applicant. Work (culvert through dry creek) likely completed without permit. No figures available to log.			0	0	0	0																			
200200589		Finalized	NWP 39	BRADSHAW VINEYARDS HOUSING	0.04 isolated (wet). Mary has file.	Y	0.04	0.255						0.001											0.254				IN	
200200589		Finalized	NWP 39 Inclusion	BRADSHAW VINEYARDS HOUSING	Row for FWS GGS mit (33.3% used) Paid into fund (how to log?			0	0	0	0																			0.212 (create wet) FUND. For GGS (33.3% used)
200200614		Finalized	UNAUTHACT	15-ACRE WOODS RD. PROJECT	Probably impacts, but closed as "no further action" in 2009. Delineation verified 1.23 acres (wet). include?? Decision NO.			0	0	0	0																			
200200634		Finalized	NWP 29	GARFOOT GREENS PROPERTY	FWS required additional mitigation, but Corps determined those areas of effect to be outside Corps project area. BO was not considered requisite to Corps verification. Addl FWS mit figures were not included.			2.07	0.004	0.13					0.004	0.13					0.134			OUT STUDY AREA						
200200637		Finalized	NWP 14, 39	VISTA CREEK VILLAGE PROJECT	Not clear what impacts were permanent. Defaulted to all permanent.				0.44						0.44						0.07			OUT STUDY AREA						
200200637		Finalized	NWP 14, 39 Inclusion	VISTA CREEK VILLAGE PROJECT	Row for FWS reqd mit.			0	0	0	0										0.37			UK		0.74			UK	
200200638	RF	Pending	SP	Emerald Estates	X				1.917						1.06						1.06			UK		0.85			IN	
200200638	RF	Pending	SP Inclusion	Emerald Estates	Row for addl Corps reqd mit. Note this figure was subtracted from FWS reqd preservation below. It appears Corps and FWS VP mits are not independent, but are part of same total.			0	0	0	0															2.12			UK	
200200638	RF	Pending	SP Inclusion	Emerald Estates	Row for FWS reqd mit. See note above for Corps reqd mit.			0	0	0	0															7.5			UK	
200200724		Finalized	NWP 39	BEAZER ELLIOTT RANCH EAST	X				0.26						0.26						0.26			OUT STUDY AREA						
200200727		Finalized	NWP 39	COVENTRY PROJECT	X			0.156	0.122						0.109				0.1											
200200727		Finalized	NWP 39 Inclusion	COVENTRY PROJECT	Row for FWS reqd mit.			0	0	0	0															0.06			IN	
200200728		Finalized	SP	WILDHAWK NORTH PROPERTY	0.65 isolated (other), 1.47 isolated (wet)	Y	2.12	4.56	2.8						2.38										4.56	0.42			IN	

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200200728		Finalized	SP Inclusion	WILDHAWK NORTH PROPERTY	Row for FWS reqd mit. Note creation component satisfies both Corp and FWS requirements.			0	0	0	0											4.41			UK		10			UK	
200200770		Finalized	NWP 39	CREEKSIDE UNIT NO. 4 PROPERTY	Preserve acreage approximate - no figure in record.				0.014						0.014				0.014							2.7				IN	
200200770		Finalized	NWP 39 Inclusion	CREEKSIDE UNIT NO. 4 PROPERTY	Row for FWS reqd mit.			0	0	0	0											0.014			UK		0.28			UK	
200200770		Finalized	NWP 39 Inclusion	CREEKSIDE UNIT NO. 4 PROPERTY	Row for FWS reqd mit (GGS) - 33.3% rule used.			0	0	0	0											0.25			UK						
200200773		Finalized	NWP 39	NEWTON RANCH 2	X				0.283						0.283							0.283			OUT STUDY AREA		0.566			IN	
200200782		Finalized	NWP 12, 33	LAGUNA INTERCEPTOR EXTENSION PROJECT	Large impact, all but 0.002 acre (wet) was temporary. Addl 5.67 acres temp impact to (wet).			1.28	55.52	19.14					0.002				5.67			0.22			IN						
200200782		Finalized	NWP 12, 33 Inclusion	LAGUNA INTERCEPTOR EXTENSION PROJECT	Row for FWS reqd mit. GGS habitat, 33.3% rule used.			0	0	0	0											1.502			UK						
200200788		Finalized	NWP 14, 33	BRADSHAW ROAD BRIDGE REPLACEMENT AT MORR	See 2003-00811. 0.373 acres of Morrison Creek was delineated as part of that project, but it was not included there (this project overlaps). Log that 0.373 here. Impacts to Morrison Creek (for this project) are supposedly 0.037 acres.			0.373						0.01															0.01 paid into Sac County Wetland Restoration Trust Fund (Create wet?)
200200808		Finalized	SP	SHELDON PLACE	Row for Sheridan portion of creation mit. Creation mit apparently met Corps and FWS requirements. FWS pres is also included in this row.				0.76						0.76							0.55			OUT STUDY AREA		1.52			OUT	
200200808		Finalized	SP Inclusion	SHELDON PLACE	Row for Clay Station portion of creation mit.			0	0	0	0											0.21			OUT						
200300048		Finalized	NWP 44	TEICHERT PRAIRIE CITY SITE	Creation mit apparently met Corps and FWS requirements. FWS pres is also included in this row.				0.22						0.22												0.8			IN	0.22 (create wet) Paid into CNLM fund.
200300105		Finalized	NWP 32	LAKEMONT DRIVE 8	See 1990-00244. Delineation figures are in that project. Also see 1999-00110. This project is just the violation impacts and resolution.			0	0	0	0				0.12				0.12												
200300111		Finalized	NWP 29	ALBIANI EXCELSIOR ROAD PROJECT	X				0.42						0.32							0.32			UK		0.1			IN	
200300111		Finalized	NWP 29 Inclusion	ALBIANI EXCELSIOR ROAD PROJECT	Row for FWS reqd mit.			0	0	0	0				0.32							0.32			IN		0.64			UK	
200300128		Finalized	NWP 14, 33	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Addl 0.456 acres (wet) non-jurisdictional. Also, Excavation (perm imp not loss) of 0.03 (str) and 0.04 (wet). Learned in another project (2005-01061) that THIS one inadvertently filled addl 0.05 acres wet. Only 0.02 of this was included in delineation for this project, so addl 0.03 wet was added to delineated field.	Y	0.456	0.15	0.33			Y	0.07	0.0008	0.138			0.015	0.209													
200300128		Finalized	NWP 14, 33 Inclusion	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Row for FWS reqd mit (vp)			0	0	0	0											0.076			OUT		0.042			IN	
200300128		Finalized	NWP 14, 33 Inclusion	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Row for FWS reqd mit (GGS) - 33.3% rule used.			0	0	0	0											0.969			OUT STUDY AREA						
200300128		Finalized	NWP 14, 33 PERMITMOD	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Row for inadvertant fill and acreage not included in original delineation.				0.03						0.05				0.05												
200300150		Finalized	UNAUTHACT	SACRAMENTO CONCRETE INC.	Appears resolved. No Corps documents in file...			0	0	0	0																			
200300164		Withdrawn	NWP	REC DIST NO. 800 COSUMNES RIVER MAINTNCE	Withdrawn because applicant decided mitigation not financially feasible. No new plan on record.			0	0	0	0																			
200300177		Finalized	UNAUTHACT	RICE PROPERTY	Resolved in 2000-00644			0	0	0	0																			
200300245		Pending	SP PERMITMOD	NORTH VINEYARD STATION DRAIN MASTER PLAN	Modification not complete. Adds addl delineated acres. A detention basin will be built, destroying waters. Since acreage of basin is unknown, creation figure comes from impacts.				1.19						0.086								0.086		IN						
200300245		Finalized	SP	NORTH VINEYARD STATION DRAIN MASTER PLAN				12.957	4.294	0.846				11.539	3.943	0.846				5.06	19.12			IN						
200300245		Finalized	SP Inclusion	NORTH VINEYARD STATION DRAIN MASTER PLAN	Row for Addl Corps and FWS reqd offsite mit			0	0	0	0											0.546			OUT						
200300245		Finalized	SP Inclusion	NORTH VINEYARD STATION DRAIN MASTER PLAN	Row for Addl Corps and FWS reqd offsite mit.			0	0	0	0											3.506			OUT STUDY AREA		1.815			IN	
200300251		Finalized	SP	VINEYARD CREEK	X			0.84	1.848					0.84	1.848							3.696			OUT						

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200300251		Finalized	SP Inclusion	VINEYARD CREEK	Row for FWS reqd mit. Creation component required by FWS appears to have been met with Corps reqd create component.			0	0	0	0																2.186			IN	
200300253		Finalized	PREAPPCONS	EAST ELK GROVE / TRIANGLE AREA	Info transferred to 1999-00516 Elk Grove Creek Drainage.			0	0	0	0																				
200300286		Finalized	NWP 29	FRANKLIN CROSSING (FKA SOUTH BILBY80	Authorization to fill remaining acres authorized by original NWP 39, work was not finished. No additional changes.			0	0	0	0																				
200300286		Finalized	NWP 39	FRANKLIN CROSSING (FKA SOUTH BILBY80	Addl 0.141 acre pond (other), and another 0.141 acre (str), delineated but non-jurisdictional.	Y	0.282	0.26						0.26								0.26			OUT STUDY AREA						
200300337		Finalized	SP	BRADSHAW ROAD WIDENING, FLORIN-CALVINE	See 2003-00626. Subtracted 0.0231 (wet) from this delineation as it was included in 2003-00626. Actual value delineated for (str) was not clear, so added temp and perm impacts to get figure. Addl 0.09 isolated (wet).	Y	0.09	0.494	1.6029					0.051	0.6081							0.659			UK						
200300337		Finalized	SP Inclusion	BRADSHAW ROAD WIDENING, FLORIN-CALVINE	Row for FWS reqd mit.			0	0	0	0											1.337			IN		3.524			OUT	
200300352		Finalized	UNAUTHACT	RISSLING PROPERTY VIOLATION	File not on shelf - Ness? No further action. No electronic records.			0	0	0	0																				
200300397		Finalized	RGP	ELK GROVE STREAM MAINT. GENERAL PERMIT	All impacts temporary. Previously permitted projects should include delineated waters for this area.			0	0	0	0																				
200300440		Finalized	PREAPPCONS	DOUGLAS BUISNESS PARK	No info in file.			0	0	0	0																				
200300550	RF	Pending	UNAUTHACT	VINEYARD INVESTORS ASSOCIATES VIOLATION	Settlement agreement not finalized. No mitigation figures. 1:1 creation mit assumption based on record. 2000-00025 impacted features on this site, but that project wasn't included in spreadsheet because of GIS geometry. If included later, remove SW4 (0.138), SW7 (2.271), and SWS1 (1.045) (all wet) from delineated figures HERE. Impacts to those features would be included in 2000-00025. THIS HAS BEEN DONE.			5.37	8.926	1.36				0.01	3.12	0.2				0.01	3.12	0.2		IN					
200300626		Finalized	LOP	TAYLOR PROPERTIES GERBER & BRADSHAW ROAD	See 2003-00337			0.082	0.9825						0.8787							0.8787			OUT						
200300626		Finalized	LOP Inclusion	TAYLOR PROPERTIES GERBER & BRADSHAW ROAD	Row for FWS reqd mit.			0	0	0	0											0.793			UK		0.9706			UK	
200300674		Finalized	NWP 14	NAVIGATOR MEMORIAL PHASE II @ MATHER	File missing, no electronic info. Not on shelf - Ness? (doesn't have it). Logged with zeros, as info was not retrievable.			0	0	0	0																				
200300675		Withdrawn	UNAUTHACT	HAGLER PROPERTY WETLANDS	No info in file			0	0	0	0																				
200300697		Withdrawn	NWP 14	SUNRIDGE SPECIFIC PLAN ROAD IMPROVEMENTS	Will believes this project would have been wrapped up into another Sunridge project(s). So, in a sense, not RF. Delineation and impact/project info available.			0	0	0	0																				
200300717		Finalized	NWP 12	MATHER GROUNDWATER SYSTEM	X			0.01						0.005								0.025			OUT STUDY AREA						
200300736		Finalized	NWP 13	MCCORMACK-WILLIAMSON TRACT EROSION REPAI	File not on shelf - Imamura does not have it. Impacts/delineated estimated. 0.2 acre (str) considered perm impact not loss.			0.2				Y	0.2																		
200300777		Finalized	NWP 39	SCHNITZER STEEL EXPANSION	X				0.17						0.167							0.167			OUT STUDY AREA						
200300796		Finalized	UNAUTHACT	AZIZ PROPERTY	May be violation, but never pursued. No additional info.			0	0	0	0																				

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200300811		Finalized	NWP 14, 33	BRADSHAW ROAD IMPROVEMENT JACKSON-FLORIN	Delineated does not include 0.373 acres of Morrison Creek (should get logged in 2002-00788). Mitigation includes restoration of 0.303 temp impacts (on-site) and off-site creation to mit for 0.101 acres perm impact. No data for off-site. Assumed in-kind, at Browns Creek VP preserve.			0.809	0.332					0.101						0.101				OUT						
200400012		Finalized	NWP 27	SOUTH STONE LAKE GGS MITIGATION PRESERVE	FWS required 4.4 acres GGS habitat (1.467 is 33.3%), which project self-mitigated. (ie, that acreage not available for other projects to use as mitigation).			1.33	0.73					1.33	0.01						1.467			OUT						
200400088		Finalized	NWP 39	EAST MEADOW III	X				0.016						0.016						0.016			OUT STUDY AREA						
200400091		Finalized	SP	WILDHAWK SOUTH PROPERTY	Addl 0.34 (wet) isolated. Feature filled.	Y	0.34		0.954						0.954						1.29			OUT STUDY AREA						
200400091		Finalized	SP Inclusion	WILDHAWK SOUTH PROPERTY	Row for FWS reqd mit. Creation component for GGS habitat (33.3% used), AND unclear if result is bank or fund.			0	0	0	0																			0.14 (create wet) Bank OR Fund. For GGS (33.3% used)
200400092		Finalized	NWP 39	BMD PROPERTIES EXPANSION PROJECT	No JD. Can only discern impacted waters.				0.03						0.03						0.1			OUT STUDY AREA						
200400126		Finalized	NWP 38	FRANKLIN FIELD LANDFILL CLOSURE	Note large difference between delineated and impacts.				71.38						0.042					0.042											
200400126		Finalized	NWP 38 Inclusion	FRANKLIN FIELD LANDFILL CLOSURE	Row for FWS reqd mit. Note: preservation acres probably paid into fund (known paid, but no record where).			0	0	0	0										0.022			OUT STUDY AREA						0.644 (Preserve wet), paid into FUND
200400181		Finalized	NWP 39	MERITAGE BRITSCHGI PROPERTY	Addl 0.061 (wet) non-jurisdictional. All filled.	Y	0.061	0.074	0.009					0.074	0.009						0.077			OUT						
200400182		Finalized	NWP 14, 33	BOND ROAD WIDENING	Note: NFWF req was in original permit, but not in modification. However, applicant had already paid into fund.			1.56	0.31					0.07	0.31			0.007		0.07	0.31			IN						
200400182		Finalized	NWP 14, 33 Inclusion	BOND ROAD WIDENING	Row for FWS reqd mit. Create component for GGS (33.3% used).			0	0	0	0										1.159			UK						
200400244		Withdrawn	SP	GAP SPECIFIC PLAN (AKA FLORIN-VINEYARD)	Inactive. Projects once part of this group have been reviewed separately.			0	0	0	0																			
200400254		Finalized	SP	LENT RANCH	0.042 (str) impacts occur off-site (but not on any other numbered project site). This figure has been included in impacts and delineated acres for this project.			1.624	2.066					1.533	1.482						3.015			OUT STUDY AREA		0.42			IN	
200400254		Finalized	SP Inclusion	LENT RANCH	Row for FWS reqd mit. Creation component for GGS habitat (33.3% used).			0	0	0	0										3			UK		0.908			IN	
200400255		Finalized	NWP 29	MORVAI NORTH					1.635						0.152						0.152			OUT STUDY AREA		1.483			IN	
200400255		Finalized	NWP 29 Inclusion	MORVAI NORTH	Row for FWS reqd mit. Note creation component identical to Corps requirement. Only recorded once above.			0	0	0	0															0.304			IN	
200400274		Withdrawn	NWP 39	NORTH VINEYARD GREENS UNIT #3	Inactive. This project # is wrapped up into 2006-00428.			0	0	0	0																			
200400281		Finalized	NWP 14, 33	LEWIS STEIN ROAD EXTENSION PROJECT	X			1.11	2.74					0.11	0.191			0.11	0.191											
200400281		Finalized	NWP 14, 33 Inclusion	LEWIS STEIN ROAD EXTENSION PROJECT	Row for FWS reqd mit. (GGS 33.3%)			0	0	0	0										3.06			OUT						
200400294		Finalized	UNAUTHACT	GRIMES PROPERTY	Closed, 5 years passed since Corps became aware of violation. The only info is 0.80 acres fill to wet and str.			0.4	0.4					0.4	0.4															
200400298		Finalized	NWP 7, 32	BELL SOUTH / SIERRA HOLDINGS	Incomplete ATF NWP. Note, data is taken from best info available. No Corps or FWS reqd mit could be recorded. Data in creation is on-site proposed. Project is probably complete, though no record of final permit exists.			2.442	0.358	1.538				0.22						1.04	1.31			IN						
200400303		Finalized	NWP 14	MATHER BIKE TRAIL	Delineation part of other projects. The only mitigation is FWS reqd preservation (wet).			0	0	0	0			0.004												0.112			UK	
200400339		Finalized	NWP 39	SYCAMORE GROVE	X				0.17						0.17				0.17										
200400350		Finalized	NWP 14	BRUCEVILLE WIDENING	ATF			0.02						0.02							0.02			OUT STUDY AREA						

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200400409		Finalized	NWP 39	BRADSHAW CHRISTIAN HIGH SCHOOL	Has not been constructed, mitigation has not been established. Applicant not content with permit conditions as of 2007. No file activity since then.			0.995	1.504						0.291						1.154			UK	0.995	1.213			IN	
200400431		Finalized	NWP 27	COSUMNES PRESERVE WETLAND ENHANCEMENT	1.65 acres (wet) impacts via movement of soil to create islands. Net gain of 0.5 (wet)				153.6						1.65						2.15			OUT						
200400435		Withdrawn	LOP	PANATTONI BUSINESS PARK	Only upland portion of project built. Applicant reapplied to fill wetlands, but never sent requested info. Corps withdrew.			0	0	0	0																			
200400458		Finalized	SP	Sunridge Specific Plan - Arista del Sol	Includes Grantline 220 proposed impacts and mitigation in figures. (See 2006-00604)			0.19	10.03	7.56				0.13	5.84	7.56				0.64				IN	0.05	3.71			IN	
200400458		Finalized	SP Inclusion	Sunridge Specific Plan - Arista del Sol	Row for Corps and FWS reqd mit. Mit was to be conducted in Mather Core Area if possible (IN).			0	0	0	0										10.1			IN		19.47			IN	
200400474		Finalized	LOP	VINEYARD MARKET SQUARE (BADELLA PROPERTY)	X			0.053	0.938					0.053	0.938						0.991			OUT						
200400474		Finalized	LOP Inclusion	VINEYARD MARKET SQUARE (BADELLA PROPERTY)	Inclusion for FWS required mit.			0	0	0	0										0.138			UK		0.276			UK	
200400515		Finalized	SP	Glenborough at Easton and Easton Place	Addl 2.111 (wet) and 2.594 (other) isolated. All isolated are permanently impacted. How to categorize? File contained no record of the actual used mit bank location. UK was added to field.	Y	4.705	11.843	10.743	0.575				2.161	2.265	0.057					5.283			UK	8.792	8.478	0.518		IN	
200400555		Finalized	SP	Bottimore Property	X			0.045	3.281					0.002	2.561						3.132			OUT						
200400555		Finalized	SP Inclusion	Bottimore Property	Row for FWS reqd mit.			0	0	0	0															0.882			OUT	
200400564		Withdrawn	NWP 39	STONE HOUSE ROAD ELEMENTARY SCHOOL	X			0	0	0	0																			
200400570		Finalized	NWP 39	Los Rios Community College District CRC Elk Grove Center Site	X				0.433						0.433						0.43			OUT						
200400629		Finalized	NWP 39	East Lawn Elk Grove Memorial Park Expansion Project	X			8.294	11.732						0.4						0.4			UK						
200400640		Finalized	NWP 27	LAGUNA TERRACE MITIGATION SITE	Creation/restoration figures extrapolated from existing waters vs explanation of acres created or restored. Unclear from documentation.			1.04	4.91					0.46																
200400640		Finalized	NWP 27 Inclusion	LAGUNA TERRACE MITIGATION SITE	Addl row for project activities.			0	0	0	0																			
200400640		Finalized	NWP 27 Inclusion	LAGUNA TERRACE MITIGATION SITE	Addl row for project activities.			0	0	0	0																			
200400763		Finalized	SP	CENTRAL GALT INTERCHANGE	0.124 acre (str) non jurisdictional.	Y	0.124	1.643	1.794					1.15	0.993					1.4				IN						
200400763		Finalized	SP Inclusion	CENTRAL GALT INTERCHANGE	Addl row for addl Corps reqd mit.			0	0	0	0										1.49			OUT						
200400782		Finalized	NWP 39	SECURITY PARK-GOLD FLAKE COURT	X				0.191						0.191				0.191											
200400782		Finalized	NWP 39 Inclusion	SECURITY PARK-GOLD FLAKE COURT	Row for FWS reqd mit.			0	0	0	0															0.786			IN	0.056 (Create wet) Fund OR credits
200400790		Finalized	NWP 29	HEDGE 22 PROPERTY (DEANE MCCOY ROAD)	Create component was called "VP habitat" by both FWS and Corps. No actual purchase records yet. FWS req was slightly greater but decision was made that FWS and Corps were asking for a single thing. Only the greater 0.291 acres was used for creation acres logged.				0.271						0.271						0.291			UK						
200400790		Finalized	NWP 29 Inclusion	HEDGE 22 PROPERTY (DEANE MCCOY ROAD)	See Above Note. Row for FWS reqd mit.			0	0	0	0															0.582			UK	
200400802		Finalized	NWP 27, 33	BROWNS CREEK MITIGATION SITE	X			2.2	12.23																					
200500137		Finalized	UNAUTHACT	LOW/OSTER PROPERTY	Voluntary Restoration, Though no record of post-restoration in file. 0.02 (wet) was filled. Use this proj as another example of "should we be counting delineated on projects with no impacts?"				0.02																					
200500221		Finalized	NWP 14, 33	FRANKLIN BOULEVARD WIDENING	Addl 0.12 isolated str.	Y	0.12	0.84	3.1					0.032				0.032												
200500221		Finalized	NWP 14, 33 Inclusion	FRANKLIN BOULEVARD WIDENING	Row for FWS reqd mit. Requirement for GGS was 0.6 preserve habitat, via fund OR preserve credit. Result uk. (33.3% is 0.2 wet)			0	0	0	0																			0.2 Preserve Wet via fund OR credit. (GGS, 33.3% rule used)
200500226		Finalized	NWP 14	GRANT LINE AND BOND ROAD INTERSECTION	X			0.35	0.105					0.35	0.04					0.56				IN						

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200500226		Finalized	NWP 14 Inclusion	GRANT LINE AND BOND ROAD INTERSECTION	Row for Corps reqd (wet) credits.			0	0	0	0											0.048			UK					
200500226		Finalized	NWP 14 Inclusion	GRANT LINE AND BOND ROAD INTERSECTION	Row for FWS reqd pres (wet) credits.			0	0	0	0														0.52			UK	
200500227		Finalized	PREAPPCONS	SUNRISE DOUGLAS ELECTRIC DISTRIBUTION	X			0	0	0	0																		
200500325		Withdrawn	SP	SILVER SPRINGS EAST (LOT P)	See 1999-00712. Data logged there.			0	0	0	0																		
200500371		Finalized	SP	INACTIVE RANCHO CORDOVA TEST SITE	Note all waters on-site were delineated in other projects, so no data has been logged here. No Impacts.			0	0	0	0																		
200500398		Finalized	NWP 39	WULF/ALVAREZ PROPERTY	X			0.3	0.15					0.3	0.15				0.028		0.422			UK					
200500398		Finalized	NWP 39 Inclusion	WULF/ALVAREZ PROPERTY	Row for FWS reqd mit.			0	0	0	0														0.3			UK	0.15 (creat wet) Bank OR Fund
200500438		Finalized	UNAUTHACT	8090 VINEYARD ROAD PROPERTY	Closed, no further action. Also, County may have required landowner to remove fill.			0	0	0	0																		
200500461		Finalized	NWP 3	LOST SLOUGH BRIDGE MAINTENANCE	Bridge maintenance, no impact.			0.002	0.05																				
200500516		Finalized	NWP 39	JAS-LARSON PROPERTY	0.07 temp imp only.				0.07										0.07										
200500525		Finalized	NWP 39	TRIANGLE POINT	See 201100033 and 200601045. 0.6 str and 0.44 wet delineated have been added to account for other projects that impact this site. Impacts for those are logged in their respective rows.			0.74	0.8					0.07	0.33						0.4			OUT					
200500531		Finalized	NWP 39	AMERICA'S CHOICE HIGH SCHOOL SITE	0.026 acres (wet) isolated.	Y	0.026		0.149						0.149				0.149										
200500531		Finalized	NWP 39 Inclusion	AMERICA'S CHOICE HIGH SCHOOL SITE	Row for FWS reqd mit.			0	0	0	0																		0.175 (create wet) fund, FWS VP creation account. 0.35 (Preserve Wet) Bank or fund
200500536		Finalized	NWP 29, 39	JACKSON PROPERTY	Actual delineated acreage lower, but applicant revised impacts and no new jd was performed.			0.43	0.035					0.43	0.035					0.438	0.035			OUT STUDY AREA					
200500575		Withdrawn	UNAUTHACT	PRINGLE, CHARLES	X			0	0	0	0																		
200500576		Finalized	UNAUTHACT	PRUITT, LLOYD	Closed. No Fill. No further action.			0	0	0	0																		
200500577		Finalized	NWP 14	GREENE, SCOTT	X				0.001						0.001														
200500588		Finalized	NWP 23	STATE ROUTE 16 AND EXCELSIOR ROAD SAFETY	X				1.06	0.16					0.45	0.16						0.74			OUT				
200500588		Finalized	NWP 23 Inclusion	STATE ROUTE 16 AND EXCELSIOR ROAD SAFETY	Row for FWS reqd mit. Note creation component is fund, not credits!			0	0	0	0														1.48			IN	0.74 create wet FUND
200500594		Finalized	NWP 39	PARKSIDE PROJECT ON ORANGE AVENUE	X				0.091						0.091						0.07			IN				
200500594		Finalized	NWP 39 Inclusion	PARKSIDE PROJECT ON ORANGE AVENUE	Row for addl Corps reqd mit.			0	0	0	0										0.056			UK				
200500594		Finalized	NWP 39 Inclusion	PARKSIDE PROJECT ON ORANGE AVENUE	Row for addl FWS reqd mit. Note, creation AND preservation may be by fund OR credits, can't tell.			0	0	0	0																		0.021 creat wet fund or credit. 0.042 preserv wet, fund or credit.
200500649		Pending	PREAPPCONS	SILVA RANCH MITIGATION SITE	Mitigation site for Anatolia (1901-10021)			0	0	0	0																		
200500652		Finalized	NWP 39	JAS - NORTH VINEYARD 10 PROPERTY	X				0.18						0.18				0.18										
200500652		Finalized	NWP 39 Inclusion	JAS - NORTH VINEYARD 10 PROPERTY	Row for FWS reqd mit. Creation may be by fund or credits, can't tell.			0	0	0	0														0.04			UK	0.02 Wet Creat may be by fund or credits.
200500674		Withdrawn	NWP 39	FLORIN-BRADSHAW 43	X			0	0	0	0																		
200500698		Finalized	NWP 14, 33	WILTON ROAD CULVERT REPLACEMENT PROJECT	Delineated from temp + perm impact acreages. Unable to determine split of resource acreages, so split evenly between wet and str.			0.14	0.14					0.045	0.045			0.045	0.045										
200500734		Finalized	UNAUTHACT	BRADSHAW INTERCEPTOR, SECTION 7	See 2009-00525 through 00530. All features are a part of larger Mather project. Delineated acres can be found there.			0	0	0	0				0.002			0.008	0.114										
200500734		Finalized	UNAUTHACT Inclusion	BRADSHAW INTERCEPTOR, SECTION 7	Row for FWS required mit.			0	0	0	0														0.74			OUT	0.18 funds placed in FWS VP (wet) creation acct.
200500750		Finalized	PREAPPCONS	MATHER AIRPORT AREA	KATE SAID IGNORE.			0	0	0	0																		
200500852		Finalized	PREAPPCONS	WESTBOROUGH AT EASTON	JD and project/impact info available in paper file. Did not go further than JD stage, don't know why.			0	0	0	0																		
200500883		Finalized	NWP 29	MARTIN PROPERTY PROJECT	Permit was reverified to combine FWS and Corps requirements for creation credits.				0.048						0.048						0.048			UK		0.096			UK	

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200500888		Pending	EIS	Suncreek Specific Plan _ Master File	One of Big Five. File exists as 6 other SPs: 200000414, 200600602, 603, 604, 605, and 200800795. All withdrawn at present (06/12/13).			0	0	0	0																			
200500902		Finalized	NWP 7	CITY OF GALT WASTEWATER OUTFALL	0.007 perm imp (wet) not loss				0.007			Y	0.007						0.007											
200500906		Finalized	NWP 3, 33	ELK GROVE OUTFALL PIPE MAINTENANCE	22 locations/permits, rows removed for clarity. 0.076 (str) impacts are for sediment removal, not a loss.			0.076				Y	0.076																
200500956		Finalized	PREAPPCONS	SHELDON/BRADSHAW ROAD EXPANSION PROJECT	NPR. JD Available.			0	0	0	0																		
200500958		Finalized	NWP 12	Elk Grove Water Service Pipeline	0.003 temp impacts only.				1.28																				
200500977		Finalized	UNAUTHACT	SMUD EMERGENCY 12 KV REPAIR, ELK GROVE	Closed. Voluntary restoration.			0	0	0	0																		
200500978		Finalized	NWP 3	LINE SECTION 9 PIPELINE ANOMALY REPAIRS	Resources are 'riparian wetland'. Temp impacts only. 0.04 preservation was FWS reqd for GGS (33.3%).					0.104												0.1		OUT STUDY AREA		0.04			UK	
200500990	RF	Withdrawn	SP	Kwan Elder Creek Estates Property	New PJD in, probably reasonably foreseeable. JD info available.			0.1						0.1						0.1				UK					
200501045		Finalized	UNAUTHACT	COYOTE HILLS PROJECT	Closed. No Fill. No further action.			0	0	0	0																		
200501046		Withdrawn	SP	MATSUOKA PROPERTY	Project has been chaged to vinyards not impacting WOUS.			0	0	0	0																		
200501061		Finalized	NWP 39	GRAMMERCY PARK SUBDIVISION	X				0.064						0.064				0.064										
200501102		Finalized	NWP 39	PACIFIC WEST LAGUNA RIDGE PROPERTY	Addl 0.0208 acre isolated (wet). 0.01 acre isolated (wet) was filled. Note mit is seasonal wet credits, though with SSHCP rules, filled ditches considered (str).	Y	0.0208	0.0809	0.0374					0.05							0.05			OUT STUDY AREA						
200501102		Finalized	NWP 39 Inclusion	PACIFIC WEST LAGUNA RIDGE PROPERTY	Inclusion for FWS required mit.			0	0	0	0										0.013			OUT STUDY AREA						
200501116		Finalized	SP	TRIANGLE ROCK EXPANSION FLORIN RD SOUTH	2.58 isolated pond. Of onsite created acreage, cannot determine exact acreage of newly created channel. Defaulted to 0.99 (amount of channel filled/realigned). FWS mit requirements were met through Corps reqd 0.15 wet creation credits.	Y	2.58	0.99	10.04					0.99	9.1					0.99	23.71			IN		0.96			IN	
200501116		Finalized	SP Inclusion	TRIANGLE ROCK EXPANSION FLORIN RD SOUTH	Inclusion for Corps and FWS reqd off-site creation component.			0	0	0	0										0.15			OUT						
200501137		Finalized	NWP 3	SHED A EMERGENCY SEDIMENT REMOVAL	Sediment removal impacts 0.08 (str), not loss.			0.08				Y	0.08																
200600009		Finalized	NWP 18	CITY OF RANCHO CORDOVA FLOOD EMERGENCY	Construction of drainage ditches impact 0.009 acres (wet). Not loss.				0.009			Y	0.009																
200600194		Finalized	NWP 29	WATERMAN FAMILY APARTMENTS DEVELOPMENT	Note that PM specified via email that although creation components of equal acreage were required by Corps and FWS, a single purchase would meet requirements.				0.024						0.024						0.024			OUT STUDY AREA						
200600194		Finalized	NWP 29 Inclusion	WATERMAN FAMILY APARTMENTS DEVELOPMENT	Inclusion for addl Corps reqd mit for indirect impacts.			0	0	0	0																0.439			IN	
200600194		Finalized	NWP 29 Inclusion	WATERMAN FAMILY APARTMENTS DEVELOPMENT	Inclusion for addl FWS reqd preservation for direct impacts.			0	0	0	0																0.366			IN	
200600196		Finalized	NWP 39	Security Park	X				0.395						0.169						0.199			OUT						
200600196		Finalized	NWP 39 Inclusion	Security Park	Inclusion for FWS required mit.			0	0	0	0										0.169			UK		0.788			UK	
200600254		Finalized	NWP 12	PG&E LINE 108 REPLACEMENT PROJECT	Additional 0.61 temp impacts.			0	0	0	0																		
200600254		Finalized	SP	PG&E LINE 108 REPLACEMENT PROJECT	Line replacement project - Note delineated acres to impacts ratio. (8.4 acres temp imps only). Mit was required by FWS, and reiterated by Corps as the only mit required in permit.			10.417	88.067	29.894																2.47			OUT	
200600254		Finalized	SP Inclusion	PG&E LINE 108 REPLACEMENT PROJECT	SP Inclusion for additional FWS mitigation.			0	0	0	0																2.07			UK	
200600381		Finalized	NWP 14	ELK GROVE BLVD/SR 99 INTERCHANGE PROJECT	Addl temp imps to 0.001 str and 0.026 wet. Also see 2008-00128			0.007	0.11					0.004	0.007															
200600403		Finalized	NWP 14	EAST STOCKTON BLVD. BIKE LANE PROJECT	Note: Impacts were to drainage ditch (str for SSHCP), but mit credits were for seasonal wetland (wet).			0.03						0.03							0.03			OUT STUDY AREA						

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200600428		Finalized	SP	NORTH VINEYARD GREENS PROJECT	1.53 isolated (wet).	Y	1.53	2.195	1.97						1.6						2.796			IN						
200600428		Finalized	SP Inclusion	NORTH VINEYARD GREENS PROJECT	Row for FWS required mit			0	0	0	0										1.6			OUT		3.2			OUT	
200600438		Finalized	LOP	COURTLAND SEWER PROJECT	Horizontal drilling only, no impacts.			0	0	0	0																			
200600477		Finalized	PREAPPCONS	UPPER LAGUNA CREEK COLLABORATIVE PLAN	X			0	0	0	0																			
200600512		Withdrawn	SP	SIMMERHORN COMMERCIAL PROJECT SITE	Talked with Zach Simmons. No longer seems reasonably foreseeable. JD and project info available.			0	0	0	0																			
200600537		Finalized	NWP 39	SIENNA SUBDIVISION PROJECT	X				0.018						0.018						0.1			OUT STUDY AREA						
200600552		Finalized	PREAPPCONS	PILLIKEN RANCH (SLOUGHHOUSE) PROJECT	X			0	0	0	0																			
200600614		Finalized	NWP 14, 33	WEST STOCKTON BLVD./LAGUNA CREEK BRIDGE	0.13 acre detention basin logged in 'wet'. (Delineation had it under wetland category).			3.03	1.1					0.113						0.113			OUT STUDY AREA						
200600614		Finalized	NWP 14, 33 Inclusion	WEST STOCKTON BLVD./LAGUNA CREEK BRIDGE	FWS reqd preservation of 0.981 GGS habitat. 33.3% used in spreadsheet. Review fact that Corps impacts were to "Open Water" (str), but SSHCP rules log 33.3% as (wet).			0	0	0	0																0.327			UK	
200600615		Finalized	NWP 29	LAKEMONT 33 SUBDIVISION	Re-verification. Unknown location of wet mit. No purchase record yet.			0.17	0.14						0.14						0.14			UK						
200600622		Finalized	NWP 29	PARK PLACE	Note - resources are drainage ditch (str for purposes of this study), but mit credits were for seasonal wet.			0.022						0.022							0.022			OUT STUDY AREA						
200600648	RF	Withdrawn	SP	WHITELOCK PARKWAY CORRIDOR	Paul says probably will be built if mall project ever opens again - Talk to Lisa Gibson. JD and project/potential impact info available.			0.586	0.465					0.57	0.42						0.99			UK						Suggested FWS Preservation of at least 1.98 acres (wet) via FUND.
200600756		Finalized	NWP 39	ELK GROVE AUTO MALL PHASE III	0.057 acres isolated wet.	Y	0.057	0.155	0.035					0.073						0.22				OUT STUDY AREA						
200600764		Finalized	NWP 3, ,33	ELK GROVE STORMWATER MAINTENANCE PROJECT	0.059 perm imp (str) not a loss. Many permits. Rows removed for clarity.			0.059				Y	0.059																	
200600977		Finalized	PREAPPCONS	SOUTH EAST AREA SPECIFIC PLAN	X			0	0	0	0																			
200601045		Finalized	NWP 14	Grant Line Road / Waterman Road Intersection Improvement	Impacts are impacting portion of waters delineated (0.6 str, 0.44 wet) for project 2005-00525 (Pending). Only the newly delineated waters are included here. Additional non-jurisdictional features (0.60 str).	Y	0.6	1.37	0.904					0.19	0.103						0.29			OUT						
200700060		Finalized	NWP 27	Deer Creek Mitigation Bank	Delineation includes figures from both this project number, and Deer Creek South (2008-00721), as activities from this number affect both areas.			9.05	7.13	6.14				0.489	0.023						12.64			OUT						
200700095		Finalized	NWP 33	Twin Cities Wetland Preserve	0.037 Temp impacts (str) only. (NWP 33). Note: this project is functioning as a bank although no NWP 27 or DEVMBA associated. Make sure to review as part of mitigation areas list.			3.009	17.104	5.63																				
200700230		Finalized	UNAUTHACT	Gerber - Bradshaw Violation	Closed. No Fill.			0	0	0	0																			
200700602		Withdrawn	NWP	Shadowbrook	Duplicate number. Project is 2003-00105.			0	0	0	0																			
200701006		Finalized	NWP 13	Cosumnes River Levee Repair, RD 800	Four sites, four separate permits. Rows removed for clarity. Unable to quantify amount of loss vs "impacts to". Project was emergency levee repairs.			1.89				Y	1.89																	
200701006		Pending	UNAUTHACT	Cosumnes River Levee Repair, RD 800	Pending, but unauth will address only work done after permit expired. Work itself was within conditions of NWP.			0	0	0	0																			
200701014		Finalized	NWP 3	Grant Line Channel Restoration Project	0.68 acre temp impacts (str). 0.19 perm imp not loss to (wet)			1.241	0.335			Y	0.19																	
200701041		Finalized	NWP 27, 33	Bridge Over Laguna Creek - Safe Routes	Temporary impacts only.			0.26	0.28																					
200701062		Finalized	LOP	Walnut Grove Marine Dock Modernization	LOP for retention, modernization. Original permit was 9467. Inclusion subject to final boundary. Probably IN. Note Impacts are BAI from old documentation. Delineated acres assumed from impacts.			0.013						0.013																

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200701064		Finalized	NWP 39	Reynolds & Brown CMD Court Property	Delineated acres were already part of 199900299, so not included here. Feature impacted in this NWP was already mitigated for in that project.			0	0	0	0				0.04															
200701147		Finalized	DEVMBA	Van Vleck Property Mitigation Bank	X			5.94	23.58	7.16																				
200701357		Finalized	NWP 12	PG&E's Mather Gas Line Project	Temp impacts only.			1.91	0.719	1.641																				
200701357		Finalized	NWP 12 PERMITMOD	PG&E's Mather Gas Line Project	Modification to delineation and increased temp impacts.			0.171																						
200701465		Finalized	NWP 12	Walnut Grove Sewer Project	0.44 perm imp wet, not loss			0.62	5.04			Y	0.44																	
200701887		Withdrawn	NWP 14	Florin Road Improvement Project	Withdrawn by applicant, March 2009. No further action. Original delineation and impact information is available in file.			0	0	0	0																			
200701932		Withdrawn	NWP	SMUD Hedge Training Facility Expansion	Withdrawn by applicant. Last action was AJD in 2009. Not considered reasonably foreseeable at this point.			0	0	0	0																			
200702046		Finalized	NWP 3, 33	E.G. Storm Water Maintenance	Sites A through O. Impacts 0.16 (str) via sediment and beaver dam removal.			7.48				Y	0.16																	
200702104		Finalized	NWP 27	SMUD Nature Preserve Mitigation Bank	DEVMBA pending			3.386	47.386	4.888					0.114							24.96			OUT	3.34	44.35	4.89		OUT	
200702123		Finalized	PREAPPCONS	Pacific Grove Estates	No Permit Required.			0	0	0	0																			
200702210		Finalized	NWP 27	Cosumnes Floodplain Mitigation Bank (aka New Hope)	Data placed in reverification			0	0	0	0																			
200702210		Finalized	NWP 27	Cosumnes Floodplain Mitigation Bank (aka New Hope)	Reverification. No change from original permit. Temp impacts only. Additional 0.023 acres str not in orig delin added to logged delin.			0.454	0.811																					
200702227	RF	Withdrawn	UNAUTHACT	Hardesty Sand and Gravel	Unresolved. Mitigation is estimated from available documents.			0.172						0.172						0.344				UK						
200800061		Finalized	UNAUTHACT	Heatherpace Lane, Gerber Road Violation	Closed. No further action.			0	0	0	0																			
200800062		Finalized	NWP 14	Gerber Road Violation	ATF permit.				0.0026						0.0026				0.002											
200800062		Finalized	UNAUTHACT	Gerber Road Violation	ATF initiated			0	0	0	0																			
200800114		Finalized	NWP 12	Fresno Bridge 58.10 UPRR	In addition to logged impacts, removal of piles results in 0.0032 net increase in (wet). Did not log as wet creation as this would not have been considered fill in the first place. FWS mit was the only mit. 0.15 GGS habitat, Corps required 0.093 of that to be aquatic. Did NOT use 33.3% rule in this case.				0.07						0.031												0.093			OUT	
200800128		Finalized	NWP 39	Plaza III	Note: Although verification states that previous delineation (2006-00381) was used for this project, review shows that the impact area of THIS project was actually not included in that JD. Therefore there are "delineated" entries for both projects.			0.033						0.033					0.033											
200800181		Withdrawn	NWP 14	Bruceville Road/Poppy Ridge Road Improvement Project	Withdrawn due to NPR.			0	0	0	0																			
200800402		Finalized	NWP 27	Consumnes River Gravel Augmentation Project	Talking point: Impact vs improvement of function... 1.45 temp imp str.			2.2						0.75																
200800444	RF	Pending	SP	Stoneridge Quarry	Confirmed correct documents to use for delin/proposed impacts with Marc. Conceptual Mit Plan is 1:1 create at Corps approved mit bank... No Preserv, just avaoidance. No FWS Mit.			22.042	16.884	3.97				2.832	7.587					2.832				OUT						
200800444	RF	Pending	SP Inclusion	Stoneridge Quarry	Row for conceptual create wet component.			0	0	0	0										7.587			OUT						
200800475		Finalized	NWP 39	Prairie City State Vehicular Recreation Area	Addl 0.38 isolated wet, 0.42 isolated pond (other). Mitigation: 1.434 acres restore existing resources - logged as rehabilitate Other.	Y	0.8	3.72	0.11	3.61				0.198																0.321 rehab wet OUT uda
200800475		Finalized	NWP 39 Inclusion	Prairie City State Vehicular Recreation Area	X			0	0	0	0																			1.113 rehab str OUT uda

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200800499		Finalized	UNAUTHACT	Dillard/Meiss Road Parcels	File not on shelf - Dadey? (check for location of mit purchases). Settlement agreement finalized, however, as of 2010, applicant still has not purchased required credits. Conservative delineated figure taken from impacts. Will process a NWP 32 after conditions are met.				0.666						0.666						0.146			UK						
200800499		Finalized	UNAUTHACT Inclusion	Dillard/Meiss Road Parcels	Row for FWS reqd mit.			0	0	0	0										0.374			UK		0.748			UK	
200800936		Finalized	PREAPPCONS	Bottimore Property	See 2008-001348 - should be same project under new number. No electronic records. JD only. Applicant withdrew request for verification. Permit Required, but no impact info.			0	0	0	0																			
200800937		Finalized	NWP 27	Snake Marsh Habitat Improvement Project	Good Talking Point: Restoration of 1 acre wet by removal of water primrose. Restore normally lumped with creation (?), but is it in this case? I put it in Other as rehabilitation.				1			Y	1																1 rehab wet out UDA
200800950		Finalized	NWP 27	Wong Wetland Restoration Project	Good Talking Point: impacts are excavation involved in restoration of original 3 acres (potential impact not loss).			0.25	2.75			Y	3								102			OUT					
200800974		Finalized	PREAPPCONS	Quail Lakes North	JD only. Resources on-site. No impact/project info yet.			0	0	0	0																		
200801214		Finalized	NWP 7	City of Galt Effluent Pipeline Project	0.03 Temp imp str			0.04	0.08																				
200801317		Finalized	NWP 7	Cosumnes River Elementary School Addition Project	0.004 perm imp (str) not a loss. Additional 0.16 isolated wet (AJD)	Y	0.16	3.52		0.35		Y	0.004																
200801348		Finalized	PREAPPCONS	Bottimore Site	JD only. Appears this project number was unneccessarily created, should be with 2004-00555			0	0	0	0																		
200801349		Finalized	PREAPPCONS	Mahon Ranch	JD only. Significant amount of resources on-site. No impact/project info yet.			0	0	0	0																		
200801362		Finalized	NWP 12	CSA Potable Water T-Main and Florin Road Sewer Project - WRDA Sacramento County	Temp imp 0.434 str, perm imp 0.001 str			2.501	9.576					0.001																
200801384	RF	Pending	DEVMBA	Apple Road Property	JD only. Significant amount of resources on-site. No impact info yet.			0	0	0	0																		
200801664		Finalized	NWP 12	SMUD Twin Cities Road Pole Replacement	ATF - no JD, less than 0.001 acre temp impact to (wet).				0.001																				
200801797		Finalized	NWP 14	UPRR Bridge Milepost 56.73 Fresno Subdivision	Temp imp 0.25 wet				0.38																				
200900172		Finalized	NWP 33	Elk Grove Creek Pedestrian Overcrossing	0.47 temp imp str			4.53	0.03																				
200900172		Finalized	NWP 42	Elk Grove Creek Pedestrian Overcrossing	See Inclusions			0	0	0	0			0.06	0.03						0.03			OUT					
200900172		Finalized	NWP 42 Inclusion	Elk Grove Creek Pedestrian Overcrossing	Corps mit requirement, str.			0	0	0	0									0.06				OUT STUDY AREA					
200900172		Finalized	NWP 42 Inclusion	Elk Grove Creek Pedestrian Overcrossing	Revised BO required 0.24 aquatic (GGS) habitat credits (33% NOT used, full amount instead), FWS apprv cons bank, loc uk.			0	0	0	0										0.24			UK					
200900199		Finalized	UNAUTHACT	SMUD power pole placement in Anatolia preserve	No Further Action. No data. File not on shelf, so unsure of actual impacts, if any. Ness does not know location of file.			0	0	0	0																		
200900291		Pending	NPR	Six County Aquatic Resources Inventory	X			0	0	0	0																		
200900369		Withdrawn	NWP 14	Grant Line Road/ Waterman Road Intersection Improvement	Withdrawn. Exists as 2006-01045.			0	0	0	0																		
200900477		Finalized	NWP 27	Cosumnes River Preserve Corral Ponds	Enhancement of exising wetland plus net increase of 0.8 wet				11.5												0.8			OUT					11.5 Enh Wet out UDA
200900511		Finalized	EIS	Sunridge Properties - Sunrise Douglas Litigation	X			0	0	0	0																		
200900576		Finalized	PREAPPCONS	North Vineyard Station Off-site Road improvements	File not on shelf. No electronic records.			0	0	0	0																		
200900731		Finalized	NWP 27	Rooney Dam Repair and Fish Passage Improvement Project	X			0	0	0	0			0.08															

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
200900731		Finalized	NWP 3	Rooney Dam Repair and Fish Passage Improvement Project	0.06 perm imp (str) not loss. 0.26 temp imp str.			0.4				Y	0.06																	
200900880		Finalized	NWP 14	Zinfandel Drive Extension Project - WRDA Sac County	No JD. Waters are part of larger Mather proj, which is logged in 2002-00561.			0	0	0	0				0.052						0.025			OUT						
200900880		Finalized	NWP 14 Inclusion	Zinfandel Drive Extension Project - WRDA Sac County	NOTE: addendum to Corps Dec Doc showed reliance on FWS creation component to meet mit requirements. FWS preserv requirements were not tabulated into any mit ratio, nor was mentioned in verification, but were incuded in mitigation summary addendum. Additional mit reqd by FWS: 0.06 vp (wet) creation credits and 2.06 vp (wet) pres credits at FWS apprv Cons Bank.			0	0	0	0										0.06			OUT		2.06			OUT	
200900974		Finalized	NWP 33	Elk Grove Fiber Optic Cable Repair	0.003 temp imp wet				0.0124																					
200901345		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Site A-Elk Grove Creek)	0.005 temp imp str, and 0.005 perm imp (str) not a loss.			0.01				Y	0.005																	
200901430		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Sites B & F-Strawberry Creek)	0.04 temp imp str, and 0.04 perm imp (str) not a loss.			0.08				Y	0.04																	
200901435		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Site C-Whitehouse Creek)	0.025 temp imp (str) and 0.025 perm imp (str) not a loss.			0.05				Y	0.025																	
200901438		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Sites D and E-Laguna Creek)	0.155 temp imp str, and 0.155 perm imp (str) not a loss.			0.31				Y	0.155																	
200901599		Finalized	NWP 14	Schoeffler Road Improvement Project	X			0.012	0.012					0.012	0.012															
200901599		Finalized	UNAUTHACT	Schoeffler Road Improvement Project	After-the-fact permit initiated.			0	0	0	0																			
200901637		Finalized	UNAUTHACT	Laguna Creek Batch Plant	Closed. No Fill.			0	0	0	0																			
201000202		Finalized	NWP 12	Aerojet GET H Pipeline Extension	0.014 temp imp str.			0.023																						
201000268		Finalized	UNAUTHACT	Franzia Violation at Gill Ranch	Referred to EPA. JD is in 2004 00813. Massive site, should JD be included here? For now delineated taken from impacts. Delineation actually verified over 500 acres wous, so for data considerations/skewing, etc, we only included the impact as a conservative delineated figure.				0.05						0.05															
201000455		Finalized	NWP 14	Vineyard Road Bridge Replacement-WRDA Sacramento County	Addl 0.0014 acre (str) perm impact not loss from bridge piers.			0.13	0.0047			Y	0.0014	0.0102						0.05				IN					
201000491		Finalized	NWP 12	Sheldon Road & Highway 99 Overpass Gas Main Project	0.003 temp imp str			0.003																						
201000617		Finalized	NPR	Silverado Bank Lots 5 and 6	X			0	0	0	0																			
201000729		Finalized	NWP 29	Arbor Creek Affordable Housing	X				0.2896						0.2896						0.2896			OUT						
201000823		Finalized	NPR	Line 108 Pipeline Replacement Project - Phase 1	X			0	0	0	0																			
201000861		Finalized	NWP 14	Longleaf Drive Bridge	0.07 temp imp str. FWS reqd 0.63 GGS habitat (used 33.3%)			0.106						0.002							0.21			UK					
201000938		Finalized	NWP 12	X09 Communication Poles Replacement Project - WRDA Sac County	X			0.01	2						0.001															
201000961	RF	Withdrawn	SP	Mather Airport Layout Plan	Application not yet received. Still Pre-App phase (06/06/13)			0	0	0	0																			
201001133		Finalized	NWP 12	Line 108 Pipeline Replacement Project-Phase II	0.94 temp wet imps only.			1.173	1.462																					
201001462		Finalized	NWP 14	Twin Cities Road Interchange Project	Create 0.053 wet requirement was to be at both "FWS and Corps Approved" mit bank. 0.142 Preservation was only reqd by FWS. At "FWS approved Cons bank".			0.43	0.21						0.053						0.053			UK		0.142			UK	
201001462		Finalized	NWP 14 Inclusion	Twin Cities Road Interchange Project	This row for stream impacts/mit. Net gain in acreage.			0	0	0	0			0.25						0.352				IN					

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
201001462		Finalized	NWP 14 Inclusion	Twin Cities Road Interchange Project	Addl 0.01 Create wet credits at "Corps Approved mit bank. Loc UK. Inclusion to reflect Corps only reqd mit.			0	0	0	0				0.01						0.01				UK						
201100033		Finalized	LOP	Grant Line Road Widening Project Phase 1, Additional Area	Impacts are affecting delineated waters on other delineated project sites. (2006-01045 + 2005-00525). Only delineation not included in those sites is logged here.			0.01	0.18					0.48	0.33						0.33			OUT						
201100033		Finalized	LOP Inclusion	Grant Line Road Widening Project Phase 1, Additional Area	X			0	0	0	0									0.96				IN						
201100034		Finalized	NWP 42	Laguna Creek Bike Trail Connector	0.02 temp imp str. AJD: In addition to delin values at right, another 0.015 drainage ditch (unregulated), and 0.120 isolated wetlands. FWS req 0.044 pres wet for indirect imps at FWS apprv MIT bank. FWS also req 1.86 GGS habitat at FWS apprv CONS bank. (33.3% used).	Y	0.135	0.588	0.022												0.619			UK		0.044			UK	
201100073		Finalized	PREAPPCONS	Arcade Creek Gas Line Relocation	Julie input data into ORM. Permit probably required for work, but there is no additional info in file. Not sure of current status.			0	0	0	0																			
201100197		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 1	No JD, 0.036 temp imp str			0.036																						
201100200		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 2	Reverification, same 0.007 temp imp str as previous permit.			0	0	0	0																			
201100200		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 2	No JD, 0.007 temp imp str			0.007																						
201100201		Finalized	NWP 3, 13	City of Elk Grove Routine Stormwater Maintenance Project - Sites 3 and 4	No JD, 0.355 temp imp str			0.355																						
201100202		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 5	No JD, 0.096 temp imp str			0.096																						
201100203		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 6	No JD, 0.002 temp imp str			0.002																						
201100276		Finalized	SP	White Rock Road Widening - WRDA Sacramento County	Corps req 0.096 pres wet at Bryte Ranch, but said that is an overlap with FWS required 2.661 pres vern habitat at Bryte. Only the 2.661 is recorded.			0.15	5.96					0.004	1.018										2.661			IN	
201100276		Finalized	SP Inclusion	White Rock Road Widening - WRDA Sacramento County	FWS req an addl 6.801 pres vern habitat at Service apprv CONS Bank.			0	0	0	0																6.801			UK	
201100276		Finalized	SP PERMITMOD	White Rock Road Widening - WRDA Sacramento County	Modified location of Corps reqd mitigation from original SP - Two sites, both completely OUT of study area. Both sites are summed in creat wet field.			0	0	0	0											1.002			OUT STUDY AREA						
201100339		Finalized	NWP 14	Elk Grove Hazardous Waste Facility	Addl 0.01 perm imp stream, 0.01 temp imp str			0.02						0.01				0.01												
201100339		Finalized	NWP 14, 33	Elk Grove Hazardous Waste Facility	No JD, 0.004 Temp Imp str, 0.03 Perm imp str. AJD 0.97 ponded features determined not WOUS (unregulated)	Y	0.97	0.034						0.03																
201100391		Finalized	NWP 7	SMUD East Campus - Operation Center Project	0.002 perm imp (str) not a loss. No JD			0.002				Y	0.002																
201100585		Finalized	NWP 12	Digital 395 Barstow to Reno	Temp impacts only, no mitigation. Use delineated?? 10.433 delineated, unspec resource types. All 3 cats present. 0.541 temp imp. 191 permit actions removed for clarity. Multiple reverifications, increase in temp impacts, no other changes. Decision was to evenly split delineated acres through resource types.			3.478	3.478	3.478																				
201101017		Finalized	UNAUTHACT	Mohamed Violation	Resolved. Not a violation.			0	0	0	0																			
201101019		Finalized	NWP 7	Anatolia Overchute	0.01 perm imp (str) not a loss.			0.01				Y	0.01					0.01												
201200116	RF	Pending	UNAUTHACT	Clay Station Properties, LLC Violation	Data from Lisa G's best estimate.			2.7	12.5	3.3					4															

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES STREAM LINEAR	DELINEATED ACRES WETLAND	DELINEATED ACRES OTHER	DELINEATEDA CRES UNKNOWN RESOURCE TYPE	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES STREAM LINEAR	LOSS ACRES WETLAND	LOSS ACRES OTHER	LOSS ACRES UNKNOWN RESOURCE TYPE	ILF COMPENSATION ACRES STREAM LINEAR	ILF COMPENSATION ACRES WETLAND	CREATION MITIGATION ACRES STREAM LINEAR	CREATION MITIGATION ACRES WETLAND	CREATION MITIGATION ACRES OTHER	CREATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	CREATION RELATIVE TO UDA (IN/OUT/UK)	PRESERVATION MITIGATION ACRES STREAM LINEAR	PRESERVATION MITIGATION ACRES WETLAND	PRESERVATION MITIGATION ACRES OTHER	PRESERVATION MITIGATION ACRES UNKNOWN RESOURCE TYPE	PRESERVATION RELATIVE TO UDA (IN/OUT/UK)	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES
201200195	RF	Pending	UNAUTHACT	Calosso Property Violation	Only PJD and impacts known.			5.984	16.017	22.566				0.093	9.573	0.625														
201200525		Finalized	NWP 12	Tracy-Hedge Optical Ground Wire (OPGW)	No JD, Overhead lines, no fill for all actions, 9 actions removed for clarity			0	0	0	0			0																
201200729		Finalized	NWP 6	Twin Cities Road Bridge Replacement Geotechnical Borings	Reverify work window			0	0	0	0																			
201200729		Finalized	NWP 6	Twin Cities Road Bridge Replacement Geotechnical Borings	No JD			0.00006						0.00006																
201200945		Finalized	NWP 14	Dwight Road Extension - WRDA Sacramento County	No mit required other than FWS GGS mit, so included on this line. (33.3% rule used).			1.28	2.29					0.07								0.82			UK					
201200969		Finalized	NWP 12	Jacobsen Water Development Project	No JD, Temp Imp 0.014 str			0.014																						

EIS/EIR APPENDIX A-4

Lower-Resolution Dataset;
Projects from Beginning of Records to 1998

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
0		Finalized	SP	BORDEN RANCH (MISC)	See 1995-00428.			0			0	0	0		
190107036		Finalized	SP	R J SYSTEMS	Permit Expired, no work performed.			0			0	0	0		
190109312		Finalized	SP	MJ BROCK & SONS	Permit type is actually unknown, but judging from reqd creation, we are assuming it was an SP. 55,000cy fill.			11.7				2.6			55,000 cy fill
190109596		Finalized	SP	LAGUNA SOUTH CANAL/H.C. ELLIOT, INC.	Delineated taken from impact.			0.17			0.17	1			
190110021		Finalized	SP	ANATOLIA PHASES I - III				85.52			44.22	46.5	44		
190110079		Finalized	SP	DIXON, JIM				10.4			10.4	10.5			
190110119		Finalized	SP	NORTHEAST AREA - GALT PROJECT - SPINK				8.5			8.5	27.1			
190110156		Withdrawn	SP	SAC-YOLO MOSQUITO DIST.				0			0	0	0		
190110159		Finalized	SP	FALLBROOK	Delineated UK, used impact figure.			6.67			6.67	6.7			
191200302		Finalized	NWP	CHETCUTI, JEROME	No records.			0			0	0	0		
198800077		Finalized	NWP 26	QUAIL RANCH ESTATES - N26-262	Unable to locate records.			0			0	0	0		
198900050		Finalized	NWP 26	NEWTON SUBDIVISION	Delineated acres 1.05, no impact info found, but two NWP 26s. Mitigation UK. Should we consider all delineated impacted?			1.05			1.05				
198900074		Finalized	SP	TEICHERT ASPEN VI MINING PROJECT	Note: 65 acres of creation mitigation was required for this project and 1989-00076, but it appears only 25 acres is successful at this point. This is the figure that has been logged.			42.88			42.88	25			
198900076		Finalized	SP	GRANITE I MINING PROJECT	Mitigation acres are part of 1989-00074			16.16			16.16				
198900090		Finalized	SP	ELLIOTT RANCH	See 1998-00645. That project is a modification to this SP. Delineated acres are only recorded here. Addl 39.4 acre lake, probably considered non-jd, since it was not mentioned as a resource in permit. Include?	Y	39.4	93.2			66.2	113.04	24		
198900134		Finalized	NWP 26	POWERS HOUSE	Records Holding 0957928.			8.19			4.11	10.57	4.08		
198900179		Finalized	SP	FIRST BAPTIST CHURCH LAGUNA & WHITEHOUSE				2.662			0.59	0.59			
198900209		Finalized	NWP 26	LAGUNA CREEK RANCH UNIT 4				10.67			2.83	5.66	7.84		
198900230		Finalized	RGP	PRIVATE DOCK	Location incorrectly mapped. Actually in Sac River, mile 39.7, outside study area.			0			0	0	0		
198900253				CLAY STATION	No records. Maybe under a different number?			0			0	0	0		
198900284		Finalized	NWP	SHALAKO GOLF & COUNTRY CLUB	No Records except that it was a NWP (orm)			0			0	0	0		
199000001		Finalized	NWP 26	CALVINE MEADOWS PROJECT				2.4			0.89	2.2			
199000027		Finalized	NWP 26	N. FORK BADGER CREEK FILL	Only info is permitted for <1 acre. Delineated estimated from impact.			1			1				
199000126		Finalized	SP	CHURCHILL DOWNS				27.34			17.45	23.92	17.45		
199000152		Finalized	NWP 14	EAGLES NEST ROAD BRIDGE REPLACEMENT	See 1993-00152. Same project. Data is logged there.			0			0	0	0		
199000155		Finalized	SP	ELK GROVE BLVD EXTENSION	Delineated acres contained in 1989-00090. There are multiple permits associated with this project in ORM, though the record seems to indicate only one SP.			0			3	6			

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199000157		Finalized	NWP 26	ARTHUR C. BUTLER SCHOOL, CHURCHILL DOWNS				0.8665			0.8665	0	0		
199000211		Finalized	SP	KRAMER RANCH	See 1994-00017 (Newly Added NWP 26, no lat long in ORM). That project is on this site, so delineated is only included here.			25.61			7.83	13.42			
199000213		Finalized	NWP 26	CROCKER DEVELOPMENT, LEN HART CENTER				0.4591			0.4591	0	0		
199000244		Finalized	NWP 26	HACKARD-MULLANEY LAND INVESTMENTS	Same as Shadowbrook (1999-110, 2003-105). Delineation for all of these is included here only.			0.99			0.74	0.89	0		
199000244		Finalized	NWP 26 Inclusion	HACKARD-MULLANEY LAND INVESTMENTS	Row for addl off site mit.			0			0	0.4	0		
199000250		Finalized	SP	KIEFER LANDFILL EXPANSION				27.551			6.07	9.11	20.48		
199000294		Finalized	SP	STORAGE BUILDING	Only data is installation of 70 linear ft. bulkhead and 50 CY of fill. How to quantify? Unable to determine delineated from info.			0			0	0	0		70 linear ft. bulkhead and 50 cy of fill.
199000360		Finalized	NPR	SHELDON NORTH VILLAGE ONE				0			0	0	0		
199000393		Finalized	NWP 26	SHELDON PARK ESTATES	Appears was never processed, maybe wrapped into new #. Only record is that it did not qualify for NWPs, delineation requested.			0			0	0	0		
199000471		Finalized	NWP 12	COUNTRY CREEK ESTATES	X			1.9			0.58				
199000475		Finalized	NWP 26	FRANKLIN BOULEVARD WIDENING	Check inclusion. About half of project is IN study area, the other half right on the border. Impacts to Laguna Creek, which is crossed by project right at study area border. Limited info, delin taken from impacts.			0.7			0.7				
199000510		Finalized	NWP 26	ELK GROVE 82/SWEET PROPERTY	Addl 0.57 acre non-jd	Y	0.57	0.33			0.33				
199000531		Finalized	NWP 26	JACKSON GOLF SITE	Superseded by 199400119. all data is in that row.			0			0	0	0		
199000533		Withdrawn	SP	SHELDON NORTH II	ORM shows completed NWP and SP, though records show that this project was denied.			0			0	0	0		
199000579		Finalized	NWP 26	LA CHAUMIERE - GALT	Delineated taken from impact.			0.424			0.424				
199000590		Finalized	NPR	FISH FARM-GALT				0			0	0	0		
199000620		Finalized	NWP 26	CALVINE ROAD PROPERTY, NICHOLAS ESTATES				0.93			0.93	0	0		
199000780		Finalized	NWP 26	SHELDON PARK ESTATES, SACRAMENTO COUNTY				1.94			0.42		1.52		
199000787		Finalized	NWP 26	SILVER SPRINGS SUBDIVISION	Delineated taken from impact.			5.26			5.26	15.7			
199000818		Finalized	NWP 26	THE RANCH (FKA CLAY STATION 1200)	Appears only to be a permit for impacts, not NWP 27 or development of mit bank.			15.33			2.57		5.5		
199000923		Finalized	SP	SHELDON NORTH/SHELDON HIGHLANDS PROJECT				17.92			12.4	20.5	7.6		
199000925		Finalized	NWP 26	GORMAN PROPERTY, CHESTER DRIVE	Permit was for <1 acre, but impact unknown. Assumed delineated was all impacted.			0.28			0.28				
199000953		Finalized	NWP 26	PERRY RANCH MITIGATION SITE	Total created mit was 4.38, (1.83 was used by other projects). Needs to be grouped with DEVMIT/NWP 27 group.			2.4			1.49	2.55	0.91		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199000969		Finalized	NWP 14	UNION PACIFIC RAILROAD BRIDGE 120.75	No Data in record. Nothing to log.			0			0	0	0		
199001001		Finalized	NWP 12	WAL-MART ELK GROVE OUTFALL STRUCTURES	No Data in record. Outfalls, so prob perm imp, not loss.			0	Y		0	0	0		
199001034		Finalized	NWP 26	ELLIOTT RANCH/I-5 INTERCHANGE				2.281			2.03	4.06			
199001042		Finalized	NWP 26	BLAWAT PROPERTY				21.6			3.36	4.57			
199001156		Finalized	NWP 26	ROBBINS MEADOWS I/MASHA/SACRAMENTO CO				0.28			0.28	0	0		
199001195		Finalized	NWP 26	WITT PROPERTY				0.99			0.99	0	0		
199001226		Finalized	PREAPPCONS	SHELDON FARMS-LAGUNA CREEK-SACRAMENTO CO	Delineation only.			0			0	0	0		
199001304		Finalized	NWP 26	JDS LAGUNA ESTATES				0.96			0.5				
199001307		Finalized	NWP 26	LAGUNA WEST VI	Delineated taken from impacts. SP in addition to NWP. May be a mistake, no records of SP in file.			1.5			1.5	2.25			
199001314		Finalized	NWP 26	MARENGO RANCH				6.13			2.13	10			
199001320		Finalized	NWP 26	SANTOS PROPERTY				2.84			0.084				
199001369		Finalized	NWP 14	DEER CREEK FILL - SLOUGHHOUSE - SACTO CO				0.024			0.024				
199100011		Finalized	NWP 26	BLM - SACRAMENTO COUNTY	Impact assumed - no data, permit for <1 acre fill			0.72			0.72				
199100013		Finalized	NWP 26	EXCELSIOR MEADOWS SUBDIVISION-SAC COUNTY				0.4			0.4				
199100041		Finalized	NWP 26	CONCRETE LINING ELDER CREEK-SAC COUNTY				0.8			0.8	0	0		
199100049		Finalized	NWP 26	ROBBINS MEADOWS II				0.98			0.98	0	0		
199100052		Finalized	NWP 26	QUAIL RANCH ESTATES	Impact assumed - no data, permit for <1 acre fill			0.8			0.8				
199100079		Finalized	NWP 3, 26	ELDER CREEK IMP.-ELK GROVE SCHOOL DIST.				0.56			0.56	0	0		
199100145		Finalized	NWP 26	MEADOWS SUBDIVISION, ROBBINS ROAD				0.003			0.003	0	0		
199100194		Finalized	NWP 12	WATER LINE BELOW LAGUNA CREEK- SAC CO.	Likely temp imp only, no change in bottom contours. No data in record.			0			0	0	0		
199100272		Finalized	NWP 26	SHELDON PASSAGE	Note: related to 1993-00197.			4.89			0.29	7.4			
199100281		Finalized	SP	SHELDON NORTH II				2.14			1.4	2.8			
199100315		Finalized	NWP 12	RANCHO MURIETA N12 - UNNAMED TRIBUTARY	Temp impact only, delineated from temp impact.			0.018			0	0	0		
199100337		Finalized	NWP 26	ELDER CREEK FILL-BTWN 99&STKN BLVD-SAC C				0.4936			0.4936	0	0		
199100387		Finalized	NWP 26	VINEYARD ESTATES				0.25			0.25				
199100495		Finalized	NPR	MOSQUITO ABATEMENT				0			0	0	0		
199100497		Finalized	NPR	BETTY BAPTISTA PARCEL				0			0	0	0		
199100605		Finalized	NWP 26	DI NAPOLI PROPERTY				2.15			0.96	0	0		
199100674		Finalized	NWP 26	PARKSIDE VILLAGE AT LAGUNA	Impacts and various permits difficult to decipher. Best try at values.			20.22			5.04	6.22			
199100761		Finalized	NWP 14	BRIDGE REPAIR	Roll 179 - Missing. Eileen says it was lost, not recoverable at this time..			0			0	0	0		
199100842		Finalized	NWP 12	GALT PLAZA OUTFALL - DRY CREEK	Impact and delineated area is estimated. Outfall would be 0.0018 perm impact not loss. Info scarce.			0.0018	Y	0.0018					
199100937		Finalized	NWP 26	JAMES PROPERTY/SACRAMENTO COUNTY	No record of actual impacts. All wous assumed impacted.			0.17			0.17				

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199101030		Finalized	NWP 26	STRAWBERRY CREEK REALIGNMENT AT CALVINE				0.66			0.66	0.66			
199101053		Finalized	NWP 26	STRAWBERRY CREEK REALIGNMENT EAST OF RR				10.38			6.36	5.99			
199101250		Finalized	NWP 26	STATE ROUTE 16 IMPROVEMENT - SAC CNTY	Delineated figure is from impacts.			0.12			0.12				
199200095		Finalized	NWP 26	ORCHARD-CALVINE PROPERTY/STRAWBERRY CR.				0.13			0.13	0	0		
199200152		Finalized	NWP 27	BEACH LAKE MITIGATION BANK	Possible impacts from an old NWP 12, 14, though no records listing figure. Nothing to log.			24.2							
199200171		Finalized	NWP 14	ROAD CROSSINGS-SKUNK CREEK-SACRAMENTO CO	Unable to determine any figures.			0			0	0	0		
199200196		Finalized	NWP 26	CHETCUTI/JACKSON ROAD/VIO/FILL: NW26-302				0.76			0.76	0	0		
199200525		Finalized	NWP 5	USGS ACOUSTIC VELOCITY METERS	5 locations, 3 in Sac River, 1 in Three Mile Slough, 1 in San Joaquin. Impacts so small as to be negligible			0			0	0	0		
199200544		Finalized	NWP 3	REPAIR BANK EROSION - RD 2110	628 linear feet revetment. 0.047 perm impact not loss. Partial OUT. 10 sites, 2 of which are in Mokolumne. Impacts calculated from one cy per linear ft, minus two of the 10 sites. Delineated is from impacts.			0.047	Y	0.047					
199200550		Finalized	SP	ELLIOTT RANCH SOUTH/LAGUNA STONELAKE DEV	Combination of SP and several modifications. A bit unclear as to actual figures, but these take into consideration actual acreage of constructed wetlands. Does not reflect any previously preserved acreage (some is associated with this site).			202.6			49	53.44	159.2		
199200663		Finalized	NWP 26	HWY 16, GRANTLINE TO RM, SACRAMENTO CO.				3.584			0.458				
199200760		Finalized	NWP 26, 12, 33	JAS PROPERTY, ELK GROVE AREA, SUGNET	Difficult to discern figures. Multiple NWPs, combined in this row. Potential preservation in addition to these figures, amount uk.			7.93			6.76	8.19			
199200775		Finalized	NWP 14	ELK GROVE - FLORIN ROAD WIDENING, SACTO	Perm impact not loss! 0.01 acre			0.01	Y	0.01	0	0	0		
199200817		Finalized	NPR	WINDSOR DOWNS PROPERTY				0			0	0	0		
199300078		Finalized	NWP 3	EMERGENCY BANK PROTECTION RD 2110	759 linear feet revetment. 0.071 perm impact not loss. Partial OUT. 23 sites, 5 of which are in Mokolumne. Impacts calculated from one cy per linear ft, minus five of the 23 sites. Delineated is from impacts.			0.071	Y	0.071					
199300139		Finalized	NPR	BRIDGE REPLACEMENT				0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199300152		Finalized	NWP 14	EAGLES NEST ROAD BRIDGE - LAGUNA CREEK	Same as 1990-00152 (newly added). Data is only logged here. Only data is 70 cy area impacted: 45 cy is perm excavation (imp not a loss?), 25 cy is backfilled (temp). Unable to determine delineated from info.			0	Y		0	0	0		
199300191		Finalized	NWP 3, 33	CALVINE ROAD BRIDGE REPLACEMENT, SAC CO	Temp impacts only.			0.013							
199300197		Finalized	NWP 12	SHELDON PASSAGE/WHITEHOUSE CR/UTILITY L	See 1991-00272. Additional work on Sheldon Passage Subdivision. Buried Utility lines, no perm impacts, no mit.			0			0	0	0		
199300239		Finalized	NPR	CARSON ENERGY SITE - NPR				0			0	0	0		
199300246		Finalized	NPR	ELDER CREEK WIDENING/FRENCH ROAD ESTATES				0			0	0	0		
199300283		Finalized	NWP 26	SMUD BIGHORN SUBSTATION -LAGUNA SPGS #3				0.007			0.007				
199300334		Finalized	NWP 14, 26	COSUMNES RIVER BLVD/CALVINE INTERCHANGE				2.24			2.24	2.24	0		
199300366		Finalized	NWP 26	RANCHO SECO/CALIFORNIA MUNI GOLF	Appears project not built, but mitigation was built. Delin 199.48 wous, (now within SMUD mit bank 2007-02104). Intended impacts 4.28 acres, intended mit 6.9 creation, actual creation was 3.4 acres. Did not log impacts and delineated acres in this case. Records Holding 0960602, 2 vols, 05 MIT box 1006897.							3.4			
199300367		Finalized	NWP 13	RD 2110, MCCORMACK-WILLIAMSON TRACT	498 linear feet revetment = 0.047 perm impact not loss. Partial OUT. 19 sites, 4 of which are in Mokolumne. Impacts calculated from one cy per linear ft, minus four of the 19 sites. Delineated is from impacts.			0.047	Y	0.047					
199300372		Finalized	NWP 26	SILVER SPRINGS SUBDIVISION	See 1999-00712, and 2005-00325. This project mandated Lot P (10.72 acres wetlands) be used as preserve site in perpetuity. However, Lot P was later proposed to be filled, and AKT 184 (2000-00780) used in it's place for mitigation, with an addl 10.72 acres created wetlands. The proposed fill of Lot P is still pending, so only foreseeable impacts should be used.			12.39			0.83	0.83			
199300379		Finalized	NWP 26	ARCADIAN VILLAGE II / SACRAMENTO COUNTY				0.83			0.83	0.83	0		
199300406		Finalized	NWP 26	JAEGER CORNER ENTERPRISES FKA SLAGLE	All data wrapped up into Montelena (2001-00448)			0			0	0	0		
199300440		Finalized	NWP 14, 33	ELK GROVE-FLORIN ROAD WIDENING,EG> BOND	Delineated is from impacts figure.			0.12			0.12	0.24			
199300450		Finalized	NWP 12	VINEYARD MEADOWS/UNIT 1/STRAWBERRY CREEK	Temp impacts only. Delineated from temp impacts figure.			0.49				0	0		
199300471		Finalized	NWP 12, 18	LAGUNA CREEK PIPE CROSSING SAC CO.	Temp impacts only.			0.0003			0				

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199300475		Finalized	NWP 26	PRICE CLUB/BEACON CREEK/STOCKTON BLVD				0.59			0.59	0	0		
199300605		Finalized	SP	BORDEN RANCH - SACRAMENTO COUNTY PORTION	See 1995-00428. All data is included there.			0			0	0	0		
199300610		Finalized	NWP 14	US 50/FOLSOM BLVD INTERCHANGE IMPROVEMEN				2.19			0.34	0.686	0		
199300651		Finalized	SP	VINEYARD POINTE				6.036			6.036	14.97	0		
199300658		Finalized	NWP 26	METHODIST RETAIL CENTER				0.4			0.26	0	0		
199300670		Finalized	SP	MATHER EAST	Records Holding 0960609. Impacts and mitigation were revised from figures listed in ORM.			3.64			0.61	0.61	0.32		
199400017		Finalized	NWP 7, 26	PARK MEADOWS	See 1990-00211. Delineated acres are included there. This project has different impacts, though on the same physical site. Record of actual mit is not clear, though it shows a property was to be donated to Stone Lakes, and that Stone Lakes was to construct compensatory wetlands. Conservative figure taken from impacts...			0			3.78	3.78			
199400102		Finalized	SP	GRANITE VINEYARD MINING				19.83			17.22	17.22			
199400119		Finalized	NWP 26	EAGLES NEST GOLF LINKS/SACRAMENTO CO/CA				5.15			0.78	3.45	0.9		
199400157		Finalized	SP	SLAGLE PROPERTY--SUNRISE DOUGLAS SPEC.PL	Records Holding 1023301. All data wrapped up into Montelena (2001-00448).			0			0	0	0		
199400158		Finalized	SP	LAUSEVIC PROPERTY--SUNRISE-DOUGLAS	Records Holding 1023301. All data wrapped up into Montelena (2001-00448).			0			0	0	0		
199400159		Finalized	SP	RINGEN PROPERTY--SUNRISE DOUGLAS	Records Holding 1023301. All data wrapped up into Montelena (2001-00448).			0			0	0	0		
199400210		Finalized	SP	Sunridge Specific Plan Properites EIS - ANATOLIA IV				1.36			1.36	1.36	2.72		
199400211		Finalized	SP	DAVIS PROPERTY---SUNRISE DOUGLAS AREA	Records Holding 1023302. All data wrapped up into Montelena (2001-00448).			0			0	0	0		
199400212		Finalized	SP	WHITE PROPERTY--SUNRISE DOUGLAS AREA	Records Holding 1023302. All data wrapped up into Montelena (2001-00448).			0			0	0	0		
199400218		Finalized	SP	NORTH DOUGLAS (FKA WEIDINGER AND MATZ)				6.15			6.15	6.15	7.64		
199400312		Finalized	PREAPPCONS	COLONY RANCH ESTATES	Delineation and preapp only. Applicant decided to avoid wetlands.			0			0	0	0		
199400314		Finalized	NWP 26	LAGUNA VINEYARDS/SACRAMENTO CO/GIBSON				0.35			0.35				
199400316		Finalized	NWP 26	NEW DAWN II				0.1996			0.1996				
199400365		Finalized	SP	Sunridge Specific Plan Properties EIS - GRANTLINE 208				11.12			5.67	6.15	12.3		
199400383		Finalized	NWP 26	VINTAGE PARK EAST #4				0.43			0.42	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199400504		Finalized	SP	TEICHERT - ASPEN IV SOUTH	Aspen IV and Aspen V (1994-00693) are related and should be looked at as a group. All figures together reflect permit modification that combines them.			3.81			1.35	5.292	2.51		
199400529		Finalized	SP	NORTH DOUGLAS (FKA CUPP PROPERTY)	Available info poor. This is the best of available info. Mitigation unknown, Flagged because of large impact with uk mit. Assumtion of Corps reqd 1:1 creat mit made.			3.47			3.335	3.335			
199400572		Finalized	NWP 23	MCKENZIE ROAD BRIDGE REPLACEMENT	Temp impacts to 0.03 acre. Perm impact not loss 0.023 acre, from dredging. Net increase of 0.023 acre. Net zero.			0.03	Y	0.023					
199400693		Finalized	SP	ASPEN V SOUTH AGGREGATE - SACRAMENTO CO.	Aspen V and Aspen IV (1994-00504) are related and should be looked at as a group. All figures together reflect permit modification that combines them.			8.47			3.42	0.864	1.03		
199400771		Finalized	NWP 12	SACRAMENTO COUNTY LANDFILL	RH 1023310 (2 vols). Outfall structure, delineated waters likely included in 1990-00250. No recorded impact/mit. No useful info in electronic record.			0			0	0	0		
199400891		Finalized	NWP 14, 33	LEE SCHOOL CROSS ROADS BRIDGE PASTURE CK	Project was never actually built, though it was permitted.			0			0	0	0		
199401002		Finalized	NWP 26	BISHOP OF CALIFORNIA JAS ELK GROVE				0.8			0.8				
199401097		Finalized	NWP 14, 33	BRUCEVILLE RD, LAGUNA CRK	payment of $9800 into FWS GGS fund stipulated in permit.. Delineated taken from impacts.			0.28			0.28				
199500043		Finalized	NWP 26	ROBBINS MEADOWS II				0.8			0.8	0.8			
199500044		Finalized	NWP 26	ROBBINS MEADOWS I				1.74			1.74	1.97			
199500100		Finalized	NWP 3	UNION PACIFIC BRIDGE REPLACE COSUMNES R.	Temp impacts only, 0.6 acre.			1.78							
199500113		Finalized	NWP 26	SOUTHGATE MUNICIPAL GOLF COURSE				1.21			1.21	1.573			
199500115		Finalized	NWP 14, 33	LAMBERT ROAD BRIDGE REPLACEMENT	Permit specified that $2100 be placed in Stone Lakes Wildlife Fund, to be used for GGS mit. How to quantify? Include at all? Records Holding 1023357			0.1			0.6			$2100 placed in Stone Lakes Wildlife Fund for GGS habitat creation.	
199500293		Finalized	NWP 26	FAA MATHER AFB				0.16			0.16	0	0		
199500313		Finalized	SP	LOWER LAGUNA CREEK, SAC CO FLOOD PROJECT				83.99			12.39	23.75	71.6		
199500386		Pending	DEVRPSS	SOUTH SACRAMENTO COUNTY HCP				0			0	0	0		
199500428		Finalized	SP	BORDEN RANCH VINEYARDS, SECTIONS 4,7,8,9	See 1993-00605. These are related projects. All data for both is logged in this row. These projects compose only the Sac County portion of Borden Ranch. (Within study area). EXTREMELY convoluted record. Data is best interpretation. An additional NWP 26 project with an uk #, authorized in 1994 is included in these figures. This may actually be 1993-00605.			53.1			49.1	8.03	85.75		
199500450		Finalized	PREAPPCONS	COUNTRY CLUB ESTATES, SACRAMENTO COUNTY	Pre-app only, no records.			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199500512		Finalized	SP	LAGUNA WEST, NORTH PRESERVE, CV	There is mitigation, not specified in record… Assumption Corps reqd 1:1 creation.			2.4			2.4	2.4			
199500603		Finalized	NPR	WILLOW SLOUGH BOARDWALK, CONSUMNES RIVER	Never built under original NWP 14. New design had no impacts.			0			0	0	0		
199500605		Finalized	SP	LAGUNA ESTATES (AKA VALLEY HI)				5.71			5.71	5.71			
199500694		Finalized	NWP 3	MCCORMACK-WILLIAMSON TRACT	945 linear feet rip rap. No other info. Perm impact not a loss? Unable to determine delineated from info.			0	Y		0	0	0		945 linear feet rip rap in (str).
199600171		Finalized	NWP 26	KWOK PROPERTY GALT INDUSTRIAL PARK	Records Holding 1023371			3.7			2.3	2.3			
199600231		Finalized	NPR	SMUD, LAGUNA WEST SUBSTATION				0			0	0	0		
199600291		Finalized	DEVMBA	CLAY STATION MITIGATION BANK				8.78							
199600320		Finalized	PREAPPCONS	TRAXLER/WAEGELL RANCH MITIGATION AREA	No records. Pre-app only.			0			0	0	0		
199600389		Finalized	NWP 26	BIG TRIANGLE PROPERTY, ROSSINI FARMS	See 1997-00151			0			0	0	0		
199600392		Finalized	NWP 26	MOUNTAIN TOP PROPERTY, SILVA-ROSSINI FRM	See 1997-00151			0			0	0	0		
199600485		Finalized	NWP 12	MATHER FIELD WEST ROADWAY PROJECT	65 cy for outfalls and associated fill, is only info. Unable to determine delineated from info.			0			0	0	0		65 cy outfalls/fill (resource type assumed str).
199600527		Finalized	NWP 3	RECLAMATION DISTRICT 2110 BANK PROTECTN	925 linear feet fill and rock revetment is only info. Permanent impact not a loss. Unable to determine delineated from info.			0	Y		0	0	0		925 linear feet fill/revetment (str)
199600546		Finalized	NWP 26	TWIN CITIES PROPERTY, ROSSINI FARMS	See 1997-00151. Records Holding 1023377			0			0	0	0		
199600547		Finalized	NWP 26	LAGUNA CREEK PROPERTY, ROSSINI FARMS	See 1997-00151. Records Holding 1023377			0			0	0	0		
199600573		Finalized	ATF	COSUMNES RIVER FILL	Impossible to quantify. 800cy fill plus addl 997 tons rip-rap. Unable to determine delineated figure from info.			0			0	0	0		800 cy fill and 997 tons rip-rap (str)
199600588		Finalized	NWP 12	MORRISON CREEK PIPELINE CROSSING, SRCSD	0.49 temp impacts only. Delineated figure from temp impacts.			0.49							
199700006		Finalized	SP	Sunridge Specific Plan - Douglas Road 103				4.71			1.98	7.25	8.62		
199700009		Finalized	RGP	RECLAMATION DISTRICT 2110 LEVEE REPAIRS	Records Holding 1023380. Partial OUT. Mokolumne, Dead Horse Cut, and Lost Slough. Mostly dredging, no info in file except 50,000 cu ft dredge material. No breakdown for locations. Unable to determine delineated figure from available info.			0	Y		0	0	0		1852 cy dredge from (str)
199700100		Finalized	NWP 26	CARILLION BOULEVARD EXTENSION, GALT	Records Holding 1023383			0.036			0.036				
199700144		Finalized	NWP 26, 33	DWIGHT ROAD EXTENSION				1.74			1.74				

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199700151		Finalized	NWP 26	L.V. ISLAND PRESERVE, ROSSINI, SACTO. CO	This project (1997-00151), 1996-00547, 1996-00546, 1996-00392, 1996-00389 impacts and mitigation are all compiled on this row, as part of the Laguna Creek Partnership Project. Individual delineated wous not available, so delineated figure is combined impacts and preservation. 1997-00151 is Records Holding 494071686.			97.04			29.43	26.09	67.61		
199700189		Finalized	NWP 3	WALNUT GROVE MARINA-FLOOD DAMAGE REPAIR	Inclusion subject to final boundary. Decided IN. Permit was for rebuilding to pre 1997 flood conditions (already permitted, legacy).			0			0	0	0		
199700289		Finalized	NWP 14	MATHER FIELD EAST ROADWAY PROJECT	Not enough info to determine delin or impacts. No mit. Record Holding 1023421. No additional info.			0			0	0	0		
199700314		Finalized	SP	STONE LAKES - DREDGE S-P CUT	Dredge 6000 linear feet of channel. (Perm imp not loss), Unable to determine delineation figure from this.			0	Y		0	0	0		Dredge 6000 linear feet (str)
199700441		Finalized	LOP	CITIZENS COMMUNICATIONS/LOST SLOUGH LINE	Lateral boring, no impact.			0			0	0	0		
199700565		Finalized	NWP 14	ALTA MESA, DRY CREEK, BRIDGE REPLACEMENT	No recorded impacts or mitigation. Record Holding 1023428			0			0	0	0		
199700650		Finalized	NWP 26	MATHER SPECIFIC PLAN AND HOUSING AREA	impacts 0.155. NOTE: Delineated acres are included in 2000-00006. Do not include any delineated figures here.			0			0.155	0.155			
199700678		Finalized	NWP 3	LAGUNA CREEK MITIGATION BANK, SACRAMENTO	0.007 perm imp not a loss. Needs to be reviewed with NWP 27/DEVMBA? No record in ORM of creation, only NWP 3 action.			5.87	Y	0.007					
199700708	RF	Pending	NWP 12, 43	Upper Laguna Creek Drainage Improvement and Trail System - WRDA Sac County	Outfall perm impacts not loss 0.10 acre			24.908	Y	0.1	0.095	0.095			
199700793		Finalized	PREAPPCONS	PEERY ARRILLAGA SUNRISE-DOUGLAS PROPERTY	Same as 2004-00707			0			0	0	0		
199800104		Pending	COMPCERT	ARROYO SECO MITIGATION BANK SITE, SACTO	No permit action, but is a known bank used for mit by other projects. Should probably be grouped with DEVMBA and/or NWP 27. JD only, 37.23 acres WOUS.			0			0				
199800148		Finalized	UNAUTHACT	KRAFT SEAWALL, TULLOCH	No impact			0			0	0	0		
199800155		Finalized	NWP 12, 14	KIEFER LANDFILL EXTRACTION/DUTRA PROPERY				0			0	0	0		
199800187		Finalized	LOP	LAGUNA CREEK PARTNERSHIP/FLOOD CNTL/SAC	CatX debris removal (800 cy from str). Impact placed in Other Mitigation. Unable to determine a delineation figure from this.			0	Y		0	0	0		Removal 800 cy from (str)
199800272		Finalized	NWP 14	AMTRAK/LIGHT RAIL EXPANSION TO FOLSOM	Review inclusion - rail, generally following hwy 50 from downtown Sac to Folsom.			0.376			0.376	0.38			

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199800288		Finalized	NWP 26	HARDESTER PARK - SOUTHGATE REC & PARK				0.103			0.103				
199800325		Finalized	SP	SLEEPY HOLLOW (FKA CALVINE MEADOWS)	Preservation acreage not entirely clear.			2.52			0.77	0.77	1.1		
199800330		Finalized	NWP 26	SHELDON PACIFIC PHASE I	Impacts an additional 0.01 acre wet on an adjacent site (whitehouse creek)			0.94			0.95	1.25			
199800350		Finalized	NWP 26	DIERKS RANCH/COUNTRY CLUB ESTATES/SAC CO				2.65			2.65	2.65	8.85		
199800424		Finalized	NWP 26	CALVINE/ELK GROVE-FLORIN COMMERCIAL				1.3			1.3	1.229			
199800451		Finalized	NWP 26	SIERRA HEALTH FOUNDATION COUNTRY ESTATES	Delineated UK, used impact figure.			0.06			0.06	0.06	0		
199800475		Finalized	PREAPPCONS	STATE ROUTE 16 REALIGNMENT	JD Only 0.37 acre WOUS			0			0	0	0		
199800485		Finalized	NWP 13	STONE LAKES/LEWIS RANCH PARCEL/RIPRAP	700 linear feet impacts. Assuming 1 cy per linear ft, surface area 5.197 x 700= 3638 sq feet. 0.084 acre perm impact not a loss.			0.084	Y	0.084	0	0	0		
199800504		Finalized	NWP 15	DELTA CROSS CHANNEL BRIDGE SEISMIC/RETRO				0			0	0	0		
199800566		Finalized	NWP 26	SHELDON PACIFIC PHASE II	Mitigate 0.21 create seasonal wet, OR mitigate in accordance with FWS (if 0.21 impacted is determined to be VP sp habitat). Decision was made to use what was known, so preservation component was not used.			4.69			0.21	0.21			
199800645		Finalized	SP PERMITMOD	ELLIOTT RANCH	See 1989-00090. This action is a mod to that SP. Delineation recorded in 1989-00090.			0			19.8	22			
199800653		Finalized	NWP 26	GALT INDUSTRIAL PARK: AVILA PROJECT				1.4			1.4	1.4			
199800681		Finalized	NWP 26	WEST VINEYARD STATION				0.06			0.06				
199800683		Finalized	SP	TRIANGLE ROCK PRODUCTS AGGREGATE MINE				7.6			4.03	11.34	10.26		
199800684		Finalized	NWP 26	ROBBINS VILLAGE				0.06			0.002				
199800696		Finalized	NWP 26	SHELDON PARK (PREVIOUSLY SHELDON 40)				1.47			1.47	0	0		
199900060		Finalized	LOP	FRANKLIN BLVD/THORNTON RD BRIDGE REPLACE	Approx half of project is in study area. Affects wetlands. Mokolumne, south side of study area. 0.74 "riparian habitat" credits and 1.38 shallow water hab credits for splittail both OUT STUDY AREA.			3.5			0.56	0	0	0.74 "riparian habitat" credits and 1.38 "shallow water habitat" credits for splittail both OUT STUDY AREA	
199900069		Finalized	NWP 26	REMINGTON ESTATES	Records Holding 1037120. There is a BO.			0.88			0.88	0.75	0		
199900069		Finalized	NWP 26 Inclusion	REMINGTON ESTATES	Row for FWS reqd mit			0			0	0.13	0.26		
199900110		Finalized	NWP 26	SHADOWBROOK SUBDIVISION	See 199000244. This is the same project, delineated acres are included in 199000244, not here. FWS mitigation was the only mitigation. All contents of this file have been transferred to 200700602.			0			0.257	0.257	0.514		
199900110		Finalized	NWP 26 Inclusion	SHADOWBROOK SUBDIVISION	Row for GGS amendment (33% used). Fund.			0			0	0	0	0.09 (Create wet) GGS FUND	

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199900118		Finalized	NWP 26	HARRIS RANCH	This project is the same as 1999-00312. Data is recorded here, but 99-00312 is likely the current file number (all it contains is a modification). There is an indication that applicant wanted to put remainder of wetland on-site into a preserve, but there is no record of vehicle to do so, therefore no on-site preservation was recorded here. Records Holding 1037122			13.33			0.96	0.63	0		
199900118		Finalized	NWP 26 Inclusion	HARRIS RANCH	Row for FWS reqd mit			0			0	0.33	1.82		
199900195		Finalized	PREAPPCONS	COSUMNES CORRECTIONAL FACILITY FENCE	No action in record.			0			0	0	0		
199900200		Finalized	NWP 14	MATHER SANITARY SEWER SYSTEM REHAB	No physical records. Sec 7 consult was initiated, for 0.06 permanent and 4.6 indirect, to (wet). No response or further info in record. Conservative estimate of FWS reqd mit was logged, but is actually uk.			4.66			0.06	0	0		
199900200		Finalized	NWP 14 Inclusion	MATHER SANITARY SEWER SYSTEM REHAB	Row for assumed 1:1, 2:1 FWS reqd mit.			0			0	0.06	0.12		
199900212		Finalized	NWP 12	LAGUNA CREEK WATERLINE CROSSING - AKT	Temp impacts only.			0.3			0	0	0		
199900299		Finalized	SP	GRANT LINE ROAD/SR 99 INTERCHANGE IMPROV	See 200701064. Impact and delineation info is confusing. Best estimates made from conflicting sources.			1.62			1.4242	2.63	0		
199900299		Finalized	SP Inclusion	GRANT LINE ROAD/SR 99 INTERCHANGE IMPROV	Row for FWS reqd mit.			0			0	0.89	1.78		
199900299		Finalized	SP PERMITMOD	GRANT LINE ROAD/SR 99 INTERCHANGE IMPROV	Delineated a combo of temp and permanent impacts.			0.046			0.033	0.04	0		
199900312		Finalized	NWP 26	HARRIS RANCH	Same project as 1999-00118. Data is recorded there, though this number is likely the current file number. Records Holding 1037128			0			0	0	0		
199900412		Finalized	NWP 26, 7	BOND ROAD FAMILY FITNESS CENTER OUTFALL	Records Holding 1037130. FWS mit is only mit. 0.04 perm imp (wet) not a loss.			0.04	Y	0.04	0	0.01	0.02		
199900412		Finalized	NWP 26, 7 Inclusion	BOND ROAD FAMILY FITNESS CENTER OUTFALL	Row for GGS mit (33.3% used), but was to be paid into PRES fund.			0			0	0	0	0.03 (Preserve Wet) paid into GGS FUND	
199900436		Finalized	NWP 7	LIVE OAK NORTH DRAINAGE IMPROVEMENT	Records Holding 1037132			0.94			0.94	1.01	0		
199900437		Finalized	NWP 26	SUMMERGATE PROPERTY NWP 26 REQUEST	Records Holding 1037132. FWS mit was only mit.			0.31			0.31	0.31	0.62		
199900439		Finalized	NWP 26	OAK BROOK APARTMENT COMPLEX-SPANOS,FOLSO	Delineation is estimated, from impacts.			0.02			0.02	0	0		
199900449		Finalized	UNAUTHACT	HOBDAY ROAD AND WOODS ROAD HOUSE CONSTRU	No Further action. Records Holding 1037132			4.242			0.112	0	0		
199900459		Finalized	NWP 26	RIO CONSUMES CORRECTIONAL PERIMETER	Records Holding 1037133. FWS mit was only mit reqd.			0.72			0.26	0.046	0.092		
199900501		Finalized	NPR	RANCHO SECO PHOTOVOLTAIC EXPANSION	X			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
199900516		Finalized	SP	ELK GROVE CREEK DRAINAGE	File on shelf.			7.23			0.854	1	3.07		
199900516		Finalized	SP Inclusion	ELK GROVE CREEK DRAINAGE	Row for FWS reqd mit, for SP.			0			0	0.044	0.202		
199900534		Finalized	NWP 26	SHELDON POINTE, UNIT #2 - SACRAMENTO CO	X			0.18			0.18	0	0		
199900590		Finalized	SP	Rio Del Oro - EIS	Addl 12.224 wet, and 0.721 other, isolated. All filled.	Y	12.945	56.632			27.9	13.288	76.15	2.98 (wet) enhance IN	
199900590		Finalized	SP Inclusion	Rio Del Oro - EIS	Row for addl Corps Reqd mit.			0			0	13	0		
199900618		Finalized	NWP 7	SHADOWBROOK OUTFALL, SACRAMENTO CO	Records Holding 1037169. No info in electronic files. Outfall considered 0.002 perm impact (str), not a loss.			0.002	Y	0.002	0	0	0		
199900653		Finalized	SP	FRANKLIN MEADOWS PROPERTY	Records Holding 1037170.			1.07			1.07	1.04	0		
199900653		Finalized	SP Inclusion	FRANKLIN MEADOWS PROPERTY	Row for FWS reqd mit.			0			0	0.03	0.06		
199900712		Finalized	SP	SILVER SPRINGS EAST (LOT P)	This project appears completed in ORM, but I believe was actually denied (confusion here). 2005-00325 is the "new" version of this file, but all actions currently withdrawn. Check to make sure no data is double counted between these two. Also, 2000-00780 is the mitigation property on which the creation mit would be performed for Lot P. There were previously existing wetlands onsite - check if these should be included as pres mit, and that they are not double counted.			10.78			10.78	10.78	20		
200000006		Finalized	NWP 26	MATHER AIRPORT CARGO EXPANSION	Records Holding 1037174. KATE SAID IGNORE. FWS mit was only mit. Note, delineated acreage includes all of 1997-00650. DO NOT put delineated acres in 1997-650.			1.73			1.01	1.01	2.1		
200000025		Finalized	SP	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	See 2003--00550. JD record unclear. Record extremely convoluted. Best available info. Non jurisdictional acreage AT LEAST 0.91 acres (wet). Portions of the delineated and impact figures may be outside SSHCP boundary, but isolating those figures is too difficult.	Y	0.91	84.184			13.655	9.815	0		
200000025		Finalized	SP Inclusion	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	Row for addl. Corps mit.			0			0	0.972	0		
200000025		Finalized	SP Inclusion	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	Row for addl. FWS mit.			0			0	2.75	0		
200000025		Finalized	SP Inclusion	EBMUD/SACRAMENTO COUNTY FREEPORT WATER	Row for addl. Corps mit.			0			0	11.2435	0		
200000055		Finalized	UNAUTHACT	KOSCHNER PROPERTY	No significant discharge. Closed.			0			0	0	0		
200000085		Finalized	NWP 14, 3	UNION PACIFIC RAILROAD GALT TO NEED	Records Holding 1037177. Only mitigation was FWS mit.			2.07			1.472	1.72	3.44		
200000085		Finalized	NWP 14, 3 Inclusion	UNION PACIFIC RAILROAD GALT TO NEED	Row for GGS mit (30% used)			0			0	0.51	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200000147		Finalized	NWP 26	BEAZER-MCGEE PROPERTY	Data is estimated based on applicant proposal. BO unavailable. Corps did not require mit in addition to FWS requirements.			0.067			0.067	0.067	0.134		
200000163		Finalized	NWP 14	FOLSOM BLVD. WIDENING	Records Holding 1037179			0.094			0.035	0.06	0		
200000163		Finalized	NWP 14 Inclusion	FOLSOM BLVD. WIDENING	Row for acreage increase via culvert construction.			0			0	0.009	0		
200000203		Finalized	LOP	SHELDON ESTATES PROJECT	File Loc UK, no regulator assigned. A BO exists, but no copy available., Reqmts UK. Logged data from best available info. Conservative estimate of 1:1, 2:1 FWS reqd mit used.			1.308			0.576	0	0.732		
200000203		Finalized	LOP Inclusion	SHELDON ESTATES PROJECT	Row for FWS reqd mit. Conservative estimate of 1:1, 2:1 FWS reqd mit used.			0			0	0.576	1.152		
200000227		Finalized	NWP 39	SADDLE CREEK AND PRINGLE AVENUE	File Loc UK, no regulator assigned. There is a BO, reqmts UK. Logged data from best available info.			0.47			0.47	0.47	0		
200000232		Finalized	NWP 14	KNUTSON ROAD	Records Holding 1037193.			0.095			0.095	0.095	0.19		
200000244		Finalized	UNAUTHACT	ABEID PROPERTY	Vountary Restoration. Temp impact only. Records Holding 1037194. Delineated acres estimated from temp impact.			0.01			0	0.01	0		
200000251		Finalized	PREAPPCONS	SUNRIDGE 530 (fka SUNRIDGE VILLAGE & PEERY-ARRILLAGA)	Same as 2004-00707. FRC box 077-2013-0772_6_of_10. Confusing because one SP was supposedly complete, yet everything else including all 2004-00707 have been withdrawn.			0			0	0	0		
200000260				STRAWBERRY CREEK REALIGNMENT AT CALVINE	DA Number not found, File Loc UK.			0			0	0	0		
200000298		Finalized	NWP 27	CONSUMNES RIVER SALMONID BARRIER PROJECT	FRC box 077-2013-0772_7_of_10. Temp impacts only. No mit in record. Unable to determine delineated area (no figure for temp impacts. Zeroed, as data unavailable.			0			0	0	0		
200000332		Finalized	PREAPPCONS	WAEGELL FAMILY RANCH - TRAXLER'S HILL	X			0			0	0	0		
200000403		Finalized	NWP 3, 33	LAGUNA CREEK PIPELINE	Records Holding 1037198. Appears all impacts temporary, no special conditions.			0.03			0	0	0		
200000414	RF	Withdrawn	SP	Suncreek EIS - Sierra Sunrise	Part of Big Five.JD and project info available. Data for all Suncreek is only logged in 2008-00795 (reviewed as a group), except for 2006-00604. Because projects are within Mather core recovery area and must comply with the Sunridge ROD, creation mit was assumed 1:1 out of UDA. Preservation figures come from PN for these projects, (applicant suggested on-site preserves).			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200000426		Finalized	NWP 13	MAHON LEVEE STABILIZATION	Records Holding 1037199. Str impacts only, 225 linear feet rip-rap is only info. 0.0268 perm impact (str) considered not a loss. Reveg is only mitigation. Delineated figure 225 x 160 (channel width), converted to acres. Impacts figure comes from assumed 1 cy per linear foot (1x5.197x5.197), so surface area is 5.197x225= 1169 sq ft.			0.83	Y	0.0268	0	0	0		
200000445		Finalized	NWP 39	KAPALUA ESTATES	On-site str acres is net increase via widened channel. Newly widened channel is preserved also, total of 2.56 acres.			1.2			0.22	1.58	0.98		
200000445		Finalized	NWP 39 Inclusion	KAPALUA ESTATES	Row for Corps reqd off site mit.			0			0	0.47	0		
200000470	RF	Pending	DEVMBA	NICOLAUS RANCH-W.FLINT MITIGATION AREA	Addl 1.6 acre pond, and 0.04 acre ditch non-jurisdictional. Creation acres are still proposed at time of this recording.	Y	1.64	1.93			0	36.75	0		
200000501		Finalized	NWP 3, 33	COSUMNES RIVER PIPELINE	Records Holding 1037202. Temp impacts only, to 200 linear feet of (str). Multiplied by channel width at location (85ft) to get rough acreage.			0.39			0	0	0		
200000523		Finalized	PREAPPCONS	SUNRISE COMMUNITY PLAN/WETLANDS PRESERVE	No Records			0			0	0	0		
200000634		Finalized	NWP 23	HWY. 16 GAP CLOSURE PROJECT	In study area. Records Holding 1037205.			0.378			0.102	0.18	0		
200000635		Finalized	SP	WRIGHT PARK (FKA TRIBUTARY POINTE)	Creation component likely satisfied both FWS and Corps reqs (VP creation).			1.49			0.42	0.42	1.07		
200000635		Finalized	SP Inclusion	WRIGHT PARK (FKA TRIBUTARY POINTE)	Row for FWS reqd mit.			0			0	0	3.22		
200000636		Finalized	NWP 39, 7	ELK GROVE UNIFIED SCHOOL DISTRICT/ALBIAN	Unclear how much of onsite preserve is what resource type. It is known that there are wet and str features in preserve, so total acres resources were divided by 2.			0.6			0.09	0	0.32		
200000636		Finalized	NWP 39, 7 Inclusion	ELK GROVE UNIFIED SCHOOL DISTRICT/ALBIAN	Row for FWS reqd mit.			0			0	0.08	0	0.16 (Preserve Wet) via CNLM Fund.	
200000644		Finalized	NWP 39	KYLE'S READY MIX	FWS mit requirements only.			0.4			0.06	0.112	1.264		
200100007		Finalized	SP	BRADSHAW 6 INTERCEPTOR	Only 2.13 temp impacts (Corps), but significant habitat impacts and mit (FWS). 0.4 (wet) Corps creation mit was covered by FWS mit.			7.62			0	0	0	0.473 enhanc (str) in Morrison Creek Watershed (in/out?)	
200100007		Finalized	SP Inclusion	BRADSHAW 6 INTERCEPTOR	Row for FWS reqd mit.			0			0	3.012	9.405		
200100007		Finalized	SP Inclusion	BRADSHAW 6 INTERCEPTOR	Row for FWS reqd GGS habitat. (33.3% used)			0			0	5.34	0		
200100008		Finalized	UNAUTHACT	SILVA PROPERTY	Likely a violation that needs investigation. However, this action has been "temporarily closed due to no time or resources". 5 year limit has passed. Zeros logged, as there is no info to record.			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200100012		Finalized	NWP 3	FLORES DAM REPAIR	File loc UK. Dam repair. For retention of fill, originally Unauth. Figures come from best available data.			0.16			0.16	0.16	0		
200100041		Finalized	LOP	COSUMNES PRESERVE PARKING LOT & TRAIL	File Loc UK. There was compensatory mitigation, though unclear how much. Assumption made of 1:1 creation on Cosumnes Preserve lands. Potential FWS mit (if any) was not considered.			4.503			1.8	1.8	0		
200100046		Finalized	NPR	MEISS ROAD BRIDGE REMOVAL	X			0			0	0	0		
200100048		Finalized	NWP 39, 7	PARKLAND/BUSTED FLAT RANCH-SACRAMENTO CO	Records Holding 1037210.			0.242			0.242	0.23	0	0.39 Riparian habitat OUT. Riparian habitat (not aquatic resource) was in lieu of buffers.	
200100048		Finalized	NWP 39, 7 Inclusion	PARKLAND/BUSTED FLAT RANCH-SACRAMENTO CO	Row for FWS reqd mit.			0			0	0.01	0.02		
200100062		Finalized	SP	POWELL PROPERTY / ROBBINS VILLAGE UNIT 4	File loc UK.			1.504			1.504	1.024	0		
200100062		Finalized	SP Inclusion	POWELL PROPERTY / ROBBINS VILLAGE UNIT 4	Row for FWS and Corps Reqd mit.			0			0	0.004	0.008		
200100101		Finalized	SP	SUNRISE DOUGLAS 2 MASTER FILE	Appears this file is just a JD, impacts probably in other projects.			0			0	0	0		
200100114		Finalized	SP	ZINFANDEL VILLAGES-SACRAMENTO CO	File loc UK.			2.03			1.5	0.09	0.82		
200100114		Finalized	SP Inclusion	ZINFANDEL VILLAGES-SACRAMENTO CO	Row for Corps reqd mit.			0			0	0.45	0		
200100114		Finalized	SP Inclusion	ZINFANDEL VILLAGES-SACRAMENTO CO	Row for Corps and FWS reqd mit.			0			0	4.84	1.21		
200100134		Finalized	NPR	EAST FRANKLIN SPECIFIC PLAN-SACRAMENTO	X			0			0	0	0		
200100151		Finalized	NWP 39, 13	TAMARINDO SUBDIVISION	Records Holding 1037249.			1.967			0.131	0	0	0.748 riparian habitat OUT of STUDY AREA. Riparian habitat (not a wet resource) was in lieu of buffers.	
200100151		Finalized	NWP 39, 13 Inclusion	TAMARINDO SUBDIVISION	Row for FWS reqd mit.			0			0	0.137	0.274		
200100154		Finalized	SP	TRIBUTARY POINT VILLAGE 4B, ROAD X'ING	RH 1037249. Delineated figure from impacts, since no other info is available.			0.07			0.07	0.07	0		
200100177		Finalized	NWP 14	FOLSOM SRA-GRANITE BAY RECREATIONAL	File loc UK, Will? Electronic record sparse.			0.099			0.006	0	0		
200100184				KIEFER LANDFILL BUFFER LANDS	No ORM, electronic or paper record. Extensive research cannot find evidence of this Project # or file.			0			0	0	0		
200100195		Finalized	SP	WILDHAWK/DUNMORE PROPERTY	File Loc UK. FWS mit served as Corps reqd mit.			1.83			1.83	1.83	3.66		
200100223		Finalized	PREAPPCONS	SACRAMENTO STORMWATER MAINTENANCE	File Loc UK. No electronic or ORM data.			0			0	0	0		
200100230		Finalized	SP	Sunridge Specific Plan Properties EIS - SUNRIDGE VILLAGE	FWS mit served as Corps reqd mit.			2.99			2.99	3.38	9.18		
200100252		Finalized	SP	SUNRIDGE PARK (AKA RONENBERG PROPERTY)	FWS mit served as Corps reqd mit.			2			1.81	3.39	0.19		
200100252		Finalized	SP Inclusion	SUNRIDGE PARK (AKA RONENBERG PROPERTY)	Row for addl Corps reqd mit.			0			0	0	10.4		
200100263		Finalized	NWP 29	MCNAIR PROPERTY	Records Holding 1037252. Data is currently best of available electronic info.			2.3			0.01	0.01	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200100307		Finalized	NWP 5	DELTA CROSS CHANNEL FLOW MONITORING STA	Records Holding 1037253. No impacts, no delineation record.			0			0	0	0		
200100403		Finalized	NWP 39	MEADOWS RANCHETTES	ATF			1.531			0.21	0.32	1.29		
200100403		Finalized	NWP 39 Inclusion	MEADOWS RANCHETTES	Row for FWS reqd mit. (GGS 33.3%)			0			0	0	0	0.171 (create wet) FUND. GGS 33.3%	
200100407		Finalized	NWP 7	EMERALD PARK COMPANY UNIT 22	0.03 perm imp (str) not a loss.			0.03	Y	0.03	0	0	0		
200100434		Finalized	SP	R&B ELK GROVE GILLIAM GAP CHANNEL DEVEL.	5.38 (wet) isolated, will be filled. File location UK, Finan? Delineation not available. Delineation figures are estimated from impacts figures.	Y	5.38	9.87			9.87	11.67	0		
200100434		Finalized	SP Inclusion	R&B ELK GROVE GILLIAM GAP CHANNEL DEVEL.	Row for FWS reqd mit.			0			0	3.58	7.16		
200100435		Finalized	SP	QUAIL RIDGE / FORMERLY BILBY 105	0.03 (wet) isolated. File location UK. Best info available.	Y	0.03	2.19			2.19	1.75	0		
200100435		Finalized	SP Inclusion	QUAIL RIDGE / FORMERLY BILBY 105	Row for addl FWS reqd mit.			0			0	0.44	0.88		
200100441		Finalized	NWP 39	MATHER EAST	X			3.07			0.39	0.13	2.68		
200100441		Finalized	NWP 39 Inclusion	MATHER EAST	Row for corps and FWS reqd mit.			0			0	0.2	1.6		
200100447		Finalized	NWP 39	MOHAMED ACRES	Corps and FWS reqd mit were unified.			0.14			0.14	0.14	0.28		
200100448		Finalized	SP	MONTELENA DJ ENTERPRISES SUNRIDGE	1.23 acre non-jurisdictional (other) - will be filled. Includes previous project numbers 1994-00212, 1994-00211, 1994-00159, 1994-00158, 1994-00157, 1993-00406.	Y	1.23	16.47			11.233	19.31	9.12		
200100491		Finalized	NPR	BONACCI PROPERTY	JD only			0			0	0	0		
200100531		Finalized	NWP 3	COSUMNES RIVER FLASHBOARD DAM REPAIR	0.227 perm imp (str) not a loss. Earlier NWP 3 exists, unable to determine from file what impacts were.			2.631	Y	0.227	0	0	0		
200100559		Finalized	SP	GALT RIVER OAKS	X			2.58			0.66	0.11	1.95		
200100559		Finalized	SP Inclusion	GALT RIVER OAKS	Row for the channel reroute creation acreage.			0			0	0.43	0		
200100559		Finalized	SP Inclusion	GALT RIVER OAKS	Row for addl FWS and Corps reqd mit.			0			0	0.25	0.5		
200100562		Finalized	SP	EAST FRANKLIN NORTH DRAINAGE	X			7.8			0.51	1.78	0		
200100562		Finalized	SP Inclusion	EAST FRANKLIN NORTH DRAINAGE	Row for addl Corps reqd mit.			0			0	3.4	0		
200100562		Finalized	SP Inclusion	EAST FRANKLIN NORTH DRAINAGE	Row for FWS reqd mit. (0.51 GGS creation was fully aquatic)			0			0	0.51	0		
200100584		Pending	SP	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Rows for this project are really SP MOD for a previously authorized SP. Figures are the most likely outcome. Since project was already authorized, considered complete, not RF. Modification is not yet completed. Figures deviate slightly from originally permitted SP.			26.45			8.08	5.05	5.6		
200100584		Pending	SP Inclusion	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Row for addl creation (increase in pond area). Proposed, not required.			0			0	2.08	0		
200100584		Pending	SP Inclusion	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Row for addl Corps reqd mit.			0			0	8.57	0		
200100584		Pending	SP Inclusion	VINTARA PARK (FKA BOND/WATERMAN PROPERTY	Row for addl FWS reqd pres mit. Creation was covered via Corps create requirement.			0			0	0	12.54		
200100605		Finalized	NPR	GREGG RETAINING WALL	X			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200100624		Finalized	PREAPPCONS	WILDLANDS SNODGRASS SLOUGH MITIGATION	Records Holding 1037258. No electronic records. ORM has no useful data. Preapp only.			0			0	0	0		
200100633		Finalized	SP	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Addl perm imp 0.54 (wet) isolated	Y	0.54	10.18			5.84	4.33	4.34		
200100633		Finalized	SP Inclusion	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Row for addl Corps reqd mit.			0			0	2.59	5.32		
200100633		Finalized	SP Inclusion	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Addl row for addl Corps reqd mit.			0			0	0	5.53		
200100633		Finalized	SP Inclusion	THE GROVE AT LAGUNA RIDGE (FKA BIGHORN)	Addl row for FWS reqd mit.			0			0	0	0.9	0.45 Create wet (VP Conservation Fund)	
200100641		Finalized	NWP 39	BACKER PROPERTY-LENNAR COMMUNITIIES	On-site preservation acreage is assumed to be remainder of resources after impact. No specific info in file.			0.34			0.13	0.13	0.21	0.83 (Riparian Habitat) credit, OUT uda	
200100708		Finalized	NWP 39	BISHOP RANCH SUBDIVISION	X			0.3			0.04	0	0.26		
200100708		Finalized	NWP 39 Inclusion	BISHOP RANCH SUBDIVISION	FWS mit served as Corps reqd mit.			0			0	0.04	0.08		
200100710		Finalized	SP	SMUD COSUMNES POWER PLANT	X			47.08			1.307	1.95	0		
200100710		Finalized	SP Inclusion	SMUD COSUMNES POWER PLANT	Addl row for FWS reqd mit, including GGS creation mit. (33.3% rule used).			0			0	13.833	19.7		
200100710		Finalized	SP Inclusion	SMUD COSUMNES POWER PLANT	For addl Corps and FWS reqd mit. Note creation component satified both Corps and FWS vp mit requirements.			0			0	3	0		
200100710		Finalized	SP Inclusion	SMUD COSUMNES POWER PLANT	Addl row for FWS reqd mit as per amended BO.			0			0	0.291	0.196		
200100744		Finalized	SP	GALAXIDAS/BILBY RANCH PROPERTY	X			0.39			0.39	0.39	0		
200100763		Finalized	NWP 32	Chester Drive Property	Creation mit component (on this line) satisfied both Corps and FWS requirements.			2.01			0.852	0.653	1.158		
200100763		Finalized	NWP 32 Inclusion	Chester Drive Property	Row for addl FWS reqd mit.			0			0	0.626	0		
200200094		Finalized	NWP 14, 7	CHANCELLOR ESTATES	X			1.23			0.045	0.12	0		
200200236		Finalized	NWP 39	KINGSBRIDGE SUBDIVISION	X			4.48			0.43	1.07	4.05	1.76 (wet) enhanced IN	
200200236		Finalized	NWP 39 Inclusion	KINGSBRIDGE SUBDIVISION	Row for FWS reqd mit.			0			0	0	4.25		
200200402		Finalized	NWP 3	BLODGETT DAM REPAIR PROJECT	Impacts to (str), but how much is not clear. Also, no delineation. Logged as zeros, info not available.			0			0	0	0		
200200410		Finalized	PREAPPCONS	NORTH VINEYARD STATION SPECIFIC PLAN	Pre-App only. Looking at projects 2003-00245, 2003-00251, 1993-00651.			0			0	0	0		
200200487		Finalized	LOP	SUN RIVER PROPERTY / WETLAND RESTORATION				397.4			10.97	26.16	0	16.91 (str), and 319.15 (wet) enhanced OUT.	
200200523		Finalized	NWP 39	R&B EAST MEADOW PROJECT	Creation mit credits satisfied both Corps and FWS requirements.			0.06			0.06	0.06	0.12		
200200527		Finalized	NWP 39	R&B ALBIANI PROPERTY	0.005 (wet) isolated. NFWF payment was accepted by FWS as suitable to meet their creation requirement. FWS preservation credits were put on this row.	Y	0.005	0.081			0.081	0	0.27		
200200537		Withdrawn	SP	MORVAI PROPERTY-NORTH VINEYARD STATION	This permit appears to have been withdrawn for the time being. ORM does not reflect this. Delineation and impact info available.			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200200538		Finalized	SP	SHELDON ROAD/STATE ROUTE 99 INTERCHANGE	X			2.73			0.67	1.14	0		
200200538		Finalized	SP Inclusion	SHELDON ROAD/STATE ROUTE 99 INTERCHANGE	Row for addl Corps reqd mit.			0			0	0.19	0		
200200538		Finalized	SP Inclusion	SHELDON ROAD/STATE ROUTE 99 INTERCHANGE	Row for addl FWS reqd mit.			0			0	1.101	2.99		
200200561	RF	Pending	EIS	MATHER FIELD MASTER EIS	See 200900880. Also, all permits withdrawn and are now part of 2009-00525 through 00530. Delineated waters for all of these projects is logged here.			90.64			0	0	0		
200200568		Finalized	SP	Sunridge Specific Plan Properties EIS - DOUGLAS ROAD 98	X			3.91			3.91	3.91	7.82		
200200568		Finalized	SP Inclusion	Sunridge Specific Plan Properties EIS - DOUGLAS ROAD 98	Row for addl FWS reqd mit.			0			0	0	7.82		
200200577		Withdrawn	NWP	NGUYEN CHURCH	PM unable to contact applicant. Work (culvert through dry creek) likely completed without permit. No figures available to log.			0			0	0	0		
200200589		Finalized	NWP 39	BRADSHAW VINEYARDS HOUSING	0.04 isolated (wet). Mary has file.	Y	0.04	0.255			0.001	0	0.254		
200200589		Finalized	NWP 39 Inclusion	BRADSHAW VINEYARDS HOUSING	Row for FWS GGS mit (33.3% used) Paid into fund (how to log?			0			0	0	0	0.212 (create wet) FUND. For GGS (33.3% used)	
200200614		Finalized	UNAUTHACT	15-ACRE WOODS RD. PROJECT	Probably impacts, but closed as "no further action" in 2009. Delineation verified 1.23 acres (wet). include?? Decision NO.			0			0	0	0		
200200634		Finalized	NWP 29	GARFOOT GREENS PROPERTY	FWS required additional mitigation, but Corps determined those areas of effect to be outside Corps project area. BO was not considered requisite to Corps verification. Addl FWS mit figures were not included.			2.204			0.134	0.134	0		
200200637		Finalized	NWP 14, 39	VISTA CREEK VILLAGE PROJECT	Not clear what impacts were permanent. Defaulted to all permanent.			0.44			0.44	0.07	0		
200200637		Finalized	NWP 14, 39 Inclusion	VISTA CREEK VILLAGE PROJECT	Row for FWS reqd mit.			0			0	0.37	0.74		
200200638	RF	Pending	SP	Emerald Estates	X			1.917			1.06	1.06	0.85		
200200638	RF	Pending	SP Inclusion	Emerald Estates	Row for addl Corps reqd mit. Note this figure was subtracted from FWS reqd preservation below. It appears Corps and FWS VP mits are not independent, but are part of same total.			0			0	0	2.12		
200200638	RF	Pending	SP Inclusion	Emerald Estates	Row for FWS reqd mit. See note above for Corps reqd mit.			0			0	0	7.5		
200200724		Finalized	NWP 39	BEAZER ELLIOTT RANCH EAST	X			0.26			0.26	0.26	0		
200200727		Finalized	NWP 39	COVENTRY PROJECT	X			0.278			0.109	0	0		
200200727		Finalized	NWP 39 Inclusion	COVENTRY PROJECT	Row for FWS reqd mit.			0			0	0	0.06		
200200728		Finalized	SP	WILDHAWK NORTH PROPERTY	0.65 isolated (other), 1.47 isolated (wet)	Y	2.12	7.36			2.38	0	4.98		
200200728		Finalized	SP Inclusion	WILDHAWK NORTH PROPERTY	Row for FWS reqd mit. Note creation component satisfies both Corp and FWS requirements.			0			0	4.41	10		
200200770		Finalized	NWP 39	CREEKSIDE UNIT NO. 4 PROPERTY	Preserve acreage approximate - no figure in record.			0.014			0.014	0	2.7		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200200770		Finalized	NWP 39 Inclusion	CREEKSIDE UNIT NO. 4 PROPERTY	Row for FWS reqd mit.			0			0	0.014	0.28		
200200770		Finalized	NWP 39 Inclusion	CREEKSIDE UNIT NO. 4 PROPERTY	Row for FWS reqd mit (GGS) - 33.3% rule used.			0			0	0.25	0		
200200773		Finalized	NWP 39	NEWTON RANCH 2	X			0.283			0.283	0.283	0.566		
200200782		Finalized	NWP 12, 33	LAGUNA INTERCEPTOR EXTENSION PROJECT	Large impact, all but 0.002 acre (wet) was temporary. Addl 5.67 acres temp impact to (wet).			75.94			0.002	0.22	0		
200200782		Finalized	NWP 12, 33 Inclusion	LAGUNA INTERCEPTOR EXTENSION PROJECT	Row for FWS reqd mit. GGS habitat, 33.3% rule used.			0			0	1.502	0		
200200788		Finalized	NWP 14, 33	BRADSHAW ROAD BRIDGE REPLACEMENT AT MORR	See 2003-00811. 0.373 acres of Morrison Creek was delineated as part of that project, but it was not included there (this project overlaps). Log that 0.373 here. Impacts to Morrison Creek (for this project) are supposedly 0.037 acres.			0.373			0.01	0	0	0.01 paid into Sac County Wetland Restoration Trust Fund (Create wet?)	
200200808		Finalized	SP	SHELDON PLACE	Row for Sheridan portion of creation mit. Creation mit apparently met Corps and FWS requirements. FWS pres is also included in this row.			0.76			0.76	0.55	1.52		
200200808		Finalized	SP Inclusion	SHELDON PLACE	Row for Clay Station portion of creation mit.			0			0	0.21	0		
200300048		Finalized	NWP 44	TEICHERT PRAIRIE CITY SITE	Creation mit apparently met Corps and FWS requirements. FWS pres is also included in this row.			0.22			0.22	0	0.8	0.22 (create wet) Paid into CNLM fund.	
200300050	RF	Withdrawn	SP	Teichert Aggregates Quarry 404-acre	Addl 0.314 isolated (wet). Delineation and impact/project info available.	Y	0.314	6.99			3.15	3.15	3.334		
200300105		Finalized	NWP 32	LAKEMONT DRIVE 8	See 1990-00244. Delineation figures are in that project. Also see 1999-00110. This project is just the violation impacts and resolution.			0			0.12	0	0		
200300111		Finalized	NWP 29	ALBIANI EXCELSIOR ROAD PROJECT	X			0.42			0.32	0.32	0.1		
200300111		Finalized	NWP 29 Inclusion	ALBIANI EXCELSIOR ROAD PROJECT	Row for FWS reqd mit.			0			0	0.32	0.64		
200300128		Finalized	NWP 14, 33	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Addl 0.456 acres (wet) non-jurisdictional. Also, Excavation (perm imp not loss) of 0.03 (str) and 0.04 (wet). Learned in another project (2005-01061) that THIS one inadvertently filled addl 0.05 acres wet. Only 0.02 of this was included in delineation for this project, so addl 0.03 wet was added to delineated field.	Y	0.456	0.48	Y	0.07	0.1388	0	0		
200300128		Finalized	NWP 14, 33 Inclusion	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Row for FWS reqd mit (vp)			0			0	0.076	0.042		
200300128		Finalized	NWP 14, 33 Inclusion	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Row for FWS reqd mit (GGS) - 33.3% rule used.			0			0	0.969	0		
200300128		Finalized	NWP 14, 33 PERMITMOD	CALVINE RD WIDENING,KINGSBURG-VINEYARD	Row for inadvertant fill and acreage not included in original delineation.			0.03			0.05	0	0		
200300150		Finalized	UNAUTHACT	SACRAMENTO CONCRETE INC.	Appears resolved. No Corps documents in file…			0			0	0	0		
200300164		Withdrawn	NWP	REC DIST NO. 800 COSUMNES RIVER MAINTNCE	Withdrawn because applicant decided mitigation not financially feasible. No new plan on record.			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200300177		Finalized	UNAUTHACT	RICE PROPERTY	Resolved in 2000-00644			0			0	0	0		
200300245		Pending	SP PERMITMOD	NORTH VINEYARD STATION DRAIN MASTER PLAN	Modification not complete. Adds addl delineated acres. A detention basin will be built, destroying waters. Since acreage of basin is unknown, creation figure comes from impacts.			1.19			0.086	0.086	0		
200300245		Finalized	SP	NORTH VINEYARD STATION DRAIN MASTER PLAN				18.097			16.328	24.18	0		
200300245		Finalized	SP Inclusion	NORTH VINEYARD STATION DRAIN MASTER PLAN	Row for Addl Corps and FWS reqd offsite mit			0			0	0.546	0		
200300245		Finalized	SP Inclusion	NORTH VINEYARD STATION DRAIN MASTER PLAN	Row for Addl Corps and FWS reqd offsite mit.			0			0	3.506	1.815		
200300251		Finalized	SP	VINEYARD CREEK	X			2.688			2.688	3.696	0		
200300251		Finalized	SP Inclusion	VINEYARD CREEK	Row for FWS reqd mit. Creation component required by FWS appears to have been met with Corps reqd create component.			0			0	0	2.186		
200300253		Finalized	PREAPPCONS	EAST ELK GROVE / TRIANGLE AREA	Info transferred to 1999-00516 Elk Grove Creek Drainage.			0			0	0	0		
200300286		Finalized	NWP 29	FRANKLIN CROSSING (FKA SOUTH BILBY80	Authorization to fill remaining acres authorized by original NWP 39, work was not finished. No additional changes.			0			0	0	0		
200300286		Finalized	NWP 39	FRANKLIN CROSSING (FKA SOUTH BILBY80	Addl 0.141 acre pond (other), and another 0.141 acre (str), delineated but non-jurisdictional.	Y	0.282	0.26			0.26	0.26	0		
200300337		Finalized	SP	BRADSHAW ROAD WIDENING, FLORIN-CALVINE	See 2003-00626. Subtracted 0.0231 (wet) from this delineation as it was included in 2003-00626. Actual value delineated for (str) was not clear, so added temp and perm impacts to get figure. Addl 0.09 isolated (wet).	Y	0.09	2.0969			0.6591	0.659	0		
200300337		Finalized	SP Inclusion	BRADSHAW ROAD WIDENING, FLORIN-CALVINE	Row for FWS reqd mit.			0			0	1.337	3.524		
200300352		Finalized	UNAUTHACT	RISSLING PROPERTY VIOLATION	File not on shelf - Ness? No further action. No electronic records.			0			0	0	0		
200300397		Finalized	RGP	ELK GROVE STREAM MAINT. GENERAL PERMIT	All impacts temporary. Previously permitted projects should include delineated waters for this area.			0			0	0	0		
200300440		Finalized	PREAPPCONS	DOUGLAS BUISNESS PARK	No info in file.			0			0	0	0		
200300550	RF	Pending	UNAUTHACT	VINEYARD INVESTORS ASSOCIATES VIOLATION	Settlement agreement not finalized. No mitigation figures. 1:1 creation mit assumption based on record. 2000-00025 impacted features on this site, but that project wasn't included in spreadsheet because of GIS geometry. If included later, remove SW4 (0.138), SW7 (2.271), and SWS1 (1.045) (all wet) from delineated figures HERE. Impacts to those features would be included in 2000-00025. THIS HAS BEEN DONE.			15.656			3.33	3.33	0		
200300626		Finalized	LOP	TAYLOR PROPERTIES GERBER & BRADSHAW ROAD	See 2003-00337			1.0645			0.8787	0.8787	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200300626		Finalized	LOP Inclusion	TAYLOR PROPERTIES GERBER & BRADSHAW ROAD	Row for FWS reqd mit.			0			0	0.793	0.9706		
200300669	RF	Pending	SP	East Sacramento Ranch	Additional UNAUTHACT, closed "no further action", some fill likely occurred, unclear how much.			22.23			4.48	6.4	17.75	3 rehabilitation VP, IN uda.	
200300674		Finalized	NWP 14	NAVIGATOR MEMORIAL PHASE II @ MATHER	File missing, no electronic info. Not on shelf - Ness? (doesn't have it). Logged with zeros, as info was not retrievable.			0			0	0	0		
200300675		Withdrawn	UNAUTHACT	HAGLER PROPERTY WETLANDS	No info in file			0			0	0	0		
200300697		Withdrawn	NWP 14	SUNRIDGE SPECIFIC PLAN ROAD IMPROVEMENTS	Will believes this project would have been wrapped up into another Sunridge project(s). So, in a sense, not RF. Delineation and impact/project info available.			0			0	0	0		
200300717		Finalized	NWP 12	MATHER GROUNDWATER SYSTEM	X			0.01			0.005	0.025	0		
200300736		Finalized	NWP 13	MCCORMACK-WILLIAMSON TRACT EROSION REPAI	File not on shelf - Imamura does not have it. Impacts/delineated estimated. 0.2 acre (str) considered perm impact not loss.			0.2	Y	0.2	0	0	0		
200300777		Finalized	NWP 39	SCHNITZER STEEL EXPANSION	X			0.17			0.167	0.167	0		
200300796		Finalized	UNAUTHACT	AZIZ PROPERTY	May be violation, but never pursued. No additional info.			0			0	0	0		
200300811		Finalized	NWP 14, 33	BRADSHAW ROAD IMPROVEMENT JACKSON-FLORIN	Delineated does not include 0.373 acres of Morrison Creek (should get logged in 2002-00788). Mitigation includes restoration of 0.303 temp impacts (on-site) and off-site creation to mit for 0.101 acres perm impact. No data for off-site. Assumed in-kind, at Browns Creek VP preserve.			1.141			0.101	0.101	0		
200400012		Finalized	NWP 27	SOUTH STONE LAKE GGS MITIGATION PRESERVE	FWS required 4.4 acres GGS habitat (1.467 is 33.3%), which project self-mitigated. (ie, that acreage not available for other projects to use as mitigation).			2.06			1.34	1.467			
200400088		Finalized	NWP 39	EAST MEADOW III	X			0.016			0.016	0.016	0		
200400091		Finalized	SP	WILDHAWK SOUTH PROPERTY	Addl 0.34 (wet) isolated. Feature filled.	Y	0.34	0.954			0.954	1.29	0		
200400091		Finalized	SP Inclusion	WILDHAWK SOUTH PROPERTY	Row for FWS reqd mit. Creation component for GGS habitat (33.3% used), AND unclear if result is bank or fund.			0			0	0	0	0.14 (create wet) Bank OR Fund. For GGS (33.3% used)	
200400092		Finalized	NWP 39	BMD PROPERTIES EXPANSION PROJECT	No JD. Can only discern impacted waters.			0.03			0.03	0.1	0		
200400116	RF	Withdrawn	SP	Cordova Hills	One of Big Five. Delineation and impact/project info available.			89.106			39.63	39.63	65.138		
200400126		Finalized	NWP 38	FRANKLIN FIELD LANDFILL CLOSURE	Note large difference between delineated and impacts.			71.38			0.042	0	0		
200400126		Finalized	NWP 38 Inclusion	FRANKLIN FIELD LANDFILL CLOSURE	Row for FWS reqd mit. Note: preservation acres probably paid into fund (known paid, but no record where).			0			0	0.022	0	0.644 (Preserve wet), paid into FUND	
200400181		Finalized	NWP 39	MERITAGE BRITSCHGI PROPERTY	Addl 0.061 (wet) non-jurisdictional. All filled.	Y	0.061	0.083			0.083	0.077	0		
200400182		Finalized	NWP 14, 33	BOND ROAD WIDENING	Note: NFWF req was in original permit, but not in modification. However, applicant had already paid into fund.			1.87			0.38	0.38	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200400182		Finalized	NWP 14, 33 Inclusion	BOND ROAD WIDENING	Row for FWS reqd mit. Create component for GGS (33.3% used).			0			0	1.159	0		
200400244		Withdrawn	SP	GAP SPECIFIC PLAN (AKA FLORIN-VINEYARD)	Inactive. Projects once part of this group have been reviewed separately.			0			0	0	0		
200400254		Finalized	SP	LENT RANCH	0.042 (str) impacts occur off-site (but not on any other numbered project site). This figure has been included in impacts and delineated acres for this project.			3.69			3.015	3.015	0.42		
200400254		Finalized	SP Inclusion	LENT RANCH	Row for FWS reqd mit. Creation component for GGS habitat (33.3% used).			0			0	3	0.908		
200400255		Finalized	NWP 29	MORVAI NORTH				1.635			0.152	0.152	1.483		
200400255		Finalized	NWP 29 Inclusion	MORVAI NORTH	Row for FWS reqd mit. Note creation component identical to Corps requirement. Only recorded once above.			0			0	0	0.304		
200400274		Withdrawn	NWP 39	NORTH VINEYARD GREENS UNIT #3	Inactive. This project # is wrapped up into 2006-00428.			0			0	0	0		
200400281		Finalized	NWP 14, 33	LEWIS STEIN ROAD EXTENSION PROJECT	X			3.85			0.301	0	0		
200400281		Finalized	NWP 14, 33 Inclusion	LEWIS STEIN ROAD EXTENSION PROJECT	Row for FWS reqd mit. (GGS 33.3%)			0			0	3.06	0		
200400294		Finalized	UNAUTHACT	GRIMES PROPERTY	Closed, 5 years passed since Corps became aware of violation. The only info is 0.80 acres fill to wet and str.			0.8			0.8	0	0		
200400298		Finalized	NWP 7, 32	BELL SOUTH / SIERRA HOLDINGS	Incomplete ATF NWP. Note, data is taken from best info available. No Corps or FWS reqd mit could be recorded. Data in creation is on-site proposed. Project is probably complete, though no record of final permit exists.			4.338			0.22	2.35	0		
200400303		Finalized	NWP 14	MATHER BIKE TRAIL	Delineation part of other projects. The only mitigation is FWS reqd preservation (wet).			0			0.004	0	0.112		
200400339		Finalized	NWP 39	SYCAMORE GROVE	X			0.17			0.17	0	0		
200400350		Finalized	NWP 14	BRUCEVILLE WIDENING	ATF			0.02			0.02	0.02	0		
200400409		Finalized	NWP 39	BRADSHAW CHRISTIAN HIGH SCHOOL	Has not been constructed, mitigation has not been established. Applicant not content with permit conditions as of 2007. No file activity since then.			2.499			0.291	1.154	2.208		
200400431		Finalized	NWP 27	COSUMNES PRESERVE WETLAND ENHANCEMENT	1.65 acres (wet) impacts via movement of soil to create islands. Net gain of 0.5 (wet)			153.6			1.65	2.15	0		
200400435		Withdrawn	LOP	PANATTONI BUSINESS PARK	Only upland portion of project built. Applicant reapplied to fill wetlands, but never sent requested info. Corps withdrew.			0			0	0	0		
200400458		Finalized	SP	Sunridge Specific Plan - Arista del Sol	Includes Grantline 220 proposed impacts and mitigation in figures. (See 2006-00604)			17.78			13.53	0.64	3.76		
200400458		Finalized	SP Inclusion	Sunridge Specific Plan - Arista del Sol	Row for Corps and FWS reqd mit. Mit was to be conducted in Mather Core Area if possible (IN).			0			0	10.1	19.47		
200400474		Finalized	LOP	VINEYARD MARKET SQUARE (BADELLA PROPERTY)	X			0.991			0.991	0.991	0		
200400474		Finalized	LOP Inclusion	VINEYARD MARKET SQUARE (BADELLA PROPERTY)	Inclusion for FWS required mit.			0			0	0.138	0.276		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200400515		Finalized	SP	Glenborough at Easton and Easton Place	Addl 2.111 (wet) and 2.594 (other) isolated. All isolated are permanently impacted. How to categorize? File contained no record of the actual used mit bank location. UK was added to field.	Y	4.705	23.161			4.483	5.283	17.788		
200400555		Finalized	SP	Bottimore Property	X			3.326			2.563	3.132	0		
200400555		Finalized	SP Inclusion	Bottimore Property	Row for FWS reqd mit.			0			0	0	0.882		
200400564		Withdrawn	NWP 39	STONE HOUSE ROAD ELEMENTARY SCHOOL	X			0			0	0	0		
200400570		Finalized	NWP 39	Los Rios Community College District CRC Elk Grove Center Site	X			0.433			0.433	0.43	0		
200400629		Finalized	NWP 39	East Lawn Elk Grove Memorial Park Expansion Project	X			20.026			0.4	0.4	0		
200400640		Finalized	NWP 27	LAGUNA TERRACE MITIGATION SITE	Creation/restoration figures extrapolated from existing waters vs explanation of acres created or restored. Unclear from documentation.			5.95			0.46				
200400640		Finalized	NWP 27 Inclusion	LAGUNA TERRACE MITIGATION SITE	Addl row for project activities.			0			0				
200400640		Finalized	NWP 27 Inclusion	LAGUNA TERRACE MITIGATION SITE	Addl row for project activities.			0			0				
200400707	RF	Withdrawn	SP	The Ranch at Sunridge	Data taken from FWS datasheet. Original creation mit was going to be more than 1:1. Original impacts about 4 acres more…			21.45			10.48	10.48	10.97		
200400763		Finalized	SP	CENTRAL GALT INTERCHANGE	0.124 acre (str) non jurisdictional.	Y	0.124	3.437			2.143	1.4	0		
200400763		Finalized	SP Inclusion	CENTRAL GALT INTERCHANGE	Addl row for addl Corps reqd mit.			0			0	1.49	0		
200400782		Finalized	NWP 39	SECURITY PARK-GOLD FLAKE COURT	X			0.191			0.191	0	0		
200400782		Finalized	NWP 39 Inclusion	SECURITY PARK-GOLD FLAKE COURT	Row for FWS reqd mit.			0			0	0	0.786	0.056 (Create wet) Fund OR credits	
200400790		Finalized	NWP 29	HEDGE 22 PROPERTY (DEANE MCCOY ROAD)	Create component was called "VP habitat" by both FWS and Corps. No actual purchase records yet. FWS req was slightly greater but decision was made that FWS and Corps were asking for a single thing. Only the greater 0.291 acres was used for creation acres logged.			0.271			0.271	0.291	0		
200400790		Finalized	NWP 29 Inclusion	HEDGE 22 PROPERTY (DEANE MCCOY ROAD)	See Above Note. Row for FWS reqd mit.			0			0	0	0.582		
200400791	RF	Withdrawn	SP	EXCELSIOR ESTATES	One of Big Five. Delineation and impact/project info available. Applicant has proposed creation mitigation at a 1.3:1 ratio (this is what was logged). This mit is assumed to be outside the watershed and UDA.Preservation figure is also proposed at this time. Addl 13.61 acre isol/non jd, all filled.	Y	13.61	39.81			28.77	37.401	11.04		
200400802		Finalized	NWP 27, 33	BROWNS CREEK MITIGATION SITE	X			14.43			0				

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200500137		Finalized	UNAUTHACT	LOW/OSTER PROPERTY	Voluntary Restoration, Though no record of post-restoration in file. 0.02 (wet) was filled. Use this proj as another example of "should we be counting delineated on projects with no impacts?"			0.02			0	0	0		
200500221		Finalized	NWP 14, 33	FRANKLIN BOULEVARD WIDENING	Addl 0.12 isolated str.	Y	0.12	3.94			0.032	0	0		
200500221		Finalized	NWP 14, 33 Inclusion	FRANKLIN BOULEVARD WIDENING	Row for FWS reqd mit. Requirement for GGS was 0.6 preserve habitat, via fund OR preserve credit. Result uk. (33.3% is 0.2 wet)			0			0	0	0	0.2 Preserve Wet via fund OR credit. (GGS, 33.3% rule used)	
200500226		Finalized	NWP 14	GRANT LINE AND BOND ROAD INTERSECTION	X			0.455			0.39	0.56	0		
200500226		Finalized	NWP 14 Inclusion	GRANT LINE AND BOND ROAD INTERSECTION	Row for Corps reqd (wet) credits.			0			0	0.048	0		
200500226		Finalized	NWP 14 Inclusion	GRANT LINE AND BOND ROAD INTERSECTION	Row for FWS reqd pres (wet) credits.			0			0	0	0.52		
200500227		Finalized	PREAPPCONS	SUNRISE DOUGLAS ELECTRIC DISTRIBUTION	X			0			0	0	0		
200500325		Withdrawn	SP	SILVER SPRINGS EAST (LOT P)	See 1999-00712. Data logged there.			0			0	0	0		
200500371		Finalized	SP	INACTIVE RANCHO CORDOVA TEST SITE	Note all waters on-site were delineated in other projects, so no data has been logged here. No Impacts.			0			0	0	0		
200500398		Finalized	NWP 39	WULF/ALVAREZ PROPERTY	X			0.45			0.45	0.422	0		
200500398		Finalized	NWP 39 Inclusion	WULF/ALVAREZ PROPERTY	Row for FWS reqd mit.			0			0	0	0.3	0.15 (creat wet) Bank OR Fund	
200500438		Finalized	UNAUTHACT	8090 VINEYARD ROAD PROPERTY	Closed, no further action. Also, County may have required landowner to remove fill.			0			0	0	0		
200500461		Finalized	NWP 3	LOST SLOUGH BRIDGE MAINTENANCE	Bridge maintenance, no impact.			0.052			0	0	0		
200500516		Finalized	NWP 39	JAS-LARSON PROPERTY	0.07 temp imp only.			0.07			0	0	0		
200500525		Finalized	NWP 39	TRIANGLE POINT	See 201100033 and 200601045. 0.6 str and 0.44 wet delineated have been added to account for other projects that impact this site. Impacts for those are logged in their respective rows.			1.54			0.4	0.4	0		
200500531		Finalized	NWP 39	AMERICA'S CHOICE HIGH SCHOOL SITE	0.026 acres (wet) isolated.	Y	0.026	0.149			0.149	0	0		
200500531		Finalized	NWP 39 Inclusion	AMERICA'S CHOICE HIGH SCHOOL SITE	Row for FWS reqd mit.			0			0	0	0	0.175 (create wet) fund, FWS VP creation account. 0.35 (Preserve Wet) Bank or fund	
200500536		Finalized	NWP 29, 39	JACKSON PROPERTY	Actual delineated acreage lower, but applicant revised impacts and no new jd was performed.			0.465			0.465	0.473	0		
200500575		Withdrawn	UNAUTHACT	PRINGLE, CHARLES	X			0			0	0	0		
200500576		Finalized	UNAUTHACT	PRUITT, LLOYD	Closed. No Fill. No further action.			0			0	0	0		
200500577		Finalized	NWP 14	GREENE, SCOTT	X			0.001			0.001	0	0		
200500588		Finalized	NWP 23	STATE ROUTE 16 AND EXCELSIOR ROAD SAFETY	X			1.22			0.61	0.74	0		
200500588		Finalized	NWP 23 Inclusion	STATE ROUTE 16 AND EXCELSIOR ROAD SAFETY	Row for FWS reqd mit. Note creation component is fund, not credits!			0			0	0	1.48	0.74 create wet FUND	
200500594		Finalized	NWP 39	PARKSIDE PROJECT ON ORANGE AVENUE	X			0.091			0.091	0.07	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200500594		Finalized	NWP 39 Inclusion	PARKSIDE PROJECT ON ORANGE AVENUE	Row for addl Corps reqd mit.			0			0	0.056	0		
200500594		Finalized	NWP 39 Inclusion	PARKSIDE PROJECT ON ORANGE AVENUE	Row for addl FWS reqd mit. Note, creation AND preservation may be by fund OR credits, can't tell.			0			0	0	0	0.021 creat wet fund or credit. 0.042 preserv wet, fund or credit.	
200500649		Pending	PREAPPCONS	SILVA RANCH MITIGATION SITE	Mitigation site for Anatolia (1901-10021)			0			0	0	0		
200500652		Finalized	NWP 39	JAS - NORTH VINEYARD 10 PROPERTY	X			0.18			0.18	0	0		
200500652		Finalized	NWP 39 Inclusion	JAS - NORTH VINEYARD 10 PROPERTY	Row for FWS reqd mit. Creation may be by fund or credits, can't tell.			0			0	0	0.04	0.02 Wet Creat may be by fund or credits.	
200500674		Withdrawn	NWP 39	FLORIN-BRADSHAW 43	X			0			0	0	0		
200500698		Finalized	NWP 14, 33	WILTON ROAD CULVERT REPLACEMENT PROJECT	Delineated from temp + perm impact acreages. Unable to determine split of resource acreages, so split evenly between wet and str.			0.28			0.09	0	0		
200500734		Finalized	UNAUTHACT	BRADSHAW INTERCEPTOR, SECTION 7	See 2009-00525 through 00530. All features are a part of larger Mather project. Delineated acres can be found there.			0			0.002	0	0		
200500734		Finalized	UNAUTHACT Inclusion	BRADSHAW INTERCEPTOR, SECTION 7	Row for FWS required mit.			0			0	0	0.74	0.18 funds placed in FWS VP (wet) creation acct.	
200500750		Finalized	PREAPPCONS	MATHER AIRPORT AREA	KATE SAID IGNORE.			0			0	0	0		
200500852		Finalized	PREAPPCONS	WESTBOROUGH AT EASTON	JD and project/impact info available in paper file. Did not go further than JD stage, don't know why.			0			0	0	0		
200500883		Finalized	NWP 29	MARTIN PROPERTY PROJECT	Permit was reverified to combine FWS and Corps requirements for creation credits.			0.048			0.048	0.048	0.096		
200500888		Pending	EIS	Suncreek Specific Plan _ Master File	One of Big Five. File exists as 6 other SPs: 200000414, 200600602, 603, 604, 605, and 200800795. All withdrawn at present (06/12/13).			0			0	0	0		
200500902		Finalized	NWP 7	CITY OF GALT WASTEWATER OUTFALL	0.007 perm imp (wet) not loss			0.007	Y	0.007	0	0	0		
200500906		Finalized	NWP 3, 33	ELK GROVE OUTFALL PIPE MAINTENANCE	22 locations/permits, rows removed for clarity. 0.076 (str) impacts are for sediment removal, not a loss.			0.076	Y	0.076	0	0	0		
200500956		Finalized	PREAPPCONS	SHELDON/BRADSHAW ROAD EXPANSION PROJECT	NPR. JD Available.			0			0	0	0		
200500958		Finalized	NWP 12	Elk Grove Water Service Pipeline	0.003 temp impacts only.			1.28			0	0	0		
200500977		Finalized	UNAUTHACT	SMUD EMERGENCY 12 KV REPAIR, ELK GROVE	Closed. Voluntary restoration.			0			0	0	0		
200500978		Finalized	NWP 3	LINE SECTION 9 PIPELINE ANOMALY REPAIRS	Resources are 'riparian wetland'. Temp impacts only. 0.04 preservation was FWS reqd for GGS (33.3%).			0.104			0	0.1	0.04		
200500990	RF	Withdrawn	SP	Kwan Elder Creek Estates Property	New PJD in, probably reasonably foreseeable. JD info available.			0.1			0.1	0.1	0		
200501045		Finalized	UNAUTHACT	COYOTE HILLS PROJECT	Closed. No Fill. No further action.			0			0	0	0		
200501046		Withdrawn	SP	MATSUOKA PROPERTY	Project has been chaged to vinyards not impacting WOUS.			0			0	0	0		
200501061		Finalized	NWP 39	GRAMMERCY PARK SUBDIVISION	X			0.064			0.064	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200501102		Finalized	NWP 39	PACIFIC WEST LAGUNA RIDGE PROPERTY	Addl 0.0208 acre isolated (wet). 0.01 acre isolated (wet) was filled. Note mit is seasonal wet credits, though with SSHCP rules, filled ditches considered (str).	Y	0.0208	0.1183			0.05	0.05	0		
200501102		Finalized	NWP 39 Inclusion	PACIFIC WEST LAGUNA RIDGE PROPERTY	Inclusion for FWS required mit.			0			0	0.013	0		
200501116		Finalized	SP	TRIANGLE ROCK EXPANSION FLORIN RD SOUTH	2.58 isolated pond. Of onsite created acreage, cannot determine exact acreage of newly created channel. Defaulted to 0.99 (amount of channel filled/realigned). FWS mit requirements were met through Corps reqd 0.15 wet creation credits.	Y	2.58	11.03			10.09	24.7	0.96		
200501116		Finalized	SP Inclusion	TRIANGLE ROCK EXPANSION FLORIN RD SOUTH	Inclusion for Corps and FWS reqd off-site creation component.			0			0	0.15	0		
200501137		Finalized	NWP 3	SHED A EMERGENCY SEDIMENT REMOVAL	Sediment removal impacts 0.08 (str), not loss.			0.08	Y	0.08	0	0	0		
200600009		Finalized	NWP 18	CITY OF RANCHO CORDOVA FLOOD EMERGENCY	Construction of drainage ditches impact 0.009 acres (wet). Not loss.			0.009	Y	0.009	0	0	0		
200600194		Finalized	NWP 29	WATERMAN FAMILY APARTMENTS DEVELOPMENT	Note that PM specified via email that although creation components of equal acreage were required by Corps and FWS, a single purchase would meet requirements.			0.024			0.024	0.024	0		
200600194		Finalized	NWP 29 Inclusion	WATERMAN FAMILY APARTMENTS DEVELOPMENT	Inclusion for addl Corps reqd mit for indirect impacts.			0			0	0	0.439		
200600194		Finalized	NWP 29 Inclusion	WATERMAN FAMILY APARTMENTS DEVELOPMENT	Inclusion for addl FWS reqd preservation for direct impacts.			0			0	0	0.366		
200600196		Finalized	NWP 39	Security Park	X			0.395			0.169	0.199	0		
200600196		Finalized	NWP 39 Inclusion	Security Park	Inclusion for FWS required mit.			0			0	0.169	0.788		
200600254		Finalized	NWP 12	PG&E LINE 108 REPLACEMENT PROJECT	Additional 0.61 temp impacts.			0			0	0	0		
200600254		Finalized	SP	PG&E LINE 108 REPLACEMENT PROJECT	Line replacement project - Note delineated acres to impacts ratio. (8.4 acres temp imps only). Mit was required by FWS, and reiterated by Corps as the only mit required in permit.			128.378			0	0	2.47		
200600254		Finalized	SP Inclusion	PG&E LINE 108 REPLACEMENT PROJECT	SP Inclusion for additional FWS mitigation.			0			0	0	2.07		
200600381		Finalized	NWP 14	ELK GROVE BLVD/SR 99 INTERCHANGE PROJECT	Addl temp imps to 0.001 str and 0.026 wet. Also see 2008-00128			0.117			0.011	0	0		
200600403		Finalized	NWP 14	EAST STOCKTON BLVD. BIKE LANE PROJECT	Note: Impacts were to drainage ditch (str for SSHCP), but mit credits were for seasonal wetland (wet).			0.03			0.03	0.03	0		
200600428		Finalized	SP	NORTH VINEYARD GREENS PROJECT	1.53 isolated (wet).	Y	1.53	4.165			1.6	2.796	0		
200600428		Finalized	SP Inclusion	NORTH VINEYARD GREENS PROJECT	Row for FWS required mit			0			0	1.6	3.2		
200600438		Finalized	LOP	COURTLAND SEWER PROJECT	Horizontal drilling only, no impacts.			0			0	0	0		
200600477		Finalized	PREAPPCONS	UPPER LAGUNA CREEK COLLABORATIVE PLAN	X			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200600512		Withdrawn	SP	SIMMERHORN COMMERCIAL PROJECT SITE	Talked with Zach Simmons. No longer seems reasonably foreseeable. JD and project info available.			0			0	0	0		
200600537		Finalized	NWP 39	SIENNA SUBDIVISION PROJECT	X			0.018			0.018	0.1	0		
200600552		Finalized	PREAPPCONS	PILLIKEN RANCH (SLOUGHHOUSE) PROJECT	X			0			0	0	0		
200600602	RF	Withdrawn	SP	Suncreek EIS - Jaeger Ranch, Shalako	Part of Big Five.JD and project info available. Data for all Suncreek is only logged in 2008-00795 (reviewed as a group), except for 2006-00604. Because projects are within Mather core recovery area and must comply with the Sunridge ROD, creation mit was assumed 1:1 out of UDA. Preservation figures come from PN for these projects, (applicant suggested on-site preserves).			0			0	0	0		
200600603	RF	Withdrawn	SP	Suncreek EIS - Lixouri Village	Part of Big Five.JD and project info available. Data for all Suncreek is only logged in 2008-00795 (reviewed as a group), except for 2006-00604. Because projects are within Mather core recovery area and must comply with the Sunridge ROD, creation mit was assumed 1:1 out of UDA. Preservation figures come from PN for these projects, (applicant suggested on-site preserves).			0			0	0	0		
200600604	RF	Withdrawn	SP	Suncreek EIS - Grantline 220	Part of Big Five. Only info is 3,96 acres delineated. All Reasonably Foreseeable data included in 2004-00458. No paper file. Part of Suncreek group, but supposedly reviewed separately. New app has not come in yet.			0			0	0	0		
200600605	RF	Withdrawn	SP	Suncreek EIS - Shalako	Part of Big Five.JD and project info available. Data for all Suncreek is only logged in 2008-00795 (reviewed as a group), except for 2006-00604. Because projects are within Mather core recovery area and must comply with the Sunridge ROD, creation mit was assumed 1:1 out of UDA. Preservation figures come from PN for these projects, (applicant suggested on-site preserves).			0			0	0	0		
200600614		Finalized	NWP 14, 33	WEST STOCKTON BLVD./LAGUNA CREEK BRIDGE	0.13 acre detention basin logged in 'wet'. (Delineation had it under wetland category).			4.13			0.113	0.113	0		
200600614		Finalized	NWP 14, 33 Inclusion	WEST STOCKTON BLVD./LAGUNA CREEK BRIDGE	FWS reqd preservation of 0.981 GGS habitat. 33.3% used in spreadsheet. Review fact that Corps impacts were to "Open Water" (str), but SSHCP rules log 33.3% as (wet).			0			0	0	0.327		
200600615		Finalized	NWP 29	LAKEMONT 33 SUBDIVISION	Re-verification. Unknown location of wet mit. No purchase record yet.			0.31			0.14	0.14	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200600622		Finalized	NWP 29	PARK PLACE	Note - resources are drainage ditch (str for purposes of this study), but mit credits were for seasonal wet.			0.022			0.022	0.022	0		
200600648	RF	Withdrawn	SP	WHITELOCK PARKWAY CORRIDOR	Paul says probably will be built if mall project ever opens again - Talk to Lisa Gibson. JD and project/potential impact info available.			1.051			0.99	0.99	0	Suggested FWS Preservation of at least 1.98 acres (wet) via FUND.	
200600756		Finalized	NWP 39	ELK GROVE AUTO MALL PHASE III	0.057 acres isolated wet.	Y	0.057	0.19			0.073	0.22	0		
200600764		Finalized	NWP 3, ,33	ELK GROVE STORMWATER MAINTENANCE PROJECT	0.059 perm imp (str) not a loss. Many permits. Rows removed for clarity.			0.059	Y	0.059	0	0	0		
200600977		Finalized	PREAPPCONS	SOUTH EAST AREA SPECIFIC PLAN	X			0			0	0	0		
200601045		Finalized	NWP 14	Grant Line Road / Waterman Road Intersection Improvement	Impacts are impacting portion of waters delineated (0.6 str, 0.44 wet) for project 2005-00525 (Pending). Only the newly delineated waters are included here. Additional non-jurisdictional features (0.60 str).	Y	0.6	2.274			0.293	0.29	0		
200700060		Finalized	NWP 27	Deer Creek Mitigation Bank	Delineation includes figures from both this project number, and Deer Creek South (2008-00721), as activities from this number affect both areas.			22.32			0.512	12.64	0		
200700095		Finalized	NWP 33	Twin Cities Wetland Preserve	0.037 Temp impacts (str) only. (NWP 33). Note: this project is functioning as a bank although no NWP 27 or DEVMBA associated. Make sure to review as part of mitigation areas list.			25.743			0				
200700133	RF	Withdrawn	SP	ARBORETUM	One of Big Five. Addl 0.03 acre non-jd (wet), filled. Addl on-site restoration (not creation) of Laguna Creek corridor, 18.81 acres of wous.	Y	0.03	117.0833			30.13	43.68	11.01		
200700230		Finalized	UNAUTHACT	Gerber - Bradshaw Violation	Closed. No Fill.			0			0	0	0		
200700602		Withdrawn	NWP	Shadowbrook	Duplicate number. Project is 2003-00105.			0			0	0	0		
200700716	RF	Withdrawn	NWP 12	Mather Interceptor Project	Withdrawn by applicant. Delineation and impact information is available in file. Talk with Mary.			86.73			0.015	0.015	0.03		
200701006		Finalized	NWP 13	Cosumnes River Levee Repair, RD 800	Four sites, four separate permits. Rows removed for clarity. Unable to quantify amount of loss vs "impacts to". Project was emergency levee repairs.			1.89	Y	1.89	0	0	0		
200701006		Pending	UNAUTHACT	Cosumnes River Levee Repair, RD 800	Pending, but unauth will address only work done after permit expired. Work itself was within conditions of NWP.			0			0	0	0		
200701014		Finalized	NWP 3	Grant Line Channel Restoration Project	0.68 acre temp impacts (str). 0.19 perm imp not loss to (wet)			1.576	Y	0.19	0	0	0		
200701041		Finalized	NWP 27, 33	Bridge Over Laguna Creek - Safe Routes	Temporary impacts only.			0.54			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200701062		Finalized	LOP	Walnut Grove Marine Dock Modernization	LOP for retention, modernization. Original permit was 9467. Inclusion subject to final boundary. Probably IN. Note Impacts are BAI from old documentation. Delineated acres assumed from impacts.			0.013			0.013	0	0		
200701064		Finalized	NWP 39	Reynolds & Brown CMD Court Property	Delineated acres were already part of 199900299, so not included here. Feature impacted in this NWP was already mitigated for in that project.			0			0.04	0	0		
200701147		Finalized	DEVMBA	Van Vleck Property Mitigation Bank	X			36.68			0				
200701357		Finalized	NWP 12	PG&E's Mather Gas Line Project	Temp impacts only.			4.27			0	0	0		
200701357		Finalized	NWP 12 PERMITMOD	PG&E's Mather Gas Line Project	Modification to delineation and increased temp impacts.			0.171			0	0	0		
200701465		Finalized	NWP 12	Walnut Grove Sewer Project	0.44 perm imp wet, not loss			5.66	Y	0.44	0	0	0		
200701887		Withdrawn	NWP 14	Florin Road Improvement Project	Withdrawn by applicant, March 2009. No further action. Original delineation and impact information is available in file.			0			0	0	0		
200701932		Withdrawn	NWP	SMUD Hedge Training Facility Expansion	Withdrawn by applicant. Last action was AJD in 2009. Not considered reasonably foreseeable at this point.			0			0	0	0		
200702046		Finalized	NWP 3, 33	E.G. Storm Water Maintenance	Sites A through O. Impacts 0.16 (str) via sediment and beaver dam removal.			7.48	Y	0.16	0	0	0		
200702104		Finalized	NWP 27	SMUD Nature Preserve Mitigation Bank	DEVMBA pending			55.66			0.114	24.96	52.58		
200702123		Finalized	PREAPPCONS	Pacific Grove Estates	No Permit Required.			0			0	0	0		
200702210		Finalized	NWP 27	Cosumnes Floodplain Mitigation Bank (aka New Hope)	Data placed in reverification			0			0				
200702210		Finalized	NWP 27	Cosumnes Floodplain Mitigation Bank (aka New Hope)	Reverification. No change from original permit. Temp impacts only. Additional 0.023 acres str not in orig delin added to logged delin.			1.265			0				
200702227	RF	Withdrawn	UNAUTHACT	Hardesty Sand and Gravel	Unresolved. Mitigation is estimated from available documents.			0.172			0.172	0.344	0		
200800061		Finalized	UNAUTHACT	Heatherpace Lane, Gerber Road Violation	Closed. No further action.			0			0	0	0		
200800062		Finalized	NWP 14	Gerber Road Violation	ATF permit.			0.0026			0.0026	0	0		
200800062		Finalized	UNAUTHACT	Gerber Road Violation	ATF initiated			0			0	0	0		
200800114		Finalized	NWP 12	Fresno Bridge 58.10 UPRR	In addition to logged impacts, removal of piles results in 0.0032 net increase in (wet). Did not log as wet creation as this would not have been considered fill in the first place. FWS mit was the only mit. 0.15 GGS habitat, Corps required 0.093 of that to be aquatic. Did NOT use 33.3% rule in this case.			0.07			0.031	0	0.093		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200800128		Finalized	NWP 39	Plaza III	Note: Although verification states that previous delineation (2006-00381) was used for this project, review shows that the impact area of THIS project was actually not included in that JD. Therefore there are "delineated" entries for both projects.			0.033			0.033	0	0		
200800181		Withdrawn	NWP 14	Bruceville Road/Poppy Ridge Road Improvement Project	Withdrawn due to NPR.			0			0	0	0		
200800402		Finalized	NWP 27	Consumnes River Gravel Augmentation Project	Talking point: Impact vs improvement of function… 1.45 temp imp str.			2.2			0.75	0	0		
200800444	RF	Pending	SP	Stoneridge Quarry	Confirmed correct documents to use for delin/proposed impacts with Marc. Conceptual Mit Plan is 1:1 create at Corps approved mit bank… No Preserv, just avaoidance. No FWS Mit.			42.896			10.419	2.832	0		
200800444	RF	Pending	SP Inclusion	Stoneridge Quarry	Row for conceptual create wet component.			0			0	7.587	0		
200800475		Finalized	NWP 39	Prairie City State Vehicular Recreation Area	Addl 0.38 Isolated wet, 0.42 isolated pond (other). Mitigation: 1.434 acres restore existing resources - logged as rehabilitate Other.	Y	0.8	7.44			0.198	0	0	0.321 rehab wet OUT uda	
200800475		Finalized	NWP 39 Inclusion	Prairie City State Vehicular Recreation Area	X			0			0	0	0	1.113 rehab str OUT uda	
200800499		Finalized	UNAUTHACT Inclusion	Dillard/Meiss Road Parcels	File not on shelf - Dadey? (check for location of mit purchases). Settlement agreement finalized, however, as of 2010, applicant still has not purchased required credits. Conservative delineated figure taken from impacts. Will process a NWP 32 after conditions are met.			0.666			0.666	0.146	0		
200800499		Finalized	UNAUTHACT Inclusion	Dillard/Meiss Road Parcels	Row for FWS reqd mit.			0			0	0.374	0.748		
200800795	RF	Withdrawn	SP	Suncreek EIS - Smith-Dunmore Property	Part of Big Five. JD available. Data for all Suncreek is only logged here (reviewed as a group), except for 2006-00604. Because projects are within Mather core recovery area and must comply with the Sunridge ROD, creation mit was assumed 1:1 out of UDA. Preservation figures come from PN for these projects, (applicant suggested on-site preserves).			38.114			19.132	19.132	18.982		
200800909	RF	Pending	SP	Teichert--Aspen VIII & IX	May 30, 2014 PN does not specify preservation. Lisa Gibson has confirmed that 22.793 acres avoided WOUS will be preserved, but possibly used as a bank at a later date. Preservation acreage reserved (if any) for proposed project is uk at this time.			27.706			4.954	4.954	22.793		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200800936		Finalized	PREAPPCONS	Bottimore Property	See 2008-001348 - should be same project under new number. No electronic records. JD only. Applicant withdrew request for verification. Permit Required, but no impact info.			0			0	0	0		
200800937		Finalized	NWP 27	Snake Marsh Habitat Improvement Project	Good Talking Point: Restoration of 1 acre wet by removal of water primrose. Restore normally lumped with creation (?), but is it in this case? I put it in Other as rehabilitation.			1	Y	1	0	0	0	1 rehab wet out UDA	
200800950		Finalized	NWP 27	Wong Wetland Restoration Project	Good Talking Point: impacts are excavation involved in restoration of original 3 acres (potential impact not loss).			3	Y	3	0	102	0		
200800974		Finalized	PREAPPCONS	Quail Lakes North	JD only. Resources on-site. No impact/project info yet.			0			0	0	0		
200801214		Finalized	NWP 7	City of Galt Effluent Pipeline Project	0.03 Temp imp str			0.12			0	0	0		
200801317		Finalized	NWP 7	Cosumnes River Elementary School Addition Project	0.004 perm imp (str) not a loss. Additional 0.16 isolated wet (AJD)	Y	0.16	3.87	Y	0.004	0	0	0		
200801348		Finalized	PREAPPCONS	Bottimore Site	JD only. Appears this project number was unneccessarily created, should be with 2004-00555			0			0	0	0		
200801349		Finalized	PREAPPCONS	Mahon Ranch	JD only. Significant amount of resources on-site. No impact/project info yet.			0			0	0	0		
200801362		Finalized	NWP 12	CSA Potable Water T-Main and Florin Road Sewer Project - WRDA Sacramento County	Temp imp 0.434 str, perm imp 0.001 str			12.077			0.001	0	0		
200801384	RF	Pending	DEVMBA	Apple Road Property	JD only. Significant amount of resources on-site. No impact info yet.			0			0	0	0		
200801664		Finalized	NWP 12	SMUD Twin Cities Road Pole Replacement	ATF - no JD, less than 0.001 acre temp impact to (wet).			0.001			0	0	0		
200801797		Finalized	NWP 14	UPRR Bridge Milepost 56.73 Fresno Subdivision	Temp imp 0.25 wet			0.38			0	0	0		
200900172		Finalized	NWP 33	Elk Grove Creek Pedestrian Overcrossing	0.47 temp imp str			4.56			0	0	0		
200900172		Finalized	NWP 42	Elk Grove Creek Pedestrian Overcrossing	See Inclusions			0			0.09	0.03	0		
200900172		Finalized	NWP 42 Inclusion	Elk Grove Creek Pedestrian Overcrossing	Corps mit requirement, str.			0			0	0.06	0		
200900172		Finalized	NWP 42 Inclusion	Elk Grove Creek Pedestrian Overcrossing	Revised BO required 0.24 aquatic (GGS) habitat credits (33% NOT used, full amount instead), FWS apprv cons bank, loc uk.			0			0	0.24	0		
200900199		Finalized	UNAUTHACT	SMUD power pole placement in Anatolia preserve	No Further Action. No data. File not on shelf, so unsure of actual impacts, if any. Ness does not know location of file.			0			0	0	0		
200900291		Pending	NPR	Six County Aquatic Resources Inventory	X			0			0	0	0		
200900369		Withdrawn	NWP 14	Grant Line Road/ Waterman Road Intersection Improvement	Withdrawn. Exists as 2006-01045.			0			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200900404	RF	Withdrawn	SP	Mather Specific Plan - Airport Commercial	Do not include delineated waters. This figure is included in 2002-00561. Kate said all Mather Specific Plan projects can be summed. Data is logged only in "Master File" (2009-00530)			0			0	0	0		
200900477		Finalized	NWP 27	Cosumnes River Preserve Corral Ponds	Enhancement of exising wetland plus net increase of 0.8 wet			11.5			0	0.8	0	11.5 Enh Wet out UDA	
200900493	RF	Withdrawn	SP	Douglas Jaeger Widening	Withdrawn due to court order on Sunrise-Douglas.			1.514			1.514	1.514	2.226		
200900511		Finalized	EIS	Sunridge Properties - Sunrise Douglas Litigation	X			0			0	0	0		
200900525	RF	Withdrawn	SP	Mather Specific Plan - Commercial	Do not include delineated waters. This figure is included in 2002-00561. Kate said all Mather Specific Plan projects can be summed. Data is logged only in "Master File" (2009-00530)			0			0	0	0		
200900526	RF	Withdrawn	SP	Mather Specific Plan - Mining/Aggregate Extraction	Do not include delineated waters. This figure is included in 2002-00561. Kate said all Mather Specific Plan projects can be summed. Data is logged only in "Master File" (2009-00530)			0			0	0	0		
200900527	RF	Withdrawn	SP	Mather Specific Plan - Parks and Recreation	Do not include delineated waters. This figure is included in 2002-00561. Kate said all Mather Specific Plan projects can be summed. Data is logged only in "Master File" (2009-00530)			0			0	0	0		
200900528	RF	Withdrawn	SP	Mather Specific Plan - Regional Sports Park	Do not include delineated waters. This figure is included in 2002-00561. Kate said all Mather Specific Plan projects can be summed. Data is logged only in "Master File" (2009-00530)			0			0	0	0		
200900529	RF	Withdrawn	SP	Mather Specific Plan - University Village/Residential	Do not include delineated waters. This figure is included in 2002-00561. Kate said all Mather Specific Plan projects can be summed. Data is logged only in "Master File" (2009-00530)			0			0	0	0		
200900530	RF	Withdrawn	SP	Mather Specific Plan - Infrastructure and Master File	Do not include delineated waters. This figure is included in 2002-00561. Kate said all Mather Specific Plan projects can be summed. Data is logged only in "Master File" (2009-00530)			0			48.28	48.28	81.3		
200900576		Finalized	PREAPPCONS	North Vineyard Station Off-site Road improvements	File not on shelf. No electronic records.			0			0	0	0		
200900731		Finalized	NWP 27	Rooney Dam Repair and Fish Passage Improvement Project	X			0			0.08	0	0		
200900731		Finalized	NWP 3	Rooney Dam Repair and Fish Passage Improvement Project	0.06 perm imp (str) not loss. 0.26 temp imp str.			0.4	Y	0.06	0	0	0		
200900880		Finalized	NWP 14	Zinfandel Drive Extension Project - WRDA Sac County	No JD. Waters are part of larger Mather proj, which is logged in 2002-00561.			0			0.052	0.025	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
200900880		Finalized	NWP 14 Inclusion	Zinfandel Drive Extension Project - WRDA Sac County	NOTE: addendum to Corps Dec Doc showed reliance on FWS creation component to meet mit requirements. FWS preserv requirements were not tabulated into any mit ratio, nor was mentioned in verification, but were incuded in mitigation summary addendum. Additional mit reqd by FWS: 0.06 vp (wet) creation credits and 2.06 vp (wet) pres credits at FWS apprv Cons Bank.			0			0	0.06	2.06		
200900974		Finalized	NWP 33	Elk Grove Fiber Optic Cable Repair	0.003 temp imp wet			0.0124			0	0	0		
200901345		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Site A-Elk Grove Creek)	0.005 temp imp str, and 0.005 perm imp (str) not a loss.			0.01	Y	0.005	0	0	0		
200901430		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Sites B & F- Strawberry Creek)	0.04 temp imp str, and 0.04 perm imp (str) not a loss.			0.08	Y	0.04	0	0	0		
200901435		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Site C-Whitehouse Creek)	0.025 temp imp (str) and 0.025 perm imp (str) not a loss.			0.05	Y	0.025	0	0	0		
200901438		Finalized	NWP 3	Elk Grove Routine Stormwater Maintenance Project 2009-2010 (Sites D and E-Laguna Creek)	0.155 temp imp str, and 0.155 perm imp (str) not a loss.			0.31	Y	0.155	0	0	0		
200901599		Finalized	NWP 14	Schoeffler Road Improvement Project	X			0.024			0.024	0	0		
200901599		Finalized	UNAUTHACT	Schoeffler Road Improvement Project	After-the-fact permit initiated.			0			0	0	0		
200901637		Finalized	UNAUTHACT	Laguna Creek Batch Plant	Closed. No Fill.			0			0	0	0		
201000202		Finalized	NWP 12	Aerojet GET H Pipeline Extension	0.014 temp imp str.			0.023			0	0	0		
201000216	RF	Finalized	PREAPPCONS	Capital SouthEast Connector Project	Delineated figure high because 92.5 acres irrigated pasture considered to be wetland (from FEIR, Feb 2012). All figures proposed at this time. Impacts are considered equal to delineated in the absence of other info, and infered from FEIR. 1:1 creation mitigation is assumed Corps requirement.			127.6			127.6	127.6			
201000268		Finalized	UNAUTHACT	Franzia Violation at Gill Ranch	Referred to EPA. JD is in 2004-00813. Massive site, should JD be included here? For now delineated taken from impacts. Delineation actually verified over 500 acres wous, so for data considerations/skewing, etc, we only included the impact as a conservative delineated figure.			0.05			0.05	0	0		
201000455		Finalized	NWP 14	Vineyard Road Bridge Replacement-WRDA Sacramento County	Addl 0.0014 acre (str) perm impact not loss from bridge piers.			0.1347	Y	0.0014	0.0102	0.05	0		
201000491		Finalized	NWP 12	Sheldon Road & Highway 99 Overpass Gas Main Project	0.003 temp imp str			0.003			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
201000617		Finalized	NPR	Silverado Bank Lots 5 and 6	X			0			0	0	0		
201000729		Finalized	NWP 29	Arbor Creek Affordable Housing	X			0.2896			0.2896	0.2896	0		
201000823		Finalized	NPR	Line 108 Pipeline Replacement Project - Phase 1	X			0			0	0	0		
201000861		Finalized	NWP 14	Longleaf Drive Bridge	0.07 temp imp str. FWS reqd 0.63 GGS habitat (used 33.3%)			0.106			0.002	0.21	0		
201000938		Finalized	NWP 12	X09 Communication Poles Replacement Project - WRDA Sac County	X			2.01			0.001	0	0		
201000961	RF	Withdrawn	SP	Mather Airport Layout Plan	Application not yet received. Still Pre-App phase (06/06/13)			0			0	0	0		
201001133		Finalized	NWP 12	Line 108 Pipeline Replacement Project-Phase II	0.94 temp wet imps only.			2.635			0	0	0		
201001462		Finalized	NWP 14	Twin Cities Road Interchange Project	Create 0.053 wet requirement was to be at both "FWS and Corps Approved" mit bank. 0.142 Preservation was only reqd by FWS. At "FWS approved Cons bank".			0.64			0.053	0.053	0.142		
201001462		Finalized	NWP 14 Inclusion	Twin Cities Road Interchange Project	This row for stream impacts/mit. Net gain in acreage.			0			0.25	0.352	0		
201001462		Finalized	NWP 14 Inclusion	Twin Cities Road Interchange Project	Addl 0.01 Create wet credits at "Corps Approved mit bank. Loc UK. Inclusion to reflect Corps only reqd mit.			0			0.01	0.01	0		
201100033		Finalized	LOP	Grant Line Road Widening Project Phase 1, Additional Area	Impacts are affecting delineated waters on other delineated project sites. (2006-01045 + 2005-00525). Only delineation not included in those sites is logged here.			0.19			0.81	0.33	0		
201100033		Finalized	LOP Inclusion	Grant Line Road Widening Project Phase 1, Additional Area	X			0			0	0.96	0		
201100034		Finalized	NWP 42	Laguna Creek Bike Trail Connector	0.02 temp imp str. AJD: In addition to delin values at right, another 0.015 drainage ditch (unregulated), and 0.120 isolated wetlands. FWS req 0.044 pres wet for indirect imps at FWS apprv MIT bank. FWS also req 1.86 GGS habitat at FWS apprv CONS bank. (33.3% used).	Y	0.135	0.61			0	0.619	0.044		
201100073		Finalized	PREAPPCONS	Arcade Creek Gas Line Relocation	Julie input data into ORM. Permit probably required for work, but there is no additional info in file. Not sure of current status.			0			0	0	0		
201100197		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 1	No JD, 0.036 temp imp str			0.036			0	0	0		
201100200		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 2	Reverification, same 0.007 temp imp str as previous permit.			0			0	0	0		
201100200		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 2	No JD, 0.007 temp imp str			0.007			0	0	0		
201100201		Finalized	NWP 3, 13	City of Elk Grove Routine Stormwater Maintenance Project - Sites 3 and 4	No JD, 0.355 temp imp str			0.355			0	0	0		

DA NUMBER	PAST AND PRESENT OR REASONABLY FORESEEABLE	ACTION STATUS - FINALIZED PENDING OR WITHDRAWN	PERMIT OR ACTION TYPE	PROJECT NAME	RESEARCH NOTES	ISOLATED OR NON JURISDICTIONAL WATERS PRESENT (Y/N)	ISOLATED OR NON JURISDICTIONAL WATERS TOTAL ACRES	DELINEATED ACRES WOUS	PERMANENT IMPACT NOT A LOSS PRESENT (Y/N)	PERMANENT IMPACT NOT A LOSS TOTAL ACRES	LOSS ACRES WOUS	CREATION MITIGATION ACRES WOUS	PRESERVATION MITIGATION ACRES WOUS	SPECIFICS FOR MITIGATION NOT IN OTHER CATEGORIES	ALTERNATIVE IMPACT QUANTIFICATIONS
201100202		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 5	No JD, 0.096 temp imp str			0.096			0	0	0		
201100203		Finalized	NWP 3	City of Elk Grove Routine Stormwater Maintenance Project - Site 6	No JD, 0.002 temp imp str			0.002			0	0	0		
201100276		Finalized	SP	White Rock Road Widening - WRDA Sacramento County	Corps req 0.096 pres wet at Bryte Ranch, but said that is an overlap with FWS required 2.661 pres vern habitat at Bryte. Only the 2.661 is recorded.			6.11			1.022	0	2.661		
201100276		Finalized	SP Inclusion	White Rock Road Widening - WRDA Sacramento County	FWS req an addl 6.801 pres vern habitat at Service apprv CONS Bank.			0			0	0	6.801		
201100276		Finalized	SP PERMITMOD	White Rock Road Widening - WRDA Sacramento County	Modified location of Corps reqd mitigation from original SP - Two sites, both completely OUT of study area. Both sites are summed in creat wet field.			0			0	1.002	0		
201100339		Finalized	NWP 14	Elk Grove Hazardous Waste Facility	Addl 0.01 perm imp stream, 0.01 temp imp str			0.02			0.01	0	0		
201100339		Finalized	NWP 14, 33	Elk Grove Hazardous Waste Facility	No JD, 0.004 Temp Imp str, 0.03 Perm imp str. AJD 0.97 ponded features determined not WOUS (unregulated)	Y	0.97	0.034			0.03	0	0		
201100391		Finalized	NWP 7	SMUD East Campus - Operation Center Project	0.002 perm imp (str) not a loss. No JD			0.002	Y	0.002	0	0	0		
201100585		Finalized	NWP 12	Digital 395 Barstow to Reno	Temp impacts only, no mitigation. Use delineated?? 10.433 delineated, unspec resource types. All 3 cats present. 0.541 temp imp. 191 permit actions removed for clarity. Multiple reverifications, increase in temp impacts, no other changes. Decision was to evenly split delineated acres through resource types.			10.434			0	0	0		
201101017		Finalized	UNAUTHACT	Mohamed Violation	Resolved. Not a violation.			0			0	0	0		
201101019		Finalized	NWP 7	Anatolia Overchute	0.01 perm imp (str) not a loss.			0.01	Y	0.01	0	0	0		
201200116	RF	Pending	UNAUTHACT	Clay Station Properties, LLC Violation	Data from Lisa G's best estimate.			18.5			4	0	0		
201200195	RF	Pending	UNAUTHACT	Calosso Property Violation	Only PJD and impacts known.			44.567			10.291	0	0		
201200525		Finalized	NWP 12	Tracy-Hedge Optical Ground Wire (OPGW)	No JD, Overhead lines, no fill for all actions, 9 actions removed for clarity			0			0	0	0		
201200729		Finalized	NWP 6	Twin Cities Road Bridge Replacement Geotechnical Borings	Reverify work window			0			0	0	0		
201200729		Finalized	NWP 6	Twin Cities Road Bridge Replacement Geotechnical Borings	No JD			0.00006			0.00006	0	0		
201200945		Finalized	NWP 14	Dwight Road Extension - WRDA Sacramento County	No mit required other than FWS GGS mit, so included on this line. (33.3% rule used).			3.57			0.07	0.82	0		
201200969		Finalized	NWP 12	Jacobsen Water Development Project	No JD, Temp Imp 0.014 str			0.014			0	0	0		

EIS/EIR APPENDIX B

Summary of Process to Determine the Scope of the EIS/EIR (Scoping) (Part 1 of 2)

South Sacramento Habitat Conservation Plan Environmental Impact Statement/Environmental Impact Report

2013 Additional Scoping - Summary Report

PREPARED FOR:

U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
Conservation Planning Division, Endangered Species Program
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

and

Sacramento County
Department of Community Development
827 7th Street, Room 220
Sacramento, CA 95814

May 20, 2015

South Sacramento Habitat Conservation Plan
Environmental Impact Statement/Environmental Impact Report

2013 Additional Scoping - Summary Report

PREPARED FOR:

U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
Conservation Planning Division, Endangered Species Program
2800 Cottage Way, Room W-2605
Sacramento, CA. 95825

and

Sacramento County
Department of Community Development
827 7th Street, Room 220
Sacramento, CA 95814

PREPARED BY:

Ascent Environmental
455 Capitol Mall, Suite 300
Sacramento, CA 95814

May 20, 2015

TABLE OF CONTENTS

Section Page

TABLE OF CONTENTS I

ACRONYMS AND ABBREVIATIONS II

1 INTRODUCTION 1-1
1.1 Public and Agency Involvement 1-1

2 SIGNIFICANT ISSUES IDENTIFIED IN SCOPING COMMENTS 4

Appendices

A NOI, NOP, Scoping Meeting Announcements, Scoping Meeting Materials, Scoping Meeting Notes, and Comments Received

Tables

Table 1 Scoping Issue Summary 4
Table 2 Scoping Comment Summary 5

ACRONYMS AND ABBREVIATIONS

BDCP	Bay Delta Conservation Plan
BMPs	Best Management Practices
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CEQ	Council on Environmental Quality
CWA	Federal Clean Water Act
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	federal Environmental Protection Agency
IE	Implementing Entity
ITP	Incidental Take Permit
LURMP	Land Use and Resource Management Plan
NNL	National Natural Landmark
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
SOI	Sphere of Influence
SSHCP	South Sacramento Habitat Conservation Plan
UDA	Urban Development Area
USACE	United States Army Corps of Engineers
USB	Urban Services Boundary
USFWS	United States Fish and Wildlife Service

1 INTRODUCTION

This scoping summary report reviews the additional public scoping effort conducted in 2013 for the South Sacramento Habitat Conservation Plan (SSHCP) (Plan) environmental impact statement (EIS) and environmental impact report (EIR). Public scoping processes occurred twice: once in 2008 and once in 2013. In 2013, the draft SSHCP had been further refined, some conditions had changed, and sufficient time had elapsed that the applicants felt that a second scoping process was warranted. The 2013 scoping was primarily directed to stakeholders that had not been approached during the 2008 scoping process.

Lead agencies must solicit appropriate information from the public and must make a diligent effort to involve the public in their NEPA and CEQA processes. An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action is required by the Council on Environmental Quality (CEQ) regulations and the Department of Interior regulations for implementing the National Environmental Policy Act (NEPA), as well as the California Environmental Quality Act (CEQA) Statues and Guidelines for preparation of an EIR. The process of public and inter-agency scoping is an integral part of the environmental review process. Scoping includes refining the proposed action and identifying all reasonable alternatives, identifying preliminary issues deserving of study, deemphasizing insignificant issues to narrow the scope of the environmental document, and identifying interested and affected persons. The results of the scoping process are used by lead agencies to determine the "scope" of their environmental document. The "scope" of an environmental document consists of the range of actions, alternatives, environmental effects, and mitigation measures to be considered and analyzed in the document.

The United States Fish and Wildlife Service (USFWS) (for the National Environmental Policy Act [NEPA]) and Sacramento County (for CEQA) are the lead agencies for preparation of this EIS/EIR. In addition, the U.S. Army Corps of Engineers (USACE), the US Environmental Protection Agency (USEPA), and the California Department of Fish and Wildlife (CDFW) will act as cooperating agencies under NEPA due to the nexus between the SSHCP and other federal and state environmental-permits required to implement the SSHCP. For the preparation of this EIS/EIR, the document must be in compliance with NEPA as amended, the NEPA regulations, and all other applicable federal laws, executive orders, regulations, and direction, and the EIS/EIR must be in compliance with the CEQA statute and guidelines and all other applicable state laws and regulations.

1.1 PUBLIC AND AGENCY INVOLVEMENT

1.1.1 Public Notices – Scoping

The 2013 public scoping began on October 28, 2013 with a Notice of Preparation (NOP) provided to the California State Clearinghouse (pursuant to CEQA) and on November 4, 2013 with the publication of a Notice of Intent (NOI) in the *Federal Register* (pursuant to NEPA). These documents are provided in Appendix A.

The NOP was distributed to state agencies on October 28, 2013 through the California State Clearinghouse and posted on the Clearinghouse website (http://www.derasearch.saccounty.net/portals/0/docs/EnvDocs_Notices/20030637020131028083136.pdf). The NOP was also posted on a project website developed by the County specifically for the SSHCP (http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/SSHCPPlan.aspx). The NOP was sent to 60 recipients via US Postal Service and on November 12, 2013, Sacramento County staff sent an email to 178 recipients providing a link to the NOI and NOP and information about the scoping meetings. The announcements and their distribution are included in Appendix A.

The NOI was published in the federal register and was available on the website starting on October 28, 2013 (https://www.federalregister.gov/public-inspection).A news release prepared by the USFWS announcing the NOI and scoping meeting was sent by the USFWS Sacramento Regional Office, via e-mail to 153 recipients in and around Sacramento County on November 4, 2013. . Beginning on November 3, 2013, the NOI and News Release was also available for review on the USFWS's website at http://www.fws.gov/sacramento/. The announcements and their distribution are included in Appendix A.

The NOI and NOP provided the public information on the proposed SSHCP, notified the public of the intent to prepare the EIS/EIR, and provided details on how to participate in public scoping meetings to be held on November 20 and 21st, 2013. Both the NOI and NOP included a project description and a list of the covered species; the NOP also included a map of the plan area. The NOI informed the public that written comments would be accepted for 45 days after the start of the scoping period, or until December 19, 2013, while the NOP stated comments would be accepted for 30 days after the start of the scoping period, or until December 13, 2013.

Both the NOI and NOP identified various mechanisms to provide input during the scoping process including the two scoping meetings, Sacramento County email, USFWS facsimile, and mailing addresses for USFWS and the County.

1.1.2 Media Coverage

Although information was provided to media outlets, no articles concerning the project and habitat conservation issues in the Plan Area were published as a result of the 2013 NOI or NOP.

1.1.3 Public Scoping Meetings

The first 2013 public scoping meeting was held on Wednesday, November 20, from 6:30 p.m. to 8:30 p.m., at the Anthony Pescetti Community Room, Galt Police Facility, 455 Industrial Drive, Galt, CA 95632. Thirteen participants signed in for the Galt meeting. The meeting included an open house prior to and following the presentation of the proposed action, a summary of the NEPA process, and receipt of oral and written comments from the public.

The second 2013 scoping meeting was held on Thursday November 21, from 2:00 p.m. to 4:00 p.m., at the Governor's Office of Planning and Research, Large Conference Room 202, 2nd Floor, 1400 Tenth Street, Sacramento, California, 95814. Sixteen participants signed in for the Sacramento meeting. The meeting included an open house prior to and following the presentation of the proposed action, a summary of the NEPA process, and receipt of oral and written comments from the public.

Only one individual or group submitted a written comment during the two scoping meetings. All verbal and written scoping comments received from the agencies and the general public are provided in Appendix A and are summarized in Table 1 below.

1.1.4 Collaboration and Consultation with Tribes

The County coordinated with the Native American Heritage Commission to compile a list of individuals and organizations that may have knowledge of heritage lands or other resources of interest that the project could potentially affect. The NOP was sent to the State Clearing House and the Native American Heritage Commission was one of the reviewing agencies. The County also mailed the NOP to the Buena Vista Rancheria. The USFWS Sacramento Regional Office emailed the news release regarding the NOI and scoping

meetings to Rhonda Morningstar Pope (Tribal Chairwoman) and Roselynn Lwenya (Environmental Resources Director/THPO) at the Buena Vista Rancheria.

2 SIGNIFICANT ISSUES IDENTIFIED IN SCOPING COMMENTS

During the 2013 scoping period, a total of eight individuals or groups submitted letters. Many of these letters included multiple comments. Written comments via U.S. mail and e-mail came from state agencies, local agencies, non-profit groups, and concerned citizens. The written commenters included: Stone Lakes Wildlife Refuge and Association, the Delta Protection Commission, Lynn Wheat, Delta Stewardship Council, California Department of Transportation, Sacramento-Yolo Mosquito and Vector Control District, Friends of the Swainson's Hawk, and U.S. Department of the Interior National Park Service (National Park Service. Only one written comment was received during the two scoping meetings, from the Friends of the Swainson's Hawk.

In addition to the written comments received, individuals provided verbal comments. Verbal comments were provided via telephone to USFWS from the staff of Assemblyman Richard Pan on November 4, 2013 and from the Stone Lakes National Wildlife Refuge staff during a meeting with refuge staff, at the refuge, on January 21, 2014. In addition, a total of 19 verbal comments were provided at the two scoping meetings from those who attended. The scoping meeting comments are listed below in the "Scoping Meeting Comments" section in Appendix A. Most of the comments pertain to the SSHCP, while some apply to both the Plan and the EIS/EIR processes.

Eighty-four total written and verbal comments were received during scoping which were organized into 10 general topic areas. Table 1 summarizes the number and percentages of comments received related to each general topic area. Table 2 summarizes the comments received during scoping, organized by general topic area.

Table 1 Scoping Issue Summary

Air Quality	2	2%
Consistency with Local and Regional Planning Documents	14	17%
Economics	3	4%
Grazing and Mining	2	2%
Mitigation	9	11%
Permitted Activities	13	15%
Planning Process	19	23%
Preserves	6	7%
Sensitive Species	12	14%
Water Resources and Hydrology	4	5%
Total	**84**	

Table 2	Scoping Comment Summary		
Issue Category	**Comment Received**	**Commenter**	**Date**
Air Quality			
	If approved, the HCP and related incidental take permit (ITP) seems to apply to a wide range of activities that could be mitigated to an accepted level of protection for listed species. This appears to be a convenient approach for the benefit of development in the region. However, the EIR/EIS should discuss the mechanisms that are/are not in place to ensure that those approved activities comply either individually or cumulatively with the federal Environmental Protection Agency (EPA) air quality standards for the region.	Lynn Wheat	12/18/2013
	Wouldn't deteriorating air quality (and the ability of member jurisdictions to easily adopt CEQA statements of Overriding Considerations) eventually jeopardize the sustainability of the habitat of the species this HCP is intended to protect (not to mention human health)?	Lynn Wheat	12/18/2013
Consistency with Local and Regional Planning Documents			
	The Delta Plan, including its policies and recommendations, should be acknowledged in the EIR's description of the project's environmental setting.	Delta Stewardship Council	12/17/2013
	Discuss or include in the EIR any inconsistencies with the Delta Plan as required by 15125(d) of the CEQA Guidelines.	Delta Stewardship Council	12/17/2013
	The EIR should include an analysis of the potential loss of agricultural land in the Delta caused by urban development covered by the SSHCP to be consistent with the Delta Plan Policy (DP P1 923 CCR Section 5010). Please quantify the aerial extent of the proposed urban development area (UDA) within the Delta, and discuss any potential impacts to agricultural resources.	Delta Stewardship Council	12/17/2013
	The EIR should analyze the impact of any urbanization or the placement of permanent agricultural easements on the opportunity to restore seasonal floodplain and riparian habitat within the Delta Plan's Cosumnes-Mokelumne Confluence area as per Delta Plan Policies- ER P2 (23 CCR Section 5006) and ER P3 (23 CCR Section 5007). The EIR should assess impacts to the opportunity to restore these areas for the habitat uses encouraged by the Delta Plan or the conservation measures recommended in the draft Bay Delta Conservation Plan.	Delta Stewardship Council	12/17/2013
	The Delta Plan Policy ER P5 (23 CCR Section 5009) calls for avoiding introductions of and habitat improvements for invasive non-native species. The EIR should analyze the project's potential to introduce or improve habitat for non-native invasive species.	Delta Stewardship Council	12/17/2013
	The NOP states that the EIR will analyze hydrology and presumably, flooding. The Delta Plan contains three policies that are most relevant to the County's consideration of this issue: Policy RR P2 (23 CCR section 5013) requires flood protection for residential development in rural areas, Policy RR P3 (23 CCR section 5014) restricts encroachment in floodways, and Policy RR P4 (23 CCR Section 5015) restricts encroachments in floodplains, including the Cosumnes-Mokelumne Confluence. Policy RR P4 states that "no encroachment shall be allowed or constructed unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant impact on the floodplain values and functions."	Delta Stewardship Council	12/17/2013
	In addition, the Delta Plan contains a recommendation (RR R6) encouraging the Central Valley Flood Protection Board to evaluate designating additional floodways. Flood risk reduction should be included as a factor when evaluating various conservation and development scenarios. The EIR should include an analysis of potential conflicts between proposed activities in the SSHCP and the	Delta Stewardship Council	12/17/2013

Table 2	Scoping Comment Summary		
Issue Category	**Comment Received**	**Commenter**	**Date**
	implementation of the project.		
	The Delta Reform Act specifically established a certification process for compliance with the Delta Plan's regulatory policies. If the South Sacramento Habitat Conservation Plan is a covered action under the Delta Plan, a way to streamline the process and make full use of the EIS/EIR is to include the information and analysis needed to support the certification of the Delta Plan consistency within the EIS/EIR, potentially including a draft certification as an appendix to the EIS/EIR.	Delta Stewardship Council	12/17/2013
	A portion of the project lies within the Primary Zone of the Sacramento-San Joaquin Delta (predominantly the land located west of Interstate 5) and is subject to consistency requirements with the Delta Protection Commission's Land Use and Resource Management Plan (LURMP) for the Primary Zone of the Delta. Please review the LURMP and ensure that the EIR is consistent with the goals and policies related to land use agriculture, natural resources, recreation access, water, levees and utilities infrastructure.	Delta Stewardship Council	12/17/2013
	The NOP indicates a list of covered activities that may not be supported in the Primary Zone of the Delta and may be inconsistent with Delta Protection Commission's Land Use and Resource Management Plan (LURMP) Policy P-2. Please specify which covered activities are being proposed in the Primary Zone of the Delta.	Delta Protection Commission	12/18/2013
	Please review the Delta Protection Commission's Land Use and Resource Management Plan to ensure consistency with agricultural policies.	Delta Protection Commission	12/18/2013
	Please review the Delta Protection Commission's Economic Sustainability Plan for the Sacramento-San Joaquin Delta (2011) which is an important document guiding future activities in the legal Delta. Proposals for habitat management activities should consider the recommendations on Economic Sustainability for Agriculture, Recreation and Tourism; and Habitat and Ecosystem Improvements (pg. 274, 276).	Delta Protection Commission	12/18/2013
	Scott Finley and Bart McDermott noted that the Bay Delta Conservation Plan (BDCP) applicants have proposed that the BDCP could "swap out" future BDCP preserves established in areas where the BDCP Plan Area overlaps the Plan Area of another HCPs— if that habitat is needed later by the other HCP. Bill Ziebron and Jan Knight said that BDCP proposal lacked sufficient detail and did not explain how a preserve "land swap" could be implemented.	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR
	What is the relationship between the SSCHP and the BDCP?	Assemblyman Richard Pan's Office via Robert Moler	11/04/2013 Phone Call with USFWS
Economics			
	How will the HCP be financed? How will the Plan Partners/Regulatory Agencies factor in inflation over the life of the permit?	Scoping Meeting Comment	11/21/2013
	Bart McDermott (Refuge Manager) asked how the SSHCP will assure that their wetland habitats can be managed for a 50 year permit term, and then in perpetuity— managing wetland habitats on the Refuge are much more "hands on" and expensive than managing their upland habitats. Rob Burness asked if the SSHCP will be able to fund the long-term management of the SSHCP preserve lands, especially those that are inside the Refuge boundary or in the area between the Refuge and the Cosumnes Preserve.	Stone Lakes NWR	01/21/2014 Meeting at Stone Lakes NWR
	Rob Burness asked how SSHCP covered-activity mitigation fees will be determined.	Stone Lakes NWR Association	01/21/2014 Meeting
	Bart McDermott (Refuge Manager) noted that the Refuge has extensive information	Stone Lakes NWR	01/21/2014

Table 2	Scoping Comment Summary		
Issue Category	**Comment Received**	**Commenter**	**Date**
	on costs for wetland management, and could provide this information to the SSHCP. Bart estimates that seasonal wetland management on the Refuge is $200-$300 per acre; most of that cost is from water pumping and weed control.		Meeting at Stone Lakes NWR
Grazing and Mining			
	Is grazing land considered "agriculture" or "annual (non-native) grassland"?	Scoping Meeting Comment	11/21/2013
	Draft SSHCP Conservation Strategy (most recent version available at the time) p7-180 Tri-Colored Blackbird. Paragraph 4 discusses possible threats to the species. Please document all unsubstantiated claims with scientific and supportive evidence, and utilize current research as it pertains to mosquito control for all species	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
Mitigation			
	How do proposed or existing mitigation banks relate to the proposed HCP?	Scoping Meeting Comment	11/20/2013
	The EIS/EIR should discuss the time lag that will likely exist between the pace of new development (the immediate loss of habitat) and the timing of acquisition of new, replacement mitigation land.	Lynn Wheat	12/18/2013
	Can eminent domain ever be used to assist in purchasing new land if the time gap between immediate loss of habitat and the acquisition of new habitat ever becomes unacceptable?	Lynn Wheat	12/18/2013
	What measures will be adopted to ensure that the SSHCP covered-activity impact fees will always correlate with the market prices of mitigation land?	Lynn Wheat	12/18/2013
	Page 6-63 paragraph 3- "No vehicle access or traffic would be able to access preserves." Please ensure that the Sacramento-Yolo Mosquito and Vector Control District has the appropriate provisions contained with the SSHCP to allow for District access to all SSHCP preserve and buffer areas.	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	Can the area of mitigation originally proposed for Swainson's hawk be considered again? Similarly, the eastern and western portions of the Plan Area differ in importance to Swainson's hawk; therefore, can the conservation for Swainson's hawk be concentrated east of I-5 as much as possible?	Scoping Meeting Comment	11/21/2013
	Mitigation in the area west of I-5 and west of Snodgrass Slough may not be effective or a good long term solution because these areas are below sea level.	Scoping Meeting Comment	11/21/2013
	Will ratio for Swainson's hawk mitigation be 1:1, and be dependent on the land cover type?	Scoping Meeting Comment	11/21/2013
	If the SSHCP is a covered action under the Delta Plan, it would be affected by the Delta Plan's Policy G P1 (23 CCR Section 5002(b)(2) which states " Covered actions not exempt from CEQA must include applicable feasible mitigation measures identified in the Delta Plan's Program EIR or substitute mitigation measures that the proposing agency finds are equally or more effective"	Delta Stewardship Council	12/17/2013
SSHCP Permitted (Covered) Activities			
	While many of the potential impacts remain unknown at this time, failure to address mosquito breeding issues during the planning, construction and management process of aquatic habitats may result in enforcement actions to the landowner.	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	Excavation Activities: The cubic yard removal thresholds for beaver dam and related blockage removal may exceed the limits provided by the SSHCP. Please include a recognition of the impacts to public health cause be beaver dams and other blockages by creating mosquito habitat and by following the provisions contained in this SSHCP, allow these dams to be removed in excess of the allowable cubic yards	Sacramento-Yolo Mosquito Vector Control District	12/12/2013

Table 2	Scoping Comment Summary		
Issue Category	**Comment Received**	**Commenter**	**Date**
	on an as needed basis.		
	Chapters 6.8.2/6.8.3 page 6-84 and 6-87, Uses and Activities Not Permitted within Stream Buffer Zones: To the exception list under "clearing or cutting of riparian woodland vegetation," please add "Vegetation removal for the purpose of mosquito control and BMP implementation."	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	Please include Drainage Maintenance and Mosquito Reduction Best Management Practices (BMP) Implementation to the list of SSHCP management activities	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	Add AMM16- Implement Mosquito Reducing BMPs in all designs, management and construction plans.	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	Restoration and Creation Guidelines: Please add a section under Project Design to include a requirement to reference, construct, and manage any habitat restoration or creation projects following the Sacramento-Yolo Mosquito and Vector Control District BMP manual.	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	The HCP must recognize that in certain instances the health and safety code may be the more restrictive of landowner regulatory requirements, thus requiring BMP implementation to reduce mosquito breeding.	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	Scott Finley noted that the Stone Lakes NWR Refuge Association is very concerned about rapid loss of grazing lands and wildlife habitat inside the Refuge planning boundary to new vineyards. He would like information on any SSHCP plans for early preservation of habitat and the SSHCP conservation strategy's "get ahead/stay ahead" component	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR
	Rob Burness and Scott Finley asked about current acres in the SSHCP's "take area" (the UDA), and asked if acres presented in the NOI and NOP will change because of LAFCo's recent decision denying the proposed Elk Grove sphere of influence (SOI) expansion. Rob Burness noted that the lands within the proposed SOI expansion area are critical foraging habitat for several Refuge species, and that area is essential to providing a habitat link between the Cosumnes Preserve and the Refuge	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR
	Bart McDermott noted that sandhill cranes, curlews, and other species use the proposed Elk Grove SOI expansion area to go back and forth between the Refuge and the Preserve; however, farmland throughout this linkage area is being lost to vineyards and solar, and the dairies present during the Refuge scoping period (20 year ago) are now closed. Species on the Refuge will need this adjacent area to remain as farmland. Also, this linkage area is important in the long run, because other areas of existing species-habitat will likely be lost to rising sea level and saltwater intrusion over time. Bart stated that the SSHCP is a good mechanism to preserve farmland habitats east of Interstate 5 (I-5).	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR
	Scott Finley asked how the SSHCP will incorporate Climate Change information in future land-acquisition decisions for preserves—has expected salt water intrusion and land-subsidence been considered in development of alternative conservation strategies? Will expected sea level rise be included in the SSHCP analysis?	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR
	Rob Burness asked a question about the Kammerer Road improvement project, and if this work would be part of the Capitol Connector highway project (a SSHCP Covered Activity), or if it will be a separate project constructed by the City of Elk Grove.	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR

Table 2	Scoping Comment Summary		
Issue Category	**Comment Received**	**Commenter**	**Date**
Planning process			
	Who are the NEPA/CEQA lead/cooperating agencies?	Scoping Meeting Comment	11/21/2013
	Can PowerPoints and maps shared at tonight's meeting be provided to the public through the County's website?	Scoping Meeting Comment	11/20/2013 and 11/21/2013
	How can the public get involved in the process? How can the public get minutes from the LAWG and RAWG meetings?	Scoping Meeting Comment	11/20/2013
	As a responsible agency, Caltrans is committed to coordinate with Sacramento County and the other federal, State, and local partners as the SSHCP is being developed. Please include Caltrans in any interagency working groups that may be formed and provide us with any information on project actions.	California Department of Transportation	11/26/2013
	The EIR/EIS should address the potential impact if cities within the HCP area either "opt out" of the HCP at a later date, and/or independently acquire mitigation lands (inside or outside of their jurisdiction) to reserve that land as mitigation for development projects occurring within their own jurisdiction. For instance, the EIR should address the problems associated with competing territorial mitigation lands undermining the HCP's effort to acquire mitigation lands to support regional development.	Lynn Wheat	12/18/2013
	The EIR/EIS should clearly articulate the processes that would be involved if the HCP is being subjected to an amendment request. The public is interested in assessing the political arena in which this final document will exist so we may be confident in the HCP's ability to provide long-term protection of the species in the region.	Lynn Wheat	12/18/2013
	Bart McDermott (Stones Lakes National Wildlife Refuge manager) requested a briefing about the SSHCP.	Stone Lakes National Wildlife Refuge	11/04/2013
	It should be noted that both the Cosumnes River Riparian Woodland National Natural Landmark (NNL) and American River Bluffs and Phoenix Park Vernal Pools NNL appear to be within the plan area of approximately 374,000 acres or quite possibly within the smaller 123,000-acre UDA.	National Park Service, Pacific West Region	01/16/2014
	The boundary of the Cosumnes River Riparian Woodland NNL is currently being evaluated for possible expansion by the National Park Service. If expanded, the landmark would continue to be part of the much larger Cosumnes Preserve, which encompasses an additional 820 acres.	National Park Service, Pacific West Region	01/16/2014
	What role will PMC Consulting firm play in the preparation of the EIS/EIR?	Scoping Meeting Comment	11/20/2013
	What alternatives will be evaluated in the EIS/EIR?	Scoping Meeting Comment	11/20/2013
	How will the HCP and HCP EIS/EIR public comment period and approval process proceed? How can the public get involved in this process?	Scoping Meeting Comment	11/20/2013
	What role does California Department of Fish and Wildlife (CDFW) have in this planning process? What action will CDFW take on the HCP?	Scoping Meeting Comment	11/21/2013
	Why won't the use of eminent domain be utilized during implementation of the HCP?	Scoping Meeting Comment	11/20/2013
	The EIS/EIR should include an Alternative that includes the original SSHCP western boundary, which ended at Interstate-5.	Friends of the Swainson's Hawk	11/20/2013 Scoping Meeting Comment Card
	Alternatives- Include an EIS/EIR alternative with the higher mitigation ratio for	Friends of the Swainson's Hawk	11/20/2013

Table 2	Scoping Comment Summary		
Issue Category	**Comment Received**	**Commenter**	**Date**
	impacts to Swainson's hawk.		Scoping Meeting Comment Card
	The "preferred alternative" should limit the SSHCP's "area of take" to be the of the adopted urban services boundary (USB). Multiple reasons were given to support this as the preferred alternative.	Friends of the Swainson's Hawk	12/16/2013
	Will there be a cumulative effects analysis?	Scoping Meeting Comment	11/21/2013
	What alternatives will be evaluated in the EIS/EIR?	Scoping Meeting Comment	11/21/2013
	Beatrix Treiterer (Deputy Refuge Manager) asked for information about the future SSHCP Implementing Entity (IE)—has the IE format has been determined, or will alternative IE formats be included in the EIS/EIR and the final format determined later?	Stone Lakes NWR	01/21/2014 Meeting at Stone Lakes NWR
Preserves			
	How can farmland co-exist with preserves?	Scoping Meeting Comment	11/20/2013
	The SSHCP should reference the Sacramento-Yolo Mosquito and Vector Control District, Mosquito Reduction BMPs for a variety of land uses including managed wetlands, habitats, and preserves.	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	The SSHCP should reference the Sacramento-Yolo Mosquito and Vector Control District, Mosquito Reduction BMP manual for BMP implementation on all preserve areas in an effort to reduce mosquito breeding and subsequent pesticide applications.	Sacramento-Yolo Mosquito Vector Control District	12/12/2013
	Bart McDermott asked what was minimum "patch size" used by the SSHCP when estimating availability of species habitat for preservation?	Stone Lakes NWR	01/21/2014 Meeting at Stone Lakes NWR
	Sean Wirth noted that the Refuge Association believes lands below sea level should not be included in the inventory of land/habitat available for preservation under the SSHCP	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR
	Rob Burness requested detailed information on methods the SSHCP used to determine which lands were suitable for preservation and included in the SSHCP "habitat inventory." Rob asked if the Refuge Association would be able to "weigh in" on the assumptions and methods used by the SSHCP to quantify the amount of suitable habitat available for future preservation.	Stone Lakes NWR Association	01/21/2014 Meeting at Stone Lakes NWR
Sensitive Species			
	What does it mean to "take" a species or its habitat?	Scoping Meeting Comment	11/20/2013
	Provide rational for why some species were dropped as "SSHCP covered-species" between the 2008 and 2013 HCP public scoping meetings.	Scoping Meeting Comment	11/20/2013
	The DEIR should address the direct, indirect and cumulative impacts on the state listed species, the Swainson's Hawk in terms of both loss of nesting habitat, nesting pairs, foraging habitat and the loss of range of a threatened species. If 52 nesting sites will be lost, where will these pairs nest? What will be the effect on species reproduction? What is the anticipated level of direct, indirect and cumulative "take" of this threatened species?	Friends of the Swainson's Hawk	12/16/2013

Table 2	Scoping Comment Summary		
Issue Category	Comment Received	Commenter	Date
	Does the EIR serve as the foundation document for the CDFW issuance of a 2081 permit for the "take" of Swainson's hawk?	Friends of the Swainson's Hawk	12/16/2013
	What is the comparative quality of Swainson's hawk foraging and nesting habitat that you expect in the anticipated area of Elk Grove SOI expansion that is included in the SSHCP "permit area"? Please compare each of the EIS/EIR alternatives with these issues in mind.	Friends of the Swainson's Hawk	12/16/2013
	Please do not rely on the CNDDB which is not intended as a census of existing threatened species, but instead use the several recent surveys by CDFW, the City of Rancho Cordova, the City of Elk Grove and records of the County of Sacramento about Swanson's Hawk nesting sites.	Friends of the Swainson's Hawk	12/16/2013 and 11/20/2013 Scoping Meeting Comment Card
	Include potential impact on Swainson's hawk nesting sites outside of the SSHCP plan area (within 2-5 miles) because of loss of foraging habitat proposed inside the Plan area.	Friends of the Swainson's Hawk	11/20/2013 Scoping Meeting Comment Card
	Include future reproductive potential of current known nest sites of Swainson's hawk because of loss of foraging habitat	Friends of the Swainson's Hawk	11/20/2013 Scoping Meeting Comment Card
	Include loss of nourishment to migrating Swainson's hawks, especially juveniles.	Friends of the Swainson's Hawk	11/20/2013 Scoping Meeting Comment Card
	State the assurances of how Swainson's hawk habitat will be fully mitigated by preservation of land at a 1:1 mitigation ratio; and explain how that quality is adequate to ensure no loss of range of Swainson's hawk.	Friends of the Swainson's Hawk	11/20/2013 Scoping Meeting Comment Card
	Stone Lakes National Wildlife Refuge staff and the Stone Lakes Association members would like information on the SSHCP Covered Species that use the Refuge, and information on SSHCP activities that could occur within the Refuge planning boundary.	Stone Lakes National Wildlife Refuge	01/21/2014 Meeting at Stone Lakes NWR
	Thirteen of the 30 SSHCP covered species listed in the NOI and NOP are known to occur within the Refuge boundary, and four other covered-species (pallid bat, ferruginous hawk, tricolored blackbird, and Stanford's arrowhead) may occur inside the Refuge boundary.	Stone Lakes National Wildlife Refuge	01/24/2014 Email to USFWS
	Sean Wirth noted that Todd Gardner (CDFW) did a lot of work identifying criteria for defining Swainson's hawk high-value habitat inside the Plan Area, but this information was not integrated into recent drafts of those HCP chapters—which resulted in a lot of EIS/EIR scoping comments from the Friends of Swainson's Hawk.	Stone Lakes National Wildlife Refuge Association	01/21/2014 Meeting at Stone Lakes NWR
	Are the species protected in the SSHCP present in the Delta?	Assemblyman Richard Pan's Office via Robert Moler	11/04/2013 Phone Call with USFWS

Table 2 Scoping Comment Summary			
Issue Category	**Comment Received**	**Commenter**	**Date**
Water Resources and Hydrology			
	The EIS/EIR should summarize the regional allocation of water within the HCP area and the known projects that are awaiting approval of the HCP.	Lynn Wheat	12/18/2013
	To the extent that any existing and/or future habitat may rely upon water on the site (or immediate vicinity), the EIS/EIR should discuss the potential for land owners to sell/transfer water rights that may have an adverse impact to species protection.	Lynn Wheat	12/18/2013
	To what extent will the construction of the new water delivery structures/systems be evaluated in the cumulative impacts analysis?	Scoping Meeting Comment	11/20/2013
	Will the EIS/EIR evaluate indirect effects/impacts on water resources?	Scoping Meeting Comment	11/20/2013

APPENDIX A

2013 NOP

2013 NOI

2013 Scoping Meeting Announcements and Distribution List

2013 Scoping Meeting Materials

2013 Scoping Meeting Notes

2013 Written Comments Received

2008 Scoping Report Summary

2013 Notice of Preparation (NOP) and Distribution List

Department of
Community Development
Lori A. Moss, Director

Divisions
Building Permits & Inspection
Code Enforcement
County Engineering
Planning & Environmental Review

DEPARTMENT OF COMMUNITY DEVELOPMENT
Planning and Environmental Review Division
NOTICE OF PREPARATION

OCTOBER 28, 2013

TO: ALL INTERESTED PARTIES

SUBJECT: NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR SOUTH SACRAMENTO HABITAT CONSERVATION PLAN (CONTROL NUMBER 2003-PLE-0637)

Sacramento County will be the Lead Agency under the California Environmental Quality Act (CEQA) for preparation of an Environmental Impact Statement and Environmental Impact Report (EIS/EIR) for a project known as the SOUTH SACRAMENTO HABITAT CONSERVATION PLAN (SSHCP). This Notice of Preparation has been sent to responsible and trustee agencies and involved federal agencies pursuant to Section 15082 of the CEQA Guidelines. Agencies should comment on the scope and content of the environmental information that is germane to the agencies' statutory responsibilities in connection with the proposed project. Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after receipt of this notice. Late comments received prior to 5:00 PM Friday December 13, 2013, will be considered.

The project description, location, and the probable environmental effects are contained in the attached materials and may also be viewed online at:
http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchPublicNotices.aspx

The SSHCP has not been finalized or distributed for agency or public review. Requests for details beyond the attached project description or other specific questions about the project may be directed to Marianne Biner at 916-874-7520 or Catherine Hack at 916-874-8783.

Two scoping meetings will be held for the public and agencies to provide input on the scope and content of the EIS/EIR. The first scoping meeting will be tailored towards information and input with the general public on **Wednesday, November 20,** from 6:30 p.m. to 8:30 p.m., at the Anthony Pescetti Community Room, Galt Police Facility, 455 Industrial Drive, Galt, CA 95632. The second scoping meeting will be directed towards government agencies on **Thursday November 21,** from 2:00 p.m. to 4:00 p.m., at 1400 10th Street, Sacramento, CA 95814, Governor's Office of Planning and Research, Large Conference Room 202.

Please send your Agency's response to this Notice to:

Catherine Hack, Environmental Coordinator
Department of Community Development
Planning and Environmental Review Division
827 7th Street, Room 220, Sacramento, CA 95814
or via e-mail at: DERA@saccounty.net

Your response should include the name of a contact person in your agency.

827 7th Street, Room 220 • Sacramento, California 95814 • phone (916) 874-7914 • fax (916) 874-8343 • www.saccounty.net

PROJECT TITLE
SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

CONTROL NUMBER
03-PLE-0637

PROJECT APPLICANTS (PLAN PARTNERS)

- County of Sacramento
- City of Elk Grove
- City of Rancho Cordova
- City of Galt
- Capital Southeast Connector JPA
- Sacramento Regional County Sanitation District
- Sacramento County Water Agency
- Future SSHCP JPA

INTENT OF PROJECT
The intent of the proposed project is to provide development and infrastructure projects with streamlined, predictable federal and state permitting processes while creating a robust preserve system to protect habitat, open space, and agricultural lands.

Pursuant to the California Environmental Quality Act (CEQA) the County of Sacramento is circulating this Notice of Preparation (NOP) to inform the public that the County intends to gather information to prepare a joint Environmental Impact Report (EIR) and Environmental Impact Statement (EIS) on the proposed South Sacramento Habitat Conservation Plan (SSHCP). The EIS/EIR may include additional analysis in response to comments on the NOP. The joint EIS/EIR will analyze the environmental effects of the United States Fish and Wildlife Service (USFWS) proposed issuance of an incidental take permit (ITP) under Section 10(a)(1)(B) of the Federal Endangered Species Act of 1973, as amended (ESA), the California Department of Fish and Wildlife (CDFW) proposed issuance of an incidental take permit under Section 2081(b)(2) of the California Endangered Species Act, as amended (CESA). The joint EIS/EIR will also analyze the approval and implementation of the SSHCP and Aquatic Resources Program (ARP) required for the proposed incidental take permit and permits pursuant to Section 404 of the Clean Water Act. The SSHCP will provide habitat and protection for 30 species of plants and animals, 10 of which are either state or federally listed as protected pursuant to ESA and/or CESA. The anticipated ITPs would be in effect for a period of 30 to 50 years.

The SSHCP also seeks a Master Streambed Alteration Agreement (MSAA) under California Fish and Game Code, Section 1600 et seq.. The Plan Partners are also seeking a variety of permits pursuant to Section 404 of the Clean Water Act from the U.S. Army Corps of Engineers (Corps) and a Water Quality Certification pursuant to Section 401 of the Clean Water Act from the Regional Water Quality Control Board. The SSHCP would protect vernal pool, wetland, and stream habitats that are subject to the federal Clean Water Act (CWA) and California's Porter–Cologne Water Quality Control Act.

In addition to local actions, the Plan Partners are seeking the following federal and state permits and actions:

- A Programmatic General Permit from the Corps authorizing discharge of dredged or fill materials into waters of the US for private and public projects that are consistent with the SSHCP.
- A Letter of Permission process from the Corps that will result in an expedited District Engineer review and authorization of discharge of dredged or fill materials into waters of the US for private and public projects that do not qualify under the Programmatic General Permit and are approved through the SSHCP Incidental Take Permit.
- A streamlined Individual Permit process from the Corps that will result in an expedited District Engineer review and authorization of discharge of dredged or fill materials into waters of the US for large private and public projects that do not qualify under the Programmatic General Permit or Letter of Permission and are approved through a SSHCP Incidental Take Permit. The streamlining would be based on a regional Section 404(b)(1) alternative site analysis, and minimization based on the SSHCP conservation strategy, which would be included in the SSHCP EIS Record of Decision. It is anticipated that large projects that are SSHCP covered activities will be able to rely heavily on the SSHCP EIS for the Corp's NEPA compliance, and those projects that do require site-specific NEPA analysis will generally be able to meet NEPA requirements by preparing a tiered EA.
- A Water Quality Certification (or waiver) pursuant to Section 401 of the Clean Water Act from the Central Valley Regional Water Quality Control Board authorizing discharge of dredged or fill materials into waters of the US for private and public projects approved under a SSHCP ITP.
- A Master Streambed Alteration Agreement pursuant to Section 1600 et seq. of the California Fish and Game Code from CDFW authorizing modifications to river, stream, or lake.
- An incidental take permit pursuant to Section 2081(b)(2) of the CESA from CDFW.
- An incidental take permit pursuant to Section 10(a)(1)(B) of the ESA from the USFWS.
- A Corps approved in-lieu-fee and/or land dedication program providing required compensatory mitigation beyond the compensatory mitigation already provided in the SSHCP.

PROJECT SUMMARY -- SSHCP AND AQUATIC RESOURCE PROGRAM:
The SSHCP identifies urban development and public infrastructure projects within an Urban Development Area (UDA) and defines mitigation and avoidance measures for covered species and habitat that will be affected by the covered activities identified in the SSHCP. The SSHCP will consolidate mitigation in areas with high habitat value, thereby enhancing the long-term viability of species populations and habitat.

The ARP is a regional conservation approach for aquatic resources located within the SSHCP Plan Area; this approach minimizes impacts to aquatic resources, avoids impacts to a significant amount of high quality aquatic resources and directs mitigation at a landscape level to preserve largely intact watersheds including their associated aquatic resources. A primary goal of ARP implementation is

to achieve no net loss of aquatic function and services. The ARP is directly tied to, and is a fully integrated element of the SSHCP.

In order to implement the SSHCP, the County and its Plan Partners would adopt a participant-paid fee that would be based on loss of habitat acreage, habitat type, long-term management costs and costs to administer the SSHCP. Fees would fund the habitat conservation restoration/creation, management elements of the proposed SSHCP and administration. Supplementary funding sources would be sought from grants or other sources to acquire preserve lands that would contribute to the recovery of covered species, but which are not required as mitigation for covered activities.

The SSHCP includes a mitigation strategy that is consistent with the intent of federal and state wetland regulations. The intent of the ARP is to explain how implementation of the SSHCP, in conjunction with the ARP, will satisfy the requirements of the CWA (Sections 404 and 401), California Fish and Game Code Section 1600 et seq., and Porter-Cologne Act for covered activities, and how the ARP will streamline wetlands permitting in a coordinated fashion.

PROJECT LOCATION
The geographic location of the proposed SSHCP includes approximately 374,000 acres within south Sacramento County (unincorporated area) and the cities of Rancho Cordova, Elk Grove, and Galt (Plate NOP-1, Project Location). The geographical boundaries of the Plan Area are U.S. Highway 50 to the north, the Sacramento River levee and County Road J11 to the west, the Sacramento County line with El Dorado and Amador counties to the east, and the San Joaquin county line to the south. The Plan Area excludes the City of Sacramento, the City of Folsom, the lands of the Miwok tribe, and the Sacramento County community of Rancho Murieta.

Almost all incidental take of SSHCP covered-species is expected to occur inside an area referred to as the Urban Development Area or UDA. The UDA corresponds to land within the County's Urban Services Boundary (USB), and to land within the city limits of Rancho Cordova, Elk Grove, and Galt, and within Elk Grove's proposed sphere of influence and Galt's adopted sphere of influence. A limited amount of infrastructure development, such as planned road widening projects and recycled water conveyance pipelines would occur in the SSHCP Planning Area outside the UDA.

PROJECT OBJECTIVE:
The objective of the SSHCP is to implement a regional conservation strategy that will provide private and public projects with streamlined, predictable federal and state permitting processes while creating a comprehensive preserve system to protect habitat, open space, and agricultural lands.

PROJECT DESCRIPTION:
The proposed conservation strategy for the SSHCP provides for the conservation of covered species and their associated habitat types in order to aid recovery of the species, fully mitigate for the impacts of covered activities on the species and their habitats, and provide a regional approach to the avoidance and mitigation of biological and aquatic resource impacts. The SSHCP and ARP are based on the concepts of conservation biology and landscape ecology, the ecological needs of the covered species and the nature, quality, and geographic distribution of the different habitat types.

The SSHCP would minimize and mitigate incidental take and provide for the conservation of 30 covered species that may occur in the Plan Area, 10 of which are either state or federally listed as

protected pursuant to ESA and/or CESA. The anticipated ITP would be in effect for a period of 30 to 50 years. The plan identifies 20 different habitat cover types including vernal pool aquatic and upland habitat, other wetland habitats, riparian woodland, blue oak woodland, and rural agricultural crops. Bisecting the Plan Area is the Cosumnes River and Deer Creek corridor which contains agricultural lands and extensive riparian habitat (Plate NOP-2).

With an approved SSHCP, larger habitat preserves that are linked by habitat corridors would be created outside the UDA, and smaller habitat preserves would be created inside the UDA, also linked by corridors. The key principles of conservation biology that guide the design for the SSHCP include minimizing habitat fragmentation, minimizing edge effects, establishing linkages amongst preserves, establishing buffers and setbacks, maintaining heterogeneity within preserves, protecting watersheds, maintaining or increasing species population size, maintaining species distribution across their native range, and establishing large preserves. The ultimate preserve system is designed to fit into the larger landscape of protected open space within the permit area and connect existing habitat areas. Existing and proposed conservation areas within the reserve system are identified on Plate NOP-3.

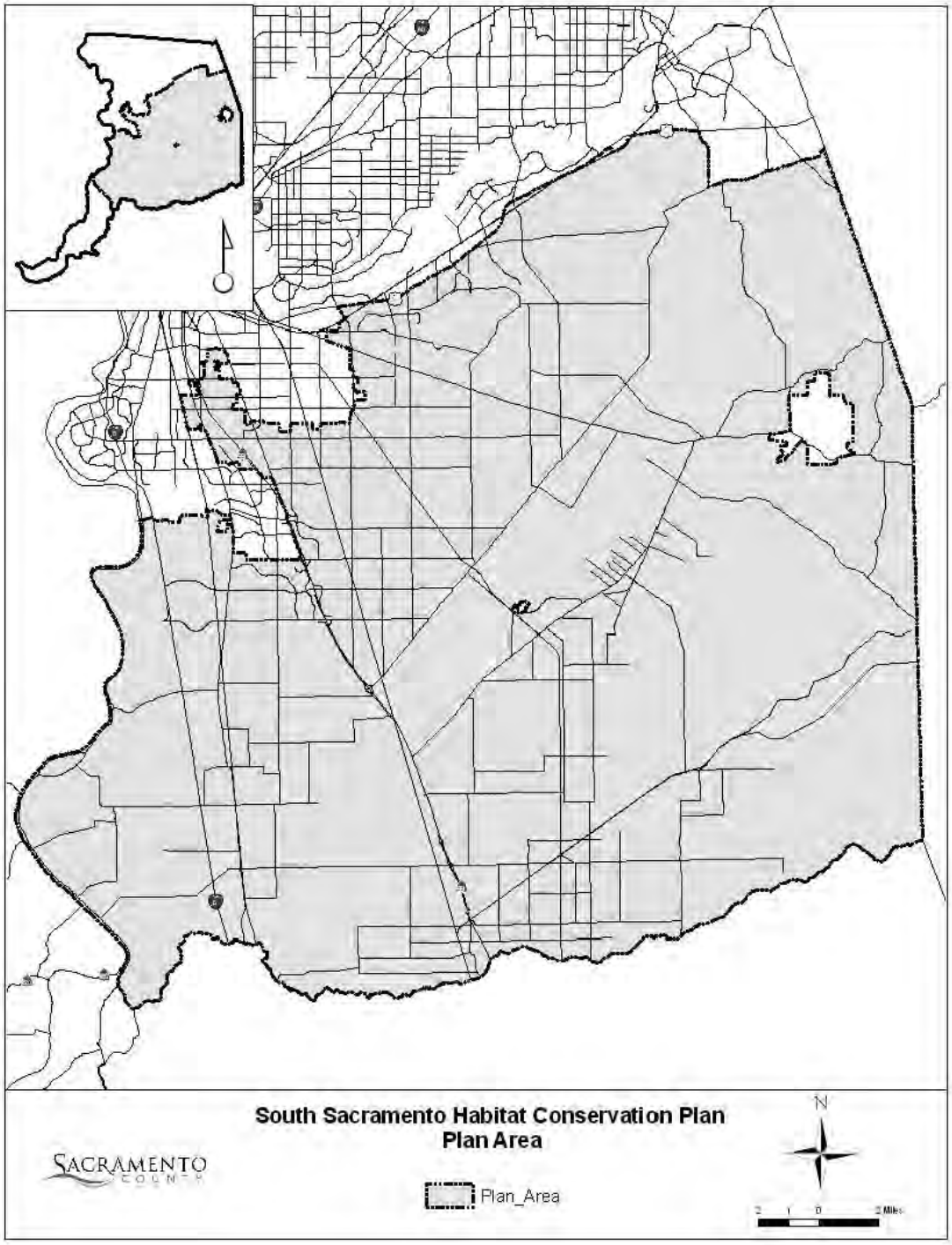
Planned Conservation Inside the UDA

Given that the effects of covered activities would be concentrated mostly within the UDA and these effects cannot be completely offset outside the UDA (particularly vernal pools), establishing preserves and linkages inside the UDA is critical to the conservation strategy. Reserve assembly inside the UDA, including new preserves and linkages, generally would build on the framework of existing and planned preserves and linkages using specific design methods. The following preserve and habitat linkage categories are employed to establish the Reserve System within the UDA: Landscape Preserve, Core Preserve, Minor Preserve, Satellite Preserve, Linkage, Laguna Creek Wildlife Corridor, Flexible Preserve, and Soft-lined Criteria-based Preserve.

Planned Conservation Outside the UDA

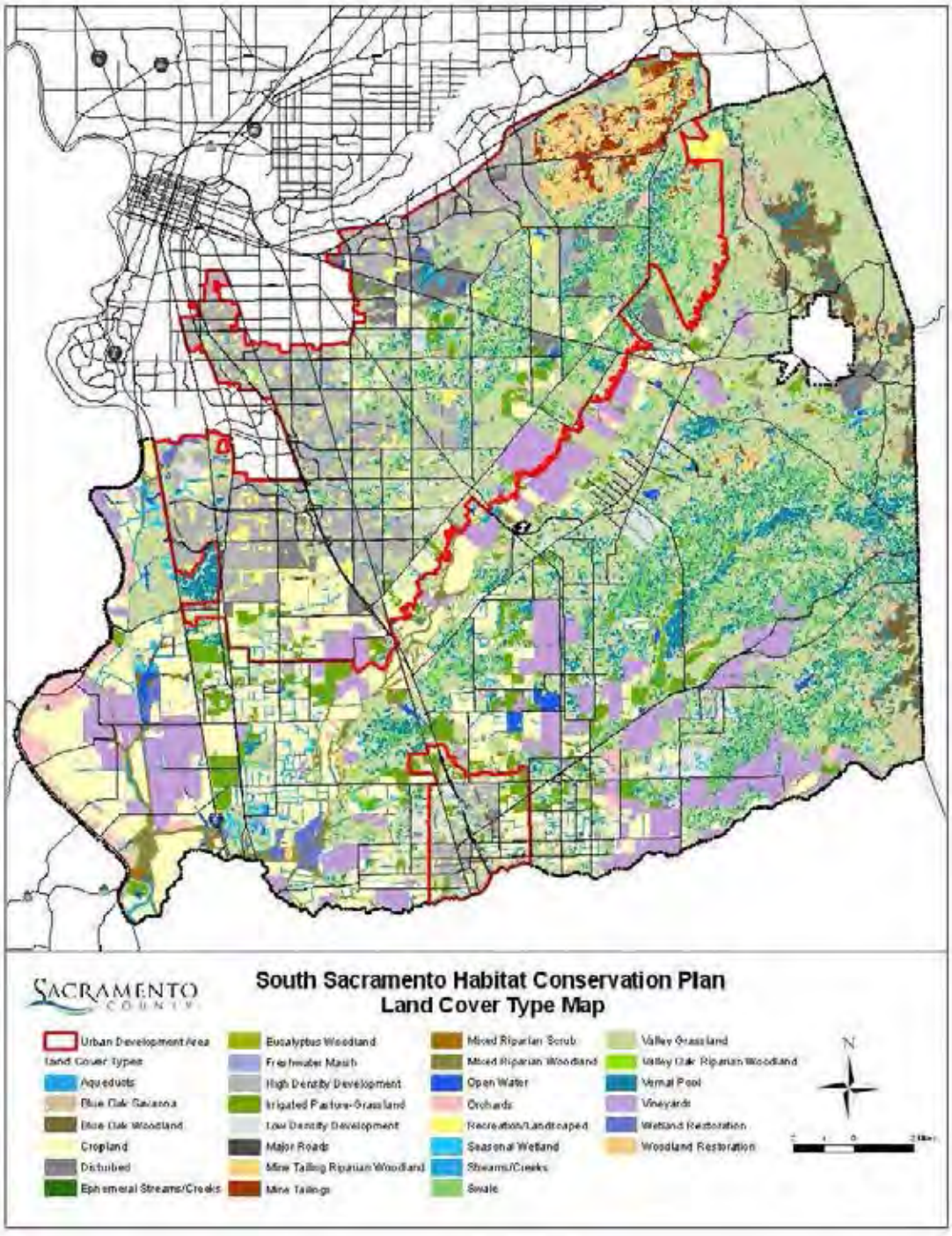
Outside the UDA, where fewer effects of covered activities would result (primarily related to infrastructure), reserve design can be more directly focused on the biological goals and objectives for the covered species and natural communities. In general, conservation opportunities are much more available and reserve design can be more flexible outside the UDA with regard to preserve location because large contiguous parcels that could support covered species are more abundant and are not constrained by the more site-specific urban development pressures inside the UDA. Therefore, reserve design outside the UDA employs a narrative set of criteria that articulates the biological goals and objectives and corresponding conservation actions intended to guide and direct conservation outside the UDA.

Plate NOP-1 Project Location



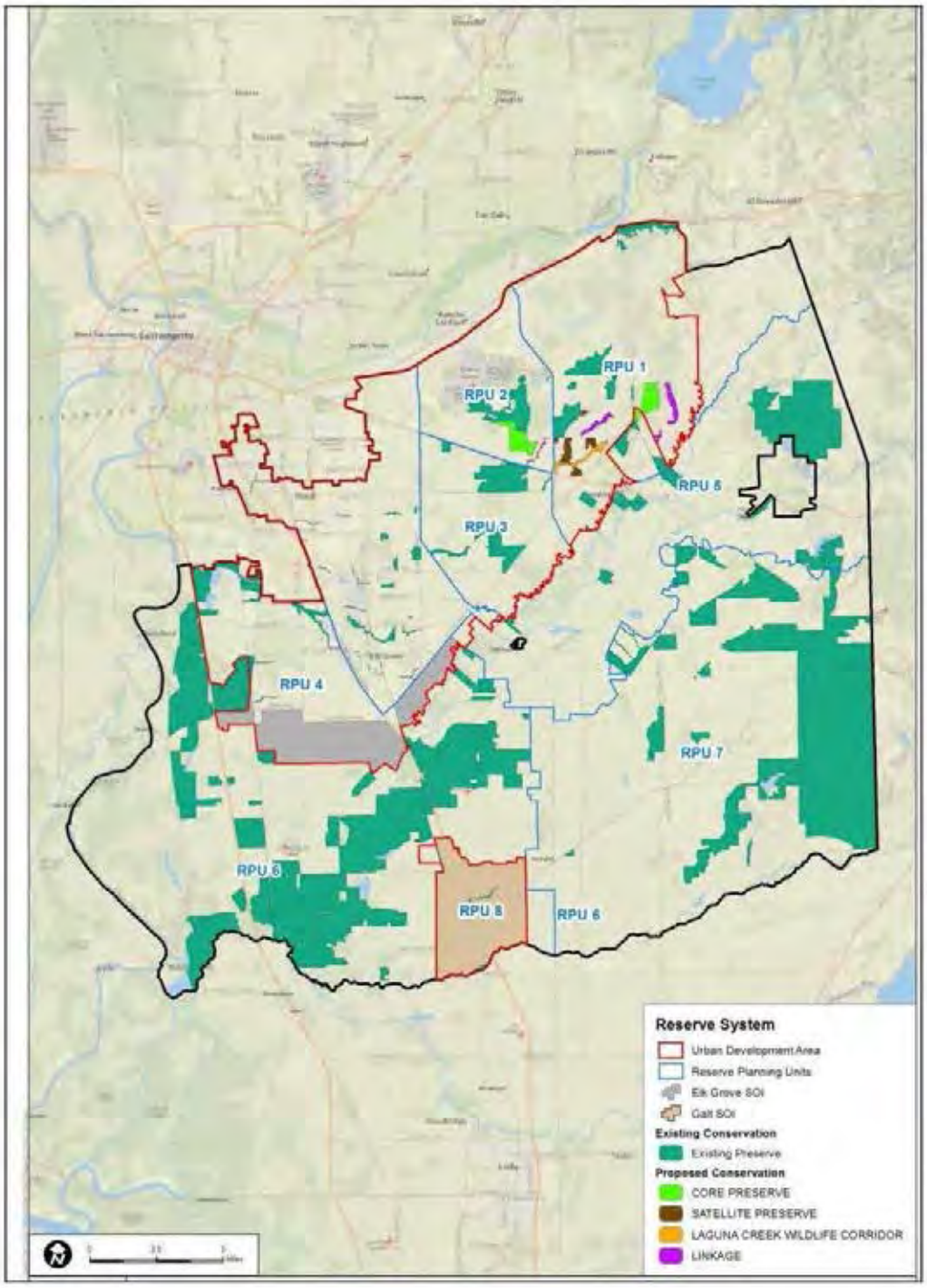
Notice of Preparation NOP-6 03-PLE-0637

Plate NOP-2 SSHCP Habitat Types



Notice of Preparation NOP-7 03-PLE-0637

Plate NOP-3 Proposed Reserve System



Notice of Preparation NOP-8 03-PLE-0637

Reserve Planning Units

To assist with Plan implementation, the Plan Area is further divided into Reserve Planning Units; these Reserve Planning Units are geographic subdivisions of the Plan Area designed to ensure that habitat for covered species is conserved across the Plan Area; that the conserved habitat is heterogeneous across the Plan Area; and that large-scale ecological functions and processes are maintained. Each Reserve Planning Unit is designed to encompass habitat for a suite of covered species and known species occurrences based on existing information. By designating spatially diverse Reserve Planning Units and using the SSHCP biological goals and objectives to set conservation criteria for each unit, the Conservation Strategy will assure that the covered species are adequately and representatively conserved throughout the Plan Area. In total, the SSHCP could preserve or restore nearly 50,000 acres of native and naturalized landcovers within the Plan Area boundary. When combined with existing preserve lands, the SSHCP could result in a large and interconnected reserve system encompassing approximately 113,600 acres within the SSHCP Plan Area. The total amount of preserve land proposed under the SSHCP is subject to further refinement prior to release of the public Draft SSHCP.

The timing and sequence of land acquisition relative to impacts is critical to the success of the Plan. A "stay ahead" provision of the SSHCP was developed to adhere to California Department of Fish and Wildlife's requirements that all impacts of a particular project must be mitigated prior to the impact occurring. The "stay ahead" provision will ensure that conservation measures occur prior to impacts.

Covered Species

There are 30 wildlife and plant species proposed for coverage under the Plan including 10 state or federally listed species. **Table NOP-1 Covered Species**, lists those species and their current status. Species may be added or deleted from this list as Plan development continues.

Covered Activities

Potential ground disturbance from proposed covered-activities of the SSHCP may encompass up to 42,400 acres (40,000 acres within the UDA and 2,400 acres outside the UDA). The total amount of potential ground disturbance from covered activities is subject to further refinement prior to release of the public Draft SSHCP. Covered activities may include the construction, installation, or extension of:

- Private development projects
- Transportation facilities
- Surface and groundwater delivery facilities
- Water treatment facilities
- Sewer and recycled water treatment and conveyance facilities
- Solid waste sanitation facilities
- Public facilities (fire station, police stations, hospitals, schools, community centers, cemeteries, and administration centers)
- Indoor and outdoor recreation facilities
- Energy utility facilities
- Aggregate mining activities
- Habitat management activities

Table NOP-1 Covered Species[1]

Mammals	Invertebrates
American Badger, *Taxidae taxus*	Mid-Valley Fairy Shrimp, *Branchinecta mesovallensis*
Pallid Bat, *Antrozous pallidus*	Ricksecker's Water Scavenger Beetle, *Hydrochara ricksecker*i
Western Red Bat, *Lasirus blossevillii*	Valley Elderberry Longhorn Beetle, *Desmocerus californicus dimorphus*, (FT)
Yuma Myotis Bat, *Myotis yumanensis*	Vernal Pool Fairy Shrimp, *Branchinecta lynch*i, (FT)
	Vernal Pool Tadpole Shrimp, *Lepidurus packardi,* (FE)
Birds	**Plants**
White-Tailed Kite, *Elanus leucurus*	Ahart's Dwarf Rush, *Juncus leiospermus var. ahartii*
Cooper's Hawk, *Accipiter cooperii*	Boggs Lake Hedge-Hyssop, *Gratiola heterosepala* (SE)
Ferruginous Hawk, *Buteo regalis*	Dwarf Downingia, *Downingia pusilla*
Greater Sandhill Crane, *Grus Canadensis tabida* (ST)	Legenere, *Legenere limosa*
Loggerhead Shrike, *Lanius ludovicianus*	Pincushion Navarretia, *Navarretia myertsii*
Northern Harrier, *Circus cyaneus*	Sacramento Orcutt Grass, *Orcuttia viscida*, (SE, FE)
Swainson's Hawk, *Buteo swainsoni* (ST)	Slender Orcutt Grass, *Orcuttia tenuis,* (SE, FE)
Tricolored Blackbird, *Agelaius tricolor*	Sanford's Arrowhead, Sagittaria sanfortii
Western Burrowing Owl, *Athene cunicularia hypugaea*	
Amphibians	**Reptiles**
California Tiger Salamander, *Ambystoma californiense* (central valley, DPS), (FT)	Giant Garter Snake, *Thamnophis gigas* (FT)
Western Spadefoot Toad, *Scaphiopus hammondii*	Western Pond Turtle, *Actinemys marmorata marmorata* and *A. m. pallida* (2 sub-species: Northwestern and Southwestern)

Biological Goals and Objectives

Habitat loss and fragmentation is a threat common to the covered species in the Plan Area. Loss and fragmentation of land cover types that provide habitat for the covered species will be among the main effects of covered activities in the Plan Area; therefore, the biological goals and objectives focus on land cover type protection and connectivity as key components of the SSHCP Conservation

[1]: F - federal, S – State, E – endangered, T – threatened

Strategy. Through protecting and connecting large contiguous areas of the different land cover types, the Conservation Strategy will preserve broad landscape ecological functions, maintain the abundance and heterogeneity of land cover types, and preserve populations of individual species.

Biological goals provide the broad guiding principles of the Conservation Strategy and are required by the USFWS' 5-Point Policy to be included in HCPs. Biological objectives are measureable objectives that, when implemented collectively, achieve the biological goals.

For each biological goal and objective there is a set of conservation actions that would be implemented and monitored.

Landscape Level Conservation

Land conservation is a key component of the Conservation Strategy, which calls for the establishment, enhancement, and long-term management of a Reserve System for the benefit of natural communities, covered species, and overall biodiversity and ecosystem functions. The system of new reserves is anticipated to be linked to existing protected lands to form a network of protected areas.

Community Level Conservation

Reserve assembly actions have been divided into natural community and other land cover categories that link to the biological goals and objectives. The natural communities include agriculture, valley grassland, vernal wetland, blue oak woodland and savanna, riparian, non-vernal wetlands, open water, and stream and creek. Conservation will occur through acquisition of lands in fee title or placement of conservation easements. The conservation actions associated with each of the eight communities are listed below.

- Agriculture—Conserving agriculture to benefit covered species in the Plan Area includes protecting and managing (including enhancement of) cropland and irrigated pasture. The agricultural conservation strategy is designed to maintain a mosaic of agricultural crop types distributed throughout the main agricultural area of the Plan Area as a method of conserving agricultural habitats that benefit the covered species. A diverse array of agricultural types will allow for variation in crop types from year to year in specific fields but overall will maintain important habitat functions. Agriculture will also be preserved to allow for management actions that will enhance the habitat value of these areas for covered species, such as increasing prey.
- Valley Grassland—Valley grassland will be conserved to benefit covered species and protect grassland ecological functions in the Plan Area. Conservation of large tracts of valley grassland will provide watershed functions and water filtration for vernal pools, other ephemeral wetlands, streams/creeks, and open water.
- Vernal Pool—To benefit covered species and to maintain ecological functions, vernal pools will be restored and conserved in the Plan Area. To conserve the full diversity of ecological conditions, mitigation for the loss of vernal pool habitat should occur through the conservation of vernal pool habitat in the same geologic formation where impacts occur, when it would be beneficial for the covered species.

- Blue Oak Woodland and Savanna—Conserving and restoring blue oak woodland and savanna will benefit covered species in the Plan Area. The main conservation focus will be connectivity to the existing Deer Creek Hills Preserve, which will be connected to lands inside and outside the UDA by protected preserve linkages.
- Riparian—The conservation strategy for riparian includes conserving mixed riparian woodland, mixed riparian scrub, and valley oak riparian woodland to benefit covered species populations in the Plan Area.
- Non-vernal Wetland—The conservation strategy for community would include conservation, restoration or creation of seasonal wetland, freshwater marsh, and swale.
- Open Water—Conserving, restoring and creating open water will benefit covered species and ecological functions in the Plan Area.
- Stream and Creek—Conserving and/or creating stream/creek will benefit covered species and protect ecological functions in the Plan Area.

Species Level Conservation

The plan provides a framework for conservation of known occurrences of covered species as well as habitat that would allow target populations to expand. These species-by-species biological goals and objectives take into account the opportunities for expansion of existing populations keeping in mind the various life cycle requirements of each species.

Management Measures

The SSHCP includes specific actions for the management of the Reserve System for the conservation and enhancement of natural communities and the covered species. Management measures would include both routine management and adaptive management depending on the identified management needs of each preserve and linkage. Routine management is expected to include common open space management activities such as controlling public access to sensitive areas, fencing, signage, trail repair, trash removal, patrols, etc. Adaptive management, in both an "active" and "passive" context would occur throughout the term of the ICP and may include full-scale actions, pilot programs, and research.

Potential management activities, particularly in the context of vernal pool and grassland habitat, will likely include invasive species control, thatch management (grazing or fire), manipulation of percent suspended organic matter in vernal pool environments, hydrology studies to determine watershed and vernal pool function, predator control, and disease control (treatment of water source).

As it is assembled, the Reserve System will be routinely monitored to ensure habitat health and reserve functionality. Typical monitoring activities would include surveys for covered species.

PROBABLE ENVIRONMENTAL EFFECTS OF THE PROPOSED SSHCP

The analysis within the EIS/EIR is expected to include the following environmental topical areas of probable effects: land use; agriculture; soils; geology; mining; hydrology; water quality; drainage;

biological resources; wetlands and waters of the U.S. and State; transportation; air quality; climate change; cultural, historic, and paleontological resources; and public facilities and services.

INTENDED USES OF THE EIS/EIR

The Plan Partners including: Sacramento County, City of Elk Grove, City of Galt, City of Rancho Cordova, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and Capital Southeast Connector Joint Powers Authority, are seeking concurrent and parallel authorizations from federal and state regulatory wetland programs for covered activities authorized through the SSHCP and the associated ITPs. The EIS/EIR will serve as the environmental document for actions taken by the federal, state, and local agencies.

RESPONSIBLE AGENCIES

- United State Fish and Wildlife Service
- United States Army Corps of Engineers
- United States Environmental Protection Agency
- California Department of Fish and Wildlife
- State Water Resources Control Board (?)
- Central Valley Region Water Quality Control Board
- City of Elk Grove
- City of Rancho Cordova
- City of Galt
- Capital Southeast Connector Joint Powers Authority
- Sacramento Regional County Sanitation District
- Sacramento County Water Agency
- Future SSHCP Joint Powers Authority

2013 NOP – US Mail Distribution List

Curtis Banks
[redacted]

Sheryl Cecchettini
[redacted]

Terry and Jane Christensen
[redacted]

Rosemary Clemmons
[redacted]

Kurt Cruise
[redacted]

Bob Decker
[redacted]

John Dijamatouich
[redacted]

Ralph Frattura
[redacted]

Deanna Garcia
[redacted]

Glen Holstein
[redacted]

Alan Ingham
[redacted]

Barbara Lemar
[redacted]

Wesley Namikawa
[redacted]

William A. Roberts
[redacted]

Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
2800 Cottage Way
Sacramento, CA 95825
916-414-6645 (added 9-08)

Van Saed
[redacted]

Marilyn Waegell
[redacted]

Don Walker
[redacted]

Tom Zlotkowski
Connector JPA
[redacted]

Ron Alvarado
[redacted]

Paul Asterlin
[redacted]33

Thomas G. Baumann
[redacted]

Michael Carney
[redacted]

ECOS
P.O. Box 1526
Sacramento, CA 95812

Fred Hegge
[redacted]

Alisa Lopez
[redacted]

George Waegell
[redacted]

Tammy Urguhait
[redacted]

Clara Binotto
[redacted]

Katie Carvajal
[redacted]

John Dijamatouich
[redacted]

SACOG
1415 L St #300 Sacramento, CA 95814

Missy Matzen
[redacted]

William H. Roberts
[redacted]

Vincent Singh
[redacted]

Franca Vanzan
[redacted]

Harry Eldredge
[redacted]

Veronica Rowan - Assistant Regional Solicitor, Office of the Solicitor, Pacific Southwest Region,
2800 Cottage Way, Suite E-1712,
Sacramento CA. 95825

Betty Yee,
Regional Water Quality Control Board
11020 Sun Center Dr. Ste 200
Rancho Cordova, CA 95670

Govt Pubs Section
CA State Library
914 Capitol Mall
Sacramento, CA 95814

Dr. Steve Schwarzbach Director, W Ecological Research Ctr
USGS
CSUS-6000 J St, Placer Hall
Sacramento, CA 95827

Curt Campion Asst City Manager
Galt Planning Dept.
495 Industrial Dr
Galt, CA 95632

Robert Grunwald Planning Consultant
Isleton Planning, Grunwald & Associates
350 Rivergate Way
Sacramento, CA 95831

Surpervisor
UC Coop Extension – Sacto County
4145 Branch Center Rd
Sacramento, CA 95827

Jude Lamore
Friends of the Swainson's Hawk
915 L St, Ste C-425
Sacramento, CA 95814

Director Ducks Unlimited
3074 Gold Canal Dr
Rancho Cordova, CA 95670-6116

Rhonda Morningstar Pope Spokesperson
Buena Vista Rancheria
PO Box 162283
Sacramento, CA 95816

Joseph Sheley Exec VP
CSUS, Sacto President's Office
6000 J St
Sacramento, CA 95819

Mayor
City of Rancho Cordova
2729 Prospect Park Drive
Rancho Cordova CA 95670

Aimee Rutledge Exec Dir
SVOSC
3507 13th St
Sacramento, CA 95818

David Wright
[redacted]

Eric Hansen
[redacted]

Douglas Bell
CSUS - Dept of Biological Sciences
CA State University
Sacramento, CA 95819-6077

Sean Barry
Entrix, Inc
701 University Avenue, Ste 200
Sacramento, CA 95825-6757

Kari Dohn Rosie & Kindel, PA Specialists
[redacted]

Katz & Associates
1801 I Street Ste 100
Sacramento, CA 95811-3000

Carol Witham President
CA Native Plan Society
1141 37th St
Sacramento, CA 95816-5415

Al Wright Executive Director
Wildlife Conservation Board
1807 13th St #103
Sacramento, CA 95814-7137

William Miller President
Villages of Laguna San Luis
2251 Ralston Rd
Sacramento, CA 95821

Rex Albright Exec Dir
Rancho Cordova Chamber of Commerce
3328 Mather Field Rd
Rancho Cordova, CA 95670

2013 NOP – Email Alert

From: Radmacher. Richard [mailto:RADMACHERR@saccounty.net]
Sent: Tuesday, November 12, 2013 1:56 PM
To: [redacted]
Subject: South Sacramento Habitat Conservation Plan NOI/NOP

Dear SSHCP Stakeholders,

The South Sacramento Habitat Conservation Plan (SSHCP) Partners and the US Fish and Wildlife Service (USFWS) are pleased to announce the release of the Notice of Intent (NOI) and Notice of Preparation (NOP) to prepare a joint Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the South Sacramento Habitat Conservation Plan. To view links to the NOI and/or NOP please follow the link below.

http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/SSHCPPlan.aspx

Two scoping meetings will be held in November for the public and agencies to provide input on the scope of the EIR/EIS. The first scoping meeting will be held on Wednesday, November 20th in Galt from 6:30 to 8:30 pm. This scoping meeting will be tailored to the general public. A second scoping meeting will be held on Thursday, November 21th in Sacramento from 2:00 to 4:00 pm and is tailored to the agencies. The public is welcome to attend either meeting, but due to limited space is encouraged to attend the November 20th meeting in Galt. More information regarding the two scoping meetings can be found in the attached flyer.

For those of you that are unable to attend one of our scoping meetings, but would still like to provide input, a commnet card is attached for your convenience. If you have any questions or concerns regarding the SSHCP please don't hesitate to contact me. For additional information regarding the EIS/EIR please direct your inquires to Marianna Biner at (916) 874-7520 or by email at binerm@saccounty.net.

Sincerely,

Richard Radmacher
Senior Planner
Department of Water Resources
827 7th Street, Room 230
Sacramento, CA 95814
Phone: 916-874-6141
Fax: 916-874-6100
E-Mail: Radmacherr@saccounty.net

County of Sacramento Email Disclaimer: This email and any attachments thereto may contain private, confidential, and privileged material for the sole use of the intended recipient. Any review, copying, or distribution of this email (or any attachments thereto) by other than the County of Sacramento or the intended recipient is strictly prohibited. If you are not the intended recipient, please contact the sender immediately and permanently delete the original and any copies of this email and any attachments thereto.

fdsf

2013 Notice of Intent (NOI)

2013 Scoping Meeting Announcements and Distribution Lists

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[FWS–R8–ES–2013–N209]; [FF08E00000–FXES11120800000F2–123–F2]

Habitat Conservation Plan for South Sacramento County, California

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of intent, request for comments, and notice of public scoping meetings.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), intend to gather additional information and to prepare, in coordination with the County of Sacramento, California, a joint environmental impact statement and environmental impact report (EIS/EIR) under the National Environmental Policy Act and the California Environmental Quality Act for the proposed South Sacramento Habitat Conservation Plan (HCP). The draft EIS/EIR will evaluate the impacts of several alternatives related to the proposed issuance of Endangered Species Act permits to eight permit applicants in south Sacramento County, California. The permit applicants intend to apply for either a 30-year or a 50-year permit from the Service that would authorize the incidental take resulting from implementation or approval of covered activities, including various kinds of development projects. We also announce public scoping meetings and the opening of a public comment period. We request data, comments, new information, or suggestions from other concerned governmental agencies, the scientific community, Tribes, industry, or any other interested party.

DATES: To ensure consideration, please send your written comments by December 19, 2013. We will hold two public scoping meetings at different locations in the plan area (see *Public Meetings* under **SUPPLEMENTARY INFORMATION** for dates, times, and locations). In addition to this notice, we will also announce the public scoping meetings in local news media and on the Internet at *http://www.fws.gov/sacramento.*

ADDRESSES: Please address written comments to Nina Bicknese, Senior Fish and Wildlife Biologist, Sacramento Fish and Wildlife Office, 2800 Cottage Way, W–2605, Sacramento, CA 95825. Alternatively, you may send comments by facsimile to (916) 414–6713.

FOR FURTHER INFORMATION CONTACT: Mike Thomas, Chief, Conservation Planning Division, or Eric Tattersall,

Deputy Assistant Field Supervisor, at the address shown above (see **ADDRESSES**) or at (916) 414–6600 (telephone). If you use a telecommunications device for the deaf, please call the Federal Information Relay Service at (800) 877–8339.

SUPPLEMENTARY INFORMATION: We intend to gather additional information and to prepare, in coordination with the County of Sacramento, California, a joint environmental impact statement and environmental impact report (EIS/ EIR) under the National Environmental Policy Act and the California Environmental Quality Act for the proposed South Sacramento Habitat Conservation Plan (HCP). This notice revises information on the proposed HCP previously published on June 10, 2008 (73 FR 32729). The draft EIS/ EIR will evaluate the impacts of several alternatives related to the proposed issuance of Endangered Species Act permits to eight permit applicants (the County of Sacramento, City of Elk Grove, City of Rancho Cordova, City of Galt, the Capital Southeast Connector Joint Powers Authority, the Sacramento Regional County Sanitation District, the Sacramento County Water Agency, and a South Sacramento Habitat Conservation Plan Joint Powers Authority) for activities they would conduct or approve within a proposed 374,000-acre plan area located in south Sacramento County, California.

The permit applicants intend to apply for either a 30-year or a 50-year permit from the Service that would authorize the incidental take of 22 animal species. Incidental take would result from implementation or approval of covered activities, including private development projects, transportation facilities, surface and groundwater delivery facilities, water treatment facilities, solid waste sanitation facilities, public facilities, recreation facilities, energy utility facilities, aggregate mining activities, and future preserve land-management activities. We also announce public scoping meetings and the opening of a public comment period. We request data, comments, new information, or suggestions from other concerned governmental agencies, the scientific community, Tribes, industry, or any other interested party.

We publish this notice in accordance with the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.;* NEPA), and its implementing regulations in the Code of Federal Regulations (CFR) at 40 CFR 1500–1508, as well as in compliance with section 10(c) of the Endangered Species Act (16 U.S.C. 1531 *et seq.;* Act), and in compliance with the California Environmental Quality Act (CEQA). We intend to prepare a joint draft EIS/ EIR to evaluate the impacts of several alternatives related to the potential issuance of an incidental take permit (ITP) to the permit applicants, as well as impacts of the implementation of the supporting proposed habitat conservation plan (HCP).

The permit applicants propose to prepare the South Sacramento Habitat Conservation Plan as part of their application for an ITP under section 10(a)(1)(B) of the Act. The proposed HCP will include measures necessary to minimize and mitigate the impacts, to the maximum extent practicable, of potential proposed taking of federally listed species to be covered by the ITP, and the habitats upon which they depend. The covered activities and projects proposed by the HCP would disturb a maximum total of 42,243 acres within the plan area and would include the construction of residential and commercial development projects, improvements to existing transportation facilities, new transportation facilities (including the proposed Capital Southeast Connector highway), new surface water and groundwater delivery facilities, water treatment facilities, solid waste sanitation facilities, public facilities (including fire stations, police stations, hospitals, schools, community centers, cemeteries, and administration centers), indoor and outdoor recreation facilities, energy utility facilities, aggregate mining activities, and future habitat-management activities.

The plan area, the area in which all impacts would be evaluated and all conservation actions will be implemented, is approximately 374,000 acres within unincorporated south Sacramento County and within the cities of Rancho Cordova, Elk Grove, and Galt. The approximate geographical boundary of the plan area would be the area bound by U.S. Highway 50 in the north, the San Joaquin County line to the south, the Sacramento River levee and County Road J11 to the west, and the Sacramento County line with El Dorado and Amador counties to the east. The 374,000-acre plan area would include a 123,000-acre urban development area (UDA) where most ground-disturbing development, infrastructure activities, and projects would occur. The UDA corresponds to land within the County's urban services boundary (USB); and to land within the city limits of Rancho Cordova, Elk Grove, and Galt; land within Elk Grove's proposed sphere of influence; and land within Galt's adopted sphere of influence.

Almost all ground disturbance and incidental take of federally listed endangered and threatened species would occur on approximately 40,000 acres within the UDA. A limited amount of infrastructure development, such as planned road widening projects and recycled water conveyance pipelines, would disturb or remove approximately 2,443 acres of native and naturalized landcovers outside the UDA. In addition, the HCP would include an aquatic resource program that would avoid, minimize, or fully mitigate potential covered activity impacts to existing aquatic resources within the plan area, and would facilitate the U.S. Army Corps of Engineers' development of a process for permit applicant compliance with the Clean Water Act (33 U.S.C. 1251 *et seq.*). The permit applicants also propose to permanently preserve or restore approximately 8,950 acres of the UDA and preserve approximately 40,980 acres outside the UDA, following criteria that would expand the size of existing preserves and create linkages and corridors between existing preserves. In total, the HCP proposes to permanently preserve or restore 49,930 acres of native and naturalized landcovers within the plan area boundary. When combined with the existing preserve lands, the HCP would result in a large and interconnected 113,623-acre habitat reserve system within the 374,000-acre plan area.

Background Information

Section 9 of the Act and Federal regulations prohibit the taking of fish and wildlife species listed as endangered or threatened under section 4 of the Act. Take of federally listed fish or wildlife is defined under the Act as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed species, or attempt to engage in such conduct. The term ''harass'' is defined in the regulations as to carry out actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). The term ''harm'' is defined in the regulations as significant habitat modification or degradation that results in death or injury of listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3).

However, under specified circumstances, the Service may issue permits that allow the take of federally

listed species, provided that the take is incidental to, but not the purpose of, an otherwise lawful activity. Regulations governing permits for endangered and threatened species can be found at 50 CFR 17.22 and 17.32, respectively. Section 10(a)(1)(B) of the Act contains provisions for issuing such incidental take permits to non-Federal entities for the take of endangered and threatened species, provided the following criteria are met:

1. The taking will be incidental;
2. The applicants will, to the maximum extent practicable, minimize and mitigate the impact of such taking;
3. The applicants will develop a proposed HCP and ensure that adequate funding for the HCP will be provided;
4. The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and
5. The applicants will carry out any other measures that the Service may require as being necessary or appropriate for the purposes of the HCP.

Thus, the purpose of issuing ITPs is to allow the permit applicants, under their respective authorities, to authorize new development and infrastructure, while conserving covered species and their habitats. Implementation of a regional habitat conservation plan, rather than a species-by-species or project-by-project approach, would enhance benefits of conservation measures for covered species and would eliminate expensive and time-consuming efforts associated with processing individual ITPs for each project within the applicants' proposed plan area. The Service expects that the permit applicants will request ITP coverage for a period of 30 to 50 years.

Alternatives in the Draft Environmental Impact Statement

The proposed action alternative presented in the draft EIS/EIR will be compared to a no-action alternative. The no-action alternative represents estimated future conditions to which the proposed action's estimated conditions can be compared. Other action alternatives considered, including their potential impacts, will also be addressed in the draft EIS/ EIR and compared to a no-action condition.

No-Action Alternative

Because the proposed covered activities would provide needed regional infrastructure and economic development, these types of activities would occur within the plan area regardless of whether a 10(a)(1)(B) ITP is requested or issued. Although future activities would be similar to the covered activities proposed by the HCP, not all activities would necessitate an incidental take permit or consultation with the Service. Under the no action alternative, the permit applicants could implement a covered activity that fully avoids impacts to protected species and their habitats. Where potential impacts to federally protected species could not be avoided, the permit applicants could minimize and mitigate their impacts through individual formal or informal consultations with the Service. When applicable, the permit applicants would potentially seek individual section 10(a)(1)(B) ITPs on a project-by-project basis. Under the no-action alternative, the permit applicants may also satisfy the requirement of the Clean Water Act's sections 404 and 401, the California Fish and Game code section 1600, and the Porter-Cologne Act, and other applicable law, on a project-by-project basis. Thus, under the no-action alternative, various permit applicants would likely need to develop and file numerous separate permit applications over the 30-to-50-year project period. This activity-by-activity approach could be more time consuming and less efficient and could result in smaller and fragmented mitigation areas.

Proposed Action Alternative

The proposed action alternative is the issuance of an ITP for the take of covered species, caused by covered activities within the proposed plan area, for a period of 30 to 50 years. The proposed action HCP, developed and implemented by the permit applicants, must meet the requirements of section 10(a)(2)(A) of the Act by providing measures to minimize and mitigate the effects of the potential incidental take of covered species to the maximum extent practicable. The proposed HCP allows for a comprehensive mitigation approach for unavoidable impacts, and reduces permit processing times and efforts for the permit applicants and the Service.

Covered activities under the proposed HCP are otherwise lawful activities that applicants carry out consistent with all HCP requirements, including, but not limited to:

1. Construction of private development projects within the UDA (e.g., single- and multi-family homes, residential subdivisions, commercial or industrial projects, offices, and park infrastructure);
2. Installation and/or maintenance of utility infrastructure within the UDA (e.g., transmission or distribution lines and facilities related to electric, telecommunication, natural gas, and other types of energy utilities);
3. Installation and/or maintenance of surface and groundwater delivery facilities within the UDA;
4. Construction, maintenance, and/or improvement of water treatment facilities within the UDA;
5. Construction, maintenance, and/or improvement of solid waste sanitation facilities within the UDA;
6. Construction, use, and maintenance of public facilities (e.g., fire stations, police stations, schools, hospitals, community centers, cemeteries, and administration centers) within the UDA;
7. Construction, use, or maintenance of other public infrastructure, including indoor and outdoor recreation facilities, within the UDA;
8. Excavation, use, maintenance, and/or expansion of quarries, gravel mining, or other aggregate mining activities within the UDA;
9. Construction, maintenance, and/or improvement of new roads, bridges, and other transportation infrastructure facilities outside the UDA and within the UDA, including the proposed Southeast Connector highway;
10. Construction, maintenance, and/or improvement of recycled water conveyance pipelines and outside the UDA and within the UDA; and
11. Maintenance and land management activities on conservation lands outside the UDA and within the UDA.

We anticipate that the following 30 species of plants and animals, including seven federally listed threatened (T) or endangered (E) species, will be included as covered species in the permit applicants' proposed HCP:

Mid-valley fairy shrimp *(Branchinecta mesovallensis)*
Ricksecker's water scavenger beetle *(Hydrochara ricksecker)*
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)* (T)
Vernal pool fairy shrimp *(Branchinecta lynchi)* (E)
Vernal pool tadpole shrimp *(Lepidurus packardi)* (E)
California tiger salamander, central California distinct population segment (*Ambystoma californiense)* (T)
Western spadefoot toad *(Scaphiopus hammondii)*
Giant garter snake *(Thamnophis gigas)* (T)
Western pond turtle *(Actinemys marmorata marmorata* and *A. m. pallida)* (two subspecies)
American badger *(Taxidea taxus)*
Pallid bat *(Antrozous pallidus)*
Western red bat *(Lasiurus blossevillii)*
Yuma myotis bat *(Myotis yumanensis)*
White-tailed kite *(Elanus leucurus)*
Cooper's hawk *(Accipiter cooperii)*
Ferruginous hawk *(Buteo regalis)*
Greater sandhill crane *(Grus canadensis tabida)*
Loggerhead shrike *(Lanius ludovicianus)*

Northern harrier *(Circus cyaneus)*
Swainson's hawk *(Buteo swainsoni)*
Tricolored blackbird *(Agelaius tricolor)*
Western burrowing owl *(Athene cunicularia hypugaea)*
Ahart's dwarf rush *(Juncus leiospermus var. ahartii)*
Boggs Lake hedge hyssop *(Gratiola heterosepala)*
Dwarf downingia *(Downingia pusilla)*
Legenere *(Legenere limosa)*
Pincushion navarretia (*Navarretia myersii*)
Sacramento Orcutt grass (*Orcuttia viscida*) (T)
Slender Orcutt grass (*Orcuttia tenuis*) (T)
Sanford's arrowhead (*Sagittaria sanfordii*)

The permit applicants seek incidental take authorization for all applicable covered species. Candidate and federally listed species that are not likely to be taken by the covered activities, and therefore not covered by the proposed ITP, may also be addressed in the proposed HCP, to explain why the permit applicants believe these species will not be taken.

Environmental Review and Next Steps

The Service will conduct an environmental review to analyze the proposed action, along with other alternatives evaluated, and the associated impacts of each. The draft EIS/EIR will be the basis for the impact evaluation for each covered species. The draft EIS/EIR is expected to provide biological descriptions of the affected species and habitats, as well as the effects of the proposed action and other alternatives on other resources, such as soils, geology, water quality, agriculture, vegetation, wetlands, wildlife, cultural resources, transportation, air quality, land use, recreation, water use, local economy, and environmental justice.

Following completion of the environmental review, the Service will publish a notice of availability and a request for comment on the draft EIS/EIR and on the permit applications, which will include the proposed HCP. We anticipate that the draft EIS/EIR and proposed HCP will be completed and available to the public in March or April 2014.

Public Comments

We request data, comments, new information, or suggestions from other concerned governmental agencies, the scientific community, Tribes, industry, or any other interested party on this notice. We will consider these comments in developing an EIS/EIR and in the development of a South Sacramento Habitat Conservation Plan and incidental take permit. We particularly seek comments on the following:

1. Biological information concerning the proposed covered species;
2. Relevant data concerning the proposed covered species;
3. Additional information concerning the range, distribution, population size, and population trends of the proposed covered species;
4. Current or planned activities in the subject area and their possible impacts on the proposed covered species;
5. The presence of archeological sites, buildings and structures, historic events, sacred and traditional areas, and other historic preservation concerns that are required to be considered in project planning by the National Historic Preservation Act (16 U.S.C. 470 *et seq.*); and
6. Identification of any other environmental issues that should be considered with regard to the proposed development and the permit action.

You may submit your comments and materials by one of the methods listed in the **ADDRESSES** section.

Comments and materials we receive on this notice will be available for public inspection by appointment, during normal business hours, at our office (see **FOR FURTHER INFORMATION CONTACT**).

Public Availability of Comments

Written comments we receive become part of the public record associated with this action. Before including your address, phone number, email address, or other personal identifying information in your comments, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Public Scoping Meetings

The purpose of scoping meetings is to provide the public with a general understanding on the background of the proposed HCP and activities it would cover, alternative proposals under consideration for the draft EIS/EIR, the Service's role, and steps to be taken to develop the draft EIS/EIR for the proposed HCP. Two public scoping meetings will be held:

1. Wednesday, November 20, from 6:30 p.m. to 8:30 p.m., at the Anthony Pescetti Community Room, Galt Police Facility, 455 Industrial Drive, Galt, CA 95632.
2. Thursday November 21, from 2:00 p.m. to 4:00 p.m., at the Governor's Office of Planning and Research, Large Conference Room 202, 2nd Floor, 1400 Tenth Street, Sacramento, California, 95814.

The meeting will include a 1-hour open house prior to the formal scoping meeting. The open house will provide an opportunity to learn about the proposed action, permit area, and species covered. The open house will be followed by a presentation of the proposed action, a summary of the NEPA process, and comments from the public. The primary purpose of these meetings and public comment period is to solicit suggestions and information on the scope of issues and scope of alternatives for the Service to consider when drafting the EIS/EIR. Written comments will be accepted at the meetings. Comments can also be submitted by methods listed in the **ADDRESSES** section. Once the draft EIS/EIR and proposed HCP are complete and made available for review, there will be additional opportunity for public comment on the content of these documents during a 90-day draft EIS/EIR public comment period.

Meeting Location Accommodations

Please note that the meeting locations are accessible to wheelchair users. If you require additional accommodations, please notify us at least 1 week in advance of the meeting (see **FOR FURTHER INFORMATION CONTACT**).

Authority

We provide this notice under section 10 of the Act (16 U.S.C. 1531 *et seq.*) and by NEPA regulations (40 CFR 1501.7, 1506.6, and 1508.22).

Dated: October 29, 2013.

Alexandra Pitts,

Deputy Regional Director, Pacific Southwest Region, Sacramento, California.

[FR Doc. 2013–26366 Filed 11–1–13; 8:45 am]

BILLING CODE 4310–55–P

Department of the Interior
U.S. Fish & Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Phone: 916/414-6600
Fax: 916/414-6713
Website: http://www.fws.gov/sacramento/

News Release

For Immediate Release

November 4, 2012
Media Contacts:
Sarah Swenty, sarah_swenty@fws.gov, (530) 665-3310

NOI Published and Scoping Meetings Scheduled for the South Sacramento Habitat Conservation Plan

Plan to Help Offset Impacts to Threatened and Endangered Species

Sacramento – The U.S. Fish and Wildlife Service (Service) and Sacramento County announce a Notice of Intent (NOI) to prepare a joint Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the proposed South Sacramento Habitat Conservation Plan (HCP). The Service and the HCP permit-applicants intend to work together to preserve endangered species and to streamline the existing development-permitting process. To do that, a habitat conservation plan will be prepared for a 374,000-acre area of south Sacramento County, California. The HCP is being prepared to preserve natural lands in Sacramento County and protect habitat for 30 special-status plant and animal species, including seven federally listed species.

This announcement opens a 45-day comment period on the NOI. **All comments should be received by December 19, 2013.**

Two scoping meetings will be held for the public and agencies to provide input on the scope and content of the EIS/EIR. The first scoping meetings will be held **Wednesday, November 20,** from 6:30 p.m. to 8:30 p.m., at the Anthony Pesetti Community Room, Galt Police Facility, 455 Industrial Drive, Galt, CA 95632. The second scoping meeting will be held **Thursday, November 21,** from 2:00 p.m. to 4:00 p.m., at the Governor's Office of Planning and Research, Large Conference Room 202, Second Floor, 1400 Tenth Street, Sacramento, California, 95814.

The Notice of Intent was published today and is available for review in the Federal Register and on the Service's website at http://www.fws.gov/sacramento/. The California Environmental Quality Act's Notice of Preparation (NOP) for the EIS/EIR was also released today and is available for review at http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchPublicNotices.aspx.

America's fish, wildlife, and plant resources belong to all of us, and ensuring the health of imperiled species is a shared responsibility. Together with the local community, the state and federal agencies are working to actively engage conservation partners and the public in the search for improved and innovative ways to conserve and recover imperiled species.

The HCP is being prepared to support compliance with the federal Endangered Species Act. The HCP will also provide the basis for an Incidental Take Permit from the California Department of Fish and Wildlife, and the basis for streamlining U.S. Army Corps of Engineers permits under the Clean Water Act.

The EIS/EIR will be prepared in compliance with the National Environmental Policy Act and the California Environmental Quality Act. The EIS/EIR will describe the underlying purposes, needs, and objectives for developing, approving and implementing a HCP in south Sacramento County; will identify alternatives, including the proposed HCP; describe the existing environment conditions that could be affected by each alternative; and will analyze the potential effects of each alternative on the environment.

To submit written comments, please use one of the following methods and note that your comment is in reference to the South Sacramento Habitat Conservation Plan (SSHCP):

- *U.S. Mail*: Nina Bicknese, Senior Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825.
- *Fax*: U.S. Fish and Wildlife Service, 916-414-6713, Attn: Nina Bicknese.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. We are both a leader and trusted partner in fish and wildlife conservation, known for our scientific excellence, stewardship of lands and natural resources, dedicated professionals, and commitment to public service. For more information on our work and the people who make it happen, visit www.fws.gov/cno. Connect with our Facebook page at http://www.facebook.com/usfwspacificsouthwest, follow our tweets at http://twitter.com/USFWSPacSWest, watch our YouTube Channel at http://www.youtube.com/usfws and download photos from our Flickr page at http://www.flickr.com/photos/usfws_pacificsw.

###

2013 NOI News Release – Email Alert

From: Swenty, Sarah [mailto:sarah_swenty@fws.gov]
Sent: Monday, November 04, 2013 9:13 AM
Subject: NOI Published and Scoping Meetings Scheduled for the South Sacramento Habitat Conservation Plan: Plan to Help Offset Impacts to Threatened and Endangered Species

NOI Published and Scoping Meetings Scheduled for the South Sacramento Habitat Conservation Plan

Plan to Help Offset Impacts to Threatened and Endangered Species

Sacramento – The U.S. Fish and Wildlife Service (Service) and Sacramento County announce a Notice of Intent (NOI) to prepare a joint Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the proposed South Sacramento Habitat Conservation Plan (HCP). The Service and the HCP permit-applicants intend to work together to preserve endangered species and to streamline the existing development-permitting process. To do that, a habitat conservation plan will be prepared for a 374,000-acre area of south Sacramento County, California. The HCP is being prepared to preserve natural lands in Sacramento County and protect habitat for 30 special-status plant and animal species, including seven federally listed species.

This announcement opens a 45-day comment period on the NOI. **All comments should be received by December 19, 2013.**

Two scoping meetings will be held for the public and agencies to provide input on the scope and content of the EIS/EIR. The first scoping meetings will be held **Wednesday, November 20,** from 6:30 p.m. to 8:30 p.m., at the Anthony Pescetti Community Room, Galt Police Facility, 455 Industrial Drive, Galt, CA 95632. The second scoping meeting will be held **Thursday November 21,** from 2:00 p.m. to 4:00 p.m., at the Governor's Office of Planning and Research, Large Conference Room 202, Second Floor, 1400 Tenth Street, Sacramento, California, 95814.

The Notice of Intent was published today and is available for review in the Federal Register and on the Service's website at http://www.fws.gov/sacramento/. The California Environmental Quality Act's Notice of Preparation (NOP) for the EIS/EIR was also released today and is available for review at http://www.per.saccounty.net/EnvironmentalDocuments/Pages/SearchPublicNotices.aspx.

America's fish, wildlife, and plant resources belong to all of us, and ensuring the health of imperiled species is a shared responsibility. Together with the local community, the state and federal agencies are working to actively engage conservation partners and the public in the search for improved and innovative ways to conserve and recover imperiled species.

The HCP is being prepared to support compliance with the federal Endangered Species Act. The HCP will also provide the basis for an Incidental Take Permit from the California Department of Fish and Wildlife, and the basis for streamlining U.S. Army Corps of Engineers permits under the Clean Water Act.

The EIS/EIR will be prepared in compliance with the National Environmental Policy Act and the California Environmental Quality Act. The EIS/EIR will describe the underlying purposes, needs, and objectives for developing, approving and implementing a HCP in south Sacramento County; will identify alternatives, including the proposed HCP; describe the existing environment conditions that could be affected by each alternative; and will analyze the potential effects of each alternative on the environment.

To submit written comments, please use one of the following methods and note that your comment is in reference to the South Sacramento Habitat Conservation Plan (SSHCP):

• *U.S. Mail*: Nina Bicknese, Senior Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825.
• *Fax*: U.S. Fish and Wildlife Service, 916-414-6713, Attn: Nina Bicknese.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. We are both a leader and trusted partner in fish and wildlife conservation, known for our scientific excellence, stewardship of lands and natural resources, dedicated professionals, and commitment to public service. For more information on our work and the people who make it happen, visit www.fws.gov/cno. Connect with our Facebook page at http://www.facebook.com/usfwspacificsouthwest, follow our tweets at http://twitter.com/USFWSPacSWest, watch our YouTube Channel at http://www.youtube.com/usfws and download photos from our Flickr page at http://www.flickr.com/photos/usfws_pacificsw.

###

2013 NOI News Release – Email Alert Distribution

Name	Title	Organization Name
	Chair	Sacramento Audubon
	Executive Director	Audubon California
John Costa	Director, Government Affairs	North State Building Industry Association
	Director	Construction Materials Association of CA
Jeff Rodeo	Controller	California Building Industry Assoc
Nita Vail	Executive Director	CA Rangeland Trust
Dawn Clover	Directort, Govt Affairs	CA Cattlemen's Association
Justin Oldfield	Director, Industry Affairs	CA Cattlemen's Association
Dan Gallardo	President	Yolo County Cattlemen and Wool Growers Association
Rex Albright	Executive Director	Rancho Cordova Chamber of Commerce
Rod Campbell	Director	City of Lincoln Planning Department
Robert McGarvey	Mayor	City of Rancho Cordova
Sandra Kiriu	Director	Galt Community development Dept
John Little	Sycamore Environmental	French Camp Conservation Bank
Kari Hawkins	Project Manager	Conservation Resources, Arroyo Seco Cons. Bank
Bjorn Gregersen	Vice President	ECORP Consulting
Julie Maddox	Marketing Coordinator, Wildlands, Inc.	Kimball Island Conservation Bank
Julie Maddox	Marketing Coordinator, Wildlands, Inc.	Gilsizer Slough S Giant Garter Snake Conservation Bank
Erik Grotte	CFO	Conservation Resources
Matt Gause	Senior Ecologist	Westervelt Ecological Services
Travis Hemmen		Westervelt Ecological Services; Mariner VP Conservation Bank
Steve French	Charter Properties	Bryte Ranch Conservation Bank
Ed Flynn	Wetlands Resources LLC	Elsie Gridley Multi-Species Conservation Bank
Kari Hawkins	Administrator	Laguna Creek Conservation Bank
Julie Maddox	Marketing Coordinator, Wildlands, Inc.	River Ranch Conservation Bank
Julie Maddox	Marketing Coordinator, Wildlands, Inc.	Pope Ranch Conservation Bank
Julie Maddox	Marketing Coordinator, Wildlands, Inc.	Orchard Creek Conservation Bank
Steve Mayo	Senior Habitat Planner	San Joaquin County Council of Govts
Jim Allan	Ag Commissioner	Solano County Department of Agriculture
John Young	Ag Commissioner	Yolo County
Brad Wagenknecht	Supervisor, Dist.1	Napa County Board of Supervisors
Brad Wagenknecht	Supervisor, Dist.1	Napa County Board of Supervisors
Gladys Coil	Clerk	Napa County Board of Supervisors
Georgia Flake	Clerk	Placer County Board of Supervisors
	Clerk	Solano County Board of Supervisors
	Clerk	Yolo County Board of Supervisors
Donna Stottlemeyer	Clerk of the Board	Yuba County Board of Supervisors
Melissa Batteate		Placer County
Jeffrey Redding	Director	Napa County Conservation Development & Planning
	Director	Placer County Planning Dept
Thomas Hutchings	Director	Sacto County Planning & Community Development
Kerry Sullivan	Director	San Joaquin County Community Development Dept
Doug Libby	Principal Planner	Sutter County Planning Services Department
David Morrison	Assistant Director	Yolo County Planning Div
Kevin Maller	Director	Yuba County Community Development
Jeff Boehm	Executive Director	The Marine Mammal Center
		Common Cause
Carol Whitam	Chair, VP Recovery Plan Implementation Team	CA Native Plant Society
Mark Biddlecomb	Director	Ducks Unlimited
Eric Hansen	Consulting Environmental Biologist	Independent Contractor
Graham Sharpe	Manager	HDR Engineering, Inc
Greg Suba	Conservation Program Director	California Native Plant Society
		Born Free USA

Name	Title	Organization Name
Jim Little	President	Forest Landowners of California
Justin Caporusso	Public Affairs Specialist	Rural County Representatives of California (RCRC)
Catherine Troka	First Vice-President	League of Women Voters
Maureen Marcotte	Senior Administrative Assistant	H.T. Harvey & Associates
Pamel Flick	California Representative	Defenders of Wildlife
Roxanne Hatfield	Editor-in-Chief	Northern California Herpetological Society
Sue Britting	Interim Executive Director	California Native Plant Society
Tim Dunbar	Executive Director	Mountain Lion Foundation
Tiffany Meyer	Research Program Specialist (GIS)	California Dept of Forestry and Fire Protection
Gretchen Lebednik		Cardno Entrix
Dan Corcoran	Environmental Division Manager	El Dorado Irrigation District
John Bayless	Executive Vice President	Bayless & Hicks
Paul Kronenberg	President	
Carol Whiteside	Executive Director	Great Valley Center
Betty Walker	Manager	Contra Costa County Farm Bureau
Sandy Elles	Executive Director	Napa County Farm Bureau
Joe Fischer	President	Placer County Farm Bureau
Richard Matteis	Administrator	California Farm Bureau Federation
Paul Wenger	President	California Farm Bureau Federation
Kate Campbell	Assistant Editor, Ag Alert/California Country	California Farm Bureau Federation
Bruce Blodgett	Executive Director	San Joaquin County Farm Bureau
Mary Ann Diehl	Executive Secty	Solano County Farm Bureau
Denise Sagara	Executive Director	Yolo County Farm Bureau
Megan Foster	Executive Director	Yuba-Sutter County Farm Bureau
Jim Little	President	Forest Landowners of CA
Brian Plant		Remy, Thomas, Moose and Manley, LLP
David Cismowski	Manager, Govt Pubs Section	CA State Library
Cindy Won-Nakata	Section 6 Grants Coordinator	California Department of Fish and Wildlife
Eugenia Laychak	Principal	EJL & Associates
		KTXL, Channel 40
Judy Farah	News Director	KFBK
Jennifer Weiss	News Assignment Editor	KXTV, Channel 10
Lisa Maria Burcar	Assignment Editor	KCRA, Channel 3
Walt Shaw	News Director	KHTK
Ben Wallace	Executive Director	Contra Costa RCD
Mark Egbert	District Manager	El Dorado County RCD/Georgrtown Divide RCD
	Director	Napa County RCD
William Mosher	Chairman	Sloughhouse RCD
Larry Lloyd	District Manager	Sutter County RCD
Mimi Cary	Secretary/District Clerk	Yuba County RCD
	Chair	Sierra Club - Mother Lode Ch
Terry Davis	Conservation Program Coordinator	Mother Lode Chapter Sierra Club
Eric Heath	Owner/Manager	Leave No Trace Adventures
Janice Mackey	Information Officer, Regions 3 & 4	California Department of Fish and Wildlife
Sandy Morey	Regional Mgr	California Department of Fish and Wildlife, Sac Valley-Central Sierra Reg 2
Kevin Thomas	District Supervisor	California Department of Fish and Wildlife-Red Lake Wildlife Area
Cherilyn Burton	Staff Environmental Scientist	California Department of Fish and Wildlife
Cherilyn Burton	Staff Environmental Scientist	California Department of Fish and Wildlife
Cliff Feldheim		CA Dept of Water Resources
Diane Colborn	Chief Consultant	State Assembly Standing Committee-Water, Parks & Wildlife
Chuck Bonham	Director	California Department of Fish and Wildlife
Charlton Bonham	Director	California Department of Fish and Wildlife

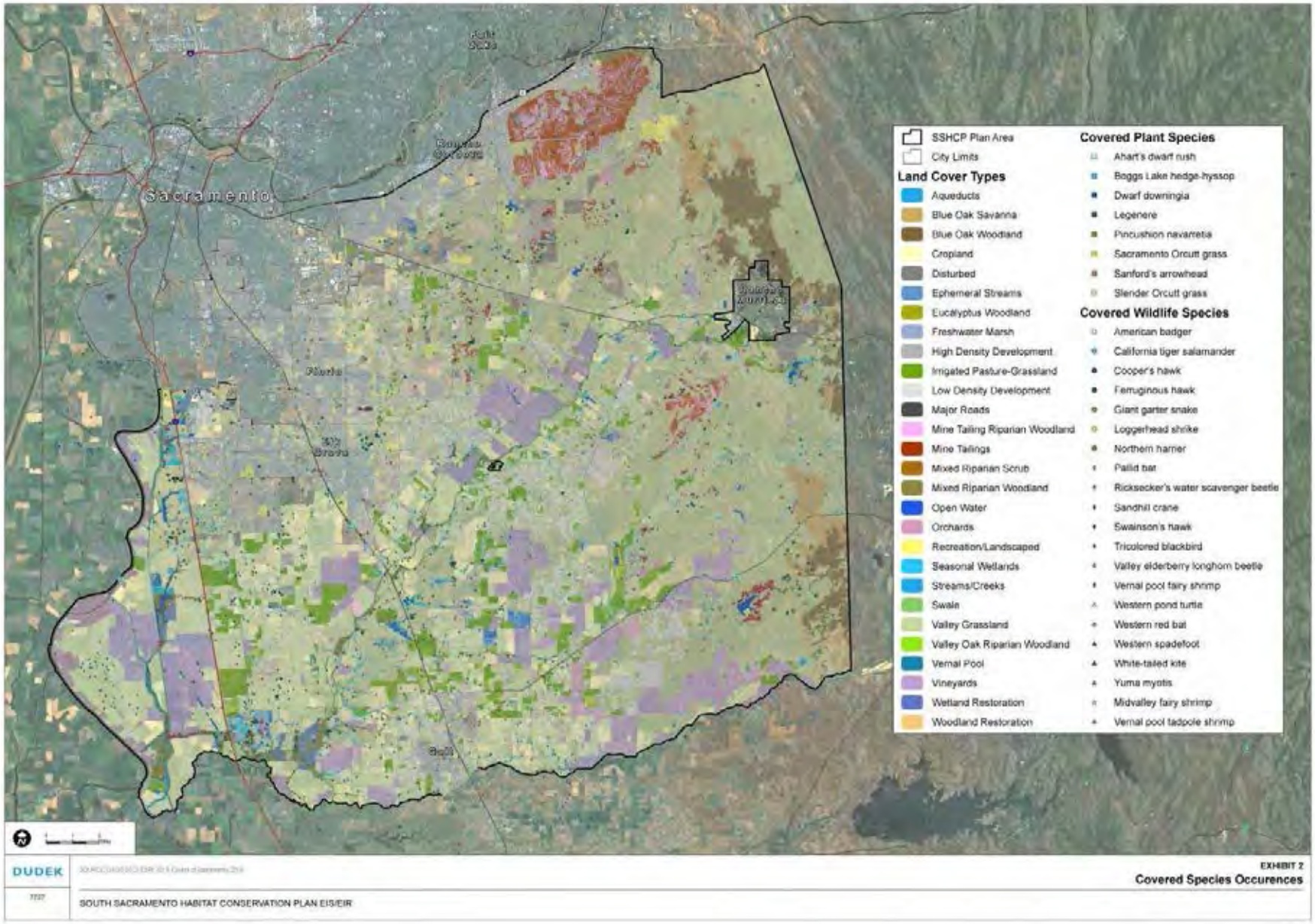
Name	Title	Organization Name
Adrianna Shea	Dept. Executive Director - External Affairs	California Department of Fish and Wildlife
Janet Upton	Deputy Director, Communications	California Department of Forestry and Fire Protection
Jordan Traverso	Deputy Director	California Department of Fish and Wildlife
Mark Cowin	Director	CA Dept of Water Resources
Luz Rodriguez	Public Information Officer	Sacramento-Yolo Mosquito Vector Control District
Scott Wilson	Acting Regional Manager, Region 3	California Department of Fish and Wildlife,Central Coast Reg
Jim Frazier	Assemblymember	California State Assembly
Richard Pan	Assemblymember	California State Assembly
Roger Dickinson	Assemblymember	California State Assembly
Ken Cooley	Assemblymember	California State Assembly
Ted Gaines	Minority Caucus Chair	California State Senate
Ted Gaines	Senator	California State Senate
Darrell Steinberg	Senate President pro Tem	California State Senate
Cathleen Galgiani	Senator	California State Senate
Lois Wolk	Senator	California State Senate
Rhonda Morningstar Pope	Tribal Chairwoman	Buena Vista Rancheria
Roselynn Lwenya	Environmental Resources Director/THPO	Buena Vista Rancheria
Chuck Ingels	County Director	UC Coop Extension - Sacto County
Jerry McNerney	Congressman	District Office, Stockton
Jerry McNerney	Congressman	District Office, Stockton
John R. Garamendi	Congressman	District Office, Fairfield
Doug LaMalfa	Congressman	District Office, Oroville
Doug LaMalfa	Congressman	District Office, Redding
John R. Garamendi	Congressman	District Office, Fairfield
Amerish "Ami" Bera	Congressman	District Office, Rancho Cordova
Amerish "Ami" Bera	Congressman	District Office, Rancho Cordova
Doris Matsui	Congresswoman	District Office, Sacramento
Doris Matsui	Congresswoman	District Office, Sacramento
Jim Kenna	State Director	BLM, State Office
Donald Yasuda	Regional Analyst/R5 Strategic Decision Support Cadre	USFS
Jay Miller	Remote Sensing Specialist	USFS
Col William J. Leady	District Engineer	Army Corps
Patti Clinton	Natural Resources Specialist	BOR, Central Cal. Area Office
Bill Aley	Natural Resources Specialist	BOR, Central Cal. Area Office
Dwane Coffey	Distr Conservationist	USDA NRCS - Sacramento Field Office
John Aguirre	President	CA Assoc of Wine Grape Growers
Matthew Rodriquez	Secretary	CA Environmental Protection Agency
Andrew Ball	Member	CA Water Commission
Terry Erlewine	General Manager	State Water Contractors
James Herota	Staff Environmental Specialist	Central Valley Flood Protection Board
Larry Bauman	Executive Director	Central Valley Project Water Assoc
Melinda Terry	Executive Director	CA Central Valley Flood Control Assoc
Melida Terry	Manager	North Delta Water Agency
Stephen Testa	Executive Officer	Mining and Geology Board
Barbara Barrigan-Parrilla		Restore the Delta
Mike Wade	Executive Director	CA Farm Water Coalition
Kellye Kennedy	Senior Project Manager	Santa Clara Valley Water District
Matt Weiser		Sacramento Bee

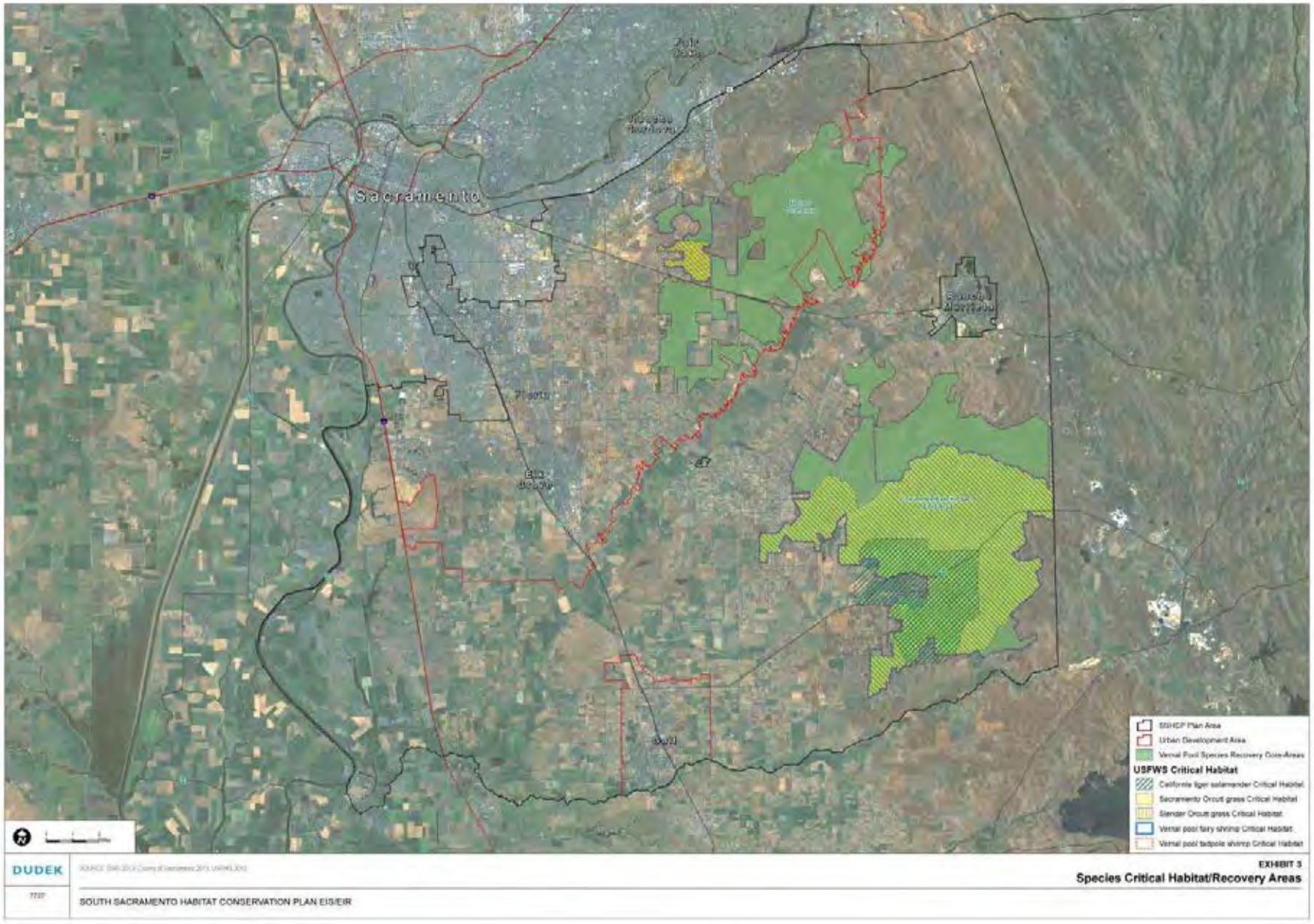
Title	Organization Name
Chair	Sacramento Audubon
Executive Director	Audubon California
Director, Government Affairs	North State Building Industry Association
Director	Construction Materials Association of CA
Controller	California Building Industry Assoc
Executive Director	CA Rangeland Trust
Directort, Govt Affairs	CA Cattlemen's Association
Director, Industry Affairs	CA Cattlemen's Association
President	Yolo County Cattlemen and Wool Growers Association
Executive Director	Rancho Cordova Chamber of Commerce
Director	City of Lincoln Planning Department
Mayor	City of Rancho Cordova
Director	Galt Community development Dept
Sycamore Environmental	French Camp Conservation Bank
Project Manager	Conservation Resources, Arroyo Seco Cons. Bank
Vice President	ECORP Consulting
Marketing Coordinator, Wildlands, Inc.	Kimball Island Conservation Bank
Marketing Coordinator, Wildlands, Inc.	Gilsizer Slough S Giant Garter Snake Conservation Bank
CFO	Conservation Resources
Senior Ecologist	Westervelt Ecological Services
	Westervelt Ecological Services; Mariner VP Conservation Bank
Charter Properties	Bryte Ranch Conservation Bank
Wetlands Resources LLC	Elsie Gridley Multi-Species Conservation Bank
Administrator	Laguna Creek Conservation Bank
Marketing Coordinator, Wildlands, Inc.	River Ranch Conservation Bank
Marketing Coordinator, Wildlands, Inc.	Pope Ranch Conservation Bank
Marketing Coordinator, Wildlands, Inc.	Orchard Creek Conservation Bank
Senior Habitat Planner	San Joaquin County Council of Govts
Ag Commissioner	Solano County Department of Agriculture
Ag Commissioner	Yolo County
Supervisor, Dist.1	Napa County Board of Supervisors
Supervisor, Dist.1	Napa County Board of Supervisors
Clerk	Napa County Board of Supervisors
Clerk	Placer County Board of Supervisors
Clerk	Solano County Board of Supervisors
Clerk	Yolo County Board of Supervisors
Clerk of the Board	Yuba County Board of Supervisors
	Placer County
Director	Napa County Conservation Development & Planning
Director	Placer County Planning Dept
Director	Sacto County Planning & Community Development
Director	San Joaquin County Community Development Dept
Principal Planner	Sutter County Planning Services Department
Assistant Director	Yolo County Planning Div
Director	Yuba County Community Development
Executive Director	The Marine Mammal Center
	Common Cause
Chair, VP Recovery Plan Implementation Team	CA Native Plant Society
Director	Ducks Unlimited
Consulting Environmental Biologist	Independent Contractor
Manager	HDR Engineering, Inc
Conservation Program Director	California Native Plant Society
	Born Free USA

Title	Organization Name
President	Forest Landowners of California
Public Affairs Specialist	Rural County Representatives of California (RCRC)
First Vice-President	League of Women Voters
Senior Administrative Assistant	H.T. Harvey & Associates
California Representative	Defenders of Wildlife
Editor-in-Chief	Northern California Herpetological Society
Interim Executive Director	California Native Plant Society
Executive Director	Mountain Lion Foundation
Research Program Specialist (GIS)	California Dept of Forestry and Fire Protection
	Cardno Entrix
Environmental Division Manager	El Dorado Irrigation District
Executive Vice President	Bayless & Hicks
President	
Executive Director	Great Valley Center
Manager	Contra Costa County Farm Bureau
Executive Director	Napa County Farm Bureau
President	Placer County Farm Bureau
Administrator	California Farm Bureau Federation
President	California Farm Bureau Federation
Assistant Editor, Ag Alert/California Country	California Farm Bureau Federation
Executive Director	San Joaquin County Farm Bureau
Executive Secty	Solano County Farm Bureau
Executive Director	Yolo County Farm Bureau
Executive Director	Yuba-Sutter County Farm Bureau
President	Forest Landowners of CA
	Remy, Thomas, Moose and Manley, LLP
Manager, Govt Pubs Section	CA State Library
Section 6 Grants Coordinator	California Department of Fish and Wildlife
Principal	EJL & Associates
	KTXL, Channel 40
News Director	KFBK
News Assignment Editor	KXTV, Channel 10
Assignment Editor	KCRA, Channel 3
News Director	KHTK
Executive Director	Contra Costa RCD
District Manager	El Dorado County RCD/Georgrtown Divide RCD
Director	Napa County RCD
Chairman	Sloughhouse RCD
District Manager	Sutter County RCD
Secretary/District Clerk	Yuba County RCD
Chair	Sierra Club - Mother Lode Ch
Conservation Program Coordinator	Mother Lode Chapter Sierra Club
Owner/Manager	Leave No Trace Adventures
Information Officer, Regions 3 & 4	California Department of Fish and Wildlife
Regional Mgr	California Department of Fish and Wildlife, Sac Valley-Central Sierra Reg 2
District Supervisor	California Department of Fish and Wildlife-Red Lake Wildlife Area
Staff Environmental Scientist	California Department of Fish and Wildlife
Staff Environmental Scientist	California Department of Fish and Wildlife
	CA Dept of Water Resources
Chief Consultant	State Assembly Standing Committee-Water, Parks & Wildlife
Director	California Department of Fish and Wildlife
Director	California Department of Fish and Wildlife
Dept. Executive Director - External Affairs	California Department of Fish and Wildlife

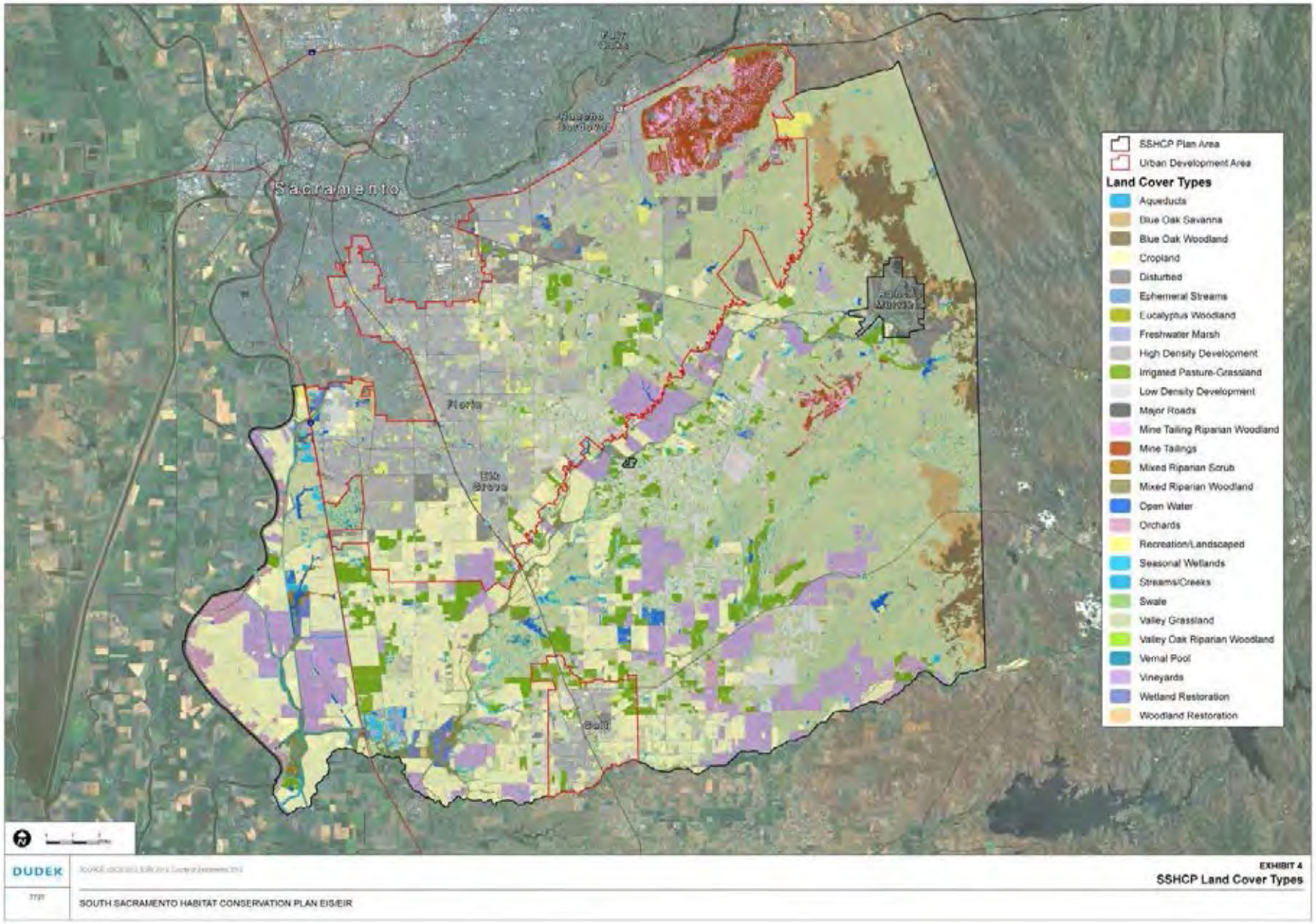
Title	Organization Name
Deputy Director, Communications	California Department of Forestry and Fire Protection
Deputy Director	California Department of Fish and Wildlife
Director	CA Dept of Water Resources
Public Information Officer	Sacramento-Yolo Mosquito Vector Control District
Acting Regional Manager, Region 3	California Department of Fish and Wildlife,Central Coast Reg
Assemblymember	California State Assembly
Assemblymember	California State Assembly
Assemblymember	California State Assembly
Assemblymember	California State Assembly
Minority Caucus Chair	California State Senate
Senator	California State Senate
Senate President pro Tem	California State Senate
Senator	California State Senate
Senator	California State Senate
Tribal Chairwoman	Buena Vista Rancheria
Environmental Resources Director/THPO	Buena Vista Rancheria
County Director	UC Coop Extension - Sacto County
Congressman	District Office, Stockton
Congressman	District Office, Stockton
Congressman	District Office, Fairfield
Congressman	District Office, Oroville
Congressman	District Office, Redding
Congressman	District Office, Fairfield
Congressman	District Office, Rancho Cordova
Congressman	District Office, Rancho Cordova
Congresswoman	District Office, Sacramento
Congresswoman	District Office, Sacramento
State Director	BLM, State Office
Regional Analyst/R5 Strategic Decision Support Cadre	USFS
Remote Sensing Specialist	USFS
District Engineer	Army Corps
Natural Resources Specialist	BOR, Central Cal. Area Office
Natural Resources Specialist	BOR, Central Cal. Area Office
Distr Conservationist	USDA NRCS - Sacramento Field Office
President	CA Assoc of Wine Grape Growers
Secretary	CA Environmental Protection Agency
Member	CA Water Commission
General Manager	State Water Contractors
Staff Environmental Specialist	Central Valley Flood Protection Board
Executive Director	Central Valley Project Water Assoc
Executive Director	CA Central Valley Flood Control Assoc
Manager	North Delta Water Agency
Executive Officer	Mining and Geology Board
	Restore the Delta
Executive Director	CA Farm Water Coalition
Senior Project Manager	Santa Clara Valley Water District
	Sacramento Bee

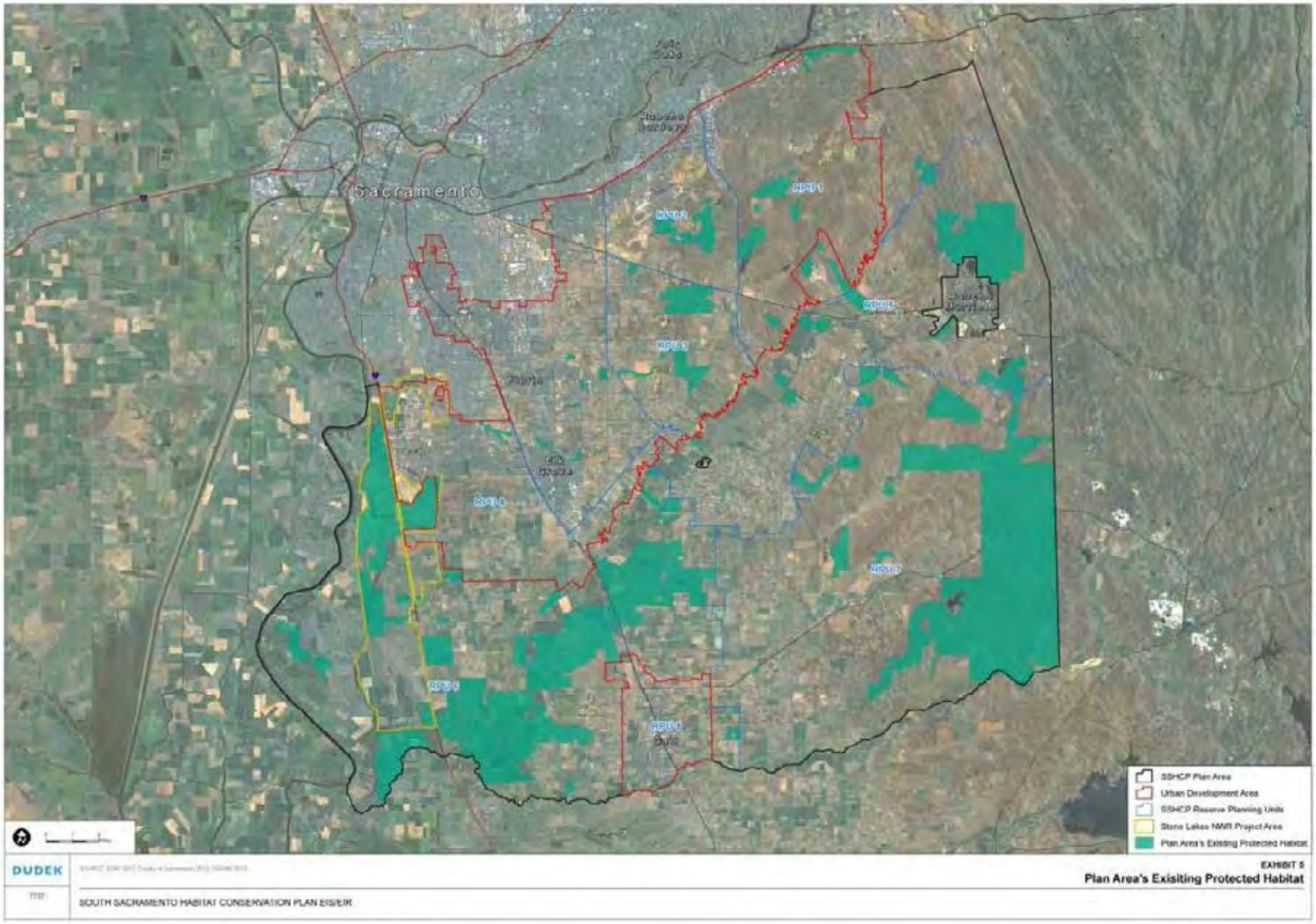
Scoping Meeting Materials


Sacramento
SSHCP Plan Area
City Limits
Land Cover Types
Aqueducts
Blue Oak Savanna
Blue Oak Woodland
Cropland
Disturbed
Ephemeral Streams
Eucalyptus Woodland
Freshwater Marsh
High Density Development
Irrigated Pasture-Grassland
Low Density Development
Major Roads
Mine Tailing Riparian Woodland
Mine Tailings
Mixed Riparian Scrub
Mixed Riparian Woodland
Open Water
Orchards
Recreation/Landscaped
Seasonal Wetlands
Streams/Creeks
Swale
Valley Grassland
Valley Oak Riparian Woodland
Vernal Pool
Vineyards
Wetland Restoration
Woodland Restoration
Covered Plant Species
Ahart's dwarf rush
Boggs Lake hedge-hyssop
Dwarf downingia
Legenere
Pincushion navarretia
Sacramento Orcutt grass
Sanford's arrowhead
Slender Orcutt grass
Covered Wildlife Species
American badger
California tiger salamander
Cooper's hawk
Ferruginous hawk
Giant garter snake
Loggerhead shrike
Northern harrier
Pallid bat
Ricksecker's water scavenger beetle
Sandhill crane
Swainson's hawk
Tricolored blackbird
Valley elderberry longhorn beetle
Vernal pool fairy shrimp
Western pond turtle
Western red bat
Western spadefoot
White-tailed kite
Yuma myotis
Midvalley fairy shrimp
Vernal pool tadpole shrimp
DUDEK
SOUTH SACRAMENTO HABITAT CONSERVATION PLAN EIS/EIR
EXHIBIT 2
Covered Species Occurences

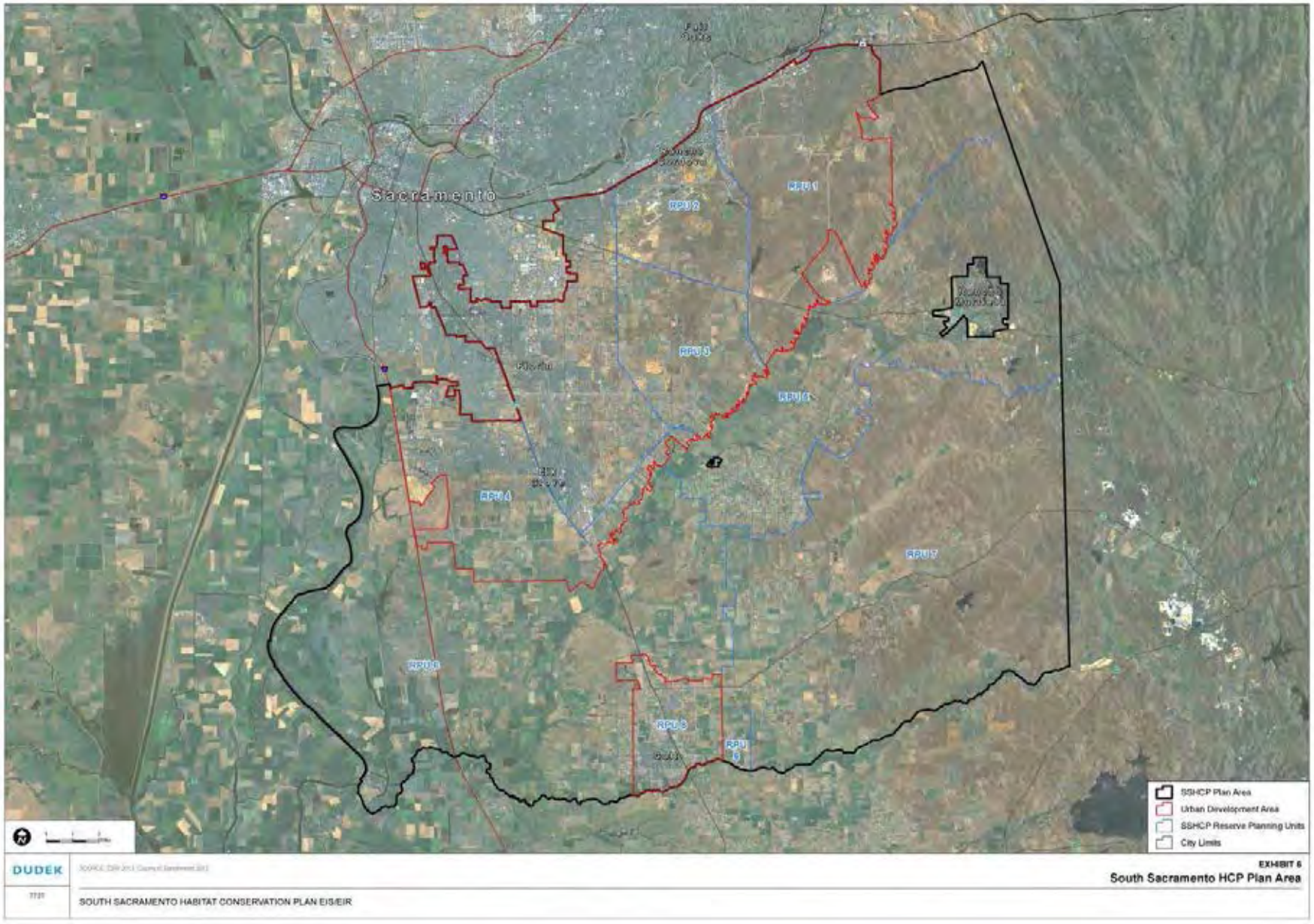


AGENDA ITEM 11.1
5601


Sacramento
Florin
Elk Grove
Galt
SSHCP Plan Area
Urban Development Area
Land Cover Types
Aqueducts
Blue Oak Savanna
Blue Oak Woodland
Cropland
Disturbed
Ephemeral Streams
Eucalyptus Woodland
Freshwater Marsh
High Density Development
Irrigated Pasture-Grassland
Low Density Development
Major Roads
Mine Tailing Riparian Woodland
Mine Tailings
Mixed Riparian Scrub
Mixed Riparian Woodland
Open Water
Orchards
Recreation/Landscaped
Seasonal Wetlands
Streams/Creeks
Swale
Valley Grassland
Valley Oak Riparian Woodland
Vernal Pool
Vineyards
Wetland Restoration
Woodland Restoration
DUDEK
SOUTH SACRAMENTO HABITAT CONSERVATION PLAN EIS/EIR
EXHIBIT 4
SSHCP Land Cover Types



AGENDA ITEM 11.1
5603



AGENDA ITEM 11.1
5604

South Sacramento Habitat Conservation Plan




South Sacramento
Habitat Conservation Plan
Public Comment Opportunities During the Preparation of the EIS/EIR
Notice of Preparation and Notice of Intent Released
Provide Written Comments
Now - December 13, 2013
Public Provides Comments at Scoping Meetings
November 20, 2013 Galt
November 21, 2013 Sacramento
County and USFWS Prepare the Draft EIS/EIR
• Consider Scoping Comments
• Compare Alternatives
• Analyze Substantive Effects
• Develop Mitigation Measures
Draft EIS/EIR
Public Provides Comments During the 90-day Public Comment Period
Spring 2014
Public Provides Comments at Meetings and/or Public Hearings on the Draft EIS/EIR
Spring 2014
County and USFWS write the Final EIS/EIR
• Respond to Substantive Comments
• Revise Text Based on Comments
Final EIS/EIR
Public Provides Comments During the 30-day Final Review Period
Fall 2014
Agency Decisions
• Consider any Public Comments
• County Prepares Findings
• USFWS prepares Record of Decision
GREEN indicates opportunities to provide input



South Sacramento Habitat Conservation Plan

Please help us prepare the EIS/EIR for a South Sacramento Habitat Conservation Plan.

We need your help. The County of Sacramento and U.S. Fish and Wildlife Service are working together to prepare a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) that will analyze impacts of a Habitat Conservation Plan (HCP) proposed for south Sacramento County. The HCP will provide a framework under the Endangered Species Act to help local communities accommodate development while conserving plant and animal species. The Draft EIS/EIR is expected to be publicized by the spring of 2014.

What is your role during this public scoping process?

Your help is needed to inform the County and the Service of the important issues you want studied in the EIS/EIR. Please focus your comments on:

- Potential impacts that the EIS/EIR should study in depth.
- Problems the proposal may cause, and ways to solve them.
- Better, more effective mitigation measures.
- Suggestions for reasonable alternatives to the proposal.
- Questions you want addressed in the EIS/EIR
- Specific habitat locations inside the Urban Development Area that you think should be preserved.

Please make your comments as specific as you can.

Sometimes participants identify issues during scoping meetings that are too broad to be useful for EIS/EIR analytical purposes - For example, "cultural impacts" - what does this mean? What precisely are the impacts or issues that you want examined? When we encounter a comment as broad as this, we have to guess about what you meant, and you may find that your issues are not covered in the EIS/EIR. Thus, you should refine broad general topics, and specify which issues need evaluation and analysis.



South Sacramento Habitat Conservation Plan

What information will the Draft EIR/EIS contain?

- Descriptions of a proposed HCP and alternative HCPs under consideration.
- A detailed analysis of direct, indirect, and cumulative impacts of all HCP alternatives on the human and environmental resources that you identify in your scoping comments.
- Resources and topics that will be analyzed in the draft EIS/EIR may include, but may not be limited to: Soils, Hydrology, Water Quality, Land Use, Mining, Agriculture, Wildlife and Plants, Wetlands, Cultural Resources, Socio-economics, Public Services, and Transportation.

Public Comment: What's Next?

- Your scoping comments and the comments others submit will appear in a Scoping Report. The report will be available this winter on the South Sacramento HCP web site: *www.per.saccounty.net/ PlansandProjectsInProgress/Pages/SSHCPPlan.aspx*
- You will have opportunities to provide additional comments in the spring of 2014 when the Draft EIS/EIR is expected to be released for public review.

Please submit your written comments from this scoping meeting, the Notice of Preparation (NOP), or the Notice of Intent (NOI) **before December 13, 2013 to:**

Catherine Hack
County of Sacramento,
Department of Community Development
Planning and Environmental Review
827 7th St, Room 220
Sacramento, CA 95814

or

Nina Bicknese
Sacramento Fish and Wildlife
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-260
Sacramento, CA 95825
nina_bicknese@fws.gov

The NOP and NOI, the scoping meeting handouts, and additional comment-forms are available at: http://dev.per2.saccounty.net/PlansandProjectsIn-Progress/Pages/SSHCPPlan.aspx

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Would you like to be added to the SSHCP mailing list? □ Yes □ No

If so, please provide your contact information.

Name: _____

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Catherine Hack, 827 7th Street, Room 220, Sacramento, CA 95814

PLEASE FOLD ALONG THIS LINE FOR MAILING

PLACE STAMP HERE

County of Sacramento
Department of Community Development
Planning and Environmental Review
ATTN: Catherine Hack
827 7th Street, Room 220
Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

OCTOBER 20, 2013 SSHCP EIS/EIR SCOPING MEETING (GALT)

NAME	ORGANIZATION	E-MAIL	PHONE #	MAILING ADDRESS
Emily Bacchini	SMUD	emily.bacchini@smud.org	916-732-6334	
Mick Gorkey	SGM	[illegible]	565-3683	
MICHAEL MONASKY	ELK GROVE RESIDENT	[redacted]		
John & Margaret Dierk	Land owner Elk Grove Franklin	[redacted]		
Kate Whatley	Taylor & Wiley	kwhatley@taylorwiley.com	9166925545	
Marsha Carrillo	Resident	[redacted]		
Tish Espinosa	Resident	[redacted]		
Michelle Tovar	FWE	mtovar@prcwest.net	916-497-3364	
Brad Miller	FWE	bmiller@prcwest.net	916-498-3362	
Becky Rozumowicz	FWE	becky@prcwest.net	" "	
Lynn Wheat	Resident	[redacted]		
NOVEMBER 7, 2013		SCOPING Meeting		
[illegible]	BMW Consulting	[redacted]		
[illegible]	[illegible]	[illegible]	916-444-0918	
Ammon Rice	SMUD	ammon.rice@smud.org	916-732-7466	
Vanessa Emerzian	BSK	emerzian@gmail.com	707-762-1884	
Megan Brooks	DSC	Megan.Brooks@DeltaCouncil.ca.gov		
Clive Ghirardelli	DWR	Ghirardelli@saccounty.net	875-4557	

South Sacramento Habitat Conservation Plan

OCTOBER 20, 2013 SSHCP EIS/EIR SCOPING MEETING (GALT)

NAME	ORGANIZATION	E-MAIL	PHONE #	MAILING ADDRESS
JACK KAUTZ	FARMS -	[redacted]		
Madison Gelfstein	- Pottruck Ranch	[redacted]		
	November 21, 2013	Scoping Meeting		
Herb Grams	Barton Ranch		[redacted]	
Larry Larsen	Law offices of Gregory Thatch	llarsen@thatchlaw.com		
BJORN GREGERSEN	ECORP CONSULTING	BGREGERSEN@ECORPCONSULTING.COM	916-782-9100	2525 WARREN DR. ROCKLIN CA 95667
Jude Lamare	Friends of Swainson's Hawk	Swainsons@sbcglobal.net	916 447-4956	717 K St 529 SACTO 95814
SCOTT FINLEY	STONE LAKES NWRA	SBGFINLEY@SBCGLOBAL.NET	916-933-1219	
[redacted]				
KTIENNE OZORAK	Sac County DWMR	OZORAKE@saccounty.net	916-875-4115	9850 Goethe Rd Sac 95827
Kate Wheatley	Taylor + Wiley	KWheatley@taylor-wiley.com	9295545	
Mark Hanson	Cordova Hills	MHanson@sbmcorp.com	916-565-2667	5241 Arnold Ave McClellan, CA 95652
TRAVIS Hemmen	Westervelt	themmen@westervelt.com	916-646-3644	600 N Market Blvd. Sac CA 95834
PETE DWELLEY	JACKSON TWSHP	pedwelley@gmail.com	916 420 0610	

Scoping Meeting Notes

DUDEK

980 9TH STREET, 17TH FLOOR SUITE 1750
SACRAMENTO, CALIFORNIA 95814
T 916.440.8310 F 916.443.3211

SOUTH SACRAMENTO HCP EIS/EIR

SCOPING MEETING NOTES

Meeting Title:	Scoping Meeting #1
Meeting Date:	November 20, 2013
Location:	Galt Police Headquarters, Galt, California
Attendees:	**County of Sacramento:** Marianne Biner, Rich Radmacher, Bill Ziebron **USFWS:** Nina Bicknese **Dudek:** Sarah Lozano **Ascent:** Sean Bechta Members of the public

1. Can the powerpoint and maps shared at tonight's meeting be provided to the public through the County's Website?
2. Provide a rationale for why species were dropped between the 2008 and 2013 HCP efforts.
3. What does it mean to "take" a species or its habitat?
4. How will the HCP and HCP EIS/EIR public comment period and approval process proceed?
5. How can the public get involved with this process? How can the public get minutes from the LAWG and RAWG meetings?
6. Why won't the use of eminent domain be utilized during implementation of the HCP?
7. To what extent will the construction of new water delivery structures/systems be evaluated in the cumulative impacts analysis? Similarly, will the EIS/EIR evaluate indirect effects/impacts on water resources?
8. How do existing or proposed mitigation banks relate to the proposed HCP?
9. How can farmland coexist with preserves?
10. What role will PMC play in the EIS/EIR?

Notes prepared by Sarah Lozano, Dudek, December 3, 2013

South Sacramento HCP/NCCP/EIS/EIR
Subject: EIS/EIR Scoping Meeting Notes

MEETING NOTES

Meeting Title:	Scoping Meeting #2
Meeting Date:	November 21, 2013
Location:	Governor's Office of Planning and Research, Sacramento, California
Attendees:	**County of Sacramento:** Marianne Biner, Cathy Hack, Rich Radmacher, Bill Ziebron **USFWS:** Nina Bicknese **USACE:** Mary Pekenham-Walsh **Dudek:** Sarah Lozano **Ascent:** Curtis Alling, Claudia Funari Members of the public

1. Who are the CEQA/NEPA lead/cooperating agencies?
2. What role will CDFW plan in this process? What action will CDFW take on the HCP?
3. Will there be a cumulative effects/impacts analysis?
4. What alternatives would be evaluated in the EIS/EIR? Can the area of mitigation for originally proposed for Swainson's hawk be considered once again? Similarly, the eastern and western portions of the Plan Area differ in importance to Swainson's hawk, therefore, can the conservation for Swainson's hawk be concentrated east of I-5 as much as possible?
5. Mitigation in the area west of I-5 and west of Stodgrass Slough may not be effective or a good long term solution because these areas are below sea level.
6. How will the HCP be financed? How will the Plan Partners Regulatory Agencies factor in inflation over the life of the permit?
7. Will the ratio for Swainson's hawk mitigation be 1:1 and dependent on the land cover type?
8. Is grazing land considered "agriculture" or "annual (non-native) grassland"?
9. Will the powerpoint and maps shared at today's meeting be available on the County's website? And if, so, by when?

Notes prepared by Sarah Lozano, Dudek, December 3, 2013

Comments Received

Edmund G. Brown Jr.
Governor

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Ken Alex
Director

Notice of Preparation

October 28, 2013

To: Reviewing Agencies

Re: South Sacramento Habitat Conservation Plan (SSHCP)
SCH# 2008062030

Attached for your review and comment is the Notice of Preparation (NOP) for the South Sacramento Habitat Conservation Plan (SSHCP) draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Catherine Hack
Sacramento County
827 Seventh Street, Room 220
Sacramento, CA 95818

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

RECEIVED
OCT 29 2013
County Of Sacramento
Department of Community Development
Planning and Environmental Review Division

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2008062030
Project Title South Sacramento Habitat Conservation Plan (SSHCP)
Lead Agency Sacramento County

Type **NOP** Notice of Preparation

Description The proposed SSHCP is a regional approach to conserving species and addressing issues related to urban development, habitat conservation, open space protection and agricultural protection. The SSHCP would authorize the County, cities of Elk Grove, Rancho Cordova and Galt, and two public utility agencies to issue permits allowing landowners to engage in specific development activities that could result in incidental takes of listed species.

Lead Agency Contact

Name Catherine Hack
Agency Sacramento County
Phone 916 874 7183 **Fax**
email
Address 827 Seventh Street, Room 220
City Sacramento **State** CA **Zip** 95818

Project Location

County Sacramento
City Elk Grove, Rancho Cordova, Galt
Region
Cross Streets Regional
Lat / Long
Parcel No. Numerous
Township **Range** **Section** Region **Base**

Proximity to:

Highways Hwy 16
Airports Franklin Field
Railways Union Pacific
Waterways American, Sacramento, Cosumnes Rivers and Tributaries
Schools Various
Land Use Regional project encompassing various types of urban, rural residential and agricultural land use designations.

Project Issues Air Quality; Archaeologic-Historic; Drainage/Absorption; Economics/Jobs; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Public Services; Recreation/Parks; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife; Growth Inducing; Landuse; Cumulative Effects; Agricultural Land

Reviewing Agencies Resources Agency; Department of Conservation; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Wildlife, Region 2; Native American Heritage Commission; California Highway Patrol; Caltrans, District 3 S; Air Resources Board; Regional Water Quality Control Bd., Region 5 (Sacramento); Delta Stewardship Council

Date Received 10/28/2013 **Start of Review** 10/28/2013 **End of Review** 11/26/2013

Notice of Completion

Control Number # 03-PWE-0637 SEE NOTE BELOW **SCH # 2008062030**

Mail to: PO Box 3044, Sacramento CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth street, Sacramento CA 95814

Project Title: South Sacramento Habitat Conservation Plan (SSHCP)
Lead Agency: Sacramento County
Mailing Address: 827 7th Street, Room 220
City: Sacramento Zip: 95818
Contact Person: Catherine Hack
Phone: (916) 874-7183
County: Sacramento

Project Location
County: Sacramento City/Nearest Community: Elk Grove, Rancho Cordova, Galt
Cross Streets: Regionall Zip Code: Regional
Lat. / Long.: Regional° ____ ' ____ " N/ ____ ° ____ ' " W Total Acres: 341,000
Assessor's Parcel No.: Numerous Section: Regionall Twp: ____ Range: ____ Base: ____
Within 2 Miles: State Highway # 16 Waterways: American, Sacramento, Cosumnes rivers and tributaries
Airports: Franklin Field Railways: Union Pacific Schools: Various

RECEIVED
OCT 28 2013
STATE CLEARINGHOUSE

Document Type
CEQA: ☒ NOP ☐ Draft EIR ☐ Early Cons ☐ Supplement/Subsequent EIR ☐ Neg Dec (Prior SCH No.) ____ ☐ Mit Neg Dec Other: ____
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
OTHER: ☐ Joint Document ☐ Final Document ☐ Other: ____

Local Action Type
☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other: HCP

Development Type
☐ Residential: Units ____ Acres ____
☐ Office: Sq. Ft. ____ Acres ____ Employees ____
☐ Commercial: Sq. Ft. ____ Acres ____ Employees ____
☐ Industrial: Sq. Ft. ____ Acres ____ Employees ____
☐ Education: ____
☐ Recreational: ____
☐ Water Facilities: Type:____ MGD:____
☐ Transportation: Type:____
☐ Mining: Mineral:____
☐ Power: Type:____ MW:____
☐ Waste Treatment: Type:____ MGD:____
☐ Hazardous Waste: Type:____
☐ Other: HCP

Project Issues Discussed in Document
☐ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☐ Coastal Zone
☒ Drainage/Absorption
☒ Economic/Jobs
☐ Fiscal
☒ Floodplain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☐ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Wildlife
☒ Growth Inducing
☒ Land Use
☒ Cumulative Effects
☐ Other: ____

Present Land Use/Zoning/General Plan Use
Regional project encompassing various types of urban, rural residential and agricultural land use designations

Project Description
The proposed SSHCP is a regional approach to conserving species and addresssing issues related to urban development, habitat conservation , open space protection and agricultural protection. The SSHCP would authorize the County, cities of Elk Grove, Rancho Cordova and Galt, and two public utiliity agencies to issue permits allowing landowners to engage in specific development acitivities that could result in incidental take of listed species.

NOTE: Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g., from a Notice of Preparation or previous draft document) please fill it in. Page 1

NOP Distribution List SA

County: Sacramento

SCH# 2008062030

esources Agency

- [■] Resources Agency — Nadell Gayou
- [ ] Dept. of Boating & Waterways — Nicole Wong
- [ ] California Coastal Commission — Elizabeth A. Fuchs
- [ ] Colorado River Board — Tamya Trujillo
- [■] Dept. of Conservation — Elizabeth Carpenter
- [ ] California Energy Commission — Eric Knight
- [ ] Cal Fire — Dan Foster
- [ ] Central Valley Flood Protection Board — James Herota
- [ ] Office of Historic Preservation — Ron Parsons
- [■] Dept of Parks & Recreation — Environmental Stewardship Section
- [ ] California Department of Resources, Recycling & Recovery — Sue O'Leary
- [ ] S.F. Bay Conservation & Dev't. Comm. — Steve McAdam
- [■] Dept. of Water Resources — Resources Agency — Nadell Gayou

ish and Game

- [ ] Depart. of Fish & Wildlife — Scott Flint, Environmental Services Division
- [ ] Fish & Wildlife Region 1 — Donald Koch
- [ ] Fish & Wildlife Region 1E — Laurie Harnsberger
- [■] Fish & Wildlife Region 2 — Jeff Drongesen
- [ ] Fish & Wildlife Region 3 — Charles Armor
- [ ] Fish & Wildlife Region 4 — Julie Vance
- [ ] Fish & Wildlife Region 5 — Leslie Newton-Reed, Habitat Conservation Program
- [ ] Fish & Wildlife Region 6 — Gabrina Gatchel, Habitat Conservation Program
- [ ] Fish & Wildlife Region 6 I/M — Heidi Sickler, Inyo/Mono, Habitat Conservation Program
- [ ] Dept. of Fish & Wildlife M — George Isaac, Marine Region

Other Departments

- [ ] Food & Agriculture — Sandra Schubert, Dept. of Food and Agriculture
- [ ] Depart. of General Services — Public School Construction
- [ ] Dept. of General Services — Anna Garbeff, Environmental Services Section
- [ ] Dept. of Public Health — Jeffery Worth, Dept. of Health/Drinking Water
- [ ] Delta Stewardship Council — Kevan Samsam

Independent Commissions,Boards

- [ ] Delta Protection Commission — Michael Machado
- [ ] Cal EMA (Emergency Management Agency) — Dennis Castrillo
- [■] Native American Heritage Comm. — Debbie Treadway
- [ ] Public Utilities Commission — Leo Wong
- [ ] Santa Monica Bay Restoration — Guangyu Wang
- [ ] State Lands Commission — Jennifer Deleong
- [ ] Tahoe Regional Planning Agency (TRPA) — Cherry Jacques

Business, Trans & Housing

- [ ] Caltrans - Division of Aeronautics — Philip Crimmins
- [ ] Caltrans - Planning — Terri Pencovic
- [■] California Highway Patrol — Suzann Ikeuchi, Office of Special Projects
- [ ] Housing & Community Development — CEQA Coordinator, Housing Policy Division

Dept. of Transportation

- [ ] Caltrans, District 1 — Rex Jackman
- [ ] Caltrans, District 2 — Marcelino Gonzalez
- [■] Caltrans, District 3 — Gary Arnold
- [ ] Caltrans, District 4 — Erik Alm
- [ ] Caltrans, District 5 — David Murray
- [ ] Caltrans, District 6 — Michael Navarro
- [ ] Caltrans, District 7 — Dianna Watson
- [ ] Caltrans, District 8 — Dan Kopulsky
- [ ] Caltrans, District 9 — Gayle Rosander
- [ ] Caltrans, District 10 — Tom Dumas
- [ ] Caltrans, District 11 — Jacob Armstrong
- [ ] Caltrans, District 12 — Maureen El Harake

Cal EPA

Air Resources Board

- [■] All Projects — CEQA Coordinator
- [ ] Transportation Projects — Jon Taylor
- [ ] Industrial Projects — Mike Tollstrup
- [ ] State Water Resources Control Board — Regional Programs Unit, Division of Financial Assistance
- [ ] State Water Resources Control Board — Student Intern, 401 Water Quality Certification Unit, Division of Water Quality
- [ ] State Water Resouces Control Board — Phil Crader, Division of Water Rights
- [ ] Dept. of Toxic Substances Control — CEQA Tracking Center
- [ ] Department of Pesticide Regulation — CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] RWQCB 1 — Cathleen Hudson, North Coast Region (1)
- [ ] RWQCB 2 — Environmental Document Coordinator, San Francisco Bay Region (2)
- [ ] RWQCB 3 — Central Coast Region (3)
- [ ] RWQCB 4 — Teresa Rodgers, Los Angeles Region (4)
- [■] RWQCB 5S — Central Valley Region (5)
- [ ] RWQCB 5F — Central Valley Region (5), Fresno Branch Office
- [ ] RWQCB 5R — Central Valley Region (5), Redding Branch Office
- [ ] RWQCB 6 — Lahontan Region (6)
- [ ] RWQCB 6V — Lahontan Region (6), Victorville Branch Office
- [ ] RWQCB 7 — Colorado River Basin Region (7)
- [ ] RWQCB 8 — Santa Ana Region (8)
- [ ] RWQCB 9 — San Diego Region (9)

- [■] Other Delta Stewardship Council
- [ ] _____ Conservancy

Last Updated 9 /24/2013

SACRAMENTO-YOLO
MOSQUITO
& VECTOR
CONTROL
DISTRICT

1.800 429.1022
FIGHTtheBITE net

December 12, 2013

County of Sacramento
Department of Community Development
Planning and Environmental Review Division
Attn: Catherine Hack, Environmental Coordinator
827 7th Street, Room 220
Sacramento, CA 95814

Re: Notice of Preparation of the Draft Environmental Impact Report for South Sacramento Habitat Conservation Plan # 2003-PLE-0637

DAVID BROWN, MANAGER

2013 BOARD OF TRUSTEES

The Sacramento-Yolo Mosquito and Vector Control District (District) appreciates the opportunity to review and comment on the Notice of Preparation of the Draft Environmental Impact Report for South Sacramento Habitat Conservation Plan (SSHCP).

The District has reviewed the SSHCP and is providing comments and concerns relating to the preparation of the Environmental Impact Report (EIR) to be incorporated into the Plan.

General Comment:
Drawing on previous work by the Central Valley Joint Venture Working Group, the District has compiled and published a list of Mosquito Reduction Best Management Practices (BMPs) for a variety of land uses including managed wetlands, habitats, and preserves. The SSHCP should reference the BMP manual for BMP implementation on all preserve areas in an effort to reduce mosquito breeding and subsequent pesticide applications. The Districts' BMP Manual may be viewed and downloaded from our website at: http://www.fightthebite.net/physical-control. Furthermore, the SSHC must recognize that in certain instances the HSC may be the more restrictive of landowner regulatory requirements, thus requiring BMP implementation to reduce mosquito breeding

The following are comments relating to specific issues contained within the SSHCP:

Chapter 5.6.1 *Land Management and Monitoring*
Comment: Please include Drainage Maintenance and BMP Implementation to the list of management activities. (BMP Manual)

Chapter 6.6.2 *Avoidance and Minimization Measures*
Comment: Add AMM 16 – Implement Mosquito Reducing BMPs in all designs, management and construction plans.

Chapter 6.6.3 *Avoidance and Minimization Analyses*
Comment: Page 6-63 paragraph 3 - "*No vehicle access or traffic would be able to access preserves.*" Please ensure that District has the appropriate provisions contained within the SSHCP to allow for District access to all preserve and buffer areas.

Chapter 6.7.1 *Excavation Activities, Table 6-46*
Comment: Every year the District works with the appropriate permitting agencies and landowners to remove multiple beaver dams and related blockages that are causing immediate mosquito breeding. The cubic yard removal thresholds for these public health threats may exceed the limits provided by the SSHCP. Please include a recognition of the impacts to public health caused by beaver dams and other blockages, and by following the provisions contained in this SSHCP, allow these dams to be removed in excess of the allowable cubic yards on an as needed basis.

Chapters 6.8.2/ 6.8.3 *page 6-84 and 6-87 Uses and Activities Not Permitted Within Stream Buffer Zones*
Comment: Add to the exception list under *"clearing or cutting of riparian woodland vegetation"* - Vegetation removal for the purpose of mosquito control and BMP implementation.

Chapter 7 *Draft SSHCP Conservation Strategy, p7-180 Tri-Colored Blackbird*
Comment: Paragraph 4 discusses possible threats to the species. Please document all unsubstantiated claims with scientific and supportive evidence, and utilize current research as it pertains to mosquito control for all species.

Appendix M – *Restoration and Creation Guidelines*
Comment: Please add a section under *Project Design* to include a requirement to reference, construct, and manage any habitat restoration or creation projects following the Districts BMP manual.

While many of the potential impacts remain unknown at this time, failure to address mosquito breeding issues during the planning, construction, and management process of aquatic habitats may result in enforcement actions to the landowner. The District has the authority to abate a public nuisance as defined in Section 2010 of the California Health and Safety Code (HSC) and may pursue enforcement actions pursuant to Sections 2060 of the HSC which can involve civil fines of up to $1000/per day.

The District remains committed to working with and assisting the SSHCP's Federal, State, and Local permitting agencies as well as local landowners to develop reasonable mosquito control measures as site specific projects are implemented and managed. It is important to include mosquito control operations as an integral component of the overall SSHCP to ensure effective mosquito control over the life of this permit. Please do not hesitate to contact me at 916-405-2085 with any questions or concerns as the SSHCP continues to be developed.

Sincerely,

Marty Scholl
Sacramento-Yolo MVCD
Ecological Management Supervisor
mscholl@FightTheBite.net

RECEIVED
DEC 13 2013
County of Sacramento
Department of Community Development
Planning and Environmental Review

OH

sacramento valley
conservancy
Open Space. For all of us.

BOARD OF TRUSTEES
Kate Hart
President
Rob Donlan
Vice President
Robert Slobe
Secretary
Shayleen Mastagni
Treasurer
Cydney Bender-Reents
Curtis Fossum
Cassie Gilson
Robert Jones
Rick Rayburn
Lynn Sadler
Beverly Sandeen
Chris Unkel
Jay Ziegler

TRUSTEES EMERITUS
Russell Austin
Dick Troy

ADVISORY COUNCIL
Jay Abbott
Christy Anderson
John Anderson
Jennifer Buckman
Stephan Buol
Robert Burness
Ann Chandler
Jeff Chandler
Mike Eaton
Paul Junker
Bruce Kennedy
Len McCandliss
Taylor Miller
Mary Ose
Susan Peters
George Phillips
Randy Sater
Ron Suter
Daniel Taylor
Sherry Teresa
Hal Thomas
Marty Tuttle

EXECUTIVE DIRECTOR
Aimee Rutledge

December 10, 2013

Milgatte Associates, LP
P.O. Box 1405
Sloughhouse, CA 95683
Attn: Herb Garms

Dear Mr. Garms,

I have attached the 2013 monitoring report, which references the Conservation Easement on your Milgate Associates L.P. property that was recorded on November 29, 2012 and the Baseline Documentation Report (BDR) completed in October 2012.

Section 10 of your Conservation Easement requires you to give notice to SVC if you are planning on selling your property or transferring an interest in your property. SVC reminds you of this requirement to make sure we can fulfill our responsibilities in the easement and so we can promptly communicate with any new owners.

We had a lovely day monitoring the property and I greatly appreciate the CE boundary markers you placed. SVC appreciates the opportunity to work with you to protect the special resources on your property. We hope to see you at our upcoming events. For a full list of events visit our website at www.sacramentovalleyconservancy.org.

Please call or email me if you have any questions concerning this report.

Sincerely,

Lucie A. Adams

Lucie Adams, Stewardship Director

Sacramento Valley Conservancy
P.O. Box 163351
Sacramento, CA 95816
(916) 974-4329
ladams@sacramentovalleyconservancy.org

Attached: Annual Monitoring Report
SVC Stewardship and Transfer Policy

cc: Forest Halford – Western Land Company
Coyote Creek Inc.
County of Sacramento, Division of Environmental Review and Assessment
California Dept. of Fish and Wildlife: Region 2 Manager

Sacramento Valley Conservancy 2013 Monitoring Report
Milgate Conservation Easement

Date of Report: December 10, 2013

Date of monitoring visit: November 7, 2013

Property Data:

Name: Milgate Associates, L.P., Conservation Easement

Address: Barton Ranch
3830 Scott Road
Sloughhouse, CA 95683

Acres: 78.68 acres

Date of Recorded Easement: November 29, 2012

Current Owner:

Milgate Associates, L.P
P.O. Box 1405
Sloughhouse, CA 95683
Attn: Herb Garms
(916) 214-6722

Reports also sent to:

Coyote Creek Inc.
Attn: Herb Garms
8698 Elk Grove Blvd., Suite 3, #334
Elk Grove, CA 95624-3300

County of Sacramento
Division of Environmental Review and Assessment
Attn: Director
827 7th Street
Sacramento, CA 95814
Telephone: (916) 874-7914

California Department of Fish and Wildlife, Region 2
Attn: Regional Manager
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670
Telephone: (916) 358-2912

Purpose

The Milgate Conservation Easement Area possesses wildlife and habitat values of great importance and includes oak woodlands, oak grasslands and natural habitat for Swainson's hawk (*Buteo swainsoni*). This Conservation Easement Deed for Oak and Hawk Habitat on Agricultural Land and Agreement Creating Enforceable Restrictions in Perpetuity protects 78.68 acres of oak tree canopy and grasslands as Swainson's hawk (*Buteo swainsoni*) habitat as mitigation requirements by Sacramento County. The area protected by the Conservation Easement will offset the loss of oak tree canopy and Swainson's hawk foraging habitat for the proposed development Easton Place and Glenborough at Easton. Both Sacramento County and the California Department of Fish and Wildlife have approved the establishment of the mitigation.

The purpose of the Conservation Easement is to identify, protect, sustain and forever protect the Conservation Values (oak woodlands, oak grasslands and natural habitat for Swainson's hawk) from impairment by retaining the Easement Area predominantly in its agricultural and open space condition. The Conservation Purposes will be achieved through continues agricultural uses of the easement as provided in the Covenants, Terms, Conditions and Restriction of the Conservation Easement Deed.

Location

The property is located in the northeast section of Sacramento County, south of the city of Folsom. The entrance to the Easement Area is approximately 4.4 miles south on Scott Road from its intersection with White Rock Road. Access to the property is through a locked gate on the east side of Scott Road just past the bridge at Carson Creek.

Description of Uses

The Easement Area consists of annual grassland and oak woodlands and is used for livestock grazing and is part of the larger 3000 acre Barton Ranch. The 78.68 acre Milgate Easement is directly adjacent to the 241 acre Barton-Mosher Conservation Easement. Together they create a 320 acre area of Conservation Easements on the Barton Ranch.

The Easement Area has been owned by the Barton family since the late 1800's. The original homestead is north of the entrance to the Easement Area. Approximately 75 head of cattle graze the property from November to May.

A portion of the Conservation Area is reserved for the future development of a public recreational trail. The future trail is part of a plan for a public trail system connecting the American and Consumnes Watersheds to include 10,000 acre recreational wildlife habitat corridor.

Man made alterations

The Easement area contains a double track dirt road and numerous single track trails. East of the Easement area is Wall Town, an abandoned mining town. Along the eastern section of the Easement Area are several disturbed areas from past mining operations. Barbed wire fencing is adjacent to the eastern and northern boundaries and in other portions of the Easement Area. The Easement Area has been surveyed and boundaries and corners have been marked with metal t-posts.

Are restrictions in the Conservation Easement being complied with?

Yes, I observed property to be in compliance with the easement and management plan.

The property is in good condition. All gates and fences are in good condition. There is no sign of public access, illegal dumping of trash, or excavation on the property. No buildings and no paving or impervious materials was observed. No road building or alteration of the topography was observed. No equipment or fuel storage was observed. No unseasonable watering or use of fertilizers, herbicides or pesticides was observed. There is no off road vehicle disturbance.

Preserve Manager Comments:

Herb Garms, Ranch Manager, said everything went well this year and he had little to report. Herb said about 75 head of cattle graze on the total 3000 acres. Herb has had no trouble with dumping and only occasional trespassing from people wishing to fish in Carson Creek.

Other Observations:

Residual Dry Matter values were between 700 -1500 lbs/acre.

Date of Inspection and Method: November 7, 2013

The SVC monitors parked on the ranch road heading north, and walked to all the photo points. Monitors began at PP 4 and then followed the green t- post stakes marking the easement boundary to PP 3, 2 then 1.

Weather: Sunny, warm and clear

Photo Log:
Photo reference is from the Milgate Associates L.P Conservation Easement Baseline Documentation Report (October 2012). Photo point (PP).

#1 – PCR PP4 – View north
#2 – PCR PP4 – View northeast
#3 – PCR PP4 – View east

#4 – PCR PP3 – View west
#5 – PCR PP3 – View northwest
#6 – PCR PP3 – View north
#7 – PCR PP2 – View south
#8 – PCR PP2 – View southwest
#9 – PCR PP2 – View west
#10 – PCR PP1 – View east
#11 – PCR PP1 – View southeast
#12 – PCR PP1 – View south

Person's Attending the Inspection:
Herb Garms - Barton Mosher Sacramento Ranches
Forest Halford - Western Land Company
Lucie Adams - SVC Stewardship Director
Fred Tracy - SVC Program Assistant

Report Written By:

Lucie A. Adams

Lucie Adams, SVC Stewardship Director December 10, 2013

P.O. Box 163351
Sacramento, CA 95816
Sacramento Valley Conservancy
(916) 974-4329

On File at SVC office:

- Baseline Documentation Report
- Conservation Easement
- Copies of photos taken
- Management Plan

DELTA STEWARDSHIP COUNCIL
A California State Agency

980 NINTH STREET, SUITE 1500
SACRAMENTO, CALIFORNIA 95814
WWW.DELTACOUNCIL.CA.GOV
(916) 445-5511

December 17, 2013

RECEIVED
DEC 18 2013
County Of Sacramento
Department of Community Development
Planning and Environmental Review Division

Chair
Phil Isenberg

Members
Frank C. Damrell, Jr.
Randy Fiorini
Gloria Gray
Patrick Johnston
Hank Nordhoff
Frank L. Ruhstaller

Executive Officer
Christopher M. Knopp

Catherine Hack, Environmental Coordinator
County of Sacramento
Department of Community Development
Planning and Environmental Review Division
827 7th Street, Room 220, Sacramento, CA 95814

Via Email: DERA@saccounty.net

RE: South Sacramento Habitat Conservation Plan NOP, SCH# 2008062030

Dear Ms. Hack:

This letter responds to your Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) for the South Sacramento Habitat Conservation Plan (SSHCP) and its request for comments on the scope and content of the environmental information that is relevant to our agency's responsibility in connection with the proposed project.

State law specifically directs the DSC to provide "advice to local and regional planning agencies regarding the consistency of local and regional planning documents with the Delta Plan" (Water Code sec 85212). The Delta Stewardship Council adopted the Delta Plan on May 16, 2013, and the Plan's regulatory policies became effective on September 1, 2013. The Delta Plan, including its policies and recommendations, should be acknowledged in the EIR's description of the project's environmental setting.

The NOP's project summary states that the South Sacramento Habitat Conservation Plan "identifies urban development and public infrastructure projects within an Urban Development Area (UDA) and defines mitigation and avoidance measures for covered species and habitat that will be affected by the covered activities identified in the SSHCP." The NOP indicates that the covered activities may include the construction, installation, or extension of:

- Private development projects.
- Surface and groundwater delivery facilities.
- Water treatment facilities.
- Sewer and recycled water treatment and conveyance facilities.
- Solid waste sanitation facilities.
- Public facilities (police station, hospitals, schools, community centers, and administration centers).
- Indoor and outdoor recreation facilities.
- Energy utility facilities.
- Aggregate mining activities.
- Habitat management activities.

"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."
– CA Water Code §85054

We recommend the following matters be discussed or included in the EIR:

- **Inconsistencies with the Delta Plan.** The EIR should discuss any inconsistencies between the project and the Delta Plan, as required by 15125(d) of the CEQA Guidelines. Note, too, that the CEQA Guidelines' Appendix G states that a project that is inconsistent with any applicable land use plan, policy, or regulation may result in a finding of significant impact on biological resources.

- **Agricultural Resources:** The EIR should include an analysis of the potential loss of agricultural land in the Delta caused by urban development covered by the SSHCP. Delta Plan Policy **DP P1** (23 CCR Section 5010) states that new residential, commercial, or industrial development is permitted outside the urban boundaries only if it is consistent with the land use designated in the relevant county general plan. It is intended to strengthen existing Delta communities while protecting farmland and open space, providing land for ecosystem restoration needs, and reducing flood risk. Please quantify the areal extent of the proposed UDA within the Delta, and discuss any potential impacts to agricultural resources.

- **Biological Resources:** The NOP states that the EIR will identify any potential impacts of the SSHCP on biological resources. Delta Plan Policy **ER P2** (23 CCR Section 5006) states that habitat restoration must be carried out consistent with Appendix 3 of the Delta Plan regulations, which is an excerpt from the California Department of Fish and Wildlife's Draft Ecosystem Restoration Program *Conservation Strategy*, which calls for restoring habitats at appropriate elevations. Further guidance is provided by Delta Plan Recommendation **ER R2**, which states, for the Cosumnes-Mokelumne Confluence, "Allow these unregulated and minimally regulated rivers to flood over their banks during winter and spring frequently and regularly to create seasonal floodplains and riparian habitats that grade into tidal marsh and shallow subtidal habitats."

  The Delta Plan establishes six habitat restoration areas in the Delta, one of which, the Cosumnes-Mokelumne Confluence, is located within the SSHCP Plan Area. Delta Plan Policy **ER P3** (23 CCR Section 5007) calls for protecting opportunities to restore habitat in these areas. More specifically, the policy states that "significant adverse impacts to the opportunity to restore as described in section 5006 must be avoided or mitigated." Potential mitigation measures could include elevating facilities so that water can flow underneath to allow for future restoration of habitats dependent on tides or periodic flooding, or locating facilities at the edge of the restoration area, rather than in the middle, to improve opportunities for restoring habitat connectivity. The mitigation shall be determined, in consultation with the California Department of Fish and Wildlife, considering the size of the project area and the type and value of habitat that could be restored in that area.

  We recommend that the EIR analysis include the impact of any urbanization or the placement of permanent agricultural easements on the opportunity to restore these types of habitat within the Delta Plan's Cosumnes-Mokelumne Confluence area.[1] The EIR should assess impacts to the opportunity to restore these areas for the habitat uses encouraged by the Delta Plan or the conservation measures recommended in the draft Bay Delta Conservation Plan.

[1] The boundaries of the priority habitat restoration areas are depicted in Appendix 5 of the Delta Plan regulations.

Delta Plan Policy **ER P5** (23 CCR Section 5009), calls for avoiding introductions of and habitat improvements for invasive nonnative species. It states, "The potential for new introductions of or improved habitat conditions for nonnative invasive species, striped bass, or bass must be fully considered and avoided or mitigated in a way that appropriately protects the ecosystem." The EIR should analyze the project's potential to introduce or improve habitat for nonnative invasive species.

- **Hydrology:** The NOP states that the EIR will analyze hydrology, which we presume includes flooding. The Delta Plan contains three policies that are most relevant to the County's consideration of this issue: Policy **RR P2** (23 CCR section 5013) requires flood protection for residential development in rural areas, Policy **RR P3** (23 CCR section 5014) restricts encroachment in floodways, and Policy **RR P4** (23 CCR Section 5015) restricts encroachments in floodplains, including the Cosumnes-Mokelumne Confluence.[2] Policy **RR P4** states that "no encroachment shall be allowed or constructed unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant impact on the floodplain values and functions."

  In addition, the Delta Plan contains a recommendation (**RR R6**) encouraging the Central Valley Flood Protection Board to evaluate designating additional floodways. Flood risk reduction should be included as a factor when evaluating various conservation and development scenarios. We recommend that the EIR include analysis of potential conflicts between proposed activities in the SSHCP and the implementation of the project.

Other matters for your consideration

The Delta Reform Act specifically established a certification process for compliance with the Delta Plan's regulatory policies (See attachment on Covered Actions for details). According to the Delta Reform Act, it is the state or local agency approving, funding, or carrying out the project that must certify consistency with the Delta Plan. This certification is subject to appeal to the DSC. Should you determine the South Sacramento Habitat Conservation Plan is a covered action, a way to streamline the process and make full use of the EIS/EIR is to include the information and analysis needed to support the certification of Delta Plan consistency within the EIS/EIR, potentially including a draft certification as an appendix to the EIS/EIR.

Please also note that the final EIR for the Delta Plan includes a Mitigation Monitoring and Reporting Plan that describes the mitigation required for covered actions. If you should determine the South Sacramento Habitat Conservation Plan is a covered action, it would be affected by the Delta Plan's Policy **G P1** (23 CCR Section 5002(b)(2)), which states, "Covered actions not exempt from CEQA must include applicable feasible mitigation measures identified in the Delta Plan's Program EIR or substitute mitigation measures that the proposing agency finds are equally or more effective."

I encourage you to contact Jessica Davenport at jdavenport@deltacouncil.ca.gov or (916) 445-2168 with your questions, comments, or concerns. We would like to work with you to ensure the consistency of the South Sacramento Habitat Conservation Plan with the Delta Plan while also avoiding, minimizing or mitigating potential environmental impacts and we look forward to continued coordination between our agencies to further our related efforts. We are available to continue discussions about how to ensure that your project is consistent with the Delta Plan.

---

[2] RR P4 refers to the "Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the Department of Water Resources or U.S. Army Corps of Engineers."

Sincerely,

Cindy Messer
Deputy Executive Officer

cc: Erik Vink, Delta Protection Commission
Carl Wilcox, Department of Fish and Wildlife
Scott Cantrell, Department of Fish and Wildlife
Dave Zezulak, Department of Fish and Wildlife
Len Marino, Central Valley Flood Protection Board
Kacey Lizon, Sacramento Area Council of Governments

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 3 – SACRAMENTO AREA OFFICE
2379 GATEWAY OAKS DRIVE, SUITE 150
SACRAMENTO, CA 95833
PHONE (916) 274-0635
FAX (916) 263-1796
TTY 711

Flex your power!
Be energy efficient!

November 26, 2013

032013-SAC-0173
03-SAC-16
SCH# 2008062030

Ms. Catherine Hack
County of Sacramento
827 7th Street, Room 220
Sacramento, CA 95814

South Sacramento Habitat Conservation Plan (SSHCP)—Notice of Preparation (NOP)

Dear Ms. Hack:

Thank you for including the California Department of Transportation (Caltrans) in the review and comment process for the South Sacramento Habitat Conservation Plan (Plan) NOP. The Plan proposes a regional conservation strategy to provide private and public projects with streamlined, predictable federal and state permitting processes while creating a comprehensive and regional preserve system to protect habitat, open space, and agricultural lands through avoidance and mitigation of impacts. The geographic location of the Plan includes 374,000 acres within south Sacramento County (unincorporated area) and the cities of Rancho Cordova, Elk Grove, and Galt. Generally the Plan limits are United States Highway (US) 50 to the north, the Sacramento River levee and County Road J11 to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and the San Joaquin County line to the south.

As the responsible agency, Caltrans is committed to coordinate with Sacramento County and the other federal, State, and local partners as the SSHCP is being developed. Please include Caltrans in any interagency working groups that may be formed and provide us with any information on project actions.

If you have any questions regarding these comments or require additional information, please contact Melody L. Friberg, Intergovernmental Review Coordinator, at (916) 263-1625 or by email at: melody.friberg@dot.ca.gov

Sincerely,

Tracey Frost

TRACEY FROST, Chief
Office of Transportation Planning – South

c: Scott Morgan, State Clearinghouse

RECEIVED
DEC 2 – 2013
County Of Sacramento
Department of Community Development
Planning and Environmental Review Division

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

DELTA PROTECTION COMMISSION
2101 Stone Blvd., Suite 210
West Sacramento, CA 95691
Phone (916) 375-4800 / FAX (916) 376-3962
Home Page: www.delta.ca.gov

Contra Costa County Board of Supervisors

Sacramento County Board of Supervisors

San Joaquin County Board of Supervisors

Solano County Board of Supervisors

Yolo County Board of Supervisors

Cities of Contra Costa and Solano Counties

Cities of Sacramento and Yolo Counties

Cities of San Joaquin County

Central Delta Reclamation Districts

North Delta Reclamation Districts

South Delta Reclamation Districts

CA State Transportation Agency

CA Department of Food and Agriculture

CA Natural Resources Agency

CA State Lands Commission

December 18, 2013

Catherine Hack, Environmental Coordinator
County of Sacramento
Department of Community Development
Planning and Environmental Review Division
827 7th Street, Room 220
Sacramento, CA 95814

Subject: Notice of Preparation of A Draft Environmental Impact Report for South Sacramento Habitat Conservation Plan (Control Number 2003-PLE-0637)

Dear Ms. Hack:

Delta Protection Commission (Commission) staff have reviewed the *Notice of Preparation (NOP) of A Draft Environmental Impact Report (EIR) for South Sacramento Habitat Conservation Plan (SSHCP)*. A portion of the project lies within the Primary Zone of the Sacramento-San Joaquin Delta (predominately the land located west of Interstate 5), and is subject to consistency requirements with the Delta Protection Commission's Land Use and Resource Management Plan (LURMP) for the Primary Zone of the Delta.

At this stage in your project we recommend that you review the LURMP to ensure that the EIR is consistent with our goals and policies related to land use, agriculture, natural resources, recreation access, water, levees and utilities infrastructure. You can access the LURMP on our website at: http://www.delta.ca.gov/plan.htm . We also recommend that the following matters be addressed in the EIR:

1. Please note that LURMP Land Use Policy P-2 states: "local governments general plans and zoning codes shall continue to promote and facilitate agriculture and agriculturally-supporting commercial and industrial uses as the primary land uses in the Primary Zone; recreation and natural resources land uses shall be supported in appropriate locations and where conflicts with agricultural land uses or other beneficial uses can be minimized." That said, the NOP

indicates a list of covered activities that may not be supported in the Primary Zone of the Delta. Please specify which covered activities are being proposed in the Primary Zone.

2. The Commission is that the SSHCP "support the long-term economic viability of agriculture; support the continued capability for agricultural operations to diversify and remain flexible to meet changing market demands and crop production technology; and encourage compatibility between agricultural practices and wildlife habitat (LURMP Agriculture Goals, pg. 13)." Please review the LURMP to ensure consistency with the agriculture policies.

3. Please review the DPC's Economic Sustainability Plan (ESP) for the Sacramento-San Joaquin Delta (2011),which is an important document guiding future activities in the legal Delta. Proposals for habitat management activities should consider the recommendations on Economic Sustainability for Agriculture, Recreation and Tourism; and Habitat and Ecosystem Improvements (pg. 274, 276). You can access the ESP on our website at: http://www.delta.ca.gov/Final_ESP_Jan_2012.htm .

Thank you for the opportunity to provide input on the NOP. If you have any questions please contact Raymond Costantino, Associate Environmental Planner, or myself at (916) 375-4800.

Sincerely,

Erik Vink
Executive Director

Biner. Marianne

From:	Hack. Catherine
Sent:	Thursday, December 19, 2013 7:33 AM
To:	Biner. Marianne
Subject:	FW: SSCHCP
Attachments:	sac_034334staffprop.pdf; EGsuitable_habitat_5_26_06.pdf; countyswhapprovedhab.pdf

Catherine Hack, Environmental Coordinator
Department of Community Development - Planning and Environmental Review
827 7th Street, Room 220, Sacramento, CA 95814 | (916) 874-7183
www.per.saccounty.net
SACRAMENTO COUNTY

From: Maulit. Justin
Sent: Wednesday, December 18, 2013 1:39 PM
To: Hack. Catherine
Subject: FW: SSCHCP

From: Judith Lamare [mailto:swainsonshawk@sbcglobal.net]
Sent: Monday, December 16, 2013 12:39 PM
To: DERA (Web Page)
Cc: Jim Pachl; Friends of the Swainsons Hawk; Nina Bicknese; Tina.bartlett@wildlife.ca.gov
Subject: SSCHCP

Catherine Hack, Environmental Coordinator

Comments on NOP for the South Sacramento Habitat Conservation Plan (2003-PLE_0637)

At the Scoping meeting November 21, 2013 I submitted comments orally and in writing. The following comments supplement my previously submitted comments.

1. The DEIR should address the direct, indirect and cumulative impacts on the state listed species, the Swainson's Hawk, in terms of both loss of nesting habitat, nesting pairs, foraging habitat, and the loss of range of a threatened species? An estimated 52 nest sites will be lost; where will these nesting pairs nest? What will be the effect on the species reproduction? What is the anticipated level of direct, indirect and cumulative "take" of this threatened species. Does the EIR serve, as we would expect, as a foundation document for DFW issuance of a 2081 permit for take of Swainson's Hawk?

2. What is the comparative quality of the foraging habitat that you expect in the anticipated area of expansion of Swainson's Hawk nesting and foraging? Please compare each of the alternatives with these issues in mind. Please note that the success of

1

Swainson's Hawk reproductive activity and survival of young is directly dependent upon availability of food supply which is reasonably available to nesting hawks during the breeding and nesting season. Destruction of foraging habitat eliminates food supply and forces hawks to travel greater distances to find prey, resulting in less food for the nest and a greater likelihood of nest failure, nestling mortality and reduced reproductive performance.

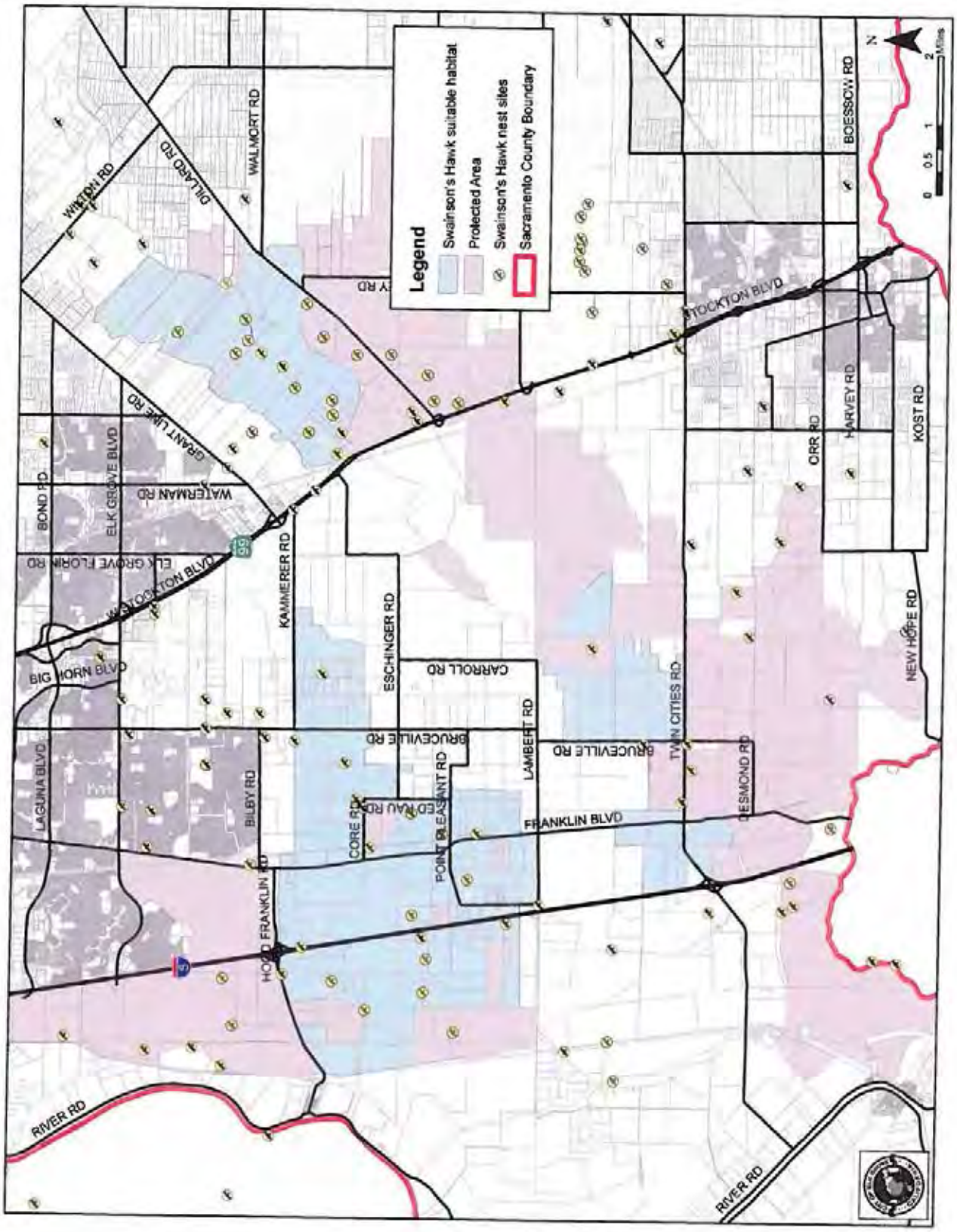
2. Please do not rely on the CNDDB which is not intended as a census of existing threatened species, but instead use the several recent surveys by California Department of Fish and Wildlife, the City of Rancho Cordova, the City of Elk Grove and records of the County of Sacramento on nesting sites. CNDDB is known to be incomplete by the preparers of the SSCHCP. The CNDDB is not intended by the Department of Fish and Wildlife to be used in CEQA review as a comprehensive inventory.

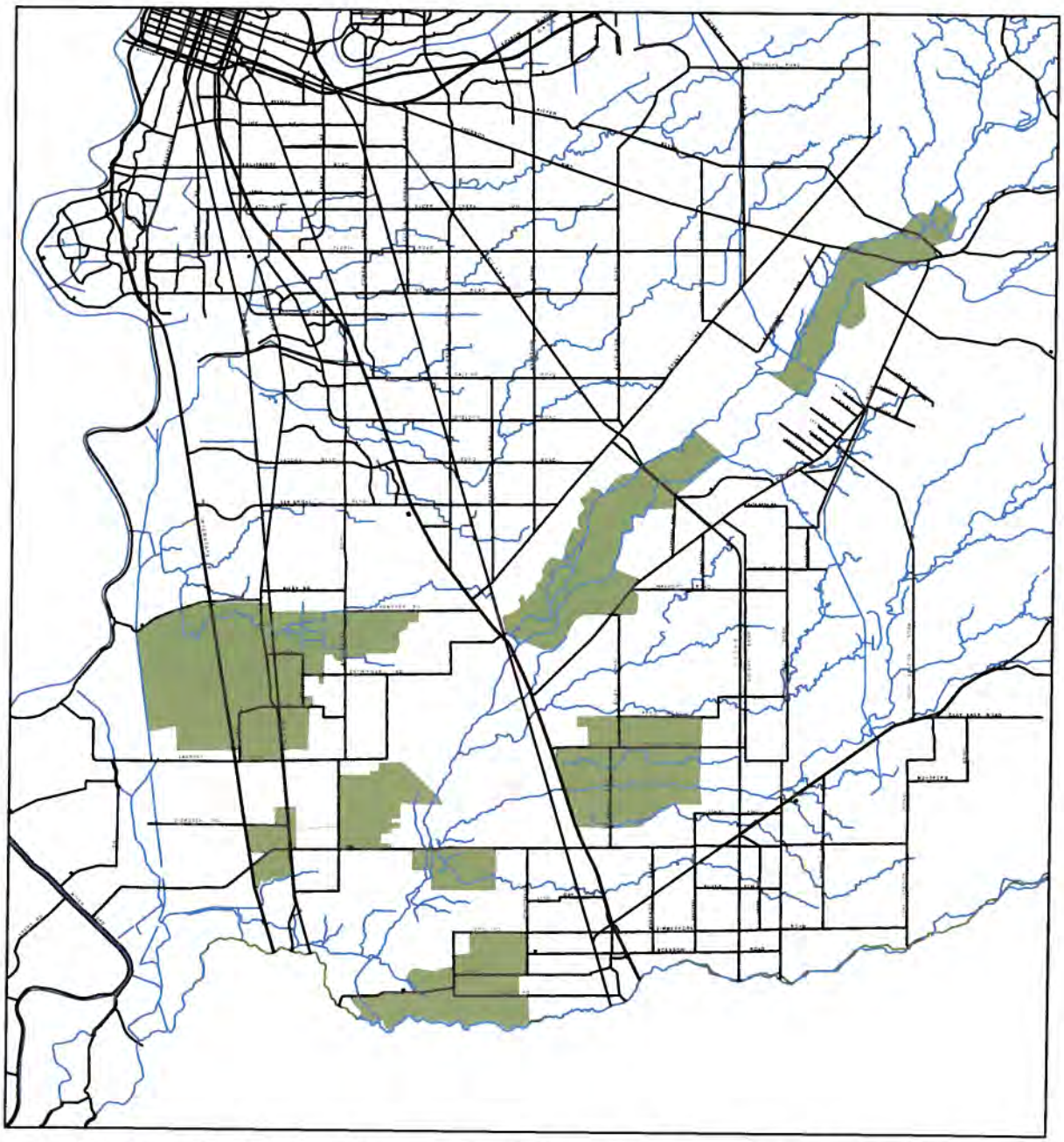
3. Alternatives. The preferred alternative area of take should be limited to the area within the adopted USB. There are several reasons why this should be the preferred alternative:
1) Areas outside the USB are not included in the federally and state approved plans for transportation and air quality planning and are not planned for urban growth. (SACOG MTP/SCS and SMAQMD Air Quality Plans)
2) The SACOG Blueprint for regional urbanization which anticipates long term growth does not include any anticipated urbanization south of Elk Grove before 2050. The possibility of urbanization after 2050 is far too speculative to consider.
3) The Elk Grove SOIA Final EIR (October, 2013) identified significant and unavoidable biological impacts and other impacts if the Elk Grove SOI was extended to either the 8,000 acres requested, or the Regional Enhanced Alternative (approximately 4000 acres).
4) The Elk Grove SOI Final EIR and LAFCo staff report identifies over 3,000 acres available inside the City limit, and 2,000 acres adjacent to Elk Grove and inside the USB that would be available for annexation and urbanization. For the area inside the USB in the Elk Grove application for expansion, see attachment showing 485 acres is west of 99 and 1477 acres is east of 99 and south of Grant Line Road.) The available 3,000 acres inside the City and the additional 2000 acres inside the USB but outside the City would be more than enough to meet the expected land demand for urban uses in the foreseeable future. There is a 1200 acre vacant, undeveloped and unplanned area within the City which could be zoned entirely for job related uses, but the City has not done so. SACOG also said in its July 2013 comment letter on the SOI proposal that the area outside the City but inside the USB "is the next logical extension of the City of Elk Grove SOI."
5) The Sacramento LAFCo Commission denied Elk Grove's application to expand its Sphere of Influence into the area south of Elk Grove (vote of 5-2 on November 6, 2013). The reasons given by the Commissioners included lack of consistency with regional planning for infrastructure, particularly concern for water supply, need to protect farmland, biological impacts, and availability of ample opportunity within Elk Grove's current city limits to develop urban uses desired by Elk Grove. We can provide further documentation of what Commissioners said were reasons for denial if this information would be helpful.

6) The area south of Elk Grove has been identified in the past by DFW, County and City of Elk Grove, as a prime area for mitigation for take of Swainson's Hawk foraging habitat inside the USB. (See attached maps)
7) If land south of Elk Grove is not included in the area of mitigation, owners in this area will be denied the opportunity to voluntarily sell their land or conservation easements for mitigation, and the pool of available land to mitigate for Swainson's Hawk impact will be diminished with serious consequences for both the economics and the feasibility of the plan as well as the rights of landowners in this area.

Thank you for considering our comments on the NOP.

Judith Lamare, President
Friends of the Swainson's Hawk
717 K Street, Ste 529
Sacramento, CA 95814
916 447 4956
www.swainsonshawk.org
swainsonshawk@sbcglobal.net


Legend
Swainson's Hawk suitable habitat
Protected Area
Swainson's Hawk nest sites
Sacramento County Boundary
N
0 0.5 1 2 Miles
WILTON RD
DILLARD RD
WALMORT RD
BOEGSCOW RD
STOCKTON BLVD
GRANT LINE RD
WATERMAN RD
BOND RD
ELK GROVE BLVD
ELK GROVE FLORIN RD
KAMMERER RD
ESCHINGER RD
CARROLL RD
BIG HORN BLVD
LAGUNA BLVD
BILBY RD
BRUCEVILLE RD
LAMBERT RD
TWIN CITIES RD
NEW HOPE RD
CORE RD
PORTAGEE PHEASANT RD
FRANKLIN BLVD
DESMOND RD
HOOD FRANKLIN RD
CRR RD
HARVEY RD
KOST RD
RIVER RD
RIVER RD



Potential Swainson's Hawk Mitigation Areas

Disclaimer: The green regions on this map represent information provided to the Planning Department from the California Department of Fish and Game. The purpose is to guide project applicants in selecting areas for potential Swainson's Hawk mitigtion lands. Not all areas shown in green will be acceptable, however the green regions represent geographic areas where there is a high likelyhood that a particular parcel will be approved for Swainson's Hawk mitigation. It is possible that areas outside the green regions will be approved as mitigation as well. All requests for approval of a particular parcel for mitigation should be directed to the Planning Department. A form and instructions to request approval of a parcel(s) for mitigation is available at www.saccounty.net/planning/swainsons-hawk-ordinance/index.html.

Prepared by the Sacramento County Planning and Community Development Department
Updated November 8, 2005

N
W E
S


LEGEND
Enhanced Regional Alternative 4,949 AC.
County of Sacramento Urban Service Boundary
EXISTING 1,976.63 AC.
EXISTING IN USB 2,063.82 AC.
CITY OF ELK GROVE
ELK GROVE
1,578.86 AC.
1,976.63 AC.
484.96 AC.

Agenda

November 21, 2013 2:00-4:00PM
Governor's Office of Planning and Research
1400 10th Street, Sacramento

South Sacramento Habitat Conservation Plan (SSHCP)
Environmental Impact Statement/Environmental Impact Report
(EIR/EIS) Agency Scoping Meeting

- Introductions
- Presentation of SSHCP
- Environmental Analysis Overview
- Roundtable Questions and Comments from Agencies
- Next Steps/Schedule

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential environmental topics that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Alternatives – Analysis include original boundary of I-5 alternative with higher mitigation ratio for SWH

Analysis of take – " "

Include future reproductive potential of current known nest sites of Swainson's hawk because of loss of foraging habitat

Include potential impact on nesting sites outside plan area within 2-5 miles because of loss of foraging habitat

Include loss of nourishment to migrating Swainson's hawks, esp juvenile

Available data – use all available data on nesting Swainson's hawks nesting in Sac County

How to assure that SWH habitat loss is mitigated by preservation of land at 1:1 ratio – & and quality is adequate to ensure no loss of range of Swainson's hawk?

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Judith Lamare

Title and Organization/Business (if applicable): Pres Friends of the Swainson's Hawk

Email address: swainsonshawk@sbcglobal.net

Mailing address: 717 K St 529

Phone: 916-447-4956

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Catherine Hack, 827 7th Street, Room 220, Sacramento, CA 95814

-----Original Message-----
From: Nina Bicknese [mailto:Nina_Bicknese@fws.gov]
Sent: Wednesday, December 18, 2013 8:09 PM
To: Marianne Biner SacCo; Hack. Catherine; Bill Ziebron
Cc: Rich Radmacher; Sarah Lozano; Curtis Alling
Subject: FW: South Sacramento HCP NOP comments

For your information.

(Lynn Wheat was at the Galt scoping meeting, sitting next to the man in the raincoat that asked many questions).

Nina Bicknese, Senior Fish and Wildlife Biologist U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
Conservation Planning Division, Endangered Species Program
2800 Cottage Way, Sacramento, CA. 95825
(916) 414-6633, FAX (916) 414-6712
nina_bicknese@fws.gov
www.fws.gov/sacramento
https://twitter.com/UsfwsSacArea

-----Original Message-----
From: lynn wheat [redacted]
Sent: Wednesday, December 18, 2013 8:05 PM
To: nina_bicknese@fws.gov
Subject: South Sacramento HCP NOP comments

Ms. Bicknese,

Please accept the following NOP comments:

1. The EIR/EIS should address the potential impact if cities within the HCP area either opt out of the HCP at a later date, and/or independently acquire mitigation lands (inside or outside of their jurisdiction) to reserve that land as mitigation for development projects occurring within their own jurisdiction.

For example, several years ago the City of Elk Grove purchased Swainson Hawk mitigation land outside of their proposed Sphere of Influence and adopted a policy to reserve that land for development projects within their jurisdiction. If this trend were to continue, the EIR should address the problems associated with competing territorial mitigation lands undermining the HCP's effort to acquire mitigation lands to support regional development.

2. If approved, the HCP and related ITP seems to apply to a wide range of activities that could be mitigated to an accepted level of protection for listed species. This appears to be a convenient approach for the benefit of development in the region. However, the EIR/EIS should discuss the mechanisms that are/are not in place to ensure that those approved activities comply either individually or cumulatively with the federal EPA air quality standards for the region.

Wouldn't deteriorating air quality (and the ability of member jurisdictions to easily adopt CEQA Statements of Overriding Considerations) eventually jeopardize the sustainability of the habitat of the species this HCP is intended to protect (not to mention human health)?

3. The EIR/EIS should discuss the time lag that will likely exist between the pace of new development (the immediate loss of habitat) and the timing of acquisition of new, replacement mitigation land. Can eminent domain ever be used to assist in purchasing new land if the time gap between immediate loss of habitat and the acquisition of new habitat ever becomes unacceptable? What measures will be adopted to ensure that the impact fees will always correlate with the market prices of mitigation land?

4. The EIR/EIS should summarize the regional allocation of water within the HCP area and the known projects that are awaiting approval of the HCP.
To the extent that any existing and/or future habitat may rely upon water on the site (or immediate vicinity), the EIR/EIS should discuss the potential for land owners to sell/ransfer water rights that may have an adverse impact to species protection.

5. The EIR/EIS should clearly articulate the processes that would be involved if the HCP is being subjected to an amendment request. The public is interested in assessing the political arena in which this final document will exist so we may be confident in the HCP's ability to provide long-term protection of the species in the region.

Thank you,

Lynn Wheat
[redacted]

OFFICIAL CORRESPONDENCE BY ELECTRONIC MAIL
NO HARD COPY TO FOLLOW

PACIFIC WEST REGION
333 Bush Street, Suite 500
San Francisco, CA 94104-2828

N2219 (PWR-NR)
January 16, 2014
Memorandum

To: Nina Bicknese, Senior Fish and Wildlife Biologist
Sacramento Fish and Wildlife Office
2800 Cottage Way, W–2605
Sacramento, CA 95825

From: Acting Regional Director, Pacific West Region

Subject: National Park Service Comments on Notice of Intent to Prepare EIS/EIR: Habitat Conservation Plan for South Sacramento County, California

We commend the U.S. Fish and Wildlife Service (USFWS) and County of Sacramento, California on their intent to prepare cooperatively a Habitat Conservation Plan for South Sacramento County. Thank you for the extension in time and opportunity to provide comments on the above subject, and we hope our comments that follow will be helpful.

It should be noted that both the Cosumnes River Riparian Woodland National Natural Landmark (NNL) and American River Bluffs and Phoenix Park Vernal Pools NNL appear to be within the plan area of approximately 374,000 acres or quite possibly within the smaller 123,000-acre Urban Development Area (UDA).

In the case of the Cosumnes River Riparian Woodland NNL, it was designated by the Secretary of the Interior in January 1976, and it envelops three adjacent tracts consisting of approximately 255 acres. This NNL is nationally significant in that it represents a small remnant of a biotic community type, riparian woodland, that once formed a major and integral part of the California Central Valley. These three tracts along the Cosumnes River are some of the very few still remaining (see attached map: CosumnesRiverRiparianNNL).

Currently, the two landowners within the Cosumnes River Riparian Woodland NNL are the CA Department of Fish and Wildlife and a private landowner, Mr. John Belcher. The natural landmark is wholly within the Cosumnes Preserve which is managed by the Bureau of Land Management in cooperation with other state, federal, and private landowners. It should also be mentioned that the boundary of the landmark is currently being evaluated for possible expansion by the National Park Service. If expanded, the landmark would continue to be part of the much larger Cosumnes Preserve, which encompasses an additional 820 acres. If expanded, additional landowners would include The Nature Conservancy, CA Department of Water Resources, Sacramento County, and a private landowner, Mr. Chuck Williams.

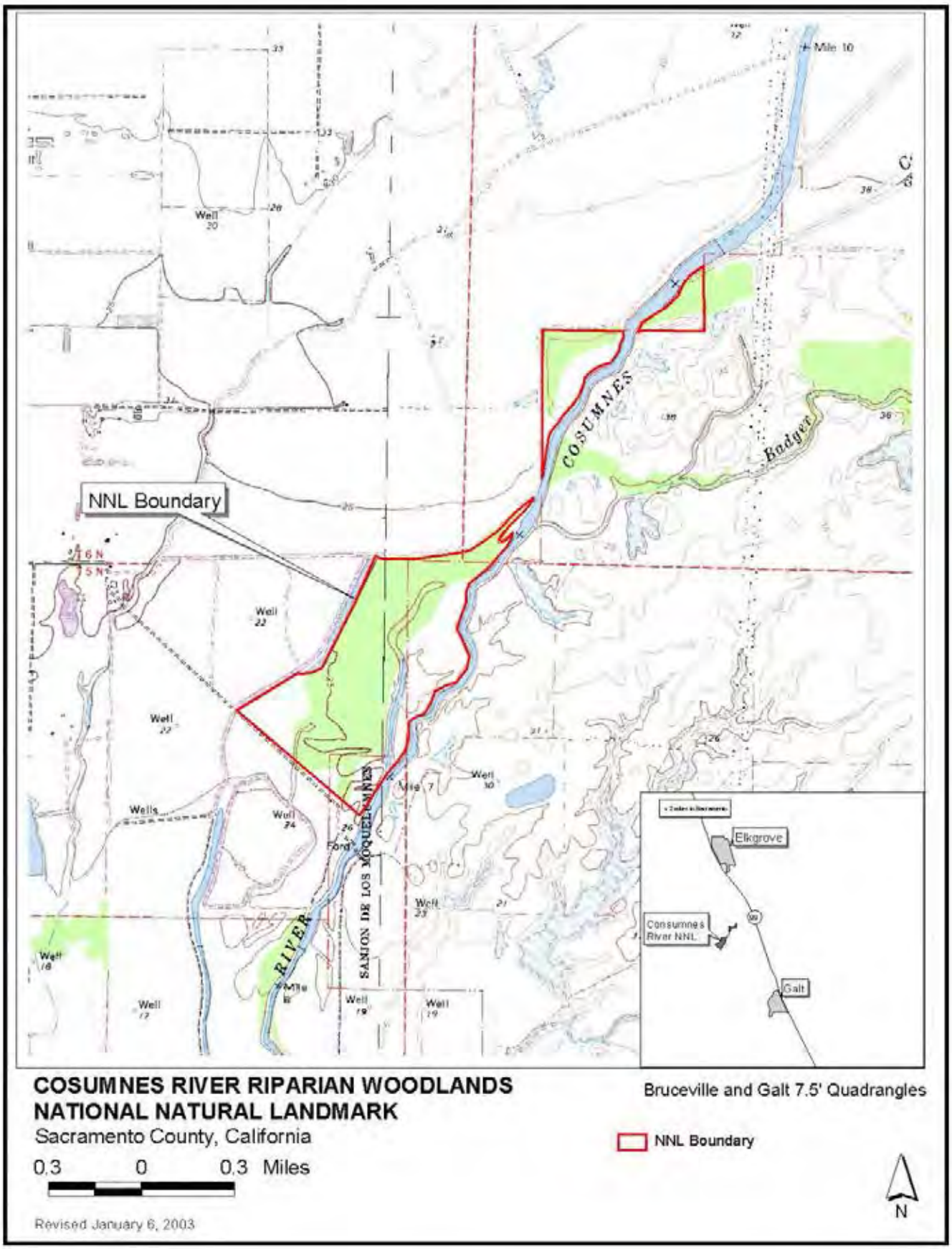
In the case of American River Bluffs and Phoenix Park Vernal Pools NNL, it too was designated in January 1976 and is composed of two noncontiguous units, blue oak woodland and a vernal pool field (see attached map: AmericanPhoenixOwnershipBluffs&PoolsNNL.pdf). The woodland includes a portion of the American River bluffs that have eroded over time, creating four steep south-trending ravines. The vernal pool field contains a unique grouping of species of *Brodiaea* including several hybrid forms, and as such is an important research and teaching site for plant evolution, genetics, and ecology. Landownership within American River Bluffs and Phoenix Park Vernal Pools NNL includes the CA Department of Parks and Recreation, Sacramento County, U.S. Bureau of Reclamation, Fair Oaks Recreation and Parks District, and several private landowners.

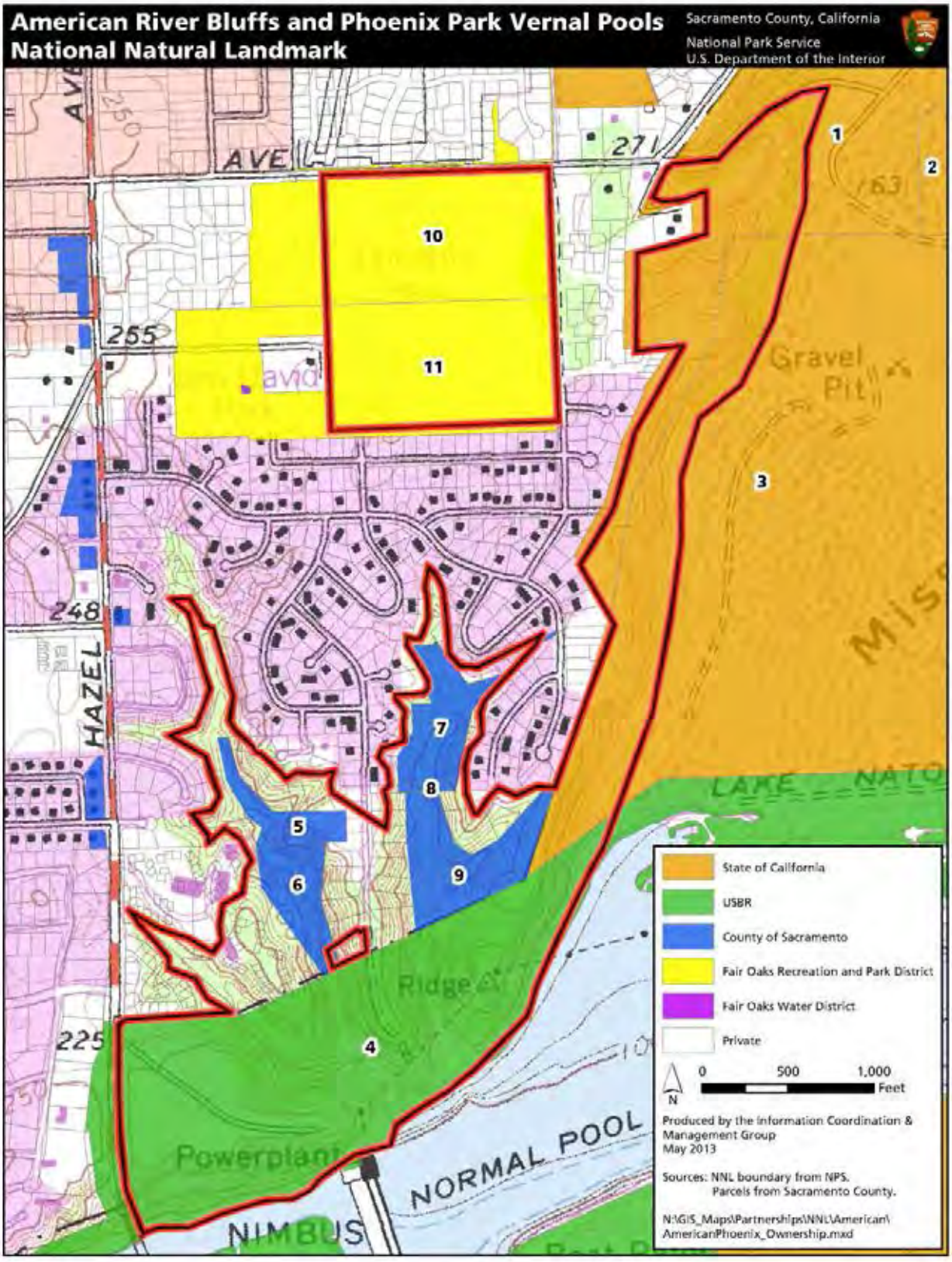
The National Natural Landmarks (NNL) program was established in 1962 and is managed by the National Park Service in cooperation with other state, federal, municipal, and private landowners. The Cosumnes River Riparian Woodland NNL is one of ninety-nine NNLs within the Pacific West Region of the National Park

Service. If you have any questions related to the National Natural Landmarks program, please contact Pacific West Region NNL coordinator, Mr. Steve Gibbons, at (360-854-7203) or steve_gibbons@nps.gov .

If your agency requires further information or has questions about the above comments, please do not hesitate to contact Mietek Kolipinski, PhD, Pacific West Region, Natural Resources Programs Specialist, at 415 623 2204 or mietek_kolipinski@nps.gov.

/s/ Stephanie Burkhart
(signed original on file)
Christine S. Lehnertz
Attachments (2):
CosumnesRiverRiparianNNL.pdf
AmericanPhoenixOwnershipBluffs&PoolsNNL.pdf
cc:
Steve Gibbons, PWR, NNL Regional NNL Program Coordinator
Deputy Regional Director, Resource Management and Planning, Pacific West Region
Chief, Natural Resource Programs, Pacific West Region
Briana Collier, NPS, Environmental Protection Specialist, Ft., Collins, CO


NNL Boundary
COSUMNES
Badger
RIVER
SAMON DE LOS MOQUELUMNES
Mile 10
Mile 7
Well 20
Well 22
Well 22
Well 24
Well 23
Well 18
Well 17
Well 19
Well 19
Wells
Well 10
Ford
Elkgrove
Consumnes River NNL
Galt
COSUMNES RIVER RIPARIAN WOODLANDS
NATIONAL NATURAL LANDMARK
Sacramento County, California
0.3 0 0.3 Miles
Revised January 6, 2003
Bruceville and Galt 7.5' Quadrangles
NNL Boundary
N


American River Bluffs and Phoenix Park Vernal Pools
National Natural Landmark
Sacramento County, California
National Park Service
U.S. Department of the Interior
AVE
271
250
255
248
225
HAZEL
Gravel Pit
LAKE
NATO
Ridge
Powerplant
NORMAL POOL
NIMBUS
1
2
3
4
5
6
7
8
9
10
11
State of California
USBR
County of Sacramento
Fair Oaks Recreation and Park District
Fair Oaks Water District
Private
N
0
500
1,000
Feet
Produced by the Information Coordination & Management Group
May 2013
Sources: NNL boundary from NPS.
Parcels from Sacramento County.
N:\GIS_Maps\Partnerships\NNL\American\AmericanPhoenix_Ownership.mxd

From: rmburness@comcast.net [mailto:rmburness@comcast.net]
Sent: Friday, January 24, 2014 4:27 PM
To: nina_bicknese@fws.gov; hackc@saccounty.net
Cc: Richard Radmacher; jan_knight@fws.gov; Bart McDermott; Beatrix Treiterer; Dale Claypoole; SCOTT FINLEY; Sean Wirth
Subject: Request that covered species model information be provided and evaluated in CEQA and NEPA documents

Dear Ms. Bicknese and Ms. Hack,

Representatives of the Stone Lakes NWR staff and the Stone Lakes NWR Association recently met with Sacramento County staff working on the South Sacramento Habitat Conservation Plan (SSHCP) concerning the plan and its relationship with the Stone Lakes NWR. As a consequence of that meeting we are very much interested in gaining a better understanding on how the covered species models were derived, especially for those species found in and around the Stone Lakes NWR. The Swainson's hawk is of particular interest, as substantial high quality foraging acreage is necessary in order to support the important concentration of hawks in southwest Sacramento County.

The Stone Lakes NWR Association is an independent organization that, by agreement, works as a "Friends Group" to advance the goals and the objectives of the Stone Lakes NWR. We feel that it is important that the SSHCP clearly identify the assumptions, criteria and process used in developing the species models. The Stone Lakes NWR Association has requested that the preparers of the draft SSHCP provide us with additional details regarding the development of the species models. In particular, we are interested in the habitat inventory assumptions and data associated with Swainson's hawk foraging acreage, including the acreages and maps of habitat that is potentially problematic, such as included habitat currently in vineyards and orchards (and presumed to be restorable to foraging habitat), included habitat below sea level and/or potentially below sea level as determined by climate change modelling, and excluded foraging habitat anticipated to be developed for other uses or designated for restoration to non foraging habitat.

We have requested that the SSHCP preparers provide us with this information at their earliest opportunity. In addition, we are requesting as part of the Notice of Preparation Process, that the CEQA and NEPA documents for the Plan incorporate the above information in the impacts analysis.

In recognition of the important role that the Stone Lakes NWR will play in realizing the habitat protection objectives of the SSHCP, we hope that Refuge staff and Association members will be able to establish ongoing cooperation and coordination with your respective agencies as the SSHCP finally moves into the environmental analysis, hearing approval and implementation phases.

Sincerely,

Rob Burness
Conservation Chair
Stone Lakes NWR Association

From: rmburness@comcast.net [mailto:rmburness@comcast.net]
Sent: Friday, January 24, 2014 4:10 PM
To: billziebron@yahoo.co
Cc: Richard Radmacher; nina_bicknese@fws.gov; jan_knight@fws.gov; Bart McDermott; Beatrix Treiterer; Dale Claypoole; SCOTT FINLEY; Sean Wirth
Subject: Followup to Stone Lakes Meeting and request for covered species model information.

Dear Mr. Ziebron,

We appreciated the opportunity to meet on January 21st with you and Mr. Radmacher to discuss the South Sacramento Habitat Conservation Plan (SSHCP) and its relationship with the Stone Lakes NWR. We are very much interested in gaining a better understanding on how the covered species models were derived, especially for those species found in and around the Stone Lakes NWR. The Swainson's hawk is of particular interest, as substantial high quality foraging acreage is necessary in order to support the important concentration of hawks in southwest Sacramento County.

The Stone Lakes NWR Association is an independent organization that, by agreement, works as a "Friends Group" to advance the goals and the objectives of the Stone Lakes NWR. We feel that it is important that the SSHCP clearly identify the assumptions, criteria and process used in developing the species models. The Stone Lakes NWR Association requests that you provide us with additional details regarding the development of the species models. In particular, we are interested in the habitat inventory assumptions and data associated with Swainson's hawk foraging acreage, including the acreages and maps of habitat that is potentially problematic, such as included habitat currently in vineyards and orchards (and presumed to be restorable to foraging habitat), included habitat below sea level and/or potentially below sea level as determined by climate change modelling, and excluded foraging habitat anticipated to be developed for other uses or designated for restoration to non foraging habitat. We would very much appreciate your providing us with this information at your earliest opportunity.

In recognition of the important role that the Stone Lakes NWR will play in realizing the habitat protection objectives of the SSHCP, we hope that Refuge staff and Association members will be able to establish ongoing cooperation and coordination as the HCP finally moves to hearing, approval and implementation. Thanks for your assistance in this request.

Rob Burness
Conservation Chair
Stone Lakes NWR Association

From: McDermott, Bart [mailto:bart_mcdermott@fws.gov]
Sent: Wednesday, November 13, 2013 4:34 PM
To: Nina Bicknese
Subject: South Sacramento HCP Comment Opportunity

Hi Nina. We just noticed the NOI on this plan and were wondering if we should work with you on our comments that pertain to the covered species that are associated with the Refuge and surrounding area. We have an active Friends Group that is also planning to attend the public meetings and submit comments. Do you think we can set up a meeting with the County POC for this plan to discuss any concerns and issues regarding the Refuge?
Thanks,

Bart McDermott
Refuge Manager
Stone Lakes NWR
Elk Grove, CA
916-775-4426 Office
916-869-6632 Cell
http://www.fws.gov/stonelakes

Table NOP-1 Covered Species[1]

Mammals	Invertebrates
American Badger, *Taxidae taxus*	Mid-Valley Fairy Shrimp, *Branchinecta mesovallensis*
Pallid Bat, *Antrozous pallidus*	Ricksecker's Water Scavenger Beetle, *Hydrochara rickseckeri*
Western Red Bat, *Lasirus blossevillii*	Valley Elderberry Longhorn Beetle, *Desmocerus californicus dimorphus*, (FT)
Yuma Myotis Bat, *Myotis yumanensis*	Vernal Pool Fairy Shrimp, *Branchinecta lynchi*, (FT)
	Vernal Pool Tadpole Shrimp, *Lepidurus packardi*, (FE)
Birds	**Plants**
White-Tailed Kite, *Elanus leucurus*	Ahart's Dwarf Rush, *Juncus leiospermus var. ahartii*
Cooper's Hawk, *Accipiter cooperii*	Boggs Lake Hedge-Hyssop, *Gratiola heterosepala* (SE)
Ferruginous Hawk, *Buteo regalis*	Dwarf Downingia, *Downingia pusilla*
Greater Sandhill Crane, *Grus Canadensis tabida* (ST)	Legenere, *Legenere limosa*
Loggerhead Shrike, *Lanius ludovicianus*	Pincushion Navarretia, *Navarretia myertsii*
Northern Harrier, *Circus cyaneus*	Sacramento Orcutt Grass, *Orcuttia viscida*, (SE, FE)
Swainson's Hawk, *Buteo swainsoni* (ST)	Slender Orcutt Grass, *Orcuttia tenuis*, (SE, FE)
Tricolored Blackbird, *Agelaius tricolor*	Sanford's Arrowhead, Sagittaria sanfortii
Western Burrowing Owl, *Athene cunicularia hypugaea*	
Amphibians	**Reptiles**
California Tiger Salamander, *Ambystoma californiense* (central valley, DPS), (FT)	Giant Garter Snake, *Thamnophis gigas* (FT)
Western Spadefoot Toad, *Scaphiopus hammondii*	Western Pond Turtle, *Actinemys marmorata marmorata* and *A. m. pallida* (2 sub-species: Northwestern and Southwestern)

Biological Goals and Objectives

Habitat loss and fragmentation is a threat common to the covered species in the Plan Area. Loss and fragmentation of land cover types that provide habitat for the covered species will be among the main effects of covered activities in the Plan Area; therefore, the biological goals and objectives focus on land cover type protection and connectivity as key components of the SSHCP Conservation

[1]: F - federal, S – State, E – endangered, T – threatened

Notes from SSHCP Meeting with the Stone Lakes National Wildlife Association.
Stone Lakes NWR Headquarters building, January 21, 2013. Notes prepared by N. Bicknese

Participants

Bart McDermott, Refuge Manager
Beatrix Treiterer, Deputy Refuge Manager
Rob Burness, Stone Lakes NWR Association
Scott Finley, Stone Lakes NWR Association
Dale Claypoole, Stone Lakes NWR Association
Sean Wirth, Sierra Club/ECOS
Jan Knight, SFWO Deputy Field Supervisor
Nina Bicknese, SFWO Senior Fish and Wildlife Biologist
Rich Radmacher, Sacramento County
Bill Ziebron, Ziebron Group

- Bart McDermott asked how much public scoping has been done for the SSHCP. Nina summarized previous scoping meetings in 2008. Bill reviewed 2013 scoping meetings and current status of the HCP and the EIS/EIR: Draft HCP expected in late spring 2014, EIS/EIR and draft Implementing Agreement expected in late summer 2014. Public draft documents will have a 90 day public review. Final documents expected in spring 2015. A Sacramento Board of Supervisors workshop is scheduled for January 28, 2014.

- Rich reviewed map of Planning Area, UDA boundary and acres.

- Bart McDermott provided map of the Refuge boundary, which includes 17,900 acres; Refuge is currently 35% complete; all of Refuge boundary overlaps with current SSHCP Planning Area.
    1. Refuge staff and the Association have been involved with the Bay Delta Conservation Plan (BDCP) and are developing appropriate avoidance and minimization measures for BDCP actions expected inside the Refuge boundary.
    2. Refuge staff and the Association would like information on the SSHCP Covered Species that use the Refuge, and information on SSHCP activities that could occur within the Refuge boundary.
    3. Refuge staff and Association have been involved in the proposed Elk Grove SOI expansion on the eastern border of the Refuge boundary, and the potential effects of future development in that expansion area on the species that travel between the Refuge and Cosumnes Preserve lands.
    4. The Refuge cannot purchase land outside of their designated boundary, but FWS may be able to secure agricultural easements to preserve habitat links between the Refuge and Cosumnes, possibly in association with the Sacramento National Wildlife Refuge.

- Scott Finley noted that the Refuge Association is very concerned about rapid loss of grazing lands and wildlife habitat inside the Refuge boundary to vineyards. He would like information on any SSHCP plans for early preservation of habitat and the SSHCP conservation strategy's "get ahead/stay ahead" component.

- Beatrix Treiterer noted that 11 BDCP covered species overlap with the Refuge boundary; she would like to know how many of the 30 SSHCP covered species have habitat inside the Refuge boundary. After discussion, the Refuge staff and Association decided to review the species list presented in the NOI and NOP and then will provide a comment letter that identifies which SSHCP covered species are also Stone Lakes NWR species.

- Rob Burness and Scott Finley asked about current acres in the SSHCP's take area" (the UDA), and asked if acres presented in the NOI and NOP will change because of LAFCo's recent decision denying the proposed Elk Grove SOI expansion.

- Bill Ziebron summarized the history of the proposed Elk Grove SOI expansion, and explained that the 2008 scoping and the 2010 administrative draft SSHCP addressed the proposed SOI expansion as part of the SSHCP's "UDA" because the SOI expansion was "reasonably foreseeable" at that time. Bill noted that the November 2013 LAFCo decision changes this assumption; however, exactly what 2014 public draft SSHCP will present regarding the UDA boundary near Elk Grove is still being determined. Bill noted that the City of Elk Grove presented an idea at last week's SSHCP "RAWG" meeting, but the permitting agencies expressed concerns. Bill noted that the primary concern is that urban development is not approved for areas outside the USB and incorporated city limits. Bill Ziebron and County staff are meeting with Elk Grove on Friday 1/24/14, which may result in an agreement on what the SSHCP analysis will assume about the UDA boundary near Elk Grove.

- Rob Burness noted that the lands within the proposed SOI expansion area are critical foraging habitat for several Refuge species, and that area is essential to providing a habitat link between the Cosumnes Preserve and the Refuge.

- Bart McDermott noted that Sandhill cranes, curlews, and other species use the proposed expansion area to go back and forth between the Refuge and the Preserve, however, farmland throughout this linkage area is being lost to vineyards and solar, and the dairies present during the Refuge scoping period (20 year ago) are now closed. Species on the Refuge will need this adjacent area to remain as farmland. Also, this linkage area is important in the long run, because other areas of existing species-habitat will likely be lost to rising sea level and saltwater intrusion over time. Bart stated that the SSHCP is a good mechanism to preserve farmland habitats east of I-5.

- Scott Finley and Bart McDermott noted that the BDCP applicants have proposed that the BDCP could "swap out" future BDCP preserves established in areas where the BDCP Plan Area overlaps the Plan Area of another HCPs— if that habitat is needed later by the other HCP. Bill Ziebron and Jan Knight said that BDCP proposal lacked sufficient detail and did not explain how a preserve "land swap" could be implemented.

- Scott Finley asked how the SSHCP will incorporate Climate Change information in future land-acquisition decisions for preserves has expected salt water intrusion and land-subsidence been considered in development of alternative conservation strategies? Will expected sea level rise be included in the SSHCP analysis?

- Rich Radmacher stated that details of the SSHCP's Preserve Assembly Criteria/Process are still being developed, and he noted that the Service has requested additional detail about the proposed Preserve Assembly Process. Rich noted that approximately 6000 acres of the SSHCP Plan Area could be below sea level, but the current Conservation Strategy requires any preserved land that becomes below sea-level would be replaced with new preserves that are above sea-level. Rich thinks SSHCP mitigation requirements will need to preserve 10,000 to 15,000 acres of existing "high-value" Swainson's hawk habitat. After the recent LAFCo decision, approximately 45,000 acres of "high-value" habitat are currently available for preservation in the SSHCP Plan Area. Rich noted that the proposed BDCP "fore bay" project area was not included in the 45,000 acres of high-value Swainson's hawk habitat.

- Bart McDermott asked what was minimum "patch size" used by the SSHCP when estimating availability of species habitat for preservation? Rich Radmacher stated that he thinks minimum patch size used was 20 acres for all landcover types. Rich noted that this minimum patch size assured that small undeveloped lots within areas of existing ag-residential development were not included in the SSHCP' inventory of existing land/habitat available for habitat preservation.

- Sean Wirth noted that the Refuge Association believes lands below sea level should not be included in the inventory of land/habitat available for preservation under the SSHCP.

- Rob Burness requested detailed information on methods the SSHCP used to determine which lands were suitable for preservation and included in the SSHCP "habitat inventory." Rob asked if the Refuge Association would be able to "weigh in" on the assumptions and methods used by the SSHCP to quantify the amount of suitable habitat available for future preservation. Bill and Nina requested the Refuge Association describe their concerns, questions, and ideas as EIS/EIR Scoping comments.

- Rob Burness stated that the Refuge Association will submit these scoping comments: 1) that the SSHCP EIS/EIR analysis needs to present assumptions used about the acres and locations of species habitat currently available for preservation, and 2) that the Refuge Association be provided with copies of the GIS data that the SSHCP used to quantify/inventory the amount and locations of available habitat. Rob stated the Refuge Association is requesting this information now in order to provide well-informed scoping comments. Nina asked if the Refuge Association will be requesting this information for all 30 SSHCP species models; Rob stated that the Refuge is primarily interested in how the SSHCP is quantifying amount and locations of existing habitat for Sandhill crane and Swainson's hawk.

- Sean Wirth noted that Todd Gardner (CDFW) did a lot of work identifying criteria for defining Swainson's hawk high-value habitat inside the Plan Area, but this information was not integrated into recent drafts of those HCP chapters—which resulted in a lot of EIS/EIR scoping comments from the Friends of Swainson's Hawk (FOSH).

- Beatrix Treiterer asked for information about the future SSHCP Implementing Entity (IE)—has the IE format has been determined, or will alternative IE formats be included in the EIS/EIR and the final format determined later? Bill Ziebron stated that the SSHCP Implementing Entity format is still being determined, but believes the SSHCP's IE will include a JPA, similar to the Santa Clara HCP Implementing Entity. Bill stated that the SSHCP Implementing entity will not be structured like a habitat-conservancy, as in the Natomas HCP, but the SSHCP format will likely include some type of day-to-day manager. Bill stated that this two-part SSHCP Implementing Entity format will assure that SSHCP biological decisions will remain separated from any local planning process or politics.

- Bart McDermott asked how the SSHCP will assure that their wetland habitats can be managed for 50 year permit term, and then in perpetuity – managing wetland habitats on the Refuge are much more "hands on" and expensive than managing their upland habitats. Rob Burness asked if the SSHCP will be able to fund the long-term management of the SSHCP preserve lands, especially those that are inside the Refuge boundary or in the area between the Refuge and the Cosumnes Preserve. Rob asked how SSHCP covered-activity fees will be determined.

- Rich Radmacher stated that a new consulting firm (EPS, in Berkley CA) is under contract to conduct the economic analysis. Their analysis will incorporate land cost differences in each Plan Area zone, and costs for vernal pool and other land management will be based on recent local examples and discussions with

local preserve managers. In addition, Dudek (consultant writing the HCP document) has extensive experience managing HCP preserve lands in southern California.

- Bart McDermott noted that the Refuge has extensive information on costs for wetland management, and could provide this information to the SSHCP. Bart estimates that seasonal wetland management on the Refuge is $200-$300 per acre; most of that cost is from water pumping and weed control. Rich requested the Refuge provide that information for use in the SSHCP economic analysis.

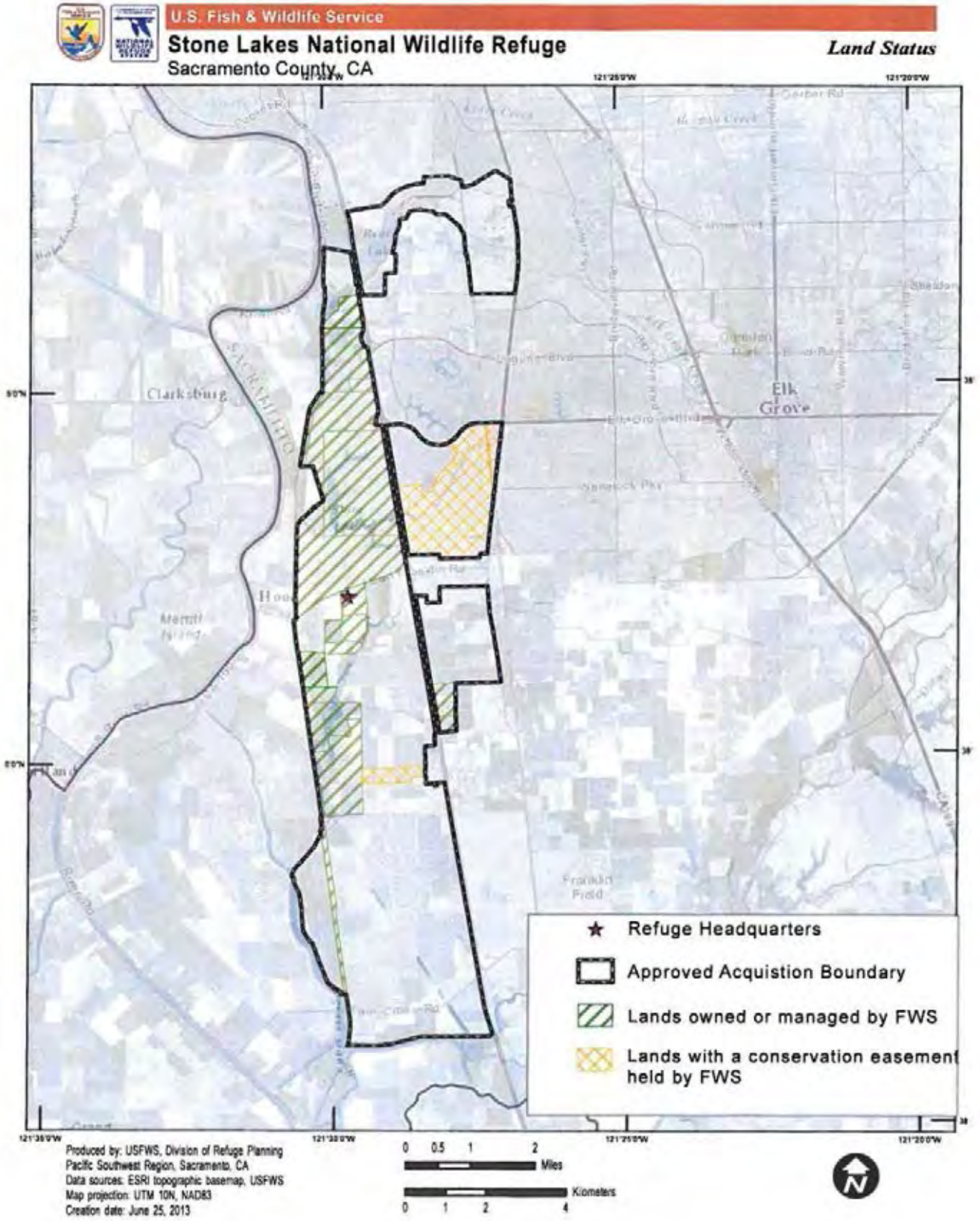
- Rob Burness asked a question about the Kammerer Road improvement project, and if this work would be part of the Capitol Connector highway project, or if it will be an Elk Grove project. Rich Radmacher stated that regardless of who completes those improvements, the improvements on Kammerer Road will be a SSHCP covered activity. Bart McDermott noted that the Refuge and Refuge Association have met with the Connector JPA.

- Bart Mc Dermott summarized that the Refuge will be submitting the following scoping comments to the County and the USFWS contacts listed on the NOP and NOI:
    1. Comments on the SSHCP covered species that occur within the Refuge boundary area;
    2. Comments on SSHCP conservation strategy elements proposed within the Refuge boundary and in the area between the Refuge and the Cosumnes Preserve, and any suggestions for alternative SSHCP conservation strategies in these areas;

    3. Comments on Covered Activity projects the SSHCP would allow inside the Refuge boundary and in the area between the Refuge and the Cosumnes Preserve (including the 5 "major" projects, private development, and the Capitol Connector highway project).

January 21, 2014, Stone Lake National Wildlife Refuge headquarters

Meeting: South Sacramento HCP			
Name	**Organization**	**Email**	**Phone Number**
Bart McDermott	STONE LAKES NWR	bart_mcdermott@fws.gov	916-775-4426
ROB BURNESS	Friends of Stone Lake	rmburness@comcast.net	916-456-4332
SCOTT FINLEY	STONE LAKES NWR ~~ASSN~~	~~SAFFN~~-SBGFINLEY@SBCGLOBAL.NET	9169331
BEATRIX TREITERER	"	beatrix_treiterer@fws.gov	916-775-4421
Sean Wirth	Sierra Club / ECOS	wirthsoscramor@yahoo.com	916-852-9905
Dale Claypoole	STONE LAKES Assoc.	Claypoole@sbcglobal.net	916-457-3145
Jen Knight	USFWS	jen_knight@fws.gov	916-414-6700
Nina Bicknese	USFWS	nina_bicknese@fws.gov	916-414-6633
RICH RAINMACHER	SAC. COUNTY	RAINMACHERR@SACCOUNTY.NET	911-874-5369
Bill Ziebrin	Ziebrin Group	billziebrin@yahoo.com	916-761-2358


U.S. Fish & Wildlife Service
Stone Lakes National Wildlife Refuge
Sacramento County, CA
Land Status
121°25'0"W
121°20'0"W
Clarksburg
Elk Grove
Franklin Field
Refuge Headquarters
Approved Acquistion Boundary
Lands owned or managed by FWS
Lands with a conservation easement held by FWS
Produced by: USFWS, Division of Refuge Planning
Pacific Southwest Region, Sacramento, CA
Data sources: ESRI topographic basemap, USFWS
Map projection: UTM 10N, NAD83
Creation date: June 25, 2013
0 0.5 1 2 Miles
0 1 2 4 Kilometers
N

U.S. Fish & Wildlife Service

A UNIT OF THE National Wildlife Refuge System

Stone Lakes
National Wildlife Refuge

1624 Hood-Franklin Rd
Elk Grove, CA 95757 - 9774
E-mail: stonelakes@fws.gov
Phone Number: 916-775-4421

Visit the Refuge's Web Site:
http://www.fws.gov/refuge/stone_lakes/



Overview

Stone Lakes National Wildlife Refuge

The Stone Lakes National Wildlife Refuge, located south of Sacramento, California, lies within the Sacramento-San Joaquin delta, the destination of thousands of migrating waterfowl, shorebirds, and other water birds. The refuge was established in 1994 and is one of the few urban refuges that have the potential to attract and educate thousands of visitors in a region that is becoming the new Silicon Valley of California.

Through a number of innovative partnerships, the refuge is protecting scarce natural habitats and agricultural resources in an area threatened by urban sprawl and agricultural changes. Stone Lakes Refuge contains both seasonal and permanent wetlands, riparian forest, and grasslands, as well as some of the last remaining freshwater lakes in the central valley.

These habitats support large populations of migratory water birds, a major rookery for several colonial nesting species such as great blue herons, and a warm water fishery. Several endangered, threatened, and special-status species benefit from these habitats: the valley elderberry longhorn beetle, Swainson's hawk, and greater sandhill crane.

Visitor numbers increase every year; they topped 8,500 in 2001, despite a lack of developed facilities such as a visitor education center and restrooms. Volunteers from the local area dedicate their time on weekends guiding visitors through grasslands and tree-lined waterways to educate the public about the refuge in their backyard.

Getting There . . .

Recreation & Education Opportunities

Environmental Education
Photography
Wildlife Observation
Learn More >>

Management Activities

The primary focus of management on the refuge is to restore and maintain wetland and riparian habitats. Wetland habitats include seasonal, permanent wetlands, and vernal pools. The wetlands are managed through manipulation of water levels through pumping and vegetation control.

Impoundments are flooded in early fall; and water is maintained through spring. Vegetation such as cattails and bulrush is manipulated through mowing and disking. The refuge also works cooperatively with local agencies to chemically control water hyacinth.

Impoundments are managed by the local mosquito district to control mosquitoes through the use of mosquito fish and other means. Riparian restorations involve the planting of native vegetation including valley oak, cottonwood, willow, Oregon ash, box-elder, rose, elderberry, and native blackberry in appropriate areas.

A grazing program is used to manage the grasslands to promote native species and control exotics such as pepper grass and star thistle. Refuge staff and volunteers survey wildlife

The refuge headquarters is located at 1624 Hood Franklin Road. Take Interstate 5 south from Sacramento, approximately 12 miles to the Hood Franklin exit. Turn west (right) about 1 mile. The office is a two story building with a red tile roof on the south (left) side of the road.

A self-guided hike to the universally accessible wildlife viewing platform is open to the public every second and fourth Saturday of each month except July and August. The trail is normally open from 9 a.m. to 3 p.m.; but please call the information line (916-775-4420) for any updates to the schedule.

To find the entrance to the hiking trail, take Interstate 5 south from Sacramento, approximately 10 miles, to the Elk Grove exit. After exiting, turn right on the off-ramp before going back over the overpass, and meet at the gate for special events and public access days.

Get Google map and directions to this refuge/WMD from a specified address:

Your full starting address **AND** town and state **OR** zip code

Get Directions

Google Maps opens in a new window

NOTE: When using this feature, you will be leaving the U S. Fish & Wildlife Service domain. We do not control the content or policies of the site you are about to visit. You should always check site policies before providing personal information or reusing content.

These driving directions are provided as a general guide only. No representation is made or warranty given as to their content, road conditions or route usability or expeditiousness. User assumes all risk of use.

Wildlife and Habitat

Stone Lakes NWR is composed of a rich mosaic of habitats across several properties that are managed by the Service.

Learn More>>

populations to monitor use by migratory and breeding birds. The rookery is also monitored for population trends and nesting success. Water quality and contaminants monitoring are also underway.

Learn More>>

2008 Scoping Report

South Sacramento Habitat Conservation Plan's Joint Environmental Impact Report/Environmental Impact Statement Scoping Report

INTRODUCTION

Primary principles of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act of 1969 as amended (NEPA) process include full public disclosure and open public participation in the decision-making process. To support preparation of a joint Environmental Impact Statement and Environmental Impact Report (EIS/EIR), the lead agencies solicited input from the public to help identify issues and concerns that they feel should be addressed in the joint document. To initiate the scoping process, the County, the lead CEQA agency, sent a Notice of Preparation (NOP) to the State Clearing House on June 10, 2008 (Control No. 03-0637). The NOP was published and distributed by the California State Clearing House on July 11, 2008. On June 10, 2008, the U.S. Fish and Wildlife Service (USFWS), the lead NEPA agency, published a Notice of Intent (NOI) in the Federal Register on July 10, 2008 (73 FR 3279). The NOP and NOI included a comment period of 50 days. Copies of the NOP and NOI are contained in Appendix A of this Scoping Report.

The published notices provided a brief summary of the project and the lead agencies intention to prepare a joint EIR/EIS. During the NOI and NOP comment period, the lead agencies held four public scoping meetings and one public workshop to solicit information on alternative actions, including the proposed project.

Under NEPA regulations, any agency which has jurisdiction by law or has special expertise with respect to any environmental issue which should be addressed in an EIS may be a cooperating agency upon request of the NEPA lead agency. Roles of a cooperating agency, include participation in the scoping process, and development of the NEPA document (40 CFR §1501.6). Under CEQA (State CEQA Guidelines §15381), those state or local agencies that issue permits, have approval authority, or provide funding for the project are referred to as Responsible Agencies. CEQA Responsible Agencies play a similar role to a NEPA Cooperating Agency, but in practice generally limit their participation to a commenting role.

The California Department of Fish and Game (CDFG) and the Army Corps of Engineers (USACE) participated in one or more public scoping meetings and alternatives formulation workshop (see Appendix G of this scoping report for Cooperating agency letters).

PUBLIC OUTREACH

The public was invited to participate in the scoping process through a variety of media. Email that included a flyer announcement of the scoping meeting purpose, locations, and dates were sent by the County to some 1,400 interested parties and organizations. Display ads of the meeting announcement were published in the following newspapers at least one week prior to each public meeting:

Sacramento Bee (Metro Section):	July 1, 2008
Grapevine:	July 4, 2008
Galt Herald and River Valley Times:	July 2, 2008

In addition, the City of Elk Grove sent a meeting announcement attached to each resident's utility bill informing them of the scoping meetings.

The public announcements are included in Appendix B of this scoping report.

MEETING LOCATION AND FORMAT

Public scoping meetings were held on the following dates and times:

July 8, 2008	from 6:30 pm to 8:30 pm in Galt
July 11, 2008	from 10 am to 12:00 pm in Sacramento
July 15, 2008	from 6:30 pm to 8:30 pm in Rancho Cordova
July 16, 2008	from 6:30 p.m. to 8:30 pm in Elk Grove

Each meeting was held in an open house format, beginning with a short presentation to explain the purpose of the scoping meeting, followed by a 15-minuite Power Point presentation by Rich Radmacher (the County's Project Manager for the SSHCP) which summarized available information on the proposed SSHCP project. Approximately 12 information poster boards summarizing the proposed SSHCP and the environmental resources within the SSHCP planning area were available for public review and comment during the open-house portion of the meeting. Staff from the Lead and the Cooperating Agencies was available at each informational poster board to provide information on the natural resources in the SSHCP planning area and solicit public comments (See Appendix C and D for meeting materials).

ISSUES IDENTIFIED IN COMMENTS RECEIVED

A total of approximately eighty comment letters, including e-mails, from individuals, businesses, organizations, and agencies were received. The primary issues identified by the public they wished to be addressed in the EIS/EIR are:

1. Geographic Areas to be Addressed
   - Dry Creek
   - Borden Ranch
   - Highway 99, Zone 9
   - Cordova Hills
   - Highway 50 to 99 connector
   - City of Elk Grove sphere of influence
   - Cosumnes River flood plain
   - Adjacent counties and impacts of agriculture to urban/agricultural activities
   - UDA development impact on adjacent areas including agriculture

2. Resource Topics/Issues
   - Gravel mining and processing
   - Livestock grazing
   - Grazing leases
   - Impacts to agriculture
   - Urban sprawl

3. Regulatory Topics
   - Mitigation banking
   - In lieu fee program
   - Consistency with Corps mitigation regulations

4. Corrections to poster board Maps presented at the public meetings
   - Arno and Valensin Rd & Rily is a vineyard, not vernal pool
   - Waegell Home Ranch has no vineyards, cropland shown as grazing land, and pond south of Florin Road is Tri-Colored Blackbird habitat

5. Agency involvement
   - RWQCB involvement

6. Cumulative Impacts Analysis
   - South of Elk Grove South of Kammerer Road
   - Cordova Hills infrastructure impact, including roads
   - Elk Grove sphere of influence
   -Galt outside UDA development impact

Copies of each written comment received are included in Appendix E and F of this scoping report.

MEETING AND COMMENT TRANSCRIPTS

The following section includes the scoping meeting date and location, and a transcript of each comment (See Appendix D for sign-in sheets and Appendix E for each comment card).

July 8, 2008, Galt, CA, at the Anthony Pescetti Community Room, Galt Police Facility, 455 Industrial Drive, Galt, CA 95632

Thirteen public and three agency participants registered on the meeting's sign-in sheets. (See Appendix D.)

Eight written comments and one verbal comment were received at this meeting (see Appendix E and F for all comment cards) :

Tina B. Holt (1)--The Herald area in Southeast Sacramento County are open agricultural and flood plain lands. Rich with diverse species such as Swainson's Hawk; Tiger Salamander; Bald Eagle; Elderberry Beetle. Chiefly the Borden Ranch is the most preservable land in the area consisting of riparian creek, oaks, cottonwood, elderberry, Prime Ag land when it is not in flood plain stage during winder & early spring. The land is 400 acres on a historic family ranch 'Borden.' The rest of the area approx. 1200 acres are in productive vineyards.

Gary Patterson (1)--I want this E.I.R. to address the specific impacts of surface gravel mining and its related activities, i.e. blacktop, concrete production, topsoil removal, etc. Impacts on all listed species and impacts on the local communities must be addressed in the E.I.R. Impacts of water supply to adjacent properties, traffic on these rural roads, dust on adjacent agricultural operations, noise impacts on neighbors, etc. Also the impact on public utilities like roads & drainages. I also want the E.I.R. to address the specific right to farm ordinances in Sac. County and those rights in relation to its neighbors.

Gary Patterson (2)--I believe this E.I.R. needs to specifically address the area of Dry Creek at the south edge of the county. Impacts on all species listed and the local communities by operations other than what zoning allows. This E.I.R. needs to address the cumulative impact of these species protections on adjacent counties. Specifically the Borden gravel mining proposal along Dry Creek at the south each side of the county. This E.I.R. needs to address the impacts of agriculture/urban interaction.

Kathleen Amos --What habitat issues are involved in the area just west of Hwy 99 (in Zone 9) along Twin Cities Rd.? (A group wants to put a senior housing project there—the group is called, "Citizens to Protect the Future of Galt" even though the land is OUTSIDE the city limits of Galt). We @ Galt Parks & Rec want to support as large a regional area for "passive rec" activities (like hiking, bird-watching, etc.) around the city of Galt.

Jerry Stribling (Verbal comments)--
Livestock grazing needs to be preserved,
Limitations on grazing/farming
Leased land—will HCP reduce availability of land for lease
Native pasture
Concerned about urban sprawl

Doug Trimble --Arno and Valensin Rd & Rily is a vineyard not a vernal pool

Tina Holt (2)--Traffic noise from increased activity in Herald where a mining proposal threatens the community; suggesting 285 rock trucks would use the narrow roads. This is the equivalent of 12,000 cars a day. The air quality and noise would be unbearable.

Tina B. Holt (3) --As a resident of the rural community of Herald my concerns are about mining and the negative cumulative impacts that increased rock truck traffic will have. Also I fear the loss of important Ag land on Borden by mining Borden Ranch. The damage to Dry Creek watershed of Borden Ranch would be an environmental disaster. Also the amount of water consumption by a mining operation on Borden Ranch would be devastating to the residential wells in the neighborhood. I know of 7 wells that have been depleted. The air quality would be degraded. The road damage from rock truck traffic is a costly negative impact: over $600,000.00 a mile to replace.

Mining of Borden Ranch and the increased truck, traffic, noise pollution is not wanted in the rural residential community of Herald.

While the loss of prime ag land on Borden Ranch would be most unfortunate; if mining were to occur; a railroad spur line must be developed for the efficient removal of mined materials to a High Way 104 location that will in no way burden Herald residents.

July 11, 2008, Sacramento, CA, at the Sixth Floor Meeting Room, Sacramento County Administration Building, 700 H Street, Sacramento, CA 95814

Twenty-two people, including thirteen public and seven agency participants registered on the meeting's sign-in sheets (see Appendix D).

The four written comments (See Appendix E for all comments) included:

Michael Devereaux (1)--Will the Corps of Engineers consider the new South Sacramento Habitat an approved:

1. Mitigation bank; or

2. an in lieu fee program; or

3. a permittee-responsible mitigation project for purposes on the new Corps rulemaking issued earlier this year?

[no name provided]--Did the team consider involving the Regional Water Quality Control Board. Most of the time, the Corp requirements are in-line with the NPDFS require., but there may be additional measures that applicants should know about.

Thanks.

Michael Devereaux (2)--Will the SSHCP have a feature that would allow it to incorporate private wetland preserve areas into the preserve system managed by the SSHCP?

Judy Waegell --Waegell Home Ranch map designation connections. We have no vineyards, some parcels that are cropland are designated as grassland, Pond south of Florin Road not colored Blue = Tri Colored Blackbird habitat.

July 15, 2008, Rancho Cordova, at the American River Room, Rancho Cordova City Hall, 2729 Prospect Park Drive, Rancho Cordova, CA 95670

Thirteen public and two agency participants registered on the meeting's sign-in sheets. (See Appendix D.)

The two written comments (See Appendix E for all comments) included:

Mark Hanson --Regarding Cordova Hills, the impacts outside the UDA for roadway, sewer, water, dry utilities should be taken into account (covered activities). Cordova Hills project is 2,419 acres all within the USB, but will require a 4-6 lane roadway crossing & possibly other infrastructure through the northeastern side of the Keifer Landfill's bufferlands. Cordova Hills will require 3 access points & due to spacing requirements the southern entrance to Cordova Hills must traverse through the bufferlands outside the USA. Cordova Hills owns this portion of the bufferlands & no uses requiring urban services are proposed, but construction of necessary project infrastructure outside the UDA will be needed.

Michael Devereaux--

1. The EIR/EIS needs to cover the impacts on the South Sac HCP of the proposed Highway 50 to Highway 99 connector road, for which a joint powers agency was just created; the HCP also needs to provide permit coverage for the connector.

2. The EIR/EIS needs to include development in the City of Elk Grove's "South of Kammerer Road" areas as a future development area covered by the permits to be issued for the South Sac HCP.

July 16, 2008, Elk Grove, at the City Council Chambers, Elk Grove City Hall, 8400 Laguna Palms Way, Elk Grove, CA 95758

Twenty-four public and two agency participants registered on the meeting's sign-in sheets. (See Appendix D.)

The three written comments (See Appendix E for all comments) included:

bwackford@aol.com --Continue to look at City of Elk Grove sphere of influence and annexing proposal. Area should be addressed in EIR. Potential for future growth should be assessed. Avenues for EG to blend these areas into plan should be kept open. A "50 year" plan should clearly look to the future & the reality that growth will occur. we trust you'll continue to listen with an open mind and include the City of Elk Grove & its current & future residents in the decision making process.

Michael Winn --With the City of Elk Grove's formal application to amend the city's sphere of influence, the SSHCP environmental review should address that acreage for future development (or "take" habitat). The EIR/EIS should also evaluate the mitigation type and quantity for the proposed SOI areas.

Don Smith --We are very concerned about protecting the resources of the Cosumnes River floodplain area. Specifically riparian habitat protection in zones 3c [illegible] 8, 9 near Grantline Road, Highway 99, and Kammerer Road. At a minimum the area within the 200 year floodplain of Cosumnes River & Deer Creek.

It is a sensitive area with wetlands, vernal pools endangered species habitat. It is being threatened by the development and expansion of the City of Elk Grove. The analysis should consider the impacts of expansion of the City of Elk Grove. Identification of resources in the sensitive areas and mitigation (if any).

I believe that keeping City of Elk Grove expansion outside the 200 year floodplain will cover the zone & concerns.

WORKSHOP

The workshop was held on Tuesday, August 19, at the Florin Service Center, 7000 65th Street, Sacramento, CA 95823, and was attended by 35 public and three agency participants (see Appendix H). Workshop announcements were e-mailed to those individuals who attended the previous four scoping meetings and to the individuals, organizations, and agencies on the mailing list previously used for the public scoping meetings.

The purpose of the workshop was to gather information regarding specific natural areas and natural resources inside the UDA where participants would like to see habitat conserved, know of specific biological information, believe inappropriate for a preserve, or may cause concern if preserved.

Alternatives Workshop Comments Received

Participants in the Alternatives Workshop identified areas of concern by pointing out some 230 specific locations on maps of Zones 1, 2, 3, 4, 5, and 12.

REPORT SECTION ON AGENCY COMMENTS RECEIVED? (I.E. APPENDIX F)

At a minimum, a scoping report must include some discussion of comments received from any regulatory agency – determines level of "controversy" under NEPA (for our letters received, this is EPA and CDFG).

APPENDICES

A. NOP/NOI
B. Public Notices
C. Meeting Materials
D. Sign-in Sheets
E. Public Comments
F. Agency Comments
G. Coordination Letters
H. Workshop

Appendix A

NOI/NOP

Notice of Intent
Notice of Preparation

FR Doc E8-12963[Federal Register: June 10, 2008 (Volume 73, Number 112)]
[Notices]
[Page 32729-32732]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr10jn08-66]

==========

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[FWS-R8-ES-2008-N0106; 1112-0000-81420-F2]

Habitat Conservation Plan for South Sacramento, Sacramento County, CA

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of intent to prepare an Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) and notice of public scoping meetings.

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA) we, the Fish and Wildlife Service (Service), advise the public that we intend to gather information necessary to prepare, in coordination with the County of Sacramento (the County), a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The EIS/EIR will analyze the environmental effects of the Service's proposed issuance of an incidental take permit under section 10(a)(1)(B) of the Federal Endangered Species Act of 1973 as amended (ESA), for a habitat conservation plan (HCP) within a portion of south Sacramento County, California. The County, along with their local partners (the cities of Elk Grove, Rancho Cordova, Galt, the Sacramento Regional County Sanitation District, and the Sacramento County Water Agency), is facilitating the preparation of the South Sacramento HCP (SSHCP) in compliance with section 10(a)(2) of the ESA. The County and their local partners intend to apply to the Service for a 30-year permit that would authorized the incidental take of 40 species due to ground-disturbing private activities implemented under the SSHCP. The County, in accordance with the California Environmental Quality Act (CEQA) and with 40 CFR 1506.6(b)(3), has published a similar notice of preparation

for this EIS/EIR with the State Clearinghouse.

We provide this notice to (1) Describe the proposed action and possible alternatives; (2) announce the initiation of a public scoping period, including when and where scoping meetings will be held; (3) advise other interested Federal, State, and local agencies, affected Tribes, and the public of our intent to prepare an EIS/EIR and invite their participation in the scoping process and; (4) obtain suggestions, comments, and useful information from interested parties and other agencies on the range of actions, the significant issues, range of alternatives, and impacts to be considered in the EIS/EIR document. We invite written comments on this notice from any interested party.

DATES: Submit written comments on or before July 30, 2008. Four public scoping meeting will be held on:

1. Tuesday, July 8, 2008, from 6:30 p.m. to 8:30 p.m., Galt, CA.
2. Friday, July 11, 2008, from 10 a.m. to 12:00 p.m., Sacramento, CA.
3. Tuesday, July 15, 2008, from 6:30 p.m. to 8:30 p.m., Rancho Cordova, CA.
4. Wednesday, July 16, 2008, from 6:30 p.m. to 8:30 p.m., Elk Grove, CA.

ADDRESSES: The public meetings will be held at the following locations:

1. Tuesday, July 8, 2008, at the Anthony Pescetti Community Room, Galt Police Facility, 455 Industrial Drive, Galt, CA 95632.
2. Friday, July 11, 2008, at the Sixth Floor Meeting Room, Sacramento County Administration Building, 700 H Street, Sacramento, CA 95814.
3. Tuesday, July 15, 2008, at the American River Room, Rancho Cordova City Hall, 2729 Prospect Park Drive, Rancho Cordova, CA 95670.
4. Wednesday, July 16, 2008, at the City Council Chambers, Elk Grove City Hall, 8400 Laguna Palms Way, Elk Grove, CA 95758.

Submit written comments to Nina Bicknese, Conservation Planning Branch, Sacramento Fish and Wildlife Office, Fish and Wildlife Service, 2800 Cottage Way, Room W-2605,

[[Page 32730]]

Sacramento, CA 95825. Comments may also be sent by facsimile to (916) 414-6713.

FOR FURTHER INFORMATION CONTACT: Nina Bicknese, Senior Fish and Wildlife Biologist, Sacramento Fish and Wildlife Office at (916) 414-6600. Additional details of the County's proposed South Sacramento Habitat Conservation Plan are available at http://frwebgate.access.gpo.gov/cgi-bin/leaving.cgi?from=leavingFR.html&log=linklog&to=http://

www.planning.saccounty.net/habitat-conservation/overview/html.

SUPPLEMENTARY INFORMATION:

Reasonable Accommodation

Persons needing reasonable accommodations in order to attend and participate in a public meeting should contact Nina Bicknese at (916) 414-6600 as soon as possible. In order to allow sufficient time to process requests, please call no later than one week before the public meeting. Information regarding this proposed action is available in alternative formats upon request.

Background

The County and their local partners anticipate that landowners and individuals will continue to request their discretionary or ministerial approval of ground-disturbing land development projects in portions of south Sacramento County where species listed as threatened or endangered under the ESA are present. The County and their local partners intend to apply for a permit from the Service for the incidental take of listed species resulting from their approval of otherwise lawful land-use changes within portions of south Sacramento County over the next 30 years. Pursuant to the ESA and federal regulations governing incidental take permits (ITPs), the County and their local partners are in the process of preparing a habitat conservation plan titled South Sacramento HCP (SSHCP). Development of the SSHCP involved a public process that has included open meetings of a stakeholder Steering Committee.

Section 9 of the ESA (16 U.S.C. 1538) and Federal regulations (50 CFR 17.21 and 17.31) prohibit the ``take'' of wildlife species listed as endangered or threatened. The term ``take'' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed species, or to attempt to engage in such conduct (16 U.S.C. 1532). ``Harm'' in the definition of ``take'' includes significant habitat modifications or degradations (50 CFR 17.3). Pursuant to section 10(a)(1)(B) of the ESA, the Service may permit authorized take of species other wise prohibited by Section 9 of the ESA if such taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity (16 U.S.C. 1539). Federal regulations governing ITPs for threatened and endangered wildlife species, respectively, are promulgated in 50 CFR 17.32 and 50 CFR 17.22 and in Section 10(a)(2) of the ESA. Pursuant to these regulations, no permit authorizing incidental take may be issued unless the applicant prepares a Habitat Conservation Plan (HCP). An HCP must include: a description of the activities sought to be authorized; the names of the species sought to

be covered by the ITP; the impacts that will likely result from the proposed taking; steps the applicant will take to minimize and mitigate such taking to the maximum extent practicable; the funding that will be available to implement such steps; biological goals and objectives; a monitoring plan; an adaptive management plan; alternatives to the proposed taking the applicant considered and reasons why such alternatives are not proposed for implementation; other measures that may be necessary or appropriate for the purposes of the HCP; and the procedures the applicant will use to deal with unforeseen circumstances over the term of the ITP.

The SSHCP Planning Area--the area in which all impacts would be evaluated and all conservation actions will be implemented--is approximately 341,000-acres within south Sacramento County. The approximate geographical boundary of the SSHCP Planning Area is the area bound by U.S. Highway 50 in the north, the county line dividing Sacramento County with San Joaquin County on the south, the county line dividing Sacramento County with Amador and El Dorado counties in the east, and Interstate 5 on the west. The SSHCP's 341,000-acre Planning Area includes a 123,000-acre Urban Development Area (UDA) where most ground-disturbing development and infrastructure projects would be approved by the County and its local partners over the next 30 years. The 123,000-acre UDA includes lands within Sacramento County's Urban Service Boundary, lands within the city limits of Rancho Cordova, Elk Grove, and Galt, and lands within Galt's adopted sphere of influence area. The County and its partners propose that approximately 43,500 acres within the 123,000-acre UDA would be developed or otherwise disturbed, while approximately 8,000 acres of the UDA would be permanently preserved or restored. The County and its partners also propose that approximately 40,500 acres of the Planning Area outside the UDA would be permanently preserved or restored, and only approximately 2,000 acres of the Planning Area outside the UDA would be developed or otherwise disturbed.

The species proposed for coverage in the SSHCP are those that occur within the SSHCP Planning Area and are currently listed as federally threatened or endangered, or that may become federally listed during the term of the proposed permit. The County intends to request an ESA section 10(a)(1)(B) permit to authorize the incidental take of 40 species (7 federally listed and 33 unlisted). The proposed SSHCP would provide for the long-term conservation and management of these 40 covered-species and their habitats within the SSHCP Planning Area. Species may be added or deleted during the course of the SSHCP development based on public comment, new information, further analysis, and agency consultation. Listed animal species proposed to be covered under the SSHCP permit are the federally-endangered vernal pool tadpole shrimp (Lepidurus packardi), the federally-threatened California tiger salamander (Ambystoma californiense), the federally-threatened giant

garter snake (Thamnophis gigas), the federally-threatened valley elderberry longhorn beetle (Desmocerus californicus dimorphus), and the federally-threatened vernal pool fairy shrimp (Branchinecta lynchi). Listed plant species proposed to be covered are the federally endangered Sacramento Orcutt grass (Orcuttia viscida) and the federally endangered slender Orcutt grass (Orcuttia tenuis).

The 33 unlisted species (27 animal and 6 plant species) proposed to be covered under the SSHCP permit are the mid-valley fairy shrimp (Branchinecta mesovallensis), Ricksecker's water scavenger beetle (Hydrochara ricksecker), western pond turtle (2 sub-species) (Actinemys marmorata marmorata and Actinemys marmorata pallida), western spadefoot toad (Scaphiopus hammondii), the white-tailed kite (Elanus leucurus), Cooper's hawk (Accipiter cooperii), the ferruginous hawk (wintering) (Buteo regalis), golden eagle (Aquila chrysaetos), the state-threatened Swainson's hawk (Buteo swainsoni), bald eagle (Haliaeetus leucocephalus), loggerhead shrike (Lanius ludovicianus), northern harrier (nesting) (Circus cyaneus), sharp-shinned hawk (Accipiter striatus), the state-endangered American peregrine falcon (wintering) (Falco peregrinus anatum), tricolored blackbird (nesting) (Agelaius tricolor),

[[Page 32731]]

western burrowing owl (Athene cunicularia hypugaea), long-eared owl (Asio otus), merlin (Falco columbarius), short-eared owl (Asio flammeus), white-faced ibis (Plegadis chihi), yellow breasted chat (Icteria virens) the state-threatened greater sandhill crane (Grus canadensis tabida), American badger (Taxidae taxus), pallid bat (Antrozous pallidus), ringtail (Bassariscus astutas), western red bat (Lasirus blossevilli),Yuma myotis bat (Myotis yumanensis), Ahart's dwarf rush (Juncus leiospermus var. ahartii), dwarf downingia (Downingia pusilla), legenere (Legenere limosa), pincushion navarretia (Navarretia myersii), Sanford's arrowhead (Sagittaria sanfordii) and the state-endangered Bogg's Lake hedge-hyssop (Gratiola heterosepala). Should any of these unlisted covered-species become listed under the ESA during the term of the permit, take authorization for those species would become effective upon listing. The County proposes to include 8 plant species (2 listed and 6 unlisted) in the SSHCP. The ESA does not prohibit the incidental take of federally listed plants on private lands unless the take is a violation of state law or regulation. We propose to include these plant species on the ITP in recognition of the conservation benefits that would be provided for these plant species under the SSHCP and to meet regulatory obligations under Section 7 of the ESA and the California Endangered Species Act (CESA). All wildlife and plant species included on the proposed ITP would receive assurances under the Service's ``No Surprises'' regulations found in 50 CFR

17.22(b)(5) and 17.32(b)(5).

The activities proposed for coverage in the SSHCP are wide-ranging, but are generally related to urban-suburban development on city and unincorporated lands. Proposed covered-activities presently include the construction, installation, extension, or removal of: (1) Private and commercial developments, (2) transportation facilities, (3) surface water and groundwater supply and delivery facilities, (4) water treatment facilities, (5) flood control facilities, (6) sanitation facilities (landfills, transfer stations, recycling stations), (7) public facilities (fire stations, police stations, hospitals, schools, community centers, cemeteries, and administration centers), (8) outdoor and indoor recreation facilities, (9) utility facilities, (10) aggregate mining activities, and (11) conservation activities (habitat restoration, creation, and enhancement; preserve management and monitoring). These covered activities are expected to impact 18 existing habitat and agricultural land-cover types within the 341,000-acre Planning Area. Approximately 43,500 acres of the existing natural habitat and agricultural land-cover in the Planning Area would be converted to a developed condition under the proposed SSHCP.

The proposed SSHCP Conservation Strategy would provide a regional approach for the conservation of the 40 covered-species and their 18 habitat types so as to aid recovery of the species and to minimize and mitigate impacts of the covered activities on the species and their habitats within the Planning Area. The 18 species habitat types include vernal pools and associated uplands, valley grasslands, other wetlands, woodlands, riparian habitats, and several agricultural land-cover types. The proposed SSHCP Conservation Strategy would protect a total of approximately 47,000 acres and restore or create a total of approximately 1,500 acres within the 341,000-acre Planning Area. The SSHCP Planning Area would be divided into a system of 12 conservation zones with an explicit amount of species habitat preservation directed to specific zones. The County and its partners anticipate that large landscape preserves and linkage corridors would be established outside of the UDA, and that these habitat preserves would be established within a matrix of open space and agricultural land uses. The proposed Conservation Strategy also includes approximately 8,000 acres of habitat preserves within the UDA, but these UDA habitat preserves would be much smaller and would eventually be surrounded by urban or suburban development. Components of the proposed SSHCP conservation program are now under consideration by the Service and the County. These components may include monitoring, adaptive management, species avoidance measures, and species mitigation measures including the preservation, restoration, and enhancement of suitable habitat. It is anticipated the SSHCP would be implemented through a section 10(a)(1)(B) incidental take permit and an Implementation Agreement.

Environmental Impact Statement/Report

The proposed EIS/EIR will consider (1) The proposed action (i.e. the Service issues an ITP for the SSHCP proposed by the County and its partners), (2) a no-action alternative (i.e. the Service does not issue an ITP and a SSHCP is not implemented) and, (3) reasonable alternatives to the proposed action (i.e. the Service considers alternative versions of the SSHCP, and then permits alternative). We anticipate that several alternatives will be developed for analysis in the EIS/EIR. These alternatives might vary by the number of covered species; the covered activities, different strategies for avoiding, minimizing, and mitigating the impacts of incidental take; the amount of land preserved or restored, the type of future conservation efforts; or a combination of these factors. A detailed description of all reasonable alternatives, including the proposed action, will be included in the EIS/EIR.

The EIS/EIR will analyze in depth all significant environmental issues identified through this scoping process. These issues may include biological resources, agricultural resources, land use, housing, hydrology and water resources, cultural resources, aesthetics, transportation and circulation, mineral resources, recreation, air quality, noise and vibration, or other components of the human environment that could be directly, indirectly, or cumulatively impacted by the proposed action or by the alternatives.

We anticipate that a draft EIS/EIR and the draft SSHCP will be available in late 2009 and will have a 60-day public review period. The environmental review of the EIS/EIR will be conducted in accordance with the requirements of NEPA (42 U.S.C. 4321 et seq.), its implementing regulations (40 CFR 1500-1508), other applicable regulations, and Service policy and guidance on compliance with those regulations. We expect to complete the final EIS/EIR in the middle of 2010 and to make the decision on issuing a section 10(a)(1)(B) permit for a SSHCP in late 2010.

The U.S. Army Corps of Engineers (Corps) will be a NEPA Cooperating Agency on the proposed EIS/EIR pursuant to 40 CFR 1501.6, 1506.3(c), and 1508.5. The County and their partners expect to apply to the Corps for a Programmatic General Permit (PGP) under Section 404 of the Clean Water Act (CWA). Section 404 of the CWA regulates and requires Corps authorizations for discharges of dredged or fill material into waters of the United States. A PGP is among the types of general permits which can be issued for any category of activities involving discharges of dredged or fill material if the Corps makes certain determinations (33 U.S.C. 1344(e)). Corps regulations promulgated under the CWA define dredged or fill material in detail at 33 CFR 323.2 and regulations concerning processing of Corps permits are at 33 CFR part 325. The Corps may use the

[[Page 32732]]

EIS/EIR to inform their discretionary decision to issue to a PGP for certain components of the proposed SSHCP.

The California Department of Fish and Game (CDFG) will be a NEPA Cooperating Agency on the proposed EIS/EIR pursuant to 40 CFR 1501.6 and 1508.5. The County and their partners expect to apply to CDFG for an incidental take permit under Section 2081 of the California Fish and Game code and to apply for a Lake or Streambed Alteration Agreement under Section 1600 of the California Fish and Game code. CDFG intends to use the EIS/EIR in conducting its review of the SSHCP as a CEQA Trustee Agency. CDFG will also use the EIS/EIR in makings its CEQA findings in their decision to issue an incidental take permit under Section 2081 of the California Fish and Game Code. As a CEQA Responsible Agency, CDFG may also use the EIS/EIR during their consideration to approve a Lake or Streambed Alteration Agreement under Section 1600 of the California Fish and Game Code. The SSHCP will incorporate best management practices that have been developed in cooperation with, and approved by, CDFG.

This notice of intent is being furnished in accordance with 40 CFR Sections 1501.2, 1501.7, 1506.6, and 1508.22 to obtain suggestions, comments, and useful information from other agencies and the public on the scope of the proposed EIS/EIR, including the significant environmental issues deserving of study, the range of actions, the range of alternatives, and the range of impacts to be considered. Written comments from interested parties are invited to ensure that all issues related to the proposed section 10(a)(1)(B) incidental-take permit application are identified. Comments will only be accepted in written form. You may submit written comments by mail, facsimile transmission, or in person (see ADDRESSES). All comments received will become part of the official administrative record. Our practice is to make comment letters (including names, home addresses, home phone numbers and email addresses of respondents) available for public review. You may request that we withhold personal information, if so, please state this prominently at the beginning of your comments. However, we cannot guarantee that we will be able to do so.

Dated: June 4, 2008.

John Engbring,

Deputy Regional Director, California and Nevada Region, Sacramento, California.

[FR Doc. E8-12963 Filed 6-9-08; 8:45 am]

BILLING CODE 4310-55-P

COUNTY OF SACRAMENTO
CALIFORNIA

Municipal Services Agency
Paul J. Hahn
Administrator

DEPARTMENT OF
ENVIRONMENTAL REVIEW AND ASSESSMENT

JOYCE HORIZUMI
Director,
Environmental Coordinator

NOTICE OF PREPARATION

JUNE 11, 2008

TO: ALL INTERESTED PARTIES

SUBJECT: NOTICE OF PREPARATION OF A JOINT DRAFT ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL IMPACT STATEMENT FOR SOUTH SACRAMENTO HABITAT CONSERVATION PLAN (CONTROL NUMBER 03-PLE-0637)

Sacramento County will be the California Environmental Quality Act (CEQA) lead local agency and the US Fish and Wildlife Service will be the National Environmental Policy Act (NEPA) lead federal agency for preparation of a joint Environmental Impact Statement/Environmental Impact Report/ (EIS/R) for a project known as the SOUTH SACRAMENTO HABITAT CONSERVATION PLAN. This Notice of Preparation (NOP) has been sent to responsible and trustee agencies, involved federal agencies, and interested persons pursuant to Section 15082 of the CEQA Guidelines and section 1506.2 and 1506.6 of the NEPA regulations. A similar NEPA Notice of Intent (NOI) was published in the Federal Register on June 10, 2008 (73 FR 32729). Agencies should comment on the scope and content of the environmental information that is germane to the agencies' statutory responsibilities in connection with the proposed project. Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 50 days after receipt of this notice. The County and USFWS will hold four public scoping meetings on the proposed SSHCP to solicit information from the public on the proposed plan, alternatives, and the scope of issues and impacts to be addressed in the Environmental Impact Statement/Environmental Impact Report. Scoping meeting dates, time and location follow.

1. **Galt, Tuesday, July 8, 6:30 to 8:30 pm,** Galt Police Department, Anthony Pescetti Community Room, 455 Industrial Dr., Galt, CA. 95632.

2. **County of Sacramento, Friday, July 11, 10:00 am to 12:00 pm**, Sacramento County Administration Building, Sixth Floor Training Room, 700 H Street, Sacramento, CA. 95814

3. **Rancho Cordova, Tuesday, July 15, 6:30 to 8:30 pm**, Rancho Cordova City Hall, American River Room, 2729 Prospect Park Dr., Rancho Cordova, CA. 95670

4. **Elk Grove, Wednesday, July 16, 6:30 to 8:30 pm**, Elk Grove City Council Chambers, 8400 Laguna Palms Way, Elk Grove, CA. 95758

Dates and location of the public meetings will, among other methods, also be advertised on the following website: http://www.DERA.SacCounty.net .

The SSHCP proposed location, project description, and the probable environmental effects are contained in the attached materials. This NOP may also be viewed online at: http://www.DERA.SacCounty.net. Please send your Agency's response to this Notice to:

Ms. Joyce Horizumi, Environmental Coordinator
Department of Environmental Review and Assessment
827 7th Street, Room 220, Sacramento, CA 95814
or via e-mail at: DERA@saccounty.net.

Your response should reference the DERA Control Number (03-PLE-0637) and include the name of a contact person in your agency.

Persons and agencies with specific questions about the project should contact Mr. Peter Morse, Department of Environmental Review and Assessment (DERA), Project Manager, at (916) 874-7914 for further information. Additional details of the County's proposed draft SSHCP are available at http://www.planning.saccounty.net/habitat-conservation/overview.html.

PROJECT TITLE
SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

CONTROL NUMBER
03-PLE-0637

PROJECT PROPONENT
County of Sacramento

PROJECT PERMITTEES (PARTNERS)
County of Sacramento
City of Elk Grove
City of Rancho Cordova
City of Galt
Sacramento Regional County Sanitation District (includes County Sanitation District-1)
Sacramento County Water Agency

INTENT
Pursuant to the California Environmental Quality Act (CEQA) the County of Sacramento is circulating this Notice of Preparation (NOP) to inform the public that the County intends to gather information to prepare, in coordination with US Fish and Wildlife Service (USFWS), a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) on the proposed South Sacramento Habitat Conservation Plan (SSHCP). The joint EIS/EIR will analyze the environmental effects of the USFWS's proposed issuance of an incidental take permit under Section 10(a)(1)(B) of the federal Endangered Species Act of 1973, as amended (FESA), the California Department of Fish and Game's proposed issuance of an incidental take permit under Section 2081(b)(2) of the state Endangered Species Act, as amended (CESA), and local approval and implementation of the habitat conservation plan associated with the proposed incidental take permit. The County of Sacramento is facilitating preparation of the joint environmental document with project permittees and is the lead agency under the California Environmental Quality Act (CEQA). The SSHCP will cover 40 species, 10 of which are either state or federally listed. The County and its partners intend to apply for permits from the USFWS and the CDFG for the incidental take of covered species resulting from otherwise lawful activities. Anticipated permit life is 30 years. Pursuant to the Federal Endangered Species Act (FESA), the County and its partners must prepare a regional habitat conservation plan (HCP) as part of their application for the Federal incidental take[1] permit. In addition, the County and its partners expect to apply to the US Army Corps of Engineers (Corps) for a Programmatic General Permit under Section 404 of the Clean Water Act. Such a permit would be issued to allow the discharge of dredge or fill materials into waters within the regulatory jurisdiction of the Corps.

[1] The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed species, or to attempt to engage in such conduct, and includes take resulting from significant habitat modifications or degradations.

PROJECT SUMMARY

The proposed SSHCP is a regional approach to conserving species and addressing issues related to urban development, habitat conservation, open space protection, and agricultural protection. The SSHCP would minimize regulatory hurdles and streamline the permitting process for projects that engage in development related activities inside the urban development area or UDA. The SSHCP would consolidate environmental efforts to protect and enhance vernal pool habitat and other aquatic and upland habitats to provide ecologically viable conservation areas in south Sacramento County for numerous species. Adoption of the SSHCP would authorize the County and its partners to issue permits that allow landowners to engage in specific development activities (covered activities) that could result in the incidental take of listed species. The County and its partners would adopt a developer-paid fee based on loss of habitat acreage, habitat type and long-term management costs. Fees would fund the habitat preservation, restoration and management elements of the proposed SSHCP.

PROJECT LOCATION

The geographic location of the proposed SSHCP includes a combined 341,000 acres within south Sacramento County (unincorporated area) and the cities of Rancho Cordova, Elk Grove, and Galt. The geographic boundaries of the SSHCP planning area are Highway 50 to the north, the County line to the east and south, and Interstate 5 to the west. The plan area excludes the City of Sacramento, the City of Folsom, Folsom's Sphere of Influence, the Sacramento-San Joaquin Delta, and the Sacramento County community of Rancho Murieta (Plate NOP-1 SSHCP Planning Area).

PROPOSED SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

The proposed conservation strategy for the SSHCP provides for the conservation of covered species and their associated habitat types so as to aid recovery of the species, fully mitigate for the impacts of covered activities on the species and their habitats, and provide a regional approach to the avoidance, minimization and mitigation of impacts on the Waters of the United States. It is based on the concepts of conservation biology and landscape ecology, the ecological needs of the covered species and the nature, quality and geographical distribution of the different habitat types.

The permits issued for implementing the SSHCP would minimize and mitigate incidental take and provide for the conservation of 40 covered species that may occur in the plan area. The plan identifies 18 different habitat types including vernal pool aquatic and upland habitat, other wetland habitats, oak woodland, and rural agricultural crops. Bisecting the plan area is Cosumnes and Deer Creek corridor which contains agricultural lands and extensive riparian habitat (Plate NOP-2 SSHCP Habitat Types).

The proposed SSHCP conservation strategy includes the following elements:

- Protect approximately 8,000 acres of habitat inside the UDA.
- Protect approximately 39,000 acres outside the UDA.
- Restore approximately 1,500 acres of habitat in the plan area.

Plate NOP-1 SSHCP Planning Area

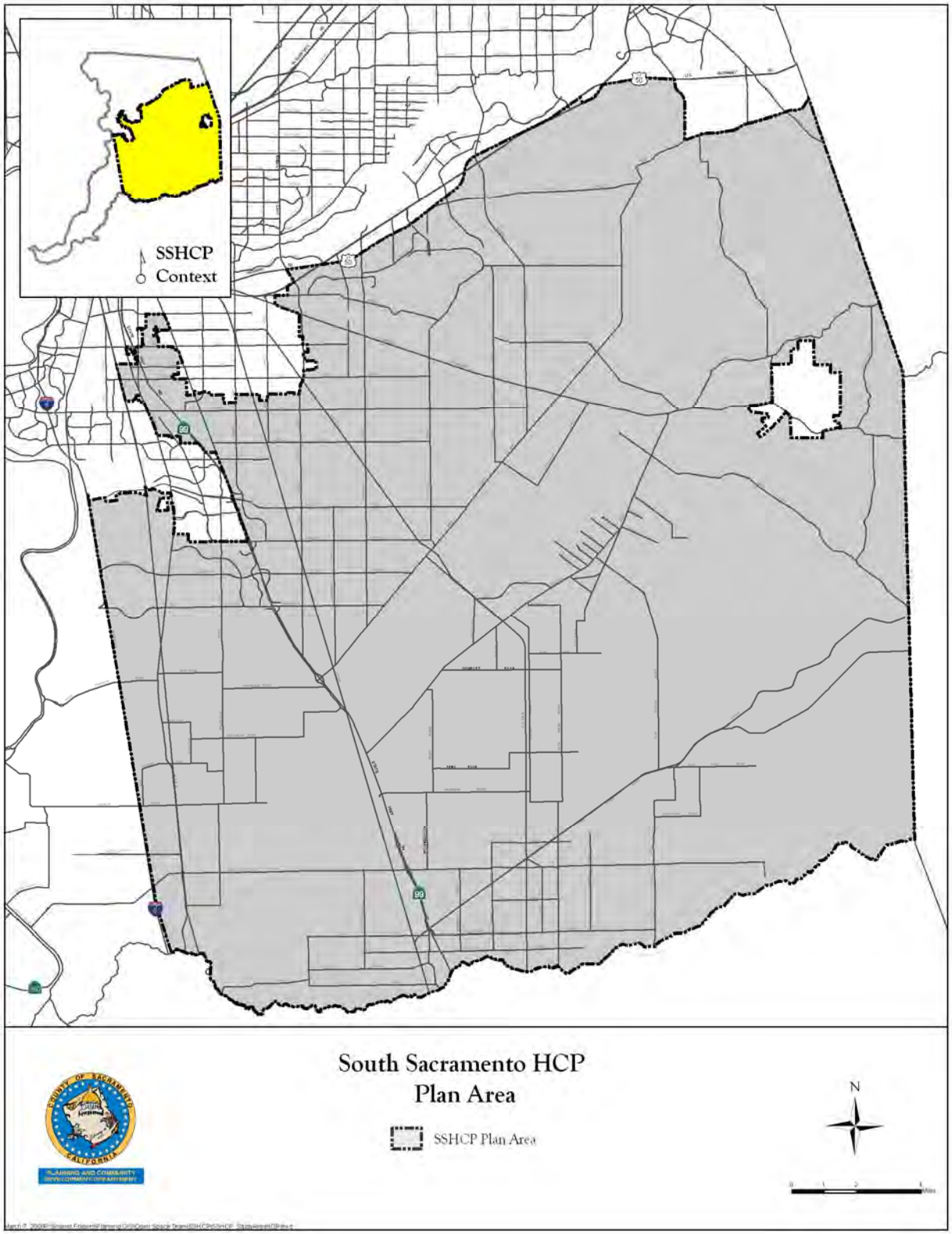
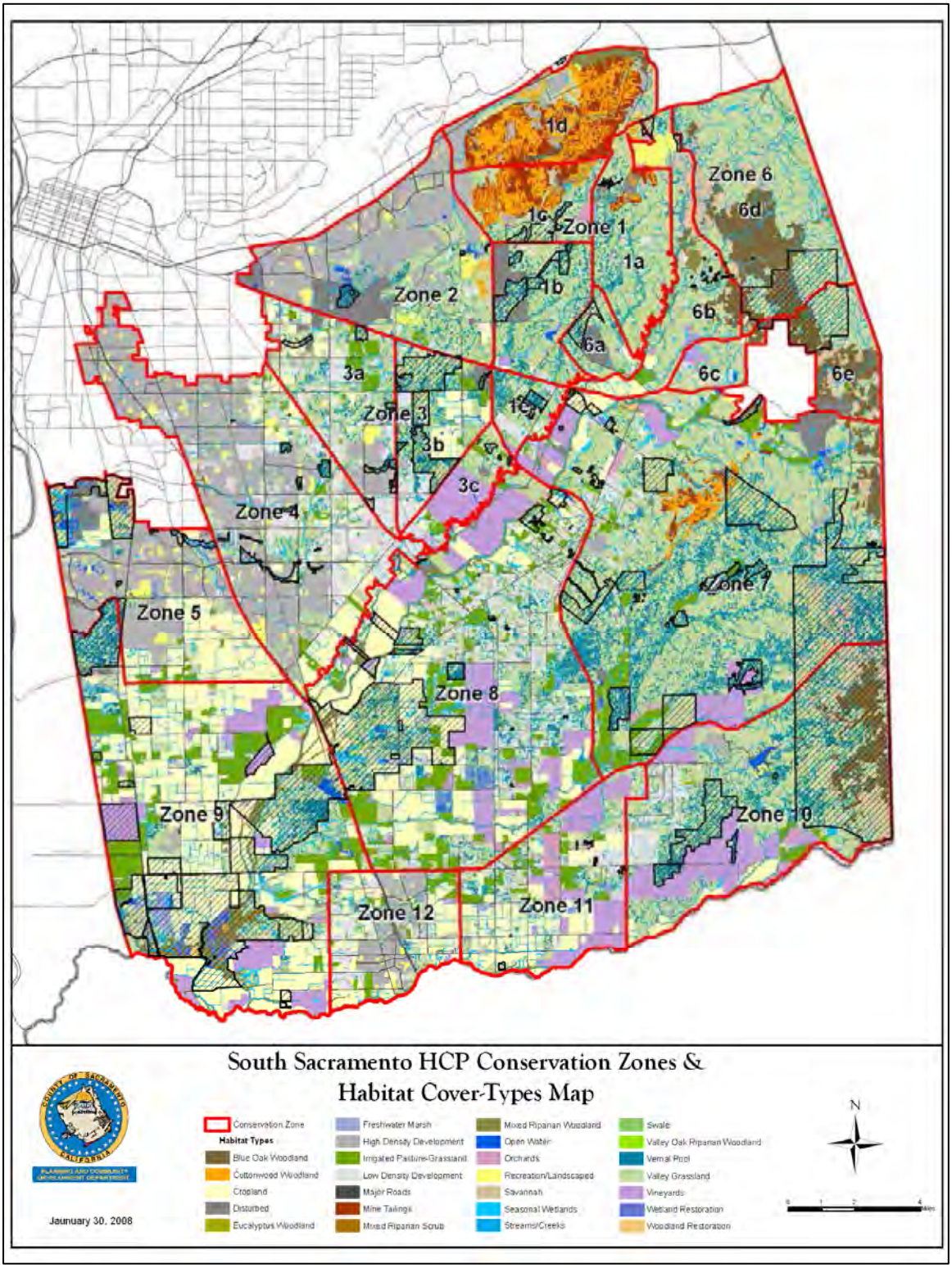


Plate NOP-2 SSHCP Habitat Types[2]



[2] The plan area is divided into 12 zones to assist in implementing and managing habitat conservation.

The plan anticipates larger habitat preserves and linked habitat corridors outside the UDA. Habitat preserves inside the UDA would be smaller, also linked by corridors, and would eventually be a component of the urban/suburban landscape. Specific location of preserves would occur over time during plan implementation. Habitat preserves purchased or conservation easements acquired would be selected based on a number of important biological criteria, including:

- Protect habitat areas that are considered core elements of the SSHCP.
- Add parcels onto existing preserves to increase their size and reduce habitat fragmentation and edge effect.
- Provide connections to existing preserves and/or preserve areas that are currently isolated from each other.

Covered Species

There are 40 wildlife and plant species proposed for coverage under the Plan including 10 state or federally listed species. Table NOP-1 Covered Species lists those species and their current status. Species may be added or deleted from this list as Plan development continues.

Covered Activities

Activities considered under this Plan are wide ranging and may result in incidental take but are primarily related to urban-suburban development. Proposed covered-activities may include the construction, installation, or extension of:

- Private and commercial developments
- Transportation facilities
- Surface and groundwater delivery facilities
- Water treatment facilities
- Solid waste sanitation facilities
- Public facilities (fire station, police stations, hospitals, schools, community centers, cemeteries, and administration centers)
- Indoor and outdoor recreation facilities
- Energy utility facilities
- Aggregate mining activities
- Habitat management activities

Covered activities will continue to be refined as the Plan is developed further.

Incidental Take

Almost all incidental take of SSHCP covered-species is expected to occur inside an area referred to as the urban development area or UDA. The UDA corresponds to land within the County's urban services boundary (USB), and to land within the city limits of Rancho Cordova, Elk Grove and Galt, and Galt's adopted sphere of influence. A limited amount of infrastructure development, such as planned road widening projects and water conveyance pipelines would occur in the SSHCP planning area outside the UDA.

Table NOP-1 Covered Species[3]

Mammals	**Invertebrates**
American Badger, *Taxidae taxus*	Mid-Valley Fairy Shrimp, *Branchinecta mesovallensis*
Pallid Bat, *Antrozous pallidus*	Ricksecker's Water Scavenger Beetle, *Hydrochara ricksecker*i
Ringtail, *Bassariscus astutas*	Valley Elderberry Longhorn Beetle, *Desmocerus californicus dimorphus*, (FT)
Western Red Bat, *Lasirus blossevillii*	Vernal Pool Fairy Shrimp, *Branchinecta lynch*i, (FT)
Yuma Myotis Bat, *Myotis yumanensis*	Vernal Pool Tadpole Shrimp, *Lepidurus packardi,* (FE)
Birds	**Plants**
American Peregrine Falcon, *Falco peregrinus anatum*	Ahart's Dwarf Rush, *Juncus leiospermus var. ahartii*
Bald Eagle, *Haliaeetus leucocephalus*	Boggs Lake Hedge-Hyssop, *Gratiola heterosepala* (SE)
White-Tailed Kite, *Elanus leucurus*	Dwarf Downingia, *Downingia pusilla*
Cooper's Hawk, *Accipiter cooperii*	Legenere, *Legenere limosa*
Ferruginous Hawk, *Buteo regalis*	Pincushion Navarretia, *Navarretia myertsii*
Golden Eagle, *Aquila chrysaetos*	Sacramento Orcutt Grass, *Orcuttia viscida*, (SE, FE)
Greater Sandhill Crane, *Grus Canadensis tabida* (ST)	Slender Orcutt Grass, *Orcuttia tenuis,* (SE, FE)
Loggerhead Shrike, *Lanius ludovicianus*	Sanford's Arrowhead, Sagittaria sanfortii
Long-Eared Owl, *Asio otus*	
Merlin, *Falco columbarius*	**Amphibians**
Northern Harrier, *Circus cyaneus*	California Tiger Salamander, *Ambystoma californiense* (central valley, DPS*)*, (FT)
Sharp-Shinned Hawk, *Accipiter striatus*	Western Spadefoot Toad, *Scaphiopus hammondii*
Short-Eared Owl, *Asio flammeus*	
Swainson's Hawk, *Buteo swainsoni* (ST)	**Reptiles**
Tricolored Blackbird, *Agelaius tricolor*	Giant Garter Snake, *Thamnophis gigas* (FT)

[3] : F - federal, S – State, E – endangered, T – threatened

Western Burrowing Owl, *Athene cunicularia hypugaea*	Pond Turtle, *Actinemys marmorata marmorata* and *A. m. pallida* (2 sub-species: Western and Northeastern)
White-Faced Ibis, *Plegadis chihi*	
Yellow Breasted Chat, *Icteria virens*	

Current assumptions of take include:

- Take will occur on approximately 43,500 acres within the UDA on land already identified for urbanization.
- Take will occur on approximately 2,000 acres outside the UDA for public roadway or utility projects already identified in master plans or other projections.

Permits

Six permits may be required to implement the proposed SSHCP or any alternative:

- Federal Endangered Species Act (FESA), Section 10(a)(1)(B) permit (incidental take) issued by the US Fish and Wildlife Service
- California Endangered Species Act (CESA), Section 2081 permit (incidental take) issued by the Department of Fish and Game
- Clean Water Act, Section 404 permit (wetland fill) issued by the US Army Corps of Engineers (USACE)[4]
- Clean Water Act, Section 401 compliance (water quality) administered by the Regional Water Quality Control Board
- Fish and Game Code, Section 1600 agreement (stream bed alteration) issued by Department of Fish and Game

POSSIBLE ENVIRONMENTAL EFFECTS OF THE PROPOSED SSHCP

Land Use

Assess how habitat preserves inside the UDA may affect development densities and land use patterns within UDA to accommodate anticipated future population growth. Assess how preserves or easements may also affect existing agricultural use.

Public Facilities

Assess how habitat preserves may affect placement of future public service extensions inside the UDA, such as water, sewer and power lines. Agencies involved in providing public services include Sacramento County Water Agency (SCWA), County Sanitation District-1 (CSD-1), Sacramento Municipal Utility District (SMUD), and Pacific Gas and Electric (PG&E).

Transportation/Circulation

Assess how habitat preserves may affect the placement of future roadways and/or redirect traffic to nearby roadways, potentially increasing congestion.

[4] It is unclear whether or not the USACE can issue a Clean Water Act permit for SSHCP.

Emergency services
Assess how the presence of grassland habitat preserves adjacent to urban development may increase exposure to fire risks or other natural hazards.

Hydrology/Flooding
Assess how habitat protection and enhancement along local stream channels may increase existing habitat values and potentially affect existing floodway capacities and floodwater velocities.

Biological Resources
Assess the effectiveness of habitat conservation as prescribed by the SSHCP for providing long-term habitat protection and population enhancements for 40 covered species inside the plan area. Assess proposed interface between habitat and non-habitat land uses. Consider effectiveness of elements of habitat conservation preserves including preserve size, shape, location, water availability, connectivity, critical habitat designation, vegetation cover, enhancement potential, and other elements.

Water Quality
Assess how proposed habitat enhancement, restoration, and creation of habitat may affect existing stormwater runoff, especially during restoration/creation of wetland habitat. Analysis will consider consistency with various water quality permits, including the National Pollution Discharge Elimination System, and state and local policies and regulations.

Recreational Access
Assess impacts on existing recreation opportunities in the Plan Area. Assess the potential for illicit passive recreation activities on proposed habitat preserves.

Noise
Assess impacts of construction noise associated with proposed habitat enhancement and restoration.

Air Quality
Assess impacts of construction dust and exhaust associated with proposed habitat enhancement and restoration.

Mineral Resource
Assess impacts on existing aggregate resources.

Climate Change
Assess impacts of green house gas emissions in relation to proposed habitat protection, enhancement and restoration.

Cultural/Historical Resources
Assess impacts to cultural resources, especially given general proximity of historical human habitation to water courses.

Agriculture
Assess impacts to agricultural productivity in relation to the conservation or conversion of agricultural lands for wildlife habitat uses. Assess any effect of wildlife habitat lands on adjacent agricultural uses.

Other Studies
Other sections, such as aesthetics, health and human hazards, and vector control may be added.

INTENDED USES OF THE EIR
The County of Sacramento as Lead CEQA Agency, must consider the information provided in the joint EIS/EIR prior to its approval or denial of the proposed SSHCP. The EIS/EIR will also provide environmental information for other agencies that may have permitting authority or an interest in various aspects of the project. Responsible agencies may include, but are not limited to:

- City of Rancho Cordova
- City of Elk Grove
- City of Galt
- Sacramento Regional County Sanitation District, including County Sanitation District-1
- Sacramento County Water Agency
- US Army Corps of Engineers
- US Fish and Wildlife Service
- US Environmental Protection Agency
- California Department of Fish and Game
- California Department of Water Resources
- California Regional Water Quality Control Board
- State Historic Preservation Office

Appendix B

Meeting Announcements

Fliers for Scoping Meetings
Scoping Meetings Postcard
Scoping Meetings Postcard Mailing List
Email Announcement
Online Newspaper Story About Scoping Meeting
Newspaper Advertisement for Scoping Meetings

South Sacramento Habitat Conservation Plan

Help Scope the Environmental Review Process!

What is the SSHCP?

The proposed SSHCP is a regional plan to address issues related to species conservation, agricultural protection, and urban development. The proposed SSHCP will consolidate environmental efforts to protect and enhance wetland and upland habitats to provide ecologically functional conservation areas while also streamlining the permitting process and minimizing regulatory hurdles for future development projects.

For more information about the proposed SSHCP visit the SSHCP website at: www.planning.saccounty.net/habitat-conservation/overview.html or contact Vince King at kingv@saccounty.net or (916)874-3257

The proposed South Sacramento Habitat Conservation Plan (SSHCP) is beginning environmental review. Please join us at one of the four meetings in July to discuss the proposal, alternatives, and scope of issues and impacts to be addressed in the environmental review process:

Galt
Tuesday, July 8 - 6:30 to 8:30 pm
Galt Police Department,
Anthony Pescetti Community Room
455 Industrial Drive
Galt, CA 95632

County of Sacramento
Friday, July 11 - 10:00 am to 12:00 pm
Sacramento County Admin. Building, Sixth Floor Training Room
700 H Street, Sacramento, CA 95814

Rancho Cordova
Tuesday, July 15 - 6:30 to 8:30 pm
Rancho Cordova City Hall,
American River Room
2729 Prospect Park Drive
Rancho Cordova, CA 95670

Elk Grove
Wednesday, July 16 - 6:30 to 8:30 pm
Elk Grove City Council Chambers
8400 Laguna Palms Way
Elk Grove, CA 95758

Following these scoping meetings, the County will host a community workshop in August to help identify alternatives to analyze during the environmental review process. Stay tuned for details!

For more information on the environmental review process, please contact Peter Morse at (916)874-6929, morsep@saccounty.net or visit the DERA web site at: www.dera.saccounty.net and goto the South Sacramento Habitat link

South Sacramento Habitat Conservation Plan

Help Design the South Sac HCP Conservation Alternatives!

What is the SSHCP?

The proposed SSHCP is a regional plan to address issues related to species conservation, agricultural protection, and urban development. The proposed SSHCP will consolidate environmental efforts to protect and enhance wetland and upland habitats to provide ecologically functional conservation areas while also streamlining the permitting process and minimizing regulatory hurdles for future development projects.

The proposed South Sacramento Habitat Conservation Plan (SSHCP) is undergoing environmental review. A significant step in the environmental review process is identifying and analyzing conservation alternatives in the Environmental Impact Statement. The SSHCP must balance the need to conserve sensitive habitat with urban growth. This workshop is designed to allow you to map particular locations within the SSHCP's Urban Development Area (UDA) that you feel are important to sensitive species and habitats in the region. Your maps will be used to help inform the conservation alternatives analyzed during environmental review.

What will you do at the workshop?

* Learn about the proposed plan
* Join a workgroup to map conservation alternatives
* Enjoy food and beverages courtesy of Sacramento County

When and Where?

Tuesday, August 19th
6:00 - 9:00 PM
Florin Service Center
7000 65th Street
Sacramento, CA 95823

For more information about the proposed SSHCP visit the SSHCP website at: www.planning.saccounty.net/habitat-conservation/overview.html or contact Vince King at kingv@saccounty.net or (916)874-3257

For more information on the environmental review process, please contact Tim Hawkins at (916)874-7914, hawkinst@saccounty.net or visit the DERA web site at: www.dera.saccounty.net and goto the South Sacramento Habitat link

The proposed South Sacramento Habitat Conservation Plan (SSHCP) is beginning environmental review. Please join us at one of the following scoping meetings to help us scope issues and impacts you would like analyzed in the environmental document. **Click here** for the EIR/EIS scoping meetings flyer, which provides the following information as well as additional information and links for the proposed SSHCP. A direct link to the Federal Register notice is: **http://edocket.access.gpo.gov/2008/pdf/E8-12963.pdf**

1. **Galt, Tuesday, July 8, 6:30 to 8:30 pm**, Galt Police Department, Anthony Pescetti Community Room, 455 Industrial Dr., Galt, CA. 95632.
2. **County of Sacramento, Friday, July 11, 10:00 am to 12:00 pm**, Sacramento County Administration Building, Sixth Floor Training Room, 700 H Street, Sacramento, CA. 95814
3. **Rancho Cordova, Tuesday, July 15, 6:30 to 8:30 pm**, Rancho Cordova City Hall, American River Room, 2729 Prospect Park Dr., Rancho Cordova, CA. 95670
4. **Elk Grove, Wednesday, July 16, 6:30 to 8:30 pm**, Elk Grove City Council Chambers, 8400 Laguna Palms Way, Elk Grove, CA. 95758

If you are unable to attend one of the scoping meetings, you may provide written comments germane to drafting the environmental document by July 30, 2008. Please submit written comments to:

Peter Morse
County of Sacramento, DERA
827 7th St, Room 220
Sacramento, CA 95814
Email - morsep@saccounty.net
Phone - 916-874-6929

U.S. Fish and Wildlife Service
Sacramento Fish & Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

ADDRESS SERVICE REQUESTED

SSHCP Scoping Meeting Postcard (back and front)

Govt Pubs Section
CA State Library
914 Capitol Mall
Sacramento CA 95814

Dr. Steve Schwarzbach Director, W Ecological Research Ctr
USGS
CSUS-6000 J St, Placer Hall
Sacramento CA 95819-6129

Curt Campion Asst City Manager
Galt Planning Dept
495 Industrial Dr
Galt CA 95632

Robert Grunwald Planning Consultant
Isleton Planning, Grunwald & Associates
350 Rivergate Way
Sacramento CA 95831

Supervisor
UC Coop Extension - Sacto County
4145 Branch Center Rd
Sacramento CA 95827

Jude Lamore
Friends of the Swainson's Hawk
915 L St, Ste C-425
Sacramento CA 95814

Director
Ducks Unlimited
3074 Gold Canal Dr
Rancho Cordova CA 95670-6116

Rhonda Morningstar Pope Spokesperson
Buena Vista Rancheria
PO Box 162283
Sacramento CA 95816

Joseph Sheley Exec VP
CSUS, Sacto President's Office
6000 J St
Sacramento CA 95819

Mayor
City of Rancho Cordova
2729 Prospect Park Drive
Rancho Cordova CA 95670

Aimee Rutledge Exec Dir
SVOSC
3507 13th St
Sacramento CA 95818

David Wright
1573 49th St
Sacramento CA 95819

Eric Hansen
5065 Tuckerman Way
Sacramento CA 95835

Douglas Bell
CSUS - Dept of Biological Sciences
CA State University
Sacramento CA 95819-6077

Sean Barry
Entrix, Inc
701 University Avenue, Ste 200
Sacramento CA 95825-6757

Kari Dohn
Rosie & Kindel, PA Specialists
915 L St, Ste 1210
Sacramento CA 95814

Carol Witham President
CA Native Plant Society
1141 37th St
Sacramento CA 95816-5415

William Miller President
Villages of Laguna San Luis
2251 Ralston Rd
Sacramento CA 95821

Katz & Associates
1801 I Street, Ste 100
Sacramento CA 95811-3000

Al Wright Executive Director
Wildlife Conservation Board
1807 13th St #103
Sacramento CA 95814-7137

Rex Albright Exec Dir
Rancho Cordova Chamber of Commerce
3328 Mather Field Rd
Rancho Cordova CA 95670

From: SSHCP (MSA) <sshcp@saccounty.net>
Date: Thu, Aug 7, 2008 at 10:05 AM
Subject: South Sacramento Habitat Conservation Plan EIS Scoping Workshop
To:

HELP DESIGN THE SOUTH SAC HCP CONSERVATION ALTERNATIVES!

The proposed South Sacramento Habitat Conservation Plan (SSHCP) is undergoing environmental review. A significant step in the environmental review process is identifying and analyzing conservation alternatives in the Environmental Impact Statement (EIS). The SSHCP must balance the need to conserve sensitive habitat with urban growth. The workshop is designed to allow you to map particular locations within the SSHCP's Urban Development Area (UDA) that you feel are important to sensitive species and habitats in the region. Your maps will be used to help inform the conservation alternatives analyzed during environmental review.

WHAT WILL YOU DO AT THE WORKSHOP?

- Learn about the proposed plan.
- Join a workgroup to map conservation alternatives.
- Enjoy food and beverages courtesy of Sacramento County.

WHEN AND WHERE?

Tuesday, August 19th, 6:00 – 9:00 PM

Florin Service Center
7000 65th Street
Sacramento, CA 95823

Please send RSVP by email or calling Vince King at (916) 874-3257. We look forward to seeing you at the workshop!
To see a flyer on this workshop or to get more information about the SSHCP, please click here.

COUNTY OF SACRAMENTO EMAIL DISCLAIMER:
This email and any attachments thereto may contain private, confidential, and

privileged material for the sole use of the intended recipient. Any review, copying, or distribution of this email (or any attachments thereto) by other than the County of Sacramento or the intended recipient is strictly prohibited.

If you are not the intended recipient, please contact the sender immediately and permanently delete the original and any copies of this email and any attachments thereto.

Residents can chime in on habitat conservation plan

By Loretta Kalb - lkalb@sacbee.com

Published 3:14 pm PDT Wednesday, August 13, 2008

Urban growth and habitat conservation in the south county will be the topic of a workshop at 6 p.m. Tuesday. Residents can lend their voice to the issue during a discussion of the proposed South Sacramento Habitat Conservation Plan, which is undergoing environmental review.

Participants in the three-hour session will be able to map locations within the plan's urban development area they deem important to sensitive species and habitats. The maps will be used to analyze conservation alternatives during the environmental review.

The workshop will be held at 7000 65th Street.

For information or to reserve a seat, call Vince King at (916) 874-3257. Or e-mail King at kingv@saccounty.net.

For more information on the plan, go to www.planning.saccounty.net and search for "habitat."

The Sacramento Bee Unique content, exceptional value. **SUBSCRIBE NOW!**

Copyright © The Sacramento Bee
2100 Q St. P.O. Box 15779 Sacramento, CA 95816 (916) 321-1000

South Sacramento Habitat Conservation Plan

Help Shape the Environmental Review Process!

What is the SSHCP?

The proposed SSHCP is a regional plan to address issues related to species conservation, agricultural protection, and urban development. The proposed SSHCP will consolidate environmental efforts to protect and enhance wetland and upland habitats to provide ecologically functional conservation areas while also streamlining the permitting process and minimizing regulatory hurdles for future development projects.

For more information about the proposed SSHCP visit the SSHCP website at: www.planning.saccounty.net/habitat-conservation/overview.html or contact Vince King at kingv@saccounty.net or (916)874-3257

The proposed South Sacramento Habitat Conservation Plan (SSHCP) is beginning environmental review. Please join us at one of the four meetings in July to discuss the proposal, alternatives, and scope of issues and impacts to be addressed in the environmental review process:

Galt
Tuesday, July 8 - 6:30 to 8:30 pm
Galt Police Department,
Anthony Pescetti Community Room
455 Industrial Drive
Galt, CA 95632

County of Sacramento
Friday, July 11 - 10:00 am to 12:00 pm
Sacramento County Admin. Building, Sixth Floor Training Room
700 H Street, Sacramento, CA 95814

Rancho Cordova
Tuesday, July 15 - 6:30 to 8:30 pm
Rancho Cordova City Hall,
American River Room
2729 Prospect Park Drive
Rancho Cordova, CA 95670

Elk Grove
Wednesday, July 16 - 6:30 to 8:30 pm
Elk Grove City Council Chambers
8400 Laguna Palms Way
Elk Grove, CA 95758

Following these scoping meetings, the County will host a community workshop in August to help identify alternatives to analyze during the environmental review process. Stay tuned for details!

For more information on the environmental review process, please contact Peter Morse at (916)874-6929, morsep@saccounty.net or visit the DERA web site at: www.dera.saccounty.net and goto the South Sacramento Habitat link

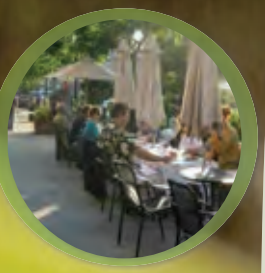
Appendix C

Meeting Materials

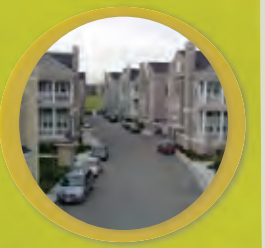
Scoping Process Overview Handout
Habitat Conservation Plan Slide Show Presentation
Habitat Conservation Plan Brochure
Covered Activities (poster)
Local Jurisdiction and Boundaries Map (poster)
Conservation Zones and Parcels (poster)
Conservation Zones and Habitat Map (poster)
Conservation/Mitigation Sites Map (poster)
Covered Species (poster)
Species Distribution Map (poster)
Conservation Zones and Wetland Map (poster)
Vernal Pools Map (poster)
Critical Habitat Map (poster)
Habitat Conservation Plan Timeline (poster)
Public Comment Opportunities (poster)
List of Conservation Measures by Zone

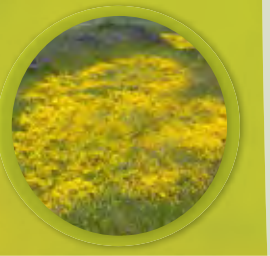
South Sacramento Habitat Conservation Plan













Please help us prepare the EIS/EIR for a South Sacramento Habitat Conservation Plan

We need your help. The County of Sacramento and U.S. Fish and Wildlife Service are working together to prepare a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) that will analyze impacts of a Habitat Conservation Plan (HCP) proposed for south Sacramento County. The HCP will provide a framework under the Endangered Species Act to help local communities accommodate development while conserving plant and animal species. The Draft EIS/EIR will be published in the summer of 2009.

What is your role during this public scoping process?

Your help is needed to inform the County and the Service of the important issues you want studied in the EIR/EIS. Please focus your comments on:

- Potential impacts that the EIS/EIR should study in depth.
- Problems the proposal may cause, and ways to solve them.
- Better, more effective mitigation measures.
- Suggestions for reasonable alternatives to the proposal.
- Questions you want addressed in the EIS/EIR
- Specific habitat locations inside the Urban Development Area that you think should be preserved.

Please make your comments as specific as you can.

Sometimes participants identify issues during scoping meetings that are too broad to be useful for EIS/EIR analytical purposes - For example, "cultural impacts" - what does this mean? What precisely are the impacts or issues that you want examined? When we encounter a comment as broad as this, we have to guess about what you meant, and you may find that your issues are not covered in the EIS/EIR. Thus, you should refine broad general topics, and specify which issues need evaluation and analysis.

What information will the Draft EIR/EIS contain?

- Descriptions of a proposed HCP and alternative HCPs under consideration.
- A detailed analysis of direct, indirect, and cumulative impacts of all HCP alternatives on the human and environmental resources that you identify in your scoping comments.
- Resources and topics that will be analyzed in the draft EIS/EIR may include, but may not be limited to: Soils, Hydrology, Water Quality, Land Use, Mining, Agriculture, Wildlife and Plants, Wetlands, Cultural Resources, Socio-economics, Public Services, and Transportation

The Proposed South Sacramento Habitat Conservation Plan (SSHCP)



Sacramento County, City of Rancho Cordova, City of Elk Grove, City of Galt, the County Water Agency & Sacramento County Regional Sanitation District

AGENDA ITEM 11.1

5700

SSHCP

Welcome!

South Sacramento Habitat Conservation Plan (SSHCP) Scoping Meetings:

1. Galt (July 8th)
2. Downtown Sacramento (July 11th - day)
3. Rancho Cordova (July 15th)
4. Elk Grove (July 16th)

AGENDA ITEM 11.1

5701

SSHCP



Your role at this Meeting

- Tell us about issues you want analyzed in the EIR/EIS
- Tell us your ideas about the SSHCP proposal
  - Potential Impacts
  - Problems/resolutions
  - Reasonable alternatives
  - Specific questions
  - Specific habitat locations

SSHCP



Agenda for Tonight

- Brief overview of the proposed SSHCP
- Information and comment stations

SSHCP







HCP & EIR/EIS Staff

- Rich Radmacher, Sac. County Planning Dept.
- Vince King, Sac. County Planning Dept.
- Peter Morse, Sac. County DERA
- Nina Bicknese, US Fish & Wildlife Service
- Kate Dadey, US Army Corps of Engineers
- Dan Gifford, CA Dept. of Fish & Game

SSHCP

What is a Habitat Conservation Plan?

HCPs are:

- A document that outlines measures to conserve species and their habitats.

- The document results in the issuance of an incidental take permit to local jurisdictions that can then be extended to a project proponent.

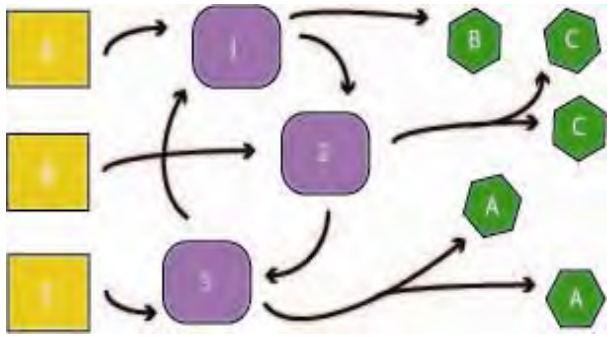
SSHCP

Habitat Conservation Planning

- The Issues

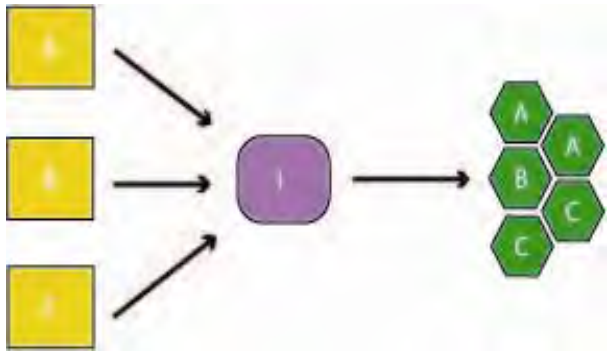
  It is unlawful to “take” listed wildlife species under ESA.

  Desire to avoid time consuming & costly individual negotiations



- The Solution

  Permits development while addressing wetland & endangered species interests in a coordinated & predictable manner





SSHCP

Benefits to:

The Public

Developers

Environmentalists

Agriculture

Landowners

- Preserve floodplains
- Community buffers
- Recreational opportunities
- Attract businesses & jobs
- Protect biological resources
- Reduce development permitting costs & complexity
- Adaptive management specific to species needs
- Create opportunities to seek grants to benefit regional conservation
- Provide assurances & means to voluntarily sell land or conservation easements while continuing agricultural operations

SSHCP

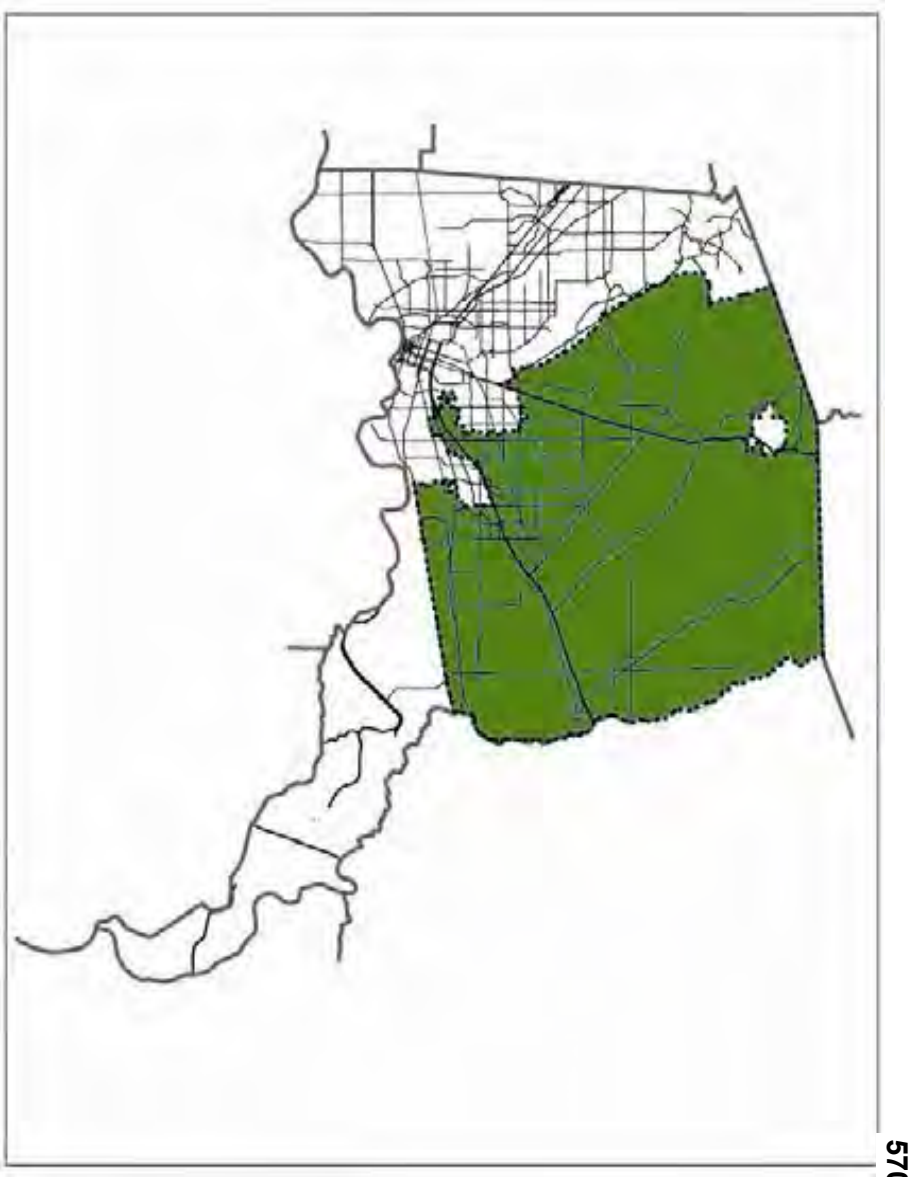
Boundaries:

North - Highway 50

West - Interstate 5

South & East - County Line

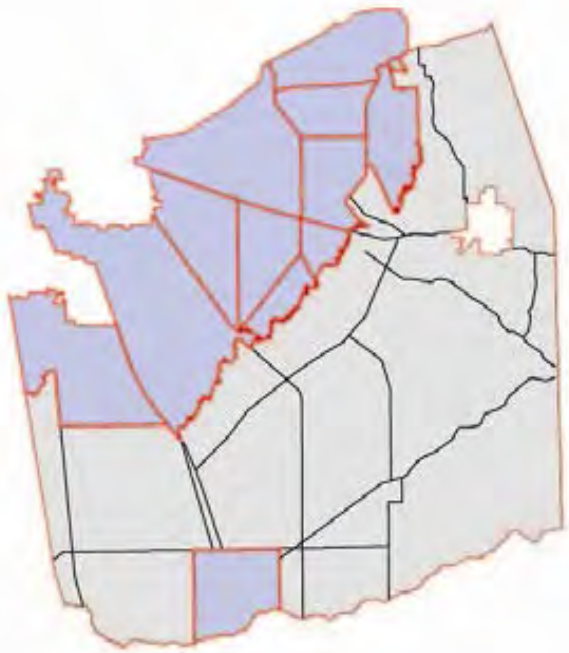
Encompasses 341,000 acres



SSHCP

Urban Development Area (UDA)

- Majority of take covered under the plan
- Does not preclude species recovery
- Predictable streamlined permitting process



SSHCP

Outside the UDA

- Some transportation and Infrastructure projects
- Consolidate and direct mitigation
- Contribute to species recovery
- Address adjacent landowner concerns

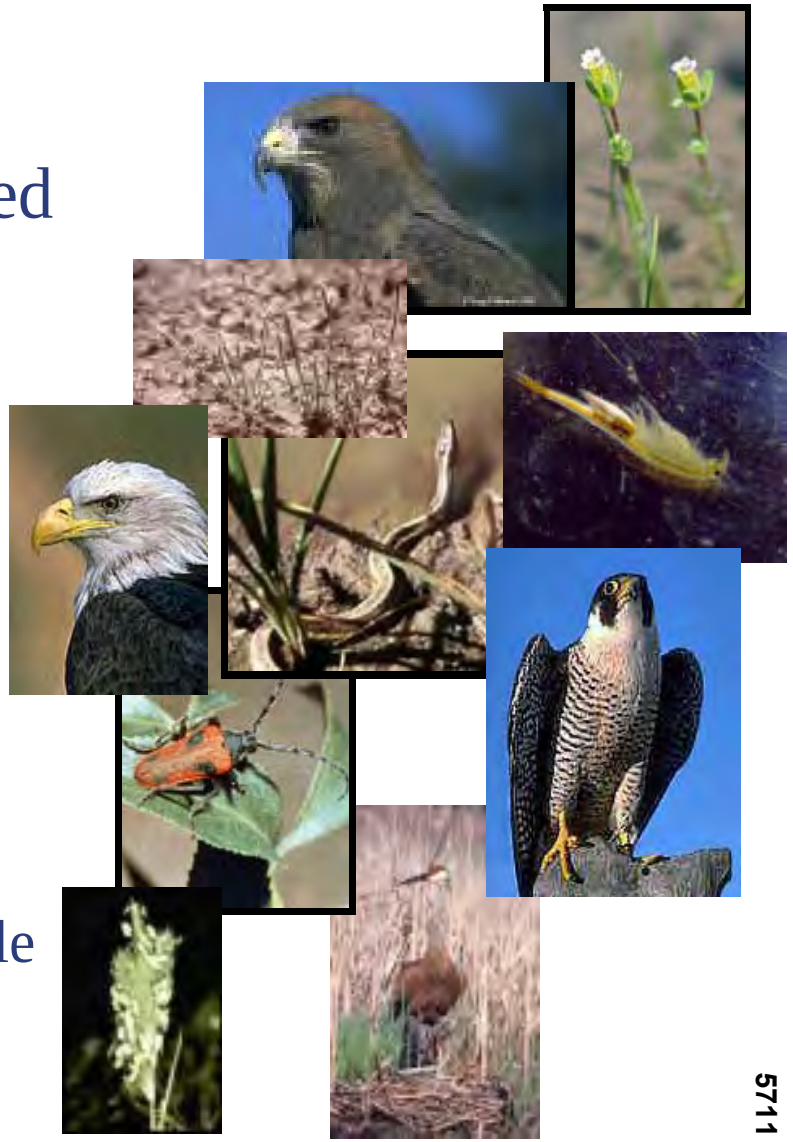


SSHCP

Covered Species

40 total, 10 State/Federally Listed

- Vernal Pool Fairy Shrimp
- Vernal Pool Tadpole Shrimp
- Swainson's Hawk
- Giant Garter Snake
- California Tiger Salamander
- Sacramento Orcutt Grass
- Slender Orcutt Grass
- Boggs Lake Hedge-Hyssop
- Valley Elderberry Longhorn Beetle
- Greater Sandhill Crane



SSHCP



Habitat Types

- Agricultural Lands
- Riparian / Stream
- Upland Grassland
- Vernal Pool & Associated Uplands
- Wetlands, Ponds & Lakes
- Oak Woodlands

SSHCP

Conservation Principles

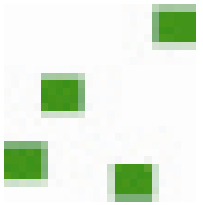
- Minimize Fragmentation

  Fragmentation disrupts movement and lowers species diversity.

Good



Poor



AGENDA ITEM 11.1

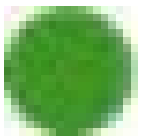
SSHCP

Conservation Principles

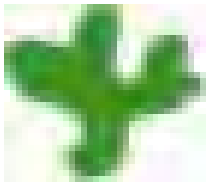
- Minimize Edge Effects

  Non-compatible uses adjacent to preserves lowers habitat values and species abundance/diversity

Good



Poor



SSHCP

Conservation Principles

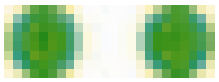
- Establish Connectivity

  Linking preserves allows for increased movement amongst interacting landscapes.

Good



Poor



SSHCP

Conservation Principles

- Maximize Heterogeneity

  Preserves with greater mix of habitats tend to support greater biodiversity.

Good



Poor



AGENDA ITEM 11.1

SSHCP

Conservation Principles

- Protect Watersheds

  Preserving watersheds helps maintain hydrologic stability and water quality.

Good



Poor



SSHCP

HCP Development to date

- Steering Committee:
  - Development Community
  - Environmental Community
  - Agricultural/Ranching Community
  - Regulatory and Resource Agencies
  - Local Governments
    - City of Elk Grove
    - City of Galt
    - City of Rancho Cordova
    - County of Sacramento

Next Steps

- Scoping Meetings
- Public Workshops
- Draft EIR/EIS

www.planning.saccounty.net/habitat-conservation/Environmental_Review.html

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

GROW • ENHANCE • PRESERVE



An Introduction to the Proposed Plan

June
2008

City of Elk Grove • City of Galt • City of Rancho Cordova • Sacramento County
Sacramento County Water Agency • Sacramento Regional County Sanitation District

Introduction

Southern Sacramento County gradually slopes eastward from the rich flat agricultural lands of the untamed Cosumnes River floodplain towards stretching vernal pool landscapes and rolling blue oak woodlands. The interplay between fertile agricultural lands, open rangelands scattered with thousands of vernal pools, and the annual cycle of inundated winters and parched summers provides a key stop for millions of migratory birds, and crucial home to an array of threatened and endangered species.

These features in company with its proximity to the urban capital core and access to the Bay and Tahoe regions have also made the plan area an attractive home for thousands of new residents. Regional estimates predict that by 2050, the area will need to accommodate over 200,000 new housing units. This degree of growth has led local jurisdictions to partner with State and Federal regulatory agencies to develop the proposed South Sacramento Habitat Conservation Plan (SSHCP) to study how to accommodate continued growth while maintaining lasting environmental stewardship.

This brochure outlines some of the key concepts addressed in developing the proposed SSHCP and how the SSHCP may help guide development and conservation in the SSHCP plan area. For further information please contact staff listed on the back of or visit the web site at http://www.planning.saccounty.net/habitat-conservation/overview.html.

SSHCP Plan Area

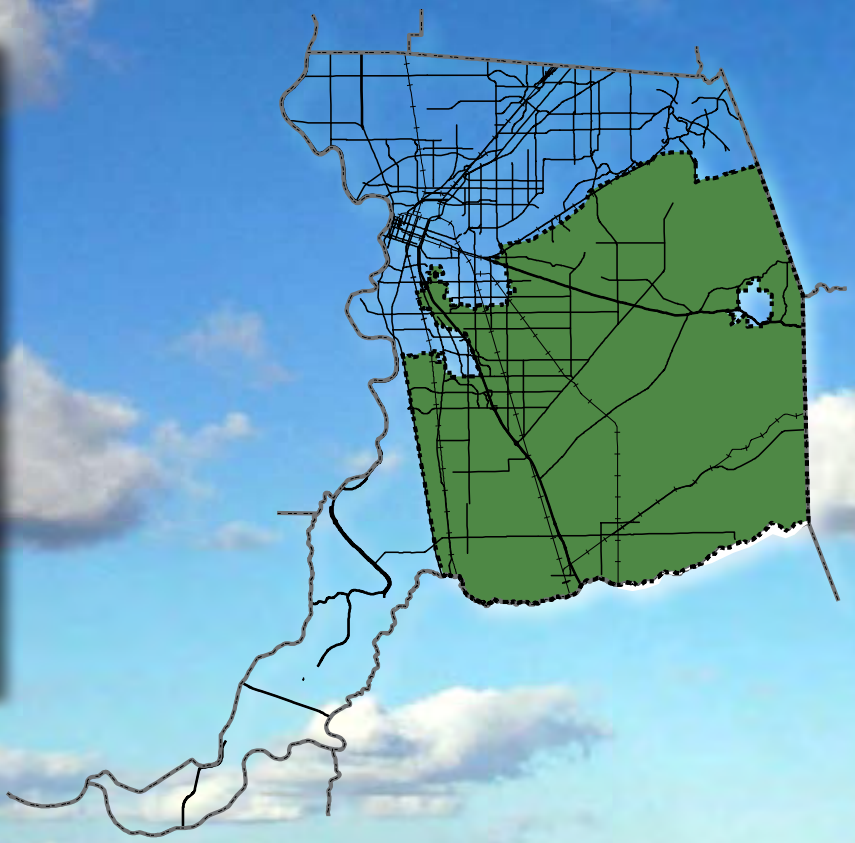
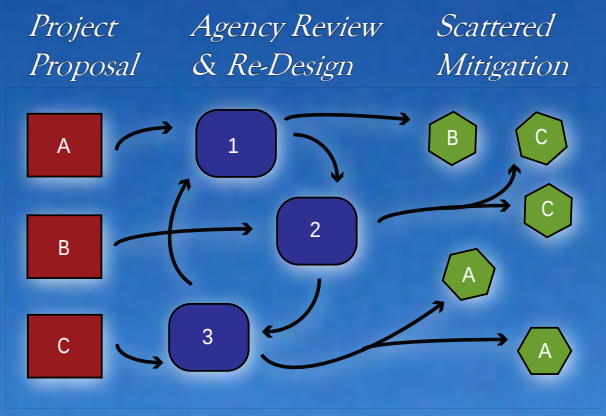


Table of Contents

Introduction.....2
The Need & Solution.....3
Goals & Principles.....4
Development.....5
Conservation Strategy.....6
Preserve Design & Linkage.....7
Permitting.....8
Implementation.....9
Costs & Funding.....10
Partnerships.....11

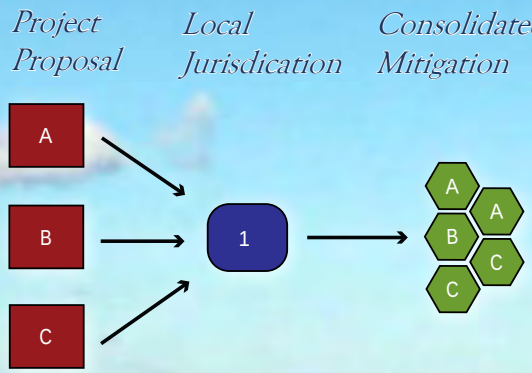
The Need

Currently, individual project proponents must address regulatory agencies on an individual basis when seeking compliance with wetland and species regulations. The resulting process can be confusing, and potentially ineffective. Years of negotiation can result in not only costly expenses and lost time, but also scattered and less than desirable habitat preserves.



The Solution

The proposed SSHCP would consolidate wetland and endangered species interests to address them in a coordinated and predictable manner. Project-by-project permitting would be avoided, which would benefit all interests involved from the project proponents, State, Federal and Local agencies, environmental interests, landowners, agricultural production, to the local residents.



Benefits to:

The Public

A large preserve system will help sustain healthy balanced communities by protecting view sheds, preserving floodplains, buffering distinct communities, increasing recreational opportunities, attracting businesses and jobs, and protecting our biological resources for future generations.

Developers

A single regional conservation plan greatly reduces the cost and complexity of meeting regulatory requirements. It also provides predictable mitigation costs and constraints up-front so that those costs can be anticipated at the onset of a project.

Environmentalists

Large-scale conservation avoids isolated, postage stamp preserves. HCPs also provide for perpetual adaptive management specific to species needs. They can also create opportunities to seek grants to augment HCP funds and to benefit regional conservation.

Agriculturists

The proposed SSHCP provides landowners the opportunity to voluntarily sell land or conservation easements while providing assurances that they can continue their own operations without affecting their neighbors. Landowners and agricultural operators are not subject to increased regulation.

SSHCP Principles

- Involve all stakeholders
- Inform the public
- Build consensus

SSHCP Goals

Aid and enhance the recovery of species. Conservation will be guided by science and expert opinion to link local land use programs. Funding will ensure adaptive management of the preserve system in perpetuity.

Streamline development in appropriate sites. The proposed SSHCP would guide and facilitate growth in a consistent and predictable manner. Mitigation fees are collected for impacts to natural resources.

Protect agricultural lands and operations. The proposed SSHCP would incorporate "safe harbor" agreements to provide assurances to landowners surrounding existing and future preserves.

Fairly consider stakeholder interests. Development and implementation of the proposed SSHCP would rely heavily on all constituents to provide input and comment on document content.

Rely on voluntary participation. The proposed SSHCP is a willing seller plan. Selling land or conservation easements on land also not required, but would be an option to interested landowners.

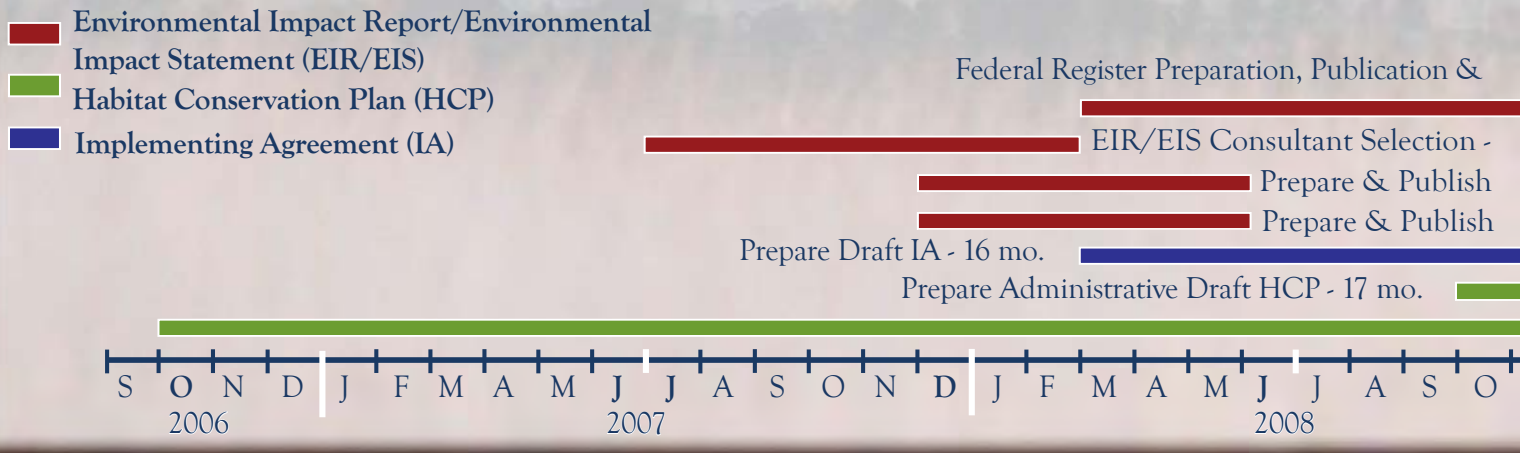
SSHCP Overview

The SSHCP plan area encompasses 341,270 acres of land in south Sacramento County. The area includes the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County. The Plan is a regional approach to addressing urban development, infrastructure improvements, habitat and open space conservation, and agricultural protection. It provides for ecologically viable conservation and minimizes regulatory hurdles for development by streamlining the permitting process.

The proposed SSHCP covers 40 species of plants and animals including 10 that are state or federally listed as threatened or endangered. The Plan is an agreement between state and federal wildlife and wetland regulators and local jurisdictions. The Plan would permit landowners to engage in the "incidental take" of listed species in return for conservation commitments consistent with the Plan goals.

Through the duration of the 30-year plan, the SSHCP may permit approximately 45,000 acres of habitat loss and will protect approximately 60,000 acres. Conservation commitments will be fulfilled through take avoidance, paying per-acre fees, conservation easement dedications, grants and other funding sources. Fees will be directed to public and private mitigation sites that provide large-scale habitat preservation and restoration. Supplementary grants and other monies will be sought to acquire additional preserve lands to support covered species.

SSHCP Timeline



Plan Development

The SSHCP began in 1992 as a watershed study. The regulatory agencies proposed shifting to a more comprehensive plan a year later, which led to investigating the feasibility of the SSHCP. In 1995, the Board of Supervisors approved the Steering Committee composed of members from State and Federal regulatory agencies, local jurisdictions, homebuilders, environmentalists, scientists, landowners, agriculturalists, and business interests to consolidate often polar interests and develop an equitable solution for all parties.

The Committee drafted plan goals, principles, and formed the biological and economic subcommittees in September 1996. In February 1997, the County hired consulting firms to assist with the SSHCP. The consultant, with direction from the committees and the County, researched and wrote text for the SSHCP.

After a hiatus, due to a lack of funding and loss of key personnel, the County reassessed the feasibility of the SSHCP in 2001. Major alterations were made. It was concluded that the County would handle all aspects of project management and document preparation. Individual experts were hired to prepare forty-six specialized documents that County staff have used to prepare various chapters of the SSHCP. Draft HCP chapters were reviewed beginning in November 2006 and a comprehensive draft is expected in the fall of 2008.

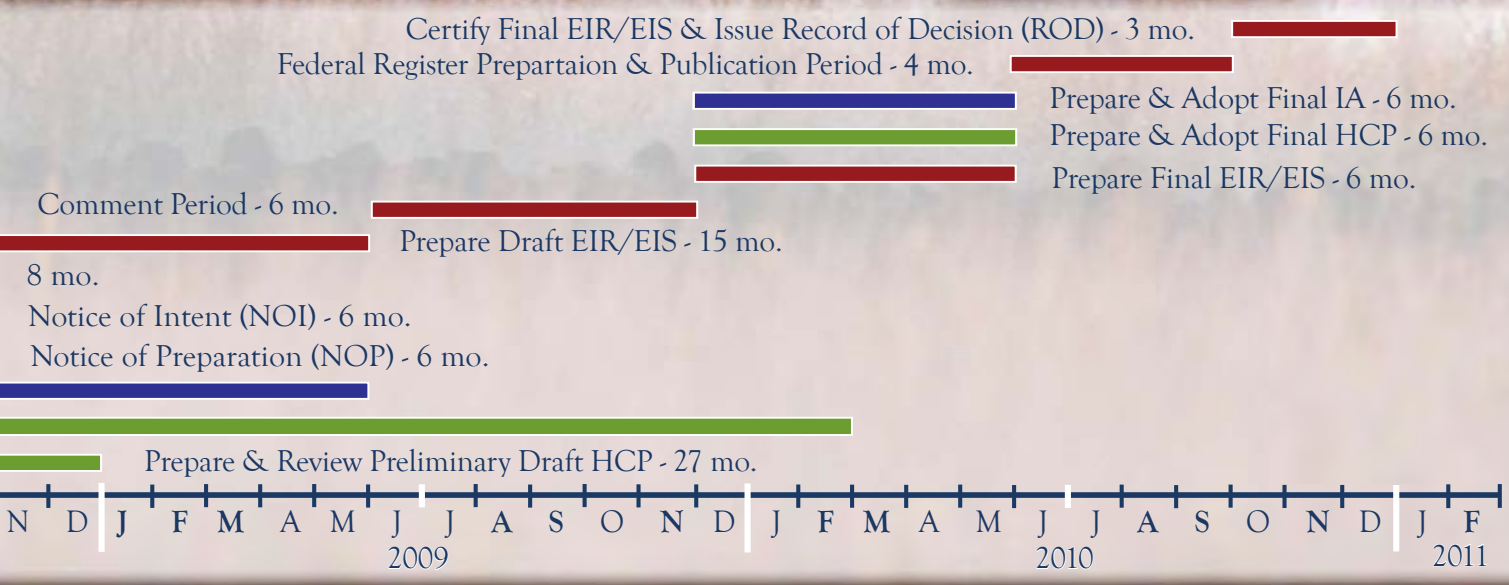
Definitions

HCP - A Habitat Conservation Plan provides regional permitting of species impacts through the Endangered Species Act. Potential impacts to species are authorized in exchange for well-designed preserves.

USB - Sacramento County has established an Urban Services Boundary. Urban growth is not anticipated beyond the USB, which runs roughly west of Scott Rd., along the Cosumnes River floodplain, and across Kammerer Rd.

SOI - A Sphere of Influence is established by a local agency as a probable service area. SOIs are regulated by the Local Agency Formation Commission (LAFCO).

UDA - The Urban Development Area is a term introduced in the SSHCP. It encompasses land where most development and species impacts will occur. The boundary includes the Sacramento County USB, the City limits of Rancho Cordova and Elk Grove, and the City of Galt's adopted SOI.



Conservation Strategy

The SSHCP plan area is home and wintering grounds for an abundance of wildlife, including many threatened and endangered species. One of which, Sacramento Orcutt grass (*Orcuttia tenuis*), is only found in Sacramento County.

The proposed SSHCP approaches conservation on a habitat and landscape scale while considering the specific ecological needs of each species covered by the plan. The strategy guides implementation to preserve important habitat, restore degraded habitat, avoid impacts to species, minimize impacts and enhance habitat to support covered species.

In brief, the proposed SSHCP would preserve 47,000 acres of vernal pool grasslands, blue oak woodlands, agricultural croplands, riparian woodlands, and wetlands as mitigation, and fund preservation of an additional 13,000 acres. The Plan would also include 1,488 acres of compensatory restoration and 1,500 acres of additional restoration.

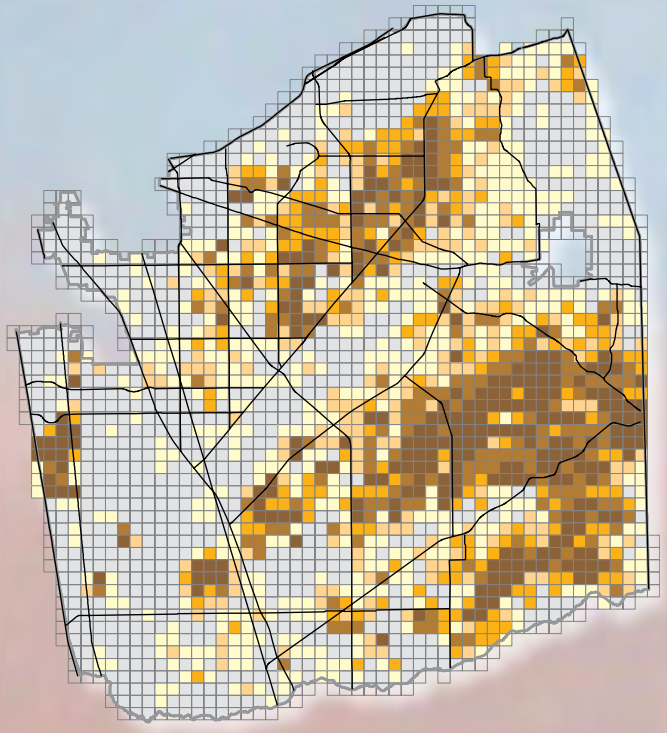
Adaptive Management

Conventional preserve management often lacks mechanisms to alert managers of any threats to species in due time to save the species. The SSHCP monitoring program would evaluate mitigation compliance, determines if specific biological goals and objectives are being met, and provides feedback information to inform a management strategy. It also provides safeguards against reasonably foreseeable changed circumstances.

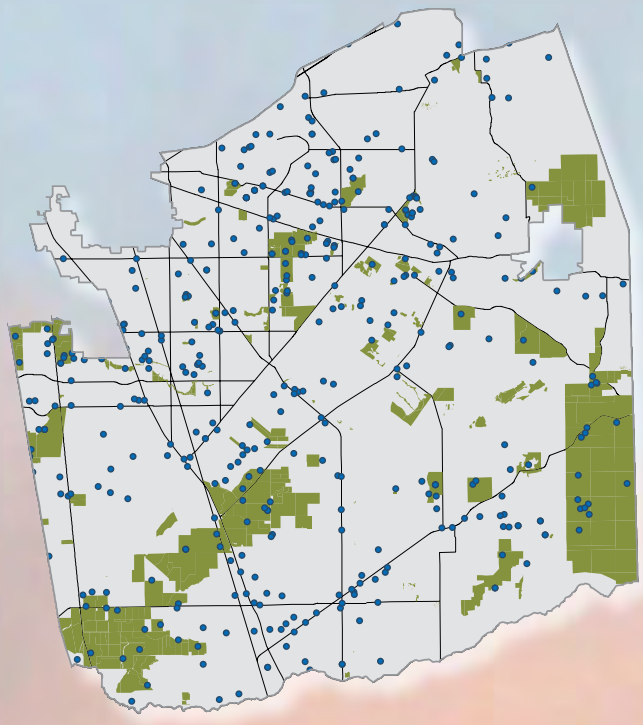
Specifically, the proposed SSHCP adaptive management strategy would (1) integrate a monitoring program that ensures compliance; (2) develop management strategies and determines which strategies to implement; (3) identify uncertainty and how to resolve the uncertainty; and (4) incorporate feedback loops to inform preserve management. In this way, the program will monitor the success of conservation strategy and help inform changes to the strategy.



Vernal Pool Wet Acre Density Index



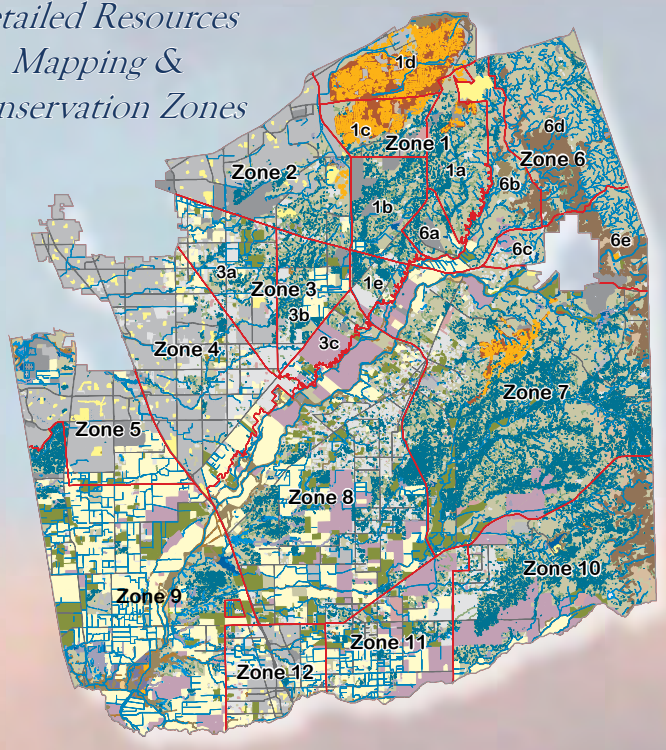
Existing Conservation Sites & Documented Species Occurences



Preserve Design - 8 Guiding Principles

Goal	Effect	Poor	Good	Example
Minimize Fragmentation	Fragmentation disrupts movement and lowers species diversity.			Roads bisecting preserves can prevent movement between preserves.
Minimize Edge Effects	Non-compatible uses adjacent to preserves lowers habitat values and species abundance/diversity.			Feral cats from residential development dramatically reduce song bird populations.
Establish Connectivity	Linking preserves allows for increased movement amongst interacting landscapes.			A corridor between grasslands and a lake allows species to utilize both habitats.
Establish Buffers	Buffers help reduce edge effects to protect preserve integrity.			A vegetated buffer absorbs pollutants to protect waterways.
Maximize Heterogeneity	Preserves with greater mix of habitats tend to support greater biodiversity.			An oak preserve with a stream may support greater biodiversity than an oak preserve without a stream.
Protect Watersheds	Preserving watersheds helps maintain hydrologic stability and water quality.			Nutrients from landscaping upstream flows into the preserve and harms species.
Maximize Population	Larger populations are less vulnerable to disease and local disturbances.			If 10% of a populations is resistant to a disease, 10 individual will not persist, but 20 may.
Maintain Distribution	Allows species to repopulate after disturbances, protects metapopulations and genetic variation.			Individuals in one preserve are able to repopulate another after a fire.

Detailed Resources Mapping & Conservation Zones



Preserve Linkages

The SSHCP planning area was divided into a system of 12 Zones to aid conservation planning. Some Zones are further divided into Subzones. The proposed SSHCP would use these Zones to delineate preserve requirements. In the absence of known willing sellers, the proposed SSHCP does not delineate boundaries of future preserves with hard lines on a map, but rather establishes conservation criteria for each Zone and Subzone. Criteria include securing sufficient acreage and quality habitat for each preserve.

The general area for preserves was determined based on resource mapping, existing conservation sites and known occurrences of covered species within the SSHCP plan area (*see diagrams*).

SSHCP Permitting

In the absence of an HCP, project proponents have to negotiate individually with the federal and state agencies to mitigate for species take and habitat loss. This process has proven expensive and typically requires lengthy negotiations.

The proposed SSHCP offers an expedited and predictable endangered species and wetland permitting process, controlled by local jurisdictions, at a reduced cost. The proposed SSHCP would allow the local jurisdictions to issue permits for up to 43,500 acres inside the urban development area (UDA) in exchange for conservation commitments within and outside the UDA.

Participation in the plan would be voluntary. The regulatory community would benefit from reduced project oversight and the protection of sensitive species.

Local Jurisdiction Permit Holders

• City of Elk Grove • City of Galt • City of Rancho Cordova • County of Sacramento • Sacramento County Water Agency • Sacramento Regional County Sanitation District

Permit Duration

• 30-year incidental take permit

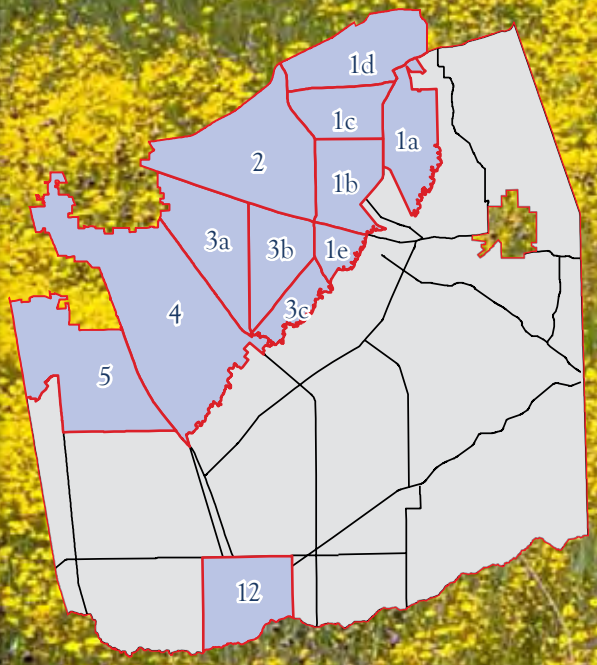
Urban Development Area (UDA)

• Covered activities will primarily be permitted inside the UDA, conservation zones 1-5 and 12. These areas correspond to locations identified for urban development by participating jurisdictions (see diagram).

Permits

• Endangered Species Act (FESA, CESA) - federal Sec. 7 & 10, state Sec. 2081.
• Clean Water Act (CWA) - federal 404, state 401.
• California Fish & Game Code - Sec. 1601 agreement.

Urban Development Area



SSHCP Covered Activities

- Development: Public and private residential, commercial, and industrial construction.
- Transportation: Planned projects by local jurisdictions.
- Water: Projects in adopted master drainage plans.
- Flood Control: Projects adopted in flood control plans.
- Sanitation: Construction, growth and maintenance of landfill, transfer, and recycling stations.
- Public Facilities: Construction of public stations/centers, hospitals, & schools.
- Recreation Facilities: Construction of recreation facilities.
- Utility Services: Construction of stations and gas/transmission lines.
- Mining: Extraction of aggregate resources and construction of roads and facilities.
- Preserve Management: Habitat restoration, creation and enhancement.

Implementation

It is anticipated that a **joint powers authority** (JPA) created from representatives of the local jurisdiction permit holders will ensure project compliance with the SSHCP and conditions of SSHCP permits. The JPA will also oversee the **implementing conservancy**; a non-profit organization established to administer day-to-day preserve operations. The conservancy's duties include acquiring land or easements, monitoring and managing preserved lands, and general administration.

Wetland Permitting

The U.S. Army Corps of Engineers (Corps) has permitting authority pursuant to Section 404 of the Clean Water Act. They are responsible for ensuring no net loss to acres and functions of waters of the U.S. In coordination with the SSHCP planning effort, the Corps is developing a general functional assessment of aquatic resources for the SSHCP plan area. Permit actions must comply with the Section 404(b)(1) Guidelines, which prohibit the Corps from issuing a permit for any project that is not the least environmentally damaging practicable alternative. The Corps is developing a streamlined permitting strategy consistent with the SSHCP conservation strategy. Key elements may include: (1) A Regional General Permit (RGP) for less complex activities with minimal adverse effects to aquatic resources, (2) a Programmatic General Permit (PGP) for projects with small to medium range of impacts, and/or (3) a Letter of Permission (LOP) process for projects with greater impacts that subscribe to the terms of the SSHCP. Non-conformance with the SSHCP will be a consideration in Corps permit decisions.

How it Works

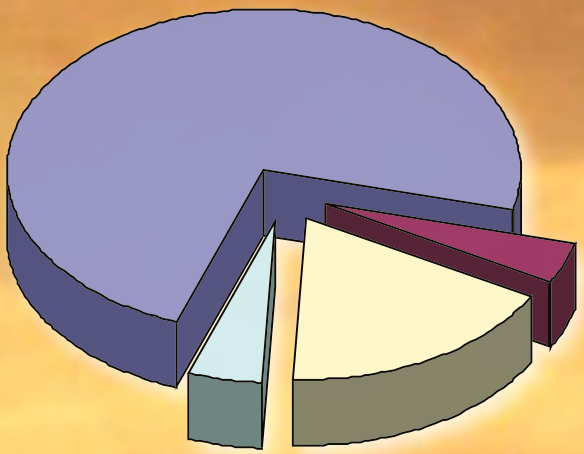
Sensitive Species & Streambed Alteration: Incidental take permits & CDFG streambed alteration agreements will be held by the local jurisdictions. Project proponents will approach the appropriate jurisdiction to identify possible impacts, mitigation needs, and requirements to participate in the SSHCP. Once a project is submitted to the local jurisdiction, participating projects will undergo environmental review and be assessed impacts & costs based on the proposed SSHCP tiered fee structure. Approved projects will be covered under the SSHCP incidental take permits in exchange for mitigation funds. The mitigation funds will be transferred to the SSHCP implementing conservancy for the acquisition of land or conservation easements, the restoration of degraded habitat, the enhancement of existing habitat, and the perpetual adaptive management of the preserves.

Covered Species (Bold indicates state or federal threatened or endangered species)

Birds • Total (18): American Peregrine Falcon, Bald Eagle, Cooper's Hawk, Ferruginous Hawk, Golden Eagle, **Greater Sandhill Crane**, Loggerhead Shrike, Long-Eared Owl, Merlin, Northern Harrier, Sharp-Shinned Hawk, Short Eared-Owl, **Swainson's Hawk**, Tricolored Blackbird, Western Burrowing Owl, White-Faced Ibis, White-Tailed Kite, & Yellow Breasted Chat.
Invertebrates • Total (5): Mid-Valley Fairy Shrimp, Ricksecker's Water Scavenger Beetle, **Valley Elderberry Longhorn Beetle**, **Vernal Pool Fairy Shrimp**, & **Vernal Pool Tadpole Shrimp**.
Plants • Total (8): Ahart's Dwarf Rush, **Boggs Lake Hedge-Hyssop**, Dwarf Downingia, Legenere, Pincushion Navarretia, **Sacramento Orcutt Grass**, Sanford's Arrowhead & **Slender Orcutt Grass**.
Mammals • Total (5): American Badger, Pallid Bat, Ringtail, Western Red Bat & Yuma Myotis Bat.
Reptiles & Amphibians • Total (4): **California Tiger Salamander**, **Giant Garter Snake**, Western Pond Turtle, & Western Spadefoot Toad.

Costs

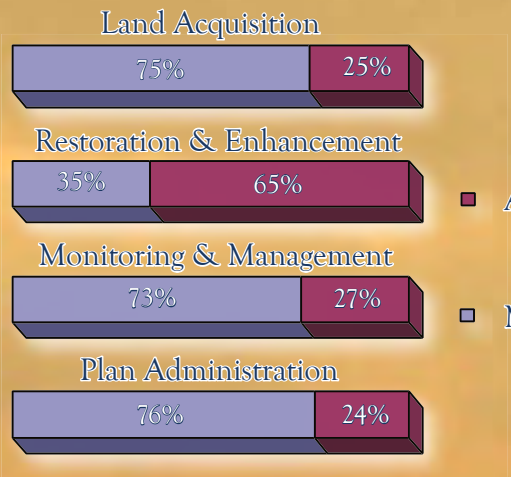
The cost of implementing the SSHCP over the 30-year life of the plan is estimated at $1.6 billion. This includes land & easement acquisition, habitat restoration & enhancements, perpetual management, and administration. The chart below depicts the relative proportion of those costs.



- Land Acquisition 73%
- Restoration & Enhancement 4%
- Monitoring & Management 18%
- Plan Administration 5%

Funding

The SSHCP seeks funding from a variety of sources. Mitigation fees from private development projects and public infrastructure projects will provide the majority of the funds. The adopted SSHCP is also eligible for state and federal grants, which will support the "above-and-beyond" conservation goals of the proposed SSHCP.



Participants

Steering Committee
The SSHCP is overseen by a Steering Committee comprised of representatives from the development, environmental, agricultural, landowner, and regulatory communities. The Steering Committee was formed at the request of the Board of Supervisors, but members do not have the authority to act on behalf of elected officials. The Committee's primary responsibility is to review work products and provide advice to local jurisdictions who are crafting the Plan document.

Biological Subcommittee
The Biological Subcommittee was formed to provide rigorous scientific review of documents. The Committee is made up of members of the Steering Committee, but includes experts in various fields.

Economic Subcommittee
Much like the Biological Subcommittee, the Economic Subcommittee was formed to address complex economic issues and help guide the Plan to make economic sense.

Technical Advisory Committee
The Technical Advisory Committee was formed early on to evaluate and establish species lists, habitat cover-types and biological goals and objectives. The members included professional scientists from relevant disciplines and Agency representatives.

Science Advisors
The SSHCP recognized early on the importance of independent scientific review of plan documents. The County chose to utilize local experts on a case by case basis as they were needed. This method proved useful as it enabled consultants and planners to seek answers to specific questions.



Public Review

The County of Sacramento strives to ensure that the public is afforded every opportunity to be part of the planning process and to provide comments and feedback as the Plan is developed. To ensure public participation every planning meeting was open to the public. The County maintains an e-mail list of interested individuals and posted draft materials on a SSHCP Web site. The County has held a number of outreach meetings for the public, has made many presentations to organizations, and met with many landowners in the plan area. Additional public outreach workshops and presentations to organizations will be conducted including outreach for preparation of the EIS/EIR as required under CEQA and NEPA. Extensive outreach will continue in the fall of 2008.

Partnerships

The SSHCP has been developed with assistance and input from countless individuals and organizations. They have provided expert opinions, time, and resources. Likewise, implementation and realization of the goals set forth within the SSHCP will necessitate continued involvement.

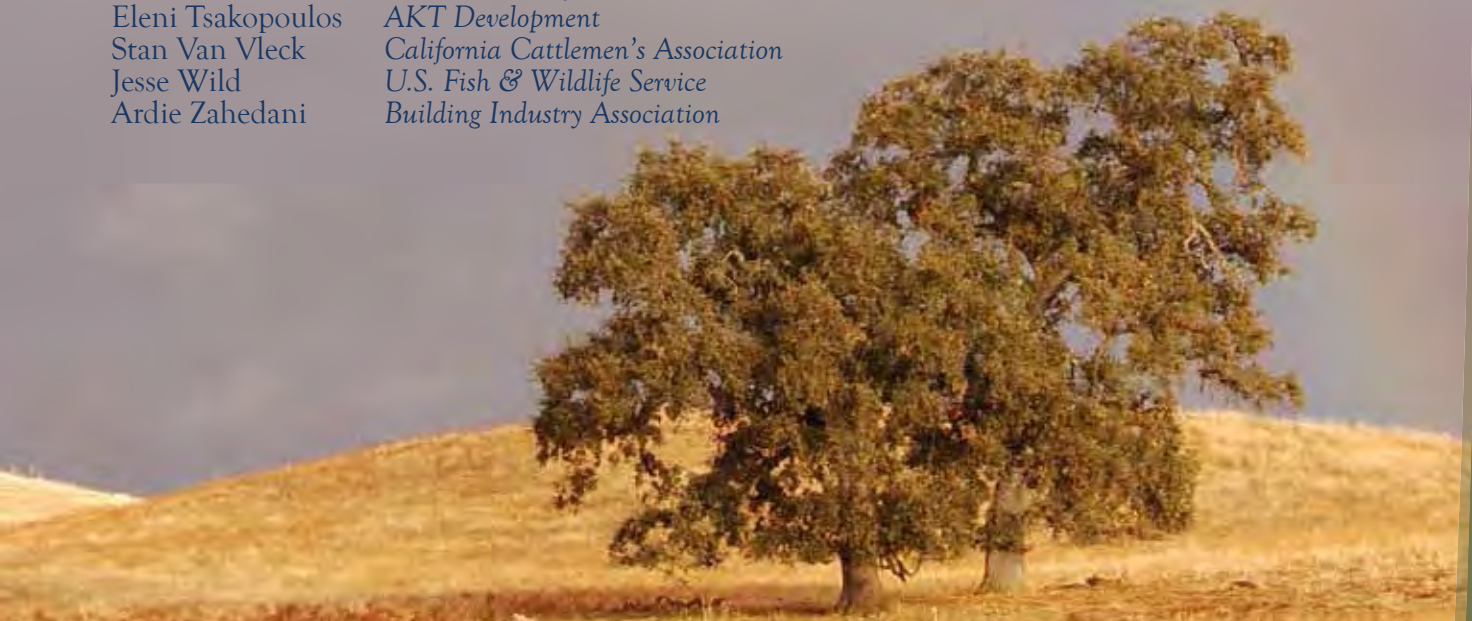
The SSHCP implementing conservancy will work cooperatively with other conservancies and organizations, such as The Nature Conservancy, The Center for Natural Lands Management, and Sacramento Valley Conservancy, to better their management practices through shared knowledge. They will also work cooperatively to help realize the preserve linkage system outlined in the SSHCP. Doing so can better ensure biologically rich preserves are established for future residents to enjoy and appreciate.

The South Sacramento Habitat Conservation Plan

- COMMUNITY DEVELOPMENT
- HABITAT PRESERVATION
- ECONOMIC VITALITY

The following individuals contributed to the development of the SSHCP as participants in the SSHCP Steering Committee:

Rick Balazs	*Sacramento County Economic Development*
Eva Butler	*California Native Plant Society*
Curt Campion	*City of Galt*
Kathleen Dadey	*U.S. Army Corps of Engineers*
Mike Eaton	*The Nature Conservancy*
Christine Crawford	*City of Elk Grove*
Dan Gifford	*California Department of Fish & Game*
John Hodgson	*The Hodgson Company*
John Hopkins	*Institute for Ecological Health*
Paul Jones	*U.S. Environmental Protection Agency*
Paul Junker	*City of Rancho Cordova*
Vincent King	*Sacramento County, Planning & Community Development*
John Lane	*Teichert Construction*
Charlotte Mitchell	*Sacramento County Farm Bureau*
Leighann Moffitt	*Sacramento County, Planning & Community Development*
Steve Norris	*Sacramento Regional County Sanitation District*
Richard Radmacher	*Sacramento County, Planning & Community Development*
Bob Shattuck	*Lennar Homes*
Robert Sherry	*Sacramento County, Planning & Community Development*
Alta Tura	*Audubon Society*
Eleni Tsakopoulos	*AKT Development*
Stan Van Vleck	*California Cattlemen's Association*
Jesse Wild	*U.S. Fish & Wildlife Service*
Ardie Zahedani	*Building Industry Association*



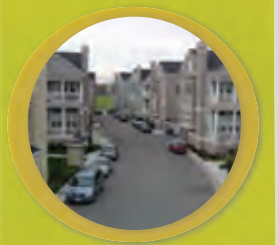
Sacramento County Staff: Rich Radmacher (radmacherr@saccounty.net) &
Vince King (kingv@saccounty.net)
Phone (916) 874-6141, Fax (916) 974-6400
827 7th Street, Rm. 230, Sacramento CA 95814
vAll photos taken in Sacramento County

South Sacramento Habitat Conservation Plan













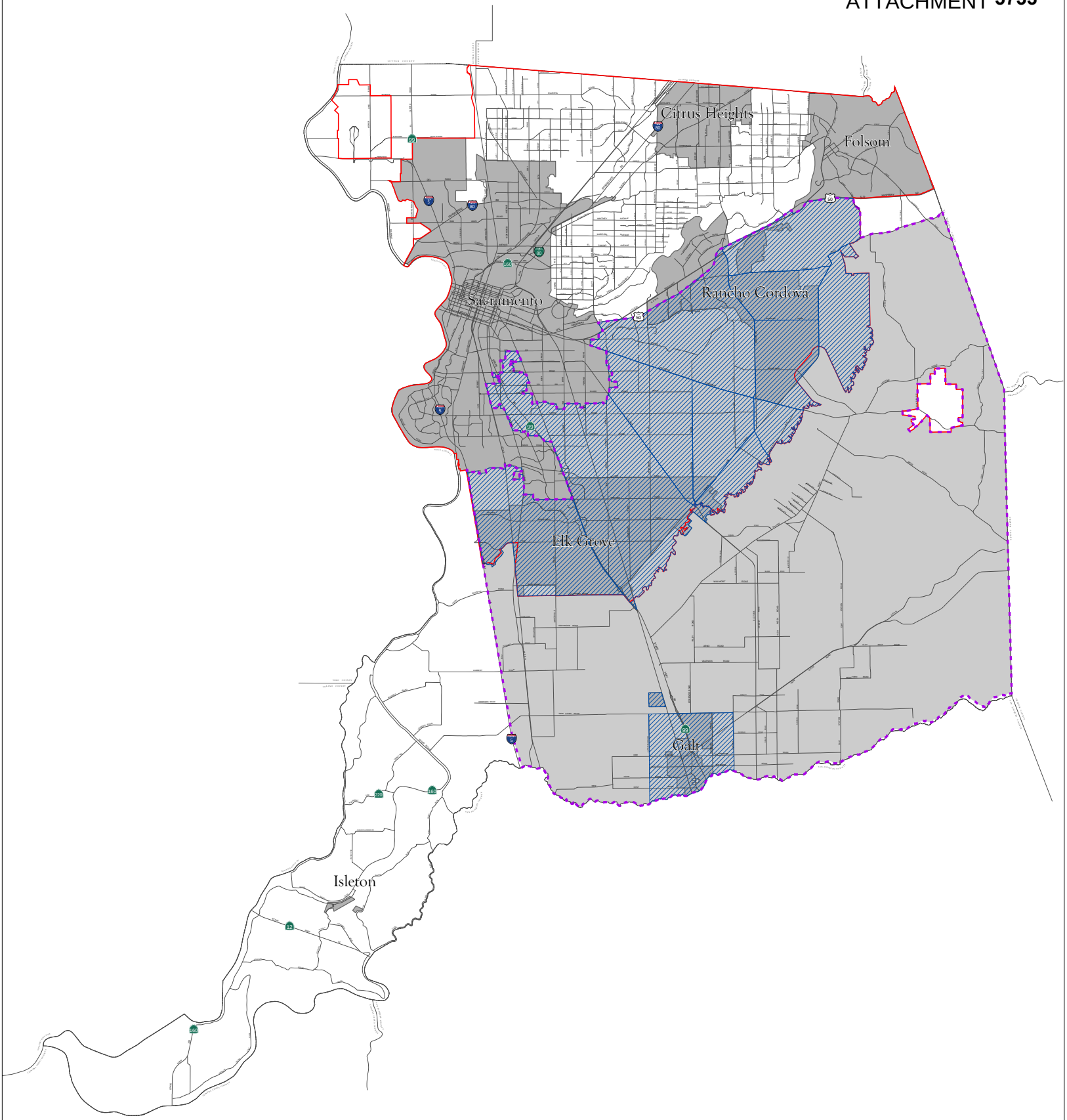
COVERED ACTIVITIES

The activities proposed for coverage in the SSHCP are wide-ranging, but are generally related to urban-suburban development on city and unincorporated lands. Approximately 43,500 acres of the existing natural habitat and agricultural land-cover in the SSHCP Urban Development Area (UDA) would be converted to a developed condition under the proposed SSHCP.

Proposed covered-activities presently include the construction, installation, extension, or removal of:

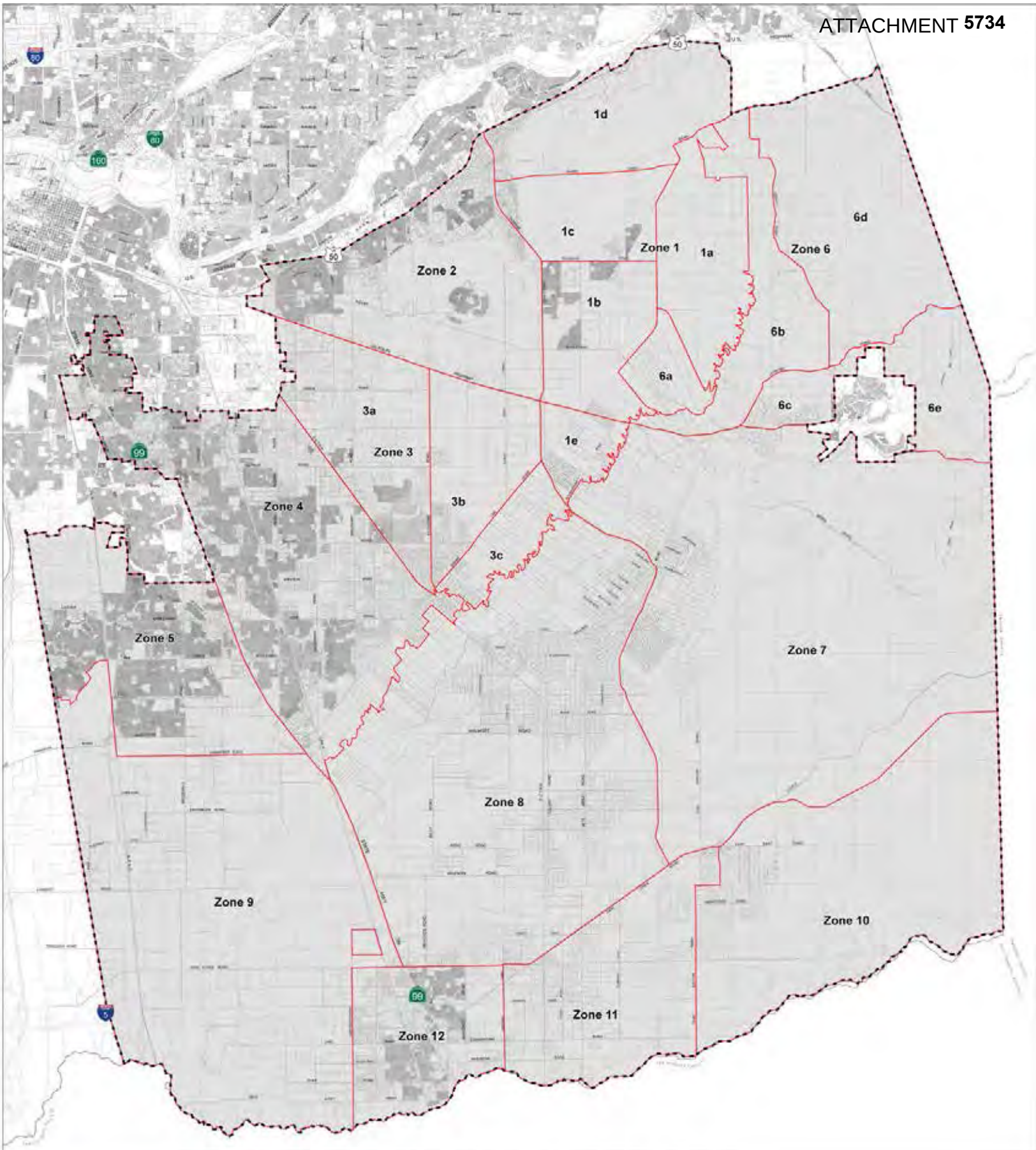
- Private and public residential, commercial, and industrial developments
- Transportation facilities
- Surface water and groundwater supply and delivery facilities
- Water and Wastewater treatment and delivery facilities
- Flood control facilities
- Sanitation facilities (landfills, transfer stations, recycling stations)
- Public facilities (fire stations, police stations, hospitals, schools, community centers, cemeteries, and administration centers)
- Outdoor and indoor recreation facilities
- Utility facilities
- Aggregate mining activities
- Conservation activities (habitat restoration, creation, and enhancement; preserve management and monitoring)

While a majority of the SSHCP Covered Activities occur inside the UDA, certain SSHCP Covered Activities will occur in the Planning Area outside of the UDA. These are limited to the specific public infrastructure improvement projects that have been approved and adopted through various transportation master plans, public infrastructure plans, and local jurisdiction General Plans. Approximately 2,000 acres of the existing natural habitat and agricultural land-cover outside the UDA would be converted to a developed condition under the proposed SSHCP.

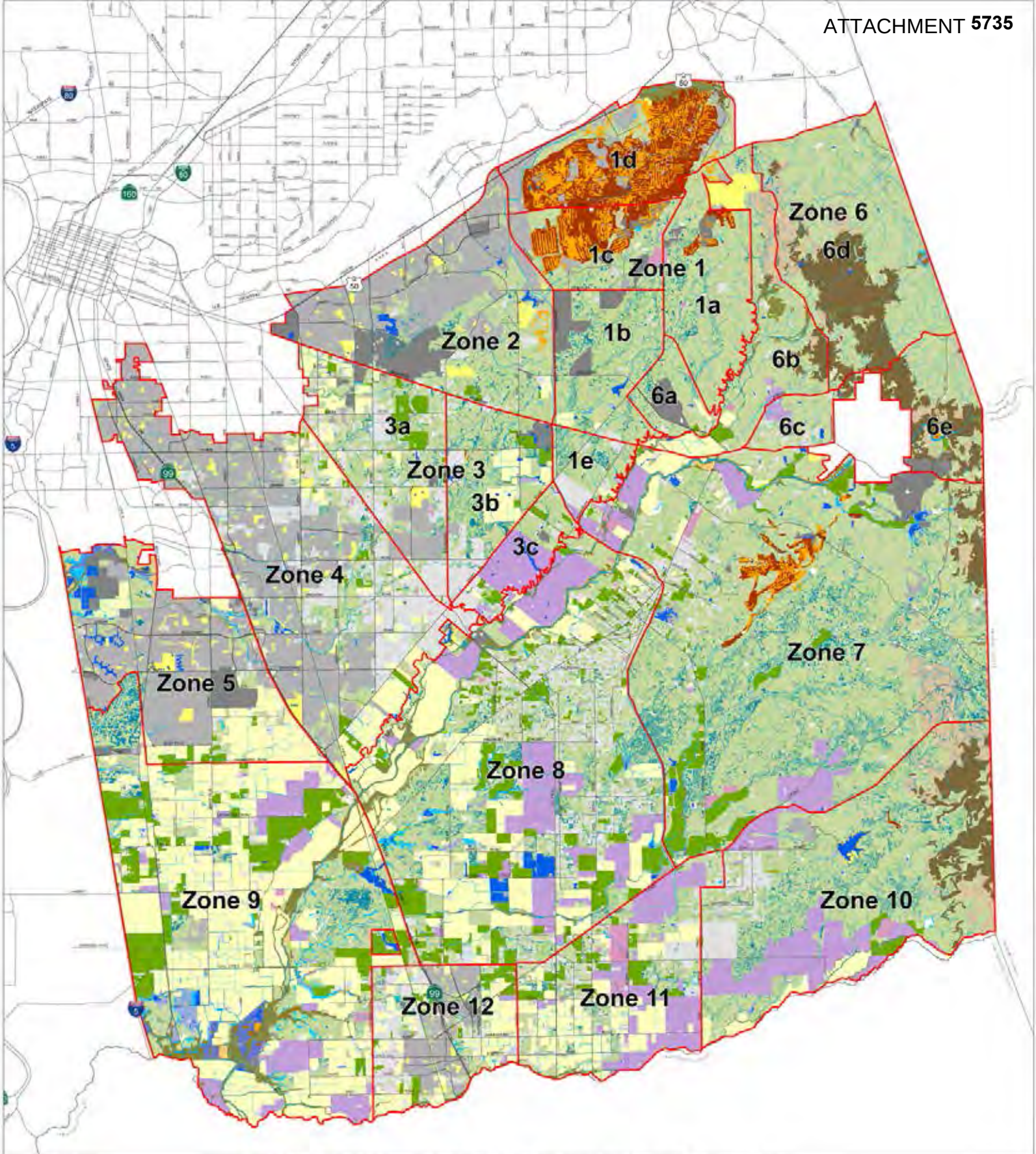


Local Jurisdiction & South Sacramento HCP Boundaries

- City Jurisdiction
- County Line
- Urban Services Boundary
- SSHCP Plan Area
- SSHCP Urban Development Area (UDA)



SSHCP Conservation Zones & Parcels



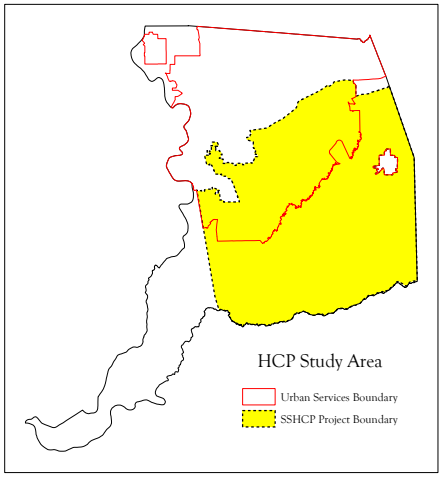
South Sacramento HCP Conservation Zones & Habitat Cover-Types Map

PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

- Conservation Zone

Habitat Types

- Blue Oak Woodland
- Cottonwood Woodland
- Cropland
- Disturbed
- Eucalyptus Woodland
- Freshwater Marsh
- High Density Development
- Irrigated Pasture-Grassland
- Low Density Development
- Major Roads
- Mine Tailings
- Mixed Riparian Scrub
- Mixed Riparian Woodland
- Open Water
- Orchards
- Recreation/Landscaped
- Savannah
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Valley Oak Riparian Woodland
- Vernal Pool
- Valley Grassland
- Vineyards
- Wetland Restoration
- Woodland Restoration



Sacramento County Conservation/Mitigation Sites Map

- Sacramento County Urban Services Boundary
- Sacramento County Urban Policy Area
- City Jurisdiction
- Agricultural-Residential Development
- Public, Quasi-public lands
- SSHCP Plan Area
- Stone Lakes NWR Project Boundary
- American River Parkway Boundary
- SVC Vernal Pool Prairie Preserve Project Boundary
- Dry Creek Parkway Boundary
- Protected Easement (Lands protected by a perpetual conservation or agricultural easement or deed restriction)
- Protected Fee Title (Land owned by a conservancy or government entity for purposes of habitat or agricultural protection)
- Protected Policy (Lands protected via set asides required by governmnet jurisdictions for purposes of mitigation)
- Mitigation Bank (Lands within a mitigation bank that have credits remaining to be sold)

0 2 4 8 Miles

South Sacramento Habitat Conservation Plan



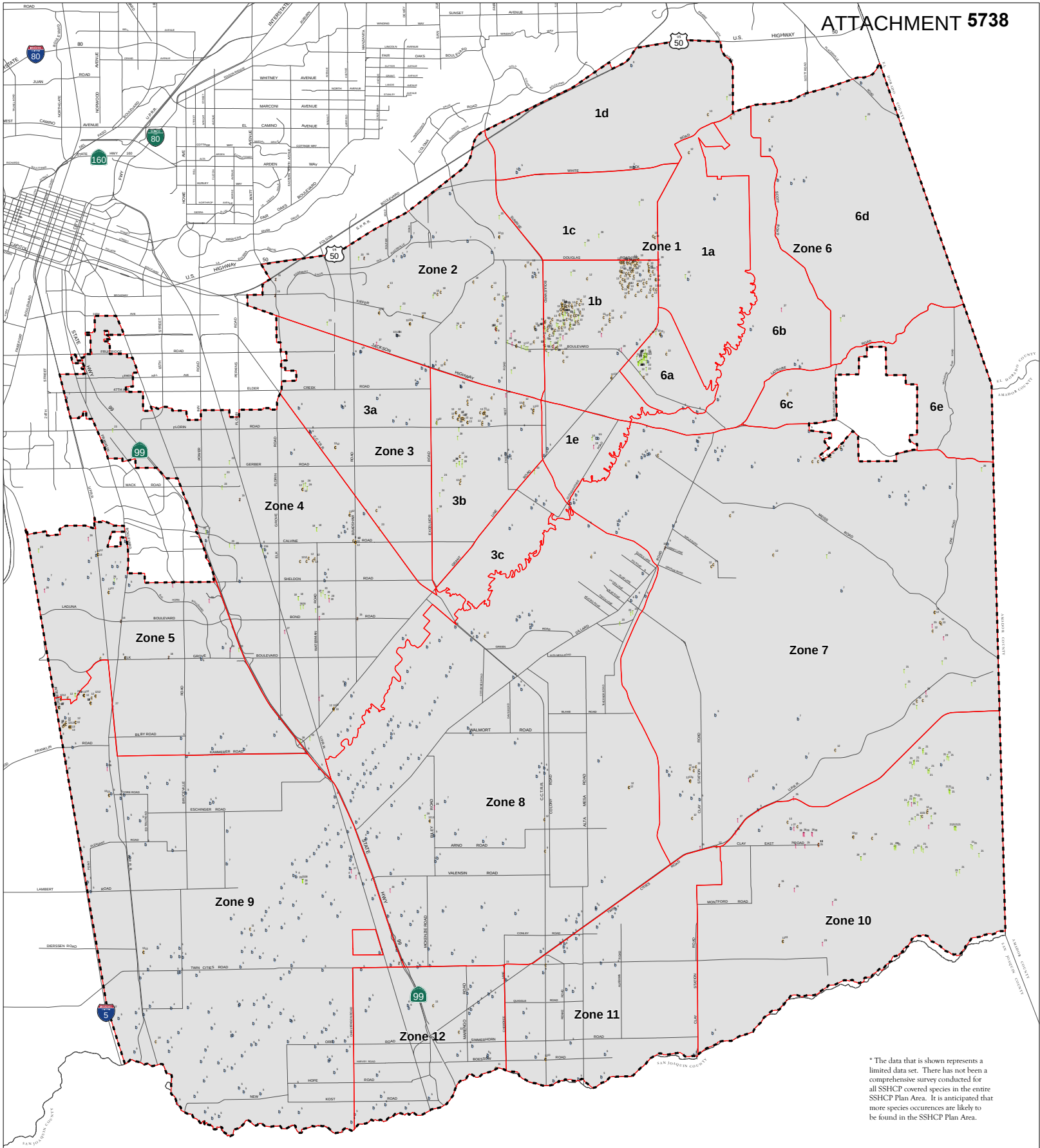






COVERED SPECIES

	Blue Oak Woodland	Cottonwood Woodland	Cropland	Eucalyptus Woodland	Freshwater Marsh	Irrigated Pasture	Mixed Riparian Scrub	Mixed Riparian Woodland	Open Water	Orchards	Savannah	Seasonal Impoundment	Seasonal Wetlands	Streams	Swale	Valley Grassland	Valley Oak Riparian	Vernal Pool	Vineyards
American Badger											X					X			
Pallid Bat	X	X	X	X	X	X	X	X	X		X		X	X		X	X		
Ringtail								X									X		
Western Red Bat	X	X					X	X									X		
Yuma Myotis Bat	X	X			X		X	X	X		X		X	X		X	X		
American Peregrine Falcon					X	X			X				X			X			
Bald Eagle									X				X			X			
Cooper's Hawk	X	X					X	X									X		
Ferruginous Hawk			X		X		X				X		X			X			
Golden Eagle	X					X					X					X			
Greater Sandhill Crane			X			X							X			X			
Loggerhead Shrike			X			X	X				X					X			
Long-Eared Owl	X	X					X	X									X		
Merlin	X	X	X		X	X			X		X		X			X		X	
Northern Harrier			X		X	X					X		X		X	X			
Sharp-Shinned Hawk	X	X		X			X	X		X							X		
Short-Eared Owl			X		X	X					X		X			X			
Swainson's Hawk	X	X	X	X		X	X	X			X		X		X	X	X	X	
Tricolored Blackbird	X		X		X	X					X		X		X	X		X	
Western Burrowing Owl			X			X					X					X			
White-Faced Ibis			X		X	X	X						X						
White-tailed Kite	X	X	X		X	X	X	X			X		X			X	X		
Yellow Breasted Chat		X					X	X									X		
Giant Garter Snake					X									X		X			
Northwestern Pond Turtle					X									X		X			
Southwestern Pond Turtle					X									X		X			
California Tiger Salamander											X	X				X		X	
Western Spadefoot											X	X				X		X	
Mid-Valley Fairy Shrimp																		X	
Rickseckers Water Scavenger Beetle																		X	
Valley Elderberry Longhorn Beetle		X					X	X									X		
Vernal Pool Fairy Shrimp																		X	
Vernal Pool Tadpole Shrimp																		X	
Ahart's Dwarf Rush																		X	
Boggs Lake Hedge-Hyssop																		X	
Dwarf Downingia																		X	
Legenere																		X	
Pincushion Navarretia																		X	
Sacramento Orcutt Grass																		X	
Slender Orcutt Grass																		X	



* The data that is shown represents a limited data set. There has not been a comprehensive survey conducted for all SSHCP covered species in the entire SSHCP Plan Area. It is anticipated that more species occurences are likely to be found in the SSHCP Plan Area.

SSHCP Covered Species Distribution*

SSHCP Study Area

SSHCP Conservation Zones

SSHCP Covered Species

BIRDS

- b 1 - COOPER'S HAWK
- b 2 - FERRUGINOUS HAWK
- b 3 - GOLDEN EAGLE
- b 4 - SANDHILL CRANE
- b 5 - SWAINSON'S HAWK
- b 6 - TRICOLORED BLACKBIRD
- b 7 - WESTERN BURROWING OWL
- b 8 - WHITE-TAILED KITE

INVERTEBRATES

- c 9 - MID-VALLEY FAIRY SHRIMP
- c 10 - RICKSECKER'S WATER SCAVENGER BEETLE
- c 11 - VALLEY ELDERBERRY LONGHORN BEETLE
- c 12 - VERNAL POOL FAIRY SHRIMP
- c 13 - VERNAL POOL TADPOLE SHRIMP

MAMMALS

- z 14 - AMERICAN BADGER
- z 15 - WESTERN RED BAT
- z 16 - YUMA MYOTIS

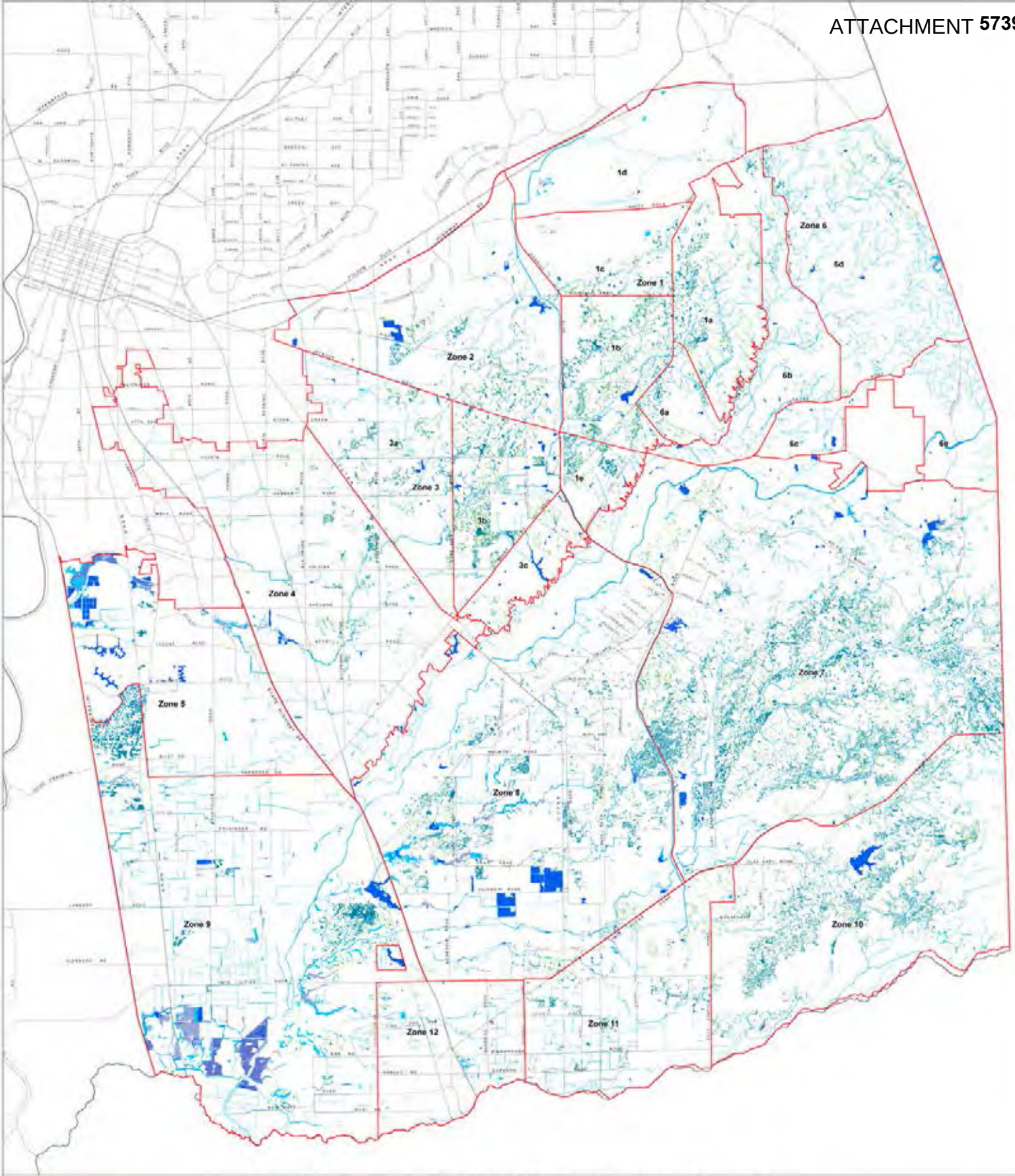
PLANTS

- † 17 - AHART'S DWARF RUSH
- † 18 - BOGG'S LAKE HEDGE-HYSSOP
- † 19 - DWARF DOWNINGIA
- † 20 - LEGENERE
- † 21 - PINCUSHION NAVARRETIA
- † 22 - SACRAMENTO ORCUTT GRASS
- † 23 - SANFORD'S ARROWHEAD
- † 24 - SLENDER ORCUTT GRASS

REPTILES/AMPHIBIANS

- † 25 - CALIFORNIA TIGER SALAMANDER
- † 26 - GIANT GARTER SNAKE
- † 27 - NORTHWESTERN POND TURTLE
- † 28 - WESTERN POND TURTLE
- † 29 - WESTERN SPADEFOOT TOAD

Miles



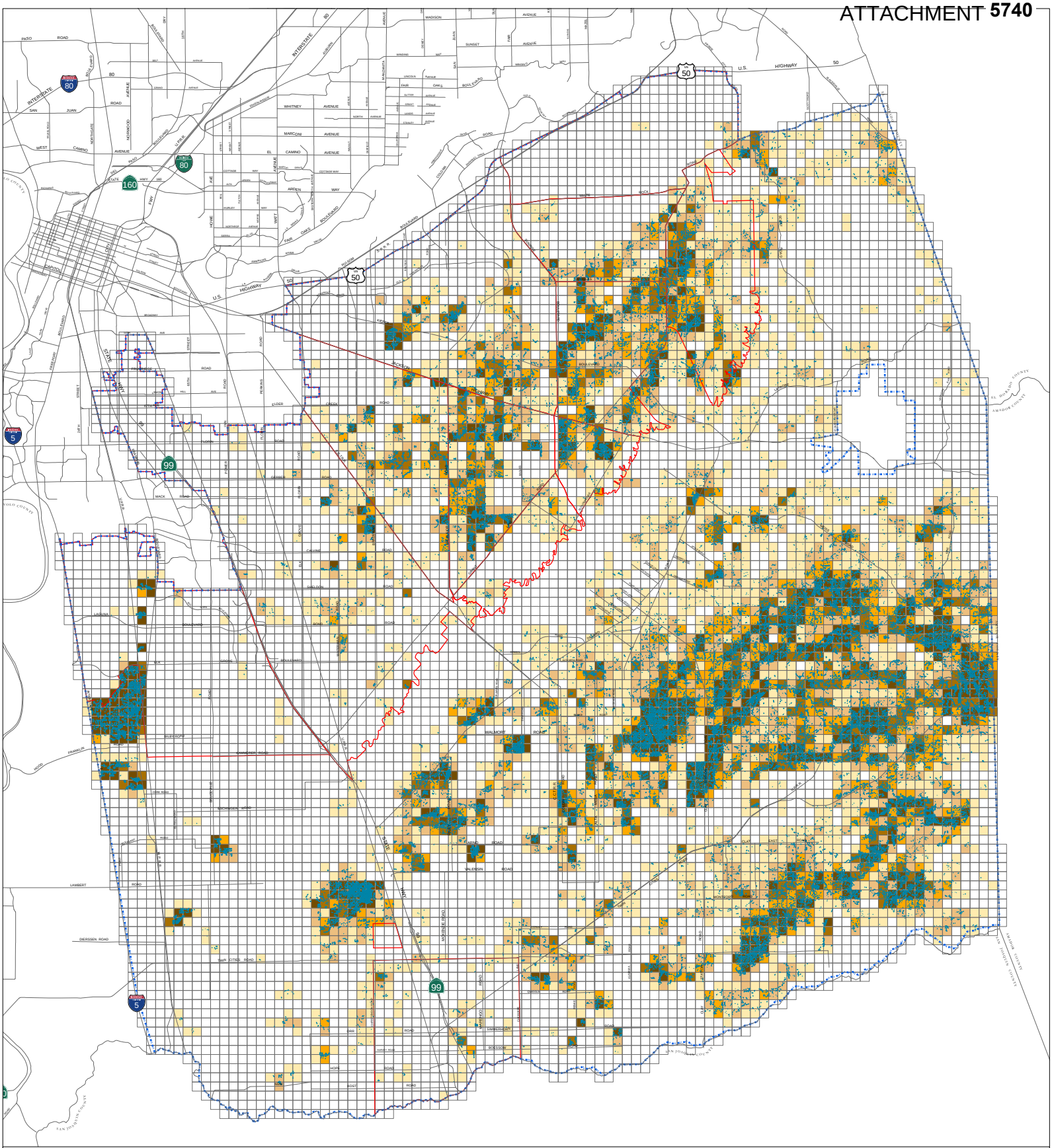
South Sacramento HCP Conservation Zones & Wetland Cover-Types Map

Conservation Zone

Habitat Types

- Freshwater Marsh
- Open Water
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool
- Wetland Restoration

0 1 2 4 Miles



SSHCP Vernal Pool Wet-Acres Density Index Map (WADI)

SSHCP Study Area

SSHCP Urban Development Area

Vernal Pool

Category 1 (A5, B5, C5, D4, D5, E1, E2, E3, E4, & E5)

Category 2 (A4, B4, C4, D1, D2 & D3)

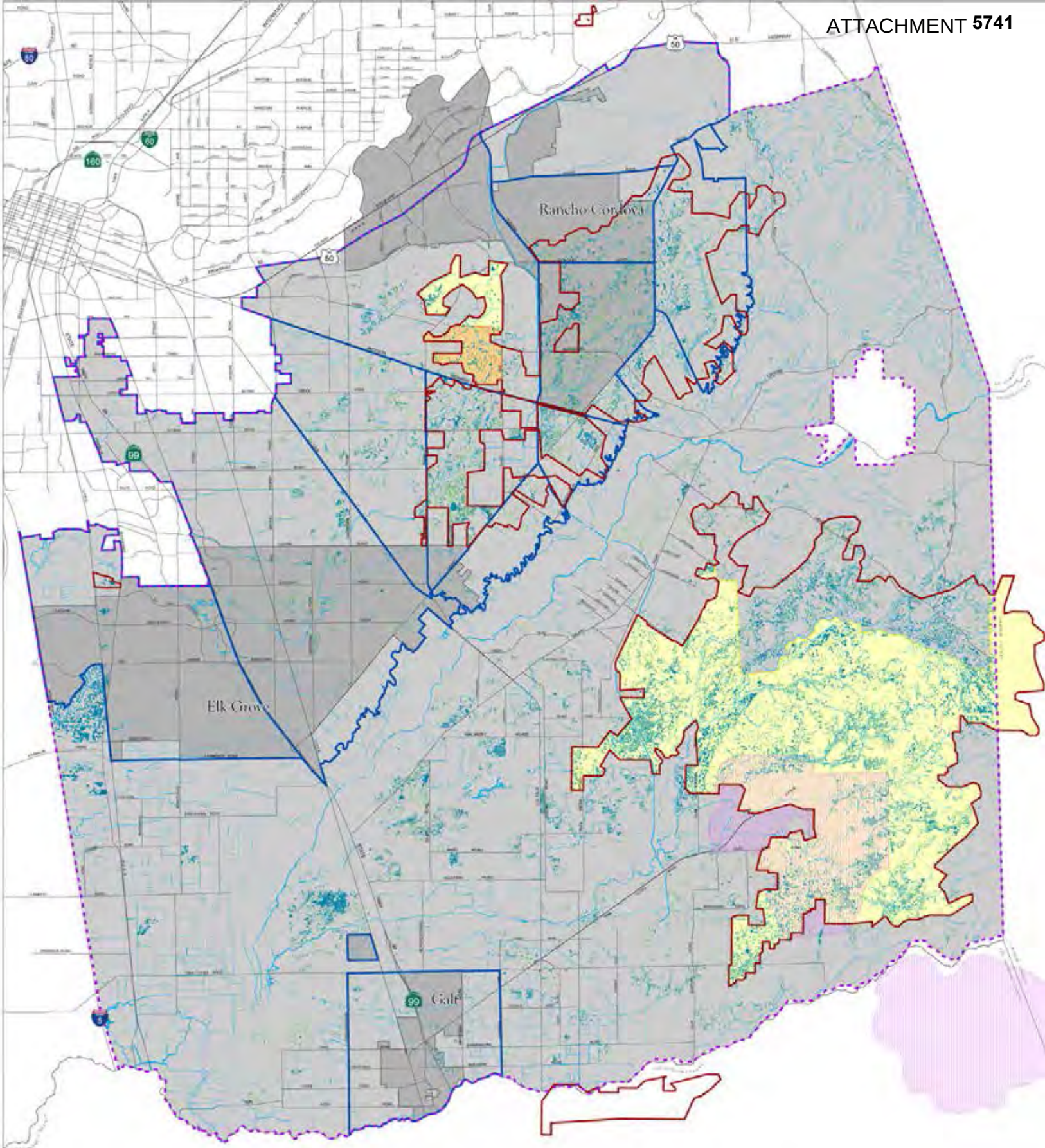
Category 3 (A3, B3, C1, C2 & C3)

Category 4 (A2, B1, & B2)

Category 5 (A1)

1 0.5 0 1 2

July 7, 2008P:\Shared Folders\Planning GIS\Open Space Team\SSHCP\WADI Revised\WADI_06-11-08.mxd



South Sacramento HCP Boundaries & USFWS Species Recovery Units & Critical Habitat

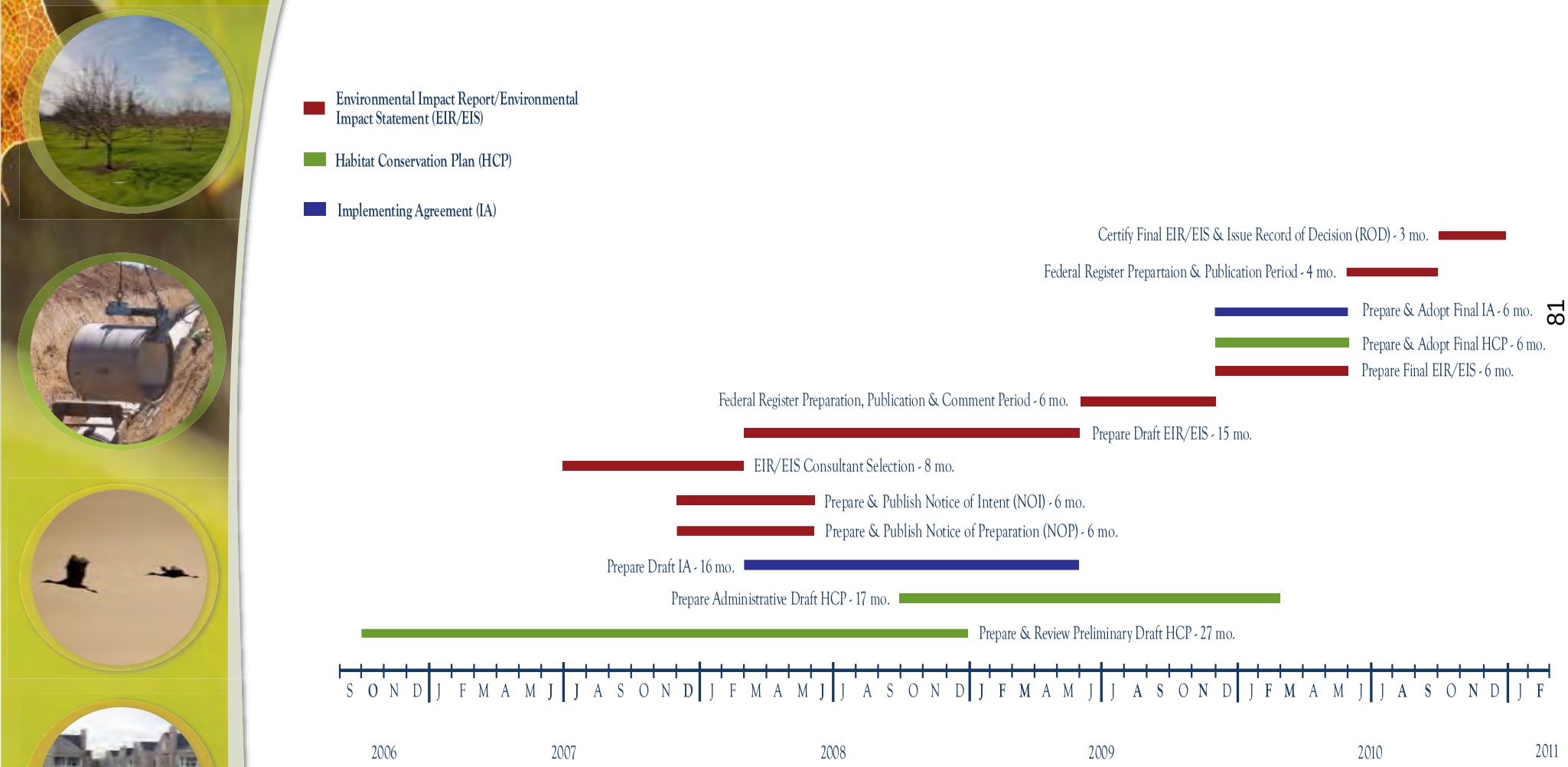
- City Jurisdiction
- SSHCP Plan Area
- SSHCP Urban Development Area (UDA)
- Streams/Creeks
- Swale
- Vernal Pool
- Vernal Pool Recovery Unit

Critical Habitat Areas

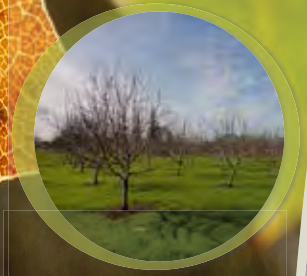
- Sacramento & Slender Orcutt Grass
- California Tiger Salamander
- Vernal Pool Fairy & Tadpole Shrimp

South Sacramento Habitat Conservation Plan

SSHCP TIMELINE



South Sacramento Habitat Conservation Plan













Public Comment Opportunities During the Preparation of the EIR/EIS

Notice of Preparation and *Notice of Intent* Released

Provide Written Comments

June 10 – July 30, 2008

Provide Comments at Scoping Meetings

July 8, 2008 Galt
July 11, 2008 Sacramento
July 15, 2008 Rancho Cordova
July 16, 2008 Elk Grove

Provide Comments at Community Workshops

Locations and Dates to be determined

August 2008

County and Service write the Draft EIR/EIS

- ✓ Consider Public Comments
- ✓ Compare Alternatives
- ✓ Analyze Substantive Effects
- ✓ Evaluate Mitigation Measures

Summer 2008-Summer 2009

Draft EIR/EIS

Provide Comments During the 60-day Public Comment Period

Summer 2009

Provide Comments at Meetings and Public Hearing on the Draft EIR/EIS

Summer 2009

County and Service write the Final EIR/EIS

- ✓ Respond to Substantive Comments
- ✓ Revise Text Based on Comments

Summer 2009-Summer 2010

Final EIR/EIS

Provide Comments During the 30-day Review Period

Summer 2010

Agency Decisions

- ✓ Consider any Public Comments
- ✓ County prepares Findings
- ✓ Service prepares Record of Decision

Fall/Winter 2010

GREEN indicates opportunities to provide input

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 1	Specific Requirements	**1a**	Establish a Core preserve at least 1,000 acres in size that incorporates 60 vernal pool acres, 2 occurrences of Sacramento Orcutt Grass at least 300' from the preserve edge and is no less than 1,500' wide at any given point	1
			Establish two landscape linkages at least 1,000' wide: one to Zone 1b and one to Zone 6a.	1,41,43
			Preserve 80 Vernal Pool Ac on Surficial Alluvial Deposits, Laguna & Mehrten Formations (60 Ac must occur on category 1 or 2 LAU)	1
			Preserve 1,500 Valley Grassland Ac	1
		1b	Establish a Minor preserve at least 750 acres in size that incorporates one occurrence of Western Spadefoot Toad 300' from the preserve edge	2
			Establish two landscape linkages; one to Zone 1e and one to Zone 6a	2
			Preserve 54 Vernal Pool Ac on Surficial Alluvial Deposits, Laguna & Riverbank Formations (44 Ac must occur on category 1 or 2 LAU)	2
		1c	Establish a Satellite preserve that incorporates an occurrence of Slender Orcutt Grass at least 300' from the preserve edge	3
			Preserve 2 Vernal Pool Ac	3
			Preserve 140 Valley Grassland Ac	3
		1d	(none)	
		1e	Establish a Minor preserve at least 466 acres in size that is no less than 2,000' wide at any given point	4
			Establish two landscape linkages at least 700' wide; one to Zone 1b and one to Zone 3b	4
			Preserve 23 Vernal Pool Ac on Laguna & Riverbank Formations (15 Ac must occur on category 1 LAU and 5 Ac must occur on category 1 or 2 LAU)	4
			Preserve 443 Valley Grassland Ac	4
	Shared Requirements	**1**,2,3,4,5,12	Preserve 10 Vernal Pool, 50 Freshwater Marsh, 60 Open Water, 38 Seasonal Impoundment, 8 Seasonal Wetland, 10 Mixed Riparian Scrub, 300 Mixed Riparian Woodland, and 11 Valley Oak Riparian Woodland acres	7,13,14
		1a,**1b**,**1c**,**1e**,2,3b,12	Preserve 161 Swale acres	13
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		1c,**1d**	Preserve 250 Cottonwood Woodland acres	14
		1,3,4,5	Preserve a 600' wide corridor along undeveloped portions of North Laguna Creek	24
		1,2,3,4,5,12	Preserve a 100' wide corridor along undeveloped portions of all remaining Creeks, tributaries and significant swale systems	26
		1c,3b	Preserve all known occurrences of Sacramento and Slender Orcutt Grasses	67
		1,2,3	Preserve six (6) Western Burrowing Owl nesting colonies (at least one in each zone and within 3 miles of 6,000 acres of suitable foraging habitat)	64
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		1,2,3	Restore or Create 12.7 Vernal Pool acres	30
		1,2,3,4,5,6,7,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,7,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		1,2,3,4,5,6,7,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1a,2,3b,7,8,10	Incorporate/establish 2 Western Burrowing Owl nesting areas in all core and landscape preserves and create at least 20 burrows per area	62
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 2	Specific Requirements	**2**	Establish a Core preserve at least 1,040 acres in size that incorporates 40 vernal pool acres, and 1,000 valley grassland acres	5
			Establish one landscape linkages at least 1000' wide to Zone 3b	5
			Preserve 40 Vernal Pool Ac on Surficial Alluvial Deposits, Laguna & Modesto Formations (17 Ac must occur on category 1 or 2 LAU)	5,42
			Preserve 1,000 Valley Grassland Ac	5
	Shared Requirements	1,**2**,3,4,5,12	Preserve 10 Vernal Pool, 50 Freshwater Marsh, 60 Open Water, 38 Seasonal Impoundment, 8 Seasonal Wetland, 10 Mixed Riparian Scrub, 300 Mixed Riparian Woodland, and 11 Valley Oak Riparian Woodland acres	7,13,14
		1a,1b,1c,1e,**2**,3b,12	Preserve 161 Swale acres	13
		1,**2**,3,4,5,6,7,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,**2**,3,4,5,6,7,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		2,3,4	Preserve a 300' wide corridor along undeveloped portions of Elder and Morrison Creeks	25
		1,**2**,3,4,5,12	Preserve a 100' wide corridor along undeveloped portions of all remaining Creeks, tributaries and significant swale systems	26
		1,**2**,3	Preserve six (6) Western Burrowing Owl nesting colonies (at least one in each zone and within 3 miles of 6,000 acres of suitable foraging habitat)	64
		1,**2**,3,4,5,6,7,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,**2**,3,4,5,6,7,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		1,**2**,3	Restore or Create 12.7 Vernal Pool acres	30
		1,**2**,3,4,5,6,7,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,**2**,3,4,5,6,7,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		1,**2**,3,4,5,6,7,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1a,**2**,3b,7,8,10	Incorporate/establish 2 Western Burrowing Owl nesting areas in all core and landscape preserves and create at least 20 burrows per area	62
		1,**2**,3,4,5,6,7,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,**2**,3,4,5,6,7,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,**2**,3,4,5,6,7,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,**2**,3,4,5,6,7,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,**2**,3,4,5,6,7,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 3	Specific Requirements	**3a**	(none)	
		3b	Establish a Core preserve at least 3,000 acres in size that incorporates one occurrence of Slender Orcutt Grass 300' from the preserve edge that is no less than 2,500' wide at any given point.	6
			Establish two landscape linkages; one to Zone 1e that is at least 600' wide and one to Zone 2 that is at least 1,000' wide	6
			Preserve 45 Vernal Pool Ac on Laguna, Riverbank, and Turlock Formations (30 Ac must occur on category 1 or 2 LAU)	6
			Preserve 300 Cropland and/or Irrigated Pasture-Grassland in fee title that incorporates known Tri-colored Blackbird colonies	21
		3c	Establish a landscape linkage that is at least 1,000' wide connecting Zone 3b to Zone 8.	44
	Shared Requirements	1,2,**3**,4,5,12	Preserve 10 Vernal Pool, 50 Freshwater Marsh, 60 Open Water, 38 Seasonal Impoundment, 8 Seasonal Wetland, 10 Mixed Riparian Scrub, 300 Mixed Riparian Woodland, and 11 Valley Oak Riparian Woodland acres	7,13,14
		1a,1b,1c,1e,2,**3b**,12	Preserve 161 Swale acres	13
		1,2,**3**,4,5,6,7,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,**3**,4,5,6,7,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		1,**3**,4,5	Preserve a 600' wide corridor along undeveloped portions of North Laguna Creek	24
		2,**3**,4	Preserve a 300' wide corridor along undeveloped portions of Elder, Gerber and Morrison Creeks	25
		1,2,**3**,4,5,12	Preserve a 100' wide corridor along undeveloped portions of all remaining Creeks, tributaries and significant swale systems	26
		1c,**3b**	Preserve all known occurrences of Sacramento and Slender Orcutt Grasses	67
		1,2,**3**	Preserve six (6) Western Burrowing Owl nesting colonies (at least one in each zone and within 3 miles of 6,000 acres of suitable foraging habitat)	64
		3a,**3b**,6b,6e,7,8	Preserve six (6) Tricolored Blackbird nesting colonies (colonies shall be within 3 miles of 6,000 acres of suitable foraging habitat)	65
		1,**2**,3,4,5,6,7,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,**2**,3,4,5,6,7,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		1,2,**3**	Restore or Create 12.7 Vernal Pool acres	30
		1,2,**3**,4,5,6,7,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,**3**,4,5,6,7,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,7,8,9,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		1,2,**3**,4,5,6,7,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		3,4,5,6,7,8,9,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3,4,5,7,8,9	Restore Valley Elderberry Longhorn Beetle habitat in conjunction with native vegetation along portions of Deer, S. Laguna & N. Laguna Creeks, and the Cosumnes River	49,50,51,52
		3b,6,7,8,9,11	Incorporate/establish 20 Himalayan blackberry sites for Tricolored Blackbird nesting sites within new and existing preserves	61
		1a,2,**3b**,7,8,10	Incorporate/establish 2 Western Burrowing Owl nesting areas in all core and landscape preserves and create at least 20 burrows per area	62
		1,2,**3**,4,5,6,7,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,**3**,4,5,6,7,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,**3**,4,5,6,7,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,**3**,4,5,6,7,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,**3**,4,5,6,7,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 4	Specific Requirements	**4**	(none)	
	Shared Requirements	1,2,3,**4**,5,12	Preserve 10 Vernal Pool, 50 Freshwater Marsh, 60 Open Water, 38 Seasonal Impoundment, 8 Seasonal Wetland, 10 Mixed Riparian Scrub, 300 Mixed Riparian Woodland, and 11 Valley Oak Riparian Woodland acres	7,13,14
		1,2,3,**4**,5,6,7,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,**4**,5,6,7,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		1,3,**4**,5	Preserve a 600' wide corridor along undeveloped portions of North Laguna Creek	24
		2,3,**4**	Preserve a 300' wide corridor along undeveloped portions of Elder and Gerber Creeks	25
		1,2,3,**4**,5,12	Preserve a 100' wide corridor along undeveloped portions of all remaining Creeks, tributaries and significant swale systems	26
		1,2,3,**4**,5,6,7,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,**4**,5,6,7,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		1,2,3,**4**,5,6,7,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,**4**,5,6,7,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,**4**,5,6,7,8,9,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		1,2,3,**4**,5,6,7,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		3,**4**,5,6,7,8,9,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3,**4**,5,7,8,9	Restore Valley Elderberry Longhorn Beetle habitat in conjunction with native vegetation along portions of Deer, S. Laguna & N. Laguna Creeks, and the Cosumnes River	49,50,51,52
		1,2,3,**4**,5,6,7,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,**4**,5,6,7,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,**4**,5,6,7,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,**4**,5,6,7,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,**4**,5,6,7,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 5	Specific Requirements	**5**	(none)	
	Shared Requirements	1,2,3,4,**5**,12	Preserve 10 Vernal Pool, 50 Freshwater Marsh, 60 Open Water, 38 Seasonal Impoundment, 8 Seasonal Wetland, 10 Mixed Riparian Scrub, 300 Mixed Riparian Woodland, and 11 Valley Oak Riparian Woodland acres	7,13,14
		1,2,3,4,**5**,6,7,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,**5**,6,7,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		1,3,4,**5**	Preserve a 600' wide corridor along undeveloped portions of North Laguna Creek	24
		1,2,3,4,**5**,12	Preserve a 100' wide corridor along undeveloped portions of all remaining Creeks, tributaries and significant swale systems	26
		1,2,3,4,**5**,6,7,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,**5**,6,7,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		1,2,3,4,**5**,6,7,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,**5**,6,7,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,**5**,6,7,8,9,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		1,2,3,4,**5**,6,7,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		3,4,**5**,6,7,8,9,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3,4,**5**,7,8,9	Restore Valley Elderberry Longhorn Beetle habitat in conjunction with native vegetation along portions of Deer, S. Laguna & N. Laguna Creeks, and the Cosumnes River	49,50,51,52
		1,2,3,4,**5**,6,7,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,**5**,6,7,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,**5**,6,7,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,**5**,6,7,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,**5**,6,7,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 6	Specific Requirements	**6a**	Establish a Minor preserve at least 400 acres in size that is no less than 1,000' wide at any given point.	8
			Establish two landscape linkages that are at least 1,000' wide; one to Zone 1a and one to Zone 1b	8
			Preserve 10 Vernal Pool Ac on Laguna Formation (10 Ac must occur on category 1, 2, or 3 LAU)	8
		6b	(none)	
		6c	(none)	
		6d	(none)	
		6e	(none)	
		6f	Establish a landscape linkage that is at least 2,640' wide to Zone 7	45
	Shared Requirements	**6**,7,8,9,10,11	Preserve 191 Freshwater Marsh, 182 Open Water, 187 Seasonal Impoundment, 135 Seasonal Wetland, 95 Mixed Riparian Scrub, and 663 Mixed Riparian Woodland acres	13,14
		6a,7,8,9,10,11	Preserve 207 Swale acres	13
		1,2,3,4,5,**6**,7,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,**6**,7,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		6b,**6e**,**6f**	Preserve 48 Blue Oak Woodland acres	15
		6,7,8,9,10,11,12	Preserve 141 linear miles of Stream channel within a habitat corridor (800' wide, 2,000' wide along the Cosumnes R.)	21,22,23,63
		6b,**6e**,**6f**,7	Preserve 2,500 Blue Oak Woodland and 1,500 Savannah acres beyond compensatory mitigation	27
		6,7,8,9,10,11	Preserve 6,500 Valley Grassland acres beyond compensatory mitigation	26
		3a,3b,**6b**,**6e**,7,8	Preserve six (6) Tricolored Blackbird nesting colonies (colonies shall be within 3 miles of 6,000 acres of suitable foraging habitat)	65
		1,2,3,4,5,**6**,7,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,**6**,7,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		1,2,3,4,5,**6**,7,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,**6**,7,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,**6**,7,8,9,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		1,2,3,4,5,**6**,7,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		6b,**6e**,**6f**	Restore 48 Blue Oak Woodland acres	37
		3,4,5,**6**,7,8,9,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		6,7,8,9,10	Incorporate clusters of native shrubs in 20 locations and up to 1,000 hunting perches (100 perches/20Ac) within new and existing preserves for Loggerhead Shrike	59,60
		3b,**6**,7,8,9,11	Incorporate/establish 20 Himalayan blackberry sites for Tricolored Blackbird nesting sites within new and existing preserves	61
		1,2,3,4,5,**6**,7,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,**6**,7,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,**6**,7,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,**6**,7,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,**6**,7,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 7	Specific Requirements	**7**	Establish a Landscape preserve at least 10,242 acres in size that is no less than 2,500' wide at any given point.	9
			Establish two landscape linkages that are at least 1,000' wide; one to Zone 8 (between Wilton & Alta Mesa) and one to Zone 10	9,46
			Preserve 242 Vernal Pool Ac (242 Ac must occur on category 1 or 2 LAU)	9
			Preserve 10,000 valley grassland acres	9
			Preserve a minimum of 200 Cropland Ac in fee title to be maintained in for Alfalfa production (1 plot - 200 Ac/plot)	18,55
	Shared Requirements	6,**7**,8,9,10,11	Preserve 191 Freshwater Marsh, 182 Open Water, 187 Seasonal Impoundment, 135 Seasonal Wetland, 95 Mixed Riparian Scrub, and 663 Mixed Riparian Woodland acres	13,14
		6a,**7**,8,9,10,11	Preserve 207 Swale acres	13
		7,10	Preserve 81 Seasonal Impoundment acres	13
		1,2,3,4,5,6,**7**,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,**7**,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		7,8,9,10,11	Preserve 4,571 Cropland and/or Irrigated Pasture Ac	17
		7,8,9	Preserve 30 Valley Oak Riparian Woodland acres	14
		6,**7**,8,9,10,11,12	Preserve 196 linear miles of Stream channel within a corridor (800' wide, 2,000' wide along the Cosumnes R.) ensuring that 55 linear miles is preserved to support Giant Garter Snake	21,22,23,63
		6b,6e,6f,**7**	Preserve 2,500 Blue Oak Woodland and 1,500 Savannah acres beyond compensatory mitigation	27
		6,**7**,8,9,10,11	Preserve 6,500 Valley Grassland acres beyond compensatory mitigation	26
		7,8,9,10,11	Preserve 2,000 Cropland acres beyond compensatory mitigation	29
		3a,3b,6b,6e,**7**,8	Preserve six (6) Tricolored Blackbird nesting colonies (colonies shall be within 3 miles of 6,000 acres of suitable foraging habitat)	65
		1,2,3,4,5,6,**7**,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,**7**,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		7,8,9,10,11	Restore or Create 241.3 Vernal Pool and 184 Swale acres	31
		1,2,3,4,5,6,**7**,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,**7**,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,**7**,8,9,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		1,2,3,4,5,6,**7**,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1,2,3,4,5,6,**7**,8,9,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3,4,5,**7**,8,9	Restore Valley Elderberry Longhorn Beetle habitat in conjunction with native vegetation along portions of Deer, S. Laguna & N. Laguna Creeks, and the Cosumnes River	49,50,51,52
		6,**7**,8,9,10	Incorporate clusters of native shrubs in 20 locations and up to 1,000 hunting perches (100 perches/20Ac) within new and existing preserves for Loggerhead Shrike	59,60
		3b,6,**7**,8,9,11	Incorporate/establish 20 Himalayan blackberry sites for Tricolored Blackbird nesting sites within new and existing preserves	61
		1a,2,3b,**7**,8,10	Incorporate/establish 2 Western Burrowing Owl nesting areas in all core and landscape preserves and create at least 20 burrows per area	62
		1,2,3,4,5,6,**7**,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,**7**,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,**7**,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,**7**,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,**7**,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 8	Specific Requirements	**8**	Establish a Core preserve at least 1,500 acres in size that is no less than 2,500' wide at any given point.	10
			Establish two landscape linkages that are at least 1,000' wide; one to Zone 3b and one to Zone 7	10
			Preserve 79 Vernal Pool Ac on Laguna and Riverbank formations (55 Ac must occur on category 1 or 2 LAU)	10
			Preserve 2,500 valley grassland acres	10
			Preserve 1,000 Cropland and/or Irrigated Pasture Ac	17
			Preserve a minimum of 1,000 Cropland Ac in fee title to be maintained in for Alfalfa production (5 plots - 200 Ac/plot: 3 north and 2 south of Dillard Rd.)	18,55
	Shared Requirements	6,7,**8**,9,10,11	Preserve 191 Freshwater Marsh, 182 Open Water, 187 Seasonal Impoundment, 135 Seasonal Wetland, 95 Mixed Riparian Scrub, and 663 Mixed Riparian Woodland acres	13,14
		6a,7,**8**,9,10,11	Preserve 207 Swale acres	13
		1,2,3,4,5,6,7,**8**,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,7,**8**,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		7,**8**,9,10,11	Preserve 4,571 Cropland and/or Irrigated Pasture Ac	17
		7,**8**,9	Preserve 30 Valley Oak Riparian Woodland acres	14
		6,7,**8**,9,10,11,12	Preserve 196 linear miles of Stream channel within a corridor (800' wide, 2,000' wide along the Cosumnes R.) ensuring that 55 linear miles is preserved to support Giant Garter Snake	21,22,23,63
		6,7,**8**,9,10,11	Preserve 6,500 Valley Grassland acres beyond compensatory mitigation	26
		7,**8**,9,10,11	Preserve 2,000 Cropland acres beyond compensatory mitigation	29
		3a,3b,6b,6e,7,**8**	Preserve six (6) Tricolored Blackbird nesting colonies (colonies shall be within 3 miles of 6,000 acres of suitable foraging habitat)	65
		1,2,3,4,5,6,7,**8**,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,7,**8**,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		7,**8**,9,10,11	Restore or Create 241.3 Vernal Pool and 184 Swale acres	31
		1,2,3,4,5,6,7,**8**,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,7,**8**,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,7,**8**,9,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		8,9,11	Restore 60 Valley Oak Riparian Woodland acres	35
		1,2,3,4,5,6,7,**8**,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1,2,3,4,5,6,7,**8**,9,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3,4,5,7,**8**,9	Restore Valley Elderberry Longhorn Beetle habitat in conjunction with native vegetation along portions of Deer, S. Laguna & N. Laguna Creeks, and the Cosumnes River	49,50,51,52
		6,7,**8**,9,10	Incorporate clusters of native shrubs in 20 locations and up to 1,000 hunting perches (100 perches/20Ac) within new and existing preserves for Loggerhead Shrike	59,60
		8,9	Incorporate 5,000 linear feet of hedgerows and 500 suitable trees within the agricultural cropland matrix	57,58
		3b,6,7,**8**,9,11	Incorporate/establish 20 Himalayan blackberry sites for Tricolored Blackbird nesting sites within new and existing preserves	61
		1a,2,3b,7,**8**,10	Incorporate/establish 2 Western Burrowing Owl nesting areas in all core and landscape preserves and create at least 20 burrows per area	62
		1,2,3,4,5,6,7,**8**,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,7,**8**,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,7,**8**,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,7,**8**,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,7,**8**,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 9	Specific Requirements	**9**	Establish two Satellite preserves that are no less than 2,500' wide at any given point; one that is 700 Ac and one that is 200 Ac.	11
			Preserve 80 Vernal Pool Ac on Riverbank formation (50 Ac must occur on category 1 or 2 LAU)	11
			Preserve 29 Seasonal Wetland acres	13
			Preserve 7,200 Cropland and/or Irrigated Pasture Ac	17
			Preserve a minimum of 800 Cropland Ac in fee title to be maintained in for Alfalfa production (4 plots - 200 Ac/plot: 2 north and 2 south of Twin Cities Rd.)	18,55
			Preserve a minimum of 200 Cropland Ac in fee title to be maintained in for Greater Sandhill Crane food plots (10 plots - 20 Ac/plot)	19,56
			Restore 29 Seasonal Wetland acres	36
	Shared Requirements	6,7,8,**9**,10,11	Preserve 191 Freshwater Marsh, 182 Open Water, 187 Seasonal Impoundment, 135 Seasonal Wetland, 95 Mixed Riparian Scrub, and 663 Mixed Riparian Woodland acres	13,14
		6a,7,8,**9**,10,11	Preserve 207 Swale acres	13
		1,2,3,4,5,6,7,8,**9**,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,7,8,**9**,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		7,8,**9**,10,11	Preserve 4,571 Cropland and/or Irrigated Pasture Ac	17
		7,8,**9**	Preserve 30 Valley Oak Riparian Woodland acres	14
		6,7,8,**9**,10,11,12	Preserve 196 linear miles of Stream channel within a corridor (800' wide, 2,000' wide along the Cosumnes R.) ensuring that 55 linear miles is preserved to support Giant Garter Snake	21,22,23,63
		6,7,8,**9**,10,11	Preserve 6,500 Valley Grassland acres beyond compensatory mitigation	26
		7,8,**9**,10,11	Preserve 2,000 Cropland acres beyond compensatory mitigation	29
		1,2,3,4,5,6,7,8,**9**,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,7,8,**9**,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		7,8,**9**,10,11	Restore or Create 241.3 Vernal Pool and 184 Swale acres	31
		1,2,3,4,5,6,7,8,**9**,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,7,8,**9**,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,7,8,**9**,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		8,**9**,11	Restore 60 Valley Oak Riparian Woodland acres	35
		1,2,3,4,5,6,7,8,**9**,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1,2,3,4,5,6,7,8,**9**,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3,4,5,7,8,**9**	Restore Valley Elderberry Longhorn Beetle habitat in conjunction with native vegetation along portions of Deer, S. Laguna & N. Laguna Creeks, and the Cosumnes River	49,50,51,52
		6,7,8,**9**,10	Incorporate clusters of native shrubs in 20 locations and up to 1,000 hunting perches (100 perches/20Ac) within new and existing preserves for Loggerhead Shrike	59,60
		8,**9**	Incorporate 5,000 linear feet of hedgerows and 500 suitable trees within the agricultural cropland matrix	57,58
		3b,6,7,8,9,11	Incorporate/establish 20 Himalayan blackberry sites for Tricolored Blackbird nesting sites within new and existing preserves	61
		1,2,3,4,5,6,7,8,**9**,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,7,8,**9**,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,7,8,**9**,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,7,8,**9**,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,7,8,**9**,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 10	Specific Requirements	**10**	Establish a Core preserve at least 3,100 acres in size that is no less than 2,500' wide at any given point.	12
			Establish a landscape linkage to Zone 7 that is at least 1,000' wide	47
			Establish and maintain connectivity to/from Chase Ranch by preserving habitat or establish landscape linkages to new or existing preserves	12
			Preserve 100 Vernal Pool Ac on Surficial Alluvial Deposits, Laguna, Mehrten & Modesto Formations (80 Ac must occur on category 1 or 2 LAU)	12
			Preserve 3,000 valley grassland acres	12
	Shared Requirements	6,7,8,9,**10**,11	Preserve 191 Freshwater Marsh, 182 Open Water, 187 Seasonal Impoundment, 135 Seasonal Wetland, 95 Mixed Riparian Scrub, and 663 Mixed Riparian Woodland acres	13,14
		6a,7,8,9,**10**,11	Preserve 207 Swale acres	13
		7,**10**	Preserve 81 Seasonal Impoundment acres	13
		1,2,3,4,5,6,7,8,9,**10**,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,7,8,9,**10**,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		7,8,9,**10**,11	Preserve 4,571 Cropland and/or Irrigated Pasture Ac	17
		6,7,8,9,**10**,11,12	Preserve 141 linear miles of Stream channel within a habitat corridor (800' wide)	21,22,23,63
		6,7,8,9,**10**,11	Preserve 6,500 Valley Grassland acres beyond compensatory mitigation	26
		7,8,9,**10**,11	Preserve 2,000 Cropland acres beyond compensatory mitigation	29
		1,2,3,4,5,6,7,8,9,**10**,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,7,8,9,**10**,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		7,8,9,**10**,11	Restore or Create 241.3 Vernal Pool and 184 Swale acres	31
		1,2,3,4,5,6,7,8,9,**10**,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,7,8,9,**10**,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,7,8,9,**10**,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		1,2,3,4,5,6,7,8,9,**10**,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1,2,3,4,5,6,7,8,9,**10**,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		6,7,8,9,**10**	Incorporate clusters of native shrubs in 20 locations and up to 1,000 hunting perches (100 perches/20Ac) within new and existing preserves for Loggerhead Shrike	59,60
		1a,2,3b,7,8,**10**	Incorporate/establish 2 Western Burrowing Owl nesting areas in all core and landscape preserves and create at least 20 burrows per area	62
		1,2,3,4,5,6,7,8,9,**10**,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,7,8,9,**10**,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,7,8,9,**10**,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,7,8,9,**10**,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,7,8,9,**10**,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
	Specific Requirements	**11**	Preserve 1,000 Cropland and/or Irrigated Pasture Ac	17
Zone 11	Shared Requirements	6,7,8,9,10,**11**	Preserve 191 Freshwater Marsh, 182 Open Water, 187 Seasonal Impoundment, 135 Seasonal Wetland, 95 Mixed Riparian Scrub, and 663 Mixed Riparian Woodland acres	13,14
		6a,7,8,9,10,**11**	Preserve 207 Swale acres	13
		1,2,3,4,5,6,7,8,9,10,**11**,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,7,8,9,10,**11**,12	Preserve a total of 24,667 Valley Grassland acres	16
		7,8,9,10,**11**	Preserve 4,571 Cropland and/or Irrigated Pasture Ac	17
		6,7,8,9,10,**11**,12	Preserve 196 linear miles of Stream channel within a corridor (800' wide, 2,000' wide along the Cosumnes R.) ensuring that 55 linear miles is preserved to support Giant Garter Snake	21,22,23,63
		6,7,8,9,10,**11**	Preserve 6,500 Valley Grassland acres beyond compensatory mitigation	26
		7,8,9,10,**11**	Preserve 2,000 Cropland acres beyond compensatory mitigation	29
		1,2,3,4,5,6,7,8,9,10,**11**,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,7,8,9,10,**11**,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		7,8,9,10,**11**	Restore or Create 241.3 Vernal Pool and 184 Swale acres	31
		1,2,3,4,5,6,7,8,9,10,**11**,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,7,8,9,10,**11**,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,7,8,9,10,**11**,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		8,9,**11**	Restore 60 Valley Oak Riparian Woodland acres	35
		1,2,3,4,5,6,7,8,9,10,**11**,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1,2,3,4,5,6,7,8,9,10,**11**,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3b,6,7,8,9,**11**	Incorporate/establish 20 Himalayan blackberry sites for Tricolored Blackbird nesting sites within new and existing preserves	61
		1,2,3,4,5,6,7,8,9,10,**11**,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,7,8,9,10,**11**,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,7,8,9,10,**11**,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,7,8,9,10,**11**,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,7,8,9,10,**11**,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

		Applicable Zones	Measure - Abbreviations	Measure - Reference
	Specific Requirements	**12**	(none)	
Zone 12	Shared Requirements	1,2,3,4,5,**12**	Preserve 10 Vernal Pool, 50 Freshwater Marsh, 60 Open Water, 38 Seasonal Impoundment, 8 Seasonal Wetland, 10 Mixed Riparian Scrub, 300 Mixed Riparian Woodland, and 11 Valley Oak Riparian Woodland acres	7,13,14
		1a,1b,1c,1e,2,3b,**12**	Preserve 161 Swale acres	13
		1,2,3,4,5,6,7,8,9,10,11,**12**	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,7,8,9,10,11,**12**	Preserve a total of 24,667 Valley Grassland acres	16
		6,7,8,9,10,11,**12**	Preserve 141 linear miles of Stream channel within a habitat corridor (800' wide)	21,22,23,63
		1,2,3,4,5,**12**	Preserve a 100' wide corridor along undeveloped portions of all remaining Creeks, tributaries and significant swale systems	26
		1,2,3,4,5,6,7,8,9,10,11,**12**	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,7,8,9,10,11,**12**	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		1,2,3,4,5,6,7,8,9,10,11,**12**	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,7,8,9,10,11,**12**	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,7,8,9,10,11,**12**	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		1,2,3,4,5,6,7,8,9,10,11,**12**	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		3,4,5,6,7,8,9,10,11,**12**	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		1,2,3,4,5,6,7,8,9,10,11,**12**	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,7,8,9,10,11,**12**	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,7,8,9,10,11,**12**	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,7,8,9,10,11,**12**	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,7,8,9,10,11,**12**	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

Appendix D

Public Comments

George Waegell Letter
Sam Miller Email
Lynn Wheat Email
William H. Geyer Letter
Jack Sales Letter
Wildlands Inc. Letter
Todd Chambers Letter
Galt Meeting Signin Sheets
Galt Meeting Comment Cards
Sacramento Meeting Signin Sheets
Sacramento Meeting Comment Cards
Rancho Cordova Meeting Signin Sheets
Rancho Cordova Meeting Comment Cards
Elk Grove Meeting Signin Sheets
Elk Grove Meeting Comment Cards

[redacted]



July 15, 2002

Attn: Peter Morse
DERA, County of Sacramento
827 7th Street, Room 220
Sacramento, CA 95814

Comment - South Sacramento HCP, Environmental Review Process

MORRISON CREEK SHED JUMP

Historically there was little shed jump from Morrison Creek south across Kiefer Blvd into the Laguna creek watershed at Sunrise Blvd.

There is a1937 aerial photo that shows only swales and not the new channel cutting southeast across the Shalako Property, APN 067-0090-026-0000. On Dec 30, 2005 heavy runoff from the new AKT Sun Ridge development flooded Sunrise Blvd and Folsom South Canal, and eroded a new tributary to Laguna Creek east of Sunrise Barn.

In the fifties and sixties I dry farmed wheat in the swales south of Kiefer Road. In the late 1960's when Sunrise Blvd was built an 18 inch culvert was installed to carry road runoff from the west side to the east side into the swales farmed to wheat. In 2005 with Sun Ridge streets and housing in place this culvert was completely overwhelmed as water backed up and poured across Sunrise. With added flooding from the east side a new 2 ft by 2t channel was cut down these swales to Laguna Creek.

There is currently serious back cutting on both sides of Sunrise near the black walnut tree. This is caused by a 10 ft drop in elevation in a distance of 400 ft. The 2005 unprecedented flooding results from two inadequate flumes across Folsom South Canal and minimal catchment basins on the AKT SunRidge development.

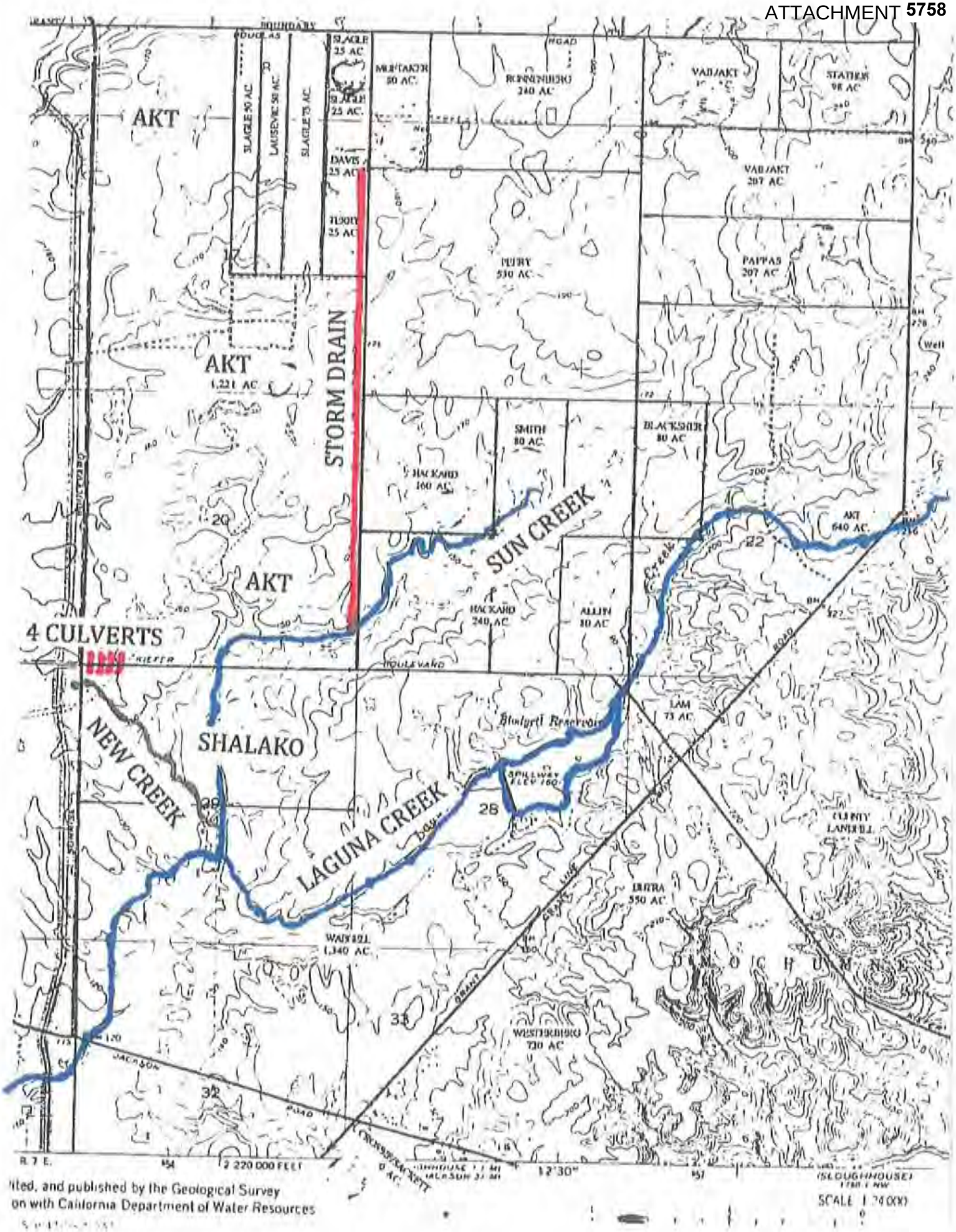
County Drainage is memorializing this untenable situation with a dozen pipes crisscrossing Sunrise and four 30 inch pipes under Kiefer Road. These pipes will flood a vernal pool complex and cause serious erosion compromising the ecological functioning of these pools.

When only minor elevations separate watersheds, shed jump can occur with deeply set storm drains. This is evidenced by the 3 ft diameter storm drain emerging at the Jaeger Road bridge over Sun Creek. Running north along the west side of Jaeger Road this pipe will deliver Morrison Creek water to the Laguna Creek watershed via Sun Creek. It is also possible that storm drains could deliver Morrison water into a tributary of Laguna that drains into Blodgett Reservoir. Sun Ridge storm drains will have a serious impact on the Laguna Creek floodplain.

Shed jump flooding, deep set storm drains, and inadequate catchment basins are causing serious problems for those downstream. These issues must be addressed.

Sincerely,

[redacted]



ited, and published by the Geological Survey
on with California Department of Water Resources

From: Sam Miller
Sent: Thursday, July 17, 2008 1:51 PM
To: Radmacher. Richard (MSA)
Subject: RE: NOP

oooops

Sam Miller

From: Radmacher. Richard (MSA) [mailto:RADMACHERR@saccounty.net]
Sent: Thursday, July 17, 2008 12:13 PM
To: Sam Miller
Subject: RE: NOP

No problem except there was no attachment.

From: Sam Miller
Sent: Thursday, July 17, 2008 11:13 AM
To: Radmacher. Richard (MSA)
Subject: NOP

Richard:

Could you see that the attached comments get to the right persons (unless you believe they should not see the light of day!) for me?

thanks

Sam Miller

Notice of Preparation of an EIR/EIS for the South Sacramento Habitat Conservation Plan.

1. It might be useful to change an element of the plan. The National Academy of Sciences recommendations have been the reference point for definition of compensation for loss of wetlands. Those six recommendations are:

a. Avoid wetlands that cannot be restored
b. Maintain watershed diversity, connectivity, etc.
c. Ensure that mitigation sites become self sustaining
d. Mitigate before or concurrent with impacts
e. Develop clear, enforceable, compliance requirements
f. Give authority and funding to third party stewards.

The plan as written includes a finance section. The first obligation of this effort has been to define the costs of the plan implementation. My consideration is this

It appears to be that a seventh recommendations has been added. The addition is the continuing study of the wetlands set aside in landscape, core, satellite and minor preserves. This commitment appears to go beyond assurance of the accomplishment of the six recommendations, particularly c – e, and to creation of research opportunity.

While there is no question that the continued research of wetlands is a valuable effort, the focus should be clearly upon maintenance and assurance and not upon investigation and assessment of the wetlands. As is true of all environments, the valley floor and margins are dynamic environments. The cost of plan implementation is a significant element of the plan viability. The EIR should address the cost differential for conservation plus research as against conservation only from the perspective of cost being an inhibitor of plan viability. Please address the value of making the long term mitigation and monitoring plan a conservation only effort and not conservation plus research.

2. It has been my understanding for some years now that the Garter Snake is an entirely "timid/asocial critter". The plan at several places would have habitat enhancement/creation in areas near by urban/suburban development. This characteristic of the snake should help to direct the identification of suitable mitigation/restoration locations for this snake. The EIR/EIS should identify and include a list or some presentation of geographic areas where restoration of habitat and/or creation of habitat is likely to be ineffective.

3. The recently distributed General Plan visioning efforts in both the Grant Line and the Jackson area suggest land uses in contradiction of the HCP. The consequence of these alternatives should be discussed.

4. The plan appears to have a strong bias against restoration efforts as a form of mitigation. The EIR/EIS should explore the potential for expansion of the use of restoration. The commonly cited basis for the current threats against Special Status species, particularly vernal pool species, is the over 160 years of farming and urban/suburban development that has occurred throughout the original range of the species. To the extent that significant likelihood of success of restoration is possible within, adjacent to or within or on an annexation basis to a Core or Landscape scale preserve, restoration should have equal value to preservation.

5. The use of terms fundamental to understanding of the EIR/EIS need to be defined up front in the document.

From: lynn wheat
To: morsep@saccounty.net; nina_bicknese@fws.gov
Sent: Friday, July 18, 2008 1:55:18 PM
Subject: SSHCP=public comment for record
To: Peter Morse County of Sacramento DERA
To: Nina Bicknese U.S. Fish and Wildlife NEPA

Regarding: South Sacramento Habitat Conservation Plan. NOP

The following are comments I would like evaluated and placed into the record.

I attended the Public Meeting in Elk Grove on July 16th and at the time shared my concerns regarding property situated within the City limits of Elk Grove located at Bond and Waterman Roads. This area (230 acres) is home to many migratory species, endangered and threatened plant and animal species. Located on the property are high grade quality vernal pools and wetlands that support the local habitat (Considered a preservation site in the 1980's).

It is my opinion after much investigation into this property that this site should not be ignored in evaluating the SSHCP.

This area preserved would be a wonderful site for preservation of species and natural resources.

- Currently Sacramento Area Sewer District owns this property.

- Located on this site of vernal pools and wetlands is Whitehouse Creek that flows into Laguna Creek.

? **What will be the cumulative impacts of channeling the waters of the wetlands and Whitehouse Creek into Laguna Creek?**

? **How will this impact local flood issues?**

? Currently the vernal pool and wetland waters are filtered through the soils renewing local water table levels. **What will this loss do to the water table on residential use by residents of Sheldon area?**

? In a 1993 EIR the vernal pools and wetland were not going to be filled-I suppose because of their importance. **What happened to make this change with the Elk Grove City plans for development? How has this been evaluated with the SSHCP?**

• This site is home to various bird species as identified by a biological consultant of Sacramento Area Sewer District.

? 27 bird species were identified: note in particular White-tailed Kite, Red Winged Blackbird, Tri Colored Blackbird, Snowy egret, Red Tailed Hawk, Kill deer, Western Kingbird, Swallows, Cedar Waxwing, Western Meadowlark.

? How is the area habitat being protected for these species? Where will these species relocate? Are there enough mitigation banks available to support the various bird species? Has is been determined when banks are full? Are the banks accessible to the public? Is reconstructing an area for the species as cost effect as preserving what is already available? Is there documentation available to support either?

• As previously reported/documented this site is home to federally listed species: Vernal Pool Tadpole Shrimp, Vernal Pool Fairy Shrimp, threatened slender Orcutt Grass and Sacramento Orcutt Grass.

? What impact will developing this site have in regards to habitat preservation for the region?

? When do the mitigation banks reach capacity? Will net loss be significantly more than net gain?

? **What documentation information will be used supporting the decisions in the EIR?**

Elk Grove City supposedly supports the habitat conservation plan, however I would suggest with the city's behavior of mitigating away the vernal pools and wetlands and accepting dollars for Swainson Hawk valuable specie habitat has been lost within the city.

Through FOIA I attempted to obtain information regarding vernal pools and wetland mitigation and the amounts filled/lost and the city did not have a record of the totals. The city was able to provide the habitat areas of Swainson Hawk loss only because of dollars accepted.

I requested all records of development that included wetland/vernal pool mitigation. In every recent situation the vernal pools were mitigated away and there was not any onsite preservation.

? **As citizens are there any guarantees when the plan is implemented the cities will be amenable and follow the plan/ guidelines as developed?**

? **Who will be overseeing the implementation of the plan? Will it be individual agencies/cities? How will the coordination look?**

? **Is Elk Grove willing to rezone an area for an urban preserve?** (Elk Grove has rezoned many many areas changing site designations from the approved general plan).

? **How cooperative is the City of Elk Grove in this plan? Are they demonstrating by any actions that habitat preservation is important?**

? **Will this be addressed in the EIR?**

I recommend and suggest the following:

Cities need to have available urban preserves allowing open spaces within the city and allowing wildlife species to remain and continue on their current sites. I was told by the city Swainson Hawk and Kite would not be in this area-to urban….How come the species are here?

Urban preserves with interpretive centers are an excellent resource for youth and adults alike. The preserves provide walkable areas within the city allowing for outdoor exercise and a nature experience. In particular the site at Bond and Waterman would allow natural, undisturbed connectivity between Whitehouse Creek and Laguna Creek.

This property is situated such that the local elementary, middle and high school could use this as a valuable area for science/natural resource studies. I was told by one professional biologist this particular site was one used during her college days for study as an example of quality vernal pools and habitat.

As the life style of Americans change with the change in our natural/ energy resources looking forward and envisioning urban preserves will offer local interaction with nature while providing the exercise of walking or riding a bike and at the same time will prevent car emissions/pollutants as one won't have to drive to experience nature in the outdoors.

Urban Preserves will allow species an opportunity to choose to remain and live in their current environment.

Lynn Wheat

Fax 874-7593

OCT 27 2008
BOARD OF SUPERVISORS

From: William H. Geyer
To: Don Nottoli, Supervisor, Sacramento County
Date: Oct 24, 2008
Subject: HCP Comments

Dear Don,

Two weeks ago I was unable to attend the session that Herb Garms invited me to, with you and other county officials, to discuss the implementation of the proposed HCP in our area. I understand comments are due today. Here are some preliminary thoughts.

1. I attended one of your community input workshops. Whether they have any value as public comment exercises, I will leave for you to decide. However, regarding HCPs, landowners are far more than a part of the general public, and I believe those workshops are an insufficient and ineffective tool for communicating with them.

2. We spent two years and a lot of time and effort on the East County Open Space Committee earlier this decade, trying to learn what kind of programs the landowners would be willing to consider participating in for open space enhancements and protection. They recommended a smorgasbord approach, and suggested more than a dozen possible approaches. From conversations with them, and personal observations since, I fear the county may have learned little or nothing from that valuable exercise. I suggest you revisit those proposals with the local ranchers, and use them to help shape a viable approach to the HCP if you want any substantial participation.

3. I have had extensive experience with HCPs and NCCPs, primarily in southern California, and have a good grasp of what makes them work or not work for landowners. I also know that neither the state (DFG) nor federal (USFW) wildlife people have ever had a very good approach to dealing with working landscapes (like ranches) other than forcing them into permanent single purpose reserves as urban mitigation. I also know that tying up extensive land areas through regulatory means far ahead of the need for actual mitigation and ahead of the ability of either the governments' or developers' ability to pay for it at prices that reflect its long-term amenity value to the urban community it is designed to serve, is an environmentalist's dream, a landowner's nightmare, and a recipe for gridlock.

4. As a result of my experiences, I am acquainted with a number of environmental and planning consultants with development experience who I think have the capability of suggesting approaches that might help you. I would be willing to impose on some of these people to either meet with you, or to work with both of us, to critique your present situation and help you construct successful real-world approaches that would ultimately allow the ranchers who wished to remain to become compensated stewards, and help those who do not, to control the timing and economics of their exit strategy.

Let me know if I can be of help.

Sincerely, William H. Geyer

Morse. Peter

From:
Sent: Tuesday, June 24, 2008 1:28 PM
To: Morse. Peter
Subject: South Sacramento Habitat Conservation Plan

Dear: Mr. Morse

I am very short on time with up coming travel.
In case I can't make the meetings or respond specifically to the EIR pleas consider this a response.
Understanding that I have not looked at the EIR but will soon.

My response is -

Any EIR or Habitat Conservation Plan plan prepared today or in the future can only be considered incomplete or invalid if it does not address Outdoor Lighting, Light Trespass (into the havitat, and Light Pollution.

For a partial basis of my statement please see my Ecological Light Pollution Page on skykeepers web site.
http://www.skykeepers.org/ecol-lp.html

Many references on that page address the wildlife of the area and the adverse effects of light at night.

Ecological Consequences of Artificial Night Lighting (ECANL) By Catherine Rich, Travis Longcore is a good starting point.

Some of the species noted on that page and ECANL are-

Salmon, Bats, Frogs, Zooplanktion, Moths, Salamanders etc.

In my opinion -
Outdoor Lighting constitute a "taking" under the ESA.

"Harm" includes "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

Outdoor Lighting is - a "significant habitat modification or degradation"
Outdoor Lighting can - "significantly impairing essential behavioral patterns"
Outdoor Lighting can - affect breeding
Outdoor Lighting can - affect feeding (reduced foraging)

How much light? Very low levels in the case of Zooplanktion, some Frogs and even fish.
In most cases levels well below that produced by the full moon can have a negative effect on various aspects of breeding, foraging while somewhat higher levels effect predation and navigation.

In closing this is a Habitat Conservation Plan, the natural night time is a part of the "Habitat" and any degradation of the natural levels must be considered.

Regards

---- Original message ----
>Date: Mon, 23 Jun 2008 16:40:34 -0700
>From: "SSHCP (MSA)" <sshcp@SacCounty.NET>



WILDLANDS, INC.

July 30, 2008

Ms. Joyce Horizumi
Environmental Coordinator
Sacramento County Department of Environmental Review and Assessment
827 7th Street, Room 220, Sacramento, CA 95814

Re: South Sacramento Habitat Conservation Plan Notice of Preparation (Control Number 03-PLE-0637)

Dear Ms. Horizumi:

Wildlands, Inc. ("Wildlands") would like to thank you for the ongoing efforts to reach out to stakeholders within Sacramento County and provide an opportunity to participate in the creation of the South Sacramento Habitat Conservation Plan ("HCP"). Wildlands owns and operates several Mitigation and Conservation Banks throughout the HCP Planning Area, and we applaud your efforts to create a document that provides the regulated community with identifiable preservation goals while maintaining adequate organizational flexibility to allow the HCP to adapt to changes in the environment and development outlook for the County.

As a land owner in Sacramento County, an active contributor to the overall environmental health and well-being of the County, and an interested party in the development of the HCP, Wildlands is providing the following general comments for incorporation into the Draft Environmental Impact Report/Environmental Impact Statement ("EIR/EIS").

Incorporation of Existing Tools to Guarantee Restoration and Protection.
Private and non-profit Conservation and Mitigation Organizations such as Wildlands have been pursuing restoration and preservation goals within Sacramento County for over 15 years, and have protected thousands of acres within the County through the establishment of Mitigation and Conservation Banks ("Banks").

The maintenance and protection of these Bank habitats are guaranteed through Agency-reviewed cost models for endowment requirements, formalization of legally defensible Conservation Easement templates, and standardization of monitoring and reporting programs for long term management activities which are designed to ensure protection of environmental resources in perpetuity. Through almost two decades of fine tuning and regulatory oversight, these Banks are now able to allocate costs for land acquisition, endowment funding, and long term management through the sale of credits within each individual preserve. We suggest incorporation of these same tools into the HCP will provide a mechanism to determine HCP costs, and therefore habitat fees, in a manner which ensures a sustainable program.

We therefore believe a discussion of these items needs to be included in the scope and content of the environmental information provided in the EIR/EIS such that Agencies and Interested Parties

3855 Atherton Road • Rocklin, CA 95765 (916) 435-3555 • Fax (916) 435-3556

may understand the mechanisms by which fees will be established, the HCP program will be made sustainable, and mitigation for impacts will be generated and protected in perpetuity.

Use of Existing Restoration Resources.
Conservation and Mitigation Bank market-ready credits within the HCP Planning Area represent fully entitled, restored, and/or protected habitats which can be used by the HCP as a front loading mechanism upon initiation of the HCP, or can be used to achieve the HCP "get ahead and stay ahead" goals.

We therefore believe that a discussion of the role which market ready credits in entitled bank properties may play in the achievement of HCP goals needs to be included in the scope and content of the environmental information provided in the EIR/EIS.

Consistency with the Federal Final Rule on Compensatory Mitigation.
Effective June 2008, the U.S. Army Corps of Engineers ("Corps") and Environmental Protection Agency ("EPA") adopted 33 CFR Part 332 and 40 CFR Part 230, which established their Final Rule on mitigation for impacts to wetlands and aquatic resources. The Rule applies equivalent standards to permittee-responsible compensatory mitigation, mitigation banks and in-lieu fee mitigation. Since Banks must have approved management plans and long term financial assurances in place before all of their credits can be used to offset permitted impacts, Sections 332.3 and 230.93 of the Rule establish a priority preference for the use of Banks for compensatory mitigation. Simply put, the Rule recognizes that the use of Banks requires successful mitigation prior to permitting an impact, while an HCP may allow impacts prior to successful mitigation. The Rule also recognizes deferred mitigation can increase the risks and uncertainties associated with successful mitigation as well as create inconsistency with the Corps "no net loss policy".

We therefore believe that a discussion needs to be provided in the EIR/EIS on the consistency of the HCP mitigation policy with the Final Rule priority preferences and requirements for HCP – Bank biological equivalency, as well as the national policy of "no net loss" of wetlands.

We look forward to continuing to work with your office during the development of the EIR/EIS and the HCP documents. If you have any questions on these comments, do not hesitate to contact me at (916) 435-3555.

Regards,



Paul Sherman
Wildlands, Inc.

August 29, 2008

Ms. Joyce Horizumi
Environmental Coordinator
Department of Environmental Review and Assessment
County of Sacramento
827 7th Street, Room 220
Sacramento, CA 95814

Re: Notice of Preparation of a Joint Draft Environmental Impact Report and Environmental Impact Statement for South Sacramento Habitat Conservation Plan (Control Number 03-PLE-0637)

Dear Ms. Horizumi:

Please accept the following comments and suggestions submitted on behalf of the Harry Family, the owners of approximately 700 acres (Harry Ranch) located within the South Sacramento Habitat Conservation Plan (SSHCP) Zone 9. More specifically, Harry Ranch is located directly south of Eschinger Road and west of State Route 99 (see attached Exhibit 1).

The Harry Ranch property is a working cattle ranch, of which this land use is defined in the SSHCP as "irrigated pasture". In addition, the property provides habitat value for Swainson's Hawk, Greater Sandhill Crane, Tricolored Blackbird, Western Burrowing Owl, White-faced Ibis, and White-tailed Kite to name a few.

We have reviewed the subject Notice of Preparation and offer the following comments.

Land Use

Harry Ranch is located outside the Urban Development Area (UDA), just south of Eschinger Road, which is the southern boundary of the City of Elk Grove's proposed Sphere of Influence (SOI) Amendment application currently on file with Sacramento County LAFCo. As such, future urban development is being considered to move south of Kammerer Road (the current city limits of Elk Grove and Urban Services Boundary) to Eschinger Road. The SOI Amendment application should be considered when identifying strategic properties for permanent preservation as part of the SSHCP. Given this scenario, the Harry Ranch property is strategically located to provide permanent conservation land between potential future development and existing preserve land contiguous to and located directly southeast. A 700 acre irrigated pasture / farmland preserve in this location is consistent with the Conservation Principals of the SSHCP, including 1) minimizing fragmentation, 2) minimizing edge effects, 3) establishing connectivity, and 4) maximizing heterogeneity. Establishing a permanent conservation area directly south of Eschinger Road should be addressed in the SSHCP Draft EIR / EIS as the Elk Grove SOI Amendment application should be considered a reasonably foreseeable project under CEQA.

Agriculture

The Harry Ranch property and other similar properties in the area should be analyzed in the SSHCP Draft EIR/EIS as the first areas to be targeted for mitigation of impacts to irrigated pasture and farmland in order to establish a buffer line where future urban development in this area cannot occur south of this boundary. In addition, The SSHCP Draft EIR/EIS should analyze a requirement for future development

occurring within Zone 5 and impacting irrigated pasture and farmland in Zone 5, to mitigate for the loss of agricultural land impacts in Zone 9. As more irrigated pasture and farmland with "like" habitat is developed to the north of Harry Ranch, the more critical it becomes to preserve the Harry Ranch property and other properties with similar value in the immediate area. Having this area under permanent conservation early on in the implementation of the SSHCP will set a precedent for establishing other conversation land in this area of Sacramento County.

Economic Analysis

The SSHCP Draft EIR/EIS should include an Economic Analysis Section that analyzes a provision for additional credit beyond one acre of impact equals one acre of mitigation for irrigated pasture and farmland. The SSHCP Draft EIR/EIS should analyze a requirement for providing 3 acres of credit for every one acre of land on those properties extending ½ mile south of Eschinger Road, including Harry Ranch (see attached Exhibit 2). The additional credit consideration would provide an incentive for landowners in this area to voluntarily participate in the SSHCP program, thus directly assisting in meeting the established Conservation Principals and providing a clear buffer or boundary between urban development to the north and permanent preservation land. The value of having a permanent conservation buffer on the edge of future urban development in this area of the County should be recognized in the SSHCP as this concept is strongly desired by the local community and environmental stakeholders. This provides the County an opportunity to implement this buffer concept. In addition, future development should be required to directly acquire needed habitat mitigation land in lieu of simply paying a established fee for the land acquisition component of the program. This will ensure that the land acquisition fee component of the program is not outpaced by land values.

In summary, we believe that the properties located south of Eschinger Road including Harry Ranch provide a strategic aspect of establishing a permanent preserve boundary between future urban development and existing / future open space habitat. Therefore, providing additional economic incentive in the form of enhanced credit value for landowners in this area to place their land under permanent conservation is warranted.

Thank you for the opportunity to comment on the subject NOP. If you have any questions regarding this information, please contact me at (916) 837-2266

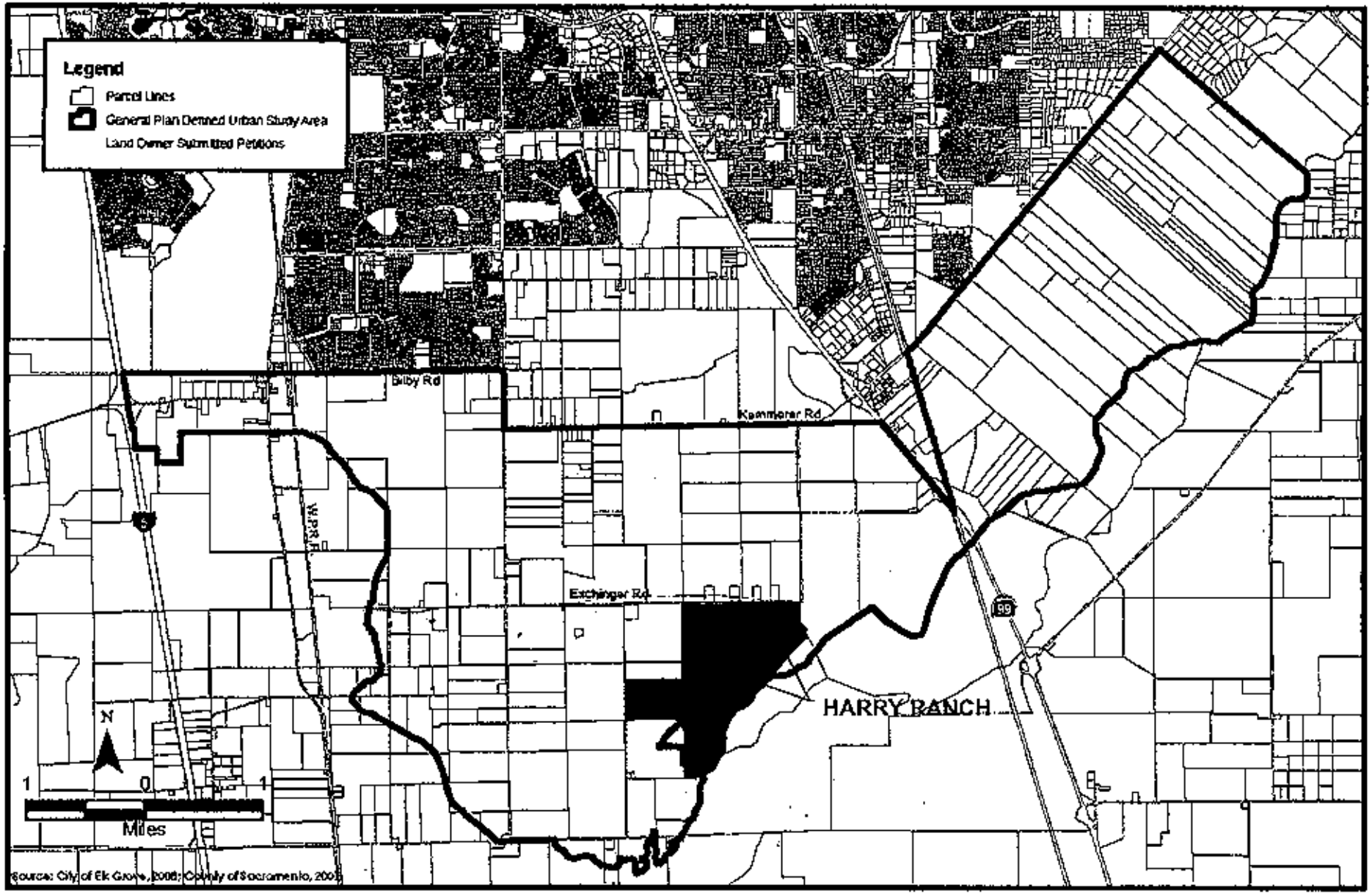
Sincerely,

Todd Chambers
The Chambers Company

Attachments

Cc: Richard Radmacher, County of Sacramento Planning
Tom Harry, Harry Ranch

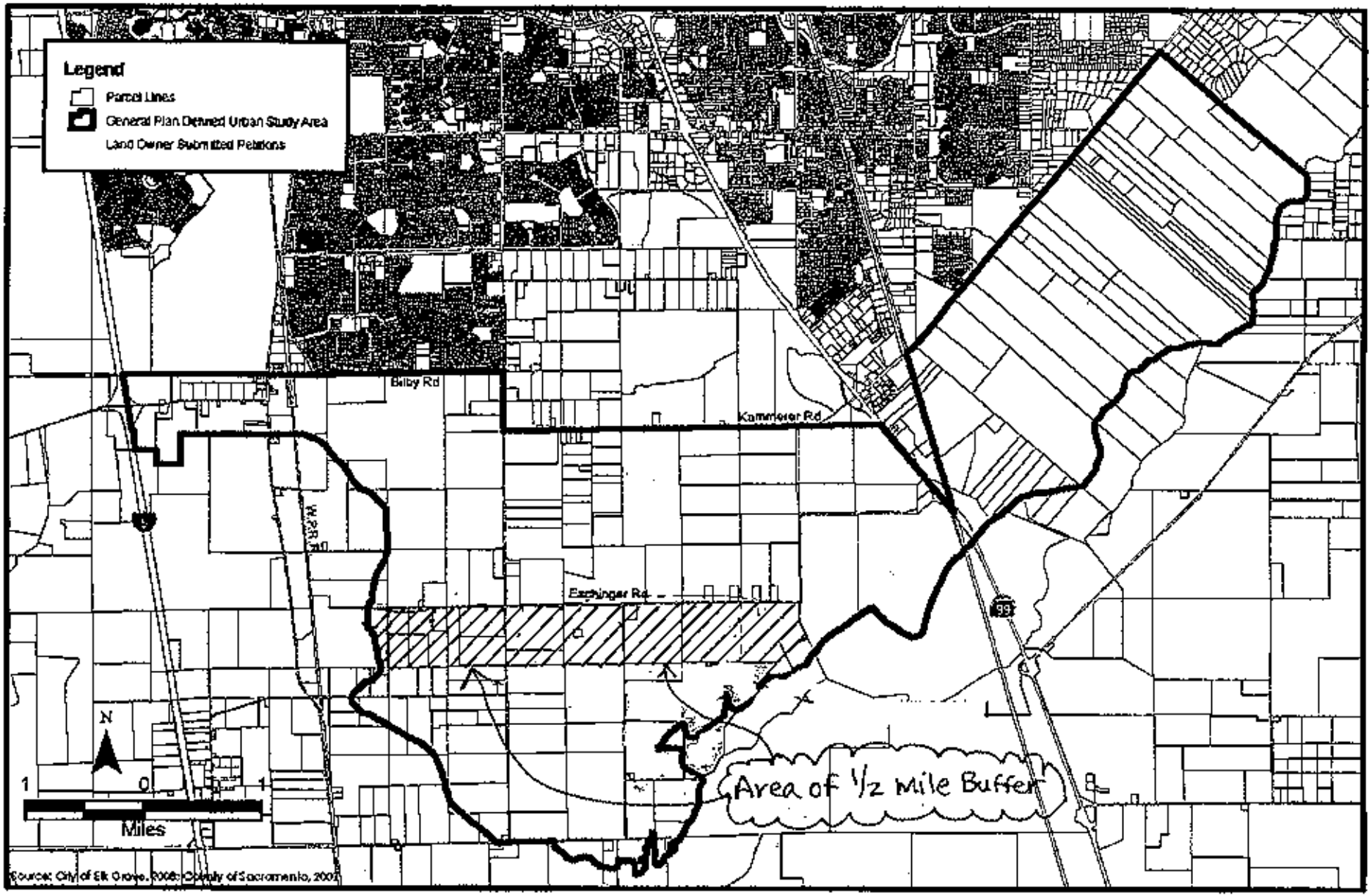
EXHIBIT 1



City of Elk Grove
Development Services

Property Owner Petition for Inclusion in the Sphere of Influence

EXHIBIT 2



ELK GROVE

City of Elk Grove
Development Services

Property Owner Petition for Inclusion in the Sphere of Influence

South Sacramento Habitat Conservation Plan

July 8, 2008 SSHCP EIR/EIS SCOPING MEETING (GALT)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
Lisa Stallings				
JERRY STALLING	RANCHER			

080708-GALT-01

South Sacramento Habitat Conservation Plan

July 8, 2008 SSHCP EIR/EIS SCOPING MEETING (GALT)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
PATTI RANSDELL	MMC Comm			
JAMES NAVICKY - DFG				
JENNIFER NAVICKY - DFG				
~~RICHARD SMITH PGF~~				
RICHARD SMITH PGF				
Curt Compton				
Carl Bona				

080708-GALT-02

South Sacramento Habitat Conservation Plan

July 8, 2008 SSHCP EIR/EIS SCOPING MEETING (GALT)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
Nancy Kang	JBR			
Ronald Addison	GAHS MA			
Lee Baldwin	CITIZEN			
GARY PATTERSON	VESTOR ENTERPRISES			
Patty and Doug Trimble	self			
Thom Smith	C.P.A.C.			
Kathleen Amos	Parks & Rec, Galt			
Tina Holt	Herald Area Civic Assc			
11655 Clay Station Rd	Herald			

080708_GALT_04

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

the "current" water consumption depletes the Mehrten aquifer by 8" a year without further development. A mining operation will consume as much water a day as a family of 4 can use in a year. The roads are not up to D.O.T. code. These specifications have a cost of 800,000.00 a mile to construct: 30' across; 6 foot shoulders on each side; 15" sub grade w/ 4" asphaltic overlay.

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Tina Holt

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080708-GALT-05

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

The Herald Area in South East Sacramento County are open agricultural and flood plain lands. Rich with diverse species such as Swainsons Hawk; Tiger Salamader, Bald Eagle, Elderberry Beetle. Cheifly the Borden Ranch is the most preservable land in the area consisting of Riparian Creek, Oaks, Cotton Wood, Elderberry, prime ag land when it is not in flood stage during winter & early spring. the land is 400 acres on a historic family ranch 'Borden'. The rest of the area approx. 1200 acres is in productive vineyards.

Would you like to be added to the SSHCP mailing list? [X] Yes [ ] No

If so, please provide your contact information.

Name: TINA B. HOLT

Title and Org/Business (if applicable): Herald Area Civic Association B.O.P.

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080708_GALT_06

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

I want this E.I.R. to address the specific impacts of surface gravel mining and its related activities ie. blacktop, concrete production, Topsoil removal etc.. Impacts on all listed species and impacts on the local communities must be addressed in in this E.I.R. Impacts of water supply to adjacent properties, traffic on these rural roads, dust on adjacent agricultural operations, noise impacts on neighbors, etc. ALSO THE impact on public utilities like roads & drainages.
I also want the E.I.R. to address the specific right to farm ordinances in Sac. County and those rights in relation to its neighbors.

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: GARY PATTERSON

Title and Org/Business (if applicable): GEN MGR Vestor Enterprises

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080708-GALT-07

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

I BELIEVE THIS EIR NEEDS TO SPECIFICALLY ADDRESS THE AREA OF DRY CREEK AT THE SOUTH EDGE OF THE COUNTY. IMPACTS ON ALL SPECIES LISTED AND THE LOCAL COMMUNITIES BY OPERATIONS OTHER THAN WHAT ~~2006 AMG~~ 2010 UG ALLOWS.

THIS E.I.R. NEEDS TO ADDRESS THE CUMULATIVE IMPACTS OF THESE SPECIES PROTECTIONS ON ADJACENT COUNTIES. SPECIFICALLY THE BORDEN GRAVEL MINING PROPOSAL ALONG DRY CREEK AT THE SOUTH EAST SIDE OF THE COUNTY.

THIS EIR NEEDS TO ADDRESS THE IMPACTS OF AGRICULTURE/URBAN INTERACTION

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: GARY PATTERSON

Title and Org/Business (if applicable): GEN. MGR. NESTOR ENTERPRISES

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080708_GALT_08

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

What Habitat issues are involved in the area just west of Hwy 99 (in Zone 9) along Twin Cities Rd.? (a group wants to put a senior housing project there- the group is called, "Citizens to Protect the Future of Galt" even tho the land is OUTSIDE the city limits of Galt). We @ Galt Parks & Rec want to support as large a regional area for "passive use" activities (like hiking, bird-watching etc.) around the city of Galt.

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Kathleen Amos

Title and Org/Business (if applicable): Attorney at Law

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080708-GALT_10

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

ARNO & VALENSIN RD & RILY IS NOT VERNAL POOL
LT VINEYARD

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: DOUG TRIMBLE

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080708-GALT-11

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

traffic noise from increased activity in Herald where a mining proposal threatens the community; Suggesting 285 rock trucks would use the narrow roads. This is the equivalent of 12,000 cars a day. The air quality & noise would be unbearable.

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: Tina Hott

Title and Org/Business (if applicable): _____

Email address: [redacted]

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080708_GALT_12

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

As a resident of the rural community of HERALD my concerns are about mining and the negative cumulative impacts that increased ROCK-TRUCK traffic will have. Also I fear the loss of important Ag land on BORDEN RANCH. The damage to DRY CREEK watershed on BORDEN Ranch would be an ENVIRONMENTAL DISASTER. Also the amount of water consumption by a mining operation on BORDEN Ranch would be devasting to the residential wells in the neighborhood I know of 4 wells that have been depleated. The air quality would be degraded by mining Borden Ranch. The Road damages from ROCK TRUCK traffic is a costly negative impact: over $600,000.00 a mile to replace. OVER→

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: Tina Helt

Title and Org/Business (if applicable): Herald Area Civic Association B.O.D.

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

<CONTINUED;

Mining of BORDEN RANCH and the increased truck traffic, noise, pollution is not wanted in the rural residential community of HERALD.

While the loss of prime agland on BORDEN RANCH would be most unfortunate; if mining were to occur; a railroad spur line must be developed for the efficient removal of mined materials to a Hi Way 104 location that will in no way a Burden HERALD residents.

PLEASE FOLD ALONG THIS LINE FOR MAILING

PLACE STAMP HERE

County of Sacramento
Department of Environmental Review and Assessment
ATTN: Peter Morse
827 7th Street, Room 220
Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: Tony Ceccarini

Title and Org/Business (if applicable): Owner L. Ceccarini & Son

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

WE HAVE LAND SPECULATORS, AND DEVELOPERS WHO OWN PROPERTY WEST and SOUTH OF OUR WASTEWATER TREATMENT PLANT. PLEASE DO NOT ALLOW THESE LANDS TO BE DEVELOPED.

A GREEN ZONE BETWEEN ELK GROVE and GALT IS AN EXCELLANT IDEA, AND SHOULD BE PURSUED!

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: RICK WALTERS

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

HERE IN GALT, WE HAVE A CERTAIN CONTINGENT OF FOLKS AND DEVELOPERS, ATTEMPTING TO RAM DOWN OUR THROATS A SO-CALLED SR. COMPLEX CALLED DELTA GREENS/DELL-WEB – THIS WOULD BORDER THE NATURE CONSERVE ON HWY. 104 – AKA TWIN CITIES ROAD. IT IS TOO CLOSE TO THE SEWER W.W. PLANT CONTAIN A 9 HOLE GOLF COURSE – CREATE TRAFFIC, ETC. – – WHAT IS NEEDED TO STOP THIS IS A STRONG ENHANCEMENT OF A "GREEN BUFFER BELT TO BRACE UP THE ONE WE ALREADY HAVE IN PLACE. OF ALL THE ITEMS THAT NEED YOUR ATTENTION, THIS PROJECT, IF IT GOES THRU, WILL HAVE A HELL OF AN IMPACT IN THIS AREA – ALL BAD. PLEASE LOOK AT THIS THROUGH A MICROSCOPE ~~ THESE STEEL AND CONCRETE ADVOCATES ARE OUT FOR ONE THING – – BUCKS! P.S. PLEASE SEE ENCLOSED ARTICLE,

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: DAVID L. DAHLGREN – RET.

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address:

Phone

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Lodi News-Sent

WEDNESDAY, July 23, 2008 www.lodinews.com

Recall effort underway in Galt

Group seeks to unseat City Council members Meredith, Haines

By Chris Nichols
NEWS-SENTINEL STAFF WRITER

A long-threatened campaign to unseat two slow-growth Galt City Council members is now underway.

Members of Protect Galt's Future, a political action committee formed to push a pro-growth agenda, said Tuesday they plan to file a notice of intent to recall Mayor Andrew Meredith and Councilman Don Haines.

"They have not provided good stewardship ... they have stymied any real development," said Jim Ferguson, a retired Galt resident and PGF member.

"We've been (speaking) in front of the City Council for about a year, talking about Delta Greens and other projects, (and) it's become very, very obvious that they're simply not listening to us," added Dick Smith, another PGF member.

Delta Greens is a senior living center proposed off Twin Cities Road west of Galt. An earlier version of the project, backed by the Del Webb company, was nixed from city growth plans in January 2007 by a majority of the current council, including Meredith and Haines.


Andrew Meredith

Advocates continue to argue the senior project would generate millions in revenue and hundreds of jobs for Galt.

Haines and Meredith had been elected the previous fall on campaign promises to scale back Galt's growth plans.


Don Haines

Reached for comment, the two city leaders said they've followed the community's vision for responsible growth.

"I don't think the public is going to let them steal these seats from us," Haines noted. "This isn't going to go far."

Meredith said he wasn't surprised hear of the recall effort. noted he has heard threats a recall from members of t group since he was elected November 2006.

The earliest a recall vo could be held is during March 2009 special electio City Clerk Liz Aguire sai Several requirements — i cluding the collection roughly 1,800 signatures fro registered Galt voters — mu be met before a recall vote can be set motion.

Please see Galt, Page 8

Jerry Stribling (verbal comments)

- Livestock grazing needs to be preserved in Sacramento County

- Concerned that the SSHCP will place additional limitations on grazing/farming.

- Leased land—Concerned the Conservation Strategy of purchasing land in fee title will HCP reduce availability of land for lease. Many farmers, in particular ranchers, lease land. These ranchers may be impacted if the land is taken off the market.

- Native pasture—concerned about the management of native pasture. Will the SSHCP understand how to manage grazing land.

- Concerned about urban sprawl impact to agriculture throughout Sacramento County.

5792

ATTACHM

AGENDA ITEM 11.1

South Sacramento Habitat Conservation Plan

July 11, 2008 SSHCP EIR/EIS SCOPING MEETING (SAC COUNTY)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
Judy Wargell	Wargell Family			
Keith DeVore	County of Sacramento			
John Lane	Teichert			
Don Lockhart	LAFCo			
Dalia Fadl	County of Sac			
Edward Hand	Private Citizen			

080712-SAC-05

5793

ATTACH

AGENDA ITEM 11.1

South Sacramento Habitat Conservation Plan

July 11, 2008 SSHCP EIR/EIS SCOPING MEETING (SAC COUNTY)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
Ron Bertolino	AKT Development			
George Woegerl	Landowner			
Michele McCormick	MMC Communities			
Todd Chambers	The Chambers Company			
Paul Jones	USEPA			
Ginger-Forlye	Gibson+Scordal			
Peter Brundage	LAFCo			
GLEN HOLSTEIN	CALIFORNIA NATIVE PLANT SOCIETY			

080728 - SAC - 06

South Sacramento Habitat Conservation Plan

July 11, 2008 SSHCP EIR/EIS SCOPING MEETING (SAC COUNTY)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
John Weech	Farm Bureau			
Joel Buettner	Sac-Yolo Mosquito & Vector Control Dist			
GEORGE HUNSON	SAC COUNTY AIRPORT SYSTEM			
Michael Devereaux	Law Offices of Gregory Thatch			
James Morrell	Taylor & Wiley			
Jason Brandt	Sacramento Valley Conservancy			
Kate Daley	USACE			
Brian Williams	STA			

08071R-SAC-01

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Will the Corps of Engineers consider the new South Sacramento Habitat Conservation Plan ~~as~~ an approved:

(1) mitigation bank; or

(2) an in lieu fee program; or

(3) a permittee-responsible mitigation project

for purposes of the new Corps mitigation rulemaking issued earlier this year?

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: Michael Devereaux

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Did the team consider involving the Regional Water Quality Control Board. Most of the time, the CORP requirements are in-line with NPDES requirem., but there maybe additional measures that applicants should know about.

Thanks.

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: _____

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Will the SSHCP have a feature that would allow it to incorporate private wetland preserve areas into the preserve system managed by the SSHCP?

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: Michael Devereaux

Title and Org/Business (if applicable): Law offices of Gregory Thatch

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Waegell Home Rand ~~&~~ map designations corrections
- We have no vineyards
- Some parcels that are cropland are designated as grassland
- Pond South of Florin Road not colored Blue = Tri Colored Blackbird habitat

Judy Waegell

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name:

Title and Org/Business (if applicable):

Email address: already on list

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080715 ATTACHMENT 5799

AGENDA ITEM 11.1



South Sacramento Habitat Conservation Plan

July 15, 2008 SSHCP EIR/EIS SCOPING MEETING (RANCHO CORDOVA)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
Tami Tollenaar	landowner			
ELSIE MACHADO	landowner			
Kellie Berry	Pulte Homes			
Mike Devereaux	Law Offices of Gregory Thatch			
James Mizell	Taylor & Wiley			
Mark Hanson	cordova Hills			
Danny Young				
BILL MARTIN	CUFT			
Sandra Wiseman	Rep. Lungren			
Sam Miller	Lewis Planned Com			
Wendy Hall	Hall Consulting			
John I Tracy	Rancher.			
Stacey McKinley	SACOG			

South Sacramento Habitat Conservation Plan

July 15, 2008 SSHCP EIR/EIS SCOPING MEETING (RANCHO CORDOVA)

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER	MAILING ADDRESS
Bob McLeod	DFG			
Jeff Schaffl	"			
	D			

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Regarding Cordova Hills, the impacts outside the UDA for roadway, sewer, water, dry utilities should be taken into account. (covered activities) Cordova Hills project is 2,419 acres all within the USB, but will require a 4-6 lane roadway crossing & possibly other infrastructure through the northern eastern side of the Kiefer landfill's bufferlands. Cordova Hills will require 3 access points & due to spacing requirements the southern entrance into Cordova Hills must traverse through the bufferlands outside the UDA. Cordova Hills owns this portion of the bufferlands & no [redacted] uses requiring urban services are proposed but construction of necessary project infrastructure outside the UDA will be needed.

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No I think already on list

If so, please provide your contact information.

Name: Mark Hanson

Title and Org/Business (if applicable): Cordova Hills

Email address:

Mailing address.

Phone

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

(1) The EIR/EIS needs to cover the impacts on the South Sac HCP of the proposed Highway 50 to Highway 99 connector road, for which a joint powers agency was just created; The HCP also needs to provide permit coverage for the connector.

(2) The EIR/EIS needs to include development in the City of Elk Grove's "South of Kammerer Road" area as a future development area covered by the permits to be issued for the South Sac HCP.

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: Michael Devereaux

Title and Org/Business (if applicable): Law Offices of Gregory D. Thatch

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

ELK CROSS SIGN-IN SHEET

NAME	EMAIL OR STREET ADDRESS
1. Charlotte Mitchell	
2. Marilyn Waegell	
3. Bob Dotson	
4. Ginger Fudge	
5. Tony Ceccarini	
6. Maureen Casey	
7. Lynn Wheat	
8. Ralph Pavey	
9. Mike Winn	
10. Bill Kuter	
11. JOHN FERGUSON	
12. Karen Buhr	
13. Dan Taverner	
14. Pablo Garza	
15. Wendel Fleisch	
16. KATHERINE MAESTAS	
17 Richard Rival	
18. Craig Ledbetter	
19. Betty Robertson	
20 Gene Robertson	
21. Don Smith	
22. DON & BARBARA HACKFORD	
23 STEVE DETRICK	
24 Laura Keister	
25 Kevin & Sherita Norrington	

080716-2

NAME	EMAIL /OR/ ST ADDRESS
Stan Miette	[redacted]

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

Continue to look at City of Elk Grove Sphere of Influence and annexation proposal. Area should be addressed in EIR. Potential for future growth should be assessed. Avenues for EG to blend these areas into the plan should be kept open. A "50 year" plan should clearly look to the future & the reality that growth will occur. We trust you'll continue to listen with an open mind and include the City of Elk Grove & it's current & future residents in the decision making process

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: _____

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: Wakeford

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

With the City of Elk Grove's formal application to Amend the City's sphere of influence, the SSHCP environmental review should address that acreage for future development (or "take" habitat).
The EIR/EIS should also evaluate the mitigation type and quantity for these proposed SOI AREAS.

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: Michael Winn

Title and Org/Business (if applicable): Michael Winn Associates

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

080416-1

South Sacramento Habitat Conservation Plan

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please tell us of any potential impacts that should be studied, any alternatives or mitigating measures that offer promise, any problems or issues the proposed plan may cause, or your recommendations for improving the proposed plan. It helps us if you are specific.

We are very concerned about protecting the resources of the Cosumnes River floodplain area, specifically Riparian habitat protection in zones 35, 1e & 39 near Grantline Road and Highway 99 and Kammerer Road. At a minimum the area within the 200 year floodplain of Cosumnes River & Dear Creek - include Dear Creek

It is a sensitive area with wetlands, vernal pools endangered species habitat. It is being threatened by the development and expansion of the City of Elk Grove. The analysis should conside the impacts of expansion of the City of Elk Grove. Identification of resources in the sensitive areas and mitigation (if any).

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Don Smith

Title and Org/Business (if applicable):

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

		Applicable Zones	Measure - Abbreviations	Measure - Reference
Zone 8	Specific Requirements	8		10
				10
			Preserve 79 Vernal Pool Ac on Laguna and Riverbank formations (55 Ac must occur on category 1 or 2 LAU)	10
			Preserve 2,500 valley grassland acres	10
			Preserve 1,000 Cropland and/or Irrigated Pasture Ac	17
			Preserve a minimum of 1,000 Cropland Ac in fee title to be maintained in for Alfalfa production (5 plots - 200 Ac/plot; 3 north and 2 south of Dillard Rd.)	18,55
	Shared Requirements	6,7,8,9,10,11	Preserve 191 Freshwater Marsh, 182 Open Water, 187 Seasonal Impoundment, 135 Seasonal Wetland, 95 Mixed Riparian Scrub, and 663 Mixed Riparian Woodland acres	13,14
		6a,7,8,9,10,11	Preserve 207 Swale acres	13
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve 88 Freshwater Marsh acres along select stream reaches for Giant Garter Snake	13
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve a total of 24,667 Valley Grassland acres	16
		7,8,9,10,11	Preserve 4,571 Cropland and/or Irrigated Pasture Ac	17
		7,8,9	Preserve 30 Valley Oak Riparian Woodland acres	14
		6,7,8,9,10,11,12	Preserve 196 linear miles of Stream channel within a corridor (800' wide, 2,000' wide along the Cosumnes R.) ensuring that 55 linear miles is preserved to support Giant Garter Snake	21,22,23,63
		6,7,8,9,10,11	Preserve 6,500 Valley Grassland acres beyond compensatory mitigation	26
		7,8,9,10,11	Preserve 2,000 Cropland acres beyond compensatory mitigation	29
		3a,3b,6b,6e,7,8	Preserve six (6) Tricolored Blackbird nesting colonies (colonies shall be within 3 miles of 6,000 acres of suitable foraging habitat)	65
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve all newly discovered occurrences of Sacramento and Slender Orcutt Grasses in as large a preserve as possible	68
		1,2,3,4,5,6,7,8,9,10,11,12	Preserve up to 10 occurrences of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia (5 occurrences must be protected before permitting take of the species and shall be located within a core/landscape preserve	66
		7,8,9,10,11	Restore or Create 241.3 Vernal Pool and 184 Swale acres	31
		1,2,3,4,5,6,7,8,9,10,11,12	Restore 242 Open Water and 153 Seasonal Impoundment acres	33
		1,2,3,4,5,6,7,8,9,10,11,12	Restore 79 Freshwater Marsh Ac ensuring that 50 acres are preserved to support Giant Garter Snake	34
		3,4,5,6,7,8,9,10,11,12	Restore 35 Mixed Riparian Scrub and 120 Mixed Riparian Woodland ensuring that 30 MRS and 95 MRW acres are preserved in zones 8, 9, and/or 11, and 20 MRW are restored along North Laguna Creek	35
		8,9,11	Restore 60 Valley Oak Riparian Woodland acres	35
		1,2,3,4,5,6,7,8,9,10,11,12	Restore 57 Seasonal Wetlands acres ensuring 36 acres occur outside the UDA and specifically 29 acres in zone 9.	36
		1,2,3,4,5,6,7,8,9,10,11,12	Restore 1,000 Mixed Riparian Woodland and 500 Valley Oak Riparian Woodland beyond compensatory mitigation	38
		3,4,5,7,8,9	Restore Valley Elderberry Longhorn Beetle habitat in conjunction with native vegetation along portions of Deer, S. Laguna & N. Laguna Creeks, and the Cosumnes River	49,50,51,52
		6,7,8,9,10	Incorporate clusters of native shrubs in 20 locations and up to 1,000 hunting perches (100 perches/20Ac) within new and existing preserves for Loggerhead Shrike	59,60
		8,9	Incorporate 5,000 linear feet of hedgerows and 500 suitable trees within the agricultural cropland matrix	57,58
		3b,6,7,8,9,11	Incorporate/establish 20 Himalayan blackberry sites for Tricolored Blackbird nesting sites within new and existing preserves	61
		1a,2,3b,7,8,10	Incorporate/establish 2 Western Burrowing Owl nesting areas in all core and landscape preserves and create at least 20 burrows per area	62
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate three (3) outlier populations of Sacramento and Slender Orcutt Grasses from populations in Zones 1, 2, & 3 into preserves no smaller than 500 acres in size	70
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate five (5) outlier populations of Ahart's Dwarf Rush, Bogg's Lake Hedge-Hyssop, Dwarf Downingia, and Pincushion Navarretia from populations in Zones 2, 3 & 4 into core/landscape preserves	69
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate 400 bat roost structures within new and existing preserves (one structure per 60 preserved acres), bat roosting structures into new bridges and culverts and retrofit 10 existing bridges/culverts with bat roosts	53,54
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate management plans and assess the current biological value for all preserves	39,40
		1,2,3,4,5,6,7,8,9,10,11,12	Incorporate avoidance and minimization measures while performing covered activities to prevent impacts to covered species	71,72,73,74,75,76,78,79

I believe that keeping City of Elk Grove Expansion outside the 200 year floodplain will cover Ahart Zone 8 & encourage

Don Smith

EIS/EIR APPENDIX B

Summary of Process to Determine the Scope of the EIS/EIR (Scoping) (Part 2 of 2)

Appendix E

Agency Comments

U.S. Environmental Protection Agency Letter
Department of Transportation (Caltrans) Letter
Department of Conservation Letter
Department of Fish and Game Letter
Sacramento County Airport System Letter
Sacramento County Farm Bureau Letter
Sacramento Regional County Sanitation District Letter
Southgate Recreation & Park District

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

July 30, 2008

Ms. Nina Bicknese
Conservation Planning Branch
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Subject: Notice of Intent to Prepare an Environmental Impact Statement (EIS) for the South Sacramento Habitat Conservation Plan, Sacramento County, California.

Dear Ms. Bicknese:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Fish and Wildlife Service (Service) Notice of Intent to Prepare an Environmental Impact Statement (EIS) for the South Sacramento Habitat Conservation Plan (HCP) pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. These comments were also prepared under the authority of, and in accordance with, the provisions of the Federal Guidelines (Guidelines) promulgated at 40 CFR 230 under Section 404(b)(1) of the Clean Water Act (CWA). Our detailed comments are enclosed.

The proposed HCP would result in a 30-year permit, issued by the Service that would authorize incidental take of 40 covered species due to ground disturbing activities implemented under the HCP. Sacramento County, the cities of Elk Grove, Rancho Cordova, Galt, the Sacramento Regional County Sanitation District, and the Sacramento County Water Agency (Local Partners) would apply to the Service for incidental take authorization under the HCP. Incidental take would occur from a wide range of activities but would generally be related to urban and suburban development and supporting infrastructure, including roads, water supply, water and sewage treatment, flood control, utilities, land fills, police, fire and medical services, open space and recreation, as well as mining operations, and conservation activities. The local partners are facilitating the preparation of the HCP in coordination with the Service. The U.S.

Printed on Recycled Paper

Army Corps of Engineers (Corps), as a cooperating agency, will consider using the EIS to inform their discretionary decision to issue a programmatic general permit (PGP) for certain components proposed under the HCP.

EPA recognizes the level of effort that has gone into the HCP thus far; however, we remain concerned with various impacts to environmental resources. We have been involved with the development of the HCP since its inception, both through our direct participation and through awarding of a $750,000 grant. Since that time, we note that the HCP development process has benefited from the efforts of Richard Radmacher, Senior Planner with the Sacramento County Planning Department. We acknowledge Richard's good efforts and look forward to continued coordination with him, the Service, Corps, and other participants in this process.

Significant impacts would occur to many acres of vernal pools and other aquatic resources in the HCP area. This is in addition to a long history of direct and indirect impacts, as well as impacts from future planned development near the HCP area. The EIS should clearly describe the cumulative impacts to these resources, impacts to the species that depend on them, and how they will be adequately mitigated through the HCP conservation strategy. EPA recognizes the level of effort that has gone into the mapping, species accounts, and review of biological resources in the HCP area and we anticipate the EIS will clearly disclose how this information has informed the conservation strategy. The EIS should also assess a reasonable range of alternatives that maximize avoidance of aquatic resources and comply with Clean Water Act Section 404 (b)(1) Guidelines. EPA is concerned with the significant amount of fill that would occur as a result of development plans approved by the Local Partners and authorized under the HCP.

The EIS should also provide a science-based discussion of vernal pool mitigation in the HCP area and describe how vernal pool mitigation predominantly in the southern portion will provide adequate mitigation for impacts to the north. EPA is especially concerned that this approach could compromise biological and genetic diversity in the area.

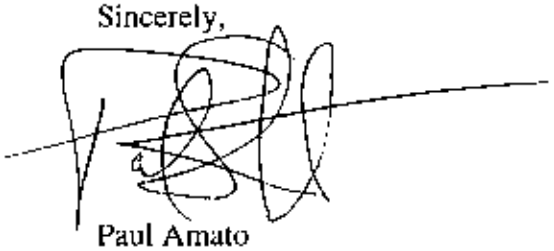
EPA encourages the Service and Local Partners to integrate Smart Growth, Low Impact Development (LID), and Green Building principles into the conservation strategy of the HCP to reduce impacts to environmental resources and improve living conditions for future residents. We are concerned that the planning and developments that would occur in the HCP area would be a continuation of urban and suburban sprawl that has been shown to result in greater environmental impacts than Smart Growth, LID, and Green Building alternatives. The HCP is an opportunity to demonstrate how these principles can be used to design developments that have reduced impacts and improved living conditions for future occupants.

The EIS should also provide a detailed analysis of groundwater impacts, water availability, impacts to air quality and traffic, and the potential impacts from induced growth that would result from projects approved under the HCP.

Due to the potential significant impacts from projects likely seeking approval under the HCP, and a possible Corps PGP, EPA encourages the Corps and Local Partners to continue to coordinate with EPA and other environmental resource agencies prior to the release of the EIS for public review. When the EIS is released for review, please send one hard copy and two CD

copies to the address above (mailcode: CED-2) at the same time the EIS is formally filed with EPA Headquarters. If you have any questions, please contact me at 415-972-3847 or amato.paul@epa.gov.

Sincerely,



Paul Amato
Environmental Protection Specialist
Environmental Review Office

Enclosure:
EPA's Detailed Comments

Cc:
Mr. Richard Radmacher, Sacramento County Planning Department
Mr. Patrick Gillum, Central Valley Regional Water Quality Control Board
Mr. Jeff Finn, California Department of Fish and Game

ENVIRONMENTAL PROTECTION AGENCY'S (EPA) DETAILED COMMENTS ON THE NOTICE OF INTENT (NOI) TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN PROJECT (HCP), JULY 30, 2008

Waters of the US

Though not described in the NOI, EPA is very concerned with the amount of direct and indirect impacts to vernal pools and other aquatic resources that would occur under the HCP. The EIS should describe the potential direct, indirect, and cumulative impacts to these resources that could result from HCP approved projects. Mitigation for these impacts should also be described. Continued urban and suburban development in South Sacramento and surrounding regions have had a significant impact on vernal pool habitat and species, and insufficient opportunities to adequately mitigate for these impacts is an ongoing and increasing concern for EPA. EPA recommends the Service and Local Partners reduce impacts to all aquatic resources, including vernal pools, to the maximum extent feasible. For further discussion of these concerns, the Service should contact Paul Jones, EPA Water Division at (415) 972-3470, or by email at jones.paul@epa.gov.

Conservation Strategy

The EIS should clearly demonstrate how the HCP will contribute to the recovery of the covered species and provide adequate conservation of their habitats. The NOI states that the HCP would provide a regional approach for the conservation of the 40 covered species and their 18 habitat types so as to aid in the recovery of the species. Key to this is the protection of approximately 47,000 acres and creation or restoration of approximately 1,500 acres, out of the 341,000 acre HCP area. This would result in the protection of less that 14% and creation or restoration of approximately 0.4% of the total HCP area. Of this, approximately 8,000 acres would be spread throughout the Urban Development Area (UDA) and eventually be surrounded by development, resulting in fragmentation, increased edge effects, and habitat degradation. EPA is concerned with the small percentage of larger protected areas, and the creation and restoration components of the HCP conservation strategy. We recommend increasing these areas and providing a clear analysis in the EIS that demonstrates how they will provide adequate conservation and aid in the recovery of the 40 covered species.

The EIS should demonstrate how the conservation and mitigation areas selected to protect and compensate for high quality habitats will adequately benefit the species in the development areas that have been identified through on-the-ground species accounts. While not stated in the NOI, we understand that a significant amount of mitigation for development in the northern portion of the HCP area will occur in the south. This redistribution of habitat and species could result in reduced genetic integrity for various vernal pool species. The EIS should provide a scientific basis for the adequacy and appropriateness of the conservation strategy and mitigation measures. The EIS should also clarify whether any activities, such as agriculture, are expected to occur in the conservation areas and if so, what their impacts would be.

Statements in the NOI regarding acres conserved and developed are contradictory and should be clarified in the EIS. Page 32730 of the Federal Register states that approximately 43,500 acres within the 123,000 acre UDA and 2,000 acres outside the UDA would be developed, for a total of 45,500 acres developed under the HCP. Page 32731 states that approximately 43,500 acres of land would be developed within the 341,000 acre Planning Area.

The NOI states that components of the proposed HCP conservation program are under consideration and that "...these components may include monitoring, adaptive management, species avoidance measures, and species mitigation measures including preservation, restoration, and enhancement of suitable habitat" (emphasis added). The EIS should include these components, at a minimum, and describe how they will aid to the recovery of the 40 species.

Finally, as stated above, the Service and Local Sponsors should commit to implementing Smart Growth, LID, and Green Building principles as part of the conservation strategy for the HCP.

Alternatives

The EIS should clearly describe and equally assess a reasonable range of alternatives, including the no action alternative. Alternatives previously considered but not carried forward in the EIS should be described, and reasons to not be considered further explained. Because of the large area of the proposed HCP and the potential for significant impacts from covered actions to several environmental resources, including 7 listed and 33 nonlisted species under the Federal Endangered Species Act (ESA), the Service and Local Partners should consider a range of alternatives that includes avoiding impacts to resources to the maximum extent practicable. We note that the NOI anticipates the development of several alternatives for analysis in the EIS.

As stated in the NOI, the Corps will be a NEPA cooperating agency and may use the EIS to inform their discretionary decision to issue a programmatic general permit (PGP) for certain components of the HCP involving fill and dredging activities. EPA supports efforts to properly integrate the Corps' Clean Water Act (CWA) Section 404 authority into the HCP; however, the EIS should analyze alternatives that avoid, minimize, and mitigate impacts to waters of the US (WOUS), identify the least damaging practical alternative (LEDPA) consistent with CWA Section 404 (b)(1) Guidelines, and conduct a robust comparative analysis of these alternatives. This information is necessary to inform the decision maker as to which alternative is the LEDPA prior to integration of Corps 404 authority. EPA also recommends the County of Sacramento adopt an ordinance that would protect conservation and mitigation areas within the HCP area from impacts to WOUS in.

As part of the alternatives analysis, EPA strongly encourages the HCP proponents to conduct a detailed, accurate, and comprehensive assessment of the environmental resources at the proposed HCP site. Areas with higher functions and values should be preserved in perpetuity, including protection of WOUS through the HCP, 404 integration, and a County ordinance. The results of this analysis should be described in the EIS, including how this

information has been used to inform development of alternatives that avoid and protect environmental resources identified at the site.

Smart Growth, Low Impact Development, and Green Building Principles

The NOI states that activities covered by the HCP are wide-ranging, but generally will be urban and suburban development, supporting infrastructure and services. EPA strongly encourages the Service, Corps and Local Partners to commit to implementing Smart Growth, Low Impact Development (LID), and Green Building principles as conservation measure that will avoidance and minimize impacts to covered species and their habitats, including aquatic resources. Urban and suburban sprawl continues to contribute significant negative impacts to terrestrial and aquatic habitats, air quality, traffic, water supply, water quality, archeological resources, agriculture, and other environmental and human resources. Smart Growth, LID, and Green Building principles provide opportunities to design and construct urban and suburban developments in a way that minimizes these impacts. The Service and Corps, along with the Local Partners should seize the opportunity to integrate these principles as conservation and impact minimization measures for covered species, WOUS, and to enhance the daily lives of future residents.

By implementing Smart Growth, LID, and Green Building principles, environmental impacts of the projects covered under the HCP can be reduced within and beyond the HCP Area. For example, high density, transit oriented and bicycle and pedestrian-friendly villages reduce the need for residents to drive to services and amenities thus reducing the amount of tailpipe emissions like nitrogen oxides, and other ozone precursors, that compromise respiratory function in Sacramento County. In addition to reduced vehicle emissions, integrating solar power and other sources of renewable energy generation can reduce greenhouse gas emissions and help improve efforts to stem climate change impacts. Project footprints can also be configured to avoid impacts to terrestrial and aquatic habitat and preserve more open space. Building materials selected from sustainable sources such as lumber from sustainably managed forests, lumber alternatives, and building products made from recycled materials reduce the impacts from natural resource demands. EPA encourages the Service, Corps and Local Partners to commit to maximizing the implementation of these principles.

More information on Smart Growth, LID, and Green Building can be found in publications at EPA's websites at www.epa.gov/smartgrowth, http://www.epa.gov/nps/lid/, and www.epa.gov/greenbuilding/index.htm. Information about the Leadership in Energy and Environmental Design (LEED) for Neighborhood Development Rating System can be found at the US Green Building Council website at http://www.usgbc.org/.

Groundwater

Development and water supply projects approved for incidental take under the HCP have the potential to result in significant impacts to groundwater in the HCP area. The EIS should clearly describe existing groundwater conditions, potential cumulative impacts to groundwater

quantity and quality, and avoidance measures to prevent impacts. EPA is especially concerned with groundwater in the HCP area due to the relationship between existing conditions and vernal pools, and other aquatic resources that exist due to these conditions. Any direct, indirect and cumulative impacts to groundwater that may occur as a result of the HCP should be clearly assessed in the EIS in light of these relationships.

Water Availability

The EIS should describe existing and/or proposed sources of water supply for projects that would be covered under the HCP and include direct, indirect and cumulative impacts to water resources that may occur. Projects approved under the HCP and actions potentially approved under a Corps programmatic general permit could result in thousands of new residences, businesses, and services in the area, resulting in significant increases in water demands for an indefinite period of time. EPA strongly encourages the Service and Local Partners include in the EIS a description of all water conservation measures that will be implemented to reduce water demands for projects that would be covered under the HCP. Project designs should maximize conservation measures such as appropriate use or recycled water for landscaping and industry, xeric landscaping, a water pricing structure that accurately reflects the economic and environmental costs of water use, and water conservation education. Water saving strategies can be found in the EPA's publications *Protecting Water Resources with Smart Growth* at www.epa.gov/piedpage/pdf/waterresources_with_sg.pdf, and *USEPA Water Conservation Guidelines* at www.epa.gov/watersense/docs/app_a508.pdf.

In addition, the EIS should describe water reliability for development projects approved under the HCP and clarify how existing and/or proposed sources will be affected by climate change. At a minimum, EPA expects a qualitative discussion of impacts to water supply and adaptability of the projects to these changes, as part of the EIS impacts analysis.

Air Quality and Traffic

Projects approved under the HCP will result in increased impacts to air quality in Sacramento County; an area designated nonattainment for 8-hour ozone and particulate matter smaller than 10 microns (PM_{10}). Specifically, the air basin is designated serious nonattainment for 8-hour ozone and moderate nonattainment for PM_{10}. The EIS should provide a discussion of the baseline air quality conditions in the HCP area and a description of federal and state air quality regulations, and a rigorous assessment of direct, indirect, and cumulative effects of the projects authorized under the HCP on air quality. The analysis of air quality impacts should include direct, indirect and cumulative impacts from construction and post construction conditions, including increased traffic. The Service should describe in the EIS specific commitments to mitigate emissions that will prevent further degradation of air quality in the basin. In short, the cumulative impacts analysis should consider all new sources of emissions that are likely to result from the federal action of issuing the proposed HCP. The EIS should also describe coordination with EPA, California Air Resources Board, and the Sacramento Metropolitan Air Quality Management District to reduce air quality impacts in the air basin.

The EIS should describe whether emissions from projects approved under the HCP will or will not meet general conformity requirements with the associated state implementation plans for the air basin. If the federal action is determined to potentially interfere with the attainment of Clean Air Act national ambient air quality standards (NAAQS), the Service is required to conduct a conformity analysis to determine the likelihood and extent of interference. For conformity-related questions, the Corps is encouraged to consult with EPA and should contact Ms. Karina O'Connor at (775) 833-1276 or by email at oconnor.karina@epa.gov.

To prevent degradation of air quality from construction-caused PM_{10} in Sacramento County, we suggest the following fugitive dust control measures be committed to in the EIS to reduce impacts to existing air quality conditions:

Fugitive Dust Source Controls:

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- Reduce use, trips, and unnecessary idling from heavy equipment.
- Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications.
- Prohibit any tampering with engines and require continuing adherence to manufacturers recommendations
- If practicable, lease newer and cleaner equipment meeting the most stringent of applicable Federal or State Standards.
- Utilize EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site.

Administrative controls:

- Identify where implementation of mitigation measures is rejected based on economic infeasibility.
- Prepare an inventory of all equipment prior to construction and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking. (Suitability of control devices is based on: whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public.)

- Utilize cleanest available fuel engines in construction equipment and identify opportunities for electrification. Use low sulfur fuel (diesel with 15 parts per million or less) in engines where alternative fuels such as biodiesel and natural gas are not possible.
- Develop a construction traffic and parking management plan that minimizes traffic interference and maintain traffic flow.

The EIS should identify sensitive receptors in the project area, such as schools, daycare centers, nursing homes, and hospitals and specify the means by which impacts to these receptors will be minimized due to both construction and long term land use associated with the new development . For example, locate construction equipment and staging zones away from sensitive receptors away from fresh air intakes and buildings and design neighborhoods such that activity centers (ball fields, etc.) and sensitive receptors are not proximate to emissions sources, such as highways.

Due to the scale of the proposed HCP area and the amount of new residents, businesses, and services that could occur, it is reasonable to anticipate increased traffic and congestion in the local surface streets, freeways and highways. The EIS should include a traffic analysis to determine how the proposed projects will affect traffic in the region and contribute to cumulative air quality impacts.

Cumulative Effects

The proposed HCP would issue incidental take permits for the construction of several developments, in addition to several in the area that have occurred in the recent past or are proposed and under various stages of development. As a result, it is critical that the cumulative effects analysis be comprehensive and rigorous, and that it consider an appropriate scope of activities, and spatial and temporal scales when assessing project effects. EPA suggests referring to the Council on Environmental Quality 1997, guidance *Considering Cumulative Effects Under the National Environmental Policy Act* found at http://www.nepa.gov/nepa/ccenepa/ccenepa.htm, and 1999 EPA guidance, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* found at http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf. In addition, we recommend referring to the EPA, California Department of Transportation, and Federal Highway Administration Guidance for Preparers of Cumulative Impact Analysis found at http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm. While this guidance was developed for transportation projects, the principles and the 8-step process in this guidance can be applied to other types of projects, both within and outside of California. We recommend the principles and steps in this guidance to other agencies as a systematic way to analyze cumulative impacts for their projects.

Induced Growth

The EIS should describe how the proposed HCP could result in environmental impacts due to induced-growth. New development and anticipated population growth that could occur

from projects covered under the HCP could result in increased pressure for more development, increased transportation infrastructure and other essential services in the area. Taken into account with the other proposed projects in the project area, induced growth impacts could be significant. EPA's recommendation is to make both the methodology and the assumptions in the growth inducing analysis as transparent as possible to the public and decision makers. To do this, EPA recommends that Service and Local Sponsors:

(1) Identify which land use model will be used, discuss its strengths and weaknesses, and describe why it was selected.

(2) Identify the assumptions used in the model and why those assumptions were selected. For example, describe which method will be used to allocate growth to analysis zones, its strengths and weaknesses, and why that method was selected.

(3) Ground truth the results of the land use model by enlisting local expertise involved in land use issues, such as local government officials, land use and transportation planners, home loan officers, and real estate representatives. Use their collective knowledge to validate or modify the results of the land use model.

(4) Use the results of the growth inducing analysis to inform transit options, neighborhood design, and recommendations for land use as well as mitigation measures to reduce environmental impacts.

Covered Species

The NOI states that species may be added or deleted from the HCP during the course of the 30-year permit. The EIS should clearly describe the process, criteria, and authority under which adding or deleting species would occur.

Project Purpose and Need

The purpose and need statement in the EIS should be clearly stated and briefly describe the underlying purpose and need to which Service is responding in proposing alternatives, including the proposed action (40 C.F.R. 1502.13.) The statement of purpose and need should explain why the Service and Local Partners are undertaking the proposed South Sacramento Habitat Conservation Plan (HCP) and the objectives that the action is intended to achieve. A clear purpose and need statement is important under the National Environmental Policy Act (NEPA) and to EPA's review in that it should be directly linked to the proposed alternative designs and clarify the potential impacts of a range of reasonable alternatives for the proposed HCP.

DEPARTMENT OF TRANSPORTATION
DISTRICT 3 – SACRAMENTO AREA OFFICE
VENTURE OAKS, MS 15
P. O. BOX 942874
SACRAMENTO, CA 94274-0001
PHONE (916) 274-0635
FAX (916) 274-0648
TTY (530) 741-4509

Flex your power!
Be energy efficient!

July 10, 2008

08SAC0122
03 SAC-VARIOUS
South Sacramento Habitat Conservation Plan
Notice of Preparation
SCH#2008062030

Ms. Joyce Horizumi
County of Sacramento
Department of Environmental Review and Assessment
827 7th Street, Room 220
Sacramento, CA 95814

Dear Ms. Horizumi:

Thank you for the opportunity to review and comment on the South Sacramento Habitat Conservation Plan Notice of Preparation document. Our comments are as follows:

- Caltrans would like to coordinate with Sacramento County and other participants regarding the South Sacramento Habitat Conservation Plan as it is being developed. Please include Caltrans on any inter-agency working group that may be formed.

- A buffer between land designated as habitat conservation areas in the Plan and existing transportation facility right of way should be considered to avoid conflict between transportation facility operation or improvements and the long term viability of habitat conservation areas.

If you have any questions regarding these comments, please contact Ken Champion at (916) 274-0615.

Sincerely,

ALYSSA BEGLEY, Chief
Office of Transportation Planning – South

c: Scott Morgan, State Clearinghouse

STATE OF CALIFORNIA, RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

DEPARTMENT OF CONSERVATION

DIVISION OF LAND RESOURCE PROTECTION

801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-0850 • FAX 916 / 327-3430 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

July 9, 2008

RECEIVED
JUL 9 2008
DEPARTMENT OF CONSERVATION
ENVIRONMENTAL REVIEW AND ASSESSMENT

VIA FACSIMILE (916) 874-8343
Peter Morse
Joint Sacramento County/USFWS
827 7th Street, Room 220
Sacramento, CA 95818

Subject: South Sacramento Habitat Conservation Plan Notice of Preparation
SCH# 2008062030

Dear Mr. Morse:

The Department of Conservation's (Department) Division of Land Resource Protection (Division) has reviewed the Notice of Preparation (NOP) for the referenced project. The Division monitors farmland conversion on a statewide basis and administers the California Land Conservation (Williamson) Act and other agricultural land conservation programs. We offer the following comments and recommendations with respect to the project's impacts on agricultural land and resources.

Project Description

The South Sacramento Habitat Conservation Plan (SSHCP) project is a regional plan to conserve species and address issues related to urban development, habitat conservation, open space protection and agricultural protection. The Division recommends that the Environmental Impact Report (EIR) address the following items to provide a comprehensive discussion of potential impacts of the project on agricultural land and activities.

Agricultural Setting of the Project

- Location and extent of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and other types of farmland in and adjacent to the project area.
- Current and past agricultural use of the project area. Please include data on the types of crops grown, and crop yields and farm gate sales values.

To help describe the full agricultural resource value of the soils on the site, the Department recommends the use of economic multipliers to assess the total contribution of the site's potential or actual agricultural production to the local, regional

and state economies. Two sources of economic multipliers can be found at the University of California Cooperative Extension Service and the United States Department of Agriculture (USDA).

Project Impacts on Agricultural Land

- Type, amount, and location of farmland conversion resulting directly and indirectly from project implementation and growth inducement, respectively.
- Impacts on current and future agricultural operations; e.g., land-use conflicts, increases in land values and taxes, vandalism, etc.
- Incremental project impacts leading to cumulative impacts on agricultural land. This would include impacts from the proposed project, as well as impacts from past, current, and likely projects in the future.

Under California Code of Regulations Section 15064.7, impacts on agricultural resources may also be both quantified and qualified by use of established thresholds of significance. As such, the Division has developed a California version of the USDA Land Evaluation and Site Assessment (LESA) Model. The California LESA model is a semi-quantitative rating system for establishing the environmental significance of project-specific impacts on farmland. The model may also be used to rate the relative value of alternative project sites. The LESA Model is available on the Division's website at:

http://www.consrv.ca.gov/DLRP/qh_lesa.htm

Williamson Act Lands

Under California Code of Regulations Section 15206(b)(3), a project is deemed to be of statewide, regional or area-wide significance if it will result in cancellation of a Williamson Act contract for a parcel of 100 or more acres. If lands under Williamson Act contracts and/or in agricultural preserves exist in the project area, the Department recommends that the following information be discussed and/or provided in the EIR:

- A map detailing the location of agricultural preserves and contracted land within each preserve. The EIR should also tabulate the number of Williamson Act acres, according to land type (e.g., prime or non-prime agricultural land), which could be impacted directly or indirectly by the project.
- A discussion of Williamson Act contracts that may be terminated in order to implement the project. The EIR should discuss the probable impacts on nearby properties resulting from the termination of adjacent Williamson Act contracts. For example, a termination of a Williamson Act contract may have a growth-inducing impact. In other words, a termination may not only lift a barrier to development, but also result in higher property taxes, and thus, an incentive to shift to a more intensive land use, such as urban development.

- As a general rule, land can only be withdrawn from a Williamson Act contract through the nine-year non-renewal process. Immediate termination via cancellation is reserved for "extraordinary circumstances" (See Sierra Club v. City of Hayward (1981) 28 Cal.3d 840, 852-855). Under Government Code Section 51282, the city or county must approve a request for cancellation and base that approval on specific findings that are supported by substantial evidence. When cancellation is proposed, the Department recommends that a discussion of the findings be included in the EIR. Finally, a notice of the hearing to approve the tentative cancellation and a copy of the landowner's petition must be mailed to the Director of the Department ten working days prior to the hearing. (The notice should be mailed to Bridgett Luther, Director, Department of Conservation, c/o Division of Land Resource Protection, 801 K Street MS 18-01, Sacramento, CA 95814-3528.)
- Under Government Code Section 51243, if a city annexes land under a Williamson Act contract, the city must succeed to all rights, duties, and powers of the county under the contract. However, under Section 51243.5, a city may exercise its option not to succeed to the contract if certain conditions are met. LAFCO must notify the Department within 10 days of a city's proposal to annex land under a contract (Government Code Section 56753.5). Additionally, LAFCO must not approve a change to a sphere of influence or annexation of contracted land to a city unless certain conditions are met (see Government Code Sections 51296.3, 56426, 56426.5, 56749 and 56856.5).
- If portions of the planning area are under Williamson Act contracts (and will continue to be under contract after project implementation) the EIR should discuss the proposed uses for those lands. Uses of contracted land must meet compatibility standards identified in Government Code Sections 51238 - 51238.3. Otherwise, contract termination (see paragraph above) must occur prior to the initiation of the land use.
- An agricultural preserve is a zone authorized by the Williamson Act and established by the local government to designate qualified land to be placed under the Williamson Act's 10-year contracts. Preserves are also intended to create a setting for contract-protected lands that is conducive to continuing agricultural use. Under Government Code Section 51230, "An agricultural preserve may contain land other than agricultural land, but the use of any land within the preserve and not under contract shall within two years of the effective date of any contract on land within the preserve be restricted by zoning, including appropriate minimum parcel sizes that are at a minimum consistent with this chapter, in such a way as not to be incompatible with the agricultural use of the land." Therefore, the EIR should also discuss any proposed general plan designation or zoning within agricultural preserves affected by the project.

Thank you for giving us the opportunity to comment on this NOP. If you have questions regarding our comments, or require technical assistance or information on agricultural land conservation, please contact Elliott Lum, Environmental Planner, at 801 K Street, MS 18-01, Sacramento, California 95814; or, phone (916) 324-0869.

Sincerely,

Brian Leahy
Assistant Director

cc: State Clearinghouse

State of California - The Resources Agency ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
North Central Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670
(916) 358-2900

RECEIVED
JUN 30 2008
DEPARTMENT OF ENVIRONMENTAL REVIEW AND ASSESSMENT

June 24, 2008

Mr. Peter Morse
Joint Sacramento County/USFWS
827 Seventh Street, Room 220
Sacramento, CA 95818

Dear Mr. Morse:

The Department of Fish and Game (DFG) has reviewed the Notice of Preparation of a draft Environmental Impact Report (DEIR) for the South Sacramento Habitat Conservation Plan (SSHCP), (SCH #2008060230). The project consists of a regional approach to conserving species and addressing issues related to urban development, habitat conservation, open space and agricultural protection. The SSHCP will authorize Sacramento County, and the cities of Elk Grove, Rancho Cordova, and Galt, and two public utility agencies to issue permits allowing landowners to engage in specific development activities that could result in incidental take of listed species. The SSHCP plan area includes the Cities of Elk Grove, Rancho Cordova, and Galt, and the portion of Sacramento County south of the American River and east of Highway I-5 all the way to the County-line boundaries with Amador and San Joaquin Counties.

Wildlife habitat resources consist of a wide variety of habitats including vernal pool grasslands, oak woodlands, agricultural lands, and riparian and other wetland habitats. Significant natural resources of the project include habitat for sensitive species including 10 species listed under either the State or Federal Endangered Species Act.

We recommend that the DEIR discuss and provide adequate mitigation for the following concerns:

1. The project's impact upon fish and wildlife and their habitat. The SSHCP will replace actions previously taken to protect wildlife and their habitat. Examples include: individual project review under CEQA, individual incidental take permits issued under State and Federal Endangered Species Acts, individual permits under section 404 of the River and Harbors Act, Streambed Alteration Agreements (1600 permits), etc. The DEIR should discuss the value of the SSHCP in comparison with existing or alternative strategies for conserving wildlife and habitat in the SSHCP plan area.

2. The DEIR should identify and discuss potential areas of conflict in conservation planning. Examples may include conserving one species or group of species at the expense of other species of wildlife, SSHCP Preserve designs which differ significantly from USFWS critical habitat or recovery units, or conflicts with the conservation efforts of private organizations like The Nature Conservancy, or Sacramento Valley Conservancy.

3. The project's impact upon wetlands including vernal pools and riparian habitat. The SSHCP's Conservation Strategy will likely effect the location and amount of the remaining wetland habitat in south Sacramento County. The DEIR should discuss the impact of the SSHCP's Conservation Strategy on wetlands and wetland dependant species. Among other things, the analysis should center on whether the proposed configuration of preserved habitat will permit long-term viability of habitats and species.

4. The SSHCP Covered Species list includes endemic species that have a narrow distribution (Sacramento Orcutt grass), as well as species which have important parts of their range within the plan area (vernal pool tadpole shrimp). The DEIR should discuss the potential for the project to impact these species, or other species, such that their populations might drop below a self-sustaining level.

5. The SSHCP affords Incidental Take coverage for infrastructure projects like roads, water conveyance, etc., both inside and outside the Urban Development Area. These types of projects may act as barriers to the movement of wildlife across the landscape, or between preserves. The DEIR should contain a discussion of, and provide mitigation for, any adverse effects that these barriers may have upon wildlife.

6. The DEIR will form the basis for DFG's issuance of a 2081(b) Incidental Take Permit for the SSHCP. Therefore, mitigation for State-listed species must meet DFG's full mitigation standard contained in California Code of Regulation Title 14, Section 783.4.

7. The DEIR should contain an evaluation of the SSHCP's consistency with applicable land use plans (General Plans, Specific Plans, etc.), as well as other habitat conservation plans (San Joaquin HCP, Natomas HCP).

This project will have an impact to fish and/or wildlife habitat. Assessment of fees under Public Resources Code Section 21089 and as defined by Fish and Game Code Section 711.4 is necessary. Fees are payable by the project applicant upon filing the Notice of Determination by the lead agency.

Pursuant to Public Resources Code Sections 21092 and 21092.2, the DFG requests written notification of proposed actions and pending decisions regarding this project. Written notifications should be directed to this office.

Thank you for the opportunity to review this project. If the DFG can be of further assistance, please contact Mr. Dan Gifford, Staff Environmental Scientist, telephone (209) 369-8851 or, Mr. Jeff Drongesen, Supervising Environmental Scientist, telephone (916) 358-2382.

Sincerely,

for Sandra Morey
Regional Manager

cc. Mr. Jeff Drongesen
Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

Mr. Dan Gifford
Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

Mr. Ken Sanchez
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W2605
Sacramento, CA 92825-1888

County Executive
Terry Schutten

Sacramento County
Airport System
G. Hardy Acree, Director of Airports

County of Sacramento

Sacramento International Airport
Mather Airport
Executive Airport
Franklin Field

RECEIVED
JUL 14 2008
DEPARTMENT OF ENVIRONMENTAL REVIEW AND ASSESSMENT

July 9, 2008

Joyce Horizumi
Director/ Environmental Coordinator
Department of Environmental Review
and Assessment (DERA)
827 Seventh Street, Room 220
Sacramento, CA 95814-2922

Nina Bicknese
Conservation Planning Branch
Sacramento Fish and Wildlife Office
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

Subject: Comments – Notice of Preparation (NOP) of a Joint DEIR and DEIS for South Sacramento Habitat Conservation Plan (SSHCP)
DERA Control Number 03-PLE-0637

Dear Ms. Horizumi and Ms. Bicknese:

This letter conveys the comments and recommendations of the Sacramento County Airport System (County Airport System) in response to the NOP issued by the Sacramento County Department of Environmental Review and Assessment (DERA) on June 11, 2008, and published in the *Federal Register* on June 10, 2008 by the United States Fish and Wildlife Service (Service). In summary, we strongly recommend that the Joint DEIR/DEIS consider current and future projected aircraft operational requirements at three airports operated by the County Airport System in the southern portion of the County: Executive Airport (SAC), Mather Airport (MHR), and Franklin Field (F72). In particular, the goal of the SSHCP to protect and conserve 40 wildlife species could increase the areal extent and concentration of habitat for avian species particularly hazardous to commercial aircraft operations.

Our comments begin with an overview of the three airports. Mather Airport and Franklin Field are located within the SSHCP Study Area depicted in Figure 2-1 of Chapter 2 (Physical Resources) of the Draft SSHCP. In addition, the western boundary of the Study Area appears to be within one mile or less of Executive Airport. We then summarize the requirements of the Federal Aviation Administration (FAA) relative to wildlife hazards near airports, and the involvement of the County Airport System in efforts that resulted in approval by the Sacramento County Board of Supervisors of changes in County land use plans for South Mather (Resolution 2006-0210, February 26, 2006).

(1) Overview of Mather Airport

Mather Airport is one of four airports operated by the County Airport System. (The aviation operations at McClellan Airport are managed by the County Airport System on behalf of the County's Department of Economic Development and Intergovernmental Affairs.) MHR is the County Airport System's designated cargo airport, and it also supports a significant number of general aviation operations. During 2007, MHR supported 87,617 flight operations, including cargo, general aviation, air taxi, and military. (An "operation" is either an aircraft landing or take-off.) As an indication of Mather Airport's regional economic importance, during the first five months of 2008, MHR accommodated 69,401,179 pounds of freight, almost evenly divided between arriving and departing shipments. The total represents an increase of 8.6 percent over the same five-month period in 2007.

The County Airport System initiated a Master Plan for Mather Airport in April 2001. On February 17, 2004, the Sacramento County Board of Supervisors accepted the draft Master Plan and directed that DERA initiate preparation of environmental review, a process that is ongoing. The draft MHR Master Plan forecast update projects an annual average growth rate in operations of 1.3 percent for the period between 2007 and 2025, resulting in annual operations growth from 87,617 in 2007 to 110,634 in 2025. In addition to existing available commercial space at MHR, over 200 acres of land is planned for new construction once the Mather Airport Master Plan is complete. The Mather Airport Master Plan may be viewed on the County Airport System website, by accessing the Planning and Development tab:
http://www.sacairports.org/mather/planning/index.html.

(2) Overview of Executive Airport

Located on 540 acres in the City of Sacramento on Freeport Boulevard, Executive Airport (SAC) is the County Airport System's designated General Aviation airport. For the five months ending May 2008, SAC had a total of 39,144 flight operations, consisting of 38,691 general aviation operations and 453 military operations, or a monthly average of 7,829. Over 30 businesses operate at SAC, offering a wide variety of aviation related services including flight schools, aircraft maintenance, avionics, insurance, and aerial photography. Both MHR and SAC have been designated as reliever airports for Sacramento International Airport pursuant to the Federal Aviation Administration (FAA) National Plan of Integrated Airport Systems (NPIAS).

(3) Overview of Franklin Field

Franklin Field Airport (F 72) is currently a public use airport owned and operated by the County of Sacramento. The facility is considered an "uncontrolled airport" because it does not have an operating air traffic control tower.. There are approximately 36,000

annual flight operations at F72, including flight training. In 1947 the airport was acquired by the County of Sacramento from the federal government. It is located at 12480 Bruceville Road, Elk Grove.

(4) Executive Airport/Franklin Field Master Plan Update

The County Airport System is preparing Master Plan Updates (MPUs) for Executive Airport and Franklin Field Airport. The MPUs will establish guidelines for improving the facilities at each airport over a 20-year period. It will also represent a vision for each airport in the future, recognizing the operational, economic, and environmental factors likely to influence physical development. The MPUs will identify the type and extent of facilities required to meet forecast aviation demand, and will evaluate a range of alternatives for improving facilities consistent with forecast requirements. We recommend that the SSHCP and the Joint DEIR/DEIS take into account that the MPUs, when completed, may encompass physical and operational expansion parameters that will need to be reconciled with the conservation goals of the SSHCP.

(5) Hazardous Wildlife Implications and Concerns

The FAA establishes, updates and enforces policies and guidance relative to the placement of hazardous wildlife attractants on and near airports, in particular with regard to projects within a five-mile radius of airports subject to FAA grant assurances. The FAA Wildlife Hazards Advisory Circular (AC) referenced herein specifies two geographic areas of concern relative to hazardous wildlife:

- The "Critical Zone," which is defined as a 10,000-foot radius from the runway centerline for airports serving turbine-powered (jet) aircraft, and a 5,000-foot radius for airports serving piston-powered aircraft; and
- A five-mile radius from the outer edge of the Airport Operating Area (AOA).

The FAA strongly discourages hazardous wildlife attractants within the Critical Zone, and requires airport operators such as the County Airport System to evaluate all proposed development projects within a five-mile radius for potential hazardous wildlife attractants. Exhibits depicting the Critical Zone and Five-Mile radius for MHR are enclosed. Certain aquatic components of the habitat preserves contemplated in the SSHCP, when implemented, could attract avian species that can inflict significant damage to aircraft, in addition to endangering passengers and crew members.
We therefore request that the environmental analysis of the draft EIR/EIS for the SSHCP include a detailed analysis of the HCP's potential to increase hazardous wildlife activity within the five-mile radius of MHR, in addition to potential impacts to SAC and F72 in consideration of the projected increases in aviation activity at the three facilities.

(6) Federal Aviation Administration Policies Addressing Hazardous Wildlife

The FAA is the federal agency responsible for the safe design, operation and maintenance of airports. As the human population and number of aircraft operations have increased in the United States, collisions involving avian species and aircraft have become more common, costly, and threatening to human safety. Aquatic features such as wetlands, golf course ponds, water and sewage treatment plants and compensatory wetland mitigation projects are among the landscape characteristics most likely to attract waterfowl and other birds that have a high likelihood of inflicting damage to aircraft. The FAA is therefore understandably concerned with minimizing hazardous wildlife attractants near airports. Pursuant to FAA policy, airport operators such as the County Airport System are responsible for monitoring proposed developments that could lessen airport viability. A few of the FAA hazardous wildlife policies and guidance documents are described below.

- Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D.
- "Hazardous Wildlife Attractants On Or Near Airports," FAA Advisory Circular (AC) No. 150/5200-33B, August 28, 2007 (enclosed). Please note that the 2007 revision replaces all previous versions of this AC.
- *Memorandum of Agreement Between the Federal Aviation Administration, the U.S. Air Force, the U.S. Army, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service and the U.S. Department of Agriculture to Address Aircraft-Wildlife Strikes* (hereinafter "Interagency MOA"), executed by the six agencies between December 9, 2002 and May 2, 2003 (enclosed).
- *Wildlife Hazard Management At Airports – A Manual for Airport Personnel*, FAA and USDA, Second Edition - July 2005.

Environmental staff specialists assigned to the FAA's San Francisco Airports District Office (ADO) recently clarified the "guidance" and "advisory" nature of the first two documents listed above: "Although the term 'guidance' is used to refer to the hazardous wildlife criteria, Part 139 airport operators, such as the Sacramento County Airport System, are **required** (emphasis added) to comply with the standards provided." Attachment 1 comprises a more complete list of FAA policies and requirements. The County Airport System strongly recommends that DERA and the U.S. Fish and Wildlife Service (Service) incorporate those documents into the environmental analysis for the SSHCP. Moreover, pursuant to the Interagency MOA, the Service has an affirmative obligation to consult with the FAA during preparation of the DEIS, and to collaborate in reducing the likelihood of bird-aircraft strikes that may result from implementation of the SSHCP.

(7) Regional Commercial Aviation Considerations

The County Airport System also requests that the DEIR and DEIS include consideration of the following factors.

Temporary Relocation of Commercial Service

As stated above, MHR is the County Airport System's designated cargo airport. However, a "Continuity of Operations Plan" (Continuity Plan) is now in the initial stages of preparation for Sacramento International Airport (SMF). The lessons learned during Hurricane Katrina warrant such a contingency plan. It is contemplated that the Continuity Plan will address means by which limited commercial passenger service operations could be temporarily transferred to MHR in the event of a levee breach or other natural disaster that could cause commercial passenger operations to be temporarily interrupted at SMF. (No permanent facilities or related developments at MHR are contemplated to address the temporary relocation of operations to that facility.)

Although the number of flights diverted to MHR would be limited to those necessary to sustain the Sacramento region's access to the national air transportation system, the passengers and crews aboard such aircraft could be confronted with unnecessary risk of collision with birds as a result of implementing the SSHCP. The County Airport System therefore recommends that the potential for temporary relocation of commercial passenger aviation activity to MHR be thoroughly considered in the environmental analysis.

Potential Expansion and/or Relocation of Aviation Activity

As noted, the Master Plan Update process for SAC and F72 was recently begun. At this stage of the master plan studies, it is impossible to predict the roles and functions for the two airports that will ultimately be recommended for approval by the Board of Supervisors. Given the continued population growth and economic development of the Sacramento - Stockton region, it is quite possible that over time Franklin Field Airport could experience a substantial increase in general aviation, ground support services such as aircraft maintenance and flight training, and as a base of operations for entities such as the California Division of Forestry (CDF). No actions, therefore, should be taken near F72 under the auspices of the SSHCP if those measures could constrain expansion of aviation activity. An example of a constraining action would be establishment of conservation easements near the airport, which could reduce the County Airport System's ability to carry out FAA-mandated hazardous wildlife control activities. The potential interaction of the SSHCP and potential increases at F72 should be evaluated in the DEIR/DEIS.

(8) Mather-Related General Plan Amendments

Efforts begun in late 2005, among a number of County agencies and a diverse stakeholders group, resulted in the above referenced directive by the Sacramento County Board of Supervisors to proceed with County General Plan amendments and federal

wetland fill permits at South Mather. Those efforts are described in the February 22, 2006, Board report that recommended approval of Resolution 2006-0210. During the stakeholder process the County Airport System emphasized the need for flexibility in the designation of wetland features in the MHR Airport Operations Area (AOA). The result was the attached exhibit titled "South Mather Draft Master Plan Wetlands & Land Uses," which comprised Attachment A to the February 22, 2006 Board report. As noted on the exhibit, vernal pools at the airport are designated as "Protected" rather than "Preserved." This distinction is articulated on Page 3 of Attachment B to the Board report (enclosed), which makes clear that while no development may occur in those vernal pools, operations and development consistent with the Mather Airport Master Plan may occur.

Despite the efforts made by the stakeholder group to accommodate both aviation activity and wetland habitat protection, the FAA subsequently indicated concern regarding variance from FAA policy with respect to federally obligated land, and potential hazardous wildlife attractants. The County Airport System therefore recommends that DERA and the Service take the FAA's enclosed March 29, 2006 letter into account in preparing the DEIR/DEIS, which will no doubt require close coordination with the FAA's San Francisco ADO.

(9) Recommendations

The Sacramento County Airport System recommends that the Draft EIR/EIS for the SSHCP include the following:

- A complete and thorough evaluation of the hazardous wildlife implications associated with the proposed project, as identified in Sections 5 and 6 of this letter, and any project alternatives that may be considered.
- Based on the federal "Interagency MOA" described in Section 6, we believe the Service has an affirmative obligation to actively consult with the FAA regarding measures to minimize hazardous wildlife attractants associated with the proposed project and any alternatives that may be considered. Such consultation should be initiated immediately.

Project Review by FAA and California Department of Transportation (Caltrans)

The FAA wildlife Advisory Circular obligates commercial airports to a number of responsibilities related to nearby changes in land-use practices (Section 4-3-a of AC 150/5200-33B). Pursuant to the AC, the County Airport System will submit this project to the FAA San Francisco ADO for review and comment, utilizing FAA Form 7460-1, "Notice of Proposed Construction or Alteration." In addition, the Caltrans Division of Aeronautics will typically comment on proposed projects, such as the SSHCP, which are located near airports.

CEQA Requirements

The County Airport System also requests that the DEIR fully address the potential for the wetland components of the SSHCP to create a safety hazard for aircraft operations. Please refer to CEQA Guideline 15154 – Projects Near Airports (below).[1]

> 15154. Projects Near Airports
>
> (a) When a lead agency prepares an EIR for a project within the boundaries of a comprehensive airport land use plan or, if a comprehensive airport land use plan has not been adopted for a project within two nautical miles of a public airport or public use airport, the agency shall utilize the Airport Land Use Planning Handbook published by Caltrans' Division of Aeronautics to assist in the preparation of the EIR relative to potential airport-related safety hazards and noise problems.
>
> (b) A lead agency shall not adopt a negative declaration or mitigated negative declaration for a project described in subdivision (a) unless the lead agency considers whether the project will result in a safety hazard or noise problem for persons using the airport or for persons residing or working in the project area.

Thank you for the opportunity to provide scoping comments in response to the NOP for the South Sacramento Habitat Conservation Plan. Questions may be directed to me at the telephone number below. Alternatively, information on the Mather Master Plan CEQA/NEPA process may be obtained by contacting Airport Planner George Munson at 874-0767. Information on hazardous wildlife may be obtained by contacting Senior Natural Resource Specialist Janae Scruggs at 874-0820.

Sincerely,

J. Glen Rickelton
Manager – Planning and Environment (P&E)
916-874-0482

C: Robert B. Leonard, Assistant to the County Executive
Lisa J. Stanton, Airports Chief Administrative Officer
Michael La Pier, Airports Chief Operating Officer
Frederick Greco, Deputy Director – Maintenance
Barry Rondinella, Deputy Director - Operations
George Munson, Airport Planner – Planning and Environment

[1] Title 14 CCR, Chapter 3 - CEQA Guidelines, Article 10 - Considerations in Preparing EIRs and Negative Declarations.

Greg Rowe, Senior Environmental Analyst – Planning and Environment
Janae R. Scruggs, Senior Natural Resource Specialist – P&E
Gregg Weissenfluh, Manager – Mather Airport
John Downey, Manager – Sacramento Executive Airport and Franklin Field
Peter Morse, Associate Environmental Analyst - DERA
Richard Radmacher, Senior Planner – Planning and Community Development, County of Sacramento Municipal Services Agency (MSA)
Robin K. Hunt, Manager – FAA San Francisco Airports District Office (ADO)
Douglas Pomeroy, Environmental Protection Specialist/Biologist – FAA San Francisco Airports District Office (ADO)

Enclosures:

- Hazardous Wildlife Attractants On Or Near Airports," FAA Advisory Circular (AC) No. 150/5200-33B, August 28, 2007.
- *Memorandum of Agreement Between the Federal Aviation Administration, the U.S. Air Force, the U.S. Army, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service and the U.S. Department of Agriculture to Address Aircraft-Wildlife Strikes* (hereinafter "Interagency MOA"), executed by the six agencies between December 9, 2002 and May 2, 2003.
- Drawing No. 1, MHR Critical Zone
- Mather Airport 5-Mile Radius exhibit
- Exhibit - South Mather Draft Master Plan Wetlands & Land Uses.
- Attachment 1 – FAA Regulations & Related Requirements – Hazardous Wildlife
- Board of Supervisors Report and Resolution 2006-0210, February 22, 2006. "Initiation of Mather-Related General Plan Amendments And Approval To Proceed With Application For Federal Wetland Fill Permits At South Mather."
- "Initiation of Mather-Related General Plan Amendment." FAA letter dated March 29, 2006.

U.S. Department of Transportation

Federal Aviation Administration

Advisory Circular

Subject: HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS	Date: 8/28/2007	AC No: 150/5200-33B
	Initiated by: AAS-300	Change:

1. **PURPOSE.** This Advisory Circular (AC) provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2. **APPLICABILITY.** The Federal Aviation Administration (FAA) recommends that public-use airport operators implement the standards and practices contained in this AC. The holders of Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D (Part 139), may use the standards, practices, and recommendations contained in this AC to comply with the wildlife hazard management requirements of Part 139. Airports that have received Federal grant-in-aid assistance must use these standards. The FAA also recommends the guidance in this AC for land-use planners, operators of non-certificated airports, and developers of projects, facilities, and activities on or near airports.

3. **CANCELLATION.** This AC cancels AC 150/5200-33A, *Hazardous Wildlife Attractants on or near Airports*, dated July 27, 2004.

4. **PRINCIPAL CHANGES.** This AC contains the following major changes, which are marked with vertical bars in the margin:

   a. Technical changes to paragraph references.

   b. Wording on storm water detention ponds.

   c. Deleted paragraph 4-3.b, *Additional Coordination.*

5. **BACKGROUND.** Information about the risks posed to aircraft by certain wildlife species has increased a great deal in recent years. Improved reporting, studies, documentation, and statistics clearly show that aircraft collisions with birds and other wildlife are a serious economic and public safety problem. While many species of wildlife can pose a threat to aircraft safety, they are not equally hazardous. Table 1

ranks the wildlife groups commonly involved in damaging strikes in the United States according to their relative hazard to aircraft. The ranking is based on the 47,212 records in the FAA National Wildlife Strike Database for the years 1990 through 2003. These hazard rankings, in conjunction with site-specific Wildlife Hazards Assessments (WHA), will help airport operators determine the relative abundance and use patterns of wildlife species and help focus hazardous wildlife management efforts on those species most likely to cause problems at an airport.

Most public-use airports have large tracts of open, undeveloped land that provide added margins of safety and noise mitigation. These areas can also present potential hazards to aviation if they encourage wildlife to enter an airport's approach or departure airspace or air operations area (AOA). Constructed or natural areas—such as poorly drained locations, detention/retention ponds, roosting habitats on buildings, landscaping, odor-causing rotting organic matter (putrescible waste) disposal operations, wastewater treatment plants, agricultural or aquaculture activities, surface mining, or wetlands—can provide wildlife with ideal locations for feeding, loafing, reproduction, and escape. Even small facilities, such as fast food restaurants, taxicab staging areas, rental car facilities, aircraft viewing areas, and public parks, can produce substantial attractions for hazardous wildlife.

During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage. Hazardous wildlife attractants on and near airports can jeopardize future airport expansion, making proper community land-use planning essential. This AC provides airport operators and those parties with whom they cooperate with the guidance they need to assess and address potentially hazardous wildlife attractants when locating new facilities and implementing certain land-use practices on or near public-use airports.

6. MEMORANDUM OF AGREEMENT BETWEEN FEDERAL RESOURCE AGENCIES. The FAA, the U.S. Air Force, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture - Wildlife Services signed a Memorandum of Agreement (MOA) in July 2003 to acknowledge their respective missions in protecting aviation from wildlife hazards. Through the MOA, the agencies established procedures necessary to coordinate their missions to address more effectively existing and future environmental conditions contributing to collisions between wildlife and aircraft (wildlife strikes) throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety while protecting the Nation's valuable environmental resources.

DAVID L. BENNETT
Director, Office of Airport Safety
and Standards

Table 1. Ranking of 25 species groups as to relative hazard to aircraft (1=most hazardous) based on three criteria (damage, major damage, and effect-on-flight), a composite ranking based on all three rankings, and a relative hazard score. Data were derived from the FAA National Wildlife Strike Database, January 1990–April 2003.[1]

Species group	Ranking by criteria			Composite ranking[2]	Relative hazard score[3]
	Damage[4]	Major damage[5]	Effect on flight[6]		
Deer	1	1	1	1	100
Vultures	2	2	2	2	64
Geese	3	3	6	3	55
Cormorants/pelicans	4	5	3	4	54
Cranes	7	6	4	5	47
Eagles	6	9	7	6	41
Ducks	5	8	10	7	39
Osprey	8	4	8	8	39
Turkey/pheasants	9	7	11	9	33
Herons	11	14	9	10	27
Hawks (buteos)	10	12	12	11	25
Gulls	12	11	13	12	24
Rock pigeon	13	10	14	13	23
Owls	14	13	20	14	23
H. lark/s. bunting	18	15	15	15	17
Crows/ravens	15	16	16	16	16
Coyote	16	19	5	17	14
Mourning dove	17	17	17	18	14
Shorebirds	19	21	18	19	10
Blackbirds/starling	20	22	19	20	10
American kestrel	21	18	21	21	9
Meadowlarks	22	20	22	22	7
Swallows	24	23	24	23	4
Sparrows	25	24	23	24	4
Nighthawks	23	25	25	25	1

[1] Excerpted from the *Special Report for the FAA, "Ranking the Hazard Level of Wildlife Species to Civil Aviation in the USA: Update #1, July 2, 2003".* Refer to this report for additional explanations of criteria and method of ranking.

[2] Relative rank of each species group was compared with every other group for the three variables, placing the species group with the greatest hazard rank for ≥ 2 of the 3 variables above the next highest ranked group, then proceeding down the list.

[3] Percentage values, from Tables 3 and 4 in Footnote 1 of the *Special Report*, for the three criteria were summed and scaled down from 100, with 100 as the score for the species group with the maximum summed values and the greatest potential hazard to aircraft.

[4] Aircraft incurred at least some damage (destroyed, substantial, minor, or unknown) from strike.

[5] Aircraft incurred damage or structural failure, which adversely affected the structure strength, performance, or flight characteristics, and which would normally require major repair or replacement of the affected component, or the damage sustained makes it inadvisable to restore aircraft to airworthy condition.

[6] Aborted takeoff, engine shutdown, precautionary landing, or other.

This page intentionally left blank.

Table of Contents

SECTION 1. GENERAL SEPARATION CRITERIA FOR HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS 1

1-1. INTRODUCTION 1

1-2. AIRPORTS SERVING PISTON-POWERED AIRCRAFT 1

1-3. AIRPORTS SERVING TURBINE-POWERED AIRCRAFT 1

1-4. PROTECTION OF APPROACH, DEPARTURE, AND CIRCLING AIRSPACE 1

SECTION 2. LAND-USE PRACTICES ON OR NEAR AIRPORTS THAT POTENTIALLY ATTRACT HAZARDOUS WILDLIFE 3

2-1. GENERAL 3

2-2. WASTE DISPOSAL OPERATIONS 3

2-3. WATER MANAGEMENT FACILITIES 5

2-4. WETLANDS 8

2-5. DREDGE SPOIL CONTAINMENT AREAS 9

2-6. AGRICULTURAL ACTIVITIES 9

2-7. GOLF COURSES, LANDSCAPING AND OTHER LAND-USE CONSIDERATIONS 10

2-8. SYNERGISTIC EFFECTS OF SURROUNDING LAND USES 11

SECTION 3. PROCEDURES FOR WILDLIFE HAZARD MANAGEMENT BY OPERATORS OF PUBLIC-USE AIRPORTS 13

3.1. INTRODUCTION 13

3.2. COORDINATION WITH USDA WILDLIFE SERVICES OR OTHER QUALIFIED WILDLIFE DAMAGE MANAGEMENT BIOLOGISTS 13

3-3. WILDLIFE HAZARD MANAGEMENT AT AIRPORTS: A MANUAL FOR AIRPORT PERSONNEL 13

3-4. WILDLIFE HAZARD ASSESSMENTS, TITLE 14, CODE OF FEDERAL REGULATIONS, PART 139 13

3-5. WILDLIFE HAZARD MANAGEMENT PLAN (WHMP) 14

3-6. LOCAL COORDINATION 14

3-7. COORDINATION/NOTIFICATION OF AIRMEN OF WILDLIFE HAZARDS 14

SECTION 4. FAA NOTIFICATION AND REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS 15

4-1. FAA REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS 15

4-2. WASTE MANAGEMENT FACILITIES 15

4-3. OTHER LAND-USE PRACTICE CHANGES 16

APPENDIX 1. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR 19

This page intentionally left blank.

SECTION 1.

GENERAL SEPARATION CRITERIA FOR HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS.

1-1. INTRODUCTION. When considering proposed land uses, airport operators, local planners, and developers must take into account whether the proposed land uses, including new development projects, will increase wildlife hazards. Land-use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife strikes.

The FAA recommends the minimum separation criteria outlined below for land-use practices that attract hazardous wildlife to the vicinity of airports. Please note that FAA criteria include land uses that cause movement of hazardous wildlife onto, into, or across the airport's approach or departure airspace or air operations area (AOA). (See the discussion of the synergistic effects of surrounding land uses in Section 2-8 of this AC.)

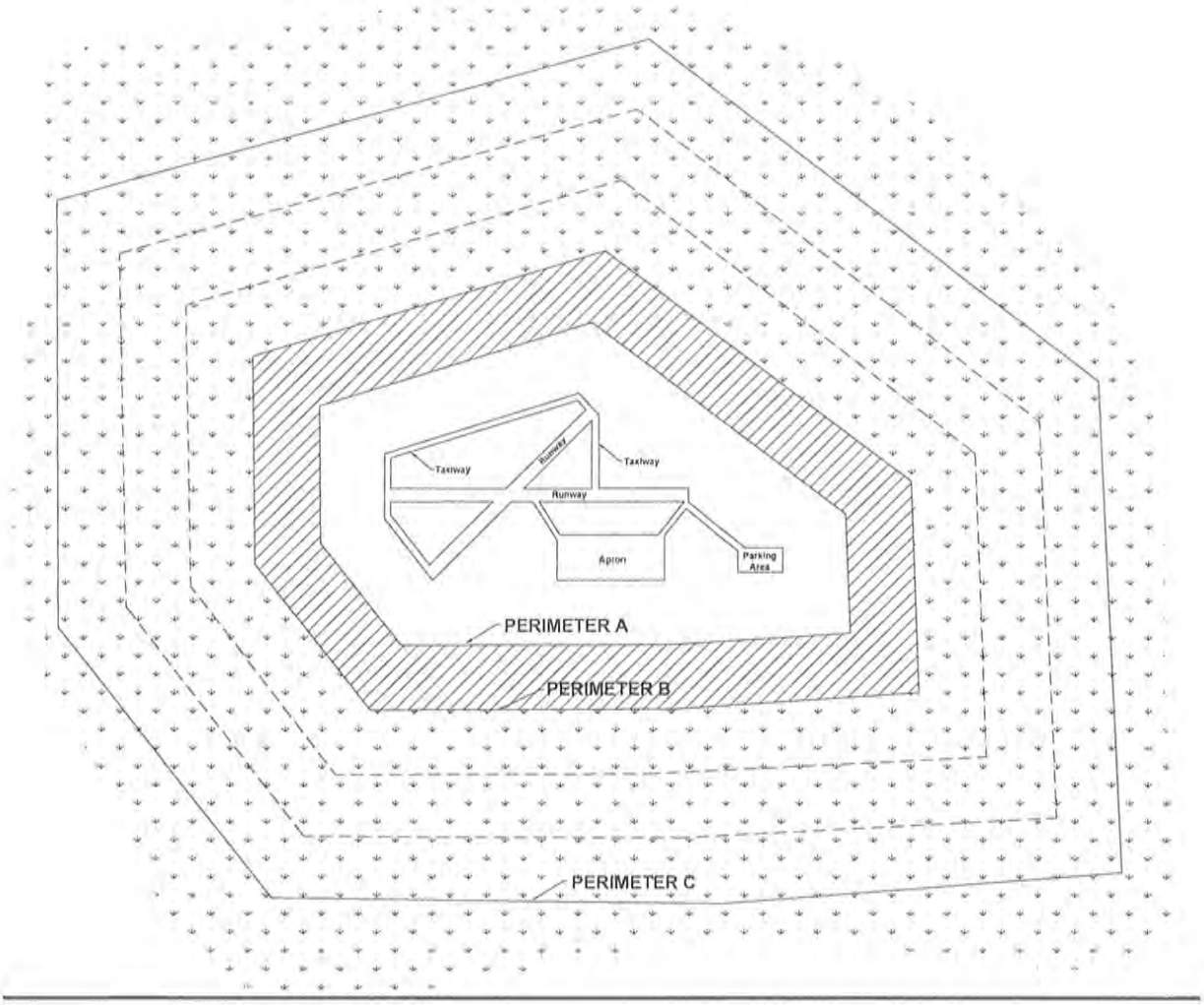
The basis for the separation criteria contained in this section can be found in existing FAA regulations. The separation distances are based on (1) flight patterns of piston-powered aircraft and turbine-powered aircraft, (2) the altitude at which most strikes happen (78 percent occur under 1,000 feet and 90 percent occur under 3,000 feet above ground level), and (3) National Transportation Safety Board (NTSB) recommendations.

1-2. AIRPORTS SERVING PISTON-POWERED AIRCRAFT. Airports that do not sell Jet-A fuel normally serve piston-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 5,000 feet at these airports for any of the hazardous wildlife attractants mentioned in Section 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between an airport's AOA and the hazardous wildlife attractant. Figure 1 depicts this separation distance measured from the nearest aircraft operations areas.

1-3. AIRPORTS SERVING TURBINE-POWERED AIRCRAFT. Airports selling Jet-A fuel normally serve turbine-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 10,000 feet at these airports for any of the hazardous wildlife attractants mentioned in Section 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between an airport's AOA and the hazardous wildlife attractant. Figure 1 depicts this separation distance from the nearest aircraft movement areas.

1-4. PROTECTION OF APPROACH, DEPARTURE, AND CIRCLING AIRSPACE. For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport's AOA and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace.

Figure 1. Separation distances within which hazardous wildlife attractants should be avoided, eliminated, or mitigated.



PERIMETER A: For airports serving piston-powered aircraft, hazardous wildlife attractants must be 5,000 feet from the nearest air operations area.

PERIMETER B: For airports serving turbine-powered aircraft, hazardous wildlife attractants must be 10,000 feet from the nearest air operations area.

PERIMETER C: 5-mile range to protect approach, departure and circling airspace.

SECTION 2.

LAND-USE PRACTICES ON OR NEAR AIRPORTS THAT POTENTIALLY ATTRACT HAZARDOUS WILDLIFE.

2-1. GENERAL. The wildlife species and the size of the populations attracted to the airport environment vary considerably, depending on several factors, including land-use practices on or near the airport. This section discusses land-use practices having the potential to attract hazardous wildlife and threaten aviation safety. In addition to the specific considerations outlined below, airport operators should refer to *Wildlife Hazard Management at Airports*, prepared by FAA and U.S. Department of Agriculture (USDA) staff. (This manual is available in English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA's wildlife hazard mitigation web site: http://wildlife-mitigation.tc.FAA.gov.). And, *Prevention and Control of Wildlife Damage,* compiled by the University of Nebraska Cooperative Extension Division. (This manual is available online in a periodically updated version at: ianrwww.unl.edu/wildlife/solutions/handbook/.)

2-2. WASTE DISPOSAL OPERATIONS. Municipal solid waste landfills (MSWLF) are known to attract large numbers of hazardous wildlife, particularly birds. Because of this, these operations, when located within the separations identified in the siting criteria in Sections 1-2 through 1-4, are considered incompatible with safe airport operations.

a. **Siting for new municipal solid waste landfills subject to AIR 21.** Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) (AIR 21) prohibits the construction or establishment of a new MSWLF within 6 statute miles of certain public-use airports. Before these prohibitions apply, both the airport and the landfill must meet the very specific conditions described below. These restrictions do not apply to airports or landfills located within the state of Alaska.

   The airport must (1) have received a Federal grant(s) under 49 U.S.C. § 47101, et. seq.; (2) be under control of a public agency; (3) serve some scheduled air carrier operations conducted in aircraft with less than 60 seats; and (4) have total annual enplanements consisting of at least 51 percent of scheduled air carrier enplanements conducted in aircraft with less than 60 passenger seats.

   The proposed MSWLF must (1) be within 6 miles of the airport, as measured from airport property line to MSWLF property line, and (2) have started construction or establishment on or after April 5, 2001. Public Law 106-181 only limits the construction or establishment of some new MSWLF. It does not limit the expansion, either vertical or horizontal, of existing landfills.

   NOTE: Consult the most recent version of AC 150/5200-34, *Construction or Establishment of Landfills Near Public Airports,* for a more detailed discussion of these restrictions.

b. **Siting for new MSWLF not subject to AIR 21.** If an airport and MSWLF do not meet the restrictions of Public Law 106-181, the FAA recommends against locating MSWLF within the separation distances identified in Sections 1-2 through 1-4. The separation distances should be measured from the closest point of the airport's AOA to the closest planned MSWLF cell.

c. **Considerations for existing waste disposal facilities within the limits of separation criteria.** The FAA recommends against airport development projects that would increase the number of aircraft operations or accommodate larger or faster aircraft near MSWLF operations located within the separations identified in Sections 1-2 through 1-4. In addition, in accordance with 40 CFR 258.10, owners or operators of existing MSWLF units that are located within the separations listed in Sections 1-2 through 1-4 must demonstrate that the unit is designed and operated so it does not pose a bird hazard to aircraft. (See Section 4-2(b) of this AC for a discussion of this demonstration requirement.)

d. **Enclosed trash transfer stations.** Enclosed waste-handling facilities that receive garbage behind closed doors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles generally are compatible with safe airport operations, provided they are not located on airport property or within the Runway Protection Zone (RPZ). These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; that store uncovered quantities of municipal solid waste outside, even if only for a short time; that use semi-trailers that leak or have trash clinging to the outside; or that do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations. The FAA considers these facilities incompatible with safe airport operations if they are located closer than the separation distances specified in Sections 1-2 through 1-4.

e. **Composting operations on or near airport property.** Composting operations that accept only yard waste (e.g., leaves, lawn clippings, or branches) generally do not attract hazardous wildlife. Sewage sludge, woodchips, and similar material are not municipal solid wastes and may be used as compost bulking agents. The compost, however, must never include food or other municipal solid waste. Composting operations should not be located on airport property. Off-airport property composting operations should be located no closer than the greater of the following distances: 1,200 feet from any AOA or the distance called for by airport design requirements (see AC 150/5300-13, *Airport Design*). This spacing should prevent material, personnel, or equipment from penetrating any Object Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway. Airport operators should monitor composting operations located in proximity to the airport to ensure that steam or thermal rise does not adversely affect air traffic. On-airport disposal of compost by-products should not be conducted for the reasons stated in 2-3f.

f. **Underwater waste discharges.** The FAA recommends against the underwater discharge of any food waste (e.g., fish processing offal) within the separations identified in Sections 1-2 through 1-4 because it could attract scavenging hazardous wildlife.

g. **Recycling centers.** Recycling centers that accept previously sorted non-food items, such as glass, newspaper, cardboard, or aluminum, are, in most cases, not attractive to hazardous wildlife and are acceptable.

h. **Construction and demolition (C&D) debris facilities.** C&D landfills do not generally attract hazardous wildlife and are acceptable if maintained in an orderly manner, admit no putrescible waste, and are not co-located with other waste disposal operations. However, C&D landfills have similar visual and operational characteristics to putrescible waste disposal sites. When co-located with putrescible waste disposal operations, C&D landfills are more likely to attract hazardous wildlife because of the similarities between these disposal facilities. Therefore, a C&D landfill co-located with another waste disposal operation should be located outside of the separations identified in Sections 1-2 through 1-4.

i. **Fly ash disposal.** The incinerated residue from resource recovery power/heat-generating facilities that are fired by municipal solid waste, coal, or wood is generally not a wildlife attractant because it no longer contains putrescible matter. Landfills accepting only fly ash are generally not considered to be wildlife attractants and are acceptable as long as they are maintained in an orderly manner, admit no putrescible waste of any kind, and are not co-located with other disposal operations that attract hazardous wildlife.

   Since varying degrees of waste consumption are associated with general incineration (not resource recovery power/heat-generating facilities), the FAA considers the ash from general incinerators a regular waste disposal by-product and, therefore, a hazardous wildlife attractant if disposed of within the separation criteria outlined in Sections 1-2 through 1-4.

2-3. WATER MANAGEMENT FACILITIES. Drinking water intake and treatment facilities, storm water and wastewater treatment facilities, associated retention and settling ponds, ponds built for recreational use, and ponds that result from mining activities often attract large numbers of potentially hazardous wildlife. To prevent wildlife hazards, land-use developers and airport operators may need to develop management plans, in compliance with local and state regulations, to support the operation of storm water management facilities on or near all public-use airports to ensure a safe airport environment.

a. **Existing storm water management facilities.** On-airport storm water management facilities allow the quick removal of surface water, including discharges related to aircraft deicing, from impervious surfaces, such as pavement and terminal/hangar building roofs. Existing on-airport detention ponds collect storm water, protect water quality, and control runoff. Because they slowly release water

after storms, they create standing bodies of water that can attract hazardous wildlife. Where the airport has developed a Wildlife Hazard Management Plan (WHMP) in accordance with Part 139, the FAA requires immediate correction of any wildlife hazards arising from existing storm water facilities located on or near airports, using appropriate wildlife hazard mitigation techniques. Airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.

Where possible, airport operators should modify storm water detention ponds to allow a maximum 48-hour detention period for the design storm. The FAA recommends that airport operators avoid or remove retention ponds and detention ponds featuring dead storage to eliminate standing water. Detention basins should remain totally dry between rainfalls. Where constant flow of water is anticipated through the basin, or where any portion of the basin bottom may remain wet, the detention facility should include a concrete or paved pad and/or ditch/swale in the bottom to prevent vegetation that may provide nesting habitat.

When it is not possible to drain a large detention pond completely, airport operators may use physical barriers, such as bird balls, wires grids, pillows, or netting, to deter birds and other hazardous wildlife. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office.

The FAA recommends that airport operators encourage off-airport storm water treatment facility operators to incorporate appropriate wildlife hazard mitigation techniques into storm water treatment facility operating practices when their facility is located within the separation criteria specified in Sections 1-2 through 1-4.

b. **New storm water management facilities.** The FAA strongly recommends that off-airport storm water management systems located within the separations identified in Sections 1-2 through 1-4 be designed and operated so as not to create above-ground standing water. Stormwater detention ponds should be designed, engineered, constructed, and maintained for a maximum 48–hour detention period after the design storm and remain completely dry between storms. To facilitate the control of hazardous wildlife, the FAA recommends the use of steep-sided, rip-rap lined, narrow, linearly shaped water detention basins. When it is not possible to place these ponds away from an airport's AOA, airport operators should use physical barriers, such as bird balls, wires grids, pillows, or netting, to prevent access of hazardous wildlife to open water and minimize aircraft-wildlife interactions. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office. All vegetation in or around detention basins that provide food or cover for hazardous wildlife should be eliminated. If soil conditions and other requirements allow, the FAA encourages

the use of underground storm water infiltration systems, such as French drains or buried rock fields, because they are less attractive to wildlife.

c. **Existing wastewater treatment facilities.** The FAA strongly recommends that airport operators immediately correct any wildlife hazards arising from existing wastewater treatment facilities located on or near the airport. Where required, a WHMP developed in accordance with Part 139 will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should encourage wastewater treatment facility operators to incorporate measures, developed in consultation with a wildlife damage management biologist, to minimize hazardous wildlife attractants. Airport operators should also encourage those wastewater treatment facility operators to incorporate these mitigation techniques into their standard operating practices. In addition, airport operators should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

d. **New wastewater treatment facilities.** The FAA strongly recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in Sections 1-2 through 1-4. Appendix 1 defines wastewater treatment facility as "any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes." The definition includes any pretreatment involving the reduction of the amount of pollutants or the elimination of pollutants prior to introducing such pollutants into a publicly owned treatment works (wastewater treatment facility). During the site-location analysis for wastewater treatment facilities, developers should consider the potential to attract hazardous wildlife if an airport is in the vicinity of the proposed site, and airport operators should voice their opposition to such facilities if they are in proximity to the airport.

e. **Artificial marshes.** In warmer climates, wastewater treatment facilities sometimes employ artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. The FAA strongly recommends against establishing artificial marshes within the separations identified in Sections 1-2 through 1-4.

f. **Wastewater discharge and sludge disposal.** The FAA recommends against the discharge of wastewater or sludge on airport property because it may improve soil moisture and quality on unpaved areas and lead to improved turf growth that can be an attractive food source for many species of animals. Also, the turf requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw, both of which can attract hazardous wildlife. In addition, the improved turf may attract grazing wildlife, such as deer and geese. Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

2-4. WETLANDS. Wetlands provide a variety of functions and can be regulated by local, state, and Federal laws. Normally, wetlands are attractive to many types of wildlife, including many which rank high on the list of hazardous wildlife species (Table 1).

NOTE: If questions exist as to whether an area qualifies as a wetland, contact the local division of the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, or a wetland consultant qualified to delineate wetlands.

a. **Existing wetlands on or near airport property.** If wetlands are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. At public-use airports, the FAA recommends immediately correcting, in cooperation with local, state, and Federal regulatory agencies, any wildlife hazards arising from existing wetlands located on or near airports. Where required, a WHMP will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.

b. **New airport development.** Whenever possible, the FAA recommends locating new airports using the separations from wetlands identified in Sections 1-2 through 1-4. Where alternative sites are not practicable, or when airport operators are expanding an existing airport into or near wetlands, a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the state wildlife management agency should evaluate the wildlife hazards and prepare a WHMP that indicates methods of minimizing the hazards.

c. **Mitigation for wetland impacts from airport projects.** Wetland mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects or projects required to correct wildlife hazards from wetlands. Wetland mitigation must be designed so it does not create a wildlife hazard. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Sections 1-2 through 1-4.

   (1) Onsite mitigation of wetland functions. The FAA may consider exceptions to locating mitigation activities outside the separations identified in Sections 1-2 through 1-4 if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge, which cannot be replicated when moved to a different location. Using existing airport property is sometimes the only feasible way to achieve the mitigation ratios mandated in regulatory orders and/or settlement agreements with the resource agencies. Conservation easements are an additional means of providing mitigation for project impacts. Typically the airport operator continues to own the property, and an easement is created stipulating that the property will be maintained as habitat for state or Federally listed species.

Mitigation must not inhibit the airport operator's ability to effectively control hazardous wildlife on or near the mitigation site or effectively maintain other aspects of safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife must be avoided. The FAA will review any onsite mitigation proposals to determine compatibility with safe airport operations. A wildlife damage management biologist should evaluate any wetland mitigation projects that are needed to protect unique wetland functions and that must be located in the separation criteria in Sections 1-2 through 1-4 before the mitigation is implemented. A WHMP should be developed to reduce the wildlife hazards.

(2) Offsite mitigation of wetland functions. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Sections 1-2 through 1-4 unless they provide unique functions that must remain onsite (see 2-4c(1)). Agencies that regulate impacts to or around wetlands recognize that it may be necessary to split wetland functions in mitigation schemes. Therefore, regulatory agencies may, under certain circumstances, allow portions of mitigation to take place in different locations.

(3) Mitigation banking. Wetland mitigation banking is the creation or restoration of wetlands in order to provide mitigation credits that can be used to offset permitted wetland losses. Mitigation banking benefits wetland resources by providing advance replacement for permitted wetland losses; consolidating small projects into larger, better-designed and managed units; and encouraging integration of wetland mitigation projects with watershed planning. This last benefit is most helpful for airport projects, as wetland impacts mitigated outside of the separations identified in Sections 1-2 through 1-4 can still be located within the same watershed. Wetland mitigation banks meeting the separation criteria offer an ecologically sound approach to mitigation in these situations. Airport operators should work with local watershed management agencies or organizations to develop mitigation banking for wetland impacts on airport property.

2-5. DREDGE SPOIL CONTAINMENT AREAS. The FAA recommends against locating dredge spoil containment areas (also known as Confined Disposal Facilities) within the separations identified in Sections 1-2 through 1-4 if the containment area or the spoils contain material that would attract hazardous wildlife.

2-6. AGRICULTURAL ACTIVITIES. Because most, if not all, agricultural crops can attract hazardous wildlife during some phase of production, the FAA recommends against the used of airport property for agricultural production, including hay crops, within the separations identified in Sections 1-2 through 1-4. . If the airport has no financial alternative to agricultural crops to produce income necessary to maintain the viability of the airport, then the airport shall follow the crop distance guidelines listed in the table titled "Minimum Distances between Certain Airport Features and Any On-Airport Agricultural Crops" found in AC 150/5300-13, *Airport Design*, Appendix 17. The cost of wildlife control and potential accidents should be weighed against the income produced by the on-airport crops when deciding whether to allow crops on the airport.

a. **Livestock production.** Confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg laying operations) often attract flocking birds, such as starlings, that pose a hazard to aviation. Therefore, The FAA recommends against such facilities within the separations identified in Sections 1-2 through 1-4. Any livestock operation within these separations should have a program developed to reduce the attractiveness of the site to species that are hazardous to aviation safety. Free-ranging livestock must not be grazed on airport property because the animals may wander onto the AOA. Furthermore, livestock feed, water, and manure may attract birds.

b. **Aquaculture.** Aquaculture activities (i.e. catfish or trout production) conducted outside of fully enclosed buildings are inherently attractive to a wide variety of birds. Existing aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4 must have a program developed to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should also oppose the establishment of new aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4.

c. **Alternative uses of agricultural land.** Some airports are surrounded by vast areas of farmed land within the distances specified in Sections 1-2 through 1-4. Seasonal uses of agricultural land for activities such as hunting can create a hazardous wildlife situation. In some areas, farmers will rent their land for hunting purposes. Rice farmers, for example, flood their land during waterfowl hunting season and obtain additional revenue by renting out duck blinds. The duck hunters then use decoys and call in hundreds, if not thousands, of birds, creating a tremendous threat to aircraft safety. A wildlife damage management biologist should review, in coordination with local farmers and producers, these types of seasonal land uses and incorporate them into the WHMP.

2-7. GOLF COURSES, LANDSCAPING AND OTHER LAND-USE CONSIDERATIONS.

a. **Golf courses.** The large grassy areas and open water found on most golf courses are attractive to hazardous wildlife, particularly Canada geese and some species of gulls. These species can pose a threat to aviation safety. The FAA recommends against construction of new golf courses within the separations identified in Sections 1-2 through 1-4. Existing golf courses located within these separations must develop a program to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should ensure these golf courses are monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.

b. **Landscaping and landscape maintenance.** Depending on its geographic location, landscaping can attract hazardous wildlife. The FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. A wildlife damage management biologist should review all landscaping plans. Airport operators should also monitor all landscaped areas on a continuing basis for the presence of hazardous wildlife. If

hazardous wildlife is detected, corrective actions should be immediately implemented.

Turf grass areas can be highly attractive to a variety of hazardous wildlife species. Research conducted by the USDA Wildlife Services' National Wildlife Research Center has shown that no one grass management regime will deter all species of hazardous wildlife in all situations. In cooperation with wildlife damage management biologist, airport operators should develop airport turf grass management plans on a prescription basis, depending on the airport's geographic locations and the type of hazardous wildlife likely to frequent the airport

Airport operators should ensure that plant varieties attractive to hazardous wildlife are not used on the airport. Disturbed areas or areas in need of re-vegetating should not be planted with seed mixtures containing millet or any other large-seed producing grass. For airport property already planted with seed mixtures containing millet, rye grass, or other large-seed producing grasses, the FAA recommends disking, plowing, or another suitable agricultural practice to prevent plant maturation and seed head production. Plantings should follow the specific recommendations for grass management and seed and plant selection made by the State University Cooperative Extension Service, the local office of Wildlife Services, or a qualified wildlife damage management biologist. Airport operators should also consider developing and implementing a preferred/prohibited plant species list, reviewed by a wildlife damage management biologist, which has been designed for the geographic location to reduce the attractiveness to hazardous wildlife for landscaping airport property.

c. **Airports surrounded by wildlife habitat.** The FAA recommends that operators of airports surrounded by woodlands, water, or wetlands refer to Section 2.4 of this AC. Operators of such airports should provide for a Wildlife Hazard Assessment (WHA) conducted by a wildlife damage management biologist. This WHA is the first step in preparing a WHMP, where required.

d. **Other hazardous wildlife attractants.** Other specific land uses or activities (e.g., sport or commercial fishing, shellfish harvesting, etc.), perhaps unique to certain regions of the country, have the potential to attract hazardous wildlife. Regardless of the source of the attraction, when hazardous wildlife is noted on a public-use airport, airport operators must take prompt remedial action(s) to protect aviation safety.

2-8. SYNERGISTIC EFFECTS OF SURROUNDING LAND USES. There may be circumstances where two (or more) different land uses that would not, by themselves, be considered hazardous wildlife attractants or that are located outside of the separations identified in Sections 1-2 through 1-4 that are in such an alignment with the airport as to create a wildlife corridor directly through the airport and/or surrounding airspace. An example of this situation may involve a lake located outside of the separation criteria on the east side of an airport and a large hayfield on the west side of an airport, land uses that together could create a flyway for Canada geese directly across the airspace of the airport. There are numerous examples of such situations;

therefore, airport operators and the wildlife damage management biologist must consider the entire surrounding landscape and community when developing the WHMP.

SECTION 3.

PROCEDURES FOR WILDLIFE HAZARD MANAGEMENT BY OPERATORS OF PUBLIC-USE AIRPORTS.

3.1. INTRODUCTION. In recognition of the increased risk of serious aircraft damage or the loss of human life that can result from a wildlife strike, the FAA may require the development of a Wildlife Hazard Management Plan (WHMP) when specific triggering events occur on or near the airport. Part 139.337 discusses the specific events that trigger a Wildlife Hazard Assessment (WHA) and the specific issues that a WHMP must address for FAA approval and inclusion in an Airport Certification Manual.

3.2. COORDINATION WITH USDA WILDLIFE SERVICES OR OTHER QUALIFIED WILDLIFE DAMAGE MANAGEMENT BIOLOGISTS. The FAA will use the Wildlife Hazard Assessment (WHA) conducted in accordance with Part 139 to determine if the airport needs a WHMP. Therefore, persons having the education, training, and expertise necessary to assess wildlife hazards must conduct the WHA. The airport operator may look to Wildlife Services or to qualified private consultants to conduct the WHA. When the services of a wildlife damage management biologist are required, the FAA recommends that land-use developers or airport operators contact a consultant specializing in wildlife damage management or the appropriate state director of Wildlife Services.

NOTE: Telephone numbers for the respective USDA Wildlife Services state offices can be obtained by contacting USDA Wildlife Services Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD, 20737-1234, Telephone (301) 734-7921, Fax (301) 734-5157 *(http://www.aphis.usda.gov/ws/)*.

3-3. WILDLIFE HAZARD MANAGEMENT AT AIRPORTS: A MANUAL FOR AIRPORT PERSONNEL. This manual, prepared by FAA and USDA Wildlife Services staff, contains a compilation of information to assist airport personnel in the development, implementation, and evaluation of WHMPs at airports. The manual includes specific information on the nature of wildlife strikes, legal authority, regulations, wildlife management techniques, WHAs, WHMPs, and sources of help and information. The manual is available in three languages: English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA's wildlife hazard mitigation web site: http://wildlife-mitigation.tc.FAA.gov/. This manual only provides a starting point for addressing wildlife hazard issues at airports. Hazardous wildlife management is a complex discipline and conditions vary widely across the United States. Therefore, qualified wildlife damage management biologists must direct the development of a WHMP and the implementation of management actions by airport personnel.

There are many other resources complementary to this manual for use in developing and implementing WHMPs. Several are listed in the manual's bibliography.

3-4. WILDLIFE HAZARD ASSESSMENTS, TITLE 14, CODE OF FEDERAL REGULATIONS, PART 139. Part 139.337(b) requires airport operators to conduct a Wildlife Hazard Assessment (WHA) when certain events occur on or near the airport.

Part 139.337 (c) provides specific guidance as to what facts must be addressed in a WHA.

3-5. WILDLIFE HAZARD MANAGEMENT PLAN (WHMP). The FAA will consider the results of the WHA, along with the aeronautical activity at the airport and the views of the airport operator and airport users, in determining whether a formal WHMP is needed, in accordance with Part 139.337. If the FAA determines that a WHMP is needed, the airport operator must formulate and implement a WHMP, using the WHA as the basis for the plan.

The goal of an airport's Wildlife Hazard Management Plan is to minimize the risk to aviation safety, airport structures or equipment, or human health posed by populations of hazardous wildlife on and around the airport.

The WHMP must identify hazardous wildlife attractants on or near the airport and the appropriate wildlife damage management techniques to minimize the wildlife hazard. It must also prioritize the management measures.

3-6. LOCAL COORDINATION. The establishment of a Wildlife Hazards Working Group (WHWG) will facilitate the communication, cooperation, and coordination of the airport and its surrounding community necessary to ensure the effectiveness of the WHMP. The cooperation of the airport community is also necessary when new projects are considered. Whether on or off the airport, the input from all involved parties must be considered when a potentially hazardous wildlife attractant is being proposed. Airport operators should also incorporate public education activities with the local coordination efforts because some activities in the vicinity of your airport, while harmless under normal leisure conditions, can attract wildlife and present a danger to aircraft. For example, if public trails are planned near wetlands or in parks adjoining airport property, the public should know that feeding birds and other wildlife in the area may pose a risk to aircraft.

Airport operators should work with local and regional planning and zoning boards so as to be aware of proposed land-use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in Sections 1-2 through 1-4. Pay particular attention to proposed land uses involving creation or expansion of waste water treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas. At the very least, airport operators must ensure they are on the notification list of the local planning board or equivalent review entity for all communities located within 5 miles of the airport, so they will receive notification of any proposed project and have the opportunity to review it for attractiveness to hazardous wildlife.

3-7 COORDINATION/NOTIFICATION OF AIRMEN OF WILDLIFE HAZARDS. If an existing land-use practice creates a wildlife hazard and the land-use practice or wildlife hazard cannot be immediately eliminated, airport operators must issue a Notice to Airmen (NOTAM) and encourage the land–owner or manager to take steps to control the wildlife hazard and minimize further attraction.

SECTION 4.

FAA NOTIFICATION AND REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS

4-1. FAA REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS.

a. The FAA discourages the development of waste disposal and other facilities, discussed in Section 2, located within the 5,000/10,000-foot criteria specified in Sections 1-2 through 1-4.

b. For projects that are located outside the 5,000/10,000-foot criteria but within 5 statute miles of the airport's AOA, the FAA may review development plans, proposed land-use changes, operational changes, or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. The FAA considers sensitive airport areas as those that lie under or next to approach or departure airspace. This brief examination should indicate if further investigation is warranted.

c. Where a wildlife damage management biologist has conducted a further study to evaluate a site's compatibility with airport operations, the FAA may use the study results to make a determination.

4-2. WASTE MANAGEMENT FACILITIES.

a. **Notification of new/expanded project proposal.** Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) limits the construction or establishment of new MSWLF within 6 statute miles of certain public-use airports, when both the airport and the landfill meet very specific conditions. See Section 2-2 of this AC and AC 150/5200-34 for a more detailed discussion of these restrictions.

The Environmental Protection Agency (EPA) requires any MSWLF operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, *Criteria for Municipal Solid Waste Landfills*, Section 258.10, *Airport Safety*). The EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. (See 4-2.b below.)

When new or expanded MSWLF are being proposed near airports, MSWLF operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR 258.

b. **Waste handling facilities within separations identified in Sections 1-2 through 1-4.** To claim successfully that a waste-handling facility sited within the separations identified in Sections 1-2 through 1-4 does not attract hazardous wildlife and does not threaten aviation, the developer must establish convincingly that the facility will not handle putrescible material other than that as outlined in 2-2.d. The FAA strongly recommends against any facility other than that as outlined in 2-2.d (enclosed transfer stations). The FAA will use this information to determine if the facility will be a hazard to aviation.

c. **Putrescible-Waste Facilities.** In their effort to satisfy the EPA requirement, some putrescible-waste facility proponents may offer to undertake experimental measures to demonstrate that their proposed facility will not be a hazard to aircraft. To date, no such facility has been able to demonstrate an ability to reduce and sustain hazardous wildlife to levels that existed before the putrescible-waste landfill began operating. For this reason, demonstrations of experimental wildlife control measures may not be conducted within the separation identified in Sections 1-2 through 1-4.

4-3. OTHER LAND-USE PRACTICE CHANGES. As a matter of policy, the FAA encourages operators of public-use airports who become aware of proposed land use practice changes that may attract hazardous wildlife within 5 statute miles of their airports to promptly notify the FAA. The FAA also encourages proponents of such land use changes to notify the FAA as early in the planning process as possible. Advanced notice affords the FAA an opportunity (1) to evaluate the effect of a particular land-use change on aviation safety and (2) to support efforts by the airport sponsor to restrict the use of land next to or near the airport to uses that are compatible with the airport.

The airport operator, project proponent, or land-use operator may use FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, or other suitable documents similar to FAA Form 7460-1 to notify the appropriate FAA Regional Airports Division Office. Project proponents can contact the appropriate FAA Regional Airports Division Office for assistance with the notification process.

It is helpful if the notification includes a 15-minute quadrangle map of the area identifying the location of the proposed activity. The land-use operator or project proponent should also forward specific details of the proposed land-use change or operational change or expansion. In the case of solid waste landfills, the information should include the type of waste to be handled, how the waste will be processed, and final disposal methods.

a. **Airports that have received Federal grant-in-aid assistance.** Airports that have received Federal grant-in-aid assistance are required by their grant assurances to take appropriate actions to restrict the use of land next to or near the airport to uses that are compatible with normal airport operations. The FAA recommends that airport operators to the extent practicable oppose off-airport land-use changes or practices within the separations identified in Sections 1-2 through 1-4 that may attract hazardous wildlife. Failure to do so may lead to noncompliance with applicable grant assurances. The FAA will not approve the placement of airport

development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants without appropriate mitigating measures. Increasing the intensity of wildlife control efforts is not a substitute for eliminating or reducing a proposed wildlife hazard. Airport operators should identify hazardous wildlife attractants and any associated wildlife hazards during any planning process for new airport development projects.

This page intentionally left blank.

APPENDIX 1. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR.

1. **GENERAL.** This appendix provides definitions of terms used throughout this AC.

   1. **Air operations area.** Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.

   2. **Airport operator.** The operator (private or public) or sponsor of a public-use airport.

   3. **Approach or departure airspace.** The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.

   4. **Bird balls.** High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.

   5. **Certificate holder.** The holder of an Airport Operating Certificate issued under Title 14, Code of Federal Regulations, Part 139.

   6. **Construct a new MSWLF.** To begin to excavate, grade land, or raise structures to prepare a municipal solid waste landfill as permitted by the appropriate regulatory or permitting agency.

   7. **Detention ponds.** Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.

   8. **Establish a new MSWLF.** When the first load of putrescible waste is received on-site for placement in a prepared municipal solid waste landfill.

   9. **Fly ash.** The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.

   10. **General aviation aircraft.** Any civil aviation aircraft not operating under 14 CFR Part 119, Certification: Air Carriers and Commercial Operators.

   11. **Hazardous wildlife.** Species of wildlife (birds, mammals, reptiles), including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard

   12. **Municipal Solid Waste Landfill (MSWLF).** A publicly or privately owned discrete area of land or an excavation that receives household waste and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR § 257.2. An MSWLF may receive

other types wastes, such as commercial solid waste, non-hazardous sludge, small-quantity generator waste, and industrial solid waste, as defined under 40 CFR § 258.2. An MSWLF can consist of either a stand alone unit or several cells that receive household waste.

13. **New MSWLF.** A municipal solid waste landfill that was established or constructed after April 5, 2001.

14. **Piston-powered aircraft.** Fixed-wing aircraft powered by piston engines.

15. **Piston-use airport.** Any airport that does not sell Jet-A fuel for fixed-wing turbine-powered aircraft, and primarily serves fixed-wing, piston-powered aircraft. Incidental use of the airport by turbine-powered, fixed-wing aircraft would not affect this designation. However, such aircraft should not be based at the airport.

16. **Public agency.** A State or political subdivision of a State, a tax-supported organization, or an Indian tribe or pueblo (49 U.S.C. § 47102(19)).

17. **Public airport.** An airport used or intended to be used for public purposes that is under the control of a public agency; and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft is publicly owned (49 U.S.C. § 47102(20)).

18. **Public-use airport.** An airport used or intended to be used for public purposes, and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft may be under the control of a public agency or privately owned and used for public purposes (49 U.S.C. § 47102(21)).

19. **Putrescible waste.** Solid waste that contains organic matter capable of being decomposed by micro-organisms and of such a character and proportion as to be capable of attracting or providing food for birds (40 CFR §257.3-8).

20. **Putrescible-waste disposal operation.** Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.

21. **Retention ponds.** Storm water management ponds that hold water for several months.

22. **Runway protection zone (RPZ).** An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the airport design, aircraft, type of operation, and visibility minimum.

23. **Scheduled air carrier operation.** Any common carriage passenger-carrying operation for compensation or hire conducted by an air carrier or commercial

operator for which the air carrier, commercial operator, or their representative offers in advance the departure location, departure time, and arrival location. It does not include any operation that is conducted as a supplemental operation under 14 CFR Part 119 or as a public charter operation under 14 CFR Part 380 (14 CFR § 119.3).

24. **Sewage sludge.** Any solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works. (40 CFR 257.2)

25. **Sludge.** Any solid, semi-solid, or liquid waste generated form a municipal, commercial or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. (40 CFR 257.2)

26. **Solid waste.** Any garbage, refuse, sludge, from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including, solid liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or by product material as defined by the Atomic Energy Act of 1954, as amended, (68 Stat. 923). (40 CFR 257.2)

27. **Turbine-powered aircraft.** Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.

28. **Turbine-use airport.** Any airport that sells Jet-A fuel for fixed-wing turbine-powered aircraft.

29. **Wastewater treatment facility.** Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including Publicly Owned Treatment Works (POTW), as defined by Section 212 of the Federal Water Pollution Control Act (P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-576) and the Water Quality Act of 1987 (P.L. 100-4). This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. (See 40 CFR Section 403.3 (q), (r), & (s)).

30. **Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this AC, wildlife includes feral animals and domestic animals out of the control of their owners (14 CFR Part 139, Certification of Airports).

31. **Wildlife attractants.** Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's AOA. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.

32. **Wildlife hazard.** A potential for a damaging aircraft collision with wildlife on or near an airport.

33. **Wildlife strike.** A wildlife strike is deemed to have occurred when:

    a. A pilot reports striking 1 or more birds or other wildlife;

    b. Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike;

    c. Personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;

    d. Bird or other wildlife remains, whether in whole or in part, are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified;

    e. The animal's presence on the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal) (Transport Canada, Airports Group, *Wildlife Control Procedures Manual*, Technical Publication 11500E, 1994).

2. RESERVED.

Memorandum of Agreement Between the Federal Aviation Administration, the U.S. Air Force, the U.S. Army, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture to Address Aircraft-Wildlife Strikes

PURPOSE

The signatory agencies know the risks that aircraft-wildlife strikes pose to safe aviation.

This Memorandum of Agreement (MOA) acknowledges each signatory agency's respective missions. Through this MOA, the agencies establish procedures necessary to coordinate their missions to more effectively address existing and future environmental conditions contributing to aircraft-wildlife strikes throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety, while protecting the Nation's valuable environmental resources.

BACKGROUND

Aircraft-wildlife strikes are the second leading causes of aviation-related fatalities. Globally, these strikes have killed over 400 people and destroyed more than 420 aircraft. While these extreme events are rare when compared to the millions of annual aircraft operations, the potential for catastrophic loss of human life resulting from one incident is substantial. The most recent accident demonstrating the grievous nature of these strikes occurred in September 1995, when a U.S. Air Force reconnaissance jet struck a flock of Canada geese during takeoff, killing all 24 people aboard.

The Federal Aviation Administration (FAA) and the United States Air Force (USAF) databases contain information on more than 54,000 United States civilian and military aircraft-wildlife strikes reported to them between 1990 and 1999[1]. During that decade, the FAA received reports indicating that aircraft-wildlife strikes, damaged 4,500 civilian U.S. aircraft (1,500 substantially), destroyed 19 aircraft, injured 91 people, and killed 6 people. Additionally, there were 216 incidents where birds struck two or more engines on civilian aircraft, with damage occurring to 26 percent of the 449 engines involved in these incidents. The FAA estimates that during the same decade, civilian U.S. aircraft sustained $4 billion worth of damages and associated losses and 4.7 million hours of aircraft downtime due to aircraft-wildlife strikes. For the same period,

[1] FAA estimates that the 28,150 aircraft-wildlife strike reports it received represent less than 20% of the actual number of strikes that occurred during the decade.

USAF planes colliding with wildlife resulted in 10 Class A Mishaps[2], 26 airmen deaths, and over $217 million in damages.

Approximately 97 percent of the reported civilian aircraft-wildlife strikes involved common, large-bodied birds or large flocks of small birds. Almost 70 percent of these events involved gulls, waterfowl, and raptors (Table 1).

About 90 percent of aircraft-wildlife strikes occur on or near airports, when aircraft are below altitudes of 2,000 feet. Aircraft-wildlife strikes at these elevations are especially dangerous because aircraft are moving at high speeds and are close to or on the ground. Aircrews are intently focused on complex take-off or landing procedures and monitoring the movements of other aircraft in the airport vicinity. Aircrew attention to these activities while at low altitudes often compromises their ability to successfully recover from unexpected collisions with wildlife and to deal with rapidly changing flight procedures. As a result, crews have minimal time and space to recover from aircraft-wildlife strikes.

Increasing bird and wildlife populations in urban and suburban areas near airports contribute to escalating aircraft-wildlife strike rates. FAA, USAF, and Wildlife Services (WS) experts expect the risks, frequencies, and potential severities of aircraft-wildlife strikes to increase during the next decade as the numbers of civilian and military aircraft operations grow to meet expanding transportation and military demands.

SECTION I.

SCOPE OF COOPERATION AND COORDINATION

Based on the preceding information and to achieve this MOA's purpose, the signatory agencies:

A. Agree to strongly encourage their respective regional and local offices, as appropriate, to develop interagency coordination procedures necessary to effectively and efficiently implement this MOA. Local procedures should clarify time frames and other general coordination guidelines.

B. Agree that the term "airport" applies only to those facilities as defined in the attached glossary.

C. Agree that the three major activities of most concern include, but are not limited to:

    1. airport siting and expansion;

[2] See glossary for the definition of a Class A Mishap and similar terms.

2. development of conservation/mitigation habitats or other land uses that could attract hazardous wildlife to airports or nearby areas; and

3. responses to known wildlife hazards or aircraft-wildlife strikes.

D. Agree that "hazardous wildlife" are those animals, identified to species and listed in FAA and USAF databases, that are most often involved in aircraft-wildlife strikes. Many of the species frequently inhabit areas on or near airports, cause structural damage to airport facilities, or attract other wildlife that pose an aircraft-wildlife strike hazard. Table 1 lists many of these species. It is included solely to provide information on identified wildlife species that have been involved in aircraft-wildlife strikes. It is not intended to represent the universe of species concerning the signatory agencies, since more than 50 percent of the aircraft-wildlife strikes reported to FAA or the USAF did not identify the species involved.

E. Agree to focus on habitats attractive to the species noted in Table 1, but the signatory agencies realize that it is imperative to recognize that wildlife hazard determinations discussed in Paragraph L of this section may involve other animals.

F. Agree that not all habitat types attract hazardous wildlife. The signatory agencies, during their consultative or decisionmaking activities, will inform regional and local land use authorities of this MOA's purpose. The signatory agencies will consider regional, local, and site-specific factors (e.g., geographic setting and/or ecological concerns) when conducting these activities and will work cooperatively with the authorities as they develop and implement local land use programs under their respective jurisdictions. The signatory agencies will encourage these stakeholders to develop land uses within the siting criteria noted in Section 1-3 of FAA Advisory Circular (AC) 150.5200-33 (Attachment A) that do not attract hazardous wildlife. Conversely, the agencies will promote the establishment of land uses attractive to hazardous wildlife outside those siting criteria. Exceptions to the above siting criteria, as described in Section 2.4.b of the AC, will be considered because they typically involve habitats that provide unique ecological functions or values (e.g., critical habitat for federally-listed endangered or threatened species, ground water recharge).

G. Agree that wetlands provide many important ecological functions and values, including fish and wildlife habitats; flood protection; shoreline erosion control; water quality improvement; and recreational, educational, and research opportunities. To protect jurisdictional wetlands, Section 404 of the Clean Water Act (CWA) establishes a program to regulate dredge and/or fill activities in these wetlands and navigable waters. In recognizing Section 404 requirements and the Clean Water Action Plan's goal to annually increase the Nation's net wetland acreage by 100,000 acres through 2005, the signatory agencies agree to resolve aircraft-wildlife conflicts. They will do so by

avoiding and minimizing wetland impacts to the maximum extent practicable, and will work to compensate for all associated unavoidable wetland impacts. The agencies agree to work with landowners and communities to encourage and support wetland restoration or enhancement efforts that do not increase aircraft-wildlife strike potentials.

H. Agree that the: U.S. Army Corps of Engineers (ACOE) has expertise in protecting and managing jurisdictional wetlands and their associated wildlife; U.S. Environmental Protection Agency (EPA) has expertise in protecting environmental resources; and the U.S. Fish and Wildlife Service (USFWS) has expertise in protecting and managing wildlife and their habitats, including migratory birds and wetlands. Appropriate signatory agencies will cooperatively review proposals to develop or expand wetland mitigation sites, or wildlife refuges that may attract hazardous wildlife. When planning these sites or refuges, the signatory agencies will diligently consider the siting criteria and land use practice recommendations stated in FAA AC 150/5200-33. The agencies will make every effort to undertake actions that are consistent with those criteria and recommendations, but recognize that exceptions to the siting criteria may be appropriate (see Paragraph F of this section).

I. Agree to consult with airport proponents during initial airport planning efforts. As appropriate, the FAA or USAF will initiate signatory agency participation in these efforts. When evaluating proposals to build new civilian or military aviation facilities or to expand existing ones, the FAA or the USAF, will work with appropriate signatory agencies to diligently evaluate alternatives that may avoid adverse effects on wetlands, other aquatic resources, and Federal wildlife refuges. If these or other habitats support hazardous wildlife, and there is no practicable alternative location for the proposed aviation project, the appropriate signatory agencies, consistent with applicable laws, regulations, and policies, will develop mutually acceptable measures, to protect aviation safety and mitigate any unavoidable wildlife impacts.

J. Agree that a variety of other land uses (e.g., storm water management facilities, wastewater treatment systems, landfills, golf courses, parks, agricultural or aquacultural facilities, and landscapes) attract hazardous wildlife and are, therefore, normally incompatible with airports. Accordingly, new, federally-funded airport construction or airport expansion projects near habitats or other land uses that may attract hazardous wildlife must conform to the siting criteria established in the FAA Advisory Circular (AC) 150/5200-33, Section 1-3.

K. Agree to encourage and advise owners and/or operators of non-airport facilities that are known hazardous wildlife attractants (See Paragraph J) to follow the siting criteria in Section 1-3 of AC 150/5200-33. As appropriate, each signatory agency will inform proponents of these or other land uses about the land use's potential to attract hazardous species to airport areas.

The signatory agencies will urge facility owners and/or operators about the critical need to consider the land uses' effects on aviation safety.

L. Agree that FAA, USAF, and WS personnel have the expertise necessary to determine the aircraft-wildlife strike potentials of various land uses. When there is disagreement among signatory agencies about a particular land use and its potential to attract hazardous wildlife, the FAA, USAF, or WS will prepare a wildlife hazard assessment. Then, the appropriate signatory agencies will meet at the local level to review the assessment. At a minimum, that assessment will:

   1. identify each species causing the aviation hazard, its seasonal and daily populations, and the population's local movements;

   2. discuss locations and features on and near the airport or land use attractive to hazardous wildlife; and

   3. evaluate the extent of the wildlife hazard to aviation.

M. Agree to cooperate with the airport operator to develop a specific, wildlife hazard management plan for a given location, when a potential wildlife hazard is identified. The plan will meet applicable FAA, USAF, and other relevant requirements. In developing the plan, the appropriate agencies will use their expertise and attempt to integrate their respective programmatic responsibilities, while complying with existing laws, regulations, and policies. The plan should avoid adverse impacts to wildlife populations, wetlands, or other sensitive habitats to the maximum extent practical. Unavoidable impacts resulting from implementing the plan will be fully compensated pursuant to all applicable Federal laws, regulations, and policies.

N. Agree that whenever a significant aircraft-wildlife strike occurs or a potential for one is identified, any signatory agency may initiate actions with other appropriate signatory agencies to evaluate the situation and develop mutually acceptable solutions to reduce the identified strike probability. The agencies will work cooperatively, preferably at the local level, to determine the causes of the strike and what can and should be done at the airport or in its vicinity to reduce potential strikes involving that species.

O. Agree that information and analyses relating to mitigation that could cause or contribute to aircraft-wildlife strikes should, whenever possible, be included in documents prepared to satisfy the National Environmental Policy Act (NEPA). This should be done in coordination with appropriate signatory agencies to inform the public and Federal decision makers about important ecological factors that may affect aviation. This concurrent review of environmental issues will promote the streamlining of the NEPA review process.

P. Agree to cooperatively develop mutually acceptable and consistent guidance, manuals, or procedures addressing the management of habitats attractive to

hazardous wildlife, when those habitats are or will be within the siting criteria noted in Section 1-3 of FAA AC 5200-33. As appropriate, the signatory agencies will also consult each other when they propose revisions to any regulations or guidance relevant to the purpose of this MOA, and agree to modify this MOA accordingly.

SECTION II.
GENERAL RULES AND INFORMATION

A. Development of this MOA fulfills the National Transportation Safety Board's recommendation of November 19, 1999, to form an inter-departmental task force to address aircraft-wildlife strike issues.

B. This MOA does not nullify any obligations of the signatory agencies to enter into separate MOAs with the USFWS addressing the conservation of migratory birds, as outlined in Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, dated January 10, 2001 (66 *Federal Register*, No. 11, pg. 3853).

C. This MOA in no way restricts a signatory agency's participation in similar activities or arrangements with other public or private agencies, organizations, or individuals.

D. This MOA does not alter or modify compliance with any Federal law, regulation or guidance (e.g., Clean Water Act; Endangered Species Act; Migratory Bird Treaty Act; National Environmental Policy Act; North American Wetlands Conservation Act; Safe Drinking Water Act; or the "no-net loss" policy for wetland protection). The signatory agencies will employ this MOA in concert with the Federal guidance addressing wetland mitigation banking dated March 6, 1995 (60 *Federal Register*, No. 43, pg. 12286).

E. The statutory provisions and regulations mentioned above contain legally binding requirements. However, this MOA does not substitute for those provisions or regulations, nor is it a regulation itself. This MOA does not impose legally binding requirements on the signatory agencies or any other party, and may not apply to a particular situation in certain circumstances. The signatory agencies retain the discretion to adopt approaches on a case-by-case basis that differ from this MOA when they determine it is appropriate to do so. Such decisions will be based on the facts of a particular case and applicable legal requirements. Therefore, interested parties are free to raise questions and objections about the substance of this MOA and the appropriateness of its application to a particular situation.

F. This MOA is based on evolving information and may be revised periodically without public notice. The signatory agencies welcome public comments on this MOA at any time and will consider those comments in any future revision of this MOA.

G. This MOA is intended to improve the internal management of the Executive Branch to address conflicts between aviation safety and wildlife. This MOA does not create any right, benefit, or trust responsibility, either substantively or procedurally. No party, by law or equity, may enforce this MOA against the United States, its agencies, its officers, or any person.

H. This MOA does not obligate any signatory agency to allocate or spend appropriations or enter into any contract or other obligations.

I. This MOA does not reduce or affect the authority of Federal, State, or local agencies regarding land uses under their respective purviews. When requested, the signatory agencies will provide technical expertise to agencies making decisions regarding land uses within the siting criteria in Section 1-3 of FAA AC 150/5200-33 to minimize or prevent attracting hazardous wildlife to airport areas.

J. Any signatory agency may request changes to this MOA by submitting a written request to any other signatory agency and subsequently obtaining the written concurrence of all signatory agencies.

K. Any signatory agency may terminate its participation in this MOA within 60 days of providing written notice to the other agencies. This MOA will remain in effect until all signatory agencies terminate their participation in it.

SECTION III. PRINCIPAL SIGNATORY AGENCY CONTACTS

The following list identifies contact offices for each signatory agency.

Federal Aviation Administration
Office Airport Safety and Standards
Airport Safety and
Compliance Branch (AAS-310)
800 Independence Ave., S.W.
Washington, D.C. 20591
V: 202-267-1799
F: 202-267-7546

U.S. Air Force
HQ AFSC/SEFW
9700 Ave., G. SE, Bldg. 24499
Kirtland AFB, NM 87117
V: 505-846-5679
F: 505-846-0684

U.S. Army
Directorate of Civil Works
Regulatory Branch (CECW-OR)
441 G St., N.W.
Washington, D.C. 20314
V: 202-761-4750
F: 202-761-4150

U.S. Environmental Protection Agy.
Office of Water
Wetlands Division
Ariel Rios Building, MC 4502F
1200 Pennsylvania Ave., SW
Washington, D.C. 20460
V: 202-260-1799
F: 202-260-7546

U.S. Fish and Wildlife Service
Division of Migratory Bird Management
4401 North Fairfax Drive, Room 634
Arlington, VA 22203
V: 703-358-1714
F: 703-358-2272

U.S. Department of Agriculture
Animal and Plant Inspection Service
Wildlife Services
Operational Support Staff
4700 River Road, Unit 87
Riverdale, MD 20737
V: 301-734-7921
F: 301-734-5157

Signature Page

Associate Administrator for Airports,
Federal Aviation Administration

12/17/02
Date

Chief of Safety,
U. S. Air Force

27 May 2003
Date

Acting Assistant Secretary of the Army
(Civil Works)
Department of the Army

December 9, 2002
Date

Assistant Administrator, Office of Water,
U.S. Environmental Protection Agency

1/17/03

Assistant Director, Migratory Birds
and State Programs,
U.S. Fish and Wildlife Service

7/29/03
Date

Acting Deputy Administrator, Wildlife Services
U.S. Department of Agriculture

09 January 2003
Date

GLOSSARY

This glossary defines terms used in this MOA.

Airport. All USAF airfields or all public use airports in the FAA's National Plan of Integrated Airport Systems (NPIAS). Note: There are over 18,000 civil-use airports in the U.S., but only 3,344 of them are in the NPIAS and, therefore, under FAA's jurisdiction.

Aircraft-wildlife strike. An aircraft-wildlife strike is deemed to have occurred when:

1. a pilot reports that an aircraft struck 1 or more birds or other wildlife;
2. aircraft maintenance personnel identify aircraft damage as having been caused by an aircraft-wildlife strike;
3. personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;
4. bird or other wildlife remains, whether in whole or in part, are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified; or
5. the animal's presence on the airport had a significant, negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal)

(Source: *Wildlife Control Procedures Manual*, Technical Publication 11500E, 1994).

Aircraft-wildlife strike hazard. A potential for a damaging aircraft collision with wildlife on or near an airport (14 CFR 139.3).

Bird Sizes. Title 40, Code of Federal Regulations, Part 33.76 classifies birds according to weight:

small birds weigh less than 3 ounces (oz).
medium birds weigh more than 3 oz and less than 2.5 lbs.
large birds weigh greater than 2.5 lbs.

Civil aircraft damage classifications. The following damage descriptions are based on the *Manual on the International Civil Aviation Organization Bird Strike Information System*:

Minor: The aircraft is deemed airworthy upon completing simple repairs or replacing minor parts and an extensive inspection is not necessary.

Substantial: Damage or structural failure adversely affects an aircraft's structural integrity, performance, or flight characteristics. The damage normally requires major repairs or the replacement of the entire affected component. Bent fairings or cowlings; small dents; skin punctures; damage to wing tips, antenna, tires or brakes, or engine blade damage not requiring blade replacement are specifically excluded.

Destroyed: The damage sustained makes it inadvisable to restore the aircraft to an airworthy condition.

Significant Aircraft-Wildlife Strikes. A significant aircraft-wildlife strike is deemed to have occurred when any of the following applies:

1. a civilian, U.S. air carrier aircraft experiences a multiple aircraft-bird strike or engine ingestion;
2. a civilian, U.S. air carrier aircraft experiences a damaging collision with wildlife other than birds; or
3. a USAF aircraft experiences a Class A, B, or C mishap as described below:

    A. **Class A Mishap:** Occurs when at least one of the following applies:
        1. total mishap cost is $1,000,000 or more;
        2. a fatality or permanent total disability occurs; and/or
        3. an Air Force aircraft is destroyed.
    B. **Class B Mishap:** Occurs when at least one of the following applies:
        1. total mishap cost is $200,000 or more and less than $1,000,000; and/or
        2. a permanent partial disability occurs and/or 3 or more people are hospitalized;
    C. **Class C Mishap:** Occurs when at least one of the following applies:
        1. cost of reported damage is between $20,000 and $200,000;
        2. an injury causes a lost workday (i.e., duration of absence is at least 8 hours beyond the day or shift during which mishap occurred); and/or
        3. an occupational illness causing absence from work at any time.

Wetlands. An ecosystem requiring constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or

near the surface and the presence of physical, chemical, and biological features indicating recurrent, sustained inundation, or saturation. Common diagnostic wetland features are hydric soils and hydrophytic vegetation. These features will be present, except where specific physiochemical, biotic, or anthropogenic factors have removed them or prevented their development.

(Source the 1987 Delineation Manual; 40 CFR 230.3(t)).

Wildlife. Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring there of (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this MOA, "wildlife" includes feral animals and domestic animals while out of their owner's control (14 CFR 139.3, *Certification and Operations: Land Airports Serving CAB-Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters)*)

Table 1. Identified wildlife species, or groups, that were involved in two or more aircraft-wildlife strikes, that caused damage to one or more aircraft components, or that had an adverse effect on an aircraft's flight. Data are for 1990-1999 and involve only civilian U.S. aircraft.

Birds	No. reported strikes
Gulls (all spp.)	874
Geese (primarily, Canada geese)	458
Hawks (primarily, Red-tailed hawks)	182
Ducks (primarily Mallards.)	166
Vultures (primarily, Turkey vulture)	142
Rock doves	122
Doves (primarily, mourning doves)	109
Blackbirds	81
European starlings	55
Sparrows	52
Egrets	41
Shore birds (primarily, Killdeer & Sandpipers)	40
Crows	31
Owls	24
Sandhill cranes	22
American kestrels	15
Great blue herons	15
Pelicans	14
Swallows	14
Eagles (Bald and Golden)	14
Ospreys	13
Ring-necked pheasants	11
Herons	11
Barn-owls	9
American robins	8
Meadowlarks	8
Buntings (snow)	7
Cormorants	6
Snow buntings	6
Brants	5
Terns (all spp.)	5
Great horned owls	5
Horned larks	4
Turkeys	4
Swans	3
Mockingbirds	3
Quails	3
Homing pigeons	3
Snowy owls	3
Anhingas	2

Ravens	2
Kites	2
Falcons	2
Peregrine falcons	2
Merlins	2
Grouse	2
Hungarian partridges	2
Spotted doves	2
Thrushes	2
Mynas	2
Finches	2
Total known birds	2,612

Mammals	**No. reported strikes**
Deer (primarily, White-tailed deer)	285
Coyotes	16
Dogs	10
Elk	6
Cattle	5
Bats	4
Horses	3
Pronghorn antelopes	3
Foxes	2
Raccoons	2
Rabbits	2
Moose	2
Total known mammals	340

Ring-billed gulls were the most commonly struck gulls. The U.S. ring-billed gull population increased steadily at about 6% annually from 1966-1988. Canada geese were involved in about 90% of the aircraft-goose strikes involving civilian, U.S. aircraft from 1990-1998. Resident (non-migratory) Canada goose populations increased annually at 13% from 1966-1998. Red-tailed hawks accounted for 90% of the identified aircraft-hawk strikes for the 10-year period. Red-tailed hawk populations increased annually at 3% from 1966 to 1998. Turkey vultures were involved in 93% of he identified aircraft-vulture strikes. The U.S. Turkey vulture populations increased at annually at 1% between 1966 and 1998. Deer, primarily white-tailed deer, have also adapted to urban and airport areas and their populations have increased dramatically. In the early 1900's, there were about 100,000 white-tailed deer in the U.S. Current estimates are that the U.S. population is about 24 million.

SACRAMENTO COUNTY AIRPORT SYSTEM
6900 AIRPORT BLVD
SACRAMENTO CA 95837

REVISIONS

NO.	DATE	DESCRIPTION

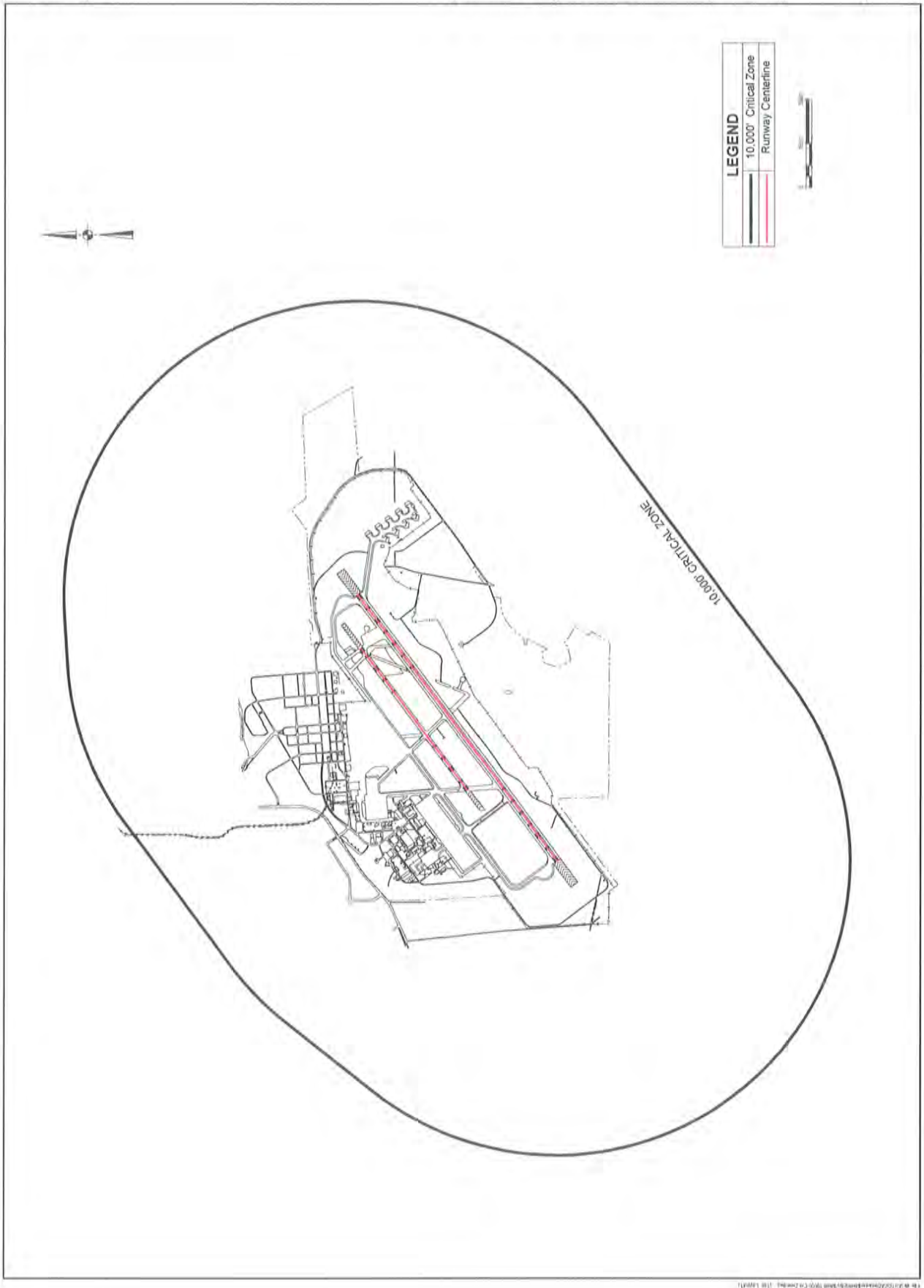
FILE NAME	MHR 10000 Crit Zone
DRAWN BY	WILSONDS
DATE	4/23/07
DESIGNED BY	
CHECKED BY	
SCALE	AS SHOWN

SACRAMENTO INTERNATIONAL AIRPORT

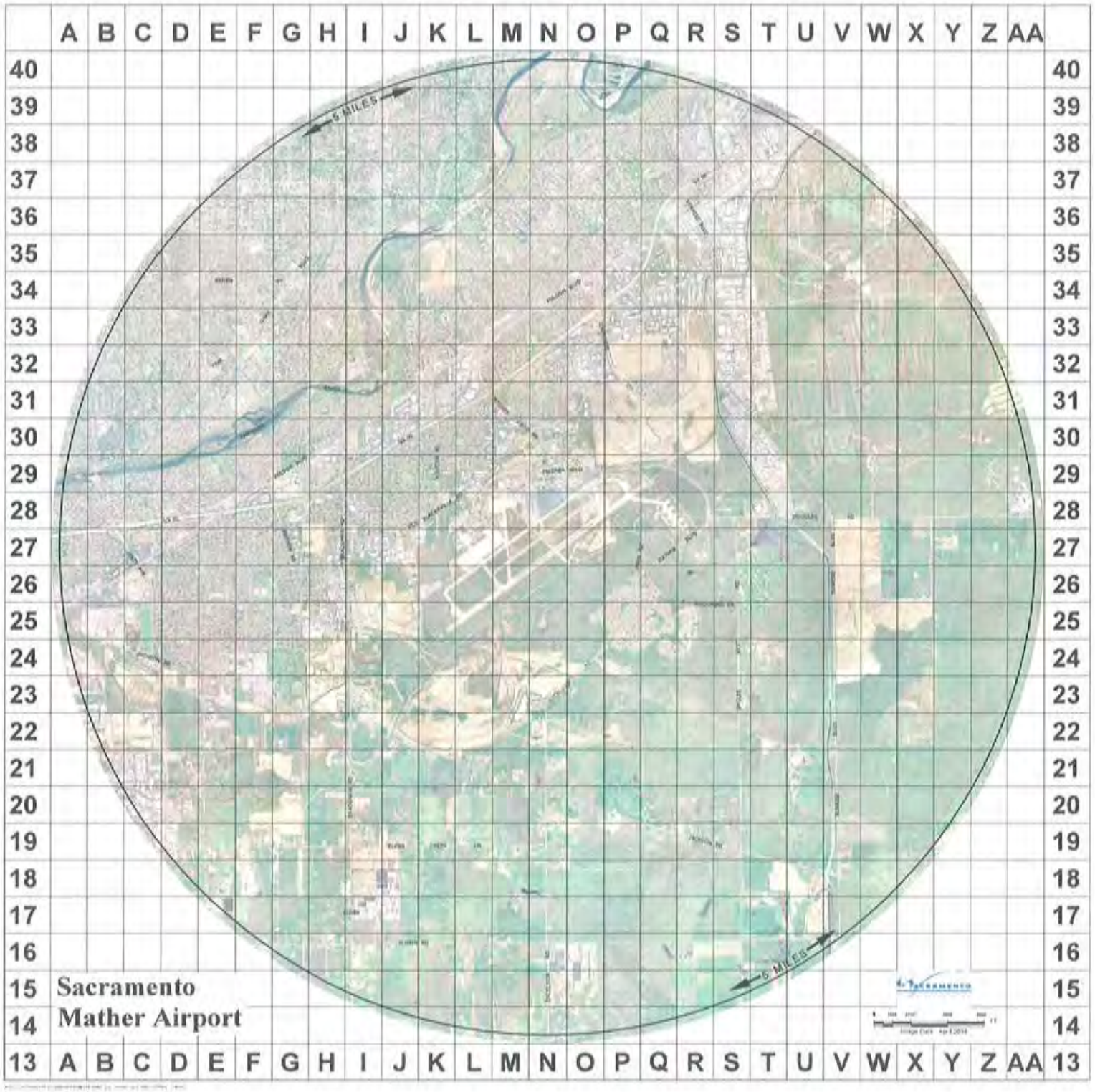
SHEET TITLE: 10,000 Foot Critical Zone

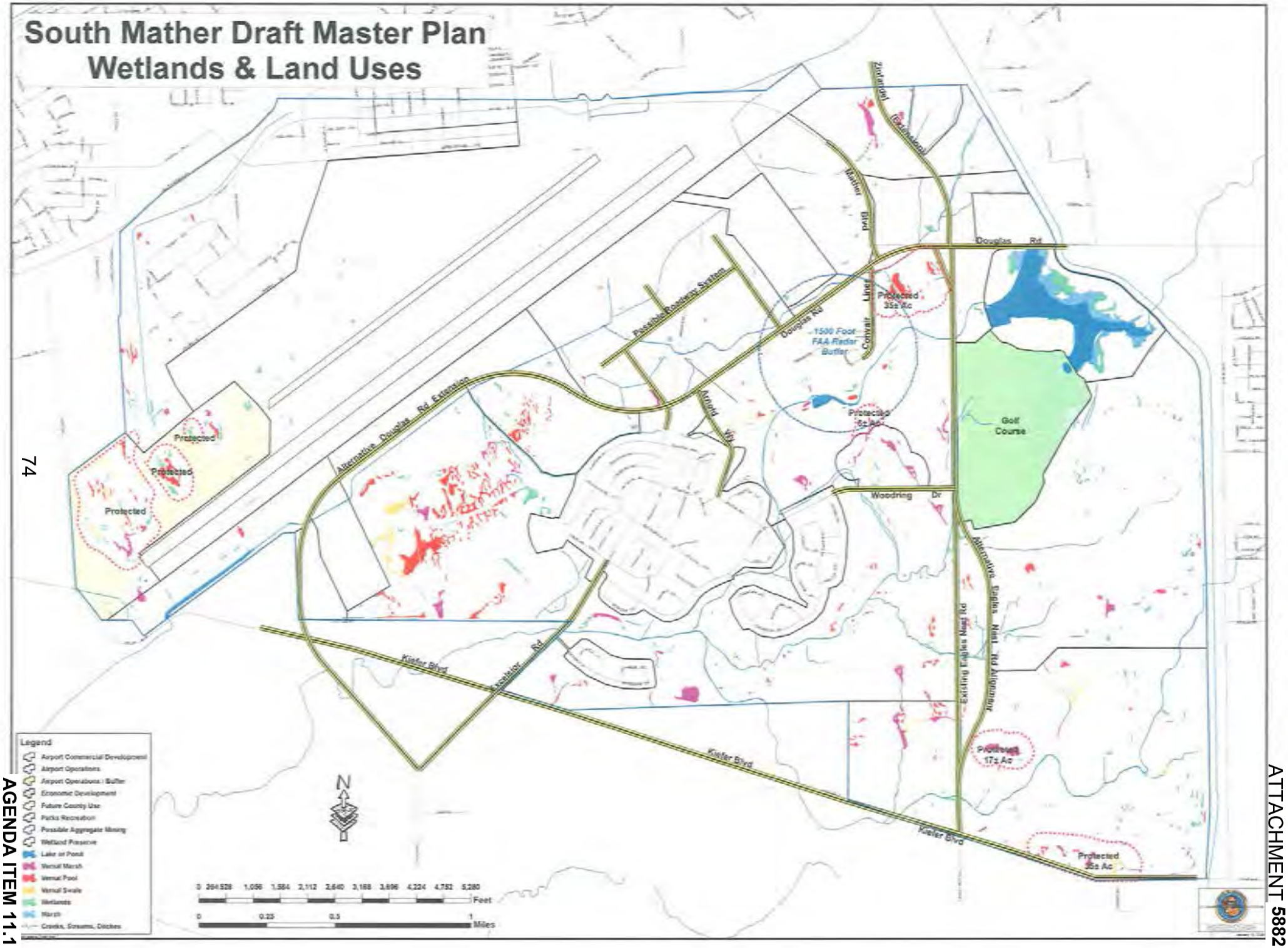
DRAWING NO. 1

SHEET NO. 1 OF 1



SACRAMENTO MATHER AIRPORT
5 MILE RADIUS




South Mather Draft Master Plan
Wetlands & Land Uses
Douglas Rd
Douglas Rd
Zinfandel Extension
Mather Blvd
Possible Roadway System
Alternative Douglas Rd Extension
Arnold Rd
Convair Liner
1500 Foot FAA Radar Buffer
Protected 35± Ac
Protected 5± Ac
Protected
Protected
Protected
Golf Course
Woodring Dr
Alternative Eagles Nest Rd Alignment
Existing Eagles Nest Rd
Kiefer Blvd
Excelsior Rd
Kiefer Blvd
Kiefer Blvd
Protected 17± Ac
Protected 35± Ac
Legend
Airport Commercial Development
Airport Operations
Airport Operations / Buffer
Economic Development
Future County Use
Parks Recreation
Possible Aggregate Mining
Wetland Preserve
Lake or Pond
Vernal Marsh
Vernal Pool
Vernal Swale
Wetlands
Marsh
Creeks, Streams, Ditches
N
0 264 528 1,056 1,584 2,112 2,640 3,168 3,696 4,224 4,752 5,280
Feet
0 0.25 0.5 1
Miles

Attachment 1

Federal Aviation Administration (FAA) Regulations and Related Requirements - Hazardous Wildlife

The FAA has developed a number of regulations, policies and guidance documents related to the minimization of bird strike hazards and to habitat restoration and management on airport lands. These documents include:

- Federal Aviation Regulation (FAR), CFR Part 139 (as amended February 2004); in particular Part 139.337 *Wildlife Hazard Management*.
- Advisory Circular 50/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*, August 28, 2007 (replaces 33A published July 27, 2004, and all previous versions).
- FAA Certification Alert 06-07, *Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State-Listed Threatened and Endangered Species and Species of Special Concern on Airports*, November 21, 2006.
- FAA Advisory Circular 150/5200-32A, *Reporting Wildlife Aircraft Strikes*, December 22, 2004.
- FAA Advisory Circular 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculum for Airport Personnel in Controlling Wildlife Hazards at Airports*. June 28, 2006.
- *Wildlife Hazard Management at Airports – A Handbook for Airport Personnel.* FAA Office of Airport Safety and Standards and United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS) - Wildlife Services, 2nd Edition July 2005.
- FAA Advisory Circular 150/5200-34 *Construction or Establishment of Landfills Near Public Airports*, August 26, 2000.
- FAA Advisory Circular 150/5300-13 *Airport Design*, Appendix 19, "Minimum Distances Between Certain Airport Features and Any On-Airport Agriculture Crops." Amended periodically.
- FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, April 28, 2006. Section 209.a – Wildlife Hazard Management Plans (WHMP) specifies that when the FAA Administrator determines that an airport must prepare a WHMP to address wildlife hazards, the airport must submit the WHMP to the FAA for approval prior to implementation. Order 5050.4B further specifies that FAA approval of a WHMP is a "federal action" requiring a NEPA analysis.
- *Memorandum of Agreement Between the FAA, U.S. Air Force, U.S. Army, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture to Address Aircraft-Wildlife Strikes.* Signed by the six agencies between December 2002 and July 2003.
- Animal Damage Control Act, 7 USC, Section 426-426c, enacted in 1931 and amended in 19378 and 1991; grants the Secretary of Agriculture broad authority to investigate and control certain predatory and wild animals and nuisance mammals and birds.
- FAA Office of Airport Safety and Standards – Program Policies and Guidance, Airport Certification – 14 CFR 130; Policies 77, 78,79 and 82 specify procedures with regard to wildlife hazard management, waste disposal, and coordination with regard to the federal Endangered Species Act. These policies comprise Appendix D of the 2005 FAA-USDA Hazard Wildlife Management handbook referenced above.

In general, these documents direct airport operators, in this case the Sacramento County Airport System (SCAS), to discourage wildlife usage of airport lands by managing vegetation to decrease wildlife attractiveness. Additionally, these policy documents generally discourage habitat restoration activities and the creation of wetlands, waste disposal facilities and open bodies of water on and adjacent to airports unless it can be shown that those activities will not increase bird strike hazards. The FAA may revoke an airport's operating certificate if the FAA determines that the airport has created or failed to vigorously oppose the creation of such hazards on or near the airport. FAA safety certification personnel conduct periodic inspections of public airports to ascertain compliance with the above regulations, policies and guidance documents.

W:\PLANNING\ENVIRONMENTAL\EIR-EIS Comments\Mather Airport Projects\South Sacramento HCP_2008\Attachments for NOP Comment Ltr\ATT 1 - FAA Wildlife Documents_070908(2).doc

APPROVED
BOARD OF SUPERVISORS
by Reso. No. 2006-0210
FEB 22 2006
Clerk of the Board

COUNTY OF SACRAMENTO
CALIFORNIA

28
of the Agenda of:
February 22, 2006
Timed: 2:00 p.m.

To: Board of Supervisors

From: Department of Economic Development and Intergovernmental Affairs

Subject: **Initiation Of Mather-Related General Plan Amendments And Approval To Proceed With Application For Federal Wetland Fill Permits At South Mather**

Contact: Paul Lake, Special Projects Manager (874-8537)
David Norris, Senior Civil Engineer (874-5049)

Overview
This report recommends changes to the land use plans for South Mather. These include: new boundaries for a Wetlands Preserve of approximately 1,070 acres; designating certain vernal pools outside of the Wetlands Preserve for protection, new routes for extensions of Douglas Road and Eagles Nest Road, and to accommodate future development which may include a university. To accomplish these plans, staff is recommending initiating amendments to the General Plan, Mather Specific Plan, and Mather Special Planning Area.

On December 5, 2005, a group of stakeholders representing thirteen outside entities and seven county departments endorsed the proposed boundaries, pending official review and approval by regulatory federal and state agencies. The Board's approval of these recommendations would initiate CEQA (California Environmental Quality Act) review. It would also initiate preparation of applications to regulatory agencies for fill permits of identified wetlands, stream bed alteration permits, and other necessary permits and authorizations.

Recommendations
Staff recommends that the Board of Supervisors:

1. **Receive And File** information on the proposed initiation of Mather-Related General Plan and Specific Plan Amendments;

2. **Accept** testimony from the general public;

3. **Conceptually Endorse** the use map for South Mather presented in Attachment A, including the boundaries for a Wetlands Preserve, future County land use for economic development and parks, protected vernal pools, airport commercial development, and airport operations. This endorsement will allow staff to move forward with seeking fill permits from federal regulators. It does not create definitive boundaries or finalize protected pools, which will depend on future mutual agreement on local, state, and federal mitigation requirements.

4. **Conceptually Endorse** the realignments of Eagles Nest and Douglas Roads as shown on the map in Attachment A.

5. **Adopt** the attached resolution initiating General Plan, Mather Specific Plan, and Mather Special Planning Area amendments to change the designation of the Economic Development Conveyance area and the munitions area at South Mather, and to modify the locations of Douglas Road and Eagles Nest Road. This will allow for a possible university and accompanying development. The attached resolution initiates General Plan amendments to change designations from Recreational to Commercial-Office for areas that may be developed for a university and accompanying residential and retail development. It also initiates an amendment to the Mather Field Specific Plan to permit the same uses listed above. Finally, it initiates an amendment to the Mather Field Special Planning Area to allow mixed-use development and a University without need for conditional use permits. Development Plan Review to the Board of Supervisors will be required.

6. **Endorse** the language in Attachment B that proscribes activities and development within preserved, protected, and developed areas;

7. **Direct** the Department of Economic Development and Intergovernmental Affairs (DEDIA) to apply for federal Clean Water Act Section 404 and related state and federal permits associated with the proposed land uses.

Fiscal Impact
General Plan: The proposed actions to initiate General and Specific Plans amendments, including CEQA review, and preparing an application package for federal and state permits will not result in a net County (general fund) cost. DEDIA costs related to the proposed actions will be funded with Mather funds in DEDIA's budget. Expenditures for the Department's staff time dedicated to this effort have been anticipated and sufficient funding is available. Estimated costs for amending the General and Specific Plans, including CEQA review, are in the low- to mid-$100,000s.

Potential Mitigation: The proposed plan would fill approximately sixteen acres of vernal wetlands, approximately seventeen acres of seasonal wetlands, and approximately six acres of lakes and ponds. The permitting process will determine the exact mitigation requirements for these fills. Precise mitigation costs and funding sources are therefore unknown at this time, but staff estimates it could be in excess of $4 million.

BACKGROUND:
In December 1988, the Department of Defense officially announced the decision to close Mather Air Force Base. The Air Force issued a Record of Decision (ROD) for the disposal of the base in March 1993. The Base closed in September 1993.

In May 1997, the Board of Supervisors adopted a Specific Plan to facilitate the conversion of Mather from a base to public and private uses. (See Attachment C for Specific Plan map) The Plan established (1) the location, intensity, and character of land uses; (2) circulation patterns and necessary infrastructure improvements to support development (Attachment D); (3) the location and general configuration of parks and open space; (4) community facilities necessary to support

new development and contribute to the quality and livability of the region as a whole; and (5) implementing actions required to realize the Plan's objectives.

In March 1999, the United States Fish and Wildlife Service issued a Biological Opinion (BO) relating to water service contracts to deliver water out of the American River for utilization within Sacramento County Water Agency's Zone 40 Service Area, which includes Mather. The Board of Supervisors approved the Water Contract, thereby agreeing to the BO conditions. The BO requires, in part, the County to develop a vernal pool management plan and to dedicate conservation easements over vernal pools on the County airport and park properties at Mather.

In April 2004, the Board of Supervisors conceptually endorsed creation of a Wetlands Preserve at Mather. The Board directed staff to work with stakeholders to develop a plan for creating the Wetlands Preserve and for addressing other uses, including roadways, economic development, parks, and easement restrictions for conservation and resource protection.

CONSENSUS-BUILDING PROCESS:

In June 2005, staff brought together representatives of key stakeholders interested in the future of South Mather. Attachment E provides a full list of the stakeholder group, including environmental advocates, park supporters, community residents, the City of Rancho Cordova, the Air Force, federal regulators, County departments, and others.

Using an interest-based approach, the stakeholders group developed alternatives for the boundaries of the Wetlands Preserve, identified other vernal pools to be protected, and discussed the alignments of Eagles Nest and Douglas Roads. After several meetings, the group unanimously voted to support staff presenting the current plan to the Board to initiate the General and Specific Plan Amendment process and the federal permitting processes.*

RECOMMENDED CHANGES TO MATHER MAP AND LAND USE AREAS:

Attachment B describes the land use areas presented in this report These descriptions summarize intended and allowed uses in the Wetlands Preserve, Protected Pool Areas, and Future County Land Use Areas. In general, the designations are:

- Preserve Area: Development limited to controlled public access for observing and viewing pools by pedestrians and bicyclists, including some trails. One important unresolved issue is the location of a "staging" area for the Wetlands Preserve. This will provide a location for bus and other parking that viewers of the Wetlands Preserve will need. Regulators and some environmental advocates may request that the County locate the staging area within parks or economic development areas, while County staff suggests that it be located within the Wetlands Preserve, in an area that would not impact vernal habitat. The stakeholders did not discuss this issue in detail and their endorsement of the plan on December 5 did not include any agreement to a location for the staging area.

* The Institute for Ecological Health (IEH) and the Army Corps of Engineers were not present at the final meeting. A separate meeting with IEH garnered its endorsement. Efforts to meet with the Corps were not successful, due to the Corps' staffing limitations.

- Future County Use: The County would seek fill permits for most of the pools in these areas. To the extent that some pools are compatible with approved development, we would not impact them. Nonetheless, staff recommends seeking maximum flexibility for filling these pools to meet the County's economic and parks development objectives at South Mather.

- Protected Pool Areas (including Ahart's Dwarf Rush Area and Spadefoot Toad Pool): These are pools that we would not fill nor develop within buffered zones. The public would not have access to these areas other than for viewing from outside the zones. We would limit other access to stipulated maintenance activities and emergencies. (Note difference in access to Airport Protected Pools below.)

- Airport: These are designated for airport operations, commercial development, or both. The Mather Airport Master Plan specifies activities that will occur. Except for necessary maintenance or other airport operations, no one would access protected pools within the Airport. Maintenance in these pools would be different than maintenance activities outside of Airport areas, due to FAA regulations and air traffic safety needs.

ROAD ALIGNMENTS:

- Roadway Sizing: The Department of Transportation contracted with Fehr & Peers Associates to evaluate the transportation needs related to future development in South Mather, including the projected need along Eagles Nest and Douglas Roads through 2030. In summary, the study (Attachment F) found a definite need for both roads to be four-lane arterials. The most pressing need is for the Douglas Road extension, to take pressure off Excelsior Road, which now runs directly through Independence at Mather. Many commuters are using this as a "short-cut" through Mather, creating potential hazards for residents.

- Douglas Road Extension: Attachment D shows the proposed alternative alignment of the extension of Douglas Road from Sunrise Boulevard. Currently, the General Plan shows the extension running near the western edge of Independence at Mather. Many of the stakeholders expressed concern about a four-lane road running close to homes and through the Wetlands Preserve.

A subcommittee of the stakeholders group analyzed alternatives to the General Plan route and selected the proposed alignment as optimal. The proposed route would take Douglas away from the residential areas and keep it away from habitat in the proposed preserve. The Department of Transportation has determined that this alignment will meet the future traffic needs and can be designed adequately to move commuter traffic away from Independence at Mather.

The table below compares estimated costs of the original (straight) Douglas Road alignment and the proposed alignment.

Project Limit	Length (miles)	Estimated Construction Cost (millions)
Original Alignment	2.43	$ 11.5
Proposed Alignment	3.09	$ 15.5
Difference	0.66	$ 4.0

* Note: Costs do not reflect potential right-of-way or contingency costs, only estimated construction costs.

- Eagles Nest Road: Attachment D shows the proposed alternative alignment of Eagles Nest Road. Currently, the General Plan shows Eagles Nest Road as a straight road between Douglas Road and Kiefer Boulevard. Many of the stakeholders expressed concern about a four-lane "straightaway" in the community and its potential for impacting the vernal pools that are just north of Kiefer Boulevard, considered important by the group to protect.

The stakeholders subcommittee analyzed alternatives to the General Plan route (see Attachment G showing the options that the subcommittee considered). The challenge was to find a route that would minimize impact on the pools and still meet the road standards for curves that would connect Eagles Nest at its intended point on Kiefer. The proposed route would meet these interests.

Eagles Nest will also be relatively close to a pool that contains the Western Spadefoot Toad (shown as "Protected", right next to the proposed road curve). DEDIA is funding a study to recommend measures to protect the Spadefoot from the traffic hazards of Eagles Nest, such as an elevated road, curbing, or expanded buffers around the pool. The results of the study and the recommendations for the pool will be part of discussions with the federal regulators who are concerned about this species.

The table below compares estimated costs of the original (straight) Eagles Nest alignment and the proposed alignment.

Project Limit	Length (miles)	Estimated Total Project Cost (millions)
Original Alignment	2.16	$ 12.0
Proposed Alignment	2.23	$ 12.2
Difference	0.07	$ 0.2

* Note: Costs do not reflect potential right-of-way or contingency costs, only estimated construction costs.

The proposed realignment of Eagles Nest shifts more land area into the proposed wetlands preserve and protected areas. Staff recommends including this property in the Wetlands Preserve in order to save habitat and species.

WETLANDS PRESERVE:
The Wetlands Preserve as shown in Attachment A would serve some critical functions.

1. It would be one of the largest set-asides of natural habitat in Sacramento County and an important anchor to the South Sacramento Habitat Conservation Plan (HCP).

2. It would ensure a large open space area south of Highway 50 to be enjoyed by current and future generations.

3. It would provide educational opportunities for the public to learn about and appreciate wildlife and water resources.

4. It would provide potential areas for mitigation of restoration of vernal features and wetlands that proposed development outside of the Wetlands Preserve at South Mather could damage.

The proposed preserve encompasses 1,070 total acres of land and protects nearly 56 acres of vernal wetlands and 33 acres of seasonal wetlands. Changes to the boundary of the Wetlands Preserve from that proposed in April 2004 include the area to the west of proposed Eagles Nest Road alignment (discussed above) and some habitat north of Woodring Road (Attachment H). The recommended boundary represents a compromise between the land needs for future County use and environmental needs.

The County would own the Wetlands Preserve and the Parks Department would oversee management and maintenance. A combination of development-related activities on the economic development, park and airport properties at Mather, and the HCP would fund the management and maintenance of the Wetlands Preserve.

FUTURE COUNTY USE:
Areas identified in Attachment A as "Future County Use" are for the Department of Regional Parks, Recreation, and Open Space ("Parks") and DEDIA. Parks would use the area north of Woodring for soccer and rugby fields and festival grounds. Future parks master planning will recommend specific uses for the remaining areas.

This plan identifies four sets of vernal pools for protection within the Future County Land Use areas (shown with red circles and as "Protected" in Attachment A).

- North of Woodring, just south of Morrison Creek: Protecting this pool would provide some connectivity between the creek and the northernmost portion of the proposed Wetland Preserve. The only reason it is not in the Wetlands Preserve is that Parks needs connectivity between the proposed soccer and rugby fields, which may include pedestrian and bicycle throughways. Parks would limit development near this pool to what would be necessary and to minimize impact to the pool.

- Southwest corner of Douglas Road and Eagles Nest: These large pools would serve as an entryway into the Regional Park. Protecting vernal pools at the entry would be appropriate, representing an important aspect of the regional park site.

- Western Spadefoot Toad (WST) Pool: This 1.7 acre pool is south of Mather Golf Course and just east of the proposed alternative Eagles Nest alignment. Although the WST is not a federally protected species, the Planning Department will likely write the HCP to protect it as a species of interest.

  At this time, staff cannot determine how much land would be used for this pool set aside, for two reasons:

  1. The map in Attachment A shows a 250-foot buffer around the pool, taking up approximately 17 acres of land. It is not known whether this is an appropriate buffer for the WST. DEDIA is funding a study to help answer that question, pending review and approval from regulators.

  2. The pool's close location to Eagles Nest may not be the best location for long-term survivability of the WST, even with protection measures. DEDIA is funding an additional survey to identify other pools at Mather and elsewhere within the HCP boundaries that have WST that have stronger chances at survival. If this succeeds, we will re-visit these pools in the Mather Plan.

- Ahart's Dwarf Rush (ADR) pools: This cluster of pools lies just north of Kiefer Boulevard. They include 1.9 acres of vernal features, with approximately 35 acres set aside for protection (including buffers).

  The HCP will also be targeting this plant species for protection. This pool cluster is one of the few identified locations of ADR in the County. DEDIA is funding a survey to identify ADR pools at Mather and elsewhere within the HCP boundaries that might have stronger chances at survival. If this succeeds, we will re-visit these pools in the Mather Plan. (Note: The market value of the 35 acres protected could be worth $18 million or more in today's real estate market.)

AIRPORT USES:

The Airport Development Areas as shown in Attachment A would be for future airport commercial development and airport operations. Staff proposes seeking fill permits for most of these pools, as necessary to carry out the Mather Airport Master Plan. The management and maintenance (M&M) of pools noted as "Protected" at the end of the runway will be substantively different from M&M of protected pools elsewhere at South Mather, because the practices cannot conflict with Federal Aviation Administration (FAA) regulations governing operations of Mather Airport. Specifically:

1. The restrictions must not impede aircraft operations (including the ability to retrieve/rescue aircraft that may leave the runway or taxiways and end up in such preserves).

2. The maintenance and management requirements, including vegetation maintenance requirements, must be acceptable to the FAA as well as the Fish and Wildlife Service and other regulators.
3. Conditions must not penalize the County for any aircraft leaving the runway and damaging pools.

In total, we are recommending applying for fill permits impacting approximately 18 wet acres for Airport uses.

MATHER LAKE:
Staff is making no recommendations to change the current uses or plans for Mather Lake. The County will not be seeking fill permits for the wetland and marsh features around the lake. We will however seek approval for appropriate construction that allows use of the lake without damaging the habitat, such as some minor trails and piers. Mather Lake and ponds at Mather total 130 acres.

POSSIBLE FUTURE MINING:
Natural Resource studies show that the area marked "Possible Future Mining" in Attachment A could be a valuable source of aggregate, which could generate substantial revenues for the County. There remain questions however whether mining could pose a threat to the adjacent wetlands. The stakeholders group agreed to support mining as one possible use only if it can be shown that the mining would not directly or indirectly endanger the wetlands. The stakeholders also asked that the County consider using the area for potential wetlands restoration or for appropriate economic development use compatible with adjacent uses.

TOTAL IMPACT AND PRESERVATION:
The tables below summarize the total take proposed in this plan.

Jurisdictional – Overall				
Wetlands/Water Type	**Acres Avoided**	**Acres Impacted**	**Total**	**Avoidance**
Vernal (Pool, Swale, Marsh)	53.9	16.3	70.3	77%
Seasonal Wetlands/Ditches	32.0	12.5	44.6	72%

Critical Habitat Designation Only				
Wetlands/Water Type	**Acres Avoided**	**Acres Impacted**	**Total**	**Avoidance**
Vernal (Pool, Swale, Marsh)	36	3.7	39.7	91%

Non-Jurisdictional – Overall				
Wetlands/Water Type	Acres Avoided	Acres Impacted	Total	Avoidance
Vernal (Pool, Swale, Marsh)	0.014	0.74	0.75	2%
Seasonal Wetlands/Ditches	0.6	6.3	7.0	9%

FEDERAL PERMITTING PROCESS:

Attachment I provides an estimated time table for completing the federal regulatory process and having approvals that will allow the County to move forward with appropriate development. Two key factors will play a major role in this process.

- Management Plan: The Fish and Wildlife Service will require a management plan as part of the conveyance of the Mather property from the Air Force. It will detail how the County will ensure preservation of the protected pools, including maintenance, construction, allowable uses, etc. Approval of the Management Plan will require sign-off by the United States Environmental Protection Agency, Fish and Wildlife Service, Army Corps of Engineers, and the State Department of Fish and Game. Staff will also seek review and approval from the FAA, due to the proximity of the airport and potential regulatory restrictions regarding maintenance regimens.

- Programmatic Permit for Infrastructure and EIS: The Army Corps of Engineers will not issue a blanket permit for filling wetlands at Mather. Their interpretation of regulations requires a specific project (not a master project) in order to grant a fill permit. For this reason, staff is following two parallel paths that will position us to seek expedited individual project permits at the end of the process. The first path is to seek a Programmatic Environmental Impact Statement (EIS). This allows for review of environmental impacts of a large, master-planned project as a whole. The EIS will establish conditions and mitigation requirements for all areas within the project area. The second path is to seek a Programmatic Permit for Infrastructure, a fill permit based on the plan's road and utility needs. All other permits, for individual parks and economic development projects, will tier off the conditions established by the EIS and Infrastructure Permit.

To the extent that federal regulators are satisfied that the project is consistent with the EIS and Infrastructure Permit, they will grant the individual permit in relatively rapid fashion. Where possible, staff will also attempt to process individual permits simultaneously with efforts to obtain the larger infrastructure permit. This will expedite projects now under consideration.

LOCAL LAND USE PLAN UPDATES:

- General Plan: The General Plan for South Mather designates the area east of Eagles Nest Road as Recreation, which does not permit a university or residential uses that are contemplated for the EDC property in the southeast corner (as discussed above). Staff is seeking a redesignation to Commercial-Office, which would permit the university. Additionally, staff is seeking the Board's approval to initiate the process to amend the

General Plan to include the new proposed routes of Eagles Nest Road and Douglas Boulevard, as discussed earlier in this report.

- Mather Specific Plan: The Mather Specific Plan also regulates uses in this portion of South Mather. The EDC parcel is designated by the Special Plan as a Commercial-Recreation District, with the property to the north designated as a Recreation District. Part of the property in the Recreation District is the former munitions area of Mather Air Force Base. This area may be unsuitable for the regional park due to demolition and development costs. Staff is seeking flexibility to include this in the Commercial-Recreation District, which would still allow for parks use as well as the economic development uses under consideration (e.g., the University of Sacramento). To attain the desired flexibility, staff is seeking to move the boundary of the current Commercial-Recreation District to the northern edge of the munitions area and including that in the General Plan Commercial-Office designation.

- Special Planning Area: Staff is also seeking amendments to the Special Planning Area to allow mixed-use development in the Commercial-Recreation District. The university and its related uses would be allowed without need for conditional use permits, but Development Plan Review to the Board of Supervisors would be required. It would not permit residential other than dormitories without a use permit approved by the Board of Supervisors.

MITIGATION IMPLICATIONS:
Staff has met with federal regulators to get a general idea of the mitigation requirements that might come out of this plan. While no specific mitigation requirements can be established until the environmental process is completed, it appears we will be required to mitigate approximately 30 acres of filled wetlands on a 1:1 basis, through either restoration, enhancement, creation, or purchasing banked acreage.

Respectfully submitted,

Paul J. Hahn
Department of Economic Development
and Intergovernmental Affairs

APPROVED

TERRY SCHUTTEN
County Executive

Attachments:
Resolution
A – Proposed Master Plan Map for South Mather
B – Land Use Designations and Definitions
C – General Plan Land Use Map
D – Circulation Plan Map
E – Stakeholder Attendees, December 5, 2005, meeting
F – Fehr and Peers Traffic Study for Eagles Nest and Douglas Roads
G – Map of Eagles Nest options considered by stakeholder subcommittee
H – April 2004 Preserve Map
I – Estimated Regulatory Time Line for South Mather

PL:jw
sr Mather GPA&Federal Wetland Fill Permits

RESOLUTION NO. 2006-0210

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SACRAMENTO, STATE OF CALIFORNIA INITIATING AMENDMENTS TO THE GENERAL PLAN, MATHER SPECIFIC PLAN, AND MATHER SPECIAL PLANNING AREA:

MODIFY LAND USE ZONING AND PROTECTION OF WETLANDS AND VERNAL POOLS AT THE FORMER MATHER AIR FORCE BASE

WHEREAS, the United States Air Force has issued a Record of Decision to transfer ownership of property at the former Mather Air Force Base, and,

WHEREAS, the Sacramento County Board of Supervisors approved the Mather Specific Plan and Special Planning Area in 1997 to direct development at Mather as envisioned at that time; and,

WHEREAS, the County desires to integrate vernal habitat preservation with development at Mather, and,

WHEREAS, the County's intended uses at Mather have changed since the Board adopted the Mather Specific Plan and Special Planning Area;

THEREFORE, BE IT RESOLVED that the Board of Supervisors of the County of Sacramento does hereby initiate General Plan amendments to change the designation of the Economic Development Conveyance area and the munitions area at South Mather from Recreational to Commercial-Office for areas that may be developed for a university and accompanying residential and retail development, and to modify the locations of Douglas Road and Eagles Nest Road..

BE IT FURTHER RESOLVED that the Board of Supervisors of the County of Sacramento does hereby initiate an amendment to the Mather Field Specific Plan to permit the same uses listed above and to initiate an amendment to the Mather Field Special Planning Area to allow mixed-use development and a University without need for conditional use permits.

On a motion by Supervisor Nottoli, Seconded by Supervisor Dickinson, the foregoing resolution was passed and adopted by the Board of Supervisors of the County of Sacramento, State of California, at a regular meeting thereof this 22nd day of February, 2006, by the following vote, to wit:

AYES: Supervisors: Collin, Dickinson, Nottoli, Peters, MacGlashan

NOES: Supervisors: None

ABSENT: Supervisors: None

ABSTAIN: Supervisors: None

(SEAL)

Roberta MacGlashan
Chair, Board Of Supervisors

ATTEST: Cindy A. Turner
Clerk, Board of Supervisors

In accordance with Section 25103 of the Government Code of the State of California a copy of this document has been delivered to the Chairman of the Board of Supervisors, County of Sacramento on

FEB 22 2006

By Faith Turnwald
Deputy Clerk, Board of Supervisors

FILED

FEB 22 2006

BOARD OF SUPERVISORS

BY Cindy A. Turner
CLERK OF THE BOARD

PL:jw
rs Mather GPA&Federal Wetland Fill Permits

Attachment B - Mather Area Designations

These designations correspond to areas identified on the map in Attachment A. The table below generally describes activities and facilities allowable in each area. The terms in parenthesis under "Type of Area" are terms that will be used in the South Sacramento Habitat Conservation Plan. Future versions of the Mather map will include the SSHCP nomenclature.

Area	Purpose	Activities	Permitted Facilities
PRESERVE AREA **(SSHCP - Preserve Area)**	☐ To allow minimal public use that does not disturb environmentally sensitive areas. ☐ Intended for study of the natural environment and interpretive education ☐ Scientific study	☐ Individuals permitted on designated trails. ☐ Groups may use areas only under supervision. ☐ Science experiments ☐ Monitoring, maintenance, and management activities ☐ Activities must be authorized by preserve management entity ☐ Maintenance of existing infrastructure ☐ Emergency & Fire response	☐ Minor trail improvements ☐ Trail stops ☐ Observation points ☐ Interpretive signs
PRESERVE AREA – STAGING AREA	☐ An as-yet-to-be-determined location within the preserve will be designated for access and staging areas for public tours in the preserve. This area will in a location that is convenient and will not disturb the vernal habitat.	Staging activities	☐ Parking lots ☐ Bus turn-around ☐ Restrooms ☐ Drinking fountains ☐ Remediation Facilities
PROTECTED AHART'S DWARF RUSH POOLS (Within "Future County Use" Area East of Eagles Nest Road) (SSHCP - Protected)	☐ Avoidance areas with no public access ☐ To preserve value of areas in their present state. ☐ Requires measures to remain undeveloped.	☐ Human activity prohibited except for maintenance & management activities. Some scientific study allowed. ☐ Existing infrastructure maintenance ☐ Emergency response and fire control	☐ None, except as required for public health, safety, and welfare. ☐ Does not allow buildings, trails, etc.

Area	Purpose	Activities	Permitted Facilities
PROTECTED – SPADEFOOT TOAD POOL (Within "Future County Use" Area East of Eagles Nest Road) **(SSHCP - Protected)**	☐ Avoidance area with no public access ☐ To preserve value of area in its present state. ☐ Requires measures to remain undeveloped.	☐ Human activity prohibited except for maintenance & management activities. ☐ Some scientific study. ☐ Existing infrastructure maintenance ☐ Emergency response and fire control	☐ None, except as required for public health, safety, and welfare. ☐ Does not allow buildings, trails, etc.
PROTECTED POOL AREAS (Within "Future County Use" Area West of Eagles Nest Road) **(SSHCP – Nature Study Area)**	☐ Areas that can sustain light to moderate use, but not heavy use. ☐ Intended for general public access and use, while still preserving natural areas. ☐ Generally applied to large areas that can sustain public use.	☐ Individuals and small groups, with occasional large groups. ☐ Limited picnicking along trails. ☐ Monitoring, maintenance, and management activities	☐ Drinking fountains ☐ Portable restrooms ☐ Trails (surfaced and un-surfaced) ☐ Trail stops ☐ Observation points ☐ Interpretive signs ☐ Some family picnic tables ☐ Roads and/or parking only if no other alternatives in less restrictive areas. ☐ Facilities that provide for preserve maintenance & management. ☐ Education facilities ☐ Fishing pier
FUTURE COUNTY USE **(SSHCP – Same)**	☐ Set-aside land for future park or economic development use.	Can be used for immediate use if project meets uses listed in Mather Specific Plan and Mather Park Master Plan. All permitted active and passive recreation as well as urban development.	Park facilities or urban development. Not limited to, but could include the following: ☐ Caretaker facilities ☐ Trails for maintenance and emergency access ☐ Many, including interpretive centers, trails, large picnic areas, playgrounds, etc. ☐ Utilities ☐ Economic development

Area	Purpose	Activities	Permitted Facilities
AIRPORT **(SSHCP – Sacramento Mather Airport)**	☐ To support the regional economy by providing air cargo hub operations and ancillary commercial facilities	Operations and commercial development consistent with the Mather Airport Master Plan	Commercial and general aviation operations combined with supportive infrastructure (including commercial buildings and offices)
PROTECTED POOL AREAS WITHIN "AIRPORT" AREAS **(SSHCP – Protected Mather Airport)**	☐ Avoidance areas with no public access ☐ To preserve value of areas in their present state. ☐ Requires measures to remain undeveloped, but minor work maybe be needed periodically for installation or upgrading of aircraft navigational equipment, etc. ☐ Land use compatible with aircraft operations	☐ Human activity prohibited except for maintenance and management activities, including mowing and vegetation control on airport property necessary to comply with Federal Aviation Regulation (FAR) Part 139 and FAA Advisory Circular 150/5200-33A "Hazardous Wildlife Attractants On Or Near Airports." Such activities are typically conducted during dry periods. Due to safety and security requirements, scientific study will not be allowed within the Airport Operations Area (AOA) ☐ Emergency response and fire control ☐ Biological monitoring	☐ None, except as required for public health, safety, and welfare, including those required for safe aircraft operations. ☐ Any installation of navigational and related equipment will be done in accordance with FAA requirements and will be subject to environmental assessments pursuant to CEQA and NEPA

Area	Purpose	Activities	Permitted Facilities
POSSIBLE AGGREGATE MINING AREA **(SSHCP – Future County Use – Subarea)**	□ For uses approved by County that are compatible with uses on adjacent properties including aggregate mining, economic development uses, park uses or creation/restoration of vernal feature for mitigation purposes	Available for immediate use if project is consistent with uses authorized in Mather Specific Plan. All permitted mining, urban development, recreation and vernal pool creation/restoration uses. Aggregate mining will only be considered if mining activities will not impact vernal pools on adjacent vernal pool preserve.	All facilities that will support the use(s) that are approved by County for this area provided the facilities are consistent with the Mather Specific Plan development standards and guidelines.

U.S. Department
of Transportation
**Federal Aviation
Administration**

San Francisco Airports District Office
831 Mitten Road, Room 210
Burlingame, California 94010-1303

March 29, 2006

RECEIVED
APR 11 2006
AIRPORT FACILITIES

Mr. Paul Lake, Special Projects Manager
County of Sacramento California
Department of Economic Development and Intergovernmental Affairs
700 H. Street, Room 7650
Sacramento, California 95814-1280

Dear Mr. Lake:

Subject: Initiation Of Mather-Related General Plan Amendment And Approval To Proceed With Application For Federal Wetland Fill Permits At South Mather

This letter is regarding the contents of the above referenced document that was on the County of Sacramento, Board of Supervisors Meeting Agenda for February 22, 2006. The document, or report, discussed plans to change land uses for South Mather that appears to affect Sacramento Mather Airport. The Federal Aviation Administration (FAA) San Francisco Airports District (ADO) Office reviewed the contents of that document and provides the following comments.

Sacramento Mather Airport is a federally funded obligated airport, having received Airport Improvement Program (AIP) funds for maintenance and the safe operation of the airport. As such, the airport is required to comply with all of its signed Airport Sponsor Assurances, which includes compliance with certain compatible land use assurances. Compatible land uses are uses of airport property that provide the greatest amount of safety to persons and property using the airport. The airport sponsor is also required to reasonably maintain, through zoning, outright ownership, or other avenues, control of adjacent land areas where incompatible land use could affect the safe operation of aircraft using the airport, such as uses that attract large numbers of people. Of concern, also, is the environmental impact that any land use may have on airport property. Any action that might affect the operation of the airport must be reviewed and approved by the Federal Aviation Administration (FAA).

The document makes reference to a Wetlands Preserve, pools, protected species of wildlife (Western Spadefoot Toad), recreational land-use of dedicated airport property and possibly, some sort of university environment. We have also concerns regarding to operation of landfill sites on airport property. Having not seen the complete "Plan", inclusive of maps and attachments, showing proposed road realignments, and the location of these wildlife areas and possible university, our analysis of this plan from an aviation

compatibility standpoint is incomplete. Also, it is not know whether the airport sponsor supports this plan. However, it must be noted that any use that introduces wildlife, or wildlife attractants, to the airport environment is incompatible with safe airport operations.

Prior FAA approval, the ADO needs to review the Airport Development Areas, contained in Attachment A, as well as, the entire plan, complete with attachments. It is the responsibility of the airport sponsor to coordinate with FAA proposed projects affecting the airport. Information on this project can be sent to my attention at the following address:

Racior R. Cavole
Airports Compliance Specialist
San Francisco Airports District Office
831 Mitten Road, Room 210
Burlingame, CA 94010-1303

Please contact our office at (650) 876-2778, extension 677, should you have any questions.

Sincerely,

Racior R. Cavole
Airports Compliance Specialist

Cc: Robert B. Leonard, SCAS
Assistant Director of Airports
Administration & Planning
6900 Airport Road
Sacramento, CA 95837

Antonia Barry, Senior Environmental Analyst
Manager, Public Projects Division
Department of Environmental Review & Assessment
827 7th St., Room 220
Sacramental, CA 95814

Sacramento County Farm Bureau

8970 Elk Grove Boulevard Elk Grove, California 95624-1946

Phone (916) 685-6958 Fax (916) 685-7125

Ms. Joyce Horizumi, Environmental Coordinator
Department of Environmental Review and Assessment
827 7th Street, Room 220, Sacramento, CA 95814

Sent via e-mail: DERA@saccounty.net.

RE: SSHCP EIR/EIS Scoping Comments - DERA Control Number (03-PLE-0637)

Dear Ms. Horizumi;

On behalf of the **Sacramento County Farm Bureau and the Amador, El Dorado, Sacramento Cattlemen's Association**, we wish to express our concern regarding the joint draft environmental impact report and environmental impact statement for South Sacramento Habitat Conservation Plan (SSHCP).

Farm Bureau is California's largest farm organization representing roughly 91,000 members throughout the state. Farm Bureau strives to protect and improve the ability of farmers and ranchers engaged in production agriculture to provide a reliable supply of food and fiber through responsible stewardship of the land's resources. The Sacramento County Farm Bureau's purpose is to protect and promote agricultural interest throughout Sacramento County and to find solutions to farm, farm home and rural community problems.

Agriculture provides society with not only open space, wildlife habitat, and flood protection but also food and fiber. Sacramento County agriculture represents more than a $365 million industry in farm gate sales. The SSHCP must fully acknowledge the importance of production agriculture for the sake of producing food and fiber. Not just for its ability to provide habitat. The conservation easements that will be offered by the implementing agency to a willing seller must provide for the continuance of farming practices. Agriculture must have the ability to move from one crop to the other without any additional restrictions beyond state or federal law. All agricultural practices must be covered and provided for its continuation for easements established pursuant to the SSHCP. Activities covered should include but are not limited to discing, spraying, planting, harvesting, irrigating, ditch cleaning, etc. Without the ability of an agricultural landowner to perform the tasks of normal farming practices; the SSHCP will have little benefit to anyone in agriculture.

With climate change, changing soil conditions, and the varying supply of water, farmers must often plant new types of crops in order to continue farming. For example, the conditions may make it more efficient and profitable for a farmer to change from row crops to vineyards. The SSHCP must not impose additional requirements that would prevent this from occurring.

In addition, the SSHCP must integrate a non-participating neighboring landowner assurance ("Good Neighbor") Policy. The "Good Neighbor" policies and "Safe Harbor" policies established under state or federal law must be incorporated into the SSHCP so that participants can work directly with the implementing SSCHP authority instead of having to work with multiple agencies for approval.

Furthermore, the SSHCP must include a provision that use of land that does NOT have an easement on it can not be limited by the County because it is "targeted" or "desirable" land for habitat mitigation.

To conclude, the EIR/EIS must assess impacts to agricultural productivity given the conservation easements provided to landowners. The SSHCP must also include a 'Good Neighbor Policy' and a 'Safe Harbor Agreement'. These must be clearly defined and provided for those who are enrolled in the SSHCP and to their neighbors not enrolled into the SSHCP.

Thank you for your consideration.

Sincerely,

Ken Oneto

Mark Wilson

Ken Oneto
President, Sacramento County Farm Bureau

Mark Wilson
President, Amador, El Dorado, Sacramento Cattlemen's Association

SRCSD
Wastewater Treatment

10545 Armstrong Avenue
Mather, CA 95655
Tel: (916) 876-6000
Fax: (916) 876-6160
Website: www.srcsd.com

JUL 21 2008

July 16, 2008

Joyce Horizumi
Environmental Coordinator
Department of Environmental Review and Assessment
827 7th Street, Room 220
Sacramento, CA 95814

Subject: **Notice of Preparation of a Joint Draft Environmental Impact Report and Environmental Impact Statement for the South Sacramento Habitat Conservation Plan (Control Number 03-PLE-0637)**

Dear Ms. Horizumi:

Sacramento Regional County Sanitation District (SRCSD) and Sacramento Area Sewer District (formerly known as CSD-1) have reviewed the Notice of Preparation of a Draft Environmental Impact Report for the South Sacramento Habitat Conservation Plan and have the following comments:

The Sacramento Area Sewer District (SASD) provides local wastewater collection and conveyance to the urbanized, unincorporated areas of Sacramento County, the cities of Rancho Cordova, Elk Grove and Citrus Heights as well as portions of the City of Sacramento and Folsom. These local pipelines are designed to carry peak wet weather flows of less than 10 million gallons per day (MGD).

Wastewater from local collection agencies (SASD, the City of Sacramento and City of Folsom) is discharged into the SRCSD interceptor system and treated at SRCSD's Sacramento Regional Wastewater Treatment Plant (SRWTP) in Elk Grove. SRCSD facilities (interceptor pipelines and pump stations) are designed to carry peak wet weather flows of greater than 10 MGD.

SASD's *Draft Sewerage Facilities Expansion Master Plan Update 2006* (Master Plan Update 2006) and its associated Supplemental Environmental Impact Review (SEIR) is expected to be adopted by the SASD Board of Directors in August 2008.

SRCSD is currently working on an Interceptor Sequencing Study to evaluate the *Interceptor Master Plan 2000* (MP 2000) and determine when its next master planning document will be developed.

SRCSD and SASD are two separate agencies. Each should be listed separately under "Project Permittees (Partners)" and under the section "Intended Uses of the EIR."

Board of Directors
Representing:

County of Sacramento

County of Yolo

City of Citrus Heights

City of Elk Grove

City of Folsom

City of Rancho Cordova

City of Sacramento

City of West Sacramento

Mary K. Snyder
District Engineer

Stan R. Dean
Plant Manager

Wendell H. Kido
District Manager

Marcia Maurer
Chief Financial Officer

Under **Covered Activities**, sanitary sewer facilities for both SASD and SRCSD (i.e. lift stations, pipelines and pump stations) as well as recycled water facilities should be included along with wastewater treatment facilities.

Under the section **Possible Environmental Effects of the Proposed SSHCP** Public Facilities, assessment of how habitat preserves may affect placement of future public service extensions should be expanded to include recycled water along with water, sewer and power lines. Agencies involved in providing public services should include SRCSD as well as SASD.

If you have any questions regarding these comments please contact me at (916) 876.9994.

Sincerely,

Sarenna Deeble

Sarenna Deeble
SRCSD/SASD
Policy and Planning

CC: Ruben Robles
Michael Meyer
SASD Development Services
SRCSD Development Services

RECEIVED
AUG 21 2008
DEPARTMENT OF ENVIRONMENTAL REVIEW

August 20, 2008

Ms. Joyce Horizumi, Environmental Coordinator
Department of Environmental Review and Assessment
827 – 7th Street, Room 220
Sacramento, CA 95814

SUBJECT: Comments on the Notice of Preparation of a Joint Draft Environmental Impact Report and Environmental Impact Statement for the South Sacramento Habitat Conservation Plan (Control Number 03-PLE-0637)

Dear Ms. Horizumi;

Thank you for the opportunity to review and comment on the Joint Draft Environmental Impact Report (DEIR) and Environmental Impact Statement (DEIS) for the South Sacramento Habitat Conservation Plan (SSHCP). The SSHCP will provide for the conservation of 40 covered species and their associated habitat types. The plan identifies 18 different habitat types including vernal pool aquatic and upland habitat, other wetland habitats, oak woodland, and rural agricultural crops. The SSHCP project area is approximately 341,000 acres within south Sacramento County (unincorporated area) and includes the cities of Rancho Cordova, Elk Grove, and Galt. Southgate Recreation and Park District lies entirely within the SSHCP project area and is included within the following SSHCP Conservation Zones: 1e, 3a, 3b, and 4 (Attachment A).

The District is responsible for the planning of parkland, open space and recreational facilities and the ownership and maintenance of existing and planned facilities within the District boundaries. The District is committed to providing recreational opportunities, and safe and attractive parks and open spaces that make a positive contribution to the quality of life in the South Sacramento area. It may be helpful for you to review the District map of the District boundaries and the respective facilities, which would potentially be impacted by the South Sacramento Habitat Conservation Plan (Attachment B).

The District requests that the following comments, which were approved by the Southgate Board of Directors at their August 19, 2008 meeting, be considered and included in the DEIR/DEIS where applicable.

LAND USE

The proposed SSHCP conservation strategy will protect approximately 8,000 acres of habitat inside the Urban Development Area (UDA). The UDA corresponds to land within the County's Urban Services Boundary (USB), and to land within the city limits of Rancho Cordova, Elk Grove, Galt, and Galt's adopted sphere of influence.

SOUTHGATE
RECREATION & PARK DISTRICT

Sheldon
Administrative Headquarters
6000 Orange Avenue
Sacramento, CA 95823-3225
Phone 916-428-1171
Facsimile 916-428-7334
www.southgaterecandpark.net

Board of Directors
Rolfe P. Appel
John R. Cockerham
Edwin A. Smith
Christine Thompson
Shirley J. Wirth

General Manager
Wind Winchell

Assistant General Manager
Maureen Casey

Of the 8,000 acres of habitat to be preserved within the UDA, a measure to establish a core preserve of at least 3,000 acres has been identified within the District's Boundaries as part of Conservation Zone 3b.

The District requests that the DEIR/DEIS assess how the establishment of habitat preserves and mitigation measures proposed for Zones 3a and 3b will affect the land use plans for the following County Planning Areas: Florin-Vineyard "GAP", North Vineyard Station, and Vineyard Springs. The District has cooperated with Developers and the County to identify park sites and open space, using smart-growth principles, within these adopted land use plans.

In addition, the SSHCP has measures to preserve a 600 foot wide habitat corridor along Laguna Creek and a 300 foot wide habitat corridor with variances along Morrison, Elder and Gerber Creeks. These creeks are within the District's boundaries and are part of multiple planning efforts for open space corridors including a recreational trail system.

The District requests that the DEIR/DEIS also assess how the establishment of habitat preserves and mitigation measures proposed for these creekways will affect the District's planning efforts. The District is an active participant in the Upper Laguna Creek Collaborative (ULCC) and is planning to provide a recreational trail through the Laguna Creek Open Space Corridor. The District is also working with the County to provide recreational trails within the Gerber/Elder Creek Open Space Corridors and the Morrison Creek Open Space Corridor.

The District wants to ensure that the SSHCP is not in conflict with the District's Master Plan. If it is determined that the SSHCP will impact the District's existing facilities or its opportunities to acquire parkland and open space, the District requests to work with the County to resolve any differences and to jointly plan any preserves that will be adjacent to the District's existing and/or future facilities.

PUBLIC FACILITIES

State laws authorize recreation and park districts to provide recreation programs, local parks, and open spaces. (Public Resources Code Section 5780) The District's Level of Service goal is to provide 5 acres of parkland per 1,000 people and to maintain a balance of open space and recreation facility development. The District accepts, through its planning process, the responsibility of stewardship and habitat conservation of these open space areas in cooperation with the County and other regulatory agencies.

The District is concerned that the SSHCP's Conservation Strategy and Plan Implementation may affect the District's opportunities to own and manage open space properties with established habitat preserves and requests that the DEIR/DEIS evaluate the organizational structure and criteria of the SSHCP and the restrictions that it may place on local recreation and park district's authority to own and manage such properties.

As mentioned in the previous section, the District is also concerned about the effects that the SSHCP's may have on parkland and open space acquisition by the District. The SSHCP may affect the placement of future park sites, recreational trails and public facilities, thereby limiting the District's ability to provide recreational opportunities to the residents of the community.

TRANSPORTATION/CIRCULATION

As roadways become more congested the need for alternative transportation options increases; bicycle and pedestrian recreational trails can serve as commuter routes and provide community linkages that may decrease the number of personal vehicle trips for residents. The District is planning recreational trails within the Laguna Creek and Gerber/Elder Creek Corridors that will serve the residents of the Vineyard Springs, Florin-Vineyard GAP, and North Vineyard Station communities. These trails will serve as alternate transportation routes and will provide linkages to parks, schools, offices and shopping centers.

The District requests that the DEIR/DEIS assess the impacts on the Districts ability to provide these recreational trails and evaluate the possible loss of alternate transportation routes in these communities.

BIOLOGICAL RESOURCES

The District currently manages approximately 195 acres of open space which includes the Laguna Creek Parkway, Dunmore Preserve, and Kingsbridge Open Space Preserve (Attachment B). The District is also expected to acquire an additional 210 acres of open space within the North Vineyard Station Specific Plan Area and will be the designated Preserve Manager for the Gerber/Elder Creek Preserve. These open space areas include habitats and biological resources that are identified within the SSHCP for preservation.

Currently, the Laguna Creek Parkway offers a recreational trail within the creek's open space corridor and the Kingsbridge Open Space Preserve is adjacent to the Tillotson Parkway and Churchill Downs Community Park. The District successfully manages these open spaces and minimizes the impacts and edge effects of the active and passive recreational activities that occur within or adjacent to these properties.

Providing passive recreational opportunities such as bicycle and pedestrian trails, interpretative signage and nature viewing areas can offer environmental education experiences, promote stewardship and increase public awareness and support for natural preserve areas.

The District requests that the DEIR/DEIS consider passive recreational land-uses compatible with the conservation goals of the SSHCP. The District also encourages the establishment of preserve buffers and requests the DEIR/DEIS evaluate the benefits of allowing passive recreational activities within established preserve buffers.

RECREATIONAL ACCESS

The District offers passive recreational access to open space areas by creating bicycle and pedestrian trails with minimal landscaping around the perimeter of open space preserves or within open space creek corridors. Public access to open space areas with sensitive habitat is limited by post and cable fencing and signage. The District also minimizes the edge effects of active and passive recreational land use by managing and maintaining open space preserves in accordance with Operations and Management Plans developed by regulatory agencies.

The SSHCP considers passive recreational activities such as hiking, bicycling, equestrian, and bird watching generally compatible with conservation goals. The District supports this consideration and requests that the DEIR/DEIS assess the potential to allow limited active and passive recreational activities within or adjacent to habitat preserves.

Once again the District would like to thank the County of Sacramento Department of Environmental Review and Assessment for the opportunity to comment on the Notice of Preparation of a Joint Draft Environmental Impact Report and Environmental Impact Statement for the South Sacramento Habitat Conservation Plan. The District appreciates the County's consideration of the comments and requests in this letter. The District shall coordinate with the County and all related agencies to minimize the effects of significant impacts and maximize the availability of parkland, open space and recreational facilities throughout the project area for the community.

Please continue to forward documentation related to this project to the District. If you require additional information or assistance please do not hesitate to contact me at (916) 428-1171, ext. 29, or via e-mail at mcasey@southgaterecandpark.net.

Sincerely,

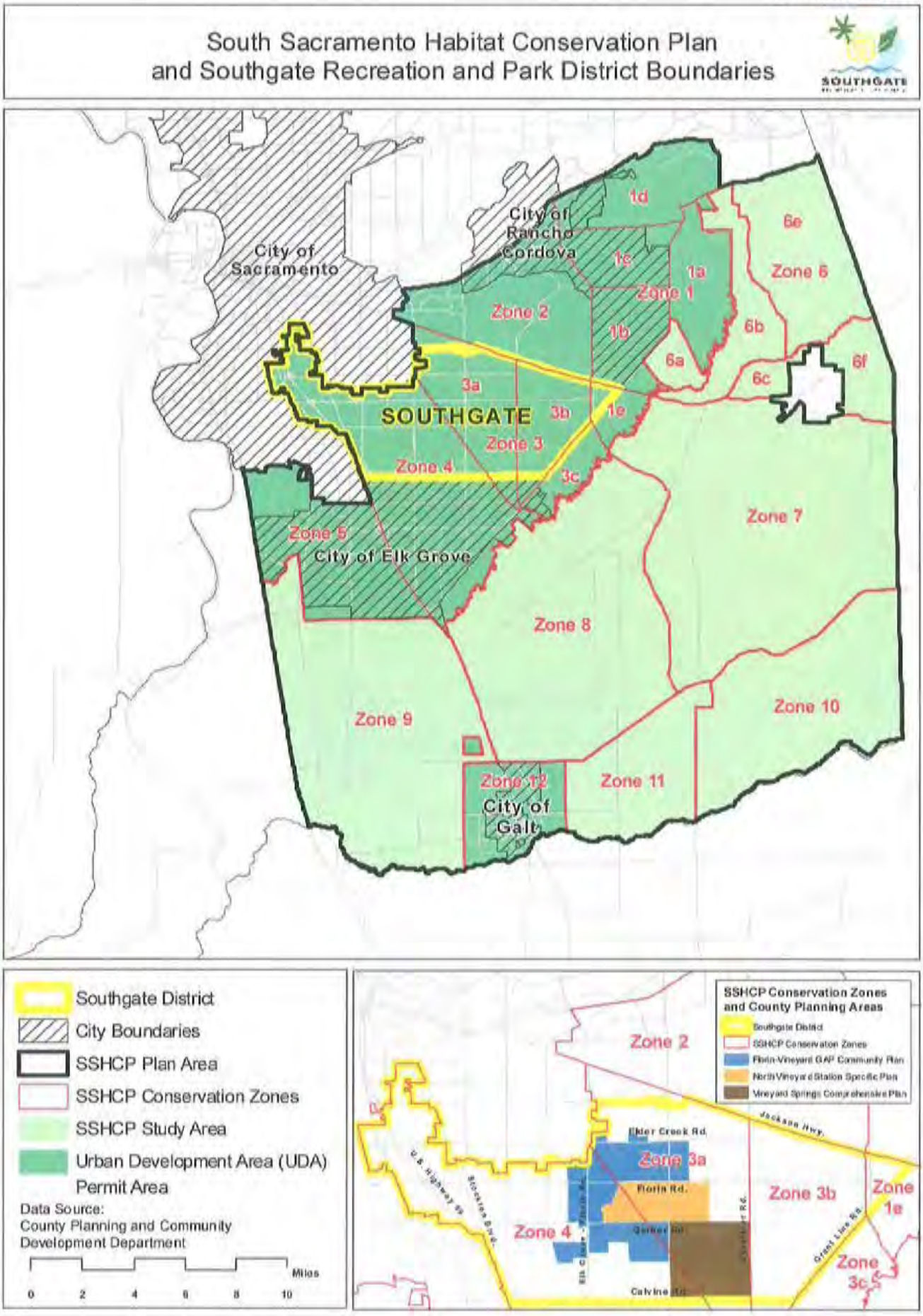
Maureen Casey

Maureen Casey
Assistant General Manager

Attachment:

A. District Boundary & South Sacramento Habitat Conservation Plan Boundaries
B. District Map and Facilities

Attachment A

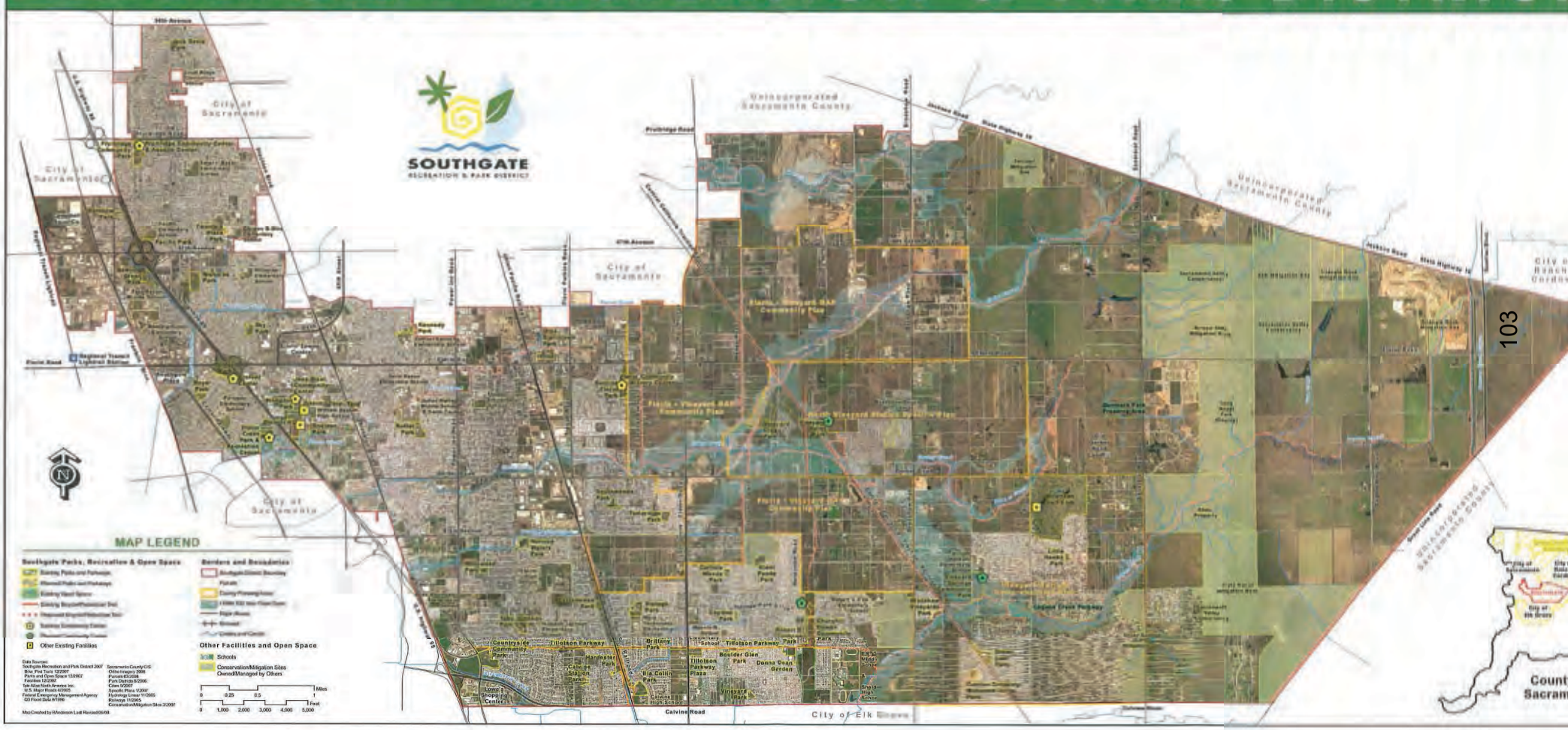


ATTACHMENT 5911

AGENDA ITEM 11.1

Attachment 3

SOUTHGATE RECREATION & PARK DISTRICT



Appendix F

Workshop

Workshop Script
Signin Sheets
SSHCP Conservation Zones
Conservation Zone 1 (representative map)
Conservation Zone 2 (representative map)
Conservation Zone 3 (representative map)
Conservation Zone 4 (representative map)
Conservation Zone 5 (representative map)
Conservation Zone 12 (representative map)
Comment Cards

Workshop Script

South Sacramento Habitat Conservation Plan
UDA Conservation Strategy Alternatives Workshop
August 19, 2008

Following is the draft script for the August 19 UDA Conservation Strategy Alternatives Workshop as outlined at the August 8 Dry Run meeting.

1. Upon arrival workshop attendees will sign in and receive a numbered nametag, comment card/map packet and numbered stickers.
    a. Attendees will be directed to the refreshment area and then to the workshop tables.

The workshop will begin with a brief introduction by Michele McCormick. She will describe the evenings' workshop activities. The introduction will provide attendees with the following information:

- Why are we here tonight?
    i. We are going to begin mapping conservation alternatives for six zones within the Urban Development Area (UDA). This information will be considered in the EIR/EIS.

- What are we doing?
    i. Each attendee has been given numbered comment sheets and stickers to coincide with their numbered nametags.
    ii. The stickers are green and red. Please use the green stickers to indicate areas where you would like to see habitat conserved. Use the red stickers to indicate where you do not feel are appropriate for a preserve or you may have a particular concern with a preserve in a given area.
    iii. It is essential to provide a brief explanation of your selections that correlate to the sticker number ("sticker 17-a: …there is an occurrence of Orcutt grasses at this location…sticker 17-b"). You can provide written descriptions of the habitats or species populations you would like to conserve and/or indicate habitat areas that might not be highlighted.

    iv. Please try to provide fairly specific geographic information of where you placed your stickers and do not overlap stickers with other participants ("…north of intersection of Grantline at Sunrise…"). We will be collecting the comment cards tonight and collating them with the stickers on the maps.

    v. Each table will have staff available to assist with the exercise and moderate the group.

vi. Towards the end of the mapping exercise, **if we have time** (about 30 minutes) we will re-convene and briefly review the maps. We should be able to see some obvious preferences after the exercise is complete.

- How will the data obtained tonight be used?
  i. The information obtained tonight will be used to help identify conservation alternatives for the EIR/EIS.
  ii. A summary of the results will be published to in a scoping report due for release towards the end of September or early October.

II. After the workshop format is explained, Rich Radmacher is introduced and gives a very brief explanation of the SSHCP.
- UDA
- Riparian
- Vernal Pools
- Grasslands

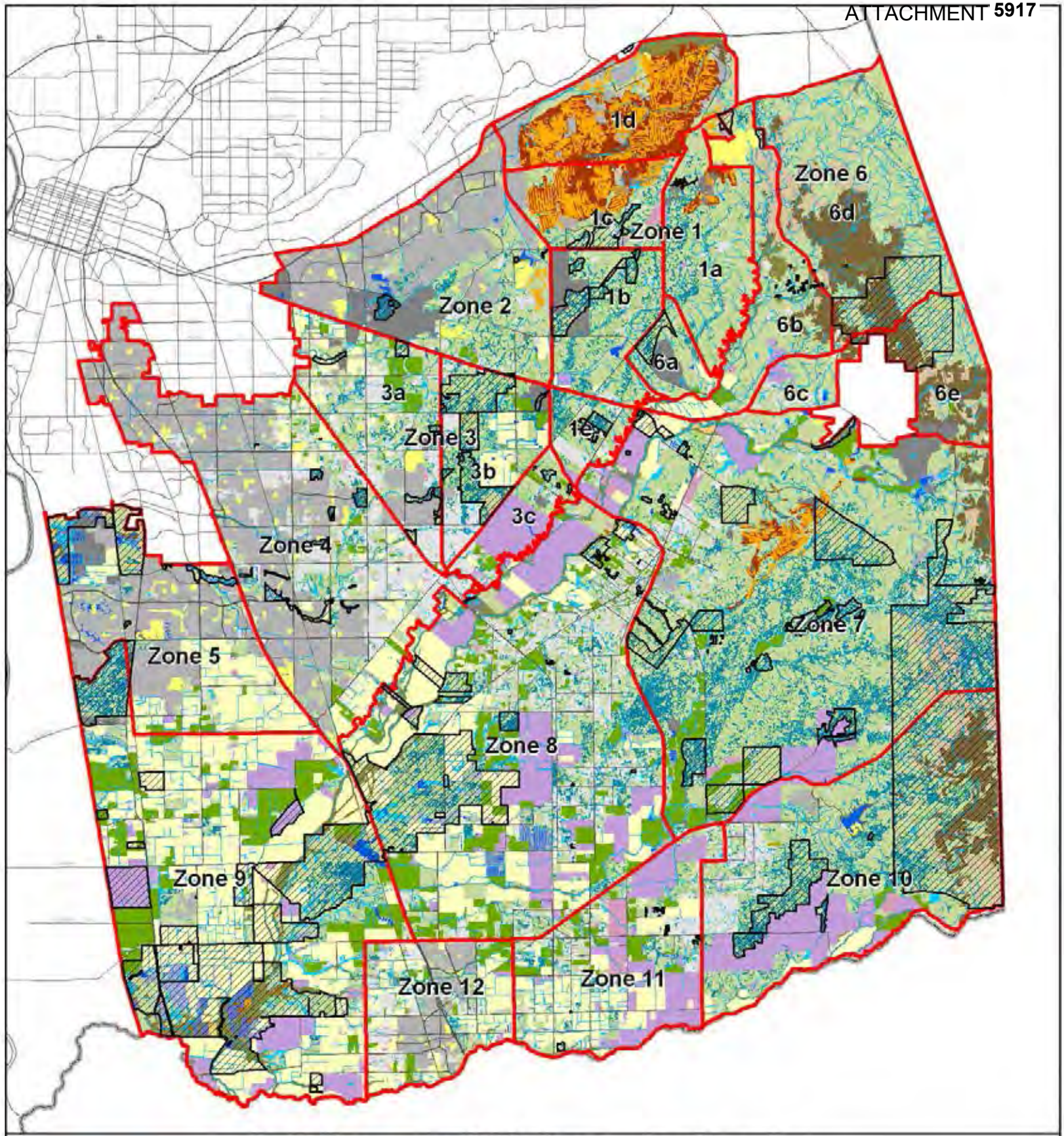
III. After Rich's explanation, meeting attendees are released to begin the mapping exercise.

AUGUST 19, 2008 SSHCP EIR/EIS ALTERNATIVES WORKSHOP

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER
John Newman			
Kathy Newman			
Ellie Hoole			
Doug Williams			
Larry Larsen			
Rick Roths			
Pam Keen			
Terri Chambers			
Judy Worrell			
George Waegell			
Justin Carney			
Don Barnett			
Kate Wheatley			
Javi Swerwak			
David Shabazian			
Alex Lucenski			
Rob Ries			
Kathy Cohen			
Myrtle Tara			
Jim Pachl			

AUGUST 19, 2008 SSHCP EIR/EIS ALTERNATIVES WORKSHOP

NAME	ORGANIZATION	E-MAIL	PHONE NUMBER
Kris Steward			
Karen Buhr			
Lynn Wheat			
Dave Ghirardelli			
Dale W Mahan			
Carol Witham			
Jeff Rorabaugh			
GLEN HOLSTEN			
MIKE CARNET			
MARILYN CARNEY			
Kim Schwab			
FRED HEGE			
Jim Penman			
BILL GEYER			
Steve Greco			
FRANCES KNIGHT			
STACEY McKINLEY			
Antonio Gonzalez			



South Sacramento HCP Conservation Zones & Habitat Cover-Types Map

Conservation Zone

Habitat Types

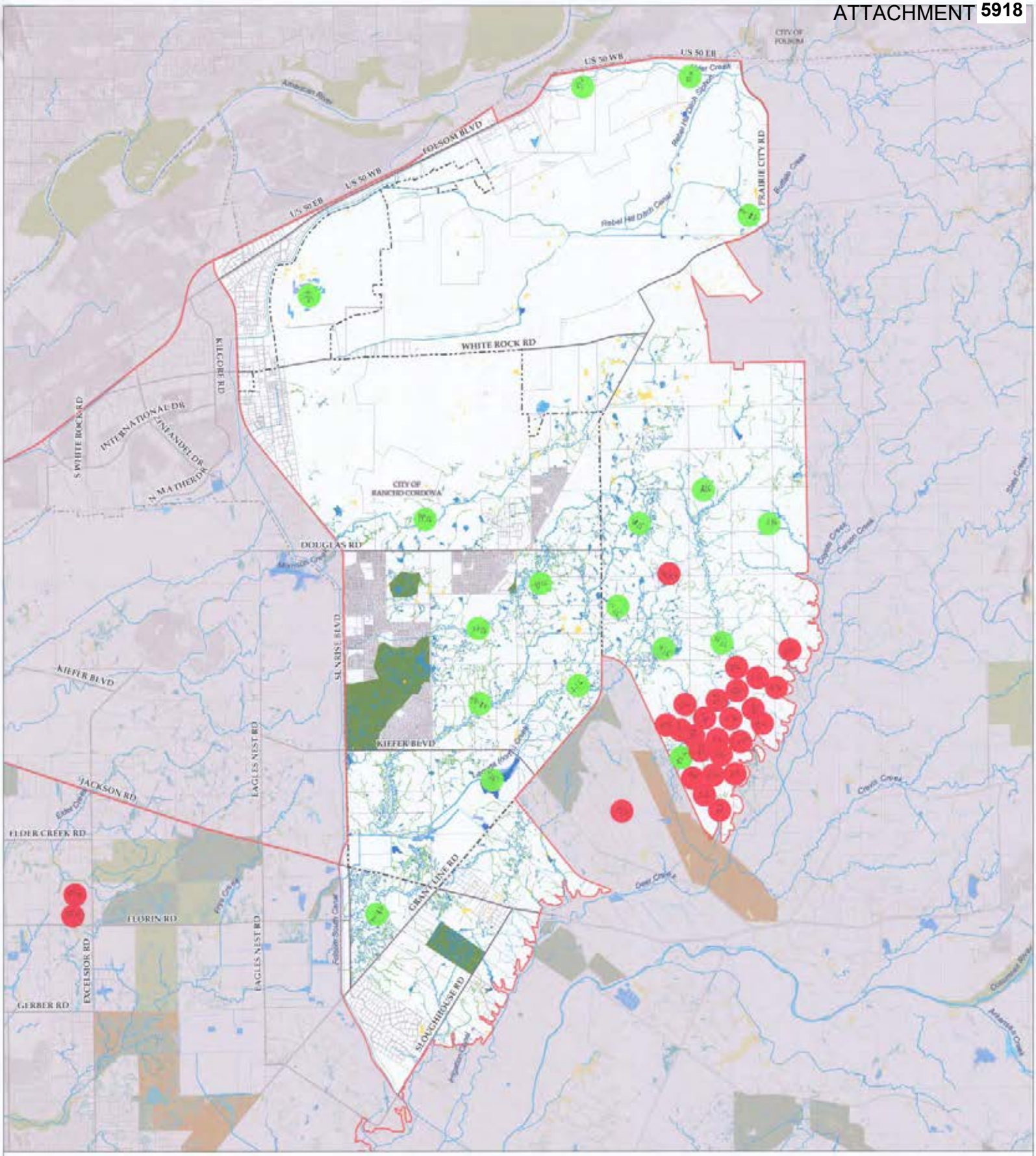
- Blue Oak Woodland
- Cottonwood Woodland
- Cropland
- Disturbed
- Eucalyptus Woodland
- Freshwater Marsh
- High Density Development
- Irrigated Pasture-Grassland
- Low Density Development
- Major Roads
- Mine Tailings
- Mixed Riparian Scrub
- Mixed Riparian Woodland
- Open Water
- Orchards
- Recreation/Landscaped
- Savannah
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Valley Oak Riparian Woodland
- Vernal Pool
- Valley Grassland
- Vineyards
- Wetland Restoration
- Woodland Restoration

N

0 1 2 4 Miles

PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

Jaunuary 30, 2008

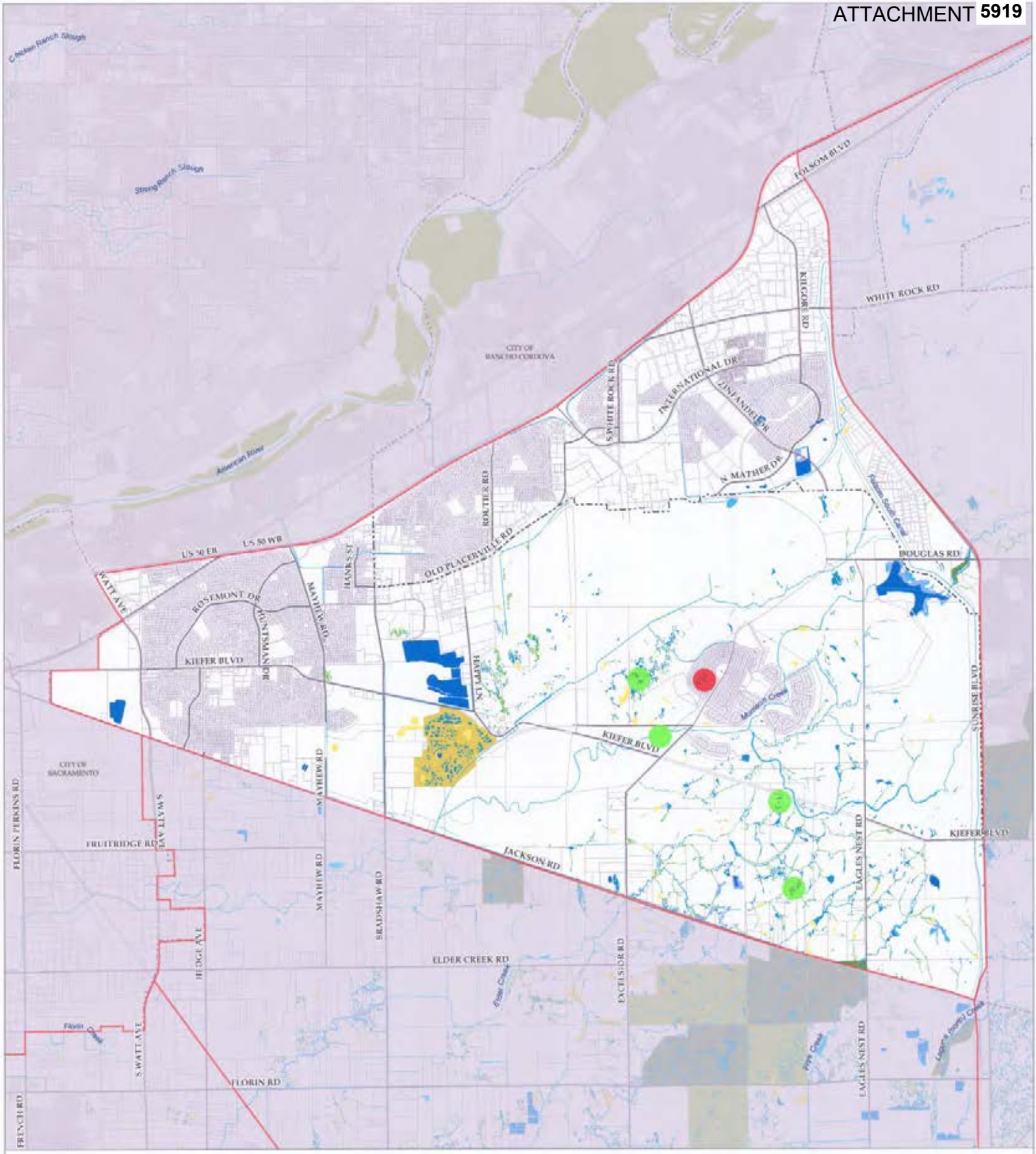


Zone 1

Urban Development Area Conservation Zone
Protected Easement
Protected Fee Title
Protected Policy
Mitigation Bank

Wetland Cover Type

Incorporated Areas
Freshwater Marsh
Open Water
Seasonal Impoundment
Seasonal Wetlands
Streams/Creeks
Swale
Vernal Pool
Wetland Restoration



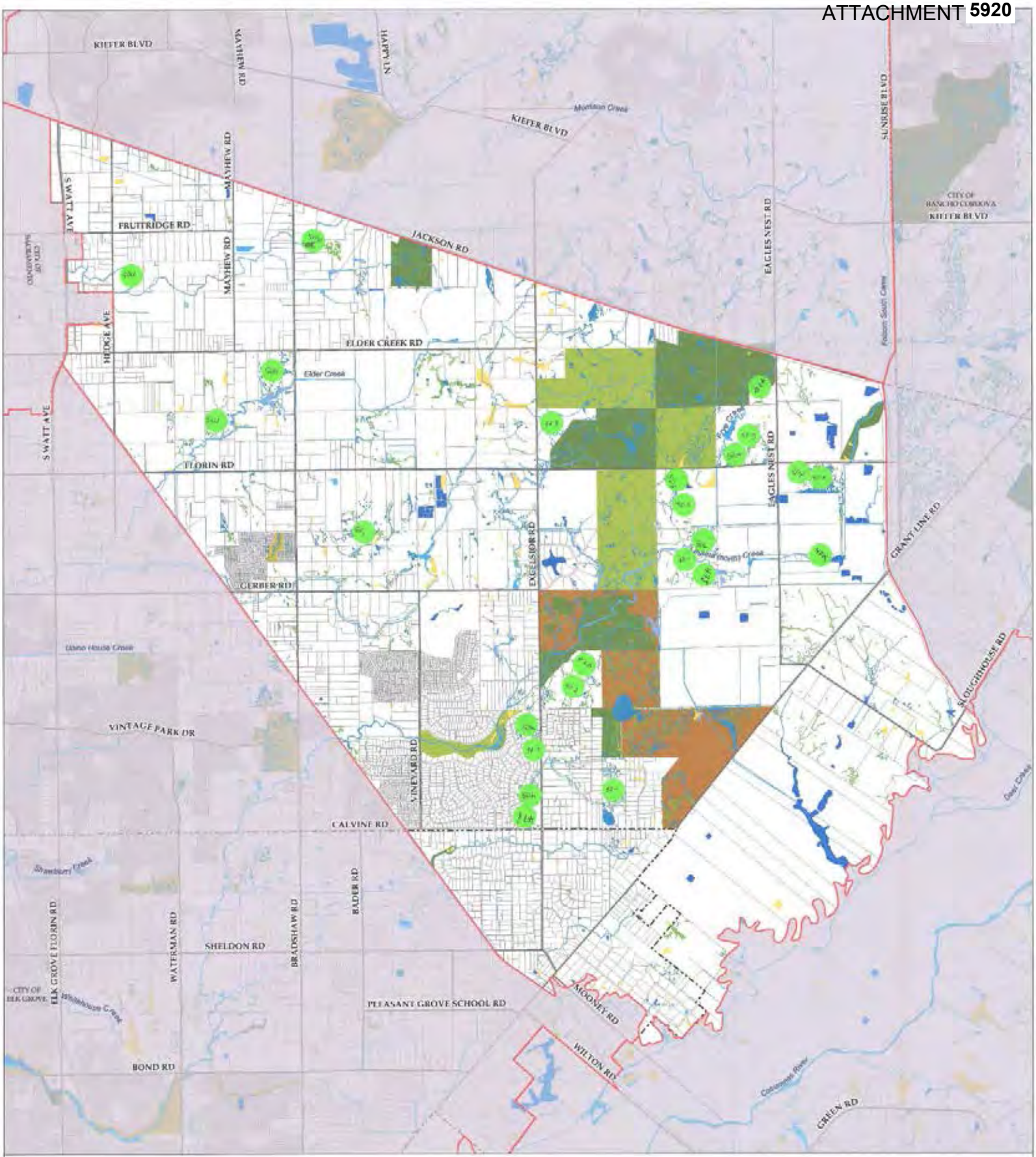
Zone 2

- Urban Development Area Conservation Zone
- Protected Easement
- Protected Fee Title
- Protected Policy
- Mitigation Bank

Wetland Cover Type

- Freshwater Marsh
- Open Water
- Seasonal Impoundment
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool
- Wetland Restoration
- Incorporated Areas

N



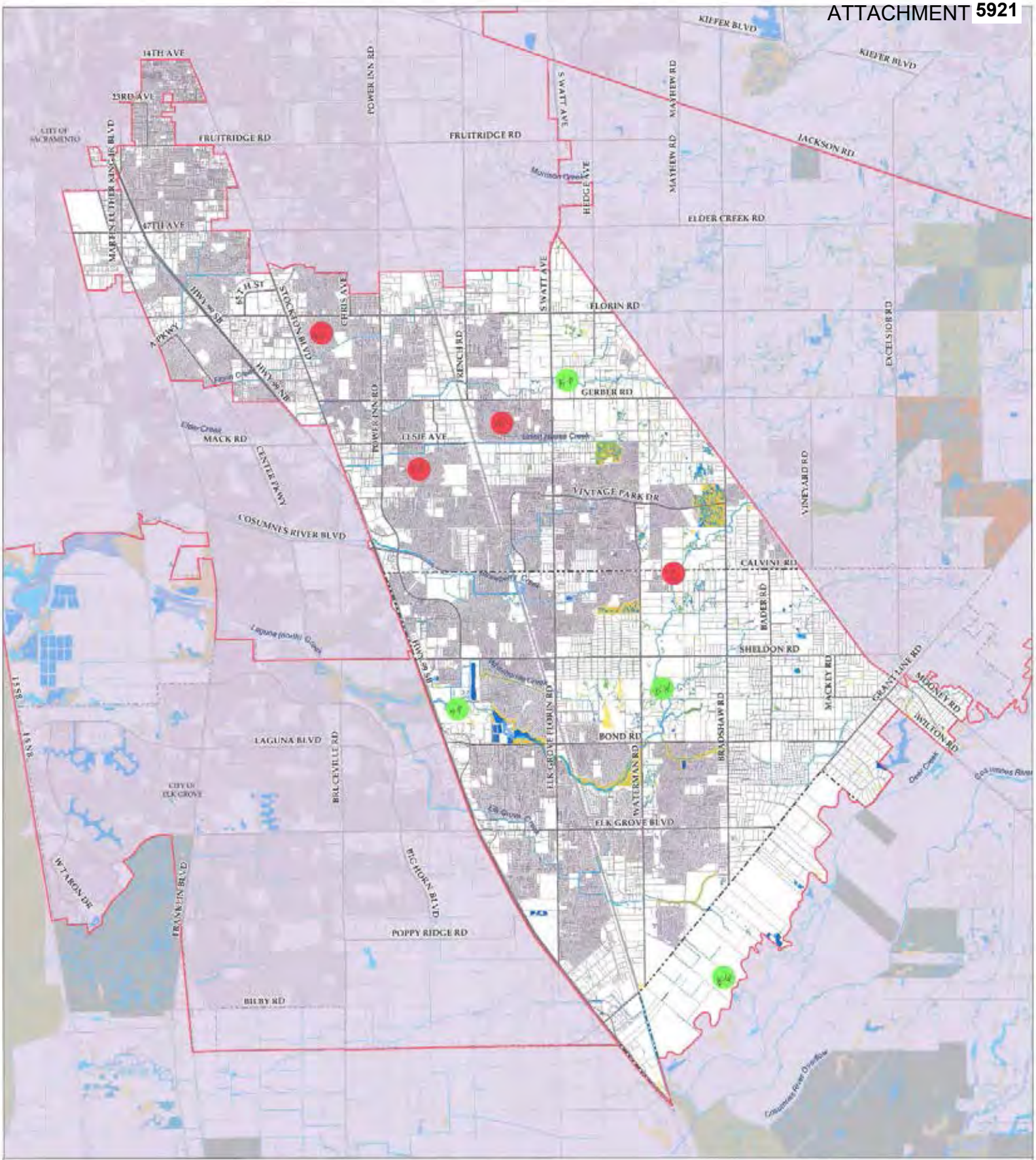
Zone 3

- Urban Development Area Conservation Zone
- Protected Easement
- Protected Fee Title
- Protected Policy
- Mitigation Bank

Wetland Cover Type

- Incorporated Areas
- Freshwater Marsh
- Open Water
- Seasonal Impoundment
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool
- Wetland Restoration

N



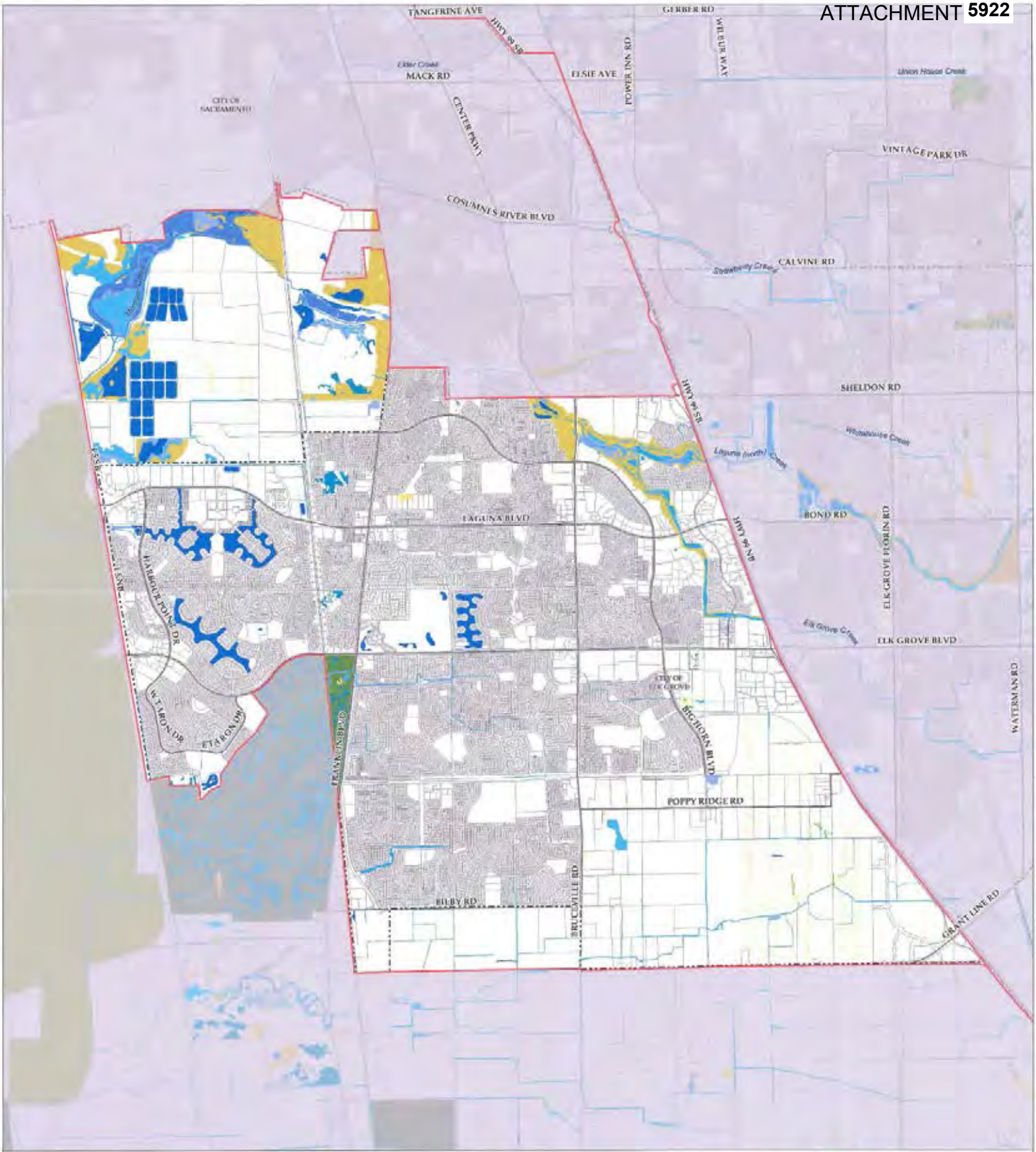
Zone 4

- Urban Development Area Conservation Zone
- Protected Easement
- Protected Fee Title
- Protected Policy
- Mitigation Bank

Wetland Cover Type

- Freshwater Marsh
- Open Water
- Seasonal Impoundment
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool
- Wetland Restoration
- Incorporated Areas

N



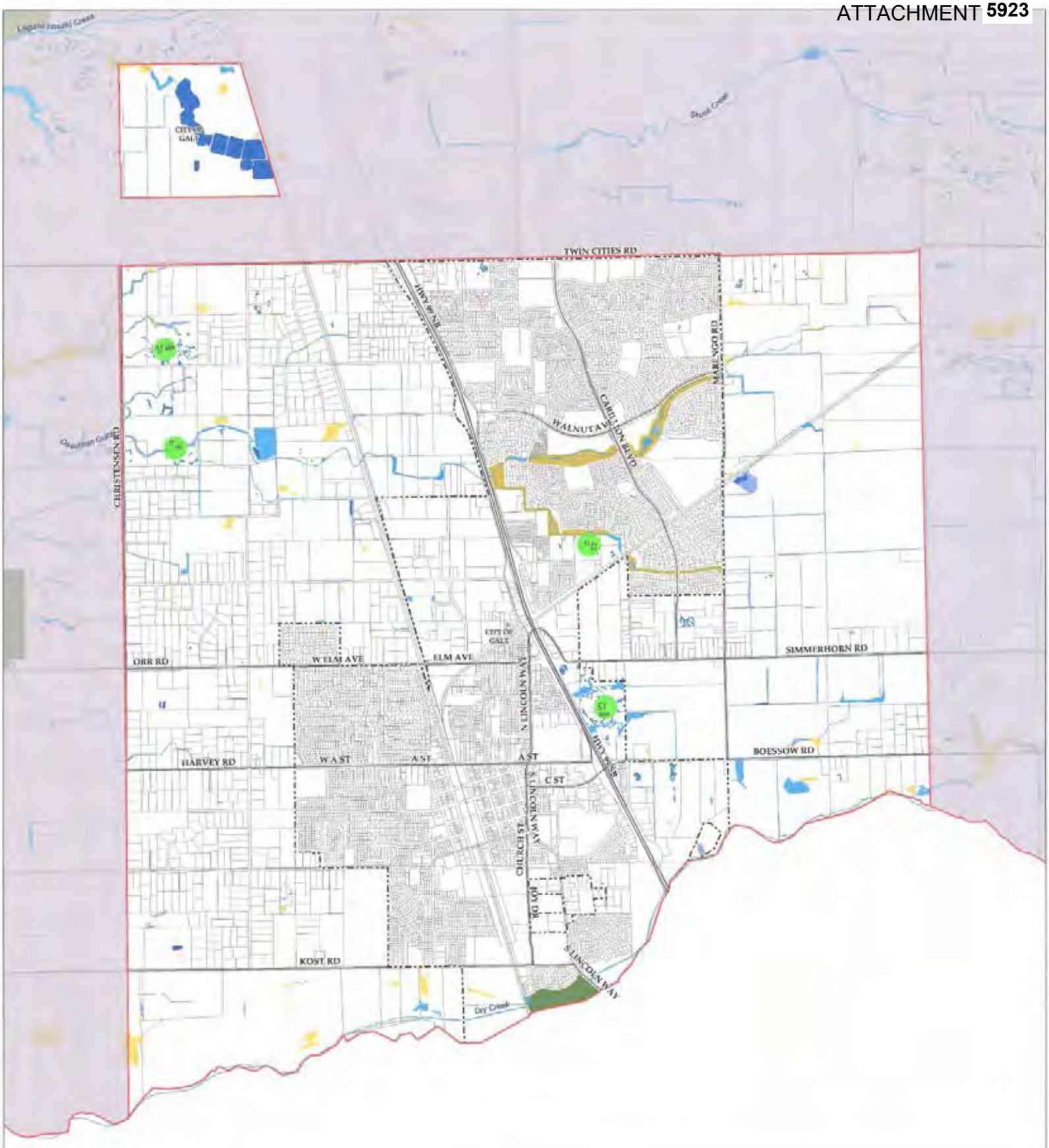
Zone 5

- Urban Development Area Conservation Zone
- Protected Easement
- Protected Fee Title
- Protected Policy
- Mitigation Bank

Wetland Cover Type

- Freshwater Marsh
- Open Water
- Seasonal Impoundment
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool
- Wetland Restoration
- Incorporated Areas

N



Zone 12

- Urban Development Area Conservation Zone
- Protected Easement
- Protected Fee Title
- Protected Policy
- Mitigation Bank

Wetland Cover Type

- Incorporated Areas
- Freshwater Marsh
- Open Water
- Seasonal Impoundment
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool
- Wetland Restoration

N

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 1

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

1-a Preserve a creek buffer the length of Laguna creek that averages 600 feet eg 300' each side of the creek or 100' one side & 500' the other side. the width would vary based on the resource & constraints. Creek corridor can connect vernal pools as well as uplands preserves.

1-b Preserve vernal pools - important & unique pools here -

1-c another important vernal pool area that needs to have land preserved - both Carpenter Hills & to N

1-d important to preserve Morrison Creek with buffer

1-e Heritage Falls - Preserve VP's

1-f Early Triangle - Vernal pools should be preserved.

1-g Preserve vernal pools in a long connected preserve.

1-h Important for riparian. Established & regenerating oaks. Use

1-i Preserve Runway pools

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process - EIS/EIR

Comment Card

Participant Number:

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

1-J - Laguna Creek Reserve - 600 feet wide

1-K - 3 / There is an opportunity to preserve creek riparian

1-L Vernal pools

1-M Vernal pools

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process - EIS/EIR

Comment Card

Participant Number: 3

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

3-a: This section of the map seems to contain the vernal pools or other "water parts" that start the Laguna Creek water system

3-b: This section seems to contain critical habitat for vernal pools. If development continues into this habitat how does stormwater run-off affect the vernal pools and creeks?

3-c: From Folsom-South Canal to ~~Bo~~ Vinyard there shows the Upper Laguna Creek Watershed that ~~contains~~ demonstrates potential to be protected for riparian habitat, pedestrian walkways and possibly a wildlife corridor

3-D: If this section is existing farm land then it should be set aside as such with the possibility of also using it as a buffer zone for nearby vernal pools and creeks.

Antonio Gonzalez

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 8

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

8A - This Area is part of City of Elk Grove SOI Amendment process & should be included in UDA under the HCP.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process - EIS/EIR

Comment Card

Participant Number: 15

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

15A - Laguna Creek North potential restoration of natural stream

15-B - Vernal pool

15-C - Vernal pool potential preservation

15-D - Mather vernal pool

15-E - Habitat - wildlife corridor

15-F - Morrison Creek - riparian restoration

15-G Laguna Creek Corridor restoration

15-H - Laguna Creek corridor restoration

15-I - Elder Creek corridor restoration

15-J - Gerber Creek Corridor restoration

15-K - Deer Creek Tributary Corridor restoration

15-L - Restore waterway to provide connection to Deer Creek

15-M - Rotore Creek Corridor

15-N Laguna Creek Corridor restoration

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 15

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

15-O Elder Creek Corridor restoration
15-P Laguna Creek Corridor restoration
15-QQ - Deer Creek Flood plain protection
15-R - Restore Creek between Grant and Poppy Ridge
15-S - Buffer land protected
15-T Dry Creek protect-restore riparian corridor
15-U Protect enhance wetlands
15-V Restorian Creek Corridor.
15-W Restore Creek/Swale Corridor

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 17

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

17a – Lot P Keep Lot P as a preserve - is contiguous with Laguna Creek Corridor. Should have a management plan for the vernal pool area,

17b - please this property in preserve - keep contiguous with Laguna Creek corridor -

17a – Drainage Plans for the area

17c Keep the creek natural channel – 300ft

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 19

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

19 a - Find a name for the creek. Widen Creeks, add native plants + trees to the area to prevent wash out.

19 B. Preserve as many Vernal pools in the largest area as possible. The houses can be concentrated in one areas

19 a red Developments need to be slowed
19 b " or even stopped until the problems are fixed in those housing areas. (such as traffic lights.) etc.

19 c Extend preserve to include this area.

19 d - e Marsh areas should be preserved also.

19 c red Again problems should b fixed concerning strip malls + housing + traffic. Continued housing ruins habitat for wild life. Increased traffic also destroys wild life

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 19

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

19f preserve creek

19g extend preserve

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 20

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

20 a – Watershed – preserve Streams & Any related vernal pools that are within close proximity to the streams – Streams should be left as natural as possible (not channeled), leave at least 100 yards on each side as part of the preserve

20 b. – Same as 20a

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: John R Newman

Title and Org/Business (if applicable): Florin Historical Society (V.P.)

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 21

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

21-a RED - AREA Along GRANT Line Rd is adjacent to city of ELK Grove and has been Farmed Continuously for >100 years, so Little Preservation Value

21-b RED - Area is NOT suitable for preservation because it Could be used for PASSIVE RECREATION since it is close to city of Elk Grove & INCONSISTENT with Farming.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No 21

Environmental Review Process – EIS/EIR **Comment Card**

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information. ALSO ON ~~[illegible]~~ Economic Committee

Name: Doug Williams

Title and Org/Business (if applicable):

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th St., Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 22

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

RED. ZONE 1

22A – DON'T DESIGNATE AS CONSERVATION & PRESERVE. PROPERTY IS ENTITLED & OUTCOME OF LITIGATION MAY ALLOW DEVELOPMENT TO PROCEED — REASONABLE MITIGATION ANTICIPATED

JAEGER ROAD 530, LLC. "THE DONUT WHOLE" HAS INTENTIONS TO DEVELOP

COMMENT IS SUBJECT TO PARTNERSHIP APPROVAL — WILL CONFIRM WITH DAVE DEFANTI & RICH RADMACHER

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 22

Environmental Review Process – EIS/EIR **Comment Card**

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: FRANCES KNIGHT

Title and Org/Business (if applicable): K. HOVNANIAN HOMES

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 23

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

23a & 23b:

Land south of Eschinger Rd. (outside UDA) adjacent to future Elk Grove SOI Amendment area should be considered as a critical buffer between future development in the SOI area and permanent preserve land. As such, this area provides / supports some of the key elements of the ITCP including:

1. Interconnecting future and existing preserves
2. Minimization of Edge effects
3. Support of greater biodiversity in the form of corridors allowing for animal movement and hawk foraging

This land area South of Eschinger should be given additional credit ~~in~~ for preserving land as a permanent preserve line against future development.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 24

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

a. RESERVE 25 ADJACENT TO MATHER LAKE AND PACIL, SO THIS IS A NATURAL EXTENSION

b. CONSERVE ALL AREA WITHIN STREAM/CREEK BANKS.

c. " " " " " "

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR **Comment Card** Participant Number: 27

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

- For vernal pool reserves, please include uplands with resources for salamanders (burrows from ground squirrels, etc.)

27-a Connect to the nearby existing reserves. Use large culverts to hydrologically connect the reserves across roads.
27-b Connect this area to 27-a
27-c connect this area to 27-a also
27-d restore Morrison Creek – use it for a riparian reserve/ flood control system – make the floodplain wide enough to incorporate riparian trees and shrubs (willow-cottonwood)
27-e Restore this portion of Morrison Creek and connect it to the City of Sacramento
27-f protect the vernal pools and Elder Creek
27-g connect to 27-f area
27-h connect this area to the existing reserves nearby
27-i connect this area to the existing reserves nearby
27-j connect these pools to the nearby reserve (across Florin Rd)
27-K connect these pools to the nearby reserve and restore the creek (Laguna) – connect the vernal pool area to the creek.
27-l connect all parts of Laguna Creek and restore it – protect a wide portion of the floodplain. How wide? wide enough to have large trees growing along the creek
27-m this should be connected to the rest of the creek restoration area and vernal pools nearby
27-n connect this part of the creek to the existing reserve → same comments in 27-l apply here

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 27

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

27-o connect the creek to the two existing reserves on both ends – restore the creek – same comments apply from comment 27-l

27-p connect the creek to the existing reserves and to 27-q – the idea is to have a creek system protected

27-r connect this area of vernal pools to the Galt water treatment plant area

27-s Connect this area to the existing reserve nearby

27-t connect this area to the nearby reserves – expand the floodplain of the creek also

27-u Connect this area to the nearby reserves to west & South

27-v same system → keep it hydrologically connected

27-w high density of vernal pools should be preserved

27-x this whole system (From North to South) needs protection, especially because of the density of pools

27-y connect this area to the reserves to the north

27-z connect this area to 27-y and the existing reserve to the South

27-aa connect this area of Laguna Creek to the reserves downstream – these are valuable headwater areas of Laguna Creek and will preserve water quality and wildlife/plants.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR **Comment Card** Participant Number: 28

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

28a – Green High concentration of high quality vernal pools running from Anatolia east toward Kiefer Landfill. Still potential for large-scale preserver in this area.

28b – Green vernal pools critical habitat area. Opportunity for connectivity between Mather to North + preserve (S) of Jackson Hwy.

28a Red – Preserve not feasible near "node" on Jackson Hwy / Excelsior. This is area being considered for next stage of logical growth for County. New growth area. Also – preserve/open space inconsistent w/ Blueprint policies.

28b – Red Elder Creek is very disturbed in this area. Could be improved through restoration but doesn't make sense to preserve in current state.

28c – Green High concentration of vernal pools in close proximity to Laguna Creek. Also – Laguna Creek is habitat for variety of protected species

28d – High concentration vernal pools w/ potential to connect to Anatolia preserve

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 30

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

2 Inconsistent with farming. This land should be governed by the City of Elk Grove.

I will follow up with a letter or use Re #30 I.D.

Debra Mahan

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 31

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

31 A/B Preserves should be established where there is a high concentration of natural resources and where development is not anticipated. Opportunities for preserving corridor are available here.

31 C Preserves are inappropriate in this area ~~Reese~~ These areas, closest to services and infrastructure are more suitable for development.

31 D/H Preserves should be contiguous ~~&~~ ~~and~~ to existing preserves south of Jackson.

31 E F G Sacramento Rendering Company is at this location. This site is adjacent to the city of Rancho Cordova and proximate to infrastructure. It is not a suitable preserve.

31 I Preserves should be contiguous to existing preserves.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 32

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

32A - ? Mather Preserve.
32B + C I sent my comments in
32D restoration area ? creek ?

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 42

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

42-a Carli Triangle (green)
42-b Cordova Hills (green)
42-c Waegells (green)
42-d Orcutt ia (green)
42-e developed (red)
42-b developed (red)
42-e bomb pool (green)
42-f spadefoot (green)
42-g thru j SPVPP targets (green)
42-k habitat corridor (green)
42-l George Clark Preserve (green)
42-m School Pool (green)
42-n Tricolored Blackbirds (green
42-o corridor (green)
42-p corridor (green)
42-q rest of arroyo seco (green)
42-r lot P (green)
42-s Juncus & Gratiola (green)
42-t Critical Habitat

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No 42

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: Carol Witham

Title and Org/Business (if applicable):

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 43

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

43A Carli Triangle (G)
43B Cordova Hills (G)
43C Waegells (G)
43D Orcutt's family (G)
43A Developed (R)

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 47

George Waegell

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

47 a Preserve Blodgett Lake

47 B John Tracy 1000 acres has vernal pools

47 C Carli property has good vernal pools + creek

47 D SE half of Wakita property good vernal pools

47 E Oaks on Mathes pork tributary of Morrison Creek

47 F Wakita creek tributary of Morrison creek.

47.G Triangle Rock Frye creek preserve has 41 shelters for oak trees 37 living?

47 H Preserve Werre property for vernal pools and its proximity to large wetland area

47 I Lot was dedicated by AKT when Vineyard Springs was built

47 J Shehadeh property has vernal pools and Laguna creek. Frye creek joins Laguna on Shehadeh property

47 K Preserve Laguna Creek oak riparian habitat on Waegell property

Red 47A Major flooding from Sunridge that shed jumps from Morrison creek headwaters down into Laguna creek

Red 47B Inadequate flumes across Folsom S canal move water south flooding into Folsom S canal and cutting a new creek across Shalako onto Laguna Creek

Red 47 C Kiefer Landfill sits in an outcrop of Mehrten sands that are the aquifer under Sacto County. This a decent pipeline into aquifer.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 47

Environmental Review Process – EIS/EIR **Comment Card**

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

Green
47L Preserve 4' tall valley west of bridge on 99
47M Protect western pond turtles on Elk Grove Creek
(Greg Suba) down stream of Emerald Vista Drive
47N Granite Construction is digging up Morrison Creek
E of Hedge. They will backfill and restore
creek to current location. See that creek
gets restored. See that pit slopes
are sloped and planted to
scattered oaks - Valleys not bomb
craters!

47O Remove chain link and oleanders so
public can see a beautiful green
General Workshop Comments: valley.

47P Level strip along Laguna Creek so
oaks can be planted. There are about
8 new oaks east of Vineyard on S side of
Laguna Creek

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: _____

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 49

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

Red 49a – Adjacent to Grant Line Rd. is an ideal ~~location~~ ↓ylable for a major retail center for Cordova Hills.

Green 49a – ~~Mgbe~~ The highest density of vernal pools exist in this area. A core preserve in this area should entail a preserve boundary associated with watersheds & clear hydrological barriers such as topo.

Red 49b – ~~Mobile~~ Only viable location within Cordova Hills for a regional shopping center / town center.

Red 49c – ~~Min~~ Minimal wetland resources exist in this area. Does not make sense to preserve Swainson Hawk ~~with~~ foraging habitat on non-prime ag land with minimal wetlands & no alfae. Preserving foraging habitat within the urban services boundary only pushes development further out, which worsens air quality, increases traffic, & ultimately leads to economic losses for the region. Need a balance between Swainson Hawk needs & human needs.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

GLEN HOLSTEIN

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 50

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

502 – ALL AREAS EAST OF CRAWFORD, NORTH OF THE KIEFER LANDFILL, AND NORTH TO THE ALIGNMENT OF WHITELOCK ROAD SHOULD BE PRESERVED. THIS AREA INCLUDES ONE OF THE MOST OUTSTANDING LARGE VERNAL POOL LANDSCAPES IN THE WORLD INCLUDING SIGNIFICANT ENDANGERED SPECIES POPULATIONS. FOR EXAMPLE THE MOST SIGNIFICANT POPULATION OF ORCUTTIA VIRIDIS IS HERE. FARTHER EAST IS THE ARCHENT VALLEY OAK RIPARIAN FOREST NEAR THE EASTERN EDGE OF THE URBAN SERVICES BOUNDARY. ROLLING PRAIRIE HILLSIDES BETWEEN THESE TWO AREAS ARE AMONG THE MOST SIGNIFICANT PRAIRIE HABITAT NEAR SACRAMENTO. IT IS IMPORTANT FOR RAPTOR FORAGING AND HAS HIGH POTENTIAL FOR URBAN RECREATION BECAUSE OF ITS OUTSTANDING VIEW SHEDS. THIS LINKED COMPLEX HAS EXTREMELY HIGH PRESERVE POTENTIAL.

506 VERNAL COMPLEXES SOUTHWEST OF THE CORNER OF CRAWFORD AND DOUGLAS ARE EXTREMELY DENSE AND HAVE A DOCUMENTED FULL RANGE OF SPECIES INCLUDING NUMEROUS LISTED THREATENED AND ENDANGERED SPECIES ASSOCIATED WITH VERNAL POOLS. VALLEY AREAS ARE OUTSTANDINGLY INTACT AND CAN PROVIDE THE FULL RANGE OF UPLAND PRAIRIE ECOLOGICAL SERVICES. THESE RANGE FROM POLLINATION NEST AREAS REQUIRED FOR VERNAL POOL PLANT SEED SET TO FORAGING BY MIGRATORY RAPTORS LIKE SWAINSON, ROUGH-LEGGED AND FERRUGINOUS HAWKS

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 50

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

50 c DENSE VERNAL POOLS HERE NEED PROTECTION
50 d DENSE VERNAL POOLS HERE NEED PROTECTION
50 e DENSE VERNAL POOLS HERE NEED PROTECTION
50 f RIO DEL ORO SUBUNIT I NUMEROUS EXAMPLES OF GOOD VERNAL POOL HABITAT INCLUDING ORCUTTIA VIRIDIS AND PALEMATE SKATE FOOT
50 g DENSE VERNAL POOLS NEED PROTECTION
50 h WELL OVER ONE HUNDRED LARGE AND SMALL VERNAL POOLS OCCUR INCLUDING A RARE TRANSITION BETWEEN REDDING AND SAN JOAQUIN VERNAL POOL LANDSCAPES, RICH VERNAL POOL FLORA, BUT RECENT LOTUS INVASION NEEDS CONTROL. EXCELLENT OPPORTUNITY FOR CORRIDOR CONNECTION WITH RIPARIAN PROTECTED ZONE ALONG LAGUNA CREEK
50 i DENSE VERNAL POOLS NEED PROTECTION
50 j DENSE VERNAL POOLS NEED PROTECTION
50 K DENSE VERNAL POOLS NEED PROTECTION
50 L DENSE VERNAL POOLS NEED PROTECTION
50 M DENSE VERNAL POOLS NEED PROTECTION
50 N DENSE VERNAL POOLS NEED PROTECTION
50 O EXTREMELY IMPORTANT AND DENSE VERNAL POOL COMPLEX – THE MAIN MATHER POOLS – VERY HIGH PLANT DIVERSITY – SITE OF SAC SPLAIN ENVIRONMENTAL ED PROGRAM – THIS OUTDOOR LABORATORY HAS TOUCHED THOUSANDS OF KIDS ABOUT VERNAL POOL BIOLOGY
50 P. THIS IS THE CRITICALLY IMPORTANT HIGH TERRACE SECTION OF THE MATHER POOL EDUCATION PROGRAM – SAC SPLASH – POOL DENSITY SOMEWHAT LOW BUT POOLS VERY LARGE

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

CRITICAL HABITAT FOR SEVERAL LISTED PLANTS AND ANIMAL SPECIES – FAIRY AND ORCUTTIA

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 50

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

50 Q SWAINSON'S HAWKS HERE – PRESERVE NEEDED

50 R AMARGOSA RUSH IS HERE – PRESERVE NEEDED

50 S TWO COLOR BLACKBIRDS ARE HERE – PRESERVE NEEDED

50 T DENSE VERNAL POOLS HERE NEED PROTECTION

50 U SWAINSON'S HAWKS USE AND PROBABLY NEST IN OLD GROWTH FREMONT COTTONWOOD GALLERY FOREST HERE

50 V OLD GROWTH VALLEY OAK RIPARIAN FOREST ALONG MORRISON CREEK + ADJACENT RELATIVELY UNALTERED PRAIRIE IS OUTSTANDING URBAN RAPTOR HABITAT

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Kelly. Cohen

Environmental Review Process – EIS/EIR **Comment Card**

Participant Number: 51

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

51a West Fork Vernal pools into Deer Creek adjacent to Mitigation Bank. watershed should be studied for expansion of bank/preserves.

51b-h Vernal pools, esp. Those w/ connectivity & other habitat/ecological value and connectivity should be conserved in preserves. (zone 2)

51j Frye Creek, west of Eagles nest, should be added to existing preserves due to wetland/ecological value & connectivity

51k East of Excelsior, 160 acres possible habitat value, vernal pools.

51l West of Eagles nest – wetland/vernal pool habitat, adjacent to protected area – value for connectivity.

51m&o Laguna Creek (north) – habitat value, wetlands. Habitat like this should be considered in preserves, as they support a wide range of species. m whole ½ section south

51p&t Laguna (north) Creek – whole section (SP) = Quarter N/W section and section northeast (51t) wetland-ecological values need preserving. Valuable to ecosystem

51qr-whole section – wetland, vernal pool values – irreplacable, unique eco. value habitat (entire habitat type marked green in Zone 1) (i applies to)

51 Y-YY entire watershed of Deer Creek into Mitigation bank and south, should be included in conservation/protection areas due to value to species and systems. Deer Creek is also habitat to bats in places – though bats aren't listed, they are in need of protection.

51s Fork (west) of Coyote Creek into Coyote Creek/Canyon Creek would have ecological habitat value to wildlife and ecolog. systems important to wildlife (tho they may not live in the habitat). This applies to all habitat of this character.

51v – along with areas marked by 51 Q & t, this watershed has ecological value that needs to be considered for preservation.

51 v & w Alder Creek and habitat south (oak woodland? grazing) has habitat value and needs to be conserved for connectivity value since areas north of 50 are developed. In fact the

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR **Comment Card** Participant Number: 51

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

51 v & w cont. being pushed out. It is critical that large swaths of contiguous habitat are preserved. Habitat that includes creeks & streams & wetlands are especially needed.

51 x wetland habitat & open space (for wildlife) value, though I see a seasonal impound there, so habitat may be degraded from grazing? If so, the vernal pools wetlands need to be protected from the cattle.

51 aa – west of Prairie City Road – Buffalo Creek watershed. Same reasons as above. Additional wetland value occurs outside USA boundary to the southeast

51 bb – watershed & vernal pools 51 ee/ff: Same comments.

51 cc – west of South Canal & east of Grantline & watershed/vernal pools habitat has high value & needs to be included in conservation/protected area. 51 dd: Morrison Creek watershed – rapid surrounding development necessitates protection in this watershed

NOTE: Zone 1 has concentrations of vernal pools, creeks with nearby vernal pools & wetland areas and these habitats are unique enough and important enough ecologically to be seriously planned for preservation, protection, limitations on use/development, etc. This habitat ecological value cannot be re-created, nor is it more common in the area. Rapid development in the County is reducing habitat and the ecological purposes that occur within Conservation is now or never for this region.

Zone 2 51 gg, hh, ii, jj (plus 51 b–i from pg 1) – watershed of Morrison Creek & scattered wetlands/vernal pools need to be considered for protection, whether in preserves, easements, mitigation banks, or via limitations from within permitting requirements/restrictions. Development is encroaching and displacing wildlife & reducing habitat, and so protected areas and linkages need to be retained. This includes wildlife movement corridors.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 51

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

zone 3

51 KK Elder Creek, west of Bradshaw – watershed, wetland, vernal pool habitat is of value & needs protecting.

51 LL area south of Jackson Rd / north of Elder Creek, west of protected easement is wetland habitat adjacent to existing easement & would be of benefit to include into this protected area in a contiguous way.

51 mm South of Jackson Rd – include into existing protected area to south.

51 oo any development in this watershed needs to be set back at least 200', with riparian habitat maintained or restored. This should apply to any & all development/"improvement" along creeks, streams or wetlands.

zone 4 51 pp area south of Vintage Park Drive (NW corner of SE ¼ section) suggest adding this Qtr section to mitigation ~~section~~ area to North.

51 QQ Add to mitigation protected parts of creek to west.

zone 5 51 rr/ss/tt/ww Include in mitigation area already protected. Any other habitat that is of ecological value or that would connect two or more protected areas should be acquired. This applies to entire HCP area.

51 a, b, c (red) infeasible to protect

zone 12 51 yy include in mitigation area – would enable protected connectivity & protection of ecological value

51 zz Deadman's Gulch, east of Christensen Rd: wetland habitat / creek has ecological value that needs protecting. watershed protection enables movement corridors along creeks / riparian zones. Very important habitat ~~area~~ Applies to all my comments where creeks/streams or "dots" of vernal pools occur.

51 aaa patchwork of wetlands may be important to gene exchange if movement is occurring or able to occur → conserve this value

bbb wildlife movement corridors are critical! They need to be studied and built into HCP. This is a #1 priority.

Please submit your comments to a project representative or fold this form, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 51

Environmental Review Process - EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments: Great!

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Kelly Cohen

Title and Org/Business (if applicable):

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 54

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

59 – We are landowners of the area that comes down in a "V" in zone one. There is a lot of land for mitigation to the east of this property that is within the Urban Service Boundary line. ~~this~~ This, we feel the V ~~should~~. since it is within the USB should be developed. The fact that a Catholic University is close by is an additional reason to allow development in the "V" area.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 55

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

- My biggest concern is that the HCP or the participation in any type of preservation be [redacted] voluntary.

55

JUSTIN CARNEY

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 56

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

~~120,000 to~~

~~60,000 DEV~~

56 PRIVATE PROP. – NO EASEMENTS OR PRESERVES

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 58

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

58 A – included in JACKSON HW Study AREA – limited resources

58 B – same comments as above.

58 A – concentration of vernal pools.

58 C – included in NVSSP – limited resources

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 58

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Don Barnett

Title and Org/Business (if applicable): Lennar

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 61

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

a - Connect to existing preserve, keep whole corridor
b - Riparian corridor in ~~dam~~ place & good quality
Keep the whole stretch
c - Contiguous preserve

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 61

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: David Shabazian

Title and Org/Business (if applicable): SACOG

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 64

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

64-1 USES BEING DESIRED RE-USE OF EXISTING LAND, NO HABITAT VALUES VISUALLY PRESENT.

64-2,3

I OPTED TO NOT PUT RED DOTS IN MOST INSTANCES – DEVELOPMENT WHERE PLANNED

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant 64

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Stacey McKinley

Title and Org/Business (if applicable): The McKinley Group

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 1

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

1-a Preserve a creek buffer the length of Laguna creek that averages 600 feet eg 300' each side of the creek or 100' one side & 500' the other side. The width would vary based on the resource & constraints. Creek corridor can connect vernal pools as well as uplands preserves.

1-b Preserve vernal pools - important & unique pools here -

1-c another important vernal pool area that needs to have large preserves - both Cordova Hills & to N

1-d Important to preserve Morrison Creek with buffer

1-e Heritage Falls - Preserve VP's

1-f Early Triangle - Vernal pools should be preserved.

1-g Preserve vernal pools in a long connected preserve.

1-h Important for riparian. Established & regenerating oaks. Dne

1-i Preserve runway pools

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant Number: _____

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

1-J - Laguna Creek Ripper - 600 feet wide

1-K - There is an opportunity to preserve creek ripper

1-L Vernal pools

1-M Vernal pools

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 3

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

3-a: This section of the map seems to contain the vernal pools or other "water parts" that start the Laguna Creek water system

3-b: This section seems to contain critical habitat for vernal pools. If development continues into this habitat how does stormwater run-off affect the vernal pools and creeks?

3-c: From Folsom South Canal to ~~be~~ Vinyard there shows the Upper Laguna Creek Watershed that ~~remains~~ demonstrates potential to be protected for riparian habitat, pedestrian walkways and possibly a wildlife corridor

3-D: If this section is existing farm land then it should be set aside as such with the possibility of also using it as a buffer zone for nearby vernal pools and creeks.

Antonio Gonzalez

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 8

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

8A - This Area is part of City of Elk Grove SOI Amendment process & should be included in UDA under the HCP.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 15

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

15A - Laguna Creek North potential restoration of natual stream

15-B - Vernal pool

15-C - Vernal pool potential preservation

15-D - Mather vernal pool

15-E - Habitat - wildlife corride

15-F - Morrison Creek - riparian restoration

15-G Laguna Creek Corridor restoration

15-H - Laguna Creek corridor restoration

15-I - Elder Creek corridor restoration

15-J - Gerber Creek Corridor restoration

15-K - Deer Creek Tributary Corridor restoration

15-L - Restore waterway to provide connection to Deer Creek

15-M - Rotore Creek corridor

15-N Laguna Creek Corridor restoration

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 15

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

15-O ~~Or~~ Elder Creek Corridor restoration

15-P ~~Laguna~~ Laguna Creek Corridor restoration

15-~~QQ~~Q - Deer Creek Floodplain protection

15-R - Restore Creek between Grant and Poppy Ridge

15-S - Buffer land protected

15-T Dry Creek protect-restore riparian corridor

15-U Protect enhance wetlands

15-V Restoring Creek Corridor.

15-W Restore Creek/Swale Corridor

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 17

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

17a – Lot P Keep Lot P as a preserve – is contiguous with Laguna Creek Corridor. Should have a managment plan for the vernal pool area,

17b – please this property in preserve – keep contiguous with Laguna Creek corridor –

17a – Drainage Plans for the area

17c Keep the creek natural channel – 300ft

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 19

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

19 a - Find a name for the creek. Widen Creeks add native plants + trees to the area to prevent wash out.

19B Preserve as many Vernal pools in the largest area as possible. The houses can be concentrated in one areas

19 a red Developments need to be slowed
19b " or even stopped until the problems are fixed in those housing areas. (such as traffic lights.) etc.

19 c Extend preserve to include this area.

19d-e Marsh areas should be preserved also.

19 c red Again problems should b fixed concerning Strip malls + housing + traffic. Continued housing ruins habitat for wild life. Increased traffic also destroys wild life

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to. County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 19

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

19f preserve creek

19g extend preserve

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 20

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

20 a – Watershed – preserve Streams & Any related vernal pools that are within close proximity to the streams – streams should be left as natural as possible (not channeled). leave at least 100 yards on each side as part of the preserve

20 b. – Same as 20a

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☑ Yes ☐ No

If so, please provide your contact information.

Name: John R Newman

Title and Org/Business (if applicable): Florin Historical Society (V.P.)

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 21

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

21-a RED - AREA Along GRANT Line Rd is Adjacent to City of ELK Grove and has been Farmed Continuously for >100 years, so little Preservation Value

21-b RED - Area is NOT suitable for preservation because it Could be used for Passive Recreation since it is close to city of Elk Grove & inconsistent with Farming.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No 21

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information. ALSO on ~~SSHCP~~ Economic Committee

Name: Doug Williams

Title and Org/Business (if applicable):

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 22

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

RED. ZONE 1

22A – DON'T DESIGNATE AS CONSERVATION & PRESERVE. PROPERTY IS ENTITLED & OUTCOME OF LITIGATION MAY ALLOW DEVELOPMENT TO PROCEED – REASONABLE MITIGATION ANTICIPATED. JAEGER ROAD 530, LLC. "THE DONUT WHOLE" HAS INTENTIONS TO DEVELOP COMMENT IS SUBJECT TO PARTNERSHIP APPROVAL – WILL CONFIRM WITH DAVE DEFANTI & RICH RADMACHER

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: FRANCES KNIGHT

Title and Org/Business (if applicable): K. HOVNANIAN HOMES

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 23

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

23a & 23b:

Land south of Eschinger Rd. (outside UDA) adjacent to future Elk Grove SOI Amendment area should be considered as a critical buffer between future development in the SOI area and permanent preserve land. As such, this area provides / supports some of the key elements of the HCP including:

1. Interconnecting future and existing preserves
2. Minimization of Edge effects
3. Support of greater biodiversity in the form of corridors allowing for animal movement and hawk foraging

This land area South of Eschinger should be given additional credit ~~in~~ for preserving land as a permanent preserve line against future development.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 24

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

a. Preserve 25 adjacent to Mather Lake and Park, so this is a natural extension

b. Conserve all area within stream/creek areas.

c. " " " " " "

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 27

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

- For vernal pool reserves, please include uplands with resources for salamanders (burrows from ground squirrels, etc.)

27-a Connect to the nearby existing reserves. Use large culverts to hydrologically connect the reserves across roads.

27-b Connect this area to 27-a

27-c connect this area to 27-a also

27-d restore Morrison Creek – use it for a riparian reserve/flood control system – make the floodplain wide enough to incorporate riparian trees and shrubs (willow-cottonwood)

27-e Restore this portion of Morrison Creek and connect it to the City of Sacramento

27-f protect the vernal pools and Elder Creek

27-g connect to 27-f area

27-h connect this area to the existing reserves nearby

27-i connect this area to the existing reserves nearby

27-j connect these pools to the nearby reserve (across Florin Rd)

27-K connect these pools to the nearby reserve and restore the creek (Laguna) – connect the vernal pool area to the creek.

27-l connect all parts of Laguna Creek and restore it – protect a wide portion of the floodplain. How wide? wide enough to have large trees growing along the creek

27-m this should be connected to the rest of the creek restoration area and vernal pools nearby

27-n connect this part of the creek to the existing reserve → same comments in 27-l apply here

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 27

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

27-o connect the creek to the two existing reserves on both ends – restore the creek – same comments apply from comment 27-l

27-p connect the creek to the existing reserves and to 27-q – the idea is to have a creek system protected

27-r connect this area of vernal pools to the Galt water treatment plant area

27-s Connect this area to the existing reserve nearby

27-t connect this area to the nearby reserves – expand the floodplain of the creek also

27-u Connect this area to the nearby reserves to west & South

27-v same system → keep it hydrologically connected

27-w high density of vernal pools should be preserved

27-x this whole system (From North to South) needs protection, especially because of the density of pools

27-y connect this area to the reserves to the north

27-z connect this area to 27-y and the existing reserve to the South

27-aa connect this area of Laguna Creek to the reserves downstream – these are valuable headwater areas of Laguna Creek and will preserve water quality and wildlife/plants.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 28

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

28a – green – High concentration of high quality vernal pools running from Anatolia north east toward Kiefer Landfill. Still potential for large-scale preserver in this area.

28b – green – vernal pool – critical habitat area. Opportunity for connectivity between Matter to North + preserve (S) of Jackson Hwy.

28a red – Preserve not feasible near "node" on Jackson Hwy / Excelsior. This is area being considered for next stage of logical growth for County. New growth area. Also – preserve/open space inconsistent w/ Blueprint policies.

28b – red – Elder Creek is very disturbed in this area. Could be improved through restoration but doesn't make sense to preserve in current state.

28c – green – High concentration of vernal pools in close proximity to Laguna creek. Also – Laguna Creek is habitat for variety of protected species

28d – High concentration vernal pools w/ potential to connect to Anatolia preserve

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 30

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

2 Inconsistent with forming: Rio Land should be governed by the City of Elk Grove

I will follow up with a letter & use Re # 30 ID.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 31

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

31 A/B Preserves should be established where there is a high concentration of natural resources and where development is not anticipated. Opportunities ~~are~~ for preserving corridor are available here.

31 C Preserves are inappropriate in this area. ~~Reese~~ These areas, closest to services and infrastructure are more suitable for development.

31 D/H Preserves should be contiguous ~~B~~ ~~and~~ to existing preserves south of Jackson.

31 E F G Sacramento Rendering Company is at this location. This site is adjacent to the city of Rancho Cordova and proximate to infrastructure. It is not a suitable preserve.

31 I Preserves should be contiguous to existing preserves.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 32

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

32A - ? Mather Preserve.
32B + C I sent my comments in
32D restoration area ? creek?

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 42

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

42-a Carli Triangle (green)
42-b Cordova Hills (green)
42-c Waegells (green)
42-d Cruthis (green)
42-a developed (red)
42-b developed (red)
42-e bomb pool (green)
42-f spadefoot (green)
42-g thru j SPVPP targets (green)
42-k habitat corridor (green)
42-l George Clark Preserve (green)
42-m School Pool (green)
42-n Tricolored Blackbirds (green
42-o carridor (green)
42-p corridor (green)
42-q rest of arroyo seco (green)
42-r lot P (green)
42-s Juncus & Grafiola (green)
42-t Critical Habitat

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 42

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: Carol Witham

Title and Org/Business (if applicable):

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 43

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

43A Carli Triangle (G)
43B Cordova Hills (G)
43C Waegells. (G)
43D Orcutt's family (G)
43A Developed (R)

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 47

George Waegell

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

47 a Preserve Blodgett Lake

47 B John Tracy 1000 acres has vernal pools

47 C Carli property has good vernal pools + creek

47 D SE half of Wakita proputy good vernal pools

47 E oaks on Mathes park tributary of Morrison Creek

47 F Wakita creek tributary of Morrison creek.

47 G Triangle Rock Frye creek preserve has 41 shelters for oak trees 37 living?

47 H Preserve Werre property for vernal pools and its proximity to large wetland area

47 I Lot was dedicated by A K T when Vineyard Springs was built

47 J Shehadeh property has vernal pools and Laguna creek. Frye creek joins Laguna on Shehadeh property

47 K Preserve Laguna Creek oak riparian habitat on Waegell property

Red 47 A Major flooding from Sunridge that shed jumps from Morrison creek headwaters down into Laguna creek

Red 47 B Inadequate flumes across Folsom S canal move water south flooding into Folsom S canal and cutting a new creek across Shalako onto Laguna Creek

Red 47 C Kiefer Landfill sits in an outcrop of Mehrten sands that are the aquifer under Sacto County. This a direct pipeline into aquifer.

over

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 17

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

Green
47L Preserve 4' tall valley west of bridge on 99
47M Protect western pond turtles on Elk Grove Creek (Greg Suba) down stream of Emerald Vista Drive
47N Granite Construction is digging up Morrison Creek E of Hedge. They will backfill and restore creek to current location. See that creek gets restored. See that pit slopes are sloped and planted to scattered oaks - Valleys not bomb craters!

47O Remove chain link and oleanders so public can see a beautiful green valley.

General Workshop Comments:

47P ~~Level~~ strip along Laguna Creek so oaks can be planted. There are about 8 new oaks east of Vineyard on S side of Laguna Creek

Would you like to be added to the SSHCP mailing list? ☐ Yes ☐ No

If so, please provide your contact information.

Name: _____

Title and Org/Business (if applicable): _____

Email address: _____

Mailing address: _____

Phone: _____

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 49

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

Red 49a – Adjacent to Grant Line Rd. is an ideal viable location for a major retail center for Cordova Hills.

Green 49a – The highest density of vernal pools exist in this area. A core preserve in this area should entail a preserve boundary associated with water sheds & clear hydrological barriers such as topo.

Red 49b – Only viable location within Cordova Hills for a regional shopping center/town center.

Red 49c – Minimal wetland resources exist in this area. Does not make sense to preserve Swainson Hawk ~~Hdg~~ foraging habitat on non-prime ag land with minimal wetlands & no alfae. Preserving foraging habitat within the urban services boundary only pushes development further out, which worsens air quality, increases traffic, & ultimately leads to economic losses for the region. Need a balance between Swainson Hawk needs & human needs.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

ELLEN HOLSTEIN

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 50

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

SOA – ALL AREAS EAST OF CHANTLINE, NORTH OF THE KIEFER LANDFILL, AND NEXT TO THE ALIGNMENT OF WHITERACK ROAD SHOULD BE PRESERVED. THIS AREA INCLUDES ONE OF THE MOST OUTSTANDING LARGE VERNAL POOL LANDSCAPES IN THE WORLD INCLUDING SIGNIFICANT ENDANGERED SPECIES POPULATIONS. FOR EXAMPLE THE MOST SIGNIFICANT POPULATION OF ORCUTTIA VISCIDA IS HERE. FARTHER EAST IS THE ARCHENT VALLEY OAK RIPARIAN FOREST NEAR THE EASTERN EDGE OF THE URBAN SERVICES BOUNDARY. ROLLING PRAIRIE HILLSIDES BETWEEN THESE TWO AREAS ARE THE MOST SIGNIFICANT PRAIRIE HABITAT NEAR SACRAMENTO. IT IS IMPORTANT FOR RAPTOR FORAGING AND HAS HIGH POTENTIAL FOR URBAN RECREATION BECAUSE OF ITS OUTSTANDING VIEW SHEDS. THIS LINKED COMPLEX HAS EXTREMELY HIGH PRESERVE POTENTIAL.

SOB VERNAL COMPLEXES SOUTHWEST OF THE CORNER OF CHANTLINE AND DUNCAN ARE EXTREMELY DENSE AND HAVE A DOCUMENTED FULL RANGE OF SPECIES INCLUDING NUMEROUS LISTED THREATENED AND ENDANGERED SPECIES ASSOCIATED WITH VERNAL POOLS. VALLEY AREAS ARE OUTSTANDINGLY INTACT AND CAN PROVIDE THE FULL RANGE OF VALLEY PRAIRIE ECOLOGICAL SERVICES. THESE RANGE FROM POLLINATION NEST AREAS REQUIRED FOR VERNAL POOL PLANT SEED SET TO FORAGING BY MIGRATORY RAPTORS LIKE SWAINSON, ROUGH-LEGGED AND FERRUGINOUS HAWKS

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 50

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

50 c DENSE VERNAL POOLS HERE NEED PROTECTION
50 d DENSE VERNAL POOLS HERE NEED PROTECTION
50 e DENSE VERNAL POOLS HERE NEED PROTECTION
50 f RIO DEL ORO SUBUNIT I NUMEROUS EXAMPLES OF GOOD VERNAL POOL HABITAT INCLUDING ORCUTTIA VIRIDA AND PALEDALE SPADEFOOT
50 g DENSE VERNAL POOLS NEED PROTECTION
50 h WELL OVER ONE HUNDRED LARGE AND SMALL VERNAL POOLS OCCUR INCLUDING A RARE TRANSITION BETWEEN REDDING AND SAN JOAQUIN VERNAL POOL LANDSCAPES, RICH VERNAL POOL FLORA, BUT RECENT LOTUS INVASION NEEDS CONTROL. EXCELLENT OPPORTUNITY FOR CORRIDOR CONNECTION WITH RIPARIAN PROTECTED ZONE ALONG LAGUNA CREEK
50 i DENSE VERNAL POOLS NEED PROTECTION
50 j DENSE VERNAL POOLS NEED PROTECTION
50 K DENSE VERNAL POOLS NEED PROTECTION
50 L DENSE VERNAL POOLS NEED PROTECTION
50 M DENSE VERNAL POOLS NEED PROTECTION
50 N DENSE VERNAL POOLS NEED PROTECTION
50 O EXTREMELY IMPORTANT AND DENSE VERNAL POOL COMPLEX – THE MAIN MATHER POOLS – VERY HIGH PLANT DIVERSITY – SITE OF SAC SALSA ENVIRONMENTAL ED PROGRAM – THIS OUTDOOR LABORATORY HAS TAUGHT THOUSANDS OF KIDS ABOUT VERNAL POOL BIOLOGY
50 P. THIS IS THE CRITICALLY IMPORTANT HIGH TERRACE SECTION OF THE MATHER POOL EDUCATION PROGRAM – SAC SALSA – POOL DENSITY SOMEWHAT LOW BUT POOLS VERY LARGE

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

CRITICAL HABITAT FOR SEVERAL LISTED PLANTS AND ANIMAL NAME SPECIES – [illegible] AND ORCUTTIA

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 50

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

50 Q SMARTWEED ARE HERE - PRESERVE NEEDED

50 R AHART'S RUSH IS HERE - PRESERVE NEEDED

50 S TWO COLOR BLACK RAILS ARE HERE - PRESERVE NEEDED

50 T DENSE VERNAL POOLS HERE NEED PROTECTION

50 U SWAINSON'S HAWKS USE AND PROBABLY NEST IN OLD GROWTH FREMONT COTTONWOOD GALLERY FOREST HERE

50 V OLD GROWTH VALLEY OAK RIPARIAN FOREST ALONG MORRISON CREEK + ADJACENT RELATIVELY UNALTERED PRAIRIE IS OUTSTANDING WILD RAPTOR HABITAT

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Kelly Cohen

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 51

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

51a West Fork into Deer Creek adjacent to Mitigation Bank. watershed should be studied for expansion of bank/preserves.

zone 2 51b Vernal pools, esp. Those w/ connectivity & other habitat/ecological value and connectivity should be conserved in preserves.

51j Frye Creek, west of Eagles nest, should be added to existing preserves due to wetland/ecological value & connectivity

51k East of Excelsior 160 acres possible habitat value; vernal pools.

51L West of Eagles nest – wetland/vernal pool habitat, adjacent to protected area – value for connectivity.

51m&o Laguna Creek (north) – habitat value, wetlands. Habitat like this should be considered in preserves, as they support a wide range of species. m whole ½ section south

51p&t Laguna (north) Creek – whole section (p) – Quarter N/W section (t) wetland-ecological values and section northeast (51t) need preserving. Valuable to ecosystem.

51Q&r-whole section – wetland, vernal pool values – irreplacable, unique habitat (entire habitat type marked green in Zone 1) applies to ecol. value

51 Y-YY entire watershed of Deer Creek into Mitigation bank and south, should be included in conservation/protection areas due to value to species and systems. Deer Creek is also habitat to bats in places – though bats aren't listed, they are in need of protection.

51s Fork (west) of Coyote Creek into Coyote Creek/Carson Creek would have ecological habitat value to wildlife and ecolog. systems important to wildlife (tho they may not live in the habitat). This applies to all habitat of this character.

51u – along with areas marked by 51 Q&t, this watershed has ecological value that needs to be considered for preservation.

51v&w Alder Creek and habitat south (oak gray pine woodland?) has habitat value and needs to be conserved for connectivity value since areas north of 50 are developed. In fact, the whole north of I-50 in Folsom is newly developed and will

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 51

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

51 v & w Cont.

being pushed out. It is critical that large swaths of contiguous habitat are preserved. Habitat that includes creeks & streams & wetlands are especially needed.

51 x wetland habitat & open space (for wildlife) value, though I see a seasonal impound there, so habitat may be degraded from grazing? If so, the vernal pools wetlands need to be protected from the cattle.

51 aa – west of Prairie City Road – Buffalo Creek watershed. Same reasons as above. Additional wetland value occurs outside UDA boundary to the southeast

51 bb – watershed & vernal pools 51 ee/ff: Same comments.

51 cc – west of South Canal & east of Grantline & watershed/vernal pools habitat has high value & needs to be included in conservation/protected area. 51 dd: Morrison Creek watershed – rapid surrounding development necessitates protection in this watershed

NOTE: Zone 1 has concentrations of vernal pools, creeks with nearby vernal pools & wetland areas and these habitats are unique enough and important enough ecologically to be seriously planned for preservation, protection, limitations on use/development etc. This habitat ecological value cannot be re-created, nor is it more common even in the area. Rapid development in the County is reducing habitat and the ecological processes that occur within. Conservation is now or never for this region.

Zone 2 51 gg, hh, ii, jj (plus 51 b–i from pg 1) – watershed of Morrison Creek & scattered wetlands/vernal pools need to be considered for protection, whether in preserves, easements, mitigation banks, or via limitations from within permitting requirements/restrictions. Development is encroaching and displacing wildlife & reducing habitat, and so protected areas and linkages need to be retained. This includes wildlife movement corridors.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 51

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

zone 3

51 KK Elder Creek, west of Bradshaw – watershed, wetland, vernal pool hab. tat is of value & needs protecting.

51 LL area south of Jackson Rd / north of Elder Creek, west of protected easement is wetland habitat adjacent to existing easement & would be of benefit to include into this protected area in a contiguous way.

51 mm South of Jackson Rd – include into existing protected area to south.

51 oo any development in this watershed needs to be set back at least 200', with riparian habitat maintained or restored. This should apply to any & all development/"improvement" along creeks, streams or wetlands.

zone 4

51 pp area south of Vintage Park Drive (NW corner of SE ¼ section) suggest adding this Qtr section to mitigation ~~area~~ area to North.

51 QQ Add to mitigation protected parts of creek to WEST.

zone 5

51 rr/ss/~~tt~~/uu Include in mitigation area already protected. Any other habitat that is of ecological value or that would connect two or more protected areas should be acquired. This applies to entire HCP area.

51 a, b, c (red) infeasible to protect

zone 12

51 yy include in mitigation area – would enable protected connectivity & protection of ecological value

51 zz Deadman's Gulch, east of Christensen Rd: wetland habitat / creek has ecological value that needs protecting. watershed protection enables movement corridors along creeks / riparian zones. Very important habitat. ~~of~~ Applies to all my comments where creeks / streams or "dots" of vernal pools occur.

51 aaa bbb patchwork of wetlands may be important to gene exchange if movement is occurring or able to occur → conserve this value

Wildlife movement corridors are critical! They need to be studied and built in to HCP. This is a #1 priority.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments: great!

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Kelly Cohen

Title and Org/Business (if applicable):

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 54

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

59 – We are landowners of the area that comes down in a "V" in zone one. There is a lot of land for mitigation to the east of this property that is within the Urban Service Boundary line ~~that~~ this, we feel the V ~~should~~ since it is within the USB should be developed. The fact that a Catholic University is close by is an additional reason to allow development in the "V" area.

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 55

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

- My biggest concern is that the HCP or the participation in any type of preservation be [redacted] voluntary.

55

JUSTIN CARNEY

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 56

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

~~120,000 TO~~

~~60,000 DEV~~

56 PRIVATE PROP. – NO EASEMENTS OR PRESERVES

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN. Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 58

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

58 A – included in JACKSON ~~HWY~~ HW study AREA – limited resources.
58 B – same comments as above.
58 A – concentration of vernal pools.
58 C – included in NVSSP – limited resources

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 58

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Don Barnett

Title and Org/Business (if applicable): Lennar

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 61

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

a - Connect to existing preserve, keep whole corridor

b - Riparian corridor in ~~four~~ place & good quality
Keep the whole stretch

c - Contiguous preserve

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Participant No. 61

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? □ Yes □ No

If so, please provide your contact information.

Name: David Shabazian

Title and Org/Business (if applicable): SACOG

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Participant Number: 64

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

64-1 USES BEING REQUESTED RE: USE OF EXISTING LAND, NO HABITAT VALUES VISUALLY PRESENT.

64-2,3

I

~~WE~~ OPTED TO NOT PUT RED DOTS IN MOST INSTANCES – DEVELOPMENT WHERE PLANNED

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Peter Morse, 827 7th Street, Room 220, Sacramento, CA 95814

Environmental Review Process – EIS/EIR

Comment Card

Thank you for your interest in the Environmental Impact Statement/Environmental Impact Report for the proposed South Sacramento Habitat Conservation Plan. Please record a clearly legible **comment** correlating with **every** red and green **dot** placed on the Zone maps.

General Workshop Comments:

Would you like to be added to the SSHCP mailing list? ☒ Yes ☐ No

If so, please provide your contact information.

Name: Stacey McKinley

Title and Org/Business (if applicable): The McKinley Group

Email address:

Mailing address:

Phone:

Please submit your comments to a project representative or fold this form in half, seal with tape, and mail to: County of Sacramento, Department of Environmental Review and Assessment, ATTN: Tim Hawkins, 827 7th Street, Room 220, Sacramento, CA 95814

EIS/EIR APPENDIX C

Draft Multi-Layered CWA 404 Permit Strategy for future SSHCP Covered Activities

Appendix C-1. Draft CWA 404 Permit Strategy

Appendix C-2. Draft Programmatic General Permit

Appendix C-3. Draft Letter of Permission Procedure

Appendix C-4. Abbreviated Standard Permit Process

EIS/EIR APPENDIX C-1

Draft CWA 404 Permit Strategy

CWA 404 Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

February 2018

Background

The South Sacramento Habitat Conservation Plan (SSHCP) covers twenty-eight species of plants and wildlife, including ten that are state and/or federally-listed as threatened or endangered. The SSHCP is a regional approach to address issues related to planned development and species habitat conservation, following a comprehensive conservation strategy, over a 50-year period. The boundaries of the 317,655-acre SSHCP Plan Area are generally U.S. Highway 50 to the north, the Sacramento River levee and County Road J11 to the west, the county line with El Dorado and Amador Counties to the east, and the county line with San Joaquin County to the south. The six SSHCP Plan Partners are the County of Sacramento, City of Galt, City of Rancho Cordova, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Southeast Connector Joint Powers Authority. The Plan Partners have formed a SSHCP Implementing Entity to carry out the HCP's commitments and requirements. The U.S. Fish and Wildlife Service's Sacramento Field Office (USFWS) will approve the SSHCP through a species incidental take permit issued to five of the Plan Partners and the SSHCP Implementing Entity under Section 10 of the Endangered Species Act (ESA 10), collectively termed "SSHCP Permittees" upon approval of ESA 10. Before it can issue its incidental take permit, the USFWS must internally consult under Section 7 of the ESA (ESA 7) and is required to comply with the National Environmental Policy Act (NEPA) and other related laws.

The U.S. Army Corps of Engineers (Corps) regulates discharges of dredged or fill material into waters of the U.S., including wetlands, under Section 404 of the Clean Water Act (CWA 404) through its Regulatory Program. Permits are issued to applicants only after a determination has been made that the proposed activity is the least environmentally damaging practicable alternative under the U.S. Environmental Protection Agency's (USEPA) 404(b)(1) Guidelines, which involves evaluating avoidance, minimization and compensation for impacts to waters of the U.S. Further, the Corps must comply with ESA 7, NEPA, Section 401 of the Clean Water Act (CWA 401), and Section 106 of the National Historic Preservation Act (NHPA 106) before authorizing an activity under CWA 404. Types of permits the Corps issues include general permits issued on a regional, nationwide, or programmatic basis for activities with minimal impacts on the aquatic environment, individually and cumulatively, and individual permits (standard and letters of permission) for those activities which do not fall under a general permit or have greater than minimal impacts. The Corps' Sacramento District (Sacramento District) administers the Regulatory Program in the Central Valley and Sierra Nevada California, the States of Nevada and Utah, and the Western Slope of Colorado.

Currently, the Corps reviews permit applications on an individual or case-by-case basis, which sometimes makes it challenging to evaluate avoiding, minimizing and compensating impacts to aquatic resources on a broader scale. As a result, the Corps' review is generally on the merits of the individual activity and the characteristics of the proposed project site, with limited ability to comprehensively assess where the risks, trade-offs and interactions among several projects and aquatic resources can be considered. Over time, environmental issues and development demands, especially in urbanizing areas, have resulted in adverse effects to the aquatic ecosystem that are not necessarily surprising, but fall short of more

ecologically meaningful and sustainable outcomes that a landscape-scale permitting solution may afford. For instance, permits issued by the Corps have led to a patchwork of wetland mitigation sites in certain areas, which may have disjointed or inconsistent preserve boundaries and be functionally compromised by abutting development. Furthermore, the distance between the permitted impact location and its mitigation site may be considerable, especially in cases where the compensation was accomplished through the purchase of credits at a mitigation bank or through an in-lieu fee (ILF) program.

The Sacramento District views the SSHCP as a remarkable opportunity to improve both species and aquatic resource protection in a coordinated way on a regional scale, taking into account planned development and providing greater certainty for the regulated public. With this in mind, the Sacramento District has been coordinating with the USFWS and Plan Partners, and others, since 2004 to develop and implement a "streamlined" approach to permitting under CWA 404 that encompasses a number of different permit types and processes. The Corps' "CWA 404 permit strategy" is intended to provide for better assurances and quicker permit decisions for the regulated public, while protecting aquatic resources to an equal or greater level in a manner consistent with existing regulations, policies and processes. The expectation of putting in place an effective and efficient CWA 404 permit strategy is based on a number of tenets upon which the SSHCP is founded including, but not limited to:

The Sacramento District views the SSHCP as a remarkable opportunity to improve both species and aquatic resource protection in a coordinated way on a regional scale, taking into account planned development and providing greater certainty for the regulated public.

- Protection of a broad range of species and habitats;
- Implementation of Low Impact Development Strategies (LIDS);
- Consistency with general plans;
- Avoidance of high quality vernal pool landscapes; and
- Preservation of watershed functions and stream corridors, and development of large, contiguous preserves, with particular focus on the Mather Core Recovery Area.

The CWA 404 permit strategy is being vetted through a public review process, inclusive of NEPA (as described in further detail below) and public notices distributed by the Sacramento District.

Benefits of CWA 404 Alignment

In addition to providing a regional platform to inform better and faster CWA 404 permit decisions, a USFWS-approved SSHCP provides several other benefits to the Sacramento District and its customers. Because the SSHCP is an action that may potentially significantly affect the quality of the human environment, the USFWS is in the process of completing an Environmental Impact Statement (EIS) under NEPA that will include impact analyses over a 50 year period of all SSHCP covered activities within the Plan Area. As a cooperating agency, the Sacramento District intends to use the EIS in a programmatic manner to underpin its CWA 404 permit strategy. Because the EIS will examine a range of reasonable HCP alternatives affecting waters of the U.S., it can serve as the basis for the Sacramento District's evaluation of alternatives under NEPA, and along with supplemental information provided to the Corps, the primary basis for evaluation of less damaging alternatives and mitigation under USEPA's 404(b)(1) Guidelines. The Sacramento

As a cooperating agency, the Sacramento District intends to use the EIS in a programmatic manner to underpin its CWA 404 permit strategy.

District will adopt the EIS and make its own Record of Decision (ROD) regarding the CWA 404 permit strategy's compliance with the 404(b)(1) Guidelines at the regional scale. Any necessary subsequent NEPA documentation prepared by the Sacramento District will tier from the EIS.

The CWA 404 permit strategy will rely, at all levels of permitting, on the SSHCP to address avoidance, minimization and requirements for compensatory mitigation for impacts to aquatic resources. Key to satisfying compensatory mitigation requirements, payment of HCP-required fees will dually fulfill a Corps-approved SSHCP In-lieu Fee (ILF) Program established by the Plan Partners. Substantial processing efficiency and improving aquatic resource protection at the regional level will result from the CWA 404 permit strategy's reliance on the compensatory mitigation ratio requirements for aquatic resources contained in the SSHCP. Implementation of on-the-ground compensatory mitigation projects would be consistent with the SSHCP conservation strategy, located within SSHCP preserve areas.

The Sacramento District will further streamline the CWA 404 regulatory review process by requesting the USFWS to consult once programmatically for all SSHCP covered activities that require a CWA 404 permit, eliminating the need for individual project-by-project ESA 7 consultations. Furthermore, the Sacramento District will request programmatic water quality certification under CWA 401 from the Central Valley Regional Water Quality Control Board for all activities under the CWA 404 permit strategy. This will eliminate the need for permit applicants to apply individually for CWA 401 certification. Finally, to comply with NHPA 106, the Sacramento District will seek to develop a programmatic agreement with the California State Historic Preservation Officer, following coordination with tribes and others, for the CWA 404 permit strategy.

CWA 404 Permitting Strategy

The Sacramento District has developed a multi-tiered approach to CWA 404 permitting that will address activities which involve discharges of dredged or fill material into waters of the U.S. covered by the USFWS-approved SSHCP. This strategy consists of the use of:

- A programmatic general permit (PGP) founded on a local aquatic resources protection program to be implemented through local aquatic resource ordinances, and designed to reduce duplication with that program, for activities with minimal individual and cumulative effects on the aquatic environment;

- A procedure for issuing Letters of Permission (LOPs) for activities with more than minimal but less than significant effects on the human environment, including aquatic resources; and

- An abbreviated process for issuing standard permits (SPs) for other activities consistent with the SSHCP that may have a significant impact on the human environment, and require the preparation of an EIS under NEPA.

PGP

Based on the SSHCP and local aquatic resource ordinances (Sacramento County, City of Galt, City of Rancho Cordova and SSHCP Implementing Entity) that implement a locally-based Aquatic Resources Program (ARP), the Sacramento District will establish a PGP for covered activities that have minimal impacts on the aquatic environment. The PGP is premised on the ordinances resulting in the same or better level of protection to waters of the U.S. as currently in place under CWA 404. The PGP includes

limits and thresholds that exceed those found in many of the Nationwide Permits, such as an upper threshold for most projects of 2 acres instead of 0.5 acre. The PGP will not impose additional requirements or conditions on individual activities for avoiding, minimizing, or compensating for the loss of aquatic resources beyond those in the SSHCP, ARP and ordinances. The Corps will rely on the agencies responsible for administering the ARP/ordinances to regularly report to the Sacramento District on use of the ordinances and coverage under the PGP, not requiring a project-by-project notification or review process, thus eliminating to the maximum extent possible the Sacramento District's review of activities with minimal impacts on waters of the U.S. The PGP will result in CWA 404 authorization in under 30 days. The process for the Corps to establish the PGP follows the standard permit process, which requires a public notice. The PGP will be addressed in the Sacramento District's ROD prepared for the SSHCP EIS. The PGP will be effective once the local aquatic resources ordinances are approved.

The PGP will not impose additional requirements or conditions on individual activities for avoiding, minimizing, or compensating for the loss of aquatic resources.

LOP Procedure

For covered activities found to be consistent with the SSHCP requirements which would have more than minimal impacts to aquatic resources but less than significant impacts on the human environment under NEPA, the Sacramento District will institute an procedure for issuing LOPs under CWA 404. For purposes of the permit strategy, activities that are determined to not require an EIS will be eligible for authorization under the LOP procedure. As such, the procedure will not have a specific limitations or thresholds. The LOP procedure will streamline the standard permit process by eliminating the need for a public notice and only require the preparation of a simplified decision document that tiers from the SSHCP EIS. Most on-site avoidance and minimization requirements will be satisfied when proposed activities are designed to comply with all applicable avoidance and minimization measures contained in the SSHCP and ARP. As a type of individual permit, the LOP procedure will require evaluation of on-site avoidance and minimization in compliance with CWA 404, including USEPA's 404(b)(1) Guidelines. For example, the USACE may require evaluation of alternatives to avoid and minimize effects to waters of the U.S. within and adjacent to streams. This may result in minor adjustments to features such as stream setback width requirements imposed by the SSHCP, in an area of a project site containing a wetland adjacent to the stream setback. Like the other types of CWA 404 permits in the Sacramento District's permit strategy, compensatory mitigation requirements will be the same as those in the SSHCP. The goal is to issue LOPs in 60 days or less, assuming compliance (programmatic or otherwise) with other laws is in place.

The LOP procedure will rely on the SSHCP to address avoidance, minimization, and compensatory mitigation for impacts to aquatic resources.

The process for establishing the LOP procedure requires the development of a list of categories or activities proposed for authorization (which consists of the SSHCP covered activity categories) through coordination with federal, state and local agencies, a public notice, and a 401 WQC issued or waived on a generic or individual basis. The decision to implement the LOP procedures will be addressed in the Sacramento District's ROD.

SP Abbreviated Process

A small number of SSHCP covered activities requiring CWA 404 will not fall under the PGP or LOP procedure and will require a SP. These activities are those that may have a significant impact on the human environment and require the preparation of an EIS under NEPA. If the Sacramento District serves as the federal lead agency for an activity under NEPA, the EIS requirement would be determined on a case-by-case basis upon receipt of a CWA 404 permit application by the Corps, consistent with the CWA 404 implementing regulations for NEPA (33 CFR Part 325, Appendix B). If the Corps is a cooperating agency to a federal lead agency who has determined an EIS is required under NEPA, the SP abbreviated process would apply if the Corps determines potential significant individual and/or cumulative impacts to the human environment could occur as a result of the proposed activities.

The extent of analysis in the project EIS will be reduced by tiering from the SSHCP EIS, alternatives will be limited to the project site because avoidance has been addressed at the regional level, and compensatory mitigation requirements will align with those of the SSHCP.

Even for activities that require a SP, the process and amount of time it takes to reach a permit decision can be compressed significantly by relying on the SSHCP. For instance, the extent of analysis in the project EIS will be lessened by tiering from the SSHCP EIS. Similar to the LOP procedure, most on-site avoidance and minimization requirements will be satisfied when proposed activities are designed to comply with all applicable avoidance and minimization measures contained in the SSHCP and ARP. The primary additional evaluation necessary for the SP process is an alternatives analysis required for compliance with USEPA's 404(b)(1) Guidelines. This will be limited to just the project site ("on-site alternatives"), because avoidance and minimization assessment that would normally be done via evaluation of off-site alternatives as part of a typical SP process has already been addressed at the regional level. Please refer to the LOP procedure, above, for an example of how minor adjustments in project design may be sought to support compliance with avoidance and minimization requirements. Compensatory mitigation requirements will align with those of the SSHCP, as described above. Time may further be shortened through the preparation of a joint EIS/EIRs for projects (the Corps' preference). In addition, the Corps will pursue programmatic compliance with ESA, NHPA 106 and CWA 401 to provide for greater assurances and further streamline the process. With reliance on the SSHCP EIS and programmatic compliance with related laws, the Corps expects to complete SP decisions for activities under the SSHCP within six to nine months.

Activities not Covered by the SSHCP

Activities involving a discharge of fill material into waters of the U.S. that are not covered under the SSHCP would be subject to the normal Corps' regulatory permit processes.

Next Steps

The Sacramento District's proposed CWA 404 permit strategy was provided in the Draft EIS for the SSHCP published in June 2017. Following public input on the Draft EIS, coordination with the Plan Partners, resource agencies and others, and review of any new information that becomes available, the Sacramento District's CWA 404 permit strategy and final draft permit instruments were updated and included for public review in the Final EIS for the SSHCP. With adoption of the EIS, the Sacramento District will complete its ROD, issue final permit instruments, finalize establishment of the SSHCP ILF Program, and implement the CWA 404 permit strategy.

EIS/EIR APPENDIX C-2

Draft Programmatic General Permit

MINIMAL IMPACT COVERED ACTIVITIES UNDER THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

EFFECTIVE:
EXPIRES: (*5 years from effective date*)

The U.S. Army Corps of Engineers, Sacramento District (Corps), hereby issues a programmatic general permit (PGP) for certain covered activities under the South Sacramento Habitat Conservation Plan that result in the discharge of dredged and/or fill material into waters of the United States (U.S.) resulting in no more than minimal individual and cumulative impacts on aquatic resources, and have been authorized by a local Aquatic Resource Impact Permit pursuant to local Aquatic Resource Protection (ARP) ordinances, implemented by SSHCP "Land Use Authority Permittees" (SSHCP LUAPs) or the SSHCP Implementing Entity (SSHCP IE). The ARP ordinances are associated with, and refer directly to, the SSHCP and an associated locally-based Aquatic Resources Program.

An activity is verified under the PGP when a SSHCP LUAP or the SSHCP IE approves a local Aquatic Resource Impact Permit, in compliance with the [*INSERT FINAL DATE*] SSHCP Aquatic Resources Program, a local ARP ordinance and all applicable terms and conditions of the SSHCP.

ISSUING OFFICE: U.S. Army Corps of Engineers, Sacramento District

ACTION ID: SPK-1995-00386

AUTHORITY: Section 404 of the Clean Water Act (CWA 404)

LOCATION: The South Sacramento SSHCP Plan Area encompasses approximately 317,655 acres within Sacramento County (*Figure 1 [showing SSHCP Plan Area; figure to be developed*], attached). The Plan Area includes the City of Galt and the City of Galt's sphere of influence, and the portion of the City of Rancho Cordova that is located south of U.S. Highway 50. The geographical boundaries of the Plan Area are U.S. Highway 50 and White Rock Road to the north, the Sacramento River levee and County Road J11 (Walnut Grove-Thornton Road) to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and with the San Joaquin County to the south.

PURPOSE: This PGP is intended to minimize duplication between the SSHCP LUAPs' and SSHCP IE's local ARP and the Corps' Regulatory Program, for authorization of SSHCP covered activities subject to CWA 404 that are substantially similar in nature, and would result in minimal individual and cumulative impacts on the aquatic environment. The PGP is premised on local ARP ordinances, resulting in the same or better level of protection of waters of the U.S. as currently exists under CWA 404. Subject to certain exclusions and conditions, the PGP eliminates the need for project applicants to seek separate review from the Corps for many activities that result in minimal impacts to waters of the U.S., when such activities are authorized by a SSHCP LUAP or SSHCP IE in compliance with the SSHCP Aquatic Resources Program, under a local ARP ordinance. In addition to reducing duplication with the SSHCP Aquatic Resources Program and local ARP ordinances, the PGP is designed to

expedite review of certain covered activities through other programmatic elements, such as compliance with Section 7 of the federal Endangered Species Act (ESA) and Section 106 of the National Historic Preservation Act (NHPA). The PGP will increase certainty, reduce time, and improve efficiency for project applicants through synergies with processes implemented by local jurisdictions, such as those associated with land use entitlements, while protecting aquatic resources, including waters of the U.S.

BACKGROUND: The SSHCP is a regional approach to address issues related to planned development and species habitat conservation. The SSHCP provides coverage for twenty-eight species of plants and wildlife, including ten that are state and/or federally-listed as threatened or endangered. The Plan Permittees consist of Sacramento County, the City of Galt, the City of Rancho Cordova, the Sacramento County Water Agency, Sacramento Regional County Sanitation District, the Southeast Connector Joint Powers Authority, and the SSHCP IE. The U.S. Fish and Wildlife Service's Sacramento Field Office (USFWS) [*has approved*] the SSHCP through a species incidental take permit (ITP) issued to the SSHCP's Plan Permittees under Section 10 of the ESA.

ACTIVITIES COVERED: This PGP applies only to SSHCP covered activities that are substantially similar in nature, would result in minimal individual and cumulative impacts on the aquatic environment, and have been authorized under the local Aquatic Resources Program. SSHCP covered activities are described briefly below and in greater detail in Chapter 5 of the SSHCP.

1. **Urban Development in the UDA:** Activities associated with the construction and maintenance of urban development projects and associated facilities/activities, including but not limited to structures (residential, commercial, industrial), parks/recreation facilities, water supply facilities, flood control and stormwater management, utilities (e.g., electric), solid waste management, wastewater, transportation and stream channel modification.

2. **Mining in the UDA:** Activities associated with surface extraction of rock or mineral resources, construction of associated infrastructure (e.g., buildings and facilities including surface mining pits, processing sites, conveyors, access roads and detention basins), and reclamation of previously mined land in accordance with the applicable federal and state laws.

3. **Rural Transportation Projects:** Activities associated with transportation projects outside of the UDA that are approved by the Sacramento County's 2030 General Plan, inclusive of construction, improvement and operation-related maintenance. For example, road widening, realignment and interchange improvement. Chapter 5 of the SSHCP describes specific rural transportation projects that fit into this category (e.g., widening of nine segments of arterial roads).

4. **Recycled Water Projects:** Activities associated with construction and maintenance of facilities associated with two specific recycled water projects; one that would serve the existing Bartley-Cavanaugh Golf Course, and the other known as the South Sacramento County Agriculture and Habitat Lands Recycled Water Project (South County Agricultural Program).

5. **Covered Activities in Preserve Setbacks in the UDA:** Activities associated with construction and maintenance of permeable and semi-permeable trails, bio-retention swales, fencing, firebreaks, benches, shade structures, shade trees, trash receptacles, interpretive signs and kiosks, outdoor lighting and livestock access facilities (e.g., access points) for livestock utilized pursuant to preserve management plans.

6. **Covered Activities in Stream Setbacks in the UDA:** Activities associated with construction and maintenance of permeable and semi-permeable trails, bio-retention swales, crossings perpendicular to streams (e.g., new roads, bike or pedestrian trails and utility lines), stream bank stabilization projects, fencing, firebreaks, benches, shade structures, shade trees, interpretive signs and kiosks, riparian habitat re-establishment or establishment, outfalls, flood control structures and stormwater management.

7. **SSHCP Preserve System Covered Activities:** Activities associated with implementation of the SSHCP Conservation Strategy, including preserve management, monitoring, habitat (including aquatic) enhancement, re-establishment establishment, "low-impact" nature trails, removal or breeching of farm levees, research activities (e.g., species surveys), livestock water supply, groundwater monitoring and extraction wells (specific to Kiefer Landfill), detention basins, and maintenance of existing utility facilities within SSHCP preserves.

8. **Covered Activities in the Laguna Creek Wildlife Corridor of the SSHCP Preserve System:** Activities associated with construction and maintenance of permeable and semi-permeable trails, benches, trash receptacles, bio-retention swales, fencing, shade structures, shade trees, crossings perpendicular to streams (e.g., new roads, bike or pedestrian trails and utility lines), stream bank stabilization projects, interpretive signs and kiosks, riparian habitat re-establishment and establishment, outfalls, flood control structures and stormwater management.

EXCLUSIONS:

1. This PGP may not be used to authorize discharges of dredged and/or fill material into waters of the U.S. for activities that do not require authorization from a SSHCP LUAP or SSHCP IE pursuant to a local ARP ordinance.

2. After-the-fact authorizations: This PGP may not be used to authorize activities that resulted in the discharge of dredged or fill material into waters of the U.S. without Department of the Army (DA) authorization.

TERMS OF AUTHORIZATION:

1. Activity Completion: Activities authorized by the Corps under this PGP may be conducted until the expiration date of the PGP, or the expiration date of the local Aquatic Resource Impact Permit issued by a SSHCP LUAP or SSHCP IE, whichever occurs sooner.

2. Applying for PGP Authorization: Prior to commencing a proposed activity, project applicants seeking authorization under this PGP shall notify the applicable SSHCP LUAP or SSHCP IE as required by the Aquatic Resources Program and local ARP ordinances, and in accordance with PGP general condition number 13 (*Notification*).

3. Compliance with SSHCP Conditions: Activities to be authorized under this PGP must be covered activities as identified above and in Chapter 5 of the SSHCP, and must comply with any applicable terms and conditions contained in the SSHCP. Project applicants must receive written concurrence from a SSHCP LUAP of SSHCP IE that the proposed project is eligible for coverage under the SSHCP. Compliance with the SSHCP requires project applicants to implement the applicable and

appropriate avoidance and minimization measures contained in Chapter 5 of the SSHCP, and other applicable terms and conditions as contained in the SSHCP.

4. Discretionary Authority: The Corps has the discretion to suspend, modify, or revoke authorizations under this PGP. This discretionary authority may be used by the Corps to further condition or restrict the applicability of the PGP for cases in which it has concerns associated with the Clean Water Act Section 404(b)(1) Guidelines, or regarding any factor of the public interest. Should the Corps determine that a proposed activity may have more than minimal individual or cumulative adverse impacts to waters of the U.S. or otherwise be contrary to the public interest, the Corps will modify the authorization to reduce or eliminate those adverse effects, or notify the project applicant that the proposed activity is not authorized by the PGP and provide instructions on how to apply for authorization under another type of DA permit. Activities not meeting the terms and conditions of this permit may be authorized through another type of permit from the Corps, such as a Nationwide Permit, , Regional General Permit, Letter of Permission or Standard Permit. The Corps will determine on a case-by-case basis, as needed, whether an activity has a more than minimal impact, individually or cumulatively, on the aquatic environment or may be contrary to the public interest. The Corps may restore authorization under the PGP at any time it determines the reason for asserting discretionary authority has been resolved or satisfied by a condition, project modification, or new information. The Corps may also use its discretionary authority to modify, suspend, or revoke the PGP at any time.

5. Avoidance and Minimization: Impacts to waters of the U.S. shall be avoided and minimized to the maximum extent practicable. For purposes of the PGP, notwithstanding the Corps' discretionary authority described above, this term shall be considered satisfied when project applicants have designed and implemented activities to comply with all applicable avoidance and minimization measures contained in both Chapter 5 of the SSHCP and the applicable ARP ordinance.

6. Impact Thresholds for Losses of Waters of the U.S.: Loss of waters of the U.S. shall be determined using the definition in Section F of the January 6, 2017, Federal Register Notice for *Issuance and Reissuance of Nationwide Permits; Final Rule* (82 FR 1860), which can be found at: http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2017/nwp2017_final_rule_FR_06jan2017.pdf?ver=2017-01-06-092409-457

a. Except for as specified in b – c below, the loss of waters of the U.S. (including wetlands) resulting from authorization of a single and complete project under this PGP shall not exceed a total of 2.0 acres, and/or a total of 500 linear feet of perennial, intermittent, or third or higher order of ephemeral streams, and/or a total of 1,000 linear feet of irrigation or drainage ditch (provided the irrigation or drainage ditch is not a relocated or channelized stream, as verified by the Corps). The acreage of loss of streambed for streams and/or ditches shall be included in the acreage threshold for loss of waters of the U.S.

b. The loss of vernal pool waters of the U.S., as verified in writing by the Corps, in the Mather Core Recovery Area resulting from authorization of a single and complete project under this PGP shall not exceed 1.5 acres.

c. The cumulative loss of waters of the U.S. authorized under this PGP shall not exceed 120 acres of waters of the U.S., including wetlands, within the Plan Area. Additional restrictions are listed in the General Conditions, below.

DRAFT

7. Single and Complete: The activity must be a single and complete project as defined in the Section F of the January 6, 2017, Federal Register Notice for *Issuance and Reissuance of Nationwide Permits; Final Rule* (82 FR 1860), which can be found at: http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2017/nwp2017_final_rule_FR_06jan2017.pdf?ver=2017-01-06-092409-457.

8. Section 401 Water Quality Certification: In order for authorization to be valid under this PGP, an approved Section 401 Water Quality Certification (WQC) or waiver thereof is required to be obtained and evidence thereof in possession by the applicable SSHCP LUAP or SSHCP IE, prior to the commencement of activities authorized by this PGP (see General Condition 10 [*Water Quality Certification*]).

9. Reporting Requirements for Local Implementing Entities: Each of the four implementing entities of the local ARP ordinances (the SSHCP LUAPs and the SSHCP IE) shall submit reports to the Corps documenting usage of the PGP. Reporting will include the activity name, type of SSHCP covered activity, acreage and/or linear feet of permanent and temporary discharges of dredged and/or fill material into waters of the U.S. by aquatic resource type, acreage and/or linear feet of loss of waters of the U.S. by aquatic resource type, and evidence of the project applicant's fulfillment of CWA 404 compensatory mitigation requirements. Reporting shall be provided on a quarterly basis for Year 1, biannually for Year 2, and annually for Years 3-to-5 of this PGP. For this PGP to be applicable, a memorandum of understanding between the Corps and each LUAP or IE will need to be executed to record processing, tracking, and reporting of SSHCP covered activities.

GENERAL CONDITIONS:

1. Compensatory Mitigation: Compensatory mitigation for impacts to waters of the U.S. shall be accomplished at the ratios specified in the *Compensatory Mitigation Standards* specified in the local ARP ordinances (which mirror requirements contained the SSHCP), and shall be accomplished by payment into a Corps-approved SSHCP in-lieu fee (ILF) program.

2. Compliance Inspections: The project applicant must allow representatives from the Corps to inspect the authorized activity at any time deemed necessary to ensure that the activity is being, or has been, accomplished in accordance with the terms and conditions of the permit. The Corps will notify the project applicant at least 48 hours advance of an inspection.

3. Threatened and Endangered Species: No activity is authorized under this PGP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal ESA. Activities authorized under this PGP must comply with the mandatory terms and conditions of the USFWS's [programmatic Biological Opinion (BO) for this PGP] (USFWS #___, dated ___) (copy [to be] attached). The BO contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" authorization under this PGP. Authorization under this PGP is conditional upon your compliance with all of the mandatory terms and conditions of the Biological Opinion. Failure to comply with the terms and conditions of the Biological Opinion would constitute non-compliance with the PGP. The USFWS is the appropriate authority to determine compliance with the terms and conditions of the Biological Opinion, and with the ESA. The project applicant must comply with all applicable conditions of this Biological Opinion, including those ascribed to the Corps.

4. Historic Properties: No activity is authorized under the PGP if the activity may affect historic properties listed, or eligible for listing, in the National Register of Historic Places, until the requirements of Section 106 of the National Historic Preservation Act (NHPA), as amended, have been satisfied. If NHPA compliance is not addressed programmatically, e.g., by a Programmatic Agreement (PA), project applicants must notify the Corps if the activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, including previously unidentified historic properties. The notification shall consist of the application identified in General Condition 5, and two hard copies and one electronic copy of a cultural resources report meeting the Corps Guidelines for Compliance with Section 106 of the National Historic Preservation Act of 1966 (http://www.spk.usace.army.mil/Portals/12/documents/regulatory/sec-106-tribal/FINAL_2014-03-24_Section-106-Guidelines.pdf). The Corps will consult with the State Historic Preservation Officer (SHPO), as appropriate, following the policy and procedural standards of 33 CFR Part 325 Appendix C.

5. Notification: The prospective project applicant shall submit an application to the applicable SSHCP LUAP or SSHCP IE, in accordance with the procedures specified in the SSHCP Aquatic Resources Program and local ARP ordinances. No notification is required to be made to the Corps, except as provided by General Condition 4.

6. Permit Transfer: If the property associated with this permit is sold, the project applicant shall transfer the permit verification to the new owner by submitting a letter to the applicable SSHCP LUAP or SSHCP IE, with a copy provided to the Corps, to validate the transfer. A copy of the local Aquatic Resource Impact Permit authorization issued by the applicable SSHCP or SSHCP IE must be attached to the letter, and the letter must contain the name and address of the transferee, as well as the following statement and signature of the transferee

> When the structures or work authorized by this programmatic general permit (PGP) are still in existence at the time the property is transferred, the terms and conditions of this PGP, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this PGP and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.
>
> _____
> (Transferee)
>
> _____
> (Date)

7. Wetland and Stream Setbacks: Project applicants shall establish wetland and stream setback standards consistent with the minimum standards as described in the SSHCP Aquatic Resources Program and local ARP ordinances (mirroring requirements contained the SSHCP). Associated terms of the local ARP ordinances concerning setbacks, including (but not limited to) land use, allowable uses within setbacks, exemptions, and waivers shall apply as described in the SSHCP Aquatic Resources Program and applicable local ordinance. These terms shall meet or exceed all applicable standards and terms contained within Chapter 5 of the SSHCP.

8. Tribal Rights: No activity or its operation shall impair reserved Tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

DRAFT

9. Unanticipated Discovery: If the project applicant discovers any previously unknown historic, cultural or archeological remains and/or artifacts while accomplishing the activity authorized by this PGP, the project applicant shall immediately notify the Corps of what has been found, and to the maximum extent practicable, shall avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. Notification to the Corps shall include a copy of the local Aquatic Resource Impact Permit issued by the applicable SSHCP LUAP or SSHCP IE. The Corps will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

10. Water Quality Certification: Water Quality Certification (WQC), or waiver thereof, under Section 401 of the Clean Water Act is required for activities to be authorized by this PGP. The project applicant shall comply with the terms and conditions of any individual or programmatic WQC provided by the State Water Resources Control Board and/or Central Valley Regional Water Quality Control Board.

FURTHER INFORMATION:

1. Congressional Authorities: Section 404 of the Clean Water Act (33 U.S.C. 1344)

2. Limits of this authorization:

a. The Corps has authority to determine if an activity complies with the terms and conditions of the PGP.

b. This permit does not obviate the need to obtain other federal, state, or local authorizations required by law.

c. This permit does not grant any property rights or exclusive privileges.

d. This permit does not authorize any injury to the property or rights of others.

e. This permit does not authorize interference with any existing or proposed federal projects.

3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

DRAFT

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of the Corps that issuance of this PGP is not contrary to the public interest was made in reliance on the information provided by the SSHCP Plan Permittees.

5. Reevaluation of Permit Decision: The Corps may reevaluate its decision on this PGP at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. The project applicant fails to comply with the terms and conditions of this permit.

b. The information provided by the project applicant in support of a permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which the Corps did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5.

PERMIT DURATION: This PGP is valid for five (5) years from the date of issuance. It will expire on [Day, Month, 20XX]. At least sixty (60) calendar days prior to expiration, the Corps will issue a public notice, with an opportunity for public comment, describing the reasons for reissuing the PGP for another five years with or without modification, or not reissuing the PGP. If the Corps has not reissued the PGP by the expiration date, the PGP will no longer be valid. This PGP may also be modified, suspended, or revoked by the Corps at any time deemed necessary. In such instance, the Corps will issue a public notice concerning the proposed action.

CONTACTS AND ADDITIONAL INFORMATION: For additional information about this PGP, please contact the U.S. Army Corps of Engineers, Sacramento District.

This permit becomes effective when the federal official, designated to act for the Secretary of the Army has signed below.

DRAFT DRAFT

_____ _____

[Name] [Date]
Chief, Regulatory Division
Sacramento District

EIS/EIR APPENDIX C-3

Draft Letter of Permission Procedure

LETTER OF PERMISSION PROCEDURES FOR COVERED ACTIVITIES UNDER THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN WITH LESS THAN SIGNIFICANT IMPACTS ON THE HUMAN ENVIRONMENT

DATE: *[Insert Date of Issuance]*

ACTION ID: SPK-1995-00386

AUTHORITY: 33 CFR 325.2(e)(1)(ii)

LOCATION: The South Sacramento Habitat Conservation Plan (SSHCP) Plan Area encompasses approximately 317,655 acres in southern Sacramento County (*Figure 1 [showing SSHCP Plan Area; figure to be developed*], attached). The Plan Area includes the City of Galt, including its sphere of influence, and the area of the City of Rancho Cordova located south of U.S. Highway 50. The geographical boundaries of the Plan Area are U.S. Highway 50 and White Rock Road to the north, the Sacramento River levee and County Road J11 (Walnut Grove-Thornton Road) to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and with the San Joaquin County to the south.

PURPOSE: The U.S. Army Corps of Engineers (Corps), Sacramento District has established this Letter of Permission (LOP) procedure to efficiently authorize SSCHP covered activities which involve discharges of dredged or fill material into waters of the United States (U.S.) under Section 404 of the Clean Water Act (CWA 404) with more than minimal on the aquatic environment but less than significant impacts on the human environment under the National Environmental Policy Act.

The SSHCP LOP Procedure is an optional abbreviated process for issuing an individual permit, available to all applicants for Department of the Army (DA) permits for SSHCP covered activities meeting the criteria and conditions described in this notice. If the proposed activity does not meet LOP criteria or the applicant chooses not to use this process, the activity may be evaluated under a different permit type or procedure.

BACKGROUND: In accordance with Title 33 of the Code of Federal Regulations (CFR) Part 325, district engineers are authorized to use alternative procedures to authorize activities under the Corps Regulatory Program. LOPs are a type of individual permit that is issued through an abbreviated process which includes coordination with federal and state fish and wildlife agencies and a public interest evaluation, but without publishing an individual public notice.

The SSHCP provides coverage for twenty-eight species of plants and wildlife, including ten that are state and/or federally-listed as threatened or endangered. The SSHCP is a regional approach to address issues related to planned development and species habitat conservation. The U.S. Fish and Wildlife Service's Sacramento Field Office (USFWS) [*has approved*] the SSHCP through a species

incidental take permit (ITP) issued to the SSHCP's Plan Permittees under Section 10 of the ESA. The Plan Permittees have additionally developed a SSHCP Aquatic Resources Program (ARP), complementary to the SSHCP, with a locally-based permit program for activities resulting in no more than minimal individual and cumulative impacts on aquatic resources.

PROPOSED CATEGORIES OF ACTIVITIES: This LOP procedure applies only to SSHCP covered activities that have been authorized by a SSHCP "Land Use Authority Permittees" (SSHCP LUAPs) or the SSHCP Implementing Entity (SSHCP IE), consistent with the SSHCP and locally-based ARP. SSHCP covered activities are described briefly below, and in greater detail in the SSHCP.

Activities to be authorized under an LOP following the procedure described herein must be SSHCP covered activities. Applicants must receive a consistency determination from a SSHCP LUAP of SSHCP IE that the proposed project is a covered activity under the SSHCP. Compliance with the SSHCP requires applicants to implement applicable and appropriate avoidance and minimization measures contained in Chapter 5 of the SSHCP, and other applicable terms and conditions as contained in the SSHCP.

An LOP will be issued only for those activities which meet all of the procedures and criteria identified in this notice, including the general conditions, and which do not result in a potentially significant impact(s) on the human environment. The Corps reserves the use of its discretionary authority to determine that an activity may be authorized under an LOP, to add special conditions to LOP authorizations, or to determine that an activity may not be authorized by a LOP and will instead require authorization under another permit type.

For a SSHCP covered activity to be authorized under an LOP following this procedure, impacts to waters of the U.S. shall be avoided and minimized to the maximum extent practicable. All applicable avoidance and minimization measures contained in Chapter 5 of the SSHCP and the ARP shall be required, resulting in fulfillment of most on-site avoidance and minimization requirements necessary to comply with CWA 404 requirements. Evaluation of project-level, on-site avoidance and minimization opportunities will be assessed on a case-specific basis. For example, the USACE may require evaluation of alternatives to avoid and minimize effects to waters of the U.S. within and adjacent to streams. This may result in minor adjustments to features such as stream setback width requirements imposed by the SSHCP in an area of a project site containing a wetland adjacent to the stream setback.

To qualify for a LOP under this procedure; activities must meet the following criteria:

1. The proposed activity does not result in a potentially significant impact(s) on the human environment that requires preparation of an environmental impact statement (EIS) under the National Environmental Policy Act (NEPA).

2. Compensatory mitigation for impacts to waters of the U.S. shall be accomplished at the ratios specified in the SSHCP, and shall be accomplished by payment into a Corps-approved SSHCP in-lieu fee (ILF) program.

Covered Activities under the SSHCP: The following SSHCP covered activities, described in greater detail in Chapter 5 of the SSHCP, are applicable to this LOP procedure.

1. **Urban Development in the UDA:** Activities associated with the construction and maintenance of urban development projects and associated facilities/activities, including but not limited to structures (residential, commercial, industrial), parks/recreation facilities, water supply facilities, flood control and stormwater management, utilities (e.g., electric), solid waste management, wastewater, transportation and stream channel modification.

2. **Mining in the UDA:** Activities associated with surface extraction of rock or mineral resources, construction of associated infrastructure (e.g., buildings and facilities including surface mining pits, processing sites, conveyors, access roads and detention basins), and reclamation of previously mined land in accordance with the applicable federal and state laws.

3. **Rural Transportation Projects:** Activities associated with transportation projects outside of the UDA that are approved by the Sacramento County's 2030 General Plan, inclusive of construction, improvement and operation-related maintenance. For example, road widening, realignment and interchange improvement. Chapter 5 of the SSHCP describes specific rural transportation projects that fit into this category (e.g., widening of nine segments of arterial roads).

4. **Recycled Water Projects:** Activities associated with construction and maintenance of facilities associated with two specific recycled water projects; one that would serve the existing Bartley-Cavanaugh Golf Course, and the other known as the South Sacramento County Agriculture and Habitat Lands Recycled Water Project (South County Agricultural Program).

5. **Covered Activities in Preserve Setbacks in the UDA:** Activities associated with construction and maintenance of permeable and semi-permeable trails, bio-retention swales, fencing, firebreaks, benches, shade structures, shade trees, trash receptacles, interpretive signs and kiosks, outdoor lighting and livestock access facilities (e.g., access points) for livestock utilized pursuant to preserve management plans.

6. **Covered Activities in Stream Setbacks in the UDA:** Activities associated with construction and maintenance of permeable and semi-permeable trails, bio-retention swales, crossings perpendicular to streams (e.g., new roads, bike or pedestrian trails and utility lines), stream bank stabilization projects, fencing, firebreaks, benches, shade structures, shade trees, interpretive signs and kiosks, riparian habitat re-establishment or establishment, outfalls, flood control structures and stormwater management.

7. **SSHCP Preserve System Covered Activities:** Activities associated with implementation of the SSHCP Conservation Strategy, including preserve management, monitoring, habitat (including aquatic) enhancement, re-establishment establishment, "low-impact" nature trails, removal or breeching of farm levees, research activities (e.g., species surveys), livestock water supply, groundwater monitoring and extraction wells (specific to Kiefer Landfill), detention basins, and maintenance of existing utility facilities within SSHCP preserves.

8. **Covered Activities in the Laguna Creek Wildlife Corridor of the SSHCP Preserve System:** Activities associated with construction and maintenance of permeable and semi-permeable trails, benches, trash receptacles, bio-retention swales, fencing, shade structures, shade trees, crossings perpendicular to streams (e.g., new roads, bike or pedestrian trails and utility lines), stream bank stabilization projects, interpretive signs and kiosks, riparian habitat re-establishment and establishment, outfalls, flood control structures and stormwater management.

DRAFT

EXCLUSIONS:

1. The LOP procedure does not apply to any activities in waters of the U.S. that are not considered covered activities under the SSHCP.

2. The LOP procedure does not apply to any activities in waters of the U.S. that have a potential to significantly impact the human environment.

LOP PROCEDURE:

1. **Before submitting an application**:

The applicant must attend a pre-application meeting with the Sacramento District. Applicants are encouraged to invite the applicable SSHCP LUAP or SSHCP IE (i.e., the anticipated reviewer of the local Aquatic Resource Impact Permit) to the pre-application meeting.

2. **Application submittal**:

To be considered for authorization by LOP, the application must include all information required for a standard permit application, pursuant to 33 CFR 325.1. The application package must be submitted to the Sacramento District in both paper and electronic form (pdf), suitable for electronic transmittal and/or posting to an FTP site, and include the following:

a. A cover letter from the applicant requesting an LOP under the SSHCP LOP procedure for the proposed activity, referencing the Sacramento District's identification number and including contact information for the applicant and their designated agents or primary points-of-contact. This must include mailing and e-mail addresses and telephone and fax numbers.

b. A completed and signed Department of the Army Engineering Form 4345.

c. A copy (hardcopy, and electronic on CD) of the Aquatic Resource Impact Permit application submitted to the SSHCP LUAP and/or SSHCP IE.

d. An aquatic resources delineation for the activity area, conducted in accordance with the Sacramento District's minimum standards for aquatic resource delineations, or information that an aquatic resources delineation has been verified and is still valid.

e. Site location map(s), including the proposed activity, clearly outlined on USGS 7.5' quad sheet drawings, with latitudes and longitudes for the site(s), name of the quad sheet(s) and directions to the site, as well as all appropriate aerial and other imagery available.

f. A complete description of the proposed activity, including all of the information identified under 33 CFR 325.1(d) "Content of application."

g. Plan and profile views of the proposed work, relative to potential or approved waters of the U.S. (e.g., wetlands and open waters below the Ordinary High Water Mark), showing areas, types and acreages of waters of the U.S. proposed to be impacted by the proposed activity. All available

DRAFT

drawings must be provided and must show proposed impacts on appropriately scaled figures, in accordance with the Corps' map and drawing standards. All maps and drawings shall follow the South Pacific Division February 2016, Updated Map and Drawing Standards for the South Pacific Division Regulatory Program, or most recent update (available on the South Pacific Division website at: http://www.spd.usace.army.mil/Missions/Regulatory/PublicNoticesandReferences.aspx/), unless specifically waived by the Corps.

h. The total area (acreage and/or linear feet) and types of waters of the U.S. to be directly and/or indirectly affected by the proposed activity, the volume (in cubic yards) and type of material to be discharged into each type of aquatic resource(s), acreage and/or linear feet of loss of waters of the U.S. by aquatic resources type, a description of habitat types, including plant communities, within and surrounding the activity site, and a description of how the proposed activity would affect all of the above resources.

i. A description and graphical representation of how impacts to waters of the U.S. and associated functions (e.g., water quality and habitat) have been avoided and minimized to the maximum extent practicable on the project site. A summary of all applicable avoidance and minimization conditions proposed to be implemented, as required by the SSHCP, shall also be provided. This may be fulfilled by submitting a copy of the applicant's documentation provided to the SSHCP LUAP and/or SSHCP IE, including but not limited to the submittal of documentation to support the local permitting entity's Determination of Environmentally Equivalent or Superior Alternative (DEESA), provided these documents clearly identify avoidance and minimization measures related to waters of the U.S.

j. A description of potential indirect (secondary) and cumulative impacts to waters of the U.S. and the human environment in the watershed and vicinity of the proposed activity.

k. Documentation and record of all pre-application coordination with the Sacramento District and other agencies (as applicable), including any activity-specific comments or concerns provided by agencies, as well as the applicant's response(s) to the comments or concerns.

l. Information, in report form, concerning on-site practicable alternatives and the relative environmental impacts of those alternatives as compared to the environmental impacts of the proposed activity, in accordance with 33 CFR 325.1 (e) and 323.6 (a). The information must address compliance with the Environmental Protection Agency's 404(b)(1) Guidelines at 40 CFR part 230.

m. A statement providing the proposed compensatory mitigation for offset of unavoidable losses of waters of the U.S., indicating proposed compliance with General Condition 3, *Compensatory Mitigation*.

n. Copies of state and local approvals, pending applications or approvals, and any other evidence that the proposed activity has been or is currently being reviewed by the appropriate state and local agencies and is consistent with their land use plans and policies, particularly wetland policies, programs, ordinances and/or laws.

3. Review and Decision:

a. The Sacramento District will review the applicant's submittal for completeness within approximately fifteen (15) calendar days of receipt. If the application is incomplete, the appropriate Sacramento District staff person will notify the applicant and request the additional information necessary to complete the application for further processing.

b. If the Sacramento District determines the application is complete but the activity cannot be authorized by a LOP, the Sacramento District will notify the applicant within 15 calendar days of that determination and proceed to an alternate permitting process (General Permit or Standard Permit).

c. If the application is determined to be complete and appears to meet LOP criteria, the Sacramento District will notify the applicant that the proposed activity is being evaluated for LOP authorization. The Sacramento District will notify the applicable SSHCP LUAP and SSHCP IE, and applicable state and federal coordination agencies via e-mail of the proposed LOP for the activity, and request any comments within fifteen (15) calendar days of such notice. The Sacramento District will also request any additional information necessary to complete processing of the permit application, and, if sufficient information has been submitted, initiate any required consultation(s) with other agencies, to the extent necessary (e.g., in lieu of programmatic consultations).

d. The Sacramento District will review the comments received and, if otherwise complete (e.g., Endangered Species Act [ESA], National Historic Preservation Act [NHPA] consultations and 401 Water Quality Certification done), make a determination within 30 calendar days after the close of the comment period as to whether LOP authorization is warranted, and whether special conditions are needed. If the Sacramento District determines the activity (1) meets the criteria for LOP authorization, (2) would have a less than significant impact on aquatic resources and the human environment, (3) meets the requirements of the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines for Specification of Disposal Sites, (4) would not be contrary to the public interest, (5) is in compliance with other applicable laws (e.g. ESA, NHPA, Section 401 WQC), and (6) has been provided evidence of a consistency determination from the applicable SSHCP LUAP or SSHCP IE that the project is covered under the SSHCP, an LOP will be issued.

e. If at any time during the process the Sacramento District determines the activity may not be authorized by a LOP, Sacramento District staff will immediately notify the applicant, terminate the LOP process, and proceed to an alternate permitting process, as described in C(3)(b) above.

f. Evidence of Section 401 Water Quality Certification must be provided to the Sacramento District before any final LOP decision is made. A LOP will not be issued until and unless all necessary certifications, consultations and/or authorizations (e.g., 401 Water Quality Certification, ESA and/or NHPA) have been completed and/or issued.

g. The Sacramento District will add special conditions to LOP authorizations as necessary.

DRAFT

EIS/EIR APPENDIX C-4

Abbreviated Standard Permit Process

South Sacramento HCP
Abbreviated Standard Permit Process

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

February 2018

ABBREVIATED STANDARD PERMIT PROCESS FOR COVERED ACTIVITIES UNDER THE SOUTH SACRAMENTO HABITAT CONSERVATION PLAN WITH MORE THAN SIGNIFICANT IMPACTS ON THE HUMAN ENVIRONMENT

Background

The South Sacramento Habitat Conservation Plan (SSHCP) covers twenty-eight species of plants and wildlife, including ten that are state and/or federally-listed as threatened or endangered. The SSHCP is a regional approach to address issues related to planned development and species habitat conservation, following a comprehensive conservation strategy. Additional background information on the SSHCP and the U.S. Army Corps of Engineers (Corps) Sacramento District's long-term coordination with the U.S. Fish and Wildlife Service (USFWS), other state and federal agencies, and the SSHCP Plan Partners is provided in the document titled "CWA 404 Permit Strategy Aligned with the South Sacramento Habitat Conservation Plan" (dated February 2018, hereafter "CWA 404 Permit Strategy"). The goal of the Sacramento District's coordination "from the ground up" with development of the SSHCP is to develop and implement a "streamlined" approach to permitting under Section 404 of the Clean Water Act (CWA 404) that encompasses a number of different permit types and processes. The following provides approaches and mechanisms to be utilized in the abbreviated SP process for issuing standard permits (SP) for SSHCP covered activities.

When Would the Abbreviated Standard Permit Process Apply?

The abbreviated standard permit process will be used for the small number of SSHCP covered activities requiring authorization under CWA 404 that may significantly affect the human environment under the National Environmental Policy Act (NEPA), requiring the preparation of an Environmental Impact Statement (EIS). As a result of coordination and alignment with the SSHCP and a locally-based Aquatic Resources Program (ARP) the Sacramento District's' evaluation process for SP applications can be streamlined or "abbreviated" to produce higher quality and faster decisions.

EIS Trigger for SSHCP Abbreviated SP Process

If an EIS is required for a SSHCP covered activity, the abbreviated SP process would apply when the Corps determines an EIS is required. The determination that a proposed activity may significantly affect the human environment is based on an analysis of the direct and indirect effects of the proposed action, within the Corps' scope of analysis as defined in 33 CFR Part 325, Appendix B.

The Sacramento District recognizes that identifying the appropriate type of CWA 404 permit appropriate for processing SSHCP covered activities needing CWA 404 authorization is of paramount interest to project applicants, particularly early in project planning and design. Although a final determination of the need for an EIS can only be made by the Corps in response to receiving a complete permit application, the Sacramento District encourages project applicants to engage during the early planning stages of projects to discuss CWA 404 regulatory strategies. Following this approach, project applicants would have limited unknowns in terms of which type of SSHCP aligned CWA 404 permit is anticipated to be required.

Abbreviated Standard Permit Process

While the procedural requirements for CWA 404 SPs would follow the same process as identified by regulations found at 33 CFR Part 325, *Applications for Permits*, the anticipated timeline for completing this process would be substantially reduced as a result of streamlining. Certain SP processing components are required by regulation; examples include contents of a complete application, and public notices. A top objective of the abbreviated SP process is to address, in the most efficient way possible and with reliance on the SSHCP, including its EIS and other related documents including the ARP, the most information-intensive and time-consuming aspects of SP evaluation and streamline these to the maximum extent possible. Key processing elements of the SSHCP abbreviated SP process are described below, and summarized (with some additional procedural examples) in comparison to a typical SP process in **Table 1**.

Pre-application Meeting

The abbreviated SP process will include a required pre-application meeting between the project applicant, Corps and SSHCP Implementing Entity. As an outcome of the pre-application meeting, the Corps will provide feedback on whether it appears and EIS may be necessary, as well as guidance on alternatives the applicant may consider to avoid and minimize effects to the human environment, and reduce the likelihood of an EIS being required.

Complete Permit Application and Supplemental Information

Reducing the review time for an SP under the SSHCP will be in part achieved through the applicant's submittal of a complete Department of the Army (DA) permit application and supplemental information. The information necessary to reduce processing times includes: (1) Providing information required for a complete application as defined at 33 CFR 325, *Applications for Permits*; (2) Information to show the project is in compliance with all applicable requirements of the SSHCP; (3) Information to show the project is in compliance with the U.S. Environmental Protection Agency's (EPA) *Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material* (404(b)(1) Guidelines) as relates to on-site alternatives to avoid and minimize adverse effects to waters of the U.S.; (4) Information to show the project is in compliance with Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, and Section 401 of the Clean Water Act, as appropriate; and (5) A proposed plan for compensating for the loss of waters of the U.S. on the project site, consistent with the SSHCP In-Lieu Fee (ILF) Program.

Information Requirements for Aquatic Resources in SP Application's EIS

The level of information and/or extent of analysis necessary in the project EIS to comply with NEPA at the project level will be reduced as a result of tiering from the SSHCP EIS. While timelines for review required by NEPA regulations will remain the same (e.g. Draft EIS comment period of 45 days, Final EIS review period of 30 days), submittal of information necessary for a complete application and tiering from

the SSHCP EIS will substantially reduce the required preparation time of the EIS, including using applicable information regarding the direct, indirect, and cumulative effects, incorporation of applicable avoidance and minimization measures, and elimination of the evaluation of off-site alternatives.

Compliance with CWA 404 Avoidance and Minimization Requirements, Including EPA's 404(b)(1) Guidelines

Because the SSHCP EIS examines a range of reasonable HCP alternatives affecting waters of the U.S., it can serve as the basis for the Sacramento District's landscape-level evaluation of alternatives under NEPA. Similarly, the SSHCP EIS and supplemental information submitted concurrently with EIS processing to the Corps, provide the fundamental basis for the Corps' evaluation of avoidance, minimization and less damaging practicable alternatives at the regional scale. Most project-level avoidance and minimization requirements will be satisfied when proposed activities are designed to comply with all applicable avoidance and minimization measures contained in the SSHCP and ARP.

An on-site alternatives analysis will still be required, but the off-site alternatives analysis normally required for SP evaluation under EPA's 404(b)(1) Guidelines would have been addressed at the regional level in the Corps' ROD for the SSHCP EIS. Most on-site avoidance and minimization will be achieved by incorporating applicable avoidance and minimization measures from the documents noted above. The Corps will exercise its discretionary judgment, consistent with CWA 404 regulations, in evaluating avoidance and minimization of on-site impacts to waters of the U.S. This will be accomplished within the context of recognizing regional, plan-wide trade-offs in aquatic resource impacts, avoidance, minimization and compensatory mitigation, resulting in an overall enhanced quality of regional aquatic resource protection offered by the SSHCP and associated local ARP. For example, a stream setback may have opportunity to be reasonably expanded to include the outer boundary of an adjacent wetland. Assessment of avoidance and minimization opportunities is necessarily site-specific, however the Sacramento District expresses the intent to apply case-specific analysis in consideration of the SSHCP regulatory context within which the proposed action would processed toward decision-making.

Compensatory Mitigation Requirements

Compensatory mitigation requirements for unavoidable impacts to waters of the U.S. would align to the mitigation requirements contained in the SSHCP, and would be satisfied by a "one-fee" system in which the SSHCP's fees required for impacts to aquatic resources would cover both the SSHCP's requirements and the Corps' compensatory mitigation requirements, vis-à-vis a SSHCP ILF Program that would be established consistent with requirements of the Federal Mitigation Rule (33 CFR Part 332).

Compliance with Other Laws

The Corps will pursue programmatic compliance with ESA, NHPA 106 and CWA 401 to provide for greater assurances and streamline these processes. In comparison to a typical SP process, programmatic approaches to complying with these laws is anticipated to save significant amounts of time and cost to project applicants.

DRAFT

Table 1. SSHCP Abbreviated Standard Permit vs. Normal Standard Permit Requirements

Requirements	SSHCP Abbreviated SP	Normal SP
Pre-application Meeting	Required	Recommended
Complete Application	Required. See 33 CFR Part 325.1(d)	Required. See 33 CFR Part 325.1(d)
Public Notice	Required. See Under 33 CFR Part 325.3	Required. See under 33 CFR Part 325.3
EIS Level of Analysis	Reduced, Due to "Tiering" from SSHCP EIS/EIR	Required. Stand-Alone, Project-Specific
Alternatives for NEPA, 404(b)(1) and Public Interest Review	Reduced, Due to "Tiering" from SSHCP EIS/EIR, and Incorporating SSHCP Avoidance/Minimization Measures	Required. Stand-Alone, Project Specific
Evaluation of Off-site Alternatives Analysis	Not Required	Required
Evaluation of On-site Alternatives Analysis	Required. See 33 CFR Part 325, Appendix B.9(5). Primarily Satisfied through Incorporation of SSHCP Avoidance/Minimization Measures; Minor Adjustments Along Preserve Boundaries may be Necessary	Required. See Under 33 CFR Part 325, Appendix B.9(5). Project-Specific Avoidance and Minimization
Applicant Information About Avoidance and Minimization for Impacts to Waters of the US	Required. Most On-site Avoidance and Minimization Requirements Satisfied by Incorporating SSHCP Avoidance/Minimization Measures; Additional Supporting Information Will be Required	Required. No Standardized Design and Construction Avoidance/Minimization Measures to Rely Upon
Compensation for Impacts to Waters of the U.S.	Required. Compensatory Mitigation Achieved through SSHCP In-Lieu Fee Program	Required. Project-specific mitigation plan subject to Corps approval. Compensatory mitigation Achieved through Mitigation Bank, Corps-Approved (Non-SSHCP) In-Lieu Fee Program, and/or Permittee-Responsible Mitigation; See 33 CFR Part 332.
Compliance with Section 7 of the Endangered Species Act (ESA)	Required. Project Covered by Programmatic Biological Opinion (BO)	Required. Project-Specific Biological Assessment, Consultation, and BO
Compliance with Section 401 of the Clean Water Act (Section 401 Water Quality Certification [WQC])	Required. Project Covered by Programmatic Section 401 Water Quality Certification (WQC)	Required. Project-Specific Section 401 WQC Application
Compliance with Section 106 of the National Historic Preservation Act (NHPA)	Required. Project Covered by Programmatic Agreement (PA)	Required. Project-Specific Information and Consultation

DRAFT

BENEFITS OF THE ABBREVIATED STANDARD PERMIT PROCESS

Alignment with the SSHCP is an opportunity to streamline the standard permit process under the Corps Regulatory Program for covered actions which require the preparation of an EIS. The abbreviated SP process will reduce Corps review time by more than half. With NEPA tiering and programmatic consultations, a permit decision can be made in 6 to 9 months (excluding any delays attributable to the permit applicant). Additional reduction in processing times would also occur if reviews are conducted concurrent with local agency review, including completing a joint EIS' and Environmental Impact Report (EIR) with the local agency. As shown in **Table 1**, reduction in length of processing of SPs under the abbreviated SP process will result from:

1. A reduction in time necessary to complete a Draft and Final EIS, as a result of tiering from the SSHCP EIS.

2. A reduction in the level of information required to show compliance with EPA's Section 404(b)(1) Guidelines, which would be limited to evaluation of on-site avoidance and minimization alternatives, most of which would be satisfied by incorporating SSHCP avoidance/minimization measures. This would result in a reduction in the review time by the Corps.

3. A reduction in Corps review time for proposed compensatory mitigation, as compensatory mitigation would occur through the purchase of ILF program credits consistent with the SSHCP.

4. A reduction in processing time for Section 7 ESA compliance due to issuance of a programmatic BO by USFWS.

5. A reduction in processing time for Section 401 WQC due to issuance of a programmatic 401 WQC by the Central Valley Regional Water Quality Control Board.

6. A reduction in processing time for Section 106 of the NHPA, due to development of a PA with the California State Historic Preservation Officer.

DRAFT

EIS/EIR APPENDIX D

Impact Avoidance and Minimization Measures (AMMs)

As required by the ESA (Section 10(a)(2)(A)(ii)), Fish and Game Code Section 2081, and the 2008 Mitigation Rule (USACE and USEPA 2008), the action alternatives evaluated in this EIS/EIR include measures to avoid and minimize take of Covered Species and measures to avoid and minimize impacts to aquatic resources. This appendix describes the Avoidance and Minimization Measures (AMMs) that would be included in the projects and activities implemented under the Proposed Action/Proposed Project Alternative, and implemented under the Reduced Permit Term HCP (i.e. the HCP Covered Activities). The AMMs presented in this EIS/EIR Appendix are conditions on each HCP Covered Activity. Each condition contains several AMMs that are intended to eliminate or to reduce direct or indirect effects to species habitats and to aquatic resources.

GENERAL AVOIDANCE AND MINIMIZATION MEASURES

General AMMs are designed to avoid or minimize effects of Covered Activities on natural land covers and Covered Species.

Condition 1. Avoid and Minimize Urban Development Impacts to Watershed Hydrology and Water Quality

Urban development Covered Activities may adversely alter watershed hydrology and degrade water quality. Condition 1 is designed to conserve and/or rehabilitate on-site natural creeks and streams. This condition would require project designs to include low-impact development (LID) drainage control measures and would require the implementation of BMPs during construction and during other ground disturbance. These AMMs would assure that rainwater runoff from newly developed lands would not change the pre-development hydrographs of receiving waterways, and these aquatic resources would retain most pre-development functions and services.

LID-1 (Stormwater Quality): When the size of a Covered Activity project exceeds the thresholds established by the State Water Resources Control Board (SWRCB) (see the most recent Stormwater Quality Design Manual for the Sacramento and South Placer Regions, or future SWRCB-approved design manuals applicable to the Planning Area), incorporate stormwater management into site design to satisfy the requirements outlined in the most recent Stormwater Quality Design Manual for the Sacramento and South Placer Regions. Stormwater management may include groundwater recharge (LID-2) and natural site features (LID-3).

LID-2 (Groundwater Recharge): When siting new HCP Preserves containing Riparian, Open Water, or Freshwater Marsh land cover types, the HCP Implementing Entity will prioritize locations that are suitable for groundwater recharge.

LID-3 (Natural Site Features): Incorporate preservation of a site's natural aquatic features (such as creeks and streams) into the project's design to retain natural hydrologic patterns and to retain habitat that might be used by Covered Species.

Condition 2. Avoid and Minimize Urban Development Direct and Indirect Impacts to Existing Preserved Lands and HCP Preserves

New Urban Development adjacent to existing natural lands or HCP Preserves may indirectly impact species habitat and species that use those lands. Condition 2 seeks to avoid or minimize these environmental stressors, which could n direct and indirect impacts to species habitats and aquatic resources existing preserves or the HCP Preserve System:

- Alterations to landscape hydrology from new impervious surfaces may adversely affect natural communities in the lower watershed, the ecology of preserved lands, and/or downstream aquatic resources.
- Water runoff from development or from roadways directed into preserved lands may introduce harmful substances into existing preserves and HCP Preserves. Unseasonal and/or additional water entering Preserved Lands may eliminate vernal pools and other seasonal wetlands native to the region by converting them to low-functioning perennial wetlands.
- New development adjacent to existing or HCP Preserves may alter or remove the soil's "perched aquifer" (see Appendix G), reducing or eliminating the micro-watersheds that support the natural hydrology of vernal pools within the preserve boundary. These changes may adversely affect the existing hydrologic regime of vernal pools by changing the timing, depth, and/or duration of vernal pool saturation and/or ponding, causing long-term changes to a suite of vernal pool functions. For example, changes to water chemistry could adversely affect species habitat, and although the vernal pool may remain, the environmental conditions of the pools may no longer provide habitat for vernal pool Covered Species, or provide the benefit of other wetland functions (e.g., stormwater attenuation) compared to pre-project conditions.
- Introduction or proliferation of non-native or invasive plant and wildlife species may displace native species.
- Urban landscaping in the interface of a new development and a vernal pool ecosystem Preserve often includes native or non-native trees and other plant species that are not found in California grasslands, and therefore, cannot survive in the interface without intensive irrigation and cultivation. In addition to adverse effects from artificial irrigation and landscape maintenance, adult trees may become landscape barriers that inhibit species movement and may act to isolate individual Preserves from the larger HCP Preserve System.

- Recreational use of HCP Preserves near developed areas may compact soils, eliminate vegetation, impair hydrologic functions, introduce weeds or invasive plant species, and disturb plants and wildlife.
- Introduction of light, noise, or vibrations may disrupt normal nocturnal and diurnal cycles of native species.

AMMs associated with Condition 2 must be applied to all Covered Activities implemented within the UDA that border an existing Preserve or a planned HCP Preserve.

EDGE-1 (Compatible Land Uses): To the maximum extent practicable, unban development project Covered Activities will locate compatible land uses (e.g., designated open space such as parks and ball fields, detention basins, and other land uses with less-intensive human activity) in areas immediately adjacent to existing preserves or planned HCP Preserve boundaries. The compatible land use will provide additional buffering of existing preserves or HCP Preserves from potential indirect effects of adjacent urban development. However, the soil surfaces in a compatible land use area may be re-contoured slightly, provided that the soil restrictive layer remains undamaged and most of the soil profile above the restrictive layer remains intact. The Land Use Authority Permit Applicant will determine when it is not practicable for a new project to locate a compatible land use adjacent to existing preserve or a planned HCP Preserve boundary.

EDGE-2 (Single-Loaded Streets): To the maximum extent practicable, the design of new urban development Covered Activities will locate single-loaded streets adjacent to existing preserves or planned HCP Preserves. The Land Use Authority Permit Applicant will determine when it is not practicable for a new project to locate single-loaded streets adjacent to existing preserves or planned HCP Preserves.

EDGE-3 (Preserve Setbacks): New urban development Covered Activities constructed adjacent to existing preserves or planned HCP Preserves must establish a minimum 50-foot-wide setback, measured outward from the boundary of any existing Preserve or a planned HCP Preserve. This minimum 50-foot-wide setback will function as a transition between urban development and the preserved lands, and must be managed to maintain the natural community of vegetation present in the adjacent preserved lands. As much of the setback as possible should remain in the same natural habitat as the preserved lands.

However, some recreational Covered Activities would be allowed in the Preserve Setbacks. Also, where an existing preserve or planned HCP Preserve is adjacent to an existing roadway (e.g., collectors, arterials, thoroughfares), the 50-foot

Preserve Setback will not be required, and any bicycle or pedestrian trails will be located in the road right-of-way. In addition, where a roadway Covered Activity crosses an existing preserve or planned HCP Preserve, no Preserve Setback will be required at the crossing, and any bicycle or pedestrian trail will be located in the road right-of-way.

EDGE-3a (Setback Recreational Trails): Trails are best suited outside of the setback; however, certain types of recreational trails or facilities (e.g., benches, trash receptacles, shade structures, fencing) that can be constructed with minimum ground disturbance and in compliance with EDGE-7 may be allowed within a Preserve Setback, as specified in Section 5.2.5 of the SSHCP document. Preserve Setback design must locate trails on the side nearest development, away from the Preserve boundary. Trails may be permeable or semi-permeable hiking trails or paved community trials. The maximum trail width will be 16 feet total, including 2-foot-wide shoulders. Post and cable fencing, split rail, or other open fencing will be installed adjacent to recreation trails to keep pedestrians on the trail.

EDGE-3b (Setback Firebreaks): If approved by the local authorities, the Preserve Setback trail may also be used as a firebreak. In instances where a trail cannot act as a firebreak, the firebreak will be located between the trail and the Preserve boundary (see Section 5.2.7 of the SSHCP document). Firebreaks allowed inside the setbacks must be created by methods that will not disturb the soil's restrictive layer or perched aquifer, such as mowing, minor scraping of surface vegetation, or shallow tilling, to comply with EDGE-7. Firebreak width within Preserve Setbacks is the minimum width needed to comply with applicable local codes.

EDGE-3c (Setback Shade Trees and Landscaping): To prevent potential impacts from landscaping irrigation water or from accumulation of landscaping leaf litter onto the grasslands or vernal pools of a n existing or HCP Preserve, planting of shade trees or landscaping vegetation will be limited to the area of the Preserve Setback that is located between the recreation trail and the adjacent urban development (i.e., away from the Preserve).

- Only drought-tolerant plant species will be planted. The planting pallet used for Preserve Setback landscaping will not include invasive plant species listed in the California Invasive Plant Council's (Cal-IPC) California Invasive Plant Inventory Database or listed in the Cal-IPC California Invasive Plant Watch List (see http://www.cal-ipc.org/paf/). Any shade trees planted along Preserve Setback trails will be native species that are

found in California grasslands and that can survive in the Vernal Pool Ecosystem/ Valley Grassland border without long-term irrigation or fertilization (e.g., valley oak, black oak, blue oak, oracle oak). In general, no more than 30% of any 1,000-foot-long segment of a Preserve Setback trail will have canopy cover from tree plantings (to be consistent with maximum tree densities naturally found within native California grasslands and savanna).

- Drip irrigation will be allowed for a maximum of 5 years to establish native shade trees or other native landscape vegetation planted between the recreation trail and adjacent urban development. The HCP Implementing Entity has the discretion to allow irrigation to continue past 5 years if extenuating circumstances necessitate it (e.g., during a drought) and the continuance of irrigation will not affect the Preserve. Any irrigation systems located within Preserve Setbacks will be inspected quarterly to determine if such systems are affecting soils or vegetation not part of the intended plantings. Irrigation system repairs will be completed immediately if it is determined that the irrigation system is affecting vegetation or soil moisture not part of the intended tree planting.
- If, during annual monitoring of the adjacent preserve (see Chapter 8 of the SSHCP document), adverse indirect effects (e.g., leaf litter accumulation, irrigation runoff, plant encroachment) of the Preserve Setback's planted vegetation are detected, then the HCP Implementing Entity, the HCP Preserve Manager, and the entity responsible for the Preserve Setback will identify appropriate adaptive management of the Preserve Setback tree or landscape plantings in accordance with the Preserve Setback Easement (see Section 5.2.5 and Chapter 9 of the SSHCP document).

EDGE-4 (Locate Stormwater Control Outside Preserves): Roads, sidewalks, and other impermeable surfaces of urban development Covered Activities adjacent to existing preserves or new HCP Preserves will slope away from preserved lands and Preserve Setbacks, or will intercept drainage with swales or curbs and gutters outside the Preserve Setbacks to preclude drainage from entering preserves and Preserve Setbacks. Stormwater flows must be directed away from preserved lands and Preserve Setbacks and directed into stormwater control facilities inside the development (outside Preserves and Preserve Setbacks)[1] (see EDGE-6 for exception to EDGE-4 in certain Linkage Preserves).

[1] However, detention basins are allowed in certain Linkage Preserves, consistent with the requirements of EDGE-6. At the time of SSHCP preparation, seven Linkage Preserves with drainages are planned SSHCP

EDGE-5 (Stormwater Control in Preserve Setbacks): If recreation trails are established in any Preserve Setback in compliance with EDGE-3, the trail must be sloped away from the Preserve, and rainwater leaving the trail surface must flow into an adjacent low-velocity bio-retention swale or cell to keep rainwater runoff and trail contaminants from entering the Preserve. Low-velocity bio-retention swales or cells are typically small linear features placed on one or both sides of a trail. As required by EDGE-3, trails and their adjacent bio-retention swales or cells must be located on the side of the Preserve Setback nearest development.

EDGE-6 (Detention Basins in Linkage Preserves): Because planned Linkage Preserves L1, L2, L4, L7, L8, L9, and L10 (see Section 7.5) surround natural creeks or streams that must receive stormwater from the planned adjacent urban development Covered Activities, a limited number of stormwater detention basins will be allowed on those Linkage Preserves. Detention basins within Linkage Preserves (see Section 5.2.7) will be designed and constructed with fill material to build up the perimeter of the detention basin so as not to impact the soil restrictive layer (duripan or hardpan) and functions of the soil perched aquifer. Detention basins within Linkage Preserves will capture stormwater flows and runoff, and will discharge water to the stream/creek or percolate collected water to the soil perched aquifer. Detention basin structures that collect stormwater entering the basin or convey stormwater leaving the basin must be designed to avoid and minimize effects to Covered Species habitat in the Linkage Preserve.

EDGE-7 (Hardpan/Duripan Protection): To protect the soil perched aquifer in the watersheds supporting existing vernal pool hydrology, activities that have the potential to cut into, disrupt, or remove the soil's restrictive layer (hardpan or duripan) will not occur within preserved lands or Preserve Setbacks. However, in certain circumstances, the Covered Activities (defined in Section 5.2.6 of the SSHCP document), Covered Activities in Stream Setbacks within the UDA, and Covered Activities discussed in Section 5.2.8 (Covered Activities in the Laguna Creek Wildlife Corridor of the HCP Preserve System), may result in small punctures[2] or other minor disruptions of the soil hardpan or duripan, if approved by the HCP Implementing Entity and the HCP Technical Advisory Committee according to the process described in Chapter 9 of the SSHCP document. If a Covered Activity on a Preserve or Preserve Setback results in a puncture or other disruption to the soil hardpan or duripan, the puncture will be sealed using bentonite clay or other

Preserves: L1, L2, L4, L7, L8, L9, and L10 (see Section 5.2.7 and Section 7.5). Also see project-specific measures in Section 5.5.1.

[2] Punctures may include small holes that penetrate the soil hardpan or duripan such as might occur when digging or drilling holes for the installation of fence posts, sign posts, or trees.

material that maintains the functionality of the soil's restrictive layer and associated perched aquifer.

EDGE-8 (Outdoor Lighting): All outdoor lighting in urban development Covered Activity projects will be designed to minimize light pollution into existing and planned HCP Preserves, except where a Land Use Authority Permit Applicant determines lighting is necessary for public safety or security. Minimization measures may include light fixture placement (e.g., as low to the ground as possible), lamp designs (e.g., shielding, low glare, or no lighting), directing light away from HCP Preserves, or other means to avoid or minimize light pollution. The Third-Party Project Proponent will use the best information available at the time of project design to minimize effects of light pollution on target Covered Species (e.g., western spadefoot (*Spea hammondii*) and Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*)).

EDGE-9 (Livestock Access to Preserves): urban development Covered Activity projects that include on-site HCP Preserves will include in their design an adequate number of access points and facilities for delivery and pick up of grazing animals (livestock), such that these activities will not significantly alter the Preserve's habitat and are consistent with the protection of livestock and protection of adjacent public property, and include adequate public safety measures.

EDGE-10 (Prevent Invasive Species Spread): Completed Covered Activities (including roads) will be maintained in a manner that avoids the spread of invasive species into Preserve and Open Space areas. Such maintenance measures will include the following:

- To prevent the transport of non-native invasive species onto HCP Preserves, before bringing any equipment onto an Preserve or Preserve Setback, equipment must be cleaned of mud, dirt, and plant material. Cleaning will occur in the infested area or another appropriate location as approved by a Permit Applicant.
- Mowing rotation will start in un-infested areas and move to infested areas.
- Invasive plant prevention techniques will be incorporated into maintenance plans.
- The HCP Implementing Entity will survey road shoulders, ditches, and rights-of-way that border HCP Preserves for invasive weeds or other exotic plant species. Where roadside weed infestations have reached a critical control point, the HCP Implementing Entity or Land Use Authority Permit Applicant will apply the appropriate manual, mechanical, or chemical treatment.

Condition 3. Implement Construction Best Management Practices

AMMs associated with Condition 3 must be applied to all Covered Activities.

BMP-1 (Construction Fencing): Orange construction fencing will be installed to ensure that ground disturbance does not extend beyond the allowed construction footprint (i.e., the limit of project construction plus equipment staging areas and access roads). Permit Applicants and their "Third-Party Project Proponents" implementing ground-disturbing Covered Activities will mark the outer boundary of any Preserve Setback or Stream Setback adjacent to or within the project site with orange construction fencing prior to ground disturbance. This fencing will remain in place until project completion, as identified by the Permit Applicant.

BMP-2 (Erosion Control): Permit Applicants and their Third-Party Project Proponents implementing ground-disturbing Covered Activities will install temporary control measures for sediment, stormwater, and pollutant runoff as required by the Permit Applicant to protect water quality and species habitat. Silt fencing or other appropriate sediment control device(s) will be installed downslope of any Covered Activity that disturbs soils.

Fiber rolls and seed mixtures used for erosion control will be certified as free of viable noxious weed seed. As discussed in Section 5.4.2, Covered Species Take Avoidance and Minimization Measures, erosion controls installed in or adjacent to Planning Area modeled habitat for giant gartersnake (*Thamnophis gigas*), western pond turtle (*Actinemys marmorata*), California tiger salamander (*California tiger salamander*), or western spadefoot (see Chapter 3 of the SSHCP document) must be of appropriate design and materials that will not entrap the species (e.g., not contain mesh netting). Regular monitoring and maintenance of the project's erosion control measures will be conducted until project completion to ensure effective operation of erosion control measures.

BMP-3 (Equipment Storage and Fueling): Permit Applicants and their Third-Party Project Proponents implementing ground-disturbing Covered Activities will ensure that equipment storage and staging will occur in the development footprint only (not sited in any existing on-site Preserve, planned on-site Preserve, Preserve Setback, Stream Setback, or aquatic land cover type). Fuel storage and equipment fueling will occur away from waterways, stream channels, stream banks, and other environmentally sensitive areas within the development footprint.

However, certain equipment storage and fueling activities can be allowed on HCP Preserves within habitat re-establishment/establishment sites (refer to Section

5.2.7) if no location outside of the site is available. If a Covered Activity results in a spill of fuel, hydraulic fluid, lubricants, or other petroleum products, the spill will be absorbed and waste disposed of in a manner to prevent pollutants from entering a waterway, Preserve, Preserve Setback, or Stream Setback.

BMP-4 (Erodible Materials): Permit Applicants and their Third-Party Project Proponents implementing Covered Activities must not deposit erodible materials into waterways. Vegetation clippings, brush, loose soils, or other debris material will not be stockpiled within stream channels or on adjacent banks. Erodible material must be disposed of such that it cannot enter a waterway, Preserve, Preserve Setback, Stream Setback, or aquatic land cover type. If water and sludge must be pumped from a subdrain or other structure, the material will be conveyed to a temporary settling basin to prevent sediment from entering a waterway.

BMP-5 (Dust Control): Permit Applicants and their Third-Party Project Proponents implementing ground-disturbing Covered Activities will water active construction sites regularly, if warranted, to avoid or minimize impacts from construction dust on adjacent vegetation and wildlife habitats. No surface water will be used from aquatic land covers; water will be obtained from a municipal source or existing groundwater well.

BMP-6 (Construction Lighting): Permit Applicants and their Third-Party Project Proponents implementing ground-disturbing Covered Activities will direct all temporary construction lighting (e.g., lighting used for security or nighttime equipment maintenance) away from adjacent natural habitats, and particularly Riparian and Wetland habitats and wildlife movement areas.

BMP-7 (Biological Monitor): If a Covered Activity includes ground disturbance within Covered Species modeled habitat, an approved biologist will be on site during the period of ground disturbance, and may need to be on site during other construction activities depending on the Covered Species affected. After ground-disturbing project activities are complete, the approved biologist will train an individual to act as the on-site construction monitor for the remainder of construction, with the concurrence of the Permitting Agencies. The on-site monitor will attend the training described in BMP-8. The approved biologist and the on-site monitor will have oversight over implementation of Avoidance and Minimization Measures, and will have the authority to stop activities if any of the requirements associated with those measures are not met. If the monitor requests that work be stopped, the Wildlife Agencies will be notified within one working day by email. The approved biologist and/or on-site monitor will record all observations

of listed species on California Natural Diversity Database field sheets and submit them to the California Department of Fish and Wildlife. The approved biologist or on-site monitor will be the contact source for any employee or contractor who might inadvertently kill or injure a Covered Species or who finds a dead, injured or entrapped individual. The approved biologist and on-site monitor's names and telephone numbers will be provided to the Wildlife Agencies prior to the initiation of ground-disturbing activities. Refer to species-specific measures for details on requirements for biological monitors.

BMP-8 (Training of Construction Staff): A mandatory Worker Environmental Awareness Program will be conducted by an approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The training will include how to identify Covered Species that might enter the construction site, relevant life history information and habitats, HCP and statutory requirements and the consequences of non-compliance, the boundaries of the construction area and permitted disturbance zones, litter control training (SPECIES-2), and appropriate protocols if a Covered Species is encountered. Supporting materials containing training information will be prepared and distributed by the approved biologist. When necessary, training and supporting materials will also be provided in Spanish. Upon completion of training, construction personnel will sign a form stating that they attended the training and understand all of the Avoidance and Minimization Measures (AMMs). Written documentation of the training must be submitted to the HCP Implementing Entity within 30 days of completion of the training, and the HCP Implementing Entity will provide this information to the Wildlife Agencies.

BMP-9 (Soil Compaction): After construction is complete, all temporarily disturbed areas will be restored similar to pre-project conditions, including impacts relating to soil compaction, water infiltration capacity, and soil hydrologic characteristics.

BMP-10 (Revegetation): Permit Applicants and their Third-Party Project Proponents implementing ground-disturbing Covered Activities will revegetate any cut-and-fill slopes with native or existing non-invasive, non-native plants (e.g., non-native grasses) suitable for the altered soil conditions and in compliance with EDGE-2 and EDGE-8, if applicable.

BMP-11 (Speed Limit): Project-related vehicles will observe the posted speed limits on paved roads and a 10-mile-per-hour speed limit on unpaved roads and during travel in project areas. Construction crews will be given weekly tailgate instruction to travel only on designated and marked existing, cross-country, and project-only roads.

Condition 4. Avoid and Minimize Impacts that May Result from Implementation of Covered Transportation Projects

Urban development transportation projects and Rural Transportation Project Covered Activities, including bridge projects, can affect Covered Species. AMMs included for Condition 4 seek to avoid or minimize direct and indirect impacts that may result from construction of roadways or roadway improvements. Condition 4 applies to all transportation-related Covered Activities (see Sections 5.2.1 and 5.2.3).

Permit Applicants and their Third-Party Project Proponents implementing Urban Development transportation or Rural Transportation Project Covered Activities must comply with the roadway siting, design, and construction AMMs described below.

ROAD-1 (Road Project Location): Road projects will be located in the least environmentally sensitive area to avoid, to the maximum extent practicable, impacts on Covered Species, Covered Species habitat, and waters of the United States. Road project alignments will follow existing roads, road easements, and rights-of-way, or be sited in disturbed areas to minimize habitat loss and additional habitat fragmentation.

ROAD-2 (Wildlife Crossing Structures): Road projects that are identified as Urban Development Covered Activities (see Section 5.2.1) (including the Capital Southeast Connector, see Section 5.2.1.1) or are identified as Rural Transportation Covered Activities (see Section 5.2.3) will include an adequate number of wildlife crossing structures, as depicted in Figure 5-10 of the SSHCP document. An adequate number of wildlife crossing structures within the Urban Development Area (UDA) and outside the UDA will provide for continued dispersal and movement of native wildlife throughout the Planning Area, as required by the HCP Biological Goals and Objectives.

The HCP defines “wildlife crossing structure” as a physical structure specifically designed or retrofitted to facilitate undercrossing for target wildlife species. The Plan further classifies wildlife crossings as hydrologic crossings and dry crossings. Hydrologic crossings are built where there is an existing stream, creek, or intermittent drainage to maintain existing hydrologic connectivity within the Planning Area. As described below, hydrologic crossings require specialized features to be built into the crossing structure, such as elevated platforms to allow wildlife to pass under a crossing structure when it is inundated with water. Dry wildlife crossings are built where there is no hydrologic feature but where a crossing is needed to provide for overland connectivity. wildlife crossing structures may include structures such as bridges, arches, or box and pipe culverts.

Permit Applicants expect that future wildlife movement and dispersal within the UDA will occur almost entirely within the boundaries of the future interconnected HCP Preserve System (see Section 7.5). Therefore, wildlife crossings are needed wherever a roadway crosses (bisects) the conceptual HCP Preserve System. Wildlife crossing structures inside the UDA will be sized to accommodate movement of a highly mobile native indicator species (i.e., coyote (*Canis latrans*)). By designing UDA wildlife crossing structures to meet the movement and dispersal requirements of coyote, the Permit Applicants anticipate that the crossing structure will also accommodate most native wildlife species that currently occupy the UDA (see Chapter 8 in the EIS/EIR).

The Permit Applicants expect that most of the Planning Area outside of the UDA will remain as Open Space over the 50-year EIS/EIR Study Period (see Chapter 3 of the EIS/EIR). Therefore, the Permit Applicants expect that the Rural Transportation Project Covered Activities proposed outside the UDA will have a relatively small effect on the movement and dispersal of larger or more mobile native wildlife species, including coyote. Consequently, the Permit Applicants anticipate that the design of Rural Transportation Project Covered Activities outside the UDA will need to include wildlife crossing structures primarily where the Rural Transportation Project Covered Activities occur within California tiger salamander modeled habitat (see AMM CTS-3 and also EIS/EIR Chapter 9, and Figure 3-16 of the SSHCP document).

The design and location of wildlife crossing structures both inside the UDA and outside the UDA will be determined by collaboration between the Third-Party Project Proponent, the Land Use Authority Permit Applicant, and the HCP Implementing Entity. Crossing design will use the best available scientific and commercial information for the target species. The design of crossing structures will be based on demonstrated effectiveness of design for the target species when such information is available, or will be designed with a high level of certainty of success based on studies of similar taxa in similar environmental settings. The proposed wildlife crossing structures designs will be reviewed and approved by the HCP Implementing Entity prior to final design.

The HCP Implementing Entity will develop a Wildlife Crossing Maintenance Manual to be provided to the entity responsible for maintaining the wildlife crossing. The Wildlife Crossing Maintenance Manual will identify vegetation management, clearing of obstructions, and other techniques to maintain the desired movement and hydrologic connectivity, and to avoid effects to adjacent HCP Preserves.

All HCP wildlife crossing structures in the UDA will include the following design elements:

- Open-bottom bridges or arches where the roadway crosses a river or stream. Where an open-bottom bridge or arch is used, the span of the crossing will be at least 1.2 times the bankfull width of the stream and span the banks to allow for dry wildlife passage along each side of the stream and to avoid or minimize piers or footings within the stream. (Bankfull width refers to the width of a stream channel at the point where over-bank flow begins during a flood event.)
- Any wildlife crossing structure that also maintains hydrologic connectivity will be designed to maintain pre-construction water capacity, depth, and velocity. The crossing structure will not restrict or impede normal flows or flood flows, unless a primary purpose of the structure is to manage such flow(s). Wildlife crossing structures must be designed to provide a dry passage (e.g., a platform ledge) higher than flows for a 10-year storm event to allow wildlife to pass through an inundated crossing structure.
- Wildlife crossing structures in the UDA will be designed and sized to accommodate movement of at least medium-sized mammals (e.g., coyote). The opening must be at least 3 feet high and the crossing structure must have a minimum openness ratio of at least 0.4.
- Vegetation leading up to the entrance of a crossing structure and the substrate leading into and within the crossing structure will be natural and appropriate to provide for continuity of habitat, attract the target animal species for which the crossing is designed, and facilitate use of the crossing structure.
- A wildlife crossing under six-lane roads or larger will be designed to provide ambient light and temperature in the longer crossing structures (e.g., either by providing a larger opening or a grate at the top of the structure to improve the attractiveness of the crossing to certain Covered Species and wildlife that may hesitate to cross through dark, confined structures or one with a temperature gradient (Jackson and Griffin 2000)). If a road is less than six lanes in width, these designs will be optional.
- Lighting will not be placed at or near the entrance of a wildlife crossing structure to maintain natural ambient light conditions at night and to increase chances of wildlife use. However, a Land Use Authority Permit Applicants may allow lighting if necessary for human health or safety.

Outside the UDA, wildlife crossing structures may be required for California tiger salamander (refer to AMM CTS-1), and could also be required for other native species.

ROAD-3 (Roadside Pesticide Use[3]): If pesticide use is necessary along roadsides, the appropriate HCP Permit Applicant will ensure that the pesticide application strictly complies with the pesticide label and all other applicable federal, state, and local authorities pertaining to the use, safety, storage, disposal, and reporting of the pesticide. Where roadside weed infestations have reached a critical control point, the HCP Implementing Entity or a Land Use Authority Permit Applicant will apply the appropriate manual, mechanical, or chemical treatment. In addition, the HCP Implementing Entity or appropriate Land Use Authority Permit Applicant will post signs along road shoulders adjacent to sensitive areas (e.g., California tiger salamander breeding ponds, endemic plant populations). The signs will identify pesticide use restrictions or other roadside maintenance restrictions.

Condition 5. Avoid and Minimize Impacts that Result from Public Use of Low-Impact Nature Trails in HCP Preserves

HCP Preserves within the UDA are likely to be surrounded by urban development. As discussed in Section 5.2.7, allowing limited use of HCP Preserves will help to foster a sense of community ownership and will provide an opportunity to educate the community about the natural resources to be protected within the HCP Preserve System.

Low-impact nature trails will be designed following the AMMs outlined below.

NATURE TRAIL-1 (Nature Trail Plan): A nature trail plan must be prepared for each Preserve where a trail is allowed by the HCP Preserve Management Plan. Nature trails will be unpaved trails that vary in width depending on terrain and existing constraints, but will never exceed 4 feet in width. Where a trail crosses a swale, wooden walkways elevated to a height no greater than 2 feet will be installed. Trail improvements may include mowing vegetation to create or maintain a trail, minor grading to remove trip hazards, and signs providing directional and educational information. Public access to land acquired for preservation will be prohibited until a trail plan can be prepared by the HCP Implementing Entity and approved by the Permitting Agencies. A trail plan will include the following:

- Maps identifying areas that contain sensitive habitats or species occurrences.

[3] Use of pesticides (including rodenticides and herbicides) is not an SSHCP Covered Activity. However, pesticide use specified in Section 5.3 is an allowed land management tool, provided the pesticide application is otherwise legal and conforms to all conditions in Section 5.4.

- Maps that show the location and footprint of proposed trails.
- Methods used to control public access.
- Trail and use monitoring methods, schedules, and responsibilities.
- Trail operation and maintenance guidelines and responsibilities.
- Clear triggers for use restrictions or closure based on sensitive biological indicators (e.g., seasonal closures of some trails on the basis of activity periods of Covered Species or sensitive species).

NATURE TRAIL-2 (Nature Trail Protection of Duripan): Nature trails will be sited and constructed so as not to interfere with existing soil duripan and the perched aquifer that support the existing hydrologic regime of the Vernal Pool Ecosystem and Valley Grassland, and will not interfere with existing pool hydrology. Trails within HCP Preserves will not be paved.

NATURE TRAIL-3 (Nature Trail Location): Nature trails will be located away from sensitive natural resources (e.g., vernal pools, riparian habitat, woodland habitat, Covered Species occurrences, raptor nesting sites, tricolored blackbird (*Agelaius tricolor*) colony sites). The Wildlife Agencies will determine the distance necessary to avoid impacts to sensitive natural resources.

NATURE TRAIL-4 (Biological Studies Prior to Nature Trail Design): Biological studies will be conducted within the area being considered for nature trail construction prior to project design. The studies will include land cover type mapping and focused species surveys and/or wetland delineations. The biological studies will include assessments of potential effects of trail construction on HCP Preserve System resources, and recommendations for avoidance and minimization that may be incorporated into project siting, design, construction, and operation.

NATURE TRAIL-5 (Monitoring of Nature Trail Impacts): Impacts that could result from use of a nature trail within a Preserve will be monitored according to the HCP Preserve Management Plan to ensure that uses do not conflict with the individual Preserve Management Plan. If use of a trail is found to conflict with the individual Preserve Management Plan, use of that trail will be discontinued until adjustments in the use can be made to reduce or eliminate conflicts. The HCP Implementing Entity will make decisions about discontinuing or modifying use of a trail in consultation with the HCP Preserve Manager or other applicable Preserve management agency or organization.

Condition 6. Avoid and Minimize Impacts When Re-Establishing or Establishing Wetlands

As discussed in Chapter 7 of the SSHCP document, the Permit Applicants anticipate that approximately 389 acres of Vernal Pool habitat will be re-established or established[4] within the Planning Area as part of the HCP Conservation Strategy. Although re-establishment or establishment of vernal pools is a Measurable Objective under this Plan, if not done correctly, the action could have an adverse impact on existing vernal pools.

RE-ESTABLISHMENT/ESTABLISHMENT-1 (Vernal Pool): Re-establish or establish Vernal Pool Wetland according to the following guidelines:

- Re-establishment will always take priority over establishment of vernal pools. Establishment will be permitted only after it has been determined that sites with the potential to re-establish vernal pools no longer exist in the Planning Area or cannot be acquired through a willing seller/buyer agreement.
- When possible, re-established or established sites will be located adjacent to an existing Preserve(s) to maximize connectivity and Preserve area.
- Re-establishment or establishment will not result in direct or indirect adverse impacts to the hydrologic regime of existing vernal pools. Vernal pool re-establishment or establishment actions will not remove more than 10% of any existing vernal pool watershed, as defined by the HCP LIDAR analysis (see Section 3.6 of the EIS/EIR document and Conservation Action VPI1.2 in Table 2-7 of the EIS/EIR).
- Vernal pool re-establishment will attempt to restore the historical density and range of vernal pool sizes to the maximum extent feasible using historical aerial photography of the site, if available. Where aerial photography of the site's historical conditions is not available, vernal pool re-establishment will include a range of pool sizes (area and depth) to accommodate the different habitat needs and life history characteristics of the vernal pool invertebrate Covered Species.
- Established vernal pools must be located on sites with vernal pool soils, defined as any Planning Area soil type where vernal pools currently exist.
- Established vernal pool sites will include a range of pool sizes to accommodate the different habitat needs and life history characteristics of the three vernal pool invertebrate Covered Species.

[4] In the context of this Plan, "establish" is synonymous with "create."

- The total density of vernal pools will not exceed 10% of the suitable soil areas in any vernal pool re-establishment and/or establishment site, unless it can be shown that the suitable areas of that site historically supported greater densities.
- Re-establishment or establishment may include inoculation when it is likely that no seed or cyst bank of vernal pool species remains at a site. Vernal Pool inocula will come from nearby vernal pools that are on the same geologic formation and soil type.

RE-ESTABLISHMENT/ESTABLISHMENT-2 (Vernal Pool Inocula Bank): Vernal pool re-establishment or establishment may include "soil inoculation" when it is likely that no seed or cyst bank of vernal pool species remains at a re-establishment or establishment site.

- During conversion of Urban Development Area vernal pools to a developed land cover type, project proponents will excavate and retain soil from vernal pools following protocols developed by the HCP Technical Advisory Committee (see Chapter 9 of the SSHCP document).
- Inocula applied in re-established or established vernal pools must be harvested from a vernal pool that is on the same geologic formation and soil type shown on the County General Soil Map as the re-establishment/establishment site. Geologic formations and soil types will follow U.S. Department of Agriculture Soil Conservation Service's 1993 Soil Survey of Sacramento County, California. Proposed off-site inocula sources must be approved by the Wildlife Agencies.

RE-ESTABLISHMENT/ESTABLISHMENT-3 (Re-Establishment/Establishment of Freshwater Marsh or Open Water near Airports): During review of proposed re-establishment/ establishment projects for freshwater marsh or open water on HCP Preserves, the HCP Implementing Entity shall consider the potential for the location of the re-establishment/establishment projects to increase the risk of wildlife strikes or generation of ground fog at airports. If a re-establishment/ establishment project would result in (1) a net increase in open water or freshwater marsh acreage over baseline conditions[5] within 5 miles of Mather Field, Sacramento Executive Airport, or Franklin Field; or (2) replacement of open water/freshwater marsh habitat that is located 2 or more miles from Mather Field or Sacramento Executive Airport with open

[5] For purposes of establishing baseline conditions, Freshwater Marsh and Open Water acreages will be calculated using that version of the SSHCP Land Cover Type Map in existence as of the date that the SSHCP ITP permit is issued to the Permit Applicants by the USFWS.

water/freshwater marsh habitat that is located less than 2 miles from those airports, a qualified biologist shall prepare a concise letter report. The letter report shall summarize the biologist's findings regarding (1) the species likely to use the re-established/established habitat, (2) a rough order of magnitude estimate on the peak number of birds that might use the re-established/established habitat, and (3) potential movement patterns for birds using the re-established/established habitat and whether they might cross through the airport safety zones (e.g., to reach foraging habitat or another wildlife attractant). The letter report will also provide recommendations to the HCP Implementing Entity on how they could reduce any of the identified wildlife hazards if there are any feasible means to do so that would not conflict with the biological goals and measurable objectives of the Conservation Plan.

Condition 7. Avoid and Minimize Impacts to Streams and Creeks

AMMs associated with Condition 7 must be applied to all Covered Activities where a stream or creek is located within a project footprint.

STREAM-1 (Laguna Creek Wildlife Corridor): A 150-foot setback measured from the top of the bank on both sides of the stream will be applied to Laguna Creek within the Urban Development Area (minimum 300-foot corridor width). If trails are located within the Laguna Creek Wildlife Corridor, the nearest edge of the trail will be located at least 80 feet from the top of the bank.

STREAM-2 (UDA Stream Setbacks): A 100-foot setback measured from the top of the bank on both sides of the stream channel will be applied to all streams listed in Table 1 below (see also Figure 2-4 of the SSHCP document). If a stream reach supports woody riparian vegetation, the setback will be equal to the riparian edge plus 25 feet or will be the setback defined above, whichever is greater. If trails are located within the Stream Setback, the nearest edge of the trail will be located at least 50 feet from the top of the bank.

Table 1. Stream Setback Minimum Requirements in the Urban Development Area

Stream	Minimum Setback (from the Top of Bank Measured in Aerial Perspective) on Both Sides of the Stream
Elder Creek	100 feet
Frye Creek	100 feet or as depicted as part of the NewBridge development project hardline Preserve (see Appendix K of the SSHCP Document)
Gerber Creek	100 feet
Morrison Creek	100 feet
Central Paseo	100 feet or as depicted as part of the Cordova Hills development project hardline Preserve (Appendix K of the SSHCP Document)
Sun Creek	100 feet or as depicted as part of the Sun Creek development project hardline Preserve (see Appendix K of the SSHCP Document)

STREAM-3 (Minor Tributaries to UDA Streams): A 25-foot setback measured from the top of the bank on both sides of the stream channel will be applied to all avoided first and second order tributaries to the streams listed in Table 1 and Laguna Creek. Refer to Objective W6 in Table 2-7 of the EIS/EIR regarding avoided first and second order tributaries. Trails are not permitted within headwater ephemeral Stream Setbacks.

STREAM-4 (Minimize Effects from Temporary Channel Re-Routing): When an Urban Development Covered Activity temporarily re-routes a stream, creek, or drainage, the re-routing will be completed in a manner that minimizes impacts to beneficial uses and habitat. The following measures will be employed to minimize disturbances that will adversely impact water quality:

- No equipment will be operated in areas of flowing or standing water.
- Construction materials and heavy equipment must be stored outside of the active flow of any waters.
- When work within waters is necessary, the entire stream flow will be diverted around the work area.
- In the event of rain, the disturbed in-water work area will be temporarily stabilized before water body flow exceeds the capacity of the diversion structure. The disturbed water body will be stabilized so that the disturbed areas will not come in contact with the flow.
- Once construction is complete, all project-introduced material (e.g., pipes, gravel, cofferdam, sandbags) must be removed, leaving the water as it was before construction. Excess materials will be disposed of at an appropriate disposal site.
- All work areas will be effectively isolated from stream flows using suitable control measures before commencement of any in-water work. The diverted stream flow will not be contaminated by construction activities. Structures for isolating the in-water work area and/or diverting the stream flow (e.g., cofferdam, geo-textile silt curtain) will not be removed until all disturbed areas are cleaned and stabilized.
- Any flow diversion used during construction will be designed in a manner to prevent pollution and minimize siltation, and will provide flows to downstream reaches. Flows will be maintained to support existing aquatic life, riparian wetlands, and habitat that may be located upstream and downstream from any temporary diversion.

- All surface waters, including ponded waters, will be diverted away from areas undergoing grading, construction, excavation, vegetation removal, and/or any other activity that may result in a discharge to waters.
- All temporary dewatering methods will be designed to have the minimum necessary impacts to waters to isolate the immediate work area. All dewatering methods will be installed such that natural flow is maintained upstream and downstream of the diversion area. Any temporary dams and diversions will be installed such that the diversion does not cause sedimentation, siltation, or erosion upstream or downstream of the diversion area. All dewatering methods will be removed immediately upon completion of diversion activities.
- A method of containment must be used below any bridge, boardwalk, and/or temporary crossing to prevent debris from falling into the waters through the entire duration of a project.
- If temporary surface water diversions and/or dewatering are anticipated, the Permit Applicant or their Third-Party Project Proponent will develop and maintain on site a surface water diversion and/or dewatering plan. The plan(s) must be developed prior to initiation of any water diversions and will include the proposed method and duration of diversion activities. The plan(s) must be made available to Central Valley Water Board staff upon request.
- When work in a flowing stream is unavoidable and any dam or other artificial obstruction is being constructed, maintained, or placed in operation, sufficient water will be allowed at all times to pass downstream to maintain beneficial uses of waters below the dam. Construction, dewatering, and removal of temporary cofferdams will not violate the turbidity, settle-able matter, pH, temperature, or dissolved oxygen requirements of any project water quality control Plan.
- Any temporary dam or other artificial obstruction will only be built from clean materials such as sandbags, gravel bags, water dams, or clean/washed gravel that will cause little or no siltation. Stream flow will be temporarily diverted using gravity flow through temporary culverts or pipes, or pumped around the work site with the use of hoses.

STREAM-5 (Design for Stream Channel Re-Routing, Widening, or Deepening): When an urban development Covered Activity alters a stream, creek, or drainage by re-routing, widening, or deepening a channel, the project design will include the following:

- The main channel of a re-routed channel will be free to migrate laterally over its active and terrace floodplain.
- Channel geometry (plan, profile, and cross-section) of the site will be appropriate for the watershed location and physical/hydrologic condition.
- Local, native materials will be used as fill material to the extent practicable.
- Bioengineering techniques will be used for construction and maintenance of bank stabilization. Bioengineered bank stabilization structures will use vegetation in combination with bank reshaping; biodegradeable geotextile materials; and, in some cases, a minimal amount of rock or wood to the extent practicable to dissipate erosive energy. The Permit Applicant or their Third-Party Project Proponents will consult a professional engineer when considering using bioengineering techniques.
- All re-routed, widened, or deepened streams are required to establish Stream Setbacks with minimum widths required under AMMs STREAM-1, STREAM-2, or STREAM-3. All re-routed, widened, or deepened streams must re-establish/ establish and maintain native Woody Riparian land cover and/or native Grassland Riparian land cover in the entire Stream Setback.

Condition 8. Avoid and Minimize Impacts to Covered Species from Utility and Utility Maintenance Covered Activities

AMMs associated with Condition 8 must be applied to all Covered Activities associated with construction and maintenance of infrastructure projects.

UTILITY-1 (Avian Collision Avoidance): Installation of new, or relocation of existing, utility poles, lines, and cell towers located within the HCP Preserve System or within 1,000 feet of a Preserve boundary will be coordinated with the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife. The applicant or relevant utility/service provider will install utility poles, lines, and cell towers in conformance with Avian Powerline Interaction Committee (APLIC) standards for collision-reducing techniques, as outlined in Reducing Avian Collisions with Power Lines: State of the Art in 2012 (APLIC 2012), or any superseding document issued by the APLIC.

UTILITY-2 (Utility Maintenance on Preserves): Utility maintenance inside HCP Preserves and Preserve Setbacks containing vernal pools will occur only when vernal pools have been dry for 30 days, except in emergency situations related to human health and safety.

UTILITY-3 (Trenchless Construction Methods): Where a pipeline or conduit crosses an existing or HCP Preserve or will be located between adjacent Preserves (e.g., under a roadway that has a Preserve on both sides), trenchless construction methods will be used to minimize impacts to the existing soil profile (including impacts to a hardpan or duripan) to maintain the perched aquifer in Vernal Pool Ecosystem and Valley Grassland land cover type.

UTILITY-4 (Siting of Entry and Exit Location): The entry and exit locations for the trenchless construction method (see Utility-3) will be sited to avoid impacts to vernal pools and Riparian Woodland, and to avoid direct take of HCP Covered Species.

Condition 9. Avoid and Minimize Impacts That Might Result From Removing or Breaching Levees to Establish or Re-establish Riparian Habitat

LEVEE-1 (Preparation of Hydrologic Analysis): Prior to approving a draft Preserve Management Plan that includes (1) modifying or breaching an existing levee, or (2) would place a potential impedance to high-water event flood-flows on the water side of an existing levee (including new riparian vegetation plantings or other new Preserve facilities), a hydrologic analysis will be conducted. The Preserve activity will only be implemented if the hydrologic analysis concludes that the activity will not result in a substantial increase in flood stage elevations or flood risk on lands outside the Preserve.

Condition 10. Avoid and Minimize Impacts That Might Result From Potential Residual Contamination of Preserves and Related Exposure of People to Such Hazardous Materials

HAZARDOUS MATERIALS-1 (Preparation of Phase I Environmental Site Assessment): Prior to the acquisition of a HCP Preserve site or implementation of a stream or riparian restoration project, a Phase I Environmental Site Assessment shall be conducted in general accordance with the American Society for Testing and Materials Standard Practice E1527-05. The purpose of this Environmental Site Assessment is to identify, to the extent feasible pursuant to the American Society for Testing and Materials Standard, recognized environmental conditions in connection with the potential site. The term “recognized environmental condition” means the presence or likely presence of hazardous substances or petroleum products on the property under conditions that may indicate an existing release, a past release, or a material threat of release of these substances to the property. If the Phase 1 Environmental Site Assessment indicates the presence of a recognized

environmental condition, the HCP Implementing Entity shall consider the following options.

- Determine that the acquisition/project can proceed on the basis that the Habitat Plan goals and objectives can be met on the site even with the presence of a recognized environmental condition.
- Conduct a Phase II Environmental Site Assessment, including soil and groundwater testing, to further study the potential for contamination to limit the HCP Implementing Entity's management activities.
- If the results of the Phase I (or Phase II) Environmental Site Assessment indicate that the Habitat Plan goals and objectives cannot be met on the site, the HCP Implementing Entity should not acquire the site.

HAZARDOUS MATERIALS-2 (Contingency Plan): As part of each Preserve Management Plan or site restoration plan, a Contingency Plan shall be prepared to address the actions that would be taken during construction in the event that unexpected contaminated soil or groundwater is discovered. The Contingency Plan shall include health and safety considerations, handling and disposal of wastes, reporting requirements, and emergency procedures. The Contingency Plan shall include a requirement that if evidence of contaminated materials is encountered during construction, construction would cease immediately and applicable requirements of the Comprehensive Environmental Release Compensation and Liability Act and the California Code of Regulations Title 22 regarding the disposal of waste would be implemented.

COVERED SPECIES TAKE AVOIDANCE AND MINIMIZATION MEASURES

The following section describes measures to avoid or minimize effects of Covered Activities on specific HCP Covered Species. Species-specific AMMs include species surveys, pre-construction surveys, and construction monitoring. Most species-specific AMMs require that species surveys be conducted if Covered Species modeled habitat is within the proposed Covered Activity footprint or within a specified distance of the proposed Covered Activity. Section 3.4 of SSHCP document and Appendix G of the EIS/EIR provides maps and descriptions of modeled habitat for each Covered Species. The AMMs described below apply to Covered Activities when Covered Species modeled habitat or a Covered Species occurrence are at a project site. The HCP Implementing Entity and the Wildlife Agencies may update specific HCP AMMs over the HCP Permit Term to provide the best and most appropriate protective measures for a Covered Species.

General Covered Species Take Avoidance and Minimization Measures

The following AMMs will apply to all Covered Activities that are required to implement Covered Species take AMMs.

SPECIES-1 (Litter Removal Program): A litter control program will be instituted for the entire project site. All workers will ensure that their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. All garbage will be removed from the project site at the end of each work day, and construction personnel will not feed or otherwise attract wildlife to the area where construction activities are taking place.

SPECIES-2 (No Pets in Construction Areas): To avoid harm and harassment of native species, workers and visitors will not bring pets onto a project site.

SPECIES-3 (Take Report): If accidental injury or death of any Covered Species occurs, workers will immediately inform the approved biologist or on-site monitor and site supervisor. The approved biologist or on-site monitor will phone the appropriate contact person at the HCP Implementing Entity. The HCP Implementing Entity will immediately contact the Wildlife Agencies by telephone. A memorandum will be provided to the HCP Implementing Entity and Wildlife Agencies within 1 working day of the incident. The report will provide the date and location of the incident, number of individuals taken, the circumstances resulting in the take, and any corrective measures taken to prevent additional take.

SPECIES-4 (Post-Construction Compliance Report): A post-construction compliance report will be submitted to the HCP Implementing Entity within 30 calendar days of completion of construction activities or within 30 calendar days of any break in construction activity that lasts more than 30 days. The report will detail the construction start and completion dates, any information about meeting or failing to meet species take Avoidance and Minimization Measures (AMM), effectiveness of each AMM that was applied at the project site, and any known project effects to Covered Species.

Rare Plants

PLANT-1 (Rare Plant Surveys): If a Covered Activity project site contains modeled habitat for Ahart's dwarf rush (*Juncus leiospermus* var*. ahartii)*, Bogg's Lake hedge-hyssop (*Gratiola heterosepala)*, dwarf downingia (*Downingia pusilla),* Legenere (*Legenere limosa*), pincushion navarretia (*Navarretia myersii),* or Sanford's arrowhead (*Sagittaria sanfordii*), the Covered Activity project site will be surveyed for the rare plant by an approved biologist and following

the California Department of Fish and Wildlife (CDFW) rare plant survey protocols (CDFG 2009) or the most recent CDFW rare plant survey protocols. An approved biologist will conduct the field surveys and will identify and map plant species occurrences according to the protocols. See Chapter 10 of the SSHCP document for the process to submit survey information to the Permit Applicant and the Permitting Agencies.

PLANT-2 (Rare Plant Protection): If a rare plant listed in AMM PLANT-1 is detected within an area proposed to be disturbed by a Covered Activity or is detected within 250 feet of the area proposed to be disturbed by a Covered Activity, the HCP Implementing Entity will assure one unprotected occurrence of the species is protected within a HCP Preserve before any ground disturbance occurs a the project site.

Sacramento and Slender Orcutt Grass

Sacramento Orcutt grass (*Orcuttia viscida*) is a federally and state endangered species and is ranked by the California Native Plant Society as a California Rare Plant Rank 1B.1 species. Slender Orcutt grass (*Orcuttia tenuis*) is a federally threatened and state endangered species and is ranked by the California Native Plant Society as a California Rare Plant Rank 1B.1 species. Both Orcutt grasses are very rare, and the likelihood of finding new occurrences within the Planning Area is low. Due to their rarity, take of either of these species is not permitted under the HCP, with the exception of take related to Preserve management and monitoring (see Section 5.2.7, HCP Preserve System Covered Activities).

ORCUTT-1 (Orcutt Grass Surveys): If a Covered Activity project site is located within 1 mile of the Mather Core Recovery Area and contains the Vernal Pool land cover type, the project site will be surveyed for Sacramento and slender Orcutt grass by an approved biologist following California Department of Fish and Wildlife (CDFW) rare plant survey protocols (CDFG 2009) or most recent CDFW guidelines to determine if Sacramento and/or slender Orcutt grass is present. An approved biologist will conduct the field investigation to identify and map occurrences. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

ORCUTT-2 (Orcutt Grass Protection): Where known or new Sacramento or slender Orcutt grass occurrences are found, they will be protected within an HCP Preserve that is at least 50 acres. The occurrence will be located interior to the Preserve at a distance of no less than 300 feet from the edge of the Preserve boundary. If a Third-Party Project Proponent encounters a previously undiscovered occurrence of Sacramento or slender Orcutt grass on a Covered Activity project site, the Third-Party Project Proponent will contact the HCP Implementing Entity or Land

Use Authority Permit Applicant with authority over the project, who will coordinate with the Wildlife Agencies for written concurrence of avoidance to ensure that the project does not cause take of the species.

California Tiger Salamander

To avoid direct and indirect effects of Covered Activities on California tiger salamander (*Ambystoma californiense*), the following AMMs will be implemented.

CTS-1 (California Tiger Salamander Daily Construction Schedule): Ground-disturbing Covered Activities within California tiger salamander modeled habitat (Figure 3-16 of the SSHCP document) will occur outside the breeding and dispersal season (occur after July 31 and before October 15), to the maximum extent practicable. If Covered Activities must be implemented in modeled habitat (Figure 3-16 of the SSHCP document) during the breeding and dispersal season (after October 15 and before July 31), construction activities will not start until 30 minutes after sunrise and must be complete 30 minutes prior to sunset.

CTS-2 (California Tiger Salamander Exclusion Fencing): If a Covered Activity must be implemented in modeled habitat (Figure 3-16 of the SSHCP document) during the breeding and dispersal season (after October 15 and before July 31), exclusion fencing will be installed around the project footprint before October 15. Temporary high-visibility construction fencing will be installed along the edge of work areas, and exclusion fencing will be installed immediately outside of the temporary high-visibility construction fencing to exclude California tiger salamanders from entering the construction area or becoming entangled in the construction fencing. Exclusion fencing will be at least 1 foot tall and be buried at least 6 inches below the ground to prevent salamanders from going under the fencing. Fencing will remain in place until all construction activities within the construction area are complete. No project activities will occur outside the delineated project footprint. An approved biologist must inspect the exclusion fencing and project site every morning before 7:00 a.m. for integrity and for any entrapped California tiger salamanders. If a California tiger salamander is encountered, refer to CTS-5, below. (However, the HCP Implementing Entity may, with approval of the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW), determine that it is appropriate for a Covered Activity project to not implement CTS-2 for certain long and linear roadway Covered Activity projects if it appears that the exclusion fencing will likely trap individuals or cause more take of California tiger salamander than it would prevent.)

CTS-3 (California Tiger Salamander Monitoring): If Covered Activities must be implemented in modeled habitat (Figure 3-16 of the SSHCP document), an approved biologist experienced with California tiger salamander identification and behavior will monitor the project site, including the integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place, and will inspect the project site for California tiger salamander every morning before 7:00 a.m., or prior to construction activities. As required by AMM BMP-8 (Training of Construction Staff), the approved biologist will also train construction personnel on the required California tiger salamander avoidance procedures, exclusion fencing, and correct protocols in the event that a California tiger salamander enters an active construction zone. If a California tiger salamander is encountered, refer to CTS-5, below.

CTS-4 (Avoid California Tiger Salamander Entrapment): If Covered Activities must be implemented in modeled habitat, all excavated steep-walled holes or trenches more than 6 inches deep will be covered with plywood (or similar material) or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes or trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within California tiger salamander modeled habitat will be inspected for California tiger salamanders by the approved biologist prior to being moved. If a California tiger salamander is encountered, refer to CTS-5, below.

CTS-5 (California Tiger Salamander Encounter Protocol): If a California tiger salamander is encountered during construction activities, the approved biologist will notify the Wildlife Agencies immediately (California Department of Fish and Wildlife (CDFW) and U.S. Fish and Wildlife Service (USFWS)). Construction activities will be suspended in a 100-foot radius of the animal until the animal is relocated by an approved biologist with appropriate handling permits from the Wildlife Agencies. Prior to relocation, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the salamander, within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to USFWS and CDFW immediately. Any worker who inadvertently injures or kills a California tiger salamander or who finds dead,

injured, or entrapped California tiger salamander(s) must immediately report the incident to the approved biologist.

CTS-6 (Erosion Control Materials in California Tiger Salamander Habitat): If erosion control (BMP-2) is implemented within California tiger salamander modeled habitat (Figure 3-16 of the SSHCP document), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure that salamanders are not trapped (no monofilament). Coconut coir matting and fiber rolls with burlap are examples of acceptable erosion control materials. This limitation will be communicated to the contractor through use of special provisions included in the bid solicitation package.

CTS-7 (Rodent Control): CTS-7 only applies to projects that are within California tiger salamander modeled habitat (Figure 3-16 of the SSHCP document) and on Covered Activities. Rodent control will be allowed only in developed portions of a Covered Activity project site. Where rodent control is allowed, the method of rodent control will comply with the methods of rodent control discussed in the 4(d) Rule published in the U.S. Fish and Wildlife Service's (2004) final listing rule for tiger salamander.

Western Spadefoot

To avoid direct and indirect effects of Covered Activities on western spadefoot (*Spea hammondii*), the following AMMs will be implemented.

WS-1 (Western Spadefoot Work Window): Ground-disturbing Covered Activities within western spadefoot modeled habitat (Figure 3-17 of the SSHCP document) will occur outside the breeding and dispersal season (after May 15 and before October 15), to the maximum extent practicable.

WS-2 (Western Spadefoot Exclusion Fencing): If Covered Activities must be implemented in modeled habitat (Figure 3-17 of the SSHCP document) after October 15 and before May 15, exclusion fencing will be installed around the project footprint before October 15, and the project site must be monitored by an approved biologist following rain events. Temporary high-visibility construction fencing will be installed along the edge of work areas, and silt fencing will be installed immediately behind the temporary high-visibility construction fencing to exclude western spadefoot from entering the construction area. Fencing will remain in place until all construction activities within the construction area are completed.

No project activities will occur outside the delineated project footprint. If a western spadefoot is encountered, refer to WS-6, below.

WS-3 (Western Spadefoot Monitoring): If Covered Activities must be implemented in modeled habitat (Figure 3-17 of the SSHCP document) in the breeding and dispersal season (after October 15 and before May 15), an approved biologist experienced with western spadefoot identification and behavior will monitor the project site, including the integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place, and will inspect the project site daily for western spadefoot prior to construction activities. The approved biologist will also train construction personnel on the required avoidance procedures, exclusion fencing, and protocols in the event that a western spadefoot enters an active construction zone (i.e., outside the buffer zone). If a western spadefoot is encountered, refer to WS-6, below.

WS-4 (Avoid Western Spadefoot Entrapment): If a Covered Activity occurs in western spadefoot modeled habitat (Figure 3-17 of the SSHCP document), all excavated steep-walled holes and trenches more than 6 inches deep will be covered with plywood (or similar material) or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes and trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within western spadefoot modeled habitat will be inspected for western spadefoot by the approved biologist prior to being moved. If a western spadefoot is encountered, refer to WS-6, below.

WS-5 (Erosion Control Materials in Western Spadefoot Habitat): If erosion control (BMP-2) is implemented within western spadefoot modeled habitat (Figure 3-17 of the SSHCP document), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure that western spadefoots are not trapped (no monofilament). Coconut coir matting and fiber rolls containing burlap are examples of acceptable erosion control materials.

WS-6 (Western Spadefoot Encounter Protocol): If Covered Activities must be implemented in modeled habitat (Figure 3-17 of the SSHCP document) during the breeding and dispersal season (after October 15 and before May 15), and a western spadefoot is encountered during construction activities, the approved biologist will notify

the Wildlife Agencies immediately. Construction activities will be suspended in a 100-foot radius of the animal until the animal leaves the project site on its own volition. If necessary, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the western spadefoot within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife immediately. Any worker who inadvertently injures or kills a western spadefoot or who finds dead, injured, or entrapped western spadefoot(s) must immediately report the incident to the approved biologist.

Giant Gartersnake

To avoid direct and indirect effects of Covered Activities on giant gartersnake (*Thamnophis gigas*), the following AMMs will be implemented.

GGS-1 (Giant Gartersnake Surveys): If the HCP giant gartersnake modeled habitat maps (Figure 3-18 of the SSHCP document) show that modeled habitat for giant gartersnake is present within a Covered Activity's project footprint or within 300 feet of a project footprint, then an approved biologist will conduct a field investigation to delineate giant gartersnake aquatic habitat within the project footprint and adjacent areas within 300 feet of the project footprint. In addition to the HCP land cover types shown in Figure 3-18 of the SSHCP document, giant gartersnake aquatic habitat includes, but is not limited to, low-gradient streams and creeks, open water, freshwater marsh, agricultural ditches, and rice fields. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. The Third-Party Project Proponent will map all existing or potential sites and provide these maps to the Local Land Use Permit Applicants and the HCP Implementing Entity. Locations of delineated giant gartersnake habitat must also be noted on plans that are submitted to a Local Land Use Permit Applicant. The applicant will use this information to finalize project design. Covered Activities may occur throughout the year as long as giant gartersnake habitat is identified and fully avoided. Otherwise, Covered Activities must comply with GGS-2 through GGS-8, below. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

GGS-2 (Giant Gartersnake Work Window): Covered Activities that do not fully avoid giant gartersnake modeled habitat (Figure 3-18 of the SSHCP document) will be

conducted during the snake's active season. Construction and ground-disturbing activities will be initiated after May 1 and will end prior to September 15. If it appears that construction activities may go beyond September 15, the Local Land Use Permit Applicant or their Third-Party Project Proponent will contact the HCP Implementing Entity as soon as possible, but not later than September 1. The Local Land Use Permit Applicant and the HCP Implementing Entity will discuss with the Wildlife Agencies additional measures necessary to minimize take.

GGS-3 (Giant Gartersnake Monitoring): If a Covered Activity is occurring in giant gartersnake modeled habitat (Figure 3-18 of the SSHCP document), an approved biologist experienced with giant gartersnake identification and behavior will monitor the project site, including the integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place in aquatic habitat or within 300 feet of aquatic habitat, and will inspect the project site daily for giant gartersnake prior to construction activities. If a giant gartersnake is encountered, refer to GGS-7. The approved biologist will also train construction personnel on the required avoidance procedures, exclusion fencing, and protocols in the event that a giant gartersnake enters an active construction zone (i.e., outside the buffer zone).

GGS-4 (Giant Gartersnake Habitat Dewatering and Exclusion): If construction activities will occur in giant gartersnake aquatic habitat, aquatic habitat will be dewatered and then remain dry and absent of aquatic prey (e.g., fish and tadpoles) for 15 days prior to initiation of construction activities. If complete dewatering is not possible, the HCP Implementing Entity will be contacted to determine what additional measures may be necessary to minimize effects to giant gartersnake. After aquatic habitat has been dewatered 15 days prior to construction activities, exclusion fencing will be installed extending a minimum of 300 feet into adjacent uplands to isolate both the aquatic and adjacent upland habitat. Exclusionary fencing will be erected 36 inches above ground and buried at least 6 inches below the ground to prevent snakes from attempting to move under the fence into the construction area. In addition, high-visibility fencing will be erected to identify the construction limits and to protect adjacent habitat from encroachment of personnel and equipment. Giant gartersnake habitat outside construction fencing will be avoided by all construction personnel. The fencing and the work area will be inspected by the approved biologist to ensure that the fencing is intact and that no snakes have entered the work area before the start of each work day. The fencing will be maintained by the contractor until completion of the project. If giant gartersnake is encountered, refer to GGS-7, below.

GGS-5 (Avoid Giant Gartersnake Entrapment): If a Covered Activity occurs in giant gartersnake modeled habitat (Figure 3-18 of the SSHCP document), all excavated steep-walled holes and trenches more than 6 inches deep will be covered with plywood (or similar material) or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes and trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within giant gartersnake modeled habitat will be inspected for giant gartersnake by the approved biologist prior to being moved. If a giant gartersnake is encountered, refer to GGS-7.

GGS-6 (Erosion Control Materials in Giant Gartersnake Habitat): If erosion control (BMP-2) is implemented within giant gartersnake modeled habitat (Figure 3-18 of the SSHCP document), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure snakes are not trapped (no monofilament). Coconut coir matting and fiber rolls containing burlap are examples of acceptable erosion control materials.

GGS-7 (Giant Gartersnake Encounter Protocol): If a giant gartersnake is encountered during construction activities, the approved biologist will notify the Wildlife Agencies immediately. Construction activities will be suspended in a 100-foot radius of the animal until the animal leaves the project site on its own volition. If necessary, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the giant gartersnake within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to the U.S. Fish and Wildlife Service immediately. Any worker who inadvertently injures or kills a giant gartersnake or who finds one dead, injured, or entrapped must immediately report the incident to the approved biologist.

GGS-8 (Giant Gartersnake Post-Construction Restoration): After completion of ground-disturbing Covered Activities, the applicant will remove any temporary fill and construction debris and will restore temporarily disturbed areas to pre-project conditions. Restoration work includes such activities as re-vegetating the banks and active channels with a seed mix similar to pre-project conditions. Appropriate methods and plant species used to re-vegetate such areas will be determined on a

site-specific basis in consultation with the HCP Implementing Entity. Restoration work may include replanting emergent aquatic vegetation. Refer to the U.S. Fish and Wildlife Service's (USFWS) Guidelines for the Restoration and/or Replacement of Giant Gartersnake Habitat (USFWS 1997), or the most current USFWS guidelines at the time of the activity. A photo documentation report showing pre- and post-project conditions will be submitted to the HCP Implementing Entity 1 month after implementation of the restoration.

Western Pond Turtle

To avoid direct and indirect effects of Covered Activities on western pond turtle (*Actinemys marmorata*), the following AMMs will be implemented.

WPT-1 (Western Pond Turtle Surveys): If the HCP western pond turtle modeled habitat maps (Figure 3-19 of the SSHCP document) show that modeled habitat for western pond turtle is present within a Covered Activity's project footprint or within 300 feet of a project footprint, then an approved biologist will conduct a field investigation to delineate western pond turtle aquatic habitat within the project footprint and within 300 feet of the project footprint. In addition to the HCP land cover types shown in Figure 3-19 of the SSHCP document, western pond turtle aquatic habitat includes, but is not limited to, low-gradient streams and creeks, open water, freshwater marsh, and rice fields. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. The Third-Party Project Proponent will map all existing or potential sites and provide those maps to the Local Land Use Permit Applicants and the HCP Implementing Entity. Locations of delineated western pond turtle habitat must also be noted on plans that are submitted to a Local Land Use Permit Applicant. The applicant will use this information to finalize project design. Covered Activities may occur throughout the year as long as western pond turtle habitat is identified and fully avoided. Otherwise, Covered Activities must comply with WPT-2 through WPT-9. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

WPT-2 (Western Pond Turtle Work Window): Maintenance and improvements to existing structures may occur throughout the year as long as western pond turtle habitat is identified and avoided, and movement of equipment is confined to existing roads. Otherwise, construction and ground-disturbing Covered Activities must be conducted outside of western pond turtle's active season. Construction and ground-disturbing activities will be initiated after May 1 and will commence prior to September 15. If it appears that construction activities may go beyond

September 15, the appropriate Permit Applicant will contact the Local Land Use Permit Applicant and the HCP Implementing Entity as soon as possible, but not later than September 1, to determine if additional measures are necessary to minimize take.

WPT-3 (Western Pond Turtle Monitoring): If a Covered Activity is occurring in western pond turtle modeled habitat (Figure 3-19 of the SSHCP document), an approved biologist experienced with western pond turtle identification and behavior will monitor the project site, including the integrity of any exclusion fencing. The approved biologist will be on site daily while construction-related activities are taking place in aquatic habitat or within 300 feet of aquatic habitat, and will inspect the project site daily for western pond turtle prior to construction activities. The approved biologist will also training construction personnel on the required avoidance procedures, exclusion fencing, and protocols in the event that a western pond turtle enters an active construction zone (i.e., outside the buffer zone).

WPT-4 (Western Pond Turtle Habitat Dewatering and Exclusion): If construction activities will occur in western pond turtle aquatic habitat, aquatic habitat for the turtle will be dewatered and then remain dry and absent of aquatic prey (e.g., crustaceans and other aquatic invertebrates) for 15 days prior to the initiation of construction activities. If complete dewatering is not possible, the HCP Implementing Entity will be contacted to determine what additional measures may be necessary to minimize effects to western pond turtle. After aquatic habitat has been dewatered 15 days prior to construction activities, exclusion fencing will be installed extending a minimum of 300 feet into adjacent uplands to isolate both the aquatic and adjacent upland habitat. Exclusionary fencing will be erected 36 inches above ground and buried at least 6 inches below the ground to prevent turtles from attempting to burrow or move under the fence into the construction area. In addition, high-visibility fencing will be erected to identify construction limits and to protect adjacent habitat from encroachment of personnel and equipment. Western pond turtle habitat outside construction fencing will be avoided by all construction personnel. The fencing and work area will be inspected by the approved biologist to ensure that the fencing is intact and that no turtles have entered the work area before the start of each work day. Fencing will be maintained by the contractor until completion of the project. If, after exclusion fencing and dewatering, western pond turtles are found within the project footprint or within 300 feet of the project footprint, the

Third-Party Project Proponent will discuss the next best steps with the HCP Implementing Entity and Wildlife Agencies.

WPT-5 (Avoid Western Pond Turtle Entrapment): If a Covered Activity occurs within western pond turtle modeled habitat (Figure 3-19 of the SSHCP document), all excavated steep-walled holes and trenches more than 6 inches deep will be covered with plywood (or similar material) or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each work day or 30 minutes prior to sunset, whichever occurs first. All steep-walled holes and trenches will be inspected by the approved biologist each morning to ensure that no wildlife has become entrapped. All construction pipes, culverts, similar structures, construction equipment, and construction debris left overnight within western pond turtle modeled habitat will be inspected for western pond turtle by the approved biologist prior to being moved.

WPT-6 (Erosion Control Materials in Western Pond Turtle Habitat): If erosion control (BMP-2) is implemented within western pond turtle modeled habitat (Figure 3-19 of the SSHCP document), non-entangling erosion control material will be used to reduce the potential for entrapment. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material will be used to ensure that turtles are not trapped (no monofilament). Coconut coir matting and fiber rolls containing burlap are examples of acceptable erosion control materials.

WPT-7 (Western Pond Turtle Modeled Habitat Speed Limit): Covered Activity construction and maintenance vehicles will observe a 20-mile-per-hour speed limit within western pond turtle modeled upland habitat (Figure 3-19 of the SSHCP document).

WPT-8 (Western Pond Turtle Encounter Protocol): If a western pond turtle is encountered during construction activities, the approved biologist will notify the Wildlife Agencies immediately. Construction activities will be suspended in a 100-foot radius of the animal until the animal leaves the project site on its own volition. If necessary, the approved biologist will notify the Wildlife Agencies to determine the appropriate procedures related to relocation. If the animal is handled, a report will be submitted, including date(s), location(s), habitat description, and any corrective measures taken to protect the turtle, within 1 business day to the Wildlife Agencies. The biologist will report any take of listed species to the U.S. Fish and Wildlife Service immediately. Any worker who inadvertently injures or kills a western pond turtle or who finds one dead, injured, or entrapped must immediately report the incident to the approved biologist.

WPT-9 (Western Pond Turtle Post-Construction Restoration): After completion of ground-disturbing Covered Activities, the applicant will remove any temporary fill and construction debris and will restore temporarily disturbed areas to pre-project conditions. Restoration work includes such activities as re-vegetating the banks and active channels with a seed mix similar to pre-project conditions. Appropriate methods and plant species used to re-vegetate such areas will be determined on a site-specific basis in consultation with the HCP Implementing Entity. Restoration work may include replanting emergent aquatic vegetation and placing appropriate artificial or natural basking areas in waterways and wetlands. A photo documentation report showing pre- and post-project conditions will be submitted to the HCP Implementing Entity 1 month after implementation of the restoration.

Tricolored Blackbird

To avoid direct and indirect effects of Covered Activities on tricolored blackbird (*Agelaius tricolor*), the following AMMs will be implemented.

TCB-1 (Tricolored Blackbird Surveys): If modeled habitat for tricolored blackbird is present within a Covered Activity's project footprint or within 500 feet of a project footprint, then an approved biologist will conduct a field investigation to determine if existing or potential nesting or foraging sites are present within the project footprint and adjacent areas within 500 feet of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. Within the Planning Area, potential tricolor blackbird nest sites are often associated with freshwater marsh and seasonal wetlands, or in thickets of willow, blackberry, wild rose, thistle, and other thorny vegetation. Tricolored blackbirds are also known to nest in crops associated with dairy farms. Foraging habitat is associated with annual grasslands, wet and dry vernal pools and other seasonal wetlands, agricultural fields (such as large tracts of alfalfa and pastures with continuous haying schedules and recently tilled fields), cattle feedlots, and dairies. The Third-Party Project Proponent will map all existing or potential nesting or foraging sites and provide these maps to the Local Land Use Permit Applicants and HCP Implementing Entity. Nesting sites must also be noted on plans that are submitted to a Local Land Use Permit Applicant. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

TCB-2 (Tricolored Blackbird Pre-Construction Surveys): Pre-construction surveys will be required to determine if active nests are present within a project footprint or within 500

feet of a project footprint if existing or potential nest sites were found during design surveys and construction activities will occur during the breeding season (March 1 through September 15). An approved biologist will conduct pre-construction surveys within 30 days and within 3 days of ground-disturbing activities, and within the proposed project footprint and 500 feet of the proposed project footprint to determine the presence of nesting tricolored blackbird. Pre-construction surveys will be conducted during the breeding season (March 1 through August 31). Surveys conducted in February (to meet pre-construction survey requirements for work starting in March) must be conducted within 14 days and 3 days in advance of ground-disturbing activities. If a nest is present, then TCB-3 and TCB-4 will be implemented. The approved biologist will inform the Land Use Authority Permit Applicant and the HCP Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

TCB-3 (Tricolored Blackbird Nest Buffer): If active nests are found within the project footprint or within 500 feet of any project-related Covered Activity, the Third-Party Project Proponent will establish a 500-foot temporary buffer around the active nest until the young have fledged.

TCB-4 (Tricolored Blackbird Nest Buffer Monitoring): If nesting tricolored blackbirds are present within the project footprint or within 500 feet of any project-related Covered Activity, then an approved biologist experienced with tricolored blackbird behavior will be retained by the Third-Party Project Proponent to monitor the nest throughout the nesting season and to determine when the young have fledged. The approved biologist will be on site daily while construction-related activities are taking place near the disturbance buffer. Work within the nest disturbance buffer will not be permitted. If the approved biologist determines that tricolored blackbirds are exhibiting agitated behavior, construction will cease until the buffer size is increased to a distance necessary to result in no harm or harassment to the nesting tricolored blackbirds. If the biologist determines that the colonies are at risk, a meeting with the Third-Party Project Proponent, HCP Implementing Entity, and Wildlife Agencies will be held to determine the best course of action to avoid nest abandonment or take of individuals. The approved biologist will also train construction personnel on the required avoidance procedures, buffer zones, and protocols in the event that a tricolored blackbird flies into an active construction zone (i.e., outside the buffer zone).

TCB-5 (Timing of Pesticide Use and Harvest Timing on Agricultural Preserves): On HCP Farmland/Agricultural Preserves, pesticides (including herbicides) will not be applied from January 1 through July 15.

Swainson's Hawk

To avoid direct and indirect effects of Covered Activities on Swainson's hawk (*Buteo swainsoni*), the following AMMs will be implemented.

SWHA-1 (Swainson's Hawk Surveys): If modeled habitat for Swainson's hawk (Figure 3-25 of the SSHCP document) is present within a Covered Activity's project footprint or within 0.25 mile of a project footprint, then an approved biologist will conduct a survey to determine if existing or potential nesting sites are present within the project footprint and adjacent areas within 0.25 mile of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. Nest sites are often associated with Riparian land cover, but also include lone trees in fields, trees along roadways, and trees around structures. Nest trees may include, but are not limited to, Fremont's cottonwood (*Populus fremontii*), oaks (*Quercus* spp.), willows (*Salix* spp.), walnuts (*Juglans* spp.), eucalyptus (*Eucalyptus* spp.), pines (*Pinus* spp.), and Deodar cedar (*Cedrus deodara*). The Third-Party Project Proponent will map all existing and potential nesting sites and provide these maps to the Local Land Use Permit Applicants and HCP Implementing Entity. Nesting sites must also be noted on plans that are submitted to a Local Land Use Permit Applicant. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

SWHA-2 (Swainson's Hawk Pre-Construction Surveys): Pre-construction surveys will be required to determine if active nests are present within a project footprint or within 0.25 mile of a project footprint if existing or potential nest sites were found during initial surveys and construction activities will occur during the breeding season (March 1 through September 15). An approved biologist will conduct pre-construction surveys within 30 days and 3 days of ground-disturbing activities to determine presence of nesting Swainson's hawk. Pre-construction surveys will be conducted during the breeding season (March 1 through September 15). If a nest is present, then SWHA-3 and SWHA-4 will be implemented. The approved biologist will inform the Land Use Authority Permit Applicant and HCP Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

SWHA-3 (Swainson's Hawk Nest Buffer): If active nests are found within the project footprint or within 0.25 mile of any project-related Covered Activity, the Third-Party Project Proponent will establish a 0.25 mile disturbance buffer around the active nest until the young have fledged, with concurrence from the Wildlife Agencies.

SWHA-4 (Swainson's Hawk Nest Buffer Monitoring): If nesting Swainson's hawks are present within the project footprint or within 0.25 mile of any project-related Covered Activity, then an approved biologist experienced with Swainson's hawk behavior will be retained by the Third-Party Project Proponent to monitor the nest throughout the nesting season and to determine when the young have fledged. The approved biologist will be on site daily while construction-related activities are taking place within the buffer. Work within the temporary nest disturbance buffer can occur with the written permission of the HCP Implementing Entity and Wildlife Agencies. If nesting Swainson's hawks begin to exhibit agitated behavior, such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, the approved biologist will have the authority to shut down construction activities. If agitated behavior is exhibited, the biologist, Third-Party Project Proponent, HCP Implementing Entity, and Wildlife Agencies will meet to determine the best course of action to avoid nest abandonment or take of individuals. The approved biologist will also train construction personnel on the required avoidance procedures, buffer zones, and protocols in the event that a Swainson's hawk flies into an active construction zone (i.e., outside the buffer zone).

Greater Sandhill Crane

To avoid direct and indirect effects of Covered Activities on greater sandhill crane (*Grus canadensis*), the following AMMs will be implemented.

GSC-1 (Greater Sandhill Crane Surveys): If modeled habitat for greater sandhill crane (Figure 3-22 of the SSHCP document) is present within a Covered Activity's project footprint or within 0.5 mile of a project footprint, then an approved biologist will conduct a field investigation to determine if existing or potential roosting sites are present within the project footprint and adjacent areas within 0.5 mile of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. Roosting sites within the Planning Area are often associated with flooded fields, seasonal wetlands, and freshwater marsh. The Third-Party Project Proponent will map all existing or potential roosting sites and provide these maps to the Local Land Use Permit Applicants and HCP Implementing Entity.

Roosting sites must also be noted on plans that are submitted to a Local Land Use Permit Applicant. See Chapter 10 for the process to conduct and submit survey information.

GSC-2 (Greater Sandhill Crane Pre-Construction Surveys): Pre-construction surveys will be required to determine if active roosting sites are present within a project footprint or within 0.5 mile of a project footprint if existing or potential roosting sites were found during initial surveys and construction activities will occur when wintering flocks are present within the Planning Area (September 1 through March 15). An approved biologist will conduct pre-construction surveys within 15 days of ground-disturbing activities, and within 0.5 mile of a project footprint, to determine presence of roosting greater sandhill cranes. Pre-construction surveys will be conducted September 1 through March 15, when wintering flocks are present within the Planning Area. If birds are present, then GSC-3, GSC-4, and GSC-5 will be implemented. The approved biologist will inform the Land Use Authority Permit Applicant and HCP Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

GSC-3 (Greater Sandhill Crane Roosting Buffer): If active roosting sites are found within the project footprint or within 0.5 mile of any project-related Covered Activity, the Third-Party Project Proponent will establish a 0.5 mile temporary roosting disturbance buffer around the roosting site until the cranes have left.

GSC-4 (Greater Sandhill Crane Visual Barrier): Greater sandhill cranes have low tolerance for human disturbance, and such disturbance has caused cranes to abandon foraging and roosting sites. Repeat disturbance affects their ability to feed and store energy needed for survival. If project-related activities occur within 0.5 mile of a known roosting site as identified by surveys conducted during implementation of GSC-1 or GSC-2, a visual barrier will be constructed.

GSC-5 (Greater Sandhill Crane Roosting Buffer Monitoring): If roosting sites are found within the project footprint or within 0.50 mile of any project-related Covered Activity, an approved biologist experienced with greater sandhill crane behavior will be retained by the Third-Party Project Proponent to monitor the roosting site throughout the roosting season and to determine when the birds have left. The approved biologist will be on site daily while construction-related activities are taking place within the disturbance buffer. Work within the temporary disturbance buffer can only occur with the written permission of the HCP Implementing Entity and Wildlife Agencies. If greater sandhill cranes are abandoning their roosting and/or forage sites, the approved biologist will have the authority to shut down construction activities. If

roost abandonment occurs, the approved biologist, Third-Party Project Proponent, HCP Implementing Entity, and Wildlife Agencies will meet to determine the best course of action to avoid harm and harassment of individuals. The approved biologist will also train construction personnel on the avoidance procedures, buffer zones, and protocols in the event that greater sandhill cranes move into an active construction zone (i.e., outside the buffer zone).

Western Burrowing Owl

To avoid direct and indirect effects of Covered Activities on western burrowing owl (*Athene cunicularia*), the following AMMs will be implemented.

WBO-1 (Western Burrowing Owl Surveys): Surveys within modeled habitat are required for both the breeding and non-breeding season. If the project site falls within modeled habitat, an approved biologist will survey the project site and map all burrows, noting any burrows that may be occupied. Occupied burrows are often (but not always) indicated by tracks, feathers, egg shell fragments, pellets, prey remains, and/or excrement. Surveying and mapping will be conducted by the approved biologist while walking transects throughout the entire project site plus all accessible areas within a 250-foot radius from the project site. The centerline of these transects will be no more than 50 feet apart and will vary in width to account for changes in terrain and vegetation that can preclude complete visual coverage of the area. For example, in hilly terrain with patches of tall grass, transects will be closer together, and in open areas with little vegetation, they can be 50 feet apart. This methodology is consistent with current survey protocols for this species (California Burrowing Owl Consortium 1993). Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. If suitable habitat is identified during the initial survey, and if the project does not fully avoid the habitat, pre-construction surveys will be required. Burrowing owl habitat is fully avoided if project-related activities do not impinge on a 250-foot buffer established by the approved biologist around suitable burrows. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

WBO-2 (Western Burrowing Owl Pre-Construction Surveys): Prior to any Covered Activity ground disturbance, an approved biologist will conduct pre-construction surveys in all areas that were identified as suitable habitat during the initial surveys. The purpose of the pre-construction surveys is to document the presence or absence of burrowing owls on the project site, particularly in areas within 250 feet of construction activities. To maximize the likelihood of detecting owls, the pre-construction

survey will last a minimum of 3 hours. The survey will begin 1 hour before sunrise and continue until 2 hours after sunrise (3 hours total), or begin 2 hours before sunset and continue until 1 hour after sunset. Additional time may be required for large project sites. A minimum of two pre-construction surveys will be conducted (if owls are detected on the first survey, a second survey is not needed). All owls observed will be counted and their location will be mapped. Surveys will conclude no more than 2 calendar days prior to construction. Therefore, the Third-Party Project Proponent must begin surveys no more than 4 days prior to construction (2 days of surveying plus up to 2 days between surveys and construction). To avoid last-minute changes in schedule or contracting that may occur if burrowing owls are found, the Third-Party Project Proponent may also conduct a preliminary survey up to 15 days before construction. This preliminary survey may count as the first of the two required surveys as long as the second survey concludes no more than 2 calendar days in advance of construction.

WBO-3 (Burrowing Owl Avoidance): If western burrowing owl or evidence of western burrowing owl is observed on the project site or within 250 feet of the project site during pre-construction surveys, then the following will occur:

During Breeding Season: If the approved biologist finds evidence of western burrowing owls within a project site during the breeding season (February 1 through August 31), all project-related activities will avoid nest sites during the remainder of the breeding season or while the nest remains occupied by adults or young (nest occupation includes individuals or family groups foraging on or near the site following fledging). Avoidance is establishment of a minimum 250-foot buffer zone around nests. Construction and other project-related activities may occur outside of the 250-foot buffer zone. Construction and other project-related activities may be allowed inside of the 250-foot non-disturbance buffer during the breeding season if the nest is not disturbed, and the Third-Party Project Proponent develops an avoidance, minimization, and monitoring plan that is approved by the HCP Implementing Entity and Wildlife Agencies prior to project construction based on the following criteria:

- The HCP Implementing Entity and Wildlife Agencies approve of the avoidance and minimization plan provided by the project applicant.
- An approved biologist monitors the owls for at least 3 days prior to construction to determine baseline nesting and foraging behavior (i.e., behavior without construction).

- The same approved biologist monitors the owls during construction and finds no change in owl nesting and foraging behavior in response to construction activities.

If there is any change in owl nesting and foraging behavior as a result of construction activities, the approved biologist will have authority to shut down activities within the 250-foot buffer. Construction cannot resume within the 250-foot buffer until any owls present are no longer affected by nearby construction activities, and with written concurrence from the Wildlife Agencies.

If monitoring by the approved biologist indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in use, the non-disturbance buffer zone may be removed if approved by the Wildlife Agencies. The approved biologist will excavate the burrow in accordance with the latest California Department of Fish and Wildlife guidelines for burrowing owl to prevent reoccupation after receiving approval from the Wildlife Agencies.

The HCP Implementing Entity and Wildlife Agencies will respond to a request from the Third-Party Project Proponent to review the proposed construction monitoring plan within 21 days.

During Non-Breeding Season: During the non-breeding season (September 1 through January 31), the approved biologist will establish a minimum 250-foot non-disturbance buffer around occupied burrows. Construction activities outside of this 250-foot buffer will be allowed. Construction activities within the non-disturbance buffer will be allowed if the following criteria are met to prevent owls from abandoning over-wintering sites:

- An approved biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction).
- The same approved biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities.
- If there is any change in owl foraging behavior as a result of construction activities, the approved biologist will have authority to shut down activities within the 250-foot buffer.
- If the owls are gone for at least 1 week, the Third-Party Project Proponent may request approval from the HCP Implementing Entity and Wildlife Agencies that an approved biologist excavate usable burrows and

install one-way exclusionary devices to prevent owls from re-occupying the site. After all usable burrows are excavated, the buffer zone will be removed and construction may continue.

Monitoring must continue as described above for the non-breeding season as long as the burrow remains active.

WBO-4 (Burrowing Owl Construction Monitoring): During construction of Covered Activities, 250-foot construction buffer zones will be established and maintained around any occupied burrow. An approved biologist will monitor the site to ensure that buffers are enforced and owls are not disturbed. The approved biologist will also train construction personnel on avoidance procedures, buffer zones, and protocols in the event that a burrowing owl flies into an active construction zone.

WBO-5 (Burrowing Owl Passive Relocation): Passive relocation is not allowed without the express written approval of the Wildlife Agencies. Passive owl relocation may be allowed on a case-by-case basis on project sites during the non-breeding season (September 1 through January 31) with the written approval of the Wildlife Agencies if the other measures described in this condition preclude work from continuing. Passive relocation must be done in accordance with the latest California Department of Fish and Wildlife guidelines for burrowing owl. Passive relocation will only be proposed if the burrow needing to be removed or with the potential to collapse from construction activities is the result of a Covered Activity. If passive relocation is approved by the Wildlife Agencies, an approved biologist can passively exclude birds from their burrows during the non-breeding season by installing one-way doors in burrow entrances. These doors will be in place for 48 hours to ensure that owls have left the burrow, and then the biologist will excavate the burrow to prevent reoccupation. Burrows will be excavated using hand tools only. During excavation, an escape route will be maintained at all times. This may include inserting an artificial structure into the burrow to avoid having materials collapse into the burrow and trap owls inside. Other methods of passive relocation, based on best available science, may be approved by the Wildlife Agencies over the HCP Permit Term.

WBO-6 (Burrowing Owl Timing of Maintenance Activities): All activities adjacent to existing or planned HCP Preserves, Preserve Setbacks, or Stream Setback areas will be seasonally timed, when safety permits, to avoid or minimize adverse effects on occupied burrows.

WBO-7 (Rodent Control): Rodent control will be allowed only in developed portions of a Covered Activity project site within western burrowing owl modeled habitat. Where rodent control is allowed, the method of rodent control will comply with the methods of rodent control discussed in the 4(d) Rule published in the U.S. Fish and Wildlife Service's (2004) final listing rule for tiger salamander.

Covered Raptor Species

To avoid direct and indirect effects of Covered Activities on covered raptor species, the following AMMs will be implemented. This measure applies to Cooper's hawk (*Accipiter cooperii*), loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus cyaneus*), and white-tailed kite (*Elanus leucurus*). The following AMMs do not apply to ferruginous hawk (*Buteo regalis*), as they do not nest in the Planning Area. The following AMMs also do not apply to Swainson's hawk or burrowing owl, as specific AMMs have been developed for these covered raptor species.

RAPTOR-1 (Raptor Surveys): If modeled habitat for a covered raptor species (Figures 3-20, 3-23, 3-24, or 3-28 of the SSHCP document) is present within a Covered Activity's project footprint or within 0.25 mile of a project footprint, then an approved biologist will conduct a field investigation to determine if existing or potential nesting sites are present within the project footprint and adjacent areas within 0.25 mile of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. The Third-Party Project Proponent will map all existing or potential nesting sites and provide these maps to the Local Land Use Permit Applicants and HCP Implementing Entity. Nesting sites must also be noted on plans that are submitted to a Local Land Use Permit Applicant. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

RAPTOR-2 (Raptor Pre-Construction Surveys): Pre-construction surveys will be required to determine if active nests are present with a project footprint or within 0.25 mile of a project footprint if existing or potential nest sites are found during initial surveys and construction activities will occur during the raptor breeding season. An approved biologist will conduct pre-construction surveys within 30 days and 3 days of ground-disturbing activities within the proposed project footprint and within 0.25 mile of the proposed project footprint to determine presence of nesting covered raptor species. Pre-construction surveys will be conducted during the raptor breeding season. If a nest is present, then RAPTOR-3 and RAPTOR-4 will be implemented. The approved biologist will inform the Land Use

Authority Permit Applicant and HCP Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

RAPTOR-3 (Raptor Nest/Roost Buffer): If active nests are found within the project footprint or within 0.25 mile of any project-related Covered Activity, the Third-Party Project Proponent will establish a 0.25 mile temporary nest disturbance buffer around the active nest until the young have fledged.

RAPTOR-4 (Raptor Nest/Roost Buffer Monitoring): If project-related Covered Activities within the temporary nest disturbance buffer are determined to be necessary during the nesting season, then an approved biologist experienced with raptor behavior will be retained by the Third-Party Project Proponent to monitor the nest throughout the nesting season and to determine when the young have fledged. The approved biologist will be on site daily while construction-related activities are taking place within the disturbance buffer. Work within the temporary nest disturbance buffer can occur with the written permission of the HCP Implementing Entity and Wildlife Agencies. If nesting raptors begin to exhibit agitated behavior, such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, the approved biologist/monitor will have the authority to shut down construction activities. If agitated behavior is exhibited, the biologist, the Third-Party Project Proponent, HCP Implementing Entity, and Wildlife Agencies will meet to determine the best course of action to avoid nest abandonment or take of individuals. The approved biologist will also train construction personnel on the required avoidance procedures, buffer zones, and protocols in the event that a covered raptor species flies into an active construction zone (i.e., outside the buffer zone).

Western Red Bat

To avoid direct and indirect effects of Covered Activities on western red bat (*Lasiurus blossevillii*), the following AMMs will be implemented.

BAT-1 (Winter Hibernaculum Surveys): If modeled habitat (Figure 3-30 of the SSHCP document) for western red bat is present within 300 feet of a Covered Activity's project footprint, then an approved biologist will conduct a field investigation of the project footprint and adjacent areas within 300 feet of a project footprint to determine if a potential winter hibernaculum is present, and to identify and map potential hibernaculum sites. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas. If potential hibernaculum sites are found, the Third-Party Project Proponent

will note their locations on project designs and will design the project to avoid all areas within a 300-foot buffer around the potential hibernaculum sites. Winter hibernaculum habitat is fully avoided if project-related activities do not impinge on a 300-foot buffer established by the approved biologist around an existing or potential winter hibernaculum site. See Chapter 10 of the SSHCP document for the process to conduct and submit survey information.

BAT-2 (Winter Hibernaculum Pre-Construction Surveys): If the Third-Party Project Proponent elects not to avoid potential winter hibernaculum sites within the project footprint plus a 300-foot buffer, additional surveys are required. Prior to any ground disturbance related to Covered Activities, an approved biologist will conduct a pre-construction survey within 3 days of ground-disturbing activities within the project footprint and 300 feet of the project footprint to determine the presence of winter hibernaculum sites. Pre-construction surveys will be conducted during the winter hibernaculum season (November 1 through March 31). If a winter hibernaculum is present, then BAT-3 and BAT-4 will be implemented. The approved biologist will inform the Land Use Authority Permit Applicant and HCP Implementing Entity of species locations, and they in turn will notify the Wildlife Agencies.

BAT-3 (Winter Hibernaculum Buffer): If active winter hibernaculum sites are found within the project footprint or within 300 feet of the project footprint, the Third-Party Project Proponent will establish a 300-foot temporary disturbance buffer around the active winter hibernaculum site until bats have vacated the hibernaculum and the HCP Implementing Entity and Wildlife Agencies concur.

BAT-4 (Bat Eviction Methods): An approved biologist will determine if non-maternity and non-hibernaculum day and night roosts are present on the project site. If necessary, an approved biologist will use safe eviction methods to remove bats if direct impacts to non-maternity and non-hibernaculum day and night roosts cannot be avoided. If a winter hibernaculum site is present, Covered Activities will not occur until the hibernaculum is vacated, or, if necessary, safely evicted using methods acceptable to the Wildlife Agencies.

Table 2. Summary of Actions Associated with Covered Activities

Action		Residential, Commercial, and Industrial Development	Water Delivery	Recycled Water and Wastewater Facilities	Flood Control and Storm Drainage	Energy and Other Utility Services	Park and Recreation Facilities	Transportation Facilities	Sanitation Facilities	Other Public Facilities	Mining	Roads Outside the UDA	Land Management and Monitoring	Habitat Enhancement, Restoration, and Creation
Initial Construction	*Vegetation clearing*	X	X	X	X	X	X	X	X		X	X	X	X
	Grading, earthmoving	X	X	X	X	X	X	X	X		X	X	X	X
	Excavating	X	X	X	X	X	X	X	X		X	X	X	X
	Trenching and tunneling	X	X	X	X	X	X	X	X			X		
	Compacting soils	X	X	X		X	X	X	X		X	X		
	Pouring concrete/asphalt	X	X	X	X	X	X	X	X			X		
	Landscaping	X		X	X	X	X	X	X		X	X		
	Culvert placement	X						X				X		
Operation	*Vehicular use*	X	X	X			X	X				X		
	Wastewater generation	X		X		X								
	Water consumption	X		X		X								
Main Initial Construction enhancement	*Vegetation removal*	X	X	X	X	X	X		X			X		X
	Beaver dam removal				X									X
	In-stream removal of detritus	X			X		X	X						X

Table 2. Summary of Actions Associated with Covered Activities

Action		Residential, Commercial, and Industrial Development	Water Delivery	Recycled Water and Wastewater Facilities	Flood Control and Storm Drainage	Energy and Other Utility Services	Park and Recreation Facilities	Transportation Facilities	Sanitation Facilities	Other Public Facilities	Mining	Roads Outside the UDA	Land Management and Monitoring	Habitat Enhancement, Restoration, and Creation
	Ditch maintenance	X			X									X
	Fence repair	X		X	X		X		X		X	X	X	X
	Culvert clean-out	X			X							X	X	X
	Repairing channel banks	X			X									
	Spill cleanup	X		X	X			X				X		
	Cleaning trash racks	X			X									
	Tree trimming	X		X	X	X	X	X				X		
	Culvert replacement	X						X				X	X	X
	Fire management	X											X	X
	Species monitoring												X	X

AGENDA ITEM 11.1
6094

REFERENCES CITED

APLIC (Avian Power Line Interaction Committee). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C. October 2012.

California Burrowing Owl Consortium. 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.

CDFG (California Department of Fish and Game). 2009. Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities. California Natural Resources Agency. November 24, 2009.

Jackson, S.D., and C.R. Griffin. 2000. A Strategy for Mitigating Highway Impacts on Wildlife. Pp. 143–159 In Messmer, T.A., and B. West, (eds) *Wildlife and Highways: Seeking Solutions to an Ecological and Socio-economic Dilemma*. The Wildlife Society.

Robins, J.D. 2002. Stream Setbacks Technical Memo. Prepared for the Napa County Conservation Development and Planning Department.

SACOG (Sacramento Area Council of Governments). 2002. *Metropolitan Transportation Plan 2025.*

SACOG. 2011. *Sacramento County General Plan of 2005–2030*. Amended November 9, 2011.

Sacramento Stormwater Quality Partnership. 2007. Stormwater Quality Design Manual for the Sacramento and South Placer Regions: Integrated Design Solutions for Urban Development Protecting Our Water Quality. May 2007.

Semlitsch, R.D., and J.R. Bodie. 2003. Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles. *Conservation Biology*, Volume 17, No. 5: 1219–1228.

SRCSD (Sacramento Regional County Sanitation District). 2007. *Water Recycling Opportunities Study*.

SRCSD. 2015a. Sacramento Regional County Sanitation District / Special Plan Area / City of Sacramento Recycled Water Feasibility Study. Prepared by RMC Water and Environment. January 2015.

SRCSD. 2015b. Sacramento Regional County Sanitation District's South County Ag Recycled Water Feasibility Study. Prepared by RMC Water and Environment. January 2015.

USFWS (U.S. Fish and Wildlife Service). 1997. Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat. Appendix A of Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California. November 13, 1997.

USFWS. 2004. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemption for Existing Routine Ranching Activities; Final Rule. 50 CFR 17. Federal Register, August 4, 2004.

Wenger, S. 1999. A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation. Prepared for the Office of Public Service and Outreach, Institute of Ecology, University of Georgia, Athens, Georgia.

INTENTIONALLY LEFT BLANK

EIS/EIR APPENDIX E

Alternative Formulation and Screening

Table E-1. First Tier Alternatives Screening

Remove Lands Outside USB From the Planning Area Boundary	Remove Lands West of Interstate-5 From the Planning Area Boundary	All Habitat Preservation and Project Mitigation Is Located Outside of the USB	Preserve 50% of all Vernal Pools in the Planning Area	Recovery Plan Alternative (Preserve 95% of Total Acreage of the MCRA)	Preserve 76% of the Total Acreage of the MCRA	Preserve 49% of the Vernal Pools within the MCRA	Preserve More of the Highest-Quality Swainson's Hawk Habitat	SSHCP	Reduced Permit Term
Would the potential alternative include an interconnected preserve system throughout the Planning Area that is large enough to maintain in perpetuity each type of natural community that is native to the Planning Area, maintain in perpetuity each type of native plant and animal species present within the Planning Area, and maintain in perpetuity or expand the existing distribution of each native animal and plant species within the Planning Area?									
Not likely because the USB is already highly developed and the opportunities for preserve establishment are limited.	Not likely because it would not allow for establishment of preserves in lands that provide valuable habitat for greater sandhill crane.	Not likely because it would not include any additional conservation in the MCRA, which would likely make conservation of vernal pool tadpole shrimp not possible.	Not likely because it would not include sufficient preservation of vernal pools to maintain the existing distribution of native animal and plant species in the Planning Area.	Not likely because it would not be possible to establish a preserve system that meets the mandate of 95% vernal pool preservation in the MCRA.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative locate preserves in areas that maximize protection of native plant and animal species and the ecosystems on which they depend?									
Not likely because it would not allow for establishment of preserves in the areas of the Planning Area that retain the most intact habitat.	Not likely because it would not allow for establishment of preserves in lands that provide valuable habitat for greater sandhill crane.	Not likely because it would not allow for protection of special-status plant species that only occur within the USB.	Not likely because it would not include sufficient preservation of vernal pools to maximize protection of native plant and animals species and their ecosystems.	Not likely, as the high burden for preservation in the MCRA would reduce the amount of development fees available for preservation of other habitat types outside the MCRA.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative locate preserves in areas that maximize the protection of intact watersheds and watershed functions?									
Not likely because the watersheds in the USB are the most disturbed in the Planning Area; the intact watersheds are generally located outside the USB.	Possibly.	Not likely because it would not allow for establishment of preserves in all watersheds of the Planning Area.	Not likely because it would not prioritize preservation of vernal pools in the MCRA, resulting in preservation of vernal pools scattered around the Planning Area.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative protect large, contiguous blocks of species habitat. Provide habitat linkages between preserves that are wide enough to allow dispersal of individual native animals and plants and allow genetic exchange between species populations?									
Not likely because large, contiguous blocks of species habitat are mostly gone from the USB.	Possibly.	Not likely because it would not allow for establishment of linkage preserves in the USB to connect existing preserves.	Possibly.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative protect sufficient cropland and irrigated pasture to provide important foraging habitat on which some native animal species now depend (e.g., Swainson's hawk, white-tailed kite)?									
Not likely, because most of the habitat for these species is outside the USB. Although no Covered Activities would occur outside the USB, it is likely that development would still proceed outside the USB. However, it would not occur under the mitigation framework of an HCP.	Not likely because it would not allow for establishment of preserves in lands that provide valuable habitat for greater sandhill crane.	Possibly.	Possibly.	Not likely, as the high burden for preservation in the MCRA would reduce the amount of development fees available for preservation of other habitat types outside the MCRA.	Not likely, because the high avoidance within the MCRA would limit the available mitigation fees that would allow for acquisition of cropland and irrigated pasture. Preventing development in the MCRA would also shift development pressure to other lands, including those that currently contain cropland and irrigated pasture.	Possibly.	Possibly.	Possibly.	Possibly.

AGENDA ITEM 11.1
6100

Table E-1. First Tier Alternatives Screening

Remove Lands Outside USB From the Planning Area Boundary	Remove Lands West of Interstate-5 From the Planning Area Boundary	All Habitat Preservation and Project Mitigation Is Located Outside of the USB	Preserve 50% of all Vernal Pools in the Planning Area	Recovery Plan Alternative (Preserve 95% of Total Acreage of the MCRA)	Preserve 76% of the Total Acreage of the MCRA	Preserve 49% of the Vernal Pools within the MCRA	Preserve More of the Highest-Quality Swainson's Hawk Habitat	SSHCP	Reduced Permit Term
Would the potential alternative preserve adequate greater sandhill crane roosting habitat and foraging habitat between the existing Stone Lakes National Wildlife Refuge and the existing Cosumnes River Preserve, to maintain or increase the population of greater sandhill crane over-wintering within the Planning Area?									
Not likely because it would not allow for establishment of preserves in lands that provide connectivity between Stone Lakes and the Cosumnes River Preserve.	Not likely because it would not allow for establishment of preserves in lands that provide connectivity between Stone Lakes and the Cosumnes River Preserve.	Possibly.	Possibly.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative protect the long-term viability of ranching and farming operations in the Planning Area (consistent with other objectives)?									
Not likely, as some ranching and farming operations outside the USB would be threatened by development if it is not included in the Plan Area.	Possibly.	Possibly.	Possibly.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative protect all currently documented and any newly discovered occurrences of Sacramento Orcutt grass and slender Orcutt grass in the Planning Area?									
Not likely, because if Orcutt grasses are found outside the USB they could not be included in the Preserve System.	Possibly.	Not likely, because Orcutt grasses are located inside the USB and then could not be included in the preserve system.	Possibly.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative avoid or minimize impacts to state and federally listed species and their habitats, to the maximum extent practicable?									
Possibly.	Not likely because it would not allow for establishment of preserves in lands that provide valuable habitat for greater sandhill crane.	Not likely, because Orcutt grasses are located inside the USB and then could not be included in the preserve system.	Not likely because it would not include sufficient preservation of vernal pools to avoid or minimize impacts to state and federally listed species to the maximum extent practicable.	Not likely, as the high burden for preservation in the MCRA would reduce the amount of development fees available for preservation of other habitat types outside the MCRA.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative avoid or minimize impacts to the existing physical, chemical, and biological functions and services of wetlands and streams in the Planning Area, to the maximum extent practicable?									
Possibly.	Possibly.	Not likely, because wetlands and streams in the USB would not be protected in preserves.	Possibly.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative achieve no net loss of the existing functions and services of aquatic resources in the Planning Area? Methods used to achieve no net loss may include the re-establishment and establishment of vernal pools, riparian, and other aquatic land cover types?									
Possibly.	Possibly.	Possibly.	Not likely because it would result in insufficient preservation of vernal pools than to mitigate Covered Activities and achieve no net loss.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.

AGENDA ITEM 11.1
6101

Table E-1. First Tier Alternatives Screening

Remove Lands Outside USB From the Planning Area Boundary	Remove Lands West of Interstate-5 From the Planning Area Boundary	All Habitat Preservation and Project Mitigation Is Located Outside of the USB	Preserve 50% of all Vernal Pools in the Planning Area	Recovery Plan Alternative (Preserve 95% of Total Acreage of the MCRA)	Preserve 76% of the Total Acreage of the MCRA	Preserve 49% of the Vernal Pools within the MCRA	Preserve More of the Highest-Quality Swainson's Hawk Habitat	SSHCP	Reduced Permit Term
Would the potential alternative include a long-term preserve monitoring and habitat management program sufficient to maintain or improve habitats of targeted native plant and animal species in perpetuity?									
Possibly.	Possibly.	Possibly.	Possibly.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative support the development and implementation of streamlined water-resource permitting programs under CWA Section 404, CWA 401, the Porter–Cologne Water Quality Control Act, and Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) by the federal and state agencies with responsibility for implementing those statues within the Planning Area?									
Possibly.	Possibly.	Possibly.	Possibly.	Possibly, although this alternative is not feasible for the reasons listed under Screening Criteria #1.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative facilitate the recovery of federally listed species, and provide sufficient preservation of federally designated recovery areas within the Planning Area?									
Not likely, as it would not result in preservation of habitat in the Cosumnes/Rancho Seco Core Recovery Area.	Possibly.	Not likely because it would not include any additional conservation in the MCRA, which would likely make conservation of vernal pool tadpole shrimp not possible.	Not likely because it would include sufficient preservation of vernal pools ESA core recovery areas that are now designated within the Planning Area.	Not likely, as the high burden for preservation in the MCRA would reduce the amount of development fees available for preservation of other habitat types outside the MCRA including the Cosumnes/Rancho Seco Core Area.	Possibly.	Possibly.	Possibly.	Possibly.	Possibly.
Score (# of "Possibly")									
5	9	5	9	9	13	14	14	14	14
Carried Forward to Second Tier Screening?									
No	No	No	No	No	Yes	Yes	Yes	Yes	Yes

AGENDA ITEM 11.1
6102

Table E-2. Second Tier Alternatives Screening

Preserve 76% of the Total Acreage of the MCRA	Preserve 49% of the Vernal Pools within the MCRA	Preserve More of the Highest-Quality Swainson's Hawk Habitat	SSHCP	Reduced Permit Term
Would the potential alternative avoid or substantially lessen any of the significant environmental effects of the proposed project?				
Possibly.	Possibly	Not likely, because the proposed project would have minimal effects on Swainson's hawk. This is especially true since the withdrawal of the City of Elk Grove from the Plan Area, as that was the area with by far the greatest impacts to Swainson's hawk habitat from Covered Activities.	Does not apply, as this alternative is the proposed project.	Possibly.
Would the potential alternative address one or more significant issues related to the proposed action?				
Possibly.	Possibly	Not likely, because the proposed project would have minimal effects on Swainson's hawk. This is especially true since the withdrawal of the City of Elk Grove from the Plan Area, as that was the area with by far the greatest impacts to Swainson's hawk habitat from Covered Activities.	Does not apply, as this alternative is the proposed project.	Possibly.
Score (# of "Possibly")				
2	2	0	N/A	2
Carried Forward to Third Tier Screening?				
Yes	Yes	No	Yes	Yes

AGENDA ITEM 11.1
6103

Table E-3. Third Tier Alternatives Screening

Preserve 76% of the Total Acreage of the MCRA	Preserve 49% of the Vernal Pools within the MCRA	SSHCP	Reduced Permit Term
Would the potential alternative accommodate the existing transportation, utility, and other infrastructure master plans that have been prepared by the SSHCP permit Applicants (County of Sacramento, City of Galt, City of Rancho Cordova, SCWA, SRCSD, and Connector JPA)?			
Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative allow an adequate amount of urban development within the currently adopted spheres of influence for the City of Rancho Cordova and the City of Galt, and the currently adopted USB for Sacramento County, to discourage expansion beyond these boundaries and maintain the sound land use planning principles these boundaries encourage (e.g., preventing sprawl outside the USB and leap-frog development; consolidating development to support the efficient provision of utilities and infrastructure; promoting compact mixed use development that supports viable transit and walkable areas; creating communities with a variety of housing types that support different income levels and socioeconomic conditions; and maintaining compliance with air quality laws and regulations that influence, or are influenced by land use decisions such as Assembly Bill 32, Senate Bill 375, and the Clean Air Act).			
Not likely, because "displaced" development outside the USB would require additional development of utilities and infrastructure, lead to more urban sprawl with more vehicle trips, and would not promote compact mixed-use development that supports viable transit and walkable areas. This development outside the USB may also conflict with requirements of AB32 and SB375 to reduce greenhouse gas emissions through land use planning that minimizes vehicle trips.	Not likely, because "displaced" development outside the USB would require additional development of utilities and infrastructure, lead to more urban sprawl with more vehicle trips, and would not promote compact mixed-use development that supports viable transit and walkable areas. This development outside the USB may also conflict with requirements of AB32 and SB375 to reduce greenhouse gas emissions through land use planning that minimizes vehicle trips.	Possibly.	Possibly.
Would the potential alternative include an adequate amount of urban development with associated fees to meet first tier screening criteria, above? In addition, the associated mitigation-fee structure must be practicable, with fees that are analogous to fees collected under other Northern California permitted HCPs that have similar species habitats and similar impacts.			
Not likely, because the resource agencies did not take into account the feasibility of obtaining these lands for permanent habitat preservation when the 2011 Agency Conceptual Design was prepared. In order to acquire these lands, the development fee would need to be increased to such an extent that it would not be consistent with fees charged by other HCPs.	Possibly.	Possibly.	Possibly.
Would the potential alternative include as covered activities the SSHCP Permit Applicant's transportation, utility, and other infrastructure activities and projects as described in the approved master plans of the SSHCP permit Applicants (County of Sacramento, City of Galt, City of Rancho Cordova, SCWA, and Connector JPA)?			
Possibly.	Possibly.	Possibly.	Possibly.
Would the potential alternative rely on willing sellers for the purchase of land or easements when establishing habitat preserves; do not include condemnation or imminent domain to meet the project needs, purposes, and objectives?			
Not likely, as this alternative would require establishing preserves in nearly all of the remaining undeveloped land within the MCRA. One or more landowners would most likely refuse to sell.	Not likely, as this alternative would require establishing preserves in nearly all of the remaining undeveloped land within the MCRA. One or more landowners would most likely refuse to sell.	Possibly.	Possibly.
Score (# of "Possibly")			
3	3	5	5
Carried Forward to Analysis in the EIS/EIR?			
No	No	Yes	Yes

AGENDA ITEM 11.1
6104

INTENTIONALLY LEFT BLANK

EIS/EIR APPENDIX F

CEQA Environmental Checklist Form

INITIAL STUDY CHECKLIST

Appendix G of the California Environmental Quality Act (CEQA) provides guidance for assessing the significance of potential environmental impacts. Based on this guidance, Sacramento County has developed the following Initial Study Checklist. The Checklist identifies a range of potential significant effects by topical area. The words "significant" and "significance" used throughout the following checklist are related to impacts as defined by the California Environmental Quality Act as follows:

1 Potentially Significant indicates there is substantial evidence that an effect MAY be significant. If there are one or more “Potentially Significant” entries an Environmental Impact Report (EIR) is required. Further research of a potentially significant impact may reveal that the impact is actually less than significant or less than significant with mitigation.

2 Less than Significant with Mitigation applies where an impact could be significant but specific mitigation has been identified that reduces the impact to a less than significant level.

3 Less than Significant or No Impact indicates that either a project will have an impact but the impact is considered minor or that a project does not impact the particular resource.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
1. **LAND USE** - Would the project:				
a. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to a general plan, specific plan or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	X			See Chapter 4.
b. Physically disrupt or divide an established community?	X			See Chapter 4.
2. **POPULATION/HOUSING -** Would the project:				
a. Induce substantial unplanned population growth in an area either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of infrastructure)?	X			See Chapter 4 and 16.
b. Displace substantial amounts of existing housing, necessitating the construction of replacement housing elsewhere?	X			See Chapter 4.
3. **AGRICULTURAL RESOURCES** - Would the project:				
a. Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance or areas containing prime soils to uses not conducive to agricultural production?	X			See Chapter 6.
b. Conflict with any existing Williamson Act contract?	X			See Chapter 6.
c. Introduce incompatible uses in the vicinity of existing agricultural uses?	X			See Chapter 4 and Chapter 6. .

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
4. **AESTHETICS -** Would the project:				
a. Substantially alter existing viewsheds such as scenic highways, corridors or vistas?			X	Given its nature, the project is not expected to substantially alter the viewshed associated with Highway 16, the River Road or other corridors or vistas when compared to the No Action/No Project Baseline.
b. Substantially degrade the existing visual character or quality of the site and its surroundings?			X	Construction will not substantially degrade the visual character or quality of the project site when compared to the No Action/No Project Baseline.
c. Create a new source of substantial light, glare, or shadow that would result in safety hazards or adversely affect day or nighttime views in the area?			X	The project will not result in a new source of substantial light, glare or shadow that would result in safety hazards or adversely affect day or nighttime views in the area when compared to the No Action/No Project Baseline.
5. **AIRPORTS -** Would the project:				
a. Result in a safety hazard for people residing or working in the vicinity of an airport/airstrip?	X			See Chapter 4.
b. Expose people residing or working in the project area to aircraft noise levels in excess of applicable standards?	X			See Chapter 4.
c. Result in a substantial adverse effect upon the safe and efficient use of navigable airspace by aircraft?	X			See Chapter 4.
d. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	X			See Chapter 4.
6. **PUBLIC SERVICES -** Would the project:				
a. Have an adequate water supply for full buildout of the project?	X			See Chapter 12.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
b. Have adequate wastewater treatment and disposal facilities for full buildout of the project?	X			See Chapter 12.
c. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	X			See Chapter 12.
d. Result in substantial adverse physical impacts associated with the construction of new water supply or wastewater treatment and disposal facilities or expansion of existing facilities?	X			See Chapter 12.
e. Result in substantial adverse physical impacts associated with the provision of storm water drainage facilities?	X			See Chapter 7 and Chapter 12.
f. Result in substantial adverse physical impacts associated with the provision of electric or natural gas service?	X			See Chapter 12.
g. Result in substantial adverse physical impacts associated with the provision of emergency services?	X			See chapter 12.
h. Result in substantial adverse physical impacts associated with the provision of public school services?			X	The project would not require the construction/expansion of additional new unplanned school facilities compared to the No Action/No Project Alternative. Established case law, *Goleta Union School District v. The Regents of the University of California* (36 Cal-App. 4th 1121, 1995), indicates that school overcrowding, standing alone, is not a change in the physical conditions, and cannot be treated as an impact on the environment.
i. Result in substantial adverse physical impacts associated with the provision of park and recreation services?	X			See Chapter 12.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
7. **TRANSPORTATION/TRAFFIC** - Would the project:				
a. Result in a substantial increase in vehicle trips that would exceed, either individually or cumulatively, a level of service standard established by the County?	X			See Chapter 13.
b. Result in a substantial adverse impact to access and/or circulation?	X			See Chapter 13.
c. Result in a substantial adverse impact to public safety on area roadways?	X			See Chapter 13.
d. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	X			See Chapter 13.
8. **AIR QUALITY** - Would the project:				
a. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?	X			See Chapter 14.
b. Expose sensitive receptors to pollutant concentrations in excess of standards?	X			See Chapter 14
c. Create objectionable odors affecting a substantial number of people?	X			See Chapter 14
9. **NOISE -** Would the project:				
a. Result in exposure of persons to, or generation of, noise levels in excess of standards established by the local general plan, noise ordinance or applicable standards of other agencies?			X	Compared to the No Action/No Project alternative, the project is not expected to result in exposure of persons to, or generation of, noise levels in excess of applicable standards.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
b. Result in a substantial temporary increase in ambient noise levels in the project vicinity?			X	Project construction will result in a temporary increase in ambient noise levels in the project vicinity. This impact is less than significant due to the temporary nature of the these activities, limits on the duration of noise, and evening and nighttime restrictions imposed by the County Noise Ordinance (Chapter 6.68 of the County Code).
10. **HYDROLOGY AND WATER QUALITY** - Would the project:				
a. Substantially deplete groundwater supplies or substantially interfere with groundwater recharge?	X			See Chapter 7.
b. Substantially alter the existing drainage pattern of the project area and/or increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	X			See Chapter 7.
c. Develop within a 100-year floodplain as mapped on a federal Flood Insurance Rate Map or within a local flood hazard area?	X			See Chapter 7
d. Place structures that would impede or redirect flood flows within a 100-year floodplain?	X			See Chapter 7.
e. Expose people or structures to a substantial risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	X			See Chapter 7
f. Create or contribute runoff that would exceed the capacity of existing or planned stormwater drainage systems?	X			See Chapter 7
g. Create substantial sources of polluted runoff or otherwise substantially degrade ground or surface water quality?	X			See Chapter 7.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
11. **GEOLOGY AND SOILS** - Would the project:				
a. Expose people or structures to substantial risk of loss, injury or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	X			See Chapter 5.
b. Result in substantial soil erosion, siltation or loss of topsoil?	X			See Chapter 5.
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, soil expansion, liquefaction or collapse?	X			See Chapter 5.
d. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available?	X			See Chapter 5.
e. Result in a substantial loss of an important mineral resource?	X			See Chapter 5.
f. Directly or indirectly destroy a unique paleontological resource or site?	X			See Chapter 5.
12. **BIOLOGICAL RESOURCES** - Would the project:				
a. Have a substantial adverse effect on any special status species, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop	X			See Chapters 8 and 9.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
below self-sustaining levels, or threaten to eliminate a plant or animal community?				
b. Have a substantial adverse effect on riparian habitat or other sensitive natural communities?	X			See Chapter 8.
c. Have a substantial adverse effect on streams, wetlands, or other surface waters that are protected by federal, state, or local regulations and policies?	X			See Chapters 8 and 9.
d. Have a substantial adverse effect on the movement of any native resident or migratory fish or wildlife species?	X			See Chapters 8 and 9.
e. Adversely affect or result in the removal of native or landmark trees?	X			See chapter 8.
f. Conflict with any local policies or ordinances protecting biological resources?	X			See Chapters 1, 8 and 9.
g. Conflict with the provisions of an adopted Habitat Conservation Plan or other approved local, regional, state or federal plan for the conservation of habitat?	X			See Chapter 4.
13. **CULTURAL RESOURCES -** Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource?	X			See Chapter 11.
b. Have a substantial adverse effect on an archaeological resource?	X			See Chapter 11.
c. Disturb any human remains, including those interred outside of formal cemeteries?	X			See Chapter 11.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
d. Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?	X			See Chapter 11,
14. **HAZARDS AND HAZARDOUS MATERIALS** - Would the project:				
a. Create a substantial hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	Chapter 5, condition 10 of the SSHCP identifies responsibilities of the implementing agency, which will reduce impacts associated with hazardous materials to less than significant levels. The responsibilities are described below: *Prior to the acquisition of a preserve site or implementation of a stream or riparian restoration project, a Phase I Environmental Site Assessment shall be conducted in general accordance with the American Society for Testing and Materials Standard Practice E1527-05. The purpose of this Environmental Site Assessment is to identify, to the extent feasible pursuant to the American Society for Testing and Materials Standard, recognized environmental conditions in connection with the potential site. The term "recognized environmental condition" means the presence or likely presence of hazardous substances or petroleum products on the property under conditions that may indicate an existing release, a past release, or a material threat of release of these substances to the property. If the Phase 1 Environmental Site Assessment indicates the presence of a recognized environmental condition, the Implementing Entity shall consider the following options.* • *Determine that the acquisition/project can proceed on the basis that the Habitat Plan goals and objectives can be met on the site even with the presence of a recognized environmental condition.* • *Conduct a Phase II Environmental Site Assessment, including soil and groundwater testing, to further study the potential for contamination to limit the Implementing Entity's management activities.*

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
				• *If the results of the Phase I (or Phase II) Environmental Site Assessment indicate that the Habitat Plan goals and objectives cannot be met on the site, the Implementing Entity should not acquire the site.* *As part of each Preserve Management Plan or site restoration plan, a Contingency Plan shall be prepared to address the actions that would be taken during construction in the event that unexpected contaminated soil or groundwater is discovered. The Contingency Plan shall include health and safety considerations, handling and disposal of wastes, reporting requirements, and emergency procedures. The Contingency Plan shall include a requirement that if evidence of contaminated materials is encountered during construction, construction would cease immediately and applicable requirements of the Comprehensive Environmental Release Compensation and Liability Act and the California Code of Regulations Title 22 regarding the disposal of waste would be implemented.*
b. Expose the public or the environment to a substantial hazard through reasonably foreseeable upset conditions involving the release of hazardous materials?			X	See 14.a (above).
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?			X	See 14.a (above)
d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, resulting in a substantial hazard to the public or the environment?			X	See 14.a (above). The project would not interfere with any ongoing clean-up efforts of known hazardous materials sites. *The Implementing Entity will take the following steps when reviewing and considering any fee title or conservation easement acquisition, in addition to any steps required to comply with applicable federal and state laws governing real estate transactions:* *Determine landowner interest in selling an easement or selling in*

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant or No Impact	Comments
				fee title. Approach property owner with proposal to acquire land through conservation easement or fee title. *The Implementing Entity will obtain a title report to determine if there are encumbrances that might exclude property from acquisition. Properties with encumbered water rights or surface mineral rights that cannot be subordinated to a conservation easement or habitat protection interest will be excluded from acquisition unless these encumbrances do not influence the integrity of the proposed Preserve. A Phase I survey with an environmental determination document for the presence of hazardous materials will be included with the title report.*
e. Impair implementation of or physically interfere with an adopted emergency response or emergency evacuation plan?			X	The project would not interfere with any known emergency response or evacuation plan.
15. GREENHOUSE GAS EMISSIONS – Would the project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	X			See Chapter 15 of the EIS/EIR.

EIS/EIR APPENDIX G

Supporting Information for the Biological Resources Analyzed in Chapters 8 and 9

Appendix G-1. Environmental Stressors from Urban Development Projects and Activities

Appendix G-2. Selection of Special-Status Species to be Analyzed in this EIS/EIR

Appendix G-3. Species Accounts for Proposed Covered Species

Appendix G-4. Covered Species Habitat Models

EIS/EIR APPENDIX G-1

Environmental Stressors from Urban Development Projects and Activities

This section describes environmental stressors resulting from actions considered under the alternativesthat may affect land covers, species habitat, and individuals of species. Twenty-four environmental stressors are described below, organized by: (1) environmental stressors that would occur on an ongoing and permanent basis for activities over the 50-year study period considered in the EIS/EIR, and (2) those that would be temporary and occur only during and immediately after construction of an activity. These environmental stressors are listed below, then a narrative discussion is provided for each stressor. Table G-1.1 (tables are provided at the end of Appendix G-1) presents a matrix identifying which environmental stressors could result from different categories of projects or activities. Table G-1.2 provides a matrix indicating which environmental stressors have potential to affect each of the 28 proposed covered species included in the Propsoed Action/Proposed Project and the Reduced Permit Term Alternative.

ENVIRONMENTAL STRESSORS OF URBAN DEVELOPMENT

- Loss of land covers and species habitat
- Permanent alterations to watershed hydrographs and downstream water quality effects
- Habitat fragmentation
- Increased wildfire
- Vernal pool hydrologic alterations
- Chronic ground vibration and noise
- Lighting
- Increased human activity
- Wildlife community alterations
- Invasive plants
- Invasive animals
- Mesopredators
- Wildlife disease
- Pesticides and fertilizers
- Vehicle and aircraft collisions with wildlife
- Aboveground electrical utilities collision and electrocution

TEMPORARY ENVIRONMENTAL STRESSORS DURING CONSTRUCTION

- Temporary alterations to hydrographs and construction water quality effects
- Laydown or trampling of vegetation
- Construction noise
- Construction ground vibration

- Construction lighting
- Construction dust
- Increased human presence during construction
- Construction trash and debris.

PERMANENT ENVIRONMENTAL STRESSORS

Loss of Land Covers and Species Habitat

The major effect of new urban development, transportation, and utility projects is conversion from undeveloped to developed land cover types. In addition to the net loss of undeveloped land cover in the Planning Area, such conversion may further isolate remaining natural habitat rendering it less suitable or unsuitable for wildlife and plant species.

Natural land covers would be permanently converted to developed uses from construction of residential, commercial, and industrial structures, park and recreation facilities, some public and private utilities, solid waste management facilities, urban and rural transportation, and wastewater facilities.

Habitat Fragmentation

Fragmentation and isolation of plant and wildlife populations can affect wildlife movement and dispersal as well as seed dispersal and movement and dispersal of plant pollinators. These may cause extinction of local populations as a result of two processes: (1) reduction in total habitat area, which reduces effective population sizes; and (2) isolation of local populations, which affects dispersal and immigration rates (Wilcox and Murphy 1985). Because of complex community-level interactions (e.g., mutualistic species, habitat guilds, and keystone species), the loss of one or a few species from a habitat patch as a direct result of habitat fragmentation ("primary" extinctions) also may result in multiple "secondary" extinctions within the habitat patch (Wilcox and Murphy 1985). At the larger landscape scale, change in regional abundance and distribution of habitat may change the migration and habitat use patterns of some wildlife species, which in turn affects the metapopulation dynamics of numerous organisms and alters multiple landscape-scale ecological functions. For example, many species will either not cross roads, drainages, disturbed lands, and urbanized areas or do so infrequently or unsuccessfully. The necessity of crossing roads also increases the risk of vehicle collisions, especially for small rodents, reptiles, amphibians, and low- or slow-flying birds. Roadway mortality or limitations on species movement leads to a variety of problems, including reduction and isolation of populations. As populations become isolated and smaller, they become particularly vulnerable to negative demographic trends, including genetic bottlenecks, genetic drift, and inbreeding depression. These changes in turn can affect ecological functions and the long-term viability of

species, including those for which roads are not a major barrier, but which have important ecological relationships with high-risk species (e.g., predator/prey relationships, mutualisms such as burrow construction and use, pollination). This disruption may also affect vegetation communities if the spatial behavior of plant dispersers and pollinators is altered.

Fragmentation also decreases the functional size of conserved habitat patches. As remaining habitat areas diminish in size, the ratio of vulnerable edge to preserved interior area increases, especially with narrow or irregularly shaped habitat patches. Ecological consequences arise because, as this ratio increases, any given interior point (habitat or organism) is closer to potential threats existing outside the preserve boundary. Increased edge effects heighten species' vulnerability to stochastic disturbances, pollution, and invasion by non-native plant and animal species.

Fencing may inhibit the movement of some species that have large home ranges, such as badgers (*Taxidea taxus*), coyotes (*Canis latrans*), and mule deer (*Odocoileus hemionus*). Disrupting the ability of these species to move freely throughout their ranges may alter their foraging and social behavior, and may expose them to greater risks in other areas they may normally avoid or use less frequently due to lower habitat suitability, greater risks of predation, or greater risks of vehicle collisions.

Wildlife Community Alterations

Wildlife community alterations will occur in developed areas, and may occur along the open space–urban interface due to development-induced habitat degradation. Rottenborn (1999), for example, characterized wildlife species as being "tolerant" or "sensitive" to urbanization. The "tolerant" species include several birds that are commonly thought of as urban-related, such as pigeons (*Columbia livia*), mourning doves (Zenaida macroura), western scrub-jays (*Aphelocoma californica*), American crows (*Corvus brachyrhynchos*), northern mockingbirds (Mimus polyglottos), European starlings (*Sturnus vulgaris*), and bushtits (Psaltriparus minimus). Urban "sensitive" species included both year-long resident species, such as California quail (Callipepla californica), acorn woodpecker (Melanerpes formicivorus), and Bewick's wren (Thryomanes bewickii), as well as migrants, such as willow flycatcher (Empidonax traillii) and yellow warbler (Setophaga petechia). Permeability to invasive or urban-tolerant species may be increased through reductions in plant structure and cover related to increased human activity in the area, and especially related to fuel-modification activities along habitat edges. These species may out-compete resident native species for resources (e.g., habitat, food, nesting locations) or directly prey on or parasitize the native residents. European starlings, for example, may directly compete with native cavity nesters for nest sites in urban settings.

Permanent Alterations to Watershed Hydrographs and Downstream Water Quality Effects

By permanently increasing the extent of impermeable surfaces, urban development results in increased runoff, especially during storm events. Such increases can change the hydrograph of local creeks and streams, result in greater levels of scour and/or incision of local creeks, increased sediment loads downstream, alterations of downstream hydrology, and decreased groundwater recharge. Also, addition of new development may permanently increase the amount of pollutants such as grease, oil, and lawn pesticides in local creeks and streams transported from residences during wet weather. An increase in the quantity of pollutants reaching local creeks through higher runoff may affect the biological and physical characteristics of aquatic habitats. Pollutants can also enter groundwater when development occurs over percolation zones in streams, which can affect drinking water quality. High runoff temperature may also result in an increase of in-stream water temperatures when runoff enters local streams. Permanent increases in impermeable surfaces or compaction of soils may also inhibit natural percolation of stormwater into groundwater basins, which may lead to a drawdown in groundwater levels.

Activities increase the potential for permanent ongoing discharge of point and non-point source pollutants to the natural landscape through surface and subterranean water flows, windblown trash accumulation, windblown dispersion of chemicals, and illegal dumping of industrial and household trash and garden waste in natural ecosystems. Pesticides, herbicides, and fertilizers may enter adjacent landscapes through runoff from irrigated landscapes or from storm events on a frequent basis. Contaminants from automobiles that collect on roadways, parking lots, and driveways and enter natural landscapes during storm events include oil, gas, brake dust, and other fluids. Road materials, leaks, and spills also permanently adversely affect riparian, wetland, aquatic, and semiaquatic species by contaminating their habitats. Illegal dumping of unwanted items such as trash, tires, and appliances in vacant habitat areas also crush vegetation and restrict photosynthesis by blocking the sun. Discarded electronics (i.e., e-waste) can introduce various toxic chemicals into the environment, including heavy metals that may leach into soil and water. These waste materials may chronically disrupt natural hydrology by forming obstructions and blocking flows and may create permanent habitat for pest species, such as non-native rats.

Effects from Vernal Pool Hydrologic Alterations

Vernal pool ecosystems are especially vulnerable to hydrologic alteration, because the timing and period of inundation dictates whether vernal pool plants and vernal pool crustaceans are able to reproduce. Vernal pool ecology is directly linked to vernal pool hydrology. The vernal pool hydrologic cycle consists of multiple steps, several of which are susceptible to disruption

or disturbance. The vernal pool hydrologic cycle for vernal pools within this Plan Area consists of rainfall, soil saturation, formation of a perched aquifer, filling of the pools, surface swale flows, discharge to a stream or creek, and drying, as discussed below.

Water enters the vernal pool ecosystem through rainfall. In the Mediterranean climate of the Planning Area, rainfall in the Planning Area primarily occurs during the winter months, followed by a hot, dry season during the summer months. The winter rainy season, when there is sufficient precipitation to initiate and maintain filling of vernal pools, typically begins in November and ends in March or April.

Before vernal pools begin to fill, the soil under and around the vernal pools first becomes saturated. The rainfall percolates through the soil until it is stopped by an impervious layer in the soil profile. Soil series that contain vernal pools include an impermeable layer, which can be a claypan, a cemented hardpan (duripan), or rock (Solomeshch et al. 2007).

As water accumulates in the soil above the impermeable layer, a perched water table (a perched aquifer) forms. A perched aquifer is an area of saturated soil that is separated from underlying deeper groundwater by an impermeable layer of rock, clay, or other material. Seasonal perched groundwater is an important category of groundwater in the Planning Area with respect to the hydrologic functioning of vernal pools. Up to 60% of the water entering a vernal pool does so from the perched water table (Rains et al. 2006). The perched water table allows rainfall that falls some distance from the vernal pool to be retained in the soil and flow into the vernal pool. Subsurface flows from perched water tables stabilize vernal pool water levels, causing them to be inundated for longer periods of time than would be the case if the vernal pools were recharged only by rainfall (Rains et al. 2006).

Once the soils in the vernal pool ecosystem is saturated and the perched aquifer fills, water accumulates in the pool itself, resulting in the filling of the pool and inundation of the ground surface. Although vernal pools may temporarily hold water at the surface during and immediately after rainfall events, pools that are dependant on a perched aquifer will not remain inundated until the soil is saturated and the perched aquifer fills.

Most of the vernal pools in the Planning Area are types that occur on soils or soil layers impermeable to water, such as a hardpan, claypan, or volcanic basalt (Smith and Verrill 1998) that can result in a perched aquifer. However, another vernal pool type in the Planning Area, drainageway vernal pools, occur on recent alluvial deposits adjacent to the incised channels of active watercourses. Consequently, drainageway vernal pools are interspersed throughout the other vernal pool types present in the Planning Area. Drainageway vernal pools fill and drain rapidly, and may depend more on overland runoff and direct precipitation to maintain their hydrology relative to the other vernal pool types (Jones and Stokes 1990). In some cases, soils

above the restricting claypan or hardpan layers in these pool types may be too deep for perched water tables to become exposed in shallow vernal pools. Additionally, the basins of these types of pools are often shallow, increasing susceptibility to evaporation, or slightly sloped, which encourages drainage.

Once a vernal pool fills completely, water exits the pool via surface flows. The movement of surface water between vernal pools can occur in a network of narrow and intermittent surface "swales" (Solomeshch et al. 2007). In the Planning Area swales are defined as shallow seasonal drainages typically found in flat to gently rolling valley grassland in association with vernal pool complexes on soils with an impermeable claypan or hardpan layer. Swales convey rainwater runoff as broad gently sloping ephemeral drainages during, and for short periods after, winter rainstorms. All swales mapped in the Planning Area are associated with vernal pools. The swales provide intermittent conduits between vernal pools for movement of surface water and vernal pool plant and animal propogules (seeds, cysts, eggs, and spores), and adult amphibians that use vedrnal pools, such as California tiger salamanders and western spadefoot toads. The swale land cover type also provide habitat for these amphibian species (USFWS 2006). Many of the native plants that grow in vernal pools also grow in swales. Swales also often include smaller shallow depressional features that may pond during the rainy season to provide suitable reproductive habitat for some vernal pool associated species, and may be considered vernal pools. Generally, the swale land cover provides suitable habitat for portions or all of the life cycle of many of the species that occur in the vernal pool land cover type.

Water moving within a vernal pool complex via surface swale flows ultimately discharges from the complex if there is sufficient rainfall. Typically, at the topographic lowpoint of a vernal pool complex the surface discharge will be to a stream or creek.

Surface swale flows and discharges to streams and creeks are associated with rainfall events when additional water enters a vernal pool complex. Depending on the timing and volume of rainfall through the winter and spring, the depth of vernal pools may fluctuate somewhat as water enters and leaves the system, but the vernal pools will remain inundated. However, vernal pools begin to dry in spring as temperatures rise and rainfall diminishes. Without further rainfall adding water to the vernal pool ecosystem, water in the pools is lost through evaporation and transpiration. Many pools will no longer have surface water by March or April. The soil in the pool may remain moist through April and May, and then desiccates and stays dry until the next rainy season.

Vernal pools support endemic plants and animals that are adapted to living under the hydrologica cycle and inundation regime of vernal pools. The inundation regime is too short and unpredictable to support aquatic species but long enough to eliminate upland species, which characterizes vernal pools as ephemeral wetlands and differentiates them from other

aquatic ecosystems such as alkali meadows and seasonally flooded emergent bulrush or tule marshes (Solomeshch et al. 2007). Almost all plants that occur in vernal pools live their entire lifecycle within one year, but have seeds that could remain dormant for many years, allowing them to survive annual periods of drought. Similarly, species of crustaceans, amphibians, and insects that occur in vernal pools have adaptations to respond to periods of drying, such as a single year life cycle and eggs or cysts resitant to drought, or finding underground refugia during the dry season.

Urban development can affect vernal pool hydrology in three major ways: (1) by permanently interrupting connection to surface water flows from up-gradient swales; (2) by damaging or permanently interrupting hydrologic connections to the perched water table; and (3) by puncturing the duripan within the vernal pool's micro-watershed, permanently increasing rate of water loss from the vernal pool and its associated perched aquifer, and allowing that water to drain into deeper groundwater tables.

Reduced groundwater infiltration through development of increased impervious surfaces also may reduce the amount of seasonal perched groundwater available to support vernal pools. Increased impervious surfaces may also result in increased stormwater runoff rates and volumes from development sites. If increases in flows are sufficient, they could cause soil erosion and offsite sedimentation, including sedimentation of vernal pools.

Invasive Plants

Development, including roads and utility corridors, can promote invasive, non-native plant species that negatively affect habitat in a variety of ways, ultimately changing ecological functions and adversely affecting native species. As new urban development and infrastructure encroach into natural landscapes, newly disturbed areas and/or the new interface between developed areas and native habitats provide an opportunity for invasive plant species to establish and eventually invade natural habitat settings, degrading habitat and potentially displacing native species. Ornamental plants and native cultivars may spread to adjacent protected habitats and outcompete and displace native plant species; they can also hybridize (interbreed) with local native plants and thereby disrupt the genetics of the native population. Such hybridization can cause a number of problems for the native plant population, including poor growth and reproduction.

According to the *Invasive Plants of California's Wildlands* (Bossard et al. 2000), non-native invasive plant species can alter ecosystem processes, such as nutrient cycling, hydrologic cycles, frequencies of wildfires, and erosion and sediment deposition. Invasive plants interfere in ecosystem functions by outcompeting and displacing native plants and wildlife by providing refuge for non-native animals and by hybridizing with native species (Bossard et al. 2000).

Several organizations, such as the California Native Plant Society (CNPS) and the California Invasive Plant Council (Cal-IPC) (formerly known as the California Exotic Pest Plant Council), have provided detailed documentation regarding invasive plant species that threaten California's native plants and animals.

Invasive plant species, and especially upland species, are often identified as an indirect "edge effect" of new urban development because invasive plants generally colonize modified or otherwise disturbed zones between development and remaining natural areas. However, invasive species can colonize virtually any upland area that is subject to some kind of disturbance, such as road shoulders, cleared zones along railroad lines, clearings along utility easements, areas affected by fire, fire breaks, and grazed areas.

Future development in the Planning Area will likely increase local sources of nitrogenous air pollutants, primarily due to increased transportation and demand for electricity generation. Increased nitrogen deposition (N-deposition) facilitates the growth of non-native plant species, especially invasive annual grasses in low-biomass ecosystems. Increased abundance of non-native plants, and invasive annual grasses in particular, represents a potentially significant effect to native vegetation communities and wildlife habitat. Nitrogen deposition can be locally elevated near roadways, with nitrogen flux along busy roads up to four times above background levels (Redling et al. 2013). However, nitrogen deposition can also result from emissions within the greater air basin.

Broadleaved pepperweed (*Lepidium latifolium*), yellow star-thistle (*Centaurea solstitialis*), and medusahead (*Elymus caput-medusae*) are common invasive species in grasslands and/or along Planning Area roadsides (Kleinschmidt Associates 2008).

Riparian and wetland ecosystems are also extremely vulnerable to invasive plants because of the highly effective transport of invasive species along rivers and streams. Invasive species can dominate the biomass of riparian and wetland communities where they become established, virtually choking out the native vegetation. Invasive plants commonly found in wetlands, riparian systems, and/or waterways in the Planning Area include broadleaved pepperweed, common water hyacinth (*Eichhornia crassipes*), Brazilian waterweed (*Egeria densa*), and Himalayan blackberry (*Rubus armeniacus*) (Kleinschmidt Associates 2008). Several other invasive species potentially affecting vernal pools and associated watersheds have also been identified, including waxy mannagrass (*Glyceria declinata*), barbed goatgrass (*Aegilops triuncialis*), Italian thistle (*Carduus pycnocephalus*), stinkwort (*Dittrichia graveolens*), Klamath weed (common St. Johnswort) (*Hypericum perforatum*), yellow glandweed (*Parentucellia viscosa*), and milk thistle (*Silybum marianum*) (Sacramento County Department of Economic Development 2013).

Invasive Animals

Human activities associated with urban development can exacerbate the introduction or spread of non-native animal species. Non-native aquatic wildlife is known to have serious effects on native amphibian populations, including California tiger salamander (*Ambystoma californiense*). For example, aquarium species released in the wild may introduce new diseases to wild amphibian or fish populations. Feral cats (*Felis catus*) are a serious threat to native birds, especially birds that nest on or near the ground, as well as native reptiles and amphibians. They can also cause a shift in small mammal populations from native to non-native species. An increase in year-round water availability due to irrigation and water features can result in increased abundance of bullfrogs.

Invasive wildlife can negatively affect extant native wildlife and plants in many ways. Common native wildlife (e.g., ravens (*Corvus corax*), crows, pigeons, raccoons (*Procyon lotor*), skunks (*Mephitis mephitis)*, and gopher snakes (*Pituophis catenifer*)) and non-native species (e.g., Argentine ants (*Linepithema humile*), European starlings, wild turkeys (*Meleagris gallopavo*), bullfrogs (*Rana catesbeiana*), opossums (*Didelphimorphia*), house mice (*Mus musculus*), rats (*Rattus* spp.), and feral cats and dogs (*Canis lupus familiaris*)) may thrive in disturbed or otherwise marginal habitats and can harm native species through predation, competition, and displacement. Some of these non-native species may also have the potential to spread diseases and parasites to other native wildlife, as discussed below.

Urban development activities in the Urban Development Area (UDA) will increase the number of pet cats and dogs, and increase the potential for stray and feral animals. Unconstrained pets at the interface between habitat preserves and residential development can have significant predation effects on native wildlife, including birds, rodents, reptiles, and amphibians (e.g., Churcher and Lawton 1987; Kelly and Rotenberry 1993). Lost or abandoned pets may penetrate even farther into open space areas in search of food or refugia, including native prey.

Also, as noted below in the discussion of disease, domestic cats and dogs may be vectors for diseases that affect native wildlife, such as feline immunodeficiency virus, feline leukemia virus, feline infectious peritonitis, feline and canine distemper, panleukopenia, and rabies (Foley et al. 1999).

Mesopredators

A related indirect consequence of habitat fragmentation and isolation is an increase in urban-adapted or urban-tolerant mesopredators, such as raccoons, skunks, opossums, and foxes (*Vulpes* spp.), in small habitat fragments where top predators, such as coyotes and bobcats (*Lynx rufus*), have been removed (i.e., the “mesopredator release” effect) (Crooks and Soulé

1999). Non-native mesopredators also may include free-roaming stray and feral cats and dogs, which can have the same effects as wild mesopredators. These species can out-compete smaller native species for available resources and increase predation rates, thus reducing the distribution and populations of vulnerable native species (Crooks and Soulé 1999). The increase in mesopredators in fragmented habitats is often considered an indirect edge effect, but because some of these species can penetrate long distances in natural habitats in the absence of top predators (e.g., coyotes, bobcats), they also have landscape-level ecosystem effects.

Pesticides and Fertilizers

Pesticide (including fungicide, herbicide, and rodenticide) and fertilizer use associated with urban development may affect vegetation communities and habitat quality, be directly toxic to species, or indirectly toxic through prey vectors, or reduce prey abundance. These substances may penetrate the open space–urban interface through urban runoff from residential and commercial landscape areas and golf courses, overspray, wind, direct application in interface areas, soil penetration, and wildlife vectors.

Pesticides, for example, can act in several ways. The original pesticide can be toxic, its decomposed elements can be even more toxic, and it can "bioaccumulate," whereby the contaminant concentrates further in each successive link of the food chain, and thus reaches higher concentrations at higher levels of the food chain. Dichlorodiphenyltrichloroethane (DDT) and other chlorinated hydrocarbon pesticides have been used worldwide to control crop pests and disease-carrying insects since the 1940s. DDT was banned in the United States by the U.S. Environmental Protection Agency (EPA) in 1972 because of unacceptable risks to the environment and potential harm to human health (EPA 1972). Long-term ecological exposure and accumulation resulted in eggshell thinning and loss of young in many raptorial bird species, resulting in serious declines in reproductive success (Terres 1980; Henny and Wight 1972).

In a similar manner, fertilizers can enter wetland and riparian systems and cause eutrophication (excessive nutrients in water bodies) and result in large algae blooms. They also can enhance growth of non-native species in edge areas.

Rodenticides may also affect wildlife in various ways. Rodenticides are directly toxic to rodents, but may also indirectly affect rodent predators, such as hawks and owls, coyotes, snakes, etc., either through loss or contamination of prey. Eradication of rodents can also affect habitat quality for other species, such as burrowing owls (*Athene cunicularia*) that use ground squirrel (*Otospermophilus beecheyi*) burrows and many species of reptiles, amphibians, and insects that use rodent burrows as refugia and aestivation and hibernation habitat.

Chronic Ground Vibration and Noise

Chronic increases in noise related to urban development primarily result from increased traffic volumes at all hours. Other sources of development-related increases in noise that may affect native wildlife include operation of landscape maintenance equipment and tools (e.g., mowers, blowers, trimmers, wood chippers), active recreation at parks (particularly at night), loud music from vehicles and residences, noise from aircraft operations at Mather Airport, and on-site heavy equipment and machinery use by commercial and industrial businesses.

Some of these noise sources, such as traffic noise, are relatively constant (although with daily cycles related to peak traffic periods), and some wildlife species may habituate and adapt to the chronic ambient noise levels, while others may avoid noisy areas. Other noise sources are more occasional or discrete and are more likely to startle wildlife and at least temporarily disrupt their behavior at the time. Noise may affect wildlife in several ways that disrupt both their behavior and physiology in complex and interactive ways, including startling or annoying, raising stress levels, interrupting sleep and rest, interfering with acoustic communications, interfering with prey detection, and in the case of loud abrupt noises, causing permanent injury to the auditory system (Dooling 2006; Barrass and Cohn 1984; Brattstrom and Bondello 1983).

Lighting

Ecological light pollution associated with development, particularly in the UDA, would increase ambient light and direct glare from sky glare, lighted buildings, streetlights, and security lights, and would generally be chronic. Lighting from vehicles would be both chronic and unexpected.

Longcore and Rich (2004) address the ecological effects of light pollution at three levels: (1) behavioral and population ecology, (2) community ecology, and (3) large-scale ecosystem functions. Effects at the behavioral and population ecology level include orientation/ disorientation and attraction/repulsion, reproduction, and communication, and are the main effects of lighting related to construction activities. Orientation and disorientation are responses to ambient light levels, while attraction and repulsion are responses to the source of light (e.g., moths attracted to a light bulb). Orientation includes artificially expanding behavioral repertoires of normally diurnal (active during the day) or crepuscular (active during dawn or twilight hours) species, such as foraging or territorial advertisement or mate attraction (e.g., singing birds), into nighttime periods. Disorientation may occur in nocturnal species that normally orient during dark periods and whose visual systems are adapted to low light levels. Attraction to lights affects birds, which may suffer injury or mortality due to collisions with permanent lighted structures. Many insects are attracted to light sources, resulting in high numbers of prey being taken by nocturnal insectivores such as bats. Repulsion of nocturnal wildlife by lights is probably quite common and may cause them to avoid lighted areas in their normal home ranges.

Wildlife reproduction may be affected by lighting in various ways. Movement to breeding areas, chorus behavior, and mate selection by some amphibians may be affected (Longcore and Rich 2004). Lighting may disturb the nighttime rest and sleep periods of diurnal species, including most passerine (perching) birds, having effects similar to noise, including annoying individuals and causing them to abandon nests that are otherwise perfectly suitable. Nest site selection by some birds may be affected by light, with nests being established farther from light sources (Longcore and Rich 2004). Artificial light may simulate increased day length, affecting reproductive cycles by triggering premature reproductive activity at a time when environmental conditions are not conducive to successful reproduction (e.g., cold temperatures and/or poor food resources). Because light may interfere with sleep, it can be stressful and may disrupt normal biological rhythms and raise the level of stress hormones, which may in turn affect reproductive capacity.

At the level of community ecology, light pollution may affect competition and predation (Longcore and Rich 2004). Behavioral interactions by groups of species may be affected by lighting as species move into the "light niche" (Longcore and Rich 2004). Species groups that normally partition foraging periods in relation to ambient light levels may be in direct competition under artificial light conditions (e.g., some bats). Likewise, species that are adapted to higher light levels (e.g., crepuscular species) may out-compete strictly nocturnal species, which normally forage in the darkest part of the night.

Lighting may increase the risk of predation of both nocturnal and diurnal species because they may be more detectable to nocturnal predators. Some species, such as amphibians, may be attracted to light because insect prey may congregate around light sources, which may in turn increase the risk of the amphibians being preyed upon. Longcore and Rich (2004) characterize this as a tradeoff in the benefit of foraging longer (or at richer sources) with the cost of higher predation risk. Many small species, such as rodents, rabbits, snakes, and bats, actually forage at lower rates at high illumination levels (Longcore and Rich 2004), which may be a biological adaptation to high levels of moonlight. Chronic ecological light pollution may favor light-tolerant species over those that are dark-adapted (Longcore and Rich 2004).

Lighting can also indirectly affect vegetation communities, potentially by altering the behavior of seed dispersers (e.g., small rodents and ants); other potential plant dispersers, such as larger mammals and birds that transport seeds and plant parts over longer distances; and pollinators.

Increased Human Activity

Urban development results in permanent increases in human presence from adjacent development. Increased human presence near preserves will affect essential and normal behavioral patterns and physiology of wildlife. Similar to noise and lighting effects, permanent

increases in human activity from adjacent urban development will disturb nocturnal animals during their rest or sleep periods, annoying them and causing harm to them if they abandon nests or den sites, as well as harming them by disrupting their normal biological rhythms and raising the level of stress hormones. Abandonment (even temporary) of active nests or dens increases the risk to eggs, nestlings, fledglings, and other dependent young. Flushing animals from nests, dens, and other refuges also increases their risk of injury or mortality from collisions with vehicles, as well as predation. Human presence may also alter the spatial behavior of animals, causing them to avoid certain parts of their home range, which may prevent them from using critical resources such as water.

Increases in human activity along the open space–urban interface may also result in trampling of vegetation and compaction of soils, affecting the viability of vegetation communities, wildlife habitat quality, and species that are sensitive to habitat structure, such as shrub and herbaceous vegetation integrity, soil friability, and burrowing substrate quality (e.g., rodents, reptiles, amphibians, and invertebrates). Increased human activity near preserves will also increase the amount of trash and debris that enters preserves and natural communities. Trash and debris can degrade vegetation communities and wildlife habitat, and can attract nuisance and pest species. Trash and debris include discarded packaging materials, plastic bags, and plastic and other lighter materials may be dispersed into natural areas by wind or along creeks and streams.

Increased Wildfire

Increased human activity related to urban development activities can result in increased wildfires. These fires are a result of human activities at the habitat preserve–urban interface, including accidental ignitions from sparks from equipment (e.g., mowers striking rocks), cigarettes, children playing with matches, etc., as well as intentional ignitions (i.e., arson). However, fires also may be ignited by downed or arcing power lines or cars catching on fire along roadways.

In most cases, wildfires in the UDA would be quickly suppressed for public safety and to protect property, but in some cases wildfires become uncontrollable and catastrophic. Wildfire suppression activities (e.g., grading, fire line construction) can also affect plant and animals through ground disturbance.

Outside the UDA, activities would not result in increased frequency, duration, or intensity of wildfire in that portion of the Planning Area.

Wildlife Disease

The increased human and associated pet population can increase the risk of disease transmission to native wildlife in the Planning Area. For example, free-ranging domestic cats and dogs can transmit new diseases to wild animals. Native wildlife in the Planning Area,

including American badger, gray fox (*Urocyon cinereoargenteus*), and coyote, may be at risk of canine distemper (Deem et al. 2000). Diseases transmitted from humans and pets also may affect raptors, such as Cooper's hawk (*Accipiter cooperii*). Boal and Mannan (1999) found that mortality of nestling Cooper's hawks in urban settings primarily was from trichomoniasis, which is caused by the parasitic protozoan *Trichomonas gallinae* that occurs in the digestive and urogenital tracts of many animals and humans. This parasite causes lesions in the mouth, throat, and crop of birds and prevents infected individuals from eating. An important vector of trichomoniasis in urban areas may be domestic pigeons and potentially wild doves, which are preyed on by hawks and falcons. Stabler (1941), for example, found that of 242 pigeons originating from Pennsylvania, Maryland, and New Jersey, 64.5% were infected with *Trichomonas gallinae*. West Nile virus has been identified as a potential factor in loggerhead shrike (*Lanius ludovicianus*) declines in the Central Valley based on a correlation between higher infection rates of the virus and greater declines in shrike abundance in Central Valley counties compared to other counties (Pandolfino 2008). Chytrid fungus is implicated in the decline of several amphibian species, and can infect California tiger salamander. However, chytrid fungus has not been found to be responsible for California tiger salamander mortality in the lab or the field (CDFG 2010).

Vehicle and Aircraft Collisions with Wildlife

The increased capacity of roads in urban areas and increased capacity of roads from rural transportation projects likely will increase the risk of vehicle collisions where wildlife use or attempt to cross roadways, particularly in areas that were frequently used by wildlife before roads were constructed or improved and other development was built. Wildlife may be able to cross two-lane, low-density, and lower-speed roads in relative safety, but if roads are expanded to four and six lanes, and traffic densities and speeds increase, vehicle strikes can increase dramatically. Factors related to the number and types of species affected therefore include vehicle speeds, traffic volume, traffic pulses, accessibility of cover, structure of the road (e.g., whether the road is raised or at grade level with the surrounding environment), barrier walls to prevent access to a roadway, and availability of alternative crossings, such as bridges and culverts (Dodd et al. 2004).

Increased use of Mather Airport following proposed expansions will also result in increased chance of bird strikes; however, such strikes are relatively uncommon and are not included in take estimates for bird species.

Aboveground Utilities

Power lines, transmission towers, and utility poles can cause collisions, entanglements, and electrocution of birds, especially raptors (Franson et al. 1995; Lehman et al. 2007). Bird

species known to be at particular risk of collisions with aboveground utilities include ferruginous hawk (*Buteo regalis*) and greater sandhill crane (*Grus canadensis*), as discussed in more detail in Section 6.6.

TEMPORARY ENVIRONMENTAL STRESSORS DURING CONSTRUCTION

Construction Noise

Temporary direct effects related to noise will be generated during construction, including vegetation clearing, grading and earthmoving, excavation, trenching and tunneling, pouring of concrete and asphalt, and vehicle use. Construction may affect normal or essential behavioral patterns of wildlife in several ways. Excessive noise may affect bird species, for example, in at least four ways: (1) noise may annoy and cause birds to abandon nests that are otherwise suitable; (2) noise can raise the level of stress hormones, interfering with sleep and other activities; (3) intense noise can cause permanent injury to the auditory system; and (4) noise can interfere with acoustic communication by masking important sounds or sound components (Dooling 2006). Similar effects may occur in other taxa. For example, noise may interfere with communication in toads and frogs that use calls to advertise their location and attract mates (e.g., Barrass and Cohn 1984). Loud noise, such as off-road vehicles, may damage the hearing of some terrestrial species (Berry 1980; Brattstrom and Bondello 1983).

Construction Ground Vibration

Ground vibration will be generated during construction, including grading and earthmoving, excavation, trenching, and tunneling. Vibration caused by construction equipment may affect normal and essential behavioral patterns and the habitat of wildlife in several ways. Vibration from equipment operating in or near vernal pools, creeks, and other aquatic habitats may affect semi-aquatic species, such as giant gartersnake (*Thamnophis gigas*), western pond turtle (*Actinemys marmorata*), western spadefoot (*Spea hammondii*), and California tiger salamander, possibly causing them to alter their behavior and potentially abandon areas. For example, vibration can cause western spadefoot to emerge from burrow sites at inappropriate times because vibration created by machinery and construction equipment can mimic the effect of rainfall, which triggers western spadefoot emergence (Dimmitt and Ruibal 1980). Vibration may also directly disturb fossorial species that occupy burrows, dens, and depressions, including western burrowing owl and American badger, as well as rodents, coyotes, and lagomorphs (rabbits and hares), causing them to abandon these areas and increase predation and vehicle collision risks. Excessive vibration might also cause the collapse of burrow systems and dens of fossorial species in areas with highly friable soils.

Construction Lighting

Ecological light pollution directly associated with construction ultimately would be temporary, but it may be considered chronic to some extent in terms of effects on wildlife. For example, lighting for security and public safety in some construction areas may extend for several months or more, thus potentially disrupting critical phases of species' life cycles, such as reproduction, or causing animals to abandon lighted areas. Other lighting effects may be short term or unexpected. Lighting during urban development construction primarily would occur during concrete and asphalt pouring and from vehicular use, but also may be used for security and public safety and off-hours equipment maintenance (e.g., at staging areas). Lighting for nighttime construction or maintenance of construction equipment typically involves high-intensity lighting systems that may have very wide lightsheds and high glare values. Vehicle ingress and egress at construction sites may occur during twilight or nighttime hours (especially during winter months), resulting in unexpected light changes.

Construction Dust

Fugitive dust generated by construction, especially vegetation clearing and grading and earthmoving, can decrease photosynthesis and can kill individual plants by blocking or reducing light and penetration as well as photosynthesis, respiration, and transpiration; increased penetration of phytotoxic gaseous pollutants; and increased incidence of pests and diseases. The loss of plant vigor and productivity can directly affect plant species and wildlife that depend on plants for food or refuge. Construction vehicle traffic can also result in construction dust.

Increased Human Presence during Construction

Temporary construction effects include activity at the construction site and ingress and egress to and from the construction area. Increased human presence during construction will temporarily affect essential and normal behavioral patterns and physiology of wildlife. Similar to noise and lighting effects, temporary increased human activity during construction would disturb nocturnal animals during their rest or sleep periods, annoying them and causing harm to them if they abandon nests or den sites, as well as harming them by disrupting their normal biological rhythms and raising the level of stress hormones. Abandonment (even temporary) of active nests or dens increases the risk to eggs, nestlings, fledglings, and other dependent young. Flushing animals from nests, dens, and other refuges also increases their risk of injury or mortality from collisions with construction equipment and other vehicles, as well as predation. Human presence may also alter the spatial behavior of animals, causing them to avoid certain parts of their home range, which may prevent them from using critical resources such as water. In addition, construction traffic can result in crushing or disturbance of animal and plant species in and near construction sites.

Laydown or Trampling of Vegetation

Trampling of vegetation communities and wildlife habitat in designated construction zones may occur during construction activities such as vegetation clearing, equipment storage, and vehicle use. Accidental trampling of vegetation communities and wildlife habitat may also occur outside designated construction zones. These effects may occur for various reasons, including incorrect construction plans, human error in interpreting plans, human error or accidents in operating construction equipment, and misunderstandings or disregard by construction personnel in adhering to construction planning requirements, including avoidance of natural resources.

Construction Trash and Debris

Construction may cause trash and other non-toxic debris to enter species habitat. Trash and debris can degrade vegetation communities and wildlife habitat, and can attract nuisance and pest species. Trash and debris include discarded construction-related materials, such as packaging materials, plastic bags, and plastic sheeting that may be dispersed into natural areas by wind or along creeks and streams. Trash generated by construction personnel, such as food packaging and cigarette butts, also can be dispersed by wind and water into natural areas. Pest and predatory species, such as crows and ravens, gulls (*Laridae*), coyotes, skunks, and raccoons, may be attracted to discarded food. Certain kinds of construction debris, such as fiberglass insulation, can be directly dangerous to wildlife. Trash and debris may also blow into preserves from adjacent development and roadways.

Temporary Alterations to Hydrographs and Water Quality Effects

Construction may result in temporary release of contaminants in uplands during activities such as vegetation clearing, grading and earthmoving, excavation, trenching and tunneling, pouring concrete or asphalt, and landscaping, and equipment and vehicle refueling and maintenance. Chemical and toxic compound pollution (fuel, oil, lubricants, paints, release agents, and other construction materials) may affect the health of upland vegetation communities, wildlife habitats, and wildlife species. Wildlife may be affected by contaminants through direct exposure (e.g., to the skin, fur, or feathers), through consumption of contaminated food, or by reduced habitat quality.

Temporary hydrologic alterations potentially occurring from construction, including dewatering activities, include changes in flow rates and patterns in streams and small drainages that may temporarily affect adjacent and downstream aquatic, wetland, and riparian vegetation communities, and aquatic species (e.g., fish), semi-aquatic species (including reptiles such as giant gartersnake and western pond turtle), and riparian nesting birds. Construction of some activities may require temporary diversions or impoundments of

surface waters and thus remove or degrade wetland and aquatic habitats during the period of diversion or impoundment.

Temporary water temperature changes also may occur due to temporary changes in the active channel morphology, thus affecting species associated with aquatic habitats (such as giant gartersnake, western pond turtle, western spadefoot, and California tiger salamander) that may have specific thermal tolerances.

Table G-1.1. Environmental Stressors Associated with Development Projects and Activities

Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Urban Development																								
Residential, Commercial and Industrial Structures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Park and Recreation Facilities	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Water Supply Facilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Flood Control and Urban Stormwater Management in the UDA	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X								
Stream Bank Stabilization Projects	X	X		X	X	X	X	X	X	X	X	X		X	X	X								
Public and Private Utilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Solid Waste Management Facilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Wastewater Facilities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Urban Transportation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Stream Channel Modification	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X							
Capital Southeast Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Mather Airport Development Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Third-Party Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mining in the UDA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

AGENDA ITEM 11.1
6142

Table G-1.1. Environmental Stressors Associated with Development Projects and Activities

Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Rural Transportation Projects																								
Rural Collector Road Improvements	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Arterial Road Improvements	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Road Realignment Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Road Interchange Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Recycled Water Projects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Activities in Preserve Setbacks in the UDA																								
Trails	X	X		X	X	X	X	X	X	X	X	X	X	X		X				X				
Bioswales	X	X		X	X	X	X	X	X	X	X	X	X	X	X									
Fencing	X	X			X	X	X		X	X	X		X											
Fire Breaks	X	X		X	X	X	X	X	X	X	X	X		X		X	X			X				
Benches, Shade Structures, and Shade Trees	X	X		X	X	X	X		X					X		X				X				
Interpretive Signs and Kiosks	X	X		X	X	X	X		X				X											
Activities in Stream Setbacks in the UDA																								
Trails	X	X		X	X	X	X	X	X	X	X	X	X	X		X				X				

Table G-1.1. Environmental Stressors Associated with Development Projects and Activities

Activity	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Bioswales	X	X		X	X	X	X	X	X	X	X	X	X	X	X										
Crossings	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X			X		
Stream-bank Stabilization	X	X		X	X	X	X	X	X	X	X	X		X	X	X									
Fencing	X	X			X	X	X		X	X	X		X												
Benches, Shade Structures, and Shade Trees	X	X		X	X	X	X		X					X		X				X					
Interpretive Signs and Kiosks	X	X		X	X	X	X		X				X												
Riparian Re-establishment and Establishment	X	X		X	X	X	X	X	X		X	X													
Outfalls	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X								
Flood Control Structures and Stormwater Management	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X									
Preserve System Activities																									
Preserve Management and Monitoring	X	X	X	X	X	X		X													X				
Low-Impact Nature Trails	X	X		X	X			X	X	X		X		X						X					
Habitat Re-establishment and Establishment	X	X		X	X	X	X	X	X		X	X													

AGENDA ITEM 11.1
6144

Table G-1.1. Environmental Stressors Associated with Development Projects and Activities

Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Species Surveys, Monitoring, Research and Adaptive Management Activities					X															X				
Water Supply for Livestock	X	X			X	X	X					X												
Groundwater Monitoring and Extraction Wells	X	X		X	X	X	X	X				X						X						
Allowed Detention Basins on certain Linkage Preserves	X	X		X	X	X	X	X	X		X	X	X	X	X									
Utility Maintenance and Repair	X	X	X		X	X	X										X			X	X		X	
Trails in Preserve and Stream Setbacks, including adjacent bioswales.	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X				
Crossings	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X			X	
Stream-bank Stabilization	X	X		X	X	X	X	X	X	X	X	X		X	X	X								
Fencing	X	X			X	X	X		X	X	X		X											
Benches, Shade Structures, and Shade Trees in Preserve Setbacks	X	X		X	X	X	X		X					X		X				X				
Interpretive Signs and Kiosks in Preserve Setbacks	X	X		X	X	X	X		X				X											

Table G-1.1. Environmental Stressors Associated with Development Projects and Activities

Activity	Temporary Environmental Stressors								Permanent Environmental Stressors															
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Riparian Re-establishment and Establishment	X	X		X	X	X	X	X	X		X	X												
Outfalls in Preserve Setbacks	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X							
Flood Control Structures and Stormwater Management in Preserve Setbacks	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X								

Table G-1.2. Proposed Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Plants																									
Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Dwarf downingia (Downingia pusilla)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Legenere (Legenere limosa)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Pincushion navarretia (*Navarretia myersii)*			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Sacramento Orcutt grass (*Orcuttia viscida*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Slender Orcutt grass (*Orcuttia tenuis*)			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X			
Sanford's arrowhead (*Sagittaria sanfordii*)			X	X	X	X	X	X	X	X		X		X	X		X		X	X	X			
Invertebrates																									
Vernal pool fairy shrimp (*Branchinecta lynchi*)			X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X			
Midvalley fairy shrimp (Branchinecta mesovallensis)			X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X			

AGENDA ITEM 11.1
6147

Table G-1.2. Proposed Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
Vernal pool tadpole shrimp			X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X			
Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i)			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)			X	X	X	X	X	X	X	X	X	X		X	X		X		X	X	X			
Reptiles and Amphibians																									
California tiger salamander (*Ambystoma californiense*)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Western spadefoot (*Spea hammondii*)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Giant gartersnake (*Thamnophis gigas*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Western pond turtle (*Actinemys marmorata*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Birds																									
Cooper's hawk (Accipiter cooperii)	X	X	X		X			X	X	X	X	X				X	X	X	X	X	X	X	X	X	X
Ferruginous hawk (*Buteo regalis*)					X			X	X	X	X	X					X			X	X	X	X	X	X
Swainson's hawk (*Buteo swainsoni*)	X	X	X	X	X		X		X	X	X					X		X	X	X	X	X	X	X	X

AGENDA ITEM 11.1
6148

Table G-1.2. Proposed Covered Species Vulnerability to Environmental Stressors

Covered Species	Temporary Environmental Stressors								Permanent Environmental Stressors																
	Construction Noise	*Construction Ground Vibration*	*Construction Lighting*	*Construction Dust*	*Increased Human Presence*	*Laydown or Trampling*	*Construction Trash and Debris*	*Temporary Alterations to Hydrographs and Water Quality Effects*	*Loss of Land Covers and Covered Species Habitat*	*Habitat Fragmentation*	*Wildlife Community Alterations*	*Permanent Alterations to Hydrographs and Water Quality Effects*	*Vernal Pool Hydrologic Alterations*	*Invasive Plants*	*Invasive Animals*	*Mesopredators*	*Pesticides and Fertilizers*	*Chronic Ground Vibration and Noise*	*Lighting*	*Increased Human Activity*	*Increased Wildfire*	*Wildlife Disease*	*Vehicle and Aircraft Collisions with Wildlife*	*Aboveground Utilities*
White-tailed kite (*Elanus leucurus*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Northern harrier (*Circus cyaneus*)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Western burrowing owl (*Athene cunicularia*)	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X
Loggerhead shrike (*Lanius ludovicianus*)	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X
Greater sandhill crane (*Grus canadensis*)	X	X	X	X	X	X	X	X	X	X		X					X	X	X	X	X	X	X	X	X
Tricolored blackbird (*Agelaius tricolor*)	X	X	X	X	X		X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X
Mammals																									
American badger (*Taxidea taxus*)	X	X	X		X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	
Western red bat (Lasiurus blossevillii)	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X			X

REFERENCES CITED IN APPENDIX G-1

Barrass, A. and L. Cohn 1984. "Variation of the Spacing of Calling Male *Bufo woodhousii* and *Hyla cinerea* Near Highway Noise." *American Zoologist* 24(3): 15A.

Berry, K.H. 1980. "A Review of the Effects of Off-Road Vehicles on Birds and Other Vertebrates." In *Workshop Proceedings: Management of Western Forests and Grasslands for Nongame Birds; February 11–14, 1980*; Salt Lake City, Utah, edited by R.M. DeGraff and N.G. Tilghman, 451–467. General Technical Report INT-86. Ogden, Utah: U.S. Forest Service.

Boal, C.W. and R.W. Mannan. 1999. "Comparative Breeding Ecology of Cooper's Hawks in Urban and Exurban Areas of Southeastern Arizona." *Journal of Wildlife Management* 63: 77–84.

Bossard, C.C., J.M. Randall, and M.C. Hoshovsky. 2000. Invasive Plants of California's Wildlands. Berkeley, California: University of California Press.

Brattstrom B.H. and M.C. Bondello. 1983. "Effects of Off-Road Vehicle Noise on Desert Vertebrates." In *Environmental Effects of Off-Road Vehicles: Impacts and Management in Arid Regions*, edited by R.H. Webb and H.G. Wilshire, 167–206. New York, New York: Springer-Verlag.

CDFG. 2010. *A Status Review of the California Tiger Salamander (Ambystoma californiense)*. Betsy C. Bolster. Wildlife Branch. Nongame Wildlife Program. Report 2010-4. January 11, 2010. Accessed February 1, 2017. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=21754&inline.

Churcher, P.B. and Lawton, J.H. 1987. "Predation by Domestic Cats in an English Village." *Journal of Zoology, London* 212: 439–455.

Crooks, K.R., and M.E. Soulé. 1999. "Mesopredator Release and Avifaunal Extinctions in a Fragmented System." *Nature* 400:563–566.

Deem, S.L., L.H. Spelman, R.A. Yates, R.J. Montali. 2000. "Canine Distemper in Terrestrial Carnivores: A Review." *Journal of Zoo and Wildlife Medicine* 31(4).

Dimmitt, M.A. and R. Ruibal. 1980. "Exploitation of Food Resources by Spadefoot Toads (*Scaphiopus*)." *Copeia* 1980(4):854–862.

Dodd, C.K., Jr., W.J. Barichivich, and L.L. Smith. 2004. "Effectiveness of a Barrier Wall and Culverts in Reducing Wildlife Mortality on a Heavily Traveled Highway in Florida." *Biological Conservation* 118:619–631. Accessed July 7, 2008. doi: 10.1016/j.biocon.2003.10.011.

Dooling, R.J. 2006. "Estimating Effects of Highway Noise on the Avian Auditory System." In *Proceedings of the 2005 International Conference of Ecology and Transportation,* edited by C.L. Irwin, P. Garrett, and K.P. McDermott, 30–31. Raleigh, North Carolina: Center for Transportation and the Environment, North Carolina State University. Accessed August 13, 2012. http://escholarship.org/uc/item/60z8s62w.

EPA (U.S. Environmental Protection Agency). 1972. "DDT Ban Takes Effect" [EPA press release]. December 31, 1972. Accessed online January 8, 2016. http://www.epa.gov/aboutepa/ddt-ban-takes-effect .

Foley, J.E., P.F. Foley, and N.C. Pedersen. 1999. "The Persistence of a SIS Disease in a Metapopulation." *Journal of Applied Ecology* 36 (4). September 1999.

Franson J.C., L. Sileo, and N.J. Thomas. 1995. "Causes of Eagle Deaths." In *Our Living Resources: A Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems*, edited by E.T. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran, and M.J. Mac, 68. Washington, D.C.: U.S. Department of the Interior, National Biological Survey.

Henny, C.J. and H.M. Wight. 1972. Population Ecology and Environmental Pollution: Red-tailed and Cooper's Hawks." *Wildlife Research Report 2.* U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center.

Jones and Stokes. 1990. Sacramento County Vernal Pools: Their Distribution, Classification, Ecology, and Management. Prepared for the County of Sacramento, Planning and Community Department. Sacramento, California: Jones and Stokes.

Kelly, P. A. and J. T. Rotenberry. 1993. "Buffer Zones for Ecological Reserves in California: Replacing Guesswork with Science." In *Interface Between Ecology and Land Development in California*. J. E. Keeley, ed. Los Angeles, California: Southern California Academy of Sciences, pp 85–92.

Kleinschmidt Associates. 2008. *Cosumnes River Management Plan*. Prepared for Cosumnes River Preserve. Accessed on line February 1, 2017. http://www.cosumnes.org/about_crp/CH%201%20-%202.pdf.

Lehman, R.N., P.L. Kennedy, and J.A. Savidge. 2007. "The State of the Art in Raptor Electrocution Research: A Global Review." *Biological Conservation* 136:159–174. Accessed July 30, 2012. doi:10.1016/j.biocon.2006.09.015.

Longcore, T., and C. Rich. 2004. "Ecological Light Pollution." *Frontiers in Ecology and the Environment* 2:191–198.

Pandolfino, E.R. 2008. "Population Trends of the Loggerhead Shrike in California: Possible Impact of West Nile Virus in the Central Valley." *CVBC Bulletin* 11(2):37–44. Accessed July 15, 2014.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. "The role of perched aquifers in hydrological connectivity and biogeochemical processes in vernal pool landscapes, Central Valley, California." *Hydrological Processes* (20) 5: 1157–1175.

Redling, K., E. Elliott, D. Bain, and J. Sherwell. 2013. "Highway contributions to reactive nitrogen deposition: tracing the fate of vehicular NOx using stable isotopes and plant biomonitors." Biogeochemistry 10.1007/s10533-013-9857-x.

Rottenborn, S.C. 1999. "Predicting the Impacts of Urbanization on Riparian Bird Communities." Biological Conservation 88(3), pp 289–299.

Sacramento County Department of Economic Development. 2013. *South Mather Wetlands Management Plan*. Accessed on February 1, 2017. http://economic.saccounty.net/LocateHere/Mather/Documents/(3)%20Wetlands%20Management%20Plan%20Nov2013.pdf#search=stinkwort.

Smith DW, Verrill WL. 1998. Vernal pool–soil–landform relationships in the Central Valley, California. In Ecology, Conservation, and Management of Vernal Pool Ecosystems, Witham CW, Bauder ET, Belk D, Ferren Jr WR, Ornduf R (eds). California Native Plant Society: Sacramento, CA; 15–23.

Solomeshch, A.I., M.G. Barbour, and R.F. Holland. 2007. Vernal Pools: Terrestrial Vegetation of California, 3rd ed. University of California Press, California. 394–424.

Stabler 1941. "Further Studies of Trichomoniasis in Birds". *The Auk*. 58(4): 558-562.

Terres, J.K. 1980. "Eagle, Golden, *Aquila chrysaetos*." In *The Audubon Society Encyclopedia of North American Birds,* 477–478. New York, New York: Alfred A. Knopf.

United States Fish and Wildlife Service (USFWS). 2006. Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus) Five-year Review Summary and Evaluation. September 2006. USFWS, Sacramento Fish and Wildlife Office, Sacramento, California.

Wilcox, B., and D. Murphy. 1985. "Conservation Strategy: The Effects of Fragmentation on Extinction." *American Naturalist* 125:879–887.

INTENTIONALLY LEFT BLANK

EIS/EIR APPENDIX G-2

Selection of Special-Status Species to be Analyzed in this EIS/EIR

This appendix summarizes the review process and criteria used to identify individual plant and animal species evaluated in Chapter 9 of the EIS/EIR. The list of species evaluated in Chapter 9 includes the species proposed for coverage under the SSHCP incidental take permits (Table G-2.1), as well as additional special-status species that occur in the Planning Area and may be adversely affected by the implementation of the EIS/EIR Alternatives. The following section summarizes the process used by the EIS/EIR to determine special-status species, beyond the proposed covered species, to be addressed and analyzed in the EIS/EIR Alternatives. Tables G-2.2 and G-2.3 show the list of special-status plant and animal species, respectively, that are considered and the reasoning for inclusion or elimination in the EIS/EIR detailed analysis.

DEFINITION OF SPECIAL-STATUS SPECIES

As first defined in Section 9.1.2, Planning Area special-status species are plants and animals that are protected under state and/or federal law, or are species considered sufficiently rare or unique that they are given special consideration by a state and/or a federal resource agencies or they are given special consideration by a non-government conservation organization, as discussed below:

- Listed or proposed for listing under the federal Enangered Species Act (ESA) or the California Endangered Species Act (CESA) as endangered, threatened, or rare;
- a candidate for listing under the ESA or the CESA as endangered, threatened, or rare ;
- taxa (i.e., taxonomic category or group) that meet the criteria for ESA or CESA listing, even if not currently included on any list, as described in California Code of Regulations (CCR) Section 15380 of the CEQA Guidelines;
- Planning Area species that are included in a ESA species recovery plan prepared by the USFWS;
- Planning Area species identified by California Fish and Game Code as a Species of Special Concern. The term “California Species of Special Concern” is applied to animals not listed under the federal ESA or CESA, but that are nonetheless declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist;
- species identified by California Fish and Game Code as a Watch List Species;
- species afforded protection under the General Plans or codes or ordinances for Sacramento County or the Cities of Rancho Cordova and Galtn.
- species assigned a California Rare Plant Rank (CRPR) of 1A, 1B, and 2 by the California Native Plant Society.

The designations used by the CRPR are defined as follows:

- 1A = Presumed extirpated in California and either rare or extinct elsewhere
- 1B = Rare, threatened, or endangered in California and elsewhere
- 2A = Presumed extirpated in California, but more common elsewhere
- 2B = Rare, threatened, or endangered in California, but more common elsewhere
- 3 = Plants which need more information and on the Review list
- 4 = Plants of limited Distribution – Watch List

The CRPR designations correspond with and replace former CNPS listings. While these rankings do not afford the same type of legal protection as ESA or CESA, the uniqueness of these species affords special consideration.

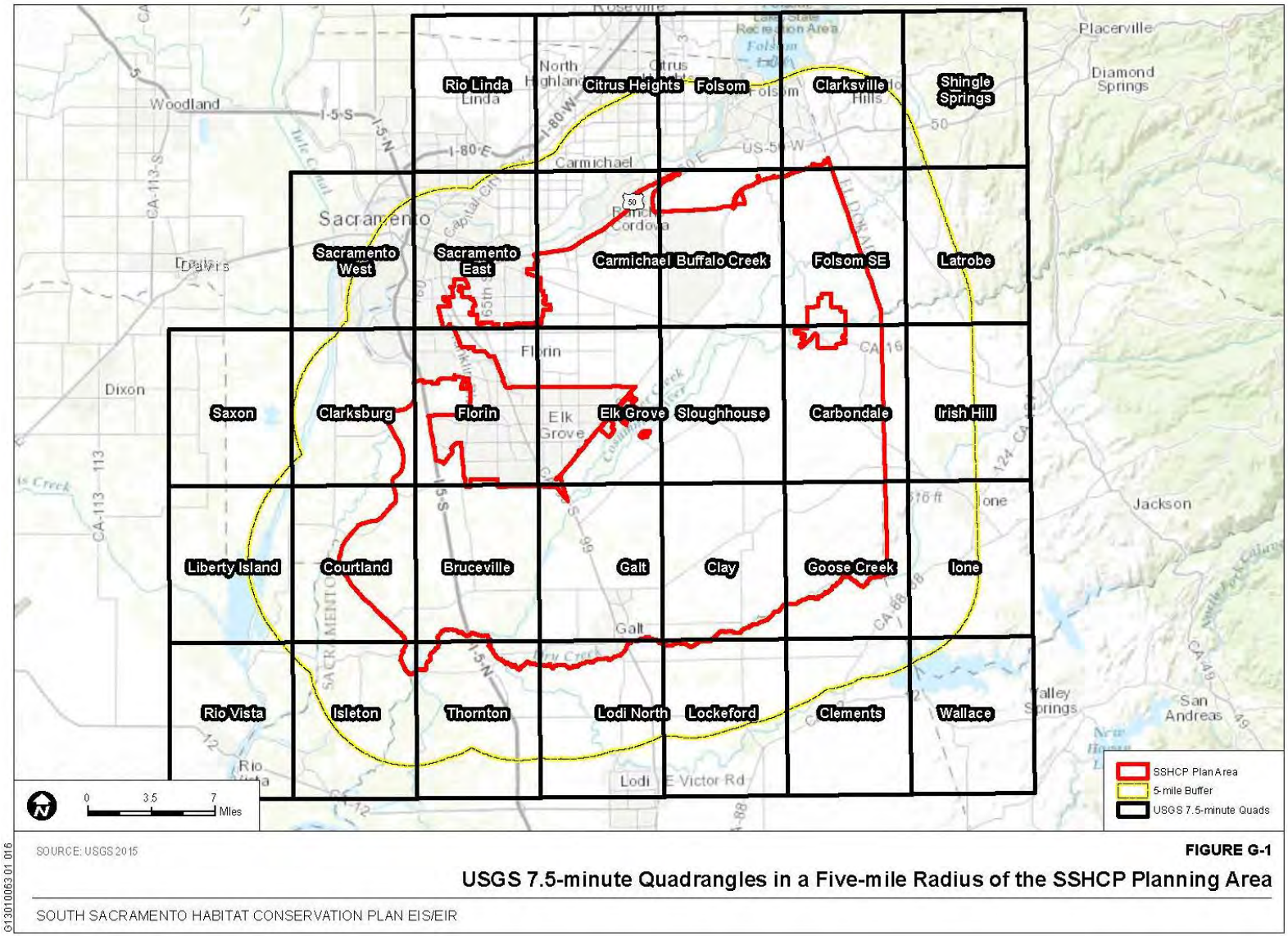
SPECIAL STATUS SPECIES EVALUATED IN THE EIS/EIR

All species proposed by the SSHCP permit applicants to be included as covered species in the SSHCP were selected for evaluation in the EIS/EIR, as these species were considered as part of the Proposed Action/Proposed Project Alternative. These species are identified first below. All other plant and wildlife species that meet the definition of "special-status" above, and were reported by various data sources reviewed for the analyis, were then considered for evaluation in the EIS/EIR. The data sources used to identify the list of species to be considered for inclusion in the EIS/EIR are described further below.

In addition to the species selected by the Permit Applicants to be Covered Species under the proposed SSHCP, a list of special-status plant and wildlife species known to occur in the EIS/EIR Chapter 9 Study Area, or with potential to occur in the Chapter 9 Study Area, was developed based on review of the following:

- a records search and GIS query of the California Natural Diversity Database (CNDDB) (CDFW 2015a) within 5 miles of the Planning Area. The use of a 5-mile search radius is based on typical best practices for environmental impact analyses to identify CNDDB recorded species with potential to occur in an action/project area;
- a review of the USFWS Environmenal Conservation Online System (ECOS) within the 29 US Geological Survey 7.5 minute quadrangles encompassing the Chapter 9 Study Area that are listed as endangered or threatened under the ESA, or are proposed for listing under the ESA (USFWS 2016) (Figure G-1);
- the CNPS online Inventory of Rare and Endangered Plants (CNPS 2014); The 29 U.S. Geological Survey 7.5 minute quadrangle topographic maps encompassing the Chapter 9 Study Area (Figure G-1) were used for the this data search;
- CalFlora database (CalFlora 2014), an electronic inventory operated by a non-profit organization

Figure G-1 USGS 7.5-minute Quadrangles in a Five-mile Radius of the SSHCP Planning Area



AGENDA ITEM 11.1
6158

INTENTIONALLY LEFT BLANK

HCP Covered Species

As first discussed in Section 2.3.3, "Covered Species" are the species proposed by the permit applicants to be included on the federal Endangered Species Act (ESA) Incidental Take Permits that have been requested by the Permit Applicants (See Section 9.1.1). The 28 proposed SSHCP Covered Species includes 20 wildlife species and 8 plant species, of which, 10 are currently listed as threatened or endangered under the ESA and/or CESA (Table G-2.1).

Table F-2.1 below presents the ESA, CESA, and CRPR status for each Covered Species under the Proposed SSHCP, as well as a brief description of the species' biology, a description of the species habitat model and information on occurrences within the Planning Area.

Other Special Status Species Evaluated in the EIS/EIR

Other Special Status Plant Species Evaluated in the EIS/EIR

The review of the data sources listed above identifed 37 special-status plant species known, or with potential to occur in the Chapter 9 Study Area. Of the total 37 plants liidentified in this review, eight were already selected by the Permit Applicants to be Covered Species under the proposed SSHCP.

For the other 29 special-status plants identified in the review, 18 species were selected for evaluation in the EIS/EIR. These species are listed in in Table G-2.2 with information on their legal status and rationale for evaluation in the EIS/EIR. These determinations were based primarily on the types, extent, and quality of habitats in the Chapter 9 Study Area; the proximity of the Study Area to known occurrences of the species; and the regional distribution and abundance of the species.

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
Invertebrates				
Lepidurus packardi Vernal pool tadpole shrimp	E*	—	—	Occurs in a variety of natural and artificial seasonally inundated habitats that are wet for at least 7 weeks and dry in summer (Gallagher 1996). This species is typically associated with low-alkalinity seasonal pools in unplowed grasslands throughout the northern and eastern portions of the Central Valley. The vernal pool tadpole shrimp needs cold winter waters to hatch and develop, typically appearing after the first frosts, and dry summers to dry the resting cysts and prevent them from being attacked by fungi. Habitats supporting the vernal pool tadpole shrimp are typically in Central Valley California floristic provinces below 984 feet in elevation. There are 851 documented occurrences of vernal pool tadpole shrimp within the Planning Area. There are 587 occurrences within the UDA and 264 occurrences outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Branchinecta lynchi Vernal pool fairy shrimp	T*	—	—	Inhabits vernal pools with clear to tea-colored water, most commonly in grass or mud-bottomed swales, or basalt flow depression pools in unplowed grasslands. Occupied pools typically have highly turbid waters, but also occurs in pools with clear water with aquatic vegetation that provides shelter from predators, and range in size from 54 square feet to 84 acres (USFWS 2007). This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. They depend upon the presence of water in the winter and early spring and the absence of water during the summer (USFWS 2007). These fairy shrimp need cold winter waters to hatch and grow, typically appearing after the first frosts, and dry summers to dry the resting cysts and prevent them from being attacked by fungi. The vernal pool fairy shrimp were first officially reported from the Planning Area in 1982 (CDFW 2014a). Numerous surveys related to development projects have been conducted within and adjacent to the Planning Area (CDFW 2014a), but the area has not been thoroughly surveyed for vernal pool fairy shrimp, and the total extent of potential habitat is unknown. There are 581 documented occurrences of vernal pool fairy shrimp within the Planning Area, There are 193 occurrences inside the UDA and 388 occurrences outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Branchinecta mesovallensis Mid-valley fairy shrimp	—	—	—	Endemic to the Central Valley, but its distribution is poorly understood. Habitat requirements for this species are similar to other local fairy shrimp species, although they tend to occupy shallower pools (USFWS 2005). As with other freshwater branchiopods, mid-valley fairy shrimp lay eggs in vernal pools during the wet season. These eggs are stored in the basin of the pool and stay dormant until the next rainy season. Since these shrimp are restricted to temporary pools, habitat loss increases the vulnerability of local populations to decline. The mid-valley fairy shrimp was first officially reported from the Planning Area in the species' original description (USFWS 2005). Numerous surveys related to development projects have been conducted within and adjacent to the Planning Area (CDFG 2014a), but the area has not been thoroughly surveyed for mid-valley fairy shrimp, and the total extent of potential habitat is unknown. There are 37 documented occurrences of mid-valley fairy shrimp within the Planning Area. There are 22 occurrences within the UDA and 15 occurrences outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.

AGENDA ITEM 11.1
6161

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	T	—	—	Dependent on elderberry shrubs (*Sambucus* spp.) for breeding and feeding habitat. Elderberry shrubs are a common component of riparian forests and adjacent upland habitats in California's Central Valley (USFWS 1999a). The VELB spends most of its life in the larval stage, living within the stems of the elderberry plant. USFWS considers all elderberry shrubs 2.5 centimeters (1 inch) or greater diameter at ground level within the species' range to be potential habitat (USFWS 1999a). Because comprehensive surveys for VELB in the Planning Area have not been conducted and because known occurrences throughout the species range are based mostly on incidental observations, the population size and locations of this species in the Planning Area are not known. There are 156 documented occurrences of valley elderberry longhorn beetle within the Planning Area. Within the UDA there is 1 occurrence and outside the UDA there are 155 occurrences. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	—	—	—	An aquatic beetle, it lives in weedy, shallow, open water associated fresh water seeps, springs, farm ponds, vernal pools, and slow moving stream habitats. This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The Ricksecker's water scavenger beetle depends upon the presence of water in the winter and early spring and the absence of water during the summer. This species is able to fly and presumably can aerially disperse from one area to another, at least within the immediate vicinity (Sacramento County 2016). Ricksecker's water scavenger beetle is closely associated with temporary pools that contain a diversity of vernal pool plants and that support a complex vernal pool invertebrate community, including copepods, cladocerans, and ostracods, as well as flatworms and a number of other species of beetles (Rogers 1998). Ricksecker's water scavenger beetle co-occurs with the mid-valley shrimp, the vernal pool fairy shrimp, and the vernal pool tadpole shrimp. The Ricksecker's water scavenger beetle was first reported from the Planning Area from Mather Airport (Sacramento County 2016). No surveys focused on Ricksecker's beetle have been conducted within and adjacent to the Planning Area and the total extent of potential habitat is unknown. There are eight documented occurrences of Ricksecker's water scavenger beetle in the Planning Area. Four of these occurrences are located inside the UDA and four are outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Amphibians				
Ambystoma californiense California tiger salamander, (Central Valley population)	T*	T	—	This species may be found in riparian and wet meadow habitats, but is more common in grasslands. Adults are terrestrial outside of the breeding season, often inhabiting rodent burrows located up to 1.24 miles (2 kilometers) from breeding ponds (Orloff 2011). The CTS spends most of its life cycle underground in adjacent valley oak woodland or grassland habitat, primarily in rodent burrows. Research has shown that dispersing juveniles can roam up to 2 miles from their breeding ponds and that a minimum of several hundred acres of uplands habitat is needed surrounding a breeding pond in order for the species to survive over the long term (69 FR 47212–47248; Trenham 2001). Breeding takes place following the first heavy winter rains. Temporary or permanent freshwater pools or slowly flowing streams are required for egg-laying and larval development. They appear to be absent in waters containing predatory game fish (65 FR 3096–3109). There are 31 documented occurrences in the Planning Area. Two of these

AGENDA ITEM 11.1
6162

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
				occurrences are within the UDA and 29 are located outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Spea hammondii Western spadefoot toad	—	CSC	—	Occurs in shallow temporary pools (i.e., vernal pools and seasonal wetlands) adjacent to annual grassland habitat. They prefer open areas with sandy or gravelly soils in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Western spadefoot eggs and larvae have been observed in a variety of permanent and temporary wetlands including rivers, creeks, pools in intermittent streams, vernal pools, and temporary rain pools (CDFW 2014a). They have also been found in altered wetlands including vernal pools that have been disturbed by activities such as earthmoving, disking, intensive livestock use, and off-road vehicle use, and man-made wetlands such as artificial ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits (Fisher and Shaffer 1996; CDFW 2014). Western spadefoot toads typically breed from January to May in temporary pools that do not contain bullfrogs, fish, or crayfish. According to Fisher and Shaffer (1996), the western spadefoot has suffered a severe decline with virtually complete extirpation from the Sacramento Valley, a reduced density of populations in the eastern San Joaquin Valley and modest declines in the Coast Ranges. There are 41 documented occurrences of western spadefoot in the southeastern portion of the Planning Area. Twenty occurrences are inside the UDA and twenty-one are outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Reptiles				
Actinemys marmorata Western pond turtle	—	CSC	—	The Planning Area falls within the introgression zone for the two subspecies of western pond turtle: the northwestern pond turtle (*A. m. marmorata*) and the southwestern pond turtle (*A. m. pallida*). Western pond turtles inhabit a variety of aquatic habitats from sea level to elevations of 1,980 meters (6,500 feet). They are found in fresh to brackish aquatic habitats including marshes, rivers, ponds, and streams. Western pond turtles may also occur in man-made habitats, such as irrigation ditches, reservoirs, and sewage and millponds, but seem to become more active in water that consistently reaches 15° Celsius (60° Fahrenheit) (Jennings and Hayes 1994). They require still or slow moving water with in-stream emergent woody debris, rocks, or other similar features for basking sites. Western pond turtles typically forage on land and in quiet pools of water and, as omnivores with a broad feeding niche, they eat almost anything they can capture (Bury 1986). Reproductive activity by western pond turtles has been observed from February through November (Buskirk 2002). Depending on latitude, peak nesting season is from late May through early July but extends from late April through August (Rosenberg et al. 2009). Nests are typically located on unshaded upland slopes in dry substrates with clay or silt soils. There are 16 documented occurrences of western pond turtle in a patchy distribution within the Planning Area. Fourteen occurrences are outside of the UDA and two are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.

AGENDA ITEM 11.1
6163

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
Thamnophis gigas Giant gartersnake	T	T	—	The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways, agricultural wetlands, such as irrigation and drainage canals and rice fields, and the adjacent uplands (USFWS 1999b). Recent field studies have shown giant garter snakes to be associated with aquatic environments that contain: (1) sufficient water during the active summer season (May 1 through September 30) to supply food (fish and amphibians) and cover; (2) vegetated banks for basking located immediately adjacent to water; (3) emergent vegetation for cover during the active season; and (4) high ground or uplands, such as levees or railroad grades, that provide cover and refugia from floodwaters during the dormant winter season (USFWS 1999b). The giant garter snake inhabits dense emergent vegetation in and directly adjacent to water bodies during its active season, and upland habitat above ordinary high water mark throughout its winter dormancy period. The snake may utilize upland habitat during its active season, although upland habitat is utilized much less frequently during the active season. During the dormant season, giant garter snakes typically select small mammal burrows and other soil crevices in upland habitat within 200 feet of ordinary high water mark with sunny exposure along south- and west-facing slopes (USFWS 1999b). The dormant season typically extends from October 2 to April 31, although this is largely weather-dependent. The active season extends from May 1 to October 1. There are 11 documented occurrences of giant garter snake within the Planning Area, including two within the UDA and nine outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Birds				
Accipiter cooperii Cooper's hawk	—	WL	—	Throughout its range, the Cooper's hawk nests in a wide variety of woodland and forest habitats, including oak woodland, riparian woodland, coniferous, deciduous, and mixed forest, woodlots, and suburban and urban areas. In much of California's lowland valley and foothill landscapes, including those within the Planning Area, this species appears strongly associated with live oak woodland (Curtis et al. 2006; Asay 1987).Cooper's hawks breed from approximately March to August (Curtis et al. 2006; Asay 1987). Nesting usually occurs in a deciduous tree near open water or riparian vegetation. They prefer to nest in open interrupted or marginal type woodland habitats. Nest sites are mainly found in live oaks and in riparian habitats with deciduous trees, as in canyon bottoms of river floodplains. Foraging occurs while flying quickly through dense vegetation, and Cooper's hawks prey almost exclusively on small to mid-sized birds (Curtis et al. 2006). There are 20 documented occurrences of Cooper's hawk within the Planning Area. Thirteen occurrences are outside of the UDA and 7 are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Agelaius tricolor Tricolored blackbird	BCC	CE	—	This species typically nests in a freshwater marsh or other areas with dense, emergent vegetation such as dense cattails or tules and also in thickets of blackberry and willow. While the vast majority of tricolored blackbirds are permanent residents of California, they make extensive migrations and movements within California (Beedy 2008). Major wintering areas include the Sacramento–San Joaquin River Delta and coastal area, with smaller flocks occurring from Sonoma County south to San Diego County (Beedy 2008). Breeding begins in late March and early April and extends into late July. Clutch size is

AGENDA ITEM 11.1
6164

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
				typically three or four eggs, with clutches of two and five eggs occasionally observed (Emlen 1941). The tricolored blackbird primarily feeds on seeds and invertebrates, and requires an abundant, concentrated supply of insects for successful breeding colonies. It may also forage in wet and dry vernal pools, seasonal wetlands, riparian scrub, and open marsh borders. Most foraging occurs within 3.1 miles of colony sites (Beedy 2008). There are 36 documented occurrences of tricolored blackbird within the Planning Area. Fourteen occurrences are outside of the UDA and 22 are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Athene cunicularia hypugea Western burrowing owl	BCC	CSC	—	Suitable habitat within the Planning Area is found in annual and perennial grasslands, fallow agricultural fields, and open oak savannah. While Burrowing owls prefer grasslands, they may also be found in habitats with trees and shrubs if the canopy covers less than 30% of the ground surface (DeSante et al. 1997). Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls. Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement. Suitable habitat is present within the annual grasslands or ruderal habitat and cropland edges within the Planning Area. Western burrowing owls exhibit high site fidelity and reuse burrows year after year (Gervais et al. 2008). Western burrowing owls are opportunistic feeders, primarily feeding on arthropods, small mammals and birds found in grasslands, mowed areas, overgrazed grasslands, and agricultural areas near nest sites (Gervais et al. 2008). Western burrowing owls breed from March through August, with a peak in April and May. The Planning Area occurs within the Middle Central Valley portion of the burrowing owl's range. DeSante et al. (1997) estimated that the Central Valley supports 14% of the total California burrowing owl population. Although burrowing owl populations have declined or disappeared from much of their historical habitat, outlying areas of the County still provide suitable habitat for the species (Sacramento County 2016). There are 97 documented occurrences of western burrowing owl within the Planning Area. Sixty-one occurrences are outside of the UDA and 36 are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Buteo regalis Ferruginous hawk	BCC	—	—	This bird is also protected under the MBTA. Ferruginous hawks do not regularly breed in California (Bechard and Schmutz 1995). Ferruginous hawks are birds of open country. They are found in habitats, such as grasslands, sagebrush, deserts, shrublands, and the outer edges of pinyon–pine and other forests. Since the species does not regularly nest in California, only the habitat requirements and ecology of wintering ferruginous hawks are included in this section. During the winter, ferruginous hawks use grasslands and arid areas, particularly where pocket gophers, ground squirrels, rabbits, or prairie dogs are abundant. Ferruginous hawks also winter near cultivated fields that support populations of pocket gophers (Bechard and Schmutz 1995). The spatial requirements of ferruginous hawks during winter have not been widely reported (Bechard and Schmutz 1995) and what constitutes the minimum size of suitable winter foraging habitat is unknown for most areas. Ferruginous hawk is only expected within the Planning Area as a migrant or overwintering visitor. Most observations

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
				of ferruginous hawks have been reported from open grassland habitats in the eastern portion of the Planning Area from U.S. Highway 50 south to Howard Ranch. Winter observations have also been recorded from non-vineyard agricultural habitats in the south and southwestern portions of the Planning Area. There are 26 documented occurrences of Ferruginous hawk within the Planning Area. Eighteen occurrences are outside of the UDA and 8 are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Buteo swainsoni Swainson's hawk	BCC	T	—	Swainson's hawks typically nest in riparian habitats or isolated trees bordered by suitable foraging habitat. This species migrates into California from South America in the spring to establish breeding territories for the summer and typically migrates out of California by the end of September. Throughout the North American breeding range, adults arrive on nesting territories in March to May, lay eggs between April and June, and the young fledge between June and August (Bechard et al. 2010). The Central Valley provides optimal nesting habitat for this species due to the abundance of agricultural fields and riparian woodlands, which this species uses for foraging and nesting, respectively. The Swainson's hawk is considered to be largely insectivorous, but breeding pairs are thought to switch to vertebrate prey due to the energetic demands of reproduction. In the Central Valley a wide variety of prey items are taken including small mammals, birds, reptiles, and insects; however, the California vole (*Microtus californicus*) is the preferred prey item (Bechard et al. 2010). Key components in this success involve prey densities, prey availability, and distance to the nest site. There are 410 documented occurrences of Swainson's hawk within the Planning Area. Three hundred forty-eight occurrences are outside of the UDA and 62 are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Circus cyaneus Northern harrier	—	CSC	—	This species is found in meadows, grasslands, open rangelands, desert sinks, and freshwater and saltwater emergent wetlands. The northern harrier nests on the ground, usually at marsh edge in emergent wetland or along rivers or lakes, but may also nest in grasslands or grain fields several miles from water (Smith et al. 2011). This species breeds approximately from March through May. Northern harriers almost always forage on the wing and take small and medium sized prey, including mammals and birds (Smith et al. 2011). Northern harrier breeding populations in the northern portions of the species' range are more migratory than those at more southern latitudes (Smith et al. 2011). In the United States, migrating northern harriers depart their breeding grounds in August to December, and leave their wintering grounds in February to March. Migratory birds may winter in California, and some migrate south through Central and South America (Smith et al. 2011). Northern harriers occur in suitable habitat within the Planning Area and are probably regular breeders (County of Sacramento 2015). There are 70 documented occurrences of northern harrier within the Planning Area. Fifty-eight occurrences are outside of the UDA and 12 are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.

AGENDA ITEM 11.1
6166

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
Elanus leucurus White-tailed kite	—	CFP	—	White-tailed kites roost individually or communally during winter and often reuse roost sites annually (Dunk 1995). This year-round resident breeds from February to October, with a peak from May to August. The species hunts almost exclusively by hovering at heights between 5 to 25 meters, often facing into the wind. White-tailed kites are known to forage for small rodents and insects in agricultural areas, especially alfalfa fields (Dunk 1995). White-tailed kites generally inhabit low-elevation grasslands, wetlands dominated by grasses, oak woodlands, and agricultural and riparian areas (Dunk 1995). Nests are built in trees that occur in isolation or in riparian areas. Nest sites are closely associated with suitable foraging habitat with high rodent populations in the immediate vicinity of the nest. White-tailed kites occur in suitable habitat throughout the Planning Area; their overall distribution, abundance, and population structure are not well known. There are 62 documented occurrences of white-tailed kite within the Planning Area. Forty-two occurrences are outside of the UDA and 20 are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Grus canadensis tabida Greater sandhill crane	—	T; CFP	—	Greater sandhill cranes winter within and around the Planning Area. They use open agricultural habitats, natural vegetation communities, and seasonally managed wetlands. They feed mostly in marshes and grain fields, consuming seeds, grains (including waste grain) and some invertebrates. They need shallow flooded fields for roosting where they can be protected for terrestrial predators. They rarely roost in areas with heavy emergent vegetation. Greater sandhill crane use in the Planning Area principally in the Cosumnes River floodplain. Greater sandhill cranes that are foraging and roosting at the Cosumnes River Preserve tend to be concentrated in the roadless area south of Desmond Road, 1 to 2 miles east of Franklin Boulevard, and north of the Cosumnes River. Greater sandhill cranes also use the area immediately west of the Planning Area south of Lambert Road (County of Sacramento 2015). There are 210 documented occurrences of greater sandhill crane within the Planning Area. Of these, 202 occurrences are outside of the UDA and eight are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Lanius ludovicianus Loggerhead shrike	BCC	CSC	—	Loggerhead shrikes occur most frequently in riparian areas along the woodland edge, grasslands with sufficient perch and butcher sites, scrublands, and open canopied woodlands, although they can be quite common in agricultural and grazing areas, and can sometimes be found in mowed roadsides, cemeteries, and golf courses. Preferred habitats for the loggerhead shrike are open areas that include scattered shrubs, trees, posts, fences, utility lines, or other structures that provide hunting perches with views of open ground, as well as nearby spiny vegetation or man-made structures (such as chain link fences or barbed wire) that provide a location to impale prey items for storage or manipulation (Humple 2008). They inhabit open areas with clear visibility for hunting, perches for scanning, and fairly dense trees and shrubs for nesting. In many areas, loggerhead shrike abundance is correlated with the amount of pastureland and available perches and hunting perches are especially important for loggerhead shrike foraging (Yosef 1996). Loggerhead shrikes prey mainly on arthropods, but also take reptiles, amphibians, fish, small birds, and rodents (Humple 2008). Loggerhead shrikes occur year-round in suitable habitat throughout the Planning Area. They are probably regular breeders in the Planning Area in low

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
				densities; however, their overall distribution, abundance, and population structure are not well known. There are 34 documented occurrences of loggerhead shrike within the Planning Area. Twenty-seven occurrences are outside of the UDA and seven are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Mammals				
Lasiurus blossevillii Western red bat	—	CSC	—	These bats are found along the West Coast and in the southwestern United States and into Mexico, where they are thought to hibernate in the winter and use torpor to conserve energy during the day when it is inactive (Shump and Shump 1982). They are solitary creatures that roost in broad-leaved trees, especially cottonwoods and willows in the foothills and lower mountains of the Southwest, and in the fruit and nut orchards of the west, where they resemble dried leaves when roosting. They are often found near streams. Red bats take a variety of prey, including moths, crickets, flies, true bugs, beetles, and cicadas (Shump and Shump 1982). They generally forage in grasslands, shrublands, open woodlands, and croplands, but they also take advantage of congregations of insects attracted to streetlights and building floodlights. There are seven documented occurrences of western red bat within the Planning Area. Two occurrences are outside of the UDA and five are within the UDA. Additionally, western red bat records were obtained from the numerous bat specimens annually submitted for rabies testing to the Sacramento County Public Health Laboratory; localities reported were the City of Sacramento, Folsom, Rancho Cordova, Wilton, Elk Grove, or Galt. These specimens included females and immature bats, which indicate the presence of reproductive populations (Sacramento County 2016). The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Taxidea taxus American badger	—	CSC	—	The Species' Habitat Model considers the land covers with potentially suitable habitat for badgers to be, blue oak savanna, vernal pool seasonal wetland, swale and valley grassland. Badgers occupy dry, open, treeless regions; prairies; parklands; and cold desert areas with friable soils. American badgers are large members of the weasel family that inhabit a wide range of natural communities and throughout the state (Ahlborn 1990). Badgers are ground-dwelling animals, and require friable soils that support burrows for den sites and permit digging for prey (e.g., ground squirrels and other small animals). Within the Planning Area, valley grasslands likely provide the most suitable badger habitat, although badgers also could occur in other habitat types with appropriate soil conditions. They require sufficient food (burrowing rodents), friable soils for burrowing, and open, uncultivated ground. Badgers have large home ranges and spend inactive periods in underground burrows. Badgers typically mate in mid-to-late summer and give birth between March and April (Ahlborn 1990). American badgers have been documented in the northeastern portion of the Planning Area. There are 9 documented occurrences of American badger within the Planning Area. One occurrence is outside of the UDA and 8 occurrences are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.

AGENDA ITEM 11.1
6168

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
Plants				
Downingia pusilla Dwarf downingia	—	—	2B.2	Dwarf downingia is an annual herb that grows along the margins of several types of vernal pools as well as mesic sites within valley and foothill grasslands at elevations between 3 and 1,591 feet (CNPS 2014). Occurrences are associated mainly with northern claypan vernal pools in central Sacramento County, with northern hardpan vernal pools in the foothills of the Sierra Nevada, and with vernal pools of the Interior Valleys of the Coast Range in Napa and Sonoma Counties (CDFW 2014a). In Sacramento County, dwarf downingia occurs primarily on the Laguna and Riverbank geologic formations. Flowers from March to May (CNPS 2014). There are 10 documented occurrences of dwarf downingia distributed in concentrated patches within the Planning Area. None of the occurrences are located within the UDA. Two occurrences are located outside of the UDA within the Planning Area. One of these is encompassed within the 16,420-acre Nature Conservancy Cosumnes River Preserve and the other is located within the Howard Ranch preserve (Sacramento County 2016). The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Gratiola heterosepala Boggs Lake hedge-hyssop	—	E	1B.2	Bogg's Lake hedge-hyssop is a semi-aquatic annual herb that is strictly associated with the vernal pool-type hydrologic cycle. In Sacramento County, Bogg's Lake hedge-hyssop is associated with vernal pools located on ancient weathered alluvial terraces of the Laguna Geologic formation, with soils of the Redding, Red Bluff and related Series. Bogg's Lake hedge-hyssop shares the annual growth habit with the vast majority of other endemic vernal pool plants. Flowers from April to August. There are 31 documented occurrences of Boggs Lake hedge-hyssop within the Planning Area. Twenty occurrences are located within the UDA, and 11 occurrences are located outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Juncus leiospemus var. ahartii Ahart's dwarf rush	—	—	1B.2	This annual rush species is found in mesic valley and foothill grassland between 98 and 751 feet mean sea level (msl) (CNPS 2014). This species is restricted to wetlands possessing vernal pool-type hydrology. The blooming period is between March and May. Currently, there are two documented occurrences of Ahart's dwarf rush in the Planning Area, both in the UDA. One of the recorded occurrences is possibly extirpated and is located southeast of Rancho Cordova on private land southeast of the intersection of Kiefer Boulevard and Sunrise Boulevard. The other recorded occurrence is extant and located approximately 1.75 miles to the northwest of the Kiefer Blvd. occurrence on Mather Airport (Sacramento County 2016). The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Legenere limosa Legenere	—	—	1B.1	Legenere is an annual herb that flowers and sets seeds during the dry-down phase of the vernal pool hydrologic cycle, sometimes while shallow water or inundated soil remains in the deepest parts of the pool basin. Flowers from April to June or can be without flowers and self-pollinates. Legenere occurs at elevations between 3 and 2,887 feet (CNPS 2014). Many historical occurrences are extirpated (CDFW 2014a). There are 62 documented occurrences of legenere patchily distributed

AGENDA ITEM 11.1
6169

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
				in the Planning Area. Thirty-six are located within the UDA and 26 are outside the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Navarretia myserii Pincushion navarretia	—	—	1B.1	This annual herb is found in vernal features that are often acidic between 65 and 1,082 feet in elevation, and is considered a strict vernal pool endemic. This species blooms in May. There are 49 documented occurrences of pincushion navarretia within 5 miles of the Planning Area. The vast majority (48) of the documented occurrences are located outside the UDA in the southeast corner of the Planning Area. Most of these occurrences are on the 13,000-acre Howard Ranch property. The remaining Sacramento County occurrence is located outside of the Planning Area, just north of the American River at the Phoenix Field Ecological Reserve (Sacramento County 2016). The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Orcuttia tenuis Slender Orcutt grass	T*	E	1B.1	Like all grasses in the genus *Orcuttia*, slender Orcutt grass is strictly adapted to the vernal pool hydrological cycle. Slender Orcutt grass can tolerate a wider range of vernal pool sizes and vernal wetland types than other *Orcuttia* species. It also occurs over a greater geographical area and landform types, and a larger number of occurrences as well. This annual grass is found in vernal pools between 114 and 5,774 feet in elevation. This species blooms between May and September, sometimes until October (CNPS 2014). There are four documented occurrences of slender Orcutt grass distributed in the Planning Area. All four occurrences are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.
Orcuttia viscida Sacramento Orcutt grass	E*	E	1B.1	This annual grass is found in vernal features between 98 and 328 feet in elevation (CNPS 2014) and is generally restricted to the largest pools. This species blooms between April and July. There are 40 documented occurrences of Sacramento Orcutt grass within the Planning Area, 10 are located within the UDA and 30 are outside the UDA. The central population center is located on the terrace landscape east of Mather Air Force Base in the vicinity of the Laguna Creek watershed. As measured by the number of CNDDB occurrences, number of occupied pools, and past estimates of the number of individuals, this population center comprises the core of the species' currently known distribution. All four occurrences are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.

AGENDA ITEM 11.1
6170

Table G-2.1. The Proposed Covered Species; their Listing Status, Biology, and Habitat Requirements

Scientific Name Common Name	Regulatory Status			Description
	ESA	*CESA*	*CRPR*	
Sagittaria sanfordii Sanford's arrowhead	—	—	1B.2	Sanford's arrowhead is a perennial rhizomatous, emergent herb whose blooming period is between May and October (CNPS 2014). This plant species grows in water bodies located between sea level and 2,132 feet in elevation (CNPS 2014). Sanford's Arrowhead is strictly associated with freshwater marsh hydrology. Sanford's Arrowhead shares the perennial clonal growth habit with the vast majority of other endemic emergent marsh plants. Thin elongate rhizomes produce ovoid tubers (corms) at their tips that allow the plant to persist within the submersed substrate through the dormant winter season. The ability of colonies to withstand at least 1 year of unfavorable hydrologic conditions and then reappear with vigor is likely attributable to the dormant rhizome and associated tubers/corms. This species is extirpated from Southern California and mostly extirpated from the Central Valley (CNPS 2014). There are 64 documented occurrences of Sanford's arrowhead in the Planning Area. Fifteen occurrences are located within the UDA, and 49 occurrences are located outside the UDA. All four occurrences are within the UDA. The habitat model for this species along with the acres of existing modeled habitat within the Planning Area is shown in Section 3 below.

Status Definitions

Federal ESA:

E = listed as endangered under the ESA
T = listed as threatened under the ESA
* = species has designated Critical Habitat located within the Planning Area.
— = no ESA listing
BCC = Bird of Conservation Concern, USFWS 2008.

State CESA:

E = listed as endangered under CESA
T = listed as threatened under CESA
CFP = fully protected under the California Fish and Game Code
CSC = species of special concern in California
WL = Watch List
CE = Candidate for listing as endangered by CDFW
— = no state status

California Native Plant Society

California Rare Plant Rank (CRPR)
1B = Rare, threatened, or endangered in California and elsewhere
2 = Rare, threatened, or endangered in California but more common elsewhere
CRPR Threat Ranks
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Table G-2.2. Other Special-Status Plant Species Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
Brasenia schreberi Watershield	—	S2	2B.3	Y	Y	Found in freshwater marshes and swamps. Grows in aquatic waterbodies both natural and artificial. Elev. 98-7,218 ft. Blooms: June-September.	One record within 0.5 miles of Planning Area is located near the Stone Lake Duck club east of Highway 5 (CDFW 2015a, CalFlora 2014). This record is historic but considered extant. Suitable habitat and elevation occurs in the Planning Area. Potentially affected by wetland or riparian removal or damage from activities such as road development or preserve maintenance.
Carex comosa Bristly Sedge	—	S2	2B.1	Y	Y	Found in and on the edges of marshes and swamps; on edge of riparian areas. Valley and foothill grasslands and coastal prairies. Prefers wet places like lake margins. Elev.: 0-2,051 ft. Blooms: May- September.	Found in 10 recent locations (within the last 5 years) within and six locations outside the Planning Area near or following Snodgrass Slough and tributaries. Recorded in Delta Meadows River Park in the Sacramento River Delta. Suitable habitat and elevation occurs in the Planning Area. No records within the UDA. Could be affected by alternatives that result in wetland or riparian removal or damage in the Planning Area.
Castilleja campestris var. *succulent* Succulent owl's clover	T	E/S2	1B.2	N	Y	Found in vernal pools. Pools can be acidic. Elev. 164-2,460 ft. Blooms: April-May.	One record found outside of the Planning Area at UC Cooperative Extension Angraves Nature Study Area, just south of Dry Creek and Galt. Critical habitat is located just inside the southern boundary of the Planning Area along Dry Creek, just east of the

AGENDA ITEM 11.1
6172

Table G-2.2. Other Special-Status Plant Species Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
							City of Galt. Suitable habitat and elevation occurs in the Planning Area. Could be affected by disturbance or removal of vernal pools.
Clarkia biloba ssp. *Brandegeeae* Brandegee's clarkia	—	S4	4.2	N	Y	Found in the foothills within chaparral, cismontane woodland, and lower montane coniferous forest. Elev. 0-1,640 ft. Blooms: April-June	One historic occurrence located within the UDA. Two occurrences outside of the Planning Area. One near American River bluffs in Folsom, and the other outside the County in El Dorado Hills near Marble Valley. Suitable habitat located in blue oak woodland and savannah in the western section of the Planning Area. Could be affected by disturbance or removal of blue oak woodland or savannah in the Planning Area.
Cicuta maculata var. *bolanderi* Bolander's Water-hemlock	—	S2	2B.1	Y	Y	Found in coastal, fresh, or brackish water marshes. Elev. 0-656 ft. Blooms: July-September.	One 1993 record for the Planning Area near Snodgrass Slough and Delta Meadows River Park. No records in the UDA. Suitable habitat exists within Planning Area. Could be affected by wetland or riparian removal or damage in the Planning Area.
Cuscuta obtusiflora var. *glandulosa* Peruvian Dodder	—	—	2B.2	Y	Y	Generally found in freshwater marshes and swamps. Parasitic to host plant. A native species that is classified as a noxious weed by CA Department of Food and Agriculture. Elev. 49-919 ft. Blooms: July-October.	One record near Franklin/Big Horn Blvd and Laguna Lake just outside the Planning Area in Elk Grove (CDFW 2015a, CalFlora 2014). No records within the UDA. Suitable habitat and elevation occurs in the Planning Area. Could be affected by wetland or riparian removal or damage.

Table G-2.2. Other Special-Status Plant Species Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
Eryngium pinnatisectum Tuolumne Button-celery	—	S2	1B.2	Y	Y	Found in freshwater wetlands, vernal pools, wetland riparian and foothill woodland communities. Elev. 100 -5,610 ft. Blooms: May-August.	One historic record within the Planning Area from 1941 by Michigan Bar and Rancho Murieta. Five more records occur on the eastern outskirts of the Planning Area just south of Rancho Murieta. No records within the UDA. Suitable habitat and elevation occurs in the Planning Area. Potential effects from wetland or riparian removal.
Fritillaria agrestis Stinkbells	—	S3	4.2	Y	Y	Found in chaparral, cismontane woodlands, and valley and foothill grasslands. Elev. 0-1,640 ft. Blooms March-June.	One recent record within the Planning Area along Sloughhouse Road (CalFlora 2014). One record from dirt parking lot in Citrus Heights outside the Planning Area. Suitable habitat and elevation exists on the eastern edge of the Planning Area. Potential effects in the Planning Area from disturbance or removal of blue oak woodland and savannah and valley grasslands.
Hibiscus lasiocarpos var. *occidentalis* Woolly Rose-Mallow	—	S2	1B.2	Y	Y	Found in freshwater marshes and swamps, along freshwater soaked river banks and low peat island sloughs. Can also occur on riprap and levees. Known in the Delta watershed. Elev. 0-394 ft. Blooms: June-September.	27 records within the Study Areas; ten are found within the Planning Area near and along Snodgrass slough. Remainder are along the Sacramento River or Mokelumne River and tributaries running into the Delta. No records within the UDA. Suitable habitat and elevation occurs in the Planning Area. Potential effects from wetland or riparian removal or damage.

Table G-2.2. Other Special-Status Plant Species Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
Juglans hindsii Northern California Black Walnut	—	S1	1B.1	Y	Y	Found in riparian forest and woodland. Elev. 0-1,444 ft. Blooms: April-May.	Seven recent records are located within the Planning Area. Records within the Study Areas are located along the Sacramento River, the American River, within the Prairie City State Vehicle Recreation Area, and along Crevis Creek (by Rancho Murietta) within the Planning Area (CalFlora 2014). Only one record is located within the UDA by Hazel Ave and Highway 50. CNDDB (CDFW 2015a) records indicate one historic and extirpated occurrence. Suitable habitat and elevation occurs in the Planning Area. Potential effects from removal of trees along riparian corridors.
Lathyrus jepsonii var. *jepsonii* Delta tule pea	—	S2	1B.2	Y	Y	Found in freshwater and brackish marshes and swamps. Elev. 0-13 ft. Blooms: May-September.	Nine records in the Study Areas with the majority (five) near Snodgrass Slough in the Planning Area and tributaries of the Delta outside the Planning Area. No records within the UDA. Suitable habitat and elevation occurs in the Planning Area. Potential effects from wetland removal or damage in the Planning Area.
Lepidium latipes var. *heckardii* Heckard's Pepper-grass	—	S2	1B.2	Y	Y	Found in alkaline flats in valley and foothill grasslands. Elev. 7-656 ft. Blooms: March-May.	Two recent locations within the Planning Area south of Stone Lake; associated with pools. Suitable habitat and elevation occurs within Planning Area. Potential effects on suitable

AGENDA ITEM 11.1
6175

Table G-2.2. Other Special-Status Plant Species Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
							habitat from implementation of alternatives.
Lilaeopsis masonii Mason's lilaeopsis	—	S2	1B.1	Y	Y	Found in riparian scrub and brackish or freshwater marshes and swamps. Elev. 3-33 ft. Blooms: April-November.	Known from areas south of the Planning Area. Concentrated in region of southern Sacramento County. Recent records occur all along the Sacramento Deep Water Ship Channel outside the Planning Area and along the Mokelumne river and tributaries of the Delta. Older records found in Snodgrass Slough within the Planning Area. No records within the UDA. Suitable habitat and elevation range occurs in Planning Area. Potential effects from wetland or riparian removal or damage.
Limosella australis Delta Mudwort	—	S2	2B.1	Y	Y	Found in mud banks in riparian scrub and freshwater or brackish marshes and swamps. Elev. 0-10 ft. Blooms: May-August.	Suitable habitat and elevation range occurs in Planning Area. Six records in the Study Area with most outside the Planning Area on the Mokelumne River and tributaries. Two records in the Planning Area along Snodgrass Slough at the edge of the Planning Area. Potential effects from wetland or riparian removal or damage.
Scutellaria galericulata Marsh Skullcap	—	S1	2B.2	Y	Y	Found in Lower montane coniferous forest, meadows, seeps, marshes and swamps. Elev. 0-6,980 ft. Blooms: June-	Two recent records are located within the Planning Area along Snodgrass Slough. Preferred higher elevation range does not occur within Planning

Table G-2.2. Other Special-Status Plant Species Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
						September.	Area. Likely restricted to the western section of the Planning near recent occurrences. Potential effects from wetland or riparian removal or damage.
Scutellaria lateriflora Side-flowering Skullcap	—	S1	2B.2	Y	Y	Found in marshes, swamps, mesic meadows and seeps. Elev. 0-1,640 ft. Blooms: July-September.	Ten occurrences within the Study Area. The majority of them (eight) occurring in the Planning Area along Snodgrass Slough and the Mokelumne River. Suitable habitat and elevation range occurs within Planning Area. Potential effects from wetland or riparian removal or damage.
Symphyotrichum lentum Suisun Marsh aster	—	S2	1B.2	Y	Y	Found in brackish and freshwater marshes and swamps. Elev. 0-10ft. Blooms: May-November.	Suitable habitat and elevation range occurs in Planning Area. Eight occurrences within the Study Area. The majority of them occur outside the Planning Area (six) in the Sacramento Deep Water Ship Channel. Within the Planning Area, occurrence found on tributaries of Snodgrass Slough. No records within the UDA. Potential effects from wetland or riparian removal or damage.
Trifolium hydrophilum Saline Clover	—	S2	1B.2	Y	Y	Found in marshes and swamps, valley and foothill grasslands, and vernal pools. Elev. 0-984 ft. Blooms: April-June	There are five recent occurrences within the Planning Area around Stone Lake. Colonies located within seasonally wet grasslands and vernal pools.Suitable habitat and elevation range occurs in Planning Area.

AGENDA ITEM 11.1
6177

Table G-2.2. Other Special-Status Plant Species Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
							Potential effects from wetland or riparian removal or damage.

Sources: CDFW 2015a, CalFlora 2014, CNPS 2015, USFWS 2016.
Records noted are from the CNDDB database (CDFW 2015a). If more data was needed, the CalFlora database was searched and was cited. Records noted as recent are within the last 10 years (CalFlora 2014). Elevation in the Planning Area is from -5 to 670 feet. Records noted as Historic are within > 20 years old.

Y = Yes; N = No

Status Definitions
— = no status in the category

Federal:
E = listed as endangered under the ESA
T = listed as threatened under the ESA

State:
E = listed as endangered under CESA
T=listed as threatened under CESA
S1- Critically Imperiled by the State
S2- Imperiled by the State

California Rare Plant Rank (CRPR):
1A= Presumed extirpated in California and either rare or extinct elsewhere
1B = Rare, threatened, or endangered in California and elsewhere
2A = Presumed extirpated in California, but more common elsewhere
2B = Rare, threatened, or endangered in California, but more common elsewhere
3 = Plants which need more information and on the Review list
4= Plants of limited Distribution – Watch List

CRPR Threat Ranks:
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Other Special Status Wildlife Species Evaluated in the EIS/EIR

The review of the data sources listed in the introduction to this section identifed 53 special-status wildlife species known, or with potential to occur in the Chapter 9 Study Area. Of the total 53 wildlife species identified in this review, 20 were already selected by the Permit Applicants to be Covered Species under the proposed SSHCP.

For the other 33 special-status wildlife species identified in the review, four species were selected for evaluation in the EIS/EIR. These species are listed in Table G-2.3 with information on their legal status and rationale for evaluation in the EIS/EIR. These determinations were based primarily on the types, extent, and quality of habitats in the Chapter 9 Study Area; the proximity of the Study Area to known occurrences of the species; and the regional distribution and abundance of the species.

Table G-2.3. Other Special Status Wildlife Species Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
Birds						
Ammodramus savannarum Grasshopper sparrow (nesting)	—	CSC	Y	Y	Nests and forages in dense grasslands; favors a mix of native grasses, forbs, and scattered shrubs.	Suitable habitat occurs in Planning Area. Could nest in annual grassland habitat in the Planning Area. Known to occur in southern half of Sacramento County. Two records within the Planning Area. Potential affected by disturbance or removal of grasslands.
Grus canadensis canadensis Lesser sandhill crane (wintering)	—	CSC	N	Y	Wintering habitats include crop fields, grazed and mowed grasslands, pastures, alfalfa fields, and shallow wetlands.	Winters in Planning Area. A regular winter visitor to the Bufferlands, Cosumnes River Preserve and other waterfowl preserves in the Sacramento area. Primary range is in Central Valley, with fall and winter occurrences within the Sacramento–San Joaquin River Delta and Sacramento Valley within the Study Area. Suitable wintering habitat occurs in Planning Area. Potential effects from disturbance and removal of roosting areas in crop fields, grasslands, and wetlands.
Melospiza melodia Song sparrow (Modesto population)	—	CSC	Y	Y	Breeding and wintering habitat is in emergent freshwater marshes, riparian forests, vegetated irrigation canals, levees, and newly planted valley oak restoration sites.	Suitable habitat occurs within Planning Area. 17 occurrences within the Planning Area. Two occurrences within the UDA. Generally known to occur within Sacramento County in southwestern corner of the County. Potential effects from disturbance and removal of emergent freshwater marshes, riparian forests, vegetated irrigation canals and levees or oak restoration sites.

AGENDA ITEM 11.1
6180

Table G-2.3. Other Special Status Wildlife Species Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
Riparia riparia Bank Swallow (nesting)	—	T	Y	Y	Breeds in riparian, lacustrian and coastal areas with vertical banks, bluffs, and cliffs with sandy soils.	Limited suitable habitat within Planning Area. Known to occur in Sacramento County. Two occurrences found along the Cosumnes River near Rancho Murietta. No occurrences within the UDA. Potential effects from disturbance and removal of vertical banks, bluffs, or cliffs along rivers.

Source: Black and Vaughn 2005,CDFW 2015a, USFWS 2016.
Note: CNDDB = California Natural Diversity Database; USFWS = U.S. Fish and Wildlife Service
The federal and state status of species primarily is based on the Special Animals List (October 2015) (CDFW 2015b).

Legal Status Definitions

Federal:
— = no ESA listing

State:
T= listed as threatened under CESA
CSC= Species of special concern (no formal protection other than CEQA consideration)

Other Special Status Species not Evaluated in the EIS/EIR

Other Special Status Plant Species not Evaluated in the EIS/EIR

As described previously, the review of the data sources listed in the introduction to this section identified 37 special-status plant species known, or with potential to occur in the Chapter 9 Study Area. Of the total 37 plant species identified, 11 were not included in the EIS/EIR analysis. These species are listed in Table G-2.4 with information on their legal status and rationale for not being included in the EIS/EIR evaluation. These determinations were based primarily on the types, extent, and quality of habitats in the Chapter 9 Study Area; the proximity of the Study Area to known occurrences of the species; and the regional distribution and abundance of the species.

The review of the data sources listed in the introduction to this section identifed 53 special-status wildlife species known, or with potential to occur in the Chapter 9 Study Area. Of the total 53 wildlife species identified, 29 were not included in the EIS/EIR analysis.

For the other 33 special-status wildlife species identified in the review, four species were selected for evaluation in the EIS/EIR. These species are listed in Table G-2.3 with information on their legal status and rationale for evaluation in the EIS/EIR. These determinations were based primarily on the types, extent, and quality of habitats in the Chapter 9 Study Area; the proximity of the Study Area to known occurrences of the species; and the regional distribution and abundance of the species.

Table G-2.4. Other Special-Status Plant Species not Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
Amsinckia grandiflora Large-flowered Fiddleneck	E	E	1.B.1	N	N	Cismontane woodland and valley grassland in Alameda, Contra Cost and western San Joaquin Counties. Elevation: 886 – 1,804 ft. Blooms: March-May	No records in the County or Planning Area. Suitable habitat exists in the Planning Area; however , the Planning Area is outside the known range of the species. Not likely to be affected by alternatives.
Arctostaphylos myrtifolia Ione Manzanita	T	—	1B.2	N	N	Chaparral habitat. Restricted to the Ione Formation in Amador and Calaveras Counties, along an approximate 19.5 mile stretch, with the central distribution being the large exposure of the Ione Formation in western Amador County around the City of Ione. Elev.: 229-2,526 ft. Blooms: November-March.	Eight occurrences within 0.5 miles of the Planning Area. No records in the County or Planning Area. No suitable habitat exists in the Planning Area. Not likely to be affected by alternatives.
Calystegia stebbinsii Stebbins' morning-glory	E	E/S1	1B.1	N	N	Found in gabbroic or serpentine soils in chaparral or cismontane woodland openings. Elev. 606-3,576 ft. Blooms: April-July.	Not found within the Study Areas. No suitable habitat within Planning Area. Not likely to be affected by alternatives.
Ceanothus roderickii Pine Hill ceanothus	E	S1	1B.1	N	N	Found in gabbroic or serpentine soils in chaparral or cismontane woodland openings. Elev. 803-2,066 ft. Blooms: April-July	Not found within the Study Areas. Suitable habitat and elevation does not occur in the Planning Area. Not likely to be affected by alternatives.
Crocanthemum suffrutescens Bisbee Peak rush-rose	—	S2	3.2	N	N	Found in chaparral openings on Serpentine, Gabbroic, or Ione Formation Soils. Elev. 328-2,296 ft. Blooms: March-June.	Seven records outside the eastern edge of the Planning Area on Ione Formation soils. No records within the UDA. No suitable habitat exists in the Planning Area. Would not be affected by alternatives.

AGENDA ITEM 11.1
6183

Table G-2.4. Other Special-Status Plant Species not Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
Eriogonum apricum var. *apricum* Ione Buckwheat	E	E	1B.1	N	N	Found in chaparral habitat with gravelly opening on Ione Formation soil. Elev. 262 -656 ft. Blooms: July-October.	*Eriogonum apricum* var. *apricum* and *E. apricum* var. *prostratum* are known only from an approximate 10-mile stretch along the Ione Formation in western Amador County at the edge of the Planning Area. No records from within the Planning Area. No suitable habitat exists within the Planning Area. Not likely to be affected by the alternatives.
Eriogonum apricum var. *prostratum* Irish Hill Buckwheat	E	E	1B.1	N	N	Found in chaparral habitat with gravelly opening on Ione. Elev. 262 -656 ft. Blooms: June-July.	*Eriogonum apricum* var. *apricum* and *E. apricum* var. *prostratum* are known only from an approximate 10-mile stretch along the Ione Formation in western Amador County at the edge of the Planning Area. No records from within the Planning Area. No suitable habitat exists within the Planning Area. Not likely to be affected by the alternatives.
Fremontodendron californicum ssp. *Decumbens* Pine Hill flannelbush	E	S1	1B.1	N	N	Found in rocky, gabbroic or serpentine soils in chaparral or cismontane woodland openings. Elev. 1,394 -2,493 ft. Blooms: April-July.	Not found within the Study Area. Suitable habitat and elevation does not occur in the Planning Area. Would not be affected by alternatives.
Galium californicum ssp. *Sierra* El Dorado bedstraw	E	S1	1B.2	N	N	Found in gabbroic soils in chaparral, cismontane woodlands, or lower montane coniferous forests in the foothills. Elev. 328 -1,919 ft. Blooms: May-June.	Not found within the Study Areas. No suitable habitat exists within the Planning Area. Would not be affected by alternatives.

AGENDA ITEM 11.1
6184

Table G-2.4. Other Special-Status Plant Species not Analyzed in the EIS/EIR

Species Scientific Name Common Name	ESA (Federal) Status	State Status	CRPR Plant Rank	CNDDB or CalFlora records within Planning Area	Analyzed in the EIS/EIR	Rationale for EIS/EIR Analysis Decision	
						Species Habitat Requirements	*Conditions in the Planning Area*
Horkelia parryi Parry's Horkelia	—	S2	1B.2	N	N	Found in chaparral and cismontane woodlands on Ione formation and other soils. Elev. 262-3,510 ft. Blooms: April-September.	Four records are located outside of the Planning Area in the Study Area on Ione soils in the foothills of Amador County.No suitable habitat located within the Planning Area. Not affected by alternatives.
Senecio layneae Layne's butterweed	T	S2	1B.2	N	N	Found in rocky, gabbroic or serpentine soils in chaparral or cismontane woodlands. Elev. 658 -3,559 ft. Blooms: April-August.	Not found within the Study Area. No suitable habitat found within the Planning Area. Not affected by alternatives.

Sources: CDFW 2015a, CalFlora 2014, CNPS 2015, USFWS 2016.

Records noted are from the CNDDB database (CDFW 2015a). If more data was needed, the CalFlora database was searched and was cited. Records noted as recent are within the last 10 years (CalFlora 2014). Elevation in the Planning Area is from -5 to 670 feet. Records noted as Historic are within > 20 years old.

Y = Yes; N = No

Status Definitions
— = no status in the category

Federal:
E = listed as endangered under the ESA
T = listed as threatened under the ESA

State:
E = listed as endangered under CESA
T=listed as threatened under CESA
S1- Critically Imperiled by the State
S2- Imperiled by the State

California Rare Plant Rank (CRPR):
1A= Presumed extirpated in California and either rare or extinct elsewhere
1B = Rare, threatened, or endangered in California and elsewhere
2A = Presumed extirpated in California, but more common elsewhere
2B = Rare, threatened, or endangered in California, but more common elsewhere
3 = Plants which need more information and on the Review list
4= Plants of limited Distribution – Watch List

CRPR Threat Ranks:
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Other Special Status Wildlife Species not Evaluated in the EIS/EIR

As described previously, the review of the data sources listed in the introduction to this section identified 53 special-status wildlife species known, or with potential to occur in the Chapter 9 Study Area. Of the total 53 wildlife species identified, 29 were not included in the EIS/EIR analysis. These species are listed in Table G-2.5 with information on their legal status and rationale for not being included in the EIS/EIR evaluation. These determinations were based primarily on the types, extent, and quality of habitats in the Chapter 9 Study Area; the proximity of the Study Area to known occurrences of the species; and the regional distribution and abundance of the species.

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
Fish						
Acipenser medirostris North American Green Sturgeon (Southern DPS)	T*	CSC	N	N	Spawn in deep pools in large, turbulent, freshwater rivers. Adults live in oceanic waters, bays, and estuaries. In the Sacramento River, spawning occurs near Red Bluff and in the Feather River. Can be found at other life stages in the Sacramento River and the Sacramento-San Joaquin Delta. Critical habitat in Snodgrass Slough area along the Sacramento River.	No CNDDB records in the Planning Area. The Planning Area boundary is the Sacramento River levee and does not extend into habitat or critical habitat for North American green sturgeon (Southern DPS) in the River. The species would not be affected by activities considered in the alternatives along other rivers/waterways in the Planning Area that could provide habitat for the species. Not included for analysis because the activities and projects included in the EIS/EIR alternatives would not directly or indirectly impact North American green sturgeon (Southern DPS).
Archoplites interruptus Sacramento perch (within native range only)	_	CSC	N	N	Historically existed in vegetated sloughs, and pooling areas of rivers and lakes. More recently found in ponds and impoundments where it has been translocated. Prefers warm water. Historically, native to the Central Valley, it is mostly likely extirpated from its native range (Crain and Moyle 2011).	Only one record in the Study Area by Lake Greenhaven between I-5 and the Sacramento River. No CNDDB records in the Planning Area. Known only from translocations. No currently recorded or persistent populations in the Sacramento River (Crain and Moyle 2011) or other areas with the Planning Area. While suitable habitat exists in the Planning Area, it is not likely that this species persists in the natural waterways within the County. Not included for analysis because the activities and projects included in the EIS/EIR alternatives would not directly or indirectly impact Sacramento perch.

AGENDA ITEM 11.1
6187

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
Hypomesus transpacificus Delta smelt	T*	E	N	N	Found in estuaries. Able to occur in brackish and freshwater. Pelagic and anadromous. Occurs in Sacramento-San Joaquin Delta most of the year. Spawns in tidally influenced freshwater wetlands and seasonally submerged uplands along the Sacramento River, downstream from its confluence with the American River (City of Sacramento, 2009).	Critical habitat within the Planning Area from the Sacramento River to just east of I-5; includes Snodgrass Slough. No CNDDB records in the Planning Area. The Planning Area boundary is the Sacramento River levee and does not extend into habitat or critical habitat for Delta smelt in the River. The species would not be affected by activities considered in the alternatives along other rivers/waterways in the Planning Area that could provide habitat for the species. Not included for analysis because the activities and projects included in the EIS/EIR alternatives would not directly or indirectly impact Delta smelt.
Lampetra ayresii River lamprey	_	CSC	N	N	Found in estuaries and the ocean, migrating to clear gravel riffles of streams to spawn. Known to occur in the lower Sacramento River and other tributaries within the County, but it is uncommon.	No CNDDB records in the Planning Area. The Planning Area boundary is the inside toe of the Sacramento River levee and does not extend into habitat for river lamprey within the River. The species would not be affected by activities considered in the alternatives along other rivers/waterways in the Planning Area that could provide habitat for the species. Not included for analysis because the activities and projects included in the EIS/EIR alternatives would not directly or indirectly impact river lamprey.
Oncorhynchus mykiss irideus Central Valley steelhead	T*	—	Y	N	All river reaches and estuarine areas accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries in California. Widely distributed in the Sacramento River and its	Three recent CNDDB occurrences within the Planning Area: the Sacramento-San Joaquin Delta area, the Mokelumne River and the Cosumnes River. Critical habitat on the Sacramento, American and Mokelumne Rivers (including Dry Creek) along the edge of the Planning Area. The Planning Area boundary is the

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
					tributaries.	inside toe of theSacramento River levee and does not extend into habitat or critical habitat for Central Valley steelhead in the River. The species would not be affected by activities considered in the alternatives along other rivers/waterways in the Planning Area that could provide habitat for the species. Not included for analysis because the activities and projects included in the EIS/EIR alternatives would not directly or indirectly impact Central Valley steelhead.
Oncorhynchus tshawytscha Chinook salmon - Central Valley spring-run Evolutionary Significant Unit (ESU)	T*	T	N	N	Chinook salmon tend to spawn in the mainstems of rivers (or larger tributaries) in areas of gravel and cobble substrate. Migrate to and from oceanic environments to natal streams. Requires cool winter and spring flows for migration, spawning and cool summer water temperatures for fry and juvenile rearing, Also found in lakes up to 375 meters in depth. Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning.	No CNDDB records within the Planning Area. Spring-run Chinook enter the Sacramento River from late March through September. Adults hold in cool water habitats through the summer, then spawn in the fall from mid-August through early October. Spring-run juveniles migrate soon after emergence as young-of-the-year, or remain in freshwater and migrate as yearlings (CDFW 2014b). Rearing habitat may be found in the Cosumnes River and tributaries. Critical habitat occurs along the Sacramento and American Rivers It also occurs in the Delta Cross Channel leading into Snodgrass Slough. The Planning Area boundary is the inside toe of the Sacramento River levee and does not extend into Chinook salmon habitat or critical habitat for the Central Valley spring-run ESU. The species would not be affected by activities considered in the alternatives along the Cosumnes or its tributaries or Snoddgrass Slough. Not included for analysis because the activities and projects included in the

AGENDA ITEM 11.1
6189

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
						EIS/EIR alternatives would not directly or indirectly impact Chinook salmon – Central Valley spring-run ESU.
Oncorhynchus tshawytscha Chinook salmon - Sacramento River winter-run ESU	E	E	N	N	Chinook salmon tend to spawn in the mainstems of rivers (or larger tributaries) in areas of gravel and cobble substrate. Migrate to and from oceanic environments to natal streams. Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning.	No CNDDB records within the Planning Area. The Sacramento River winter-run Chinook salmon occur as far upstream as the Keswick Dam and depend on cold water releases from the Shasta dam (located 9 miles upstream of Keswick Dam) to allow them to hold for several months until they spawn in early summer in the 70 miles below the Dam (Moyle 2002). Adult winter-run pass under the Golden Gate Bridge from November through May, and pass into the Sacramento River from December through early August. (CDFW 2014b). Planning Area boundary is the Sacramento River levee and does not extend into Chinook salmon habitat. Not included for analysis because there is no habitat within the Planning Area.
Oncorhynchus tshawytscha Chinook salmon – Central Valley fall / late-fall-run ESU	C	CSC	N	N	Chinook salmon tend to spawn in the mainstems of rivers (or larger tributaries) in areas of gravel and cobble substrate. Migrate to and from oceanic environments to natal streams. Requires cool summer flows for fry and juvenile rearing.	No CNDDB records within the Planning Area. Present in Sacramento-San Joaquin Delta and associated marshes. Presently fall and late-fall run chinook spawn in the Sacramento and San Joaquin rivers and their tributaries (including the American River) between Keswick Dam (near Redding) and the Merced River (NMFS 2014, CDFW 2014b). Rearing may occur in the Cosumnes River and tributaries. The Planning Area boundary is the Sacramento River levee and does not extend into Chinook salmon habitat. The species would not be affected by activities considered in the alternatives along the

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
						Cosumnes or its tributaries. Not included for analysis because the activities and projects included in the EIS/EIR alternatives would not directly or indirectly impact Chinook salmon – Central Valley fall / late-fall-run ESU.
Pogonichthys macrolepidotus Sacramento splittail	—	CSC	N	N	Found in pooling areas of rivers and lakes as well as backwaters. Able to survive in brackish waters as well. Requires flooded vegetation for spawning and juvenile foraging habitat. Spawning occurs over flooded stream bank vegetation in sloughs and in slow moving large rivers Requires flooded vegetation for spawning and juvenile foraging habitat. Spawning occurs over flooded stream bank vegetation in sloughs and in slow moving large rivers.	Small amount of appropriate habitat along the Sacramento River. One CNDDB record from 1995 within the Sacramento River along the border of the Planning Area was found in CNDDB records. However, the Planning Area boundary is the Sacramento River levee and does not extend into Sacramento splittail habitat in the river. Young of the year found in the Cosumnes River Preserve (Whitener and Kennedy 1999). Present in Sacramento-San Joaquin Delta and associated marshes. The species would not be affected by activities considered in the alternatives along the Cosumnes or its tributaries. Not included for analysis because the activities and projects included in the EIS/EIR alternatives would not directly or indirectly impact Sacramento splittail.
Spirinchus thaleichthys Longfin smelt	C	T	N	N	Found in the California's bay, estuary, and nearshore coastal environments from San Francisco Bay north to Lake Earl, near the Oregon border. The San Francisco Estuary and the Sacramento-San Joaquin Delta supports the largest longfin smelt population in California.	While there are two recent CNDDB occurrences along the Sacramento River, the Planning Area boundary is the inside toe of theSacramento River levee and does not extend to longfin smelt habitat. The majority of the population's habitat is in the Delta region south and east of the Planning Area. Would not be affected by the alternatives because is found outside Sacramento County or on its borders, it has no known distribution within the

AGENDA ITEM 11.1
6191

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
						Planning Area, and is not located near UDA activities.
Birds						
Aquila chrysaetos Golden eagle (nesting and wintering)	—	CFP (Breeding and Wintering)	Y	N	Occurs in mountainous canyon land, rimrock terrain of open desert, and grassland areas. Potential foraging habitat is in shrublands, grasslands, farmland, and riparian areas. Occurs in foothills and mountain areas of California with known occurrences in central Sacramento County.	Two historic records from the Planning Area. Only one record in the UDA of a wintering golden eagle by Mather Airport is located within the Planning Area. Golden eagles likely to do not nest in the Planning Area due to the lack of rocky ledges and cliffs. Limited suitable nesting habitat within the Planning Area. Low likelihood of nesting in the Planning Area and being affected by the alternatives.
Asio flammeus Short-eared owl (nesting)	—	CSC	N	N	Open areas with few trees including grasslands, prairies, dunes, meadows, and irrigated lands. Potential habitat within the Planning Area includes valley grasslands, wetlands, and agriculture lands. A winter migrant that is found primarily in the Central Valley, the western Sierra Nevada foothills and along the coastline.	No observations were found within the CNDDB within the Study Area. Highest concentrations are in Solano County. There is a low likelihood of nesting in the Planning Area and being affected by the alternatives.
Asio otus Long-eared owl (nesting)	—	CSC	N	N	Requires riparian habitat breeding and wintering; also uses live oak thickets and other dense stands of trees.	Some suitable habitat in Planning Area. No known occurrences within Sacramento County or surrounding region. A year-round resident in California, although it has been nearly extirpated from the central valley. Low likelihood of nesting in the Planning Area and being affected by the alternatives.

AGENDA ITEM 11.1
6192

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
Coccyzus americanus occidentalis Western yellow-billed cuckoo (nesting)	T	E	Y	N	Open woodland; deciduous riparian woodland; nests in tall cottonwood and willow riparian woodland.	Found along the Sacramento River north of the Study Area. Does not nest within the Planning Area or Sacramento County. CNDDB record in Planning Area is from 1896. Low likelihood of nesting in the Planning Area and being affected by the alternatives.
Falco peregrinus anatum American peregrine falcon (nesting)	Delisted, Taxon Recovered;	Delisted, CFP	N	N	Occurs in a wide range of habitats. Breeds mostly in woodland, forest, and coastal habitats with high cliff faces. Year-around habitats include riparian areas, inland and coastal wetlands. Wintering may occur within the Planning Area.	Limited suitable habitat in Planning Area, and no known occurrences within Sacramento County. Low likelihood of nesting in the Planning Area and being affected by the alternatives.
Haliaeetus leucocephalus Bald eagle (nesting and wintering)	Delisted, Taxon Recovered;	E, CFP	N	N	Breeds in forested areas adjacent to large bodies of water. Usually nests in trees. Wintering birds may occur within Planning Area.	No known occurrences within Sacramento County. Limited suitable habitat within the Planning Area. Low likelihood of nesting in the Planning Area and being affected by the alternatives.
Icteria virens Yellow-breasted chat (nesting)	—	CSC	N	N	Breeds in early-successional, riparian habitats with well-developed shrub layer and open canopy.	Species is a rare spring and summer visitor to the region. Nesting has not been documented within the Planning Area. Limited habitat within Planning Area. Not known to occur in Sacramento County. Low likelihood of nesting and being affected by the alternatives.
Progne subis Purple Martin (nesting)	—	CSC	N	N	Within species range breeds in wooded, low elevation habitats including riparian, coniferous, and valley foothill and montane woodlands, and structures. Within the Planning Area, uses	Suitable habitat occurs within Planning Area and known from Sacramento County, but no known occurrences from the Planning Area. Only documented occurrences are within the City of Sacramento along freeway overpasses. Not likely to be affected by the alternatives.

AGENDA ITEM 11.1
6193

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
					weep holes in freeway overpasses.	
Rallus longirostris obsoletus California clapper rail	E	E	N	N	Tidal marshes, shallow freshwater margins, wet meadows and flooded grassy vegetation. May breeding and winter in the Planning Area.	Some potential habitat occurs in Planning Area, but no known occurrences in Sacramento County. Low likelihood of being affected by the alternatives.
Setophaga petechia Yellow warbler (nesting)	—	CSC	N	N	Breeds in riparian woodlands, montane chaparral, open ponderosa pine, and mixed conifer habitats.	Yellow warblers currently occupy much of their former breeding range, except in the Central Valley, where they are close to extirpation (Shuford and Gardali, 2008). Limited suitable habitat and elevation within Planning Area. Not known to occur within Sacramento County. There is a low likelihood of being affected by the alternatives.
Vireo bellii pusillus Least Bell's vireo (nesting)	E	E	N	N	Breeds in dense, riparian scrub. Prefers early successional stages in riparian areas, brushy fields, young second-growth forest or woodland, scrub oak, coastal chaparral, and mesquite brushlands, often near water in arid regions.	While suitable riparian scrub may be found within the Planning Area, these birds are considered extirpated from Sacramento County. Therefore, there is a low likelihood of being affected by the alternatives.
Xanthocephalus xanthocephalus Yellow-headed blackbird (nesting)	—	CSC	Y	N	Marshes with tall emergent vegetation are used for breeding and wintering.	Some suitable habitat within the Planning Area. Not known to currently occur within Sacramento County. The one CNDDB record within the Planning Area is from 1899. Therefore, there is a low likelihood of being affected by the alternatives.

AGENDA ITEM 11.1
6194

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
Mammals						
Bassariscus astutus Ringtail	—	CFP	N	N	Mixed forests and shrublands near rocky area or riparian habitats. Forages near water and is seldom found more than 0.62 mile from a water source.	There are no records of the species in CNDDB, and due to the limited occurrence of rocky habitats along rivers and within riparian areas of the Planning Area and the level of human disturbance within these habitats in the Planning Area this species is not likely to occur. There is a low likelihood of being affected by the alternatives.
Corynorhinus townsendii Townsend's Big-eared bat	—	CSC/ CT	N	N	Prefers mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas. Roosts in limestone caves and lava tubes, also man-made structures and tunnels.	Limited suitable habitat within Planning Area. Not known to occur in Sacramento County. There is a low likelihood of being affected by the alternatives.
Sylvilagus bachmani riparius Riparian brush rabbit	E	E	N	N	Large patches of riparian vegetation composed of wild roses, grapes, willow or blackberries, edges of brushy species to grasses and herbaceous forbs. High ground refugia from flooding needed.	Limited habitat within the Planning Area. The range of this species is located within San Joaquin County and the Delta near Paradise Cut. There is a low likelihood of being affected by the alternatives.
Amphibians						
Rana boylii Foothill yellow-legged frog	—	CSC	N	N	Rocky streams and rivers with open banks in forest, chaparral, and woodland habitat. Generally found in the foothills.	No known occurrences within Sacramento County. Limited suitable habitat within Planning Area. Only CNDDB record in Study Area is from 1958. There is a low likelihood of being affected by the alternatives.

AGENDA ITEM 11.1
6195

Table G-2.5. Other Special Status Wildlife Species not Analyzed in the EIS/EIR

Scientific Name Common Name	Status				Rationale	
	ESA (Federal) Status	*State Status*	*CNDDB Records within Planning Area*	*Analyzed in the EIS/EIR*	*Species Habitat Requirements*	*Conditions in the Planning Area*
Invertebrates						
Branchinecta conservatio Conservancy fairy shrimp	E	—	N	N	Larger more turbid vernal pools, playa pools.	Not known to occur in Sacramento County. Limited suitable habitat in Planning Area. Not likely to be affected by the alternatives.
Callophrys mossii bayensis San Bruno Elfin Butterfly	E	—	N	N	Coastal chaparral with populations of the larval food plant broadleaf stonecrop (*Sedum spathulifolium*). Known from these habitats in Northern San Mateo, Marin and Contra Costa Counties (Black and Vaughn 2005).	Not known to occur in Sacramento County. Found only in San Mateo, Marin and Contra Costa Counties. There is a low likelihood of being affected by the alternatives.
Elaphrus viridis delta green ground beetle	T	—	N	N	Vernal pool habitat.	Not known to occur in Sacramento County. Found only in Solano County at Jepson Prairie Preserve. There is a low likelihood of being affected by the alternatives.

Source: Black and Vaughn 2005,CDFW 2015a, USFWS 2016.
Note: CNDDB = California Natural Diversity Database; USFWS = U.S. Fish and Wildlife Service
The federal and state status of species primarily is based on the Special Animals List (October 2015) (CDFW 2015b).

Legal Status Definitions
Federal:
E = listed as endangered under the ESA
T = listed as threatened under the ESA
C = candidate for listing under the ESA
— = no ESA listing
*= species has designated Critical Habitat located within the Planning Area.

State:
E = listed as endangered under CESA
T= listed as threatened under CESA
C = Candidate for listing under CESA
CT = Candidate Threatened
CSC= Species of special concern (no formal protection other than CEQA consideration)
CFP = Fully protected (legally protected)
— = no state status
** Analysis of impacts to rookeries are a requirement under CEQA

REFERENCES CITED IN APPENDIX G-2

Ahlborn, G. 1990. "American Badger." In *California Wildlife Habitat Relationships System*, edited by M. White and G. Ahlborn. California Department of Fish and Game, California Interagency Wildlife Task Group. Updated February 2005. Accessed July 23, 2013. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=17482.

Asay, C.E. 1987. "Habitat and Productivity of Cooper's Hawks Nesting in California." *California Fish and Game* 73:80–87.

Bechard, M.J., and J.K. Schmutz. 1995. "Ferruginous hawk (Buteo regalis)." *The Birds of North America*, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. Accessed October 22, 2008. doi: 10.2173/bna.172.

Bechard, M.J., C.S. Houston, J.H. Sarasola, and A.S. England. 2010. "Swainson's Hawk (Buteo swainsoni)." *The Birds of North America* Online, edited by A. Poole. Ithaca: Cornell Lab of Ornithology. http://bna.birds.cornell.edu/bna/species/265. doi:10.2173/bna.265.

Beedy, E.C. 2008. "Tricolored Blackbird." In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, edited by W.D. Shuford and T. Gardali. Studies of Western Birds no. 1. California: Western Field Ornithologists (Camarillo) and California Department of Fish and Game (Sacramento).

Black, S. H., and D. M. Vaughan. 2005. Species Profile: Callophrys mossii bayensis. In Shepherd, M. D., D. M. Vaughan, and S. H. Black (Eds). Red List of Pollinator Insects of North America. CD-ROM Version 1 (May 2005). Portland, Oregon: The Xerces Society for Invertebrate Conservation. Available: http://www.xerces.org/san-bruno-elfin/. Accessed: Oct, 2016.

Brigham, R. M., H. D. J. N. Aldridge, and R. L. Mackey. 1992. "Variation in Habitat Use and Prey Selection by Yuma Bats, Myotis yumanensis." *Journal of Mammalogy* 73(3): 640–645.

Bury, R.B. 1986. "Feeding Ecology of the Turtle, Clemmys marmorata." *Journal of Herpetology*. 20.4: 515–521.

Buskirk, J. 2002. "The Western Pond Turtle, Emys marmorata." *Radiata: Journal of DGHT*-AG Schildkroten, English Edition, 11: 3–30.

Calflora. 2014 CalFlora: Information on California plants for education, research and conservation. [web application]. 2014. Berkeley, California: The Calflora Database [a non-profit organization]. Available at: http://www.calflora.org/. (Accessed: October 20, 2014 through November 14, 2014).

CNPS (California Native Plant Society). 2015. *Inventory of Rare and Endangered Plants* (online edition, v8-02). California Native Plant Society, Sacramento, California. Website http://www.rareplants.cnps.org [accessed 22 December 2015]. Available at: http://www.cnps.org/inventory.

CDFW (California Department of Fish and Wildlife). —2014b. Chinook Salmon species information. Website located at:http://www.dfg.ca.gov/fish/Resources/Chinook/ Accessed 12/10/2014.

CDFW (California Department of Fish and Wildlife). 2015a. California Natural Diversity Database (CNDDB). Rarefind Version 5 (Commercial Subscription). Sacramento, California: CDFG, Wildlife and Habitat Data Analysis Branch. October 6, 2015.

CDFW (California Department of Fish and Wildlife). —2015b (October). California Natural Diversity Database (CNDDB) Special Animals List. Periodic publication. 52 pp. https://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf.

City of Sacramento. 2009. *Sacramento 2030 General Plan Master Environmental Impact Report*. SCH No. 2007072024. 2009 (March 3). Prepared by PBSJ. Sacramento, California.

Crain, Patrick K. and Peter B. Moyle. 2011. Biology, History, Status and Conservation of Sacramento Perch, *Archoplites interruptus*. San Francisco Estuary and Watershed Science. Retrieved from: http://www.escholarship.org/uc/item/8st5g6df. Accessed 12/11/2014.

Curtis, O.E., R.N. Rosenfield, and J. Bielefeldt. 2006. “Cooper’s Hawk (*Accipiter cooperii*).” The Birds of North America Online, edited by A. Poole. Ithaca: Cornell Lab of Ornithology. http://bna.birds.cornell.edu/bna/species/075. doi:10.2173/bna.75. Access date?

DeSante, D.F., E.D. Ruhlen, S.L. Adamany, K.M. Burton and S. Amin. 1997. “A Census of Burrowing Owls in Central California in 1991.” In *The Burrowing Owl, Its Biology and Management; Including the Proceedings of the First International Burrowing Owl Symposium*, edited by J.R. Lincer and K. Steenhof, 38–48. Raptor Research Report, no. 9. Hastings, Minnesota: Raptor Research Foundation.

Dunk, J.R. 1995. "White-Tailed Kite." *The Birds of North America* Online, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. Accessed November 29, 2011. doi: 10.2173/bna.178.

Emlen, J.T. 1941. "An Experimental Analysis of the Breeding Cycle of the Tricolored red-wing." *Condor*. 43.5: 209-219.

Fisher, R.N., and H.B. Shaffer. 1996. "The Decline of Amphibians in California's Great Central Valley." *Conservation biology* 10(5):1387–1397.

Gallagher, S.P. 1996. "Seasonal Occurrence and Habitat Characteristics of Some Vernal Pool Branchiopods in Northern California, USA." *Journal of Crustacean Biology* 16.2 (1996): 323–329.

Gervais, J.A. D.K. Rosenberg, and L.A. Comrack. 2008. "Burrowing Owl (Athene cunicularia)." In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, edited by W.D. Shuford and T. Gardali, 218–226. Studies of Western Birds, no. 1. California: Western Field Ornithologists (Camarillo), and California Department of Fish and Game (Sacramento). February 4, 2008. Accessed December 11, 2012. http://www.dfg.ca.gov/wildlife/nongame/ssc/birds.html.

Harris, J. and P. Brown. 1990a. "Pallid Bat." In California's Wildlife. Vol. 3, Mammals, edited by D.C. Zeiner, W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, 70–71. California Statewide Wildlife Habitat Relationships System. Sacramento, California: CDFG. April 1990.

Harris, J. and P. Brown. 1990b. "Yuma Myotis. In California's Wildlife. Vol. 3, Mammals, edited by D.C. Zeiner, W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, 70–71. California Statewide Wildlife Habitat Relationships System. Sacramento, California: CDFG. April 1990.

Hermanson, J.W. and T.J. O'Shea. 1983. "*Antrozous pallidus*." *Mammalian Species*. 213:1–8.

Humple, D. 2008. "Loggerhead Shrike (Lanius ludovicianus) (Mainland populations)." In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, edited by W.D. Shuford and T. Gardali. Studies of Western Birds no. 1. Camarillo, California: Western Field Ornithologists.

Jennings, M.R., and M.P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. Commissioned by the California Department of Fish and Game, Inland Fisheries Division Endangered Species Project. November 1, 1994. Accessed February 9, 2010. http://www.dfg.ca.gov/wildlife/nongame/publications/docs/herp_ssc.pdf.

Moyle, P. B. 2002. *Inland Fishes of California*. Berkeley: University of California Press 502 pp.

NMFS (National Marine Fisheries Service). 2014. Species of Concern: Chinook Salmon *Ondorhychus tshawytscha*, Central Valley Fall, Late-fall run ESU. Website: http://www.nmfs.noaa.gov/pr/pdfs/species/chinooksalmon_highlights.pdf. Accessed 10/10/2014.

Orloff, S. 2011. "Movement Patterns and Migration Distances in an Upland Population of California Tiger Salamander (*Ambystoma californiense*)." *Herpetological Conservation and Biology* 6(2): 266–276.

Rogers, C. 1998. "Aquatic Macroinvertebrate Occurrences and Population Trends in Constructed and Natural Vernal pools in Folsom, California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems − Proceedings from a 1996 Conference*, edited by C.W, Witham, E.T. Bauder, D. Belk, W.R. Ferrin Jr., and R. Orduff, 224–235. Sacramento, California: CNPS.

Rosenberg, D., J. Gervais, D. Vesely, S. Barnes, L. Holts, R. Horn, R. Swift, L. Todd, C. Yee. 2009. "Conservation Assessment of the Western Pond Turtle in Oregon (*Actinemys marmorata*)." Version 1.0. November 2009.

Sacramento County. 2010 (April). *Final Environmental Impact Report, Sacramento County General Plan Update*. Control No: 2002-GPB-0105. State Clearinghouse No: 2007082086. Prepared by the County of Sacramento, Department of Environmental Review and Assessment, Sacramento, California.

Sacramento County.2011 (November 9). *Sacramento County General Plan of 2005-2030*. Prepared by the Community Planning & Development Department. Sacramento, California.

Sacramento County. 2016. *South Sacramento Habitat Conservation Plan*. Draft. Sacramento, California. Prepared by Dudek. Available at www.southsachcp.com.

Shuford, W. D., and Gardali, T. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. *Studies of Western Birds 1*. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Shump, K.A., Jr. and A.U. Shump. 1982. "*Lasiurus borealis*" *Mammalian Species* 183: 1–6.

Smith, K.G., S.R. Wittenberg, R.B. Macwhirter, and K.L. Bildstein. 2011. "Northern Harrier (Circus cyaneus)." *The Birds of North America* Online edited by A. Poole. Ithaca: Cornell Lab of Ornithology. http://bna.birds.cornell.edu/bna/species/210. doi:10.2173/bna.210.

Trenham, P.C. 2001. "Terrestrial Habitat Use by Adult California Tiger Salamanders." *Journal of Herpetology*, 35(2): 343–346.

Whitener, K. and T. Kennedy. 1999. Evaluation of fisheries relating to floodplain restoration on the Cosumnes River Preserve. *Interagency Ecological Program Newsletter* 12(3):50-57.

USFWS (U.S. Fish and Wildlife Service). 1999a. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. Sacramento, California: USFWS. July 9, 1999. http://www.fws.gov/sfbaydelta/documents/velb_conservation.pdf.

USFWS (U.S. Fish and Wildlife Service). 1999b. Dr*aft Recovery Plan for the GGS (*Thamnophis gigas*)*. Portland, Oregon: USFWS.

USFWS (U.S. Fish and Wildlife Service). 2005. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population; Final Rule. Federal Register Volume 70, pages 49389-49458. Available at: http://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=D01T.

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. United States Fish and Wildlife Service Region 1,Portland, Oregon. Available at: http://www.fws.gov/sacramento/es/Recovery-Planning/Vernal-Pool/es_recovery_vernal-pool-recovery.htm.

USFWS (U.S. Fish and Wildlife Service). 2007. Vernal Pool Fairy Shrimp. 5-Year Review: Summary and Evaluation. United States Fish and Wildlife Service Sacramento Fish and Wildlife Office, Sacramento, California. Available at http://ecos.fws.gov/ecp0/profile/speciesProfile.

USFWS (U.S. Fish and Wildlife Service). 2016. Federal Endangered and Threatened Species that Occur in or may be Affected by Projects by USGS 7.5 Minute Quads Requested (Wallace, Clements, Lockeford, Lodi North, Thornton, Isleton, Rio Vista, Irish Hill, Ione, Carbondale, Sloughhouse, Clay, Goose Creek, Elk Grove, Florin, Bruceville, Galt, Clarksburg, Liberty Island, Courtland, Latrobe, Clarksville, Folsom, Buffalo Creek, Folsom Se, Citrus Heights, Sacramento East, Carmichael, Sacramento West). Sacramento Fish and Wildlife Office. Document first provided in 2014. Document Number: 140714120402. Verfied against IPaC Trust Resources Report generated on October 26, 2016 (see Section F-2.4).

Yosef, R. 1996. "Loggerhead Shrike (Lanius ludovicianus)." In *The Birds of North America* Online, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. http://bna.birds.cornell.edu/bna/species/231. doi:10.2173/bna.231.

INTENTIONALLY LEFT BLANK

EIS/EIR APPENDIX G-3

Species Accounts for

Proposed Covered Species

The following species accounts describe each of the species proposed by the Project Aplicant for coverage under the South Sacramento Habitat Conervation Plan (SSHCP). Each account gives the listing status, life history, genetics, habitat and ecology of the species, including its distribute on within the Planning Area. These species accounts provide additional detailed information on these potential covered species and potential conservation strategy actions in support of the analysis found in Chapter 9 of the EIS/EIR. The information used to create these species accounts is found in the literature cited section at the end of each account. To reduce the amount of text in each profile, a three or four letter abbreviation is identified for each species. The abreviations either reflect abreviations already in common use for a species, such as VELB for valley-elderberry longhorn beetle, or were developed in support of SSHCP preparation based on the common name of the species.

DWARF DOWNINGIA (DWDO)

Dwarf Downingia (DWDO)

(Downingia pusilla)

Status USFWS: None

Status CDFW: None

Status CNPS:2.2



© 2004 Carol W. Witham

DWDO Listing Status

Dwarf downingia (*Downingia pusilla*) is considered to be rare, threatened or endangered in California, but more common elsewhere, thus qualifying its designation as a list 2.2 species by the California Native Plant Society (CNPS), meaning it is fairly threatened in California with a moderate degree/immediacy of threat, but it is more common outside of California (CNPS 2010). It has been assigned an R-E-D Code of 1-2-1, meaning it is rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time, it is endangered in a portion of its range, and it is more or less widespread outside of California.

Being a CNPS List 2 plant species, dwarf downingia meets the California Department of Fish and Wildlife (CDFW) definition of a special plant though it has no formal protection status by the CDFW or United States Fish and Wildlife Service (USFWS).

DWDO Life History and Ecology

DWDO Species Description and Life History

DWDO Morphology

Dwarf downingia, a strict endemic of the vernal pool hydrologic regime, is an annual member of the Bellflower family (Campanulaceae). This inconspicuous species is variable with regard to stem length (Mason 1957). Single small-stature plants can be erect and less than three centimeters in height at maturity, or longer branched stems (up to 15 cm) can sprawl horizontally, forming relatively dense colonies, or mix with the other sprawling vernal pool species (Dittes pers. obs.). Small (five to ten millimeter-long) narrowly linear leaves are alternately arranged on the stems. Single flowers are borne in the leaf axils towards the tips of the stems.

Dwarf downingia possesses atypical flowers within the genus with regard to size and symmetry. Typical *Downingia* flowers, ranging from five to 19 millimeters in length, are bilaterally symmetrical, with two narrow "upper petals" and a broad, three-lobed "lower petal." These five corolla lobes, mostly blue or blue-purple with varying combinations of white and yellow, are united into a tube below their bases. The flower is borne at the apex of a long narrow stalk-like ovary (inferior ovary).

In comparison to characteristically showy *Downingia* flowers, the flowers of dwarf downingia are very small, ranging from only 2.5 to 5.4 millimeters in length. In addition, they lack the strong bilateral symmetry characteristic of other *Downingia* species; dwarf downingia flowers appear almost radial or star-like, with five narrow, triangular lobes that barely exceed the green calyx lobes. Dwarf downingia flowers can be white or blue, with two small yellow spots near the throat (Hickman 1993). This is a very inconspicuous plant and must be surveyed for while in flower, as there is no other way to identify this species.

DWDO Ecological Life Cycle

Other than field observations recorded in the California Natural Diversity Data Base (CNDDB) (CDFG 2010), basic taxonomy and biogeographic treatments, dwarf downingia remains mostly unstudied. Since all vernal pool plant species share similar environmental selective pressures, they likely also share similar adaptive traits. For this reason, studies addressing the life history and ecology of other more common vernal pool plant species may provide some insight into the life history and ecology of dwarf downingia.

Dwarf downingia shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait allows populations to persist through the regular and extreme

summer drought that characterizes vernal pools and the Mediterranean Climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

DWDO Seed Germination

The specific timing of the germination of dwarf downingia seeds relative to the timing of the vernal pool inundation cycle has not been studied or described in detail. In general, *Downingia* seeds germinate during the early stages of vernal pool inundation (Zedler 1987). Studies involving germination of *Downingia cuspidata* have demonstrated a required pretreatment for germination at high percentages, although complete submersion was not required (Myers 1975). Studies involving *D. concolor* have had erratic to poor germination results (Hoover 1937; Linhart 1972 as reported in Zedler 1987). Seeds of other more common *Downingia* spp. occurring in the Sacramento Valley (*D. bicornuta, D. ornatissima, D. cuspidata, D. bella*) germinate under water in pool basins or in inundated soil at shallow edges of filled pools (Dittes pers. obs.). Germination requirements and optima for dwarf downingia have not been investigated. Seed dormancy and required environmental cues for in-situ germination may exist, but are presently unknown.

DWDO Vegetative Growth

One of the challenges posed to many vernal pool plant species is optimization of photosynthesis and other metabolic processes in both the early season aquatic and later season terrestrial phases of the vernal pool cycle. *Downingia* and many other vernal pool species, being amphibious, possess differing aquatic and terrestrial growth forms. After germination, seedlings and young plants growing under water produce thickened, elongate, spongy stems with large air chambers, and narrowly linear leaves that lack waxy cuticle (Weiler 1962). Stems produced in the terrestrial phase are thinner with denser tissue, and leaves are somewhat wider, thicker and posses waxy cuticle. The air-filled aquatic stems hold the plant vertical in the water column and with the thinner leaves, facilitate light exposure and gas exchange. This in effect lengthens the growing season by maximizing growth while vernal pools are still inundated.

DWDO Reproduction

Dwarf downingia and other species in the genus flower and set seeds during the dry-down and terrestrial phase of the vernal pool hydrologic cycle, typically during March through May (CNPS 2010). The very small, reduced flowers and included anthers and stigma reflect a self-fertilizing breeding system for dwarf downingia, in contrast to the outcrossing strategy for almost all other Downingias (Weiler 1962; Zedler 1987; Thorp 1990). Once fertilized, the inferior ovary elongates into a narrow stalk like capsule that can reach two to three centimeters in length. The mature capsules produce numerous minute dust-like seeds that are released as the capsule

disintegrates through the late spring, summer and fall months. Fecundity and variation in seed production have not been investigated in dwarf downingia.

DWDO Dispersal

In many other vernal pool species, seed dispersal is naturally limited, although this has not been stated specifically for *Downingia*. Limited seed dispersal in vernal pool species is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974, 1980). Natural dispersal of dwarf downingia seeds likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock.

Evidence of dwarf downingia dispersal and colonization exists in occupancy of man-made topo-hydrologic features within occupied vernal pool landscapes (stock pond margins, roadside ditches, rutted tire tracks, gravel pits and scraped depressions (Witham 1991; CDFG 2010). As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming ungulates (Griggs 1980). Dwarf downingia, and about 10-15 other vernal pool species occur both in Californian and South American vernal pool habitats (amphitropical); a distribution most likely resulting in historic long-distance dispersal by migratory waterfowl (Zedler 1987).

DWDO Seed Dormancy

The existence of a dormant soil seed bank is unknown for dwarf downingia. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

DWDO Population Genetics

The population biology and genetics of dwarf downingia have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1998) provides a good overview of the different issues that should be considered in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the limited number of occurrences and the scattered geographical distribution, each dwarf downingia population should be considered unique, and for species conservation, are unique genetic entities.

DWDO Habitat Requirements and Ecology

DWDO Biogeography and Landform Relations

It is generally held that many of the endemic vernal pool plant species, including downingias, are relatively recent evolutionary derivations of more common and widespread upland progenitors (Stebbins 1976; Stone 1990; Raven and Axlerod 1978; Thorne 1984). These neoendemic vernal pool species are thought to have evolved from terrestrial habitat into seasonally aquatic vernal pool habitat made available as the Mediterranean Climate developed and the inland Tertiary-age Sea dried.

Dwarf downingia occurrences are associated mainly with northern claypan vernal pools in central Sacramento County, with northern hardpan vernal pools in the foothills of the Sierra Nevada, and with vernal pools of the Interior Valleys of the Coast Range in Napa and Sonoma Counties (CDFG 2010). Throughout this area, the species occurs on a variety of landforms and soil associations. In Sacramento County, dwarf downingia occurs primarily on the Laguna and Riverbank.

DWDO Hydrology Relations

Dwarf downingia is a strict endemic of the vernal pool hydrologic cycle. It is of importance to conservation however, that in contrast to the "deeply-adapted" vernal pool grasses of the Orcuttiae Tribe, and legenere (*Legenere limosa*), dwarf downingia occupies more commonly occurring, smaller and/or shallower vernal pools with comparatively more "flashy" hydrology (CDFG 2010; Dittes pers. obs.). In a survey of eight dwarf downingia-occupied vernal pools at Beale Air Force Base, the mean vernal pool area was found to be 299 square meters (357.6 square yards) and the mean vernal pool depth was 20.8 centimeters (8.2 inches). These are reported as being of average area and depth among the pools measured in that study (Platenkamp 1998). Vernal pool dimensions or reference to size are not given for any of the other CDFW occurrences. Dwarf downingia is also known to occupy the margins of larger or deeper vernal pools, and the seasonally fluctuating vernal pool-like edges of more severely inundated systems, including seasonal marsh, slough and stock pond habitats.

DWDO Biological Community Relations

Floristic associations provide further indication of preference for less extreme (more typical) vernal pool hydrological cycles. Dwarf downingia grows in the same hydro-topographical position as more commonly occurring vernal pool associates, including Fremont's goldfields (*Lasthenia fremontii*), smooth goldfields (*L. glaberrima*), dwarf wooly marbles (*Psilocarphus brevissimus*), Oregon wooly marbles (*P. oregonus*), annual hairgrass (*Deschampsia danthonoides*), popcorn-flowers (*Plagiobothrys stipitatus* var. *micranthus, P. bracteatus),* double-horned downingia (*Downingia bicornuta*), mousetail (*Myosurus minimus*), American

pillwort (*Pilularia americana*), quillwort (*Isoetes howellii*), coyote thistle (*Eryngium* spp.), and others. All species reported as associates of dwarf downingia in Sacramento County (CDFG 2010). Most of these are commonly occurring vernal pool species that inhabit small to medium size vernal pools and swales, and the slopes and margins of larger and/or deeper pools. It is interesting to note that at least one population has been reported as growing among deeper pool associations [e.g., smooth goldfields, common spikerush (*Eleocharis macrostachya*), and water starwort (*Callitriche marginata)].*

DWDO Non-Native Weed Relations

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*), two non-native facultative wetland species typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Since dwarf downingia occupies the smaller to medium size, “more typical” vernal pool types and the margins of larger or deeper pools, it may be more susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch buildup than the Orcuttiae grasses, or the more deeply adapted legenere.

Other weedy hydrophytic species reported as growing with dwarf downingia include lippia (*Phyla nodiflora*), and swamp pricklegrass (*Crypsis schoenoides*). Although none of the following are specifically reported to co-inhabit vernal pools with dwarf downingia, other non-native weedy hydrophytes may present future problems, including European mannagrass (*Glyceria declinata*), field bindweed (*Convolvulus arvensis*), Common unicorn plant (*Probiscidea louisianica*), Bermuda-grass (*Cynodon dactylon*) and paradox canary-grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), another native species, can also dominate vernal pools (Schlising, Unger pers. comms.).

DWDO Livestock Grazing Relations

Specific interactions between livestock grazing and dwarf downingia are largely unknown. In general, appropriately timed dry-pasture livestock grazing regimes are thought to be compatible with the development and persistence of vernal pool vegetation. Robins and Vollmer (2002) provide a review of information pertaining to livestock grazing in vernal pool ecosystems.

Many extant populations of dwarf downingia inhabit long-operating cattle ranches, so persistence indicates tolerance for at least some level of grazing. Timing of livestock grazing is likely more important than stocking rates in affecting persistence of dwarf downingia. During the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. Once the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. It should be noted however, as with many other vernal pool annuals, small stature and high plant densities ensure that in all but extreme cases, a portion of every year's cohort escapes destruction, matures and sets seed. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect on dwarf downingia.

DWDO Disturbance Response

Observations of field workers provide some evidence of the potential response of dwarf downingia populations to particular disturbance regimes. Several dwarf downingia populations persist despite periodic disking of the vernal pool substrates over decades (Kelsey pers. comm.; Dittes pers. obs.; CDFG 2010). It is very important to note that in these cases, disking is not so deep as to significantly affect the subtending impermeable layer or the vernal pool hydrological cycle. In addition, the disking is performed in the late summer or fall months in preparation for dryland winter grain crops, so vernal pool plants have set seed and dried. Persistence of populations in fall-disked and planted dryland winter wheat fields has also been noted for several of the Orcuttiae grasses (Hoover 1941; Crampton 1959; Stone et al. 1988). This has been observed for other more common vernal pool species as well (Ahart pers. comm. 2003).

If this disking occurs earlier in the growing season, before seeds are mature, over consecutive years, population extirpation is probable through exhaustion of soil seed bank. These are outstanding examples of the overriding selective force of the vernal pool hydrologic cycle in affecting floristic composition, and the importance of timing of management-related disturbances relative to specific life-history stages.

DWDO Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for dwarf downingia in this Planning Area are identified in Table G-3.1-1 with from input from agency and local species experts.

Table G-3.1-1. Habitat Elements for Dwarf Downingia

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

DWDO Species Distribution and Population Trends

DWDO Species Range

Presently, dwarf downingia is recorded from 117 CNDDB occurrences, all in California (CDFG 2010). These are distributed primarily in the Great Central Valley from Fresno County in the south, to Tehama County in the north. Dwarf downingia also occurs at scattered sites in the interior valleys of the southern North Coast Ranges, in Napa and Sonoma Counties. These occurrences are all situated at sites ranging from 10 to 1,600 feet elevation above mean sea level (CNPS 2010), and lie within the California Floristic Province (Sacramento Valley and San Joaquin Valley Sub-regions of the Great Valley Region; Sierra Nevada Foothill Subregion of the Sierra Nevada Region; North Coast Range Subregion of the Northwest Region; Hickman 1993). At least two additional occurrences, not yet registered in the CNDDB, occur in Sacramento County (Gibson and Skordal 1994; TNC *date unknown*).

Throughout its range, dwarf downingia occupies a variety of landforms and numerous soil associations.

DWDO Central Valley Distribution

Dwarf downingia is known from three geographically defined population centers in the Central Valley. The northernmost is located in Tehama County, between the vicinity of Red Bluff in the north and Black Butte Lake in the south. The southernmost population center occupies a narrow band in the San Joaquin Valley along the eastern edge of Merced County and a single occurrence on the northern edge of Fresno County. The central population center, located in

the southern Sacramento Valley, is comprised of occurrences within Solano, Placer, Sacramento, and Yuba Counties.

DWDO Distribution within the Planning Area

Of the 10 occurrences of dwarf downingia recorded from Sacramento County (eight CNDDB occurrences and two occurrences not-yet registered), five are located outside of the Planning Area (CNDDB occurrence #32, #56, #57, #58, and #59). Of the remaining five occurrences, three are located within the UDA in the City of Elk Grove (Figure DWDO-1) (CNDDB occurrence #54, #55, and an occurrence not yet registered); and two occurrences are located outside of the UDA within the Planning Area. One of these is encompassed within the 16,420-acre The Nature Conservancy (TNC) Cosumnes River Preserve (CNDDB occurrence #53) and the other is located within the Howard Ranch preserve and is not yet registered with the CNDDB.

It is important to note that owing to its small stature, preference for small to medium-sized vernal pools and the area of remaining unsurveyed or partially surveyed habitat, moderate to high potential exists for discovery of additional populations within the Planning Area.

Table G-3.1-2 shows the soil series, geological formation and landform associations for each known occurrence in Sacramento County. Generally, dwarf downingia is associated with Lower Unit Riverbank and old terrace remnant alluvial deposits of the Laguna Formation.,The modeled habitat of dwarf downingia is described in Section G-4 of this Appendix.

Table G-3.1-2. CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations for Dwarf downingia In Sacramento County

Occurrence #	Quadrangle	Soil Series[a]	Geological Formation and Landform
32	Rio Linda	San Joaquin Fine Sandy Loam (0-3% slopes and 3-8% slopes)	Lower Unit Riverbank Formation
53	Galt	Adjacent to Clear Lake Clay, Partially Drained, 0-2% Slopes	Adjacent to Qfa
54	Elk Grove	Redding Gravelly Loam, 0-8% Slopes	Laguna
55	Elk Grove	Redding Gravelly Loam, 0-8% Slopes	Laguna
56	Florin	San Joaquin-Galt Complex, 0-3% Slopes	Lower Unit Riverbank Formation
57	Rio Linda	San Joaquin Fine Sandy Loam (0-3% Slopes and 3-8% Slopes)	Lower Unit Riverbank Formation
58	Rio Linda	San Joaquin Fine Sandy Loam (0-3% Slopes and 3-8% Slopes)	Lower Unit Riverbank Formation
59	Rio Linda	San Joaquin Fine Sandy Loam (0-3% Slopes and 3-8% Slopes)	Lower Unit Riverbank Formation

[a] Soil series information based on what USDA soil survey type occurs at the CNDDB species location (USDA 1993)

DWDO Distribution Status and Trends

Dwarf downingia is known from a total of 117 CNDDB occurrences in California. Of the 117 CNDDB occurrences, two are extirpated and one possibly extirpated from Sonoma County, one is extirpated from Napa County, one is extirpated and another possibly extirpated from Placer County, and one is extirpated from Sacramento County. Of the remaining 110 CNDDB occurrences presumed extant, 26 have not been revisited since before 1983 (CDFG 2010). Of the 84 CNDDB occurrences reported since 1983 and presumed extant, one is listed as experiencing a decreasing trend, and the rest are listed as trend "unknown" (CDFG 2010). It should be noted though, that the vast majority of these 84 occurrences are located on private lands and most are reported as being subject to one or more threats.

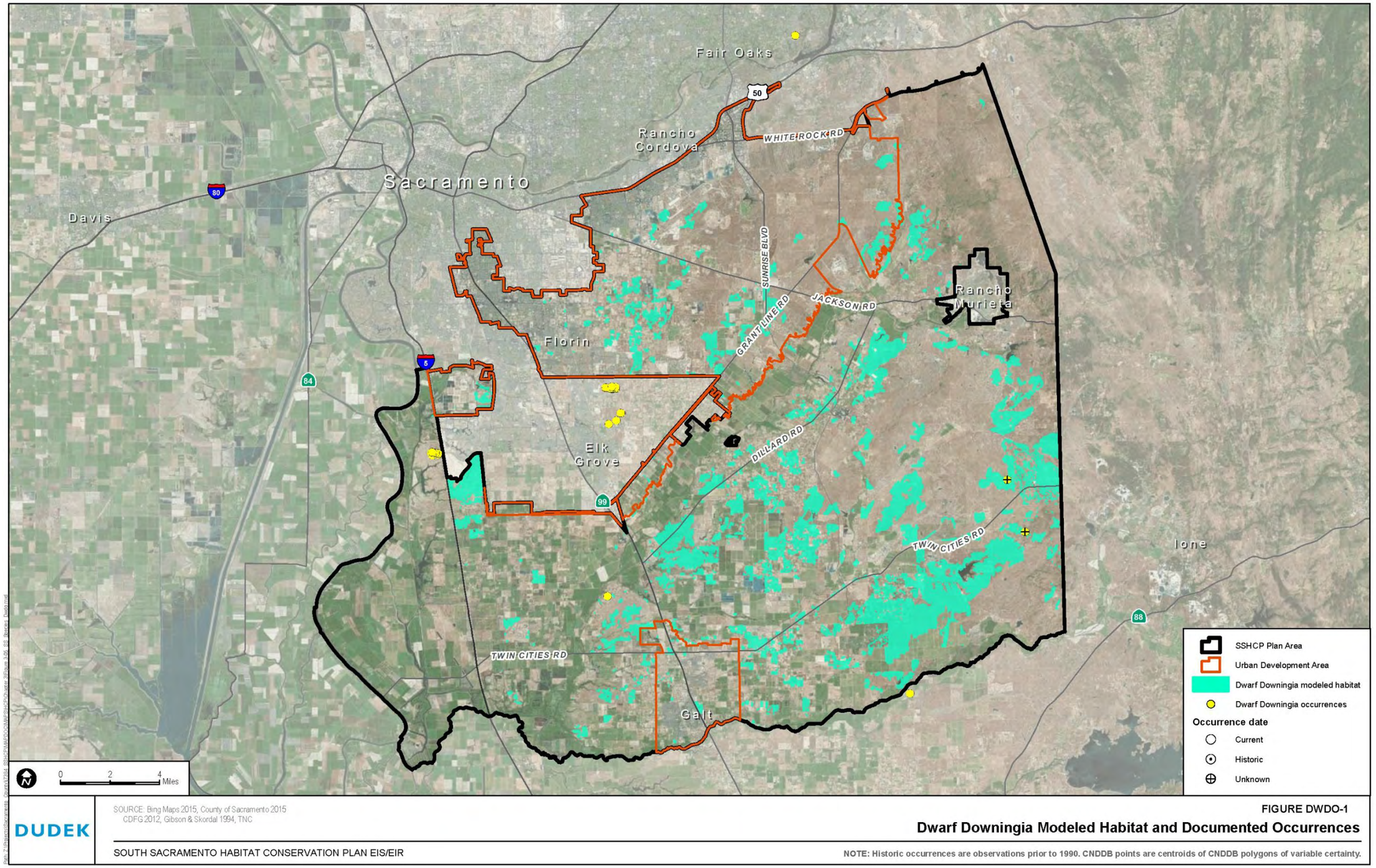
It is impossible to determine the number of historically occurring dwarf downingia populations or the acreage of suitable habitat lost to historic agricultural and urban land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978). Since dwarf downingia is adapted to the smaller, more "flashy" types of vernal pools, as well as to the margins of larger or deeper pools, estimates of vernal pool habitat lost may reflect loss of potentially suitable dwarf downingia habitat as well. Effects of historic livestock grazing combined with drought cycles and habitat alterations relating to development of non-native annual grassland are not quantifiable (Table G-3.1-3).

Table G-3.1-3. Dwarf downingia Population Estimates Recorded for Sacramento County

CNDDB Occurrence #	# of Pools Observed	Range of Population Estimates
32	unknown	1994: 100 plants
53	Large vernal marsh	1991: 1000 plants
54	1	1991: 200 plants
55	6 vernal pools and 2 scraped areas	1991: 300
56	2 vernal pools	1990: varied from 100's to 1000's
57	Created depression	1991:50 plants
58	Vernal pool	1993: 50 plants
59	Vernal pool	1993: 150 plants

Between-year variation in population numbers has been documented for several of the dwarf downingia occurrences outside of Sacramento County, although none have been studied in detail. One occurrence is reported as supporting 300 plants in 1988, and 10,000 in 1989 (CNDDB occurrence #29). Another occurrence (CNDDB occurrence #60) was reported as supporting more than 1,000 plants in 1989 and 237 plants in 1990. CNDDB occurrence #62 was found to support 200-400 plants in 1989 and 36 plants in 1990 (CDFG 2010).

Figure DWDO-1 Dwarf Downingia Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

AGENDA ITEM 11.1
6217

Studies involving other vernal pool plant rarities, including Orcuttiae grasses and Hoover's spurge (*Chamaesyce hooveri*) have demonstrated marked fluctuation in numbers of individuals within populations between years (Griggs 1983; Holland 1987; Alexander and Schlising 1997). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). It is not known however, to what degree dwarf downingia exhibits a similar between-year pattern.

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given dwarf downingia population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another critical aspect of population demography is the presence and nature of the soil seed bank, which is unknown for dwarf downingia.

DWDO Threats to the Species

Potential direct threats to dwarf downingia include: loss of vernal pool habitat to agricultural or urban/industrial land-use conversions; construction and maintenance of firebreaks, roads, and utility corridors; inappropriate livestock grazing regimes (later spring/summer rotations, sheep versus cattle); grassland fires; recreational vehicles; equestrian and pedestrian traffic, and refuse dumping.

Potential Indirect threats to dwarf downingia include hydrological alteration of sub-watersheds by surrounding developments and land uses, shifts in competitive interactions (hydrology-mediated or invasive weeds), windblown refuse accumulation, point and non-point source water pollution, air pollution, and global climate change.

DWDO Data Gaps and Conservation Implications

Despite its distinctive appearance and relative rarity, dwarf downingia has received little research attention from botanists or ecologists. Aside from general observations of field workers provided in the CNDDB, detailed studies have not been conducted regarding the biology, ecology, pollinators, breeding system, population genetics, habitat relationships, population levels, trends or threats associated with this species. Pertinent data gaps, implications for conservation, and operating assumptions include:

DWDO Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Planning Area and elsewhere within the range of the species. In the Planning Area, discovery of

new populations may occur on the large dry-land ranchlands, public quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of the County.

DWDO Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

Throughout its range, dwarf downingia is associated with a variety of geological formations and associated soil types. In Sacramento County, this species is occurs on the Lower Unit Riverbank Formation (five occurrences) and on the Laguna Formation (two occurrences) (CDFG 2010). The exact nature of relationship to landform is however, unknown. It is unknown if soil pH or other edaphic factors influence dwarf downingia distribution and population vigor. It is possible that the presence of functioning vernal pools, regardless of landform, soil series and soil pH indicates suitable habitat.

DWDO Unknown Pollination Ecology

Dwarf downingia possesses the smallest flowers of any of the species in the genus, and is thought to be a self-pollinator; however, without knowing specific breeding abilities and pollinator relationships, it is difficult to ascertain habitat needs for potentially co-evolved insect pollinators.

DWDO What Constitutes Population Vigor, and How to Measure?

Population dynamics, including year-to-year variability in abundance, have not been studied for dwarf downingia. The existence of a dormant soil seed bank, a critical contributor to population stability in some other vernal pool species, is unknown for dwarf downingia as well. Other rare vernal pool species have been shown to be highly variable in abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors contributing to year-to-year population fluctuations may be difficult to identify (Alexander and Schlising 1997).

Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

DWDO Specific Hydrological Requirements

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting dwarf downingia populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor and/or assess hydrological suitability of dwarf downingia-vernal pool habitat within established

preserves. Similarly, assessment of potentially suitable dwarf downingia habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing dwarf downingia populations are established, assessed and monitored over time, a more quantifiable definition of suitable dwarf downingia -vernal pool hydrology may be developed.

DWDO Hydrological Trends of Vernal Pools

Extant dwarf downingia populations in the Planning Area may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Existing dwarf downingia conditions within the planning area may not be pristine, so if trends in vigor or habitat quality become apparent over time, it may be difficult to attribute trend to any specific management activity.

DWDO Buffer Sizes to Protect Habitat

There is no standard for appropriate scale of effective buffers between new urban development and vernal pools that provide dwarf downingia habitat, to assure no indirect impact to the vernal pool's existing hydrologic regime, because the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by landform, geologic formation, and soil type (Holland and Dains 1990).

Proposed preserve designs may not afford complete protection to the hydrological systems that support dwarf downingia and other species assemblages dependent on them.

Definition of Appropriate Scale Dwarf Downingia-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective dwarf downingia-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes dwarf downingia at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

DWDO Determination of Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the dwarf downingia-vernal pool preserves, because livestock grazing is used for upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with dwarf downingia-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2000; Robins and Vollmar 2002). It is important to note that dwarf downingia does persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems.

Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

DWDO Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include European mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, lippia, paradox canary grass, hairy hawkbit, cocklebur and cattails. None of these are reported to co-inhabit dwarf downingia-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in dwarf downingia-occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to dwarf downingia, owing to the latter's preference for small to medium size vernal pools.

Potential competitive interactions with these species may affect the vigor of dwarf downingia populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect dwarf downingia populations.

DWDO Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to design preserves for multi-species conservation. Suitability of dwarf downingia habitat for supporting other rare plant species has not been specifically addressed, although in Sacramento County natural populations of legenere and Sanford's arrowhead (*Sagittaria sanfordii*) are documented as sharing habitat with it. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well.

Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime

between November 1st and April 15th may be compatible with or even benefit some dwarf downingia-associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

DWDO Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

Population genetics for dwarf downingia are completely unknown. For an overview of genetic considerations of vernal pool plant species see Elam (1998).

Current limitations in our understanding of dwarf downingia population genetics have little immediate conservation implication, given the extreme rarity of dwarf downingia.

DWDO Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is completely unknown for dwarf downingia. There have been no studies addressing the presence of a soil seed bank, seed dormancy or longevity.

From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

DWDO Inoculation

Since there are so few natural populations of dwarf downingia in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied dwarf downingia habitat, create meta-population structure at extant occurrences where single pools may support the species, and ensure existence should any natural populations become compromised.

DWDO Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant dwarf downingia occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of dwarf downingia, if existing air quality

can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect dwarf downingia and other native plant species.

DWDO Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for dwarf downingia populations within the study period of this EIS/EIR, or at some time beyond.

DWDO Literature Cited

Ahart, Lowell, Rancher/Botanist Honcutt, Butte County. California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G. M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Gibson and Skordal. 1994. *Mitigation Monitoring Report for Perry Ranch Fall Brook*. November 1994. Sacramento, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservatio*n 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1937. Endemism in the flora of the Great Valley of California. Ph.D. Dissertation, University of California, Berkeley, California.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. *Slender Orcutt Grass Surveys at the Kiefer Landfill*. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1981. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). *Vernal Pools and Intermittent Streams*. Institute of Ecology No. 28, University of California, Davis.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany,* 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Kelsey, Jon. (2001) Rancher Snelling, Merced County. California.

Leidy, R.A. and E.G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Linhart, Y.B. 1972. Differentiation within natural populations of California annual plants. Ph.D. Dissertation. University of California, Berkeley, California.

Mason, H.L. 1957. Flora of the Marshes of California. University of California Press, Berkeley and Los Angeles, California.

Myers, E.L. 1975. Seed germination of two vernal pool species: Downingia cuspidate and Plagiobothrys leptocladus. M.S. Thesis. San Diego State University, California. 76 pp.

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

Raven, P. H. and D. I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. *Fremontia* 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. Soil Survey of Sacramento County, California. April 1993. Sacramento, California.

Stebbins, G.L. 1976. Ecological islands and vernal pools of California. *In* S.Jain [ed.] Vernal pools: their ecology and conservation, 1-4. Institute of Ecology Publ. 9, University of California, Davis, California.

Stone, D.R. 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment. *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. *Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring*. Pp. 91, Environmental Protection Agency, San Francisco, California.

The Nature Conservancy (TNC). *date unknown.* Howard Ranch Special-status species Survey. Sacramento County, California.

Thorne, R.F., 1984. Are California vernal pools unique? *In* S. Jain and P. Moyle [eds.], Vernal pools and intermittent streams, 1-8. *Institute of Ecology* Publ. 28. University of California, Davis, California.

Thorp, R.W. 1990. Vernal pool flowers and host-specific bees *in* Ikeda, D.H. and R.A. Schlising (Eds.). *Vernal Pool Plants: Their Habitat and Biology*. Studies from the Herbarium, CSU Chico, California. Number 8.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Restoration Ecologist EDAW, Sacramento, California.

USDA (United States Department of Agriculture, Natural Resources Conservation Service). 1993 (April). *Soil Survey of Sacramento County, California*. USDA Natural Resources Conservation Service in cooperation with the Regents of the University of California. Accessed September 2015. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA067/0/sacramento.pdf.

Weiler, J.H., Jr. 1962. A bio-systematic study of the genus *Downingia*. Ph.D. Thesis. University of California, Berkeley, California. 189 pp.

Witham, C. 1991. Dwarf Downingia, rare plant of the month. Hibiscus, Sacramento Valley Chapter Newsletter. California Native Plant Society.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H. 1987. The Ecology of southern California vernal pools: a community profile. U.S. Fish and Wildlife Service Biological report 85(7.11).

Zedler, P.H. 1990. Life Histories of Vernal Pool Vascular Plants, In: *Vernal Pool Plants-Their Habitat and Biology*. Studies from the Herbarium, California State University, Chico. Number 8.

BOGG'S LAKE HEDGE-HYSSOP (BLHH)

Bogg's Lake hedge-hyssop (BLHH)

(Gratiola heteropepala)

Status USFWS: None

Status CDFW: Endangered

Status CNPS: List 1B.2



© 2005 Robert E. Preston, Ph.D.

BLHH Listing Status

Bogg's Lake hedge-hyssop (*Gratiola heterosepala*) was listed by the California Department of Fish and Wildlife (CDFW), as State Endangered under the California Endangered Species Act (CESA) in 1978. The California Native Plant Society (CNPS) includes Bogg's Lake hedge-hyssop as

a CNPS List 1B.2 species which means it is a plant species that is fairly threatened in California with moderate degree or immediacy of threat (CNPS 2010). CNPS has also assigned an R-E-D Code of 1-2-2, meaning it is rare but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time, it is endangered in a portion of its range, and it is rare outside of California (CNPS 2010).

BLHH Life History and Ecology

BLHH Species Description and Life History

Bogg's Lake hedge-hyssop is a small-stature annual in the figwort family (Scrophulariaceae). This diminutive species has an erect, un-branched stem that can reach from two to 10 cm in height. Small one to two centimeter-long leaves are arranged oppositely on the stem; the lower ones are linear-lanceolate and the upper ones are shorter, proportionally wider and more blunt (obtuse) at the tip. The inflorescence is comprised of one to several six to eight millimeter-long flowers arranged in a terminal raceme. Individual pale-yellow and white, tubular flowers are born on 10 to 20 millimeter-long stalks (pedicels). The pedicels and upper stem are glandular puberulent. The calyx is comprised of five round-tipped sepals, three of which are united about 1/3 the distance from their base, and two that are more–or-less separate. Of the three united sepals, the central one is wider and longer. Numerous small seeds are produced in pear-shaped (pyriform) capsules that usually equal the mature calyx in length (four to six millimeter).

The more common and potentially co-occurring bractless hedge-hyssop (*Gratiola ebracteata*) is distinguished from its rare relative on the basis of having more elongate and sharply pointed sepals that are mostly separate to their bases, and white, versus mostly yellow flowers (Mason and Bacigalupi 1954; Hickman 1993). A third species, clammy hedge-hyssop (*Gratiola neglecta*), is distinguished from *G. bracteata,* and *G. heterosepala* on the basis of having two small bracts subtending the flowers, and flowers that are at least two to three times as long as the calyx.

Bogg's Lake hedge-hyssop, and the genus *Gratiola* in general, has received little attention from biologists or ecologists. Other than basic taxonomic and biogeographic treatments, and a single study of pollinator ecology (Kaye et al. 1990), Bogg's Lake hedge-hyssop remains mostly unstudied. Ecological information, mostly from observations of field workers, exists mostly as a result of land management and agency-mandated resource management activities (Corbin 2000; Corbin et al. 1994; Schoolcraft 2000; Plantenkamp 1998; Jones and Stokes 1994).

BLLH Ecological Life Cycle

Bogg's Lake hedge-hyssop shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to the populations avoidance of the

regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean Climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

BLLH Seed Germination

The specific timing of germination of Bogg's Lake hedge-hyssop seeds relative to the timing of the vernal pool inundation cycle has not been described in detail. Observations indicate that Bogg's Lake hedge-hyssop seeds germinate and begin juvenile growth under water (Kaye et al. 1990; Corbin et al. 1994). Seed longevity, germination requirements and germination optima for Bogg's Lake hedge-hyssop have not been investigated.

BLLH Vegetative Growth

One of the challenges to many vernal pool plant species is optimization of physiological processes in both the early season aquatic and later season terrestrial phases of the vernal pool cycle. For Bogg's Lake hedge-hyssop, the hollow (fistulous) stem is the principal structural adaptation to growth in the aquatic habitat. The air-filled stems hold the plant vertical in the water column, thus facilitating light exposure and gas exchange. This in effect lengthens the growing season by maximizing growth while vernal pools are still inundated. It is interesting to note that, although the species inhabits the basins and slopes of deeper/larger vernal pools, it lacks distinctly different juvenile aquatic morphology, an adaptation that is shared by many other deep pool annual species with which it occurs (e.g., *Orcuttia* spp., *Downingia* spp., *Navarretia* spp., *Eryngium* spp., *Callitriche* spp.).

BLLH Reproduction

Bogg's Lake hedge-hyssop flowers and sets seeds during the dry-down phase of the vernal pool hydrologic cycle, typically while shallow water up to two inches (five centimeters) deep remains in the pool basin (Corbin et al. 1994). Flowering occurs in the Central Valley from April to June (CNPS 2010), and at higher elevations as late as August (Corbin et al. 1994; CNPS 2010; CDFG 2010). Bogg's Lake hedge-hyssop is completely self-compatible as indicated by pollinator exclusion experiments (Kaye et al. 1990). Fruits mature quickly, usually within one to two weeks after the flowers appear (Corbin et al. 1994). The mature capsules produce numerous minute seeds that are released as the 4-valved capsule opens, and as the parent plant disintegrates. Fecundity and variation in seed production have not been investigated in Bogg's Lake hedge-hyssop.

BLLH Dispersal

In many other vernal pool species, seed dispersal is naturally limited, although this has not been stated specifically for *Gratiola*. Limited seed dispersal in vernal pool species is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974,

1980, 1990). Bogg's Lake hedge-hyssop does not appear to have dispersal-limiting traits (e.g., fruit adherent to parent plant, fruit not opening).

Evidence of natural Bogg's Lake hedge-hyssop dispersal and colonization exists in occupancy of man-made topo-hydrologic features located within or near occupied vernal pool landscapes (created vernal pools, stock pond and reservoir margins, ditches, and other excavated or scraped depressions (CDFG 2010). Further evidence of long-range dispersal exists in the relatively widespread range of this species in northern California. Natural dispersal of Bogg's Lake hedge-hyssop seeds likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming native ungulates (Griggs 1980).

BLLH Seed Dormancy

Seed dormancy is indicated by observation of a three-year period where Bogg's Lake hedge-hyssop plants were absent, followed by reappearance during the favorable growing season of the fourth year (Corbin et al. 1994). Seed longevity and seed abundance in the soil has not been investigated. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

BLLH Population Genetics

Population genetics of Bogg's Lake hedge-hyssop have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the limited number of occurrences in the Planning Area and the scattered geographical distribution, all Bogg's Lake hedge-hyssop populations should be considered unique, and important genetic entities.

BLHH Habitat Requirements and Ecology

BLLH Biogeography and Landform Relations

Bogg's Lake hedge-hyssop is strictly associated with the vernal pool-type hydrologic cycle. Over its geographic range, this species is found in a number of distinct physiographic/edaphic settings. In Sacramento County, Bogg's Lake hedge-hyssop is associated with vernal pools

located on ancient weathered alluvial terraces of the Laguna Geologic formation, with soils of the Redding, Red Bluff and related Series. Soils of the Redding Series tend to be strongly acidic (indication of age and weathering) and are generally gravelly with cobble. These soils also typically possess a shallow, water-impermeable iron-silica hardpan that favors the development of vernal pools (SCS 1993). In Tehama County, Bogg's Lake hedge-hyssop occurs in vernal pools associated with cemented hardpan of the Tuscan, Toomes and related series, as well as in more shallow volcanic soils (CDFG 2010). The montane occurrences of Lassen, Shasta and Modoc Counties are also associated with volcanic soils, but in addition to volcanic mudflow and basalt substrates, wetlands formed on large hydric clay flats also support the species. Similarly, in Lake County, and Solano County, Bogg's Lake hedge-hyssop is associated with large seasonal Playa Lake-type pools formed on clay substrates.

BLLH Hydrology Relations

Bogg's Lake hedge-hyssop is a strict endemic of the vernal pool hydrologic cycle. This species is reported to grow in well-developed vernal pools, and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies (small lakes, reservoirs, stock ponds, seasonally saturated clay flats in meadows). It is significant to note that most of the other rare species with which Bogg's Lake hedge-hyssop grows are also associated with well-developed large or deep vernal pools that exhibit more extreme, longer duration inundation such as slender Orcutt grass (*Orcuttia tenuis*), San Joaquin Valley Orcutt grass (*O. ineaequalis*), Sacramento Orcutt grass (*O. viscida*), Greene's tuctoria (*Tuctoria greenei*), hairy Orcutt grass (*Orcuttia pilosa*), legenere (*Legenere limosa*), and Hoover's spurge (*Chamaesyce hooveri)* (CDFG 2010). Specific pool area, pool depth, or other measures of pool hydrology are not reported for any of the Bogg's Lake hedge-hyssop occurrences. It has been observed that the species germinates and grows underwater, and quickly flowers and sets seed as the pool dries, while two to five inches of water remain in the pool basin.

BLLH Biological Community Relations

Floristic associations provide further indication of preference for more extreme vernal pool hydrological cycles. Like the Orcuttiae grasses, Bogg's Lake hedge-hyssop often grows in comparatively barren areas within deeper portions of vernal pools, sometimes in barren openings with common spikerush (*Eleocharis macrostachya*). In addition to the fore-mentioned rarities, other associated species indicative of well-developed vernal pool hydrology, including hairy pepperwort (*Marsilea vestida*), coyote thistle (*Eryngium castrense, E. vaseyi*), Alisma-leaved coyote thistle (*E. alismifolium),* bee-thistle (*E. arictulatum*), Mathia's thistle (*E. mathiasae),* bractless hedge-hyssop, downingias (*Downingia bicornuta, D. bacigalupi, D. cuspidata, D. ornatissima*), quillwort (*Isoetes howellii, I. orcuttii and I. nuttallii*), flowering

quillwort (*Lilaea scilloides*), smooth goldfields (*Lasthenia glaberrima*), California elatine (*Elatine californica*), and winged water starwort (*Callitriche marginata*),

Other vernal pool endemics reported as occurring with Bogg's Lake hedge-hyssop include common inhabitants of shallower or smaller to medium-size vernal pools with shorter duration ponding, or the slopes and edges of larger or deeper pools. These species include Fremont's goldfields (*Lasthenia fremontii*), white-headed navarretia (*Navarretia leucocephala*), stalked popcorn-flower (*Plagiobothrys stipitatus*), bracted popcorn-flower (*P. bracteatus*), dwarf wooly marbles (*Psilocarphus brevissimus*), dwarf downingia (*Downingia pusilla*), annual hairgrass (*Deschampsia danthonioides*), Douglas' meadowfoam (*Limnanthes douglasii*), tricolored monkey-flower (*Mimulus tricolor*).

BLLH Non-Native Weed Relations

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian Rye and Mediterranean Barley, two non-native facultative wetland species typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. Some suggest that built-up thatch from Italian wild rye (*Lolium multiflorum*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2001).

Since Bogg's Lake hedge-hyssop occupies medium to larger or deeper vernal pools, it may not be particularly susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch buildup, as with the more deeply-adapted legenere and Orcuttiae grasses.

No weedy hydrophytic species are presently reported as growing with Bogg's Lake hedge-hyssop. Although none of the following are specifically reported to co-inhabit vernal pools with Bogg's Lake hedge-hyssop, other non-native weedy hydrophytes may present future problems, including mannagrass (*Glyceria declinata*), lippia (*Phyla nodiflora*), swamp pricklegrass (*Crypsis schoenoides*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), Bermuda grass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), a native species, can also dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

BLLH Livestock Grazing Relations

In general, appropriately timed dry-pasture livestock grazing regimes are thought to be compatible with the persistence of vernal pool vegetation. Robins and Vollmer (2002) provide a review of information pertaining to livestock grazing in vernal pool ecosystems. Observations made on (U.S. Bureau of Land Management (BLM) and U.S. Forest Service (USFS) grazing allotments indicate that Bogg's Lake hedge-hyssop populations are somewhat resistant to grazing and trampling pressures, with abundant and vigorous flowering and fruiting plants present despite hoof-pocked surfaces. Others have indicated livestock grazing as a threat (CDFG 2010).

Many extant populations of Bogg's Lake hedge-hyssop inhabit long-operating cattle ranches and USFS and BLM grazing allotments. Persistence in un-irrigated pasture systems indicates tolerance for at least some level of grazing. In most cases, timing of livestock grazing is likely more important than stocking rates in affecting persistence of Bogg's Lake hedge-hyssop, as it is for the Orcuttiae grasses (Stone et al. 1988). During the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. As the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. Excessive trampling and grazing during this period may negatively affect Bogg's Lake hedge-hyssop, and other vernal pool species. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect on Bogg's Lake hedge-hyssop (Mason and Bacigalupi 1954; CDFG 1987) especially since the plant usually disintegrates rapidly once pools have dried (Corbin et al. 1994).

It should be noted however, as with many other vernal pool annuals, small stature and high plant densities ensure that in all but extreme cases, a portion of every year's cohort escapes destruction, matures and sets seed.

BLLH Disturbance Response

Observations of field workers provide some evidence of the potential response of Bogg's Lake hedge-hyssop populations to particular disturbance regimes. One occurrence has been extirpated as a result of disking and harrowing. It is interesting to note that several rare and common vernal pool species, including Bogg's Lake hedge-hyssop and Orcuttiae grasses are recorded to persist despite periodic disking of the vernal pool substrates over decades (Hoover 1941; Crampton 1959; Stone et al. 1988; CDFG 2010; Ahart pers. comm.; Kelsey pers. comm.; Dittes pers. obs.). It is very important to note that in these cases, disking is not so deep as to significantly affect the subtending impermeable layer or the vernal pool hydrological cycle. In addition, the disking is performed in the late summer or fall months in preparation for dry land

winter grain crops, so vernal pool plants have set seed and dried. If this disking occurs earlier in the growing season, before seeds are mature, over consecutive years, population extirpation is probable through exhaustion of soil seed bank.

BLLH Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Bogg's Lake hedge-hyssop are identified in Table G-3.2-1 and have been derived from input from local species experts.

Table G-3.2-1. Habitat Elements for Bogg's Lake Hedge Hyssop

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, and vernal pool.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

BLHH Species Distribution and Population Trends

BLHH Species Distribution

Bogg's Lake hedge-hyssop was first collected from Bogg's Lake in Lake County, California in 1954. Since that time, 90 total occurrences have been recorded (CDFG 2010), ranging from Fresno County in the south to northern Modoc County in northeast California. Bogg's Lake hedge-hyssop occurrences are distributed among five of the Geographic Sub-regions of the California Floristic Province, as described by Hickman (1993); the San Joaquin Valley, Sacramento Valley, Inner Coast Range, Cascade Range Foothill, High Cascade Range, and the non-Warner Mountain and Warner Mountain Sub-regions of the Modoc Plateau Region. Bogg's Lake hedge-hyssop is among the most widespread of the rare vernal pool species in the Chapter 8 and Chapter 9 Study Areas and exhibits the widest range in elevations (25 to 7,900 feet elevation) (CNPS 2010).

Tehama and Modoc Counties together support 40 percent of the 90 presently known Bogg's Lake hedge-hyssop occurrences, with 17 and 19 occurrences for each county, respectively. Shasta County supports 14 occurrences (16 percent of total), while Sacramento County supports 11 occurrences (12 percent of total) and Solano County supports six occurrences (seven percent of total). San Joaquin, Fresno, Lake, Placer, Lassen, Madera, Siskiyou, Merced, and Fresno Counties each support five or fewer occurrences (CDFG 2010).

This comparatively wide geographic and elevation distribution of Bogg's Lake hedge-hyssop may partially reflect comparatively broad habitat requirements relative to some of the other vernal pool rarities (e.g., Sacramento Orcutt Grass). It may also reflect a different propensity for seed dispersal by waterfowl, or perhaps even a different "biogeographic legacy" (e.g., timeline of evolution and geographic distribution of ancestral taxon).

BLHH Central Valley Distribution

In the Central Valley, Bogg's Lake hedge-hyssop occurs among five roughly defined population centers. The southernmost of these, comprising four CNNDB occurrences, is located along the eastern edge of the Great Central Valley near the Fresno and Madera County lines. The next population center to the northwest, comprised of a single occurrence, is located approximately 45 miles away in eastern Merced County. A third population center is located 75 miles to the north and is comprised of 18 occurrences. These occurrences extend approximately 45 miles north-to-south along the eastern edge of the Great Central Valley from northern San Joaquin County north through Sacramento County, to western Placer County. A fourth population center, comprised of six occurrences, is located approximately 30 miles to the west near the Sacramento-San Joaquin River Delta in Solano County. The northernmost Great Central Valley population center, comprised of four occurrences, is located in southern Tehama County, approximately 75 miles north of the northernmost Placer County occurrence. Another Tehama County population center, comprised of 13 additional occurrences, is located approximately 20 miles further northeast at higher elevations on the volcanic mudflow formations of the Cascade Range Foothills, east of the Great Central Valley.

BLHH Distribution within the Planning Area

Currently, there are ten CNDDB occurrences of Bogg's Lake hedge-hyssop within the Planning Area (Figure BLHH-1), all of which are located within the Urban Development Area (UDA). Within the UDA, the northeastern-most occurrence (CNDDB occurrence #48) is located northwest of the intersection of White Rock and Prairie City Roads. This occurrence is located on private land and is comprised of an unrecorded number of occupied pools. The next occurrence to the southwest is located approximately seven mi away (CNDDB occurrence #57)

at the proposed Sunrise-Douglas Subdivision development. With 12 occupied pools, this is the largest Bogg's Lake hedge-hyssop occurrence in Sacramento County (CDFG 2010).

The next occurrence to the west (CNDDB occurrence #84) is located approximately two miles from the Sunrise Douglas site, just north of Morrison Creek and west of Eagles Nest Road near the southern edge of Mather Field. This occurrence is comprised of an unrecorded number of occupied vernal pools.

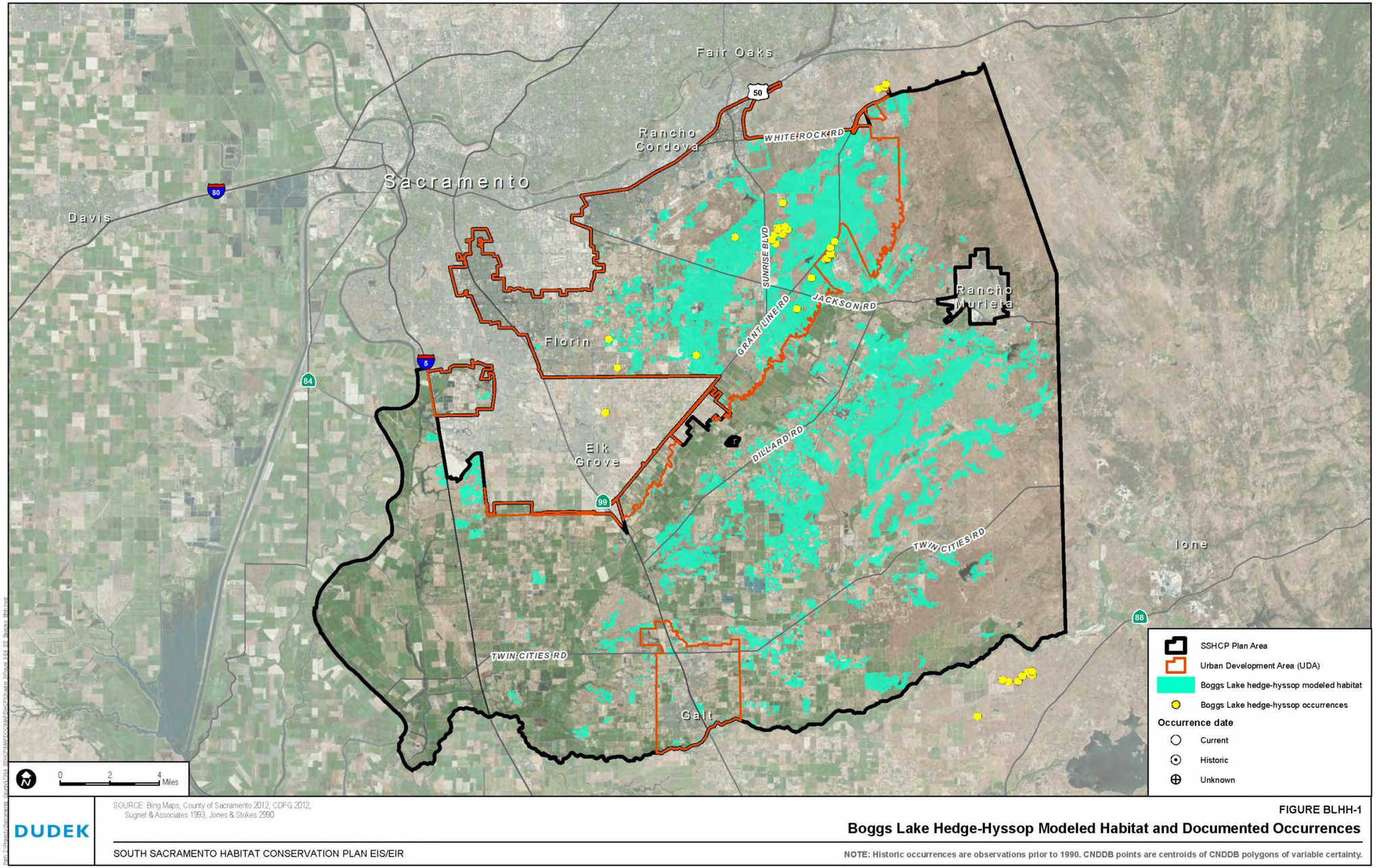
Another occurrence (CNDDB occurrence #30), associated with the 138-acre Sheldon Mitigation Site, is located approximately 2.5 miles south of the Sunrise-Douglas occurrence, just north of the Cosumnes River Floodplain. The number of occupied pools at this site is not recorded. CNDDB occurrence #81, comprised of a single occupied pool, is located on private land near Laguna Creek east of Excelsior Road, approximately 4.5 miles west by southwest of CNDDB occurrence #30.

The three westernmost occurrences (CNDDB occurrence #33, #34, and #35) are distributed along a north-south oriented axis with Elk Grove-Florin Road on the west, and Gerber Road and Elk Grove Boulevard on the north and south, respectively. The southernmost of these three occurrences (CNDDB occurrence #33) is located on private land, and is comprised of one occupied vernal pool. CNDDB occurrence #34, located on private land approximately 1.8 miles to the north, is comprised of an unrecorded number pools. The northernmost of these three occurrences (CNDDB occurrence #35) is located approximately one mile north of the central occurrence, and is also comprised of an unrecorded number of occupied pools.

Two additional occurrences are associated with the Kiefer Landfill development (CNDDB occurrence #18 and #82). Occurrence #18 is composed of seven occupied vernal pools, and occurrence #82 is reported to support one occupied vernal pool (Jones and Stokes 1998; CDFG 2010).

In Sacramento County, eight of the nine (89 percent) extant Bogg's Lake hedge-hyssop occurrences are associated with the Laguna Formation. Associated soils include those of the Redding and Red Bluff/Redding Series. This geological landform is comprised of remnant old-terrace alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene, between 600,000 and 1,500,000 years ago. Laguna Formation and associated soils are strongly associated with the distribution of vernal pools. Table G-3.2-2 shows the soil series, geological formation and landform associations for each known occurrence in Sacramento County. It is significant to note that owing to the diminutive size of the species, its ability to inter-mingle with the more common species bractless hedge-hyssop, and the area of unsurveyed or partially surveyed area of Laguna Formation, other occurrences are likely to be present in Sacramento County. In addition, well-developed vernal pools on landforms other than Laguna could provide suitable habitat. The modeled habitat of Bogg's Lake hedge-hyssop is described in Section G-4 of this Appendix.

Figure BLHH-1 Boggs Lake Hedge-Hyssop Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Table G-3.2-2. CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations for Bogg's Lake hedge-hyssop in Sacramento County

CNDDB Occurrence #	Quadrangle	Soil Series[a]	Geological Formation and Landform
3 (possibly extirpated)	Rio Linda	San Joaquin Fine Sandy Loam, 3-8% Slopes	Lower Unit, Riverbank Formation
18	Buffalo Creek	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
30	Sloughhouse	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
33	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
34	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	North Merced Gravel (Arroyo Seco gravel)
35	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
48	Buffalo Creek	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
57	Buffalo Creek	Red Bluff-Redding Complex, 0-5% Slopes	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
81 (extirpated)	Elk Grove	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
82	Buffalo Creek	Redding gravelly loam, 0-8% slopes, Claypan and hardpan +/- 20 inches	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.
84	Carmichael	Red Bluff-Redding Complex, 0-5% Slopes	Laguna Formation, remnant, high-terrace deposits of Pleistocene river channels.

[a] Soil series information based on what USDA soil survey type occurs at the CNDDB species location (USDA 1993)

BLHH Population Levels and Trends

Of the 90 documented CNDDB occurrences, all but two are presumed extant. One occurrence in Sacramento County is listed as "possibly extirpated" after the vernal pools were plowed, harrowed, and leveled for a housing development in 1977 (CNNDB occurrence #3) (CDFG 2010). The extirpated occurrence is located in the City of Elk Grove where the site had been disked and partially leveled and is slated for development (CDFG 2010).

Downward population trends have been reported for five populations (two in Sacramento County and one each in Placer, Lake, and Tehama Counties); while three occurrences from Shasta County are classified as "fluctuating" and one Shasta County occurrence is classified as "increasing." The population trends for the remaining occurrences are listed as "unknown."

It should be noted that Bogg's Lake hedge-hyssop is a diminutive and a relatively ephemeral species that easily escapes the notice of botanists, particularly since the taxonomic features used to circumscribe it are subtle, and it often grows intermingled with the more common and

superficially similar species. Given these considerations and the amount of unsurveyed or partially surveyed potentially suitable habitat, additional occurrences will likely be discovered.

It is impossible to determine the number of historically occurring Bogg's Lake hedge-hyssop populations lost or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before these species first received attention (Stone et al. 1988). Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978; Jones and Stokes 1990), however owing to habitat specificity (restriction to), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for Bogg's Lake hedge-hyssop.

There has been no comprehensive effort to monitor all populations of Bogg's Lake hedge-hyssop although various monitoring projects have been conducted by the BLM and USFS. However, the population estimates for some of the occurrences in Sacramento County occurrences have been made (Table G-3.2-3).

Observations of Bogg's Lake hedge-hyssop indicate that abundance of individuals in a population can vary greatly from year-to year, depending at least in part on precipitation of the season. Abundance estimates made at several occurrences range from a complete lack of plants to thousands in subsequent years (CDFG 2010). Population variability in some vernal pools species is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for Hoover's spurge, hairy Orcutt grass, and Greene's tuctoria at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Bogg's Lake hedge-hyssop population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

Table G-3.2-3. Bogg's Lake Hedge-hyssop Population Estimates for Sacramento County (CNDDB)

CNDDB Occurrence #	Occurrence # of pools observed	Range of population estimates
3	Reported from "several vernal pools:	Possibly extirpated
18	7	10,000 + plants
30	1	1990: 0 plants 1993: 1,000 + plants
33	1	1991: 20 plants
34	1	1991: 200 plants
35	3	?
48	Ponds	?
57	12	Several thousand to several hundred thousand
81	1	1998: 1 plant
82	1	?
84	1	2000: 1,000's of plants

BLHH Threats to the Species

Potential direct threats to Bogg's Lake hedge-hyssop include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions; construction and maintenance of firebreaks, roads, and utility corridors; timber harvest activities (in montane Occurrences); inappropriate livestock grazing regimes (later spring/summer rotations); grassland fires; recreational vehicles; equestrian and pedestrian traffic; and refuse dumping (CDFG 1992, 1998; CDFG 2010; Corbin et al. 1994; Kaye et al. 1990).

Potential Indirect threats to Bogg's Lake hedge-hyssop include hydrological alteration of sub-watersheds by surrounding developments and land uses; shifts in competitive interactions (hydrology-mediated or invasive weeds); windblown refuse accumulation; point and non-point source water pollution; air pollution, and global climate change.

BLHH Data Gaps and Conservation Implications

With exception to an investigation into the breeding system (Kaye et al. 1990), various monitoring projects, and the visual observations of field workers (Corbin et al. 1994; Schoolcraft 2000; CDFG 2010; Witham pers. comm.), Bogg's Lake hedge-hyssop has received limited research attention. Detailed studies have not been conducted regarding the biology, ecology, potential for cross pollination, population genetics, habitat relationships, population dynamics, trends or threats. Pertinent data gaps, implications for conservation, and operating assumptions include the following.

BLHH Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Planning Area and elsewhere within the range of the species. In the Planning Area, discovery of new populations of Bogg's Lake hedge-hyssop may occur on the large dry-land ranchlands, public/quasi-public lands and vernal pool-grassland preserves already established in Sacramento County.

BLHH Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

In Sacramento County, Bogg's Lake hedge-hyssop has a geographic association with old alluvial terraces possessing acidic soils, primarily of the Redding and Red Bluff Families (Laguna Geological Formation). The exact nature of this relationship is, however, unknown. It is unknown if soil pH or other edaphic factors influence the species distribution and population vigor. It is possible that functioning vernal pools with well-developed hydrology, regardless of landform, soil series and soil pH may provide suitable habitat for this species. This is supported by the occurrence of this species in vernal pools and wetlands with vernal pool-type hydrology on other landforms, with different soil types, at varying locations. In the Planning Area, vernal pools are most frequent and best developed on the Laguna Formation.

BLHH Unknown Pollination Ecology

In a study conducted in Oregon, Bogg's Lake hedge-hyssop has been shown to be completely self-compatible, and insects were never observed visiting its flowers (Kaye et al. 1990). It is not known though whether or not out-crossing ability exists, and if so, whether or not insect pollinators are associated with the species anywhere in its range.

BLHH What Constitutes Population Vigor, and How to Measure?

Population vigor and population dynamics, including year-to-year variability in abundance, have not been described in detail for any of the occurrences in Sacramento County. In other areas, Bogg's Lake hedge-hyssop population estimates have been made over varying periods of time. Population estimates range from 1,000,000 plants at CNDDB occurrence #36, to a single individual at CNDDB occurrence #64. Observations made over time also indicate that Bogg's Lake hedge-hyssop populations can vary by several orders of magnitude between years, with low numbers present during years with sub-optimal hydrology (CDFG 2010; Corbin et al. 1994). Other rare vernal pool species have been shown to be variable in population abundance from year-to-year (Holland 1987; Griggs pers. comm.), and causative factors contributing to year-to-year population fluctuations in rare species may be difficult to identify (Alexander and Schlising 1997).

Population vigor will be difficult to assess based on number of individuals present over short intervals of time. Trends occurring over longer periods may occur that are not discernable, and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

BLHH Specific Hydrological Requirements of Bogg's Lake hedge-hyssop

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting Bogg's Lake hedge-hyssop populations in the Planning Area (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of Bogg's Lake hedge-hyssop -vernal pool habitat within established preserves. Similarly, assessment of potentially suitable Bogg's Lake hedge-hyssop habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing Bogg's Lake hedge-hyssop populations are established, assessed and monitored over time, a more quantifiable definition of suitable Bogg's Lake hedge-hyssop - vernal pool hydrology will emerge based on learned information.

BLHH Existing Hydrological Trend of Pools and Existing Indirect Effects

Extant Bogg's Lake hedge-hyssop populations in the Planning Area may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Existing Bogg's Lake hedge-hyssop habitat existing conditions may not be pristine, so if trends in vigor or habitat quality become apparent over time, it may be difficult to attribute trend to any specific management activity.

BLHH Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990).

Proposed preserve designs may not afford complete protection to the hydrological systems that support Bogg's Lake hedge-hyssop and other species assemblages dependent on them.

BLHH Definition of Appropriate Scale Bogg's Lake hedge-hyssop -Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective Bogg's Lake hedge-hyssop -vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes rare plant populations at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

BLHH Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the Bogg's Lake hedge-hyssop -vernal pool preserves, primarily for upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with Bogg's Lake hedge-hyssop -occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2000; Robins and Vollmar 2002). It is important to note that Bogg's Lake hedge-hyssop does persist though, in historically and contemporary operating livestock ranches and USFS and BLM grazing allotments. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems. Since Bogg's Lake hedge-hyssop occupies medium to large-size vernal pools, management of Italian wild rye and Mediterranean barley around the margins of vernal pools, and Medusa-head grass in uplands should be monitored and managed but not primarily for the needs of Bogg's Lake hedge-hyssop specifically.

Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

BLHH Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, filed bindweed, lippia, paradox canary-grass, hairy hawkbit, Cocklebur and cattails. None of these are reported to co-inhabit Bogg's Lake hedge-hyssop -occupied vernal pools in Sacramento County. Any of these and others now unknown may appear and/or change in abundance in Bogg's Lake hedge-hyssop -occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to Bogg's Lake hedge-hyssop if they are allowed to completely dominate the vernal pool margins and adjacent uplands. Potential competitive interactions with these species may affect the vigor of Bogg's Lake hedge-hyssop populations. In addition, any eradication or control

methods implemented for these species may in turn potentially affect Bogg's Lake hedge-hyssop populations.

BLHH Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine to design preserves for multi-species conservation. Bogg's Lake hedge-hyssop has been reported as sharing vernal pools with other rare plant species, including Sacramento Orcutt grass, hairy Orcutt grass, slender Orcutt grass, Greene's tuctoria, San Joaquin Valley Orcutt grass, Bogg's Lake hedge-hyssop, Hoover's spurge, legenere, succulent owl's-clover. Many of these pool complexes supporting rare species also provide habitat for rare invertebrates, amphibians, mammals, and bird species as well.

Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between July 1 and April 1 may be compatible with or even benefit some Bogg's Lake hedge-hyssop -associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

BLHH Genetic Variation (Spatial and Temporal [Seed Bank], Genetic Drift, Genetic Bottlenecks)

Population genetics for Bogg's Lake hedge-hyssop are completely unknown. For an overview of genetic considerations of vernal pool plant species, see Elam 1998). Current limitations in our understanding of Bogg's Lake hedge-hyssop population genetics have little immediate conservation implication, given the relatively few number of Bogg's Lake hedge-hyssop occurrences in the Planning Area.

BLHH Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is indicated by the observation of a three-year period during which plants were absent, followed by abundant plants the following favorable hydrologic season. Beyond this observation though, there have been no empirical studies addressing the presence of a soil seed bank, seed dormancy or longevity for Bogg's Lake hedge-hyssop.

From the perspective of conservation, knowledge of site specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

BLHH Inoculation

Since there are so few natural populations of Bogg's Lake hedge-hyssop in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied Bogg's Lake hedge-hyssop habitat, create meta-population structure at extant occurrences where single pools may support the species, and help ensure existence should any natural populations become compromised. Dispersal into, and colonization of created or enhanced vernal pools, stock-ponds, reservoirs and even rutted tire tracks in already occupied vernal pool landscapes has been documented (CDFG 2010; Sanger pers. comm. 2003). Bogg's Lake hedge-hyssop is a fully self-compatible species, which is a pre-adaptation for colonization.

BLHH Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant Bogg's Lake hedge-hyssop occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Bogg's Lake hedge-hyssop, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect Bogg's Lake hedge-hyssop and other native plant species in the future.

BLHH Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for Bogg's Lake hedge-hyssop populations within the study period of this EIS/EIR, or at some time beyond.

BLHH Literature Cited

Ahart, Lowell. Rancher/Botanist Honcut, Butte County, California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Dept. of Fish and Game, Redding, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 1987. California native plant status report: *Gratiola heterosepala*. California Department of Fish and Game Endangered Plant Project, California Natural Diversity Data Base, and California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 1992. Annual report on the status of California state-listed threatened and endangered animals and plants. Sacramento, California.

California Department of Fish and Game (CDFG). 1996. The status of rare, threatened, and endangered animals and plants of California combined annual report for 1993, 1994, and 1995. An addendum to the 1992 report. Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Corbin, B. 2000. Letter to Ellen Cypher, Endangered Species Recovery Program, Bakersfield, CA, 3 p. + 4 pp. attachments. (Cited by USFWS 2000; Original not seen).

Corbin, B. and G. Schoolcraft, A. Sanger, and J Molter. 1994. *Gratiola heterosepala* Conservation Strategy. Unpublished report to Lassen National Forest, Modoc National Forest, Alturus Resource Area BLM, and Redding Resource Area BLM.

Corbin, Beth. District Botanist USDA, Bureau of Land Management (formerly with Lassen National Forest).

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193.

Griggs, Tom, Ph.D. Senior Restoration Ecologist, River Partners, Chico, California.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., and V.I. Dains. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1994. Durta property wetland delineation and special status species surveys. Prepared for Sacramento County Department of Public Works. Sacramento, California.

Jones and Stokes 1998. Kiefer Landfill Wetland Mitigation Plan. Sacramento, California.

Kaye, T., W. Messinger, S. Massey, and R Meinke. 1990 Gratiola heterosepala: inventory and breeding system evaluation. Unpublished report to the U.S. Bureau of Land Management, Lakeview, Oregon.

Kelsey, Jon. Rancher/Botanist Snelling, Merced County, California.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Mason H.L., and R. Bacigalupi. 1954. A new Gratiola from Boggs Lake, Lake County, California. *Madrono* 12:150-152.

Molter, Joe. District Botanist USDA, Bureau of Land Management.

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Sanger, Alison. Forest Botanist, Lassen National Forest, Susanville, California

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Schoolcraft, G.D. 2000. Letter to Ellen Cypher, Endangered Species Recovery Program, Bakersfield, California, 2pp. (Cited by USFWS 2000; Original not seen).

Soil Conservation Service (SCS). 1993. United States Department of Agriculture Soil Conservation Service. Soil Survey of Sacramento County, California. Sacramento, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Thorpe, R. 2003. Unpublished E-Mail to Daniel Burmester, CDFG.

Unger, Ron. Senior Restoration Ecologist, EDAW, Sacramento, California.

USDA (United States Department of Agriculture, Natural Resources Conservation Service). 1993 (April). *Soil Survey of Sacramento County, California*. USDA Natural Resources Conservation Service in cooperation with the Regents of the University of California. Accessed September 2015. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA067/0/sacramento.pdf.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H. 1990. Life Histories of Vernal Pool Vascular Plants, In: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

AHART'S DWARF RUSH (ADR)

Ahart's dwarf rush (ADR)

(Juncus leiospermus ahartii)

Status USFWS: None

Status CDFW: None

Status CNPS: 1B.2



photo courtesy BCAG

ADR Listing Status

Ahart's dwarf rush is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a list 1B.2 species by the California Native Plant Society (CNPS 2010). It has been assigned an R-E-D Code of 3-2-3, meaning it is distributed in one to several highly restricted occurrences, endangered in a portion of its range, and entirely restricted to California.

Being a CNPS List 1B plant species, Ahart's dwarf rush meets the California Department of Fish and Wildlife's (CDFW's) definition of a special plant though it has no formal protection status by the CDFW or United States Fish and Wildlife Service (USFWS).

ADR Life History and Ecology

ADR Species Description and Life History

Dwarf rush (*Juncus leiospermus* F.J. Herm.), is represented by two varieties, var. *leiospermus* (Red Bluff dwarf rush), and var. *ahartii* (Ahart's dwarf rush), both of which are rare and endemic to California. The species is an annual in the rush family (Juncaceae) that is restricted to wetlands possessing vernal pool-type hydrology.

This inconspicuous species exhibits a tufted growth form, with a basal cluster of thread-like leaves exceeded by one to several erect, 1.9 to 11.6 centimeter-long, stiff, thread-like stems. One to seven flowers are born together in a compact cluster at the tip of each stem. The flower clusters are subtended by small (0.7 to 2.4 millimeters) bract scales. Flowers are small (1.5 to 4.6 millimeters) and comprised of 6 to 10 dark brown, pointed scales, three stamens, and a single ovary with a long (1.5 to 3 millimeters), three-branched style. The mature fruit capsule is similar to the flower scales in color and is equal, or slightly exceeding them in length. Ahart's

dwarf rush (*J.leiospermus* var. *ahartii*) is distinguished from the rare Red Bluff dwarf rush (*J.leiospermus* var. *leiospermus*) on the basis of the former having only one to two flowers per cluster, overall smaller size and fewer parts (Ertter 1986).

Other small annual rushes also occur in vernal pool habitat and may co-occur with Ahart's dwarf rush. Dwarf rush is distinguished from the closely related Yosemite rush (*J. triformis*) by the latter having slightly narrower stems (less than 0.4 millimeter), capsules shorter than flower scales, and flower scales that are unequal in length. Dwarf rush is most easily distinguished from toad rush (*J. bufonius* vars.) on the basis of having a simple versus a branched stem and terminal versus axillary flowers. Dwarf rush is readily distinguished from leafy-bracted dwarf rush (*J. capitatus*) by the former having a shorter inflorescence bract (0.7 to 2.4 millimeters versus five to 15 millimeters). Dwarf rush is distinguished from inch-high rush (*J. uncialis*) and vernal pool dwarf rush (*J. hemiendytus* vars.) by its comparatively long (1.5 to 3 millimeters) long style.

Ahart's dwarf rush, and annual vernal pool rushes in general, have received little attention from biologists or ecologists. Other than observations of field botanists and basic taxonomic and biogeographic treatments (Ertter 1986), the biology and ecology of Ahart's dwarf rush remains unstudied.

Since all vernal pool plant species share similar environmental selective pressures, they likely also share similar adaptive traits. For this reason, studies addressing the life history and ecology of other more common vernal pool plant species may provide some insight into the life history and ecology of Ahart's dwarf rush.

Ahart's dwarf rush shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to population's avoidance of the regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

The specific timing of the germination of Ahart's dwarf rush seeds relative to the timing of the vernal pool inundation cycle has not been studied or described. In general, a given vernal pool species may germinate either during the wetting phase or the inundation-phase of the vernal pool cycle (Keeley and Zedler 1998). Based on the preference of Ahart's dwarf rush for the outer margins of larger vernal pools, the margins of shallow vernal pools, and shallow swales (CDFG 2010; Dittes and Guardino pers. obs.) and its relatively early flowering date (late March), it might be expected that it germinates relatively early in the hydrological season during the wetting or early inundated-phase, in saturated, as opposed to inundated soil. Germination requirements, optima and the potential presence of seed dormancy for Ahart's dwarf rush have not been investigated.

One of the challenges posed to "deeply adapted" vernal pool plants is the need to photosynthesize and grow while submersed, and then transition into a terrestrial growth phase. Many vernal pool species exhibit an aquatic juvenile growth form that is different from the adult form. These morphological adaptations, not exhibited by Ahart's dwarf rush, facilitate light exposure and gas exchange under aquatic conditions, thus lengthening the growing season by maximizing growth while vernal pools are still inundated. The lack of this specialized dimorphism is further indicative of preference to the less-extreme inundation regimes of those encountered in the spectrum of vernal wetland types.

Dwarf rush flowers and sets seeds during the terrestrial phase of the vernal pool hydrologic cycle, typically in March and April (CNPS 2010). The very long style, and large stamens generally indicate an outcrossing breeding strategy (Hickman 1993), although breeding system and pollination strategies have not been investigated for this species. It is likely that these and other outcrossing annual *Juncus* are mainly wind-pollinated, although the potential for flower-visiting insects has not been studied.

Mature fruit capsules dehisce and release mature seeds by late spring to early summer (Dittes pers. obs.). Unlike some other vernal pool species (e.g., Orcuttiae grasses, pincushion navarretia), Ahart's dwarf rush does not appear to exhibit anti-dispersal adaptations, although the species often appears in small discrete aggregations amid larger areas of available habitat (Dittes pers. obs.). Natural dispersal of seeds, however limited, likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming ungulates (Griggs 1980).

The existence of a dormant soil seed bank is unknown for Ahart's dwarf rush. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

The population biology and genetics of Ahart's dwarf rush have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the highly limited number of occurrences and the scattered geographical distribution, all Ahart's dwarf rush populations should be considered unique, and important genetic entities.

ADR Habitat Requirements and Ecology

It is generally held that many of the endemic vernal pool plant species are relatively recent evolutionary derivations of more common and widespread upland progenitors (Stebbins 1976; Stone 1990; Raven and Axlerod 1978; Thorne 1984), likely including Ahart's dwarf rush. These neoendemic vernal pool species are thought to have evolved from terrestrial habitat into seasonally aquatic vernal pool habitat made available as the Mediterranean Climate developed and the inland Tertiary-age Sea dried.

In Eastern Sacramento County, the two Ahart's dwarf rush occurrences are associated with the Redding Gravelly Loam Series of the Arroyo Seco Formation. This soil series has a very gravelly hardpan approximately 28 inches below the surface and is strongly cemented with silica. These soils are typically acidic and conducive to the development of vernal pool hydrology).

Ahart's dwarf rush is strictly adapted to the vernal pool hydrologic cycle. It is of importance to conservation however, that in contrast to most of the more "deeply-adapted" vernal pool endemics, Ahart's dwarf rush occupies the more "flashy" hydrology of vernal pool margins, shallow vernal pools, and swales (Ahart pers. comm.; Dittes and Guardino pers. obs.; CDFG 2010). The closely related and comparatively more widespread Red Bluff dwarf rush is also known from vernally moist edges of groundwater seep areas as well. Quantified vernal pool dimensions are not given for any of the CNDDB occurrences.

Floristic associations provide further indication of preference for the more "flashy" portion of the spectrum of vernal pool hydrological cycles. In Butte County, Ahart's dwarf rush is most often observed with other "shallow pool" or "edge" species, including other annual rushes (toad rush; *Juncus bufonius*, leaf-bracted rush; *J. capitatus*, inch-high rush; *J. capitatus*), annual hairgrass (*Deschampsia danthonoides*), Sacramento Valley pogogyne (*Pogogyne zizyphoroides*), marigold navarretia (*Navarretia tagetina*), smooth cat's-ear (*Hypochaeris glabra*), hyssop loosestrife (*Lythrum hyssopifolium*), long-beaked hawkbit (*Leontodon taraxicoides*), cowbag clover (*Trifolium depauperatum*) and Fremont's goldfields (*Lasthenia fremontii*) (Dittes and Guardino pers. obs.; Ahart pers. comm.).

Although Ahart's dwarf rush is also recorded as occurring with the more "deeply-adapted" vernal pool endemics, including coyote thistle (*Eryngium castrense*), bractless hedge-hyssop (*Gratiola ebracteata*), tricolor monkey-flower (*Mimulus tricolor*), American pillwort (*Pilularia americana*), double-horned downingia (*Downingia bicornuta*), ornate downingia (*Downingia ornatissima*), white-headed navarretia (*Navarretia leucocephala*) and water pygmyweed (*Crassula aquatica*) (CDFG 2010), it usually is growing at the higher-drier edge of hydro-topographic position preferred by the latter species (Dittes and Guardino pers. obs.; Ahart pers. comm.). Interestingly,

Ahart's dwarf rush is also known to do well on disturbed gopher mounds along the margins of the wetlands as well (Ahart pers. comm.; Dittes and Guardino pers. obs.; CDFG 2010).

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural areas, and ruderal habitats. Italian wild rye (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), two non-native facultative wetland species, typically dominate vernal pool portions of disturbed wetlands in the Central Valley and can be invasive around vernal pool margins and in smaller, more ephemeral vernal pool types. Similarly, long-beaked hawkbit (*Leontodon taraxicoides*), another non-native annual, can dominate the edges of vernal pool and the basins of smaller pools and swales. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Since Ahart's dwarf rush occupies the margins of pools and smaller pools and swales, it may be more susceptible to the effects of excessive growth of Italian wild rye, Mediterranean barley, long-beaked hawkbit, and thatch buildup, than many of the other "more deeply-adapted" vernal pool rarities. As a case in point, Ahart mentions that some populations of Ahart's dwarf rush and other vernal pool species in his area have diminished over the years with concomitant increase in cover of European annual grasses (Ahart 2003 and pers. comm.).

Specific interactions between livestock grazing and Ahart's dwarf rush have not been investigated empirically. Some regimes of livestock grazing have been shown to benefit the floristic composition of vernal pools and associated upland annual grassland. Vernal pools included within livestock exclosures have demonstrated a "simplification" of floral composition with a shift towards dominance by Italian wild rye and Mediterranean barley (Robins and Vollmar 2002; Dittes pers. obs.). Uplands that are not grazed can shift in dominance towards Medusa-head grass and yellow-star thistle (*Centaurea solstitialis*). Appropriate livestock grazing regimes can result in reduction of cover by weedy grasses and thatch and opening of habitat at vernal pool margins by hoof-pocking. This in turn increases micro-habitat heterogeneity and provides germination and colonization opportunities for other native vernal pool species.

Field observations indicate that annual rushes, and many other associated vernal pool annuals do well on gopher mounds and between deep hoof print depressions in wetter areas, and within the puddled hoof prints around drier margins (Dittes pers. obs.). It has also been observed though, that in some cases at the Vina Plains Preserve in Tehama County, excessive trampling of shallow vernal pools can result in their obliteration as distinct topographical features, particularly on heavy clay soils (Schlising pers. comm.). Robins and Vollmer (2002)

provide a recent review of information pertaining to livestock grazing in vernal pool-annual grassland ecosystems.

Timing of grazing appears more important than stocking rates in affecting persistence of some vernal pool rarities (Stone *et. al*. 1988; Robins and Vollmer 2002). During the period when pools are inundated and upland forage is still green and attractive (late fall to early spring), cattle tend to not congregate in pools, and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. Once the upland forage cures and the vernal pools are in the flowering and seed-producing terrestrial phase (mid-spring to early summer), moist pools become more attractive to livestock, and trampling pressures are increased. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect on most vernal pool annuals, and may enhance the habitat by further reducing thatch and exposing soil for the following growing season (Ahart pers. comm.).

Ahart's dwarf rush is small enough to escape grazing pressures by livestock (except perhaps sheep). The most vulnerable stage of Ahart's dwarf rush is probably after pool margins have dried and the plant is in flower, before seed matures. It likely will not attract grazers, but if trampled at this point in the life cycle, seed production may be limited. However, with many vernal pool species of such small stature, at least some individuals escape livestock trampling pressures during most years except under all, but the most severe grazing regimes.

Although none are specifically reported to co-inhabit vernal pools with Ahart's dwarf rush, several non-native weedy hydrophytes may present future problems. Mannagrass (*Glyceria occidentalis*), an aggressive weed of irrigated agriculture and degraded vernal pools, has already been reported as a potential problem at vernal pools in the region. Additional species to consider include rosy lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), swamp pricklegrass (*Crypsis schoenoides*), crabgrass (*Cynodon dactylon*) and paradox canary-grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), another native species, can also dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

ADR Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Ahart's dwarf rush are identified in Table G-3.3-1 and have been derived from input from local species experts.

Table G-3.3-1. Habitat Elements for Ahart's Dwarf Rush

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

ADR Species Distribution and Population Trends

ADR Range Wide Distribution

Presently, Ahart's dwarf rush is recorded from 10 CNDDB occurrences scattered throughout the Great Central Valley, from Calaveras County in the south to Tehama County in the north (CDFG 2010). These occurrences are all situated at sites ranging from 100 to 320 feet in elevation, and with the exception of the occurrence in Calaveras County (San Joaquin Valley Subregion) and the occurrence in Tehama County (North Coast Ranges Subregion), all lie within the Sacramento Valley Subregion of the Great Valley Region of the California Floristic Province (Hickman 1993).

ADR Central Valley Distribution

The northernmost occurrence of Ahart's dwarf rush is located in Tehama County. Four occurrences are found in Butte County, one in the vicinity of the Oroville Municipal Airport, south of Chico and three on the Peter Ahart Ranch, near Honcut (CDFG 2010). The single occurrence in Yuba County is located south of Honcut Creek near the Butte County line. Two occurrences are located in central Sacramento County, and the southernmost occurrence is located in the northwest portion of Calaveras County (CDFG 2010).

ADR Distribution within the Planning Area

Currently, there are two documented CNDDB occurrences of Ahart's dwarf rush in Sacramento County and the two not-yet-recorded occurrences, each of which is found within both the Planning Area and UDA (CDFG 2010; Mather Field date unknown; Wetland Research Associates 2004). Figure ADR-1 shows these occurrences. One of the occurrences (CNDDB occurrence #7)

is located southeast of Rancho Cordova on private land southeast of the intersection of Kiefer Boulevard and Sunrise Boulevard. The other occurrence (CNDDB occurrence #8) is located approximately 1.75 miles to the northwest on Mather Field. The two occurrences not yet recorded are located on Mather Field north of Kiefer Boulevard.

It is important to note that owing to its small stature, preference for vernal pool margins and swales, early flowering season, and the area of remaining unsurveyed or partially surveyed habitat, moderate to high potential exists for discovery of additional populations of Ahart's dwarf rush within the Planning Area.

Table G-3.3-2 shows the soil series, geological formation and landform associations for the two Ahart's dwarf rush occurrences in Sacramento County that are recorded in the CNDDB. Generally, this species is associated with old terrace remnant alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene between 600,000 and 1,500,000 years ago. Though the distribution of the taxon is extremely disjunct, the modeled habitat of Ahart's dwarf rush is discussed in Section F-4 of this appendix.

Table G-3.3-2. Extant CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations For Ahart's dwarf rush In Sacramento County

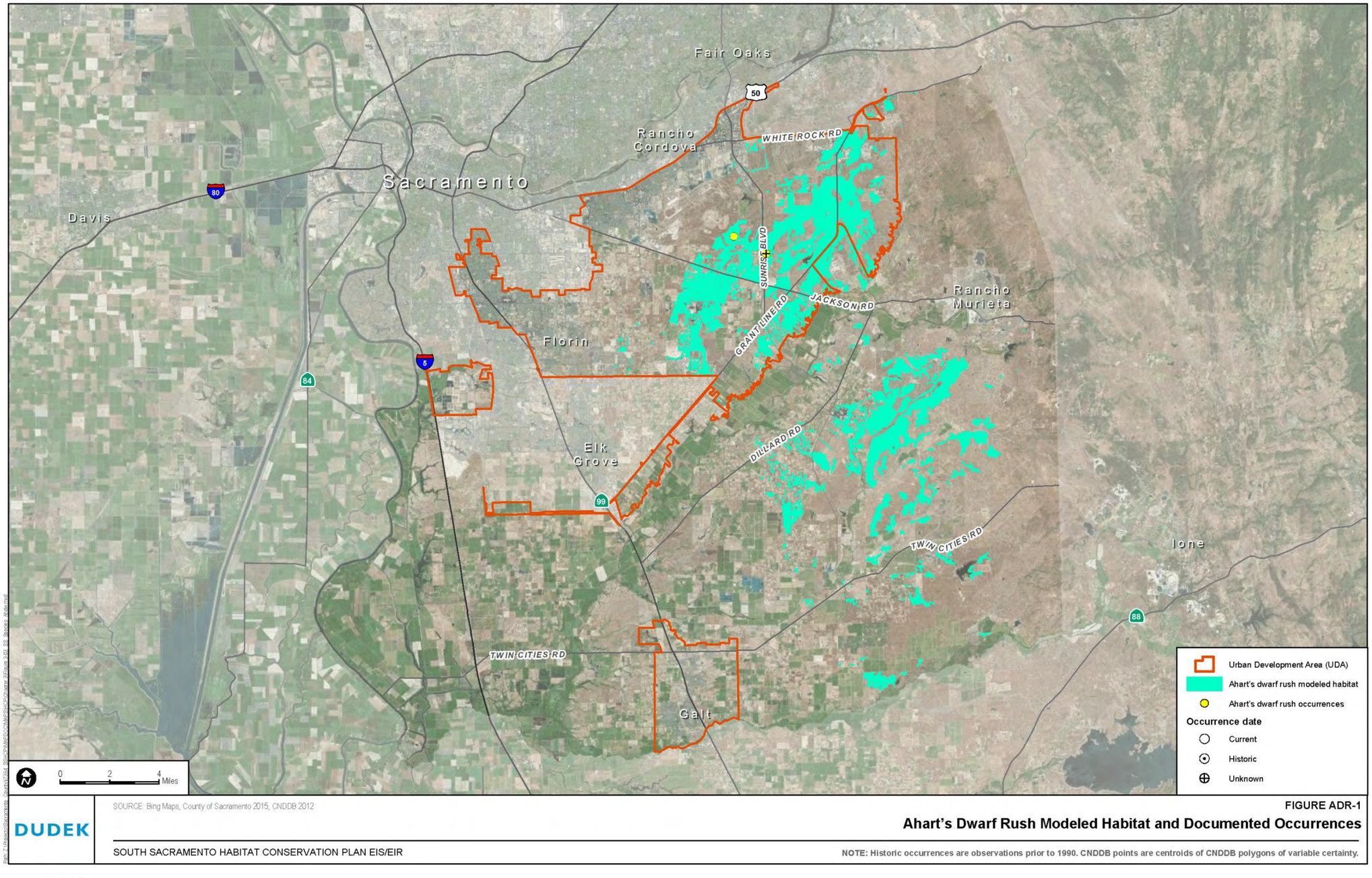
CNDDB Occurrence #	Quadrangle	Soil Series[a]	Geological Formation and Landform
7	Buffalo Creek	Redding gravelly loam	Arroyo Seco Formation Remnant high terraces
8	Carmichael	Redding gravelly loam	Arroyo Seco Formation Remnant high terraces

[a] Soil series information based on what USDA soil survey type occurs at the CNDDB species location (USDA 1993)

ADR Population Levels and Trends

Ahart's dwarf rush is known from a total of 10 CNDDB occurrences, all in California, including four in Butte County, two in Sacramento County, and one in each of Calaveras, Placer, Tehama and Yuba Counties (CDFG 2010).

Figure ADR-1 Ahart's Dwarf Rush Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Of the 10 documented occurrences presumed extant, one in Sacramento County (CNDDB occurrence #7) is listed as "Possibly Extirpated" (CDFG 2010). The other Sacramento County occurrence, presumed extant (CNDDB occurrence #8), was observed to support approximately 300 plants in 2001 (CDFG 2010). The Tehama County occurrence is reported as supporting 750 plants as of 2004. The Calaveras County population was observed to support approximately 100 plants among three vernal pools in 1987, the last time this population was recorded (CDFG 2010). The Placer County occurrence, reported as supporting 45 plants in 1990, is on land proposed for development. The Yuba County occurrence was reported as supporting several hundred plants among three colonies in 1998 (CDFG 2010). The northernmost occurrence (CNDDB occurrence #4) was observed to support several hundred plants in the spring of 2003 (Dittes and Guardino pers. obs.). The occurrences on the Peter Ahart Ranch are presumed extant, but it and other vernal pool species in the area likely have diminished over the last few decades concomitant with an overall increase in range productivity and increasing abundance of weedy annual European grasses (Ahart pers. comm. 2003). Table G-3.3-3 shows the population estimates of the CNDDB occurrences.

Table G-3.3-3. Population Estimates for CNDDB Occurrences

CNDDB #	# of Pools Observed	Range of Population Estimates
7	Unknown	1999: 4 plants
8	Unknown	2000: 300 plants

It is impossible to determine the number of historically occurring Ahart's dwarf rush populations or the acreage of suitable habitat lost to historic agricultural and urban land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978); however, owing to habitat specificity, only a subset of the vernal pool habitat lost within the natural range of the species may have provided suitable habitat for Ahart's dwarf rush. Effects of historic livestock grazing combined with drought and habitat alterations relating to development of non-native annual grassland are unknown as well.

There has been no comprehensive effort to monitor any of the known populations of Ahart's dwarf rush. Numbers of individuals have not been recorded for the populations since their discovery and the overall population dynamics for this plant are unknown.

Studies involving other vernal pool plant rarities, including Orcuttiae grasses and Hoover's Spurge have demonstrated marked fluctuation in numbers of individuals within populations between years (Griggs and Jain 1983; Holland 1987; Alexander and Schlising 1997). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and

between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). It is not known however, if Ahart's dwarf rush exhibits a similar between-year pattern.

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Ahart's dwarf rush population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another critical aspect of population demography is the presence and nature of the soil seed bank, which is unknown for Ahart's dwarf rush.

ADR Threats to the Species

Potential threats to Ahart's dwarf rush include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, hydrological alteration of sub-watersheds and associated vernal pool habitat, shifts in competitive interactions (hydrological mediated or invasive weedy species), inappropriate livestock grazing regimes (none, mid-spring rotations, sheep vs. cattle), recreational vehicle use, equestrian and pedestrian traffic, refuse dumping, windblown refuse accumulation, air pollution and global climate change.

Proposed development is a threat to one of the Sacramento County Occurrences (CNDDB occurrence # 7). This population is now listed as "Possibly Extirpated" (CDFG 2010). Proposed development of an aggregate mine was stated as a threat to the only other Sacramento County Occurrence (CNDDB occurrence #8) in 2000. This occurrence is now within the boundaries of the proposed Mather Field Vernal Pool Preserve. Off-road vehicle traffic, road construction, cattle grazing, surrounding development and a proposed subdivision are stated as threats for the single Placer County occurrence (CNDDB occurrence #3). Power line corridor maintenance activities are stated as a threat to the single Yuba County Occurrence (CNDDB occurrence #9). No threats are stated for the Calaveras County population (CNDDB occurrence #2). The Butte County occurrences in the vicinity of Honcut (CNDDB #1, #5, and #6) have no threats stated in the CNDDB. According to Ahart though (pers. comm. 2003), these populations may be experiencing a decline in vigor associated with increasing range productivity and increasing abundance of annual European grasses.

ADR Data Gaps and Conservation Implications

Despite its distinctive appearance and extreme rarity, Ahart's dwarf rush has received little research attention from botanists or ecologists. Aside from general observations of field workers provided in the CNDDB and the taxonomic work of Ertter (1986), nothing else exists regarding the biology, ecology, pollinators, breeding system, population genetics, habitat

relationships, population levels, trends or threats associated with this taxon. Pertinent data gaps, implications for conservation, and operating assumptions include:

ADR Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Planning Area and elsewhere within the range of the species. In the Planning Area, discovery of new populations may occur on the large dry-land ranchlands, public and quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of Sacramento County.

ADR Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

Ahart's dwarf rush has a geographic association with old alluvial terraces possessing acidic soils primarily of the Redding Series. The exact nature of this relationship is however, unknown. It is unknown if soil pH or other edaphic factors influence Ahart's dwarf rush distribution and population vigor. It is possible that the presence of functioning vernal pools, regardless of landform, soil series and soil pH can provide suitable habitat.

ADR Unknown Pollination Ecology

The pollination ecology of Ahart's dwarf rush has not been studied. Floral morphology (long style and style branches, exerted anthers) suggests an outcrossing breeding strategy. The inconspicuous scale-like flower parts and lack of nectar suggest wind pollination, as with most other graminoids (grasses, sedges, rushes, and other grass-like plants). Without knowing specific aspects of pollination ecology, it is difficult to ascertain the importance of associated uplands in the design and management of preserves supporting Ahart's dwarf rush.

It is well documented that specific co-evolved bee species are depended on by a guild of vernal pool plant species. Conservation of these vernal pool plant communities depends on inclusion of adequate areas of surrounding functioning upland habitat to maintain populations of the co-evolved ground-dwelling bees. Some suggest that buffers of up to ½-mile around vernal pools might be needed (Robin Thorp, e-mail to D. Burmester 2003).

ADR What Constitutes Population Vigor, and How to Measure?

Population vigor and population dynamics, including year-to-year variability in abundance, have not been studied for Ahart's dwarf rush. The existence of a dormant soil seed bank, a critical contributor to population stability in some other vernal pool species, is unknown for Ahart's dwarf rush as well. Other rare vernal pool species have been shown to be highly variable in abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors

contributing to year-to-year population fluctuations may be difficult to identify (Alexander and Schlising 1997). Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

ADR Specific Hydrological Requirements of Ahart's dwarf rush

Data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting Ahart's dwarf rush populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor and/or assess hydrological suitability of Ahart's dwarf rush-vernal pool habitat within established preserves. Similarly, assessment of potentially suitable Ahart's dwarf rush habitat for preserve establishment or for detection of the species at this time must rely on generalities.

ADR Existing Hydrological Trend of Pools and Existing Indirect Effects

Extant Ahart's dwarf rush populations may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown Existing Conditions Ahart's dwarf rush conditions may not be pristine, so if trends in vigor or habitat quality become apparent over time, it may be difficult to attribute trend to any specific management activity.

ADR Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990).Proposed preserve designs may not afford complete protection to the hydrological systems that support Ahart's dwarf rush and other species assemblages dependent on them.

ADR Definition of Appropriate Scale Ahart's dwarf rush-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective Ahart's dwarf rush-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve

at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark *et. al*. 1998).

ADR Determination of an Appropriate Livestock Grazing Regime

Specific grazing regimes have not been formulated for annual grassland pasture systems with Ahart's dwarf rush-occupied pools, although grazing and monitoring of vernal pool-annual grassland stems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002).

Ahart (2003 and pers. comm.) emphasizes the need to graze vernal pool-annual grasslands, particularly those supporting Ahart's dwarf rush, to maintain vernal pool diversity and the "vernal pool edge" habitat that Ahart's dwarf rush and many of the showy vernal pool annuals require. This upper, drier topographic-hydrologic microhabitat on the edge of a vernal pool has been termed the "transition zone" between the wetter vernal pool habitat and the surrounding upland annual grassland matrix (Schlising and Sanders 1982).

Since Ahart's dwarf rush occupies small and/or shallow vernal pools, or the edges of larger pools, management of Italian wild rye and Mediterranean barley in and around pools and Medusa-head grass in surrounding uplands should be of particular management concern. Ahart states that for this species, it is better to err on the side of overgrazing (Ahart pers. comm. 2003).

Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

ADR Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, bindweed, lippia, paradox canary-grass, long-beaked hawkbit, cocklebur and cattails. None of these are reported to co-inhabit Ahart's dwarf rush-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in Ahart's dwarf rush-occupied pools over time. Italian Rye and Mediterranean Barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to Ahart's dwarf rush, owing to the latter's preference for small to medium size vernal pools. Similarly, Medusa-head grass in uplands should be monitored and controlled. Potential competitive interactions with these species may affect the vigor of Ahart's dwarf rush populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect Ahart's dwarf rush populations.

ADR Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine design preserves for multi-species conservation. Suitability of Ahart's dwarf rush habitat for supporting other rare plant species has not been specifically addressed. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well. Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime after May 15 may be compatible with or even benefit some Ahart's dwarf rush-associated pool complexes, but may be detrimental to other later-flowering species depending on those complexes (e.g., slender Orcutt grass).

ADR Genetic Variation (Spatial and Temporal [Seed Bank], Genetic Drift, Genetic Bottlenecks)

Population genetics for Ahart's dwarf rush are completely unknown. Current limitations in our understanding of Ahart's dwarf rush population genetics have little immediate conservation implication, given the extreme rarity of Ahart's dwarf rush.

ADR Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is completely unknown for Ahart's dwarf rush. There have been no studies addressing the presence of a soil seed bank, seed dormancy or longevity. From the perspective of conservation, knowledge of site specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

ADR Inoculation

Since there are so few natural populations of Ahart's dwarf rush in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied Ahart's dwarf rush habitat, create meta-population structure at extant occurrences where single pools may support the species, and ensure existence should any natural populations become compromised.

ADR Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter. ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant Ahart's dwarf rush occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Ahart's dwarf rush, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect Ahart's dwarf rush and other native plant species.

ADR Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology. It is likely that given the expected global climate trends, a vigor response of some kind could be expected for Ahart's dwarf rush populations within the study period of this EIS/EIR, or at some time beyond.

ADR Literature Cited

Ahart, L. 2003. Thoughts on *Juncus leiospermus* var. *ahartii*. Unpublished note given to John Dittes.

Ahart, Lowell. Retired Rancher, Botanist, Oroville, California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. *In*: Castri, F di, Mooney, H.A. (eds) Mediterranenan type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2000. Biological information-Slender Orcutt Grass. Accessed online October 26, 2002 at http://www.dfg.ca.gov/hcpb/species/jsp/more_info.jsp?specy=plants&idNum=178.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

Day, A.G. 1993. New taxa and nomenclatural changes in *Allophyllum, Gilia*, and *Navarretia* (Polemoniaceae). *Novon* 3(4): 331-340.

Day, AG. 1995. Sessile-flowered species in the Navarretia leucocephala group (Polemoniaceae). *Madrono* 42(1):34-39.

DeVilla, Bill. Consultant, Owner Ecosystems West, Ben Lomond, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Ertter, B. 1986. The Juncus triformis complex. *Memoirs of the New York Botanical Garden,* 39:1-90.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. *In* Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 1981. 1981a. Life histories of vernal pool annual grasses. *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management. *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3 or 4) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones & Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Slender Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1981. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*, 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Keeley, J.E. and P.H. Zedler. 1998. Characterization and Global Distribution of Vernal Pools. Pp. 1-14 *in*: C.W. Whitham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California. 1998.

Leidy, R.A. and E.G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones & Stokes, Sacramento, California.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18:1 pp. 18-29.

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J.R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. *American Journal of Botany* 69: 1082-1095.

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. *Fremontia* 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. Soil Survey of Sacramento County, California. April. U.S. Department of Agriculture. Sacramento, California.

Stebbins, G.L. 1976. Ecological islands and vernal pools. *Fremontia* 4(3):12-18.

Stone, R.D., 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment. Pp. 89-108 *in:* D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants: their habitatand biology. Studies from the Herbarium Number 8, California State University, Chico, California.

Stone, Douglas. Ph.D. Candidate, University of California, Berkeley, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Thorne, R.F. 1984. Are California's vernal pools unique? Pp 1-8 *in:* S. Jain and P. Moyle (Editors). Vernal pools and intermittent streams. Institute of Ecology, University of California, Davis, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Restoration Ecologist EDAW, Sacramento, California.

USDA (United States Department of Agriculture, Natural Resources Conservation Service). 1993 (April). *Soil Survey of Sacramento County, California*. USDA Natural Resources Conservation Service in cooperation with the Regents of the University of California. Accessed September 2015. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA067/0/sacramento.pdf.

United States Fish and Wildlife Service (USFWS). 1997. Determination of Endangered Status for *Orcuttia pilosa, Orcuttia viscida, Tuctoria greenei* and Threatened Status for *Castilleja campestris* ssp *succulenta, Chamaesyce hooveri, Neostapfia colusana, Orcuttia inaequalis* and *Orcuttia tenuis*. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

Wetland Research Associates. 2004. Mather Field Natural Resources Assessment Phase I&II, February 5, 2004. Sacramento, California.

Witham, C. W. 2006. 2006 Focused Field Survey Ahart's Dwarf Rush. Prepared for County of Sacramento. September 21, 2006. Sacramento, California.

Witham, C. W. 2007. 2007 Focused Field Survey Ahart's Dwarf Rush. Prepared for County of Sacramento. September 4, 2007. Sacramento, California.

Witham, C. W. 2008. 2008 Focused Field Survey Ahart's Dwarf Rush. Prepared for County of Sacramento. September 2, 2008. Sacramento, California.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H., 1990. Life histories of vernal pool vascular plants. Pp. 123-146 *in:* D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants: their habitats and biology. Studies from the Herbarium Number 8, California State University, Chico, California.

LEGENERE (LEG)

Legenere (LEG)

(Legenere limosae)

Status USFWS: None

Status CDFW: None

Status CNPS: 1B.1



© 2000 John Game (Calphotos)

LEG Listing Status

Legenere (*Legenere limosa*), a vernal pool endemic, is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a List 1B Species by the California Native Plant Society (CNPS) (CNPS 2010). It has been assigned an R-E-D Code of 2-3-3, meaning it is distributed in a limited number of occurrences, occasionally more if each occurrence is small, it is endangered throughout its range, and entirely restricted to California.

Being a CNPS List 1B plant species, legenere meets the California Department of Fish and Wildlife (CDFW) definition of a special plant though it has no formal protection status by the CDFW or United States Fish and Wildlife Service (USFWS).

LEG Life History and Ecology

LEG Species Description and Life History

Legenere is an inconspicuous annual in the Bellflower family (Campanulaceae). This species has slender, sprawling, sometimes branched stems that can grow from 10 to 30 centimeters in length. These stems may also root at the nodes. Small one to three centimeter-long leaves are arranged alternately on the stem; the lower (submersed) ones are linear and early deciduous and the upper ones (emersed) are proportionally shorter, wider and oblong-lanceolate to oblanceolate (Mason 1957), or narrowly triangular (Hickman 1993; Oswald 1994). The inflorescence is a terminal raceme with flowers and fruit born on slender six to 20 millimeter-long stalks (pedicels). These flowers are alternately arranged along an often zig-zag central axis. Each flower stalk is subtended by a six to 12 millimeter-long leaf-like bract. Flowers consist of an inferior ovary, five narrowly triangular green sepals that are 1/2 to 1/3 the length of the

ovary, and five greenish-white to yellowish petals (two to four millimeter-long) that are unequally united into a two-lipped, five-lobed corolla with a tubular base. The lower flowers often lack petals entirely. The +3.5 millimeter-long obconic ovary elongates as it matures, eventually becoming a cylindrical fruit that reaches six to 10 millimeter in length and one to two millimeter diameter.

Legenere is a monotypic genus with no close relatives in North America Stone (1990). When in full fruit and without petals present however, legenere might be confused with potentially co-occurring with downingia (*Downingia* spp.). Mature downingias, however, lack the often up-curved, narrow pedicel (stalk) that subtends each cylindrical fruit. Downingias also do not exhibit the often zig-zag central axis of the inflorescence.

The genus *Legenere* has received little empirical study from biologists or ecologists and other than basic taxonomic and biogeographic treatments, legenere remains mostly unstudied. Ecological information resulting from observations of field botanists exists primarily as a result of land management and Agency-related resource surveys (Holland 1983; Platenkamp 1998; CDFG 2010).

LEG Ecological Life Cycle

Legenere shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to the population's avoidance of the regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

LEG Seed Germination

The specific timing of germination of legenere seeds relative to the timing of the vernal pool inundation cycle has not been described in detail. Seeds are reported to germinate under water in late February to April (Holland 1983). Seed longevity, dormancy characteristics, germination requirements and germination optima for legenere have not been investigated.

LEG Vegetative Growth

One of the challenges to many vernal pool plant species is optimization of physiological processes in both the early season aquatic and later season terrestrial phases of the vernal pool cycle. For legenere, the principal structural adaptation to amphibious growth appears to be production of thin linear aquatic leaves, and thicker, proportionately wider aerial leaves. Although not determined for legenere, it has been shown in other amphibious vernal pool plants that the aquatic leaves lack both waxy cuticle and stomates, in this respect differing from adult aerial leaves (Keeley 1990). These juvenile leaves optimize photosynthesis in the aquatic

environment and maximize growth while vernal pools are still inundated, thus lengthening the vernal pool-growing season.

LEG Reproduction

Legenere flowers and sets seeds during the dry-down phase of the vernal pool hydrologic cycle, sometimes while shallow water or inundated soil remains in the deepest parts of the pool basin (Dittes pers. obs.). Flowering and fruit maturation occurs from April through June (CNPS 2010; CDFG 2010), and likely varies by vernal pool depth/ponding duration and conditions of the season. Although pollination and breeding experiments have not been carried out for legenere, the reduced white flowers and flowers without corollas suggest a self-pollinating breeding system. Oswald (1994) has observed completely cleistogamous plants (flowers never open) in the Northern Sacramento Valley, which further indicates self-compatibility. Plants typically produce from several to 10 or more fruit, with each fruit containing up to 20 small smooth brown seeds (Holland 1983).

LEG Dispersal

Short-distance seed dispersal in legenere appears to be naturally limited by the mature fruit capsule, which only partially opens at its apex. Seeds can remain in the mature capsule after disintegration of the mother plant, potentially being transported by flowing water during the following fall-winter inundation phase (Holland 1983). Seed dispersal is naturally limited in a suite of other vernal pool plant species. This adaptive trait is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974, 1980; Zedler 1990).

Evidence of long-distance dispersal and colonization exists in the overall geographic distribution of this species in northern California. Natural dispersal of legenere seeds likely occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming native ungulates (Griggs 1980).

LEG Seed Dormancy

Seed dormancy and a stored soil seed bank is indicated by observation of multi-year periods with insufficient precipitation where legenere plants were absent, followed by reappearance during following favorable-hydrology growing seasons (Holland 1983; CDFG 2010). Seed longevity and seed abundance in the soil has not been investigated. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or

fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

LEG Population Genetics

Population genetics of legenere have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. In general, self-pollinating species tend to exhibit low levels of intrapopulation variation and a high degree of between population divergences. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the limited number of occurrences in the Planning Area and the scattered geographical distribution, all intra-pool legenere populations should be considered unique, and important genetic entities.

LEG Habitat Requirements and Ecology

LEG Biogeography and Landform Relations

Legenere is strictly associated with the vernal pool-type hydrologic cycle. Over its geographic range, this species is found in several vernal pool physiographic/edaphic settings, including northern basalt, northern claypan, northern hardpan, northern volcanic ashflow, and northern volcanic mudflow vernal pools (Holland 1983). In Sacramento County, legenere is associated with vernal pools located on various geologic surfaces, including the Laguna, Mehrten, Riverbank, Undifferentiated Surficial Alluvial Deposit and South Fork Gravels. For this reason, it is more likely that presence of wetland habitat with suitable vernal pool-type hydrology is a more important factor in determining the geographical distribution of this species than is geologic surface or soils. All well-developed vernal pools, regardless of landform association, should be considered potentially suitable habitat for legenere.

LEG Hydrology Relations

Legenere is a strict endemic of the vernal pool hydrologic cycle. This species grows in well-developed vernal pools and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies (small lakes, ponds, stock ponds), and basins within seasonal drainages (Holland 1983; CDFG 2010). Legenere has been reported to inhabit vernal wetlands ranging in size from 40 square feet to 100 acres (Holland 1983). Topographical position within pools and associated plant species indicate tolerance of, or preference for, the more extreme (longer-duration) inundation regimes encountered in vernal wetlands. It is interesting to note however, that in the larger/deeper pools encountered by Holland (1983), legenere was reported as not inhabiting basin positions deeper than eight inches ponding depth.

LEG Biological Community Relations

Floristic associations provide further indication of preference for more extreme vernal pool hydrological cycles. Legenere most frequently co-occurs in micro-sites with smooth goldfields (*Lasthenia glaberrima*) and common spikerush (*Eleocharis macrostachya*) (CDFG 2010). Both are typically associated with well-developed large or deep pools with longer periods of inundation, as well as with vernal marshes, permanent marsh edges and the seasonally fluctuating margins of stockponds. Most rare plant species found with legenere are also inhabitants of pools with longer duration inundation, including slender Orcutt grass (*Orcuttia tenuis*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), and Sanford's arrowhead (*Sagittaria sanfordi*). Other associates indicative of well-developed vernal pool hydrology include three-sepaled buttercup (*Ranunculus bonariensis* var. *trisepalus*), coyote thistle (*Eryngium castrense*, *E. vaseyi*), bractless hedge-hyssop (*Gratiola ebracteata*), downingias (*Downingia bicornuta*, *D. cuspidata, D. ornatissima*), flowering quillwort (*Lilaea scilloides*), and American pillwort (*Pilularia americana*).

Other vernal pool endemics reported as occurring with legenere include common inhabitants of shallower and/or smaller to medium-size vernal pools with shorter duration ponding, or the slopes and edges of larger or deeper pools. These species include Fremont's goldfields (*Lasthenia fremontii*), white-headed navarretia (*Navarretia leucocephala*), stalked popcorn-flower (*Plagiobothrys stipitatus*), bracted popcorn-flower (*P. bracteatus*), wooly marbles (*Psilocarphus brevissimus*), dwarf downingia (*Downingia pusilla*), annual hairgrass (*Deschampsia danthonioides*), and Douglas' meadowfoam (*Limnanthes douglasii*).

LEG Non-Native Weed Relations

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye (*Lolium multiflorum*), and Mediterranean barley (*Hordeum marimum* ssp. *gussoneanum*), two non-native facultative wetland species, typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types and the margins of larger/deeper ones as well. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Since legenere occupies medium to larger or deeper vernal pools, it may not be particularly susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch build-up, as with the more deeply-adapted Orcuttiae grasses and Bogg's Lake hedge-hyssop.

Weedy hydrophytic species presently reported as growing with legenere include mannagrass (*Glyceria occidentalis declinata*) and lippia (*Phyla nodiflora*). Although not-yet reported to co-inhabit vernal pools with legenere, other non-native weedy hydrophytes may present future problems. These species include swamp pricklegrass (*Crypsis schoenoides*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), Bermuda grass (*Cynodon dactylon*), and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), a native species, can also become weedy and dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

LEG Livestock Grazing Relations

In general, appropriately timed dry-pasture livestock grazing regimes are thought to be compatible with the persistence of vernal pool vegetation. Robins and Vollmer (2002) provide a review of information pertaining to livestock grazing in vernal pool ecosystems.

Livestock grazing is reported as a threat at a number of populations (CDFG 2010), however many extant populations of legenere inhabit long-operating cattle ranches. Persistence in un-irrigated pasture systems indicates tolerance for at least some level of grazing. In most cases, timing of livestock grazing is likely more important than stocking rates in affecting persistence of legenere, as it is for the Orcuttiae grasses (Stone et al. 1988). During the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools, and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. As the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. Excessive trampling and grazing during this period may negatively affect legenere, and other vernal pool species. Grazing in the summer and fall months, after seeds have set and plants have died likely has little negative effect on legenere.

It should be noted however, of all vernal pool rarities, legenere is the only one with a decumbent or sprawling habit, and it tends to intermingle with a comparatively succulent mass of intertwined smooth goldfields (*Lasthenia glaberrima*) stems. This growth habit, combined with typically low population numbers may make legenere somewhat more susceptible to inappropriately timed livestock grazing. For most other vernal pool annuals, small stature and high plant densities ensure that in all but extreme cases, a portion of every year's cohort escapes destruction, matures, and sets seed.

LEG Disturbance Response

With exception to persistence of some populations within operating ranches, little is known about the potential response of legenere to other disturbances. One wetland in Sacramento

County, observed to support up to 1,000 to 10,000 plants in 1991 (CNDDB occurrence # 33), has been "…disked annually for firebreak" (CDFG 2010). Another "large vernal pool" in Tehama County, "ripped and filled in Fall of 1994," was observed to support an estimated 1,000 legenere plants in 1995 (CDFG 2010).

Populations of several other rare vernal pool species, including Orcuttiae grasses and dwarf downingia, as well as more common species, may persist despite periodic disking of their resident pools over decades (Hoover 1941; Crampton 1959; Stone et al. 1988; Ahart pers. comm.; Kelsey pers. comm.; Dittes pers. obs.; CDFG 2010). It is exceedingly important to note that in these cases, disking is not so deep as to significantly affect the subtending impermeable layer or the vernal pool hydrological cycle. In addition, the disking is performed in the late summer or fall months in preparation for dry land winter grain crops, so vernal pool plants have set seed and dried. If this disking occurs earlier in the growing season, before seeds are mature, over consecutive years population extirpation is probable through exhaustion of the soil seed bank.

LEG Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for legenere are identified in Table G-3.4-1 and have been derived from input from local species experts.

Table G-3.4-1. Habitat Elements for Legenere

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

LEG Species Distribution and Population Trends

LEG Species Distribution

Legenere was first collected in 1890 from Solano County, California. Since that time, 61 occurrences have been recorded in the California Natural Diversity Data Base (CNDDB) (CDFG 2010), ranging from Santa Clara County in the south to southern Shasta County at the northern edge of the Great Central Valley. Legenere occurrences are distributed among four of the Geographic Sub-regions of the California Floristic Province, as described by Hickman (1993), including the San Joaquin Valley, Sacramento Valley, Inner Coast Range and Cascade Range Foothills. Elevations of legenere occurrences range from one to 880 meters (three to 2,887 feet) (CNPS 2010).

Sacramento County has the largest number of legenere occurrences with 23 of the 61 occurrences (38 percent) represented. Solano County has the second largest number with 12 occurrences (~20 percent), followed by Tehama County with five occurrences reported (~eight percent). The remaining 21 occurrences are found in Lake, Placer, Yuba, Sonoma, Alameda, Napa, Santa Clara, Shasta, San Mateo, San Joaquin and Stanislaus Counties which each have three or fewer occurrences (CDFG 2010).

Legenere's comparatively wide geographic and elevation distribution may partially reflect comparatively broad habitat requirements, or preference for a more commonly occurring vernal pool hydro-period. It may also reflect a higher propensity for seed dispersal by waterfowl, or even a different "biogeographic legacy" (e.g., timeline of evolution and geographic distribution of ancestral taxon).

LEG Central Valley Distribution

The Central Valley supports 52 (85 percent) of the 61 recorded legenere occurrences. The two southernmost occurrences, one of which is extirpated, are located in the Central Valley in northern San Joaquin County, approximately three miles southeast of the City of Galt. The next occurrence to the north is in southern Sacramento County, located approximately 7.5 miles away, just south of the Cosumnes River. An additional 22 occurrences are recorded from Sacramento County, these being widely distributed from near Interstate 5 near the western edge of the county, to the vicinity of Arkansas Creek along the eastern county line, to just northeast of Rio Linda, near the county's northern boundary (CDFG 2010).

Another population center, comprised of 12 clustered occurrences is located approximately 15 miles to the west in Solano County. A gap of approximately 12 miles exists between the northernmost Sacramento County occurrence and the two closely situated occurrences in Placer County. Another two occurrences are located approximately 19 miles further north of the Placer County occurrences in southwest Yuba County. A distance of approximately 70 miles

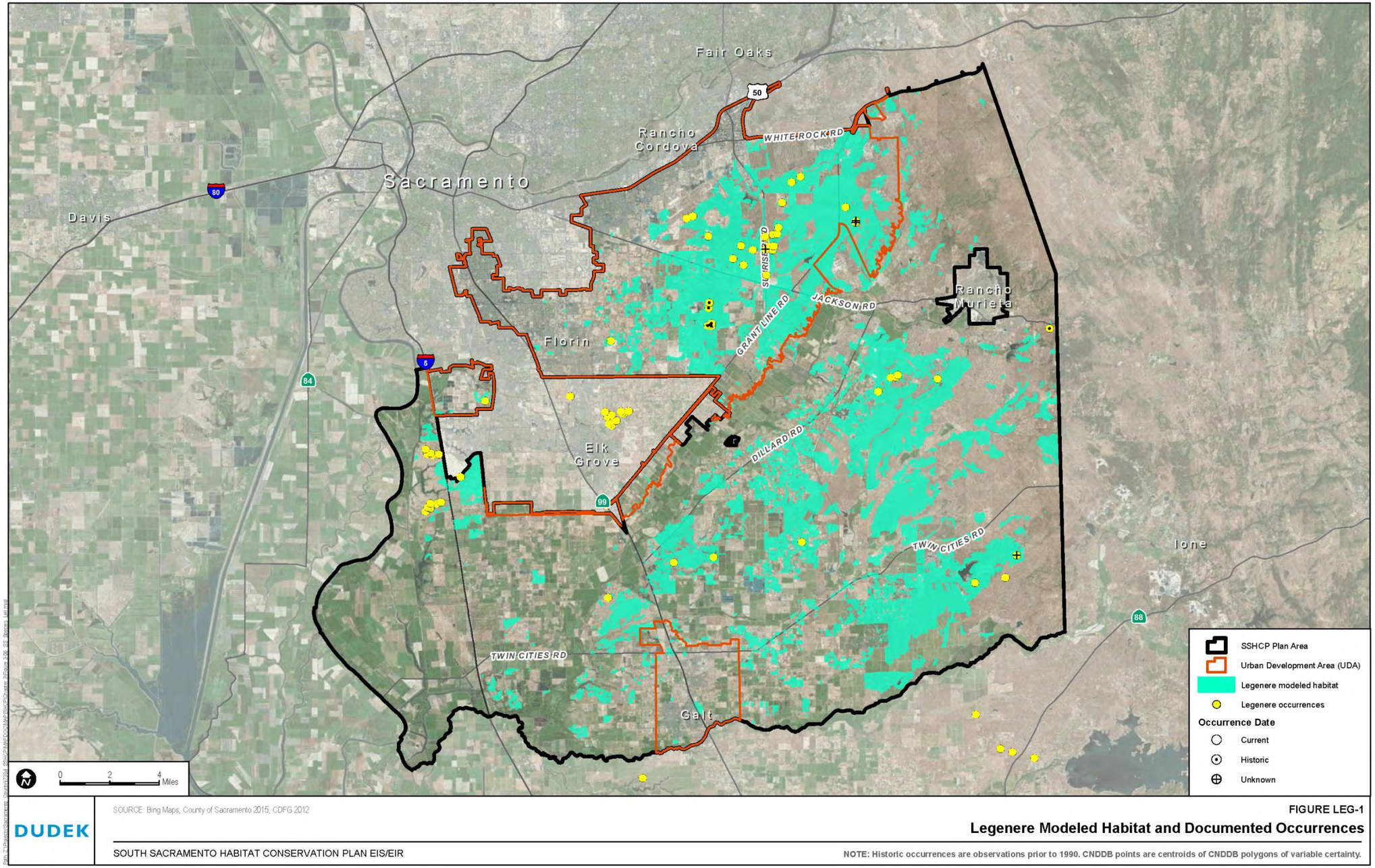
separates the southernmost of the two Tehama County occurrences from the Yuba County occurrences to the south. In Tehama County, the southern most of the two occurrences is located between Corning and Black Butte Lake in southern Tehama County, and the other is located approximately 15 miles to the northeast, west of the Sacramento River near Gerber. The northernmost Central Valley legenere population is comprised of a single occurrence southeast of Redding at the Stillwater Plains (CDFG 2010). Although suitable habitat exists in Butte County, legenere has not yet been encountered there.

LEG Distribution within the Planning Area

Of the 23 CNDDB legenere occurrences presently known in Sacramento County, 21 are located within the Planning Area (Figure LEG-1). The two outlying occurrences, one of which is extirpated, are located near the northern Sacramento County line, in the vicinity of Rio Linda (CNDDB occurrences #32 and #33). Of the 21 extant occurrences in the Planning Area, 15 are located within the UDA, and six are outside (CDFG 2010). One additional legenere occurrence not yet recorded in the CNDDB is located within the UDA (within the Sunrise-Douglas Mitigation Bank).

Within the UDA, the western-most CNDDB occurrence, located within the 2,465-acre Beach Lake Mitigation Site on the south side of Laguna Creek, is comprised of an unspecified number of vernal pools (CNDDB occurrence #41). Another occurrence is located approximately 3.5 miles to the east on private land, northeast of the intersection of State Highway 99 and Sheldon Road. This occurrence (CNDDB occurrence #31) is comprised of an unspecified number of occupied vernal pools as well (CNDDB 2010). A distance of less than two miles separates occurrence #31 from its nearest neighbor (CNDDB occurrence #27), located northwest of the intersection of Waterman and Bond Roads. Occurrence #27, comprised of five occupied natural pools and five occupied created pools, is located on private land (CDFG 2010). Another occurrence, supporting three colonies, is located on private land, approximately 0.75 miles to the east, northeast of the intersection of Waterman Road and Bond Road (CNDDB occurrence #30). Two occurrences, situated within 0.75 mile of each other, are located on the 320-acre Gene Andel Park, approximately five miles northeast of CNDDB occurrence #30. One of these (CNDDB occurrence #28) is comprised of four occupied vernal pools; the other (CNDDB occurrence #29), located approximately 1.3 miles to the north, is comprised of two colonies associated with vernally wet depressions along a seasonal drainage (CDFG 2010).

Figure LEG-1 Legenere Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Four CNDDB occurrences are located three to four miles to the north of occurrence #29, in association with Mather Air Force Base (AFB); all are near the southern boundary, north of Kiefer Blvd. The westernmost of these occurrences (CNDDB occurrence #44), is comprised of four occupied vernal pools. The next occurrence to the southeast, located approximately one-mile distant within the 700-acre Mather Regional Park, is comprised of two occupied vernal pools (CNDDB occurrence #45). The two easternmost of the four Mather AFB occurrences, each support one occupied vernal pool (CNDDB occurrences #46 and #47) (CDFG 2010).

An additional occurrence, not yet registered in the CNDDB, is located east of Mather Field, northeast of the intersection of Sunrise Boulevard and Kiefer Boulevard. This occurrence, comprised of 12 occupied vernal pools, is included within the 400-acre Sunrise-Douglas Mitigation Bank (Sugnet and Associates 1998). Another occurrence, not yet registered in the CNDDB, is located within the UDA to the east (Cordova Hills Survey *date unknown*) and another occurrence is located outside the UDA in the southeastern portion of the Planning Area at Howard Ranch (TNC *date unknown*).

In Sacramento County, nine of the 23 legenere occurrences (39 percent) are associated with River Bank Formation. This Formation consists of alluvial deposits associated with the Sacramento, American and Cosumnes Rivers. Eight other legenere occurrences (40 percent) are associated with Redding and Red Bluff/Redding soils of the Laguna Formation. This geological landform is comprised of remnant old-terrace alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene, between 600,000 and 1,500,000 years ago. Laguna Formation and associated soils are strongly associated with the distribution of vernal pools. It is significant to note that owing to the diminutive size of the species, its ability to inter-mingle with more common species, and the area of unsurveyed or partially surveyed area of Riverbank and Laguna Formation, other occurrences are likely to be present in Sacramento County. In addition, well-developed vernal pools on landforms other than Riverbank and Laguna could provide suitable habitat. The modeled habitat of the species in the Planning Area is discussed in Section G-4 of this Appendix.

LEG Population Levels and Trends

Of the 61 documented CNDDB occurrences, six are now reported as “extirpated” (10 percent), including one occurrence in each of Sacramento County (CNNDB occurrence #32), Placer County (Occurrence CNDDB #14), and Sonoma County (occurrence #8). An occurrence on the San Joaquin and Stanislaus County line (CNDDB occurrence #4) is reported as extirpated, as well as two occurrences in Solano County (occurrence CNDDB #2 and #3). A single occurrence in Lake County (occurrence CNDDB #9) is reported as “possibly extirpated” (CDFG 2010).

Population trends are listed as unknown from all occurrences statewide, with the exception of one occurrence in Placer County (decreasing) and one occurrence in Lake County listed as possibly extirpated (CDFG 2010). Population trends for all extant legenere occurrences in Sacramento County are reported as unknown. In all but three cases, only one estimate for population numbers is recorded (Table G-3.4-2). Botanists making second visits to the other three sites did not observe any legenere plants during 1993 (CNNDB occurrence #5) and 1997 (CNNDB occurrences #46 and #47) (CDFG 2010).

Table G-3.4-2. Legenere Population Estimates for Sacramento County

CNDDB Occurrence #	Occurrence # of pools observed	Range of population estimates
5	Streambed	1976: Locally common 1983: none
12	Large vernal pool (> 1 Acre)	1983: 1000+
13	Vernal pool (~ 1000 sq. ft.)	1983: 100
21	Vernal pool Marsh	1991: >4100
22	Large vernal marsh	1991: 15
27	5 vernal pools and 5 created depressions	1991: 1000's
28	4 vernal pools	1988: <100
29	Ephemeral drainage	1988: <100
30	Seasonal wetland vernal pool	1991: 300+
31	Vernal pools	1993: 2500+
32	Artificial seasonal pond	1991: 150 1997: Site extirpated by subdivision
33	Seasonal wetland	1991: 1000-10,000 1997: none (too late for surveys?)
40	Vernal pool	1995: 50
41	Vernal pools	1995: 300
42	Vernal pools	1995: Unknown
44	4 vernal pools	1997: Several hundred
45	2 vernal pools	1997: Several hundred
46	1 deep vernal pool	1993: 1000 1997: none
47	1 vernal pool and swale	1993: 500 1997: none
50	Stock pond	2000: ?
60	Vernal pools	2002: thousands
62	Vernal pool	2002: ~1,000
63	Vernal pool	2003: 300-500

Source: CDFG 2010.

It should be noted that legenere is an inconspicuous and relatively ephemeral species that easily escapes the notice of botanists; it lacks showy flowers, and it most frequently grows

clambering and mixed with the stems of more common and superficially similar species. Given these considerations and the amount of unsurveyed or partially surveyed suitable habitat in the Planning Area, additional occurrences may have escaped notice during past surveys, and more populations likely remain to be discovered.

It is impossible to determine the number of historically occurring legenere populations lost or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978; Jones and Stokes 1990), however owing to habitat specificity (restriction to), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for legenere.

There has been no comprehensive effort to monitor all populations of legenere. In summary, the following population estimates for the Sacramento County occurrences have been recorded (CDFG 2010). Observations, monitoring and research conducted on other rare vernal pool species indicate that abundance of individuals within populations may vary greatly between species, between populations within species, and within populations through years (Griggs and Jain 1983; Holland 1987; Alexander and Schlising 1997; CDFG 2010). For Orcuttiae grasses and other species, this extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for hairy Orcutt grass (*Orcuttia pilosa*), Hoover's spurge (*Chamaesyce hooveri*), and Greene's tuctoria (*Tuctoria greenei*) at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given legenere population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

LEG Threats to the Species

Potential direct threats to legenere include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions; construction and maintenance of firebreaks, roads, and utility corridors; inappropriate livestock grazing regimes (later spring/summer rotations); feral pigs, recreational target shooting, grassland fires; recreational vehicles; equestrian and pedestrian traffic; and refuse dumping (CDFG 2010).

Potential Indirect threats to legenere include hydrological alteration of sub-watersheds by surrounding developments and land uses; shifts in competitive interactions (hydrology-mediated or invasive weeds); windblown refuse accumulation; point and non-point source water pollution; air pollution, and global climate change.

LEG Data Gaps and Conservation Implications

With exception to observations of field workers (Holland 1983; Platenkamp 1998; Preston pers. comm.; CDFG 2010), legenere has received limited research attention. Detailed studies have not been conducted regarding the biology, ecology, potential for cross pollination, population genetics, habitat relationships, population dynamics, trends or threats associated with the species. Pertinent data gaps, implications for conservation, and operating assumptions include the following.

LEG Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Planning Area and elsewhere within the range of the species. In the Planning Area, discovery of new populations of legenere may occur on the large dry-land ranchlands, public quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of the County.

LEG Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

In Sacramento County, legenere is associated primarily with the Riverbank and Laguna Formations, although it also occurs on Mehrten, Undifferentiated Surfucial Alluvial Deposits, and South Fork Gravels as well. Elsewhere within its range, legenere is associated with northern basalt flow, northern claypan, northern hardpan, northern volcanic ashflow, and northern volcanic mudflow vernal pool settings. Soil properties, including chemistry, likely vary substantially among these edaphic settings.

The exact nature of the relationship of Landform to species distribution is unknown. It is probable that functioning vernal pools with well-developed hydrology, regardless of landform, soil series and soil pH (except extremes) may provide suitable habitat for this species. In the Planning Area, vernal pools are most frequent and best developed on the Laguna Formation.

LEG Unknown Pollination Ecology

In general, plants with reduced flowers tend to be self-pollinators. In addition to plants producing flowers with no petals at all (Holland 1983; Mason 1957), Oswald (1994) mentions cleistogamous flowers present in northern California legenere populations. Pollination and

breeding studies have not been conducted, so the potential for outcrossing and potential pollinator relationships are unknown.

LEG What Constitutes Population Vigor, and How to Measure?

Population vigorand population dynamics, including year-to-year variability in abundance, has not been described in detail for any of the occurrences in Sacramento County, or elsewhere. The majority of CNDDB occurrences do not have population estimates recorded for single year observations. Where given, estimates range from 15 plants to 10,000 individuals, although most vernal pools are reported to support fewer than 1,000 individuals. At several sites, observations made over multiple years indicate that legenere populations can vary between years, with low numbers present during years with sub-optimal hydrology (CDFG 2010). Other rare vernal pool species have been shown to be variable in population abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors contributing to year-to-year population fluctuations in rare species may be difficult to identify (Alexander and Schlising 1997).

Population vigor will be difficult to assess for this cryptic species, based on number of individuals present over short intervals of time. Trends occurring over longer periods may occur that are not discernable, and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

LEG Specific Hydrological Requirements of Legenere

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting legenere populations in the Planning Area (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of legenere -vernal pool habitat within established preserves. Similarly, assessment of potentially suitable legenere habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing legenere populations are established, assessed and monitored over time, a more quantifiable definition of suitable legenere-vernal pool hydrology will emerge based on the new information.

LEG Existing Hydrological Trend of Pools and Existing Indirect Effects

Extant legenere populations in the Planning Area may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Existing legenere habitat conditions may not be pristine, so if trends in vigor or habitat quality become apparent during over time, it may be difficult to attribute trend to any specific management activity.

LEG Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations are complex and may vary substantially by geography (Holland and Dains 1990).

Proposed preserve designs may not afford complete protection to the hydrological systems that support legenere and other species assemblages dependent on them.

LEG Definition of Appropriate Scale Legenere-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective legenere-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes rare plant populations at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

LEG Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the legenere-vernal pool preserves, primarily for upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with legenere-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002). It is important to note that legenere does persist though, in historically and contemporary operating livestock ranches and United States Forest Service (USFS) and Bureau of Land Management (BLM) grazing allotments. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems. Since legenere occupies medium to large-size vernal pools, management of Italian wild rye and Mediterranean barley around the margins of vernal pools, and Medusa-head grass in uplands should be monitored and managed, but not primarily for the needs of legenere specifically.

Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

LEG Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass and lippia. Others that may become problematic in the future include swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, paradox canary grass, hairy hawkbit, cocklebur, and cattails. None of these species are reported to co-inhabit legenere-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear and/or change in abundance in legenere -occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to legenere if they are allowed to completely dominate the vernal pool margins and adjacent uplands. Potential competitive interactions with these species may affect the vigor of legenere populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect legenere populations.

LEG Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine to design preserves for multi-species conservation. Within Sacramento County, legenere has been reported as sharing vernal pools and wetlands with other rare plant species, including slender Orcutt grass, Bogg's Lake hedge-hyssop, and Sanford's arrowhead. Many of these pool complexes supporting rare species also provide habitat for rare invertebrates, amphibians, mammals, and bird species as well.

Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between July 1st and April 1st may be compatible with or even benefit some legenere-associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

LEG Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

Population genetics for legenere are completely unknown. For an overview of genetic considerations of vernal pool plant species, see Elam (1998). Current limitations in our understanding of legenere population genetics have little immediate conservation implication, given the relatively few number of legenere occurrences in the Planning Area.

LEG Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is indicated by the observation of multiple-year periods during which plants were absent, followed by reappearance during a following favorable hydrologic season. Beyond observations though, there have been no empirical studies addressing the presence of a soil seed bank, seed dormancy or longevity for legenere. From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

LEG Inoculation

Since there are few populations of legenere in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied legenere habitat, create meta-population structure at extant occurrences where single pools may support the species, and help ensure existence should any natural populations become compromised. Dispersal into, and colonization of re-established or established or enhanced seasonal wetlands and vernal pools, irrigation ditches, trenches next to railroad tracks has been documented (CDFG 2010). Legenere appears to be a self-compatible species, which is a pre-adaptation for colonization.

LEG Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant legenere occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of legenere, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect legenere and other native plant species in the future.

LEG Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall

patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for legenere populations within the study period of this EIS/EIR, or at some time beyond.

LEG Literature Cited

Ahart, Lowell. Rancher/Botanist, Honcut, Butte County, California.

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game, Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Cordova Hills. *Date unknown*. Cordova Hills Survey. Rancho Cordova, California.

Crampton, B. 1959. The grass genera Orcuttia and Neostapfia: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Dains, V.I. 1988. Botanical Survey of the South Florin Park Site. June 21, 1988. Sacramento, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in*: C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus Orcuttia (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1980. Population studies in the genus Orcuttia (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Senior Restoration Ecologist, River Partners, Chico, California.

Griggs, F.T. and S.K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus Orcuttia. *Biological Conservation* 27: 171-193.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1983. Endangerment Status of *Legenere limosa* (Greene) McVaugh in California. Submitted to the California Natural Diversity Database, Department of Fish and Game. Sacramento, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In*: T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., and V.I. Dains, 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in*: Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes 1998. Kiefer Landfill Wetland Mitigation Plan. Sacramento, California.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1994. Durta property wetland delineation and special-status species surveys. Prepared for Sacramento County Department of Public Works. Sacramento, California.

Kaye, T., W. Messinger, S. Massey, and R Meinke. 1990 Gratiola heterosepala: inventory and breeding system evaluation. Unpublished report to the U.S. Bureau of Land Management, Lakeview, Oregon.

Keeley, J.E., 1990. Photosynthesis in vernal pool macrophytes: relation of structure and function. *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Kelsey, Jon. Rancher/Botanist, Snelling, Merced County, California.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Mason H.L., and R. Bacigalupi. 1954. A new Gratiola from Boggs Lake, Lake County, California. *Madrono* 12:150-152.

Mason, H.L., 1957. Flora of the Marshes of California. University of California Press, Berkeley and Los Angeles, California.

Oswald, V.H. 2002. Selected Plants of Northern California and Adjacent Nevada. Studies from the Herbarium, California State University, Chico, Chico, California.

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

Robins, J.D. and J.E. Vollmar. 2002. Livestock Grazing and Vernal Pools in Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. United States Department of Agriculture Soil Conservation Service. Soil Survey of Sacramento County, California. Sacramento, California.

Stone, R.D. 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment. *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Sugnet and Associates, Inc. 1993. Wetland Preservation and Compensation Plan Sammis Sunrise-Douglas. June 18, 1993. Sacramento, California.

Sugnet and Associates, Inc. 1998. Sunrise-Douglas Conservation Plan. Sacramento, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in*: C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

The Nature Conservancy (TNC). *Unknown date*. Howard Ranch Rare Species Survey. Sacramento, County, California.

Thorpe, R. 2003. Unpublished E-Mail to Daniel Burmester, CDFG.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Senior Restoration Ecologist, EDAW, Sacramento, California.

Witham, Carol. Consulting Botanist, Davis, California.

Zedler, P.H. 1990. Life Histories of Vernal Pool Vascular Plants, *In*: Vernal Pool Plants-Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

PINCUSHION NAVARRETIA (PINA)

Pincushion Navarretia (PINA)

(Navarretia myersii)

Status USFWS: None

Status CDFW: None

Status CNPS: 1B.1

PINA Listing Status

Pincushion navarretia *(Navarretia myersii)* is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a list 1B.1 species by the California Native Plant Society (CNPS 2010). I

t has been assigned an R-E-D Code of 3-3-3, meaning it is distributed in one to several highly restricted occurrences, endangered throughout its range, and entirely restricted to California.

Being a CNPS List 1B.1 plant species, pincushion navarretia meets the California Department of Fish and Wildlife's (CDFW's) definition of a special plant though it has no formal protection status by the California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS).

PINA Life History and Ecology

PINA Species Description and Life History

Pincushion navarretia, a strict vernal pool endemic, is an annual in the phlox family (Polemoniaceae). This distinctive species grows very low with aggregations attaining a mat-like

appearance. The typically low-growing stems can reach up to two centimeters in height. Long thread-like leaves reaching from four to eight centimeters in length radiate from the base of the inflorescence. The inflorescence is comprised of five to 60, long (1.2 to 2.1 centimeters), tubular, sessile (stalkless) white flowers (Day 1993). These sessile flowers, long flower tubes and low-growing stems are features that most readily distinguish pincushion navarretia from the co-occurring and much more common white-headed navarretia (*N. leucocephala* ssp. *leucocephala*).

Interestingly, pincushion navarretia specimens collected from the northern edge of its range (Sacramento and Amador Counties) possess slightly shorter flower tubes, and in Sacramento County, more lobing of the inflorescence bracts, than do specimens collected from the type locality in Merced County. Plants from these northern localities are considered to be morphologic and geographic intermediates between typical *N. myersii* ssp. *myersii* and the closely related and even more rare Small pincushion navarretia (*N. myersii* ssp. *deminuta* P.S Allen and Day), which only occurs in the Coast Ranges to the northeast (Day 1995).

Pincushion navarretia, and the genus in general, has received little attention from biologists or ecologists. Pincushion navarretia was included in an investigation of evolution of adaptive morphological and life history traits of vernal pool species, with the genus *Navarretia* used as a model (Spencer and Reiseberg 1998). Pincushion navarretia was determined to be one of the more highly adapted of the vernal pool specialists in the group. Other than this single study and basic taxonomic and biogeographic treatments, pincushion navarretia remains mostly unstudied.

Since all vernal pool plant species share similar environmental selective pressures, they likely also share similar adaptive traits. For this reason, studies addressing the life history and ecology of other more common vernal pool plant species may provide some insight into the life history and ecology of pincushion navarretia.

Pincushion navarretia shares the annual growth habit with the vast majority of other endemic vernal pool plants. This adaptive trait confers to populations avoidance of the regular and extreme seasonal drought that characterizes vernal pool habitat and the Mediterranean Climate (Griggs and Jain 1983; Holland 1987; Stone et al. 1988; Zedler 1990).

The specific timing of the germination of pincushion navarretia seeds relative to the timing of the vernal pool inundation cycle has not been studied or described. In general, a given vernal pool species may germinate either during the wetting phase or the inundation-phase of the vernal pool cycle (Keeley and Zedler 1998). Seeds of the more common and related white-headed navarettia germinate under water in pool basins or on saturated soil at pool margins in the late fall and winter months, after the soil profile is saturated and vernal pools have filled (Crampton 1959; Dittes pers. obs.).

Germination requirements and optima for pincushion navarretia have not been investigated. It has been shown however, that seeds readily germinate in the laboratory by cold-stratifying imbibed seeds at two to four degrees Celsius in the dark for two weeks and then subjecting them to a cycle of 16 hours of light at 21 degrees Celsius and eight hours of dark at 15 degrees Celsius (Spencer and Rieseberg 1998). Unlike Orcuttiae grasses, symbiosis with an aquatic fungus does not appear necessary to break seed dormancy in the lab. Seed dormancy and required environmental cues for in-situ germination may exist, but are presently unknown.

One of the challenges posed to vernal pool plants is the need to photosynthesize and grow while submersed, and then transition into a terrestrial growth phase. pincushion navarretia and some other vernal pool species exhibit a juvenile isoetid growth form defined by production of cylindrical, air-filled, erect/floating leaves while submersed. These leaves facilitate light exposure and gas exchange, thus lengthening the growing season by maximizing growth while vernal pools are still inundated. This juvenile morphology contrasts with that of "adult" plants, or those producing growth during the dry-down or terrestrial phase of the vernal pool cycle. In their study of adaptive traits of vernal pool navarretias, Spencer and Rieseberg (1998) found that pincushion navarretia was the only one possessing an "unambiguous" isoetid growth form. The others were found to exhibit an inducible isoetid growth form, likely indicating a less strict requirement for, or lower tolerance of more severe vernal pool inundation regimes.

Pincushion navarretia flowers and sets seeds during the terrestrial phase of the vernal pool hydrologic cycle, typically in May (CNPS 2010), although populations in eastern Merced County were fully flowering by April 15th (Dittes and Guardino 2001). The large flowers, long flower tubes, and exerted stamens and stigmas indicate an outcrossing breeding strategy, as do a high proportion of pollen grains per flower, a large pollen-ovule ratio, and a comparatively wide corolla limb (Spencer and Rieseberg 1998).

Considering the unusually long white flowers, a specific co-evolved insect pollinator of pincushion navarretia may exist, although this has not been investigated. The existence of pollinator guilds involving co-evolved native solitary bees has been reported as occurring with a variety of vernal pool plant species (Thorp 1990, 1996). Although pollinators of Navarretia have not been investigated specifically, native solitary bees have been frequently observed visiting the closely related White-Headed Navarretia (Dittes pers. obs.). Fecundity and variation in seed production have not been investigated in pincushion navarretia.

As with many other vernal pool species, seed dispersal is naturally limited, in the case of pincushion navarretia, by an indehiscent fruit capsule that is forced open only after the fiberous seed coats absorb water and expand (Spencer and Rieseberg 1998). Limited seed dispersal in vernal pool species is thought to represent an adaptation to spatially unpredictable and limited vernal pool habitat (Griggs 1974, 1980). Natural dispersal of seeds, however limited, likely

occurs via flowing water, transport on feet and feathers of waterfowl, and in mud on hooves and legs of livestock. As with all other vernal pool species, natural dispersal of seeds was likely a more frequent event when there were many more vernal pools, more pool interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming ungulates (Griggs 1980).

The existence of a dormant soil seed bank is unknown for pincushion navarretia. The presence of a persistent soil seed bank provides insurance against localized extirpation resulting from the unpredictable occurrence and duration of appropriate growing conditions. If total seed crop failure occurs in a given year or set of years (failure to germinate, loss to late season flooding or fire, excessive grazing by livestock or grasshopper herbivory), additional stored seeds are available for another year's effort.

The population biology and genetics of pincushion navarretia have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon. Given the highly limited number of occurrences and the scattered geographical distribution, all intra-pool pincushion navarretia populations should be considered unique, and important genetic entities.

PINA Habitat Requirements and Ecology

It is generally held that many of the endemic vernal pool plant species are relatively recent evolutionary derivations of more common and widespread upland progenitors (Stebbins 1976; Stone 1990; Raven and Axlerod 1978; Thorne 1984), including pincushion navarretia (Spencer and Rieseberg 1998). These neoendemic vernal pool species are thought to have evolved from terrestrial habitat into seasonally aquatic vernal pool habitat made available as the Mediterranean Climate developed and the inland Tertiary-age Sea dried.

Most of the pincushion navarretia occurrences in eastern Merced County are associated with the ancient, weathered alluvial terraces comprising the Valley Springs and Ione Geologic Formations (Dittes and Guardino 2001). A small number of occurrences are also found in vernal pools on the North Merced Gravels Formation. In Sacramento County, pincushion navarretia is associated primarily with the Ione and Laguna Formations

Pincushion navarretia is a strict vernal pool endemic. It is of importance to conservation however, that in contrast to the "deeply-adapted" vernal pool grasses of the Orcuttiae Tribe, pincushion navarretia occupies more commonly occurring, smaller and/or shallower vernal pools with comparatively more "flashy" hydrology. In a survey involving 19 occupied vernal pools in eastern Merced County, pincushion navarretia was documented as occurring in small to medium size vernal pools that range from 16 to 283 square meters (0.004 to 0.07 acres) in

area and from 12.7 to 25.4 centimeters (five to 10 inches) in depth (Dittes and Guardino 2001). At the Phoenix Field Ecological Reserve in Sacramento County (CNDDB occurrence #3) pincushion navarretia is reported to inhabit the margins of "the more shallow, dry pools" in the complex (CDFG 2010). Vernal pool dimensions (or reference to size) are not given for any of the other CNDDB occurrences.

Floristic associations provide further indication of preference for less extreme (more typical) vernal pool hydrological cycles than the Orcuttiae grasses. In contrast to the latter, pincushion navarretia grows in the same hydro-topographical position as more commonly occurring vernal pool associates, while Common Spikerush (*Eleocharis macrostachya*, an indicator of longer duration inundation) is lacking. Pincushion navarretia grows mixed together with Fremont's goldfields (*Lasthenia fremontii*), wooly marbles (*Psilocarphus* spp.), annual hairgrass (*Deschampsia danthonoides*), stipitate popcorn-flower (*Plagiobothrys stipitatus*), double-horned downingia (*Downingia bicornuta*), bluestars (*Brodiaea minor*), toad rush (*Juncus bufomius*), capitate rush (*Juncus capitatus*), quillwort (*Isoetes howellii*), coyote thistle (*Eryngium* spp.), Sacramento Valley pogogyne (*Pogogyne zizyphoroides*), long-beaked stork's-bill (*Erodium botrys*), and succulent owl's clover (*Castilleja campestris* ssp. *succulenta*). Most of these species are commonly occurring vernal pool species that inhabit small to medium size vernal pools and swales, and the slopes and margins of larger or deeper pools that support Orcuttiae grasses and common spikerush.

Hydrological stresses associated with vernal pools exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye and Mediterranean barley, two non-native facultative wetland species, typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. Some suggest that built-up thatch from Italian wild rye, Mediterranean barley, Medusa-head grass, and other non-native upland species may indirectly affect vernal pool species as well by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2001).

Since pincushion navarretia occupies the smaller to medium size, "more typical" vernal pool types and the margins of larger and/or deeper pools, it may be more susceptible to the effects of excessive growth of Italian wild rye and Mediterranean barley and thatch buildup than the Orcuttiae grasses, or the more deeply-adapted legenere (*Legenere limosa*).

Although none are specifically reported to co-inhabit vernal pools with pincushion navarretia, several non-native weedy hydrophytes may present future problems. Mannagrass (*Glyceria declinata*), an aggressive weed of irrigated agriculture and degraded vernal pools, has already been reported as a potential problem at vernal pools in the region. Additional species to consider include rosy lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*),

common unicorn plant (*Probiscidea louisianica*), swamp pricklegrass (*Crypsis schoenoides*), crabgrass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), another native species, can also dominate vernal pools (Schlising pers. comm.; Unger pers. comm.).

Specific interactions between livestock grazing and pincushion navarretia are largely unknown. In general, appropriately timed dry-pasture livestock grazing regimes are thought to be compatible with the development and persistence of vernal pool vegetation. Robins and Vollmer (2001) provide a review of information pertaining to livestock grazing in vernal pool ecosystems.

All populations of pincushion navarretia located in eastern Merced County inhabit long-operating cattle ranches, so persistence indicates tolerance for at least some level of grazing. Observations made along fence-lines in the region indicate however, that sheep grazing may be responsible at least in part, for absence of pincushion navarretia and the co-occurring rare succulent owl's-clover in some areas (Dittes and Guardino 2001). Sheep exert a somewhat different selective pressure in vernal pools owing to very close cropping of vegetation and a tendancy to "nest" in pool basins during the terrestrial phase (Kelsey pers. comm.).

Timing of livestock grazing is likely more important than stocking rates in affecting persistence of pincushion navarretia. By limiting grazing to the period when pools are inundated and upland forage is still green and attractive, cattle tend to not congregate in pools and trampling and grazing pressures to vernal pool plant species in their seedling or juvenile aquatic phase are minimized. Once the upland forage cures and the vernal pools are in their flowering and seed-producing terrestrial phase, moist pools become more attractive to livestock and grazing and trampling pressures are increased. Grazing in the summer and fall months, after seeds have set and plants have died likely has little effect on pincushion navarretia.

Although responses to disturbance have not been described for pincushion navarretia, other pertinent examples exist. As an illustration of the role of timing in response of vernal pool species to potential disturbances, Hoover (1941) and Crampton (1959) have reported Orcuttieae grass populations being completely disked in dry-farmed grain fields in the late fall, without apparent detriment to the Orcuttieae populations the following growing season. It has been noted that the same disking performed during the late spring or summer growing periods may completely deplete the soil seed bank if performed over successive years (Stone et al. 1988). Similarly, a small vernal pool located in the middle of a winter-wheat field in eastern Merced County persists and continues to support the rare dwarf downingia (*Downingia pusilla*), despite annual disking and planting over decades (Kelsey pers. comm.; Dittes pers. obs.). It is very important to note that in these cases the disking is not disrupting the water-retaining capacity and hydrological cycle of the respective vernal pools. This is not always the case with disking.

PINA Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for pincushion navarretia are identified in Table G-3.5-1 and have been derived from input from local species experts.

Table G-3.5-1. Habitat Elements of Pincushion Navarretia

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

PINA Species Distribution and Population Trends

PINA Range Wide Distribution

Presently, pincushion navarretia is recorded from 14 CNDDB occurrences distributed along a narrow swath of the Great Central Valley, from Placer County in the north to Merced County in the south (CDFG 2010). These occurrences are all situated at sites ranging from 65 to 1,082 feet in elevation (CNPS 2010), and all lie within either the Sacramento Valley or San Joaquin Valley Subregions of the Great Valley Region of the California Floristic Province (Hickman 1993).

PINA Central Valley Distribution

The northernmost occurrence of pincushion navarretia is located near the City of Lincoln in Placer County. Six CNDDB occurrences are located in eastern Sacramento County, three in Amador County (one of these is shared with Sacramento County), one in Calaveras County, one in Placer County and four in Merced County (CDFG 2010).

PINA Distribution within the Planning Area

Currently, of the six documented CNDDB occurrences of pincushion navarretia recorded from Sacramento County, five are included within the Planning Area (CNDDB #7-10 and #16) (Figure PINA-1). These five are located outside of the UDA in the southeast corner of the County. Most of these occurrences are on the 13,000-acre Howard Ranch property. The Howard Ranch is managed by The Nature Conservancy (TNC) as part of the Cosumnes River Watershed Project. The remaining Sacramento County Occurrence (CNDDB occurrence #3) is located outside of the Planning Area, just north of the American River at the Phoenix Field Ecological Reserve.

It is important to note that owing to its small stature, preference for small to medium-sized vernal pools and the area of remaining unsurveyed or partially surveyed habitat, moderate to high potential exists for discovery of additional populations within the Planning Area.

Table G-3.5-2 shows the soil series, geological formation and landform associations for each known occurrence in Sacramento County. Generally, pincushion navarretia is associated with old terrace remnant alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene between 600,000 and 1,500,000 years ago (confirm). Though the distribution of the taxon is extremely disjunct, the modeled habitat of the taxon in the Planning Area is discussed in Section G-4 of this Appendix.

Table G-3.5-2. Extant CNDDB Occurrence Numbers, Distribution, Associated Soil Series and Landform Formations For Pincushion Navarretia In Eastern Sacramento County

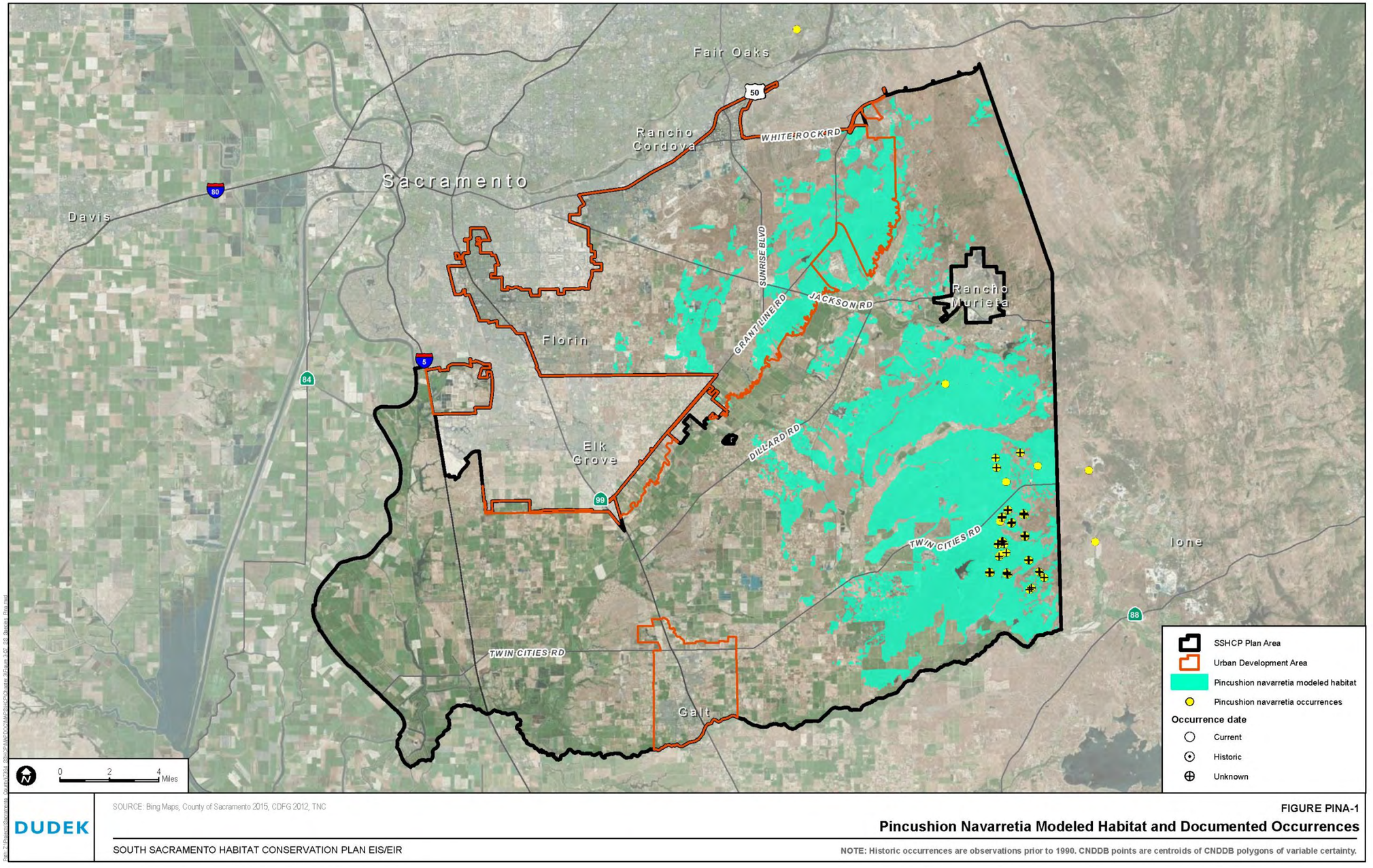
CNDDB Occurrence #	Quadrangle	Soil Series[a]	Geological Formation and Landform
3	Folsom	Red Bluff-Redding	Laguna Formation
7	Carbondale	Amador-Gillender	Valley Springs Formation
8	Carbondale	Amador-Gillender	Valley Springs Formation
9	Goose Creek	Corning	Laguna Formation
10	Goose Creek	Hadselville-Pentz	Modesto Formation

[a] Soil series information based on what USDA soil survey type occurs at the CNDDB species location (USDA 1993)

PINA Population Levels and Trends

Of the 15 documented occurrences presumed extant, one in Amador County (CNDDB occurrence #2) has not been observed since 1941; the Calaveras County population (CNDDB occurrence #13) has not been observed since 1957, and the Placer County population (CNDDB occurrence #12) has not been observed since 1971. The exact locations and status of these occurrences are unknown. The remaining 12 CNDDB occurrences presumed extant are also given a trend assessment of unknown (CDFG 2010).

Figure PINA-1 Pincushion Navarretia Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

It is impossible to determine the number of historically occurring pincushion navarretia populations or the acreage of suitable habitat lost to historic agricultural and urban land-use conversions, since so much had happened before these species first received attention. Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978); however, owing to habitat specificity, only a subset of the vernal pool habitat lost within the natural range of the species may have provided suitable habitat for pincushion navarretia. Effects of historic livestock grazing combined with drought and habitat alterations relating to development of non-native annual grassland are unknown as well.

There has been no comprehensive effort to monitor any of the known populations of pincushion navarretia. Numbers of individuals have not been recorded for any of the populations and year-to-year population dynamics are unknown (Table G-3.5-3).

Table G-3.5-3. Population Estimates of CNDDB Occurrences

CNDDB #	# of Pools Observed	Range of Population Estimates
3	Unknown	1994: 1000 plants
7	Unknown	2005: 1000's
8	Unknown	Unknown
9	Unknown	Unknown
10	Unknown	Unknown

Studies involving other vernal pool plant rarities, including Orcuttiae grasses and Hoover's Spurge have demonstrated marked fluctuation in numbers of individuals within populations between years (Griggs 1983; Holland 1987; Alexander and Schlising 1997). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). It is not known however, if pincushion navarretia exhibits a similar between-year pattern.

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given pincushion navarretia population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another critical aspect of population demography is the presence and nature of the soil seed bank, which is unknown for pincushion navarretia.

PINA Threats to the Species

Potential threats to pincushion navarretia include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, hydrological alteration of sub-watersheds and associated vernal pool habitat, shifts in competitive interactions (hydrological mediated or invasive weeds), inappropriate livestock grazing regimes (later spring/summer rotations, sheep vs. cattle), recreational vehicle use, equestrian and pedestrian traffic, refuse dumping, windblown refuse accumulation, air pollution and global climate change.

Irrigation runoff and invasive plants are listed as a threat at one occurrence (CNDDB occurrence #3) (CDFG 2010). Although no threats are listed for the remaining 12 occurrences, all are located on operating cattle ranches and are subject to potentially inappropriate livestock grazing regimes.

PINA Data Gaps and Conservation Implications

Despite its distinctive appearance and extreme rarity, pincushion navarretia has received little research attention from botanists or ecologists. Aside from general observations of field workers provided in the CNDDB and the study of vernal pool adaptive traits in the genus *Navarretia* (Spencer and Rieseberg 1998), nothing else exists regarding the biology, ecology, pollinators, breeding system, population genetics, habitat relationships, population levels, trends or threats associated with this taxon. Pertinent data gaps, implications for conservation, and operating assumptions include:

PINA Unknown Number of Undiscovered Populations

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Planning Area and elsewhere within the range of the species. In the Planning Area, discovery of new populations may occur on the large dry-land ranchlands, public quasi-public lands and vernal pool-grassland preserves already established in the eastern portion of the County.

PINA Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

Pincushion navarretia has a geographic association with old alluvial terraces possessing acidic soils primarily of the Ione, and to a lesser extent, Red Bluff Families (Arroyo Seco and Laguna Geological Formations). The exact nature of this relationship is however, unknown. It is unknown if soil pH or other edaphic factors influence pincushion navarretia distribution and population vigor. It is possible that the presence of functioning vernal pools, regardless of landform, soil series and soil pH can provide suitable habitat.

PINA Unknown Pollination Ecology

Pincushion navarretia possesses the longest flowers of any of the species in the genus. Floral morphology generally reflects breeding systems and pollinator relationships. It may be expected that the very long flower tubes select for a particular pollinator, perhaps even a specialized co-evolved species. Bumble-bee flies (family Bombylidae), butterflies, and moths all have feeding apparatus long enough to reach potential nectar rewards located at the base of the floral tube. Since the stigma and anthers are exerted though, it may also be possible that solitary bees, small beetles, or some insect with less specialized mouthparts collects the pollen from the exerted stamens for use and incidentally spreads it to the exerted stigmas of nearby flowers.

PINA What Constitutes Population Vigor, and How to Measure?

Population vigor and population dynamics, including year-to-year variability in abundance, have not been studied for pincushion navarretia. The existence of a dormant soil seed bank, a critical contributor to population stability in some other vernal pool species, is unknown for pincushion navarretia as well. Other rare vernal pool species have been shown to be highly variable in abundance from year-to-year (Holland 1987; Griggs pers. comm. 2003), and causative factors contributing to year-to-year population fluctuations may be difficult to identify (Alexander and Schlising 1997).

Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

PINA Specific Hydrological Requirements of Pincushion Navarretia

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting pincushion navarretia populations (e.g., timing of rainfall, depth of ponding, duration of ponding, and soil dry down rate).

The general lack of numerical hydrological data limits the ability to precisely monitor and/or assess hydrological suitability of pincushion navarretia -vernal pool habitat within established preserves. Similarly, assessment of potentially suitable pincushion navarretia habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing pincushion navarretia populations are established, assessed and monitored over time, a more quantifiable definition of suitable pincushion navarretia -vernal pool hydrology will emerge based on the new information.

PINA Existing Hydrological Trend of Pools and Existing Indirect Effects

Extant pincushion navarretia populations may have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Existing pincushion navarretia conditions may not be pristine, so if trends in vigor or habitat quality become apparent over time, it may be difficult to attribute trend to any specific management activity.

PINA Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990). Proposed preserve designs may not afford complete protection to the hydrological systems that support pincushion navarretia and other species assemblages dependent on them.

PINA Definition of Appropriate Scale pincushion navarretia -Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective pincushion navarretia -vernal pool preserves. It is a paradigm of conservation biology that “bigger is better” for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale vernal pool preserve that includes pincushion navarretia at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et. al. 1998).

PINA Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the pincushion navarretia -vernal pool preserves, for upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with pincushion navarretia-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002). It is important to note that pincushion navarretia does persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems. Since pincushion navarretia occupied small to medium size vernal pools,

management of Italian Rye and Mediterranean Barley around the margins of vernal pools, and Medusa-head grass in uplands should be of particular management concern.

Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

PINA Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, lippia, paradox canary grass, hairy hawkbit, cocklebur and cattails. None of these are reported to coinhabit pincushion navarretia -occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in pincushion navarretia -occupied pools over time. Italian wild rye and Mediterranean barley, two common non-native inhabitants of shallow vernal pools and vernal pool margins, might be of management concern to pincushion navarretia, owing to the latter's preference for small to medium size vernal pools.

Potential competitive interactions with these species may affect the vigor of pincushion navarretia populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect pincushion navarretia populations.

PINA Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to combine design preserves for multi-species conservation. Suitability of pincushion navarretia habitat for supporting other rare plant species has not been specifically addressed, although natural populations of the rare Sacramento Orcutt grass (Orcuttia viscida), legenere (*Legenere limosa*), and succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*) are documented as sharing vernal pools with it. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well. Management for multiple species maximizes the effectiveness of habitat conservation and requires coordinated monitoring and actions. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between November 1st and April 15th may be compatible with or even benefit some pincushion navarretia -associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

PINA Genetic Variation (Spatial and Temporal [Seed Bank], Genetic Drift, Genetic Bottlenecks)

Population genetics for pincushion navarretia are completely unknown. Current limitations in our understanding of pincushion navarretia population genetics have little immediate conservation implication, given the extreme rarity of pincushion navarretia.

PINA Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, the existence and potential role of a dormant soil seed bank in population dynamics is completely unknown for pincushion navarretia. There have been no studies addressing the presence of a soil seed bank, seed dormancy or longevity. From the perspective of conservation, knowledge of site specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

PINA Inoculation

Since there are so few natural populations of pincushion navarretia in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied pincushion navarretia habitat, create meta-population structure at extant occurrences where single pools may support the species, and ensure existence should any natural populations become compromised.

PINA Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter. ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant pincushion navarretia occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of pincushion navarretia, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect pincushion navarretia and other native plant species.

PINA Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology. It is likely that given the expected global climate trends, a vigor response of some kind could be expected for pincushion navarretia populations within the study period of this EIS/EIR, or at some time beyond.

PINA Literature Cited

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Department of Fish and Game, Redding, California.

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. *In*: Castri, F di, Mooney, H.A. (eds) Mediterranenan type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Barry, S. F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2000. Biological information-Slender Orcutt Grass. Accessed online October 26, 2002 at http://www.dfg.ca.gov/hcpb/species/jsp/more_info.jsp?specy=plants&idNum=178.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

Day, A.G. 1993. New taxa and nomenclatural changes in *Allophyllum, Gilia*, and *Navarretia* (Polemoniaceae). *Novon* 3(4): 331-340.

Day, A.G. 1995. Sessile-flowered species in the Navarretia leucocephala group (Polemoniaceae). *Madrono* 42(1):34-39.

DeVilla, Bill. Consultant, Owner Ecosystems West, Ben Lomond, California.

Dittes, J. C., and J. L. Guardino. 2001. Chapter 3: Rare Plants. *In* Vollmar J. E. (ed.) 2002. Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting, Berkeley, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 1981. 1981a. Life histories of vernal pool annual grasses. *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Hickman, J.C. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3 or 4) California Native Plant Society. Berkeley, California.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Slender Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1981. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*, 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Leidy, R.A. and E.G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones & Stokes, Sacramento, California.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18:1 pp. 18-29.

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J.R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. *American Journal of Botany* 69: 1082-1095.

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. *Fremontia* 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2001 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). April 1993. Soil Survey of Sacramento County, California. U.S. Department of Agriculture Sacramento, California.

Spencer, S. C., and L. H. Rieseberg. 1998. Evolution of amphibious vernal pool specialist annuals: putative vernal pool adaptive traits in *Navarretia* (Polemoniaceae). In C.W. Witham, D. Belk, W. Ferren, and R. Ornduff (eds.) Ecology, conservation, and management of vernal pool ecosystems -- proceedings from a 1996 conference. California Native Plant Society, Sacramento, California (in press).

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Stone, Douglas. Ph.D. Candidate, University of California, Berkeley, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B. C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Presribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Restoration Ecologist EDAW, Sacramento, California.

USDA (United States Department of Agriculture, Natural Resources Conservation Service). 1993 (April). *Soil Survey of Sacramento County, California*. USDA Natural Resources Conservation Service in cooperation with the Regents of the University of California. Accessed September 2015. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA067/0/sacramento.pdf.

United States Fish and Wildlife Service (USFWS). 1997. Determination of Endangered Status for Orcuttia pilosa, Orcuttia viscida, Tuctoria greenei and Threatened Status for Castilleja campestris ssp succulenta, Chamaesyce hooveri, Neostapfia colusana, Orcuttia inaequalis and Orcuttia tenuis. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

United Stated Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

Witham, Carol. Consulting Botanist, Davis, California.

SLENDER ORCUTT GRASS (SLOG)

Slender Orcutt Grass (SLOG)

(Orcuttia tenuis)

Status USFWS: Threatened

Status CDFW: Endangered

Status CNPS: List 1B.



Joe Molter, BLM

SLOG Listing Status

Slender Orcutt grass (*Orcuttia tenuis*) was first listed as state Endangered by the California Department of Fish and Wildlife (CDFW) under the California Endangered Species Act in 1988 (Stone et al. 1988), and on March 26, 1997 the species received Listing as Threatened under the Federal Endangered Species Act by the United States Fish and Wildlife Service (USFWS) (USFWS 1997). The California Native Plant Society (CNPS) includes slender Orcutt grass as a CNPS List 1B.1 species and has assigned an R-E-D Code of 2-3-3, meaning it is distributed in a limited

number of occurrences, occasionally more if each occurrence is small, it is endangered throughout its range, and found only in California (CNPS 2010).

SLOG Life History and Ecology

SLOG Species Description and Life History

Slender Orcutt grass is a member of the distinctive *Orcuttieae* Tribe of the grass family (Poaceae), a group of nine vernal pool species endemic to California and northern Baja California. The Orcutt grasses have been long recognized by botanists as highly evolved, ecologically unusual and naturally restricted (Hoover 1941; Crampton 1959; Reeder 1965, 1980, 1982).

As with other members of the tribe, slender Orcutt grass is a relatively small-stature annual species. Its five to 15 centimeter-long, sparsely hairy-sticky stems are weakly tufted and mostly erect. Like the stems and inflorescences, the 1-2 mm wide, one to five centimeters-long leaves are sparsely hairy and covered with a sticky, highly aromatic exudate. Small scale-bracted flowers (florets) are arranged in erect, two-ranked, flattened spikelets that are usually separated from each other along the exserted terminal five to 10 centimeter-long spikes (Hickman 1993). Often, the flowering stems branch from the upper nodes, with each branch terminating in a single spike-like inflorescence (Stone et al. 1988).

Slender Orcutt grass is most readily distinguished from its closest relative hairy Orcutt grass (*O. pilosa*) on the basis of the stem branching mostly from the upper nodes, the spikelets being evenly spaced rather than congested along the inflorescence axis, and being only sparsely hairy (Reeder 1982; Hickman 1993). Other than the arrangement of spikelets, slender Orcutt grass is similar to hairy Orcutt grass with respect to floral characteristics. Both have similar-sized irregularly toothed glumes and equally five-toothed lemmas, also of similar size. Although morphologically similar, specific status of slender Orcutt grass is further substantiated by a chromosome number of 2n=26, versus 2n=30 for hairy Orcutt grass (Reeder 1982).

All Orcutt grasses are very highly evolved and uniquely adapted members of the endemic vernal pool flora. Their anatomy and physiology (Keeley 1981, 1990, 1998), morphology, and life history traits (Crampton 1959; Griggs 1974, 1976, 1980, 1981) are highly adapted to the stressful, more extreme portions of the vernal pool niche. Some adaptive traits (physiology, anatomy, morphological-distinct life history stages) confer ability of individuals to survive the varied stresses of a single hydrological season, while others (e.g., annual habit, precise germination cues, stored soil seed bank, indeterminate flowering, dispersal-limiting traits) confer population stability through time in the context of year-to-year hydrological uncertainties that characterize the Mediterranean climate (Griggs 1980; Stone et al. 1988).

Evolution of the annual growth habit is a key adaptation of slender Orcutt grass to vernal pool habitat, as is the case with almost all other vernal pool plants (Griggs and Jain 1983; Holland 1987). The annual growth habit allows populations to persist through the regular and extreme summer drought that is characteristic of California's vernal pool landscape (Stone et al. 1988).

Slender Orcutt grass seeds germinate during the fall or winter months, generally 2-4 weeks after standing water has been present in the vernal pool (Griggs 1980). Germination can continue after cessation of winter rains and as the shallow water at the pool margins begins to warm and recede (Griggs 1974; Holland 1987; Stone et al. 1988). A requirement of cold stratification followed by increasingly warm fluctuating diurnal temperatures and the presence of a symbiotic aquatic fungus (*Alternaria* sp., *Curvilaria* sp.) that has been determined necessary for Orcutt grass seed germination (Griggs 1980, 1981; Keeley 1988). Sensitivity to these environmental cues ensures germination only during years with hydrological conditions favorable for plants to complete their entire life cycle (Griggs 1980, 1981; Stone et al. 1988).

Slender Orcutt grass is thought to be one of the least specifically adapted of the genus with regard to hydrology and habitat breadth (Stone et al. 1988). It has been observed to be more likely than other Orcutt grasses to germinate during years of marginal precipitation, although seedling mortality can be high during such years (Griggs 1981).

Members of the genus *Orcuttia* develop long (approximately ten centimeters), thin (one to two millimeters-wide) juvenile leaves that float on the water surface when seeds germinate under shallow water or when seeds become submersed shortly after germination (Hoover 1941; Griggs 1974, 1980, 1981; Reeder 1982). By facilitating light exposure and atmospheric gas exchange for photosynthesis while submersed, these amphibious juvenile leaves maximize vegetative growth before vernal pool dry-down (Griggs 1981; Stone et al. 1988; Keeley 1990).

Orcutt grass plants are able to produce most of their aboveground vegetative growth, as well as flowers and seed as the vernal pools dry down in late spring and early to mid-summer (Crampton 1959). Vegetative and phenological demographics appear to be largely determined by pool dry-down rate (Griggs 1974, 1980; Stone et al. 1988). Thus, mature fruiting plants in drying soil above the waterline and submersed seedlings further toward the center can occur simultaneously in a single pool.

Indeterminate growth of new stems and spikelets provides for prolonged productivity as seasonally available water allows (Griggs 1974, 1980). This habit may result in smaller plants with fewer flowers and seeds maturing earlier in the season at the pool margins, and later maturing, larger, more fecund plants towards the pool center. This morphological and phenological plasticity confers an adaptive advantage in the context of extreme seasonal

fluctuations and the unpredictable year-to-year variability of the Mediterranean Climate (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988).

Since Orcutt grasses mature in a terrestrial setting during the hotter, more xeric late spring and summer months, possession of the C_4 photosynthetic pathway and Krantz Anatomy (Griggs 1980; Keeley 1990, 1998) are important adaptive traits. This photosynthetic pathway allows plants to exchange atmospheric gasses with increased efficiency and concomitant reduction in water loss to evaporative transpiration. This permits the extended period of vegetative growth and reproduction of Orcutt grasses into the hot arid summer months after most other vernal pool associates have completely desiccated (Griggs 1980; Stone et al. 1988).

All Orcutt grasses possess an aromatic sticky glandular exudate on the stems, leaves and inflorescences. This trait is thought to be advantageous both as an anti-desiccation (Hoover 1941; Crampton 1959) and anti-herbivory adaptation (Griggs 1974, 1980). Grasshoppers can exert significant herbivory pressures late in the season although it has not been noted for slender Orcutt grass specifically.

Slender Orcutt grass plants flower and set seed as the margins and basin of the vernal pools dry from May through October (CNPS 2010). Detailed pollination and breeding experiments have not been conducted on this species. Like most other grasses, Orcutt grasses are thought to be primarily wind-pollinated out-breeders as indicated by protogynous floral maturation, strongly exserted anthers and measured patterns of genetic variation (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988). In one instance, native solitary bees of the family Halictidae were observed collecting pollen from one of its relatives, slender Orcutt grass (Griggs 1974).

Seed production of Orcutt grass plants is known to vary greatly between individuals along moisture gradients within single pools, among populations between pools, and within pools between years (Griggs 1980; Griggs and Jain 1983). Fully mature slender Orcutt grass individuals can produce from 11 to over 164 seeds per plant, with an average of 58 seeds estimated. Seed set in Orcutt grasses appears uncertain and dependent on precise synchrony of appropriate environmental conditions and phenological development (Stone et al. 1988).

After the growing season, the mature slender Orcutt grass seeds are held tightly within maternal floral structures (lemma and pelea) on the inflorescence until the mechanical action of wind, heavy rain and winter inundation shatter the inflorescences and release the mature florets. This lack of dispersal is thought to be an adaptation to the sparsely scattered distribution of suitable large vernal pools (Griggs 1974, 1980). It is an advantage for a large proportion of the seed crop to remain within the available large-pool habitat, rather than chance loss to unsuitable uplands. Even though dispersal is naturally limited, Orcutt grass colonization of pools was probably a more frequently occurring event in the historic past when

there were likely more populations, many more pools, more pool interconnectivity, exceedingly larger waterfowl migrations, and unfenced roaming ungulates (Griggs 1980). Of the Genus *Orcuttia*, slender Orcutt grass exhibits the greatest propensity for colonizing newly available habitat, most likely the result of seed transport by livestock (Stone et al. 1988).

Not all *Orcuttia* seeds germinate every year, resulting in the buildup of a dormant soil seed bank (Griggs 1974, 1980, 1981). The soil seed bank is a critical adaptive barrier against local extinction events that could otherwise result from the unpredictable occurrence and duration of favorable growing conditions (Stone et al. 1988). In a study of five slender Orcutt grass populations, 14 seeds were found dormant in the soil for every 1 growing plant present (Griggs 1980; Griggs and Jain 1983). Between-population and between-year variation in soil seed bank density and the duration of seed viability in the soil is unknown. The soil seed bank also may contribute to overall genetic diversity of populations, as seeds stored over multiple years produced under varying growth conditions may harbor adaptive allelic combinations that are infrequently expressed or selected.

Studies of seed weight and allozyme electrophoresis indicate that Orcutt grasses possess low levels of gene flow between populations, and high levels of gene flow within (Griggs 1980, 1984; Griggs and Jain 1983). This is to be expected given the highly insular distribution and seasonally dynamic nature of vernal pool habitat (Stone et al, 1988). These studies also revealed very high levels of genetic diversity within the seed families of individual plants, with almost 50 percent of each species' genetic variation represented in samples from one plant. In addition, approximately 80 to 90 percent of the total genetic diversity of each species was represented in each population (Griggs 1980, 1984; Griggs and Jain 1983). It should be noted that this study was limited to assaying seven enzyme systems from two populations of slender Orcutt grass.

SLOG Habitat Requirements and Ecology

Like all grasses in the genus *Orcuttia*, slender Orcutt grass is strictly adapted to the vernal pool hydrological cycle. The tribe is thought to be a relatively ancient evolutionary group (Griggs 1981; Reeder 1982), descendant from a perennial ancestor related to the Chlorideae Tribe (Keeley 1998). The ancestral entity is thought to have inhabited the marshy margins of the Tertiary-age sea formerly covering the Great Central Valley (Axelrod 1973; Raven and Axelrod 1978). The evolving Orcuttieae lineage adapted to the increasing seasonal stresses as the Mediterranean climate developed and the inland water body receded.

Interestingly and of potential significance to conservation, slender Orcutt grass appears to be the least specific of the genus *Orcuttia* with regard to niche breadth and habitat specificity. This is indicated by occupation of a wider range of vernal pool sizes and vernal wetland types, occurrence over a greater geographical area and landform types, a larger number of occurrences,

and a marked tendency to colonize newly available habitats (where seed sources are available), including constructed stock-ponds and hydrology-enhanced vernal pools (Stone et al. 1988).

Over its geographic range, slender Orcutt grass is associated with a number of distinct physiographic/edaphic settings (Stone et al. 1988). In eastern Sacramento County (southernmost populations) and on the Stillwater and Millville Plains of Shasta County, slender Orcutt grass is associated with vernal pools located on ancient weathered alluvial terraces with soils of the Redding and related Series (Stone et al. 1988). Soils of the Redding series tend to be strongly acidic (indication of age and weathering) and are generally gravelly with cobble. These soils also typically possess a shallow, water-impermeable iron-silica hardpan that favors the development of vernal pools (SCS 1993). In Tehama County, slender Orcutt grass occurs in vernal pools associated with cemented hardpan of the Tuscan, Toomes and related Series, as well as in more shallow volcanic soils and in volcanic bedrock depressions (Stone et al. 1988; CDFG 2010). The montane Occurrences of Lassen and Shasta Counties are also associated with volcanic soils, but in addition to mudflow and bedrock substrates, wetlands formed on large clay flats also support the species.

Orcutt grasses are strongly adapted to the more extreme hydrological cycles encountered in the spectrum of vernal pool types, e.g., they are typically associated with larger or deeper vernal pools that tend to possess more extreme regimes of inundation (Crampton 1959; Griggs 1974). Of the members of the genus *Orcuttia*, slender Orcutt grass tends to occupy the widest range of vernal pool sizes and types (Stone et al. 1988). Vernal pools occupied by slender Orcutt grass documented prior to 1988 range in size from 840 square meters to 45 hectares at Boggs Lake, and among the 39 pools measured, the median pool size was found to be 6,500 square meters (Stone et al. 1988). Upslope watershed area (Area of Drainage) associated with occupied pools was reported by Stone et al. (1988) to range from 0.4 to 1,145 acres among the known occurrences. It should be noted that a number of occurrences have been discovered since 1988.

Vernal pool hydrology has not been precisely defined for any of the Orcutt grasses. In general, ponding must be of sufficient duration and under the appropriate seasonal temperature regime to release the seeds from dormancy through decomposition of maternal floral structures in the presence of a symbiotic aquatic fungus (Griggs 1980; Griggs and Jain 1983; Keeley 1988). The depth or duration of pool inundation are not only critical for germination, but are likely strong determinants excluding other less specialized, but obligate vernal pool species from the barren micro-sites located in the deeper parts of pools that are inhabited by Orcutt grass species.

Ponding cannot be so excessive though, as to foster the recruitment and proliferation of native perennial marsh species, in particular common spikerush (*Eleocharis macrostachya*) (Crampton 1959; Stone et al. 1988; CDFG 2010) and cattail (*Typha* spp.). Common spikerush, a potentially aggressive rhizomatous species, is usually only found in the deepest portions of the more well

developed natural vernal pools. In such cases where it co-occurs with slender Orcutt grass, the latter grows mostly in barren areas lacking the spikerush, or at topographical positions just above the spikerush zone (Stone et al. 1988). Prolonged duration of ponding resulting from placement of berms, construction of road surfaces, or other alterations in the vicinity of natural pools has been cited as potential impacts at a number of slender Orcutt grass occurrences (CDFG 2010).

In the Sacramento Valley, slender Orcutt grass occurs in pools with other vernal pool endemics, including stalked popcorn-flower (*Plagiobothrys stipitatus*), common spikerush, coyote thistle (*Eryngium castrense*), white-headed navarretia (*Navarretia leucocephala*), water shamrock (*Marsilea vestida*), dwarf wooly marbles (*Psilocarphus brevissimus*), downingia (*Downingia* spp.), California damasonium (*Damasonium californicum*), vernal pool foxtail (*Alopecurus saccatus*), annual hairgrass (*Deschampsia danthonioides*), doveweed (*Eremocarpus setigerus*), smooth spike-primrose (*Epilobium pygmaeum*), Fitch's spikeweed (*Hemizonia fitchii*), Fremont's Goldfields (*Lasthenia fremontii*), and rabbitsfoot grass (*Polypogon monspeliensis*) (Stone et al. 1988; CDFG 2010). Many of these other vernal pool species however, do not appear to tolerate the hydrologic extremes of prime Orcutt grass habitat. They complete their lifecycle earlier in the season, and are therefore confined to the shallower margins or slopes of the deeper pools that support Orcutt grasses (Crampton 1959; Stone et al. 1988).

Hydrological stresses associated with vernal pools, and Orcutt grass pools specifically, exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian rye grass (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), are two non-native facultative wetland species that typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. They cannot however, tolerate the more extreme inundation regimes of deeper Orcutt pools. Thatch build-up from Italian rye grass, Mediterranean barley, medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmar 2002).

Although none are specifically reported to co-inhabit vernal pools with slender Orcutt grass "weedy species" are mentioned as a threat at several of the occurrences (CDFG 2010). Several non-native weedy hydrophytes may present future problems within the deeper portions of occupied Orcutt grass pools through competitive exclusion (as with common spikerush). Mannagrass (*Glyceria occidentalis*), an aggressive weed of irrigated agriculture and degraded vernal pools, has already been reported as a potential problem at several of the known related Sacramento Orcutt grass (*Orcuttia viscida*) populations. Additional species to consider include rosy lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), swamp pricklegrass (*Crypsis schoenoides*), Bermuda grass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*). Cocklebur (*Xanthium*

strumarium), another native species, can also dominate portions of Orcutt grass-type pools (Schlising, Unger pers. comm.).

Appropriately timed dry-pasture livestock grazing regimes are generally thought to be compatible with Orcutt grass populations, and may even enhance habitat in situations where Common Spikerush may otherwise predominate (Stone et al. 1988; CDFG 2010). By grazing from late fall, into early to mid-spring months, livestock are generally kept from the occupied portions of Orcutt grass pools by standing water, inundated soil and attraction to abundant green forage in the uplands. Most problems with livestock grazing arise from later spring and summer grazing regimes, when the Orcutt grass pools have dried and flowering and fruiting plants are exposed and vulnerable to trampling and cropping (Stone et al. 1988). In addition, during the later season when the upland forage has dried, the moist bottoms of vernal pools become highly attractive and may suffer increased trampling and hoof-pocking (Dittes pers. obs).

As an example of the role of timing in response to potential disturbances, Hoover (1941) and Crampton (1959) have reported Orcuttieae populations being completely disked in dry-farmed grain fields in the late fall, without apparent detriment to the Orcuttieae populations the following growing season. It has been noted that the same disking performed during the late spring or summer growing periods may completely deplete the soil seed bank and extirpate the population if performed over successive years (Stone et al. 1988).

SLOG Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Sacramento Orcutt grass are identified in Table G-3.6-1 and have been derived from the USFWS's list of primary constituent elements in the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table G-3.6-1. Habitat Elements for Slender Orcutt Grass

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

SLOG Species Distribution and Population Trends

SLOG Species Distribution

Slender Orcutt grass is distributed in the Sacramento Valley from eastern Sacramento County in the south, to the vicinity of Redding in Shasta County to the north. The species also occupies the adjacent Cascade Range Foothills in the region north and northeast of Red Bluff, as well as sites in the Pit River Drainage, located northeast of the Sacramento Valley. Another concentration of occurrences is located in the montane region of northern Plumas, western Lassen and eastern Shasta Counties, extending from the vicinity of Lake Almanor, north to the plateau region east and northeast of Lassen Peak. Two disjunct populations, comprising the westernmost occurrences, are located in the Inner Coast Range region of Lake County. Slender Orcutt grass is among the most widespread of the Orcuttiae grasses and exhibits the widest range in elevations (85 to 5,760 feet).

Slender Orcutt grass occurrences are distributed among five of the Geographic Subregions of the California Floristic Province, as described by Hickman (1993); the Sacramento Valley (Sacramento, Butte and Tehama Counties), Inner Coastal Range (Lake County), Cascade Range Foothill (Tehama County), High Cascade Range (Tehama, Shasta, Siskiyou, Plumas and Lassen Counties), and the non-Warner Mountain Subregion of the Modoc Plateau Region (Modoc County) (CNPS 2010).

This comparatively wide distribution may partially reflect the previously mentioned observations of Stone et al. (1988) regarding its comparatively broad habitat requirements relative to some of the other Orcutt grasses (e.g., Sacramento Orcutt grass). It may also reflect a different propensity for seed dispersal by waterfowl, or perhaps even a different “biogeographic legacy” (e.g., timeline of evolution and geographic distribution of ancestral taxon).

SLOG Central Valley Distribution

In the Central Valley, slender Orcutt grass occurs among five population centers. The southernmost of these, comprising three CNNDB occurrences and one yet to be recorded occurrence, is located in eastern Sacramento County. The next population center, comprised of two occurrences, is located approximately 65 miles to the north in southern Butte County. The next population center to the north, comprised of 30 occurrences, is located in Tehama County (CDFG 2010).

A large portion of the extant slender Orcutt grass occurrences are distributed among the remaining two Central Valley population centers. The northernmost, extends from the Stillwater Plains near Redding, to the Millville Plains in the vicinity of Cottonwood and Anderson to the south. The remaining Central Valley population center is located at slightly higher

elevations in the Cascade Range Foothills of Tehama County, north and northeast of Red Bluff in the vicinity of Manton, Dales Lake, Dales, and Hog Lake Plateau.

SLOG Distribution within the Planning Area

Currently, there are three recorded CNDDB occurrences of slender Orcutt grass presently known within the Planning Area (Figure SLOG-1), and one occurrence that is not yet registered with the CNDDB (Witham pers. comm.). One of these (CNDDB occurrence #16) is situated on the alluvial terrace at the northern edge of Laguna Creek, southeast of the intersection of Gerber and Excelsior Roads. This occurrence, comprised of a single occupied natural vernal pool, is situated within a proposed 300-acre habitat preserve (Klotz Property). This occurrence is located within the Planning Area as well as within the Sacramento UDA. The second slender Orcutt grass occurrence within the Planning Area is located just south of the Klotz property and is also located on a property that is proposed for a preserve (occurrence #90).

The third slender Orcutt grass occurrence located within the Planning Area is situated on the terrace landscape to the east of Mather Field, between Douglas Road and Kiefer Boulevard (CNDDB occurrence #71). This occurrence, comprised of one occupied natural vernal pool, is also located within the UDA. This occurrence is not currently protected, but is proposed for inclusion within a 20-acre vernal pool mitigation preserve (Radmacher pers. comm., 2003)

A fourth occurrence not yet reported in the CNDDB is located at the Unico Radio Facility on the south side of White Rock Road. This occurrence is within the Planning Area as well as within the UDA (Radmacher pers. comm. 2003).

In Sacramento County, slender Orcutt grass is associated with the Laguna Formation. This geological landform is comprised of remnant old-terrace alluvial deposits of ancestral river channels and pediment gravels, which were deposited during the early Pleistocene, between 600,000 and 1,500,000 years ago. Though the distribution of the species is extremely disjunct, the modeled habitat of the species in the Planning Area is discussed in Section G-4 of this Appendix.

SLOG Population Levels and Trends

Alice Eastwood collected the type collection for slender Orcutt grass in Shasta County in 1912. Since then, a total of 90 occurrences have been recorded (CDFG 2010), including 31 in Tehama County, 24 in Shasta County, a shared occurrence in Shasta and Tehama counties, five in Lassen County, 18 in Modoc County, four in Plumas County, three in Sacramento County and two occurrences in each of Siskiyou, Butte, and Lake counties. It should be noted that an additional population not yet recorded in the CNDDB is known from Sacramento County (CDFG 2010).

Of the 90 documented CNDDB occurrences, one is possibly extirpated from Shasta County and the shared Shasta/Tehama County occurrence is possibly extirpated. In addition, downward population trends have been reported for six populations in Shasta County, two in Tehama County, and one in Plumas County. Of the 90 known occurrences, only two have been classified as "stable." The population trends for the remaining 79 occurrences are classified as "unknown." By 1991, the CDFG stated that the trend for slender Orcutt grass is one of decline (USFWS 1997).

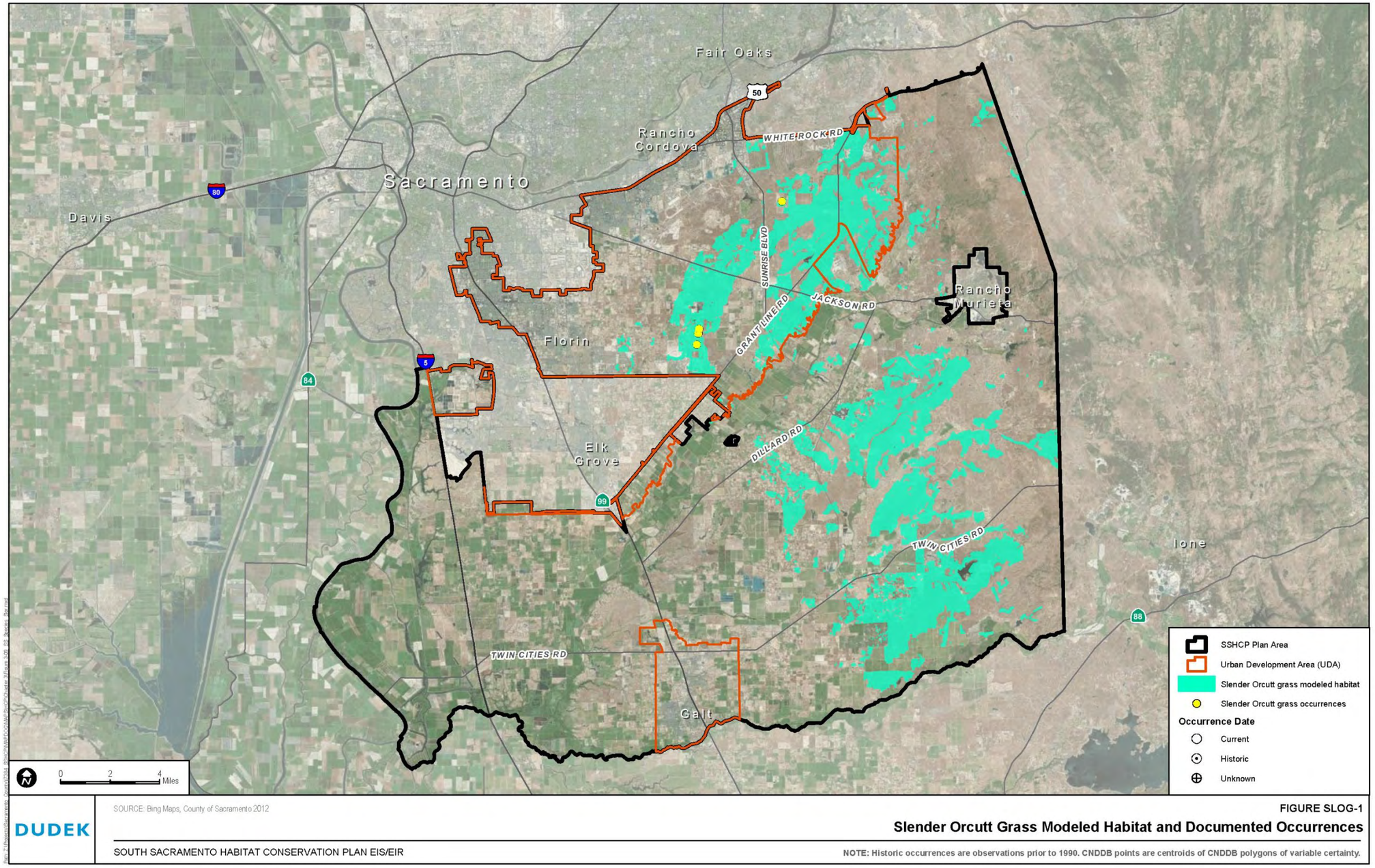
It is impossible to determine the number of historically occurring slender Orcutt grass populations or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before these species first received attention (Stone et al. 1988). Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978, Jones & Stokes 1990), however owing to habitat specificity (restriction to), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for slender Orcutt grass (Stone et al. 1988). Concerns over loss of Orcutt grass populations and habitat were expressed beginning with some of the earliest investigators (Hoover 1941; Crampton 1959, 1976; Griggs 1974).

There has been no comprehensive effort to monitor all populations of slender Orcutt grass. Various monitoring projects have been conducted by BLM, USFS, and CDFW. Stone et al. (1988) also provided estimates of populations at all Occurrences visited in 1986 and 1987.

Research conducted at other sites and on other Orcuttiae species indicate that abundance of individuals within Orcutt grass populations varies greatly between species, between populations within species, and within populations through years (Griggs and Jain 1983). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), and Greene's tuctoria (*Tuctoria greenei*) at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Orcutt grass population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

Figure SLOG-1 Slender Orcutt Grass Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

SLOG Threats to the Species

Potential direct threats to slender Orcutt grass include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, construction and maintenance of firebreaks, roads, and utility corridors, timber harvest activities (in montane occurrences), inappropriate livestock grazing regimes (later spring/summer rotations), grassland fires, recreational vehicles, equestrian and pedestrian traffic, and refuse dumping.

Potential Indirect threats to slender Orcutt grass include hydrological alteration of sub-watersheds by surrounding developments and land uses, shifts in competitive interactions (hydrology-mediated or invasive weeds), windblown refuse accumulation, point and non-point source water pollution, air pollution, and global climate change.

The proposed Klotz Preserve encompasses approximately 300 acres of vernal pool habitat supporting one CNDDB Occurrence of slender Orcutt grass (CNDDB Occurrence #16). The proposed Were preserve encompasses approximately 160 acres of vernal pool habitat supporting one CNDDB Occurrence of slender Orcutt grass (CNDDB Occurrence #90) The other Sacramento County CNDDB Occurrence (CNDDB Occurrence #71) is currently unprotected, but is planned for inclusion within a proposed 20-acre vernal pool preserve. The fourth slender Orcutt grass occurrence known in Sacramento County, located at the Unica Radio Facility Site, is currently unprotected.

The USFWS has designated critical habitat areas for slender Orcutt grass that encompasses all of the known occurrences and a large portion of the remaining potentially suitable habitat.

SLOG Data Gaps and Conservation Implications

Grasses of the Tribe Orcuttieae, including slender Orcutt grass, are among the most studied and best known of all vernal pool plant species and vernal pool species assemblages. As previously discussed, researchers have variously addressed taxonomy and biogeography, biology, ecology, breeding system, population genetics, habitat relationships, population levels, trends and threats. Even with the attention of researchers and relatively extensive body of information, data gaps with varying implications for conservation remain including:

SLOG What Constitutes Population Vigor, and How to Measure?

A good measure of Orcutt grass population vigor is difficult to define, given the highly variable year-to-year abundance within populations (Holland 1987; Griggs pers. comm. 2003). The contribution of the stored soil seed bank to population numbers and population genetic diversity is an important, but currently unknown factor as well. Furthermore, even if a trend at

the population level is discerned, causative factors contributing to year-to-year population fluctuations may be very difficult to identify (Alexander and Schlising 1997).

Trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

SLOG Specific Hydrological Requirements of Slender Orcutt Grass

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting slender Orcutt grass populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate). At the same time, It is also important to note that slender Orcutt grass is cited as one of the more broadly adapted species of the genus, inhabiting a wider array of vernal pool sizes and types, and one of the most likely to germinate during years with marginal precipitation (Holland 1987; Griggs pers. comm.).

The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of slender Orcutt grass-vernal pool habitat within established preserves. Similarly, assessment of potentially suitable slender Orcutt grass habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing slender Orcutt grass populations are established, assessed and monitored over time, a more quantifiable definition of suitable slender Orcutt grass-vernal pool hydrology may be developed.

SLOG Existing Hydrological Trend of Pools and Existing Indirect Effects

Several slender Orcutt grass populations throughout the state have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

Existing slender Orcutt grass conditions are not pristine, so if trends in vigor or habitat quality become apparent over time, it may be difficult to attribute trend to any specific management activity.

SLOG Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990). The geo-hydrologic investigation of Hanes and Stromberg (1998), conducted at a single site over three years in

eastern Sacramento County, addresses aspects of vernal pool hydrology that are important to consider in formulation of hydrological buffers (e.g., relationship between pool basin hydrology and surrounding upland soil profile).

Proposed preserve designs may not afford complete protection to the hydrological systems that support slender Orcutt grass and other species assemblages dependent on them without more information on appropriate scale hydrologic buffers.

SLOG Definition of Appropriate Scale Slender Orcutt Grass-Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective slender Orcutt grass-vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale Sacramento Orcutt grass pool preserve at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998).

Proposed preserve designs may not afford complete protection to the ecosystems that slender Orcutt grass and other species assemblages depend on without more information on appropriate scale of preserve area.

SLOG Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the slender Orcutt grass-vernal pool preserves, primarily for upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with slender Orcutt grass-occupied pools, although grazing and monitoring in similar systems have been addressed (Barry 1998, TNC 2000; Griggs 2002; Robins and Vollmar 2002; Burmester pers. comm.). It is important to note that slender Orcutt grass and other members of the Orcuttiae tribe do persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems.

. Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

With regard to compatible grazing regimes, timing of grazing appears far more important than stocking rate, grazing intensity, or duration of rotation in annual grassland pasture systems that support Orcutt grass-occupied vernal pools (Stone et al. 1988; Griggs 2000; Griggs pers. comm.). During the inundated period of the vernal pool cycle (generally late fall through mid-to late spring), germinating seed and establishing aquatic-phase seedlings are afforded protection from trampling and grazing by a general aversion of cattle to standing water, as well as

attractive forage in uplands. Even if some cattle congregate at the edge or meander into or across the pools while inundated, germinating seeds in the deeper portions of the pools are unaffected, the vast majority of the pool substrate escapes trampling and nothing is eaten.

Conversely, grazing during the dry-down period or terrestrial phase, when plants are flowering and setting seed can be detrimental to the season's flowering effort and seed crop (generally mid-to late spring through the summer and early fall months). Given multiple years of improperly timed grazing and seed loss (both from standing crop and exhaustion of soil seed bank), populations may decline in vigor and may even be extirpated.

SLOG Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in Orcuttiae-occupied vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, Lippia (*Phyla nodiflora*), paradox canary grass, cocklebur, and cattails. Of these, common spikerush presently co-inhabit slender Orcutt grass-occupied vernal pools in Sacramento County. Any of these and others now unknown may appear or change in abundance in slender Orcutt grass-occupied pools over time.

Potential competitive interactions with these species may affect the vigor of slender Orcutt grass populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect slender Orcutt grass populations.

SLOG Unknown Relationship Between Landform/Soil Chemistry And Bio-Geographic Distribution

In Sacramento County, slender Orcutt grass has a geographic association with old alluvial terraces possessing soils primarily of the Redding Family (Laguna Geological Formation). Occurrences in Tehama, Lassen and Modoc Counties are associated with other landforms and soils as well. The exact nature of this relationship to landform and soil is however, unknown. Given the relatively wide distribution of this species though, it is unlikely that soil pH or other parameter of soil chemistry strongly influences slender Orcutt grass distribution and population vigor. It is more likely that large or deep vernal pools, regardless of landform, soil series and soil pH may provide suitable habitat.

From the perspective of slender Orcutt grass conservation, this uncertainty has bearing on the definition of potentially suitable habitat, which guides surveys and establishment of habitat preserves.

SLOG Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to design preserves for multi-species conservation. Suitability of slender Orcutt grass habitat for supporting other rare plant species has not been specifically addressed, although natural populations of the rare pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), and legenere (*Legenere limosa*) are documented as sharing specific vernal pools with slender Orcutt grass. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals and bird species as well.

Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between November 1st and May 1st may benefit slender Orcutt grass-associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

SLOG Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

It has been determined that *Orcuttia* populations are genetically isolated as well as diverse, the latter both within and between pools (populations), and within the "seed family" of a single reproductive plant. In addition, there is a high degree of localized adaptation and strong intra-pool selective pressures (Griggs 1980; Griggs and Jain 1983). However, investigations of slender Orcutt grass population genetics have been limited to measures of seed size and weight (genetically fixed traits) within and among populations, and electrophoretic study of seven enzyme systems in only two populations. These analyses represent a very small portion of the genome and allow limited interpretation of patterns of genetic diversity and limited inference as to uniqueness of a given population. Another potentially important consideration is that there has been no assessment of the "genetic memory" potentially associated with stored seeds in the soil seed bank. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon.

SLOG Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, it appears that slender Orcutt grass populations depend on a substantial reserve of dormant seed stored in the soil as a buffer against single year and multiple-year cycles of unfavorable hydrological conditions. This population parameter has only been measured in a few pools during one growing season (Griggs 1980). There have been no other studies addressing spatial or temporal variability of seed abundance in the soil seed bank or longevity of dormant seeds.

From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

SLOG Inoculation

Since there are so few natural populations of slender Orcutt grass in Sacramento County, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied slender Orcutt grass habitat, create meta-population structure at extant occurrences where single pools now support the species, and ensure existence should any natural populations become compromised.

In addition to complete protection and enhancement of natural populations, it has been suggested that experimental inoculations may be desirable for Orcuttieae conservation (Griggs and Jain 1983; Griggs pers. comm.). The experimental establishment of a Sacramento Orcutt grass population at Phoenix Field (CNDDB occurrence #15), now 25 years-old, provides some indication of the probable success of inoculating suitable habitat and creating self-sustaining populations. However, not all experimental inoculations attempted during the research of Griggs were “successful.” (Griggs pers. comm.). Inoculations of slender Orcutt grass planted in Tehama County into re-established or established pools have had marginal success due to excessive ponding and competitive exclusion from Cattails. These Occurrences (CNDDB Occurrence # 72, #73 and #74) are rank as “poor” and the current population trends are “unknown.” The population genetics and long-term viability of artificially inoculated population for Orcutt grasses are unknown.

SLOG Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant slender Orcutt grass occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of slender Orcutt grass, if existing air quality can be maintained. If however, California’s human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect slender Orcutt grass and other native plant species.

If air pollution becomes such a problem that slender Orcutt grass is affected, few management options will exist to change conditions for this species.

SLOG Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a vigor response of some kind could be expected for slender Orcutt grass populations within the EIS/EIR Study Period, or at some time beyond.

SLOG Unknown Number of Undiscovered Populations

Additional unsurveyed potentially suitable habitat exists within the Planning Area, principally on the larger private dry-land ranches that harbor well-developed vernal pools and vernal pool complexes. Authorities generally consider slender Orcutt grass as one of the more completely understood species with regard to distribution and frequency (Stone, Taylor, Macdonald, Griggs, 2002 pers. comm.), owing primarily to typical association with only the best developed of vernal pools and seemingly natural restricted range; however, it is also acknowledged that a limited number of additional populations could be yet discovered as the remaining large tracts become surveyed.

It is very unlikely however, that enough populations remain to be discovered to justify a future change in the conservation status of slender Orcutt grass (Stone, Taylor, Witham, Griggs pers. comm.).

It is assumed that most, but perhaps not all extant populations of slender Orcutt grass are already known. It is further assumed that since there are so few natural populations and the probability of finding a substantial number more is low, that all populations yet discovered are of great conservation importance and should receive the same protection and management.

SLOG Literature Cited

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Dept. of Fish and Game, Redding, California.

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. In: Castri, F di, Mooney, H.A. (eds) Mediterranean type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Clark, G.M., T.J. Roscoe, M.J. Van Ess, and N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 1981. Life histories of vernal pool annual grasses. *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, F.T. and S.K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. Biological *Conservation* 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hickman, J.C. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley, California.

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F., and V.I. Dains, 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*. 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18: 18-29.

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J. R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. American Journal of Botany 69: 1082-1095.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Soil Conservation Service (SCS). 1993. United States Department of Agriculture Soil Conservation Service. Soil Survey of Sacramento County, California. Sacramento, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

United Stated Fish and Wildlife Service (USFWS). 1997 Determination of Endangered Status for *Orcuttia pilosa*, *Orcuttia viscida*, *Tuctoria greenei* and Threatened Status for *Castilleja campestris* ssp *succulenta*, *Chamaesyce hooveri*, *Neostapfia colusana*, *Orcuttia inaequalis* and *Orcuttia tenuis*. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

United Stated Fish and Wildlife Service (USFWS). 2003. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule August 6, 2003. Portland, OR. Federal Register. Vol. 68:46683 U.S. Fish and Wildlife Service Publication.

United Stated Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

SACRAMENTO ORCUTT GRASS (SAOG)

Sacramento Orcutt Grass (SAOG)

(Orcuttia tenuis)

Status USFWS: Endangered

Status CDFW: Endangered

Status CNPS: 1B.1

SAOG Listing Status

Sacramento Orcutt grass (*Orcuttia viscida*), also commonly called sticky Orcutt grass, was first listed as state Endangered by the California Department of Fish and Wildlife (CDFW) under the California Endangered Species Act in 1988 (Stone et al. 1988), and on March 26, 1997 the species received listing by the United States Fish and Wildlife Service (USFWS) as Endangered under the Federal Endangered Species Act (USFWS 1997). The California Native Plant Society

(CNPS) includes Sacramento Orcutt grass as a CNPS List 1B.1 species and has assigned an R-E-D Code of 3-3-3, meaning it is distributed in several highly restricted occurrences, or present in such small numbers that it is seldom found and reported, it is endangered throughout its range, and found only in California (CNPS 2010).

SAOG Life History and Ecology

SAOG Species Description and Life History

Sacramento Orcutt grass is a member of the distinctive Orcuttieae Tribe of the grass family (Poaceae), a group of nine vernal pool species endemic to California and northern Baja California. The Orcutt grasses have been long recognized by botanists as highly evolved, ecologically unusual and naturally restricted (Hoover 1941; Crampton 1959; Reeder 1965, 1980, 1982).

As with other members of the tribe, Sacramento Orcutt grass is a relatively small-stature annual species. Its three to 10 centimeter-long, densely hairy-sticky stems are tufted and mostly erect to spreading with age. Like the stems and inflorescences, the two to four millimeter-wide leaves are also hairy and densely covered with a sticky, highly aromatic exudate. Small scale-bracted flowers (florets) are arranged in dense two-ranked, flattened spikelets that are more or less overlapping and clustered together into exserted terminal three to five centimeter-long spikes (Hickman 1993).

Sacramento Orcutt grass is most readily distinguished from its closest relatives California Orcutt grass (*O. californica)* and San Joaquin Valley Orcutt grass (*O. inaequalis*) on the basis of having five unequal lemma lobes with the central lobe being the longest, the large lemma size (six to seven millimeter), lemma awn length (greater than one millimeter), and comparatively long fruit ($\pm$ 2.5 millimeter) (Hickman 1993). These morphological characters were first used to circumscribe the taxon as *O. californica* var. *viscida* (Hoover 1941). Subsequent study of morphology, chromosome number, and seed protein composition justified elevation of both varieties *O. tenuis* and *O*. *inaequalis* to specific rank (Reeder 1980, 1982).

All Orcutt grasses are very highly evolved and uniquely adapted members of the endemic vernal pool flora. Their anatomy and physiology (Keeley 1981, 1990, 1998), morphology, and life history traits (Crampton 1959; Griggs 1974, 1980, 1981) are highly adapted to the stressful, more extreme portions of the vernal pool niche. Some adaptive traits (physiology, anatomy, morphological-distinct life history stages) confer ability of individuals to survive the varied stresses of a single hydrological season, while others (e.g., annual habit, precise germination cues, stored soil seed bank, indeterminate flowering, dispersal-limiting traits) confer population stability through time in the context of year-to-year hydrological uncertainties that characterize the prevailing Mediterranean Climate (Griggs 1980; Stone et al. 1988).

Evolution of the annual growth habit is a key adaptation of Sacramento Orcutt grass to vernal pool habitat, as is the case with almost all other vernal pool plants (Griggs and Jain 1983; Holland 1987). The annual growth habit allows populations to persist through the regular and extreme summer drought that is characteristic of California's vernal pool landscape (Stone et al. 1988).

Sacramento Orcutt grass seeds germinate during the later spring months after cessation of winter rains and as the shallow water at the pool margins begins to warm and recede (Griggs 1974; Holland 1987; Stone et al. 1988). A requirement of cold stratification followed by increasingly warm fluctuating diurnal temperatures and the presence of a symbiotic aquatic fungus that has been determined necessary for Orcutt grass seed germination (Griggs 1980, 1981; Keeley 1988). Sensitivity to these environmental cues ensures germination only during years with hydrological conditions favorable for plants to complete their entire life cycle (Griggs 1980, 1981; Stone et al. 1988).

Sacramento Orcutt grass is thought to be the most specifically adapted of the genus with regard to suitable hydrology (Stone et al. 1988). It has been observed to be the least likely to germinate during years of marginal precipitation (Holland 1987). During a 14 year-long observation period at one population (CNDDB Occurrence #15), it was determined that Sacramento Orcutt grass numbers peaked in years when heavy rains (greater than 40 centimeters [15.7 inches]) occurred in the period from November through April and vernal pools remained inundated longer than usual (Holland 1987).

Members of the genus *Orcuttia* develop long (approximately 10 centimeters), thin (one to two millimeters-wide) juvenile leaves that float on the water surface when seeds germinate under shallow water or when seeds become submersed shortly after germination (Hoover 1941; Griggs 1974, 1980, 1981; Reeder 1982). By facilitating light exposure and atmospheric gas exchange for photosynthesis while submersed, these amphibious juvenile leaves maximize vegetative growth before vernal pool dry-down (Griggs 1981; Stone et al. 1988; Keeley 1990).

Orcutt grass plants are able to produce most of their above-ground vegetative growth, as well as flowers and seed as the vernal pools dry down in late spring and early to mid-summer (Crampton 1959). Vegetative and phenological demographics appear to be largely determined by pool dry-down rate (Griggs 1974, 1980; Stone et al. 1988). Thus, mature fruiting plants in drying soil above the waterline and submersed seedlings further toward the center can occur simultaneously in a single pool.

Indeterminate growth of new stems and spikelets provides for prolonged productivity as seasonally available water allows (Griggs 1974, 1980). This habit may result in smaller plants with fewer flowers and seeds maturing earlier in the season at the pool margins, and later maturing, larger, more fecund plants towards the pool center. This morphological and

phenological plasticity confers an adaptive advantage in the context of extreme seasonal fluctuations and the unpredictable year-to-year variability of the Mediterranean Climate (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988).

Since Orcutt grasses mature in a terrestrial setting during the hotter, more xeric late spring and summer months, possession of the C_4 photosynthetic pathway and Krantz Anatomy (Griggs 1980; Keeley 1990, 1998) are important adaptive traits. This photosynthetic pathway allows plants to exchange atmospheric gasses with increased efficiency and concomitant reduction in water loss to evaporative transpiration. This permits the extended period of vegetative growth and reproduction of Orcutt grasses into the hot arid summer months after most other vernal pool associates have completely desiccated (Griggs 1980; Stone et al. 1988).

All Orcutt grasses possess an aromatic sticky glandular exudate on the stems, leaves and inflorescences. This trait, particularly well developed in Sacramento Orcutt grass, is thought to be advantageous both as an anti-desiccation (Hoover 1941; Crampton 1959) and anti-herbivory adaptation (Griggs 1974, 1980). Grasshoppers can exert significant herbivory pressures late in the season although it has not been noted for Sacramento Orcutt grass specifically.

Sacramento Orcutt grass plants flower and set seed as the margins and basin of the vernal pools dry from April through July (CNPS 2010). Detailed pollination and breeding experiments have not been conducted on this species. Like most other grasses, Orcutt grasses are thought to be primarily wind-pollinated out-breeders as indicated by protogynous floral maturation, strongly exserted anthers and measured patterns of genetic variation (Griggs 1980; Griggs and Jain 1983; Stone et al. 1988). In one instance, native solitary bees of the family Halictidae were observed collecting pollen from Sacramento Orcutt grass plants (Griggs 1974).

Seed production of Orcutt grass plants is known to vary greatly between individuals along moisture gradients within single pools, among populations between pools, and within pools between years (Griggs 1980; Griggs and Jain 1983). Fully mature Sacramento Orcutt grass individuals can produce from 0 to over 600 seeds per plant. Seed set in Orcutt grasses appears uncertain and dependent on precise synchrony of appropriate environmental conditions and phenological development (Stone et al. 1988).

After the growing season, the mature Sacramento Orcutt grass seeds are held tightly within maternal floral structures (lemma and pelea) on the inflorescence until the mechanical action of wind, heavy rain and winter inundation shatter the inflorescences and release the mature florets. This lack of dispersal is thought to be an adaptation to the very sparsely scattered distribution of suitable large vernal pools (Griggs 1974, 1980). It is an advantage for a large proportion of the seed crop to remain within the available large-pool habitat, rather than chance loss to unsuitable uplands. Even though dispersal is naturally limited, Orcutt grass

colonization of pools was probably a more frequently occurring event in the historic past when there were likely more populations, many more pools, more pool interconnectivity, exceedingly larger waterfowl migrations, and unfenced roaming ungulates (Griggs 1980).

Not all *Orcuttia* seeds germinate every year, resulting in the buildup of a dormant soil seed bank (Griggs 1974, 1980, 1981). The soil seed bank is a critical adaptive barrier against local extinction events that could otherwise result from the unpredictable occurrence and duration of favorable growing conditions (Stone et al. 1988). In a study of one Sacramento Orcutt grass population, 44 seeds were found dormant in the soil for every one growing plant present (Griggs 1980; Griggs and Jain 1983). Between-population and between-year variation in soil seed bank density and the duration of seed viability in the soil is unknown. The soil seed bank also may contribute to overall genetic diversity of populations, as seeds stored over multiple years produced under varying growth conditions may harbor adaptive allelic combinations that are infrequently expressed or selected for.

Studies of seed weight and allozyme electrophoresis indicate that Orcutt grasses possess low levels of gene flow between populations, and high levels of gene flow within (Griggs 1980, 1984; Griggs and Jain 1983). This is to be expected given the highly insular distribution and seasonally dynamic nature of vernal pool habitat (Stone et al, 1988). These studies also revealed very high levels of genetic diversity within the seed families of individual plants, with almost 50 percent of each species' genetic variation represented in samples from one plant. In addition, approximately 80 to 90 percent of the total genetic diversity of each species was represented in each population (Griggs 1980, 1984; Griggs and Jain 1983). It should be noted that this study was limited to assaying four enzyme systems from two populations of Sacramento Orcutt grass.

SAOG Habitat Requirements and Ecology

Like all grasses in the genus *Orcuttia*, Sacramento Orcutt grass is strictly adapted to habitats possessing vernal pool-type hydrology. The tribe is thought to be a relatively ancient evolutionary group (Griggs 1981; Reeder 1982), descendant from a perennial ancestor related to the Chlorideae Tribe (Keeley 1998). The ancestral entity is thought to have inhabited the marshy margins of the Tertiary-age sea formerly covering the Great Central Valley (Axelrod 1973; Raven and Axelrod 1978). The evolving Orcuttieae lineage adapted to the increasing seasonal stresses as the Mediterranean climate developed and the inland water body receded.

Interestingly and of potential significance to conservation, Sacramento Orcutt grass appears to be the most specific of the genus *Orcuttia* with regard to niche breadth, as indicated by restriction to the largest of pools (Stone et al. 1988), comparatively poor seed germination

during marginal hydrologic-seasons (Stone et al. 1988; Holland 1987), and highly limited geographic distribution.

Sacramento Orcutt grass is restricted to the older and more weathered high terrace alluvial landform that comprises the Laguna Geologic Formation (SCS 1993). Soils associated with Sacramento Orcutt grass vernal pools include the Red Bluff-Redding Complex (0 to 5 percent slopes), Redding Gravelly Loam (0 to 8 percent slopes), Corning Complex (0 to 8 percent slopes), and Xerarents-Urban Land San Joaquin Complex (0 to 5 percent slopes). These soils tend to be strongly acidic, an indication of age and weathering (SCS 1993). In addition to being acidic, these soils are gravelly with cobble, and in many places, they possess a shallow, water-impermeable iron-silica hardpan that favors the development of vernal pools (SCS 1993).

Natural restriction of Sacramento Orcutt grass to these alluvial terrace landforms and associated soil series may reflect the propensity of these soils and landforms to develop suitably large vernal pools with appropriate hydrological regimes. Holland and Dains (1990) have shown how landform and soil relate to hydrological characteristics of vernal pools, and how these factors may influence floristic composition. This distribution may also reflect on the biogeography of an old geological surface that has remained exposed and relatively undisturbed over geological time, away from lower elevation, more recent alluvial depositions.

Orcutt grasses are strongly adapted to the more extreme hydrological cycles encountered in the spectrum of vernal pool types (e.g., they are typically associated with larger or deeper vernal pools that tend to possess more extreme regimes of inundation) (Crampton 1959; Griggs 1974). Of the members of the genus *Orcuttia*, Sacramento Orcutt grass tends to occupy the larger, more hydrologic-extreme pools. Vernal pools occupied by Sacramento Orcutt grass documented prior to 1988 range in size from 100 square meters (~120 square yards) to 10 hectares (~25 acres), and among the 10 pools measured, the median pool size was found to be 2,800 square meters (~3,349 square yards) (Stone et al. 1988). Upslope watershed area (Area of Drainage) associated with occupied pools was reported by Stone et al. (1988) to range from 0.5 to 123 acres among the known occurrences.

Since 1988, additional smaller pools within one of the pool complexes located east of Mather Air Force Base were found to support this species (CNDDB Occurrence #6) (CDFG 2010). Even though Sacramento Orcutt grass can be found in smaller pools (as measured by surface area), it is important to consider that even these are relatively deep, exhibit characteristics of well-developed vernal pool hydrology (Preston 2002 pers. comm.), and are situated in relatively close proximity to more typical, large pools within the 123-acre drainage area reported by Stone et al. (1988).

Vernal pool hydrology has not been precisely defined for any of the Orcutt grasses. In general, ponding must be of sufficient duration and under the appropriate seasonal temperature regime to release the seeds from dormancy through decomposition of maternal floral structures in the presence of a symbiotic aquatic fungus (Griggs 1980; Griggs and Jain 1983; Keeley 1988). The depth or duration of pool inundation are also likely factors excluding other less specialized, but obligate, vernal pool species from the barren micro-sites located in the deeper parts of pools that are inhabited by Sacramento Orcutt grass.

Ponding cannot be so excessive though, as to foster the recruitment and proliferation of native perennial marsh species, in particular common spikerush (*Eleocharis macrostachya*) (Crampton 1959; Stone et al. 1988; CDFG 2010). This potentially aggressive rhizomatous species is usually only found in the deepest portions of the more well developed natural vernal pools. In such cases where it co-occurs with Sacramento Orcutt grass, the latter grows mostly in barren areas lacking the spikerush (Stone et al. 1988). Prolonged duration of ponding resulting from placement of berms, construction of road surfaces, or urban development in the vicinity of natural pools appears to have resulted in increase vigor of common spikerush with concomitant loss of Sacramento Orcutt grass vigor in three pools in the complex east of Grant Line Road (CNDDB Occurrence #6) (Jones and Stokes 1990, 1998). Hydrological alteration and proliferation of common spikerush may also have negatively affected Sacramento Orcutt grass habitat at two Phoenix Field occurrences (CNDDB Occurrences #5 and 15) and the occurrence immediately east of Mather Air Force Base (CNDDB Occurrence #17; Preston pers. comm.).

Sacramento Orcutt grass occurs in pools with other vernal pool endemics, including Howell's quillwort (*Isoetes howelii*), coyote thistle (*Eryngium castrense*), dwarf wooly marbles (*Psilocarphus brevissimus*), flowering quillwort (*Lilaea scilloides*), stalked popcorn-flower (*Plagiobothrys stipitatus*), common spikerush, pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), legenere (*Legenere limosa*), white-headed navarretia (*Navarretia leucocephala*), double-horned downingia (*Downingia bicornuta*), goldfields (*Lasthenia* spp.) and hairy pepperwort (*Marsilea vestida*) (CDFG 2010). Many of these other vernal pool species however, do not appear to tolerate the hydrologic extremes of prime Sacramento Orcutt grass habitat. They complete their life cycle earlier in the season, and are therefore confined to the shallower margins or slopes of the deeper pools that support Sacramento Orcutt grass (Crampton 1959; Stone et al. 1988).

Hydrological stresses associated with vernal pools, and Orcutt grass pools specifically, exclude the majority of non-native weedy species that characterize the present-day valley annual grassland, agricultural fields, and ruderal habitats. Italian wild rye (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*) are two non-native facultative wetland species that typically dominate disturbed wetlands and can be invasive in smaller, more ephemeral vernal pool types. They cannot however, tolerate the more extreme

inundation regimes of deeper Orcutt pools. Thatch build-up from Italian rye grass, Mediterranean barley, Medusa-head grass (*Taeniatherum caput-medusae*), and other non-native upland species may indirectly affect vernal pool species by lessening the amount of water entering the system through surface and subsurface flow (Robins and Vollmer 2001)

Several non-native weedy hydrophytes may however, present problems within the deeper portions of occupied Orcutt pools through competitive exclusion (as with common spikerush). Mannagrass (*Glyceria occidentalis*), an aggressive weed of irrigated agriculture and degraded vernal pools has already been reported as a potential problem at two of the known Sacramento Orcutt grass populations (CNDDB Occurrences #16 and #17). Although not recorded from any Sacramento Orcutt grass populations, other non-native aggressive species that can become problematic in deeper Orcutt grass-type vernal pools include rosy Lippia (*Phyla nodiflora* var. *rosea*), field bindweed (*Convolvulus arvensis*), swamp pricklegrass (*Crypsis schoenoides*), Bermuda grass (*Cynodon dactylon*) and paradox canary grass (*Phalaris paradoxa*) (Dittes pers. obs.). Cocklebur (*Xanthium strumarium*), another native species, can also come to dominate portions of Orcutt grass-type pools (Schlising, Unger pers. comm.).

Appropriately timed dry-pasture livestock grazing regimes are generally thought to be compatible with Orcutt grass populations, and may even enhance habitat in situations where Common spikerush may otherwise predominate (Stone et al. 1988; CDFG 2010). By grazing from late fall, into early to mid-spring months, livestock are generally kept from the occupied portions of Orcutt grass pools by standing water, inundated soil and attraction to abundant green forage in the uplands. Most problems with livestock grazing arise from later spring and summer grazing regimes, when the Orcutt grass pools have dried and flowering and fruiting plants are exposed and vulnerable to trampling and cropping (Stone et al. 1988). In addition, during the later season when the upland forage has dried, the moist bottoms of vernal pools become highly attractive and may suffer increased trampling and hoof-pocking (Dittes pers. obs).

As an example of the role of timing in relation to potential disturbance response, Hoover (1941) and Crampton (1959) have reported Orcuttieae populations being completely disked in dry-farmed grain fields in the late fall, without apparent detriment to the populations the following growing season. It has been noted that the same disking performed during the late spring or summer growing periods may completely deplete the soil seed bank and extirpate the population if performed over successive years (Stone et al. 1988).

SAOG Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Sacramento Orcutt grass are identified in Table G-3.7-1 and have been derived from the USFWS's list of primary constituent elements in

the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table G-3.7-1. Habitat Elements for Sacramento Orcutt Grass

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools, providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and non-native upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

SAOG Species Distribution and Population Trends

SAOG Species Distribution

Sacramento Orcutt grass occurs only in southeastern Sacramento County near the juncture of the Sierra Nevada foothills and eastern edge of the Sacramento Valley, qualifying it as the most geographically restricted member of the genus *Orcuttia*. There are no historic records or collections of this species made outside of this area (Stone et al. 1988; CDFG 2010). This distinction may partially reflect the previously mentioned observations of Holland (1987) and Stone et al. (1988) regarding its relatively high level of ecological specialization and comparatively narrow habitat requirements. This distribution also may reflect the fact that the largest, most hydrological stable pools located at lower topographical positions in the Central Valley were the first to have been lost to agriculture in the latter 19th and early 20th centuries, before the pioneering collections of Hoover and Crampton were made.

SAOG Central Valley Distribution

Sacramento Orcutt grass occurs within a narrow swath of remnant high terraces that lay near the juncture of the Northern Sierra Nevada Foothill and Sacramento Valley Biogeographic Provinces (Hickman 1993), between 110 and 270 feet in elevation (CDFG 2010). The recorded range of the species extends in a narrow band of habitat from the terrace just north of the American River in the vicinity of Orangevale, south approximately 26 miles to the vicinity of Rancho Seco Lake on the Arroyo Seco Mesa.

Nine extant (and one extinct) CNDDB occurrences are recorded from within this narrow north-to-south oriented band (CDFG 2010). These ten CNDDB occurrences are clustered among three geographically defined regions, hereafter referred to as the northernmost, central, and southernmost population centers (CDFG 2010).

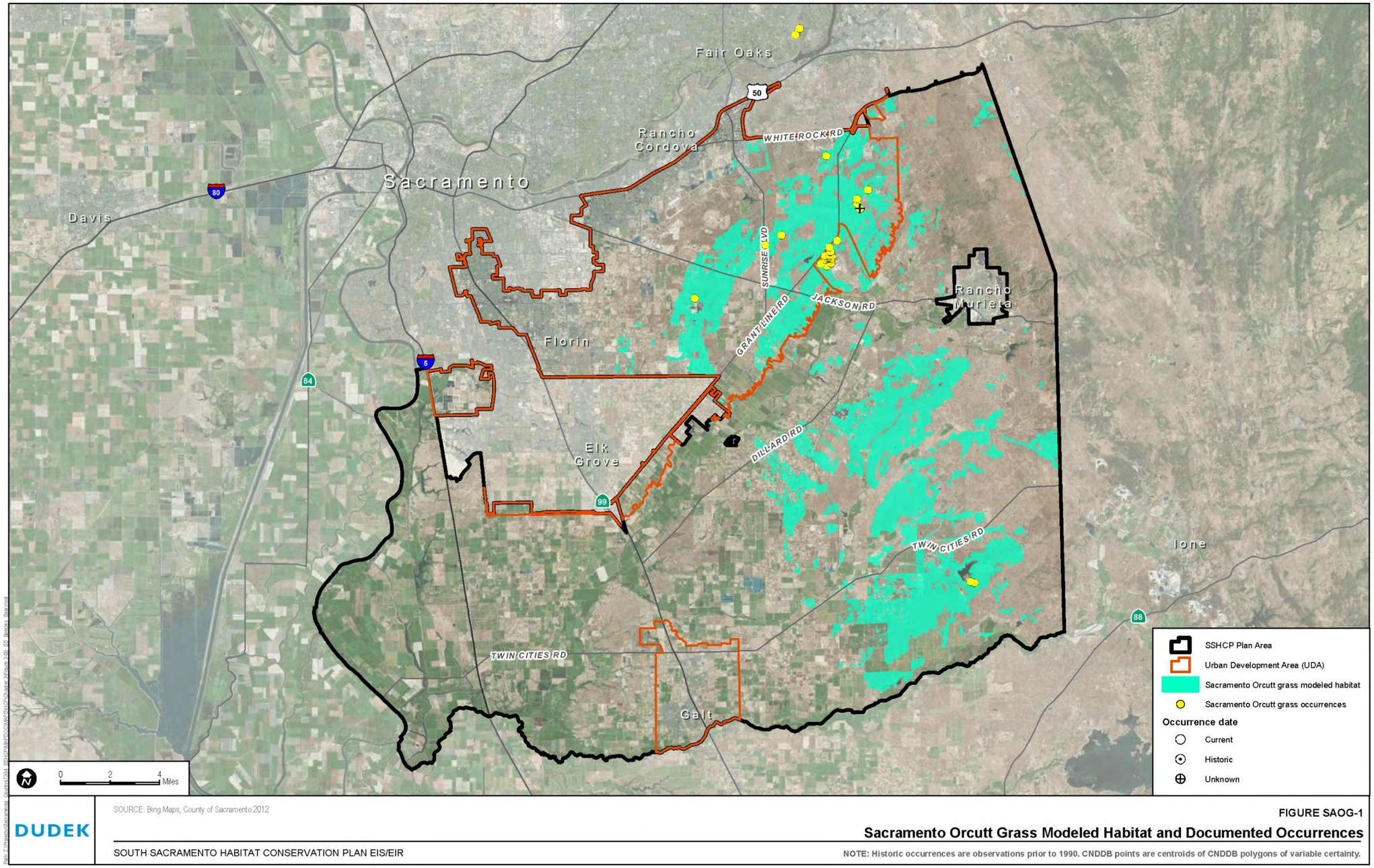
The northernmost of the three Sacramento Orcutt grass population centers, located on the alluvial terrace north of the American River, is comprised of three CNDDB occurrences. The northernmost occurrence, located near Orangevale, is extinct (CNDDB occurrence #4). One occurrence, comprised of one occupied vernal pool, is located further south at Phoenix Field (CNDDB occurrence #5). An artificially introduced population is located in a single vernal pool at nearby Phoenix Park (CNDDB occurrence # 15). It has been suggested that since the Phoenix Park Occurrence has established from seed derived from the Phoenix Field occurrence, the two are best considered as one genetic population. The northernmost population center (CNDDB occurrences #4, #5, and #15) is located outside of the Planning Area.

SAOG Distribution within the Planning Area

The central population center is located on the terrace landscape east of Mather Air Force Base in the vicinity of the Laguna Creek watershed. As measured by the number of CNDDB occurrences, number of occupied pools and past estimates of the number of individuals, this population center comprises the core of the species' currently known distribution (CDFG 2010; Stone pers. comm. 2002). Within an area spanning approximately seven miles by four miles, six CNDDB occurrences are known. This central Sacramento Orcutt grass population center lies within the Planning Area, however four of the occurrences are included within the UDA (CNDDB occurrences #17, #18, #19 and #20) and two occurrences are in the Keifer Landfill area outside of the UDA (CNDDB occurrences #1 and #6) (Figure SAOG-1).

The southernmost population center, comprised of just one occurrence (CNDDB occurrence #16), is located approximately three miles north of the Sacramento-San Joaquin County Line near Rancho Seco Lake. This population is located approximately 14 miles south of the next nearest population. This southernmost site is located within the Planning Area, but outside of the Sacramento UDA. The distribution of the species is extremely disjunct. The modeled habitat of the species in the Planning Area is discussed in Section G-4 of this Appendix.

Figure SAOG-1 Sacramento Orcutt Grass Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

SAOG Population Levels and Trends

It is impossible to determine the number of historically occurring Sacramento Orcutt grass populations or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before these species first received attention (Stone *et. al*. 1988). Investigators have made estimates as to the acreage of vernal pool habitat lost since historic times (Holland 1978). Owing to habitat specificity (restriction to largest pools), only a subset of the vernal pool habitat lost within the natural range of the species likely provided suitable habitat for Sacramento Orcutt grass (Stone et al. 1988). Concerns over loss of Orcutt grass populations and habitat were expressed beginning with some of the earlier investigators (Hoover 1941; Crampton 1959, 1976; Griggs 1974).

The first collections of Sacramento Orcutt grass were made by Hoover in 1941. At that time, much habitat had already been lost, including some of the larger, lower terrace pools that occupied sites most favorable to agricultural development. Since 1941, a total of only 30 occupied vernal pools have been recorded, two of which (CNDDB occurrence #4 and portion of CNDDB occurrence # 6) were extirpated by 1988 (Stone et al. 1988, CDFG 2010). By 1991, the USFWS stated that the trend for Sacramento Orcutt Grass is one of rapid decline (USFWS 1997).

There has been no comprehensive effort to monitor all populations of Sacramento Orcutt grass. Informal monitoring projects have been conducted by the CDFW at the Phoenix Field Ecological Preserve, by Holland at the Phoenix Park Vernal Pool Preserve, and by Jones and Stokes at the Kiefer Landfill sites (Preston pers. comm.). Stone et al. (1988) also provided estimates of populations at all occurrences visited in 1986 and 1987. Population estimates recorded for Sacramento Orcutt Grass are summarized in Table G-3.7-2.

Table G-3.7-2. Sacramento Orcutt Grass Population Estimates for Eastern Sacramento County

CNDDB Occurrence #	Occurrence # of pools observed	Range of population estimates
1	1	1986-87: "numerous" 1995: 400,000 1998: 138,000
5	1	1986: >200,000 1994-96: >100,000 1997: 9,500
6	6-19	1990: "thousands" 1995: >1,000,000 1998: 129,000
15	1	1978: (0) pool seeded 1985: >1,000 1986: >10,000 1991: >1,000 1995: ~ 100,000 1996: 35 1997: 1,000
16	1	1986: ~500 1987:200 1993: < 20 (M. Gause) 1995: 300
17	1	1987: >10,000 1995: >10,000
18	1	1987: 1,000
19	4	1994: "hundreds" 1995: 1,200,000
20	Unknown	Unknown

Source: CDFG 2010; Stone et al. 1988

These data, and research of others, indicate that abundance within Orcutt grass populations varies greatly between populations, and within populations from year to year (Griggs and Jain 1983; Holland 1987). This extreme population variability is attributable to interactions of seed dormancy, early seedling survivorship, and average seed set per plant, as principally determined by seasonal and between-year limitations in available moisture (Griggs and Jain 1983; Holland 1987). Fluctuations of similar magnitude are also recorded for hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), and Greene's tuctoria (*Tuctoria greenei*) at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997).

Observations made over a decade or so may provide a reasonable indication of the short-term vigor of a given Orcutt grass population. It is important to consider however, that in order to assess the trend of the species, long-term monitoring of both habitat and populations conducted over multiple cycles of wet and dry years is needed. Another aspect of population demography is

the quantity and age of stored seed in the soil profile. Undoubtedly, the number of stored seeds in the soil profile has bearing on how many plants can be produced in a given favorable year.

SAOG Threats to the Species

Potential direct threats to Sacramento Orcutt grass include loss of vernal pool habitat to agricultural or urban/industrial land-use conversions, construction and maintenance of firebreaks, roads, and utility corridors, inappropriate livestock grazing regimes (later spring/summer rotations), grassland fires, recreational vehicles, equestrian and pedestrian traffic, and refuse dumping.

Potential Indirect threats to Sacramento Orcutt grass include hydrological alteration of sub-watersheds by surrounding developments and land uses, shifts in competitive interactions (hydrology-mediated or invasive weeds), windblown refuse accumulation, point and non-point source water pollution, air pollution, and global climate change.

Preserves currently established or in the process of becoming established that include Sacramento Orcutt grass are the Sunrise-Douglas Mitigation Bank and the Kiefer Landfill Wetland Preserve. The Sunrise-Douglas preserve encompasses approximately 480 acres of vernal pool annual grassland habitat supporting two CNDDB occurrences (CNDDB occurrence #17 and #18). The proposed Kiefer Wetland Preserve will encompass two CNDDB occurrences (CNDDB occurrence #1 and #6), encompassing 19 occupied pools, and an undetermined number of acres of annual grassland vernal pool habitat. The remaining Sacramento Orcutt Grass Occurrences in the Planning Area (CNDDB occurrences #16, #19 and #20) remain unprotected.

The USFWS has designated critical habitat areas for Sacramento Orcutt grass that encompasses all of the known 0ccurrences and a large portion of the remaining potentially suitable habitat.

SAOG Data Gaps and Conservation Implications

Grasses of the Tribe Orcuttieae, including Sacramento Orcutt grass, are among the most studied and best known of all vernal pool plant species and vernal pool species assemblages. As previously discussed, researchers have variously addressed taxonomy and biogeography, biology, ecology, breeding system, population genetics, habitat relationships, population levels, trends and threats. Even with the attention of researchers and relatively extensive body of information, data gaps with varying implications for conservation remain including:

SAOG What Constitutes Population Vigor, and How to Measure?

A good measure of Orcutt grass population vigor is difficult to define, given the highly variable year-to-year abundance within populations (Holland 1987; Griggs pers. comm. 2003). The contribution

of the stored soil seed bank to population numbers and population genetic diversity is an important, but currently unknown factor as well. Furthermore, even if a trend at the population level is discerned, causative factors contributing to year-to-year population fluctuations may be very difficult to identify (Alexander and Schlising 1997). Therefore, trends may occur that are not discernable and trends that are discerned may be unexplainable. These factors will complicate attempts to change management for benefit of the species if measured vigor shows decline.

SAOG Specific Hydrological Requirements of Sacramento Orcutt Grass

Numerical data do not exist regarding specific parameters of the annual hydrological cycle of vernal pools supporting Sacramento Orcutt Grass populations (e.g., timing of rainfall, depth of ponding, duration of ponding and soil dry down rate). At the same time, It is also important to note that Sacramento Orcutt Grass is cited as one of the more specifically adapted species of the genus, inhabiting the more well-developed of vernal pools, and one of the least likely to germinate during years with marginal precipitation (Holland 1987; Griggs pers. comm.). The general lack of numerical hydrological data limits the ability to precisely monitor or assess hydrological suitability of Sacramento Orcutt Grass-vernal pool habitat within established preserves. Similarly, assessment of potentially suitable Sacramento Orcutt grass habitat for preserve establishment or for detection of the species at this time must rely on generalities. Once preserves for existing Sacramento Orcutt grass populations are established, assessed and monitored over time, a more quantifiable definition of suitable Sacramento Orcutt grass -vernal pool hydrology may be developed.

SAOG Existing Hydrological Trend of Pools and Existing Indirect Effects

Most of the Sacramento Orcutt grass populations have already experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds. Without complete protection of entire vernal pool watersheds, or precise hydrological monitoring and accurate modeling on a pool complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown. Existing Sacramento Orcutt grass conditions for are not pristine, so if trends in vigor or habitat quality become apparent over time, it may be difficult to attribute trend to any specific management activity.

SAOG Definition of Appropriate Hydrology Buffer

There is no standard for appropriate scale of effective hydrologic buffers for vernal pool-annual grassland ecosystems, since the nature of vernal pool complexes and their geo-hydrological relations may vary substantially by geography (Holland and Dains 1990). The geo-hydrologic investigation of Hanes and Stromberg (1998), conducted at a single site over three years in eastern Sacramento County, addresses aspects of vernal pool hydrology that are important to

consider in formulation of hydrological buffers (e.g., relationship between pool basin hydrology and surrounding upland soil profile).

Proposed preserve designs may not afford complete protection to the hydrological systems that support Sacramento Orcutt grass and other species assemblages dependent on them without more information on appropriate scale hydrologic buffers.

SAOG Definition of Appropriate Scale Sacramento Orcutt Grass -Vernal Pool-Annual Grassland Preserve

There is no standard for appropriate scale of effective Sacramento Orcutt grass -vernal pool preserves. It is a paradigm of conservation biology that "bigger is better" for a variety of well-documented reasons. Conservation challenges associated with the relatively small-scale Sacramento Orcutt grass -vernal pool preserve at Phoenix Field and Phoenix Park are well documented and reflect consequences of increase edge effect associated with smaller preserves (Clark et al. 1998). Proposed preserve designs may not afford complete protection to the ecosystems that Sacramento Orcutt grass and other species assemblages depend on without more information on appropriate scale of preserve area.

SAOG Determination of an Appropriate Livestock Grazing Regime

Livestock grazing will occur in at least some of the Sacramento Orcutt grass -vernal pool preserves, primarily for upland annual grassland vegetation management. Specific grazing regimes have not been formulated for annual grassland pasture systems with Sacramento Orcutt grass -occupied pools; although grazing and monitoring in similar systems have been addressed (Barry 1998; TNC 2000; Griggs 2002; Robins and Vollmar 2002; Burmester pers. comm.). It is important to note that Sacramento Orcutt grass and other members of the Orcuttiae tribe do persist though, in historically and contemporary operating livestock ranches. At a minimum, compatibility with some level of grazing is evidenced by persistence of the species in these systems.

Specific livestock grazing regimes cannot be formulated until preserve size, configuration, and soil and vegetation conditions and vegetation management goals are determined.

With regard to compatible grazing regimes, timing of grazing appears far more important than stocking rate, grazing intensity, or duration of rotation in annual grassland pasture systems that support Orcutt grass-occupied vernal pools (Stone et al. 1988; Griggs 2000; Griggs pers. comm.). During the inundated period of the vernal pool cycle (generally late fall through mid-to late spring), germinating seed and establishing aquatic-phase seedlings are afforded protection from trampling and grazing by a general aversion of cattle to standing water, as well as attractive forage in uplands. Even if some cattle congregate at the edge or meander into or

across the pools while inundated, germinating seeds in the deeper portions of the pools are unaffected, the vast majority of the pool substrate escapes trampling and nothing is eaten.

Conversely, grazing during the dry-down period or terrestrial phase, when plants are flowering and setting seed can be detrimental to the season's flowering effort and seed crop (generally mid-to late spring through the summer and early fall months). Given multiple years of improperly timed grazing and seed loss (both from standing crop and exhaustion of soil seed bank), populations may decline in vigor and may even be extirpated.

SAOG Interactions with Non-Native Weeds and Weed Management Activities

Non-native weeds, or weedy native species reported as occurring in Orcuttiae-occupied vernal pools include western mannagrass, swamp pricklegrass, Bermuda grass, common spikerush, field bindweed, lippia, paradox canary grass and cocklebur. Of these, western mannagrass and common spikerush presently co-inhabit Sacramento Orcutt grass -occupied vernal pools. Any of these, as well as currently unknown, species may appear or change in abundance in Sacramento Orcutt grass -occupied pools over time.

Potential competitive interactions with these species may affect the vigor of Sacramento Orcutt grass populations. In addition, any eradication or control methods implemented for these species may in turn potentially affect Sacramento Orcutt grass populations

SAOG Unknown Relationship Between Landform/Soil Chemistry and Bio-Geographic Distribution

As previously mentioned, Sacramento Orcutt Grass has a strong geographic association with old alluvial terraces possessing soils primarily of the Redding, and to a lesser extent, Red Bluff Families (Laguna Geological Formation). This association has proven useful in predicting the location of new populations, as indicated by the southernmost discovery on Llano Seco Mesa (Stone 2002 pers. comm.). The exact nature of this relationship is however unknown. Does pH or some other factor influence Orcutt grass population vigor, or do soil associations with tendency to develop and support large vernal pools/hydrology, regardless of landform and soil pH, provide suitable habitat? From the perspective of Sacramento Orcutt grass conservation, this uncertainty has bearing on the definition of potentially suitable habitat, which guides surveys and establishment of habitat preserves.

SAOG Potential Association and Compatibility with Other Rare Vernal Pool Species

It is desirable to design preserves for multi-species conservation. Suitability of Sacramento Orcutt grass habitat for supporting other rare plant species has not been specifically addressed,

although natural populations of the rare pincushion navarretia, Bogg's-Lake hedge hyssop, and legenere are documented as sharing specific vernal pools with Sacramento Orcutt grass. Many of these pool complexes also may provide habitat for rare invertebrates, amphibians, mammals, and bird species as well. Management for the benefit of one species may conflict with management needs of other rare species. For instance, livestock grazing anytime between November 1st and May 1st may benefit Sacramento Orcutt grass -associated pool complexes, but may be detrimental to ground-dwelling amphibians depending on those complexes (e.g., California tiger salamander).

SAOG Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

It has been determined that *Orcuttia* populations are genetically isolated as well as diverse, the latter both within and between pools (populations), and within the "seed family" of a single reproductive plant. In addition, there is a high degree of localized adaptation and strong intra-pool selective pressures (Griggs 1980; Griggs and Jain 1983). However, investigations of Sacramento Orcutt grass population genetics have been limited to measures of seed size and weight (genetically fixed traits) within and among populations, and electrophoretic study of four enzyme systems in only two populations. These analyses represent a very small portion of the genome and allow limited interpretation of patterns of genetic diversity and limited inference as to uniqueness of a given population. Another potentially important consideration is that there has been no assessment of the "genetic memory" potentially associated with stored seeds in the soil seed bank. Elam (1996) provides a good overview of the myriad considerations in assessing the population genetics of vernal pool plants in the absence of empirical data for a given taxon.

Current limitations in our understanding of Sacramento Orcutt grass population genetics have little immediate conservation implication, , however; ifinoculation of pools is proposed for any alternatives analyzed in this EIS/EIR, or as part of the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005), appropriate measures will be developed to ensure that seed collection, seed treatment and pool inoculation methods are consistent with what we know and do not know about Sacramento Orcutt grass ecology and population genetics.

SAOG Seed Longevity and Dynamics of Stored Soil Seed Bank

As previously mentioned, it appears that Sacramento Orcutt Grass populations depend on a substantial reserve of dormant seed stored in the soil as a buffer against single year and multiple-year cycles of unfavorable hydrological conditions. This population parameter has only been measured in a few pools during one growing season (Griggs 1980). There have been no other studies addressing spatial or temporal variability of seed abundance in the soil seed bank

or longevity of dormant seeds. From the perspective of conservation, knowledge of site-specific soil seed bank characteristics would allow more accurate assessment of population size and stability (vigor). This is particularly true of populations that typically support the fewest standing individuals through time.

SAOG Inoculation

Since there are so few natural populations of Sacramento Orcutt Grass, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable pools and increasing the number of naturally self-sustaining populations. These additional populations would increase the likelihood of natural dispersal events into preserved, but unoccupied Sacramento Orcutt grass habitat, create meta-population structure at extant occurrences where single pools now support the species, and ensure existence should any natural populations become compromised.

In addition to complete protection and enhancement of natural populations, it has been suggested that experimental inoculations may be desirable for Orcuttieae conservation (Griggs and Jain 1983; Griggs pers. comm.). The experimental establishment of one population at Phoenix Field (CNDDB occurrence #15), now 25 years-old, provides some indication of the probably success of inoculating suitable habitat and creating self-sustaining populations. However, not all experimental inoculations attempted during the research of Griggs were "successful" (Griggs pers. comm.), and the population genetics and long-term viability of the inoculated population are unknown.

SAOG Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter. ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to vernal pool vegetation. Assuming that extant Sacramento Orcutt grass occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Sacramento Orcutt grass, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively effect Sacramento Orcutt grass and other native plant species. If air pollution becomes such a problem that Sacramento Orcutt grass is affected, few management options will exist to change conditions for this species.

SAOG Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature

over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology. It is likely that given the expected global climate trends, a vigor response of some kind could be expected for Sacramento Orcutt grass populations within the 50-year study period of the EIS/EIR or at some time beyond.

SAOG Unknown Number of Undiscovered Populations

Additional unsurveyed potentially suitable habitat exists within the Planning Area, principally on the larger private dry-land ranches that harbor well-developed vernal pools and vernal pool complexes. Authorities generally consider Sacramento Orcutt grass as one of the more completely understood species with regard to distribution and frequency (Stone, Taylor, Macdonald, Griggs, 2002 pers. comm.), owing primarily to typical association with only the most developed vernal pools and seemingly natural restricted range. However, it is also acknowledged that a limited number of additional populations could be yet discovered as the remaining large tracts become surveyed. It is very unlikely however, that enough populations remain to be discovered to justify a future change in the conservation status of Sacramento Orcutt grass (Stone, Taylor, Witham, Griggs pers. comm.).

SAOG Literature Cited

Alexander, D.G., and R.A. Schlising. 1997. Vernal pool ecology and vernal pool landscape management as illustrated by rare macro invertebrates and vascular plants at Vina Plains Preserve. California Dept. of Fish and Game, Redding, California.

Axlerod, D.I. 1973. History of the Mediterranean ecosystem in California. *In*: Castri, F di, Mooney, H.A. (eds) Mediterranenan type ecosystems: origin and structure. Springer, Berlin, Heidelberg, New York.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Burmester, Daniel. Regional Ecologist, California Department of Fish and Game Rancho Cordova, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Clark, G.M., and T.J. Roscoe, M.J. Van Ess, N. Wymer. 1998. Management of considerations for small vernal pool preserves - The Phoenix Vernal Pools. Pp. 250-254 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. *Madrono* 15 pp. 97-110.

Crampton, B. 1976. Rare grasses in a vanishing habitat. *Fremontia* 4: 22-23.

DeVilla, Bill. Consultant, Owner Ecosystems West, Ben Lomond, California.

Elam, D.R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, F.T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F.T. 1976. Life history strategies of the genus *Orcuttia*. Jain, S. (ed.) Vernal Pools: Their Ecology and Conservation. Institute of Ecology Publication No. 9, University of California, Davis, California. 93pp.

Griggs, F.T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F.T. 1981. Life histories of vernal pool annual grasses, *Fremontia* 9:1 pp. 14-17.

Griggs, F.T. 1984. A strategy for the conservation of the genus *Orcuttia*. Pp. 255-262 *in:* S. Jain and P. Moyle, (Eds) Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis, California.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management, *Fremontia* 27: 48-51.

Griggs, Tom, Ph.D. Senior Restoration Ecologist River Partners, Chico, California.

Griggs, F.T. and S.K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. *Biological Conservation* 27: 171-193.

Hanes, T. and L.P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hickman, J.C. (ed.) 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley, California.

Holland, R.F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R.F. and V.I. Dains. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Holland, R.F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Hoover, R.F. 1941. The genus *Orcuttia*. *Bulletin of the Torrey Botanic Club* 68: 149-156.

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Sacramento Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Keeley, J.E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. *American Journal of Botany*, 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants: Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. *Oecologia* 116(1-2): 85-97.

Macdonald, Rod, Ph.D. Consulting Botanist, Davis, California.

Preston, Robert, Ph. D. Consulting Botanist, Jones and Stokes, Sacramento, California.

Raven, P.H. and D.I. Axlrod. 1978. Origin and Relationships of the California Flora. *University of California Publications in Botany*. 72:1-134.

Reeder, J.R. 1965. The Tribe Orcuttieae and the subtribes of the Pappophoreae (Gramineae). *Madrono*. 18:1 pp. 18-29.

Reeder, J.R. 1980. Nomenclature changes in *Orcuttia* (Gramineae). *Phytologia* 47:221.

Reeder, J.R. 1982. Systematics of the tribe Orcuttieae (Gramineae) and the description of a new segregate genus, *Tuctoria*. *American Journal of Botany* 69: 1082-1095.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Soil Conservation Service (SCS). 1993. Soil Survey of Sacramento County, California. United States Department of Agriculture. Sacramento, California.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Stone, Douglas. Ph.D. Candidate, University of California, Berkeley, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Teresa, S. and B.C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

The Nature Conservancy (TNC). 2000. Effects of Prescribed Fire and Grazing on a Vernal Pool Grassland Landscape: Recommendations for Monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Unger, Ron. Senior Restoration Ecologist EDAW, Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1997. Determination of Endangered Status for *Orcuttia pilosa*, *Orcuttia viscida*, *Tuctoria greenei* and Threatened Status for *Castilleja campestris* ssp *succulenta*, *Chamaesyce hooveri*, *Neostapfia colusana*, *Orcuttia inaequalis* and *Orcuttia tenuis*. Federal Register. Vol. 62. Number 58. U.S. Fish and Wildlife Service Publication.

United States Fish and Wildlife Service (USFWS). 2003. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule August 6, 2003. Portland, Oregon. Federal Register. Vol. 68:46683 U.S. Fish and Wildlife Service Publication.

United Stated Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

Witham, Carol. Consulting Botanist, Davis, California.

Register. Vol. 68:46683 U.S. Fish and Wildlife Service Publication.

SANFORD'S ARROWHEAD (SAAR)

Sanford's Arrowhead (SAAR)

(Sagittaria sanfordii Green)

Status USFWS: None

Status CDFW: None

Status CNPS: List 1B.2



© 2007 Wendy Fisher

SAAR Listing Status

Sanford's Arrowhead (*Sagittaria sanfordii*), an obligate wetland species, is considered to be rare, threatened or endangered throughout its range, thus qualifying its designation as a list 1B.2 species by California Native Plant Society (CNPS 2010). It has been assigned an R-E-D Code of 2-2-3, meaning it is distributed in a limited number of occurrences, occasionally more if each occurrence is small, it is endangered in a portion of its range, and entirely restricted to California.

Being a CNPS List 1B.2 plant species, Sanford's Arrowhead meets the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 of the California Endangered Species Act (CESA) of the California Department of Fish and Wildlife (CDFW) Code, and is eligible for state listing. It is mandatory that all CNPS 1B species be fully considered during preparation of environmental documents relating to California Environmental Quality Act (CEQA) (CNPS 2010). Owing to its relatively limited geographic range and ongoing and potential future threats, Sanford's Arrowhead may become a candidate for future agency listing.

SAAR Life History and Ecology

SAAR Species Description and Life History

SAAR Physical Description

Sanford's Arrowhead is a perennial member of the water plantain family (*Alismataceae*). This emergent marsh species possesses a thin elongate underground stem (rhizome) that produces small [8-15 millimeters (0.3-0.6 inches) –wide] spherical tubers (corms) at their apices. New plants (clones), comprised of a cluster of leaves and one to several inflorescence stalks, grow from these tubers at the onset of the growing season. Emergent leaves possess sheathing stalks

and range from two to ten decimeters (~8-39 inches) in length. The leaves are completely linear and three-angled, or they may possess a narrowly elliptic to lanceolate blade that ranges from five to 15 centimeters (~2-5.9 inches) in length (Mason 1957; Hickman 1993). Plants tend to grow in colonial patches.

The inflorescence is comprised of a naked stem bearing several whorled-series of flowers near the apex. The lowermost inflorescence whorls are typically comprised of three female flowers and the upper whorls are comprised entirely of male flowers. Both male and female flowers possess three white roundish petals with entire margins, as well as three small green narrowly triangular sepals. The petals are deciduous, and as the fruits mature, the flower stalks elongate to two to three centimeters (0.8-1.2 inches) and curve downward relative to the inflorescence axis. Fruits are arranged in dense ovoid head-like clusters, and from a distance superficially resemble green berries. Individual fruit are narrowly flattened side-to-side and possess a small lateral beak at the apex (Mason 1957). Initially, the emergent inflorescence stalk is erect and shorter than the leaves. As the fruits mature the entire inflorescence may recline and float on the surface of the water.

Sanford's Arrowhead is distinguished from its close relatives on the basis of its emergent leaves being narrowly linear to narrow-ovate or lanceolate, in contrast to the sagittate (arrowhead-shaped) leaves of the other Arrowhead species. In addition, only in Sanford's Arrowhead do the stalks of the maturing fruit thicken and curve downward relative to the inflorescence axis; the others possess stalks that remain un-thickened and curved upward (Hickman 1993).

Other than basic taxonomic and biogeographic treatments (Mason 1957; Hickman 1993), Sanford's Arrowhead is mostly unstudied. Existing biological and ecological information is derived mostly from observations of field botanists, primarily as a result of land management and agency-related resource surveys (Gause and Burmester pers. comms.).

Other species in the genus *Sagittaria*, have been variously studied with respect to breeding systems and reproduction (Wooten 1971; Kaul 1985; Delesalle and Muenchow 1992; Muenchow and Blum 1994; Muenchow 1998; Sarkissian et al. 2001; Huang 2003), dispersal and population dynamics (Gordon 1996), seed germination (Keddy and Constabel 1986; Gordon 1996; Leck 1996), seedling-hydrology relations (Keddy and Ellis 1985; Delesalle and Blum 1994), fish and wildlife interactions (Gruenhagen and Fredirickson 1990; Hohman et al. 1990; Muenchow and Delesalle 1992; Gough and Grace 1998; Evers et al. 1998), competitive interactions and community relations (Shaffer et al. 1992), and population genetics and rare plant conservation (Newberry 1991; Edwards and Sharitz 2000). Where applicable, information derived from studies of related Sagittaria species is referenced here for Sanford's Arrowhead.

SAAR Ecological Life Cycle

Sanford's Arrowhead shares the perennial clonal growth habit with the vast majority of other endemic emergent marsh plants. Thin elongate rhizomes produce ovoid tubers (corms) at their tips that allow the plant to persist within the submersed substrate through the dormant winter season. New plants (clones) are produced from these tubers at the onset of favorable growing conditions (Mason 1957). Observations have also been made of a Sanford's Arrowhead colony reappearing with vigor following a year during which the habitat failed to flood and aerial leaves and stems were completely absent (Gause pers. comm.). The ability of this colony to withstand at least one year of unfavorable hydrologic conditions and then reappear with vigor is likely attributable to the dormant rhizome and associated tubers/corms.

SAAR Seed Germination

Seed longevity, after-ripening, dormancy characteristics, germination requirements and optima for Sanford's Arrowhead have not been investigated. Similarly, no observations have been recorded or are otherwise available relating to seed ecology, germination or seedling growth in the field. Many marsh species exhibit soil-seed banking as a dynamic of their population ecology. This trait is unknown for Sanford's Arrowhead.

SAAR Vegetative Growth

Little is known regarding the dynamics of vegetative growth of Sanford's Arrowhead (e.g., growth rates, rhizome elongation rate or rhizome length, time to reproduction, clone longevity, physiological adaptations, etc.). Sanford's Arrowhead colonies have been observed to persist in a vegetative state throughout the year, without significant seasonal dieback of leaves (Gause pers. comm.).

SAAR Reproduction

Like many perennial marsh species, Sanford's Arrowhead reproduces asexually by dispersal of fragmented rhizomes and tubers, as well as sexually, via flowering and seed production. The relative contributions of asexual and sexual reproduction to population dynamics (e.g., dispersal, colonization, population growth and maintenance) likely vary by the type of aquatic system (isolated and static versus interconnected and flowing), and the nature of seasonal disturbances (flood, scour, trampling, waterfowl foraging, dredging and other ditch maintenance, etc.).

Sanford's Arrowhead flowers from May through October. As previously mentioned, this species has separate male and female flowers within a single inflorescence. Although pollination and breeding experiments have not been carried out for Sanford's Arrowhead specifically, the separate male and female flowers and well-developed petals suggest an out-crossing breeding

system. Pollination ecology of Sanford's Arrowhead has not been investigated. For two other Sagittaria species, principal flower visitors appeared to be generalist bees as well as assorted wasps and flies (Muenchow and Delesalle 1994). Fecundity has not been addressed for Sanford's Arrowhead.

SAAR Dispersal

Many perennial marsh species exhibit a comparatively wide geographic range and low morphologic variability (Mason 1957). This may reflect high dispersal potential associated with interconnected watercourses and with actions of migratory waterfowl. Waterfowl, muskrats, beavers and other wildlife readily consume all parts of some Sagittaria species, including seeds and tubers (Mason 1957). In addition, floodwaters likely disperse mature fruits and seeds, as well as fragmented rhizomes and associated tubers.

Evidence of long-distance dispersal and colonization exists in the overall geographic distribution of Sanford's Arrowhead in California, with disjunct northern and southern populations in Del Norte and Orange Counties, respectively. As with other wetland species, natural dispersal of seeds was likely a more frequent event when there were many more wetland acres, more interconnectivity, exceedingly larger waterfowl migrations and unfenced roaming native ungulates.

SAAR Seed Dormancy

Seed dormancy and stored soil seed banks are characteristics shared by many perennial marsh species. These traits however have not been investigated for Sanford's Arrowhead specifically. In perennial marsh species, the presence of a persistent soil seed bank may facilitate recolonization following prolonged periods of drought. A soil seed bank also ensures germination within barren topographic-hydrologic positions made newly available as water levels recede within drought-affected basins. Perenniating tubers/corms and rhizomes may buffer colonies against at least one year of drought; dormant seeds in the soil profile may further assure persistence over longer periods. Recruitment from persistent seed banks may also contribute over time to genetic diversity of populations that are potentially dominated by clones arising through high rates of vegetative reproduction (Edwards and Sharitz 2000).

SAAR Population Genetics

Population genetics of Sanford's Arrowhead have not been investigated, so intra- and inter-population patterns of genetic variability are unknown. Given the limited number of occurrences in the Planning Area and the widely scattered geographical distribution, all Sanford Arrowhead occurrences should be considered unique, and important genetic entities.

SAAR Habitat Requirements and Ecology

SAAR Biogeography and Landform Relations

Sanford's Arrowhead is strictly associated with freshwater marsh hydrology. Since this topographic-hydrologic setting occurs on nearly all landforms supporting rivers, creeks, lakes, ponds and irrigation channels, strong correlations with landforms should not be expected. In addition to numerous Central Valley settings, Sanford's Arrowhead is also recorded from marsh habitats in Orange and Ventura Counties of southern California and from the coastal region of Del Norte County. Sanford's Arrowhead also occurs on the Tuscan Volcanic Formation in the Cascade Range Foothills. Modeled habitat for Sanford's arrowhead is discussed in Section G-4 of this Appendix.

SAAR Hydrology Relations

As previously noted, Sanford's Arrowhead is strictly associated with hydrologic systems supporting emergent marsh vegetation. These include the margins of rivers, streams, ponds, reservoirs, irrigation and drainage canals and ditches, and stock-ponds. This species is reported to inhabit the cracks in concrete-lined irrigation/drainage ditches as well. Sanford's Arrowhead is also reported to occur in several seasonal wetlands with sufficient hydrology for persistence of emergent marsh species. As with other perennial marsh species, Sanford's Arrowhead likely inhabits specific zones defined by depth of ponding. Water depths are reported for only three of the 68 occurrences reported in CNDDB in 2010 (CDFG 2010); these range from four inches to two feet in depth (CDFG 2010). Observations made by some indicate preference for the relatively shallow margins o f deeper marsh systems (Gause pers. comm.).

SAAR Biological Community Relations

Plant species reported as occurring with Sanford's Arrowhead include regionally common emergent marsh species, as well as non-emergent wetland species more typically associated with marsh edges, saturated soil and even disturbed irrigated pastures. At one occurrence, Sanford's Arrowhead is reported as co-occurring with species more typically associated with vernal pools, including the rare legenere (*Legenere limosa*) and dwarf downingia (*Downingia pusilla*) (CDFG 2010).

Regionally common emergent marsh species associated with Sanford's Arrowhead include cattail (*Typha* spp.), other arrowheads (*Sagittaria latifolia*, *S. montevidensis, S. rigida*), water plantain (*Alisma plantago-aquatica*), tule (*Scirpus acutus*), yellow or Montevido waterweed (*Ludwigia peploides* ssp. *peploides* or *L.p.* ssp. *montevidensis*, respectively), parrot's-feather (*Myriophyllum aquaticum*), and willow-weed (*Polygonum lapathifolium*).

Co-occurring non-emergent wetland species more typically associated with the margins of permanent marshes, and/or with seasonal marshes, include various umbrella sedges (*Cyperus difformis, C. eragrostis, Cyperus* sp.), lady's-thumb (*Polygonum persicaria*) and assorted native bearded spangletop (*Leptochloa fascicularis*), and non-native perennial grasses barnyard grass (*Echinochloa crus-galli*, purple love grass (*Eragrostis diffusa*), dallisgrass (*Paspalum dilatatum*), Johnsongrass (*Sorghum halepense*) and bristlegrass (*Setaria* sp.). Willow (*Salix* spp.) is reported to share habitat with Sanford's Arrowhead as well (CDFG 2010).

SAAR Non-Native Weed Relations

Many of the previously mentioned emergent marsh associates, native and non-native alike, can be aggressive competitors. This trait results from vigorous lateral vegetative growth, either underground via rhizomes or stolons, with branching and elongating stems in the water column, or sprawling clambering aerial stems. Some floating species can completely cover the surface of water and mud as well such as mosquito fern (*Azolla* spp.), duckweed (*Lemma* spp.), water hyacinth (*Eichornia crassipes*), young mannagrass (*Glyceria* spp.), and others. Unlike terrestrial habitats, water availability is not a limiting factor for emergent marsh species. Rather, competition between species for available rooting substrate and light impose limits on population establishment, growth and persistence.

As mentioned previously, some of the commonly reported species associated with Sanford's Arrowhead are non-native perennial grasses, many of which are relatively aggressive weeds of marsh edges, irrigation ditches, irrigated pastures, rice fields and seasonal wetlands. In addition, other aggressively weedy wetland species in the region may present competitive problems with Sanford's Arrowhead, including other arrowheads (*Sagittaria* spp.), water plantains (*Alisma* spp., *Damasonium* spp.), water pepperweeds (*Polygonum* spp.), water hyacinth, water-nymph (*Najas* spp.), burhead (*Echinodorus berteroi*), water-milfoil (*Myriophyllum* spp.), waterweeds (*Elodea* spp., *Hydrilla verticillata, Ottelia alismoides*), Brazilian waterweed (*Egeria densa*), pondweed (*Potamogeton* spp.), purple loosestrife (*Lythrum salicaria*), and others.

The perennial marsh wetland habitat is highly productive, with much potential for intense interspecies competitive interactions. Many of the component species, including Sanford's Arrowhead, can be aggressive spreaders by rhizomes, stolons, or by dispersal of fragments/propagules. Ability for rapid lateral overtopping growth is the norm in this habitat. Sanford's Arrowhead is reported to be weedy and troublesome at the Rancho Cordova Golf Course ponds (CDFG 2010); however, other information on competitive interactions is lacking.

SAAR Livestock Grazing Relations

Interactions of livestock grazing with Sanford's Arrowhead have not been specifically addressed. As with other species though, interactions likely vary according to a variety of site-specific factors and timing. For example, marsh habitats located within irrigated pastures are likely to receive less grazing and trampling pressure than would the same habitat if it were located within a non-irrigated upland annual grassland setting. Within non-irrigated upland pastures, grazing and trampling pressures within the marshy shallows probably vary by season, with relatively little tendency of livestock to enter the marshy shallows during late winter to mid-spring months when forage and water is abundant and an increased pressure from livestock as the weather dries and warms into the summer months (Dittes pers. obs.). The capacity of colonies to recover from grazing and trampling is not known; however many rhizomatous perennial marsh species have the marked capacity to re-sprout after fragmentation of rhizome mats.

Among all of the CNDDB occurrences, livestock grazing is reported as a potential threat at only two (CNDDB occurrence # 14 and 15) (CDFG 2002). Nutrient loading, algae blooms and eutrophication associated with runoff from irrigated and overstocked pastures may potentially negatively affect some aquatic plant species, including Sanford's Arrowhead.

SAAR Disturbance Response

Owing to high vegetative productivity, rhizomatous or stoloniferous spread, subterranean tubers, and seed production, many emergent marsh species are well-adapted to, and may even benefit from periodic disturbances. In the absence of disturbances and a limiting deep-water edge, some marsh habitats may diminish in emergent species diversity, and may eventually transition into semi-terrestrial and terrestrial habitat. It is likely that in addition to basin topography, periodic disturbances (sediment scour and deposition) associated with seasonal flood events are an important determinant in the succession and species composition of any given marsh, as well as the meta-population dynamics of a given emergent marsh species. These dynamics are unknown as they relate to Sanford's Arrowhead.

The foraging activities of ducks and other waterfowl have been cited as loosening the rhizome tubers of Sagittaria, thus facilitating dispersal and potential colonization events. One mention of significant foraging of Sanford's Arrowhead by ducks is given in Tehama County (CDFG 2002). All parts of some Sagittaria species are edible for waterfowl, and dispersal is facilitated by wildlife breaking off tubers and perhaps spreading seeds while foraging (Mason 1954).

SAAR Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Sanford' Arrowhead are identified in Table G-3.8-1 and have been derived from input from local species experts.

Table G-3.8-1. Habitat Elements for Sanford's Arrowhead

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Freshwater marsh, open water, streams/creeks.	Strictly associated with hydrologic systems supporting emergent marsh vegetation, including the margins of rivers, streams, ponds, reservoirs, irrigation and drainage canals and ditches, and stock-ponds. Sanford's Arrowhead is also reported to occur in several seasonal wetlands with sufficient hydrology for persistence of emergent marsh species. As with other perennial marsh species, Sanford's Arrowhead likely inhabits specific zones defined by depth of ponding; however, additional information is needed to determine depth requirements.

SAAR Species Distribution and Population Trends

SAAR Species Distribution

Sanford's Arrowhead is distributed from Orange and Ventura Counties in southern California to Butte and Tehama Counties at the northern edge of the Great Central Valley. A disjunct population occurs in the most northwestern part of the state near Crescent City in Del Norte County (CNPS 2010).

Sanford's Arrowhead occurrences are distributed among six of the Geographic Sub-regions of the California Floristic Province, as described by Hickman (1993), including the San Joaquin Valley, Sacramento Valley, Cascade Range Foothills, Outer North Coast Range, Western Transverse Range, and South Coast. Sanford's Arrowhead ranges from sea level to 2,132 feet above mean sea level (CNPS 2010).

Sacramento County has the largest number of Sanford Arrowhead occurrences with 40 of the 68 occurrences (59%) represented (CDFG 2010). Calflora reports 86 records within California, 10 of which are within Sacramento County (Calflora 2010). Fresno County has the second largest number with eight occurrences (12%), followed by Butte and Merced Counties each having five occurrences reported (7% each) (CDFG 2010). Of the remaining 10 occurrences, San Joaquin and Tehama each have three (4% each), Del Norte, El Dorado, Madera, Mariposa, Orange, Placer, Shasta, and Ventura Counties each support one occurrence (<2% each) (CDFG 2010).

SAAR Central Valley Distribution

The Central Valley supports the majority of Sanford's Arrowhead occurrences. The northernmost Central Valley occurrences are located approximately 28 miles apart from each other in east-central and southern Butte County (CDFG 2002). Forty occurrences are located in Sacramento County (CDFG 2010). Another 15 Occurrences are distributed in the Central Valley along an arc of approximately 65 miles, extending from central Merced to northern Madera counties (CDFG 2002).

SAAR Distribution within the Planning Area

Of the 40 total (32 extant) Sanford's Arrowhead CNDDB occurrences presently recorded from Sacramento County, 23 occurrences (58%) are located within the Planning Area, 15 of which are located within the Urban Development Area (UDA) (Figure SAAR-1) (CDFG 2010). Figure SAAR-1 shows occurrence records within and adjacent to the Planning Area from the CNDDB (CDFG 2010), with one additional occurrence recorded by Wetland Research Associates (2004).

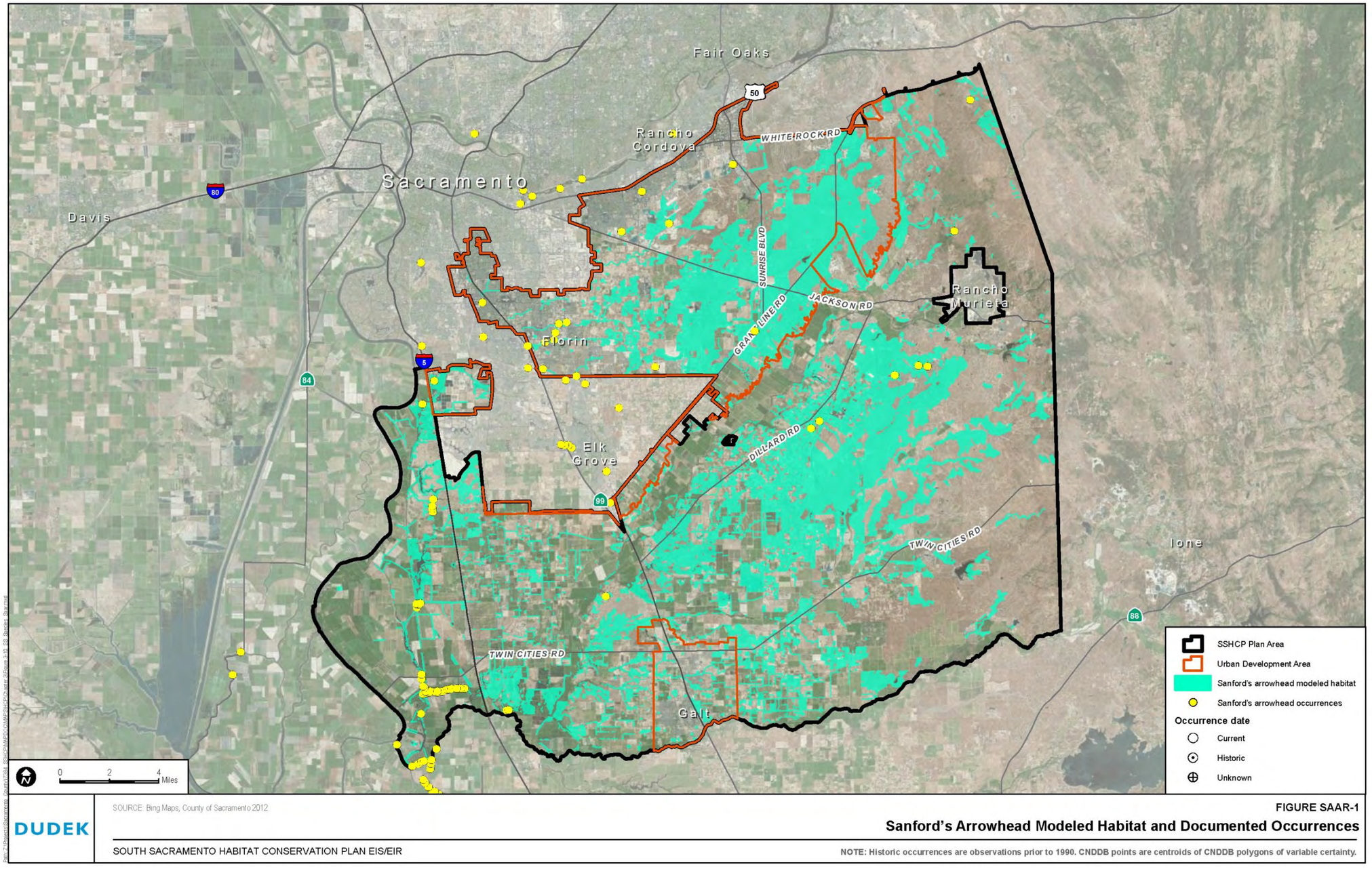
Occurrences of Sanford's Arrowhead in Sacramento County have been documented in the following Landform Formations: Basin deposits, lower and middle units in the Riverbank Formation, stream channel deposits, Turlock Lake Formation, and upper unit Modesto Formation/Alluvial deposits (CDFG 2002).

SAAR Population Levels and Trends

Of the 68 documented CNDDB Sanford's Arrowhead occurrences, one (CNDDB occurrence #2) located in Ventura County, is now reported as "extirpated." Another eight occurrences located in Sacramento County are reported as possibly extirpated (CDFG 2010). It is important to note though, that of the remaining 59 occurrences presumed extant, 11 have not been observed since between 1940 and 1958, even though the habitats were resurveyed in 1980 (CDFG 2002; none of these are in Sacramento County). One occurrence observed in 1975 was resurveyed in 1993 with no plants found (CDFG 2002). Twenty CNDDB occurrences are historic; they have not been observed in the last 20 years (CDFG 2010). Population trends are listed as unknown for all Sanford's Arrowhead Occurrences statewide.

It should be noted that Sanford's Arrowhead is a relatively cryptic emergent marsh species, the habitats are not easily surveyed, and much unsurveyed habitat is associated with agricultural and urbanized areas, neither of which are frequented by botanists. For these reasons, additional as-yet undiscovered Sanford's Arrowhead occurrences should be expected within the Planning Area.

Figure SAAR-1 Sanford's Arrowhead Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

It is impossible to determine the number of historically occurring Sanford's Arrowhead lost or the acreage of suitable habitat lost to historic agricultural land-use conversions, since so much had happened before this species first received attention. The Great Central Valley marsh system once extended from the southern edge of the Tulare Lake Basin in the southern San Joaquin Valley, almost interrupted, to the Sacramento River basin of Butte and Tehama counties in the north. Early explorers write about the extensive Tule Marsh that impeded east-west travel at most of these latitudes within the Great Central Valley. Mason reports of a 100-acre population of Sanford's Arrowhead observed in 1912 from near Tracy that by 1954 was gone and the habitat entirely under cultivation (Mason 1954). It has been estimated that by 1978 only 4% of California's pre-settlement Central Valley wetlands remained (Airola and Messick 1987 as cited by Snyder 1994). Loss of Sanford's Arrowhead populations and habitat since pre-settlement times is incalculable and without doubt, substantial.

There has been no comprehensive effort to monitor any populations of Sanford's Arrowhead over years, so variations in abundance and other population dynamics are unknown.

Observations, monitoring and research conducted on other perennial marsh species indicate that abundance of individuals within populations can vary greatly between years, with some species exhibiting even transitory behavior (Mason 1957). Furthermore, successional changes can be relatively rapid in marshes, and if a deep-water edge is not available to impede spread, and if disturbances do not remove accumulated biomass, transition into terrestrial or semi-terrestrial habitats may result. Owing to these dynamics, long-term management and monitoring of Sanford's Arrowhead and other aquatic and emergent marsh species pose unique challenges.

SAAR Threats to the Species

Potential direct threats to Sanford's Arrowhead include: loss of emergent marsh habitat owing to agricultural and urban land-use conversion, irrigation and drainage ditch maintenance, flood control activities, road widening and maintenance, inappropriate livestock grazing regimes, recreational vehicles, bicycle traffic, and refuse dumping (CDFG 2010).

Potential indirect threats to Sanford's Arrowhead include: hydrological alteration of sub-watersheds by surrounding developments and land uses; shifts in competitive interactions (hydrology-mediated or invasive non-native and weedy native species); sedimentation; windblown refuse accumulation; herbicides, nutrient loading and other point and non-point source water pollution; recreational boat waves; foraging damage by wildlife; ecological succession, air pollution, and global climate change.

Note that of the 32 occurrences presumed extant in Sacramento County (CDFG 2010), none are included within established preserves, and at least 15 are habitants of artificial or otherwise

maintained irrigation, drainage, or flood control conveyances (CDFG 2002). Only 10 appear to be associated with relatively natural wetland systems (CDFG 2002).

With regard to the remaining 27 presumed extant CNNDB occurrences outside of Sacramento County, only two are encompassed within established preserves; one of these is associated with a stockpond at The Nature Conservancy's (TNC) Vina Plains Preserve in Tehama County (CNDDB occurrence # 33), and another is located on Bureau of Land Management (BLM) land at Hog Lake, Tehama County (CNDDB occurrence # 34). Of the 19 remaining occurrences, eight are associated with irrigation/drainage canals, two are in man-made reservoirs, one is located in a groundwater recharge basin, and one is associated with a stockpond (CDFG 2002). Of the remaining seven occurrences, three do not have habitat notes included (CDFG 2002). In summary, of the 27 presumed extant occurrences outside of Sacramento County (CDFG 2010), only four are associated with presumably "natural" hydrological features (CDFG 2002).

SAAR Data Gaps

It is significant to note that Sanford's Arrowhead is difficult to survey for, and it can be difficult to see when growing with other emergent marsh species. Furthermore, since it occurs in association with a variety of water body-types, including irrigation and drainage ditches and canals (habitats seldom surveyed), other occurrences are likely to be present within Sacramento County. All marsh habitats, regardless of landform association, should be considered as potentially suitable habitat for Sanford's Arrowhead. It is likely that as additional surveys are conducted, new occurrences/populations will be discovered within the Planning Area. It is impossible however, to predict the number of future discoveries in Sacramento County or elsewhere.

With exception to observations of field workers (CDFG 2010), Sanford's Arrowhead has received limited research attention. Detailed studies have not been conducted regarding the biology, ecology, breeding system, population genetics, habitat-hydrology relationships, population dynamics, trends or threats. Investigations have been conducted on the biology and ecology of other Arrowhead species, including the sometimes co-occurring wide-leaved arrowhead or tule potato (*Sagittaria latifolia*). Pertinent data gaps for Sanford's Arrowhead specifically, along with implications for conservation, and operating assumptions include:

SAAR Unknown Number of Undiscovered Occurrences

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Planning Area and elsewhere within the range of the species. In the Planning Area, discovery of new populations of Sanford's Arrowhead may occur anywhere that emergent marsh habitat is present, including natural drainages, created irrigation/drainage conveyances, reservoir and lake margins

and stockponds. Potential habitat is also present within channelized natural, and artificially excavated drainages within urbanized areas. In these situations, Sanford's Arrowhead can colonize reaches that are concrete-lined; here inhabiting cracks or rooting on accumulated sediments.

SAAR Unknown Relationship between Landform/Soil Chemistry and Bio-Geographic Distribution

In the 2002 CNDDB in Sacramento County, 11 of the 28 Sanford's Arrowhead occurrences are associated with Lower and Middle Units of the River Bank Formation. Another four occurrences are associated with Stream Channel Deposits, three are associated with the Turlock Formation, two with the Upper Unit Modesto Formation, and one occurrence is associated with each of the Quaternary Fanglomerate (Qfa) and Basin Deposits (CDFG 2002). The nature of relationship of landform to Sanford's Arrowhead is likely attributable to factors affecting the development and persistence of emergent marsh habit. Recent alluvial deposits are associated with active watercourses.

SAAR Unknown Breeding System and Pollination Ecology

Pollination and breeding studies have not been conducted for Sanford's Arrowhead and specific pollinator relationships are unknown. It may be important to note that the flowers of Sanford's Arrowhead closely resemble those found in other Sagittaria species, as well as those in other genera of the family Alismataceae (*Alisma, Damasonium, Echinodorus*). Separate male and female flowers and relatively large flower petals suggest an outcrossing breeding strategy, although self-compatibility has been demonstrated for other species of Sagittaria (Muenchow and Delesalle 1994).

An investigation of pollination ecology involving the common arrowheads (*Sagittaria latifolia* and *S. australis*) in Colorado revealed that flower visitors there are principally generalist bees of the genera *Bombus, Lasioglossum, Ceratina and Augochlora*, as well as assorted flies and wasps (Muenchow and Delesalle 1994).

SAAR Specific Hydrological Requirements of SAAR

Numerical data do not exist regarding specific hydrological parameters associated with emergent marsh habitats supporting Sanford's Arrowhead populations in the Planning Area, or elsewhere (e.g., maximum and minimum inundation tolerances; optimal ponding depth; response to water level fluctuations; tolerance of dry-down/desiccation; wave action and other water current relationships, etc.).

SAAR Interactions with Non-Native Weeds (and Aggressive Natives) and Weed Management Activities

Non-native weeds, or aggressive native species reported as occurring in emergent marsh habitats with Sanford's Arrowhead are listed in Section 2.2. All of these and others not-yet known may become problematic in Sanford's Arrowhead-occupied emergent marsh preserves owing to aggressive lateral growth and strong competitive abilities. Other aquatic weeds not yet known from the region or even from North America may become problematic following potential future introductions. Interactions between Sanford's Arrowhead and associated emergent marsh species are unknown.

SAAR Interactions with Non-Native and Native Wildlife Species and Wildlife Management Activities

Wildlife interactions with Sanford's Arrowhead are mostly unknown. One reference is made of waterfowl heavily utilizing a Sanford's Arrowhead population (CDFG 2010). Other Sagittaria species are well documented with regard to food utilization by waterfowl (Mason 1957). In addition to waterfowl, muskrats likely utilize all parts of Sagittaria plants as well. Grazing of seedlings or young vegetation by crayfish is not known, but is likely. Other aquatic pest invertebrate and fish species not-yet known from the region, but which could become established if introduced, could threaten Sanford's Arrowhead emergent marsh habitats in the future (e.g. Asian mitten crab, jumping carp, etc.).

SAAR Genetic Considerations (Spatial and Temporal Variation, Seed Bank, Drift, Bottlenecks)

Population genetics for Sanford's Arrowhead are completely unknown.

SAAR Seed Longevity and Dynamics of Stored Soil Seed Bank

There have been no empirical studies addressing the presence of a soil seed bank, seed dormancy or longevity for Sanford's Arrowhead.

Since there are few populations of Sanford's Arrowhead in Sacramento County that are not threatened, species viability may be significantly enhanced by inoculating unoccupied, apparently suitable emergent marsh habitat and increasing the number of naturally self-sustaining populations. In addition, so much Sanford's Arrowhead habitat within the Planning Area is not protected and is subject to potential impacts resulting from routine maintenance (irrigation and drainage channels).

Any additional populations would increase the likelihood of natural dispersal events into preserved but unoccupied emergent marsh habitat, create meta-population structure at extant occurrences where single colonies may support the species, and help ensure existence should any natural populations become compromised. Dispersal into, and colonization of artificially created or enhanced irrigation ditches, excavations next to railroad tracks and artificial ponds has been documented (CDFG 2010). Sanford's Arrowhead has been successfully transplanted elsewhere in Sacramento County by the U.S. Army Corp of Engineers (USACE) (Burmester pers. comm.). The common tule potato and many other clonal emergent marsh species are readily transplantable where suitable marsh habitat exists.

SAAR Water Quality

Sanford's Arrowhead occupies habitats that are particularly subject to a variety of types of point and non-point-source water pollutants. Specific examples include sediment transport in storm-water runoff; myriad hydrocarbons from road, highway and rooftop surfaces; nutrient runoff from dairies and stockyards; fertilizer runoff from golf courses, residential landscaping and agricultural areas; herbicide runoff from roadside and highway shoulder maintenance activities; chemical and material spills from road and highway surfaces industrial areas and construction sites; myriad rain-borne air pollutants; recreational watercraft, and others. In addition, the relationship between Sanford's Arrowhead and relationships to basic physical properties of water are unknown as well, including turbidity, conductivity, pH, Biological Oxygen Demand (BOD), and others. Interestingly, the common tule potato, and several other emergent marsh species have been investigated and variously utilized in small-scale non-conventional wastewater treatment systems.

SAAR Air Pollution (Dust/Ozone/Nitric Oxide, Sulphur Dioxide, etc.)

Portions of the Central Valley of California frequently exceed State and Federal safety levels for a variety of air pollutants, including particulate matter, ozone, and others. Some of these pollutants are known to negatively affect plant physiology and health, although none have been investigated as they relate to emergent marsh vegetation. Assuming that extant Sanford's Arrowhead occurrences are maintaining their vigor at existing ambient pollution levels, air pollution will probably not present a major threat to the viability of Sanford's Arrowhead, if existing air quality can be maintained. If however, California's human population increases as projected and air pollution control measures are not developed and implemented concomitantly and effectively, these pollutants may negatively affect Sanford's Arrowhead and other native plant species in the future.

SAAR Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

SAAR Existing Hydrological Trend of Emergent Marshes and Existing Indirect Effects

Extant Sanford's Arrowhead populations in the Planning Area have undoubtedly experienced some degree of hydrological modification resulting from development-related alterations to sub-watersheds (CDFG 2010). Without complete consideration and management/protection at the level of watershed, or precise hydrological monitoring and accurate modeling on a wetland complex-scale, long-term indirect effects resulting from existing alterations to sub-watershed hydrology are unknown.

SAAR Literature Cited

Burmester, Daniel. Regional Ecologist.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Fish and Game (CDFG). 2002. California Natural Diversity Data Base search of Sanford's Arrowhead. California Department of Fish and Game. Sacramento, California.

California Department of Fish and Game

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10b). California Native Plant Society. Sacramento, California. Accessed online April 27, 2010 at http://www.cnps.org/inventory.

Delesalle, V.A. and S. Blum. 1994. Variation in germination and survival among families of Sagittaria latifolia in response to salinity and temperature. *International Journal of Plant Sciences*. 155(2):187-195.

Delesalle, V.A. and G.E. Muenchow. 1992. Opportunities for selfing and inbreeding depression in Sagittaria congeners (Alismataceae) with contrasting sexual systems. *Evolutionary Trends in Plants*. 6(2):81-91.

Edwards, A.L. and R.R. Sharitz. 2000. Population genetics of two rare perennials in isolated wetlands: Sagittaria isoetiformis and Sagittaria teres (Alismataceae). *American Journal of Botany*. 87(8):1147-1158.

Evers, D.E., C.E. Sasser, J.G. Gosselink, D.A. Fuller, and J.M. Visser. 1998. The impact of vertebrate herbivores on wetland vegetation in Atchafalaya Bay, Louisiana. *Estuaries*. 21(1):1-13.

Gause, Matt. Consulting Botanist.

Gordon, E. 1996. Dispersal type, germination and seedling growth of Sagittaria latifolia (Alismataceae). *Fragmenta Floristica et Geobotanica* 41(2):657-688.

Gough, L. and J.B. Grace. 1998. Herbivore effects on plant species density at various productivity levels. *Ecology*. 79(5):1586-1594.

Gruenhagen, N.M. and L.H. Fredrickson. 1990. Food used by migratory female mallards in northwest Missouri (USA). *Journal of Wildlife Management*. 54(4):622-626.

Hickman, J. C. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley, California.

Hohman, W.L., D.W. Woolington, and J.H. Devries. 1990. Food habits of wintering canvasbacks in Louisiana (USA). *Canadian Journal of Zoology* 68(12):2605-2609.

Huang, S. Q. 2003. Flower dimorphism and the maintenance of andromonoecy in Sagittaria guyanensis ssp. lappula (Alismataceae). *New Phytologist*. Vol. 157(2):357-364.

Kaul, R.B. 1985. Reproductive phenology and biology in annual and perennial Alismataceaae. *Aquatic Botany*. 22(2):153-164.

Keddy, P. A. and T.H. Ellis. 1985. Seedling Recruitment of 11 Wetland Plant Species Along a Water Gradient: Shared or Distinct Responses? *Canadian Journal of Botany*. 63: 1876-1879.

Keddy, P.A. and P. Constabel. 1986. Germination of Ten Shoreline Plants in Relation to Seed Size, Soil Particle Size and Water Level: An Experimental Study. *Journal of Ecology*. 74: 133-141.

Leck, M.A. 1996. Germination of Macrophytes from a Delaware River tidal freshwater wetland. *Bulletin of the Torrey Botanical Club*. 123(1):48-76.

Mason, H.L., 1957. Flora of the Marshes of Califiornia. University of California Press, Berkeley and Los Angeles, California.

May Consulting, Walnut Grove, California.

Muenchow, G.E. 1998. Subandrodioecy and male fitness in *Sagittaria lancifolia* ssp. *lancifolia*. *American Journal of Botany* 85:513-?.

Muenchow, G. and V. Delesalle. 1992. Patterns of Weevil herbivory on male, monoecious and female inflorescences of Sagittaria latifolia. *American Midland Naturalist*. 127(2):355-367.

Muenchow, G. and V. Delesalle. 1994. Pollination Response to Male Floral Display Size in Two Sagittaria (Alismataceae) Species. *American Journal of Botany*. 81(5):568-573.

Newberry, G. 1991. Factors affecting survival of the rare plant Sagittaria fasciculata E.O.Beal (Alismataceae). *Castanea*. 56(1):59-64. Rancho Cordova, California.

Sarkissian T.S., S.C.H. Barrett and L.D. Harder. 2001. Gender Variation in Sagittaria latifolia (Alismataceae): Is Size All That Matters? *Ecology*. 82:360-373.

Shaffer, G.P., Sasser, C.E., Gosselink, J.G. and M. Rejmanek. 1992. Vegetation dynamics in the emerging Atchafalaya Delta, Louisiana, USA. *Journal of Ecology*. Vol 80(4):667-687.

Wetland Research Associates. 2004. Mather Field Natural Resources Assessment Phase I&II, February 5, 2004. Sacramento, California.

Wooten. J.W. 1971. The Monoecious and Dioecious Conditions in Sagittaria latifolia L. (Alismataceae). *Evolution*. 25:549-553.

MID-VALLEY FAIRY SHRIMP (MVFS)

Mid-Valley Fairy Shrimp (MVFS)

(Branchinecta mesovallensis)

Status USFWS: None

Status CDFW: None

MVFS Listing Status

The mid-valley fairy shrimp meets the requirements as a "rare, threatened or endangered species" under the California Environmental Quality Act (CEQA); however, they have no formal State or Federal protected species status. Mid-valley fairy shrimp was petitioned for endangered status under the Federal Endangered Species Act (USFWS 2003), but rejected for listing (USFWS 2004)

MVFS Life History and Ecology

MVFS Species Description and Life History

The mid-valley fairy shrimp is a typical Branchinecta anostracan. The female's second antennae are smooth, and there are no cephalic ridges or cornices. The female's thoracic surface has two paired dorsolateral projections on the fifth to seventh segments, and a pair of single dorsolateral conical projections on the fourth segment. The brood pouch is pyriform (Eriksen and Belk 1999; Belk and Fugate 2000; Rogers 2002c). The basal fourth of the male mid-valley fairy shrimp's second antennal proximal segment bears an anteriomedial pulvillus, but otherwise is smooth (Eriksen and Belk 1999; Belk and Fugate 2000). The distal segment of the male second antennae is flattened laterally, with the bilobed apex bent medially. This bilobed apex is asymmetrical: the anterior lobe is larger than the posterior. Live animals are typically off-white to grey, although the brood pouch may be green or yellow (Rogers pers. obs.). Depending upon the rapidity of development, mature animals may vary in length from three to 38 millimeters (Rogers pers. obs.). Animals may shrink as much as 11 to 32 percent upon preservation (Rogers 2002b).

Anostracans like the mid-valley fairy shrimp are a component of the zooplanktonic community within episodic, ephemeral aquatic habitats and can occur in densities as high as 200 per liter of water (Rogers pers. obs.). The vast majority of fairy shrimp are omnivorous, indiscriminately

filtering particles from the water column, including bacteria, unicellular algae, and micrometazoa (Eriksen and Belk 1999). Fairy shrimp will attempt to consume whatever material they can fit into their feeding groove, and do not discriminate based upon taste as do some other crustacean groups (Eriksen and Belk 1999). Mid-valley fairy shrimp will also rasp periphyton from sticks, stems and slender leaves (Rogers pers. obs.).

During the dry phase of their habitat, the anostracans survive as diapausing cysts (resting eggs) in and on the substrate (Sars 1896, 1898; Eriksen and Belk 1999; Rogers and Fugate 2001). When the habitat inundates from seasonal rainfall, some of the cysts hatch, and the nauplii (early larval form of anostraca) swim into the upper water column (Eriksen and Belk 1999). These larval forms are typically indistinguishable between species.

The maturation rates of the animal vary extensively depending upon temperature, and habitat type (Helm 1998; Eriksen and Belk 1999; Rogers *In review*), and the mid-valley fairy shrimp can reach maturity in as little as four days (Rogers *In review*; Rogers pers. obs.). In the genus Branchinecta, the brood pouch is truncate and as wide as the thoracic genital segments. However, when oocytes are present in the lateral pouches, the brood pouch is wider than the genital segments, forming an amplexial groove, and males can amplex the female successfully. If the oocytes are not present in the lateral pouches the female is sometimes able to wriggle out of the male's grasp (Rogers 2002b). Males approach the females from beneath to amplex. Amplexus is sustained for a second or two, as mating is rapid and the female is released immediately afterwards (Rogers 2002b). The female typically sheds her cysts as the shell forms over the fertilized oocyte (Murugan et al. 1996) and the cysts fall to the substrate.

The cysts lay dormant in the substrate until the pool dries and re-inundates during the subsequent rains. Beyond inundation of the habitat, the specific cues for hatching are unknown although temperature (Hall 1959; Belk 1977; Al-Tikrity and Grainger 1990; Belk and Nelson 1995; Helm 1998; Eriksen and Belk 1999; Rogers *In review*) and conductivity (Anderson 1958; Bowen et al. 1988; Broch 1969, 1988; Brown and Carpelan 1971; Brown 1972) are believed to play a large role. The mid-valley fairy shrimp is typically univoltine (i.e., one generation per year); however, animals of different ages may be present if a pool partially inundates allowing some cysts to hatch, and then later increases in volume, hydrating cysts that were further up-slope (Rogers pers. obs.).

Planktonic crustaceans are important in the food web, as they represent a high fat, high protein resource for migratory waterfowl. Mallard (*Anas platyrhynchos*), green-winged teal (*A. carolinensis*), bufflehead (*Bucephala albeola*), greater yellowlegs (*Tringa melanoleuca*), and killdeer (*Charadrius vociferus*) all forage actively in Central Valley vernal pools on the invertebrate and amphibian fauna during the winter months (Proctor 1964; Horne1966; Mellors, 1975; Silveira 1996; Dumont and Negrea 2002).

Predator consumption of fairy shrimp cysts aids in distributing populations of fairy shrimp. Predators (e.g., birds, amphibians) expel viable cysts in their excrement, often at locations other than where they were consumed (Proctor 1964; Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts are also transported by wind, and in mud carried on the feet of animals, including livestock that may wade through the habitat (Rogers in prep). This type of dispersal aids ephemeral pool crustaceans to exploit a wide variety of ephemeral habitats (Rogers 2000).

Being prey items of birds, mid-valley fairy shrimp are an intermediate host for avian cestodes (Rogers *In review*). Anostracans that are hosting a cestode tend to be bright pink in color. The change in color is due to the presence of cestode cysticercoides. The parasitic tapeworm castrates the host, which causes the host animal to accumulate lipids (probably linked to carotenoid pigments) that would otherwise be expended by the host during reproduction (Amat et al. 1991).

No specific bacterial, viral or protozoan diseases have been reported for the mid-valley fairy shrimp. Occasionally, specimens with black markings or lesions will appear in collections. These black markings, sometimes referred to as 'black disease', are actually evidence of the normal immune response of all crustacea to any bacteria, where any foreign bacteria is infused with melanin to lethal levels (Bang 1983). Branchiopod crustaceans are commonly found with phoretic ciliate protozoan colonies around the mouth and posterioventral portions of the head, which are abandoned with the exuvia by the crustacean with each molt.

Mid-valley fairy shrimp commonly co-occur with the California fairy shrimp (*Linderiella occidentalis* Dodds, 1923) (Eriksen and Belk 1999; Rogers *In review*). This species has also been reported co-occurring with the vernal pool fairy shrimp (*Branchinecta lynchi* Eng, Belk and Eriksen 1990) on three occasions, where the mid-valley fairy shrimp was probably washed into the vernal pool fairy shrimp habitat by abnormally high rainfall (Eriksen and Belk 1999). Other species of Branchinecta (*B. lindahli* Packard, 1883, *B. coloradensis* Packard, 1874, *B. mackini* Dexter, 1956, *B. lynchi*, *B. conservatio* Eng, Belk and Eriksen, 1990) occur within the range of the vernal pool fairy shrimp, but are typically found in different, although similar, vernal pool habitats (Rogers *In review*).

MVFS Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The mid-valley fairy shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependent upon intact sub-watersheds, and the surrounding uplands that support

those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

The mid-valley fairy shrimp needs the cold winter waters to hatch and grow in, typically appearing after the first frosts, and the dry summers to dry the resting cysts and prevent them from being attacked by fungi. Habitats supporting the mid-valley fairy shrimp are typically in Central Valley California floristic provinces below 300 meters in elevation. Typical habitat for mid-valley fairy shrimp in California includes vernal pools and seasonally ponded areas within vernal swales (Eng et al. 1990). Vernal pools that support these fairy shrimp are often grass or mud-bottomed, with clear to tea-colored water, and are often in basalt flow depression pools in grasslands (Eriksen and Belk 1999).

Mid-valley fairy shrimp have been found in habitats ranging from 0.001 to 0.5 acre in area, and typically utilizes habitats shorter in duration than is used by congeners (Eriksen and Belk 1999; Rogers pers. obs.).

Various physiochemical factors have been examined in laboratory experiments and existing mid-valley fairy shrimp habitats including alkalinity, total dissolved solids (TDS), and pH (Rogers *In review*). The importance of many of these parameters has recently been called into question with evidence that type and amount of dissolved salts may be a more important habitat requirement (Rogers *In review*). Considering the daily fluctuations in pH of a given habitat, this is to be expected. During the daylight hours, the hydrophytes are photosynthesizing, removing the CO_2 (from HCO_3) from the water, and raising the pH. During the night, the hydrophytes are respiring, increasing the CO_2 (and thereby, the HCO_3) in the water lowering the pH. If there is rainfall, the distilled precipitation will lower the pH, as will winds that cause surface action. When the habitats are drying and losing volume through evaporation, the pH, alkalinity, TDS, and electrical conductivity will increase, just as they decrease when the pools inundate or reinundate (Rogers *In review*).

Some vernal pools need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it also oxidizes the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat component. Conversely, excessive livestock grazing can be detrimental to mid-valley fairy shrimp. Over-grazing tends to result in a large amount of manure in vernal pools. The organic waste reduces the dissolved oxygen in the water, leaving the gill-breathing invertebrates like the mid-valley fairy shrimp without oxygen (Rogers 1998, pers. obs,). It is important not to alter grazing regimes in conservation areas until the importance of grazing to those particular systems are assessed.

Common wetland plant species that co-occur with mid-valley fairy shrimp generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of these shrimp to be present. These plants may include: coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), goldfields (*Lasthenia* spp.), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and toad rush (*Juncus bufonius*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods may have hydrology that cannot support shrimp species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*) and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round cannot support special-status shrimp species because the shrimp's cysts must dry out before they can hatch (Eriksen and Belk 1999), or if they remain wet or moist through the warmer summer months, the cysts will fungus (Rogers pers. obs.). These plants include cattails (*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

Fairy shrimp are a component of a larger invertebrate community structure (Rogers 1998). This invertebrate community includes mostly planktonic crustacea dependent upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as flatworms, and a suite of insect species, including: vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*), and many others (Rogers 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers 1998).

Therefore, potential special-status shrimp habitat is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that may also support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow special-status shrimp species to complete their life cycles and to maintain water temperatures conducive to special-status shrimp species.

Optimal mid-valley fairy shrimp habitat tends to be small, with an abbreviated hydroperiod, neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal pool invertebrate community (Eriksen and Belk 1999; Rogers pers. obs., 1998, *In review*).

MVFS Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Vernal Pool Fairy Shrimp are identified in Table G-3.9-1 and are largely based on the habitat elements for mid-valley fairy shrimp.

Table G-3.9-1. Habitat Elements for Mid-Valley Fairy Shrimp

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

MVFS Species Distribution and Population Trends

There are more than 40 species of *Branchinecta* world-wide (Belk and Brtek 1995, 1997; Rogers and Fugate 2001; Belk and Rogers 2002) distributed throughout the Holarctic and Neotropical regions, with one species ranging into the Antarctic. The mid-valley fairy shrimp is endemic to California (Eriksen and Belk 1999; Belk and Fugate 2000).

Habitat occupied by fairy shrimp tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been lost, and an unknown number of mid-valley fairy shrimp occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more mid-valley fairy shrimp habitat will and is being encroached upon and impacted throughout the species range.

MVFS Range Wide Distribution

The earliest collections of the mid-valley fairy shrimp were made by Clyde Eriksen in the late 1960's at Mather Air Force Base. Eriksen collected the mid-valley fairy shrimp with specimens of the vernal pool tadpole shrimp, *Lepidurus packardi*. The mid-valley fairy shrimp was not recognized as a new species until Anne Huber collected material from south of Mather Field

and sent the specimens to Mike Fugate for identification. Fugate sent the material on to Denton Belk, who identified them as an undescribed species.

The mid-valley fairy shrimp is found in California from southern Sacramento County, west to Solano and Contra Costa Counties, and along the east side of the Central Valley south to Fresno County (Eriksen and Belk 1999). The entire range of this species is within the Central Valley.

MVFS Central Valley Distribution

The mid-valley fairy shrimp is endemic to California Central Valley grassland vernal pools (Belk and Fugate 2000). Known occurrences include: scattered occurrences from Mather Field area of Sacramento, south through Galt from Sacramento County; Jepson Prairie, Travis Air Force Base and Vacaville areas in Solano County: from Lodi north to the county border in San Joaquin County; the Byron Airport in Contra Costa County; the Virgina Smith Trust (Haystack Mountain) and Arena Plains National Wildlife Reserve in Merced County; one location in central Madera County; and one in northern Fresno County (Erickson and Belk 1999; Belk and Fugate 2000; Rogers in prep.).

MVFS Distribution within the Planning Area

The mid-valley fairy shrimp was first officially reported from the Planning Area in the species' original description (Belk and Fugate 2000). Specimens were collected from Mather Air Force Base as early as 1967 by Dr. Clyde Eriksen (Eriksen, pers. comm.). Numerous surveys related to development projects have been conducted within and adjacent to the Planning Area (USFWS records; CDFG 2010), but the area has not been thoroughly surveyed for mid-valley fairy shrimp, and the total extent of potential habitat is unknown. Figure MVFS-1 illustrates the known recorded occurrences of mid-valley fairy shrimp within and adjacent to the Planning Area. The modeled habitat of the species in the Planning Area is discussed in Section G-4 of this Appendix.

MVFS Population Levels and Trends

An unknown amount of vernal pool habitat has been lost and with it, an unknown number of mid-valley fairy shrimp occurrences. Attempts have been made to calculate lost vernal pool acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more mid-valley fairy shrimp habitat will and is being encroached upon and impacted throughout the species' range.

Adequate determination of remaining mid-valley fairy shrimp occurrences throughout the animal's range as well as population trends is difficult. Eriksen and Belk (1999) present a map of localities for the mid-valley fairy shrimp with less than 30 localities represented, with the greatest density of occurrences in southern Sacramento County.

The California Natural Diversity Data Base (CNDDB) vernal pool crustacean records (CDFG 2010) may be somewhat misleading, due to the inconsistency of the data presented. Some records refer to individual pools, while others refer to pool complexes, and others still refer to groups of complexes. Additionally, the CNDDB does is not updated when a particular site or population is extirpated. Because of issues such as these, it is difficult to determine what actually constitutes a "population" or "occurrence" in any attempt at impact analysis.

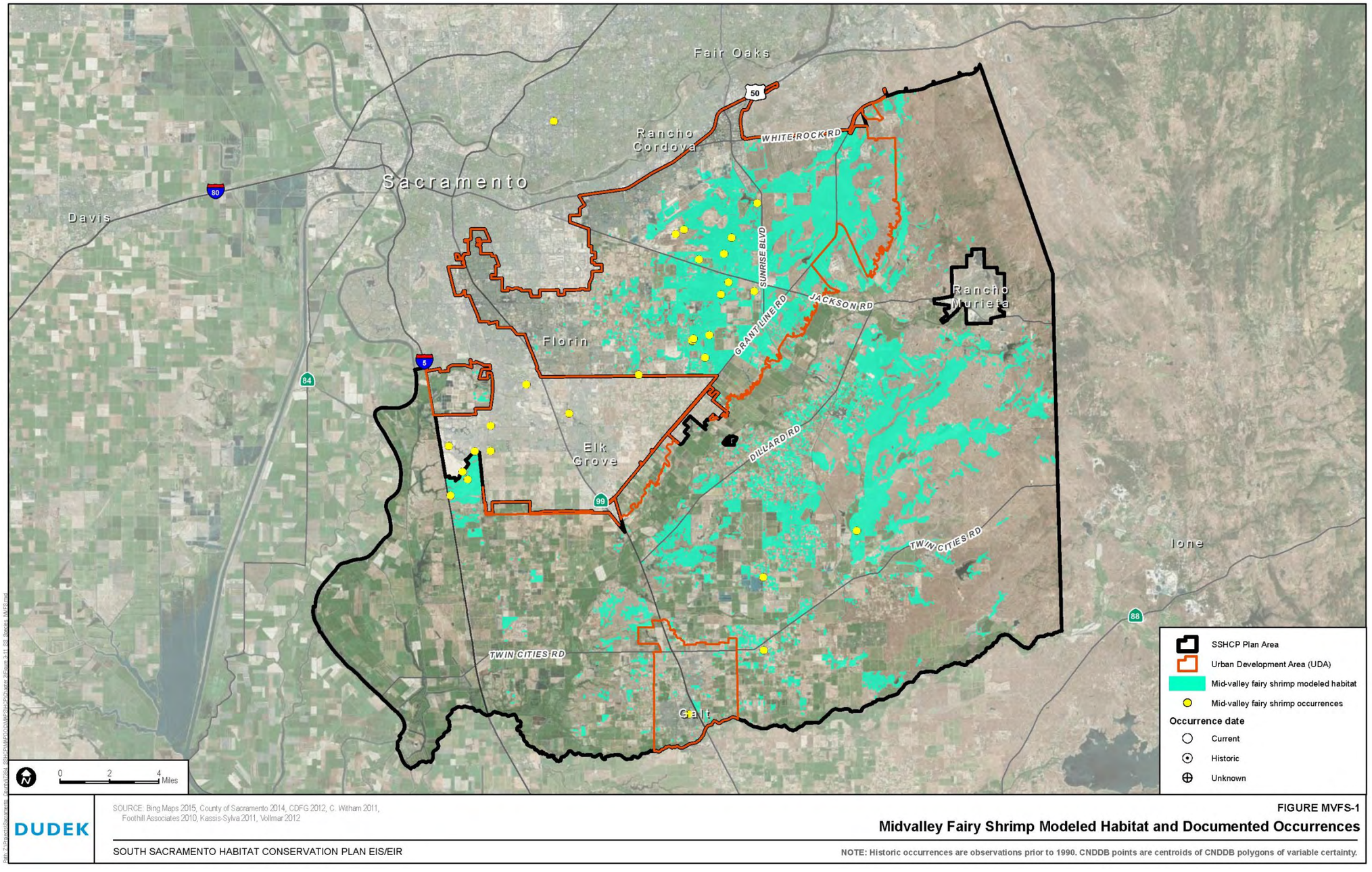
In addition, survey maps and records tend to show where vernal pool crustaceans are, and do not emphasize where they are not. Compounding these difficulties, records are typically a reflection of where surveys have been conducted, rather than a delineation of special-status shrimp distribution. Therefore, it is difficult to establish existing conditions for this species across the entire species range, as well as within the Planning Area. None of this is to say that vernal pool crustaceans are not threatened, endangered, or should not be protected. The issue is that where a paucity of adequate data exists, consistent data reporting would help prevent ambiguous interpretation or mischaracterization of species conservation needs.

MVFS Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem to where it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that out compete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Over grazing tends to result in large amounts of manure in vernal pools. The organic waste reduces the dissolve oxygen in the water during decomposition, leaving gill-breathing invertebrates without oxygen (Rogers 1998, pers. obs,). Conversely, vernal pool grasslands are disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (i.e.; Eleocharis sp., Eryngium sp.) and exotic plants (i.e.; Glyceria sp. Lolium multiflorum) that generate deep thatch layers on the pool substrate. As this thatch layer decomposes, it also reduces the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Both lack of and excessive grazing cause an increase in organic matter in the habitat that eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that outcompete the obligatory vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat suitability component, and the removal of grazing or excessive grazing are threats to the mid-valley fairy shrimp.

Figure MVFS-1 Midvalley Fairy Shrimp Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles or paving or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities that may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. There is concern that Bullfrogs (Rana catesbeiana) may feed upon federally protected vernal pool crustaceans (Balfour and Morey 1999). Manna grass and Italian rye grass are both exotic plants that occur in vernal pools. These species tend to produce heavy thatch and eventually organic loads upon decomposition, which reduce available oxygen in the water (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish (Gambusia affinis) into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

Additional threats to the vernal pool invertebrate community structure include off-road vehicle use of vernal pool habitat for recreational “mud-bogging,” conversion of vernal pools into deep stock tanks that do not dry during the summer, and draining of vernal pools.

MVFS Data Gaps and Conservation Implications

Restoration and creation of mid-valley fairy shrimp habitat has been demonstrated to be feasible (Rogers 1998). Specific habitat parameters for this and other vernal pool invertebrate species are still poorly understood. For example, there appears to be a need by this species to have a minimum pool volume and a minimum pool surface area within a given habitat to be occupied. Since this species has been found in a wide variety of natural and re-established or established vernal pool habitats, it is likely that it is in some respects an opportunist, as most temporary water fauna must be.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the Planning Area. It is not feasible economically or temporally to survey the entire Planning Area.

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and the role, seasonality and intensity of grazing and other disturbances in vernal pool ecosystems. Furthermore, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

MVFS Literature Cited

Al-Tikrity, M.R. and J.N.R. Grainger. 1990. The effect of temperature and other factors on the hatching of the resting eggs of *Tanymastix stagnalis* (L.) (Crustacea, Anostraca). *Journal of Thermal Ecology*, 15(1): 87-90.

Amat, F., A. Gozalbo, J.C. Navarro, F. Hontoria, and I. Varó. 1991. Some aspects of *Artemia* biology affected by cestode parasitism. *Hydrobiologia* 212:39–44.

Balfour, P.S. and S.R. Morey. 1999. Prey selection by juvenile bullfrogs in a constructed vernal pool complex. *Transactions of the Western Section of the Wildlife Society*, 35:34-40.

Bang, F.B. 1983. Crustacean Disease Responses. *In:* The Biology of the Crustacea, Vol. 6. Pathobiology. Edited by D. E. Bliss and A. J. Provenzano, Jr. Pp. 113-153. Academic Press, New York, New York.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Belk, D. 1977. Zoogeography of the Arizona fairy shrimps (Crustacea: Anostraca). *Arizona Academy of Science*, 12: 70-78.

Belk, D. and J. Brtek. 1995. Checklist of the Anostraca. *Hydrobiologia* 298:315-353.

Belk, D. and J. Brtek. 1997. Supplement to 'Checklist of the Anostraca'. *Hydrobiologia* 359: 243-245.

Belk, D. and M.L. Fugate. 2000. Two new *Branchinecta* (Crustacea: Anostraca) from the southwestern United States. *The Southwestern Naturalist* 45(2):111-117.

Belk, D. and D.C. Rogers. 2002. A confusing trio of *Branchinecta* (Crustacea: Anostraca) from the western North America with a description of a new species. *Hydrobiologia*. 486:49–55.

Bowen, S.T., M.R. Buoncirstiani and J.R. Carl. 1988. *Artemia* habitats: ion concentrations tolerated by one superspecies. *Hydrobiologica*, 158: 201-214.

Broch, E.S. 1969. The osmotic adaptation of the fairy shrimp *Branchinecta campestris* Lynch to saline astatic waters. *Limnology and Oceanography*, 14: 485-492.

Broch, E.S. 1988. Osmoregulatory patterns of adaptation to inland astatic waters by two species of fairy shrimps, *Branchinecta gigas* Lynch and *Branchinecta mackini* Dexter. *Journal of Crustacean Biology*, 8: 383-391.

Brown, L.R. and L.H. Capelan. 1971. Egg hatching and life history of a fairy shrimp *Branchinecta mackini* Dexter (Crustacea: Anostraca) in a Mohave desert playa (Rabbit Dry Lake). *Ecology*, 52(1): 41-54.

Brown, R.J. 1972. A study of the mechanisms of osmotic and ionic regulation of the fairy shrimp, *Branchinecta mackini* (Crustacea, Branchiopoda). Ph. D. thesis. University of Toronto. Toronto, Canada. 215 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Center for Biological Diversity (CBD). 2001. Petition to list the midvalley fairy shrimp as an endangered species under the Endangered Species Act with concurrent designation of critical habitat. Center for Biological Diversity, PO 40090, Berkeley, California 94704-4090.

Collie, N. and E.W. Lathrop. 1976. Chemical characteristics of the standing water of a vernal pool on the Santa Rosa Plateau, Riverside County, California. Pp. 27-31 *In:* S. Jain (ed.) Vernal Pools, their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis, California.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. *Verh. Internat. Verein. Limnol*. 23:1107-1113.

Dumont, H.J. and S. Negrea. 2002. Introduction to the Class Branchiopoda. Guides to the Microinvertebrates of the Continental Waters of the World. Backhuys, Leiden.

Eng, L., D. Belk, and C. Eriksen. 1990 Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.

Eriksen, C. and D. Belk. 1999. *Fairy shrimps of California's pools, puddles, and playas*. Mad River Press, Eureka, California.

Eriksen, pers. comm. Dr. Clyde Eriksen. P.O. Box 23 Wise River, Montana 59763.

Hall, R.E. 1959. The development of eggs of *Chirocephalus diaphanus* Prévost at a low temperature. *Hydrobiologia*, 13: 156-159.

Helm, B. 1998. Biogeography of eight large branchiopods endemic to California. Pp. 124-139 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Horne, F.R. 1966. The effect of digestive enzymes on the hatchability of Artemia salina eggs. *Transactions of the American Microscopical Society*, 85(2): 271-274.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's Heartland*. University of California Press, Berkeley.

Lilljeborg, W. 1889. Diagnosen zweier Phyllopoden-Arten aus Süd-Brasilien. Abhandlungen herausgegeben vom naturwissenschaftlichen *Vereine zu Bremen*, 10: 424.

Linder, F. 1941. Contributions to the morphology and the taxonomy of the Branchiopoda Anostraca. *Zoologiska Bidrag fran Uppsala*, 10: 101-302.

Mellors, W.K. 1975. Selective Predation of ephippial *Daphnia* and the resisitance of ephippial eggs to digestion. *Ecology* 65:974-980.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Murugan, G., A. Maeda-Martinez, G. Criel, and H. Dumont. 1996. Unfertilized oocytes in Streptocephalids: resorbed or released? *Journal of Crustacean Biology*, 16(1):54–60.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. *Ecology*, 45(3):656-658.

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

Rogers, D.C. 2002b. Amplexial morphology of selected Anostraca. *Hydrobiologia,* 486:1-18.

Rogers, D.C. 2002c. Female based characters for anostracan (Crustacea: Branchiopoda) identification: a key for species in California and Oregon, USA. *Hydrobiologia,* 486 125-132.

Rogers, D.C. *In prep*. Dispersal agents and speciation in the Branchiopoda (Crustacea).

Rogers, D.C. and M. Fugate. 2001. *Branchinecta hiberna*, a new species of fairy shrimp (Crustacea: Anostraca) from western North America. *Western North American Naturalist,* 61(1):11 – 18.

Rogers, D.C. *In review*. Distribution and habitat parameter surveys for the fairy shrimp *Branchinecta mesovallensis* (Crustacea: Branchiopoda: Anostraca). Submitted to Zootaxa.

Sars, G.O. 1896. On some West Australian Entomostraca raised form dried sand. *Archiv for Mathematik og Naturvidenskab* 19(1):1-35. 4pls.

Sars, G.O. 1898. On some South-African Phyllopoda raised from dried mud. *Archiv for Mathematik og Naturvidenskab* 20(4):1-43. 4pls.

Silveira, J. 1996. Avian uses of vernal pools and implications for conservation practice. Pp. 92-106 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1994. Federal Register Final Rule; determination of endangered status for the conservancy fairy shrimp, longhorn fairy shrimp, and the mid-valley fairy shrimp; and threatened status for the vernal pool fairy shrimp. September 19.

United States Fish and Wildlife Service (USFWS). 2003. Federal Register Notice of 90-day Petition Finding and Initiation of Status Review; 90-day finding for a petition to list the midvalley fairy shrimp as endangered. April 29.

United States Fish and Wildlife Service (USFWS). 2004. Federal Register Notice; 12-month finding for a petition to list the midvalley fairy shrimp as endangered. January 26.

Wissinger, S.A., A.J. Bohonak, H.H. Whiteman, and W.S. Brown. 1999. Habitat Permanence, salamander predation and invertebrate communities. *In:* Invertebrates in Freshwater Wetlands of North America: Ecology and Management, edited by D. P. Batzer, R. B. Bader, and S. A. Wissinger, John Wiley and Sons, Inc. New York.

VERNAL POOL FAIRY SHRIMP (VPFS)

Vernal Pool Fairy Shrimp (VPFS)

(Branchinecta lynchi)

Status USFWS: Threatened

Status CDFW: None



www.nd.water.ca.gov

VPFS Listing Status

The vernal pool fairy shrimp (*Branchinecta lynchi*) was federally listed as threatened on 19 September 1994 (56 CFR 48136).

VPFS Life History and Ecology

VPFS Species Description and Life History

The vernal pool fairy shrimp is a typical Branchinecta anostracan. The female's second antennae are smooth, and there are no cephalic ridges or cornices. The female's thoracic surface has two paired dorsolateral projections on the third, and fifth to eleventh segments, and a pair of single dorsolateral conical projections on the fourth segment. The broodpouch is pyriform (Eng et al. 1990; Rogers 2002c). The basal fourth of the male vernal pool fairy shrimp's second antennal proximal segment bears an anteriomedial pulvillus and a posteriobasal transverse 'ridge-like' apophysis (Eng et al. 1990; Eriksen and Belk 1999). The medial surface of the distal third of the proximal second antennal segment has a small sparsely spined tubercle. Live animals are typically off-white to grey, although the broodpouch may be green or yellow (Rogers pers. obs.). Depending upon the rapidity of development, mature animals may vary in length from three to 38 millimeters (Rogers pers. obs.). Animals may shrink as much as 11 to 32 percent upon preservation (Rogers 2002b).

Anostracans like the vernal pool fairy shrimp are a component of the zooplanktonic community within episodic, ephemeral aquatic habitats and can occur in densities as high as 200 per liter of water (Rogers pers. obs.). The vast majority of fairy shrimp are omnivorous, indiscriminately filtering particles from the water column, including bacteria, unicellular algae, and micrometazoa (Eriksen and Belk 1999). Vernal pool fairy shrimp will attempt to consume whatever material they can fit into their feeding groove, and do not discriminate based upon taste as do some other crustacean groups (Eriksen and Belk 1999). Vernal Pool Fairy shrimp will also rasp periphyton from sticks, stems and slender leaves (Rogers pers. obs.).

During the dry phase of their habitat, the anostracans survive as diapausing cysts (resting eggs) in and on the substrate (Sars 1896, 1898; Eriksen and Belk 1999; Rogers and Fugate 2001). When the habitat inundates from seasonal rainfall, some of the cysts hatch, and the nauplii (early larval form of anostraca) swim into the upper water column (Eriksen and Belk 1999). These larval forms are typically indistinguishable between species.

The maturation rates of the animal vary extensively depending upon temperature and habitat (Gallagher 1996; Helm 1998; Eriksen and Belk 1999; Rogers 2002a). Gallegher (1996) and Helm (1998) reported the vernal pool fairy shrimp as reaching maturity in 14 and 18 days respectively; however, Rogers (pers. obs.) observed this species reaching maturity in as little as six days under high temperatures. In the genus *Branchinecta*, the brood pouch is truncate and as wide as the thoracic genital segments. When oocytes are present in the lateral pouches, the brood pouch is wider than the genital segments, forming an amplexial groove, and males can amplex the female successfully. If the oocytes are not present in the lateral pouches the female is sometimes able to

wriggle out of the male's grasp (Rogers 2002b). Males approach the females from beneath to amplex. Amplexus is sustained for a second or two, as mating is rapid and the female is released immediately afterwards (Rogers 2002b). The female typically sheds her cysts as the shell forms over the fertilized oocyte (Murugan et al. 1996) and the cysts fall to the substrate.

The cysts lay dormant in the substrate until the pool dries and re-inundates during the subsequent rains. Beyond inundation of the habitat, the specific cues for hatching are unknown although temperature (Hall 1959; Belk 1977; Al-Tikrity and Grainger 1990; Belk and Nelson 1995; Eriksen and Belk 1999) and conductivity (Anderson 1958; Bowen et al. 1988; Broch 1969, 1988; Brown and Carpelan 1971; Brown 1972) are believed to play a large role. The vernal pool fairy shrimp is typically univoltine (i.e., one generation per year); however animals of different ages may be present if a pool partially inundates allowing some cysts to hatch, and then later increases in volume, hydrating cysts that were further up-slope (Rogers pers. obs.).

Planktonic crustacea are important in the food web, as they represent a high fat, high protein resource for migratory waterfowl. Mallard, Green-Winged Teal, Bufflehead, Greater Yellowlegs, and Killdeer all forage actively in Central Valley vernal pools on the invertebrate and amphibian fauna during the winter months (Proctor 1964; Horne1966; Mellors, 1975; Silveira 1996; Dumont & Negrea 2002).

Predator consumption of fairy shrimp cysts aids in distributing populations of fairy shrimp. Predators (e.g., birds, amphibians) expel viable cysts in their excrement, often at locations other than where they were consumed (Proctor 1964; Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts are also transported by wind, and in mud carried on the feet of animals, including livestock that may wade through the habitat (Rogers *in prep*). This type of dispersal aids ephemeral pool crustaceans to exploit a wide variety of ephemeral habitats (Rogers 2000).

Being prey items of birds, vernal pool fairy shrimp are an intermediate host for avian cestodes (Rogers 2002a). Anostracans that are hosting a cestode tend to be bright pink in color. The change in color is due to the presence of cestode cysticercoides. The parasitic tapeworm castrates the host, which causes the host animal to accumulate lipids (probably linked to carotenoid pigments) that would otherwise be expended by the host during reproduction (Amat et al. 1991).

No specific bacterial, viral or protozoan diseases have been reported for the vernal pool fairy shrimp. Occasionally, specimens with black markings or lesions will appear in collections. These black markings, sometimes referred to as "black disease," are actually evidence of the normal immune response of all crustacea to any bacteria, where any foreign bacteria is infused with melanin to lethal levels (Bang 1983). Branchiopod crustaceans are commonly found with

phoretic ciliate protozoan colonies around the mouth and posterioventral portions of the head, which are abandoned with the exuvia by the crustacean with each molt.

Vernal pool fairy shrimp commonly co-occur with the California fairy shrimp (*Linderiella occidentalis*) (Dodds 1923; Eriksen and Belk 1999). This species has also been reported co-occurring with the mid-valley fairy shrimp (*Branchinecta mesovallensis* Belk and Fugate 2001) on three occasions, where the Mid-Valley Fairy Shrimp was probably washed into the vernal pool fairy shrimp habitat by abnormally high rainfall (Eriksen and Belk 1999). Other species of Branchinecta (*Branchinecta lindahli* Packard 1883, *B. coloradensis* Packard 1874, *B. mackini* Dexter 1956*, B. mesovallensis, B. conservatio* Eng, Belk and Eriksen 1990, *B. longiantenna* Eng, Belk, and Eriksen 1990) occur within the range of the vernal pool fairy shrimp, but are typically found in different, although similar, habitats (Rogers 2002a).

VPFS Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The vernal pool fairy shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependent upon intact sub-watersheds, and the surrounding uplands that support those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

The vernal pool fairy shrimp needs the cold winter waters to hatch and grow in, typically appearing after the first frosts, and the dry summers to dry the resting cysts and prevent them from being attacked by fungi. Habitats supporting the vernal pool fairy shrimp are typically in Central Valley California floristic provinces below 300 m elevation. Typical habitat for vernal pool fairy shrimp in California include vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas and alkali flats (Eng et al. 1990). Vernal pool fairy shrimp have also been found in water pooled in sandstone outcrops and in alkaline vernal pools. Vernal pools that support these fairy shrimp are often grass or mud bottomed, with clear to tea-colored water, including basalt flow depression pools in grasslands (USFWS 1994; Eriksen and Belk 1999).

Pool volume is important in determining potential shrimp habitat because deeper pools with a large surface area can more easily maintain their dissolved oxygen levels. Similarly, deep pools will pond long enough to allow the shrimp to complete their life cycle. Vernal pool fairy shrimp have been found in pools ranging from 0.1 to 1.5 ac (Eriksen and Belk 1999; Rogers pers. obs.).

Various physiochemical factors have been examined in existing vernal pool fairy shrimp habitats including alkalinity, total dissolved solids (TDS), and pH (Keely 1984; Collie and Lathrop 1976; Eriksen and Belk 1999). The USFWS (1994) described the water in pools occupied by vernal pool fairy shrimp as having low conductivity and chloride; however, specific data were not provided. Eriksen and Belk (1999) presented a range of attributes measured by different workers,

reporting alkalinity ranging from 22 to 274 parts per million (ppm), TDS of 48 to 481 ppm, and pH ranging from 6.3 to 8.5 inches occupied habitats. However, the importance of many of these parameters has recently been called into question with evidence that type and amount of dissolved salts may be a more important habitat requirement (Rogers 2002a). Considering the daily fluctuations in pH of a given habitat, this is to be expected. During the daylight hours, the hydrophytes are photosynthesizing, removing the CO2 (from HCO3) from the water, and raising the pH. During the night, the hydrophytes are respiring, increasing the CO2 (and thereby, the HCO3) in the water lowering the pH. If there is rainfall, the distilled precipitation will lower the pH, as will winds that cause surface action. When the habitats are drying and losing volume through evaporation, the pH, alkalinity, TDS, and electrical conductivity will increase, just as they decrease when the pools inundate or reinundate (Rogers 2002a).

Some vernal pools need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it also oxidizes the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat suitability component. Conversely, excessive livestock grazing can be detrimental to vernal pool fairy shrimp. Over-grazing tends to allow a great deal of manure into vernal pools. The organic waste oxidizes the water, leaving the gill-breathing invertebrates like the vernal pool fairy shrimp without oxygen (Rogers 1998). It is important not to alter grazing regimes in conservation areas until the importance of grazing to those particular systems are assessed.

Common wetland plant species that co-occur with special-status shrimp species generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of these shrimp to be present. These plants may include coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), goldfields (*Lasthenia* spp.), common spikerush (*Eleocharis macrostachya*), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and aquatic buttercup (*Ranunculus aquatilis*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods may have hydrology that cannot support shrimp species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*), toad rush (*Juncus bufonius*), false dandelion (*Hypochoeris radicata*), and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round cannot support special-status shrimp species because the shrimp's cysts must dry out before they can hatch (Eriksen and Belk 1999), or if they remain wet or moist through the warmer summer months, the cysts are subject to attack by fungi (Rogers pers. obs.). These plants include cattails (*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

The vernal pool fairy shrimp is a component of a larger invertebrate community structure (Rogers 1998). This invertebrate community includes mostly planktonic crustacea dependent upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as flatworms, and a suite of insect species, including vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*), and many others (Rogers, 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers 1998).

Therefore, potential habitat for special-status shrimp is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that may also support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow special-status shrimp species to complete their life cycles and to maintain water temperatures conducive to development and reproduction.

Optimal habitat for vernal pool fairy shrimp tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal pool invertebrate community (Eriksen and Belk 1999; Rogers pers. obs., 1998, 2001a). Unfortunately, little effort has been made to accurately quantify these parameters.

VPFS Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for vernal pool fairy shrimp are identified in Table G-3.10-1 and have been derived from the USFWS's list of primary constituent elements in the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table G-3.10-1. Habitat Elements for Vernal Pool Fairy Shrimp

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

VPFS Species Distribution and Population Trends

There are more than 40 species of *Branchinecta* world-wide (Belk and Brtek 1995, 1997; Rogers and Fugate 2001; Belk and Rogers 2002) distributed throughout the Holarctic and Neotropical regions, with one species ranging into the Antarctic. The vernal pool fairy shrimp is endemic to Oregon and California (Eng et al. 1990; Eriksen and Belk 1999).

Habitat occupied by fairy shrimp tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been lost, and an unknown number of vernal pool fairy shrimp occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California and Oregon, more vernal pool fairy shrimp habitat will and is being encroached upon and impacted throughout the species range.

VPFS Range Wide Distribution

The earliest collections of the vernal pool fairy shrimp on record were made by Dr. G. Eisen at "San Francisco" in 1874 (Lilljeborg 1889; Linder 1941), which were misidentified as *Branchinecta coloradensis* (Eng et al. 1990). Linder (1941) used Eisen's misidentified material for his sketch of *B. coloradensis*; on page 191 of Linder's definitive monograph of the anostraca the vernal pool fairy shrimp is clearly pictured.

The vernal pool fairy shrimp is found in California from the Redding/Bella Vista area of Shasta County in the north, throughout the Central Valley, and west to the central Coast Ranges, from northern Solano County to Pinnacles National Monument in San Benito County. Disjunct occurrences were also reported to occur in San Luis Obispo County, Santa Barbara County, and Riverside County, and from near Rancho California and the Santa Rosa Plateau in Riverside County. A disjunct population(s) has been reported in Jackson County near Medford Oregon (Eng et al. 1990; USFWS 1994; Eriksen and Belk 1999).

The existence of recently discovered occurrences near Medford, Oregon (Eriksen and Belk 1999) may indicate that there are other undiscovered occurrences between Shasta County, California and Medford.

VPFS Central Valley Distribution

In 1994, the USFWS reported that there were 32 occurrences of the vernal pool fairy shrimp ranging from the Stillwater Plain in Shasta County through most of the length of the Central Valley to Paisley in Tulare County (USFWS 1994).

Since then, vernal pool fairy shrimp have been reported from throughout Sacramento, Colusa and Glenn Counties, as well as Central Valley portions of the following counties: Tehama, Butte, Sutter, Yuba, Placer, Stanislaus, Madera, Fresno and Tulare on the east side of the valley (Eriksen and Belk 1999), and Alameda, Solano, Yolo, Colusa and Glenn on the west side (Eriksen and Belk 1999).

VPFS Distribution within the Planning Area

The vernal pool fairy shrimp were first officially reported from the Planning Area in 1982 (CDFG 2010). Specimens were collected from near Mather Air Force Base as early as 1967 by Dr. Clyde Eriksen (Eriksen, pers. comm.). Numerous surveys related to development projects have been conducted within and adjacent to the Planning Area (USFWS records; CDFG 2010), but the area has not been thoroughly surveyed for vernal pool fairy shrimp, and the total extent of potential habitat is unknown. Figure VPFS-1 illustrates the known recorded occurrences of vernal pool fairy shrimp within and adjacent to the Planning Area. The modeled habitat of the species in the Planning Area is described in Section G-4 of this Appendix.

VPFS Population Levels and Trends

An unknown amount of vernal pool habitat has been lost and with it, an unknown number of vernal pool fairy shrimp occurrences. Attempts have been made to calculate lost vernal pool acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California and Oregon, more vernal pool fairy shrimp habitat will and is being encroached upon and impacted throughout the species' range.

Adequate determination of remaining vernal pool fairy shrimp occurrences throughout the animal's range as well as population trends is difficult. The USFWS (1994) listed 32 known occurrences of the vernal pool fairy shrimp. These data were collected during a prolonged drought in California. Sugnet and Associates (1993) submitted a study claiming 178 "discrete locations" supporting the vernal pool fairy shrimp, however as specific localities were not divulged, the data are unverifiable and therefore not scientifically useful in any type of analyses. Eriksen and Belk (1999) present a map of localities for the vernal pool fairy shrimp with more than 200 localities represented, with the greatest density of occurrences in Sacramento County.

The California Natural Diversity Data Base (CNDDB) vernal pool crustacean records (CDFG 2010) may be somewhat misleading, due to the inconsistency of the data presented. Some records refer to individual pools, while others refer to pool complexes, and others still refer to groups of complexes. Additionally, the CNDDB is not updated when a particular site or population is

extirpated. Because of issues such as these, it is difficult to determine what actually constitutes a "population" or "occurrence." when using this data.

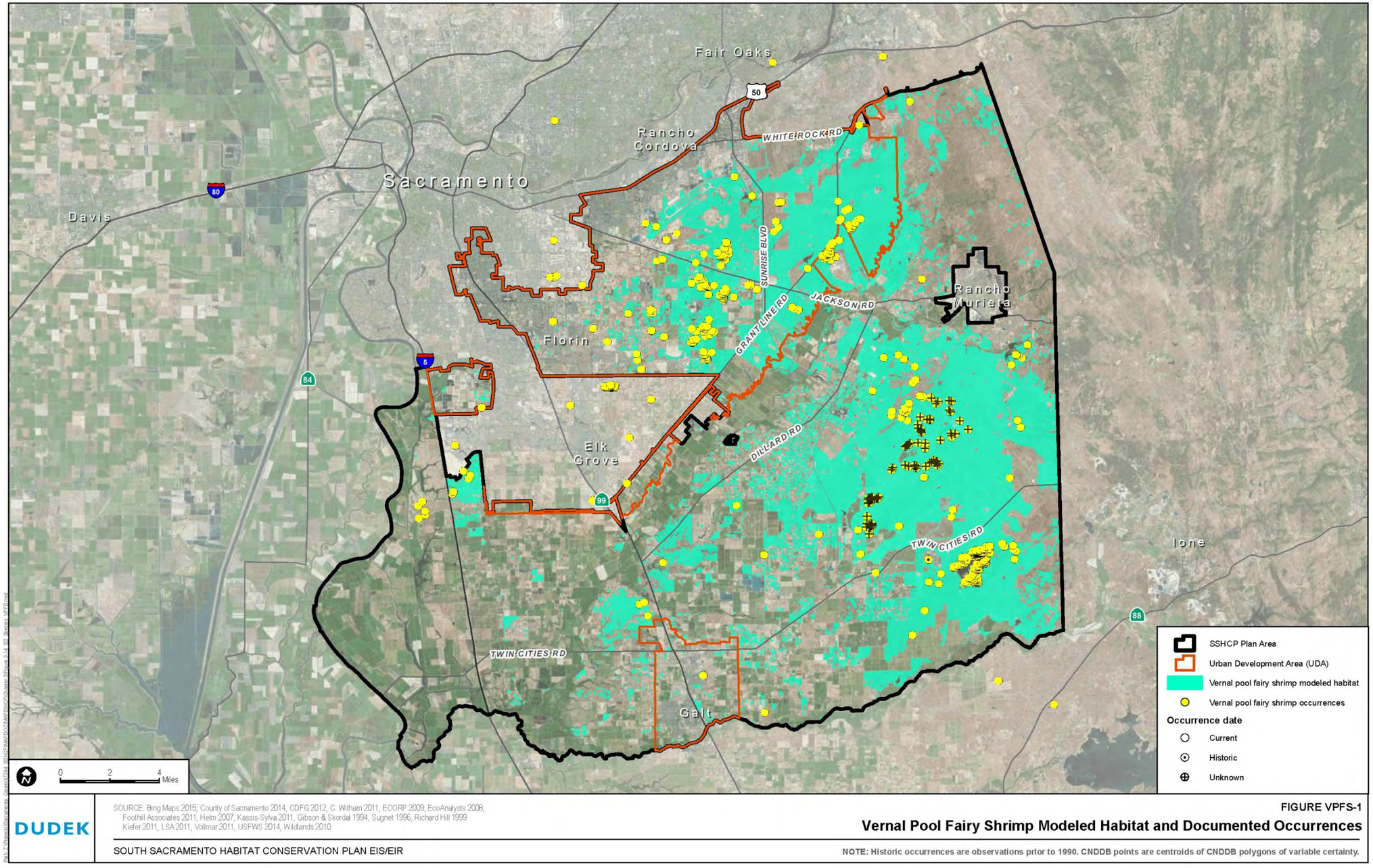
In addition, survey maps and records tend to show where vernal pool crustaceans are, and do not emphasize where they are not. Compounding these difficulties, records are typically a reflection of where surveys have been conducted, rather than a delineation of special-status shrimp distribution. Therefore, it is difficult to establish existing conditions for this species across the entire species range, including within the Planning Area. None of this is to say that vernal pool crustaceans are not threatened, endangered, or should not be protected. The issue is that where a paucity of adequate data exists, consistent data reporting would help prevent ambiguous interpretation or mischaracterization of species conservation needs.

VPFS Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem to where it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that out compete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Overgrazing tends to result in a large amount of manure in vernal pools. The organic waste oxidizes the water, leaving gill-breathing invertebrates without oxygen (Rogers 1998). Conversely, vernal pool grasslands are disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (e.g., *Eleocharis* sp., *Eryngium* sp.) and exotic plants (e.g., *Glyceria* sp. *Lolium multiflorum*) that generate deep thatch layers on the pool substrate. As this thatch layer decomposes, it lowers the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Both lack of and excessive grazing cause an increase in organic matter in the habitat that eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that outcompete the obligatory vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat component, and the removal of grazing or excessive grazing are threats to the vernal pool fairy shrimp.

Figure VPFS-1 Vernal Pool Fairy Shrimp Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles, paving or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. There is concern that bullfrogs (*Rana catesbeiana*) may feed upon federally protected vernal pool crustaceans (Balfour and Morey 1999). Manna grass (*Glyceria declinata*) and Italian rye grass are both exotic plants that occur in vernal pools, tend to produce heavy thatch and eventually create organic loads upon decomposition which reduce dissolved oxygen in the water (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish (*Gambusia affinis*) into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

Additional threats to the vernal pool invertebrate community structure includes: off-road vehicle use of vernal pool habitat for recreational “mud-bogging;” conversion of vernal pools into deep stock tanks that do not dry during the summer; and draining of vernal pools.

VPFS Data Gaps and Conservation Implications

Restoration and creation of vernal pool fairy shrimp habitat has been demonstrated to be feasible (Rogers 1998). However, specific habitat parameters for this and other vernal pool invertebrate species are still poorly understood. For example, there appears to be a need by this species to have a minimum pool volume and a minimum pool surface area within a given habitat to be occupied. Since this species has been found in a wide variety of natural and re-established or established vernal pool habitats, it is likely that it is in some respects an opportunist, as most temporary water fauna must be.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the Planning Area, because it is not feasible economically or temporally to survey the entire Planning Area.

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and the importance of seasonality and intensity of grazing and other disturbances in vernal pool ecosystems.

VPFS Literature Cited

Al-Tikrity, M.R. and J.N.R. Grainger. 1990. The effect of temperature and other factors on the hatching of the resting eggs of *Tanymastix stagnalis* (L.) (Crustacea, Anostraca). *Journal of Thermal Ecology*, 15(1): 87-90.

Amat, F., A. Gozalbo, J.C. Navarro, F. Hontoria, and I. Varó. 1991. Some aspects of *Artemia* biology affected by cestode parasitism. *Hydrobiologia* 212:39 – 44.

Balfour, P.S. and S.R. Morey. 1999. Prey selection by juvenile bullfrogs in a constructed vernal pool complex. *Transactions of the Western Section of the Wildlife Society*, 35:34-40.

Bang, F.B. 1983. Crustacean Disease Respnses. *In:* The Biology of the Crustacea, Vol. 6. Pathobiology. Edited by D. E. Bliss and A. J. Provenzano, Jr. Pp. 113-153. Academic Press, New York, New York.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Belk, D. 1977. Zoogeography of the Arizona fairy shrimps (Crustaca: Anostraca). *Arizona Academy of Science*, 12: 70-78.

Belk, D. and D.C. Rogers. 2002. A confusing trio of *Branchinecta* (Crustacea: Anostraca) from the western North America with a description of a new species. *Hydrobiologia*. 486:49–55.

Belk, D. and J. Brtek. 1995. Checklist of the Anostraca. *Hydrobiologia* 298:315-353.

Belk, D. and J. Brtek. 1997. Supplement to 'Checklist of the Anostraca'. *Hydrobiologia* 359:243-245.

Belk, D. and M.L. Fugate. 2000. Two new *Branchinecta* (Crustacea: Anostraca) from the southwestern United States. *The Southwestern Naturalist* 45(2):111-117.

Bowen, S.T., M.R. Buoncirstiani and J.R. Carl. 1988. *Artemia* habitats: ion concentrations tolerated by one superspecies. *Hydrobiologica*, 158: 201-214.

Broch, E.S. 1969. The osmotic adaptation of the fairy shrimp *Brachinecta campestris* Lynch to saline astatic waters. *Limnology and Oceanography*, 14: 485-492.

Broch, E.S. 1988. Osmoregulatory patterns of adaptation to inland astatic waters by two species of fairy shrimps, *Branchinecta gigas* Lynch and *Branchinecta mackini* Dexter. *Journal of Crustacean Biology*, 8: 383-391.

Brown, L.R. and L.H. Capelan. 1971. Egg hatching and life history of a fairy shrimp *Branchinecta mackini* Dexter (Crustacea: Anostraca) in a Mohave desert playa (Rabbit Dry Lake). *Ecology*, 52(1): 41-54.

Brown, R.J. 1972. A study of the mechanisms of osmotic and ionic regulation of the fairy shrimp, *Branchinecta mackini* (Crustacea, Branchiopoda). Ph. D. thesis. University of Toronto. Toronto, Canada. 215 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Center for Biological Diversity (CBD). 2001. Petition to list the midvalley fairy shrimp as an endangered species under the Endangered Species Act with concurrent designation of critical habitat. Center for Biological Diversity, PO 40090, Berkeley, California 94704-4090.

Collie, N. and E.W. Lathrop. 1976. Chemical characteristics of the standing water of a vernal pool on the Santa Rosa Plateau, Riverside County, California. Pp. 27-31 *In:* S. Jain (ed.) Vernal Pools, their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis, California.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. Verh. Internat. *Verein. Limnol*. 23:1107-1113.

Dumont, H.J. and S. Negrea. 2002. *Introduction to the Class Branchiopoda*. Guides to the Microinvertebrates of the Continental Waters of the World. Backhuys, Leiden.

Eng, L., D. Belk, and C. Eriksen. 1990 Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.

Eriksen, C. and D. Belk. 1999. *Fairy shrimps of California's pools, puddles, and playas*. Mad River Press, Eureka, California.

Eriksen, pers. comm. Dr. Clyde Eriksen. P.O. Box 23 Wise River, Montana 59763.

Hall, R.E. 1959. The development of eggs of *Chirocephalus diaphanus* Prévost at a low temperature. *Hydrobiologia*, 13: 156-159.

Helm, B. 1998. Biogeography of eight large branchiopods endemic to California. Pp. 124-139 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Horne, F.R. 1966. The effect of digestive enzymes on the hatchability of Artemia salina eggs. *Transactions of the American Microscopical Society*, 85(2): 271-274.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's heartland*. University of California Press, Berkeley.

Lilljeborg, W. 1889. Diagnosen zweier Phyllopoden-Arten aus Süd-Brasilien. Abhandlungen herausgegeben vom naturwissenschaftlichen. *Vereine zu Bremen*, 10: 424.

Linder, F. 1941. Contributions to the morphology and the taxonomy of the Branchiopoda Anostraca. Zoologiska Bidrag fran Uppsala, 10: 101-302.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Mellors, W.K. 1975. Selective Predation of ephippial *Daphnia* and the resisitance of ephippial eggs to digestion. *Ecology* 65:974-980.

Murugan, G., A. Maeda-Martinez, G. Criel, and H. Dumont. 1996. Unfertilized oocytes in Streptocephalids: resorbed or released? *Journal of Crustacean Biology*, 16(1):54–60.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. *Ecology*, 45(3):656-658.

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

Rogers, D.C. 2002a. Draft: Distribution and habitat parameter surveys B*ranchinecta mesovallensis* (Crustacea: Branchiopoda: Anostraca). Report to US Fish and Wildlife Service. Jones and Stokes Associates.

Rogers, D.C. 2002b. Amplexial morphology of selected Anostraca. *Hydrobiologia* 486:1-18.

Rogers, D.C. 2002c. Female based characters for anostracan (Crustacea:Branchiopoda) identification: a key for species in California and Oregon, USA. *Hydrobiologia* 486 125-132.

Rogers, D.C. and M. Fugate. 2001. *Branchinecta hiberna*, a new species of fairy shrimp (Crustacea: Anostraca) from western North America. *Western North American Naturalist* 61(1):11 – 18.

Rogers, D.C. *In prep*. Dispersal agents and speciation in the Branchiopoda (Crustacea).

Sars, G.O. 1896. On some West Australian Entomostraca raised form dried sand. *Archiv for Mathematik og Naturvidenskab* 19(1):1-35. 4pls.

Sars, G.O. 1898. On some South-African Phyllopoda raised from dried mud. *Archiv for Mathematik og Naturvidenskab* 20(4):1-43. 4pls.

Silveira, J. 1996. Avian uses of vernal pools and implications for conservation practice. Pp. 92-106 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

United States Fish and Wildlife Service (USFWS). September 19, 1994. Federal Register Final Rule; determination of endangered status for the conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool fairy shrimp; and threatened status for the vernal pool fairy shrimp.

Wissinger, S.A., A.J. Bohonak, H.H. Whiteman, and W. S. Brown. 1999. Habitat Permanence, salamander predation and invertebrate communities. *In:* Invertebrates in Freshwater Wetlands of North America: Ecology and Management, edited by D. P. Batzer, R. B. Bader, and S. A. Wissinger, John Wiley and Sons, Inc. New York.

VALLEY ELDERBERRY LONGHORN BEETLE (VELB)

Valley Elderberry Longhorn Beetle (VELB)

(Desmocerus californicus dimorphus)

Status USFWS: Threatened

Status CDFW: None



VELB Listing Status

The Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) (VELB) was federally listed as a threatened species on August 8, 1980 (50 CFR part 17, 52803 – 52807).

VELB Life History and Ecology

VELB Physical Description and Taxonomy

VELB is an atypical lepturine Cerambycid beetle. The Cerambycidae are the longhorned wood boring beetles. The subfamily Lepturinae is comprised mostly of small, showy, diurnal, species that are commonly found on flowers through the spring and summer, although they are generally more abundant at higher altitudes. Elderberry beetles are in the genus *Desmocerus*, the sole genus in the Lepturine tribe (*Desmocerini* Linsley and Chemsak 1972; Monné and Hovore 2001). This tribe is separated from all other Lepturine tribes by the form of the mandibles, which are broad and short, without internal pubescence (Linsley and Chemsak 1972).

The California elderberry longhorn beetle (*D. californicus*) was originally described by Horn in 1881. This beetle is black in color, with red to orange margins on the elytra in living animals,

fading to yellow in death. The pronotum disc is plane, with confluent punctations. The elytra are densely punctate or rugose. Adult beetles range from 14 to 25 millimeters in length (Linsley and Chemsak 1972).

VELB was described as a separate species by Fisher (1921) and was reduced to subspecific status by Doane et al. (1936). The majority of male VELB can be separated from the nominate subspecies by the short, suberect, pale setae on the antennae (as opposed to dark setae), and having the black elytral markings reduced to a single elongated apical dot and a single elongated basal dot per each elytron (Linsley and Chemsak 1972). Although it has been reported that a percentage of VELB males have identical elytral patterns to the nominate form (Linsley and Chemsak 1972; Eya 1976; Barr 1991), there is no explanation as to how this percentage is separated from the nominate form. The female VELB cannot be separated morphologically from the nominate subspecies. The larva has not been described, but the life history and immature stages of the nominate taxon were detailed by Davis and Comstock (1924).

This species has been confused with females of the common and widespread Lepturine *Anastrangalia laetifica* (LeConte) 1859, which is smaller (8 to 13 millimeters), much more elongated, and is similarly colored, except that the elytra have a subbasal, sutural, elongated black marking, and an elongated black marking near the elytral margin.

VELB Reproduction

The VELB is univoltine. The female oviposits between eight and 20 eggs in bark crevices on the host plant (Burke 1921; Barr 1991). The host plant is the elderberry (*Sambucus* spp.) (Burke 1921; Linsley and Chemsak 1972, 1997; Barr 1991). The eggs are 3.5 to 1.25 millimeters in diameter, oblong (football shaped), with a small knob at each end, and have wavy, longitudinal ridges, white initially, and then darkening to reddish brown (Burke 1921; Barr 1991). The egg is attached to the shrub by a thin secretion and the larva ecloses within 30 to 40 days (Burke 1921).

The newly emerged larvae bore into the wood of the host plant (Linsley and Chemsak 1972; Barr 1991). Burke (1921) and Eya (1976) reported that the larvae take two years to mature, however Halstead (1991) believes that one year is the norm. The larva typically bores into the central pith of stems and feeds there; however, on large trunks the larvae feed upon the wood (Burke 1921). The larvae create an elongated, longitudinal gallery through the heart of the stems, filling it with frass and shredded wood (Barr 1991). When the larva is ready to pupate it chews a circular to slightly oval exit hole (7 to 10 millimeters in diameter) to the outside, which it plugs with frass. Then the larva backs up into the gallery and constructs a pupal chamber out of shredded wood and frass (Barr 1991). Jones and Stokes (1985, 1986, 1987a, and 1987b) and Halstead (1991) reported that 70 percent of exit holes are within 1.2 meters of the ground in stems greater than 13 mm in diameter; however holes may be as high as three meters above

the ground (Barr 1991, Rogers pers. obs.). Pupae can be found between January and April, and the pupal stage lasts about one month (Burke 1921).

After pupation, the teneral adult remains in the pupal cell for several weeks prior to emergence (Burke 1921). The adult eventually emerges from the pupal chamber, through the exit hole (Barr 1991). The adults readily fly from shrub to shrub. VELB is most often seen on, in, or immediately under the host plant's inflorescences; however, copulation occurs on the lower parts of the stems (Barr 1991; Rogers pers. obs.). The adults feed on the leaves, and to a lesser extent on the flowers (Linsley and Chemsak 1972; Barr 1991). The adults are active from March to early June.

VELB Ecological Relationships

There are no known diseases of VELB. Numerous species of Cleridae (checkered beetles), Cucujidae (flat bark beetles), Ostomatidae (bark-gnawing beetles), Elateridae (click beetles), Asilidae (robber flies), Phymatidae (ambush bugs), Reduviidae (ambush bugs), and some Thysanoptera (thrips) are known predators of Cerambycid beetles (Linsley 1961). All are common in the Central Valley, but none have been reported feeding on VELB.

The non-native invasive Argentine ant (*Linepithema humile*) has been observed attacking and killing VELB larvae. The ants enter the exit hole that the beetle makes prior to pupation, and remove the larva (Huxel 2000).

Birds that hunt insect larvae in wood, such as woodpeckers, creepers, and nuthatches, may also prey upon VELB, but no observations of this have been reported. Adult beetles may not be taken by birds due to their warning colors. Whether these warning colors are genuine or represent Batesian mimicry is unknown.

VELB Habitat Requirements and Ecology

The VELB is completely dependent upon its host plant, the elderberry (*Sambucus glauca, S. mexicana, S. caerulea*) (Linsley and Chemsak 1972, 1997; Eng 1984; Barr 1991; Collinge et al. 2001) using no other recorded larval host plant. This shrub is a component of riparian forests throughout the Central Valley. Although this shrub occasionally occurs outside of riparian areas, shrubs supporting the greatest beetle densities are where the shrubs are abundant and interspersed among dense riparian forest, including species such as Fremont's cottonwood (*Populus fremontii*), box elder (*Acer negundo*), western sycamore (*Platanus racemosa*), California black walnut (*Juglans hindsii* var. *californica*), white alder (*Alnus rhombifolia*), willow (*Salix* spp.), button-willow (*Cephalanthus occidentalis*), Oregon ash (*Fraxinus latifolia*), wild grape (*Vitis californicus*), California hibiscus (*Hibiscus lasiocarpos*), and western poison-oak (*Toxicodendron diversilobum*) (Barr 1991; USFWS 1999; Collinge *et a*l. 2001). Isolated elderberry

shrubs separated from contiguous habitat by extensive development are not typically considered to provide viable habitat for VELB (USFWS 1998; Collinge et al. 2001).

Although VELB can be found wherever elderberry shrubs are found, the VELB is also a component of a larger community structure dependent upon riparian forest (Eya 1976; USFWS 1984, 1999; Barr 1999; Huxel 2000; Collinge et al. 2001). This community includes numerous other invertebrates dependent upon riparian corridors including other invertebrates like the Sierra sideband snail *(Monodenia mormonum)*, bumblebee scarab *(Licnanthe rathvoni)*, flat headed borers (*Buprestis viridisuturalis* and *Buprestis laeviventris)*, the oak root borers *(Prionus lecontei* and *Prionus californicus)*, monarch butterfly (*Danaus plexippus)*, California dogface *(Zerene eurydice)*, western tiger swallowtail (*Papilio rutulus)*, and Argiope orb weavers (Rogers, pers, obs.), as well as vertebrates such as yellow-billed cuckoo and least Bell's vireo.

Therefore, suitable VELB habitat is defined as elderberry shrubs that are adjacent to, or contiguous with riparian forest, flood plains or relict elderberry savannah that measure greater than or equal to one inch in diameter measured at ground level.

VELB Habitat Elements

Habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The habitat elements for VELB are identified in Table G-3.11-1 and have been derived from input from local species experts.

Table G-3.11-1. Habitat Elements for Valley Elderberry Longhorn Beetle

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Mine tailing riparian woodland, valley oak riparian woodland, mixed riparian woodland, and mixed riparian scrub.	Requires elderberry shrubs (*Sambucus glauca*, *S. mexicana, S. caerulea*); generally in a matrix of other continuous to semi-continuous riparian vegetation.

VELB Species Distribution and Population Trends

Habitat occupied by VELB tends to form and exist in riparian corridors and on the level open ground of periodic flood plains. This geomorphic setting historically has been desirable for agricultural, urban or industrial development. As a result, much of this habitat type has been converted through dams and levees for use as developable land. Although it has been estimated that 90 percent of California riparian habitat has been lost over the last century and a half (Barr 1991; Barbour et al. 1991; Smith 1980; Reiner and Griggs 1989; TNC 1990; Jacobs 1992; Naiman et al. 1993; Naiman and Décamps 1997) it is difficult to accurately quantify in terms of direct VELB habitat losses. Therefore, an unknown amount of riparian forest and

elderberry savannah habitat has been lost, and an unknown number of VELB metapopulations as well (Collinge et al. 2001).

Long-term datasets on VELB occupancy are limited to those collected by Collinge et al. (2001) who, in 1997, re-surveyed sites visited by Barr (1991). Both found about 25 percent occupancy of elderberry groups and 20 percent occupancy of sites. However, decreases in the number of sites with elderberry (at seven fewer re-visited sites: a 10 percent decline) and in density of elderberry between surveys, resulted in lower total numbers of occupied sites and shrub groups (Collinge et al. 2001). Considering elderberry loss, and VELB extirpations (exit holes no longer found) and colonizations (exit holes found in 1997 where there were none in 1991) at sites that still had elderberry, Collinge et al. (2001) counted extirpations at nine of 72 re-visited sites (12.5 percent over six years, or about 2.5 percent of sites per year), and colonizations at four of 43 previously unoccupied sites revisited (nine percent over six years or about 1.5 percent of sites per year). colonizations only were identified within major drainage systems.

Lang et al. (1989) found much lower occupancy rates along the southern half of the Sacramento River than in the northern half and attributed the lower rates to the loss and narrowing of riparian corridors associated with agricultural development. This pattern may also reflect changes that have occurred through time. Loss of over 90 percent of riparian habitat (Katibah et al. 1984; GIC 2003) and subsequent fragmentation in the VELB's range may have resulted in not only loss of populations occurring in destroyed areas, but also degradation and declines in occupancy rates within remnants of habitat.

VELB Range Wide Distribution

Desmocerus californicus is one of three species of *Desmocerus* in North America. VELB is one of two subspecies of *D. californicus*. The nominate subspecies is widespread in coastal California, ranging from Mendocino County southward to western Riverside and northern San Diego Counties, and also into the southern Sierra Nevada range (Kern and Tulare Counties). The VELB subspecies is a narrowly defined endemic taxon, limited distributionally to portions of the California Central Valley and Sacramento-San Joaquin River Delta (USFWS 1999). Studies to assess the distribution and extent of the valley subspecies began in the late 1970's (Eya 1976) and the USFWS proposed the species for listing in 1978. Since VELB was listed in 1980, numerous distributional studies have been conducted (summarized in Barr 1991; Halstead and Oldham 2000). This subspecies is endemic to California, occurring below 900 meters elevation (USFWS 1999).

VELB Central Valley Distribution

In the Central Valley proper, VELB was first collected from "Sacramento, California," the precise location being unknown (Fisher 1921). Additional material was identified from Putah Creek in

Solano and Yolo counties, and from along the Lower American River in Sacramento County (Linsley and Chemsak 1972). Linsley and Chemsak (1972) also reported a single female from the Merced River; however, since the females cannot be separated to subspecific level, the identification is considered unverified.

Subsequent to various surveys throughout the Central Valley, the USFWS (1999) prepared a map of the presumed range of VELB. This map encompasses the entire Central Valley, and the Sacramento-San Joaquin River Delta, below 900 meters in elevation. Additionally the CNDDB identifies 201 occurrences in a continuous band from Shasta County in the north to Kern County in the southern portion of the State (CDFG 2010).

VELB Distribution within Planning Area

Because comprehensive surveys for VELB in the Planning Area have not been conducted and because known occurrences throughout the species range are based mostly on incidental observations, the population size and locations of this species in the Planning Area are not known. Few surveys focused on VELB have been conducted within and adjacent to the Planning Area, and the total extent of potential habitat (i.e., elderberry shrubs) is unknown. Of the 22 known occurrences of VELB recorded within the CNDDB from Sacramento County 15 are located north and outside of the Planning Area in proximity to the American River. Of the remaining seven CNDDB occurrences located within the Planning Area, five CNDDB occurrences are located along the Cosumnes River/Deer Creek riparian corridor, one along Highway 50 in Rancho Cordova, and one is located along Dry Creek east of the City of Galt (CDFG 2010). There were also several documented exit holes within the mine tailing riparian woodland in Rancho Cordova on the Aerojet property (Talley et al. 2007) and along the Cosumnes River near Rancho Murieta (Talley 2003). There are no previously recorded occurrences along the Sacramento River within the County (CDFG 2010).

It is important to note that much of the Planning Area encompasses privately owned property, a majority of which has not been surveyed for the presence of VELB; therefore, there is a high probability that future surveys will identify additional occurrences within the Planning Area.

Figure VELB-1 illustrates the recorded distribution of known VELB occurrences (based primarily on exit holes) within and adjacent to the Planning Area (CDFG 2010; Talley et al. 2007; Talley 2003). Recently made exit holes can be identified and are commonly used as an indicator of species presence. As noted above, extensive mapping efforts on public and private lands within the Planning Area have not been conducted and would be needed to fully characterize the distribution of VELB in the Planning Area. The modeled habitat of the species within the Planning Area is discussed in Section G-4 of this Appendix.

VELB Population Levels and Trends

The VELB is known from a total of 201 CNDDB occurrences, which include 23 in Fresno County; 22 in Sacramento County; 21 in Tehama County; 18 each in Butte and Yolo Counties; 17 in San Joaquin County; 13 Yuba County; 12 in Glenn County; ten in Tulare County; nine in Solano County; eight in Stanislaus County; seven each in Colusa, Placer, and Sutter Counties; six each in Madera and Tuolumne Counties, four each in Kern, Merced, Napa, and Shasta Counties; two in El Dorado County; and one each in Amador Calaveras, and Mariposa Counties (CDFG 2010).

Of the 201 CNDDB occurrences recorded, all are listed as presumed extant (CDFG 2010). Only one recorded occurrence, which is located in Sacramento County along State Highway 50, is listed as experiencing a decreasing trend the rest are listed as trend unknown (CDFG 2010); this occurrence has Argentine ants which have killed two newly emerged VELB (Calderaro pers.obs.).

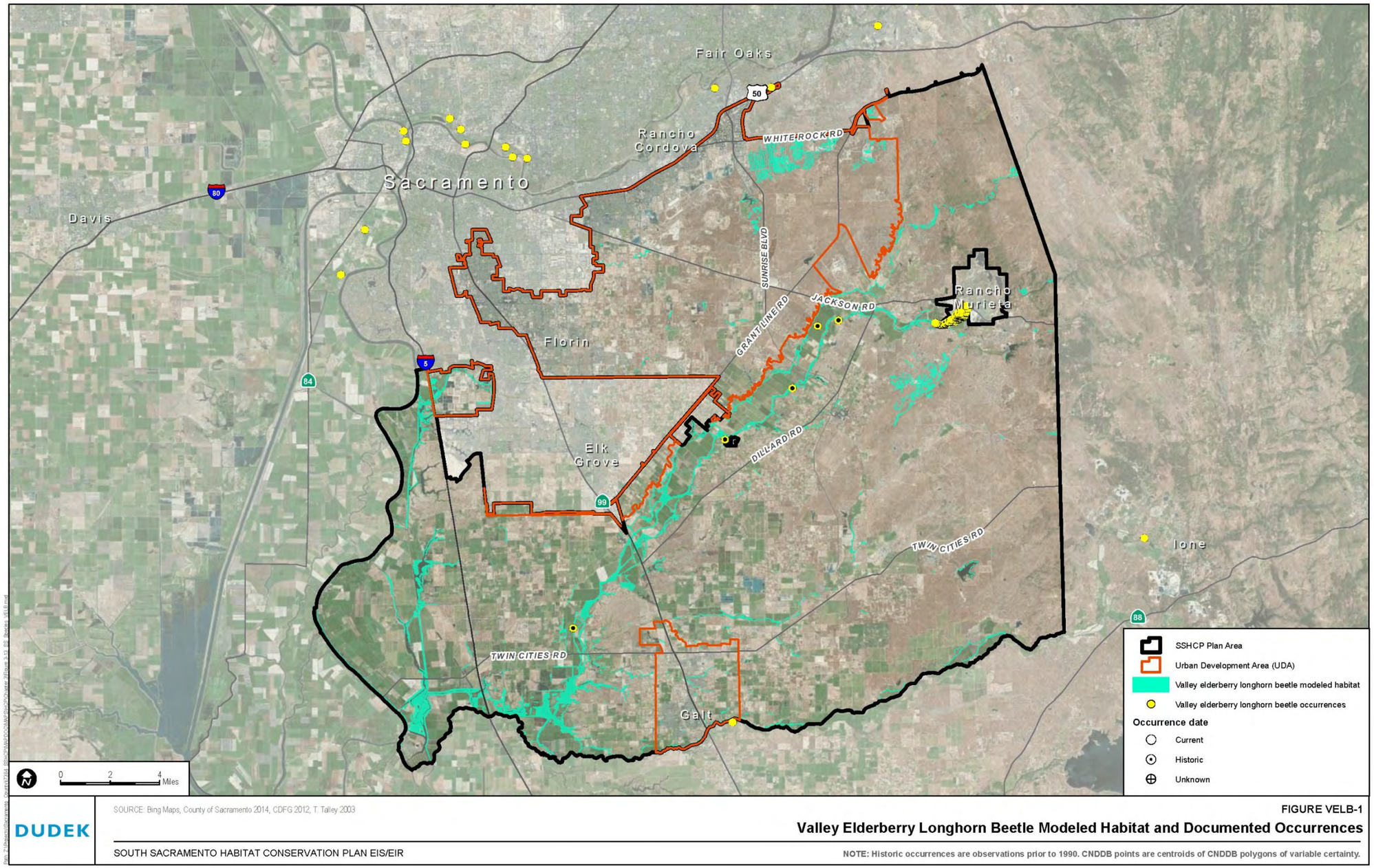
An unknown amount of riparian forest and elderberry savannah has been lost, and with it, an unknown number of VELB occurrences. Due to current pressures of the increasing human populations in California, more VELB habitat is being and will continue to be encroached upon and impacted throughout the species range. Although it has been estimated that 90 percent of California riparian habitat has been lost over the last century and a half (Barr 1991) it is difficult to adequately quantify. It is not unreasonable to assume that as riparian habitat is lost, VELB will experience a decreasing trend in population.

VELB Threats to the Species

The greatest threat to VELB is the elimination, loss, or modification of their habitat by development and other activities, which reduce or eliminate their host plants. Levees, dams or other structures or activities that alter the hydrology of riparian areas may lead to the direct loss of riparian forests and elderberry shrubs. Habitat fragmentation also may pose a threat to the VELB, as development which isolates small patches of riparian forest may prevent VELB movement and genetic flow between occupied areas of habitat, isolating metapopulations (Collinge et al. 2001). Furthermore, small areas of habitat, which are surrounded by development may not be buffered against run-off and other degrading effects from adjacent developed areas, such as storm run-off contaminants.

Opportunistic invasive non-native plants like the Himalayan blackberry (*Rubus discolor*) may overwhelm elderberry shrubs by the sheer mass of their growth form, and may shade out the leaves, killing the shrub, or prevent VELB from moving between shrubs, or dispersing to other shrubs. Excessive livestock grazing in riparian areas can be detrimental to riparian communities. Cattle and horses chew on elderberry and other riparian forest species, often girdling shrubs and trees, and eventually killing them.

Figure VELB-1 Valley Elderberry Longhorn Beetle Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Pesticide drift from agriculture or direct fogging of riparian areas by mosquito abatement districts or the State Health Department to control encephalitis mosquitoes may affect VELB.

VELB Data Gaps and Conservation Implications

The ecology, status, and management of VELB have received increased attention in recent years; however, there are several sources of uncertainty regarding VELB and its requirements in the Planning Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

VELB Population and Habitat Distribution within the Planning Area

VELB occur in suitable habitat within the Planning Area; however, comprehensive surveys for VELB in the Planning Area have not been conducted and the existing occurrence data are based primarily on incidental observations (particularly the presence of exit holes which may or may not be associated with VELB). Consequently, the population size and distribution of the species throughout the Planning Area are not known. Although the distribution of different land cover-types is mapped and quantifiable, the quality of habitat (particularly as it relates to habitat components such as elderberry shrubs and stem size) for VELB within most of these areas is unknown. These information gaps limit our ability to identify the best lands available for preserving VELB habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for VELB will be considered relatively high in lands that support (or recently supported) known occurrences and/or are adjacent to these areas.

VELB Determining Threat Severity

Although certain factors are known to contribute to VELB decline range wide, exactly how and to what extent these factors contribute to the decline of the VELB are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., adjacent use of pesticides and herbicides); therefore, to improve conservation planning efforts for VELB in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

VELB Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for VELB

Achieving the conservation goals and objectives for VELB will require successful enhancement and restoration of suitable habitat as well as maintenance of dispersal corridors. The function of habitat

(e.g., connectivity, biodiversity, etc.) is an important factor for suitability of VELB. Whether restored or enhanced habitats can retain the structural attributes suitable for VELB is unknown.

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for VELB, then those lands would not support sustainable populations.

VELB Literature Cited

Barr, C. B. 1991. The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* Fisher (Insecta: Coleoptera: Cerambycidae). USFWS, Sacramento, California.

Burke, H. E. 1921.Biological notes on *Desmocerus*, a genus of roundhead borers, the species of which infest various elders. *Journal of Economic Entomology*, 14:450-452.

Calderaro, Angela, PMC.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Collinge, S.K., M. Holyoak, C.B. Barr, and J.T. Marty. 2001. Riparian habitat fragmentation and population persistence of the threatened valley elderberry longhorn beetle in central California. *Biological Conservation,* 100:103 - 113.

Eng, L.L. 1984. Rare, threatened and endangered invertebrates in California riparian systems. In: California riparian systems ecology, conservation, and productive management. Ed. R.E. Warnter and K.M. Hendrix, Berkeley: University of California Press.

Eya, B. K. 1976. Distribution and status of a longhorn beetle, *Desmocerus californicus dimorphus* Fisher (Coleoptera: Cerambycidae). Unpublished report, Department of Zoology, University of California, Davis, California. 6 pp.

Fisher, W. S. 1921. A new Cerambycid beetle from California. *Proceedings of the Entomological Society of Washington,* 23 (9): 206-208.

Geographic Information Center (GIC). 2003. The Central Valley Historic Mapping Project. Report of the Habitat Restoration Program, U.S. Fish and Wildlife Service. Geographic Information Center, California State University, Chico, Dept. of Geography and Planning, Chico, CA 95929-0425, Chico, California.

Halstead, J. A. 1990. Letter to G.C. Kobetich, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Field Office, Sacramento California. October 29, 1990.

Halstead, J. A. 1991. Unpublished manuscript. Kings River Conservation District, Fresno, California. 47pp.

Halstead, J. A. and J. A. Oldham. 2000. New distribution records for the elderberry longhorn beetle *Desmocerus californicus* Horn (Coleoptera: Cerambycidae). Pan-Pacific Entomologist 76:74-76.

Holyoak, M., T.S. Talley and S.E. Hogle. 2010. The effectiveness of US mitigation and monitoring practices for the threatened Valley elderberry longhorn beetle. *Journal of Insect Conservation*. 14(1):43-52.

Horn, G. H. 1881. The Species of Desmocerus. *Transactions of the American Entomological Society*, 9:7-8.

Hovore, Frank, Frank Hovore and Associates.

Huxel, G. 2000. The effect of the Argentine ant on the threatened valley elderberry longhorn beetle. *Biological Invasions,* 2:81-85.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Jones and Stokes Associates, Inc. 1985. Survey of the Habitat and Populations of the Valley Elderberry Longhorn Beetle along the Sacramento River. 1985 Progress Report. Prepared for the U.S. Fish and Wildlife Service, Sacramento Endangered Species Field Office, Sacramento, California. 46 pp.+ appendices.

Jones and Stokes Associates, Inc. 1986. Survey of the Habitat and Populations of the Valley Elderberry Longhorn Beetle along the Sacramento River. 1986 Progress Report. Prepared for the U.S. Fish and Wildlife Service, Sacramento Endangered Species Field Office, Sacramento, California. 13 pp.+ appendices.

Jones and Stokes Associates, Inc. 1987a. Biological Survey of the Raleys Landing Project Site, Yolo County. Sacramento, California.

Jones and Stokes Associates, Inc. 1987b. Survey of the Habitat and Populations of the Valley Elderberry Longhorn Beetle along the Sacramento River. Final Report. Prepared for the U.S. Fish and Wildlife Service, Sacramento Endangered Species Field Office, Sacramento, California. 48 pp.+ appendices.

Katibah, E. E., K. J. Dummer, and N. E. Nedeff. 1984. Current condition of riparian resources in the Central Valley of California. Pages 314-321 in R. E. Warner and K. M. Hendrix, editors. California Riparian Systems: Ecology, Conservation, and Productive Management. University of California Press, Berkeley, California.

Lang, F. J., J. Jokerst, and G. Sutter. 1989. Habitat populations of the valley elderberry longhorn beetle along the Sacramento River. US Forest Service General Technical Report PSW-110, pp. 242-247.

Linsley, E.G. 1961. Cerambycidae of North America, Part I. Introduction. University of California Publications in Entomology 18:1-97.

Linsley, E.G. 1964. Cerambycidae of North America, Part V. Taxonomy and Classification of the Subfamily Cerambycinae, Tribes Callichromini Through Ancylocerini. *University of California Publications in Entomology*, 22:1-197.

Linsley, E.G. and J. A. Chemsak. 1972. Cerambycidae of North America, Part VI, No.1. Taxonomy and Classification of the Subfamily Lepturinae. *University of California Publications in Entomology*, 69:1-138.

Linsley, E.G. and J. A. Chemsak. 1997. Cerambycidae of North America, Part VIII. Bibliography, Index and Host Plant Index. *University of California Publications in Entomology*, 117:1-534.

Monné, M.A. and F.T. Hovore. 2001. Checklist of the Cerambycidae of the Western Hemisphere, Part 1. Parandrinae through Lepturinae. Electronic version, Internet files at www.hovore.com.

Naiman, R. J., H. Décamps, and M. Pollock. 1993. The role of riparian corridors in maintaining regionalbiodiversity. *Ecological Applications,* 3:209-212.

Naiman, R. J. and H. Décamps. 1997. The ecology of interfaces: riparian zones. *Annual Review of Ecology and Systematics,* 28:621-658.

Serpa, Larry, The Nature Conservancy.

Smith, F. 1980. A short review of the status of riparian forests in California. *In*: Sands, A. (Ed.), Riparian Forests in California: Their Ecology and Conservation. University of California Regents, Berkeley, California, pp 1-2.

Talley, T.S. 2007. Which heterogeneity framework? Consequences for conclusions about patchy population structure. *Ecology*. 88(6), pp. 1476–1489.

Talley, T.S. 2003. Data obtained from surveys conducted in March 21, 2003; April 7, 2003; April 17, 2003. The data has been modified to show only new exit holes.

Talley, T.S. 2005. Spatial ecology and conservation of the valley elderberry longhorn beetle. PhD dissertation. University of California, Davis.

Talley, Theresa, University of California, Davis.

Talley T.S, E. Fleishman, M. Holyoak, D.D. Murphy, and A. Ballard. 2007. Rethinking a rare-species conservation strategy in an urban landscape: The case of the Valley Elderberry Longhorn Beetle. *Biological Conservation*. 135:21–32.

United States Fish and Wildlife Service (USFWS). August 8, 1980. Federal Register Final Rule; Listing the Valley elderberry longhorn beetle as a Threatened Species with critical habitat. 50 CFR part 17, 52803 – 52807.

United States Fish and Wildlife Service. 1984 (USFWS). Valley Elderberry Longhorn Beetle Recovery Plan. U. S. Fish and Wildlife Service, Portland, Oregon. 62 pp.

United States Fish and Wildlife Service (USFWS). 1998. Letter dated 7 December 1998 to the California Statewide Certified Development Corporation.

United States Fish and Wildlife Service (USFWS). 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle, 9 July 1999.

United States Fish and Wildlife Service (USFWS). 2006. Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) Five-year Review Summary and Evaluation. September 2006. USFWS, Sacramento Fish and Wildlife Office, Sacramento, California.

Witham, Carol, Ecologist.

RICKSECKER'S HYDROCHARA/WATER SCAVENGER BEETLE (RWSB)

Ricksecker's Hydrochara/Water Scavenger Beetle (RWSB)

(Hydrochara ricksecker)

Status USFWS: None

Status CDFW: None

RWSB Listing Status

The Ricksecker's hydrochara (*Hydrochara ricksecker*), or Ricksecker's water scavenger beetle, meets the requirements as a "rare, threatened or endangered species" under the California Environmental Quality Act (CEQA); however, they have no formal State or Federal protected species status.

RWSB Life History and Ecology

RWSB Species Description and Life History

Ricksecker's hydrochara was originally described in the genus *Hydrocharis* (in error) by Horn in 1895. Leech (1956) moved it to the genus *Hydrochara*. The Ricksecker's hydrochara is a typical aquatic Hydrophilid beetle. The sexes are not readily separable. The Ricksecker's hydrochara is 10 to 12 millimeters in length, and dorsally convex. The overall color is black. Dorsally the beetle has metallic green reflections, and the lateral margins of the pronotum and elytra are testaceous to yellow. Ventrally, the keel is short, ending in a sharp spine (Smetana 1980). Underwater, the black ventral surface appears silvery due to the air trapped on the ventral setae. This species can readily be confused with the widespread *Tropisternus lateralis* Fabricius 1775, which is slightly smaller, is less convex, and has a much more elongated ventral keel. The larva has not yet been formally described; however, it can be separated from all other Hydrophilid genera by the five segmented legs, symmetrical mandibles, reduced gula, lateral abdominal projections, and tracheal gills absent (Archangelski 1997; Rogers and Serpa *in prep*).

The vast majority of Hydrophilid beetles, including the Ricksecker's hydrochara, are predatory as larvae and omnivorous as adults. Ricksecker's hydrochara is a component of the benthic community within episodic, ephemeral aquatic habitats (Rogers pers. obs.). Ricksecker's

hydrochara larvae indiscriminately attack anything their size or smaller, and attempt to consume it, including other insects, crustaceans, amphibian larvae, and other Ricksecker's hydrochara larvae (Rogers pers. obs.; Serpa pers. obs.). Like other Hydrophilid species, the larvae tend to keep to shallow margins and heavily vegetated areas, and upon making a kill, carry the prey item to the surface and hold it out of the water while consuming it (Plague 1996; Rogers pers. obs.). Adults feed on common frog-fruit (*Phyla nodiflora*), and dead insects and tadpoles (Serpa pers. obs; Rogers pers. obs.).

The Ricksecker's hydrochara is univoltine. Oviposition and eclosion have not been observed. Early instar larvae appear in the pools three to four weeks after the pools first fill (Rogers pers. obs.). The larvae grow quickly, usually requiring only two or three meals to molt to each subsequent instar. When temperatures begin to rise (typically March) the late instar larvae leave the pool, and construct a burrow in the adjacent uplands, typically where the soil is slightly moist, and pupate therein (Rogers pers. obs.). Pupation lasts two to four days, depending upon temperature. Upon emergence, the adults fly to a different vernal pool and mate (Rogers pers. obs.). The ovisac of other *Hydrochara* spp. is constructed by the female at the water surface, in vegetation. The ovisac is typically off-white, roughly subspherical, 10 to 18 millimeters in length, with a slender mast (Archangelski 1997). The mast and operculum are brownish. The adults may die after mating and oviposition, as dead adults have been found as the pools are drying (Rogers pers. obs).

There are no known diseases, parasites or predators of the Ricksecker's hydrochara, other than the species' own cannibalistic larvae.

Ricksecker's hydrochara co-occurrs with the following fairy shrimps: California fairy shrimp (*Linderiella occidentalis* Dodds, 1923), mid-valley fairy shrimp (*Branchinecta mesovallensis* Belk and Fugate 2001), vernal pool fairy shrimp (*B. lynchi* Eng, Belk and Eriksen, 1990) and Conservancy fairy shrimp (*B. conservatio* Eng, Belk and Eriksen, 1990), as well as vernal pool tadpole shrimp (*Lepidurus packardi* Simon, 1886) (Rogers pers. obs.).

RWSB Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The Ricksecker's hydrochara depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependent upon intact sub-watersheds, and the surrounding uplands that support those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

Habitats supporting the Ricksecker's hydrochara are typically in Central Valley California floristic provinces below 300 meters in elevation. The physical parameters that affect the suitability of aquatic habitats for Ricksecker's hydrochara have not been described. Collection records suggest that the Ricksecker's hydrochara is not sensitive to the size of vernal pools or other aquatic habitats, and primarily utilizes vernal pools and swales, seasonal wetlands and other ephemeral habitats, as well as constructed vernal pools (Serpa pers. obs.; Rogers pers. obs.). Adults have been observed to burrow into the substrate at the bottoms of pools (Serpa pers. obs.; Rogers pers. obs.). It is probable that, like other vernal pool insects, the larvae, pupae or adults may over-summer in burrows at or above the vernal pool water line, or the eggs may be dessication resistant and lay dormant in the pool bottom. Neither larvae nor adults have been found in similar habitat in nearby permanent waters, although similar Hydrophilid beetle species have been found in these situations.

Excessive livestock grazing may be detrimental to Ricksecker's hydrochara. Overgrazing tends to result in large amounts of manure in vernal pools. The decomposition of this organic waste reduced the dissolved oxygen in the water, leaving the gill-breathing invertebrates like the Ricksecker's hydrochara without oxygen (Rogers 1998). Conversely, most vernal pool grasslands need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it also reduces the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat suitability component.

Common wetland plant species that co-occur with Ricksecker's hydrochara generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of this species to be present. These plants may include coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), common frogfruit (*Phyla* spp.), goldfields (*Lasthenia* spp.), common spikerush (*Eleocharis macrostachya*), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and aquatic buttercup (*Ranunculus aquatilis*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods will have hydrology that cannot support this species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*), toad rush (*Juncus bufonius*), false dandelion (*Hypochoeris radicata*), and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round do not appear to support Ricksecker's hydrochara (Rogers pers. obs.). These plants include cattails

(*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

The Ricksecker's hydrochara is a component of a larger invertebrate community structure dependant on vernal pools (Rogers, 1998). This invertebrate community includes mostly planktonic crustacea dependant upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as Flatworms, and a suite of insect species, including vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*), and many others (Rogers, 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers, 1998).

Therefore, potential Ricksecker's hydrochara habitat is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that also support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow Ricksecker's hydrochara to complete its life cycle.

Optimal Ricksecker's hydrochara habitat tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, sustaining a complex vernal pool invertebrate community (Rogers pers. obs., 1998). Unfortunately, little effort has been made to accurately quantify these parameters.

RWSB Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Ricksecker's hydrochara are identified in Table G-3.12-1 and have been derived from input from local species experts.

Table G-3.12-1. Habitat Elements for Ricksecker's hydrochara

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

RWSB Species Distribution and Population Trends

Habitat occupied by Ricksecker's hydrochara tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been lost, and an unknown number of Ricksecker's hydrochara occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more Ricksecker's hydrochara habitat is being and will be encroached upon and impacted throughout the species range.

RWSB Range Wide Distribution

Ricksecker's hydrochara is the smallest species in the genus Hydrochara, which currently has 22 currently recognized species reported from North America, Eurasia, and Africa (Smetana 1980; Archangelski 1997). Only two species occur in California.

Ricksecker's hydrochara was redescribed by Smetana in 1980, at which time only 14 specimens were known, all of which were collected from the San Francisco Bay region. Smetana grouped Ricksecker's hydrochara with Hydrochara similis (d'Orchymont), a species from India, into the Similis Group, a sub-group within the genus Hydrochara.

Ricksecker's hydrochara was originally described as endemic to the San Francisco Bay region, occurring in Alameda, Marin, San Mateo, and Sonoma Counties (Smetana 1980). Recent collections have been made in Solano County at the Jepson Prairie Preserve, and from vernal pools in Sacramento and Placer counties (Rogers pers. obs.; Serpa pers. obs.; CDFG 2010).

RWSB Central Valley Distribution

In the Central Valley proper, Ricksecker's hydrochara have been collected from Solano, Sacramento and Placer Counties (Rogers pers. obs., Serpa pers. obs.). In Solano County, all records are from the Jepson Prairie Preserve and vicinity (Rogers pers. obs.; Serpa pers. obs.). In Sacramento County, this species has been collected from Planning Area (Rogers pers. obs.; Serpa pers. obs.; Witham pers. obs.), and from Blue Ravine in Folsom (Rogers pers. obs.). The single Placer County record comes from just south of Lincoln, at the Twelve Bridges Preserve (Rogers pers. obs.).

RWSB Distribution in the Planning Area

Figure RWSB-1 illustrates the known recorded occurrences of Ricksecker's water scavenger beetle within the Planning Area. The Ricksecker's hydrochara were first reported from the Planning Area from Mather Field (Rogers pers. obs.). This species has been collected from Mather Field on three additional occasions (Rogers pers. obs.; Serpa pers. obs.; Witham pers. obs.), from Ranch Seco (Rogers pers. obs.), Howard's Ranch (TNC Rare Species Survey) and from Peterson Ranch (Serpa pers. obs.).

No surveys focused on Ricksecker's hydrochara have been conducted within and adjacent to the Planning Area and the total extent of potential habitat is unknown. The modeled habitat of the species in the Planning Area is described in Section G-4 of this Appendix.

RWSB Population Levels and Trends

An unknown amount of vernal pool habitat has been lost, and with it, an unknown number of Ricksecker's hydrochara occurrences. Attempts have been made to calculate lost vernal pool acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more Ricksecker's hydrochara habitat will be and is being encroached upon and impacted throughout the species range. Adequate determination of remaining Ricksecker's hydrochara populations throughout the animal's range as well as population trends is difficult, as no specific surveys have ever been conducted outside of the locations listed above

RWSB Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem until it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that out compete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Overgrazing tends to result in large amounts of manure in vernal pools. The organic waste oxidizes the water, leaving gill breathing invertebrates without oxygen (Rogers 1998). Conversely, vernal pool grasslands are disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (e.g., *Eleocharis* sp., *Eryngium* sp.) and exotic plants (e.g., *Glyceria* sp. *Lolium multiflorum*) that generate deep thatch layers on the pool substrate. As this thatch layer decomposes, it lowers the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Both lack of grazing and excessive grazing cause an increase in organic matter in the habitat that

eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that out compete the obligate vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat component, and the removal of grazing or excessive grazing may be threats to the Ricksecker's hydrochara .

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles, paving or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. manna grass and Italian rye grass are both exotic plants that occur in vernal pools, tend to produce heavy thatch and eventually create organic loads upon decomposition, which reduce dissolved oxygen in the water upon decomposition (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

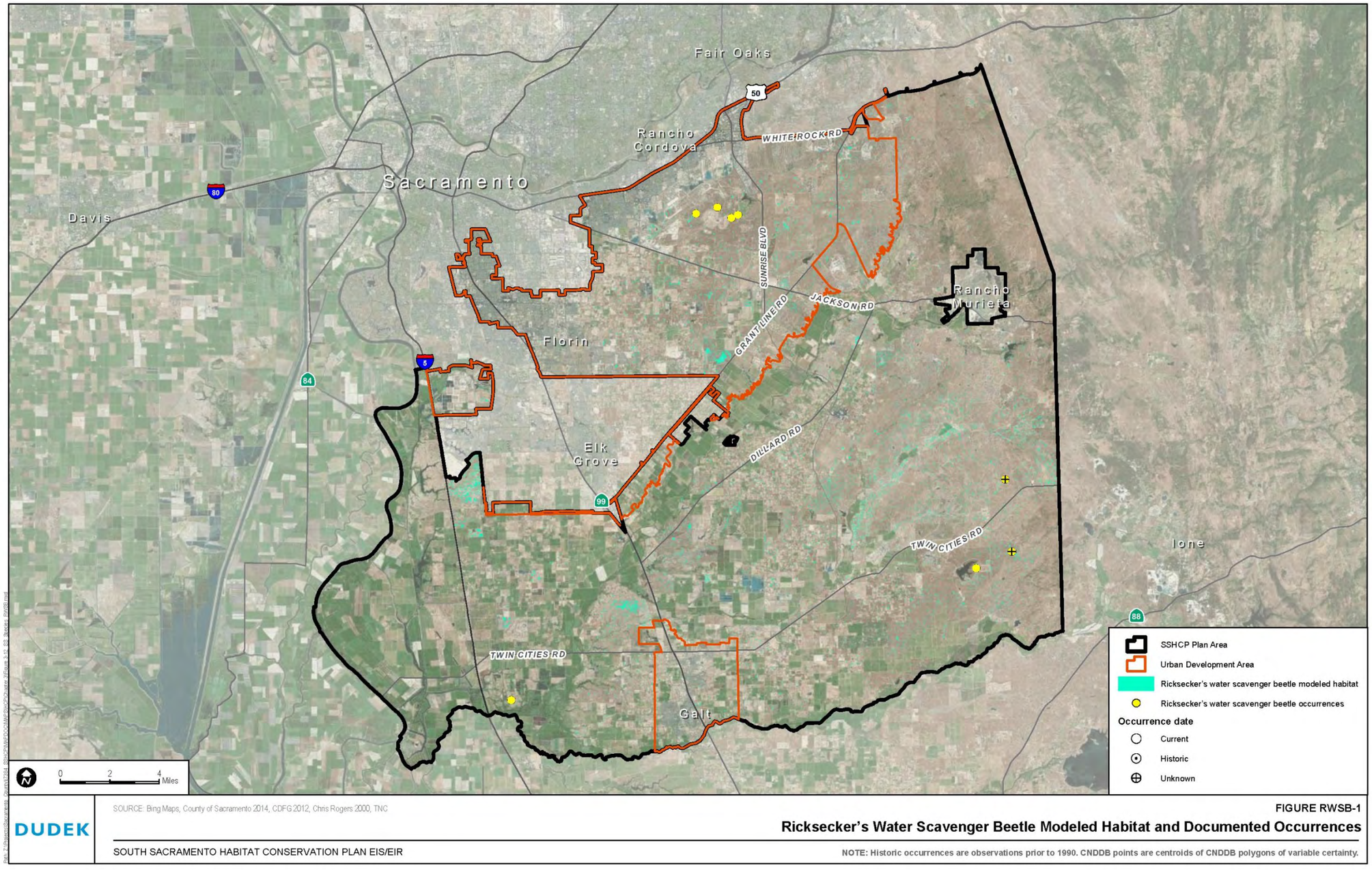
Additional threats to the vernal pool invertebrate community structure includes: off-road vehicle use of vernal pool habitat for recreational 'mud-bogging'; conversion of vernal pools into deep stock tanks that do not dry during the summer; and draining of vernal pools.

RWSB Data Gaps and Conservation Implications

Restoration and creation of vernal pool habitat has been demonstrated to be feasible (Rogers 1998). Specific habitat parameters for this and other vernal pool invertebrate species are still poorly understood.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the Planning Area. It is not feasible economically or temporally to survey the entire Planning Area.

Figure RWSB-1 Ricksecker's Water Scavenger Beetle Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and the importance of seasonality and intensity of grazing and other disturbances in vernal pool ecosystems. Furthermore, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

RWSB Literature Cited

Archangelsky, M. 1997. Studies on the Biology, Ecology, and Systematics of the Immature Stages of New World Hydrophiloidea (Coleoptera: Staphyliniformia). *Bulletin of the Ohio Biological Survey* 12(1) 1-207. ISBN 0-86727-126-4.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. Verh. Internat. *Verein. Limnol*. 23:1107-1113.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's heartland*. University of California Press, Berkeley.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Plague, G.R. 1996. Examination of the feeding behavior of larval *Tropisternus* (Coleoptera: Hydrophilidae). *Journal of the Kansas Entomological Society*, 69:104-107.

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

Serpa, Larry, The Nature Conservancy.

Smetana, A. 1980. Revision of the genus *Hydrochara* Berth. (Coleoptera: Hydrophilidae). Memoirs of the Entomological Society of Canada, No. 111.

Witham, Carol, Ecologist.

VERNAL POOL TADPOLE SHRIMP (VPTS)

Vernal Pool Tadpole Shrimp (VPTS)

(Lepidurus packardi)

Status USFWS: Endangered

Status CDFW: None



VPTS Listing Status

The vernal pool tadpole shrimp (*Lepidurus packardi*) was federally listed as endangered on 19 September 1994 (56 CFR 48136).

VPTS Life History and Ecology

VPTS Species Description and Life History

The vernal pool tadpole shrimp is a typical member of the genus *Lepidurus*. Like some other tadpole shrimp species, this species appears to be unisexual (Rogers 2001).

The vernal pool tadpole shrimp was considered a subspecies of the Eurasian *Lepidurus apus* by Longhurst (1955). Lynch (1972) commented that the vernal pool tadpole shrimp was separate from *L. apus*, but did not provide a quantitative analysis. Rogers quantitatively reinstated the vernal pool tadpole shrimp as a separate species in 2001.

The vernal pool tadpole shrimp is separated from most other nearctic *Lepidurus* species by having the nuchal organ (a large tubercle behind the eyes) intersected by a line drawn between the posterior apices of eyes, and 24 to 29 body rings and 30 to 35 pairs of legs. The caudal lamina is truncate, 0.3 to 0.1 times the length of carapace. Mature specimens have the sulcus spines triangular, as long as broad, separated by at least twice their width, with numerous small spines of varying shapes, sometimes in double rows, separating the larger spines. Smaller specimens have large acute spines, 1.2 to 1.5 times as long as broad. Old specimens may have the largest sulcus spines rounded. The endites three, four and five of the second thoracic appendages project beyond the carapace margin. The adult length is 15 to 86 millimeters from anterior margin of carapace to tip of caudal lamina.

Lepidurus cryptus Rogers 2001 is inseparable morphologically from the vernal pool tadpole shrimp. This species had been previously confused with The vernal pool tadpole shrimp (Linder 1952; Lynch 1972). Analysis of 12S rDNA and allozyme data, performed by King and Hanner (1998), demonstrates that it is genetically distinct from the vernal pool tadpole shrimp (Rogers 2001).

The vernal pool tadpole shrimp may vary in coloration depending upon habitat, although it is most commonly green. In highly turbid water, this species may be nearly translucent to buff colored with brown mottles. In slightly turbid to clear water it may range from light green to dark green, dark green mottled with brown, chocolate brown, brown with green mottles, and black. The vernal pool tadpole shrimp can on occasion reach very large sizes. One specimen from Stanislaus County measured 86 millimeters from the anterior carapace margin to the apex of the caudal lamina (Rogers 2001).

Notostracans like the vernal pool tadpole shrimp are a component of the zooplanktonic community within episodic, ephemeral aquatic habitats; although the larger they grow the more time they spend at or near the bottom (Rogers pers. obs.). Tadpole shrimp are omnivorous, with a strong preference for animal matter, and will capture and consume live invertebrates, amphibian larvae, or carrion (Longhurst 1955). Vernal pool tadpole shrimp will also filter detritus for micrometazoa (Rogers pers. obs.).

During the dry phase of their habitat, Notostracans survive as diapausing cysts (resting eggs) in and on the substrate (Sars 1896, 1898; Eriksen and Belk 1999; Rogers and Fugate 2001). When the habitat inundates from seasonal rainfall, some of the cysts hatch, and the nauplii (early larval form of crustacea) swim into the upper water column (Eriksen and Belk 1999). These early instars are typically indistinguishable between species. The maturation rates of vernal pool crustaceans vary extensively depending upon temperature (Eriksen and Belk 1999; Rogers 2002), and the vernal pool tadpole shrimp can reach maturity in 19 days (Rogers pers. obs.). Vernal pool tadpole shrimps may persist as adults right up to the point when the pool dries.

Contrary to Ahl (1991), each individual is capable of producing viable cysts without sexual reproduction (Longhurst 1955; Rogers 2001). Populations are probably made up of either parthenogenic females, amphigenic females (females with lobes of testicular tissue on the ovaries) or both (Bernard 1889; Longhurst 1954; Sassaman 1991, 1995; Maeda-Martinez, et al., 2000; Rogers 2001). The cysts are produced by the ovaries into a marsupium on the 11th thoracopods, made from a modification of the subapical lobe, which holds the cysts, and the exopodite, which forms the “lid” of the marsupium (Fryer 1988). The female typically sheds her cysts as the shell forms over the fertilized oocyte (Murugan et al. 1996) and the cysts fall to the substrate.

The cysts lay dormant in the substrate until the pool dries and re-inundates during the subsequent rains. Beyond inundation of the habitat, the specific cues for hatching are unknown

although temperature (Hall 1959; Belk 1977; Al-Tikrity and Grainger 1990; Belk and Nelson 1995; Eriksen and Belk 1999) and conductivity (for example: Anderson 1958; Bowen et al. 1988; Broch 1969, 1988; Brown and Carpelan 1971; Brown 1972) are believed to play a large role. The vernal pool tadpole shrimp is typically univoltine (i.e., one generation per year), however animals of different ages may be present if a pool partially inundates allowing some cysts to hatch, and then later increases in volume, hydrating cysts that were further up-slope (Rogers pers. obs.).

Planktonic crustacea are important in the food web, as they represent a high fat, high protein resource for migratory waterfowl. Mallard, Green-winged Teal, Bufflehead, Greater Yellowlegs, and Killdeer all forage actively in Central Valley vernal pools on the invertebrate and amphibian fauna during the winter months (Proctor 1964; Horne1966; Mellors, 1975; Silveira 1996; Dumont and Negrea 2002).

Predator consumption of cysts aids in distributing populations of vernal pool crustaceans. Predators (e.g., birds, amphibians) expel viable cysts in their excrement, often at locations other than where they were consumed (Proctor 1964; Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts are also transported by wind, and in mud carried on the feet of animals, including livestock that may wade through the habitat (Rogers in prep). This type of dispersal aids ephemeral pool crustaceans to exploit a wide variety of ephemeral habitats (Rogers 2000).

Vernal pool tadpole shrimp are an intermediate host for the metacercariae of an echinostome fluke (Ahl 1991) which also infects co-occurring gastropods. The parasitic fluke castrates the vernal pool tadpole shrimp. This fluke is most likely a bird parasite.

No specific bacterial, viral or protozoan diseases have been reported for the vernal pool tadpole shrimp. Occasionally, specimens with black markings or lesions will appear in collections. These black markings, sometimes referred to as “black disease,” are actually evidence of the normal immune response of all crustacea to any bacteria, where any foreign bacteria is infused with melanin to lethal levels (Bang 1983). Branchiopod crustaceans are commonly found with phoretic ciliate protozoan colonies around the mouth and posterioventral portions of the head, which are abandoned with the exuvia by the crustacean with each molt.

Vernal pool tadpole shrimp commonly co-occur with fairy shrimp such as *Linderiella occidentalis* (Dodds 1923), *Branchinecta conservatio* Eng, Belk, and Eriksen 1990, *B. lindahli* Packard 1883, *B. coloradensis* Packard 1874, and vernal pool fairy shrimp (*B. lynchi* Eng, Belk, and Eriksen 1990). The mid-valley fairy shrimp (*B. mesovallensis* Belk and Fugate 2001) and *B. longiantenna* Eng, Belk, and Eriksen 1990 both occur within the range of the vernal pool tadpole shrimp, but are typically found in different habitats (Rogers pers. obs.).

VPTS Habitat Requirements and Ecology

This species is entirely dependent upon the aquatic environment provided by vernal pool wetland ecosystems. The Vernal pool tadpole shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetland characteristics are dependent upon intact sub-watersheds, and the surrounding uplands that support those watersheds. Vernal pool habitat is a component of the larger grassland ecosystem of the California Great Central Valley.

The Vernal pool tadpole shrimp needs the cold winter waters to hatch and develop, typically appearing after the first frosts, and the dry summers to dry the resting cysts and prevent them from being attacked by fungi. Habitats supporting the Vernal pool tadpole shrimp are typically in Central Valley California floristic provinces below 300 m elevation. Typical habitat for Vernal pool tadpole shrimp in California include vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas and alkali flats (Eriksen and Belk 1999; Rogers 2001). Vernal pool tadpole shrimp have also been found in alkaline vernal pools. Vernal pools that support these shrimp may be grass or mud-bottomed with clear to tea-colored or highly turbid water, and are often in grassland depression pools (USFWS 1994; Rogers 2001).

Pool volume is important in determining potential shrimp habitat because deeper pools with a large surface area can more easily maintain their dissolved oxygen levels. Similarly, deeper pools will pond long enough to allow the shrimp to complete their life cycle. Vernal pool tadpole shrimp have been found in pools ranging from 0.1 to 80+ acres (USFWS 1994; Eriksen and Belk 1999; Rogers pers. obs.).

Various physiochemical factors have been examined in existing Vernal pool tadpole shrimp habitats including alkalinity, total dissolved solids (TDS), and pH (Collie and Lathrop 1976; Eriksen and Belk 1999). The U.S. Fish and Wildlife Service (1994) described the water in pools occupied by vernal pool tadpole shrimp as having low conductivity and chloride, however specific data were not provided. In addition, the importance of many of these parameters has recently been called into question with evidence that type and amount of dissolved salts may be a more important habitat requirement for vernal pool crustaceans (Rogers 2002). Considering the daily fluctuations in pH of a given habitat, this is to be expected. During the daylight hours, the hydrophytes are photosynthesizing, removing the CO_2 (from HCO_3) from the water, and raising the pH. During the night, the hydrophytes are respiring, increasing the CO_2 (and thereby the HCO_3) in the water lowering the pH. If there is rainfall, the distilled precipitation will lower the pH, as will winds that cause surface action. When the habitats are drying and losing volume through evaporation, the pH, alkalinity, TDS, and electrical conductivity will increase, just as they decrease when the pools inundate or reinundate (Rogers 2002).

Some vernal pools need a certain amount of grazing. Vernal pools that have all grazing removed become overgrown with native and exotic plants that generate deep thatch layers on the pool substrate, unless some other disturbance (i.e., weed control programs, vehicular use of pools, fire fuels control) prevents thatch deposition. As this thatch layer decomposes, it reduces the dissolved oxygen in the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Therefore, moderate grazing may be a necessary habitat suitability component. Conversely, excessive livestock grazing can be detrimental to vernal pool tadpole shrimp. Over-grazing tends to result in a large amount of manure in vernal pools. The decomposition of this organic waste removes oxygen from the water, leaving the gill-breathing invertebrates like the vernal pool tadpole shrimp without oxygen (Rogers 1998). It is important not to alter grazing regimes in conservation areas until the importance of grazing to those particular systems are assessed.

Common wetland plant species that co-occur with special-status shrimp species generally need the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of these shrimp to be present. These plants may include coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), goldfields (*Lasthenia* spp.), common spikerush (*Eleocharis macrostachya*), wooly-marbles (*Psilocarphus* spp.), hair grass (*Deschampsia* spp.), and aquatic buttercup (*Ranunculus aquatilis*).

Similarly, pools that are dominated by vernal pool plant species that require short inundation periods may have hydrology that cannot support shrimp species. These plants may include Mediterranean barley (*Hordeum marinum* ssp, *gussoneanum*), toad rush (*Juncus bufonius*), false dandelion (*Hypochoeris radicata*), and Italian rye grass (*Lolium multiflorum*).

Conversely, wetland habitats that support plant species that need water year round cannot support special-status shrimp species because the shrimp's cysts must dry out before they can hatch (Eriksen and Belk 1999), or if they remain wet or moist through the warmer summer months, the cysts will be attacked by fungi (Rogers pers. obs.). These plants include cattails (*Typha* spp.), willow (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), duckweed (*Lemna* spp.), nut grass (*Cyperus* spp.), Baltic rush (*Juncus balticus*), and bulrush (*Schenoplectus* spp.).

The vernal pool tadpole shrimp is a component of a larger invertebrate community structure (Rogers 1998). This invertebrate community includes mostly planktonic crustacea dependant upon temporary wetlands including copepods, cladocerans, and ostracodes, as well as flatworms, and a suite of insect species, including vernal pool haliplid beetle (*Apterliplus parvulus*), Scimitar backswimmers (*Buenoa scimitra*), Ricksecker's hydrochara (*Hydrochara rickseckeri*), and many others (Rogers 1998). These habitats are usually low in opportunistic species like mosquitoes and chironomid midges in the genus *Chironomus* (Rogers 1998).

Therefore, potential special-status shrimp habitat is defined as vernal pools and seasonal wetlands of sufficient size (depth and area) and seasonality that may also (but does not have to) support specific vegetation and invertebrate community structure that indicate the potential for ponding for a sufficient duration to allow special-status shrimp species to complete their life cycles and to maintain water temperatures conducive to development and reproduction.

Optimal vernal pool tadpole shrimp habitat tends to be neutral to slightly alkaline, clear vernal pools, low in dissolved salts, dominated with vernal pool plants, and sustains a complex vernal pool invertebrate community (Rogers pers. obs., 1998, 2001). Unfortunately, little effort has been made to accurately quantify these parameters.

VPTS Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Vernal pool tadpole shrimp are identified in Table G-3.13-1 and have been derived from the USFWS's list of primary constituent elements in the final rule designating critical habitat for the species (USFWS 2005) as well as input from local species experts.

Table G-3.13-1. Habitat Elements for Vernal Pool Tadpole Shrimp

Essential Activities	Land Cover Types	Habitat Elements
Entire life cycle	Vernal impoundment, vernal pool, and vernal swale.	Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction.

VPTS Species Distribution and Population Trends

There are six species of *Lepidurus* in North America (Rogers 2001) distributed throughout arctic Canada, Alaska, and Greenland and western portions of the United States and Mexico. The vernal pool tadpole shrimp is endemic to California (Rogers 2001).

Habitat occupied by tadpole shrimp tends to exist on level open ground. This geomorphic setting tends to be the most desirable for agricultural, urban or industrial development. As a result, the grassland plateaus and floor of the Great Central Valley has been broadly converted by human use. Consequently, an unknown amount of vernal pool habitat has been

lost, and an unknown number of vernal pool tadpole shrimp occurrences as well, although there have been attempts to calculate the lost acreages (Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California, more habitat for vernal pool tadpole shrimp will and is being encroached upon and impacted throughout the species range.

VPTS Range Wide Distribution

The vernal pool tadpole shrimp was originally described by Simon (1886) from "California," and the types were apparently lost (Rogers 2001). Linder (1952) reported the vernal pool tadpole shrimp from the California Central Valley one mile north of Davis, Yolo County, and from the California Great Basin. Longhurst (1955) synonymized both the vernal pool tadpole shrimp and *Lepidurus couesii* with the Eurasian *L. apus* (Linneaus) 1756. Lynch (1972) redescribed *L. couesii* and provided specific morphological characters for the genus *Lepidurus* in North America, emphasizing that both the vernal pool tadpole shrimp and *L. couesii* are taxa distinct from each other and from *L. apus.* Lynch deposited material at the U. S. National Museum of Natural History identified as the vernal pool tadpole shrimp from the Great Basin Regions of south central Oregon.

The USFWS gave the vernal pool tadpole shrimp protection as an endangered species in 1994 (59 FR 48153). It was reported at that time that the vernal pool tadpole shrimp was known only from 14 occurrences in the Central Valley of California, but did not mention the Linder or Lynch references or material, although the references were cited.

Helm (1998) reported *L. couesii* from the east side of the Cascade Mountains in Lassen County, California, and *Lepidurus* n. sp., the "Modoc Plateau Tadpole Shrimp" from two locations in Modoc County, California, citing King pers. comm. as his source for the shrimp's identification. King and Hanner (1998) performed 12S rDNA and allozyme analysis of *Lepidurus* populations throughout western North America, reporting a taxon they referred to as "*L. couesii*-1" from Klamath County, Oregon, and the east side of the Casacade Mountains in Shasta and Lassen counties, California. In addition, they mention Linder's Lassen County vernal pool tadpole shrimp material, but do not comment on its implications. King and Hanner concluded that *L. couesii* populations from Manitoba, Canada may represent a separate species from "*L. couesii*-1" in the Sierra Nevada, Cascade Mountains and Great Basin regions of northeastern California and south-central Oregon. Furthermore, King and Hanner stated: "Because our Oregon locality. seems to be the same as one of the sites from which Linder (1952) examined material (i.e., near Klamath Falls, OR) we suggest that the California/Oregon clade should retain the name *L. couesii*." However, Rogers (2001) demonstrated that the specimens from King and Hanner's "*L. couesii*-1" localities are morphologically distinct from the type specimens of *L. couesii* from Montana and thus their suggestion that the specific name *couesii* be applied to the taxon they

call "*L. couesii*-1"cannot be accepted. Furthermore, Rogers demonstrated that the *Lepidurus* that Linder and Lynch had identified as the vernal pool tadpole shrimp were actually an unrecognized cryptic species, which he described. This cryptic species *Lepidurus cryptus* Rogers 2001, is morphologically indistinguishable from the vernal pool tadpole shrimp, and hence the confusion. Rogers (2001) quantitatively established the vernal pool tadpole shrimp as endemic to the Central Valley of California.

VPTS Central Valley Distribution

In 1994, the USFWS reported that there were 14 known occurrences of the vernal pool tadpole shrimp ranging from the Vina Plains in Tehama County, through most of the length of the Sacramento Valley to Sacramento, and west to Solano County at the Jepson Prairie (59 FR 48153).

Since then, vernal pool tadpole shrimp have been reported from throughout Sacramento, Colusa and Glenn Counties, as well as Central Valley portions of Tehama County, Butte County, Sutter County, Yuba County, Placer County, Stanislaus County, Madera County, Fresno County and Tulare County on the east side of the valley (Eriksen and Belk 1999), and Alameda County, Solano County, Yolo County, Colusa County and Glenn County on the west side (Rogers 2001).

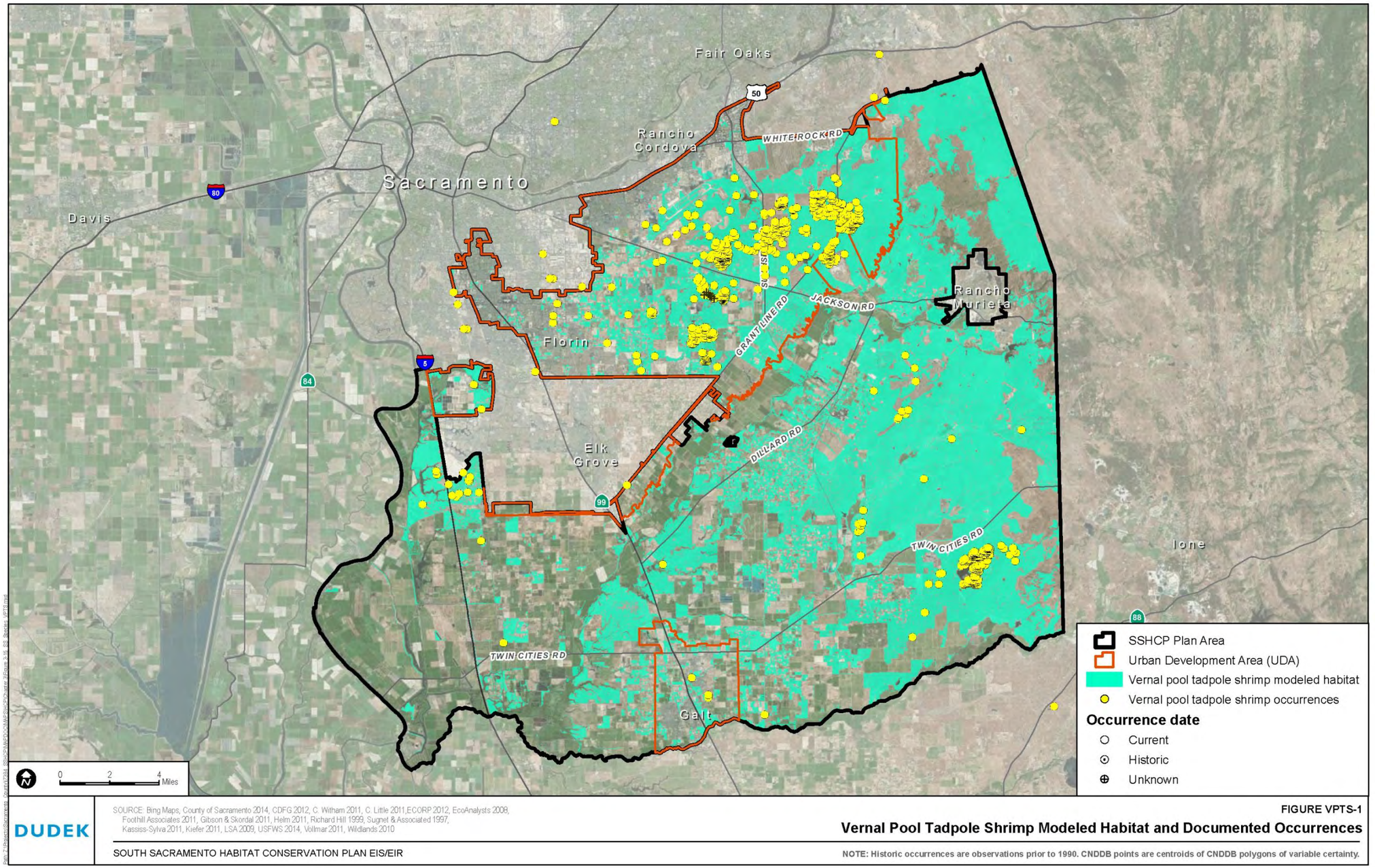
VPTS Distribution within the Planning Area

The vernal pool tadpole shrimp was first officially reported from the Planning Area in 1982 (CDFG 2010); however, specimens were collected from near Mather Air Force Base as early as 1967 by Dr. Clyde Eriksen (Eriksen, pers. comm.). Numerous surveys related to development projects have been conducted within and adjacent to the Planning Area (USFWS records; CDFG 2010), but the area has not been thoroughly surveyed for vernal pool tadpole shrimp, and the total extent of potential habitat is unknown. Figure VPTS-1 illustrates the known recorded occurrences of vernal pool tadpole shrimp within and adjacent to the Planning Area. The modeled habitat of the species in the Planning Area is discussed in Section G-4 of this Appendix.

VPTS Population Levels and Trends

An unknown amount of vernal pool habitat has been lost and with it an unknown number of vernal pool tadpole shrimp occurrences. Attempts have been made to calculate lost vernal pool acreages (for example: Holland 1978, 1988, 1998; Bauder and McMillan 1988). Due to current pressures of the increasing human populations in California and Oregon, more habitat for vernal pool tadpole shrimp will be and is being encroached upon and impacted throughout the species range.

Figure VPTS-1 Vernal Pool Tadpole Shrimp Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Adequate determination of remaining vernal pool tadpole shrimp occurrences throughout the animal's range as well as population trends is difficult. The USFWS (1994) listed 14 known occurrences of the vernal pool tadpole shrimp. These data were collected during a prolonged drought in California. Sugnet and Associates (1993) submitted a study claiming 345 'discrete locations' supporting the vernal pool tadpole shrimp, however as specific localities were not divulged, the data are unverifiable and therefore not scientifically useful in any type of analyses. Rogers (2001) presents a map and a list of 23 specific localities for the vernal pool tadpole shrimp represented.

The California Natural Diversity Data Base (CNDDB) vernal pool crustacean records (CDFG 2010) may be somewhat misleading, due to the inconsistency of the data presented. Some records refer to individual pools, while others refer to pool complexes, and others still refer to groups of complexes. Additionally, the CNDDB does is not updated when a particular site or population is extirpated. Because of issues such as these, it is difficult to determine what actually constitutes a "population" or "occurrence" in any attempt at impact analysis.

In addition, survey maps and records tend to show where vernal pool crustaceans are, and do not emphasize where they are not. Compounding these difficulties, records are typically a reflection of where surveys have been conducted, rather than a delineation of special-status shrimp distribution. Therefore, it is difficult to establish existing conditions for this species across the entire species range, as well as within the Planning Area. None of this is to say that vernal pool crustaceans are not threatened, endangered, or should not be protected. The issue is that where a paucity of adequate data exists, consistent data reporting would help prevent ambiguous interpretation or mischaracterization of species conservation needs.

VPTS Threats to the Species

As described previously, the greatest threat to vernal pool invertebrates is the elimination, loss, or modification of their habitat by development. The filling of vernal pools or modification of the watershed that supports those pools either eliminates the habitat or disrupts the pool ecosystem so that it is overcome by opportunistic invertebrate species and invasive, opportunistic and non-native plants, that outcompete the obligatory vernal pool species (Rogers 1998).

Excessive livestock grazing in vernal pool terrain can be detrimental to vernal pool invertebrate communities. Overgrazing tends to result in large amounts of manure in vernal pools. The decomposition of organic waste removes oxygen from the water, leaving gill-breathing invertebrates without oxygen (Rogers 1998, pers. obs,). Conversely, vernal pool grasslands are disturbance systems, and need a certain amount of grazing. Vernal pools that have all grazing removed may become overgrown with native (e.g., *Eleocharis* sp*., Eryngium* sp.) and exotic plants (e.g., *Glyceria* sp*. Lolium multiflorum*) that generate deep thatch layers on the pool

substrate. As this thatch layer decomposes, it also removes oxygen from the water, which can suffocate gill-breathing invertebrates (Rogers 1998). Both lack of and excessive grazing cause an increase in organic matter in the habitat that eliminates the natural vernal pool invertebrate community, and promotes opportunistic and invasive species, that outcompete the obligatory vernal pool species (Rogers 1998). Therefore, moderate grazing, or other disturbance may be a necessary habitat suitability component, and the removal of grazing or excessive grazing are threats to the vernal pool tadpole shrimp.

Damage to the watershed that supports vernal pools and vernal pool complexes will impact vernal pool invertebrate communities. Elimination of the watershed will not allow the pools to pond properly and will curtail the movement of nutrients into the pool from overland flow (Rogers 1998). Road run-off entering the watershed and conveyed to occupied habitat through the watershed may carry petroleum by-product residue or sediment from vehicles, paving, or road maintenance activities. Furthermore, pesticide, herbicide, fertilizer, and sediment run-off from agricultural activities may enter the watershed and be conveyed to occupied habitat, and may be injurious to vernal pool invertebrates. Ground disturbance from development activities may loosen soil that that may enter the watershed and be conveyed to occupied habitat as sediment.

Non-native invasive species are a threat to vernal pool invertebrate communities. There is concern that bullfrogs (*Rana catesbeiana*) may feed upon federally protected vernal pool crustaceans (Balfour and Morey 1999). Manna grass (*Glyceria declinata*) and Italian rye grass are both exotic plants that occur in vernal pools, tend to produce heavy thatch and eventually create organic loads upon decomposition, which reduce dissolved oxygen in the water (Rogers 1998). In addition, people may introduce the non-discriminating predatory mosquitofish (*Gambusia affinis*) into vernal pools to control perceived local mosquito problems (Rogers pers. obs.).

Habitat fragmentation is a threat to vernal pool invertebrates in that the development surrounding small pool complexes may prevent waterfowl or shorebirds from feeding at the pools, thereby preventing genetic flow between occupied habitats. Furthermore, small pool complexes surrounded by development will not be buffered against the run-off from developed areas, and concomitant changes in the watershed hydrology.

Additional threats to the vernal pool invertebrate community structure includes: off-road vehicle use of vernal pool habitat for recreational “mud-bogging;” conversion of vernal pools into deep stock tanks that do not dry during the summer; and draining of vernal pools.

VPTS Data Gaps and Conservation Implications

Restoration and creation of habitat for vernal pool tadpole shrimp has been demonstrated to be feasible (Rogers 1998). However, specific habitat parameters for this and other vernal pool

invertebrate species are still poorly understood. For example, there appears to be a need by this species to have a minimum pool volume and a minimum pool surface area within a given habitat to be occupied. Since this species has been found in a wide variety of natural and re-established or established vernal pool habitats, it is likely that it is in some respects an opportunist, as most temporary water fauna must be.

The primary data gap regarding conservation of vernal pool invertebrates is lack of distributional data for the species within and adjacent to the EIS/EIR Study Areas, because it is not feasible economically or temporally to survey the entire Chapters 4-16 Study Areas.

Other data gaps include the role of the surrounding uplands in vernal pool habitats, and importance of seasonality and intensity of grazing and other disturbances in vernal pool ecosystems. Furthermore, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve area vernal pools to assess their suitability and value as preservation habitats.

VPTS Literature Cited

Al-Tikrity, M.R. and J.N.R. Grainger. 1990. The effect of temperature and other factors on the hatching of the resting eggs of *Tanymastix stagnalis* (L.) (Crustacea, Anostraca). *Journal of Thermal Ecology*, 15(1): 87-90.

Amat, F., A. Gozalbo, J. C. Navarro, F. Hontoria, and I. Varó. 1991. Some aspects of *Artemia* biology affected by cestode parasitism. *Hydrobiologia* 212:39 – 44.

Balfour, P.S. and S.R. Morey. 1999. Prey selection by juvenile bullfrogs in a constructed vernal pool complex. *Transactions of the Western Section of the Wildlife Society*, 35:34-40.

Bang, F.B. 1983. Crustacean Disease Respnses. *In:* The Biology of the Crustacea, Vol. 6. Pathobiology. Edited by D. E. Bliss and A. J. Provenzano, Jr. Pp. 113-153. Academic Press, New York, New York.

Bauder, E.T. and S. McMillan. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 56-70 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Belk, D. 1977. Zoogeography of the Arizona fairy shrimps (Crustaca: Anostraca). *Arizona Academy of Science*, 12: 70-78.

Belk, D. and D.C. Rogers. 2002. A confusing trio of *Branchinecta* (Crustacea: Anostraca) from the western North America with a description of a new species. *Hydrobiologia*. 486:49–55.

Belk, D. and J. Brtek. 1995. Checklist of the Anostraca. *Hydrobiologia* 298:315-353.

Belk, D. and J. Brtek. 1997. Supplement to 'Checklist of the Anostraca'. *Hydrobiologia* 359:243-245.

Belk, D. and M.L. Fugate. 2000. Two new *Branchinecta* (Crustacea: Anostraca) from the southwestern United States. *The Southwestern Naturalist* 45(2):111-117.

Bowen, S. T., M. R. Buoncirstiani and J. R. Carl. 1988. *Artemia* habitats: ion concentratins tolerated by one superspecies. *Hydrobiologica*, 158: 201-214.

Broch, E.S. 1969. The osmotic adaptation of the fairy shrimp *Brachinecta campestris* Lynch to saline astatic waters. *Limnology and Oceanography*, 14: 485-492.

Broch, E.S. 1988. Osmoregulatory patterns of adaptation to inland astatic waters by two species of fairy shrimps, *Branchinecta gigas* Lynch and *Branchinecta mackini* Dexter. *Journal of Crustacean Biology*, 8: 383-391.

Brown, L.R. and L.H. Capelan. 1971. Egg hatching and life history of a fairy shrimp *Branchinecta mackini* Dexter (Crustacea: Anostraca) in a Mohave desert playa (Rabbit Dry Lake). *Ecology*, 52(1): 41-54.

Brown, R.J. 1972. A study of the mechanisms of osmotic and ionic regulation of the fairy shrimp, *Branchinecta mackini* (Crustacea, Branchiopoda). Ph. D. thesis. University of Toronto. Toronto, Canada. 215 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Center for Biological Diversity (CBD). 2001. Petition to list the mid-valley fairy shrimp as an endangered species under the Endangered Species Act with concurrent designation of critical habitat. Center for Biological Diversity, PO 40090, Berkeley, California 94704-4090.

Collie, N. and E.W. Lathrop. 1976. Chemical characteristics of the standing water of a vernal pool on the Santa Rosa Plateau, Riverside County, California. Pp. 27-31 *In:* S. Jain (ed.) Vernal Pools, their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis, California.

Cushing, C.E. 1988. Allochthonous detritus input to a small, cold desert spring-stream. Verh. Internat. *Verein. Limnology*, 23:1107-1113.

Dumont, H.J. and S. Negrea. 2002. *Introduction to the Class Branchiopoda*. Guides to the Microinvertebrates of the Continental Waters of the World. Backhuys, Leiden.

Eng, L., D. Belk, and C. Eriksen. 1990 Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.

Eriksen, C. and D. Belk. 1999. *Fairy shrimps of California's pools, puddles, and playas*. Mad River Press, Eureka, California.

Hall, R.E. 1959. The development of eggs of *Chirocephalus diaphanus* Prévost at a low temperature. *Hydrobiologia*, 13: 156-159.

Helm, B. 1998. Biogeography of eight large branchiopods endemic to California. Pp. 124-139 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Special Publication No. 4. Sacramento, California.

Holland, R.F. 1988. Vernal Pools. Pp 1012-1014 *In:* M. E. Barbour and J. Major, eds., Supplement to Terrestrial Vegetation of California (new expanded edition). California Native Plant Society Special Publication No. 9. Sacramento, California.

Holland, R.F. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pp. 71-75 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Horne, F.R. 1966. The effect of digestive enzymes on the hatchability of Artemia salina eggs. *Transactions of the American Microscopical Society*, 85(2): 271-274.

International Union of Conservation of Nature and Natural Resources. 2000. 2000 IUCN Red List of Threatened Species, compiled by Craig Hilton-Taylor. IUCN- The World Conservation Union Species Survival Commission.

Johnson, S., G. Haslam, and R. Dawson. 1993. *The Great Central Valley, California's heartland*. University of California Press, Berkeley.

Lilljeborg, W. 1889. Diagnosen zweier Phyllopoden-Arten aus Süd-Brasilien. Abhandlungen herausgegeben vom naturwissenschaftlichen Vereine zu Bremen, 10: 424.

Linder, F. 1941. Contributions to the morphology and the taxonomy of the Branchiopoda Anostraca. Zoologiska Bidrag fran Uppsala, 10: 101-302.

Linder, F. 1952. Contributions to the Morphology and Taxonomy of the Branchiopoda Notostraca, with Specific Reference to the North American Species. *Proceedings of the United States National Museum*. 102:1-69.

Lynch, J. 1972. *Lepidurus couesii* Packard (Notostraca) Redescription With a Discussion of Specific Characters in the Genus. *Crustaceana*. 23:43-49.

McLay, C.L. 1973. Wind-blown dust as a source of nutrients for aquatic plants. *Environmental Pollution*, 5:173-180.

Mellors, W.K. 1975. Selective Predation of ephippial *Daphnia* and the resisitance of ephippial eggs to digestion. *Ecology* 65:974-980.

Murugan, G., A. Maeda-Martinez, G. Criel, and H. Dumont. 1996. Unfertilized oocytes in Streptocephalids: resorbed or released? *Journal of Crustacean Biology*, 16(1):54–60.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. *Ecology*, 45(3):656-658.

Rogers, D.C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems − proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Rogers, D.C. 2000. *Eulimnadia texana* Packard 1871 (Conchostraca: Crustacea) from northern California: anthropogenic introduction? *Pan-Pacific Entomologist* 76(2):132-133.

Rogers, D.C. 2001. Revision of the Nearctic *Lepidurus* (Notostraca). *Journal of Crustacean Biology* 21: 991 – 1006.

Rogers, D.C. 2002a. Draft: Distribution and habitat parameter surveys B*ranchinecta mesovallensis* (Crustacea: Branchiopoda: Anostraca). Report to US Fish and Wildlife Service. Jones and Stokes Associates.

Rogers, D.C. 2002b. Amplexial morphology of selected Anostraca. *Hydrobiologia* 486:1-18.

Rogers, D.C. 2002c. Female based characters for anostracan (Crustacea:Branchiopoda) identification: a key for species in California and Oregon, USA. *Hydrobiologia* 486 125-132.

Rogers, D.C. and M. Fugate. 2001. *Branchinecta hiberna*, a new species of fairy shrimp (Crustacea: Anostraca) from western North America. *Western North American Naturalist* 61(1):11 – 18.

Rogers, D.C. *In prep*. Dispersal agents and speciation in the Branchiopoda (Crustacea).

Sars, G.O. 1896. On some West Australian Entomostraca raised form dried sand. *Archives for Mathematik og Naturvidenskab* 19(1):1-35. 4pls.

Sars, G.O. 1898. On some South-African Phyllopoda raised from dried mud. *Archives for Mathematik og Naturvidenskab* 20(4):1-43. 4pls.

Silveira, J. 1996. Avian uses of vernal pools and implications for conservation practice. Pp. 92-106 *In*: Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferrin Jr., and R. Orduff (eds.). Ecology, conservation, and management of vernal pool ecosystems – proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

United States Fish and Wildlife Service (USFWS). September 19, 1994. Federal Register Final Rule; determination of endangered status for the conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool tadpole shrimp; and threatened status for the vernal pool fairy shrimp.

Wissinger, S. A., A. J. Bohonak, H. H. Whiteman, and W. S. Brown. 1999. Habitat Permanence, salamander predation and invertebrate communities. *In:* Invertebrates in Freshwater Wetlands of North America: Ecology and Management, edited by D. P. Batzer, R. B. Bader, and S. A. Wissinger, John Wiley and Sons, Inc. New York.

CALIFORNIA TIGER SALAMANDER (CTS)

California Tiger Salamander (CTS)

(Ambystoma californiense)

Status USFWS: Threatened

Status CDFW: Threatened



CTS Listing Status

In August 2004, the United States Fish and Wildlife Service (USFWS) listed the California tiger salamander (*Ambystoma californiense)* as threatened range-wide, downgrading the status of the Santa Barbara and Sonoma Counties populations from endangered to threatened. To promote conservation efforts of the California Tiger Salamander (CTS), the USFWS also adopted a special rule under section 4(d) of the Federal Endangered Species Act (ESA) of 1973, which allows the Secretary of the Interior to issue a "special rule" tailored to meet the conservation needs of a particular threatened species (special rules cannot be issued for endangered species). Based on the 4d rule, "take" of the threatened CTS caused by existing routine ranching activities on private, State or tribal lands is exempt from the prohibitions of the ESA. The intent of the 4d rule is to allow landowners and ranchers to continue activities that are important for livestock operations, as those activities also maintain habitat for the CTS.

The CTS was listed as threatened under the California Endangered Species Act (CESA) on August 19, 2010.

CTS Life History and Ecology

CTS Species Description and Life History

Taxonomy

In 1853, Gray first described CTS as *Ambystoma californiense* based on specimens that he collected in Monterey, California (Grinnell and Camp 1917). Storer (1925) and Bishop (1943) also considered CTS to be a distinct species; however, Dunn (1940), Gehlbach (1967) and Frost (1985) believed CTS to be a subspecies of the more widespread eastern tiger salamander (*A. tigrinum*). Nonetheless, based on recent studies of the geographic distribution, phylogenetics, and ecological differences among the members of the *A. tigrinum* complex, the CTS has been

determined to represent a distinct species (Shaffer and Stanley 1991; Jones 1993; Shaffer et al. 1993; Shaffer and McKnight 1996; Irschick and Shaffer 1997; Petranka 1998). Furthermore, the range of this amphibian does not naturally overlap with any other species of tiger salamander (*Ambystoma* spp.) (Stebbins 1985; Petranka 1998).

Species Description

CTS is a large, stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 208 millimeters (8.2 inches), with males generally averaging 203 millimeters (8 inches) in total length, and females averaging 173 millimeters (6.8 inches) in total length. For both sexes, the average snout-to-vent length is approximately 91 millimeters (3.6 inches). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. Ventral coloration varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae, larger tails, and larger overall size (Stebbins 1962; Loredo and Van Vuren 1996).

Reproduction

Adult CTS breed in vernal pools and similar seasonal water bodies. The females lay their eggs in the water (Twitty 1941; Shaffer et al. 1993; Petranka 1998) in groups of two to four, on twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). In ponds with little or no vegetation, females may attach eggs to objects under the water, such as rocks and boards on the pool's bottom (Jennings and Hayes 1994). In the East San Francisco Bay Area (Bay Area), CTS may lay eggs twice, once in December and again in February (Bobzien 2003). After breeding, adults leave the pool and return to small mammal burrows in surrounding uplands (Loredo et al. 1996; Trenham 1998a), where they may continue to come out nightly for approximately the next two weeks to feed (Shaffer et al. 1993). In drought years, seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994).

The eggs hatch in 10 to 14 days with newly hatched CTS larvae ranging in size from 11.5 to 14.2 millimeters (0.5 to 0.6 inches) in total length (Petranka 1998). The larvae are aquatic, yellowish gray in color and have a broad fat head, large, feathery external gills, and broad dorsal fins that extend well onto the back. They feed on zooplankton, small crustaceans, and aquatic insects for approximately six weeks after hatching, after which time they begin foraging for larger prey (P. Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific treefrogs (*Pseudacris regilla*) and California red-legged frogs (*Rana draytonii*) (J. Anderson 1968). CTS larvae are among the top aquatic predators in seasonal pool ecosystems. Often resting on pool bottoms in shallow water, larvae also may be found at different layers in the

water column in deeper water. Young CTS are wary and commonly dart into vegetation on the bottom of pools when approached by potential predators (Storer 1925).

As most seasonal ponds and pools dry up during the summer, the larval stage of CTS usually lasts three to six months (Petranka 1998), although some larvae in Contra Costa and Alameda Counties may remain in their breeding sites over the summer (Shaffer and Trenham 2002). The absence of paedomorphism (mature adults that retain larval characteristics) in the species suggests that CTS are unable to express this life history trait, presumably because most of their evolutionary history has been spent in seasonal vernal pool habitats (Shaffer and Trenham 2002).

Before they can metamorphose (change into a different physical form) into the terrestrial stage, amphibian larvae must reach a critical minimum body size (Wilbur and Collins 1973). Larvae collected near Stockton in the Central Valley during the spring varied from 47 to 58 millimeters (1.9 to 2.3 inches) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch et al. 1988; Pechmann et al. 1989; Morey 1998; Trenham 1998b). Pechmann et al. (1989) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians. P. Anderson (1968) and Feaver (1971) determined that CTS larvae perish, if a site dries before they complete metamorphosis. In Madera County, Feaver (1971) found that only 11 of 30 pools sampled supported larval CTS, and five of these dried before metamorphosis could occur. Out of the original 30 pools, only six (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch et al. 1988; Scott 1994; Morey 1998).

Lifetime reproductive success for CTS and other tiger salamanders is low. Trenham et al. (2000) found the average female bred 1.4 times and produced 8.5 young that survived to metamorphosis per reproductive effort. This resulted in roughly 11 metamorphic offspring over the lifetime of a female. Preliminary data suggest that most individuals of CTS require two years to become sexually mature, but some individuals may be slower to mature (Shaffer et al. 1993). Some animals do not breed until they are four to six years old. While individuals may survive for more than 10 years, many breed only once, and in some populations, less than five percent of marked juveniles survive to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations can decline greatly from unusual, randomly occurring natural events as well as from human caused factors that reduce breeding success and individual survival. Furthermore, factors that repeatedly lower breeding success in isolated ponds that are

too far from other ponds for migrating individuals to replenish the population have the potential of quickly extirpating a population.

Diet and Foraging

Post-metamorphic juveniles and adults of CTS appear to be "sit-and-wait" predators similar to the closely related *Ambystoma tigrinum*, taking earthworms, snails, insects, fish, and even small mammals (Stebbins 1972). CTS larvae prey on vernal pool macroinvertebrates (Stebbins 1972), but also take other amphibian larvae once they attain sufficient size.

Dispersal and Migration

Movements made by CTS can be grouped into two main categories: (1) breeding migration, and (2) post-metamorphosis dispersal. Breeding migration is the movement of adult CTS between a breeding pond and the surrounding upland habitat during a reproductive cycle while post-metamorphosis dispersal involves recently metamorphosed individuals leaving their natal pond and moving into the surrounding upland habitat. CTS are also known to exhibit what has been termed interpond dispersal, but this is considered to be a breeding migration. Though not yet supported by empirical data, it is believed that dispersing post-metamorphs sometimes encounter other suitable breeding ponds during dispersal and then return to these other ponds upon maturing rather than return to their natal pond (Bumgardner pers. comm.). The benefits of such an evolutionary strategy are apparent when considering that seasonal wetlands appear and disappear over time as older pools fill and new pools are created. Following breeding, adult CTS return to upland habitats, where they may live for one or more years before breeding again (Trenham et al. 2000). Adult CTS have been observed up to 2,092 meters (1.3 miles) from breeding ponds (S. Sweet *in litt.* 1998), which may be vernal pools, stock ponds, or other seasonal or perennial water bodies. A recent trapping effort in Contra Costa County captured CTS 805 meters (2,641 feet) to 1,207 meters (3,960 feet) from the nearest breeding aquatic habitat (USFWS 2004b). Trenham et al. (2001) observed CTS moving up to 670 meters (2,200 feet) between breeding ponds in Monterey County. Similarly, in an experimental study, Trenham and Shaffer (2005) found that 95 percent of CTS resided within 640 meters (2,100 feet) of their breeding pond at Jepson Prairie in Solano County. Trenham et al. (2001) recommended that plans to maintain local populations of CTS should include pond(s) surrounded by at least 173-meter (567-feet) wide buffers of terrestrial habitat occupied by burrowing mammals. The distance between the upland and breeding sites is thought to depend on local topography and vegetation, and the distribution of California ground squirrel or other rodent burrows (Stebbins 1989). The rate of natural movement of salamanders among breeding sites depends on the distance between the ponds or complexes of ponds and on the quality of intervening habitat (e.g., salamanders may move more quickly through sparsely covered and open grassland than they can through densely vegetated lands) (Trenham 1998a).

After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. Upon reaching sexual maturity, most individuals return to their natal (birth) pond to breed, while others disperse to other ponds (Trenham et al. 2001). Some data suggest that juvenile CTS disperse further into upland habitats than adult CTS. A trapping study conducted in Solano County during winter 2002–03 found that juveniles used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More juvenile CTS were captured at distances of 100, 200, and 400 meters (300, 600, and 1,300 feet) respectively, from a breeding pond than at 50 meters (160 feet). Approximately 20 percent of the total captures were found 400 meters (1,300 feet) from a breeding pond. Fitting a distribution curve to the data revealed that 95 percent of juvenile CTS could be found within 640 meters (2,000 feet) of the pond, with the remaining five percent being found at even greater distances. In the same study, post-breeding movements away from breeding ponds by adults appear to be much shorter. During post-breeding emigration, radio-equipped adult CTS were tracked to burrows 19 to 248 meters (62 to 813 feet) from their breeding ponds (Trenham 2001). These reduced movements may be due to adult CTS having depleted physical reserves post-breeding, the drier weather conditions that are typical of the period when adults leave the ponds, or reduced reproductive/bioenergetic benefits from traveling further away from a breeding pond.

When studying interpond dispersal, documented dispersers moved no more than 670 meters (2,200 feet) from breeding sites in Monterey County, and based on a projected exponential relationship between dispersal probability and distance, less than one percent of dispersers were likely to move between ponds separated by 1,160 meters (0.70 miles) (Trenham et al. 2001). The frequency of dispersal among known extant occurrences or subpopulations ultimately depends on the distance between the ponds or complexes and on the intervening habitat (Trenham et al. 2001). Moreover, the distance between upland refugia and breeding sites depends on local topography and vegetation, and the distribution of California ground squirrel or other rodent burrows (Stebbins 1989). Unlike other ambystomatid salamanders, CTS and other tiger salamanders are grassland animals and do not favor forested areas as corridors for movement or long-term residence. Trenham (2001) found that radio-tracked adults favored grasslands with scattered large oaks over more densely wooded areas. Based on the Monterey County study, Trenham et al. (2001) recommends that plans to maintain local populations of CTS should include pond(s) surrounded by at least 173-meter (567-foot) wide buffers of terrestrial habitat occupied by fossorial (burrowing) mammals.

Survivorship

Individual CTS have been known to live more than 10 years (Stebbins 1951; Trenham et al. 2000) and at least one specimen was known to live beyond 20 years (USFWS 2004a). CTS eggs are susceptible to desiccation, and predation by fish, crayfish, and insect larva (Stebbins 1972; Zeiner et al. 1988). CTS larvae are preyed upon by native frogs, garter snakes, egrets, herons

(Zeiner et al. 1988) and the introduced bullfrog (*Rana catesbeiana*) (Anderson 1968). In addition, current research has suggested a negative correlation between larvae and the presence of predatory fishes including mosquitofish (*Gambusia affinis*) (USFWS 2004b). During their seasonal migration to ponds, adult CTS are preyed upon by raccoons (*Procyon lotor*) (USFWS 2004a). Adults are also highly susceptible to mortality from vehicle traffic if roads are constructed between their breeding and aestivation sites (Shaffer et al. 1993).

CTS Habitat Requirements and Ecology

Rangewide, suitable habitat for CTS includes vernal pools, and seasonal and perennial ponds, and surrounding upland areas in grassland, oak savannah, edges of mixed hardwood-conifer woodland and low elevation coniferous forest plant communities from sea level to about 1,067 meters (3,600 feet) (Stebbins 1989; Stebbins 2003; Shaffer et al. 1993; Jennings and Hayes 1994; Petranka 1998; CDFG 2010; Bobzien 2003; USFWS 2004a).

Wetland Habitat and Aquatic Ecology

Once fall or winter rains begin, adult CTS emerge from their upland refugia at night to feed and migrate to the breeding ponds (Stebbins 1985, 1989; Shaffer et al. 1993). Males migrate to the breeding ponds before females (Twitty 1941; Shaffer et al. 1993; Loredo and Van Vuren 1996; Trenham 1998b) and usually remain there for approximately six to eight weeks, while females stay for approximately one to two weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996; Trenham 1998b). Most marked salamanders have been recaptured at the pond where they were initially captured. In one study, approximately 80 percent were recaptured at the same pond over the course of three breeding seasons (Trenham 1998b). A CTS breeding site is defined as a location where CTS are able to successfully breed in years of normal rainfall and persist during the dry months of the year. Therefore, suitable habitat includes both suitable wetlands and surrounding uplands.

Historically, vernal pools and other natural seasonal ponds and surrounding uplands constituted primary breeding sites utilized by CTS (Storer 1925; Feaver 1971; Zeiner et al. 1988; Trenham et al. 2000). Vernal pools typically form in topographic depressions underlain by an impervious layer such as claypan, hardpan, or volcanic strata that prevents the downward percolation of water. Vernal pool hydrology is characterized by inundation of water during the late fall, winter, and spring, followed by complete desiccation during the summer dry season (Holland and Jain 1988). Vernal pools support a diverse and highly evolved biota that has adapted to the ever-changing water regime and benefits from the lack of predation by non-native fish. Twenty-nine other federally or State-listed species within the range of CTS are vernal pool specialists, including 24 plants, four crustaceans, and one insect (Keeler-Wolf et al. 1998). CTS, like listed vernal pool crustaceans, inhabit these seasonally inundated habitats. However, listed vernal

pool crustaceans require a relatively short period of inundation to complete their life cycle (USFWS 2004b). Therefore, many pools that support crustaceans may not hold water long enough to allow successful metamorphosis of CTS. In a study of amphibians located in eastern Merced County, CTS larvae were only observed in the largest vernal pools (Laabs et al. 2001). Unlike vernal pool crustaceans, CTS can breed and metamorphose in perennial ponds.

Stock ponds for cattle, sheep, horses, and other livestock have been, and continue to be, built to supply local water needs, especially in rural grazing lands in coastal and Sierra Nevada foothill areas (Bennett 1970) and in the absence of historical breeding ponds, have become important aquatic habitats for the CTS throughout its range (USFWS 2004a). These created water bodies have become especially important to CTS breeding success in the Bay Area and Coast Range regions where vernal pool complexes have been largely extirpated (Stebbins 1985; Zeiner et al. 1988; Shaffer et al. 1993; CDFG 2004). Of the 155 CTS locality records in the East Bay Area (Alameda and Contra Costa Counties) where the wetland type was identified, 85 percent (131 sites) were located in stock ponds (CDFG 2004). However, management of these water bodies ultimately determines their suitability as CTS breeding habitat (USFWS 2004a). As is true of natural vernal pools, the inundation period of stock ponds can be insufficient in allowing larvae to metamorphose (e.g., when early drawdown of irrigation ponds occurs). Conversely, in contrast to natural vernal pools, stock ponds may be perennial in nature and support predatory fish and bullfrogs, known predators of CTS (Shaffer et al. 1993; Seymour and Westphal 1994). In addition, inappropriate management of ponds can threaten CTS rangewide by increasing sedimentation of breeding ponds and impacts from stock animals (Hamilton and Jepson 1940; Prunuske 1987). In addition, stock ponds may be geographically isolated from other seasonal wetlands occupied by CTS, and newly created ponds may be located beyond the maximum dispersal distances of juvenile or adult salamanders. However, it is possible that during this species' lifetime, individuals from sub-populations could migrate between aquatic and upland habitats, colonizing newly created and geographically isolated ponds provided the intervening habitat could be successfully traversed by dispersing CTS (USFWS 2004a).

Upland Habitat and Terrestrial Ecology

The upland component of CTS habitat typically consists of grassland or oak savannah (Shaffer et al. 1993; USFWS 2004a); however, in Santa Barbara and eastern Contra Costa Counties, some CTS breeding ponds occur in grasslands within scrub or chaparral habitats (Shaffer et al. 1993; USFWS 2004a). CTS typically utilize burrows in open grassland or under isolated oaks, and less commonly in woodlands (Shaffer et al. 1993). CTS cannot dig their own burrows and depend on fossorial mammals such as California ground aquirrel (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Seymour and Westphal 1994; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a) for upland wintering sites.

A key component of CTS habitat, upland wintering sites are where subadult and adult CTS spend the dry summer and fall months of the year aestivating (a state of dormancy or inactivity in response to hot, dry weather). During this time, CTS eat very little (Shaffer et al. 1993). In Sonoma County, occurrence of CTS is significantly associated with occurrence of gophers (USFWS 2004b). The utilization of ground squirrel and gopher burrows by CTS suggests a commensal relationship between these species (Loredo et al. 1996); therefore, active fossorial rodent populations are likely required to sustain CTS as inactive burrow systems become progressively more unsuitable over time. Loredo et al. (1996) found that California Ground Squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, fossorial mammals. CTS use both occupied and unoccupied burrows and movement within and between burrow systems continues for at least several months after CTS return from the breeding ponds (Trenham 2001; Shaffer and Trenham 2004).

Metamorphosed juveniles leave their natal ponds in the late spring or early summer. Before the ponds dry completely, these individuals settle in small mammal burrows, to which they return at the end of nightly movements (Zeiner et al. 1988; Shaffer et al. 1993; Loredo et al. 1996). Similar to the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925; Shaffer et al. 1993) before settling in their selected upland sites for the dry, hot summer months. While most CTS rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during dispersal or migration (Lorendo et al. 1996).

Habitat Elements

Habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The habitat elements for CTS are identified in Table G-3.14-1 and have been derived from the USFWS's list of primary constituent elements identified in the Designation of Critical Habitat for the CTS, Central Population: Final Rule (USFWS 2005) as well as input from local species experts.

Table G-3.14-1. Habitat Elements for California Tiger Salamander

Essential Activities	Land Cover Types	Habitat Elements
Breeding and larval development	Vernal impoundment, vernal pool, and seasonal impoundment.	Provide suitable wetlands (i.e., wetlands must be inundated with winter rain for a minimum of 12 weeks in a year of average rainfall). Seasonal wetlands are preferred, but permanent man-made ponds may be used so long as predatory fish are absent.
Foraging, dispersal, migration, and summer Inactivity	Blue oak savanna, blue oak woodland, and valley grassland.	Provide upland habitat suitable for dispersal, migration, and over-summering. Must also contain small mammal burrows or other underground habitat that CTS depend upon for food, shelter, and protection from the elements and predation.

CTS Species Distribution and Population Trends

CTS Range-wide Distribution

Genetic studies of the CTS suggest that levels of interchange among populations are very low, and that populations or groups of subpopulations (metapopulations) are genetically isolated from one another (Shaffer et al. 1993; Shaffer and Trenham 2002). Studies of mitochondrial DNA and allozymes (proteins) indicate that there are six populations of *A. californiense*, which are found in the following areas: (1) Santa Rosa area of Sonoma County; (2) Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties); (3) Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeast Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties); (4) southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings counties); (5) Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties); and (6) Santa Barbara County (Shaffer and Trenham 2002).

Along the Coast Ranges, the species occurs in the Santa Rosa area of Sonoma County, southern San Mateo County south to San Luis Obispo County, and the vicinity of northern Santa Barbara County (CDFG 2010). In the Central Valley and surrounding Sierra Nevada foothills and Coast Ranges, the species occurs from northern Yolo County (Dunn 1940) southward to northwestern Kern County and northern Tulare and Kings Counties (CDFG 2010). Other occurrences of CTS from Lake and Mono Counties outside the range of the CTS have been identified as non-native Tiger Salamanders (Shaffer et al. 1993). CTS at Grass Lake in Siskiyou County (Mullen and Stebbins 1978) have been identified as the northwestern tiger salamander (*A. t. melanostictum*) (USFWS 2004b). The USFWS notes several historical occurrences of individual CTS outside its current range. In the northeastern Sacramento Valley, there is a single occurrence located at the Gray Lodge Waterfowl Management Area in southern Butte County and northern Sutter County, and there is also a single occurrence located in Glenn County; both of these records are from the mid 1960s (CDFG 2010). There are two records from 1939 and another, from an unknown date, of CTS recorded from the edge of the range in southwestern San Luis Obispo County (CDFG 2010; Shaffer and Trenham 2002); however, it should be noted that these latter two records have recently been shown to be misidentified specimens (Hunt 2009). There is also a historic record of CTS from outside the species' range in Riverside County that was recorded in the late 1800's (CDFG 2010); however, subsequent surveys have not been able to verify the presence of CTS from this latter location (Stebbins 1989; Shaffer et al. 1993).

Although the area between Butte County and the Cosumnes River contains suitable vernal pools and has been surveyed extensively, the species has only been recorded along the southern edge of Sacramento County, south of the Cosumnes River and in northern Yolo

County (CDFG 2010). It is likely that the species is uncommon or absent in much of the southernmost San Joaquin Valley because of unsuitable habitat. This includes areas to the south of Los Banos in Merced County, and the foothills of the Sierra Nevada south of Visalia in Tulare County (Shaffer et al. 1993). The factors that restrict the CTS in the northern and southern extent of its range are not fully understood, but may include low rainfall in the southern San Joaquin Valley and a greater abundance of non-native predatory fish in the northern Sacramento Valley (Hayes 1977). Studies suggest that the present patchy distribution pattern was caused by a combination of the extreme anthropogenic changes in and around the Central Valley, and the restrictive breeding requirements of the species (Dahl 1990; Fisher and Shaffer 1996; Frayer et al. 1989; Holland 1978, 1998; Jones and Stokes 1987; Shaffer et al. 1993; Trenham et al. 2000). Because there are only a few historic collections of the species from the 1800's, and the majority of collections have occurred in the last 25 years (CDFG 2010) subsequent to significant changes in historic habitat-types (Shaffer et al. 1993), documentation of the historic distribution of the CTS does not exist. The USFWS based the analysis associated with listing on estimated current distribution and habitat availability and then assumed the available habitat was populated (USFWS 2004a).

CTS Distribution within Planning Area

The California Natural Diversity Database (CNNDB) has 22 occurrence records of CTS in Sacramento County (CDFG 2010). An additional four occurrences, not reported in the CNDDB, have been recorded at Gill Ranch (Gill Ranch Survey 2003). Figure CTS-1 shows the recorded occurrences of CTS within and adjacent to the Planning Area. Twenty-one occurrences of CTS are outside the Urban Development Area (UDA) within the Planning Area; all of which are located south of the Cosumnes River and east of Interstate 5. Although the eastern edge of the Sacramento Valley between Butte County and the Cosumnes River contains suitable vernal pools and associated upland, and has been surveyed extensively, the species has only been recorded in the southeastern-most portion of Sacramento County in this part of the valley (USFWS 2004a).

The distribution of CTS in the Planning Area includes suitable wetland habitats and the grasslands and blue oak savannah south of the Consumes River in the following watersheds: South of Cosumnes River-Badger Creek, North Fork Badger Creek, Middle Laguna, Upper Laguna, Willow Creek, Town of Wilton–Cosumnes River, Arkansas Creek–Cosumnes River, Liberty Cemetery–Dry Creek, Lower Laguna, Loch Lane–Dry Creek, Grizzley South–Cosumnes River and Hadselville Creek. CTS have not been recorded north of the Cosumnes River in the Planning Area. No occurrences have been documented in this latter area despite extensive surveys in very large areas with presumably suitable habitat (e.g., Mather, Sacramento Valley Conservancy Vernal Pool Prairie Preserve, Sunrise Douglas Area, Kiefer landfill, and East of Grant Line Road (CDFG 2010).

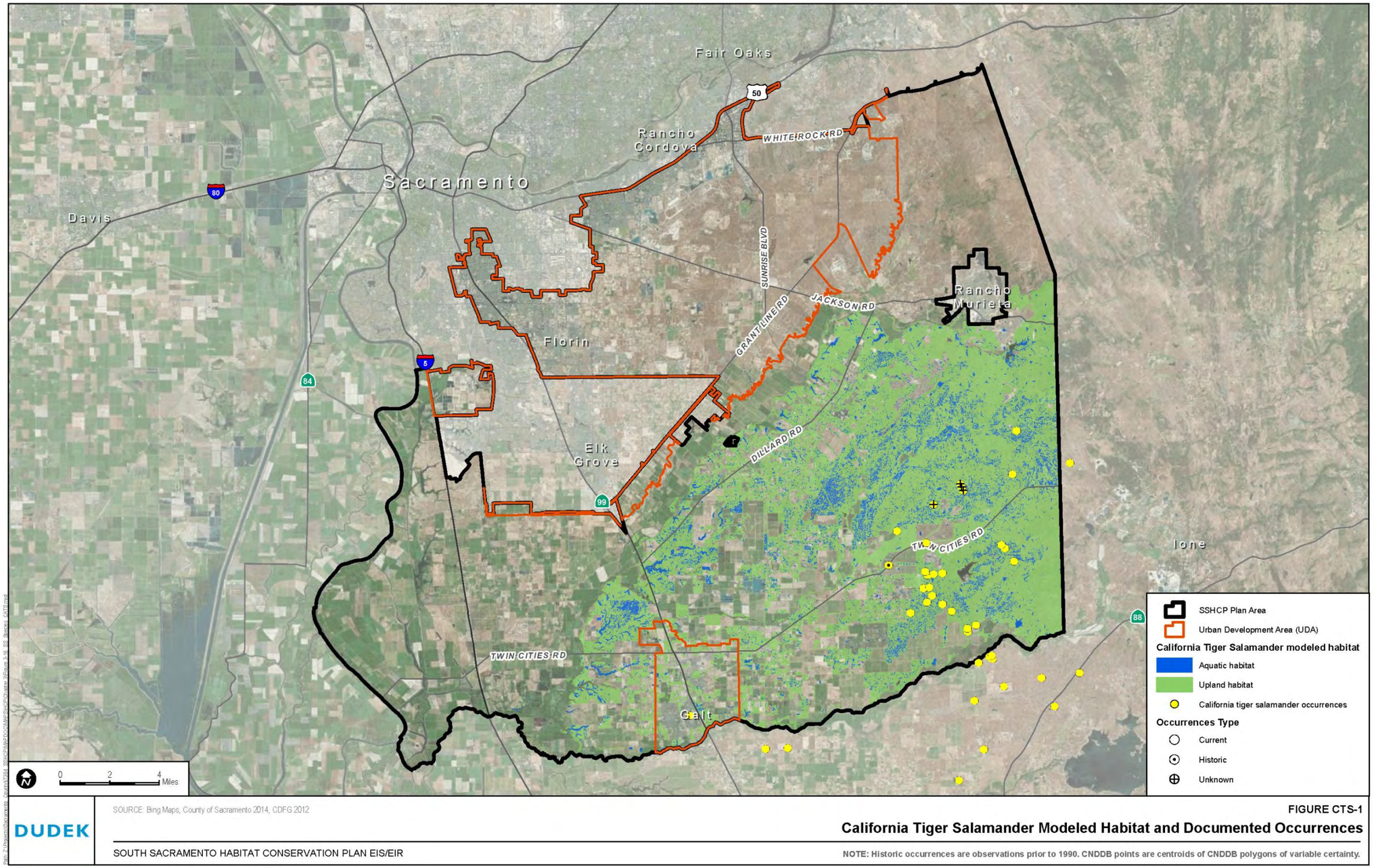
CTS Population Level and Trends

Population trends for CTS are difficult to assess due to limited data for the species. Data for the species is lacking for several reasons: 1) the species is difficult to detect; 2) CTS spend much of their life underground (Storer 1925; Feaver 1971; Shaffer et al. 1993); and 3) all individuals do not migrate to breeding pools each year (Trenham et al. 2000). Consequently, population estimates for the species are not possible and the USFWS primarily relies on measures of habitat availability as well as current and future habitat status as an indication of the status of the species.

The life history and ecology of CTS make it likely that it has a metapopulation structure (Hanski and Gilpin 1991). A metapopulation is a set of local populations or breeding sites within an area, where typically migration from one local population or breeding site to other areas containing suitable habitat is possible, but not routine. Movement between areas containing suitable habitat (i.e., dispersal) is restricted due to inhospitable conditions around and between areas of suitable habitat. Because many of the areas of suitable CTS habitat may be small, and support small numbers of CTS, local extinction of these small units may be common. A metapopulation's persistence depends on the combined dynamics of these local extinctions and the subsequent recolonization of these areas through dispersal (Hanski and Gilpin 1991, 1997; McCullough 1996; Hanski 1999).

Habitat loss has reduced the size and connectivity of patches of suitable and occupied CTS habitat (USFWS 2003, 2004b). Reduction in the extent and amount of suitable water bodies, grasslands, and other suitable upland habitats likely has eliminated connectivity among most of the known breeding sites, making recolonization of some sites more difficult following local extinction (USFWS 2003, 2004b). Furthermore, the reduction of habitat below a certain size threshold has the effect of reducing the quality of the remaining habitat by reducing the size of habitat boundaries, and making effects of other factors such as amount of food, availability of rodent burrows, pesticide use, mortality from vehicles, and predators more pronounced given the smaller area now exposed to such impacts (Semlitsch and Brodie 1998). Currently, there is not enough data to determine potential impact thresholds regarding CTS, whereby any further reduction in habitat quality or quantity would decrease survivorship or persistence (USFWS 2003, 2004a). Area of suitable habitat is likely dependent upon factors such as land-use adjacent to habitat boundaries (i.e., residential, industrial, community park), number of coterminous roads and number of vehicular trips on those roads, amount of pesticide use within the breeding pool watershed, or whether domestic animals or people have access to the site during periods when CTS are on the move and vulnerable. According to the USFWS (2003, 2004a), there is a size threshold for habitat below which the combination of various impacts will result in the loss of more CTS than the fragmented populations can produce and local extinction will occur.

Figure CTS-1 California Tiger Salamander Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

CTS Threats to the Species

Although certain factors are known to contribute to CTS decline range-wide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantified than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for CTS in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect California Tiger Salamander and other target species, the potential for success in conserving the species is reduced. The following is a summary of factors known or suspected to negatively affect CTS.

CTS Habitat Loss and Alteration

Destruction or modification of CTS habitat is caused by conversion of rangeland to a variety of urban and agricultural land uses. The USFWS (2004b) defines urban impacts as non-agricultural development activities such as building and maintenance of housing, commercial, and industrial developments; construction and widening of roads and highways; golf course construction and maintenance; landfill operation and expansion; operation of gravel mines and quarries; dam building and inundation of habitat by reservoirs; and other infrastructure activities that support urban areas. Agricultural impacts include the conversion of native habitat by disking and deep-ripping; and cultivation, planting, irrigation, and maintenance of row crops, orchards, and vineyards. These impacts threaten suitable breeding and upland habitat for CTS.

CTS Loss of Upland Habitat

Research suggests that even CTS using breeding ponds that are protected from development may not persist as viable populations if upland habitat is unavailable or reduced in the area, or if breeding ponds become fragmented and isolated from other breeding ponds (Marsh and Trenham 2001; Trenham and Shaffer 2005). Earthmoving operations and cultivation in upland habitat can directly or indirectly kill or injure CTS in burrows or on the surface by crushing or trapping them. Such activities render all affected areas unsuitable for CTS breeding, feeding, and sheltering. Earth disturbing practices can also expose CTS to adverse environmental conditions (increased predation, high temperatures, low humidity), destroy food sources, and alter surface hydrology (potentially affecting breeding ponds). Disking, deep-ripping, or grading of upland habitat also destroys California ground squirrel burrows and crevices utilized by CTS, making suitable subterranean refugia unavailable and likely reducing long-term adult survival of CTS (Loredo et al. 1996). Stebbins (2003) maintains that extensive control of California ground squirrels and Botta's pocket gophers is considered a serious threat to the species.

CTS Loss of Wetland Habitat

Filling, disking, or excavating wetland habitat can directly kill or injure CTS larvae, eggs, or breeding adults, and prevent future use of the wetland for reproduction. Additionally, surviving adults may be unable to locate alternative breeding sites in subsequent years if habitat is present, but has become highly fragmented by roads, housing, agriculture, and other non-habitat elements. Changes in vernal pool or pond inundation duration and depth caused by urban and agricultural land use (e.g., digging of drainage/irrigation ditches, construction of permanent ponds or reservoirs, deepening or terming of seasonal wetlands, and redirection of runoff from developments) can reduce reproductive success for CTS by: 1) prematurely drying wetlands and desiccating larvae; 2) extending the inundation period and facilitating invasion of non-native predators; 3) creating conditions that are more conducive for hybridization with non-native Tiger Salamanders; and 4) increasing vulnerability to disease by increasing isolation and fragmentation (USFWS 2004a).

CTS Rangewide Habitat Trends

Although the CTS still occurs throughout the majority of its historic range, the overall area of the species' natural habitat has been substantially reduced and the species has become increasingly rare (Shaffer et al. 1993; Barry and Shaffer 1994; Fisher and Shaffer 1996). Some researchers estimate that as much as 75 percent of CTS historic habitat has been lost (Shaffer et al. 1993). Historically, approximately 3.7 million hectares (9.1 million acres) of valley and coastal grasslands existed within the range of the Central Valley CTS population (Central CTS) (Kuchler 1988). An additional 2.6 million hectares (6.5 million acres) of blue oak/foothill pine, valley oak, or mixed hardwoods (Kuchler 1988) also existed, of which some portion was likely used by the species; however, urbanization and intensive agriculture have eliminated virtually all valley grassland and oak savanna habitat from the Central Valley floor. Loss of grasslands has exceeded the loss of all other habitats in California (Ewing et al. 1988) and it has been estimated that less than 10 percent of California's Central Valley grasslands remain (USFWS 2003). Consequently, valley grasslands and the Central CTS are now distributed primarily in a ring around the Central Valley (Heady 1977; Holland 1978).

The relative loss of habitat has also been significant with respect to vernal pool grasslands, the historic breeding habitat of the CTS (Trenham et al. 2000). Approximately 1.68 million hectares (4.15 million acres) of grasslands in 20 Central Valley counties are estimated to have supported vernal pools at the time of European settlement (Holland 1978, 1998; Holland and Jain 1988; CDFG 2010) although there is no historical data to substantiate this estimate. Most of this area, except the northern Sacramento Valley, was within the CTS assumed historic range (Shaffer et al. 1993). The remaining vernal pool complexes in California are now fragmented and significantly reduced in area (USFWS 2004b). Where vernal pools exist, the habitat is often

disturbed and degraded and the natural regime has been affected by drainage modification, off-road vehicle use, gravel mining, non-native plant invasion, road construction, and urban development (Jones and Stokes Associates 1987; USFWS 2004b; Keeler-Wolf et al. 1998). Vernal pools in California are now recognized as threatened resources, and many of the species that inhabit them are listed as threatened or endangered species (Jones and Stokes Associates 1987; Wright 1991; USFWS 2004b). Estimates of vernal pool habitat loss through the 1980s were at two to three percent annually and this rate is compounded continually (Holland 1988). During the 1980s and 1990s, vernal pool grasslands continued to be lost at an estimated rate of 1.5 percent per year (Holland 1998). As of 1997, 377,165 hectares (931,991 acres) of vernal pool grasslands remained in the Central Valley, representing a loss of approximately 78 percent (Holland 1998). Along the southeastern edge of the Central Valley, from San Joaquin to Fresno counties, at least 25 percent of the 259–hectare (640–acre) sections that had contained vernal pools in 1970 (Holland 1978) were wholly converted to agriculture or urban uses by 1994 (Seymour and Westphal 1994). This conversion estimate is probably conservative because it does not include partially converted sections where vernal pool habitat may also have been lost (Seymour and Westphal 1994). Holland (1998) estimated that at a continued 1.5 percent annual loss of vernal pools in California, 50 percent of the vernal pool habitat present in 1997 would be lost by 2043 (46 years), representing a cumulative loss of 88 percent of vernal pool grasslands.

As part of an evaluation of CTS status throughout its range, Shaffer et al. (1993) detected CTS in only 36 of 86 localities (42 percent) that had been previously recorded, and ponds currently occupied by CTS were significantly higher in elevation than those that were unoccupied or had been previously occupied; although it should be noted that these decreases may also be the result of low sampling frequency. Some researchers (Shaffer et al. 1993; Seymour and Westphal 1994; Fisher and Shaffer 1996; Davidson et al. 2002) believe these and other data suggest that many of the low-elevation breeding sites on the valley floor have been eliminated in recent years, restricting habitat used by this species to higher elevations on the margin of its ecological requirements. These higher elevation breeding sites are likely human-created stock ponds or bermed ponds that have benefited the species by offsetting the loss of CTS natural, historic vernal pool breeding habitat; however, these created breeding ponds have a shorter life span than natural vernal pools if not maintained. Additionally, some of these created breeding ponds can place CTS at risk of predation by holding water for a greater period than vernal pools.

Using information from 632 CTS records identified in the CNDDB, of which 589 records were considered extant by the CDFW, as well as 79 CTS breeding sites from Carnegie Off-Road Vehicular Park and the Los Vaqueros watershed, the USFWS (2004b) analyzed threats to the Central CTS throughout the remaining portions of its range in 20 counties. Their results suggested that there were approximately 378,882 hectares (936,204 acres) of Central CTS upland and aquatic habitat remaining in 2003 (USFWS 2004b). Of the 378,882 hectares (936,204 acres) of Central CTS habitat,

28,526 hectares (70,489 acres, 8 percent) fell within areas delineated by general plans or other planned development (high-density residential, medium-density residential, industrial, and commercial development) (USFWS 2004b). Because they are within areas that were to be developed, the USFWS considered these areas to be threatened by development. These development projects may destroy and fragment upland or aquatic breeding habitat and reduce the likelihood of long-term persistence and viability at the affected localities.

The USFWS determined that an additional 24,240 hectares (59,897 acres, 6 percent) of the estimated 378,882 hectares (936,204 acres) of Central CTS habitat is threatened by low-density residential development (2- to 20-acre parcels). Furthermore, 45,880 hectares (113,371 acres, 12 percent) of CTS habitat is threatened by very-low-density residential development (20- to 160-acre parcels) (USFWS 2004b). The land use data the USFWS used to evaluate the threat of low-density and very-low-density development is based on a minimum delineation of these areas in 2000 (USFWS 2004b). These areas will likely be further developed resulting in a greater number of houses per area in the future, and in some cases, low-density areas are regions that will become incorporated into high-density urban areas (USFWS 2004b).

Low-density residential development is a greater threat to the Central CTS than very-low-density residential development due to the greater number of houses per acre. These low-density housing developments may result in the extirpation of CTS at some locations due to the direct effects of construction that destroy breeding sites or indirect effects that alter hydrology and increase sedimentation. Structures, roads, and highways fragment habitat and prevent CTS from reaching their breeding sites by eliminating or disrupting their upland habitat or migratory corridors (Marsh and Trenham 2001). Reduced availability of upland habitat decreases the long-term population viability of CTS breeding sites (Trenham and Shaffer 2005). In the eastern United States, 25 percent of the upland habitat within 300 meters (984 feet) of a spotted salamander (*A. maculatum*) vernal pool breeding site was destroyed, resulting in a 53 percent decline in the abundance of the species at the site (Calhoun and Klemens 2002).

Low-density housing would also further fragment CTS habitats within the Sierra Nevada and Coast Range foothill counties, which are among the fastest growing counties in California (CGCDD 2003). These areas provide the last strongholds of remaining CTS (USFWS 2004b). CTS are known to have a high rate of interpond dispersal between breeding ponds, but only when the ponds are relatively close together (i.e., less than 670 meters [2,200 feet]) (Trenham et al. 2001). Therefore, the loss of breeding localities, or their isolation due to habitat fragmentation, may result in the extirpation of other breeding locations (Marsh and Trenham 2001). Furthermore, decreased landscape connectivity and increased habitat fragmentation has had negative effects on other amphibian assemblages including the eastern tiger salamander (*A. tigrinum*) (Lehtinen et al. 1999). Increased numbers of residents living in low-density residential developments and rural houses may also result in increased introduction of non-native

predators, increased applications of pesticides or agricultural contaminants, and rodent control that may reduce the long-term viability of CTS inhabiting these areas. The CTS may also be threatened by the construction of new roads or increased mortality due to increased vehicle traffic (USFWS 2004b).

Estimates of the location and amount of habitat threatened by conversion and fragmentation from urban uses described above does not consider all of the projected human population growth, urbanization, and subsequent habitat loss that will occur in the counties inhabited by the Central CTS because most city and county general plans have variable planning horizons that do not extend beyond 20 years (USFWS 2004b). California developers and builders constructed 2.8 million new housing units between 1980 and 1997, and an additional 220,000 units will be required each year for the next 20 years with the human population of the State almost doubling in less than 40 years (CGCDD 2003). New housing is currently being constructed in low-density developments on the edge of urban areas or beyond such areas (CGCDD 2003). Most of the future growth of California will be outside of the current metropolitan areas (San Francisco, Los Angeles, and San Diego), occurring in the Sacramento, San Joaquin, and Imperial valleys (CGCDD 2003). Two of these valleys are inhabited by CTS.

Rangeland areas contain vernal pool grassland are being lost as a result of rural residential development (CGCDD 2003). Privately owned rangeland in California decreased by 252,524 hectares (624,000 acres) from 1982 to 1997, an average loss of 16,997 hectares (42,000 acres) per year (USFWS 2004a), and from 1998 to 2000, the State lost an additional 21,555 hectares (53,263 acres) of rangeland (CGCDD 2003). The decline in farm rancher income, the aging of ranchers, tax implications of intergenerational transfers of ranches, and the difficulty of beginning a ranching operation (e.g., in terms of cost and knowledge of ranching) are all reasons California is experiencing the loss of rangeland (CGCDD 2003).

Projecting the future loss of Central CTS habitat from conversion of rangeland to intensive agriculture is difficult because conversion to this land use is largely unregulated by cities and counties. Conversion to intensive agriculture largely depends upon the individual landowner and is based on numerous factors that are difficult to predict, such as economic considerations, markets, and water availability. The loss of rangelands and vernal pool grasslands has been well documented in counties within the range of the Central CTS and annual rates of loss have been estimated (CDC 1994, 1998, 2000; Holland 1978, 1998, 2003; Jones and Stokes Associates 1987; Keeler-Wolf et al. 1998; CDFG 2003; CDWR 1998). The cumulative loss of vernal pool grassland was estimated at 78 percent by the late 1990s, and annual rates of loss have been between 1 and 3 percent during the 1980s and 1990s. Some of the loss of Central CTS habitat has resulted from conversion to intensive agriculture, and some is attributable to urbanization and other non-agricultural activities. The USFWS (2004b) believes that the continued loss of Central CTS habitat due to intensive agriculture represents an important threat to the species.

The USFWS anticipates that this conversion of land use will continue to adversely affect CTS if human population growth continues to increase as projected (75 percent increase from 2000 to 2040) in the range of the Central CTS (CDF 1998). If these projections are correct, this population growth will continue to spur the conversion of irrigated agriculture conversion to urban use, and the subsequent displacement of intensive agriculture on to rangeland in the foothill areas of the Central Coast or east side of the San Joaquin Valley (CDWR 1998; CDC 2002). However, the rate of displacement and subsequent conversion to intensive agriculture is expected to continue at lower rates than in the past as areas with suitable soils and water availability necessary for intensive agriculture become increasingly scarce. Additionally, there can be a financial incentive for landowners to convert existing rangeland and grasslands areas to irrigated crops, as rangeland is generally valued much less per acre than irrigated agricultural (ASFMRA 2003). Conversion of Central CTS habitat to intensive agriculture, in addition to the loss of habitat to rural residential housing, further fragments CTS habitat. Fragmentation of habitat may not only be directly impacting breeding sites, but may also be creating barriers to interpond dispersal and seasonal movements between breeding sites and upland refugia (Marsh and Trenham 2001; Trenham and Shaffer 2005; Calhoun and Klemens 2002).

CTS Urban and Population Growth

As the human population of the State of California continues to increase, there is a concomitant increase in urban and suburban development. According to the 2000 census, the number of people in California has increased by 13.8 percent since 1990 (CDF 2002). The average growth in human population within the counties in the range of the Central CTS during this period has been 19.5 percent (CDF 1998). Counties in the East Bay Area region and State Highway 99 corridor in the San Joaquin Valley are also undergoing increases in urbanization related to population growth (CDF 1998, 2002). From 1995 to 2020, the human population in the Central Valley, Bay Area, and Central Coast counties is projected to grow by 49 percent (from 12.8 million to 19.1 million people) (CDWR 1998). According to the California Department of Finance (CDF), the human population in the counties inhabited by the Central CTS is expected to grow by 75 percent from 2000 to 2040 (from 11.2 million to 19.6 million people) (CDF 1998). Therefore, impacts to the CTS due to conversion of its habitat resulting from urban development are expected to continue (USFWS 2004b).

CTS Disease, Parasitism and Non-Native Species

The specific effects of disease on the CTS are not known and there is presently no information indicating disease is prevalent in existing populations in California (USFWS 2004a). Chytrid Fungus infections (chytridiomycosis) have been detected specifically in Central CTS and pathogens (fungi, bacteria, and viruses) have been known to adversely affect other amphibians including other tiger salamander species (USFWS 2004b). Ranaviruses are another potential

threat to CTS because they have been found to adversely affect other amphibians including other Tiger Salamander species, and it is carried by non-native species that occur within the range of CTS, including bullfrogs and non-native tiger salamander species. Nowhere are pathogens indicated as an imminent threat.

Bullfrogs prey on CTS (Anderson 1968; Lawler et al. 1999), which has resulted in an overall pattern of the decline in areas where bullfrogs and other exotic species are present (Fisher and Shaffer 1996). The bullfrog, native to North America east of the Great Plains, was introduced into California in the late1800s and early-1900s, and has rapidly spread throughout the State (Storer 1925; Hayes and Jennings 1986). Morey and Guinn (1992) documented a shift in amphibian community composition at a vernal pool complex, with CTS becoming proportionally less abundant as bullfrogs increased in number. Bullfrogs are unable to establish permanent breeding populations in unaltered vernal pools and seasonal ponds because they require more than one year to complete their aquatic larval stage. Dispersing immature bullfrogs take up residence in such water bodies during the winter and spring where they prey on native amphibians, including larval CTS (Laabs et al. 2001; Morey and Guinn 1992; Seymour and Westphal 1994).

Bullfrogs are known to travel at least 2.6 kilometers (1.6 miles) between ponds (Bury and Whelan 1984), and have the potential to naturally colonize new areas where they do not currently exist, including areas where Central CTS occur. In one study of the eastern San Joaquin Valley, 22 of 23 ponds (96 percent) with CTS were within the bullfrogs' potential dispersal range (Seymour and Westphal 1994). In addition, because bullfrogs are still sought within California for sport and as food, and may be taken without limit under a fishing license (USFWS 2004b), the threat of transport for intentional establishment in new habitat already occupied by CTS is significant.

Western mosquitofish (*Gambusia affinis*), first introduced in California in 1922, are native to central North America (watersheds tributary to the Gulf of Mexico) and have been introduced throughout the world for mosquito control. The species occurs throughout California wherever the water does not get too cold for extended periods and they are still widely planted throughout the State (Boyce 1994; Moyle 2002) by about 50 local mosquito abatement districts. Mosquitofish are ubiquitous because of their tolerance of poor water quality and wide temperature ranges (Boyce 1994). Larval CTS may be especially vulnerable to mosquitofish predation due to their fluttering external gills, which may attract these visual predators (Graf and Allen-Diaz 1993). Loredo-Prendeville et al. (1994) found no CTS inhabiting ponds containing mosquitofish. Leyse and Lawler et al. (2000) found that the survival of CTS in experimental ponds stocked with mosquitofish, at densities similar to those found in many stock ponds, was significantly reduced. Larvae that survived in ponds with mosquitofish were smaller, took longer to reach metamorphosis, and had injuries such as shortened tails. However, a recent experiment that replicated conditions in vernal pool environments and permanent ponds

determined that, at low densities, mosquitofish did not have a significant effect on larval CTS growth and survival, but that growth and size at metamorphosis was significantly reduced at high fish densities (USFWS 2004b).

Other non-native fish have either been directly implicated in predation of CTS or appear to have the potential to prey upon them (Fisher and Shaffer 1996; Shaffer et al. 1993). For example, introductions of sunfish species (e.g., largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), catfish (*Ictalurus* spp.), and fathead minnows (*Pimephales promelas*) are believed to have eliminated CTS from several breeding sites in Santa Barbara County (USFWS 2000). In eastern Merced County, CTS were absent in stock ponds where non-native fish were present, whereas stock ponds absent of non-native fish had CTS present (Laabs et al. 2001). Non-native sunfish, catfish, and bullheads (*Ameiurus* spp.) have been, and still are, widely planted in ponds in California to provide for sportfishing. By 1984, the California fish fauna included about 50 such transplanted and exotic species, mostly of eastern North American origin (Hayes and Jennings 1986). The alien species have been introduced for a variety of reasons including ornamental, sport, bait, insect control and food uses. Thus, the USFWS considers introductions of such nonnative fish species into Central CTS breeding habitat a threat to the persistence of the species in these locations (USFWS 2004a).

CTS Other Natural or Manmade Factors Affecting California Tiger Salamander Continued Existence

Several other factors may threaten CTS including exposure to various contaminants, rodent population control efforts, chemical mosquito control, direct mortality while crossing roads, hybridization with non-native tiger salamanders, and certain practices associated with livestock grazing.

Contaminants

Little research has been done on the effects of contaminants to the CTS, especially with respect to agricultural pesticides. Most toxicological studies to date have been conducted on other amphibian species, specifically anuran species (frogs and toads). Although not specifically on CTS, these latter studies provide insight to the potential risks of contaminants to the CTS. Like most amphibians, CTS inhabit both aquatic and terrestrial habitats during different stages of their life cycle and may be exposed to a variety of pesticides and other chemicals throughout their range. Due to their permeable skin, amphibians may be particularly vulnerable to environmental stressors such as pesticides (Blaustein and Wake 1990). It is important to note that toxicants do not have to be present at lethal levels to be harmful. Toxicants at sub-lethal levels may still cause adverse effects such as developmental abnormalities in larvae and behavioral anomalies in adults (Hall and Henry 1992; Blaustein and Johnson 2003). Sources of

chemical pollution which may adversely affect CTS include pesticides used in agricultural, landscaping, roadside maintenance, and rodent and vector control activities, as well as hydrocarbons and other pollutants that enter stormwater runoff from residential areas and industrial facilities (USFWS 2004a).

Rodent Control

As CTS spend the majority of their lives aestivating underground, typically in ground squirrel, pocket gopher, and other burrowing mammal burrows (Loredo et al. 1996; Trenham 1998a), widespread burrowing mammal control likely poses a significant threat to CTS. Beginning in the early 1900's (Marsh 1987), burrowing mammal control methods have included trapping, shooting, fumigation of burrows, use of toxic (e.g., anticoagulant) baits, and deep ripping of burrow areas (USFWS 2004a). Burrowing mammal control programs are widely conducted (frequently via bait stations placed at specific sites) on and around various commercial agricultural operations, including grazing/range lands, various row crop areas, and vineyards (Thompson *in litt*. 1998). In addition, flood control agencies and levee districts, routinely conduct extensive California Ground Squirrel control programs around levees, canals, and other facilities under their management (USFWS 2004b). Pocket gopher control is common around golf courses, residential homes, and gardens. Two of the most commonly used rodenticides, chlorophacinone and diphacinone, are anticoagulants that cause animals to bleed to death. These chemicals can be absorbed through the skin and are considered toxic to fish and wildlife (USFWS 2004a). These latter two chemicals, along with strychnine, are used to control rodents (Thompson *in litt.* 1998). Although the effects of these poisons on CTS have not been assessed, any use in close proximity to occupied Central CTS habitat may have various direct and indirect toxic effects. Gases, including aluminum phosphide, carbon monoxide, and methyl bromide, are used in rodent fumigation operations and are introduced into burrows by either using cartridges or by pumping. When such fumigants are used, most or all animals inhabiting the fumigated burrow are non-selectively killed (Salmon and Schmidt 1984).

In addition to possible direct adverse effects of rodent control chemicals and gasses, California ground squirrel and Botta's pocket gopher control operations may also indirectly affect CTS by reducing the number of upland burrows available to them (Loredo-Prendeville et al. 1994). Because the burrow density required by CTS is unknown, the impacts of less than total burrow loss are also unknown. It is currently thought that active California Ground Squirrel colonies are probably needed to sustain CTS because inactive burrow systems become progressively unsuitable over time (USFWS 2004a). For example, Loredo et al. (1996) found that burrow systems usually collapsed within 18 months following cessation of California ground squirrel use and that CTS did not utilize collapsed burrows.

Mosquito Control

In addition to the use of western mosquitofish, a common chemical method of mosquito control in California involves the use of methoprene, an insect hormone mimic that increases the level of juvenile hormone in insect larvae and disrupts the molting process. Lawrenz (1984, 1985) found that methoprene (Altosoid SR–10) retarded the development of selected crustacea that had the same molting hormones (i.e., juvenile hormone) as insects, and anticipated that the same hormone may control metamorphosis in other arthropods. Because the success of many aquatic vertebrates relies on an abundance of invertebrates in temporary wetlands, any delay in insect growth could reduce the numbers and density of available prey (Lawrenz 1984, 1985). Therefore, the use of methoprene could have an indirect adverse effect on CTS by reducing the availability of prey.

Road-Crossing Mortality

Although no systematic studies of road mortality of the CTS have been conducted, traffic related mortality on CTS is well documented (Hansen and Tremper 1993; USFWS 2004a). For example, during one 15-day period in 2001 at a Sonoma County location, 26 road-killed CTS were found (USFWS 2004a). Loss of CTS to vehicular-caused mortality in the vicinity of breeding sites can range from 25 to 72 percent of the observed CTS crossing roads (Twitty 1941; Launer and Fee 1996). Additionally, mortality is likely exacerbated by associated roadway curbs and berms as low as 9 to 12 centimeters (3 to 5 inches) that allow CTS access to roadways, but prevent their exit (Launer and Fee 1996; S. Sweet *in litt.* 1998).

Vehicular usage on California roads is increasing proportional to human population growth and urban expansion. During November 2002, California's estimated total vehicular travel on State highway system roads alone was 23 billion kilometers (14.27 billion miles) (Caltrans 2003). From 1972 to 2001, the State highway system total vehicular usage rose steadily from 108.6 billion to 270 billion kilometers (67.1 to 167.8 billion miles) annually. For the California counties in which the Central CTS may occur, State highway system total annual vehicular usage in 1999, 2000, and 2001 was 86.0, 90.0, and 92.1 billion kilometers (53.3, 55.9, and 57.2 billion miles) respectively. Moreover, in those areas of the State where the Central CTS occurs, road densities from past urbanization are already high. Overall, these areas have 5,860.2 kilometers (3,641.5 miles) of roads (and rail tracks) of all types. The range of current road (and rail) density is from 1.01 kilometer per 100 hectares (0.25 mile per 100 acres) in the southern San Joaquin Valley, to 1.64 kilometers per 100 hectares (0.41 mile per 100 acres) in the Bay Area counties. The USFWS (2004a) believes that these high road-use and road-density values and subsequent associated road-kill mortality are a threat to the species, a threat that will continue growing in concert with the State's rapid growth of human population and urbanization.

Hybridization

Hybridization has been defined by Rhymer and Simberloff (1996) as ‘‘interbreeding of individuals from what are believed to be genetically distinct populations, regardless of taxonomic status.’’ Hybridization between species may lead to introgression, which occurs when hybrid individuals repeatedly backcross to one or both parental types so that genetic material is transferred between the two species. Natural hybridization can be an important component of evolutionary processes; however, hybridization and introgression can be cause for concern, particularly if they are the result of human activities such as the introduction of non-native taxa. In the extreme, hybridization between native and non-native taxa can lead to loss of the native taxon through ‘‘genetic assimilation’’ (Rhymer and Simberloff 1996; Allendorf et al. 2001). Hybridization has been implicated in the extinction of populations and species of many animal and plant taxa (Rhymer and Simberloff 1996; Allendorf et al. 2001), including Tecopa pupfish (*Cyprinodon nevadensis calidae*), Amistad gambusia (*Gambusia amistadensis*), and longjaw cisco (*Coregonus alpenae*) (Rhymer and Simberloff 1996).

Of particular concern is the threat of genetic contamination and assimilation of CTS by non--native barred tiger salamanders (*A. mavortium*), which were introduced into central California as bass bait in the mid-1900s (Riley et al. 2003). Riley et al. (2003) studied hybridization between these two species relative to habitat-types commonly used by the species and identified diagnostic genetic markers from mtDNA and nuclear DNA. They found clear evidence that the two species are interbreeding in the wild and producing viable and fertile hybrid offspring. Furthermore, they determined that the extent of genetic mixing depends on the breeding habitat, with non-hybrid CTS more likely to occur in natural habitats than in created or disturbed wetlands. Vernal pools contained significantly fewer larvae with hybrid genotypes and significantly more non-hybrid parental genotypes than expected. Fitzpatrick and Shaffer (2004) further analyzed the frequencies of hybrid genotypes in breeding habitats, focusing on natural vernal pools, ephemeral man-made cattle pools and perennial man-made ponds. They found that perennial ponds contained a high percentage of non-native alleles (alternative forms of a gene). They suggested that this may be because *A. mavortium* has 1) a more flexible breeding phenology than CTS and can therefore take advantage of perennial ponds by breeding earlier in the fall, and 2) exhibits facultative paedomorphosis (i.e., retention of larval characteristics as an adult). These two characteristics of *A. mavortium* may increase the relative ability of non-native alleles to persist in perennial ponds. Riley et al. (2003) and Fitzpatrick and Shaffer (2004) show that the extent of hybridization between *A. mavortium* and CTS may depend on the breeding habitat used (i.e., created and highly modified habitats may facilitate hybridization) and that, in at least some circumstances (e.g., where there are perennial ponds), non-native genes may be more likely to persist than native genes.

CTS hybridization has been found to varying degrees in the Central Coast, Bay Area, and Central Valley portions of the CTS range (Shaffer and Trenham 2002; H.B. Shaffer *in litt.* 2003; USFWS 2004a). Of particular concern is the widespread hybridization within the Central Coast population where introduced genes have been found from southern Santa Clara County throughout most of Monterey County down to Fort Hunter Liggett on the San Luis Obispo County line, and east across all of San Benito County (H.B. Shaffer *in litt.* 2003). Within this region, virtually all Monterey County populations of the CTS have been compromised by non-native genes, and every population of the CTS at Fort Hunter Liggett is either introduced or a hybrid mixture (H.B. Shaffer *in litt.* 2003).

Using Geographic Information System (GIS), the USFWS estimated the number of Central CTS records (presumably CTS without non-native genes present) that were threatened by hybridization (USFWS 2004b). A CTS record was considered threatened by hybridization if the record was within 2.1 kilometers (1.3 miles) of a hybridized or non-native tiger salamander observation. Dr. H. Bradley Shaffer of University of California at Davis provided locations of hybridized or non-native tiger salamander locations. Other records also were considered threatened if they were part of a larger polygon that consisted of multiple records located within 2.1 kilometers (1.3 miles) of a hybridized or non-native Tiger Salamander observation. The USFWS's assumptions were that if a non-native or hybridized tiger salamander was within 2.1 kilometers (1.3 miles) (based on the maximum observed migration distance of a tiger salamander, Sweet *in litt.* 1998) of a CTS record, then the non-native or hybridized tiger salamander would be able to migrate to the native CTS breeding site and breed with the individuals at that location. Additionally, if the non-native or hybrid was located within 2.1 kilometers (1.3 miles) of a polygon consisting of multiple records, then there would be sufficient intervening breeding habitat located within the polygon to allow for the nonnative or hybrid tiger salamanders to migrate to and breed with the CTS records within the polygon (USFWS 2004b).

Using this analysis, the USFWS determined that 48 records (22 percent) in the Bay Area region, 56 records (78 percent) in the Central Coast region, and 27 records (8 percent) in the Central Valley region were threatened by hybridization because of their close proximity to non-native and hybridized tiger salamanders (USFWS 2004b). Non-native tiger salamanders are not known to occur within the range of the CTS in Sonoma County. In Santa Barbara County, nonnative tiger salamanders are known from the Lompoc Federal Penitentiary. The closest known CTS breeding pond is approximately 12.9 kilometers (8 miles) from the Penitentiary.

Livestock Grazing

Rangeland, suitably managed for livestock (cattle, sheep, and horses), is generally thought to be compatible in many cases with CTS habitat requirements (Shaffer et al. 1993; Loredo et al.

1996; USFWS 2004a). By maintaining shorter vegetation, grazing may make areas more suitable for California Ground Squirrels whose burrows are essential to CTS survival. The long-term effects of ranching on the species is thought to have been either neutral or beneficial where burrowing rodents were not completely eradicated, because the CTS would have likely been extirpated from many areas if stock ponds had not been built and maintained for livestock production (USFWS 2004b).

CTS Data Gaps and Conservation Implications

In recent years, the ecology, status, and management of CTS have received increased attention; however, there are several sources of uncertainty regarding CTS and its requirements in the Planning Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

CTS Population and Habitat Distribution within the Planning Area

CTS occur in suitable habitat within the Planning Area; however, the species' overall distribution, abundance, and population structure are incompletely known. Land cover-types used by CTS, such as vernal impoundment, vernal pool, and seasonal impoundment, and adjacent uplands (blue oak woodland, blue oak savanna, and valley grassland), occur throughout Sacramento County. Nonetheless, almost all records of CTS are from the southeastern portion of the area.

Though comprehensive surveys for CTS have been conducted in much of the Planning Area, the population size and distribution of the species throughout the Planning Area are still incompletely known. In addition, though the distribution of different habitat-types is mapped and quantifiable, the quality of habitat (particularly as it relates to certain essential habitat components) for CTS within many areas is unknown. These information gaps limit our ability to identify the best lands available for preserving CTS habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for CTS will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, have multiple breeding sites that may function as a metapopulation, or are adjacent to these areas.

CTS Determining Threat Severity

Certain factors are known to contribute to CTS decline rangewide; however, exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., habitat fragmentation, changes in hydroperiod

of potential breeding sites, etc.). Therefore, to improve conservation planning efforts for CTS in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for California Tiger Salamander

Achieving the conservation goals and objectives for CTS will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability for CTS. Whether created, restored or enhanced habitats can retain the functional attributes suitable for CTS is unknown.

If habitat creation, restoration and enhancement techniques cannot eventually result in habitats with functional characteristics suitable for CTS, then those lands would not support sustainable populations.

CTS Literature Cited

Allendorf, F.W., R.F. Leary, P. Spruell and J.K. Wenburg. 2001. The problem with hybrids: setting conservation guidelines. *Trends in ecology and Evolution,* 16(11):613-622.

American Society of Farm Managers and Rural Appraisers (ASFMRA). 2003. Trends in Agricultural Land & Lease Values. Pp. 1-29.

Anderson, J.D. 1968. Comparison of the food habits of *Ambystoma macrodactylum sigillatum, Ambystoma macrodactylum croceum*, and *Ambystoma tigrinum californiense. Herpetologica,* 24(4): 273-284.

Anderson, P.R. 1968. The reproductive and developmental history of the California tiger salamander. Master's thesis, Department of Biology, Fresno State College, Fresno, California. 82pp.

Barry, S.J. and H.B. Shaffer. 1994. The status of the California tiger salamander (*Ambystoma californiense*) at Lagunita: A 50-year update. *Journal of Herpetology,* 28(2): 159-164.

Bennett, G.W. 1970. *Management of lakes and ponds*. Second Edition. Van Nostrand Reinhold Company, New York.

Bishop, S.C. 1943. *Handbook of Salamanders: the Salamanders of the United States, of Canada, and of Lower California*. Comstock Publishing Co., Inc. Ithaca, New York. pp. 119-123.

Blaustein, A.R. and D.B. Wake. 1990. Declining amphibian populations: a glocal phenomenon? *Trends in Ecology and Evolution*, 5(7): 203-204.

Blaustein, A.R. and Johnson, T.J. 2003. Explaining frog deformities. An eight-year investigation into the cause of a shocking increase in deformed amphibians has sorted out the roles of three prime suspects. *Scientific American*. 4 pp.

Bobzien, S. 2003. East Bay Regional Park District Comments to the USFWS for the listing of the Central California Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*). Proposed Rule.

Boyce, K. 1994. Beneficials: mosquitofish. Sacramento County/Yolo County Mosquito and Vector Control District. 2.

Bumgardner, Michael. 2010.

Bury, R.B and J.A. Whelan. 1984. Ecology and Management of the Bullfrog. Fish and Wildlife Service/Resource Publication 155.

Calhoun, A., and M.W. Klemens. 2002. Best development practices (BDPs) for conserving pool breeding amphibians in residential and commercial developments (MCA Tech. Paper 5).

California Department of Conservation (CDC). 1994. Farmland conversion report 1990 to 1992. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Conservation (CDC). 1998. Farmland conversion report 1994 to 1996. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Conservation (CDC). 2000. Farmland conversion report 1998 to 2000. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Conservation (CDC). 2002. Farmland conversion report 2000 to 2002. Prepared by Farmland Mapping and Monitoring Program. Sacramento, California.

California Department of Finance (CDF). 2002. Demographic Research Unit. E-6 County Population Estimates and Detailed Components of Change, July 1, 2000. Historical 1999 Estimates and Census 2000 Counts. California Agriculture and Natural Resources Publication 7438, January 2002.

California Department of Finance (CDF). 1998. County Population Projections with Age, Sex and Race/Ethnic Detail, July 1990 – 2040 in 10-year Increments.

California Department of Fish and Game (CDFG). 2003. Atlas of the Biodiversity of California. Sacramento, California. 121 pp.

California Department of Fish and Game (CDFG). 2004. Evaluation of Petition: Request of the Center for Biological Diversity et al. (2004) to list the California tiger salamander (*Ambystoma californiense*) as endangered. Sacramento, California. 81 pp.

California Department of Fish and Game (CDFG). 2005. State and Federally Listed Endangered and Threatened Animals of California. Sacramento, California. 11 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Transportation (Caltrans). 2000. Natural Environment Study and Biological Assessment. State Route 120, Oakdale Expressway Project. Technical Report: 10-STA-120 April 2000.

California Department of Transportation (Caltrans). 2003. California Department of Transportation's Internet website, January 2, 2003 Web site http://www.dot.ca.gov/.

California Department of Water Resources (CDWR). 1998. The California water plan update. DWR Bulletin 160-98.

City of Gilroy Community Development Department (CGCDD). 2003. Mesa Ridge Subdivision. Draft Environmental Impact Report. SCH# 20030120070.

Dahl, T.E. 1990. Wetland losses in the United States 1780's to 1980's. U.S. Dept. Interior, Fish and Wildlife Service, Washington, D.C. 21pp.

Davidson, C., H.B. Shaffer, and M.R. Jennings. 2002. Spatial tests of the pesticide drift, habitat destruction, UV-B and climate change hypotheses for California amphibian declines.

Dunn, E.R. 1940. The races of *Ambystoma tigrinum*. *Copeia,* 1940(3): 154-162.

Ewing, M.S., S.A. Ewing, and K.M. Kocan. 1988.*Ichthyophthirius* (Ciliophora): population studies suggest reproduction in host epithelium. *Journal of Protozoology*, 35:549-552.

Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense* Gray, Hyla regilla Baird and Girard and *Scaphiopus hammondi hammondi* Girard. Master's thesis, Department of Biology, Fresno State College, Fresno California. 58pp.

Fisher, R.N. and H.B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley. *Conservation Biology,* 10(5): 1387-1397.

Fitzpatrick, B.M. and H.B. Shaffer. 2004. Environment-dependent admixture dynamics in a tiger salamander hybrid zone. *Evolution,* 58(6):1282-1293.

Frayer, W. E., Peters, D. D., and Pywell, H. R. 1989. Wetlands of the California Central Valley:status and trends. United States Fish and Wildlife Service Portland, Oregon.

Frost, D.R., editor. 1985. Amphibian species of the world: a taxonomic and geographical reference. Allen Press, Inc. and Association of Systematics Collection, Lawrence, Kansas. pp. 553-558.

Gehlbach, F.R. 1967. *Ambystoma tigrinum*. Catalogue of American Amphibians and Reptiles 1:52.1-52.4.

Gill Ranch Survey. 2003. 135 Gill Ranch Survey, Sacramento County, Calfiornia.

Graf, M. and Allen-Diaz. 1993. Evaluation of mosquito abatement district's use of mosquitofish as biological mosquito control: case study - Sindicich Lagoon in Briones Regional Park. Unpublished manuscript. 22 pp.

Grinnell, J., and C.L. Camp. 1917. A distributional list of the amphibians and reptiles of California. *University of California Publications in Zoology,* 17(10): 131, 138.

Hall R.J. and P.F.P. Henry. 1992. Assessing effects of pesticides on amphibians and reptiles: status and needs. *Herpetological Journal,* 2:65-71.

Hamilton, C.L., and H.J. Jepson. 1940. Stock-water developments: wells, springs, and ponds. U.S. Department of Agriculture Farmers' Bulletin No. 1859.

Hansen, R.W., and R.L. Tremper. 1993. Amphibians and Reptiles of Central California. California Natural History Guides. University of California Press, Berkeley. 11 pp.

Hanski, I. 1999. Metapopulation Ecology. Oxford University Press, Oxford, England.

Hanski, I. and M. Gilpin. 1991. Metapopulation dynamics: brief history and conceptual domain. *Biological Journal of Linean Society,* 42: 3-16.

Hanski, I. and M. Gilpin. 1997. Metapopulation Dynamics. *Nature,* 396: 41 – 49.

Hayes and Jennings. 1986. Decline of ranid frog species in Western North America: Are bullfrogs responsible? *Journal of Herpetology,* 220(4):490-509.

Hayes, M.P. 1977. A Sacramento Valley record of the California tiger salamander (Ambystoma californiense) with comments on its distribution and ecology (Amphibia, Caudata, Ambystomatidae). Unpublished manuscript.

Heady, H.F. 1977. Valley Grassland. Pp. 491-514 In: M. G. Barbour and J. Major (Editors). Terrestrial Vegetation of California. California Native Plant Society, Special Publication No. 9. Heady 1988

Holland, D.C., M.P. Hayes, and E. McMillan. 1990. Late summer movement and mass mortality in the California tiger salamander (*Ambyostoma californiense*). *Southwestern Naturalist,* 35:217-220.

Holland, R.F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society Sp. Pub. 4:1-12.

Holland, R.F. 1998a. No net loss? Changes in Great Valley vernal pool distribution from 1989 to 1997. Prepared for the California Department of Fish and Game, Natural Heritage Division, Sacramento, California.

Holland, R.F. 1998b. Great Valley vernal pool distribution, photorevised, p. 71-75 *In* Witham, C. W., E. T. Bauder, D. Belk, W. R. Ferren, and R. Ornduff. (editors.). Ecology, conservation, and management of vernal pool ecosystems. California Native Plant Society, Sacramento, California.

Holland, R.F. 2003. Distribution of vernal pool habitats in five counties of California's southern Coast Ranges. Prepared for U. S. Fish and Wildlife Service, Ventura, California.

Holland, R.F. and S. Jain. 1988. Vernal pools. Pp. 513-533 *in* M. G. Barbour and J. Major, eds. Terrestrial vegetation of California. California Native Plant Society, Special Publication No. 9.

Hunt, L.E. 2009. Assessment of California Tiger Salamander (*Ambystoma californiense*) Occurrence in Brizziolari Creek and Stenner Creek Watersheds, San Luis Obispo County, California, with a Discussion of their Regional Distribution. USFWS Contract No. 101814M720-0001.

Irschick, D.J., and H.B. Shaffer. 1997. The polytypic species revisited: morphological differentiation among tiger salamanders (*Ambystoma tigrinum*) (Amphibia: Caudata). *Herpetologica,* 53(1): 30-49.

Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. Final report to California Dept. of Fish and Game. Pp. 12-16.

Jones and Stokes and Associates. 1987. Sliding toward extinction: California's natural heritage. Privately produced.

Jones, T.R. 1993. Intraspecific genetic variation and cladogenesis in California tiger salamanders *Ambystoma tigrinum californiense* Gray). Unpublished manuscript. 49 pp.

Keeler-Wolf, T., D.R. Elam, K. Lewis, and S.A. Flint. 1998. California vernal pool assessment preliminary report. California Department of Fish and Game, Sacramento, California.

Kuchler, A.W. 1988. The Map of the Natural Vegetation of California. Pp 909-938 and map in: M. G. Barbour and J. Major (Editors). Terrestrial Vegetation of California. California Native Plant Society, Special Publication No. 9.

Laabs, D.M., S.G. Orloff and M. L. Allaback. 2001. Ponds and stream-breeding amphibians. Pp. 191-230 *in* Vollmer, J. E., (Ed.) Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands.

Launer, A., and C. Fee. 1996. Biological research on California tiger salamanders at Stanford University. 25 pp. plus figures, tables, and appendix.

Lawler, S.P., D. Dritz, T. Strange, and M. Holyoak. 1999. Effects of introduced mosquitofish and bullfrogs on the threatened California red-legged frog. *Conservation Biology,* 13(3):613-622.

Lawrenz, R.W. 1984-85. The response of invertebrates in temporary vernal wetlands to Altosid® SR-10 as used in mosquito abatement programs. *Journal of the Minnesota Academy of Science,* 50: 31-34.

Lehtinen, R.M. and S.M. Galatowitsch. 2001. Colonization of restored wetlands by amphibians in Minnesota. *American Midland Naturalist,* 145(2): 388-396.

Lehtinen, R.M., S.M. Galatowitsch, and J.R. Tester. 1999. Consequences of habitat loss and fragmentation for wetland amphibian assemblages. *Wetlands,* 19(1):1-12.

Leyse, K. and Lawler, S.P. 2000. Effect of mosquitofish (*Gambusia affinis*) on California tiger salamander (*Ambystoma californiense*) larvae in permanent ponds. Mosquito Control Research, annual report 2000.

Loredo, I. and D. Van Vuren. 1996. Reproductive ecology of a population of the California tiger salamander. *Copeia,* 1996(4): 895-901.

Loredo, I., D. Van Vuren and M.L. Morrison. 1996. Habitat use and migration behavior of the California tiger salamander. *Journal of Herpetology,* 30(2): 282-285.

Loredo-Prendeville, I., D. Van Vuren, A.J. Kuenzi, and M.L. Morrison. 1994. California ground squirrels at Concord Naval Weapons Station: alternatives for control and the ecological consequences. Pp. 72-77 *In* W. S. Halverson and A. C. Crabb (editors). Proceedings of the 16th Vertebrate Pest Conference. University of California Publications.

Marsh, D.M. and P.C. Trenham. 2001. Metapopulation dynamics and amphibian conservation. *Conservation Biology,* 15(1): 40-49.

Marsh, R.E. 1987. Ground squirrel control strategies in Californian agriculture. Pp. 261-277 *In* Richards, C. G. J. and T. Y. Ku (editors). Control of mammal pests. Taylor and Francis, London, New York and Philadelphia.

McCullough, D.R. (editor) 1996. Metapopulations and wildlife conservation. Island Press, Covelo, California. 432 pp.

Morey, S.R. 1998. Pool duration influences age and body mass at metamorphosis in the western spadefoot toad: implications for vernal pool conservation. Pp. 86-91 *In* Witham, C.W., E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Ecology, Conservation, and Management of Vernal Pool Ecosystems Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California. 1998.

Morey, S.R. and D.A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. Pp. 149-157 *In* Williams, D.F., S. Byrne, T.A. Rado (editors). Endangered and Sensitive Species of the San Joaquin Valley, California. California Energy Commission, Sacramento, California. 1992.

Moyle, P.B. 2002. *Inland Fishes of California*. University of California Press.

Mullen, D.A. and R.C. Stebbins. 1978. An addition to the amphibian fauna of California. *Great Basin Naturalist,* 38(4): 429-437.

Pechmann, J.H.K., D.E. Scott, J.W. Gibbons, and R.D. Semlitsch. 1989. Influence of wetland hydroperiod on diversity and abundance of metamorphosing juvenile amphibians. *Wetlands Ecology and Management,* 1(1):3-11.

Pechmann, J.H.K., R.A. Estes, D.E. Scott and J.W. Gibbons. 2001. Amphibian colonization and use of ponds created for trial mitigation of wetland loss. *Wetlands,* 21(1): 93-111.

Petranka, J.W. 1998. *Salamanders of the United States and Canada*. Smithsonion Institution Press.

Prunuske, L. 1987. Groundwork: A Handbook for Erosion Control in North Coastal California. Marin County Resource Conservation District. 60 pp.

Rhymer, J.M. and D. Simberloff. 1996. Extinction by hybridization and introgression. *Annual Review of Ecology and Systematics*, 27: 83-109.

Riley, S.P.D., H.B. Shaffer, S.R. Voss and B.M. Fitzpatrick. 2003. Hybridization between rare, native tiger salamanders (*Ambytoma californiense*) and its introduced cogener. *Ecological Applications,* 13(5):1263-1275.

Salmon, T.P., and R.H. Schmidt. 1984. An introductory overview to California ground squirrel control. Pp. 32-37 *In* Clark, D. O. (editor). Proceedings of the Eleventh Vertebrate Pest Conference, March 6-8, 1984, Sacramento, California.

Scott, D.E. 1994. The effect of larval density on adult demographic traits in *Ambystoma opacum*. *Ecology,* 75:1383-1396.

Semlitsch, R.D. 1998. Biological delineation of terrestrial buffer zones for pond-breeding salamanders. *Conservation Biology,* 12(5): 1113-1119.

Semlitsch, R.D. and J.R. Bodie. 1998. Are small isolated wetlands expendable? *Conservation Biology,* 12(5): 1129-1133.

Semlitsch, R.D., D.E. Scott, and J.H.K. Pechmann. 1988. Time and size at metamorphosis related to adult fitness in *Ambystoma talpoideum*. *Ecology,* 69: 184-192.

Seymour, R., and M. Westphal. 1994. Final Report - Status and habitat correlates of California tiger salamanders in the eastern San Joaquin Valley: results of the 1994 survey. Report prepared by the Coyote Creek Riparian Station for the U.S. Fish and Wildlife Service, Sacramento Office. 33 pp.

Shaffer, H.B., *in litt.* 2003. Federal Register Vol. 69, No. 149. Wednesday, August 4, 2004. Rules and Regulations.

Shaffer, H.B. and M.L. McKnight. 1996. The polytypic species revisited: genetic differentiation and molecular phylogenetics of the tiger salamander *Ambystoma tigrinum* (Amphibia:Caudata) complex. *Evolution,* 50(1): 417-433.

Shaffer, H.B. and P.C. Trenham. 2004. Family Ambystomatidae. Pp. 1-10.

Shaffer, H.B. and P.C. Trenham. 2005. *Ambystoma californiense.* Pp. 1093-1102. *In* Lannoo, M. J. (Ed.), Status and Conservation of US Amphibians. Volume 2: Species Accounts, University of California Press, Berkeley, California.

Shaffer, H.B. and P.C. Trenham. 2002. Distinct Population Segments of the California Tiger Salamander. Section of Evolution and Ecology, and Center for Population Biology, University of California.

Shaffer, H.B. and S.E. Stanley. 1991. Final report to California Department of Fish and Game; California tiger salamander surveys, 1991. Unpublished report. 11 pp. plus figure, tables and appendix.

Shaffer, H.B., R.N. Fisher, and S.E. Stanley. 1993. Status report: the California tiger salamander (*Ambystoma californiense*). Final report for the California Department of Fish and Game. 36 pp. plus figures and tables.

Shaffer, M. 1987. Variable Populations For Conservation. Minimum viable populations: Coping with uncertainty. Cabridge University Press. Cambridge. pp. 69-86.

Stebbins, R.C. 1951. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 1962. Amphibians of the western United States. Ambystomids. University of California Press. Berkeley and Los Angeles. pp. 29-49 and plates.

Stebbins, R.C. 1972. California Amphibians and Reptiles. University of California Press. Berkeley, California. 152 pp.

Stebbins, R.C. 1985. A field guide to western reptiles and amphibians. Houghton Mifflin Co. Boston, Massachusetts. Pp. 33-37.

Stebbins, R.C. 1989. Declaration of R. C. Stebbins in support of petition of writ of mandate. Sierra Club and Richard Pontuis v. Gilroy City Council, Shappell Industries et al. Santa Clara County Superior Court. March 16, 1989. 11 pp. plus exhibits.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians*, 3rd Edition. Houghton Mifflin Company. Boston, Massachusetts. 530 pp.

Storer, T.I.1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27: 60-71.

Sweet, S., Ph.D., *in litt.* 1998. Letter to Dwight Harvey, U.S. Fish and Wildlife Service with enclosed report, "Vineyard development posing an imminent threat to *Ambystoma californiense* in Santa Barbara County, California." 31 August 1998.

Thompson, R. *in litt.* 1998. Senior Biologist, Science Applications International Corporation. 19 October 1998, letter to Al McCurdy, County of Santa Barbara. With enclosed "Proposed Alternative Amphibian Management Plan, Premiere Partners Property in Lost Alamos Valley."

Trenham, P.C. 1998b. Demography, migration, and metapopulation structure of pond breeding salamanders. Unpublished Ph.D. dissertation. University of California, Davis. 96 pp.

Trenham, P.C. 1998a. Radio Tracking Information, unpublished manuscript. 6 pp.

Trenham, P.C. 2001. Terrestrial habitat use by adult California tiger salamanders. *Journal of Herpetology,* 35(2): 343-346.

Trenham, P.C., and H.B. Shaffer. 2005. Amphibian upland habitat use and its consequences for population viability. *Ecological Applications,* 15:1158–1168.

Trenham, P.C., H. B. Shaffer, W. D. Koening and M. R. Stromberg. 2000. Life History and Demographic variation in the California Tiger Salamander (*Ambystoma californiense*). *Copeia,* 2000(2): 365-377.

Trenham, P.C., W. D. Koenig and H.B. Shaffer. 2001. Spatially autocorrelated demography and interpond dispersal in the salamander *Ambystoma californiense*. *Ecology,* 82(12): 3519-3530.

Twitty, V. C. 1941. Data on the life history of *Ambystoma tigrinum californiense* Gray. *Copeia,* 1941(1): 1-4.

United States Fish and Wildlife Service (USFWS). 1994. Endangered and threatened wildlife and plants; Determination of endangered status for the Conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool tadpole shrimp; and threatened status for the vernal pool fairy shrimp; Final Rule 59 FR 48136-48153.

United States Fish and Wildlife Service (USFWS). 1996. Endangered and threatened species; notice of reclassification of 96 candidate taxa. Federal Register 61:7457-7463.

United States Fish and Wildlife Service (USFWS). 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, Oregon. 319 pages.

United States Fish and Wildlife Service (USFWS). 2000. Endangered and threatened wildlife and plants; Emergency rule to list the Santa Barbara County distinct population of the California tiger salamander as endangered; Rule and proposed rule. 65 FR 3096.

United States Fish and Wildlife Service (USFWS). 2002. Endangered and threatened wildlife and plants; Emergency Rule Listing the Sonoma County Distinct Population Segment of the California Tiger Salamander as Endangered. Federal Register 67: 47726-47740, July 22, 2002.

United States Fish and Wildlife Service (USFWS). 2004a. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemption for Existing Routine Ranching Activities. Federal Register 69(149) 47212-47248.

United States Fish and Wildlife Service (USFWS). 2004b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population; Proposed Rule. Federal Register 69(153) 48570-48649.

United States Fish and Wildlife Service (USFWS). 2005. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population; Final Rule. Federal Register 70(162) 49380-49458.

United States Fish and Wildlife Service (USFWS). Proposed Rule to list the Central California distinct population segment of the California tiger salamander as Threatened. Federal Register 68:28648-2888. May 23, 2003.

Wilbur, H.M. and J.P. Collins. 1973. Ecological aspects of amphibian metamorphosis. *Science* (n.s.), 182(4119): 1305-1314.

Wright, S.A., 1991. Pheonological Survey of abundance and diversity of aquatic fauna in Sacramento County Vernal Pools.

Zedler, J.B., and J.C. Calloway. 1999. Tracking wetland restoration: do mitigation sites follow desired trajectories? *Restoration Ecology,* 7(1): 69-73.

Zeiner, D.C., W. Laudenslayer, and K. Mayer. 1988. Tiger salamander *Ambystoma tigrinum*. Pages 2-3, in: California's Wildlife, Volume 1: Amphibians and Reptiles. The Resources Agency, California Department of Fish and Game.

WESTERN SPADEFOOT (WST)

Western Spadefoot (WST)

(Spea hammondii)

Status USFWS: None

Status CDFW: Species of Special Concern



WST Listing Status

The western spadefoot (*Spea hammondii*) was a Category 2 candidate for listing in 1994 (USFWS 1994). This species currently has no federal listing status. The western spadefoot was designated a species of special concern by the State of California in 1994 (Jennings and Hayes 1994; CDFG 1998).

WST Life History and Ecology

WST Species Description and Life History

Taxonomy

Spadefoots are members of the Family Pelobatidae. Two closely related genera of spadefoots have been recognized within this Family: *Scaphiopus* and *Spea* (Cannatella 1985; Weins and Titus 1991). Western spadefoots are officially recognized within the genus *Spea* (Weins and Titus 1991) although many literature sources reference *Scaphiopus* as the genus. Species relationships within *Spea* have been difficult to define due to morphological homogeneity among species. At least four species currently are recognized (Weins and Titus 1991). Named by

Baird in 1859, *Spea hammondii* was believed to have a broad geographic range from California to western Texas and Oklahoma with a distributional gap in the Mojave Desert of California (Storer 1925; Stebbins 1966). Brown (1976) identified morphological, vocalization, and reproductive differences between eastern (Arizona eastward) and western (California) populations, justifying species recognition for each. The California populations retained the name *Spea hammondii* while the eastern populations were designated as *Spea multiplicata*. This distinction was further supported by electrophoretic analyses conducted by Sattler (1980) and by allozymic and morphological analyses conducted by Weins and Titus (1991). Genetic variation across the range of *Spea hammondii* has not been studied to date.

Species Description

Western spadefoots are dusky green or gray above and often have four irregular light-colored stripes on their back, with the central pair of stripes sometimes distinguished by a dark, hourglass-shaped area. The skin tubercles (small, rounded protuberances) are sometimes tipped with orange or are reddish in color, particularly among young individuals (Storer 1925; Stebbins 1985). The iris of the eye is usually a pale gold. The abdomen is whitish without any markings. Spadefoots have a wedge-shaped, glossy black "spade" on each hind foot. The call of the western spadefoot is hoarse and snore-like, and lasts between 0.5 and 1.0 second (Stebbins 1985). Snout-vent length ranges in size from 3.7 to 6.2 centimeters (1.5 to 2.5 inches) (Stebbins 1985).

Spadefoots are distinguished from the true toads (genus *Bufo*) by their cat-like eyes (their pupils are vertically elliptical in bright light, but are round at night), the single black sharp-edged "spade" on each hind foot, teeth in the upper jaw, and rather smooth skin (Stebbins 1985). The parotid glands (large swellings on the side of the head and behind the eye) are absent or indistinct on spadefoots. Adult males may have a dusky throat and dark nuptial pads on the innermost front toes (i.e., thumb). Western spadefoots and southern spadefoots (*Spea multiplicata*) lack a cranial boss (a ridge between the eyes). This trait distinguishes these species from the Plains spadefoot (*S. bombifrons)* and Great Basin spadefoot (*S. intermontanus*), which each have a cranial boss. Compared to western spadefoots, southern spadefoots have a more elongate spade, are brownish above, and have a copper-colored iris.

The eggs of western spadefoots are pigmented and are found in irregular cylindrical clusters of about 10 to 42 eggs attached to plant stems and other submerged objects in temporary pools (Stebbins 1985). Spadefoot larvae (tadpoles) can reach seven centimeters (2.5 inches) in length. They have oral papillae (small nipple-like projections that encircle the mouth), and their eyes are set close together at the top of the head. Their body is broadest just behind the eyes (Storer 1925).

Western spadefoot larvae are similar in appearance to other spadefoot larvae. The larvae have oral papillae, and their eyes are set close together and situated well inside the outline of the head

as viewed from above. Western spadefoot larvae resemble those of the Plains spadefoot in that their body is broadest just behind the eyes and they are light to medium gray or brown above. In addition, western spadefoot larvae have an upper mandible that is beaked and a lower mandible that is notched. These larvae grow to around seven centimeters (2.8 inches) (Storer 1925).

Reproduction

Western spadefoots breed from January to May in temporary pools and drainages that form following winter or spring rains. Water temperatures in these pools must be between nine (9) degrees Celsius (48 degrees Fahrenheit) and 30 degrees Celsius (86 degrees Fahrenheit) for western spadefoots to reproduce (Brown 1966, 1967). Oviposition (egg-laying) does not occur until water temperatures reach the required minimum of nine (9) degrees Celsius (48 degrees Fahrenheit) (Jennings and Hayes 1994). Depending on the water temperature and annual rainfall, oviposition may occur between late February and late May (Storer 1925; Burgess 1950; Feaver 1971; Stebbins 1985). During breeding, highly vocal aggregations of more than 1,000 individuals may form (Jennings and Hayes 1994). Breeding calls are audible at great distances and are thought to bring individuals together at suitable breeding sites (Stebbins 1985). Females deposit their eggs in numerous small irregularly cylindrical clusters of 10 to 42 eggs (average is 24) (Storer 1925), and may lay more than 500 eggs in one season (Stebbins 1951). Eggs are deposited on plant stems or pieces of detritus in temporary rain pools, or sometimes pools in ephemeral stream courses (Storer 1925; Stebbins 1985).

Eggs hatch in 0.6 to sic (6) days depending on water temperature (Brown 1967). At relatively high water temperatures (e.g., 21 degrees Celsius [70 degrees Fahrenheit]), Storer (1925) noted that approximately half of the Western spadefoot eggs failed to develop, possibly due to a fungus that thrives in warmer water and invades the eggs. Larval development can be completed in 3 to 11 weeks (Burgess 1950; Feaver 1971) depending on food resources and water temperature, but must be completed before pools dry. In eight vernal pools examined by Morey (1998), the average duration to complete larval development (hatching to metamorphosis) was 58 days (range 30 to 79 days). Further, pools that persisted for longer periods permitted longer larval development resulting in larger juveniles with greater fat reserves at metamorphosis. Morey (1998) concluded that longer periods of larval development are associated with larger body size at metamorphosis, which is correlated to greater fitness and survivorship (Pfennig 1992).

Annual reproductive success probably varies with precipitation levels with success being lower in drier years (Fisher and Shaffer 1996). Recently metamorphosed juveniles emerge from water and seek refuge in the immediate vicinity of natal ponds where they spend several hours to several days near ponds before dispersing. Weintraub (1979) reported that toadlets of Plains spadefoot seek refuge in drying mud cracks, under boards, and under other surface objects

including decomposing cow manure. Age of sexual maturity in western spadefoot is unknown, but considering the relatively long period of subterranean dormancy (eight to nine months), individuals may require at least two years to mature (Jennings and Hayes 1994).

Demography

Virtually no data are available on demographic values such as long-term population dynamics, survival rates, reproductive success, and dispersal rates for western spadefoot. However, it is assumed that protecting connectivity corridors between metapopulations is essential for conservation of the species. Morey and Guinn (1992) reported that western spadefoot abundance appeared to remain stable from 1982 to 1986 at a vernal pool complex in Stanislaus County, California. Based on systematic collections of road-killed western spadefoots, proportions of adults and juveniles were 70 percent and 30 percent, respectively, and the proportions of adult males and females were about equal (USFWS 2005).

In a study of amphibian reproduction in 30 vernal pools in Madera County, Feaver (1971) reported a mortality rate of 81 percent for larval spadefoots, 10 percent of which he attributed to predation from California tiger salamander (*Ambystoma californiense*) larvae, while the remainder was due to desiccation from pools drying before metamorphosis was complete. In some years, all reproductive potential is lost when pools dry before any spadefoot larvae are able to metamorphose (Baldwin 1988; Morey 1998). Morey (1998) reported that Western spadefoot larvae that occurred in pools lasting less than five weeks experienced nearly 100 percent mortality. Denver et al. (1998) reported that the Western spadefoot showed the ability to "accelerate metamorphosis in response to water volume reduction" triggered by the reduced opportunity or inability to feed in combination with reduced water volume.

Diet and Foraging

Adult western spadefoots forage on a variety of insects, worms, and other invertebrates. Morey and Guinn (1992) examined the stomach contents of 14 Western spadefoots and found 11 different food items including grasshoppers (Order Orthoptera: Family Gryllacrididae), true bugs (Order Hemiptera), moths (Order Lepidoptera: Family Noctuidae and unidentified moths), ground beetles (Order Coleoptera: Family Carabidae), predaceous diving beetles (Order Coleoptera: Family Dytiscidae), ladybird beetles (Order Coleoptera: Family Coccinellidae), click beetles (Order Coleoptera: Family Elateridae), flies (Order Diptera: Family Heleomyzidae), ants (Order Hymenoptera: Family Formicidae), and earthworms (Order Haplotaxida). Adult spadefoots can consume 11 percent of their body mass during a single outing, and Dimmit and Ruibal (1980) speculated that adult southern spadefoots may be able to acquire sufficient energy for their long dormancy period (eight to nine months) in only a few weeks. The specific food habits of western spadefoot larvae are unknown; however, the larvae of southern

spadefoot and Plains spadefoot consume planktonic organisms and algae, and also will scavenge dead organisms, including other spadefoot larvae (Bragg 1964). In addition, larvae of Plains spadefoots reportedly will prey on fairy shrimp (e.g., *Branchinecta* spp.) (Bragg 1962).

WST Habitat Requirements and Ecology

Western spadefoots primarily occur in lowland habitats generally below 900 meters (3,000 feet) within or adjacent to washes, floodplains of rivers, alluvial fans, playas, and alkali flats. They also occur in the foothills and mountains (Stebbins 1985) up to 1,363 meters (4,500 feet) (Morey 1988). Associated vegetative communities include valley-foothill grassland, open chaparral, pine-oak woodland and lower montane conifer and mixed conifer forest within open areas comprised of short grasses and sandy or gravelly soil. Western spadefoots have two distinct habitat requirements including quiet streams (Stebbins 2003) or seasonal pools for breeding and uplands for foraging and dry-season aestivation. Western spadefoot eggs and larvae have been observed in a variety of permanent and temporary wetlands including rivers, creeks, pools in intermittent streams, vernal pools, and temporary rain pools (CDFG 2010). They have also been found in altered wetlands including vernal pools that have been disturbed by activities such as earthmoving, disking, intensive livestock use, and off-road vehicle use, and man-made wetlands such as created ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits (Fisher and Shaffer 1996; CDFG 2010). Although western spadefoots have been observed inhabiting and breeding in wetlands altered or created by humans, survival and reproductive success in these pools have not been compared to unaltered natural pools and research suggests that vernal pools and other temporary wetlands may be optimal for breeding due to the absence or reduced abundance of both native and nonnative predators, many of which require more permanent wetlands.

Often undervalued in conservation planning, terrestrial habitats surrounding aquatic breeding sites are critical to the survival of many semiaquatic species that depend on mesic ecotones to complete their life cycles (Semlitsch and Bodie 2003). Several studies have shown the close dependence of semiaquatic species, such as reptiles and amphibians, on terrestrial habitats for critical life history functions. During periods of drought, aquatic habitats may not be available to semiaquatic species for extended periods of their lives. In such cases, terrestrial habitats act as population reservoirs or sources for adults until breeding and reproduction can again occur (Semlitsch and Bodie 2003). In addition, adult frogs, salamanders and turtles are generally philopatric to individual wetlands and migrate annually between aquatic and terrestrial habitats to forage, reproduce and overwinter or aestivate (Burk and Gibbons 1995; Semlitsch 1998). The amount of terrestrial habitats used during migrations to and from wetlands and for foraging defines the terrestrial core habitat of a population. This aggregation of adults constitutes a local population centered on a single wetland or wetland complex (Semlitsch and Bodie 2003). Local

populations are connected by dispersal and are part of a larger metapopulation, which extends across the landscape (Pulliam 1988; Marsh and Trenham 2001).

Annual natal migrations centered on a single wetland or wetland complex are biologically different than dispersal to new breeding sites. It is generally thought that dispersal among populations is achieved primarily by juveniles for amphibians (Gill 1978; Breden 1987; Berven and Grudzien 1990) or by males for turtles (Morreale *et a*l. 1984). Dispersal by juvenile amphibians tends to be unidirectional and longer in distance than the annual migratory movements of breeding adults (Breden 1987; Seburn et al. 1997). Thus, habitats adjacent to wetlands can serve as stopping points and travel corridors for dispersal to other nearby wetlands (Semlitsch and Bodie 2003). In any given western spadefoot population, we expect that some subpopulations will disappear, but the habitat they occupied will eventually be recolonized if it remains suitable.

Little is currently known regarding western spadefoot dispersal distances and overland movement patterns from aquatic breeding sites to upland aestivation sites. Semlitsch and Bodie (2003) summarized data from the literature on the use of terrestrial habitats by 19 frog and 13 salamander species representing 1363 individuals that are otherwise typically associated with wetlands. In general, plethodontid stream salamanders (e.g., *Desmognathus fuscus*, *Eurycea bislineata*, *Eurycea longicauda*), although migratory at some stage of their life cycle, remain close to the edges of ponds and streams and seldom move more than 20-30 m from aquatic habitats. Alternatively, some species of frogs, toads and newts are highly mobile and move 1,000 to 1,600 meters (e.g., *Bufo bufo*, *Rana catesbbeiana*, *Notophthalmus viridescens*). The majority of the remaining species occur at intermediate distances, where they emigrate to find suitable terrestrial habitat. The overall core terrestrial habitat ranged from 159 to 290 meters (522 to 951 feet) from the edge of aquatic breeding sites.

Behavior

Western spadefoots are almost completely terrestrial and enter water only to breed (Dimmitt and Ruibal 1980); however, typical of amphibians, Western spadefoots require a certain level of moisture to avoid desiccation, which can be a challenge in the arid habitats occupied by the species. Consequently, spadefoots have adapted behaviorally and physiologically to better facilitate moisture retention.

During dry periods for example, spadefoots construct and occupy burrows that may be up to 0.9 meters (3 feet) in depth (Ruibal et al. 1969) where they may remain for 9 to 10 months aestivating. Like all amphibians, Western spadefoots have very permeable skin, which allows them to absorb moisture from the surrounding soil. Ruibal et al. (1969) found that spadefoots may select soils that are relatively sandy and friable when constructing burrows as these

attributes facilitate both digging and water absorption. Research also suggests that spadefoots may retain urea to increase the osmotic pressure within their bodies preventing water loss to, and facilitating water absorption from, surrounding soil with relatively high moisture tensions (Ruibal et al. 1969; Shoemaker et al. 1969).

Spadefoots emerge from burrows to forage and breed following rains in the winter and spring; however, the factors that stimulate emergence are not well understood. In Arizona, spadefoots emerged after as little as 0.25 centimeters (0.1 inch) of precipitation, which barely wet the soil surface and obviously did not soak down to burrows (Ruibal et al. 1969). Sound or vibration from rain striking the ground appears to be the primary emergence cue used by spadefoots, and even the vibrations of a motor can cause them to emerge (Dimmitt and Ruibal 1980). Spadefoots may move closer to the surface prior to precipitation and may even emerge to forage on nights with adequate humidity. Most surface activity is nocturnal. Morey and Guinn (1992) report that surface activity is related to both moisture and cooler temperatures that occur following storms. Surface activity has been observed in all months from October to May (Morey 1988; Morey and Guinn 1992). Above-ground activity is primarily nocturnal, presumably to reduce water loss. Even when exposed to artificial light, spadefoots will immediately move away or begin burrowing underground (Storer 1925; Ruibal et al. 1969). During the day, spadefoots dig and occupy relatively shallow burrows two to five centimeters (0.5 to 2 inches) in depth (Ruibal et al. 1969), and may even use small mammal burrows. In addition to breeding during periods of above-ground activity, spadefoots must acquire sufficient energy resources prior to reentering dormancy (Seymour 1973).

Interspecific Interactions

The role of predation on the population dynamics of western spadefoots is unclear. The extended dormancy period of adult and juvenile spadefoots reduces their exposure to predators. Also, toxic secretions from dermal glands provide a significant deterrent to predators. Predators pose a much greater threat to larval western spadefoots than to adults. Spadefoot larvae are preyed upon by a variety of native predators including wading birds, garter snakes (*Thamnophis* spp.), and Raccoons (*Procyon lotor*) (Childs 1953; Feaver 1971). Feaver (1971) found Western spadefoot larvae were preyed upon by California tiger salamander larvae when the two species co-existed in the same pools and the California tiger salamander larvae matured first; however, if western spadefoot and California tiger salamander larvae are the same size, no predation may occur (Anderson 1968).

Nonnative predators introduced within the range of western spadefoots include crayfish (*Procambarus clarkii*), various fishes, and bullfrogs (*Rana catesbeiana*) (Hayes and Warner 1985; Hayes and Jennings 1986; Morey and Guinn 1992; Jennings and Hayes 1994; Fisher and Shaffer 1996). Nonnative fish, many of which are predatory, negatively affect native amphibians by

preying upon eggs and larvae (Jennings 1988). In some locations, mosquitofish (*Gambusia affinis*), purposely introduced to control mosquitoes, also prey on Western spadefoot eggs and larvae (Grubb 1972; Jennings and Hayes 1994; Fisher and Shaffer 1996). Introduced bullfrogs have been implicated in the declines of native amphibians (Moyle 1973; Hayes and Jennings 1986), but may not be significant predators of adult western spadefoots, although western spadefoots have been found in the stomachs of bullfrogs on at least two occasions (Hayes and Warner 1985; Morey and Guinn 1992). Bullfrogs may present more of a threat to larval western spadefoots than adults. During dispersal between permanent water sources, juvenile bullfrogs will use temporary water sources (e.g., vernal pools) as resting and feeding areas, increasing the potential for predation on spadefoot larvae (Morey and Guinn 1992).

Although, bullfrogs are of concern regarding the conservation of western spadefoots, some significant ecological differences exist that may minimize interactions between the species. For example, spatial segregation may exist due to bullfrogs occurring less frequently in the temporary wetlands (e.g., vernal pools) used by western spadefoots. Also, western spadefoots increase activity in response to moisture and low temperatures following storms whereas bullfrogs increase activity in response to warmer temperatures prior to storms (Morey and Guinn 1992). Thus, some temporal segregation may occur as well; however, some studies indicate that declining population trends may be associated with introduced predators including bullfrogs (USFWS 2005). At a site in Stanislaus County, California, western spadefoot abundance remained stable during 1982 to 1986 despite dramatic increases in bullfrog abundance during this same period (Morey and Guinn 1992).

Western spadefoots have been recorded in 11 of the 17 vernal pool regions described by Keeler-Wolf et al. (1998). The species has been documented to co-occur with several other rare species, some of which are federally protected. Among the 406 locations for western spadefoots in the CNDDB (CDFG 2010), the following special status animals have been documented to co-occur: California tiger salamander, California red-legged frog (*Rana draytonii*), vernal pool tadpole shrimp (*Lepidurus packardi*), vernal pool fairy shrimp (*Branchinecta lynchi*), and California fairy shrimp (*Linderiella occidentalis*). Rare plants have also been observed in association with western spadefoot and include San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), hairy Orcutt grass (*O. pilosa*), fleshy owl's clover (*Castilleja campestris* ssp. *succulenta*), Colusa grass (*Neostapfia colusana*), and Hoover's spurge (*Chamaesyce hooveri*). In addition, both adult and larval western spadefoots consume food items that also are used by other co-occurring amphibians including pacific tree frog (*Hyla regilla*), California tiger salamander, and western toad (*Bufo boreas*) (Morey and Guinn 1992). Thus, some degree of resource competition may unnecessarily occur, depending upon the abundance of food resources.

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for western spadefoot are identified in Table G-3.15-1 and have been derived from input from local species experts.

Table G-3.15-1. Habitat Elements for Western Spadefoot

Essential Activities	Land Cover Types	Habitat Elements
Breeding and larval development	Vernal impoundment, vernal pool, vernal swale, seasonal wetlands, seasonal impoundment, swale, open water, and streams/creeks.	Temporary pools, drainages, and quiet streams that form following winter or spring rains. Water temperatures in these pools must be between 9 degrees Celsius (48 degrees Fahrenheit) and 30 degrees Celsius (86 degrees Fahrenheit) for western spadefoots to reproduce.
Foraging, dispersal, migration, and summer inactivity	Blue oak savanna, blue oak woodland, and valley grassland.	Require uplands to create burrows and some degree of moisture. In particularly dry areas spadefoots may select soils that are relatively sandy and friable.

WST Species Distribution and Population Trends

WST Central California Distribution

The western spadefoot is nearly endemic to California, and historically ranged from Redding in Shasta County southward to Mesa de San Carlos in northwestern Baja California, Mexico (Stebbins 1985) occurring throughout the Central Valley, Coast Ranges and coastal lowlands (Jennings and Hayes 1994). However, in recent decades the western spadefoot has been extirpated throughout most of the lowlands of southern California (Stebbins 1985) and from many historic locations within the Central Valley (Jennings and Hayes 1994; Fisher and Shaffer 1996). According to Fisher and Shaffer (1996), the western spadefoot has suffered a severe decline with virtually complete extirpation from the Sacramento Valley, a reduced density of populations in the eastern San Joaquin Valley and modest declines in the Coast Ranges. The average elevation of sites where the species still occurs is significantly higher than the average elevation for historical sites suggesting that declines have been more pronounced in lowlands (USFWS 2005).

WST Distribution within Planning Area

Figure WST-1 shows 31 occurrence records of WST within and adjacent to the Planning Area. Fourteen occurrences of WST are within the Urban Development Area (UDA). Sixteen occurances are located outside of the UDA, east of Interstate 5 and north of the Cosumnes River. One occurance record is location south of the Cosumnes River.

WST Population Levels and Trend

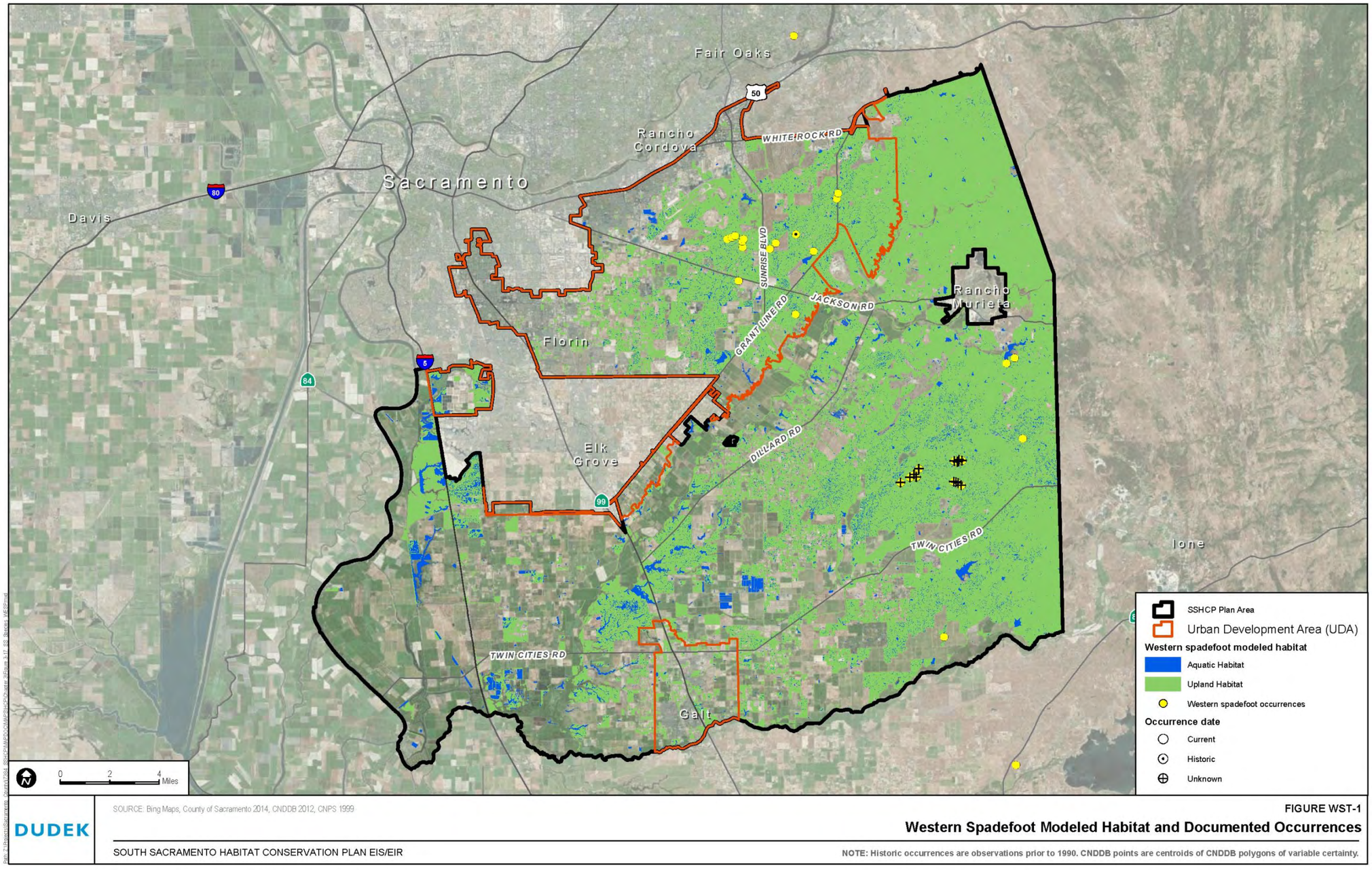
Three relatively recent sources of data have presented information regarding the current status and distribution of the western spadefoot. Jennings and Hayes (1994) examined 832 museum and sighting records from 346 locations and concluded that western spadefoots still occurred in 18 California counties, but had been extirpated from six counties. Fisher and Shaffer (1996) conducted field surveys of 315 sites in the Sacramento Valley, San Joaquin Valley, and Coast Ranges from 1990 to 1992 that confirmed the presence of western spadefoots in 13 counties. The CNDDB (CDFG 2010) lists 406 records of western spadefoots from 26 counties. These records range from 1978 to 2006 and do not represent a systematic survey. Additionally, the status of most of the sites where western spadefoots were observed is unknown and many sites may no longer exist due to subsequent development. Some of the records were submitted by biological consultants who conducted surveys on sites that were about to be developed (USFWS 2005).

WST Threats to the Species

Although certain factors are known to contribute to western spadefoot decline rangewide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for western spadefoot in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect western spadefoot and other target species, the potential for success in conserving the species is reduced. The following is a summary of known and suspected threats to western spadefoot in the Planning Area.

Habitat loss and fragmentation are currently the most significant threats to the survival and recovery of western spadefoot (USFWS 2005). Although determining the degree of severity among contributing factors is difficult without additional information, habitat loss generally is a result of urbanization and agricultural conversion, but can also occur in the form of habitat alteration and degradation resulting from the following: changes to natural hydrology; introduction of invasive species; incompatible grazing regimes, including insufficient grazing for prolonged periods; infrastructure projects (e.g., roads, water storage and conveyance, utilities); recreational activities (e.g., off-highway vehicles and hiking); erosion; contamination; and poor rangeland management and/or lack of monitoring. Habitat fragmentation generally is a result of activities associated with habitat loss (e.g., roads and other infrastructure projects that contribute to the isolation and fragmentation of suitable habitats).

Figure WST-1 Western Spadefoot Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Most western spadefoot habitat is not protected and those areas that are protected are relatively small and therefore highly subject to external threats. It is likely that western spadefoots suffered dramatic reductions in the mid to late 1900's when urban and agricultural development were rapidly destroying natural habitats in the Central Valley and southern California (Jennings and Hayes 1994). Jennings and Hayes (1994) estimated that over 80 percent of the habitat once known to be occupied by the western spadefoot in southern California (from the Santa Clara River Valley in Los Angeles and Ventura Counties southward) has been developed or converted to uses that are incompatible with successful reproduction and recruitment of the species. In northern and central California, loss of habitat has been less severe, but nevertheless significant. It is estimated that over 30 percent of the habitat once occupied by western spadefoots has been developed or converted (Jennings and Hayes 1994). Regions that have been severely affected include the lower two-thirds of the Salinas River system, and much of the areas east of Sacramento, Fresno, and Bakersfield. In addition, many of the suitable seasonal wetlands and vernal habitats concentrated on valley terraces above the Central Valley floor, have begun disappearing or been fragmented (Jennings and Hayes 1994).

California has both the highest absolute and relative human population growth in the United States. California's population is predicted to grow by almost 18 million by the year 2025, an increase of over 50 percent, the highest of any state in the nation (US Census Bureau 1996). Approximately 73 percent of the land within the Central Valley is privately owned, and in areas containing vernal pool habitats, only six percent of the land area is in public ownership (USFWS 2005). According to the 1997 National Resources Inventory (USDA 2000), California ranked sixth in the nation in amount of non-federal land developed between 1992 and 1997, at over 221,200 hectares (546,700 acres). If current population trends continue, seasonal wetland habitats in California, especially those on private land, will be increasingly threatened and possibly extirpated.

In more recent years, vernal pool habitats have been lost primarily as a result of widespread urbanization. Between 1994 and 2003, the Sacramento Field Office of the USFWS conducted section seven consultations on impacts to almost 20,250 hectares (50,000 acres) of vernal pool habitats across California (USFWS 2005). Over half of this loss of habitat, 10,125 hectares (25,000 acres), was the result of residential, commercial, and industrial development projects. The construction of infrastructure associated with urbanization including the construction of highways, wastewater treatment plants, sewer lines, water supply projects, and other utility projects has also contributed greatly to the loss and fragmentation of vernal pools and seasonal wetlands in California (USFWS 2005).

In addition to urbanization, conversion of California's Central Valley to intensive agricultural uses continues to contribute to the decline of vernal pool habitat. From 1992 to 1998, 50,825 hectares (125,591 acres) of grazing land were converted to other agricultural uses in the Central

Valley of California. It is likely that much of this land supported vernal pools. Holland (1998) estimated that more than 12,950 hectares (32,000 acres) of vernal pool habitats were lost in the San Joaquin Valley vernal pool region from the late 1980's through 1997, mostly as a result of agricultural conversion. Since 1994, the Sacramento USFWS office has reviewed projects converting more than 6,070 hectares (15,000 acres) of vernal pool habitats to intensive agricultural uses via section 7 of the Endangered Species Act (USFWS 2005).

WST Altered Hydrology

In addition to direct habitat loss, changes to vernal pool hydrology may also adversely affect spadefoot populations. For example, physical barriers, such as roads and canals can dam or block hydrologically linked systems and alter wetland hydrology both upstream and downstream of the barrier by truncating connectivity and flow. Wetland hydrology also may be altered by changes to patterns of surface and subsurface flow, depending on topography, precipitation, and soil types (Hanes et al. 1990; Hanes and Stromberg 1998). In addition, increased runoff and nuisance flows associated with urban development and impervious surfaces can result in altered hydrology of seasonal wetlands on and off-site. For example, stormwater drains, or the coverage of land surfaces with concrete, asphalt, or irrigated lawns, can alter the duration, volume discharge and frequency of surface flows through increased flooding and runoff (USFWS 2005).

As the timing, frequency, and duration of vernal pool inundation are critical to the survival of vernal pool species including the western spadefoot, alterations to hydrology can be particularly harmful due to premature pool dry-down before the life cycle of the species is completed, preventing reproduction and disrupting gene flow. Similarly, flowing water that removes plants and animals, including cysts, eggs or seeds, from the pool complexes can also prevent successful reproduction and disrupt gene flow. Water flow into vernal pools during the summer can significantly alter vernal pool species composition (Clark et al. 1998). In addition, longer periods of inundation and/or changes in water depth can effectively change seasonal wetland functions (e.g., change from vernal pool to perennial/permanent wetlands), which could potentially provide suitable habitat for introduced bullfrogs and fish.

Excluding livestock and/or changing the grazing intensity and/or season of use can also alter vernal pool hydrology. Historically, native herbivores helped maintain appropriate inundation periods of seasonal wetlands by limiting vegetation accumulation and by sustaining soil conditions that create favorable vernal pool habitat (Barry 1995). The removal of cattle grazing from historically grazed grasslands has been found to dramatically decrease the inundation period of vernal pools (Marty 2004). In a study conducted in pools inhabited by spadefoots, Marty (2004) found that the removal of grazing led to a reduction in pool inundation below the period of time necessary for successfully metamorphose by western spadefoot. Standing dry or dead

vegetation may reduce overland flows during precipitation events via interception and direct evaporation. In addition, changes in vernal pool hydrology resulting from livestock exclusion are interrelated with the invasion of nonnative annual species (USFWS 2005). Bauder (1987) found a direct correlation between nonnative vegetation and length of inundation in vernal pools.

In some areas, the alteration of hydrology, often in combination with specific land use practices, has caused downcutting of sloughs and swales, thus threatening the stability and functions of adjacent vernal pools. Any ground-disturbing activities, such as plowing, trenching, grading, deep-ripping, scraping, off-road vehicles, inappropriate levels of livestock grazing, or other activities, adjacent to or within the watersheds of vernal pools can result in siltation when pools fill during the following wet season. Siltation is particularly likely in areas where high, disturbed slopes rise above the level of the vernal pools. Poorly designed trail and road systems near vernal pools may also cause erosion and result in siltation of vernal pools. Larval western spadefoots may suffocate in pools with high levels of siltation and turbidity and siltation may also result in the burial and/or asphyxiation of eggs. Runoff from irrigated agricultural lands can also alter the hydrology of adjacent vernal pools and also can contribute to erosion, siltation, and contaminant loads (USFWS 2005).

WST Contaminants

Amphibians typically have complex life cycles and thus more opportunities for and routes of exposure than other vertebrates. The western spadefoot is exposed to a variety of toxins throughout its range, but the sensitivity of this species to pesticides, heavy metals, air pollutants, and other contaminants is largely unknown. Each year, millions of kilograms (millions of pounds) of fertilizer, insecticides, herbicides, and fungicides are used on crops, forests, rights of way, and landscape plants in California. Some of these chemicals are extremely toxic to aquatic organisms such as amphibians and their prey. Industrial facilities and motor vehicles also release contaminants that may harm the western spadefoot. Contaminants from road materials, leaks, and spills also could adversely affect western spadefoots by contaminating the water in wetlands.

WST Human Waste, Recreational Use, and Vandalism

As vernal pool habitats become increasingly rare and urban development expands, threats from disposal of waste, off-road vehicle use, and vandalism increase. People often dump unwanted items such as trash, tires, and appliances in vernal pool areas. Not only can these items release toxic substances into the environment and contaminate water and soil (Ripley et al. 2004), but they can directly affect species by crushing them and restricting photosynthesis in plants by shielding the sun. Waste material also may disrupt the natural hydrologic flow.

Certain recreational activities threaten vernal pool ecosystems and western spadefoots may be adversely affected by off-road vehicle use, hiking, and bicycling. When off-road vehicles and bicycles cut through vernal pool complexes, they may impair hydrological functions by displacing soil and causing erosion or truncating swale connectivity, thus resulting in hydrological changes. Similarly, some off-road enthusiasts (e.g., bicyclists may create dirt jump ramps, which also could result in the aforementioned effects. Western spadefoots may be crushed and killed as a result of careless site users. Trampling also may reduce the reproductive output of western spadefoots using the area.

WST Inappropriate Livestock Grazing

Considering the historic grazing of native ungulates and other herbivores in vernal pool ecosystems, properly managed livestock grazing can play a significant role as a process surrogate in the protection and enhancement of vernal pool ecosystems. Livestock grazing has three primary effects on vernal pools: consumption of vegetation, trampling, and nutrient input from urine and feces (Vollmar 2002). However, inappropriate levels of grazing, from overgrazing, undergrazing, or inappropriately timed grazing, can result in significant adverse effects to vernal pool ecosystems on which western spadefoots depend.

Although experts maintain that the relationship between grazing livestock and vernal pool habitat condition is difficult to quantify, the prevailing belief is that livestock grazing can play an important role as a management tool in vernal pool habitat (USFWS 2005). The perceived need for some amount of ecosystem disturbance should not be interpreted as an invitation to indiscriminately graze vernal pool landscapes. Because vernal pool species exhibit a variety of life history strategies, grazing regimes must take these needs into consideration.

WST Random, Naturally Occurring Events

Western spadefoots occurring in small habitat patches are vulnerable to random environmental fluctuations or variation (stochasticity) due to annual weather patterns and availability of food and other environmental factors. As with most vernal pool species, western spadefoot populations are unevenly distributed within fragmented vernal habitats and are predominantly isolated from other. As a result, these populations are more vulnerable to stochastic extinction and genetic problems, particularly in the expression of deleterious genes (known as inbreeding depression). Individuals and populations possessing deleterious genetic material are less likely able to withstand environmental change and survivorship is decreased.

WST Disease

Chytrid fungus (*Batrachochytrium dendrobatidis*) is known to contribute to amphibian declines, and could be spread via infected organisms or contaminated equipment (USFWS 2005).

Diseases and parasitic threats may range from benign to fatal. The vectors and biochemical pathways associated with spread and infection should be considered in order to adequately minimize the threats posed by diseases and pathogens.

WST Non-Native Species

Another reason for the population decline of the western spadefoot is the introduction of nonnative predators, specifically bullfrogs, crayfishes and fishes (e.g., mosquitofish) (Hayes and Warner 1985; Hayes and Jennings 1986; Fisher and Shaffer 1996). All of these species were introduced into California in the late 1800's and early 1900's, and through range expansions, additional introductions, and transplants, these exotics have become established throughout most of California (USFWS 2005). Fisher and Shaffer (1996) reported an inverse relationship between the presence of western spadefoots and nonnative predators. Additionally, nonnative predators may have displaced western spadefoots at lower elevations, resulting in the species being found primarily at higher elevation sites where these predators apparently are less abundant (Fisher and Shaffer 1996). Fisher and Shaffer (1996) assessed native amphibian populations in the Coast Ranges, Sierra Nevada foothills, and Central Valley. They predicted that widespread declines of western spadefoots would occur if nonnative species continued to spread into low-elevation Coast Range habitats. In the San Joaquin Valley they found that relatively few nonnative predators were present, but native amphibians still had declined significantly. The San Joaquin Valley was the most intensively farmed and most modified of the three regions examined. It has been subject to extensive habitat loss, degradation, and fragmentation (USFWS 1998). Adverse impacts from these activities as well as isolation from other western spadefoot populations may have caused the observed declines. In addition, disking the soil as a part of row-cropping and other forms of intensive agriculture are likely to cause mortality of western spadefoots in their underground burrows.

WST Roads

Roads represent an additional threat to the western spadefoot. Road construction can result in direct mortality of the western spadefoot and can cause direct loss and fragmentation of habitat. Roads can also cause indirect loss of habitat by facilitating additional road construction and urban development (a major cause of habitat loss for the western spadefoot) (USFWS 2005). Mortality of western spadefoots from motor vehicle strikes has been observed by multiple researchers (Morey and Guinn 1992; CDFG 2010), and appears to be both widespread and frequent. For instance, Jennings (1998) reported road mortality at all seven sites that he surveyed in Kings and Alameda Counties. The impact of motor vehicle-caused mortality on populations of western spadefoots is unknown. Roads can also be a barrier to movements and effectively isolate populations. In Germany, roads are significant barriers to gene flow among common frog (*Rana temporaria*) populations and has resulted in genetic differentiation (Reh and Seitz 1990).

Similarly, Kuhn (1987, in Reh and Seitz 1990) determined that approximately 24 to 40 cars per hour on a given road resulted in mortality of 50 percent of common toads (*Bufo bufo*) as individuals attempted to migrate across the road. Heine (1987, *in* Reh and Seitz 1990) identified that 26 cars per hour effectively reduced toad survival at road crossings to zero.

WSt Noise and Vibration

Activities that produce low frequency noise and vibration, such as grading for development and seismic exploration for natural gas in or near habitat for western spadefoots, may be detrimental to the species. Dimmitt and Ruibal (1980) determined that southern spadefoots were extremely sensitive to such stimuli and would break dormancy and emerge from their burrows in response to these disturbances. Disturbances that cause spadefoots to emerge at inappropriate times could result in detrimental effects such as mortality or reduced fitness.

WST Data Gaps and Conservation Implications

In recent years, the ecology, status, and management of the western spadefoot have received increased attention. There are several sources of uncertainty regarding western spadefoot and its requirements in the Planning Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

WST Population and Habitat Distribution within the Planning Area

Western spadefoots occur in suitable habitat within the Planning Area. The species' overall distribution, abundance, and population structure are incompletely known. Habitat-types used by western spadefoot, such as drainages, vernal pools, other seasonal wetlands, some perennial wetlands, and adjacent uplands, occur throughout Sacramento County.

No comprehensive surveys for western spadefoot have been conducted in the Planning Area. Therefore, the population size and distribution of the species throughout the Planning Area are still incompletely known. In addition, though the distribution of suitable habitat-types is mapped and quantifiable, the quality of habitat (particularly as it relates to certain essential habitat components) for California tiger salamander within many areas is unknown. These information gaps limit our ability to identify the best lands available for preserving western spadefoot habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for western spadefoot will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, have multiple breeding sites that may function as a metapopulation, or are adjacent to these areas.

WSt Determining Threat Severity

Certain factors are known to contribute to western spadefoot decline rangewide. Exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., habitat fragmentation, changes in hydroperiod of potential breeding sites, etc.). Therefore, to improve conservation planning efforts for western spadefoot in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

WST Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Western Spadefoot

Achieving the conservation goals and objectives for western spadefoot will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability for western spadefoot. Whether created, restored or enhanced habitats can retain the functional attributes suitable for western spadefoot is unknown.

If habitat creation, restoration and enhancement techniques cannot eventually result in habitats with functional characteristics suitable for western spadefoot, then those lands would not support sustainable populations.

WST Literature Cited

Allaby, M. 1994. The Concise Oxford Dictionary of Ecology. Oxford University Press. New York, New York.

Anderson, P.R. 1968. The reproductive and developmental history of the California tiger salamander. Master of Science Thesis. Fresno State College, Fresno, California.

Baird, J. 1856. *Scaphiopus hammondii*. Master of Arts Thesis, Fresno State College, Fresno, California.

Baldwin, K.S. 1988. Effects of pond quality on the life history features of the western spadefoot toad. *American Zoologist* (abstract) 28:87A.

Barry, S.J. 1995. Vernal Pools on California's Annual Grasslands. *Rangelands* 17(5):173–175.

Barry, S.J. 1998. Managing the Sacramento Vernal Pool Landscape to Sustain Native Flora. Pp. 236–240 *in*: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren, Jr., and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems: proceedings from a 1996 conference. California Native Plant Society, Sacramento, California. 285 pages.

Bauder, E.T. 1987. Threats to San Diego Vernal Pools and a Case Study in Altered Pool Hydrology. *In*: Elias, T.S. (ed.). Conservation and Management of Rare and Endangered Plants. Proceedings of a California Conference on the Conservation and Management of Rare and Endangered Plants. *California Native Plant Society*. 1987:209–213.

Berven, K.A. and T.A. Grudzien 1990. Dispersal in the wood frog (Rana sylatica) – Implications for genetic population-structure. *Evolution* 44 (8): 2047-2056.

Berven, K.A. and T.A. Grudzien. 1990. Dispersal in the wood frog (*Rana sylvatica*): implications for genetic structure. *Evolution* 44:2047-2056.

Bragg, A.N. 1962. Predation on arthropods by spadefoot tadpoles. Herpetologica 18:144.

Bragg, A.N. 1964. Further study of predation and cannibalism in spadefoot tadpoles. *Herpetologica* 20(1):17-24.

Breden, F. 1987. The effect of post-metamorphic dispersal on the population genetic structure of Fowler's toad, (*Bufo woodhousei fowleri). Copeia* 987:386-395.

Brown, H.A. 1966. Temperature adaptation and evolutionary divergence in allopatric populations of the spadefoot toad, *Scaphiopus hammondii*. Doctor of Philosophy Dissertation, University of California, Riverside, California.

Brown, H.A. 1967. Embryonic temperature adaptations and genetic compatibility of two allopatric populations of the spadefoot toad, *Scaphiopus hammondii*. *Evolution* 21(4):742-761.

Brown, H.A. 1976. The status of California and Arizona populations of the western spadefoot toads (genus *Scaphiopus*). *Contributions in Science of the Natural History Museum of Los Angeles County* 286:1-15.

Burgess, R.C., Jr. 1950. Development of spade-foot toad larvae under laboratory conditions. *Copeia* 1950(1):49-51.

Burk, V.J. and J.W. Gibbons. 1995. Terrestrial buffer zones and wetland conservation: a case study of freshwater turtles in a Carolina bay. *Conservation Biology* 9:1365-1369.

California Department of Fish and Game (CDFG). 1998. Special animal list. California Natural Heritage Division, Sacramento, California. 66 pages.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Cannatella, D.C. 1985. A phylogeny of primitive frogs (Archaeobatrachians). Doctor of Philosophy dissertation, University of Kansas, Lawrence, Kansas.

Childs, H.E. 1953. Selection by predation on albino and normal spadefoot toads. *Evolution* 7:228–233.

Clark, G.M., T.J. Roscoe, M. J. van Ess, and N. Wymer. 1998. Management considerations for small vernal pool preserves: the Phoenix vernal pools. Pages 250-254 *In*: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren, Jr., and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems: proceedings from a 1996 conference. California Native Plant Society, Sacramento, California. 285 pages.

Cooperrider, A.Y., C. Carroll, K. Nelson, R. Noss, D. Olson, H. Welsh, and W. Zielinski. 1999. Terrestrial fauna of redwood forests. *In* R.F. Noss, editor. The Redwood Forest: History, Ecology, and Conservation of Coast Redwoods. Island Press, Washington, D.C.

Denver R.J., N. Mirhadi and M. Phillips. 1998. Adaptive plasticity in amphibian metamorphosis: response of *Scaphiopus hammondii* tadpoles to habitat desiccation. *Ecology* 79:1859-1872.

Dimmitt, M.A. and R. Ruibal. 1980. Environmental correlates of emergence in spadefoot toads (*Scaphiopus*). *Journal of Herpetology* 14(1):21-29.

Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense* Gray, *Hyla regilla* Baird and Girard, and *Scaphiopus hammondii* Girard. Master of Arts Thesis, Fresno State College, Fresno, California.

Fisher, R.N., and H.B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley. *Conservation Biology* 10(5):1387-1397.

Gill, D.E. 1978. The metapopulation ecology of the red-spotted newt, *Notophthalmus viridescens* (Rafinesque). Ecological Monographs 48:145-166.

Grubb, J.C. 1972. Differential predation by *Gambusia affinis* on the eggs of seven species of anuran amphibians. *American Midland Naturalist* 88:102-108.

Hanes, T. and L. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pages 38-49 *in*: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren, Jr., and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht, and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pages 49-60 *in*: D.H. Ikeda and R.A. Schlising, editors. Vernal pool plants, their habitats and biology. Studies from the Herbarium Number 8, California State University. Chico, California.

Hayes, M.P. and J. Warner. 1985. *Rana catesbeiana* (bullfrog) food. *Herpetological Review* 16(4):109.

Hayes, M.P., and J. Warner. 1985. *Rana catesbeiana* (bullfrog) food. *Herpetological Review* 16(4):109.

Hayes, M.P., and M.R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana*) responsible? *Journal of Herpetology* 20:490-509.

Heine, G. 1987. Einfache Meß- und Rechenmethode zur Ermittlung der Überlebenschance wandernder Amphibien beim Überqueren von Straßen.

Holland, R.F. 1998. Great Valley vernal pool distribution, photorevised 1996. Pages 71-75 *in*: C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren Jr. and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems--Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Jennings, M.R. 1988. Natural history and decline of native ranids in California. Pages 61-72 *in*: H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty, editors. Proceedings of the conference on California Herpetology, Southwestern Herpetologists Society.

Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game, Sacramento, California.

Keeler-Wolf, T., D.R. Elam, K. Lewis and S.A. Flint. 1998. California vernal pool assessment preliminary report. California Department of Fish and Game, Sacramento, California. 159 pages.

Kuhn, J. 1987. Strassentod der Erdkröte (*Bufo bufo* L.): Verlusquoten und Verkehrsaufkommen. Verhalten auf der Strasse. Beith. Veröff. Naturshutz und.

Marsh, D.M. and P.C. Trenham. 2001. Metapopulation dynamics and amphibian conservation. *Conservation Biology* 15:40-49.

Marty, J. 2004. Managing for diversity in California vernal pool grasslands. Presentation Abstracts. Ecology and Management of California Grasslands. April 2–3, 2004, University of California at Berkeley.

Morey, S.R. 1988. Western spadefoot *Scaphiopus hammondi*. Pages 56-57 *in*: D. C. Zeiner, W. F. Laudenslayer, Jr., and K. E. Mayer, editors. California's wildlife. Volume 1. Amphibians and reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, California.

Morey, S.R. 1998. Pool duration influences age and body mass at metamorphosis in the western spadefoot toad: implications for vernal pool conservation. Pages 86-91 *in*: C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren Jr., and R. Ornduff, editors. Ecology, conservation, and management of vernal pool ecosystems: Proceedings from a 1996 conference. California Native Plant Society, Sacramento, California.

Morey, S.R., and D. A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. Pages 149-158 *in*: D. Williams, S. Byrne, and T. A. Rado, editors. Endangered and sensitive species of the San Joaquin Valley, California. The California Energy Commission, Sacramento, California.

Morreale, S.J., J.W. Gibbons, and J.D. Congdon. 1984. Significance of activity and movement in the yellow-bellied slider turtle (*Pseudemys scripta*). *Canadian Journal of Zoology* 62:1038-1042.

Moyle, P. B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California. Copeia 1973:18-22.

Noss R.F., Strittholt J.R., Vance-Borland K., C. Carroll, and P.A. Frost. 1999. A conservation plan for the Klamath-Siskiyou ecoregion. *Natural Areas Journal* 19(4):392-411.

Pfennig, D.W. 1992. Polyphenism in Spadefoot toad tadpoles as a local evolutionary stable strategy. *Evolution* 46(5): 1408-1420.

Pulliam, H. R. 1988. Sources, sinks and population regulation. *The American Naturalist* 132:652-661.

R. Ferren, Jr., and R. Ornduff (eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society; Sacramento, California.

Reh, W., and A. Seitz. 1990. The influence of land use on the genetic structure of populations of the common frog *Rana temporaria*. *Biological Conservation* 54:239-249.

Ripley, B.J., K.C. Davis, B.J. Carter and M.A. Simovich. 2004. Toxicity of malathion and Roundup to the San Diego fairy shrimp. 2002-2003 Transactions of the Western Section of the Wildlife Society 38/39: 13-21.

Ruibal, R., L. Tevis, Jr., and V. Roig. 1969. The terrestrial ecology of the spadefoot toad *Scaphiopus hammondii*. *Copeia* 1969:571-584.

Sattler, P.W. 1980. Genetic relationships among selected species of North American *Scaphiopus*. *Copeia* 1980:605-610.

Seburn, C.N.L., D.C. Seburn, and C.A. Paskowski. 1997. Northern leopard frog (*Rana pipiens*) dispersal in relation of habitat. Pages 64-72 *in* D. M. Green, editor. Amphibians in decline: Canadian studies of a global problem. Society for the Study of Amphibians and Reptiles, St. Louis, Missouri.

Semlitsch, R.D. 1998. Biological delineation of terrestrial buffer zones for pond-breeding salamanders. *Conservation Biology* 12:1113-1119.

Semlitsch, R.D. and J.R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology* 17(5):1219-1228.

Seymour, R.S. 1973. Energy metabolism of dormant spadefoot toads (*Scaphiopus*). *Copeia* 1973:435-445.

Shoemaker, V.H., L. McClanahan, Jr., and R. Ruibal. 1969. Seasonal changes in body fluids in a field population of spadefoot toads. *Copeia* 1969:585-591.

Stebbins, R.C. 1951. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 1966. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 1985. *A field guide to western reptiles and amphibians*. Second Edition, revised. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R.C. 2003. *Western Reptiles and Amphibians*. Third Edition, revised. Houghton Mifflin Company, Boston, Massachusetts.

Storer, T.L. 1925. A synopsis of the amphibia of California. *University of California Publications in Zoology* 27:1-342.

United States Census Bureau. 1996. Populations Projections for States by Age, Sex, Race, and Hispanic Origin. Accessed online November 4, 2004 at http://www.census.gov/population/www/projections/ppl47.html#tableb

United States Department of Agriculture (USDA). 2000. Summary Report: 1997 National Resources Inventory (revised December 2000). Natural Resources Conservation Service, Washington, DC, and Statistical Laboratory, Iowa State University, Ames, Iowa. 89 pages.

United States Fish and Wildlife Service (USFWS). 1994. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened species; proposed rule. Federal Register 59(219):58982-59028.

United States Fish and Wildlife Service (USFWS). 1996. Endangered and threatened wildlife and plants; Notice of final decision on identification of candidates for listing as endangered or threatened. Federal Register 61:64481-64485.

United States Fish and Wildlife Service (USFWS). 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, Oregon. 319 pages.

United States Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland, Oregon. xxii + 574 pp.

Vollmar, J.E. (editor). 2002. Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands. Merced, California: Merced County UC Development Office.

Weins, J.J., and T.A. Titus. 1991. A phylogenetic analysis of *Spea* (Anura: Pelobatidae). *Herpetologica* 47:21-28.

Weintraub, J.D. 1979. Selection of daytime retreats by recently metamorphosed *Scaphiopus multiplicatus*. *Journal of Herpetology* 14(1):83-84.

WESTERN POND TURTLE (WPT)

Western Pond Turtle (WPT)

(Actinemys marmorata)

Status USFWS: None

Status CDFW: Species of Concern



WPT Listing Status

The western pond turtle (*Actinemys marmorata*), including the northwestern sub-species (*A. m. marmorata*) and the southwestern sub-species (*A. m. pallida*), is a California species of concern.

WPT Life History and Ecology

WPT Species Description and Life History

Taxonomy

The phylogenetic relationships of the western pond turtle are in a state of flux. Recent evidence suggests that the species is distinct from the other three species of the former group *Clemmys and Emys* in eastern North America (Bickham et al. 1996; Feldman and Parham 2001; Holman and Fritz 2001). Feldman and Parham (2002) and Parham and Feldman (2002) presented evidence that the western pond turtle should be placed in the genus *Emys*, along with the European pond turtle (*Emys orbicularis*) and Blanding's turtle (*Emys* [=*Emydoidea*] *blandingii*), and this view has been adopted by others (Spinks et al. 2003; Spinks and Shaffer 2005). In contrast, Holman and Fritz (2001) and Stephens and Wiens (2003) believed that the western pond turtle is not closely related to any extant species and should be placed in its own genus, *Actinemys*. The Turtle Taxonomy Working Group (2007) recorded it as "*Emys* or *Actinemys marmorata* Baird and Girard 1852 [formerly in *Clemmys*]." The genus *Actinemys* is used in both of the most recent standardized names of North American herpetofauna (Collins and Taggart 2002; Iverson et al. 2008) and globally (Fritz and Havas 2007).

The first specimens of *A. marmorata* were collected in 1841 in the vicinity of Puget Sound, Washington and described by Baird and Girard (1852) as *Emys marmorata*. Seeliger (1945) described two subspecies: northern pacific pond turtle (*Clemmys* [=*Actinemys*] *marmorata marmorata*) and southern pacific pond turtle (*Clemmys* [=*Actinemys*] *m. pallida*). A broad range

of intergradations occurs from the American River south through the San Joaquin Valley (Seeliger 1945; Stebbins 2003).

Recently, Spinks and Shaffer (2005) reported genetic differences indicating four un-named clades within *A. marmorata*, with the following distributions: 1) from the Transverse Mountains of southern California south into Baja California Norte; 2) San Joaquin Valley and adjacent foothills; 3) Ventura and Santa Barbara counties in central coastal California; and 4) all of the remaining populations. These data suggest considerable genetic fragmentation within the species, especially in the southern half of the range. The new groups do not follow the pattern of the earlier described subspecies (i.e., *A. m. marmorata* and *A. m. pallida*).

Species Description

The western pond turtle is the only native box turtle widely distributed in the western United States (Stebbins 1985). The painted turtle (*Chrysemys picta*), which is found primarily in the Midwestern United States, ranges into the Pacific Northwest. The painted turtle can be distinguished from the western pond turtle by the presence of yellow lines on the head and limbs, and red markings on the shell (Stebbins 1985). The pond slider or red-eared slider (*Trachemys scripta elegans*), has been introduced in the west. The pond slider can be distinguished from the western pond turtle by the presence of lengthwise wrinkles and streaks on the shell, absence of spotting on the head and neck, and a broad red, yellow, or orange stripe or blotch behind the eye (Stebbins 1985).

The western pond turtle is a small (9 to 19 centimeters, 3.5 to 7.5 inches) aquatic turtle characterized by an olive, dark brown, or black shell with a spotted head and neck (Stebbins 1985) and is often observed basking on logs, rocks, or floating on the surface of calm water bodies. The northwestern subspecies is defined on the basis of mottled head and neck coloration and a relatively high frequency of inguinal shields. The southern subspecies is defined on the basis of light head and neck coloration with more prominent markings in these areas, and a reduced frequency of occurrence of large inguinal shields.

Reproduction

The age of first reproduction is typically seven to nine years of age for the southern western pond turtle and 10 to 14 years of age for the northern western pond turtle (Holland 1991a). Most females lay eggs in alternate years; however, Hays *et a*l. (1999) reported that females nested every year. Gist and Jones (1989) suggest that sperm storage within the female may occur. This may allow adults to mate in the fall, when environmental conditions are highly suitable, while fertilization occurs during the next year. Clutch size ranges from one to 13 eggs, with larger females generally laying larger clutches (Holland 1985a, 1991a; Storer 1930; Ernst et

al. 1994). From May through August females make many extended movements into upland habitat where they dig shallow nests (Rathburn et al. 1992; Reese and Welsh 1997). Nest locations range from 12 to 402 m (39 to 1,319 ft) from aquatic habitat (Storer 1930; Holland 1991b; Rathbun et al. 1992) and are typically located in open areas dominated by grasses and forbs. Soils are dry and generally well drained with significant clay/silt content and low slope. Nests on sloping terrain often have a southern or southwestern exposure. Females excavate their nests in the ground, deposit the eggs, and cover the nest by scraping soil and vegetation over the eggs. Females tend to be very wary during overland nesting movements and may abandon nesting attempts if disturbed (Holland 1991a; Rathbun et al. 1992). Some level of nest site philopatry has been reported in the western pond turtle (Holland 1994). This suggests a great need for the protection of upland habitats that may be used by nesting turtles.

Incubation requires from 96 to 104 days in the wild (Holland 1991a). In captivity, Feldman (1982) noted an incubation period of 73 to 80 days. Normal hatching success is approximately 70 percent (Feldman 1982; Holland 1994). In southern California, juveniles may emerge from the nest in early fall; however, most hatchlings overwinter in the nest and move to water in during March to April (Holland 1994; Reese and Welsh 1997). Feldman (1982) suggested that the eggs of the western pond turtle must normally be laid in soils that are relatively dry. He noted that eggs placed in a wet environment exploded when internal pressure exceeded the limits of the eggs. He further noted that hatchlings did not leave the eggs when temperatures exceeded 27 degrees Celsius, “but once moved to a cooler environment, they broke free from the eggs within two to three hours.” This response, he concluded, may reduce the potential for dehydration when hatchlings leave the nest to seek aquatic habitat.

Diet and Foraging

Western pond turtles are opportunistic predators and occasionally scavengers (Bury 1986; Ashton et al. 1998). The majority of their diet consists of crustaceans, arthropods (i.e., insect larvae and crayfish), but western pond turtles also feed opportunistically on carrion. Western pond turtles will eat plant matter and have been observed foraging on submergent vegetation mats, as well as willow, alder, and other plant types (Bury 1986; Holland 1994). Herbivory in adults may provide an important source of nutrients and some proteins when animal food is unavailable. Adults, particularly females, consume a greater percentage of plant material than do juveniles (Bury 1986). Young turtles feed on mosquito larvae and other aquatic invertebrates, and nekton (Holland 1994). Western pond turtles commonly forage from early morning to early evening. It has been reported that the western pond turtle must swallow its food underwater (Holland 1994).

Dispersal and Migration

In the majority of its range, western pond turtles are active from approximately March through October with the peak of activity in May and June (USFWS 1999). Western pond turtles are generally inactive during the winter months (December to February) within most of their range; however, western pond turtles in southern California are active throughout the year. During this time, turtles either bury into the bottom mud of ponds, creeks, or other watercourses, or they move upland, well away from water, to find suitable habitat to wait out periods of unsuitable weather (Holland 1994; Reese and Welsh 1997). During the winter months, some western pond turtles may become active for short periods (Holland 1994). After their winter inactive period, western pond turtles have been reported to congregate in vernal pools before returning to riverine systems. This may allow them to utilize a warm water habitat while high seasonal water flows in rivers still exist (Ashton et al. 1998). In the fall and spring, hatchling turtles may move as far as 400 m from their nest locations to aquatic sites nearby (Holland 1994).

During their active season, western pond turtles engage in movements along the watercourses in which they live seeking suitable foraging and basking habitat (USFWS 1999). Active season home ranges are typically represented by several hundred meters of the same creek bank (Holland 1994), as they rarely move between drainages (Holland 1991a). Bury (1972a) found active season home ranges of western pond turtles to average one hectare (2.5 acre) for males, 0.3 hectare (0.7 acre) for females, and 0.4 hectare (one acre) for juveniles. Within the northern California stream system studied by Bury (1972a), males moved greater distances than females or juveniles. More extensive movement occurs seasonally when females move upland to find suitable nesting locations. When studying the terrestrial movements of western pond turtle within the Trinity River system of northern California, Reese (1996) found a mean terrestrial migration distance from aquatic sites of 118 meters (range = 39-423 meters).

Western pond turtles exhibit a high degree of site fidelity in both aquatic and terrestrial environments (Ashton et al. 1998; Holland 1994). Western pond turtles trapped and moved at the Los Vaqueros watershed for example, moved 3.2 to 6.4 kilometers (2 to 4 miles) to return to the original trapping site (USFWS 1999). Other long-distance movements may occur in response to drying of local water bodies, or other unknown factors (Ashton et al. 1998). This species is capable of moving distances of 1.6 to 12.8 kilometers (1 to 8 miles) over upland habitat to find water (Ernst et al. 1994; Holland 1994).

Survivorship

Survivorship in western pond turtles is apparently dependent on age and sex (USFWS 1999). Hatchlings and first-year juveniles average only eight to 12 percent survivorship and this rate may not increase significantly until turtles are 4–5 years old (USFWS 1999). Once the turtles

reach adulthood, survivorship increases dramatically, with an average adult turnover rate of only three to five percent (Holland *in* Hays et al. 1999). On average, adult males have a higher probability of surviving than adult females, with skewed sex ratios observed as high as 4:1 (Holland 1991a). The most plausible explanation for these observed sex ratios is that females suffer higher rates of predation during overland nesting attempts (Holland 1991a). The maximum-recorded age for western pond turtle is 39 to 40 years, but the expected longevity for this species is likely 50 to 70 years (Ashton et al. 1998; USFWS 1999).

The western pond turtle is preyed upon by a wide variety of native and introduced predators including large and small mammals, raptors, herons, corvids, snakes, frogs, and fish. Of the native predators, the raccoon (*Procyon lotor*) is a ubiquitous and effective predator, taking animals of all sizes, including eggs and hatchlings. The spotted skunk (*Spilogale putorius*) is also a suspected predator of nests. In Oregon, over 90 percent of the 100 nests examined in 1991-1992 were destroyed by predators, most likely raccoons or skunks (Holland 1992). Raccoon populations, in particular, respond favorably to urban environments, where human refuse may support larger populations than normal. Larger populations of raccoons and other predators combined with reduced nesting habitat for western pond turtles adjacent to aquatic habitat results in concentrations of nests, which are more easily detected by predators. Other native predators observed to have locally significant effects on western pond turtles are the black bear (*Ursus americanus*), river otter (*Lutra canadensis*), and mink (*Mustela vison*) (Holland 1991a). Two introduced predators of particular concern are the bullfrog (*Rana catesbeiana*) and the largemouth bass (*Micropterus salmoides*). Both species have been observed feeding on juvenile western pond turtles (Moyle 1973; Holland 1991a).

WPT Habitat Requirements and Ecology

Western pond turtles inhabit a variety of aquatic habitats from sea level to elevations of 1,980 meters (6,500 feet). They are found in fresh to brackish aquatic habitats including marshes, rivers, ponds and streams. Western pond turtles also may occur in man-made habitats, such as irrigation ditches, reservoirs, and sewage and millponds. Western pond turtles have been found in waters with temperatures as low as one degree Celsius (34 degrees Fahrenheit), and rarely in water with temperatures exceeding 39 to 40 degrees Celsius (102 to 104 degrees Fahrenheit) (Boyer 1965; Holland 1994; Jennings and Hayes 1994), but seem to become more active in water that consistently reaches 15 degrees Celsius (60 degrees Fahrenheit) (Jennings and Hayes 1994). Preferred aquatic habitat is characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, partially submerged rocks and logs, open mud banks and matted floating vegetation for thermoregulatory basking. Western pond turtles use aquatic habitats primarily for foraging, thermoregulation, and avoidance of predators (Boyer 1965; Holland 1994, Reese and Welsh 1998a). Basking is done intermittently throughout the day and is primarily conducted to maintain a body temperature of 24 to 32

degrees Celsius (75 to 90 degrees Fahrenheit) (Boyer 1965; Bury 1986). Hatchling and young turtles (one year) require shallow water areas (less than 30 centimeters [11.8 inches] deep) dominated primarily by emergent aquatic reeds (*Juncus* spp.) and sedges (*Carex* spp.) (Holland 1991a) and have been observed to avoid areas of open water lacking these species (Boyer 1965; Holland 1994; Hays et al. 1999; Reese and Welsh 1998a). Highly fluctuating flow rates associated with aquatic habitats may diminish habitat quality for western pond turtles (Reese and Welsh 1998b). Conversely, western pond turtles may leave aquatic habitat as pools dry. Holland (1994) reported overland movements of five kilometers (3.1 miles) possibly resulting in turtles seeking more appropriate aquatic habitat.

Western pond turtles "hibernate" in both aquatic and terrestrial habitats. Aquatic refugia consist of rocks, logs, mud, and undercut areas along banks while terrestrial hibernacula consist of burrows in leaf litter, heavy brush, or soil (Holland 1994). In woodland and sage scrub habitats along coastal streams in central California, most western pond turtles leave the drying creeks in late summer and return after winter floods. These turtles spend an average of 111 days in upland refugia that are an average of 50 meters (164 feet) from the creeks (Rathbun et al. 1992). Upland nesting sites must be dry and often have a high clay or silt component. Typically, western pond turtles dig nests in open sunny areas that are on slopes no steeper than 25 degrees.

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for western pond turtle are identified in Table G-3.16-1 and have been derived from input from local species experts.

Table G-3.16-1. Habitat Elements for Western Pond Turtle

Essential Activities	Land Cover Types	Habitat Elements
Foraging, breeding and dispersal	Vernal impoundment, vernal pool, vernal swale, seasonal wetlands, seasonal impoundment, swale, freshwater marsh, open water, and streams/creeks.	Fresh to brackish aquatic habitats characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, partially submerged rocks and logs, open mud banks and matted floating vegetation for thermoregulatory basking. Highly fluctuating flow rates associated with aquatic habitats may diminish habitat quality.
Nesting and aestivation	Blue oak savanna, blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, mixed riparian scrub, and valley grassland.	Aquatic aestivation sites consist of rocks, logs, mud, and undercut areas along banks while terrestrial hibernacula consist of burrows in leaf litter, heavy brush, or soil. Upland nesting sites must be dry and often have a high clay or silt component.

WPT Species Distribution and Population Trends

WPT Range-wide Distribution

The northern western pond turtle historically and currently ranges from Puget Sound, Washington, south through Oregon, generally west of the Sierra-Cascade crest, to the American River drainage in central California. The southwestern subspecies ranges from the vicinity of Monterey Bay, California, south through the Coast Ranges to Baja California, Mexico. The area of the Central Valley of California between the American River drainage and the Transverse Ranges is considered to be a zone of introgression between the two subspecies (Seeliger 1945). Historically, the western pond turtle inhabited the vast permanent and seasonal wetlands on the Central Valley, with the Tulare Lake Basin being a stronghold for the species. Today, the western pond turtle remains in 90 percent of its historic range, but at greatly reduced numbers (Holland 1991a). Records of the species from Grant County, Oregon, and British Columbia, Canada, are believed to represent introduced animals (Nussbaum et al. 1983; Storer 1937). Outlying populations of the species occur in Nevada primarily in the Carson River drainage. Whether or not these populations are native or represent introduced animals is debated by the experts (Holland 1991a).

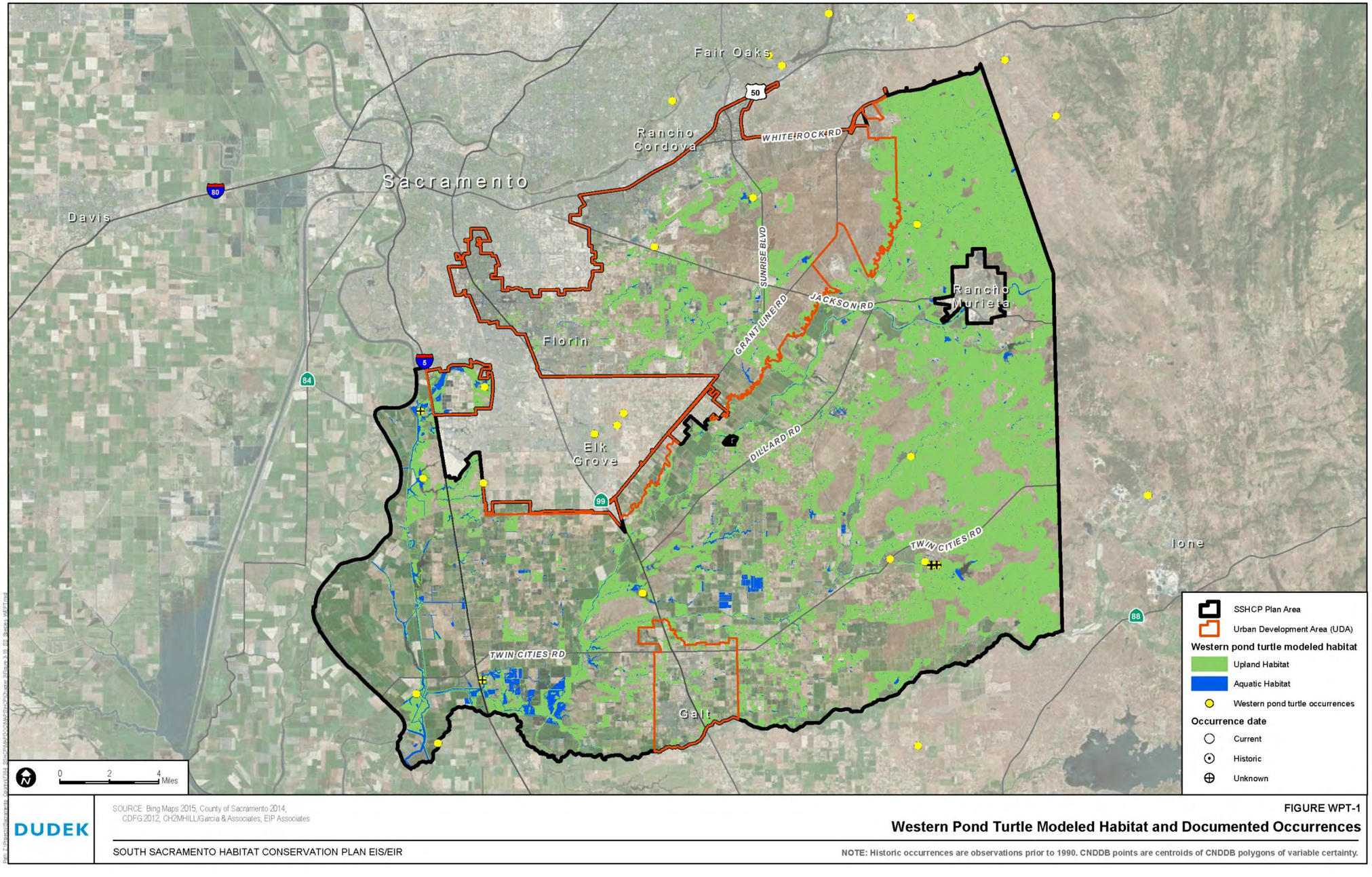
WPT Central Valley Distribution

Historically in the Central Valley, western pond turtles inhabited the permanent and seasonal wetlands of the area, with the Tulare Lake Basin as a major population center (Hays et al. 1999; USFWS 1999). Today, western pond turtles occur in 90 percent of their historic range in the Central Valley, but in greatly reduced numbers (Jennings and Hayes 1994).

WPT Distribution within the Planning Area

The Planning Area falls within the introgression zone for the two subspecies of western pond turtle. Currently there are no records for the southern western pond turtle in the Planning Area. There are 25 known occurrences of western pond turtle in Sacramento County (CDFG 2010). Among these 25 locations, seven are known to occur in the Urban Development Area (UDA) Figure WPT-1. The range of western pond turtle within the Planning Area is therefore considered to be the entire Planning Area.

Figure WPT-1 Western Pond Turtle Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

WPT Population Level and Trends

Western pond turtle were once abundant in California, Oregon, and locally in Washington, but are declining in numbers throughout their range, particularly in Washington, northern Oregon, southern California and Baja California (Lovich 1998; Hays et al. 1999). Although the western pond turtle still exists in about 90 percent of its original range, this species has been completely or ecologically extirpated from a number of areas including the Puget Sound area of Washington, Willamette River drainage in Oregon, Klamath River drainage of Oregon and California, San Francisco metropolitan area, southern San Joaquin Valley, Los Angeles and San Diego metropolitan areas, and Nevada (Holland 1991a). A variety of factors, including habitat loss and modification, commercial exploitation, disease, introduced predators and competitors, and other natural and man-made factors working together have resulted in a significant decline in western pond turtle populations throughout 75 to 80 percent of its range (Holland 1991a; Jennings and Hayes 1994; Hays et al. 1999; USFWS 1999).

The population status and trends of western pond turtle in the EIS/EIR Study Area is unknown. The western pond turtle is believed to have been abundant in the area when it supported extensive wetlands (Hays et al. 1999), but conversion of former wetlands to agricultural lands and urban development has likely resulted in local declines of these populations (Jennings and Hayes 1994).

WPT Threats to the Species

Although certain factors are known to contribute to western pond turtle decline rangewide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for western pond turtle in the Planning area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect western pond turtle and other target species, the potential for success in conserving the species is reduced. The following is a summary of factors known or suspected to negatively affect western pond turtle.

WPT Habitat Loss and Alteration

Habitat loss and alteration are most responsible for the historic decline of western pond turtles throughout its range (USFWS 1999). In California, over 90 percent of historic wetlands have been diked, drained, and filled primarily for agricultural development and urban development (Frayer et al. 1989). Urbanization has significantly altered or eliminated western pond turtle habitat, with significant impacts occurring in southern California. Local extirpation of the

southwestern subspecies in the Los Angeles Basin has occurred primarily through the channelization and cementing of numerous tributaries comprising the watershed (Brattstrom and Messer 1988; Holland 1991a).

Water diversions for agriculture and urban uses have also negatively affected western pond turtle populations. For example, agricultural, aquatic habitats, such as rice lands, are used to convey and store agricultural water and are consequently subject to changes in the timing and amount of water flow. Many rivers, particularly in more arid regions such as the San Joaquin Valley, have had significant portions of their flows diverted for agriculture resulting in very low flows or no flows for several miles of stream during summer months. In addition, numerous wetlands are channelized and periodically cleaned of aquatic vegetation, rendering them less suitable for western pond turtles. Furthermore, where western pond turtles persist adjacent to agricultural lands, upland nesting opportunities may be limited or nonexistent due to the practice of farming up to the edge of aquatic habitats. Such actions typically result in the elimination of western pond turtles from affected waters and isolation of turtle populations located in other portions of the drainage (Holland 1991a). Because western pond turtles are long-lived, populations may persist in these isolated wetlands long after recruitment of young has ceased (Jennings and Hayes 1994; USFWS 1999) resulting in very small and heavily adult biased populations (Holland 1991a).

Changes in the nature and timing of water releases from reservoirs adversely affects downstream habitat by eliminating or altering basking sites, upland refugia, foraging areas, and particularly, hatchling microhabitat (Reese and Welsh 1998b; Hays et al. 1999). High releases of water in the Trinity River in late May to early June in 1991, for example, scoured out several miles of hatchling turtle habitat (Holland 1991a) and a similar incident occurred in Piru Creek in southern California (Holland 1991a). Reservoirs also are typically stocked with exotic species of fish, which may expand into previously isolated turtle habitat. Reservoirs, in general, provide poor habitat for turtles because of the lack of emergent aquatic vegetation, basking sites, high recreational use, and presence of exotic species. Only small groups of adults are typically seen using reservoir habitats (Holland 1991a).

Another significant source of habitat alteration throughout the range of the western pond turtle is livestock grazing. Livestock have been documented as a major cause of excessive habitat disturbance in riparian areas (Behnke and Raleigh 1978; Kauffman and Krueger 1984). Cattle have a disproportionately greater adverse affect on riparian and other wetland habitats because they tend to concentrate in these areas, particularly during the dry season (Marlow and Pogacnik 1985). Cattle trample and eat emergent vegetation (Platts 1981) that serves as foraging habitat for turtles of all sizes and as critical microhabitat for hatchlings and first-year animals. Stream banks also are trampled by cattle often resulting in the collapse of undercut banks (Platts 1981; Kauffman et al. 1983) that provided refugia for turtles. Cattle grazing results

in increased erosion in streams (Winegar 1977), which in turn fills in deep pools, increases stream velocity, and adversely affects aquatic invertebrates (Behnke and Raleigh 1978; Platts 1981). Cattle may also crush turtles (Holland 1991a).

In-stream and streamside mining operations for sand and gravel also unfavorably alter western pond turtle habitat. These operations may directly eliminate or modify aquatic habitats and adjacent riparian habitat, alter the pattern of water flow, increase siltation, which fills in pools and alters the prey base, and disrupt normal behavior patterns or force displacement (Holland 1991a). In addition, removal of basking sites (e.g., logs, snags, and rocks) for aesthetic reasons or to facilitate recreational pursuits has a negative effect on western pond turtles. Loss of basking sites changes thermoregulatory behavior of turtles and reduces available foraging and refuge sites. According to Holland (1992), this activity is a primary factor in the observed decline of western pond turtles in several lakes in Oregon.

Construction of roadways and railways adjacent to western pond turtle habitat may adversely affect western pond turtles in several ways. First, roads often present a partial or complete barrier to turtles traveling overland to nesting or over wintering sites. Western pond turtles have been observed crushed on roadways in California, Oregon and Washington, with the majority of these being gravid (with developing young or eggs) or postpartum females (Holland 1985a, 1992). In addition to hampering access to nesting areas, roadbeds reduce the area of potential nesting. Roads constructed on south-facing slopes adjacent to the Umpqua River in Oregon likely eliminated both existing and potential nesting habitat (Holland 1992). Train tracks may have similar adverse affects on western pond turtles. At two locations in Oregon, western pond turtles were found dead between railroad tracks. In both cases, the railroad tracks paralleled the north side of the watercourse and were located between the watercourse and potential nesting habitat (Holland 1992). Holland (1992) hypothesized that the turtles became trapped between the railroad tracks when unable to find a way to exit under the rail.

WPT Over Utilization for Commercial, Recreational, Scientific, or Educational Purposes

Records of harvesting western pond turtles for food date back to the commercial harvest of this species for the San Francisco market (Lockington 1879). At the time, commercial harvest had already depleted populations of the western pond turtle in the San Francisco area, resulting in commercial operations focusing on populations in the San Joaquin Valley, particularly Tulare Lake (Elliot 1883; Brown 1940). Over 18,000 western pond turtles were offered for sale in San Francisco markets, presumably in one year in the 1890s (Smith 1895). This practice continued at least through the 1920s (Storer 1930).

Collection of western pond turtles for food still exists today with numbers from 20 to over 100 taken in a single outing (Holland 1991a). In addition, a commercial pet market exists for the species despite state prohibitions. Holland (1991a) noted western pond turtles for sale by a Florida dealer in 1991 and in some California pet stores through at least 1985. Bury (1982) noted removal of over 500 turtles from one lake in southern California for the pet trade.

Incidental collection of the species by fisherman may be a significant mortality factor in some areas. Approximately 3.6 percent of turtles captures by Holland (1991a) at an Oregon site had ingested fishhooks. At a California site, about six percent of captured turtles showed evidence of trauma related to removal of hooks, had hooks in place, or were found dead with hooks embedded in the esophagus or stomach (Holland 1991a). A turtle captured by Holland (1991a) in Oregon before and after ingestion of a fishhook had lost a significant amount of weight, suggesting that hooked turtles may eventually starve to death. Hooked turtles are often killed by fishermen, who mistakenly presume that western pond turtles are competitors for fish or consume ducklings (Holland 1991a). Similarly, indiscriminate shooting of western pond turtles can be a significant mortality factor, particularly in areas adjacent to urban development. In southern California for example, a substantial proportion of a western pond turtle population under study was shot by two individuals carrying rifles (Holland 1991a). In Washington, shooting of turtles for sport was reported in the early 1970's (Milner 1986).

WPT Disease, Parasitism and Non-Native Species

The only documented instance of disease outbreak in the western pond turtle occurred in an isolated Klickitat County population in southern Washington in 1990 (Holland 1991b). A significant portion of the population displayed symptoms of upper respiratory disease syndrome, a disease previously observed in desert tortoises (*Gopherus agassizi*). A minimum of 42 to 47 percent of the population died from the disease despite extensive efforts to treat diseased animals in captivity (Holland 1991b). The agent and mechanism responsible for the epidemic are unknown. Given the highly contagious nature of this disease and the high observed rates of mortality, the potential exists for significant population declines should this disease appear in contiguous western pond turtle populations. Evidence of this or a similar disease was found in a turtle from the Willamette River drainage in Oregon (Holland 1991a). Parasites that affect the western pond turtle include trematodes, helminthes, nematodes, lungworms, and leeches (Holland 1994).

Two introduced predators, the bullfrog and largemouth bass have been observed feeding on juvenile western pond turtles (Holland 1991a). Both species were introduced into the western United States in the latter part of the 19th century, and through range expansions, reintroductions, and transplants these species have become established across most of the western United States (Moyle 1973). Bullfrogs forage primarily in shallow water, the

microhabitat favored by hatchling and juvenile western pond turtles. Examination of a number of sites in Washington, Oregon, and California by Holland (1991a) indicates a negative correlation between the abundance of bullfrogs and the abundance of small western pond turtles. Their impact on populations of native species is thought to be significant due to the high reproductive potential of the bullfrog (i.e., egg masses may have 20,000 individuals eggs). Although many authors have reported bullfrogs feeding on native reptiles and amphibians, the extent to which bullfrogs can modify or contribute to the decline of their prey populations has been the source of much speculation (Morey and Guinn 1992). High concentrations of bullfrogs within structurally simple habitats (e.g., vernal pools and heavily grazed ponds) may have a significant impact on local populations. Interestingly, recent investigations suggest that Bullfrogs may not contribute to changes in the community composition and structure of native amphibians, particularly in complex habitat types (e.g., heavily vegetated stream courses) (Morey and Guinn 1992). The vulnerability of hatchling turtles remains very high when bullfrogs are sympatric with the western pond turtle. The impact of bullfrogs on the recruitment of western pond turtles is poorly understood and may not be evident until many years have past. This may result in significant gaps in recruitment or the absence of entire cohorts.

Another factor that may adversely affect western pond turtle populations is the introduction of non-native competitors. Numerous species of nonnative aquatic turtles have been observed within the range of the western pond turtle (Jennings 1987). These species include the painted turtle, red-eared slider, common snapping turtle (*Chelydra serpentina*), spiny soft-shelled turtle (*Apalone spinifera*), alligator snapping turtle (*Macroclemys temmincki*), stinkpot (*Sternotherus odoratus*), diamondback terrapin (*Malaclemys terrapin*), and Mississippi map turtle (*Graptemys kohni*). Most of these turtles represent animals imported for the pet or food trade that have been released or escaped captivity. In addition to competition for food, exotic turtles also may carry new pathogens for which western pond turtles exhibit no immunity.

Additional non-native competitors of particular concern are carp (*Cyprinus carpio* and *Carassius auratus*), aunfish (*Lepomis* spp. and *Pomoxis* spp.), and crayfish (*Cambarus*, *Procambarus*, and *Pacifasticus*). Carp alter aquatic habitats by consuming emergent and floating vegetation. Their activities also produce turbid water conditions. These alterations of the aquatic habitat may have a significant impact on hatchling turtle habitat, may reduce the availability of invertebrate prey, and decrease turtle foraging success as turtles rely primarily on vision to capture prey (Holland 1991a). Sunfish, which are capable of reaching large population sizes in aquatic habitats may modify or compete for the available invertebrate prey base (Holland 1991a). Although direct scientific data are unavailable to support this hypothesis, Holland (1991a) noted that several sites lacking native or nonnative fishes support the largest known western pond turtle populations. Crayfish, which also may prey on young western pond turtles, may compete with western pond turtles for both the invertebrate prey base and carrion (Holland 1991a).

WPT Other Natural or Manmade Factors Affecting Its Continued Existence

Off-road vehicle activity poses a threat to western pond turtles both directly and indirectly. Direct impacts include crushing of individual turtles or nests and access to remote populations of the turtle for collection or shooting. Off-road vehicle activity indirectly impacts western pond turtles by interfering with normal foraging and basking activities, and by altering or restricting overland or instream movements of turtles. Long-term impacts of off-road vehicle activity include increased soil erosion, soil compaction, vegetation removal, siltation of the watercourse, and alteration or loss of refugia. According to Holland (1991a), western pond turtle populations located in off-road vehicle areas in California tend to be small and disjunct, and occur in very limited habitats. Poor habitat quality combined with a very low probability of maintenance or reestablishment by immigration, renders these populations highly susceptible to extirpation.

Boat traffic also may adversely affect western pond turtles. Observations on the Rogue River in Oregon by Holland (1992) indicate that high levels of boat traffic may detrimentally alter basking and other behavior patterns. In addition, turtles that become acclimated to boat or vehicle traffic are potentially more susceptible to shooting. Holland (1991b) found that flight distances were significantly less in turtle populations acclimated to low or moderate levels of vehicle traffic than for populations in isolated areas. Boat propellers may also injure or kill western pond turtles (Holland 1992).

The exact role that contaminants play in western pond turtle mortality is unknown. Only one documented instance of contaminant-related mortality of western pond turtles was reported by Bury (1972b). Turtle mortality resulted from a spill of diesel fuel. In Oregon, pollution of several tributaries to the Willamette River (i.e., the Tualatin and Clackamas Rivers) in the late 1950's and 1960's may be related to the disappearance of western pond turtles from these rivers (Holland 1991a). The long life span and food habits of the western pond turtle could render this species prone to bioaccumulation of contaminants, such as heavy metals; however, no data are available to support this hypothesis (Holland 1991a).

The most significant natural factor affecting western pond turtle populations is drought. The six-year drought in California (1987 to 1992) had a major effect on western pond turtle populations, particularly in central and southern California within the range of the southern western pond turtle. Surveys of eight sites conducted by Holland (1991a) from 1987 to 1991 in central and southern California indicated that turtle populations had declined from 65 to 100 percent as a result of drought. One population in the Pajaro-Salinas River drainage of central coastal California, which contained the highest recorded density of turtles, suffered an 85 percent population decline (Holland 1991a). Drying of the habitat resulted in 1) concentrating large numbers of turtles in the few remaining pools, 2) major increases in the distance between pools, 3) exhaustion of the prey base, 4) increased exposure to predators, and 5) a general

increase in stress suffered by the turtle population (Holland 1991a). Observations of additional sites by Holland (1991a) within the range of the southern western pond turtle indicated that drought related declines in populations of this subspecies were widespread. Where non-native predators and competitors were present, the adverse affects of drought were probably magnified (Holland 1991a).

Fire, which is often associated with drought and the over accumulation of combustible plant material, adversely affects western pond turtles in several ways. Unseasonal fires may kill overwintering turtles or hatchlings in the nest. Sweet (*in* Holland 1991a) reported that the Sespe Creek fire in fall 1991 probably killed any adult or hatchling turtles overwintering in the uplands. Excessive siltation of streams following fires may alter the prey base and eliminate refugial habitat, generally decreasing the suitability of the stream for turtles (Holland 1991a).

WPT Data Gaps and Conservation Implications

The ecology, status, and management of western pond turtle s have received increased attention in recent years. There are several sources of uncertainty regarding western pond turtle and its requirements in the Planning Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

WPT Population and Habitat Distribution within the Planning Area

Western Pond Turtles occur in suitable habitat within the Planning area; however, their overall distribution, abundance, and population structure are not well known. Habitat-types used by western pond turtles, such as suitable riverine and lacustrine habitats and adjacent uplands, occur throughout much of the Central Valley and are well represented in Sacramento County and the Planning area.

Because comprehensive surveys for western pond turtle in the Planning Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and distribution of the species throughout the Planning Area are not known. In addition, though the distribution of different land cover-types is mapped and quantifiable, the quality of habitat for western pond turtle s within most of these areas is unknown. These information gaps limit our ability to identify the best lands available for preserving western pond turtle habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for western pond turtle will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

WPT Determining Threat Severity

Although certain factors are known to contribute to western pond turtle decline rangewide, exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for western pond turtle in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

WPT Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Western Pond Turtle

Achieving the conservation goals and objectives for western pond turtle will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability of western pond turtle. Whether restored or enhanced habitats can retain the structural attributes suitable for western pond turtle is unknown.

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for western pond turtle, then those lands would not support sustainable populations.

WPT Literature Cited

Allaby, M. 1994. The Concise Oxford Dictionary of Ecology. Oxford University Press. New York, New York. 415 pp.

Ashton, D.T., A. J. Lind, and K.E. Schlick. 1998. WPT (*Clemmys marmorata*). Natural History. Unpublished report. USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, California.

Baird, S.F. and C. Girard. 1852. Descriptions of new species of reptiles collected by the U.S. Exploring Expedition under the command of Capt. Charles Wilkes, U.S.N. *Proceeding of the Academy of Natural Science Philadelphia* 6:174-177.

Behnke, R.J. and R.F. Raleigh. 1978. Grazing and the riparian zone: Impacts and management perspectives. Pages 263-267, *In*: R.R. Johnson and J.F. McCormick (technical coordinators) Strategies for Protection and Management of Floodplain Wetlands and Other Riparian Ecosystems. U.S.D.A. Forest Service General Technical Report WO-12.

Bickham, J. W., T. Lamb, P. Minx, and J. C. Patton. 1996. Molecular Systematics of the Genus *Clemmys* and the Intergenetic Relationships of Emydid Turtles. *Herpetelogica*. 52(1): pp 89-97.

Boyer, D. R. 1965. Ecology of the basking habitat in turtles. *Ecology* 46:99-118.

Brattstrom, J.W., and D.F. Messer. 1988. Current status of the southwestern pond turtle, *Clemmys marmorata pallida*, in southern California. Final Report, Contract C-2044. California Department of Fish and Game, Sacramento. 62 pp.

Brown, R.R. 1940. *History of Kings County*. A.R. CaWPTon, Hanford, California.

Bury, R.B. 1972a. Habits and home range of the Pacific pond turtle, *Clemmys marmorata*, in a stream community. Dissertation for Doctor of Philosophy and Zoology. University of California, Berkeley. 205 pp.

Bury, R.B. 1972b. The effects of diesel fuel on a stream fauna. *California Department of Fish and Game Bulletin* 58:291-295.

Bury, R.B. 1982. Turtle of the month -*Clemmys marmorata* - a true western turtle (Pacific Pond). *Tortuga Gazette*:3-5.

Bury, R.B. 1986. Feeding ecology of the turtle, *Clemmys marmorata*. Journal of *Herpetology*. 20(4):515-521.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Carr, A. 1952. *Handbook of turtles: The turtles of the United States, Canada and Baja California*. Cornell University Press, Ithaca, New York.

Collins, J.T. and T.W. Taggart. 2002. Standard Common and Current Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians. Fifth Edition. Publication of The Center for North American Herpetology, Lawrence, Kansas. iv + 44 pp. http://www.cnah.org/.

Cooperrider, A.Y., C. Carroll, K. Nelson, R. Noss, D. Olson, H. Welsh, and W. Zielinski. 1999. Terrestrial fauna of redwood forests. *In* R.F. Noss, editor. The Redwood Forest: History, Ecology, and Conservation of Coast Redwoods. Island Press, Washington, D.C.

Elliot, W.W. 1883. *History of Tulare County, California*. San Francisco, California.

Ernst, C.H., J.E. Lovich, and R.W. Barbour. 1994. *Turtles of the United States and Canada*. Smithsonian Institution Press, Washington, D.C.

Evenden, F.G., Jr. 1948. Distribution of the turtles of western Oregon. *Herpetologica* 4:201-204.

Feldman, C.R. and J.F. Parham. 2001. Molecular Systematics of Emydine Turtles. Linnaeus Fund Research Report. *Chelonian Conservation and Biology*. 4(1): pp 224-228.

Feldman, C.R. and J.F. Parham. 2002. Molecular Phylogenetics of Emydine Turtles: Taxonomic Revision and the Evolution of Shell Kinesis. *Molecular Phylogenetics and Evolution*. 22(3): pp 388-398.

Feldman, M. 1982. Notes on reproduction in *Clemmys marmorata*. *Herpetological Review* 13(1):10-11.

Frayer, W.E., D.D. Peters, and H.R. Pywell. 1989. Wetlands of the California Central Valley: Status and trends. U. S. Fish and Wildlife Service, Portland, Oregon.

Fritz, U. and P. Havas. 2007. Checklist of chelonians of the world. *Vertebrate Zoology* 57: 149-368.

Gist, D. H. and J.M. Jones. 1989. Storage of sperm in the oviducts of turtles. *Journal of Morphology* 199:379-384.

Gray, E. 1995. DNA fingerprinting reveals lack of genetic variation in northern populations of the western pond turtle (*Clemmys marmorata*). *Conservation Biology* 9:1244-1255.

Hays, D.W., K.R. McAllister, S.A. Richardson, and D.W. Stinson. 1999. Washington State Recovery Plan for Western Pond Turtle. Washington Department of Fish and Wildlife, Olympia, Washington.

Holland, D.C. 1985a. An ecological and quantitative study of the western pond turtle (*Clemmys marmorata*) in San Luis Obispo County, California. Master's Thesis, California State University Fresno, Fresno, California. 181 pp.

Holland, D.C. 1985b. *Clemmys marmorata* (western pond turtle) feeding. *Herpetological Review* 16(4):112-113.

Holland, D.C. 1991a. A synopsis of the ecology and status of the western pond turtle (*Clemmys marmorata*) in 1991. Report prepared for the U.S. Fish and Wildlife Service, National Ecology Research Center. 146 pp.

Holland, D.C. 1991b. Status and reproductive dynamics of a populations of western pond turtles (*Clemmys marmorata*) in Klickitat County, Washington in 1991. Report prepared for Washington Department of Wildlife. 40 pp. + figures, tables and appendices.

Holland, D.C. 1992. A synopsis of the distribution and current status of the western pond turtle (*Clemmys marmorata*) in Oregon. Report prepared for Oregon Department of Fish and Wildlife. 41 pp. + tables and figures.

Holland, D.C. 1994. The Western Pond Turtle: Habitat and History. US Department of Energy, Bonneville Power Administration, Portland, Oregon. DOE/BP-62137-1.

Holman, J. A. and U. Fritz. 2001. A New Emydine Species from the Medial Miocene (Barstovian) of Nebraska, USA with a New Generic Arrangement for the Species of *Clemmys* sensu McDowell (1964) (Reptilia: Testudines: Emydidae). *Zoologische Abhandlungen*, 51(19): pp 321-343.

Iverson, J.B., P.A. Meylan, and M.E. Seidel. 2008. Testudines-Turtles. In: Crother, B.I. (Ed.) Scientific and Standard English Names for Amphibians and Reptiles of North America North of Mexico. SSAR Herpetological Circular 37, pp. 67-74.

Jennings, M.R. 1987. Annotated checklist of the amphibians and reptiles of California, second revised edition. Southwestern Herpetologists Society, Special Publication 3:1-48.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and reptile species of concern in California. California Department of Fish and Game technical report, Inland Fisheries Division, Rancho Cordova, California.

Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications. A review. *Journal of Range Management* 37(5):430-438.

Kauffman, J.B., W.C. Krueger, and M. Vavra. 1983. Impacts of cattle on streambanks in northeastern Oregon. *Journal of Range Management* 36(6):683-685.

Lockington, W.N. 1879. Notes on some reptiles and batrachia of the Pacific coast. *The American Naturalist* 13(12):780-784.

Lovich, J.E. 1998. Human-induced changes in the Mojave and Colorado Desert Ecosystems: recovery and restoration potential. Pages 529-531 *in* M.J. Mac, P.A. Opler, C.E. Puckett-Haecker, and P.D. Doran (eds.). Status and trends of the nation's biological resources. US Dept. of the Interior, USGS.

Marlow, C.B. and T.M. Pogacnik. 1985. Time of grazing and cattle-induced damage to streambanks. Pages 279-284, *In*: R.R. Johnson, C.D. Ziebell, Patton, D. R., P.F. Folliott, and R.H. Hamre (technical coordinators) Riparian Ecosystems and Their Management: Reconciling Conflicting Uses. First North American Riparian Conference. United States Department of Agriculture, National Forest Service, General Technical Report RM-120.

Milner, R. 1986. Status of the western pond turtle (*Clemmys marmorata*) in northwestern Washington, 1986. Unpublished report. Washington State Department of Fish and Game, Olympia, Washington.

Morey, S.R. and D.A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. Pp. 149-157 *In* Williams, D.F., S. Byrne, T.A. Rado (editors). Endangered and Sensitive Species of the San Joaquin Valley, California. California Energy Commission, Sacramento, California. 1992.

Moyle, P.B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California. *Copeia* 1973 (1):18-22.

Noss, R.F., J.R. Strittholt, K. Vance-Borland, C. Carroll, and P. Frost. 1999. A conservation plan for the Klamath-Siskiyou ecoregion. *Natural Areas Journal* 19 (4):392-411.

Nussbaum, R.A., E.D. Brodie, Jr., and R.C. Storm. 1983. *Amphibians and reptiles of the Pacific Northwest. University Press of Idaho*. 332 pp.

Parham, J.F. and C.R. Feldman. 2002. Generic Revisions of Emydine Turtles. Turtle and Tortoise Newsletter. Issue 6: pp 28-30. Accessed online at http://www.chelonian.org/ttn/archives/ttn6/pp28-30.shtml.

Platts, W.S. 1981. Influence of forest and rangeland management on anadromous fish habitat in western North America - effects of livestock grazing. General Technical Report PNW-124. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. 25 pp.

Rathbun, G.B., N. Siepel, and D. Holland. 1992. Nesting behavior and movements of western pond turtles, *Clemmys marmorata*. *The Southwestern Naturalist* 37(3)319-324.

Reese, D.A. 1996. Comparative demography and habitat use of western pond turtles in northern California: the effects of damming and related alterations. PhD dissertation. University of California, Berkeley.

Reese, D.A. and H.H. Welsh. 1997. Use of terrestrial habitat by western pond turtles, *Clemmys marmorata*: implications for management. Pp. 352-357 *in* J. Van Abbema, editor. Proceedings: Conservation, Restoration, and Management of Tortoises—and International Conference. State University of New York, Purchase, New York.

Reese, D.A. and H.H. Welsh. 1998a. Habitat use by western pond turtles in the Trinity River, California. *Journal of Wildlife Management* 62:842-853.

Reese, D.A. and H.H. Welsh. 1998b. Comparative demography of *Clemmys marmorata* populations in the Trinity River of California in the context of dam-induced alterations. *Journal of Herpetology* 32(4):505-515.

Seeliger, M.L. 1945. Variation in the Pacific mud turtle. *Copeia* 1945(3): 150159.

Semlitsch, R.D. and J.R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology* 17(5):1219-1228.

Smith, H.M. 1895. Notes on the reconnaissance of the fisheries of the Pacific Coast of the United States in 1884. Bulletin of United States Fish Commission 14:223-288.

Spinks, P.Q. and H.B. Shaffer. 2005. Rangewide Molecular Analysis of the Western Pond Turtle (*Emys marmorata*): Cryptic Variation, Isolation by Distance, and Their Conservation Implications. *Molecular Ecology*. 14: pp 2047-2064.

Spinks, P.Q., G.B. Pauly, J.J. Crayon and H.B. Shaffer. 2003. Survival of the western pond turtle (*Emys marmorata*) in an urban California environment. *Biological Conservation*.113: pp 257-267.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians*, 3rd Edition. Houghton Mifflin Company. Boston, Massachusetts. 530 pp.

Stebbins, R.C. 1985. *A field guide to western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts. 336 pp.

Steinhart, P. 1990. California's wild heritage. Threatened and endangered animals in the golden state. California Department of Fish and Game, California Academy of Sciences, Sierra Club Books. 108 pp.

Stephens, P.R. and J.J. Wiens. 2003. Ecological Diversification and Phylogeny of Emydid Turtles. *Biological Journal of the Linnean Society*. 79(4): pp 577-610.

Storer, T.I. 1930. Notes on the range and life-history of the Pacific fresh-water turtle, *Clemmys marmorata*. University of California Publications in Zoology. 32(5):429-441.

Storer, T.I. 1937. Further notes on the turtles of the north Pacific coast of North America. *Copeia*:250-252.

United States Fish and Wildlife Service (USFWS). 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened, proposed rule. Federal Register 56(225):58804-58836.

United States Fish and Wildlife Service (USFWS). 1993. Endangered and threatened wildlife and plants; petition finding on the western pond turtle. Federal Register 58(153): 42717-42718.

United States Fish and Wildlife Service (USFWS). 1999. Draft Recovery Plan for the western pond turtle (*Thamnophis gigas*). US Fish andWildlife Service, Portland, Oregon. Pages 116-131.

Winegar, H.H. 1977. Camp Creek channel fencing - Plant, wildlife, soil, and water response. *Rangeman's Journal* 4(1):10-12.

GIANT GARTER SNAKE (GGS)

Giant Garter Snake (GGS)

(Thamnophis gigas)

Status USFWS: Threatened

Status CDFW: Threatened



GGS Listing Status

The giant garter snake (*Thamnophis gigas*) was listed as threatened by the State of California in 1971 and the United States Fish and Wildlife Service (USFWS) in 1993 under the California and Federal Endangered Species Acts respectively (USFWS 1993).

GGS Life History and Ecology

GGS Species Description and Life History

Species Description

The giant garter snake is one of the world's largest garter snakes, reaching a total length of up to 162 centimeters (64 inches). Females are slightly longer and proportionately heavier (typically 500 to 700 grams [1.0 to 1.4 pounds]) than males. The maximum number of dorsal scale rows is 23 or 21; supralabials (scales on upper lip) number eight with the 6th shorter than the 7th; subcaudals (scales on the underside of the tail, counted beginning with the first scale behind the vent) number 73 to 81 inches males and 65 to 73 inches females; and the lateral stripe, when present, is confined to dorsal scale rows two and three (Van Denburgh and Slevin 1918; Fitch 1940; Stebbins 1985; Rossman and Stewart 1987; Rossman et al. 1996).

Dorsal background color varies from brown to olive with a cream, yellow, or orange dorsal stripe and two light colored lateral stripes. Some individuals have a checkered pattern of black spots between the dorsal and lateral stripes. Background coloration, prominence of the checkered pattern, and the three yellow stripes are individually and geographically variable (R. Hansen 1980). Individuals in the northern Sacramento Valley for example, tend to be darker with more pronounced mid-dorsal and lateral stripes (California Department of Fish and Game [CDFG] 1992). The ventral coloration is variable from cream to orange to olive-brown to pale blue with or without ventral markings (R. Hansen 1980; CDFG 1992). Supralabial scales are dull brown and usually lack distinct wedge markings (R. Hansen 1980; CDFG 1992). As giant garter snake nears ecdysis (skin shedding), all pattern characteristics and colors may be obscured.

The giant garter snake can be distinguished from the common garter snake (*T. sirtalis*) and western terrestrial garter snake (*T. elegans*) by its color pattern, scale numbers, and head shape. The giant garter snake lacks the red lateral markings of the common garter snake. The Western terrestrial garter snake has well defined stripes and a black to dark gray ground color. The giant garter snake has a maximum of 23 or 21 scale rows and eight supralabials while the common garter snake has a maximum of 19 scale rows and seven supralabials, and the western terrestrial garter snake has a maximum of 19 or 21 scale rows and eight supralabials. In addition, the giant garter snake's seventh supralabial scale is wider than the sixth (R. Hansen 1980; Stebbins 1985; Rossman et al. 1996). The giant garter snake has an elongated head with a pointed muzzle (Stebbins 1985; Rossman et al. 1996) where the relative width of the muzzle of the giant garter snake averages 75.6 percent in males and 65.1 percent in females (calculated as InR/NR, where InR is the width of contact between the internasal and rostral scales, and NR is the width of contact between the nasal and rostral scales) (Rossman et al. 1996). The common garter snake and western terrestrial garter snake have broad muzzles with the relative muzzle width of the

western terrestrial garter snake averaging 99 to 112 percent, and the relative muzzle width of the common garter snake averaging 127.6 percent (Rossman et al. 1996).

Subspecies have not been described for the giant garter snake, but there appears to be some morphological variation, principally with aspects of dorsal coloration and pattern, that conforms to geographic units (i.e., northern and southern groupings) (Boundy 1990). To date, there have been no range-wide studies of genetic variation in the giant garter snake. The only contemporary genetic studies on the giant garter snake have incorporated allozyme variation (Lawson and Dessauer 1979) or mtDNA sequencing (de Queiroz and Lawson 1994) in phylogenetic studies of the Sierra Nevada garter snake complex.

Reproduction

The giant garter snake breeding season begins soon after emergence from over-wintering sites and extends from March into May (USFWS 1999). Females brood young internally, and typically give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23 (Hansen and Hansen 1990). At birth, young have an average snout-vent length of approximately 20.6 centimeters (8.1 inches) and weight of three to five grams (0.1 to 0.2 ounces). Following birth, young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size by one year of age (G. Hansen pers. comm.). Sexual maturity averages three years in males and five years for females (USFWS 1999).

During 1989 and 1990, sex ratio data were collected from giant garter snakes captured by hand in the Natomas Basin population near Sacramento County (Hansen and Brode 1993). In a sample of 191 individuals, the ratio of females to males was approximately 1.5:1 (Hansen and Brode 1993). During 1996, sex ratio data were collected for three other populations (Wylie et al. 1997). The ratio of females to males was approximately 1:1 at both Badger Creek Marsh in Sacramento County and Gilsizer Slough in Sutter County. In contrast, the sex ratio was roughly 2:1 at Colusa National Wildlife Refuge in Colusa County.

Diet and Foraging

Giant garter snakes feed primarily on aquatic prey such as fish and amphibians. Brode (1988) and G. Hansen (1988) suggest that the giant garter snake specializes in ambushing small fish underwater, and Rossman et al. (1996) suggest the giant garter snake occupies a niche similar to some eastern water snakes (*Nerodia* spp.). They appear to take advantage of pools which trap and concentrate prey items. R. Hansen (1980) and Hansen and Brode (1993) observed giant garter snakes feeding on mosquitofish (*Gambusia affinis*) confined to small pools of

water. The predominant food items of giant garter snakes are now introduced species such as carp (*Cyprinus carpio*), mosquitofish, other small fish, and bullfrogs (*Rana catesbeiana*) (Fitch 1941; Fox 1951; R. Hansen 1980; Brode 1988; Hansen and Brode 1993; Rossman et al. 1996; USFWS 1993). Native species preyed upon by giant garter snakes include the Sacramento blackfish (*Orthodox microlepidotus*) and Pacific treefrog (*Hyla regilla*). Cunningham (1959) reported a record of a giant garter snake from Buena Vista Lake, Kern County, swallowing a live Sacramento blackfish, which it had just dragged onto the bank. Historically, giant garter snake food also may have included the extinct thick-tailed chub (*Gila crassicauda*) and the federally threatened California red-legged frog (*Rana draytonii*), which has been extirpated from the Central Valley floor (R. Hansen 1980; Rossman et al. 1996).

Dispersal and Migration

Giant garter snakes begin emerging from winter retreats around April 1st. By April 15th, most giant garter snakes are active and beginning to search for food. By May 1st, all giant garter snakes have usually emerged and are actively foraging. Around October 1st, giant garter snakes begin seeking winter retreats. Foraging and other activities are sporadic at this time and dependent upon weather conditions. By November 1st, most snakes are in winter retreats and will remain there until spring (Brode 1990; Hansen and Brode 1993).

Seasonal activity may begin earlier than April 1st (as early as March 1st) in some years. Hansen and Brode (1993) concluded that they may emerge from winter retreats during any month of the year based on captures of giant garter snakes in the Natomas Basin in March and multiple observations of injured snakes. In 1996, captures of giant garter snakes began in March at Gilsizer Slough and at Colusa National Wildlife Refuge (Wylie et al. 1997). Late March was reported as the earliest time of regular seasonal activity at the Mendota Wildlife Area (R. Hansen 1980). Giant garter snake activity peaks during April and May; therefore, they may become less detectable in mid- to late summer (Hansen and Brode 1993). Hansen and Brode (1993) found that the sudden decrease in observations of giant garter snakes along canals in June and July corresponded with the sudden appearance of giant garter snakes within maturing rice fields. Captures at Gilsizer Slough and Colusa National Wildlife Refuge became infrequent after June of 1996 (Wylie et al. 1997). At Badger Creek Marsh, captures in 1996 became infrequent after mid-July, and in August of 1996, giant garter snakes at Badger Creek Marsh used burrows as much as 50 meters (164 feet) away from the marsh edge to escape extreme heat (Wylie et al. 1997).

Giant garter snakes are generally inactive during the winter months although some individuals may bask or move short distances on warmer days. For example, juveniles were occasionally observed at the Mendota Wildlife Area during the winter months when the air temperature was only 15 degrees Celsius (59 degrees Fahrenheit) (R. Hansen 1980). In the Sacramento

Valley, 50 percent of the radio-telemetered snakes were observed, at some time, basking or moving short distances during the winter months (Wylie et al. 1997).

Fitch (1940) considered the giant garter snake as a "strictly diurnal snake"; however, observations by R. Hansen (1980) suggest that giant garter snakes are flexible in terms of their activity. Giant garter snakes were observed feeding at night on mosquitofish in small pools of water, and giant garter snakes at the Mendota Wildlife Area exhibited diurnal activity during the spring (March to June), and nocturnal activity during the hot summer months (R. Hansen 1980). Cunningham (1959) observed giant garter snakes feeding at night in September, 2.5 hours after dark at Buena Vista Lake. Hansen and Brode (1993) also observed giant garter snakes after sunset during hot weather. G. Hansen reported observing giant garter snakes active at night at the Mendota Wildlife Area, Gray Lodge Wildlife Area, and within the Natomas Basin during cool spring nights as well as during hot weather (USFWS 1993). The daily activity of giant garter snakes as described by Hansen and Brode (1993) follows a general pattern: 1) emergence from burrows after sunrise; 2) increasing body temperature to activity temperatures by basking, particularly during cool weather or on cold mornings; and 3) foraging or courting activity for the remainder of the day.

During radio-telemetry studies conducted by the USFWS, giant garter snakes typically moved little from day to day; however, total activity varied widely among individuals (USFWS 1993). At the Colusa National Wildlife Refuge, snakes moved up to eight kilometers (five miles) in two days in response to dewatering of habitat during refuge maintenance of water control structures (Wylie et al. 1997). Giant garter snakes usually remain in close proximity to wetland habitats, but can be found as far away as 250 meters (820 feet) from their edge (G. Hansen 1988; Wylie et al. 1997). Hansen and Brode (1993) also documented giant garter snakes moving at least 400 meters (0.25 miles) between small lateral ditches and larger canals within the Natomas Basin. Some marked and recaptured giant garter snakes moved distances greater than 800 meters (0.5 miles) in as little as a day. The average distance between upland, over wintering sites and aquatic breeding sites is thought to be approximately 150 meters, ranging from 50 to 400 meters (G. Wylie and S. Barry pers. comm. 2005)

Derived from telemetry data, the USFWS estimated the home range sizes of giant garter snakes at three study sites (Table G-3.17-1). The mean home range estimate for individual snakes was 19.0 hectares (47 acres) (range 0.8 hectares [2 acres] to 259.5 hectares [641 acres], N=27) at Gilsizer Slough; 53.2 hectares (131 acres) (range 1.3 to 1,130 hectares [3.2 to 2,792 acres], N=29) at the Colusa National Wildlife Refuge; and 9.2 hectares (23 acres) (range 4.2 to 82.0 hectares [10.3 to 203 acres], N=8) at Badger Creek (USFWS 1993).

Table G-3.17-1. Population Estimates and Home Range Size Estimates for Three Populations of Giant Garter Snakes

Site (surface area in hectares/acres)	Year	Population Estimate(95% C.I.)*	Median Home Range in hectares/acres(range in hectares)**
Gilsizer Slough (1,430/3,500)	1995	206 (136-349)	19.0/47 (0.8-259.5) N =27
	1996	170 (128-248)	
Colusa NWR (4,500/11,120)	1996	132 (80-254)	53.2/131 (1.3 - 1,130) N =29
	1997	119 (72-239)	
Badger Creek (235/580)	1996	191 (69-674)	9.2/23 (4.2 - 82.0) N =8

* Population estimates for giant garter snakes from the mark-recapture model with time-specific changes in probability of capture, which results in a conservative estimate. Estimates are derived from two-week time intervals. ** Home range estimates (ha/ac) for individual giant garter snakes derived from telemetry using the adaptive kernal method. "N" is the number of snakes in the sample. "C.I." is the Confidence Interval.

Ecological Relationships

A number of native mammals and birds are known or likely predators of giant garter snake including raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), opossums *(Didelphis virginiana*), foxes (*Vulpes vulpes*, *Urocyon cinereoargenteus*), hawks (*Bute*o spp.), northern harriers *(Circus cyaneus*), egrets (*Ardea alba*, *Egretta thula*), bitterns (*Botaurus lentiginosus*), and great blue herons (*Ardea herodias*). Many areas supporting garter snakes have been documented to have abundant predators (R. Hansen 1980; Hansen and Brode 1993; Wylie et al. 1997). G. Hansen (1986) observed that nearly all giant garter snakes captured and examined possessed scars or recent injuries, presumably acquired during attacks by predators. R. Hansen (1980) concluded that the abundance and diversity of predators suggested that predation pressure might be severe; however, predation does not seem to be a limiting factor in areas that provide abundant cover, high concentrations of prey items, and connectivity to a permanent water source (Wylie et al. 1997).

The giant garter snake may coexist with two other species of garter snakes. The Valley garter snake (*T. sirtalis fitchi*) was found to coexist with giant garter snakes in all areas that currently support them (R. Hansen 1980; G. Hansen 1986). The western terrestrial garter snake was observed at locations in the Elk Grove and Galt areas of Sacramento County, and Badger Creek Marsh supports all three species of garter snakes (G. Hansen 1986). Differences in foraging behavior may allow these species to co-exist. The Valley garter snake forages among vegetation bordering the water, while the giant garter snake captures its food in the water (R. Hansen 1980). Giant garter snakes may also successfully compete with the Valley garter snake by specializing on small fish as prey (Brode 1988).

GGS Habitat Requirements and Ecology

Endemic to valley floor wetlands in California's Central Valley, the giant garter snake inhabits marshes, sloughs, low gradient streams, and other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields. Giant garter snakes feed on small fishes, tadpoles, and frogs (Fitch 1941; G. Hansen 1980; G. Hansen 1988). Suitable habitat consists of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover, (2) emergent, herbaceous wetland vegetation, such as *Scirpus* and *Typha* spp. for escape cover and foraging habitat during the active season, (3) grassy banks and openings in waterside vegetation for basking, and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (G. Hansen 1988). Giant garter snakes are absent from larger rivers and other water bodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Hansen 1980; Rossman and Stewart 1987; Brode 1988; G. Hansen 1988). Riparian woodlands do not typically provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (R. Hansen 1980).

The ideal concept of a marsh managed for giant garter snake includes shallow and deep water with variations in topography, including some higher ground resembling ditch banks, or "islands" similar to a rice check. Rice fields contain warm, shallow water with emergent vegetation (i.e., rice plants), which is present during the giant garter snake's active season (spring through early fall). During the late summer when rice fields contain large numbers of mosquitofish and Pacific tree frogs, rice fields may provide important nursery areas for newborn giant garter snakes (Brode and Hansen 1992; Hansen and Brode 1993). In addition, this habitat-type and its associated water conveyance system, if managed properly, provides hydrological connectivity, protection from predators, relatively warm water to aid metabolism, gestation, and digestion, and a reliable source of food (USFWS 1993).

Today, giant garter snakes appear to be most numerous in rice growing regions. The diverse habitat elements of rice lands, rice fields, tail-water marshes, ditch and drain components of water conveyance systems, delivery canals, and associated levees, all contribute structure and complexity to this man-made ecosystem. Giant garter snakes can apparently survive in this created ecosystem because the spring and summer flooding and fall dry-down of rice culture roughly coincides with the biological needs of the species (USFWS 1999). Giant garter snakes utilize rice lands extensively and depend on them for habitat (Fuller pers. comm. 2005). Giant garter snake seasonal activity associated with rice cultivation occurs as follows:

- **Spring:** Rice is planted and the fields are flooded with several inches of water. Rice fields that contain prey species such as small fish or frogs attract giant garter snakes.

- **Summer:** While the rice grows, giant garter snake continue to use rice fields as long as prey species are present in sufficient densities.
- **Late Summer/Fall:** Rice fields are drained and rice is harvested. Giant garter snakes move off the fields into adjacent habitats and the females, who have just delivered young, intensively forage to regain their body weight before winter. The dry-down of rice fields during this time is thought to be important because prey species which have been proliferating, become concentrated in the remaining pockets of standing water where snakes can gorge prior to the period of winter inactivity.
- **Winter:** giant garter snakes are predominantly dormant in the winter and rice fields are fallow.

In addition to grassy banks, giant garter snakes will bask in bulrush, cattails, shrubs overhanging the water, patches of waterweed (*Ludwigia peploides*) and other floating vegetation. In the San Joaquin Valley, giant garter snakes also bask in openings within saltbush (*Atriplex* spp.) (Van Denburgh and Slevin 1918; Brode 1988). Riparian vegetation such as saltbush and willows (*Salix* spp.) provide cover from predation. Giant garter snakes also bask in openings in vegetation created by rip-rap placed around water control structures. Giant garter snakes use small mammal burrows and other soil crevices above prevailing flood elevations during the winter (i.e., November to mid-March), typically with sunny exposures along south- and west-facing slopes (USFWS 1999). During the active season, small mammal burrows, crayfish burrows, and soil crevices provide retreats from extreme heat (Hansen and Brode 1993). In one study, wintering site location varied from canal banks and marsh areas to riprap along a railroad grade near the marsh (Wylie et al. 1997). Wintering locations of radio-telemetered snakes tended to be in the vicinity of spring capture sites. In addition, during the active season, giant garter snakes use burrows as far as 50 meters (164 feet) away from the marsh edge, whereas, overwintering snakes use burrows as far as 250 meters (820 feet) from the edge of marsh habitat (Wylie et al. 1997).

Brode and Hansen (1992) and Hansen and Brode (1993), reported that giant garter snakes begin utilizing rice fields as early as June. In agricultural areas where rice fields and agricultural waterways are available, radio-telemetered giant garter snakes were located in rice fields 19 to 20 percent of the time, in marsh habitat 20 to 23 percent, and in canal and agricultural waterway habitats 50 to 56 percent of the time (Wylie et al. 1997). Between 48 and 55 percent of these latter snakes used rice fields at some time. Where marsh habitat and adjacent uplands were the only habitat available, giant garter snakes used the marsh edge most of the time (Wylie et al. 1997).

Habitat Elements

Habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The habitat elements for giant garter snake are identified in Table G-

3.17-2 and have been derived from the USFWS's list of habitat components in the Draft Recovery Planning for the giant garter snake (USFWS 1999) as well as input from local species experts.

Table G-3.17-2. Habitat Elements for Giant Garter Snake

Essential Activities	Land Cover Types	Habitat Elements
Foraging, breeding and dispersal	Seasonal impoundments, freshwater marsh, open water, and streams/creeks.	Adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; emergent, herbaceous wetland vegetation for escape cover, dispersal, and foraging habitat during the active season; and grassy banks and openings in waterside vegetation for basking.
Winter and summer inactivity	Mine tailing riparian woodland, valley oak riparian woodland, mixed riparian scrub, cropland, seasonal wetlands, seasonal impoundment, and freshwater marsh.	Uplands for cover and refuge during high summer temperatures. Higher elevation uplands for cover and refuge from flood waters during winter dormancy.

GGS Species Distribution and Population Trends

GGS Range-wide Distribution

Giant garter snakes are endemic to the valley floors of the Sacramento and San Joaquin Valleys of California (Fitch 1940; Hansen and Brode 1980; R. Hansen 1980; Rossman and Stewart 1987). Although the boundaries of its original distribution are uncertain, records coincide with the historical distribution of the large flood basins, fresh water marshes, and tributary streams of the Central Valley of California (Hansen and Brode 1980). Fitch (1940) described the historical range of giant garter snakes as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield in Kern County. Fox (1951) indicated that intergrades between giant garter snakes and another closely related species (then called *T. elegans aquaticus*) occurred from Butte County near Gridley south to Sacramento. Hansen and Brode (1980) suggested that the intergrades described by Fox (1951) were actually giant garter snakes and described the range of the giant garter snake as extending from Burrel in Fresno County, north to Gridley. Rossman and Stewart (1987) examined additional specimens and concluded that the range of the giant garter snake extended to about 32 kilometers (20 miles) north of Gridley.

The giant garter snake probably occurred historically from Butte County in the north, southward to Buena Vista Lake in Kern County. Giant garter snakes have probably always been absent from the northern portion of the San Joaquin Valley, where the floodplain of the San Joaquin River is restricted to a relatively narrow trough by alluvium from tributary rivers and streams. This 100-kilometer (62 -mile) gap in its distribution separates populations in Merced County from those along the eastern fringes in the Sacramento/San Joaquin River Delta (Delta)

in San Joaquin County (Hansen and Brode 1980). Because extensive marshes once occurred throughout the Delta, it is possible that giant garter snakes historically occupied this area (G. Hansen 1986, 1988). The foothills of the Coast Ranges and Sierra Nevada Mountains probably define the eastern and western boundaries of their range. Rossman et al. (1996) described the elevational distribution as ranging from sea level to 122 meters (400 feet) above mean sea level; whereas locality records in the southern Sacramento Valley occurred between three and 12 meters (10 and 40 feet) in elevation (G. Hansen 1986).

R. Hansen (1980) investigated the gap between the distribution of the giant garter snake and Sierra garter snake on the eastern side of San Joaquin Valley and determined that extensive riparian forests along river corridors historically limited the ranges of the two garter snake species. The river corridors lacked rocks or exposed vegetation (e.g., bulrushes, cattails) and areas on shore that might serve as basking sites. Prey items may also have been less abundant in these riparian corridors than in sloughs and marshes of the Central Valley floor (R. Hansen 1980).

GGS Sacramento County Distribution

There are 56 documented occurrences of giant garter snake in Sacramento County in the California Natural Diversity Data Base (CNDDB) (CDFG 2010). Thirty-nine (70 percent) of these occurrences are located in northern Sacramento County (i.e., north of Interstate 80)and constitute the southern portion of the American Basin population, the largest extant population of the giant garter snake (USFWS 1999). Reconnaissance-level surveys of this area conducted by the USFWS prior to 1991 indicated that approximately 570 hectares (1,408 acres) of giant garter snake habitat existed in the form of man-made irrigation channels and drainage ditches, and an undetermined number of acres of suitable habitat within approximately 5,260 hectares (13,000 acres) of adjoining rice fields; however, much of this habitat is now gone. The remaining 17 CNDDB occurrences in Sacramento County (i.e., south of Interstate 80) are in the following general locations: just north of the Antioch Bridge, Horseshoe Bend, Stone Lake, Laguna Creek, Morrison Creek, Snodgrass Slough, Willow Creek, Badger Creek, Hadselville Creek, and Elk Grove Creek. In addition, an unknown number of giant garter snakes are believed to occur along portions of Elder Creek (USFWS 1999) as well as hydrologically connected irrigation canals and tail waters in agricultural areas. Together, these occurrences suggest that Sacramento County supports a substantial proportion of the current rangewide distribution of giant garter snake.

GGS Distribution within Planning Area

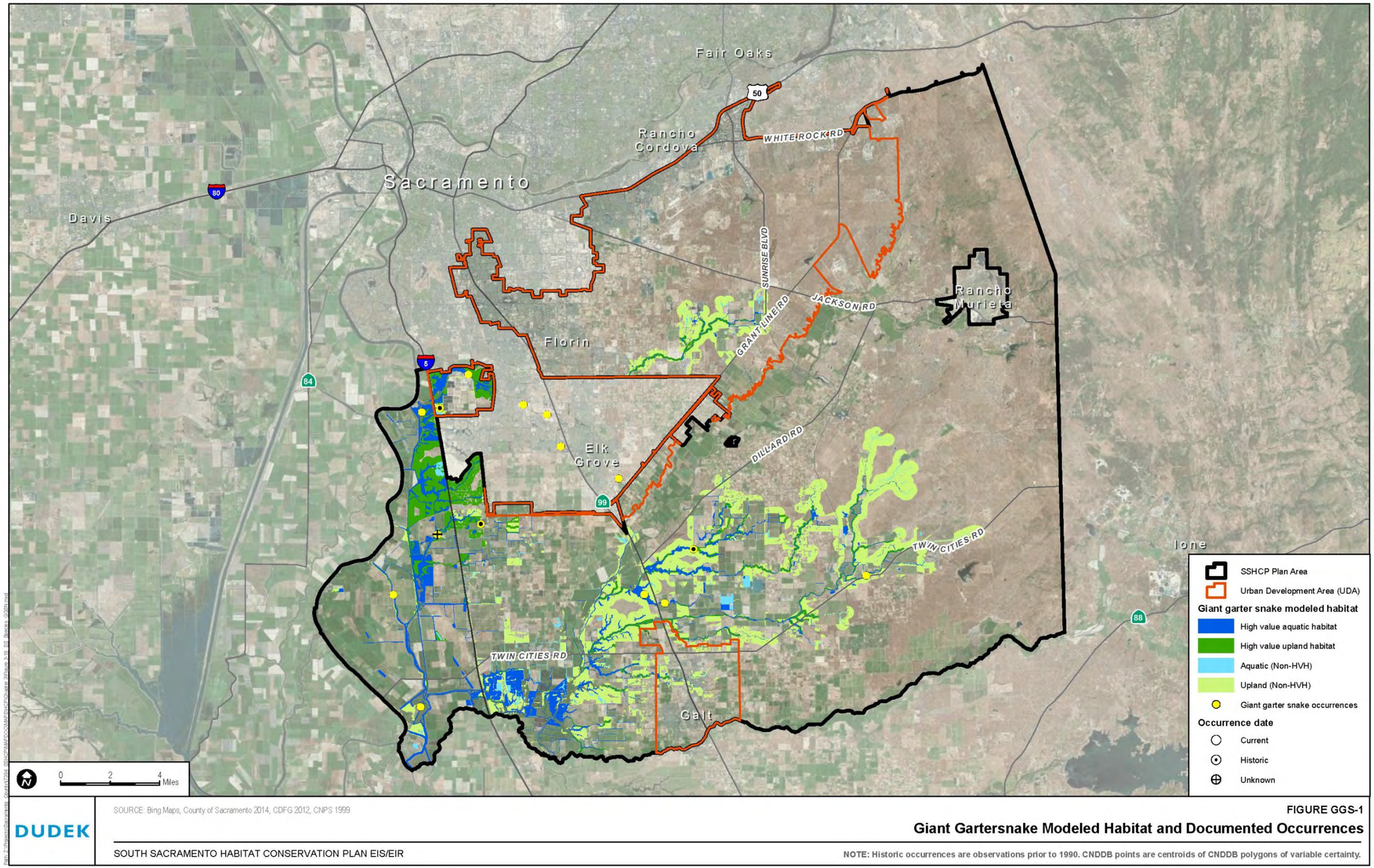
There are 15 documented occurrences of giant garter snake within the Planning Area including six within the Urban Development Area (UDA) and nine outside of the UDA (CDFG 2010) (Figure GGS-1). The giant garter snake occurrence records within the Planning Area are concentrated within the southern and southwestern portions of the Planning Area. There are no occurrence

records east of Clay Station Road in the southern portion of the Planning Area or east of Bradshaw Road in the City of Elk Grove (CDFG 2010). The occurrence record located in the southern part of the City of Elk Grove east of Waterman Road approximately one mile north of Grant Line Road is assumed to be recorded in error. Eric Hansen (pers. comm., January 12, 2006) considers this occurrence questionable given the general lack of habitat components for the species at and near this location, the lack of other documented occurrences from the vicinity, and no supporting documentation for the occurrence (e.g., specimen or photograph). The documented occurrence records seem to indicate that the range of the species is west of State Highway 99 and south of the Cosumnes River; however, according to the Draft Recovery Planning for the giant garter snake, the distribution of giant garter snake is defined by the Delta Recovery Area from the Draft Giant Garter Snake Recovery Planning (USFWS 1999). The Planning Area modeled habitat was then extended to include streams and creeks that have been visually determined to have a perennial water source and are hydrologically connected to current or past occurrence record, according to the CNDDB database (CDFG 2010).

GGS Population Levels and Trends

Agricultural and flood control activities have extirpated the giant garter snake from the southern one third of its range in the former wetlands associated with the historic Buena Vista, Tulare, and Kern lakebeds (Hansen and Brode 1980; R. Hansen 1980; CDFG 1992; G. Hansen 1986, 1988). As recently as the 1970's, the range of the giant garter snake extended from near Burrel (Hansen and Brode 1980) northward to the vicinity of Chico (Rossman and Stewart 1987). CDFW studies (G. Hansen 1988) indicate that giant garter snake populations are distributed in portions of the rice production zones of Sacramento, Sutter, Butte, Colusa, and Glenn Counties; along the western border of the Yolo Bypass in Yolo and Solano Counties; west to the vicinity of Woodland in Yolo County and the vicinity of Liberty Farms in Solano County; and along the eastern fringes of the Sacramento/San Joaquin River Delta from the Laguna Creek/Elk Grove region of central Sacramento County southward to the Stockton area of San Joaquin County. Giant garter snakes also occur in the central San Joaquin Valley in rice production zones in Fresno and Merced Counties, and at Mendota Wildlife Area in Fresno County (G. Hansen 1996; USFWS 1993). In September 1998, a giant garter snake was positively identified in the western Sacramento/San Joaquin Delta in the vicinity of Decker and Sherman Islands, in Sacramento County (USFWS 1999). The last record of a giant garter snake this far west in the Delta region was a specimen collected in the 1930's to 1940's. It is not known if this snake represents a resident population in the western Delta or was washed into the Delta during high water flows in the winter of 1997-1998 (USFWS 1999).

Figure GGS-1 Giant Gartersnake Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

The San Joaquin Valley populations of giant garter snakes have apparently suffered severe declines and possible extirpations over the last three decades. Prior to 1980, several areas within the San Joaquin Valley supported populations of giant garter snakes. Until recently, there were no post-1980 sightings from Stockton southward despite several survey efforts (G. Hansen 1988). Surveys of historic localities conducted during 1986 did not detect any giant garter snakes (G. Hansen 1988). However, during the 1995 surveys of historic locality records and adjacent waterways, one road-killed giant garter snake was found, and three presumed giant garter snakes were observed, but not captured. These two sightings occurred at the Mendota Wildlife Area, and two occurred several miles south of the city of Los Banos. These data indicated that giant garter snakes are still extant in two localities within the San Joaquin Valley, but are in extremely low to undetectable numbers. giant garter snakes also were observed in the Caldoni Marsh/White Slough Wildlife Area in San Joaquin County during 1995 surveys (G. Hansen 1996).

In 1994, the Biological Resources Division of the US Geological Survey (BRD) (formerly the National Biological Survey) began a study of the life history and habitat requirements of the giant garter snake in response to an interagency submittal for consideration as a National Biological Survey Ecosystem Initiative. Since April of 1995, the BRD has further documented occurrences of giant garter snakes within some of the populations identified in the final rule to list this species (USFWS 1993). The BRD has studied populations of giant garter snakes at the Sacramento and Colusa National Wildlife Refuges within the Colusa Basin; at Gilsizer Slough within the Sutter Basin; and at the Badger Creek area of the approximately 46,000-acre Cosumnes River Preserve, within the Badger Creek/Willow Creek area (Wylie et al. 1997). These populations, along with the American Basin population of giant garter snakes, represent the largest extant populations. During 1997, the BRD also surveyed at Stone Lakes National Wildlife Refuge, where four locality records from 1992 and earlier occur on or within close proximity to the Refuge (CDFG 2010). Although suitable habitat is present at Stone Lakes National Wildlife Refuge, the BRD did not find giant garter snakes during their trapping efforts (USFWS 1999). Surveys over the last two decades have located the giant garter snake as far north as the Butte Basin in the Sacramento Valley.

Currently, the USFWS recognizes 13 separate populations of giant garter snakes, with each population representing a cluster of discrete locality records within contiguous habitat (USFWS 1993). The 13 extant populations largely coincide with historical riverine flood basins and tributary streams throughout the Central Valley (G. Hansen 1980, Brode and Hansen 1992) and include: (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin/Willow Slough, (6) Yolo Basin/Liberty Farms, (7) Sacramento Basin, (8) Badger Creek/Willow Creek, (9) Caldoni Marsh, (10) East Stockton -- Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrel/Lanare. These populations are distributed discontinuously in small isolated patches and are vulnerable to extirpation by

random, naturally occurring environmental events, population dynamics and genetic processes. All 13 populations are isolated from each other without protected dispersal corridors. These populations span the Central Valley from just southwest of Fresno (i.e., Burrel/Lanare) north to Butte Creek. The 11 counties where the giant garter snake is still presumed to occur are: Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo.

The current distribution and abundance of the giant garter snake is much reduced from former times (USFWS 1999). Agricultural and flood control activities have extirpated the giant garter snake from the southern one third of its range in former wetlands which were associated with the historic Buena Vista, Tulare, and Kern lakebeds (Brode and Hansen 1992; CDFG 1992; G. Hansen 1986; Hansen and Brode 1980; R. Hansen 1980). These lakebeds once supported vast expanses of ideal giant garter snake habitat, consisting of Cattail and Bulrush-dominated marshes. South of Fresno, virtually no suitable freshwater habitat remains (Hansen and Brode 1980). Vast expanses of Bulrush and Cattail floodplain habitat also typified much of the Sacramento Valley historically (Hinds 1952). Prior to reclamation activities beginning in the mid- to late 1800's, about 60% of the Sacramento Valley was subject to seasonal flooding in broad, shallow flood basins that provided expansive areas of giant garter snake habitat (Hinds 1952). However, these valley floor wetlands have since been subjected to the cumulative effects of upstream watershed modifications, water storage and diversion projects, as well as urban and agricultural development resulting in their almost complete elimination; however, a relatively small percentage of semi-natural and created wetlands remain, which currently provides suitable habitat for giant garter snake (USFWS 1999). Regardless of the extent of wetlands currently remaining, field studies (Hansen 1986; Hansen 1988) indicate that the species is absent from most areas with seemingly suitable habitat.

GGS Threats to the Species

Although certain factors are known to contribute to giant garter snake decline range wide, exactly how and to what extent they affect the decline are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for giant garter snake in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats. Without a better understanding of how covered activities affect giant garter snake and other target species, the potential for success in conserving the species is reduced. The following is a summary of factors known or suspected to negatively affect giant garter snake.

GGS Habitat Loss and Alteration

Habitat loss and alteration throughout the range of the giant garter snake has resulted in fragmented and isolated habitat remnants supporting small, scattered populations of giant garter snake. Principles of population genetics stipulate that small populations confined to limited habitat areas are more vulnerable to extirpation from stochastic (random) environmental, genetic and demographic events than larger, less fragmented populations (Schonewald-Cox et al. 1983). When an existing, local population becomes extinct, there is virtually no chance of recolonization by other populations unless adequate dispersal corridors are protected and maintained into perpetuity. In addition, the breeding of closely related individuals can cause genetic problems in small populations, particularly the expression of deleterious genes (known as inbreeding depression).

A number of land use practices and other human activities currently threaten the survival of the giant garter snake throughout its remaining range. Although some giant garter snake populations have persisted at low population levels in created wetlands associated with agricultural and flood control activities, many of these altered wetlands are now threatened with urban development. Several cities within the current range of the giant garter snake are expanding rapidly within or near the historic range of the giant garter snake and include, but are not limited to, Chico (Butte Basin population), Yuba City (Sutter Basin population), Sacramento (American and Sacramento Basin populations), Galt (Badger/Willow Creek population), Stockton (East Stockton population), and Gustine and Los Banos (North and South Grasslands population). In addition, the North Delta Water Management project proposed by the California Department of Water Resources would facilitate urban development and adversely affect the Sacramento Basin population; the American River Watershed Investigation or local equivalent by the Corps would facilitate urban growth that may adversely affect the American Basin population; and the Sacramento River Flood Control Project, Phase II Marysville/Yuba City Area, and Yuba River Basin project would facilitate urban growth in the vicinity of the Sutter Basin population.

Certain agricultural practices can also destroy habitat that supports the giant garter snake. For example, intensive vegetation control activities along canal banks can fragment and isolate available habitat. In addition, G. Hansen (1982, 1986), and G. Hansen and J. Brode (USFWS 1993) observed livestock grazing threats to four populations of the species. Studies on other garter snake species have established a negative cause and effect relationship between livestock grazing and snake population demographics (Szaro et al. 1985). The giant garter snake requires dense vegetative cover in proximity to waterside foraging and basking habitats in which to seek refuge from predators and other forms of disturbance. Livestock grazing along the edges of water sources degrades habitat quality by reducing vegetative cover. Overall, grazing has eliminated or reduced the quality of available habitat at four known locations (USFWS 1993).

Northern Sacramento County

Habitat supporting the giant garter snake in the American Basin is threatened by a number of activities including urbanization. In addition, the United States Corps of Engineers and/or local project sponsors are proposing flood protection for this approximately 22,260-hectare (55,000-acre) agricultural area. The USFWS (USFWS 1991) anticipates that the provision of flood control would result in the conversion of most or all of this area to urban land uses within the next 50 years. Other projects in the American Basin include the North Natomas Community Drainage System and associated urban development. These projects, which are proposed by the City of Sacramento, would affect about 42 kilometers (26 miles) of giant garter snake habitat along existing canals and ditchesas well as additional rice field habitat (Brode and Hansen 1992). In addition, the Sacramento Metropolitan Airport is proposing about 765 hectares (1,890 acres) of development on agricultural and vacant lands that could result in major adverse impacts to the species, including the loss of about 14.5 kilometers (9.0 miles) of canal habitat and 607 hectares (1,500 acres) of rice fields, as well as the disruption of movement corridors (Brode and Hansen 1992). Roadway improvements or construction projects, or the planned extension of the Sacramento Regional Transit system in this area, would likely result in elevated mortality from increased traffic on local roads and highways (Brode and Hansen 1992).

Planning Area

Habitat supporting the giant garter snake in the Planning Area is threatened by a number of activities including urbanization. Development within the Urban Development Area (UDA) may adversely affect the species if present. For example, the City of Elk Grove contains natural and man-altered wetland features that may support giant garter snake. These features include areas within the Stone Lakes National Wildlife Refuge, Cosumnes River, Sacramento River and associated tributaries (e.g., Deer Creek, Morrison Creek, and Laguna Creek), and vegetative communities consisting of valley oak woodland, annual grassland, valley foothill riparian, and agricultural lands. Some of the irrigation ditches and open water habitats in the UDA support suitable habitats for this species.

GGS Over Utilization for Commercial, Recreational, Scientific, or Educational Purposes

Although giant garter snakes do not seem to be of great interest to reptile collectors, the species has been found for sale in pet shops (USFWS 1993); however, collection for commercial purposes does not appear to threaten the giant garter snake.

Collection and harassment associated with recreational activities apparently cause a substantial impact in certain areas (USFWS 1993). Recreationists can disturb basking snakes, interfering

with thermoregulatory behavior. Fishing pressure at the Mendota population during the 1970's and 1980's resulted in numerous observed instances of road kills and other possible killing and injuring of giant garter snakes (USFWS 1993). In the American Basin, collection of crayfish for human consumption also results in harassment of giant garter snakes and disturbance and harassment associated with fishing pressure also is implicated in the demise of the giant garter snake population at Burrell (USFWS 1993).

GGS Disease and Predation

Little information on diseases that affect the giant garter snake is available. The CDFW ceased mark and recapture studies on the giant garter snake in the American Basin after observing that marked snakes were slow to heal and often became infected (USFWS 1993).

Unidentified parasitic worms have been found in giant garter snakes from the American Basin population (USFWS 1993). Infected snakes exhibited reduced appetites and growth rates compared to uninfected snakes and all infected snakes eventually died after lingering malaise, although some reached 12 to 14 months of age. Upon death, uniformly sized five- to eight-centimeter worms emerged from noticeable lumps at locations along the ventral or dorsal skin surfaces. The degree of threat posed by these worms to the American Basin population or the species throughout its range is not known.

Predation levels on the giant garter snakes have increased due to a number of factors. A number of native mammals and birds are known or likely predators of giant garter snakes, including raccoons, skunks, opossums, foxes, hawks, egrets, and herons. The abundance and diversity of predators and a paucity of escape cover in remaining giant garter snake habitat suggest that predation pressure on this species probably is severe (Hansen 1980). The high fecundity (Hansen and Hansen 1990) and extremely wary behavior (Hansen 1980 and references cited therein) of the species provide additional evidence that the species has developed physiological and behavioral adaptations to help withstand predatory pressure. Hansen (1986) observed that nearly all captured and examined giant garter snakes possessed scars or recent injuries (presumably acquired during attacks by predators).

Domestic cats prey upon the giant garter snake. G. Hansen (pers. comm. 1993) has observed numerous snake kills by domestic cats in one of his longtime study areas about 3.2 kilometers (2 miles) from the closest urban development in the City of Davis, Yolo County.

Few, if any, native fish species pose a predatory threat to the giant garter snake. However, introduced large mouth bass and catfish are voracious, opportunistic predators of many species of invertebrates, fish, reptiles, amphibians, birds, and small mammals, and have become established in virtually all permanent and semi-permanent waters throughout the Central Valley (USFWS 1993).

These introduced predatory fishes have been responsible for eliminating many species of native fishes and aquatic vertebrates in the western United States (Minkley 1973; Moyle 1976).

Bass in the 0.4 to 1.4 kilogram size class can take 30 to 38-centimeter snakes and would prey upon giant garter snakes (USFWS 1993). The instinctive response of giant garter snakes to dive under water upon disturbance (Fitch 1941) would be maladaptive where nonnative predatory fish have become established. Parmley and Mulford (1985) reported an instance of a Largemouth Bass eating a water snake. Introduced predatory fish may explain the absence of garter snakes from large bodies of water (Brode 1988). Brode (1988) believed that the giant garter snake was absent from large bodies of water due to the presence of introduced predatory fishes.

Introduction of the bullfrog to virtually all areas inhabited by the giant garter snake further increases the threat of predation facing the species. The spread of Bullfrogs has contributed to the demise of numerous species of native amphibians and reptiles (Schwalbe and Rosen 1989; Holland 1991). Bury and Whelan (1984) cited 14 cases of bullfrogs eating snakes. These studies documented (1) bullfrog ingestion of garter snakes up to 80 centimeters (31.5 inches) in length, (2) depletion of the <80-centimeter length (snout-vent) age class, and (3) disappearance and resurgence of garter snake populations coincident with the introduction and decline of bullfrog populations. Schwalbe and Rosen (1989) concluded that bullfrogs have a high potential for eliminating garter snake populations. Treanor (1993) found that unidentified garter snakes *(Thamnophis* spp.*)* comprised 6.0 and 6.4 percent volume of bullfrog stomach contents in the months of July and August at Gray Lodge Waterfowl Management Area, a known giant garter snake location.

GGS Other Natural or Manmade Factors Affecting Giant Garter Snake Continued Existence

In rice production areas of the American Basin, the largest remaining population of giant garter snakes inhabits water management facilities adjoining rice fields (in rare instances the snake occurs along other agricultural waterways) (USFWS 1993). The seasonal flooding and draining of rice ponds may provide an adequate forage base and may prevent establishment of populations of large predatory fish (Brode and Hansen 1992).

However, Pacific Environmental Consultants (1992) cites sources that document 250,000-acre swings in rice production over a three-year time span suggesting that these situations do not represent stable conditions for associated giant garter snake populations. Rice production varies depending upon market conditions (e.g., Department of Agriculture price support programs), and water availability for agriculture (e.g., State Water Resources Control Board Draft Interim Water Rights Decision, D—1630) protects estuarine fisheries values by reducing winter and spring exports from the Delta, which could result in reduced acreage of rice production.

Furthermore, intensive control of vegetation along water delivery and drainage facilities eliminates remaining habitat and prevents reestablishment of former habitat (Hansen 1988; Brode and Hansen 1992; USFWS 1993). For example, more intensive maintenance practices have eliminated habitat along water canals in the American Basin along State Route 70/99 (USFWS 1993). Such activities can kill or injure snakes, remove critical escape cover, eliminate prey populations, and destroy small mammal burrows and other soil fissures needed as winter retreat habitat. G. Hansen observed the complete elimination of suitable habitat from maintenance practices along both sides of canals where giant garter snakes were found the previous season (USFWS 1993).

The giant garter snake is vulnerable to changes in water management because it depends on the availability of wetlands. In response to Statewide water shortages associated with drought, water management agencies, including the California Department of Water Resources and US Bureau of Reclamation, announce reductions in delivery of water to certain agricultural regions. In addition, the Department of Water Resources has begun acting as a broker to facilitate transfer of water from users with discretionary supplies to those with critical needs. Water districts from around the State are offering to purchase water from water districts in rice production regions of the Sacramento Valley (USFWS 1993).

Contaminants, such as fertilizers and pesticides, could adversely affect giant garter snake populations by degrading water quality and reducing prey populations. Selenium contamination of agricultural drain water appears to pose a severe threat to any giant garter snake population that still may inhabit the Grasslands region of western Merced County in the San Joaquin Valley (USFWS 1999). High levels of selenium contamination have been documented in biota from at least six major canals and watercourses in the Merced Grasslands (Saiki et al. 1991, 1992a) that have historic giant garter snake records. The bioaccumulative food chain threat of selenium contamination to fish, frogs, and fish-eating birds in the region has been well documented (Ohlendorf et al. 1986, 1988; Saiki and Lowe 1987; Saiki and May 1988; Hothem and Ohlendorf 1989; Saiki et al. 1991, 1992b, 1993). Contaminant studies on aquatic organisms and their habitats in the grasslands and neighboring areas documented elevated levels of waterborne selenium in many representative water bodies in this region that exceeded known toxicity thresholds for giant garter snake prey species (San Joaquin Valley Drainage Program 1990; Central Valley Regional Water Quality Control Board 1992; Hermanutz 1992; Hermanutz et al. 1992; Nakamoto and Hassler 1992). Elevated salinity of waters in the grasslands due to a sodium sulfate-based salt have also been documented at deleterious levels in resident fishes and amphibians (Ohlendorf et al. 1986, 1988; Saiki et al. 1992a), the major food source of giant garter snakes.

According to the USFWS (1993), most or all giant garter snake populations are vulnerable to adverse effects from flooding, and a 100-year flood event has the potential of extirpating all remaining populations of giant garter snake. Many areas, such as in the rice production districts

of the Sacramento Valley, flood more frequently, even during winters with normal levels of rainfall. In Glenn and Colusa Counties, Willow Creek, Walker Creek, French Creek, Wilson Creek, Logan Creek, Hunter Creek, Lurline Creek, and the Colusa Drain all flood to heights exceeding the levee tops (USFWS 1993). In eastern Sutter County, many creeks convey water to heights one to two feet above levee tops (USFWS 1993). These flooding events may account, at least in part, for the apparent absence of the giant garter snake in many rice production districts.

Giant garter snakes retreat to habitats at higher elevations during the winter dormancy period. Commercial development, agricultural conversion, and levee channel construction and maintenance along the edges of wetlands have eliminated much of the retreat habitat, forcing giant garter snakes to overwinter in flood-prone (streamside) levee slopes.

GGS Data Gaps and Conservation Implications

The ecology, status, and management of giant garter snake have received increased attention in recent years; however, there are several sources of uncertainty regarding giant garter snake and its requirements in the Planning Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

GGS Population and Habitat Distribution within the Planning Area

Giant garter snakes occur in suitable habitat within the Planning Area; however, their overall distribution, abundance, and population structure are not well known. Land cover-types used by giant garter snakes, such as suitable seasonal impoundments, freshwater marsh, open water, streams and creeks as well as adjacent uplands, occur throughout much of the Central Valley and are well represented in Sacramento County and the Planning Area.

Because comprehensive surveys for giant garter snake in the Planning Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and distribution of the species throughout the Planning Area are not known. In addition, though the distribution of different habitat-types is mapped and quantifiable, the quality of habitat (particularly as it relates to essential habitat components) for giant garter snakes within most of these areas is unknown. These information gaps limit the ability to identify the best lands available for preserving giant garter snake habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for giant garter snake will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

Determining Threat Severity

Although certain factors are known to contribute to giant garter snake decline rangewide, exactly how and to what extent these factors contribute are largely unknown. Activities that directly remove or replace suitable habitat with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population (e.g., stormwater flooding of occupied winter retreats). Therefore, to improve conservation planning efforts for giant garter snake in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Giant Garter Snake

Achieving the conservation goals and objectives for giant garter snake will require successful enhancement and restoration of suitable habitat. The function of habitat (e.g., connectivity, hydroperiod, biodiversity) is an important factor for suitability of giant garter snake. Whether restored or enhanced habitats can retain the structural attributes suitable for giant garter snake is unknown.

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for giant garter snake, then those lands would not support sustainable populations.

GGS Literature Cited

Barry, Sean. Herpetologist. Entrix Environmental Consultants. Sacramento, California. April 2005.

Boundy, J.J. 1990. Biogeography and variation in southern populations of the garter snake *Thamnophis atratus*, with a synopsis of the *T. couchii* complex. Unpublished Master's Thesis, San Jose State University. 105 pp.

Brode, J. 1988. Natural history of the Giant Garter Snake (*Thamnophis couchii gigas*). Pages 25-28, *In* Proceedings of the conference on California herpetology, H.F. DeListe, P.R. Brown, B. Kaufman, and B.M. McGurty (eds). Southwestern Herpetologists Society, Special Publication No. 4.

Brode, J. 1990. Guidelines for procedures and timing of activities related to the modification or relocation of Giant Garter Snake habitat. CDFG Inland Fisheries Division, October 1990.

Brode, J., and G. Hansen. 1992. Status and future management of the giant garter snake (*Thamnophis gigas*) within the southern American Basin, Sacramento and Sutter counties, California. CDFG, Inland Fisheries. Division.

Bury, R.B., and J.A. Whelan. 1984. Ecology and management of the bullfrog. US Fish and Wildlife Service, Resource Publication 155:1-23.

California Department of Fish and Game (CDFG). 1992. Draft five-year status report. CDFG, Inland Fisheries Division.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Regional Water Quality Control Board, Central Valley Region. 1992. Agricultural drainage contribution to water quality in the Grasslands Area of western Merced County, California: October 1990 to September 1991.

Cooperrider, A.Y., C. Carroll, K. Nelson, R. Noss, D. Olson, H. Welsh, and W. Zielinski. 1999. Terrestrial fauna of redwood forests. In R.F. Noss, editor. The Redwood Forest: History, Ecology, and Conservation of Coast Redwoods. Island Press, Washington, D.C.

Cunningham, J. D. 1959. Reproduction and food of some California snakes. *Herpetologica,* 15(1):17-20.

de Queiroz, A., and R. Lawson. 1994. Phylogenetic relationships of the garter snakes based on DNA sequence and allozyme variation. *Biological Journal of the Linnaeus Society*, 53:209-229.

Fitch, H.S. 1941. The feeding habits of California garter snakes. California Department of Fish and Game 27:2-32.

Fitch, H.S. 1948. Further remarks concerning *Thamnophis ordinoides* and its relatives. *Copeia* 1948(2):121-126.

Fitch, H.S. 1940. A biogeographical study of the *ordinoides* Artenkreis of garter snakes (genus *Thamnophis*. *University of California Publications in Zoology*. 44:1-150.

Fitzgerald, Kelly. Fish and Wildlife Biologist. US Fish and Wildlife Service. Sacramento, California. February 2006.

Fox, W. 1951. Relationships among the garter snakes of the T*hamnophis elegans rassenkreis*. *University of California Publications in Zoology.* 50:485-530.

Frankham, R. 1995. Effective population size/adult population ratios in wildlife: a review. Genetical Research 66(2):95-107.

Frayer, W.E., D.D. Peters, and H.R. Pywell. 1989. Wetlands of the California Central Valley: Status and trends. US Fish and Wildlife Service, Portland, Oregon.

Hansen, Eric. Herpetologist. Environmental Biology Consultant. Sacramento, California. June 2006.

Fuller, Ken. Fish and Wildlife Biologist. US Fish and Wildlife Service. Sacramento, California. March 2005.

Hansen G.E., and J.M. Brode. 1980. Status of the giant garter snake, *Thamnophis couchi gigas* (Fitch). California Department of Fish and Game. Inland Fisheries Endangered Species Program Special Publication Report No. 80-5. 14 pp.

Hansen G.E., and J.M. Brode. 1993. Results of relocating canal habitat of the GGS (*Thamnophis gigas*) during widening of State Route 99/70 in Sacramento and Sutter counties, California. Final report for Caltrans Interagency Agreement 03E325 (FG7550) (FY 87/88-91-92). Unpublished. 36 pp.

Hansen, G.E. 1982. Status of the giant garter snake (*Thamnophis couchii gigas*) along portions of Laguna and Elk Grove creeks, Sacramento County, California. Report to Sacramento County Planning Dept. 15 pp.

Hansen, G.E. 1986. Status of the Giant Garter Snake (*Thamnophis couchi gigas* (Fitch)) in the Southern San Joaquin Valley During 1986. Final report for CDFG, Standard Agreement No. C1433. Unpublished. 31 pp.

Hansen, G.E. 1988. Review of the status of the GGS (*Thamnophis couchi gigas*) and its supporting habitat during 1986-1987. Final report for CDFG, Contract C-2060. Unpublished. 31 pp.

Hansen, G.E. 1996. Status of the Giant Garter Snake (*Thamnophis gigas*) in the San Joaquin Valley in 1995. Final report for CDFG, Standard Agreement No. FG4052IF. Unpublished 31 pp.

Hansen, R.W. 1980. Western aquatic garter snakes in central California: an ecological and evolutionary perspective. Master's thesis, Department of Biology, California State University, Fresno. 78 pp.

Hansen, R.W. and G.E. Hansen. 1990. *Thamnophis gigas*. Reproduction. Herpetological Review 21(4):93-94.

Hermanutz, R.O. 1992. Malformation of the fathead minnow (*Pimephales promelas*) in an ecosystem with elevated selenium concentrations. Bulletin of Environmental Contamination and Toxicology Report 49:290-294.

Hermanutz, R.O., K. N. Allen, T. H. Roush, and S. F. Hedtke. 1992. Effects of elevated selenium concentrations on bluegills (*Lepomis macrochirus*) in outdoor experimental streams. Environmental Toxicology and Chemistry 11:217-224.

Hinds, N.E.A. 1952. Evolution of the California landscape. California Division of Mines Bulletin No. 158. 240 pp.

Holland, D. 1991. A synopsis of the ecology and status of the western pond turtle (*Clemmys marmorata)* in 1991. Unpublished report for the US Fish and Wildlife Service, San Simeon, California.

Hothem, R.L., and H.M. Ohlendorf. 1989. Contaminants in foods of aquatic birds in Kesterson Reservoir, California, 1985. Archives of Environmental Contamination and Toxicology 18:773-786.

Lawson, R. and H. C. Dessauer. 1979. Biochemical genetics and systematics of garter snakes of the *Thamnophis elegans-couchii-ordinoides* complex. Occasional Papers of the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana, No. 56. 24 pp.

Minkley, W.L. 1973. *Fishes of Arizona*. Arizona Game and Fish Department. Phoenix, Arizona.

Moyle, P. B. 1976. *Inland fishes of California*. University of California Press, Berkeley, Los Angeles, and London.

Nakamoto, R.J., and T. Hassler. 1992. Selenium and other trace elements in bluegills from agricultural return flows in the San Joaquin Valley, California. *Archives of Environmental Contamination and Toxicology* 22:88-98.

Noss, R. F., E. Dinerstein, B. Gilbert, M. Gilpin, B. J. Miller, J. Terborgh, and S. Trombulak. 1999. Core areas: where nature reigns. Pages 99-128 *in* M. E. Soulê and J. Terborgh, editors. *Continental conservation: scientific foundations of regional reserve networks.* Island Press. Washington, D.C., USA.

Ohlendorf, H.M., D.J. Hoffman, M.K. Saiki, and T.W. Aldrich. 1986. Embryonic mortality and abnormalities of aquatic birds: Apparent impacts of selenium from irrigation drainwater. The Science of the Total Environment, 52:49-63.

Ohlendorf, H.M., R.L. Hothem, and T.W. Aldrich. 1988. Bioaccumulation of selenium by snakes and frogs in the San Joaquin Valley, California. *Copeia* 1988(3):704-710.

Parmley, D., and C. Mulford. 1985. An incident of largemouth bass (*Micropterus salmoides*) feeding on a water snake. *Texas Journal of Science* 37:89.

Rossman, D., and G. Stewart. 1987. Taxonomic reevaluation of *Thamnophis couchii* (Serpentes: Colubridae). Occasional Papers of the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana. No. 63. 25 pp.

Rossman, D.A., N.B. Ford, and R.A. Seigel. 1996. *The garter snakes: evolution and ecology*. University of Oklahoma Press, Norman. 331 pp.

Saiki, M.K., and T.P. Lowe. 1987. Selenium in aquatic organisms from subsurface agricultural drainage water, San Joaquin Valley, California. *Archives of Environmental Contaminants and Toxicology*. 16: 657-670.

Saiki, M.K., and T.W. May. 1988. Trace element residues in bluegills and common carp from the lower San Joaquin River, California, and its tributaries. *The Science of the Total Environment* 74:199-217.

Saiki, M.K., M.R. Jennings, and R.H. Wiedmeyer. 1992b. Toxicity of agricultural subsurface drainwater from the San Joaquin Valley, California, to juvenile chinook salmon and striped bass. *Transactions of the American Fisheries Society*. 121:78-93.

Saiki, M.K., M.R. Jennings, and S.J. Hamilton. 1991. Preliminary assessment of the effects of selenium in agricultural drainage on fish in the San Joaquin Valley. Pages 369-385, *In*: A. Dinar and D. Zilberman (eds.). The economics and management of water and drainage in agriculture. Kluwer Academic Publishers, Boston, Massachusetts.

Saiki, M.K., M.R. Jennings, and T.W. May. 1992a. Selenium and other elements in freshwater fishes from the irrigated San Joaquin Valley, California. *The Science of the Total Environment* 126:109-137.

Saiki, M.K., M.R. Jennings, and W.G. Brumbaugh. 1993. Boron, molybdenum, and selenium in aquatic food chains from the lower San Joaquin River and its tributaries, California. *Archives of Environmental Contaminants and Toxicology*, 24:307-319.

San Joaquin Valley Drainage Program. 1990. Fish and wildlife resources and agricultural drainage in the San Joaquin Valley, California. San Joaquin Valley Drainage Program, 2800 Cottage Way, Room W-2143, Sacramento, California. 2 vol.

Schonewald-Cox C.M., S.M. Chambers, B. MacBryde and W.L. Thomas. eds 1983. *Genetics and conservation: a reference for managing wild animal and plant populations.* Benjamin/Cummings, Melo Park, California.

Schwalbe, C.R., and P.C. Rosen. 1989. Preliminary report on effect of bullfrogs on wetland herpetofaunas in southeastern Arizona, Pages 166-173, *In*: Szaro, R.C., K.E. Severson and D.R. Patton (tech. coords.). 1989. Management of amphibians, reptiles, and small mammals in N. America. US Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-166.

Semlitsch, R. D. and J. R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology,* 17(5):1,219-1,228.

Stebbins, R.C. 1985. *A field guide to western reptiles and amphibians*. Houghton Mifflin Co., New York. 336 pp.

Szaro, R., S. Belfit, J. Aitkin, and J. Rinne. 1985. Impact of grazing on a riparian garter snake. Paper presented at the Symposium on riparian ecosystems and their management: reconciling conflicting uses. Tucson, Arizona.

Treanor, R.R. 1993. Contributions to the biology of the bullfrog, (*Rana catesbeiana* Shaw), in California. CDFG, Inland Fisheries Administrative Report No. 83-1.

United States Fish and Wildlife Service (USFWS). 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened, proposed rule. Federal Register 56(225):58804-58836.

United States Fish and Wildlife Service (USFWS). 1993. Endangered and threatened wildlife and plants; determination of threatened status for the GGS. Federal Register 58: 54053-54066.

United States Fish and Wildlife Service (USFWS). 1999. Draft Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*). US Fish and Wildlife Service, Portland, Oregon. ix+ 192 pp.

Van Denburgh, J., and Slevin, J.R. 1918. The garter snakes of western North America. *Proceedings of California Academy of Sciences*, 8 (4):181-270.

Wilcox, B.A. and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. *American Naturalist* 125:879-887.

Wylie, G. D., M. Cassaza, and J. K. Daugherty. 1997. 1996 Progress report for the GGS study. Preliminary report, US Geological Survey, Biological Resources Division.

Wylie, Glen. Herpetologist. US Geologic Survey. Dixon, California. April 2005.

COOPER'S HAWK (COHA)

Cooper's Hawk (COHA)

(Accipiter cooperii)

Status USFWS: None

Status CDFW: Bird Species of Special Concern



COHA Listing Status

Cooper's hawk (*Accipiter cooperii*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800). This species is considered a "Watch List" species by the California Department of Fish and Wildlife (CDFW).

COHA Life History and Ecology

COHA Species Description and Life History

Physical Description

Cooper's hawk is a medium-sized (e.g., crow-sized) woodland hawk with short, rounded wings and a long tail. Adult birds have yellow legs and orange-red eyes. The back and upper wing coverts are blue-gray, and the breast and underparts are finely barred with rufous or rust coloration. Young and juvenile birds are brown on the back and white on the breast with fine brownish streaks. Female Cooper's hawks are approximately one-third larger than males, and western birds are smaller than eastern birds. Adult mass of western females averages 16.7 and 15.5 ounces (473 and 439 grams) during the breeding season and migration, respectively. Adult mass of western males averages around 9.9 ounces (280 grams) during breeding and migration. Length estimates for western Cooper's hawks have not been summarized; however, eastern females average 17.7 inches (45 centimeters) in length, while males average 15.4 inches (39 centimeters). (Rosenfield and Bielefeldt 1993).

Field identification of Cooper's hawk can be difficult where the species co-occurs with similar species. This species is frequently confused with the smaller sharp-shinned hawk (*A. striatus*) and larger northern goshawk (*A. gentilis*).

Taxonomy

Cooper's hawk is one of three North American hawks in the genus *Accipiter*. The other two species are the larger northern goshawk and smaller sharp-shinned hawk. Two subspecies of *A. cooperii*, the western *A. c. mexicanus* and eastern *A. c. cooperii*, are no longer recognized (Rosenfield and Bielefeldt 1993).

Reproduction

The breeding season for Cooper's hawk is generally March to July, however breeding is sometimes initiated earlier. Cooper's hawks typically begin breeding after two years of age, although breeding by first-year males (Rosenfield and Wilde 1982) and females (Meng 1951; Hennessy 1978; Reynolds and Wight 1978; Moore and Henny 1984; Asay 1987) have been documented. Cooper's hawks are monogamous and generally breed once per year; however, renesting can occur if a clutch is lost early in the incubation period (Rosenfield and Bielefeldt 1993). Pairs generally return to the same territory each year, but typically build a new (alternate) nest in the vicinity of the existing nest (Reynolds and Wight 1978). In California, the rate of nest area reoccupancy has been found to be 80 percent, and half of nesting attempts occurred in rebuilt nests (Asay 1987). In Southeast Arizona, Boal and Mannan (1999) observed

color-banded pairs of Cooper's hawks on their territories during the non-breeding seasons, suggesting that some pairs maintain their pair bonds year-round.

Throughout its range, Cooper's hawk nests in evergreen and deciduous tree species. In California, 75 of 77 (97 percent) Cooper's hawk nests studied by Asay (1987) in three low-elevation study areas (Sacramento, Stockton, and southern California) were in live oaks (*Quercus wislizenii* or *Q. agrifolia*). The other two nests were in a blue oak (*Q. douglasii*) and California sycamore (*Platanus racemosa*). Most of these nests occurred in groves of six or more trees; however, two were in solitary trees 30 to 40 meters from the nearest tree.

Cooper's hawk nests are stick platforms with a cup lined with bark, placed in a crotch or lateral limb against the trunk of a tree. On average, nests are constructed 26 to 49 feet (8 to 15 meters) high, in trees 8.3 to 20 inches (21 to 52 centimeters) diameter-at-breast-height (dbh), and in stands with 64 to 95 percent canopy closure and 600 to 2,863 trees per acre (243 to 1,159 trees per hectare) (Rosenfield and Bielefeldt 1993).

Once the nest is built, Cooper's hawks engage in a month-long prelaying and copulatory period (Rosenfield et al. 1991). During this period, the male leaves the nest area to forage for himself and the female, but spends most of his time near the nest. The male provides nearly all the female's food during the pre-laying and nesting periods (Rosenfield and Bielefeldt 1993). In California, Cooper's hawks typically lay eggs in April and May. Clutch sizes range from one to seven eggs, but clutch sizes of three to five eggs are typical. Immature breeders tend to lay approximately five to 10 days later than adults. Incubation lasts approximately 34 to 36 days, and young remain in the nest an additional 30 to 34 days. Young may remain together in the vicinity of the nest for up to five to six weeks or more prior to dispersal (Rosenfield and Bielefeldt 1993). Boal and Spaulding (2000) recently observed a nesting attempt that involved nest helping by a third Cooper's hawk. Both the parental male and a subadult male delivered food to the nesting female, and all three individuals defended the nest.

Survival and Longevity

The maximum reported age of a Cooper's hawk is 12 years, while nine years is the maximum age known for a breeding bird. First year and adult annual survivorship has been estimated at 22 to 28 percent and 63 to 66 percent for first year and adult birds, respectively, using life table methods (Rosenfield and Bielefeldt 1993). Mannan et al. (2004) estimated a survival rate of 67 percent for radio-tagged fledgling Cooper's hawks, through 180 days of age, in an urban setting in Tuscon, Arizona.

Dispersal Patterns

The small amount of information on Cooper's hawk natal dispersal is based on band return data and a few localized studies. In Wisconsin, the average distance between the natal site and subsequent breeding site was 7.5 miles (12.0 kilometers) for six males, and 8.9 miles (14.4 kilometers) for a female (Rosenfield and Bielefeldt 1993). A female Cooper's hawk was also documented dispersing 49 miles (79 kilometers) between the natal and subsequent breeding site (Rosenfield and Bielefeldt 1993). Mannan et al. (2004) studied dispersal of 40 radio-tagged fledgling Cooper's hawks in urban Tuscon, Arizona. Dispersal patterns were characterized by relatively sedentary behavior in the natal area, followed by long movements after 11 to 13 weeks of age, then settlement and sedentary behavior in the fall/winter home range. The average distance between natal sites and winter home ranges was 6.8 and 3.7 miles (10.9 and 6.0 kilometers) for females and males, respectively.

There is little empirical information about adult dispersal; however, the available information suggests that adult Cooper's hawks exhibit strong fidelity to nesting areas (Rosenfield and Bielefeldt 1993), and pairs often reuse the same nest sites over consecutive years (Call 1978).

Diet and Foraging

Cooper's hawks primarily eat medium-sized birds and mammals; and birds comprise most of the diet (Peterson and Murphy 1992; Rosenfield and Bielefeldt 1993). Important avian prey includes mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), northern flicker (*Colaptes auratus*), jays (*Cyanocitta* spp*., Aphelocoma* spp.), and European starling (*Sturnus vulgaris*). Other documented avian prey includes ring-necked pheasant (*Phasianus colchicus*), American crow (*Corvus brachyrhynchos*), rock pigeon (*Columba livia*), house sparrow (*Passer domesticus*), and dark-eyed junco (*Junco hyemalis*). Mammalian prey includes chipmunks (*Tamius* spp*., Eutamius* spp.), hares (*Lepus* spp.), deer mouse (*Peromyscus*), tree squirrels (*Sciurus* spp*., Tamiasciurus*), ground squirrels (*Ammospermophilus* spp*., Spermophilus* spp.). Cooper's hawks also eat reptiles, mammals, insects, and fish.

In an urban environment, Roth and Lima (2003) found that mourning dove, European starling, and rock pigeon comprised 91 percent of the diet of eight Cooper's hawks. In this study, small birds such as house sparrow were abundant, but rarely attacked. Mammals were not taken.

Cooper's hawks are considered aggressive ambush predators, using concealment to catch prey. Surprise attacks are often initiated at close range from behind an obstruction (Roth and Lima 2003). They often use a series of brief perch and scan episodes to locate and capture prey. In open habitats, Cooper's hawks occasionally hunt from the air, scanning the ground and stooping on prey (Rosenfield and Bielefeldt 1993).

Movement and Migration Patterns

Cooper's hawks breeding in the northern portions of the species' range are more migratory than those at more southern latitudes (Palmer 1988; Rosenfield and Bielefeldt 1993). Most Cooper's hawks breeding in California are permanent, non-migratory residents; however, Cooper's hawks breeding in montane habitats may exhibit seasonal movements, moving to snow-free lower elevations during winter (Zeiner et al. 1990).

Territoriality/Home Range

Cooper's hawk home ranges have been estimated at 988 to 4,446 acres (400 to 1,800 hectares) in New York, Michigan, Oregon, New Mexico, and Wisconsin. Home range size varies through the nesting cycle, and small portions of the home range may be used disproportionately (Rosenfield and Bielefeldt 1993). In urban Tuscon, Arizona, home range size for nine subadult Cooper's hawks during their first fall/winter averaged 1,905 acres (771 hectares) (Mannan et al. 2004). In a study of nesting Cooper's hawks in the Sacramento area, the average distance between adjacent nests was 0.99 mile (1.6 kilometers) (Asay 1987).

In Tuscon, Mannan and Boal (2000) studied the movements of adult male Cooper's hawks in adjacent home ranges during the breeding season. Home range sizes for nine individuals ranged between 32.9 and 322.7 acres (13.3 and 130.6 hectares) and averaged 161.9 acres (65.5 hectares), while only one pair of home ranges overlapped. These home range sizes were considerably smaller than those reported elsewhere. Home range size apparently decreased with the number of years a Cooper's hawk maintained its breeding territory. The authors suggested that these relatively small home ranges may be a function of abundant prey availability, and Cooper's hawks in their study area may not require long foraging distances to meet their energetic requirements. In a study by Estes and Mannan (2003), the proportion of land use types within home ranges varied considerably among territories, and Cooper's hawks did not appear to select their home ranges based on the land use categories recognized by the authors. Also, patterns of habitat use suggested that male Cooper's hawks foraged primarily in areas surrounding their nests.

COHA Habitat Requirements and Ecology

Throughout its range, the Cooper's hawk nests in a wide variety of woodland and forest habitats, including oak woodland, riparian woodland, coniferous, deciduous, and mixed forest, woodlots, and suburban and urban areas. In much of California's lowland valley and foothill landscapes, including those within the Planning Area, this species appears strongly associated with live oak woodland (Asay 1987). At higher elevations in California (e.g., the Sierra Nevada), Cooper's hawks nest in conifer forest (Asay 1987; Zeiner et al. 1990; Henderson pers. obs.).

On average, Cooper's hawk nests are constructed 26 to 49 feet (8 to 15 meters) high, in trees 8.3 to 20 inches (21 to 52 centimeters) diameter-at-breast-height (dbh), and in stands with 64 to 95 percent canopy closure and 600 to 2,863 trees per acre (243 to 1,159 trees per hectare) (Rosenfield and Bielefeldt 1993). Dense canopy closure is a consistent feature of most nest sites, and the tallest tree in the stand is often selected for nesting (Kennedy 1988). Kennedy (1988) suggested that suitability of Cooper's hawk nest sites may be a function of four primary factors: 1) proximity to foraging habitat with dense prey populations; 2) availability of prey during the fledgling period; 3) historic nest success at a site; and 4) the overall vegetation structure of the site.

In a study of 77 Cooper's hawk nests in California, Asay (1987) found that nearly all nests (i.e., 75) were in live oak trees. The other two nests were in a blue oak and California sycamore; and these trees were in stands of live oak. This study focused on three study areas at relatively low elevation including the Sacramento study area (Sacramento, Placer, and El Dorado counties at 98 to 656 feet [30 to 200 meters] elevation), the Stockton study area in the foothills east of Stockton (Calaveras county at 394 to 1,378 feet [120 to 420 meters] elevation), and the southern California study area in the hills east and north of San Diego (Riverside and San Diego Counties at 345 to 3,593 feet [105 to 1,095 meters] elevation). The Sacramento study area, which included 27 nest sites, was dominated by gray pine (*Pinus sabiniana*), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), blue oak, and interior live oak (*Q. wislizenii*). In the vicinity of Folsom Lake, habitat consisted of relatively continuous and dense stands of interior live oak, gray pine, and shrubs. Occupied areas south of Folsom Lake consisted of more patchy stands of interior live oak mixed with valley oak, blue oak, and gray pine in a matrix of rolling grasslands. Although not specified in Asay's study, riparian woodlands also provide important habitat for Cooper's hawks in Sacramento County.

Other key findings of Asay's (1987) study of Cooper's hawk nesting habitat in lowland California were: 1) most nests occurred in groves of six or more trees; 2) stand structure was characterized by the canopies of multiple trees growing together; 3) the understory of these stands was relatively sparse, comprised of larger branches, few small branches and leaves, and sparse ground cover that included short grass and/or poison oak; 4) most nest trees (79 percent) were in flat or bottomland areas, although 21 percent occurred on steep hillsides; 5) nests were typically constructed in one of the most mature trees in the stand, in or just below the canopy; and 6) the heights of 48 nests ranged 18.7 to 46 feet (5.7 to 14 meters) and averaged 33 feet (10.1 meters) above ground.

In typical conifer forest habitats, Cooper's hawks inhabit medium to older aged forests with moderate tree densities, high canopy closure, and high canopy height (Reynolds et al. 1982; Moore and Henny 1983). Forest edge habitats are generally included within the home range (Rosenfield and Bielefeldt 1993). In Oregon, Cooper's hawks nested in stands of intermediate

ages (30 to 70 years old) and densities (2,240 trees per acre [907 trees per hectare]). Comparatively, northern goshawks nested in older and more open stands, and sharp-shinned hawks nested in the youngest and densest stands (Reynolds 1983; Moore and Henny 1983).

Cooper's hawks also breed in urban and suburban areas. Several urban populations of Cooper's hawks have been well documented (Beebe 1974; Stahlecker and Beach 1979; Murphy et al. 1988; Rosenfield et al. 1991; Mannan et al 2004). Cooper's hawks appear tolerant of habitat fragmentation and human disturbance near the nest (Beebe 1974; Murphy et al. 1988; Palmer 1988; Rosenfield et al. 1992). Urban nest sites have included isolated trees within 492 feet (150 meters) of commercial and recreational activities, and 66 to 98 feet (20 to 30 meters) of residential houses (Stahlecker and Beach 1979; Rosenfield and Bielefeldt 1993). In urban Tuscon, first-year Cooper's hawks used a variety of habitats before settling on winter home ranges, but occurred most frequently (35 percent of locations) in riparian areas (Mannan et al. 2004). Adult Cooper's hawks in Tuscon nested more frequently in eucalyptus (*Eucalyptus* spp., 70.8 percent), Aleppo pine (*Pinus halepensis*, 25 percent), and cottonwood (4.2 percent) trees than expected based on their availability (Boal and Mannan 1998). Most nest trees were in the yards of single-family residences (48.3 percent) and high-use recreational areas (28.3 percent). Human disturbance levels did not appear to affect nest site selection. Compared to random sites, nest sites were characterized by groves of greater canopy closure and more trees greater than 32.8 feet (10 meters) tall. Furthermore, nest trees were taller and larger (Boal and Mannan 1998).

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Cooper's hawk are identified in Table G-3.18-1 and have been derived from input from local species experts.

Table G-3.18-1. Habitat Elements for Cooper's Hawk

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, mixed riparian scrub, and orchards.	Structurally diverse woodland habitats that provide suitable prey abundance and diversity (i.e., medium-sized birds) and large numbers of sites within which to perch, scan, and launch attacks on potential prey.
Nesting	Blue oak woodland, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, and mixed riparian scrub.	Groves of trees; stand structure with the canopies of multiple trees growing together; sparse understory; and mature trees that allow for placement of nests 18 to 46 feet above ground.

COHA Species Distribution and Population Trends

COHA Species Distribution

Cooper's hawk is the most widely distributed North American Accipiter south of Canada (American Ornithologists' Union 1957; Asay 1987). Populations of Cooper's hawk occur throughout most of the United States as well as southern Canada and northern Mexico. Northern populations are migratory or partially migratory (Palmer 1988; Rosenfield and Bielefeldt 1993), while some southwestern populations migrate as well (Millsap 1981; Kelly and Kennedy 1993). Most Cooper's hawks winter in the coterminous United States, most of Mexico, and south to Costa Rica and possibly Panama (Ridgely and Gwynne 1989; Rosenfield and Bielefeldt 1993).

COHA Central Valley Distribution

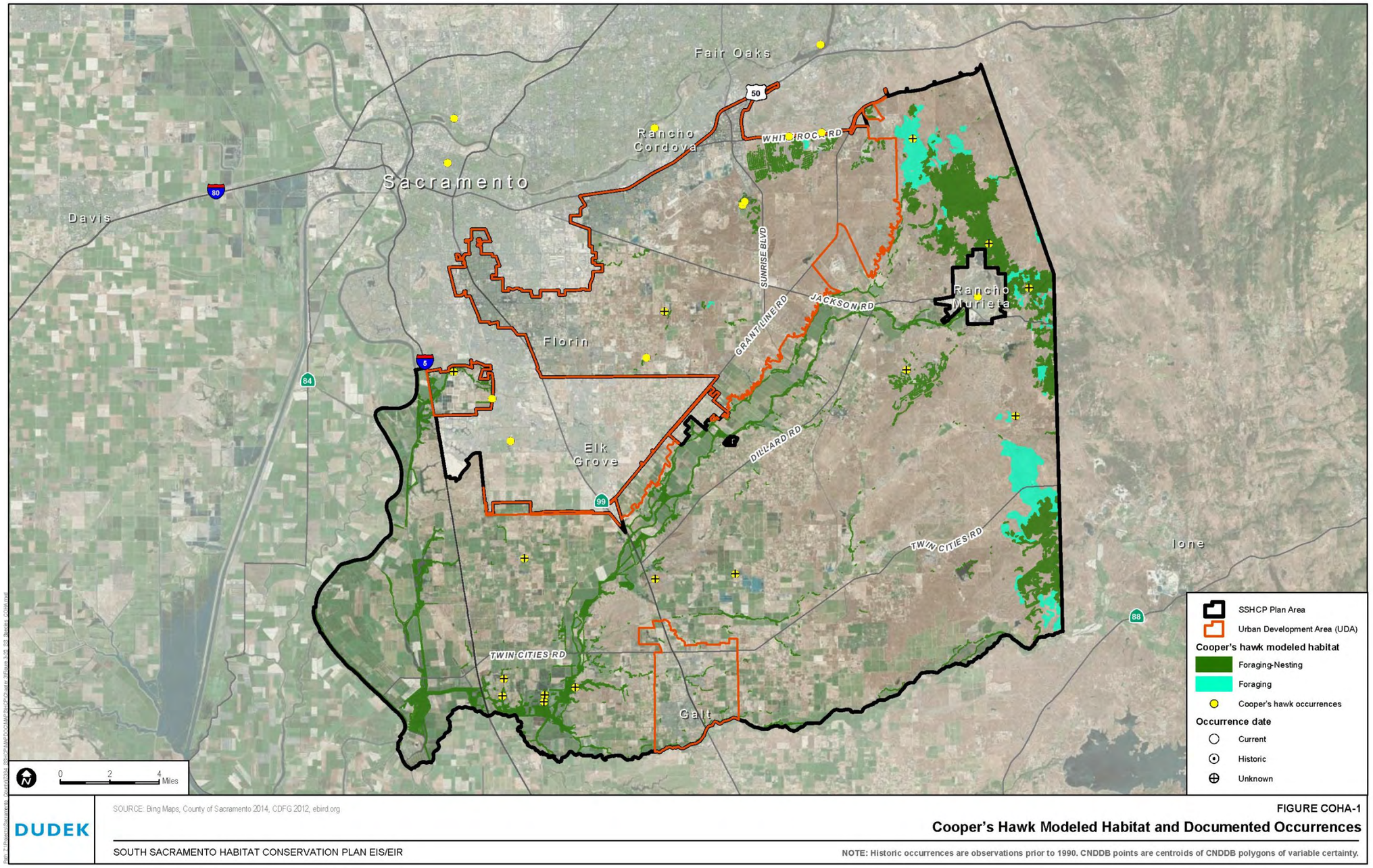
Cooper's hawk is a breeding resident throughout most of California, including the Central Valley, in a variety of woodland habitats. Based on its close association with live oak woodlands (Asay 1987), its Central Valley breeding distribution is probably concentrated in the foothill woodlands along the upper margins of the Central Valley.

COHA Distribution Within the Planning Area

Cooper's hawks occur in suitable habitat within the Planning Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by Cooper's hawks, such as oak and riparian woodland, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Planning Area, particularly in the eastern portion of the Planning Area and outside the Urban Development Area (UDA). At most sites within these land-cover types, the presence of Cooper's hawk is not known, and it is assumed that most of this habitat is not occupied.

Asay (1987) studied breeding habitat characteristics and productivity of Cooper's hawks at 27 nest sites in Sacramento, El Dorado, and Placer Counties collectively; however, the number and locations of sites specifically in Sacramento County were not reported. In the Planning Area, the CNDDB reports three occurrences inside the UDA and no occurrences outside the UDA (CDFG 2010). There are four CNDDB occurrence records of Cooper's hawk in Sacramento County outside, but near the Planning Area (CDFG 2010). Figure COHA-1 shows the known occurrences of Cooper's Hawk within and adjacent to the Planning Area (CDFG 2010; Henderson unpublished; Asay 1987).

Figure COHA-1 Cooper's Hawk Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

The occurrence data from the CNDDB does not allow for an estimate of the distribution or population size of Cooper's hawk in the Planning Area because they are based on a very small number of surveys in a limited area. Local ornithologists C. Conard and J. Trochet provided additional occurrence and habitat distribution information, which is summarized below.

- At the Cosumnes River Preserve, at least three Cooper's hawk nests have been documented in the Lower Preserve over the last 10 years. All of these nests failed before fledging, presumably due to predation by great horned owls (*Bubo virginianus*). Also, an adult Cooper's hawk carrying a towhee was recently observed at the Tall Forest (Trochet pers. comm.). This adult could have been delivering food to a nest.
- In 2003, nesting was documented east of Highway 99 at Bond Drive (Trochet pers. comm.).
- First-year Cooper's hawks are regularly observed at the Bufferlands (Conard pers. comm.).
- Cooper's hawks have historically nested in McKinley Park (Trochet pers. comm.).
- Nesting has not been documented at Howard Ranch (Trochet pers. comm.).
- Habitat identified as suitable for nesting Cooper's hawks in the Planning Area includes dense stands of interior live oak near Scott Road (Conard pers. comm.). Also, riparian woodland along Deer Creek downstream of its crossing with Scott Road, which includes cottonwood trees, has a high potential to support breeding Cooper's hawks (Trochet pers. comm.).

Because comprehensive surveys or monitoring efforts for Cooper's hawk in the Planning Area have not been conducted, and because the known occurrences are based mostly on incidental observations or limited surveys (e.g., CNDDB, anecdotal records, surveys conducted over a limited area), the population size and extent of suitable nesting habitat for this species in the Planning Area are not well known.

COHA Population Levels and Trend

Overall, Cooper's hawk has been considered common in the western portion of its range (Reynolds 1989), and western populations have been considered relatively stable (Snyder et al. 1973; Jones 1979). Grinnell and Miller (1944) once considered Cooper's hawk a common breeder throughout its range in California. Although population declines in the west are less well documented than in the east, Remsen (1978) reported that breeding populations of Cooper's hawk had declined throughout California over the two or three decades prior to 1978. At that time, breeding populations had been extirpated from some areas (e.g., the Colorado River), and severe declines were reported for the Sacramento Valley (Gaines 1974), Santa Cruz and Santa Clara Counties (Chandik and Baldridge 1969), Santa Barbara area, northern San Diego County, and Yosemite National Park (Gaines 1977, Remsen 1978). Also, analysis of Breeding

Bird Survey (BBS) data for the 20-year period (1983 to 2003) suggests that Cooper's hawk populations in California may have declined (P = 0.11) during that period (Sauer et al. 2004).

COHA Threats to the Species

The primary threat to Cooper's hawk, particularly in California, is probably habitat loss and degradation as a result of urbanization and development. Direct or indirect human disturbance of nesting activities, particularly in suburban areas, may also threaten populations (Thelander 1973; Olendorff and Kochert 1977; Remsen 1978; Bosakowski et al. 1993; Boal and Mannan 1998).

Declines in eastern Cooper's hawk populations attributed to pesticide contamination have been documented (Henny and Wight 1972; Snyder et al. 1973; Bednarz et al. 1990). In San Diego, one Cooper's hawk in 1968 was found to be highly contaminated with DDT (dichlorodiphenyltrichloroethane) (Risebrough et al. 1968); however, pesticide contamination of Cooper's hawks in California has not been reported elsewhere (Remsen 1978).

Shooting and trapping were important factors in historical population declines, but are no longer considered a threat (Rosenfield and Bielefeldt 1993). Timber harvest is considered a potential threat, but the impacts of logging on this species are poorly understood (Reynolds 1983; Rosenfield and Bielefeldt 1993). The availability of breeding habitat is apparently not a limiting factor for Cooper's hawk populations, at least in some areas, including suburban areas (Rosenfield and Bielefeldt 1993). More than 100 nest sites for this species have been found during on-going surveys by the Golden Gate Raptor Observatory (GGRO) in the larger East Bay Area (i.e., urban areas from El Cerrito south to Alameda) since 2002 (Fish 2008).

Trichonmoniasis, a digestive tract disease in raptors that originates from infected avian prey (particularly doves), has been reported to be common and an important source of mortality in nestling and fledgling Cooper's hawks in some urban populations (Boal et al. 1998; Boal and Mannan 1999; Rosenfield et al. 2002; Estes and Mannan 2003). However, the prevalence of infection appears to vary widely across the Cooper's hawk's breeding range (Rosenfield et al. 2002). Also, West Nile virus has been isolated from brain tissue of a Cooper's hawk in Connecticut (Wakem et al. 1999).

COHA Data Gaps and Conservation Implications

The ecology, status, and management of Cooper's hawks have received considerable attention in recent years. However, there are several sources of uncertainty regarding Cooper's hawks and their requirements in the Planning Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

COHA Population and Habitat Distribution within the Planning Area

Cooper's hawks occur in suitable habitat within the Planning Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by Cooper's hawks, such as oak and riparian woodland, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Planning Area, particularly in the eastern portion of the Planning Area and outside the UDA. However, at most sites within these land-cover types, the presence of Cooper's hawk is not known, and it is assumed that most of this habitat is not occupied.

Because comprehensive surveys for Cooper's hawk in the Planning Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and nesting locations of this species throughout the Planning Area are not known. Also, although the distribution of oak and riparian woodlands is mapped and quantifiable, the quality of habitat for Cooper's hawks within most of these areas is unknown. A few areas identified as suitable for nesting Cooper's hawks in the Planning Area include dense stands of interior live oak near Scott Road (Conard pers. comm.). Also, riparian woodland along Deer Creek downstream of its crossing with Scott Road has a high potential to support breeding Cooper's hawks (Trochet pers. comm.).

These information gaps limit our ability to identify the best lands available for preserving Cooper's hawk habitat and accurately estimate the impacts resulting from covered activities. Until this data gap is remedied, the conservation value of woodland and riparian woodland land-cover types for Cooper's hawk will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas (e.g., near the Cosumnes River Preserve).

COHA Effectiveness of Woodland Enhancement and Restoration Techniques in Creating Suitable Habitat Structure for Cooper's Hawk

Achieving the conservation goals and objectives for Cooper's hawk will require successful enhancement and restoration of oak and riparian woodlands. The structure of woodlands (e.g., dense canopy closure) is an important factor for suitability of Cooper's hawk. Whether restored or enhanced woodlands can retain the structural attributes suitable for Cooper's hawk is unknown. If woodland restoration and enhancement techniques cannot eventually create woodland habitats with structural characteristics suitable for Cooper's hawk, then those lands would not support breeding pairs.

COHA Literature Cited

American Ornithologists' Union. 1957. Check-list of North American birds. American Ornithologists' Union, Washington, D.C.

Asay, C.E. 1987. Habitat and productivity of Cooper's hawks nesting in California. *California Fish and Game* 73:80–87.

Bednarz, J. C., D. Klem Jr., L. J. Goodrich, and S. E. Senner. 1990. Migration counts of raptors at Hawk Mountain, Pennsylvania, as indicators of population trends, 1934-1986. *The Auk* 107:96-109.

Beebe, F.L. 1974. Field studies of the Falconiformes of British Columbia. Brit. Col. Prov. Mus. Occas. Paper No. 17. 163 pp.

Boal, C.W. and R.L. Spaulding. 2000. Helping at a Cooper's Hawk nest. *Wilson Bulletin* 112:275-277.

Boal, C.W. and R.W. Mannan. 1998. Nest-site selection by Cooper's hawks in an urban environment. *Journal of Wildlife Management* 62:864–871.

Boal, C.W. and R.W. Mannan. 1999. Comparative breeding ecology of Cooper's Hawks in urban and exurban areas of southeast Arizona. *Journal of Wildlife Management* 63:77-84.

Boal, C.W., R.W. Mannan, and K. S. Hudelson. 1998. Trichomoniasis in Cooper's Hawks from Arizona. *Journal of Wildlife Diseases* 34:590-593.

Bosakowski, T., R. Speiser, and L.J. Niles. 1993. Loss of Cooper's Hawk nesting habitat to suburban development: inadequate protection for a state-endangered species. *Journal of Raptor Research* 27:26-30.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Partners in Flight (CalPIF). 2002. Version 2.0. The oak woodland bird conservation planning: a strategy for protecting and managing oak woodland habitats and associated birds in California (S. Zack, lead author). Point Reyes Bird Observatory, Stinson Beach, California. http://www.prbo.org/calpif/plans.html.

Call, M. W. 1978. Nesting Habitats and surveying techniques for common western raptors. Technical Note TN-316. U.S. Department of the Interior - Bureau of Land Management, Denver Service Center.

Chandik, T., and A. Baldridge. 1969. The nesting season. Middle Pacific Coast Region. *Audubon Field Notes* 23:688-693.

Conard, C. Ornithologist. Telephone conversation, October 15, 2004.

Estes, W.A., and R.W. Mannan. 2003. Feeding behavior of Cooper's Hawks at urban and rural nests in southeastern Arizona. *Condor* 105:107-116.

Fish, A.M. 2008. October 22, 2008 letter to West Contra Costa Unified School District from Golden Gate Raptor Observatory in regards to information and comments on Cooper's hawk at Castro Park.

Gaines, D. 1974. A new look at the nesting riparian avifauna of the Sacramento Valley, California. *Western Birds* 5:61-80.

Gaines, D. 1977. *Birds of the Yosemite Sierra*. Cal-Syl Press, Oakland, California.

Grinnell, J. and A.H. Miller. 1944. *Distribution of the birds of California*. Pacific Coast Avifauna, No. 27. Berkeley, California.

Hennessy, Stephen P. 1978. Ecological relationships of accipiters in northern Utah-with special emphasis on the effects of human disturbance. 66 p. M.S. Thesis, Utah State University, Logan.

Henny, C.J., and H.M. Wight. 1972. Population ecology and environmental pollution: red-tailed and Cooper's hawks. *In* Population ecology of migratory birds: a symposium. *United States Fish and Wildlife Service Report* 2:229–250.

Jones, S. 1979. The Accipiters: Goshawk, Cooper's Hawk, Sharp-shinned Hawk. U.S. Bureau of Land Management Technical Note No. 335. 51 pp.

Kelly, E.J., and P.L. Kennedy. 1993. A Dynamic State Variable Model of Mate Desertion in Cooper's Hawks. *Ecology*, 74(2):351-366.

Kennedy, P.L. 1988. Habitat characteristics of Cooper's Hawks and Northern Goshawks nesting in New Mexico. Pp. 218-227 *in* Proc. Southwestern raptor management symposium (R. Glinski, B.G. Pendleton, M.B. Moss, B.A. Millsap, and S.W. Hoffman, Editors). Natl. Wildl. Fed. Sci. Tech. Ser. No. 11.

Mannan, R.W., and C.W. Boal. 2000. Home range characteristics of male Cooper's Hawks in an urban environment. *Wilson Bulletin* 112:21-27.

Mannan, R.W., W.A. Estes, and W.J. Matter. 2004. Movements and survival of fledgling Cooper's Hawks in an urban environment. *Journal of Raptor Research* 38:26-34.

Meng, H. K. 1951. The Cooper's hawk, Accipiter cooperii (Bonaparte). Ph.D. Thesis, Cornell Univ., Ithaca, New York. 202pp.

Millsap, B.A. 1981. Distributional status of Falconiformes in west central Arizona with notes on ecology, reproductive success, and management. U.S. Bureau of Land Management Technical Note 355.

Moore, K.R. and C.J. Henny. 1983. Nest site characteristics of three coexisting *Accipiter* hawks in northeastern Oregon. *Raptor Research* 17:65–76.

Moore, K.R. and C.J. Henny. 1984. Age-specific productivity and nest site characteristics of Cooper's Hawks (*Accipiter cooperii*). *Northwest Sci*. 58:290-299.

Murphy, R.K., M.W. Gratson, and R.N. Rosenfield. 1988. Activity and habitat use by a breeding male Cooper's hawk in a suburban area. *Journal of Raptor Research* 22: 97-100.

Olendorff, R.R. and M.N. Kochert 1977. Land Management for the Conservation of Birds of Prey. From R.D. Chancellor. World Conference on Birds of Prey, Vienna, 1975, Report of Proceedings. International Council for Bird Preservation.

Palmer, R. S., ed. 1988. Handbook of North American birds. Vol. 5. Yale Univ. Press, New Haven. 465 pp.

Peterson, D.J., and R.K. Murphy. 1992. Prey delivered to two cooper's hawk Accipiter cooperii nests in northern mixed grass prairie. *Canadian Field-Naturalist* 106: 385-386.

Remsen, J.V. 1978. Bird Species of Special Concern in California, Cooper's Hawk. California Department of Fish and Game. Sacramento, California.

Reynolds, R.T. 1983. Management of western coniferous forest habitat for nesting accipiter hawks. U.S. Forest Service Technical Report RM-102.

Reynolds, R.T. 1989. Status reports: accipiters. Pages 92-101 *in* B. G. Pendleton, C. E. Ruibal, D. L. Krahe, K. Steenhof, M. N. Kockert, and M. L. LeFranc, editors. Proceedings of the western raptor management symposium and workshop. National Wildlife Federation, Washington, D.C., USA.

Reynolds, R. T. and H. M. Wight. 1978. Distribution, density, and productivity of accipiter hawks breeding in Oregon. *Wilson Bulletin,* 90:182-96.

Reynolds, R.T., E.C. Meslow, and H.M. Wight. 1982. Nesting habitat of coexisting *Accipiter* in Oregon. *Journal of Wildlife Management* 46:124–138.

Ridgely, R.S. and J.A. Gwynne. 1989. A guide to the birds of Panama with Costa Rica, Nicaragua, and Honduras. Rev. E. Princeton University Press, Princeton, New Jersey.

Risebrough, R. W., P. Reiche, D. B. Peakall, S. G. Herman, and M. N. Kirven. 1968. Polychlorinated biphenyls in the global ecosystem. *Nature* 220:1098-1102.

Rosenfield, R.N. and J. Wilde 1982. Male Cooper's Hawk Breeds in Juvenal Plumage Male Cooper's Hawk Breeds in Juvenal Plumage. *The Wilson Bulletin*, 94(2): 213

Rosenfield, R.N., J. Bielefeldt, L.J. Rosenfield, S.J. Taft, R.K. Murphy, A.C. Stewart. 2002. Prevalence of Trichomonas gallinae in Nestling Cooper's Hawks among Three North American Populations Prevalence of Trichomonas gallinae in Nestling Cooper's Hawks among Three North American Populations. *The Wilson Bulletin*, 114(1):145-147.

Rosenfield, R.N., and J. Bielefeldt. 1993. Cooper's Hawk (*Accipiter cooperii*). *In* The Birds of North America, No. 75 (A. Poole and F. Gill, Editors). Philadelphia: The Academy of Natural Sciences, Washington, DC. The American Ornithologists' Union.

Rosenfield, R.N., C.M. Morasky, J. Bielefeldt, and W.L. Loope. 1992. Forest fragmentation and island biogeography, a summary and bibliography. USDI, National Park Service Technical Report 92/08.

Rosenfield, R.N., J. Bielefeldt, L.J. Rosenfield, S.J. Taft, R.K. Murphy, and A.C. Stewart. Prevalance of *Trichomonas gallinae* in nestling Cooper's Hawks among three North American populations. *Wilson Bulletin* 114:145-147.

Rosenfield, R.N., J. Bielefeldt, R.K. Anderson, and J.M. Papp. 1991. Status Reports: accipiters. Pp. 42-49 *in* Proc. Midwest Raptor Management Symposium and Workshop. Natl. Wildl. Fed., Washington, D.C.

Roth, T. C. and S. L. Lima. 2003. Hunting behavior and diet of Cooper's Hawks: an urban view of the small-bird-in-winter paradigm. *Condor* 105:474–483.

Sauer, J.R., J.E. Hines, and J. Fallon. 2004. *The North American Breeding Bird Survey, Results and Analysis 1966-2003.* Version 2004.1. USGS Patuxent Wildlife Research Center, Laurel, Maryland.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Snyder, N.F.R., H.A. Snyder, J.L. Lincer, and R.T. Reynolds. 1973. Organochlorines, heavy metals, and the biology of North American accipiters. *BioScience* 23:300-305.

Stahlecker, D.W. and A. Beach. 1979. Successful nesting by Cooper's hawks in an urban environment. *Inland Bird Banding* 51:56-57.

Thelander, C.G. 1973. Bald Eagle Reproduction in California. 1972-1973. California Department og Fish and Game, Wildlife Branch Adm. Rep. 73-5. 17 pp.

Trochet, J. Ornithologist. Telephone conversation, October 15, 2004.

Wakem, E.M, R.A. French, A.E. Garmendia, and H.J. Van Kruiningen. 1999. Isolation of West Nile virus from mosquitoes, crows, and a Cooper's Hawk in Connecticut. *Science* 286(5448):2331-2333.

Zeiner, D. C., W. F Laudenslayer Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife: volume II: birds. California Department of Fish and Game. Sacramento, California.

TRICOLORED BLACKBIRD (TRIC)

Tricolored Blackbird (TRIC)

(Agelaius tricolor)

Status USFWS: Bird of Conservation Concern

Status CDFW: Candidate for Listing as Endangered



iStockphotos

TRIC Listing Status

The tricolored blackbird (*Agelaius tricolor*) is legally protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7012) and California Fish and Game Code (Section 3503.5 and 3800).

The species is a candidate for listing as endangered by the California Department of Fish and Wildlife (CDFW). The tricolored blackbird was formerly a candidate (category 2) for federal listing as either Threatened or Endangered by the U.S. Fish and Wildlife Service (USFWS) (59 Federal Register [219]: 58990), and was also informally identified as a Species of Concern (USFWS 1995). More recently, the USFWS (2002) designated the tricolored blackbird as a Bird of Conservation Concern (BCC). The Bureau of Land Management (BLM) also designates it as a Sensitive Species (BLM 1999).

TRIC Life History and Ecology

TRIC Species Description and Life History

Physical Description

The tricolored blackbird is a medium-sized, sexually dimorphic blackbird. Adults range from 18 to 24 centimeters (7 to 9.5 inches) in length (from beak to tail) and weight between 40 to 70 grams (1.4 to 2.5 ounces), depending on the sex and season (Beedy and Hamilton 1999). Adult males are entirely black, glossed bluish (in full sunlight), with bright red lesser wing-coverts forming conspicuous reddish patches on wing shoulders (epaulets). The median-coverts are buffy white (August through February) to pure white (February through July) (Mailliard 1910; DeHaven 1975). Adult females are mostly black, with distinct grayish streaks; relatively whitish chins and throats, rarely with faint pinkish or peach wash; and small but distinct reddish shoulder patches (DeHaven 1975). Juveniles of both sexes (April through August) are similar to adult females but are much paler gray and buff (Pyle 1997).

TRIC Demography

Reproduction

During the breeding season, tricolored blackbirds typically nest in dense colonies (some estimated as having 200,000+ nests), with males defending small territories and mating with one to four females (Beedy and Hamilton 1999). They are also considered itinerant breeders, sometimes nesting more than once at different locations during the breeding season. Studies by Neff (1937) reported that nesting colonies are often located in seasonal wetlands with tules (*Scirpus* spp.) and cattails (*Typha* spp.) present. More recent studies indicate that nesting colonies are also regularly found in Himalayan blackberries (*Rubus discolor*) (Cook 1999) and grain fields (DeHaven 2000).

Female tricolored blackbirds breed in their first year, but most males apparently defer breeding until they are at least two years old (Payne 1969). Nest construction, done exclusively by females, is usually highly synchronous and may be initiated as soon as the day of arrival at the

breeding colony (Neff 1937). Additional birds may be recruited to the colony site and initiate nesting later. These birds may nest in a continuing concentric wave at the margin of the colony (Orians 1961). As colonization of a breeding site proceeds, the area occupied by nests expands (Tyler 1907), engulfing any previously established breeding red-winged blackbird (*Agelaius phoeniceus*) nest sites (Orians 1961).

Tricolored blackbird nests are bound to upright plant stems from a few inches up to about six feet (1.8 meters) above water or ground (Harrison 1978). Nests in the canopies of willows (*Salix* spp.) and ashes (*Fraxinus* spp.), however, may be more than 12 feet (3.6 meters) high (Hamilton pers. comm.). Tricolored blackbird nests are rarely built on the ground (Neff 1937). Deep cup nests are constructed with outer layers of long leavers (e.g., cattail thatch, annual grasses, or forbs) woven tightly around supporting stems. The inner layers are coiled stems of grasses lined with soft plant down, mud, or algal fibers. Nest building takes about four days (Payne 1969).

Egg laying can begin as early as the second day after nest initiation, but ordinarily starts about four days after the arrival of birds at breeding sites (Payne 1969). One egg per day is laid, and clutch size is typically three to four eggs (Payne 1969, Hamilton et al. 1995). Emlen (1941) and Orians (1961) estimated the tricolored blackbirds incubation period at 11 or 12 days, while Payne (1969) estimated this interval at 11 to 14 days. Incubation begins before clutches are completed, and eggs in individual nests hatch asynchronously (Hamilton pers. comm.).

Tricolored blackbird clutches take about nine days from hatching until the oldest nestling is willing to jump from the nest when disturbed. Young require about 15 days from this pre-fledging date until they are independent of their parents. Thus, one successful nesting effort for a reproductive pair takes about 45 days (Hamilton et al. 1995). The persistence of a successful colony takes additional time, depending on the presence of females recruited into the colony after the initial establishment.

A successful tricolored blackbird colony, including some asynchronous nests, takes about 50 days from nest initiation to fledging. Because most first nesting efforts are made before April 25, most nesting attempts observed between April 25 and May 20 are probably second or third attempts by birds that lost earlier nests. A pair beginning nesting after April 25 and before May 20 would not have had sufficient time (i.e., about 45 days) to complete a prior, successful nest (Beedy and Hamilton 1997).

Tricolored blackbird activity during the early stages of colony settlement may give the erroneous impression of high local nesting densities because typically more birds are present at some colonies initially than will actually remain to nest (Hamilton et al. 1995). Flight activity over colonies during the settlement phase is mainly by males that have not established nesting territories. Males gaining breeding territories may remain below the canopy of nesting

substrates and, therefore, out of view. The mean number of females per male is estimated to be two (Orians 1961; Payne 1969), but some colonies may have nearly as many males as females (Hamilton pers. comm.). A count of active tricolored blackbird nests per unit area is a better indication of local abundance than numbers of singing males (Neff 1937).

Females on nests are quiet during incubation, and active colonies may appear to be largely deserted. The more synchronous colonies are particularly inconspicuous at this stage and can be easily overlooked. Close approach by an observer, however, usually causes females to leave their nests and fly away (Hamilton pers. comm.).

Banding studies, summarized by Neff (1942) and DeHaven and Neff (1973), indicated life span may extend to at least 13 years (Kennard 1975; Beedy and Hamilton 1999). No annual survivorship studies have been conducted and available banding data is inadequate to determine annual survivorship (Beedy and Hamilton 1999).

Dyer et al. (1977 *in* DeHaven 2000) reported red-winged blackbird's (*Agelaius phoeniceus*), the tricolored blackbird's closest relative, annual survival between 42 to 62 percent and an average life expectancy of 2.14 years.

Dispersal Patterns

A crèche of tricolored blackbirds is a group of fledglings that have left the nest and assembled either at the colony site or at locations between colonies and favorable foraging areas (Payne 1969). These fledglings are conspicuous, both because they are vociferous and because adults are feeding them as rapidly as possible (Hamilton pers. comm.). DeHaven et al. (1975) banded 33,058 nestlings and only 39 percent of band recoveries were re-located within 16 kilometers (10 miles) of natal colonies.

Diet and Foraging

Tricolored blackbirds primarily forage by gleaning food parts from the ground and secondarily by gleaning food parts from foliage (Ehrlich et al. 1988). Food items are diverse and change seasonally. During the nesting season, foods delivered by adults to nestlings include beetles and weevils, grasshoppers, caddisfly larvae, and moth and butterfly larvae (Orians 1961; Crase and DeHaven 1977; Skorupa et al. 1980), and, especially in current rice-growing areas, dragonfly larvae (Hamilton pers. comm.). In contrast, breeding season foraging studies in Merced County showed that animal matter makes up about 91 percent of the food volume of nestlings and fledglings, 56 percent of the food volume of adult females, and 28 percent of that of adult males (Skorupa et al. 1980). Studies conducted since the 1980's have documented tricolored blackbirds feeding on dairy cow silage that is stored in large open piles on the ground (Cook

pers. comm.). Also, the importance of grasshoppers as a dietary item has been highlighted during the breeding season (Cook pers. comm.; DeHaven 2000).

Adults may continue to consume plant foods through the nesting cycle, but also forage on insects and other animal foods. Immediately before and during nesting, adults are often attracted to dairies, where the birds take high-energy items from livestock feed rations. Adults with access to livestock feed, such as cracked corn, begin providing it to nestlings when they are about 10 days old (Hamilton et al. 1995).

More that 88 percent of all winter food in the Sacramento Valley is plant material, primarily seeds or rice and other grains, but also weed seeds (Crase and DeHaven 1978). In winter, tricolored blackbirds often associate with other blackbirds, but flocks as large as 15,000 individuals (almost all tricolored blackbirds) may aggregate at one location and disperse to foraging sites. Some winter foraging flocks are almost exclusively composed of one sex (Hamilton pers. comm.), which may imply an as-yet unidentified gender difference in foraging preferences.

Movement and Migration Patterns

In late March and early April, tricolored blackbirds vacate wintering areas in the Sacramento-San Joaquin River Delta and along coastal central California and arrive at breeding locations in Sacramento County and throughout the San Joaquin Valley (DeHaven et al. 1975). A substantial, but as yet unmeasured, number of tricolored blackbirds also winter in the northern San Joaquin Valley (Hamilton pers. comm.).

During the breeding season, tricolored blackbirds often exhibit itinerant breeding and move to new breeding locations following previous nesting attempts elsewhere (Hamilton 1998). Most probably move from the San Joaquin Valley and Sacramento County to the northern Sacramento Valley for second or third nesting attempts. While this trend was noted in all three years of an intensive study, colonies may form at any time during the breeding season (April through July) throughout the known breeding distribution of this species (Hamilton et al. 1995; Hamilton 2000).

Long-term banding studies by DeHaven et al. (1975) demonstrated a major postbreeding season movement into the Sacramento Valley from other breeding locales. Large postbreeding roosts continue to develop in this area from late summer (August) into fall (Hamilton pers. comm.).

The timing of major movements to wintering areas is unknown. Large foraging flocks can be seen in pasturelands north of Rio Vista, Solano County, by late October (Beedy pers. obs.), and Hamilton (pers. comm.) has seen large flocks in the Sacramento and San Joaquin River Delta by late November. During winter, tricolored blackbirds can be found in large flocks by themselves,

or with other blackbird species including red-winged blackbirds and Brewer's blackbirds (*Euphagus cyanocephalus*) (Beedy and Hamilton 1999).

Ecological Relationships

Several wildlife species are known to raid tricolored blackbird nests. In addition, great-tailed grackles (*Quisalus mexicanus*), a southern species expanding its range northward, have been reported nesting near and exhibiting aggression toward tricolored blackbird breeding colonies (Hamilton pers. comm. *in* Beedy and Hamilton 1999). Roosting European starlings (*Sturnus vulgaris*) are associated with desertion of tricolored blackbird colonies (Payne 1969 *in* Beedy and Hamilton 1999).

TRIC Habitat Requirements and Ecology

Tricolored blackbirds are closely related to red-winged blackbirds, but the two species differ substantially in their breeding ecology. Red-winged blackbird pairs defend individual territories, while tricolored blackbirds are among the most colonial of North American passerines (Bent 1958; Orians 1961, 1980; Orians and Collier 1963; Payne 1969; Beedy and Hamilton 1999). As many as 20,000 or 30,000 tricolored blackbird nests have been recorded in cattail marshes of 9 acres (four hectares) or less (Neff 1937; DeHaven et al. 1975), and individual nests may be built less than 1.5 feet (0.50 meters) from each other (Neff 1937). The tricolored blackbirds highly synchronized and colonial breeding system have adapted to exploit a rapidly changing environment where the locations of secure nesting habitat and rich insect food supplies were ephemeral and likely to change each year (Orians 1961; Orians and Collier 1963; Collier 1968; Payne 1969).

Tricolored blackbirds have three basic requirements for selecting their breeding colony sites: a protected nesting substrate that is either flooded, thorny, spiny, or "visually" but not actually spiny; a suitable foraging space providing adequate insect prey within a few miles of the nesting colony; and open accessible water (Hamilton et al. 1995; Beedy and Hamilton 1997, 1999). DeHaven (2000), however, questioned whether the lack of water constitutes a significant limitation on breeding substrate utilization.

Almost 93 percent of the 252 tricolored blackbird breeding colonies reported by Neff (1937) were in freshwater marshes dominated by tules and cattails. The remaining colonies in Neff's study were in willows, blackberries (*Rubus* spp.), thistles (*Cirsium* and *Centaurea* spp.), or nettles (*Urtica* spp.). In contrast, only 53 percent of the colonies reported during the 1970s were in cattails and tules (DeHaven et al. 1975).

An increasing percentage of tricolored blackbird colonies in the 1980s and 1990s were reported in Himalayan blackberries (Beedy et al. 1991; Cook 1996, 1999), and some of the largest recent colonies are in grain fields (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000).

Other substrates where they have been observed nesting include giant European reed (*Arundo donax*), safflower (*Carthamus tinctorius*) (DeHaven et al. 1975), tamarisk (*Tamarix* spp.), elderberry (*Sambucus* spp.), poison-oak (*Toxicodendron diversilobum*), and riparian scrublands and forests (e.g., *Salix, Populus,* and *Fraxinus* spp.) (American Birds file data).

Tricolored blackbird foraging habitats in all seasons include annual grasslands, wet and dry vernal pools and other seasonal wetlands, agricultural fields (such as large tracts of alfalfa and pastures with continuous haying schedules, and recently tilled fields), cattle feedlots, and dairies. They also forage occasionally in mixed riparian scrub habitats along marsh borders. Weed-free row crops and intensively managed vineyards and other orchards do not serve as regular foraging sites (Beedy and Hamilton 1997, 1999; DeHaven 2000).

Grassland and vernal pool complexes characterize the landscape in much of the tricolored blackbirds breeding range and preferred foraging habitat in southern Sacramento County (Cook 1999). Ungrazed grasslands containing tall grasses (greater than 15 centimeters [six inches] tall) and vernal pools were considered preferred over dry, grazed grasslands containing short grasses (Cook 1999). Foraging birds often congregate at the margins of wet vernal pools and in their interiors once they dry (Cook 1999). Most tricolored blackbirds forage within five kilometers (three miles) of their colony sites (Orians 1961), but commute distances of up to 13 kilometers (eight miles) have been reported (Hamilton pers. comm.). Short-distance foraging (i.e., in sight of the colony) for nestling provisioning also is common. Both sexes are known to provision nestlings (Beedy and Hamilton 1999).

Proximity to suitable foraging habitat appears to be extremely important for the establishment of colony sites, because tricolored blackbirds always forage, at least initially, in the field containing the colony site (Cook 1999). Usually only a minor fraction of the area within the commuting ranges of a colony, however, provides suitable foraging habitat (Beedy and Hamilton 1999; Cook 1999). For example, within a five-kilometer (three-mile) radius there may be low-quality foraging habitats such as cultivated row crops, orchards, and vineyards, along with high-quality foraging areas like irrigated pastures, lightly grazed rangelands, vernal pools, and recently hayed alfalfa fields (Cook 1999).

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for tricolored blackbird are identified in Table G-3.1911 and have been derived from input from local species experts.

Table G-3.19.1. Habitat Elements for Tricolored Blackbirds

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, cropland, vineyards, orchards, irrigated pasture grassland, valley grassland, seasonal wetlands, freshwater marsh, and open water.	Foraging space providing adequate insect prey within a few miles of the nesting colony; and open accessible water.
Nesting	Mine tailing riparian woodland, valley oak riparian woodland, mixed riparian scrub, cropland, seasonal wetlands, seasonal impoundment, and freshwater marsh.	A protected nesting substrate, including flooded, thorny, spiny, or "visually" spiny vegetation.

TRIC Species Distribution and Population Trends

TRIC Species Distribution

Surveys indicate that the Tricolored Blackbirds overall range is little changed since the 1930s (Neff 1937; DeHaven et al. 1975; Beedy et al. 1991; Hamilton 1998). Tricolored blackbirds are largely endemic to California, and more than 99 percent of the global population occurs in the state. In any give year, more than 75 percent of the breeding population occurs in the Central Valley (Hamilton 2000). Small breeding populations also exist at scattered sites in Oregon, Washington, Nevada, and western coastal Baja California (Beedy and Hamilton 1999).

TRIC Central Valley Distribution

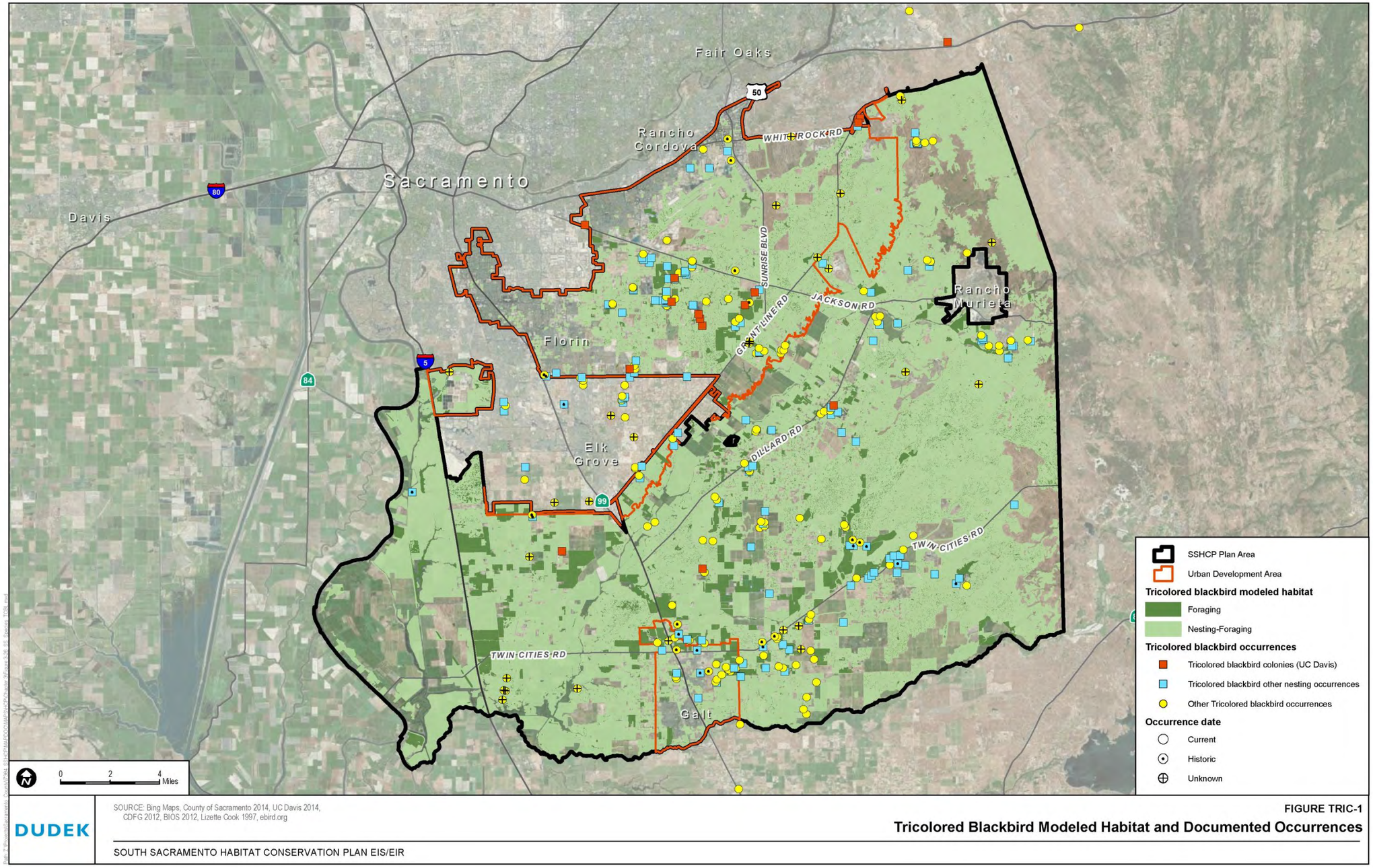
Tricolored blackbird breeding colonies have been observed in all Central Valley counties (Beedy and Hamilton 1997, 1999; Hamilton 2000). DeHaven et al. (1975) found that tricolored blackbirds were unlikely to nest at the sites where they hatched or where they had nested the year before (N=298 recoveries from 45,660 banded birds). Other studies have demonstrated that breeding colonies often exhibit site fidelity and traditionally use many of the same areas year after year if they continue to provide essential resources, including secure nesting substrates, water, and suitable foraging habitats (Beedy et al. 1991; Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Therefore, there may be regional differences in the degree of site fidelity. As discussed earlier, the distribution of tricolored blackbirds in the Central Valley varies according to relatively predictable, seasonal movements.

TRIC Distribution within Planning Area

Observations and field studies of tricolored blackbirds have been ongoing in southern Sacramento County since 1991 (Cook 1999). Colonies occurred primarily in the approximately 1,036 square kilometers (400 square miles) region bordered by U.S. Highway 50 to the north, U.S.

Highway 99 to the west, and the county line to the south and east. A total of 46 active tricolored blackbird colony sites had been documented in the Planning Area from surveys conducted until 1999 (Cook 1999). Of the 46 nest sites reported by Cook (1999), 37 colonies were found in Himalayan blackberries surrounded by mostly fallow, annual grasslands. The remaining eight colonies were in cattail marshes or willows. Between 1992 and 1994, an average of 22 active tricolored blackbird colonies were found in the Planning Area. That number declined in 1997, 1998, and 1999 when the counts were 12, 11, and 9, respectively. Six formerly active colony sites have been lost (i.e. nesting habitat), including one of the largest colonies (Bozich Ranch) observed since 1992 (Cook 1999). Figure TRIC-1 provides the distribution of known tricolored blackbird occurrences within and adjacent to the Planning Area. The modeled habitat of the species in the Planning Area is discussed in Section G-4 of this Appendix.

Figure TRIC-1 Tricolored Blackbird Modeled Habitat and Documented Occurrences



SOURCE: Bing Maps, County of Sacramento 2014, UC Davis 2014, CDFG 2012, BIOS 2012, Lizette Cook 1997, ebird.org

DUDEK

FIGURE TRIC-1

Tricolored Blackbird Modeled Habitat and Documented Occurrences

SOUTH SACRAMENTO HABITAT CONSERVATION PLAN EIS/EIR

AGENDA ITEM 11.1
6596

INTENTIONALLY LEFT BLANK

TRIC Population Levels and Trend

Historical Populations

Published and unpublished accounts of historical tricolored blackbird breeding observations were summarized by Dawson (1923), Neff (1937), Grinnell and Miller (1944), and Beedy et al. (1991). Hamilton et al. (1995) also provided an update of historical tricolored blackbird observations. The first systematic, rangewide surveys of their population status and distribution were conducted by Neff (1937, 1942). He observed as many as 736,500 adults per year (1934) in just eight Central Valley counties. During a five-year interval, he found tricolored blackbirds in 26 California counties. The largest numbers of breeding tricolored blackbirds were in the Central Valley (Neff 1937).

Neff (1937) summarized his observations of 252 California colonies. These surveys were conducted after most Central Valley wetlands were lost (Frayer et al. 1989). Neff (1937) found many large colonies, including one in Glenn County containing more than 200,000 nests (about 300,000 adults) covering almost 24 hectares (60 acres), and several others in Sacramento and Butte Counties that contained more than 100,000 nests (about 150,000 adults). Most large tricolored blackbird colonies observed by Neff (1937) were associated with freshwater emergent wetlands in rice growing areas of California.

Orians (1961) and Payne (1969) made detailed accounts of the ecology and breeding biology of tricolored blackbirds. These workers observed colonies of up to 100,000 nests in Colusa, Yolo, and Yuba Counties, but did not attempt to survey the entire range of the species. DeHaven et al. (1975) conducted population surveys and banding studies of tricolored blackbirds in the Central Valley from 1969 through 1972. They concluded that the tricolored blackbirds geographic range and major breeding areas were unchanged in the 35 years since Neff's (1937) study. They observed an average of about 133,000 individuals per year and estimated that the overall population size had declined by more than 50 percent since the 1930s. It is possible, however, that DeHaven et al. (1975) underestimated the tricolored blackbird total population size because they did not survey large portions of the southern San Joaquin Valley (Beedy and Hamilton 1999). Table G-3.19-2 shows the tricolored blackbird colonies in Sacramento County from 1991 to 1999 (Cook 1999).

Table G-3.19-2. Tricolored Blackbird Colonies in Sacramento County from 1991 through 1999[1]

No.	Name	Habitat	1991	1992	1993	1994a	1994b	1997	1998	1999
1	Rancho Seco	HB	K's	20000	5000	20000	7000	4000	N	2400
2	Latrobe	HB	K's	4000	N	4000		N	Y	3500
3	Folsom	HB	K's	3000	3500	6000	5000	N	N	&
4	Calvine	HB	H's	250	1000	250		X	Y	X
5	Calvine @ Hwy 99	HB	H's	X	X	X	X	X	X	X
6	Slough-house [1]	HB	2000	N	N	N	N	N	?	N
7	Slough-house [2]	HB	1600	N	N	N	N	N	?	N
8	Clay @ Dillard	HB	400	Y	N		400	N	?	N
9	Marengo [1]	HB	600	X	X	X	X	X	X	X
10	Borden & West	HB	Y	?	?	600	?	?	?	?
11	Alabama	Cattail	?	5000	N	N	N	N	N	N
12	Alabama [2]	HB	?	5000	?	?	?	110	?	N
13	Campbell	HB	?	5000	7000	4000		N	N	N
14	Cherokee	HB	?	1500	15000	N	N	15000	1500	N
15	Cherokee [2]	HB	?	500	N	N	N	N	N	N
16	Moore	Cattail	Y*	3000	7500	?	?	?	?	?
17	Green Rd	Cattail	?	3000	N	N	N	N	N	?
18	Colony Rd	HB	Y	3000	550	400	400	X	X	X
19	Knox	HB	?	4000	2400	15000		1000	3500	4500
20	Sheldon	HB	?	500	Y*	500		N	N	&
21	Van Vleck [1]	Cattail	?	1950	3000	4000		?	?	?
22	Van Vleck [2]	Willows	?	500	?	?	?	?	?	?
23	Van Vleck [3]	Willows	?	1500	?	?	?	?	?	?
24	Elder Ck	HB	?	5000	30	7000		N	N	52
25	Bozich Ranch	HB	Y*	20000	N	N	N	N	N	X
26	Bradshaw	HB	?	350	350	350		N	Y	N
27	Grant Line @ Mosher	HB	?	1500	?	?	?	?	Y	N
28	Hwy99 @ Twin Cities	HB	?	100	?	?	?	?	?	?
29	Walmort	HB	?	Y						
30	Alta Mesa	HB	?	?	3500	3000		N	?	Y
31	Brad/Elder	HB	?	?	3500	4500		N	N	N
32	Horse	HB	Y*	Y*	2000	N	N	N	?	#
33	Davis Rd	HB	?	?	1600	1000		500	900	1200
34	Bull	HB	?	?	320	N	N	N	X	X
35	Ivie	HB	?	?	260	N	N	N	N	N
36	Betts Ranch	HB	?	?	7500	?	?	?	?	?
37	Koessler	HB	?	?	?	4000		3000	?	20
38	Scott Marsh	Cattail	?	?	500	5000	5750	300	Y	3000
39	Eagles Nest	HB	?	?	?	1000		250	Y	Y
40	Grant Line @ Bradshaw	HB	?	?	Y	6750	2500	?	?	N
41	Slough-house [3]	HB	N	N	N		40	30	?	N

Table G-3.19-2. Tricolored Blackbird Colonies in Sacramento County from 1991 through 1999[1]

No.	Name	Habitat	1991	1992	1993	1994a	1994b	1997	1998	1999
42	Excelsior-Jackson Hwy	HB	?	N	N	15		N	?	N
43	Mather	HB	?	?	?	9000		200	?	?
44	Dillard-Cosumnes	unknown	?	?	?	?	?	Y	Y	?
45	Marengo Marsh	Cattails	N	N	?	?	?	3000	4000	N
46	Tavenor & Apricot	HB	?	?	?	?	?	3000	?	
Total number of colonies			**13**	**24**	**21**	**22**		**12**	**9**	
Total number of birds				**86142**	**64510****	**96365**	**21090**	**32387**	**NA**	**16671**

[1] Data from Cook (1999)
Y = Nesting occurred, but colony size estimate not available
Y* = Observation reported by landowner
N = The site was visited, but no colony was observed
X = No breeding due to nesting habitat loss
? = Breeding unverified. The site may or may not have been used that year.
= Birds observed, but the site was not used for breeding
& = Settlement attempted, but was unsuccessful
** = Probably an underestimate. An intensive survey
K's = Thousands; H's= Hundreds
HB = Himalayan blackberry
Notes: This table includes only observed colonies. Because not all colonies may have been observed, the total population sizes may have been larger. In 1991, the colony size estimating skills were under development. Therefore, relatively reliable estimates are not available. In 1993, the total estimated number of breeding birds is probably less than the actual number because survey efforts were focused on obtaining data about reproductive success at a sample of colonies, such that survey effort was not comparable to other years. The 1994a and 1994b surveys represent an early and later (second) breeding attempt following the first. The total estimate for the number of breeding tricolored blackbirds in Sacramento County in 1994 would therefore be the combined total, or, 111,855. In 1998, survey effort was not comparable to other years. The total number for the year is, therefore, an underestimate.

Recent Populations

The USFWS, CDFW, and California Audubon cosponsored intensive, volunteer tricolored blackbird surveys (Volunteer Surveys) in suitable habitats throughout California in 1994, 1997, 1999, and 2000 (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Results of late April surveys for Sacramento County, Sacramento Valley, and the statewide totals for these four years are presented in Table G-3.19-3. In 2001, Point Reyes Bird Observatory (PRBO) coordinated the Volunteer Surveys with the help of Bill Hamilton and developed a web based data sheet and submittal process for volunteers. A statewide estimate of 142,045 adults was reported, but PRBO believed data from priority sites was not submitted (PRBO 2002). Therefore, some researchers do not consider the 2001 effort comparable to previous years such as those in 1994, 1997, 1999, and 2000 (Cook pers. comm.)

Local, regional, and statewide tricolored blackbird populations have experienced major declines since 1994. These declines are especially alarming because approximately 99 percent of the global population of this species occurs in California (Beedy and Hamilton 1999).

Table G-3.19-3. Total Adult Tricolored Blackbirds (breeding and nonbreeding) in Statewide Surveys[1]

Region	1994	1997	1999	2000	% Decline (1994-2000)
Sacramento County	94,028	31,508	12,859	16,383	-82.6%
Sacramento Valley	98,362	37,426	24,748	30,979	-68.7%
Statewide Total	**369,359**	**237,928**	**104,786**	**162,508**	**-56%**

[1] Data from Hamilton (2000)

The Volunteer Survey results (summarized by Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000) have identified several important distribution and population trends for tricolored blackbirds that should be emphasized: 1) local, regional, and statewide populations and distributions vary from year to year; 2) 60 percent of all Tricolored Blackbirds located in all years were found in the ten largest colonies; 3) 70 percent of all tricolored blackbird nests and 86 percent of all foraging by nesting birds were on private agricultural lands; 4) in some portions of their range, tricolored blackbirds have definitely declined or been eliminated, including local extirpation in most of Yolo County and portions of southern Sacramento County.

A decline in the number of breeding tricolored blackbirds in Sacramento County has mirrored the species' overall population decline since 1994. In the four years when accurate population censuses were made, Sacramento County supported 50 to 95 percent of the Sacramento Valley breeding population, and between 10 and 25 percent of the statewide population. In each census year since 1992, one or more of the state's 10 largest colonies has been in southern Sacramento County, and this area has consistently supported some of the largest and most successful colonies observed anywhere in the species' range (Cook 1996, 1999; Beedy and Hamilton 1997).

Declines in the tricolored blackbird population is northern Sacramento County corresponded with a reduction in the percentage of the statewide population nesting in Himalayan blackberries, which averaged from 22 to 34 percent in 1992 and 1994, but declined to about 12 percent and 17 percent in 1997 and 1999, respectively (Cook 1999). Most Himalayan blackberry nesting colonies in the Planning Area are situated in areas where the extent of suitable foraging and nesting habitat has been substantially reduced since 1992 because of extensive conversion of grasslands and vernal pools to vineyards. Declines in the number of breeding tricolored blackbirds in southern Sacramento County is probably related to this documented habitat loss (Cook 1999).

Reproductive success of tricolored blackbird colonies in southern Sacramento County has consistently been the highest of any region in the state since studies began in 1992 (Cook 1999). On average, the reproductive success of colonies in Himalayan blackberries was substantially higher than in other habitats, such as cattails, which approached zero in most years. The high reproductive success of tricolored blackbirds in Himalayan blackberry habitats was attributed to a marked reduction in predation rates compared to marsh habitats (Cook 1999).

TRIC Threats to the Species

TRIC Habitat Loss and Alteration

At one time virtually all alluvial soils in the Central Valley supported riparian woodlands, marshlands, or perennial grasslands, but these lands were converted to agricultural and urbanization uses (Frayer et al. 1989). Many formerly agricultural areas within the historical range of the tricolored blackbird are now being urbanized. Tricolored blackbirds in Sacramento County forage in the extensive, lightly to moderately grazed annual grasslands associated with ranches and rural subdivisions (Cook pers. comm.). These land uses currently provide suitable habitat for tricolored blackbirds, habitat that will be largely eliminated if current development patterns and land use conversions continue.

In some places, most historical tricolored blackbird breeding and foraging habitats have been eliminated, and there is little or no breeding effort where once there were large colonies (Orians 1961; Beedy et al. 1991). Elsewhere, tricolored blackbirds have shifted from cattails as a primary nesting substrate (Neff 1937) to Himalayan blackberries (DeHaven 1975) and more recently to cereal crops and barley silage (Hamilton et al. 1995). Nests and nest contents in cereal crops and silage are often destroyed by agricultural operations (Hamilton et al. 1995). Harvesting silage and plowing weedy fields are currently the most common reasons tricolored blackbird colonies are destroyed on agricultural lands.

Agricultural cropping patterns have also affected tricolored blackbird habitat. DeHaven (2000) quantified changes in California cropping patterns and found that tricolored blackbird “friendly” habitats such as rangelands, grassland, and pastures have decreased. These habitats are often replaced by other crops that do not provide habitat (e.g., fruit and nuts, vegetables and melons, cotton, tomatoes, beans, potatoes, sugar beets, and vineyards). Clearly, irrigated and non-irrigated pastures (alfalfa, various hay crops, etc.) and grasslands of various kinds, dry seasonally wet areas, dairies, livestock feedlots, and harvested grain fields continue to be important crops and areas to tricolored blackbirds during breeding and non-breeding periods (DeHaven 2000).

In addition to the increase in tricolored blackbird non-habitat crops, changes in management of habitat friendly crops such as rice and hay have affected foraging. Tricolored blackbirds were observed in huge flocks during the fall and winter months in the 1970s in rice fields after they were harvested and burned (DeHaven 2000). Recent crop harvesting and management changes (i.e., flooding during fall) preclude significant foraging by tricolored blackbirds (DeHaven 2000). More intensive pest control management practices in hay and pastures is hypothesized to substantially reduce insect-foraging opportunities, although no confirming studies have been conducted (DeHaven 2000).

In recent years and possibly also in the past, more than half of all observed nesting efforts by tricolored blackbirds occurred in a few, large colonies (Hamilton et al. 1995; Beedy and Hamilton 1997). Concentration of a high proportion of the known population in a few breeding colonies increases their risk of major reproductive failures, especially if they are situated in vulnerable habitats such as active agricultural fields.

Predation

Predation is at present a major cause of complete nesting failure at some tricolored blackbird colonies (Hamilton et al. 1995; Beedy and Hayworth 1992). Historical accounts documented the destruction of nesting colonies by a diversity of predators, including wolves (*Canis lupus*) and gray foxes (*Urocyon cinereoargenteus*) (Hermann 1853), skunks (*Mephitis* sp.) and opossums (*Didelphis virginiana*) (Evermann 1919), Swainson's hawks (*Buteo swainsoni*) (Mailliard 1914), Cooper's hawks (*Accipiter cooperii*), burrowing owls (*Athene cunicularia*), American crows (*Corvus brachyrhynchos*), raccoons (*Procyon lotor*), and mink (*Mustela vison*) (Neff 1937).

More recently, Payne (1969) reported predation of tricolored blackbird nests by feral domestic cats (*Felis catus*), northern harriers (*Circus cyaneus*), barn owls (*Tyto alba*), short-eared owls (*Asio flammeus*), and yellow-billed magpies (*Pica nuttallii*). Merlins (*Falco columbarius*) may associate with flocks of wintering tricolored blackbirds and have been observed preying on adults (Manolis pers. comm.).

At some colonies, especially those in permanent freshwater marshes, black-crowned night herons (*Nycticorax nycticorax*) devastate nesting efforts and eliminate all or most nests (Hamilton et al. 1995). At foothill locations and in the southern San Joaquin Valley, common ravens (*Corvus corax*) may assemble and destroy all or almost all nests within colonies. In the Central Valley, coyotes (*Canis latrans*) are a major predator of tricolored blackbird colonies, especially in silage field colonies, and cattail colonies when water is withdrawn (Hamilton pers. comm.).

Poisoning, Hunting, Contaminants, and Pollution

Tricolored blackbirds were commercially hunted in the early 1900's (DeHaven 2000) and were regularly shot during hazing programs in an effort to limit crop damage in rice. Neff (1937) reported that greater than 300,000 tricolored blackbirds and red-winged blackbirds were killed and marketed during one five-year period in the 1930's. As agriculture expanded, the use of poisons was adopted to also control blackbirds from rice crop depredations (DeHaven 2000).

McCabe (1932) described the strychnine poisoning of 30,000 breeding tricolored blackbirds as part of an agricultural experiment. Poisoning to regulate numbers of blackbirds preying on crops in California, especially rice, was considered a major source of adult mortality by Neff (1942). This practice continued until the 1960s, and thousands of tricolored blackbirds and

other blackbirds were exterminated to control damage to rice crops in the Central Valley. However, improved harvesting methods, earlier ripening rice varieties, and fewer blackbirds have resulted in few recent reports of blackbird crop depredation, and no control programs are currently operating (Gorenzel pers comm.).

During 1986, Beedy and Hayworth (1992) observed a complete nesting failure of a large (about 47,000 breeding adults) tricolored blackbird colony at Kesterson Reservoir, Merced County. External examinations of dead nestlings collected from roads surrounding the reservoir revealed that two of the 10 specimens had club feet (Grau pers. comm. *in* Beedy and Hayworth 1992). Similar deformities were found for shorebirds and other water birds that were also collected at Kesterson Reservoir (Ohlendorf et al. 1986). Pathological examinations of the tricolored blackbird nestlings revealed some evidence of heart muscle degeneration. Selenium toxicosis was suspected as the cause of the deaths (Beedy pers. comm.).

Hamilton (pers. comm.) observed a colony sprayed by mosquito abatement operators in Kern County. All sprayed eggs failed to hatch. Hosea (1986) attributed the loss of at least two tricolored blackbird colonies to aerial herbicide applications.

Human Disturbance

Tricolored blackbirds are sensitive to human disturbance at active nesting colonies. Entry into colonies may be required for scientific study and management purposes; however, to avoid unnecessary disturbance of the nesting birds, colonies should not be entered by casual observers (Beedy and Hamilton 1999).

TRIC Data Gaps and Conservation Implications

Several researchers have documented the life history, habitat requirements, species distribution, population trends, and threats to the species throughout California and the Planning Area. This information is critical for the development of the tricolored blackbird Conservation Strategy. Equally important is the acknowledgment of information considered to be data gaps, along with their implications for conservation. These topics are discussed below.

TRIC Wintering Habitat

Most of the tricolored blackbird population within the EIS/EIR Study Area is assumed to winter along the Delta and central coast area; however, it is unclear if important wintering habitat is necessary within the Planning Area. Wintering habitat requirements, if not met, can potentially aid to the further decline of the species rangewide and in the Planning Area.

TRIC Locations of Important yet Unknown Tricolored Blackbird Colonies

Undescribed tricolored blackbird breeding colonies may be located within portions of the Planning Area that have not been surveyed. In the Planning Area, discovery of new populations of tricolored blackbirds may occur anywhere that vernal pool/grassland complexes, emergent marshes, natural drainages, created irrigation/drainage conveyances, reservoirs and lake margins and stockponds, and silage fields are present.

Tricolored blackbirds do not currently occupy habitat that appears suitable (Cook pers. comm.). Although specific habitat elements are present (i.e., Himalayan blackberry), and general habitats such as irrigated pasture and rangelands occur nearby, no active colonies have been identified. Decisions regarding which areas to include as tricolored blackbird preserves would benefit from discovering if there are any relationships between amount of suitable habitat and food abundance to support specific population sizes of nesting tricolored blackbirds.

No studies have been conducted that can make predictions regarding the potential size of a tricolored blackbird colony based on the quality of nearby foraging habitat or other operating factors (e.g., predation). Tricolored blackbird colony sizes vary tremendously (e.g., 50 to 20,000 individuals) within the Planning Area, and no data is available to conclude why some colonies are larger than others.

TRIC Predators and Nest Destruction

Several predators have been documented to cause complete reproductive failure of large tricolored blackbird colonies; however, determination of “safe” distances between tricolored blackbird colonies and the most devastating of these predators (e.g., black-crowned night-heron colonies) may provide effective protection during nesting.

Knowledge of these “safe” distances, if any, would help in the establishment of the proper location for preserves. Furthermore, predator populations such as black-crowned night herons may have to be discouraged from nesting or roosting near historical or current locations supporting tricolored blackbird colonies.

TRIC Pesticide and Herbicide Application

The use of pesticides and herbicides in agricultural areas and their impacts on prey items for tricolored blackbirds is unknown. There is no information on whether tricolored blackbirds could benefit from changes in pesticide or herbicide applications that are still consistent with effective management of agricultural crops.

Unknown Factors Affecting Breeding Site Fidelity

Tricolored blackbird colonies are generally thought of as nomadic colonial nesters. This nomadic behavior is hypothesized to have evolved due their dependence upon highly productive, but unpredictable food resources that are necessary during the nestling and fledgling stages of the breeding season. However, recent data suggests an increase in nest site fidelity even at sites that experience complete reproductive failure, suggesting suitable nesting habitat may be limited.

Managing for tricolored blackbirds by establishing preserves may be the desired strategy to ensure populations are maintained and enhanced; however, if tricolored blackbirds leave previously successful breeding sites (i.e., preserves) for unknown reasons, conservation of the species may be difficult.

TRIC Effects of Global Climate Change

The scientific community commonly accepts as valid the phenomenon of increasingly rapid global climate change. Specific climatic models for California predict an average increase in temperature over the coming decades, with concomitant unpredictability in annual rainfall patterns. There is uncertainty regarding the exact nature and extent of these changes, as well as the consequences these changes pose to conservation biology.

It is likely that given the expected global climate trends, a response of some kind could be expected for tricolored blackbird populations within the study period of this EIS/EIR, or at some time beyond.

TRIC Literature Cited

Beedy, Edward C. Beedy Environmental Consulting, Nevada City, California.

Beedy, E.C. 1989. Draft habitat suitability index model, Tricolored Blackbird (*Agelaius tricolor*). Prepared for U.S. Bureau of Reclamation, Sacramento, California.

Beedy, E.C., S.D. Sanders, and D. Bloom. 1991. Breeding status, distribution, and habitat associations of the Tricolored Blackbird (*Agelaius tricolor*) 1859-1989. Prepared for U.S. Fish and Wildlife Service, Sacramento.

Beedy, E.C. and A. Hayworth. 1992. Tricolored Blackbird nesting failures in the Central Valley of California: general trends or isolated phenomena? Pages 33-46 in D.F. Williams, S. Byrne, and T.A. Rado (eds), Endangered and sensitive species of the San Joaquin Valley, California. California Energy Commission. Sacramento, California.

Beedy, E.C. and W.J. Hamilton III. 1997. Tricolored Blackbird status update and management guidelines. Prepared for U.S. Fish and Wildlife Service, Migratory Birds and Habitat Programs, and California Department of Fish and Game, Bird and Mammal Conservation Program. Sacramento, California.

Beedy, E.C. and W.J. Hamilton III. 1999. Tricolored Blackbird (*Agelaius tricolor*) in A. Poole and F. Gill (eds.), The birds of North America, No. 423. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Bent, A.C. 1958. Life histories of North American blackbirds, orioles, tanagers, and allies. Dover Publications, Inc. New York, New York.

Bureau of Land Management (BLM). 1999. Updated Animal Sensitive Species List—Updated Draft. Sacramento California. Online version: http://www.blm.gov/nhp/efoia/ca/Public/IMs/1999/CAIM99-112.htm.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Collier, G. 1968. Annual cycle and behavioral relationships in the Red-Winged and Tricolored Blackbirds of southern California. Ph.D. dissertation. University of California, Los Angeles, California.

Cook, L. 1996. Nesting adaptations of Tricolored Blackbirds (*Agelaius tricolor*). Master's thesis, University of California, Davis.

Cook, L. 1999. Tricolored Blackbird (*Agelaius tricolor*) conservation plan for southern Sacramento County. Unpublished report submitted to Jones & Stokes, in cooperation with the southern Sacramento County Habitat Conservation Plan.

Cook, Liz. California Department of Water Resources, Sacramento, California.

Crase, F.T., and R.W. DeHaven. 1977. Food of nestling Tricolored Blackbirds. *Condor.* 79: 265-269.

Crase, F.T., and R.W. DeHaven. 1978. Food selection by five sympatric California blackbird species. *California Fish and Game,* 64:255-267.

Dawson, W. L. 1923. *The Birds of California*: Vol. I. South Moulton Co., San Francisco, California.

DeHaven, R.W. 1975. Plumages of the Tricolored Blackbird. *Western Bird Bander,* 50:59-61.

DeHaven, R.W., F.T. Crase, P.D. Woronecki. 1975. Breeding status of the Tricolored Blackbird, 1969-1972. *California Department Fish and Game,* 61:166-180.

DeHaven, R.W., and J. A. Neff. 1973. Recoveries and returns of Tricolored Blackbirds, 1941-1964. *Western Bird Bander,* 48:10-11.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use – for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Emlen, J.T. 1941. An experimental analysis of the breeding cycle of the Tricolored Red-Wing. *Condor,* 43:209-219.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The birder's handbook*. Simon and Schuster, New York. 785pp.

Evermann, B.W. 1919. A colony of Tricolored Blackbrids. *The Gull,* 1:2-3.

Frayer, W.E., D.D. Peters, and H.R. Pywell. 1989. Wetlands of the California Central Valley: status and trends-1939 t mid-1980s. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon.

Gardali, Tom. Ornithologist. Point Reyes Bird Observatory, Palo Marin, California.

Gorenzel, Paul. Staff Research Associate, Wildlife Damage Management, U.C. Davis, California.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. *Pacific Coast Avifauna*, No. 27. Berkeley, California.

Hamilton, W.J. III. 1998. Tricolored Blackbird itinerant breeding in California. *Condor,* 100:218-226.

Hamilton, W.J. III, L. Cook, and R. Grey. 1995. Tricolored Blackbird project 1994. Unpublished report prepared for U.S. Fish and Wildlife Service, Portland, Oregon.

Hamilton, W.J. III. 2000. Tricolored Blackbird 2000 survey and population analysis. Unpublished report prepared for U.S. Fish and Wildlife Service, Portland, Oregon.

Hamilton, W. J. III. Emeritus professor, Division of Environmental Studies, University of California, Davis, California.

Harrison, C. 1978. A field guide to the nests, eggs, and nestlings of North American birds. The Stephen Greene Press. Brattleboro, Vermont.

Hosea, R.C. 1986. A population census of the Tricolored Blackbird, Agelaius tricolor (Audubon), in four counties in northern Central Valley of California. M.S. thesis. California State University, Sacramento, California.

Hunting, K. California Department of Fish and Game, Sacramento, California.

Kennard, J.H. 1975. Longevity records of North American birds. *Bird-banding*, 46:55-73.

Mailliard, J. 1914. Notes on a colony of Tricolored Red-Wings. *Condor,* 16:204-207.

Manolis, Tim. Ornithologist. Sacramento Audubon Society, Sacramento, California. Conversations with Ted Beedy in 1989-1996.

McCabe, T.T. 1932. Wholesale poison for the Red-Wings. *Condor,* 34:49-50.

Neff, J.A. 1937. Nesting distribution of the Tricolored Red-Wing. *Condor,* 39:61-81.

Neff, J.A. 1942. Migration of the Tricolored Red-Wing in central California. *Condor,* 44:45-53.

Ohlendorf, H.M., D.J. Hoffman, M.K. Saiki, and T.W. Aldrich. 1986. Embryonic mortality and abnormalities of aquatic birds. *Science of the Total Environment,* 52:49-63.

Orians, G.H. 1961. Social stimulation within blackbird colonies. *Condor,* 63:330-337.

Orians, G.H. 1980. Some adaptations of marsh-nesting blackbirds. Monographs in Population Biology. Princeton University Press, Princeton, New Jersey.

Orians, G.H. and G. Collier. 1963. Competition and blackbird social systems. *Evolution*. 17: 449-459.

Payne, R. 1969. Breeding seasons and reproductive physiology of Tricolored Balckbirds and Red-Winged Blackbirds. *University of California Publication Zoology*, 90:1-115.

Point Reyes Bird Observatory (PRBO). 2002. Tricolored Blackbird survey report 2001. Prepared for U.S. Fish and Wildlife Service, Portland, Oregon.

Pyle, P. 1997. *Identification guide to North American Birds*.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Skorupa, J. P., R. L. Hothem and R. W. DeHaven. 1980. Foods of breeding Tricolored Blackbirds in agricultural areas of Merced County, California. *Condor,* 82:465-467.

Tyler, J. G. 1907. A colony of Tri-Colored Blackbirds. *Condor,* 9:199-178.

United States Fish and Wildlife Service (USFWS). 1995. Migratory nongame birds of management concern in the United States: The 1995 list. Prepared by the Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Washington, D.C.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. [Online version: http://migratorybirds.fws.gov/reports/bcc2002.pdf.

WESTERN BURROWING OWL (BUOW)

Western Burrowing Owl (BUOW)

(Athene cunicularia hypugaea)

Status USFWS: Bird of Conservation Concern

Status CDFW: Species of Special Concern



BUOW Listing Status

Western burrowing owl (*Athene cunicularia hypugaea*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800). This species is designated as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW) (Shuford and Gardali 2008); Bird of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS) (USFWS 2002); and Sensitive Species by the U.S. Bureau of Land Management (BLM).

BUOW Life History and Ecology

BUOW Species Description and Life History

Physical Description

Western burrowing owl is a small, round-headed, ground-dwelling owl that inhabits open habitats such as grasslands, deserts, steppes, and agricultural lands. Burrowing owls are unique in physical appearance and behavior among other owls due to their ground-dwelling and non-arboreal natural history. Individuals have long legs relative to their body size, a stubby tail, bright yellow eyes (irises) and white eyebrows, an oval facial ruff, and no ear tufts. Their long legs allow the species to scan over short- or sparsely-vegetated landscapes for predators and prey from the ground, and pursue insect prey on foot. The head, back, and upper wings of adults are brown with thick white or buffy-white spots; while the underparts are generally buffy-white in color with brown barring along both sides. Adults range from approximately 7.5 to 9.8 inches (19 to 25 centimeters) in total length (from bill to tail) and weigh approximately 5.3 ounces (150 grams). Adult burrowing owls have a wingspan of approximately 20 to 24 inches (50.8 to 61.0 centimeters). Their wings are rounded and long relative to body size. Burrowing owls exhibit sexual size and color dimorphism as females are larger and darker than males (Haug et al. 1993.); however, it is often difficult to distinguish between males and females in the field.

Taxonomy

Burrowing owl was originally classified as *Strix cunicularia* in 1782. Through several taxonomic and name revisions, it has been moved between the genera *Speotyto* and *Athene* (Haug et al. 1993; Clark 1997). The species was classified as *Athene* by the American Ornithologists' Union (AOU) in 1983 (AOU 1983), reclassified as *Speotyto* in 1991 based on genetic data (AOU 1991), and moved back to *Athene* in 1997 (AOU 1997).

As many as 21 subspecies of *A. cunicularia* have been recognized; however, Konig et al. (1999) recognizes only 13 subspecies. Two subspecies occur in North America: Florida burrowing owl (*A. c. floridana*) occurs in Florida and the Bahama Islands, while western burrowing owl (*A. c. hypugaea*) occurs in North America west of the Great Plains and south to Panama (Haug et al. 1993). The remaining subspecies, with the exception of two island forms (i.e., *A. c. rostrata* [Clarion Island off the west coast of Mexico] and *A. c. troglodytes* [Hispaniola]) are all found in South America.

Reproduction

During the breeding season, burrowing owls build nests in excavated burrows, underground tunnels, or burrow facsimiles. They typically adopt burrows or tunnels excavated by fossorial mammals or reptiles, including ground squirrels, prairie dogs, badgers, skunks, armadillos,

marmots, foxes, coyotes, and tortoises (Karalus and Eckert 1987). In California's Central Valley, California ground squirrel (*Spermophilus beecheyi*) populations are particularly important to the breeding ecology and conservation of burrowing owls, by creating and maintaining availability of burrowing owl nesting and satellite burrows. Where the number and availability of suitable natural burrows are limited (e.g., where burrows have been destroyed or ground squirrels eradicated), burrowing owls will occupy drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures.

Nesting burrowing owls often occur in loose colonies, depending on local population density and site conditions. Breeding adults can exhibit strong nest site fidelity and often return to the same or nearby burrows each year. This life history trait can make burrowing owl populations particularly sensitive to loss of occupied nesting habitat and permanent displacement of owls from nest sites; and it is important that conservation planning efforts for western burrowing owl emphasize *in situ* protection of occupied nesting habitat. During the nesting period, adults and juveniles typically utilize several satellite burrows around the main or nest burrow. During nest site selection, the adult pair will often prepare or "renovate" several neighboring burrows by scraping out dirt with their bills, feet, and wings. One of those burrows is eventually selected as the nest burrow. Adults frequently line the nest burrow with cattle or horse manure, other organic material such as vegetation or feathers, or debris (CBD et al. 2003).

Like other owls, burrowing owls usually breed once per year in an extended reproductive period; however, renesting and production of a second brood within a nesting season, after the first brood successfully fledged, was recently documented in California (Gervais and Rosenberg 1999). Most adults are monogamous, although polygamy and extra-pair fertilizations occasionally occur (Johnson 1997b). Localized high densities of burrowing owls, along with the mobility of their young, facilitate extra-pair copulations, brood amalgamation and mixing, and joint-nesting (and possibly intraspecific brood parasitism). In one study of burrowing owls near Sacramento, at least 37 percent of adults exhibited parental behavior toward offspring that were not their own (i.e., alloparenting). They were similarly non-discriminating in their choice of mates, breeding randomly with respect to the local group of adults (Johnson 1997b).

Both sexes reach sexual maturity at one year of age. The burrowing owl nesting season (including courtship, breeding, and fledging stages) is generally February through August. Most Burrowing owls in California begin pair formation and courtship in February or early March; however in the Imperial Valley, pair formation is initiated as early as mid-January (Coulombe 1971). Courtship and pair formation begins when the male conducts courtship displays and vocalizations. Males produce a "who-who" call to attract females while standing near a potential nest burrow. After a female is attracted to the site, courtship behaviors include a combination of vocalizations and posturing by both sexes, typically within 49 feet (15 meters) of

the burrow. Nest site selection begins once the pair has formed. Males collect and deliver the majority of nesting material (Anderson et al. 2001).

Burrowing owl pairs breed from March through May, although the peak breeding period is April through May. During March through May, eggs are laid at least one day apart and are incubated by both adults for about three to four weeks. Females can lay up to 12 eggs; however, the average clutch size is seven eggs (Haug et al. 1993). The female incubates the eggs for 28 to 30 days. The male forages and delivers food to the female and guards the burrow entrance during the day. Young owlets are brooded in the nest chamber for another two to three weeks, at the end of which time they may be seen at the burrow entrance in their natal-down plumage. Nestlings emerge asynchronously and tentatively. They gradually become bolder, eventually spending more time outside near the burrow entrance. During this period, nestlings can range widely on foot, even before they can fly. The adults guard their brood tenaciously, attacking intruders if provoked. Older nestlings or fledglings may move to nearby satellite burrows as the natal burrow becomes crowded. Fledging occurs six to eight weeks after emergence. Fledglings typically remain near the burrow and accompany the adults in foraging flights at dusk (Rosenberg et al. 1998).

Reproductive success is probably the most important demographic parameter in ensuring population viability for most species with short life spans and low survival rates (Emlen and Pilkitch 1989; CBD et al. 2003); and it is probably the most important demographic parameter for burrowing owl populations (Gervais and Rosenberg 1999); however, accurately estimating reproductive rates for burrowing owls is difficult (Gorman et al. 2003). Up to ten young per pair can be fledged in especially productive years (Gervais and Rosenberg 1999). In recent years, the number of young fledged in central California has ranged between three and six, and was typically four or five (DeSante et al. 1997). In the Sacramento area, the mean per capita rate of reproduction of burrowing owls has been estimated at zero to 4.5 offspring per individual (Johnson 1997c). Anecdotal information suggests that burrowing owl fledging success in the early 1900's was six to eight young per nest (Dawson 1923). The possible decline in fledging success in the Central Valley since the early 1900's corresponds with documented population declines of other avian predators occurring in Central Valley grassland habitats (e.g., loggerhead shrike [*Lanius ludovicianus*], American kestrel [*Falco sparverius*]) (DeSante et al. 1997). Rosenberg and Haley (2004) reported that average fledging success in the Imperial Valley was 2.5 young per nest.

Survival and Longevity

Extensive data on burrowing owl longevity are not available. The maximum life span documented for a banded burrowing owl is approximately 8.5 years (Rosenberg et al. 1998). Burrowing owl adult and juvenile survival rates vary considerably among studies. The range of reported between-year return rates is 30–83 percent (Thomsen 1971; Haug et al. 1993; Clayton

and Schmutz 1997; CBD et al. 2003). Depending on assumptions about emigration and immigration, the probability that juvenile burrowing owls will survive to one year of age (the age of first breeding) has been estimated between 0.23 and 0.93, while annual adult survivorship has been estimated between 0.42 and 0.93 (Johnson 1997c).

Dispersal Patterns

Nest site fidelity is common in resident burrowing owl populations. Breeding adults often return to the same or nearby burrows each year (Botelho and Arrowood 1998). Also, second-year birds will often attempt to nest near (less thean 0.2 mile [300 meters]) their natal sites (Rosenberg et al. 1998). Burrowing owls in migratory populations often renest in or near the same burrow, particularly if breeding was successful there the previous year (Belthoff and King 1997).

As of 1993, the USFWS Bird Banding Lab (BBL) documented 44 records of burrowing owls band returns in California. Nearly all of these records were from the same area in which the birds were originally banded or adjacent areas. Only two records were from owls that moved substantial distances (one between Orange County and Mexico, another between Orange County and Nevada) (Barclay pers. comm., cited in CBD et al. 2003). In two burrowing owl demography studies conducted in the San Francisco Bay Area, owls moved an average distance of 0.5 to 0.9 miles (0.8 to 1.4 kilometers) (n=276 owls) between breeding seasons. Of this sample population, 27 percent remained at the same nest site; 14 percent dispersed less than 265 feet (80.8 meters) away; 34 percent dispersed 0.05 to 0.5 mile (80 to 804.7 meters); eight percent dispersed 0.5 to 1.0 mile (804.7 meters to 1.6 kilometers); 14 percent dispersed 1.0 to 5.0 mile (1.6 to 8.0 kilometers); and two percent moved 5.0 to 10 miles (8.0 to 16.1 kilometers) (Chromczak unpublished data, cited in CBD et al. 2003). Adults that experience failed nesting attempts have been documented to move miles (up to tens of kilometers) away prior to subsequent renesting attempts, sometimes within the same season (Gervais pers. comm., cited in CBD et al. 2003).

Diet and Foraging

Burrowing owls primarily eat small rodents and large arthropods (Coulombe 1971; Green and Anthony 1989; Silva et al. 1995; Gervais et al. 2003). Important rodent prey items include mice, voles, rats, kangaroo rats, and young ground squirrels. Arthropod prey includes grasshoppers, beetles, crickets, dragonflies, other insects, and crayfish. Burrowing owls are considered opportunistic predators (Thomsen 1971; Zarn 1974; York et al. 2002) and will also prey on small birds, reptiles, amphibians, and other small live prey. Burrowing owls have been documented preying on several bird species including killdeer (*Charadrius vociferus*), western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), Wilson's warbler (*Wilsonia pusilla*), American avocet (*Recurvirostra americana*), red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), mourning dove (*Zenaida macroura*), and black-

headed grosbeak (*Pheucticus melanocephalus*) (see CBD et al. 2003). They have also been documented preying on burrowing owl chicks (Botelho 1996; Rosenberg et al. 1988); spadefoots (*Spea* spp.) (Sperry 1941; Bond 1942); snakes, centipedes, and scorpions (Stoner 1933; Neff 1941); and bats, including hoary bat (*Lasiurus cinereus*) (Thomsen 1971) and Mexican free-tailed bat (*Tadarida brasiliensis*) (Gobalet 1999).

Burrowing owls often hunt from a perch. Foraging behavior is variable but generally consists of hunting while hovering or hover-gliding and returning to the perch. Burrowing owls also chase their prey on foot while walking, running, or hopping. Hunting behavior apparently depends on vegetation type and structure, time of day, and the type of prey pursued (Thompson and Anderson 1988; Haug et al. 1993).

Burrowing owls are primarily crepuscular (i.e., dawn and dusk) foragers, but will hunt at any time (Grant 1965; Marti 1974; Rosenberg et al. 1988). Nesting burrowing owls are also central-place foragers (Gervais et al. 2003; Rosenberg and McKelvey 1999), foraging from and returning to the same location. Some owls may forage up to one mile from their burrow (Johnson pers. comm.) and nocturnal foraging can occur up to several miles away from the burrow. During the breeding season, adult male burrowing owls have been documented foraging over a range of 0.8 to 1.2 square miles (2 to 3 square kilometers) (Haug and Oliphant 1987) and primarily within 0.4 mile (600 meters) of the nest burrow (Gervais et al. 2003; Rosenberg and Haley 2004).

Burrowing owls tend to concentrate their hunting in natural grasslands, agricultural lands, uncultivated fields, ungrazed areas, and open ruderal areas such as roadsides that support abundant small mammal and arthropod populations (Haug and Oliphant 1990; Gervais et al. 2003). In urban areas, burrowing owls are often attracted to street lights, where insect prey congregates. In a recent study conducted in California's San Joaquin Valley, burrowing owls did not appear to differentiate between grassland and cropland in their foraging habitat selection (Gervais et al. 2003).

Movement and Migration Patterns

The tendency of burrowing owl populations to migrate annually varies over the species range. Populations are resident in locations where food availability is stable and available throughout the year. Burrowing owl populations in the northern part of the species' range are migratory, leaving their breeding grounds in the fall and returning to the same or nearby areas (often the same burrow) in the spring. However, most California populations are resident (i.e., non-migratory) (Thomsen 1971; Haug et al. 1993) or wander during winter months (Coulombe 1971; Martin 1973; Botelho 1996), especially in central and southern California (CBD et al. 2003). The winter burrowing owl population in California is large relative to other regions throughout the species' range. It is thought that some owls migrating from northern areas (e.g., Canada, Washington, Oregon, and

Idaho) winter in California and augment resident populations (Coulombe 1971). Non-migratory seasonal movements in burrowing owl populations can also occur. For example, after the young fledge, family groups will sometimes move among burrows in the fall and juveniles may adopt their own nearby burrow. During winter, pairs will examine and select new burrows as territorial boundaries are relaxed and pair formation proceeds (Thomsen 1971).

During the breeding season, adult burrowing owls remain close to or inside their nest burrows throughout most of the day. They have been documented spending most of their time within 162 to 325 feet (49.4 to 99.1 meters) of their nest or satellite burrows during daylight hours (Haug and Oliphant 1990). Individuals often begin perching outside in the afternoon and foraging at dusk. Nesting adults return to the burrow at night (Thomsen 1971).

Territoriality/Home Range

Home range sizes of western burrowing owls vary greatly among individuals (Gervais et al. 2003). During the breeding season, adult male burrowing owls have been documented foraging over a range of 0.8 to 1.2 square miles (2 to 3 square kilometers) (Haug and Oliphant 1987), and primarily within 0.4 mile (600 meters) of the nest burrow (Gervais et al. 2003; Rosenberg and Haley 2004). Although burrowing owls aggressively defend a small territory around their burrows against predators and other owls (CBD et al. 2003), the home ranges of adjacent males may overlap considerably (Haug and Oliphant 1987). Inter-nest distances, which can indicate the limit of an owl's territory, have been found to average between 198 to 695 feet (60.4 to 211.8 meters) (Thomsen 1971; Haug and Oliphant 1990).

Gervais et al. (2003) studied space use and habitat selection of a burrowing owl population in a San Joaquin Valley agricultural landscape (near Fresno, California). Out of several biophysical variables analyzed, including cover-type (e.g., grass, crop) and distance to road edges and irrigation ditches, distance-from-nest was the best predictor of foraging habitat use. In their study, approximately 80 percent of foraging observations occurred within 0.37 mile (600 meters) of the nest burrow, independent of cover-type availability or other factors measured. These results are different than those reported by Haug and Oliphant (1990), who found that burrowing owls used grass-forb habitats more frequently than croplands or grazed pasture. Also, Gervais et al. (2003) reported that variation in burrowing owl home range size was not explained by several variables including cover-type composition, number of neighboring nests, reproductive output, and the proportion of rodents in the diet.

Ecological Relationships

In California's Central Valley, perhaps the most important ecological relationship for the burrowing owl is its commensalism with California Ground Squirrels. Because burrowing owls

generally need fossorial animals to dig their burrows, burrowing owl population dynamics in the Central Valley are closely linked with California Ground Squirrel populations. California Ground Squirrels create and maintain burrowing owl nest and satellite burrows. Furthermore, burrowing owl habitat quality is considered proportional to the condition and viability of California Ground Squirrel populations. In addition to creating burrows, colonial rodents such as California Ground Squirrels can maintain burrowing owl nest burrows between breeding seasons, and vigilant ground squirrels incidentally alert burrowing owls to predation threats by alarm-calling (Trulio 1994).

Predator-prey relationships are important for burrowing owls, particularly because burrowing owls are both a predator and prey species. Predation on burrowing owls generally occurs in two forms: predation of nests and/or incubating adults in the nest chamber, and predation of juvenile or adult birds outside the nest chamber. Nest predators are typically species that are capable of accessing the nest chamber and include foxes (*Vulpes* spp.), badgers (*Taxidea taxus*), skunks (*Mephitis* spp.), raccoons (*Procyon lotor*), and rattlesnakes (*Crotalus viridis*) (Coulombe 1971; Kemper 1996). Predators of burrowing owls above ground include prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), golden eagle (*Aquila chrysaetos*), foxes, coyote (*Canis latrans*), and domestic dogs (*C. familiaris*) and cats (*Felis catus*).

BUOW Habitat Requirements and Ecology

Historically, burrowing owls in California were most abundant in broad, interior, lowland valley bottoms and flat coastal lowlands (Grinnell and Miller 1944). According to DeSante and Ruhlen (1995), 92 percent of breeding burrowing owls in California occurred in these lowland settings, usually below approximately 200–984 feet (60–300 meters) in elevation. In these landscapes, burrowing owls occurred primarily in open prairie and shrub-steppe habitats (Coulombe 1971; Butts 1973). Most of the burrowing owl's original prairie habitat in California has been removed and other open habitats in lowland landscapes are experiencing the most intensive urban development pressures in the state (CBD et al. 2003).

Throughout their life cycle, burrowing owls require habitat with three basic attributes: open, well-drained terrain outside areas at risk of flooding; short, sparse vegetation; and underground burrows or burrow facsimiles. Burrowing owls inhabit grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands, and urban vacant lots, as well as the undeveloped margins of airports, golf courses, roads, and railroad beds. Burrowing owls typically occur in habitats with less than 30 percent tree or shrub cover (DeSante et al. 1996). In California, the four cover types most frequently occupied by burrowing owls are: grasslands adjacent to intensive agriculture; intensive agriculture where owls nest along irrigation banks; large, unfragmented grasslands;

and small grassland and ruderal patches surrounded by and adjacent to urban development (Rosenberg and DeSante 1997; Rosenberg and Haley 2004). The proximity of nest sites to suitable foraging habitat is especially important, as burrowing owls tend to forage near their burrows (Gervais et al. 2003).

The most important habitat consideration for burrowing owls is the availability of underground burrows throughout their life cycle. While burrowing owls nest and roost in these burrows, they do not typically create them. Throughout their range, they use burrows excavated by fossorial mammals or reptiles, including ground squirrels, prairie dogs, badgers, skunks, armadillos, marmots, foxes, coyotes, and tortoises (Karalus and Eckert 1987). Where the number and availability of natural burrows are limited (e.g., where burrows have been destroyed or ground squirrels eradicated), owls may occupy other natural and unnatural sites such as rock outcrops (Gleason and Johnson 1985; Rich 1986), concrete and asphalt (Trulio 1994), cavities under piles of rubble, drainage culverts, discarded pipe and other tunnel-like structures, and human-made artificial burrows (Collins and Landry 1977).

In the Sacramento region, including the Planning Area, burrowing owls most commonly live in natural tunnels created by California ground squirrels. Accordingly, the quality of burrowing owl habitat in the Planning Area is closely and positively related to the occurrence and population viability of California ground squirrels in an area. DeSante et al. (1996, 2003) found that the best predictor of burrowing owl reoccupancy of nest sites in California was ground squirrel presence. Burrowing owls and ground squirrels can co-inhabit the same burrow system (Johnson pers. comm.), but the frequency with which this occurs has not been measured, and underground interactions have not been studied.

Vegetation height and structure, and the availability of roost sites, particularly affect burrowing owl habitat quality, especially because this species is a small ground-dweller (Zarn 1974; Green and Anthony 1989; Trulio 1994). Burrowing owls select sites that support short vegetation, even bare soil, presumably because they can easily see over it and maneuver through it; however, they will tolerate tall vegetation if it is sparse. Owls will perch on raised burrow mounds or other relief, such as rocks, tall plants, fence posts, and debris piles to attain good visibility. During the breeding season, they may also need enough permanent cover and taller vegetation within their foraging range to provide them with sufficient prey, such as small mammals (Wellicome 1994). In Santa Clara County, vegetation cover and average vegetation height at occupied burrow habitat were 44 to 57 percent and six inches (15.2 centimeters), respectively (Trulio 1994). burrowing owls in Oklahoma occured where vegetation was four inches (10.2 centimeters) or less in height (Butts 1973). Green and Anthony (1989) reported that 28 percent vegetation cover was optimal in the Columbia Basin, and that burrowing owls used areas with high proportions of bare ground. Some land management practices that manipulate vegetation while avoiding burrow damage or disturbance, including moderate

grazing or vegetation removal, can enhance or maintain suitable vegetation in burrow habitat (Coulombe 1971; Green and Anthony 1989; Trulio 1994; Jones pers. comm.).

Burrowing owls sometimes occur in small habitat fragments, including grassland or ruderal patches surrounded by urban development (Rosenberg and DeSante 1997; DeSante et al. 2004). In general, burrowing owl colonies often occur in habitat edges and/or disturbed sites characterized by natural or anthropogenic soil disturbance (including soil piles and bare ground) and topographic breaks (Gifford pers. comm.). Their proximate association with these areas may be independent of certain landscape variables such as habitat patch size; therefore, these settings appear to simply provide burrowing owls with some of their required habitat elements, including suitable digging sites for California ground squirrels, short and sparse vegetation, and good visibility. However, the spatial requirements of burrowing owls, and how long-term population viability varies with landscape-level parameters, are not well understood. CDFW's burrowing owl mitigation guidelines (CBOC 1993) imply that breeding pairs or resident individuals of burrowing owls may require a minimum of 6.5 acres (2.6 hectares) of contiguous foraging habitat to persist (based on a 300-foot [91.4-meter] radius around an occupied burrow). For example, the guidelines for avoiding project impacts on pairs or individuals requires preserving a minimum of 6.5 acres of foraging habitat contiguous with occupied burrow sites for each pair of breeding owls or single unpaired resident bird. Guidelines for mitigating the loss of foraging and burrowing habitat on a project site requires protection of at least 6.5 acres of foraging habitat per pair or unpaired resident bird. Whether these guidelines have an empirical ecological or demographic basis is not clear.

Burrowing owl pairs have been observed in isolated habitat patches as small as one acre (0.4 hectare). However, an area this size does not support the foraging requirements of most burrowing owls, and individuals occurring at sites this small must forage offsite. Reproductive success and long-term persistence in small and isolated habitats are unknown. Although the relationship between habitat area and population viability of this species is not well documented, small and isolated habitat patches are not likely to sustain high reproductive success or long-term persistence.

In urban settings, burrowing owls occurring in isolated habitats may experience frequent disturbances from adjacent land uses (e.g., habitat degradation, predation) and barriers to foraging areas. For example, the availability of rodent prey may be limited in isolated habitats, and ground squirrels may abandon or be eradicated from small parcels of habitat in urban settings. Also, small and isolated occurrences are more likely to experience random local extirpation as a result of natural disturbances (e.g., Goodman 1987) and recolonization of small or isolated habitat patches is less likely than recolonization of large habitat areas. Burrowing owls can tolerate considerable levels of non-threatening human activity and noise in locations

that sustain their other habitat requirements (e.g., suitable nesting and foraging habitat, and roosting sites) (CBD et al. 2003).

What constitutes an isolated habitat patch for burrowing owl and the minimum size of a viable patch of habitat (i.e., habitat capable of sustaining a population over a long time) are not well documented. These parameters are likely affected by habitat quality, juxtaposition of the site relative to other suitable habitat, surrounding land uses, and prey availability. Burrowing owls have been observed in small lots nearly surrounded by development. Furthermore, burrowing owls will fly through urban areas to forage in nearby areas; however, the type and minimum extent of development that constitutes a barrier to movement between occupied patches and nearby foraging areas is not known. Although small and isolated patches of habitat can support owls, these sites may be unlikely to attract new pairs.

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for burrowing owl are identified in Table G-3.20-1 and have been derived from input from local species experts.

Table G-3.20-1. Habitat Elements for Burrowing Owl

Essential Activities	Land Cover Types	Habitat Elements
Foraging, breeding and dispersal	Blue oak savanna, cropland, irrigated pasture grassland, and valley grassland.	Open, well-drained terrain outside areas at risk of flooding; short, sparse vegetation; and underground burrows or burrow facsimiles. Requirement for burrows is facilitated by healthy populations of California ground squirrel.

BUOW Species Distribution and Population Trends

BUOW Species Distribution

Western burrowing owl occurs throughout western North America west of the Mississippi River, and south through Mexico to Panama (Haug et al. 1993). In California, western burrowing owl is a year-round resident. Historically, burrowing owl was widespread and occurred in suitable habitats throughout the state (Grinnell and Miller 1944), but its range has contracted significantly, particularly in coastal grasslands. Its present range includes lowlands from north-central California west of the Sierra Nevada and south to Mexico, desert regions of southwestern California, and scattered locations in the Great Basin (DeSante et al. 1996). Burrowing owls are absent from coastal areas north of Sonoma County. They are also absent

from montane regions such as the Sierra Nevada and the ranges between Santa Barbara and San Bernardino Counties.

BUOW Central Valley Distribution

There are historical records of burrowing owl occurrence from nearly every county in the Central Valley (DeSante et al. 1996). DeSante et al. (1996) described the western burrowing owl's Central Valley range in terms of its county distribution within three geographic zones: Northern Central Valley, Middle Central Valley, and Southern Central Valley. Approximately half of all breeding groups known to occur in the Central Valley during the 1980's disappeared by the early 1990s (DeSante and Ruhlen 1995).

BUOW Distribution within the Planning Area

The Planning Area occurs within the Middle Central Valley portion of the burrowing owl's range. DeSante et al. (1996) estimated that the Central Valley supports 14 percent of the total California burrowing owl population (and some of the highest population densities, along with Imperial Valley); and 11 percent of the total population occurs in the Middle and Northern Central Valley, and southern San Francisco Bay Area combined. The Planning Area lies within the core of this region. This area is particularly important to the current and future western burrowing owl population in California for several reasons: 1) it is located within a complex that supports some of the highest burrowing owl population densities in the state; 2) it historically supported some large burrowing owl populations (see below); 3) breeding populations still remain within this area, and there are opportunities to enhance existing populations; 4) large areas of suitable habitat remain in the area; and 5) the greater region is threatened by intensive development and urbanization pressure.

Western burrowing owls occur in suitable habitat within the Planning Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by burrowing owls, such as grasslands, vernal pool grasslands, fallow agricultural fields, and open oak savannah occur throughout most of the Central Valley and are well-represented in Sacramento County and the Planning Area, particularly outside the Urban Development Area (UDA); however, at most sites within these land-cover types, the presence of burrowing owls is not known, and it is assumed that most of this habitat is not occupied

Since the 1950's, large colonies of burrowing owls have been recorded in the Planning Area at Executive Airport, Sacramento Army Depot, Cosumnes River College, and Mather Air Force Base (DeSante et al. 1996; CDFG 2010; Johnson pers. comm.) (see Figure BUOW-1). Large colonies have also been documented in Sacramento County outside the Planning Area at the California State University Campus. Effects from surrounding development and habitat degradation have

reduced burrowing owl numbers in these areas. Some populations remain in increasingly isolated tracts of urban open space south of the American River and in the North Natomas area, in Sacramento County but outside the Planning Area.

Although burrowing owl populations have declined or disappeared from much of their historical habitat, outlying areas of the County still provide suitable habitat for the species. Burrowing owls are known to occupy patches of habitat that extend from the Sacramento Regional County Sanitation District (SRCSD) Bufferlands (Jones pers. comm.) to The Nature Conservancy's Cosumnes River Preserve (Reiner pers. comm.), as well as habitat in the rolling grasslands in eastern Sacramento County. The Meadowview and Pocket areas within the City of Sacramento (outside the Planning Area) support disjunct, isolated populations north to Florin Road (Roscoe pers. comm.). No comprehensive data exist on the distribution or abundance of these owls or on their demographic relationship to the burrowing owls within the city limits of Sacramento. It seems likely, however, that extant habitat south and east of the city boundary has served for some time as a "refuge" for burrowing owls being displaced from the Sacramento Metropolitan Area by urbanization.

Because comprehensive surveys or monitoring efforts for western burrowing owl in the Planning Area have not been conducted, and because the existing data of known occurrences are based mostly on incidental observations or limited surveys (e.g., CNDDB, anecdotal records, surveys conducted over a limited area), the population size and nesting distribution of this species in the Planning Area are not known. There are 36 previously recorded occurrences scattered throughout the Planning Area, 17 of which are within the UDA (CDFG 2010). The species is believed to occur throughout the Planning Area in areas of modeled habitat, which is discussed in Section G-4 of this Appendix.

BUOW Population Levels and Trend

The burrowing owl is experiencing precipitous population declines throughout North America. In Canada, its numbers are rapidly declining, and in 1995 the Committee on the Status of Endangered Wildlife in Canada listed it as an endangered species. In Mexico, it is officially considered a threatened species. The burrowing owl is also declining throughout most of the western United States, and has disappeared from much of its historical range in California. Nearly 60 percent of California burrowing owl colonies that existed in the 1980's had disappeared by the early 1990s (DeSante and Ruhlen 1995; DeSante et al. 1997). In the San Francisco Bay Area and the central portion of the Central Valley (from Yolo and Sacramento Counties to Merced County), the burrowing owl population has declined by at least 65 percent since 1986 (DeSante pers. comm.).

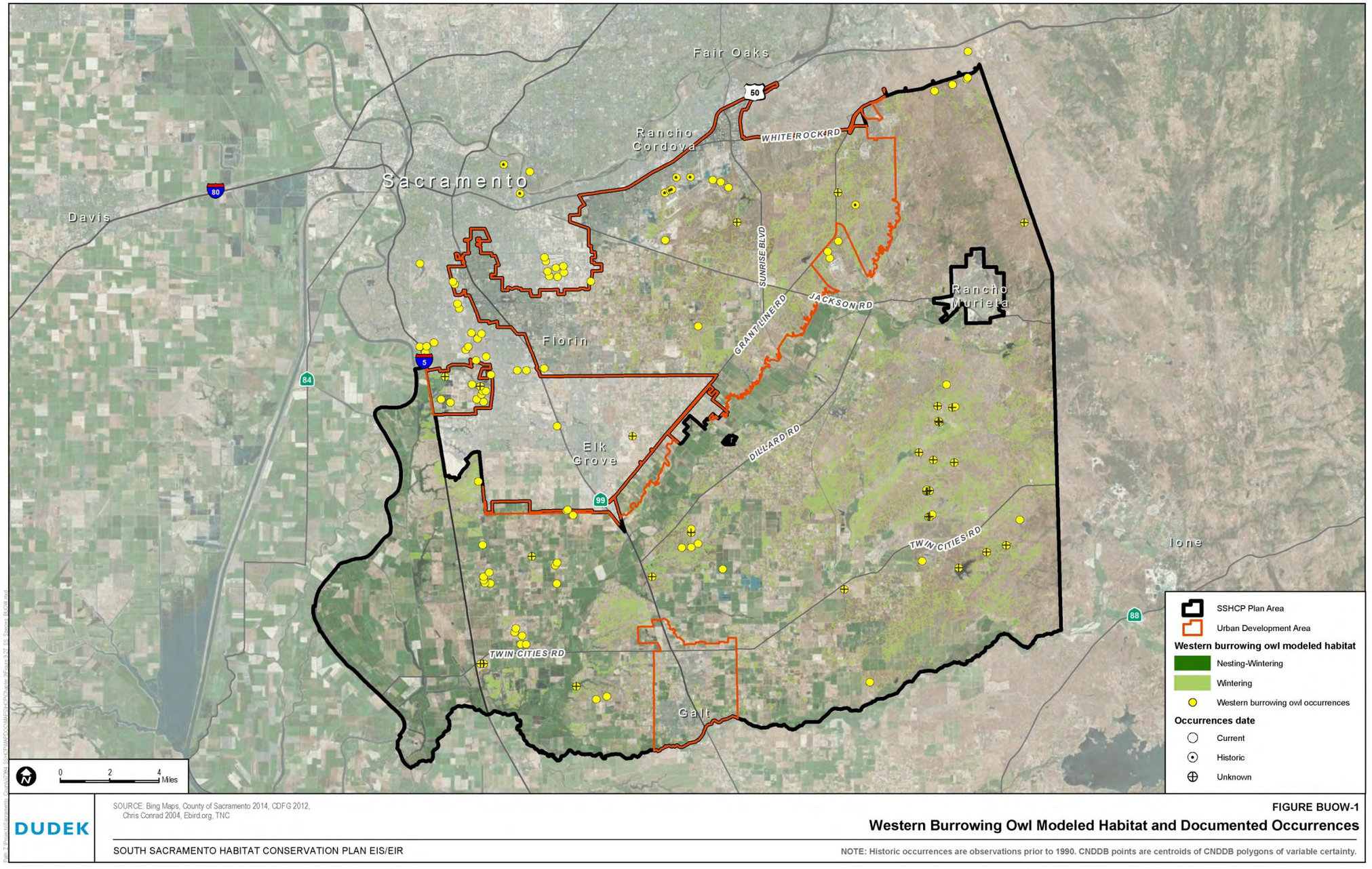
Burrowing owls remain throughout nearly all of their Central Valley range. Approximately half of all breeding groups known to occur in the Central Valley during the 1980s disappeared by the early 1990s (DeSante and Ruhlen 1995). Due to severe losses of habitat suitable for burrowing owls in the Planning Area over the past several decades, as a result of development and certain agricultural conversions, it is assumed that western burrowing owl populations in the Planning Area have declined substantially over recent decades.

BUOW Threats to the Species

Western burrowing owl is threatened over most of its range by several factors. The Center for Biological Diversity et al. (2003) provides a thorough description of threat factors, including documentation by specific studies in several cases. The following section summarizes threats to western burrowing owl populations. Immediate threats to western burrowing owl include the conversion of grassland habitat to urban and agricultural uses, and the loss of suitable agricultural lands to development. Approximately 91 percent of burrowing owls in California occur on private land. Statewide, over 86 percent of grasslands are in private ownership (Bates 2006). Equally important is the loss of fossorial rodent populations such as prairie dogs and ground squirrels across much of the owl's historical habitat. Eradication programs have decimated populations of these rodents and have in turn disrupted the commensal ecological relationship the owls have with these species. Another cause of population declines is thought to be pesticide use (especially organophosphates in southern Canada); however, the available evidence does not clearly indicate that other contaminants are reducing populations (Gervais et al. 1997). Habitat fragmentation (Remsen 1978) probably increases foraging distances, making hunting less efficient, and potentially reducing reproductive success. Furthermore, fragmentation may reduce the chances that a male owl will attract a mate and successfully reproduce.

Studies of island biogeography suggest that small, isolated populations can suffer from genetically induced problems that may jeopardize the long-term survival of a species (Goodman 1987; Hanski and Gilpin 1997), and recent studies of burrowing owls suggest that such genetically induced problems may threaten the species. One study suggests that small owl populations many be genetically isolated from other populations (Johnson 1992). Another study found a population of owls near Sacramento to be inbred due to small population size rather than non-random mating (Johnson 1997a).

Figure BUOW-1 Western Burrowing Owl Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Other documented threats to western burrowing owl throughout the species' range include predation, mortality due to collisions with vehicles and wind turbines, and relocation of burrowing owls away from occupied habitat for development (CBD et al. 2003). Attempts to exterminate rodents by the use of poisons may also kill burrowing owls (Rosenberg et al. 1998).

Western burrowing owls in south Sacramento County are specifically threatened by habitat loss and fragmentation as a result of conversion of habitat to urban uses and agriculture, particularly the conversion of grasslands to vineyards. Also, the loss of suitable agricultural land to development has reduced the extent of suitable habitat. It is assumed that control of ground squirrels has reduced the extent and quality of burrowing owl habitat by reducing the number of suitable nesting burrows. It is possible that the use of rodenticides and insecticides have reduced prey populations, resulting in lowered survivorship and reproductive success.

BUOW Data Gaps and Conservation Implications

The ecology, status, and management of western burrowing owl have received considerable attention in recent years; however, there are several sources of uncertainty regarding burrowing owl and its requirements in the Planning Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

Population and Habitat Distribution within the Planning Area

Because comprehensive surveys for western burrowing owl in the Planning Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and nesting locations of this species throughout the Planning Area are not known. In addition, though the distribution of grassland, agricultural, and ruderal land-cover types is mapped and quantifiable, the quality of habitat for burrowing owls within most of these areas is unknown.

These information gaps limit our ability to identify the best lands available for preserving burrowing owl habitat, and accurately estimate the impacts resulting from covered activities. Until these data gaps are remedied, the conservation value for burrowing owl will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for the western burrowing owl are not well documented. This causes uncertainty in determining what preserve design will be effective in meeting the conservation goals for burrowing owls.

BUOW Literature Cited

American Ornithologists' Union (AOU). 1983. Check-list of North American birds. 6th edition. American Ornithologists' Union, Washington, D.C.

American Ornithologists' Union (AOU). 1991. Thirty-eighth supplement to the American Ornithologists' Union Check-list of North American birds. *Auk* 108:750-754.

American Ornithologists' Union (AOU). 1997. Forty-first supplement to the check-list of North American birds. *Auk* 114:542-552.

Anderson, S.H., L.W. Ayers, J.A. Dechant, M.T. Green, W.H. Howe, S.L. Jones, D.S. Klute, D.K. Rosenberg, S.R. Sheffield and T.S. Zimmerman. 2001. Draft status assessment and conservation plan for the Western Burrowing Owl in the United States. Administrative Report. U.S. Department of Interior, Fish and Wildlife Service, Denver, Colorado.

Bates, C. 2006. Burrowing Owl (Athene cunicularia). In The Draft Desert Bird Conservation Plan: a strategy for reversing the decline of desert-associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/desert.html.

Belthoff, J.R., and A.R. King. 1997. Between-year movements and nest burrow use by Burrowing Owls in southwestern Idaho: 1996 annual report. *Technical Bulletin* No. 97-3, Bureau of Land Management, Boise.

Botelho, E.S. 1996. Behavioral ecology and parental care of breeding Western Burrowing Owls (*Speotyto cunicularia hypugaea*) in southern New Mexico, USA. Dissertation, New Mexico State University, Las Cruces, New Mexico.

Botelho, E.S. and P.C. Arrowood. 1998. The effect of burrow site use on the reproductive success of a partially migratory population of Western Burrowing Owls (*Speotyto cunicularia hypugaea*). *Journal of Raptor Research* 32:233-240.

Butts, K.O. 1973. Life history and habitat requirements of Burrowing Owls in western Oklahoma. Master's thesis, Oklahoma State University, Stillwater. 188 pp.

California Burrowing Owl Consortium (CBOC). 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. (April 1993) California Department of Fish and Game (CDFG). Sacramento, California. Accessed online at http://www.dfg.ca.gov/wildlife/nongame/docs/boconsortium.pdf.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Fish and Game and Point Reyes Bird Observatory (CDFG and PRBO). 2003. California Bird Species of Special Concern: Updated Draft List and Solicitation of Input. Available at http://www.prbo.org/cms/.

Center for Biological Diversity (CBD), Santa Clara Valley Audubon Society, Defenders of Wildlife, San Bernardino Valley Audubon Society, California State Park Rangers Association and Tri-County Conservation League. 2003. Petition to the State of California Fish and Game Commission and Supporting Information for Listing the California Population of the Western Burrowing Owl (*Athene cunicularia hypugaea*) as an Endangered or Threatened Species Under the California Endangered Species Act. Submitted April 7.

Clark, R.J. 1997. A review of the taxonomy and distribution of the Burrowing Owl (*Speotyto cunicularia*). Pages 14-23 in J.L. Lincer and K. Steenhof (Editors). The Burrowing Owl, its Biology and management: including the Proceedings of the First International Symposium. Raptor Research Report No. 9.

Clayton, K.M. and J.K. Schmutz. 1997. Burrowing Owl (*Speotytcou nicularia*) survival in prairie Canada. Pages 107-110 *in* J.R. Duncan, D.H. Johnson, and T.H Nicholls [EDs.], Biology and conservation of owls of the northern hemisphere. U.S. Dep. of Agri. For Serv. Gem Tech. Rep. NC-190.

Collins CT and RE Landry. 1977. "Artificial Nest Burrows for Burrowing Owls." *North American Bird Bander* 2:151-154.

Coulombe, H.N. 1971. Behavior and population ecology of the burrowing owl, *Speotyto cunicularia*, in the Imperial Valley of California. *Condor* 73:162-176.

Dawson, W.L. 1923. *Birds of California, Volume 2*. South Moulton Company, San Francisco, California.

DeSante, David. Ornithologist. The Institute for Bird Populations, Point Reyes Station, California.

DeSante, D.F. and E.D. Ruhlen. 1995. A census of burrowing owls in California, 1991-1993. Institute for Bird Populations, Point Reyes Station, California.

DeSante, D.F., E.D. Ruhlen and D.K. Rosenberg. 1996. The distribution and relative abundance of burrowing owls in California: evidence for a declining population. Institute for Bird Populations. Point Reyes Station, California.

DeSante, D.F., E.D. Ruhlen and D.K. Rosenberg. 2004. Density and abundance of burrowing owls in the agricultural matrix of the imperial valley, California. *Studies in Avian Biology* 27:116-119.

DeSante, D.F., E.D. Ruhlen, D.K. Rosenberg and R. Scalf. 2003. The distribution and relative abundance of burrowing owls in California in the early 1990s. Abstract. California Burrowing Owl Symposium Program and Abstracts.

DeSante, D.F., E.D. Ruhlen, S.L. Adamany, K.M. Burton and S. Amin. 1997. A census of burrowing owls in central California in 1991. Pages 38-48 in J.L. Lincer and K. Steenhof (Editors). The burrowing owl, its Biology and management: including the Proceedings of the First International Symposium. Raptor Research Report No. 9.

Emlen, J.M. and E.K. Pilkitch. 1989. Animal population dynamics: identification of critical components. *Ecological Modeling*. 44: 253-273.

Gervais, J. A. and D.K. Rosenberg. 1999. Burrowing Owls in California produce second broods of chicks. *Wilson Bulletin* 111:569-571.

Gervais, J.A., D.K. Rosenberg and R.G. Anthony. 2003. Burrowing Owl space use and pesticide exposure risk. *Journal of Wildlife Management* 67:155-64.

Gervais, J.A., D.K. Rosenberg, D.M. Fry, L.A. Trulio and K.K. Sturm. 2000. Burrowing owls and agricultural pesticides: Evaluation of residues and risks for three populations in California. *Environmental Toxicology and Chemistry* 19:337-343.

Gervais, J. A., D. K. Rosenberg, D. M. Fry, and L. A. Trulio. 1997. Evaluation of contaminant residues in burrowing owls populations from central and southern California. The Institute for Bird Populations, Point Reyes Station, California. Publication No. 79.

Gifford, Dan. Biologist. California Department of Fish and Game, Sacramento, California.

Gleason, R.S. and D.R. Johnson. 1985. Factors influencing nesting success of burrowing owls in southeastern Idaho. *Great Basin Naturalist* 45: 81-84.

Goodman, D. 1987. The demography of chance extinction. Pages 11–34 in M.E. Soule (ed). Viable populations for conservation. Cambridge University Press, Cambridge, UK.

Gorman, L.R., D.K. Rosenberg, N.A. Ronan, K.L. Haley, J.A. Gervais and V. Franke. 2003. Estimation of reproductive rates of burrowing owls. *Journal of Wildlife Management* 67:493-500.

Green, G.A. and R.G. Anthony. 1989. Nesting success and habitat relationships of burrowing owls in the Columbia Basin, Oregon. *Condor* 91:347-354.

Grinnell, J. and A.H. Miller. 1944. *The Distribution of the Birds of California*. Cooper Ornithological Club. Berkeley, California.

Hanski, I. and Gilpin, M.E. 1997. *Metapopulation Biology*, Academic Press, San Diego, California.

Haug, E. A., and L. W. Oliphant. 1987. Breeding biology of Burrowing Owls in Saskatchewan. Pages 269-271 *in* G. L. Holroyd, P. H. R. Stepney, G. C. Trottier, W. B. McGillivray, D. M. Ealey, and K. E. Eberhart, editors. Endangered species in the prairie provinces. Natural History Occasional Paper No. 9. Provincial Museum of Alberta, Edmonton, Alberta.

Haug, E.A., B.A. Millsap and M.S. Martell. 1993. The Burrowing Owl (*Speotyto cunicularia*). In Poole, A. and F. Gill (editors). The birds of North America, No. 61. Philadelphia: The Academy of Natural Sciences; Washington, D. C. The American Ornithologists' Union. Washington, D. C. The American Ornithologists' Union.

Johnson, B.S. 1992. Effects of demography, mating patterns, and sociality on the population genetics and dynamics of the burrowing owl. Ph.D. dissertation. University of California, Davis.

Johnson, B.S. 1997a. Characterization of population and family genetics of the burrowing owl by DNA fingerprinting with pV47-2. Pages 58–63 in J.L Lincer and K. Steenhof (eds.). The burrowing owl, its biology and management. Raptor Research Report No. 9.

Johnson, B.S. 1997b. Reproductive success, relatedness, and mating patterns of colonial burrowing owls. Pages 64-67 in J.L Lincer and K. Steenhof (eds.). The burrowing owl, its biology and management. Raptor Research Report No. 9.

Johnson, B.S. 1997c. Demography and population dynamics of the burrowing owl. Pages 28–33 in J.L. Lincer and K. Steenhof (eds.). The burrowing owl, its biology and management. Raptor Research Report No. 9.

Johnson, Brenda. Conservation Planning Ecologist and Western Burrowing Owl Expert. California Department of Fish and Game, Sacramento, California.

Jones, Roger. Wildlife Biologist and Resource Manager. Sacramento Regional County Sanitation District (SRCSD) Bufferlands, Sacramento, California.

Karalus, K. E. and A. W. Eckert. 1987. *The owls of North America*. Weathervane Books, New York, New York.

König, C., F. Weick, and J.-H. Becking, eds. 1999. Owls: a guide to the owls of the world. Pica Press, Sussex, UK.

Nelson.

Pandolfino, Ed. Chair, Placer County Conservation Committee. Sierra Foothills Audubon Society.

Reiner, R. Ecologist, The Nature Conservancy, California.

Remsen, J.V., Jr. 1978. Bird species of special concern in California. Calif. Dept. of Fish and Game, Wildlife Management Branch Admin. Report, No. 78-1. 54pp.

Rich, T. 1986. Habitat and nest-site selection by Burrowing Owls in the sagebrush steppe of Idaho. *Journal of Wildlife Management* 50:548–555. CrossRef, CSA.

Roscoe.

Rosenberg D. K. and D. F. DeSante. 1997. Demographic characteristics of burrowing owl populations in California. Progress Report, September 1997. Institute for Bird Populations. Point Reyes Station, California. Publication No. 95.

Rosenberg, D.K. and K.L. Haley. 2004. The ecology of burrowing owls in the agroecosystem of the Imperial Valley, California. Studies in Avian Biology 27:120-135.

Rosenberg, D.K. and K.S. McKelvey. 1999. Estimation of habitat selection for central-place foraging animals. Journal of Wildlife Management 63:1028-1038.

Rosenberg, D.K., J. Gervais, H. Ober and D. DeSante. 1998. An adaptive management plan for the burrowing owl population at Naval Air Station Lemoore, Lemoore, California. The Institute for Bird Populations. Point Reyes Station, California. Publication No. 95.

Sacramento Regional County Sanitation District Bufferlands [SRCSD Bufferlands]. 2004. Sacramento Regional Wastewater Treatment Plant Bufferlands Annual Report 2003. Available at http://www.srcsd.com/pdf/annl-rpt-bufferlands-2003.pdf.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Silva, S.I., I. Lazo, E. Silva-Aranguiz, F.M. Jaksic, P.L. Meserve and J.R. Gutierrez. 1995. Numerical and functional response of burrowing owls to long-term mammal fluctuations in Chile. Journal of Raptor Research 29:150-255.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73:177-192.

Trulio, L. A. 1994. The ecology of a population of burrowing owls at a naval air station in northern California. Dept. of the Navy. San Bruno, California.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Available at http://migratorybirds.fws.gov/reports/bcc2002.pdf.

Wellicome, T. I. 1994. Taverner award recipient's report: Is reproduction in Burrowing Owls limited by food supply? *Picoides* 7:9-10.

Zarn, M. 1974. Burrowing Owl. U.S. Department of Interior, Bureau of Land Management. Technical Note T-N-250, Denver, Colorado, 25 pp.

FERRUGINOUS HAWK (FEHA)

Ferruginous Hawk (FEHA)

(Buteo regalis)

Status USFWS: Bird of Conservation Concern

Status CDFW: None



FEHA Listing Status

Ferruginous hawk (*Buteo regalis*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800). It is considered a Bird of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS).

FEHA Life History and Ecology

FEHA Species Description and Life History

Physical Description

Ferruginous hawk is a large broad-winged hawk that occurs in two morphs (light and dark) with no intermediate morph. The dark morph is less frequent. Adult light morphs are rust colored on the back and shoulders, with a pale head, and white tail with pale rust washings. When observed in flight from below, the species appears mostly white, with a rufous "V" patch that is formed from the leg feathers. Observed from above, a white crescent-shaped patch is distinctive in the outer primaries. Dark morphs have a deep brown-colored head and body, upper-and lower-wing surfaces, and tail coverts. The back and breast are a dark rufous color. The tail, primaries, and secondaries are white or pale (Bechard and Schmutz 1995; Sibley 2000; Udvardy 1998). Adults are not sexually dimorphic in plumage, but females tend to show more pigmentation on the legs and belly (Bechard and Schmutz 1995).

Juvenile light morphs are generally similar to adults; however, the darker colored feathers are more brown than rufous. When observed from below in flight, juvenile feathers are more white or pale as compared to adults. They also lack the rufous "V" shape that is formed from the leg feathers on adults. Like light morphs, juvenile dark morphs are similar to adults, but have

feathers that are more brown than rufous. In both morphs, juvenile iris color is pale, while adult iris color is reddish-brown (Sibley 2000).

Reproduction

Ferruginous hawks do not regularly breed in California, with the most recent breeding being recorded in 1989 in northeastern California (Harlow and Bloom 1989). Since the species is not a regular breeder in California and has not been recorded breeding in the Central Valley, reproduction will not be discussed in detail in this account.

Ferruginous hawks are apparently monogamous, and pairs initiate nesting mid-March to mid-April depending on location (Bechard and Schmutz 1995). Clutch size in this species is larger than in most raptors, generally ranging from two to four eggs, but occasionally ranging up eight eggs in years of high prey abundance (Smith and Murphy 1978). Both sexes participate in nest building. Nests are most often located in trees and shrubs, followed by cliffs, utility structures, and ground outcrops (Olendorff 1993). Incubation is estimated to range between 32 and 33 days (Palmer 1988), while young leave the nest between 38 and 50 days after hatching (Powers 1981 *in* Bechard and Schmutz 1995).

Suitable nesting sites have declined in some portions of the breeding range given that isolated trees are uncommon, many have fallen, and little new regeneration is occurring. Furthermore, ferruginous hawks may experience reduced reproductive success due to harassment by later arriving Swainson's hawks and competition for nest sites (Leslie 1992). Establishment of artificial nesting platforms in regions with limited available nest sites has proven successful in addressing this issue (Bechard and Schmutz 1995).

Longevity, Survival, and Mortality

Maximum potential longevity is believed to be 20 years of age (Lloyd 1937; Houston 1984 in Bechard and Schmutz 1995). The oldest known age of a wild ferruginous hawk is 17 years 11 months. Banding data from Schmutz and Fyge (1987) was used to estimate first year mortality at 65 percent, while reoccupancy of nest data from Woffinden and Murphy (1989) has been used to estimate annual adult mortality at 25 percent.

Ferruginous hawks fall prey to birds and mammals. Great horned owls (*Bubo virginianus*) take nestlings, common ravens (*Corvus corax*) and American crows (*Corvus brachyrhynchos*) prey on eggs and nestlings, and ground predators such as coyotes (*Canis latrans*), American badgers (*Taxidea taxus*), and foxes (*Vulpes* spp.) may be a serious threat to ground-nesting pairs and young after fledging (Bechard and Schmutz 1995).

Other sources of mortality include illegal shooting, presumed collisions with automobiles, and high-tension wire collisions or electrocution (Gossett 1993). Olendorff (1973) also reported that eggs and young are killed when blown or pushed from nests.

Dispersal Patterns

Band return data for juvenile ferruginous hawks from the first 90 days after banding found that 48 individuals moved less than 15.5 miles from their natal site, while 33 individuals dispersed as far as 1,056 miles (Gossett 1993 in Bechard and Schmutz 1995). No other dispersal information is available for the ferruginous hawk.

Diet and Foraging

Prey selection by ferruginous hawks is determined primarily by availability (Steenhof and Kochert 1985 *in* Bechard and Schmutz 1995). Some individuals have even been reported to forage on prairie dogs (*Cynomys* spp.) immediately after the prey was shot by squirrel hunters (Chesser 1979).

Ferruginous hawks opportunistically forage at times during the day when their main prey items are available. Four types of prey pursuit have been described and include: 1) still hunting from perches with flights of less than 100 meters to capture prey; 2) short-distance strikes originating from the ground; 3) aerial hunting; and 4) hovering. No communal feeding has been reported, though 10 to 20 ferruginous hawks have been observed standing or perching in the same general area (Bechard and Schmutz 1995).

Mammals are the most common food items with rabbits and hares (*Syvillagus* and *Lepus* spp.), ground squirrels (*Spermophilus* spp.), and prairie dogs *Cynomys* spp.) comprising most of the food consumed by adults and juveniles throughout the year. Bechard and Schmutz (1995) summarized ferruginous hawk prey reported from several studies throughout the species' range by percent occurrence and percent biomass. Mammals were most frequently preyed upon (83 percent) and constituted 95 percent of the food biomass, while birds were the second prey group most frequently eaten (13 percent), but only constituted 3.8 percent of the food biomass. Amphibians, reptiles, and insects were also consumed, but were found to be much less frequent and comprised less than one percent of the food biomass. No food habit studies of wintering ferruginous hawks in California have been conducted.

Movement and Migration Patterns

The ferruginous hawk is a migratory species in the northern part of its breeding range, but little is known regarding migration for southern nesting individuals. Fall migration of juveniles begins in early August, while most ferruginous hawks migrate in September and October. Adults begin

migration later in August and peak migration occurs in late October and early November. Migration of both juveniles and adults is completed by the end of November (Bechard and Schmutz 1995).

Spring migration is different in that hatch-year birds migrate later than adults. As with most bird species, the migration period of ferruginous hawks is shorter during spring. Adults migrate between mid-February and early April, with peak activity occurring during the month of March. First year birds start spring migration in early April, peak between mid-April and mid-May, and finish with the latest migrating individuals leaving in early June.

Most individuals that winter in California are believed to have originated in the states west of the continental divide. Gossett (1993) used band recovery data to calculate that 4.1 percent of eastern nesting birds were recovered west of the continental divide, while 27.5 percent of western birds were recovered east of the divide. In California, Garrison (1990) reported that 66 percent of band recoveries were from breeding populations west of the Rocky Mountains, while the remaining recoveries were from the north and east. Fidelity to wintering areas by migratory individuals is unknown (Bechard and Schmutz 1995).

Territoriality/Home Range

Bechard and Schmutz (1995) suggest that the ferruginous hawk may defend winter territories. Winter densities in Utah have been reported at one individual per 3.60 square miles (Smith and Murphy 1978), while Plumpton and Andersen (1997) found a mean daily minimum convex polygon home range size of 1.36 square miles. Data on nesting territory size has been reported by several researchers and may also be useful as an estimate for winter habitat requirements (Hunting 2001). Breeding home ranges have been reported between 2.28 and 2.93 square miles per pair (Smith and Murphy 1978; Bechard and Schmutz 1995).

Ecological Relationships

Ferruginous hawks depend on a small number of prey species for their main food items. Consequently, population cycles and abundance of these species are highly correlated with the number of breeding pairs, eggs laid, and young fledged (Thurow et al. 1980; White and Thurow 1985; Woffinden and Murphy 1989; Steenhof and Kochert 1985; Schmutz and Hungle 1989 *in* Bechard and Schmutz 1995).

FEHA Habitat Requirements and Ecology

The ferruginous hawk is considered an “open country” species that inhabits the grasslands, shrub steppes, and deserts of western North America. Since the species does not regularly nest in California, only the habitat requirements and ecology of wintering ferruginous hawks will be described herein. During the winter, ferruginous hawks use grasslands and arid areas,

particularly where pocket gophers, ground squirrels, rabbits, or prairie dogs are abundant. Ferruginous hawks also winter near cultivated fields that support populations of pocket gophers (Bechard and Schmutz 1995), and are known to use urban open space grasslands as long as prey is available (Berry et al. 1998).

Few field studies of the ferruginous hawk have been conducted in wintering areas, and none are known for the Central Valley of California. Therefore, descriptions of the species' winter habitat requirements in California are based mostly on the personal observations of birders. Manolis (pers. comm.) has observed ferruginous hawks in open grassland habitats and non-vineyard agricultural areas in the Planning Area. Characteristics of these grasslands and agricultural lands are that they support abundant prey and include friable soils (for digging and burrowing), moderate to dense vegetative cover (particularly grasses), and some topographic variation (West pers. comm.).

Ferruginous hawks wintering in Utah have been found in higher numbers in irrigated pastures and dry croplands (Brouse 1999). The spatial requirements of ferruginous hawks during winter have not been widely reported (Bechard and Schmutz) and what constitutes the minimum size of suitable winter foraging habitat is unknown for most areas. In Colorado, Plumpton and Andersen (1997) found a mean daily minimum convex polygon home range size of 1.36 square miles. The minimum patch size for ferruginous hawks is likely affected primarily by prey availability, but also by the juxtaposition of the site relative to other suitable habitat, and by surrounding land uses. Ferruginous hawks generally roost individually, but sometimes roost communally in groups of up to 24 birds (Olendorff 1993).

FEHA Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for ferruginous hawk are identified in Table G-3.21-1 and have been derived from input from local species experts. This species does not nest within the Planning Area and therefore habitat elements for nesting is not included.

Table G-3.21-1. Habitat Elements for Ferruginous Hawk

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, and valley grassland.	Abundant rodent populations.

FEHA Species Distribution and Population Trends

FEHA Species Distribution

Ferruginous hawks nest in western North America, from southern Saskatchewan and Alberta south to central New Mexico and Arizona, east to the Great Plains, and west to central Nevada and Oregon. Nesting occurs in 17 states and three provinces in western North America (Bechard and Schmutz 1995).

The winter distribution includes the southwestern United States and northern Central America. In California, ferruginous hawks occur commonly in each of the eight geographic regions used in analysis of the National Audubon Society's Christmas Bird Count (CBC) data (Garrison 1990). In each region, ferruginous hawks were reported to occur in over 22 percent (range 22 to 56percent) of CBC's between 1950 through 1988. When CBC data was standardized by search effort, Ferruginous hawks were most commonly observed in the North Interior, followed by the South Interior, Central Coast, and South Coast. Fewer individuals were found in the North and South Sierras, North Coast, and Central Valley.

Analysis of more recent CBC data found more ferruginous hawks in the Sierra Nevada, Cascades, and Inner Coast Range physiographic regions than other regions. Regions reporting moderate numbers of ferruginous hawks included the South Coast, Central Coast, and Central Valley. Those regions reporting the fewest ferruginous hawks included the Mojave and Colorado Deserts, North Coast, and High Desert (Hunting 2001).

FEHA Central Valley Distribution

Ferruginous hawks were detected regularly on more than 97 percent of the CBCs in the Central Valley between 1980 and 1997 (Hunting 2001); however, no additional data analysis on these records has been reported.

FEHA Distribution within the Planning Area

Observations of ferruginous hawk in the Planning Area are primarily opportunistic sightings of individuals by birders or observations during CBCs. Most observations of ferruginous hawks have been reported from open grassland habitats in the eastern portion of the Planning Area from Interstate 50 south to Howard Ranch (Manolis pers. comm.). Winter observations have also been recorded from non-vineyard agricultural habitats in the south and southwestern portions of the Planning Area. There are three previously recorded occurrences of ferruginous hawk reported to the CNDDB within Sacramento County, all of which are within the UDA (CDFG 2010). Figure FEHA-1 shows the occurrences within the Planning Area according to CNDDB (CDFG 2010) and other sources (ebird.org 2005-2010).

FEHA Population Levels and Trend

The ferruginous hawk range-wide population was estimated at between 5,842 and 11,330 individuals between 1990 and 1995 (Olendorff 1993). In the grasslands of the Great Plains, Schmutz et al. (1992) estimated 14,000 individuals; however, no range-wide breeding population or California wintering population estimates have been conducted to date (Bechard and Schmutz 1995, Garrison 1990).

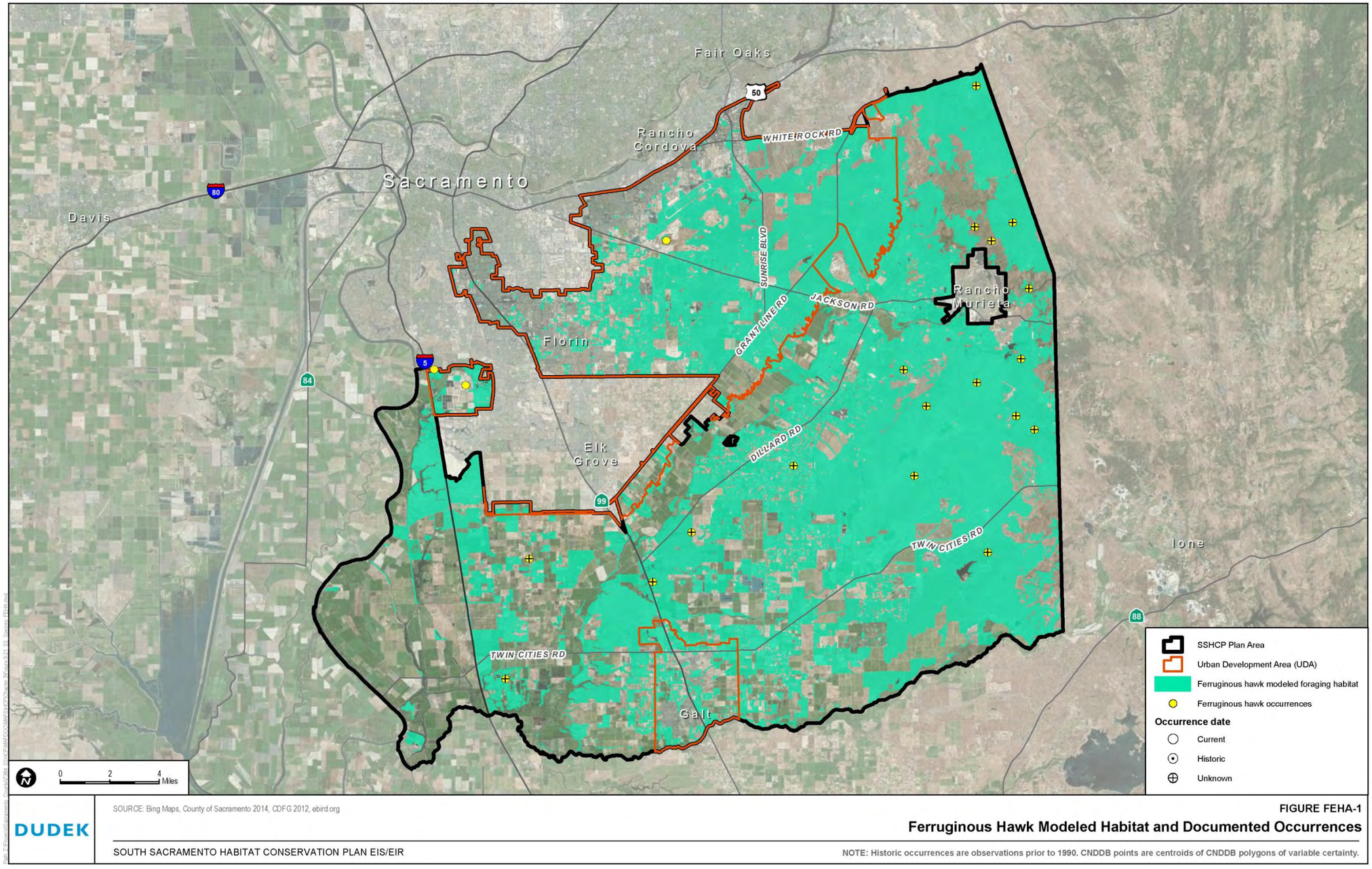
Garrison (1990) analyzed CBC data and found the species winters throughout the state. Analysis was grouped in eight regions and two time periods (Table G-3.22-2). The greatest number of ferruginous hawks occurred in the North Interior, Central Coast, South Coast, and South Interior regions.

Table G-3.22-2. Measures of Abundance for Wintering Ferruginous Hawks in California based on Christmas Bird Count Data Between 1949-1988 (Garrison 1990)

Region	N (#)	% of CBCs with Ferruginous hawks	Avg. No. Ferruginous hawks/CBC	Avg. No. Ferruginous hawks/100 party mi.
North Coast	17	32.5	0.64	.20
North Interior	6	56.8	2.51	1.07
North Sierra	4	28.6	0.50	0.16
Central Valley	21	36.5	0.94	0.33
Central Coast	19	34.4	1.40	0.65
South Sierra	7	22.4	0.31	0.28
South Interior	14	35.0	2.25	0.78
South Coast	23	37.0	1.63	0.63

Regional populations have been documented as both increasing and decreasing; however, the North American population is generally considered to be declining (Bechard and Schmutz 1995). In California, Garrison (1990) and Hunting (2003) used CBC data to investigate trends and found increases in wintering ferruginous hawks. Although many comparisons between time periods (1949-1969 compared with 1970-1988) within regions lacked adequate sample sizes, ferruginous hawks were significantly more frequent and more individuals were observed per CBC in the Central Coast and South Coast regions. No significant differences were found in the North Coast and Central Valley regions, although the Central Valley showed increases in the percentage of ferruginous hawks/CBC and more individuals/CBC. Garrison provided several reasons why the recorded increases in wintering birds may be artificial, and could not unequivocally conclude these increases were “real.”

Figure FEHA-1 Ferruginous Hawk Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

More recent analysis of CBC data by Hunting (2001) also reported increases in wintering ferruginous hawks (Table G-3.22-3). Both mean ferruginous hawk detections per count circle and mean number of count circles detecting ferruginous hawks increased in six of seven physiographic regions with a decrease noted only in the South Coast region. Some increases, however, were attributed to an increase in the absolute number of count circles (Hunting 2001).

Table G-3.22-3. Mean Ferruginous hawk Observations (Circles Detecting Ferruginous hawks) for Each of Seven California Physiographic Regions[1]

Physiographic Region	Mean Count Circle Observations (Circles) 1980-89	Mean Count Circle Observations (Circles) 1990-97	Numeric (percent) Change
North Coast	2.43 (4.8)	2.76 (7.5)	0.33 (12.1)
Sierra Nevada, Cascades and Inner Coast Range	3.53 (2.2)	8.14 (3.8)	4.61 (56.7)
Great Central Valley	2.73 (11.6)	4.43 (14.7)	1.7 (38.5)
Central Coast	2.70 (20.4)	4.63 (27.0)	1.93 (41.7)
South Coast	5.06 (13.6)	4.77 (15.8)	-0.29 (-6.1)
Mojave and Colorado Deserts	3.17 (4.2)	3.83 (4.7)	0.66 (17.4)
High Desert, Mono and Inyo Counties	0.33 (0.2)	1.30 (0.8)	0.97 (77.5)
Mean Observations[2]	3.27 (+-0.96)	5.22 (+-2.88)	

1 Table copied from Hunting 2001

2 Due to small sample size, values for High Desert, Mono and Inyo Counties omitted from calculation

FEHA Threats to the Species

Threats to ferruginous hawks occur in their breeding and wintering areas; however, since this species does not regularly nest in California, only threats in their wintering areas will be discussed in this account. Also, some historical threats such as egg collection, which occurred from 1900 to 1930 (Bechard and Schmutz 1995), no longer occur and are not considered a key factor in population declines (Bechard and Houston 1984; Bechard and Schmutz 1995). The use of organochlorine pesticides between the 1940's and 1960's also caused severe reductions in raptor populations from secondary poisoning. These pesticides have been banned in the United States since the 1970's, although they are still used in Central and South America (Sibley 2000).

FEHA Habitat Loss and Alteration

Foraging habitat (i.e., grasslands) for ferruginous hawks has been lost to urbanization or converted to agricultural crops that do not support prey species or are not used for foraging. Conversion of grassland habitats to urban and agricultural uses proportionately exceeds the conversion of any other habitat type in California (Ewing et al. 1988; Moore et al. 1990 *in* Hunting 2001). DeHaven (2000) quantified changes in California cropping patterns and found that ferruginous hawk "friendly" habitats such as rangelands, grassland, and pastures have

decreased. These habitats have been replaced by a variety of other crops (e.g., fruit and nuts, cotton, and vineyards) that are not used by ferruginous hawks, or by crops (e.g., vegetables and melons, tomatoes, beans, potatoes, sugar beets) that are suspected as having lower quality foraging value. Unlike other wintering raptors in California, ferruginous hawks do not use agriculture areas as frequently. Instead, they are more frequently found using natural habitat types such as grasslands and vernal pool/grassland complexes for foraging.

FEHA Shooting

Historically, raptors were illegally shot for sport like many other bird species (Bendire 1892; Cameron 1914; Salt 1939 *in* Bechard and Schmutz 1995). Shootings are still reported (Howard 1975; Harmata 1981), but decreases in the rate of band recoveries since the mid-1940's suggest a decrease in the numbers shot (Houston and Bechard 1984). Bechard and Schmutz (1995), however, suggest that shootings may still be a problem on the wintering grounds (Harmata 1981; Gilmer et al. 1985).

FEHA Pesticides

The control of ground squirrel and prairie dog populations with pesticides (i.e., strychnine) may affect ferruginous hawks (Hunting 2001). Eradication programs have decimated populations of these rodents. In addition, secondary poisoning has been documented for several raptors species; however, no studies have been found that document secondary poisoning of ferruginous hawks, and Bechard and Schmutz (1995) suggest pesticides pose little threat to the species.

FEHA Data Gaps and Conservation Implications

The ecology, status, and management of ferruginous hawks have received attention in recent years. However, there are several sources of uncertainty regarding ferruginous hawk and its requirements in the Planning Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

FEHA Population and Habitat Distribution within the Planning Area

Ferruginous hawks occur in suitable habitat within the Planning Area; however, their overall abundance and population structure are not well known. Land-cover types used by ferruginous hawks, such as grasslands, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Planning Area; however, at most sites with these land-cover types, the status of ferruginous hawk is not known.

Because comprehensive surveys for ferruginous hawk in the Planning Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g.,

anecdotal records), the population size and important wintering areas of this species throughout the Planning Area are not known. Although the distribution of grasslands is mapped and quantifiable, the quality of habitat for ferruginous hawks within most of these areas is unknown.

These information gaps limit our ability to identify the best lands available for preserving ferruginous hawk habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value of grassland and agricultural land-cover types for ferruginous hawk will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

FEHA Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for ferruginous hawk are not well documented. This causes uncertainty in determining whether the preserve design will be effective in meeting the conservation goals for ferruginous hawk.

FEHA Effectiveness of Mammalian Prey Population Enhancement Measures in Improving Foraging Habitat for Ferruginous Hawk

Achieving the conservation goals and objectives for ferruginous hawk may require successful enhancement of mammalian prey populations. Mammalian prey populations, particularly leporids and ground squirrels, should be passively or actively promoted on all lands acquired and managed for ferruginous hawk habitat. However, whether these efforts will succeed at increasing the available prey base and enhancing habitat for ferruginous hawk is unknown.

FEHA Other Data Gaps

Other data gaps that could be important for ferruginous hawk conservation include: 1) responses of ferruginous hawk populations to habitat management and enhancement techniques; 2) prey population dynamics and cycles; and 3) an appropriate livestock grazing and fire regime appropriate for ferruginous hawk habitat management and enhancement.

FEHA Literature Cited

Bechard, M.J., and C.S. Houston. 1984. North Dakota oologists. Blue Jay 42: 176-183.

Bechard, M.J., and J.K. Schmutz. 1995. Ferruginous hawk (*Buteo regalis*). *In* The Birds of North America, No. 172 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

Bendire, C.E. 1892. Life histories of North American birds. *U.S. Nat. Mus. Spec*. Bull. 1.

Berry, M.E., C.E. Bock, and S.L. Haire. 1998. Abundance of diurnal raptors on open space grasslands in an urbanized landscape. *Condor* 100: 601-608.

Brouse, P. 1999. Twenty year change in the raptor community in northern Utah during the non-breeding season. *Journal of Raptor Research,* 33(4):317-322.

Cameron, E.S. 1914. Ferruginous rough-leg *Archibuteo ferrugineus* in Montana. *Auk* 31: 158-167.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Chesser, R.K. 1979. Opportunistic feeding on man-killed prey by Ferruginous hawks. *Wilson Bull*. 91: 330-331.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use— for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, New York. Accessed online http://ebird.org/content/ebird.

Ewing, R.A., N. Tosta, R. Tuazon, L. Huntsinger, R. Marose, K., Nielson, R. Motroni, and S. Turan. 1988. California's forest and rangelands: growing conflict over changing uses. California Department of Forestry and Fire Protection. 348 pp with appendices.

Garrison, B.A. 1990. Trends in winter abundance and distribution of Ferruginous hawks in California. *Trans. West. Sect. Wildl. Soc*. 26: 51-56.

Gilmer, D.S., D.L. Evans, P.M. Konrad, and R.E. Stewart. 1985. Recoveries of Ferruginous hawks banded in south central North Dakota. *Journal of Field Ornithology*, 56: 184-187.

Gossett, D.N. 1993. Studies of Ferruginous hawk biology: I. Rediscoveries of banded Ferruginous hawks from presumed eastern and western subpopulations. II. Morphological and genetic differences of presumed subpopulations of Ferruginous hawks. Master's thesis, Boise State Univ, Boise, Idaho.

Harlow, D.L., and P.H. Bloom. 1989. Buteos and the golden eagle. Pages 102-110 *in* B.G. Pendleton, ed. Proceedings of the western raptor management symposium and workshop. National Wildlife Federation Scientific and Technical Series No. 12. Washington, D.C.

Harmata, A.R. 1981. Recoveries of Ferruginous hawks banded in Colorado. *North American Bird Bander*, 6: 144-147.

Houston, C.S., and M.J. Bechard. 1984. Decline of the Ferruginous hawk in Saskatchewan. *American Birds* 38: 166-170.

Howard, R.P. 1975. Breeding ecology of the Ferruginous hawk in northern Utah and southern Idaho. Master's thesis, Utah State Univ., Logan.

Hunting, K. 2001. Ferruginous hawk (*Buteo regalis*). Species account for the CalPIF Grassland Bird Conservation Plan. http://www.prbo.org/calpif/htmldocs/species/grassland/fehaacct.html.

Leslie, D.G. 1992. Population status, habitat and nest-site characteristics of a raptor community in eastern Colorado. M.S. thesis. Colorado State University, Fort Collins, Colorado. 45 pages.

Lloyd, H. 1937. Twenty-year-old Ferruginous Rough-legged Hawk. *Can. Field-Nat.* 51: 137.

Manolis, Tim.

Moore, S., J. Winckel, S. Detwiler, S. Klasing, P. Gaul, N. Kanim, B. Kesser, A. DeBevec, K. Beardsley, and L. Puckett. 1990. Fish and wildlife resources and agricultural drainage in the San Joaquin Valley, California. Volume 1. San Joaquin Valley Drainage Program, Sacramento, California. 364+ pp.

Oldendorff, R.R. 1993. Status, biology, and management of Ferruginous hawks: a review. Raptor Res. and Tech. Asst. Cen., Spec. Rep. U.S. Dep. Interior, Bur. Land Manage., Boise, Idaho.

Olendorff, R.R. 1973. Ecology of the nesting birds of prey of northeastern Colorado. Tech. rep. 211, U.S. Int. Biol. Prog., Grassland Biome, Fort Collins, Colorado.

Palmer, R. S. 1988. Ferruginous Hawk. Pages 135-151 *in* Handbook of North American birds, volume 5. Yale University Press, New Haven, Connecticut.

Plumpton, D.L., and D.E. Andersen. 1997. Habitat use and time budgeting by wintering Ferruginous hawks. Condor 99:888-893.

Salt, W.R. 1939. Notes on recoveries of banded ferruginous rough-legged hawks (*Buteo regalis*). *Bird Banding* 10:80-84.

Schmutz, J.K., S.H. Bretchel, K.D. De Smet, G.L. Hjertaas, G.L. Holroyd, C.S. Houston, and R.W. Nero. 1992. Recovery Plan for the Ferruginous Hawk in Canada. Prepared for Recovery of Nationally Endangered Wildlife (RENEW), Ottawa.

Schmutz, J.K., and D.J. Hungle. 1989. Population of Ferruginous and Swainson's hawks increase in synchrony with ground squirrels. *Can. J. Zool*. 67:2598-2601.

Schmutz, J.K., and R.W. Fyfe. 1987. Migration and mortality of Alberta Ferruginous hawks. *Condor* 89:169-174.

Sibley, D.A. 2000. *The Sibley guide to Bird Life and Behavior*. National Audubon Society. Alfred A. Knopt, New York. 587pp.

Smith, D.G., and J.R. Murhpy. 1978. Biology of the Ferruginous hawk in central Utah. *Sociobiology* 3:79-98.

Steenhof, K., and M.N. Kochert. 1985. Dietary shifts of sympatric buteos during a prey decline. *Oecologia* 66: 6-16.

Thurow, T.L., C.M. White, R.P. Howard, and J.F. Sullivan. 1980. Raptor ecology of the Raft River Valley, Idaho. E.G. & G. Idaho, Inc., Idaho Falls, ID. 45pp.

Udvardy, M.D.F. 1998. The Audubon Society Field Guide to North American Birds. Alfred A. Knopf, Inc. New York.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. [Online version: http://migratorybirds.fws.gov/reports/bcc2002.pdf.

West.

White, C.M., and T.L. Thurrow. 1985. Reproduction of Ferruginous hawks exposed to controlled disturbance. *Condor* 87: 14-22.

Woffinden, N.D., and J.R. Murphy. 1989. Decline of a Ferruginous hawk population: a 20-year summary. *Journal of Wildlife Management*, 53: 1127-1132.

SWAINSON'S HAWK (SWHA)

Swainson's Hawk (SWHA)

(Buteo swainsoni)

Status USFWS: Bird of Conservation Concern

Status CDFW: Threatened



SWHA Listing Status

Swainson's hawk (*Buteo swainsoni*) is a migratory bird that is provided protection by the Migratory Bird Treaty Act of 1918. In 1983, the California Fish and Game Commission, acting on the recommendation of the California Department of Fish and Game (CDFG, the title of the agency at the time of the action), listed the Swainson's hawk as a Threatened species, thereby providing protection under the California Endangered Species Act (CESA). The species is considered Bird of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS)

SWHA Life History and Ecology

Swainson's hawk is a member of the genus *Buteo*. Other members of this genus that are found on an annual basis in the EIS/EIR Planning Area include two resident species: red-shouldered hawk (*B. lineatus*) and red-tailed hawk (*B. jamaicensis*). Although many red-tailed hawks are resident in the Sacramento Valley, substantial numbers of red-tailed hawks from other portions of western North America migrate to and overwinter in the Planning Area each winter. Two additional *Buteo* spp. also are found in the Planning Area, but are strictly winter visitors and do not nest in the Planning Area: ferruginous hawk (*B. regalis*) and rough-legged hawk (*B. lagopus*). Swainson's hawk is a summer visitor that nests in the Planning Area, but winters in Central and South America. Swainson's hawk is not closely related to the other *Buteo* spp. in the Planning Area. It is thought to be most closely related to Galapagos hawk (*B. galapagos*) and white-tailed hawk (*B. albicaudatus*) (Palmer 1988).

SWHA Species Description and Life History

Adult Description

The Swainson's hawk is a medium-sized *Buteo*, weighing 1.5 to 2.5 pounds. It is less than two feet long and has a wingspan of approximately four feet. In general, it is slightly larger than a

red-shouldered hawk, but it is slightly smaller than the other *Buteos* in the Planning Area. It appears more slender than other *Buteos* due to its relatively long tail and more pointed wings. When perched, the wingtips extend to the tip of the tail. When in flight, the wings are extended in a shallow "U" shape. This slight dihedral silhouette in flight and the more pointed wings are good field marks for distinguishing Swainson's hawks from other flying *Buteos*.

Adult Swainson's hawks, like several other *Buteos*, have different color variations. These color variations are referred to as "morphs" that are generally described as one of the following: light, rufous, intermediate, or dark. These are not discrete color variations, but represent attempts to broadly classify what is a continuum of variation in color. The color variation is readily observed on the underside of the bird and is largely confined to the lower belly, underwing linings and throat. Color on these feathers can range from almost completely white to almost completely black but is usually between these extremes, and is most often represented by brown or rufous speckling, or bars, or washes of color. Clark and Wheeler (1987) noted that dark morphs represent only one to 10 percent of local populations in the Swainson's hawk's entire breeding range, and that the overwhelming majority of individuals are light morphs. However, in the Central Valley roughly 33 percent can be classified as light morph and another 33 percent as dark morph, while the remaining 33 percent are an intermediate morph that has some of the characteristics of dark morphs (Estep 1989; England et al. 1997).

The eye of the adult is dark brown. The hooked, medium-sized beak is dark with a yellow cere (the unfeathered nasal area at the base of the upper mandible). There can be a varying amount of white feathering just above the cere. Otherwise, the feathering on the head is a solid brown to chocolate-gray. This color spreads down the nape and the back to the rump, and extends onto the upperwing coverts (feathers covering the forward part of wing). The chin and throat color is variable. In lighter individuals the chin can have a squared-off white patch. While darker individuals can lack this patch entirely with the chin and throat being completely brown. On other individuals the chin and throat patch can be streaked or otherwise partially present. The breast is always a solid brown bib, with a well-defined horizontal demarcation between breast and belly that is most prominently observable on light morph individuals. Much of the underparts are variable in color. The belly, flanks, axillaries, and underwing coverts can be anything from an immaculate white to rufous or a very dark brown. Throughout most of the species' range, its underparts are usually white, however, in the Central Valley, a multitude of color variations are found. The majority of birds in the Central Valley exhibit characteristics of dark or intermediate morphs.

Swainson's hawks of all color morphs have dark gray remiges (i.e., the large primary and secondary flight-feathers). In all morphs, one can see contrast between the brown coverts and darker flight-feathers of the upperwing. The contrast is most prominently seen on the underside of the wings. When viewed from below, the darker gray trailing edge of the wings

stands out against the lighter underwing coverts. This field mark is widely used to identify the species and, though less pronounced, is even evident on most dark morph Swainson's hawks.

The undertail coverts (feathers between vent and tail on underside) are white, often with some amount of sparse brown barring. This is the case with all color morphs of the species. The tail is a light gray-brown with numerous darker horizontal bands. The sub-terminal band is a bit wider. The prominence of these bands is variable and tends to become fainter toward the base of the tail. The tail can sometimes appear to be slightly reddish when viewed from below (especially when sunlight is shining through it). The legs and feet are yellow or yellow-green while the talons are black.

Sub-Adult Description

Juveniles are similar in size and shape to adults, but have coloration different plumage. The eye is lighter and gray. The head is mainly brown, forehead white and crown streaked. The supercilium (line above eye) is pale, while the cheeks and throat are buffy with dark brown malar streaks (lines at sides of throat). The back and upper wing coverts are brown with buffy edges to the individual feathers. The primary and secondary flight-feathers are dark. The underparts are creamy to buffy, with varying amounts of dark brown spotting. The breast does not have a well-defined bib (unlike in adults) and is buffy with dark brown irregular spots. The tail is usually more distinctly banded with the sub-terminal band not noticeably wider. The cere, legs and feet are yellow, while the talons are black. Individuals that will ultimately attain a dark or light plumage as adults are noticeably more heavily or, conversely, less heavily spotted respectively as juveniles. Second-year plumages are best identified by the juvenal plumage features that are retained: the pale supercilium on a head that usually is otherwise paler than in the adult plumage; the breast is not yet a solid, well-defined bib, but can have irregular dark blotches; and the tail can be less evenly banded.

Sexual Dimorphism

Female Swainson's hawks are, on average, larger than males. Total length of males is 48 to 51 centimeters and mass is 693 to 936 grams, while females are 51 to 56 centimeters long and weigh 937 to 1367 grams (J.K. Schmutz *in* Palmer 1988). In the Central Valley of California, sexual dimorphism is apparent in the color morphs. The female, in virtually every mated pair in the Central Valley is the darker of the pair (Estep 1989; Holt pers. obs.). Females, therefore, tend to account for more of the dark morph individuals, while more of the light morph individuals are male. Clark and Wheeler (1987) notes that "(B)irds of each color morph tend to mate preferentially with their own morph." Sharp (1902) noted that the ample Swainson's hawk population that once existed in southern California was exclusively dark morph. Heerman (*in* Cassin 1856) reports a "new species" of hawk from the Central Valley of California that he

calls the "black hawk" (*Buteo insignatus*). It is evident from his description and an illustration made from specimens that he was referring to female dark morph Swainson's hawks standing next to fledgling Swainson's hawks near nests. No description of an adult male Swainson's hawk is given by Heerman.

Longevity

Data concerning longevity is not abundant. A recovered band from an individual killed in Argentina indicated an age of 19 years six months (Woodbridge *et a*l. 1995b). A female observed at a nesting site in the Butte Valley, California was banded nearby as a nestling 24 years earlier (Bradbury pers. comm. 2004). These individuals likely are representative of the maximum lifespan for the species.

Age at Sexual Maturity

Sexual maturity is perhaps achieved by the third year (Cameron 1913). Instances of breeding at two years have been observed (Woodbridge et al. 1995a). In the Central Valley, individuals in sub-adult plumage have been observed paired with an adult and attempting to breed, but most encounter difficulties, probably due to inexperience, and fail entirely or loose chicks from starvation (n=5, Holt unpubl. notes). Individuals, once mature, are capable of breeding annually throughout the remainder of their life.

Reproductive Strategy

Mated pairs are largely reported to establish nesting territories that are in the same general area from where they were hatched (Woodbridge et al. 1995a; Gilmer and Stewart 1984; Bechard 1980). Pairs are monogamous and can remain together for many years (England et al. 1997). Site tenacity is evident, as the same individuals will return year after year to the same nesting territory (England et al. 1997). Estep (1989) had each of nine color-banded individuals return in successive years (1986-87) to the same nesting territory in the Central Valley. Pair bonding and courtship can take up to several weeks. A pair bond is formed while engaging in: soaring together in the nesting territory, displays of leg-dragging while soaring, undulating swoops, calling to each other, food sharing, copulating and, nest building. Nest building takes one to two weeks and eggs are laid approximately one week after copulation (Fitzner 1980). Clutch size is between one to four eggs. The female does almost all of the incubating of the eggs with the male incubating only briefly to allow the female a respite and an opportunity to stretch her wings. The male provisions the female during incubation and continues provisioning the female and chicks into the nestling and fledgling stages, at which time the female assists with provisioning from areas closer to the nest (Estep 1989; England et al. 1997).

Throughout the North American breeding range, adults arrive on nesting territories in March to May, lay eggs between April and June, and the young fledge between June and August (England et al. 1997). The Central Valley population is disjunct from the remainder of the species breeding range. The Central Valley has a relatively warmer climate than many other parts of the species' breeding range; therefore, the nesting season proceeds a bit earlier than in the more intemperate parts of the range. In the Central Valley, Swainson's hawks arrive at nesting territories from mid-February to the first week in April. Eggs are laid April to mid-May and fledging takes place from mid-June through early August (Swainson's Hawk Technical Advisory Committee 2000; Holt pers. obs.). The latest known nesting dates from the Central Valley population are associated with a nest in Yolo County and another in Sacramento County in 2003. Due to unrelenting inclement weather in April of that year, initial nesting attempts of these pairs were interrupted and secondary nest building and egg-laying took place as late as May 19 to 23 (Holt pers. obs.). Nest-building generally takes one week (Fitzner 1980). Egg-laying involves the laying of a single egg every other day until the clutch is completed (Fitzner 1980). The incubation period is 34 to 35 days (Fitzner 1980). Chicks take two to four days to hatch (Fitzner 1980). Chicks are altricial (helpless) and hatch asynchronously. This allows the first chicks that hatch to get a head start on their younger siblings. The first chick is able to beg for food earlier than the younger chicks and therefore, gains extra strength so that in those years when food resources are short, the available supply will go only to the older chick(s). This strategy ensures the survival of the largest number of offspring that the food resources will allow when the abundance of food for chicks cannot be predicted at the time when eggs are laid. With asynchronous hatching, the smallest chicks will not garner their fair share when times are tough and will only survive in years of abundant resources. Elimination of the smallest chicks usually occurs by starvation as a result of competition with their more developed siblings.

Chicks develop in the nest for 27 to 33 days (Fitzner 1980) before they are able to walk or hop onto nearby limbs (branching). First flight (fledging) takes place between 38 to 46 days (Fitzner 1980). For the first seven to 10 days after first flight the young stay near the nest (Fitzner 1980). The parents continue to feed the young for one month (Fitzner 1980). After that, the fledglings must fend for themselves. They then range widely in search of prey, covering up to one hundred miles in a day and associate in loose groups with other fledglings (Anderson et al. in progress). The pair bond and parental bonds are then relinquished and adults and juveniles migrate separately in autumn (Woodbridge et al. 1995b; Bradbury et al. in prep).

Multi-year studies addressing reproduction have documented the mean number of fledged young per nesting attempt. The high is 1.67 fledglings per attempt (Bednarz 1988), while the low is 1.11 fledglings (England et al. 1995). Eight studies from six states and one province document 2,023 chicks fledged out of 1,444 nesting attempts for an average of 1.40 fledglings per nesting attempt (synthesized from England et al. 1997). It is assumed that a high

percentage of first-year individuals do not survive to breeding age, but data concerning survivorship and recruitment is currently inadequate to address this question.

Seasonal Movements

At the conclusion of nesting when fledglings no longer are dependent upon adults, Swainson's hawks become gregarious and nomadic. Nesting territories and local foraging areas are abandoned and no longer defended. Large flocks of Swainson's hawks join together and range widely in pursuit of prey. They roost communally in trees at night. These flocks are loose associations joined primarily to exploit a common prey source and are not necessarily concerned with pre-migratory staging (Johnson et al. 1987). They remain gregarious and nomadic throughout the entire non-nesting period.

The Swainson's hawk is a neotropical migrant. Migratory movements of the atypical, disjunct Central Valley population are discussed below. The overwhelming majority of the population funnels through the Isthmus of Panama each Boreal autumn/Austral spring and then returns through Panama each Boreal spring/Austral autumn. In migration, they stay over land and do not attempt over-water crossings of extended length. They are reported to roost in trees or on the ground at night in Central America (Smith 1980; Smith et al. 1986).

Migration routes are primarily east of the Rocky Mountains and down the eastern coast of Mexico through Central America and over mountain passes in the Andes in Columbia. The return trip north covers roughly similar routes, only in reverse (Palmer 1988; England et al. 1997). They travel diurnally, seeking thermal updrafts and soaring upward in circles, barely flapping their wings. They then glide for as far as they can go, taking advantage of updrafts with skill while efficiently conserving stored fat reserves (Smith 1980; Smith et al. 1986). They will surf along weather fronts, using the change in air pressure to coast great distances with as little wasted effort as possible. Great masses of Swainson's Hawks have been observed passing over a single spot in Costa Rica or Panama (Smith 1973; Smith 1980). Brown and Amadon (1968) consider the immense migrating flocks of Swainson's hawks to be the most impressive avian gatherings in North America since the demise of the passenger pigeon.

During the Austral summer/Boreal winter, Swainson's hawks remain gregarious and nomadic. They use communal roosts at night (Woodbridge et al. 1995b; Bradbury et al. in prep). They flock together in pursuit of prey, which are almost exclusively insects such as swarms of locusts or dragonflies (Orlog *in* Smith 1980; Jaramillo 1993; Woodbridge et al. 1995b). Seasonal migration can involve many thousands of miles each way. Those that nest furthest north may face the extreme journey of a complete migration of 14,000 miles (Palmer 1988). Six to eight months is spent in migration and wintering, with each leg of migration capable of taking up to two months (Palmer 1988).

SWHA Habitat Requirements and Ecology with Emphasis on the Central Valley of California and Planning Area

Nesting Habitat

Swainson's hawks build their nests with sticks and twigs and some stems from other vegetation. A nest is about two feet in diameter and about one foot deep (England et al. 1997). In the Central Valley of California, there are about 25 different tree species that have been utilized for nesting (Holt pers. obs.; CDFG 2010). The most common nest trees are Fremont's cottonwood (*Populus fremontii*), oaks (*Quercus* spp.), willows (*Salix* spp.), walnuts (*Juglans* spp.), eucalyptus (*Eucalyptus* spp.), pines (*Pinus* spp.), and Deodar cedar (*Cedrus deodara*). They build the nest in the top part of the tree (Bloom 1980). Swolgaard (2004) found nests to be located on average at 79 percent of tree height (n=94). Estep (1989) found average nest height to be 81.8 percent of the average tree height (n=40). In oaks, the nest is often situated in smaller branches toward the top of the tree. In cottonwoods, willows and eucalypts it often is in a crotch of vertical branches. In cottonwoods, nests are also commonly placed atop large mistletoe clumps. Selected conifers are often ones that are very tall, frequently with the tops broken off, being flattened on top or having a large limb projecting from the side (England et al. 1995). In the Central Valley, Estep (1989) documents the mean height of nest trees in his study area at 57.7 feet and the mean height of the nest at 47.2 feet (n=40). In a study done on the Sacramento River (Moreno 1994), the mean tree height was 63.3 feet and the mean height of the nest was 50.6 feet (n=32). In northern San Joaquin County, Swolgaard (2004) found mean tree height to be 62 feet and mean nest height to be 49 feet (n=94). Mature tall trees provide extra safety from dangers below, sturdiness during storm events, and superior vantage points from which to assess potential threats and hunting opportunities.

Most nest trees are associated with riparian systems. Schlorff and Bloom (1984) found 87 percent of all Swainson's hawk's nests in the Central Valley to be associated with riparian systems. Within his study area in parts of Yolo, Sacramento and San Joaquin Counties, Estep (1989) found 78.1 percent of nest trees to be in riparian systems. This, however, is not due to any known affinity for aquatic systems by Swainson's hawks, but may reflect a relationship of superior nesting territories located adjacent to superior foraging habitat. Swainson's hawk's nests are also found well away from waterways in lone trees in fields and pastures, in trees along roadside edges, in small groves, around farm buildings, and in some urban areas.

Nest trees selected in riparian strips or groves are typically among the tallest trees in the stand and they are also situated at an edge of the stand. When in a grove, the nest tree is at the outer edge of the grove (Bloom 1980; Estep 1989). Curiously, in riparian strips a nest tree is typically on the riverside edge much more so than on the landside edge (Wilkinson and Levy 1993; Moreno 1994; Holt pers. obs.). This may be because a particular riverside tree may be taller

than other nearby trees, it may have fewer disturbances at the river's edge, or it could offer the best vantage of the surrounding territory. Nest trees can also be found in close proximity to farm buildings (Bloom 1980; Swolgaard 2004); often in large, well-established, exotic tree species or relict natives. It is likely that a tradeoff exists between the amount of extra disturbance at farm buildings versus the safety of a truly superior nesting tree. Or, it may simply be that a marginally suitable nest tree occurs in an agricultural landscape of cleared open fields that is a vastly superior territory.

Urban Nesting

Nesting in completely urbanized areas is an unusual phenomenon that has recently been discovered in some particular urban settings: 1979 in Davis (P. Bloom pers. comm.) and 1983 in Stockton (D. Yee pers. comm.). England et al. (1995), reported on a five-year study that compared urban-nesting Swainson's Hawks in Davis and Stockton with nearby rural-nesting populations. They found that urban-nesting Swainson's hawks selected nest trees that were among the tallest trees and the trees were either exotic conifers or relict native trees that existed prior to the human constructions. Conifers were particularly selected in urban landscapes: 79 percent in Davis (n=14) and 94 percent in Stockton (n=17). Nests located at the top of 80-foot deodar cedars are common in Stockton (pers. obs.). From this height the hawks have unobstructed views in all directions. England et al. (1995) offered that the preference for conifers is due to their abundance in urban settings, they are the tallest trees, and the dense evergreen foliage and radial branching pattern provide extra screening from activity below.

Urban-nesting always occurs in association with suitable foraging habitat being relatively close to the nest (e.g., Stockton and Davis are surrounded in all directions by high quality foraging habitat in suitable agricultural crops). Comparatively, both Lodi, which is surrounded by vineyards, and Sacramento, with its urban sprawl, lack urban nests (England et al. 1995). At some point the energetic demands on the provisioning male of carrying prey items long distances outweighs the energy value gained. England et al. (1995) calculated that when suitable foraging habitat is beyond five to eight kilometers from suitable urban-nesting habitat, such as in Lodi and Sacramento, urban nesting does not occur. Furthermore, England et al. (1995) reported that the reproductive success of urban-nesting Swainson's hawks was lower than rural-nesting Swainson's hawks during the same period.

Nest Territory Characteristics

Although a nest territory can include only a single tree, it more typically has multiple trees. A lookout-perch that affords a good vantage of potential threats or hunting opportunities in the surrounding area is a necessary component of a nest territory. Such a perch can often be in a tree that is not the nest tree. In alternate years, a nest might be placed in a different tree within a

nesting territory, but the same lookout-perch will be used. Multiyear studies (Wilkinson and Levy 1993; England et al. 1995) and long-term data collections (CDFG 2010) reveal that it is quite common to have alternate nesting sites within the same nest territory. This is necessary when the nest or nest tree from the previous year has been destroyed is appropriated by other raptors, or is found to be newly situated too close to a neighboring raptor's territory or to some other disturbance. The overall size of a nesting territory, as such, can vary substantially from year to year. Over the years, nest territories can dynamically shift, having differing shapes and components. Some nesting territories do remain constant, with the same nest in the same tree for many years, while others are subject to various changes on an annual basis (Holt pers. obs.; Estep pers. comm.).

Estep (1989) found that territories surrounded by preferred foraging habitats were defended more aggressively than territories surrounded by less-favorable foraging habitats. Furthermore, this suggests that a high quality nest territory and its associated foraging habitats and prey base is more important than a particular nest tree.

Nesting Density

Estep (1989) found, in four plots comprising a 374-square-mile study area in the Central Valley, the average distance between nests was 1.14 kilometers. This is the closest average spacing of Swainson's hawk nests recorded (England et al. 1997). It is attributed to riparian nesting habitat being largely contained in thin strips next to treeless agricultural fields of suitable foraging habitat, while in other parts of the breeding range conditions are more savannah-like with trees dotted throughout the foraging habitats.

Competition for Nest Territories

Selection of a poor nest site can be a factor in nesting failure. Competition exists for nest sites. Conflicts with red-tailed hawks and red-shouldered hawks, as well as white-tailed kites (*Elanus leucurus*) erupt into territorial fights over nest sites when Swainson's hawks arrive from spring migration and find a favored nest site occupied by another raptor. The Swainson's hawks begin nesting later in the year when other raptors have already selected nest sites and may be brooding eggs. Nesting raptors are not happy to be dislodged. Territorial fighting can go on for days and can include calling, swooping, stooping with talons outstretched, and even contact with strikes of sharp talons or wheeling in flight with talons interlocked. Swainson's hawks are often forced to accept a second choice in these interactions. They usually have little success evicting red-tailed hawks, but apparently fair better against white-tailed kites. Great-horned owls begin nesting months earlier and do not build their own nest. They appropriate existing raptor nests, including Swainson's hawk's nests that are left over from the previous year. Swainson's hawks have not been observed to succeed in evicting these large, predatory owls.

American crows (*Corvus brachyrhynchos*), yellow-billed magpies (*Pica nuttalli*), American kestrels (*Falco sparverius*), and western kingbirds (*Tyrannus verticalis*) often harass and mob Swainson's hawks at nest sites, but these smaller birds, while undoubtedly are annoying, have not been observed to thwart Swainson's hawks in their nest site selection.

Intra-specific competition between Swainson's hawks for nest territories also occurs, but such disputes have not been reported to rise to the level where breeding success is impacted.

Diet and Foraging

The Swainson's hawk is considered to be largely insectivorous, but breeding pairs are thought to switch to vertebrate prey due to the energetic demands of reproduction (Johnson et al. 1987). Locusts, grasshoppers, dragonflies, crickets, grubs, etc. are the major staple of the Swainson's hawk's diet (Palmer 1988; England et al. 1997). They snatch locusts and dragonflies out of the air with their talons and transfer the prey to their beaks while on the wing (Orlog *in* Smith 1980; Johnson et al. 1987; Jaramillo 1993). They hunt on the ground, sometimes running after grasshoppers and crickets (Bloom 1980; Johnson et al. 1987; Estep 1989). On their wintering grounds, Swainson's hawks are almost exclusively insectivores (Orlog *in* Smith 1980; Jaramillo 1993; Woodbridge et al. 1995b). They are known in Spanish-speaking South America as the locust hawk (aguililla de langosta) or the grasshopper hawk (aguililla de saltamontes). During migration, it is thought that they fast for much of the journey (Smith et al. 1986; Brown and Amadon 1968).

Returning spring migrants in northeastern California were measured to be eight to 14 percent lighter than adults that were weighed in July (Bloom pers. comm.).

During the nesting season dragonflies, grasshoppers, dobsonflies, crickets, etc. continue to be a part of the Swainson's hawk's diet (Grinnell et al. 1930; Bloom 1980; Johnson et al. 1987; Estep 1989). However, insects are not a primary food source for provisioning at the nest. They might be considered as just a "snack" that the male devours for himself (Estep 1989). Insects individually do not have very much caloric bulk. Instead, the male Swainson's hawk provisions its mate and offspring by switching to a variety of larger vertebrate prey. In Alberta and Saskatchewan, ground squirrels are the major prey item (Schmutz et al. 1980; Houston 1990). In Utah they have a preference for whitetail jackrabbits (Smith and Murphy 1973). In New Mexico, they prefer black-tailed jackrabbits (Bednarz 1988). In Arizona, they take a variety of lizards and snakes (Bednarz 1988). In North Dakota, the species takes pocket gophers (Gilmer and Stewart 1984). In Washington, pocket gophers and snakes are the major food items (Fitzner 1980; Bechard 1980). In northeastern California, voles and ground squirrels are a big part of the diet (Woodbridge 1985; Bloom 1980). Bird species are also a large component of their vertebrate diet everywhere (England et al. 1997). Overall, this paints a picture of the Swainson's

hawk as an opportunistic hunter that can handle a variety of vertebrate prey depending upon the prey's availability in a given region.

Hunting techniques include snatching insects out of the air or running insects down on the ground as mentioned above. The Swainson's hawk takes much of its prey while foraging on the wing over open country. This is different from the red-tailed hawk, which hunts from perches with much more frequency, and red-shouldered hawks that hunt from perches almost exclusively. Vertebrate prey is captured usually by descending upon the targeted animal from the air. Besides soaring over open country looking for available prey, Swainson's hawks also commonly will stand on the ground and wait for a burrowing animal such as a gopher to reappear at the surface to pounce upon it (Bechard 1980; Holt pers. obs.). They are everywhere noted (Woodbridge et al. 1995b; England et al. 1997) to use farm machinery as a beater as tractors mowing or plowing in fields displace small rodents, birds or insects making them easy targets as they scurry for cover. Fire and flood-irrigation also provide events when Swainson's hawks take advantage of dislodged prey (Estep 1989). Swainson's hawks appear to look for and to key on these events knowing that they will produce available prey.

SWHA Foraging Habitats

Diet

Reproductive success for the Swainson's hawk in the Planning Area is directly correlated to the adults' ability to capture and deliver sufficient prey to successfully fledge young from the nest. Key components in this success involve prey densities, prey availability, and distance to the nest site. The Swainson's hawk is an opportunistic hunter that can handle a variety of vertebrate prey depending upon the prey's availability in a given area. In the Central Valley a wide variety of prey items are taken including: small mammals, birds, reptiles, and insects; however, the California vole (*Microtus californicus*) is the preferred prey item (Bloom 1980; Estep 1989; Babcock 1995; Swainson's Hawk Technical Advisory Committee 2000; Ron Schlorff pers. comm. 2003; Joe Papp pers. comm. 2004; Holt pers. obs.). Estep (1989) found that California vole was the single most important prey item in his study areas in Yolo, Sacramento and San Joaquin counties. Eight species of mammal, including California vole, Botta's pocket gopher (*Thomomys bottae*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), Norway rat (*Rattus norvegicus*), California ground squirrel (*Spermophilus beecheyi*), house mouse (*Mus musculus*), and black-tailed jackrabbit (*Lepus californicus*),were found among prey remains and regurgitated pellets, with the California vole comprising 69.2 percent of all mammalian prey. Birds represented a very significant dietary component as well, with at least 15 different species found (including juvenile ducks and pheasants). Other species taken include Pacific gopher snake (*Pituophis catenifer*), western toad (*Bufo boreas*), crayfish species (*Pacifastacus* spp; *Procambarus* spp.), and numerous insects (mostly grasshoppers and crickets). J. Papp, a nest-tree climber who

bands dozens of Central Valley Swainson's hawk nestlings each year in a long term telemetry study, confirms that the overwhelming majority of prey items in nests are California voles (Papp pers. comm.). While the variety of prey species that can be taken by Swainson's hawks is important to the nesting success of many Swainson's hawks, the consensus of field biologists who have examined prey remains or pellets and observed numerous prey captures and deliveries at nest sites is that the California vole is clearly the favored prey species of Swainson's hawks in the Central Valley (Babcock 1995; Bloom 1980; Bradbury et al. *in prep*.; England et al. 1995; Estep 1989; Schlorf pers. comm.; Swolgaard 2004).

Prey Availability

The availability of prey, rather than prey densities, appears to be the most important factor for foraging success (Estep 1989; England et al. 1997). Swainson's hawks in the Central Valley are very effective at exploiting prey when that prey is made available to them due to the effects of agricultural activities such as harvesting, disking, mowing, flood irrigating, and burning of fields (Palmer 1988; Estep 1989; England et al. 1997). These activities make prey available to predation by dislodging them or reducing their cover. Estep (1989) found that 12 radio-tagged Swainson's hawks spent 52.8 percent of their observed foraging time hunting in response to these activities. He also observed that 73.4 percent of all observed prey captures were made in association with these activities (n=143). Similar observations are noted in several other studies of Central Valley Swainson's hawks (Bloom 1980; Babcock 1995; England et al. 1995; Herzog 1996; Swolgaard 2004). The dense vegetative cover that is in place during the extended growing period of a particular crop provides good rodent habitat, allowing prey populations time to increase their numbers. The rapid removal of that cover then leaves prey species suddenly vulnerable to predation by Swainson's hawks.

Agricultural Foraging Habitats

In four study plots in Sacramento, Yolo and San Joaquin Counties, Estep (1989) analyzed agricultural habitats based on 724 hours of preference data gathered on 12 radio-tagged Swainson's hawks between May 6, 1986 and September 12, 1987. He then ranked Swainson's hawk agricultural foraging habitats in descending order of importance: alfalfa, disked field, fallow, dry-land pasture, beets, tomatoes, irrigated pasture, grains, other row crops, and other. Estep (1989) also extensively trapped for small rodents in these habitats. Swolgaard (2004) did not use radio-tagged individuals, but did record 246 observations of Swainson's hawks foraging in agricultural habitats from April through August of both 2002 and 2003. His findings are generally corroborative of Estep's (alfalfa is high preference, vineyards are low, etc.). A discussion of agricultural foraging habitats ranked by Estep (1989) in descending order of preference is provided below.

Alfalfa is generally associated with the dairy industry. The process of harvesting alfalfa occurs four to seven times a year. The entire field is mowed and the cut hay is left to dry in a row. It is turned over on another day for further drying and on a later day, it is baled and removed. The field is then flood-irrigated and the whole process is repeated. Each of these activities provides a foraging opportunity for Swainson's Hawks. Swolgaard (2004) also rated irrigated hay (alfalfa) as clearly being the first preference. He observed that Swainson's hawk's foraging in alfalfa is correlated to harvest and irrigation, but further noted that there is a preference for alfalfa fields that are not in the first year of production. Alfalfa often stays in place for several years (three to seven years). This allows the population of voles and gophers to increase as the field becomes well established. After the alfalfa crop has run its course for a number of years, grains such as corn, oats, or wheat (crops also important as fodder for dairy cattle) are the most common crops that will be planted in that field for a few years before alfalfa is planted again.

Disked fields are fields in a temporary state of dormancy and are between crops. They constitute a small portion of the total amount of agricultural habitats that may be available at any one time. Because they lack vegetative cover, they also lack significant numbers of small rodents. Estep ranked them highly because it was a daily activity for some Swainson's hawks to spend time running down grasshoppers and crickets in these fields.

Fallow fields make up a rather small amount of total agricultural habitats. Unlike disked fields they have significant weedy vegetation and therefore have significant rodent populations. Swolgaard (2004) observed that 76 percent of foraging observations in this habitat were when machinery was removing vegetation.

Dry pasture is largely comprised of annual grasslands and is grazed primarily by cattle during some part of the year. A large portion of the Swainson's hawk's historical habitat is believed to be similar to this current habitat, although the prey species, their abundance, and availability are likely quite different today as introduced grasses and forbs and introduced grazers now dominate this habitat. Therefore, direct comparisons with historical conditions should be considered with caution. Estep's relatively high ranking of this agricultural habitat was based largely on two radio-tagged hawks that had nests immediately adjacent to this habitat. Therefore, they used dry pasture regularly during foraging. These same individuals were observed to use other habitats opportunistically in response to farming activities. The reverse was not observed. Swainson's hawks with nests not adjacent to dry pasture did not utilize dry pasture for foraging. Swolgaard (2004) observed Swainson's hawks foraging in this habitat, but noted that its frequency of use was lower than expected based on its availability

Sugar beets (which are no longer in production in Sacramento County) and tomatoes have been observed as a foraging habitat, but only for a short time when they are being harvested. Sugar beets were an important foraging habitat for Swainson's hawks because they could be

harvested at different times of the year, resulting in staggered availability throughout the nesting season. Tomatoes, on the other hand, are harvested beginning in late July. The main harvesting period therefore occurs from late summer into autumn. Swainson's hawks are largely finished with nesting as the tomato harvest begins; however, tomato fields are observed to be important foraging habitats for fledglings and pre-migratory adults (Anderson et al. in progress; Holt pers. obs.). First-year mortality in Swainson's hawks is undoubtedly high and migration is a perilous journey. Therefore, tomato fields have important value for Central Valley Swainson's hawks immediately after nesting. Irrigated pasture is occasionally used for foraging. Estep (1989) noted use during periods when the pasture was being irrigated. Swolgaard (2004) observed use when the vegetative cover was at its lowest (grazed).

Grains include wheat, oats and rice. Wheat is a common crop in the Central Valley and Planning Area where it is typically planted in fall and harvested in the spring. Both Estep (1989) and Swolgaard (2004) observed limited foraging in wheat. Furthermore, foraging in this crop occurred primarily during or immediately after harvest. Estep trapped in harvested wheat where he found relatively low numbers of house mouse and deer mouse. Estep observed no foraging in rice fields.

Corn and sunflower are the main component of "other row crops." Estep (1989) considered that the low preference for foraging in these crops is a feature of these crops' attaining a vegetative height that excludes Swainson's hawks. Swolgaard (2004) also observed a low preference for foraging in these habitats. Estep trapped relatively low numbers of deer mouse in cornfields in early summer. However, as in other agricultural habitats, rodent populations build up during the growing season in cornfields. During the beginning of harvest, in September and early October, just prior to southern migration, Swainson's hawks take advantage of the foraging opportunity that corn harvesting offers (Herzog 1996; Holt pers. obs.). Therefore, corn and sunflower crops have some limited value to foraging Swainson's hawks. Also, when taken in combination with other foraging habitats that are rotated on a regular basis (wheat, oats, hay, tomatoes, alfalfa, disced field, etc.), the value of corn and sunflower acquires some added value as a piece in the over-all mosaic of suitable foraging habitats. Lastly, the small population of Swainson's hawks that winter in the Sacramento – San Joaquin Delta forage for small rodents (mainly house mouse) almost exclusively in harvested corn and sunflower fields (Yee pers. comm.; Holt pers. obs.; Herzog 1996).

Other is a category where Estep (1989) groups various infrequently used habitats. Taken collectively these are the lowest ranked habitats and either have very low prey populations or are inaccessible to Swainson's hawks. These habitats include lawn, riparian vegetation, vineyards, orchards, residential areas, oak woodland, asparagus, onions, parks, golf courses, and edge habitats. It should be noted that Estep (1989) trapped a rather high rodent population, primarily house mouse and western harvest mouse, in edge habitats. Swolgaard (2004) grouped edge

habitats differently and included them in a category he termed Ag-urban. His Ag-urban habitats included roadside edges, median strips, weedy lots, railroad right-of-ways, canal levees, and margins along a local airstrip. Swolgaard observed these areas to be used for foraging in disproportion to the small amount of area they covered in his study area. Furthermore, most foraging occurred when these edges were being mowed. Swolgaard noted that Estep had trapped rodents in high densities in edge habitats and cited references documenting voles using road edges as habitat corridors and dispersal routes (Getz *et a*l. 1978; LaPolla and Barrett 1993). Therefore, it may be appropriate to consider edge habitats separately because they may have value as prey refugia and corridors connecting agricultural habitats.

Common agricultural habitats in the Central Valley that are not thought to provide much, if any, foraging opportunities for Swainson's Hawks include safflower, orchards, cotton, vineyards, and rice (Bloom 1980; Estep 1989; England et al. 1995; Babcock 1995).

The purpose of Swolgaard's study (2004) was to determine habitat use by Swainson's hawks in the lower Mokelumne River watershed, an area in northern San Joaquin County adjacent to the Planning Area. The study area supports extensive viticulture. Swolgaard cites vineyard acreage increasing in this study area by 54 percent during the period 1987 to 1997 (DWR 2002). Swolgaard found that foraging by Swainson's hawks does occur in vineyards; however, statistical analysis of habitat selection revealed that foraging in vineyards occurred less than would be expected by random choice. It was evident that Swainson's hawks did not select for vineyards, and that foraging occurred in vineyards perhaps only by members of pairs whose nest trees are in areas that have now become surrounded by vineyards. Foraging was also observed disproportionately at edges of vineyards and along interior road edges of vineyards.

In summary, Swainson's hawks forage successfully in a variety of agricultural habitats. Alfalfa is the crop that provides the highest foraging due to high prey densities and regular harvesting and irrigation that make prey available for capture. However, a variety of suitable agricultural habitats also provide valuable foraging habitats at differing times and for different prey species during the period of time when Swainson's hawks are in the Planning Area. This mosaic of suitable foraging habitats that provides the best opportunity for regular and successful hunting during the nesting season.

Home Range Size

The home range (total area utilized during the nesting period) for Swainson's hawks in the Central Valley is reported as larger than for Swainson's hawks in general (England et al. 1997). Estep (1989) found mean home ranges to be 6,818 acres, while Babcock (1995) plotted 9,978 acres as the mean home range in his study area in eastern Yolo County. These large-sized home ranges are due to the fact that the best agricultural foraging habitats are fragmented. Estep

(1989) and Babcock (1995) both observed Swainson's hawk home ranges to expand to include distant agricultural foraging areas when prey availability was superior at more distant locations. During periods of low prey availability, radio-tagged male Swainson's hawks were recorded to travel as far as 17 miles (Estep 1989) and 18 miles (Babcock 1995) from a nest to exploit more favorable agricultural foraging opportunities. Although at these distances, it was observed that prey items were consumed in the field and not transported back to the nest, likely due to the excessive energy demands required to do so (Estep 1989; Babcock 1995). England et al. (1995) discovered that urban nests, which are in some cases completely surrounded by unsuitable foraging habitat, must have suitable foraging habitat within three to five miles from the nest tree to successfully fledge young (England et al. 1995). Furthermore, urban nest sites typically fledged fewer young than non-urban nest sites.

Nest-site Selection

In the Planning Area nest-site selection is strongly correlated to alfalfa and row and field crop agricultural habitats. Almost all Swainson's hawk nesting sites are located in portions of Sacramento County where irrigated pasture, hay, grain and field crops are being cultivated even though suitable nesting habitat exists elsewhere in the county. For example, there are large cottonwood trees on numerous streams on the eastern side of the Planning Area, there is nesting habitat in the older urbanized areas of the county, and there are unused trees on Delta islands. However, Swainson's hawks are rarely selecting nesting sites in these areas. In each of these situations, the failure to select nesting sites in these areas appears to be related to the lack of nearby suitable foraging habitat throughout the entire nesting season.

Vineyards in the Planning Area are fragmented in distribution and have only recently been converted from other crop types in the last two decades. Viticulture has increased in Sacramento County by 263 percent during the period 1987 to 1997 (DWR 2002). Swolgaard (2004) found that Swainson's hawks do not prefer nest-sites in vineyard habitats; however, the species' avoidance of vineyards is not as strong in some nearby portions of the species' range (e.g., the Lodi area in northern San Joaquin County where vineyards have been a regular part of the landscape for more than 50 years).

Agricultural Foraging Habitat Crop Rotations

Swainson's hawk nest-site selection is strongly correlated to suitable agricultural habitats. The most favored agricultural foraging habitats: alfalfa, row, and field crops are usually planted in cyclical rotations, changing from one field to another in one year to the next, or as with alfalfa, the crop stays in one place for four or five years before it is then removed. For example, a field with hundreds of acres of suitable foraging habitat can be planted with a crop that is largely unsuitable for foraging the next year. Nonetheless, Swainson's hawks often show strong nest-

site fidelity and return to the same nest territory year after year. The landscape that they return to may be different each year due to crop rotations and conversions. Within the several thousand acres typically associated with a home range/nest territory, it is likely that multiple suitable agricultural habitats will be present within any given year and high quality foraging habitat will occur somewhere within the territory at all times during the nesting season due to differences in planting, irrigation, and harvesting schedules (i.e., activities that make prey available in high numbers).

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for Swainson's hawk are identified in Table G-3.22.1 and have been derived from input from local species experts.

Table G-3.22-1. Habitat Elements for Swainson's Hawk

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, valley grassland.	Valley grassland and open agriculture, especially alfalfa, irrigated pasture, or other field or row crops that support rodent populations and are managed such that the rodents become available through activities such as flood irrigation and harvesting.
Nesting	Blue oak savanna, blue oak woodland, mine tailing riparian woodland, valley oak riparian woodland, and mixed riparian scrub.	Mature trees for nesting (approx. 50 feet) near (less than five miles) foraging habitat. Generally includes isolated trees adjacent to foraging habitat.

SWHA Species Distribution and Population Trends

SWHA Breeding Range

The Swainson's hawk's breeding range is distributed over much of western North America: in the south from Sonora, Chihuahua, Durango, Coahuila, and Nuevo Leon, Mexico north to Alberta, Saskatchewan and Manitoba, Canada; east to Minnesota, Iowa, Kansas, Oklahoma, and Texas,; and west to coastal valleys in Washington and British Colombia. Disjunct populations occur in Missouri, northern British Columbia, and the Central Valley of California, and possibly Yukon and Alaska (Palmer 1988; England et al. 1997; Howell and Webb 1995).

SWHA Boreal Winter/Austral Summer Range

The winter range during the Austral summer in South America is primarily known to be northern Argentina, Paraguay, Uruguay, and southern Brazil (Palmer 1988; England et al. 1997). However, knowledge of South American distribution is incomplete. Human alteration of

habitats (clearing of forests and subsequent increases in cattle pasture and cultivation) throughout South and Central America may provide suitable habitats that may now be utilized in areas not historically known to have Swainson's hawks. Orlog (*in* Smith 1980) and Jaramillo (1993) reported large concentrations of Swainson's hawks in Argentina where flocks were composed almost entirely of juveniles. This suggests that the population is segregated by age class on the wintering grounds and that the juveniles continue to the southern extreme of the winter range (Palmer 1988; Jaramillo 1993). Orlog (*in* Smith 1980) reports that locust swarms are being reduced by pesticides, and that this could be resulting in Swainson's hawks wintering further north.

SWHA Wintering in North America

Some migration dropouts and stragglers have been noted in Boreal winter in southern Florida where it is thought that they are primarily wayward juveniles that cannot manage the over-water crossing further south (Browning 1974). In addition, scattered winter records are noted from Mexico and Central America (Howell and Webb 1995). Observations and telemetry data (Bradbury et al. in prep) have recently documented the presence of a wintering population based primarily in western Mexico, southern Mexico and Central America. Also, a small population, never observed to exceed 30 individuals (Holt pers. obs.), has recently wintered in the Sacramento – San Joaquin River Delta of California (Herzog 1996). While the breeding origins of many Mexican-wintering Swainson's Hawks are now know to be the Central Valley of California, it is also thought that the Mexican wintering population is also comprised of Swainson's Hawks from other parts of the breeding range (Bradbury et al. in prep; Holt pers. obs.).

SWHA Wintering Locations of the Central Valley Breeding Population

The Swainson's hawk population which breeds in the Central Valley of California is now known to have significantly different wintering areas and migration routes than the main population (Bradbury et al. in prep.). In a study that successfully tracked 17 Central Valley-breeding Swainson's hawks with satellite telemetry devices, it was discovered that eight individuals spent the winter in Mexico, one wintered partly in Mexico and partly in Central America, three wintered in Colombia, four wintered in northern Argentina and southern Bolivia, and one wintered in northern Mexico and then returned to the Sacramento–San Joaquin River Delta in the Central Valley in mid-January (Bradbury et al. in prep.). Those birds that did go to northern Argentina/southern Bolivia were still well north of the known wintering areas of the main Swainson's hawk population (Jaramillo 1993; Woodbridge et al. 1997). Wintering in western Mexico (Sinaloa, Nayarit) should be considered to be a recent phenomenon as the areas where foraging now occurs have only been cleared for agricultural production in the past four decades and had previously been extensive thorn forest, a habitat that would not provide any opportunities for Swainson's hawk foraging (Bradbury et al. in prep.). It appears that the habitats in Central America and South America where Central Valley Swainson's hawks have

been discovered to be wintering are likewise landscapes that have been altered by clearing and agricultural cultivation at least within the past century.

SWHA Nesting Distribution in the Central Valley

Swainson's hawk nesting data in California has been compiled by the CDFW since 1979. Data sources used by the CDFW include the following: 1) CNDDB (CDFG 2010), 2) records supplied by Ron Schlorff of the CDFW Non-Game Division, and 3) Swainson's hawk census data obtained by CDFW Region II biologists in 2002 and 2003 (Gifford pers.comm.). Nesting in the Central Valley occurs throughout the valley, extending from Tehama County in the north to Kern County in the south. However, the population is largely concentrated in the middle of the valley in a semi-circle around the Delta, primarily in Yolo, Solano, Sacramento, and San Joaquin counties. Roughly 60 to 65 percent of the statewide population and 70 to 75 percent of the Central Valley population occurs in this latter area. This distribution pattern conforms broadly to the distribution of agricultural habitats in the valley that are suitable for foraging. While alfalfa, irrigated pasture, mixed row, and field crops are found throughout the valley, they are broadly concentrated in those same areas where nesting Swainson's hawks are shown to be concentrated. Vineyards, cotton, orchards and dry native scrub dominate the landscape in the southern end of the valley, while rice and orchards are the dominant crops in the northern end of the valley.

SWHA Nesting Distribution in the Planning Area

In the Planning Area, there are 109 records documented in the CNDDB (CDFG 2010). This number includes some duplicate records of the same nesting territory in different years. There are an additional 49 nest-sites recorded in surveys conducted in 2002 and 2003 by CDFW Region II field biologists. This data has been collected as part of a larger census effort that samples randomly selected blocks throughout the entire Sacramento Valley. This data also includes some duplicates of previously recorded nesting territories. Finally, there is an additional set of seven nest-sites along Dry Creek on the County line that have been culled from Craig Swolgaard's study in 2002-2003. Compiled together, these data points depict the approximate nesting distribution of Swainson's hawk in the Planning Area. Figure SWHA-1 illustrates the distribution of known Swainson's hawk nest sites within and adjacent to the Planning Area as recorded in the CNDDB (CDFG 2010) as well as other sources (ebird.org 2005-2010; Estep 2006, 2007; Gill Ranch Survey 2003).

Swainson's hawk nest territories are aggregated in the south-central part of the county and river bottom lands associated with the Cosumnes River, Deer Creek, and Dry Creek. Swainson's hawks also nest in some urban areas and the dry annual grassland on the east side of the county, albeit in very low numbers.

SWHA Population Levels and Trends

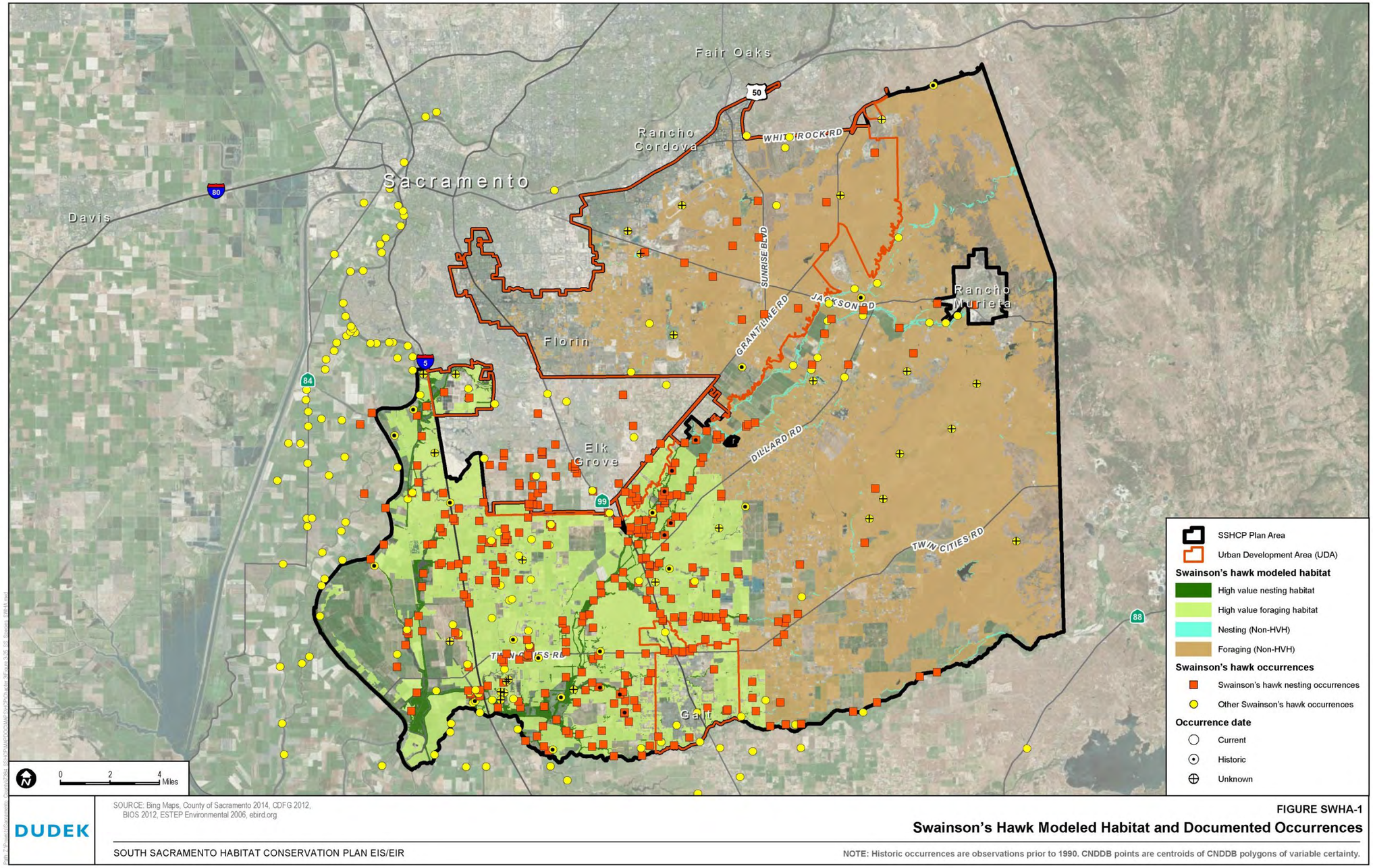
SWHA Range Wide Population Estimate and Trend

Historical population estimates for Swainson's hawk are non-existent. However, comments from several observers mention that the Swainson's hawk was abundant in western North America in the nineteenth century (Palmer 1988; England et al. 1997). By the end of the nineteenth century and well into the twentieth century, observers were noting that Swainson's hawks were becoming less common (Palmer 1988; England et al. 1997). Serious declines in Swainson's hawk numbers continue to be reported in California (Grinnell and Miller 1944; Walton 1978; Bloom 1980), Nevada (Heron and Lucas 1978), southern Saskatchewan (Houston and Bechard 1983), and southeast Oregon (Littlefield et al. 1984).

Recent estimates of the total population of Swainson's hawks are widely disparate and range between 300,000 (Palmer 1988) and 1,000,000 (Clark and Wheeler 2003). England et al. (1997) state that no comprehensive estimate of population has been calculated for the species. Migration period counts over single points in Panama and eastern Mexico in the last 25 years vary from as high as 845,465 to as low as 175,644. Unfortunately, different count methodologies have been employed in different years, resulting in the inability to meaningfully compare the data (England et al. 1997).

In Canada, serious declines in reproductive success have been reported (Houston and Schmutz 1995). It is likely that differing pressures upon local populations in different regions of the species' range result in an uneven trend with regard to the species range wide population status.

Figure SWHA-1 Swainson's Hawk Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

SWHA California and Central Valley Population Estimates and Trend

Grinnell and Miller (1944) provide the following remark in regards to Swainson's hawks in California "Formerly abundant, but now (1943) greatly reduced in numbers and in extent of breeding range, as a result of human influences." Small (1994) states that a "drastic decline for the species in the far west began in the 1930's, accelerated through the 1940's, the 1950's and into the early 1960's. In the 1970's and 1980's, the population remained at a fairly constant but diminished level. Sporadic migratory flocks of 100 to 300 are still occasionally reported, and large summer feeding concentrations of non-breeders (numbering up to 150) have recently been found in the mid-Central Valley. ." Bloom (1980) undertook an analysis of the Swainson's hawk in California. He reviewed historical records and egg collections in order to estimate the historical distribution, and found that the current range had been reduced drastically from its historical extent. Historical records indicate a past existence of breeding populations in appropriate habitat in most of California's bioregions, including the Southern Transverse Ranges, Central Coast Ranges, Central Valley, Great Basin, and Mojave-Colorado Desert. Small populations were documented to have been in Owens Valley, Shasta Valley, and Sonoma County. Unfortunately, historical records typically describe single nest trees and do not support conclusions about the size of local populations.

Bloom (1980) addressed this problem by extrapolating known densities per area of suitable habitat to larger unsurveyed areas. Thereby, he estimated a total statewide historical population to be between 4,284 to 17,136 breeding pairs. Bloom thought that the exact number probably fell somewhere in between those extremes. Bloom (1980) compared the minimum number with his 1979 statewide survey estimate of 375 pairs. Thus, a minimum 91 percent decline was calculated. Bloom (1980) also estimated an historical population in the Central Valley between 1,656 to 6,624 breeding pairs. Thus, using his 1979 population estimate of 280 breeding pairs for the Central Valley, the inferred decline for that region would be a minimum of 83.1 percent.

Hand in hand with the significant reduction in population, an enormous reduction in the former breeding range in California was documented (Bloom 1980). Historical populations have been extirpated from virtually all of Southern California, including: coastal valleys, the Mojave and Colorado Deserts, Transverse Ranges, and Santa Catalina Island. Coastal valleys of Central California (Livermore, Salinas, Sonoma) also no longer have breeding populations of Swainson's hawks. Bloom (1980) states that because of the Central Valley population size and distribution, it probably functions as the nucleus of recruitment into the other areas historically occupied in the state, with the probable exception of the Klamath Basin. Therefore, it is likely that recovery of populations in these areas outside of the Central valley is dependent upon a healthy Central Valley population.

Bloom's Central Valley population estimate of 280 pairs (Bloom 1980) was revised to 430 pairs in 1989 after further survey work (CDFG 1993, 1994). This increase in numbers was attributed to an increase in survey intensity rather than an increase in real numbers. Subsequent survey work in the Central Valley in the 1990's was never coordinated nor completely compiled. Therefore, no new calculation of population estimate was derived. The Swainson's Hawk Technical Advisory Committee (2000) estimates that there are as many as 900 pairs in the Central Valley. This is a reasonable guess; however, it is not possible to arrive at an accurate number without comprehensive surveys Nine hundred pairs are well short of Bloom's estimate of 1,656 to 6,624 historical pairs for the Central Valley. However, the reported increases in numbers could mean that the downward trend may have abated. Swainson's hawks are a relatively long-lived species. Thus, their longevity can have a masking effect on true population trends, particularly when relying on patchy and incomplete data. Therefore, estimates of current population trends are perhaps not prudent without more complete long-term data on population and reproduction.

SWHA Planning Area Population Estimates and Trend

In 1979, Bloom (1980) estimated the then current population between the Cities of Stockton and Sacramento, to be 75 pairs. In 1993, all of Sacramento County had 49 documented active pairs (CDFG Raptor Records Database). The CNDDB has 109 separate nesting records for Swainson's hawk in the Planning Area from the period between 1979 and 2010. This number is a compilation of data from several sources and does not reflect an accurate population estimate for the Planning Area. Earlier CNDDB records from 1979 through 1984 do not usually record a nest-site, but merely are an observation of a Swainson's hawk. Data from CDFW Region II census efforts in 2002 and 2003 accounts for 49 nest-sites, while Swolgaard's study in 2002-2003 of northern San Joaquin County includes seven nest sites along Dry Creek. Both of these efforts involve some duplication of records over the two-year periods. In addition, both studies surveyed only portions of the Planning Area. Therefore, it is not possible to estimate the number of nesting Swainson's hawk pairs is in the Planning Area based on the available data. Therefore, population trends for the area cannot be assessed at this time.

SWHA Threats to the Species

In general, settlement in both North and South America has brought with it a myriad of changes that have consequentially altered the environment that Swainson's hawks live in. To a large extent, vegetative cover types have undergone significant changes: clearing of land, cultivation of agriculture, new grazing regimes (fencing, sheep and cattle). These activities foster changes in plant species diversity and abundance (including invasive exotics) and subsequently affect prey-species composition and availability. Extirpations or extinctions of numerous prey species, such as the Rocky Mountain Locust, or the introduction of exotic prey species, such as house

mouse, undoubtedly has affected Swainson's hawks in ways that will never be entirely known. The rangewide decline in Swainson's hawk numbers is something that was likely the result of a multitude of factors and will never be entirely understood.

Within California, Bloom (1980) documented a dramatic statewide decline in the Swainson's hawk population, and subsequent reduction of the breeding range. The reasons for this decline are again not completely understood. Bloom (1980) discussed habitat destruction, pesticide poisoning, and direct shooting as all contributing to the decline.

SWHA Elimination of Nesting Habitat

Smith (1977) estimated that 98.5 percent of the Central Valley's riparian forest had been eliminated largely by flood control and irrigation projects. Katibah (1981) estimated that 94 percent of riparian forest in the Central Valley had been removed and that the vast majority of the remaining habitat was disturbed, degraded or otherwise impacted by human activities. Schlorff and Bloom (1984) found 87 percent of all Swainson's hawk nests in the Central Valley to be associated with riparian systems. Estep (1989) found 78.1 percent of nest trees to be in riparian systems. With regard to this loss of nesting habitat, Schlorff and Bloom (1984) state that if "species such as the Swainson's hawk are to survive, the trend of destruction must be reversed."

Nest trees that are not in riparian systems such as roadside trees exist only in so far as they are "out of the way." With continued increases in vehicle traffic, roadways everywhere are being widened or otherwise improved. These projects often result in the removal of numerous trees that may be suitable nesting sites for Swainson's hawk. Some relict trees in lone agricultural fields die every year and are never replaced. Lone trees in grazing pastures are also disappearing. They are not being replaced when they die or are cut down. Recruitment of new trees is hampered by continued heavy grazing which removes seedlings. Also, lowered ground water levels, due to over-drafting of underground aquifers, can also hamper recruitment.

SWHA Elimination of Foraging Habitat

Loss of foraging habitat is perhaps the most serious threat to Swainson's hawks. Urbanization has removed large areas of historical habitat. Incompatible foraging crops (cotton, rice, orchards, vineyards, etc.) are dominant in much of the Central Valley. Large areas of former foraging habitat have been completely removed and are now highly urbanized landscapes. This is particularly true in Southern California where entire valleys no longer have any remaining suitable habitat.

Bloom (1980) notes that Swainson's hawks have also disappeared from areas (e.g., Central Coast Ranges) that have not been transformed by excessive urbanization. Therefore, he

concludes that "habitat destruction, although a serious threat to the remaining population, does not appear to be the complete answer."

SWHA Poisoning

Bloom (1980) considered pesticide poisoning to be a threat to Swainson's hawks during migration passages or on their wintering grounds where pesticides use is not as well regulated. The Swainson's hawk's reliance on relatively short-lived terrestrial mammalian prey during the breeding season in North America, could induce a build up of pesticide residues to levels where eggshell thinning could affect reproduction (Henry and Kaiser 1979). Bloom thought that if Swainson's hawks from particular breeding areas all migrated via the same routes and all went to the same wintering areas, then they could all be vulnerable to the same threats during that journey. This could explain why Swainson's hawks are declining or have been extirpated from entire areas of their former breeding range.

Difficulties with insecticide poisoning in Argentina was suspected by Orlog (*in* Littlefield et al*.* 1984). The mass mortality of Swainson's hawks in Argentina resulting from direct organophosphate poisoning was discovered by Woodbridge et al. (1995b). Organophosphate chemicals were apparently being sprayed from tractors coursing across sunflower, corn, and alfalfa fields to control grasshoppers. Swainson's hawks, being attracted to the grasshoppers and field machinery, were found to have been mortally affected after being directly sprayed by the chemical or ingesting heavily contaminated insects. In 1996 approximately 5,000 dead Swainson's hawks were observed in Provincia de La Pampa with an estimated total kill of 16,000 to 20,000 (Goldstein et al. 1996). Additional mortality events of lower magnitude were reported in 1997 and 1998 (Woodbridge 1998; Rich et al. 2004). Education programs and restrictions on use of highly toxic pesticides have since dramatically reduced mortality of wintering Swainson's hawks (Woodbridge 1998).

Existing satellite telemetry data for Central Valley Swainson's hawks (Bradbury et al*.* in prep.) found no individuals wintering in areas where pesticide poisoning has been discovered. Also, band recoveries of deceased Swainson's hawks in Argentina did not include any from individuals banded in the Central Valley. The majority (13 of 17) of Central Valley Swainson's hawks that were tracked by satellite wintered north of the equator where the timing of farming operations (and assumedly pesticide applications) is different than in Argentina. The months when Swainson's hawks from the Central Valley are in Mexico is the winter season, a time when insecticides are generally not being applied (Bradbury pers. comm.; Holt pers. obs.). Therefore, the evidence indicates that Swainson's hawks from the Central Valley are not involved in the poisonings in Argentina. Furthermore, there is no evidence that Swainson's hawks from the Central Valley are involved in similar pesticide poisoning elsewhere.

SWHA Direct Shooting

Shooting of Swainson's hawks is something that has been widely reported in North America (Cameron 1913; Gabrielson and Jewett 1970; Palmer 1988) and in migration (Bloom 1980). Swainson's hawks were thought to be killers of chickens and even lambs and calves. Therefore, Swainson's hawks were routinely shot out of the air and at nest sites. Bloom (1980) points out that in California, in large areas of the Swainson's hawk's former range (Central Coast, Mojave Desert, southern San Joaquin Valley, etc.), red-tailed hawks and red-shouldered hawks continue to exist in fairly large numbers. Both of these species were persecuted as well by the same riflemen, however, both continue to exist in areas where Swainson's hawks no longer are found. Bloom (1980) reasoned that it is likely that shooting on the breeding grounds, therefore, is not the prime reason for the species' extirpation in those areas. Shooting could be a problem on migration routes or at winter roosts. Roost sites and mountain passes in particular are locations where Swainson's hawks are vulnerable to shooters. Information concerning Swainson's hawks in Central and South America is inadequate to assess the magnitude of this problem.

SWHA Threats within the Planning Area

Within the Planning Area, the loss of foraging and nesting habitat are the prime threats to the species. Loss of roadside nest trees and lone trees in agricultural fields and pastures, as mentioned above, should continue to be a challenge. Future flood control projects, spurred by increased human population, will pose threats to riparian nesting habitat. For instance, seven miles of trees along the south bank of the Mokelumne River (on the boundary of the Planning Area) were removed in the mid-1990's for flood control purposes. Mitigation for this long linear reach of nesting habitat, that undoubtedly held several nest trees was all placed in one 20-acre grove – a tree stand that would likely support only one nest territory. Urbanization threatens to remove both nesting habitat and foraging habitat. The Cities of Elk Grove, Galt, and Rancho Cordova, and the County of Sacramento are all expected to continue to grow and affect existing habitat for the species.

Agricultural conversions from one crop to another are not regulated and are difficult to track. Crops, be they compatible foraging habitat for Swainson's hawk or not, are planted on the basis of whether a farmer can profit from the activity. Cropping patterns from 50 years ago were likely different from what they are today. For example, major changes that have greatly affected Swainson's Hawks are the complete loss of sugar beets as a foraging habitat and the recent dramatic increase in vineyards. In Sacramento County, vineyards have increased in acreage by 263 percent in the period 1987 to 1997 (DWR 2002). This trend may have slowed, but there is no certainty in regards to what crops will be profitable to grow in the future.

Another matter of concern is the low reproductive success of Swainson's hawks in the Central Valley compared to other North American regions. Data from England et al. (1995), England et al. (1997), and Swolgaard (2004) compare multi-year studies of reproductive performance from differing regions of the Swainson's hawk's breeding range (Table 2.22-2). An average of 17.34 percent fewer chicks fledged from successful nests in studies that were done in the Central Valley versus the chicks fledged per successful nest in studies done in other areas of the Swainson's hawk's breeding range.

Table G3.22-2. Reproductive Performance of Swainson's Hawks in Various Populations

Location	Years of study	Number of nesting attempts	% successful nesting attempts	# chicks/ successful nest	Source
SE Washington	3	48	81.3%	1.85	Fitzner 1978
NE Colorado	3	119	54.6%	2.18	Olendorff 1973
SE Alberta, Canada	3	153	71.2%	1.98	Schmutz 1987
SE North Mexico	3	36	81.0%	1.94	Bednarz 1988
Saskatchewan, Canada	22	2031		1.91	Houston and Schmutz 1995
NE California	11	454	65.5%	2.24	Woodbridge et al. 1995a
Yolo County, California	5	492	82.1%	1.64	England et al. 1995
San Joaquin County, California	5	60	80.0%	1.73	England et al. 1995
Central Valley, California	2	69	83.5%	1.42	Estep 1989
Central Valley, California	2	31	54.8%	1.50	Holt *in*: Swolgaard 2004

Six studies outside of the Central Valley have a combined average of 1.96 chicks fledged per successful nest. While four combined studies within the Central Valley have an average of 1.62 chicks fledged per successful nest. This data is spread over a 28-year period, collected independently by differing investigators, and is sufficient to illuminate that there is a low rate of chicks fledged per successful nests for Central Valley Swainson's hawks. Nests with four chicks fledged are not unusual outside of the Central Valley (Brown and Amadon 1968; Palmer 1988; England et al. 1997), but in the Central Valley four chicks fledged in a nest is very rare. No such nest has been documented in the Planning Area, but at least one has been observed near Tracy, California in 1999 (Holt pers. obs.).

SWHA Data Gaps and Conservation Implications

A thorough understanding of the demographics of the population within the Planning Area would provide at least two important sources of information that could then be used to develop a more effective conservation strategy for the species: 1) age structure of the population; and 2) reproductive performance. This information would provide an opportunity

to understand whether the species is still in decline in the area or has stabilized, albeit at a low population. The information might also provide insight into how much exchange is occurring with other adjacent populations outside the Planning Area. It could provide information on whether effective recruitment is occurring from the reproductive pairs that occur in the Planning Area (and if not…how that may be related to available habitat).

SWHA Literature Cited

Anderson, D.A., J. Dinsdale, and J.A. Estep. In progress. Movements, Behavior, and Post-Fledging Dependency of Juvenile Swainson's hawks in the Central Valley of California.

Babcock, K.W. 1995. Home range and habitat use of breeding Swainson's Hawks in the Sacramento Valley of California. *Journal of Raptor Research*, 29: 193- 197.

Bechard, M.J. 1980. Factors affecting nest productivity of Swainson's Hawk (*Buteo swainsoni*) in southeastern Washington. Ph.D. diss., Washington State Univ.,Pullman.

Bechard, M.J. 1982. Effect of vegetative cover on foraging site selection by Swainson's hawk. *Condor,* 84: 153-159.

Bechard, M.J. 1983. Food supply and the occurrence of brood reduction in Swainson'shawk. *Wilson Bulletin*, 95: 233-242.

Bednarz, J.C. 1988. A comparative study of the breeding ecology of Harris' and Swainson's Hawks in southeastern New Mexico. *Condor,* 90: 311-323.

Bloom, P.H. 1980. The status of the Swainson's hawk in California, 1979. Final Report II-8.0, USDI Bureau Land Management and Federal Aid in Restoration, Project. W-54-R-12, California Department of Fish and Game, Sacramento, California.

Bloom, P.H.

Bradbury, M., Estep, J.A., and D. Anderson. *In Preparation*. Migratory patterns and wintering range of the Central Valley Swainson's hawk.

Bradbury, Michael. Wildlife Biologist, California Department of Water Resources, Sacramento, California.

Brown, L. and D. Amadon. 1968. Eagles, hawks, and falcons of the world. McGraw-Hill Book Co., New York, New York.

Browning, M.R. 1974. Comments on the winter distribution of Swainson's Hawks (*Buteo swainsoni*) in North America. *American Birds*, 28:865-867.

Burt, W.H. and R.P. Grossenheider. 1952. A field Guide to the Mammals North America North of Mexico. Houghton Mifflin Co. Boston, Massachusetts.

California Department of Fish and Game (CDFG). 1993. Five-year status review: Swainson's Hawks (*Buteo swainsoni*). Report to California Fish and Game Commission. Sacramento, California.

California Department of Fish and Game (CDFG). 1994. Staff report regarding mitigation for impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California. Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Cameron, E.S. 1913. Notes on Swainson's Hawk (*Buteo swainsoni*) in Montana. *Auk,* 30: 167-176 and 381-394.

Canevari, Nick. University of California Cooperative Extension, Stockton, California.

Cassin, J. 1856. *Illustrations of the Birds of California*, Texas, Oregon, British and Russian America.

Clark, W. S. and B. K. Wheeler. 1987. *A Field Guide to Hawks of North America*. Houghton Mifflin, Boston, Massachusetts.

Clark, W. S. and B. K. Wheeler. 2003. *Raptors of Western North America*. Princeton University Press, Princeton.

Department of Water Resources (DWR). 2002. Land Use Data. Internet. http://waterplan.water.ca.gov/landwateruse/landuse/ludataindex.htm.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, NY. Accessed online http://ebird.org/content/ebird.

England, A. Sidney, J. Estep, W. Holt. 1995. Nest-site and reproductive performance of urban-nesting Swainson's hawks in the Central Valley of California. *Journal of Raptor Research*, 29: 179 – 186.

England, A. Sidney, M.J. Bechard and C.S. Houston. 1997. Swainson's hawk (*Buteoswainsoni*). *in* Birds of North America, No. 265 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania.

Estep, J. 2006. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Elk Grove Planning Area. Estep Environmental Consulting, Sacramento, California.

Estep, J. 2007. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Rancho Cordova Planning Area. Estep Environmental Consulting, Sacramento, California.

Estep, J.A. 1989. Biology, movements and habitat relationships of the Swainson's Hawk in the Central Valley of California, 1986-87. Calif. Dept. Fish and Game, Nongame Bird and Mammal Sec. Rep.

Estep, James. Wildlife Biologist, Jones & Stokes Associates, Sacramento, California.

Fitzner, R.E. 1980. Behavioral ecology of the Swainson's Hawk (*Buteo swainsoni*) in Washington. Pac. NW Lab. PLN-2754.

Gabrielson, I.N. and S.G. Jewett. 1970. *Birds of the Pacific Northwest*. Dover Publications, Inc. New York, New York.

Getz, G.L., R.C. Frederick, and D.L. Gates. 1978. Interstate roadsides as dispersal routes for *Microtus pennsylvanicus*. *Journal of Mammalogy,* 59: 208 – 212.

Gifford, Daniel. Wildlife Biologist, California Department of Fish and Game, Rancho Cordova, California.

Gill Ranch Survey 2003. 135 Gill Ranch Survey. Sacramento County, California.

Gilmer, D.S., and R.E. Stewart. 1984. Swainson's Hawk nesting ecology in North Dakota. *Condor,* 86: 12-18.

Goldstein, M.I., B. Woodbridge, M.E. Zaccagnini, and S.B. Canavelli. 1996. An assessment of mortality of Swainson's Hawks on wintering grounds in Argentina. *Journal of Raptor Research*, 30:106-107.

Grinnell, J., and A. Miller. 1944. Distribution of the birds of California. Cooper Ornithological Club. Berkeley, California.

Grinnell, J., J. Dixon, and J. Linsdale. 1930. Vertebrate natural history of the Lassen Peak region.

Henry, C.J. and T.E. Kaiser. 1979. Organochlorine and Mercury Residues in Swainson's Hawk Eggs from the Pacific Northwest. *The Murrelet*, 60(1):2-5.

Heron, G., and P. Lucas. 1978. Population surveys, species distribution, and key habitats of selected non-game species. Nev. Dept. Fish and Game, Job Performance Rep.Proj. W-53-R, Study 1.

Herzog, S.K. 1996. Wintering Swainson's Hawks in California's Sacramento-San Joaquin River Delta. *Condor,* 98: 876-879.

Holt, W.

Houston, C. S. and J. K. Schmutz. 1995. Declining reproduction among Swainson's Hawks in prairie Canada. *Journal of Raptor Research*, 29: 198-201.

Houston, C.S. 1990. Saskatchewan Swainson's Hawks. *American Birds,* 44: 215-220.

Houston, C.S. and M.J. Bechard. 1983. Red-tailed Hawk distribution, Saskatchewan. *Blue Jay*, 41: 99-109.

Howell, S.N.G., and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford Univ. Press, New York, New York.

Jaramillo, A.P. 1993. Wintering Swainson's Hawks in Argentina: food and age segregation. *Condor,* 95: 475-479.

Johnson, C.G., L.A. Nickerson, and M.J. Bechard. 1987. Grasshopper consumption and summer flocks of non-breeding Swainson's Hawks. *Condor,* 89: 676-678.

Katibah, E.F. 1981. A brief history of riparian forests in the Central Valley of California. Paper presented at the California Riparian Systems Conference. (UC Davis Sep. 1981) Davis, California.

LaPolla, V.N. & G. Barrett. 1993. Effects of corridor width and presence on the population dynamics of meadow voles. *Landscape Ecology,* 8: 25 – 37.

Littlefield, C.D., S.P. Thompson, and B.D. Ehlers. 1984. History and present status of Swainson's Hawks in southest Oregon. *Journal of Raptor Research*, 18: 1-5.

Moreno, L. 1994. A study of nest distribution, nest site preferences, foraging habitat availability, disturbance, and population productivity of Swainson's Hawks along the Sacramento River. Dept.of Fish. Biol. UC Davis, Davis, California.

Olendorff, R.R. 1973. The ecology of the nesting birds of prey of northeastern Colorado. USIBP Grassland Biome Tech. Rep. No. 211.

Palmer, R.S. 1988. Swainson's Hawk. Pp. 48-73 in Handbook of North American birds.Vol. 5. Diurnal raptors (Pt.2) Yale Univ. Press. New Haven, Connecticut.

Papp, Joe.

Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, New York.

Schlorff, Ronald. Wildlife Biologist, California Department of Fish and Game Non-game Division, Sacramento, California.

Schlorff, R.W. and P.H. Bloom. 1984. Importance of riparian systems to nesting Swainson's hawks in the Central Valley of California. *in* R. E. Warner and K. M. Hendrix, eds. California riparian systems: ecology, conservation, and productive management. University of California Press, Berkeley, California.

Schmutz, J.K. 1987. The effect of agriculture on ferruginous and Swainson's hawks. *Journal of Range Management*, 40: 438 – 440.

Schmutz, J.K., S.M. Schmutz, and D.A. Boag. 1980. Coexistence of three species of hawks (*Buteo* spp.) in the prairie-parkland ecotone. *Canadian Journal of Zoolology*, 58: 1075-1089.

Sharp, C.S. 1902. Nesting of Swainson's Hawk. *Condor,* 4: 116-118.

Simpson, David. United States Department of Agriculture, Natural Resources Conservation, Stockton, California.

Smallwood, K.S. 1995. Scaling Swainson's Hawk population density for assessing habitat use across an agricultural landscape. *Journal of Raptor Research*, 29: 172- 178.

Smith, D.G. and J.R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. Brigham Young University Scientific Bulletin, Biol. Ser. 18(3): 1-76.

Smith, F.E. 1977. A short review of the status of riparian forests in California. In: A Sands (ed.). Riparian Forests in California: their ecology and conservation. Inst. of Eco. Pub. 15. UC Davis. Davis, California.

Smith, N. 1973. Spectacular Buteo migration over Panama Canal Zone. *American Birds,* 27: 305.

Smith, N. 1980. Hawk and Vulture migration in the tropics. In: Migrant Birds in the neotropics: ecology, behavior, distribution and conservation. Eds. A. Keast and E.Morton. Smithsonian Institute Press. Washington, D.C.

Smith, N., D. Goldstein, and G. Bartholomew. 1986. Is long-distance migration possible for soaring hawks using only stored fat? *Auk,* 103: 607-611.

Swainson's Hawk Technical Advisory Committee. 2000. Recommended timing and methodology for Swainson's Hawk nesting surveys in California's Central Valley. Unpublished manuscript. TAC. Sacramento, California.

Swolgaard, C., 2004. Nesting density and habitat use of Swainson's Hawk in a vineyardlandscape in northern San Joaquin County, California. Master's Thesis, CSUS, Sacramento, California.

Thompson, Debby, Sacramento County Agricultural Commissioner's Office, Galt, California.

United States Fish and Wildlife Service (USFWS). 1991. Sacramento urban area levee reconstruction project: Sacramento River Swainson's Hawk nesting population study, 1990. Unpublished manuscript. U. S. Army Corps of Engineers. Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1993. Sacramento urban area levee reconstruction project: Sacramento River Swainson's Hawk nesting population study, 1991. Unpublished manuscript. U. S. Army Corps of Engineers. Sacramento, California.

United States Fish and Wildlife Service (USFWS). 1994. Sacramento urban area levee reconstruction project: Sacramento River Swainson's Hawk nesting population study, 1992. Unpublished manuscript. U. S. Army Corps of Engineers. Sacramento, California.

Walton, B.J. 1978. Nesting of Swainson's Hawk in San Luis Obispo County, California in 1977. Western Birds 9: 82.

Wilkinson, C.W., and C.M. Levy. 1993. Sacramento Urban Area Levee Construction Project: Sacramento River Swainson's Hawk Nesting Population Study, 1992. Prepared for U.S. Army Corps of Engineers, Sacramento, California.

Woodbridge, B. 1985. Biology and management of Swainson's Hawk in the Butte Valley, California. U.S. Forest Service Report, 19 pp.

Woodbridge, B. 1998. Calfiornia Partners in Flight riparian bird conservation plan for the Swainson's hawk. http://www.prbo.org/calpif/htmldocs/species/riparian/swhaacct.html. California Partners in Flight, Point Reyes Bird Observatory, Stinson Beach, California.

Woodbridge, B., K.K. Finley, and P. H. Bloom. 1995a. Reproductive performance, age structure, and natal dispersal of Swainson's hawks in the Butte Valley, California. *Journal of Raptor Research*, 29: 187-192.

Woodbridge, B., K.K. Finley, S.T. Seager. 1995b. An investigation of the Swainson's Hawk in Argentina. *Journal of Raptor Research*, 29(3): 202-204.

Yee, David. Field Ornithologist, Lodi, California.

NORTHERN HARRIER (NOHA)

Northern Harrier (NOHA)

(Circus cyaneus)

Status USFWS: None

Status CDFW: Species of Special Concern



NOHA Listing Status

Northern harrier (*Circus cyaneus*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and California Fish and Game Code (Sections 3503.5 and 3800). This

species is designated as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW) (Shuford and Gardali 2008).

NOHA Life History and Ecology

NOHA Species Description and Life History

Physical Description

Northern harrier is a long-winged, long-tailed hawk with a distinctive white rump patch in both sexes. Individuals have an "owlish" appearance in the face due to a facial ruff or disk. The male has a pale gray back, head, and breast, with black wing tips. Female and subadult northern harriers are brown on the back and are streaked on the breast. The juvenile coloring has a rusty tone. Northern harrier has a distinct flying style with its wings held in a shallow "V." It is usually observed gliding unsteadily (e.g., tilting) and low over grasslands and marshes (MacWhirter and Bildstein 1996).

Taxonomy

Two subspecies of *C. cyaneus* are recognized: *C. c. hudsonius* and *C. c. cyaneus*. North American birds belong to *C. c. hudsonius*, a large subspecies (Cramp and Simmons 1980), while *C. c. cyaneus* occurs in Eurasia (MacWhirter and Bildstein 1996).

Reproduction

Northern Harriers are primarily monogamous; however, polygyny also occurs. The frequency of polygynous males is positively correlated with local prey abundance (Simmons et al. 1986; Ehrlich et al. 1988). Northern harriers reach sexual maturity at one to two years of age (Martin 1987), and females are more likely to breed during their first year than males; however, first-year males are more likely to breed in years when vole (*Microtus* spp.) abundance is high (Hamerstrom et al. 1985).

The breeding season for Northern harrier is generally late March through mid-September, although breeding is sometimes initiated earlier. Males arrive on the breeding grounds before females, typically in March or April. Pair formation likely occurs on the breeding grounds (Hamerstrom 1986). Courtship usually begins in March or April, followed by nest site selection and construction. Both sexes may select the nest site (Hamerstrom 1986; Simmons et al. 1987), and both sexes engage in nest construction. Adult northern harriers are primarily nomadic and exhibit low fidelity to breeding sites (Hamerstrom 1969; Burke 1979; MacWhirter and Bildstein 1996). When northern harriers do return to general nesting areas over consecutive years, they usually do not return to the same specific nest site (Breckenridge 1935; MacWhirter 1985).

Northern harriers nest on the ground in open, vegetated habitats such as grasslands, wetlands, and agricultural fields. Nests are typically built in dense, tall vegetation in areas that are undisturbed during the nesting period; and nest sites are often in wet areas. Nests are bowls or platforms constructed with vegetation (e.g., grasses, forbs). Northern harriers often construct platforms below the nest using sturdy vegetative material (e.g., cattails), to elevate the nest, particularly in wet areas. Nest construction typically lasts between seven to 14 days. Egg-laying can occur in early April through July, but peaks in late April through early July. The female lays four to nine eggs (five is normal); eggs are laid 2–3 days apart. The female incubates the eggs for 30 to 32 days, while the male delivers food to the female. Hatching usually occurs from April through June, and peaks in May–June. Fledging occurs 30 to 35 days later. Both parents feed the young (Hamerstrom et al. 1985, Ehrlich et al. 1988). Fledged juveniles remain near the nest site and are fed by the parents for approximately 2–4 weeks, when the family group disperses (Bildstein 1992; MacWhirter 1994; MacWhirter and Bildstein 1996). Northern harriers typically produce one brood per season, but will produce a second brood if the first clutch fails during egg-laying or shortly thereafter (Simmons 1984).

Several studies have reported nest success (i.e., percentage of clutches with ≥ 1 young fledged) for northern harrier populations in North America. Nest success ranged from 18 to 79 percent in 12 studies (MacWhirter and Bildstein 1996). Loughman and McLandress (unpubl. data, *cited in* CPIF 2000) estimated nest success for four regions in California between 1987 and 1992. In the Sacramento Valley, San Joaquin Valley, Suisun Marsh, and northeastern California, nest success was 18 percent (n = 20), 28 percent (n = 40), 21 percent (n = 135), and 16 percent (n = 36), respectively.

Survival and Longevity

The maximum reported age of a northern harrier is 16.5 years (Bildstein 1988), while the average age at death among 114 banded birds was 1.4 years (Keran 1981 *cited in* MacWhirter and Bildstein 1996). First-year female and adult survivorship has been estimated at 40 percent and 72.4 percent respectively (Martin 1987). Bildstein (1988) estimated pre-1950s survival rates for first-year and adult harriers at 41 percent and 70 percent respectively.

Dispersal Patterns

There is little empirical information about natal and post-breeding dispersal of northern harriers, and further research on this subject is needed. Juveniles exhibit virtually no fidelity to their natal area, and fledged juveniles do not typically contribute to the breeding population in their natal area (Hamerstrom 1969; MacWhirter and Bildstein 1996). There is no information available on dispersal patterns and distances between natal and subsequent breeding sites. Adult northern harriers are primarily nomadic and exhibit low fidelity to breeding sites. When

northern harriers do return to general nesting areas over consecutive years, they usually do not return to the same specific nest site (Breckenridge 1935; MacWhirter 1985).

Diet and Foraging

Northern harriers primarily eat voles (*Microtus* spp.) and other small mammals; however, they also eat birds, small reptiles, amphibians, and some insects (e.g., grasshoppers, beetles, crickets, and locusts) (MacWhirter and Bildstein 1996). In five studies conducted throughout North America, voles were the primary prey item (MacWhirter and Bildstein 1996). In California, in addition to *Microtus*, other important prey items were leporids (hares and rabbits), quail, finches, and blackbirds (red-winged blackbird and yellow-headed blackbird) (Selleck and Glading 1943).

Northern harriers hunt while flying and "patrolling" low above open ground. Harriers make low, quartering flights three to 30 feet (one to nine meters) above ground. Foraging individuals dive from flight or hover and pounce on prey. Northern Harriers have an "owlish" facial ruff or disk, which aids in the audible detection of prey (much in the same way as owls) (MacWhirter and Bildstein 1996).

Most aspects of northern harrier's population ecology are closely linked to prey availability, particularly local abundance and population cycles of small mammals (CPIF 2000). Rodent populations often experience population cycles between years. Because small mammals (e.g., voles) typically comprise the majority of the harrier's diet during the breeding season, northern harrier populations are sensitive to these cycles. For example, Northern harriers can experience increased nest densities, clutch sizes, nest success rates, and frequency of polygyny during peaks and increase phases in rodent cycles (Hamerstrom et al. 1985; Simmons et al. 1986; MacWhirter and Bildstein 1996).

Passerine birds, particularly nestlings and fledglings, are also important prey for northern harriers. Bernard et al. (1987) found that this prey group constituted the second most important diet for nesting northern harriers. Passerines have higher levels of calcium, iron, crude fat, and gross energy than grasshoppers and voles (Bird et al. 1982). Also, the timing of northern harrier nestling periods corresponded with passerine nestling periods, when young passerines were relatively abundant and available to foraging harriers (Bernard et al. 1987).

Northern harriers are generally opportunistic predators, and commonly shift their diets within a breeding season in response to prey availability and changes in local vegetation structure (MacWhirter 1985; Barnard et al. 1987). For example, Martin (1987) reported that northern harriers foraging in alfalfa fields preyed primarily on voles until vegetation height reached 18 inches (46

centimeters). Thereafter, harriers abandoned alfalfa and switched their diets to passerines and reptiles. After the alfalfa was cut, northern harriers switched their diet back to voles.

Movement and Migration Patterns

Northern harrier breeding populations in the northern portions of the species' range are more migratory than those at more southern latitudes (MacWhirter and Bildstein 1996). In the United States, migrating northern harriers depart their breeding grounds in August to December, and leave their wintering grounds in February to March. Migratory birds may winter in California, and some migrate south through Central and South America (MacWhirter and Bildstein 1996).

Many northern harrier populations breeding in California are residents; however, this species is nomadic and moves within and between seasons in response to prey availability (MacWhirter and Bildstein 1996). Northern harriers winter throughout California and typically occupy habitats similar to those used during the breeding season (MacWhirter and Bildstein 1996).

Territoriality, Home Range, and Spacing

Northern Harriers are not strongly territorial during the breeding season, except near the nest where both sexes defend the territory. Reported territory sizes for males have ranged from 2.0 to 271.8 acres (0.8 to 110 hectares). Females typically defend a smaller territory (Simmons 1983; Martin 1987). Territory sizes vary with habitat and prey availability (Martin 1987; Temeles 1987). Temeles (1987) showed that, in Yolo County, California, northern harriers adapted their territory sizes to maintain a consistent rate of prey capture. During winter, female territory size varies greatly. Temeles (1987, 1989) reported that female territory sizes in winter ranged from 9.6 to 308.6 acres (3.9 to 124.9 hectares) (mean = 83 acres [33.6 hectares]), and were inversely correlated with house mouse (*Mus musculus*) availability and pressure by intruders. In addition, prey availability was the only significant predictor of territory size in abundant food years. During winter, females defend territories and exclude non-territorial males. Females are approximately 12.5 percent larger and 50 percent heavier than males and dominate most aggressive interactions with males (MacWhirter and Bildstein 1996). Males are not considered territorial during winter.

During the breeding season, reported average home range sizes from eight studies were 420.1 to 37,066.5 acres (170 to 15,000 hectares); while the median size was 642.5 acres (260 hectares) (MacWhirter and Bildstein 1996 *citing* Smith and Murphy 1973, Rees 1976, Toland 1985, Martin 1987, Serrentino 1987). Females tend to hunt closer to the nest, and maintain smaller home ranges, than males (Martin 1987, Temeles 1987, MacWhirter and Bildstein 1996). Males reportedly will hunt ≥ 10 kilometers from the nest (Barnard 1983, Thompson-Hanson 1984). As the nestling period progresses, males and females can increase their home range by a

factor of 2.5 or greater (MacWhirter and Bildstein 1996). In California, during the winter, males maintain considerably larger foraging ranges than females, presumably because they are non-territorial, or they use areas with lower prey densities or different prey composition than those favored by females (MacWhirter and Bildstein 1996).

Prey availability and habitat quality also affect northern harrier breeding densities, inter-nest distances, and spacing (MacWhirter and Bildstein 1996). Loughman and McLandress (unpubl. data, *cited in* CPIF 2000) estimated breeding densities of northern harrier in four regions of California. In the Sacramento Valley, San Joaquin Valley, Suisun Marsh, and northeastern California, nest densities (number of nests per square kilometer) were 4.2 to 5.7 (for 1987 - 1988), 5.0 to 6.7 (for 1987–1991), 3.3 to 24.8 (for 1987–1992), and 7.4 to 9.0 (for 1987–1989), respectively. The highest density reported, 24.8 nests per square kilometer at Suisun Marsh, occurred during an unusually high vole population year.

NOHA Habitat Requirements and Ecology

Northern harrier breeds in a variety of open grassland, wetland, and agricultural habitats. Open wetland habitats used for breeding include marshy meadows, wet and lightly grazed pastures, and freshwater and brackish marshes. Northern Harrier breeding habitat also includes dry upland habitats, including grasslands, croplands, drained marshlands, and shrub-steppe in cold deserts. Although Midwestern populations use wetland habitats more frequently, western populations tend to use upland habitats (e.g., grasslands) disproportionately. Northern harriers winter throughout California where suitable habitat occurs. Wintering habitat includes open areas dominated by herbaceous vegetation, including grasslands, pastures, croplands, coastal sand dunes, brackish and freshwater marsh, and estuaries. Northern harriers rarely occur in forested areas (Grinnel and Miller 1944; Martin 1987; MacWhirter and Bildstein 1996).

The quality of open nesting habitats for northern harrier appears to be a function of five primary factors: 1) vegetation composition and structure; 2) prey abundance; 3) levels of ground disturbance during the nesting season; 4) site moisture; and 5) predation. Successful nesting by northern harriers generally require open habitats with dense, tall vegetation, a high prey base and few predators (CPIF 2000), and no agricultural or other disturbances that destroy their nests. Also, northern harriers appear to prefer moist or wet sites; however they will nest in dry sites that support other elements of suitable habitat (e.g., dense, tall vegetation). These factors are discussed below.

Vegetation height and structure particularly affect northern harrier habitat quality, especially because this species is a ground-nester. Northern Harriers nest on the ground in open, vegetated habitats such as grasslands and wetlands. Harrier nests in upland fields are typically surrounded by grasses and forbs; whereas nests in wet sites are often surrounded by marsh

grasses and cattails (Hamerstrom and Kopeny 1981; Simmons and Smith 1985; Loughman and McLandress unpubl. data, and LBWA unpubl. data *cited in* CPIF 2000). Nests are typically built in dense, tall vegetation in areas that are undisturbed during the nesting period; and nest sites are often in wet areas. Nests are bowls or platforms constructed with vegetation (e.g., grasses, forbs). Northern Harriers often construct platforms below the nest using sturdy vegetative material (e.g., cattails), to elevate the nest, particularly in wet areas.

Loughman and McLandress (unpubl. data, *cited in* CPIF 2000) reported the average vegetation height at nest sites in four regions of California (Sacramento Valley, San Joaquin Valley, Suisun Marsh, and Northeastern California). Vegetation height was lowest in the Suisun Marsh (12.6 to 24.1 inches [32.0 to 61.2 centimeters]) and greatest in the San Joaquin Valley (23.3 to 37.8 inches [59.2 to 96.0 centimeters]). Nest sites in Northeastern California were dominated by residual vegetation, while live vegetation was dominant in the other three study areas. Vegetation composition documented around northern harrier nests includes annual and perennial grasses (Poaceae), rushes (*Carex* spp.), sedges (*Juncus* spp.), hemlock (*Conium* spp.), milk thistle (*Silybum* spp.), dock (*Rumex* spp.), mustard (*Brassica* spp.), clover (*Trifolium* spp.), and goldenrod (*Sildago* spp.) (Simmons and Smith 1985; Loughman and McLandress unpubl. data, and LBWA unpubl. data *cited in* CPIF 2000).

Northern harrier nest sites are characterized by partial or complete vegetation cover around the nest circumference (Loughman and McLandress unpubl. data, LBWA unpubl. data *cited in* CPIF 2000); however, the canopies directly above nests are typically open (i.e., the nests are not concealed). Simmons and Smith (1985) reported lower success of concealed nests. Loughman and McLandress (unpubl. data *cited in* CPIF 2000) reported that 71 percent of nests at Suisun Marsh and 93 percent of nests in northeastern California were characterized by no canopy cover. Also, 78 percent of nests located at Los Banos and Salt Slough Wildlife Areas were characterized by open canopies (LBWA unpubl. data *cited in* CPIF 2000). Northern Harrier nests on state and federal wildlife refuges in California were located in upland fields managed for waterfowl breeding (Loughman and McLandress unpubl. data). Nest sites were surrounded by tall annual or perennial grasses with no nest canopy cover.

Site moisture is also associated with the quality of northern harrier nesting habitat. In most nesting habitats, including dry uplands, a disproportionate number of nests are located in wet sites (Simmons and Smith 1985, Martin 1987, Grant et al. 1991). Simmons and Smith (1985) reported that northern harriers in Canada had higher nest success in wet sites (wetland fringe or wet meadows) than in dry sites; and wet sites were selected more than expected based on availability (Simmons and Smith 1985). Although both moisture and vegetation characteristics were correlated with nest success, moisture was the best predictor. Wet sites may be preferred due to reduced predation rates there (Simmons and Smith 1985; MacWhirter and Bildstein

1996). Also, moisture may be simply correlated with or affect other factors that directly determine habitat quality (e.g., vegetation structure and prey abundance).

Where agricultural lands provide suitable vegetation characteristics and prey availability, and are free of disturbances during the nesting period, these areas can provide important nesting habitat for northern harrier. Northern Harriers will attempt to nest in agricultural fields that support suitable vegetation characteristics and prey availability early in the nesting cycle. In Yolo County, California, harrier nests were found in three different upland types: uncultivated field of grasses and weeds, cultivated rice field, and cultivated field of clover (Temeles 1987). Also, in Yolo County, Hopkins (pers. comm.) reported nesting by northern harriers in hayfields. However, where northern harriers nest in agricultural lands, practices such as mowing, disking, and haying during the nesting cycle cause nest destruction (MacWhirter and Bildstein 1996); and these lands can function as population sinks. Because northern harriers are ground nesters with a long nesting period (approximately 75 days between nest construction and fledging young), nest success in croplands remains very sensitive to agricultural practices. Without landowner commitments to avoid nest destruction, the attractiveness of some croplands to northern harriers early in the nesting period can significantly threaten regional population dynamics, particularly in the Central Valley where agricultural lands are abundant.

Hamerstrom and Kopeny (1981) reported that northern harriers were very adaptive nesters, and continued nesting in marsh areas that were drained and converted to farmland or grasslands; however, it is unknown whether survival and reproduction vary between disturbed and natural habitats (CPIF 2000).

Some agricultural lands also provide high-quality foraging habitat for northern harrier. Agricultural lands that are suitable for foraging are those that support abundant rodent populations (e.g., alfalfa and irrigated pasture). Williams et al. (2000) compared winter use of croplands and rangelands by northern harrier and other raptors in eastern Kansas. Harrier densities were higher in croplands than in rangelands; and harriers generally preferred idle land. The authors hypothesized that the importance of cropland as winter foraging habitat was a function of high prey abundance, good visibility of prey in harvested fields, and a relatively high amount of suitable hunting habitat.

There is no empirical information on effects of habitat fragmentation and habitat patch size on the viability of northern harrier populations (CPIF 2000). The spatial requirements of northern harriers, and how reproductive success and long-term persistence varies with landscape-level parameters, are not known. Although these relationships are not documented, it is assumed that small and isolated habitat patches are less likely to sustain high reproductive success or long-term persistence than larger areas. Northern Harriers using isolated habitats may experience frequent disturbances from adjacent land uses (e.g., nest disturbance, habitat degradation, predation).

Important biotic interactions between harriers and rodent populations may be disrupted, because some rodent populations may be sensitive to habitat area and surrounding land uses as well. For example, the availability of voles and other rodent prey may be limited in isolated habitats, and rodents may abandon or be eradicated from small parcels of habitat.

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for northern harrier are identified in Table G-3.23.1 and have been derived from input from local species experts.

Table G-3.23-1. Habitat Elements for Northern Harrier

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, valley grassland, vernal impoundment, vernal pool, vernal swale, seasonal wetlands, seasonal impoundment, swale, and freshwater marsh.	Abundant rodent populations.
Nesting	Blue oak savanna, cropland, irrigated pasture grassland, and valley grassland.	Open habitats with dense, tall vegetation, a high prey base, and few predators. Nests are typically built in dense, tall vegetation in areas that are undisturbed during the nesting period; and nest sites are often in wet areas.

NOHA Species Distribution and Population Trends

NOHA Species Distribution

Breeding populations of northern harrier primarily occur throughout most of Canada and Alaska; central, coastal, and southwestern California into the Baja Peninsula, Mexico; and the west-central and northeastern United States. Northern harriers winter in most of the coterminous United States except portions of the northern-most states; Mexico and Central America; and Cuba and the Bahamas. Most wintering birds occur in the western and southern United States (MacWhirter and Bildstein 1996).

In California, northern harriers historically bred throughout the state except in deserts, woodlands, and forested mountains. Historical breeding localities included the interior from Siskiyou County south to western Riverside and San Bernardino Counties and coastal regions from Marin County to San Diego County (Grinnell and Miller 1944). The northern harrier's range also includes the Sierra Nevada foothills up to 3,600 feet elevation (CPIF 2000). Breeding populations were probably concentrated in most of the Central Valley, Sacramento-San Joaquin River Delta, Suisun Marsh, and portions of the San Francisco Bay (Zeiner et al. 1990). The

northern harrier's present California breeding range is similar to its historical distribution; however, extensive local population declines continue as a result of habitat loss (Remsen 1978; Martin 1989; MacWhirter and Bildstein 1996; CPIF 2000).

NOHA Central Valley Distribution

Northern harrier's breeding range in California includes most of the Central Valley, where this species is a year-round resident (Zeiner et al. 1990;MacWhirter and Bildstein 1996).

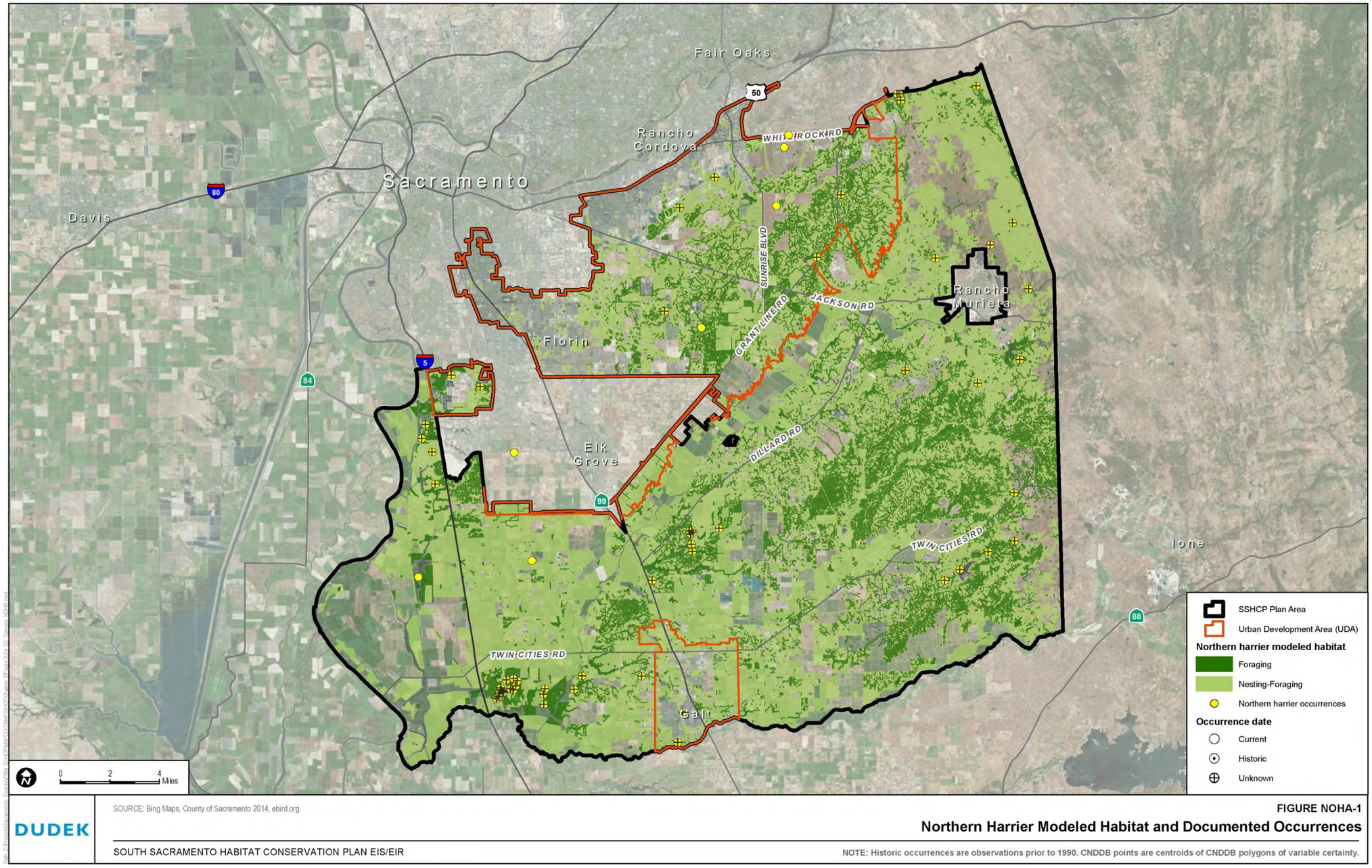
NOHA Distribution Within the Planning Area

Northern harriers occur in suitable habitat within the Planning Area and are probably regular breeders (Trochet pers. comm.). Their overall distribution, abundance, and population structure are not well known. The CNDDB (CDFG 2010) reports no occurrences of northern harrier in Sacramento County, but this simply reflects the failure of local biologists to report records of the species since it is regularly observed in the area during the breeding season. Occurrences of northern harrier shown in Figure NOHA-1 are from various other sources (ebird.oeg 2005-2010; Klotz Property 2005). Land-cover types used by northern harriers, such as irrigated pasture-grassland, and valley grassland occur throughout much of the Central Valley and are well-represented in Sacramento County and the Planning Area.

Sacramento-area ornithologists C. Conard and J. Trochet provided additional occurrence and habitat distribution information, which is summarized below.

- Two nests have been documented at the Sacramento Regional County Sanitation District (SRCSD) Bufferlands. One nest was located in a hayfield approximately 50 to 60 acres in size. The other nest was in cropland (Conard pers. comm.).
- Nesting was documented approximately three years ago at The Nature Conservancy's Howard Ranch (Trochet pers. comm.).
- Approximately six nests have been documented at the Cosumnes River Preserve in the Lower Preserve area (Trochet pers. comm.). Additionally, in 2004, an immature male and an adult female were observed copulating at the Cosumnes River Preserve. This pair was observed there into early summer. The most suitable habitat at the preserve appears to occur in areas where water is drained away latest (Trochet pers. comm.).
- Other habitat identified as suitable for nesting northern harriers in the Planning Area includes areas along Scott and Latrobe Roads, in the eastern portion of the Planning Area (Trochet pers. comm.).

Figure NOHA-1 Northern Harrier Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Because comprehensive surveys or monitoring efforts for northern harrier in the Planning Area have not been conducted, and because the existing data of known occurrences are based mostly on incidental observations or limited surveys (e.g., anecdotal records, surveys conducted within limited areas), the population size and nesting locations of this species in the Planning Area are not known. Nonetheless, , the species is considered to occur throughout the Planning Area.

NOHA Population Levels and Trend

Northern harrier has experienced an overall population decline over its distribution during the 20th century (del Hoyo et al. 1995, MacWhirter and Bildstein 1996); however, specific population status and trends vary regionally. White (1994) considered harrier population trends variable, but possibly decreasing, in western North America. Furthermore, he cited habitat modification (particularly wetlands loss) as the most important cause of possible declines. Analysis of Breeding Bird Survey (BBS) data indicates an overall decline of northern harrier populations throughout the species breeding range, although trends vary regionally. In the Western BBS Region, BBS data indicate a population decrease between 1996 and 2003 (N = 408, $P < 0.01$), 1966–1979 (N = 123, $P = 0.14$), and 1980–2003 (N = 372, $P < 0.01$) (Sauer et al. 2004).

In California, northern harrier has experienced localized population declines (CPIF 2000). BBS data suggest a slight statewide (California) population increase between 1966 and 2003 (N = 56, $P = 0.36$), 1966 to 1979 (N = 31, $P = 0.15$), and 1980 to 2003 (N = 45, $P = 0.51$) (Sauer et al. 2004); although this trend is not considered statistically significant. The BBS trend for northern harrier in the Central Valley is similar to the statewide trend. Furthermore, based on Christmas Bird Count (CBC) data, the winter population as of 1990 was estimated at 13,200 birds (Johnsgard 1990).

NOHA Threats to the Species

The primary threat to northern harrier, particularly in California, is habitat loss and degradation as a result of urbanization, development, and agricultural conversion. North American populations of northern harrier have declined during the 20th century, mainly as a result of the extensive draining of wetlands, implementation of monoculture farming, and reforestation of open farmlands (MacWhirter and Bildstein 1996). White (1994) also cited habitat modification, particularly loss of wetlands, as the most important cause of possible population declines. In agricultural landscapes, overgrazing of pastures, fewer fencerows and larger croplands, and widespread use of insecticides and rodenticides have reduced prey availability for northern harriers (MacWhirter and Bildstein 1996).

Direct or indirect human disturbance of nesting activities, particularly in agricultural areas, threatens northern harrier populations. Where northern harriers nest in agricultural lands, practices such as early mowing, disking, and haying during the nesting cycle can cause nest

destruction (MacWhirter and Bildstein 1996); and these lands can function as population sinks. Also, these activities near a nest can cause parents to abandon the nest (MacWhirter and Bildstein 1996). Because northern harriers are ground nesters with a long nesting period (approximately 75 days between nest construction and fledging young), nest success in croplands remains very sensitive to agricultural practices for a long duration.

Reproductive failure and declines in northern harrier populations in the mid-20th century have been linked to organochloride pesticide contamination, particularly dichlor-diphenylethylene (DDE), the major metabolite of Dichlorodiphenyltrichloroethane (DDT). However, these populations apparently recovered quickly after regulation of DDT in the early 1970s (Hamerstrom 1969, 1986; MacWhirter and Bildstein 1996).

In south Sacramento County, northern harrier is specifically threatened by habitat loss and fragmentation as a result of conversion of habitat to urban uses and agriculture, particularly the conversion of grasslands to vineyards. Also, the loss of suitable agricultural land to development has reduced the extent of suitable foraging habitat. It is possible that the use of rodenticides and insecticides have reduced prey populations, resulting in lowered survivorship and reproductive success.

NOHA Data Gaps and Conservation Implications

The ecology, status, and management of northern harriers have received considerable attention in recent years. There are several sources of uncertainty regarding northern harrier and its requirements in the Planning Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

NOHA Population and Habitat Distribution within the Planning Area

Northern harriers occur in suitable habitat within the Planning Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by northern harriers, such as grasslands, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Planning Area. At most sites with these land-cover types, the status of northern harrier is not known.

Because comprehensive surveys for northern harrier in the Planning Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g., anecdotal records), the population size, nesting locations, and important wintering areas of this species throughout the Planning Area are not known. Although the distribution of grasslands is mapped and quantifiable, the quality of habitat for northern harriers within most of these areas is unknown.

Until this data gap is remedied, the conservation value of grassland and agricultural land-cover types for northern harrier will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, and/or are adjacent to these areas.

Effectiveness of Grassland and Wetland Enhancement and Restoration Techniques in Creating Suitable Habitat Structure for Northern Harrier

Achieving the conservation goals and objectives for northern harrier will require successful enhancement and restoration of grassland and wetland habitats. The structure of these habitats (e.g., dense, tall vegetation) is an important factor for suitability of northern harrier. Whether restored or grasslands and wetlands can retain the structural attributes suitable for northern harrier is unknown.

If restoration and enhancement techniques cannot eventually create grassland and wetland habitats with structural characteristics suitable for northern harrier, then those lands would not support breeding pairs or contribute directly toward the conservation strategy for the species.

Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for northern harrier are not well documented. This causes uncertainty in determining whether the preserve design will be effective in meeting the conservation goals for northern harrier.

Effectiveness of Mammalian Prey Population Enhancement Measures in Improving Foraging Habitat for Northern Harrier

Achieving the conservation goals and objectives for northern harrier may require successful enhancement of mammalian prey populations. Mammalian prey populations, particularly California vole, should be passively or actively promoted on all lands acquired and managed for northern harrier habitat. Whether these efforts will succeed at increasing the available prey base and enhancing habitat for northern harrier is unknown.

Other Data Gaps

Other data gaps that could be important for northern harrier conservation include: 1) responses of northern harrier populations to habitat management and enhancement techniques; 2) prey population dynamics and cycles; 3) variation in recruitment and survival between natural and disturbed habitats; 4) habitat use and nest success between wet and dry habitats; and 5) an appropriate livestock grazing and fire regime appropriate for northern harrier habitat management and enhancement.

NOHA Literature Cited

Barnard, P.E. 1983. Foraging behaviour and energetics of Northern Harriers *Circus cyaneus* (L.). Honor's thesis, Acadia University, Wolfville, NS.

Barnard, P.E., R.B. MacWhirter, R.E. Simmons, G.L. Hansen, and P.C. Smith. 1987. Timing of breeding and the seasonal importance of passerine prey to Northern Harriers. *Canadian Journal of Zoology*, 65:1942-1946.

Bildstein, K.L. 1988. Northern Harrier *Circus cyaneus*. Pp. 251-303 I*n* Handbook of North American Birds (R. S. Palmer, editor), volume 4. Yale University Press, New Haven, Connecticut.

Bildstein, K.L. 1992. Causes and consequences of reversed sexual size dimorphism in raptors: the head start hypothesis. *Journal of Raptor Research*, 26:115-123.

Bird, D.M., S.K. Ho, and D. Pare. 1982. Nutritive values of three common prey items of the American Kestrel. *Comp. Biochem. Physiol. A*. 73:513-515.

Breckenridge, W.J. 1935. An ecological study of some Minnesota Marsh Hawks. *Condor* 37:268-276.

Burke, C.J. 1979. Effect of prey and land use on mating systems of harriers. Master's thesis, University of Wisconsin, Stevens Point.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Fish and Game and Point Reyes Bird Observatory (CDFG and PRBO). 2003. California Bird Species of Special Concern: Updated Draft List and Solicitation of Input. Available at http://www.prbo.org/cms/.

California Partners in Flight (CPIF). 2000. Version 1.0. The draft grassland bird conservation plan: a strategy for protecting and managing grassland habitats and associated birds in California (B. Allen, lead author). Point Reyes Bird Observatory, Stinson Beach, California. http://www.prbo.org/calpif/plans.html.

Conard, C. Ornithologist. Telephone conversation, October 15, 2004.

del Hoyo, J., A. Elliot, and J. Sargatal, editors. 1995. Handbook of the birds of the world. Volume 2. Lynx Edicions. Barcelona.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, NY. Accessed online http://ebird.org/content/ebird.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. The birder's handbook, a field guide to the natural history of North American birds. Simon and Schuster.

Grant, C.V., B.B. Steele, and R.L. Bayn, Jr. 1991. Raptor population dynamics in Utah's Uinta Basin: the importance of food resource. *Southwest Naturalist*, 36:265-280.

Grinnell, J. and A.H. Miller. 1944. *Distribution of the birds of California*. Pacific Coast Avifauna, No. 27. Berkeley, California.

Hamann, B., H. Johnston, P. McClelland, S. Johnson, L. Kelly, and J. Gobielle. 1999. Birds. Pages 3.1-3.34 *in* G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: A Review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307 pp.

Hamerstrom, F. 1969. A harrier population study. Pp. 367-383 I*n* Peregrine Falcon populations, their biology and decline (J. J. Hickey, editor). University of Wisconsin Press, Madison.

Hamerstrom, F. 1986. Harrier, hawk of the marsh: the hawk that is ruled by a mouse. Smithsonian Institution Press, Washington, D.C.

Hamerstrom, F. and M. Kopeny. 1981. Harrier nest-site vegetation. *Journal of Raptor Research* 15:86-88.

Hamerstrom, F., F. N. Hamerstrom, and C. J. Burke. 1985. Effect of voles on mating systems in a central Wisconsin population of harriers. *Wilson Bulletin*, 97:332-346.

Hopkins, J. President. Institute for Ecological Health. Meeting, September 28, 2004.

Johnsgard, P.A. 1990. Hawks, eagles and falcons of North America: biology and natural history. Smithsonian Institution Press, Washington, D.C.

Keran, D. 1981. The incidence of man-caused and natural mortalities to raptors. *Journal of Raptor Research,* 15:108-112.

MacWhirter, R.B. 1985. Breeding ecology, prey selection and provisioning strategies of Northern Harriers *Circus cyaneus* (L.). Honor's thesis, Mount Allison University, Sackville, NB.

MacWhirter, R.B. 1994. Offspring sex ratios, mortality, and relative provisioning of daughters and sons in the Northern Harrier (*Circus cyaneus*). Ph.D. Dissertation, Ohio State University, Columbus.

MacWhirter, R.B., and K.L. Bildstein. 1996. Northern Harrier (*Circus cyaneus*) in A. Poole and F. Gill (eds.), The Birds of North America. The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

Martin, J.W. 1987. Behavior and habitat use of breeding Northern Harriers in southwestern Idaho. *Journal of Raptor Research,* 21:57-66.

Martin, J.W. 1989. Harriers and kites. Pp. 83-91 *In* Proceedings of the western raptor management symposium and workshop. National Wildlife Federation, Washington, D.C.

Rees, J.R. 1976. Behavioral ecology of marsh hawks in dissimilar habitats. Master's thesis. Eastern Washingon State College, Cheney, Washington.

Remsen, J.V. 1978. Bird Species of Special Concern in California. California Department of Fish and Game. Sacramento, California.

Richardson, C.T., and C.K. Miller. Recommendations for protecting raptors from human disturbance: a review. *Wildlife Society Bulletin* 25:634-638.

Romin, L.A., and J.A. Muck. 1999. Utah field office guidelines for raptor protection from human and land use disturbances. U.S. Fish and Wildlife Service, Utah Field Office, Salt Lake City.

Sauer, J.R., J.E. Hines, and J. Fallon. 2004. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2003. Version 2004.1.* USGS Patuxent Wildlife Research Center, Laurel, Maryland.

Selleck, D.M., and B. Glading. 1943. Food habits of nesting Barn Owls and Marsh Hawks at Dune Lakes, California, as determined by the "cage nest" method. California Fish and Game 20:122-131.

Serrentino, P. 1987. The breeding ecology and behavior of Northern Harriers in Coos County, New Hampshire. Master's thesis, University of Rhode Island, Kingston.

Simmons, R., and P.C. Smith. 1985. Do Northern Harriers (Circus cyaneus) choose nest sites adaptively? *Canadian Journal of Zoolology*, 63:494-498.

Simmons, R., P. Barnard, and P.C. Smith. 1987. Reproductive behavior of *Circus cyaneus* in North America and Europe: a comparison. *Ornis Scand*. 18:33-41.

Simmons, R.E. 1983. Polygyny, ecology and mate choice in the Northern Harrier *Circus cyaneus* (L.). Master's thesis, Acadia University, Wolfville, NS.

Simmons, R.E. 1984. Do Northern Harriers lay replacement clutches? *Journal of Raptor Research,* 18:103-106.

Simmons, R.E., P.C. Smith, and R.B. MacWhirter. 1986. Hierarchies among Northern Harrier (*Circus cyaneus*) harems and the cost of polygyny. *Journal of Animal Ecology*, 55:755-771.

Small, A. 1994. *California birds: their status and distribution*. Ibis Publ. co., Vista, California.

Smith, D.G., and J.R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. *Brigham Young University Scientific Bulletin Bio. Ser*. 28:1-76.

Temeles, E.J. 1987. The relative importance of prey availability and intruder pressure in feeding territory size regulation by harriers, *Circus cyaneus*. *Oecologia* 74:286-297.

Temeles, E.J. 1989. The effect of prey consumption on territorial defense by harriers: differential responses to neighbors versus floaters. *Behavioral Ecology Sociobiol*. 24:239-243.

Thompson-Hanson, P.A. 1984. Nesting ecology of Northern Harriers on the Hanford site, south-central Washington. Master's thesis, Washington State University, Pullman.

Toland, B. 1985. Northern Harrier predation on Greater Prairie Chickens in southwest Missouri. *Journal of Raptor Research,* 19:146-148.

Trochet, J. Ornithologist. Telephone conversation, October 15, 2004.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Accessed online at http://migratorybirds.fws.gov/reports/bcc2002.pdf.

White, C.M. 1994. Population trends and current status of selected western raptors. *Studies in Avian Biology* 15:161-172.

Williams, C.K., R.D. Applegate, R.S. Lutz, and D.H. Rusch. 2000. A comparison of raptor densities and habitat use in Kansas cropland and rangeland ecosystems. *Journal of Raptor Research* 34:203-209.

Zeiner, D. C., W. F Laudenslayer Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife: volume II: birds. California Department of Fish and Game. Sacramento, California.

WHITE-TAILED KITE (WHKI)

White-tailed Kite (WHKI)

(Elanus leucurus)

Status USFWS: None

Status CDFW: Fully Protected Species



Ron Wolf 2008

WHKI Listing Status

The white-tailed kite (*Elanus leucurus*) is legally protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7012). It is also protected under the California Fish and Game Code (Section 3503.5, 3513, and 3800) and is identified and protected as a California Fully Protected Species (Section 3511). White-tailed kite is not listed as a species of special concern by the California Department of Fish and Wildlife (CDFW) (Shuford and Gardali 2008).

WHKI Life History and Ecology

WHKI Species Description and Life History

Physical Description

White-tailed kites are medium-sized hawks (total length 12.6 to 15 inches) with a long white tail and large, black shoulder patches. In adults, these features contrast with a gray back and white underparts. The sexes are similar is size, but females tend to have darker backs than males. Adults have red eyes and juveniles have yellow eyes. Juveniles have fluffy streaks on the breast and head, and gray and white-tipped feathers on the back. White-tailed kites are also recognized by their foraging behavior, frequently hovering in the air "kiting" while searching for prey (Sibley 2000; Sibley 2001).

Reproduction

White-tailed kites are monogamous and breed between February and October. Pairs select nest sites and build stick nests in trees, and are generally considered territorial to other kites and most large raptors (Dunk 1995; Henry 1983). Alternate nests are commonly built and may be used in subsequent breeding attempts (Waian 1973) even when first nest is successful and young are still dependent (Wright 1978). Most white-tailed kite nest studied by Erichsen (pers. comm.) failed during the first attempt due to factors including weather, predation or harassment (i.e. by Swainson's hawks [*Buteo swansonii*] or Corvids). Two broods are more common during periods of high prey abundance (Stendell 1972).

Nests are built by both sexes and the age at first breeding is unknown. Each sex gathers sticks to build nest and carries them in bill or with feet, although female places most of the sticks during nest construction (Dunk 1995). Most nests are located within the upper third of the tree and may be shaded or exposed to direct sunlight for long periods. The nests are primarily composed of small twigs and lined with grass, hay, or leaves and can take as long as 28 days to build (Dixon et al. 1957).

Females typically lay a clutch of four eggs and lay one egg every other day (Stendell 1972). Females incubate eggs exclusively (Dixon et al. 1957). Incubation begins after first or second egg is laid (Stendell 1972) and lasts for 30 to 32 days (Hawbecker 1942). Females take breaks from incubation to preen, stretch (Dixon et al. 1957), remove pellets which are dropped greater than 164 feet (50 meters) from the nest (Dunk 1995), and receive prey from the male.

Males continue to deliver prey to female when young hatch, although only female feeds prey to altricial young (Dixon et al. 1957). Prey are torn apart and fed to young until they are about 3.5 weeks old (Moore and Barr 1941). Although siblings attempt to monopolize food, females discourage aggressive young, and siblicide is not reported (Dixon et al. 1957; Dunk 1995). Young fledge around four to five weeks after hatching, and adults may teach young to fly by hovering over nest and fledglings (Waian 1973). Within two months of fledging, immature White-tailed kites are known to establish and hold territories (Dunk 1995).

Longevity, Survival, and Mortality

Little data is available for longevity and survival of white-tailed kites. The maximum life span recorded is five years and eleven months (Clapp et al. 1982). Mortality of white-tailed kites primarily occurs from natural causes (inclement weather and predation) (Stendell 1972). Predation by other large raptors is suspected from the remains of immature white-tailed kites found beneath larger raptor perches (Dunk 1995).

Dispersal Patterns

Little information is available for dispersal patterns of white-tailed kites. No evidence of natal philopatry exists, although one individual immature established a territory adjacent to natal territory (Dunk 1995).

Diet and Foraging

White-tailed kites may be observed in California hovering over grassland and ruderal habitat along the side of and in-between the Interstate 5 corridor. The species hunts almost exclusively by hovering at heights between five to 25 meters, often facing into the wind. A white-tailed kite will hover for longer periods (greater than one minute) in windy conditions, but will hover for a shorter duration until it attacks, flies to another hover location, soars, or flies to a perch (Dunk 1995; Jacsic et al. 1987). Hunting from a perch is rarely recorded (Dunk 1995). An attacking bird holds its wings nearly vertical and then drops straight down feet first. Once prey is captured, individuals fly to nearby perch to consume prey by first eviscerating, then decapitating and eating the head and body parts (Dunk 1995). During time periods when the male is feeding female or young, males fly to nest site with prey and exchange with female by perching side-by-side or by aerial exchange where female approaches hovering male from behind and grasps prey with talons from male (Dunk 1995; Waian 1973).

White-tailed kites predominantly feed on small mammals (greater than 95 percent), although a remarkable number of 10,959 different prey items have been reported from California (Dunk 1995). The species is considered a small mammal specialist, and several dietary studies (Hawbecker 1940, 1942; Dixon et al. 1957; Waian and Stendell 1970; Waian 1973; Wright 1978; Stendell 1972) from pellet analysis reveal that voles (*Microtus* spp.), house mice (*Mus musculus)*, and harvest mice (*Reithrodontomys* spp.) are the most frequent prey species eaten. Vole is most frequently eaten and is a prey species known to dramatically fluctuate in abundance. Small mammals other than house and harvest mice are occasionally eaten (2.1 to 18 percent). White-tailed kites are not known to drink water, and pellet casting is related to timing of feeding (Stendell 1972).

Movement and Migration Patterns

White-tailed kites are generally thought of as resident species throughout their range although nomadism is suggested (Dunk 1995). White-tailed kites have expanded their range during the last 40 years (Waian and Stendell 1970; Eisenmann 1971; Pruett-Jones et al. 1980) and colonized San Clemente Island from mainland California, a distance of 50 miles (Scott 1994). Nomadism appears to be linked to low abundances of California voles (*Microtus californicus*). Individuals are reported moving prior to the breeding season (January through April) (Stendell 1972).

Individuals banded as nestlings were found 12 miles away from natal site in 8 months after banding, and 100 miles after two years (Dixon et al. 1957). Stendell (1972) recovered four nestlings that were banded. One individual was found one mile of the natal site, and the other three were found between 10 and 30 miles from the natal site.

Territoriality/Home Range

Territoriality of white-tailed kites during the nesting season likely varies by an order of magnitude throughout the species range (Dunk 1995). Competitors proximately regulate territoriality size, but ultimately prey numbers regulate territory size because they apparently control competitor's numbers (Dunk and Cooper 1994). Territory sizes estimated along the south coast of California near Long Beach ranged from 22 to 128 acres (nine to 52 hectares) (Waian 1973) and near San Diego from 42 to 217 acres (17 to 88 hectares) (Henry 1983).

Breeding densities of white-tailed kites vary with local prey abundance, ranging from one pair per 64 acres to one pair per 1,116 acres in occupied habitat (Stendell 1972). Winter densities along the north coast ranged from one white-tailed kite per 15 acres to one per 28 acres in occupied areas that supported large vole populations (Dunk and Cooper 1994).

White-tailed kites roost individually or communally during winter and often reuse roost sites annually, sometimes greater than 30 years (Erichsen pers. comm.). Communal roosts typically contain between 10 and 40 individuals (Waian 1973), and have supported more than 100 (Bolander and Arnold 1965). Communal roost sites are located in a variety of locations including woodlands and even large trees within urban areas (Erichsen pers. comm.). Human disturbance in urban areas has caused white-tailed kites to abandon some communal roost sites (Waian 1973; Dunk 1995), but in some instances, attempts to discourage communal roosting by kites are difficult and unsuccessful (Erichsen pers. comm.). White-tailed kites are known to travel over twenty miles to communally roost together (Erichsen pers. comm.).

Ecological Relationships

Predator-prey relationships are important for white-tailed kites, particularly because they are predators and affected by prey (small mammals) population cycles and abundance; and predation by other taxa is a source of mortality. Populations appear regulated by prey availability (Stendell 1972; Dunk and Cooper 1994), therefore availability of nesting and roosting sites may be important in areas where prey is abundant. Population distribution is also attributed to prey abundance (Dunk and Cooper 1994), as white-tailed kites have expanded their range during the last 40 years (Waian and Stendell 1970), even across ocean waters some 50 miles away to colonize San Clemente Island (Scott 1994).

Increased competition for nest sites with other raptors and corvids is suspected to negatively affect white-tailed kite populations (Dunk 1995). In areas where competitors occur, territory size is negatively influenced by competitor abundance (e.g. northern harriers [*Circus cyaneus*], red-tailed hawks [*Buteo jamaicensis*], red-shouldered hawks [*B. lineatus*], American kestrels [*Falco sparverius*], short-eared owls [*Asio flammeus*], and barn owls [*Tyto alba*]) (Dunk and Cooper 1994). Some competitors (red-tailed hawks, common ravens [Corvus *corax*]) are kleptoparasitic.

Suitable nesting substrates have declined in some regions where isolated trees have fallen and new regeneration is lacking.

WHKI Habitat Requirements and Ecology

White-tailed kites generally inhabit low-elevation grasslands, wetlands dominated by grasses, oak woodlands, and agricultural and riparian areas (Dunk 1995). Nests are built in trees that occur in isolation or in riparian areas. Other nesting raptor species as well as other conspecifics are known to compete for nest sites and territory size, but ultimately abundance of prey species is the primary factor that influences their numbers and distribution (Dunk 1995).

Nest tree selection has not been well studied. White-tailed kites have been found nesting in isolated trees and in trees within large stands (greater than 100 hectares) (Dunk 1995). Nests are built in several tree species and even in a few shrubs. These species include valley oak (*Quercus lobata*), interior live oak (*Q. wislizeni*), boxelder (*Acer negundo*), ornamental trees, cottonwood (*Populus* spp.), olive (*Olea* spp.), (CDFG 2010; Pickwell 1930; Hawbecker 1942; Dixon et al*.* 1957). The height of nest trees/shrubs ranges from 10 feet (three meters) [e.g., coyote-brush (*Baccharis* spp*.)* and saltbush (*Atriplex* spp*.)*] (Stendell 1972) to 164 feet (50 meters) [e.g. coast redwood (*Sequoia sempervirens)* and sitka spruce (*Picea sitchensis)*] (Dunk 1995). In the Central Valley, white-tailed kites have been observed nesting in valley oak, cottonwood, and pine (*Pinus* spp.) trees (Hopkins pers. comm.). White-tailed kites are territorial with conspecifics, and are known to nest at relatively close distances (e.g. 153 meters) (Dixon et al*.* 1957; Pickwell 1930; Hawbecker 1942). Erichsen (pers. comm.) reported that white-tailed kite nests in riparian areas were typically located within 0.25 miles of one another.

The size and structural diversity of woodlands supporting white-tailed kite nests has not been well documented. Nest sites are rarely found in isolated trees. They are usually located on the edge or riparian habitats, or in hedgerows and groups of trees, and are commonly found adjacent to natural vegetation, pasture crops (alfalfa) and sugar beets (Erichsen pers. comm.).

White-tailed kites use a variety of habitat types for foraging and the importance of these habitats is dependent on vegetation structure and prey abundance. Lightly grazed or ungrazed grasslands/pastures support larger prey populations and are thus considered more suitable,

although intensively cultivated areas are also used (Dunk 1995). In cultivated areas, perennial crops such as alfalfa and sugar beets tend to support higher prey numbers, and White-tailed kite nest densities have been highly correlated with these two crops (Erichsen et al. 1994). Nesting studies conducted by Hawbecker (1942) showed that white-tailed kites foraged up to within 0.5 miles from the nest during the breeding season. During winter and the breeding season, Warner and Rudd (1975) found foraging from nest or perch sites extended up to 1.8 miles, but most were less than 0.6 miles. Foraging primarily occurred in two habitat types, riparian and irrigated cultivated land (e.g. alfalfa, tomatoes, sugar beets).

The occurrence and abundance of white-tailed kites during the breeding and non-breeding seasons are strongly affected by the dynamics of local rodent prey populations. Because rodent population cycles are often irruptive, and kite populations are sensitive to the availability of rodent prey, the suitability of an area and its occupancy by white-tailed kites may vary during certain years. Stendell (1972) found the density of voles at the onset of the breeding season affects the presence and abundance of nesting white-tailed kites. Winter densities of white-tailed kites are strongly correlated with the abundance of voles. The mean number of California Voles/territory was estimated at 1,483 for territories ranging from 3.9 to 53 acres (1.6 to 21.5 hectares) in northern California (Dunk and Cooper 1994). In other studies occurring in southern California (Waian 1973; Henry 1983), no prey abundances were reported with nesting territories.

Because white-tailed kites are highly dependent on voles, understanding habitat types optimal for prey species is of high importance. Many small mammal studies have been conducted including two studies in and adjacent to the Planning Area (Jones et al. 1999; Wyatt et al. 1991). The three most abundant species in both studies were the deer mouse (*Peromyscus maniculatus*), house mouse, and meadow vole (*Microtus californicus*). Jones et al. (1999) found the highest numbers of small mammals in perennial grassland, ruderal roadside vegetation, and restored riparian habitat when compared to alfalfa, annual grassland, and seasonal wetland. Abundance indices for these species varied by season and habitat type. When abundance indices for each of the three dominant species were combined for each season, the highest total index (1.47) occurred in perennial grassland habitat during spring.

The level of human disturbance that white-tailed kites can tolerate during the breeding season is unknown. The species generally avoids areas with regular human disturbance, although a small number of pairs appear to tolerate humans and nest at rural and urban margins (Erichsen pers. comm.). Communal roosts during the non-breeding season have been disturbed by humans and caused abandonment (Dunk 1995); however, if not disturbed, the species is known to roost communally in residential areas in cities for several consecutive years (Whisler pers. comm).

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for white-tailed kite are identified in Table G-3.24.1 and have been derived from input from local species experts.

Table G-3.24.1. Habitat Elements for White-tailed Kite

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture grassland, valley grassland, vernal impoundment, vernal pool, seasonal wetlands, seasonal impoundment, and freshwater marsh.	White-tailed kites predominantly feed on small mammals (>95%). The occurrence and abundance of white-tailed kites during the breeding and non-breeding seasons are strongly affected by the dynamics of local rodent prey populations. Because rodent population cycles are often irruptive, and kite populations are sensitive to the availability of rodent prey, the suitability of an area and its occupancy by white-tailed kites may vary during certain years. CFP (2000) listed an objective of identifying habitat requirements of prey populations. In agricultural areas, prey populations vary, but perennial crops (ex. pasture, alfalfa) generally provide better foraging opportunities compared to annual crops (e.g. grains).
Nesting	Blue oak woodland, mixed riparian scrub, mine tailing riparian woodland, and mixed riparian woodland.	Nest tree or woodland nest site selection has not been well studied and may not be as important as prey abundance. Nests can be found in isolated trees, but are more often associated with small or medium size riparian woodlands with associated grasslands, irrigated pastures, or cultivated crops such as alfalfa and sugar beets. Dunk (1995) suggests that adding nest trees in open grasslands where there are few trees may be useful if White-tailed kites are limited by nest sites. A few white-tailed kites are known to nest in urban and suburban areas.

WHKI Species Distribution and Population Trends

WHKI Species Distribution

In the United States, the white-tailed kite breeds primarily in the Central Valley, coastal valleys and prairies of California. A few instances of breeding have been documented in Oregon and Washington. The white-tailed kite also commonly nests in southern Texas, and small nesting populations can be found in Florida. Outside the United States, white-tailed kites are found along the coastal areas of Mexico, Panama, the slope of the Caribbean, Colombia, Venezuela, Guyana, Brazil, Paraguay, Uruguay, and northern Argentina (Dunk 1995).

WHKI Central Valley Distribution

White-tailed kites can be found throughout the Central Valley where grasslands, vernal pool complexes, low-growing agriculture crops, and oak savannah and woodlands occur. No studies have documented the densities of breeding or wintering population numbers within the Central Valley.

WHKI Distribution within Planning Area

White-tailed kites occur in suitable habitat throughout the Planning Area; their overall distribution, abundance, and population structure are not well known. Land cover types used by white-tailed kites, such as grasslands, vernal pool grasslands, riparian, oak savannah and woodlands, fallow agricultural fields, and cultivated agricultural fields occur throughout most of the Planning Area, particularly outside the Urban Development Area (UDA). At most sites within these land cover types, the presence and population status of white-tailed kites is not known.

No regularly occurring surveys have been conducted throughout the Planning Area, however, white-tailed kites are known to nest or forage throughout the Planning Area (Connard pers. comm.). These areas include Mather Lake (Conard pers. comm.), Mather Regional Park, Laguna Creek (Jones pers. comm.), and Morrison Creek and adjacent lands (Jones pers. comm.). They are also known to nest or forage in the Cosumnes River corridor, The Nature Conservancy's (TNC) Howard Ranch (Trochet pers. comm.), and suspected to nest at Stone Lakes National Wildlife Refuge (NWR) (Conard pers. comm.). The above areas constitute a subset of the potential habitat available for nesting and foraging white-tailed kites.

Some additional information on white-tailed kite distribution is also available from Swainson's hawks surveys conducted by the CDFW. These surveys are conducted throughout the Central Valley and include sixteen 3.1 square miles (five square kilometers) survey plots in the Planning Area. During the Swainson's hawk surveys, the presence of white-tailed kites were recorded if they were observed on any one of the three survey visits conducted during the Swainson's hawk breeding season. White-tailed kites were found in nine of the sixteen survey plots. The location of these survey plots where the kites were found primarily occurred in the southwestern portion of the Planning Area. Interestingly, no white-tailed kites were found in four study plots located in the central eastern portion of the county (i.e., near the area of Rancho Murrieta).

Because comprehensive surveys or monitoring efforts for the white-tailed kite in the Planning Area have not been conducted, and because the existing data of known occurrences are based mostly on incidental observations or limited surveys, the population size and nesting distribution of this species in the Planning Area are not well known. In the Planning Area, the CNDDB reports six occurrences inside the UDA, and four occurrences outside the UDA (CDFG 2010). These numbers do not provide an estimate of the distribution or population size of the

kites because they are based on a very small number of surveys in a limited area. Figure WHKI-1 illustrates the distribution of occurrences of white-tailed kites within and adjacent to the Planning Area as recorded in the CNDDB (CDFG 2010) and from other sources (ebird.org 2005-2010; Estep 2007; Klotz Property 2005).

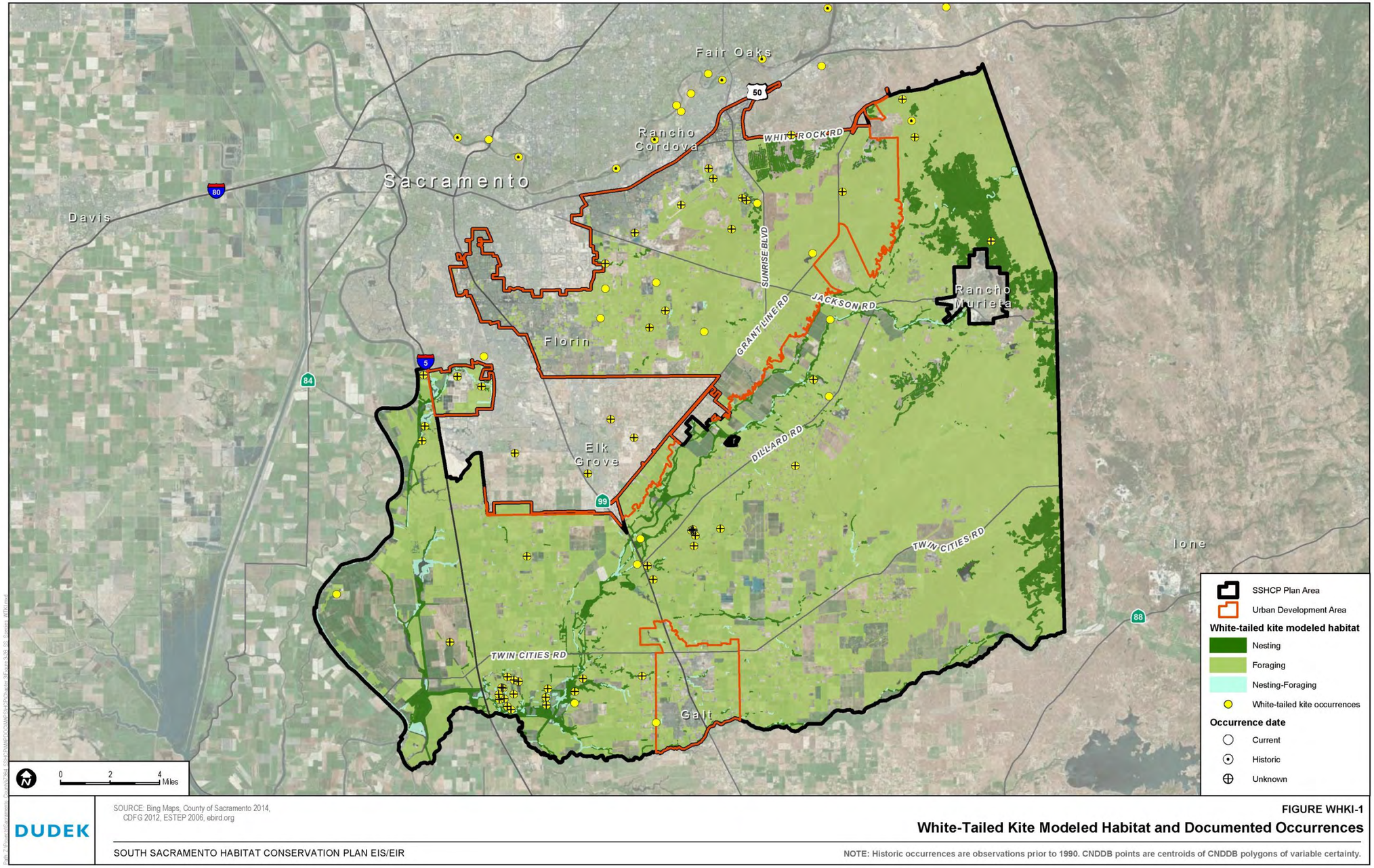
WHKI Population Levels and Trend

White-tailed kite populations have fluctuated greatly over the past century. According to Grinnel and Miller (1944), this species was common and widespread in the Central Valley and foothills before 1895 but was rare or entirely gone from many areas by the 1940's. The declines in California populations during this period have been attributed to a combination of habitat loss, shooting (kites were considered a pest species), and possibly egg collecting (Waian and Stendell 1970). From the 1940's to the early 1980's California populations increased dramatically (Fry 1966; Waian and Stendell 1970; Pruett-Jones et al. 1980), and their range expanded greatly (Dunk 1995). Factors that may have contributed significantly to this population increase include increased agricultural irrigation, reduced hunting, and the natural potential of the species for population growth.

Since the early 1980's, white-tailed kite populations have steadily decreased again throughout much of their range in California. The most significant declines have occurred in southern California grassland regions (i.e. 38.7 percent between 1982 and 1991) (Dunk 1995). No other values for percent declines in other regions were reported; however, ten of the remaining 13 regions showed declines. Factors possibly contributing to this decline include:

- The conversion of natural habitat or agricultural lands to urban development;
- Conversion of grassland, pastures, and agricultural fields to non-suitable crops such as vineyards;
- Increased disturbance of kites by human activities, farming techniques that remove vegetation along field margins that host prey species; and
- Increased competition for nesting sites with other raptors or with corvids (crows, ravens, and jays).

Figure WHKI-1 White-Tailed Kite Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

No population size or population trends have been specifically studied for the Central Valley or within the Planning Area. From Breeding Bird Surveys, Sauer et al. (1999) determined that overall numbers in California have increased, but increases were not statistically significant. Regional areas found to be decreasing included the Central Valley, southern California grasslands, and southern Pacific rainforests (CPF 2000). The California Natural Diversity Database (CNDDB) of the CDFW listed 10 occurrences in the Planning Area (CDFG 2010). These data are based on a small number of reports and do not represent an accurate measure of local population size. The actual population size in Planning Area is unknown and expected to be much larger than reported.

WHKI Threats to the Species

The white-tailed kite is threatened by habitat loss and alteration, and possibly from shooting, collisions with stationary/moving structure or objects, and disturbance at nest and communal roost sites. Few studies have good empirical data on population declines and because the species is known to vary in its nesting distribution, identifying whether once occupied habitat has become unsuitable is difficult. The following summarizes threats to white-tailed kite populations.

WHKI Habitat Loss and Alteration

Both nesting and foraging habitat for white-tailed kites has been lost to urbanization or converted to agricultural crops that do not support prey species or that are used for foraging. In addition, much of the grassland habitat used for foraging by white-tailed kite has been converted to other uses. DeHaven (2000) quantified changes in California cropping patterns and found that white-tailed kite "friendly" habitats such as rangelands, grassland, and pastures have decreased. These habitats have been replaced by a variety of other crops (e.g. fruit and nuts, cotton, and vineyards) that are not used by white-tailed kites, or by crops (e.g., vegetables and melons, tomatoes, beans, potatoes) that are suspected of lower quality than grassland habitats for foraging white-tailed kites.

Habitat loss and alteration also threatens white-tailed kites by fragmenting habitat, minimizing natural tree recruitment, and potentially lowering reproductive success by requiring kites to forage over longer distances. In fragmented habitat, increased foraging time theoretically also increases the time susceptible to predation and agonistic interactions with competitors. Fredrickson and Laubhan (1995) documented increasing fragmentation by urbanization, and in some areas, encroaching woody vegetation was decreasing grassland patch size. Some bird species are only found in grassland patches that are 100 times the size of an average territory of a given species (CDFW and PRBO 2003). In rangelands, natural tree recruitment has been minimized, and the decreased number of trees may limit nesting opportunities for white-tailed kites (Dunk 1995).

WHKI Shooting

White-tailed kites were once considered a pest species and were shot (Waian and Stendel 1970). No new research such as banding studies has been conducted that may prove that shooting still occurs. In general, white-tailed kites and other raptors are not regularly shot and this threat is not considered to seriously affect their populations (Hunt pers. comm.).

WHKI Disturbance at Nest and Communal Roost Sites

White-tailed kites are sensitive to human disturbance during communal roosting and nesting (Dunk 1995). They are known to travel greater than twenty miles during winter to roost together (Erichsen pers. comm.), most often in areas of little human disturbance, and nesting pairs are usually found in areas with minimal disturbance. Waian (1973) reported that white-tailed kites temporarily abandoned a communal roost site, although the type of disturbance and season was not reported. During this study, all terrain vehicles repeatedly disrupted a communal roost and the kites abandoned the site one day after the disturbance (Dunk 1995). Some individuals are known to tolerate disturbance of regular vehicle traffic and human activities, especially during winter. White-tailed kites are known roost communally in residential areas and also at urban fringes (Whisler pers. comm.). At one communal roost site in Davis, a landowner tried several measures to disturb greater than 100 kites communally roosting in pine trees. The white-tailed kites simply flew in at dark. Eventually, and landowner removed the tops of the trees to discourage their use by kites (Erichsen pers. comm.). Even during the nesting season, white-tailed kites have established nest sites in areas such as parks and areas at the urban fringe (CDFG 2010; Whisler pers. comm.), although one nest site monitored by Erichsen (pers. comm.) failed to produce young.

WHKI Data Gaps and Conservation Implications

Several researchers have documented many of the life history traits, habitat requirements, distribution, population trends, and threats to the species throughout its range. This information is important for the development of the white-tailed kite Conservation Strategy; however, the data gaps have implications for the species conservation.

WHKI Unknown Number of Undiscovered White-tailed Kite Nesting Territories/ Breeding Areas and Communal Roost Sites.

Additional unsurveyed and partially surveyed potentially suitable habitat exists within the Planning Area and elsewhere within the range of the species. In the Planning Area, discovery of nesting territories/breeding areas or communal roost sites of white-tailed kites may occur anywhere that suitable habitat is present.

WHKI Unknown Relationship Between Apparently Suitable Habitat Conditions but Unoccupied by Nesting Individuals

White-tailed kites do not currently occupy habitat that appears suitable (Jones pers. comm). Although specific habitat elements are present (i.e., nest trees), and general habitats such as fallow fields occur nearby, no active nest sites have been identified.

WHKI Pesticide and Herbicide Application

The use of pesticides and herbicides in agricultural areas and their impacts on prey items for white-tailed kite are unknown. Traditional efforts of rodent control may have impacts on white-tailed kite foraging opportunities.

WHKI Unknown Relationship between West Nile Virus and White-tailed Kites

West Nile Virus has only recently been reported in North America and has been found to primarily affect crows and other corvids by causing direct mortality. Many other birds species are also exposed, and owls appear to be a susceptible family of birds that develop both clinical signs and significant mortality (Fitzgerald et al. 2002). It is unknown if the virus can affect other raptors, such as the white-tailed kite, but some researchers believe that raptors may develop West Nile Virus by ingestion of infected prey such as smaller birds or mice, rather than direct transmission by biting mosquitoes (Garmendia et al. 2000).

WHKI Literature Cited

Bolander, G.L., and J.R. Arnold. 1965. An abundance of White-tailed Kites in Sonoma County, California. *Condor* 67:446.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Department of Fish and Game and Point Reyes Bird Observatory (CDFG and PRBO). 2003. California Bird Species of Special Concern: Updated Draft List and Solicitation of Input. Available at http://www.prbo.org/cms/.

California Partners in Flight (CPF). 2000. Version 1.0. The draft grassland bird conservation plan: a strategy for protecting and managing grassland habitats and associated birds in California (B. Allen, lead author). White-tailed Kite focal species account (prepared by J. Moore). Point Reyes Bird Observatory, Stinson Beach, California. http://www.prbo.org/CPIF/Consplan.html.

Clapp, R.B., M.K. Klimkiewicz, and J.H. Kennard. 1982. Longevity records of North American birds: Gaviidae through Alcidae. *Journal of Field Ornithology*, 53: 81-208.

Conard, Chris. Ornithologist. Sacramento Regional Wastewater Treatment Plant – Bufferlands. Elk Grove, California. Conversations with Todd Sloat, October 2004.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use— for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Dixon, J.B., R.E. Dixon, and J. E. Dixon. 1957. Natural history of the White-tailed Kite in San Diego County, California. *Condor* 59: 156-165.

Dunk, J.R. 1995. White-tailed Kite (*Elanus leucurus*). *In* The Birds of North America, No. 178 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornitholgists' Union, Washington, D.C.

Dunk, J.R. and R.J. Cooper. 1994. Territory size regulation in Black-shouldered Kites. *Auk* 111: 588-595.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, New York. Accessed online http://ebird.org/content/ebird.

Eisenmann, E. 1971. Range expansions and population increase in North and Middle America of the White-tailed Kite (*Elanus leucurus*). *American Birds* 25:529-536.

Erichsen, Andrea. Pacific Municipal Consultants. Rancho Cordova, California. Conversations and email correspondence with Todd Sloat, October, November, December 2004.

Erichsen, A.L., K.S. Smallwod, N.D. Ottum, and D.M. Fry. 1994. The white-tailed kite: GIS analysis of habitat selection in the Sacramento Valley, California with implication for Conservation of wildlife in agricultural landscapes. Abstract. *Journal of Raptor Research* 28(1):46.

Erichsen, A.L., K.S. Smallwood, A.C. Commandatore, B.W. Wilson, and D.M. Fry. 1996. White-tailed Kite Movement and Nesting Patterns in an Agricultural Landscape. *In*. Raptors in Human Landscapes. D. Bird and J.J. Negro eds. Academic Press, London. pp. 165-175.

Estep, J. 2007. The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (*Buteo swainsoni*) in the City of Rancho Cordova Planning Area. Estep Environmental Consulting, Sacramento, California.

Fitzgerald, S.D., J.S. Patterson, M. Kiupel, H.A. Simmons, S.D. Grimes, C.F. Sarver, R.M. Fulton, B.A. Steficek, T.M. Cooley, J.P. Massey, and J.G. Sikarskie. 2002. Clinical and pathologic features of West Nile Virus infection in Native North American Owls (Family Strigidae). *Avian Diseases*, 47 (3):602-610.

Fredrickson, L.H., and M.K. Laubhan. 1995. Land use impacts and habitat preservation in the grasslands of western Merced County, California. Grassland Water District, Los Banos. 83 pp.

Fry, D.R., Jr. 1966. Recovery of the White-tailed Kite. *Pacific Discovery* 19: 27-30.

Garmendia, A.E., H.J. Van Kruningern, R.A. French, J.F. Anderson, T.G. Andreadis, A. Kumar, and A.B. West. 2000. Recovery and identification of West Nile virus from ahawk in winter: *Journal of Clinical Microbiology* 38:3110-3111.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Pacific Coast Avifauna, No. 27. Berkeley, California.

Hawbecker, A.C. 1940. The nesting of the White-tailed Kite in Southern Santa Cruz County, California. *Condor* 42: 106-111.

Hawbecker, A.C. 1942. A life history study of the White-tailed Kite. *Condor* 44: 267-276.

Henry, M.E. 1983. Home range and territoriality in breeding White-tailed Kites. Master's thesis, San Diego State Univ., San Diego, California.

Hunt, Grainger. Santa Cruz Predatory Bird Research Group, U.C. Santa Cruz. McArthur, California. Conversations with Todd Sloat, January 2005.

Jaksic, F.M., R. Rozzi, A. Labra, and J.E. Jimenez. 1987. The hunting behavior of Black-shouldered Kites (*Elanus caeruleus leucurus*) in central Chile. *Condor* 89: 907-911.

Jones, Roger. Sacramento Regional Wastewater Treatment Plant – Bufferlands. Elk Grove, California. Conversations with Todd Sloat, October 2004.

Jones, R.T. Faith, T. Sloat, B. Young, and S. Brown. 1999. Mammalian use of the Sacramento Regional Wastewater Treatment Plant Bufferlands, Elk Grove, California.

Klotz Property. 2005. Klotz Property Open Space Preserve, Figure 6. Special-Status Species Location Map. Sacramento, California.

Moore, R.T., and A.T. Barr. 1941. Habits of the White-tailed kite. *Auk* 58:452-462.

Pickwell, G. 1930. The White-tailed Kite. *Condor* 32: 221-239.

Pruett-Jones, S.G., M.A. Pruett-Jones, and R.L. Knight. 1980. The White-tailed Kite in North and Middle America: current status and recent population changes. *American Birds* 34:682-688.

Sauer, J.R., J.E. Hines, I. Thomas, J. Fallon, and G. Gough. 1999. The North American breeding bird survey, results and analysis 1996-1998. Version 98.1. USGS Patuxent.

Scott, T.A. 1994. Irruptive dispersal of Black-shouldered Kites to a coastal island. *Condor* 96: 197-200.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Sibley, D.A. 2000. *The Sibley guide to Bird Life and Behavior*. National Audubon Society. Alfred A. Knopf, New York. 587pp.

Sibley, D.A. 2001. *The Sibley guide to Birds*. National Audubon Society. Alfred A. Knopf, New York. 544 pp.

Stendell, R.C. 1972. The occurrence, food habits, and nesting strategy of White-tailed Kites in relation to a fluctuating vole population. Ph.D. diss., Univ. of California, Berkeley.

Trochet, John. Ornithologist. The Nature Conservancy, Elk Grove, California. Conversations with Todd Sloat, October 2004.

United States Fish and Wildlife Service (USFWS). 1995. Migratory nongame birds of management concern in the United States: The 1995 list. Prepared by the Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Washington, D.C.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Online version: http://migratorybirds.fws.gov/reports/bcc2002.pdf.

Waian, L.B. 1973. The behavioral ecology of the North American White-tailed Kite (*Elanus leucurus majusculus*) of the Santa Barbara coastal plain. Ph.D. diss., Univ. of California, Santa Barbara.

Waian, L.B., and R.C. Stendell. 1970. The White-tailed Kite in California with observations of the Santa Barbara population. *California Fish and Game* 56: 188-198.

Warner, J.S., and R.L. Rudd. 1975. Hunting by the White-tailed Kite. *Condor* 77: 226-230.

Whisler, Ed. Ed Whisler Consulting. Davis, California. Conversations with Todd Sloat, November 2004.

Wright, B.A. 1978. Ecology of the White-tailed Kite in San Diego County. Master's thesis, San Diego State Univ., San Diego.

Wyatt, D.T., K.M. Norton, and T.R. Nosal. 1991. Area mammalian resources at the proposed Caltrans mitigation bank at Beach Lake, Sacramento County, 1991.

GREATER SANDHILL CRANE (SACR)

Greater Sandhill Crane (SACR)

(Grus candadensis tabida)

Status USFWS: None

Status CDFW: Threatened, Fully Protected Species



SACR Listing Status

Greater sandhill crane (*Grus canadensis tabida*) is listed as threatened under the California Endangered Species Act (CESA) and is legally protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7012) and the California Fish and Game Code (Section 3503.5 and 3800). It is also a California Fully Protected Species (Section 3511 of the California Fish and Game Code).

SACR Life History and Ecology

SACR Species Description and Life History

Physical Description

The greater sandhill crane is the largest of six subspecies occurring in North America. All sandhill cranes subspecies physically appear similar except for size. Adult sandhill cranes are

gray overall with a dull red skin on their crown and lores. They have white colored feathers on the chin, throat, and cheek, and black colored primary feathers. The males and females are similar in plumage. Juveniles lack the dull red crown, and the gray colored body is irregularly mottled with brownish-red. Adults can also appear mottled brownish-red, but the color is from "stains" and not a true feather color.

SACR Demography

Reproduction

In California, nesting greater sandhill cranes occur in Lassen, Modoc, Plumas, Shasta, Sierra, and Siskiyou Counties (Littlefield 1989; CDFG 1997).

Greater sandhill cranes nest in open areas of wet meadows. These areas are often interspersed with emergent marsh. Sandhill cranes usually build their nests over shallow water. Clutch size is typically two, and adults and young forage in emergent marsh and meadow habitat during the nesting season (CDFG 1997).

Longevity, Survival, and Mortality

The maximum age in the wild for any subspecies of sandhill crane is 21 years (Tacha et al. 1992), while in an eastern unhunted population of greater sandhill cranes, annual survival rates for post-juvenile males and females were 0.87 and 0.86 respectively. Ivey (pers. comm.) calculated survival rates for greater sandhill cranes nesting at Malheur National Wildlife Refuge (NWR) and Modoc NWR. For Malheur NWR, he found an annual survival rate of 0.9 (se=0.013) for adults and 0.66 (se=0.096) for juveniles. At Modoc NWR, annual survival rate was calculated to be 0.88 (se = 0.016) for the population.

Mortality can occur from a variety of factors. Greater sandhill cranes are not legally hunted in California and hunting is not considered a serious threat to the species. Collisions with transmission lines are known to cause crane mortality, especially in areas with high winds and fog (Tacha et al. 1992), while sandhill cranes also die from diseases such as avian botulism and cholera (Windingstad 1988).

Mortality from predation by foxes (*Vulpes* spp.), racoon (*procyon lotor*), coyote (*Canis latrans*), gray wolf (*C. lupus*), bobcat (*Lynx rufus*), common raven (*Corvus corax*), eagles, and owls typically occurs with eggs and young (Walkinshaw 1973).

Dispersal Patterns

Adults and young generally expand their range after breeding which leads to pre-migration staging (Tacha et al. 1992). Pairs and family groups consistently return to breeding areas and wintering sites if habitat conditions are suitable. Juveniles remain with adults during the first year in family groups and do not disperse until they return to the breeding areas the following year. Males are more philopatric to the natal site than females, although distances moved have not been reported (Tacha et al. 1992).

Diet and Foraging

Sandhill Cranes forage on a variety of food items by probing with their bills and gleaning food on the ground surface. They are considered omnivorous and have been reported to feed on cultivated grains, berries, small mammals, insects, snails, reptiles, amphibians, nestling birds, and seeds.

Studies by Ivey and Herziger (2003) show that within and adjacent to the Planning Area, wintering greater sandhill cranes feed in a variety of agriculture crop types; however, food items consumed in the study have not been documented.

Movement and Migration Patterns

Greater sandhill cranes are migratory and leave the northern breeding areas in mid-September. Cranes migrate in small groups (20 to 50 individuals) composed of pairs and family groups. By late October, most greater sandhill cranes have left their northern breeding or staging areas and have arrived on the wintering grounds. Once on the wintering grounds, greater sandhill cranes use traditional areas throughout the winter. Migration back to the breeding areas starts in February and is completed by mid-March (Ivey and Herziger 2003).

Territoriality/Home Range

Winter home ranges of greater sandhill cranes using the Staten Island area averaged 0.66 square miles (1.71 square kilometers), varying from 0.07-2.12 square miles (0.17-5.49 square kilometers). Cranes using other areas (e.g., Tyler Island, Cosumnes River Floodplain, and Sacramento-San Joaquin River Delta) were found to not travel far during winter. Only one of thirty-nine color marked greater sandhill cranes left the main winter use area. The rest remained in the main winter use area (Ivey and Herziger 2003).

Linear distances greater sandhill cranes traveled to forage from roost sites were also calculated by Ivey and Herzier (2003) and Pogson (1990). The average distance traveled was 0.88 mi (range 0.17-1.89 mi) (Ivey and Herziger 2003) and 1.74 miles (Pogson 1990) between roost sites and foraging areas.

SACR Habitat Requirements and Ecology

Greater sandhill cranes wintering in and adjacent to the Planning Area use open agricultural habitats, natural vegetation communities, and seasonally managed wetlands. After the onset of winter rains, Sandhill Cranes begin foraging for invertebrates by probing soils in grassland habitats and overturning cattle dung. They also hunt for mice in taller grassland vegetation (Littlefield and Ivey 2000). They appear to avoid grassland habitats when vegetation exceeds 10 inches (25 centimeters). Invertebrates are also consumed in natural and managed seasonal wetlands.

Grain is also an important component to the sandhill crane's diet and as such agricultural habitat types are frequently utilized as foraging habitat. Common habitat types used for foraging include pastures, alfalfa, corn (chopped, disced, flooded, and stubble), tomatoes (flooded, ripped), and wheat (disced, ripped, flooded, stubble) (Ivey and Herziger 2003). Ivey (pers. comm.) rated agriculture crops in the Planning Area in order of importance. Rice and corn were rated the highest, followed by winter wheat and irrigated pasture. Alfalfa was the next highest rated crop, followed by hay, dryland pasture, and row crops. Sandhill Crane use in the above crop types occurs even though the crops are harvested for farming income. Allowing the crops to mature (e.g., corn) and serve as "food plots" for cranes has been successful in attracting cranes to refuges (Littlefield and Ivey 2000).

Habitats also important for greater sandhill cranes include flooded fields for roosting and rocky uplands (e.g., dirt and gravel roads) for collecting "grit." Roosting areas are located in shallowly flooded areas where cranes loaf during the day and seek protection from terrestrial predators at night. Although they will select sites with emergent vegetation along the periphery of the wetland, they rarely use roosts with heavy emergent vegetation (Littlefield and Ivey 2000). The size of roost sites is variable. Sandhill cranes roosting in Oregon used sites between 1-300 acres (0.5 to 120 hectares), with water depths averaging 4.5 inches (11.7 centimeters). Littlefield (1993) reported cranes abandoning roost sites when water depths reached eight to 11 inches (20 to 29 centimeters). He recommended roost sites should be at least 20 acres (8 hectares) in size, with water maintained from early September to mid-March. Collection of grit by cranes is important when their diet is composed of grain seeds. Grit collected in dirt and gravel roads can be essential when none is available near foraging sites. Sandhill Cranes in Sutter County have been reported flying up to five miles (eight kilometers) to obtain grit (Littlefield and Ivey 2000).

Greater sandhill cranes travel limited distances to foraging sites from night roost areas. Typically, the foraging areas are located within two miles of the night roost site. Most of the roost sites within the Planning Area are known.

Greater sandhill cranes are intolerant of excessive human disturbance and such disturbance may play an important role in habitat selection. Excessive disturbance has caused cranes to

abandon foraging and roosting sites, and repeated disturbance affects their ability to feed and store energy needed for survival. Ivey and Herziger (2003) documented disturbance of greater sandhill cranes on Staten Island, a highly used area by cranes, and found that aircraft, vehicles, hunting, and recreational activities (e.g., birding, walking, horseback riding, bicycling, boating) can cause cranes to run or fly away. Ivey (pers. comm.) found that cranes generally avoid suitable agricultural foraging habitat near occupied dwellings, and foraging areas within 100 yards of human structures should not be considered suitable.

Greater sandhill cranes generally use open areas without significant distances of fencing. For example, the 9,200 acres on Staten Island contain virtually no fences. The only fencing on the entire island is located around a few residences. Sandhill cranes run and flap when initiating flight and this behavior prevents them from gaining altitude quickly and avoiding fences.

SACR Habitat Elements

Habitat elements are those basic aspects of the environment which are needed for survival and propagation of the species. The habitat elements for greater sandhill crane are identified in Table G-3.25-1 and have been derived from input from local species experts.

Table G-3.25-1. Habitat Elements for Greater Sandhill Crane

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Cropland, irrigated pasture grassland, valley grassland, freshwater marsh, and seasonal wetlands.	Open agricultural habitats (preferred without fencing). Foraging items (e.g. invertebrates or grains). Manage grassland habitats to not exceed 10 in height.
Roosting	Vernal impoundment, vernal pool, seasonal wetland, seasonal impoundment, and freshwater marsh.	Flooded fields with water maintained from early September to mid-March. Rocky uplands (e.g., dirt and gravel roads) for collecting "grit." Cranes abandon roost sites when water depths reached 8-11 in. Cranes are intolerant of excessive human disturbance.

SACR Species Distribution and Population Trends

SACR Species Distribution

Greater sandhill cranes nest in the Great Lakes states, northwestern Minnesota, southeastern Manitoba; Rocky Mountain states; northeastern Nevada; southern British Columbia; southwestern Washington; central, eastern, and southeastern Oregon; and the Great Basin portion of California. Wintering sandhill cranes are found in southern Georgia and Florida, Texas Gulf Coast, New Mexico, southeastern Arizona, northern Mexico, southeastern California, and the Central Valley of California. In California, greater sandhill cranes nest in northeastern

California and winter in the Central Valley, Sacramento-San Joaquin River Delta, southern Imperial County, Lake Havasu NWR, and the Colorado River Indian Reserve (Zeiner et al. 1990).

SACR Central Valley Distribution

Greater sandhill cranes occur in limited locations in the Central Valley. A winter population estimate of 8,500 individuals was reported in January 1993. Of this estimate, 61 percent were using the Butte Basin, while the other two major areas used included the Cosumnes Floodplain and Delta. In the mid-1980's, crane biologists believed 61 percent of the wintering greater sandhill cranes were found in the Delta, and the number of Cranes using the Cosumnes Floodplain increased from one percent in 1983 to 23 percent in 1984 (Littlefield and Ivey 2000). Apparently, Crane use of the Cosumnes Floodplain increases during flood years (Ivey pers. comm.).

Sandhill Cranes are counted each winter in the Central Valley during the "Mid-winter Waterfowl Survey Program" which is conducted from airplanes. No attempt is made to separate the species observed during the survey, but on occasion, ground surveys have been conducted concurrently with aerial surveys in order to determine relative proportions of Greater and Lesser Sandhill Cranes. Hoffman (pers. comm.) found that in the Sacramento Valley, most of the cranes observed were greater sandhill cranes, while those in the Sacramento-San Joaquin River Delta had a more even distribution of Greater and lesser sandhill cranes. The mid-winter waterfowl count conducted January 3rd to 6th, 2005 found 7,786 sandhill cranes in the Sacramento Valley, 2,611 in the Sacramento-San Joaquin River Delta, and 1,335 in the San Joaquin Valley.

The nearest greater sandhill crane use outside of the Planning Area occurs on the Stone Lakes NWR where several hundred greater sandhill cranes occur each winter. Crane use on the NWR and adjacent agriculture land occurs in wetland and irrigated pasture (Harvey pers. comm.). Greater sandhill crane use adjacent to the refuge has decreased from agriculture conversion.

SACR Distribution within the Planning Area

Greater sandhill crane use in the Planning Area principally occurs in the Cosumnes River Floodplain. During the 1970's, few cranes were found in the Cosumnes River Floodplain, but by 1984, an estimated 24 percent of the wintering population was found using the flooded meadows and pastures of this latter area in late January (Littlefield and Ivey 2000). Pogsen and Lindstedt (1988) recorded a peak of 1,631 greater sandhill cranes during the 1983/84 winter along the Cosumnes River Foodplain and between the preserve and State Highway 99. Apparently, greater sandhill cranes use the Sacramento-San Joaquin River Delta in early winter. When local duck clubs dewater fields after hunting season (i.e., early January), these cranes move to the Cosumnes River Floodplain. Surveys in 1999 suggest crane use in the Sacramento-

San Joaquin River Delta and Cosumnes River Floodplain is similar to that found in the mid-1980's (Littlefield and Ivey 2000).

Greater sandhill cranes that are foraging and roosting at the Cosumnes River Preserve tend to be concentrated in the roadless area south of Desmond Road, one to two miles east of Franklin Boulevard, and north of the Cosumnes River (Figure SACR-1) (Ivey and Herziger 2003). Greater sandhill cranes also use the area immediately west of the Planning Area south of Lambert Road (Harvey pers. comm.).

The of wintering greater sandhill crane is that area identified as use areas in the *Conservation Assessment for Greater Sandhill Crane Wintering on the Cosumnes River Floodplain and Delta Region* (Littlefield and Ivey 2000); however, this area was extended to include recorded occurrences (ebird.org 2005-2010) and all suitable habitat within a two-mile buffer of the occurrence location. In coordination with USFWS and CDFW modeled habitat for this species was extended to include other adjacent habitat that is otherwise consistent with that previously defined.

SACR Population Levels and Trend

Market hunting between 1880 and 1915 has been cited as having a severe impact on greater sandhill cranes (Littlefield and Ivey 2000). In the 1920's, Dawson (1923 *in* Littlefield and Ivey 2000) reported there were no more than six nesting pairs left in California. Two decades later, in 1944, Walkinshaw (1949 *in* Littlefield and Ivey 2000) estimated only three to five nesting pairs in California. In 1988, 276 pairs were reported and by 2000, 465 pairs were recorded at 127 sites (i.e., an increase of 68 percent).

Although population estimates have been regularly recorded on the breeding grounds in northern California, solid population data is not available for greater sandhill cranes wintering in California. The last detailed winter estimate was conducted in the Central Valley in January 1984. Surveyors found 6,000 greater sandhill cranes. Surveys in 1991 to 1993 estimated 8,500 individuals. During the mid-1980's, 23 percent (1,380) of the sandhill cranes occurred in the Cosumnes River Floodplain (Pogson 1990 *in* Littlefield and Ivey 2000). No recent detailed winter estimates are available for the Cosumnes River Floodplain. Ivey (pers. comm.) estimated that around 1,000 individuals used the area during the 2002/03 winter, while approximately 1,500 were documented using nearby Staten Island.

SACR Threats to the Species

Historic threats to the species included market hunting, agricultural expansion, and wetland drainage. Although sandhill cranes are no longer hunted in California, agricultural expansion and wetland impacts still occur and affect the species. These and other threats are described below.

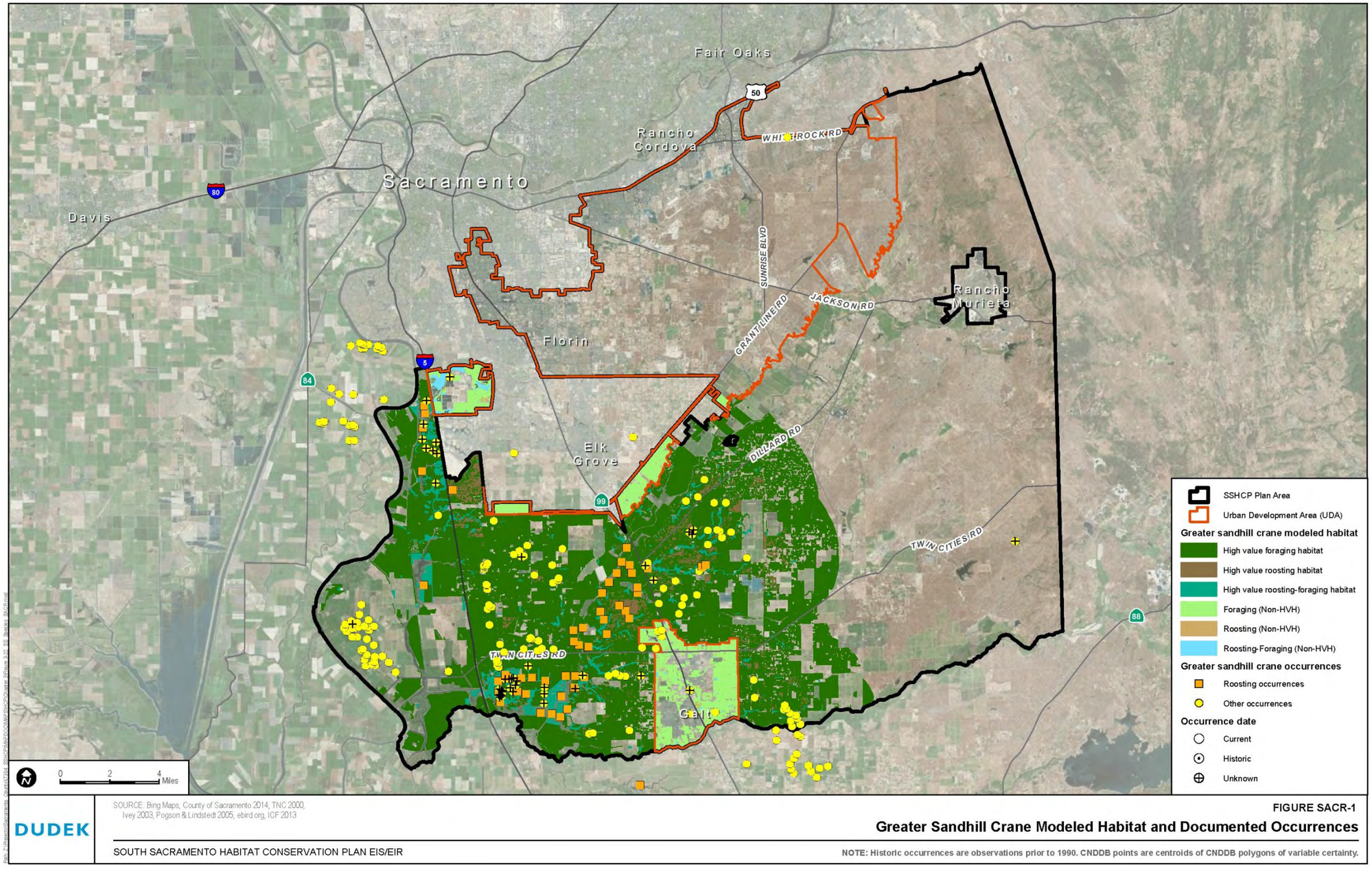
SACR Habitat Loss and Alteration

Foraging and roosting habitat for the greater sandhill crane has been lost to urbanization or converted to agricultural crops that do not provide habitat for the species (i.e., vineyards, orchards). Conversion of grassland habitats to urban and agricultural uses proportionately exceeds the conversion of any other habitat type in California (Ewing et al. 1988; Moore et al. 1990 *in* Hunting 2001). Much of the grassland and grassland/vernal pool habitat used by foraging cranes has been converted to other uses. Some of these uses, including agricultural crops such as rice, corn, winter wheat, and irrigated pasture provide high quality habitat for cranes. However, many of these crops have been recently replaced by a variety of other crops (e.g., fruit and nuts, and vineyards) (DeHaven 2000) that are not used by greater sandhill cranes, or by crops (e.g., cotton, potatoes, tomatoes) that are rarely used or are of lower quality than grassland habitats (Ivey and Herziger 2003).

Recent habitat loss in the area of Stone Lakes NWR near the Planning Area has affected greater sandhill cranes. Greater Sandhill Cranes have been displaced from suitable habitat associated with the East Franklin Project (roughly 3,000 acres). Similarly, the conversion of approximately 1,200 acres of suitable habitat to vineyards at the Circle K Ranch has displaced cranes. Additional future expansion in the area (i.e., City of Elk Grove) could impact even more crane habitat.

Decreasing patch size of natural habitats and agriculture crops has been found to reduce habitat suitability for many bird species (including sandhill cranes). Ivey (pers. comm.) found that greater sandhill cranes generally will not use suitable foraging areas that are within 100 yards of a human dwelling. Cranes also flush and are disturbed when automobiles approach within such distances. When larger, more continuous tracks of lands are split and made smaller for other crops, vehicle traffic from farming operations often increases, and this increase in human activity negatively affects crane use.

Figure SACR-1 Greater Sandhill Crane Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

SACR Collision with Transmission Lines, Fences, and Television/Radio Towers

Greater Sandhill Crane collisions with distribution lines have been reported by several authors (Pogson et al. 1988; Tacha et al. 1978; Walkinshaw 1956; Wheeler 1966; Drewien 1973; Lewis 1974; Nesbitt and Gilbert 1976 *in* California Energy Commission 1995). These collisions typically occur in foggy and windy conditions and result in mortality (Tacha et al. 1978; Lewis 1974; Nesbitt and Gilbert 1976; Littlefield and Ivey 2000). It is unknown if these collisions occur frequently enough to be considered a threat to the overall population. Drewien (1973) found that collisions with power lines accounted for 37 percent of the observed Sandhill Crane mortality in his study population, while Pogson et al. (1988) concluded that power line collisions seem to be the largest source of unnatural mortality for California's Central Valley Sandhill Crane population. In one incident in Texas (i.e., one day), 52 sandhill cranes were found dead or dying from collision with distribution lines (Tacha et al. 1978). Limiting distribution lines in areas where Sandhill Cranes forage and roost during the breeding season is considered an effective means of minimizing mortality (Ludwig pers. comm.)

SACR Disturbance of Foraging and Roosting Areas

Greater Sandhill Cranes do not tolerate regular disturbances. Types of disturbances that are detrimental to the subspecies include hunting, birding, photography, operating equipment for habitat management, boating, and aircraft. Disturbance forces them to expend unnecessary energy that is needed for survival during winter and migration. Disturbance during pre-dawn hours, such as hunting activities has caused cranes to leave roosts in darkness, increasing their risk for collisions with transmission lines or other obstructions. Only one pre-dawn disruption is usually necessary before cranes abandon a site (Littlefield and Ivey 2000).

Aircraft were found to affect the greatest numbers of greater sandhill cranes using Staten Island (Ivey and Herziger 2003). Aircraft disturbance documented during the study occurred from planes assessing water levels for mosquito abatement, weeds, levee integrity, as well as flying for recreational reasons. While aircraft have the ability to affect more cranes because they can cover large areas quickly, the most frequent disturbance type occurred from vehicles, including all-terrain vehicles (ATV's) (Ivey and Herziger 2003). Cars and trucks disturb cranes less than ATV's, providing the drivers stay inside the vehicle. This study also showed cranes are more tolerant to vehicles during mid-day compared to pre-dawn. Slow moving farm equipment only slightly disturbed cranes.

Disturbance from hunting also poses a serious threat to greater sandhill cranes. Hunters accessing hunt areas during pre-dawn hours flush cranes from their roosts and hunter presence can keep cranes from roosting or foraging in an area (Ivey and Herziger 2003). Because of hunting-related disturbances to cranes, Staten Island implemented a crane friendly hunting

program. This program has been considered successful at minimizing disturbances and increasing crane use of the island. Ivey and Herziger (2003) noted that the number of greater sandhill cranes roosting on Staten Island more than doubled after the opening day of waterfowl season. This increase in crane numbers was attributed to the disturbance of cranes in nearby crane use areas (i.e., adjacent Delta Islands).

Waterfowl hunting may impact cranes less that pheasant hunting if hunters are limited to using blinds. During pheasant hunting, hunters and dogs who are on foot are more disruptive to cranes than waterfowl hunters sitting concealed in blinds (Ivey and Herziger 2003).

SACR Epizootic Events

Like other waterfowl, sandhill cranes are limited by the low availability of wetland roost areas. For example, less than twenty salt lakes in western Texas provide roost areas for up to 80 percent of the mid-continent population during winter. Thus, greater numbers of Sandhill Cranes are "forced" to use these limited roost areas and are more susceptible to epizootic events such as cholera, avian botulism, aspergillosis, salmonella, and avian tuberculosis. Each of the above diseases has been documented to kill Sandhill Cranes (Tacha et al. 1992).

Avian cholera has resulted in greater sandhill crane mortality in San Joaquin County (S. Lindstedt pers. comm. with G. Ivey). Although no details were reported with this event, it is assumed to have only affected a small number of Sandhill Cranes. Several years of data collected from waterfowl surveys may support this assumption. Sandhill Cranes have been observed roosting in areas where thousands of dead waterfowl were being recovered due to death from avian cholera (Gifford pers. comm.). During an avian cholera abatement program from the mid-1970's to 2000 in the Sacramento-San Joaquin River Delta and Yolo Bypass area, two greater sandhill cranes were documented to succumb to avian cholera. In addition, another 32 records of sandhill cranes (subspecies unknown) were reported dead over a period of 20 years (Gifford pers. comm.). These numbers appear low, but may be important from a population perspective given there are fewer than 10,000 greater sandhill cranes wintering in California.

SACR Data Gaps and Conservation Implications

Several researchers have documented the life history traits, habitat requirements, distribution, population trends, and threats to the subspecies throughout its range. This information is important for the development of the greater sandhill crane Conservation Strategy. The discovery of new information, considered here as data gaps, has additional implications for the species conservation. These topics are discussed below.

SACR Population and Habitat Distribution within the Planning Area

Greater Sandhill Cranes occur in suitable habitat within the Planning Area. Greater Sandhill Cranes are not known to utilize many other apparently suitable lands within the EIS/EIR study area. Furthermore, it is unclear as to

Until this data gap is remedied, the conservation value of grassland, seasonal wetlands, vernal pools, and suitable agricultural land-cover types for greater sandhill crane will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

SACR Amount of Wintering Habitat

Most of the greater sandhill crane wintering population within the Planning Area is assumed to occur in the Cosumnes River Floodplain. However, in severe winters where the amount of flooded area is greatly expanded, suitable foraging habitat may be limited if preserve boundaries have not included enough land.

SACR Pesticide and Herbicide Application

The use of pesticides and herbicides in agricultural areas and their direct and indirect impacts (i.e., through effects on prey species) on greater sandhill cranes are unknown. Traditional methods for controlling invertebrates may cause toxicitiy effects or reduce foraging opportunities.

SACR Literature Cited

California Department of Fish and Game (CDFG). 1997. Annual report on the status of California state listed threatened and endangered plants and animals. Sacramento, California.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

California Energy Commission (CEC). 1995. Avian Collision and Electrocution: An Annotated Bibliography. Publ. No. P700-95-001. Sacramento, California.

Dawson, W.L. 1923. The birds of California. South Moulton College, San Diego, Los Angeles, San Francisco, California.

DeHaven, R.W. 2000. Tricolored Blackbird discussion modified for outside FWS use—for typical HCP development. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

Drewien, R. 1973. Ecology of Rocky Mountain greater sandhill cranes. Dissertation. Univ. of Idaho, Moscow. 82 pp.

Ebird.org. 2005-2010. Records of Occurrence Locations of Greater Sandhill Cranes as self-reported by local birders on ebird.org.

Ewing, R. A., N. Tosta, R. Tuazon, L. Huntsinger, R. Marose, K., Nielson, R. Motroni, and S. Turan. 1988. California's forest and rangelands: growing conflict over changing uses. California Department of Forestry and Fire Protection. 348 pp. with appendices.

Gifford, Dan. Wildlife Biologist. California Dept. of Fish and Game. Correspondence with Todd Sloat, November, 2004.

Harvey, Tom. Refuge Manager. Stone Lakes National Wildlife Refuge. Conversation with Todd Sloat, January 2005.

Hofmann, Paul. Associate Wildlife Biologist. Sacramento Valley Central Sierra Region, California Department of Fish and Game. Conversation and correspondence with Todd Sloat, April 2005.

Hunting, K. 2001. Ferruginous Hawk (*Buteo regalis*). Species account for the CalPIF Grassland Bird Conservation Plan. http://www.prbo.org/calpif/htmldocs/species/grassland/fehaacct.html.

Ivey, G.L., C.P. Herziger. 2003. Sandhill Crane monitoring at Staten Island, San Joaquin County, California, 2002-03. A survey for The Nature Conservancy, Galt, California.

Ivey, Gary. Ornithologist. Correspondence with Todd Sloat, October 2004, January 2005.

Lewis, J.C. 1974. Ecology of the sandhill crane in the southeastern central flyway. Dissertation. Oklahoma State University, Stillwater. 214 pp.

Littlefield, C. D. 1989. Status of sandhill crane breeding populations in California, 1988. California Department of Fish and Game Nongame Bird and Mammal Section Rept. Sacramento, California.

Littlefield, C.D. 1993. Annual assessment and monitoring report for Grater Sandhill cranes and other threatened and endangered species on the Little Dry Creek nit, California. California Dept. of Fish and Game, Rancho Cordova, California.

Littlefield, C.D. 1995. Demographics of a declining flock of Greater Sandhill cranes in Oregon. *Wilson Bulletin,* 107:667-674.

Littlefield, C.D., and G.L. Ivey. 2000. Conservation assessment for Greater Sandhill Cranes wintering on the Cosumnes River Floodplain and Delta Region of California. The Nature Conservancy.

Ludwig, Shannon. Wildlife Biologist. Modoc National Wildlife Refuge. Conversation with Todd Sloat in February 2005.

Moore, S., J. Winckel, S. Detwiler, S. Klasing, P. Gaul, N. Kanim, B. Kesser, A. DeBevec, KI. Beardsley, and L. Puckett. 1990. Fish and wildlife resources and agricultural drainage in the San Joaquin Valley, California. Volume1. San Joaquin Valley Drainage Program, Sacramento, California. 364+ pp.

Nesbitt, S.A. and D.T. Gilbert. 1976. Powerlines and fences: hazards to birds. *Florida Naturalist,* 49(2):23.

Pogson, T.H. 1990. Distribution, abundance, and behavior of Greaer Sandhill Cranes, Grus Canadensis tabida, winering in California's Central Valley. M.S. Thesis, Univeristy of Alaska, Fairbanks, Alaska.

Pogson, T.H., and S.M. Lindstedt. 1988. Abundance, distribution, and habitat of Central Valley Population Greater Sandhill Cranes during winter. Unpublished report. Biology and Wildlife, University of Alaska, Fairbanks.

Tacha, T.D., D.C. Martin, and C.G. Endicott. 1978. Mortality of sandhill cranes associated with utility highlines. Pages 175-176 in: J.C. Lewis, ed. Proceedings of 2nd crane workshop, Rockport, Texas. National Audubon Society. Colorado State University Printing Service, Ft. Collins, Colorado.

Tacha, T.D., S.A. Nesbitt, and P.A. Vohs. 1992. Sandhill Crane. *In* The Birds of North America, No. 31 (A. Poole, P. Stettenheim, and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Walkinshaw, L.H. 1949. The Sandhill Cranes. Cranbrook Institute of Science Bulletin 29, Bloomfield Hills, Michigan.

Walkinshaw, L.H. 1956. Sandhill cranes killed by flying into power line. *Wilson Bulletin*, 68(4):325-326.

Walkinshaw, L.H. 1973. *Cranes of the World*. Winchester Press, New York.

Wheeler, R.H. 1966. Sandhill crane casualties in the blizzard of March 22, 1966. *Nebraska Bird Review,* 34(4)69-70.

Windingstad, R. M. 1988. Nonhunting mortality in Sandhill Cranes. *Journal of Wildlife Management*, 52:260-263.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990. California's wildlife. Vol. 1 amphibians and reptiles. Vol. II - birds, and Vol. III - mammals. California Department of Fish and Game. Sacramento, California.

LOGGERHEAD SHRIKE (LOSH)

Loggerhead Shrike (LOSH)

(Lanius ludovicianus)

Status USFWS: Bird of Conservation Concern

Status CDFW: Species of Special Concern



LOSH Listing Status

Loggerhead shrike (*Lanius ludovicianus*) is legally protected under the federal Migratory Bird Treaty Act (16 U.S.C. 703-712) and the California Fish and Game Code (Section 3800). This species is designated as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW) (Shuford and Gardali 2008); and a Bird of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS) (USFWS 2002).

LOSH Life History and Ecology

LOSH Species Description and Life History

Physical Description

Loggerhead shrike is a medium-sized (7.9 to 9.8 inches [20 to 25 centimeters]), large-headed Passerine with dark gray on the back and white on the breast. Its distinguishing feature is a black face mask that extends over the bill (Yosef 1996).

Taxonomy

There is considerable geographic variation in plumage and morphometrics within *Lanius ludovicianus.* The current systematics (Clements 2000) recognize 11 subspecies of *L. ludovicianus*. Five subspecies occur in California: *L. l gambeli*, *L. l. excubitorides, L. l. mearnsi, L. l. anthonyi,* and *L. l. grinnelli*. *L. l. gambeli* breeds from Washington south to southwestern California, including the Planning Area; *L. l. grinnelli* breeds from San Diego County south to north-central Baja California, Mexico. *L. l. excubitorides* breeds in southeast California, east *of L. l gambeli*; *L. l. mearnsi* is a resident on San Clemente Island; and*, L. l. anthonyi* is a resident on Santa Cruz, Santa Rosa, and Santa Catalina Islands (Yosef 1996).

Reproduction

The breeding season for loggerhead shrike generally begins before most other sympatric Passerine species (in late January or early February), and extends to July. In non-migratory populations, shrikes remain paired during the winter. Territory establishment probably begins between February and March. There is no information available about the specific timing of nest construction; however, it probably begins soon after territory establishment. Nest construction lasts approximately six to 11 days. Loggerhead shrikes build open cup nests, placing them in well-hidden microsites on a tree or shrub. Eggs are typically laid between March and June. Females normally lay five to six eggs and incubate for 15 to 17 days. The female usually feeds the nestlings until they fledge at 16 to 20 days after hatching; however, the male will feed the nestlings if the female is absent from the nest for extended periods. During the nestling period, the male provides the brooding female with food and participates in nest sanitation (e.g., removing fecal matter and regurgitated pellets) (Yosef 1996).

Survival and Longevity

There are no reliable juvenile or adult survival estimates for loggerhead shrike.

Dispersal Patterns

Banding studies indicate that adult loggerhead shrikes exhibit some site fidelity, and juveniles disperse widely. Recapture rates of loggerhead shrikes banded as juveniles are low. In Alberta, the average distance of juvenile dispersal was 4.2 mi (6.7 kilometers). Over the period of three years since the time of banding, shrikes dispersed up to 43.5 miles (70 kilometers) from their natal site. The rates of breeding adults returning to breeding sites between selected years were 73 percent in Idaho, 68 percent in Indiana, 60 percent in Virginia, 54 percent in Missouri, 57 percent in Iowa, and 41 percent and 59 percent in Minnesota. On San Clemente Island, California, return rates between years were 30 to 90 percent between 1985 and 1988. In other areas, (e.g., Alberta and North Dakota) return rates of breeding adults were lower (Yosef 1996).

Diet and Foraging

Loggerhead shrikes eat small to medium-sized animal matter, including arthropods, birds, amphibians, reptiles, and small mammals. They also eat roadkills and carrion. Shrikes forage primarily on large ground-dwelling insects that require little to no water (Miller and Stebbins 1964). A loggerhead shrike is able to carry prey as heavy as its own mass with its feet. It can carry smaller items in its bill. Hunting perches are especially important for loggerhead shrike foraging (Brooks and Temple 1990; Yosef and Grubb 1994). Loggerhead shrikes hunt from perches such as fences, shrubs, trees, utility lines, and poles. Shrikes kill their vertebrate prey by attacking the nape and tearing the cerebral vertebrae. They often impale their prey on barbed wire and other sharp objects. Loggerhead shrikes forage primarily in the morning (Yosef 1996).

Movement and Migration Patterns

Migration in loggerhead shrikes is poorly understood. Northern populations of loggerhead shrike are migratory. They migrate annually between their breeding and wintering grounds. Their spring migration to the breeding grounds begins in January and extends to March, peaking between February and March. Fall migration to the wintering grounds generally begins in August and extends through November, peaking between September and November. Birds apparently migrate individually during the day (Yosef 1996.) Although not explicitly reported, Loggerhead shrike populations in Sacramento County are presumably resident and non-migratory.

Territoriality/Home Range

Loggerhead shrikes are territorial and aggressive during the breeding season. They maintain relatively large territories, and all activities associated with reproduction (i.e., mating, foraging, brooding) occur within the territory. In mainland California, the average size of territories averaged 21 acres (8.5 hectares) and ranged between 10.9 acres (4.4 hectares) and 39.5 acres (16 hectares) (Yosef 1996). In areas of year-round residence (such as much of lowland California) members of a pair are known to defend adjoining territories during the non-breeding season and then defend a single nesting territory comprised of the adjoining winter territories during the breeding season (Lefranc 1997).

Ecological Relationships

There is little data available on predation of loggerhead shrike. Nest predators have included feral cats, black-billed magpies (*Pica pica hudsonia*), weasels (*Mustela* spp.), raccoons (*Procyon lotor*), and snakes. Potential nest predators are often mobbed by shrikes. These species include American crow (*Corvus brachyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), and northern harrier (*Circus cyaneus*) (Yosef 1996).

Prior to nesting, loggerhead shrikes engage in "group meetings," where neighboring shrikes convene to call and display. This behavior is thought to facilitate familiarity among neighboring territorial shrikes and minimize agonistic behavior among them during breeding activities. Shrikes interact with, and appear to dominate, many species that share their habitat. Nest parasitism of loggerhead shrike by Brown-headed Cowbird was first documented in Iowa in 1991. Shrikes readily chase cowbirds that approach nests containing eggs (Yosef 1996). The extent and intensity of cowbird nest parasitism on loggerhead shrike is unknown.

LOSH Habitat Requirements and Ecology

Loggerhead shrikes occur in dry, open habitats including grasslands, pastures with fence rows, agricultural fields, open woodlands (savannahs), scrub, and riparian areas. Suitable breeding habitat has the following characteristics: 1) short, sparse vegetation; 2) scattered or isolated low trees or large shrubs for nest sites; and 3) available hunting perches with an open view (Yosef 1996; Cade and Woods 1997). Loggerhead shrikes typically avoid completely treeless and shrubless areas (Cade and Woods 1997), as well as urbanized and densely wooded areas (Grinnell and Miller 1944). Winter foraging habitat is similar to summer breeding and foraging habitat, however, shrikes also use idle pastures and hayfields during the winter (Bartgis 1992).

In many areas, loggerhead shrike abundance is correlated with the amount of pastureland and available perches (Gawlik and Bildstein 1993; Yosef 1996). Hunting perches are especially important for loggerhead shrike foraging (Brooks and Temple 1990; Yosef and Grubb 1994). Loggerhead shrikes hunt from perches such as fences, shrubs, trees, utility lines, and poles. Yosef and Grubb (1994) experimentally added wooden posts (averaging 53 inches tall) to loggerhead shrike territories. They found that productivity increased and territory size decreased in territories where perches were added compared to control sites. The authors concluded that habitats managed for loggerhead shrikes should include abundant hunting perches, as well as an adequate prey base and nest sites.

Loggerhead shrikes may also forage in areas where vegetation is tall and dense, although these areas are considered suboptimal. Foraging success in these areas may be similar to that in more open and sparse areas, but involves more hovering, more flights, and increased perch-switching (Yosef and Grubb 1993).

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for loggerhead shrike are identified in Table G-3.26.1 and have been derived from input from local species experts.

Table G-3.26-1. Habitat Elements for Loggerhead Shrike

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak savanna, cropland, irrigated pasture/grassland, and valley grassland.	Open habitats with abundant, large arthropods (e.g., grasshoppers) and numerous hunting perches.
Nesting	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, mixed riparian scrub, and orchards.	Structurally diverse woodland habitats that dense vegetation for siting nests.

LOSH Species Distribution and Population Trends

LOSH Species Distribution

The breeding range of loggerhead shrike is extensive. It includes Alberta, Saskatchewan, and Manitoba in Canada; most of the United States with the exception of the Pacific Northwest and most of the northeastern states; and most of Mexico. Northern populations of loggerhead shrike are migratory. Their winter distribution includes northern California, northern Nevada, northern Utah, central Colorado, Kansas, western Missouri, northern Kentucky, and northern Virginia south through the southern United States and Mexico (Yosef 1996). Loggerhead shrike has apparently always been more frequent throughout the western and southern portions of its range than other areas of its distribution (Cade and Woods 1997).

In California, loggerhead shrike is a year-round resident throughout the foothill and lowland regions in the central to southern portion of the state. Although it does not breed or winter in the north coast region of California, winter migrants occur there (Zeiner et al. 1990).

LOSH Central Valley Distribution

Loggerhead shrike is a resident in the Central Valley where there is suitable habitat. The Central Valley may have historically functioned as a core area for interior populations of loggerhead shrike in California. Although shrikes occur in successional habitats, the Central Valley supported abundant breeding habitat that is considered more permanent or stable, such as perennial grasslands and open savannahs (Cade and Woods 1997).

LOSH Distribution Within Planning Area

Loggerhead shrikes occur year-round in suitable habitat throughout the Planning Area. They are probably regular breeders in the Planning Area in low densities (Trochet pers. comm.); however, their overall distribution, abundance, and population structure are not well known. The CNDDB (CDFG 2010) reports no occurrences of loggerhead shrike in Sacramento County. There are occurrences from other sources (Ebird.org 2005-2010) that report the species

throughout the Planning Area. Figure LOSH-1 shows the occurrences of loggerhead shrike within and adjacent to the Planning Area.

Land cover types used by loggerhead shrikes, such as irrigated pasture-grassland, cropland, blue oak savanna, blue oak woodland, orchards, and valley grassland occur throughout much of the Central Valley and are well-represented in Sacramento County and the Planning Area; however, at most sites within these land-cover types, the presence of loggerhead shrike is not known.

Sacramento-area ornithologists C. Conard and J. Trochet provided occurrence and habitat distribution information, which is summarized below.

- At the Sacramento Regional County Sanitation District (SRCSD) Bufferlands (and at nearby Stone Lakes National Wildlife Refuge), approximately two to three shrike nests are located each year. Loggerhead shrikes occur regularly throughout the agricultural lands and grasslands where suitable habitat features exist (Conard pers. comm.).
- Loggerhead shrikes occur regularly during summer at The Nature Conservancy's Howard Ranch; although their abundance is not high. Also, a nest that produced two young was documented there in 2001 (Trochet pers. comm.).
- At the Consumes River Preserve, shrikes nested successfully from 1995–1997 north of the Tall Forest. This area supports pastureland with scattered small trees and shrubs, and was considered the most reliable location to observe shrikes during all seasons. The area has since been converted to rice fields and no longer supports loggerhead shrikes during the breeding season (Trochet pers. comm.).
- On County land northeast of the Tall Forest, shrikes nested successfully near pasture and fallow rice fields (Trochet pers. comm.). Also, along Bruceville Road, 0.2 to 0.3 miles south of Twin Cities Road, adult shrikes with four young were observed over a period of time (Trochet pers. comm.).
- Nesting has not been documented at Valensin Ranch, although some locations there provide suitable breeding habitat.
- Loggerhead shrikes have been documented at least twice during the breeding season at the Schneider property, along Meiss Road approximately 1.75 miles from Ione Road, although nesting has not been documented there. This property may not support suitable nest sites (small trees or shrubs). Nesting could have occurred in the adjacent dredge spoils area that supports small trees or shrubs; however this area has not been searched (Trochet pers. comm.).
- In general, loggerhead shrikes occur regularly during the breeding season throughout south Sacramento County, in open country with elevated perches and appropriate vegetation for breeding. They are probably regular, low-density breeders throughout the entire southern portion of the County where suitable habitat exists (Trochet pers. comm.).

Because comprehensive surveys or monitoring efforts for loggerhead shrike in the Planning Area have not been conducted, and because the known occurrences are based mostly on incidental observations or limited surveys (e.g., anecdotal records, surveys conducted over a limited area), the population size and nesting locations of this species in the Planning Area are not well known.

LOSH Population Levels and Trend

Prior to the mid-1900s, loggerhead shrike was considered widespread and abundant (Yosef 1996; Cade and Woods 1997); however, loggerhead shrike populations have been declining rangewide since that time, and it has been extirpated locally throughout the species' range (Cade and Woods 1997). Much of the evidence for population declines has come from analysis of Breeding Bird Survey (BBS) data. Loggerhead shrike is one of the few species that show a significant decline (based on BBS data) in most states.

Analysis of Breeding Bird Survey (BBS) data indicates an overall decline of loggerhead shrike populations throughout the species breeding range, although trends vary regionally (Sauer et al. 2004). In California, loggerhead shrike has experienced extensive local population declines. BBS data suggest a significant statewide (California) population decrease between 1966 and 2003 (N = 108, $P = 0.01$). The BBS trend for loggerhead shrike in the Central Valley is similar to the statewide trend.

LOSH Threats to the Species

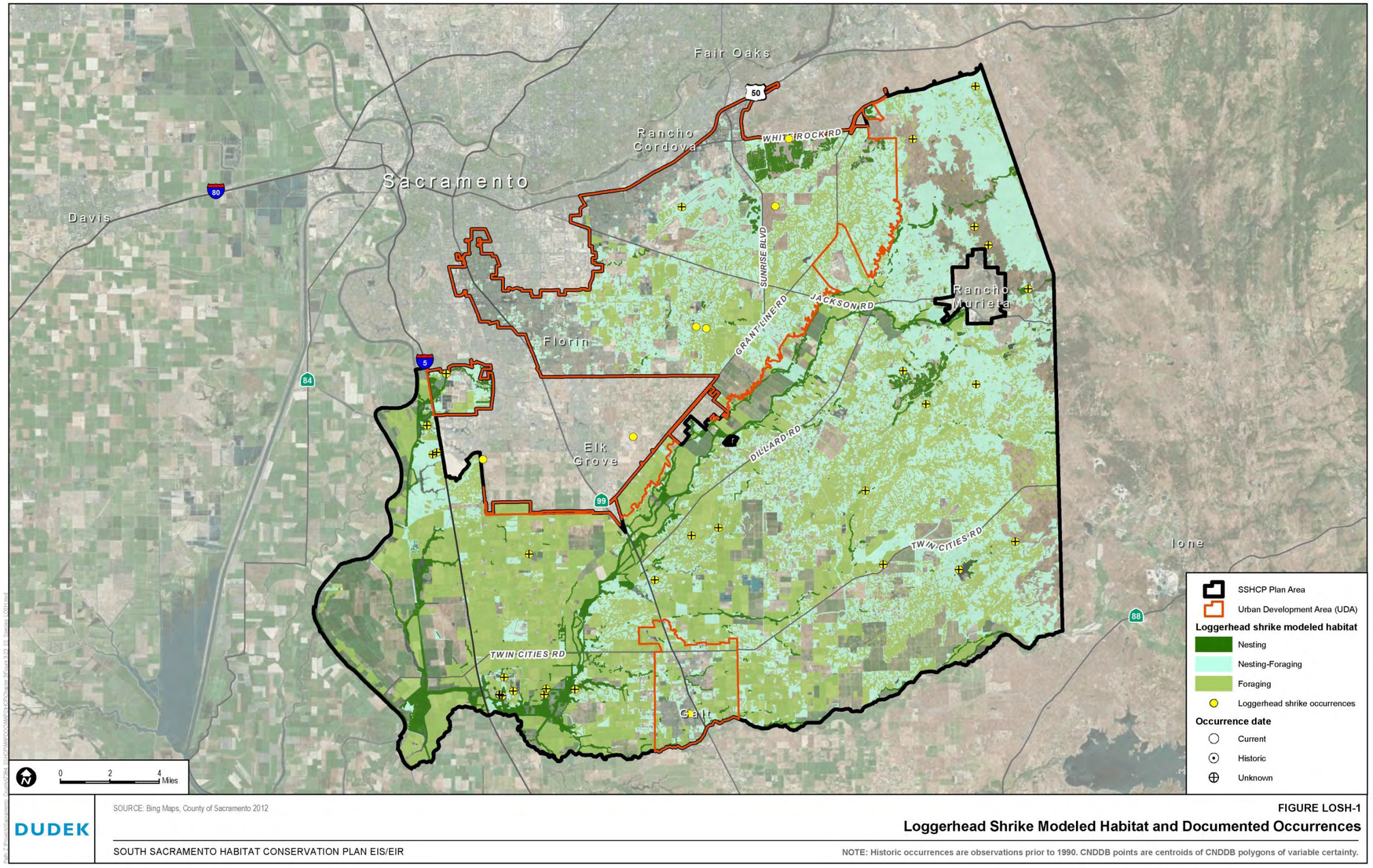
The primary cause of loggerhead shrike population declines is breeding habitat loss and degradation as a result of urbanization, development, and agricultural conversion (Morrison 1981; Yosef 1996; Cade and Woods 1997). Another important cause of population declines is related to pesticides that are ingested with the species' prey (Yosef 1996).

Shooting of perched shrikes due to dislike of their raptor-like habits contributed to the species decline in the past century (Yosef 1996), but is not likely to be a significant source of mortality in current populations. Road kills and increased predation of young and eggs by common raven, domestic cats, and foxes may also be factors in the species decline.

LOSH Data Gaps and Conservation Implications

There are several sources of uncertainty regarding loggerhead shrikes and their requirements in the Planning Area. These data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

Figure LOSH-1 Loggerhead Shrike Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

LOSH Population and Habitat Distribution within the Planning Area

Loggerhead shrikes occur in suitable habitat within the Planning Area; however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by shrikes, such as grasslands and pastureland, occur throughout much of the Central Valley and are well-represented in Sacramento County and the Planning Area. At most sites with these land cover types, the presence of loggerhead shrike is not known.

Because comprehensive surveys for loggerhead shrike in the Planning Area have not been conducted and because the existing occurrence data are based primarily on incidental observations (e.g., anecdotal records), the population size, nesting locations, and important wintering areas of this species throughout the Planning Area are not known. Although the distribution of grasslands and other open habitats is mapped and quantifiable, the quality of habitat for shrikes within most of these areas is unknown.

These information gaps limit our ability to identify the best lands available for preserving loggerhead shrike habitat and accurately estimate the impacts resulting from covered activities. Until this data gap is remedied, the conservation value of valley grassland, blue oak savannah, and pasture land-cover types for loggerhead shrike will be considered relatively high in lands that support (or recently supported) known occurrences, are large in extent, or are adjacent to these areas.

LOSH Effectiveness of Habitat Enhancement Techniques in Creating Suitable Nest and Perch Sites for Loggerhead Shrike

Achieving the conservation goal and objectives for loggerhead shrike will require successful enhancement of grassland and other habitats. The structure of these habitats (e.g., short, sparse vegetation), and presence of nest and perch sites, are important factors for suitability. Whether enhancement and management can retain the elements suitable for loggerhead shrike is unknown.

If restoration techniques cannot eventually create grassland and other habitats with characteristics suitable for nesting shrikes, then those lands would not support breeding pairs or wintering individuals.

It is assumed that careful design and implementation of grassland enhancement plans could create suitable loggerhead shrike breeding habitat. Habitat enhancement and restoration efforts to achieve conservation objectives for loggerhead shrike will incorporate habitat requirements into their objectives, designs, and performance standards. Also, restoration and enhancement projects will be established as working experiments. It is expected that enhancement and management efforts aimed at burrowing owl conservation will also benefit loggerhead shrike.

LOSH Landscape-level Habitat and Preserve Design Requirements for Viable Populations

The minimum habitat size and connectivity requirements for loggerhead shrike are not understood. This causes uncertainty in determining whether the preserve design will be effective in meeting the conservation goal for loggerhead shrike. The criteria for designing preserves will be based on the best available information on or inferences about spatial requirements for all covered species. The minimum size and connectivity requirements of preserves will be expected to meet or exceed requirements to maintain loggerhead shrike populations.

LOSH Literature Cited

Bartgis, R. 1992. Loggerhead Shrike. P. 281-297 *in* Migratory nongame birds of management concern in the northeast (K. J. Schneider and D. M. Pence, eds.). U.S. Fish and Wildlife Service, Region 5, Newton Corner, Massachusetts.

Brooks, B.L., and S.A. Temple. 1990. Habitat availability and suitability for loggerhead shrikes in the upper Midwest. *American Midland Naturalist* 123: 75-83.

Cade, T.J. and C.P. Woods. 1997. Changes in distribution and abundance of the loggerhead shrike. *Conservation Biology,* 11:21-31.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Clements, J.F. 2000. *Birds of the World: A Checklist*. 5th ed. Ibis Publishing. Vista, California.

Conard, C., Ornithologist. E-mail correspondence, December 9, 2004.

Ebird.org. 2005-2010. Ebird - Bird Observations Mapping Tool Website. Audubon and Cornell Lab of Ornithology. Ithaca, New York. Accessed online http://ebird.org/content/ebird.

Gawlik, D.E. and K.L. Bildstein. 1993. Seasonal habitat use and abundance of loggerhead shrikes in South Carolina. *Journal of Wildlife Management*, 57:352-357.

Grinnell, J., and A.H. Miller. 1944, Reprinted 1986. *The distribution of the birds of California*. Cooper Ornithological Club, Pacific Coast Avifauna. Number 27.

Lefranc, N. 1997. *Shrikes: A Guide to the Shrikes of the World*. Yale University Press. New Haven and London. 192 pp.

Miller, A.H., and R.C. Stebbins. 1964. The lives of desert animals in Joshua Tree National Monument. University of California Press, Berkeley. 452 pp.

Morrison, M.L. 1981. Population trends of the loggerhead shrike in the United States. *American Birds*. 35:754-757.

Sauer, J.R., J.E. Hines, and J. Fallon. 2004. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2003. Version 2004.1.* USGS Patuxent Wildlife Research Center, Laurel, Maryland.

Shuford, W.D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, sub-species, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Trochet, J., Ornithologist. E-mail correspondence, December 9, 2004.

United States Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. Available at http://migratorybirds.fws.gov/reports/bcc2002.pdf.

Yosef, R. and T.C. Grubb. 1993. Effect of vegetation height on hunting behavior and diet of loggerhead shrikes. *Condor* 95:127-131.

Yosef, R. and T.C. Grubb. 1994. Resource dependence and territory size in loggerhead shrikes. *Condor,* 95:127-131.

Yosef, R., 1996. Loggerhead Shrike (*Lanius ludovicianus*). In The Birds of North America, No. 231 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Zeiner, D. C., W. F Laudenslayer Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife: volume II: birds. California Department of Fish and Game. Sacramento, California.

WESTERN RED BAT (WRB)

Western Red Bat (WRB)

(Lasiurus blossevillii)

Status USFWS: None

Status CDFW: Species of Special Concern



WRB Listing Status

The western red bat (*Lasiurus blossevillii*) is considered a Species of Special Concern by the California Department of Fish and Wildlife (CDFW) (Bolster 1998). This status is based largely on the findings of the Western Bat Working Group (WBWG), which rates management concern for the western red bat as high priority, indicating that this species is imperiled or at high risk of imperilment (WBWG 1998).

WRB Life History and Ecology

WRB Species Description and Life History

The western red bat is a member of the taxonomic Order Chiroptera and Family Vespertilionidae, the largest of the three bat families present in California. The generic name *Lasiurus* may be translated as "hairy-tailed." Until 1988 the western red bat was considered a subspecies of *Lasiurus borealis* and was known as *L. b. teliotis* (Shump and Shump 1982). Current taxonomy recognizes the eastern red bat (*L. borealis*) and the western red bat (*L. blossevillii*; Baker et al. 1988) as full species.

Identification

This species is a medium-sized bat (six to 13 grams in the Sacramento Valley, Johnson unpubl. data) with long pointed wings (forearm 35 to 45 mm, Pierson et al. 2002) and a wingspan of 28 to 32 centimeters (Harvey et al. 1999). As its name suggests it is a distinctive rusty reddish color washed with white. The underparts are slightly paler. Color can vary from "a very distinct red to a yellow-brown" (Pierson et al. 2002). The wing membranes are black with orange demarcations along the fingers and the interfemoral membrane is heavily furred (bat species outside this genus usually have naked or partially furred tail membranes). Barbour and Davis (1969) state that the tail is long and extends straight out in flight, which gives this bat a distinctive silhouette against the sky as compared to other species with shorter tails. The

western red bat has short, broad, and rounded ears that do not extend much above the dorsal fur line (Barbour and Davis 1969). The tragus is triangular. The nose is plain and short. The feet are small, slender, and furred and there is fur on the wrists.

The western red bat is not likely to be confused with other species known to occur in Sacramento County due to its distinctive coloration; however, two congeners occur in California: the yellow bat (*L. xanthinus*) and hoary bat (*L. cinereus*). The northernmost known occurrences for the yellow bat are in Los Angeles and San Bernardino Counties (Constantine 1998). Therefore, this species is not expected to occur in Sacramento County. The hoary bat may occur in Sacramento County, but it is a larger bat (forearm 46 to 58 millimeters, Pierson et al. 2002), its fur is generally dark gray with whitish hair tips giving it a frosty appearance, and it has yellow fur around the face with black rimmed ears. Although *L. blossevillii* can appear somewhat frosted and have a yellowish tinge to its fur, it is never as dark nor as frosted as *L. cinereus*, nor as yellow as *L. xanthinus* (Pierson et al. 2002).

Life History

The life history of the western red bat centers on reproduction and meeting the energetic demands of a small insectivorous mammal. Several aspects of this species' life history are uncommon among bats in northern California, namely its roosting, social, reproductive, and migratory habits. The western red bat is solitary and roosts in foliage. During the day, it shelters on the underside of overhanging leaves. It most often roosts individually; however, females with dependent young roost together and multiple individuals are sometimes found in clusters during migration (e.g., roosting in the same tree). The western red bat uses torpor to conserve energy during the day when it is inactive (Shump and Shump 1982; Willis and Brigham 2001). It hangs by one foot in a compact position and it is thought that the furred tail membrane acts as a blanket. The fur on its feet and wrists and the overall thickness of the fur are adaptations to the greater exposure of its chosen roost sites.

This species makes north-south migrations in spring and fall that may be hundreds of miles. Cryan (2003) studied seasonal dispersal of the western red bat on a continental scale and stated that seasonal dispersal from California is apparently limited, and it is unclear if California populations mix with others to the south and east. During migration western red bats may form small groups (Constantine 1959), though males and females may travel separately (Barclay 1984). Western red bats may be year-round residents in the Bay Area (Orr 1950). During winter cold snaps the eastern red bat extends torpor (hibernates) and the western red bat may do so as well. Most of the life history traits of the eastern red bat and western red bat are assumed to be shared.

Pups are born from late spring to early summer (Pierson et al. 2002). Three pups are usual in a litter, but there may be as many as five (Allen 1939; Pierson et al. 2002). It is thought that red bats have more young than other bat species because their roosting habits in foliage expose

them to greater predation. The literature contains numerous accounts of birds attacking red bats and their young (Allan 1947; Constantine 1959; Downing and Baldwin 1961; Elwell 1962; Hoffmeister and Downes 1964; Wilks and Laughlin 1961). The large number of pups seem especially burdensome to females because grounded mothers have often been found unable to fly due to the weight of the clinging pups (Allan 1947; Pearson pers. comm. 2004; Stains 1965). Western red bat pups are weaned between six to eight weeks of age when they have grown to adult size and are thus able to fly.

The only longevity record known for the western red bat is two years for an individual in captivity; however, this species does not adapt well to captivity (Pearson pers. comm. 2004). Potential predators of this species include jays (Allan 1947; Constantine 1959; Elwell 1962; Hoffmeister and Downes 1964), American crows (*Corvus brachyrhynchos*), American kestrels (*Falco sparverius*), hawks (*Buteo* spp.), owls (*Bubo* spp., *Asio* spp.) (Allen 1939), opossums (Sperry 1933), skunks (*Mephitis* spp.), weasels (*Mustela* spp.), rats (*Rattus* spp.), snakes (Allen 1939), and cats. Terrestrial predators may capture bats roosting in low-growing branches. Western red bats, like all mammals, can also contract the rabies virus. In addition, infected bats may be a vector for the disease before they die.

WRB Habitat Requirements and Ecology

The western red bat occurs primarily in the low and middle elevations in broadleaf tree communities (Pierson et al*.* 1999). It is less abundant in mixed conifer forests. This species roosts in the foliage of large shrubs and trees in habitats bordering forests, rivers, agricultural areas, and urban areas (Harvey et al*.* 1999). Roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas with mature trees (WBWG 1998).

Pierson et al*.* (1999) describe roosting habitat as large diameter riparian cottonwoods and sycamores, and older orchard trees (particularly walnuts). Constantine (1958, 1959, 1966) studied red bats in California, Georgia, and Iowa. He found that roosts have the following attributes: protection from view from all directions except below; no obstructions below allowing the bat to drop downward to begin flight; no lower perches from which predatory birds or mammals can see or reach the bat; dark ground cover minimizing the reflection of sunlight; sufficient adjacent vegetation to break up wind currents and retard the distribution of dust; location on the south or southwest side of the tree; and height usually four to 10 feet above ground. The western red bat usually hangs from the leaf petiole, but occasionally hangs from a twig or branch (Barbour and Davis 1969). Hanging from one foot it closely resembles a dead leaf and the wing markings are thought to add to the camouflage.

Foraging occurs in and amongst vegetation and regularly occurs over the same territory (Allen 1939). Foraging has been noted in habitats such as mature orchards, oak woodland, low elevation conifer forest, and non-native trees in urban and rural residential areas. In addition,

this species may forage in habitats adjacent to streams and rivers that do not provide roosting habitat. No dietary information is available for western red bats in California (Pierson et al. 2002); however, eastern red bats prey on moths, flies, beetles, and tiny wasps (WBWG 1998). Western red bats may forage all night (perhaps males and nonreproductive females), but there is often an initial foraging period after sunset and a minor secondary activity period before sunrise that corresponds to periods of increased insect activity (WBWG 1998).

Habitat requirements in Sacramento County may include open water for drinking and foraging, undisturbed foliage roost sites that provide protection from predators, and structurally diverse vegetation that supports a diversity of insect prey. Water features are a vital habitat component because bats often drink immediately after emergence and water is an important source of concentrated insects. Studies by Pierson et al. (1999) comparing mature riparian habitat extending greater than 50 meters back from the Sacramento River to areas with less extensive or degraded habitat suggest that this species prefers the mature, extensive riparian habitat. Mature orchards with dense canopies provide alternate roosting sites and may provide foraging habitat (Pierson et al. 1999).

Habitat Elements

Habitat elements are those basic aspects of the environment, which are needed for survival and propagation of the species. The habitat elements for western red bat are identified in Table G-3.27-1 and have been derived from input from local species experts.

Table G-3.27-1. Habitat Elements for Western Red Bat

Essential Activities	Land Cover Types	Habitat Elements
Foraging	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, mixed riparian woodland, orchards, mixed riparian scrub, vernal impoundment, vernal pool, seasonal wetlands, seasonal impoundment, freshwater marsh, open water, and streams/creeks.	A variety of habitats including oak woodland and savanna, grassland, riparian areas, and wetlands are suitable foraging habitat. Nearby water features are a vital habitat component because bats typically have high water needs. Furthermore, water features are an important source of concentrated insects.
Roosting	Blue oak woodland, blue oak savanna, mine tailing riparian woodlands, valley oak riparian woodlands, and mixed riparian woodland.	Roosts are provided by the foliage of large shrubs and trees in habitats bordering forests, rivers, agricultural areas, and urban areas Roosts have the following attributes: protection from view from all directions except below; no obstructions below allowing the bat to drop downward to begin flight; no lower perches from which predatory birds or mammals could see or reach the bat; dark ground cover minimizing the reflection of sunlight; sufficient adjacent vegetation to break up wind currents and retard the distribution of dust; location on the south or southwest side of the tree; and height usually 4-10 feet above ground.

WRB Species Distribution and Population Trends

Anecdotal observations suggest that the historical abundance of eastern red bat and western red bat was likely much greater than at present (O'Shea et al. 2003). Carter et al. (2003) concluded that quantitative information concerning long-term population trends of solitary foliage roosting bats cannot be drawn from existing data because of the lack of standardized reporting and inability to determine the proportion of total population sampled. Carter et al. (2003) noted that indices of abundance such as submissions to health agencies for rabies testing and trends in habitat are the only present means to indirectly assess population trend.

WRB Range Wide Distribution

The western red bat ranges from southern British Columbia south to Baja California and Mexico, and east to Wyoming (Hall 1981). This species regularly occurs in California, Arizona, New Mexico, and throughout western and central Mexico to South America (Baker et al. 1988; Cryan 2003; Hall 1981). The only known region where both red bat species overlap is in west Texas (WBWG 1998).

WRB Central Valley Distribution

The western red bat occurs throughout the Central Valley in suitable habitat. Although its range includes much of western North America, the only areas with multiple records for breeding females are California river valleys west of the Sierra Nevada crest (Pierson et al. 1999). Breeding females appear to be highly associated with lower elevation riparian habitats, particularly relatively intact stands of cottonwood and sycamore in the Central Valley (Pierson et al. in review, 2002). Cryan (2003) summarized capture data from California as follows "Males and females are together at lower elevations in California during winter (Grinnell 1918, Orr 1950) but segregate during spring and summer; females remain in lowland areas, whereas males apparently move to higher elevations (Grinnell 1918; Shump and Shump 1982)." Sutter County capture data is consistent with these findings (Johnson 2000).

The Museum of Vertebrate Zoology (MVZ) at the University of California Berkeley has museum specimens from Tehama, Sutter, Butte, Yolo, Yuba, Sacramento, Solano, San Joaquin, Merced, Madera, Fresno, Tulare, Kings, and Kern Counties. Specimens have also been collected in San Joaquin County in 1950 and 1987 and deposited in the California Academy of Sciences. Johnson (2000) captured western red bats in blue oak woodland in the Sutter Buttes, Sutter County. Roost sites have been found in orange and apricot orchards near Esparto and Rumsey, Yolo County (Constantine 1959).

The four MVZ records for Sacramento County are from the following locations: (1) Eddinger–Johnson Ranch south of Sacramento, (2) two miles northwest of Folsom, and (3) Sacramento

(two specimens taken in 1952 and in 1990). A dead western red bat was found on a sidewalk in downtown Sacramento in 1995 (Johnson pers. obs.). In addition, from 1977 to 2002 at least 56 western red bats were submitted to the Sacramento County Public Health Laboratory (Constantine unpubl. data 2004). Though the California Natural Diversity Database (CNDDB) does not contain records for this species in Sacramento County (CDFG 2010), the CNDDB does provide scattered occurrence records for western red bat throughout California.

WRB Distribution within the Planning Area

Western red bat records were obtained from the numerous bat specimens annually submitted for rabies testing to the Sacramento County Public Health Laboratory. Fifty-six records for the western red bat (1977 to 2002) varied in location precision from "Sacramento County" to "Sacramento" to an actual address (CDFG 2010). Over 30 western red bats were from localities reported as the City of Sacramento, Folsom, Rancho Cordova, Wilton, Elk Grove, or Galt (Constantine unpubl. data 2004). These specimens included females and immature individuals indicating the presence of a reproductive population. Further details are unavailable on most of the occurrence localities, but seven addresses were given for locations inside the Planning Area (Figure WRB-1). Though a bat monitoring project conducted at the Cosumnes River Preserve has also detected western red bats, there has been no area-wide assessment of whether available habitats within the Planning Area provide appropriate roosting and foraging habitat for the species.

WRB Population Levels and Trends

Estimates of historic and current population levels for the western red bat are currently unavailable; however, detailed information on the species, including population trends, should be available when a report on the distribution and status of the western red bat in California becomes available (Pierson et al. in review). More information may also become available as a result of the release of the revised Mammal Species of Special Concern by the CDFW (Brylski et al. in review).

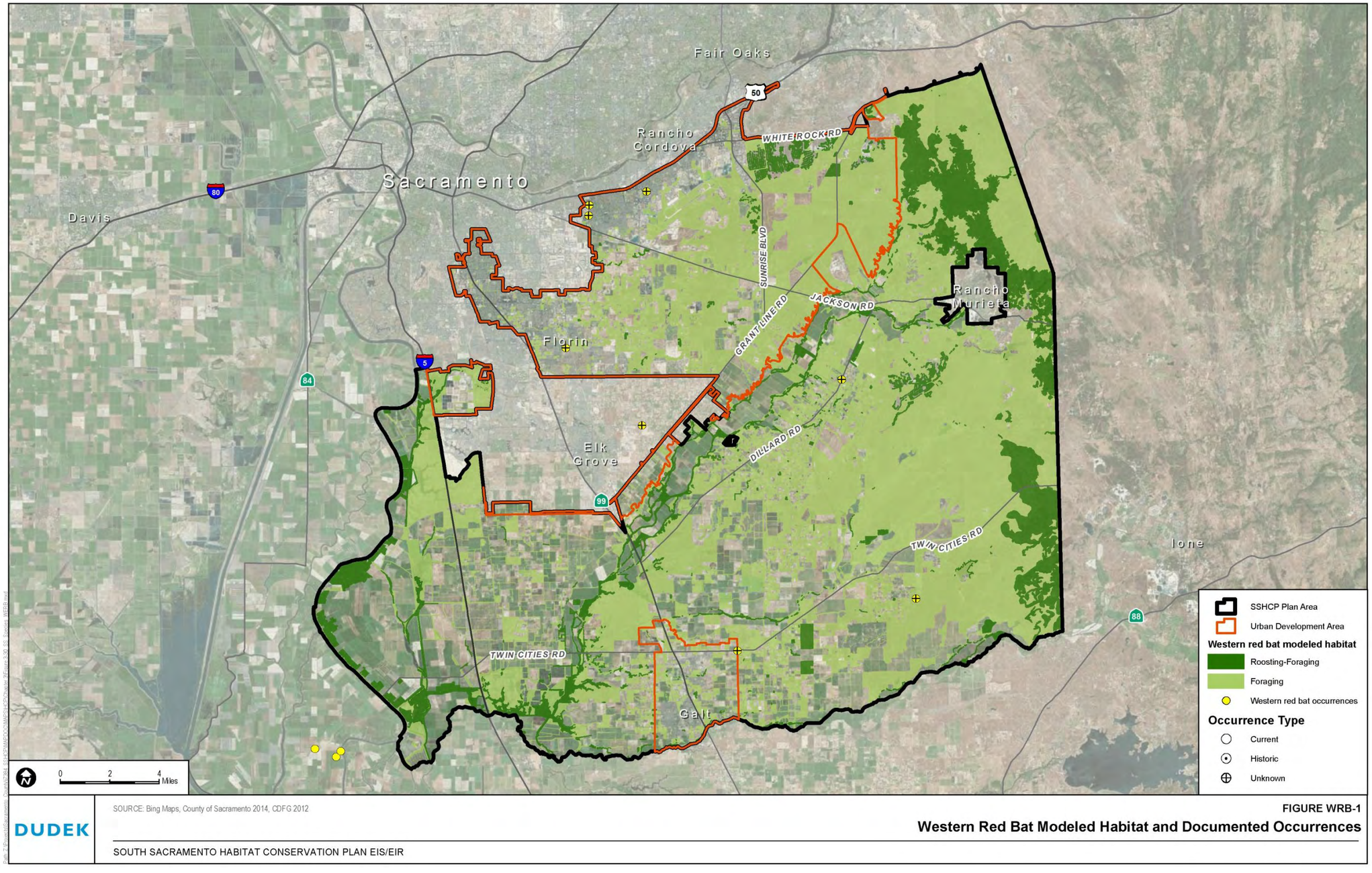
In order to assess the trend of the species, long-term monitoring of both roosting and foraging habitat conducted over multiple years is needed. Biologists recognize that "most efforts at monitoring bat populations involve use of indices that are uncalibrated in relation to population size, do not incorporate measures of variation or detectability, are discontinuous in time and space, and sometimes lack standard protocols" (O'Shea et al. 2003). Roost count indices are typically used to monitor bat populations; however, aspects of the life history of the western red bat (i.e., roosting individually or in small groups in inconspicuous locations) make it especially difficult to study. Ball (2002) proposed that if land uses and bat habitat can be monitored simultaneously, patterns in the availability and condition of bat habitat will emerge to guide their management.

O'Shea et al. (2003) states that current estimates of the relative abundance of low density foliage roosting species come primarily from capture and echolocation-detector index measures. Pierson and Rainey (Stillwater Sciences et al. 2003) were able to infer western red bat roost locations, as well as migratory and foraging activity by observing riparian woodland at sunset and visually and acoustically monitoring bats as they emerged. Though the USGS has a report in press that may suggest improved methods for estimating numbers of bats with this type of life history (O'Shea and Bogan 2003), acoustic monitoring of foraging activity may be the primary available means of monitoring this species and assessing habitat condition.

WRB Threats to the Species

Potential threats to the western red bat in the Planning Area include habitat removal, direct mortality, and increased predation. Furthermore, roosting habitat in riparian cottonwood and sycamore stands may be lost as result of reduced regeneration due to hydrological alteration of watersheds (WBWG 1998). Direct mortality may occur from pesticide use in orchards (WBWG 1998). Pierson et al. (2002) state "the intensive use of pesticides in fruit orchards may constitute a threat to roosting bats and may significantly reduce the amount of insect prey available." Although western red bats occur in urban and agricultural habitats, they may suffer higher levels of predation from the unnaturally high numbers of urban-tolerant species such as jays, crows, opossums, and domestic cats that occur in and are concentrated in these habitats (Pierson et al. 2002; Johnson pers. obs.).

Figure WRB-1 Western Red Bat Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

WRB Data Gaps and Conservation

The ecology, status, and management of the western red bat have received increased attention in recent years; however, there are several sources of uncertainty regarding western red bat and its requirements in the Planning Area. The primary data gaps, their implications for the success of the conservation strategy, and current operating assumptions are summarized below.

WRB Population and Habitat Distribution within the Planning Area

Western red bats occur in suitable habitat within the Planning Area. However, their overall distribution, abundance, and population structure are not well known. Land cover types used by western red bats occur throughout much of the Central Valley and are well represented in Sacramento County and the Planning Area.

Because comprehensive surveys for western red bat in the Planning Area have not been conducted and the existing occurrence data are based primarily on incidental observations (e.g., CNDDB, anecdotal records), the population size and distribution of the species throughout the Planning Area are not known. In addition, though the distribution of different land cover types is mapped and quantifiable, the quality of habitat for western red bat within most of these areas is unknown. These information gaps limit our ability to identify the best lands available for preserving western red bat habitat and accurately estimate the impacts resulting from covered activities.

Until this data gap is remedied, the conservation value for western red bat will be considered relatively high in lands that support (or recently supported) known occurrences (particularly roost sites) or are adjacent to these areas.

WRB Determining Threat Severity

Although it is unknown if western red bats have declined rangewide, most bats for which there is good data have shown population declines (particularly those species with limited roost sites and special roost site requirements). Activities that directly remove or replace suitable habitat (particularly roost sites) with incompatible land uses are more easily quantifiable than factors that indirectly affect an area or population. Therefore, to improve conservation planning efforts for western red bat in the Planning Area and elsewhere, additional empirical data are needed, specifically when analyzing factors that indirectly affect known populations and their habitats.

WRB Effectiveness of Habitat Enhancement and Restoration Techniques in Creating Suitable Habitat for Western Red Bat

Achieving the conservation goals and objectives for western red bat will require successful enhancement and restoration of suitable habitat that functions as both roosting and foraging habitat; however, whether restored or enhanced habitats can retain the structural attributes suitable for western red bat is unknown.

If habitat restoration and enhancement techniques cannot eventually create habitats with functional characteristics suitable for western red bat, then those lands would not support sustainable populations.

WRB Literature Cited

Allan, P.F. 1947. Blue jay attacks red bats. Journal of Mammalogy 28(2):180.

Allen, G.M. 1939. Bats. Harvard University Press, Cambridge, Massachusetts, 368 p.

Baker, R.J., J.C. Patton, H.H. Genoways, and J.W. Bickham. 1988. Genic studies of *Lasiurus* (Chiroptera: Vespertilionidae). Occasional Papers of the Museum at Texas Tech University 117:1-15.

Ball, L.C. 2002. A strategy for describing and monitoring bat habitat. Journal of Wildlife Management 66(4):1148-1153.

Barbour, R.W., and W.H. Davis. 1969. Bats of America. University of Kentucky Press, Lexington, 285 pp.

Barclay, R.M.R. 1984. Observations on the migration, ecology and behaviour of bats at Delta Marsh, Manitoba. Canadian Field-Naturalist 98(3):331-336.

Bolster, B.C., editor. 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report prepared by P.V. Brylski, P.W. Collins, E.D. Pierson, W.E. Rainey and T.E. Kucera. Report submitted to California Department of Fish and Game Wildlife Management Division, Nongame Bird and Mammal Conservation Program for Contract No.FG3146WM. Accessed online May 12, 2010 at http://www.dfg.ca.gov/wildlife/nongame/ssc/docs/mammal/species/11.pdf.

Brylski, P.V., P.W. Collins, E.D. Pierson, W.E. Rainey, and T.E. Kucera. In Review. Mammal species of special concern in California. California Department of Fish and Game, Habitat Conservation Planning Branch, 1416 Ninth Street, Sacramento, California, 95814-5560.

Carter, T.C., M.A. Menzel, and D.A. Saugey. 2003. Population trends of solitary foliage-roosting bats. *In* T. J. O'Shea and M. A. Bogan, editors. Monitoring trends in bat populations of the United States and territories: problems and prospects. United States Geological Survey, Biological Resources Division, Information and Technology Report. In press. Washington, D.C., USA.

Constantine, D.G. 1958. Ecological observations on lasiurine bats in Georgia. *Journal of Mammalogy* 39(1):64-70.

Constantine, D.G. 1959. Ecological observations on lasiurine bats in the north bay area of California. *Journal of Mammalogy* 40(1):13-15.

Constantine, D.G. 1966. Ecological observations on lasiruine bats in Iowa. *Journal of Mammalogy* 47(1):34-41.

Constantine, D.G. 1998. Range extensions of ten species of bats in California. *Bulletin of Southern California Academy of Sciences* 97(2):49-75.

Constantine, Denny G., D.V.M. Walnut Creek, California.

Cryan, P.M. 2003. Seasonal distribution of tree bats. *Journal of Mammalogy* 84(2):579-593.

Downing, S.C., and D.H. Baldwin. 1961. Sharp-shinned hawk preys on red bat. *Journal of Mammalogy* 42:540-541.

Elwell, A.S. 1962. Blue jay preys on young bats. *Journal of Mammalogy* 43(3):434.

Grinnell, H.W. 1918. A synopsis of the bats of California. *University of California Publications in Zoology* 17:223-404.

Hall, E.R. 1981. *The mammals of North America. Vol. 1*. John Wiley and Sons, New York. 600 pp.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. *Bats of the United States*. Arkansas Game and Fish Commission in cooperation with the U.S. Fish and Wildlife Service.

Hoffmeister, D.F., and W.L. Downes. 1964. Blue jays as predators of red bats. *Southwestern Naturalist* 9(2):102-109.

Johnson, H.L. 2000. Roosting and foraging ecology of bats in the Sutter Buttes, Sutter County, California. Unpublished Masters Thesis, California State University, Sacramento, 114 pp.

O'Shea, T.J., and M.A. Bogan, editors. 2003. Monitoring trends in bat populations of the United States and territories: problems and prospects. United States Geological Survey, Biological Resources Division, Information and Technology Report. In press. Washington, D.C., USA.

O'Shea, T.J., M.A. Bogan, and L. E. Ellison. 2003. Monitoring trends in bat populations of the United States and territories: status of the science and recommendations for the future. *Wildlife Society Bulletin* 31(1):16-29.

Orr, R.T. 1950. Notes on the seasonal occurrence of red bats in San Francisco. *Journal of Mammalogy* 31(4):457-458.

Pearson, Marilyn. Wildlife Rehabilitator, Sacramento, California.

Pierson, E.D., P.W. Collins, W.E. Rainey, P.A. Heady, and C. J. Corben. 2002. Distribution, Status and Habitat Associations of Bat Species on Vandenberg Air Force Base, Santa Barbara County, California. Santa Barbara Museum of Natural History Technical Reports – No. 1.

Pierson, E.D., W.E. Rainey, and C. Corben. 1999. [Abs.]. The western red bat, *Lasiurus blossevillii* – implications of distribution for conservation. *Bat Research News* 40(4):187.

Pierson, E.D., W.E. Rainey, and C. Corben. In Review. Distribution and status of red bats, *Lasiurus blossevillii* in California. Report to Species Conservation and Recovery Program, Habitat Conservation Planning Branch, California Department of Fish and Game, Sacramento, California. 40 pp.

Shump, K.A., and A.U. Shump. 1982. *Lasiurus borealis*. Mammalian Species No. 183, 1-6 pp.

Sperry, C.E. 1933. Opossum and skunk eat bats. *Journal of Mammalogy* 14:152-153.

Stains, H.J. 1965. Female red bat carrying four young. *Journal of Mammalogy* 46(2):333.

Stillwater Sciences and William Rainey, Elizabeth Pierson, and Chris Corben in consultation with Mary Power. 2003. Sacramento River Ecological Indicators Pilot Study. Berkeley, California.

Western Bat Working Group (WBWG). 1998. Species accounts: ecology, conservation, and management of western bat species. Western Bat Working Group Workshop, February 9-13, 1998, Reno, Nevada.

Wilks, B.J., and H.E. Laughlin. 1961. Roadrunner preys on a bat. *Journal of Mammalogy* 42:98.

Willis, C.K.R., and R.M. Brigham. 2001. [Abs.] Daily torpor use by temperate insect-eating bats in natural roosts. *Bat Research News* 42(3):128-129.

AMERICAN BADGER (AMB)

American Badger (AMB)

(Taxidea taxus)

Status USFWS: None

Status CDFW: Species of Special Concern



AMB Listing Status

American Badger (*Taxidea taxus*) is designated as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW) (Williams 1986).

AMB Life History and Ecology

AMB Species Description and Life History

Physical Description

American Badgers are heavy-bodied, short-legged, grayish mammals that have a white medial stripe from the nose over the top of the head and down the back. Badgers have a black nose, white cheeks, and a black spot in front of each ear. Their feet are black with extremely long front claws. The belly and the short tail are yellowish (Burt and Grossenheider 1980).

Taxonomy

There are four described extant subspecies of *T. taxus* (Long 1973); two of these occur in California: *T. t. jeffersonii and T. t. berlandieri*. Long (1972) noted that some of these specimens from the Central Valley exhibit intermediate characters, suggesting intergradation (Williams 1986). According to Long (1973), Sacramento County is within the estimated range of *T. t. jeffersonii;* however, Kyle et al. (2004) shows Sacramento County within the range of *T. t. berlandieri.*

Generally *T. t. jeffersonii* occurs in the Coast Ranges, Sierra Nevada and northeast into Oregon, Washington, northern Nevada, Idaho, Colorado, Montana, and into Canada (Long 1973; Kyle et al. 2004). *T. t. jeffersonii* (Harlan) generally ranges in the better-watered areas of California, including

coastal areas, most of the Sierra Nevada, and most of the Great Basin Province (Williams 1986). This subspecies is generally larger and darker-colored and occurs in cooler, moister areas (Williams 1986). *T. t. berlandieri* ranges throughout the Central Valley and southern California, and east through Arizona, New Mexico, southern Nevada, and Texas (Kyle et al. 2004). *T. t. berlandieri* Baird ranges through the hotter, drier desert and grassland associations of southeastern California and the Central Valley and are generally smaller and lighter-colored.

Reproduction

Badgers mate in summer and early fall. Young are born in March to early April in burrows, and are raised by the female (Long 1973; Minta 1993). Natal burrows are dug typically in dry, sandy soil in areas with sparse overstory cover (Zeiner et al. 1990). Juveniles disperse approximately three to four months following birth (Minta 1993).

Survival and Longevity

In captivity, the typical and maximum reported longevity of badgers is 11 and 15.5 years, respectively (Long 1973). There are no known survival rates reported for badger populations.

Diet and Foraging

Badgers are mostly carnivorous and prey primarily on fossorial (i.e., digging) mammals, especially ground squirrels and pocket gophers (Whitaker 1989). Badgers dig their prey out of burrows. They also prey on reptiles, insects, worms, eggs, birds, and carrion. Badgers shift their diet seasonally and annually in response to prey availability (Zeiner et al. 1990).

Movement and Migration Patterns

American Badgers are nocturnal and diurnal, active year-round, and non-migratory (Long 1973; Zeiner et al. 1990). Dispersing young females may move greater than 32 miles, whereas males may move greater than 63 miles (Messick and Hornocker 1981).

Territoriality/Home Range

Badgers are solitary and exhibit a simple social structure (Lindzey 1982; Messick 1987; Minta 1993). Olfactory communication is well-developed in this species. Badgers mark their territories with urine, feces, and scent glands. Males appear more territorial than females (Minta 1993). Female and male home range sizes in Utah have been estimated at 338 to 751 acres and 1,327 to 1,549 acres, respectively (Lindzey 1978). In Idaho, female and male badger home ranges averaged 400 acres and 600 acres, respectively (Messick and Hornocker 1981). Minimum patch

size is 25 acres (Laudenslayer and Parisi 2007). Above 100 acres, area alone does not increase habitat suitability for an individual badger (Laudenslayer and Parisi 2007).

AMB Habitat Requirements and Ecology

American Badger occurs in a variety of open habitats, including grasslands, shrublands, savannahs, and meadows. Factors that positively affect habitat suitability for badgers are food availability, presence of friable soils, and uncultivated ground (Williams 1986). Badgers dig their own burrows, and excavate their prey in friable soils. Badgers prey primarily on fossorial rodents, particularly ground squirrels. In Wyoming, badger density was correlated with ground squirrel density (Minta 1993). Accordingly, it is assumed that the quality of badger habitat in the Planning Area is closely and positively related to the occurrence and population viability of California ground squirrel (*Spermophilus beechyi*) in an area.

AMB Species Distribution and Population Trends

AMB Species Distribution

American Badger is distributed in North America from the south-central Canadian provinces south throughout the western and central United States, and south to central Mexico (Williams 1986). Its distribution does not include the eastern or southeastern United States.

AMB Central Valley Distribution

In California, American Badger's range includes open habitat throughout the state, including the Central Valley. This species does not occur in the humid forests of northwestern California in Del Norte and northwestern Humboldt Counties (Williams 1986).

AMB Distribution Within The Planning Area

The Planning Area is positioned within American Badger's range in California. American Badgers have been documented in the northeastern portion of the Planning Area (Figure AMB-1); however, their overall distribution, abundance, and population structure are not well known. Land-cover types used by badgers, including cropland (foraging), blue oak savanna, and valley grassland, occur throughout the Central Valley and are represented in Sacramento County and the Planning Area, particularly outside the Urban Development Area (UDA). Within suitable habitat in the Planning Area, the presence of badgers has not been established by extensive surveys. It is assumed that most of this habitat is not occupied.

There are few occurrence records of badger in Sacramento County and the Planning Area. There are four CNDDB records and one additional occurrence record (Trochet pers. comm.)

within Sacramento County, two of which are within the UDA (CDFG 2010). One occurrence record is within the City of Sacramento, south of Jackson Highway (State Hwy 16) near Power Inn Road and is presumed extant (CDFG 2010). Of the four occurrence records within the Planning Area, only one that is located in southeastern Rancho Cordova is extirpated (CDFG 2010). Trochet (pers. comm.) observed a badger at Valensin Ranch, Cosumnes River Preserve, in approximately 1997–1998. There is also a 1938 CNDDB record located north of Hood recorded within the Museum of Vertebrate Zoology (CDFG 2010; also reported in Williams 1986). Both of these occurrences are inside the Planning Area and outside the urban services boundary (USB). These records do not provide an estimate of the distribution or population size of American Badger, because they are based on a very small number of surveys in a limited area.

AMB Population Levels and Trend

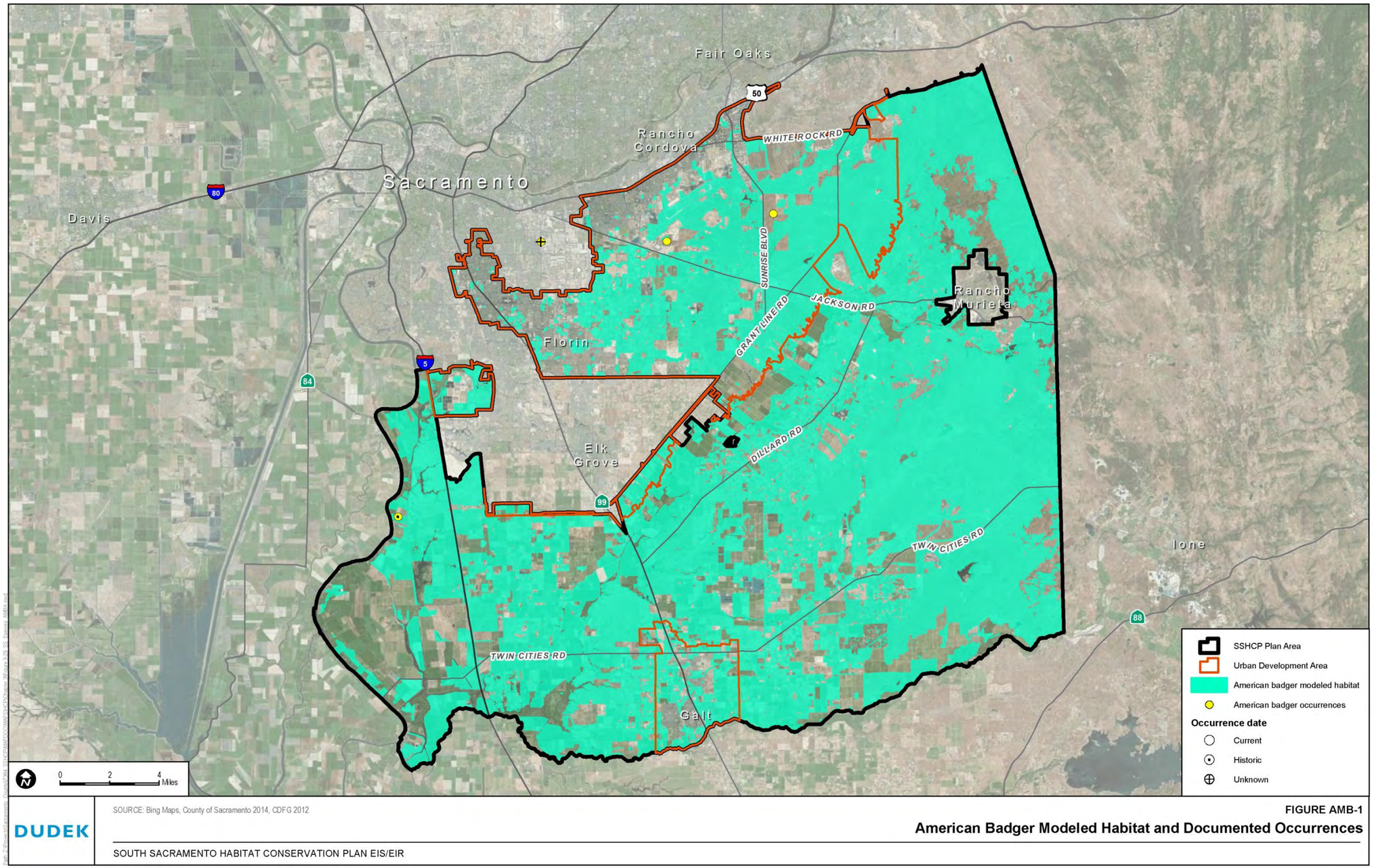
Although there is very little empirical information about American Badger population status and trends in California, badger populations have clearly declined or were extirpated in several areas of California (Williams 1986). Badger populations in some parts of the State may be stable; however, in the middle Central Valley, the population size and number of locations occupied by badgers have declined. The overall population decline and local extirpations in the middle Central Valley are probably greater than in any other portion of California (Larsen 1987).

AMB Threats to the Species

The American badger is threatened by habitat conversion to urban and agricultural uses, farming operations, shooting and trapping, poisoning, and reduction of prey base as a result of rodent control activities (Williams 1986). Loss of prey species (through poisoning), fur harvesting, and mortality from vehicles are other likely contributors to the downward trend of this species (Apps et al. 2002; Newhouse and Kinley 2000; Scobie 2002). Furthermore, badgers have a history of persecution, and are often perceived by humans as a pest species, for which they are shot or poisoned (Rahme et al. 1995). Shooting and trapping may have been important factors in population declines historically (Williams 1986).

In California, the primary threat to American Badger is habitat loss and degradation as a result of urbanization, development, and agricultural conversion (Williams 1986; Neal and Cheeseman 1996). The conversion of pasture and grasslands to farmland has led to a decline in the number of badgers as suitable foraging and denning habitat is reduced.

Figure AMB-1 American Badger Modeled Habitat and Documented Occurrences



INTENTIONALLY LEFT BLANK

Predator control with the usage of indiscriminate trapping and poisons have caused extensive loss (Ahlborn 2005). In some parts of the USA and Canada, badger numbers have declined because of indiscriminate "pest control" activities (traps set for coyotes, and poisons meant for other predators), unregulated sport hunting, and trapping (some 50,000 badgers were taken every year for their fur in the 1970's, though this number fell to 20,000 in the 1980's) (Jackson 2010).

Vehicular accidents are also a major cause of badger mortality (USFS 2008). A peak in the number of road casualties occurs in February through March. According to the University of California at Davis California Roadkill Observation System (CROS), there were approximately 15 observed roadkills of American Badger reported in California between 2009 and 2010, out of approximately 4,000 reports of medium-sized mammals (i.e., skunks, raccoons, coyotes, jackrabbits, and foxes) (CROS 2010).

AMB Data Gaps

Little research or monitoring has been conducted on the populations of the American Badger in California. As a result, many knowledge gaps exist with regard to the abundance, distribution and population trends of this species, as well as its behavior, habitat requirements, prey species, mortality factors and ecological role. The primary data gap for American Badger is lack of distributional data for the species within the Planning Area and throughout California. It is not feasible economically or temporally to survey the entire Planning Area. Some specific areas will need to be physically verified as to whether they support badger habitat and species presence. In addition, quantitative bioassessment may be necessary to determine the ecological functions and values of selected preserve areas to assess their suitability and value as preservation habitats for this species.

AMB Literature Cited

Ahlborn, G. 2005. American Badger (*Taxidea taxus*). California Wildlife Habitat Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group. Accessed online at: http://www.dfg.ca.gov/whdab/cwhr/A043.html.

Apps, C.D., N. J. Newhouse, and T.A. Kinley. 2002. Habitats associations of American badgers in southeastern British Columbia. *Canadian Journal of Zoology*, 80:1228-1239.

Burt, W. H., and R. P. Grossenheider. 1980. A field guide to the mammals. Houghton-Mifflin Co. New York, New York. 287 pp.

California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch, Rarefind Version 3.1.1. Commercial version dated February 28, 2010.

Jackson, Steve. 2010. American Badger (*Taxidea taxus*) fact file. Accessed online April 27, 2010 at www.badgers.org.uk/badgerpages.

Kyle, C.J., R.D. Weir, N.J. Newhouse, H. Davis, and C. Strobeck. 2004. Genetic Structure of Sensitive and Endangered Northwestern Badger Populations (*Taxidea taxus taxus* and *T. t. jeffersonii*). *Journal of Mammalogy*, Vol. 85, No. 4 (Aug., 2004), pp. 633-639.

Larsen, C. J. 1987. Badger distribution study. California Department of Fish and Game, Nongame Wildlife Investigations Report, Proj. W-65-R-4, Job I-11.

Laudenslayer, Jr., W.F. and M.D. Parisi. 2007. Species Notes for American Badger (*Taxidea taxus*): California Wildlife Habitat Relationships (CWHR) System Level II Model Prototype. California Department of Fish and Game, California Interagency Wildlife Task Group, October, 2007. Accessed April 27, 2010 online at http://www.dfg.ca.gov/ biogeodata/cwhr/downloads/Level_II/Notes/II_American_Badger.pdf.

Lindzey, F. G. 1982. Badger, *Taxidea taxus*. Pp. 653–663 in Wild mammals of North America: biology, management, and economics (J. A. Chapman and G. A. Feldhamer, eds.). The Johns Hopkins University Press, Baltimore, Maryland.

Linzey, F. G. 1978. Movement patterns of badgers in northwestern Utah. *Journal of Wildlife Management*. 42:418-422.

Long, C. A. 1973. *Taxidea taxus*. Mammal. Species. No. 26. 4 pp.

Long, C. A. 1972. Taxonomic revision of the North American badger, *Taxidea taxus*. *Journal of Mammalogy*, 53:725_759.

Messick, J. P. 1987. North American badger. Pages 584-597 *in* M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, eds. Wild furbearer management and conservation in North America. Ontario Ministry of Nat. Resources.

Messick, J. P., and M. G. Hornocker. 1981. Ecology of the badger in southwestern Idaho. *Wildlife Monographs* 76:1-53.

Minta, S. C. 1993. Sexual differences in spatio-temporal interaction among badgers. Oecologia 96:402-409.

Neal, E., and C. Cheeseman. 1996. Badgers. T& AD Poyser, UK.

Newhouse, N.J. and T.A. Kinley. 2000. Update COSEWIC status report on the American badger *Taxidea taxus* in Canada. Pp. 1-26 in COSEWIC assessment and status report on the American badger *Taxidea taxus* in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ontario, Canada.

Rahmea, A.H., A.S. Harestad and F.L. Bunnell. 1995. Status of the badger in British Columbia. British Columbia Ministry of Environment, Lands and Parks, Wildlife Working Report WR-72:1-51.

Scobie, D. 2002. Status of the American badger (*Taxidea taxus*) in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Division, and Alberta Conservation Association, Wildlife Status Report 43:1-17.

Trochet, J. Ornithologist. E-mail correspondence.

United States Forest Service (USFS). 2008. Species Accounts: Animals. Available online at: http://www.fs.fed.us/r5/scfpr/ projects/lmp/read.htm.

Williams, D. F. 1986. Mammalian Species of Special Concern in California, American Badger. California Department of Fish and Game, Sacramento. Admin. Rep. 86-1. 112 pp.

Zeiner, D. C., W. F. Laudenslayer, K. E. Mayer, and M. White. 1990. California's Wildlife: volume 3: mammals. California Department of Fish and Game. Sacramento, California.

INTENTIONALLY LEFT BLANK

EIS/EIR APPENDIX G-4

Covered Species Habitat Models

Habitat models described in further detail below were prepared for each of the 28 species proposed to be Covered Species in the South Sacramento Habitat Conservatin Plan (SSHCP). The habitat models were developed to identify where suitable habitat is most likely to be present in the Plan Area for each species; thereby helping identify where implementation of activities in the plan area could affect that species. The assumptions used to develop the habitat model for each species are identified below, as well as the acreages of habitat within the Plan Area based on the model.

As the models were developed, the best available information about the life history and biology of each species was used. Specifically, information concerning the species needs for breeding, feeding, and sheltering at each life history stage; information from Plan Area species-surveys; documented species-occurrences within the Plan Area; and information on species range, including soil type associations and elevation limits. This information was compiled using GIS to generate a map-based model of suitable habitat within the Plan Area for each species. Details on the biology of each proposed Covered Species can be found above in Appendix G-3, including regulatory status, ecological information, range, threats, population trends, and conservation and management considerations.

DWARF DOWNINGIA

Model Assumptions

- Soil types known to support dwarf downingia in the Planning Area include Amador-Gillender complex, 2% to 15% slopes; Clear Lake clay, partially drained, 0 to 2% slopes, frequently flooded; Corning complex, 0 to 8% slopes; Hadselville-Pentz complex, 2% to 30% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.
- Dwarf downingia is known to occupy commonly occurring, smaller and/or shallower vernal pools but has also been found at the margins of larger or deeper vernal pools.

Dwarf Downingia Modeled Habitat:

Modeled habitat for dwarf downingia is considered to be all Vernal Pool and Swale land cover on Amador-Gillender complex, 2% to 15% slopes; Clear Lake clay, partially drained, 0 to 2% slopes, frequently flooded; Corning complex, 0 to 8% slopes; Durixeralfs-Galt complex, 0 to 2% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.

Table G-4.1. Dwarf Downingia Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	24,260.96	3,084.08	21,176.88
Valley Grassland	22,240.71	2,673.10	19,567.61
Vernal Pool	1,661.56	305.28	1,356.28
Seasonal Wetland	358.69	105.70	252.99

BOGGS LAKE HEDGE HYSSOP

Model Assumptions

- Soil types known to support Bogg's lake hedge-hyssop in the Planning Area include Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Red Bluff-Xerarents complex, 0 to 2% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin-Durixeralfs complex, 0 to 1% slopes; and Vleck gravelly loam, 2% to 15% slopes.
- Bogg's lake hedge-hyssop is known to occupy well-developed vernal pools, and playa lakes, as well as along the seasonally fluctuating margins of more permanent water bodies.

Bogg's Lake Hedge-Hyssop Modeled Habitat

Modeled habitat for Bogg's lake hedge-hyssop is Vernal Pool and Seasonal Wetland cover types on Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Red Bluff-Xerarents complex, 0 to 2% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin-Durixeralfs complex, 0 to 1% slopes; Sailboat silt loam, drained, 0 to 2% slopes; occasionally flooded, and Vleck gravelly loam, 2% to 15% slopes.

Table G-4.2. Bogg's Lake Hedge-Hyssop Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	36,646.93	14,953.19	21,693.74
Valley Grassland	35,115.33	14,345.91	20,769.42
Vernal Pool	1,531.60	607.28	924.32
Seasonal Wetland	354.27	17.92	336.35
GRAND TOTAL	**37,001.19**	**14,971.10**	**22,030.09**

AHART'S DWARF RUSH

Model Assumptions

- Soil types known to support the single documented occurrence of Ahart's dwarf rush in the Planning Area include Red Bluff loam, 0 to 2% slopes; Red Bluff-Redding complex 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes.
- Ahart's dwarf rush occupies shallow vernal pools, vernal pool margins, and swales.

Ahart's Dwarf Rush Modeled Habitat

Modeled habitat for Ahart's dwarf rush is all Vernal Pool and Swale land covers on Fiddyment fine sandy loam, 1% to 8% slopes; Red Bluff-Redding complex, 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes.

Table G-4.3. Ahart's Dwarf Rush Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	25,136.08	13,001.64	13,134.44
Valley Grassland	23,885.06	12,222.74	11,662.32
Vernal Pool	937.12	584.98	352.14
Swale	313.90	193,92	119.98

LEGENERE

Model Assumptions

- Soil types at documented legenere occurrences in the Planning Area include Clear Lake clay, partially drained, 0 to 2% slopes, frequently flooded; Corning complex, 0 to 8% slopes; Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Fiddyment fine sandy loam, 1% to 8% slopes; Hedge loam, 0 to 2% slopes; Madera-Galt complex, 0 to 2% slopes; Red Bluff loam, 0 to 2% slopes; Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.
- Legenere grows in well-developed vernal pools, as well as along the seasonally fluctuating margins of more permanent water bodies and basins within seasonal drainages.
- Legenere has been reported to inhabit vernal wetlands ranging in size from 40 square feet to 100 acres.

Legenere Modeled Habitat:

Modeled habitat for legenere is considered to be all Vernal Pool and Seasonal Wetland cover types on Clear Lake clay, partially drained, 0 to 2% slopes; frequently flooded, Corning complex, 0 to 8% slopes; Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Fiddyment fine sandy loam, 1 to 8% slopes; Hedge loam, 0 to 2% slopes; Madera-Galt complex, 0 to 2% slopes; Red Bluff loam, 0 to 2% slopes; Red Bluff loam, 2% to 5% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, 0 to 3% slopes; and San Joaquin-Galt complex, 0 to 3% slopes.

Table G-4.4. Legenere Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	50,085.55	17,864.15	32,221.40
Valley Grassland	47,526.07	17,039.56	30,486.51
Vernal Pool	2,559.48	824.59	1,734.89
Seasonal Wetland	885.99	58.60	827.40
GRAND TOTAL	50,971.54	10,778.40	33,048.79

PINCUSHION NAVARRETIA

Model Assumptions

- Soil types known to support pincushion navarretia occurrences in the Planning Area include Amador-Gillender complex, 2% to 15% slopes; Corning complex, 0 to 8% slopes; Corning-Redding complex, 8 to 30% slopes; Creviscreek sandy loam, 0 to 3% slopes; Hadselville-Pentz complex, 2% to 30% slopes; Hicksville sandy clay loam, 0 to 2% slopes; occasionally flooded, Pardee-RanchoSeco complex, 3% to 15% slopes; Pentz-Lithic Xerorthents complex, 30% to 50% slopes; Peters clay, 1% to 8% slopes; and Redding gravelly loam, 0 to 8% slopes.
- Pincushion navarretia occupies small to medium size vernal pool types and the margins of larger and/or deeper pools.

Pincushion Navarretia Modeled Habitat

Modeled habitat for pincushion navarretia is considered to be all Vernal Pool and Swale land cover on Amador-Gillender complex, 2% to 15% slopes; Corning complex, 0 to 8% slopes; Corning-Redding complex, 8% to 30% slopes; Creviscreek sandy loam, 0 to 3% slopes; Hadselville-Pentz complex, 2% to 30% slopes; Hicksville sandy clay loam 0 to 2% slopes; Pardee-

Ranchoseco complex, 3% to 15% slopes; Pentz-Lithic Xerorthents complex, 30% to 50% slopes; and Redding gravelly loam, 0 to 8% slopes.

Table G-4.5. Pincushion Navarretia Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	57,437.42	12,100.64	45,336.78
Valley Grassland	54,967.33	11,440.08	43,527.25
Vernal Pool	1,843.44	474.84	1,368.59
Swale	96.26	185.71	440.94

SLENDER ORCUTT GRASS

Model Assumptions

- Soil types known to support slender Orcutt grass in the Planning Area include Redding gravelly loam, 0 to 8% slopes.
- Slender Orcutt grass occupies medium to large size vernal pool types.

Slender Orcutt Grass Modeled Habitat

Modeled habitat for slender Orcutt grass is all vernal pools on Redding gravelly loam, 0 to 8% slopes.

Table G-4.6a. Slender Orcutt Grass Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	34,491.26	12,426.29	22,064.97
Valley Grassland	33,264.96	11,970.62	21,294.35
Vernal Pool	1,226.29	455,67	190.90

Table G-4.6b. Slender Orcutt Grass Acres of Habitat in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Areas (Acres)	Mather Core Area (Acres)	Cosumnes/Racho-Seco Core Area (Acres)
Vernal Pool Ecosystem	25,428.01	10,466.24	14,364.77
Valley Grassland	24,404.98	10,039.20	14,365.77
Vernal Pool	1,023.03	145.99	595.99

SACRAMENTO ORCUTT GRASS

Model Assumptions

- Soil types known to support Sacramento Orcutt grass occurrences in the Planning Area include Corning complex, 0 to 8% slopes; Hicksville sandy clay loam, 0 to 2% slopes; Red Bluff-Redding complex, 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes soil types.
- Sacramento Orcutt grass occupies medium to large size vernal pool types.

Sacramento Orcutt grass Modeled Habitat

Modeled habitat for Sacramento Orcutt grass is considered to be all vernal pools on Corning complex, 0 to 8% slopes; Hicksville sandy clay loam, 0 to 2% slopes; Red Bluff-Redding complex, 0 to 5% slopes; and Redding gravelly loam, 0 to 8% slopes soil types.

Table G-4.7a. Sacramento Orcutt Grass Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	34,491.26	12,426.29	22,064.97
Valley Grassland	336,264.96	11,970.62	21,294.35
Vernal Pool	1,226.29	455.67	770.62

Table G-4.7b. Sacramento Orcutt Grass Acres of Habitat in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Areas (Acres)	Mather Core Area (Acres)	Cosumnes/Rancho-Seco Core Area (Acres)
Vernal Pool Ecosystem	25,428.01	10,466.24	14,961.77
Valley Grassland	24,404.98	10,039.20	14,365.77
Vernal Pool	1,023.03	427.04	595.99

SANFORD'S ARROWHEAD

Model Assumptions

- Soil types known to support Sanford's arrowhead in the Planning Area include Argonaut-Auburn complex, 3% to 8% slopes; Clear Lake clay, partially drained, 0 to 2% slopes; frequently flooded, Columbia sandy loam, partially drained, 0 to 2% slopes; Columbia sandy loam, drained, 0 to 2% slopes, occasionally flooded; Cosumnes silt loam, drained, 0 to 2% slopes, occasionally flooded; Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Dierssen clay loam, deep, drained, 0 to 2%

slopes; Durixeralfs, 0 to 1% slopes, Egbert clay, partially drained, 0 to 2% slopes; Egbert clay, partially drained, 0 to 2% slopes; frequently flooded, Fiddyment fine sandy loam, 1% to 8% slopes; Fluvaquents, 0 to 2% slopes; frequently flooded, Hedge loam, 0 to 2% slopes; Hicksville loam, 0 to 2% slopes; occasionally flooded, Hicksville gravelly loam, 0 to 2% slopes; occasionally flooded, Kimball-Urban land complex, 0 to 2% slopes; Liveoak sandy clay loam, 0 to 2% slopes; occasionally flooded, Madera loam, 2% to 8% slopes; Mokelumne-Pits, mine complex, 15% to 50% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding loam, 2% to 8% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, leveled, 0 to 1% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin silt loam, 3% to 8% slopes; San Joaquin-Galt complex, leveled, 0 to 1% slopes; San Joaquin-Urban land complex, 0 to 2% slopes; San Joaquin-Xerarents complex, leveled, 0 to 1% slopes; Reiff fine sandy loam, 0 to 2% slopes; occasionally flooded, Scribner clay loam, partially drained, 0 to 2% slopes; and Tinnin loamy sand, 0 to 2% slopes.

- Sanford's Arrowhead is strictly associated with wetland systems supporting emergent marsh vegetation, both naturally occurring and built/created.

Sanford's Arrowhead Modeled Habitat

Modeled habitat for Sanford's Arrowhead is all Seasonal Wetland, Freshwater Marsh, Open Water, and Stream/Creek associated with Argonaut-Auburn complex, 3% to 8% slopes; Clear Lake clay, partially drained, 0 to 2% slopes; frequently flooded Columbia sandy loam partially drained, 0 to 2% slopes; Columbia sandy loam, drained, 0 to 2% slopes; occasionally flooded, Cosumnes silt loam, drained, 0 to 2% slopes; occasionally flooded, Creviscreek sandy loam, 0 to 3% slopes; Dierssen sandy clay loam, drained, 0 to 2% slopes; Dierssen clay loam, deep, drained, 0 to 2% slopes; Durixeralfs, 0 to 1% slopes; Egbert clay, partially drained, 0 to 2% slopes; Egbert clay, partially drained, 0 to 2% slopes; frequently flooded, Fiddyment fine sandy loam, 1% to 8% slopes; Fluvaquents, 0 to 2% slopes; frequently flooded, Hedge loam, 0 to 2% slopes; Hicksville loam, 0 to 2% slopes; occasionally flooded, Hicksville gravelly loam, 0 to 2% slopes; occasionally flooded, Kimball-Urban land complex, 0 to 2% slopes; Liveoak sandy clay loam, 0 to 2% slopes; occasionally flooded, Madera loam, 2% to 8% slopes; Mokelumne-Pits, mine complex, 15% to 50% slopes; Red Bluff-Redding complex, 0 to 5% slopes; Redding loam, 2% to 8% slopes; Redding gravelly loam, 0 to 8% slopes; San Joaquin silt loam, leveled, 0 to 1% slopes; San Joaquin silt loam, 0 to 3% slopes; San Joaquin silt loam, 3% to 8% slopes; San Joaquin-Galt complex, leveled, 0 to 1% slopes; San Joaquin-Urban land complex, 0 to 2% slopes; San Joaquin-Xerarents complex, leveled, 0 to 1% slopes; Reiff fine sandy loam, 0 to 2% slopes; occasionally flooded, Scribner clay loam, partially drained, 0 to 2% slopes; and Tinnin loamy sand, 0 to 2% slopes.

Table G-4.8. Sanford's Arrowhead Acres if Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Freshwater Marsh	2,044.21	350.05	1,694.15
Open Water	1,086.43	86.04	1,000.36
Seasonal Wetlands	1,425.06	117.28	1,307.78
Streams/Creeks	898.48	126.35	767.13
Valley Grassland	47,374.82	17,411.92	29,962.90
GRAND TOTAL	52,824.00	18,091.64	34,732.36

MID-VALLEY FAIRY SHRIMP

Model Assumptions

- SSHCP land cover types that provide suitable habitat based on life history descriptions are all Vernal Pool and all Swale land cover.

Mid-Valley Fairy Shrimp Modeled Habitat

Modeled habitat for mid-valley fairy shrimp is all Vernal Pool and all Swale land cover types throughout the Planning Area.

Table G-4.9a. Mid-Valley Fair Shrimp Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	53,697.61	20,577.91	33,119.68
Valley Grassland	50,050.12	19,268.59	30,791.52
Vernal Pool	2,818.11	860.28	1,957.82
Swale	759.30	393.16	366.14
Streams/Creeks	60.08	55.88	4.20

Table G-4.9b. Mid-Valley Fairy Shrimp Acres of Habitat in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Areas (acres)	Mather Core Recovery Area (acres)	Cosumnes/Rancho-Seco Core Recovery Area (acres)
Vernal Pool Ecosystem	25,791.92	14,365.69	11,426.23
Valley Grassland	24,080.47	13,404.77	10,675.70
Vernal Pool	1,259.28	642.46	616.82
Swale	403.34	269.63	133.71
GRAND TOTAL	**48.83**	**48.83**	**0**

VERNAL POOL FAIRY SHRIMP

Model Assumptions

- Vernal pool fairy shrimp are widely distributed throughout the Planning Area, although they appear to be more abundant outside of the Urban Development Area (UDA) than inside the UDA.
- All Vernal Pool and Swale cover types are suitable habitat.
- A select group of ephemeral steams or portions of those streams in this Planning Area are considered suitable habitat.

Vernal Pool Fairy Shrimp Modeled Habitat

Modeled habitat for vernal pool fairy shrimp is all vernal Pool, Swale, and Stream/Creek (VPIH) throughout the Planning Area.

Table G-4.10a. Vernal Pool Fairy Shrimp Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	103,209.61	26,047.79	77,161.86
Valley Grassland	97,349.20	24,583.80	72,765.40
Vernal Pool	4,545.57	934.86	3,600.72
Swale	1,251.65	460.73	790.92
Streams/Creeks	73.19	68.37	4.82

Table G-4.10b. Vernal Pool Fairy Shrimp Acres of Habitat in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (Acres)	Mather Core Recovery Area (Acres)	Cosumnes/Racho-Seco Core Recovery Area (Acres)
Vernal Pool Ecosystem	56,631.47	18,117.19	38,514.28
Valley Grassland	53,366.85	17,022.88	36,343.97
Vernal Pool	2,463.99	709.37	1,754.62
Swale	739.65	323.96	415.69
Streams/Creeks	60.98	60.98	0

Table G-4.10c. Vernal Pool Fairy Shrimps Acres of Critical Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	30,736.73	1,203.74	29,442.77
Valley Grassland	29,052.25	1,145.83	27,825.00
Vernal Pool	1,328.34	31.24	1,288.77
Swale	343.84	14.37	326.00
Streams/Creek	12.30	12.30	0

VALLEY ELDERBERRY LONGHORN BEETLE

Model Assumptions

- The valley elderberry longhorn beetle is completely dependent upon the elderberry plant.
- The elderberry and the valley elderberry longhorn beetle are largely found within riparian ecosystems.
- Isolated elderberry shrubs separated from contiguous habitat provide limited habitat value.

Valley Elderberry Longhorn Beetle Modeled Habitat

Modeled habitat for valley elderberry longhorn beetle is Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Planning Area.

Table G-4.11. Valley Elderberry Longhorn Beetle Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Mine Tailing Riparian Woodland	641.07	219.81	421.26
Mixed Riparian Woodland	5,784.78	244.21	5,540.57
Mixed Riparian Scrub	1,451.82	241.47	1,210.35
TOTAL	**7,877.67**	**705.49**	**7,172.18**

RICKSECKER'S WATER SCAVENGER BEETLE

Model Assumptions

- Ricksecker's water scavenger beetle is not sensitive to the size of vernal pools or other aquatic habitats.

- All Vernal Pool and Swale cover types are suitable habitat.

Ricksecker's Water Scavenger Beetle Modeled Habitat

Modeled habitat for Ricksecker's water scavenger beetle is all Vernal Pool and Swale land cover types within the Planning Area.

Table G-4.12. Ricksecker's Water Scavenger Beetle Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	103,136.42	25,519.66	77,157.04
Valley Grassland	97,349.20	24,583.80	72,765.40
Vernal Pool	4,535.57	934.86	3,600.72
Swale	1,251.65	0	760.92

VERNAL POOL TADPOLE SHRIMP

Model Assumptions

- Vernal pool tadpole shrimp are widely distributed throughout the Planning Area, although they appear to be more abundant within the Urban Development Area (UDA) than outside the UDA.
- All Vernal Pool, Vernal Stream, and Swale cover types are suitable habitat.
- A select group of ephemeral steams or portions of those streams in the Planning Area are considered suitable habitat (classified as Stream/Creek (VPIH)).

Vernal Pool Tadpole Shrimp Modeled Habitat

Modeled habitat for vernal pool tadpole shrimp is all Vernal Pool, Swale, and Stream/Creek (VPIH) land cover types throughout the Planning Area.

Table G-4.13a. Vernal Pool Tadpole Shrimp Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	103,209.61	26,047.76	77,161.86
Valley Grassland	97,349.20	24,583.80	72,765.40
Vernal Pool	4,535.57	934.86	3,600.72
Swale	1,251.65	460.73	790.92
Streams/Creeks	73.19	68.37	4.82

Table G-4.13b. Vernal Pool Tadpole Shrimp Acres of Habitat in Core Recovery Areas

Habitat Model Land Cover Types	Total Core Recovery Areas (acres)	Mather Core Recovery Areas (acres)	Cosumnes/Rancho-Seco Core Recovery Area (acres)
Vernal Pool Ecosystem	56,631.47	18,117.19	8,499.95
Valley Grassland	53,366.85	17,022.88	8,117.96
Vernal Pool	2,463.99	709.37	1,754.62
Swale	739.65	323.96	415.69
Streams/Creeks	60.98	60.98	0

Table G-4.13c. Vernal Pool Tadpole Shrimp Acres of Critical Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Vernal Pool Ecosystem	30,736.73	1,203.74	29,442.77
Valley Grassland	29,052.25	1,145.83	27,825.00
Vernal Pool	1,328.34	31.24	1,288.77
Swale	343.84	14.37	329.00
Streams/Creeks	12.30	12.30	0

CALIFORNIA TIGER SALAMANDER

Model Assumptions

- California tiger salamanders have not been recorded within the Sacramento County Urban Services Boundary or north of the Cosumnes River despite extensive surveys in very large areas with presumably suitable habitat including Mather Field, Sacramento Valley Conservancy's Vernal Pool Prairie Preserve, the Sunrise Douglas Area, Kiefer landfill, Rancho Murieta, and areas East of Grant Line Road.
- In a 5-year study found the majority of California tiger salamanders migrated at least 0.5 mile (0.8 kilometer) from the breeding site. A smaller number of salamanders appeared to migrate even farther, traveling 0.75 mile (1.2 kilometer) to almost 1.3 miles (2.2 kilometers) to and from the breeding ponds and upland habitat on adjacent property.
- A study found that California tiger salamanders are physiologically capable of migrating up to 2,484 meters (1.5 miles) each breeding season and that 95% of the population occurs in upland habitat within 1,867 meters of the breeding pond.
- Recommended that plans to maintain local populations of California tiger salamanders should include pond(s) surrounded by at least 173-meter (567-foot) wide buffers of terrestrial habitat occupied by burrowing mammals.
- California Tiger Salamander Modeled Habitat

- Modeled aquatic habitat for California tiger salamander is Vernal Pool and Seasonal Wetland land cover located south of the Cosumnes River. Modeled upland refugia habitat is all Blue Oak Woodland, Blue Oak Savanna, and Valley Grassland land cover located within 1.5 miles of modeled aquatic habitat (i.e., within 1.5 miles of any Vernal Pool or Seasonal Wetland that is south of the Cosumnes River).

Table G-4.14. California Tiger Salamander Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Upland Habitat			
Blue Oak Savanna	3,321.53	0	3,321.53
Blue Oak Woodland	3,773.56	0	3,773.56
Valley Grassland	78,273.71	1,487.57	76,786.56
Total Upland Habitat	*85,368.80*	*1,487.57*	*83,881.23*
Aquatic Habitat			
Vernal Pool	3,033.33	36.34	2,996.98
Seasonal Wetland	1,391.17	26.87	1,364.29
Total Aquatic Habitat	*4,424.50*	*63.21*	*4,361.27*
GRAND TOTAL	**89,793.309**	**1,550.78**	**88,242.50**

WESTERN SPADEFOOT

Model Assumption

- Very little information is available regarding dispersal distances or minimum habitat size.
- Semlitsch and Brodie (2003) summarized data from the literature on the use of terrestrial habitats by 19 frog and 13 salamander species representing 1,363 individuals that are otherwise typically associated with wetlands. In general, plethodontid stream salamanders (e.g., *Desmognathus fuscus, Eurycea bislineata, Eurycea longicauda*), although migratory at some stage of their life cycle, remain close to the edges of ponds and streams and seldom move more than 20 to 30 meters from aquatic habitats. Alternatively, some species of frogs, toads and newts are highly mobile and move 1,000 to 1,600 meters (5,249 feet or about 1 mile) (e.g., *Bufo bufo, Rana catesbbeiana*, *Notophthalmus viridescens*). The majority of the remaining species occur at intermediate distances, where they emigrate to find suitable terrestrial habitat. The overall core terrestrial habitat ranged from 159 to 290 meters (522 to 951 feet) from the edge of aquatic breeding sites.

Western Spadefoot Modeled Habitat

Modeled aquatic habitat for western spadefoot is Vernal Pool, Seasonal Wetland, Swale, Open Water, and Stream/Creek land cover types in the Planning Area. Modeled upland habitat is Blue Oak Woodland, Blue Oak Savanna, and Valley Grassland within 1,600 meters (5,249 feet or approximately 1 mile) from modeled aquatic habitat.

Table G-4.15a. Western Spadefoot Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Upland Habitat			
Blue Oak Savanna	5,637.07	17.84	5,619.24
Blue Oak Woodland	9,131.84	0	9,131.84
Valley Grassland	134,833.67	30,326.56	104,766.78
Total Upland Habitat	*149,602.58*	*30,344.40*	*119,517.86*
Aquatic Habitat			
Vernal Pool	4,535.57	934.86	3,600.72
Swale	1,251.65	460.73	790.92
Seasonal Wetland	2,600.12	162.55	2,437.57
Open Water	2,343.81	237.11	2,106.70
Streams/Creeks	2,673.93	163.21	2,510.72
Streams/Creeks (VPIH)	73.19	68.37	4.82
Total Aquatic Habitat	*13,478.27*	*2,026.83*	*11,451.45*
GRAND TOTAL	**163,080.85**	**32,371.23**	**130,969.30**

Table G-4.15b. Western Spadefoot Acres of Habitat in Core Recovery Areas

Habitat Model Land Cover Types	All Core Recovery Areas (acres)	Mather Core Recovery Area (acres)	Cosumnes/Rancho-Sec Core Recovery Area (acres)
Upland Habitat			
Blue Oak Savanna	2,368.16	318.89	2,067.28
Blue Oak Woodland	419.21	0	414.31
Valley Grassland	53,366.85	17,022.88	36,343.98
Total Upland Habitat	*56,172.22*	*17,346.66*	*38,825.57*
Aquatic Habitat			
Vernal Pool	2,463.99	709.37	1,754.62
Swale	739.65	323.96	415.69
Seasonal Wetland	138.92	7.07	131.85
Open Water	270.56	92.20	178.36
Streams/Creeks	196.23	27.80	168.44
Streams/Creeks (VPIH)	60.98	60.98	0
Total Aquatic Habitat	*3,870.33*	*1,221.38*	*2,648.96*
GRAND TOTAL	**60,042.55**	**18,568.04**	**41,474.53**

WESTERN POND TURTLE

Model Assumptions

- Western pound turtle has been recorded along creek and stream reaches throughout the Planning Area.
- In the fall and spring, hatchling turtles may move as far as 400 meters (0.25 mile) from their upland nest locations to aquatic sites nearby.

Western Pond Turtle Habitat Model

Western pond turtle modeled aquatic habitat include all Stream/Creek land cover that occurs throughout the Planning Area and Freshwater Marsh and Open Water land covers within 400 meters (0.25 mile) of all Stream/Creek land cover. Western pond turtle modeled upland habitat is Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland within 0.25 mile of modeled aquatic habitat.

Table G-4.16. Western Pond Turtle Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Upland Habitat			
Blue Oak Savanna	7,609.66	0	7,609.66
Blue Oak Woodland	4,925.00	0.05	4,824.95
Valley Grassland	91,579.83	13,034.00	78,824.95
Mine Tailing Riparian Woodland	306.47	41.32	265.15
Mixed Riparian Woodland	5,347.42	232.40	5,115.03
Mixed Riparian Scrub	1,177.72	195.85	981.87
Total Upland Habitat	*110,846.10*	*13,503.62*	*97,342.49*
Aquatic Habitat			
Vernal Pool	2,239.66	326.58	1,913.08
Open Water	1,441.44	148.43	1,293.01
Streams/Creeks	2,673.93	162.21	2,510.73
Total Aquatic Habitat	*6,355.03*	*638.22*	*5,716.82*
GRAND TOTAL	**117,201.13**	**14,141,84**	**103,059.31**

GIANT GARTERSNAKE

Model Assumptions

- Giant gartersnake occurrences have been documented along Planning Area stream reaches, primary in the southwestern portion of the Planning Area.
- The historical range of giant gartersnake within the Planning Area included the historical Central Valley great "tule" marsh (below 70 feet above sea level), and likely included emergent marsh areas along floodplains of streams and creeks up to an elevation of 230 feet above sea level.
- Stream reaches considered important suitable habitat owing to known use within the Planning Area include the following:
- Elliot Mitigation site contains a prominent drainage that links to Stone Lakes and is wet year round.
- Drainage canals south of Elk Grove have a past occurrence and link to Stone Lakes. The perennial segments of these canals are suitable habitat.
- Badger Creek and all other creeks that drain into the marsh at the Cosumnes River Preserve is likely high-quality habitat due to its proximity and connectivity to a significant population of giant gartersnake. The perennial segments of these creeks are suitable habitat.
- The perennial segments of Laguna Creek (south) and tributaries are suitable habitat due to presence of Freshwater Marsh habitat and proximity to documented occurrences.
- The perennial segments drainages and canals leading from the Cosumnes River Preserve including Deadman's Gulch.
- Giant gartersnakes use rice lands extensively and depend on them for habitat.
- The average distance between upland, over wintering sites and aquatic breeding sites is thought to be approximately 150 meters, ranging from 50 to 400 meters.
- Hansen and Brode (1993) also documented giant gartersnakes moving at least 400 meters (0.25 mile) between small lateral ditches and larger canals within the Natomas Basin.

Giant Garter Snake Modeled Habitat

The following streams, creeks or drainages are locations that are known to support giant gartersnakes within the Planning Area.

- A prominent drainageway on the Elliot mitigation site, which links to Stone Lakes National Wildlife Refuge (NWR) and is wet year-round.

- Drainage canals south of Elk Grove, which have a past occurrence and link to Stone Lakes NWR; the perennial segments of these canals are suitable habitat.
- Badger Creek and all other creeks that drain into the marsh at the Cosumnes River Preserve, which are likely high-quality habitat due to proximity and connectivity to a significant population of giant gartersnakes; the perennial segments of these creeks are suitable habitat.
- The perennial segments of Laguna Creek (south) and tributaries, which are suitable habitat due to presence of Freshwater Marsh habitat and proximity to documented occurrences.
- The perennial segments of drainages and canals leading from the Cosumnes River Preserve including Deadman's Gulch, which provides suitable habitat.

Giant gartersnake is known to occur at elevations of up to 230 feet above sea level and to travel up to 400 meters (0.25 mile) between aquatic and upland habitat. Therefore, the waterways described above plus Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland that are entirely or partially within 0.25 mile of the aforementioned waterways and are at or below 230 feet in elevation are modeled as high-value aquatic habitat. In addition to high-value aquatic habitat, non-high value aquatic habitat was defined as Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland that is up to 0.25 mile away from high-value habitat and is at or below 230 feet in elevation.

Upland habitat for giant gartersnake is Mixed Riparian Scrub and Valley Grassland within a distance of 0.25 mile from modeled aquatic habitat and is at or below an elevation of 230 feet. High-value upland habitat for giant gartersnake is defined as upland habitat within 200 feet of high-value aquatic giant gartersnake habitat (i.e., Stream/Creek, Freshwater Marsh, Open Water, and Seasonal Wetland) that is at or below 230 feet in elevation.

Table G-4.17a. Giant Gartersnake Acres of High-Value and Non-High-Value Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Upland Habitat			
Mixed Riparian Scrub	1,043.00	170.83	872.70
Valley Grassland	26,825.06	3,882.27	22,942.79
Total Upland Habitat	*27,868.06*	*4,053.10*	*23,815.49*
Aquatic Habitat			
Seasonal Wetland	1,624.8	86.99	1,537.81
Freshwater Marsh	2,588.75	299.01	2,289.74
Open Water	1,282.12	43.20	1,238.91
Streams/Creeks	1,793.95	53.90	1,740.05
Total Aquatic Habitat	*7,289.62*	*483.10*	*6,806.51*
GRAND TOTAL	**35,157.68**	**4,536.10**	**30,622.00**

Table G-4.17b. Giant Gartersnake Acres of High-Value Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Upland Habitat			
Mixed Riparian Scrub	569.68	143.20	426.48
Valley Grassland	6,284.53	334.84	5,371.28
Total Upland Habitat	*6,854.21*	*461.21*	*5,797.76*
Aquatic Habitat			
Seasonal Wetland	740.86	57.25	683.61
Freshwater Marsh	1,194.13	272.62	921.52
Open Water	679.02	5.21	691.81
Streams/Creeks	995.09	33.67	961.42
Total Aquatic Habitat	*3,627.10*	*368.75*	*3,258.36*
GRAND TOTAL	**10,481.31**	**1,425.20**	**9,056.12**

COOPER'S HAWK

Model Assumptions

- Overall distribution, abundance, and population structure for Cooper's hawk are not well known within the Planning area.
- In urban Tucson, Arizona, home range size for nine subadult Cooper's hawks during their first fall/winter averaged 1,905 acres (771 hectares).
- In Tucson, Mannan and Boal (2000) studied the movements of adult male Cooper's hawks in adjacent home ranges during the breeding season. Home range sizes for nine individuals ranged between 33 and 323 acres (13 and 131 hectares) and averaged 162 acres (66 hectares).
- In a study of nesting Cooper's hawks in the Sacramento area, the average distance between adjacent nests was 0.99 mile (1.6 kilometers).
- Most Cooper's hawks breeding in California are permanent, non-migratory residents; however, Cooper's hawks breeding in montane habitats may exhibit seasonal movements, moving to snow-free lower elevations during winter.

Cooper's Hawk Habitat Model

Modeled foraging habitat is Blue Oak Woodland, Blue Oak Savanna, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Planning Area. Modeled nesting habitat is Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Planning Area.

Table G-4.18. Cooper's Hawk Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting/Foraging Habitat			
Blue Oak Woodland	9,122.39	0	9,122.39
Mixed Riparian Woodland	5,784.78	244.21	5,540.57
Mixed Riparian Scrub	1,451.82	241.47	1,210.35
Mine Tailing Riparian Woodland	641.07	219.81	421.26
Total Nesting/Foraging Habitat	*17,000.06*	*705.49*	*16,294.57*
Foraging Habitat			
Blue Oak Savanna	5,637.07	17.84	5,583.44
Total Foraging Habitat	*5,637.07*	*17.84*	*5,583.44*
GRAND TOTAL	**22,637.13**	**723.33**	**21,838.01**

TRICOLORED BLACKBIRD

Model Assumptions

- Over the past couple of decades tricolored blackbird colony sites have been documented throughout the Planning Area.
- DeHaven et al. (1975) banded 33,058 nestlings and only 39% of band recoveries were re-located within 16 kilometers (10 miles) of natal colonies.
- Most tricolored blackbirds forage within five kilometers (three miles) of their colony sites (Orians 1961), but commute distances of up to 13 kilometers (8 miles) have been reported.

Tricolored Blackbird Habitat Model

Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, and Open Water throughout the Planning Area. Modeled nesting habitat is Cropland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh throughout the Planning Area.

Table G-4.19. Tricolored Blackbird Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting/Foraging Habitat			
Valley Grassland	13,511.61	30,344.83	104,766.78
Cropland	47,904.83	5,480.89	42,423.94
Seasonal Wetland	2,600.12	162.55	2,437.57
Freshwater Marsh	2,921.94	391.68	2,530.26
Total Nesting/Foraging Habitat	*66,938.50*	*36,379.95*	*152,158.55*
Foraging Habitat			
Irrigated Pasture-Grassland	15,991.26	3,218.48	12,772.79
Vernal Pool	4,658.17	1,057.46	3,600.72
Swale	1,251.65	460.73	760.72
Open Water	2,343.81	237.11	760.92
Total Foraging Habitat	*24,244.89*	*4,973.78*	*19.241.13*
GRAND TOTAL	**91,183.39**	**41,353.73**	**171,399.68**

WESTERN BURROWING OWL

Model Assumptions

- During the breeding season, adult male Burrowing Owls have been documented foraging over a range of 0.8 to 1.2 square miles (2 to 3 square kilometers) (Haug and Oliphant 1987), and primarily within 0.4 mile (600 meters) of the nest burrow.
- In two burrowing owl demography studies conducted in the San Francisco Bay Area, owls moved an average distance of 0.5 to 0.9 mile (0.8 to 1 kilometers) between breeding seasons. Of this sample population, 27% remained at the same nest site; 14% dispersed less than 265 feet (81 meters) away; 34% dispersed 0.05 to 0.5 mile (80 to 805 meters); 8% dispersed 0.5 to 1.0 mile (805 meters to 2 kilometers); 14% dispersed 1 to 5 mile (2 to 8 kilometers); and 2% moved 5 to 10 miles (8 to 16 kilometers).
- Western burrowing owls occur in suitable habitat throughout the Planning Area; however, their overall distribution, abundance, and population structure are not well known.
- Although burrowing owl populations have declined or disappeared from much of their historical habitat, outlying areas of Sacramento County still provide suitable habitat for the species. Burrowing owls are known to occupy patches of habitat in the western part of the Planning Area that extend from the Sacramento Regional County Sanitation District Bufferlands (Jones, pers. comm. 2004) to The Nature Conservancy's Cosumnes River Preserve (Reiner, pers. comm. 2004), as well as patches of habitat in the rolling grasslands in eastern Sacramento County. The Meadowview and Pocket areas within the

City of Sacramento (outside the Planning Area) support disjunct, isolated populations north to Florin Road.

Burrowing Owl Habitat Model

Modeled foraging habitat is Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Stream/Creek (VPIH) throughout the Planning Area. Modeled nesting habitat is Valley Grassland, Blue Oak Savanna, Cropland, and Irrigated Pasture-Grassland throughout the Planning Area.

Table G-4.20. Western Burrowing Owl Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting/Foraging Habitat			
Cropland	47,904.83	5,480.89	42,423.94
Irrigated Pasture-Grassland	15,991.26	3,218.48	12,772.79
Valley Grassland	165,111.61	30,344.83	104,766.78
Blue Oak Savanna	5,637.37	17.84	5,619.24
TOTAL	**204,644.77**	**39,062.04**	**165,582.75**

FERRUGINOUS HAWK

Model Assumptions

- Ferruginous hawks do not regularly breed in California, with the most recent breeding being recorded in 1989 in northeastern California.
- Occurrence information is not well documented from within the Planning Area.
- The spatial requirements of ferruginous hawks during winter have not been widely reported and what constitutes the minimum size of suitable winter foraging habitat is unknown for most areas.
- The Ferruginous hawk may defend winter territories. Winter densities in Utah have been reported at one individual per 3.60 square miles (Smith and Murphy 1978), and Plumpton and Andersen (1997) found a mean daily Minimum Convex Polygon home range size of 1.36 square miles.

Ferruginous Hawk Habitat Model

Modeled foraging habitat is Valley Grassland, Irrigated Pasture-Grassland, Vernal Pool, Seasonal Wetland, and Swale land cover located anywhere in the Planning Area.

Table G-4.21. Ferruginous Hawk Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting/Foraging Habitat			
Valley Grassland	135,111.60	30,344.83	104,766.78
Irrigated Pasture-Grassland	15,991.26	3,218.48	12,772.79
Seasonal Wetland	2,600.12	162.55	2,437.57
Vernal Pool	4,658.17	1,057.46	3600.72
Swale	1,251.65	460.73	760.92
TOTAL	159,612.80	35,244.05	124,368.78

SWAINSON'S HAWK

Model Assumptions

- Radio-tagged male Swainson's hawks were recorded to travel as far as 18 miles from a nest to exploit more favorable agricultural foraging opportunities.
- Estep (1989) found mean home ranges to be 6,818 acres. While Babcock (1995) plotted out 9,978 acres as the mean home range in his study area in eastern Yolo County.
- Swainson's hawks are typically not found at elevations above 500 feet in Sacramento County.
- Swainson's hawk occurrences are recorded throughout the Planning Area.

Swainson's Hawk Habitat Model

Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale throughout the Planning Area at elevations below 500 feet. Modeled nesting habitat is mixed Riparian Woodland and Mixed Riparian Scrub throughout the Planning Area at elevations below 500 feet.

High-value habitat for Swainson's hawk is defined by as modeled foraging habitat occurring in the western portion of the Planning Area (within PPUs 4, 6, and 8).

Table G-4.22a. Swainson's Hawk Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting/Foraging Habitat			
Mixed Riparian Woodland	5,784.78	244.21	5,540.57
Mixed Riparian Scrub	1,451.82	241.47	1,207.45
Total Nesting/Foraging Habitat	*7,236.60*	*485.68*	*6,748.02*
Foraging Habitat			
Valley Grassland	133,704.65	30,344.83	632.23
Cropland	47,904.83	5,480.89	362.91
Irrigated Pasture-Grassland	15,991.26	3,218.48	155.49
Vernal Pool	4,535.19	934.86	34.16
Seasonal Wetland	2,600.12	162.55	3.67
Swale	1,251.57	460.73	1.86
Total Foraging Habitat	*205,987.62*	*40,602.34*	*1,190.32*
GRAND TOTAL	**213,244.22**	**41,088.02**	**1,231.22**

Table G-4.22b. Swainson's Hawk Acres of High-Value Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Foraging Habitat			
Valley Grassland	20,189.92	2,626.53	17,563.39
Cropland	38,669.94	3,491.49	35,179.44
Irrigated Pasture-Grassland	8,381.65	1,433.80	6,947.86
Vernal Pool	1,001.49	57.71	943.78
Seasonal Wetland	1,740.42	104.98	1,635.44
Swale	143.08	18.53	124.55
Total High-Value Habitat	**70,126.50**	**7,733.04**	**62,393.46**

NORTHERN HARRIER

Model Assumptions

- Reported territory sizes for males range from 2 to 272 acres (0.8 to 110 hectares); females typically defend a smaller territory.
- During the breeding season, reported average home range sizes from eight studies were 420 to 37,067 acres (170 to 15,000 hectares).
- Males reportedly will hunt ≥10 kilometers (≥6 miles) from the nest.

- Northern harriers occur in suitable habitat within the Planning Area and are probably regular breeders; however, their overall range, abundance, and population structure are not well known.

Northern Harrier Habitat Model

Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, Swale, and Freshwater Marsh throughout the Planning Area. Modeled nesting habitat is Cropland, Irrigated Pasture-Grassland, and Valley Grassland throughout the Planning Area.

Table G-4.23. North Harrier Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting/Foraging Habitat			
Valley Grassland	135,111.61	30,344.83	104,766.78
Cropland	47,914.83	5,480.89	42,423.94
Irrigated Pasture-Grassland	15,991.26	3,218.48	12,772.19
Total Nesting/Foraging Habitat	*199,007.70*	*39,044.20*	*159,962.91*
Foraging Habitat			
Vernal Pool	4,035.57	934.86	3,600.72
Seasonal Wetland	2,600.12	162.55	2,437.57
Freshwater Marsh	2,921.94	391.68	2,530.26
Swale	1,251.65	460.73	790.92
Total Foraging Habitat	*10,809.28*	*1,949.82*	*9,359.47*
GRAND TOTAL	**209,816.98**	**40,994.02**	**169,322.38**

WHITE-TAILED KITE

Model Assumptions

- Territory sizes estimated along the south coast of California near Long Beach ranged from 22 to 128 acres (nine to 52 hectares) and near San Diego from 42 to 217 acres (17 to 88 hectares).
- During winter and the breeding season, foraging from nest or perch sites extend up to 2 miles, but most were less than 0.6 mile.
- No regularly occurring surveys have been conducted throughout the Planning Area, however, White-tailed kites are known to nest or forage throughout the Planning Area.

White-Tailed Kite Habitat Model

Modeled foraging habitat is Blue Oak Savanna, Cropland, Irrigated Pasture-Grassland, Valley Grassland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, and Swale throughout the Planning Area. Modeled nesting habitat is Blue Oak Woodland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, and Mixed Riparian Scrub throughout the Planning Area.

Table G-4.24. White-Tailed Kite Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting Habitat			
Blue Oak Woodland	9,131.84	0	9,131.84
Mixed Riparian Woodland	5,784.78	244.21	5,540.57
Mine Tailing Riparian Woodland	641.07	219.81	421.26
Total Nesting Habitat	*15,557.69*	*464.02*	*15,936.67*
Nesting/Foraging Habitat			
Mixed Riparian Scrub	1,451.82	241.47	1,210.35
Total Nesting/Foraging Habitat	*1,451.82*	*241.47*	*1,210.35*
Foraging Habitat			
Valley Grassland	135,111.61	30,344.83	104,766.78
Cropland	47,914.83	5,480.89	42,423.94
Irrigated Pasture-Grassland	15,991.26	3,218.48	12,772.79
Blue Oak Savanna	5,637.07	17.84	5,619.24
Vernal Pool	4,658.17	1,057.46	3,600.72
Seasonal Wetland	2,600.12	162.55	4,437.57
Swale	1,251.65	460.73	790.92
Total Foraging Habitat	*213,154.71*	*40,742.78*	*172,411.96*
GRAND TOTAL	**230,164.22**	**41,448.27**	**189,558.98**

GREATER SANDHILL CRANE

Model Assumptions

- Greater sandhill cranes travel limited distances to foraging sites from night roost areas. The average distance traveled was 0.88 mile (range 0.17 to 1.89 miles) and 1.74 miles between roost sites and foraging areas.
- The size of roost sites is variable. Sandhill cranes roosting in Oregon used sites between 1 and 300 acres (0.5 and 120 hectares).
- Littlefield (1993) recommended roost sites should be at least 20 acres (8 hectares).
- Greater sandhill crane use in the Planning Area principally occurs in the Cosumnes Floodplain.

Greater Sandhill Crane Habitat Model

Modeled night roosting habitat is Vernal Pool, Seasonal Wetland, and Freshwater Marsh within 2 miles of greater sandhill crane occurrences per consultation with USFWS and CDFW. This element of the species' model is consistent with the Conservation Assessment for Greater Sandhill Cranes Wintering on the Cosumnes River Floodplain and Delta Regions of California although extends beyond the Cosumnes River Floodplain within the Planning Area. Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Seasonal Wetland, and Freshwater Marsh within 1.75 miles of modeled roosting habitat.

Table G-4.25. Greater Sandhill Crane Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Roosting/Foraging Habitat			
Seasonal Wetland	1,825.17	105.58	1,771.29
Freshwater Marsh	2,609.79	275.97	2,333.81
Total Roosting/Foraging Habitat	*4,434.96*	*281.55*	*4,105.10*
Roosting Habitat			
Vernal Pool	1,155.75	57.71	1,098.04
Total Roosting Habitat	*1,155.75*	*57.71*	*1,098.04*
Foraging Habitat			
Cropland	42,628.06	3,600.42	39,027.63
Valley Grassland	30,585.36	2,717.57	27,867.79
Irrigate Pasture-Grassland	10,908.05	1,533.58	9,374.47
Total Foraging Habitat	*84,121.47*	*7,881.57*	*76,269.89*
GRAND TOTAL	**89,712.18**	**8,320.83**	**81,473.03**

High-value habitat for greater sandhill crane is defined as modeled habitats above sea level and outside the UDA (i.e., modeled habitats within the UDA are excluded).

LOGGERHEAD SHRIKE

Model Assumptions

- In mainland California, the average size of territories averaged 21 acres (9 hectares) and ranged between 11 acres (4 hectares) and 40 acres (16 hectares).
- Loggerhead shrikes occur year-round in suitable habitat throughout the Planning Area. They are probably regular breeders in the Planning Area in low densities; however, their overall distribution, abundance, and population structure are not well known.

Loggerhead Shrike Habitat Model

Modeled foraging habitat is Cropland, Irrigated Pasture-Grassland, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale throughout the Planning Area. Modeled nesting habitat is Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Valley Grassland throughout the Planning Area.

Table G-4.26. Loggerhead Shrike Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Nesting Habitat			
Mixed Riparian Woodland	5,784.78	244.21	5,540.57
Mixed Riparian Scrub	1,451.82	214.47	1,210.35
Mine Tailing Riparian Woodland	641.07	219.81	421.26
Total Roosting/Foraging Habitat	*7,877.67*	*678.49*	*7,172.18*
Nesting/Foraging Habitat			
Valley Grassland	135,111.61	30,344.83	104,766.78
Total Roosting Habitat	*135,111.61*	*30,344.83*	*104,766.78*
Foraging Habitat			
Cropland	47,904.83	5,480.89	42,423.94
Irrigated Pasture-Grassland	15,991.26	3,218.48	12,772.79
Vernal Pool	4,658.17	1,057.46	3,600.72
Seasonal Wetland	2,600.12	162.55	4,427.57
Swale	1,251.65	460.73	790.92
Total Foraging Habitat	*72,406.03*	*10,380.11*	*62,025.94*
GRAND TOTAL	**215,395.31**	**41,403.43**	**173,964.30**

RED BAT

Model Assumptions

- Data regarding reported territory sizes and distances traveled between roosting and foraging sites is not available.
- Fifty-six records for the western red bat (1977 to 2002) varied in location precision from "Sacramento County" to "Sacramento" to an actual address. Over 30 western red bats were from localities reported as the City of Sacramento, Folsom, Rancho Cordova, Wilton, Elk Grove, and Galt.

Western Red Bat Habitat Model

Modeled foraging habitat is Valley Grassland, Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Mixed Riparian Scrub, Vernal Pool, Seasonal Wetland, Swale, Freshwater Marsh, Open Water, and Stream/Creek throughout the Planning Area. Modeled roosting habitat is Blue Oak Woodland, Blue Oak Savanna, Orchard, Mine Tailing Riparian Woodland, and Mixed Riparian Woodland throughout the Planning Area.

Table G-4.27. Western Red Bat Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Foraging Habitat			
Valley Grassland	135,111.61	30,344.83	104,766.78
Vernal Pool	4,535.57	934.86	3,600.72
Seasonal Wetlands	2,600.12	162.55	2,437.57
Freshwater Marsh	2,921.94	391.68	2,530.26
Streams/Creeks	2,673.93	163.21	2,510.73
Open Water	2,343.81	237.11	2,106.70
Mixed Riparian Scrub	1,451.82	241.47	1,210.35
Swale	1,251.65	460.73	790.92
Total Roosting Habitat	*152,890.44*	*32,936.43*	*119,954.02*
Roosting/Foraging Habitat			
Blue Oak Woodland	9,131.84	0	9,131.84
Mixed Riparian Woodland	5,784.78	244.21	5,540.57
Blue Oak Savana	5,637.07	17.84	5,619.24
Orchards	3,646.02	212.81	3,433.75
Mine Tailing Riparian Woodland	641.07	219.81	421.26
Total Foraging Habitat	*24,840.78*	*649.14*	*24,146.65*
GRAND TOTAL	**177,731.23**	**33,360.56**	**144,100.67**

AMERICAN BADGER

Model Assumptions

- Female and male home range sizes in Utah have been estimated at 338–751 acres and 1,327–1,549 acres, respectively. In Idaho, female and male badger home ranges averaged 400 acres and 600 acres, respectively.
- The Study Area is positioned within American badger's California range; and Badgers have been documented in the northeastern portion of the Planning Area.
- Badgers require large relatively undisturbed areas; therefore, primary habitat occurs in the eastern grasslands and rangelands of the Planning Area.

American Badger Habitat Model

Modeled habitat is Blue Oak Savanna, Valley Grassland, Vernal Pool, Seasonal Wetland, and Swale within rural portions of the Planning Area.

Table G-4.28. American Badger Acres of Habitat

Habitat Model Land Cover Types	Total Available Acres in the Planning Area	Total Available Acres Inside the UDA	Total Available Acres Outside the UDA
Entire Lifecycle			
Valley Grassland	135,111.61	30,344.83	668.91
Blue Oak Savanna	5,637.07	17.84	35.80
Vernal Pool	4,535.57	934.86	34.16
Seasonal Wetland	2,600.12	162.55	790.92
Swale	1,251.65	460.73	2,437.57
TOTAL	**149,136.02**	**3,192.80**	**117,215.22**

INTENTIONALLY LEFT BLANK

EIS/EIR APPENDIX H

Modeling Data and Assumptions for Air Quality and Greenhouse Gas Analyses

South Sac HCP

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	100.00	Acre	100.00	4,356,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Off-road Equipment - representative equipment for preserve construction

Operational Off-Road Equipment - maintenece equipment that could be used during operations.

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	HorsePower	400.00	255.00
tblOffRoadEquipment	LoadFactor	0.38	0.40
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	6.8984	74.9167	50.5226	0.0646	9.2955	3.5858	12.4873	5.0349	3.2990	6.9560	0.0000	6,652.4690	6,652.4690	1.9462	0.0000	6,693.3391
2017	6.4823	69.6841	48.0452	0.0646	8.9015	3.3187	12.2202	3.6570	3.0532	6.7102	0.0000	6,541.4879	6,541.4879	1.9447	0.0000	6,582.3255
Total	**13.3807**	**144.6008**	**98.5679**	**0.1292**	**18.1969**	**6.9046**	**24.7075**	**8.6919**	**6.3522**	**13.6662**	**0.0000**	**13,193.9569**	**13,193.9569**	**3.8909**	**0.0000**	**13,275.6647**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	6.8925	74.8481	50.4775	0.0646	9.2955	3.5826	12.4840	5.0349	3.2959	6.9529	0.0000	6,646.5836	6,646.5836	1.9444	0.0000	6,687.4165
2017	6.4767	69.6203	48.0023	0.0645	8.9015	3.3157	12.2171	3.6570	3.0504	6.7074	0.0000	6,535.6957	6,535.6957	1.9429	0.0000	6,576.4961
Total	**13.3691**	**144.4683**	**98.4798**	**0.1291**	**18.1969**	**6.8982**	**24.7011**	**8.6919**	**6.3464**	**13.6604**	**0.0000**	**13,182.2793**	**13,182.2793**	**3.8873**	**0.0000**	**13,263.9125**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.0862**	**0.0916**	**0.0893**	**0.0774**	**0.0000**	**0.0918**	**0.0256**	**0.0000**	**0.0918**	**0.0426**	**0.0000**	**0.0885**	**0.0885**	**0.0915**	**0.0000**	**0.0885**

AGENDA ITEM 11.1

6804

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	109.8140	1.0000e-004	0.0105	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0219	0.0219	6.0000e-005		0.0232
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	1.7675	1.2922	6.9180	0.0136	0.9100	0.0186	0.9285	0.2431	0.0171	0.2601		1,177.2236	1,177.2236	0.0483		1,178.2386
Offroad	1.6990	17.8594	10.1361	0.0202		0.9294	0.9294		0.8566	0.8566		2,079.3492	2,079.3492	0.6155		2,092.2741
Total	**113.2805**	**19.1517**	**17.0646**	**0.0338**	**0.9100**	**0.9480**	**1.8580**	**0.2431**	**0.8737**	**1.1167**		**3,256.5947**	**3,256.5947**	**0.6639**	**0.0000**	**3,270.5359**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	109.8140	1.0000e-004	0.0105	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0219	0.0219	6.0000e-005		0.0232
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	1.7675	1.2922	6.9180	0.0136	0.9100	0.0186	0.9285	0.2431	0.0171	0.2601		1,177.2236	1,177.2236	0.0483		1,178.2386
Offroad	1.6990	17.8594	10.1361	0.0202		0.9294	0.9294		0.8566	0.8566		2,079.3492	2,079.3492	0.6155		2,092.2741
Total	**113.2805**	**19.1517**	**17.0646**	**0.0338**	**0.9100**	**0.9480**	**1.8580**	**0.2431**	**0.8737**	**1.1167**		**3,256.5947**	**3,256.5947**	**0.6639**	**0.0000**	**3,270.5359**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.4998**	**93.2523**	**59.3983**	**59.7041**	**0.0000**	**98.0391**	**50.0234**	**0.0000**	**98.0439**	**76.7034**	**0.0000**	**63.8504**	**63.8504**	**92.7108**	**0.0000**	**63.9734**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/20/2016	8/11/2016	5	60	
2	Grading	Grading	8/12/2016	3/16/2017	5	155	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1		174	0.41
Site Preparation	Off-Highway Trucks	3	4.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	4.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

AGENDA ITEM 11.1

6806

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	9	23.00	0.00	0.00	15.00	8.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	15.00	8.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2016

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.0331	0.0000	9.0331	4.9653	0.0000	4.9653			0.0000			0.0000
Off-Road	3.1461	34.9844	23.2272	0.0297		1.6308	1.6308		1.5004	1.5004		3,084.6623	3,084.6623	0.9304		3,104.2016
Total	**3.1461**	**34.9844**	**23.2272**	**0.0297**	**9.0331**	**1.6308**	**10.6640**	**4.9653**	**1.5004**	**6.4657**		**3,084.6623**	**3,084.6623**	**0.9304**		**3,104.2016**

3.2 Site Preparation - 2016

Unmitigated Construction Off-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4818	0.1184	1.5930	3.3200e-003	0.2623	1.8300e-003	0.2642	0.0696	1.6800e-003	0.0713		273.1115	273.1115	0.0129		273.3823
Total	**0.4818**	**0.1184**	**1.5930**	**3.3200e-003**	**0.2623**	**1.8300e-003**	**0.2642**	**0.0696**	**1.6800e-003**	**0.0713**		**273.1115**	**273.1115**	**0.0129**		**273.3823**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.0331	0.0000	9.0331	4.9653	0.0000	4.9653			0.0000			0.0000
Off-Road	3.1432	34.9523	23.2059	0.0297		1.6293	1.6293		1.4990	1.4990	0.0000	3,081.8323	3,081.8323	0.9296		3,101.3537
Total	**3.1432**	**34.9523**	**23.2059**	**0.0297**	**9.0331**	**1.6293**	**10.6625**	**4.9653**	**1.4990**	**6.4643**	**0.0000**	**3,081.8323**	**3,081.8323**	**0.9296**		**3,101.3537**

3.2 Site Preparation - 2016

Mitigated Construction Off-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4818	0.1184	1.5930	3.3200e-003	0.2623	1.8300e-003	0.2642	0.0696	1.6800e-003	0.0713		273.1115	273.1115	0.0129		273.3823
Total	**0.4818**	**0.1184**	**1.5930**	**3.3200e-003**	**0.2623**	**1.8300e-003**	**0.2642**	**0.0696**	**1.6800e-003**	**0.0713**		**273.1115**	**273.1115**	**0.0129**		**273.3823**

3.3 Grading - 2016

Unmitigated Construction On-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975		6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**8.6733**	**3.5842**	**12.2576**	**3.5965**	**3.2975**	**6.8940**		**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

3.3 Grading - 2016

Unmitigated Construction Off-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4190	0.1030	1.3852	2.8900e-003	0.2281	1.5900e-003	0.2297	0.0605	1.4600e-003	0.0620		237.4883	237.4883	0.0112		237.7237
Total	**0.4190**	**0.1030**	**1.3852**	**2.8900e-003**	**0.2281**	**1.5900e-003**	**0.2297**	**0.0605**	**1.4600e-003**	**0.0620**		**237.4883**	**237.4883**	**0.0112**		**237.7237**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.4735	74.7451	49.0923	0.0617		3.5810	3.5810		3.2945	3.2945	0.0000	6,409.0953	6,409.0953	1.9332		6,449.6927
Total	**6.4735**	**74.7451**	**49.0923**	**0.0617**	**8.6733**	**3.5810**	**12.2543**	**3.5965**	**3.2945**	**6.8910**	**0.0000**	**6,409.0953**	**6,409.0953**	**1.9332**		**6,449.6927**

3.3 Grading - 2016

Mitigated Construction Off-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4190	0.1030	1.3852	2.8900e-003	0.2281	1.5900e-003	0.2297	0.0605	1.4600e-003	0.0620		237.4883	237.4883	0.0112		237.7237
Total	**0.4190**	**0.1030**	**1.3852**	**2.8900e-003**	**0.2281**	**1.5900e-003**	**0.2297**	**0.0605**	**1.4600e-003**	**0.0620**		**237.4883**	**237.4883**	**0.0112**		**237.7237**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.0991	69.5920	46.8050	0.0617		3.3172	3.3172		3.0518	3.0518		6,313.3690	6,313.3690	1.9344		6,353.9915
Total	**6.0991**	**69.5920**	**46.8050**	**0.0617**	**8.6733**	**3.3172**	**11.9905**	**3.5965**	**3.0518**	**6.6483**		**6,313.3690**	**6,313.3690**	**1.9344**		**6,353.9915**

3.3 Grading - 2017

Unmitigated Construction Off-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3831	0.0921	1.2402	2.8900e-003	0.2281	1.5400e-003	0.2297	0.0605	1.4200e-003	0.0619		228.1189	228.1189	0.0102		228.3340
Total	**0.3831**	**0.0921**	**1.2402**	**2.8900e-003**	**0.2281**	**1.5400e-003**	**0.2297**	**0.0605**	**1.4200e-003**	**0.0619**		**228.1189**	**228.1189**	**0.0102**		**228.3340**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.0935	69.5281	46.7621	0.0617		3.3142	3.3142		3.0490	3.0490	0.0000	6,307.5768	6,307.5768	1.9326		6,348.1621
Total	**6.0935**	**69.5281**	**46.7621**	**0.0617**	**8.6733**	**3.3142**	**11.9875**	**3.5965**	**3.0490**	**6.6455**	**0.0000**	**6,307.5768**	**6,307.5768**	**1.9326**		**6,348.1621**

3.3 Grading - 2017

Mitigated Construction Off-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3831	0.0921	1.2402	2.8900e-003	0.2281	1.5400e-003	0.2297	0.0605	1.4200e-003	0.0619		228.1189	228.1189	0.0102		228.3340
Total	**0.3831**	**0.0921**	**1.2402**	**2.8900e-003**	**0.2281**	**1.5400e-003**	**0.2297**	**0.0605**	**1.4200e-003**	**0.0619**		**228.1189**	**228.1189**	**0.0102**		**228.3340**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.7675	1.2922	6.9180	0.0136	0.9100	0.0186	0.9285	0.2431	0.0171	0.2601		1,177.2236	1,177.2236	0.0483		1,178.2386
Unmitigated	1.7675	1.2922	6.9180	0.0136	0.9100	0.0186	0.9285	0.2431	0.0171	0.2601		1,177.2236	1,177.2236	0.0483		1,178.2386

4.2 Trip Summary Information

AGENDA ITEM 11.1

6813

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	159.00	159.00	159.00	429,813	429,813
Total	159.00	159.00	159.00	429,813	429,813

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	15.00	7.50	8.50	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.504516	0.068219	0.178179	0.147873	0.044976	0.006346	0.020386	0.015946	0.002304	0.002308	0.006193	0.000574	0.002181

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

AGENDA ITEM 11.1

6815

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	109.8140	1.0000e-004	0.0105	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0219	0.0219	6.0000e-005		0.0232
Unmitigated	109.8140	1.0000e-004	0.0105	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0219	0.0219	6.0000e-005		0.0232

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	16.5946					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	93.2184					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0200e-003	1.0000e-004	0.0105	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0219	0.0219	6.0000e-005		0.0232
Total	**109.8140**	**1.0000e-004**	**0.0105**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0219**	**0.0219**	**6.0000e-005**		**0.0232**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	16.5946					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	93.2184					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0200e-003	1.0000e-004	0.0105	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0219	0.0219	6.0000e-005		0.0232
Total	**109.8140**	**1.0000e-004**	**0.0105**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0219**	**0.0219**	**6.0000e-005**		**0.0232**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Off-Highway Trucks	1	8.00	260	400	0.38	Diesel
Tractors/Loaders/Backhoes	2	8.00	260	97	0.37	Diesel
Dumpers/Tenders	1	8.00	260	16	0.38	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Dumpers/Tenders	0.0740	0.4695	0.2511	7.5000e-004		0.0188	0.0188		0.0188	0.0188		60.9403	60.9403	6.6500e-003		61.0799
Off-Highway Trucks	0.9466	10.9062	5.0793	0.0132		0.4115	0.4115		0.3785	0.3785		1,373.6788	1,373.6788	0.4144		1,382.3801
Tractors/Loaders/Backhoes	0.6784	6.4837	4.8057	6.2000e-003		0.4992	0.4992		0.4593	0.4593		644.7302	644.7302	0.1945		648.8141
Total	**1.6990**	**17.8594**	**10.1361**	**0.0202**		**0.9294**	**0.9294**		**0.8566**	**0.8566**		**2,079.3492**	**2,079.3492**	**0.6155**		**2,092.2741**

10.0 Vegetation

South Sac HCP

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	100.00	Acre	100.00	4,356,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Off-road Equipment - representative equipment for preserve construction

Operational Off-Road Equipment - maintenece equipment that could be used during operations.

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	HorsePower	400.00	255.00
tblOffRoadEquipment	LoadFactor	0.38	0.40
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4565	4.8374	3.2782	4.2300e-003	0.9619	0.2301	1.1920	0.4327	0.2117	0.6443	0.0000	394.3787	394.3787	0.1148	0.0000	396.7902
2017	0.1748	1.8817	1.2921	1.7400e-003	0.6781	0.0896	0.7677	0.2803	0.0824	0.3628	0.0000	159.6854	159.6854	0.0476	0.0000	160.6857
Total	**0.6313**	**6.7191**	**4.5703**	**5.9700e-003**	**1.6400**	**0.3197**	**1.9597**	**0.7130**	**0.2941**	**1.0071**	**0.0000**	**554.0641**	**554.0641**	**0.1625**	**0.0000**	**557.4759**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4560	4.8316	3.2744	4.2200e-003	0.9619	0.2298	1.1917	0.4327	0.2114	0.6441	0.0000	393.9292	393.9292	0.1147	0.0000	396.3379
2017	0.1746	1.8795	1.2905	1.7300e-003	0.6781	0.0895	0.7676	0.2803	0.0823	0.3627	0.0000	159.5014	159.5014	0.0476	0.0000	160.5005
Total	**0.6306**	**6.7111**	**4.5650**	**5.9500e-003**	**1.6400**	**0.3193**	**1.9593**	**0.7130**	**0.2938**	**1.0067**	**0.0000**	**553.4306**	**553.4306**	**0.1623**	**0.0000**	**556.8384**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.1109**	**0.1186**	**0.1157**	**0.3350**	**0.0000**	**0.1189**	**0.0194**	**0.0000**	**0.1190**	**0.0357**	**0.0000**	**0.1143**	**0.1143**	**0.1108**	**0.0000**	**0.1143**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	20.0410	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4800e-003	2.4800e-003	1.0000e-005	0.0000	2.6300e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.3109	0.2538	1.1762	2.2800e-003	0.1600	3.3800e-003	0.1634	0.0429	3.1100e-003	0.0460	0.0000	179.6002	179.6002	7.9700e-003	0.0000	179.7676
Offroad	0.2209	2.3217	1.3177	2.6200e-003		0.1208	0.1208		0.1114	0.1114	0.0000	245.2260	245.2260	0.0726	0.0000	246.7503
Waste						0.0000	0.0000		0.0000	0.0000	1.7457	0.0000	1.7457	0.1032	0.0000	3.9123
Water						0.0000	0.0000		0.0000	0.0000	0.0000	111.6609	111.6609	5.4900e-003	1.1300e-003	112.1279
Total	**20.5728**	**2.5755**	**2.4952**	**4.9000e-003**	**0.1600**	**0.1242**	**0.2842**	**0.0429**	**0.1145**	**0.1573**	**1.7457**	**536.4896**	**538.2353**	**0.1892**	**1.1300e-003**	**542.5608**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	20.0410	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4800e-003	2.4800e-003	1.0000e-005	0.0000	2.6300e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.3109	0.2538	1.1762	2.2800e-003	0.1600	3.3800e-003	0.1634	0.0429	3.1100e-003	0.0460	0.0000	179.6002	179.6002	7.9700e-003	0.0000	179.7676
Offroad	0.2209	2.3217	1.3177	2.6200e-003		0.1208	0.1208		0.1114	0.1114	0.0000	245.2260	245.2260	0.0726	0.0000	246.7503
Waste						0.0000	0.0000		0.0000	0.0000	1.7457	0.0000	1.7457	0.1032	0.0000	3.9123
Water						0.0000	0.0000		0.0000	0.0000	0.0000	111.6609	111.6609	5.4900e-003	1.1300e-003	112.1279
Total	**20.5728**	**2.5755**	**2.4952**	**4.9000e-003**	**0.1600**	**0.1242**	**0.2842**	**0.0429**	**0.1145**	**0.1573**	**1.7457**	**536.4896**	**538.2353**	**0.1892**	**1.1300e-003**	**542.5608**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.0736**	**90.1457**	**52.8094**	**53.4694**	**0.0000**	**97.2788**	**42.5188**	**0.0000**	**97.2829**	**70.7838**	**0.0000**	**45.7094**	**45.5611**	**38.3607**	**0.0000**	**45.4788**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/20/2016	8/11/2016	5	60	
2	Grading	Grading	8/12/2016	3/16/2017	5	155	

AGENDA ITEM 11.1

6823

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1		174	0.41
Site Preparation	Off-Highway Trucks	3	4.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	4.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	9	23.00	0.00	0.00	15.00	8.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	15.00	8.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2016

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0944	1.0495	0.6968	8.9000e-004		0.0489	0.0489		0.0450	0.0450	0.0000	83.9508	83.9508	0.0253	0.0000	84.4825
Total	**0.0944**	**1.0495**	**0.6968**	**8.9000e-004**	**0.2710**	**0.0489**	**0.3199**	**0.1490**	**0.0450**	**0.1940**	**0.0000**	**83.9508**	**83.9508**	**0.0253**	**0.0000**	**84.4825**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0142	3.9500e-003	0.0406	9.0000e-005	7.6000e-003	6.0000e-005	7.6500e-003	2.0200e-003	5.0000e-005	2.0700e-003	0.0000	6.7131	6.7131	3.5000e-004	0.0000	6.7205
Total	**0.0142**	**3.9500e-003**	**0.0406**	**9.0000e-005**	**7.6000e-003**	**6.0000e-005**	**7.6500e-003**	**2.0200e-003**	**5.0000e-005**	**2.0700e-003**	**0.0000**	**6.7131**	**6.7131**	**3.5000e-004**	**0.0000**	**6.7205**

3.2 Site Preparation - 2016

Mitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0943	1.0483	0.6960	8.9000e-004		0.0489	0.0489		0.0450	0.0450	0.0000	83.8509	83.8509	0.0253	0.0000	84.3820
Total	**0.0943**	**1.0483**	**0.6960**	**8.9000e-004**	**0.2710**	**0.0489**	**0.3199**	**0.1490**	**0.0450**	**0.1939**	**0.0000**	**83.8509**	**83.8509**	**0.0253**	**0.0000**	**84.3820**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0142	3.9500e-003	0.0406	9.0000e-005	7.6000e-003	6.0000e-005	7.6500e-003	2.0200e-003	5.0000e-005	2.0700e-003	0.0000	6.7131	6.7131	3.5000e-004	0.0000	6.7205
Total	**0.0142**	**3.9500e-003**	**0.0406**	**9.0000e-005**	**7.6000e-003**	**6.0000e-005**	**7.6500e-003**	**2.0200e-003**	**5.0000e-005**	**2.0700e-003**	**0.0000**	**6.7131**	**6.7131**	**3.5000e-004**	**0.0000**	**6.7205**

3.3 Grading - 2016

Unmitigated Construction On-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6722	0.0000	0.6722	0.2787	0.0000	0.2787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3272	3.7781	2.4814	3.1200e-003		0.1810	0.1810		0.1665	0.1665	0.0000	293.8884	293.8884	0.0887	0.0000	295.7500
Total	**0.3272**	**3.7781**	**2.4814**	**3.1200e-003**	**0.6722**	**0.1810**	**0.8532**	**0.2787**	**0.1665**	**0.4453**	**0.0000**	**293.8884**	**293.8884**	**0.0887**	**0.0000**	**295.7500**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0207	5.7800e-003	0.0594	1.3000e-004	0.0111	8.0000e-005	0.0112	2.9600e-003	7.0000e-005	3.0300e-003	0.0000	9.8264	9.8264	5.1000e-004	0.0000	9.8372
Total	**0.0207**	**5.7800e-003**	**0.0594**	**1.3000e-004**	**0.0111**	**8.0000e-005**	**0.0112**	**2.9600e-003**	**7.0000e-005**	**3.0300e-003**	**0.0000**	**9.8264**	**9.8264**	**5.1000e-004**	**0.0000**	**9.8372**

3.3 Grading - 2016

Mitigated Construction On-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6722	0.0000	0.6722	0.2787	0.0000	0.2787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3268	3.7736	2.4785	3.1100e-003		0.1808	0.1808		0.1663	0.1663	0.0000	293.5388	293.5388	0.0885	0.0000	295.3982
Total	**0.3268**	**3.7736**	**2.4785**	**3.1100e-003**	**0.6722**	**0.1808**	**0.8530**	**0.2787**	**0.1663**	**0.4451**	**0.0000**	**293.5388**	**293.5388**	**0.0885**	**0.0000**	**295.3982**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0207	5.7800e-003	0.0594	1.3000e-004	0.0111	8.0000e-005	0.0112	2.9600e-003	7.0000e-005	3.0300e-003	0.0000	9.8264	9.8264	5.1000e-004	0.0000	9.8372
Total	**0.0207**	**5.7800e-003**	**0.0594**	**1.3000e-004**	**0.0111**	**8.0000e-005**	**0.0112**	**2.9600e-003**	**7.0000e-005**	**3.0300e-003**	**0.0000**	**9.8264**	**9.8264**	**5.1000e-004**	**0.0000**	**9.8372**

3.3 Grading - 2017

Unmitigated Construction On-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6722	0.0000	0.6722	0.2787	0.0000	0.2787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1647	1.8790	1.2637	1.6700e-003		0.0896	0.0896		0.0824	0.0824	0.0000	154.6396	154.6396	0.0474	0.0000	155.6346
Total	**0.1647**	**1.8790**	**1.2637**	**1.6700e-003**	**0.6722**	**0.0896**	**0.7617**	**0.2787**	**0.0824**	**0.3611**	**0.0000**	**154.6396**	**154.6396**	**0.0474**	**0.0000**	**155.6346**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0101	2.7600e-003	0.0283	7.0000e-005	5.9500e-003	4.0000e-005	5.9900e-003	1.5800e-003	4.0000e-005	1.6200e-003	0.0000	5.0458	5.0458	2.5000e-004	0.0000	5.0511
Total	**0.0101**	**2.7600e-003**	**0.0283**	**7.0000e-005**	**5.9500e-003**	**4.0000e-005**	**5.9900e-003**	**1.5800e-003**	**4.0000e-005**	**1.6200e-003**	**0.0000**	**5.0458**	**5.0458**	**2.5000e-004**	**0.0000**	**5.0511**

3.3 Grading - 2017

Mitigated Construction On-Site

Acres of Grading: 387.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6722	0.0000	0.6722	0.2787	0.0000	0.2787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1645	1.8768	1.2622	1.6600e-003		0.0895	0.0895		0.0823	0.0823	0.0000	154.4556	154.4556	0.0473	0.0000	155.4495
Total	**0.1645**	**1.8768**	**1.2622**	**1.6600e-003**	**0.6722**	**0.0895**	**0.7616**	**0.2787**	**0.0823**	**0.3610**	**0.0000**	**154.4556**	**154.4556**	**0.0473**	**0.0000**	**155.4495**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0101	2.7600e-003	0.0283	7.0000e-005	5.9500e-003	4.0000e-005	5.9900e-003	1.5800e-003	4.0000e-005	1.6200e-003	0.0000	5.0458	5.0458	2.5000e-004	0.0000	5.0511
Total	**0.0101**	**2.7600e-003**	**0.0283**	**7.0000e-005**	**5.9500e-003**	**4.0000e-005**	**5.9900e-003**	**1.5800e-003**	**4.0000e-005**	**1.6200e-003**	**0.0000**	**5.0458**	**5.0458**	**2.5000e-004**	**0.0000**	**5.0511**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

AGENDA ITEM 11.1

6830

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.3109	0.2538	1.1762	2.2800e-003	0.1600	3.3800e-003	0.1634	0.0429	3.1100e-003	0.0460	0.0000	179.6002	179.6002	7.9700e-003	0.0000	179.7676
Unmitigated	0.3109	0.2538	1.1762	2.2800e-003	0.1600	3.3800e-003	0.1634	0.0429	3.1100e-003	0.0460	0.0000	179.6002	179.6002	7.9700e-003	0.0000	179.7676

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	159.00	159.00	159.00	429,813	429,813
Total	159.00	159.00	159.00	429,813	429,813

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	15.00	7.50	8.50	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.504516	0.068219	0.178179	0.147873	0.044976	0.006346	0.020386	0.015946	0.002304	0.002308	0.006193	0.000574	0.002181

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

AGENDA ITEM 11.1

6831

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	20.0410	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4800e-003	2.4800e-003	1.0000e-005	0.0000	2.6300e-003
Unmitigated	20.0410	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4800e-003	2.4800e-003	1.0000e-005	0.0000	2.6300e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.0285					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	17.0124					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3000e-004	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4800e-003	2.4800e-003	1.0000e-005	0.0000	2.6300e-003
Total	**20.0410**	**1.0000e-005**	**1.3100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.4800e-003**	**2.4800e-003**	**1.0000e-005**	**0.0000**	**2.6300e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.0285					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	17.0124					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3000e-004	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4800e-003	2.4800e-003	1.0000e-005	0.0000	2.6300e-003
Total	**20.0410**	**1.0000e-005**	**1.3100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.4800e-003**	**2.4800e-003**	**1.0000e-005**	**0.0000**	**2.6300e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	111.6609	5.4900e-003	1.1300e-003	112.1279
Unmitigated	111.6609	5.4900e-003	1.1300e-003	112.1279

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 119.148	111.6609	5.4900e-003	1.1300e-003	112.1279
Total		**111.6609**	**5.4900e-003**	**1.1300e-003**	**112.1279**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 119.148	111.6609	5.4900e-003	1.1300e-003	112.1279
Total		**111.6609**	**5.4900e-003**	**1.1300e-003**	**112.1279**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.7457	0.1032	0.0000	3.9123
Unmitigated	1.7457	0.1032	0.0000	3.9123

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	8.6	1.7457	0.1032	0.0000	3.9123
Total		**1.7457**	**0.1032**	**0.0000**	**3.9123**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	8.6	1.7457	0.1032	0.0000	3.9123
Total		**1.7457**	**0.1032**	**0.0000**	**3.9123**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Off-Highway Trucks	1	8.00	260	400	0.38	Diesel
Tractors/Loaders/Backhoes	2	8.00	260	97	0.37	Diesel
Dumpers/Tenders	1	8.00	260	16	0.38	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Tractors/Loaders/Backhoes	0.0882	0.8429	0.6247	8.1000e-004		0.0649	0.0649		0.0597	0.0597	0.0000	76.0356	76.0356	0.0229	0.0000	76.5173
Dumpers/Tenders	9.6200e-003	0.0610	0.0327	1.0000e-004		2.4400e-003	2.4400e-003		2.4400e-003	2.4400e-003	0.0000	7.1869	7.1869	7.8000e-004	0.0000	7.2034
Off-Highway Trucks	0.1231	1.4178	0.6603	1.7200e-003		0.0535	0.0535		0.0492	0.0492	0.0000	162.0035	162.0035	0.0489	0.0000	163.0296
Total	**0.2209**	**2.3217**	**1.3177**	**2.6300e-003**		**0.1208**	**0.1208**		**0.1114**	**0.1114**	**0.0000**	**245.2260**	**245.2260**	**0.0726**	**0.0000**	**246.7503**

10.0 Vegetation

GHG Emissions from Land Conversion

No Project

Land Cover	Acres Converted	MT/C/acre/year[1]	MT CO2/year
Riparian Woodland	147	0.737	108.339
Riparian Shrub	189	0	0
Riparian Woodland (mine tailing)	218	0.737	160.666
Grassland	23,428	0	0
Woodland	55	0.425	23.375
Savana	86	0	0
cropland	5,703	0.081	461.943
pasture grassland	2,781	0	0
orchard	219	0.081	17.739
vineyard	1,525	0	0
Total	34,351		772.062

Proposed Project

Land Cover	Acres Converted	MT/C/acre/year[1]	MT CO2/year
Riparian Woodland	184	0.737	135.608
Riparian Shrub	189	0	0
Riparian Woodland (mine tailing)	218	0.737	160.666
Grassland	22,014	0	0
Woodland	10	0.425	4.25
Savana	38	0	0
cropland	5,285	0.081	428.085
pasture grassland	2,749	0	0
orchard	207	0.081	16.767
vineyard	1,455	0	0
Total	32,349		745.376

Difference between Alternatives 26.686

Reduce Permit Term

Land Cover	Acres Converted	MT/C/acre/year[1]	MT CO2/year
Riparian Woodland	197	0.737	145.189
Riparian Shrub	194	0	0
Riparian Woodland (mine tailing)	219	0.737	161.403
Grassland	23,672	0	0
Woodland	9	0.425	3.825
Savana	38	0	0
cropland	5,464	0.081	442.584
pasture grassland	2,665	0	0
orchard	224	0.081	18.144
vineyard	1,430	0	0
Total	34,112		771.145

	Stored Carbon				Annual Sequestration			
	2015 CAP	2012 CAP	2015 CAP	2012 CAP	2015 CAP	2012 CAP	2015 CAP	2012 CAP
Land Use Type	Carbon stored per acre (MT C/acre) (a)	Carbon stored per acre (MT C/acre)	2015 CAP Source	2012 CAP Source	Annual Net Carbon Sequestration per acre (MT C/acre/year) (b)	Annual Net Carbon Sequestration per acre (MT C/acre/year)	2015 CAP Source	2012 CAP Source
Oak Woodlands	29.5	95.1	4) EPA 2015. Western Oak. 8) has more specific oak woodland data, but reports lower carbon densities. Method consistency is vital.	1) EPA 2010. Unknown method. Western Oak is 58.1 MT C/acre.	0.425	0.425	2) hardwoods	2) Brown 2004
Riparian Woodlands	77.0	80.9	4) Straight average of Redwood, Oak, and Tanoak/Laurel per description in County GP DEIR (p. 4.5-6)	1) EPA 2010. Unknown method.	0.737	0.425	2) Straight average of Redwood and hardwood per description in County GP DEIR (p. 4.5-6)	2) Brown 2004
Coniferous Forest	78.2	58.1	4) Straight average of Ponderosa Pine, Redwood, and Mixed Conifer per description in County GP DEIR (p. 4.5-6). Weighted average would be preferrable, but no available data.	1) EPA 2010. Unknown method.	0.701	0.666	2) Straight average of douglas fir, Redwood, and Mixed Conifer per description in County GP DEIR (p. 4.5-6). Weighted average would be preferrable, but no available data.	2) Brown 2004
Grasslands	2.6	1.4	3) Battles et al. Table 5	2) Brown 2004	0.000	0.000	2) P. 19	2) Brown 2004
Shrublands	12.8	16.2	3) Battles et al. p. 18	2) Brown 2004	0.000	0.000	2) P. 19	2) Brown 2004
Croplands (Not Vineyards)	2.2	3.8	2) 5) 6). Scaled by Crop Report acreage	2) Brown 2004. Unknown method.	0.081	0.057	7) 5) 6) Assumes vegetables and hay have	7) Kroodsma 2006
Vineyards	1.2	1.2	2)	2) Brown 2004	0.000	0.000	2)	2) Brown 2004
Wetlands	2	NA	3) Battles et al. Table 5	not accounted	1.335	NA	9)	not accounted

Note: Change in land use patterns do not immediately change soil carbon levels. Instead, changes to soil carbon may be gradual, while change in land use patterns would have immediate impacts on above-ground and some below-ground biomass. As such, soil carbon is not included in this analysis.

ARB's current GHG Emissions Inventory is still based on sequestration factors from the 2004 Brown/CEC study. There are no regional specific studies that can yet apply to Napa County regarding sequestration rates.

1) U.S. EPA. 2010. 2010 U.S. Greenhouse Gas Inventory Report- Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (Annex 3). U.S. EPA # 430-R-10-006. Released April 2010. Table A 21A1v -erage carbon density b

2) CEC.200. Brown, S., T. Pearson, A. Dushku, J. Kadyzewski and Y. Qi. 2004. Baseline Greenhouse Gas Emissions for Forest, Range and Agricultural Lands in California. CEC-500-04-069F. Prepared for the California Energy Commis

3) Battles et. al. 2014. Commissioned by ARB. Updates Brown et.al. 2004. Uses IPCC land categories. Table 5. 2008. Battles et. al. 2014 did not comment on sequestration rates for the different land use types.

4) U.S. EPA. 2015. 2013 U.S. Greenhouse Gas Inventory Report- Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013 (Annex 3)

5) Proietti et. al. 2014. Carbon footprint of an Olive Tree Grove

6) 2014 Napa County Crop Report

7) Kroodsma 2006. CARBON SEQUESTRATION IN CALIFORNIA AGRICULTURE, 1980–2000

8) Gaman 2008. Oaks 2040. Carbon Resources in California Oak Woodlands

9) Brevik and Homburg 2004. A 5000 year record of carbon sequestration from a coastal lagoon and wetland complex, Southern California, USA

EIS/EIR APPENDIX I

Final SSHCP Aquatic Resources Program

SSHCP South Sacramento Habitat Conservation Plan

AQUATIC RESOURCES PROGRAM



Photo credit Sean Wirth



PLAN PARTNERS

County of Sacramento

City of Rancho Cordova

City of Galt

Sacramento County Water Agency

Southeast Connector Joint Powers Authority

VOLUME I

February 2018

ACKNOWLEDGEMENTS

The plan partners wish to thank the following individuals and agencies who provided significant input to the process or were directly involved in preparing this Final Aquatic Resources Program (ARP).

Plan Permittees

County of Sacramento

Leighann Moffitt
Rich Radmacher
Krista Whitman

City of Rancho Cordova

Aaron Bush
Paul Junker (Michael Baker)
Joyce Hunting (Hunting Environmental)

City of Galt

Chris Erias

Sacramento County Water Agency

Michael Peterson
Kerry Schmitz

Southeast Connector Joint Powers Authority

Tom Zlotkowski

Program Manager

Bill Ziebron (Ziebron Group)

Local Partner

Sacramento Regional County Sanitation District

Steve Norris
Bryan Young

State and Federal Permitting Agencies

U.S. Army Corps of Engineers

Michael Jewell
Mary Packenham-Walsh
Lisa Gibson

U.S. Environmental Protection Agency

Paul Jones

State Water Resources Control Board

Bill Orme

Regional Water Quality Control Board

Elizabeth Lee

California Department of Fish and Wildlife

Jeff Drongesen
Todd Gardner
Jennifer Nguyen

Consultants

Dudek

Laurie Monarres
David Wickens
Sherri Miller
Tyler Friesen

Final

SSHCP Aquatic Resources Program

February 2018

Prepared by:

County of Sacramento
City of Rancho Cordova
City of Galt
Sacramento County Water Agency
Southeast Connector Joint Powers Authority

With Assistance From:

Dudek
853 Lincoln Way, Suite 105
Auburn, CA 95603

Best, Best and Krieger
3390 University Avenue
5th Floor, PO Box 1028
Riverside, CA 92502

Citation:

County of Sacramento, City of Rancho Cordova, City of Galt, Sacramento County Water Agency, Sacramento Regional County Sanitation District, and the Southeast Connector Joint Powers Authority. 2018. *Final SSHCP Aquatic Resources Program*. February 2018. Sacramento, CA.

FINAL

SSHCP Aquatic Resources Program

Prepared by:

The SSHCP Plan Partners

with assistance from:

DUDEK

FEBRUARY 2018

TABLE OF CONTENTS

Section **Page No.**

ACRONYMS AND ABBREVIATIONS ..... **IX**

EXECUTIVE SUMMARY ..... **XI**

1 INTRODUCTION **1**

1.1 Introduction to the ARP 1

1.1.1 ARP Overview 2

1.1.2 ARP Program Objectives 5

1.2 SSHCP Summary 6

1.3 ARP Purpose 7

1.4 Relationship of ARP to the SSHCP 13

2 AQUATIC RESOURCES PERMITTING OVERVIEW **15**

2.1 Regulatory Framework 15

2.2 Local Aquatic Resources Permitting Program Overview 15

2.3 Associated State and Federal Aquatic Resources Permits/Approvals 16

2.3.1 Clean Water Act Section 404 16

2.3.2 California Fish and Game Code/Section 1600 Master or Long-Term Streambed Alteration Agreement 17

2.3.3 Clean Water Act Section 401 Porter-Cologne Act/Waste Discharge 18

3 AQUATIC RESOURCES IN THE PLAN AREA **19**

3.1 Diversity and Abundance of Aquatic Resources in the Plan Area 19

3.1.1 Types of Wetland Waters 19

3.1.2 Types of Non-Wetland Waters 25

3.1.3 Amounts (Abundance) of Aquatic Resources 27

3.2 Functions and Services of Aquatic Resources in the Plan Area 30

3.2.1 Current Condition of Aquatic Resources 30

4 PROPOSED IMPACTS TO AQUATIC RESOURCES **69**

4.1 Estimated Impacts to Abundance and Diversity of Aquatic Resources within the Plan Area 69

4.1.1 Impacts on Abundance and Diversity of Aquatic Resources 70

4.2 Estimated Impacts to Functions and Services of Aquatic Resources in the Plan Area 71

4.2.1 Impacted Condition of Aquatic Resources 75

5 MITIGATION FRAMEWORK FOR AQUATIC RESOURCES **99**

5.1 Mitigation Overview 99

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

5.2 Avoidance and Minimization 100
5.2.1 Landscape-Scale Avoidance 100
5.2.2 Project Scale 106
5.3 Compensatory Mitigation 117
5.3.1 Compensatory Mitigation Requirements 120
5.3.2 Development of an ILF Program to Fulfill Compensatory Mitigation Requirements 129

6 AQUATIC RESOURCES PROFILE POST-MITIGATION 131
6.1 Aquatic Resources Abundance and Diversity After Impacts and Mitigation 131
6.2 Estimated Future Condition of Aquatic Resources in the Plan Area 134
6.2.1 Future Condition of Aquatic Resources 134

7 LOCAL AQUATIC RESOURCES IMPACT PERMIT APPLICATION PROCESS 159
7.1 Introduction 159
7.2 Submittal of Aquatic Resources Impact Permit Applications 159
7.2.1 Aquatic Resources Impact Permit Applications for Third-Party Project Proponents 159
7.2.2 Pre-Application Procedures 160
7.2.3 Aquatic Resources Impact Permit Applications for Local Land Use Authority Permittees 161
7.3 Master Plan Consistency with Aquatic Resources Impact Permits 161
7.4 Aquatic Resources Impact Permit Application Processing 162
7.4.1 Timing of Aquatic Resources Impact Permit Application Submittal 162
7.4.2 Components of the Aquatic Resources Impact Permit Application Package 162
7.5 Review for Completeness 168
7.6 Assessment of Impacts 169
7.6.1 Method for Calculating Impacted Acreage 169
7.6.2 Appealing the Impact Assessment 169
7.7 State and Federal Agency Review 169
7.8 Fees 170
7.8.1 SSHCP Development Fees 170

8 AQUATIC PERMITTING PROGRAM 171
8.1 General Permit Approach 172
8.1.1 USACE 404 General Permit and the Local Permit Program 172

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

8.1.2 Section 401 CWA Water Quality Certification, State Board General Order ... 175
8.1.3 California Fish and Game Code/Section 1600 MSAA ... 175
8.2 CWA Section 404 Permitting for Projects Ineligible for General Permits ... 176
8.2.1 CWA Section 404 Individual Permits ... 176
8.3 Programmatic Section 401 CWA Certification/Porter-Cologne Act Waste Discharge ... 179
8.4 California Fish and Game Code/Section 1600 Streambed Alteration Agreements ... 180
8.5 Other Federal Laws ... 181
8.5.1 Section 7 of the Federal ESA ... 181
8.5.2 Section 106 of the National Historic Preservation Act ... 182

9 REFERENCES ... 185

APPENDICES

A Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program
B-1 Vernal Pool Classifications
B-2 Addendum to Vernal Pool Classifications
C Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Plan
D Re-establishment and Establishment Guidelines

FIGURES

1 Plan Area ... 3
2 Urban Services Boundary and Urban Development Area ... 9
3 Reserve Design Map ... 11
4 Watersheds ... 31
5 Current Condition of Aquatic Resources in the Overall Plan Area ... 34
6 Current Condition of Aquatic Resources in the American River Watershed ... 36
7 Current Condition of Aquatic resources in the Deer Creek Watershed ... 37
8 Current Condition of Aquatic Resources in the Laguna Watershed ... 38
9 Current Condition of Aquatic Resources in the Lower Cosumnes Watershed ... 39

TABLE OF CONTENTS (CONTINUED)

Page No.

10 Current Condition of Aquatic Resources in the Lower Dry Creek Watershed....40
11 Current Condition of Aquatic Resources in the Lower Mokelumne River Watershed....41
12 Current Condition of Aquatic Resources in the Morrison Creek Watershed....42
13 Current Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed....43
14 Current Condition of Aquatic Resources in the Snodgrass Slough Watershed....44
15 Current Condition of Aquatic Resources in the Upper Cosumnes Watershed....45
16 Functional Assessment - American River Watershed....47
17 Functional Assessment - Deer Creek Watershed....49
18 Functional Assessment - Laguna Watershed....51
19 Functional Assessment - Lower Cosumnes River Watershed....53
20 Functional Assessment - Lower Dry Creek Watershed....55
21 Functional Assessment - Lower Mokelumne River Watershed....57
22 Functional Assessment - Morrison Creek Watershed....59
23 Functional Assessment - Sherman Lake-Sacramento River Watershed....61
24 Functional Assessment - Snodgrass Slough Watershed....63
25 Functional Assessment - Upper Cosumnes River Watershed....65
26 Summary of Overall Aquatic Resources Condition per Watershed....67
27 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Plan Area....77
28 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the American River Watershed....79
29 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Deer Creek Watershed....81
30 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Laguna Watershed....83
31 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed....85
32 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed....87
33 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Mokelumne River Watershed....89
34 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed....91

TABLE OF CONTENTS (CONTINUED)

Page No.

35 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed 93
36 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed....95
37 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed....97
38 Existing and Future Watershed Profiles of Aquatic Resources in the Plan Area 136
39 Existing and Future Watershed Profiles of Aquatic Resources in the American River Watershed....139
40 Existing and Future Watershed Profiles of Aquatic Resources in the Deer Creek Watershed....141
41 Existing and Future Watershed Profiles of Aquatic Resources in the Laguna Watershed 143
42 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed....145
43 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed....147
44 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Mokelumne Watershed 149
45 Existing and Future Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed....151
46 Existing and Future Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed....153
47 Existing and Future Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed 155
48 Existing and Future Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed....157

TABLES

1 Aquatic Resource Types and Amounts per Watershed within the Plan Area....28
2 Current Condition of Aquatic Resources in the Overall Plan Area 33
3 American River Watershed Current Conditions 35
4 Deer Creek Watershed Current Conditions 36
5 Laguna Watershed Current Conditions....37
6 Lower Cosumnes Watershed Current Conditions....38

TABLE OF CONTENTS (CONTINUED)

Page No.

7 Lower Dry Creek Watershed Current Conditions 39
8 Lower Mokelumne River Watershed Current Conditions 40
9 Morrison Creek Watershed Current Conditions 41
10 Sherman Lake–Sacramento River Watershed Current Conditions 42
11 Snodgrass Slough Watershed Current Conditions 43
12 Upper Cosumnes Watershed Current Conditions 44
13 Direct Impacts to Aquatic Resources in the Plan Area by Type (Acres) 72
14 Post-Impact Abundance of Aquatic Resources in the Plan Area by Type (Acres) 73
15 Condition of Remaining Aquatic Resources in the Overall Plan Area After Impacts and Before Accounting for Compensatory Mitigation 76
16 Condition of Remaining Aquatic Resources in the American River Watershed After Impacts and Before Accounting for Compensatory Mitigation 78
17 Condition of Remaining Aquatic Resources in the Deer Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation 80
18 Condition of Remaining Aquatic Resources in the Laguna Watershed After Impacts and Before Accounting for Compensatory Mitigation 82
19 Condition of Remaining Aquatic Resources in the Lower Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation 84
20 Condition of Remaining Aquatic Resources in the Lower Dry Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation 86
21 Condition of Remaining Aquatic Resources in the Lower Mokelumne River Watershed After Impacts and Before Accounting for Compensatory Mitigation 88
22 Condition of Remaining Aquatic Resources in the Morrison Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation 90
23 Condition of Remaining Aquatic Resources in the Sherman Lake–Sacramento River Watershed After Impacts and Before Accounting for Compensatory Mitigation 92
24 Condition of Remaining Aquatic Resources in the Snodgrass Slough Watershed After Impacts and Before Accounting for Compensatory Mitigation 94

TABLE OF CONTENTS (CONTINUED)

Page No.

25 Condition of Remaining Aquatic Resources in the Upper Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation 96
26 Mather Core Recovery Area Existing and Post-Impact Vernal Pool Conditions (Acres) 98
27 Stream Setback Minimum Requirements in the UDA 104
28 Summary of SSHCP Aquatic Resources Protection 111
29 Jump-Start Provision Acreage Requirements (at Permit Issuance) 119
30 Compensatory Mitigation Ratios 121
31 Compliance Monitoring 124
32 AMM Compliance Monitoring 126
33 Effectiveness Monitoring 127
34 Future Abundance (Acres) of Aquatic Resources in the Plan Area, by Aquatic Resource Type 132
35 Future Condition of Aquatic Resources in the Overall Plan Area 135
36 Future Condition of Aquatic Resources in the American River Watershed 138
37 Future Condition of Aquatic Resources in the Deer Creek Watershed 140
38 Future Condition of Aquatic Resources in the Laguna Watershed 142
39 Future Condition of Aquatic Resources in the Lower Cosumnes Watershed 144
40 Future Condition of Aquatic Resources in the Lower Dry Creek Watershed 146
41 Future Condition of Aquatic Resources in the Lower Mokelumne River Watershed 148
42 Future Condition of Aquatic Resources in the Morrison Creek Watershed 150
43 Future Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed 152
44 Future Condition of Aquatic Resources in the Snodgrass Slough Watershed 154
45 Future Condition of Aquatic Resources in the Upper Cosumnes Watershed 156

INTENTIONALLY LEFT BLANK

ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Meaning
AMM	Avoidance and Minimization Measure
APE	area of potential effect
ARI	Aquatic Resources Impact
ARP	Aquatic Resources Program
BMP	best management practice
CDFW	California Department of Fish and Wildlife
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CRAM	California Rapid Assessment Method
CWA	Clean Water Act
DEESA	Determination of Environmentally Equivalent or Superior Alternative
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act (federal)
FCAM	Functional/Condition Assessment Method
GIS	geographic information system
GP	General Permit
HUC	Hydrologic Unit Code
ILF	in-lieu fee
ITP	Incidental Take Permit
IP	Individual Permit
JPA	Joint Powers Authority
LEDPA	least environmentally damaging practicable alternative
LID	low-impact development
LOP	Letter of Permission
LSA	Lake or Streambed Alteration Agreement
LTLSA	Long-Term Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
MSAA	Master Streambed Alteration Agreement
MSLTA	Master Streambed Long-Term Agreement
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHWM	ordinary high-water mark
PGP	Programmatic General Permit
Porter-Cologne	Porter-Cologne Water Quality Control Act
PPU	Preserve Planning Unit

Final SSHCP Aquatic Resources Program

Acronym or Abbreviation	Meaning
RDM	residual dry matter
RGP	Regional General Permit
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SHPO	State Historic Preservation Office
SP	Standard Permit
SSHCP	South Sacramento Habitat Conservation Plan
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
USB	Urban Services Boundary
UDA	Urban Development Boundary
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VPIH	Vernal Pool Invertebrate Habitat
VWADI	Vernal Wetland Acre/Density Index
WDR	Waste Discharge Requirement
WQC	Water Quality Certification
WRAMP	Wetland and Riparian Area Monitoring Plan

EXECUTIVE SUMMARY

The South Sacramento Habitat Conservation Plan (SSHCP) Aquatic Resources Program (ARP) is a local jurisdiction-based aquatic resources permitting program that also supports the anticipated implementation of a more efficient permitting strategy by the state and federal aquatic resource regulatory agencies (see SSHCP Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) Appendix C). The comprehensive, long-term watershed approach used in the ARP enables better protection and management of aquatic resources and enables increased permitting efficiency. It benefits the regulated public and initiates the formation of a large, connected conservation system that coordinates a balance between population growth and resource use. Such outcomes would not be possible under the conventional project-by-project resource agency review approach of the past.

The local jurisdiction based aquatic resources permitting program contained in the ARP promotes a regional approach to balancing development and conservation[1] of aquatic resources located within the SSHCP Plan Area. Application of procedures contained in the ARP will ensure that impacts to aquatic resources are avoided and minimized to the greatest extent practicable during implementation of future planned development.[2] The ARP also implements aquatic resource avoidance, minimization and compensatory mitigation at a landscape[3] level to protect largely intact watersheds in the Plan Area, including their associated aquatic resources. A primary goal of ARP implementation is to achieve an overall no net loss of aquatic resources functions and services.

The ARP local aquatic resources permitting program works in coordination with the SSHCP, and would complement the SSHCP's approach to evaluating SSHCP Covered Activities that require filling aquatic resources located within the Plan Area. The existing aquatic resources are described in terms of abundance, type, and condition as they occur in each Hydrologic Unit Code (HUC)-10 watershed of the SSHCP Plan Area. Under existing conditions, the Plan Area contains a total of approximately 24,255[4] acres of aquatic resources, comprised of 10

[1] The Oxford Dictionary of Ecology defines conservation as "the maintenance of environmental quality and resources. In modern scientific usage, conservation implies sound biosphere management within given social and economic constraints, producing goods and services for humans without depleting natural ecosystem diversity, and acknowledging the naturally dynamic character of environmental systems. This contrasts with a "preservation" approach, which, it is argued, protects species or landscapes without reference to natural change in living systems or human requirements".

[2] Planned development means the type and locations of future urban development and associated infrastructure as described in the approved General Plans for Sacramento County, Rancho Cordova, and Galt.

[3] A landscape can be defined as a heterogeneous land area composed of interacting ecosystems that is repeated in a similar form throughout; a landscape is a land area at least a few kilometers wide (Forman and Godron 1981, 1986).

[4] The total acreage of aquatic resources reported in the ARP is approximately 232 acres less than the total acreage of aquatic resources reported in the SSHCP. This is primarily due to three factors: (1) The use of different geographical information system (GIS) processes that result in fractional differences in acreage

different aquatic resource land cover types (e.g., freshwater marsh, vernal pool, open water); 8,280 acres of which are considered high-condition aquatic resources based on a landscape-level functional assessment.

The anticipated impacts to aquatic resources within the SSHCP Plan Area are used to project the abundance, diversity, and condition of remaining aquatic resources prior to considering compensatory mitigation. The predicted impacts, not considering compensatory mitigation, show an effect (reduction of 1,613 acres) on the abundance of aquatic resources. However, the overall types of aquatic resources and condition of the resources would remain largely unchanged even prior to considering the compensatory mitigation strategy of the SSHCP. The SSHCP's overall Conservation Strategy that requires landscape-scale and project-level avoidance and minimization measures (AMMs) would also contribute to maintaining the condition of aquatic resources. Landscape-scale measures include assembling a large network of interconnected preserves that preserve natural corridors, provide large blocks of contiguous habitat, and include buffers between new development and natural areas. From a project-level scale, avoidance and minimization of impacts would be ensured by requiring each development Covered Activity incorporate low-impact development (LID) design measures, implement best management practices (BMPs), comply with siting and design requirements, and provide Stream and Preserve Setbacks. All of these measures and practices synergistically combine to ensure maintenance of Plan Area aquatic resource functions and services.

In addition to the SSHCP and ARP's avoidance and minimization strategy, compensatory mitigation for unavoidable impacts to aquatic resources would be implemented with a watershed approach and would systematically prioritize compensatory mitigation projects based on anticipated impacts to aquatic resources, considering both watershed- and function-based factors. Upon consideration of the SSHCP and ARP compensatory mitigation strategy, the predicted future watershed profiles resulting from implementation of the SSHCP demonstrate that overall aquatic resource abundance, type, and condition within the Plan Area would be maintained or improved. There would not be a net loss of aquatic resources in terms of acreage; all aquatic resource types would remain intact; and the amount of high-condition resources within the Plan Area would be increased.

totals; (2) Rounding; and (3) Some of the acreage of riparian land cover types reported in the SSHCP are considered non-jurisdictional as they are mitigation sites comprised of created or restored riparian habitat. Non-jurisdiction aquatic resources are not discussed in the ARP. It is this last factor that accounts for the majority of the difference in reported aquatic resource acreage between the ARP and the SSHCP.

1 INTRODUCTION

1.1 Introduction to the ARP

The Aquatic Resources Program (ARP) is a local jurisdiction based aquatic resources permit program that adds to the strength of the South Sacramento Habitat Conservation Plan's (SSHCP or Plan's) framework of protection of natural communities and native plant and wildlife species, including protection of aquatic resources. The ARP identifies, classifies, and ranks the aquatic resources located within the SSHCP Plan Area (see discussion of Plan Area in ARP Section 1.2) (Figure 1), and describes a program to implement locally based permitting that relies on a systematic approach of aquatic resource avoidance, minimization, and compensatory mitigation. The implementation of this program is synergistic with other natural resources avoidance, minimization, and compensatory mitigation described in the SSHCP. Implementation of the SSHCP and ARP would protect ecological diversity and function in Southern Sacramento County, while allowing planned urban growth and development in accordance with approved General Plans and applicable laws. The ARP introduces a locally based permit program that would also promote more efficient permitting approaches by state and federal programs that regulate aquatic resources. The regional SSHCP Preserve System (see SSHCP Section 7.5) would be used within the ARP as part of a unified watershed strategy of avoidance, minimization, and compensatory mitigation. The ARP permitting framework (local, state, and federal, as envisioned by the Plan Permittees) would be more protective of aquatic resources compared to the current project-by-project permitting process, based on several factors described in this document.

While the ARP focuses on a permit program to address impacts to aquatic resources and the SSHCP focuses on permitting related to incidental take of species, both permitting processes are done in conjunction with one another and in coordination with a local jurisdictions' land use entitlement permitting process. Projects seeking permits to impact aquatic resources will follow the local permit application process described in Section 7 of this document. Some basic components of the permit package include a project description, submittal of a wetland delineation, a description of how a project complies with AMMs, and a compensatory mitigation plan.

The Plan Permittees (Sacramento County, the City of Galt, the City of Rancho Cordova, the Sacramento County Water Agency, the Southeast Connector Joint Powers Authority, and the SSHCP Implementing Entity) are also seeking concurrent and parallel authorizations from federal and state regulatory agencies for customized, more efficient permitting approaches to address impacts to waters of the United States and waters of the state as a result of implementing future activities and projects (Covered Activities) permitted under the SSHCP's ESA and CESA Incidental Take Permits (ITPs).

Broadly, the SSHCP and ARP provide a framework for an improved process for projects (Covered Activities) to obtain environmental permits for impacts to federally and state-regulated species, natural communities, and aquatic resources, while ensuring a comprehensive watershed-based mitigation strategy that includes avoidance, minimization, establishment, re-establishment, and preservation of aquatic resources. Because so many of the SSHCP's Covered Species live part or all of their lives in water bodies, the Plan conserves wetland and stream habitats that are subject to regulation under Sections 404 and 401 of the federal Clean Water Act (CWA), California's Porter-Cologne Water Quality Control Act, and California Fish and Game Code Section 1600 et eq. pursuant to California's Lake and Streambed Alteration Program.

Aquatic resources identified in the SSHCP Plan Area include those regulated by the U.S. Army Corps of Engineers (USACE), the State Water Resources Control Board (SWRCB), Central Valley Regional Water Quality Control Board (Central Valley RWQCB), the California Department of Fish and Wildlife (CDFW), and local zoning and aquatic resource ordinances.

The ARP is a watershed-based plan developed to be synergistic with and will be implemented in conjunction with the SSHCP for the purpose of improving the protection and management of Plan Area aquatic resources with a watershed-level approach and with a better evaluation of cumulative impacts.

1.1.1 ARP Overview

The ARP is a local-jurisdiction based aquatic resources regulatory program, that further hopes to enable a new state and federal regulatory framework with increased efficiencies, within a regional conservation approach (as described in the SSHCP) for aquatic resources located within the Plan Area. This regional approach avoids and minimizes impacts to Plan Area aquatic resources, and will provide compensatory mitigation at a landscape level to protect a subset of largely intact watersheds in the Plan Area, including their aquatic resources. A primary goal of ARP implementation is to achieve an overall no net loss of aquatic resource functions and services in accordance with the USACE's and U.S. Environmental Protection Agency's (EPA's) 2008 Compensatory Mitigation Rule, *33 C.F.R. Parts 325 and 332, Compensatory Mitigation for Losses of Aquatic Resources: Final Rule* (Mitigation Rule). The ARP is directly tied to the SSHCP and designed to be fully integrated with the SSHCP. The SSHCP includes a mitigation strategy that is consistent with the CWA Sections 404 and 401 implementing regulations, in particular the Mitigation Rule, California Fish and Game Code Section 1600, and the Porter-Cologne Water Quality Control Act (Porter-Cologne).

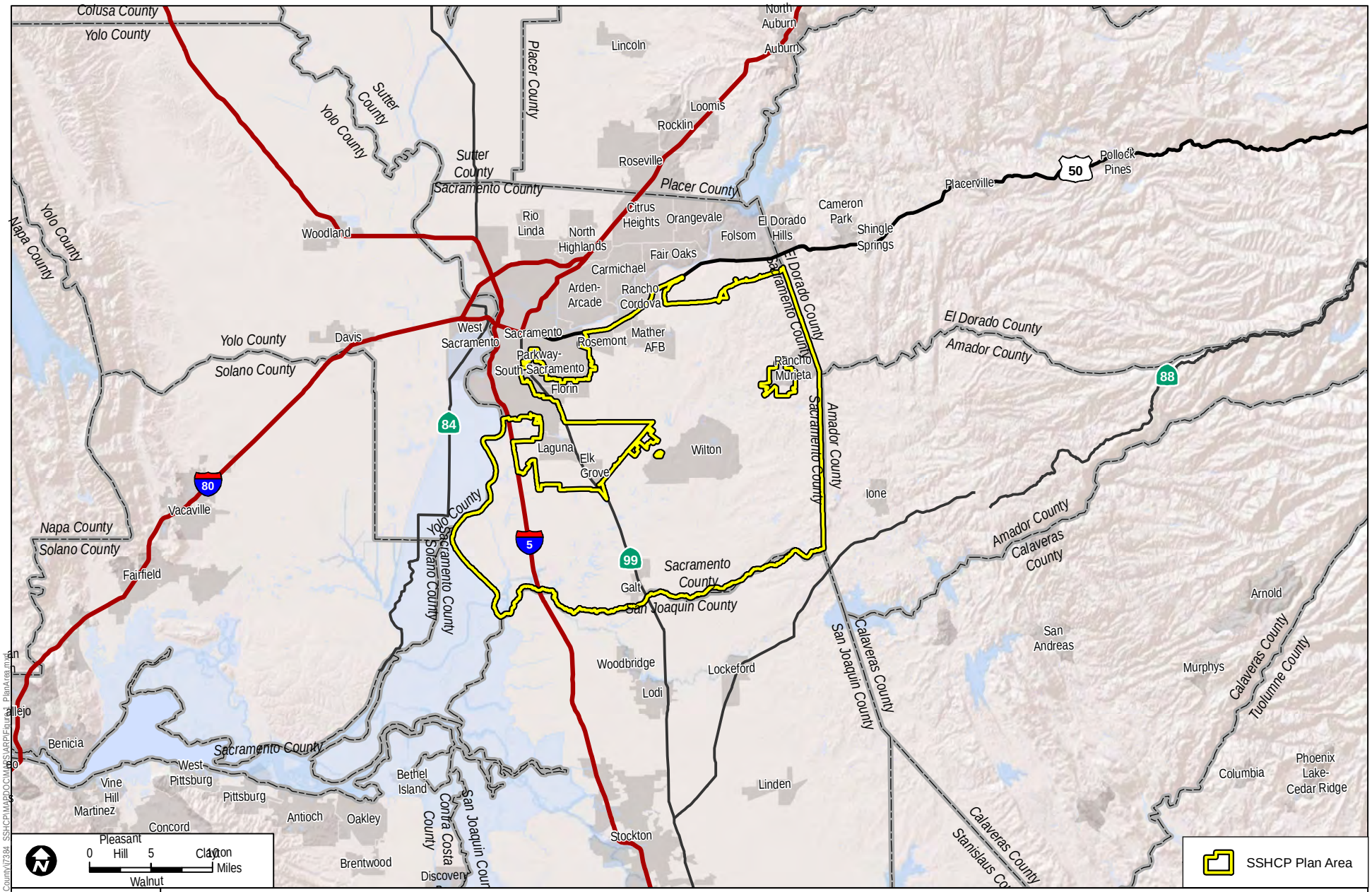


FIGURE 1

Plan Area

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

INTENTIONALLY LEFT BLANK

The ARP proposes to implement a regional compensatory mitigation strategy that recognizes the abundance, diversity, and condition of the aquatic resources so better decisions for avoidance, re-establishment, establishment, and preservation of aquatic resources are determined. This mitigation strategy is consistent with and provides for the planned urban growth and development described in the approved General Plans for Sacramento County, Galt and Rancho Cordova, and together they would result in improved economic and environmental planning for the Plan Area. This balanced regional approach to development and aquatic resource conservation in south Sacramento County provides a greater level of landscape- and watershed-scale protection of aquatic resources than has generally occurred with the conventional project-by-project agency review and permitting under the CWA Sections 404 and 401, and the California Fish and Game Code 1600 programs.

The avoidance, minimization, compensatory mitigation requirements coupled with the more efficient permitting process described in the ARP are derived from the SSHCP. However, the ARP focuses on Plan Area aquatic resources specifically, and, in some areas, addresses them in greater detail than the SSHCP. The ARP additionally articulates a proposed local jurisdiction-based aquatic resources permitting program that would be implemented via ordinances and would be implemented synergistically with the SSHCP.

1.1.2 ARP Program Objectives

The Plan Permittees and key stakeholders propose to implement a local aquatic resources permitting program, and have also coordinated with federal and state resource agencies to develop processes with a set of broad program goals for SSHCP Covered Activities that would collectively achieve the following ARP program objectives:

- **Local Implementation:** Establish local ordinances for successful implementation of the SSHCP and ARP.
- **Local Permitting Program:** Establish a local program carried out by the Plan Permittees to ensure improved permitting efficiency for future SSHCP Covered Activities for CWA 404 permits, 401 certifications, and California Fish and Game Code 1600 agreements. Such efficiency will help the regulated public and resource agencies save time and money, and will facilitate a better decision-making processes at the landscape and project levels.
- **Predictability:** Create a standardized and predictable permitting process for future SSHCP Covered Activities. A regionally integrated process allows permitting consistency and a more environmentally effective decision-making process.

- **Fair and Equitable Decisions:** Create a predictable decision-making outcome based upon a comprehensive approach that incorporates regionally important factors better serves the regulated public.
- **Greater Ecological Benefits:** Implement ecologically effective, watershed-based aquatic resource mitigation and conservation to achieve more robust protection for aquatic resources in the Plan Area.

1.2 SSHCP Summary

To offset expected impacts of future planned development described in the General Plans , the SSHCP would provide a landscape-level approach to protection of important biological and ecological resources, including suitable Covered Species habitats such as wetlands, streams, riparian, natural upland land covers, and certain types of agricultural lands that have important wildlife habitat value for SSHCP Covered Species (e.g., certain croplands and irrigated pasture-grassland). The SSHCP would provide Covered Activities with ESA and CESA incidental take coverage for their impact to 28 Covered Species of plants and wildlife, and to 17 land cover types that provide suitable habitat for the 28 Covered Species. The SSHCP Conservation Strategy will preserve approximately 36,282 acres. Properties would be acquired for the Preserve System from willing sellers via avoidance, land transfers in lieu of fees, and fees collected for development of the conservation mitigation strategy for Covered Activities located largely within urbanized areas. The 36,282 acres of new conservation would add to the approximately 64,535 acres of existing conservation in the Plan Area, resulting in total conservation of approximately 100,817 acres.

The Plan Area includes 317,655 acres within south Sacramento County, including the Cities of Galt and Rancho Cordova (see Figure 1, Plan Area). The Plan Area is defined as the area in which all SSHCP conservation actions would be implemented and where all SSHCP Covered Activities would occur. The boundary of the Plan Area was defined using political and ecological factors. The geographical boundaries are U.S. Highway 50 to the north, the Sacramento River levee and County Road J11 to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and the San Joaquin County line to the south.

The Plan Area excludes the northern portion of Sacramento County, the City of Sacramento, the City of Elk Grove, the City of Folsom, the sovereign lands of the Miwok Tribe, and the Sacramento County community of Rancho Murieta. These areas were excluded from the Plan Area because they were either significantly built out, would not use the SSHCP, or were not likely to benefit from the SSHCP due to the absence of listed species or their habitats. The sovereign lands of the Miwok Tribe are not included as the tribe is not a proposed Plan Permittee.

A majority of development Covered Activities would occur within Sacramento County's Urban Services Boundary (USB). The USB is the limit to which urban services, such as public water

and sewer, would be provided; as such, it defines the "footprint" for urban development in Sacramento County. Development Covered Activities would also occur within the City limits of Galt and Rancho Cordova, and within the extra-territorial sphere of influence for the City of Galt. Together, the USB, the Galt and Rancho Cordova city limits, and the City of Galt's sphere of influence define the SSHCP Urban Development Area (UDA) (Figure 2). All urban development-related Covered Activities would occur within the UDA. Covered Activities outside the UDA are limited to a defined list of infrastructure projects (see Chapter 5 of the SSHCP), including specific rural transportation projects and specific water-related utilities (e.g., recycled water). See Chapter 6 of the SSHCP for a description of impacts to land covers and Covered Species resulting from Covered Activities.

The Plan Area is divided into two components: inside and outside of a UDA. Inside the UDA is where the planned development outlined in the General Plans (the SSHCP urban development Covered Activities) would occur. Consequently, most ground disturbance and associated species incidental take would occur inside the UDA. However, a limited amount of species incidental take is also requested for the specific infrastructure project Covered Activities and for preserve management Covered Activities proposed outside of the UDA. Under the SSHCP, natural resource preserves would be established in strategic locations within the Plan Area.

The UDA portion of the Plan Area totals 67,618 acres. Geographically, the UDA is the portion of the Sacramento County USB, the incorporated Cities of Rancho Cordova and Galt, and Galt's sphere of influence that are also within the Plan Area. The Plan Area outside of the UDA totals 250,038 acres.

To assist with development of the SSHCP Conservation Strategy, the Plan Area was further divided into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species habitat are present, and where habitat preservation is planned (Figure 3). These eight SSHCP PPUs are geographic subdivisions of the Plan Area designed to ensure that the SSHCP Biological Goals and Measurable Objectives (see Chapter 7 of the SSHCP) would be met for biological resources present in every part of the Plan Area.

1.3 ARP Purpose

The basic purpose of the ARP is to institute a locally based aquatic permitting program that is also anticipated to assist the Plan Permittees in complying with the requirements of federal, state, and local laws that protect aquatic resources. The ARP would be implemented locally using Aquatic Resources Protection Ordinances and would draw upon the comprehensive, landscape-, and project-level Conservation Strategy, as described in the SSHCP. The overall purpose of the ARP is to improve the protection of aquatic resources with a locally based, watershed-level approach and a better evaluation of individual and cumulative impacts. This strategy would benefit state and federal regulatory agencies by allowing for development of more efficient aquatic permitting

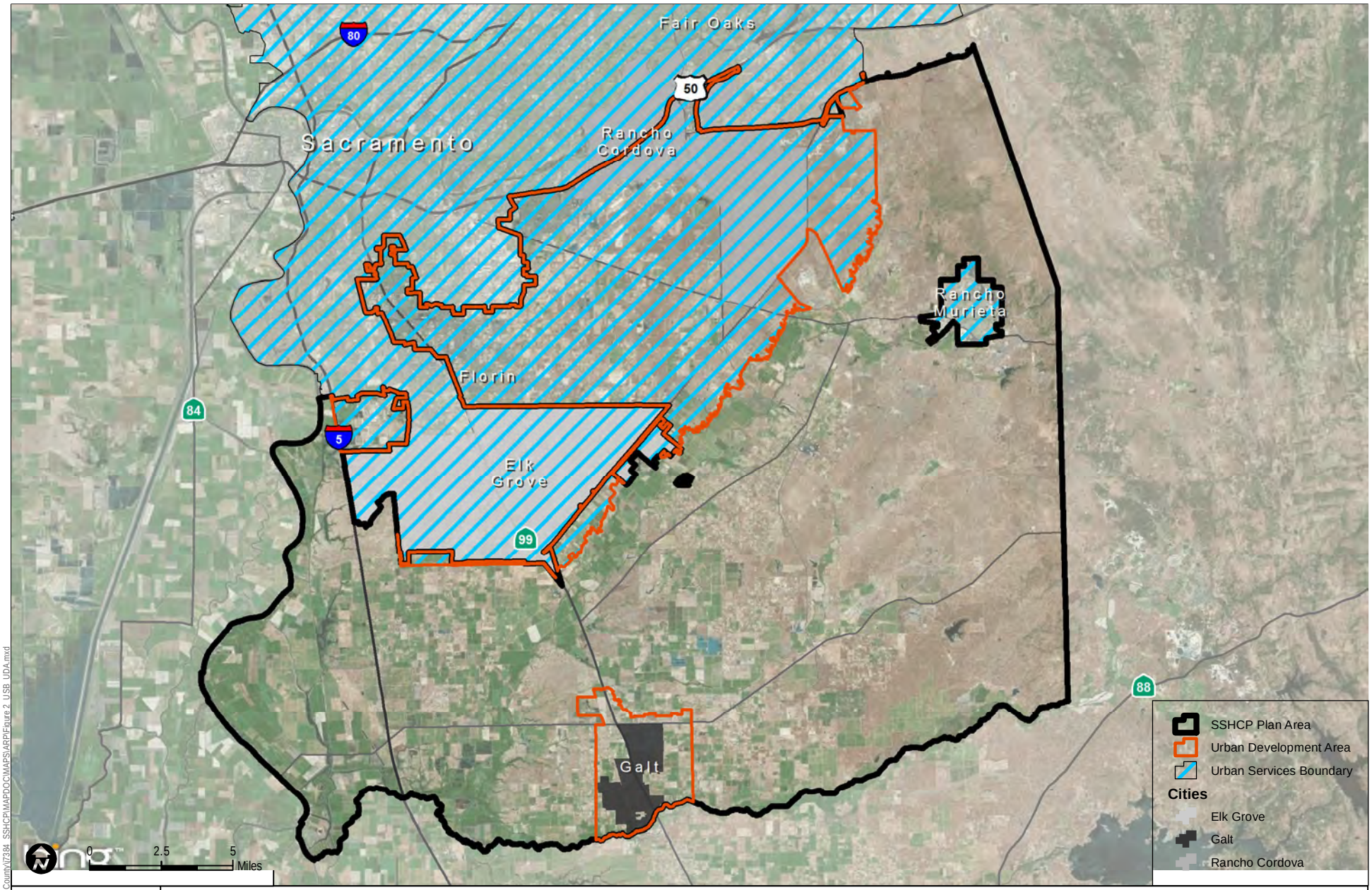
processes, and the regulated public by streamlining permitting processes to allow a consolidated view of projected impacts and compensatory mitigation needs. This strategy also provides opportunities to accomplish greater environmental benefits than could be achieved via the conventional project-by-project review process.

The three Land Use Authority Permittees (the County of Sacramento and the Cities of Galt and Rancho Cordova), along with the SSHCP Implementing Entity (see Chapter 9 of the SSHCP), would administer the ARP. Incorporating aquatic resources protection into the environmental permit review process at the local level, closer to where project impacts occur, is expected to result in greater benefits to aquatic resources and regulatory efficiency.

The three SSHCP Land Use Authority Permittees and the Implementing Entity would establish a locally implemented permit process to administer the requirements set forth in the ARP, including review of applications for SSHCP Covered Activities that propose to impact aquatic resources in the Plan Area. They would do so by enacting Aquatic Resources Protection Ordinances. Compliance with the ARP and Aquatic Resources Protection Ordinances would be monitored, as described in Section 5.3.1.3 of the ARP, and in Chapter 8 of the SSHCP. Environmental review implemented at the local level would ensure compliance with established ordinances to protect aquatic resources in conjunction with local government aquatic resources protection policies (i.e., General Plan Policies) as part of the decision-making process (see Section 9.7 of the SSHCP).

Administration of the requirements set forth in the ARP and the Aquatic Resources Protection Ordinances would be implemented by one of the Land Use Authority Permittees or the Implementing Entity, depending on which of these governmental organizations has jurisdiction over a project. Jurisdiction over a project would be ceded to the Land Use Authority Permittee in which jurisdiction the project is being implemented. If a Land Use Authority Permittee does not have land use jurisdiction over a project (e.g., school district projects), then the Implementing Entity would take jurisdiction for purposes of administrating the ARP and Aquatic Resources Protection Ordinances. All projects that are under the jurisdiction of the Implementing Entity and desire to use the local ARP program to satisfy CWA permitting requirements must comply with all aspects of the ARP and the Aquatic Resources Protection Ordinance. For instance, if a non-land-use-authority permittee (e.g., Capitol Southeast Connector JPA) qualifies for the PGP and local Aquatic Resource Permit, it must apply to the Implementing Entity for a local Aquatic Resource Permit, under the authority of the Implementing Entity's Aquatic Resources Protection Ordinance.

In addition to describing the local aquatic resources permit program, the ARP describes the types, abundance, diversity, and condition of existing aquatic resources. It then identifies the anticipated impacts to those aquatic resources as a result of implementation of the SSHCP Covered Activities. The ARP uses a regional and local conservation strategy administered with federal, state, and local permitting agencies to improve the protection of aquatic resources within the Plan Area.



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 2_USB_UDA.mxd

SOURCE: Bing Maps, County of Sacramento 2014

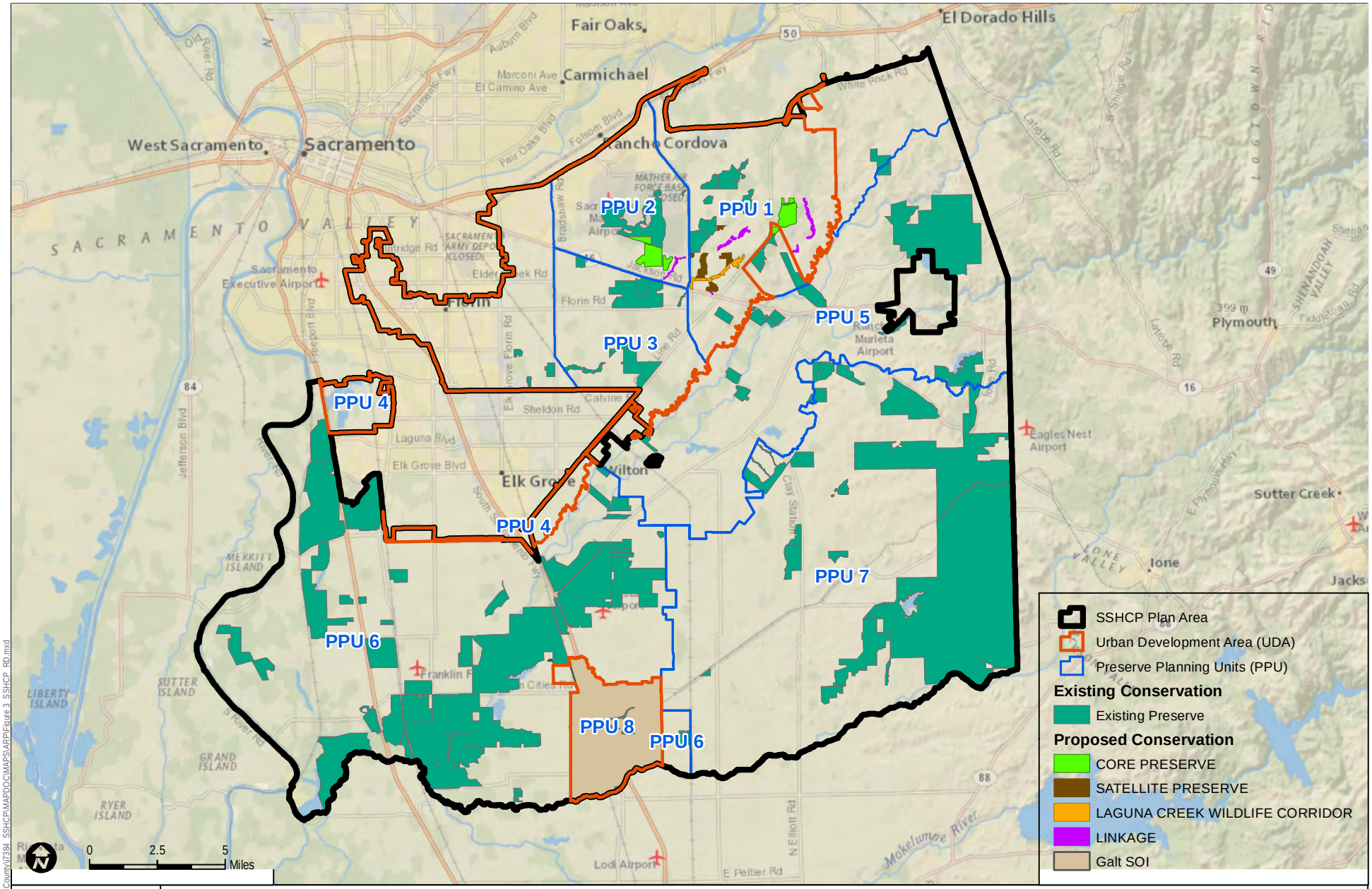
DUDEK

FIGURE 2

Urban Services Boundary and Urban Development Area

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



SOURCE: ESRI 2015, County of Sacramento 2014

FIGURE 3

Reserve Design Map

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 3_SSHCP_RD.mxd

INTENTIONALLY LEFT BLANK

1.4 Relationship of ARP to the SSHCP

The ARP was developed in conjunction with the SSHCP to develop AMMs and compensatory mitigation requirements that meet or exceed the CWA and State of California Lake and Streambed Alteration Agreement Program mandates, and implement these standards in a local aquatic resources permit program. The ARP relies on (and is fully consistent with) the conservation plan of the SSHCP, including (1) Covered Activities that would use the ARP, (2) AMMs fully consistent with those of the SSHCP to avoid and reduce direct and indirect adverse impacts to aquatic habitats, (3) impacts analysis, and (4) mitigation for aquatic resources (e.g., the Conceptual SSHCP Preserve System, and proposed in-lieu fee (ILF) program). The ARP refers to SSHCP sections that describe or analyze aquatic resources, rather than re-stating facts and/or processes from the SSHCP. Thus, the synergistic relationship of the ARP to the SSHCP Conservation Strategy benefits Plan Area native plant and animal species and their habitats by providing a more effective strategy of protection of aquatic resources located within the SSHCP Plan Area. Together, the ARP and SSHCP would result in a comprehensive Conservation Strategy for conservation of all native plant and wildlife species of the Plan Area, including 28 special-status species of plants and wildlife, including 10 that are currently listed as threatened or endangered under the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA).

The list of SSHCP Covered Species can be found in SSHCP Chapter 1 (Table 1-2). SSHCP Chapter 5 describes the Covered Activities and conditions that would be required during Covered Activity implementation to avoid, minimize, or mitigate Covered Activity impacts to Plan Area natural communities, aquatic resources, and each Covered Species. The SSHCP Conservation Strategy includes Biological Goals and Measureable Objectives for the operational SSHCP at the landscape, natural community, and Covered Species levels (SSHCP Chapter 7, Table 7-1). The ARP focuses on the SSHCP Covered Activities that could impact aquatic resources of the Plan Area.

The Permittees developed the ARP to apply the SSHCP's standards and procedures in an integrated aquatic resources permitting process that is guided by local ordinance. The SSHCP includes a mitigation program that will achieve the SSHCP Biological Goals and Measureable Objectives for the Plan Area aquatic resources (see SSHCP Chapter 7). Together, the ARP and SSHCP provide the Plan Permittees, third-party project proponents, and resource agencies with a comprehensive regional approach to natural resource conservation and project permitting (see SSHCP Chapter 1 for details).

The ARP and the SSHCP are synergistic. The SSHCP minimizes and mitigates for impacts to Covered Species suitable habitat, including aquatic natural communities and their associated uplands, and provides for the conservation and management of aquatic natural communities at a

landscape-level and community-level scale. The ARP provides a programmatic approach for Plan Permittees and third-party project proponents to obtain permits for Covered Activity impacts to aquatic resources. The approach results in a more efficient process for issuing state and federal permits for Covered Activity impacts to aquatic resources, while maintaining a robust conservation strategy that includes required avoidance, minimization, and compensatory mitigation. Where it is determined that Covered Activity impacts to aquatic resources are unavoidable, and after all required SSHCP AMMs have been incorporated into the Covered Activity project, compensatory mitigation would be required. The aquatic resource mitigation requirements outlined in the ARP are integral to achieving many of the SSHCP Biological Goals and Measurable Objectives (see SSHCP Chapter 7).

The ARP would expedite permitting of Covered Activities that may impact aquatic resources within the Plan Area. The ARP describes the type, diversity, abundance, and condition of aquatic resources in the Plan Area and describes a Covered Activity permitting process that includes measures to avoid and minimize impacts to aquatic resources; and when impacts to aquatic resources cannot be avoided, the ARP provides an aquatic resources compensatory mitigation strategy that is consistent with and would be implemented synergistically with the SSHCP mitigation and conservation strategy.

2 AQUATIC RESOURCES PERMITTING OVERVIEW

2.1 Regulatory Framework

The ARP is designed to be a local-jurisdiction-based aquatic resources permitting program that demonstrates consistency with the SSHCP's regulatory framework for Covered Activity impacts under the CESA and ESA. The ARP is also intended to be consistent with and either meet or exceed the requirements of Sections 404 and 401 of the federal CWA and Porter-Cologne. The ARP is also written to be consistent with California Fish and Game Code Sections 1600–1616 (Lake or Streambed Alteration Agreement). Together, the ARP and SSHCP would result in a comprehensive Conservation Strategy for the conservation of aquatic resources, natural communities, native species, and 28 species of plants and wildlife within the Plan Area, including 10 that are listed as threatened or endangered under the federal ESA, CESA, or both, in the Plan Area. Chapter 1 of the SSHCP provides an overview of the regulatory framework.

2.2 Local Aquatic Resources Permitting Program Overview

A local-jurisdiction-based permit program (as mentioned above and described in greater detail in Section 7 of this document) is intended to serve as a program/document that federal and state regulatory agencies (e.g., USACE, Central Valley RWQCB, CDFW) can rely upon to develop complementary and efficient permitting approaches representative of their jurisdictional mandates (e.g., CWA Section 404). The ARP is designed to demonstrate consistency with the requirements of these regulatory agencies by protecting aquatic resources using a comprehensive, long-term watershed approach. This would allow the ARP to enact more efficient permitting timelines as well as to improve the protection and management of aquatic resources in the Plan Area.

The local jurisdiction based permit program would be established via a local aquatic resources protection ordinance that would require a project applicant who is impacting aquatic resources within the SSHCP Plan Area to acquire an Aquatic Resources Impact Permit form a local Land Use Authority Permittee. Each Land Use Authority Permittee that is participating in the SSHCP (Sacramento County, City of Rancho Cordova, and City of Galt) would be required to adopt aquatic resources protection ordnances. Locally based permit programs will be developed to occur concurrently with the SSHCP permitting process as well as with local entitlement permitting processes required by Land Use Authority Permittees. A detailed description of the aquatic resources permitting process and the application requirements is included in Section 7 of this document.

Under the currently implemented project-by-project aquatic permit review approach, the regulatory agencies have fewer opportunities to evaluate impacts or compensatory mitigation on a regional scale; thus, often have difficulty addressing aquatic resource impacts in a comprehensive manner.

The ARP offers an opportunity to integrate local land use planning with aquatic resource protection, which is expected to improve aquatic resources protection in a coordinated fashion, on a regional scale, and with greater certainty for the Plan Permittees.

The ARP's local aquatic permitting program would be implemented through Aquatic Resources Protection Ordinances adopted by the County of Sacramento and the Cities of Galt and Rancho Cordova, whereby the Land Use Authority Permittees and the Implementing Entity would have a standardized and integrated permitting review process established for Covered Activities implemented in the Plan Area (see ARP Chapter 8). The Aquatic Resources Protection Ordinances would incorporate AMMs, as described in SSHCP Section 5.4, which are equal to or stronger than those historically required by federal and state regulatory agencies on a conventional project-by-project basis. In this way, the ARP and Aquatic Resources Protection Ordinances would lead to consistent and robust aquatic resource protection measures.

For Covered Activities that comply with the requirements of the ARP and the SSHCP, and which require environmental permits from the regulatory agencies, the ARP would provide the opportunity for a fully integrated regulatory approach, by, as described above, providing a local program upon which state and federal aquatic resource programs could develop programmatic and complementary approaches to streamline their permitting processes. The approach would establish clear permitting procedures, along with reasonable timelines for review. The permitting procedures would thereby increase efficiency for the Plan Permittees and for the regulatory agencies.

2.3 Associated State and Federal Aquatic Resources Permits/Approvals

The ARP and the Aquatic Resources Protection Ordinances are intended to be consistent with the following federal and state regulations. The following programs have also been coordinating with the Plan Partners for an extended period of time, including working as cooperating agencies on NEPA and CEQA compliance documents for the SSHCP. As such, while the ARP cannot dictate the final decisions that state and federal agencies may make concerning their own aquatic permit approaches that can align with the locally based program, it has been developed in close coordination with the state and federal agency programs in order to optimize its consistency and ability to serve as a basis for a suite of complementary state and federal aquatic permitting approaches.

2.3.1 Clean Water Act Section 404

Section 404 of the CWA regulates discharge of dredged or fill material into "waters of the United States." The USACE and the EPA administer Section 404 of the CWA. Waters of the United States

regulated under Section 404 of the CWA are identified in USACE regulations at 33 CFR 328.3. In addition to streams and other waters of the United States with an ordinary high-water mark (OHWM), the definition of waters of the United States includes wetlands. Wetlands are defined as areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 (7)(b)).

The USACE evaluates two types of permits under Section 404 of the CWA: general permits (nationwide, regional, and programmatic) and individual permits (letters of permission and standard permits). General permits are issued by the USACE on a nationwide or regional basis for a category or categories of activities when (1) those activities are substantially similar in nature and cause only minimal individual and cumulative environmental impact; or (2) the general permit would result in avoiding unnecessary duplication of the regulatory control exercised by another federal, state, or local agency provided it has been determined that the environmental consequences of the action are individually and cumulatively minimal (33 CFR 322.2(f)). Individual permits are evaluated on a case-by-case basis for activities that do not qualify for a general permit (i.e., that may have more than a minimal adverse environmental impact).

The USACE intends to use the ARP and Aquatic Resources Protection Ordinances in the development of a Section 404 CWA permitting strategy for SSHCP Covered Activities (see SSHCP Environmental Impact Statement/Environmental Impact Report [EIS/EIR], Appendix C). The strategy could potentially include a Programmatic General Permit (PGP) based on the ARP and/or a Regional General Permit (RGP) for Covered Activities that have no more than minimal impacts on the aquatic environment; a Letter of Permission (LOP) procedure for Covered Activities with impacts that meet certain requirements/thresholds and are more than minimal but would have less-than-significant impacts to waters of the U.S.; and an abbreviated Standard Permit (SP) procedure for other Covered Activities that exceed the LOP threshold and/or may have significant adverse impacts to waters of the U.S., but otherwise comply with the requirements of the ARP and SSHCP.

2.3.2 California Fish and Game Code/Section 1600 Master or Long-Term Streambed Alteration Agreement

Section 1600 of the California Fish and Game Code requires that a Streambed Alteration Application be submitted to the CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW reviews the proposed actions and, if necessary, submits to the applicant a proposal for measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the applicant is a Lake or Streambed Alteration Agreement (LSA). Covered Activities that require an

LSA may also require a permit from the USACE under Section 404 of the CWA. In these instances, the conditions of the CWA Section 404 permit and the LSA may overlap.

The ARP describes how the local Land Use Authority Permittees (County of Sacramento and Cities of Rancho Cordova and Galt) and the Implementing Entity would work with CDFW to develop a streamlined process for review of notifications of Lake or Streambed Alteration and, if applicable, issue Master Streambed Alteration Agreements (MSAA) or Routine Maintenance Agreements for future SSHCP Covered Activities to be implemented by a local Land Use Authority Permittee. Under the MSAA, a local Land Use Authority Permittee implementing a Covered Activity must submit a notification of streambed alteration to CDFW before construction. The notification requires an application fee for Streambed Alteration Agreements, with a specific fee schedule to be determined by CDFW.

For all other SSHCP Covered Activities that need a Streambed Alteration Agreement, the ARP would serve to quicken CDFW review by requiring projects' incorporation and compliance with the ARP's AMMs and the SSHCP conservation measures.

2.3.3 Clean Water Act Section 401 Porter-Cologne Act/Waste Discharge

Section 401 of the CWA requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification that the discharge would comply with the state's applicable effluent limitations and water quality standards. In California, the RWQCB where the dredge or fill activity occurs administers CWA Section 401 requirements. For dredge or fill activities that occur in more than one RWQCB, the SWRCB administers CWA Section 401 requirements.

Porter-Cologne is California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater. Porter-Cologne grants the SWRCB and the RWQCBs' power to protect water quality. Porter-Cologne grants the SWRCB and the RWQCBs' authority to adopt plans and policies, to regulate discharges of waste to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. Covered Activities that require a CWA Section 401 water quality certification, a CWA Section 404 permit, and/or a SAA may also require a report of waste discharge.

The ARP would facilitate the Central Valley RWQCB's development of water quality certification strategies, in conjunction with USACE's development of a CWA Section 404 permitting strategy for the Plan Area.

3 AQUATIC RESOURCES IN THE PLAN AREA

The status of existing aquatic resources in the Plan Area can be described in terms of the aquatic resources' diversity, abundance, and condition. Diversity is described in terms of the variety of aquatic resources by SSHCP land cover type (common name) and Cowardin class. Abundance is described in terms of acreage of each aquatic resource type within the Plan Area and per watershed (at the Hydrologic Unit Code [HUC]-10 level). Condition is described using a landscape-level functional assessment to determine the relative capacity of aquatic resources to perform various functions and services related to hydrology, water quality, and habitat.

3.1 Diversity and Abundance of Aquatic Resources in the Plan Area

The SSHCP and ARP impact analyses and Conservation Strategy are based upon land cover type mapping of the Plan Area. Land cover type classification is based upon the California Natural Communities classification system developed by CDFW (Sawyer and Keeler-Wolf 1995) and consists of polygons, or non-linear resources. Chapter 3 of the SSHCP provides further detail for the land cover type definitions and mapping methods. The land cover types described in the ARP are identical to the land cover types described in the SSHCP. Land cover types in the Plan Area were identified and classified through interpretation of signatures of major vegetation and physical characteristics discernible on aerial photography. This information was refined through ground-truthing.

Ten of the land cover types mapped in the Plan Area are composed of or contain aquatic features and, for purposes of this analysis, are considered potential jurisdictional aquatic resources (see Table 3-1 in Chapter 3 of the SSHCP). The definition of these land cover types and classifications of land cover types as interpreted by the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) are included below. This planning-level inventory of aquatic resources was mapped to be fully inclusive of all areas that could potentially be waters of the United States and waters of the state. As such, the acreages mapped as potentially jurisdictional are likely to be larger than the actual extent of waters of the United States and waters of the state. Exact extents of waters of the United States and waters of the state would be delineated and the mapping verified by the regulatory agencies for individual Covered Activities brought forth under the SSHCP ITPs.

3.1.1 Types of Wetland Waters

Vernal Pool Land Cover (Cowardin: Palustrine, Emergent Wetland, Nonpersistent)

Vernal Pools are a type of seasonal wetland that is characterized by a specific set of physical parameters and a unique assemblage of highly specialized endemic plants and animals that are adapted to the annual cycle of winter inundation and summer drought. The most important

feature of Vernal Pools is a distinct wet/dry hydrologic regime. Vernal Pools generally occur in complexes of interconnected pools either by swales, described below, or through a perched aquifer that exists between the soil surface and the sub-surface restricting layer or both.

All Vernal Pools may appear to be similar, yet each pool may exhibit different hydrologic behavior. In some Vernal Pool habitats, clay soils keep most water on or near the surface, so Vernal Pools receive nearly all of their water due to direct precipitation and are maintained by surface flows. In these sites, smaller and shallower pools dry quickly due to evapo-transpiration (Williamson et al. 2005). In other Vernal Pool habitats, the smaller and shallower Vernal Pools can be buffered against evapo-transpiration loss by perched aquifers (Williamson et al. 2005; Rains at al. 2006). The ecology of Vernal Pools located on duripan or claypan soils in the Central Valley appear to be supported by perched aquifers (Rains et al. 2006). In these soils, a sub-surface hydrologic restricting layer has formed preventing percolation of water into the groundwater aquifer and creates the sub-surface perched aquifer. In these soils and hydrologic conditions, seasonal surface water and perched groundwater hydrologically connect uplands, vernal pools, and streams at the catchment scale. Perched groundwater discharges from uplands to vernal pools thereby stabilizes the pools and causes them to remain inundated for longer periods than would be the case if they were recharged only by precipitation. The greater watershed can supply as much as 60% or more of the water needed to fill pools to the margin; however, individual Vernal Pools can display markedly different hydrology due to variations in topography and soil properties near each pool (Williamson et al. 2005; O'Geen et al. 2008; Leibowitz and Brooks 2008). Whether a Vernal Pool system is a direct-precipitation surface water overland flow driven (e.g., clay soil pools) or is a perched aquifer/surface flow system (e.g., duripan/claypan soil pools) also greatly influences water chemistry in vernal pools and seasonal wetlands (Rains et al. 2008; O'Driscoll and Parizek 2008).

Water chemistry and related abiotic factors have been shown to influence aquatic flora and fauna biodiversity and abundance (Kneitel and Lessin 2010; Lessin 2010; Poirier 2012), although the degree to which such changes affect vernal pools is poorly understood because the fundamental hydrogeological characteristics of perched aquifers remain relatively unexplored (Rains et al. 2006). It is possible that remnant Vernal Pools within altered landscapes, or higher densities of re-established or established Vernal Pools, may not have adequate surface and/or subsurface flows to adequately function as suitable habitat for certain species. Alternatively, the abiotic habitat components such as water chemistry, which is mediated by transport through subsurface and surface flows, may alter the suitability of the habitat to support tadpole shrimp if anthropogenic activities significantly affect upland watersheds (Rains et al. 2008). For example, truncating the upland watershed of a perched aquifer vernal pool system may convert the system from a perched aquifer/surface flow system to a direct precipitation surface water overland flow system, which may function similarly from a hydroperiod perspective but may be fundamentally altered from an abiotic water chemistry perspective. The vernal pools in the Plan Area are all perched

aquifer/surface flow type pools that are supported by sub-surface hydrology. Therefore, the hydrologic regime of Vernal Pools in the Plan Area is mediated by the interaction between the pool and the surrounding uplands that support the perched aquifer. The majority of Vernal Pools occurring within the Plan Area are largely supported by sub-surface perched aquifer hydrology. Factors affecting Vernal Pools are further discussed in SSHCP Chapters 2, Physical Setting; 3, Biological Resources Setting; and 6, Effects Analysis.

Vernal Pools in the Plan Area exhibit a variety of size and pool depth. Appendix B-1 describes the variation in Plan Area Vernal Pool complexes in greater detail. Approximately 4,537 acres of Vernal Pools have been identified within the Plan Area. Key physical parameters include landform, drainage area, geologic formation, slope, soil type, structure and depth, pool size and depth, timing of the hydrologic cycle, and pool interconnectivity. Different geologic formations in the Plan Area (see SSHCP Chapter 2) and their associated soils exhibit different propensities for the development of Vernal Pools (Keeley and Zedler 1998; Holland and Dains 1990; Metz 2001) and Vernal Pool physical parameters appear to vary by soil type. Various geological formations support characteristic Vernal Pool types that differ in fundamental physical and biological ways between geologic formations in a given region (Holland and Dains 1990; Smith and Verrill 1998, Platenkamp 1998; Metz 2001; Vollmar 2002; Helm and Vollmar 2002; Laabs et al. 2002; Dittes and Guardino 2002).

As discussed in SSHCP Chapter 3, the particular plant and animal species present in Vernal Pools vary based on physical, chemical, biologic and hydrologic parameters. In particular, several SSHCP Covered Species generally require large, deep pools that are long lasting to successfully complete their life cycles, including Boggs Lake hedge-hyssop (*Gratiola heterosepala)*, Sacramento and slender Orcutt grasses (*Orcuttia viscida* and *O. tenuis*), vernal pool tadpole shrimp (*Lepidurus packardi*), California tiger salamander (*Ambystoma californiense*), and western spadefoot (*Spea hammondii*). Other vernal pool Covered Species occur in and around small to medium-sized pools, or the more "flashy" pools that dry out relatively quickly and may inundate and dry several times during the wet season, such as Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*), dwarf downingia (*Downingia pusilla*), and pincushion navarretia (*Navarretia myersii*). For some plants in the latter category, the edges of larger Vernal Pools may provide conditions equivalent to small, flashy pools. The SSHCP Covered Species include two amphibian, four invertebrate, and seven plant Covered Species that depend on Vernal Pools (see SSHCP Table 3-2).

Seasonal Wetland Land Cover (Cowardin: Palustrine, Emergent Wetland, Nonpersistent)

Seasonal Wetlands are wetlands that saturate and/or pond for variable periods during a portion of the year, generally the rainy winter season, then dry relatively slowly, typically in the summer and early fall. Seasonal Wetlands tend to occur within moderate to large-sized depressional

features in valley grassland; along streams, creeks, and rivers; and along the edges of open water. Seasonal Wetlands are often characterized by herbaceous annual and perennial species, such as curly dock (*Rumex crispus*) and bulrush (*Scirpus* spp.).

Seasonal Wetlands provide habitat for some Covered Species (SSHCP Table 3-2). The SSHCP does not consider Seasonal Wetlands to be suitable habitat for the vernal pool invertebrate Covered Species. However, as discussed in SSHCP Section 3.4, Seasonal Wetlands do provide habitat for California tiger salamander, western spadefoot, Boggs lake hedge-hyssop, legenere (*Legenere limosa*), and Sanford's arrowhead (*Sagittaria sanfordii*). Other Covered Species that use seasonal wetland land cover as habitat are giant garter snake (*Thamnophis gigas*), all of the bird Covered Species except Cooper's hawk (*Accipiter cooperii;* mostly as foraging habitat), American badger (*Taxidea taxus*), and the three covered bat species. There are approximately 2,600 acres of Seasonal Wetlands mapped within the SSHCP Plan Area.

Swale Land Cover (Cowardin: Riverine, Intermittent, Nontidal)

Swales are shallow seasonal drainages typically found in flat to gently rolling valley grassland in association with vernal pool complexes on soils with an impermeable claypan or hardpan layer. Swales convey runoff as broad gently sloping ephemeral drainages during, and for short periods after, winter rainstorms. Swales are often associated with vernal pools and can provide conduits between vernal pools for movement of covered vernal pool plant and animal propagules (seeds, cysts, eggs, and spores) and adult California tiger salamanders and western spadefoots. Swales support several native plants commonly found in vernal pools. Swales also often include smaller shallow vernal pool riverine features that compose the headwaters of ephemeral tributaries within the Plan Area. The Plan Area includes approximately 1,252 acres of Swale.

Swales provide suitable habitat for portions or all of the life cycle of many of the Covered Species that occur in the vernal pool land cover type, including Ahart's dwarf rush, dwarf downingia, pincushion navarretia, mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp, Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*), and western spadefoot. In addition, all of the bird Covered Species (except Cooper's hawk and greater sandhill crane (*Grus canadensis*)) would use Swale land cover as foraging habitat, along with the American badger, and the three bat Covered Species (SSHCP Table 3-2).

Freshwater Marsh Land Cover (Cowardin: Palustrine, Emergent Wetland, Persistent)

The Freshwater Marsh land cover type is defined by herbaceous wetlands occurring along rivers, streams, lakes, and other linear or open bodies of water that are dominated by emergent hydrophytic (water-loving) plants such as grasses, reeds, rushes, and sedges (Kramer 1988).

Freshwater Marshes are typically perennial wetlands, but may dry out for short periods. Freshwater Marshes vary in size from small clumps to vast areas covering several kilometers (Kramer 1988). On the upper margins of this habitat, saturated or periodically flooded soils support several moist soil plant species, including big-leaf sedge (*Carex amplifolia*), Baltic rush (*Juncus balticus*), redroot flatsedge (*Cyperus erythrorhizos*), nutgrass (*Cyperus rotundus*), and on more alkali sites, saltgrass (*Distichlis spicata*). On wetter sites, common cattail (*Typha* spp.), bulrushes, and arrowhead (*Sagittaria* spp.) are potential dominant species.

Most of California's Freshwater Marshes occur in the Sacramento Valley and the San Joaquin Delta regions. Approximately 2,954 acres of freshwater marsh are mapped within the Plan Area. The majority of Freshwater Marsh in the Plan Area occurs along the perennial Cosumnes River and Deer Creek and along the margins of open water in the southeastern portion of the Plan Area in PPU 6. Freshwater Marsh is important habitat for western pond turtle, giant garter snake, and tricolored blackbird (*Agelaius tricolor*) (SSHCP Table 3-2).

Riparian Land Covers (Cowardin: Palustrine, Forested or Scrub/Shrub Wetland)

While "riparian" has various definitions, the SSHCP uses the National Research Council's 2002 definition: "Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas in the Plan Area are adjacent to perennial, intermittent and ephemeral streams, lakes" (NRC 2002). The ARP assumes that riparian areas are aquatic resources so that the broadest suite of potential aquatic resources in the Plan Area are conserved.

Riparian ecosystems are highly dependent on landscape setting and numerous physical and biotic interactions. Riparian ecosystems provide essential foraging, shelter, and breeding habitat for several of the Covered Species and other native plant and animal species, including both resident and migratory species. SSHCP Covered Species that strongly depend on riparian land covers and often associated stream/creek land covers for at least some critical phase of their life history include valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), giant garter snake, western pond turtle, Cooper's hawk, Swainson's hawk (*Buteo swainsonii*), white-tailed kite (*Elanus leucurus*), pallid bat (*Antrozous pallidus*), western red bat (*Lasiurus blossevillii*), and Yuma myotis bat (*Myotis yumanensis*).

Over the last 150 years, there have been substantial anthropogenic alterations of streams and creeks that support riparian habitat in the Central Valley related to agriculture, rangeland use, and urban development (Katibah 1984), including straightening and deepening of channels;

construction of levees, dams, and other impoundments; riprap and concrete walls; vegetation clearing; and other alterations (see SSHCP Chapter 2). These alterations have adversely affected many riparian functions by isolating active stream and creek channels from their floodplains, altering natural flow patterns (e.g., timing and amount), and disrupting many other dynamic physical processes, such as groundwater recharge and sediment transport, scouring, and deposition that affect the fluvial dynamics of the system, including growth and distribution of riparian vegetation. In the Plan Area, these alterations may be expressed as small patches of riparian vegetation, usually as small clusters of trees and shrubs, or just a thin strip of riparian vegetation that is only one or two trees wide. In the eastern portion of the Plan Area (PPU 6 and PPU 8 in Figure 3), there are cottonwoods in some streamside locations, while along other streams, there is little riparian woodland vegetation. Streams flowing through vernal pool and valley grassland land covers in PPUs 1, 2, 3, 5, and 7 often exhibit little difference in vegetation between the riparian zone along the stream and the adjacent uplands; in some cases, there is just patchy distribution of mixed riparian scrub. Some streams in the urban areas of PPUs 3 and 4 are bounded by concrete walls and support no riparian vegetation, while others have narrow undeveloped riparian zones with a mix of trees, grasses, vernal pools, and seasonal wetlands (see SSHCP Chapter 2).

The SSHCP has identified three riparian land cover types totaling approximately 7,952 acres or 2.5% of the Plan Area: Mine Tailing Riparian Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland.

The Mine Tailing Riparian Woodland land cover type is distributed among older mine tailings. This land cover type contains species commonly found in riparian woodlands and riparian scrub habitats, such as Fremont cottonwood (*Populus fremontii*), blue elderberry (*Sambucus mexicana*), willow (*Salix* spp.), and coyote-brush (*Baccharis pilularis*). In the Plan Area, this land cover type can also intergrade with Mixed Riparian Forest along bodies of water.

Mixed Riparian Scrub land cover type is interspersed with Mixed Riparian Woodlands in the floodplains of waterways throughout Sacramento County. In the Plan Area, this land cover type consists of an open to dense shrubby thicket dominated by a mixture of sandbar willow (*Salix exigua*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), and immature stands of mixed riparian woodland tree species (see description below). This plant community can also be a subcanopy community in Mixed Riparian Woodlands. Though dense stands of riparian scrub in the Plan Area typically lack an understory, some of the more open canopy mixed riparian scrub stands do support an understory of native and non-native species, including wild rose (*Rosa californica*), wild grape (*Vitis californica*), perennial pepperweed (*Lepidium latifolium*), Himalayan blackberry (*Rubus discolor*), curly dock, and various non-native grasses.

The Mixed Riparian Woodland land cover type is distinguishable by an open canopy layer dominated by tall Fremont cottonwood trees. Beneath this open layer, a moderately dense mid-

canopy layer is composed of tree species such as Oregon ash (*Fraxinus latifolia*), Goodding's willow (*Salix gooddingii*), California black walnut (*Juglans californica* var. *hindsii*), valley oak (*Quercus lobata*), and box elder (*Acer negundo*). In some areas, a subcanopy of dense riparian scrub dominated by willow species, including arroyo willow and sandbar willow, is present. A discontinuous shrub layer is also present, particularly along the northern boundary of the Plan Area, and includes species such as blue elderberry, Himalayan blackberry, coyote-brush, wild rose, and wild grape. The understory is sparsely to densely vegetated with herbaceous species. Invasive weeds that have colonized portions of the mixed riparian woodland in the Plan Area include tamarisk (*Tamarix* spp.) and giant reed (*Arundo donax*).

Riparian land covers are associated with Plan Area streams and creeks (see SSHCP Section 3.2.1) and typically occur in the zone between the active stream channel mapped as streams/creeks and adjacent upland land covers.

The best-developed existing Riparian systems in the Plan Area are outside the UDA in PPU 6 along the parallel Cosumnes River and Deer Creek that run from the northeast to the southwest (Figure 3). In many areas, the Cosumnes River riparian woodland is relatively wide and is characterized by a multi-canopy structure, including a mix of cottonwood, sycamore, and valley oaks; a shrub layer of narrow-leaf willow (*Salix exigua*), California and Himalayan blackberry, and wild grape; and an understory layer of grasses, forbs, and sedges. This species and structural diversity provides suitable habitat for a rich diversity of wildlife, including several Covered Species.

Besides the Riparian land cover along the Cosumnes River and Deer Creek, the other main concentrations of Riparian land cover in the Plan Area are approximately 219 acres of Mine Tailing Riparian Woodland in the northern portion of the Plan Area (PPU 1) and approximately 345 acres of Mine Tailing Riparian Woodland just south of the Cosumnes River in the eastern portion of the Plan Area (north portion of PPU 7). The document treats Mine Tailing Riparian Woodland land cover as an aquatic resource.

3.1.2 Types of Non-Wetland Waters

Open Water Land Cover (Cowardin: Riverine and Limnetic, Unconsolidated Bottom, Nontidal)

The Open Water land cover type includes perennial or seasonal features, such as natural or manmade ponds, lakes, and reservoirs. Open Waters may contain either no vegetation, or non-rooted aquatic vegetation, such as algae, floating pondweeds, and other plants. Along shorelines, rooted, emergent vegetation may occur, forming freshwater marsh. Like freshwater marsh, open water habitats are used by numerous bird, mammal, amphibian, and reptile species, including several Covered Species, such as western pond turtle and giant garter snake. The marshy shorelines may be used by tricolored blackbird for nesting colonies (SSHCP Table 3-2).

Open Water habitat is found throughout the SSHCP area, and accounts for 2,342 acres in the Plan Area. The largest open water features are found on or near the Cosumnes River and Deer Creek. These open water features are largely unnamed with the exception of Blodgett Reservoir inside the UDA and Rancho Seco Lake outside the UDA.

Stream/Creek Land Cover (Cowardin: Riverine, Perennial or Intermittent, Nontidal)

The SSHCP Stream/Creek land cover includes rivers such as the Cosumnes River, streams such as Laguna Creek, and smaller intermittent or perennial creeks. This land cover also includes ephemeral streams outside the UDA; ephemeral streams inside the UDA were assumed to be associated with the vernal pool ecosystem and are categorized as stream/creek (vernal pool invertebrate habitat [VPIH]) below.

The Plan Area includes approximately 2,777 acres of Stream/Creek land cover. Polygons of the Stream/Creek land cover occur in areas that contain vernal pools and other wetlands, in Valley Grassland, Blue Oak Woodlands and Savannas, Agriculture, and Developed land cover types.

According to the National Hydrography Dataset, the Plan Area includes approximately 930 miles of "natural" streams and creeks (i.e., excluding artificial path, canal/ditch, connector, and pipeline). The larger streams inside the UDA, such as Laguna Creek, have perennial flow, due to summer runoff from irrigation. However, the upstream portions of these creeks, if undeveloped, generally have intermittent (i.e., seasonal) flows. Many smaller creeks and tributaries to larger creeks have intermittent or ephemeral (i.e., following rain events) flows. Most streams in the Plan Area are valley floor streams characterized by slow-moving water, except after rain events, and often carry substantial sediment loads as a result of land disturbances. Some reaches of tributaries in the eastern portion of the Plan Area flow over gently sloping terrain and have more of a pool and riffle structure. Due to their relatively small size and location among urban and farming or rangeland uses, most Plan Area creeks have been substantially affected in terms of water quality, invasive species, habitat loss, or other habitat degradation, although they still provide suitable habitat and important ecological functions for several of the Covered Species in the SSHCP, especially where the streams and creeks are associated with other riparian and wetland communities. The following streams are listed as impaired waters under Section 303(d) of the CWA: Carson Creek, Cosumnes River, Deer Creek, Elder Creek, Lower Mokelumne River, and Morrison Creek.

Covered Species associated with the Stream/Creek land cover type include Sanford's arrowhead, California tiger salamander, western spadefoot, giant garter snake, western pond turtle, and western red bat. Some streams or creeks provide habitat for vernal pool crustaceans, which are addressed in the Stream/Creek VPIH land cover below.

Over the last 150 years, there have been substantial man-made alterations of many of the streams and creeks in the Plan Area, including straightening and deepening of channels, construction of levees, dams and other impoundments, riprap and concrete walls, vegetation clearing, and other changes. These changes have adversely affected many stream and creek area functions by separating active channels from their natural floodplains, altering natural flow patterns, and disrupting many other dynamic physical processes that maintain stream and creek functions.

Stream/Creek (VPIH) Land Cover (Cowardin: Riverine, Intermittent, Nontidal)

The SSHCP Stream/Creek (VPIH) land cover type was only mapped in the UDA; outside the UDA these features are included in either the Swale land cover type or the Stream/Creek land cover type. Stream/Creek (VPIH) is typically vegetated (i.e., with valley grassland plant species) and conveys water only after rain events (ephemeral). Unlike most swales, streams/creeks (VPIH) are less likely to exhibit vegetation characteristic of vernal pools, and the SSHCP does not consider Stream/Creek (VPIH) land cover habitat for vernal pool plant Covered Species. However, the Stream/Creek (VPIH) land cover can provide suitable habitat for some vernal pool crustaceans in depressional features that may pond water between storm events. The Stream/Creek (VPIH) land cover type often occurs in association with vernal pools and swales. The Plan Area includes approximately 73 acres of stream/creek (VPIH).

3.1.3 Amounts (Abundance) of Aquatic Resources

Within the Plan Area, there are a total of approximately 24,256 acres of mapped potentially jurisdictional aquatic resources, spread throughout 10 different HUC-10 watersheds: American River (HUC 1802011102), Deer Creek (HUC 1804001305), Laguna (HUC 1804001307), Lower Cosumnes River (HUC 1804001308), Lower Dry Creek (HUC 1804001209), Lower Mokelumne River (HUC 1804001211), Morrison Creek (HUC 1802016304), Sherman Lake–Sacramento River (HUC 1802016307), Snodgrass Slough (HUC 1804001210), and Upper Cosumnes River (HUC 1804001306). The watersheds containing the greatest abundance of aquatic resources are Snodgrass Slough and Lower Cosumnes River (Figure 4). The watersheds containing the least amounts of aquatic resources are the American River, Sherman Lake–Sacramento River, and Lower Mokelumne River.

The most abundant aquatic resource types within the Plan Area are Mixed Riparian Woodland and vernal pool. The least abundant are Ephemeral Streams (likely due to the narrow width of such creeks) and Mine Tailing Riparian woodland. See Table 1 for a summary of aquatic resource types and amounts per watershed.

Table 1
Aquatic Resource Types and Amounts per Watershed within the Plan Area

Riparian, Wetland, or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Acres and Linear Miles (if applicable) per Watershed[1]										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes*	
Riparian	Mine Tailing Riparian Woodland	R	47.9	40.7	158.3	17.3	0	0	129.4	2.0	0	245.5	**641.1**
	Mixed Riparian Scrub	R	0	80.4	58.1	271.8	47.1	2.4	57.0	130.1	528.2	99.7	**1,274.7**
	Mixed Riparian Woodland	R	0.4	835.8	261.7	1,877.0	400.6	196.4	157.1	50.6	1,292.6	732.6	**5,804.8**
Subtotal Riparian			*48.3*	*956.9*	*478.1*	*2,166.1*	*447.7*	*198.8*	*343.5*	*182.7*	*1,820.8*	*1,077.8*	*7,720.6*
Wetland Waters	Freshwater Marsh	PEM1	2.0	38.3	167.2	1,126.9	47.5	20.9	369.9	39.7	1,029.6	112.3	**2,954.1**
	Seasonal Wetland	PEM2	22.6	128.7	418.6	615.8	116.7	0	106.7	0	781.7	408.9	**2,599.8**
	Swales	R	2.8 (2.61 linear miles)	160.4 (127.55 linear miles)	428.2 (366.66 linear miles)	144.2 (96.86 linear miles)	65.2 (57.45 linear miles)	0	358.5 (218.44 linear miles)	1.4 (0.69 linear mile)	10.2 (8.10 linear miles)	80.6 (57.14 linear miles)	**1,251.5 (935.50 linear miles)**
	Vernal Pools	PEM2	6.9	274.3	1,917.0	619.1	202.8	0.1	766.5	5.3	420.9	324.7	**4,537.5**
Subtotal Wetland Waters			*34.3*	*601.7*	*2931*	*2,506.00*	*432.2*	*21*	*1,601.6*	*46.4*	*2,242.40*	*926.5*	*11,342.90*

Table 1
Aquatic Resource Types and Amounts per Watershed within the Plan Area

Riparian, Wetland, or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Acres and Linear Miles (if applicable) per Watershed[1]										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes*	
Non-Wetland Waters	Open Water	POW	2.7	200.1	297.4	663.1	8.7	3.1	156.7	9.4	720.3	280.2	**2,341.6**
	Streams/ Creeks (Intermittent and Perennial)	R2UB/ R3UB	5.4 (7.30 linear miles)	228.2 (215.56 linear miles)	416.0 (257.08 linear miles)	345.0 (148.53 linear miles)	78.2 (77.63 linear miles)	67.4 (8.02 linear miles)	122.7 (69.82 linear miles)	23.9 (7.01 linear miles)	1,141.0 (151.77 linear miles)	349.7 (94.88 linear miles)	**2,777.4 (1,037.61 linear miles)**
	Streams/ Creeks VPIH (Ephemeral)	R4SB	0	18.7 (11.29 linear miles)	0	0	0	0	54.5 (38.19 linear miles)	0	0	0	**73.2 (49.48 linear miles)**
Subtotal Non-Wetland Waters			*8.1*	*447*	*713.4*	*1,008.1*	*86.9*	*70.5*	*333.9*	*33.3*	*1,861.3*	*629.9*	*5,192.20*
Subtotal Wetland Waters and Non-Wetland Waters			*42.4*	*1,048.7*	*3,644.4*	*3,514.10*	*519.1*	*91.5*	*1,935.5*	*79.7*	*4,103.70*	*1,556.4*	*16,535.10*
Grand Total[1]			**90.7**	**2,005.6**	**4,122.5**	**5,680.2**	**966.8**	**290.3**	**2,279.0**	**262.4**	**5,924.5**	**2,634.2**	**24,255.7**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

3.2 Functions and Services of Aquatic Resources in the Plan Area

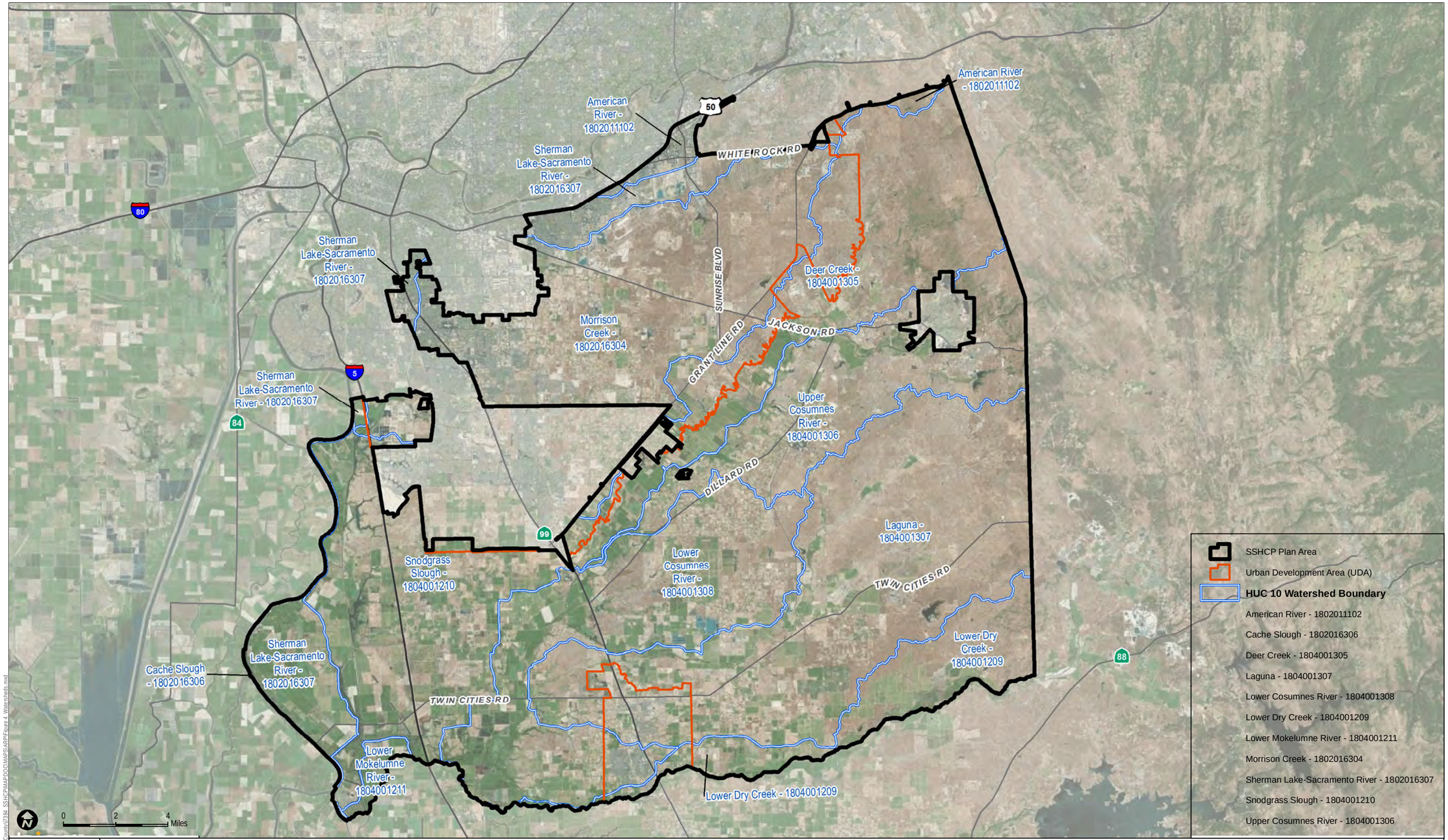
The current condition of aquatic resources within the Plan Area is used to describe the relative ability of the resources to support various functions and services. Condition is obtained from the results of the Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Plan (Appendix C), which categorizes the Plan Area's aquatic resources into high, moderate, low, or very low condition relative to aquatic resources within the Plan Area.

3.2.1 Current Condition of Aquatic Resources

A landscape-level assessment of the relative quality of potentially jurisdictional waters of the United States and waters of the state was prepared for the aquatic resource types mapped in the Plan Area using a Functional/Condition Assessment Method (FCAM) developed for use by the ARP (Appendix C) and the SSHCP. The functional assessment assists in determining which potentially jurisdictional aquatic resource areas have the highest quality and greatest potential for re-establishment/establishment and preservation.

The overall quality of aquatic resources was assessed based on the following factors: area of the aquatic resource, HUC-10 watershed, primary adjacent land cover, secondary adjacent land cover, and aquatic resource type. Function scores were assigned for each of these factors, per aquatic resource feature, based upon ability to maintain or improve the following functions: habitat, water quality, and hydrology. Habitat was evaluated based on the ability of an aquatic resource to support wildlife and plant species. Water quality was evaluated based on the ability to improve or maintain water quality through processes such as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion. Hydrology was evaluated based on the ability of an aquatic resource to facilitate groundwater recharge and store floodwaters via beneficial flood storage and flood flow modifications.

The functional assessment factor related to the habitat, water quality, and hydrology conditions for each HUC-10 watershed was based on the results of a watershed study completed for the SSHCP and ARP (Appendix A). The watershed study results were used to develop appropriate scores for aquatic resources occurring in each HUC-10, based on Covered Species occurrences within each HUC-10 (habitat function score), percentage natural land cover within each HUC-10 (water quality function score), and percentage impervious surface within each HUC-10 (hydrology function score).



Path: Z:\Projects\Sacramento_County\7268_SSHCP\MAPDOC\MAPS\ARPF\Figure 4_Watersheds.mxd

SOURCE: Bing Maps 2015, USGS 2013 National Hydrography Dataset (NHD)

DUDEK

FIGURE 4

Watersheds

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK

The results of the FCAM analysis provide an overall functional score of very low, low, moderate, or high for each potentially jurisdictional land cover type. Table 2 summarizes the current condition of aquatic resources in the Plan Area, and Figure 5 is a graphical depiction of those data.

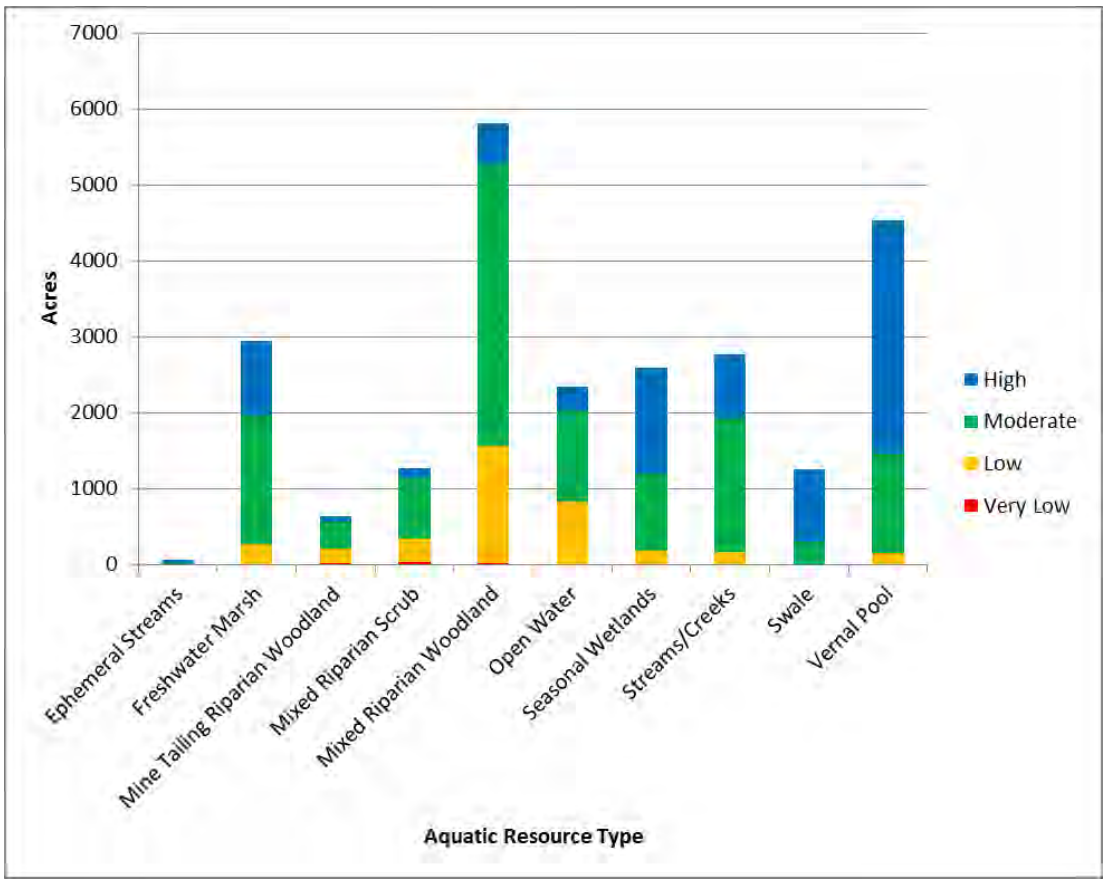
Table 2
Current Condition of Aquatic Resources in the Overall Plan Area

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.6	363.8	183.4	26.3	**641.1**
	Mixed Riparian Scrub	R2/R3	112.0	820.2	297.7	44.7	**1,274.7**
	Mixed Riparian Woodland	R2/R3	520.9	3,710.3	1,554.9	18.8	**5,804.8**
		Subtotal Riparian	*700.5*	*4,894.3*	*2,036.0*	*89.8*	*7,720.6*
Wetland Waters	Freshwater Marsh	PEM1	988.0	1,697.2	268.9	0	**2,954.1**
	Seasonal Wetland	PEM2	1,395.8	1,019.3	184.7	0	**2,599.8**
	Swales	R2/R3	944.3	302.2	5.0	0	**1,251.5**
	Vernal Pools	PEM2	3,067.5	1,313.0	157.0	0	**4,537.5**
		Subtotal Wetland Waters	*6,395.6*	*4,331.7*	*615.6*	*0*	*11,342.9*
Non-Wetland Waters	Open Water	POW	298.3	1,206.3	821.1	15.9	**2,341.6**
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	840.9	1,758.4	177.0	1.0	**2,777.4**
	Streams/Creeks VPIH (Ephemeral)	R4SB	44.3	27.4	1.5	0	**73.2**
		Subtotal Non-Wetland Waters	*1,183.5*	*2,992.1*	*999.6*	*16.9*	*5,192.2*
		Subtotal Wetland Waters and Non-Wetland Waters	*7,579.1*	*7,323.8*	*1,615.2*	*16.9*	*16,535.1*
		Grand Total[1]	**8,279.6**	**12,218.1**	**3,651.2**	**106.7**	**24,255.7**

Note: 1. Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Of the aquatic resource types, vernal pools exhibited the greatest acreage of high condition features (3,067 acres out of 4,053 acres). This result was expected, as the SSHCP and ARP recognize the highly specialized habitat functions that vernal pools serve (see Appendix B-1). Swales, Seasonal Wetlands, and Freshwater Marsh had the next largest high condition acreages (944 acres, 1,396 acres, and 988 acres, respectively). Approximately 50% of all aquatic resources within the Plan Area are considered to be of moderate condition. Mixed Riparian Woodland and Open Water resources had the largest acreages of low condition features (1,554 acres and 821 acres, respectively). The Plan Area overall did not exhibit large acreages or proportions of very low condition resources (only 107 acres total across all resource types).

Figure 5 Current Condition of Aquatic Resources in the Overall Plan Area



Current conditions of the aquatic resources can be further examined at the watershed (HUC-10) level. The following tables (Tables 3 through 12) and associated figures (Figures 6 through 15) describe the current condition of the aquatic resources within each of the ten watersheds located within the Plan Area (Figures 16 through 25). These figures, or watershed profiles, visually summarize the abundance, diversity, and condition of aquatic resources in each watershed. Deer

Creek, Laguna, Lower Cosumnes River, Lower Dry Creek, Morrison Creek, and Upper Cosumnes River watersheds all contain a majority of moderate to high condition aquatic resources. Of these, the watersheds with the greatest proportion of high condition aquatic resources are Laguna and Morrison Creek. American River, Lower Mokelumne, Sherman Lake–Sacramento River, and Snodgrass Slough watersheds currently contain no high condition aquatic resources, and the resources are mostly low to moderate in condition. Sherman Lake–Sacramento River watershed contains the greatest acreage of very low condition aquatic resources and has the highest proportion of low condition resources. Figure 26 summarizes aquatic resources condition acreages by watershed.

Table 3
American River Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	27.4	15.4	5.1	47.9
	Mixed Riparian Scrub	R2/R3	0	0	0	0	0
	Mixed Riparian Woodland	R2/R3	0	0.4	0	0	0.4
Subtotal Riparian			*0*	*27.8*	*15.4*	*5.1*	*48.3*
Wetland Waters	Freshwater Marsh	PEM1	0	2.0	0	0	2.0
	Seasonal Wetland	PEM2	0	22.6	0	0	22.6
	Swales	R2/R3	0	2.8	<0.1	0	2.8
	Vernal Pools	PEM2	0	5.1	1.0	0	6.1
Subtotal Wetland Waters			*0*	*32.5*	*1*	*0*	*33.5*
Non-Wetland Waters	Open Water	POW	0	0	2.7	0	2.7
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	5.4	<0.1	0	5.4
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*5.4*	*2.7*	*0*	*8.1*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*37.9*	*3.7*	*0*	*41.6*
Grand Total[1]			**0**	**65.7**	**19.1**	**5.1**	**89.9**

Note: 1. Table may not total precisely due to rounding.

Figure 6 Current Condition of Aquatic Resources in the American River Watershed

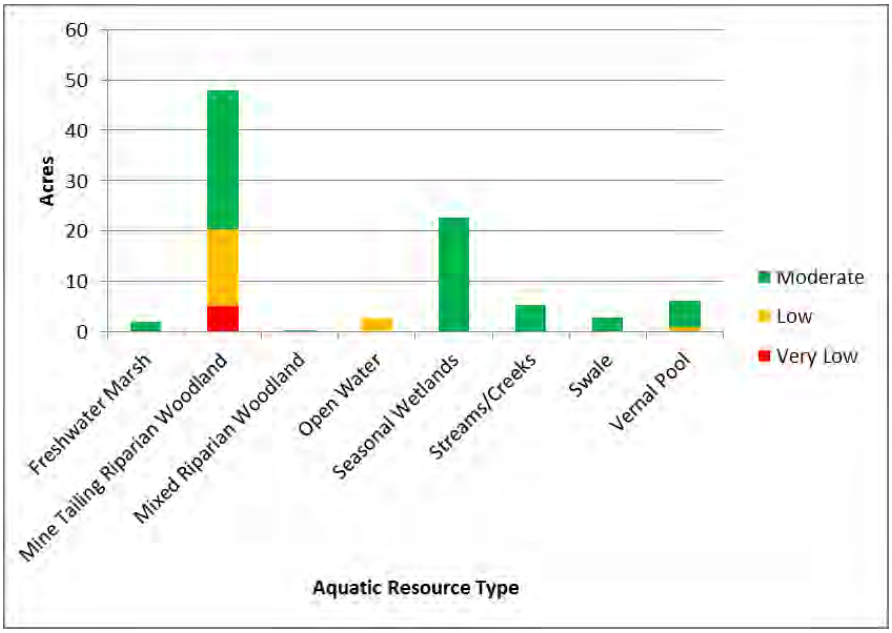


Table 4
Deer Creek Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	13.0	27.7	0	40.7
	Mixed Riparian Scrub	R2/R3	49.1	28.3	3.0	0	80.4
	Mixed Riparian Woodland	R2/R3	150.6	667.3	18.0	0	835.8
Subtotal Riparian			*199.7*	*708.6*	*48.7*	*0*	*956.9*
Wetland Waters	Freshwater Marsh	PEM1	15.5	22.8	0	0	38.3
	Seasonal Wetland	PEM2	70.8	57.9	0	0	128.7
	Swales	R2/R3	131.7	28.5	0.2	0	160.4
	Vernal Pools	PEM2	182.2	89.2	3.0	0	274.3
Subtotal Wetland Waters			*400.2*	*198.4*	*3.2*	*0*	*601.7*
Non-Wetland Waters	Open Water	POW	29.2	167.6	3.2	0	200.1
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	178.4	49.9	<0.1	0	228.2
	Streams/Creeks VPIH (Ephemeral)	R4SB	14.8	3.8	0	0	18.7
Subtotal Non-Wetland Waters			*222.4*	*221.3*	*3.2*	*0*	*447*
Subtotal Wetland Waters and Non-Wetland Waters			*622.6*	*419.7*	*6.4*	*0*	*1,048.7*
Grand Total[1]			**822.3**	**1,128.3**	**55.1**	**0**	**2,005.6**

Note: 1. Table may not total precisely due to rounding.

Figure 7 Current Condition of Aquatic resources in the Deer Creek Watershed

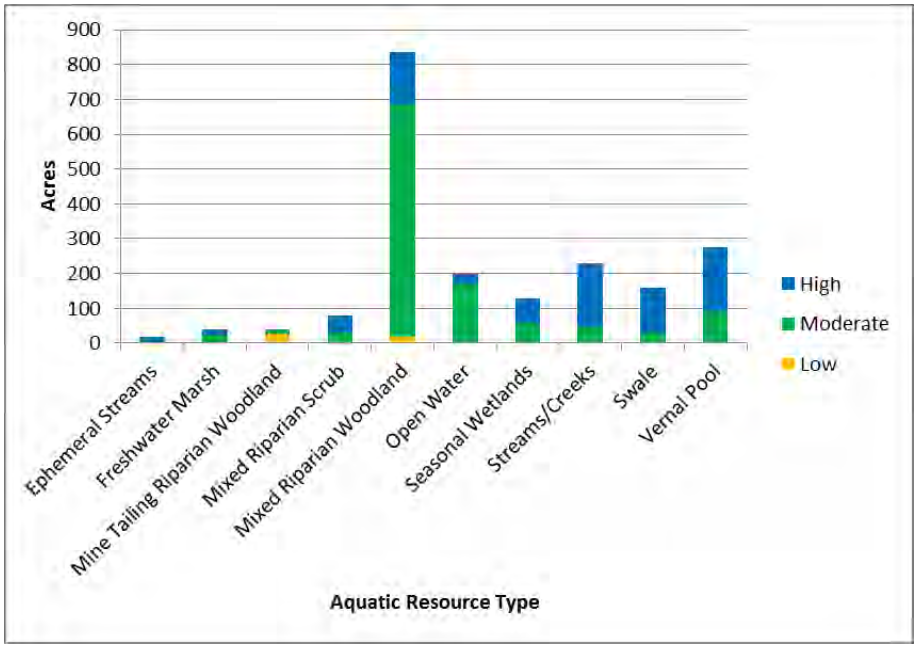


Table 5
Laguna Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.6	71.8	18.9	0	158.3
	Mixed Riparian Scrub	R2/R3	19.7	36.4	2.1	0	58.1
	Mixed Riparian Woodland	R2/R3	122.7	137.8	1.2	0	261.7
		Subtotal Riparian	*210.0*	*246.0*	*22.2*	*0*	*478.1*
Wetland Waters	Freshwater Marsh	PEM1	147.7	19.1	0.4	0	167.2
	Seasonal Wetland	PEM2	400.7	17.9	0	0	418.6
	Swales	R2/R3	416.1	11.8	0.3	0	428.2
	Vernal Pools	PEM2	1,837.2	39.7	3.5	0	1,917.0
		Subtotal Wetland Waters	*2,801.7*	*88.5*	*4.2*	*0*	*2,931.0*
Non-Wetland Waters	Open Water	POW	182.1	101.3	14.0	0	297.4
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	341.2	74.8	0	0	416.0
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*5,23.3*	*176.1*	*14.0*	*0*	*713.4*
		Subtotal Wetland Waters and Non-Wetland Waters	*3,325.0*	*264.6*	*18.2*	*0*	*3,644.4*
		Grand Total[1]	**3,535.0**	**510.6**	**40.4**	**0**	**4,122.5**

Note: [1] Table may not total precisely due to rounding.

Figure 8 Current Condition of Aquatic Resources in the Laguna Watershed

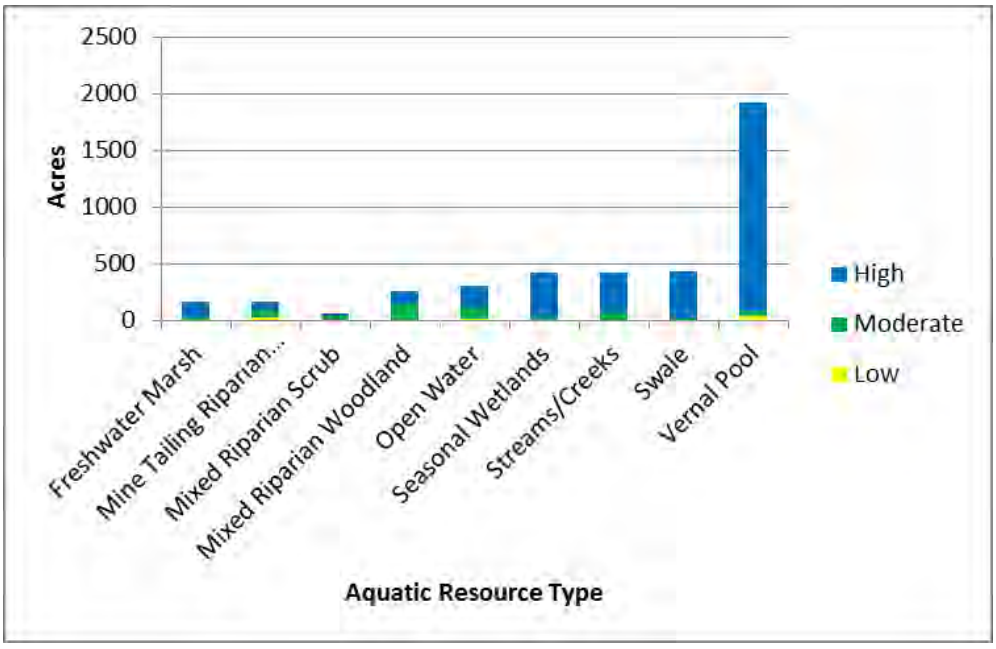


Table 6
Lower Cosumnes Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	17.3	0	0	17.3
	Mixed Riparian Scrub	R2/R3	0	257.2	14.6	0	271.8
	Mixed Riparian Woodland	R2/R3	0	1,438.4	438.6	0	1,877.0
Subtotal Riparian			*0*	*1,712.9*	*453.2*	*0*	*2,166.1*
Wetland Waters	Freshwater Marsh	PEM1	498.1	619.9	8.9	0	1,126.9
	Seasonal Wetland	PEM2	420.5	193.8	1.5	0	615.8
	Swales	R2/R3	16.0	126.9	1.3	0	144.2
	Vernal Pools	PEM2	273.5	300.5	45.1	0	619.1
Subtotal Wetland Waters			*1,208.1*	*1,241.1*	*56.8*	*0*	*2,506.0*
Non-Wetland Waters	Open Water	POW	0	279.3	383.8	0	663.1
	Streams/Creeks (Intermittent and Perennial)	R2UB/ R3UB	135.6	147.5	61.9	0	345.0
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*135.6*	*426.8*	*445.7*	*0*	*1,008.1*
Subtotal Wetland Waters and Non-Wetland Waters			*1,343.7*	*1,667.9*	*502.5*	*0*	*3,514.1*
Grand Total[1]			**1,343.7**	**3,380.8**	**955.7**	**0**	**5,680.2**

Note: 1. Table may not total precisely due to rounding.

Figure 9 Current Condition of Aquatic Resources in the Lower Cosumnes Watershed

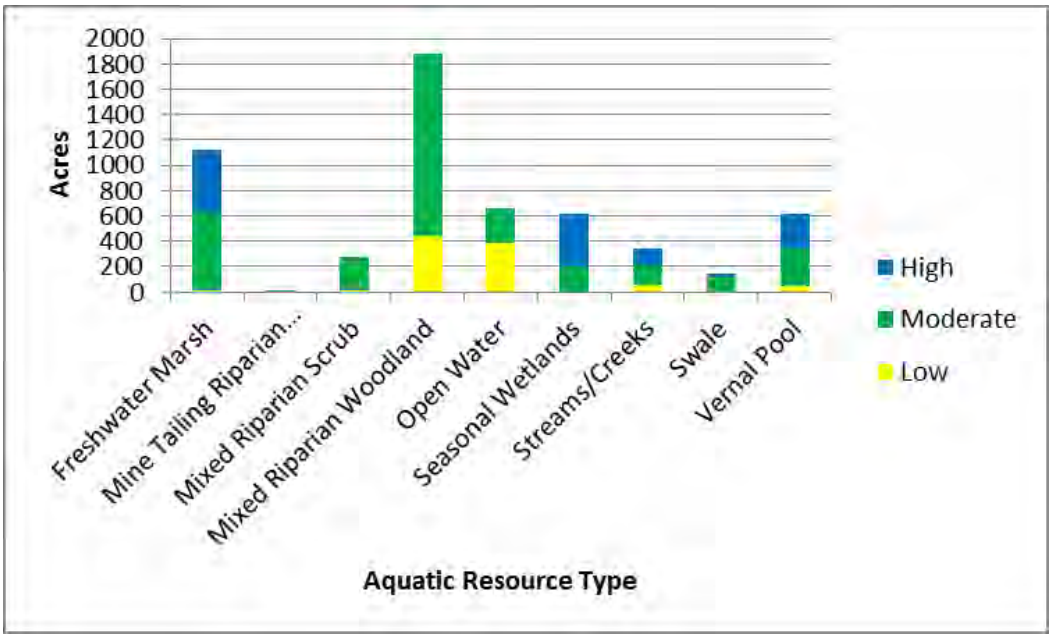


Table 7
Lower Dry Creek Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	3.1	39.8	4.2	0	47.1
	Mixed Riparian Woodland	R2/R3	0	378.4	22.3	0	400.6
Subtotal Riparian			*3.1*	*418.2*	*26.5*	*0*	*447.7*
Wetland Waters	Freshwater Marsh	PEM1	16.4	30.9	0.2	0	47.5
	Seasonal Wetland	PEM2	105.1	11.6	0	0	116.7
	Swales	R2/R3	42.8	22.4	<0.1	0	65.2
	Vernal Pools	PEM2	104.4	91.8	6.6	0	202.7
Subtotal Wetland Waters			*268.7*	*156.7*	*6.8*	*0*	*432.1*
Non-Wetland Waters	Open Water	POW	0	6.8	1.9	0	8.7
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	13.8	60.4	4.0	0	78.2
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*13.8*	*67.2*	*5.9*	*0*	*86.9*
Subtotal Wetland Waters and Non-Wetland Waters			*282.5*	*223.9*	*12.7*	*0*	*519*
Grand Total[1]			**285.6**	**642.1**	**39.2**	**0**	**966.7**

Note: 1. Table may not total precisely due to rounding.

Figure 10 Current Condition of Aquatic Resources in the Lower Dry Creek Watershed

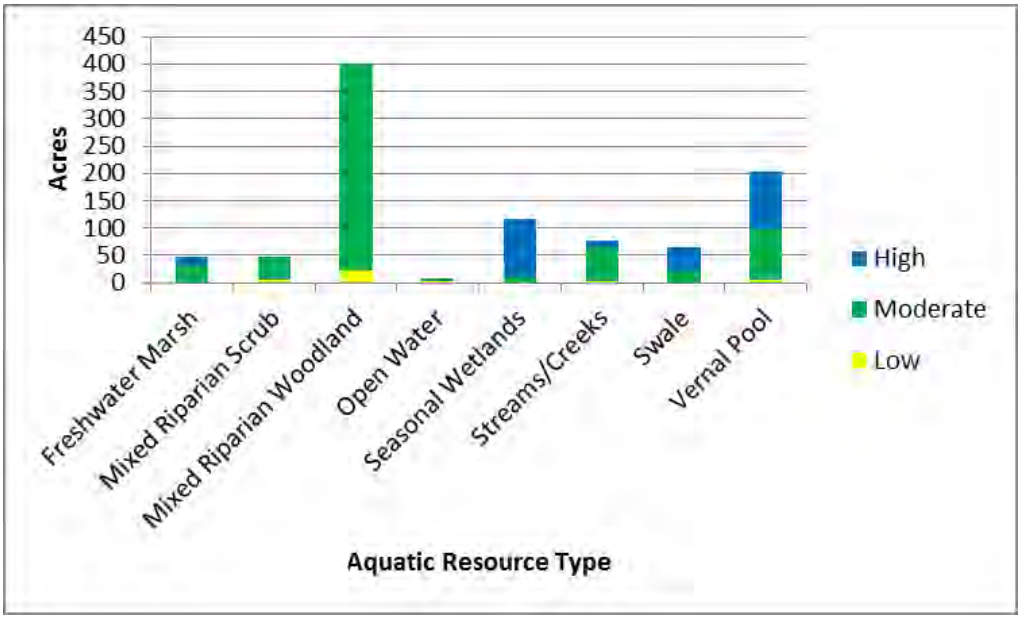


Table 8
Lower Mokelumne River Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	<0.1	2.4	0	2.4
	Mixed Riparian Woodland	R2/R3	0	19.5	176.8	0	196.4
		Subtotal Riparian	*0*	*19.5*	*179.2*	*0*	*198.8*
Wetland Waters	Freshwater Marsh	PEM1	0	20.9	0	0	20.9
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swales	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0.1	0	0	0.1
		Subtotal Wetland Waters	*0*	*21.0*	*0*	*0*	*21.0*
Non-Wetland Waters	Open Water	POW	0	3.1	0	0	3.1
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	65.1	2.2	0	67.4
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*0*	*68.2*	*2.2*	*0*	*70.5*
		Subtotal Wetland Waters and Non-Wetland Waters	*0*	*89.2*	*2.2*	*0*	*91.5*
		Grand Total[1]	**0**	**108.7**	**181.4**	**0**	**290.3**

Note: 1. Table may not total precisely due to rounding.

Figure 11 Current Condition of Aquatic Resources in the Lower Mokelumne River Watershed

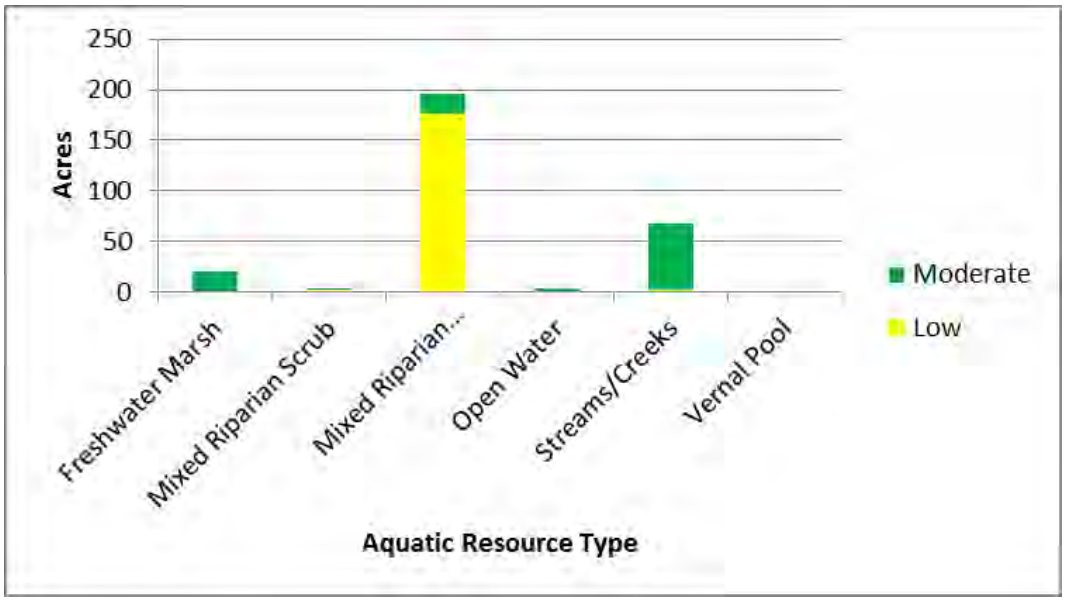


Table 9
Morrison Creek Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	25.9	84.3	19.2	129.4
	Mixed Riparian Scrub	R2/R3	3.2	47.0	6.8	0	57.0
	Mixed Riparian Woodland	R2/R3	0	98.9	58.2	0	157.1
Subtotal Riparian			*3.2*	*171.8*	*149.3*	*19.2*	*343.5*
Wetland Waters	Freshwater Marsh	PEM1	261.8	103.5	4.6	0	369.9
	Seasonal Wetland	PEM2	59.5	23.0	24.2	0	106.7
	Swales	R2/R3	277.2	80.0	1.4	0	358.5
	Vernal Pools	PEM2	522.3	231.4	12.6	0	766.3
Subtotal Wetland Waters			*1,120.8*	*437.9*	*42.8*	*0*	*1,601.4*
Non-Wetland Waters	Open Water	POW	0	118.8	37.9	0	156.7
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	7.3	93.0	22.4	0	122.7
	Streams/Creeks VPIH (Ephemeral)	R4SB	29.5	23.5	1.5	0	54.5
Subtotal Non-Wetland Waters			*36.8*	*235.3*	*61.8*	*0*	*333.9*
Subtotal Wetland Waters and Non-Wetland Waters			*1,157.6*	*673.2*	*104.6*	*0*	*1,935.3*
Grand Total[1]			**1,160.8**	**845**	**253.9**	**19.2**	**2,278.8**

Note: [1] Table may not total precisely due to rounding.

Figure 12 Current Condition of Aquatic Resources in the Morrison Creek Watershed

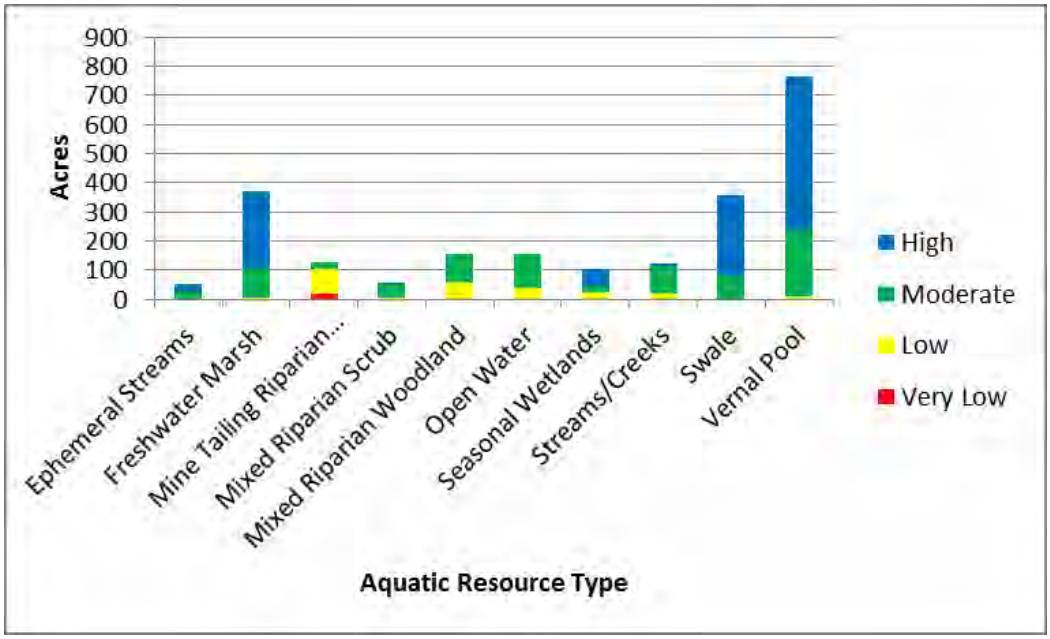


Table 10
Sherman Lake–Sacramento River Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	2.0	2.0
	Mixed Riparian Scrub	R2/R3	0	0	85.4	44.7	130.1
	Mixed Riparian Woodland	R2/R3	0	0	31.9	18.8	50.6
Subtotal Riparian			*0*	*0*	*117.3*	*65.5*	*182.7*
Wetland Waters	Freshwater Marsh	PEM1	0	7.2	32.5	0	39.7
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swales	R2/R3	0	1.3	0.1	0	1.4
	Vernal Pools	PEM2	0	3.0	2.4	0	5.3
Subtotal Wetland Waters			*0*	*11.5*	*35.0*	*0*	*46.4*
Non-Wetland Waters	Open Water	POW	0	0	9.4	0	9.4
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	0.3	22.6	1.0	23.9
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*0.3*	*32.0*	*1.0*	*33.3*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*11.8*	*67.0*	*1.0*	*79.7*
Grand Total[1]			**0**	**11.8**	**184.3**	**66.5**	**262.4**

Note: [1] Table may not total precisely due to rounding.

Figure 13 Current Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed

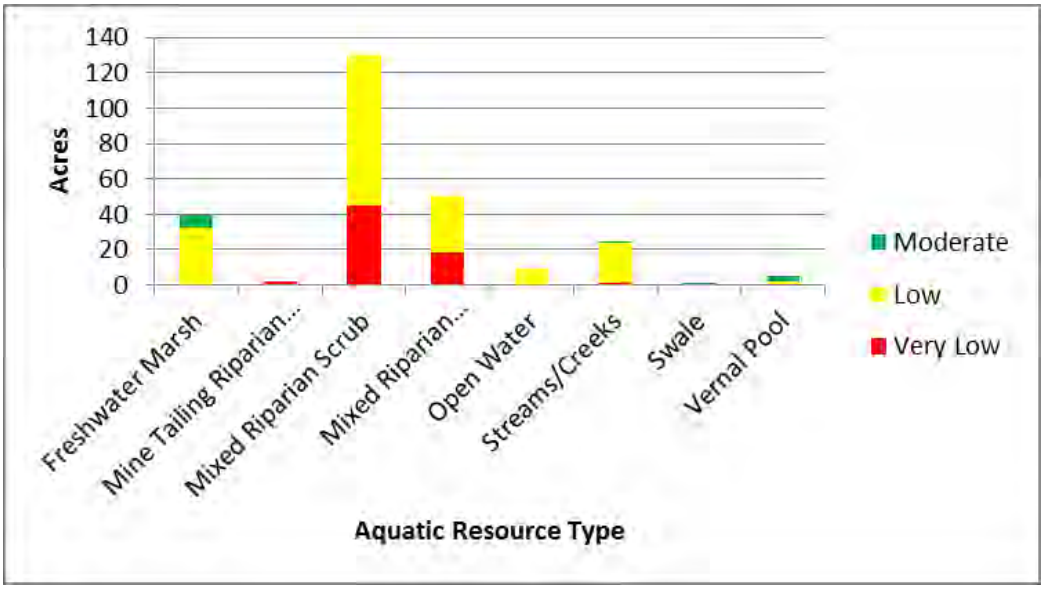


Table 11
Snodgrass Slough Watershed Current Conditions

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	350.7	177.5	0	528.2
	Mixed Riparian Woodland	R2/R3	0	488.1	804.4	0	1,292.6
Subtotal Riparian			*0*	*838.8*	*981.9*	*0*	*1,820.8*
Wetland Waters	Freshwater Marsh	PEM1	0	809.3	220.3	0	1,029.6
	Seasonal Wetland	PEM2	0	623.8	157.9	0	781.8
	Swales	R2/R3	0	9.7	0.5	0	10.2
	Vernal Pools	PEM2	0	407.5	13.4	0	420.9
Subtotal Wetland Waters			*0*	*1,850.3*	*392.1*	*0*	*2,242.5*
Non-Wetland Waters	Open Water	POW	0	417.4	287.0	15.9	720.3
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	0	1,077.2	63.9	0	1,141.0
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*1,494.6*	*350.9*	*15.9*	*1,861.3*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*3,344.9*	*743.0*	*15.9*	*4,103.8*
Grand Total[1]			**0**	**4,183.7**	**1,724.9**	**15.9**	**5,924.6**

Note: [1] Table may not total precisely due to rounding.

Figure 14 Current Condition of Aquatic Resources in the Snodgrass Slough Watershed

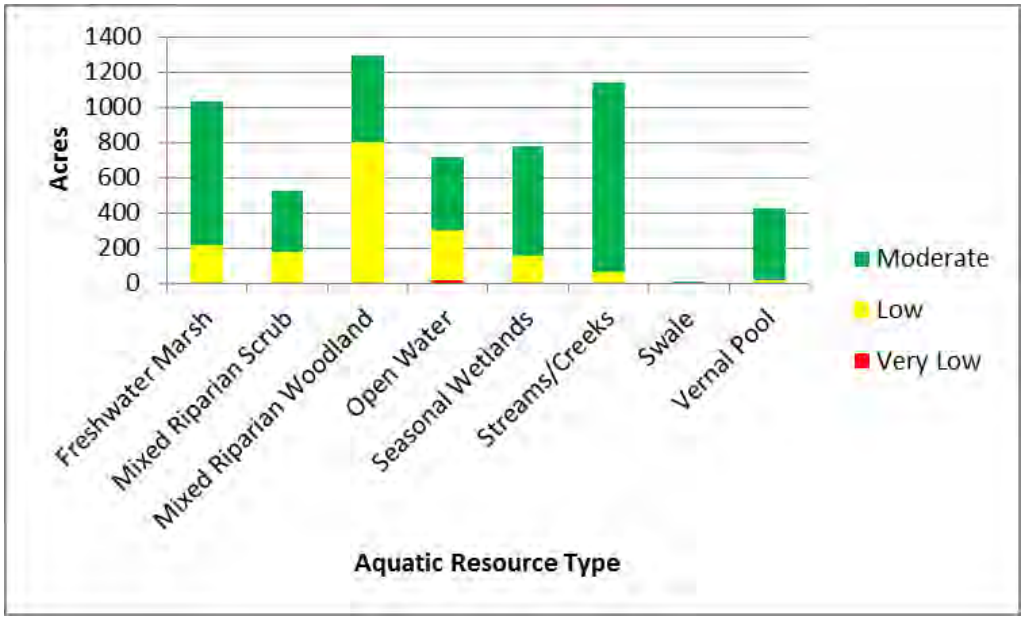
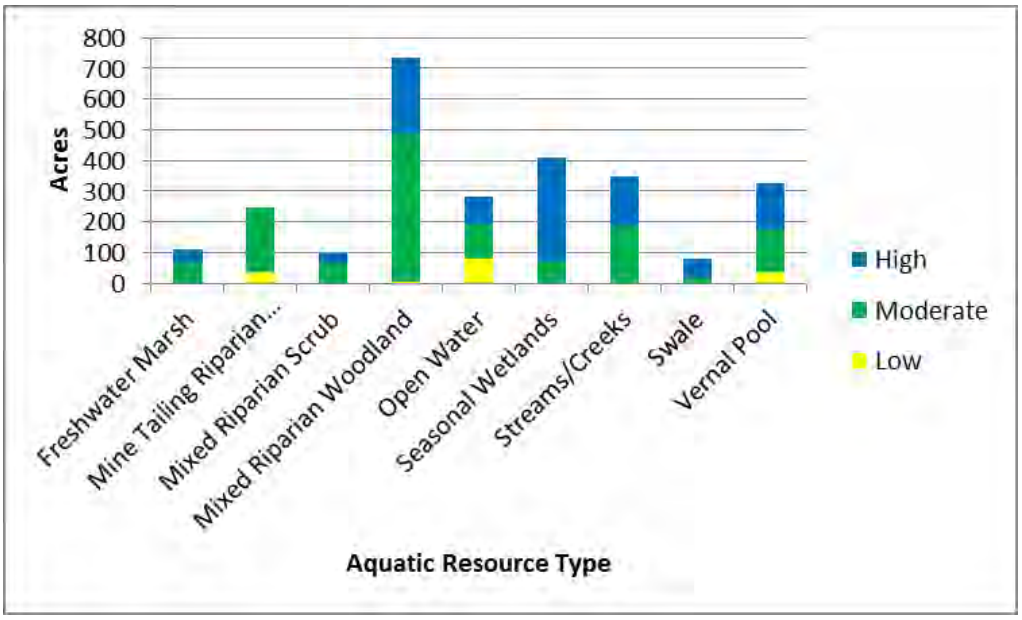


Table 12
Upper Cosumnes Watershed Current Conditions

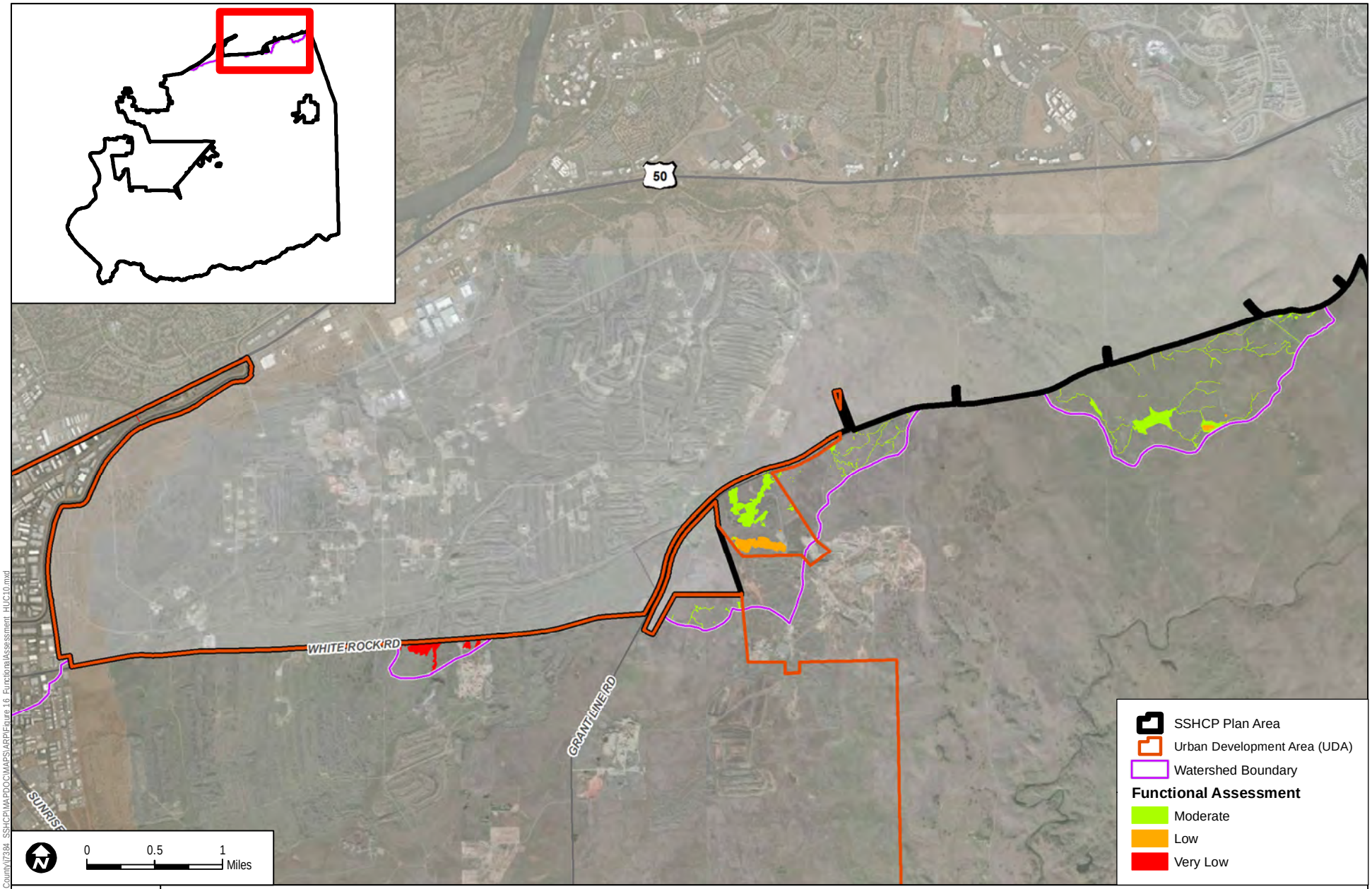
Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	High	Moderate	Low	Very Low	Total
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	208.4	37.1	0	245.5
	Mixed Riparian Scrub	R2/R3	37.0	61.0	1.7	0	99.7
	Mixed Riparian Woodland	R2/R3	247.6	481.7	3.4	0	732.6
		Subtotal Riparian	*284.6*	*751.1*	*42.2*	*0*	*1077.8*
Wetland Waters	Freshwater Marsh	PEM1	48.7	61.6	2.0	0	112.3
	Seasonal Wetland	PEM2	339.2	68.7	1.0	0	408.9
	Swales	R2/R3	60.6	18.8	1.2	0	80.6
	Vernal Pools	PEM2	147.0	143.8	34.0	0	324.7
		Subtotal Wetland Waters	*595.5*	*292.9*	*38.2*	*0*	*926.5*
Non-Wetland Waters	Open Water	POW	87.0	111.9	81.3	0	280.2
	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	164.8	184.9	<0.1	0	349.7
	Streams/Creeks VPIH (Ephemeral)	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*251.8*	*296.8*	*81.3*	*0*	*629.9*
		Subtotal Wetland Waters and Non-Wetland Waters	*847.3*	*589.7*	*119.5*	*0*	*1,556.4*
		Grand Total[1]	**1,131.9**	**1,340.8**	**161.7**	**0**	**2,634.2**

Note: [1] Table may not total precisely due to rounding.

Figure 15 Current Condition of Aquatic Resources in the Upper Cosumnes Watershed



INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 16_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

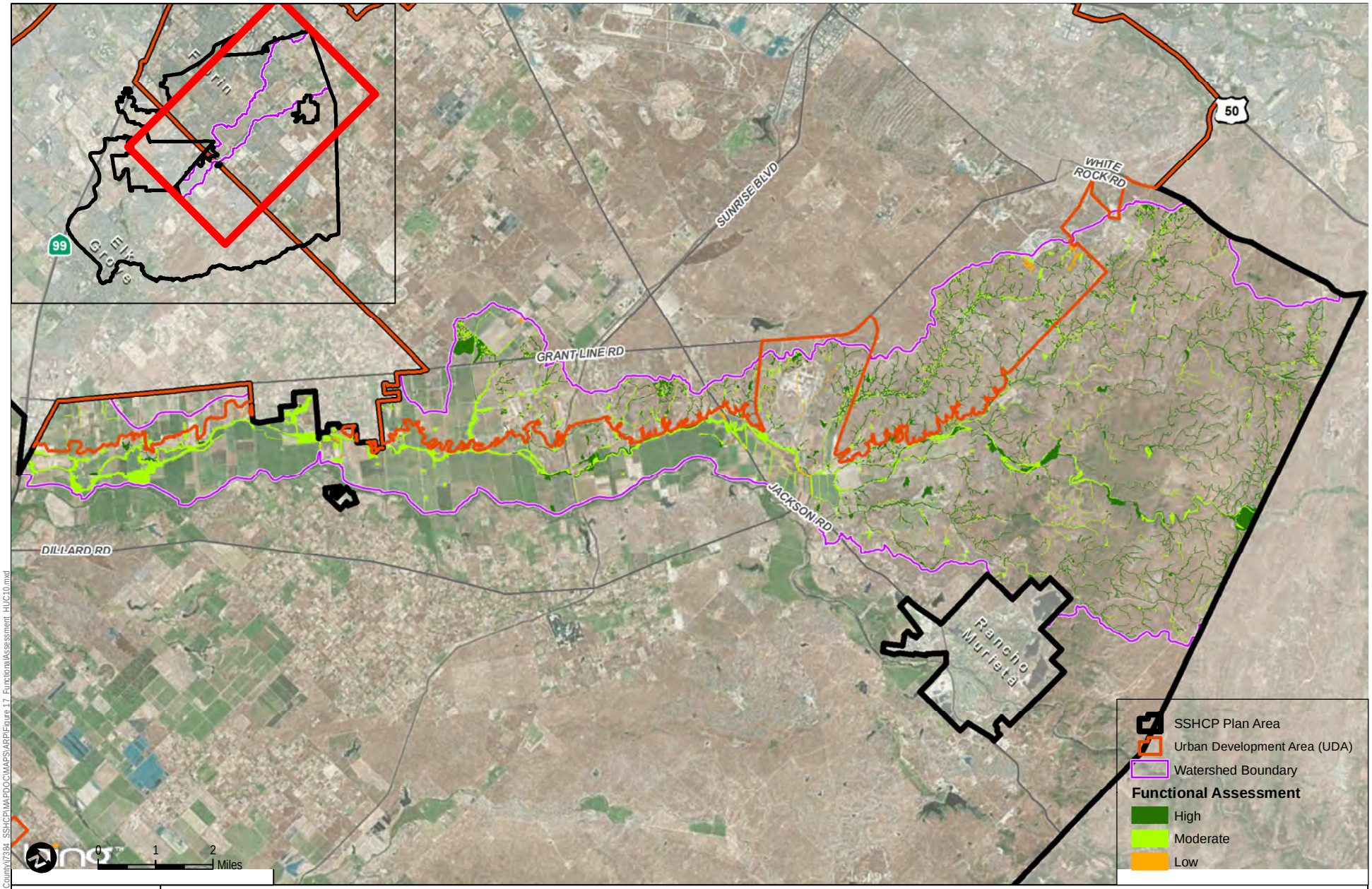
DUDEK

FIGURE 16

Functional Assessment - American River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7394_SSHCP\MAPDOC\MAPS\ARP\Figure 17_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

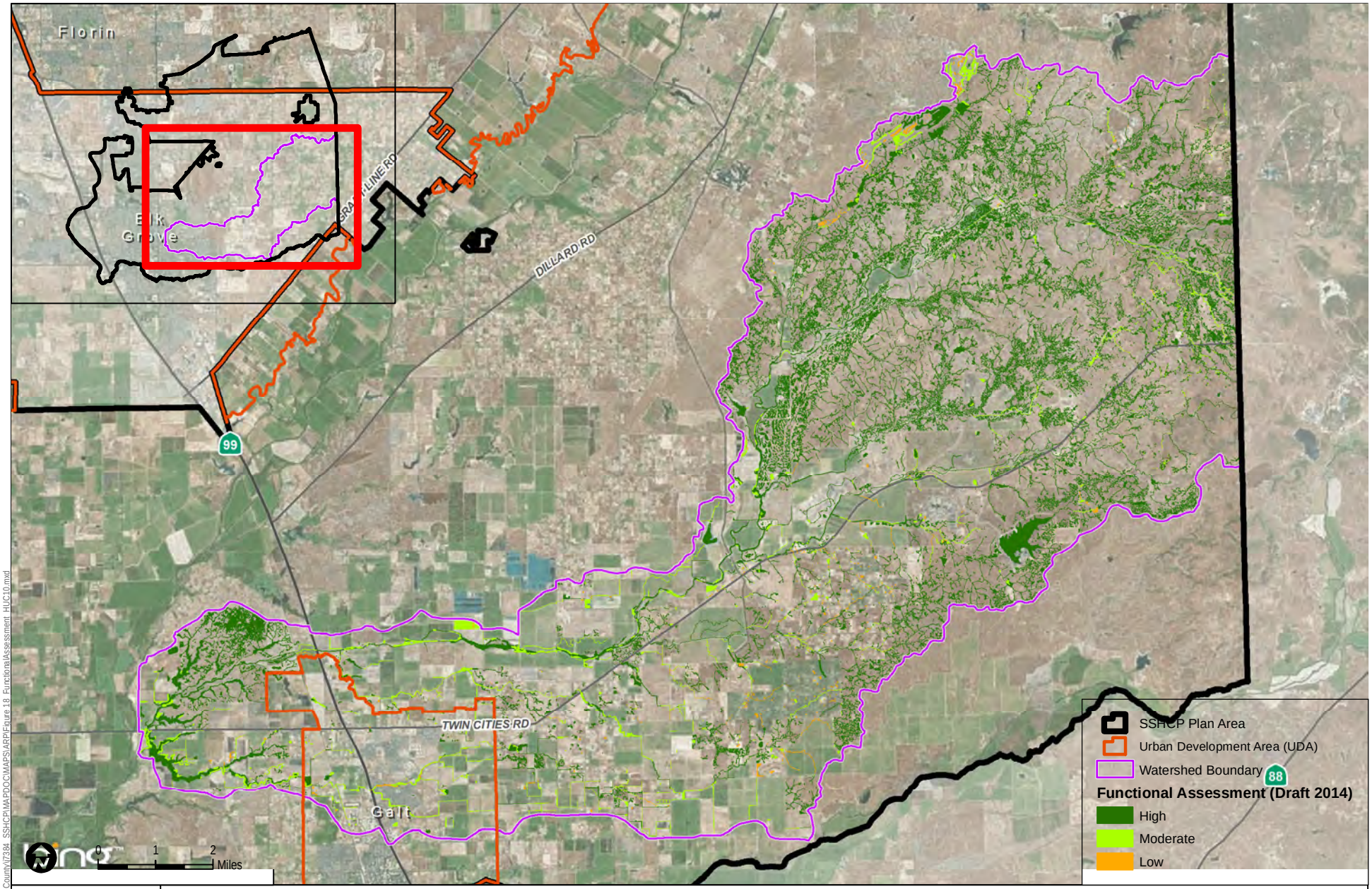
DUDEK

FIGURE 17

Functional Assessment - Deer Creek Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 18_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

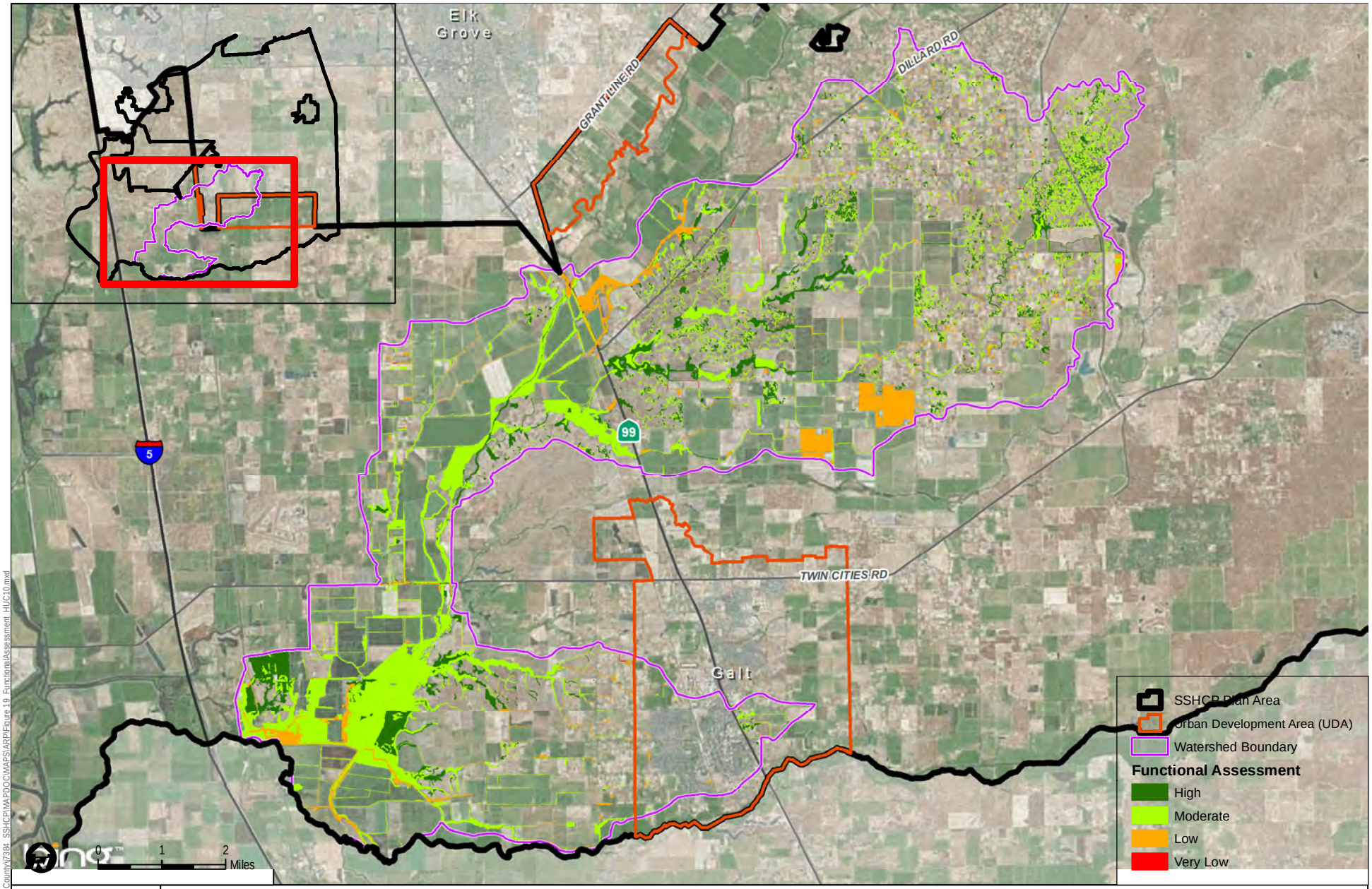
FIGURE 18

Functional Assessment - Laguna Watershed

DUDEK

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 19_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

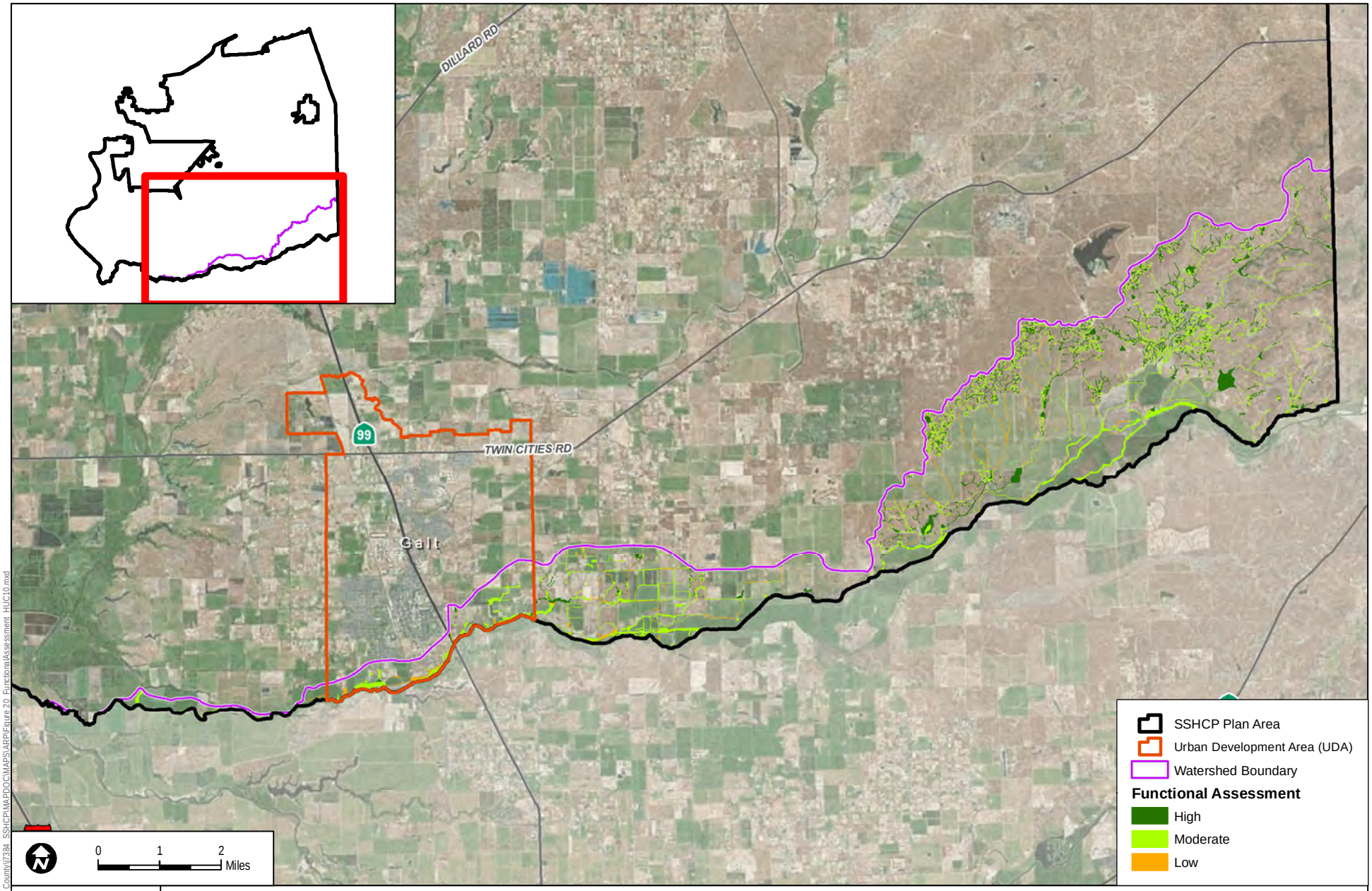
DUDEK

FIGURE 19

Functional Assessment - Lower Cosumnes River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 20_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

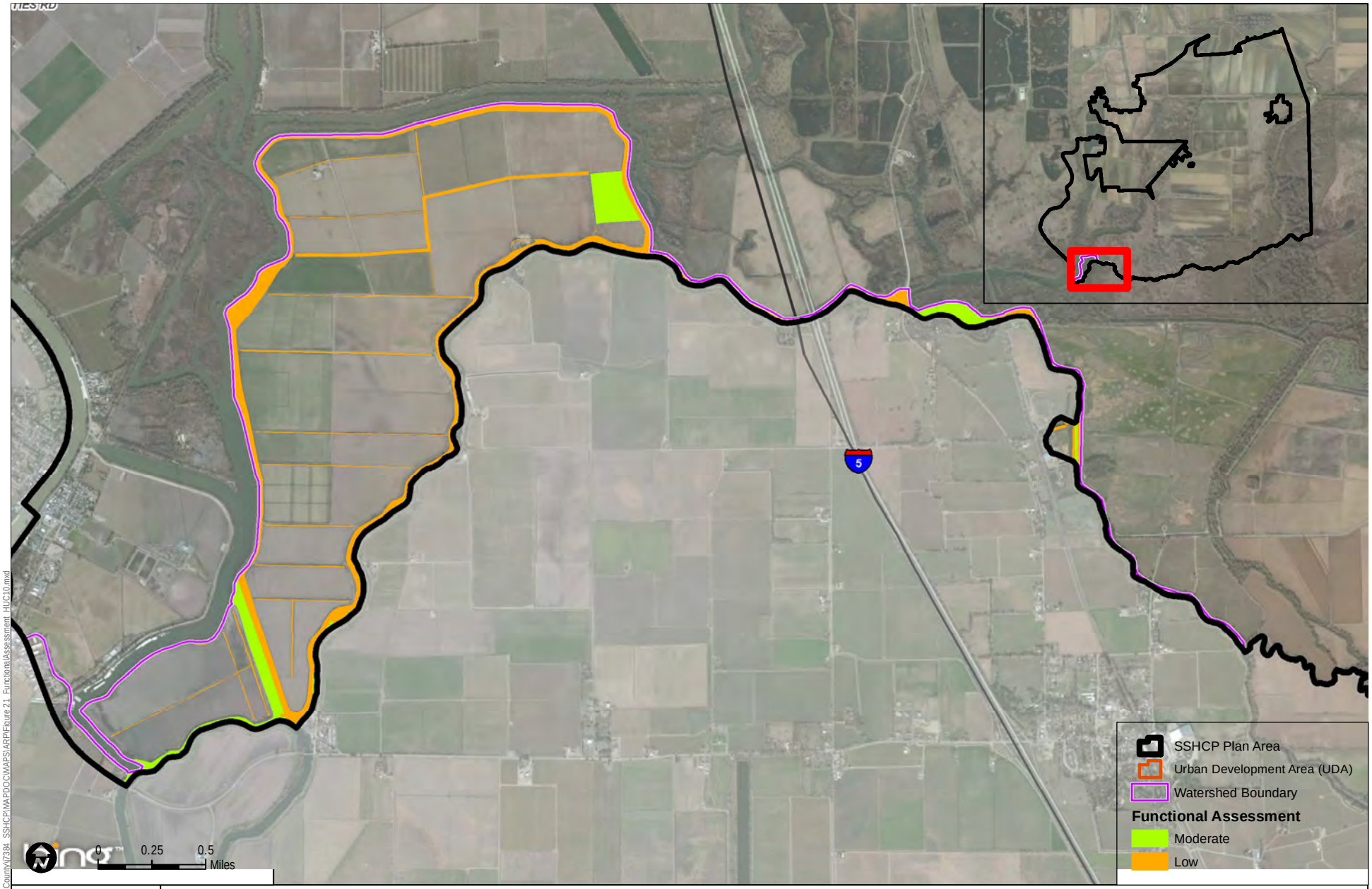
DUDEK

FIGURE 20

Functional Assessment - Lower Dry Creek Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 21_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

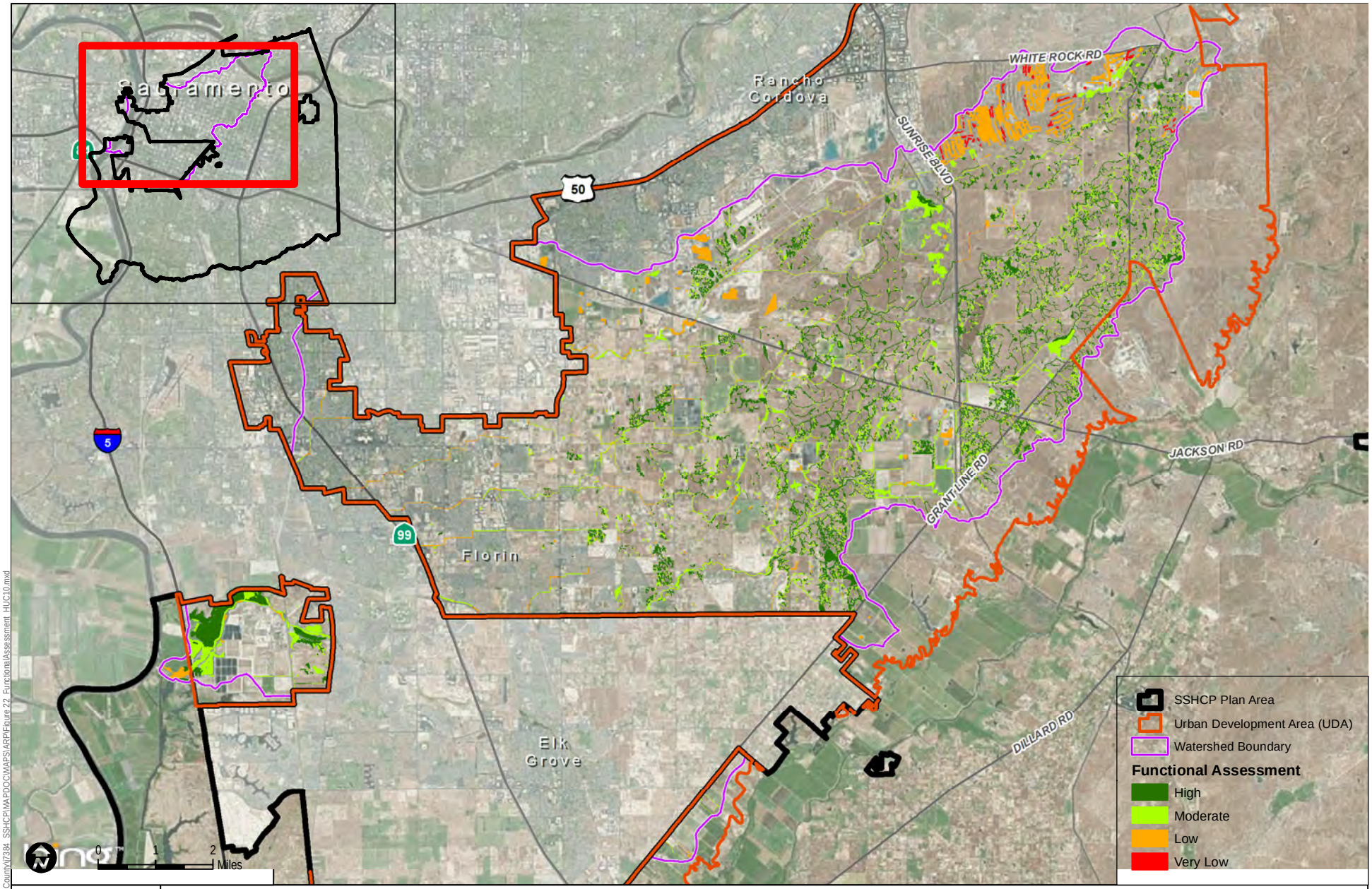
DUDEK

FIGURE 21

Functional Assessment - Lower Mokelumne River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARP\Figure 2-2_FunctionalAssessment_HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

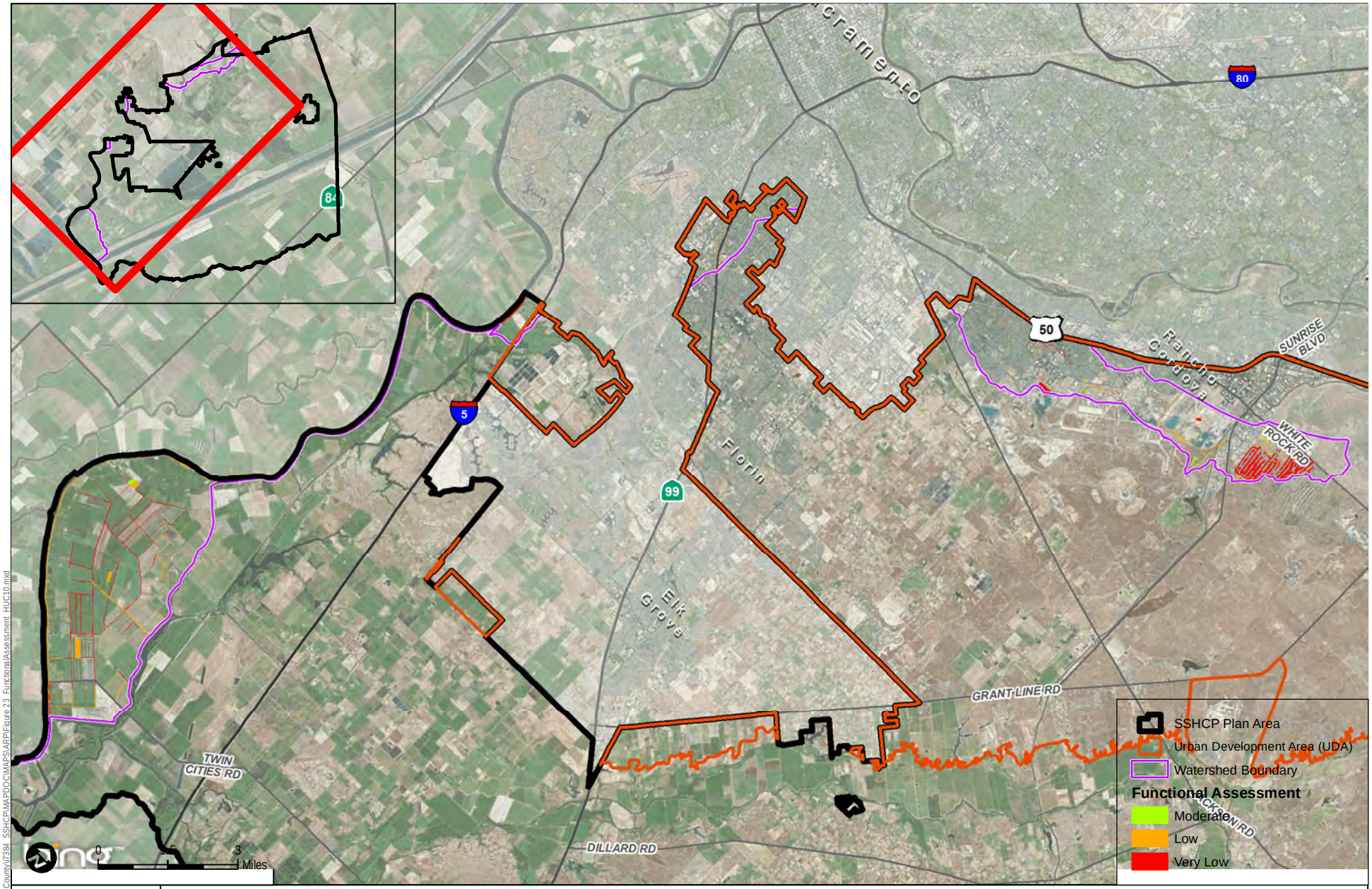
DUDEK

FIGURE 22

Functional Assessment - Morrison Creek Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

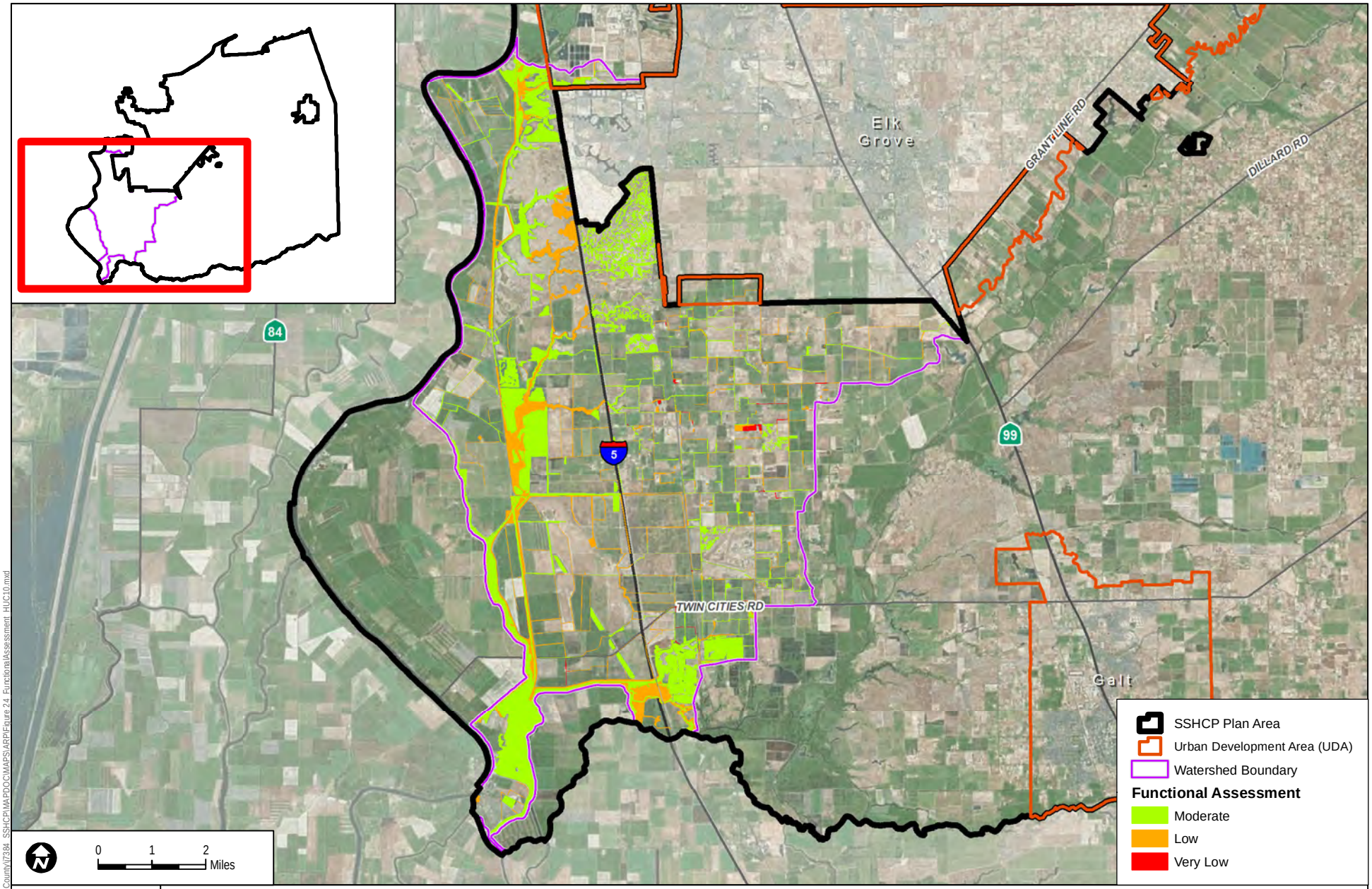
FIGURE 23

Functional Assessment - Sherman Lake-Sacramento River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

Path: Z:\Projects\Sacramento_County\7284_SSHCP\MAPDOC\MAPS\ARP\Figure 23_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

FIGURE 24

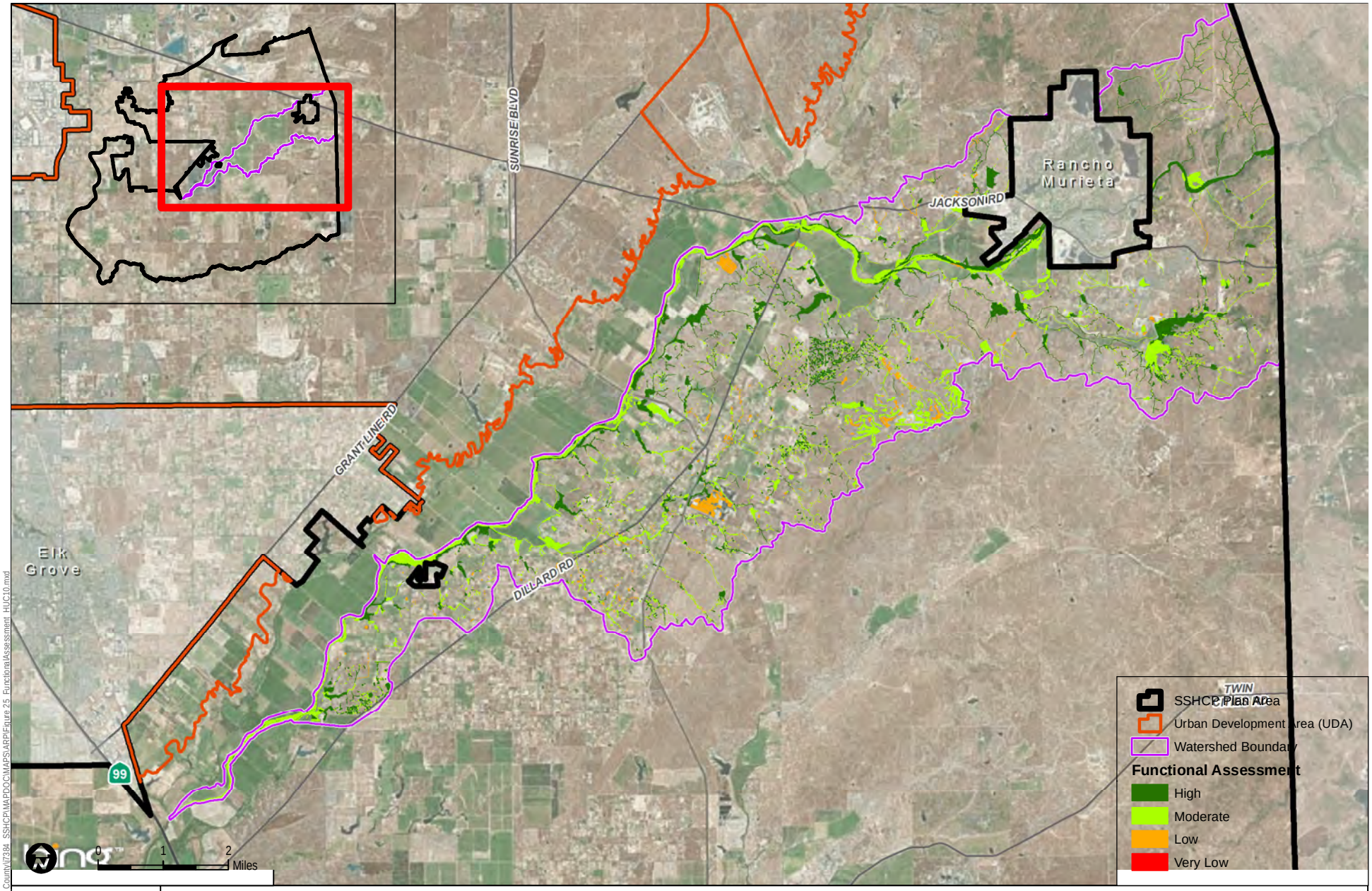
Functional Assessment - Snodgrass Slough Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

DUDEK

Path: Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\ARPF\Figure 24_FunctionalAssessment_HUC10.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento County\7384 SSHCP\MAPDOC\MAPS\ARP\Figure 25 FunctionalAssessment HUC10.mxd

SOURCE: Bing 2015, County of Sacramento 2014, USGS 2013 NHD

DUDEK

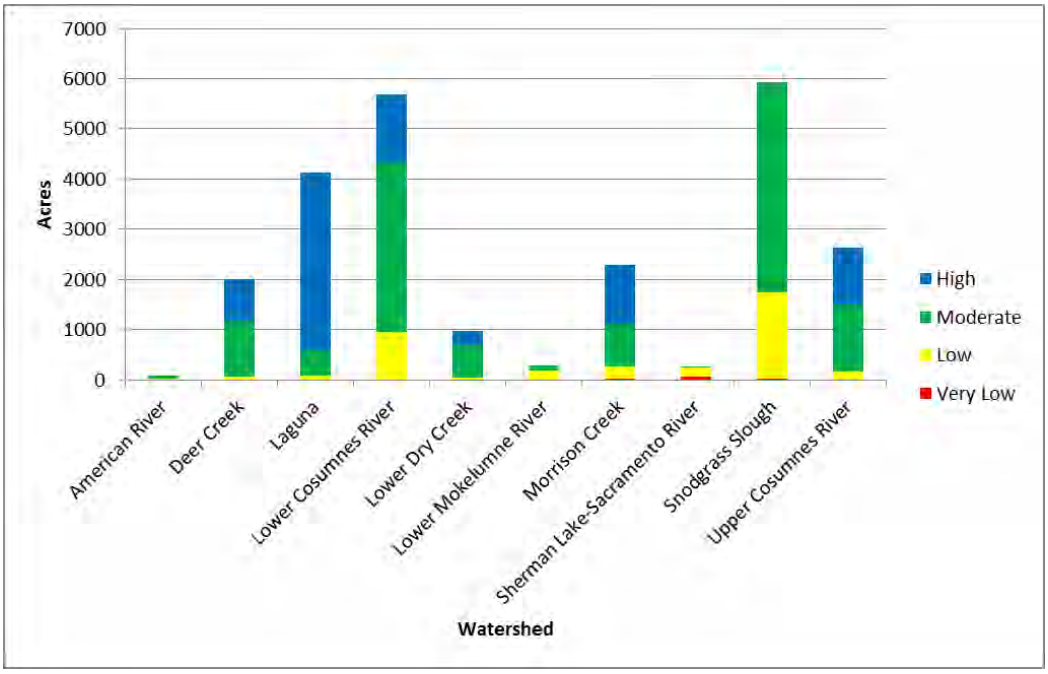
FIGURE 25

Functional Assessment - Upper Cosumnes River Watershed

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN AQUATIC RESOURCES PROGRAM

INTENTIONALLY LEFT BLANK

Figure 26 Summary of Overall Aquatic Resources Condition per Watershed



INTENTIONALLY LEFT BLANK

4 PROPOSED IMPACTS TO AQUATIC RESOURCES

Proposed impacts to aquatic resources within the SSHCP in the Plan Area can be described in terms of the aquatic resources' resulting diversity, abundance, and condition, in the same manner as they were for the existing conditions. Diversity is again described in terms of the variety of aquatic resources by land cover type (common name) and Cowardin class that would be impacted, and the variety that would remain after impacts. Abundance is described in terms of acreage of each impacted aquatic resource type within the Plan Area and per watershed (at the HUC-10 level), and the acreage that would remain. Condition is described using a landscape-level functional assessment to determine the relative capacity of the remaining aquatic resources to perform various functions and services related to hydrology, water quality, and habitat. In this section, the effects of implementing the SSHCP are examined without considering compensatory mitigation (please see Chapter 6 for an assessment of effects after consideration of compensatory mitigation), but do consider incorporation of AMMs, whose implementation would be integral to carrying out Covered Activities in the SSHCP.

4.1 Estimated Impacts to Abundance and Diversity of Aquatic Resources within the Plan Area

The SSHCP allows for specific categories of Covered Activities to occur within the Plan Area and to receive incidental take authorization from the Wildlife Agencies (U.S. Fish and Wildlife Service (USFWS) and CDFW). Covered Activities are described in Section 5.2 of Chapter 5 of the SSHCP. Conditions on Covered Activities are described in Section 5.3 of the SSHCP. The majority of the Covered Activities would be implemented within the region of the Plan Area designated as the UDA. Such Covered Activities include urban development and mining in the UDA, as well as Covered Activities in Preserves, Preserve Setbacks, and Stream Setbacks. Urban development in the UDA comprises planned urban growth and all ground-disturbing activities associated with urban development. This includes the construction of typical urban facilities, public and private, such as residential, commercial, and industrial structures; park and recreation facilities; water supply facilities; flood control and stormwater management (including operations and maintenance activities, such as vegetation control, sediment removal in the immediate vicinity of bridges, culverts and pipes, and erosion repair); stream bank stabilization projects; public and private utilities; and urban transportation. Covered Activities in Stream Setbacks and in the Laguna Creek Wildlife Corridor include trails, low-velocity bio-retention swales, perpendicular stream crossings, stream bank stabilization, fencing, shade structures (e.g., awnings) and shade trees, interpretive signs and kiosks, riparian habitat re-establishment or establishment, outfalls, and flood control structures and stormwater management (see Section 5.2.6 in Chapter 5 of the SSHCP). Covered Activities in Preserve Setbacks include trails, low-velocity bio-retention swales, fencing, firebreaks, shade structures and shade trees, and interpretive signs and kiosks (see Section 5.2.5 in Chapter 5 of the SSHCP). Covered Activities

in preserves include management and monitoring; low-impact nature trails; habitat enhancement, re-establishment, and establishment; species surveys, research, and adaptive management activities; water supply for livestock; groundwater monitoring and extraction wells; and utility maintenance and repair (see Section 5.2.7 in Chapter 5 of the SSHCP). Covered Activities in preserve linkages include all of the Covered Activities described in preserves plus limited use of detention basins (see Section 5.2.7 in Chapter 5 of the SSHCP). Covered Activities outside the UDA are limited to rural transportation projects, recycled water projects, and SSHCP Preserve System Covered Activities. Complete descriptions of all categories of Covered Activities can be found in Section 5.2 of the SSHCP.

Direct impacts are assumed to result in a permanent loss[5] of aquatic resources. Direct impacts to aquatic resources resulting from the SSHCP's Covered Activities were quantified at a programmatic scale using a geographic information system (GIS). GIS was used to overlay an electronic map-layer of projected Covered Activity footprints onto an electronic map-layer of the SSHCP land cover baseline (existing conditions) map to quantify the acres of overlap to determine acres of direct impact to each potentially jurisdictional aquatic resource land cover type. In this manner, direct impacts were quantified at a programmatic scale. This approach reasonably estimates the amount of permanent loss of aquatic resources within the Plan Area that would result from implementation of Covered Activities. For example, it is likely that a number of stream channels would be widened and/or deepened within the Plan Area, but the stream channel will remain in its relative position within the landscape. For purposes of the SSHCP impacts analysis, it is assumed that Covered Activities would impact the entire stream, resulting in a permanent loss of stream acres even though this may not be the case. This conservative approach to quantifying impacts to aquatic resources provides the uppermost thresholds for anticipated direct impacts resulting in permanent loss of aquatic resources.

Participation in the SSHCP/ARP is compulsory. Impacts to all aquatic resources within the SSHCP Plan Area would be tracked by the application processes implemented by the Land Use Authority Permittees, and by the monitoring program of the SSHCP/ARP that requires periodic surveys to be performed that are designed to detect conversion of aquatic resources throughout the Plan Area.

4.1.1 Impacts on Abundance and Diversity of Aquatic Resources

Within the Plan Area, of the currently existing 24,255 acres of mapped potentially jurisdictional aquatic resources, there are projected direct impacts to approximately 1,614 acres, leaving approximately 22,641 acres (93%) of aquatic resources remaining in the Plan Area. Of the total

[5] Aquatic resources that are permanently adversely affected by filling, flooding, excavation, or drainage because of the activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody.

amount of potentially jurisdictional aquatic resources, there are 11,343 acres of wetland waters, 5,192 acres of non-wetland waters, and 7,721 acres of riparian (Table 1). As shown in Table 13, of the currently existing 11,343 acres of wetland waters, there are projected direct impacts to approximately 856 acres, leaving approximately 10,487 acres (92%) of wetland waters remaining in the Plan Area. Of the currently existing 5,192 acres of non-wetland waters, there are projected direct impacts to approximately 294 acres, leaving approximately 4,898 acres (94%) of wetland waters remaining in the Plan Area. Of the currently existing 7,721 acres of riparian aquatic resources, there are projected direct impacts to approximately 464 acres, leaving approximately 7,257 acres (94.0%) of riparian aquatic resources remaining in the Plan Area. The watershed with the largest acreage amount of projected impacts to aquatic resources is the Morrison Creek watershed, with a total of 994 acres of impact (43.6% of aquatic resources). Proportionally, the watershed with the largest amount of impacts (61.6%) is the American River watershed; however, the actual acreage of impact is only 56 acres.

Within the Plan Area the land cover types that have the largest acreage of impact is vernal pool (389 acres), followed by Swale (235 acres). See Table 13 for a summary of impacts to aquatic resources types per watershed and Table 14 for a summary of remaining aquatic resources by type per watershed.

4.2 Estimated Impacts to Functions and Services of Aquatic Resources in the Plan Area

The effects of the SSHCP Covered Activities impacts are estimated by projecting the future condition of aquatic resources within the Plan Area, without considering mitigation. The projected future condition is obtained from the results of the Functional Assessment Report (Appendix C), which categorizes the Plan Area's aquatic resources into high, moderate, low, or very low condition.

Table 13
Direct Impacts to Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake-Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Riparian	Mine Tailing Riparian Woodland	R	47.9	40.5	0	0	0	0	127.8	2.0	0	0	218.2
	Mixed Riparian Scrub	R	0	1.6	5.0	4.1	9.9	0	36.5	3.9	0.7	0	61.7
	Mixed Riparian Woodland	R	0	15.4	9.2	17.0	78.4	0.1	54.5	2.7	1	4.9	184.1
Subtotal Riparian			*47.9*	*57.5*	*14.2*	*21.1*	*88.3*	*0.1*	*218.8*	*8.6*	*1.7*	*4.9*	*464*
Wetland Waters	Freshwater Marsh	PEM1	1.4	2.0	7.5	0.7	2.5	0	104.8	0.4	7.2	0.5	127.0
	Seasonal Wetland	PEM2	0	10.1	15.0	4.2	1.4	0	68.0	0	6.5	0.3	105.5
	Swale	R2/R3	0.9	62.3	2.3	2.6	0.9	0	162.7	1.4	1.2	0.1	234.5
	Vernal Pools	PEM2	4.4	33.2	31.1	14.1	9.4	0	283.4	5.3	5.0	3.1	389.1
Subtotal Wetland Waters			*6.7*	*107.6*	*55.9*	*21.6*	*14.2*	*0*	*618.9*	*7.1*	*19.9*	*4*	*856.1*

Table 13
Direct Impacts to Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake-Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Non-Wetland Waters	Open Water	POW	0.5	70.8	2.0	0.1	0.3	0	80.4	0.2	1.1	0	155.3
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0.9	12.3	14.0	6.4	2.5	<0.1	57.4	3.8	18.5	1.1	116.8
	Streams/ Creeks (VPIH) Ephemeral	R4SB	0	2.6	0	0	0	0	19.0	0	0	0	21.6
Subtotal Non-Wetland Waters			*1.4*	*85.7*	*16.0*	*6.5*	*2.8*	*0*	*156.8*	*4*	*19.6*	*1.1*	*293.7*
Subtotal Wetland Waters and Non-Wetland Waters			*8.1*	*193.3*	*71.9*	*28.1*	*17*	*0*	*718.3*	*11.1*	*39.5*	*5.1*	*1,149.8*
Grand Total[1]			**56**	**250.8**	**86.1**	**49.2**	**105.3**	**0.1**	**937.1**	**19.7**	**41.2**	**10**	**1,613.8**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Table 14
Post-Impact Abundance of Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Riparian	Mine Tailing Riparian Woodland	R	0	0.2	158.3	17.3	0	0	1.6	0	0	245.5	422.9
	Mixed Riparian Scrub	R	0	78.8	53.1	267.7	37.2	2.4	20.7	126.2	527.5	99.7	1,213.2

Table 14
Post-Impact Abundance of Aquatic Resources in the Plan Area by Type (Acres)

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
	Mixed Riparian Woodland	R	0.4	820.5	252.5	1,859.9	322.3	196.2	102.6	48.0	1,290.6	727.7	5,620.7
Subtotal Riparian			*0.4*	*899.5*	*463.9*	*2,144.9*	*359.5*	*198.6*	*124.9*	*174.2*	*1,818.1*	*1,072.9*	*7,256.8*
Wetland Waters	Freshwater Marsh	PEM1	0.6	36.2	159.7	1,126.2	45.0	20.9	265.2	39.3	1,022.4	111.7	2,827.1
	Seasonal Wetland	PEM2	22.6	118.9	403.5	611.5	115.4	0	38.9	0	775.2	408.6	2,494.6
	Swale	R2/R3	1.9	98.1	425.9	141.6	64.3	0	195.9	0	9.1	80.4	1,017.2
	Vernal Pools	PEM2	2.5	241.1	1,886.0	605.0	193.3	0.1	481.2	0	415.9	321.6	4,146.5
Subtotal Wetland Waters			*27.6*	*494.3*	*2,875.1*	*2,484.3*	*418*	*21*	*981.2*	*39.3*	*2,222.6*	*922.3*	*10,485.4*
Non-Wetland Waters	Open Water	POW	2.2	129.4	295.4	663.0	8.4	3.1	78.4	9.2	719.2	280.2	2,188.5
	Perennial or Intermittent Streams/ Creeks	R2UB/R3 UB	4.7	216.1	402.0	338.6	75.7	67.4	65.4	20.1	1,122.8	348.6	2,661.2
	Streams/ Creeks (VPIH) Ephemeral	R4SB	0	16.1	0	0	0	0	35.6	0	0	0	51.6
Subtotal Non-Wetland Waters			*6.9*	*361.6*	*697.4*	*1,001.6*	*84.1*	*70.5*	*179.4*	*29.3*	*1842*	*628.8*	*4,901.3*
Subtotal Wetland Waters and Non-Wetland Waters			*34.5*	*855.9*	*3,572.5*	*3,485.9*	*502.1*	*91.5*	*1,160.6*	*68.6*	*4,064.6*	*1,551.1*	*15,386.7*
Grand Total[1]			**34.9**	**1,755.4**	**4,036.4**	**5,630.8**	**861.6**	**290.1**	**1,285.5**	**242.8**	**5,882.7**	**2,624.0**	**22,643.5**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

4.2.1 Impacted Condition of Aquatic Resources

The landscape-level assessment (FCAM) that was used to describe the existing condition of the aquatic resources was also used to predict the future condition of the resources after Covered Activity impacts have occurred. As with existing condition, the future condition of aquatic resources describes the relative ability of the resources to support various functions and services. The overall quality of remaining aquatic resources (after direct impacts have occurred) was predicted based on the same factors: area of the aquatic resource, HUC-10 watershed, primary adjacent land cover, secondary adjacent land cover, and aquatic resource type. Function scores were assigned for each of these factors, per aquatic resource feature, based upon ability to maintain or improve the following functions: habitat, water quality, and hydrology. The second factor, HUC-10 watershed, was updated based on the predicted future state of each of the watersheds. The results of the analysis provided an overall functional score of very low, low, moderate, or high for each aquatic resource.

Table 15 summarizes acreage and function/condition of aquatic resources (hereinafter simply condition) using FCAM, in the overall Plan Area following impacts and before accounting for compensatory mitigation, and Figure 27 is a graphical depiction of those data, showing how the impacted Plan Area compares to the existing conditions. Compared to the existing conditions, the impacted Plan Area conditions without mitigation show that the amount of high condition resources remains stable (very slight increase of 29 acres). However, the amounts of moderate, low, and very low condition resources all decrease (decreases of 1,266 acres, 297 acres, and 79 acres, respectively). The slight increase in the amount of high condition resources is the result of the shifts in Covered Species occurrences among watersheds resulting from implementation of the SSHCP and the subsequent shift of some of the associated function scores from moderate to high via an improvement to one or more of the attributes (e.g., implementation of setback).

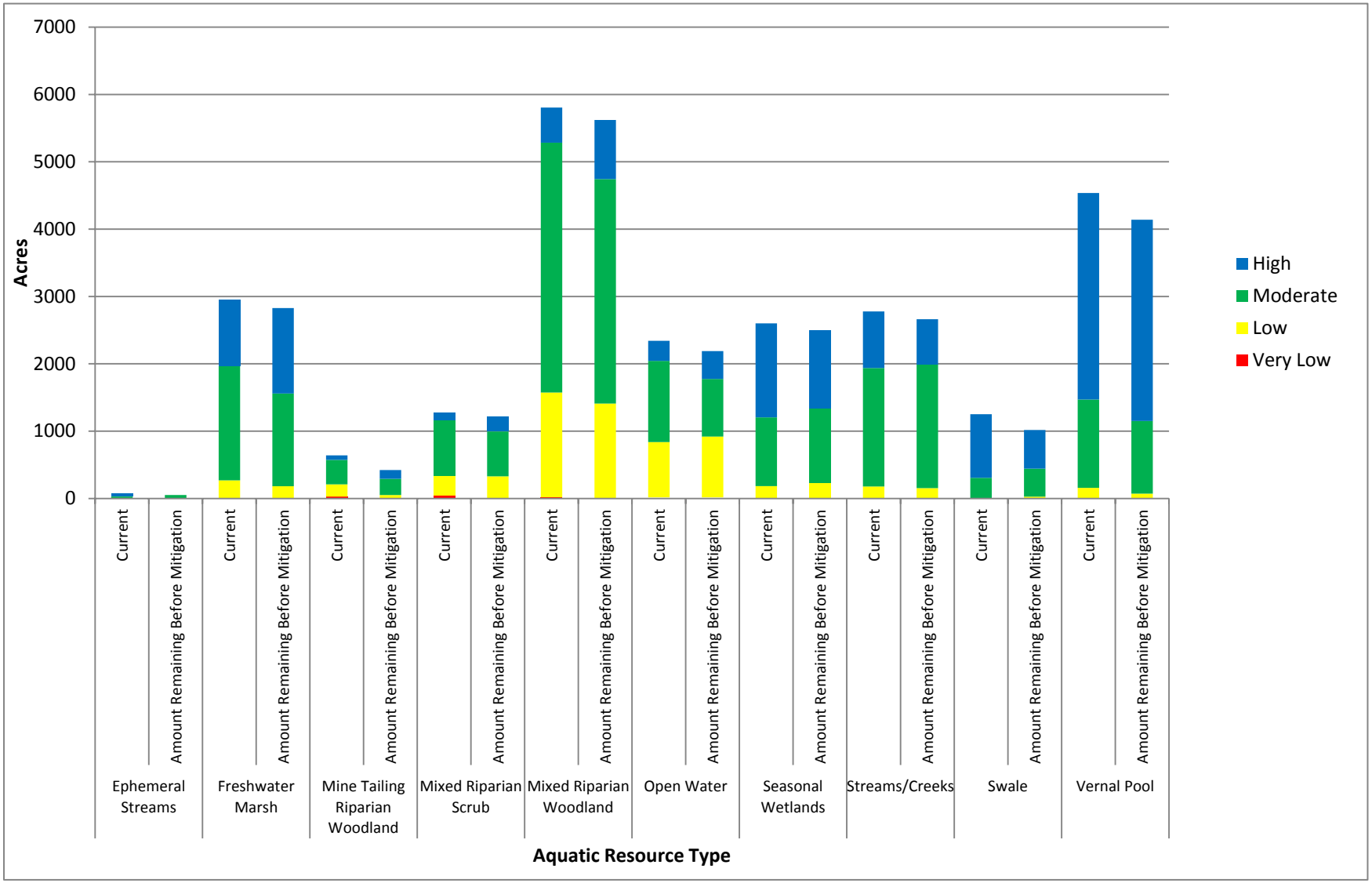
Tables 16 through 25 summarize the condition of aquatic resources in each HUC-10 watershed following impacts and before accounting for compensatory mitigation, and Figures 28 through 37 are graphical depictions, comparing the existing to the impacted watershed conditions. Table 26 summarizes current conditions in the Mather Core Recovery Area and following impacts prior to accounting for compensatory mitigation.

Table 15
Condition of Remaining Aquatic Resources in the Overall Plan Area After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	131.0	241.0	50.9	0	422.9
	Mixed Riparian Scrub	R2/R3	218.3	665.3	324.2	5.4	1,213.2
	Mixed Riparian Woodland	R2/R3	877.7	3,332.7	1,403.5	6.7	5,620.7
		Subtotal Riparian	*1,227.0*	*4,239.0*	*1,778.6*	*12.1*	*7,256.8*
Wetland Waters	Freshwater Marsh	PEM1	1,267.5	1,378.0	181.6	0	2,827.1
	Seasonal Wetland	PEM2	1,162.5	1,107.8	231.8	0	2,502.1
	Swales	R2/R3	575.4	415.6	26.4	0	1,017.3
	Vernal Pools	PEM2	2,988.2	1,078.7	72.3	0	4,139.1
		Subtotal Wetland Waters	*5,993.6*	*3,980.1*	*512.1*	*0*	*10,485.6*
Non-Wetland Waters	Open Water	POW	413.6	855.8	903.6	15.5	2,188.5
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	674.3	1,832.2	154.7	0	2,661.2
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	46.1	5.5	0	51.6
		Subtotal Non-Wetland Waters	*1,087.9*	*2,734.1*	*1,063.8*	*15.5*	*4,901.3*
		Subtotal Wetland Waters and Non-Wetland Waters	*7,081.5*	*6,714.2*	*1,575.9*	*15.5*	*15,386.9*
		Grand Total[1]	**8,308.5**	**10,953.2**	**3,354.5**	**27.6**	**22,643.7**

Note: [1] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Figure 27 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Plan Area



The Morrison Creek watershed, in addition to showing the largest decrease in abundance (acreage) of aquatic resources, was also predicted to have the largest decrease in high condition aquatic resources (943 acres), showing a shift in portions of Freshwater Marsh, Swale, and vernal pool resources to moderate condition. The amount of high condition aquatic resources is balanced out throughout the overall Plan Area because of shifts in moderate condition resources to high in other watersheds such as Lower Cosumnes and Upper Cosumnes as a result of changed Covered Species occurrences following SSHCP implementation (see Appendix C, Functional Assessment).

Within the Mather Core Recovery Area, 80% of high condition and moderate condition vernal pools would be avoided. Vernal pools in the Mather Core Recovery Area have recognized ecological importance and those proposed for avoidance were selected based on an assessment of their conservation value using FCAM and the Vernal Wetland Acre/Density Index (VWADI) as described in Section 5.2.1 below. Those vernal pool complexes with the highest conservation value scores received special consideration during the development of the SSHCP Conservation Strategy and the conceptual design of the SSHCP Preserve System.

Table 16
Condition of Remaining Aquatic Resources in the American River Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0	0	0	0
	Mixed Riparian Woodland	R2/R3	0	0	0.4	0	0.4
		Subtotal Riparian	*0*	*0*	*0.4*	*0*	*0.4*
Wetland Waters	Freshwater Marsh	PEM1	0	0.2	0.4	0	0.6
	Seasonal Wetland	PEM2	0	22.6	0	0	22.6
	Swales	R2/R3	0	1.4	0.5	0	1.9
	Vernal Pools	PEM2	0	2.5	<.1	0	2.5
		Subtotal Wetland Waters	*0*	*26.7*	*0.9*	*0*	*27.6*
Non-Wetland Waters	Open Water	POW	0	0	2.2	0	2.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	1.9	2.9	0	4.7
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*0*	*1.9*	*5.1*	*0*	*6.9*
		Subtotal Wetland Waters and Non-Wetland Waters	*0*	*28.6*	*6*	*0*	*34.5*
		Grand Total[1]	**0**	**28.6**	**6.4**	**0**	**34.9**

Note: [1] Table may not total precisely due to rounding.

Figure 28 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the American River Watershed

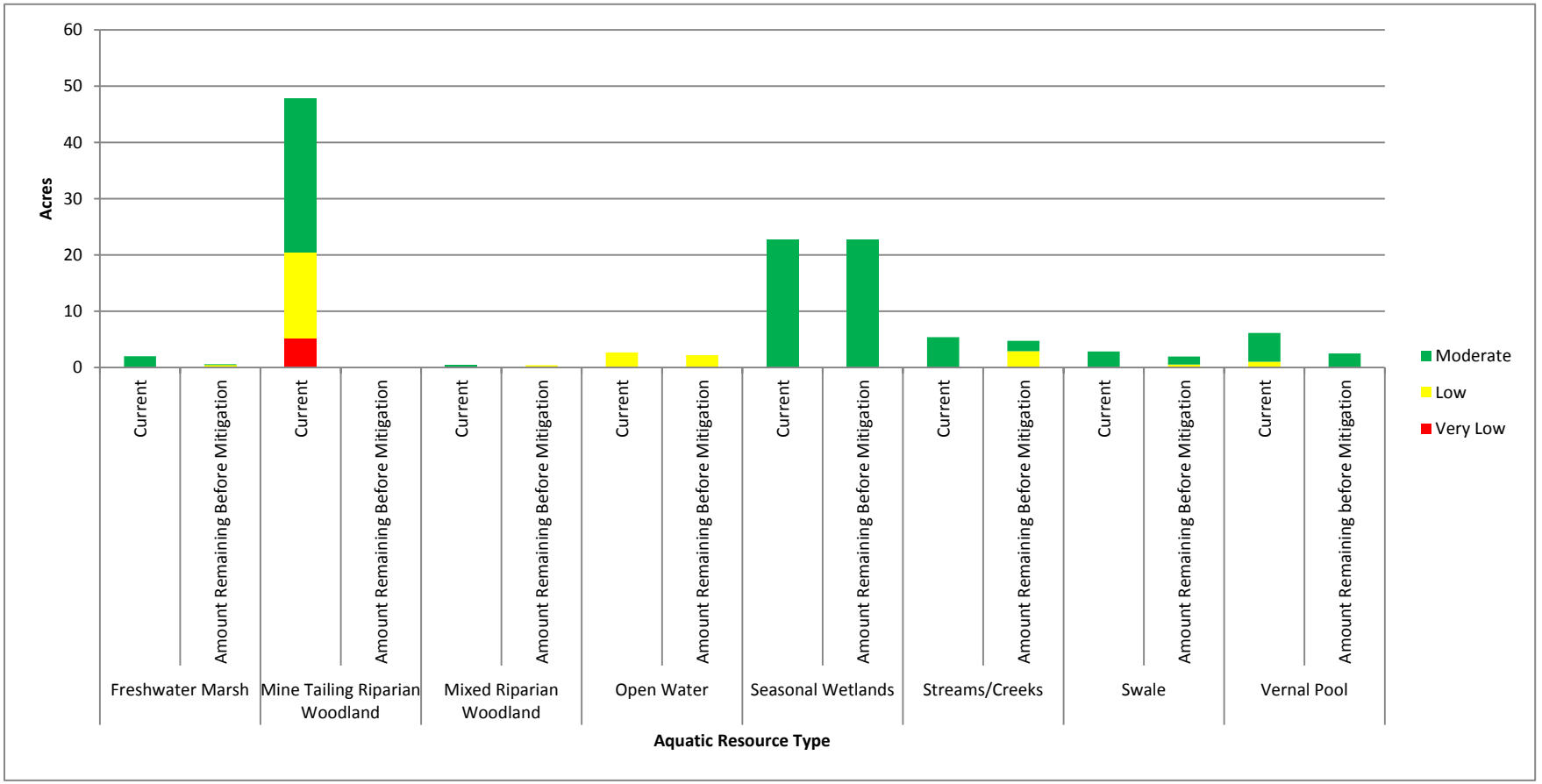


Table 17
Condition of Remaining Aquatic Resources in the Deer Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0.2	<0.1	0	0.2
	Mixed Riparian Scrub	R2/R3	40.3	35.4	3.0	0	78.8
	Mixed Riparian Woodland	R2/R3	106.6	694.6	19.3	0	820.5
Subtotal Riparian			*146.9*	*730.2*	*22.3*	*0*	*899.5*
Wetland Waters	Freshwater Marsh	PEM1	21.9	14.3	0	0	36.2
	Seasonal Wetland	PEM2	13.8	100.1	5.0	0	118.9
	Swale	R2/R3	70.9	26.3	0.9	0	98.1
	Vernal Pools	PEM2	183.6	57.2	0.3	0	241.1
Subtotal Wetland Waters			*290.2*	*197.9*	*6.2*	*0*	*494.3*
Non-Wetland Waters	Open Water	POW	69.4	56.4	3.6		129.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	121.5	<0.1	0	216.1
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	15.3	0.8	0	16.1
Subtotal Non-Wetland Waters			*69.4*	*193.2*	*4.4*	*0*	*361.6*
Subtotal Wetland Waters and Non-Wetland Waters			*359.6*	*391.1*	*10.6*	*0*	*855.9*
Grand Total[1]			**506.5**	**1,121.3**	**32.9**	**0**	**1,755.4**

Note: [1] Table may not total precisely due to rounding.

Figure 29 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Deer Creek Watershed

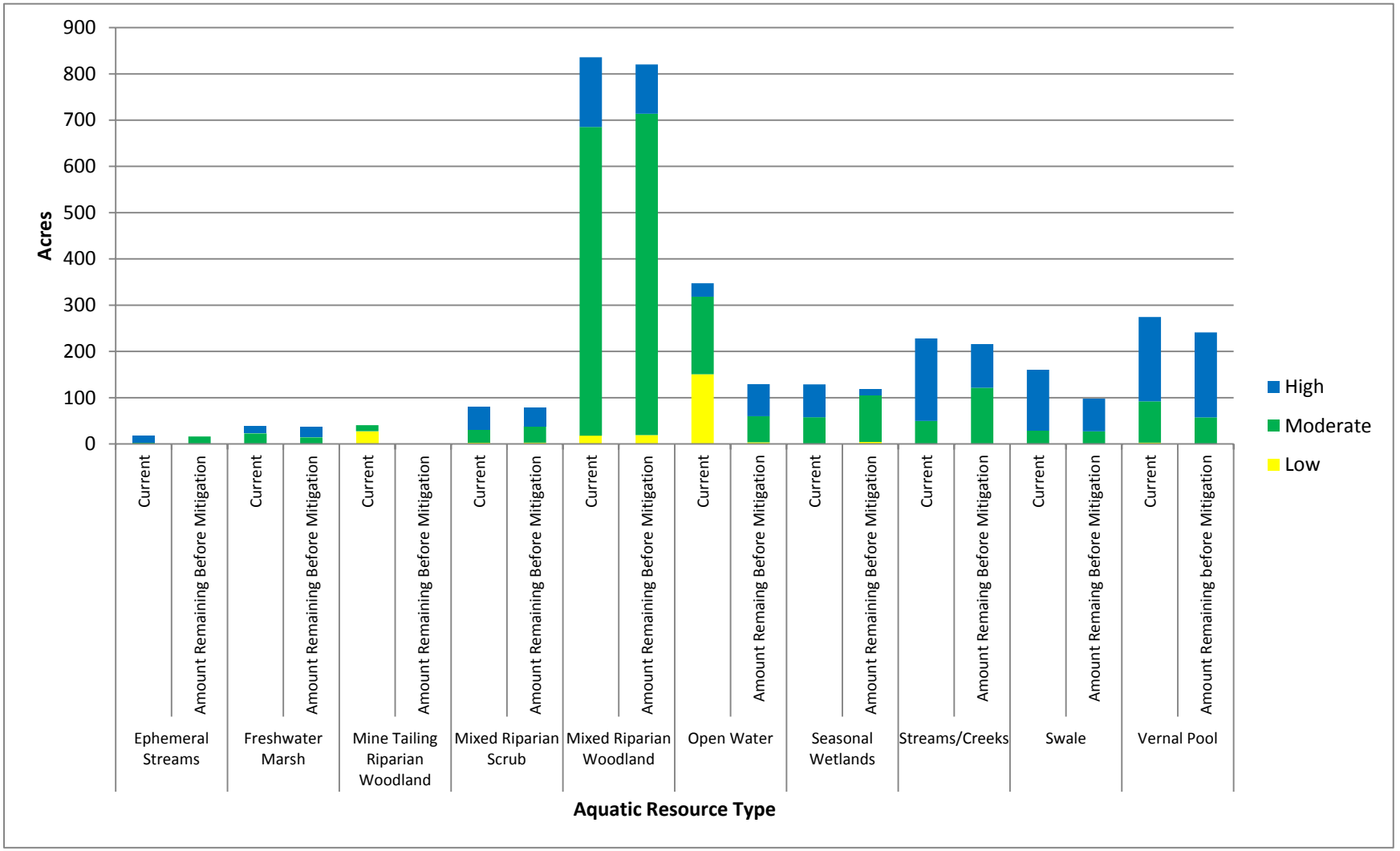


Table 18
Condition of Remaining Aquatic Resources in the Laguna Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	63.8	74.8	19.7	0	158.3
	Mixed Riparian Scrub	R2/R3	5.4	45.6	2.1	0	53.1
	Mixed Riparian Woodland	R2/R3	63.0	179.5	10.0	0	252.5
Subtotal Riparian			*132.2*	*299.9*	*31.8*	*0*	*463.9*
Wetland Waters	Freshwater Marsh	PEM1	139.6	19.6	0.4	0	159.7
	Seasonal Wetland	PEM2	370.8	25.1	14.5	0	410.5
	Swales	R2/R3	312.0	113.7	0.3	0	425.9
	Vernal Pools	PEM2	1,801.3	70.3	7.4	0	1,879.0
Subtotal Wetland Waters			*2,623.7*	*228.7*	*22.6*	*0*	*2,875.1*
Non-Wetland Waters	Open Water	POW	178.8	47.5	69.2	0	295.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	232.3	167.6	2.0	0	402.0
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*411.1*	*215.1*	*71.2*	*0*	*697.4*
Subtotal Wetland Waters and Non-Wetland Waters			*3,034.8*	*443.8*	*93.8*	*0*	*3,572.5*
Grand Total[1]			**3,167.0**	**743.7**	**125.6**	**0**	**4,036.4**

Note: [1] Table may not total precisely due to rounding.

Figure 30 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Laguna Watershed

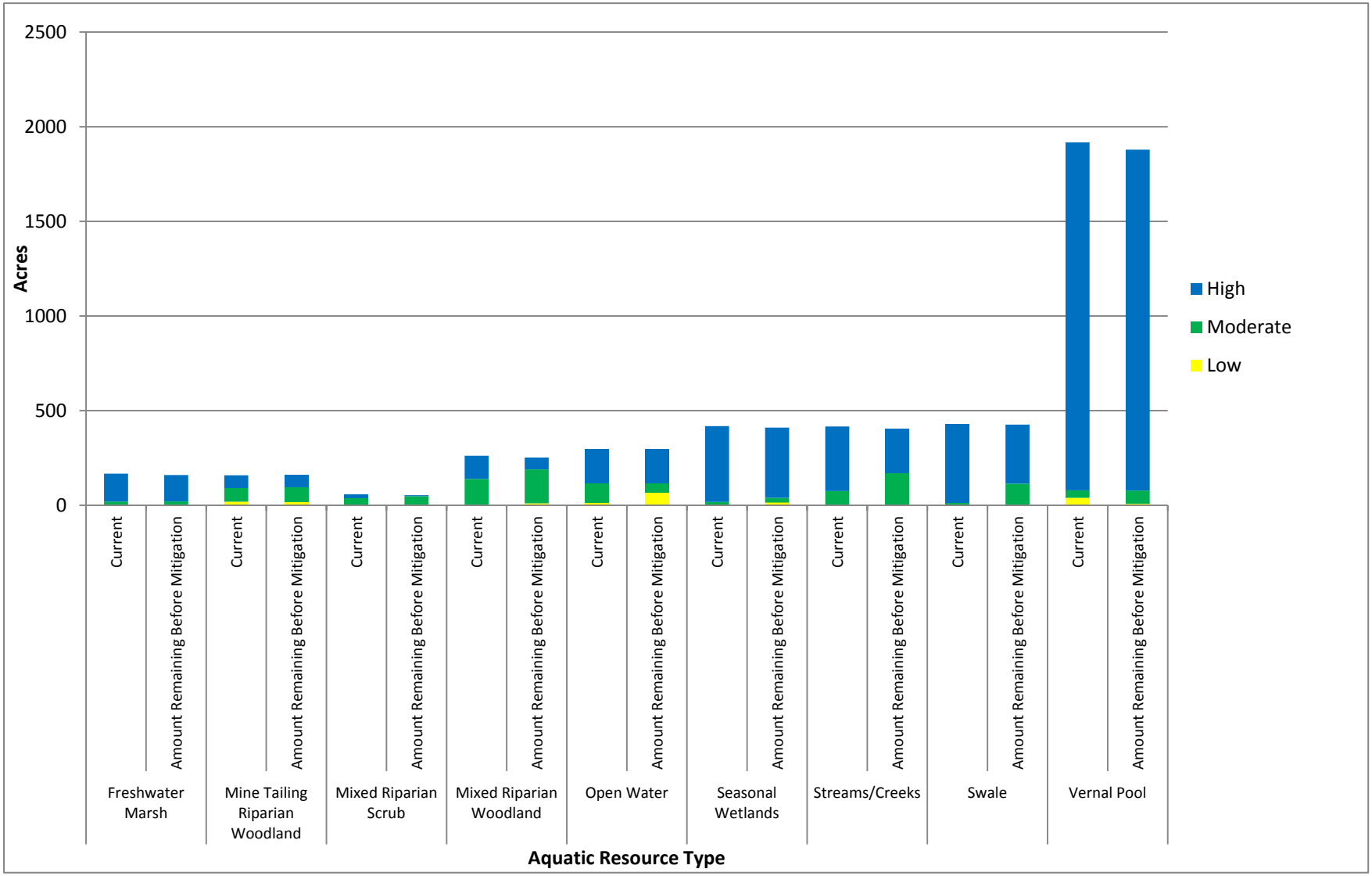


Table 19
Condition of Remaining Aquatic Resources in the Lower Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	17.3	0	0	17.3
	Mixed Riparian Scrub	R2/R3	137.5	122.8	7.4	0	267.7
	Mixed Riparian Woodland	R2/R3	352.6	1,264.0	243.4	0	1,859.9
Subtotal Riparian			*490.1*	*1,404.1*	*250.8*	*0*	*2,144.9*
Wetland Waters	Freshwater Marsh	PEM1	988.0	134.4	3.9	0	1,126.2
	Seasonal Wetland	PEM2	345.9	262.7	3.4	0	612.0
	Swale	R2/R3	99.4	41.0	1.2	0	141.6
	Vernal Pools	PEM2	335.6	230.7	38.1	0	604.5
Subtotal Wetland Waters			*1,768.9*	*668.8*	*46.6*	*0*	*2,484.30*
Non-Wetland Waters	Open Water	POW	31.6	270.5	360.9	0	663.0
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	133.2	203.4	2.0	0	338.6
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*164.8*	*473.9*	*362.9*	*0*	*1,001.6*
Subtotal Wetland Waters and Non-Wetland Waters			*1,933.70*	*1,142.70*	*409.5*	*0*	*3,485.90*
Grand Total[1]			**2,423.8**	**2,546.80**	**660.3**	**0**	**5,630.80**

Note: [1] Table may not total precisely due to rounding.

Figure 31 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed

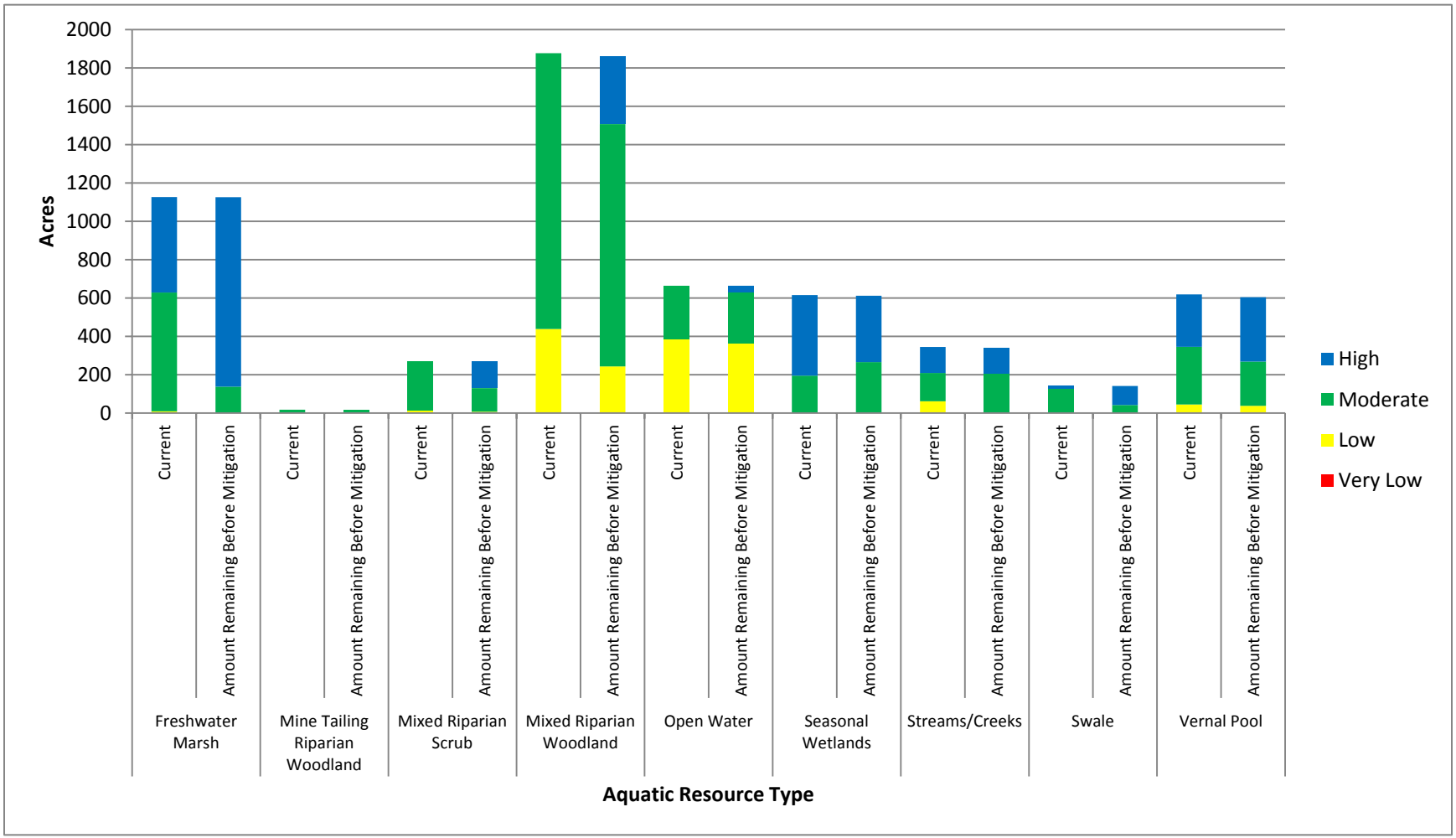


Table 20
Condition of Remaining Aquatic Resources in the Lower Dry Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	31.8	5.4	0	37.2
	Mixed Riparian Woodland	R2/R3	0	269.9	52.3	0	322.3
Subtotal Riparian			*0*	*301.7*	*57.7*	*0*	*359.5*
Wetland Waters	Freshwater Marsh	PEM1	16.4	26.5	2.2	0	45.0
	Seasonal Wetland	PEM2	71.8	39.3	4.3	0	115.4
	Swale	R2/R3	10.8	53.4	<0.1	0	64.3
	Vernal Pools	PEM2	103.0	88.2	2.1	0	193.3
Subtotal Wetland Waters			*202*	*207.4*	*8.6*	*0*	*418*
Non-Wetland Waters	Open Water	POW	0	6.6	1.9	0	8.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	16.6	55.9	3.3	0	75.7
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*16.6*	*62.5*	*5.2*	*0*	*84.1*
Subtotal Wetland and Non-Wetland Waters			*218.6*	*269.9*	*13.8*	*0*	*502.1*
Grand Total[1]			**218.6**	**571.6**	**71.5**	**0**	**861.6**

Note: [1] Table may not total precisely due to rounding.

Figure 32 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed

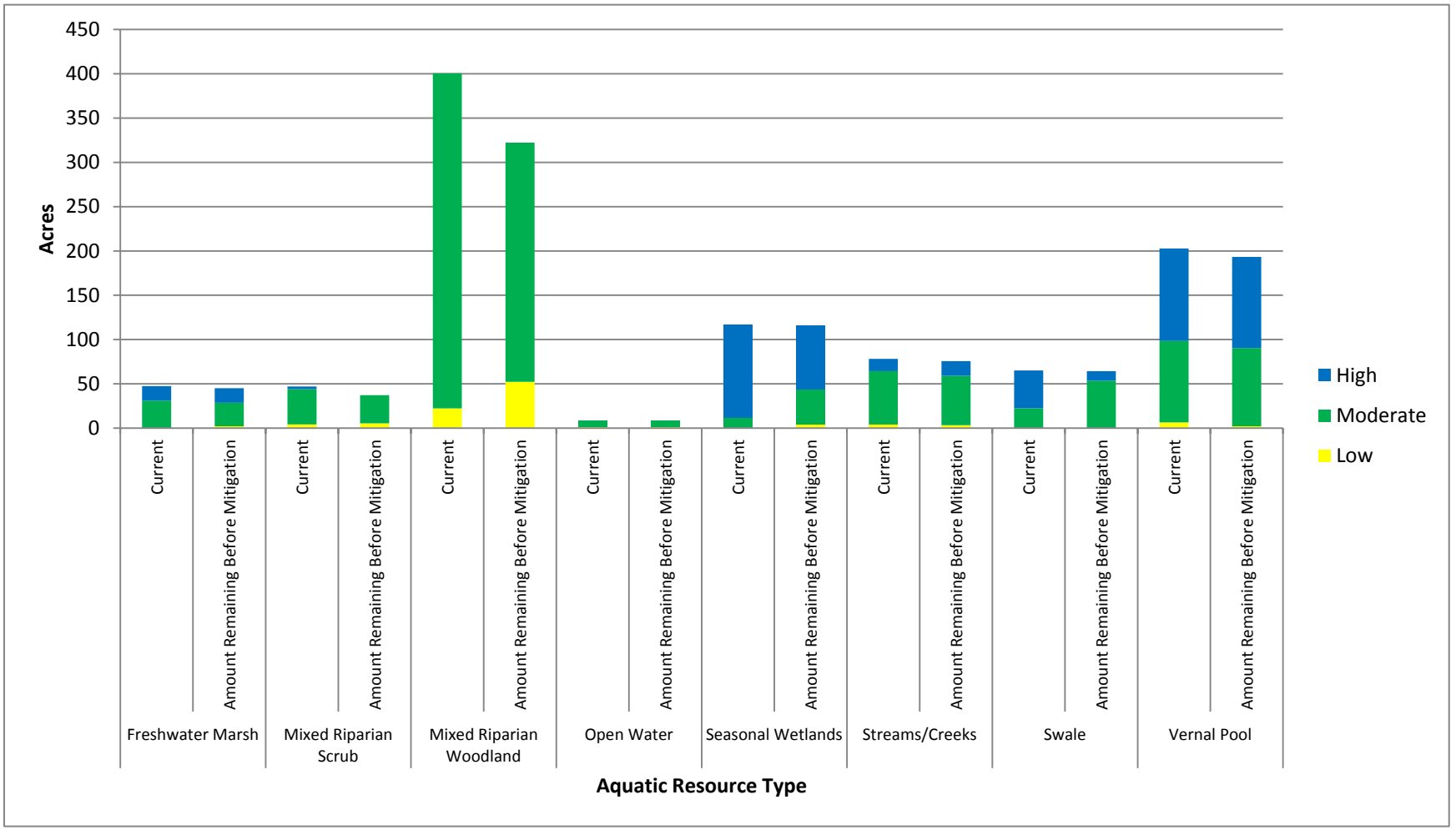


Table 21
Condition of Remaining Aquatic Resources in the Lower Mokelumne River Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	<0.1	2.4	0	2.4
	Mixed Riparian Woodland	R2/R3	0	14.0	182.2	0	196.2
Subtotal Riparian			*0*	*14*	*184.6*	*0*	*198.6*
Wetland Waters	Freshwater Marsh	PEM1	0	20.9	0	0	20.9
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swale	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0.1	0	0	0.1
Subtotal Wetland Waters			*0*	*21*	*0*	*0*	*21*
Non-Wetland Waters	Open Water	POW	0	0	3.1	0	3.1
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	65.1	2.2	0	67.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*65.1*	*5.3*	*0*	*70.5*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*86.1*	*5.3*	*0*	*91.5*
Grand Total[1]			**0**	**100.1**	**189.9**	**0**	**290.1**

Note: [1] Table may not total precisely due to rounding.

Figure 33 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Lower Mokelumne River Watershed

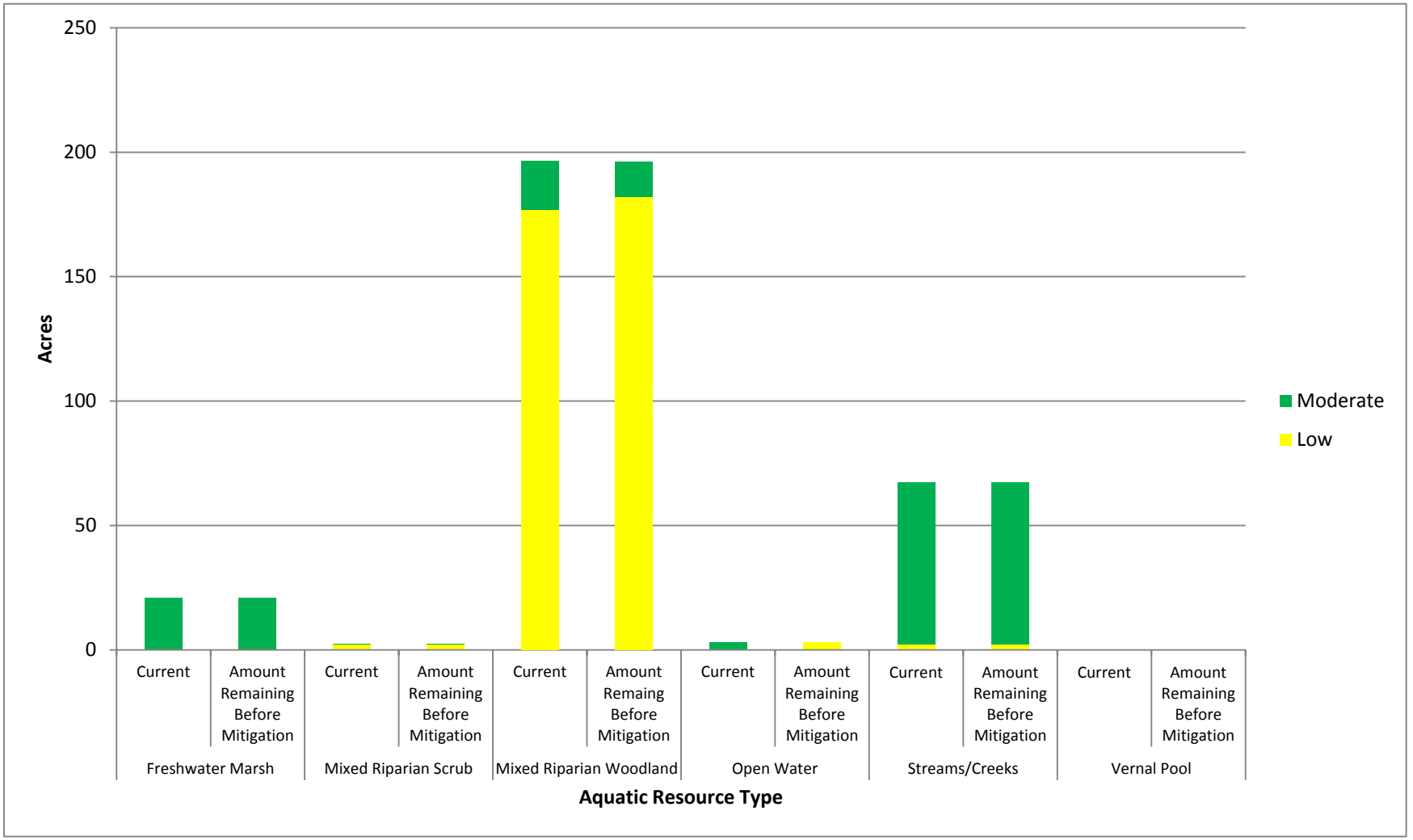


Table 22
Condition of Remaining Aquatic Resources in the Morrison Creek Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	1.6	0	1.6
	Mixed Riparian Scrub	R2/R3	3.2	11.2	6.3	0	20.7
	Mixed Riparian Woodland	R2/R3	0	54.5	48.1	0	102.6
Subtotal Riparian			*3.2*	*65.7*	*56.0*	*0*	*124.9*
Wetland Waters	Freshwater Marsh	PEM1	13.8	228.5	22.8	0	265.2
	Seasonal Wetland	PEM2	0	24.5	14.4	0	38.9
	Swale	R2/R3	16.8	158.5	20.6	0	195.9
	Vernal Pools	PEM2	283.7	183.6	13.9	0	481.2
Subtotal Wetland Waters			*314.3*	*595.1*	*71.7*	*0*	*981.2*
Non-Wetland Waters	Open Water	POW	0	19.4	59.0	0	78.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	30.2	35.2	0	65.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	30.8	4.7	0	35.6
Subtotal Non-Wetland Waters			*0*	*80.4*	*98.9*	*0*	*179.4*
Subtotal Wetland Waters and Non-Wetland Waters			*314.3*	*675.5*	*170.6*	*0*	*1,160.6*
Grand Total[1]			**317.5**	**741.2**	**226.6**	**0**	**1,285.5**

Note: [1] Table may not total precisely due to rounding.

Figure 34 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed

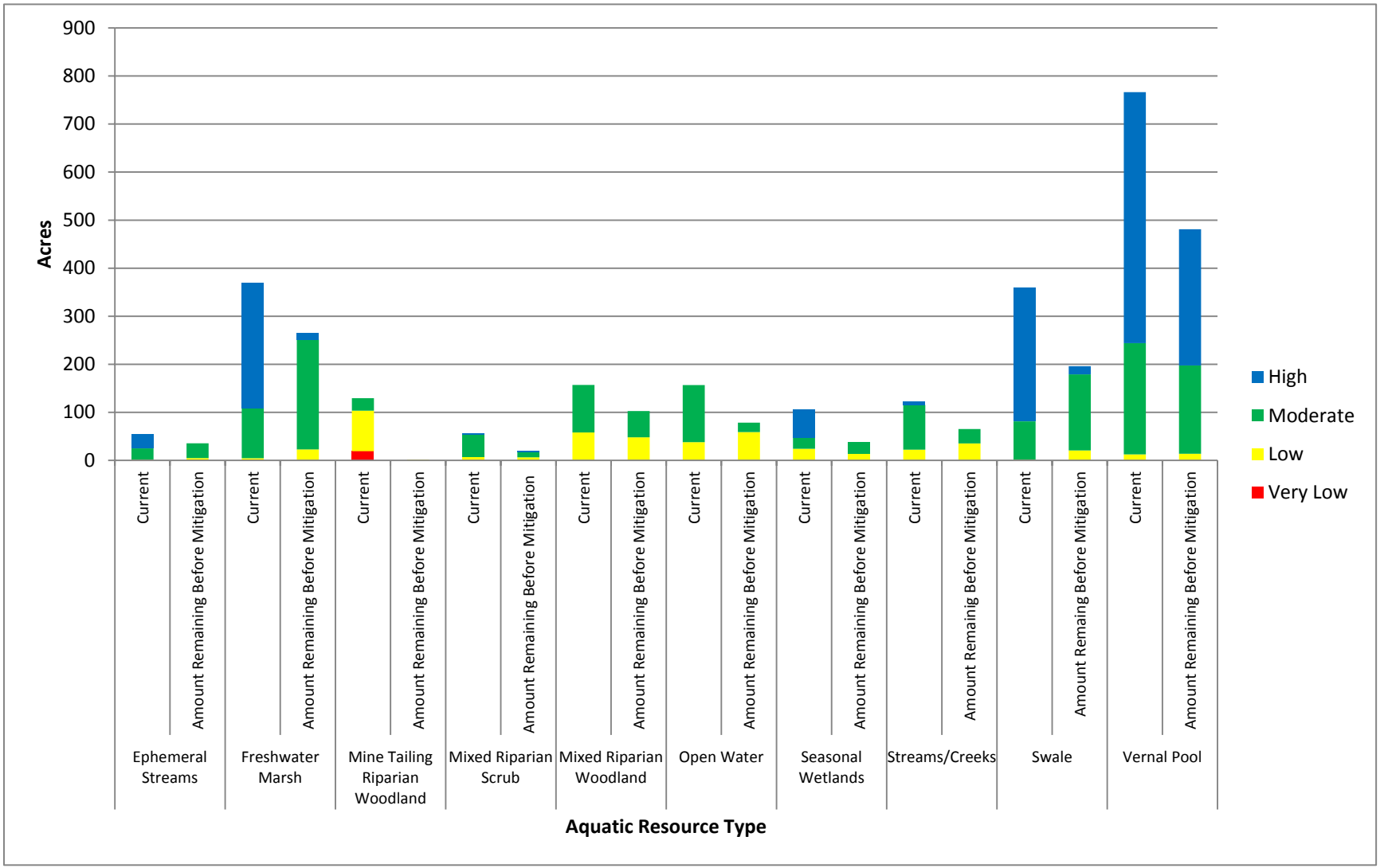


Table 23
Condition of Remaining Aquatic Resources in the Sherman Lake–Sacramento River Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0	120.8	5.4	126.2
	Mixed Riparian Woodland	R2/R3	0	0	41.2	6.7	48.0
Subtotal Riparian			*0*	*0*	*162.0*	*12.1*	*174.2*
Wetland Waters	Freshwater Marsh	PEM1	0	39.3	0	0	39.3
	Seasonal Wetland	PEM2	0	0	0	0	0
	Swale	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0	0	0	0
Subtotal Wetland Waters			*0*	*39.3*	*0*	*0*	*39.3*
Non-Wetland Waters	Open Water	POW	0	0	9.2	0	9.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3 UB	0	0.3	19.8	0	20.1
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*0.3*	*29.0*	*0*	*29.3*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*39.6*	*29.0*	*0*	*68.6*
Grand Total[1]			**0**	**39.6**	**191.0**	**12.1**	**242.8**

Note: [1] Table may not total precisely due to rounding.

Figure 35 **Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed**

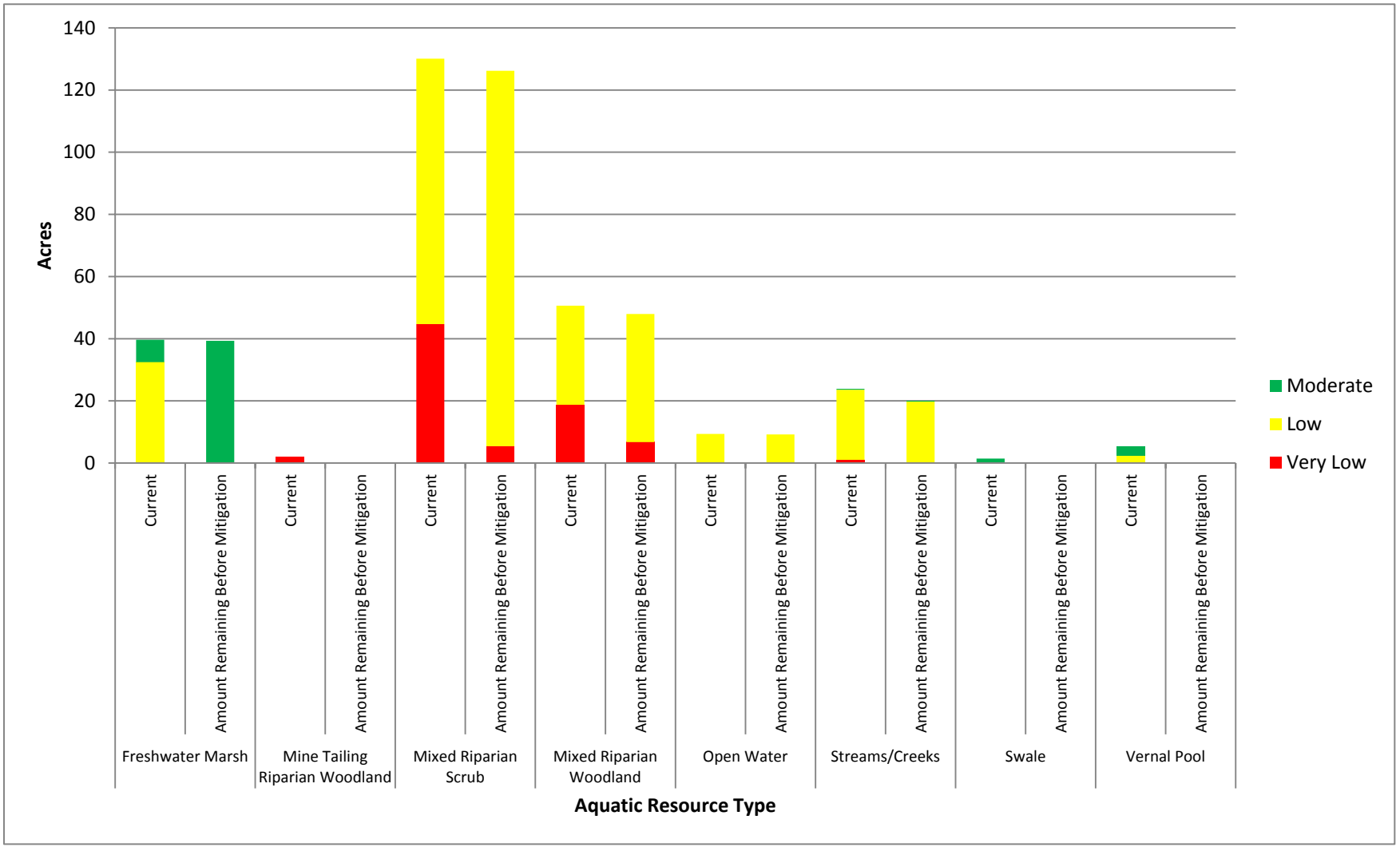


Table 24
Condition of Remaining Aquatic Resources in the Snodgrass Slough Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	350.7	176.9	0	527.5
	Mixed Riparian Woodland	R2/R3	0	488.1	802.5	0	1,290.6
Subtotal Riparian			*0*	*838.8*	*979.4*	*0*	*1818.1*
Wetland Waters	Freshwater Marsh	PEM1	0	871.7	150.7	0	1,022.4
	Seasonal Wetland	PEM2	0	590.8	184.5	0	775.2
	Swale	R2/R3	0	6.6	2.5	0	9.1
	Vernal Pools	PEM2	0	408.9	7.0	0	415.9
Subtotal Wetland Waters			*0*	*1,878.0*	*344.7*	*0*	*2,222.6*
Non-Wetland Waters	Open Water	POW	0	389.9	313.8	15.5	719.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	22.1	1,013.8	86.9	0	1,122.8
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	350.7	176.9	0	527.5
Subtotal Non-Wetland Waters			*22.1*	*1,754.4*	*577.6*	*15.5*	*2,369.5*
Subtotal Wetland Waters and Non-Wetland Waters			*22.1*	*3,632.4*	*922.3*	*15.5*	*4,592.1*
Grand Total[1]			**22.1**	**4,471.2**	**1,901.7**	**15.5**	**6,410.2**

Note: [1] Table may not total precisely due to rounding.

Figure 36 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed

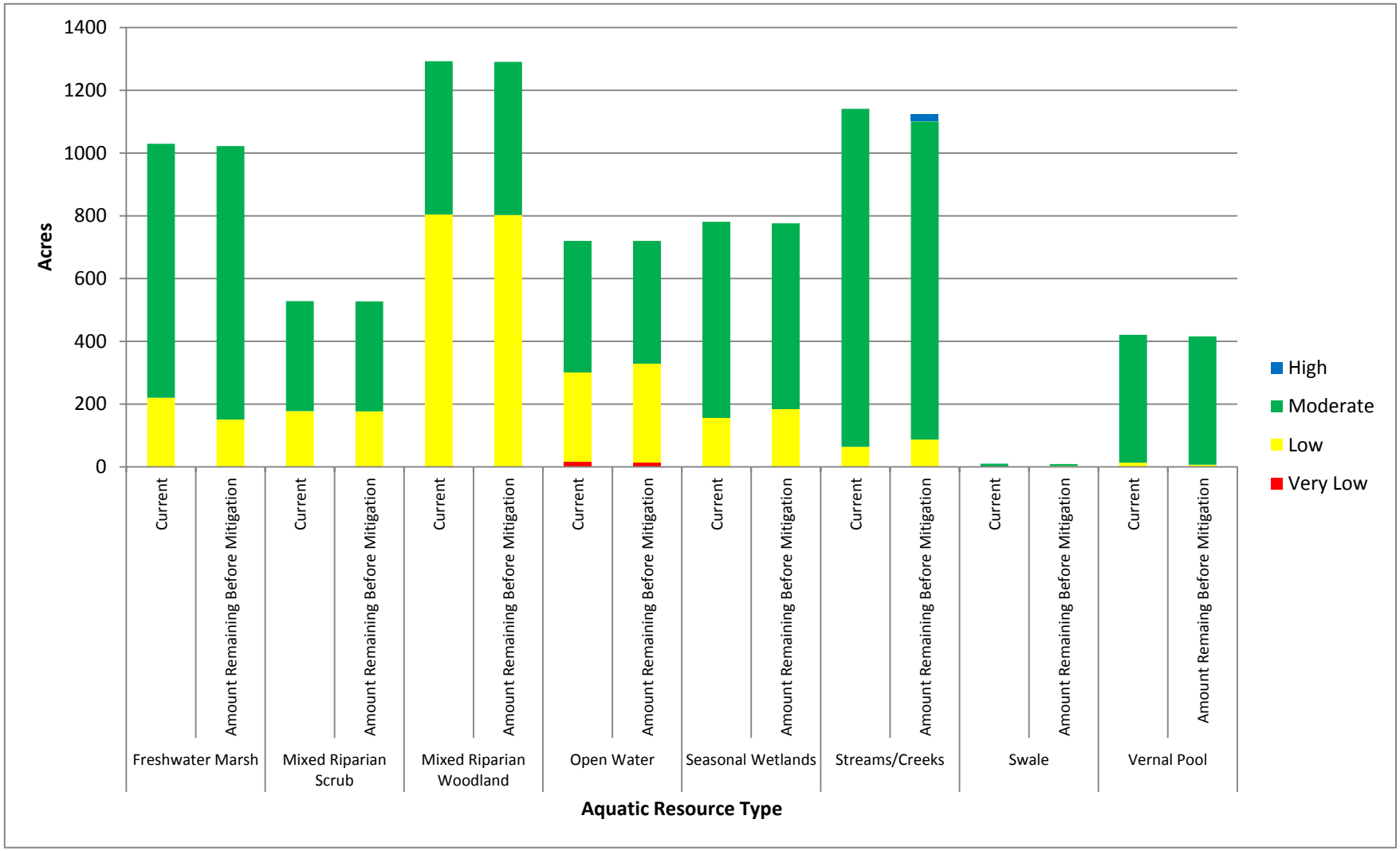


Table 25
Condition of Remaining Aquatic Resources in the Upper Cosumnes Watershed After Impacts and Before Accounting for Compensatory Mitigation

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total (acres)
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.2	148.7	29.7	0	245.5
	Mixed Riparian Scrub	R2/R3	31.8	67.9	0	0	99.7
	Mixed Riparian Woodland	R2/R3	355.6	368.1	4.0	0	727.7
Subtotal Riparian			*454.6*	*584.7*	*33.7*	*0*	*1,072.9*
Wetland Waters	Freshwater Marsh	PEM1	87.8	22.6	1.3	0	111.7
	Seasonal Wetland	PEM2	360.2	42.7	5.7	0	408.6
	Swale	R2/R3	65.5	14.6	0.3	0	80.5
	Vernal Pools	PEM2	281.0	37.2	3.4	0	321.6
Subtotal Wetland Waters			*794.5*	*117.1*	*10.7*	*0*	*922.4*
Non-Wetland Waters	Open Water	POW	133.8	65.6	80.7	0	280.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	175.6	172.6	0.4	0	348.6
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*309.4*	*238.2*	*81.1*	*0*	*628.8*
Subtotal Wetland Waters and Non-Wetland Waters			*1,103.9*	*355.3*	*91.8*	*0*	*1,551.2*
Grand Total[1]			**1,558.5**	**940.0**	**125.5**	**0**	**2,624.1**

Note: [1] Table may not total precisely due to rounding.

Figure 37 Existing and Post-Impact Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed

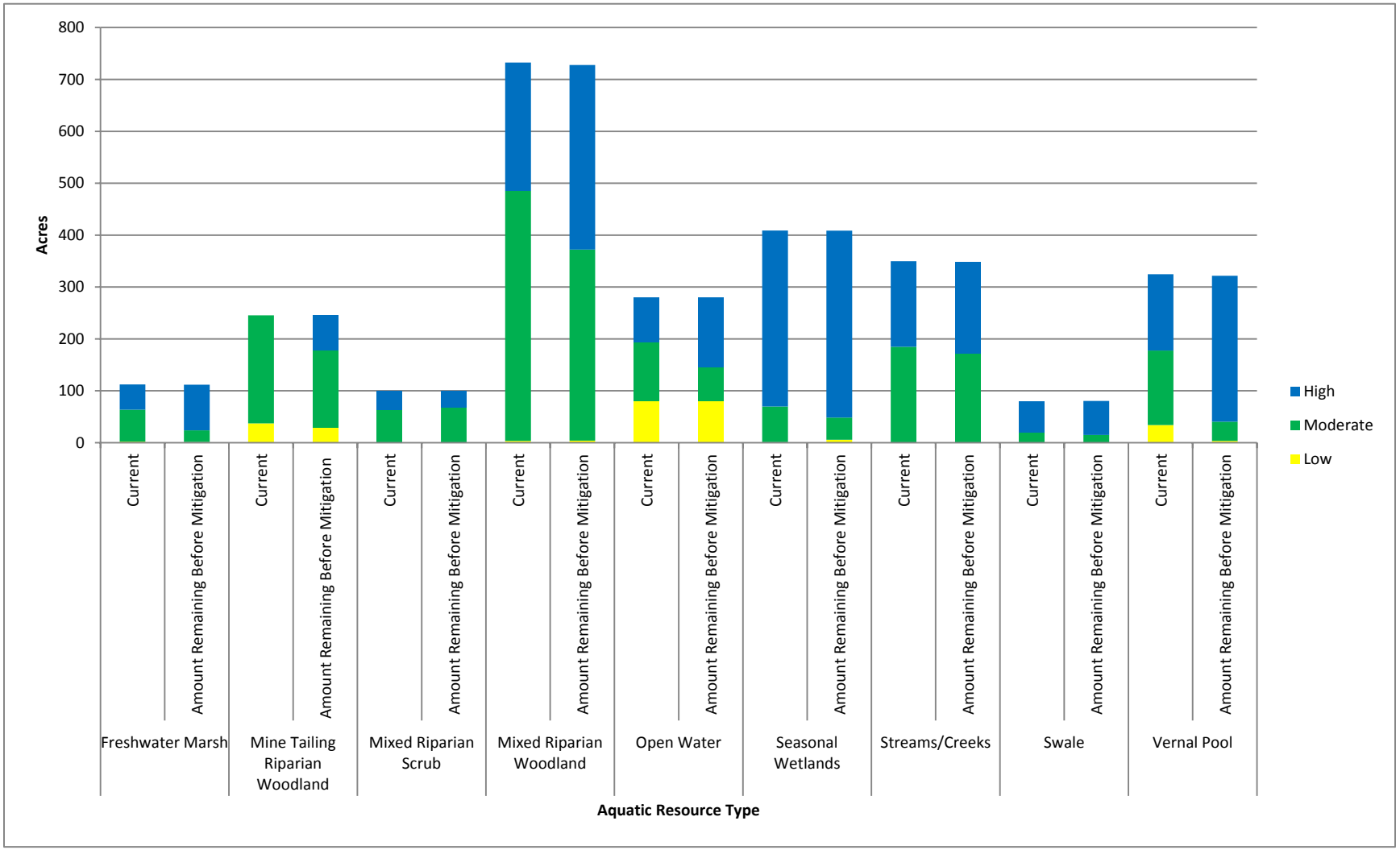


Table 26
Mather Core Recovery Area Existing and Post-Impact Vernal Pool Conditions (Acres)

Condition	High	Moderate	Low	Very Low	Total
Current	525.0	181.4	1.2	0	707.6
Remaining	425.2	144.5	0.5	0	570.1

In summary, the predicted impacts resulting from the SSHCP, prior to considering compensatory mitigation, show an impact on the abundance of aquatic resources. The diversity and condition of the resources largely remain intact, as none of the aquatic resource types are disproportionately impacted within the Plan Area, and the amount of high condition resources remains stable.

5 MITIGATION FRAMEWORK FOR AQUATIC RESOURCES

5.1 Mitigation Overview

The SSHCP and ARP would establish a network of conservation areas in the Plan Area that would preserve sensitive species and their natural communities in perpetuity. Preservation of these natural communities includes many types of waters of the United States and waters of the state, riparian buffer areas, and adjacent upland areas. The SSHCP Conservation Strategy would be an integral part of a more efficient regulatory permitting process implemented over a 50-year period. This more efficient permitting process implements a watershed perspective applied to a regional approach to avoidance, minimization, and compensatory mitigation for impacts to waters of the United States and waters of the state. This efficient permitting process would be different from the conventional permit-by-permit review process because it combines the mandates of the ESA with mandates of Section 404 of the CWA to allow for the formation of a singular, comprehensive state and federal regulatory framework for future projects that implements a more efficient permitting process for better decision-making and greater environmental benefits. It allows the regulated public the ability to comply as a whole and contribute to the overall larger SSHCP Conservation Strategy. It is envisioned that the alternative selected for the SSHCP would provide the greatest amount of avoidance and minimization at a regional level for 404 purposes. This approach would follow a process of landscape-level and project-level AMMs. These AMMs would be monitored during project implementation to assure they provide regional consistency across the Plan Area, and would be instrumental as a supporting basis for the SSHCP and ARP to avoid and minimize impacts to aquatic resources to the greatest extent practicable. It would also direct compensatory mitigation, when required, to be integrated on a watershed basis into a comprehensive system of larger, integrated and connected conservation areas. The SSHCP Conservation Strategy and associated state and federal regulatory framework approach would be superior to the existing permitting framework because it would pursue procedural goals that seek to reduce the likelihood of fragmentation of important landscapes, including aquatic resources, mixed into a matrix of urban development when administered over a 50-year period.

The Section 404(b)(1) Guidelines (40 CFR Part 230) require that all Department of the Army permits subject to Section 404 of the CWA comply with a strict sequencing approach: all appropriate and practical steps to avoid and minimize adverse impacts to waters of the United States must be taken before a permit can be issued by USACE. Additionally, compensatory mitigation for unavoidable impacts may be required to ensure that an activity requiring a CWA Section 404 permit complies with the 404(b)(1) Guidelines. The SSHCP would provide the regulated public access to greater environmental permitting certainty for development projects, while implementing a Conservation Strategy that incorporates a watershed-based approach. This is accomplished by achieving each of the stated SSHCP Biological Goals and Measureable

Objectives and conservation measures, including establishing a network of preserves with high-value resources while still providing for development. Under this strategy, the SSHCP and ARP are intended to protect watershed integrity, provide and maintain natural corridors, produce ample blocks of contiguous habitat, and provide necessary buffers for these natural areas. From a project-level standpoint, avoidance and minimization of impacts to aquatic resources by the regulated public would be consistent, robustly implemented, and would be subject to a comprehensive set of AMMs, including low-impact development (LID), best management practices (BMPs), siting and design requirements, Stream Setbacks, and Preserve Setbacks. All of the Covered Activity AMMs and the other components of the SSHCP Conservation Strategy synergistically combine to ensure maintenance of current functions and services within the Plan Area and provide avoidance and protection of thousands of acres of regulated aquatic resources and important habitats (see Section 5.4 in Chapter 5 of the SSHCP). Furthermore, compensatory mitigation for Covered Activity impacts to aquatic resources authorized under the SSHCP and ARP would be considered by using a watershed approach. The USACE/EPA "Mitigation Rule" requires the use of a watershed approach to the extent appropriate and practicable, stating "The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites" (33 CFR 332.3[c]). The SSHCP and ARP would be consistent with the Mitigation Rule, by systematically prioritizing compensatory mitigation projects based on anticipated impacts to aquatic resources, considering both watershed- and function-based factors, and pursuant to the type (e.g., mitigation bank) and location preference hierarchy identified in the 2008 Mitigation Rule at 33 CFR 332.3(b)(2) through (b)(6). However, the preference hierarchy may be overridden where appropriate, for instance when the required compensatory mitigation involves larger, more ecologically valuable parcels; is subject to more rigorous scientific and technical analysis, planning, and implementation; involves advanced site identification and planning; and utilizes significant investment of financial resources for sites located to successfully replace lost functions and services, taking into account such watershed-scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, trends in land use, ecological benefits, compatibility with adjacent land uses; and in general, when practicable, to meet the aforementioned considerations in the same watershed.

5.2 Avoidance and Minimization

5.2.1 Landscape-Scale Avoidance

The Plan Area contains two specific regions: the UDA, where local jurisdictions anticipate urban growth and lands outside the UDA, which includes agricultural land and natural landscapes with natural intact sources of surface and sub-surface water influx and outflow (described in greater detail in Appendix A, Watershed Study for the SSHCP and ARP). The lands outside the UDA already include several large areas of conservation lands (described in Section 7.2.2 of the

SSHCP). Preservation and management requirements inside the UDA would differ from those outside the UDA because the areas adjacent to these Preserves would have very different land uses. However, the ARP (through implementation of the SSHCP by the Plan Permittees) would implement a comprehensive strategy to protect the functions and services of watersheds in the Plan Area. The strategy begins with avoidance and minimization of impacts to aquatic resources at a landscape scale using a watershed-based approach for the overall Plan Area.

The Plan Area aquatic resources avoidance strategy would be built upon AMMs, LID measures, and a framework of existing and proposed preserves and linkages. Implementation of these measures would achieve the SSHCP goals and objectives for vernal pools, maximize protection of intact hydrologic sub-basins, establish stream corridors and setbacks, protect aquatic resources, and connect existing preserves to proposed preserves. The Preserve System would implement avoidance, protection, and ultimately include a vast network of thousands of acres of vernal pool systems, seasonal wetlands, streams, adjacent riparian zones, grasslands and other ecologically important areas where further development of the watershed would not occur.

The vernal pool habitat Conservation Strategy was based in part upon a Vernal Wetland Acre/Density Index (VWADI) (Dittes et al. 2007) that described and classified the vernal pool complexes within the Plan Area (see Section 5.2, Appendix B-1 and Appendix B-2). The VWADI is based on variation in vernal pool acreage and density. Plan Area vernal pools were classified according to the VWADI into five categories of conservation value, with the highest conservation value placed on high-density vernal pool complexes (most wetted acres with densest vernal pool complexes and largest number of pools). Those vernal pool complexes with the highest conservation value scores were considered during the development of the SSHCP Conservation Strategy and the conceptual design of the SSHCP Preserve System described in SSHCP Section 7.5. The VWADI should not be confused with the FCAM described in Appendix C. While both processes were used to help determine which areas within the Plan Area have the highest-quality vernal pool resources, the VWADI was used to inform the SSHCP Conservation Strategy as it relates to the preservation of vernal pool resources primarily for the protection of endangered species. The FCAM was developed to evaluate all aquatic resource classifications, not just vernal pool, and to include measurements of value for habitat, water quality and hydrology. The VWADI and FCAM are independent of one another, but are complementary and both are used to direct conservation actions for vernal pool ecosystem conservation.

The result of SSHCP implementation would be a net gain of aquatic resources functions and services in the Plan Area, which is depicted in the ARP's pre- and post-watershed profiles (see Chapter 6). Implementation of the SSHCP's comprehensive balanced approach to aquatic resource conservation can provide a greater level of landscape- and watershed-scale protection of aquatic resources than is possible via the conventional project-by-project permitting approach under the CWA Sections 404 and 401, and the California Fish and Game Code 1600 programs.

5.2.1.1 Landscape-Scale Avoidance within the UDA Watersheds

Landscape-scale avoidance within the UDA watersheds would be implemented to include protection of wetlands and streams to minimize adverse effects from the construction of new impervious surfaces. Within the UDA, sufficient sub-watershed areas would be protected via a system of AMMs during project design and development, so that natural sources of surface and sub-surface water influx and outflow remain intact, and potential development-related increases in impervious surfaces, runoff, and sources of water pollution are avoided or minimized (e.g., runoff from roads, roofs, paved surfaces, utility pipes, landscaped areas). Landscape-scale avoidance within the UDA watersheds would involve implementation of Stream Setbacks, protection of wetlands adjacent to streams, and LID measures that would be incorporated into urban development project design (as described in the SSHCP in Chapter 5). Implementation of landscape-scale avoidance strategies on 6,941 acres of land within the UDA watersheds would mitigate negative impacts to water quality and surface water runoff that could occur with urban development.

Three HUC-10 sub-watersheds occur within the UDA (Morrison Creek, American River, and Sherman Lake–Sacramento River). For first- and second-order streams[6] that flow through the UDA, a 25-foot setback buffer on either side would be enforced. The primary objective of this 25-foot buffer is to reduce sediment and nutrient inputs from surface flows in urban areas to protect water quality and habitat downstream. Dense urban adjacent land covers provide low habitat potential for Covered Species; however, a minimal buffer would reduce sediment and nutrient inputs, retain some potential for stream restoration, and provide recreational opportunities. For Morrison Creek, Gerber Creek, and Elder Creek, a Stream Setback of 100 feet on either side would be enforced. For preserve linkages that include creeks or streams, avoidance measures would include the creek or stream plus a minimum 300-foot setback on either side of the creek (in accordance with the process outlined in the SSHCP in Chapter 5, Section 5.6). The protective setback from Laguna Creek would be 150 feet wide on either side.

The SSHCP would require a robust strategy of avoidance of aquatic resources for Covered Activity projects proposed in the UDA. Project proponents who seek incidental take coverage under the SSHCP would be required by Land Use Authority Permittees or the Implementing Entity, whoever has jurisdiction over the project, to demonstrate efforts that avoid direct and indirect impacts to mapped aquatic resources pursuant to a Determination of Environmentally Equivalent or Superior Alternative (DEESA) project design requirement (see Section 5.2.2.1). Complete avoidance would be selected, if practicable. Part of the SSHCP stream mitigation policy within the UDA involves comprehensive landscape-scale avoidance of streams. Stream

[6] The SSHCP uses the Strahler stream order system where stream order is based on hierarchy of tributaries.

buffer widths within UDA watersheds were developed to meet adequate stream protection with goals such as: stabilize streambanks with vegetation; reduce erosion by uncontrolled runoff; reduce nutrient, sediments, and other contaminants loads; provide a visually appealing greenbelt; and provide recreational opportunities.

5.2.1.2 Avoidance and Preserve Assembly within Watersheds Outside UDA

The SSHCP Preserve Assembly sets goals that would preserve and link the highest-quality natural land covers, cropland, and irrigated pasture-grassland within the Plan Area (described in detail in the SSHCP in Chapter 7, Section 7.2.2.1), with a Preserve System 36,282 acres in size, and 27,554 acres of which would be located outside the UDA. Avoidance and minimization of aquatic resources would be accomplished through preserve design and assembly, which includes protecting the rarest types and highest-functioning aquatic resources (e.g., vernal pools, streams, certain seasonal wetlands) and implementing inter-preserve connectivity. The SSHCP Preserve System would be designed to protect watershed function, and specifically hydrologic regimes. This preserve design would be important to aquatic resources and water quality and its many existing and potential beneficial uses, and an important determinant of certain aquatic resource-dependent/associated plants and wildlife. It would also be designed to preserve natural upland landscapes associated with streams and wetland features for maintaining aquatic resource dependent/associated species—a strategy of primary importance. Upland landscapes adjacent to aquatic resources provide greater environmental benefits to aquatic functions and services and become another advantage to the overall avoidance and protection package of the SSHCP Conservation Strategy.

5.2.1.3 AMMs at the Landscape Scale

The SSHCP contains numerous requirements for avoidance and minimization of adverse impacts to aquatic resources. At a landscape scale, the SSHCP provides a framework for supporting avoidance and minimization of adverse impacts to aquatic resources in combination with a systematic landscape-level compensatory mitigation strategy. The SSHCP Conservation Strategy and Goal 2 of the associated Biological Goals and Measureable Objectives (SSHCP Chapter 7) describe requirements for implementing Covered Activities under the SSHCP.

The framework of requirements constituting the SSHCP's regional/landscape avoidance strategy include, but are not limited to, the following measures:

- Consistent with the USB and sphere of influence boundaries, directing impacts within the 317,655-acre Plan Area to an approximate 33,497-acre impact area, 32,059 acres of which would be inside the UDA and 1,448 acres of which would be outside the UDA.

The envelope is linked to areas within the UDA and certain pre-defined infrastructure projects outside of the UDA.

- Considering watershed needs within the Plan Area, habitat/biological functions have been found to be of primary importance to protect, while still preserving water quality and hydrology (chemical and physical functions). The SSHCP and ARP include the following components, which result in landscape-level avoidance of 22,502 acres of existing aquatic resources in the Plan Area:
    - Preservation into perpetuity of 15% (3,539 acres) of the Plan Area's existing potentially jurisdictional aquatic resources within the 36,282-acre Preserve System. The areas selected for avoidance under the SSHCP must be those that demonstrate higher habitat functions, per the Conservation Actions included in Table 7-1 in Chapter 7 of the SSHCP. However, most of the aquatic resources with high habitat functions also have high water quality and hydrology functions. Aquatic resources situated within proposed preserves are also afforded extra protection via adjacent natural upland buffers (i.e., the Preserve Setbacks) of a minimum of 50 feet in width (minimum 25 feet each side of the stream) to reduce edge effects. Note that 9,136 acres (38%) of aquatic resources in the Plan Area are already protected in existing preserves, which would become linked together by new preserves established under the SSHCP Conservation Strategy.
    - Of the other 11,419 acres of existing potentially jurisdictional aquatic resources in the Plan Area, approximately 9,827 acres (86%) would *not* be directly impacted by Covered Activities.
- Goal 2 of the SSHCP Conservation Strategy includes a Measureable Objective requiring avoidance of creeks in the UDA (a minimum of 10% avoidance required). However, the Plan would actually avoid 30% of all creek acreage in the UDA.
- Requirement for project proponents to establish Stream Setbacks. Avoided creeks (including ephemeral streams) would have minimum setback requirements based on specific objectives of the overall mitigation strategy (Table 27).

Table 27
Stream Setback Minimum Requirements in the UDA

Stream	Minimum Setback on Each Side (from the Top of Bank Measured in Aerial Perspective)
Laguna Creek	150 feet
Elder Creek	100 feet
Frye Creek	100 feet or as depicted as part of the NewBridge development project hardline Preserve (see Appendix K of the SSHCP)
Gerber Creek	100 feet
Morrison Creek	100 feet

Table 27
Stream Setback Minimum Requirements in the UDA

Stream	Minimum Setback on Each Side (from the Top of Bank Measured in Aerial Perspective)
Central Paseo	100 feet or as depicted as part of the Cordova Hills development project hardline Preserve (Appendix K of the SSHCP)
Sun Creek	100 feet or as depicted as part of the Sun Creek development project hardline Preserve (see Appendix K of the SSHCP)
Avoided 1st and 2nd Order Tributaries to Above Streams	25 feet

- Roadway construction or widening Covered Activities within the Plan Area would be subject to stream avoidance or minimization requirements (see AMMs ROAD-1, STREAM-1, STREAM-2, STREAM-3, STREAM-4, and STREAM-5 in SSHCP Section 5.4).
- The majority (55%) of impacts to vernal pools would occur outside the Mather Core Recovery Area. Vernal pool preservation, re-establishment, and establishment would be heavily weighted toward areas inside the Mather Core Recovery Area and the Cosumnes/Rancho Seco Core Recovery Area. The SSHCP would establish large and interconnected preserves in these Recovery Areas to protect a contiguous network of vernal pool habitat. Existing project-by-project permitting tends to result in a larger number of preserved pools, but ones that are isolated and more vulnerable to edge effects. In this way, the SSHCP would provide superior benefits to a rare aquatic resource as compared to a project-by-project permitting approach.
- On-site project requirements to maintain hydrologic conditions, minimize effects on downstream hydrology through stormwater retention and other measures (LID), mandatory construction monitoring near Covered Species aquatic habitat, and mandatory implementation of erosion control measures during project construction "scale up" such that the overall Plan Area would not experience a net loss of aquatic resources functions and services.
- Compensatory mitigation Covered Activities (re-establishment, establishment, preservation of aquatic resources) would be strategically located within the preserved areas where they would provide maximum functional gain. This would occur programmatically within the Plan Area. This singular approach to compensatory mitigation is better than could be achieved by a project-by-project permitting approach.
- The USACE's General Permit (GP) general conditions and any updates to those conditions would be proposed to require compliance with appropriate SSHCP AMMs and be tailored for protection of the aquatic resources in the Plan Area.

- The Plan Permittees have requested that the USACE develop a GP(s) (RGP/PGP) that would propose a per-project impact thresholds (caps), which in addition to assuring minimal individual and cumulative environmental impacts, would provide incentive for individuals and organizations to avoid aquatic resources in project planning, in order to qualify for using a GP(s) (see Chapter 7).
- The proposed RGP/PGP may also require overall impact threshold caps to limit the overall amount of direct impacts (loss) of aquatic resources during any single 5-year span of the GP(s) so that impacts to aquatic resources can be monitored and adaptive management can be implemented as necessary.
- For impacts within the UDA, caps would be tailored to address protection of streams as they are crucial to implementation of corridors in the SSHCP Preserve System. As such, a minimum of 20% of first and second order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek in the UDA would be avoided. Plan-wide, 90% of all streams would be avoided, and outside the UDA, all headwaters would be avoided.

AMMs applied across the entire Plan Area would quicken the permitting process for Covered Activities and would allow the regulated public as a whole to contribute to the implementation of the overall avoidance and minimization of aquatic resources within the development envelope and the formation of a large, connected conservation system. Such outcomes would not be possible under the project-by-project review process.

5.2.2 Project Scale

5.2.2.1 AMMs at the Project Scale

In addition to ensuring avoidance and minimization at a landscape scale, the SSHCP and ARP also require project-scale avoidance and minimization. Goal 2 of the SSHCP Conservation Strategy Biological Goals and Measurable Objectives is to "Maintain or improve physical, chemical and biological functions of aquatic resources within the Plan Area." Each project proposed within the Plan Area would need to conform to the following procedure to ensure that adequate avoidance and minimization requirements have been met.

As Covered Activity projects are proposed within the Plan Area, an assessment of the potential on-site effects of those Covered Activity projects on aquatic resources shall be performed using available information supplied by the SSHCP and ARP, augmented by project-specific mapping provided to and reviewed by the Plan Permittees prior to submittal to the USACE, RWQCB, and CDFW (see Section 10.4.3.3 in Chapter 10 of the SSHCP).

The documentation for the project-scale assessment shall include mapping (which for greatest accuracy in informing project-scale AMMs is suggested to utilize a project's aquatic resources delineation mapping prepared in accordance with the Sacramento District USACE's minimum standards for aquatic resources delineations), and a description of the functions and services of the mapped areas' aquatic resources. Factors to be considered to describe the functions and services include hydrologic regime, flood storage and flood flow modification, nutrient retention and transformation, sediment trapping and transport, toxicant trapping, and maintenance of plant and animal communities. Many of these factors would already have been given consideration, and existing information from the SSHCP and ARP can be utilized and augmented if necessary. The functions and services assessment would focus on the current functions and services being provided, particularly for those areas that should be considered for priority acquisition for the SSHCP Preserve System, as well as those functions that may affect aquatic resource diversity, abundance, and condition; and/or conservation of Covered Species within the SSHCP Preserve System.

For aquatic resources proposed to be impacted, applicable mitigation shall be required by the Plan Permittees, as follows. To ensure that these standards are met, Land Use Authority Permittees or the Implementing Entity, depending on who has jurisdiction over the project, shall require that project proponents develop on-site project alternatives demonstrating efforts that first avoid, and then minimize direct and indirect effects to the aquatic resources mapped pursuant to this section. A complete on-site avoidance alternative shall be selected by the Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, and if practicable, while taking into account the SSHCP and ARP Conservation Strategy.

If a complete avoidance alternative is not practicable as determined by the Implementing Entity or Land Use Authority Permittees, depending on who has land use jurisdiction over the project, an alternative that minimizes direct and indirect impacts to aquatic resources and associated functions and services to the greatest extent practicable shall be selected. Those impacts that are unavoidable shall be mitigated (minimized and compensated) such that the lost functions and services are replaced as set forth below under the DEESA.

Determination of Environmentally Equivalent or Superior Alternative

Consistent with the regional Conservation Strategy of the SSHCP, the following is an approach that gives consideration to on-site avoidance and minimization. The guiding principles for the SSHCP Conservation Strategy (Section 7.1 of Chapter 7 of the SSHCP) emphasize establishment of large and interconnected preserves, which is not compatible with the typical approach of on-site avoidance. That existing approach tends to result in many small, isolated aquatic resources that are subject to edge effects and provide reduced habitat value compared to large preserves. If a complete avoidance alternative is not practicable and an alternative is selected as set forth

above, a DEESA shall be made by the Land Use Authority Permittees or the Implementing Entity, depending on who has land use jurisdiction over the project, to ensure replacement of any lost functions and services to aquatic resources. The DEESA shall be submitted with the Project Application and shall include the following information to be supplied by the proponent and reviewed by the Land Use Authority Permittees or the Implementing Entity, depending on who has jurisdiction over the project, for accuracy and consistency with the SSHCP and ARP:

- A defined project area boundary and project area acreage.
- A detailed project description, including an overall project purpose statement, that demonstrates: (1) why an avoidance alternative is not practicable;[7] and (2) that the Covered Activity project minimizes direct and indirect effects to aquatic resources to the greatest extent practicable. This description would include information regarding any aquatic resources on site that are proposed to be avoided. It would also include information regarding any impacted aquatic resources in the context of the regional Conservation Strategy of the SSHCP (e.g., a statement that the project proposal is consistent with the requirements of the SSHCP and any terms and conditions of the SSHCP ITPs).
- Amount (acres and linear feet and cubic yards) of unavoidable impacts (permanent, causing loss of waters, and temporary) to aquatic resources associated with the project, and amount of indirect impacts.
- A detailed description of project design features and mitigation measures that reduce impacts, including but not limited to, impact minimization; on-site first-order stream realignment (as opposed to removal); and SSHCP BMPs, AMMs, and LID AMMs.
- A description and amount of SSHCP-required compensatory mitigation through re-establishment, establishment, and/or preservation. Compensatory mitigation must conform to the SSHCP Conservation Strategy and the minimum mitigation ratios required by the ARP and must be consistent with the USACE/EPA Mitigation Rule (33 CFR Part 332). The primary way development project Covered Activities would accomplish the required mitigation is the purchase of credits from an ILF program that would be used for the Plan Area. (See Section 5.3 for specific compensatory mitigation requirements.)

[7] Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose.

- A finding that demonstrates that although the proposed Covered Activity project would not completely avoid impacts to aquatic resources, with proposed design and compensation measures, the project would be environmentally equivalent or superior to that which would occur under a complete avoidance alternative without these measures, based on one or more of the following factors:
    - Effects on designated Critical Habitat and Core Recovery Areas
    - Effects on the diversity of aquatic resources within the Plan Area
    - Effects on vernal pool and other habitat connectivity and function of the SSHCP Preserve System
    - Effects on the condition of aquatic resources within the Plan Area
    - Effects on the abundance of aquatic resources within the Plan Area
    - Effects on Covered Species.

A written record of DEESAs shall be maintained by the Land Use Authority Permittees or Implementing Entity, depending on who has land use jurisdiction over the project. When a PGP (and/or other type of general permit, e.g., RGP) is verified, a written record of DEESA shall be included in the annual reporting documentation prepared by the Implementing Entity and submitted to the regulatory agencies. If a project is authorized using a LOP or SP, then a written record of DEESA would be provided as part of the application that is submitted to the USACE for review.

In addition to the avoidance and minimization requirements associated with the above DEESA procedure, the SSHCP has a number of other resource protection measures that help avoid and minimize impacts to aquatic resources. These objectives are set forth in the SSHCP Conservation Strategy Measureable Objectives W-1 through W-6 for SSHCP Biological Goal 2, *Maintain or improve physical, chemical, and biological function of aquatic resources within the Plan Area* (Table 7-1 in SSHCP Chapter 7) and the SSHCP AMMs (ARP Table 28 and SSHCP Section 5.4).

An avoidance measure of primary importance to the hydrologic and ecological connectivity of the SSHCP Preserve System is the requirement for establishment of Stream Setbacks, as described in this section of the ARP and in SSHCP Section 5.4. SSHCP Stream setbacks only apply to streams that are within the UDA. Setbacks have not been established for any of the rivers in the Plan Area as they are all located outside of the UDA. Some reaches of the Cosumnes River would be protected via implementation of the SSHCP Conservation Strategy.

A cohesive strategy of Stream Setback avoidance (the landscape adjacent to the aquatic resource) is an added measure of stream protection afforded under the framework of the SSHCP that would not be possible under the conventional review process. Width of specific Stream Setbacks would

be determined by SSHCP AMM STREAM-2. In addition, a 150-foot setback measured from the top of the bank on both sides of the stream would be applied to Laguna Creek within the UDA (minimum 300-foot corridor width). If trails are located within the wildlife corridor, the nearest edge of the trail would be located at least 80 feet from the top of bank. Laguna Creek's setback width is larger, set at 300 feet, because it serves as a buffer to absorb pollutants and as a corridor to preserve and protect habitat for the movement of plants and animals between otherwise separated preserves. A 100-foot setback measured from the top of the bank on either side of the stream channel would be required for the following creeks located within the UDA: Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek. Within the UDA, the setback for these creeks would generally protect habitat of plant and animal species, filter sediments and other contaminants and allow for maintenance and restoration of riparian vegetation. While not specifically designed as a wildlife corridor in the same manner as Laguna Creek, these creeks have the potential to function as movement corridors for many native species, and to provide habitat functions within the UDA. In addition to Laguna Creek, Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek, a setback width of 25 feet would be required for all first and second order streams that are avoided. These streams are smaller, typically ephemeral but still play a role in overall water quality protection. When an avoided stream reach in the UDA supports riparian vegetation, the setback would be equal to the riparian edge plus 25 feet or the setback defined above, whichever is greater. If trails are located within the Stream Setback, the nearest edge of the trail would be located at least 50 feet from the top of bank. This would protect downstream reaches by reducing loads of sediment and other contaminants.

The limits and uses of the Stream Setback system would be well defined by the Implementing Entity or local Land Use Authority Permittees, depending on who has jurisdiction over the project, during the preservation and urban development process. Stream protection provided by the setback system would preserve and link the highest-quality natural land covers.

Temporary and permanent re-routing of stream channel or activities involving channel widening or deepening as part of the Urban Development Covered Activity would incorporate a suite of AMMs designed to maintain biological, physical, and chemical integrity of streams in the Plan Area. These measures include the utilization of BMPs for construction equipment, bioengineering practices, and actions to maintain overall stream function. These practice details are listed in SSHCP Section 5.4.1, the BMP AMMs, and STREAM-4 and STREAM-5. These measures are more stringent than current standards within the Plan Area.

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing Requirements?	How General Permit Conditions are Addressed, If Any
		UDA	*Non-UDA*	*HCP*	*ARP*		
SSHCP Conservation Strategy Biological Goals (Table 7-1 of SSHCP)							
SSHCP Goal 2	Maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.	●	●	●	●	Yes	—
SSHCP Conservation Strategy Measurable Objectives (Table 7-1 of SSHCP)							
Objective W1 of Goal 2	Ensure that during implementation of Objective L2 (establishing 11 linkage preserves), the linkages that include creeks or streams will include the creek plus a minimum 300-foot setback on each side of the creek, in accordance with the process outlined in Section 5.6.	●	●	●	●	Yes	Addresses OGC-5.
Objective W2 of Goal 2	Covered Activities shall implement stream setback requirements in the UDA for creeks and streams as described in Section 5.6.	●		●	●	Yes	Addresses OGC-5.
Objective W3 of Goal 2	Covered Activities shall implement the following, as outlined in Section 5.4.2: Design AMMs (Low-Impact Development (LID) and ROAD Measures) Ground disturbance AMMs (Best Management Practices (BMPs) and ROAD Measures)	●	●	●	●	No (County/USACE)	Addresses RGC-12 and NWP-12
Objective W4 of Goal 2	Ensure that aquatic resources are preserved and managed during preserve assembly (see Objectives VP1, VG1, VG2, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, and RIP3).	●	●	●	●	Yes	—
Objective W5 of Goal 2	Ensure that aquatic resources are established or re-established during preserve assembly (see Objectives VP2, SW2, FWM2, OW2, RIP2, and RIP4).	●	●	●	●	Yes	—
Objective W6 of Goal 2	Avoid a minimum of 10% of the SSHCP land cover type Streams/Creeks (Invertebrate Habitat) in the UDA.	●		●	●	Yes	Addresses OGC-5.
SSHCP AMMs for Covered Activities (Section 5.4 of SSHCP)							
LID-1: Stormwater Quality	Incorporate stormwater management into site designs to satisfy requirements of the Stormwater Quality Design Manual for the Sacramento and South Placer Regions.	●	●	●	●	No (County/RWQCB)	—
LID-2: Groundwater Recharge	When siting preserves, consider locations that are also suitable for groundwater recharge.	●		●	●	No (County)	—
LID-3: Natural Site Features	Preserve and use natural site features (e.g., creeks, streams) to retain existing hydrologic patterns and retain Covered Species habitat.	●	●	●	●	No (County)	—
STREAM-1: Laguna Creek Wildlife Corridor	150-foot setback from top of bank along Laguna Creek within the UDA.	●		●	●	Yes	—
STREAM-2: UDA Stream Setbacks	100-foot setbacks from top of bank along Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, Sun Creek.	●		●	●	Yes	—
STREAM-3: Minor Tributaries to UDA Streams	Apply 12.5-foot setback from each side of top of bank along avoided first- and second-order tributaries to Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, Sun Creek, and Laguna Creek.	●		●	●	Yes	—
STREAM-4: Minimize Effects from Temporary Channel Re-Routing	When diverting water from a stream channel via coffer dams or other means, minimize impacts to existing habitat through specific design and construction best management practices.	●	●	●	●	Yes	—
STREAM-5: Design for Stream Channel Re-Routing, Widening or Deepening	When altering a stream channel, incorporate design features that re-establish natural conditions (hydrology, surface flow, substrate, vegetation, etc.).	●	●	●	●	Yes	—
BMP-1: Construction Fencing	Temporarily stake out and identify all aquatic resources and setback areas between development and protected areas as non-disturbance areas during construction.	●	●	●	●	No (County/USACE)	Addresses RGC-12
BMP-2: Erosion Control	Install acceptable erosion control barriers to protect aquatic resources from any Covered Activities that may cause erosion.	●	●	●	●	No (County/USACE)	Addresses NWP-12
BMP-3: Equipment Storage and Fueling	Site equipment storage, fueling, and staging areas avoid and minimize discharge into aquatic resources.	●	●	●	●	No (County)	—

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
BMP-4: Erodible Materials	Avoid deposition of erodible materials in waterways during construction or maintenance (e.g., cleaning culverts, subdrains, roadsides, or other road/flood control facility). Do not stockpile brush, loose soils, or other debris material within stream channels or on adjacent banks. Dispose of materials so that they cannot enter an aquatic resource. If water and sludge must be pumped from a subdrain or other structure, convey the material to a settling basin to prevent sediment from entering a waterway.	●	●	●	●	No (County/USACE)	Addresses NWP-12
BMP-5: Dust Control	Minimize aerial drift of sediments and airborne pollutants into aquatic resources.	●	●	●	●	No (County)	—
BMP-6: Construction Lighting	Not relevant to aquatic resources.	●	●	●		No (County)	—
BMP-7: Biological Monitor	Construction monitoring by qualified biologist to ensure compliance with BMPs.	●	●	●	●	No (County)	—
BMP-8: Training of Construction Staff	Training of construction staff to avoid aquatic resources.	●	●	●	●	No (County)	—
BMP-9: Soil Compaction	Treat all temporarily disturbed areas following construction to remove compaction and restore infiltration capacity, soil chemistry, and hydrologic characteristics similar to natural conditions.	●	●	●	●	No (County)	Addresses NWP-11
BMP-10: Revegetation	Cover and revegetate repaired surfaces of earthen flood-control channels, except in cases where soil would be expected to erode rapidly, such as during the rainy season or in channels with hardened bank.	●	●	●	●	No (County/USACE)	Addresses NWP-12 and NWP-13
EDGE-1: Compatible Land Uses	Site parkways, detention basins, and designated open space adjacent to setbacks and preserve/linkage boundaries to provide storage of stormwater flows and additional buffering.	●		●	●	Yes	—
EDGE-2: Single-Loaded Streets	Not relevant to aquatic resources.	●		●		Yes	—
EDGE-3: Preserve Setbacks	Reduce changes to surface hydrology and perched aquifer supporting vernal pools, and other types of disturbance from adjacent development on preserves, including aquatic resources.	●		●	●	Yes	—
EDGE-4: Locate Stormwater Control Outside Preserves	Stormwater flows must be directed away from preserves and preserve setbacks, and directed into stormwater control facilities inside the development.	●		●	●	Yes	—
EDGE-5: Stormwater Control in Preserve Setbacks	Design bioretention swales and other methods to prevent stormwater flows into preserves/linkages with aquatic resources.	●	●	●	●	Yes	—
EDGE-6: Detention Basins in Linkage Preserves	Detention basins within Linkage Preserves designed and constructed so as not to impact the duripan or hardpan. Basins would capture storm flows and summer runoff and discharge to stormwater facilities or bio-swales and through percolation and discharge to the perched aquifer.	●		●	●	Yes	—
EDGE-7: Hardpan/ Duripan Protection	Minimize indirect impacts to aquatic resources by limiting disruption of the soil duripan.	●	●	●	●	Yes	—
EDGE-8: Outdoor Lighting	Not relevant to aquatic resources.	●	●	●		Yes	—
EDGE-9: Livestock Access to Preserves	Design preserve access in such a way that livestock used for vegetation management don't damage aquatic resources.	●	●	●	●	Yes	—
EDGE-10: Prevent Invasive Species Spread	Maintain areas near Preserves to prevent spread of invasive non-native species that could reduce aquatic habitat function.	●	●	●	●	Yes	—
ROAD-1: Road Project Location	Site roads to minimize impacts on aquatic resources.	●	●	●	●	Yes	—
ROAD-2: Wildlife Crossing Structures	Design of culverts would be increased in diameter to allow for movement of wildlife; would also allow for increased flood flows.	●	●	●	●	Yes	Addresses NWP-3
ROAD-3: Roadside Pesticide Use	Use herbicides and pesticides only when necessary (e.g., to control invasive organisms that threaten covered species or their habitats). Application in strict compliance with label requirements and state and federal regulations, and only when weather conditions minimize drift and impacts on non- target sites.	●	●	●	●	Yes	—

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
NATURE TRAIL-1: Trail Plan	Nature Trails would be designed and sited to avoid impacts to aquatic resources.	●		●	●	Yes	—
NATURE TRAIL-2: Trail Protection of Duripan	Nature Trails would not interfere with the perched aquifer supporting the existing hydrologic regime of the vernal pool-grassland, and would not interfere with existing pool hydrology.	●		●	●	Yes	—
NATURE TRAIL-3: Trail Location	Nature Trails would be located away from sensitive aquatic resources.	●		●	●	Yes	—
NATURE TRAIL-4: Biological Studies Prior to Trail Design	Studies (e.g., wetland delineations) prior to trail design to identify sensitive aquatic resources that must be avoided.	●		●	●	Yes	—
NATURE TRAIL-5: Monitoring of Trail Impacts	Use of Nature Trails would be discontinued if monitoring indicates aquatic resources are being adversely impacted.	●		●	●	Yes	—
RE-ESTABLISHMENT/ ESTABLISHMENT-1: Vernal Pool	Created vernal pools would be designed to replicate historical density and range of vernal pool sizes, and must not impact the hydrology of existing vernal pools.	●	●	●	●	Yes	—
RE-ESTABLISHMENT/ ESTABLISHMENT-2: Vernal Pool Inocula Bank)	A vernal pool inocula bank would be established that stores soils removed from impacted vernal pools; these soils would be used when re-establishing/establishing vernal pools to maximize colonization by native vernal pool plants and invertebrates.	●	●	●	●	Yes	—
UTILITY-1: Avian Collision Avoidance	Not relevant to aquatic resources.	●	●	●		Yes	—
UTILITY-2: Utility Maintenance on Preserves	Avoid creating new disturbance to aquatic resources when accessing utilities for maintenance.	●	●	●	●	Yes	—
UTILITY-3: Trenchless Construction Methods	Avoidance of direct impacts to surface waters and indirect impacts to aquatic resources on existing or conceptual preserves by limiting disruption of the soil duripan.	●	●	●	●	Yes	—
UTILITY-4: Siting of Entry and Exit Location	Entry and exit locations for the trenchless construction method would be sited to avoid impacts to vernal pools and riparian woodland.	●	●	●	●	Yes	—
LEVEE-1: Preparation of Hydrologic Analysis	Prior to approving a draft Preserve management plan that (1) includes modifying or breaching an existing levee, or (2) would place a potential impedance to high-water event flood-flows on the water side of an existing levee (including new riparian vegetation plantings, or other new preserve facilities), a hydrologic analysis would be conducted. The Preserve activity would only be implemented if the hydrologic analysis concludes that the activity would not result in a substantial increase in flood stage elevations or flood risk on lands outside the Preserve.	●	●	●	●	Yes	NWP-10
2012 Nationwide Permit General Conditions							
NWP-2	Avoid activities in spawning areas during spawning seasons.	●	●	●	●	No (USACE/NMFS)	—
NWP-3	All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of indigenous aquatic species.	●	●	●	●	No (USACE)	Addressed by ROAD-2: UDA Wildlife Crossing Structures
NWP-4	Avoid activities in waters of the United States that serve as breeding areas for migratory birds to the maximum extent practicable.	●	●	●	●	No (MBTA)	Added to SSHCP Chapter 10, Project Application Process
NWP-5	Avoid shellfish populations (Not Applicable)					—	—
NWP-6	No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts.	●	●	●	●	No (County/USACE)	Addressed by BMP-4: Erodible Materials and also added to SSHCP Chapter 10, Project Application Process.
NWP-7	Avoid activity near a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-8	Minimize adverse effects from impoundments.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-9	Maintain the pre-construction course, condition, capacity, and location of open waters for each activity, including stream channelization and stormwater management activities.	●	●	●	●	No (USACE/CDFW)	Added to SSHCP Chapter 10, Project Application Process

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
NWP-10	Comply with applicable FEMA-approved state or local floodplain management requirements.	●	●	●	●	No (USACE/FEMA/ County)	LEVEE-1, Added to SSHCP Chapter 10, Project Application Process
NWP-11	Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-12	Use and maintain appropriate soil erosion and sediment controls during construction, and stabilize as early as practicable all exposed soil and other fills, as well as any work below the ordinary high-water mark. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.	●	●	●	●	No (County/USACE)	Addressed by BMP-2: Erosion Controls, BMP-4: Erodible Materials, BMP-10: Revegetation
NWP-13	Remove all temporary fills and return affected areas to pre-construction elevations. The affected areas must be revegetated, as appropriate.	●	●	●	●	No (County/USACE)	Addressed by BMP-4: Erodible Materials, BMP-10: Revegetation
NWP-14	Any authorized structure or fill shall be properly maintained.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-15	The activity must be a single and complete project. The same permit cannot be used more than once for the same single and complete project.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-16	No activities in Wild and Scenic Rivers or in a river under study for possible inclusion.	●	●	●	●	No (USACE, California Resources Agency, others)	Added to SSHCP Chapter 10, Project Application Process
NWP-17	No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-18	Compliance with the Endangered Species Act.	●	●	●	●	No (USFWS)	Inherent to an SSHCP
NWP-19	Compliance with the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Projection Act.	●	●	●	●	No (MBTA/USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-20	Compliance with Section 106 of the National Historic Preservation Act.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-21	Required response to the discovery of unknown historic or archeological remains.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-22	Requirements related to Critical Resource Waters (Not Applicable)					—	—
NWP-23	Description of project mitigation (avoidance, minimization, compensation). Evidence of an appropriate in-lieu fee.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-24	Demonstrate that all impoundment structures are safely designed.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-25	Requirement for Section 401 Water Quality Certification.	●	●	●	●	No (USACE/RWQCB)	Added to SSHCP Chapter 10, Project Application Process
NWP-26	Coastal Zone Management Zone consistency (Not Applicable)					—	—
NWP-27	Comply with any Regional Conditions (see below) or Specific Conditions added by the USACE or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification.	●	●	●	●	No (USACE/RWQCB)	Added to SSHCP Chapter 10, Project Application Process
NWP-28	Use of more than one permit for a single and complete project is prohibited.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-29	Requirements associated with transferring the permit verification if the permittee sells the property associated with the permit. Requirements for the contents of a letter from the permittee along with transference of the permit verification.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-30	Provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
NWP-31	Pre-Construction Notification (Not Applicable)					—	—
Sacramento District Regional General Conditions to the 2012 Nationwide Permits							
RGC-1	Include with PCN demonstration of compliance with all General and Regional Conditions. (Not Applicable)					—	Not Applicable
RGC-2	Pre-Construction Notification (Not Applicable)					—	Not Applicable

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
RGC-3	Record NWP Permit verification with Registrar of Deeds or other appropriate official. (Not Applicable)					—	Not Applicable
RGC-4	Preserve all avoided waters of the United States in legally protected preserves and maintain in perpetuity.	•	•	•	•	No (USACE)	Inherent to the SSHCP, also added to SSHCP Chapter 10, Project Application Process
RGC-5	For all activities resulting in temporary fill in waters of the United States a) Use fill materials consisting of cleaned and washed gravel; b) Clearly delineate the existing ground elevation of waters temporarily filled during construction; c) Remove all temporary fill within 30 days of completion of construction activities.	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-6	Apply the following to all road crossings: a) for all activities in waters of the United States that are suitable habitat for federally listed fish species, road crossings must not hinder passage or spawning of fish; b) road crossings shall be designed to ensure that no more than minor impacts would occur to fish and wildlife passage or expected high flows; no construction activities within standing or flowing waters; d) bank stabilization for road crossings must comply with Regional Condition 19. In no case shall stream crossings result in a reduction in the pre-construction bankfull width or depth of perennial streams or negatively alter the flood control capacity of perennial streams.	•	•	•	•	No (USACE)	Addressed by ROAD-2: UDA Wildlife Crossing Structures
RGC-7	Lead federal agency shall provide all relevant documentation to the USACE demonstrating any previous consultation efforts, as it pertains to the USACE Regulatory permit area (for Section 7 and EFH compliance) and the USACE Regulatory area of potential effect (APE) (for Section 106 compliance).	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-8	Additional documentation required for NWPs that require Pre-Construction Notification (Not Applicable).					—	Not Applicable
RGC-9	For permittee responsible mitigation, develop and submit to the USACE for review and approval, a final comprehensive mitigation and monitoring plan for all permittees responsible mitigation prior to commencement of construction activities within waters of the United States.	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-10	The permittee shall complete the construction of any compensatory mitigation required by special condition(s) of the NWP verification before or concurrent with commencement of construction of the authorized activity,	•	•	•	•	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
RGC-11	The permittee is responsible for all authorized work.	•	•	•	•	No (USACE)	Already addressed in SSHCP Implementation Chapter and built into the SSHCP
RGC-12	Requirements to clearly identify the limits of disturbance in the field.	•	•	•	•	No (County/USACE)	Addressed by BMP-1: Construction Fencing
RGC-13	When a Pre-Construction Notification is required, the permittee shall notify the appropriate district office of the start date for the authorized work within 10 days prior to initiation of construction activities. (Not Applicable)					—	Not Applicable
RGC-14	Requirement to allow Corps representatives to inspect the project site.	•	•	•	•	No (USACE)	Added to HCP Chapter 10, Project Application Process
RGC-15	Revocation of NWPs for activities located in the Mather Core Recovery Area that may affect vernal pools. (Not Applicable)					—	Not Applicable
RGC-16	Revocation of NWPs for activities located in the Primary or Secondary Zone of the Legal Delta. (Not Applicable)					—	Not Applicable
RGC-17	For all activities within the Secondary Zone of the Legal Delta, the permittee shall conduct compensatory mitigation for unavoidable impacts within the Secondary Zone of the Legal Delta. (Not Applicable)					—	Not Applicable
RGC-18	Requirements for construction of utility lines under NWP 12. (Not Applicable)					—	Not Applicable
RGC-19	Requirements for bank stabilization activities under NWP 13 and 14. (Not Applicable)					—	Not Applicable

Table 28
Summary of SSHCP Aquatic Resources Protection

Measure	Description of Measure Applicable to Aquatic Resources	Applicability				Above Existing	How General Permit Conditions are Addressed, If Any
RGC-20	Requirements for Pre-Construction Notification under NWP 23. (Not Applicable)					—	Not Applicable
RGC-21	Requirements for Pre-Construction Notification under NWP 27. (Not Applicable)					—	Not Applicable
RGC-22	Restrictions on channelization or relocation of intermittent or perennial drainages under NWPs 29 and 39. (Not Applicable)					—	Not Applicable
RGC-23	Requests to waive linear foot limitations for intermittent and ephemeral streams under NWPs 1, 13, 29, 39, 40, 42, 43, 44, 50, 51, or 52. (Not Applicable)					—	Not Applicable
RGC-24	Requirements for upland vegetated buffers under NWPs 29, 39, 40, 42, and 43. (Not Applicable)					—	Not Applicable
RGC-25	Under NWP 46, the discharge shall not cause the loss of greater than 0.5 acre of waters of the United States or the loss of more than 300 linear feet of ditch, unless specifically waived in writing by the USACE. (Not Applicable)					—	Not Applicable
RGC-26	All NWPs except 3, 6, 20, 27, 32, and 38 are revoked for activities in histosols, fens, bogs and peatlands and in wetlands contiguous with fens. (Not Applicable)					—	Not Applicable
Other General Conditions							
OGC-1	The PGP expiration date.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-2	Plan Permittees shall require that project applicants develop on-site project alternatives demonstrating efforts that first avoid, and then minimize direct and indirect effects to the aquatic resources mapped pursuant to this section and shall review these alternatives with the Plan Permittee. A complete on-site avoidance alternative shall be selected, if practicable, while taking into account the regional alternatives analysis completed through the SSHCP and ARP.	●	●	●	●	No (USACE)	SSHCP Chapter 12 addresses to some extent, but is also added to Project Application Process (Chapter 10)
OGC-3	Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity, as well as the location of delineated waters of the United States on the site.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-4	Numbered and dated pre-project color photographs.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-5	Linear foot impact limitations to particular streams.	●	●	●	●	No (USACE)	Derived from new Goal 2 Objective W-6.
OGC-6	Dewatering plan, if applicable.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process, but requirements are specified for Covered Species.
OGC-7	Proposed construction schedule.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-8	Any other information pertinent to the stream channel or wash involved.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-9	A list of all other permits and authorizations as required by law, ordinance, or regulation.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-10	Acreage and linear foot impacts triggering an LOP or SP with the USACE.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-11	Requirements for as-built drawings post-construction.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-12	Requirement for a Department of the Army Standard Permit where the District Engineer determines impacts to aquatic resources may be more than minimal, individually or cumulatively, as a result of the proposed work.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-13	Annual inspections to ensure activities authorized under this permit do not result in more than minimal impacts to waters of the United States.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process
OGC-14	No activity is authorized under this permit which is not in conformance with the SSHCP.	●	●	●	●	No (USACE)	Added to SSHCP Chapter 10, Project Application Process

5.3 Compensatory Mitigation

The central goal of compensatory mitigation for Covered Activities authorized under the SSHCP permitting framework is to maintain and improve the aquatic resources diversity, abundance, condition, and ecological connectivity across the Plan Area's differing landscape and geomorphic settings. A comprehensive preserve system would be assembled thorough protocols, described in detail in Appendix D, and outlined in 33 CFR Part 325 Sections 332.4(c)(2) through (c)(14) of the USACE's Mitigation Rule.

All Covered Activity projects proposed under the SSHCP and ARP would conform to a systematic mitigation strategy that includes the avoidance and minimization requirements of the previous subsections as well as the comprehensive compensatory mitigation strategy. Table 13 summarizes the potential maximum impacts. These potential impacts to aquatic resources over the 50-year term of the SSHCP (1,613 acres including 262 linear miles of non-wetland waters) would be compensated through the following: re-establishment/establishment of 1,613 acres of aquatic resources including re-establishment/establishment of 262 linear miles or 294 acres of non-wetland waters[8], 855 acres of wetland waters, and 464 acres of riparian habitat . Riparian establishment or re-establishment would occur that would be CDFW jurisdictional and may also be CWA 404/401 jurisdictional; and 2,248 acres of aquatic resources would be preserved.

A key component of the SSHCP's Conservation Strategy is the SSHCP Preserve System that would establish a network to systematically protect natural areas inside and outside of the UDA. Approximately 36,282 acres of new SSHCP Preserve lands would be established within the Plan Area by the end of the 50-year SSHCP. This is approximately 11% of the overall Plan Area. When considered together with the existing preserved lands in the Plan Area, the total amount of preserved land would total 99,030 acres, or 31.0%, of the Plan Area. The SSHCP Conservation Strategy is based on guiding principles of conservation biology and landscape ecology with goals and objectives to: minimize habitat fragmentation by forming large preserves and maintaining habitat linkages between preserves, protect watersheds and their ecosystem functions through sub-watershed preservation and conservation of streams and associated water quality, preserve irreplaceable and threatened resources, minimize indirect edge effects, utilize setbacks, and maintain Plan Area land cover heterogeneity within preserves. The SSHCP and ARP's proposed aquatic resources preservation would occur within the conceptual SSHCP Preserve System. All preservation would meet the standards and requirements of the Mitigation Rule (33 CFR 332.3[h]).

[8] The 262 linear miles on non-wetland waters includes Streams/Creeks (Intermittent and Perennial) and Streams/Creeks VPIH (Ephemeral). The 262 linear miles equates to 294 acres.

Compensatory mitigation in the form of aquatic resource re-establishment and establishment would also be placed within the SSHCP Preserve System. The Re-establishment and Establishment Guidelines (Appendix D) describe protocols for restoring and establishing aquatic resources within the Plan Area. These guidelines provide the outline, (consistent with SPD's 2015 Regional Compensatory Mitigation and Monitoring Guidelines), for how compensatory mitigation projects would be planned, designed, implemented, and managed such that the projects would be viable into perpetuity and would adequately compensate for unavoidable impacts to aquatic resources. In order to determine the re-establishment and establishment potential in the Plan Area and in each watershed, the SSHCP Permittees took an inventory available land suitable for re-establishment and/or establishment in order to maximize the amount of mitigation replaced within the watershed. This inventory was based upon the future state of the Plan Area, accounting for impacts from SSHCP Covered Activities.

Costs for the aquatic resources compensatory mitigation projects would be covered through the Covered Activity project mitigation fees collected under the SSHCP. Fees under the SSHCP are set at levels that fully offset the cost of compensating for the unavoidable impacts to aquatic resources. The SSHCP includes a fee structure that is distinguished by land cover type. This approach accounts for variations in costs associated with the particular requirements for each land cover type. Each new project would pay fees based on the land cover types affected by the development project and the fee schedule. The SSHCP fees were estimated on a per-acre-of-development basis, i.e., the fee represents the payment required to compensate for 1 acre of development of that land cover type. Re-establishment and establishment costs were estimated by taking into account costs associated with site reconnaissance, soil testing, engineering and preparation of construction drawings and specifications, land acquisition, staking, earthwork, plant and seed procurement, planting/seeding, and installation of irrigation system. Additionally, re-establishment and establishment projects must also account for costs associated with short-term monitoring and maintenance (5 to 10 years after projects are in the ground), as well as less intensive monitoring and management in perpetuity. Contingency costs were also accounted for in the fee calculations. Chapter 12 of the SSHCP describes the funding calculations and funding program.

Fees collected for compensatory mitigation would be routed to a proposed ILF program that is consistent with the federal Mitigation Rule (33 CFR Part 332) so that project proponents can satisfy their obligations under Section 404 of the CWA and the SSHCP. See Section 5.3.2.

Another key component of the SSHCP Conservation Strategy is the Jump-Start and Stay-Ahead provisions (described in detail in the SSHCP in Chapter 9, Section 9.5.5). These provisions require impacts to be mitigated in advance of Covered Activity project implementation, and ensure that Preserve System assembly would keep pace with development and make steady progress towards assembling the entire SSHCP Preserve System.

To satisfy this requirement, the Implementing Entity[9] would, prior to implementation of SSHCP Covered Activities, protect SSHCP land cover types and Covered Species habitat in advance of impacts—the "Jump-Start" provision (described in the SSHCP in Chapter 9, Section 9.5.5.2). The Jump-Start provision would ensure that there is enough Preserve area and habitat benefits are provided to fully offset the initial habitat loss and species take expected when the Plan is first implemented. The Jump-Start provision applies to all SSHCP land cover types (Table 29).

Table 29
Jump-Start Provision Acreage Requirements (at Permit Issuance)

Land Cover Grouping	Total Acres of Required Preservation by Land Cover Grouping[a]	Initial Acreage Required (before Permit Issuance) to Meet Jump-Start Provision (i.e., 5% of Required Preservation)
Valley Grassland	22,014	1,100[b]
Vernal Pool	966	48
Other Vernal Pool Invertebrate Wetland Habitat[c]	304	15
Other Wetland[d]	504	25
Agricultural	9,696	484
Riparian	964	48
Oak Woodland	47	2

Notes:
[a] Based on the sum of required preservation for each land cover type (refer to SSHCP Table 7-2) that is composed by the land cover grouping.
[b] This 1,100 acres must be preserved within the Vernal Pool Ecosystem (Chapter 3, Section 3.2.3, of SSHCP).
[c] Includes all Swale and Stream/Creek (VPIH) habitat that is considered invertebrate habitat.
[d] Includes Seasonal Wetland, Freshwater Marsh, Stream/Creek, and Open Water.

Over the term of the permit, the Implementing Entity would maintain a "cushion" of mitigation that is established in advance of impacts—the "Stay-Ahead" provision (described in the SSHCP in Chapter 9, Section 9.5.5.3). The stay-ahead provision requires that the Implementing Entity maintain enough Preserve land to be at least 2% ahead of the remaining preservation required for each SSHCP land cover grouping by the SSHCP Conservation Strategy at all times. This means that each project proposing to use the SSHCP must be checked against the stay-ahead provision prior to issuing ITPs to ensure that the project does not result in stay-ahead preserve land dropping below the 2% threshold. The Stay-Ahead provision would avoid temporal impacts to Covered Species that occur when mitigation is delayed from the time that impacts occur to when the associated mitigation benefits are available to the species (e.g., environmental benefits resulting from preserve management, habitat enhancement, and habitat re-establishment activities).

[9] The Implementing Entity is the body that is responsible for implementation of a permitted HCP. The SSHCP Implementing Entity consists of a Governing Board, Implementation Commission, and various committees and staff who oversee management and administration of the Plan.

Under the Jump-Start and Stay-Ahead provisions, compensatory mitigation for project proposals would exist ahead of impacts, thus eliminating the temporal loss factor of consideration under the federal Mitigation Rule. This would ensure consistency with USACE and RWQCB guidelines pursuant to Sections 404 and 401 of the CWA, and would satisfy California Fish and Game Code Section 2081(b), which requires impacts to state-listed species to be mitigated in advance of the impacts. It would also satisfy requirements under the federal ESA.

The purpose of the compensatory mitigation strategy proposed under the SSHCP and ARP is to implement a systematic mitigation strategy that individual Covered Activity projects can conform and contribute to as a means to offset unavoidable impacts to aquatic resources. It is a strategy that integrates the compliance procedures of several federal and state resource agencies to provide a long-term vision for environmental protection and monitoring, which enables greater environmental benefits and greater efficiency and certainty in environmental permitting for Plan Permittees and project proponents that implement Covered Activities under the jurisdiction of a Land Use Authority Permittee or the Implementing Entity. It is a strategy that benefits from the opportunities provided by regional conservation planning, offering a vision that is more challenging to achieve in a project-by-project review setting.

5.3.1 Compensatory Mitigation Requirements

5.3.1.1 Impact Threshold Measures

Under the SSHCP and ARP, there would be no minimum threshold of proposed acreage loss of aquatic resources for compensatory mitigation to be required. That is, all permanent loss of aquatic resources incurred by a project would require compensatory mitigation[10]. This is in contrast to the USACE's discretion to waive the compensatory mitigation requirement for loss of waters of the United States less than one-tenth of an acre (General Condition 23 of the 2012 Nationwide Permits).

5.3.1.2 Compensatory Mitigation Ratios

The compensatory mitigation ratios listed in the ARP are based upon a landscape-level assessment of the diversity, abundance, and condition of all aquatic resources types that occur in the Plan Area. The compensatory mitigation ratios listed in Table 30 represent the amount of compensatory mitigation required to maintain or improve the physical, chemical, and biological functions of aquatic resources within the Plan Area (as outlined in the SSHCP in the Biological Goals and Measureable Objectives in Table 7-1) when such impacts to aquatic resources are

[10] As discussed in Section 4.1, it is assumed that all impacts are permanent and would result in the loss of aquatic resources.

unavoidable. The compensatory mitigation ratios are also designed to be consistent with USACE's Mitigation Rule and to consider the factors used for determining compensatory mitigation requirements as required for processing Department of the Army permits under Section 404 of the CWA (USACE South Pacific Division Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios [Mitigation Ratios Procedure]).

Table 30 describes compensatory mitigation ratios provided by the SSHCP Conservation Strategy for each aquatic resource type that would be impacted by Covered Activities within the Plan Area. All ratios are in terms of (combined) re-establishment/establishment/preservation to impact. Vernal pools, mixed riparian scrub, and mixed riparian woodland would be mitigated at a ratio of at least 3:1, where a minimum 1:1 of that mitigation is provided by re-establishment or establishment. For all other aquatic resource land cover types (mine tailing riparian woodland, seasonal wetland, freshwater marsh, swale, streams/creeks [VPIH], open water, and streams/creeks) compensatory mitigation would occur at a ratio of at least 2:1, where again, a minimum ratio of 1:1 is accomplished by re-establishment or establishment. The final column of Table 30 lists the actual amount of each land cover type projected to be provided by the SSHCP. For certain land cover types, such as vernal pools, the projected amounts exceed the required amounts.

Table 30
Compensatory Mitigation Ratios

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Direct Impacts *Acres*	Required Re-establishment/ Establishment + Preservation Ratios	Required Re-estab/ Estab/ Preserve (acres)	Projected Amounts (acres)
Riparian	Mine Tailing Riparian Woodland	R2/R3	218	2:1 (min re-estab/estab 1:1)[a]	0 [a]	0 (0 re-estab/estab)[a]
	Mixed Riparian Scrub and Mixed Riparian Woodland	R2/R3	246	3:1 (min re-estab/estab 1:1)	1,174 [a]	1,174 total (464 re-estab/estab)[a]
Subtotal Riparian			*464*	-	*1,174*	*1,765 (464 re-estab/estab)*
Wetland Waters	Freshwater Marsh	PEM2	127	2:1 (min re-estab/estab 1:1)	254	254 total (127 re-estab/estab)
	Seasonal Wetland	PEM2	105	2:1 (min re-estab/estab 1:1)	210	210 total (105 re-estab/estab)
	Swales	PEM2	234	2:1 (min re-estab/estab 1:1)	468	468 total (234 re-estab/estab)
	Vernal Pools	PEM2	389	3:1 (min re-estab/estab 1:1)	1,167	1,167 total (389 re-estab/estab)
Subtotal Wetland Waters			*855*	-	*2,099*	*2,099 total (855 re-estab/estab)*
Non-Wetland	Open Water	POW	155	2:1 (min re-estab/estab 1:1)	310	310 total (155 re-estab/estab)

Table 30
Compensatory Mitigation Ratios

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Direct Impacts *Acres*	Required Re-establishment/ Establishment + Preservation Ratios	Required Re-estab/ Estab/ Preserve (acres)	Projected Amounts (acres)
Waters	Streams/Creeks (Intermittent and Perennial)	R2UB/R3UB	117	2:1 (min restor 1:1 linear foot)	234	234 total (117 restor)
	Streams/Creeks VPIH (Ephemeral)	R4SB	22	2:1 (min restor 1:1 linear foot)	44	44 total (22 restor)
Subtotal Non-Wetland Waters			*294*	—	*588*	*588*
Subtotal Wetland Waters and Non-Wetland Waters			*1,149*	—	*2,687*	*2,687*
Total[b]			**1,613**	**—**	**3,861**	**4,452**

Notes:

[a] Mine Tailing Riparian Woodland will be mitigated by preserving and re-establishing or establishing Mixed Riparian Scrub or Mixed Riparian Woodland.

[b] Table may not total precisely due to rounding.

Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

The ARP compensatory mitigation ratios are based upon factors consistent with the federal mitigation rule. The ARP compensatory mitigation ratios utilize the FCAM that was developed for the Plan Area that is aquatic resource-based, standardized, and comparable from site to site (the Functional Assessment for the SSHCP and ARP is described in detail in Appendix C). The FCAM can be implemented to determine a before-after-mitigation-impact procedure to assess aquatic resource functional gain. Compensatory mitigation ratios described in the ARP also take into consideration mitigation site location, enhancement or preservation of an aquatic resource that doesn't result in a net gain in aquatic resource area, aquatic resource type conversion need from a watershed perspective, risk and uncertainty, and temporal loss of aquatic resource functions (as described in Appendix C). The purpose of the ARP compensatory mitigation ratios strategy is to proactively offset unavoidable impacts to aquatic resources and maintain or improve physical, chemical, and biological functions of aquatic resources within the Plan Area.

As previously mentioned, two key components of the SSHCP Conservation Strategy are the Jump-Start and Stay-Ahead provisions (described in detail in the SSHCP in Chapter 9, Section 9.5.5). These components of the SSHCP Conservation Strategy were developed to address the temporal loss consideration described in the Mitigation Ratios Procedure. Jump-Start and Stay-Ahead provisions require impacts to be mitigated in advance of Covered Activity project implementation and ensure that SSHCP Preserve System assembly would

keep pace with urban development and make steady progress towards assembling the entire conceptual SSHCP Preserve System (see SSHCP Section 7.5). Implementation of these provisions would ensure that lost aquatic resource functions are replaced ahead of Covered Activity project impacts, avoiding temporal loss.

5.3.1.3 Monitoring and Management

Aquatic resources within the Plan Area would be monitored throughout SSHCP implementation as part of the SSHCP Monitoring Program and SSHCP Preserve System Management Program, which would be implemented to ensure that the requirements of the SSHCP and ARP are being met. The purposes of these programs are to ensure compliance with all elements of the SSHCP and associated permits (compliance monitoring) and to evaluate the beneficial effects of the SSHCP Conservation Strategy (mitigation program) to make sure all SSHCP goals and objectives are being met (effectiveness monitoring). Compliance monitoring would focus on ensuring all actions implemented under the SSHCP and ARP are in compliance with all requirements of their associated permits and that impacts do not exceed the amounts authorized under the permits. Effectiveness monitoring would focus on ensuring mitigation (i.e., required avoidance, minimization, and compensatory mitigation) carried out under the SSHCP and ARP is achieving the SSHCP's goals and objectives, such as ensuring the overall aquatic resource abundance, diversity, and condition of the Plan Area is maintained or improved in perpetuity. The Plan Permittees are collectively responsible for conducting all the required monitoring and reporting under the SSHCP and ARP. Annual monitoring reports from the Plan Permittees would be consolidated through the Implementing Entity, who would serve as the main point of contact.

A fully developed monitoring program would be finalized within 1 year of permit issuance with input and coordination among the SSHCP Implementing Entity, Land Use Authority Permittees, the regulatory and Wildlife Agencies, and a Technical Advisory Committee (TAC). Chapter 8 of the SSHCP describes the programmatic approach and monitoring questions that would be addressed by the SSHCP monitoring program. It is envisioned that monitoring of aquatic resources would be best achieved by implementing the California Wetland and Riparian Area Monitoring Plan (WRAMP) framework (CWMW 2010).

The WRAMP framework is commonly used to assess the compliance and effectiveness of development projects affecting aquatic resources. The WRAMP framework is suited to natural resources monitoring in general, including terrestrial wildlife and habitat, but has primarily been focused on aquatic resources. The WRAMP framework uses standardized mapping and assessment methods that combine to provide a comprehensive assessment of aquatic resource abundance, diversity, and condition within a watershed context.

Assessments are conducted at three levels, as described by the EPA's three-level data classification system:

1. **Level 1 – Landscape Assessment**

   Uses GIS, remote sensing data, and field surveys to inventory aquatic resources at a planning level. The data layers used to create the SSHCP's land cover maps are an example of Level 1 data.

2. **Level 2 – Rapid Assessment**

   Uses visible field diagnostics, semi-quantitative rapid assessment methods, and existing data to assess conditions. The California Rapid Assessment Method (CRAM) is an example of a Level 2 assessment method.

3. **Level 3 – Intensive Site Assessment**

   Provides quantitative field data to give more precise answers to management questions. Examples of a Level 3 assessment include intensive bioassessment sampling (e.g., benthic macroinvertebrates or algae), protocol-level or otherwise systematic surveys for Covered Species, and collecting biological and abiotic data such as plant species abundance or percent cover.

The monitoring requirements for aquatic resources in the Plan Area are a subset of the requirements of the SSHCP and are tied to the Biological Goals and Measureable Objectives of Chapter 7 of the SSHCP. Tables 31 through 33 are derived from Tables 8-1 through 8-4 in Chapter 8 of the SSHCP, and they summarize the measurable objectives to be achieved, the monitoring questions associated with each measurable objective, and the potential monitoring approach (Level 1, 2, or 3) for each question.

Table 31
Compliance Monitoring

Related Objectives or SSHCP Commitment (from SSHCP Chapter 7)	Monitoring Question	Compliance Monitoring Approach
The SSHCP requests take of land cover types (impacts to aquatic resources)	How many acres of land cover types have been impacted by Covered Activities?	Map impacted areas and quantify area of disturbance. Input impacts into tools such as the Project Tracking System in EcoAtlas. Ensure that impacts do not exceed amount authorized. (Level 1)
Objectives VPP1, VPP2, VPP3, VPP4, VPP5, VPP6, VPP7.	Are plant Covered Species populations being protected within Preserves?	Conduct assessment of take and preservation and protection of covered plant species to ensure preservation amounts are keeping up with impact amounts for vernal pools. (Level 1)

Table 31
Compliance Monitoring

Related Objectives or SSHCP Commitment (from SSHCP Chapter 7)	Monitoring Question	Compliance Monitoring Approach
Objectives L1, L2, W4, W5, VPG1, VP1, VP3, SW1, FWM1, ES1, SC1, OW1, RIP1, RIP3, VG1, BOW1, AG1.	Are SSHCP land cover acquisition goals being met in the Preserve System, including acquisition of linkages to existing Preserves?	Mapping of acquired Preserve lands using aerial surveys and GIS and verification that landscape-scale Preserve selection criteria for land cover types have been met. (Level 1)
Objectives W1, W2.	Are the vernal pool land covers and the Creeks/Stream land covers being adequately protected from adjacent Covered Activities? Does each proposed project design include appropriate setbacks for creeks and streams? Are requisite Stream Setbacks and Preserve being established?	During project design review, compare design against checklist that includes setbacks (Level 1). Map the preserves, corridors, and habitats of concern using aerial surveys and GIS mapping (with particular attention to buffer widths from vernal pools, streams, and creeks). Compare GIS mapping against conditions of approval. (Level 1)
Objectives VPI1, VPI2, VPI3, VPI4, CTS2, WS1, WPT1, GGS1, CH1, CH2, TB1, TB2, TB3, TB4, BO1, BO2, FH1, SH1, SH2, SH3, NH1, NH2, NH3, WK1, WK2, WK3, WK4, GS1, GS2, LS1, LS2, , WR1, WR2, WR3, WR4, AB1, AB2.	Are preserved, re-established, or established aquatic resources being adequately maintained/managed for the benefit of Covered Species?	SSHCP Annual Reports submitted by Implementing Entity, with field verification by Implementing Entity or designee. (Level 2)
Objectives VP2, SW2, RIP2, RIP4, OW2, FWM2.	Do established or re-established aquatic resources meet success criteria (performance standards)?	Monitor aquatic habitat success criteria as defined by permit conditions (Level 2).
Objectives RIP 2, RIP4	Does re-established or established riparian habitat meet success criteria (performance standards)?	Monitor success criteria as defined by permit conditions (Level 2).
Objective W3.	Were the appropriate AMMs always implemented? Is each AMM being implemented according to requirements described in Chapter 5 of the SSHCP?	Design review and comparison with checklist of AMMs. Field verification by permit compliance staff of relevant jurisdiction. (Level 2)
Objective W4, W5	Are preserved, re-established, or established aquatic resources acreage goals/requirements being met?	SSHCP Annual Reports submitted by Implementing Entity, specifying locations and amounts of compensatory mitigation implemented. (Level 1)
Objective W4, W5	Are preserved, re-established, or established aquatic resources functional/condition performance standards being met?	SSHCP Annual Reports submitted by Implementing Entity, with field verification by Implementing Entity or designee. (Level 2)
Objective CTS1.	Is the required number of occupied breeding ponds within designated Critical Habitat for California tiger salamander (*Ambystoma californiense*) being protected?	Conduct survey for occupied California tiger salamander breeding ponds and map results. Field verification of pond preservation and comparison against maps. (Level 3)

Table 32
AMM Compliance Monitoring

AMM	Monitoring Questions	Compliance Monitoring Approach
LID-1 (Stormwater Quality):	Are projects incorporating appropriate stormwater management into designs to satisfy the requirements outlined in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions?	Design review by Land Use Authority Permittee or Implementing Entity.
LID-2 (Groundwater Recharge):	Has the proponent identified areas in the project site that could be appropriate for groundwater recharge? Has the drainage design incorporated groundwater recharge?	Design review by Land Use Authority Permittee or Implementing Entity.
LID-3 (Natural Site Features):	Has the proponent identified important natural site features within the project site? Has the project design avoided or preserved these natural site features?	Design review by Land Use Authority Permittee or Implementing Entity.
RE-ESTABLISHMENT/ ESTABLISHMENT-1 (Vernal Pool)	Are entities conducting vernal pool re-establishment/establishment on SSHCP Preserves following the guidelines identified in the AMM?	Implementing Entity review of vernal pool re-establishment/establishment plans. Field verification by Implementing Entity of vernal pool conditions and consistency with stated guidelines and plans. (Level 1 and Level 2)
RE-ESTABLISHMENT/ ESTABLISHMENT-2 (Vernal Pool Inocula Bank)	Are soils from converted vernal pools being excavated and stored using the appropriate protocols? Are inocula placed in re-established or established pools being sourced from the appropriate geologic formation and soil type?	Land Use Authority Permittee review of plans for projects converting vernal pools to ensure that they clearly state the disposition of vernal pool soils. Implementing Entity coordination with entities re-establishing or establishing vernal pools on preserves to ensure that inocula are correct. (Level 2)
STREAM-1 (Laguna Creek Wildlife Corridor)	Are proponents establishing the appropriate setback on Laguna Creek? Are trails being placed in the correct location within the setbacks?	Review of project plans by Land Use Authority or Implementing Entity to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established. (Level 1 and Level 2)
STREAM-2 (UDA Stream Setbacks)	Are proponents establishing appropriate setbacks on Elder Creek, Frye Creek, Gerber Creek, Morrison Creek, Paseo Central, and Sun Creek? Are trails being placed in the correct location within the setbacks?	Review of project plans by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established. (Level 1 and Level 2)

Table 32
AMM Compliance Monitoring

AMM	Monitoring Questions	Compliance Monitoring Approach
STREAM-3 (Minor Tributaries to UDA Streams)	Are proponents establishing appropriate setbacks on first and second order tributaries that are credited as avoided? Are trails being placed in the setbacks?	Review of project plans by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are designed according to requirements, including locations of trails. Field verification by Land Use Authority Permittee or Implementing Entity to confirm that Stream Setbacks are correctly established. (Level 1 and Level 2)
STREAM-4 (Minimize Effects from Temporary Channel Re-routing)	If stream channels are being re-routed during construction, are the measures identified in the AMM being implemented to avoid hydrologic impacts?	Local Land Use Authority Permittee or Implementing Entity review of plans for temporary stream channel re-routing. Periodic inspection of the project site by Land Use Authority Permittee Permit Compliance staff or the Implementing Entity to confirm required measures are being implemented and maintained.(Level 1 and Level 2)
STREAM-5 (Design for Stream Channel Re-Routing, Widening, or Deepening)	Do designs for stream channel re-routing, widening, or deepening include the considerations outlined in the AMM?	Local Land Use Authority Permittee or Implementing Entity review of plans for stream channel re-routing. Local Land Use Authority Permittee or Implementing Entity field verification of project implementation. (Level 1 and Level 2)

Table 33
Effectiveness Monitoring

Related Objectives	Preserve Monitoring Question	Effectiveness Monitoring Approach
Objectives W4, W5	Are aquatic resources abundance, diversity, and condition being maintained or improved within the Plan Area as the SSHCP is implemented?	Monitor and track overall aquatic resource abundance and diversity annually over the life of the SSHCP (Level 1). Implement random or probabilistic sampling design throughout Plan Area at recommended intervals over the life of the SSHCP to track trends in condition; likely incorporating CRAM (Level 2).
Objectives VPI1, VPI2, VPI3, VPI4	What vernal pool invertebrate species are occupying preserved vernal pools?	Statistically valid status and trends sampling of all preserved pools in permanent and impermanent plots, conducted annually for the first 10 years after vernal pool preservation (Level 3).

Table 33
Effectiveness Monitoring

Related Objectives	Preserve Monitoring Question	Effectiveness Monitoring Approach
Objectives CTS2, WS1, WPT1, GGS1, CH1, TB1, TB2, TB3, TB5, FH1, SH1, SH2, SH3, NH1, NH2, WK1, WK2, GS1, GS2, LS1, LS2, BO1, BO2, WR1, WR2, AB1	Are Covered Species using preserved modeled-habitat? Is there a positive correlation between preserved nesting/roosting/foraging sites?	Conduct presence/absence surveys at appropriate timing for each Covered Species within preserved, established, or re-established habitat (Level 2).
Objectives VPI1, VPI2, VPI3, VPI4, CTS2, WS1, WPT1, GGS1, CH1, CH2, TB1, TB2, TB3, TB4, BO1, BO2, FH1, SH1, SH2, SH3, NH1, NH2, NH3, WK1, WK2, WK3, WK4, GS1, GS2, LS1, LS2, WR1, WR2, WR3, WR4, AB1, AB2	Is preserved, re-established, or established habitat being adequately maintained/managed for the benefit of Covered Species?	Annual SSHCP reports submitted by Implementing Entity, with field verification by Implementing Entity or designee (Level 2).
Objectives WS2, WPT2, GGS2, CH2, TB4, TB6, BO1, BO2, SH4, NH3, WK3, WK4, GS3, GS4, LS3, WR3, WR4, AB2	Are Covered Species occupying re-established or established habitat?	Compliance monitoring reports submitted annually by Implementing Entity. Field verification by Implementing Entity or designee. Presence/absence surveys at appropriate timing for each species (Level 2).
Objective HAB2	Are the physical conditions on the Preserves meeting the breeding feeding or sheltering needs of all Covered Species?	Rapid monitoring (CRAM or similar) for subset of Preserves, on at least an annual basis, compared against reference sites (Level 2).
Objective HAB4	Where are non-native weeds occurring in the Preserve System, and what species? Are they being eradicated in a timely fashion? Are the monitoring and management methods being updated to account for changed conditions?	Weed assessment and mapping within the Preserves on at least an annual basis, with other opportunistic assessment. Annual reporting of weed eradication efforts. TAC review of the SSHCP Conservation Strategy every 5 years (Level 2).
Objective HAB7	What is the biomass of vegetation within vernal pool-grassland, valley grassland, blue oak savanna, and other grasslands?	Annually monitor using residual dry matter (RDM) or another rapid monitoring technique at the end of the growing season; use a consistent time each year (Level 2).
Objective RIP5	What is the depth to groundwater within Preserves and how is it changing?	Annually measure depth to water table on Preserve parcels with existing wells (Level 2).
Objective GGS3	What is the hydrologic condition along Badger Creek? How much supplemental water would be required to maintain baseline conditions during summer? Is supplemental water maintaining appropriate hydrologic conditions in perpetuity?	Conduct hydrologic study for Badger Creek. Review hydrologic conditions every 5 years to ensure continued habitat suitability for giant garter snake (*Thamnophis gigas*) (Level 3). Annually review aerial imagery of Badger Creek to observe the ratio of open water and emergent vegetation (Level 1).

In order to properly manage the suite of monitoring data that would be collected for the SSHCP and ARP, the Implementing Entity would establish a GIS-linked database for use in compliance

monitoring, effectiveness monitoring, adaptive management, and annual reporting requirements. To the extent feasible, the database would be linked with other statewide or regional data repositories, such as the Regional Data Center of the California Environmental Data Exchange Network (CEDEN) and the California EcoAtlas Information System. The California EcoAtlas provides free public access to information about the quantity and quality of California wetlands. EcoAtlas enables integration of information to provide landscape context for consideration of wetland extent and condition.

The Implementing Entity would prepare annual reports summarizing the previous year's Covered Activities and provide a summary of all activities that have been implemented since SSHCP issuance, including all preserve monitoring results. Final reports are due to the regulatory agencies by January 31 following the end of the previous year's reporting cycle, which runs from October 1 to September 30.

5.3.2 Development of an ILF Program to Fulfill Compensatory Mitigation Requirements

The SSHCP Plan Permittees recognize the importance of a successful compensatory mitigation strategy accomplished in a timely fashion and nested in the overall conservation plan of the SSHCP. The Jump-Start and Stay-Ahead Provision (described in detail in the SSHCP in Chapter 9, Section 9.5.5) was developed to offset the potential for temporal loss of aquatic resources diversity, abundance, and condition at a sub-watershed landscape level in the Plan Area. Under this provision, the Plan Permittees would implement the compensatory mitigation requirement (pursuant to standards set forth in the 2008 federal Mitigation Rule [33 CFR Part 332]) prior to the authorized project impacts (the "Jump Start" portion of the provision). The Plan Permittees would use the "stay ahead" provisions required by the SSHCP in satisfying compensatory mitigation needs of Covered Activity projects. Thus, the importance of the "Jump-Start and Stay-Ahead" Provision is that compensatory mitigation acreage would always be ahead of impacted acreage (as opposed to similar stay-ahead programs that are based on "rough proportionality" and can actually fall behind from an acre-to-acre standpoint).

To meet the requirements of the 2008 federal Mitigation Rule (33 CFR Part 332), the Plan Permittees anticipate development of their own ILF program. The Plan Permittees would submit an ILF program proposal to the USACE (and Interagency Review Team) for review and subsequent approval by the USACE's District Engineer. The ILF would have technical consistency with the proposed restoration/creation approaches contained in Appendix D of this document. Because of the robust Jump-Start and Stay-Ahead Provision described above, a common challenge approached in many ILFs, temporal loss, is not anticipated to be an issue with the SSHCP's proposed ILF program.

The Plan Area is within the service area of several existing mitigation banks with credit availability, which may be a viable option to allow early implementation of the SSHCP compensatory mitigation strategy. Compensatory mitigation carried out via purchase of mitigation bank credits is preferred in the hierarchy set forth by the federal mitigation rule to offset impacts for authorized impacts to waters of the United States. However, an ILF program may override the USACE's mitigation bank preference when credits become available for ecologically valuable parcels identified in advance and based upon the rigorous scientific and technical analysis as part of a project-specific ILF planning framework. ILF programs can achieve important ecological and societal benefits by focusing primarily on watershed needs and by siting multiple compensatory mitigation projects in strategic locations of a watershed to meet specific needs and goals. It is for these reasons Plan Permittees believe an ILF program would best suit the long-term compensatory mitigation needs of the SSHCP regulatory framework.

6 AQUATIC RESOURCES PROFILE POST-MITIGATION

As was summarized for existing conditions (Chapter 3) and conditions post-impact without mitigation (Chapter 4), the final status of aquatic resources within the Plan Area (following impacts and mitigation) is summarized here in terms of the aquatic resources' resulting diversity, abundance, and condition. Diversity is again described in terms of the variety of aquatic resources by land cover type (common name) and Cowardin class that would remain following impacts and mitigation. Abundance is described in terms of acreage of each aquatic resource type within the Plan Area and per watershed (at the HUC-10 level) that would exist following impacts and mitigation. Condition is described using a landscape-level functional assessment to determine the relative capacity of the aquatic resources to perform various functions and services related to hydrology, water quality, and habitat.

6.1 Aquatic Resources Abundance and Diversity After Impacts and Mitigation

Within the Plan Area, of the currently existing 24,256 acres of mapped potentially jurisdictional aquatic resources, there are projected impacts to approximately 1,613 acres. However, following implementation of the SSHCP's compensatory mitigation strategy, all impacted acreage of aquatic resources would be replaced, resulting in no net loss of acres of aquatic resources (i.e., no impact on abundance). Furthermore, there would not be a disproportionate loss of any particular aquatic resource type, so aquatic resources diversity would also be maintained. The only aquatic resource types that show moderate decreases in abundance are Mine Tailing Riparian Woodlands and Open Water, both of which consist largely of unnatural or man-made features. As the intent of the SSHCP compensatory mitigation program is to establish and/or re-establish natural, high-quality aquatic resources, all of the required mitigation acreage to offset losses of Mine Tailing Riparian Woodlands is shifted to either Mixed Riparian Scrub or Mixed Riparian Woodland; and some of the required mitigation acreage to offset losses of Open Water is shifted to either Freshwater Marsh or Seasonal Wetlands.

See Table 34 for a summary of future aquatic resources abundance by type (diversity) per watershed.

Table 34
Future Abundance (Acres) of Aquatic Resources in the Plan Area, by Aquatic Resource Type

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed (acres)										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Riparian	Mine Tailing Riparian Woodland	R	0	0.2	158.3	17.3	0	0	1.6	0	0	245.5	422.9
	Mixed Riparian Scrub	R	0	80.4	58.1	290.0	47.1	2.4	20.7	130.1	546.4	99.7	1,274.9
	Mixed Riparian Woodland	R	0.4	959.5	261.7	1,908.9	400.6	196.4	102.6	52.7	1,324.5	815.7	6,023.0
Subtotal Riparian			*0.4*	*1,040.1*	*478.1*	*2,216.2*	*447.7*	*198.8*	*124.9*	*182.8*	*1,870.9*	*1,160.9*	*7,720.8*
Wetland Waters	Freshwater Marsh	PEM1	2.0	38.3	167.2	1,194.5	47.5	20.9	315.2	39.7	1,097.2	112.3	3,034.5
	Seasonal Wetland	PEM2	22.6	199.7	444.5	616.3	134.0	<0.0	38.9	0.2	799.9	427.0	2,189.0
	Swales	R2/R3	2.9	160.4	518.0	144.2	141.0	0	225.9	1.4	10.3	80.6	1,284.7
	Vernal Pools	PEM2	6.9	274.3	2,026.7	618.6	319.4	0.1	531.2	5.3	420.9	324.7	4,528.2
Subtotal Wetland Waters			*34.4*	*672.7*	*3,156.4*	*2,573.6*	*641.9*	*21.0*	*1,111.2*	*46.6*	*2,328.3*	*944.6*	*11,036.4*

Table 34
Future Abundance (Acres) of Aquatic Resources in the Plan Area, by Aquatic Resource Type

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Watershed (acres)										Total
			American River	*Deer Creek*	*Laguna*	*Lower Cosumnes River*	*Lower Dry Creek*	*Lower Mokelumne*	*Morrison Creek*	*Sherman Lake – Sac River*	*Snodgrass Slough*	*Upper Cosumnes River*	
Non-Wetland Waters	Open Water	POW	2.7	129.4	295.4	663.0	8.4	3.1	78.4	9.	719.2	280.2	2,189.0
	Perennial or Intermittent Streams/ Creeks	R2UB/ R3UB	5.6	228.3	416.3	345.0	92.5	67.4	65.4	23.9	1,155.7	362.0	2,762.9
	Streams/ Creeks (VPIH) Ephemeral	R4SB	0	18.7	0	0	0	0	35.6	0	0	0	54.2
Subtotal Non-Wetland Waters			*8.3*	*376.4*	*711.7*	*1,008.0*	*1,00.9*	*70.5*	*179.4*	*32.9*	*1,874.9*	*642.2*	*5,006.1*
Subtotal Wetland Waters and Non-Wetland Waters			*42.7*	*1,049.1*	*3,868.1*	*3,581.6*	*641.9*	*91.5*	*1,290.6*	*79.5*	*4,203.2*	*1,586.8*	*16,042.5*
Grand Total[1]			**43.1**	**2,089.2**	**4,346.2**	**5,797.8**	**1,089.6**	**290.3**	**1,415.5**	**262.3**	**6,074.1**	**2,747.7**	**23,763.3**

Note: [1.] Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

6.2 Estimated Future Condition of Aquatic Resources in the Plan Area

The effects of implementation of the SSHCP on the condition of aquatic resources are estimated by projecting the future condition of aquatic resources within the Plan Area, including consideration of mitigation as prescribed by the SSHCP. The projected future condition is obtained from the results of the Functional Assessment Report (Appendix C), which categorizes the Plan Area's aquatic resources into high, moderate, low, or very low condition.

6.2.1 Future Condition of Aquatic Resources

The landscape-level assessment that was used to describe the existing aquatic resource conditions (Chapter 3) and conditions with projected impacts (Chapter 4) was also used to predict the future condition of the aquatic resources accounting for both impacts and mitigation. The overall quality of future aquatic resources was predicted based on the same factors: area of the aquatic resource, HUC-10 watershed, primary adjacent land cover, secondary adjacent land cover, and aquatic resource type. Function scores were assigned for each of these factors, per aquatic resource feature, based upon ability to maintain or improve the following functions: habitat, water quality, and hydrology. The second factor, HUC-10 watershed, was updated based on the predicted future state of each of the watersheds, with the same scoring measures as were used for the impact-only conditions (see Chapter 4). The results of the analysis provided an overall functional score of very low, low, moderate, or high for each aquatic resource.

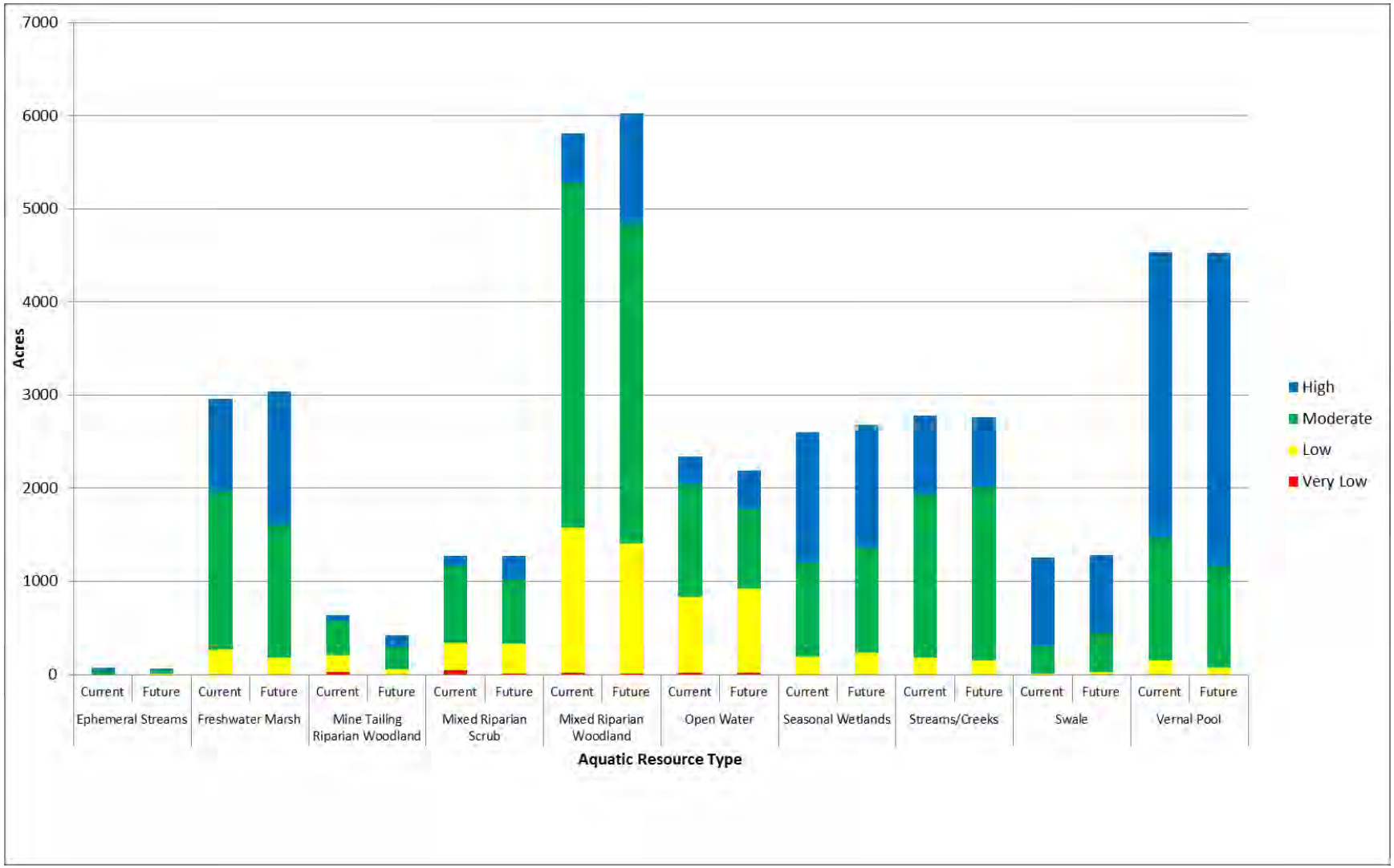
Table 35 summarizes the future condition of aquatic resources in the overall Plan Area following implementation of the SSHCP, including the mitigation program, and Figure 38 is a graphical depiction of those data, showing how the future Plan Area compares to the existing conditions. Compared to the existing conditions, the future Plan Area conditions show that the amount of high condition resources would increase (increase of 1,391 acres) as a result of the strategic and coordinated approach to mitigation implementation. This means that the future state of aquatic resources in the Plan Area would benefit from implementation of the SSHCP, as the established and re-established aquatic resources would be appropriately sited as required by Conservation Actions in Table 7-1, such that the overall conditions of Plan Area aquatic resources would be improved.

Table 35
Future Condition of Aquatic Resources in the Overall Plan Area

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	131.0	241.0	50.9	0	422.9
	Mixed Riparian Scrub	R2/R3	257.1	688.1	324.2	5.4	1,274.9
	Mixed Riparian Woodland	R2/R3	1,178.62	3,434.15	1,403.50	6.73	6,023.0
		Subtotal Riparian	*1,566.7*	*4,363.3*	*1,778.6*	*12.1*	*7,720.8*
Wetland Waters	Freshwater Marsh	PEM1	1,425.3	1,427.6	181.6	0	3,034.5
	Seasonal Wetland	PEM2	1,318.7	1,132.6	231.8	0	2,683.1
	Swales	R2/R3	839.2	419.1	26.4	0	1,284.7
	Vernal Pools	PEM2	3,362.52	1,093.38	72.26	0	4,528.1
		Subtotal Wetland Waters	*6,945.7*	*4,072.7*	*512.1*	*0*	*11,530.5*
Non-Wetland Waters	Open Water	POW	413.6	856.3	903.6	15.5	2,189.0
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	742.0	1,866.1	154.7	0	2,762.9
	Streams/Creeks (VPIH) Ephemeral	R4SB	2.6	46.1	5.5	0	54.2
		Subtotal Non-Wetland Waters	*1,158.2*	*2,768.5*	*1,063.8*	*15.5*	*5,006.1*
		Subtotal Wetland Waters and Non-Wetland Waters	*8,103.9*	*6,841.2*	*1,575.9*	*15.5*	*16,536.6*
		Grand Total[1]	**9,670.6**	**1,1204.4**	**3,354.4**	**27.6**	**24,257.3**

Note: 1. Table may not total precisely due to rounding.
Acreage totals in the ARP may not match precisely with acreage totals in the SSHCP. Factors that may result in differences between acreage figures in the ARP as compared to the SSHCP include: 1) The ARP only considers direct impacts where the SSHCP considers both direct and indirect impacts; 2) The ARP only includes jurisdictional wetlands for some land cover types where the SSHCP includes all wetlands; and 3) Slightly different Geographical Information System processes that result in small differences in totals.

Figure 38 Existing and Future Watershed Profiles of Aquatic Resources in the Plan Area



Tables 36 through 45 summarize the future condition of aquatic resources in each HUC-10 watershed following implementation of the SSHCP and Figures 39 through 48 are graphical depictions, comparing the existing to the future watershed conditions.

The watersheds with the largest amounts of impacts are the American River, Morrison Creek, and Sherman Lake–Sacramento River watersheds. Following SSHCP implementation of the prescribed mitigation program, the American River watershed would retain approximately the same amounts of aquatic resources, with only a loss of mine tailing riparian woodland. Mine tailing riparian woodland mitigation acreages would be compensated for in the form of mixed riparian woodland or mixed riparian scrub in watersheds outside the UDA, primarily within, but not limited to, the adjacent Deer Creek and Upper Cosumnes watersheds. Re-establishment and establishment requirements for all other aquatic resource types in the American River watershed would occur within the portion of its watershed that is outside the UDA. Despite the American River watershed having the largest proportion of expected impacts, aquatic resource abundance and diversity would be maintained and remain stable.

The Morrison Creek watershed in its future state would have an overall decrease in abundance of aquatic resources, as it would experience the largest amount of development within the UDA portion of the Plan Area. An inventory was taken of available land suitable for re-establishment and/or establishment within the Morrison Creek watershed in order to maximize the amount of mitigation replaced within watershed. This inventory identified approximately 50 acres of vernal pool, 30 acres of swale, and 50 acres of freshwater marsh re-establishment/establishment that is ecologically feasible within the Morrison Creek watershed. Remaining requirements for aquatic resource impacts within the watershed would be mitigated for in-kind within other adjacent watersheds. There would be a hierarchy of preference such that mitigation would be exhausted within the Morrison Creek watershed first. Mitigation would occur closest to the impact sites before exploring mitigation farther away.

The Sherman Lake–Sacramento River watershed in its future state would maintain the same aquatic resource abundance and diversity and would have a slight increase in condition. Re-establishment and/or establishment types of compensatory mitigation would occur within the portion of the watershed that is outside the UDA for all aquatic resource types.

The Deer Creek, Lower Cosumnes, Lower Dry Creek, and Upper Cosumnes watersheds in their future states all show increases in aquatic resource condition, resulting from the properly targeted preservation and compensatory mitigation strategy implemented through the SSHCP.

Table 36
Future Condition of Aquatic Resources in the American River Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0	0	0	0
	Mixed Riparian Woodland	R2/R3	0	0	0.4	0	0.4
Subtotal Riparian			*0*	*0*	*0.4*	*0*	*0.4*
Wetland Waters	Freshwater Marsh	PEM1	0	1.6	0.4	0	2.0
	Seasonal Wetland	PEM2	0	22.6	0	0	22.6
	Swale	R2/R3	0	2.4	0.5	0	2.9
	Vernal Pools	PEM2	0	6.9	<0.1	0	6.9
Subtotal Wetland Waters			*0*	*33.5*	*0.9*	*0*	*34.4*
Non-Wetland Waters	Open Water	POW	0	0.48	2.17	0	2.65
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	2.72	2.88	0	5.60
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*3.2*	*5.1*	*0*	*8.3*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*36.7*	*6.0*	*0.0*	*42.7*
Grand Total[1]			**0**	**36.7**	**6.4**	**0**	**43.1**

Note: 1. Table may not total precisely due to rounding.

Figure 39 Existing and Future Watershed Profiles of Aquatic Resources in the American River Watershed

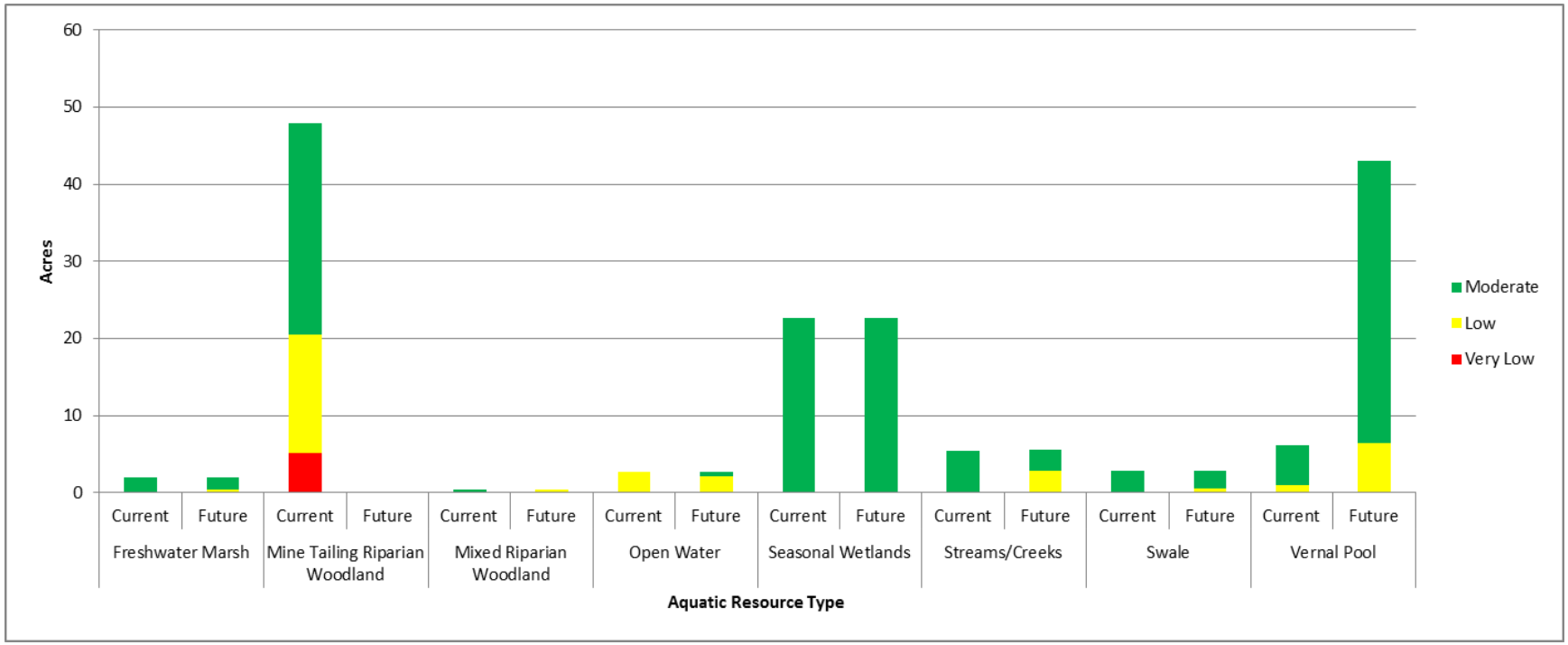


Table 37
Future Condition of Aquatic Resources in the Deer Creek Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0.20	<0.1	0	0.2
	Mixed Riparian Scrub	R2/R3	42.0	35.4	3.0	0	80.4
	Mixed Riparian Woodland	R2/R3	245.9	694.6	19.3	0	959.5
Subtotal Riparian			*287.9*	*730.2*	*22.3*	*0*	*1,040.1*
Wetland Waters	Freshwater Marsh	PEM1	24.0	14.3	0	0	38.3
	Seasonal Wetland	PEM2	94.6	100.1	5.0	0	199.7
	Swale	R2/R3	133.2	26.3	0.9	0	160.4
	Vernal Pools	PEM2	216.9	57.2	0.3	0	274.3
Subtotal Wetland Waters			*468.7*	*197.9*	*6.2*	*0*	*672.7*
Non-Wetland Waters	Open Water	POW	69.4	56.4	3.6	0	129.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	106.8	121.5	<0.1	0	228.3
	Streams/Creeks (VPIH) Ephemeral	R4SB	2.6	15.3	0.8	0	18.7
Subtotal Non-Wetland Waters			*178.8*	*193.2*	*4.4*	*0*	*376.4*
Subtotal Wetland Waters and Non-Wetland Waters			*647.5*	*391.1*	*10.6*	*0*	*1,049.10*
Grand Total[1]			**935.4**	**1,121.3**	**32.9**	**0**	**2,089.2**

Note: 1. Table may not total precisely due to rounding.

Figure 40 Existing and Future Watershed Profiles of Aquatic Resources in the Deer Creek Watershed

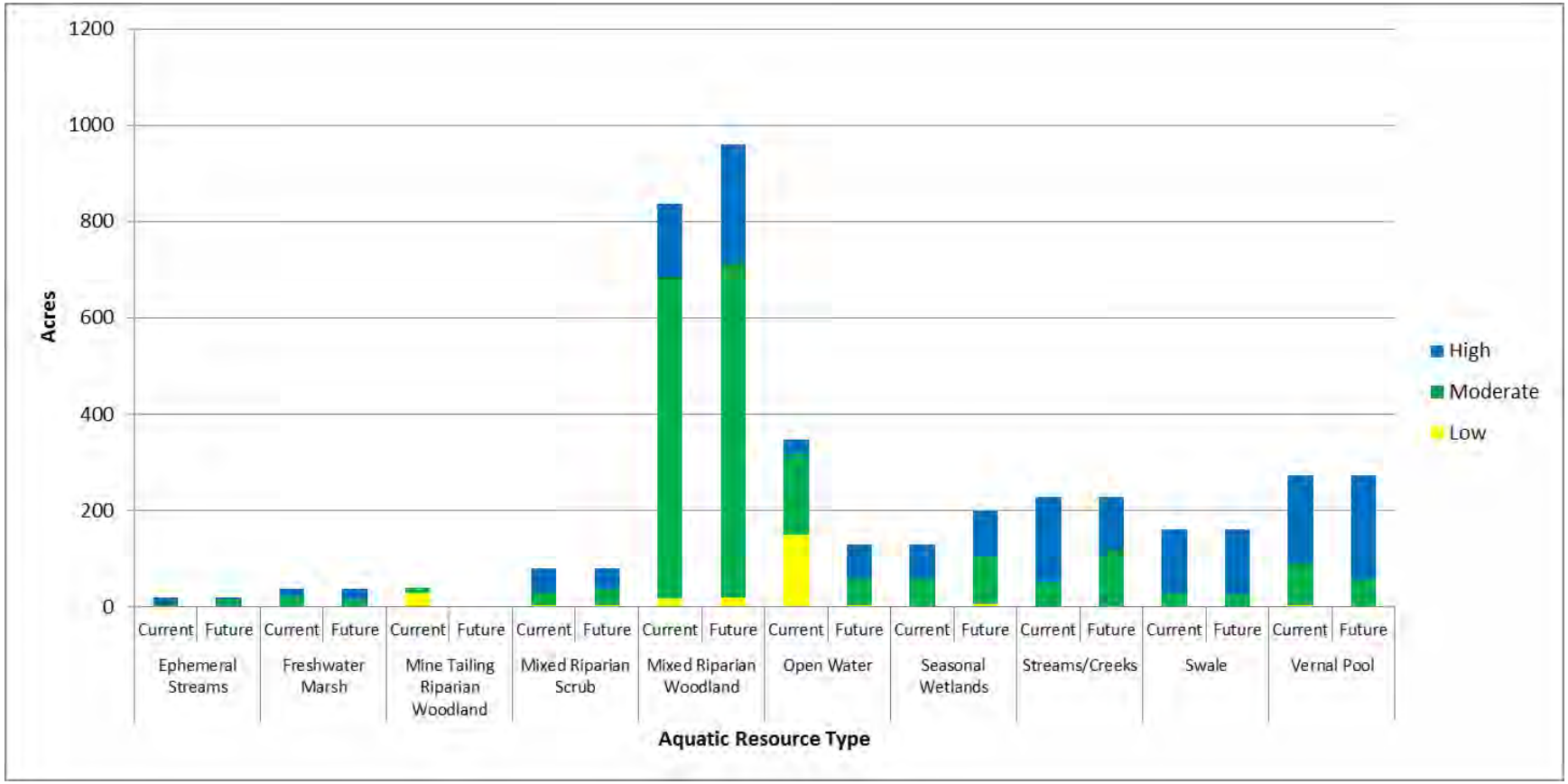


Table 38
Future Condition of Aquatic Resources in the Laguna Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	63.8	74.8	19.7	0	158.3
	Mixed Riparian Scrub	R2/R3	10.4	45.6	2.1	0	58.1
	Mixed Riparian Woodland	R2/R3	72.2	179.5	10.0	0	261.7
Subtotal Riparian			*146.4*	*299.9*	*31.8*	*0*	*478.1*
Wetland Waters	Freshwater Marsh	PEM1	147.1	19.6	0.4	0	167.2
	Seasonal Wetland	PEM2	404.8	25.1	14.5	0	444.5
	Swale	R2/R3	404.1	113.7	0.3	0	518.0
	Vernal Pools	PEM2	1,949.0	70.3	7.4	0	2,026.7
Subtotal Wetland Waters			*2,905.0*	*228.7*	*22.6*	*0*	*3,156.4*
Non-Wetland Waters	Open Water	POW	178.8	47.5	69.2	0	295.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	246.6	167.6	2.0	0	416.3
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*425.4*	*215.1*	*71.2*	*0*	*711.7*
Subtotal Wetland Waters and Non-Wetland Waters			*3,330.4*	*443.8*	*93.8*	*0*	*3,868.1*
Grand Total[1]			**3,476.8**	**743.7**	**125.6**	**0**	**4,346.2**

Note: 1. Table may not total precisely due to rounding.

Figure 41 Existing and Future Watershed Profiles of Aquatic Resources in the Laguna Watershed

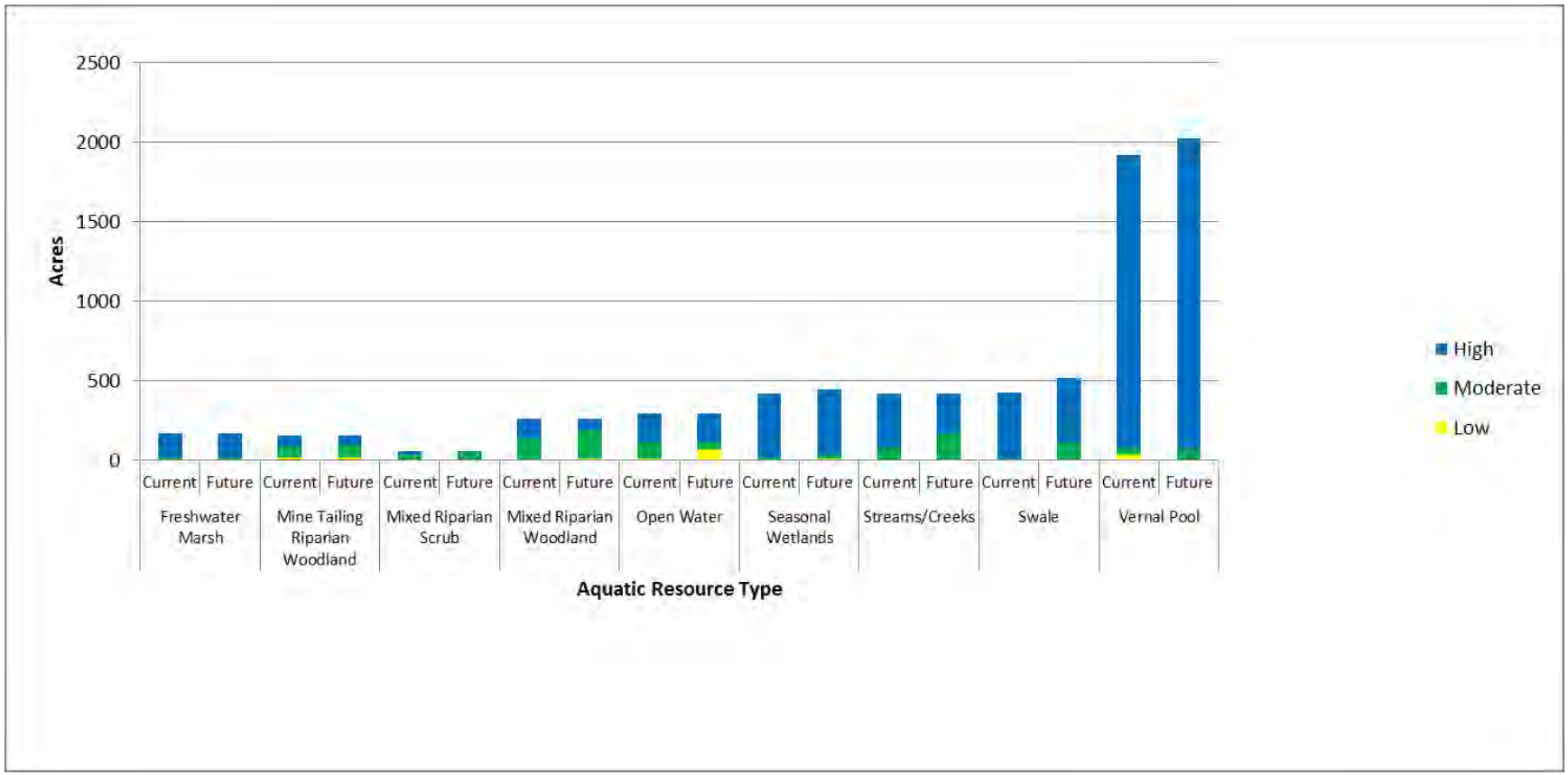


Table 39
Future Condition of Aquatic Resources in the Lower Cosumnes Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	17.3	0	0	17.3
	Mixed Riparian Scrub	R2/R3	159.8	122.8	7.4	0	290.0
	Mixed Riparian Woodland	R2/R3	401.5	1,264.0	243.4	0	1,908.9
Subtotal Riparian			*561.3*	*1,404.1*	*250.8*	*0*	*2,216.2*
Wetland Waters	Freshwater Marsh	PEM1	1,056.2	134.4	3.9	0	1,194.5
	Seasonal Wetland	PEM2	350.2	262.7	3.4	0	616.3
	Swale	R2/R3	102.0	41.0	1.2	0	144.2
	Vernal Pools	PEM2	349.8	230.7	38.1	0	618.6
Subtotal Wetland Waters			*1,858.2*	*668.8*	*46.6*	*0*	*2,573.60*
Non-Wetland Waters	Open Water	POW	31.6	270.4	360.9	0	663.0
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	139.6	203.4	2.0	0	345.0
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*171.2*	*473.8*	*362.9*	*0*	*1,008.0*
Subtotal Wetland Waters and Non-Wetland Waters			*2,029.4*	*1,142.6*	*409.5*	*0*	*3,581.6*
Grand Total[1]			**2,590.7**	**2,546.7**	**660.3**	**0**	**5,797.8**

Note: 1. Table may not total precisely due to rounding.

Figure 42 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Cosumnes Watershed

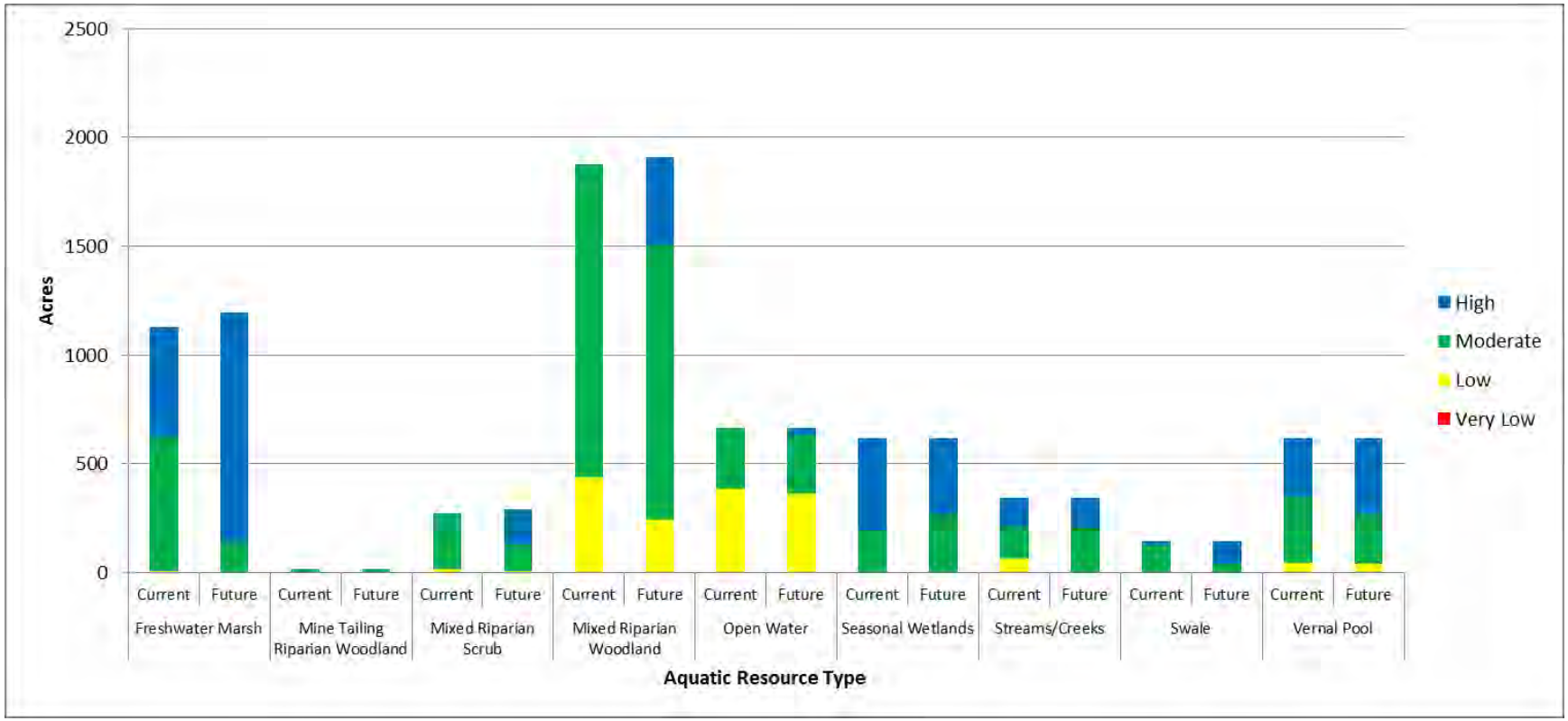


Table 40
Future Condition of Aquatic Resources in the Lower Dry Creek Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	9.9	31.8	5.4	0	47.1
	Mixed Riparian Woodland	R2/R3	15.7	332.6	52.3	0	400.6
Subtotal Riparian			*25.6*	*364.4*	*57.7*	*0*	*447.7*
Wetland Waters	Freshwater Marsh	PEM1	18.8	26.5	2.2	0	47.5
	Seasonal Wetland	PEM2	90.4	39.3	4.3	0	134.0
	Swale	R2/R3	87.5	53.4	<0.1	0	141.0
	Vernal Pools	PEM2	229.1	88.2	2.1	0	319.4
Subtotal Wetland Waters			*425.8*	*207.4*	*8.6*	*0*	*641.9*
Non-Wetland Waters	Open Water	POW	0	6.57	1.86	0	8.43
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	33.4	55.9	3.3	0	92.5
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*33.4*	*62.5*	*5.2*	*0*	*100.93*
Subtotal Wetland Waters and Non-Wetland Waters			*459.2*	*269.9*	*13.8*	*0*	*742.8*
Grand Total[1]			**484.8**	**634.3**	**71.5**	**0**	**1,190.5**

Note: 1. Table may not total precisely due to rounding.

Figure 43 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Dry Creek Watershed

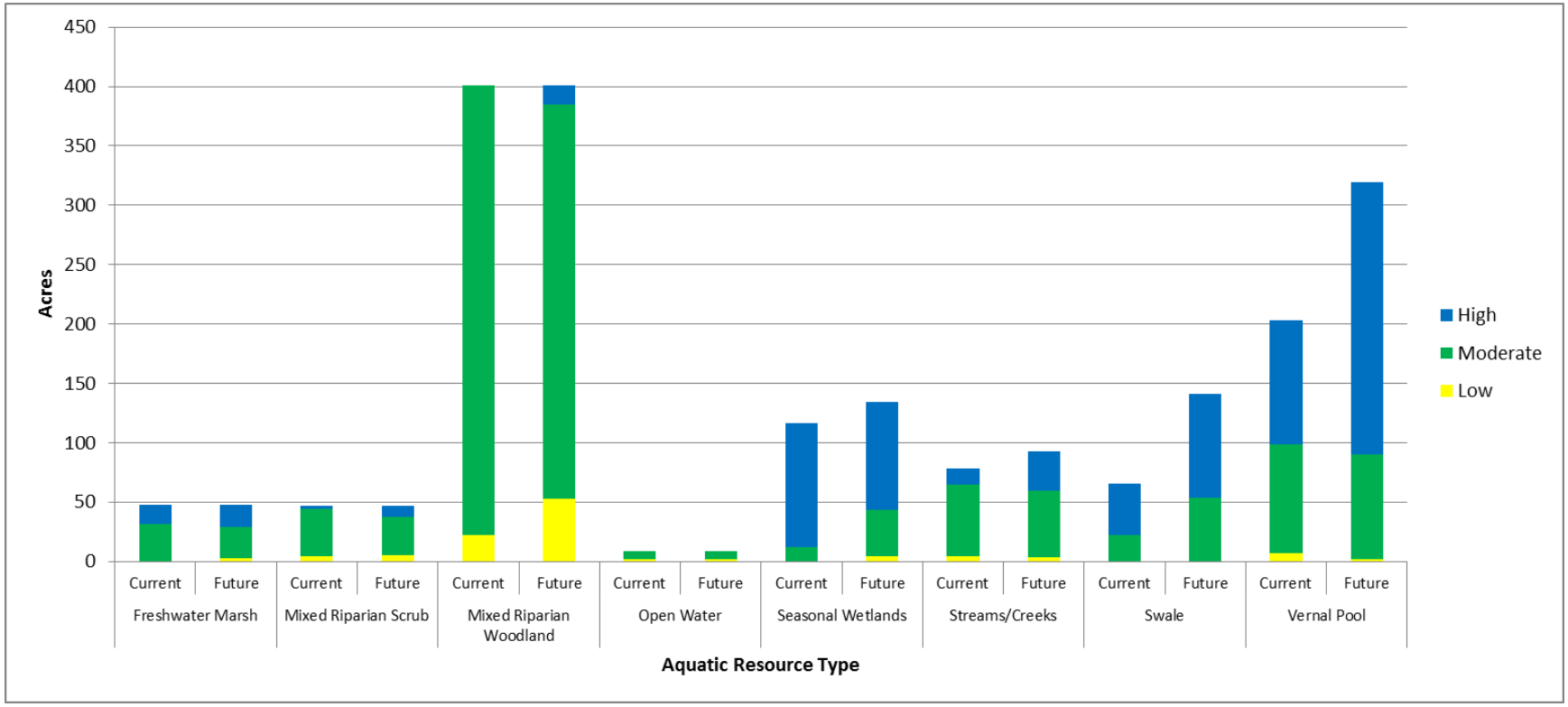


Table 41
Future Condition of Aquatic Resources in the Lower Mokelumne River Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	0.02	2.4	0	2.4
	Mixed Riparian Woodland	R2/R3	0	14.1	182.2	0	196.4
Subtotal Wetland Riparian			*0*	*14.1*	*184.6*	*0*	*198.8*
Wetland Waters	Freshwater Marsh	PEM1	0	20.9	0	0	20.9
	Seasonal Wetland	PEM2	0	0.01	0	0	0.01
	Swale	R2/R3	0	0	0	0	0
	Vernal Pools	PEM2	0	0.1	0	0	0.1
Subtotal Wetland Waters			*0*	*21.0*	*0*	*0*	*21.0*
Non-Wetland Waters	Open Water	POW	0	0	3.1	0	3.1
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	65.1	2.2	0	67.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*65.1*	*5.3*	*0*	*70.5*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*86.1*	*5.3*	*0*	*91.5*
Grand Total[1]			**0**	**100.2**	**189.9**	**0**	**290.3**

Note: 1. Table may not total precisely due to rounding.

Figure 44 Existing and Future Watershed Profiles of Aquatic Resources in the Lower Mokelumne Watershed

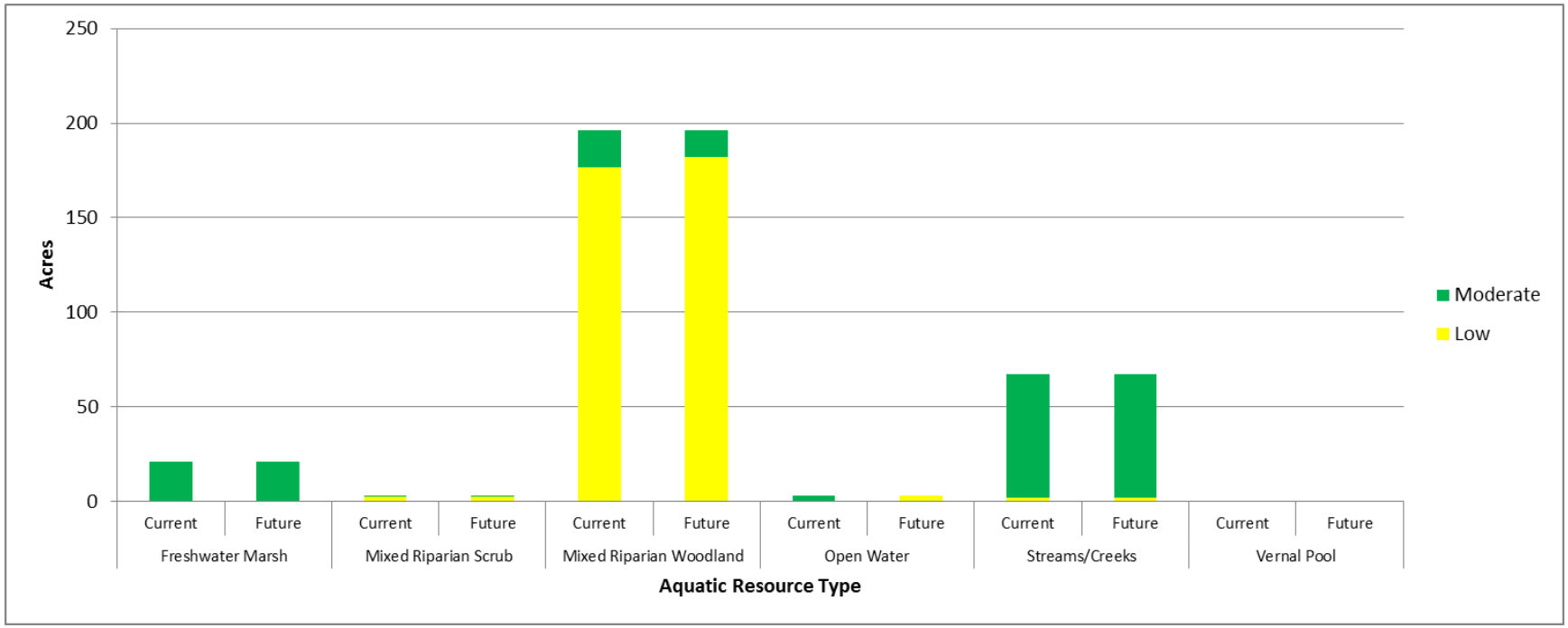


Table 42
Future Condition of Aquatic Resources in the Morrison Creek Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	1.61	0	1.61
	Mixed Riparian Scrub	R2/R3	3.2	11.2	6.3	0	20.7
	Mixed Riparian Woodland	R2/R3	0	54.5	48.1	0	102.6
Subtotal Riparian			*3.2*	*65.7*	*56.0*	*0*	*124.9*
Wetland Waters	Freshwater Marsh	PEM1	63.8	228.5	22.8	0	315.2
	Seasonal Wetland	PEM2	0	24.5	14.4	0	38.9
	Swale	R2/R3	46.8	158.5	20.6	0	225.9
	Vernal Pools	PEM2	333.7	183.6	13.9	0	531.2
Subtotal Wetland Waters			*444.3*	*595.1*	*71.7*	*0*	*1,111.2*
Non-Wetland Waters	Open Water	POW	0	19.4	59.0	0	78.4
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	30.2	35.2	0	65.4
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	30.8	4.7	0	35.6
Subtotal Non-Wetland Waters			*0*	*80.4*	*98.9*	*0*	*179.4*
Subtotal Wetland Waters and Non-Wetland Waters			*444.3*	*675.5*	*170.6*	*0*	*1,290.6*
Grand Total[1]			**447.5**	**741.2**	**226.6**	**0**	**1,415.5**

Note: 1. Table may not total precisely due to rounding.

Figure 45 Existing and Future Watershed Profiles of Aquatic Resources in the Morrison Creek Watershed

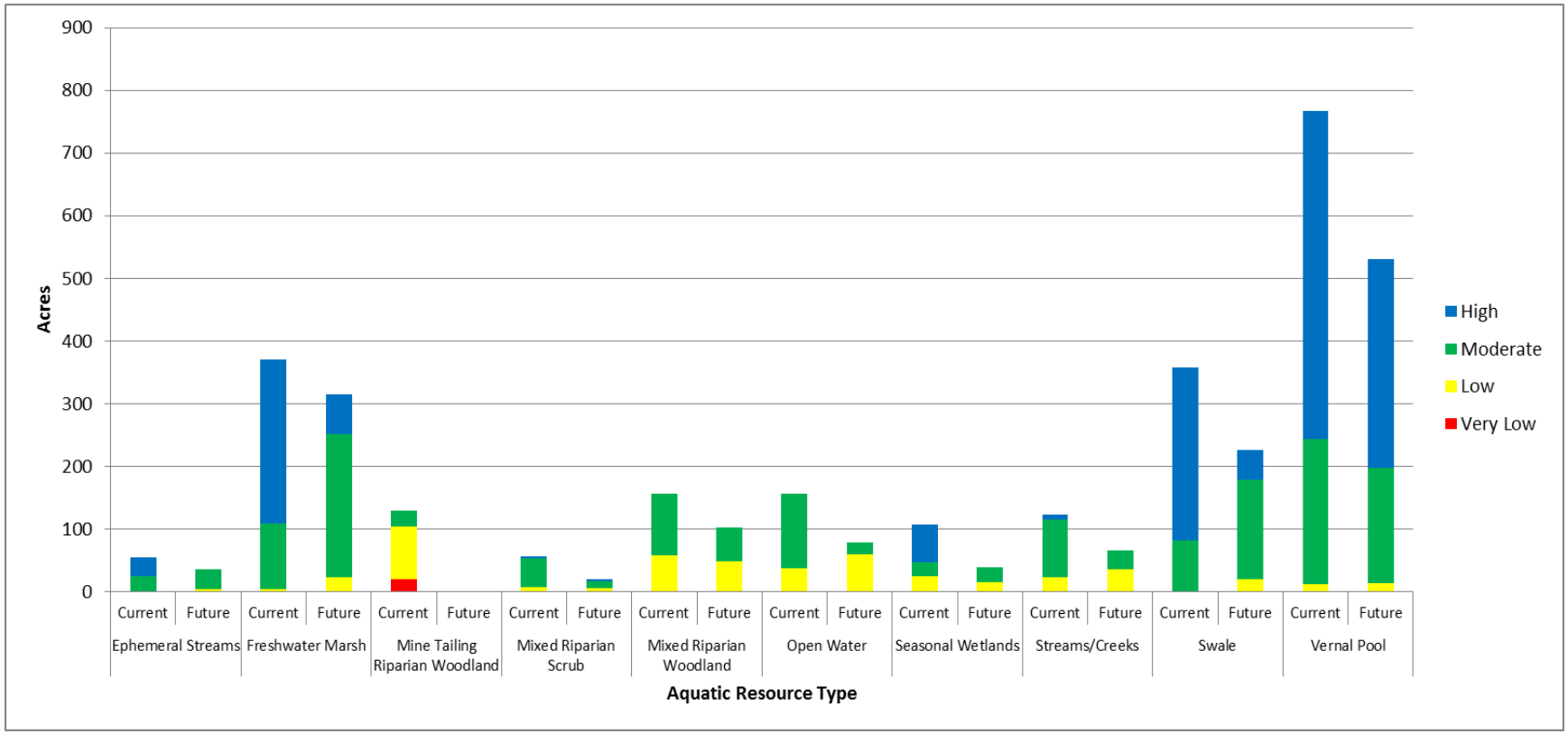


Table 43
Future Condition of Aquatic Resources in the Sherman Lake–Sacramento River Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	3.9	120.8	5.4	130.1
	Mixed Riparian Woodland	R2/R3	0	4.7	41.2	6.7	52.7
Subtotal Riparian			*0*	*8.6*	*162.0*	*12.1*	*182.8*
Wetland Waters	Freshwater Marsh	PEM1	0	39.7	0	0	39.7
	Seasonal Wetland	PEM2	0	0.2	0	0	0.2
	Swale	R2/R3	0	1.4	0	0	1.4
	Vernal Pools	PEM2	0	5.3	0	0	5.3
Subtotal Wetland Waters			*0*	*46.6*	*0*	*0*	*46.6*
Non-Wetland Waters	Open Water	POW	0	0	9.2	0	9.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	0	4.1	19.8	0	23.9
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*0*	*4.1*	*29.0*	*0*	*33.1*
Subtotal Wetland Waters and Non-Wetland Waters			*0*	*50.7*	*29*	*0*	*79.7*
Grand Total[1]			**0**	**59.3**	**191.0**	**12.1**	**262.5**

Note: 1. Table may not total precisely due to rounding.

Figure 46 Existing and Future Watershed Profiles of Aquatic Resources in the Sherman Lake–Sacramento River Watershed

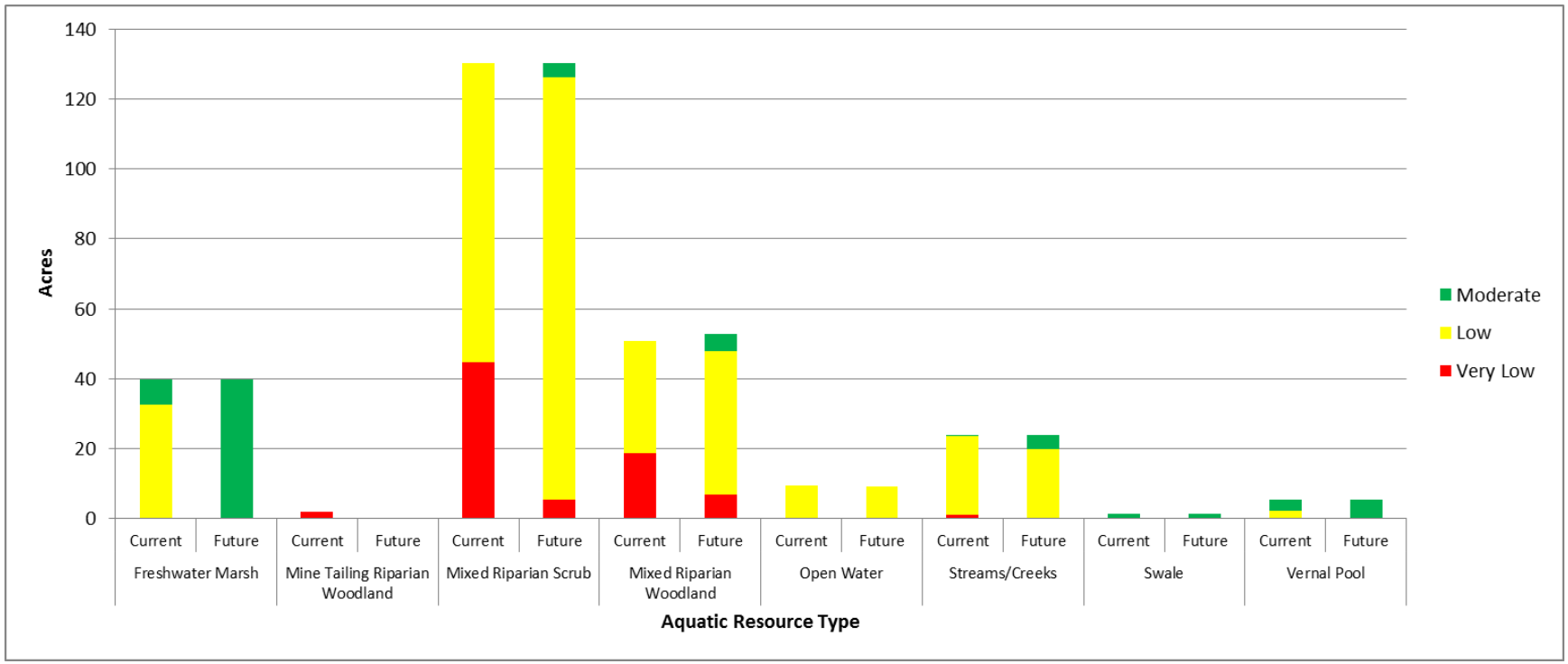


Table 44
Future Condition of Aquatic Resources in the Snodgrass Slough Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	0	0	0	0	0
	Mixed Riparian Scrub	R2/R3	0	369.6	176.9	0	546.4
	Mixed Riparian Woodland	R2/R3	0	522.0	802.5	0	1,324.5
Subtotal Riparian			*0*	*891.6*	*979.4*	*0*	*1,870.9*
Wetland Waters	Freshwater Marsh	PEM1	27.0	919.5	150.7	0	1,097.2
	Seasonal Wetland	PEM2	0	615.4	184.5	0	799.9
	Swale	R2/R3	0	7.8	2.5	0	10.3
	Vernal Pools	PEM2	0	413.9	7.0	0	420.9
Subtotal Wetland Waters			*27.0*	*1,956.6*	*344.7*	*0*	*2,328.3*
Non-Wetland Waters	Open Water	POW	0	389.9	313.8	15.5	719.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	25.7	1,043.0	86.9	0	1,155.7
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
Subtotal Non-Wetland Waters			*25.7*	*1,432.9*	*400.7*	*15.5*	*1,874.9*
Subtotal Wetland Waters and Non-Wetland Waters			*52.7*	*3,389.5*	*745.4*	*15.5*	*4,203.2*
Grand Total[1]			**52.7**	**4,281.1**	**1,724.8**	**15.5**	**6,074.1**

Note: 1. Table may not total precisely due to rounding.

Figure 47 Existing and Future Watershed Profiles of Aquatic Resources in the Snodgrass Slough Watershed

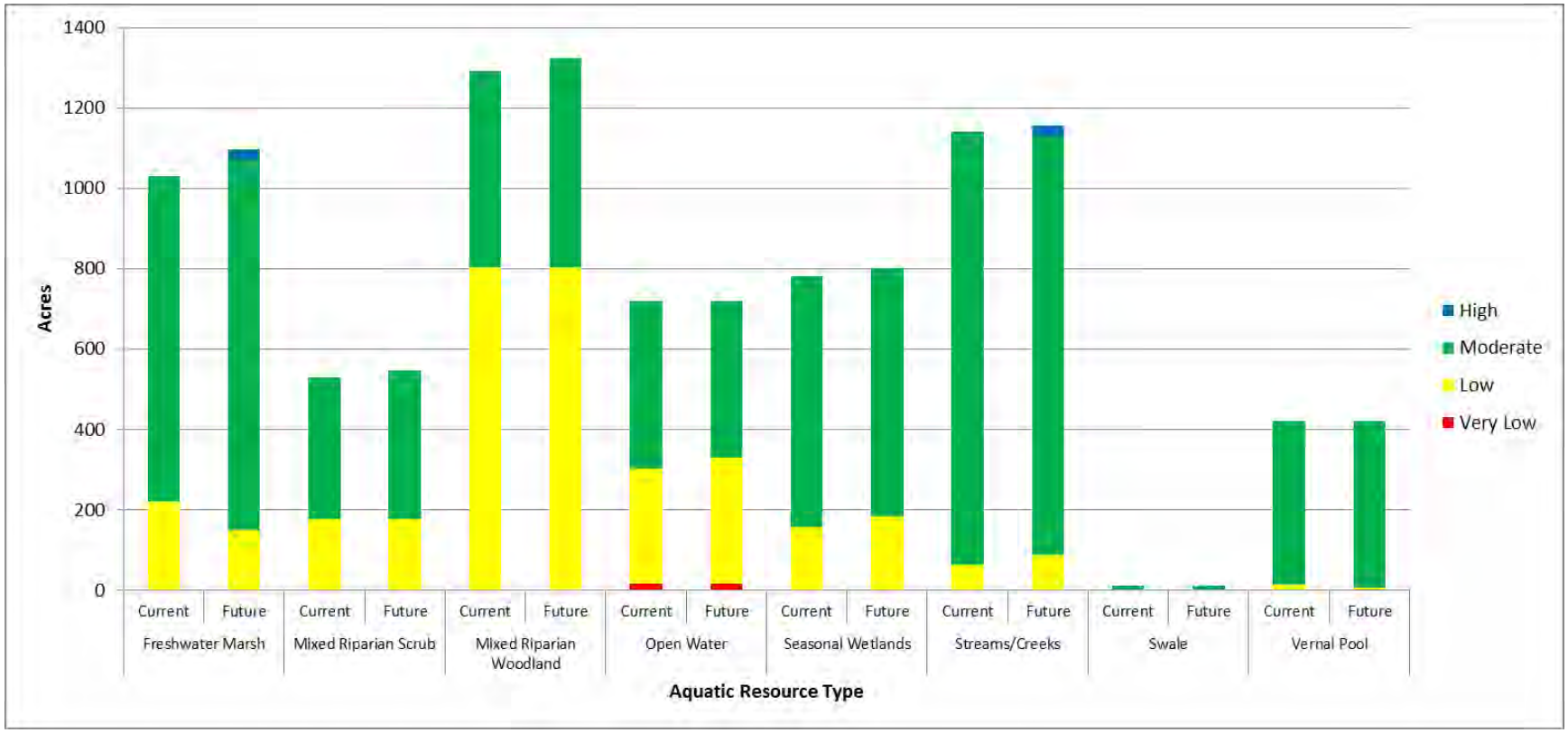
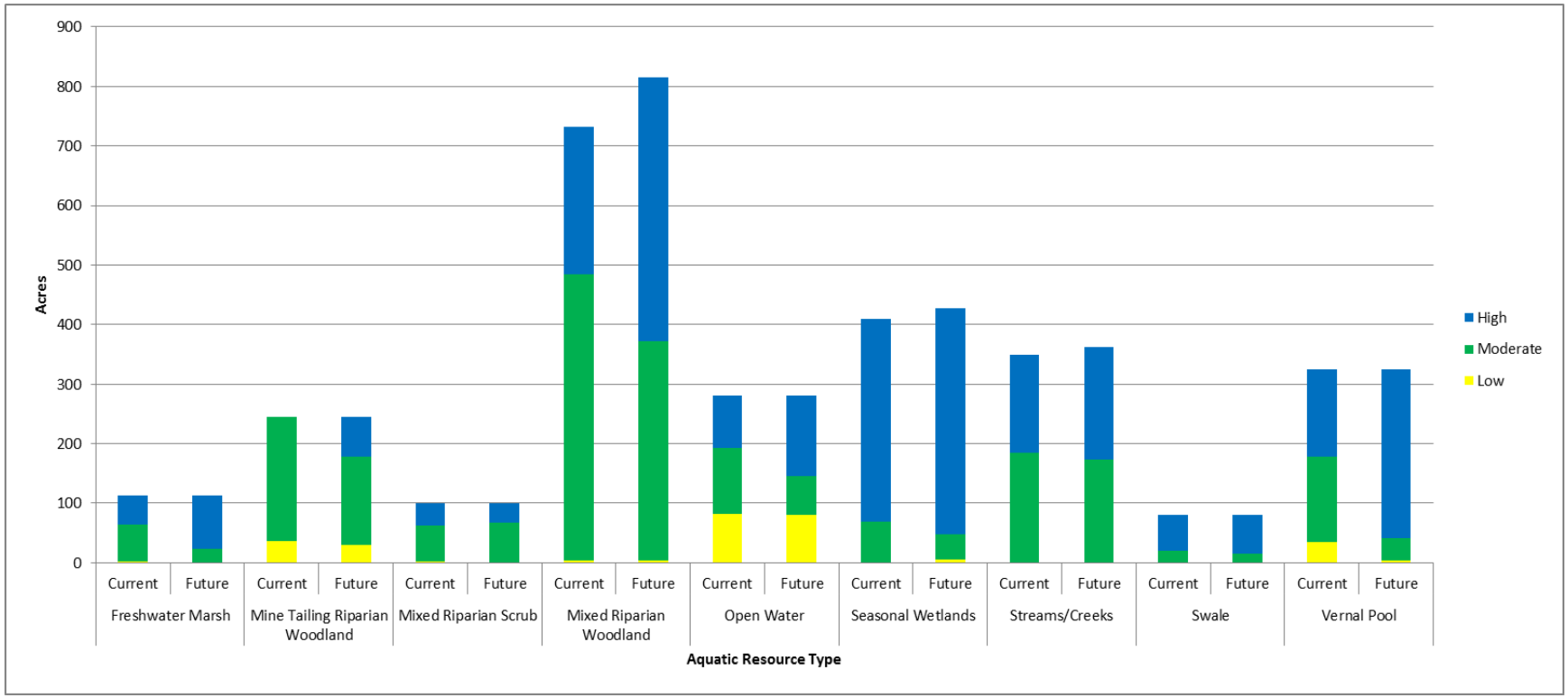


Table 45
Future Condition of Aquatic Resources in the Upper Cosumnes Watershed

Wetland or Non-Wetland Waters	SSHCP Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres	*Acres*	*Acres*	*Acres*	
Riparian	Mine Tailing Riparian Woodland	R2/R3	67.2	148.7	29.7	0	245.5
	Mixed Riparian Scrub	R2/R3	31.8	67.9	0	0	99.7
	Mixed Riparian Woodland	R2/R3	443.6	368.1	4.0	0	815.7
		Subtotal Riparian	*542.6*	*584.7*	*33.7*	*0*	*1,160.9*
Wetland Waters	Freshwater Marsh	PEM1	88.4	22.6	1.3	0	112.3
	Seasonal Wetland	PEM2	378.7	42.7	5.7	0	427.0
	Swale	R2/R3	65.7	14.6	0.3	0	80.6
	Vernal Pools	PEM2	284.1	37.2	3.4	0	324.7
		Subtotal Wetland Waters	*816.9*	*117.1*	*10.7*	*0*	*944.6*
Non-Wetland Waters	Open Water	POW	133.8	65.6	80.7	0	280.2
	Perennial or Intermittent Streams/Creeks	R2UB/R3UB	190.0	172.6	0.4	0	362.9
	Streams/Creeks (VPIH) Ephemeral	R4SB	0	0	0	0	0
		Subtotal Non-Wetland Waters	*323.8*	*238.2*	*81.1*	*0*	*643.1*
		Subtotal Wetland Waters and Non-Wetland Waters	*1,140.7*	*355.3*	*91.8*	*0*	*1,587.70*
		Grand Total[1]	**1,683.3**	**940.0**	**125.5**	**0**	**2,748.6**

Note: 1. Table may not total precisely due to rounding.

Figure 48 Existing and Future Watershed Profiles of Aquatic Resources in the Upper Cosumnes Watershed



In summary, the predicted future watershed profiles resulting from implementation of the SSHCP demonstrate aquatic resource abundance, diversity, and condition within the Plan Area would be maintained or improved. There would not be a net loss of aquatic resources in terms of acreage, aquatic resource diversity would be maintained, and the amount of high-condition resources within the Plan Area would be increased.

7 LOCAL AQUATIC RESOURCES IMPACT PERMIT APPLICATION PROCESS

7.1 Introduction

This section explains the local jurisdictions' Aquatic Resource Impact (ARI) Permit process and provides an overview of how Land Use Authority Permittees will issue ARI Permits to third-party project proponents under the ARP. This section also describes the permit application process for Plan Permittees, an explanation of specific requirements that must be satisfied by a project proponent prior to obtaining a permit, and in-lieu fee and land dedication requirements.

7.2 Submittal of Aquatic Resources Impact Permit Applications

7.2.1 Aquatic Resources Impact Permit Applications for Third-Party Project Proponents

Third-party project proponents are private project applicants that are seeking ministerial[11] or discretionary[12] permits from a Land Use Authority Permittee. Third-party project proponents shall submit their ARI Permit Application Package, the contents of which are described in Section 7.4.2, to the Land Use Authority Permittee with land use jurisdiction over their proposed project. Only the Land Use Authority Permittee with land use jurisdiction over a proposed project may issue ARI Permits to that project. For example, a project proposed by a third-party project proponent within the city limits of Rancho Cordova may only obtain an ARI Permit through the City of Rancho Cordova. The Land Use Authority Permittee will review the ARI Permit Application for consistency with all of the requirements that are described in this section and will provide the Implementing Entity, USACE, and RWQCB with a copy for tracking purposes.

Land Use Authority Permittees issue land use approval permits for a wide range of projects. Project applicants typically approach the information desk of the local jurisdiction (Land Use Authority Permittee) to inquire about land use approval permit requirements for their activity and the Land Use Authority Permittee will direct the customer to prepare the appropriate application. The Land Use Authority Permittee will review all local permitting applications to determine whether an activity will result in impacts to aquatic resources. If an activity would result in impacts to aquatic resources and

[11] A ministerial permit is a permit that requires little to no judgment on behalf of the Land Use Authority Permittee. An example of a ministerial permit is a building permit where as long as a parcel is zoned to allow the building of a structure the applicant only needs to follow building codes to construct their project.

[12] A discretionary permit is a permit that requires the use of judgement by a Land Use Authority Permittee before the permit can be issued. An example of a discretionary permit is a permit for a general plan amendment.

is otherwise not exempt, as defined by local aquatic resource protection ordinances, the applicant will be required to complete and submit an ARI Permit Application Package.

Potential CEQA Review

Many private third-party project proponent Covered Activities will require a land use approval and be subject to the California Environmental Quality Act (CEQA). For such activities, review of ARI Permit Applications should generally be undertaken concurrently with the CEQA environmental review. To facilitate this approach, the Land Use Authority Permittee should generally request that third-party project proponents submit an ARI Permit Application Package as part of the land use approval application and CEQA process.

There are many benefits to preparing the ARI Permit Application Package early in the planning process. First, submitting an ARI Permit Application Package during the land use approval/CEQA process will illustrate the various requirements required of the proposed project, and provide time for the project proponent to change the project description or to identify alternatives for CEQA analysis. Second, it will enable the CEQA document to refer to the project-specific requirements as identified in the ARI Permit Application. Finally, it will enable the local jurisdiction to provide early review of the ARI Permit Application for completeness. Based on a review of this initial information and a determination of ARI Permit requirements, the Land Use Authority Permittee can establish conditions of approval specifying ARI Permit conditions and fee requirements.

Each Land Use Authority Permittee is responsible for ensuring that an activity, upon issuance of an ARI Permit, fully complies with the terms of the permit.

7.2.2 Pre-Application Procedures

Prior to submitting an ARI Permit Application Package, third-party project proponents are encouraged to meet with the appropriate Land Use Authority Permittee. The purpose of the pre-submittal meeting is to allow the Land Use Authority Permittees to explain what information must be assembled for a specific project in support of the ARI Permit Application.

Pre-application meetings are also recommended to discuss AMMs and to determine if an applicant is proposing or is required to provide land dedication to offset all or a portion of their mitigation. Land dedications must be designed so that they comply with SSHCP/ARP AMMs as described in Chapter 5 of the SSHCP. Meeting early in the application process to discuss these criteria is strongly recommended to avoid delays in project approvals should land dedications not meet the criteria set forth in the SSHCP/ARP. A Land Use Authority Permittee may require a fee for these pre-submittal meetings and/or pre-submitted project proposal review.

7.2.3 Aquatic Resources Impact Permit Applications for Local Land Use Authority Permittees

Each local Land Use Authority Permittee that is participating in the SSHCP will adopt an aquatic resources protection ordinance requiring that permits be obtained by any party that is impacting aquatic resources within the SSHCP Plan Area. As such, all Land Use Authority Permittees are also required to comply with local aquatic resources protection ordinances and will complete an ARI Permit Application Package following the permit application process explained in Section 7.4. Each Land Use Authority Permittee will need to establish an internal process for ensuring that their projects are in compliance with the wetland protection ordinance. Because each Land Use Authority Permittee conducts project design and review independently, a single process that must be followed by all Land Use Authority Permittees will not be provided here. The completed ARI Permit Application Package will be submitted to the SSHCP Implementing Entity, USACE, and the RWQCB so that the project can be tracked for compliance monitoring purposes.

7.2.4 Aquatic Resource Impact Permit Applications for Permittees who are not Local Land Use Authorities

If a non-land-use-authority permittee (e.g., Capitol Southeast Connector JPA or SCWA) qualifies for the PGP and local Aquatic Resource Permit, it must apply to the Implementing Entity for a local Aquatic Resource Permit, under the authority of the Implementing Entity's Aquatic Resources Protection Ordinance.

7.3 Master Plan Consistency with Aquatic Resources Impact Permits

Due to the large area that a master plan[13] encompasses, third-party project proponents initiating master plans are required to consult with their respective Land Use Authority Permittee about compliance with aquatic resources protection ordinances early in the master plan process. Ensuring that the master plan complies with the provisions of an aquatic resources protection ordinance will reduce the likelihood of project delays. Master plans must be designed to comply with the requirements of the aquatic resources protection ordinance.

Early consultation with the Land Use Authority Permittee will:

- Ensure that all required AMMs are addressed by the master plan.

[13] A master plan is a document that broadly defines land use, circulation, and infrastructure for a specific area (Master Plan Area) and includes implementation measures that guide how development within the Master Plan Area will occur. The requirements for master plans can be fulfilled by a variety of planning tools, including specific plans, comprehensive plans, special planning areas, or any combination thereof.

- Ensure that on-site avoidance areas and Preserves are planned in appropriate locations to satisfy aquatic resources protection ordinance requirements.

7.4 Aquatic Resources Impact Permit Application Processing

An applicant will submit an ARI Permit Application Package for review and approval by the Land Use Authority Permittee following the process described in this section.

7.4.1 Timing of Aquatic Resources Impact Permit Application Submittal

All applicants needing to obtain an ARI Permit must do so prior to any ground-disturbing activity; however, they can also obtain an ARI Permit earlier by the following means:

a. In conjunction with any Plan Permittee discretionary review;

b. For ministerial projects, prior to the issuance of any building or grading permit; or

c. In the absence of building or grading permits, prior to the Covered Activity being performed.

7.4.2 Components of the Aquatic Resources Impact Permit Application Package

Applicants must include the data, documentation, and/or exhibits as described in this section as part of the ARI Permit Application package. Land Use Authority Permittees designate, and may amend, the form and timing in which the following information must be provided; however, each Land Use Authority Permittee's ARI Permit Application Package must include each of the application components described herein. Land Use Authority Permittees may charge a fee to recover costs associated with review and processing of the ARI Permit Application. Applicants are responsible for the costs associated with preparation of the ARI Permit Application, including surveys. Forms for the ARI Permit Application Package will be made available by the Land Use Authority Permittees. The ARI Permit Application includes the components specified in the following subsections.

7.4.2.1 Applicant Information

This part of the application should include the applicant's name and contact information, property owner's name and contact information, and names and contact information for any consultants preparing materials in support of the ARI Permit Application.

7.4.2.2 Project Description and Map

The project description must include a written description of the location of the project site, including Assessor's Parcel Number(s), as well as a written description of all activities proposed within the project site. The written description must include the following:

- Timing of construction activity;
- Type of equipment used;
- Type of fill material and cubic yards, square feet, acreage, and where appropriate linear feet of each type of fill;
- Type and location of permanent and/or temporary impacts to aquatic resources.

The application must also include a site plan illustrating the exact location of the project site overlaid on an aerial photograph at a scale no smaller than 1 inch equals 100 feet (a scaling ratio of 1:1200) showing the location, width, depth, and length of all existing and proposed activities, including structures, roads, stormwater facilities, sewage treatment, installations, stockpiling areas, borrow sites and location of avoidance areas or on-site Preserves, if applicable, within the project site.

7.4.2.3 Aquatic Resources Delineation

"Aquatic resources delineation" means identifying the amount and boundaries of aquatic resources as defined in Section 3 of this document, including wetlands. A Land Use Authority Jurisdiction shall determine the probable existence of aquatic resources on the property involved in a development permit application. If aquatic resources are believed to exist on a property, the project applicant must prepare an aquatic resources delineation. All aquatic resources delineations shall be performed in accordance with the minimum standards set forth by the Sacramento District USACE and State Water Quality Control Board at the time of the delineation. All aquatic resources delineations shall be verified by the USACE. Aquatic resource delineations must be prepared by an individual or firm qualified to prepare them. All maps will be prepared using GIS technology and all shapefiles will be provided to the Land Use Authority Permittee for tracking purposes. When a USACE-verified and valid (i.e., non-expired) delineation for a project site already exists, that delineation can be used. Waters[14] (including wetlands) found to be present on site must be classified using the nomenclature system developed for the SSHCP (see SSHCP Appendix E).

[14] As defined in 33 CFR 328 or 40 CFR 230.2(s).

7.4.2.4 Determination of Environmentally Equivalent or Superior Alternative

As described in greater detail in Section 5.2.2.1, if a complete avoidance alternative is not practicable, a DEESA will be prepared to ensure replacement of any lost functions and services to aquatic resources. The DEESA shall include the following information:

- A defined project area boundary and project area acreage.
- A detailed project description, including an overall project purpose statement, that demonstrates: (1) why an avoidance alternative is not practicable;[15] and (2) that the Covered Activity project minimizes direct and indirect effects to aquatic resources to the greatest extent practicable. This description would include information regarding any aquatic resources on site that are proposed to be avoided. It would also include information regarding any impacted aquatic resources in the context of the regional Conservation Strategy of the SSHCP (e.g., a statement that the project proposal is consistent with the requirements of the SSHCP and any terms and conditions of the SSHCP ITPs).
- Amount (acres and linear feet and cubic yards) of unavoidable impacts (permanent, causing loss of waters, and temporary) to aquatic resources associated with the project, and amount of indirect impacts.
- A detailed description of project design features and mitigation measures that reduce impacts, including, but not limited to, impact minimization; on-site first-order stream realignment (as opposed to removal); and SSHCP BMPs, AMMs, and LID AMMs.
- A description and amount of SSHCP-required compensatory mitigation through re-establishment, establishment, and/or preservation. Compensatory mitigation must conform to the SSHCP Conservation Strategy and the minimum mitigation ratios required by the ARP and must be consistent with the USACE/EPA Mitigation Rule (33 CFR Part 332). The primary way development project activities would accomplish the required mitigation is the purchase of credits from an ILF program that would be used for the SSHCP Plan Area. (See Section 5.3 for specific compensatory mitigation requirements.)
- Demonstration that, although the proposed Covered Activity project would not completely avoid impacts to aquatic resources, with proposed design and compensation measures, the project would be environmentally equivalent or superior to that which would occur under a complete avoidance alternative without these measures, based on one or more of the following factors:
    - Effects on designated Critical Habitat and Core Recovery Areas

[15] Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose.

- Effects on the diversity of aquatic resources within the Plan Area
- Effects on vernal pool and other habitat connectivity and function of the SSHCP Preserve System
- Effects on the condition of aquatic resources within the Plan Area
- Effects on the abundance of aquatic resources within the Plan Area
- Effects on Covered Species.

7.4.2.5 Proposed Compensatory Mitigation Plan

A proposed compensatory mitigation plan shall be included that explains how the project applicant will compensate for permanent and temporary impacts to aquatic resources that will occur, after efforts to avoid and minimize have been exhausted. There are three accepted methods for meeting compensatory mitigation requirements: (1) payment into an ILF program approved by the USACE and that contains the impact site within its service area, (2) payment into a mitigation bank approved by the USACE and that contains the impact site within its service area, and/or (3) a permittee-responsible compensatory mitigation plan pursuant to local Land Use Jurisdiction Permittee ordinances that is in compliance with the Mitigation Rule. If all or part of the applicant's compensatory mitigation obligation will be satisfied via an ILF fund or through purchase of credits at a mitigation bank, the name and contact information for the ILF fund or the mitigation bank must be provided.

If an applicant is proposing permittee-responsible compensatory mitigation, the Implementing Entity must determine whether the proposed permittee-responsible compensatory mitigation is consistent with SSHCP AMMs described in SSHCP Chapter 5, Section 5.4, Conditions on Covered Activities, and with the biological goals and objectives described in Chapter 7 of the SSHCP (Table 7-1, Biological Goals, Measureable Objectives, and Conservation Actions). It should be noted that the SSHCP has fairly strict criteria that must be adhered to when siting Preserves, and it is possible that a site proposed for permittee-responsible compensatory mitigation will not meet the criteria for an SSHCP Preserve. If it is determined that permittee-responsible compensatory mitigation is not consistent with the requirements of the SSHCP, the applicant may wish to work with the Implementing Entity to find alternative sites that will support the SSHCP Conservation Strategy.

An applicant must provide the following information in support of permittee-responsible compensatory mitigation:

The compensatory mitigation plan consists of two parts: baseline information for the site and a conceptual compensatory mitigation plan. If off-site aquatic resource compensatory mitigation is proposed, baseline information for both the project site and mitigation site is required.

Baseline information shall include:

- Aquatic resources delineation as described pursuant to local aquatic resources protection ordinances;
- Description and maps of land cover types and vegetative conditions at the site;
- Description and maps of hydrological conditions at the site;
- Description of soil conditions at the site based on an on-site analysis and available soils information from online or published sources such as the Natural Resources Conservation Service's soils maps;
- A topographic map of the site; and
- A functional assessment or condition of the existing aquatic resources.

The contents of the compensatory mitigation plan shall be consistent with the USACE's Regional Compensatory Mitigation and Monitoring Guidelines for the South Pacific Division (2015), Appendix D, and include:

- Title page;
- Contributor page;
- Distribution page;
- Table of contents;
- Brief description of proposed compensatory mitigation project and proposed source of compensatory mitigation;
- Determination of goals and objectives of the proposed project. Specific criteria shall be provided for evaluating whether or not the goals and objectives of the compensatory mitigation project are being met. Such criteria may include water quality standards, survival rates of planted vegetation, species abundance and diversity targets, habitat diversity indices, or other ecological, geological, or hydrological criteria;
- A description of all permanent and temporary impacts (acreage and linear feet) that require compensatory mitigation pursuant to local aquatic resources protection ordinances;
- Description of site selection criteria such as watershed overview, landscape setting and position, and site-specific information, including consistency with the site selection guidance provided in the ARP (Appendix D);
- Other baseline information, such as a map showing locations of permanent and/or temporary impact and compensatory mitigation sites; map showing proposed preserves and setbacks; delineation of aquatic resources; functional/condition assessment, if

appropriate; species of concern (federal and/or state); cultural resources; existing and planned land uses within and surrounding the proposed compensatory mitigation sites(s); existing site topography/elevations; aerial photos, land uses, site changes (deep ripping, impoundments, channel straightening or realignment); interviews with adjacent landowners, ranchers, land managers regarding locations of seeps, observations of flood events, trespassing/vandalism, opportunities for education and outreach.

- Written specifications for the compensatory mitigation project shall be provided. The specifications shall include the proposed construction sequence; grading and excavation details; water and nutrient requirements for planting; specification of substrate stockpiling techniques; and planting instructions, as appropriate. These written specifications shall be accompanied by detailed site diagrams, scaled cross-sectional drawings, topographic maps showing slope percentage and final grade elevations, and any other drawings appropriate to show construction techniques or anticipated final outcome;
- Discussion and map of plant material to be planted and planting densities;
- Preliminary drainage plan identifying location of proposed drainage facilities, including detention structures and water quality features (e.g., swales);
- Discussion of water sources for all aquatic resources on the site;
- Project schedule;
- A monitoring and management program to measure the success of the compensatory mitigation project pursuant to local aquatic resources protection ordnances. The monitoring and management program must include the following:
    - The compensatory mitigation project shall be monitored for a period necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. Compensatory mitigation projects are required to have a minimum monitoring period of 5 years. For aquatic resources with slow development rates (e.g., vernal pools and riparian habitats) a monitoring period of more than 5 years is required. Monitoring periods may be extended if performance standards are not being met. Before determining success, there should be at least two consecutive annual monitoring reports where all the performance standards are met without human intervention (e.g., artificial irrigation).
    - Monitoring shall be designed to measure the performance standards outlined in the compensatory mitigation plan.
    - A monitoring protocol shall be included outlining how the monitoring data will be evaluated by agencies that are tracking the progress of the project.

- Monitoring reports shall be submitted annually, or on a pre-arranged alternate schedule, for the duration of the monitoring period.
- Monitoring reports shall analyze the results of monitoring, documenting milestones, successes, problems, and recommendations for corrective and/or contingency actions to ensure success of the compensatory mitigation project.

- A contingency plan that identifies potential courses of action, and any corrective measures to be taken when monitoring or evaluation indicates project performance standards are not being met.
- A monitoring and management program to measure and maintain the long-term sustainability of the compensatory mitigation project in perpetuity. Monitoring and management programs shall be consistent with established practices of the SSHCP and ARP and information collected in a manner that allows for seamless integration into the SSHCP database.

7.4.2.6 Financial Assurances for Permittee-Responsible Compensatory Mitigation

A project applicant proposing permittee-responsible compensatory mitigation shall submit itemized cost estimates showing required financial assurances pursuant to local aquatic resources protection ordinances, including cost estimates associated with performance and maintenance assurances.

7.4.2.7 Description of How the Project Complies with SSHCP Avoidance and Minimization Measures

Project applicants using the SSHCP must document how the proposed project will comply with SSHCP AMMs described in SSHCP Chapter 5, Section 5.4. See the SSHCP AMMs worksheet attached to the SSHCP permit application package.

7.5 Review for Completeness

The Land Use Authority Permittee will compare the ARI Permit Application Package against a Project Review Checklist, to confirm that all requirements have been met, including requirements such as setbacks and other AMMs. The Land Use Authority Permittee's review process may be subject to the processing time and requirements of the Permit Streamlining Act (Government Code Section 65920 et seq.). For most projects, the Land Use Authority Permittee will review the ARI Permit Application Package for completeness within 30 days of receipt of a complete ARI Permit Application package. The Land Use Authority Permittee or Implementing Entity may extend the review period for large or potentially complex projects up to an additional

30 days by providing written notice to the applicant. The Land Use Authority Permittee may continue to extend the review period after written notice until the Land Use Authority Permittee deems that a SSHCP permit application package is complete.

The Land Use Authority Permittee is also authorized to close ARI Permit Applications when they determine that the applicant has failed to provide requested information within a reasonable period. In such an event, the Land Use Authority Permittee shall provide written notice that the ARI Permit Application will be closed within 30 days unless all required materials are submitted.

7.6 Assessment of Impacts

After a complete ARI Permit Application has been submitted, the involved Land Use Authority Permittee shall prepare an assessment of aquatic resource cover type impacts that would result from the project.

7.6.1 Method for Calculating Impacted Acreage

The Land Use Authority Permittee or Implementing Entity will prepare an impact assessment that identifies the location and amount of each aquatic resource cover type that will be directly impacted as a result of implementing an activity. Permanent losses of aquatic resources will be calculated by overlaying the map generated to identify project impacts onto the wetlands delineation. If any portion of a wetland land cover type is impacted, then the entire feature is considered to be directly impacted. The impact assessment will include both a map depicting the area of impact and table(s) quantifying the acres of impact to each land cover type. The results will be used to determine the required mitigation to offset impacts.

7.6.2 Appealing the Impact Assessment

An applicant has the right to appeal the impacts assessment made by a Land Use Authority Permittee. Written objections must be filed with the Land Use Authority Permittee within 30 calendar days of receiving the initial impact assessment, and must be accompanied by data supporting the appeal, such as surveys, aerial photos, maps, or resource agency-verified delineations. The Land Use Authority Permittee has 30 calendar days from the receipt of the appeal to respond. Disagreements that cannot be resolved between the Land Use Authority Permittee staff and applicants will be decided by the Land Use Authority Permittee's governing Board or Council.

7.7 State and Federal Agency Review

While an ARI Permit is required as a condition of local Aquatic Resource Protection Ordnances, the ARI Permit Application is also used to satisfy state and federal aquatic resource permitting requirements.

Programmatic General Permit

As discussed below in Section 8, a project that does not exceed 2 acres of loss of waters, and/or more than 500 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear foot limit is waived in writing by the USACE, can use a Programmatic General Permit to satisfy state and federal aquatic resource permitting requirements. The ARI Permit Application has been designed to provide all of the information necessary to process a Programmatic General Permit. Because the local Land Use Authority Permittees are authorized to issue Programmatic General Permits on behalf of the USACE and the RWQCB, no further state or federal resource agency review of the application is required.

Letter of Permission and Standard Permits

Projects that exceed the aquatic resource impact thresholds set for the Programmatic General Permit will be required to seek either a Letter of Permission or a Standard Permit from the USACE as explained in further detail in Section 8 below. Similarly to the Programmatic General Permit the ARI Permit Application has been designed to provide all of the information necessary to process a Letter of Permission or Standard Permit. Unlike the Programmatic General Permit, a Letter of Permission or a Standard Permit cannot be issued by the Land Use Authority Permittees. All ARI Permit Applications completed for projects that exceed the Programmatic General Permit threshold will be submitted to the USACE and RWQCB for review and issuance of either a Letter of Permission or Standard Permit depending on the size of impacts to aquatic resources.

7.8 Fees

Once a project receives a draft compliance determination letter, the Land Use Authority Permittee will calculate fees based on the project impacts. Once impacts are calculated, they must be reported to the SSHCP Implementing Entity, if the project applicant is using the SSHCP to satisfy mitigation obligation, so they can be tracked for compliance with the Plan's stay-ahead provision (see Chapter 9 of the SSHCP). Fees are subject to automatic adjustments to allow for fluctuating land values and other mitigation-related costs. Annual adjustments will be made on or before March 15 of each calendar year, and other adjustments may be made during periodic audits. Table 12-5, Development Fees Used in the SSHCP Economic Model, in SSHCP Chapter 12 sets forth the initial SSHCP development fee structure.

7.8.1 SSHCP Development Fees

SSHCP Development Fee Payment Timing

Mitigation for project impacts, whether through payment of the SSHCP development fee, use of conservation or mitigation bank credits, or by permittee-responsible compensatory mitigation, must occur prior to land disturbance. For master planned projects, an applicant can choose to pay

fees for a unit of land to be impacted (a phase or portion of a larger project) rather than paying fees for the full project area at one time. Project proponents that pay fees in advance of issuance of local Land Use Authority permits are subject to provisions of the "catch-up fee ordinance" as described in Chapter 9 of the SSHCP. This ordinance states that if a project proponent pays fees prior to issuance of a permit and fees increase before the permit is issued, the project proponent will pay the difference between what was originally paid and the amount of the fee increase. Fee payments are final and nonrefundable and remove any need for land dedication in lieu of fees.

8 AQUATIC PERMITTING PROGRAM

This section describes how the local permitting program contained in the ARP complements and combines with an anticipated federal and state permitting strategy to provide a comprehensive permit program for the Plan Area. Numerous federal and state regulatory agencies (USACE, RWQCB, and CDFW) have aquatic resources permitting authority over Covered Activities within the Plan Area. The SSHCP and ARP's local permitting program and comprehensive, long-term watershed approach is designed to enable these regulatory agencies to shorten permitting timelines and improve the protection and management of aquatic resources in the Plan Area.

Since many species covered under the SSHCP are closely associated with aquatic resources, state and federal aquatic resources regulatory programs can use the SSHCP framework to develop more efficient permitting processes for SSHCP Covered Activities. In comparison to building upon the ARP's framework and local permitting program, the project-by-project application review currently employed within the Plan Area does not provide as comprehensive an ability for the regulatory agencies to evaluate aquatic resources impacts and compensatory mitigation at a watershed scale.

The SSHCP and ARP are expected to provide the opportunity to increase permitting efficiency, inclusive of the development of the USACE's CWA Section 404 permitting strategy, which could include multiple permit instruments and/or processes, including a GP(s), an LOP, and an abbreviated SP process. The USACE is a cooperating agency on the USFWS' Environmental Impact Statement (EIS) under NEPA being developed for the SSHCP. The USACE anticipates using the EIS as a programmatic document and would incorporate analysis from it to the maximum extent possible to address compliance with NEPA associated with CWA Section 404 permitting for future SSHCP Covered Activities.

Parallel to the USACE's permitting strategy, the RWQCB and CDFW have opportunities to increase the efficiency of their permitting processes, while improving the protection and management of aquatic resources in the Plan Area. The RWQCB could issue a programmatic CWA Section 401 Water Quality Certification (WQC) for the USACE's GP(s), and adopt a

more efficient WQC approach for projects associated with USACE's LOP and SP processes. The RWQCB could also adopt a more efficient Waste Discharge Requirement (WDR) approach for waters of the state. The CDFW could issue a Master LSA or Long-Term LSA for activities and adopt a more efficient individual SAA process. The RWQCB and CDFW are cooperating agencies on the Environmental Impact Report (EIR) under CEQA being developed for the SSHCP, and therefore would be able to use the EIR as a programmatic document, and incorporate analysis from it to address compliance with CEQA associated with future SSHCP Covered Activities.

Final decisions on permit strategies and instruments would be made by the USACE Sacramento District, RWQCB, and CDFW. As such, the anticipated vision described in this document is preliminary, but has been reviewed in concert with the various agencies and articulates what is a representative, common outlook.

8.1 General Permit Approach

8.1.1 USACE 404 General Permit and the Local Permit Program

The USACE issues GPs for activities with no more than minimal individual and cumulative impacts on the aquatic environment. GPs are issued on a nationwide, regional, and programmatic basis. PGPs are based on a local or state program that protects aquatic resources. The SSHCP Plan Permittees are seeking a PGP from the USACE for SSHCP Covered Activities within the Plan Area.

8.1.1.1 CWA Section 404 General Permit Overview

If a PGP approach is adopted by the USACE, the PGP would be established for SSHCP Covered Activities with minimal individual and cumulative environmental impacts. The PGP would be premised on the SSHCP, ARP and Aquatic Resources Protection Ordinances that would be adopted by the County of Sacramento, the Cities of Galt and Rancho Cordova and the Implementing Entity. The ordinances would provide the legal structure for the Land Use Authority Permittees and Implementing Entity to implement the local aquatic program. Each proponent proposing to verify a project under the PGP would then submit an application to the Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, to discharge dredged or fill material into waters of the United States and waters of the state, and would receive verification from the Land Use Authority Permittees or Implementing Entity for qualified Covered Activities. It would be the Land Use Authority Permittees' or Implementing Entity's responsibility to determine consistency with the SSHCP, the ARP, and the aquatic resources ordinance, depending on who has jurisdiction over the project. The Land Use Authority Permittees and Implementing Entity would submit reports to the USACE at regular intervals for Covered Activity projects approved under the PGP. The PGP would be valid for a period of 5 years, with the potential for reauthorization by the

USACE if the program is in compliance with all requirements of the SSHCP, ARP, and PGP. The USACE also has the ability to suspend or revoke GPs (either PGPs or RGPs) in accordance with 33 CFR 325.7 in response to compliance issues and/or a determination that use of the GPs has exceeded minimal individual and cumulative adverse impacts to waters of the United States.

An alternative (or, potentially future addition) to the PGP approach is the establishment of an RGP for SSHCP Covered Activities. Like a PGP, a RGP would only authorize activities substantially similar in nature with minimal individual and cumulative environmental impacts. The main difference between a PGP and RGP is that a PGP is founded upon an existing program (federal, state or local) and is designed to avoid duplication with that program(s). As envisioned in the context of the ARP, this is anticipated to involve the USACE's issuance of a PGP for use by the Land Use Authority Permittees and Implementing Entity in verifying its use to authorize a project. The USACE also has discretion to issue a PGP that provides that the USACE review and verify authorizations for certain activities or levels of activity, should it be necessary to ensure a PGP meets the standard of minimal individual and cumulative environmental impacts. Under an RGP each project proponent proposing to authorize a project via the RGP would submit a request for verification to the appropriate SSHCP Land Use Authority Permittees or Implementing Entity, who would act as a "clearinghouse" for the permit applications by conducting the initial screening process to verify project consistency with the SSHCP and ARP. The project applications would then be submitted to the USACE, who would review the application requests under the RGP to determine compliance and make permit decisions. The USACE also has the discretion to specify types and/or levels of activities under a RGP that are "non-notifying," such that no pre- or post-project notification or reporting would be necessary between the project proponent and/or SSHCP "clearinghouse" and the USACE. The RGP would be valid for a period of 5 years, with the potential for reauthorization by the USACE if the program is in compliance with all requirements of the SSHCP, ARP, and terms and conditions of the RGP. The USACE also has the ability to suspend or revoke GPs (either PGPs or RGPs) in response to compliance issues and/or a determination that use of the GPs has exceeded minimal individual and cumulative adverse impacts to waters of the United States.

Under either permitting approach, application for use of these GPs is voluntary. Covered Activity projects that would discharge dredged or fill material into waters of the United States and meet the terms and conditions of the USACE GP(s) are eligible, but not obligated, to apply for verification under the GP(s).

8.1.1.2 General Permit Proposal and Basis for General Permit Acreage Threshold

The SSHCP Plan Permittees are developing a local aquatic resources program that they anticipate would support the USACE's issuance of a PGP for discharge of dredged or fill material into waters of the United States that would cause no more than minimal individual and cumulative

environmental impacts. This section is written to express how the SSHCP Plan Permittees would envision a proposed PGP, whose final terms and conditions would be determined by the USACE. To qualify for use of the PGP, the loss of waters of the United States, including wetland waters of the United States, resulting from a single and complete Covered Activity project is envisioned by the SSHCP Plan Permittees to not exceed 2 acres of loss of waters, and/or more than 500 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear foot limit is waived in writing by the USACE.

In addition to a specific acreage limit of loss of waters for any given single project, the SSHCP PGP overall impact amounts would be "capped" over a 5-year implementation term. This Plan Area-wide impact acreage cap would be set at 155 acres of loss of wetlands within the Plan Area per 5-year term of the PGP. Assuming the PGP is reauthorized at 5-year intervals by the USACE, this cap would be repeated approximately nine times between the time of the SSHCP's approval and the end of its 50-year term.

The SSHCP Covered Activities fall into eight general categories:

- Urban Development in the UDA
- Mining in the UDA
- Rural Transportation Projects
- Recycled Water Projects
- Covered Activities in Preserve Setbacks in the UDA
- Covered Activities in Stream Setbacks in the UDA
- SSHCP Preserve System Covered Activities
- Covered Activities in the Laguna Creek Wildlife Corridor of the Preserve System.

Covered Activities allowed under each of the above-listed categories are described in detail in the SSHCP in Section 5.2.

As described above, to qualify for use of the SSHCP PGP, the proposed loss of waters of the United States resulting from a single and complete Covered Activity project could not exceed a total of 2 acres and/or 500 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear foot limit is waived in writing by the USACE. The per-project acreage threshold of the SSHCP PGP is a higher acreage amount than the typical 0.5-acre threshold of the USACE's Nationwide Permit Program.

The following projects and activities are envisioned by the SSHCP Plan Permittees to not be eligible for authorization under the anticipated SSHCP PGP because they are not covered by the

SSHCP Permits:[16] agricultural projects; agricultural-residential development outside the UDA; trail systems outside the UDA; airport operations and expansion outside the UDA; rural infrastructure that is not identified as a Covered Activity; landfills, mining outside the UDA; oil and gas extraction or production; projects related to the Cosumnes River; projects that have received state and/or federal (as applicable) aquatic resource permits in advance of the official implementation date of the SSHCP; existing or proposed preserves not under SSHCP Management; establishment, of new and management and operation of existing mitigation and conservation banks; pesticide use; dam construction or removal; water diversion; wind energy; power lines outside the UDA; and emergency, safety, and police services. Covered Activities that do not require a development, grading, building, or other construction permit are eligible, but not obligated, to be authorized under the SSHCP PGP.

8.1.2 Section 401 CWA Water Quality Certification, State Board General Order

The SSHCP Plan Permittees are seeking a programmatic Section 401 CWA Water Quality Certification from the RWQCB. As with the proposed USACE General Permit (described above in Section 7.1.1.2), the programmatic 401 Certification would authorize SSHCP activities that cause no more than minimal individual and cumulative adverse impacts to aquatic resources within the Plan Area. Covered Activities authorized under the programmatic 401 Certification would need to satisfy the RWQCB's water quality anti-degradation policy by demonstrating that maintenance of water quality standards are being satisfied in the Plan Area. This would be accomplished when a project enters the SSHCP permitting framework. The local implementing agency would vet local Covered Activities with a review process that would assure all measures required under the SSHCP permitting framework for wildlife and water quality are met before submittal to the RWQCB for final review and approval. The programmatic 401 Certification would satisfy the Report of Waste Discharge requirements for Porter-Cologne.

The more efficient 401 Certification process would be attractive to project proponents because it would save time and costs associated when compared to the standard permitting process. From a regulatory standpoint, it would allow greater environmental benefits to accrue from project impacts considered from a watershed perspective.

8.1.3 California Fish and Game Code/Section 1600 MSAA

For projects that are initiated by a local Land Use Authority Permittee (Sacramento County, the City of Rancho Cordova, or the City of Galt) that need to notify CDFW pursuant to Section 1600 of the California Fish and Game Code, CDFW would enter into an MSAA)or a Long-Term

[16] For a complete description of activities and actions not covered by the SSHCP permits, please see Section 5.3 of the SSHCP.

Streambed Alteration Agreement (LTLSA). The aforementioned type permit vehicle (be it a CDFW MSAA or an LTLSA) would be valid for 12 years and would be eligible for a one-time extension for a maximum period of 17 years. For the amount of time remaining under the 50-year SSHCP following the expiration of the first MSAA or LTLSA and its extension, Sacramento County, the City of Rancho Cordova, or the City of Galt would enter into a new agreement that would build upon the first agreement for municipal projects.

For all other Covered Activity projects, CDFW would streamline the process to authorize activities under Section 1602 of the California Fish and Game Code that affect the bed and bank of streams, ponds, and lakes in the Plan Area with implementation of the ARP. The ARP and SSHCP address all impacts and the conservation of streams and riparian habitat and other water bodies regulated by CDFW.

In the streamlined process, the local Land Use Authority Permittees or Implementing Entity, whoever has jurisdiction, may act as a "clearinghouse" for the notification forms and would conduct an initial screening process to verify the project's consistency with the SSHCP, ARP, and the aquatic resources protection ordinances. The local Land Use Authority Permittees or Implementing Entity may then submit the notification forms to CDFW on behalf of the project proponent. Prior to processing an LSA Notification, CDFW must collect the fee for each LSA Notification submitted by the individual project proponent. CDFW is solely responsible for determining whether an LSA Agreement is required.

Ultimately, for land development Covered Activities that conform with the SSHCP permitting framework, the CDFW would enable a MSAA or LTLSA to increase the efficiency of their permitting process and benefit the County and Cities, and the JPA collectively.

8.2 CWA Section 404 Permitting for Projects Ineligible for General Permits

8.2.1 CWA Section 404 Individual Permits

Similar to the discussion above regarding an anticipated PGP, based on working with the USACE in the development of the SSHCP and ARP, the SSHCP Plan Permittees anticipate that the USACE would develop programmatic approaches to processing individual CWA 404 permits for the relatively small amount of SSHCP Covered Activity projects proposed to impact waters of the U.S. that would not fit under the terms and conditions of the PGP. The final determinations and related terms and conditions of these anticipated permit processes is at the discretion of the USACE. Project proponents with development Covered Activity projects located in the development envelope of the Plan Area that do not meet eligibility requirements under the PGP would be able to apply for CWA Section 404 authorization under an "abbreviated" individual permit (IP)

process, encompassing two kinds of IPs: SPs and LOPs. For projects proposing to permanently impact more than 2 acres but not more than 10 acres of Waters of the United States, and/or more than 700 linear feet of perennial, intermittent, or third or higher-order ephemeral streams (unless this linear-foot limit is waived in writing by the USACE), a LOP procedure for Covered Activities in the Plan Area is envisioned (see Section 7.2.1.1). For projects proposing to permanently impact more than 10 acres of waters of the United States and/or 700 linear feet of perennial, intermittent, or third or higher-order ephemeral streams, an "abbreviated" SP procedure for Covered Activities in the Plan Area is envisioned (see Section 7.2.1.2). To use either of these IP procedures, the project proponent would need to document compliance with the requirements of the SSHCP and ARP regulatory permitting framework in the project proposal. The SSHCP and ARP requirements would incorporate compliance with on-site avoidance, minimization, and compensatory mitigation as prescribed under the Plan Area regional assessment of existing aquatic resources diversity, abundance, and condition; impacts proposed upon those resources; and benefits accrued from the SSHCP and ARP AMMs and Conservation Strategy. The envisioned IP processes would be attractive to project proponents because it seeks to largely fulfill in advance the requirements of a separate off-site alternatives analysis, project-by-project assessment of compliance with the USACE's assessment of the Least Environmentally Damaging Practicable Alternative (LEDPA) requirements, and/or, in the case of SPs, alleviate the necessity of preparing a rigorous off-site alternatives analysis. In addition, the IP processes would save time and costs associated when compared to the USACE's typical permitting process through greater permit process certainty.

8.2.1.1 CWA Section 404 LOP

For moderate-scale development Covered Activity projects proposed under the SSHCP regulatory permitting framework that do not meet the eligibility requirements of the proposed SSHCP PGP, and have more than minimal impacts to aquatic resources but less than significant impacts on the human environment under NEPA, the Plan Permittees' understanding is that the USACE anticipates developing an abbreviated procedure for issuing LOPs under CWA 404. LOPs are a type of individual permit issued through abbreviated processing procedures, which includes coordination with federal and state wildlife agencies and a public interest evaluation, but without the publishing of an individual public notice (33 CFR 325.2(e)).

The envisioned LOP procedure would authorize the discharge of dredged or fill material into waters of the United States pursuant to Section 404 of the CWA for SSHCP Covered Activity projects. To qualify for use of the LOP, the loss of waters of the United States, including wetland waters of the United States, resulting from a single and complete Covered Activity project is envisioned to not exceed a total of 5 acres and/or would not permanently impact more than 700 linear feet of perennial, intermittent, or third or higher order ephemeral streams, unless this linear-foot limit is waived in writing by the USACE.

Once the anticipated LOP procedure is in place, project proponents would submit project proposals to the Land Use Authority Permittees or Implementing Entity, whoever has jurisdiction, who would act as a "clearinghouse" for the CWA 404 permit applications by conducting the initial screening process to verify project consistency with the SSHCP and ARP. The applications would then be submitted to the USACE by the Land Use Authority Permittee or Implementing Entity, whichever has jurisdiction over the project, for review under the LOP procedure. The Corps would likely prepare a simplified decision document (for their program's administrative record) that would refer to the SSHCP's EIS for compliance with NEPA and aspects of compliance with U.S. EPA's 404(b)(1) Guidelines.. The proposed LOP is envisioned to rely on the SSHCP to address avoidance, minimization and requirements for compensatory mitigation for impacts to aquatic resources. For instance, compensatory mitigation requirements would be the same as those in the SSHCP.

8.2.1.2 CWA Section 404 "Abbreviated" Standard Permit

Project proponents with Covered Activity projects located in the Plan Area that do not meet eligibility requirements under the PGP or the LOP procedure could seek authorization under an abbreviated SP process. This abbreviated SP process could be used as long as the project proponent conformed to the requirements of the SSHCP and ARP. The SSHCP permitting framework would require project compliance with on-site avoidance, minimization, and compensatory mitigation, as prescribed under the Plan.. Projects utilizing the abbreviated SP process are anticipated to only occur within the development envelope of the Plan Area (the UDA).

Advanced identification of plan-wide tradeoffs in aquatic resources loss and conservation would have already addressed aquatic resource impact avoidance at a regional level, thus, an off-site alternatives analyses would not be necessary for SP proponents to prepare for purposes of demonstrating compliance with the 404(b)(1) Guidelines. Therefore, SP proponents' alternatives analysis would be limited to addressing avoidance and minimization at the project site level. NEPA requirements for abbreviated SPs may be satisfied with an Environmental Assessment-level of review, or may require preparation of an EIS if proposing potentially significant effects on the human environment. Even for projects requiring the use of an EIS, the SP process is anticipated to be greatly compressed by relying on the SSHCP, ARP and ordinances. The USACE anticipates the use of tiering from the SSHCP EIS, use of programmatic compliance with other laws such as ESA, and alignment with the compensatory mitigation requirements contained in the SSHCP, ARP and ordinances.

The Plan Permittees would still act as the "initial clearinghouse" for permit applications that may enter into the abbreviated SP process, in the same manner they would for the PGP and LOP reviews. The Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, would screen all applications to ensure that the Covered Activity

projects are in compliance with the SSHCP and ARP, and propose to incorporate all applicable terms and measures. The applications would then be submitted to the USACE by the Land Use Authority Permittee or Implementing Entity, whichever has jurisdiction over the project. The USACE would make the final determination whether or not a permit application could be processed under the abbreviated SP process.

The anticipated abbreviated SP process would be attractive to project proponents because it would save time and cost, and increase certainty in comparison to typical information requirements and processes involved in the USACE's review of standard permit applications. For instance, under the SSHCP permitting framework, urban development Covered Activity projects with more than minimal impacts to the aquatic environment are anticipated to only occur within the development envelope of the Plan Area (the UDA). The UDA has already been determined to be the most suitable location for large-scale development as determined by County and City General Plans. It is assumed that development projects processed under the SSHCP abbreviated SP procedure would, similar to the proposed PGP and LOP, not need to expend time and costs involved with developing an off-site alternatives analysis for the USACE's review and consideration, as described above. Also, the on-site avoidance and minimization requirements that are necessary for SP proponents to address would overlap with requirements of the SSHCP (e.g., stream setbacks) and would therefore satisfy the on-site alternatives analysis for purposes of demonstrating compliance with the 404(b)(1) Guidelines. The DEESA determination made by the Land Use Authority Permittees or the Implementing Entity would be submitted with the abbreviated SP application. As described above, the CSA 404 "abbreviated" SP regulatory approach would likely be utilized for some of the anticipated large-scale urban development Covered Activity projects, and would increase the efficiency of the permitting process (compared to the existing, typical standard permit process), while also promoting greater protection of aquatic resources to accrue from a regulatory framework that considers the balancing of landscape- and project-scale impacts to aquatic resources with a coordinated approach to avoidance, minimization and compensation for unavoidable impacts to aquatic resources.

8.3 Programmatic Section 401 CWA Certification/Porter-Cologne Act Waste Discharge

As discussed in Section 7.1.2, a programmatic Section 401 Water Quality Certification (also satisfying the requirements of the state's Porter-Cologne Act) is sought by the SSHCP Plan Permittees. This programmatic 401 Certification may be able to cover projects applied for under the PGP, and potentially cover (all or in part, promoting efficiency) some larger-scale projects applied for under a LOP or SP. Larger-scale Covered Activity projects proposed within the Plan Area that do not qualify for the programmatic Section 401 Water Quality Certification would be required to obtain individual 401 Water Quality Certifications, which may be required for some LOPs and SPs processed by the USACE. However, the Plan Permittees would establish a

programmatic review process to assist in efficient processing of these individual 401 certifications for proposed Covered Activities that are in compliance with all requirements of the SSHCP and ARP. Under this more efficient review process, the Land Use Authority Permittees or Implementing Entity, depending on who has jurisdiction over the project, would still act as the initial "clearinghouse" for permit applications, in the same manner they would for the Section 404 application reviews. The Land Use Authority Permittees or Implementing Entity (as applicable) would screen all applications to ensure that the projects are in compliance with the SSHCP, ARP and applicable Aquatic Resources Protection Ordinance. This initial screening would be anticipated to facilitate a more efficient review process of individual 401 Water Quality Certification applications by the RWQCB by providing a "vetted" and more predictable review. To satisfy CEQA requirements, the Plan Permittees would be able to tier from the SSHCP EIS/EIR, which would greatly quicken their review timeline.

8.4 California Fish and Game Code/Section 1600 Streambed Alteration Agreements

The local Land Use Authority Permittees and the Implementing Entity would develop with CDFW an MOU for land development Covered Activity projects authorized under the SSHCP regulatory framework that notifies CDFW pursuant to Section 1600 et seq. of the California Fish and Game Code. Under this unique MOU, the CDFW would collect a fee for each notification submitted by the local Land Use Authority Permittees or Implementing Entity. However, this expedited MOU process would standardize AMMs and compensatory mitigation. The agreement would describe the SSHCP permitting framework arrangement between CDFW and the local Land Use Authority Permittees and the Implementing Entity, which would include procedures for avoidance, minimization, and compensatory mitigation requirements for all Covered Activities occurring within the Stream Zone, pursuant to Section 1602 of the California Fish and Game Code. Under this MOU, the CDFW would collect fees for each notification, pursuant to Section 1602 of the California Fish and Game Code, and determine whether to issue LSAs to individual Covered Activity projects. However, permitting would be standardized for proposals that comply with requirements set forth in the SSHCP, which would enable CDFW to quicken their permitting process under an MOU permitting procedure. To satisfy CEQA requirements, the CEQA lead agencies would be able to incorporate analysis from the SSHCP EIS/EIR, which would greatly quicken their review timeline. Ultimately, for land development Covered Activity projects that conform with the SSHCP permitting framework, the CDFW would enable the MOU to quicken their permitting process and benefit the County, Cities, and the Implementing Entity collectively.

For municipal projects authorized under the SSHCP regulatory framework, the Implementing Entity would describe such projects in advance and notify the CDFW pursuant to Section 1600 et seq. of the California Fish and Game Code and seek to append those projects to a MSAA or LTLSA.

8.5 Other Federal Laws

8.5.1 Section 7 of the Federal ESA

Section 7 of the ESA requires federal agencies to consult with the USFWS (and/or the National Marine Fisheries Service) to ensure that every action authorized, permitted, funded, or carried out by the federal agency would not jeopardize the continued existence of any federally listed species or destroy or adversely modify designated critical habitat.

As discussed in Section 2.3.1, projects or activities with the potential to discharge dredged or fill material into waters of the United States must consult with the USACE and must comply with Section 404 of the CWA. The USACE's issuance of a CWA 404 permit (or other USACE authorizations for impacts to jurisdictional waters) constitute a federal action, and must comply with the ESA. Therefore, the USACE would consult with the USFWS under ESA Section 7 before issuing a CWA permit (or other CWA authorizations) to any Plan Area project or activity that may impact a federally listed species.

The USACE often acts as the lead federal agency. When acting as lead federal agency, the USACE provides the federal nexus for Section 7 ESA consultation with the USFWS for projects with the potential to affect federally listed species. All of the federally listed species that occur in the Plan Area are SSHCP Covered Species (see SSHCP Chapter 1, Table 1-2).

Under the conventional project-by-project regulatory review process, the USACE first prepares a Biological Assessment to determine if the proposed project or activity may affect listed species or critical habitat. If the Biological Assessment indicates that the project or activity may affect a listed species, the USACE will request a formal consultation with the USFWS under ESA Section 7. (If the Biological Assessment determines that the project or activity is not likely to adversely affect the species or critical habitat, the USACE may request an informal consultation with the USFWS. If the USFWS does not concur with the no adverse determination of the informal consultation, the USFWS may require the USACE to initiate a formal consultation).

Under the conventional project-by-project regulatory review process, the finding by the USACE that the proposed project or activity would adversely impact a federally listed species (or its critical habitat) will initiate the preparation of a Biological Opinion by the USFWS. The Biological Opinion will include a full description of the proposed action, including any conservation measures proposed as part of the action, and will include a detailed discussion of the direct, indirect, and cumulative effects of the action on listed species or critical habitat, and will summarize the information upon which the opinion is based (including the information and analysis provided by the USACE's Biological Assessment). The Biological Opinion presents a determination on whether the proposed action is likely to jeopardize a listed species, or likely to adversely modify its critical habitat. Each Biological Opinion includes an "Incidental Take

Statement," which exempts the USACE and their permittees from the ESA's take prohibitions and penalties, and allows "take" of a specified number of individuals of a listed species, and/or allows modification or degradation of a specified acreage of species habitat. The beneficial effects of the project's conservation measures are taken into consideration for both the jeopardy and the incidental take analysis presented in the Biological Opinion. The incidental take statement also includes nondiscretionary "reasonable and prudent measures" that are necessary to minimize or reduce the impact of the incidental take. In order to be exempt from the prohibitions and penalties of the ESA, the USACE and their permittees must comply with the "terms and conditions" of the Biological Opinion, which implement the reasonable and prudent measures, and outline required future reporting and monitoring. The Biological Opinion's terms and conditions are non-discretionary.

Under the SSHCP and ARP's more efficient project permitting process, the USACE would seek to further streamline their CWA 404 regulatory review of individual future Covered Activities (see Section 7.2) by initiating a single ESA Section 7 consultation with the USFWS for all SSHCP Covered Activities that would require a CWA 404 permit (or other CWA authorization) from the USACE over the 50-year SSHCP. The USACE will request the USFWS prepare a single Programmatic Biological Opinion that programmatically address the direct, indirect, and cumulative effects on federally listed species and designated critical habitats resulting from all USACE's permitting and authorizations, over the 50-year term of the SSHCP. If the USACE can obtain a programmatic Section 7 consultation and Programmatic Biological Opinion, it would eliminate the need for the USACE to initiate individual ESA Section 7 consultations for every SSHCP Covered Activity that may discharge dredged or fill material into waters of the United States, and eliminate the need for the USACE to prepare and submit an individual Biological Assessment for each of those SSHCP Covered Activities, thus eliminating the need for the USFWS to prepare an individual Biological Opinion on each of those SSHCP Covered Activities.

At the time that the final SSHCP and final SSHCP EIS/EIR have completed required public reviews under NEPA and CEQA, the USACE would initiate a request for a programmatic Section 7 consultation with the USFWS, to seek Section 7 ESA coverage for all future SSHCP Covered Activities that the USACE would permit under their proposed multi-layered CWA 404 permitting strategy (i.e., the GPs, LOP, and SPs described in Section 7.2).

With a single programmatic Section 7 consultation anticipated to be in place, the conventional project-by-project "individual" Section 7 consultation would be unnecessary.

8.5.2 Section 106 of the National Historic Preservation Act

The USACE must assure that each Covered Activity project or activity that is permitted or otherwise authorized by the USACE under Section 404 of the CWA also complies with Section 106 of the National Historic Preservation Act (NHPA). The NHPA protects cultural resources that

are listed, or are eligible to be listed, on the National Register of Historic Places. To assure that each USACE decision to issue a CWA Section 404 permit or other CWA authorization to a SSHCP Covered Activity would not directly or indirectly result in a violation of the NHPA, the USACE and the Land-use Authority Permittees may develop a Programmatic Agreement (PA) with the State Historic Preservation Officer (SHPO) to expedite NHPA Section 106 consultations for future SSHCP Covered Activity projects and activities.

In addition, the USACE would also programmatically consult with Native American tribal contacts within the Plan Area, and may consider developing an MOU with the Plan Area Native American tribes concerning coordination and the protection of any Indian Trust Assets and other cultural resources at sites of Covered Activity projects or activities that are permitted or otherwise authorized by the USACE under CWA Section 404.

INTENTIONALLY LEFT BLANK

9 REFERENCES

33 CFR 328.1–328.5. "Definition of Waters of the United States."

33 CFR 332.3. "General Compensatory Mitigation Requirements."

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. La Roe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. U.S. Fish and Wildlife Service.

CWMW (California Wetland and Monitoring Workgroup). 2010. *California Wetland and Riparian Area Monitoring Plan*.

Dittes, J.C. and J.L. Guardino. 2002. "A GIS-Based Vernal Wetland-Acre/Density Index (VWADI) for Classification and Conservation of Vernal Pool/Annual Grassland Landscapes in California's Great Central Valley."

Dittes, J.C., J.L. Guardino, and R.A. Radmacher. 2007. "A GIS-Based Vernal Wetland Acre/Density Index (VWADI) for Classification and Conservation of Vernal Pool/Annual Grassland Landscapes in California's Great Central Valley." In *Vernal Pool Landscapes*, edited by R.A. Schlising and D.G. Alexander, 125–141. *Studies from the Herbarium 14*. Chico, California: California State University.

Formant, R.T., and M. Godron. 1981. "Patch and Structural Components for Landscape Ecology." *Bioscience* 31: 733–740.

Forman, R.T. and M. Godron. 1986. *Landscape Ecology*. New York, NY: John Wiley and Sons.

Helm, B. and J.E. Vollmar. 2002. "Vernal Pool Large Brnchipods." Chapter 4 in *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland*, edited by J.E. Vollmar, 151–190.

Holland, R.F. and V.I. Dains. 1990. "The Edaphic Factor in Vernal Pool Vegetation." In *Vernal Pool Plants, Their Habitat and Biology*, edited by D.H. Ikeda and R.A. Schlising, 31–48. Studies from the Herbarium No. 8. Chico, California: California State University.

Katibah, E.F. 1984. "A Brief History of the Riparian Forest in the Central Valley of California." In *California Riparian Systems: Ecology Conservation and Productive Management*, edited by R.E. Warner and K.M. Hendrix, 23–29. Berkeley, California: University of California Press.

Keeley, J.E. and P.H. Zedler. 1998. "Characterization and Global Distribution of Vernal Pools." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, edited by Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 1–14. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California. Accessed June 3, 2015. http://vernalpools.ucmerced.edu/sites/vernalpools.ucmerced.edu/files/page/documents/1.1characterization_and_global_distribution_of_vernal_pools_by_jon_e._keely_and_paul_h._zedler_0.pdf.

Kneitel, J.M. and C.L. Lessin. 2010. "Ecosystem-Phase Interactions: Aquatic Eutrophication Decreases Terrestrial Plant Diversity in the California Vernal Pool Ecosystem." *Oecologia* 163: 461–469.

Kramer, G. 1988. "Fresh Emergent Wetland Vegetation." California Wildlife Habitat Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group.

Laabs, D.M., S.G. Orloff, and M.L. Allaback. 2002. "Chapter 5: Pond and Stream-Breeding Amphibians." In *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland*, 191–230.

Leibowitz, S.G. and R.T. Brooks. 2008. "Chapter 3: Hydrology and Landscape Connectivity of Vernal Pools." In *Science and Conservation of Vernal Pools in Northeastern North America*, 31 – 51.

Lessin, C.L. 2010. "Nutrient Addition Effects on Vernal Pool Communities." Master's thesis; California State University, Sacramento.

Metz, J. 2001. "Correlating Vernal Pool Distribution Patterns and Geologic Formations to Inform Conservation Planning in East Merced County." Master's thesis; University of California, Berkeley.

NRC (National Research Council). 2002. *Riparian Areas: Functions and Strategies for Management. NRC, Division on Earth and Life Sciences, Board on Environmental Studies and Toxicology, Water Science and Technology Board, Committee on Riparian Zone Functioning and Strategies of Management*. Washington, D.C.: National Academy Press.

O'Driscoll, M.A. and R.R. Parizek. 2008. "Geological Controls on Seasonal-Pool Hydroperiod in a Karst Setting." *Wetlands* 28(4): 1004–1017.

O'Geen, A.T., W.A. Hobson, R.A. Dahlgren, and D.B. Kelley. 2008. "Evaluation of Soil Properties and Hydric Soil Indicators for Vernal Pool Catenas in California." *Soil Science Society of America Journal* 72(3): 727.

Platentkamp G.A.J. 1998. "Patterns of Vernal Pool Biodiversity at Beale Air Force Base." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, edited by Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 38–49. Proceedings from a 1996 Conference. Sacramento, California: California Native Plant Society=.

Poirier, P.A. 2012. "Physical and Chemical Correlates of Sacramento County Vernal Pool Crustaceans." Master's thesis; University of the Pacific, Stockton, California.

Rains, M.C., G.E. Fogg, T.H. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. "The Role of Perched Aquifers in Hydrological Connectivity and Biogeochemical Processes in Vernal Pool Landscapes, Central Valley, California." *Hydrological Processes* 20: 1157–1175.

Rains, M.C., R.A. Dahlgren, G.E. Fogg, T. Harter, and R.J. Williamson. 2008. "Geological Control of Physical and Chemical Hydrology in California Vernal Pools." *Wetlands* 28(2): 347–362.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *Manual of California Vegetation*. Sacramento, California: California Native Plant Society.

Smith, D.W. and W.L. Verrill. 1998. "Vernal Pool-Soil-Landform Relationships in the Central Valley, California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, edited by C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, 15–23. Proceedings from a 1996 conference. Sacramento, California: California Native Plant Society.

USACE (U.S. Army Corps of Engineers). 2015. *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for the South Pacific Division USACE*. January 12, 2015. Accessed September 28, 2016. http://www.spd.usace.army.mil/Missions/Regulatory/Public-Notices-and-References/Article/558934/final-regional-compensatory-mitigation-and-monitoring-guidelines/.

Vollmar, J.E. 2002. *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands*. Berkeley, California: Vollmar Consulting.

Williamson, R.J., G.E. Fogg, M.C. Rains, and T.H. Harter. 2005. *Hydrology of Vernal Pools at Three Sites, Southern Sacramento County*. Final Report For Project: F 2001 IR 20 Developing a Floristic Statewide Vernal Pool Classification, and a Functional Model of Pool Hydrology and Water Quality. April 22, 2005.

INTENTIONALLY LEFT BLANK

SSHCP South Sacramento Habitat Conservation Plan

AQUATIC RESOURCES PROGRAM

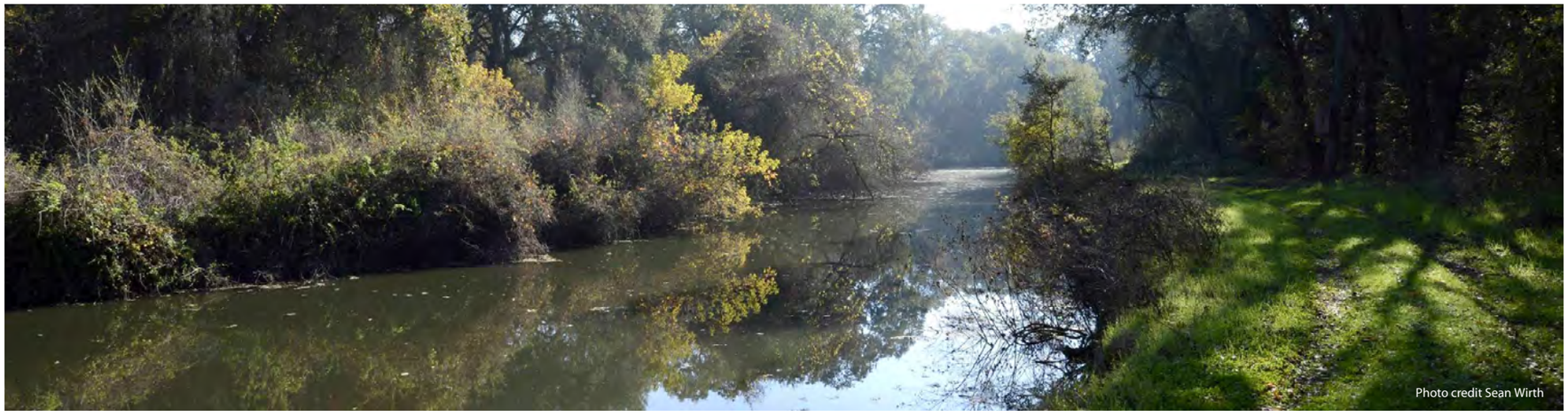


Photo credit Sean Wirth



PLAN PARTNERS

County of Sacramento

City of Rancho Cordova

City of Galt

Sacramento County Water Agency

Southeast Connector Joint Powers Authority

VOLUME II
APPENDICES

February 2018

APPENDIX A

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

DRAFT

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Prepared by:

DUDEK

930 9th Street, Suite 1750
Sacramento, California 95814
Contact: Sherri Miller

FEBRUARY 2017

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

TABLE OF CONTENTS

Section **Page No.**

ACRONYMS AND ABBREVIATIONS ..... **V**

1 INTRODUCTION **1**
- 1.1 Purpose of the Watershed Study 1
- 1.2 Definition of Watershed 1
- 1.3 Functions and Services of Watersheds 2
- 1.4 Anthropogenic Impacts to Watersheds 2

2 METHODS **3**
- 2.1 Assembly of Baseline Data 3
  - 2.1.1 USGS National Hydrography Dataset 3
  - 2.1.2 Land Cover Dataset 3
  - 2.1.3 Hydrology 4
  - 2.1.4 Geological Formations 5
  - 2.1.5 Soils 5
  - 2.1.6 Slope and Elevation 5
  - 2.1.7 SSHCP Covered Species 5
  - 2.1.8 Preserve Design 6

3 RESULTS **9**
- 3.1 Summary of Watersheds in Plan Area 9
  - 3.1.1 Land Cover Types in Plan Area 9
  - 3.1.2 Hydrology in the Plan Area 10
  - 3.1.3 Geological Formations in Plan Area 14
  - 3.1.4 Soils in the Plan Area 21
  - 3.1.5 Slope and Elevation 26
  - 3.1.6 Covered Species 27
  - 3.1.7 Preserve Design 36
- 3.2 Description of Watersheds in Plan Area 38
  - 3.2.1 American River Watershed 38
  - 3.2.2 Deer Creek Watershed 40
  - 3.2.3 Laguna Creek Watershed 45
  - 3.2.4 Lower Cosumnes River Watershed 50
  - 3.2.5 Lower Dry Creek Watershed 54
  - 3.2.6 Lower Mokelumne River Watershed 58
  - 3.2.7 Morrison Creek Watershed 61

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

3.2.8 Sherman Lake-Sacramento River Watershed 66
3.2.9 Snodgrass Slough Watershed 70
3.2.10 Upper Cosumnes River Watershed 74

4 SUMMARY 81

5 LITERATURE CITED 85

TABLES

1 Summary of Watersheds in Plan Area 9
2 Summary of Land Cover Types in Plan Area by Watershed 11
3 Summary of NHD Flowlines in Plan Area by Watershed 13
4 Summary of Landforms in Plan Area by Watershed 20
5 Summary of Soil Types in Plan Area by Watershed 22
6 Summary of Slopes in the Plan Area 26
7 Summary of Elevation Ranges in the Plan Area 26
8 Summary of Covered Species Occurrences Within Watersheds[1] 29
9 Modeled Habitat for Covered Species within a Watershed 32
10 Summary of Watershed Conservation 36
11 Summary of Preserve Planning Units by Watershed 37
12 Summary of Conserved Land Cover Types in the Deer Creek Watershed 44
13 Summary of Conserved Land Cover Types in the Laguna Creek Watershed 49
14 Summary of Conserved Land Cover Types in the Lower Cosumnes River Watershed 54
15 Summary of Conserved Land Cover Types in the Lower Dry Creek Watershed 57
16 Summary of Conserved Land Cover Types in the Lower Mokelumne River Watershed 60
17 Summary of Conserved Land Cover Types in the Morrison Creek Watershed 65
18 Summary of Conserved Land Cover Types in the Sherman Lakes-Sacramento River Watershed 69
19 Summary of Conserved Land Cover Types in the Snodgrass Slough Watershed 73
20 Summary of Conserved Land Cover Types in the Upper Cosumnes River Watershed 78

TABLE OF CONTENTS (CONTINUED)

Page No.

FIGURES

1 Regional 87
2 Watersheds 89
3 Land Cover 91
4 Hydrology 93
5 Geological Formations 95
6 Soils 97
7 Elevation 99
8 Slope 101
9-1 Critical Habitat for Sacramento Orcutt Grass 103
9-2 Critical Habitat for Slender Orcutt Grass 105
9-3 Critical Habitat for Vernal Pool Fairy Shrimp 107
9-4 Critical Habitat for Vernal Pool Tadpole Shrimp 109
9-5 Critical Habitat for California Tiger Salamander 111
9-6 Ahart's Dwarf Rush Modeled Habitat and Known Occurrences 113
9-7 Boggs Lake Hedge-Hyssop Modeled Habitat and Known Occurrences 115
9-8 Dwarf Downingia Modeled Habitat and Known Occurrences 117
9-9 Legenere Modeled Habitat and Known Occurrences 119
9-10 Pincushion Navarretia Modeled Habitat and Known Occurrences 121
9-11 Sacramento Orcutt Grass Modeled Habitat and Known Occurrences 123
9-12 Slender Orcutt Grass Modeled Habitat and Known Occurrences 125
9-13 Sanford's Arrowhead Modeled Habitat and Known Occurrences 127
9-14 Midvalley Fairy Shrimp Modeled Habitat and Known Occurrences 129
9-15 Ricksecker's Water Scavenger Beetle Modeled Habitat and Known Occurrences 131
9-16 Valley Elderberry Longhorn Beetle Modeled Habitat and Known Occurrences 133
9-17 Vernal Pool Fairy Shrimp Modeled Habitat and Known Occurrences 135
9-18 Vernal Pool Tadpole Shrimp Modeled Habitat and Known Occurren 137
9-19 California Tiger Salamander Modeled Habitat and Known Occurrences 139
9-20 Western Spadefoot Modeled Habitat and Known Occurrences 141
9-21 Giant Gartersnake Modeled Habitat and Known Occurrences 143
9-22 Western Pond Turtle Modeled Habitat and Known Occurrences 145
9-23 Cooper's Hawk Modeled Habitat and Known Occurrences 147
9-24 Ferruginous Hawk Modeled Habitat and Known Occurrences 149

TABLE OF CONTENTS (CONTINUED)

Page No.

9-25 Greater Sandhill Crane Modeled Habitat and Known Occurrences 151
9-26 Loggerhead Shrike Modeled Habitat and Known Occurrences 153
9-27 Northern Harrier Modeled Habitat and Known Occurrences 155
9-28 Swainson's Hawk Modeled Habitat and Known Occurrences 157
9-29 Tricolored Blackbird Modeled Habitat and Known Occurrences 159
9-30 Western Burrowing Owl Modeled Habitat and Known Occurrences 161
9-31 White-Tailed Kite Modeled Habitat and Known Occurrences 163
9-32 American Badger Modeled Habitat and Known Occurrences 165
9-33 Western Red Bat Modeled Habitat and Known Occurrences 167
10 Reserve Design Map 169

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
amsl	above mean sea level
ARP	Aquatic Resources Program
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
EPA	U.S. Environmental Protection Agency
HUC	Hydrologic Unit Code
MCRA	Mather Core Recovery Area
NHD	National Hydrography Dataset
NRCS	National Resources Conservation Service
SSHCP	South Sacramento Habitat Conservation Plan
SSURGO	Soil Survey Geographic
TAC	Technical Advisory Committee
UDA	Urban Development Area
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USB	Urban Services Boundary
USGS	U.S. Geological Survey

INTENTIONALLY LEFT BLANK

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

1 INTRODUCTION

1.1 Purpose of the Watershed Study

The purpose of the watershed study for the South Sacramento Habitat Conservation Plan (SSHCP) and Aquatic Resources Program (ARP) is to describe the overall characteristics of watersheds in the SSHCP and ARP area (collectively called "Plan Area" in this document) (Figure 1). The framework of the watershed study is to describe the physical locations of the watersheds, including what proportion of each watershed is within the Plan Area, as well as the overall conditions of the watersheds in terms of environmental setting (e.g., land formations, soils, topography, existing land use), hydrology, and biological resources. In addition, the watershed study describes how the SSHCP Preserve System relates to each watershed located within the Plan Area, as one of the primary purposes of the SSHCP and ARP is to protect watershed functions, as described below:

> **Protect Watersheds:** Watershed function, and specifically hydrologic regimes, is an important determinant of certain aquatic resource-dependent and aquatic resource-associated plants and wildlife. Therefore, preserving upland landscapes associated with wetland features for maintaining aquatic resource-dependent and wetland-associated species is of primary importance. Sufficient sub-watershed area should be preserved so that natural sources of surface and sub-surface water influx and outflow remain intact, and potential development-related increases in surface runoff and sources of water pollution are avoided (e.g., runoff from roads, roofs, paved surfaces, utility pipes, landscaped areas).

1.2 Definition of Watershed

A watershed is defined by the U.S. Environmental Protection Agency (EPA) as a "land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the oceans" (33 CFR 332.2). The U.S. Department of Agriculture (USDA) further defines a watershed as "a geographic area of land, water and biota within the confines of a drainage divide" (USDA 2007). According to the USDA, "watershed boundaries define the aerial extent of surface water drainage to a point. Watershed boundaries always follow the highest ridgeline around the stream channels and meet at the bottom or lowest point of the land where water flows out of the watershed. The boundary between watersheds is defined as the topographic dividing line from which water flows in two different directions" (USDA 2007).

1.3 Functions and Services of Watersheds

According to Black (1997), there are five clearly identifiable functions of watersheds, three that are hydrologic (collection, storage, and discharge) and two that are ecological (chemical and habitat). The hydrologic functions of watersheds include the (1) **collection** of water from rainfall snowmelt and storage that becomes runoff, (2) **storage** of water of various amounts and durations, and (3) **discharge** of water as runoff. The ecological functions of watersheds include (4) providing diverse sites and pathways along which vital **chemical** reactions take place, and (5) providing **habitat** for the flora and fauna that constitute the biological elements of an ecosystem (Black 1997).

There are numerous anthropogenic and biological values of watersheds. According to Postel and Thompson (2005), healthy watersheds provide the following: water supplies for agricultural, industrial, and urban-domestic uses; water filtration/purification; flow regulation; flood, erosion, and sedimentation control; fisheries; timber and other forest products; recreation/tourism; biodiversity preservation; aesthetic enjoyment; climate stabilization; and cultural, religious, and inspiration values.

1.4 Anthropogenic Impacts to Watersheds

Modification of natural landscapes (i.e., vegetation, topography, and hydrology) is one of the prime human impacts on watersheds. Altering natural landscapes for development purposes, resource extraction, or recreation can affect collection, storage, and discharge functions of a watershed. Changes in the landscape resulting from these human activities can increase sedimentation and erosion, increase or redirect natural runoff, and alter hydrologic regimes, including timing of flows and groundwater recharge. In addition, land use modification or conversion can change the way a watershed is used by individual species or species communities, including their distribution and abundance within a watershed (i.e., habitat function) and can directly or indirectly affect the chemical reactions required for the watershed to sustain itself.

Introduction of pollutants into the watershed can happen directly through agricultural activities and runoff from impervious surfaces in more urbanized areas. Over the years, an increase of impervious surfaces has caused “significant changes to both the quality and quantity of the stormwater runoff, leading to degraded stream and watershed systems: an increased quantity of stormwater for stream process to absorb sedimentation, and an increased pollutant load carried by the stormwater” (Morisawa and LaLure 1979, Arnold et al. 1982, Bannerman et al. 1993, as cited in Brabec et al. 2002).

2 METHODS

2.1 Assembly of Baseline Data

Watersheds within the Plan Area were identified by overlaying the Plan Area with the U.S. Geological Survey (USGS) hydrologic unit map data. The watersheds were then intersected with land cover, hydrologic, geological, soil, slope, and elevation data that were assembled for the SSHCP to describe their physical and biological settings. The watersheds were also intersected with known occurrences of plant and animals species that are proposed for regulatory coverage under the SSHCP (Covered Species) and the proposed SSHCP Preserve System. Descriptions of the datasets used in the SSHCP and this watershed study are provided in the following subsections.

2.1.1 USGS National Hydrography Dataset

Watersheds in the United States are delineated by the USGS using a hierarchical system, which divides the U.S. into 21 regions, 221 subregions, 378 hydrologic accounting units, and 2,264 cataloging units (USGS 2013). Each hydrologic unit is identified by a unique Hydrologic Unit Code (HUC) consisting of two to eight digits based on the levels of classification in the hydrologic unit system (USGS 2009). Two additional levels were recently added to the hydrologic unit hierarchy: watershed (10-digit) and subwatershed (12-digit).

For the purpose of this watershed study, the Plan Area was divided at the 10-digit HUC level (i.e., watershed), which yields 10 watersheds within the Plan Area (Figure 2). Note that an 11th watershed, Cache Slough, appears on Figure 2; however, that watershed makes up only 6 acres of the Plan Area and therefore is not analyzed in this study.

2.1.2 Land Cover Dataset

Land cover mapping for the Plan Area occurred in several stages. Vernal Pool and Swale land cover type mapping occurred early in the SSHCP planning process and was accomplished through interpretation of black-and-white aerial imagery dated March 2001 and mapped at a scale of 1 inch = 200 feet (1:2,400). The primary mapping of all other land cover types was completed in 2004 and was developed from the interpretation of color aerial imagery dated November 2002 and mapped at a scale of 1 inch = 400 feet (1:4,800). These original mapping efforts have been updated and refined at various times to reflect modifications of land cover types, such as cover type conversion, to accommodate an expansion of the Plan Area boundary and to correct errors in the original mapping. The current land cover map provides fairly detailed information for the existing conditions in the Plan Area based on 2009 aerial photos and limited field-truthing, with the updates occurring in May 2010, September 2012, January 2013, March 2013, November 2013, May 2014, June 2014, August 2014, and December 2014.

The land cover classification system developed for the SSHCP is a modification of the California Department of Fish and Game (CDFG)[1] List of California Natural Communities. There are 25 land cover types in the Plan Area, of which 17 provide native (e.g., Blue Oak Woodland) or naturalized (e.g., Valley Grasslands, Agriculture) conditions that have habitat value for Covered Species (Figure 3). The other eight land cover types, including developed and disturbed types, have little or no habitat value for Covered Species.

The land cover data were also used to generate a relative measure of impervious surfaces in the Plan Area. Impervious surfaces (e.g., paved roads, parking lots, driveways, rooftops, sidewalks) reflect urban intensity and may be used as a metric for adverse impacts to natural resources as a result of increased runoff, sedimentation, and pollutant loads into receiving waters (Brabec et al. 2002). For the purposes of this study, impervious surfaces are defined as Aqueduct, High-Density Development, and Major Roads. The Aqueduct land cover type is represented by the Folsom South Canal. The High-Density Development land cover type includes urban and suburban residential neighborhoods, urban centers, industrial areas, airports, and wastewater treatment plants. Most of this high-density development occurs inside the Urban Development Area (UDA) in the northwestern portion of the Plan Area. The Major Roads land cover type includes linear features with paved surfaces and can vary from large freeways to smaller arterial roads found within urban settings. It should be noted that this relative measure of impervious surfaces is not intended to calculate actual impacts, such as amount of runoff, etc., but rather to generally characterize the existing urban intensity in the Plan Area and to compare and contrast the different watersheds.

Low-density development was not included in the Impervious land cover category. While this land cover includes some impervious surfaces (e.g., driveways), it primarily consists of relatively sparse residences and other structures, such as farm buildings and small rural neighborhoods with large individual property sizes per house. Plant nurseries are also included in this category.

2.1.3 Hydrology

The USGS (2013) National Hydrography Dataset (NHD) contains hydrologic features such as lakes, ponds, streams, rivers, canals, dams, and stream gages (USGS 2013). The NHD dataset was intersected with the Plan Area to determine the type and quantity of hydrologic features within each watershed (Figure 4).

[1] The List of California Natural Communities was published by the CDFG before CDFG was formally renamed California Department of Wildlife (CDFW) in January 2013. Information from the CDFG prior to January 2013 therefore will be attributed to CDFG in this document, although the names are synonymous.

2.1.4 Geological Formations

The geological formations were derived from the Generalized Geological Map of Sacramento County prepared by the California State Geological Survey (CDMG 1999) (Figure 5). The Generalized Geological Map of Sacramento County, also referred to as a time-stratigraphic correlation map, is based on a correlation of similar-aged rock units from the east side of the Sacramento Valley with those on the west side of the valley, as well as a correlation of rock units from the northern Sacramento Valley with similarly aged rock units in the southern San Joaquin Valley. Because the time-stratigraphic correlation map is prepared on a small scale in the Plan Area, it provides excellent detail and well-refined demarcations in geologic units. However, geological formation data are unavailable for portions of four watersheds located in the western portion of the Plan Area; areas lacking data are identified in the descriptions of the four relevant watersheds in Section 3.2.

2.1.5 Soils

Individual soil units are organized into map units called soil associations, which consist of soil units of the same texture and composition that occur in geographic position. Soils for the Plan Area are from the National Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database (USGS and USDA NRCS 2009) (Figure 6).

2.1.6 Slope and Elevation

Both slope and elevation for the Plan Area were derived from the USGS National Elevation Dataset (USGS 2012) (Figures 7 and 8).

2.1.7 SSHCP Covered Species

A Technical Advisory Committee (TAC), with the assistance of outside experts, created a list of 28 plant and wildlife species proposed for federal regulatory coverage under the SSHCP. The TAC compiled data from a variety of sources, including the CDFG, California Natural Diversity Database (CNDDB), U.S. Fish and Wildlife Service (USFWS) files and databases, California Native Plant Society (CNPS) plant inventories, Sacramento County Audubon files, and solicited opinions from local experts and university researchers and staff from resource agencies. Occurrence data for Covered Species were generated from the data compilation effort and are described in detail in the SSHCP.

For the purposes of the direct effects and conservation analyses, Covered Species habitat was modeled based on the associations between species occurrence data and particular land cover types in the Plan Area and through review by species experts. This information was compiled to

generate models for land cover types and ranges within the Plan Area that each Covered Species is likely to use for breeding, foraging, and/or cover, or other important life history activities. Chapter 3 of the SSHCP describes the methods and results of those models. Figures 9-1 through 9-5 depict Critical Habitat for Sacramento Orcutt grass, slender Orcutt grass, vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamander. Figures 9-6 through 9-29 depict modeled habitat and species occurrences for the 28 Covered Species.

2.1.8 Preserve Design

This section briefly describes the SSHCP Conservation Strategy in terms of identifying the primary development areas, geographically based Preserve Planning Units, existing conservation (e.g., existing biological Preserves, mitigation sites), and planned conservation that would occur through implementation of the SSHCP. A detailed description of the SSHCP Conservation Strategy is contained in Chapter 7 of the SSHCP.

Urban Development Area/Outside Urban Development Area

The UDA is where the large majority of SSHCP Covered Activities will occur, including anticipated residential, commercial, and industrial development and associated infrastructure (e.g., roads, utilities). For the purpose of the SSHCP and watershed study, it is assumed that the UDA will eventually be built out except for the existing and proposed preserves. Outside the UDA, SSHCP Covered Activities will primarily be limited to infrastructure projects. These include transportation projects, including road upgrade projects, road realignment/extension projects, interchange projects, and connector projects. Covered activities outside the UDA would also include water-related utility projects, including recycled water projects and operations and maintenance of flood control and storm drainage infrastructure.

Preserve Planning Units

To assist with development of an adequate SSHCP Conservation Strategy, the Plan Area was further divided into eight Preserve Planning Units (PPUs) that encompass areas where important Covered Species resources are present, and where habitat preservation will be planned (see Figure 1-1 in the SSHCP). These eight SSHCP PPUs are geographic subdivisions of the Plan Area designed to ensure that adequate Biological Goals and Measurable Objectives (Table 7-1 in the SSHCP) were developed for all biological resources located within the Plan Area.

PPUs were delineated to capture specific habitat or agricultural land cover types or areas identified as being important for a specific suite of species. For instance, PPU 7, which is located in the southeastern portion of the Plan Area, was delineated to encompass the vast majority of

vernal pool grasslands remaining in the County. PPU 7 also contains the designated Cosumnes/Rancho Seco Core Recovery Area (USFWS 2005), which is considered an important area for protection of vernal pool species. PPU 2 contains the designated Mather Core Recovery Area (USFWS 2005). PPU 6, located in the southwestern portion of the Plan Area, was delineated to encompass a vast majority of agricultural cover types that provide foraging habitat for many covered raptor species. While geopolitical or physical landmarks were used to delineate some PPU boundaries, this was done for ease of mapping and to make locating PPU boundaries in the field easier.

Existing Preserve Lands

The Plan Area supports several established Preserves both inside and outside of the UDA. Existing Preserve totals approximately 64,536 acres (17%) in the Plan Area and includes wildlife refuges, nature preserves, lands under conservation easements, open space, mitigation banks, and individual project mitigation sites. Of the 61,364 acres of existing Preserve, 3,172 acres (5%) are inside the UDA and 61,360 acres (95%) are outside the UDA. Existing Preserve areas are considered in the SSHCP to be protected for their resource values, and although they do not count as mitigation for future Covered Activities, they were carefully considered in the SSHCP Conservation Strategy so that proposed preserves can augment and link to the existing Preserves.. Valley grassland comprises 35,290 acres (55%) of the existing Preserve lands, followed by agriculture at 12,365 acres (17%), and blue oak woodland and savanna at 7,223 acres (11%). Existing Preserve also supports substantial acreages of riparian woodland and riparian scrub (2,510 acres, 4%), vernal pool and swale (2,336 acres, 4%), freshwater marsh (1,057 acres, 3%), and open water (720 acres, 1%).

Planned Conservation

Planned conservation will include both planned "hardline" Preserve based on known projects and currently proposed mitigation, and "criteria-based" conservation for future projects. The boundaries of the new criteria-based Preserves are not known at the time of SSHCP preparation.

The planned hardline Preserves in the Plan Area total 1,717 acres. Including the planned hardline Preserves, it is anticipated that approximately 37,030 acres will be newly conserved in the SSHCP Preserve System. The new criteria-based Preserves will be established according to the Conservation Actions for each of the relevant Biological Goals and Measureable Objectives included in Chapter 7 of the SSHCP (see Table 7-1 of the SSHCP).

The Laguna Creek Wildlife Corridor is identified separately from the other Preserves because it is a distinctive and important landscape feature in the Plan Area and is important for maintaining regional

movement and resident habitat for wildlife, conserving riparian habitat, and maintaining hydrologic connections between Preserves inside the UDA. The Laguna Creek Wildlife Corridor will be established through a combination of planned hardline and criteria-based preservation.

3 RESULTS

3.1 Summary of Watersheds in Plan Area

The Plan Area includes a portion or the entirety of 10 watersheds (10-digit hydrologic units), as defined by the Federal Standard for Delineation of Hydrologic Unit Boundaries (USGS and USDA NRCS 2009). Those 10 watersheds are American River, Deer Creek, Laguna Creek, Lower Cosumnes River, Lower Dry Creek, Lower Mokelumne River, Morrison Creek, Sherman Lake-Sacramento River, Snodgrass Slough, and Upper Cosumnes River (Table 1, Figure 2). One additional watershed, Cache Slough, intersects the Plan Area but only comprises 6 acres in the Plan Area and therefore is not discussed in the watershed study.

The Laguna Creek and Morrison Creek watersheds account for about 37% of the Plan Area, and the next three largest watersheds (Deer Creek, Lower Cosumnes, and Snodgrass Slough) watersheds account for another 41%, resulting in the five largest watersheds making up 78% of the Plan Area.

Table 1
Summary of Watersheds in Plan Area

Watershed	Acres of the Watershed in Plan Area	Total Watershed Acreage	Percent of Watershed in Plan Area	Cumulative Percentage of Watershed in Plan Area
Laguna Creek	73,976	96,788	76.4%	23.3%
Morrison Creek	42,926	69,540	61.7%	13.5%
Snodgrass Slough	40,426	51,616	78.3%	12.7%
Lower Cosumnes River	46,682	46,683	100.0%	14.7%
Deer Creek	43,803	81,504	53.7%	13.8%
Upper Cosumnes River	31,885	114,793	27.8%	10%
Lower Dry Creek	18,493	56,110	33%	5.8%
Sherman Lake-Sacramento River	13,987	121,608	11.5%	4.4%
American River	3,452	65,103	5.3%	1%
Lower Mokelumne River	2,019	141,965	1.4%	1%
Grand Total[1]	**317,655**	**845,709**	**28.5%**	**100%**

[1] The total does not include the approximately 268,589 acres of the Cache Slough watershed, which is not discussed in this document.

3.1.1 Land Cover Types in Plan Area

The Plan Area is organized into four main land cover types (Table 2, Figure 3):

Terrestrial. Natural terrestrial land covers comprise approximately 78% of the Plan Area, with valley grassland accounting for 43% of the terrestrial land cover. Blue oak woodland and

savanna account for about 5% of the terrestrial land cover, and riparian communities account for about 3% of the terrestrial land covers.

Aquatic. Aquatic land covers comprise approximately 5% of the natural land covers in the Plan Area, with vernal pool accounting for 1% of the aquatic land covers, and remaining acreage distributed among the other types, including streams/creeks (VPIH) at less than 0.1%, freshwater marsh at 0.9%, open water at 1%, seasonal wetland at 1%, streams/creeks at 1% and swale at 0.4%.

Agriculture. Agriculture comprises about 31% of the Plan Area, with croplands accounting for about 16%, vineyards at 8%, irrigated pasture-grassland at 5%, and orchards at 1%.

Non-Habitat. Non-habitat land covers comprise about 14% of the Plan Area, with low- and high-density development and major roads accounting for about 11% of the non-habitat land covers.

Impervious surfaces (i.e., aqueduct, high-density development, and major roads) total approximately 16,101 acres, or 5% of the Plan Area. Most of the impervious surfaces are located inside the UDA in the northwestern portion of the Plan Area.

3.1.2 Hydrology in the Plan Area

Flowline data are important for the watershed analysis because they describe the flow directions and networks within a watershed. These data, for example, allow for analyses about the effects of upstream hydrologic alterations (e.g., flow rates, timing of peak flows) or discharge of pollutants on downstream hydrology, water quality, and important resources such as aquatic and riparian wildlife habitat.

The Plan Area consists of five NHD flowline features (Table 3, Figure 4).

Stream/River. A stream/river is a naturally flowing body of water that may be perennial, intermittent, or ephemeral (USGS and USDA NRCS 2009). Stream/river accounts for approximately 841 miles of flowline features in the Plan Area and about 60% of the total flowline features.

Canal/Ditch. A canal/ditch is an "artificial open waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft" (USGS 2009). Canal/ditch is also an important flowline feature in the Plan Area, totaling approximately 347 miles in the Plan Area and comprising about 25% of the flowline features.

Table 2
Summary of Land Cover Types in Plan Area by Watershed

Land Cover Types	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Terrestrial												
Blue Oak Savanna	—	2,018	2,550	—	529	—	18	—	—	521	5,637	1.8%
Blue Oak Woodland	—	4,400	1,364	—	1,417	—	—	—	—	1,951	9,132	2.9%
Mine Tailing Riparian Woodland	48	41	158	17	—	—	129	2	—	245	641	0.2%
Mixed Riparian Scrub	—	80	61	285	47	2	200	130	548	100	1,454	0.5%
Mixed Riparian Woodland	0.4	836	262	1,929	401	196	157	51	1,293	733	5,856	1.8%
Valley Grassland	1,336	23,643	42,178	14,593	7,965	0.1	21,294	665	5,947	17,531	135,166	42.5%
Terrestrial Total	*1,384.4*	*31,018*	*46,573*	*16,824*	*10,359*	*198.1*	*21,798*	*848*	*7,788*	*21,081*	*157,886*	*50%*
Aquatic												
Streams/Creeks (VPIH)	—	19	—	—	—	—	55	—	—	—	73	<0.1%
Freshwater Marsh	2	38	167	1,127	47	21	370	40	1,030	112	2,954	0.9%
Open Water	3	200	297	663	9	3	159	9	720	280	2,344	0.7%
Seasonal Wetlands	23	129	419	616	117	—	107	—	782	409	2,600	0.8%
Streams/Creeks	6	228	416	345	78	67	123	24	1,141	350	2,778	0.9%
Swale	3	160	428	144	65	—	359	1	10	81	1,252	0.4%
Vernal Pool	7	274	1,917	619	203	0.1	764	5	421	325	4,535	1.4%
Aquatic Total	*98*	*1,048*	*3,644*	*3,514*	*519*	*91.1*	*1,937*	*79*	*4,104*	*1,557*	*16,536*	*5.2%*

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 2
Summary of Land Cover Types in Plan Area by Watershed

Land Cover Types	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Agriculture												
Cropland	—	4,065	5,958	12,614	2,742	1,671	2,245	4,986	16,275	1,273	51,829	16.3%
Irrigated Pasture-Grassland	—	836	5,070	3,447	316	8	1,399	0.1	3,295	1,620	15,991	5%
Orchards	—	137	612	116	212	—	199	1,749	653	229	3,907	1.2%
Vineyards	—	4,231	5,805	4,976	3,821	0.4	330	1,260	5,560	476	26,460	8.3%
Agriculture Total	—	*9,269*	*17,445*	*21,153*	*7,091*	*1,679.4*	*4,173*	*7,995.1*	*25,783*	*3,598*	*98,187*	*31%*
Non-Habitat												
Aqueducts	40	21	31	41	—	—	72	11	—	49	264	<0.1%
Disturbed	98	844	163	69	1	13	3,390	177	190	1,341	6,287	0.2%
High-Density Development	1,531	44	919	667	29	25	6,102	3,049	583	122	13,073	4.1%
Low-Density Development	7	864	4,284	3,976	421	6	3,703	403	1,433	3,510	18,608	5.6%
Major Roads	144	123	467	353	56	4	597	310	541	170	2,764	0.9%
Mine Tailings	18	127	306	—	—	—	212	13	—	422	1,098	3.4%
Recreation/ Landscaped	185	444	143	85	17	—	943	323	6	36	2,180	6.9%
Non-Habitat Total	*2,023*	*2,467*	*6,313*	*5,191*	*524*	*48*	*15,019*	*4,286*	*2,753*	*5,650*	*44,274*	*13.9%*
Grand Total	**3,452**	**43,803**	**73,976**	**46,682**	**18,493**	**2,019**	**42,926**	**13,987**	**40,426**	**31,885**	**317,649**[1]	—

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document. This total also does not include approximately 800 acres of unmapped lands along the Sacramento River, on the river side of the levees.

Table 3
Summary of NHD Flowlines in Plan Area by Watershed

Watershed	Artificial Path		Canal/Ditch		Connector		Pipeline		Stream/River		Grand Total	
	Feet	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*	*Feet*	*Percent*
American River	23,396	48.3	2,325	4.8	—	—	227	0.5	22,484	46.4	48,432	1
Deer Creek	52,425	5.6	68,836	7.4	7,995	0.9	1,207	0.1	799,852	86.0	930,315	12.6
Laguna Creek	125,769	6.6	141,811	7.5	154	<0.1	1,312	<0.1	1,630,736	85.8	1,899,782	25.8
Lower Cosumnes River	236,780	21.8	375,506	34.6	27	<0.1	73	<0.1	471829	43.5	1,084,215	14.7
Lower Dry Creek	26,254	5.5	33,152	7.0	805	0.2	—	—	414,948	87.3	475,159	6.5
Lower Mokelumne River	11,195	12.0	81,978	88.0	—	—	—	—	—	—	93,173	1.3
Morrison Creek	72,483	10.5	40,079	5.8	4,048	1	2,912	0.4	573,510	82.8	693,032	9.4
Sherman Lake-Sacramento River	65,946	26.9	172,021	70.1	81	<0.1	323	0.1	6,858	2.8	245,230	3.3
Snodgrass Slough	243,185	20.8	846,039	72.2	4,195	0.4	—	—	77,909	6.7	1,171,326	15.9
Upper Cosumnes River	199,470	27.9	68,518	9.6	507	0.1	903	0.1	444,746	62.3	714,142	9.7
Grand Total	**1,056,962**	**14.4**	**1,830,311**	**24.9**	**17,812**	**0.2**	**6,957**	**<0.1**	**4,442,871**	**60.4**	**7,354,913**	**100.0**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations. Any discrepancies in individual totals are due to rounding but the grand total for each watershed is consistent.

Connector. A connector is "A known, but nonspecific, connection between two nonadjacent network segments," such as a two-dimensional dam/weir that causes a gap between an upstream lake/pond and downstream stream/river (USGS 2009). Connectors make up about 3 miles in the Plan Area, but only 0.2% of the flowline features.

Pipeline. A pipeline is "A closed conduit, with pumps, valves and control devices, for conveying fluids, gases, or finely divided solids" (USGS 2009). About one mile of pipeline is included in the NHD dataset, accounting for less than 0.1% of the flowline features in the Plan Area.

Artificial Path. An artificial path is used as a surrogate to complete flowlines between NHD waterbodies and NHD areas where there is no obvious channel (USGS 2009). It is the connection between the inflow and outflow points of an in-line open water body. Artificial paths are restricted to one or more of the following features that may occur in the Plan Area:

- Lake/pond;
- Stream/river;
- Swamp/marsh;
- Canal/ditch;
- Wash; or
- Area of complex channels.

About 200 miles of artificial path are included in the NHD dataset, accounting for about 14% of the flowline features in the Plan Area.

3.1.3 Geological Formations in Plan Area

A geologic formation is a geomorphic feature on the Earth's surface representative of an episode of landscape development. The Plan Area includes 17 geological landforms (Table 4, Figure 5). Approximately 57% of the Plan Area is underlain by two main landforms types: Laguna Formation (19%) and the Riverbank Formations (38%).

Riverbank Formations (Qr)

The riverbank formations included four mapping units: Riverbank Formation, Undivided; Riverbank Formation, Upper Unit; Riverbank Formation, Middle Unit; and Riverbank Formation, Lower Unit.

The Riverbank Formation, Undivided, occupies the central portion of the Plan Area, generally subdivided by the Cosumnes River and Deer Creek. In the vicinity of Elk Grove, the Riverbank Formation is about 10 miles wide from west to east. To the east, it laps onto older materials composed of the Laguna Formation and the Turlock Lake Formation. To the west, it is overlain by younger alluvial materials. The Riverbank Formation, Undivided, as well was the other Riverbank formations, were deposited on a plain of aggradation that has been partly dissected. The upper surface of this plain, in most places, represents the upper surface of the Riverbank Formation. The upper surface is characterized by a gently undulating surface. Local variations in relief may be as much as 15 feet. The age of the Riverbank Formation ranges from middle to late Pleistocene and is probably related to the Donner Lake advance of Sierran glaciation. The Riverbank Formation consists of interbedded granitic sand, silt, and clay with metamorphic channel gravels. Its sediments are very similar to those in the Laguna Formation.

The Riverbank Formation, Upper Unit, is located in the southwestern portion of the Plan Area and borders Laguna Creek in the eastern portion. It is unconsolidated, compact dark brown to red alluvium.

The Riverbank Formation, Middle Unit, includes a small area along the north-central boundary of the Plan Area and a larger area along the south-central boundary. The Middle Unit, Riverbank Formation, is locally and remotely derived granitic and basic igneous alluvium (sand, silt, clay, and gravel).

The Lower Unit, Riverbank Formation, is located in the northwestern portion of the Plan Area and consists of red semi-consolidated gravel, sand, and silt. Its surface is higher and much more dissected than the Upper Unit and has much stronger soil profiles.

Copper Hill Volcanics (Jch)

The Copper Hill Volcanics comprise dark to medium green mafic to andesitic pyroclastic rocks deposited in the Late Jurassic (~163-145 million yrs). These volcanics are of similar age to the Salt Spring Slate (Clark 1964) and are found interfingered with the Salt Springs Slate in the northeast corner of the SSHCP area, at elevations above 400 feet above mean sea level (amsl).

Gopher Ridge Volcanics (Jgo)

The Gopher Ridge Volcanics are extrusive volcanic rocks ranging from fine tuff to coarse volcanic breccias and lavas (Clark 1964). The fine tuff is yellow green in color on a fresh face, but weathers to a dark gray, resembling the Salt Spring Slate. These volcanics have been extensively folded and faulted in the same metamorphic belt as the Salt Spring Slate and Copper

Hill Volcanics. The Gopher Ridge Volcanics are the oldest deposits of this group and are found along the western edge of the metamorphic belt at elevations above 150 feet amsl.

Intertidal Deposits (Qi)

The Intertidal Deposits are primarily peat and peaty mud formed in tidal marshes and swamps along the Sacramento River (Atwater 1979). These deposits form in areas influenced by tidal fluctuations in the San Francisco Bay and Sacramento Delta, and are therefore found at elevations within a few feet of mean sea level. These Holocene (<10,000 years) deposits typically range in thickness from 3 to 9 feet, and are mapped in the southwestern portion of the SSHCP.

Mine and Dredge Tailing (t)

Deposits of tailings occur south of the American River near Nimbus and at other scattered localities in the central and eastern portions of the Plan Area. These tailings are the result of gold dredge operations and consist of windrows of gravel, cobbles, boulders, sand, and silt. The largest single expanse of tailings extends from near Folsom southwesterly nearly to Mather Field, a distance of about 12 miles; it has a width that ranges from 1 to 4 miles and covers an estimated 12,000 acres.

Chico Formation (Ku)

The Chico formation is comprised of fossiliferous marine sandstone and minor siltstone found in the eastern portion of the Plan Area.

Basin Deposits (Qhb)

During the Holocene epoch, Basin Deposits formed in sink areas and occur now as unconsolidated clay, silt, and other fine materials. This formation covers a total of 663 acres in the eastern-most corner of the SSHCP Plan Area.

On this formation, four vernal wetlands were mapped. They cover a total of 3.1 acres, all outside the UDA. Average size (mean ± SE) of vernal wetlands on Basin Deposits is 0.78 ± 0.228 acres. Each of the four wetlands on this formation is 0.10 acre or larger.

Two deep pools occur in the Basin Deposits Formation outside the UDA that total 2.4 acres.

Alluvium (Q)

Undifferentiated alluvial deposits are sand, silt, and clay sedimentary deposits found in active stream channels. These deposits are unconsolidated and are found at lower elevations than older alluvial terrace deposits. Within the SSHCP area, these deposits are found along an

approximately 3-mile-long reach of a tributary to the Cosumnes River west of the Amador County Line and south of Jackson Road, and along an approximately 2-mile-long reach of a tributary to Dry Creek in the southeastern portion of the SSHCP area.

Levee and Channel Deposits (Qa)

Unconsolidated to poorly consolidated Levee and Channel Deposits are Holocene (<10,000 years) sediments that typically range in size from sand to clay size particles and are deposited during flood events when a river overtops its banks. These deposits are mapped along approximately 12 miles of the active stream channel of the Cosumnes River (Wagner et al. 1981). At their upstream extent, approximately 1 mile northeast of Wilton, the levee and channel deposits overlie the lower member of the Modesto Formation. The downstream extent of the levee and channel deposits occurs at the intersection of the Cosumnes River and Twin Cities Road.

Salt Springs Slate (Jss)

The Salt Spring Slate is a dark gray slate with poorly sorted angular grains of quartz and feldspar set in a fine grained clay matrix. Conglomerates associated with these deposits are fine grained with well-rounded pebbles (Clark, 1964). The Salt Spring Slate, found at elevations above 200 feet MSL in the eastern portion of the SSHCP area, is part of a northwest/ southeast trending volcanic and metamorphic belt that has been extensively folded and faulted.

Modesto-Riverbank Formation (Qmr)

The Modesto-Riverbank formation is a late Pleistocene (125,000 to 10,000 years) alluvial deposit comprising sand, silt, and gravel derived from the Sierra Nevada Mountains to the east. These fluvial terrace deposits are typically semi-consolidated and tend to form thin, impermeable soils, underlain by shallow hardpan. The formation is found along the Dry Creek, Laguna, and Browns Creek floodplains in the southeastern portion of the SSHCP area (Wagner et al. 1981).

North Merced Gravels (Qtnm)

The North Merced gravels are made up of well-rounded pebbles and cobbles of dark-colored metamorphic rocks. The formation occurs as a thin veneer, capping hills in the east-central part of Sacramento County. The southernmost outcrop area of the gravels is along the top of a southwesterly trending ridge about 2 miles north of Dry Creek. The gravels here overlie sediments of the Laguna Formation and rise from an elevation of about 150 feet to over 320 feet at their eastern extremity. Farther north, the gravels cap other flat-topped hills and are underlain usually by Laguna sediments. A broad area of North Merced gravels trends southwest from Folsom. This area is at most 3 miles wide and extends nearly as far as Florin Road and Bradshaw Road.

The North Merced gravels consist of discontinuous beds of lenticles of stream-laid detritus. This material was deposited by many rivers and streams, which drained the Sierra Nevada during the middle and latter parts of the Pleistocene Epoch. The North Merced gravels are easily distinguished from the underlying materials by the coarseness of the particles and red color of the iron oxide cement.

Laguna Formation (TI)

The Laguna Formation is exposed in the eastern and central portions of the Plan Area. The formation's eastern outcrop extends northward from Dry Creek, where its area of exposure is about 6 miles wide, to its northernmost exposure along Meiss Road. Its central outcrop extends northward from Deer Creek to its northernmost exposure along U.S. 50. This formation, ranging from late Miocene to early Pliocene in age, rests over the older Mehrten Formation. Where the Mehrten is andesitic in character and generally dark-colored, the Laguna is non-volcanic and is generally a tan to brown color. It is composed of a heterogeneous assemblage of beds of silt, clay, and sand with lenticles of gravel deposited on westward-sloping floodplains.

Valley Springs Formation (Tvs)

The Valley Springs Formation is exposed along the eastern side of the Plan Area from the southeastern corner along Dry Creek, northward to the headwaters of Carson Creek. The formation is generally exposed over an area from 1 to 2 miles in width. Its widest exposure is along Arkansas Creek, where it is exposed for 4 miles from east of Ione Road, west to the Cosumnes River.

The formation contains varying amounts of rhyolite ash, vitreous tuff, quartz sand containing abundant glass shards, and pale-colored beds of ashy clay. Frequently, sediments of the formation contain fragments of pumice, some of which may be as much as an inch in diameter. This formation varies with texture composition. There may be expansible clays present, especially in fine-grained material.

Mehrten Formation (Tm)

The Mehrten Formation is exposed discontinuously along a broad belt in the eastern portion of the Plan Area. The belt extends from the south county boundary at Dry Creek, where it is 4 miles wide, to U.S. 50, where it is less than a mile wide. In the subsurface, the Mehrten Formation extends westward from the area of outcrop at least as far west as the Sacramento River.

The Mehrten Formation is divided into two different layers. One is a sedimentary unit composed of gray to black andesitic sands, interbedded bouldery gravels, and blue to brown clay. The black sands are generally soft and well sorted. They were formed as fluvial deposits, having been derived

from andesitic detritus washed down the slopes of the mountains. Frequently laminated, the beds of black sand are commonly about 5 feet thick, although beds of up to 20 feet or more have been reported. Associated with the black sands are beds of stream gravel containing andesitic cobbles and boulders of up to several feet in diameter and beds of brown to blue clay and silt.

The second major unit of the Mehrten Formation is the tuff breccia. This rock is very dense and hard. It is composed of angular pieces and blocks of black, gray, and red fine-grained to porphyritic andesite, which range from less than an inch to over several feet in diameter. The tuff breccia was derived from andesitic eruptions to the east in the Sierra Nevada. During these eruptions, great quantities of highly mobile ash flowed west down the then-existing stream channels and picked up blocks of andesite debris, which were incorporated into the mass. The mass spread out over the westward-sloping plains and solidified as a pavement of hard, concrete-like rock, which ranged from only a few feet to over 30 feet in thickness. Flow patterns are readily evident where the upper surface of the tuff breccia is now exposed. On this surface, soil cover is scant, with the blocks of andesite standing out in bold relief, giving the appearance of a boulder-strewn field. Run-off from precipitation is nearly 100% due to the rocky surface.

Ione Formation (Ti)

The Ione Formation is exposed in the eastern portion of the Plan Area from Jackson Highway north to U.S. 50. In most of Sacramento County, younger sediments overlie this formation. This formation is divisible into three distinct layers. The uppermost layer of the formation is composed principally of uniform graded, medium to coarse quartz sandstone. Below the sandstone is a thick bed of white clay of ceramic quality. In some areas, the clay has been stained red to yellow and, where it is intense, the clay has become iron cemented and is present as ocher. The bottom layer is composed of blue to gray clay with occasional seams of brown coal and lignite. A zone of gravel composed of quartz and metamorphic fragments is reported to be at the base of the formation. North of the American River, the Ione Formation sediments become coarser grained. To the east, the Ione Formation is apparently contemporaneous with the Auriferous gravels of the Sierra Nevada. In certain areas outside of Sacramento County, deposits of the Ione Formation merge eastward with these gravels. The origin of the Ione Formation appears to be of a deltaic and littoral, or near-shore, environment of deposition.

Modesto Formation (Lower) (Qm2)

The Modesto formation is made up of arkosic alluvium and sand with minor gravel and silt, which together form alluvial fans and abandoned channel ridges in valleys and along streams. Qm2 is unweathered alluvium that forms terraces that are topographically lower than Qm1.

Table 4
Summary of Landforms in Plan Area by Watershed

Formation	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River	Grand Total	Percent of Plan Area
Alluvium	23	829	—	<1	1,045	—	—	—	—	1,106	3,003	<1
Basin Deposits	—	—	—	3,378	—	629	597	1,500	8,548	—	14,652	5%
Chico Formation	—	52	—	—	—	—	—	—	—	—	52	<1
Copper Hill Volcanics	109	1,118	—	—	—	—	—	—	—	—	1,227	<1
Gopher Ridge Volcanics	353	7,666	—	—	—	—	—	—	—	2,076	10,096	3%
Intertidal Deposits	—	—	—	—	—	1,066	—	4,360	455	—	5,881	2%
Ione Formation	—	2,167	1,156	—	—	—	—	—	—	1,995	5,318	2%
Laguna Formation	373	3,433	21,165	5,327	3,621	—	20,718	465	—	6,181	61,282	19%
Levee and Channel Deposits	—	3,215	751	5,919	1,213	323	18	4,115	2,159	444	18,162	6%
Mehrten Formation	6	7,223	11,099	—	4,931	—	8		—	3,191	26,459	8%
Mine and Dredge Tailings	—	452	482	—	—	—	748	375	—	1,185	4,675	1%
Modesto Formation (Lower)	—	5,672	—	—	—	—	—	—	—	2,542	8,214	3%
Modesto-Riverbank Formation	340	175	11,343	57	2,546	—	48	179	—	—	14,688	5%
North Merced Gravel	—	—	184	—	—	—	—	—	—	—	184	<1
Riverbank Formation	504	4,583	20,340	32,001	3,781	—	20,790	2,994	29,265	7,971	122,228	38%
Salt Springs Slate	283	6,217	—	—	—	—	—	—	—	1,301	7,801	2%
Valley Springs Formation	—	987	7455	—	1,356	—	—	—	—	3,892	13,690	4%
Grand Total	**3,452**	**43,803**	**73,976**	**46,682**	**18,493**	**2,020**	**42,926**	**13,987**	**40,426**	**31,885**	**317,655**	**100%**

Note: Due to the relatively coarse scale of the land cover mapping, rounding to nearest acre is applied to acreages 10 or greater. The six acres occurring in Cache Slough are not included in the total. Any discrepancies in individual totals are due to rounding but the grand total for each watershed is consistent.

* Information is not available for the entire Plan Area.

3.1.4 Soils in the Plan Area

There are 129 different soil mapping units within the Plan Area. In order to condense the soil types within the Plan Area, the mapping units were grouped by the surface texture attribute (e.g., loam, clay, silt) (Table 5, Figure 6). Soil mapping units that did not contain a surface texture attribute are listed under "Other Soil Types" in Table 5. Overall, the Plan Area is dominated by loam soil subsets, primarily silt loam, which accounts for about 34% of the Plan Area. The "Other Soil Types" account for less than 5% of the soil types in the Plan Area.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
General Soil Types												
Silt Loam	43	10,939	20,230	30,367	6,366	394	15,233	1,705	12,892	9,306	107,475	34%
Gravelly Loam	104	7,498	22,038	2,335	5,251	—	8,987	41	—	7,332	53,586	17%
Loam	1,203	11,494	12,625	3,658	917	—	11,636	2,560	1,027	4,538	49,658	16%
Fine Sandy Loam	8	4,468	11,881	29	5,135	11	1,203	85	—	3,119	25,940	8%
Clay	—	536	1,462	2,771	127	1,198	2,028	1,642	13,138	920	23,821	7%
Sandy Loam	—	6,408	1,425	4,624	90	277	343	326	861	3,188	17,543	6%
Sandy Clay Loam	—	1,438	1,065	833	143	—	5	4	6,702	323	10,513	3%
Clay Loam	—	—	856	248	—	31	191	1,637	2,812	—	5,775	2%
Water	67	302	616	915	131	99	299	746	1,500	888	5,563	2%
Mucky Clay	—	—	—	—	—	—	—	3,601	92	—	3,693	1%
Loamy Sand	—	—	—	—	—	—	—	—	815	—	815	<1%
Cobbly Loam	—	—	4	—	19	—	—	—	—	—	23	<1%
Silty Clay Loam	—	—	<1	<1	16	9	—	—	—	—	25	<1%
Gravelly Silt Loam	—	21	—	—	—	—	—	—	—	—	21	<1%
Gravelly Sandy Loam	—	—	2	—	3	—	—	—	—	—	5	<1%
Coarse Sandy Loam	—	—	—	—	—	—	—	—	—	1	1	<1%

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Other Soil Types												
Xerorthents, dredge tailings, 2% to 50% slopes	332	335	395	—	—	—	599	362	—	1,427	3,449	1%
Xerarents-San Joaquin complex, 0 to 1% slopes	—	68	896	482	109	—	463	—	60	49	2,127	1%
Urban land	41	—	136	—	—	—	903	412	—	—	1,492	<1%
Xerarents-Urban land-San Joaquin complex, 0 to 5% slopes	101	—	—	—	—	—	359	234	—	5	698	<1%
Xerorthents, dredge tailings-Urban land complex, 0 to 2% slopes	1,197	—	—	—	—	—	—	98	—	—	1,295	<1%
Pits	75	58	18	—	—	—	384	198	10	420	1,163	<1%
Urban land-Natomas complex, 0 to 2% slopes	257	—	—	—	—	—	12	221	—	—	490	<1%

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Xerarents-Redding complex, 0 to 2% slopes	24	18	321	422	—	—	166	—	—	—	950	<1%
Fluvaquents, 0 to 2% slopes, frequently flooded	—	—	—	—	—	—	—	—	517	—	517	<1%
Slickens	—	—	—	—	—	—	26	—	—	21	47	<1%
Lithic Xerorthents, 2% to 8% slopes	—	29	—	—	184	—	—	—	—	197	410	<1%
Dumps	—	135	—	—	—	—	88	—	—	—	223	<1%
Urban land-Xerarents-Fiddyment complex, 0 to 8% slopes	—	—	—	—	—	—	—	114	—	—	114	<1%
Xerofluvents, 0 to 2% slopes, flooded	—	56	—	—	—	—	—	—	—	130	186	<1%
Riverwash	—	—	5	—	—	—	—	—	—	21	26	<1%
Mokelumne soils and alluvial land	—	—	—	—	<1	—	—	—	—	—	<1	<1%

AGENDA ITEM 11.1

7089

Table 5
Summary of Soil Types in Plan Area by Watershed

Soil Type	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)	Grand Total (acres)	Percent of Plan Area
Placer diggings and Riverwash	—	—	—	—	<1	—	—	—	—	—	<1	<1%
Inks loam and Rock land, 3% to 45% slopes	—	—	<1	—	—	—	—	—	—	—	<1	<1%
Grand Total	**3,452**	**43,803**	**73,976**	**46,682**	**18,493**	**2,019**	**42,926**	**13,987**	**40,426**	**31,885**	**317,649[1]**	**100%**

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document.

3.1.5 Slope and Elevation

The topography of the Plan Area reflects the initial geological conditions as they have been modified over time by wind, rain, and flowing water. Generally, the Plan Area is dominated by flat or gently sloping terrain, and steep slopes are rare. The central and western regions of the Plan Area are dominated by flat terrain. In the eastern region, the flat terrain gives way to rolling hills (USDA NRCS 1993). Elevations range from approximately 5 feet below sea level in the southwest portion of the Plan Area to approximately 670 feet amsl in the eastern portion of the Plan Area. Because much of the Plan Area lies in low, flat terrain with little to no slope, natural drainageways in these areas are usually poorly defined and drainage of stormwater is slow. Tables 6 and 7 show a breakdown of the slopes and elevation ranges, respectively, for each watershed. These topographic features are represented on Figure 7 for elevations and Figure 8 for slopes.

Table 6
Summary of Slopes in the Plan Area

Watershed	0–20%		21%–40%		>40%		Total (acres)
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	
American River	3,452	100	—	—	—	—	3,452
Deer Creek	43,467	99.2	327	0.1	8	<0.1	43,803
Laguna Creek	73,833	99.8	141	0.2	2	<0.1	73,976
Lower Cosumnes River	46,682	100	—	—	—	—	46,682
Lower Dry Creek	18,246	98.7	242	1.3	5	<0.1	18,493
Lower Mokelumne River	2,019	100	—	—	—	—	2,019
Morrison Creek	42,924	99.9	2	<0.1	—	—	42,926
Sherman Lake-Sacramento River	13,987	100	—	—	—	—	13,987
Snodgrass Slough	40,426	100	—	—	—	—	40,426
Upper Cosumnes River	31,447	98.6	405	1.3	34	0.1	31,885
Total	**316,483**	**99.6**	**1,117**	**0.4**	**49**	**<0.1**	**317,649**[1]

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document.

Table 7
Summary of Elevation Ranges in the Plan Area

Watershed	0–500 feet		501–1,000 feet		Total (acres)
	Acres	*Percent*	*Acres*	*Percent*	
American River	3,385	98.1	66	2	3,452
Deer Creek	42,536	97.1	1,267	2.7	43,803
Laguna Creek	73,976	100.0	—	—	73,976
Lower Cosumnes River	46,682	100.0	—	—	46,682

Table 7
Summary of Elevation Ranges in the Plan Area

Watershed	0–500 feet		501–1,000 feet		Total (acres)
	Acres	*Percent*	*Acres*	*Percent*	
Lower Dry Creek	18,451	99.8	42	0.2	18,493
Lower Mokelumne River	2,019	100.0	—	—	2,019
Morrison Creek	42,926	100.0	—	—	42,926
Sherman Lake-Sacramento River	13,987	100.0	—	—	13,987
Snodgrass Slough	40,426	100.0	—	—	40,426
Upper Cosumnes River	31,761	99.6	124	0.4	31,885
Total	**316,149**	**99.5**	**1,499**	**0.5**	**317,649**[1]

[1] The total does not include the approximately 6 acres of the Cache Slough watershed, which is not discussed in this document.

Table 6 shows that more than 99% of the Plan Area supports slopes less than 20%, with a range of just over 98% in the Upper Cosumnes River watershed to 100% in several of the watersheds. Similarly, Table 7 shows that over 99% of the Plan Area has an elevation of less than 500 feet and that all of the watersheds have at least 97% of their elevations at less than 500 feet; only four watersheds have elevations above 500 feet. The Deer Creek watershed accounts for about 3% of the acreage in the Plan Area above 500 feet.

3.1.6 Covered Species

Occurrences of Covered Species recorded throughout the Plan Area are shown in Table 8 and are depicted on Figures 9-1 through 9-29 Generally, Table 8 shows that most of the occurrence data for Covered Species in the Plan Area are concentrated in 5 of the 10 watersheds: Morrison Creek and Laguna for the vernal pool Covered Species and Morrison Creek, Laguna, Snodgrass Slough, Upper Cosumnes River, and Lower Cosumnes River for the other Covered Species. These five watersheds combined account for 72% of the total Covered Species occurrences in the Plan Area. Descriptions of the Covered Species occurrences within the different watersheds are provided in the analyses below for each watershed. It should be noted that the Covered Species occurrence data generally reflect where the most comprehensive surveys have been conducted in the Plan Area and do not necessarily reflect negative findings elsewhere in the Plan Area. For example, most of the vernal pool Covered Species occurrences are known from existing vernal pool Preserves inside the UDA and existing Preserve in PPU 7 outside the UDA, and relatively few occurrences are from planned criteria-based conservation areas simply because many of these areas have not been surveyed.

The SSHCP also includes an analysis of potentially suitable habitat (i.e., modeled habitat) for each of the Covered Species (Table 9, Figures 9-1 through 9-29). Further, several of the

Biological Goals and Measurable Objectives for plant species (Table 7-1, Chapter 7 of the SSHCP) prescribe that before an occurrence can be taken, one must be protected. For three Covered Species (giant garter snake, greater sandhill crane, and Swainson's hawk), the effects analysis also includes "high-value" habitat for the species in the Plan Area. High-value habitat is defined differently for each of the three species (Chapter 3 of the SSHCP), but generally refers to particularly important habitat in the Plan Area . Complete descriptions of the Covered Species are found in Chapter 3 of the SSHCP, effects of the SSHCP to Covered Species are described in Chapter 6, and the SSHC Conservation Strategy for the Covered Species is described in Chapter 7 of the SSHCP.

Similar to the Covered Species occurrences, Morrison Creek and Laguna support the majority of modeled habitat for vernal pool Covered Species, together accounting for 92% of the modeled habitat for both the vernal pool plants and vernal pool invertebrates. Modeled habitat for the other Covered Species is distributed across more watersheds, with Laguna accounting for most of the total, but with substantial modeled habitat in the Deer Creek, Lower Cosumnes River, Upper Cosumnes River, Morrison Creek, and Snodgrass Slough watersheds. More detailed descriptions of the modeled habitat for Covered Species within the different watersheds are provided in the analyses in Section 3.2 for each watershed.

Table 8
Summary of Covered Species Occurrences Within Watersheds[1]

Covered Species	Species Occurrence Total	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River
Vernal Pool Plants											
Ahart's dwarf rush	2	—	—	—	—	—	—	2	—	—	—
Boggs Lake hedge-hyssop	30	—	3	—	—	—	—	27	—	—	—
Dwarf downingia	10	—	—	2	1	—	—	—	—	7	—
Legenere	56	—	—	2	5	1	—	30	—	12	6
Pincushion navarretia	48	—	—	32	—	16	—	—	—	—	—
Sacramento Orcutt grass	40	—	19	2	—	—	—	19	—	—	—
Slender Orcutt grass	4	—	—	—	—	—	—	4	—	—	—
Occurrences in Watershed	**190**	**0**	**22**	**38**	**6**	**17**	**0**	**82**	**0**	**19**	**6**
Non-Vernal Pool Plant											
Sanford's arrowhead	**63**	**—**	**2**	**—**	**4**	**—**	**3**	**12**	**2**	**35**	**5**
Vernal Pool Invertebrates											
Vernal pool fairy shrimp	572	—	14	305	8	10	—	196	2	17	20
Vernal pool tadpole shrimp	748	2	16	187	3	5	—	505	2	21	7
Ricksecker's water scavenger beetle	4	—	—	3	1	—	—	—	—	—	—
Mid-valley fairy shrimp	33	—	—	5	1	—	—	18	—	9	—
Occurrences in Watershed	**1,357**	**2**	**30**	**500**	**13**	**15**	**0**	**719**	**4**	**47**	**27**

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 8
Summary of Covered Species Occurrences Within Watersheds[1]

Covered Species		Species Occurrence Total	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River
Wildlife												
Amphibians/Reptiles												
California tiger salamander		29	—	—	23	—	6	—	—	—	—	—
Giant garter snake		14	—	—	1	5	—	—	1	—	7	—
Western pond turtle		18	—	1	8	2	—	—	2	—	5	—
Western spadefoot		31	—	1	18	—	1	—	9	—	—	2
Birds												
Burrowing owl		90	1	4	23	14	—	—	26	6	16	—
Cooper's hawk		17	—	2	1	6	—	—	4	—	2	2
Ferruginous hawk		26	—	4	6	3	—	—	8	—	2	3
Loggerhead shrike		30	—	4	6	8	—	—	3	—	7	2
Northern harrier		62	1	6	7	20	1	—	9	2	13	3
Greater sandhill crane	All data	3,249	—	—	390	642	259	—	2	1,205	722	29
	Roosts	*48*	—	—	*7*	*29*	—	—	—	—	*12*	—
Swainson's hawk	All data	398	1	31	51	107	19	—	20	8	127	34
	Nests	*293*	—	*22*	*42*	*90*	*15*	—	*11*	*3*	*86*	*24*
Tricolored blackbird	All data	305	3	45	91	33	2	—	87	5	6	33
	Documented nests	*36*	—	*6*	*5*	*3*	—	—	*20*	—	*1*	*1*
White-tailed kite		58	—	4	1	23	—	—	13	4	10	3

Table 8
Summary of Covered Species Occurrences Within Watersheds[1]

Covered Species	Species Occurrence Total	American River	Deer Creek	Laguna Creek	Lower Cosumnes River	Lower Dry Creek	Lower Mokelumne River	Morrison Creek	Sherman Lake-Sacramento River	Snodgrass Slough	Upper Cosumnes River
Invertebrates											
Valley elderberry longhorn beetle	156	1	1	—	1	—	—	—	—	—	153
Mammals											
American badger	8	—	—	—	—		—	7	—	1	—
Western red bat	7	—	—	2	—	—	—	2	2	—	1
All Wildlife Species in Watershed[2]	**4,561**	**7**	**105**	**628**	**868**	**288**	**3**	**205**	**1,234**	**953**	**270**
Total Covered Species in Watershed[2]	**6,108**	**9**	**157**	**1,166**	**887**	**320**	**3**	**1,006**	**1,238**	**1,019**	**303**

1 The occurrence data reported in this table include all documented observations for the Covered Species in the Plan Area. Nest or roost sites are included for Swainson's hawk, tricolored blackbird, and greater sandhill crane.

2 Totals and percentages are based on sums of all occurrence data and do not include subtotals for nests or roosts for Swainson's hawk, tricolored blackbird, and greater sandhill crane, which are subsets of all occurrence data for these species.

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
Vernal Pool Plants (general habitat model in acres)												
Ahart's dwarf rush		25,135	126	2,954	6,689	1,269	327	—	10,974	19	2777	
Boggs Lake hedge-hyssop		37,001	183	3,908	8,663	4,954	484	—	12,702	67	815	5,225
Dwarf downingia		24,260	-	1,310	10,991	4,341	1,947	—	2,218	—	1,362	2,091
Legenere		50,971	156	4,174	16,491	6,210	2,107	—	15,118	137	1,679	4,899
Pincushion navarretia		57,437	79	8,242	29,570	1,408	6,351	—	6,841	7.33	—	4,939
Sacramento Orcutt grass		34,491	125	3951	14,275	1,371	2,005	—	9,972	19	—	2,774
Slender Orcutt grass		34,491	125	3,951	14,275	1,371	2,005	—	9,972	19	—	2,774
Non-Vernal Pool Plant												
Sanford's arrowhead		52,824	133	5,124	12,535	9,713	773	13	15,026	41	2,817	6,648
Vernal Pool Invertebrates												
Vernal pool fairy shrimp/Vernal pool tadpole shrimp	General	103,210	378	13,814	40,030	10,004	7,131	—	18,445	326	1,918	11,163
Ricksecker's water scavenger beetle	General	103,436	378	13,795	40,030	10,004	7,131	—	18,390	326	1,918	11,163
Mid valley fairy shrimp	General	53,698	208	5,705	13,594	7,412	770		16,907	309	1,852	6,941

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
Amphibians/Reptiles												
California tiger salamander	Upland	85,369	—	—	46,092	13,807	9,911	—	—	—	—	15,559
	Aquatic	4,424	—	—	2,336	1,070	319	—	—	—	—	699
Giant garter snake	Aquatic	7,290	—	3	697	2,430	1	91	441	66	3,559	2
	Upland	27,868	—	181	9,521	8,934	19	3	3,258	114	5,760	78
	High Value[3]	10,481	—	—	1,170	1,518	10	0.4	1,388	45	6,350	—
Western pond turtle	Breeding/ Foraging	6,355	10	392	739	1,866	132	91	515	7	2,005	599
	Nesting/ Aestivation	110,846	899	25,697	33,739	11,195	8,273	199	8,750	425	6,517	15,153
Western spadefoot	Aquatic	13,478	41	1,011	3,477	2,387	471	71	1,566	23	2,987	1,444
	Upland	149,862	1,318	30,062	46,092	14,593	9,911	—	21,312	627	5,945	20,002
Birds												
Burrowing owl	Nesting/ Foraging	204,644	1,336	30,562	55,756	30,654	11,553	1,679	24,956	1,704	25,499	20,945
Cooper's hawk	Foraging	5,637	-	2,018	2,550	—	529	—	18	—	—	521
	Nesting	17,010	48	5,357	1,846	2,231	1,865	199	487	182	1,767	3,028
Ferruginous hawk	Foraging	159,612	1,369	25,055	50,046	19,420	8,701	9	23,951	633	10,452	19,976
Loggerhead	Foraging	72,405	32	5,476	13,826	17,440	3,478	1,679	4,903	1,084	20,767	3,719

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
shrike	Foraging/ Nesting	135,112	1,336	23,643	42,178	14,593	7,965	0.13	21,294	626	5,945	17,530
	Nesting	7,878	48	957	481	2,231	448	199	487	182	1,767	1,078
Northern harrier	Foraging	11,309	34	602	2,931	2,506	432	21	1,600	14	2,243	926
	Foraging/ Nesting	199,008	1,336	28,544	53,205	30,654	11,023	1,679	24,938	1,704	25,499	20,424
Greater Sandhill crane	Roosting	1,156	—	8	279	369	28	—	17	—	421	734
	Foraging	84,286	—	3,677	16,315	29,301	3,289	1,421	1,593	855	25,438	2,398
	Foraging/ Roosting	4,322	—	46	336	1,696	48	21	315	8	1,811	43
	High Value	81,473	—	2,569	14,103	30,527	2,599	1,442	75	836	26,848	2,474
Swainson's hawk	Foraging	205,988	1,303	27,862	55,969	32,033	11,408	1,679	26,168	1,711	26,712	21,142
	Nesting	7,237	—	916	323	2,214	448	199	358	180	1,767	832
	High Value[3]	75,534	—	3,177	10,092	25,942	1,942	1,878	1,926	1,356	28,340	881
Tricolored blackbird	Foraging	24,244	12	1,482	7,747	4,874	627	12	2,710	16	4,446	2,318
	Nesting-Foraging	188,539	1,361	27,875	48,721	28,950	10,871	1,692	24,016	1,712	24,016	19,324
White-tailed kite	Foraging	213,154	1,369	31,138	58,554	32,033	11,972	1,679	26,215	1,711	26,712	21,771
	Nesting	17,010	48	5,357	1,846	2,231	1,865	199	487	182	1,767	3,028

Table 9
Modeled Habitat for Covered Species within a Watershed

Covered Species		Total Acres of Modeled Habitat[1,2]	American River (acres)	Deer Creek (acres)	Laguna Creek (acres)	Lower Cosumnes River (acres)	Lower Dry Creek (acres)	Lower Mokelumne River (acres)	Morrison Creek (acres)	Sherman Lake-Sacramento River (acres)	Snodgrass Slough (acres)	Upper Cosumnes River (acres)
Invertebrates												
Valley elderberry longhorn beetle	General	7,878	48	957	481	2,231	448	199	487	182	1,767	1,078
Mammals												
American badger	General	149,136	1,369	26,225	47,492	15,972	8,879	—	22,542	633	7,158	18,866
Western red bat	Foraging	152,890	1,379	24,754	45,883	18,392	8,531	94	23,376	787	10,508	19,186
	Roosting/ Foraging	24,841	48	7,432	4,946	2,062	2,559	196	504	1,540	1,874	3,679

1 Total modeled habitat acreages for a species include areas where different models (e.g., foraging and breeding) for the species overlap (i.e., the acreages in the models for a particular species are not mutually exclusive).

2 Modeled habitat totals may not sum exactly to the modeled habitat acreages reported in the SSHCP due to rounding error.

3 High-value habitat is a subset of modeled habitat and is included in the total modeled habitat acreage.

3.1.7 Preserve Design

The majority of conservation, existing and planned, within the Plan Area will occur within the Laguna Creek watershed, while very little conservation is designated within the American River watershed (Table 10, Figure 10). Watersheds with approximately 22% to 24% of existing conservation include Lower Dry Creek, Lower Cosumnes River, and Snodgrass Slough. Substantial conservation is planned for 7 of the 10 watersheds, ranging from approximately 2,571acres in Deer Creek to approximately 5,119 acres in Lower Cosumnes River. Ultimately, Laguna Creek watershed would have the highest total conservation by percentage at almost 27% and by acreage at more than 25,633 acres.

Table 10
Summary of Watershed Conservation

Watershed	Plan Area Total		Existing Conservation		Planned Conservation		No Conservation		Percentage of Conservation in Plan Area
	Acres	*% of Plan Area*	*Acres*	*% of Watershed*	*Acres*	*% of Watershed*	*Acres*	*% of Watershed*	
American River	997	0.4	0	0	0	0.0	997	0.6	0%
Deer Creek	34,971	13.5	5,464	8.5	2,571	7	26,936	17	23%
Laguna Creek	69,633	26.8	18,356	28.5	14,513	39.4	36,764	23	47%
Lower Cosumnes River	44,411	17	14,266	22	5,119	13.9	25,026	15.8	44%
Lower Dry Creek	17,661	6.8	8,834	13.7	358	1	8,470	5.3	52%
Lower Mokelumne River	2,019	0.8	1,642	2.5	0	0.0	377	0.2	81%
Morrison Creek	10,007	3.9	2,888	4.8	5,883	16	1,236	0.8	88%
Sherman Lake-Sacramento River	9,737	3.7	758	1.8	103	0.3	8,876	5.6	9%
Snodgrass Slough	38,806	15	8,943	13.9	5,497	14.9	24,366	15.4	37%
Upper Cosumnes River	31,602	12	3,368	5.2	2,803	7.6	25,429	16	20%
Total	**259,849**	**—**	**64,519**	**24.8**	**36,847**	**14.2**	**158,483**	**61**	**100**

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 11 provides a breakdown of the watersheds by non-UDA/UDA areas and PPUs. All but the Upper Cosumnes and Lower Mokelumne River watersheds intersect both the UDA and non-UDA areas and all intersect more than one PPU. Section 3.3 provides descriptions of the watersheds and how they relate to Preserve planning inside and outside the UDA and by PPUs.

Table 11
Summary of Preserve Planning Units by Watershed

Watershed		Outside of Preserve Planning Units (acres)	PPU 1 (acres)	PPU 2 (acres)	PPU 3 (acres)	PPU 4 (acres)	PPU 5 (acres)	PPU 6 (acres)	PPU 7 (acres)	PPU 8 (acres)	Total (acres)
American River	Non-UDA	1,094	—	—	—	—	—	—	—	—	1,094
	UDA	—	1,106	1,251	—	—	—	—	—	—	2,357
Deer Creek	Non-UDA	8,081	—	—	—	—	21,005	2,435	—	—	31,521
	UDA	—	8,150	—	3,003	1,130	—	—	—	—	12,283
Laguna Creek	Non-UDA	—	—	—	—	—	—	8,292	61,441	—	69,733
	UDA	—	—	—	—	—	—	—	—	4,242	4,242
Lower Cosumnes River	Non-UDA	—	—	—	—	—	4,941	31,008	8,942	—	44,891
	UDA	—	—	—	—	—	—	—	—	1,791	1,791
Lower Dry Creek	Non-UDA	—	—	—	—	—	—	1,218	16,176	--	17,394
	UDA	—	—	—	—	—	—	—	—	1,099	1,099
Lower Mokelumne River	Non-UDA	—	—	—	—	—	—	2,019	—	—	2,019
	UDA	—	—	—	—	—	—	—	—	—	—
Morrison Creek	Non-UDA	70	—	--	--	—	—	111	—	—	181
	UDA	12,210	10,146	6,028	11,301	3,060	—	—	—	—	42,745
Sherman Lake-Sacramento River	Non-UDA	—	—	—	—	—	—	9,737	—	—	9,737
	UDA	1,876	326	1,992	—	57	—	—	—	—	4,251
Snodgrass Slough	Non-UDA	—	—	—	—	—	—	39,420	—	—	39,420
	UDA	—	—	—	—	1,006	—	—	—	—	1,006

Table 11
Summary of Preserve Planning Units by Watershed

Watershed		Outside of Preserve Planning Units (acres)	PPU 1 (acres)	PPU 2 (acres)	PPU 3 (acres)	PPU 4 (acres)	PPU 5 (acres)	PPU 6 (acres)	PPU 7 (acres)	PPU 8 (acres)	Total (acres)
Upper Cosumnes River	Non-UDA	—	—	—	—	—	26,602	935	4,348	—	31,885
	UDA	—	—	—	—	—	—	—	—	—	—
Total		**23,330**	**19,729**	**9,271**	**14,303**	**5,253**	**52,549**	**95,182**	**90,906**	**7,132**	**317,655**

3.2 Description of Watersheds in Plan Area

3.2.1 American River Watershed

3.2.1.1 Land Cover Types

Approximately 3,452 acres, or about 5%, of the 65,103-acre American River watershed is located within the Plan Area. This watershed comprises 1% of the entire Plan Area and is located in the northern portion of the Plan Area (Figure 2). A little more than half of the watershed contains Non-habitat land cover types, which primarily includes high-density development and mine tailings (Table 2, Figure 3). The remaining undeveloped land consists of Valley Grassland, Mine Tailing Riparian Woodland, Mixed Riparian Woodland, Blue Oak Woodland, and Savanna and Mixed Riparian scrub. Aquatic resources account for only approximately 98 acres, or about 3%, of the American River watershed. Impervious surfaces cover approximately 1,773 acres, or 51%, of the watershed within the Plan Area. Along with the Morrison Creek (16% impervious surfaces) and Sherman Lake-Sacramento River (24% impervious surfaces) watersheds, the American River watershed has one of the three highest percentages of impervious surfaces in the Plan Area.

3.2.1.2 Hydrology

According to the NHD flowline dataset, the American River watershed contains about 1% of the Plan Area's flowline features. Alder and Buffalo Creeks are the main water sources within this watershed, both of which are tributaries to the American River located north of the Plan Area.

Artificial paths (48%) and streams/rivers (46%) account for most of the flowline features in the American River watershed.

3.2.1.3 Geological Formations

The majority of the American River watershed is comprised of riverbank formations, Laguna formation and gopher ridge volcanics (45%) (Table 4, Figure 5).

3.2.1.4 Soils

The majority of this watershed (59%) contains dredge tailings, pits, and other remnants from mining operations (Table 5, Figure 6). The remaining acreage consists mostly of loam (35%) and gravelly loam (about 3%) soils.

3.2.1.5 Slope and Elevation

The entire American River watershed contains flat to gentle slopes (0-20%). (Table 6, Figure 7). This watershed does not contain any lands above 20% slopes. Similarly, the majority of the watershed is between an elevation range of 0-500 feet, with only about 2% ranging from 500-1,000 feet (Table 7, Figure 8).

3.2.1.6 Covered Species

The American River watershed includes documented occurrences for 10 of the 28 Covered Species, including: tricolored blackbird (*Agelaius tricolor*), Swainson's hawk (*Buteo swainsoni*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool tadpole shrimp (*Lepidurus packardi*), burrowing owl (*Athene cunicularia*), and northern harrier (*Circus cyaneus*) (Table 8). However, about 45% of the American River watershed has been influenced by human activities with about half of the watershed dominated by non-habitat land covers and agriculture (Table 2, Figure 3). Subsequently, in combination with making up only 1% of the Plan Area, the portions of the American River watershed within the Plan Area do not support a high overall percentage of the Covered Species occurrences in the Plan Area.

Modeled habitat for several species occurs within this watershed, with substantial amounts of modeled habitat for the covered bird and mammal species (Table 9). Except for Cooper's hawk and greater sandhill crane (*Grus canadensis*), whose modeled habitat is limited to the western portion of the Plan Area, the American River watershed supports more than 1,000 acres of modeled habitat for each of the covered bird and mammal species, including more than 1,384 acres of nesting habitat for loggerhead shrike (*Lanius ludovicianus*) and foraging habitat for Cooper's hawk, more than 1,336 acres of nesting/foraging habitat for burrowing owl, and more

than 5,455 acres of foraging habitat for ferruginous hawk (*Buteo regalis*), loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite. The watershed contains more than 1,361 acres of modeled nesting habitat for tricolored blackbird and a nesting colony of approximately 3,900 birds was observed in 2000. The watershed supports about 1,379 acres of foraging habitat and more than 48acres of roosting habitat for western red bat, and more than 1,369 acres of modeled general habitat for American badger (*Taxidea taxus*). The watershed also contains about 48 acres of modeled habitat for valley elderberry longhorn beetle, but only one documented occurrence for the species. The watershed supports very small amounts of modeled habitat for the vernal pool Covered Species, ranging from no modeled habitat for dwarf downingia (*Downingia pusilla)* to 156 acres for legenere (*Legenere limosa*). For amphibians and reptiles, the watershed supports about 51 acres of modeled breeding habitat and 1,318acres of modeled aestivation habitat for western spadefoot (*Spea hammondii*) and 10 acres of modeled breeding/foraging habitat and 899 acres of modeled aestivation/nesting habitat for western pond turtle (*Actinemys marmorata*). The watershed does not have modeled habitat for California tiger salamander (*Ambystoma californiense*) and giant garter snake (*Thamnophis gigas*) because it is outside the geographic range of these two species in the Plan Area. The watershed contains only 133 acres of modeled habitat for Sanford's arrowhead (*Sagittaria sanfordii*).

3.2.1.7 Conservation Considerations

Almost the entire American River watershed is located within the UDA. The 2,358 acres of this watershed within the UDA are split about equally between PPU 1, and PPU 2. Due to its relative lack of vernal pools and vernal pool Covered Species occurrences, the watershed is not considered an important component of the Conservation Strategy inside the UDA. While the American River watershed supports substantial modeled habitat for covered birds and mammals (generally more than 1,000 acres for each), these species are widespread in the Plan Area and the watershed supports a relatively small percentage (generally less than 2%) of the total modeled habitats for these species in the Plan Area. No planned Preserve components are located within this watershed and it is anticipated that much of PPU 2 will eventually be urbanized.

3.2.2 Deer Creek Watershed

3.2.2.1 Land Cover Types

The Deer Creek watershed bisects the Plan Area, extending from the northeastern edge to halfway into the Plan Area (Figure 2). Of the 81,504 acres of the watershed, 43,803 acres (54%) are within the Plan Area (Table 1). A large majority (94%) of the watershed contains "Habitat" land covers, which includes Agriculture (Table 2, Figure 3). Terrestrial land covers (31,018 acres and 71% of the watershed), consisting primary of Valley Grassland (23,643 acres and 54% of the

watershed), account for the majority of the watershed. Other terrestrial land covers include Blue Oak Savanna and Woodland (9% of the watershed) and Mixed Riparian Woodland, Mixed Riparian Scrub, and Mine Tailing Riparian Woodland (2% of the watershed). Approximately 21% (9,269 acres) of the watershed consists of lands used for agricultural purposes and 6% (2,467 acres) fall under the Non-habitat land cover type. The remaining 2% of the watershed (1,048 acres) consists of aquatic resources such as streams and creeks, open water, and vernal pools. Impervious surfaces cover approximately 188 acres, or less than 1%, of the watershed within the Plan Area.

3.2.2.2 Hydrology

Approximately 86% of the NHD data within the Deer Creek watershed contains streams and rivers (Table 3, Figure 4). Deer Creek and its tributaries are the central focus of this watershed. Notable tributaries located within the watershed include Crevis Creek, Carson Creek, and Coyote Creek. The Cosumnes River separates the Deer Creek watershed from the Upper Cosumnes River watershed (see Section 3.2.10). Artificial paths account for about 6% of this watershed, with the majority related to the southern extension of the Folsom South Canal. The remaining NHD features within the Deer Creek watershed are canal/ditch (7%), connector (less than 1%), and pipeline (less than 1%).

3.2.2.3 Geological Formations

Gopher ridge volcanics, Mehrten formation and salt springs slate underlie the majority of the Deer Creek watershed, accounting for about 48% (Table 4, Figure 5). Several other geological formations are prominent within this watershed and include laguna formation, levee and channel deposits, Modesto formation, and riverbank formation.

3.2.2.4 Soils

A wide variety of loam subcategories occur within this watershed (Table 5, Figure 6): loam (26%), silt loam (25%), gravelly loam (17%), sandy loam (15%), fine sandy loam (10%), and sandy clay loam (3%). Additional soils include clay (1%) and soils listed in the other category (2%). A small percentage (less than 1%) includes areas covered in water.

3.2.2.5 Slope and Elevation

The Deer Creek watershed contains slopes from 0 to greater than 40%, with the vast majority of the slopes (99%) within the 0-20% category (Table 6, Figure 7). Less than 1% are within the 20%-40% and less than 1% are within the greater than 40% category. The majority of the steep slopes are concentrated along the portion of Deer Creek River located in the northeastern section

of the watershed. Of all the watersheds, Deer Creek contains the highest percentage (3%) of acreage within an elevation range of 500-1,000 feet (Table 7, Figure 8). This acreage is concentrated along the eastern border of the Plan Area.

3.2.2.6 Covered Species

The Deer Creek watershed includes documented occurrences for 16 of the 28 Covered Species, including: Boggs Lake hedge-hyssop, Sacramento Orcutt grass (*Orcuttia viscida*), Sanford's arrowhead, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, western pond turtle, western spadefoot, and white-tailed kite (Table 8). This watershed contains 2% of the known occurrences for these 16 Covered Species, and contains a substantial percentage of occurrences for two of the Covered Species, including 48% of the Sacramento Orcutt grass records and 15% of the ferruginous hawk records. Covered species have been recorded throughout the watershed, with the majority occurring along hydrologic features and within aquatic or terrestrial habitat. A cluster of vernal pool species records occur along the border of Deer Creek and Morrison watersheds east of the intersection of Grant Line Road and Keifer Boulevard.

Consistent with the occurrence of several vernal pool species, the Deer Creek watershed contains modeled habitat for all of the vernal pool Covered Species, ranging from 1,310 for dwarf downingia to 13,814 acres for vernal pool fairy shrimp and vernal pool tadpole shrimp (Table 9). The Deer Creek watershed contains substantial acreages of modeled habitats for all of the covered bird species, including 602 acres to well over 30,000 acres (64% of the watershed) of modeled foraging habitat for Cooper's hawk, loggerhead shrike, northern harrier, ferruginous hawk, Swainson's hawk, tricolored blackbird, white-tailed kite, and burrowing owl. The watershed also supports large amounts of nesting habitat for many of the covered birds, including more than 30,562 acres for burrowing owl (including foraging habitat), and about 5,357 acres for white-tailed kite. Of the 398 documented Swainson's hawk nest sites, 31 are in the Deer Creek watershed. The watershed also supports 3,177 acres of high-value foraging habitat for Swainson's hawk.

Fifteen of the 96 documented nest colonies for tricolored blackbird and 5 of 63 potential nest colonies are in the watershed. Approximately 14,280 individuals have been observed at the 96 documented nest colonies over the survey years, or 9% of the total individuals observed at nest colonies in the Plan Area. Nest colonies in this watershed have ranged from 30 to approximately 3,500 individuals.

The watershed is important for western spadefoot and western pond turtle, supporting almost 1,011 acres of modeled breeding habitat and almost 30,062 acres of modeled aestivation habitat for western spadefoot (both habitats provide foraging habitat as well) and more than 392 acres of breeding/foraging habitat and more than 25,697 acres of modeled nesting/aestivation habitat for western pond turtle. The Deer Creek watershed does not support modeled habitat for California tiger salamander because it is outside the species' range in the Plan Area, and supports only a small amount of modeled habitat for giant garter snake (3 acres of foraging and 181 acres of upland habitat), whose populations occur in the western portion of the Plan Area.

The Deer Creek watershed supports large acreages of modeled habitat for the covered mammals, including more than 26,225 acres of modeled general habitat for American badger and about 24,754 acres of modeled foraging habitat for western red bat (*Lasiurus blossevillii*) The watershed supports about 7,432 acres of roosting habitat for the western red bat.

The Deer Creek watershed supports a relatively small amount of modeled habitat for Sanford's arrowhead (5,124 acres, or 10% of the total in the Plan Area).

3.2.2.7 Conservation Considerations

The Deer Creek watershed supports substantial biological resources and is an important component of the SSHCP Conservation Strategy, as described in the previous section. Approximately 35% of the Deer Creek watershed is located outside of the UDA, and spans over PPUPPUs, 5 and 6 (Table 11). About 48% of the watershed in the Plan Area is within PPU 5. The Deer Creek watershed includes existing and planned conservation both inside and outside of the UDA. Existing conservation (5,463 acres) occur in a patchy distribution throughout the Deer Creek watershed, with the largest existing Preserve (about 4,490 acres) located immediately north of Rancho Murieta (Figure 10). Planned conservation totals about 2,570 acres and will focus primarily on linkage Preserves, riparian and wetland restoration (see Chapter 7 of the SSHCP). Restoration activities will be focused along the Cosumnes River. Implementation of the SSHCP would result in an integrated system of large Preserves connected by linkage Preserves (Chapter 7 of the SSHCP).

The majority of existing conservation within the Deer Creek watershed targets two terrestrial land covers: blue oak woodland and valley grassland, which together would account for about 78% of the total conservation in the watershed (Table 12). Agricultural areas will also be conserved, including about 914 acres of croplands and irrigated pasture-grassland that provide foraging habitat for several of covered bird species and western red bat. About 281 acres of aquatic habitat would conserved, with most comprised of vernal pool and swale.

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 12
Summary of Conserved Land Cover Types in the Deer Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	73	—	73
Blue Oak Woodland	1,423	—	1,423
Mine Tailing Riparian Woodland	<1	—	<1
Mixed Riparian Scrub	1	14	15
Mixed Riparian Woodland	44	312	356
Valley Grassland	2,854	1,609	4,463
Terrestrial Total	*4,395*	*1,935*	*6,330*
Aquatic			
Streams/Creeks (VPIH)	<1	14	14
Freshwater Marsh	7	1	8
Open Water	6	10	16
Seasonal Wetland	5	15	20
Streams/Creeks	28	25	53
Swale	16	16	32
Vernal Pool	104	34	138
Aquatic Total	*166*	*115*	*281*
Agriculture			
Cropland	596	318	914
Irrigated Pasture-Grassland	138	37	175
Orchards	1	4	5
Vineyards	116	51	167
Agriculture Total	*851*	*410*	*1,261*
Non-Habitat Land Cover Type			
Disturbed	2	72	74
Low-density Development	27	33	60
Major Roads	12	5	17
Mine Tailings	10	—	10
Non-Habitat Land Cover Type Total	*51*	*110*	*161*
Grand Total	**5,463**	**2,570**	**8,033**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.3 Laguna Creek Watershed

3.2.3.1 Land Cover Types

The Laguna Creek watershed is approximately 96,788 acres, of which 73,976 acres are within the Plan Area, and comprises 76% of the Plan Area (Table 1). It is located in the southeastern portion of the Plan Area (Figure 2) and contains virtually all of the mapped land cover types in the Plan Area (Table 2, Figure 3). The large majority (91%) of the Laguna Creek watershed is undeveloped. Combined, Valley Grassland, Blue Oak Savanna, and Blue Oak Woodland account for 62% (approximately 46,092 acres) of the land covers in the watershed, and 68% of the natural land covers, including Agriculture. Agriculture accounts for 24% (approximately 17,445 acres) of the land covers in the Plan Area. The Laguna Creek watershed also supports all of the aquatic cover types except Streams/Creeks (VPIH), including approximately 2,764 acres of Vernal Pool, Seasonal Wetland, and Swale, approximately 416 acres of Streams/Creeks, and almost 300 acres of Open Water. Non-habitat land cover types comprise only 9% of the watershed, with Low-Density Development accounting for 68% of the Non-habitat land cover types. Impervious surfaces cover approximately 1,417 acres, or only 2%, of the watershed within the Plan Area.

3.2.3.2 Hydrology

According to the NHD flowline dataset, the Laguna Creek watershed contains almost 26% of the flowline types in the Plan Area, which is slightly higher than its total proportion (20%) of the Plan Area (Table 3, Figure 4). Reflecting the dominance of natural land cover types in the watershed, approximately 86% of the Laguna Creek watershed is stream/river, with artificial paths and canal/ditch accounting for almost all of the remaining 14%.

The main streams/rivers in the Laguna Creek watershed include Laguna Creek (south), which flows west from outside the Plan Area and drains to the Cosumnes River in the western portion of the watershed. Browns, Hadselville, Griffith, and Skunk Creeks all drain into Laguna Creek, with each having various tributaries creating a rich network of drainages in the watershed.

3.2.3.3 Geological Formations

The Laguna Creek watershed is underlain mostly by the laguna formation and the riverbank formation 56% of the watershed (Table 4). Other prominent formations in the watershed include the Mehrten formation and the modesto-riverbank formation.

3.2.3.4 Soils

Approximately 95% of the soil types located within the Laguna Creek watershed are loam subcategories with the majority of the soil type consisting of gravelly loam, silt loam, loam, and fine sandy loam (Table 5, Figure 6).

3.2.3.5 Slope and Elevation

The vast majority (more than 99%) of the Laguna Creek watershed is on flat to gentle slopes 0-20%, with only 141 acres on 21%-40% slopes and 2 acres on slopes greater than 40% (Table 6, Figure 7). Likewise, the entire watershed is at an elevation less than 500 feet (Table 7, Figure 8). In the Laguna Creek watershed, elevations range from about 250 feet amsl in the hillier areas in the eastern portion of the watershed to less than 15 feet amsl in the western portion of the watershed where Laguna Creek (south) drains into the Cosumnes River.

3.2.3.6 Covered Species

The Laguna Creek watershed includes documented occurrences for 23 of the 28 Covered Species, reflecting both its large size and diversity of land cover types (Table 8). Covered species documented in the watershed include dwarf downingia, legenere, pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Sacramento Orcutt grass, vernal pool fairy shrimp, Ricksecker's water scavenger beetle, vernal pool tadpole shrimp, mid-valley fairy shrimp, California tiger salamander, western spadefoot, western pond turtle, giant garter snake, Cooper's hawk, burrowing owl, loggerhead shrike, northern harrier, ferruginous hawk, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat.

This watershed has the second highest percentage (19%) of known occurrences for Covered Species after the Sherman-Lake Sacramento River watershed (see Section 3.2.8), including 20% of the vernal pool covered plant occurrences and 37% of the vernal pool invertebrate occurrences (Table 8). The majority of pincushion navarretia (67%), California tiger salamander (79%), and western spadefoot (58%) occurrences in the Plan Area are in this watershed. Approximately 53% of the Plan Area's vernal pool fairy shrimp occurrences and 25% of the vernal pool tadpole shrimp occurrences are in valley grassland and vernal pool land covers located in the northeastern section of the watershed. Three of the four Ricksecker's water scavenger beetle occurrences in the SSHCP database occur in the Laguna Creek watershed. The watershed includes relatively high percentages of occurrences for several other Covered Species, including burrowing owl (26%), ferruginous hawk (23%), tricolored blackbird (30%), and western red bat (29%).

Due to its large size and number of land cover types, of the 10 watersheds in the Plan Area, the Laguna Creek watershed contains among the largest acreages of modeled habitat for most

Covered Species, except for giant garter snake, which generally occurs in the western portion of the Plan Area (Table 9).

Consistent with the occurrence of all the vernal pool Covered Species, the Laguna Creek watershed contains substantial modeled habitat for these species, ranging from 6,689 acres for Ahart's dwarf rush to 10,004acres for the vernal pool invertebrates (Table 9).

The Laguna Creek watershed contains substantial acreages of modeled habitats for all of the covered bird species, including almost 2,550 acres of modeled foraging habitat for Cooper's hawk and 2,931 to 58,554 acres (4%-79% of the watershed) of modeled foraging habitat for ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite and modeled nesting/foraging habitat for burrowing owl. The watershed supports approximately 16,315 acres of modeled foraging habitat and 279 acres of modeled roosting habitat for greater sandhill crane. The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety of more broad-scale land cover types for nesting (e.g., valley grassland, agriculture), including burrowing owl (55,756 acres), loggerhead shrike (42,659 acres), northern harrier (53,630 acres), and tricolored blackbird (48,721). However, for covered birds that are limited to riparian and woodland habitats for nesting, the Laguna Creek watershed supports more modest acreages of modeled nesting habitat relative to its large size, including 1,846 acres for Cooper's hawk and white-tailed kite and 323 acres for Swainson's hawk.

Of the 293 documented Swainson's hawk nest sites, 42 are in the Laguna Creek watershed. The Laguna Creek watershed supports 10,092 acres of high-value foraging habitat for Swainson's hawk. The watershed also supports 7 of the 48 documented roosting sites for the greater sandhill crane in the Plan Area.

Along with the Morrison Creek watershed, the Laguna Creek watershed supports the largest number of documented and potential tricolored blackbird nest colonies in the Plan Area (Table 8), with 20 of 96 documented nest colonies and 27 of 63 potential nest colonies in the watershed. The 20 documented nest colonies have ranged in size from approximately 20 individuals (1 site) to 6,750 individuals (1 site) observed in 1999 and have totaled about 22,630 individuals over the various surveys (14% of the approximately 158,330 individuals observed at all documented nest colonies).

The Laguna Creek watershed is extremely important for California tiger salamander and western spadefoot, and also provides substantial habitat for western pond turtle. As noted above, 76% of the occurrences (23 of 29) of the California tiger salamander are in the Laguna Creek watershed. Reflecting the habitat model parameters for the species (i.e., areas limited to south of the Cosumnes River), 49% of modeled aestivation habitat and 53% of the modeled

breeding/foraging habitat in the Plan Area are in the Laguna Creek watershed (Table 9). For western spadefoot, along with 58% of the documented occurrences (18 of 31), the Laguna Creek watershed supports 3,477 acres of modeled breeding habitat and 46,092 acres of modeled aestivation habitat. For western pond turtle, along with 45% of the documented occurrences (8 of 18), the Laguna Creek watershed supports 739 acres of modeled breeding/foraging habitat and 33,739 acres of modeled nesting/aestivation habitat. The Laguna Creek watershed has some value for giant garter snake, but is not as critical for this species compared to the Lower Cosumnes River (Section 3.2.4), Morrison Creek (Section 3.2.7), and Snodgrass Slough (Section 3.2.9) watersheds. There is one documented occurrence of giant garter snake in the Laguna Creek watershed, 9,521 acres of modeled upland habitat, 697 acres of modeled aquatic habitat, and 1,170 acres of high-value habitat.

The Laguna Creek watershed supports large acreages of modeled habitat for the covered mammals, including 47,492 acres of modeled general habitat for American badger and 45,883 acres of modeled foraging habitat for western red bat. The watershed supports about 4,946 acres of modeled roosting habitat for western red bat. The Laguna Creek watershed supports a moderate amount of modeled habitat for Sanford's arrowhead (12,535 acres, or 24% of the total in the Plan Area).

The Laguna Creek watershed also contains federally designated Critical Habitat for California tiger salamander (8,758 acres), Sacramento Orcutt grass (24,510 acres), and vernal pool fairy shrimp and vernal pool tadpole shrimp (27,048 acres).

3.2.3.7 Conservation Considerations

The large majority (88%) of the Laguna Creek watershed is located in PPU 7 outside UDA where limited Covered Activities would occur, but with substantial overlap with PPUs 6 and 8 in the western portion of the watershed. Chapter 7 of the SSHCP provides a detailed description of conservation considerations and conservation planning in these PPUs, with the main points summarized here.

The Laguna Creek watershed is one of the watersheds in the Plan Area least affected by man-made alterations and it supports numerous documented occurrences of Covered Species. In particular, it supports approximately 1,917 acres of the vernal pools in the Plan Area.

The conservation focus in the Laguna Creek watershed within PPUs 6 and 7 is maintaining large landscape Preserves that are interconnected, with valley grassland and vernal pool the primary conservation focus in PPU 7. In PPU 6, agricultural lands adjacent to the river and creek floodplains provide important foraging and roosting habitat for Covered Species such as Swainson's hawk, white-tailed kite, northern harrier, and greater sandhill crane.

Under the SSHCP, 18,315 acres of existing conservation and 14,493 acres of planned conservation would occur in the Laguna Creek watershed, including total conservation of 25,960 acres of valley grassland and 2,192 acres of aquatic habitat (Table 13, Figure 10). Much of the conservation would occur in the eastern part of the watershed in association with the existing 12,500-acre Chance Ranch and planned conservation to build upon the existing conservation, creating a landscape Preserve totaling between 33,500 and 34,000 acres in the southeastern portion of the Plan Area, and including conservation in the Upper Cosumnes River to the north and Lower Dry Creek to the south.

Table 13
Summary of Conserved Land Cover Types in the Laguna Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	2,362	33	2,395
Blue Oak Woodland	987	—	987
Mine Tailing Riparian Woodland	1	63	64
Mixed Riparian Scrub	23	4	27
Mixed Riparian Woodland	46	6	52
Valley Grassland	13,146	12,814	25,960
Terrestrial Total	*16,565*	*12,920*	*29,485*
Aquatic			
Freshwater Marsh	40	19	59
Open Water	9	12	21
Seasonal Wetland	129	47	176
Streams/Creeks	106	60	166
Swale	132	164	296
Vernal Pool	953	580	1,533
Aquatic Total	*1,329*	*863*	*2,192*
Agriculture			
Cropland	194	140	334
Irrigated Pasture-Grassland	39	380	419
Orchards	—	2	2
Vineyards	120	17	137
Agriculture Total	*353*	*539*	*892*
Non-Habitat Land Cover Type			
Disturbed	8	—	8
High-density Development	6	—	6
Low-density Development	6	85	91
Major Roads	18	11	29
Mine Tailings	22	75	97

Table 13
Summary of Conserved Land Cover Types in the Laguna Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Recreation/Landscaped	8	—	8
Non-Habitat Land Cover Type Total	*68*	*171*	*239*
Grand Total	**18,315**	**14,493**	**32,808**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.4 Lower Cosumnes River Watershed

3.2.4.1 Land Cover Types

The Lower Cosumnes River watershed is 46,683 acres, entirely located within the south-central portion of the Plan Area (Figure 2). This watershed consists primarily of Terrestrial and Agricultural land covers, accounting for 81% of the land covers in the watershed (Table 2, Figure 3). The terrestrial category is dominated by Valley Grasslands (14,593 acres), which accounts for approximately 87% of the total terrestrial land cover in the watershed. Agricultural areas total 21,153 acres and are the largest land covers in the Lower Cosumnes River watershed. Approximately 7% (3,514 acres) of the watershed is Aquatic land covers, including Seasonal Wetlands, Open Water, Freshwater Marsh, Vernal Pools, Wetland Restoration, Streams and Creeks and Swales. Approximately 11% (5,191 acres) of the watershed is Non-habitat land cover dominated by Low-Density Development (3,976 acres) and High-Density Development (667 acres). Impervious surfaces cover approximately 1,061 acres, or only 2%, of the watershed.

3.2.4.2 Hydrology

According to the NHD flowline dataset, the Lower Cosumnes River watershed consists primarily of stream/river (44%), canal/ditch (35%), and artificial path (22%) (Table 3, Figure 4). This watershed contains the lower portion of the Cosumnes River. The Cosumnes River and Badger Creek account for the majority of the stream/river and artificial path flowline data within this watershed. Agricultural areas are the largest land cover in this watershed, which is reflected by the high percentage of NHD flowline features categorized as canal/ditch.

3.2.4.3 Geological Formations

Riverbank formations account for approximately 69% of the Lower Cosumnes River watershed (Table 4, Figure 5). Other important formations include basin deposits, laguna formation and levee and channel deposits.

3.2.4.4 Soils

Approximately 65% of the soils within the Lower Cosumnes River watershed are silt loams with the majority falling within the San Joaquin soil series (Table 5, Figure 6). The remaining soils are subcategories of loam (25%), clay (6%), water (1%), and other (2%).

3.2.4.5 Slope and Elevation

The entire watershed is on flat to gentle slopes (Table 6, Figure 7), with elevations ranging from 0-500 feet (Table 7, Figure 8).

3.2.4.6 Covered Species

The Lower Cosumnes River watershed includes documented occurrences for 19 of the 28 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, valley elderberry longhorn beetle, California tiger salamander, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite.

This watershed contains 15% of the Plan Area's known occurrences of Covered Species. The second largest number of sandhill crane occurrences (20%) are in Lower Cosumnes River watershed, as are relatively large percentages of occurrences for Cooper's hawk (35%), loggerhead shrike (62%), northern harrier (32%), Swainson's hawk (27%), and white-tailed kite (40%). Five of the 14 documented occurrences for giant garter snake are in this watershed, primarily in close proximity to the Cosumnes River and its tributaries. Although the Lower Cosumnes River watershed supports 619 acres of vernal pool, it has relatively few occurrences of the covered vernal pool plant and invertebrate species, including no occurrences for most of the plants. There are also no occurrences for western spadefoot or California tiger salamander in the watershed, and only two occurrences for western pond turtle.

The Lower Cosumnes River watershed contains variable amounts of modeled habitats for the covered vernal pool species, ranging from 1,269 acres for Ahart's dwarf rush to 6,210 acres for legenere (Table 9). However, with the exception of Boggs Lake hedge-hyssop, it contains

substantially less modeled habitat for these species compared to the Laguna Creek (Section 3.2.3) and Morrison Creek (Section 3.2.7) watersheds. The Lower Cosumnes River watershed contains substantial acreages of modeled habitats for all of the covered bird species, including modeled foraging habitat ranging from about 19,420 acres for ferruginous hawk to 33,824 acres for tricolored blackbird and about 30,654 acres of modeled nesting/foraging habitat for burrowing owl. Second only to the Snodgrass Slough watershed (Section 3.2.9), the Lower Cosumnes River watershed supports the largest amount of high-value habitat for Swainson's hawk; 25,942 acres or 31% of the total in the Plan Area. The watershed supports variable amounts of modeled nesting habitat for covered birds, about 2,200 acres for the riparian/woodland nesting species (Cooper's hawk, Swainson's hawk, and white-tailed kite); about 30,654 acres for burrowing owl and 16,824 acres for loggerhead shrike; and about 28,950 acres for tricolored blackbird and 30,660 acres for northern harrier. The Lower Cosumnes River watershed also supports 369 acres of modeled roosting habitat for greater sandhill crane, second only to the Upper Cosumnes watershed, and 32% of the total modeled roosting habitat for the species in the Plan Area.

The Lower Cosumnes River watershed contains 90 of the 293 nest sites for Swainson's hawk, second only to the Snodgrass Slough watershed with 86 nest sites (Table 8). The watershed also contains by far the largest number of greater sandhill crane roost sites in the Plan Area (29 of the 48).

The watershed contains 7 of the 96 documented nest colonies for tricolored blackbird and 4 of 63 potential nest colonies. Approximately 2,980 individuals have been observed at the four nest colonies, or 2% of the approximately 158,330 individuals observed at nest colonies in the Plan Area over the different surveys. The four documented nest colonies have ranged in size from 130 to 1,500 individuals.

The Lower Cosumnes River watershed is important for all four of the covered amphibians and reptiles, and particularly giant garter snake. The watershed contains Badger Creek and other creeks that drain into the marsh at the Cosumnes River Preserve, which likely supports high-quality habitat due to its proximity and connectivity to a significant population of giant garter snake. The watershed supports 2,430 acres of modeled aquatic habitat, 8,934 acres of modeled upland habitat and 1,518 acres of high-value habitat for giant garter snake. The Lower Cosumnes River watershed also contains substantial modeled habitat for California tiger salamander, including more than 1, 0700 acres of modeled aquatic habitat and almost 13,807 acres of modeled upland habitat. For western pond turtle, the watershed supports more than 1,866 acres of modeled breeding/foraging habitat (29% of the total in the Plan Area and second only to the Snodgrass Slough watershed). However, compared to some other watersheds, the Lower Cosumnes River watershed supports a modest amount of modeled nesting/aestivation habitat (11,195 acres, or 10% of the total). The western spadefoot has not been documented in the Lower Cosumnes River watershed, but the

watershed supports substantial amounts of modeled habitat for the species, including almost 2,400 acres of modeled breeding habitat and about 14,590 acres of modeled aestivation habitat. The Lower Cosumnes River watershed supports substantial acreages of modeled habitat for the covered mammals, including more than 15,972 acres of modeled general habitat for American badger and almost 19,000 acres of modeled foraging habitat for western red bat. The watershed supports about 2,000 acres of modeled roosting habitat for western red bat. A bat monitoring program in the Cosumnes River Preserve has documented the occurrence of western red bat.

The Lower Cosumnes River watershed supports substantial modeled habitat for Sanford's arrowhead (9,713 acres, or 18% of the total in the Plan Area).

The Lower Cosumnes River watershed also contains federally designated Critical Habitat for Sacramento Orcutt grass (1,842 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,069 acres).

3.2.4.7 Conservation Considerations

The large majority (96%) of the Lower Cosumnes River watershed is located outside of the UDA. The portions of the watershed that occur within the UDA also overlap with PPUs 4 and 8. The remaining portion of the watershed that is outside of the UDA encompasses approximately 4,941 acres of PPU 5, 31,008 acres of PPU 6, and 8,942 acres of PPU 7 (Table 11). Notably, PPU 6 contains much of the aquatic and riparian resources in the Plan Area. Compared to the other PPUs, PPU 6 is the most important PPU for covered bird species and giant garter snake.

Current existing hardline Preserve areas, all outside of the UDA, total 14,270 acres of the watershed, with almost all located in PPU 6 (Figure 10). They include the Stone Lakes National Wildlife Refuge and the Cosumnes River Preserve. Planned conservation totals 5,116acres and includes agricultural and landscape Preserves as well as wetland and riparian restoration. These areas are immediately adjacent to existing Preserve areas and will focus on expanding the preservation of vernal pool habitat and important agricultural areas that provide foraging habitat for several covered bird species, including Swainson's hawk, white-tailed kite, tricolored blackbird, and greater sandhill crane, and roosting habitat for the crane. The Lower Cosumnes River watershed contains the second-most overall conservation in the Plan Area, with an emphasis on terrestrial and agricultural land covers (Table 14). In addition, approximately 2,340 acres of aquatic habitat will be conserved. Planned conservation will be located within PPUs 6 and 7 of the watershed.

Table 14
Summary of Conserved Land Cover Types in the Lower Cosumnes River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mine Tailing Riparian Woodland	17	—	17
Mixed Riparian Scrub	168	53	221
Mixed Riparian Woodland	1,437	111	1,548
Valley Grassland	5,239	1,861	7,100
Terrestrial Total	*6,861*	*2,025*	*8,886*
Aquatic			
Freshwater Marsh	960	42	1,002
Open Water	218	11	229
Seasonal Wetland	417	49	466
Streams/Creeks	133	81	214
Swale	52	38	90
Vernal Pool	171	141	312
Aquatic Total	*1,951*	*362*	*2,313*
Agriculture			
Cropland	4,598	1,867	6,465
Irrigated Pasture-Grassland	365	587	952
Orchards	40	<1	40
Vineyards	386	158	544
Agriculture Total	*5,389*	*2,612*	*8,001*
Non-Habitat Land Cover Type			
Aqueducts	—	20	20
Low-Density Development	62	97	159
Major Roads	<1	<1	1
Non-Habitat Land Cover Type Total	*62*	*117*	*179*
Grand Total	**14,263**	**5,116**	**19,379**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.5 Lower Dry Creek Watershed

3.2.5.1 Land Cover Types

The Lower Dry Creek watershed is located along the southern edge of the Plan Area (Figure 2). Approximately 33% of the watershed is located within the Plan Area. The watershed has very little non-agricultural development. Of the 18,493 acres in the watershed, approximately 5% are Terrestrial land covers and 38% are Agricultural land covers (Table 2, Figure 3).

Valley Grasslands dominate the terrestrial land cover in the watershed, comprising 7,965 of the 10,359 acres mapped as Terrestrial. The large majority (93%) of agricultural areas are cropland and vineyards. Aquatic and Non-habitat land covers each comprise about 3% of the remaining acreage within the watershed. Impervious surfaces cover approximately 85 acres, or less than 1% of the watershed within the Plan Area.

3.2.5.2 Hydrology

Approximately 87% of the flowlines within the Lower Dry Creek watershed are streams and rivers (Table 3, Figure 4). Artificial path (about 6%), canal/ditch (7%), and connector (less than 1%) account for the remainder of the NHD flowline features in this watershed. This watershed encompasses Dry Creek, which is located along the southern boundary of the Plan Area. The watershed ends where Dry Creek terminates into Mokelumne River located to the west (Figure 2).

3.2.5.3 Geological Formations

The Lower Dry Creek watershed consists of several different geological formations with the combined Riverbank formations, Laguna and Mehrten Formations, totaling approximately 67% of the watershed (Table 4, Figure 5). Other formations include Valley Springs, alluvial deposit formations, and levee and channel deposits.

3.2.5.4 Soils

Approximately 91% of the watershed consists of fine sandy loam, gravelly loam, and sandy loam (Table 5, Figure 6). The remaining soils are subcategories of loam (6%), other (2%), clay (less than 1%), and water (less than 1%).

3.2.5.5 Slope and Elevation

The vast majority (99%) of the Lower Dry Creek watershed contains gentle slops (i.e., 0-20% slopes) with a small fraction falling within the 20%–40% and >40% ranges (Table 6, Figure 7). Similarly, most of the watershed is within the 0–500 foot elevation range (Table 7, Figure 8). Only 40 acres (less than 1%), located along the eastern border of the Plan Area, is within the 500–1,000 foot elevation range.

3.2.5.6 Covered Species

The Lower Dry Creek watershed includes documented occurrences for 10 of the 28 Covered Species, including legenere, pincushion navarretia, vernal pool fairy shrimp, vernal pool tadpole

shrimp, California tiger salamander, western spadefoot, northern harrier, greater sandhill crane, Swainson's hawk, and tricolored blackbird. Overall, the watershed only contains 5% of the Covered Species occurrences, but it does contain 33% of the pincushion navarretia occurrences (16 of 48) and 21% of the California tiger salamander occurrences (6 of 29).

Consistent with general lack of occurrences for most of the vernal pool Covered Species, the Lower Dry Creek watershed contains some of the least amount of modeled habitat for these species, ranging from only 327 acres for Ahart's dwarf rush acres to 7,131 acres for the vernal pool invertebrates (Table 9). Although the Lower Dry Creek watershed, at 18,493 acres in the Plan Area, is one of the smaller watersheds, it contains substantial acreages of modeled habitats for all of the covered bird species due to its large amount of natural land and agriculture, and lack of non-habitat cover types (Table 2, Figure 3). It supports more than 432 acres to about 12,000 acres (2%–65% of the total land cover) of modeled foraging habitat for Cooper's hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, white-tailed kite, and burrowing owl. The watershed supports variable amounts of modeled nesting habitat for covered birds, including 1,865 acres for Cooper's hawk and white-tailed kite, 448 acres for Swainson's hawk, 11,553 acres for burrowing owl, 8,413 acres for loggerhead shrike, 10,871 acres for tricolored blackbird (although no nesting colonies have been observed), and 11,023 acres for northern harrier. Nineteen of the 398 Swainson's hawk nest sites are in the watershed. The Lower Dry Creek watershed supports 1,942 acres of high-value foraging habitat for Swainson's hawk. The watershed supports relatively small amounts of modeled habitat for greater sandhill crane, including only 28 acres of roosting habitat and 3,289 acres of foraging habitat.

The Lower Dry Creek watershed is important for California tiger salamander, containing more than 9,911 acres of modeled aestivation habitat and 319 acres of modeled breeding/foraging habitat. As noted above, 6 of the 29 occurrences of California tiger salamander are in the Lower Dry Creek watershed. The watershed is less important for western spadefoot, western pond turtle, and giant garter snake. For western spadefoot, the Lower Dry Creek contains a relatively modest amount of modeled habitat compared to most of the other watersheds, including only 3% of the modeled breeding habitat and 6% of the modeled aestivation habitat in the Plan Area. Similarly, for western pond turtle, the watershed contains less modeled habitat than several of the other watersheds, including only 2% of the modeled breeding/foraging habitat and 7% of the modeled aestivation habitat in the Plan Area. The Lower Dry Creek watershed has low value for the giant garter snake, supporting no modeled aquatic habitat, and only 19 acres of modeled upland habitat.

The Lower Dry Creek watershed supports substantial acreages of modeled habitat for the covered mammals due to its undeveloped condition, including more than 8,879 acres of modeled general habitat for American badger, and about 8,531 acres of modeled foraging

habitat for western red bat. The watershed also supports 2,559 acres of modeled roosting habitat for western red bat.

The Lower Dry Creek watershed supports a very small amount (773 acres) of modeled habitat for Sanford's arrowhead.

The Lower Dry Creek watershed also contains federally designated Critical Habitat for California tiger salamander (1,434 acres), Sacramento Orcutt grass (3,516 acres), and vernal pool fairy shrimp and vernal pool tadpole shrimp (4,335 acres).

3.2.5.7 Conservation Considerations

The Lower Dry Creek watershed is located primarily within southern portion of PPUPPU 7 (93%), with the remaining acreage located in PPUs 6 and 8. Almost the entire watershed is located outside of the UDA, except for the 1,099 acres in PPU 8 (Table 11). Because the majority of PPU 8 is located within Galt's city limits or sphere of influence it is anticipated that much of PPU 8 will eventually be urbanized.

Relative to some of the other watersheds, the Lower Dry Creek watershed has a lower priority for new conservation. Most of the species with modeled habitat in the watershed are broad ranging in the Plan Area and the conservation focus is elsewhere. Even for the more limited California tiger salamander, the conservation focus is in the Laguna Creek watershed, which contains 79% of the occurrences and large majority of modeled habitats for the species (Table 9). Further, other than expected build-out in PPU 8, the Covered Activities will have small impacts in the Lower Dry Creek watershed. The large majority (96%) of conservation in Lower Dry Creek Watershed is in existing conservation (8,652 acres), located primarily within PPU 7, and mostly in Chance Ranch (Tables 15 and 11). A small amount of planned conservation, primarily agriculture, is also proposed in the watershed. The majority of total conservation will be concentrated on terrestrial habitats, with emphasis on blue oak woodland and valley grassland and will be located within PPU 8.

Table 15
Summary of Conserved Land Cover Types in the Lower Dry Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	529	—	529
Blue Oak Woodland	1,406	—	1,406
Mixed Riparian Scrub	3	—	3
Mixed Riparian Woodland	79	—	79

Table 15
Summary of Conserved Land Cover Types in the Lower Dry Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Valley Grassland	5,717	188	5,905
Terrestrial Total	*7,734*	*188*	*7,922*
Aquatic			
Freshwater Marsh	4	—	4
Open Water	4	—	4
Seasonal Wetland	67	4	71
Streams/Creeks	29	<1	29
Swale	50	2	52
Vernal Pool	155	3	158
Aquatic Total	*309*	*9*	*318*
Agriculture			
Cropland	72	152	224
Irrigated Pasture-Grassland	285	7	292
Vineyards	251	<1	251
Agriculture Total	*608*	*159*	*767*
Non-Habitat Land Cover Type			
High-Density Development	1	—	1
Non-Habitat Land Cover Type Total	*1*	—	*1*
Grand Total	**8,652**	**356**	**9,008**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.6 Lower Mokelumne River Watershed

3.2.6.1 Land Cover Types

Although the Lower Mokelumne River watershed is more than 141,965 acres in size, only 3% of the watershed is located in the far southwest corner of the southern Plan Area (Figure 2) and it accounts for only 1% of the Plan Area. Due its minor role in the Plan Area, the discussion in this section is somewhat abbreviated compared to the discussions for the other watersheds. The small portion of this watershed located within the Plan Area is primarily made up of Agricultural land covers, specifically croplands. The remaining acreage includes Mixed Riparian Scrub and Woodland, and Aquatic land covers, and some residential areas. Impervious surfaces cover approximately 29 acres, or 1% of the watershed within the Plan Area.

3.2.6.2 Hydrology

The portion of the Lower Mokelumne River watershed that occurs within the Plan Area contains only artificial path and canal/ditch NHD flowline features (Table 3, Figure 4). The Mokelumne River, represented by the artificial path features, serves as a portion of the southern border for the Plan Area. This watershed extends to the west as a long sliver surrounding the Mokelumne River. The watershed ends where Lower Dry Creek terminates into the river. The canal and ditch flowline features, which account for 88% of the watershed, cross through the agricultural land covers, providing water to the area.

3.2.6.3 Geological Formations

Geological information is only available for the eastern sliver of the Lower Mokelumne River watershed. This portion of the watershed is dominated by intertidal deposits (53%), with basin deposits and levee and channel deposits accounting for the rest of the watershed (Table 4, Figure 5).

3.2.6.4 Soils

The majority (59%) of the Lower Mokelumne River watershed consists of clay soils, specifically Egbert clay, partially drained, 0 to 2% slopes (Table 5, Figure 6). The remaining soils are loam subcategories (35%) and water (5%).

3.2.5.5 Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0 to 500 feet (Tables 6 and 7, Figures 8 and 9).

3.2.6.6 Covered Species

The Lower Mokelumne River watershed only contains three documented occurrences of one Covered Species: Sanford's arrowhead. This species is located on the boundary of the Plan Area within the Mokelumne River. Similar to the Lower Dry Creek watershed, the lack of occurrences of Covered Species within this watershed may be attributed to large amounts of land that have been converted for agricultural purposes. In addition, only a very small portion of the watershed is actually located within the Plan Area.

Due to its small size within the Plan Area, the Lower Mokelumne watershed includes less than 1% of the modeled habitat for Covered Species. The watershed does not contain any modeled habitat for vernal pool species and contains limited habitat for giant garter snake, western pond turtle, and western spadefoot, none of which is high-value giant garter snake habitat. Of the

2,019 acres of this watershed within the Plan Area, anywhere from 9 to 1,700 acres are modeled habitat for several of the covered bird species, including burrowing owl, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite. All of the modeled habitat for Swainson's hawk (1,878 acres) is considered high value. There is limited habitat for Cooper's hawk (200 acres) and ferruginous hawk (9 acres). Approximately 200 acres of modeled roosting habitat for western red bat are present in the watershed. There are 94acres of modeled foraging habitat for western red bat. Only a small amount of modeled habitat for Sanford's arrowhead (13 acres) is in the watershed.

3.2.6.7 Conservation Considerations

The entire Lower Mokelumne River watershed is located outside of the UDA within PPU 6. Approximately 1,640 acres of the 2,019 acres located within the Plan Area contain existing hardline Preserve areas (Table 16, Figure 10). Due to its small size within the Plan Area and general lack of resources for the Covered Species relative to several of the other watersheds, no new conservation is proposed under the SSHCP.

Table 16
Summary of Conserved Land Cover Types in the Lower Mokelumne River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mixed Riparian Scrub	1	—	1
Mixed Riparian Woodland	149	—	149
Terrestrial Total	*150*	—	*150*
Aquatic			
Freshwater Marsh	21	—	21
Open Water	3	—	3
Streams/Creeks	<1	—	<1
Aquatic Total	*24*	—	*24*
Agriculture			
Cropland	1,464	—	1,464
Vineyards	<1	—	<1
Agriculture Total	*1,464*	—	*1,464*
Non-Habitat Land Cover Type			
Low-density Development	4	—	4
Non-Habitat Land Cover Type Total	*4*	—	*4*
Grand Total	**1,642**	—	**1,642**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.7 Morrison Creek Watershed

3.2.7.1 Land Cover Types

The Morrison Creek watershed is located within the northern half of the Plan Area (Figure 2). Of the 69,540 acres that comprise this watershed, 62%, or 42,926 acres, are located within the Plan Area, almost entirely inside the UDA (Table 11). Because it is located in the urbanizing portion of Sacramento County, approximately 45% of the watershed has already been developed and contains Non-habitat land covers, primarily High-Density Development. Agriculture accounts for about 10% of the watershed. Terrestrial (51%) and Aquatic (5%) land covers account for the remaining land covers in the Morrison Creek watershed. Valley Grassland accounts for about 98% of the Terrestrial land cover. This watershed also supports all of the aquatic cover types, including approximately 764 acres of Vernal Pools, 359 acres of Swale, and 107 acres of Seasonal Wetlands, which are embedded in the Valley Grasslands. Laguna Creek (north) is a significant east–west landscape feature that plays a prominent role in conservation. Impervious surfaces cover approximately 6,771 acres, or 16%, of the watershed. Along with the American River (51% impervious surfaces) and Sherman Lake-Sacramento River (24% impervious surfaces) watersheds, the Morrison Creek watershed has one of the three highest percentages of impervious surfaces in the Plan Area. Reflecting both its large size and more urbanized character, it also has by far the highest amount of impervious surface acreage in the Plan Area, with Snodgrass Slough having the second highest amount at approximately 1,124 acres.

3.2.7.2 Hydrology

The Morrison Creek watershed contains approximately 9% of the Plan Area's NHD flowline features (Table 3, Figure 4). Approximately 83% of the flowline features are stream and river features including Morrison Creek, Laguna Creek (north), Elder Creek, Strawberry Creek, Unionhouse (Beacon) Creek, and Frye Creek. Folsom South Canal accounts for the majority of the 72,483 linear feet of artificial path features. Canal/ditch features make up approximately 6% of the NHD flowline features within the Plan Area with connectors (1%) and pipeline (less than 1%) rounding out the remaining areas.

3.2.7.3 Geological Formations

The laguna and riverbank formations comprise 97% of the acreage in the Morrison Creek watershed (Table 4, Figure 5). The remaining prominent formations in the watershed include basin deposits and mine and dredge tailings.

3.2.7.4 Soils

The Morrison Creek watershed primarily contains loam subcategories such as silt loam, loam, and gravelly loam, which account for about 84% of the watershed (Table 5). Approximately 50% of the loam soils are from the San Joaquin soil series. Other loam subcategories comprise 4% of the soils, water covers less than 1% of the watershed, and 7% of the soils are listed in the Other category. Approximately 3% of the Other category is related to mining activities (dumps, pits, slickens, and Xerorthents, dredge tailings, 2% to 50% slopes) or urban development.

3.2.7.5 Slope and Elevation

The majority of the watershed is on flat to gentle slopes with elevations ranging from 0–500 feet (Table 6, Figure 7). Only 2 acres of the watershed are within the 20%–40% slope range (Table 7, Figure 8).

3.2.7.6 Covered Species

The Morrison Creek watershed includes documented occurrences for 23 of the 28 Covered Species despite substantial urbanization (Table 8). Covered species documented in the watershed include Ahart's dwarf rush, Boggs Lake hedge-hyssop, legenere, Sacramento Orcutt grass, slender Orcutt grass, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, western spadefoot, giant garter snake, western pond turtle, American badger, and western red bat.

This watershed has the third highest percentage (16%) of known occurrences for Covered Species in the Plan Area, including 43% of the covered vernal pool plants and 53% of the vernal pool invertebrate occurrences (Table 8). Due to the large area of vernal pools (764 acres and second only to the Laguna Creek watershed), swale, and seasonal wetlands, vernal pool flora and fauna are the most important biological resources in the watershed. The majority of most covered vernal pool plant occurrences in the Plan Area are in the Morrison Creek watershed, including both occurrences of Ahart's dwarf rush, all 4 occurrences of slender Orcutt grass, 27 of 30 occurrences of Boggs Lake hedge-hyssop, and 30 of 56 occurrences of legenere. The watershed also includes 12 of 63 occurrences for Sacramento Orcutt grass (with all but 2 of the remaining occurrences in the Deer Creek watershed). Similarly, the vernal pool invertebrates are well-represented in the Morrison Creek watershed, including 505 of the 748 occurrences of vernal pool tadpole shrimp, 196 of the 572 occurrences of vernal pool fairy shrimp, and 18 of 33 occurrences of mid-valley fairy shrimp. Western spadefoot, which is strongly associated with vernal pools and other ephemeral wetlands, has also been frequently found in the Morrison

Creek watershed, with 9 of the 31 occurrences in the Plan Area. The large majority of occurrences for these vernal pool species outside the Morrison Creek watershed are from the Laguna Creek watershed (Section 3.2.3). Although not a vernal pool species, 12 of the 63 occurrences of Sanford's arrowhead are from the watershed.

The Morrison Creek watershed, which includes Laguna Creek (north) and several other prominent creeks, includes 1 of 14 occurrences of giant garter snake (2 of 18 occurrences of western pond turtle

While there are occurrence data for all of the avian Covered Species in the Morrison Creek watershed, with a range of 1% of the occurrences for greater sandhill crane to 31% of the occurrences for Cooper's hawk, none stand out as prominent in the watershed. Also, except for species such as Swainson's hawk, tricolored blackbird, and sandhill crane (see discussion below), the occurrence data for avian species are not comprehensive for the Plan Area. Similarly, there are little data for the mammals in the Plan Area, with occurrence records for American badger (7 of 8 occurrences in the Plan Area) and western red bat (2 of 7 occurrences in the Plan Area).

Due to its large size and large number of land cover types, of the 10 watersheds in the Plan Area, the Morrison Creek watershed contains among the largest acreages of modeled habitat for most Covered Species (Table 9).

Consistent with the occurrence of all the vernal pool Covered Species, the Morrison Creek watershed contains substantial modeled habitat for these species, ranging from 2,200 acres for dwarf downingia to 18,400 acres for the vernal pool fairy shrimp and vernal pool tadpole shrimp (Table 9).

The Morrison Creek watershed contains substantial acreages of modeled habitat for all of the covered bird species, including up to 26,000 acres of modeled foraging habitat for Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite; about 1,593 acres of modeled foraging habitat for greater sandhill crane (but only 17 acres of modeled roosting habitat); and almost 24,956 acres of modeled nesting/foraging habitat for burrowing owl. The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety or more broad-scale land cover types for nesting (e.g., valley grassland), including loggerhead shrike (21,781 acres), northern harrier (24,938 acres), and tricolored blackbird (24,016 acres). However, for covered birds that are limited to riparian and woodland habitats for nesting, the Morrison Creek watershed supports modest amounts of modeled nesting habitat relative to its large size, including 487 acres for Cooper's hawk, 487 acres for white-tailed kite, and 358 acres for Swainson's hawk.

The Morrison Creek watershed contains 11 of the 293 Swainson's hawk nest sites and supports 1,926 acres of high-value foraging habitat for the species.

Along with the Laguna Creek watershed, the Morrison Creek watershed supports the largest number of documented and potential tricolored blackbird nest colonies in the Plan Area, with 42 of the 96 documented nest colonies and 16 of 63 potential nest colonies. The 42 documented nest colonies have ranged in size from approximately 100 individuals to 7,500 individuals in 1994. Approximately 50,690 individuals have been observed at the nest colonies over the course of the surveys, or 32% of the approximately 158,330 individuals observed at nest colonies in the Plan Area.

As noted above, the Morrison Creek watershed contains several occurrences of western spadefoot, western pond turtle, and giant garter snake, and it also provides substantial modeled habitat for these species. For western spadefoot, vernal pool, swale, and seasonal wetland are primary breeding habitats, and contribute to about 2,240 acres of modeled breeding habitat for the species in the watershed. For western pond turtle, the Morrison Creek watershed supports 515 acres of modeled breeding/foraging habitat and 8,750 acres of modeled nesting/aestivation habitat. The Laguna Creek Wildlife Corridor is an important habitat feature for western pond turtle because it provides important in-stream habitat to support breeding, foraging, movement, and dispersal. The western portion of the Morrison Creek watershed has important value for giant garter snake, but is not as critical for this species compared to the Lower Cosumnes River (Section 3.2.4) and Snodgrass Slough (Section 3.2.9) watersheds. The Morrison Creek watershed contains 3,258 acres of modeled upland habitat, 441 acres of modeled aquatic habitat, and 1,388 acres of high-value habitat for giant garter snake.

The Morrison Creek watershed supports large acreages of modeled habitat for covered mammals, including approximately 22,542 acres of modeled general habitat for American badger and more than 23,376 acres of modeled foraging habitat for western red bat.. The watershed supports a limited amount of roosting habitat for western red bat, including about 504 acres .

The Morrison Creek watershed also contains federally designated Critical Habitat for Sacramento and slender Orcutt grass (1,161 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,451 acres).

3.2.7.7 Conservation Considerations

About 45% of the Morrison Creek watershed within the Plan Area (99% of which is inside the UDA) is already developed and has little or no habitat value for the Covered Species. For this reason, approximately 23% of the watershed is outside of the PPUs (Table 11), although the Laguna Creek Wildlife Corridor outside the PPUs is an important habitat feature in the

watershed. However, as discussed in Section 3.2.7.6, the Morrison Creek watershed supports almost all of the Covered Species in the Plan Area and, along with the Laguna Creek watershed, is critical for conservation of the vernal pool ecosystems and associated plant and animal species in the Plan Area. The MCRA is an important component of the conservation of these resources in the watershed. Therefore, despite anticipated urban build out of much of the watershed inside the UDA, protection of these remaining resources in the watershed is one of the most important elements of the SSHCP and ARP conservation strategies.

Substantial conservation has already occurred in the Morrison Creek watershed in PPUs 1, 2, and 3, with existing conservation in the watershed totaling approximately 2,888 acres of hardline Preserve areas (Table 17). The SSHCP will add approximately 6,220 acres to existing conserved areas through designation of core, minor, and satellite Preserves and linkage Preserves inside the UDA, almost doubling the amount of conservation. The majority of planned conservation will be focused on valley grasslands (5,885 acres), and vernal pool and swale that occur within the valley grasslands, comprising the vernal pool ecosystem. One of the objectives of the SSHCP is to protect an additional 1,200 acres along the Laguna Creek Wildlife Corridor, which will provide both resident and movement habitat for many of the covered wildlife species, including western pond turtle and giant garter snake (see Chapter 7 of the SSHCP).

Table 17
Summary of Conserved Land Cover Types in the Morrison Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Savanna	—	15	15
Mine Tailing Riparian Woodland	—	1	1
Mixed Riparian Scrub	3	19	22
Mixed Riparian Woodland	1	75	76
Valley Grassland	2,456	4,740	7,196
Terrestrial Total	*2,460*	*4,850*	*7,310*
Aquatic			
Streams/Creeks (VPIH)	9	22	31
Freshwater Marsh	12	227	239
Open Water	4	67	71
Seasonal Wetland	1	35	36
Streams/Creeks	20	23	43
Swale	73	80	153
Vernal Pool	207	197	404
Aquatic Total	*326*	*651*	*977*

Table 17
Summary of Conserved Land Cover Types in the Morrison Creek Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Agriculture			
Cropland	—	244	244
Irrigated Pasture-Grassland	22	58	80
Orchards	—	18	18
Agriculture Total	*22*	*320*	*342*
Non-Habitat Land Cover Type			
Disturbed	3	6	9
High-Density Development	45	<1	45
Low-Density Development	6	39	45
Major Roads	2	2	4
Mine Tailings	—	1	1
Recreation/Landscaped	24	16	40
Non-Habitat Land Cover Type Total	*80*	*64*	*144*
Grand Total	**2,888**	**5,885**	**8,773**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.8 Sherman Lake-Sacramento River Watershed

3.2.8.1 Land Cover Types

The Sherman Lake-Sacramento River watershed is located in the extreme western portion of the Plan Area, with approximately 12% located within the Plan Area (Table 1, Figure 2). The watershed intersects the Plan Area in four separate locations that together comprise about 5% of the Plan Area, including a large area along the northern portion of the Plan Area, a small area in the northwest corner of the Plan Area, and two areas along the western portion of the Plan Area. The Sherman Lake-Sacramento River watershed in the Plan Area is dominated by human activities. Together, Non-habitat and Agricultural land cover types account for 88% of the land covers in the watershed (Table 2, Figure 3). Of these two land cover types, High-Density Development and Cropland contain the largest acreages at 3,049 and 4,986 acres, respectively, accounting for 57% of the total land covers in the watershed within the Plan Area. The Sherman Lake-Sacramento River watershed contains all of the Aquatic land cover types mapped within the Plan Area, but in small amounts ranging from 1 to 40 acres and totaling only 79 acres. Terrestrial land covers, primarily Valley Grassland, comprise the remaining acreage, but only totaling 848 acres, or 6% of the land cover in the watershed within the Plan Area. Impervious

surfaces cover approximately 3,370 acres, or 24%, of the watershed, which is the highest percentage of the watersheds in the Plan Area.

3.2.8.2 Hydrology

According to the NHD flowline dataset, the majority of the hydrologic features within this watershed are canal/ditch (70%) (Table 3, Figure 4). The high percentage of canal/ditch features mapped within the Sherman Lake-Sacramento River watershed is related to the large amount of agricultural land covers mapped in the watershed. Artificial path features account for 27% of the watershed, stream/river features total 3%, and the remaining 0.1% of the watershed consists of pipeline connector features. The Sacramento River and the Folsom Canal encompass the artificial path features mapped within this watershed.

3.2.8.3 Geological Formations

Geological formation data is only available for a little less than half of the Sherman Lake-Sacramento River watershed. Intertidal and levee and channel deposits dominate this watershed, with basin deposits making up most of the rest of the watershed (Table 4, Figure 5).

3.2.8.4 Soils

The majority of the soils located in this watershed are loam subcategories (45%) and clay (12%) (Table 5, Figure 6). The remaining areas contain water (5%), mucky clay (26%) or are listed under the Other category (12%). The majority of the Other category is related to mining activities (dumps, pits, slickens, and Xerorthents, dredge tailings) or urban development.

3.2.8.5 Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0–500 feet (Tables 6 and 7, Figures 8 and 9).

3.2.8.6 Covered Species

The Sherman Lake-Sacramento River watershed includes documented occurrences for 10 of the 28 Covered Species, including Sanford's arrowhead, vernal pool fairy shrimp, burrowing owl, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat (Table 8). Overall, the watershed accounts for accounts for 27% of the Covered Species occurrences in the Plan Area, most of which are sandhill crane occurrences. The large majority (88%) of the Sherman Lake-Sacramento River watershed is developed or agriculture, which accounts for the relatively small number of Covered Species with occurrences

in the watershed compared to several of the other watersheds. Also, several of the species occurrences are located in non-habitat land covers and may no longer be extant. Almost all of the covered bird species documented in the Sherman Lake-Sacramento River watershed forage in croplands (4,986 acres in the watershed) and western red bat roosts in orchards.

Consistent with the lack of occurrence records for most Covered Species, the Sherman Lake-Sacramento River watershed lacks substantial modeled habitat for most of the Covered Species. For the covered vernal pool plant and animals, modeled habitat ranges from 7 acres for pincushion navarretia to 326 acres for the vernal pool invertebrates. Likewise, for the amphibians and reptiles, modeled habitat ranges from no habitat for California tiger salamander (the watershed is outside its range in the Plan Area) to about 627 acres of modeled upland habitat for western spadefoot. The occurrence of these species in the watershed is limited by a lack of modeled aquatic habitat, including only 66 acres for giant garter snake, 7 acres for western pond turtle, and 23 acres for western spadefoot.

The croplands and valley grassland (665 acres) in the Sherman Lake-Sacramento River watershed does provide habitat for several of the covered birds. The watershed supports anywhere from 14 to 1,711 acres of modeled foraging habitat for loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite, and this habitat also is modeled nesting habitat for northern harrier and tricolored blackbird. Notably, 1,356 acres of the modeled foraging habitat for Swainson's hawk is high-value habitat. The watershed provides about 1,704 acres of modeled nesting/foraging habitat for burrowing owl and about 855 acres of modeled foraging habitat for greater sandhill crane (but no modeled roosting habitat). The watershed contains limited habitat for the covered birds that nest in riparian and woodland habitat—182 acres for Cooper's hawk, Swainson's hawk (only 3 of the 295 nest sites), and white-tailed kite. The watershed contains 3 of the 96 documented nest colonies for tricolored blackbird and no potential nest colonies. While 2 of the 3 documented nest colonies are small, about 100 and 200 birds each, approximately 9,000 individuals were observed at the third site in 1944, making it the largest documented nest colony in the Plan Area.

The watershed contains almost 787 acres of modeled foraging habitat and almost 1,540 acres of modeled roosting habitat for western red bat. The watershed contains 633 acres of modeled habitat for American badger, but with the high level of urban development and intensive agriculture in the watershed, this species is unlikely to occur.

The Sherman Lake-Sacramento River watershed contains only 41 acres of modeled habitat for Sanford's arrowhead.

3.2.8.7 Conservation Considerations

Seventy percent of the Sherman Lake-Sacramento River watershed is located outside of the UDA in PPU 6 (Table 11). The remainder of the watershed overlaps with PPUs 1, 2, and a very small portion (25 acres) of PPU 4, with the rest outside of any PPUs. The Sherman Lake-Sacramento River watershed within the Plan Area has 757 acres of existing conservation, all of which is located in PPU 4 (Table 18, Figure 10). However, the croplands in the watershed are important foraging habitat for several of the covered bird species, including Swainson's hawk (5,630 acres of high-value habitat), loggerhead shrike, northern harrier, greater sandhill crane, tricolored blackbird, and white-tailed kite. Accordingly, the SSHCP protects approximately 3,590 acres of agricultural Preserve within the watershed, or approximately 31% of the total planned agricultural Preserve in the Plan Area. All of the planned conservation will be located within PPU 6.

Table 18
Summary of Conserved Land Cover Types in the Sherman Lakes-Sacramento River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mixed Riparian Scrub	—	—	0
Mixed Riparian Woodland	—	<1	<1
Valley Grassland	—	1	1
Terrestrial Total	*0*	*1*	*1*
Aquatic			
Freshwater Marsh	—	—	0
Streams/Creeks	<1	—	<1
Aquatic Total	*<1*	*0*	*<1*
Agriculture			
Cropland	753	101	854
Orchards	—	—	0
Vineyards	—	—	0
Agriculture Total	*753*	*101*	*854*
Non-Habitat Land Cover Type			
Disturbed	2	—	2
Low-density Development	1	<1	1
Major Roads	1	—	1
Non-Habitat Land Cover Type Total	*4*	*<1*	*4*
Grand Total	**757**	**102**	**859**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.9 Snodgrass Slough Watershed

3.2.9.1 Land Cover Types

Snodgrass Slough is the fifth largest watershed in the Plan Area behind the Laguna Creek Lower Cosumnes, Deer Creek and Morrison Creek watersheds and is entirely contained within the western portion of the Plan Area (Table 1, Figure 2). About 64% of the watershed is Agriculture, of which, about 63% is Croplands; Croplands cover about 40% of the entire watershed. Non-habitat land cover types, dominated by Low-Density Development, account for 7% of the watershed. Terrestrial habitat, dominated by Valley Grassland (76%), Mixed Riparian scrub and Woodland, covers about 19% of the watershed. The Snodgrass Slough watershed accounts for the highest acreage of Aquatic land cover within the Plan Area. Approximately 4,104 acres of the watershed supports all of the aquatic cover types mapped within the Plan Area, and represents 25% of the aquatic habitat in the Plan Area. Impervious surfaces cover approximately 1,124 acres, or 3%, of the watershed.

3.2.9.2 Hydrology

Reflecting the dominance of agricultural land covers within the watershed, approximately 72% of the NHD flowlines in the Snodgrass Slough are canal/ditch features (Table 3, Figure 4). Artificial paths account for almost 21% of the watershed while stream/river features comprise 7% and connector features are less than 1% of the watershed.

3.2.9.3 Geological Formations

Geological formation data are available for approximately 60% of the Snodgrass Slough watershed. Almost the entire watershed consists of riverbank formations, which make up approximately 72% of the watershed (Table 4, Figure 5). The remaining 1% of mapped geological data for the watershed consists of basin, intertidal and levee and channel deposits.

3.2.9.4 Soils

The majority of the soils in the Snodgrass Slough watershed are subcategories of loam soils (60%) (Table 5, Figure 6). The largest acreage falls into the silt loam category (32%), most of which contains the San Joaquin soil series. Approximately 32% of the watershed contains clay soils with water (4%) and the Other (1%) category rounds out the remaining acreage.

3.2.9.5 Slope and Elevation

The entire watershed is on flat to gentle slopes with elevations ranging from 0–500 feet (Tables 6 and 7, Figures 8 and 9).

3.2.9.6 Covered Species

The Snodgrass Slough watershed includes documented occurrences for 18 of the 28 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and American badger, (Table 8). This watershed contains 17% of known occurrences for Covered Species in the Plan Area, fourth only to the Laguna Creek (26%) watershed, Sherman Lake-Sacramento River (20%) and Morrison Creek watersheds (16%). While the watershed contains occurrences for only two of the covered vernal pool plant species, it has the highest number of occurrences of dwarf downingia (7 of the 10 occurrences in the Plan Area) and second highest number of occurrences of legenere (12 of the 56 occurrences in the Plan Area). The watershed contains a small percentage of the occurrences in the Plan Area for vernal pool fairy shrimp (3%) and vernal pool tadpole shrimp (3%), but does contain 27% (9 of 33 occurrences) for mid-valley fairy shrimp. As an aquatic plant species, Sanford's arrowhead is well represented in the Snodgrass Slough watershed, with 56% of the occurrences (35 of 63) in the Plan Area.

The Snodgrass Slough watershed is important for both giant garter snake and western pond turtle. It supports an important subpopulation of giant garter snake, with 7 of the 14 occurrences in the Plan Area and 5 of the 18 occurrences for western pond turtle. Reflecting the more perennial and intermittent nature of the aquatic habitats (about 70% of the aquatic habitats are freshwater marsh, stream/creek, and open water), there are no documented occurrences for western spadefoot in the watershed. Also, the watershed is outside the range of California tiger salamander.

There are occurrence data for all of the avian Covered Species in the Snodgrass Slough watershed, including 32% of the occurrences for Swainson's hawk (127 of the 398 occurrences). Occurrence data for the other species ranges from 2% of the Plan Area occurrences of tricolored blackbird to 22% of the occurrences for greater sandhill crane (see discussion below).

Of the covered mammals, one of the eight occurrences for American badger are in the Snodgrass Slough watershed.

Due to its large size and large number and dominance by agriculture, of the 10 watersheds in the Plan Area, the Snodgrass Slough watershed contains among the largest acreages of modeled habitat for the Covered Species that use agriculture (Table 9).

For plants, the Snodgrass Slough contains over 1,679 acres of modeled habitat for legenere and over 2,817 acres of modeled habitat for Sanford's arrowhead. The watershed contains 1,918 acres of modeled habitat for the vernal pool invertebrates.

As an important area for giant garter snake and western pond turtle, the Snodgrass Slough contains large amounts of modeled habitat for both species. For giant garter snake, the watershed supports 3,559 acres of modeled aquatic habitat, 5,760 acres of modeled upland habitat and 6,350 acres of high-value habitat. The Snodgrass Slough and Lower Cosumnes River (Section 3.2.4) combined support 92% of the high-value habitat for giant garter snake. The Snodgrass Slough watershed also contains the largest amount of modeled breeding/foraging habitat for western pond turtle of the 10 watersheds in the Plan Area (2,005 acres, or 32% of the total in the Plan Area), and also contains almost 6,517 acres of nesting/aestivation habitat. Although western spadefoot has not been documented in the Snodgrass Slough watershed, the watershed supports 2,987acres of modeled aquatic habitat and 5,945 acres of modeled upland.

The Snodgrass Slough watershed contains substantial acreages of modeled habitats for all of the covered bird species, including approximately 2,243to 26,700 acres of modeled foraging habitat for loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite; about 10,452 acres for ferruginous hawk; and about 25,499 acres of modeled nesting/foraging habitat for burrowing owl.

The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety or more broad-scale land cover types for nesting (e.g., cropland, irrigated pasture-grassland, and valley grassland), including burrowing owl (25,499), northern harrier (28,260 acres), and tricolored blackbird (24,016 acres). Although the watershed supports substantial modeled nesting habitat for tricolored blackbird, only 1 of the 96 documented nest colonies and 2 of 63 potential nest colonies are in the watershed; about 100 individuals were observed at the documented nest colony in 1992. The watershed also contains more than 421 acres of modeled roosting habitat for greater sandhill crane, which accounts for 36% of the total in the Plan Area; modeled roosting habitat in the Snodgrass Slough and Lower Cosumnes River watersheds account for 99% of the total modeled roosting habitat in the Plan Area. Much of the high-value habitat (33%) for greater sandhill crane occurs in Snodgrass Slough. Twelve of the 48 documented roosting sites for greater sandhill crane in the Plan Area are in this watershed. For covered birds that are limited to riparian and woodland habitats for nesting, the Snodgrass Slough watershed supports modest amounts modeled nesting habitat relative to its large size—

1,767 acres for Cooper's hawk, Swainson's hawk, and white-tailed kite. However, despite a limited amount of modeled nesting habitat, the watershed has the highest proportion (38%) of Swainson's hawk nest sites of the watersheds in the Plan Area. Further, reflecting the value of agriculture as foraging habitat for Swainson's hawk, the watershed includes 28,340 acres of high-value foraging habitat for the species.

The Snodgrass Slough watershed supports more than 10,508 acres of foraging habitat and 1,874 acres of modeled roosting habitat for western red bat, including. The watershed also supports about 7,158 acres of modeled general habitat for American badger.

3.2.9.7 Conservation Considerations

The majority of the Snodgrass Slough watershed (98%) is located outside of the UDA within PPU 6 (Table 11). The remaining 1,006 acres of the watershed intersect PPU 4 PPU. PPU 4 encompasses the proposed sphere of influence for the City of Elk Grove. Because much of PPU 4 is located in the city's proposed sphere of influence and in the county's Urban Services Boundary (USB), it is anticipated that much of PPU 4 will eventually be urbanized.

The primary conservation considerations for the Snodgrass Slough watershed are giant garter snake and western pond turtle (to a lesser extent) and the covered birds. The watershed supports large percentages of high-value habitat in the Plan Area for giant garter snake and Swainson's hawk. For giant garter snake, the 6,030 acres of high-value habitat is 45% of the total in the Plan Area and for Swainson's hawk, the 31,230 acres of high-value habitat is 37% of the total in the Plan Area.

Existing conservation totals about 8,944 acres (62%) of the watershed and an additional 5,497 acres are planned for conservation (Table 19, Figure 10). A large portion of the planned conservation will include agricultural Preserves (82%) with the remaining acreage set aside for wetland restoration. The agricultural Preserves will provide high-value foraging habitat for Swainson's hawk, as well as many of the other Covered Species that use agricultural habitats. All of the planned conservation will occur within PPU 6. The Snodgrass Slough watershed will contain the highest acreage of total conservation for aquatic and agricultural land covers in the Plan Area.

Table 19
Summary of Conserved Land Cover Types in the Snodgrass Slough Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Mixed Riparian Scrub	232	41	273
Mixed Riparian Woodland	246	67	313

Table 19
Summary of Conserved Land Cover Types in the Snodgrass Slough Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Valley Grassland	3,425	93	3,518
Terrestrial Total	*3,903*	*201*	*4,104*
Aquatic			
Freshwater Marsh	705	48	753
Open Water	465	26	491
Seasonal Wetland	655	24	679
Streams/Creeks	206	45	251
Swale	2	—	2
Vernal Pool	290	2	292
Aquatic Total	*2,323*	*145*	*2,468*
Agriculture			
Cropland	2,617	4,024	6,641
Irrigated Pasture-Grassland	60	891	951
Orchards	—	—	0
Vineyards	—	29	29
Agriculture Total	*2,677*	*4,944*	*7,621*
Non-Habitat Land Cover Type			
Disturbed	2	3	5
High-density Development	1	—	1
Low-density Development	35	201	236
Major Roads	3	3	6
Non-Habitat Land Cover Type Total	*41*	*207*	*248*
Grand Total	**8,944**	**5,497**	**14,441**

Note: Due to the relatively coarse scale of the land cover mapping, rounding is applied to acreages 10 or greater. For acreages of 10–100, the acreage is rounded to the nearest 5 acres. For acreages greater than 100, the acreage is rounded to the nearest 10 acres. All acreages greater than 10 should be considered approximations.

3.2.10 Upper Cosumnes River Watershed

3.2.10.1 Land Cover Types

The Upper Cosumnes River watershed is located in the east-central portion of the Plan Area, which encompasses about 28% (31,885 acres) of the watershed (Table 1, Figure 2). The majority of the watershed in the Plan Area (21, 0810 acres, or 66%), consists of Terrestrial habitat by Valley Grassland (Table 2, Figure 3). Agricultural areas comprise about 11% and aquatic areas comprise about 5% of the watershed in the Plan Area. Non-habitat land cover, primarily Low-Density Development, covers the remaining 18% of the watershed. Impervious surfaces cover approximately 341 acres, or only 1%, of the watershed.

3.2.10.2 Hydrology

According to the NHD flowline dataset, approximately 62% of the Upper Cosumnes River watershed consists of stream/river features (Table 3, Figure 4). The majority of stream/river features in the watershed are tributaries to the Cosumnes River, which is mapped as an artificial path. The river and the Folsom South Canal account for most of the artificial path features mapped in the watershed. Less than 10% of the flowline features within the watershed include canal/ditch and connector or pipeline features.

3.2.10.3 Geological Formations

The Upper Cosumnes River watershed contains a variety of geological formations. Two formations total about 44% of the watershed and include the riverbank and Laguna formations (Table 4, Figure 5). Other prominent formations include Valley Springs, Mehrten, gopher ridge, and Modesto formations.

3.2.10.4 Soils

The majority of the soils within this watershed are subcategories of loam (87%)(Table 5, Figure 6). Approximately 3% of the watershed contains water, 3% clay, and 7% falls within the Other category. Most of the Other category (6%) is related to mining activities (pits, slickens and Xerorthents, dredge tailings, 2% to 50% slopes).

3.2.10.5 Slope and Elevation

While the majority of the Upper Cosumnes River watershed is on flat to gentle slopes with elevations ranging from 0–500 feet, a small percentage (0.4%) is located above 500 feet (Tables 6 and 7). This watershed contains the highest percentage of land with slopes between 20%–40% and greater than 40%. These areas occur along the eastern border of the Plan Area.

3.2.10.6 Covered Species

The Upper Cosumnes River watershed includes documented occurrences for 15 of the 28 Covered Species, including legenere; Sanford's arrowhead; vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, western spadefoot, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat.

This watershed contains 6% of documented occurrences of Covered Species within the Plan Area (Table 8). Most notably, the watershed contains 153 of the 156 known occurrences (98%)

of valley elderberry longhorn beetle, with the largest concentration of occurrences along the Cosumnes River just south of Rancho Murieta. Other than the longhorn beetle, no other Covered Species with documented occurrences in the watershed occur at particularly high levels relative to the other watersheds, ranging from 4% of total occurrences in the Plan Area for vernal pool fairy shrimp to 12% for ferruginous hawk. Therefore, the 6% of the documented occurrences of all Covered Species in the Plan Area is skewed by the extremely high percentage of valley elderberry longhorn beetle occurrences.

The Upper Cosumnes River contains 1,078 acres of modeled habitat for the valley elderberry longhorn beetle, which is substantially more than some of the other watersheds (Table 9). However, the habitat model for the beetle is very general because it includes all riparian communities under the assumption that the host plant elderberry is present. Therefore, the moderate amount of modeled habitat in the watershed compared to modeled habitat in the American River watershed (48 acres), Lower Cosumnes River watershed (2,231 acres), and Snodgrass Slough watershed (1,767 acres) should not be interpreted as the Upper Cosumnes River watershed having relatively higher value for the species.

The Upper Cosumnes River watershed contains modest amounts of modeled habitat for covered vernal pool species, ranging from 2,091 acres for dwarf downingia to 11,163acres for vernal pool invertebrates.

The Upper Cosumnes River watershed contains substantial acreages of modeled habitats for all of the covered bird species (except greater sandhill crane), including about 521 to 21,700 acres of modeled foraging habitat for Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, and white-tailed kite and about 20,945 acres of modeled nesting/foraging habitat for burrowing owl. The watershed also supports large amounts of modeled nesting habitat for covered birds that can use a variety or more broad-scale land cover types for nesting (e.g., valley grassland), including loggerhead shrike (18,608 acres), northern harrier (20,424 acres), and tricolored blackbird (19,324 acres). For covered birds that nest in riparian and woodland habitats, the watershed supports substantial modeled nesting habitat, including 3,028 acres for Cooper's hawk and white-tailed kite and 832 acres for Swainson's hawk. Due to a relatively small amount of croplands and its location in the eastern portion of the Plan Area, the Upper Cosumnes River watershed supports only 881 acres of high-value foraging habitat for Swainson's hawk, or only 1% of the total in the Plan Area. Twenty-four of the 293 Swainson's hawk nest sites in the Plan Area are in this watershed. Seven of 96 documented nest colonies for tricolored blackbird and 9 of 63 potential nest colonies are in the Upper Cosumnes River watershed. Five the six colonies were observed in 1992, with others in 2000. The six documented nest colonies have ranged in size from approximately 200 individuals to 5,000 individuals at two different sites in 1992. Approximately 16,200 individuals have been

observed at the nest colonies over the surveys, or 10% of the approximately 158,330 individuals observed at nest colonies in the Plan Area. The Upper Cosumnes River has relatively low value for greater sandhill crane, with only 734 acres of modeled roosting habitat and 2,398 acres of modeled foraging habitat.

The Upper Cosumnes River watershed generally defines the northern boundary of the California tiger salamander's range in the Plan Area, and contains a substantial amount of modeled habitat for the species, including 700 acres of modeled aquatic habitat and 15,559 acres of modeled upland habitat. No high-value habitat for the species is present in the watershed and there are no documented occurrences. There are two occurrences of western spadefoot and no occurrences of western pond turtle in the watershed, but there is substantial modeled habitat for the two species, including 1,444 acres of modeled aquatic habitat and 20,002 acres of modeled upland habitat for western spadefoot, and 599 acres of modeled breeding/foraging habitat and 15,153 acres of modeled nesting/aestivation habitat for western pond turtle. The Upper Cosumnes River watershed has low value for giant garter snake, with only 78 acres of modeled upland habitat and 2 acres of modeled aquatic habitat.

The Upper Cosumnes River watershed supports large acreages of modeled habitat for the covered mammals, including more than 18,866 acres of modeled general habitat for American badger and about 19,186 acres of modeled foraging habitat and 3,679 acres of modeled roosting habitat for western red bat. The Upper Cosumnes River watershed supports a moderate amount of modeled habitat for Sanford's arrowhead (6,648 acres).

The Upper Cosumnes River watershed also contains federally designated Critical Habitat for Sacramento Orcutt grass (7 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (1,431 acres that is habitat for both species).

3.2.10.7 Conservation Considerations

The Upper Cosumnes River watershed is entirely outside of the UDA and encompasses a large portion of PPU 5 and small sections of PPUs 6 and 7 (Table 11). One of the primary conservation considerations in this watershed is the valley elderberry longhorn beetle, with 98% of occurrences for this species in the Plan Area concentrated along the upper Cosumnes River. It generally has high wildlife habitat value for the covered bird species (except greater sandhill crane), California tiger salamander, western spadefoot, western pond turtle, American badger, and western red bat. It has relatively low value for the covered plant species, vernal pool invertebrates, and giant garter snake.

This watershed currently contains 3,358 acres of existing conservation, which are patchily distributed throughout the watershed (Table 20, Figure 10). Approximately 2,801 acres of the watershed are planned conservation. PPU 5 contains the majority of both existing and planned conservation. Valley grassland will comprise the majority of total conservation for this watershed, with the primary focus on connecting the Landscape Preserve in the Laguna Creek Watershed (PPU 7) with the Cosumnes River. Also, riparian restoration is planned for 890 acres of the watershed, and will be focused along the Cosumnes River. This watershed will contain approximately two-thirds of the riparian restoration within the Plan Area. The riparian restoration will provide both resident and nesting habitat for many of the Covered Species and will provide cover and refuge for species using the river as movement corridors. Importantly, the riparian restoration will provide resident and dispersal habitat for the valley elderberry longhorn beetle along the Cosumnes River.

Table 20
Summary of Conserved Land Cover Types in the Upper Cosumnes River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Terrestrial			
Blue Oak Woodland	443	—	443
Mine Tailing Riparian Woodland	7	—	7
Mixed Riparian Scrub	21	38	59
Mixed Riparian Woodland	55	376	431
Valley Grassland	2,453	1,479	3,932
Terrestrial Total	*2,979*	*1,893*	*4,872*
Aquatic			
Freshwater Marsh	7	<1	7
Open Water	10	—	10
Seasonal Wetland	46	31	77
Streams/Creeks	26	129	155
Swale	26	9	35
Vernal Pool	87	38	125
Aquatic Total	*202*	*207*	*409*
Agriculture			
Cropland	54	404	458
Irrigated Pasture-Grassland	20	23	43
Orchards	—	116	116
Vineyards	3	10	13
Agriculture Total	*77*	*553*	*630*
Non-Habitat Land Cover Type			
Disturbed	49	<1	49
High-density Development	1	—	1

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 20
Summary of Conserved Land Cover Types in the Upper Cosumnes River Watershed

Land Cover Types	Existing Conservation (acres)	Planned Conservation (acres)	Total Conservation (acres)
Low-density Development	13	146	159
Major Roads	1	2	3
Mine Tailings	36	<1	36
Non-Habitat Land Cover Type Total	*100*	*148*	*248*
Grand Total	**3,358**	**2,801**	**6,159**

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK

4 SUMMARY

Although all of the watersheds in the Plan Area support important biological resources, as described in the above sections, 5 of the 10 watersheds in the Plan Area stand out as relatively important for protection in the Plan Area: Laguna Creek, Lower Cosumnes River, Upper Cosumnes River, Morrison Creek, and Snodgrass Slough. The attributes that make these five watersheds particularly important for protection are summarized below.

Laguna Creek

The Laguna Creek watershed contains several attributes that make it important for conservation:

- It is the largest watershed in the Plan Area at 73,976 acres, or 76% of the Plan Area.
- It contains virtually all of the mapped land covers in the Plan Area, 91% of the watershed is undeveloped, and only 2% of the watershed is impervious surfaces.
- It contains 42% of the vernal pool in the Plan Area.
- It contains 26% of the flowline types in the Plan Area, of which 86% are natural stream/river.
- 29% of the watershed is Laguna formation, which is associated with vernal pools.
- It contains documented occurrences of 23 of the 28 Covered Species, including 19% of all Covered Species occurrences in the Plan Area, 20% of the vernal pool plant occurrences, 37% of the vernal pool invertebrate occurrences, 79% of the California tiger salamander occurrences, 58% of the western spadefoot occurrences, and 44% of western pond turtle occurrences.
- It contains large amounts of modeled habitats for all of the covered reptile, amphibian, bird, and mammal species. There are 10,092 acres of high-value habitat for Swainson's hawk. It contains 42 Swainson's hawk nest sites, 20 documented and 27 potential tricolored blackbird nest colonies, including a documented nest colony supporting approximately 6,750 individuals, and 7 roosting sites for greater sandhill crane.
- It contains federally designated Critical Habitat for California tiger salamander (8,758 acres), Sacramento Orcutt grass (24,510 acres), and vernal pool fairy shrimp and vernal pool tadpole shrimp (27,048 acres).
- It already contains 18,315 acres of existing conservation, including the 12,500-acre Chance Ranch.

Lower Cosumnes River

The Lower Cosumnes River watershed contains several attributes that make it important for conservation:

- 82% of the watershed is terrestrial habitat and agriculture and 8% is aquatic. Only 2% of the watershed is impervious surfaces.
- The lower Cosumnes River and Badger Creek are prominent features in the watershed.
- It contains documented occurrences of 19 of the 28 Covered Species, including 15% of all Covered Species occurrences in the Plan Area; 20% of the occurrences of greater sandhill crane; 23%–35% of occurrences of Cooper's hawk, loggerhead shrike, northern harrier, Swainson's hawk, and white-tailed kite; and 5 of the 14 documented occurrences for giant garter snake.
- It contains large amounts of modeled habitats for all of the covered reptile, amphibian, bird, and mammal species. 25,942 acres of high-value habitat are available for Swainson's hawk.
- It contains 90 Swainson's hawk nest sites and 29 roost sites for greater sandhill crane.
- It contains federally designated Critical Habitat for Sacramento Orcutt grass (1,842 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,069 acres).
- It already contains 14,263 acres of existing conservation, including the Stone Lakes NWR and Cosumnes River Preserve.

Upper Cosumnes River

The Upper Cosumnes River watershed contains several attributes that make it important for conservation:

- 66% of the watershed is undeveloped, with valley grassland the dominant land cover. Only 1% of the watershed is impervious surfaces.
- The upper Cosumnes River is the prominent landscape feature in the watershed and 62% of the flowlines in the watershed are stream/river features.
- It contains documented occurrences of 15 of the 28 Covered Species, including 98% of the valley elderberry longhorn beetle occurrences concentrated along the Cosumnes River.
- It contains large amounts of modeled habitats for all of the covered bird species (except greater sandhill crane), California tiger salamander, western spadefoot, western pond

turtle, American badger, and western red bat. High-value habitat includes 881 acres for Swainson's hawk.

- It contains federally designated Critical Habitat for Sacramento Orcutt grass (7 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (1,431 acres).
- It already contains 3,358 acres of existing conservation distributed throughout the watershed.

Morrison Creek

The Morrison Creek watershed contains several attributes that make it important for conservation:

- It is the fourth-largest watershed in the Plan Area at 42,926 acres, or 61%, of the Plan Area and comprises the large majority of the UDA.
- Undeveloped portions of the watershed support substantial areas of vernal pool and swale embedded within more than 21,294 acres of valley grassland.
- 83% of the flowline features are stream and river features, including Morrison Creek, Laguna Creek (north), Elder Creek, Strawberry Creek, Unionhouse (Beacon) Creek, and Frye Creek.
- The Laguna Creek Wildlife Corridor is a prominent landscape feature in the watershed that provides nesting, resident, and movement habitat for many of the Covered Species, including western pond turtle, giant garter snake, and tricolored blackbird.
- 48% of the watershed is Laguna formation, which is associated with vernal pools.
- It contains documented occurrences of 23 of the 28 Covered Species, including 16% of all Covered Species occurrences in the Plan Area 43% of the covered vernal pool plant species occurrences, 53% of the covered vernal pool invertebrate species occurrences, 29% of the western spadefoot occurrences, 19% of the Sanford's arrowhead occurrences, 7% of the giant garter snake occurrences, and 2% of the western pond turtle occurrences.
- It contains large amounts of modeled habitat for all of the Covered Species (except California tiger salamander). High-value habitat includes 1,388 acres for giant garter snake and 1,926 acres for Swainson's hawk.
- It contains 42 documented and 16 potential nest colonies for tricolored blackbird.
- It contains federally designated Critical Habitat for Sacramento and slender Orcutt grass (1,161 acres) and vernal pool fairy shrimp and vernal pool tadpole shrimp (2,451 acres).
- It already contains 2,888 acres of existing conservation focused on valley grasslands and vernal pools.

Snodgrass Slough

The Snodgrass Slough watershed contains several attributes that make it important for conservation:

- It is the fifth largest watershed in the Plan Area and contains large areas of agriculture and aquatic habitats in the western portion of the Plan Area. About 3% of the watershed is impervious surfaces.
- It contains documented occurrences of 18 of the 28 Covered Species, including 17% of all Covered Species occurrences in the Plan Area, 70% of the occurrences of dwarf downingia, 21% of the occurrences of legenere, 27% of the occurrences of mid-valley fairy shrimp, 56% of the occurrences of Sanford's arrowhead, 50% of the occurrences of giant garter snake, 28% of the occurrences of western pond turtle, 32% of the occurrences of Swainson's hawk, and 23% of the occurrences of greater sandhill crane.
- It contains large amounts of modeled habitats for most of the Covered Species. High-value habitat includes 6,050 acres for giant garter snake and 28,340 acres for Swainson's hawkand 26,848 acres for greater sandhill crane. Along with the Lower Cosumnes River watershed, it is critical for conservation of Swainson's hawk foraging habitat, with the watersheds accounting for 72% of the high-value habitat.
- It contains 86 Swainson's hawk nest sites and 12 greater sandhill crane roost sites.
- It already contains 8,944 acres of existing conservation, including aquatic habitats that are important habitats for many of the Covered Species.

5 LITERATURE CITED

33 CFR 332.2. Definitions.

Atwater, B. 1979. "Explanation accompanying 'Generalized geologic map of the Rio Vista 15-minute quadrangle, California.'" United States Geological Survey Open File Report 79-853.

Black, P.E. 1997. Watershed Functions. *Journal of the American Water Resources Association* 33: 1–11.

Brabec, E., S. Schulte, P.L. Richards. 2002. "Impervious Surfaces and Water Quality: A Review of Current Literature and Its Implications for Watershed Planning." *Journal of Planning Literature* 16: 499. doi: 10.1177/088541202400903563. http://jpl.sagepub.com/content/16/4/499.

Clark, L.D. 1964. "Stratigraphy and Structure of Part of the Western Sierra Nevada Metamorphic Belt, California." United States Geological Survey Professional Paper 410.

CDMG (California Division of Mines and Geology). 1999. "Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Kaolin Clay Resources in Sacramento County." Open File Report 99-09.

Postel, S.L. and H. Thompson. 2005. "Watershed Protection: Capturing the Benefits of Nature's Water Supply Services." *Natural Resources Forum* 29: 98–108.

USDA (U.S. Department of Agriculture). 2007. "Watersheds, Hydrologic Units, Hydrologic Unit Codes, Watershed Approach, and Rapid Watershed Assessments." June 18, 2007.

USDA NRCS (U.S. Department of Agriculture, Natural Resources Conservation Service). 1993. *Soil Survey of Sacramento County, California*. USDA NRCS, in cooperation with the Regents of the University of California. April 1993. Accessed December 2012. http://soildatamart.nrcs.usda.gov/Manuscripts/CA067/0/sacramento.pdf.

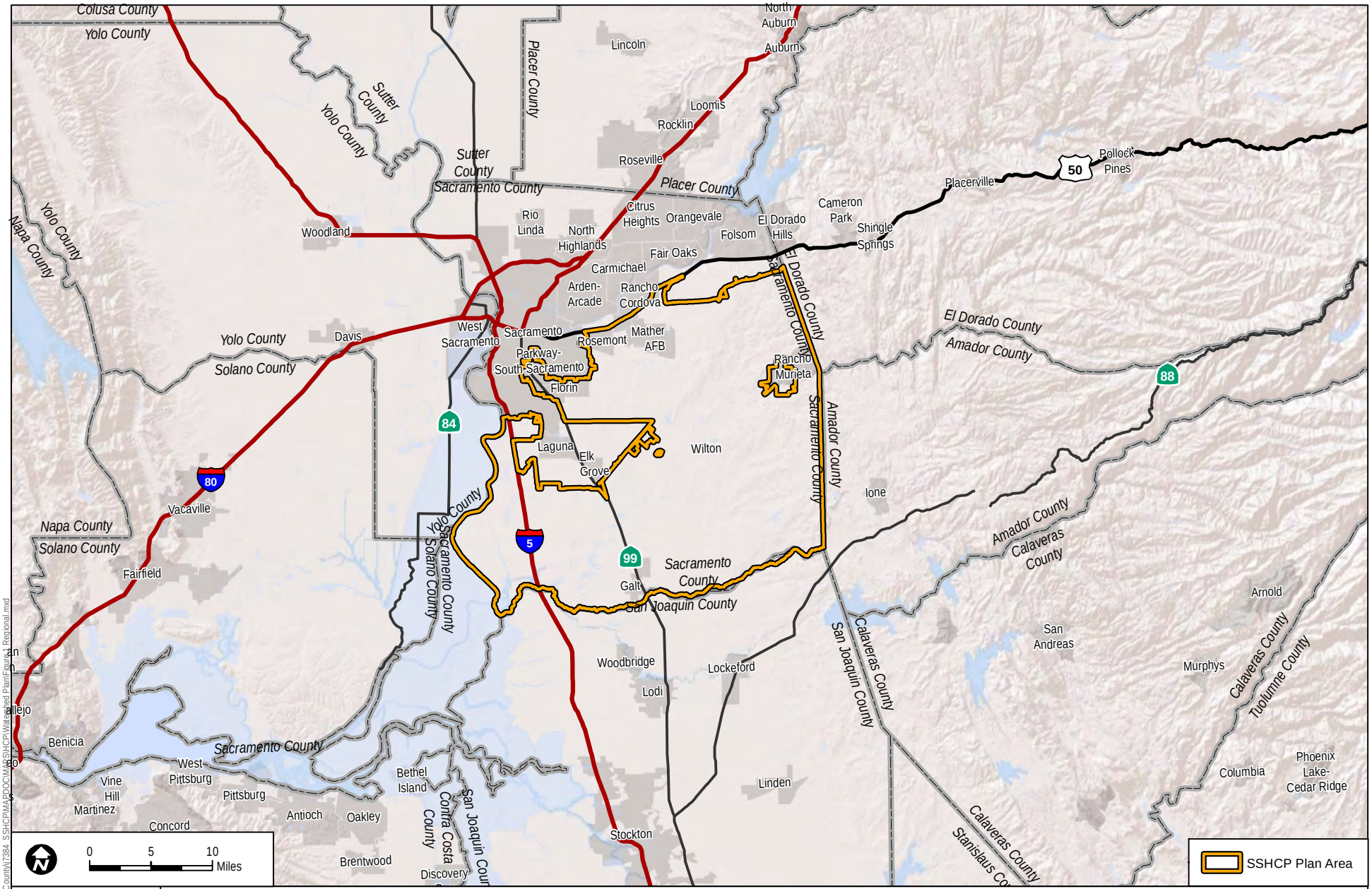
USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for Vernal Pool Ecosystems in California and Southern Oregon*. Portland, Oregon: USFWS. Approved December 15, 2005. Accessed February 6, 2012. http://ecos.fws.gov/docs/recovery_plan/060614.pdf.

USGS and USDA NRCS (U.S. Geological Survey and U.S. Department of Agriculture, Natural Resources Conservation Service. 2009. "Federal Guidelines, Requirements, and Procedures for the National Watershed Boundary Dataset." Chapter 3 of Section A, Federal Standards, Book 11, Collection and Delineation of Spatial Data. Accessed June 1, 2015. http://pubs.usgs.gov/tm/tm11a3/pdf/TM11-A3.pdf.

USGS (U.S. Geological Survey). 2012. National Elevation GIS Dataset. http://ned.usgs.gov/.

USGS. 2013. National Hydrography GIS Dataset. Accessed May 2013. http://nhd.usgs.gov/.

Wagner, D.L., C.W. Jennings, T.L. Bedrossian, and E.J. Bortugno, 1981. "Geologic Map of the Sacramento Quadrangle." 1:250,000. California Geological Survey Regional Geologic Map No. 1A.



SOURCE: ESRI, County of Sacramento 2014

FIGURE 1

Regional

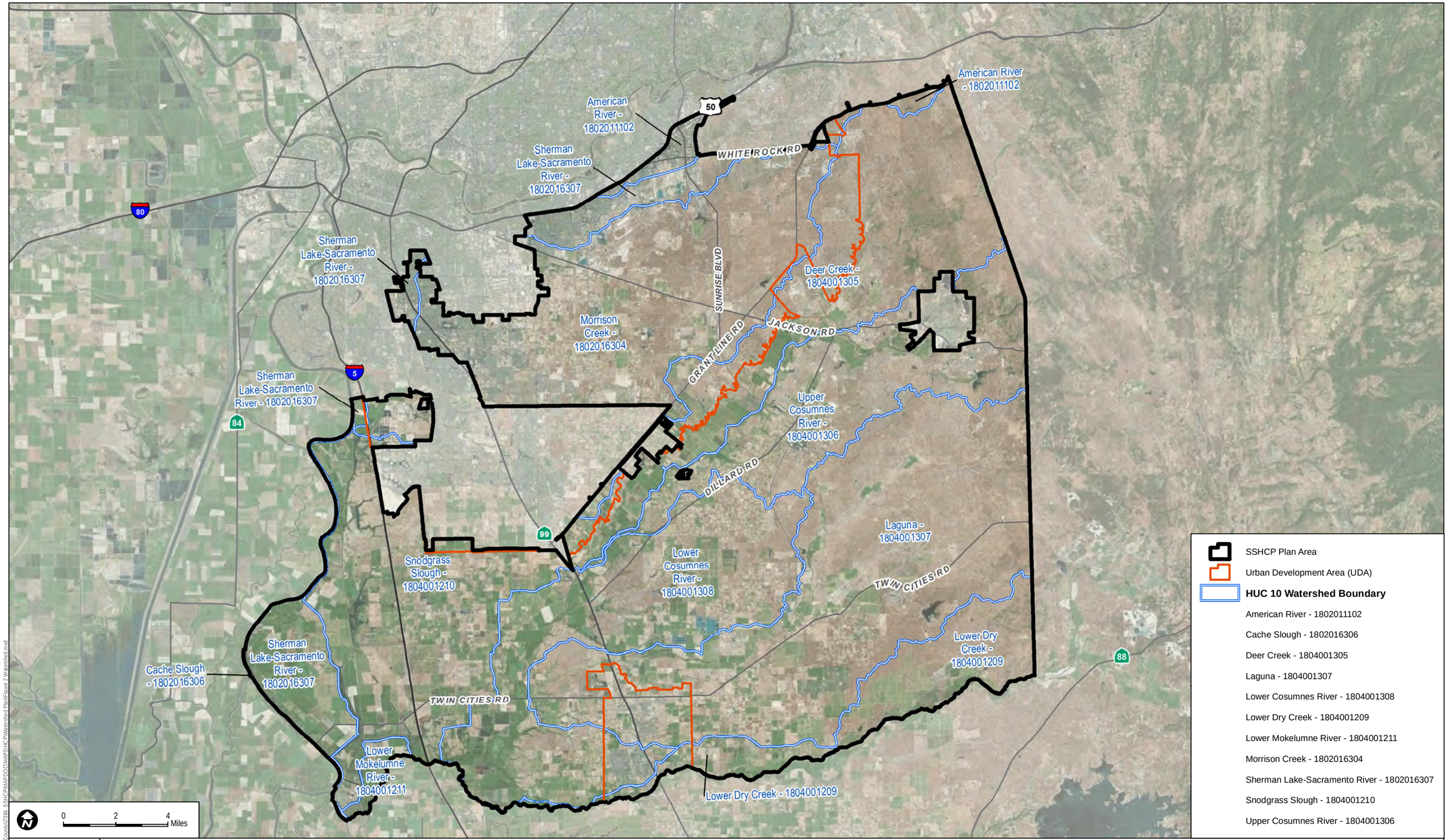
SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

DUDEK

Path: Z:\Projects\Sacramento County\7384 SSHCP\MAPDOC\MXD\SSHCP\Watershed Plan\Figure1_Regional.mxd

Watershed Study for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7154_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Figure 2 Watershed.mxd

DUDEK

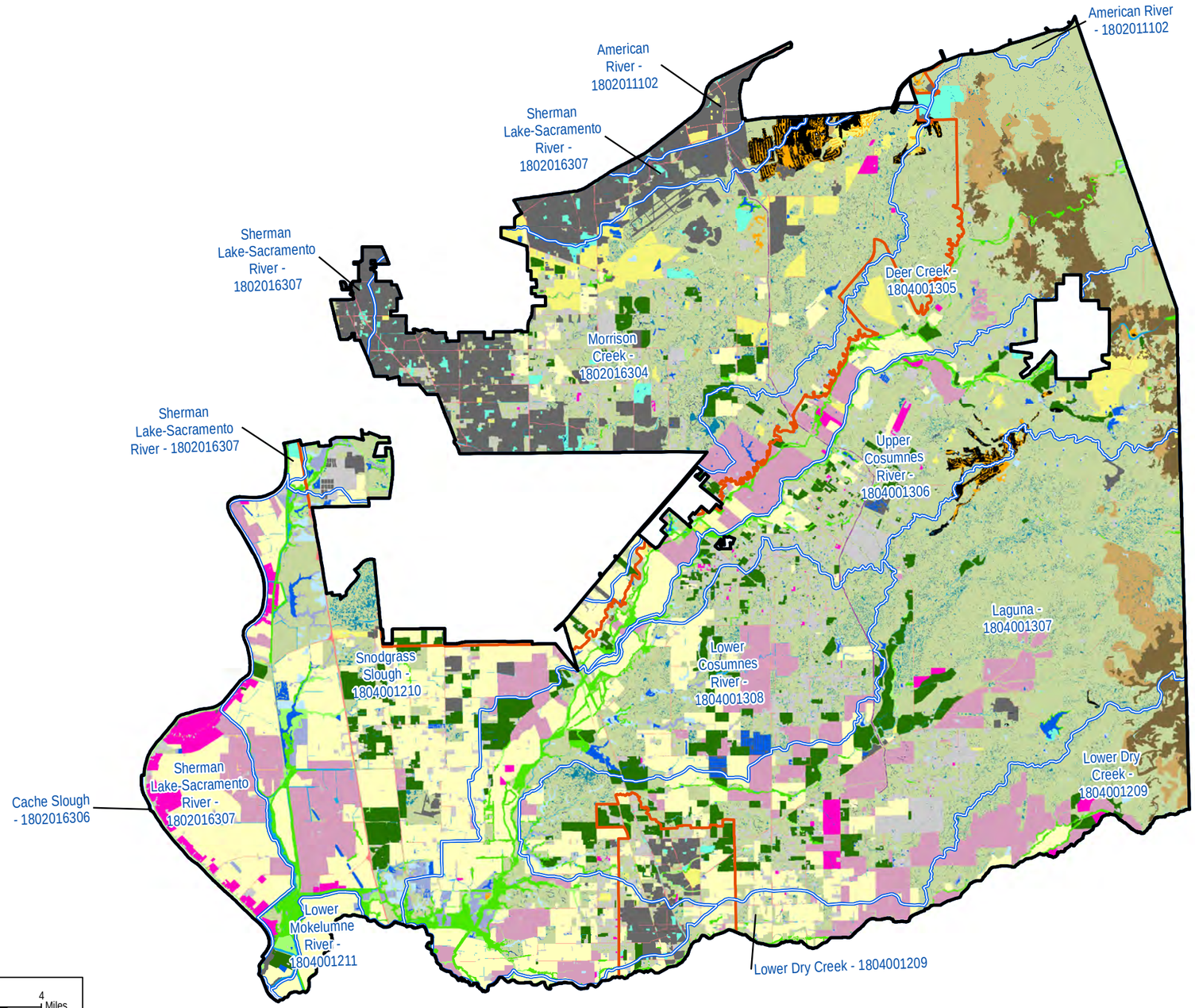
SOURCE: Bing Maps 2015, USGS 2013 National Hydrography Dataset (NHD)

FIGURE 2

Watersheds

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

INTENTIONALLY LEFT BLANK



SSHCP Plan Area
Urban Development Area (UDA)
HUC 10 Watershed Boundary

Land Cover Types

Terrestrial
- Blue Oak Savanna
- Blue Oak Woodland
- Mine Tailing Riparian Woodland
- Mixed Riparian Scrub
- Mixed Riparian Woodland
- Valley Grassland

Aquatic
- Freshwater Marsh
- Open Water
- Seasonal Wetlands
- Streams/Creeks
- Swale
- Vernal Pool

Agriculture
- Cropland
- Irrigated Pasture-Grassland
- Orchards
- Vineyards

Non-Habitat
- Aqueducts
- Disturbed
- High Density Development
- Low Density Development
- Major Roads
- Mine Tailings
- Recreation/Landscaped

SOURCE: USGS 2013 National Hydrography Dataset (NHD)

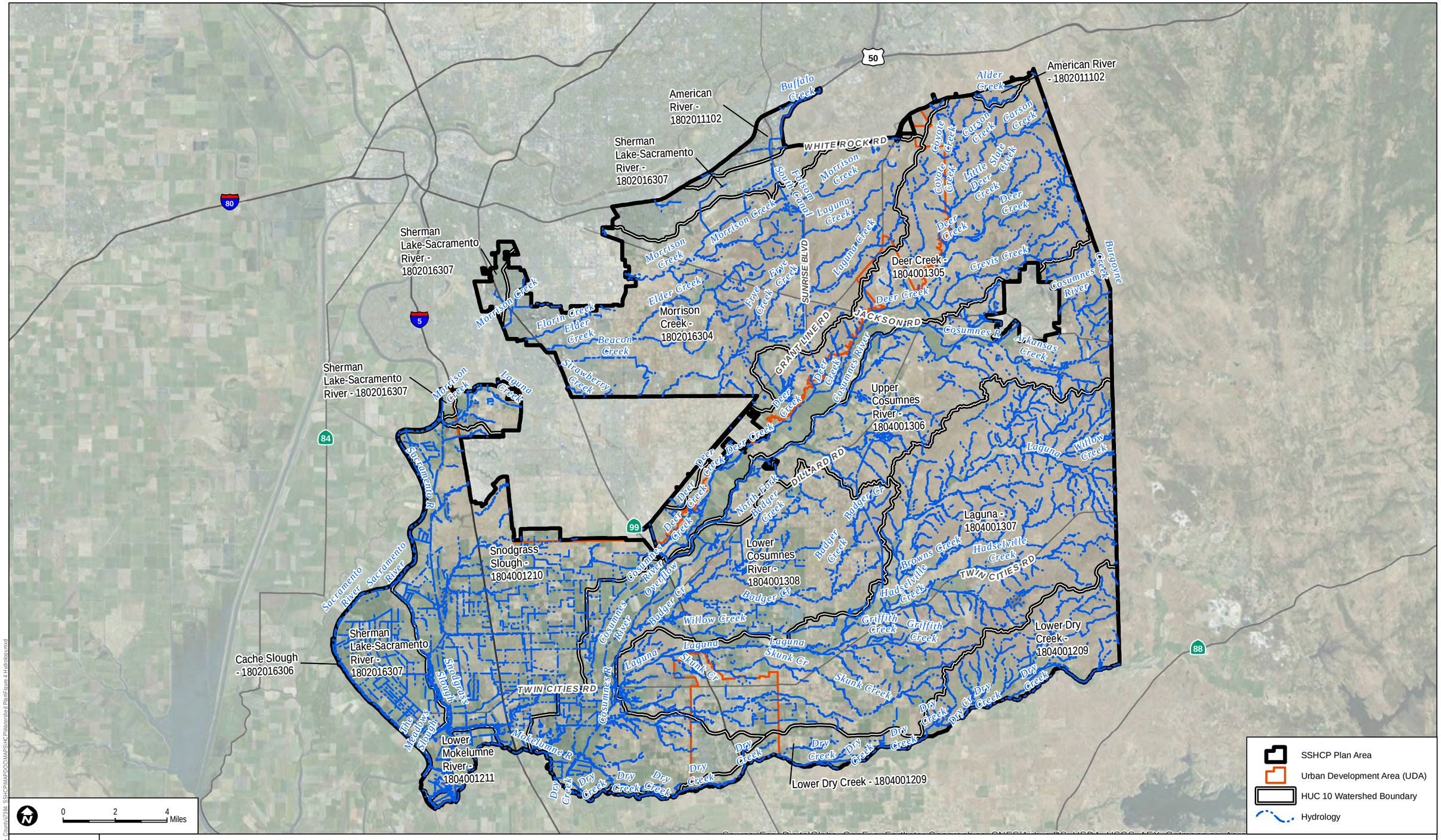
DUDEK

FIGURE 3
Land Cover

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento_County\7156_SSHCP\MAPDOC\MAPS\HCP\WatershedPlan\Figure 3 Land Cover.mxd

INTENTIONALLY LEFT BLANK



SOURCE: USGS 2013 National Hydrography Dataset (NHD), County of Sacramento 2012

DUDEK

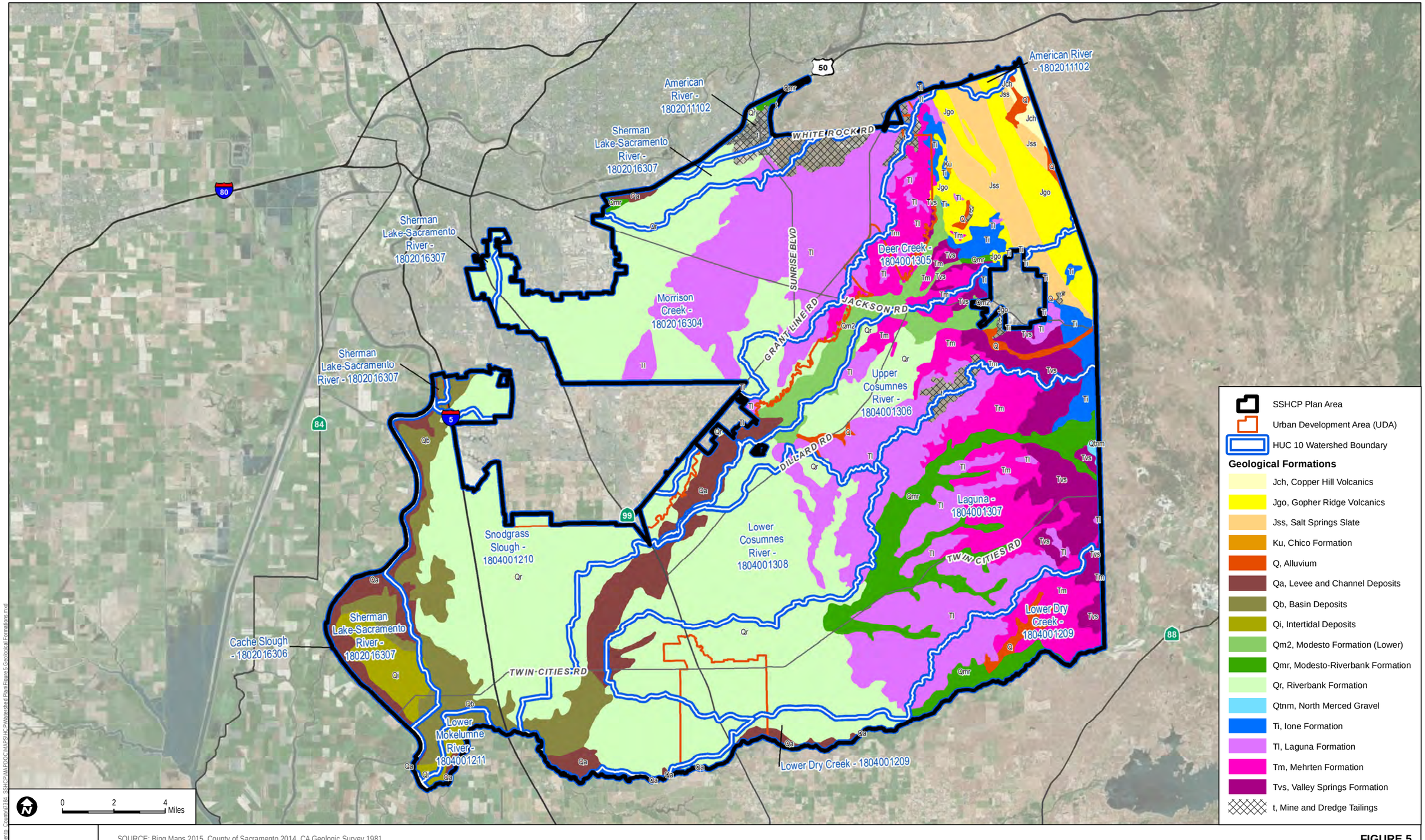
FIGURE 4

Hydrology

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento_County\7294_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Figure 4 Hydrology.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7160_SSHCP\MAPDOC\MAPS\HC\Watershed Plan\Figure 5 Geological Formations.mxd

SOURCE: Bing Maps 2015, County of Sacramento 2014, CA Geologic Survey 1981

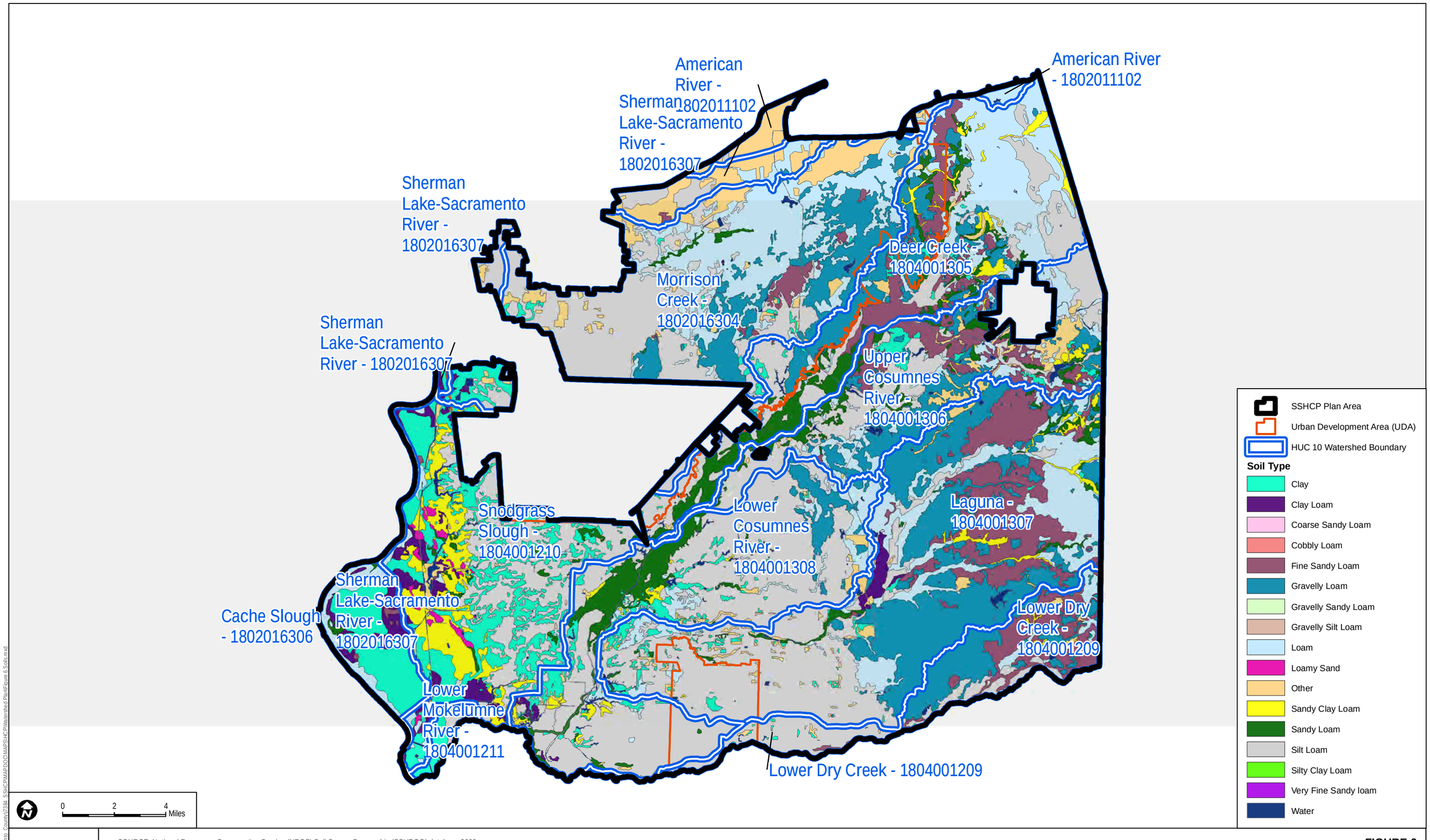
DUDEK

FIGURE 5

Geological Formations

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

INTENTIONALLY LEFT BLANK



SOURCE: National Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database 2009

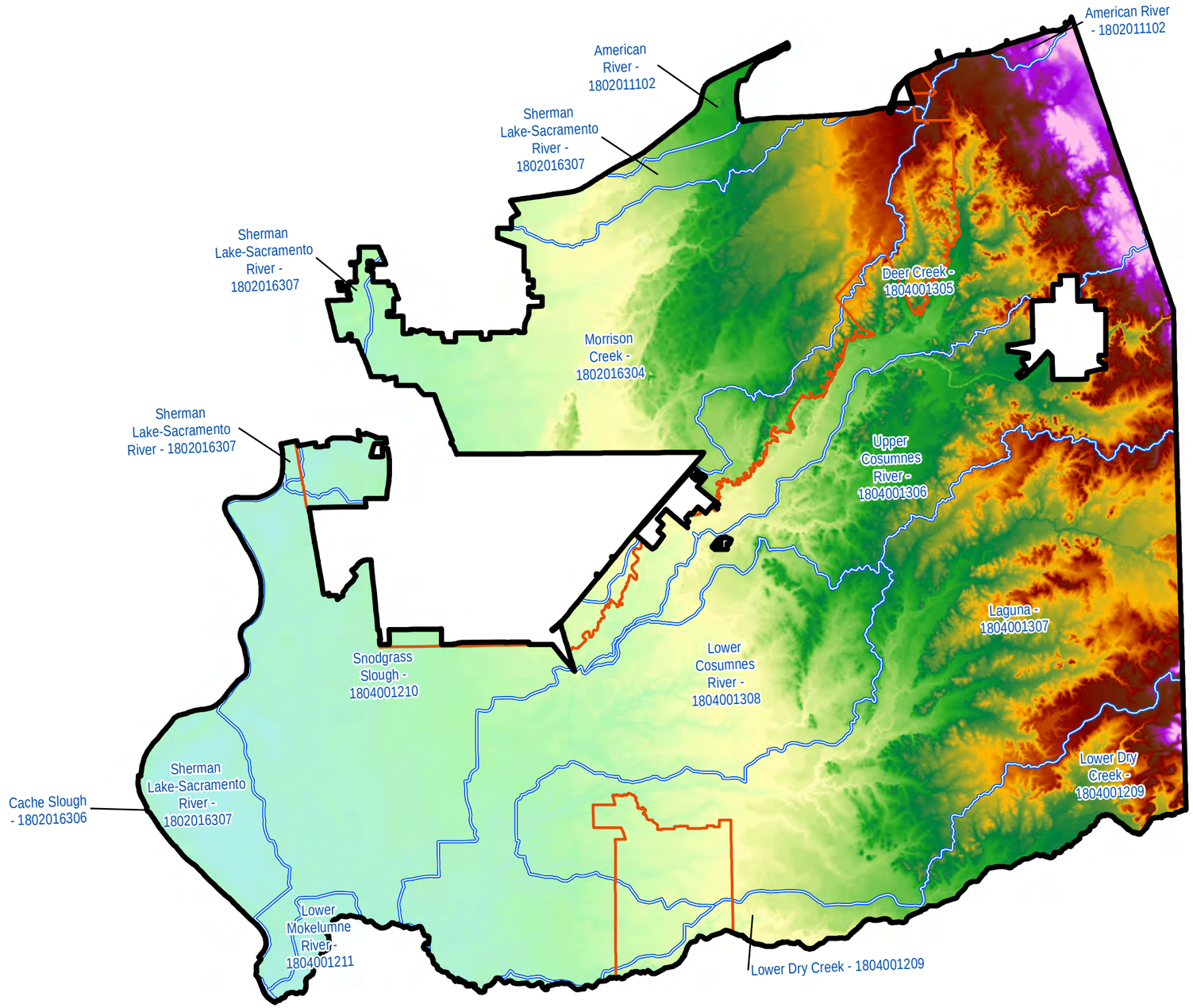
DUDEK

FIGURE 6
Soils

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento County\7162 - SSHCP\MAPPING\MAPS\HCPWatershed PlanFigure 6 Soils.mxd

INTENTIONALLY LEFT BLANK



SOURCE: USGS National Elevation Dataset (2010)

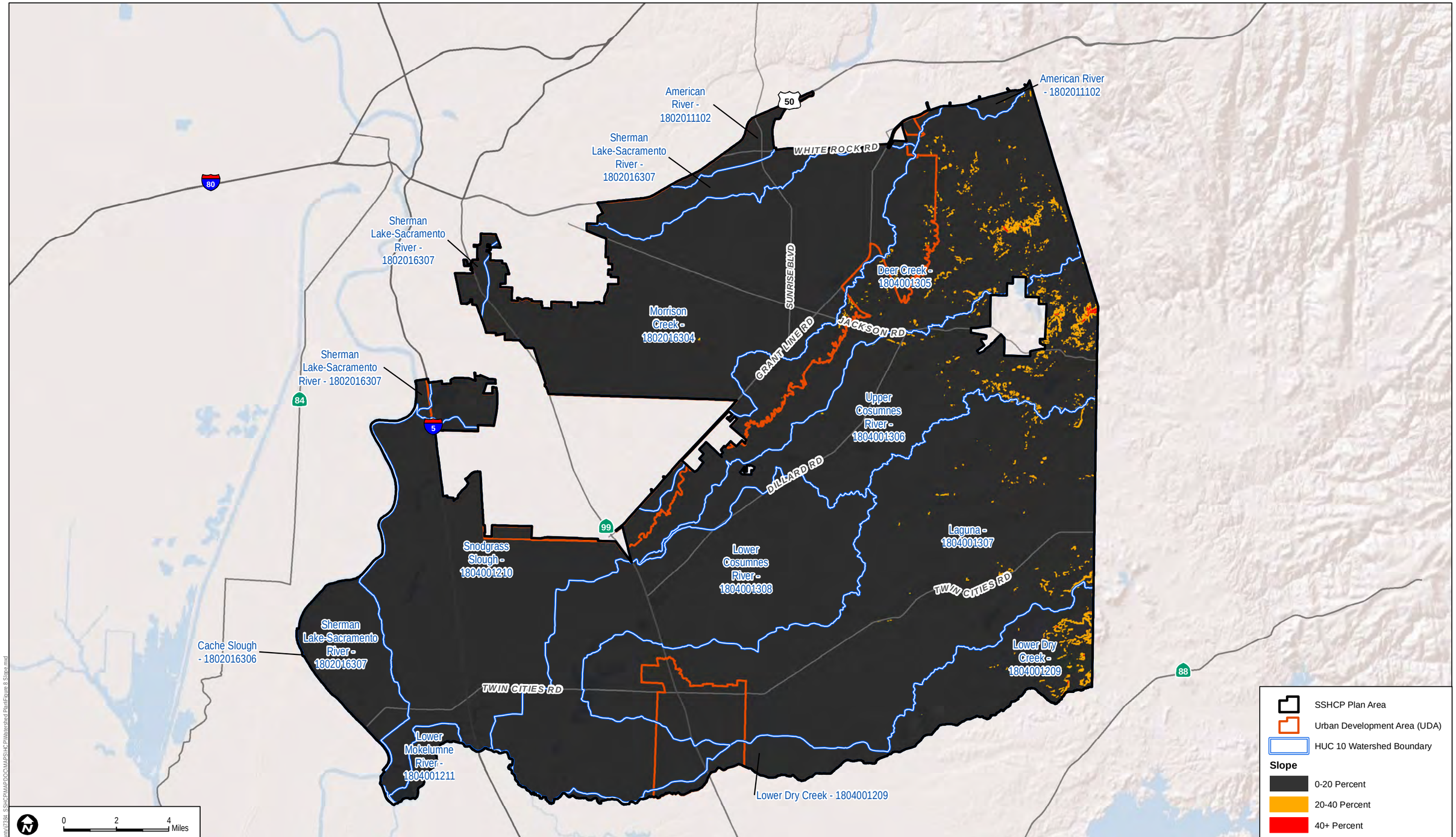
FIGURE 7
Elevation

DUDEK

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento County\7164 SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Figure 7 Elevation.mxd

INTENTIONALLY LEFT BLANK



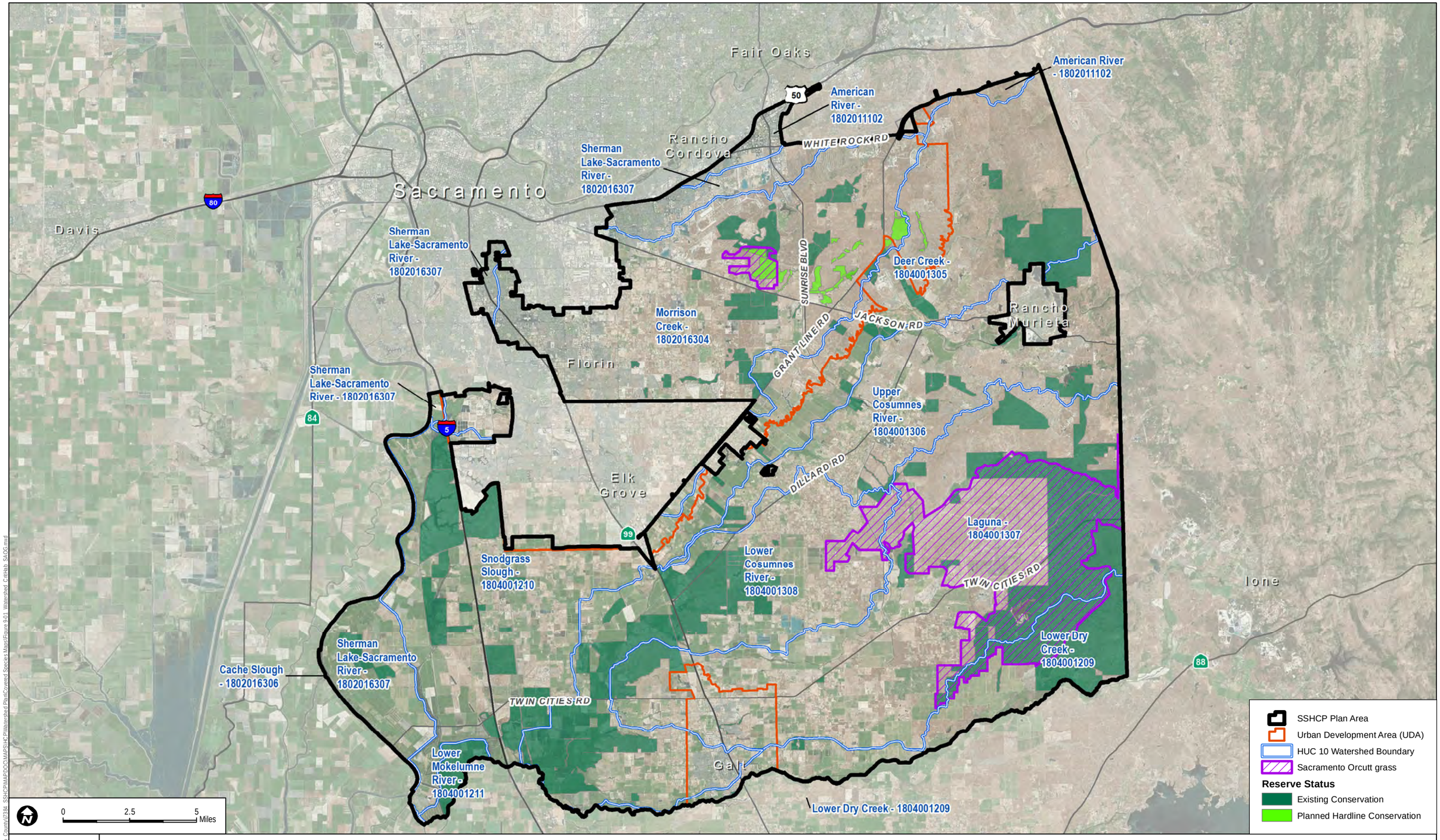
SOURCE: USGS National Elevation Dataset 2012

FIGURE 8
Slope

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento_County\7166_SSHCP\MAPDOC\MXD\SHC PlWatershed PlanFigure 8 Slope.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-1

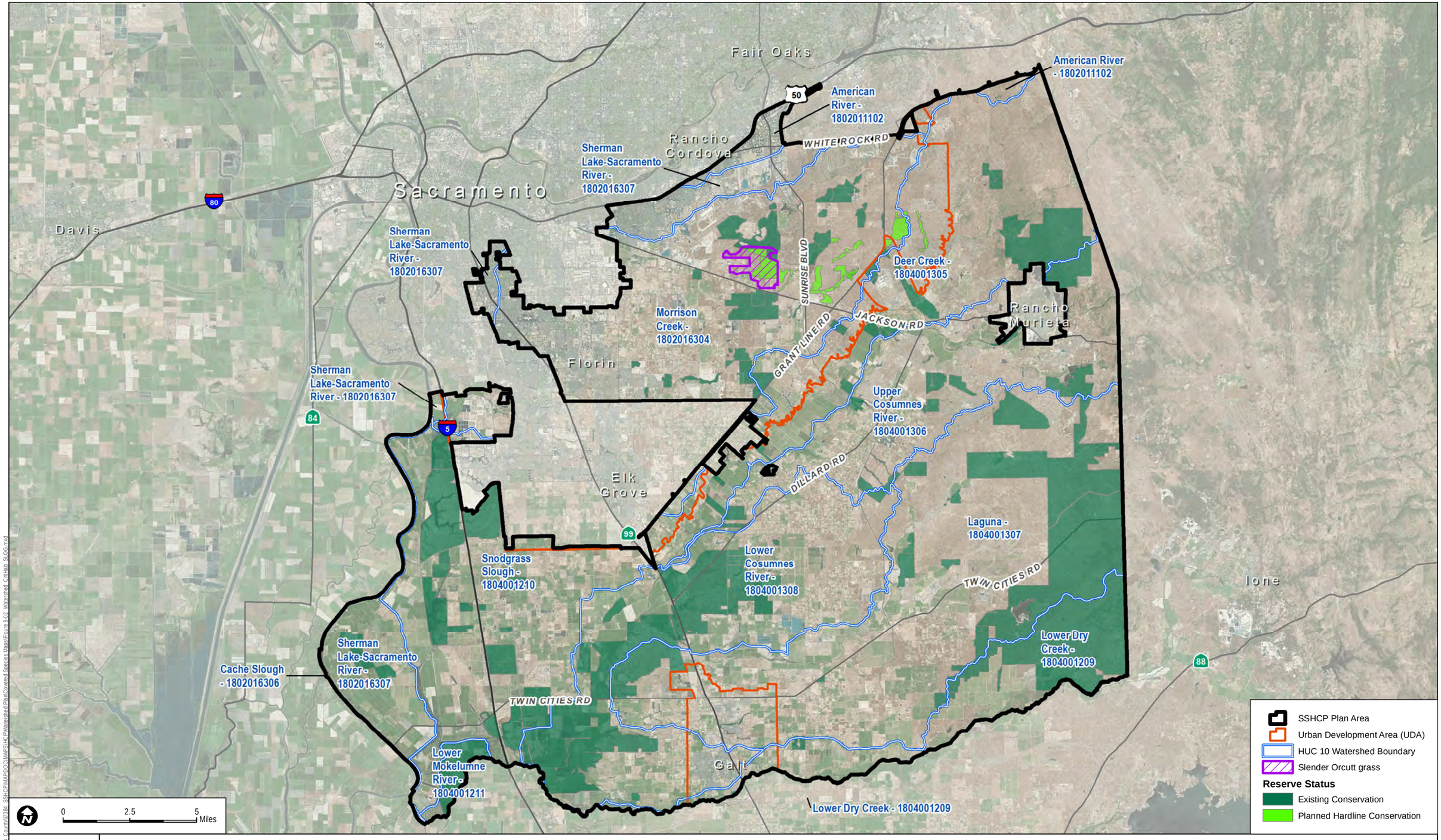
Critical Habitat for Sacramento Orcutt Grass

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

Path: Z:\Projects\Sacramento_County\2394_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-01_Watershed_CritHab_SAOG.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-2

Critical Habitat for Slender Orcutt Grass

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

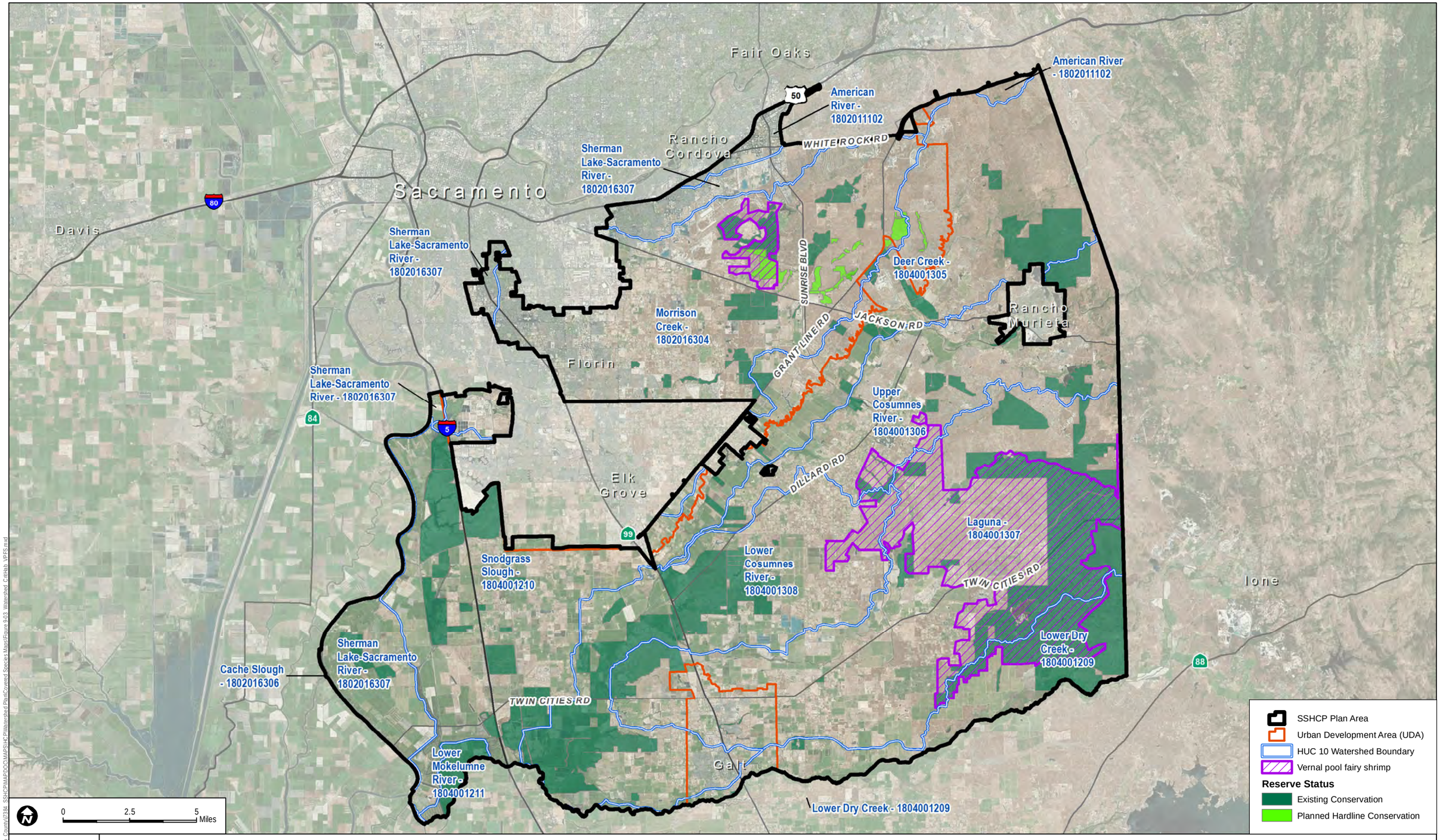
Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPS\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-02_Watershed_CritHab_SLO.mxd

AGENDA ITEM 11.1

7170

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPS\MXD\HCP\Watershed Plan\Covered Species Maps\Figure 9-03_Watershed_CritHab_VPFS.mxd

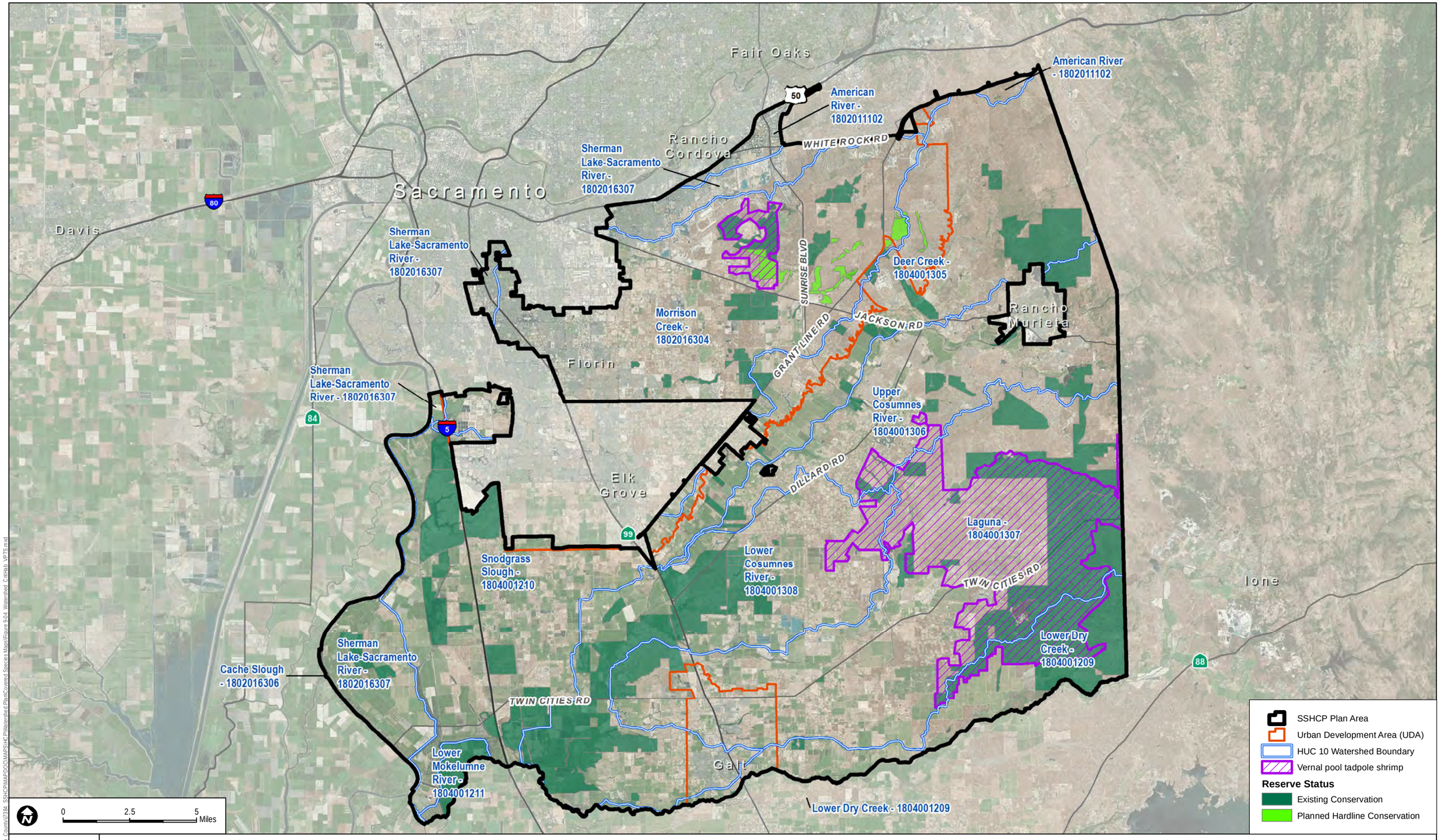
SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-3

Critical Habitat for Vernal Pool Fairy Shrimp

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-4

Critical Habitat for Vernal Pool Tadpole Shrimp

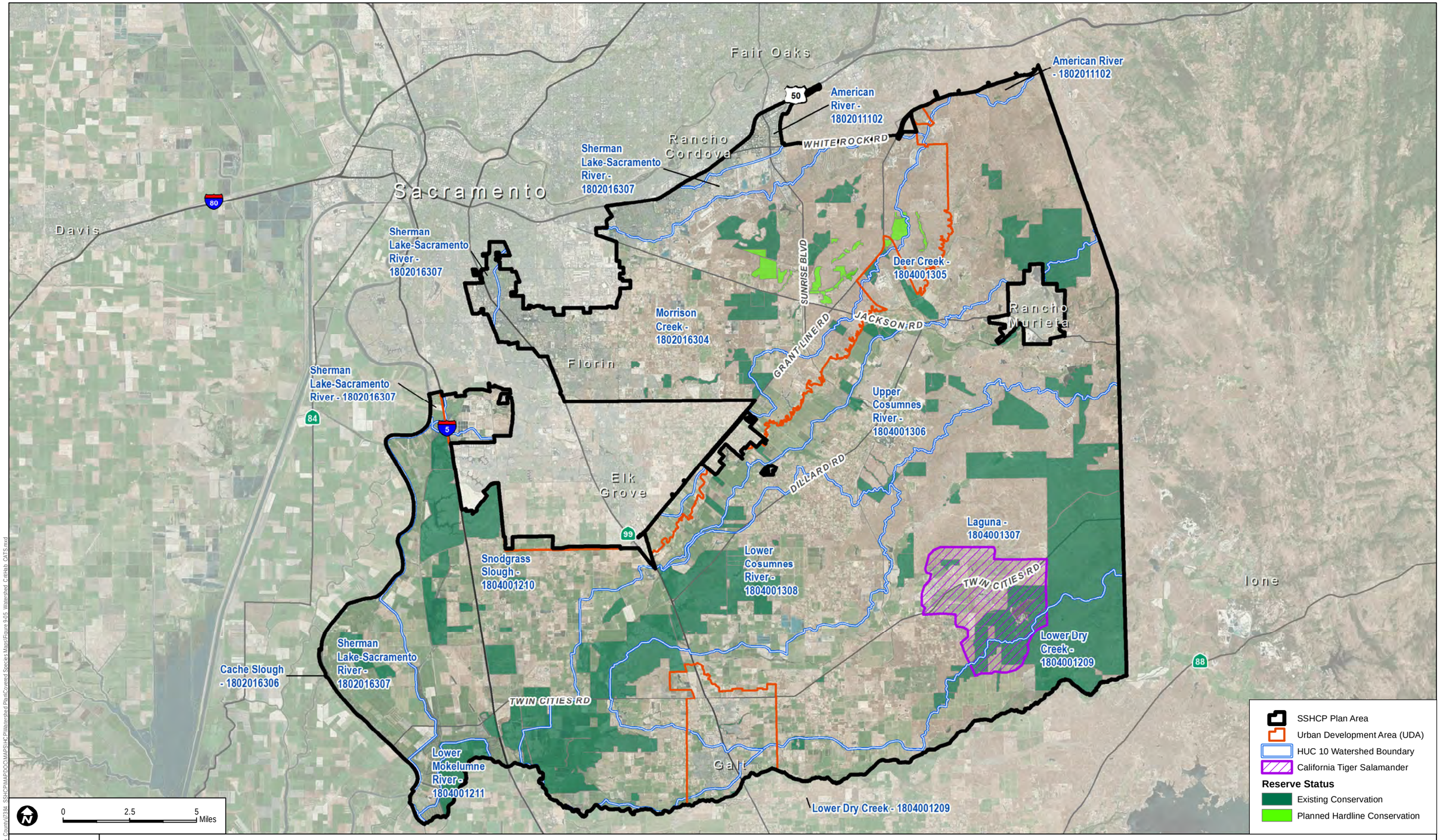
Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

Path: Z:\Projects\Sacramento_County\2304_SSHCP\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-04 Watershed_CritHab_VPTS.mxd

AGENDA ITEM 11.1

7174

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, USGS 2013 NHD, USFWS 2012

FIGURE 9-5

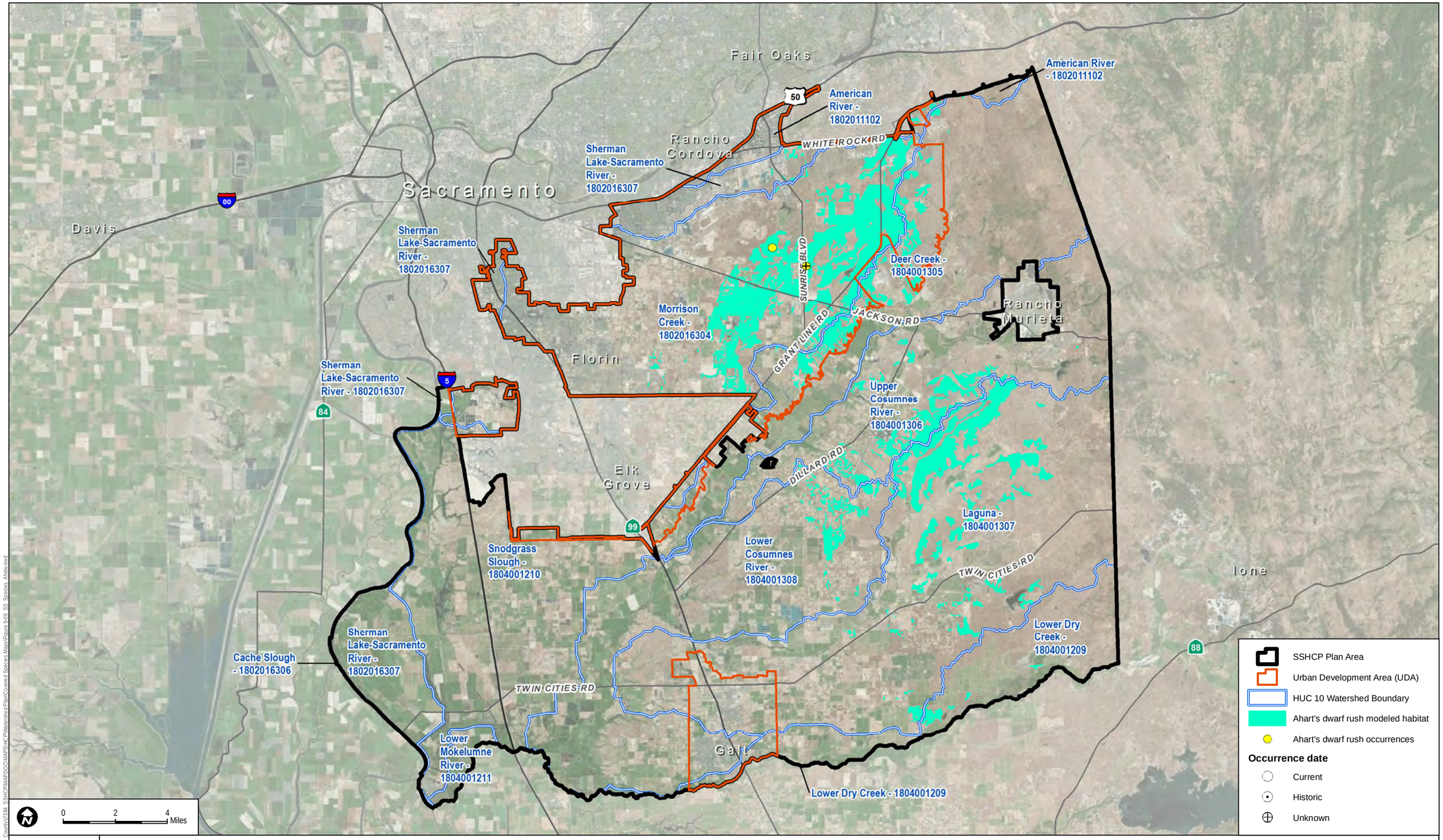
Critical Habitat for California Tiger Salamander

Figure depicts existing preserves and hard-line planned conservation only. For a description of soft-line planned conservation see Sections 7.5.2 and 7.5.3 of the HCP.

Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPS\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-05_Watershed_CATtiger_CATS.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CNDDB 2012, USGS 2013 NHD

FIGURE 9-6

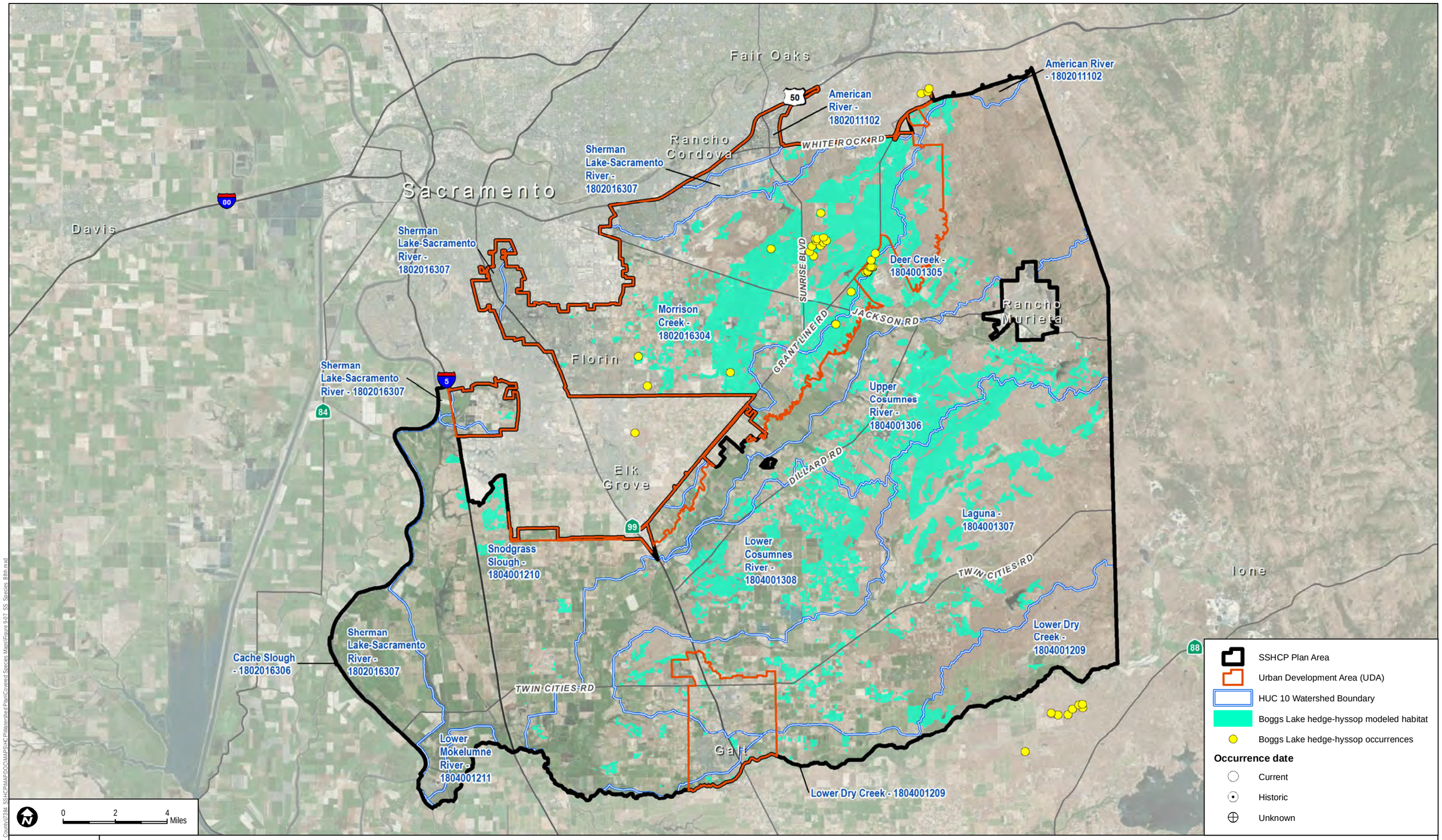
Ahart's Dwarf Rush Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7178_SSHCP\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-06_SS_Species_Ahart.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, CDFG 2012, Sugnet & Associates 1993, Jones & Stokes 1990, USGS 2013 NHD

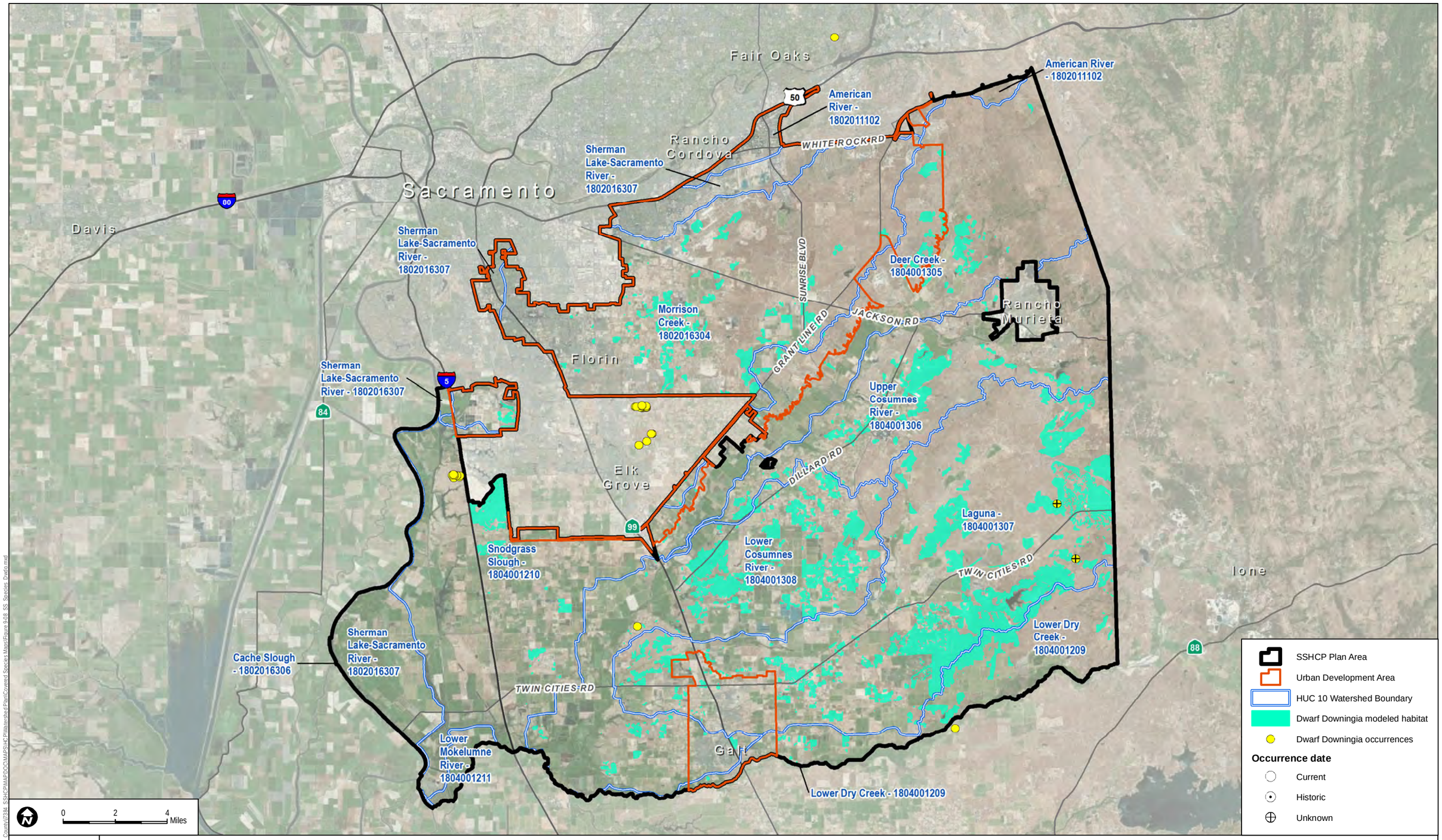
FIGURE 9-7

Boggs Lake Hedge-Hyssop Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7180_SSHCP\MAPDOC\MAPS\HCP\Watershed\PlanCovered Species Maps\Figure 9-07_SS_Species_Bhh.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2015
CDFG 2012, Gibson & Skordal 1994, TNC, USGS 2013 NHD

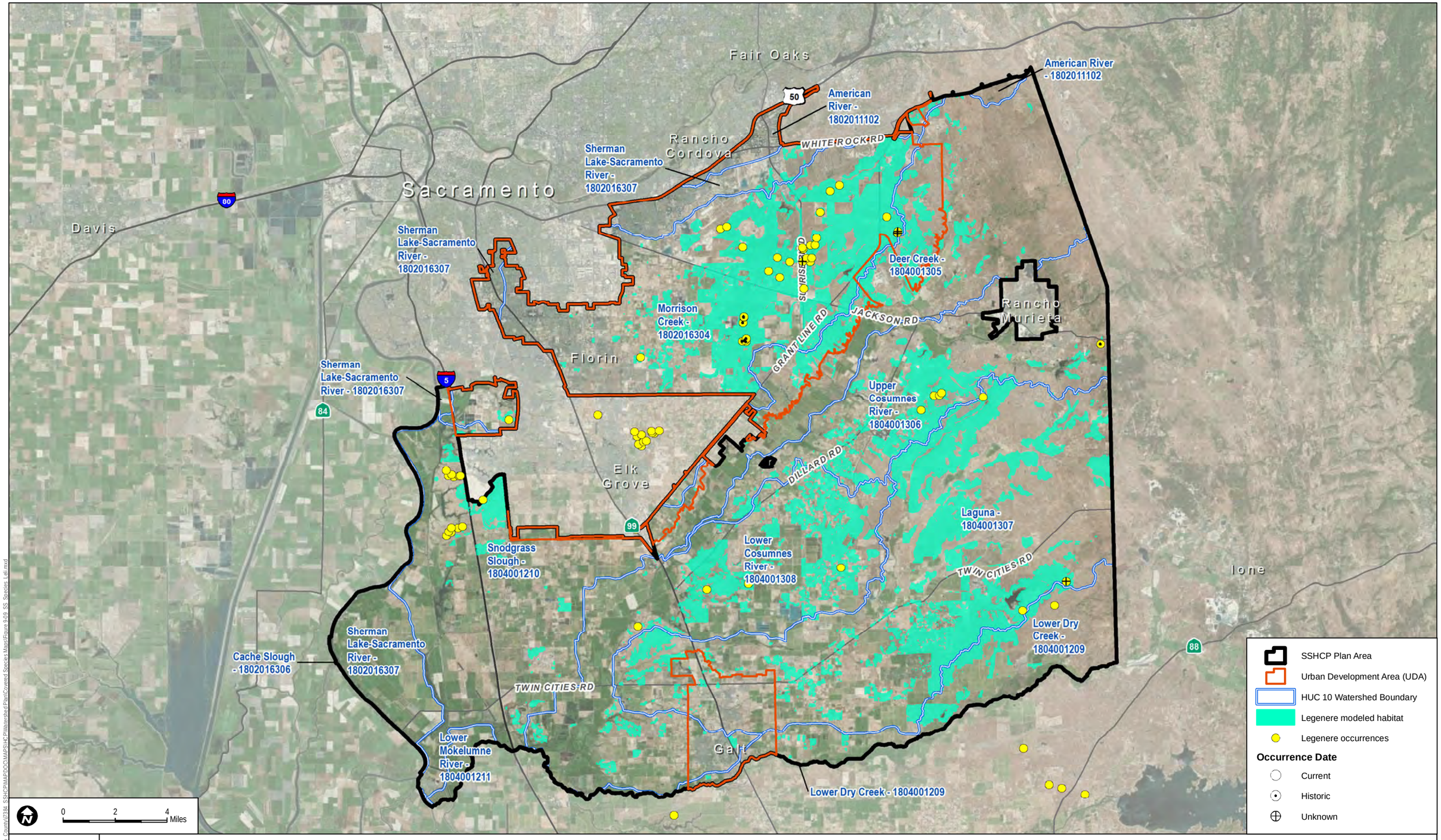
FIGURE 9-8

Dwarf Downingia Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7182_SSHCP\MAPDOC\MAPS\HCP\Watershed\PlanCovered Species Maps\Figure 9-08_SS_Species_Dwrf.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CDFG 2012, USGS 2013 NHD

FIGURE 9-9

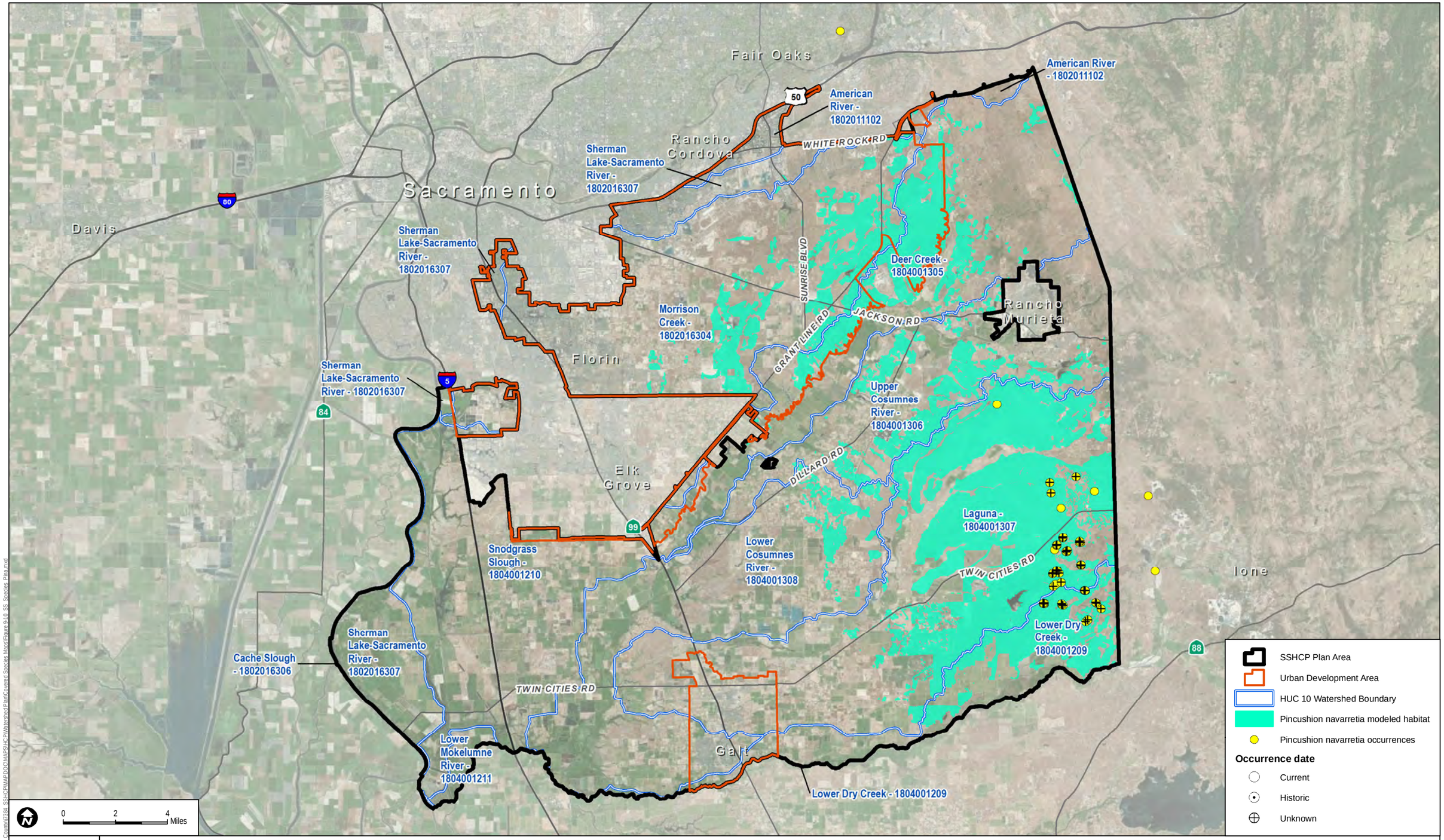
Legenere Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\72084_SSHCP\MAPPING\MAPS\HCP\WatershedPlan\Covered Species Maps\Figure 9-09_SS_Species_Leli.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2015, CDFG 2012, TNC, USGS 2013 NHD

FIGURE 9-10

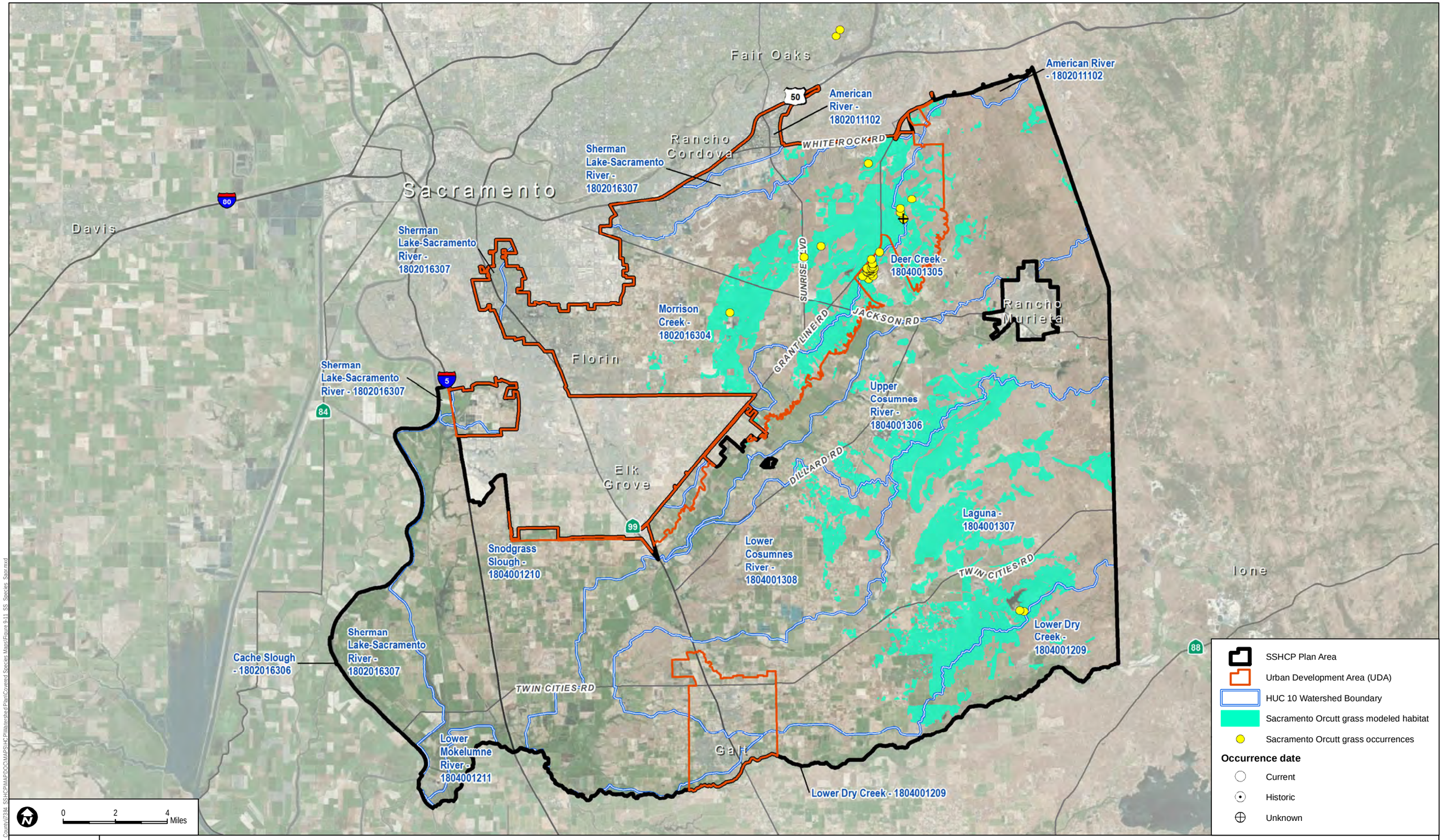
Pincushion Navarretia Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPDOC\MAPS\HCP\WatershedPlan\CoveredSpecies Maps\Figure 9-10_SS_Species_Prim.mxd

AGENDA ITEM 11.1

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

FIGURE 9-11

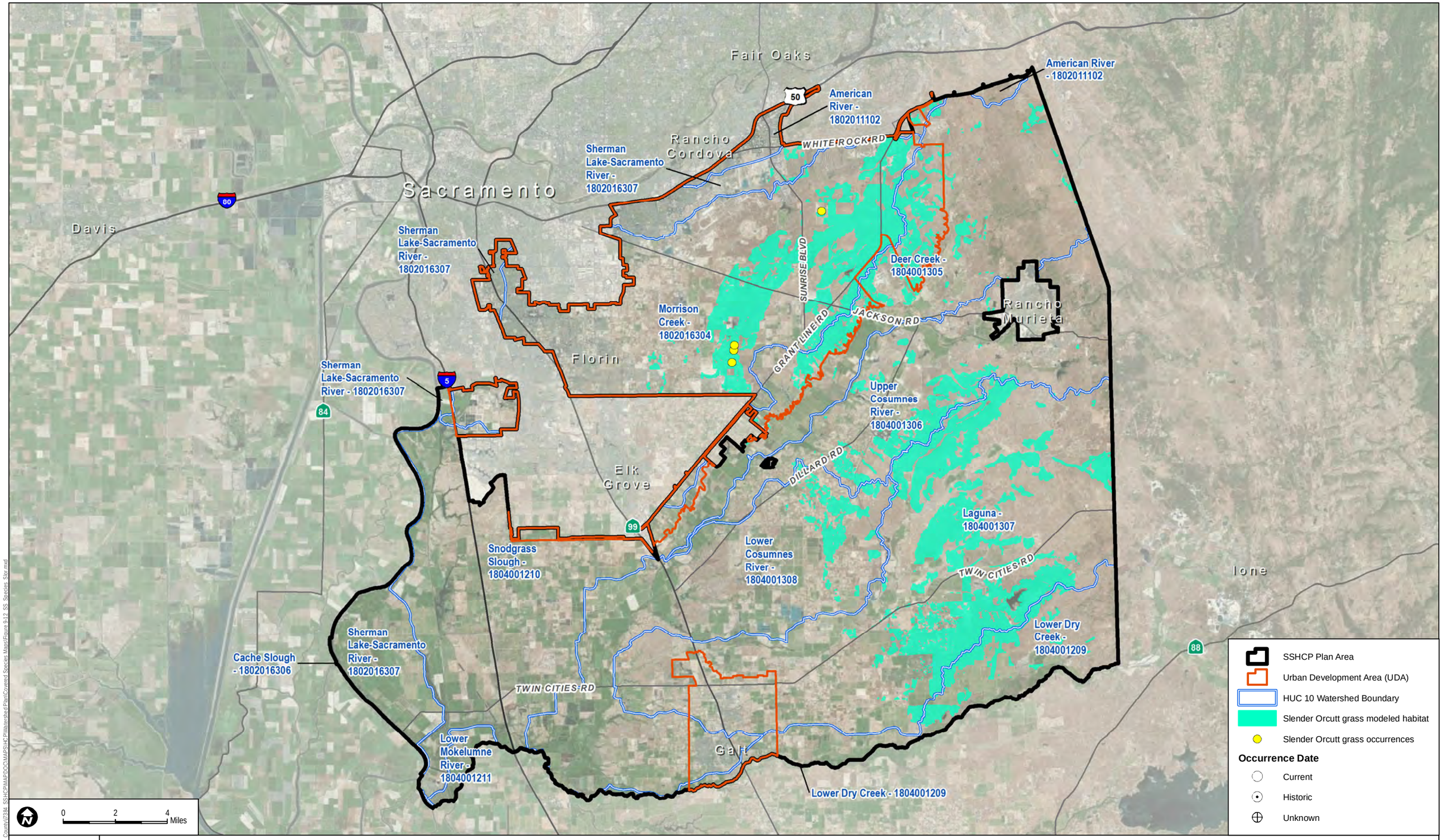
Sacramento Orcutt Grass Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7188_SSHCP\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-11_SS_Species_Sacr.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

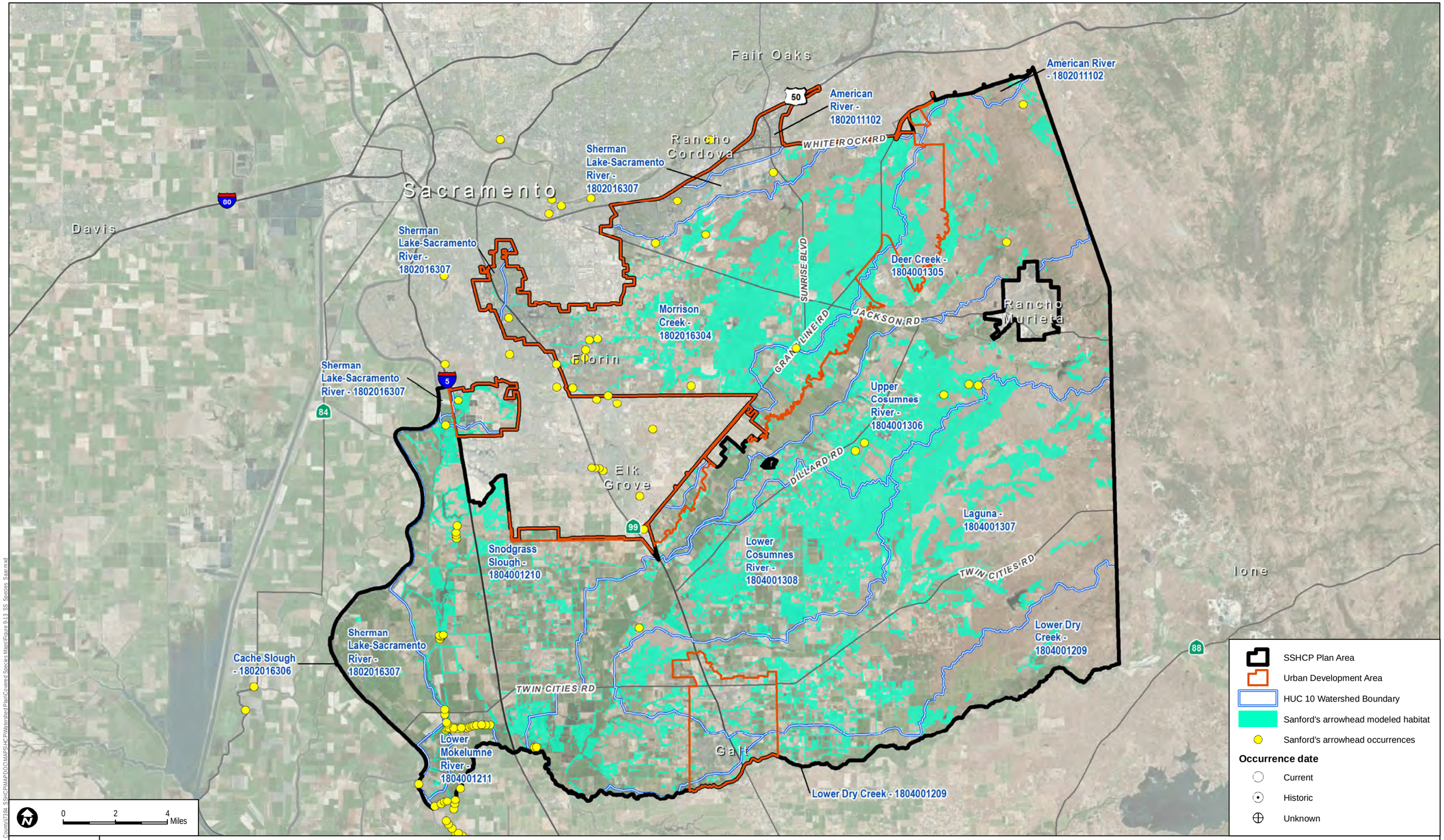
FIGURE 9-12

Slender Orcutt Grass Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7190_SSHCP\MAPS\MXD\WatershedPlan\Covered Species Maps\Figure 9-12_SS_Species_Str.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

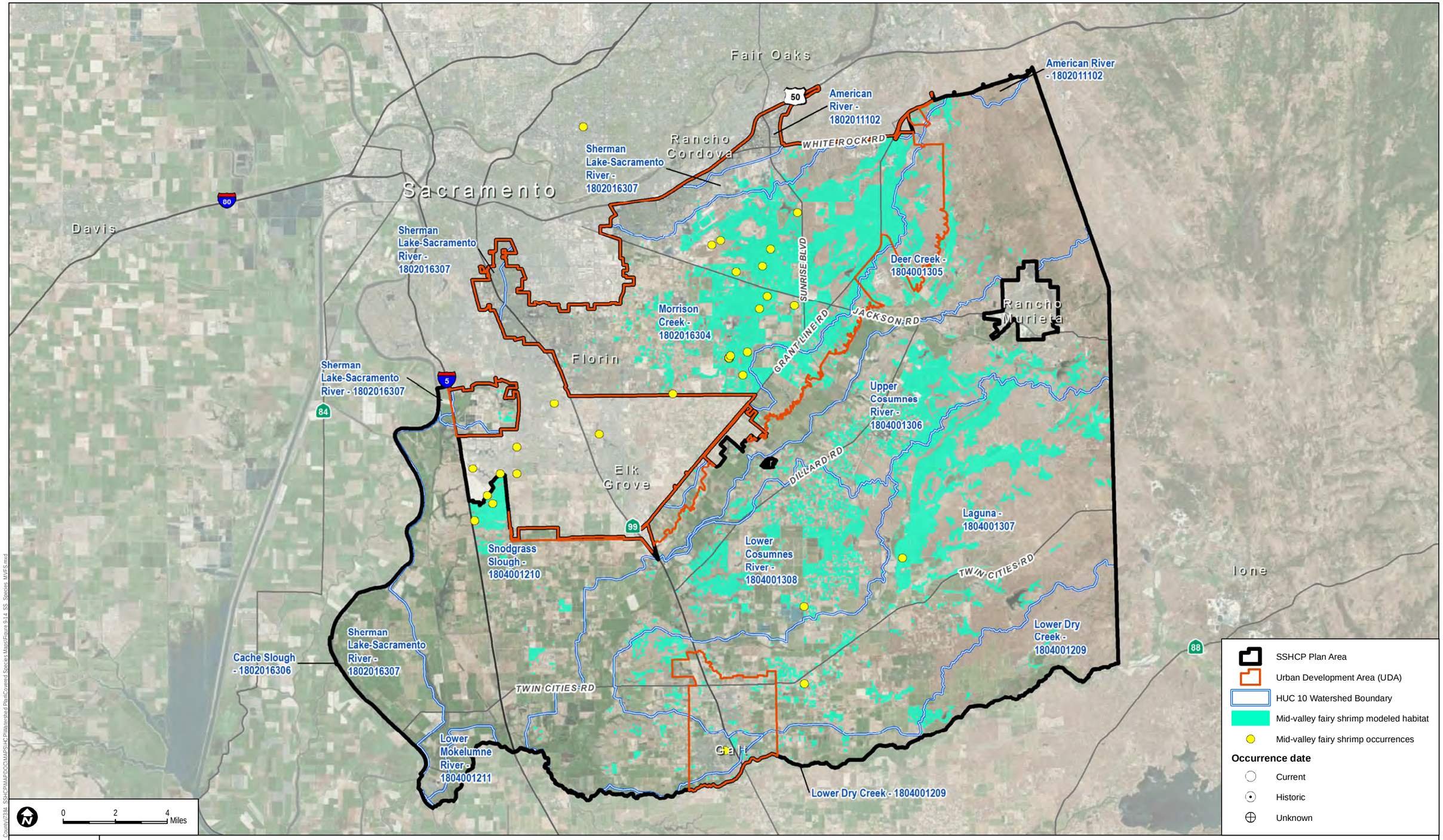
FIGURE 9-13

Sanford's Arrowhead Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2384_SSHCP\MAPDOC\MAPS\HCP\WatershedPlan\Covered Species Maps\Figure 9-13_SS_Species_Sanford.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, Foothill Associates 2010, Kassis-Sylva 2011, Vollmar 2012, USGS 2013 NHD

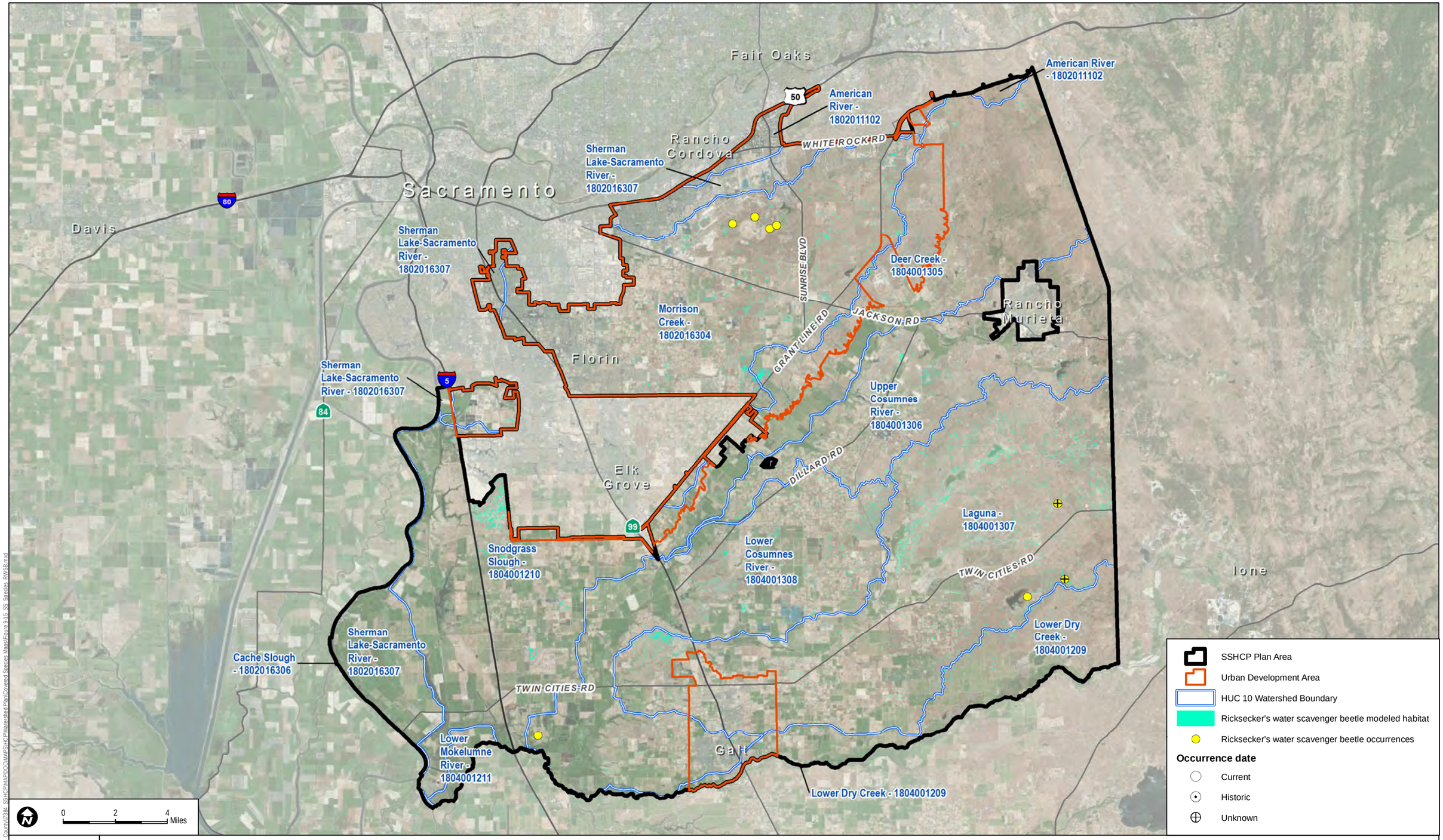
FIGURE 9-14

Midvalley Fairy Shrimp Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\203d_SSHCP\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-14_SS_Species_MVFS.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, Chris Rogers 2000, TNC, USGS 2013 NHD

FIGURE 9-15

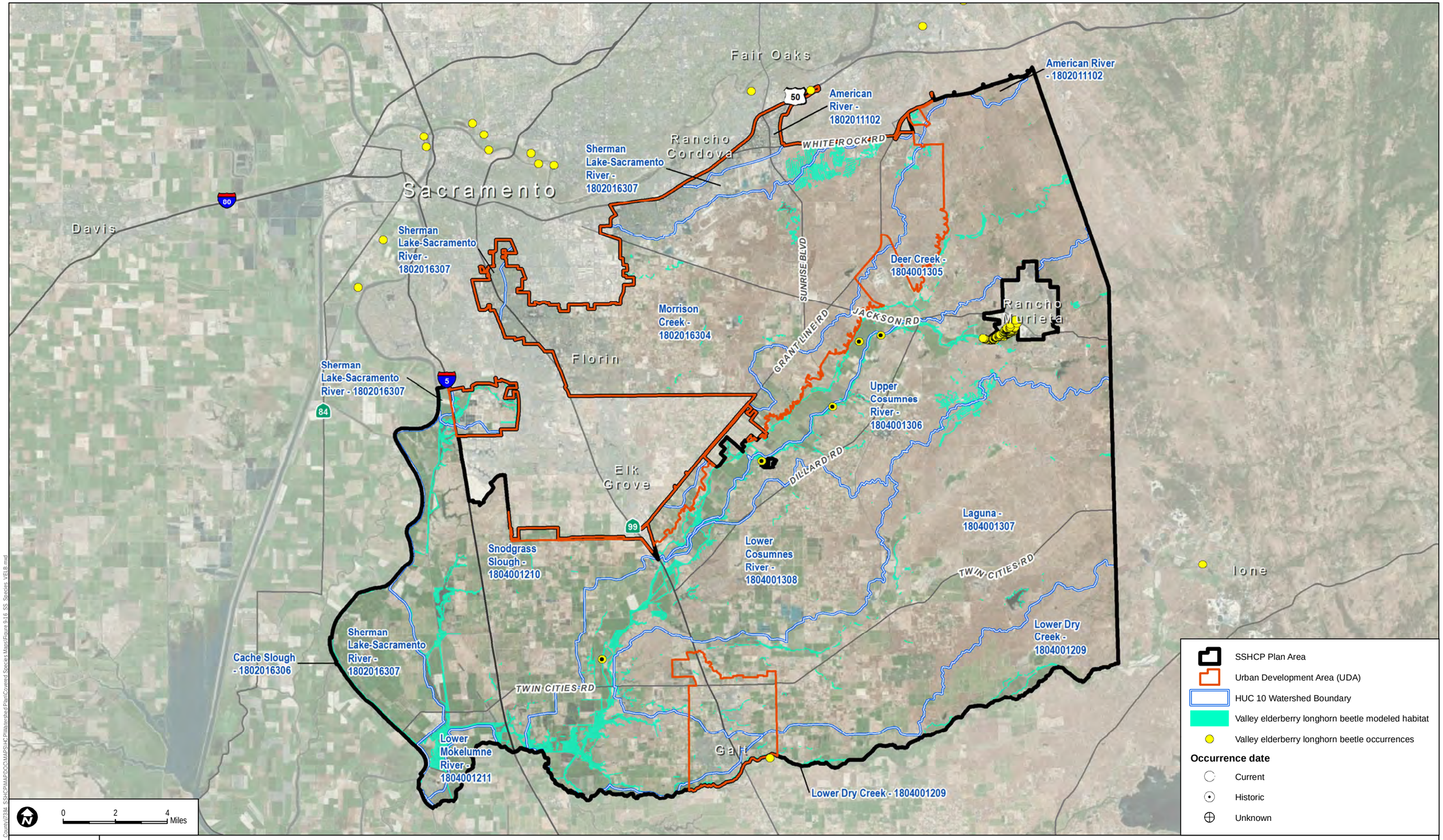
Ricksecker's Water Scavenger Beetle Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7196_SSHCP\MAPS\MXD\SSHCPWatershedPlan\Covered Species Maps\Figure 9-15_SS_Species_RWSB.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, T. Talley 2003, USGS 2013 NHD

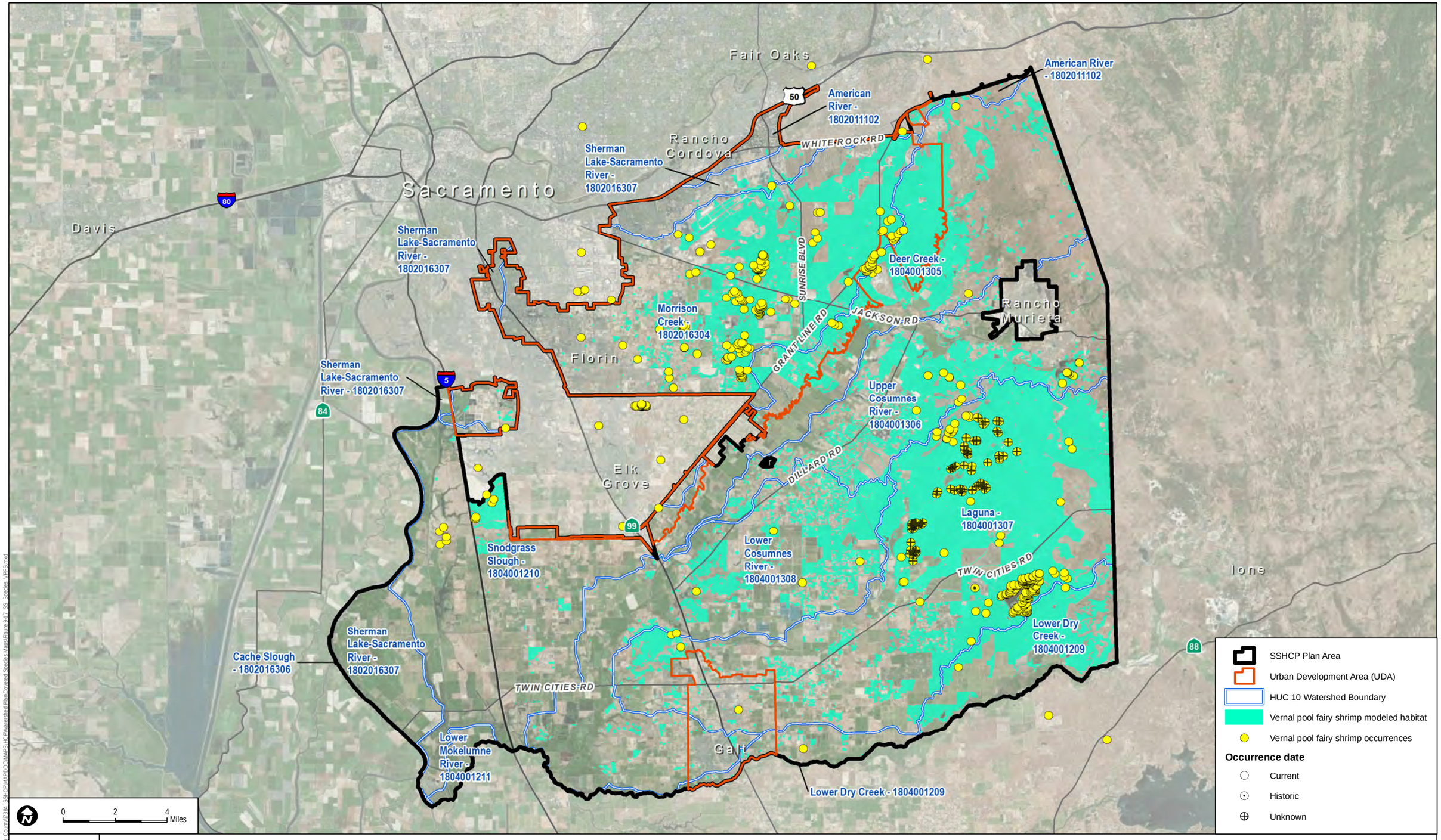
FIGURE 9-16

Valley Elderberry Longhorn Beetle Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7198_SSHCP\MAPS\MXD\WatershedPlan\Covered Species Maps\Figure 9-16_SS_Species_VELB.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\2394_SSHCP\MAPPING\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-17_SS_Species_VPFS.mxd

SOURCE: Bing Maps 2015, County of Sacramento 2014, CDFG 2012, C. Witham 2011, ECORP 2009, EcoAnalysts 2008, Foothill Associates 2011, Helm 2007, Kassis-Sylva 2011, Gibson & Skordal 1994, Sugnet 1996, Richard Hill 1999 Kiefer 2011, LSA 2011, Vollmar 2011, USFWS 2014, Wildlands 2010, USGS 2013 NHD

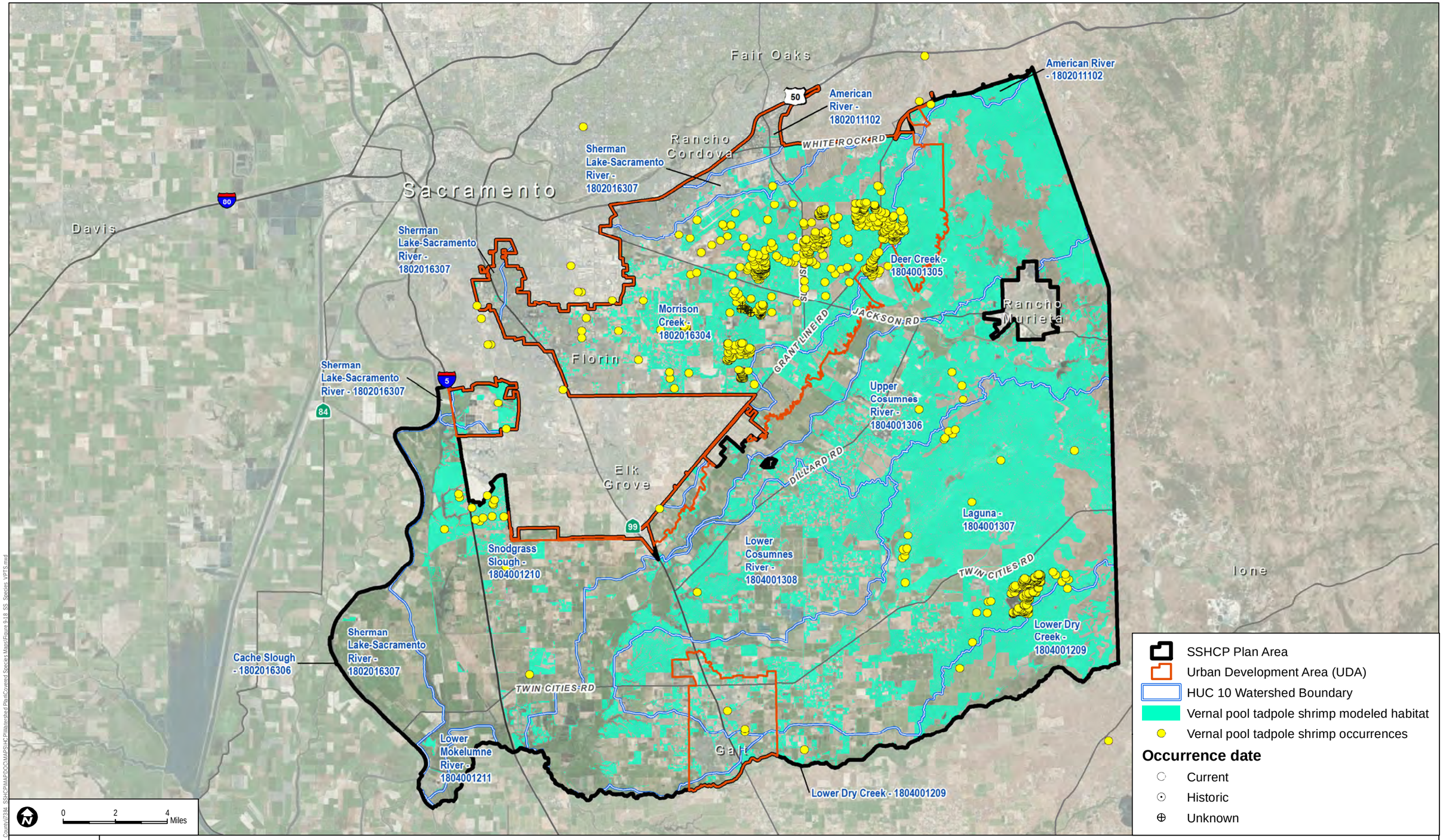
DUDEK

FIGURE 9-17

Vernal Pool Fairy Shrimp Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, C. Witham 2011, C. Little 2011,ECORP 2012, EcoAnalysts 2008, Foothill Associates 2011, Gibson & Skordal 2011, Helm 2011, Richard Hill 1999, Sugnet & Associated 1997, Kassiss-Sylva 2011, Kiefer 2011, LSA 2009, USFWS 2014, Vollmar 2011, Wildlands 2010, USGS 2013 NHD

DUDEK

FIGURE 9-18

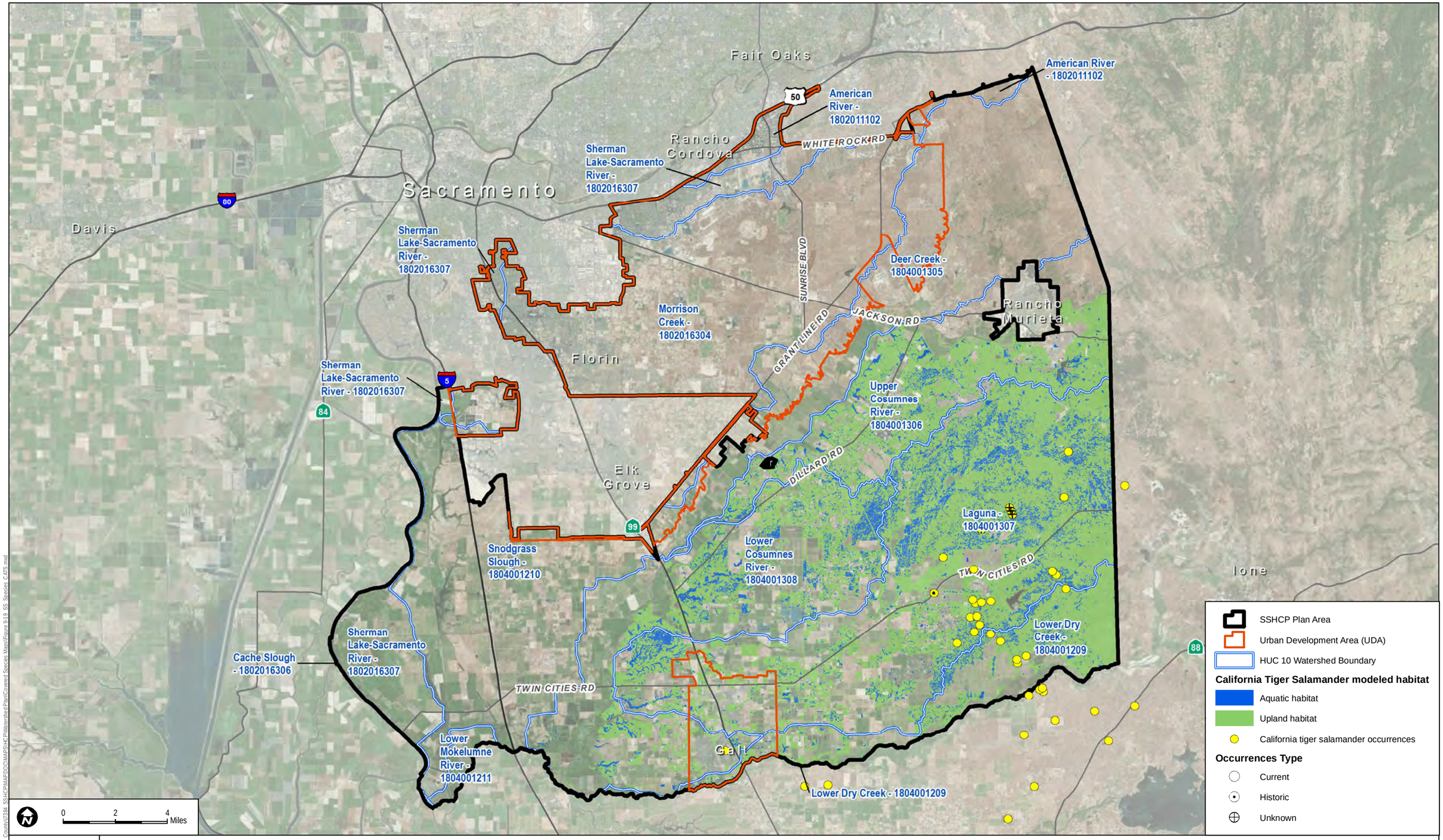
Vernal Pool Tadpole Shrimp Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7202_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-18_SS_Species_VPTS.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, USGS 2013 NHD

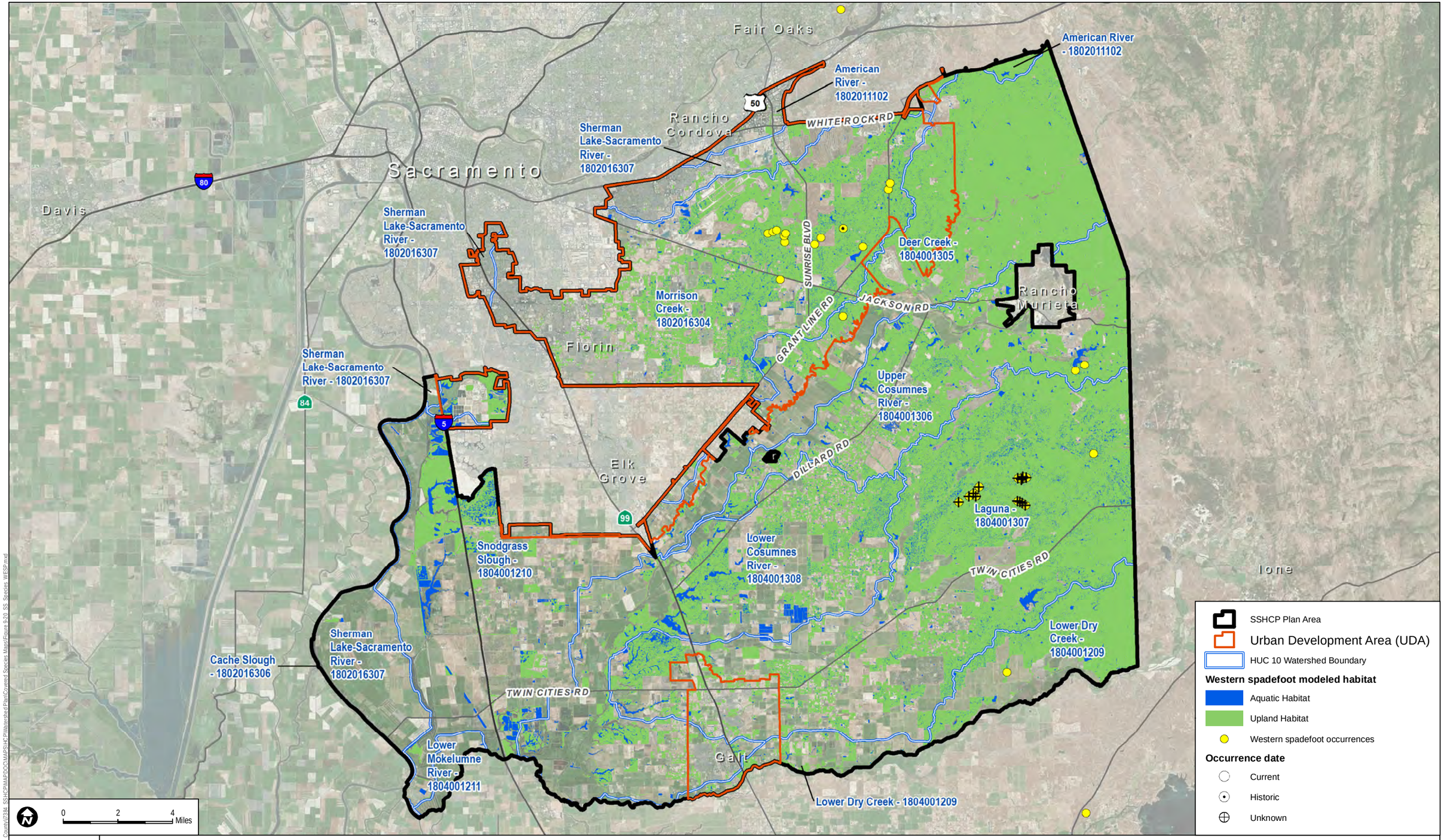
FIGURE 9-19

California Tiger Salamander Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7204_SSHCP\MAPDOC\MAPS\HCP\Watershed\PlanCovered Species Maps\Figure 9-19_SS_Species_CATS.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CNDDB 2012, CNPS 1999, USGS 2013 NHD

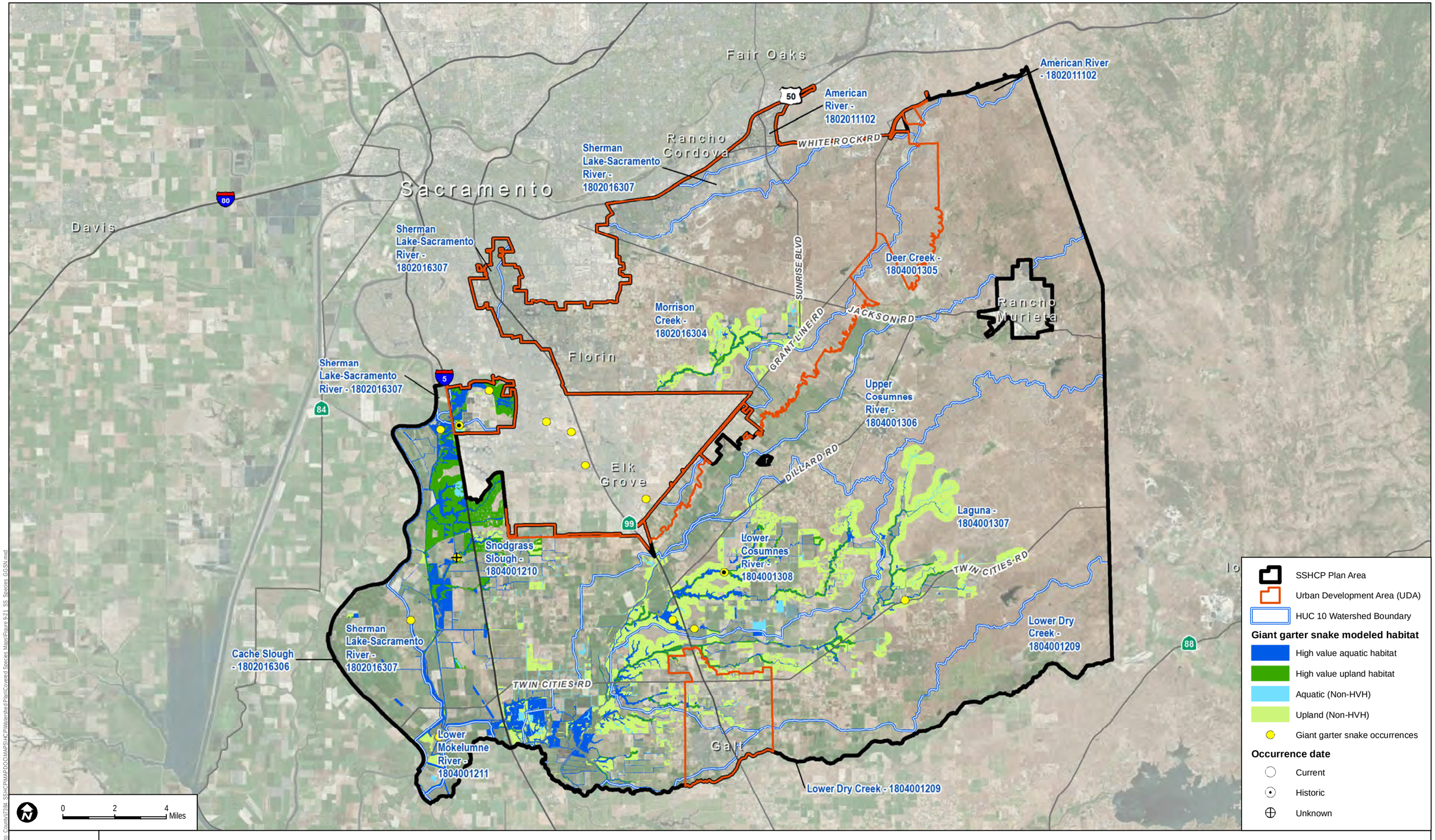
FIGURE 9-20

Western Spadefoot Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7206_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-20_SS_Species_WESP.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7208_SSHCP\MAPDOC\MXD\SHCP\Watershed Plan\Covered Species Maps\Figure 9-21_SS_Species_GGSN.mxd

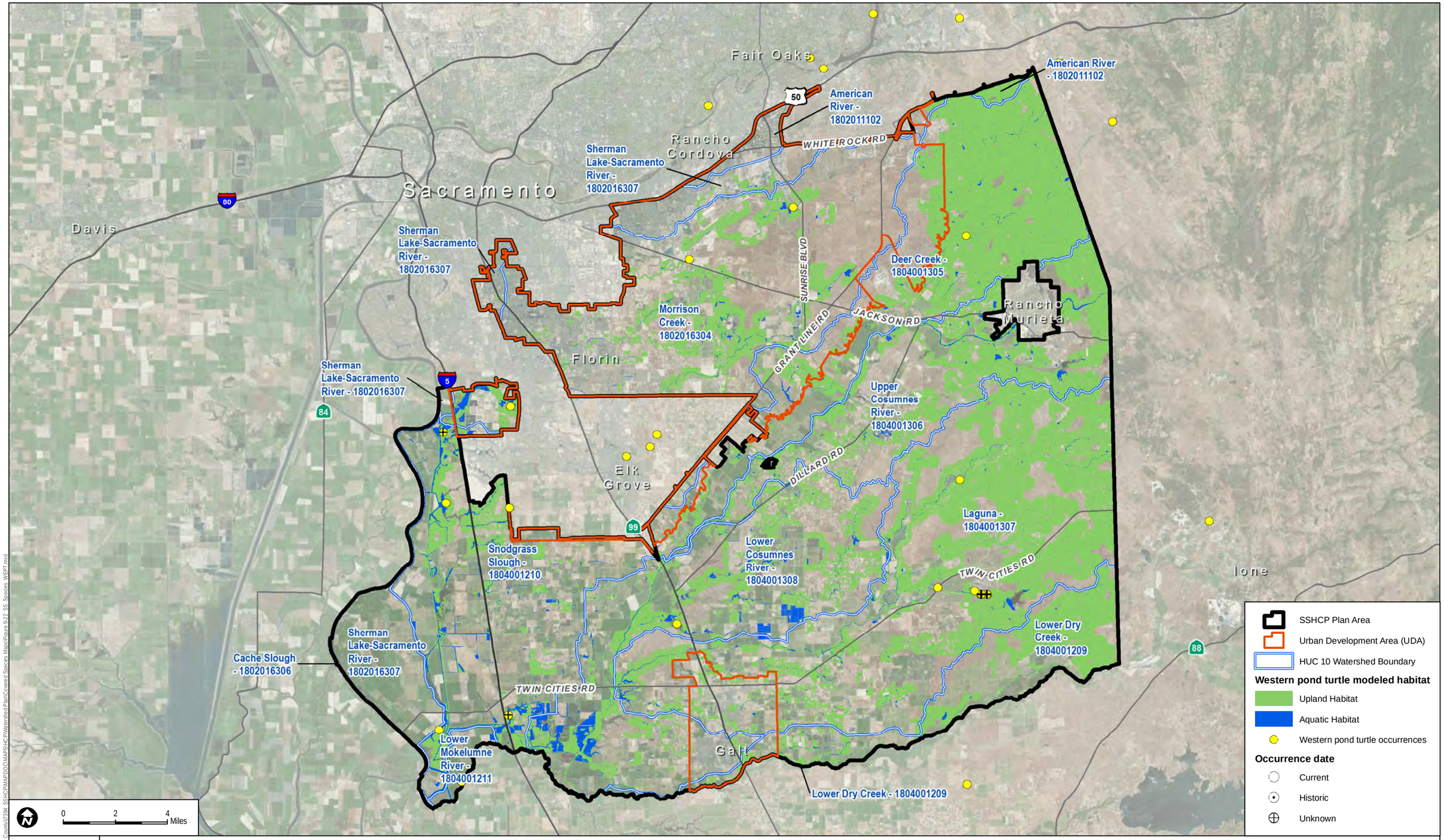
SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, CNPS 1999, USGS 2013 NHD

FIGURE 9-21

Giant Gartersnake Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps 2015, County of Sacramento 2014, USGS 2013 NHD
CDFG 2012, CH2MHILL/Garcia & Associates, EIP Associates

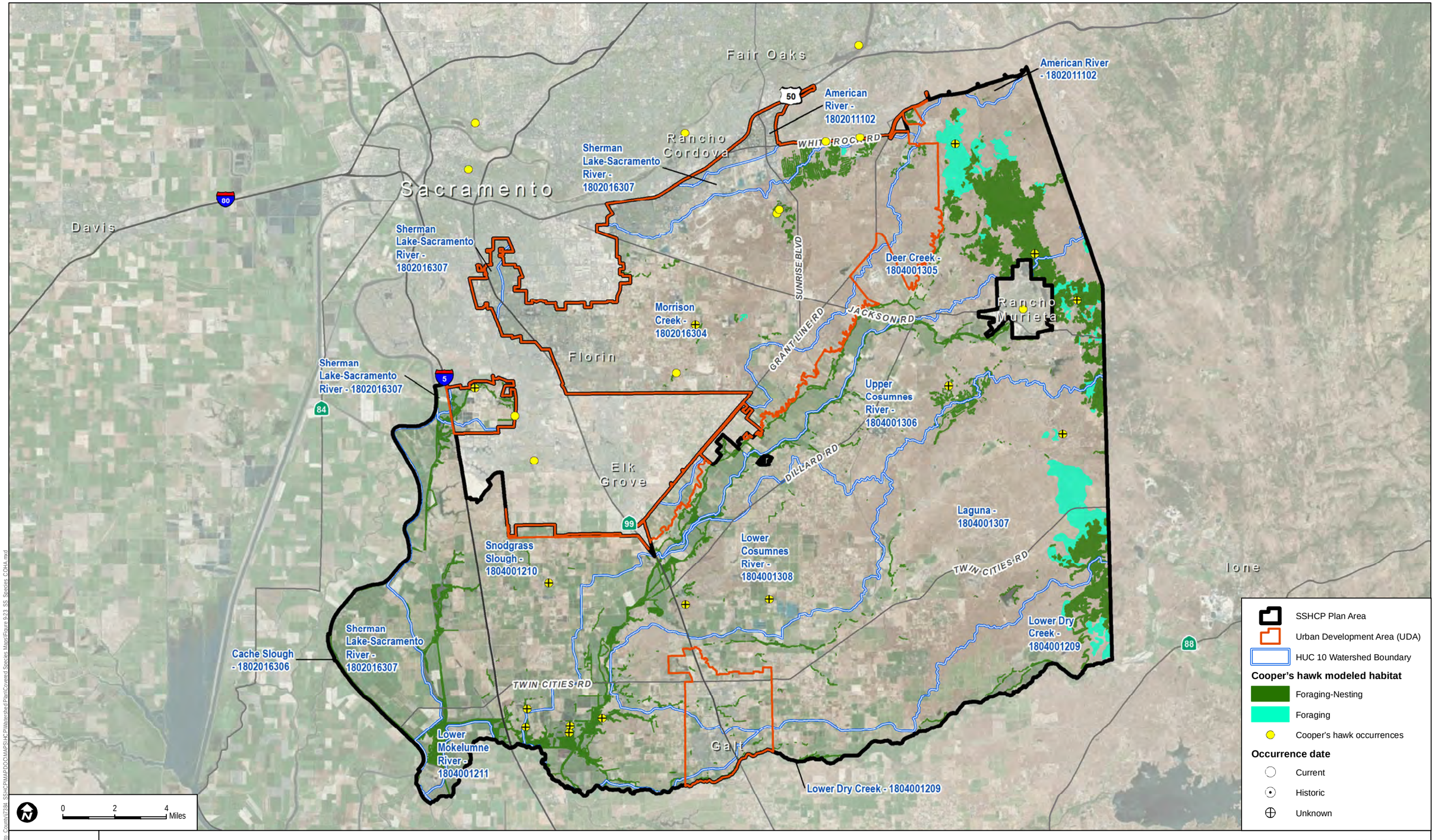
FIGURE 9-22

Western Pond Turtle Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\2284_SSHCP\MAPDOC\MAPS\HCP\WatershedPlan\Covered Species Maps\Figure 9-22_SS_Species_WEPT.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org, USGS 2013 NHD

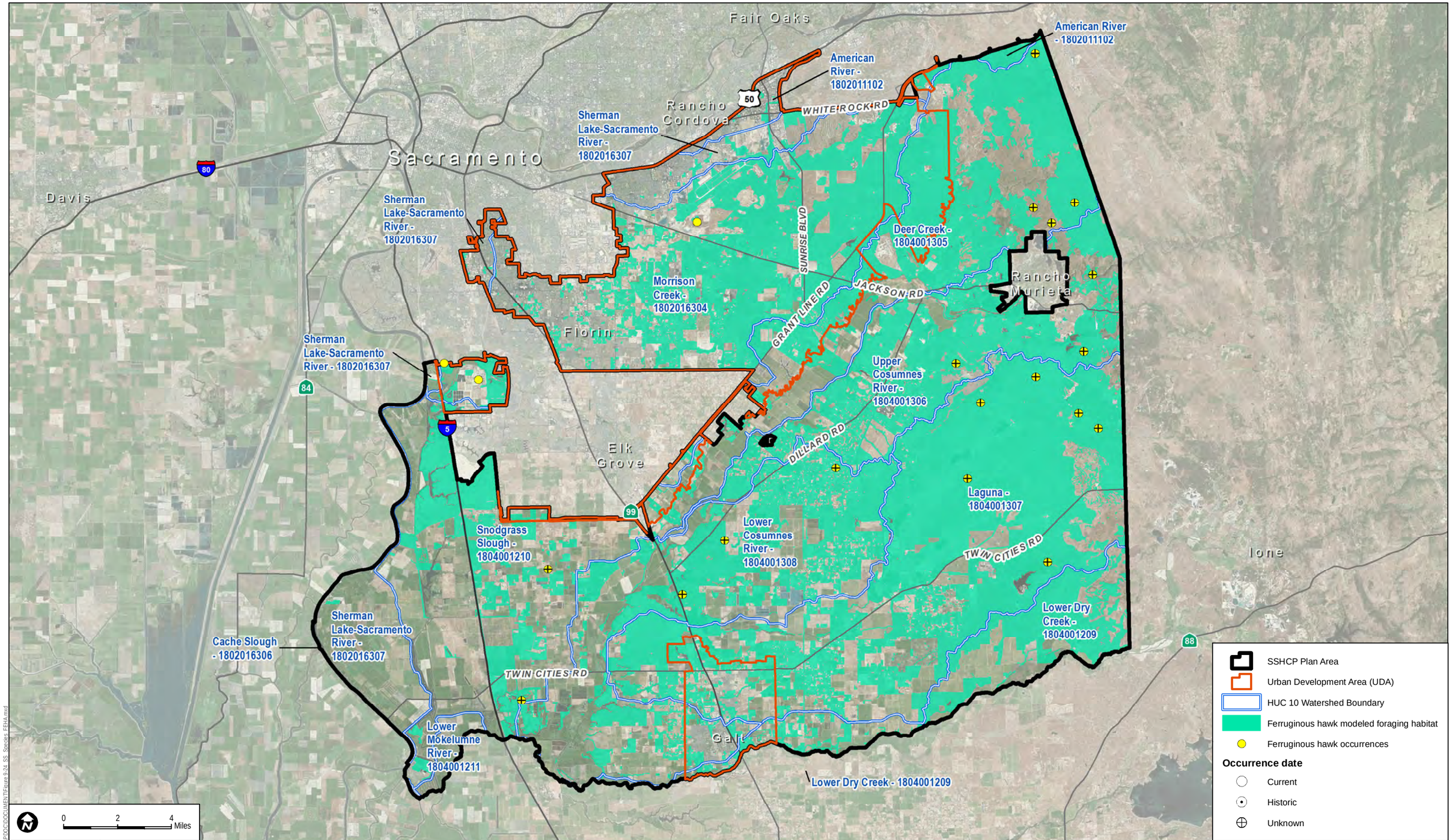
FIGURE 9-23

Cooper's Hawk Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7212_SSHCP\MAPDOC\MAPS\HCPWatershed Plan\Covered Species Maps\Figure 9-23_SS_Species_CCHA.mxd

INTENTIONALLY LEFT BLANK



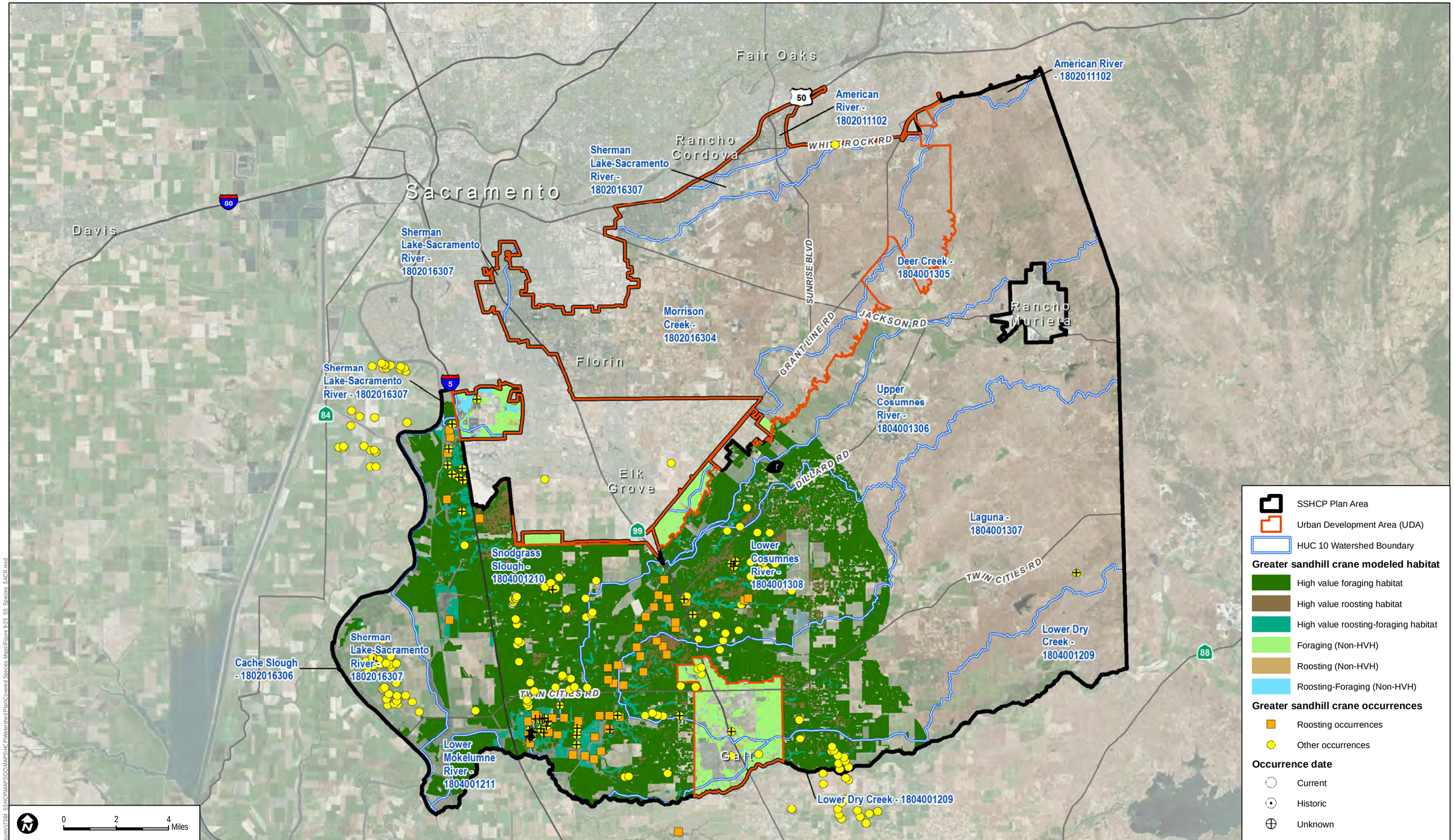
SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ebird.org, USGS 2013 NHD

FIGURE 9-24

Ferruginous Hawk Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, TNC 2000, Ivey 2003, Pogson & Lindstedt 2005, ebird.org, ICF 2013, USGS 2013 NHD

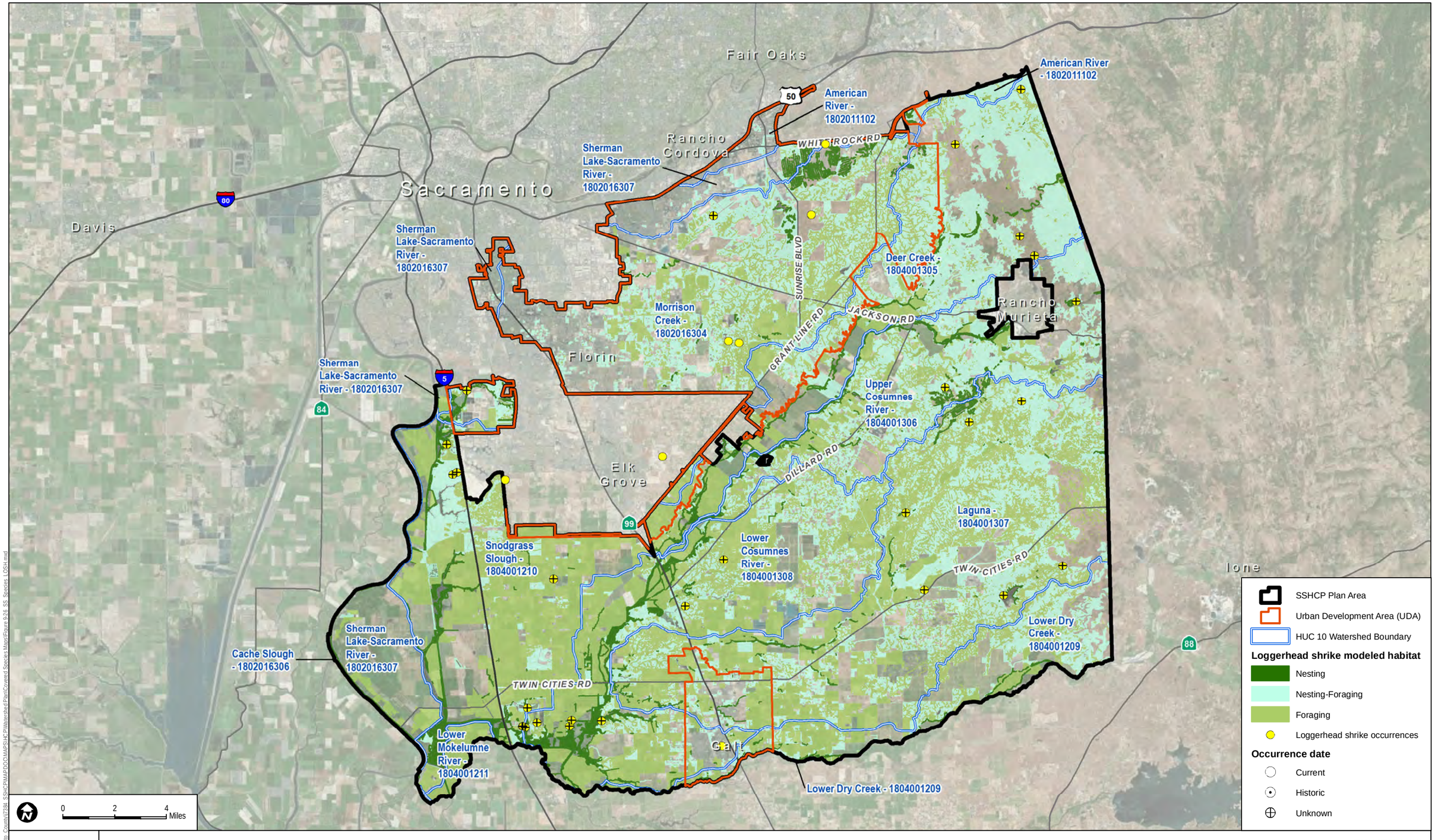
FIGURE 9-25

Greater Sandhill Crane Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7216 SSHCP\MAPDOC\MAPS\HCP\Watershed\PlanCovered Species Maps\Figure 9-25 SS_Species_SACR.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2012, USGS 2013 NHD

FIGURE 9-26

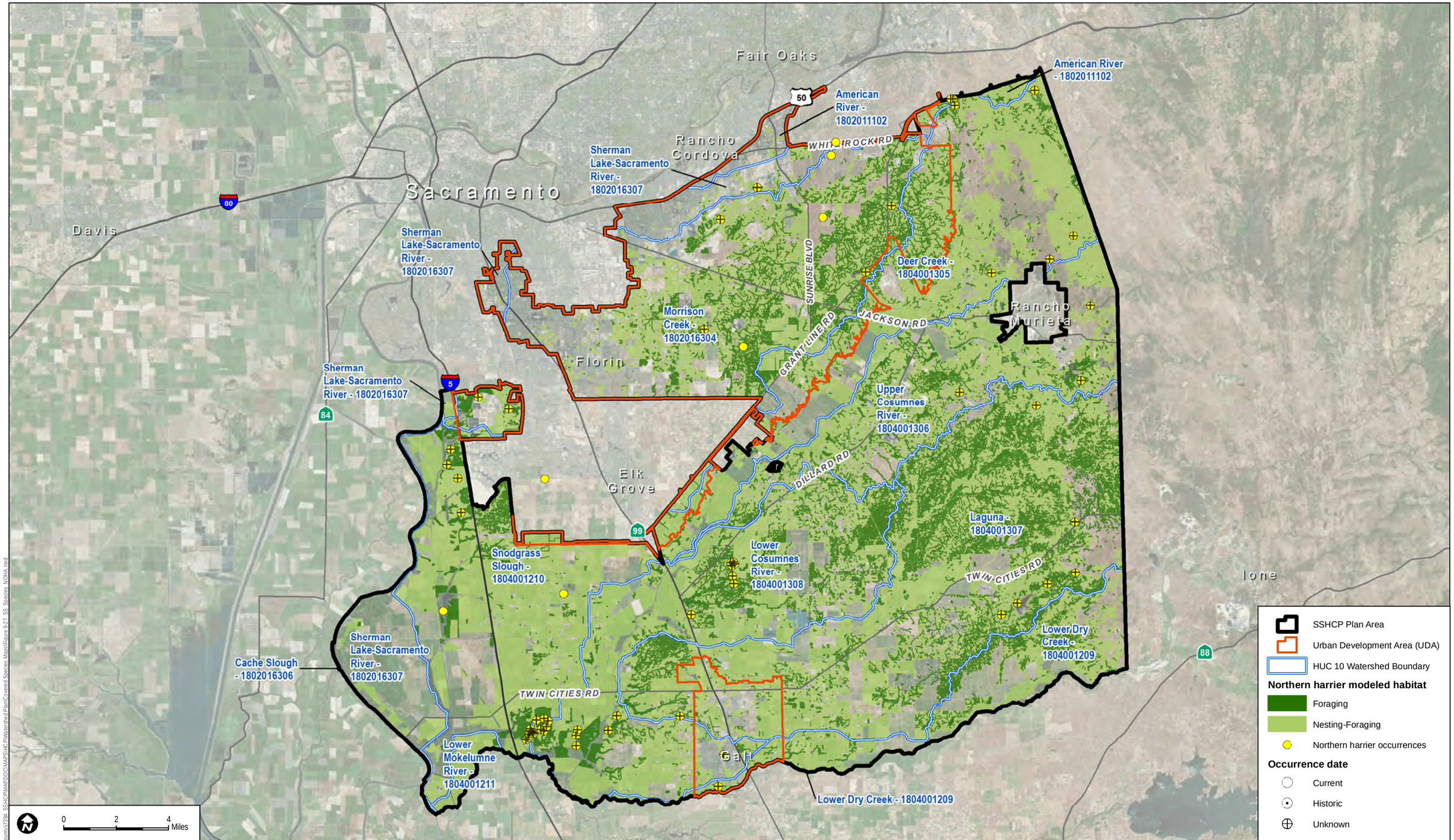
Loggerhead Shrike Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7218_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-26_SS_Species_LOSH.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, ebird.org, USGS 2013 NHD

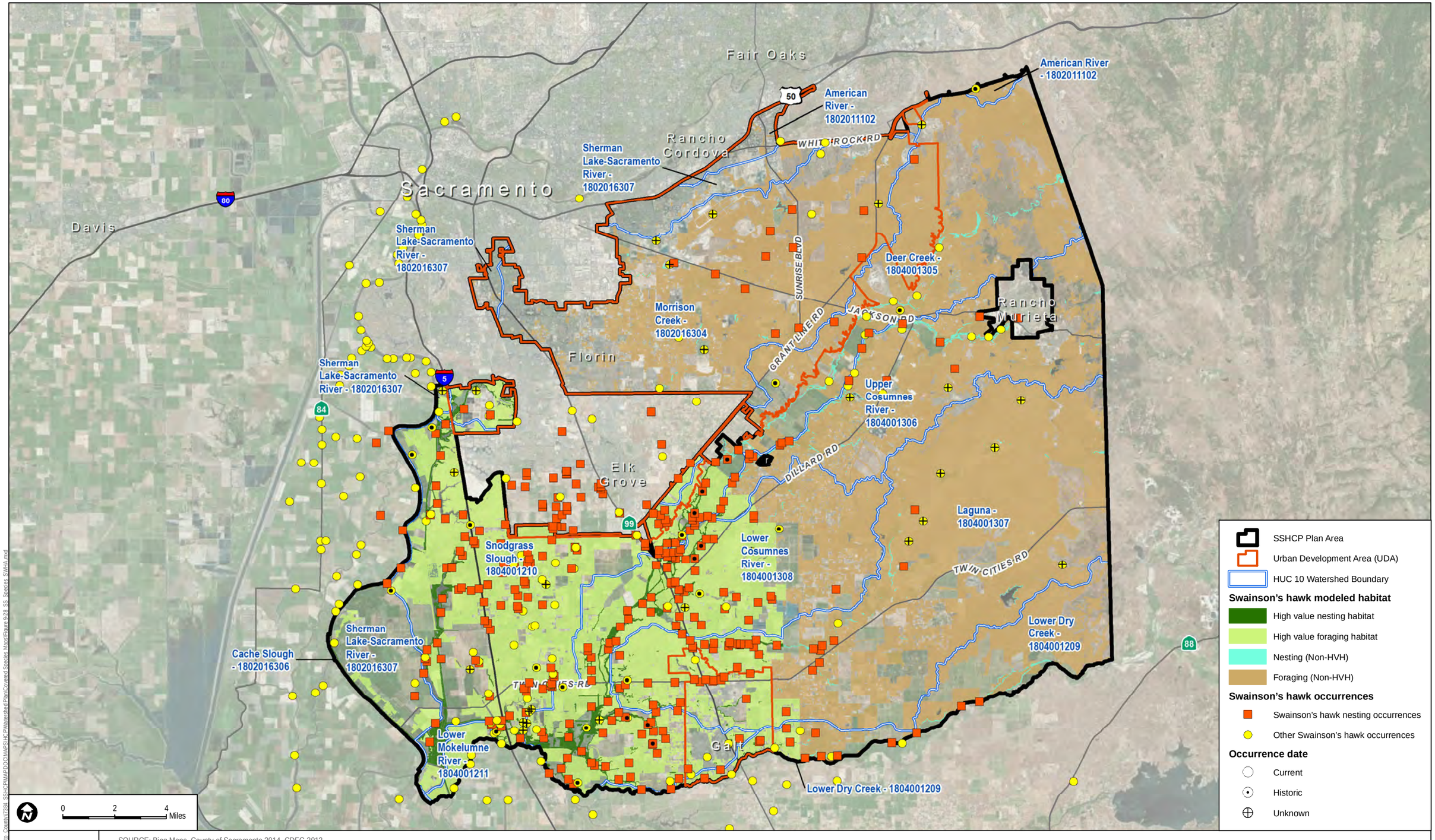
FIGURE 9-27

Northern Harrier Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7220_SSHCP\MAPDOCS\MAPS\HCPWatershed\PlanCovered Species Maps\Figure 9-27_SS_Species_NOHA.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, BIOS 2012, ESTEP Environmental 2006, ebird.org, USGS 2013 NHD

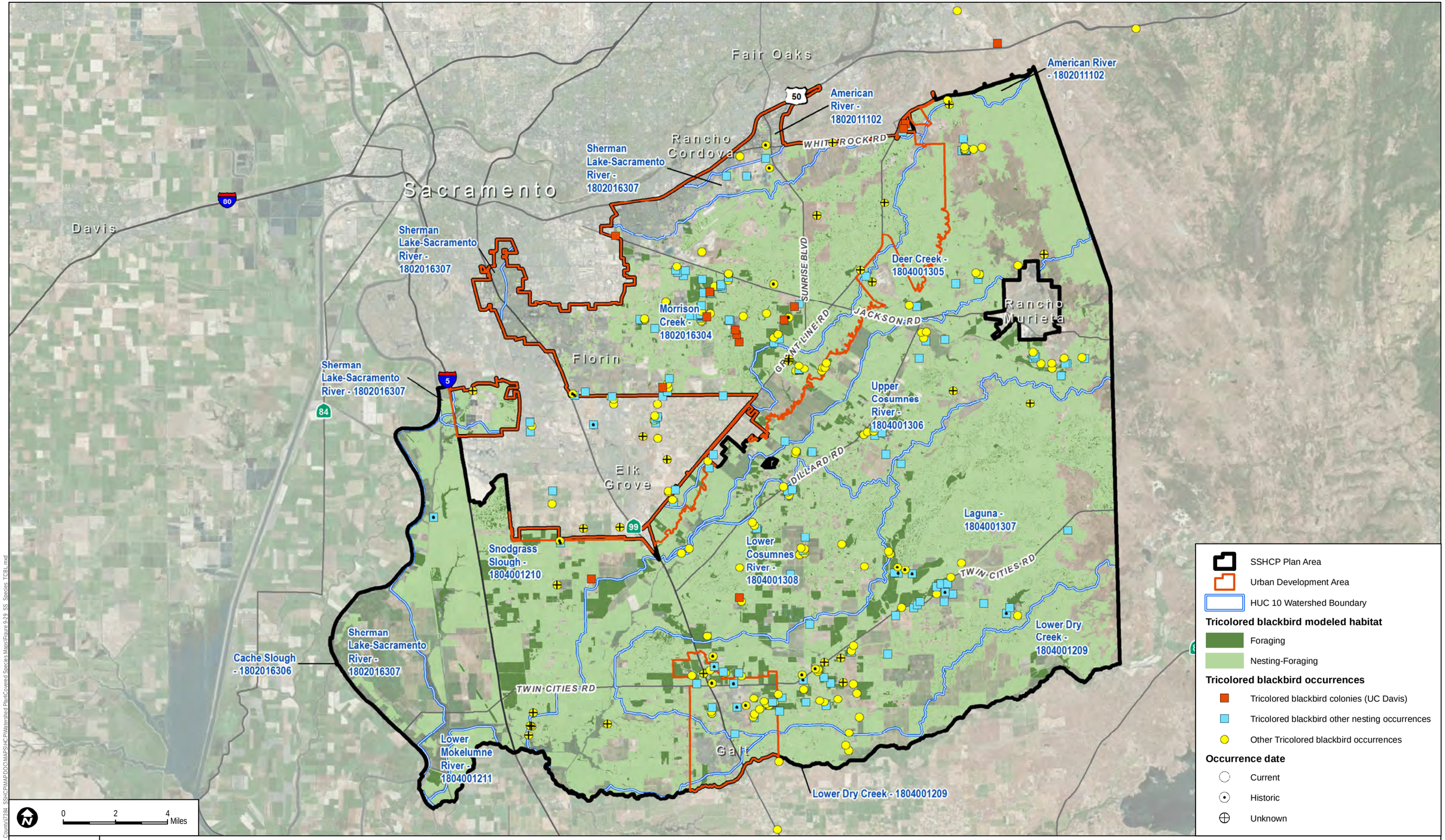
FIGURE 9-28

Swainson's Hawk Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7222_SSHCP\MAPDOC\MAPS\HCPWatershed Plan\Covered Species Maps\Figure 9-28_SS_Species_SWHA.mxd

INTENTIONALLY LEFT BLANK



Path: Z:\Projects\Sacramento_County\7284_SSHCP\MAPDOC\MAPS\HCP\WatershedPlan\CoveredSpecies\Maps\Figure 9-29_SS_Species_TCBL.mxd

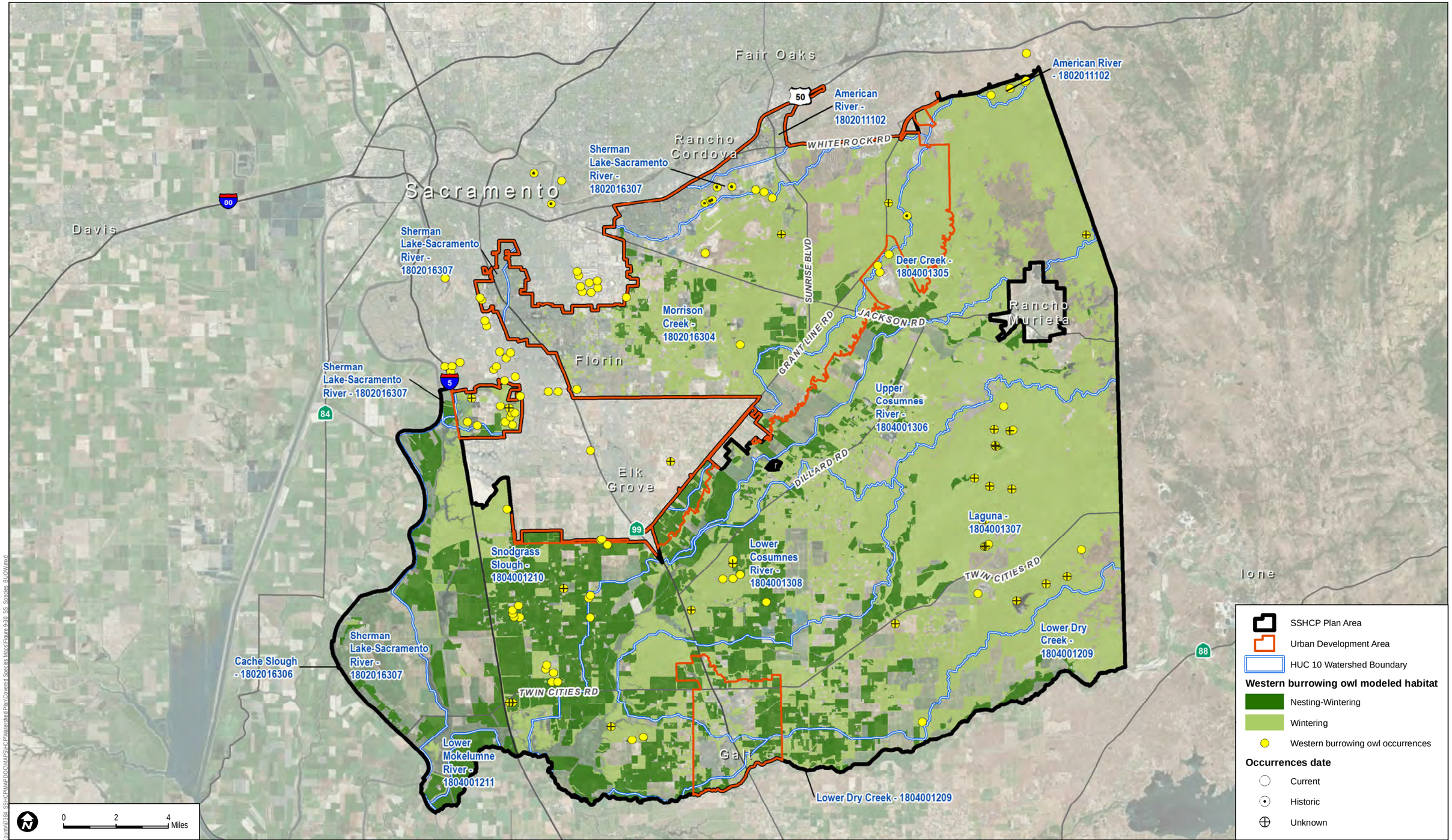
SOURCE: Bing Maps, County of Sacramento 2014, UC Davis 2014, CDFG 2012, BIOS 2012, Lizette Cook 1997, ebird.org, USGS 2013 NHD

DUDEK

FIGURE 9-29

Tricolored Blackbird Modeled Habitat and Known Occurrences

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, Chris Conrad 2004, Ebird.org, TNC, USGS 2013 NHD

FIGURE 9-30

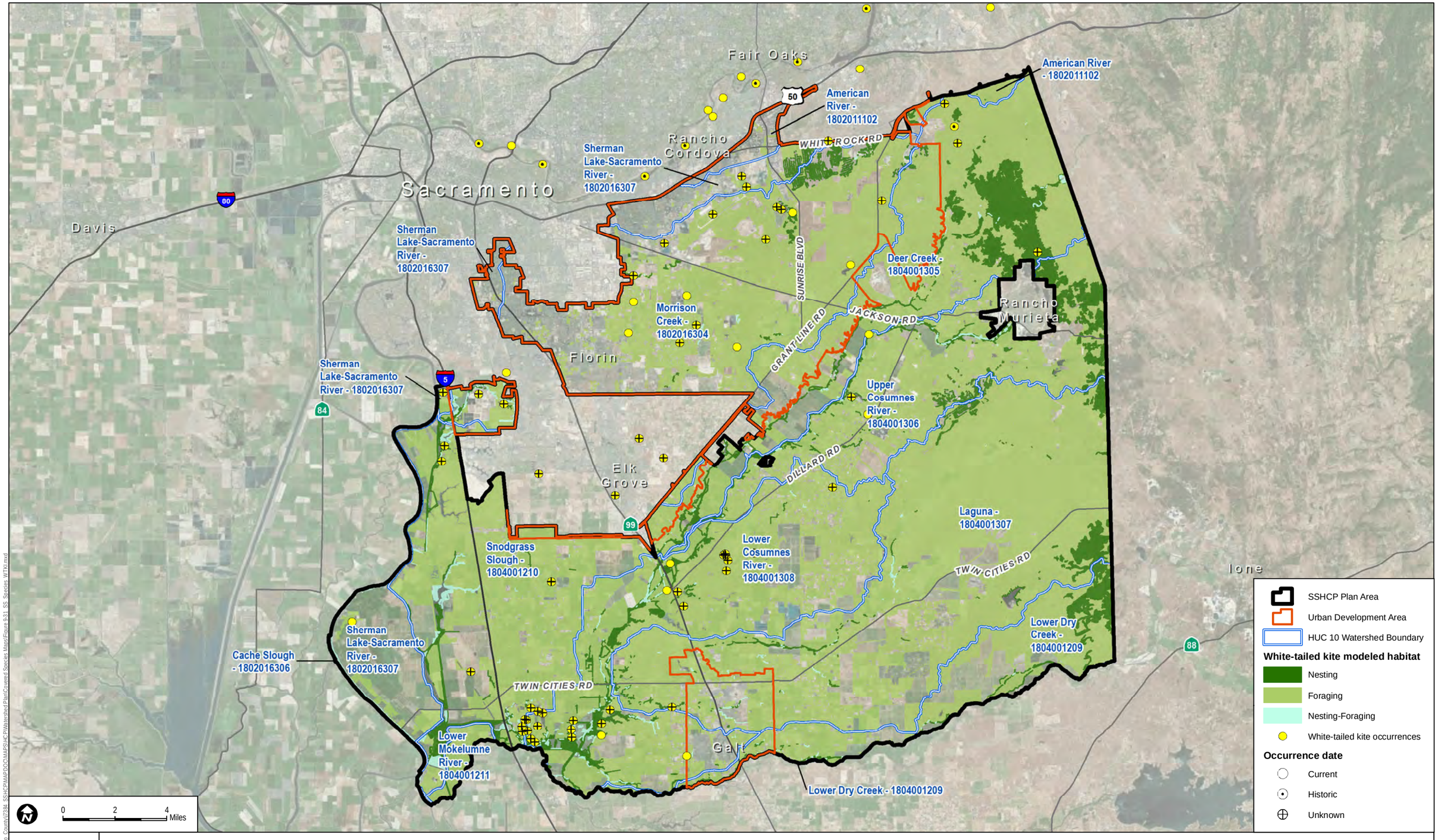
Western Burrowing Owl Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7226_SSHCP\MAPDOC\MAPS\HCPWatershedPlan\Covered Species Maps\Figure 9-30_SS_Species_BUOW.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, ESTEP 2006, ebird.org, USGS 2013 NHD

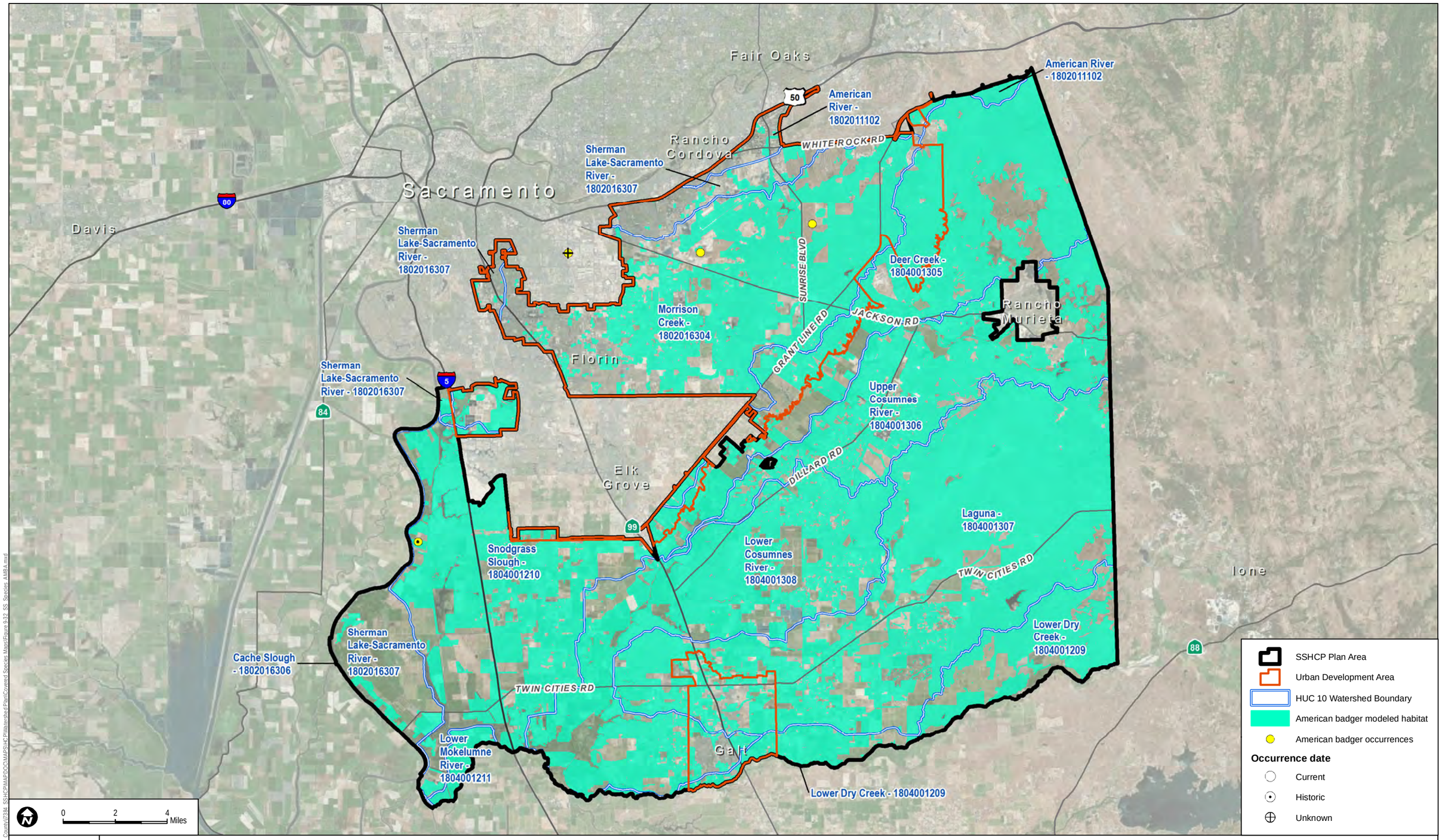
FIGURE 9-31

White-Tailed Kite Modeled Habitat and Known Occurrences

NOTE: Historic occurrences are observations prior to 1990. CNDDB points are centroids of CNDDB polygons of variable certainty.

Path: Z:\Projects\Sacramento_County\7228_SSHCP\MAPDOC\MAPS\HCPWatershed\PlantCovered Species Maps\Figure 9-31_SS_Species_WTKI.mxd

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, USGS 2013 NHD

DUDEK

FIGURE 9-32

American Badger Modeled Habitat and Known Occurrences

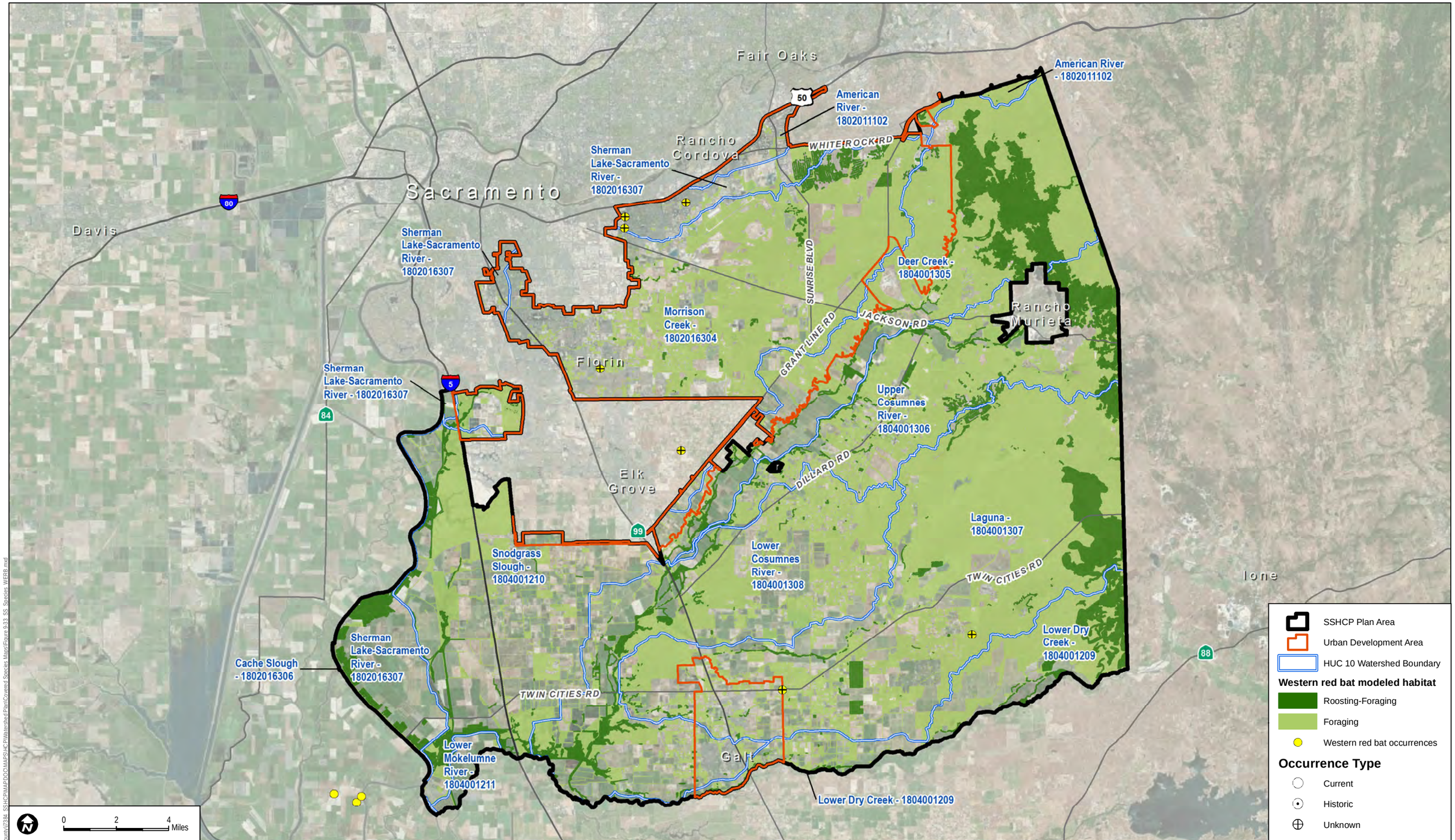
SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento County\7230 SSHCP\MAPDOC\MAPS\HCP\Watershed\PlanCovered Species Maps\Figure 9-32 SS Species AMBA.mxd

AGENDA ITEM 11.1

7230

INTENTIONALLY LEFT BLANK



SOURCE: Bing Maps, County of Sacramento 2014, CDFG 2012, USGS 2013 NHD

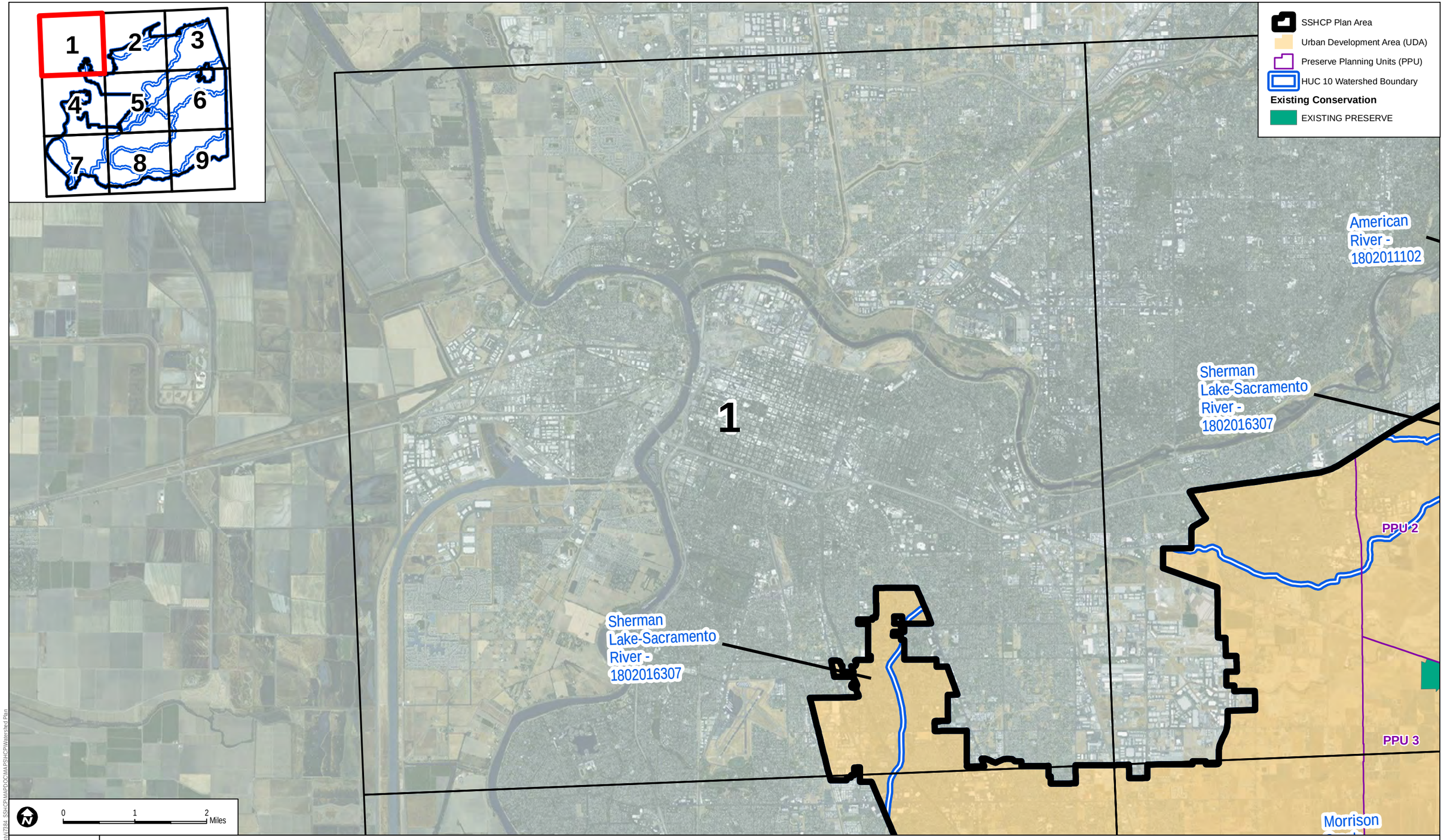
FIGURE 9-33

Western Red Bat Modeled Habitat and Known Occurrences

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

Path: Z:\Projects\Sacramento County\7232 SSHCP\MAPDOC\MAPS\HCP\Watershed Plan\Covered Species Maps\Figure 9-33_SS_Species_WERB.mxd

INTENTIONALLY LEFT BLANK



DUDEK

7384

SOURCE: USGS 2013 National Hydrography Dataset (NHD), County of Sacramento 2014

Figure 10 - Reserve Design Map

SOUTH SACRAMENTO COUNTY HABITAT CONSERVATION PLAN WATERSHED PLAN

MAP NUMBER 1

Z:\Projects\Sacramento_County\7384_SSHCP\MAPDOC\MAPS\HCP\Watershed Plan

AGENDA ITEM 11.1

7234

INTENTIONALLY LEFT BLANK

APPENDIX B-1

Vernal Pool Classifications

APPENDIX B-1
Vernal Pool Classifications

1 DESCRIPTION OF VERNAL POOLS AND VERNAL POOL COMPLEXES

California vernal pools are a type of seasonal wetland habitat that is characterized by a specific set of physical parameters and a unique assemblage of highly specialized endemic plants and animals. Owing in part to significant loss of this habitat type in the State since the latter part of the 19th century, a number of vernal pool-dependent species are now listed as rare, threatened, or endangered with State and Federal Agencies. California vernal pools and vernal pool complexes have received considerable research attention since first recognition of their unique biota and ecological characteristics in the early 20th century (Stone 1990). Excellent sources of information exist today as a result of numerous scientific investigations, many of which are included or otherwise referenced in published proceedings of four symposia convened over the last 25 years (Jain 1976; Jain and Moyle 1984; Ikeda and Schlising 1990; Witham 1998). Consultant-produced reports pertaining to vernal pool ecology and landscape-scale conservation include Jones and Stokes (1990) and Vollmar (2002). An overview of California vernal pool ecology and biogeography can be found at http://www.maphost.dfg.ca.gov/wetlands/"vp_asses_rept.

The following account provides an overview of vernal pool ecology and conservation as they pertain to analysis and planning needs for the approximately 344,600-acre SSHCP Study Area[1]. As landscape-scale conservation requires, emphasis is placed on the relationships between vernal pool habitat (climate, geology, soils, hydrology, and disturbance) and the associated assemblage of vernal pool-dependent plants and animals, including the 13 species covered by the SSHCP (Table B1-1).

Table B1-1
Vernal Pool Species Covered under the
South Sacramento County Habitat Conservation Plan

Group *Common Name* *Scientific Name*	Status[2]	General Distribution By County or Region[3]	Habitat Associaton[4]
		Plants	
Ahart's dwarf rush *Juncus leiospermus* var. *ahartii*	CNPS 1B	Butte, Calaveras, Placer, Sacramento, Yuba	Shallow vernal pools and margins of large pools; 98-328 feet; March-June
Boggs Lake hedge-hyssop *Gratiola heterosepala*	SE, CNPS 1B	Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Shasta, Siskiyou, San Joaquin, Solano, Tehama; Oregon	"Larger" vernal pools, vernal marshes and swamps; 33-7,792 feet; March-August

[1] The "SSHCP Study Area" differs from the "Plan Area" as described in the main body of the SSHCP due to the Sphere of Influence (SOI) boundary changes and the inclusion of the area west of Interstate 5 in the southern portion of the County.

APPENDIX B-1 (Continued)

Table B1-1
Vernal Pool Species Covered under the
South Sacramento County Habitat Conservation Plan

Group *Common Name* *Scientific Name*	Status[2]	General Distribution By County or Region[3]	Habitat Associaton[4]
Dwarf downingia *Downingia pusilla*	CNPS 2	Merced, Mariposa, Napa, Placer, Solano, Sacramento, Sonoma, Stanislaus, Tehama, Yuba; South America	Small to medium vernal pools and swales; 3.3-1,450 feet; March-May
Legenere *Legenere limosa*	CNPS 1B	Lake, Napa, Placer, Sacramento, Shasta, San Mateo, Solano, Sonoma*, Stanislaus*, Tehama	"Larger/deeper" vernal pools; 3.3-2,887 feet; April-June
Pincushion navarretia *Navarretia myersii* spp. *myersii*	CNPS 1B	Amador, Lake, Merced, Sacramento	Small to medium size vernal pools; 66-1,083 feet; April-May
Sacramento Orcutt grass *Orcuttia viscida*	SE, FE, CNPS 1B	Sacramento	"Larger/deeper" vernal pools; 98-328 feet; April-July
Slender Orcutt grass *Orcuttia tenuis*	SE, FT, CNPS 1B	Lake, Lassen, Plumas, Sacramento, Shasta, Siskiyou, Tehama	"Larger/deeper" vernal pools; 115-5,775 feet; May-October
Invertebrates			
Mid-valley fairy shrimp *Branchinecta mesovallensis*	FSC	Southern Sacramento County, west to Solano and Contra Costa County, along east side of the Central Valley south to Fresno County	Small to medium vernal pools, rarely vernal swales.
Ricksecker's Water Scavenger Beetle *Hydrochara ricksecker*i	FSC	Alameda, Marin, Placer, Sacramento, San Mateo, Sonoma	Vernal pools and seasonal wetlands.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	Central Valley, central and southern Coast Ranges, southern Oregon	Small to medium vernal pools, occasionally vernal swales.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	Central Valley from Shasta County to northern Tulare County; endemic to Central Valley	Medium to large vernal pools.
Amphibians			
California tiger salamander *Ambystoma californiense*	ST, FT	Central Valley and Coast Range, from Sonoma to Santa Barbara County	Breeds in vernal pools and ponds; restricted to rodent burrows during dry months.
Western spadefoot *Spea hammondii*	SSC, FSC	Central Valley and Coast Range from eastern Alameda County to northwest Baja California; Mexico	Breeds in vernal pools and ponds, aestivates during dry months in self - made burrows.

Notes:

1. Data compiled from the California Native Plant Society's Inventory of Rare and Endangered Plants of California (2001), and USFWS Federal Register (1994, 1997, 2004a, 2004b).
2. FE: federal endangered; FT: federal threatened; FSC: federal species of concern; SE: state endangered; SSC: state species of concern; CNPS Lists= List 1B: rare, threatened or endangered in California and elsewhere; List 2: rare, threatened or endangered in California, but more common elsewhere.
3. Asterisks represent recorded extirpations.
4. Flowering periods are given for plants in this column.

APPENDIX B-1 (Continued)

1.1 Vernal Pool Habitat, Climate, Landforms, Geologic Formations and Soils

The vernal pool complexes of California are considered to be relatively recent ecological entities, having evolved in the Central Valley landscape after the inland Tertiary-Age sea receded, the late Pleistocene lakes dried, and the present-day Mediterranean-type climate fully developed (Stone 1990; Stebbins 1976; Raven and Axlerod 1978). The vernal pool ecosystem developed and persists as a result of complex relationships between this climate, the region's geology and soils, the vernal pool hydrological cycle, and biological, ecological, and evolutionary processes (Keeley and Zedler 1998; Stone 1990; Holland and Dains 1990).

The annual hydrological cycle that defines the vernal pool wetland ecosystem is driven by the predictable cool wet winters and warm, extremely dry summers that characterize the Mediterranean-type climate of California. In the context of this seasonal regime, vernal pools develop in depressional basins on substrates possessing an impermeable layer that restricts the downward percolation of water through the soil profile. In general, vernal pools are classified by the nature of the water impediment as being hardpan, claypan, or volcanic mudflow-type vernal pools (Holland 1978, 1986; Sawyer and Keeler-Wolf 1995).

Different geologic formations and their associated soils exhibit different propensities for the development of vernal pools (Keeley and Zedler 1998; Holland and Dains 1990; Metz 2001). Further, vernal pools and vernal pool complexes can differ in fundamental physical and biological ways between geologic formations in a given region (Holland and Dains 1990; Smith and Verrill 1998; Platenkamp 1998; Metz 2001; Vollmer 2002; Helm and Vollmar 2002; Laabs et al. 2002; Dittes and Guardino 2002). In addition to landform-specific variance in the soil substrate itself (e.g., particle size fraction, chemistry, depth to hardpan, water retaining capacity, etc.), sub-watershed drainage area, pool size, shape, ponding depth, ponding duration, soil dry-down rates and other hydrological dynamics appear to be related to Geologic Formation (Metz 2001; Smith and Verrill 1998; Hobson and Dahlgren 1998).

Particular geologic formations possess specific biogeographic legacies (e.g., ages, centers of evolutionary origin and diversification, available refugia during long-term extreme climatic cycles, anthropological land management history, etc.); these being reflected in present day patterns of biodiversity (Holland and Dains 1990; Dittes and Guardino 2002).

In the SSHCP Study Area, 18 different geologic formations support vernal wetlands. These geologic formations are listed in Table B1-2 and are further described in Section 3.

APPENDIX B-1 (Continued)

Table B1-2
Summary of Landforms, Geologic Formations and Soils in the SSHCP Study Area, with Associated Attributes

Landform	Geologic Formation	Period/Epoch	Age[2] (Ma)	Parent Material/Description
Other	Metamorphic Rocks, Undifferentiated (pKu)	Pre-Cretaceous	Prior to 145	Composed of amphibolite, greenstone, vein quartz, slate, and shale.
High Terrace	Ione (Ti)	Eocene	35-55	Quartz sandstone deposited along ancient inland seashore
Mudflow/Lavaflow	Valley Spings (Tvs)	Oligocene/ Miocene	5-35	Cemented rhyolitic tuff deposited as fluvial clay, silt, and sand
Mudflow/Lavaflow	Mehrten (Tm)	Miocene / Pliocene	2-25	Moderately undurated fluvial sand, silt, and minor gravel alluvium, presumably from reworked andesitic volcanic mudflow deposits to the northeast
High Terrace	Laguna (Tl)	Late Pliocene	2	Weakly to moderately indurated granitic alluvium (sand, silt and minor gravel)
High Terrace	North Merced Gravel (Qtnm)	Late Pliocene / Early Pleistocene	1-2	Thin, locally derived pediment veneer of cobble gravel on very high terraces capping Tertiary and pre-Tertiary rocks, deposited through outwash of Sierra Nevada glaciation
High Terrace	Turlock Lake (Tpl)	Late Pliocene / Early Pleistocene	1-2	Weakly indurated granitic alluvium (sand, fine sand, minor clay and gravel)
Low Terrace	Riverbank Undivided (Qr)	Pleistocene	0.1	Interbedded granitic sand, silt and clay, with metamorphic channel gravels
Low Terrace	Riverbank, Lower Unit (Qrl)	Pleistocene	0.1	Granitic alluvium (sand, silt, clay and gravel)
Low Terrace	Riverbank, Middle Unit (Qrm)	Pleistocene	0.1	Locally and remotely derived granitic and basic igneous alluvium (sand, silt, ,clay and gravel)
Low Terrace	Riverbank, Upper Unit (Qru)	Pleistocene	0.1	Unconsolidated but compact dark brown to red alluvium
Low Terrace	South Fork Gravels (Qsf)	Pleistocene	0.1	Stream-rounded cobbles and gravels in a clay matrix
Other	Upper Unit Modesto (Qmu)	Upper Pleistocene / Holocene	0.01	Mixture of arkosic sand, gravel, and silt consisting of mainly quartz and feldspar.
Other	Surficial Deposits (Qu)	Holocene	recent	Unconsolidated surficial deposits from mixed alluvial sources
Other	Dredge Tailing and Artificial Fill (t)	Holocene	recent	Rows of cobble, gravel, sand, silt, and clay.
Other	Alluvial Floodplain Deposits (Qfp)	Holocene	recent	Composed of fine sands, silts, and clay
Other	Alluvial Deposits, Undivided (Qha)	Holocene	recent	Composed of cobble, gravel, sand, silt, and clay

Table B1-2
Summary of Landforms, Geologic Formations and Soils in the SSHCP Study Area, with Associated Attributes

Landform	Geologic Formation	Period/Epoch	Age[2] (Ma)	Parent Material/Description
Other	Basin Deposits (Qhb)	Holocene	recent	Composed of unconsolidated clay, silt, and fine sands formed in sink areas

Notes:
1 Information compiled from Tugel (1993), Smith and Verrill (1998) and Vollmar.
2 Age estimates of boundaries in mega-annum (Ma).

1.2 The Vernal Pool Hydrologic Cycle

California vernal pools are a subcategory of seasonal wetlands that are characterized by a very specific annual hydrologic regime, which is often cited as the strongest determinant in shaping vernal pool flora and fauna (see Section 1.3). Vernal pool basins transition through four hydro-ecologic phases during the course of a single year: (i) a wetting phase, (ii) an aquatic or inundation phase, (iii) a waterlogged-terrestrial phase, and (iv) a drought phase (Zedler 1987; Keeley and Zedler 1998). This seasonal hydrologic cycle encompasses extremes of inundation and drought, a regime that has been primary in shaping the highly specialized flora and fauna (Stone 1990). To the benefit of native biodiversity, this extreme hydrologic regime has also proven excessively stressful for the majority of non-native plant species that have come to define California's contemporary valley annual grassland habitats.

Differences in ecological function of vernal pools, and in patterns of vernal pool biodiversity are determined in large part by variance in vernal pool hydrologic regimes (Ebert and Balko 1984; Zedler 1987; Holland and Jain 1990; Jones and Stokes 1990; Jokerst 1990; Platenkamp 1998; Keeley and Zedler 1998). The characteristic concentric rings of species that occur around many vernal pools results from timing of germination and maturation relative to the seasonal inundation and dry-down of the pool basin and soil profile (Bliss and Zedler 1998; Keeley and Zedler 1998). Variance in vernal pool hydrology exists within and between pools/complexes within single years (Stone 1990; Holland and Jain 1984; Holland and Dains 1990), and within and among single pools/complexes between years.

A discussion of vernal pool types, or of variance in function of vernal pools requires thinking about the hydrologic regimes in terms of a gradient of inundation and dry-down severity of the pool basin and soil profile. At one end of the topo-hydrologic gradient are "flashy, shallow, small" pools with shallow soils and at the other end are "stable, deep, large" pools with deep soils. At a slightly higher/drier topo-hydrologic position, the "flashy/small" vernal pool type intergrades with less specialized and mostly non-native seasonal wetland species, and then at a slightly higher and drier position, with upland annual grassland vegetation. At a slightly

APPENDIX B-1 (Continued)

lower/wetter topo-hydrologic position, the "stable/large" vernal pool type intergrades with seasonal marsh vegetation, comprised mostly of comparatively common and widespread perennial wetland plant species.

The full spectrum of the vernal pool hydrologic cycle can occur within individual large/deep vernal pools during a typical year. In these larger systems, hydrology similar to that of "flashy-smaller" pools can be associated with the topographic higher and drier edges, and "stable" pool hydrology with the deeper pool basins; the intervening slope is intermediate. In a given vernal pool complex, smaller/flashy pools tend to support a vegetation assemblage that represents a higher/drier subset of the larger/stable pool vegetation assemblage in the same setting.

Although "flashy-smaller" pool hydrology and vegetation can be considered as a subset of the larger pool system, "flashy-smaller" pools likely differ from large pools in a number of physical parameters and ecological functions. This may be reflected in the preference of some vernal pool invertebrates for the smaller pool type (Helm 1998; Helm and Vollmar 2002; Simovich 1998).

Different topo-hydrographic pool types function differently within a given hydrological season. For instance, small/shallow pools fill earlier and dry-down earlier over the hydrological season, at times even filling and drying more than once in a single year (Jones and Stokes 1990). Large pools take a longer time to fill and remain inundated longer into the later spring and early summer months. In addition, they almost never completely fill and dry more than once per hydrological year.

These different pool types undoubtedly behave differently through extended dry and wet climatic cycles as well. During very dry periods, large pools may never completely fill, but may still support vernal pool biota in the deepest portions that is characteristic of shallower pools or higher topo-hydrological positions during wetter years. During these dry periods the smallest flashy pools lack the specialized hydrology to support the more deeply adapted elements of the vernal pool biota altogether. During wetter climatic cycles, large pools may begin to function more like emergent marsh habitats, with increasing cover of perennial marsh species in the deeper portions (e.g., common spikerush), and small-flashy pools may begin to resemble the condition of larger vernal pools during drier cycles.

Juxtaposition of interconnected large and small pools together in a single landscape setting probably affords stability to the associated vernal pool biotic assemblage during long periods of time and under fluctuating climatic conditions (Jones and Stokes 1990).

Alteration of the hydrology of vernal pools/complexes may result in shifts towards a seasonal marsh ecosystem if the inundated and/or waterlogged-terrestrial phases of the cycle are prolonged, or towards a less specialized seasonal wetland ecosystem if those phases are

shortened. Thus, consideration of watershed integrity, hydrological buffers, and spatial scale in the creation of vernal pool preserves is fundamental to vernal pool conservation.

Despite the importance of the hydrologic regime as a determining factor in shaping the ecology of vernal pools, few detailed studies exist which address the hydrologic dynamics that exist between the vernal pool sub-watershed, the surrounding soil profile, and pool hydrology. The most detailed study to date, conducted in Sacramento County within the Sunrise-Douglas Specific Study Area, documents the relative importance of direct precipitation, overland flow, and subsurface flow to the seasonal hydrological regime of a small set of vernal pools (Hains and Stromberg 1998). This research indicated that during the single year of data collection in this set of pools, direct precipitation was responsible for most of the hydrological input into pool basins, followed by subsurface flow through the soil profile from adjacent uplands later in the season. Although overland flow was not significant during the season of the study, the model produced indicates that under conditions of higher than normal rainfall, overland flow contributions would increase.

Dynamic relationships were found to exist between the hydrology of the vernal pool basin and the surrounding soil profile (Hains and Stromberg 1998). In the study pools, water flowed from the ponded basin into the drier surrounding upland soils early in the season, and from the saturated upland soils into the pond basin later in the season, thus buffering the pool's inundation regime against excessively rapid filling early in the season, and against rapid drying later.

1.3 Influence of Vernal Pool Hydrology on Biotic Assemblages

The extreme seasonal inundation and drought conditions of the vernal pool hydrologic cycle exert strict demands on the plant and animal inhabitants. As a result, vernal pool organisms possess a suite of life history (Zedler 1990), morphological (Griggs 1974, 1980), and anatomical and physiological (Feaver 1971; Keeley 1981, 1988, 1990, 1998) adaptations that allow them to cope with challenges imposed by the habitat.

In general, all vernal pool organisms have evolved life history adaptations as a way to take advantage of the short, stressful growing season, and to avoid the regular extreme summer drought (Zedler 1990, Kelley and Zedler 1998). The vast majority of vernal pool endemic plant species exhibit an annual life cycle (Zedler 1990). The ability to germinate, grow, and complete reproduction within one growing season allows populations of plants to pass the summer drought as seeds on/in the soil. Similarly, vernal pool invertebrates hatch from their dormant cysts/eggs after the pools fill; they mate, produce cysts/eggs, and die as the pools dry. For populations of these species, the summer is spent on/in the soil in the form of dormant cysts/eggs (Keeley and Zedler 1998). Storage of drought-dormant seeds/cysts in the soil profile may also afford stability to populations over multiple-year drought cycles (Griggs and Jain 1983; Holland 1987; Stone et al. 1988).

APPENDIX B-1 (Continued)

The inundated phase presents its own challenges to growth and survival, and an amphibious life history, with corresponding aquatic juvenile morphology and physiology, is an adaptive trait shared by plants and animals alike (Keeley and Zedler 1998). Like vernal pool amphibians, many vernal pool plant species possess dual morphology, with a juvenile grass-like (Isoetid) leaf form that is adapted for maximal growth underwater during the vernal pool inundated phase (Keeley 1981 1990, and 1998).

As the pool progresses through the waterlogged-terrestrial phase and into the drought-phase, the plants assume a different adult morphology that is suited to growth in the terrestrial setting. Adult amphibian vertebrates, including western spadefoot toad (*Spea hammondii*) and California tiger salamander (*Ambystoma californiense*), congregate, mate and lay egg masses in vernal pools during the inundated phase; the eggs hatch to produce aquatic larvae (pollywogs), which mature and metamorphose into the adult terrestrial form before the pool basins completely dry. The metamorphosed juveniles of the season and older adults then migrate to rodent burrows in the uplands after the pools dry to pass the summer in a state of dormancy.

Parameters of vernal pool hydrology (e.g., ponding duration, ponding depth, soil depth and water-holding capacity) have been variously correlated with patterns of plant (Alexander and Schlising 1998; Holland and Dains 1990; Stone et al. 1988; Platenkamp 1998; Dittes and Guardino 2002), invertebrate (Helm 1998; Helm and Vollmar 2002; Platenkamp 1998; Simovich 1998), vertebrate amphibian (Laabs, Orloff and Allaback 2002; Morey 1998), and avian biodiversity (Silviera 1998).

In general, larger/deeper vernal pools have potential to support a wider array of topo-hydrographic positions and greater overall plant diversity, as well as populations of "large pool" plant and animal species, including Orcuttiae grasses, legenere (*Legenere limosa*), California tiger salamander, western spadefoot toad, and vernal pool tadpole shrimp (*Lepidurus packardi*). All of these "large-pool" species require a relatively extended inundation phase for completion of their life cycles, as compared with more frequently occurring vernal pool taxa adapted to shorter inundation regimes.

While larger/deeper pools provide specialized habitat conditions that support several listed plant and animal species, smaller/flashy pools also provide important habitat for listed species. Two such invertebrate species are the vernal pool fairy shrimp (*Branchinecta lynchi*) and mid-valley fairy shrimp (*B. mesovallensis*), which have adapted to short inundation regimes by completing their life cycle in a relatively short amount of time. Similarly, Ahart's dwarf-rush (*Juncus leiospermus* var. *ahartii*), and to some extent, dwarf downingia (*Downingia pusilla*) and pincushion navarretia (*Navarretia myersii*), are rare plant species that are adapted to the "flashy small" pool type.

1.4 Influence of Vernal Pool Interconnectivity on Biotic Assemblage

Interconnectivity is an important consideration for vernal pool conservation for a number of reasons. A landscape encompassing multiple pools of varying sizes located in close proximity to each other is ecologically complex, presents comparatively more niches, is more likely to support meta-population dynamics, and is likely to be more resilient through time, particularly in light of climatic fluctuations, as compared to a landscape with low density and/or low diversity of pool types.

It is useful to consider vernal pool ecosystem interconnectivity at three different spatial/functional scales.

Ecological interconnectivity between individual vernal pools within complexes and between vernal pool complexes mediated by contiguity of hydrology,

Ecological interconnectivity between pools and pool complexes at a local scale as mediated by contiguity of upland matrix,

Ecological interconnectivity between vernal pool complexes in the region as mediated by attractiveness of vernal pool landscapes to waterfowl and shorebirds migrating along the Pacific Flyway.

Interconnectivity at each of these scales involves a set of functioning physical biological components and presents specific ecological implications for associated vernal pool biota.

Hydrological interconnectivity between individual vernal pools or between vernal pool complexes can occur through the soil profile, as surface sheet flow over the soil profile, or by movement of water through swales or seasonal drainages. Alteration of pool or swale hydrology within hydrological-related pool complexes may affect the hydrology of other pools within those complexes. In addition to influence of hydrologic regime, interconnectivity via swales and drainages also presents dispersal opportunities for myriad vernal pool organisms, including rare vernal pool plants, invertebrate and amphibian species that are covered under the SSHCP.

Ecological interconnectivity between pools and pool complexes via contiguity of the upland matrix is an important consideration for life-history needs and dispersal of vernal pool organisms as well. Amphibians, including western spadefoot toad and California tiger salamander, require contiguous uplands for summer aestivation and for terrestrial migration of adults between core and satellite elements within larger meta-populations. Plant seeds and invertebrate cysts and eggs may also be transported between vernal pools across contiguous uplands in mud on the hooves or legs of livestock. Solitary bees that are obligate vernal pool plant pollinators depend on the

uplands surrounding vernal pools as well, and it is not known what interconnectivity means for them regarding the temporal and spatial scale of meta-populations.

In addition, attraction of a given pool or pool complex to migratory waterfowl and shorebirds is likely influenced by the juxtaposition of the pools/complexes with each other and with the immediately surrounding uplands. Similarly, at the regional scale, juxtaposition of vernal pools/complexes with each other, with other open-space areas, and with developed areas, undoubtedly influences attractiveness of those pools and complexes to migratory waterfowl and shorebirds traveling the Pacific Flyway. The use of pools/complexes by waterfowl and shorebirds affects dispersal of seeds and invertebrate cysts and eggs. This interconnectivity has biogeographic implications at both local and regional scales.

1.5 Vernal Pool Organisms

California vernal pools are defined in part by their highly adapted and unique assemblages of obligate-associated plants and animal species. Due to the significant loss of vernal pool habitat throughout California (see Section 4), the Federal Government and/or State of California has listed over 80 vernal pool organisms as Threatened, Endangered or candidates for Listing (Keeler-Wolf et al. 1998). Table 1 includes the 7 vernal pool endemic plant species and 6 vernal pool endemic animal species covered by the SSHCP. A brief discussion of their biology, ecology, and conservation considerations follows. For a more complete discussion of these organisms, refer to the individual SSHCP species accounts (Appendix A of the SSHCP). Legal status, distribution by County, and habitat associations for the 13 vernal pool species are listed in Table 1.

1.5.1 Vernal Pool Plants

Vernal pools support a uniquely adapted, mostly native, and highly endemic flora. The hydrologic cycle that defines this seasonal wetland type is excessively stressful for more commonly occurring wetland species, and it precludes most of the non-native plants species that dominate the surrounding present-day annual grassland. There are more than 100 native plant species that are more or less restricted to the vernal pool ecosystem (Keeler-Wolf et al. 1998; Keeley and Zedler 1998), 90% of these are native, and 55% are entirely restricted to California (Holland 1976; Keeler-Wolf et al. 1998). A typical vernal pool usually supports 15–25 species (Holland and Jain 1977, 1984; Zedler 1987).

The vernal pool flora is comprised of two biogeographic elements: strict California vernal pool endemics, and more widely occurring cosmopolitan aquatic species (Keeley and Zedler 1990). Most of the California vernal pool endemics are derived from upland progenitors that evolved into the developing vernal pool landscape since the Pleistocene (Stone 1990).

APPENDIX B-1 (Continued)

Vernal pool plant species composition has been shown to vary at multiple spatial scales, with 28% of overall variability occurring between state regions, 17% of variability occurring between areas at the scale of counties, and 55% of the variability occurring among pools within landscape complexes or "within pastures" (Holland and Jain 1981). Variability at the largest scale is influenced by climate, source biota, geological surface and site history (Holland and Dains 1990).

At the smallest scale, within pool variability in plant species composition is attributable mostly to variance in inundation regime (Kopecko and Lathrop 1975; Schlising and Sanders 1982; Zedler 1987; Holland and Jain 1988; Jokerst 1990; Keeley and Zedler 1998; Bauder 2000). Barbour et al. (2003) investigated within-pool variance in plant species composition and concluded that whole pool vegetation assemblages are complexes of several apparently independent communities, each of which can be found in other pools, and which may have individual geographic restrictions. The fact that greatest differences in community types were found between the deep and shallow parts of single pools is evidence of the strong selective force of the vernal pool inundation regime.

The terms "shallow pool species and deep pool species" or "edge species and basin species" have been used to describe contrasting preferences of plants for the different portions of the larger range of vernal pool hydrological regimes. A good example of a shallow pool or edge species is found in Ahart's Dwarf Rush, one of the rare species covered under the SSHCP. Good examples of deep pool, or basin species are found in Sacramento and slender Orcutt grasses, two rare species also covered by the SSHCP. However, not all species are as easily assignable to the two categories. Vernal pool plants are able to occupy these hydrological-stressful habitats owing to genetically fixed physiological, structural (anatomical and morphological), and life history traits.

The majority of vernal pool plant species have evolved the annual life cycle (Stone 1990; Zedler 1990; Keeley and Zedler 1998). In this fashion plant populations avoid the predictable and extreme summer drought in the form of dormant seeds. Since not all seeds may germinate every year, some vernal pool plant species have been shown to maintain a persistent dormant soil seed bank that acts as a buffer against single or multiple years with poor rainfall (Griggs and Jain 1983).

Germination occurs either early in the season during the wetting phase, or later on during the inundation phase of the vernal pool annual hydrological cycle (Keeley and Zedler 1998). Many vernal pool species possess dual morphology, with a juvenile form specialized for growth in the aquatic phase, and then later an adult form that is more suited to conditions of the inundated terrestrial and drought phases of the hydrological cycle (Zedler 1990). It is common to see flowering and fruiting species at drying pool margins while at the same time other species are present as seedlings and aquatic juveniles in the inundated pool basin.

Seed dispersal of vernal pool plants tends to be limited. This is thought to be an adaptation to the discontinuous and unpredictable occurrence of vernal pools in the larger upland landscape. Successful germination, growth, and reproduction of a vernal pool plant seed is likely to be the highest in the same pool that supported the seed's parent plant. Most vernal pool plants lack specialized seed dispersal mechanisms. As a result, seeds tend to fall near the parent plant. Some dispersal of seeds also occurs via flowing water, on the hooves and legs of livestock (tule elk [*Cervus canadensis nannodes*], antelope [*Antilocapra americana*] and grizzly bears [*Ursus arctos horribilis*] originally), and on the feathers and feet of waterfowl and shorebirds, suggesting that some seeds may travel greater distances.

Genetics have been investigated for only a limited number of vernal pool plant species (Elam 1998). Owing to certain population traits (e.g., small or fluctuating population numbers) it is hypothesized that some vernal pool species are subject to effects of genetic drift. This is expected to result in reduced genetic diversity and a high degree of among-population (between pool) variation (Elam 1998). Other genetic characteristics of vernal pool plants include limited gene flow between pools (e.g., seed and pollen dispersal), high among-population (between pool) variation, and variable ecological selection within and between pools (Elam 1998).

Some vernal pool species are pollinated by wind (Orcuttiae grasses), some are self-pollinated (legenere, dwarf downingia) and others (e.g., *Lasthenia, Downingia, Blennosperma, Limnanthes*) by a suite of co-evolved specialist solitary bees of the family Andrenidae (Thorp and Long 1998, Thorp 1990). These solitary bees nest in small tunnels excavated in the uplands around vernal pools and rely on vernal pool plants entirely to supply pollen for their young while the plants, in turn, depend on the pollination services of the bees to produce seeds for the next generation..

See Appendix A of the SSHCP for specific life histories of vernal pool associated plants addressed in the SSHCP.

1.5.2 Vernal Pool Invertebrates

Invertebrates are a major part of California landscapes with respect to species richness, abundance and total biomass. Insects are especially diverse and dominant in terrestrial environments, but they can also share dominance of freshwater environments with crustaceans (Hickman et al. 2001). Insects are nearly absent in marine environments, perhaps because of the early occupancy of these aquatic habitats by a great number of crustaceans (Evans 1984). The only successful move of crustaceans to terrestrial habitats has been by the isopods (popularly known as pill bugs) (Hickman et al. 2001).

One well-known group of crustaceans, the branchiopods, has some members that are found only in vernal pools. Vernal pool branchiopods include fairy shrimp (Anostraca), tadpole shrimp

(Notostraca) and clam shrimp (Conchostraca). California hosts at least nine endemic and up to 29 total fairy shrimp species (Bauder et al. 1997), four of which are listed as endangered and one as threatened under the Federal Endangered Species Act (FESA). Fairy shrimp do not occur in running waters and none are true marine organisms (Zedler 1987). Branchiopods occurring within the SSHCP Study Area are the mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool fairy shrimp (*Branchinecta lynchi*) and the vernal pool tadpole shrimp (*Lepidurus packardi*).

The only vernal pool insect covered under the SSHCP is the Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*). See Appendix A of the SSHCP for specific life history of Ricksecker's water scavenger beetle.

Vernal Pool Crustaceans

In a survey of California vernal pools Simovich (1998) found 67 species of crustaceans and 60-100 species of insects and other invertebrates. Aquatic crustaceans found in vernal pools include branchiopods (fairy shrimp, tadpole shrimp, and clam shrimp), cladocerans (water fleas), copepods, ostracods (seed shrimp), and rotifers (Zedler 1987). Crustacean diversity in vernal pools is mediated by a number of possible factors such as inundation period and pool size (Simovich 1998). Inundation period regulates presence of crustaceans based on time required for development. Long inundation periods may allow the co-existence of similar (especially congeneric) species by reducing temporal overlap. Vernal pools of varying sizes may provide more available niches for crustaceans to inhabit, increasing diversity.

Crustaceans are sometimes more diverse in ephemeral than in permanent water bodies, perhaps due to decreased predation and non-limited resources (Simovich 1998). Historical climatic fluctuations may have created opportunities for gene exchange between previously isolated gene pools as vernal pool complexes expanded and retracted in response to increased dry and wet periods. Genetic variability in vernal pool crustaceans found within populations (i.e. within pools) may be a result of fluctuating selection and generation overlap (Simovich 1998) that occurs as a result of prolonged diapause (Ellner et al. 1999). The combination of typically large crustacean cyst banks in vernal pools (Belk 1998) together with overlapping generations (due to lack of all cysts hatching each year) creates the potential for significant within pool genetic variation (Simovich 1998).

Dispersal capability sets a limit on the distribution of any organism. As crustaceans cannot fly, their dispersal is limited to passive movement. Simovich (1998) and Ahl (1991) postulated that crustacean dispersal between vernal pool complexes probably occurs by movements of birds that eat crustacean disseminules. Proctor (1964) and Proctor and Malone (1965) found that disseminules were passed successfully through the intestinal tracts of mallard ducks, chickens, pigeons and canaries. Proctor et al. (1967) found that viable disseminules were retained for

longer periods in killdeer than in mallard ducks, suggesting that killdeer and similar shorebirds could possibly be more effective than ducks as dispersal agents for aquatic organisms, as they can carry disseminules longer distances. Large-scale flood events, which no longer occur due to levees and damming of major rivers, are postulated as influential in dispersal of crustacean disseminules historically (USFWS 1999). Dispersal is critical for the long-term survival of these species (LAS 2004).

See Appendix A of the SSHCP for specific life histories of vernal pool associated crustaceans addressed in the SSHCP.

1.5.3 Aquatic Mollusks

Studies of two aquatic snails (*Fossaria sonomensis* and *Bakerilymnaea cockerelli*) in vernal pools by Gallagher (1993) and Newman (1973) found that both snails use a form of aestivation (summer dormancy) to avoid the extreme drought of the summer-dry vernal pool. These snails migrate into the sediments before the pool dries, reappearing as the first inhabitants of vernal pools when flooding occurs. Snails lay egg masses inside vernal pools, making snails totally dependent on pools as are fairy shrimp and tadpole shrimp. Gallagher (1993) also found that vernal pool inundation period was an important factor in regulating snail dynamics. Alexander (1976) postulated that stonefly larvae are potentially significant predators on snail egg masses in vernal pools.

1.5.4 Vernal Pool Insects

Most insects that use California vernal pools are winged opportunists, utilizing vernal pools when available but abandoning them as soon as they become unsuitable (Zedler 1987). Common large aquatic insects known to visit vernal pools include predaceous dragonfly nymphs, back-swimmers, water boatmen, predaceous diving beetles and water scavenger beetles. Flies are reported from vernal pools as well, but are probably largely accidental (Zedler 1987).

Surveys of natural and constructed pools in Folsom County, California, found 58 species of insects inhabiting vernal pools including one springtail (Collembola), one mayfly (Ephemeroptera), four dragonflies (Odonata), nine true bugs (Hemiptera), one stonefly (Trichoptera), 26 beetles (Coleoptera) and 16 flies (Diptera) (Rogers 1998).

Although the role of insects in vernal pool ecology is probably substantial, little is known about the insects that inhabit vernal pools (Zedler 1987). Terrestrial insects may serve as food sources for vernal pool organisms, prey on or compete with vernal pool organisms, and have some indirect effects on vernal pool ecology.

Mosquitoes are of concern to the public owing to their potential to spread disease, including West Nile Virus and Encephalitis. Detailed studies of mosquitoes in vernal pools are mostly

lacking. In a survey of aquatic macro-invertebrates in 27 natural and 37 artificially constructed pools, Rogers (1998) found that mosquito larvae and midge larvae together comprised less than 2% of the invertebrate richness in natural pools. Some of the artificial pools were similar to natural pools with regard to mosquito and midge populations. During the 2nd year of this study however, these fly species comprised between 40% and 78% of the invertebrate composition in pools at one site. In general, it is thought that functioning vernal pools do not provide optimal breeding habitat for mosquito populations because they support a diversity of predatory invertebrate species (water beetles, backswimmers, tadpole shrimp, amphibian larvae) that feed on the aquatic mosquito larvae (Rogers pers. comm.; Alexander pers. comm.).

Flower Visiting Insects

The most conspicuous terrestrial insects associated with vernal pools are oligolectic bees. Oligolectic bees only visit a small number of closely related plants (e.g. *Limnanthes, Lasthenia*, *Blennosperma*) for pollen food. These specialized bees are important to vernal pool plants and overall vernal pool ecology (Bauder et al. 1997; LSA 2004; Thorp 1976, 1990; Thorp & Leong 1995, 1996, 1998). The highest percentages of specialist-feeding bees occur in areas of California with a Mediterranean and desert climate. These bees rely entirely on their local, specific food plants and on the availability of suitable nest habitat.

Vernal pool specialist bees are critical pollinators of vernal pool plants because of their inherent fidelity to these plants. This relationship highlights the importance of maintaining the connections between vernal pools and the uplands surrounding them. The bees construct nests primarily in upland areas near pools (although nests have been found in created pools; (S. Chamberlain, pers. obs.) and probably do not move far from their nest sites. Leong and Thorp (1995) found that most bees they studies did not travel more than about 0.5 mile. Fragmentation of vernal pool habitats increases distances between pools, possibly inhibiting movement of these dispersal-limited bees (Leong and Thorp 1995), and decreasing visitation rates to their associated flowers. Decreased visitation rates may result in lower seed output, reducing the size of the soil seed bank, the "insurance policy" of vernal pool plants against unfavorable hydrological conditions.

1.5.6 Amphibians

There are four amphibians known to inhabit vernal pools within the SSHCP Study Area, including the Pacific chorus frog (*Pseudacris regilla*), western toad (*Bufo boreas*), western spadefoot toad and the California tiger salamander. The western spadefoot toad and the California tiger salamander are covered under the SSHCP.

See Appendix A of the SSHCP for specific life histories of vernal pool associated amphibians addressed in the SSHCP.

APPENDIX B-1 (Continued)

1.5.7 Birds

Vernal pools and vernal pool complexes are important to the conservation of many bird species. Silveira (1998) reported observing 86 different taxa (44 waterbirds and 42 landbirds) using vernal pools and associated uplands at eight areas in the Sacramento Valley and from two areas in northeastern California. These birds use a variety of vernal pool types, visit pools differently at different times of year and exploit different microhabitats within a given pool (Silveira 1998).

Birds are important to the conservation of vernal pool species, as they are essential for the dispersal of vernal pool disseminules from one pool to another. Migratory birds moving along the Pacific Flyway spread plant seeds as well as invertebrate eggs and cysts between vernal pool complexes. Dispersal is important to populations as it limits isolation that can lead to inbreeding and reduces the chances of local extirpation.

1.5.8 Waterfowl and Shore Birds

During the wet season, waterfowl and shorebirds visiting vernal pools feed on a wide variety of food sources, rest, and in some cases nest. Some birds feed on invertebrates from the deeper portion of the pools, while others forage along the shoreline feeding on invertebrates or grazing the vegetation (Silveira 1998; Sloat and Whisler 2002). Vernal pools provide essential high protein food sources to migratory birds at a time critical to the development of building flight muscles and reproductive organs (Siveira 1998; USDOI 1994).

Waterfowl tend to use vernal pools with larger surface areas more often than smaller pools (Baker et al. 1992), however smaller pools are also frequently used, especially for individual breeding pairs (Silveira 1998). Uplands associated with vernal pools are also heavily used by Canada geese (*Branta canadensis*), which require new vegetation growth late in the winter and early in the spring for protein (Silveira 1998; Bogiatto pers. comm.).

A study of shorebird use of Central Valley habitats did not include large areas of vernal pool grasslands, and therefore did not report much use of vernal pool habitat by shorebirds (Shuford et al. 1998). In contrast, a study conducted over two spring seasons at the Sacramento National Wildlife Refuge, showed that although vernal pools comprised less than 2% of the refuge's total available wetland habitat, they held the highest shorebird densities, and more species preferred vernal pools than any other wetland type (Feldhiem et al. 1999).

Although waterfowl and shorebirds require these seasonal wetlands to help complete their migration and are important to the conservation of vernal pool species, these birds are not specifically covered under the SSHCP.

2 VERNAL POOL FUNCTIONS AND ECOSYSTEM SERVICES

2.1 Functions

Vernal pool functions have been defined as the hydrologic, biogeochemical, and habitat support processes that characterize and define vernal pools as self-maintaining wetland ecosystems (Butterwick 1998). The term "Values" as applied to vernal pool ecosystems is a more subjective concept. Ecosystem values relate to the perceptions of people and society regarding vernal pools; these perceptions reflect cultural, socioeconomic and policy issues that can change over time (Butterwick 1998; NRC 1995).

Consideration of ecosystem function is the basis of the Hydrogeomorphic (HGM) approach to wetland assessment (Environmental Protection Agency [EPA], United States Army Corps of Engineers [ACOE]), which likely represents one of the more comprehensive frameworks and cohesive descriptions of vernal pool functions and ecosystem processes. Ten vernal pool functions have been proposed as part of the draft HGM approach; each function is associated with one of three categories: hydrology, biogeochemistry, and habitat support (Butterwick 1998). Each vernal pool ecosystem function is described below, along with a brief discussion of determinant factors, functional variance, and relationships among functions.

The HGM approach represents a conceptual framework that is useful in facilitating communication about an exceedingly complicated ecological phenomenon. It is important to recognize that in nature these 10 vernal pool ecosystem functions are closely interrelated and overlap in the processing through time of elements, compounds and genetic information. Additionally, these functions operate and interrelate in causal-dependent relationships at multiple spatial and temporal scales: from within single vernal pools within a single annual hydrologic cycle, to among all vernal pool complexes on a given set of geologic landforms over evolutionary time.

Finally, it is important to acknowledge that paradoxically, landscape-level ecosystem function and related evolutionary dynamics are critical components of long-term conservation planning/management, yet they are not readily perceivable and they are difficult to define and to quantify.

2.1.1 Hydrology (3 Functions)

Function 1- surface water storage is the capacity of the vernal pool basin to pond water seasonally and retain surface water for long duration. This function is dependent on a variety of factors, including but not limited to surface topography (e.g., area of drainage, dimensions of depression basin), soil depth and water-holding capacity, and the nature of the water-impermeable layer in the soil profile.

APPENDIX B-1 (Continued)

Function 2- subsurface water exchange is the capacity of the subsurface area above the restrictive layer to hold water and allow exchange of water between the pool basin and the surrounding landscape. This function is dependent on a variety of factors, including but not limited to the water holding capacity of the soil, soil permeability, and soil depth. These factors together influence the dynamics of water exchange between pool basins and surrounding pool and upland areas.

Function 3- surface water conveyance is the capacity to convey concentrated inter-storm water flow into and out of pool basins through swales. Swales lack bed and bank morphology yet they are critical components of drainage and interconnectivity of vernal pool-annual grassland landscapes. This function is dependent on a number of factors, including but not limited to topography, the nature of the soil profile, and the juxtaposition of pools/pool complexes within sub-watershed areas.

2.1.2 Biogeochemical (2 Functions)

Function 4- element removal is the capacity of vernal pools to remove and concentrate imported nutrients, contaminants, elements and compounds from the water through abiotic and biotic processes. This function is dependent on myriad physical, chemical and biological components of the ecosystem.

Function 5- element cycling is the capacity of vernal pools to support biogeochemical processes that convert and recycle elements and compounds from one form to another. The vernal pool biota provides both material and metabolic process to the function of element cycling. The annual development and decay of plant and animal biomass involves cycling (assimilation, conversion, release and breakdown) of myriad inorganic elements and organic and inorganic compounds.

2.1.3 Habitat Support (5 Functions)

Function 6- maintenance of characteristic vegetation is the capacity of vernal pools to support a characteristic suite of native plant species. Vernal pool plant species are uniquely adapted to the extreme regimes of inundation and drought that defines the annual vernal pool hydrologic cycle.

Function 7- maintains characteristic aquatic invertebrates is the capacity of vernal pools to provide the hydrologic, chemical, and temperature conditions that are required to support their characteristic aquatic invertebrate fauna. Like vernal pool plant species, vernal pool invertebrate species are uniquely adapted to the extreme regimes of inundation and drought that defines the annual vernal pool hydrologic cycle.

Function 8- maintains amphibian and avian populations is the capacity of vernal pools to provide suitable aquatic and terrestrial habitat for amphibians to complete their entire life cycle,

and for resting, feeding, hiding and reproduction of avian populations. Amphibian and avian species both depend on the quality of contiguous uplands, and particularly for birds, the juxtaposition of wetlands with other wetlands and habitat types (see Function 10).

Function 9- maintain populations of sensitive taxa is the capacity of vernal pools to perpetually support populations of rare, threatened or endangered species, almost all of which are strict vernal pool endemics. It should be noted that this function might not be discernible from Functions 6, 7 and 8 above, since sensitive taxa represent a subset of the vernal pool biotic assemblage; they are dependent on and interact with the same physical and biological conditions, functions and process as their more common vernal pool associates. The presence or absence of any given species, rare or otherwise, may depend as much on biogeography and history as on particular characteristics of a given vernal pool. A vernal pool does not need to support sensitive species to qualify as a fully functioning vernal pool, whereas nearly all of the other 10 functions mentioned here are essential. For these reasons, and because designation of species as sensitive is somewhat subjective in itself, Vernal Pool Function 9 may more appropriately be considered as a "Vernal Pool Value" (see Section 3.2.2).

Function 10- maintain habitat interspersion and connectivity is the capacity of vernal pools to interact with other vernal pools, vernal pool complexes and other wetland and upland habitat types. The juxtaposition of vernal pools and vernal pool complexes across the landscape influences meta-population dynamics, migration, recruitment, establishment and persistence of species through time and space, and the long-term dynamics of population genetics (evolution).

2.2 Ecosystem Processes (Values)

Vernal pool (wetland) values are those qualities and/or functions of the ecosystem that relate to societal perceptions of "goods and services" (Butterwick 1998; NRC 1995). These values are subjective because they relate not only to complex interrelated parameters of the vernal pool ecosystem, but also to the prevailing socio-economic, political and educational status of California's human population. Wetland ecosystem values, considered as a function of societal perception, vary not only through time in a given geographic area, but also across geography at any point in time (NRC 1995).

Since vernal pool habitats are generally part of larger watershed-scale systems, they may play various roles in the hydrological function of the larger landscape. By retaining direct precipitation as well as seasonal overland and subsurface flow during the rainy season, they buffer against flooding in downslope areas, and large complexes may even affect microclimate when hydrated during the warmer spring and early summer months by modifying local temperatures (the opposite of roofing or asphalt, which tend to increase local temperatures). Since vernal pools also function in geo-chemical processes (element removal and cycling), they

APPENDIX B-1 (Continued)

potentially mediate water quality when interconnected via swales or drainages, by assimilating and processing dissolved and suspended pollutants in runoff, and atmospheric pollutants precipitated in rainfall or dust.

3 HABITAT DISTRIBUTION

3.1 California Distribution

In California, vernal pool habitats occur in settings ranging in elevation from about 10 feet in Solano County to over 5,500 feet in Plumas County (CDFG 2003), and in association with a variety of geologic formations. The greatest areas of vernal pool habitat though, are associated with the Great Central Valley (Holland and Jain 1977; Holland 1978; Stone 1990). Areas of vernal pool habitat are also associated with the coastal terraces of San Diego County (Zedler 1987), and with scattered sites in the low elevation regions of the Peninsular and south and north Coast Ranges, the Sierra Nevada Range Foothills, the Cascade Range Foothills, and the Modoc Plateau (Holland and Jain 1977; Zedler 1987; Holland 1986).

The first maps of vernal pool complexes within the Central Valley were produced for CDFG by Holland (1978) and are shown in Figure 1. The most recent treatment of California vernal pools recognizes 17 biogeographically defined Vernal Pool Regions (Figure 2), including the Sand Diego, Western Riverside County, Santa Barbara, Carrizo, Central Coast, Livermore, San Joaquin Valley, Southern Sierra Foothills, Southeastern Sacramento Valley, Northwestern Sacramento Valley, Northeastern Sacramento Valley, Solano-Colusa, Santa Rosa, Lake-Napa, Mendocino, Sierra Valley, and Modoc Plateau Vernal Pool Regions (CDFG 1998).

3.2 Central Valley Distribution

The largest total number of vernal pools and the largest most intact vernal pool complexes remaining in the state are found in the Great Central Valley (Holland and Jain 1988; Keeler-Wolf et al. 1998; Vollmar 2002). These are distributed among 6 of the 17 biogeographic areas, including the San Joaquin Valley, Southern Sierra Foothills, Solano-Colusa, Northwestern Sacramento Valley, Northeastern Sacramento Valley, and Southeastern Sacramento Valley Vernal Pool Regions. The SSHCP Study Area is included entirely within the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf et al. 1998).

The Southeastern Sacramento Valley Vernal Pool Region includes all of the vernal pool complexes located within Sacramento, Placer, Amador, and El Dorado Counties, as well as a portion of the pool complexes located in northwest Calaveras County, northeast San Joaquin County, southern Yuba County, and as indicated in Figure 3, a small inclusion of pools in southern Sutter County. It has been noted that, although there are bio-geographical differences, the boundary between the Southeastern Sacramento Valley Vernal Pool Region and the Southern Sierra Foothills Vernal Pool Region is defined in part by jurisdictional areas of regulatory agencies and the treatments of bioregional assessment teams (Keeler-Wolf et al. 1998).

3.3 SSHCP Study Area Distribution

The SSHCP Study Area encompasses a significant portion of the vernal pool complexes that remain within the Southeastern Sacramento Valley Vernal Pool Region, as indicated in Figures 1 through 3. The current extent and distribution of vernal pools/wetlands in the SSHCP Study Area is illustrated in Figure 4. This map (Figure 4) was produced by the Geographic Information Center (GIC) at California State University, Chico using digital ortho-rectified black and white aerial photographs that were flown on March 15, 2001. For a more detailed description of this mapping procedure and constraints and assumptions relating to the map data, refer to Section 5.2 of this document.

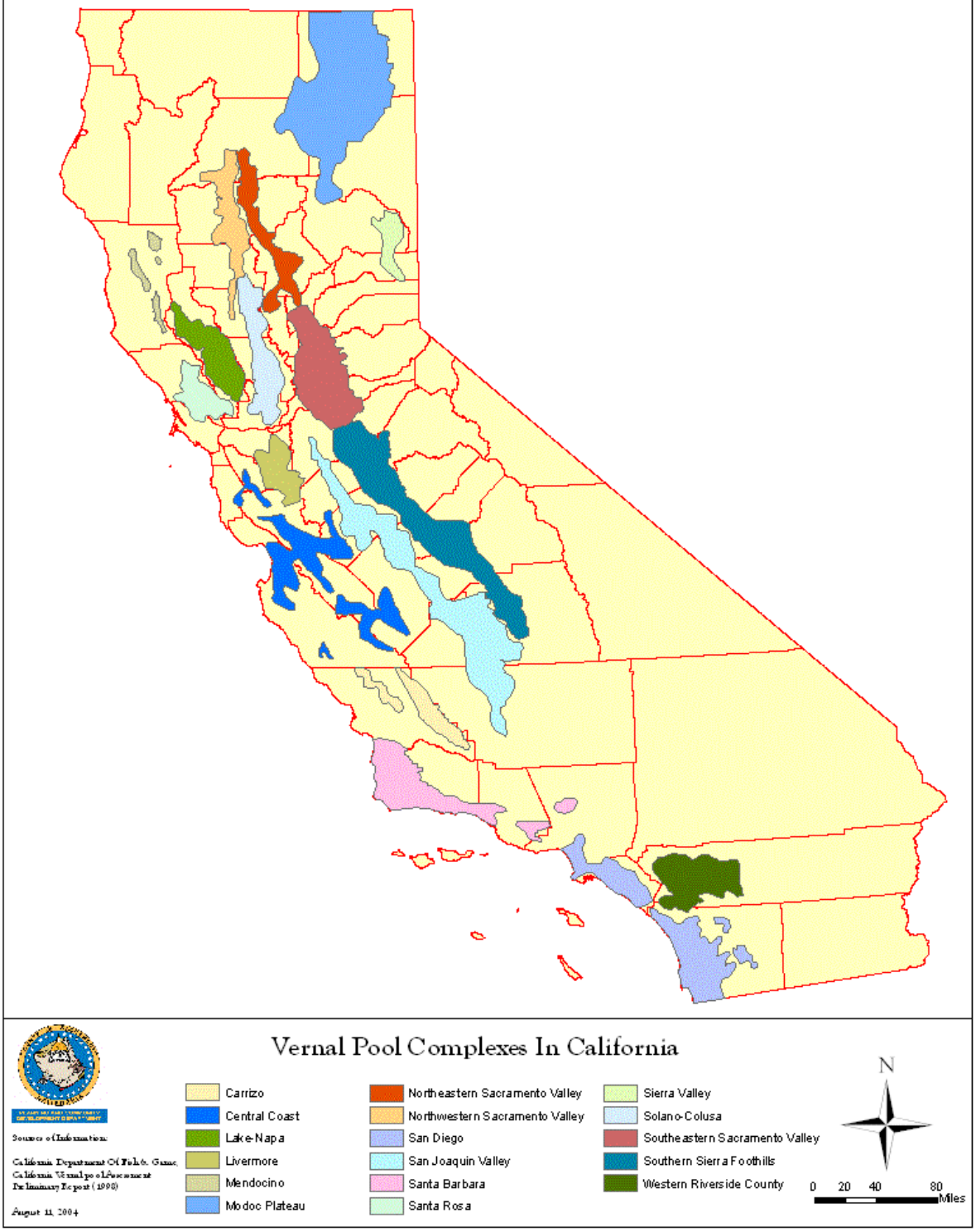
The remaining extant vernal pool/annual grassland complexes located within the region as of 2001 are mostly concentrated in the south-eastern portion of Sacramento County. Here they are associated with 18 geologic formations that occur within the boundaries of the SSHCP Study Area, as illustrated in Figure 5.

Table B1-3 numerically summarizes the distribution of vernal wetlands across geologic formations in the SSHCP study area. This table contains the total number of acres represented by each geologic formation and the total number of vernal wetted acres occurring on each formation within the SSHCP Study Area. Totals calculated for each geologic formation are also presented as percentages of the total vernal wetted area and total land area.

The number of vernal wetlands and total wetted acres for each geologic formation that contain vernal features within the SSHCP Study Area are presented in Table B1-4. These parameters are further described for the vernal wetlands both inside and outside the Urban Development Area (UDA); Figures 6 and 7 illustrate these data.

APPENDIX B-1 (Continued)

South Sacramento HCP | Figure 2 | Vernal Pool Habitat Account

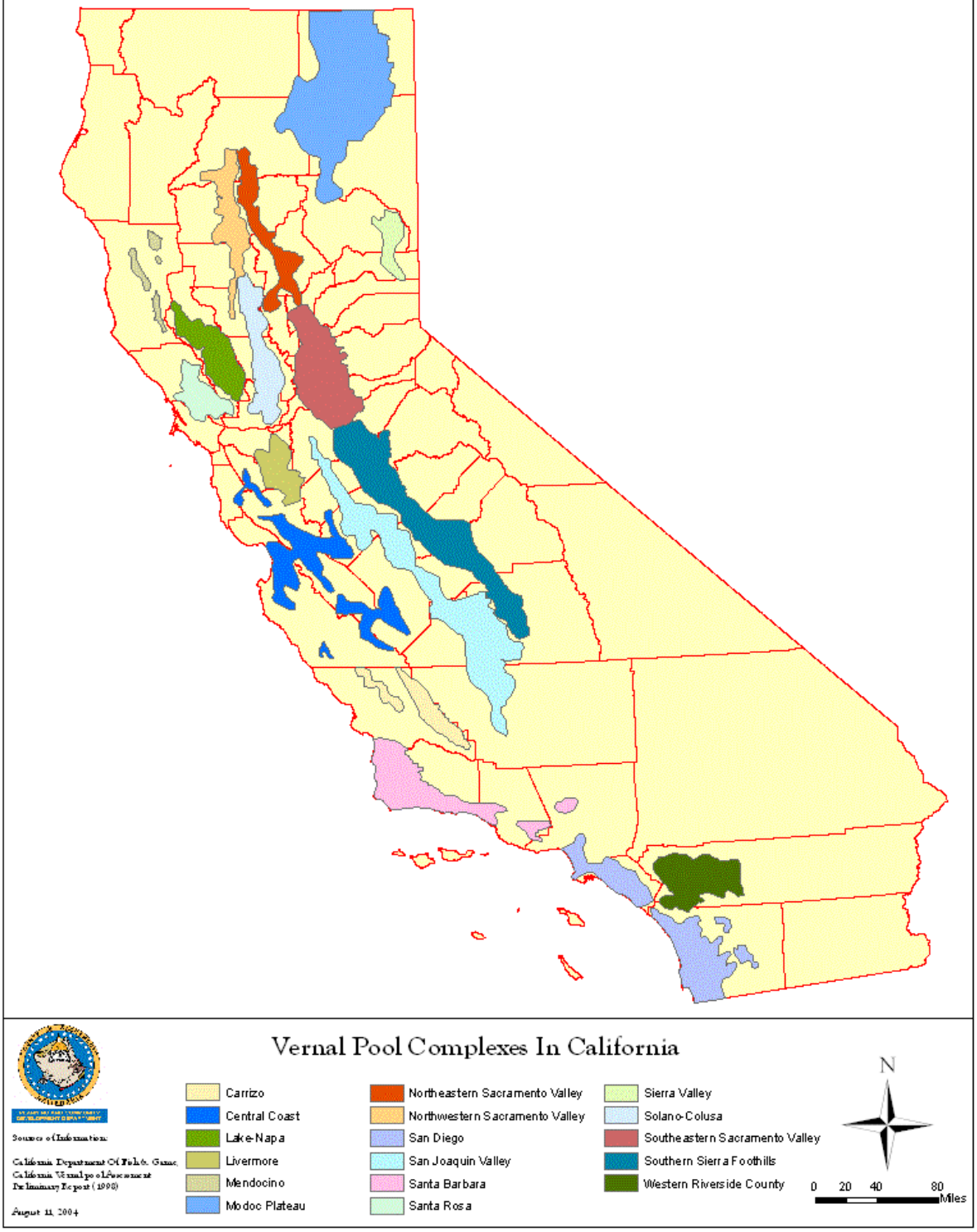


APPENDIX B-1 (Continued)

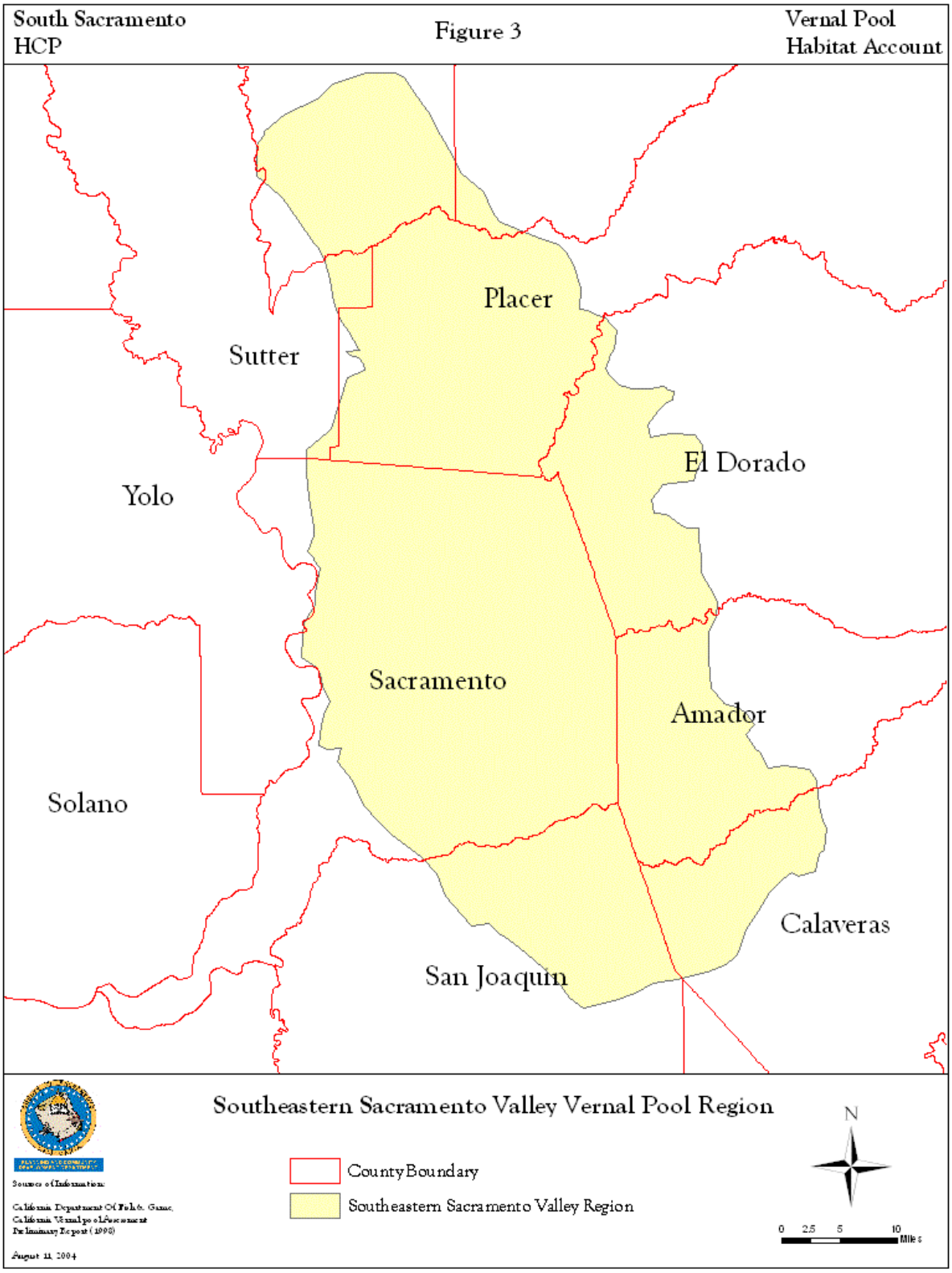
South Sacramento HCP

Figure 2

Vernal Pool Habitat Account



APPENDIX B-1 (Continued)



APPENDIX B-1 (Continued)

Table B1-3
Land and Vernal Wetland Acre Distribution by Geologic Formation in the SSHCP Study Area

Geologic Formation	Land Area (acres)	Vernal Wetland Area (acres)	Percent of Formation Occupied by Vernal Wetland Area (%)	Percent of Total Vernal Wetland Area (%)1	Percent of Total Land Area (%)1
Laguna (Tl)	67,582	1372.9	2.03	34.3	19.6
Riverbank, Lower Unit (Qrl)	53,357	494.8	0.93	12.4	15.5
Riverbank, Undivided (Qr)	51,425	700.6	1.36	17.5	14.9
Riverbank, Upper Unit (Qru)	28,212	303.9	1.08	7.6	8.2
Mehrten (Tm)	26,667	386.8	1.45	9.7	7.7
Metamorphic Rocks (pKu)	24,288	38.2	0.16	1.0	7.0
Riverbank, Middle Unit (Qrm)	18,953	187.5	0.99	4.7	5.5
Upper Unit Modesto (Qmu)	18,051	116.8	0.65	2.9	5.2
Dredge Tailing and Artificial Fill (t)	14,527	5.2	0.04	0.1	4.2
Valley Springs (Tvs)	13,648	248.1	1.82	6.2	4.0
Alluvial Floodplain Deposits (Qfp)	9,733	10.9	0.11	0.3	2.8
Undifferentiated Surficial Alluvial Deposits (Qu)	4,497	64.1	1.43	1.6	1.3
South Fork Gravels (Qsf)	3,975	48.8	1.23	1.2	1.2
Alluvial Deposits, Undivided (Qha)	3,419	1.6	0.05	0.04	1.0
Ione (Ti)	2,956	3.1	0.10	0.08	0.9
Turlock Lake (Tpl)	2,095	9.5	0.45	0.2	0.6
Basin Deposits (Qhb)	663	3.1	0.47	0.08	0.2
North Merced Gravels (Qtnm)	561	3.6	0.64	0.09	0.2
Total	**344,609**	**3999.5**	**N/A**	**100**	**100**

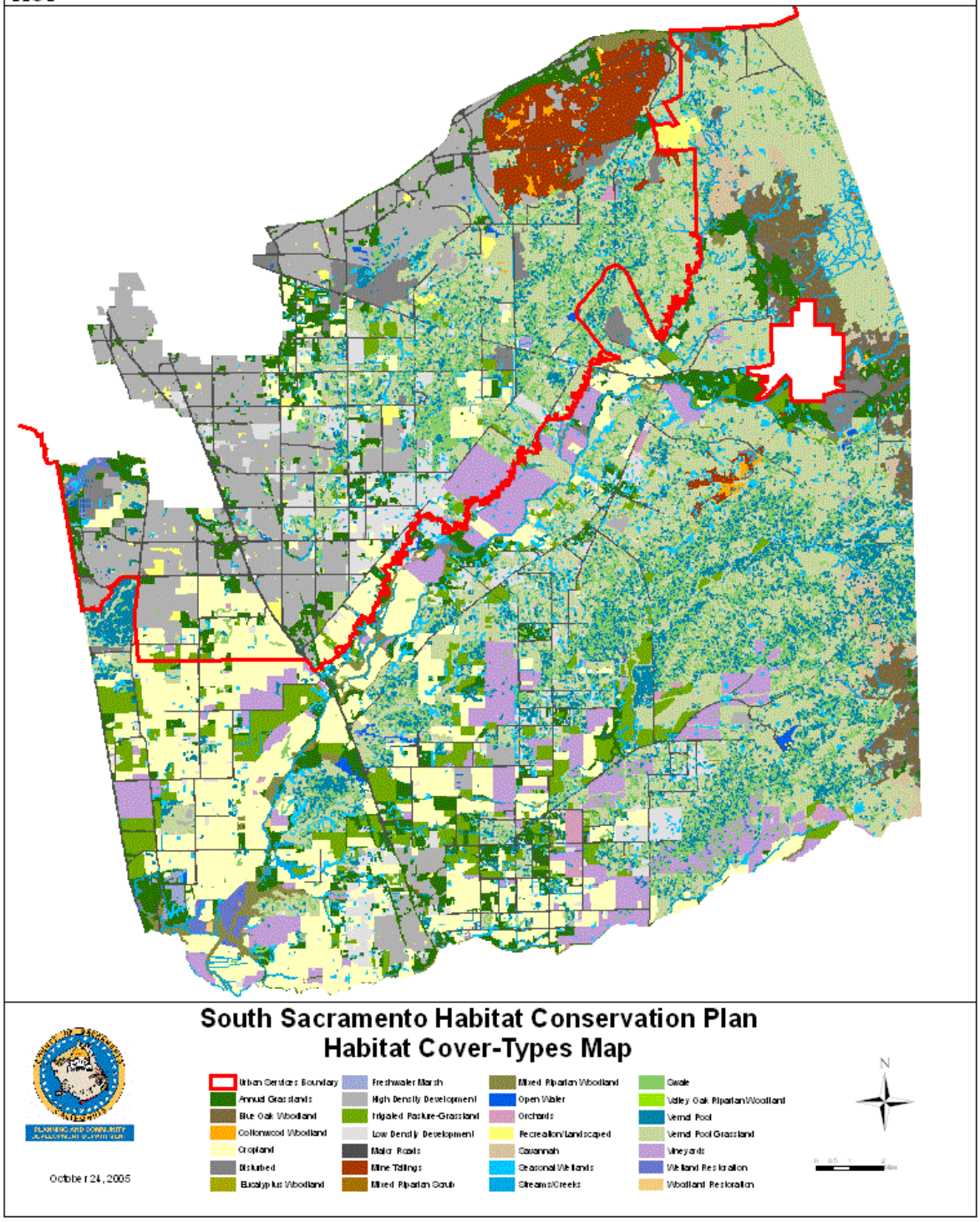
Notes:
1 Total refers to the entire SSHCP Study Area, rather than individual geologic formations.

APPENDIX B-1 (Continued)

South Sacramento HCP

Figure 4

Vernal Pool Habitat Account



APPENDIX B-1 (Continued)

Table B1-4
Number of Vernal Wetlands and Wetland acres for each Geologic Formation within the SSHCP Study Area that Contain Vernal Features

Geologic Formation	Total Acreage Inside SSHCPA	Number of Vernal Wetlands			Wetland Acres		
		Total	*Inside UDA*	*Outside UDA*	*Total*	*Inside UDA*	*Outside UDA*
Laguna (Tl)	67,582	**26844**	8484	18360	**1372.9**	587.5	785.4
Lower Unit Riverbank (Qrl)	53,357	**1719**	1055	664	**494.8**	107.1	387.7
Riverbank Undivided (Qr)	51,425	**9095**	1466	7629	**700.6**	107.2	593.4
Upper Unit Riverbank (Qru)	28,212	**2546**	240	2306	**303.9**	11.3	292.7
Mehrten (Tm)	26,667	**9759**	298	9461	**386.8**	14.8	372.1
Metamorphic Rocks (pKu)	24,288	**829**	17	812	**38.2**	0.3	37.9
Middle Unit Riverbank (Qrm)	18,953	**1970**	251	1719	**187.5**	22.6	165.0
Upper Unit Modesto (Qmu)	18,051	**1888**	1	1887	**116.8**	0.8	116.0
Dredge Tailing and Artificial Fill (t)	14,527	**162**	64	98	**5.2**	2.5	2.7
Valley Springs (Tvs)	13,648	**4018**	2	4016	**248.1**	0.1	248.0
Alluvial Floodplain Deposits (Qfp)	9,733	**59**	0	59	**10.9**	0	10.9
Undifferentiated Surficial Alluvial Deposits (Qu)	4,497	**1550**	568	982	**64.1**	23.8	40.4
South Fork Gravels (Qsf)	3,975	**586**	586	0	**48.8**	48.8	0
Alluvial Deposits, Undivided (Qha)	3,419	**32**	0	32	**1.6**	0	1.6
Ione (Ti)	2,956	**89**	0	89	**3.1**	0	3.1
Turlock Lake (Tpl)	2,095	**342**	342	0	**9.5**	9.5	0
Basin Deposits (Qhb)	663	**4**	0	4	**3.1**	0	3.1
North Merced Gravels (Qtnm)	561	**84**	41	43	**3.6**	2.2	1.4
Total	**344,609**	**61576**	**13415**	**48161**	**3999.5**	**938.5**	**3061.4**

Abbreviations are: UDA = Urban Development Area.

APPENDIX B-1 (Continued)

Figure 6 Number of Vernal Wetlands by Geologic Formation in the SSHCP Study Area. See Table B1-2 for Geologic Formation Names.

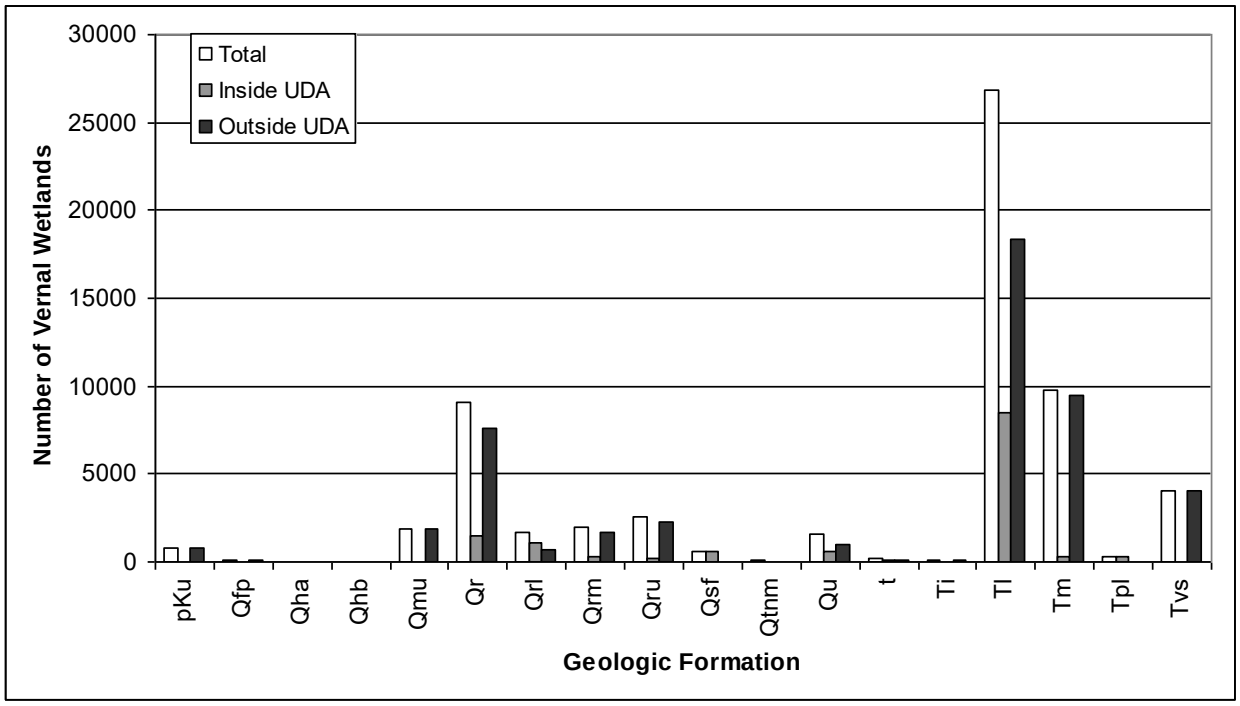
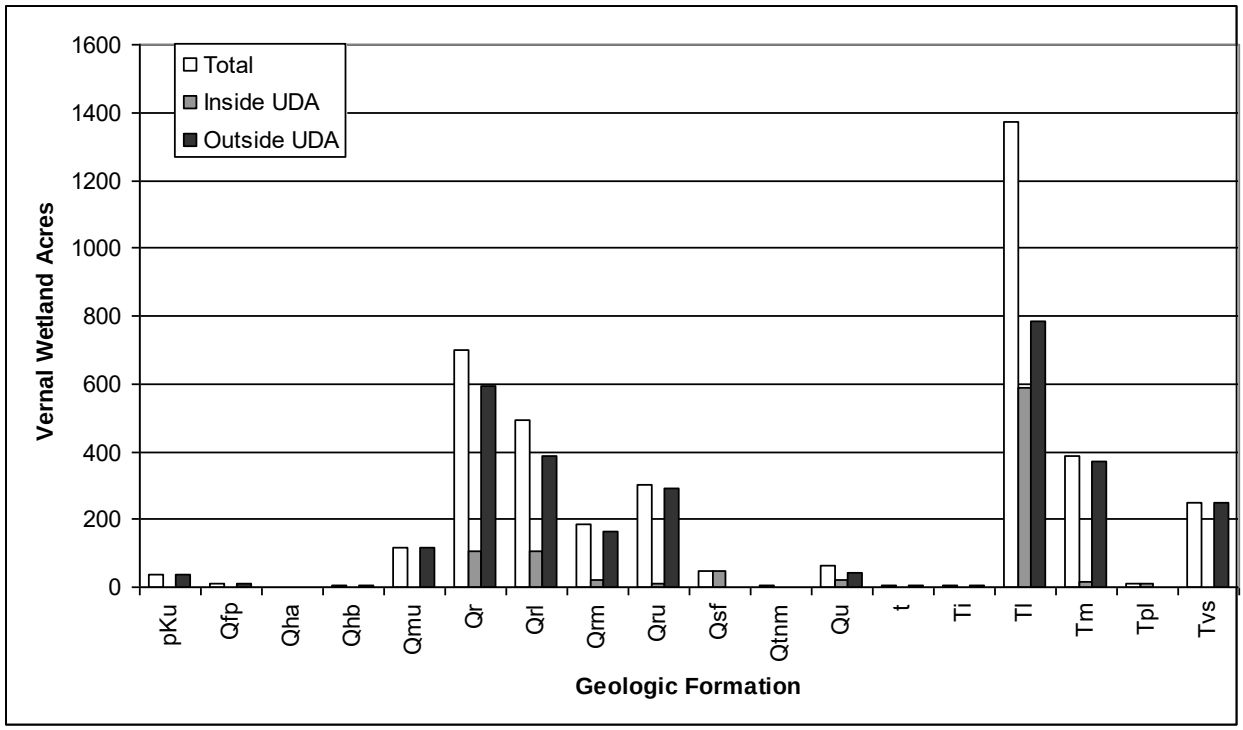


Figure 7 Number of Wetted Acres by Geologic Formation in the SSHCP Study Area. See Table B1-2 for geologic formation names.



APPENDIX B-1 (Continued)

The mean size of vernal pools / wetlands (in acres) for each geologic formation both inside and outside the UDA is summarized in Table B1-5 and illustrated in Figure 8.

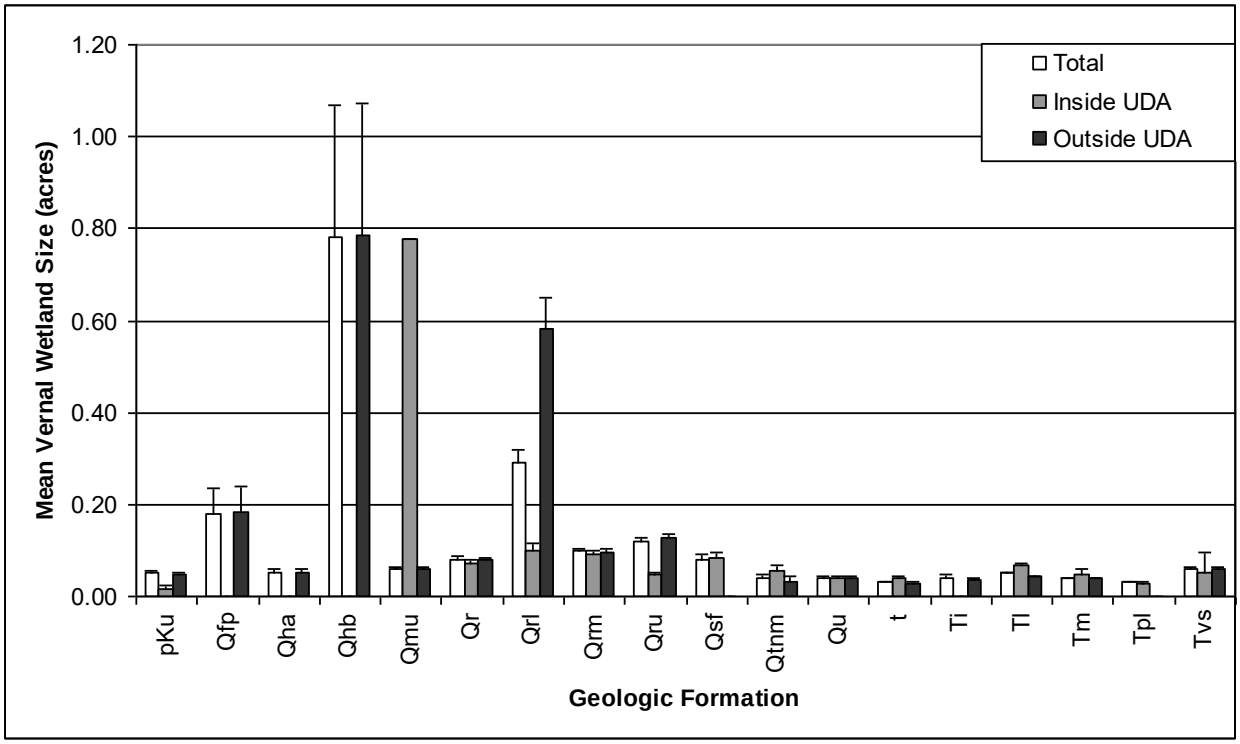
Table B1-5
Mean Vernal Wetland Size (acres) for Geologic Formations within the SSHCP Study Area

Geologic Formation	Total # of Vernal Wetlands	Mean Vernal Wetland Size		Mean Vernal Wetland Size Inside the UDA		Mean Vernal Wetland Size Outside the UDA	
		Mean	*SE*	*Mean*	*SE*	*Mean*	*SE*
Laguna (Tl)	26,844	0.05	0.001	0.07	0.004	0.04	0.001
Lower Unit Riverbank (Qrl)	1,719	0.29	0.028	0.10	0.013	0.58	0.067
Riverbank Undivided (Qr)	9,095	0.08	0.006	0.07	0.007	0.08	0.007
Upper Unit Riverbank (Qru)	2,546	0.12	0.008	0.05	0.006	0.13	0.008
Mehrten (Tm)	9,759	0.04	0.001	0.05	0.012	0.04	0.001
Metamorphic Rocks (pKu)	829	0.05	0.005	0.02	0.006	0.05	0.005
Middle Unit Riverbank (Qrm)	1970	0.10	0.006	0.09	0.010	0.10	0.006
Upper Unit Modesto (Qmu)	1888	0.06	0.004	0.78	N/A (one record)	0.06	0.004
Dredge Tailing and Artificial Fill (t)	162	0.03	0.003	0.04	0.005	0.03	0.005
Valley Springs (Tvs)	4,018	0.06	0.003	0.05	0.043	0.06	0.003
Alluvial Floodplain Deposits (Qfp)	59	0.18	0.054	N/A	N/A	0.18	0.054
Undifferentiated Surficial Alluvial Deposits (Qu)	1550	0.04	0.002	0.04	0.003	0.04	0.003
South Fork Gravels (Qsf)	586	0.08	0.011	0.08	0.011	N/A	N/A
Alluvial Deposits, Undivided (Qha)	32	0.05	0.011	N/A	N/A	0.05	0.011
Ione (Ti)	89	0.04	0.006	N/A	N/A	0.04	0.006
Turlock Lake (Tpl)	342	0.03	0.003	0.03	0.003	N/A	N/A
Basin Deposits (Qhb)	4	0.78	0.288	N/A	N/A	0.78	0.288
North Merced Gravels (Qtnm)	84	0.04	0.009	0.05	0.013	0.03	0.011
Total	**61,576**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Abbreviations are: UDA = Urban Development Area.

APPENDIX B-1 (Continued)

Figure 8 Mean (mean + 1 SE) Vernal Wetland Size for All Vernal Wetlands, and Those Inside and Outside the Urban Development Area by Geologic Formation in the SSHCP Study Area. See Table B1-2 for geologic formation names.



Large vernal wetlands (those covering 0.10 or more acres) comprise 10% of the total number of wetlands that occur in the SSHCP Study Area. Table B1-6 gives a summary of the large vernal wetlands and total wetted acres occurring on each geologic formation within the SSHCP Study Area. These large vernal wetlands were further sub-divided into five size categories (Table B1-7) that are illustrated graphically in Figure 9.

Table B1-6
Top 10% (Vernal wetlands greater than 0.1 acres) of Largest Vernal Wetlands and Total Vernal Wetland Acre for Geologic Formations within the SSHCP Study Area

Geologic Formation	Wetland Acres			Number of Vernal Wetlands		
	Total	*Inside UDA*	*Outside UDA*	*Total*	*Inside UDA*	*Outside UDA*
Laguna (Tl)	686.5	364.0	322.5	2,088	942	1,146
Lower Unit Riverbank (Qrl)	458.6	82.6	376.0	553	195	358
Riverbank Undivided (Qr)	465.4	66.4	399.0	989	164	825
Upper Unit Riverbank (Qru)	238.5	5.6	232.9	583	20	563
Mehrten (Tm)	186.6	7.8	178.8	636	13	623

APPENDIX B-1 (Continued)

Table B1-6
Top 10% (Vernal wetlands greater than 0.1 acres) of Largest Vernal Wetlands and Total Vernal Wetland Acre for Geologic Formations within the SSHCP Study Area

Geologic Formation	Wetland Acres			Number of Vernal Wetlands		
	Total	*Inside UDA*	*Outside UDA*	*Total*	*Inside UDA*	*Outside UDA*
Metamorphic Rocks (pKu)	19.5	0.0	19.5	59	0	59
Middle Unit Riverbank (Qrm)	133.2	15.8	117.4	391	44	347
Upper Unit Modesto (Qmu)	70.1	0.8	69.3	191	1	190
Dredge Tailing and Artificial Fill (t)	1.7	0.7	1.0	10	4	6
Valley Springs (Tvs)	151.9	0.0	151.9	413	0	413
Alluvial Floodplain Deposits (Qfp)	9.7	0.0	9.7	13	0	13
Undifferentiated Surficial Alluvial Deposits (Qu)	28.3	10.3	18.0	122	48	74
South Fork Gravels (Qsf)	32.9	32.9	0.0	82	82	0
Alluvial Deposits, Undivided (Qha)	0.7	0.0	0.7	3	0	3
Ione (Ti)	1.5	0.0	1.5	7	0	7
Turlock Lake (Tpl)	2.4	2.4	0.0	8	8	0
Basin Deposits (Qhb)	3.1	0.0	3.1	4	0	4
North Merced Gravels (Qtnm)	1.8	1.1	0.7	6	4	2
Total	**2492.4**	**590.4**	**1902.0**	**6,158**	**1525**	**4,633**

Abbreviations are: UDA = Urban Development Area.

Table B1-7
Top 10% (Vernal Wetlands Greater than 0.1 acres) of Largest Vernal Wetlands (in 5 Categories) for Geologic Formations within the SSHCP Study Area

Geologic Formation	Number of Large Vernal Wetlands (acres)					
	Total	*>4.0*	*4.0-1.1*	*1.1-0.7*	*0.7-0.37*	*0.37-0.10*
		(Inside the UDA / Outside the UDA)				
Laguna (Tl)	2088	6/4	48/24	29/32	111/114	748/972
Lower Unit Riverbank (Qrl)	553	3/13	5/64	11/58	20/85	156/138
Riverbank Undivided (Qr)	989	1/8	11/56	6/41	18/92	128/628
Upper Unit Riverbank (Qru)	583	0/3	0/27	2/32	2/85	16/416
Mehrten (Tm)	636	0/2	3/10	1/20	1/73	8/518
Metamorphic Rocks (pKu)	59	0/0	0/2	0/2	0/8	0/47
Middle Unit Riverbank (Qrm)	391	0/1	0/9	5/21	12/51	27/265
Upper Unit Modesto (Qmu)	191	0/0	0/10	1/15	0/20	0/145
Dredge Tailing and Artificial Fill (t)	10	0/0	0/0	0/0	0/0	4/6
Valley Springs (Tvs)	413	0/1	0/18	0/23	0/57	0/314

APPENDIX B-1 (Continued)

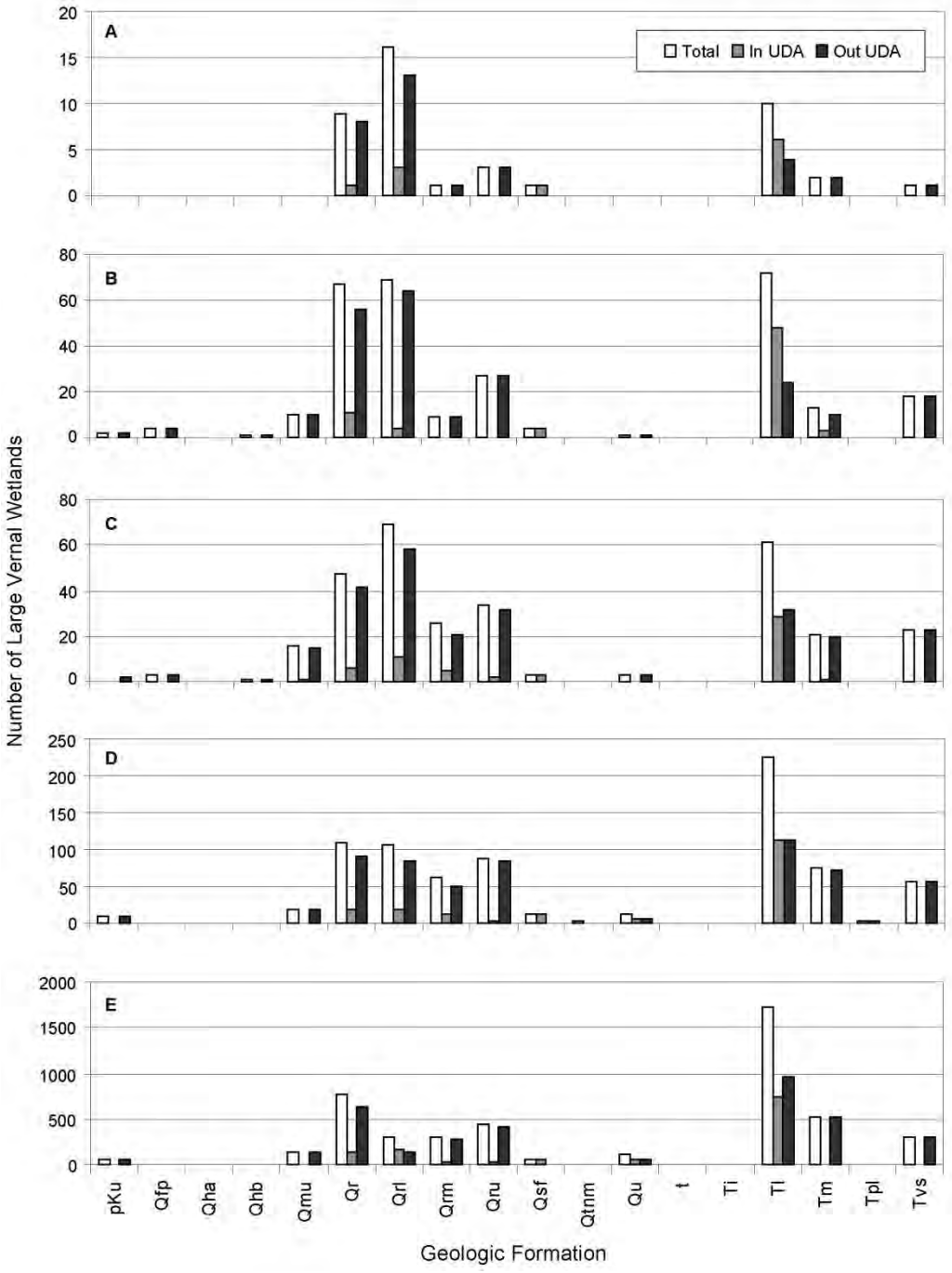
Table B1-7
Top 10% (Vernal Wetlands Greater than 0.1 acres) of Largest Vernal Wetlands (in 5 Categories) for Geologic Formations within the SSHCP Study Area

Geologic Formation	Number of Large Vernal Wetlands (acres)					
	Total	*>4.0*	*4.0-1.1*	*1.1-0.7*	*0.7-0.37*	*0.37-0.10*
		(Inside the UDA / Outside the UDA)				
Alluvial Floodplain Deposits (Qfp)	13	0/0	0/4	0/3	0/0	0/6
Undifferentiated Surficial Alluvial Deposits (Qu)	122	0/0	0/1	0/3	5/7	43/63
South Fork Gravels (Qsf)	82	1/0	4/0	3/0	14/0	60/0
Alluvial Deposits, Undivided (Qha)	3	0/0	0/0	0/0	0/0	0/3
Ione (Ti)	7	0/0	0/0	0/0	0/0	0/7
Turlock Lake (Tpl)	8	0/0	0/0	0/0	2/0	6/0
Basin Deposits (Qhb)	4	0/0	0/1	0/1	0/1	0/1
North Merced Gravels (Qtnm)	6	0/0	0/0	0/0	1/1	3/1
Total	6158	**43**	**297**	**309**	**780**	**4729**
In/Out	**1,525/4,633**	**11/32**	**71/226**	**58/251**	**186/594**	**1,199/3,530**

Abbreviations are: UDA = Urban Development Area.

APPENDIX B-1 (Continued)

Figure 9 Large vernal wetlands (the largest 10%) and their distribution among geologic formations in the SSHCP Study Area and position relative to the Urban Development Area. The graphs represent wetlands in the following large vernal wetland size categories from the top down: (A): >4.0 acres; (B): 4.0-1.1 acres; (C): 1.1-0.7 acres; (D): 0.7-0.37 acres; and (E): 0.37-0.10 acres. See Table B1-2 for geologic formation names.



The following discussion of the distribution of vernal wetlands in the SSHCP Study Area is organized by geologic formations with the most wetted acres to the formation with the least. Four geologic formations, Laguna, Undivided Riverbank, Mehrten, and Valley Springs contain 80% of the vernal wetlands mapped in the SSHCP Study Area (Table B1-4). The Laguna Formation contains 43% of all mapped vernal wetlands in the SSHCP Study Area. The Mehrten Formation is next in rank (although 5th in terms of overall acreage) bearing 16% of the total number of vernal wetlands, with Undivided Riverbank supporting 15% of the total. Some formations (e.g. Basin Deposits) are relatively minor in terms of number of acres covered, but are important because they support a few very large vernal wetlands.

Average vernal wetland size was calculated for each formation (mean ± 1SE). Means inside and outside the UDA were compared using a Student's t-test. For most of the formations, there was no significant difference between the means (at the .95 confidence level) inside and outside the UDA. However, means did differ significantly between wetlands inside and outside the UDA on the Metamorphic Rocks Formation, meaning that the larger average size of vernal wetlands outside the UDA is not attributable to random chance.

Deep pools were identified during the mapping process as pools that were at least 50% inundated as of March 15, 2001 (the date the aerial photographs were taken).

SSHCP covered species dependent on vernal pools (Table B1-1) are documented as occurring on 13 of the 18 geologic formations discussed below. Reported occurrences of these species were most often from vernal wetlands on the Laguna Formation. However, some formations (e.g., Lower Unit Riverbank, Riverbank Undivided) containing a smaller percentage of the overall number of vernal wetlands have a relatively high number of covered species occurrences.

3.3.1 Laguna Formation (Tl)

The Laguna Formation is the most extensive geologic formation in the SSHCP Study Area with a total of 67,582 acres (28,230 acres inside the UDA and 39,352 acres outside the UDA). It comprises 20% of the total SSHCP land area and is part of the High Terrace Landform that is restricted to the east side of the Central Valley (Smith and Verrill 1998; Jones and Stokes 1990; Reiner and Swenson 2000). The Laguna Formation is composed of interbedded alluvial gravel, sand and silt, deposited from ancient river channels draining from the Sierra Nevada Range, including the Feather, Yuba, American, Cosumnes, and Merced Rivers (Helley and Harwood 1985). It occurs in a band several miles wide running north-south along the eastern half of the SSHCP Study Area. Associated soil families include Redding, Red Bluff and Corning.

The Laguna Formation encompasses 43.5% of the 61,576 total vernal wetlands within the SSHCP Study Area. Of the 26,844 vernal wetlands occurring on this formation, 8,484 are located

inside the UDA and 18,360 are outside the UDA). The Laguna Formation ranks first in importance in terms of total number of wetlands.

Approximately 34% (1,373 acres) of the total vernal wetland acreage within the entire SSHCP Study Area occurs on the Laguna Formation. There are 587.5 vernal wetted acres within the UDA and 785.5 acres outside the UDA. Mean vernal wetland size (± 1 SE) on the Laguna Formation is 0.05 ±0.001 acres.

About one third (2,088) of the 6,158 largest vernal wetlands (defined as those ≥ 0.10 acre) mapped within the SSHCP Study Area occur on the Laguna Formation. The Laguna Formation also has the greatest portion (one third) of the top 10% of the largest vernal wetlands (pools >0.10 acres), encompassing a total of 2,088 of the 6,158 large vernal wetlands that occur in the SSHCP Study Area. Over half (55%) of the large wetlands on the Laguna Formation occur inside the UDA; the rest are located outside the UDA.

The Laguna formation has a total of 10,112 deep pools (3,330 inside the UDA and 6,782 outside the UDA). The total acreage of deep pools is 603.3 acres (296.3 acres inside the UDA and 307 acres outside the UDA).

Surveys conducted within the SSHCP Study Area to date have reported all 13 covered species (see Table B1-1) from vernal wetlands on the Laguna Formation (CDFG 2005). Sacramento Orcutt grass and slender Orcutt grass, the only SSHCP "no take species", are reported exclusively from the Laguna Formation.

3.3.2 Mehrten Formation (Tm)

The Mehrten Formation is made up of eroded, high standing remnants of andesitic volcanic mudflow fans that were deposited during the Pliocene and Miocene, 10-25 million years ago. In the San Joaquin Valley, this stratum overlies the Valley Spring Formation and sits under the Laguna Formation. Vernal pools tend to be located on the western edge of the Merhten Formation because the eastern portion increases in slope, precluding pool development (Smith and Verrill 1998). There are 26,667 acres of Mehrten Formation within the SSHCP Study Area (3,441 acres inside the UDA and 23,226 acres outside the UDA).

The Mehrten Formation ranks second in total number of vernal wetlands in the SSHCP Study Area, with 9,759 (16%) mapped (298 inside and 9,461 outside the UDA). There are a total of 387 wetted acres associated with the Mehrten Formation (15 acres inside and 372 acres outside the UDA). Mean size (± 1SE) of vernal wetlands on the Mehrten Formation is 0.04 ±0.001 acres. Vernal wetlands are similar in average size both inside and outside the UDA.

The Mehrten Formation encompasses about 10% (636) of the 6,158 largest vernal wetlands inside the SSHCP Study Area. All but 13 of these largest pools are located outside of the UDA.

The Mehrten Formation has a total of 1,829 deep pools (62 inside the UDA and 1,767 outside the UDA). The total acreage of deep pools is 43.9 acres (1.7 acres inside the UDA and 42.2 acres outside the UDA).

Covered species occurring in vernal wetlands on this formation include vernal pool tadpole shrimp, vernal pool fairy shrimp, legenere, and pincushion navarretia.

3.3.3 Riverbank Undivided Formation (Qr)

The Riverbank Undivided Formation covers the third largest area in the SSHCP with a total of 51,425 acres (15,850 acres inside and 35,575 acres outside the UDA). This formation is part of the lower, younger terrace deposited along the entire east side of the Central Valley and the west side of the Sacramento Valley during the Pleistocene (100,000 years ago). Soils with claypans and duripans are common, as are vernal pools (Smith and Verrill 1998). Riverbank Formation is generally confined to the central portion of the SSHCP Study Area and occurs on either side of the Cosumnes River.

The Riverbank Undivided Formation contains the third largest number of vernal wetlands within the SSHCP Study Area with a total of 9,095 (1,466 within the UDA and 7,629 outside the UDA). This is about 15% of the total number of vernal wetlands mapped. The total vernally wetted area of Riverbank Undivided Formation is 701 acres (107 acres within the UDA and 594 acres outside the UDA).

The mean size of vernal wetlands (±1 SE) on Riverbank Undivided Formation is 0.08 (±0.006) acres. The Riverbank Undivided Formation supports about 16% of the 6,158 largest vernal wetlands (top 10% largest) mapped within the SSHCP Study Area. Most of the 989 largest pools on this formation occur outside the UDA (174 inside and 825 outside the UDA).

The Riverbank Undivided Formation has a total of 2,462 deep pools (374 inside the UDA and 2088 outside the UDA). The total acreage of deep pools is 182.8 acres (33.1 acres inside the UDA and 149.7 acres outside the UDA).

Based on surveys conducted within the SSHCP Study Area to date, covered species reported from Riverbank Undivided include the vernal pool endemics vernal pool fairy shrimp, vernal pool tadpole shrimp, mid valley fairy shrimp, as well as California tiger salamander and the vernal pool plant, legenere.

3.3.4 Valley Springs Formation (Tvs)

The Valley Springs Formation is made up of eroded, high-standing remnants of rhyolitic volcanic mudflow fans that were deposited 20-35 million years ago. Vernal pools tend to be located on the western edge of the formation because the eastern portion increases in slope, precluding pool development (Smith and Verrill 1998). A total of 13,648 acres of Valley Springs Formation occurs on the south-eastern edge of the SSHCP Study Area (91 acres are inside the UDA and 13,557 acres are outside the UDA).

The Valley Springs Formation supports 4,018 vernal wetlands, all but 2 are located outside the UDA. These vernal wetlands total 248 acres. Mean size (±1 SE) of these vernal wetlands is 0.06 ±0.003 acres.

The Valley Springs Formation encompasses less than 10% (413) of the 6,158 largest vernal wetlands (≥ 0.01 acres). All of the largest wetlands on this formation are outside the UDA.

The Valley Springs Formation has a total of 1,606 deep pools that are outside the UDA. The total acreage of deep pools is 58.7 acres.

Pincushion navarretia is the only covered species found in vernal wetlands on this formation.

3.3.5 Upper Unit Riverbank Formation (Qru)

The Upper Unit Riverbank Formation is a compacted mixture of granitic sand, silt, and clay with channels of metamorphic gravel, dark brown to red in color. Sediments in this formation are similar to those in the Laguna Formation. This formation developed during the middle to late Pleistocene and covers 28,212 acres (6,295 acres inside the UDA and 21,917 acres outside the UDA) in the central to southern portion of the SSHCP Study Area, overlapping onto the older Laguna Formation to the east and covered by younger alluvium in the western portion.

The 2,546 vernal wetlands associated with Upper Unit Riverbank Formation cover a total of 304 acres. About 90% of these vernal wetlands are located outside the UDA. Mean size (± 1SE) of vernal wetlands on this formation is relatively large (0.12 ±0.008 acres). Vernal wetland mean size inside the UDA is 0.05 acres; outside the UDA, mean size is 0.12 acres. Statistically, the difference between the means is not significant (p = 1.658).

Of the 6,158 largest vernal wetlands (vernal wetlands ≥0.10 acre), 538 are located on the Upper Unit Riverbank Formation. Most of these large pools are located outside the UDA; only 20 occur within the boundaries of the UDA.

The Upper Unit Riverbank Formation has a total of 726 deep pools (12 inside the UDA and 714 outside the UDA). The total acreage of deep pools is 75.2 acres (0.6 acres inside the UDA and 74.6 acres outside the UDA).

Five covered species have been recorded from vernal wetlands on this formation within the SSHCP Study Area: western spadefoot, California tiger salamander, vernal pool fairy shrimp, vernal pool tadpole shrimp, and mid-valley fairy shrimp.

3.3.6 Middle Unit Riverbank Formation (Qrm)

The Middle Unit Riverbank Formation is similar in composition to the other Riverbank Formations. There are approximately 18,953 acres of Middle Unit Riverbank Formation located within the SSHCP Study Area (5,886 acres inside the UDA and 13,067 acres outside the UDA). This formation occurs in a few disjunct patches in the south-central and north-central parts of the SSHCP Study Area.

There are 1,970 vernal wetlands that occur on The Middle Unit Riverbank Formation (251 inside and 1,719 outside the UDA). These wetlands cover 188 acres, only 23 of which are found inside the UDA. Vernal wetland mean size (± 1 SE) is 0.10 ±0.006 acres. Average pool size inside and outside of the UDA does not differ significantly (p = 1.65).

The Middle Unit Riverbank Formation contains 391of the 6,158 top 10% largest vernal wetlands. Most of these large vernal wetlands are located outside the UDA.

The Middle Unit Riverbank Formation has a total of 501 deep pools (92 inside the UDA and 409 outside the UDA). The total acreage of deep pools is 50.3 acres (12.3 acres inside the UDA and 38 acres outside the UDA).

SSHCP covered species recorded from this formation include vernal pool tadpole shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, and legenere.

3.3.7 Upper Unit Modesto Formation (Qmu)

The Upper Unit Modesto Formation is the youngest unit of Pleistocene alluvium consisting of distinct alluvial terraces, some alluvial fans, and abandoned channel ridges (Helley and Harwood 1998). It forms the lowest deposits lying topographically above Holocene deposits along streams in valleys. Streams that still exist today deposited the Modesto Formation between 12,000 and 26,000 years ago. In the SSHCP Study Area, Upper Unit Modesto Formation covers a total of 18, 051 acres, bordering the Cosumnes River, Laguna Creek, Skunk Creek, Hadselville Creek, and Browns Creek. Most of these acres are outside the UDA (17,864 acres) and only 185 acres occur within the UDA.

The Upper Unit Modesto Formation supports 1,888 vernal wetlands covering a total of 117 acres. All but one of these wetlands occurs outside the UDA. The mean size (± 1SE) of vernal wetlands on this formation is 0.06 ±0.004 acres.

The Upper Unit Modesto has 191 of the top 10% of largest vernal wetlands (≥ 0.10 acres). Only one of these large wetlands occurs inside the UDA.

The Upper Unit Modesto Formation has a total of 837 deep pools (1 inside the UDA and 836 outside the UDA). The total acreage of deep pools is 63.8 acres (0.8 acres inside the UDA and 63 acres outside the UDA).

Four covered species are reported to occur in vernal wetlands on this formation: California tiger salamander, mid-valley fairy shrimp, Ahart's dwarf rush, and pincushion navarretia.

3.3.8 Lower Unit Riverbank Formation (Qrl)

There are 53,357 acres of Lower Unit Riverbank Formation (40,273 acres inside the UDA and 13,084 acres outside the UDA), making it the second largest geological formation within the SSHCP Study Area. It is made up of higher riverbank terraces and remnants of alluvial fans. The most extensive exposure of Lower Unit Riverbank is in and around the City of Sacramento and was probably deposited by the American River. The modern Sacramento River is impinging on and eroding this alluvial fan (Helley and Harwood 1985). Lower Unit Riverbank deposits occur in the northwest portion of the SSHCP Study Area.

The Lower Unit Riverbank Formation has 1,719 vernal wetlands within the Study Area (1,055 inside the UDA; 664 outside the UDA). The total area covered by vernal wetlands on the Lower Unit Riverbank Formation is 495 acres, about three-quarters of which, occurs outside the UDA. Mean size (±1 SE) of vernal wetlands on this formation is rather large, nearly 1/3 acre (0.29 ±0.028 acres). Average vernal wetland size is 0.1 acres inside the UDA and about 0.6 acres outside the UDA. The difference between the means is not statistically significant (p = 5.36).

Lower Unit Riverbank has 553 of the 6,158 largest vernal wetlands mapped in the SSHCP Study Area. Of these, 195 occur inside the UDA and 358 occur outside the UDA.

The Lower Unit Riverbank Formation has a total of 353 deep pools (233 inside the UDA and 120 outside the UDA). The total acreage of deep pools is 67.1 acres (29.8 acres inside the UDA and 37.2 acres outside the UDA).

Several occurrences of the SSHCP covered species vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, all vernal pool endemics, are recorded for this formation.

Legenere, another covered species, has also been reported from Lower Unit Riverbank Formation within the SSHCP Study Area.

3.3.9 Undifferentiated Surficial Alluvial Deposits Formation (Qu)

Undifferentiated Surficial Alluvial Deposits are found on 4, 497 acres largely confined to the banks of streams and rivers on the eastern side of the SSHCP Study Area. About a fourth of the area (1,189 acres) is located within the UDA and 3,309 acres are located outside the UDA. This formation derives from various alluvial sources deposited in geologically recent times.

There are 1,550 vernal wetlands on the Undifferentiated Alluvial Deposits Formation: 568 are found inside the UDA and 982 are outside. Total wetted area is 64.1 acres (23.8 acres inside and 40.4 acres outside the UDA). Mean size (±1 SE) of vernal wetlands on this formation is 0.04 ± 0.002 acres.

The Undifferentiated Surficial Alluvial Deposits Formation has 122 of the 6,158 largest vernal wetlands (1.9%). Forty-eight (48) of these occur within the UDA and 74 occur outside the UDA.

The Undifferentiated Surficial Alluvial Formation has a total of 565 deep pools (243 inside the UDA and 322 outside the UDA). The total acreage of deep pools is 30.2 acres (12.9 acres inside the UDA and 17.3 acres outside the UDA).

Six covered species are reported from vernal wetlands on Undifferentiated Surficial Alluvial Deposits in the SSHCP Study Area: western spadefoot, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, legenere, and pincushion navarretia.

3.3.10 Metamorphic Rock Formation (pKu)

Exposed metamorphic and granitic rocks are found in the northeastern part of the SSHCP Study Area. These rocks are part of the oldest geologic complex formed before the Cretaceous period, at least 145 million years ago. The Metamorphic Rock Formation of covers 7% (24, 288 acres) of the total land area in the SSHCP Study Area, of which 86 acres occur in the UDA and 24,201 acres are outside the UDA.

The Metamorphic Rock Formation has 829 vernal wetlands within the SSHCP Study Area, (17 inside the UDA and 812 outside the UDA). Total vernal wetland area for the Metamorphic Rock Formation is 38.2 acres, almost all of which falls outside the UDA. The average size (mean ± 1 SE) of vernal wetlands on this formation is 0.05 ±0.005 acres. This is the only formation on which average vernal wetland size differs significantly between those inside the UDA and those outside the UDA. Here, average vernal wetland size is statistically significantly smaller inside the UDA (p

= 0.002).The Metamorphic Rock Formation contains 59 of the 6,158 largest vernal wetlands (≥0.10 acres) in the SSHCP Study Area. All of these large wetlands occur outside the UDA.

The Metamorphic Rock Formation has a total of 213 deep pools outside the UDA. The total acreage of deep pools is 6 acres.

Vernal pool fairy shrimp is the only SSHCP covered species recorded from the Metamorphic Rock Formation at the time of this report.

3.3.11 South Fork Gravels Formation (Qsf)

South Fork Gravels form a broken belt of rounded pebbles and cobbles in a matrix of coarse sand that extends in a northeasterly direction in the center of the UDA. The age of this deposit has not been determined, but it is thought to be older than the Laguna Formation. South Fork Gravels cover a total 3,975 acres within the SSHCP Study Area (1.2% of total land area), all of which are inside the UDA.

The 586 vernal wetlands on the South Fork Gravels Formation occupy a total of 48.8 acres. Mean vernal wetland size (±1 SE) is 0.08 ± 0.011.

The South Fork Gravels Formation has 82 of the 6,158 vernal wetlands 0.1 acre or larger. All are located within the boundaries of the UDA.

The South Fork Gravels Formation has a total of 143 deep pools inside the UDA. The total acreage of deep pools is 18.8 acres.

Vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, and legenere are covered species reported from the South Fork Gravels Formation in the SSHCP Study Area.

3.3.12 Turlock Lake Formation (Tpl)

The Turlock Lake Formation is part of the high terrace on the east side of the Central Valley (Smith and Verrill 1998) that formed about a million years ago. It is made up of slightly cemented sand, gravel and silt occurring as a thin layer over the Laguna Formation in the upper central portion of the SSHCP Study Area. The Turlock Lake Formation covers a total of 2,095 acres, all of which are inside the UDA.

The Turlock Lake Formation has 342 vernal wetlands (9.5 wetted acres) within the SSHCP Study Area. Mean size (± 1SE) of these vernal wetlands is 0.03 ±0.003 acres. Eight of the 342 vernal wetlands on Turlock Lake Formation are 0.10 acres or larger. All of these large wetlands occur within the UDA.

The Turlock Formation has a total of 55 deep pools inside the UDA. The total acreage of deep pools is 2.2 acres.

SSHCP covered species reported from the Turlock Lake Formation to date are western spadefoot, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

3.3.13 Dredge Tailing and Artificial Fill Formation (t)

The Dredge Tailing and Artificial Fill Formation consists of rows of large cobble, gravel, sand, silt, and clay deposited along riverbanks as a result of gold mining undertaken during the 1800's. This formation covers 14,527 acres, 4.2% of the total land area of the SSHCP. Most (12,735 acres) of the land covered by dredge tailings and artificial fill occurs within the UDA in the northern portion of the SSHCP Study Area and 1,791 acres occur outside the UDA.

Less than one percent (162) of the mapped vernal wetlands occur on this formation (64 inside and 98 outside the UDA). These vernal wetlands cover about 5 acres; half of which occur within the UDA and the other half outside the UDA. Average vernal wetland size (mean ± 1SE) is 0.03 ±0.003 acres. There is no significant difference between the mean size of wetlands inside compared with outside the UDA.

Ten of the 6,158 largest pools occur on this formation, 4 of them inside and 6 outside the UDA.

The Dredge Tailings and Artificial Fill Formation has a total of 75 deep pools (10 inside the UDA and 65 outside the UDA). The total acreage of deep pools is 2.2 acres (0.8 acres inside the UDA and 1.4 acres outside the UDA).

No SSHCP covered species have been reported from this formation to date.

3.3.14 Ione Formation (Ti)

The Ione Formation is composed of three distinct layers: quartz sandstone overlying white clay, with gray or blue clay below. This developed during the Eocene (40-50 million years ago) when the Central Valley was covered by inland sea. Ione formation is exposed in the eastern portion of the SSHCP Study Area.

It covers a total of 2,956 acres (61 acres are inside the UDA and 2,895 acres are outside the UDA).

Eighty-nine vernal wetlands (3.1 wetted acres) have been mapped on Ione Formation. All fall outside the boundary of the UDA. Vernal wetland mean size (± 1 SE) is 0.4 ±0.006 acres. Of the 6,158 large vernal wetlands (≥ 0.1 acres), 7 occur on the Ione Formation. All of these large vernal wetlands are outside the UDA.

The Ione Formation has a total of 32 deep pools outside the UDA. The total acreage of deep pools is 0.8 acres.

There are no SSHCP covered species reported from this formation at this time.

3.3.15 North Merced Gravels (Arroyo Seco Gravel) Formation (Qtnm)

The North Merced Gravels Formation is made up of coarse, round pebbles and cobbles derived from dark metamorphic rocks that were laid down by streams and rivers draining the Sierra Nevada 1-3 million years ago. In the SSHCP Study Area, this formation occurs as a thin layer that overlies very high terraces of Laguna Formation sediments, covering 561 acres (500 acres are inside the UDA and 61 acres are outside the UDA).

There are 84 vernal wetlands on the North Merced Gravels Formation; 41 of these are found inside the UDA and 43 are outside the UDA, for a total of 3.6 wetted acres. Average size (mean ± 1 SE) of vernal wetlands mapped on this formation is 0.04 ±0.009 acres.

Six of the 6,158 largest vernal wetlands (4 inside and 2 outside the UDA) occur on North Merced Gravels within the Study Area.

The North Merced Gravels Formation has a total of 45 deep pools (9 inside the UDA and X outside the UDA). The total acreage of deep pools is 2.6 acres (1.2 acres inside the UDA and X acres outside the UDA).

Boggs Lake hedge-hyssop is the only covered species reported from North Merced Gravels in the SSHCP Study Area at this time.

3.3.16 Alluvial Floodplain Deposits (Qfp)

The Alluvial Floodplain Deposits Formation is made up of fine sand, silt, and clays deposited down during the current epoch. It covers 9,733 acres, all of it outside the UDA, primarily in the southwestern portion of the SSHCP Study Area. There are 59 vernal wetlands on this formation covering a total of 10.9 acres.

Vernal wetlands on this formation are relatively large. Mean wetland size (± 1 SE) is 0.18 ±0.054 acres. Thirteen of the largest 10% of vernal wetlands occur on this formation; about half of these are one acre or larger.

The Alluvial Floodplain Deposits Formation has a total of 21 deep pools outside the UDA. The total acreage of deep pools is 2 acres.

Dwarf downingia and legenere are the only covered species reported from vernal wetlands on Alluvial Floodplain Deposits within the SSHCP Study Area to date.

3.3.17 Undivided Alluvial Deposits (Qha)

Undivided Alluvial Deposits are composed of cobbles, gravel, sand, silt and clay. This formation occurs on less than 1% of the total SSHCP Study Area. Of the 3, 419 acres mapped, 838 acres occur inside the UDA and 2,582 acres occur outside the UDA in discrete patches along the boundaries of the SSHCP Study Area. There are 32 vernal wetlands on this formation that cover a total of 1.6 acres, all outside the UDA.

Mean area (±1 SE) of the vernal wetlands on Undivided Alluvial Deposits is 0.05 ±0.011 acres. Three of the top 10% largest vernal wetlands occur on this formation. All three are found outside the UDA.

The Undivided Deposits Formation has a total of 9 deep pools outside the UDA. The total acreage is 0.2 acres.

No covered species have been reported from this formation to date.

3.3.18 Basin Deposits (Qhb)

Basin Deposits occur as unconsolidated clay, silt, and other fine material that formed in sink areas during the Holocene epoch. This recent formation is found in the eastern-most corner of the SSHCP Study Area and covers a total of 663 acres (590 acres inside and 73 outside the UDA).

Four vernal wetlands were mapped on this formation; these cover a total of 3.1 acres, all outside the UDA. Average size (mean ± SE) of vernal wetlands on Basin Deposits is quite large: 0.78 ± 0.228 acres. Each of the four wetlands on this formation is 0.10 acres or larger.

The Basin Deposits Formation has a total of 2 deep pools outside the UDA). The total acreage of deep pools is 2.4 acres.

No covered species have been reported from this formation to date.

APPENDIX B-1 (Continued)

INTENTIONALLY LEFT BLANK

4 THREATS TO HABITAT AND AQUATIC RESOURCES

It is impossible to determine the acreage of vernal pool complexes, the number of vernal pools, or the distribution of types of vernal pools that once occurred in pre-settlement California. Dahl (1990) estimates that California has lost 95% of its pre-settlement wetlands (including vernal pools), more wetland loss than any other state in the Country. Holland (1998) reports a loss of approximately three million acres (~75%) of vernal pool complexes since the European settlement of California. He estimates that, as of July 1997, less than one million acres of mostly fragmented complexes remain. It was further estimated that since 1987, Merced County has lost 30,317 acres of vernal pool habitat, and that between 1972 and 1993 Sacramento County lost 30,512 acres (Holland 1998). Figures for total losses of vernal pool habitat statewide since 1997 are not available. However even at a conservative estimated loss rate of 1.5% per year (it may be greater considering current 50-year build-out projections for Merced, Sacramento, Solano, and Placer Counties), the estimated one million acres remaining in 1997 will be reduced by one-half in 46 years, down to just 12% of the pre-settlement California vernal pool acreage (Keeler-Wolf et al. 1998).

Vernal pool habitat remaining in California is further threatened by direct loss and by degradation resulting from residential and industrial development, agricultural land-use conversion, habitat fragmentation, hydrological alteration, invasive plant species, inappropriate livestock and vegetation management, non-point source water and air pollution and climate change.

4.1 Urban and Industrial Development

The greatest losses of California vernal pool habitat have resulted primarily from land-use conversion to irrigated agriculture, starting in the latter part of the 19th Century (see Section 4.2), and more recently, to residential and industrial development. Development remains the main threat to the continued existence of functioning vernal pool landscapes in the Central Valley and elsewhere in California (Jokerst 1993; Bauder et al. 1997; Keeler-Wolf et al. 1998).

It is important to note that Sacramento and Placer Counties together contain the majority of the vernal pool acreage existing in the Southeast Sacramento Valley Vernal Pool Bioregion. This Bioregion encompasses the majority of the State's Northern Hardpan Vernal Pool type as well (CDFG 1998). Most of the Volcanic Mudflow Vernal Pool type in this Bioregion has already been lost to development (Keeler-Wolf et al. 1998). Considering past losses, projections for development, and the high quality of some of the vernal pool habitat remaining in Sacramento and Placer Counties, the Southeast Sacramento Valley Vernal Pool Bioregion is one of the more ecologically important regions, and one of the most threatened.

Land development threatens the remaining vernal pool ecosystem directly through destruction and fragmentation of habitat. Loss of habitat, however may also indirectly affect the remaining areas by increasing the likelihood of other threats (e.g. habitat fragmentation, hydrological alteration, invasion by noxious species, changes in land management options/practices, pollution, inadequate mitigation measures, etc.).

4.2 Agricultural Conversion

Along with Urban/Industrial development, conversion to intensive agriculture has been a leading threat to vernal pool landscapes. Loss of vernal pool habitat began in earnest in the latter decades of the 19th Century, as agricultural development in the Central Valley spread from the deep-soil of fertile riverine floodplains onto the more poorly-drained soils of the higher-older alluvial fans and terraces (Smith and Verrill 1998). Common methods used to improve cultivation conditions in these vernal pool landscapes included leveling of mound-swale topography, excavation of drainage ditches to lower perched water tables, and ripping and blasting of subsoil horizons for improved water drainage. With the later advent of large-scale water delivery and drainage systems, conversion to irrigated agriculture expanded further still (Smith and Verrill 1998).

Until recently, most of the large tracts of middle and upper terrace-vernal pool habitat in the Central Valley remained intact as part of large-scale annual-pasture livestock ranches which, in most cases, have not significantly altered the landscape. In recent years, however, conversion of these otherwise marginal ranchland soils to vineyards has been increasing and has become a leading threat to vernal pools in the Southeastern Sacramento Valley Vernal Pool Bioregion (Keeler-Wolf et al. 1998).

4.3 Habitat Fragmentation

Fragmentation of vernal pool habitat results from a variety of causes and occurs at a range of spatial and temporal scales. This fragmentation reduces the spatial and ecological continuity within a given land unit (see discussion of ecological connectivity Section 1.4 of this report). Habitat fragmentation is an ongoing and cumulative threat to the vernal pool ecosystem.

It is important to consider the spatial scale of potential effects of developments. For example, Forman and Deblinger (2000) estimated the "road-effect zone" for a busy four-lane highway in Boston, Massachusetts to be an average of 600 meters in width and asymmetric. They suggest that avoidance of roads due to vehicle traffic is probably of more ecological impact to biota than the more evident roadkills. Plants that use animals for dispersal of their propagules are also affected by animal-road avoidance. Fragmentation of natural habitats by roads tends to fragment continuous populations into subpopulations, making each subpopulation more vulnerable to local extinction events due to decreased emigration, immigration and gene flow (Forman and

Alexander 1998). Roads and other fragmenting intrusions also lessen the visual aesthetic appeal of a natural landscape.

At the larger landscape scale, change in regional abundance and distribution of vernal pool habitat may also change the migration and habitat use patterns of waterfowl and shorebirds on the Pacific Flyway, which in turn also affects meta-population dynamics of numerous organisms and alters multiple landscape-scale ecological functions.

Considered at smaller scales, habitat fragmentation can result from placement of roadbeds, railroad tracks, walls, utility corridors or other developments within vernal pool complexes. These types of intrusions can prevent the California tiger salamander or western spadefoot from completing their necessary seasonal migrations to and from rodent burrows in adjacent uplands. In addition to altering the vernal pool hydrologic cycle, interruption of hydrologic interconnectivity by these types of developments can disrupt dispersal of plant seeds and invertebrate cysts/eggs, thus manifesting changes in long-term meta-population dynamics. Fences that limit the movement of livestock through the landscape may also affect meta-population dynamics, since livestock are also implicated in the transport of seeds, cysts and eggs.

One significant negative aspect of habitat fragmentation is the increased edge effect to which remaining preserved vernal pool habitat areas are subject. As remaining habitat areas diminish in size, the ratio of vulnerable edge to preserved interior area increases. Ecological consequences arise because, as this ratio increases, any given interior point (vernal pool or organism) is closer to potential threats existing outside of the preserve boundary. Concomitant with increased edge effect are increased vulnerability to stochastic disturbances, pollution, and increased vulnerability to invasions by non-native plant and feral animal species. Edge effect can be minimized for vernal pool/annual grassland preserves by maximizing the size of the preserve areas (in contrast to creating more numerous smaller preserves), and by designing preserves that are as round in shape as possible. All other factors considered equal, the best shape for an ecological preserve is a circle, and the least preferable is a long narrow rectangle.

Fragmentation ultimately leads to smaller and more numerous tracts of habitat areas, which may be proportionally more difficult to regulate, monitor and manage in a consistent, efficient, and economical fashion. In addition, smaller, more numerous preserves are more likely to be surrounded by developed residential and/or industrial areas that not only present more types and more frequent threats, but may also be less attractive to migratory waterfowl and shorebirds. For these and other reasons fragmented habitats are less likely to maintain complex ecosystem processes and species populations over time.

4.4 Invasive Non-native Plants and Animals

In general, vernal pool habitat is excessively demanding for most non-native plant and animal species; however, a number of invasive species exist which are documented as potential threats to vernal pool habitat. In addition, invasive species not yet known to be a threat to California vernal pools may be introduced in the future (see Data Gaps Section 7). Invasive species in both vernal pool basins and in surrounding uplands can negatively affect vernal pool habitat in a variety of ways, ultimately changing ecological functions and negatively affecting desirable species.

Non-native annual grasses of Mediterranean origin now dominate the uplands associated with vernal pool complexes in California. The transition from native vegetation to exotics began with European settlement and was hastened by years of drought and overgrazing during the late 1800s. Some suggest that rapid evapo-transpiration of water and built-up thatch from non-native grass species (e.g., foxtail chess, Italian wildrye, Mediterranean barley, Medusa-head grass, soft chess) may indirectly affect vernal pool species by lessening the amount of water entering the system through surface and subsurface flow (Marty 2003; Robins and Vollmar 2002). The effects of thatch buildup in uplands may negatively affect obligate vernal pool bee pollinators as well. Thick stands of mulch may also impede juvenile California tiger salamanders and western spadefoots during their migrations from their aquatic pool habitat to the upland areas and burrows used for summer activity and aestivation. Barbed awns and seed coats on non-native grasses can also injure or kill mammals by becoming lodged in their ears, eyes, throats and fur.

Italian wildrye and Mediterranean barley are two non-native facultative wetland species that typically dominate disturbed seasonal wetlands and invade smaller, more ephemeral vernal pool types. In heavy clay soils and in non-grazed systems, these two grasses can encroach upon the pool margins, resulting in a simplified pool edge habitat with diminished native plant diversity (Robins and Vollmar 2002).

Other weedy hydrophytic species reported as growing within vernal pools in the Sacramento Valley include lippia (*Phyla nodiflora*), swamp pricklegrass (*Crypsis schoenoides*), European mannagrass (*Glyceria declinata*), field bindweed (*Convolvulus arvensis*), common unicorn plant (*Probiscidea louisianica*), Bermuda-Grass (*Cynodon dactylon*) and paradox canary-grass (*Phalaris paradoxa*). Cocklebur (*Xanthium strumarium*), a native species, can also dominate vernal pools (Schlising, Unger pers. comm.; Dittes pers. obs.).

Non-native mammals inhabiting grasslands and vernal pool complexes in California include the domestic cat, domestic dog, feral pig, Norwegian rat, black rat, house mouse and perhaps most recently, ferrets. These animals prey on native species, thus decreasing population viability. They also have the potential to spread diseases and parasites to other mammals within the area. Non-native birds such as the European house sparrow and European starling are also invading annual

grasslands and vernal pool complexes. These birds compete with native species for foraging areas and nesting sites.

Non-native amphibians known to invade vernal pools and seasonal wetlands include the introduced tiger salamander (*Ambystoma tigrinum*) and bullfrog (*Rana catesbiana*). Although bullfrogs require permanent bodies of water to complete their life cycles, they can migrate through vernal pools, where they feed voraciously on native amphibians and crustaceans. In general, native amphibians do not occur in water bodies occupied by bullfrogs and non-native fishes. The introduced tiger salamander (*Ambystoma tigrinum* was introduced as fish bait and now several populations have become established in California. The species has been reported to be hybridizing with California tiger salamander (Schaffer et al. 1993).

4.5 Livestock Grazing

In general, livestock grazing under appropriate conditions is thought to be compatible with vernal pool ecosystems, and in many cases even beneficial (Pyke and Marty 2005; Marty 2003; Vollmar and Robins 2002; Griggs 2000). In other cases though, livestock grazing can be deleterious when an incompatible grazing regime is used. Grazing is cited as a threat to a variety of sensitive vernal pool organisms at a number of Central Valley locations (CDFG 2003).

Complete absence of livestock grazing can be disadvantageous to vernal pools in several ways. Barry (1998) concluded that complete rest from grazing: allows upland species to encroach upon pool edges (species in centers of pools are less affected); can cause decreased water runoff and increased soil infiltration, percolation and water storage capacity due to increased vegetation; and can result in decreased diversity around pools. Marty (2003) found that aquatic invertebrate species richness was highest in grazed vernal pools, likely resulting from longer inundation periods due to higher soil compaction.

Some showy vernal pool plants (e.g., *Blennosperma, Downingia, Lasthenia, Limnanthes*) require the pollination services of specialist bees to reproduce (Thorp 1976, 1990; Thorp and Leong 1995, 1996, 1998). These bees nest in the soil of uplands within vernal pool complexes. Therefore, vernal pool conservation must consider nesting requirements of oligolectic (pollen specialist) bees to ensure longevity of some vernal pool plants. Effects of grazing on specialist bees are not known. Given that soil disturbance and compaction in grasslands is a well-known consequence of livestock grazing, with ecological affects varying by site (Duffey et al. 1974), perturbations to bee nests and potential nesting sites are possible. Conversely, these specialist bees may not fare well in situations where excessive thatch, particularly from Medusa-head grass, results because of too little grazing. Soil types, vegetation composition, number and type of livestock, grazing duration, and seasonal periods are all factors affecting soil compaction and erosion by livestock.

Other negative potential effects of livestock grazing on vernal pool habitats result more from inappropriate timing of the grazing regime, than from the intensity of the grazing. For example, Orcutt grass flowers and sets seed during the late spring and summer months. Grazing of Orcutt grass -occupied pools at this time can reduce or eliminate the season's reproductive effort, and over time can exhaust the soil seed bank. Grazing with livestock while the pool is still inundated in the late fall, winter, and early spring months allow plants in the juvenile life stage to escape grazing and trampling impacts. Similarly, grazing in the very late summer and fall months, after seeds have matured and dried, also allows for escape from these negative pressures (Stone et al. 1988). Grazing during the migration of California tiger salamander and western spadefoot can lead to mortality by trampling.

Influence of livestock grazing on the water chemistry of vernal pools has not received direct investigation, although Robins and Vollmar (2002) provide a good review of what is currently known. Excessive livestock use can result in nutrient overloading of vernal pool basins via input of feces and urine. Under these conditions, algal blooms proliferate and eutrophication (oxygen depletion) ensues. Excessive growth of algae also limits light penetration into the water column, limiting growth of plant seedlings and potentially affecting ecology of the invertebrate community. Livestock grazing may also result in the removal of nitrogen from the vernal pool ecosystem by conversion of plant material. Livestock congregating around pool edges may increase soil erosion and pool turbidity, potentially smothering amphibian larvae.

For these and potentially other reasons, overgrazing, under grazing and improperly timed livestock grazing can negatively affect the vernal pool species and vernal pool ecosystems.

4.6 Hydrologic Alterations

As described in Section 1.2 and 1.3 of this report, timing of the four phases of the vernal pool hydrological cycle is considered to be the over-riding factor in determining the biological structure and ecological functions of the vernal pool ecosystem. It follows then that any alteration of a sub-watershed that affects the timing of the hydrological cycle has potential to affect the ecological integrity of the vernal pools present there.

Water added to the system resulting in prolonged inundation and/or waterlogged-terrestrial phases could push the vernal pool hydrology and biota away from the unique vernal pool type and towards that of the common seasonal marsh. Alterations of this type can be observed where construction of berms (e.g., stockponds) and/or obstruction of swales by roadbeds, railroad tracks and canal berms have resulted in the impoundment of water in vernal swales or an increase in pond depth. Vernal pools can also shift toward a seasonal marsh inundation regime as a result of increased precipitation runoff flowing from nearby developed impermeable surfaces, from irrigated landscaping, and from irrigated agriculture.

Conversely, water removed from the vernal pool system resulting in abbreviation of the inundated and/or waterlogged-terrestrial phases can lead to a shift towards the less specialized seasonal wetland type that is dominated by low diversity of mostly non-native plant species and generalist invertebrates. Reduction of duration of the inundated and/or waterlogged-terrestrial phases may result from interruption of flow into pools in settings where swales contribute to pool basin hydrology. Since the hydrological cycle is linked to the surrounding upland soil profile (Hains and Stromberg 1990), disturbances to the surrounding upland soil profile within a watershed containing vernal pools may alter the vernal pool ecological function as well.

Degradation of vernal pools resulting from hydrological alteration are cited as threats at a number of recorded locations, including the Phoenix Field and Phoenix Park Preserves, at other sites in Sacramento County, and elsewhere in the state (CDFG 2003; USFWS 1994; Fisher and Schaffer 1996; Stone et al. 1988; Clark et al. 1998; Dittes pers. obs.).

4.7 Fires

Grassland fires are considered to be a beneficial part of the natural cycle of historic California grassland landscapes and are generally not considered a threat to vernal pools and vernal pool ecosystems. Contemporary annual grassland communities are commonly managed with fire to control the buildup of thatch and the cover of exotic species, namely Medusa-Head Grass and Yellow Star Thistle (Griggs 2000; Mawdsley 2000). However, there are cases where fire carries through vernal pools during the dry summer and fall months, impacting the rare late blooming Orcutt Grasses (Schlising pers.comm.). Removal of upland vegetation (by fire or grazing) may also increase grazing pressures on plants remaining within pools or exclosures. For example, grasshoppers were observed eating large amounts of the rare Orcutt Grass after adjacent uplands were burned and heavily grazed at the Vina Plains Preserve in Tehama County (Schlising pers. comm.).

Management activities associated with fire control activities (e.g., plowing or scraping fuel breaks) may impact vernal pools and vernal pool complexes. Sacramento Orcutt grass pools at the Keifer Landfill have fuel breaks constructed through them along Grant Line Road and along Keifer Boulevard. These fuel breaks may directly affect plants and animals and may also alter the hydrology both the impacted pool and surrounding pools.

4.8 Recreation Activities

Recreation is not commonly considered when discussing threats to vernal pools. Since vernal pools are aesthetically appealing for only a short part of the year, unlike riparian areas that have living vegetation and water for a significant part of the year, they have been described as having an

"image problem" (Zedler 1987). Impacts from recreation may become more of a concern as more development occurs and more preserves are established in close juxtaposition with housing tracts.

Vernal pool impacts resulting from recreation activities are reported from the Phoenix Park Preserve in Sacramento County (Clark et al. 1998). In this urban-natural area interface, trampling from foot, horse and bicycle traffic within the highly accessible Preserve was reported to compact soils, eliminate plant cover where trails came close to pools, and disturb plants and wildlife. In addition litter accumulation is also cited as a problem (CDFG 1983; Clark et al. 1998). Recreational off-road vehicle use during the wet season can create large ruts and reduce vegetative cover; this activity has been observed in Butte, Tehama and Sacramento Counties (Dittes per. obs.). Uncontrolled dogs and cats may disturb wildlife as well.

4.9 Pollution

A variety of point and non-point-source pollutants enter the vernal pool landscape via overland and subterranean flow of water, and atmospheric pollution can enter in precipitation and in the form of dust. Wind-blown trash accumulation and even illegal dumping of household garbage and garden waste has also been cited as threats in some vernal pool systems (CDFG 2003; Clark et al. 1998).

4.10 Water Pollution

One of the nutrients primarily responsible for eutrophication of freshwater systems is phosphorous, which is often bound to soil particles from agricultural land. Approximately 65 percent of the sediment washed into U.S. streams, rivers and lakes is from cropland, pastures and rangeland. Non-point sources of pollution in urban and residential areas include failing septic systems, septic system additives, improper disposal of household chemicals, storm water runoff, construction activities, and inappropriate use of fertilizers and pesticides (Master et al. 1998).

Impermeable surfaces such as asphalt, concrete, and roofing increase the intensity of storm water runoff and provide a path for runoff laden with sediment, heavy metals, oil and oxygen-demanding organic matter (Master et al. 1998). Nutrients or toxicants are dissolved in water and enter streams where they may move downstream, accumulate in deposits and be ingested by organisms (NRC 1992). Sacramento County (1993) stated that "urban storm water runoff discharges contain non-point source pollutants that lower the quality of receiving waters" in Sacramento County, and indicated that pasture runoff could also serve as a source of "surface water quality degradation".

Pesticide residues in water and soil are well known to have various deleterious effects on non-target organisms (Davidson 1979; Hurlbert et al. 1972; Simon and Buikerma 1997; Wurster 1968), although specific studies addressing the effects of pesticides in vernal pool ecosystems are

lacking. A recent study in the Sacramento area (Roseville) reported that urban runoff containing pyrethroides (the active ingredients found in most insecticides available for residential use) was responsible for sediment toxicity in about half the number of samples collected. In some cases, sediment toxicity caused total or near total (>90%) mortality when exposed to the aquatic amphipod species *Hyalella azteca* in laboratory exposures (Weston et al. 2005).

Herbicides are commonly used to control unwanted plants, native or otherwise. Duffey et al. (1974) recommend that herbicides should not be used on grasslands managed for nature conservation. The effect of herbicides on vernal pool organisms and ecology has not been quantified. However, Clark et al. (1998) observed that plants were killed in vernal pools that received herbicide-laden runoff from nearby areas. Enough seeds apparently were stored in the soil seed bank to allow plants to become reestablished the following year, but continued runoff containing herbicides would likely limit the ability of the vernal pool flora to recover. Similarly, herbicide runoff from the treated ground around a wooden utility pole in Eastern Merced County was observed to result in complete lack of vegetation in an adjacent vernal pool that received the runoff (Dittes pers. obs.)

APPENDIX B-1 (Continued)

INTENTIONALLY LEFT BLANK

5 CLASSIFICATION OF VERNAL POOLS / WETLANDS

Vernal pools/wetlands have been variously classified, depending on the scope and purposes of the particular effort. Classification systems developed by various regulatory agencies and consultants for vernal pools and seasonal wetlands, their defining parameters, and applicability to the SSHCP are summarized in the following discussion. These classification systems are variously based on landforms, geologic formations, soils, hydro-geomorphology, composition of vegetation, or combinations of these in the context of geographic setting (Butterwick 1998; Cowardian et al. 1979; Holland 1986; Jones & Stokes 1990; Reiner and Swenson 2000; Sawyer and Keeler-Wolf et al. 1998; Vollmar 2002).

5.1 Previous Vernal Pools/Wetlands Classification in Sacramento County and the SSHCP Study Area

The first comprehensive classification of Sacramento County's vernal pool habitat was based on association of vernal pool complexes with geologic landform (Jones and Stokes 1990). Landforms result from specific episodes of geologic activity and are physically recognizable features of the earth's surface that have distinguishable shape, range, and composition (Smith and Verrill 1998). According to this system, Sacramento County vernal pools fall into one of four categories: Young-Terrace Pools (Riverbank Formation), Old Terrace Pools (Laguna and Arroyo Seco Gravels), Mudflow Pools (Mehrten and Valley Springs Formation), or Drainage way (recent alluvial deposits over other formations). These four landforms are further subdivided by specific geologic surficial deposits (or formations) based on differences in age, parent material, soil profile development, texture, geomorphic expression, lithology, stratigraphy, induration, and depositional environment (Helly and Hardwood 1985).

Although it was noted that vernal pool habitat varies according to landform association, no quantifiable data were used to describe the patterns of variance. Qualitative generalizations regarding vernal pool shape, depth, size and surface drainage were provided for each of the soil series present in the County (Jones and Stokes 1990). It was acknowledged however, that substantial fieldwork is required before justifying the use of soil series as a primary category of vernal pool classification.

The Nature Conservancy (TNC) modified and applied this landform and geologic formation-based classification system to their Cosumnes River Watershed Project (Reiner and Swenson 2000). As part of this effort, vernal pools in the southeast SSHCP Study Area were categorized according to the following landform categories: Low Terrace Grasslands (Riverbank), High Terrace Grasslands (Laguna), Terrace Drainageway Grasslands (Modesto/Riverbank), and Mudflow Grasslands (Mehrten and Valley Springs Formations).

These landform categories were used by TNC in conjunction with soil maps and vernal pool density maps to qualitatively designate priority conservation areas within the watershed project boundary. As with the system of Jones and Stokes (1990), physical parameters of vernal pool variability were not quantitatively described within or between landforms for the Cosumnes River Watershed Project.

5.2 Classification System of Vernal Pool Complexes for the SSHCP

The SSHCP Vernal pool classification system includes a modification of the landform approach of Jones and Stokes (1990). This landform classification was used to describe vernal pool conservation goals within the Sacramento County General Plan (1993). TNC also used a landform-based approach for conservation planning in the Cosumnes River Watershed Project in southeast Sacramento County (Reiner and Swenson 2000), although it was slightly modified from the approach first proposed by Jones and Stokes (1990).

This current SSHCP classification system builds on these approaches, with additional refinement afforded by currently available GIS technology and GIS geological formation data (California Geological Survey 2003), and recent SSHCP Land Cover Types produced by EDAW (2005).

The SSHCP classification system for vernal pools/wetlands is intended to be workable for the scale and resolution of the SSHCP mapping effort, and for the general timeline and budget constraints of the SSHCP. Within the scope of these considerations, the classification system is intended to be refined enough to identify, delineate and prioritize conservation needs for the region's vernal wetlands to the fullest extent possible at this time.

This vernal wetland classification system will increase the probability that overall biodiversity, special-status species, and myriad complex ecological functions operating up to the landscape level, are captured within appropriate and proportional mitigation-related habitat preserves.

Analysis of vernal wetland distribution in the SSHCP Study Area is based on the mapping conducted by the Geographical Information Center (GIC) in Chico, California in 2005 (Figure 4). Delineation of vernal wetlands was performed by use of ortho-rectified black and white aerial photographs that were flown on March 15, 2001. These orthophoto images were brought into ArcView 3.3 GIS software and the vernal wetland signatures were digitized into polygons which were recorded as a shape file. Vernal pool/wetlands were identified primarily by visual signatures, including contrasting shades (color) and to some degree texture and shape.

The mapping criteria and methodology used for the SSHCP Study Area were similar to those used by GIC in creating regional maps of vernal pool wetlands for Tehama County and Shasta County. In the SSHCP Study Area, these wetlands were usually found in isolation and sometimes are interspersed with and/or connected to swales. The vernal pools/wetlands usually

have a relatively distinct boundary or contrasting edge that makes them visually discernible from less distinct saturated soil formations ("spongy areas").

The vernal pool/wetland delineations conducted remotely by interpretation of aerial photos are expected to differ somewhat from jurisdictional vernal pool acreages obtained using the standard USCOE (1987) 3-parameter approach (boundaries determined on the ground using indicators of hydrology, hydric soil and hydrophytic vegetation).

This is an unavoidable consequence of remote delineation. Comparison of the remote delineation with on-the-ground 3-parameter delineations was made at a few sites where the jurisdictional delineations were available (vicinity of Sunrise-Douglas and Mather Field vernal pool complexes). In these cases, there was good correspondence in the polygons and signatures derived by these two methods (Radmacher pers. comm.; Sacramento County 2005). It is important to note though, that some of the other landscape settings may differ in agreement between the remotely mapped vernal wetlands and what is actually on the ground. It is critical to note that owing to time constraints and lack of access to private property, on-the-ground verification/delineation of vernal wetlands is not possible at this time.

Expected discrepancies between results of the two delineation scales and methods are likely to include:

1. ***Overestimation of the number and acreage of jurisdictional vernal pool wetland features using the aerial photo data set:*** On the aerial photograph, some features delineated as vernal wetlands may appear vernal pool- like, with defined boundaries and hydric reflective signatures that contrast with the surrounding upland annual grassland. In reality however, these wetland features may or may not support an actual vernal pool hydrologic cycle. If the mapped feature ponds water for too short duration, the feature may be a less-specialized seasonal wetland; if ponding is of excessive duration, the feature may actually be a less specialized seasonal marsh. In addition, some mapped signatures may not be associated with ponded basins at all; rather they may merely reflect saturated soil profiles without "pools", especially with soils heavy in clay. In all three cases, wetland features mapped that do not support the vernal pool hydrologic cycle do not provide habitat support function for the vernal pool flora and fauna.
2. It is important to note that this type of error is not likely to apply equally across all vernal pool complexes that occur on the various geologic formations. For instance, the mapping of vernal pools is more likely to be very accurate and precise for the vernal pools associated with the high-terrace Laguna Formation. In contrast, accuracy and precision is comparatively less for vernal pools occurring on the heavier clay soils associated with the low terrace Riverbank Formations.

3. ***Underestimation of the number of separate and/or small jurisdictional vernal wetland features using the aerial photo data set:*** In some cases, the higher degree of resolution afforded by use of three parameters on the ground will result in exclusion of small non-wetland areas that bridge closely-juxtaposed wetland basins. From the scale of the aerial photograph, the shallow bridges are not discernible, and so multiple jurisdictional-delineable basins are conjoined and a lesser number of larger pools are perceived. In addition, a number of isolated smaller/shallower wetlands that exhibit less distinct visual signatures were likely overlooked on the aerial photo delineation, and would be included in the 3-parameter field delineation.
4. ***Underestimation of size of functioning "hydrologic complex" with the 3-parameter delineation;*** in the preceding two cases, the differences between the two delineation methods trend towards increased resolution of jurisdictional boundaries using the 3-parameter field delineation. Importantly however, the 3-parameter approach can result in underestimation of the functional wetland area. Any given vernal wetland area is functionally related with surrounding vernal pools, seasonal wetland ecotones and with uplands, subterranean groundwater and surrounding saturated soil profiles. These areas are involved with the functions of hydrology, element cycling, and habitat support, but they may not satisfy one or more of the 3 field criteria, and so are usually excluded from jurisdictional acreage calculations.

Owing to the regional-scale view afforded, and greatly increased resolution and accuracy as compared to the previous regional vernal pool map (Jones and Stokes 1990), the map produced from the 1:200-scale aerial photograph (GIC 2005) is highly valuable for regional conservation planning and is used here for the SSHCP.

It is important to consider however, that the 3 considerations discussed above, combined with human error that is inherent in the aerial photo-mapping and digitizing process, somewhat limit the 1:200-scale GIS layer with regard to calculating exact vernal wetland acreages for precision impact analysis and mitigation planning. Owing to time and budget constraints and lack of access to private property however, on-the-ground delineations are not possible to conduct prior to completion of the SSHCP. Accurate three-parameter jurisdictional delineations will eventually be conducted on all lands as they are developed and on all preserves as they are established.

5.2.1 Classification by Geologic Formations

Physical parameters of vernal pool complexes appear to vary by geologic formation. These factors may include drainage area, slope, soil structure, soil depth, pool size, pool depth, timing of vernal pool hydrologic cycle and vernal pool interconnectivity. These physical parameters in turn affect the structure and ecological dynamics of the associated vernal pool flora and fauna.

Different geologic formations support characteristic vernal pool types. In addition, specific geologic formations may possess specific biogeographic legacies that are reflected in present day patterns of vernal pool plant and animal biodiversity.

It follows then, that in order to ensure preservation of the full spectrum of impacted vernal pool types and functions, mitigation in-kind will involve preservation/restoration of vernal pools that occur in as close proximity as possible on the same type of geologic formation.

5.2.2 Classification of SSHCP Vernal Pool Complexes with Vernal Wetland-Acre/Density Index (VWADI)

In addition to correlation with geologic formations, a Vernal Wetland Acre/Density Index (VWADI) is used to describe and classify the vernal pool complexes within the SSHCP Study Area. This index is based on the variation in vernal wetland area (acres), and variation in vernal wetland density (number of vernal wetlands per unit land area). These two parameters, assessed together as an index for standardized 160-acre land analysis units, will serve as a primary descriptor of the range of spatial-ecological variability of vernal pool/wetland types in the SSHCP Study Area, within geological formations (see Section 6).

These analyses will provide the framework for the development of the SSHCP vernal pool-annual grassland habitat conservation strategy. For each parameter proposed however, full consideration of assumptions and limitations is required particularly as they relate to resolution and accuracy of the descriptive model (e.g., it is beneficial to know which ecological situations are likely to be overlooked, why, and what is the significance).

Additional ecological measures are also desirable for a more complete and accurate description of spatial and functional variability of vernal pools and vernal pool complexes (Jokerst 1993; Leidy and White 1998; Wacker and Kelly, 2004). It is imperative to consider vernal pool functions and processes at the landscape-scale as well to maximize the likelihood of achieving long-term conservation goals (Alexander and Schlising 1998; Jokerst 1993; Wacker and Kelly, 2004;). Ongoing vernal pool mitigation efforts have received criticism for focusing overly on replacement of acreage while givinglittle attention to the functioning landscape-scale ecosystem (Jokerst 1993; Wacker and Kelly 2004).

For the purposes of the SSHCP, a GIS-derived spatial-ecological index has been developed that allows for a more refined and quantifiable assessment of the region's vernal pool complexes. This relatively simple index is used here in conjunction with earlier regional conservation strategies that were based on association of vernal pool complexes with landform and geologic formation (Jones and Stokes 1990; Reiner and Swenson 2000). This VWADI is based on two parameters that are readily measurable remotely with GIS technology: 1) density of vernal

wetland features per 160-acre Land Analysis Unit(s) (LAU), and 2) wetted acres of vernal wetland habitat per 160-acre LAU.

Note that the size (area) of the vernal wetlands, a third important parameter, is inferable when vernal wetland density and wetted acres in each 160-acre LAU are plotted together on x and y axes. These three parameters considered together as an index reflect landscape-scale spatial relationships with ecological implications that are not discernible by considering each of the parameters in isolation (see following discussion).

Specifically, the VWADI is used here in the SSHCP to more accurately perform the following 3 tasks:

1. Describe spatial-ecological variability of vernal pool landscapes in the greater SSHCP Study Area;
2. Describe and quantify spatial-ecological variability of vernal pool landscapes within and between the various geologic formations encompassed by the SSHCP Study Area;
3. Describe and quantify spatial-ecological variability of vernal pool landscapes within and between different planning areas within the SSHCP Study Area (e.g., inside and outside of UDA).

It is critical to note that although the index itself is relatively simple, the exact utility is determined by the type and quality of the spatial data available. The GIS-data set utilized for the SSHCP was derived through manual delineation of black and white aerial photographs (scale: 1 inch = 400 feet) with limited subsequent field verification (see discussion under Section 5.2 above).

5.2.3 Development of the Vernal Wetland Acre/Density Index (VWADI)

The VWADI was produced by first creating a GIS grid-layer comprised of evenly distributed, contiguous 160-acre squares and then superimposing the grid-layer over the entire SSHCP Study Area on the GIS base Geologic Formation map. The 160-acre square grid unit was chosen for several reasons: this size and shape corresponds with ¼ of a 640-acre section and it therefore roughly corresponds with land-ownership boundaries; also, since preserves should be made as large in area as possible, use of multiple 160-acre subunits will allow for more detailed analysis and preserve planning. The grid units are hereafter referred to as LAUs.

A numbering system was then created to assign a unique identifier to each of the 2,311 LAUs. It was found that 1,372 LAUs encompass vernal pool habitat in the SSHCP Study Area as of 2006.

APPENDIX B-1 (Continued)

Once the grid system was created, the GIS program was queried to obtain the following two values for each of the 160-acre LAUs:

1. Vernal wetland density expressed as the total number of vernal wetland features encompassed within the LAU, including pools shared with contiguous LAUs; and
2. Total wet acres of vernal wetland habitat, including the portion(s) of shared wetland(s) that occur within the given LAU;

The density and wet-acre values were then ordinated onto standard-scale X and Y-axes, respectively (see Figures 10, 12, 14, and 16). This ordination results in visual-spatial segregation of different types of vernal pool complexes within continua of density and wetted acreage. Note that within any given LAU and relative to another, a doubling of wetted acreage with constant vernal pool density corresponds to a doubling in the average vernal pool/wetland size (area). Thus, even though it is not a directly measured parameter, vernal pool size is inferable within the index.

Once this ordination was performed for LAUs nested within each of the geologic formations and landforms, and within each of the planning areas previously described (see tasks 1-3, Section 5.2.2), the resulting X-Y Cartesian Grid was divided into 25 VWADI categories by designating 5 intervals along the X-axis (based on vernal pool density and designated A-E), and 5 intervals along the Y-axis (based on vernal pool wet-acres and designated 1-5; (see Figures 11, 13, 15, and 17). In this fashion, each 160-acre LAU is identifiable according to one of these 25 standardized alphanumeric values.

After creation of the 25 VWADI values and ordination of the LAUs a summary calculation was made that describes the numerical and spatial distribution of each "VWADI Category Type" that exists within the SSHCP Study Area for each geologic landform. For example and as indicated in Figure 11, on the Laguna Geologic Formation there are 15 160-acre LAUs that correspond to the D4 VWADI Category; 12 of the LAUs are located inside the UDA and three are outside of the UDA; there are a total of 122 wetted acres present in this category, of which 99 acres are located inside and 23 acres are outside of the UDA.

As with any other ecological index, there are assumptions and limitations to the model that require consideration. The following is an account of rationale, assumptions and limitations as they pertain to use of the VWADI for the purpose of the SSHCP.

Assumptions Regarding the Mapping Data:

- The GIS layer base map (GIC 2005) used to produce the index reasonably reflects conditions in the field with regard to vernal wetland locations and boundaries (see Section 5.0 above).

- Inaccuracies in delineation of vernal wetland boundaries on the GIS layer base map differ between Geologic Formations (e.g., accuracy is higher for vernal pools associated with high-terrace Laguna Formation, and is lower on clay soils of low-terrace Riverbank Formation).

Assumptions Regarding Vernal Pool/Geologic Formation Relations:

- Determinant relationships between geologic formations and physical characteristics of associated vernal pools, and in turn, physical characteristics of vernal pools influence vernal pool biota. For this reason, acquisition of land or easements will occur over broad range of formations.

Assumptions Regarding Vernal Wetland Density and Ecological Interconnectivity:

- Ecological interconnectivity increases with increasing vernal pool density per given land unit. For example two vernal pools located within 3 meters of each other inter-relate differently ecologically than two pools located 90 meters apart.
- Interconnectivity at the local scale generally increases with an increase in the size of any given vernal pool preserve supporting vernal pool complexes of a given density. Similarly, at the regional scale, interconnectivity increases with an increase in the number of juxtaposed large vernal pool preserves supporting vernal pool complexes.
- Maximum interconnectivity is associated with the largest areas encompassing the densest of pool complexes.
- High-density complexes possess specific ecological properties (e.g., attractiveness to migratory waterfowl, greater function of meta-population dynamics, increased number of ecological niches, and population stability in light of drought-wet cycles and perhaps even climate change).
- Vernal wetlands and complexes occur along gradients of interconnectivity (hydrological-spatial).

Assumptions Regarding Size (area) of Vernal Wetlands:

- Larger vernal pools (by area) possess specific ecological properties, functions and values that are different from smaller pools (e.g., a greater volume of water for a given depth, a larger number of possible habitat niches, increased attractiveness to migratory waterfowl).
- Vernal wetlands occur along gradients of size (area-depth).
- Size (area) may be a useful indicator of duration of hydro-period.
- Larger pools (by area) are more infrequently occurring.

Assumptions Regarding Vernal Pool Hydrology:

- Vernal pool hydro-period is one of the primary determinants in structuring the general vernal pool biological assemblage.
- Size (area) may be a useful indicator of hydrology.
- Vernal wetlands occur along gradients of severity of seasonal inundation cycle (duration/depth).
- Vernal pools exhibiting "deep-pool" hydrology (long duration) are more infrequently occurring.

Assumptions Regarding Vernal Pool Conservation Values:

- Vernal wetlands, regardless of size or interconnectivity, possess intrinsic ecological functions and values.
- High-density vernal pool complexes are infrequently occurring, are likely to be more ecologically complex and therefore possess higher conservation value.
- Large vernal pools are more infrequently occurring (in isolation and in complexes), they tend to be more ecologically complex than small vernal pools (in isolation and in complexes) and therefore possess higher conservation value.
- Vernal pools that are known to support special-status plant and/or animal species have high conservation value regardless of interconnectivity or size.

The VWADI approach will serve as an initial guide to address the spatial distribution of differing types of vernal pool complexes, and to aid in formulation of vernal pool habitat conservation goals (see Section 6.0). As time passes and more 3-parameter jurisdictional delineations are conducted in the SSHCP Study Area, the accuracy and precision of the VWADI approach will improve.

5.3 Results of VWADI Analysis

5.1 High Terrace Landform

The High Terrace Landform includes the Laguna, Turlock Lake and Ione Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for the three geologic formations are illustrated in Figure 10 and numerically summarized in Figure 11.

5.1.1 Laguna Geologic Formation (Tl)

The Laguna Geologic Formation encompasses a total of 403 LAU (29.4%), of which 162 (40.2%) are located inside of the UDA and 241 (59.8%) are located outside of the UDA. The 403 LAU are distributed among the five VWADI categories as follows: 104 LAU are included in

Category 1 (36 LAU are inside the UDA and 68 are outside the UDA), 85 LAU are included in Category 2 (38 LAU are inside the UDA and 47 are outside the UDA), 90 LAU are included in Category 3 (36 LAU are inside the UDA and 54 are outside the UDA), 64 LAU are included in Category 4 (21 LAU are inside the UDA and 43 are outside the UDA) and 60 LAU are included in Category 5 (19 LAU are inside the UDA and 41 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 557 and the total wetland acres per 160-acre LAU range from 0.006 to 20.12 acres.

5.1.2 Turlock Lake Geologic Formation (Tpl)

The Turlock Lake Geologic Formation encompasses a total of 11 LAU (0.8%), of which 11 (100%) are located inside of the UDA. The 11 LAU are distributed among the five VWADI categories as follows: one LAU is included in Category 1, two LAU are included in Category 2, four LAU are included in Category 3, and four LAU are included in Category 4. There are no LAU included within Category 5.

The number of vernal wetlands per 160-acre LAU was found to range from 11 to 84 and the total wetland acres per 160-acre LAU range from 0.3 to 6.4 acres.

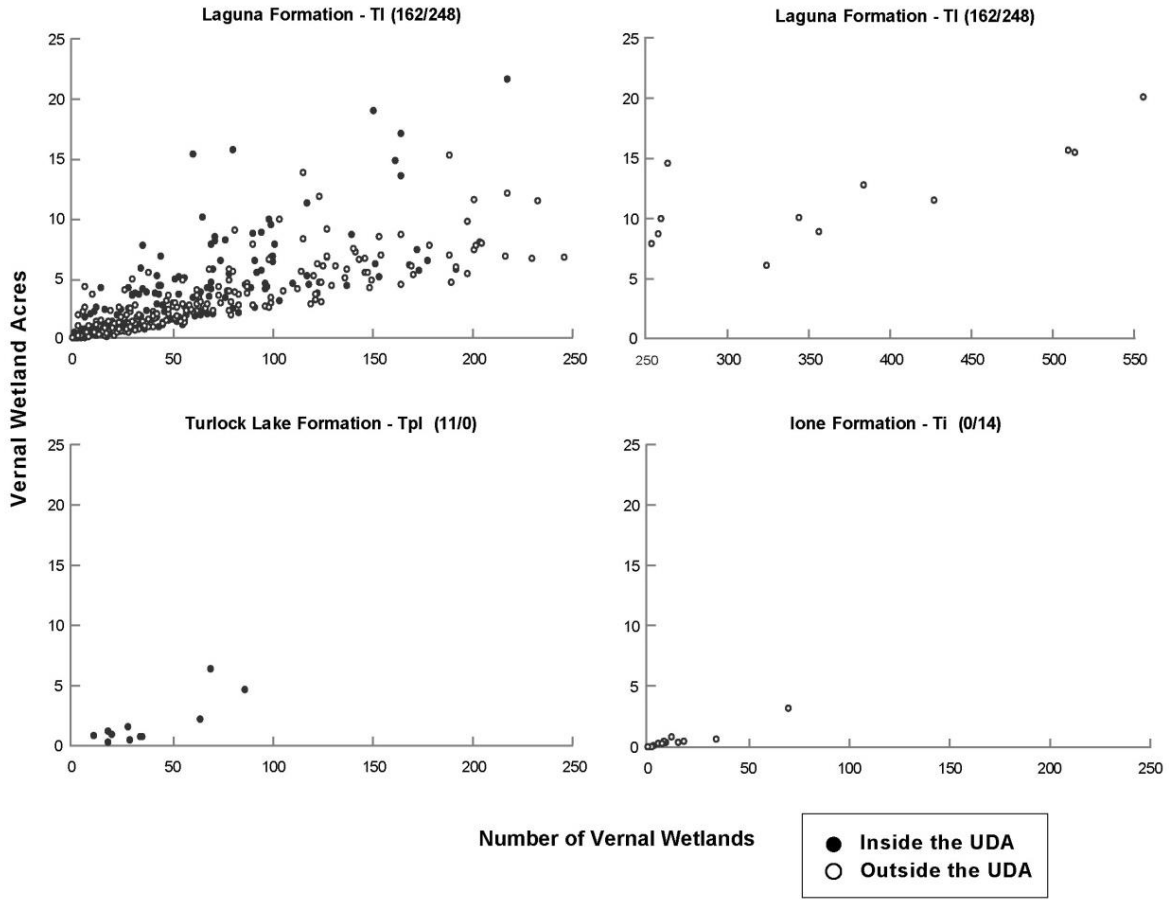
5.1.3 Ione Geologic Formation (Ti)

The Ione Formation encompasses a total of 13 LAU (0.9%), of which 13 (100%) are located outside of the UDA. The 13 LAU are distributed among the five VWADI categories as follows: one LAU is included in Category 2, one LAU is included in Category 3, three LAU are included in Category 4 and eight LAU are included in Category 5. There are no LAU included within Category 1.

The number of vernal wetlands per 160-acre LAU range from 1 to 71 and the total wetland acres per 160-acre LAU range from 0.02 to 3.15 acres.

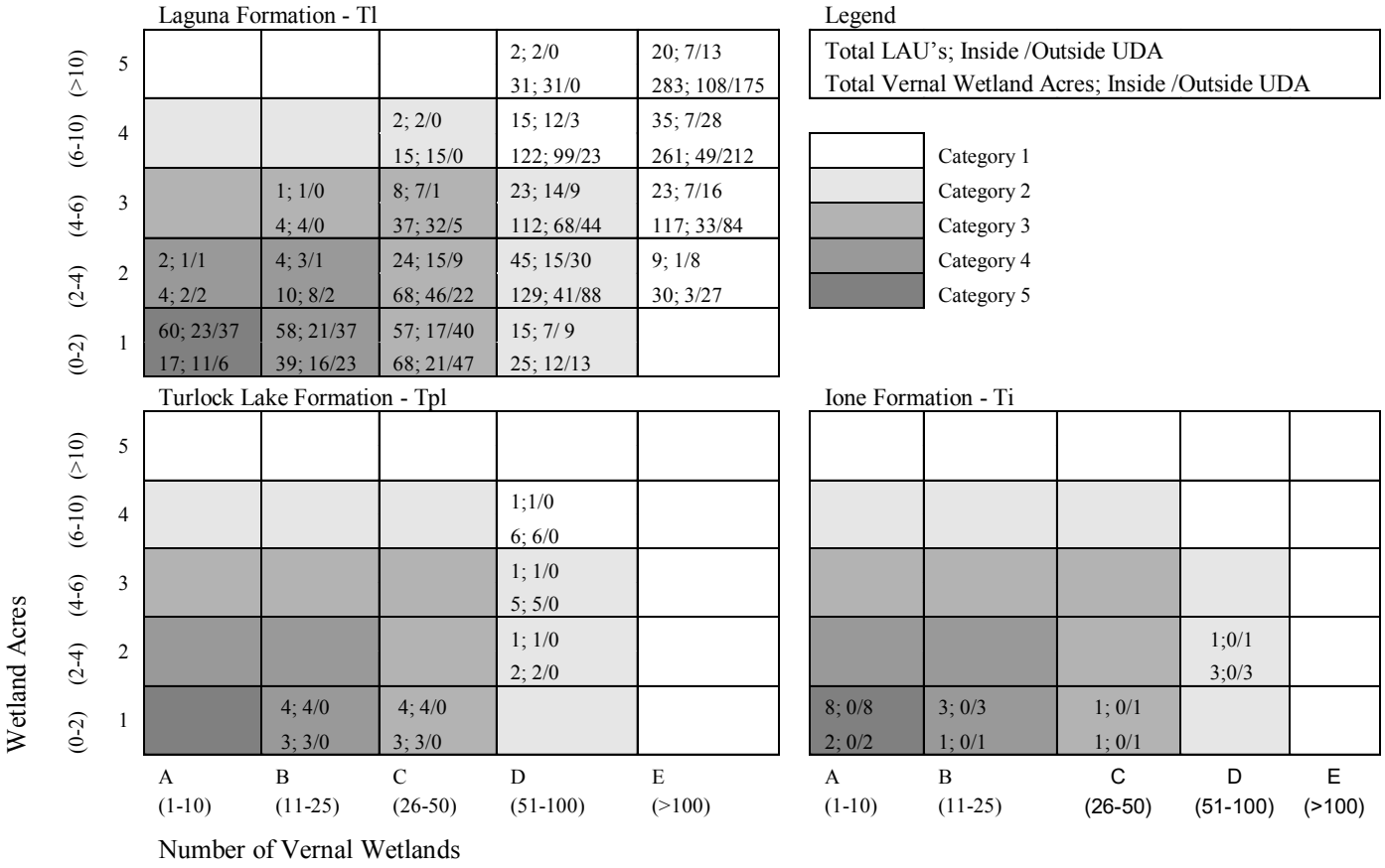
APPENDIX B-1 (Continued)

Figure 10 Relationship of number of vernal wetlands to wetted acres on High Terrace Landform geologic formations. Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation names are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 11 Vernal Wetland Acre/Density Index (VWADI) for High Terrace Landform geologic formations. Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area.



5.2 Low Terrace Landform

The Low Terrace Landform includes the Undivided Riverbank, Upper Unit Riverbank, Middle Unit Riverbank, Lower Unit Riverbank and South Fork Gravels Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for the five geologic formations are illustrated in Figure 12 and numerically summarized in Figure 13.

5.2.1 Undivided Riverbank Geologic Formation (Qr)

The Undivided Riverbank Formation encompasses a total of 261 LAU (17.9%), of which 68 (26.1%) are located inside of the UDA and 193 (73.9%) are located outside of the UDA. The total of 261 LAU are distributed among the five VWADI categories as follows: 41 LAU are included in Category 1 (seven LAU are inside the UDA and 34 are outside the UDA), 26 LAU are included in Category 2 (three LAU are inside the UDA and 23 are outside the UDA), 35 LAU are included in Category 3 (five LAU are inside the UDA and 30 are outside the UDA), 50 LAU are included in Category 4 (nine LAU are inside the UDA and 41 are outside the UDA) and 109 LAU are included in Category 5 (44 LAU are inside the UDA and 65 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 254 and the total wetland acres per 160-acre LAU range from 0.01 to 58.02 acres.

5.2.2 Upper Unit Riverbank Geologic Formation (Qru)

The Upper Unit Riverbank Formation encompasses a total of 105 LAU (7.2%), of which 27 (25.7%) are located inside of the UDA and 78 (74.3%) are located outside of the UDA. The 105 LAU are distributed among the five VWADI categories as follows: 15 LAU are included in Category 1 (all outside the UDA), six LAU are included in Category 2 (one LAU is inside the UDA and five are outside the UDA), seven LAU are included in Category 3 (one LAU is inside the UDA and six are outside the UDA), 15 LAU included in Category 4 (four LAU are inside the UDA and 11 are outside the UDA) and 62 LAU are included in Category 5 (21 LAU are inside the UDA and 41 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 237 and the total wetland acres per 160-acre LAU range from 0.01 to 26.98 acres.

5.2.3 Middle Unit Riverbank Geologic Formation (Qrm)

The Middle Unit Riverbank Formation encompasses a total of 63 LAU (4.6%), of which 15 (23.8%) are located inside of the UDA and 48 (76.2%) are located outside of the UDA. The 63 LAU are distributed among the five VWADI categories as follows: five LAU are included in Category 1 outside the UDA, eight LAU are included in Category 2 (one LAU is inside the UDA

and seven are outside the UDA), eight LAU are included in Category 3 (one LAU is inside the UDA and seven are outside the UDA), 12 LAU are included in Category 4 (two LAU are inside the UDA and ten are outside the UDA) and 30 LAU are included in Category 5 (11 LAU are inside the UDA and 19 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 114 and the total wetland acres per 160-acre LAU range from 0.005 to 17.98 acres.

5.2.4 Lower Unit Riverbank Geologic Formation (Qrl)

The Lower Unit Riverbank Formation encompasses a total of 108 LAU (7.9%), of which 79 (73.1%) are located inside of the UDA and 29 (26.9%) are located outside of the UDA. The 108 LAU are distributed among the five VWADI categories as follows: 20 LAU are included in Category 1 (six LAU are inside the UDA and 14 are outside the UDA), nine LAU are included in Category 2 (six LAU are inside the UDA and three are outside the UDA), five LAU are included in Category 3 (all LAU are inside the UDA), 14 LAU are included in Category 4 (13 LAU are inside the UDA and one is outside the UDA) and 60 LAU are included in Category 5 (49 LAU are inside the UDA and 11 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 90 and the total wetland acres per 160-acre LAU range from 0.001 to 47.92 acres.

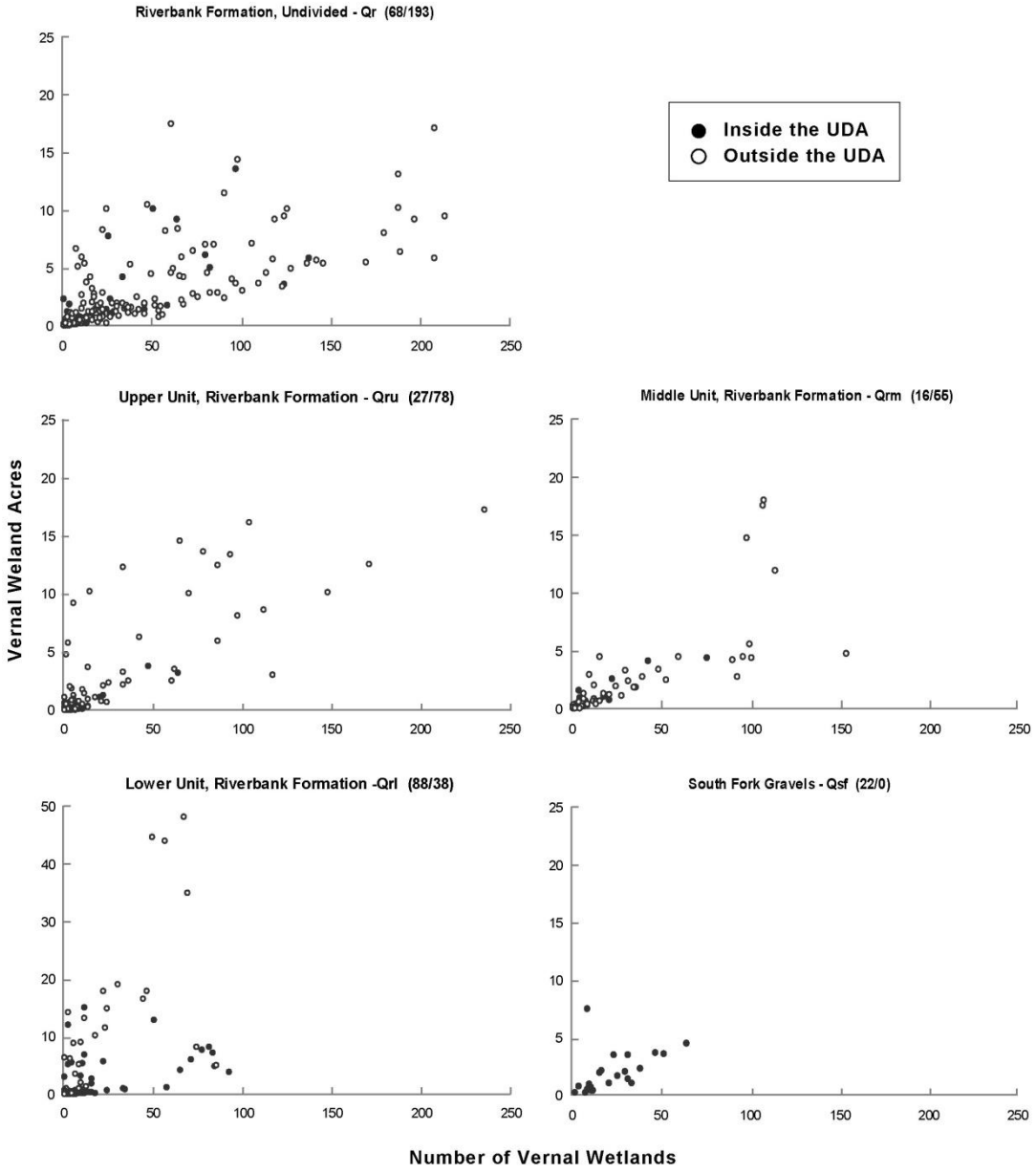
5.2.5 South Forks Gravel Geologic Formation (Qsf)

The South Forks Gravel Formation encompasses a total of 23 LAU (1.7%), of which 23 (100%) are located inside of the UDA. The 23 LAU are distributed among the five VWADI categories as follows: three LAU are included in Category 2, seven LAU are included in Category 3, six LAU are included in Category 4 and seven LAU are included in Category 5. There are no LAU included within Category 1.

The number of vernal wetlands per 160-acre LAU range from 2 to 64 and the total wetland acres per 160-acre LAU range from 0.07 to 7.07 acres.

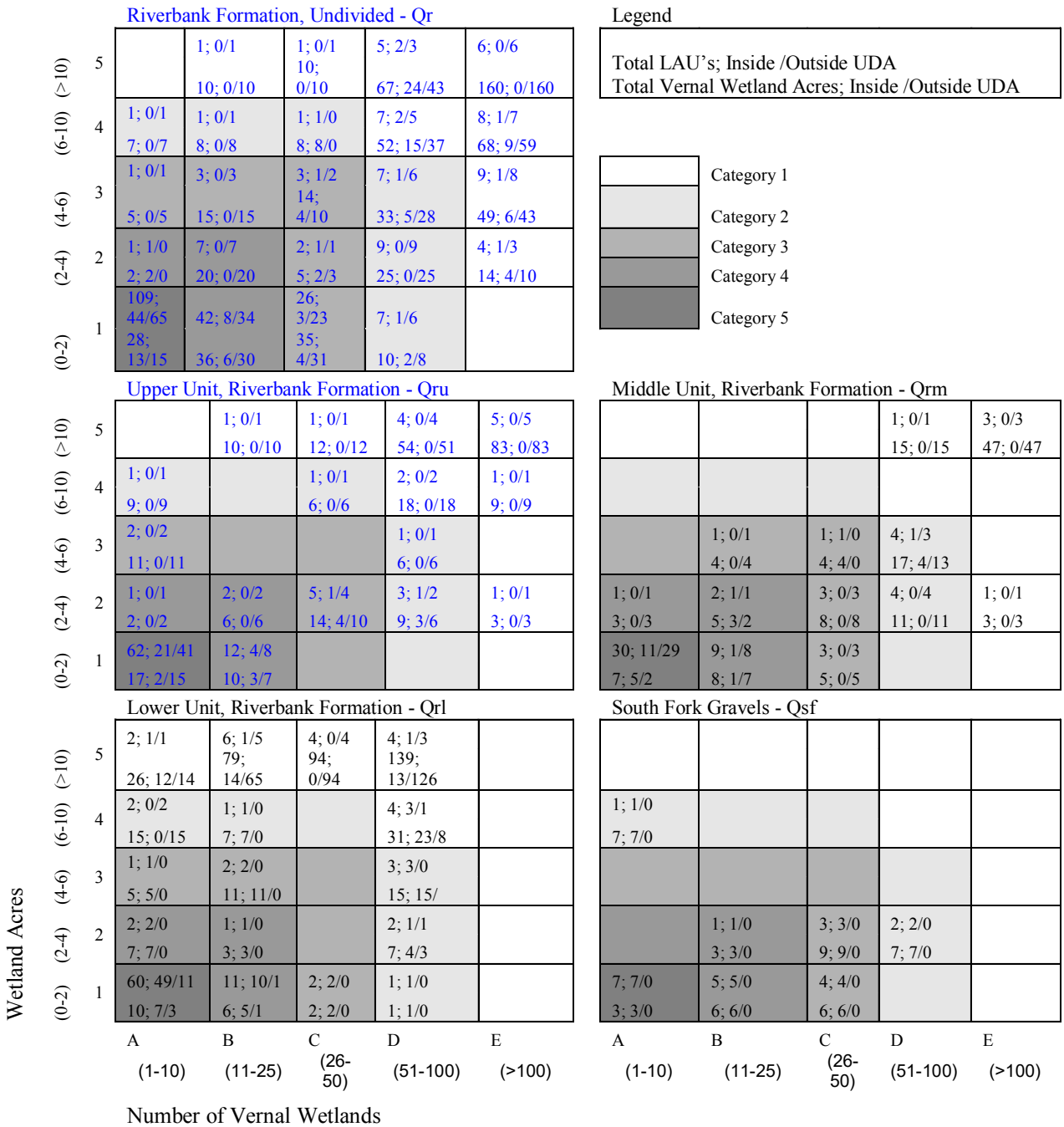
APPENDIX B-1 (Continued)

Figure 12 Relationship of number of vernal wetlands to wetted acres on Low Terrace Landform geologic formations. Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation name are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 13 Vernal Wetland Acre/Density Index (VWADI) for Low Terrace Landform geologic formations. Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area



APPENDIX B-1 (Continued)

5.3 Volcanic Mudflow Landform

The Volcanic Mudflow Landform includes the Mehrten and Valley Springs Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for the two geologic formations are illustrated in Figure 14 and numerically summarized in Figure 15.

5.3.1 Mehrten Geologic Formation (Tm)

The Mehrten Formation encompasses a total of 164 LAU (12%), of which 25 (15.2%) are located inside of the UDA and 139 (84.8%) are located outside of the UDA. The 164 LAUs are distributed among the five VWADI categories as follows: 47 LAUs are included in Category 1 (all 47 are outside the UDA), 31 LAUs are included in Category 2 (three LAUs are inside the UDA and 28 are outside the UDA), 27 LAUs are included in Category 3 (six LAU are inside the UDA and 21 are outside the UDA), 30 LAUs are included in Category 4 (eight LAUs are inside the UDA and 22 are outside the UDA) and 29 LAUs are included in Category 5 (eight LAUs are inside the UDA and 21 are outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 358 and the total wetland acres per 160-acre LAU range from 0.007 to 12.54 acres.

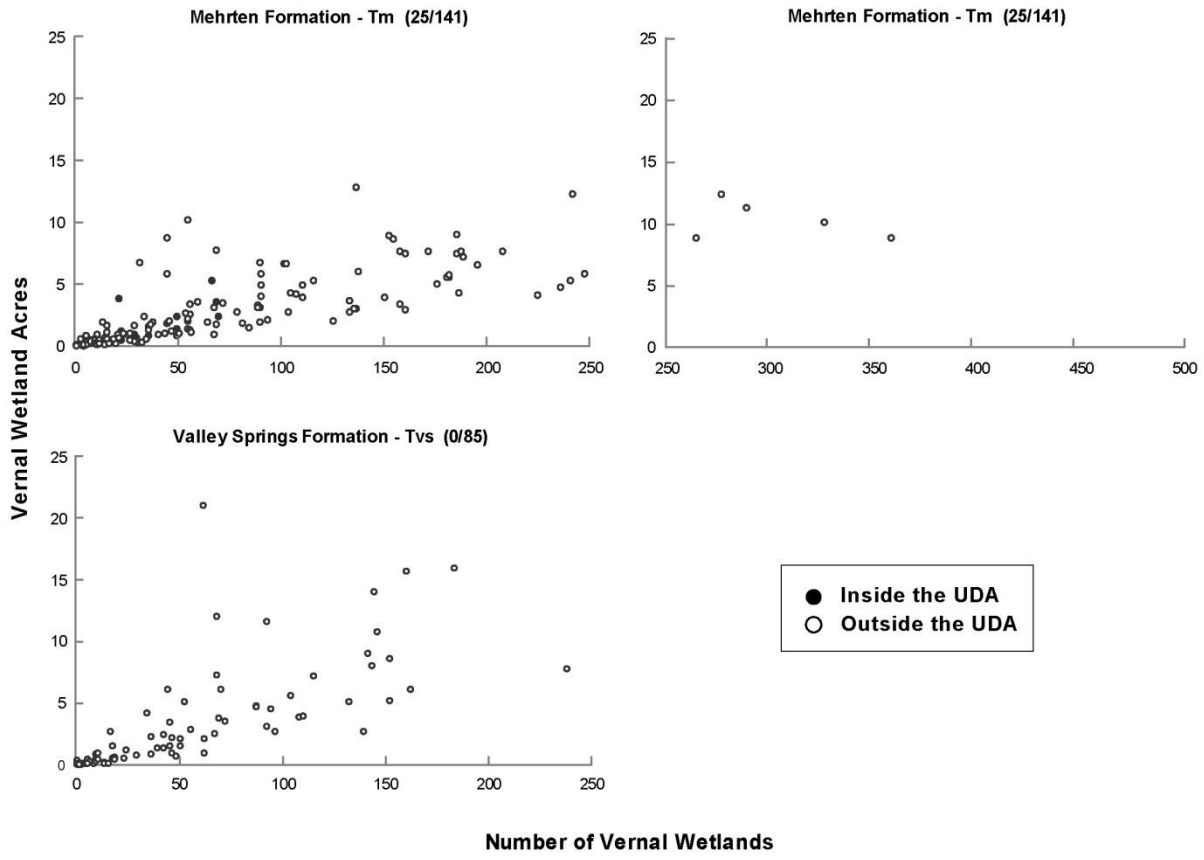
5.3.2 Valley Springs Formation (Tvs)

The Valley Springs Formation encompasses a total of 85 LAUs (6.2%), of which 85 (100%) are located outside of the UDA. The 85 LAUs are distributed among the five VWADI categories as follow): 21 LAUs are included in Category 1, 14 LAU are included in Category 2, 13 LAU are included in Category 3, 11 LAUs are included in Category 4 and 26 LAUs are included in Category 5.

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 239 and the total wetland acres per 160-acre LAU range from 0.004 to 21 acres.

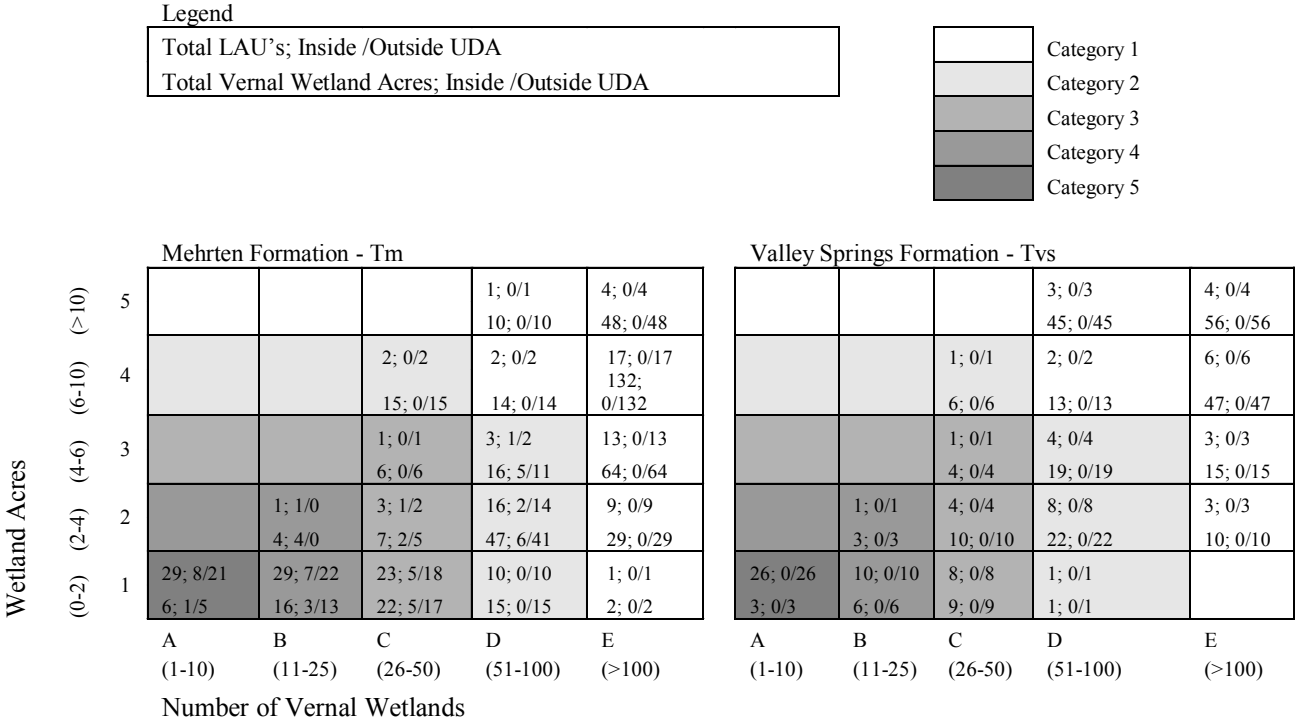
APPENDIX B-1 (Continued)

Figure 14 Relationship of number of vernal wetlands to wetted acres on Volcanic Mudflow Landform geologic formations. Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation name are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 15 Vernal Wetland Acre/Density Index (VWADI) for Volcanic Mudflow Landform geologic formations. Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area.



5.4 Other

The other Geologic Formations which do not fall in High Terrace, Low Terrace or Volcanic Mudflow Landform includes the Upper Unit Modesto, Undifferentiated Surficial Alluvial Deposits, Dredge Tailing and Artificial Fill and Metamorphic Rocks, Undifferentiated Geologic Formations. The relationship between vernal wetland acres and vernal wetland density for these 4 geologic formations are illustrated in Figure 16 and numerically summarized in Figure 17. In addition to these four geologic formations, three other formations are included within this description (North Merced Gravels, Alluvial Deposits and Alluvial Floodplain Deposits), but are not included in the tables or graphs due to low overall number and acreage of vernal wetlands per LAU.

5.4.1 Upper Unit Modesto Geologic Formation (Qmu)

The Upper Unit Modesto Formation encompasses a total of 46 LAUs (3.4%), of which 46 (100%) are located outside of the UDA. The 46 LAUs are distributed among the five VWADI categories as follows: five LAUs are included in Category 1, one LAU is included in Category 2, one LAU is included in Category 3, six LAUs are included in Category 4 and 33 LAUs are included in Category 5.

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 146 and the total wetland acres per 160-acre LAU range from 0.008 to 15.36 acres.

5.4.2 Undifferentiated Surficial Alluvial Deposits Geologic Formation (Qu)

The Undifferentiated Surficial Alluvial Deposits Formation encompasses a total of five LAU (0.4%), of which one (20%) is located inside of the UDA and four (80%) are located outside of the UDA. The 5 LAU are distributed among the five VWADI categories as follows:, one LAU is included in Category 2 inside the UDA, one LAU is included in Category 3 outside the UDA and three LAUs are included in Category 5 outside of the UDA. There are no LAUs in Category 1 or 4.

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 98 and the total wetland acres per 160-acre LAU range from 0.03 to 5.45 acres.

5.4.3 Dredge Tailing and Artificial Fill Geologic Formation (t)

The Dredge Tailing and Artificial Fill Formation encompasses a total of 23 LAU (1.7%), of which 14 (60.9%) are located inside of the UDA and 9 (39.1%) are located outside of the UDA. The 23 LAU are distributed among the five VWADI categories as follows: one LAU is included in Category 2 outside the UDA, two LAUs are included in Category 3 outside the UDA, five

LAUs are included in Category 4 LAUs are inside the UDA and one is outside the UDA) and 15 LAUs are included in Category 5 (10 LAUs are inside the UDA and five are outside the UDA).

The number of vernal wetlands per 160-acre LAU was found to range from 1 to 66 and the total wetland acres per 160-acre LAU range from 0.01 to 1.19 acres.

5.4.4 Metamorphic Rocks, Undifferentiated Geologic Formation (pKu)

The Metamorphic Rocks, Undifferentiated Geologic Formation encompasses a total of 84 LAU (6.1%), of which 1 (1.2%) is located inside of the UDA and 83 (98.8%) are located outside of the UDA. The 84 LAUs are distributed among the five VWADI categories as follows: five LAU are included in Category 2 outside the UDA), six LAUs are included in Category 3 outside the UDA, 15 LAUs are included in Category 4 (one LAU is inside the UDA and 16 are outside the UDA) and 58 LAUs are included in Category 5 outside the UDA).

The number of vernal wetlands per 160-acre LAU range from 1 to 88 and the total wetland acres per 160-acre LAU range from 0.005 to 6.80 acres.

5.5.5 Alluvial Deposits, Undivided Geologic Formation (Qha)

The Alluvial Deposits, Undivided Formation encompasses a total of one LAU (0.07%) which is located outside of the UDA. This LAU is included in Category 5. There are no LAU within Category 1, 2, 3 or 4.

The number of vernal wetlands per 160-acre LAU is one and the total wetland acres 0.40 acres.

5.5.6 Alluvial Floodplain Deposits Geologic Formation (Qfp)

The Alluvial Floodplain Deposits Geologic Formation encompasses a total of 10 LAU (0.7%), all of which are located outside of the UDA. Of these 10 LAUs, one LAU is included in Category 3 and nine LAUs are included in Category 5. There are no LAUs within Category 1, 2 or 4.

The number of vernal wetlands per 160-acre LAU range from 1 to 34 and the total wetland acres per 160-acre LAU range from 0.03to 1.85 acres.

5.5.7 North Merced Gravels Geologic Formation (Qtnm)

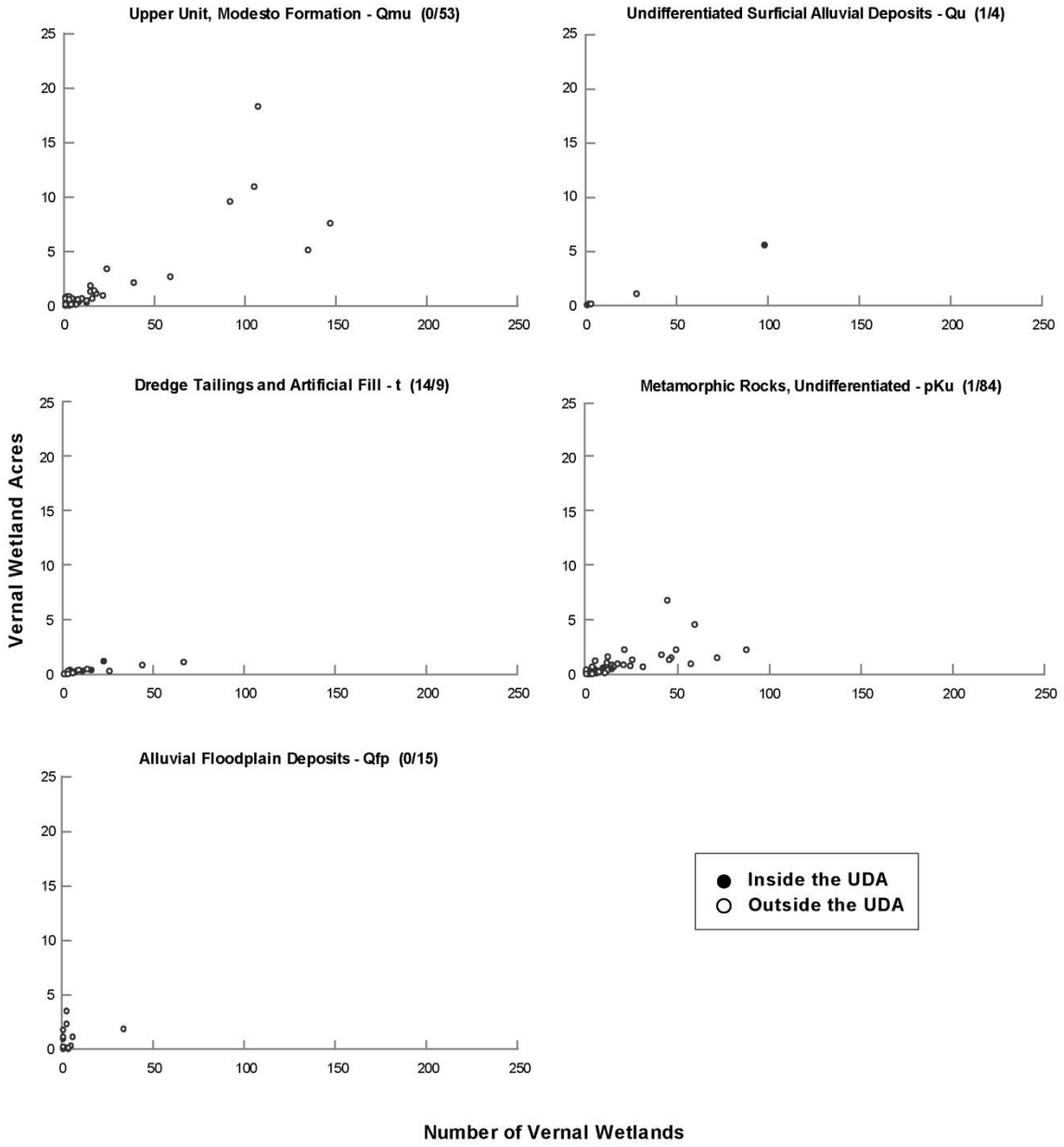
The North Merced Gravel Geologic Formation encompasses a total of two LAU (0.1%), both of which are located inside the UDA. One of the LAUs is included in Category 4 and one LAU is included in Category 5. There are no LAUs within Category 1, 2 or 3.

APPENDIX B-1 (Continued)

The number of vernal wetlands per 160-acre LAU range from 4 to 13 and the total wetland acres per 160-acre LAU range from 0.11 to 1.36 acres.

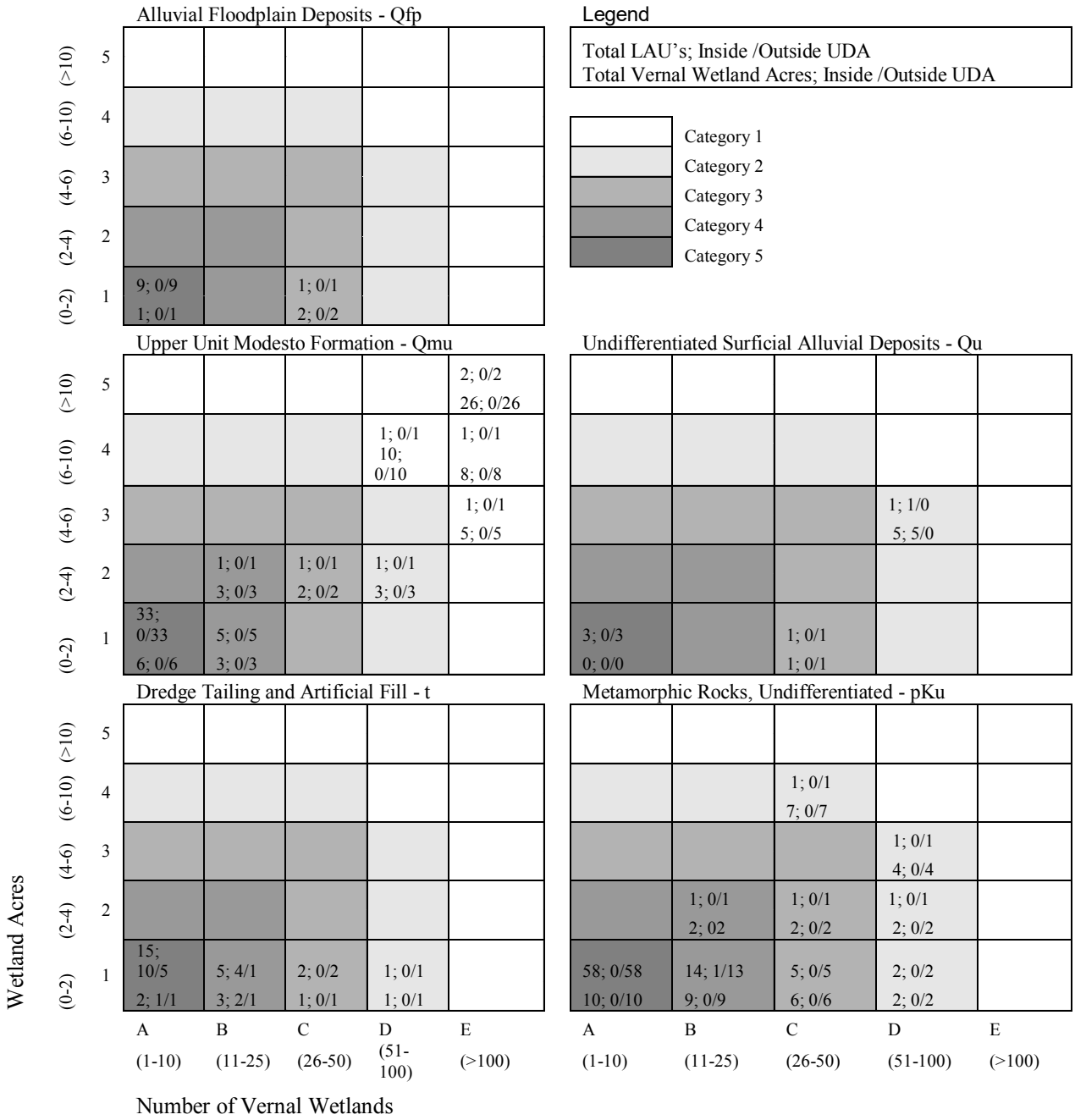
APPENDIX B-1 (Continued)

Figure 16 Relationship of number of vernal wetlands to wetted acres on other geologic formations (Qmu, Qu, t, and pKu). Each symbol represents one LAU. Black symbols represent LAUs inside the Urban Development Area, while white symbols represent LAUs outside the Urban Development Area. Numbers shown below geologic formation name are number of LAUs inside and outside the Urban Development Area (# Inside / # Outside). Abbreviations are: LAU= Land Analysis Unit.



APPENDIX B-1 (Continued)

Figure 17 Vernal Wetland Acre/Density Index (VWADI) for Other Geologic Formations (Qfp, Qmu, Qu, t, and pKu). Number of vernal wetlands (A-E) and vernal wetland acres (1-5) are shown categorically on the x and y axes, respectively. Abbreviations are: LAU = Land Analysis Unit and UDA = Urban Development Area.



6 VERNAL WETTED ACRE DENSITY INDEX (VWADI) AND PRESERVE DESIGN

The VWADI was used to classify and describe the spatial distribution of vernal pools and vernal pool complexes within the Study Area. This information was also used to develop the SSHCP vernal pool/ grassland habitat conservation strategy by assisting in identification and definition of proposed preserve zones. This index helps in the assignment of conservation value to each 160-acre LAU, based on a set of considerations and assumptions:

- LAUs with dense vernal pool complexes are infrequently occurring;
- LAUs with large vernal pools are infrequently occurring;
- LAUs with dense vernal pool complexes are ecologically unique and important because they provide vernal pool heterogeneity;
- LAUs with large vernal pools are ecologically unique and important;
- LAUs with large vernal pools and/or dense vernal pool complexes are valuable for conservation because of their infrequency and their ecological uniqueness.
- LAUs with large vernal pools and/or dense vernal pool complexes are valuable for conservation because their mitigation-preservation ratio allows for acquisition of the greatest wetted-acres with the minimal loss of developable upland areas.

Although high density complexes and large vernal pools are emphasized, it is important to note that "small" vernal pool types provide important habitat functions as well. It is assumed however, that the "small" or "shallow"-type vernal pool habitat is present as a sub-habitat type that is present in most vernal pool complexes.

Based on these considerations, it was decided that 5 quantitative categories of conservation value would be used to address the 25 VWADI categories; the highest conservation value will be placed on category 1 LAUs (most wetted acres with densest vernal pool complexes and largest number of large pools), and the least conservation value on category 5 LAUs (least wetted acres, and most isolated and smaller vernal pools). It is recognized that these categories, along with the VWADI values are somewhat subjective and may lack fine ecological resolution (e.g., are all A5/Category-1 and A4/Category-2 LAUs actually ecologically different?). This is, however an objective and quantifiable approach to describing landscape vernal pool patterns available at the present time.

The VWADI is designed to identify high-density vernal pool complexes. High-density pool complexes are targeted specifically because it maximizes (1) the amount of wetted acreages

within a given land Unit, (2) the number of vernal pools within a given land unit and (3) the connectivity between vernal pools within and between land units.

Protecting the maximum number of vernal pools is an essential part of this strategy specifically because (1) vernal pools provides the habitat (both occupied and suitable) for the 13 covered vernal pool species that need to be protected (2) it protects vernal pool heterogeneity including size, shape, depth, landform association and species diversity.

In order to preserve the most ecologically complex vernal pool habitats and to acquire the required wetland acres necessary to mitigate for the proposed impacts, Category 1 and 2 LAUs will be the primary targets for proposed preserves zones. Since all vernal pools, regardless of size or density possess ecological function and conservation values; the remaining LAUs will be targeted where available in order to provide connectivity, buffers and specific species conservation opportunities.

Land Analysis Units in Categories 1 and 2 of the VWADI system have particularly high value for the conservation of ecologically functional vernal pool complexes. It is necessary to conserve most of the acres in these categories both inside and outside the UDA. In particular, ecological connectivity increases with increasing vernal pool density per given land unit, maximum interconnectivity is associated with the largest areas encompassing the densest of pool complexes.

Category 3 and 4 LAUs are targeted in cases where they provide corridors and buffers to existing and proposed preserves, as well as opportunities to protect known locations of vernal pool covered species, unique large pools and pools on specific formations.

Category 5 LAUs will be targeted when they have a clearly defined conservation value such as “no take species”, or unique habitat features and qualities. These features may include large and/or deep vernal pools, corridors, high quality upland habitats, and suitable vernal pool creation/restoration mitigation sites.

The total number and percentages of the different VWADI categories for the 1,372 LAU with vernal wetlands is included below as well as the total vernal pool/wetland acres;

Category 1 (18.7% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI value of A5, B5, C5, D5, E5, E4, E3, E2, E1 and D4). This category contains 2,480 wetland acres (62.2% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

Category 2 (14.0% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI of A4, B4, C4, D1, D2 and D3). This category contains 706 wetland acres (17.7% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

APPENDIX B-1 (Continued)

Category 3 (14.7% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI of A3, B3, C1, C2 and C3). This category contains 421 wetland acres (10.6% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

Category 4 (16.8% of all LAUs with vernal pool habitat; includes all LAUs with an VWADI of A2, B1 and B2). This category contains 254 wetland acres (6.4% of the total vernal pools/wetlands mapped within the SSHCP Study Area);

Category 5 (35.8% of all LAUs with vernal pool habitat; includes all A1). This category contains 128 wetland acres (3.2% of the total vernal pools/wetlands mapped within the SSHCP Study Area).

APPENDIX B-1 (Continued)

INTENTIONALLY LEFT BLANK

7 LITERATURE CITED

ACOE (United States Army Corps of Engineers). 1987. Corps of Engineers wetlands delineation manual. (Technical report Y-87-1.) Vicksburg, MI. Prepared for the Department of the Army, Washington, D.C.

Ahl, J.S.B. 1991. Factors affecting contributions of the tadpole shrimp, Lepidurs packardi, to its oversummering egg reserves. Hydrobiologia 212:137-143.

Alexander, D.G. 1976. Ecological aspects of temporary annual pool fauna. Pages 32-36 in: S. Jain (Editor). Vernal Pools, Their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis.

Alexander, D.G. and R.A. Schlising. 1998. Patterns in time and space for rare macroinvertebrates and vascular plants in vernal pool ecosystems at the Vina Plain Preserve and implications for pool landscape management. Pp. 161-168 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Baker, W.S., F.E. Hayes and L.W. Lathrop. 1992. Avian use of vernal pools at the Santa Rosa Plateau Preserve, Santa Ana Mountains, California. The Southwestern Naturalist 37: 392-403.

Barry, S.F. 1998. Managing the Sacramento vernal pool landscape to sustain native flora. Pp. 236-240 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Barbour, M., A. Solomeshch, C. Withham, R. Holland, R. Macdonald, S. Cilliers, J.A. Molina, j. Buck and J. Hillman. 2003. Vernal Pool Vegetation In California: Variation Within Pools. Madrono. Vol.50, No.3.

Bauder, E., D.A. Kreager and S. McMillan. 1997. Vernal Pools of Southern California. Draft Recovery Plan. Prepared for United States Fish and Wildlife Service. Portland, Oregon.

Belk, D. 1998. Global status and tends in ephemeral pool invertebrate conservation: implications for California fairy shrimp. Pages 147-150 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

APPENDIX B-1 (Continued)

Betts, R.A., P.M. Cox and F.I. Woodward. 2000. Simulated responses of potential vegetation to doubled-CO_2 climate change feedbacks on near-surface temperature. Global Change and Biogeography 9(2):171-180.

Bliss, S.A. and P.H. Zedler. 1998. The germination process in vernal pools: sensitivity to environmental conditions and effects on community structure. Oecolgia 113:67-73.

Butterwick, M. 1998. The Hydrogeomorphic approach and its use in vernal pool functional assessment. Pages 50-55 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

CDFG (California Department of Fish and Game). 1983. Management Plan for Phoenix Field Ecological Reserve (Prepared by S. Clemons).

CDFG. 2003. California Natural Diversity Data Base search, California Department of Fish and Game. Sacramento, California.

City of Elk Grove, 2000. East Franklin Specific Plan. Online: http://www.egplanning.org/projects/eastfranklin_sp.

Clark, G.M., T.J. Roscoe, M.J. van Ess and N. Wymer. 1998. Management considerations for small vernal pool preserves-the Phoenix vernal pools. Pages 250-254 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

CNPS (California Native Plant Society). 2001. Inventory of Rare and Endangered Plants of California. 6th ed. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, California.

Cowardin, L.M., V. Carter, F.C. Golet, E.T. La Roe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. (FWS/OBS-79/31) U.S. Fish and Wildlife Service. Washington.

Crampton, B. 1959. The grass genera *Orcuttia* and *Neostapfia*: A study in habitat and morphological specialization. Madrono 15 pp. 97-110.

Dahl, T.E. 1990. Wetland losses in the United States: 1780's to 1980's. U.S. Fish and Wildlife Service. Washington, D.C.

APPENDIX B-1 (Continued)

Davidson, R.L. 1979. Micro-organisms. Pages 267-276 in: R.T. Coupland. Grassland Ecosystems of the World. Cambridge University Press. Cambridge, Great Britain.

Dittes, J.C. and J.L. Guardino. 2002. Rare Plants. Pages 55-150 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Duffey, E., M.G. Morris, J. Sheail, L.K. Ward, D.A. Wells and T.C.E. Wells. 1974. Grassland Ecology and Wildlife Management. Chapman & Hall, Great Britain.

Elam, D. R. 1998. Population genetics of vernal pool plants: theory, data and conservation implications. Pp. 180-189 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Ellner, S.P., N.G. Hairston, Jr., C.M. Kearns and D. Babai. 1999. The roles of fluctuating selection and long-term diapause in microevolution of diapause timing in a freshwater copepod. Evolution 53:111-122.

Ellstrand, N.C. and D.R. Elam. 1993. Population genetic consequences of small population size: implication for plant conservation. *Annual Review of Ecology and Systematics* 24: 217-242.

Eriksen, C.H. and D. Belk. 1999. Fairy shrimps of California's puddles, pools, and playas. Mad River Press, Inc. Eureka, California. 196 p.

Evans, H.E. 1984. Insect Biology. Addison-Wesley Publishing Company. Reading, Massachusetts.

Evans, A.V. and J.N. Hogue. 2004. Introduction to California Beetles. California Natural History Guide. University of California Press. Berkeley and Los Angeles, California.

Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: Ambystoma tigrinum californiense Gray Hyla regilla Baird and Giard and Scaphiopus hammondi Giard. M.A. Thesis, Frenso State University, California.

Feldheim, C.L., J.E. Isola and M.A. Wolder. 1999. Shorebird population and habitat use variations between a dry and wet spring on the Sacramento National Wildlife Refuge, California. Draft report of Sacramento NWR, 752 County Rd. 99W, Willows, California.

Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29:207-230+C2.

APPENDIX B-1 (Continued)

Forman, R.T.T. and R.D. Deblinger. 2000. The ecological road-effect zone of a Massachusetts (U.S.A.) suburban highway. Conservation Biology 14(1):36-46.

Fugate, M. 1998. *Branchinecta* of North America: population structure and its implications for conservation practice. Pages 140-146 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Gallagher, S.P. 1993. Life history variation in the temporary pool snail, Fossaria sonomaensis, in the Northern Sacramento Valley. American Midland Naturalist 130:372-385.

Gathmann, A. and T. Tscharntke. 2002. Foraging ranges of solitary bees. Journal of Animal Ecology 71: 757-764.

Griggs, F. T. 1974. Systematics and ecology of the genus *Orcuttia* (Gramineae). M.S. Thesis, California State University, Chico, California. 70pp.

Griggs, F. T. 1980. Population studies in the genus *Orcuttia* (Poaceae). Ph.D. Dissertation, University of California, Davis, California.

Griggs, F. T. 2000. Vina Plains Preserve: eighteen years of adaptive management, Fremontia 27: No. 4. Pp 48-51.

Griggs, F.T. and S. K. Jain. 1983. Conservation of vernal pool plants in California. II. Population biology of a rare and unique grass genus *Orcuttia*. Biological Conservation 27: 171-193.

Hanes, T. and L. P. Stromberg. 1998. Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Hanes, W.T., B. Hecht and L.P. Stromberg. 1990. Water relationships of vernal pools in the Sacramento region, California. Pp. 49-60 *in:* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, California State University Chico, California. Number 8.

Helley, E.J. and D.S. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northeastern Sierran Foothills, California. Miscellaneous Field Studies Map MF-1790. U.U. Geological Survey.

APPENDIX B-1 (Continued)

Helm, B.P. 1998. Biogeography of eight large branchiopods endemic to California. Pages 124-139 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Helm, B.P. and J.E. Vollmar. 2002. Large Branchiopods. Pages 151-190 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Hickman, C.P. Jr., L.S. Roberts and A. Larson. 2001. Integrated Principles of Zoology. 11th ed. McGraw-Hill Companies Inc. Boston, Massachusetts.

Hickman, J.C. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley, California.

Hobson W.A. and R.A. Dahlgren. Soil forming processes in vernal pools of northern California, Chico area. Pp. 224-235 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Holland, D.C., M.P. Hayes, and E. McMilla. 1990. Late summer movement and mass mortality in the California tiger salamander. The Southwestern Naturalist 35(2): 217-220.

Holland, R. F.1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. (Special Publication No. 3) California Native Plant Society. Berkeley, California.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game, Sacramento, California.

Holland, R. F. 1987. What constitutes a good year for an annual plant? Two examples from the Orcuttieae. *In:* T.S. Elias, (Ed.) Conservation and Management of Rare and Endangered Plants, California Native Plant Society, Sacramento.

Holland, R. F. 1998. Great Valley vernal pool distribution, photorevised 1996. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

APPENDIX B-1 (Continued)

Holland, R.F. 1998. No net loss? Changes in Great Valley vernal pool distribution from 1989 to 1997. Unpublished Report prepared for the California Department of Fish and Game Natural Heritage Division. Sacramento, California.

Holland, R.F., and V.I. Dains, V.I. 1990. The edaphic factor in vernal pool vegetation. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Holland R.F. and S.K. Jain. 1977. Vernal pools. Pages 515-533 in: M.G. Barbour and J. Major (Editors). Terrestrial vegetation of California. John Wiley & Sons. New York, New York.

Holland R.F. and S.K. Jain. 1984. Spatial and temporal variation in plant species diversity of vernal pools Pp. 198-209 in: S. Jain and P. Moyle. (Eds.)1984. Vernal pools and intermittent streams. Institute of Ecology, University of California, Davis, California. Number 28.

Hoover, R.F. 1941. The genus *Orcuttia*. Bulletin of the Torrey Botanic Club 68: 149-15.

Hurlbert, S.H., M.S. Mulla, and H.R. Willson. 1972. Effects of an organophosphorus insecticide on the phytoplankton, zooplankton, and insect populations of fresh-water ponds. Ecological Monographs 42(3):269-299.

Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Jain, S.K. 1976. Vernal pools: their ecology and conservation. Institute of Ecology, University of California, Davis, California.

Jain, S.K. and P. Moyle. (Eds.) 1984. Vernal pools and intermittent streams. Institute of Ecology, University of California, Davis, California. Number 28.

James, L.A. 1989. Sustained storage and transport of hydraulic gold mining sediment in the Bear River, California. Annals of the Association of American Geographers 79(4):570-592.

Jokerst, J.D. 1990. Floristic Analysis of Volcanic Mudflow Vernal Pools. *in:* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, California. Number 8.

Jokerst, J.D. 1993. An alternative approach to vernal pool mitigation planning in Sacramento County. Interface Between Ecology and Land Development in California. 227-234.

APPENDIX B-1 (Continued)

Jones and Stokes. 1990. Sacramento vernal pools, their distribution, classification, ecology, and management. Prepared for Sacramento Planning and Community Development Department. Sacramento, California.

Jones and Stokes. 1998. Slender Orcutt Grass surveys at the Kiefer Landfill. Prepared for Patrick Maxfield, Sacramento County Public Works Agency. Sacramento, California.

Kareiva, P and U. Wennergren. 1995. Connecting landscape patterns to ecosystem and population processes. *Nature* 373: 299-302.

Keeley, J. E. 1984. Photosynthetic characteristics of certain vernal pool species. Pp. 218-222 *in:* S. Jain and P. Moyle, (Eds). Vernal Pools and Intermittent Streams. Institute of Ecology No. 28, University of California, Davis.

Keeley, J. E. 1988. Anaerobiosis and fungi in the germination of two vernal pools grasses. Am. J. Bot. 75:1086-1089.

Keeley, J.E. 1990. Photosynthesis in vernal pool macrophytes: relations of structure and function. Pp. 31-48 *in:* Ikeda, D.H. and R.A. Schlising (Eds.). Vernal Pool Plants - Their Habitat and Biology. Studies from the Herbarium, CSU Chico, CA. Number 8.

Keeley, J.E. 1998. C4 photosynthetic modifications in the evolutionary transition from land to water in aquatic grasses. Oecologia 116(1-2): 85-97.

Keeley, J.E. and P.H. Zedler. 1998. Characterization and global distribution of vernal pools. Pp 1-14 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Keeler-Wolf, T., D.R. Elam, and S.A. Flint. 1998. California Vernal Pool Assessmeny Preliminary Report. The Resources Agency, Department of Fish and Game, Sacramento, California.

Laabs, D.M., S.G. Orloff and M.L. Allaback. 2002. Pond and stream-breeding amphibians. Pages 191-229 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

APPENDIX B-1 (Continued)

Leidy, R. A. and E. G. White. 1998. Toward an Ecosystem Approach to Vernal Pool Compensation and Conservation. Pp. 263-273 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Leong, J.M., R.P. Randolph and R.W. Thorp. 1995. Observations of the foraging patterns of *Andrena (Diandrena) blennospermatis* Thorp (Hymenoptera: Andrendidae). Pan-Pacific Entomologist 71:68-71.

Loredo, I., D. Van Vuren. 1996. Habitat use and migration behavior of the California Tiger Salamander. *Herpetology* 30:282-285.

LSA Associates Inc. 2004. Solana County HCP/NCCP. Solano County Water Agency. Web page(s) at http://www.scwa2.com/hcpdocs.html. Downloaded 7/21/04.

MacArthur, R.H. and E.O. Wilson, 1967. *The Theory of Island Biogeography*. Princeton University Press, Princeton, New Jersey.

Marty, J. 2003. Cows Eat Grass. Cosumnes River Preserve. The Nature Conservancy. Power point presentation. Web page(s) at http://www.conserveonline.org/csd;internal&action=buildframes.action. Downloaded 7/24/04.

Master, L.L., S.R. Flack and B.A. Stein (Editors). 1998. Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity. The Nature Conservancy. Arlington, Virginia. Web page(s) at http://www.natureserve.org/publications/riversOflife.jsp. Downloaded 6/23/04.

Mawdsley, K.F. 2000. Jepson Prairie Preserve today. Fremontia 27: No. 4. Pp. 52-55.

Metz, J. 2001. Correlating vernal pool distribution patterns and geologic formations to inform conservation planning in East Merced County. Master's Thesis. University of California, Berkeley, California.

Molles, M.C. 1999. *Ecology Concepts and Applications*. The McGraw-Hill Companies, Inc. Boston, Massachusetts.

Morey, S.R. 1998. Pool duration influences age and body mass at metamorphosis in the Western Spadefoot Toad: implications for vernal pool conservation. Pages 86-91 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

APPENDIX B-1 (Continued)

National Research Council (NRC). 1995. Wetlands: Characteristics and Boundaries. National Academy Press. Washington D.C.

National Research Council (NRC). 1992. Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy. National Academy Press. Washington D.C.

Newman, K.C. 1973. Ammonia, urea, and uric acid levels in active and aestivating snails, *Bakerilymnaea cockerelli*. Thesis (M.A.). California State University, Chico. 55 pp.

Pierson, E.D. and W.E. Rainey. 2002. Bats. Pages 385399 in: J.E. Vollmar (Editor). Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Plantenkamp, G.A.J. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. Pp 38-49 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Proctor, V.W. 1964. Viability of crustacean eggs recovered from ducks. Ecology 45:656-658.

Proctor, V.W and C.R. Malone. 1965. Further evidence of the passive dispersal of small aquatic organisms via the intestinal tract of birds. Ecology 46:728-729.

Proctor, V.W., C.R. Malone and V.L. DeVlaming. 1967. Dispersal of aquatic organisms: viabiligy of disseminules recovered from the intestinal tract of captive killdeer. Ecology 48:672-676.

Pyke, C.R. and J. Marty. 2005. Cattle Grazing Mediates Climate Change Impacts on Ephemeral Wetlands. Conservation Biology. 19: 1619-1625.

Raven, P. H. and D. I. Axlrod. 1978. Origin and Relationships of the California Flora. University of California Publications in Botany. 72:1-134

Reiner, R. and R. Swenson. 2000. Saving Vernal Pools on the Cosumnes River Watershed. Fremontia 27:4 and 28:1, 33-37.

Robins, J.D. and J.E. Vollmar, 2002 Livestock Grazing and Vernal Pools *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

APPENDIX B-1 (Continued)

Rogers, D. C. 1998. Aquatic macroinvertebrate occurrences and population trends in constructed and natural vernal pools in Folsom, California. Pp. 224-235 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Sacramento County. 1993. County of Sacramento General Plan. Planning and Community Development Department. Sacramento, CA. Web page(s) at http://www.saccounty.net/general-plan/gp-home.html. Downloaded 5/22/04.

Sawyer, J. O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society. Sacramento, California.

Schaffer, B.H., R.N. Fisher and S.E. Stanley. 1993. Status Report: The California Tiger Salamander (*Ambystoma californiense*). Inland Fisheries Division, California Department of Fish and Game (Contracts FG 9422 and FG 1383). Unpublished Report.

Semlitsch, R.D. 1998. Biological delineation of terrestrial buffer zones for pond-breeding salamanders. Conservation Biology 12: 1113-1119.

Shuford, W.D., G.W. Page, and J.E. Kjelmyr. 1998. Patterns and dynamics of shorebird use of California's Central Valley. Condor 100:227-244.

Silveira, J.G. 2000. Vernal pools and relict duneland at Arena Plains. Fremontia 27(4) & 28(1):38-47.

Silveira. J.G. 1998. Avian uses of vernal pools and implecations for conservation practice. Pp 92-106 *in:* C. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Simon, K.S. and A.L. Buikerma, Jr. 1997. Effects of organic pollution on an Appalachian Cave: changes in macroinvertebrate populations and food supplies. American Midland Naturalist 138(2):387-401.

Simovich, M.A. 1998. Crustacean biodiversity and endemism in California's ephemeral wetlands. Pages 107-118 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

APPENDIX B-1 (Continued)

Sloat T. R. and E.D. Whisler. 2002. Birds. *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grassland. Vollmar Consulting. Berkeley, California.

Smith, D.W. and W.L. Verrill. 1998. Vernal pool-soil-landform relationships in the Central Valley, California. Pages 15-23 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, conservation and management of vernal pool ecosystems – Proceedings from a 1996 conference. California Native Plant Society. Sacramento, California.

Stebbins, G.L. 1976. Ecological islands and vernal pools of California. *In* S.Jain [ed.] Vernal pools: their ecology and conservation, 1-4. Institute of Ecology Publ. 9, University of California, Davis, California.

Stone, R. D., W.B. Davilla, D.W. Taylor, G.L. Clifton and J.C. Stebbins. 1988. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooveri* (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service Stone Technical Report. Prepared by Biosystems Analysis for USFWS Office of Endangered Species, Sacramento, California.

Stone 1990. California's endemic vernal pool plants: some factors influencing their rarity and endangerment, *in* Ikeda, D.H. and R.A. Schlising (Eds.) Vernal Pool Plants -Their Habitat and Biology. Studies from the Herbarium, California State University, Chico. Number 8.

Su, T. and M.S. Mulla. 2002a. Spatial occurrence and hatch of field eggs of the tadpole shrimp Triops newberryi (Notostrac: Triopsidae), a potential biological control agent of immature mosquitoes. Journal of Vector Ecology 27:128-137.

Su, T. and M.S. Mulla. 2002b. Introducction and establishment of tadpole shrimp Triops newberryi (Notostraca: Triopsidae) in a date garden for biological control of mosquitos in the Coachella Valley, southern California. Journal of Vector Ecology 27:138-148.

Sunahara, T., K. Ishizaka and M. Mogi. 2002. Habitat size: a factor determining the opportunity for encounters between mosquito larvae and aquatic predators. Journal of Vector Ecology 27: 8-20.

Sweet, S. 1998. University of California, Santa Barbara.

APPENDIX B-1 (Continued)

Teresa, S. and B. C. Pace. 1998. Planning sustainable conservation projects: large and small-scale vernal pool preserves. Pp. 255-262 *in:* C.Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Thorne, R.F., 1984. Are California vernal pools unique? *In* S. Jain and P. Moyle [eds.], Vernal pools and intermittent streams, 1-8. Institute of Ecology Publ. 28. University of California, Davis, California.

Thorp, R. 2003. E-mail communication to Daniel Burmeister (Dept. of Fish and Game Regional Ecologist).

Thorp, R. 1990. Vernal pool flowers and host-specific bees. Pages 109-122 in: D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants--their habitat and biology. Studies from the Herbarium No. 8, California State University, Chico.

Thorp, R.W. 1976. Insect pollination of vernal pool flowers. Pages 36-40 in: S. Jain (Editor). Vernal Pools, Their Ecology and Conservation. Institute of Ecology Publication 9. University of California, Davis.

Thorp, R.W. and J.M. Leong. 1998. Specialist bee pollinators of showy vernal pool flowers. Pages 169-179 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr. and R. Ornduff (Editors). Ecology, Conservation and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California.

Thorp, R.W. and J.M. Leong. 1996. Determining effective mitigation techniques for vernal pool wetlands: effect of host-specific pollinators on vernal pool plants. Final Report. California Department of Transportation, Environmental Division. Sacramento, California.

Thorp, R.W. and J.M. Leong. 1995. Native bee pollinators of vernal pool plants. Fremontia 23(2):3-7.

TNC (The Nature Conservancy). 2000. Effects of prescribed fire and grazing on a vernal pool grassland landscape: Recommendations for monitoring. Pp. 91, Environmental Protection Agency, San Francisco, California.

TNC. 2001. California North Coast Ecoregional Plan. The Nature Conservancy, San Francisco, California.

APPENDIX B-1 (Continued)

Trenham, P.C., W.D. Koenig, and H.B. Shaffer, 2001. Spatially autocorrelated demography and interpond dispersal in the California tiger salamander, *Ambystoma californiense*. Ecology 82: 3519-3530.

Trenham, P.C. 2001. Terrestrial habitat used by adult California tiger salamanders. Journal of Herpetology, 35(2):344-346.

Tugel, A.J. 1993. Soil Survey of Sacramento County, California. United States Department of Agriculture, Soil Conservation Service.

USDA (United States Department of Agriculture). 1991. Soil Survey of Sacramento County California. Florin, Sloughhouse Lower Cosumnes Resource Conservation Districts.

USDOI (United States Department of the Interior). 1994. The Impact of Federal Programs on Wetlands, Vol. II, A Report to Congress by Secretary of Interior, Washington, D.C.

USFWS (United States Fish and Wildlife Service). 2004. Draft recovery plan for vernal pool ecosystems of California and southern Oregon. Portland, Oregon. xxii + 574 pp.

USFWS. 1999. Biological opinion for the Solano project water service contract renewal. U.S. Fish and Wildlife Service. Sacramento, California. 107 pp. + append.

USFWS. 1996. Draft Interim Vernal Pool Habitat Complex Ecosystem and Species Conservation Standards. March 14 1996. H:\WPDOCS\STDINFO\PROTECTM\VPOOLS.WPD.

Vollmar, J.E. 1999. Report on the soils, habitats, and rare species associated with the vernal pool grasslands of Eastern Merced County, California. East Merced Resource Conservation District, Merced, California.

Vollmar, J.E. (Ed.) 2002. Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting. Berkeley, California.

Wacker, M. and N.M. Kelly. 2004. Changes in vernal pool edaphic settings through mitigation at the project and landscape scale. Wetlands Ecology and Management. 12: 165-178.

Weston, D.P., R.W. Holmes, J. You and M.J. Lydy. 2005. Aquatic toxicity due to residential use of Pyrethroid insecticides. Environ. Sci. and Technol.

Witham, C., E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems. Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.

Wurster, C.F. Jr. 1968. DDT reduces photosynthesis by marine phytoplankton. Science 159:1474-1475.

APPENDIX B-1 (Continued)

Zedler, P.H. 1987. The ecology of Southern California vernal pools: a community profile. U.S. Fish and Wildlife Service, Biological Report 85(7.11), U.S. Department of the Interior, Washington, D.C.

Zedler, P.H. 1990. Life histories of vernal pool vascular plants. Pages 123-146 in: D.H. Ikeda and R.A. Schlising (Editors). Vernal pool plants-their habitat and biology. Studies from the Herbarium No. 8, California State University, Chico.

Zedler, P.H. and C. Black. 1992. Seed dispersal by a generalized herbivore: rabbits as dispersal vectors in a semiarid California vernal pool landscape. The American Midland Naturalist. Vol. 128 (No. 1) 1-9.

Personal Communications (2001–2006)

Ahart, Lowell, Rancher/Botanist Honcutt, Butte County. California.

Barbour, Michael, Ph.D. Professor, University of California, Davis, California.

Bogiatto Raymond, Adjunct Professor California State University, Chico.

Burmester, Daniel. Regional Ecologist, California Department of Fish and GameRancho Cordova, California.

Chamberlain, Scott. Biologist, Chico, California.

Clifton, Glenn. Consulting Botanist, Deer Park, California.

Gause, Matt. Consulting Botanist, May Consulting, Walnut Grove, California.

Griggs, Tom, Ph.D. Adjunct Professor, California State University, Chico, California.

Kelsey, Jon. (2001) Rancher Snelling, Merced County. California.

Preston, Robert, Ph. D. Consulting Botanist, Jones & Stokes, Sacramento, California.

Schlising, Robert, Ph.D. Professor, California State University, Chico, California.

Taylor, Dean. Ph.D. Consulting Botanist, Santa Cruz, California.

Tibor, David. Rare Plant Botanist, California Native Plant Society, Sacramento, California.

Ron Unger. Restoration Ecologist EDAW, Sacramento, California.

Witham, Carol. Consulting Botanist, Davis, California.

APPENDIX B-2

Addendum to Vernal Pool Classifications

APPENDIX B-2
Addendum to Vernal Pool Classifications

1 PURPOSE

The purpose of this document is to explain the changes in the analysis methods described in *Vernal Pool Classifications* (Appendix B-1 of the Aquatic Resources Plan (ARP)) that were used to generate the results presented in the ARP. Specifically, the focus of this addendum is regarding the classification of SSHCP vernal pools and the Vernal Wetland Acre/Density Index (VWADI) (Section 5.2 of *Vernal Pool Classifications*).

2 MODIFICATIONS

There are three factors that were modified in the analysis presented in the ARP from those used in the 2010 *Vernal Pool Classifications* document that affect the results: (1) land cover data; (2) land analysis unit (LAU) size; and (3) assigned intervals for vernal pool wetted acreage categories. Each of these modifications is described below.

2.1 Land Cover Data

The 2010 *Vernal Pool Classifications* did not use the most current available land cover data, which identifies the size and location of the vernal pools. The original mapping efforts have been updated and refined at various times to reflect modifications of land cover types (such as cover type conversion), to accommodate an expansion of the Plan Area boundary, and to correct errors in the original mapping. The current land cover map provides fairly detailed information for the existing conditions in the Plan Area based on 2009 aerial photos and limited field-truthing, with the updates occurring in May 2010 and July 2012. The analysis presented in the ARP is based upon the current land cover data.

2.2 Land Analysis Units

The VWADI is based on the variation in vernal pool areas (acres) and variation in vernal pool density (number of vernal pools per unit land area). In the 2010 *Vernal Pool Classifications*, these two parameters were assessed together as an index for vernal pool resources within standardized 160-acre LAUs (i.e., one-quarter sections) and served as the primary descriptors of the range of spatial-ecological variability of vernal pools in the Plan Area. Based on an informal recommendation from the U.S. Fish and Wildlife to the County of Sacramento, a 40-acre LAU was used to generate the results for the VWADI presented in the ARP. The 40-acre LAUs allow for more detailed analysis and preserve planning.

2.3 Assigned Intervals Based Upon Vernal Pool Wetted Acres

As described in Section 5.2.3 of the 2010 *Vernal Pool Classifications*, 25 VWADI categories were designated using 5 intervals, designated A–E, based on vernal pool density and 5 intervals,

APPENDIX B-2 (Continued)

designated 1–5, based on vernal pool wet-acres[1] within the LAUs. The VWADI letter category for vernal pool wetland density is presented in Table B2-1. The attributes and assigned VWADI letter category for vernal pool density was not modified in the analysis presented in the ARP even though the LAU was reduced in size from 160 to 40 acres. For example, a 160-acre LAU with more than 100 vernal pools was assigned as "E" in the 2010 *Vernal Pool Classifications,* whereas in the ARP a 40-acre LAU would have to include more than 100 vernal pools to be assigned "E."

Table B2-1
Assigned Intervals Based Upon Vernal Pool Density

Total Number of Vernal Pools/LAU	VWADI Letter Category
1–10	A
11–25	B
26–50	C
51–100	D
>100	E

The attributes and assigned VWADI number category for vernal pool wetted acres was scaled to the 40-acre LAU in the analysis presented in the ARP. The VWADI number category for the vernal pool wet-acres in the 2010 *Vernal Pool Classifications* and the ARP are presented in Table B2-2 to show the differences between the two analyses. The more stringent requirement for the vernal pool density factor, in combination with the reduction in the size of the LAU, provides a more fine-grained analysis of the VWADI categories across the Plan Area landscape.

Table B2-2
Assigned Intervals Based Upon Vernal Pool Wetted Acres

Total Acres Vernal Pools/LAU		VWADI Number Category
2010 *Vernal Pool Classifications*	*ARP*	
0–2	0–0.5	1
2–4	0.5–1	2
4–6	1–1.5	3
6–10	1.5–2.5	4
>10	>2.5	5

[1] The wet-acres or wetted acres is equivalent to the area delineated as a vernal pool in the land cover data.

APPENDIX C

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Plan

DRAFT

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Prepared by:

DUDEK

930 9th Street, Suite 1750
Sacramento, California 95814
Contact: Sherri Miller

JUNE 2015

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

TABLE OF CONTENTS

Section **Page No.**

1 INTRODUCTION 1

2 METHODS 3

2.1 Functional Analysis Scoring 3

2.1.1 Factor 1 – Area of Aquatic Resource 3

2.1.2 Factor 2 – Watershed 4

2.1.3 Factors 3 and 4 – Primary and Secondary Adjacent Land Cover 15

2.1.4 Factor 5 – The Aquatic Resource Type 17

3 RESULTS 19

3.1 Very Low, Low, Moderate, and High-Condition Ranking 19

3.2 Summary of Functional Assessment Results 19

APPENDIX

A FA Data

TABLES

1 Area Factor Scoring 4

2 Current Conditions Watershed Factor Scoring 14

3 Future Conditions Watershed Factor Scoring 14

4 Primary Adjacent Land Cover 16

5 Secondary Adjacent Land Cover 16

6 Aquatic Resource Type 17

7 Summary of Functional Assessment Results under Current Conditions 19

8 Summary of Functional Assessment Results under Impacted Conditions 20

9 Summary of Functional Assessment Results under Future Conditions 21

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

1 INTRODUCTION

The purpose of the functional assessment for the South Sacramento Habitat Conservation Plan (SSHCP) and Aquatic Resources Program (ARP) is to provide a landscape-level assessment of the quality and condition of "potentially jurisdictional waters/wetlands areas" (PJWA) in the Plan Area. The analysis will assist in determining which potentially jurisdictional aquatic resource areas have the highest quality based on the criteria described below and the highest potential for restoration and conservation. Additionally, the data will inform a determination as to whether or not the compensatory mitigation strategy designed under the combined Endangered Species Act (ESA) and Clean Water Act (CWA) regulatory framework of the SSHCP and ARP adequately addresses the potential loss of waters of the U.S. In order to reach these conclusions, overall aquatic resource condition was evaluated by aquatic resource type, habitat type, water quality, hydrologic functioning, geomorphic region, and adjacent land use.

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK

2 METHODS

The aquatic resources analyzed in the functional assessment include vernal pools, swales, ephemeral streams, seasonal wetlands, freshwater marsh, mine tailing riparian woodland, mixed riparian scrub, mixed riparian woodland, open water, streams/creeks, and valley oak riparian woodland. Points were assigned to each aquatic resource based on the following factors:

- Area of the aquatic resource;
- Watershed (hydrologic unit code (HUC) 10-digit cataloging units);
- Primary adjacent land cover;
- Secondary adjacent land cover; and
- Aquatic resource type.

Function scores are assigned for each of these factors, per aquatic resource feature, based upon ability to maintain or improve the following functions:

- **Habitat.** Points are added if a given type of aquatic resource has the potential to support covered wildlife and plant species.
- **Water Quality**. Points are added for a resource type with the ability to improve or maintain water quality through such processes as filtration and/or trapping of contaminants such as sediment or toxicants and prevention of erosion.
- **Hydrology**. Points are added for a resource type that can facilitate groundwater recharge and store floodwaters via beneficial flood storage and flood flow modifications.

Functional analysis scoring was conducted for both current conditions within the Plan Area and future conditions, which assumed full implementation of the SSHCP. However, the only factor that changed as a result of SSHCP implementation was the watershed factor.

2.1 Functional Analysis Scoring

2.1.1 Factor 1 – Area of Aquatic Resource

The area of aquatic resource factor is based on the ecological rationale that aquatic resources that are greater in size are generally higher functioning. Therefore, habitat, water quality, and hydrology functional scores will be increased for each aquatic resource that is greater than the median area for its aquatic resource type (see Table 1).

Table 1

Factor	Effect on Function Scores		
	Habitat	*Water Quality*	*Hydrologic*
Area			
Greater than median area for type	+2	+2	+2
Less than median area for type	0	0	0

2.1.2 Factor 2 – Watershed

The Plan Area has been divided into ten HUC 10-digit cataloguing units, as defined by the Federal Standard for Delineation of Hydrologic Unit Boundaries (USGS and USDA NRCS 2009): the American River, Deer Creek, Laguna Creek, Lower Cosumnes, Lower Dry Creek, Lower Mokelumne River, Morrison Creek, Sherman Lake – Sacramento River, Snodgrass Slough, and Upper Cosumnes. Each of the HUC 10-digit cataloguing units were characterized in terms of land use, soils, hydrology, and geology in the SSHCP ARP Watershed Plan. Based upon this data, the aquatic resources within each HUC 10 cataloging unit were assigned points for habitat, water quality, and hydrology functions, based upon which HUC 10 watershed they occur in, as follows:

- ***Habitat –*** The habitat function scores for Factor 2 were based on Covered Species occurrences (percentages) within each HUC 10 watershed. For current conditions, Covered Species occurrence percentages within the Plan Area range from 2% to 33%. Points for the habitat function scores were assigned within a range of -3 to +3 along a linear scale commensurate with percentage Covered Species occurrences (e.g. a watershed with 0% to 5% occurrence was given a score of -3, indicating the poorest habitat quality; whereas a watershed with 31% to 35% occurrence was given a score of +3, indicating the best habitat quality). For future conditions, Covered Species occurrence percentage distribution among watersheds will be much more bimodal in nature, in which species will either occur within a watershed or not. Therefore, if a watershed is expected to contain Covered Species in the future, it was assigned a score of +3, whereas a watershed that is not expected to contain Covered Species was assigned a score of -3.
- ***Water Quality –*** The water quality function scores for Factor 2 were based on percentage natural land cover within each HUC 10 watershed. Unnatural land cover types considered included both urban (e.g., stormwater runoff typical to commercial, industrial, residential properties) and agriculture (e.g., agricultural stormwater runoff with potential to introduce fertilizer, pesticides, animal waste, irrigation, and/or sediment laden runoff into an aquatic feature). For current conditions, natural land cover percentages within the Plan

Area range from 9% to 73%; for future conditions, percentages range from 6% to 71%. Points for the water quality function scores were assigned within a range of -3 to +3 along a linear scale commensurate with percentage natural land cover (e.g. a watershed with 5% to 15% natural land cover was given a score of -3, indicating the poorest water quality; whereas a watershed with 66% to 75% natural land cover was given a score of +3, indicating the best water quality).

≠ ***Hydrology*** – The hydrology function scores for Factor 2 were based on percentage impervious surface within each HUC 10 watershed. Current condition impervious surface percentages range from 1% to 31%; future condition percentages range from 1% to 77%. Points for the hydrology function scores were assigned within a range of -3 to +3 along an inverse linear scale commensurate with percentage impervious surface (e.g. a watershed with 35% to 31% impervious surface was given a score of -3, indicating the most disturbed hydrology; whereas a watershed with 5% to 0% impervious surface was given a score of +3, indicating the least disturbed hydrology.

American River

Approximately 12,060 acres, or about 18%, of the 53,360-acre American River watershed is located within the Plan Area. This watershed comprises 3.2% of the entire Plan Area and is located in the northern portion of the Plan Area. A little more than half of the watershed contains non-habitat land cover types, which primarily includes high-density development and mine tailings. The remaining undeveloped land consists of valley grassland, mine tailing riparian woodland, mixed riparian woodland, blue oak woodland, and savanna and mixed riparian scrub. Aquatic resources account for only approximately 130 acres, or about 1%, of the American River watershed. Impervious surfaces cover approximately 3,080 acres, or 26%, of the watershed within the Plan Area.

The American River watershed includes documented occurrences for 10 of the 30 Covered Species, including: Boggs Lake hedge-hyssop (*Gratiola heterosepala*), tricolored blackbird (*Agelaius tricolor*), Cooper's hawk (*Accipiter cooperii*), Swainson's hawk (*Buteo swainsoni*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), white-tailed kite (*Elanus leucurus*), burrowing owl (*Athene cunicularia*), and northern harrier (*Circus cyaneus*). However, about 58% of the American River watershed has been influenced by human activities with over half of the watershed dominated by the aforementioned non-habitat land covers. Subsequently, in combination with making up only 3% of the Plan Area, the portions of the American River watershed within the Plan Area do not support a high overall percentage of the Covered Species occurrences (2%) in the Plan Area.

Current conditions – Due to the low percentage of Covered Species occurrences, the American River watershed has a score of -3 for its habitat function. It has a moderate percentage of natural land cover, resulting in a water quality score of +1. It has a relatively large amount of impervious surface, resulting in a hydrology function score of -2.

Future conditions – The American River watershed will have less than 1% Covered Species occurrence and thereby has a score of -3 for its habitat function. It will have a mid-level percentage of natural land cover, resulting in a water quality score of 0. It will contain a large amount of impervious surface, resulting in a hydrology function score of -3.

Deer Creek

The Deer Creek watershed bisects the Plan Area, extending from the northeastern edge to halfway into the Plan Area. Of the 82,980 acres of the watershed, 46,810 acres (56%) are within the Plan Area. A large majority (93%) of the watershed contains "habitat" land covers, which includes agriculture. Terrestrial land covers (32,980 acres and 70% of the watershed), consisting primary of valley grassland (25,450 acres and 54% of the watershed), account for the majority of the watershed. Other terrestrial land covers include blue oak savanna and woodland (14% of the watershed), mixed riparian woodland, mixed riparian scrub, and mine tailing riparian woodland and valley oak riparian (0.02% of the watershed). Approximately 20% (9,940 acres) of the watershed consists of lands used for agricultural purposes and 7% (3,300 acres) fall under the non-habitat land cover type. The remaining 2% of the watershed (1,070 acres) consists of aquatic resources such as streams and creeks, open water, and vernal pools. Impervious surfaces cover approximately 370 acres, or only 1%, of the watershed within the Plan Area.

The Deer Creek watershed includes documented occurrences for 16 of the 30 Covered Species, including: Boggs Lake hedge-hyssop, Sacramento Orcutt grass (*Orcuttia viscida*), Sanford's arrowhead, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, western pond turtle, western spadefoot, and white-tailed kite. This watershed contains 6% of the known occurrences for these 16 Covered Species, and contains a substantial percentage of occurrences for two of the Covered Species, including 49% of the Sacramento Orcutt grass records and 20% of the ferruginous hawk records. Covered species have been recorded throughout the watershed, with the majority occurring along hydrological features and within aquatic or terrestrial habitat. A cluster of vernal pool species records occur along the border of Deer Creek and Morrison watersheds east of the intersection of Grant Line Road and Keifer Boulevard.

Current conditions – The Deer Creek watershed has a relatively low percentage of Covered Species occurrence, and therefore had a score of -2 for its habitat function. However, it has a high percentage of natural land cover, resulting in a water quality score of +3. It also has a low percentage of impervious surface, resulting in a hydrology function score of +3.

Future conditions – The Deer Creek watershed will have an increased percentage of Covered Species occurrence in the future, and therefore had a future score of +3 for its habitat function. It will also have a high percentage of natural land cover, resulting in a water quality score of +3. It will have a somewhat high percentage of impervious surface, resulting in a hydrology function score of -1.

Laguna Creek

The Laguna Creek watershed is approximately 98,150 acres, of which 75,350 acres are within the Plan Area, and comprises 20% of the Plan Area. It is located in the southeastern portion of the Plan Area and contains virtually all of the mapped land cover types in the Plan Area. The large majority (91%) of the Laguna Creek watershed is undeveloped. Combined, valley grassland, blue oak savanna, and blue oak woodland account for 61% (approximately 46,310) acres of the land covers in the watershed, and 68% of the "natural" land covers, including agriculture. Agriculture accounts for 24% (approximately 17,730 acres) of the land covers in the Plan Area. The Laguna Creek watershed also supports all of the aquatic cover types except wetland restoration, including approximately 2,820 acres of vernal pool, seasonal wetland, and swale, approximately 420 acres of streams/creeks, and almost 300 acres of open water. Non-habitat land cover types comprise only 9% of the watershed, with low-density development accounting for 61% of the non-habitat land cover types. Impervious surfaces cover approximately 2,010 acres, or only 3%, of the watershed within the Plan Area.

The Laguna Creek watershed includes documented occurrences for 23 of the 30 Covered Species, reflecting both its large size and diversity of land cover types. Covered species documented in the watershed include dwarf downingia), legenere, pincushion navarretia (*Navarretia myersii* ssp. *myersii*), Sacramento Orcutt grass, vernal pool fairy shrimp, Ricksecker's water scavenger beetle, vernal pool tadpole shrimp, mid-valley fairy shrimp, California tiger salamander, western spadefoot, western pond turtle, giant garter snake, Cooper's hawk, burrowing owl, loggerhead shrike, northern harrier, ferruginous hawk, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, western red bat, and Yuma myotis. This watershed has the highest percentage (26%) of known occurrences for Covered Species after the Morrison Creek watershed, including 17% of the vernal pool covered plant occurrences and 40% of the vernal pool invertebrate occurrences.

Current conditions – The Laguna Creek watershed has a relatively high percentage of Covered Species occurrence, yielding a habitat function score of +2. It also has a high percentage of natural land cover, resulting in a water quality score of +3, and a low percentage of impervious surface, resulting in a hydrology function score of +3.

Future conditions – The Laguna Creek watershed will have a high percentage of Covered Species occurrence in the future, yielding a habitat function score of +3. It will also maintain a high percentage of natural land cover, resulting in a water quality score of +3. Its percentage of impervious surface will increase, however, resulting in a hydrology function score of +1.

Lower Cosumnes

The Lower Cosumnes River watershed is 47,310 acres, entirely located within the south-central portion of the Plan Area. This watershed consists primarily of terrestrial and agricultural land covers, accounting for 81% of the land covers in the watershed. The terrestrial category is dominated by valley grasslands (14,610 acres), which accounts for approximately 31% of the total terrestrial land cover in the watershed. Agricultural areas total 21,220 acres and are the largest land covers in the Lower Cosumnes River watershed. Approximately 7% (3,510 acres) of the watershed is aquatic land covers, including seasonal wetlands, open water, freshwater marsh, vernal pools, wetland restoration, streams and creeks and swales. Approximately 12% (5,710 acres) of the watershed is non-habitat land cover dominated by low-density development (3,990 acres) and high-density development (1,260 acres). Impervious surfaces cover approximately 1,650 acres, or only 3%, of the watershed.

The Lower Cosumnes River watershed includes documented occurrences for 19 of the 30 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, valley elderberry longhorn beetle, California tiger salamander, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, and white-tailed kite. This watershed contains 10% of the Plan Area's known occurrences of Covered Species.

Current conditions – The Lower Cosumnes River watershed has a relatively low percentage of Covered Species occurrence, which gives it a habitat function score of -2. It has a mid-range percentage of natural land cover, resulting in a water quality score of 0. It has a low percentage of impervious surface, yielding a hydrology function score of +3.

Future conditions – The Lower Cosumnes River watershed will have some Covered Species occurrences in the future, and therefore has a future habitat function score of +3. It will continue

to have a mid-range percentage of natural land cover, resulting in a water quality score of 0. It will have a slightly increased amount of impervious surface compared to current conditions, which yields a hydrology function score of +1.

Lower Dry Creek

The Lower Dry Creek watershed is located along the southern edge of the Plan Area. Approximately 50% of the watershed is located within the Plan Area. The watershed has very little non-agricultural development. Of the 18,570 acres in the watershed, approximately 56% are terrestrial land covers and 38% are agricultural land covers. Valley grasslands dominate the terrestrial land cover in the watershed, comprising 14,610 of the 16,880 acres mapped as terrestrial. The large majority (92%) of agricultural areas are cropland and vineyards. Aquatic and non-habitat land covers each comprise about 3% of the remaining acreage within the watershed. Impervious surfaces cover approximately 140 acres, or only 1% of the watershed within the Plan Area.

The Lower Dry Creek watershed includes documented occurrences for 9 of the 30 Covered Species, including legenere, pincushion navarretia, vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, western spadefoot, northern harrier, Swainson's hawk, and tricolored blackbird. Overall, the watershed only contains 2% of the Covered Species occurrences, but it does contain 33% of the pincushion navarretia occurrences (16 of 49) and 19% of the California tiger salamander occurrences (6 of 29).

Current conditions – Due to the low percentage of Covered Species occurrence, Lower Dry Creek has a habitat function score of -3. However, it has a relatively high percentage of natural land cover, which gives it a water quality score of +2. And its low percentage of impervious surface gives it a hydrology function score of +3.

Future conditions – The Lower Dry Creek watershed will have less than 1% Covered Species occurrence in the future, which gives it a habitat function score of -3. It will still have a relatively high percentage of natural land cover, resulting in the same water quality score of +2. It will have slightly more impervious surface, resulting in a hydrology function score of +2.

Lower Mokelumne River

Although the Lower Mokelumne River watershed is more than 66,200 acres in size, only 3% of the watershed is located in the far southwest corner of the southern Plan Area and it accounts for only 0.5% of the Plan Area. The small portion of this watershed located within the Plan Area is primarily made up of agricultural land covers, specifically croplands. The remaining acreage

includes mixed riparian scrub and woodland, aquatic land covers, and some residential areas. Impervious surfaces cover approximately 30 acres, or 1% of the watershed within the Plan Area.

The Lower Mokelumne River watershed only contains three documented occurrences of one Covered Species: Sanford's arrowhead. This species is located on the boundary of the Plan Area within the Mokelumne River. Similar to the Lower Dry Creek watershed, the lack of occurrences of Covered Species within this watershed may be attributed to large amounts of land that have been converted for agricultural purposes. In addition, only a very small portion of the watershed is actually located within the Plan Area. Due to its small size within the Plan Area, the Lower Mokelumne watershed includes less than 1% of the modeled habitat for Covered Species.

Current conditions – Lower Mokelumne River has a habitat function score of -3 due to its low percentage of species occurrence. It has a relatively low percentage of natural land cover, resulting in a water quality function score of -2. However, its low percentage of impervious surface yields a hydrologic function score of +3.

Future conditions – Lower Mokelumne River watershed will still have a habitat function score of -3 due to its low percentage of species occurrence. It will have an even lower percentage of natural land cover, resulting in a water quality function score of -3. However, it will maintain its low percentage of impervious surface and will still have a hydrologic function score of +3.

Morrison Creek

The Morrison Creek watershed is located within the northern half of the Plan Area. Of the 82,790 acres that comprise this watershed, 85%, or 70,320 acres, are located within the Plan Area, almost entirely inside the Urban Development Area (UDA). This is the second largest watershed in the Plan Area, second only to the Laguna Creek watershed. Because it is located in the urbanizing portion of Sacramento County, approximately 45% of the watershed has already been developed and contains non-habitat land covers, primarily high-density development. Agriculture accounts for about 7% of the watershed. Terrestrial (44%) and aquatic (4%) land covers account for the remaining land covers in the Morrison Creek watershed. Valley grassland accounts for about 96% of the terrestrial land cover. This watershed also supports all of the aquatic cover types, including approximately 890 acres of vernal pools, 430 acres of swale, and 230 acres of seasonal wetlands, which are embedded in the valley grasslands. Laguna Creek (north) is a significant east–west landscape feature that plays a prominent role in conservation. Impervious surfaces cover approximately 18,260 acres, or 26%, of the watershed. Along with the American River (26% impervious surfaces) and Sherman Lake-Sacramento River (31% impervious surfaces) watersheds, the Morrison Creek watershed has one of the three highest percentages of impervious surfaces in

the Plan Area. Reflecting both its large size and more urbanized character, it also has by far the highest amount of impervious surface acreage in the Plan Area, with Snodgrass Slough having the second highest amount at approximately 7,670 acres.

The Morrison Creek watershed includes documented occurrences for 26 of the 30 Covered Species despite substantial urbanization. Covered species documented in the watershed include Ahart's dwarf rush, Boggs Lake hedge-hyssop, dwarf downingia, legenere, pincushion navarretia, Sacramento Orcutt grass, slender Orcutt grass, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, Ricksecker's water scavenger beetle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, western spadefoot, giant garter snake, western pond turtle, American badger, and western red bat. This watershed has the highest percentage (33%) of known occurrences for Covered Species in the Plan Area, including 50% of both the covered vernal pool plants and vernal pool invertebrate occurrences. Due to the large area of vernal pools (almost 900 acres and second only to the Laguna Creek watershed), swale, and seasonal wetlands, vernal pool flora and fauna are the most important biological resources in the watershed.

Current conditions – Because Morrison Creek contains the highest percentage of Covered Species occurrences, it has a habitat function score of +3. It has a moderate percentage of natural land cover, yielding a water quality function score of +1. It has a relatively large amount of impervious surface, giving it a hydrologic function score of -2.

Future conditions – Morrison Creek will have a much lower percentage of Covered Species occurrences in the future, however, it will still maintain a small percentage and therefore has a future habitat function score of +3. It will continue to have a moderate percentage of natural land cover, yielding a water quality function score of +1. It will have an increased percentage of impervious surface, giving it a hydrologic function score of -3.

Sherman Lake–Sacramento River

The Sherman Lake-Sacramento River watershed is located in the extreme western portion of the Plan Area, with approximately 29% located within the Plan Area. The watershed intersects the Plan Area in four separate locations that together comprise about 5% of the Plan Area, including a large area along the northern portion of the Plan Area, a small area in the northwest corner of the Plan Area, and two areas along the western portion of the Plan Area. The Sherman Lake-Sacramento River watershed in the Plan Area is dominated by human activities. Together, non-habitat and agricultural land cover types account for 91% of the land covers in the watershed. Of these two land cover types, high-density development and cropland contain the largest acreages

at 5,360 and 5,440 acres, respectively, accounting for 58% of the total land covers in the watershed within the Plan Area. The Sherman Lake-Sacramento River watershed contains all of the aquatic land cover types mapped within the Plan Area, but in small amounts ranging from 2 to 40 acres and totaling only 110 acres. Terrestrial land covers, primarily valley grassland, comprise the remaining acreage, but only totaling 1,450 acres, or 8% of the land cover in the watershed within the Plan Area. Impervious surfaces cover approximately 5,690 acres, or 31%, of the watershed, which is the highest percentage of the watersheds in the Plan Area.

The Sherman Lake-Sacramento River watershed includes documented occurrences for 10 of the 30 Covered Species, including Sanford's arrowhead, vernal pool fairy shrimp, burrowing owl, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat. Overall, the watershed accounts for accounts for only 1% of the Covered Species occurrences in the Plan Area. The large majority (91%) of the Sherman Lake-Sacramento River watershed is developed or agriculture, which is reflected in the relatively small number of Covered Species with occurrences in the watershed compared to several of the other watersheds.

Current conditions – Sherman Lake-Sacramento River has the lowest scores (-3) for all three functions, as a result of its low percentage of Covered Species occurrence, its low percentage of natural land cover, and its high percentage of impervious surface.

Future conditions – Sherman Lake-Sacramento River watershed will continue to have low scores (-3) for all three functions in the future.

Snodgrass Slough

Snodgrass Slough is the third largest watershed in the Plan Area behind the Laguna Creek and Morrison Creek watersheds and is entirely contained within the western portion of the Plan Area. About 54% of the watershed is agriculture, of which, about 66% is croplands; croplands cover about 35% of the entire watershed. Non-habitat land cover types, dominated by high-density development, account for 22% of the watershed. Terrestrial habitat, dominated by valley grassland (78%), mixed riparian scrub and woodland and woodland restoration, covers about 16% of the watershed. The Snodgrass Slough watershed accounts for the highest acreage of aquatic land cover within the Plan Area. Approximately 4,220 acres of the watershed supports all of the aquatic cover types mapped within the Plan Area, and represents 24% of the aquatic habitat in the Plan Area. Impervious surfaces cover approximately 7,670 acres, or 15%, of the watershed. While this watershed has a relatively smaller proportion of impervious surfaces compared to American River and Morrison Creek at 26% and Sherman Lake-Sacramento River at 31%, it has a substantially higher level of impervious surfaces than the remaining watersheds, which range from 1% to 3%.

The Snodgrass Slough watershed includes documented occurrences for 19 of the 30 Covered Species, including dwarf downingia, legenere, Sanford's arrowhead, vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, giant garter snake, western pond turtle, burrowing owl, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, greater sandhill crane, Swainson's hawk, tricolored blackbird, white-tailed kite, American badger, and Yuma myotis. This watershed contains 13% of known occurrences for Covered Species in the Plan Area, third only to the Morrison Creek (35%) and Laguna Creek (26%) watersheds.

Current conditions – Snodgrass Slough has a moderate to low percentage of Covered Species occurrences, resulting in a habitat function score of -1. It has a relatively low percentage of natural land cover, which gives it a water quality score of -2. It has a mid-range percentage of impervious surface, yielding a hydrologic function score of 0.

Future conditions – The Snodgrass Slough watershed will have less than 1% of Covered Species occurrences in the future, resulting in a habitat function score of -3. It will have a slightly low percentage of natural land cover, which gives it a water quality score of -1. It will have a relatively low percentage of impervious surface, yielding a hydrologic function score of +2.

Upper Cosumnes

The Upper Cosumnes River watershed is located in the east-central portion of the Plan Area, which encompasses about 51% (32,000 acres) of the watershed. The majority of the watershed in the Plan Area (21,220 acres, or 66%), consists of terrestrial habitat dominated by valley grassland. Agricultural areas comprise about 11% and aquatic areas comprise about 5% of the watershed in the Plan Area. Non-habitat land cover, primarily low-density development, covers the remaining 18% of the watershed. Impervious surfaces cover approximately 340 acres, or only 1%, of the watershed.

The Upper Cosumnes River watershed includes documented occurrences for 14 of the 30 Covered Species, including legenere; Sanford's arrowhead; vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, western spadefoot, Cooper's hawk, ferruginous hawk, loggerhead shrike, northern harrier, Swainson's hawk, tricolored blackbird, white-tailed kite, and western red bat. This watershed contains 9% of documented occurrences of Covered Species within the Plan Area. Most notably, the watershed contains 153 of the 156 known occurrences (98%) of valley elderberry longhorn beetle, with the largest concentration of occurrences along the Cosumnes River just south of Rancho Murieta.

Current conditions – Upper Cosumnes has a relatively low percentage of Covered Species occurrences, which gives it a habitat function score of -2. However, it has a high percentage of

natural land cover, and a low percentage of impervious surface, yielding respective water quality function and hydrologic function scores of +3.

Future conditions – The Upper Cosumnes watershed will have a greatly increased percentage of Covered Species occurrences in the future, which gives it a habitat function score of +3. It will continue to have a high percentage of natural land cover, yielding a water quality score of +3. It will have a slightly increased percentage of impervious surface, which will result in a hydrologic function score of +1.

HUC 10	Effect on Function Scores		
	Habitat	*Water Quality*	*Hydrologic*
American River	-3	+1	-2
Deer Creek	-2	+3	+3
Laguna Creek	+2	+3	+3
Lower Cosumnes	-2	0	+3
Lower Dry Creek	-3	+2	+3
Lower Mokelumne River	-3	-2	+3
Morrison Creek	+3	+1	-2
Sherman Lake-Sac River	-3	-3	-3
Snodgrass Slough	-1	-2	0
Upper Cosumnes	-2	+3	+3

Table 3

HUC 10	Effect on Function Scores		
	Habitat	*Water Quality*	*Hydrologic*
American River	-3	0	-3
Deer Creek	+3	+3	-1
Laguna Creek	+3	+3	+1
Lower Cosumnes	+3	0	+1
Lower Dry Creek	-3	+2	+2
Lower Mokelumne River	-3	-3	+3
Morrison Creek	+3	+1	-3
Sherman Lake-Sac River	-3	-3	-3
Snodgrass Slough	-3	-1	+2
Upper Cosumnes	+3	+3	+1

2.1.3 Factors 3 and 4 – Primary and Secondary Adjacent Land Cover

For the purposes of this analysis, adjacent land cover types within the Plan Area were assigned to one of four classes:

- **Class IA:** Vernal pool valley grassland.
- **Class I:** Ephemeral streams, freshwater marsh, open water, seasonal wetland, streams/creeks, swale, vernal pool, wetland restoration, aqueducts, blue oak savanna, blue oak woodland, mine tailing riparian woodland, mixed riparian scrub, mixed riparian woodland, valley grassland, valley oak riparian woodland, and woodland restoration.
- **Class II:** Cropland, irrigated pasture-grassland, orchards, vineyards, eucalyptus woodland, and recreation/landscaped.
- **Class III:** Disturbed, high-density development, low-density development, major roads, mine tailings.

Class IA only includes vernal pool valley grassland land covers, and these are considered to be indicative of the highest quality, contiguous vernal pool complexes within the Plan Area. Therefore, aquatic resources adjacent to Class IA land covers have increased habitat, water quality, and hydrologic scores, with a particular emphasis on habitat. Class I land covers generally enhance or have positive impacts on the function of aquatic resources. Habitat, water quality, and hydrologic function scores were therefore increased for aquatic resources with Class I primary adjacent land covers. (see Table 4).

Class II land covers are characterized by open space with a moderate level of disturbance. The land covers may include crop species or exotic landscape species, but the open space provides some habitat value. Habitat function scores were neutral (0) for aquatic resources with Class II primary adjacent land covers. The open space associated with Class II land covers facilitate infiltration and reduce the flashiness of the local hydrograph; however, Class II land covers are generally associated with altered hydrological regimes (e.g. straightened canals and ditches); therefore, hydrologic function scores were also considered neutral (0) with Class II primary adjacent land covers. Since most land uses in Class II are non-point sources of natural and human-made pollutants such as excess sediment, nutrients, fertilizer, herbicide, and insecticide laden run-off from agricultural land scores decreased for aquatic resources with Class II primary adjacent land cover.

Class III land covers are urban and developed. This land cover provides little habitat value and generates urban runoff, creating sources of pollutants such as lawn fertilizers, chemicals, oil and grease. Habitat and water quality function scores were therefore greatly reduced (-3) for aquatic

resources with Class III primary land cover types. Urban areas are also generally characterized by fairly intensive hydrologic modification. Therefore, hydrologic scores were also reduced (-2) for aquatic resources with Class III primary adjacent land cover.

Table 4

Factor	Effect on Function Scores		
	Habitat	*Water Quality*	*Hydrologic*
Primary Adjacent Land Cover			
Class IA	+2	+1	+1
Class I	+1	+1	+1
Class II	0	-1	0
Class III	-3	-3	-2

When more than one land cover type is adjacent to a PJWA, the adjacent land cover with the greatest linear feet of shared border with the PJWA being evaluated is the primary adjacent land cover. The land cover with the second greatest linear feet of shared border with the PJWA being evaluated is the secondary adjacent land cover. Secondary land covers are assumed to have the same type of effect on jurisdictional wetlands and waters as primary land cover types, but to a lesser extent and were scored (weighted) closer to neutral for all land cover types (see Table 5).

Table 5

Factor	Effect on Function Scores		
	Habitat	*Water Quality*	*Hydrologic*
Secondary Adjacent Land Cover			
Class IA	+1	0	0
Class I	0	0	0
Class II	0	-1	0
Class III	-2	-2	-1

If there was only a primary land cover and no secondary land cover, the corresponding secondary land cover score was used for Factor 4 (e.g. if the PJWA was only surrounded by Class I land covers, the Factor 3 scores would be +1 for habitat, +1 for water quality, and +1 for hydrologic; and the Factor 4 scores would be 0 for habitat, 0 for water quality, and 0 for hydrologic). Both Factor 3 and Factor 4 scores were used in all cases, to avoid higher scores for features solely based on the fact that more than one adjacent land cover exists.

2.1.4 Factor 5 – The Aquatic Resource Type

The aquatic resource type factor is based on the rationale that certain aquatic resources generally have more importance in terms of habitat, water quality, and hydrologic function than other types. Therefore, based on a landscape level assessment of the aquatic resources within the Plan Area, functional scores were increased for aquatic resources that have recognizable potential to support covered wildlife and plant species or assists in benefitting the continued existence of any threatened or endangered species; importance to improve or maintain water quality; and facilitate groundwater recharge and/or store floodwaters (see Table 6).

Table 6

Land Cover Type	Effect on Function Scores		
	Habitat	*Water Quality*	*Hydrologic*
Ephemeral Streams	0	0	0
Freshwater Marsh	+2	+1	+1
Streams/Creeks	+1	+2	+2
Mixed Riparian Scrub	+1	0	0
Mixed Riparian Woodland	+1	0	0
Mine Tailing Riparian Woodland	-1	-1	-1
Open Water	0	-1	0
Swale	+1	0	0
Seasonal Wetlands	+1	+1	+1
Vernal Pool	+2	0	0

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK

3 RESULTS

3.1 Very Low, Low, Moderate, and High-Condition Ranking

The function scores for each aquatic resource were ranked very low, low, moderate, or high based upon the range of scores possible resulting from the sum of all factors (range of -28 to +24). Cutoffs for each condition ranking were determined by assessing natural breaks in the data and distributing the scores roughly evenly in the four different condition bins. The condition breakdowns are as follows: aquatic resources scored between -28 and -14 are considered of "very low" condition, those scored between -13 and -1 are considered "low" condition, those scored between 0 and 12 are considered "moderate" condition, and those scored between 13 and 24 are considered "high" condition. The final total ranking is intended to provide a planning level overview of which mapped aquatic features within the Plan Area provide the highest functions and services and support analysis of trends in the location of higher or lower quality features.

3.2 Summary of Functional Assessment Results

The results of the functional assessment analysis and quality ranking for each aquatic resource mapped in the Plan Area is provided in Appendix A. Within the Plan Area under current conditions, there are a total of 24,255 acres of aquatic resources. 8,280 acres (34.1%) are ranked as high quality, 12,218 acres (50.4%) are ranked as moderate quality, 3,651 acres (15.1%) are ranked as low quality, and 107 acres (0.4%) are ranked as very low quality (Table 7).

Table 7

Wetland or Non-Wetland Waters	Land Cover Type (Common name)	High	Moderate	Low	Very Low	Total
		Acres				
Wetland Waters	Vernal Pools	3067.47	1312.96	157.02	0	4537.45
	Freshwater Marsh	988.01	1697.21	268.85	0	2954.07
	Mine Tailing Riparian Woodland	67.59	363.78	183.39	26.31	641.07
	Mixed Riparian Scrub	112.04	820.23	297.70	44.72	1274.69
	Mixed Riparian Woodland	520.87	3710.31	1554.85	18.75	5804.78
	Seasonal Wetland	1395.77	1019.33	184.65	0	2599.75
	Swales	944.33	302.17	4.98	0	1251.48
Non-Wetland Waters	Open Water	298.33	1206.30	821.06	15.94	2341.63
	Streams/Creeks (Intermittent and Perennial)	840.91	1758.42	177.03	1.03	2777.39
	Streams/Creeks VPIH (Ephemeral)	44.30	27.38	1.51	0	73.19
Total		**8279.62**	**12218.11**	**3651.03**	**106.74**	**24255.50**

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Within the Plan Area under impacted conditions, there are a total of 22,644 acres of aquatic resources. 8,308 acres (36.7%) are ranked as high quality, 10,953 acres (48.4%) are ranked as moderate quality, 3,354 acres (14.8%) are ranked as low quality, and 28 acres (0.1%) are ranked as very low quality (Table 8).

Table 8
Summary of Functional Assessment Results under Impacted Conditions

Wetland or Non-Wetland Waters	Land Cover Type (Common name)	Cowardin Class	Remaining Aquatic Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres				
Wetland Waters	Freshwater Marsh	PEM1	1267.52	1378.039	181.55	0	2827.11
	Mine Tailing Riparian Woodland	R2/R3	130.97	240.96	50.93	0	422.86
	Mixed Riparian Scrub	R2/R3	218.25	665.29	324.23	5.42	1213.18
	Mixed Riparian Woodland	R2/R3	877.72	3332.73	1403.50	6.73	5620.68
	Seasonal Wetland	PEM2	1162.51	1107.77	231.78	0	2502.05
	Swale	R2/R3	575.38	415.57	26.36	0	1017.25
	Vernal Pools	PEM2	2988.20	1078.65	72.26	0	4139.10
Non-Wetland Waters	Open Water	POW	413.55	855.84	903.64	15.47	2188.50
	Perennial or Intermittent Streams/Creeks	R3UB	674.29	1832.19	154.70	0	2661.19
	Streams/Creeks (VPIH) ephemeral	R4SB	0	46.12	5.48	0	51.60
		Total	**8308.38**	**10953.10**	**3354.43**	**27.62**	**22643.52**

Within the Plan Area under future conditions, there are a total of 24,257 acres of aquatic resources. 9,671 acres (39.9%) are ranked as high quality, 11,204 acres (46.2%) are ranked as moderate quality, 3,354 acres (13.8%) are ranked as low quality, and 28 acres (0.1%) are ranked as very low quality (Table 9).

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

Table 9
Summary of Functional Assessment Results under Future Conditions

Wetland or Non-Wetland Waters	Land Cover Type (Common name)	Cowardin Class	Future Condition of Resources				Total
			High	*Moderate*	*Low*	*Very Low*	
			Acres				
Wetland Waters	Freshwater Marsh	PEM1	1425.32	1427.58	181.55	0	3034.46
	Mine Tailing Riparian Woodland	R2/R3	130.97	240.96	50.93	0	422.86
	Mixed Riparian Scrub	R2/R3	257.12	688.08	324.23	5.42	1274.85
	Mixed Riparian Woodland	R2/R3	1178.62	3434.15	1403.50	6.73	6023.0
	Seasonal Wetland	PEM2	1318.72	1132.62	231.78	0	2683.12
	Swale	R2/R3	839.22	419.08	26.36	0	1284.67
	Vernal Pools	PEM2	3362.52	1093.38	72.26	0	4528.16
Non-Wetland Waters	Open Water	POW	413.55	856.32	903.64	15.47	2188.98
	Perennial or Intermittent Streams/Creeks	R3UB	742.03	1866.12	154.70	0	2762.85
	Streams/Creeks (VPIH) ephemeral	R4SB	2.63	46.12	5.48	0	54.23
		Total	**9670.72**	**11204.40**	**3354.43**	**27.62**	**24257.17**

Functional Assessment for the South Sacramento Habitat Conservation Plan and Aquatic Resources Program

INTENTIONALLY LEFT BLANK

APPENDIX D

Re-establishment and Establishment Guidelines

APPENDIX D
Re-establishment and Establishment Guidelines

1 INTRODUCTION

The United States Army Corps of Engineers (USACE) and the US Environmental Protection Agency (EPA) define restoration as, "the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/ historic functions to a former or degraded aquatic resource" (USACE and EPA 2008). Restoration includes both rehabilitation, which repairs natural/historic functions to a degraded aquatic resource, and re-establishment, which returns natural/historic functions to a former aquatic resource. Establishment (i.e., creation) is defined as, "the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site." Re-establishing is always preferable to establishment because the likelihood of success is far greater where some aquatic resource characteristics are already present or were historically present. Additionally, because the establishment of wetland and other waters on upland and/or deepwater sites will result in a net decrease in upland and/or deepwater habitat, this should only occur when there are no existing or available sites with re-establishment opportunities. Even highly degraded and disturbed re-establishment sites are preferable to establishment sites. Nevertheless, it is expected that a portion of mitigation acreage under the South Sacramento Habitat Conservation Plan (SSHCP) will occur as wetland and other waters establishment due to a lack of available restoration sites outside the Urban Development Area (UDA).

This appendix explains the SSHCP protocols for establishment and restoration of wetlands and other water ecosystems. These protocols are based on the USACE's Mitigation Guidelines for the Clean Water Act (CWA) 404 Program and the United States Environmental Protection Agency's (EPA) *Principles for Ecological Restoration of Aquatic Resources* (EPA 2000). They are meant to provide applicants with a basic outline for planning, designing, implementing, and managing restoration or establishment projects. In so doing, the protocols are meant to ensure that wetland projects will be viable in perpetuity, and will adequately compensate for impacted habitat. This section will also provide standards that are specific to each of the 10 aquatic resources land cover types, including restoration and establishment methods, monitoring requirements, criteria against which success will be measured, and remedial steps for projects that do not meet the basic success criteria. It is recognized that ecosystem restoration and establishment is an evolving science, and that this document represents current understandings and expectations in the field. Therefore, the application of these protocols will allow adjustments in an adaptive manner to reflect the best available science of wetland and stream establishment and re-establishment, monitoring, and performance standards that can improve the long-term viability of restoration and establishment projects.

APPENDIX D (Continued)

The following methodology describes the process by which determinations were made regarding the potential for establishment and re-establishment acreage amounts to occur within the Plan Area.

Assumptions

Irrigated pasture and croplands are considered the only habitats where removal of the current land use and re-establishment of topography may result in re-established wetlands. Irrigated pasture is considered particularly suitable for re-establishment of wetlands because the hardpan is likely intact. Croplands, depending on the crop, may also retain the hardpan. Both land uses occur where wetlands may have historically occurred.

Orchards and vineyards are not suitable for wetland restoration because the lands have been deep-ripped to support the agricultural uses.

Valley grasslands may be suitable for establishment of wetlands, but only outside of 250 feet of an existing wetland feature so as not to create any indirect effects to the wetland per U.S. Fish and Wildlife Service (USFWS) protocol.

Only land in the Plan Area is considered for re-establishment or establishment.

It is assumed that parcels 20 acres in size or less will be too expensive to acquire and too small to support successful re-establishment or establishment.

It is assumed that existing preserves will not be suitable for re-establishment or establishment as this may risk damaging protected resources and easements may prohibit re-establishment or establishment.

Based on California Department of Fish and Wildlife recommendations, it is assumed that between 15% and 30% of land that is assumed to be suitable habitat will be available for acquisition.

Up to 8% of a site can be re-established or established with wetlands. This is based on the density of wetlands found in Valley Grassland cover type throughout the Plan Area. Wetlands include vernal pools, swales, seasonal wetlands, freshwater marsh, streams and open water. Wetland density within the Plan Area was derived from the acreage of wetlands within the Valley Grassland cover type as this is the only upland cover type that is reflective of historic natural conditions. All other upland cover types have been heavily modified.

Methodology

Identify all Cropland, Irrigated Pasture, and Valley Grassland cover types in the SSHCP Plan Area. This forms the “base map.”

APPENDIX D (Continued)

Using the parcel layer, remove all parcels from the base map that are less than 20 acres in size.

Using the existing preserve layer, remove all parcels from the base map that are already protected.

Using a buffer file, remove all lands from the base map that are within 250 feet of a vernal pool, swale, and stream/creek (VPIH) land cover type.

Calculate range of how many Cropland, Irrigated Pasture, and Valley Grassland acres are available for potential re-establishment or establishment, assuming 15% to 30% of the base map can be acquired.

Calculate range of how many wetland acres can be re-established or established based on 8% density.

Conclusions

The base map sums to 210,509 acres.

After removing lots smaller than 20 acres in size and already preserved lands, the map sums to approximately 135,455 acres.

After removing areas within 250 feet of existing VPIH land covers, the map sums to approximately 85,690 acres.

It is estimated that further investigation into the historical agricultural practices on some of the potential re-establishment or establishment sites will reveal past deep-ripping. Sites that have been deep-ripped will not have an intact perched aquafer, which is necessary to support most wetland cover types. There are some questions as to whether or not the perched aquifer in soils that have been deep-ripped can be repaired. Orchards and vineyards are not considered suitable candidates for re-establishment or establishment because deep-ripping has typically occurred where they were established. It is also understood that acquiring potential re-establishment or establishment sites is dependent on a willing buyer and willing seller agreement. Therefore, it is not probable that all identified potential wetland re-establishment or establishment sites can be acquired for re-establishment or establishment. It is estimated that between 15% and 30% of potential re-establishment or establishment sites will be successfully negotiated for acquisition and will be capable of supporting re-establishment or establishment efforts. Therefore, it is assumed that between 12,854 and 25,707 acres may be available for wetland re-establishment or establishment.

Wetland re-establishment and establishment guidelines set forth in this study limit the percent of land that can be re-established and established to 8% of the site. The remaining 92% is required as upland

habitat, which supports the hydrology of the wetland. Therefore, it is estimated that between 1,028 and 2,057 acres of wetlands can be re-established or established within the Plan Area.

The SSHCP impacts analysis forecasts that approximately 1,200 acres of wetlands will be impacted. Because we assume that the Plan Area can provide between 1,028 and 2,057 acres of wetland re-establishment and establishment, the re-establishment/establishment ratio under the SSHCP is set at 1:1.

2 GUIDELINES

The restoration and establishment process has several stages: site selection, site evaluation, project design, project implementation, project monitoring, and project management. General protocols for each of these stages are as follows:

2.1 Site Selection

The National Resource Council (NRC) stipulates that "site selection for wetland conservation and mitigation should be conducted on a watershed scale in order to maintain wetland diversity, connectivity, and appropriate proportions of upland and wetland systems needed to enhance the long-term stability of the wetland and riparian systems" (NRC 2001). Protected upstream and upland areas provide a safeguard against the negative edge effects of future development. Therefore, restoration and establishment sites that are contiguous to existing preserves or lands protected by conservation easements will have priority over wetland restoration or establishment sites outside of a comprehensive preserve system. All restoration and establishment sites must be under permanent conservation easement or have preserve status.

Consideration will be given to a site's position within the watershed, its function within the watershed, and the potential impacts of restoration or establishment on existing proximate wetland and other aquatic resource habitats within the same watershed. Restoration or establishment sites that can benefit the watershed in which they are situated will have priority over those with little to no impact; sites with no potential impact on the watershed in which they are situated will have priority over those with potential negative impacts. Sites with potential negative impacts to the watershed or nearby habitat will be avoided.

Wetlands and other waters that have retained functional hydrodynamics or degraded and former wetlands whose hydrodynamics can be re-established through passive restoration tend to be more fiscally and environmentally sustainable than those where functional hydrodynamics must be engineered or created. Active hydrodynamic restoration methods, like grading and excavation can severely damage the substrate and encourage the spread of invasive plant species. "Hard" engineering solutions, such as irrigation and pumping systems, are costly and cannot readily adapt to seasonal and annual fluctuations in rainfall and water level. Hence, restoration and establishment sites that do not require active intervention to remediate wetland or other waters hydrodynamics will have priority over other sites. No restoration or establishment projects that use irrigation as a primary or long-term water source are permitted.

Soil type and permeability are also important considerations, as they dictate a site's ability to retain water and support vegetation. Highly permeable soils are not likely to retain enough water to function as a wetland or other water ecosystem, except where water tables or water inflow

rates are high. Factors such as soils pH, nutrient content, climate, parent material, relief, organisms, and the overriding influence hydrologic regime, will influence whether wetland-appropriate vegetation struggles or thrives. Therefore, restoration and establishment sites with soil types known to support wetland hydrology and vegetation will have priority over other sites.

Additionally, restoration and establishment site selection will consider the potential effects of habitat restoration on nearby County airport operations. Pursuant to Title 33 of the Code of Federal Regulations (CFR) Section 332.3, compensatory mitigation projects should not be located where they will increase risks to aviation by attracting wildlife to areas where aircraft–wildlife strikes may occur (e.g., near airports). Thus, those sites that are less likely to increase wildlife hazard attractants within a County airport's approach and departure airspace will be given priority over other sites.

Lastly, because a central goal of mitigation is to offset unavoidable adverse impacts to wetlands, streams, and other aquatic resources to maintain a diverse assortment of wetland types, functions, landscape settings, and geomorphic settings, sites that have unique or rare topographical, geomorphic, vegetative, biotic, or functional characteristics will have priority over other sites.

In summary, the Implementing Entity will prioritize restoration and establishment sites that:

- Are contiguous to existing preserves or lands under conservation easements;
- Can withstand re-establishment or establishment projects without adverse impacts to the watershed or habitat in which they are situated;
- Do not require active intervention to remediate wetland or other waters' hydrodynamics;
- Have appropriate soil types, composition, and permeability;
- Do not attract wildlife within the approach and departure airspace of County airports, and
- Have unique or rare characteristics.

Once a restoration or establishment site is selected, a reference site will be identified. Reference sites should be in-kind and as proximate to the restoration or restoration site as possible. The site being mitigated for can be used as the reference site if it is reasonably proximate and similar to the restoration or establishment site, and if it has not been destroyed prior to the start of the restoration or establishment project. Reference sites should not be chosen randomly, but rather so that collectively they represent the diversity of species and plant communities that exist on the sites that are going to be destroyed.

2.2 Site Evaluation

Once the restoration or establishment site and the reference site are selected, an interdisciplinary team of experts will survey the site. This team will include the Implementing Entity and at least one Monitoring Biologist (MB). The MB will be a professional botanist, biologist, or restoration ecologist familiar with California flora and fauna, and experienced with wetland or other waters re-establishment or establishment projects; alternatively, the MB can be a firm specializing in the re-establishment or establishment of wetlands and other waters. This person or firm will be contracted to perform the baseline evaluation (in addition to the monitoring responsibilities detailed in Section 2.5).

The baseline evaluation will actually consist of two surveys: one in wet season (January to February) and one in the flowering period (March through May). Each survey should note the following, using either metrics on or descriptions of:

- Topography and slope;
- Water quality (turbidity, nutrient levels, presence of toxins, etc.);
- Subsurface water flow rate, direction, depth, and duration;
- Surface water flow rate, direction, depth, and duration;
- Soil/substrate type, permeability, moisture levels, and erosion;
- Dominant vegetation type, location, density, and elevation;
- Presence and location of invasive species;
- Presence and location of listed species;
- Aquatic function (if any);
- Historical and current uses of the site; and
- Historical and current uses of neighboring land that may affect the project outcome.

Surveys of plant and animal species specific to particular wetland or other water types may need to occur within a more specific time frame or multiple times over the course of the survey period for the results to be accurate and reliable. These particular survey requirements will be detailed within the restoration and establishment guidelines of each wetland and other water type.

The reference site should be surveyed at the same time and using the same methods and metrics as the restoration or establishment site.

2.3 Project Design

Project design depends upon the desired outcome of each project. The overarching goal for all mitigation projects under the SSHCP is an ecosystem strategy approach to re-establish or establish sustainable and functioning ecosystems that match the characteristics and functions of the ecosystems they replace within a system of conservation areas and reserves so that species dispersal mechanisms remain functional. However, depending on project-specific constraints and opportunities, this may be too broad or constraining. Therefore, the Implementing Entity and MB will use the baseline evaluation findings to set project-specific goals and to design the project with the aim of meeting those goals. As part of the project design, the team will also generate an implementation plan that describes how the design will be implemented. Lastly, the team will generate a monitoring and management plan, which will include project-specific outcomes, criteria against which progress toward meeting those objectives can be measured, and the monitoring methods that will be used to measure those criteria.

In general, passive restoration design is preferable to active restoration, as it is less invasive and the result is self-sustaining. Passive restoration involves removing the source of degradation (e.g., cattle grazing, culverts, etc.) and allowing natural process to gradually return the site to a functioning wetland or other water ecosystem. However, passive restoration design will not meet the goals of every restoration project, especially on severely degraded sites, and passive designs cannot be used for establishment projects. Therefore, it is expected that some projects will utilize active restoration and establishment project designs.

The USACE South Pacific Division's *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines* (USACE 2015) recommend the following considerations for mitigation planning: A mitigation plan for wetland compensatory mitigation projects should consider the NRC's operational guidelines for restoring ecologically self-sustaining wetlands (NRC 2001). This succinct document provides some useful guidelines on factors to consider in planning wetland compensatory mitigation. In addition, examination of existing compensatory mitigation sites has provided information that can be used to ensure the success of proposed compensatory mitigation sites. In general, compensatory mitigation sites should be designed with the following in mind.

General Design Recommendations for Compensatory Mitigation

- Ensure an adequate buffer subject to minimal or no human disturbance is established and protected adjacent to any aquatic resources in the compensatory mitigation site.
- Integrate macro- and micro-topographic features to create a diversity of hydrologic and geomorphic conditions, plant communities, and animal habitat.

- Design the compensatory mitigation project to mimic a local reference site of similar class and landscape position that provides the desired habitat features and functionality.
- Incorporate mitigation plantings of species native to the local area.
- Avoid or minimize impacts to special-status species and other biological resources.

Design Recommendations for Wetland Compensatory Mitigation

- Select compensatory mitigation sites with natural, self-sustaining sources of hydrology (surface water, groundwater, and precipitation). The use of engineered structures such as pumps, water control structures, or diversions is strongly discouraged. Securing water rights and/or understanding the risks of existing or future water diversions are critical elements.

Design Recommendations for Stream Compensatory Mitigation

- Ensure the main channel through the compensatory mitigation site is free to migrate laterally over its active and terrace floodplain.
- Ensure channel geometry (plan, profile, and cross-section) of the compensatory mitigation site is appropriate for the watershed location and physical/hydrological condition.
- Use local, native materials as fill material to the extent practicable.
- Use bioengineering techniques to the extent practicable.
- Establish/restore and protect riparian areas next to the stream channel.

Additionally, project designs must address the three fundamental components of wetland ecosystems: hydrology, substrate, and vegetation. According to the NRC's Committee on the Characterization of Wetlands (NRC 1995):

> The states of the three factors that characterize wetlands are… recurrent, sustained saturation (the hydrological criterion), physical and chemical conditions in the substrate that reflect recurrent, sustained saturation (the substrate criterion), and the presence of organisms that are specifically adapted to recurrent and sustained saturation of the substrate (the biologic criterion).

2.3.1 Hydrology

The project design should describe how topography and hydrology of the site will be altered (if at all) to re-establish or establish the appropriate hydrodynamics and hydroperiod for the wetland or other water ecosystem. The design should also explain what aquatic function is expected to result from this change.

This component of the project design should utilize natural hydrologic patterns whenever possible, and avoid depending on hard engineering to achieve the desired hydrology. Soft engineering is always preferable to hard engineering, as it is more natural and self-sustaining, requires minimal maintenance, and is more cost-effective. As explained in Section 2.1, grading, excavation, pumping, and irrigation are undesirable and should be avoided. Irrigation is never acceptable as a primary or long-term water source.

2.3.2 Substrate

The project design should describe how (if at all) the soil or substrate will be amended or translocated to re-establish or establish the appropriate level of saturation and nutrient/organic matter content for the wetland or other water ecosystem. The project design should utilize existing soil and substrate whenever appropriate for the wetland or other water type being re-established or established. To avoid the spread of invasive species, soil and/or substrate translocated from off site should be sourced from sites free of invasive species.

2.3.3 Vegetation

The project design should describe how (if at all) the site will be vegetated or revegetated. Substrate, plants, and seeds collected from the site can be used to revegetate and repopulate the site after hydrology is re-established or established. When no native seed bank exists, site-suitable plant species should be procured from as local a source as possible. Off-site plant, seed, and substrate collection should come from local sites free of invasive species. Commercial seeds for native plants can be substituted if no local seed banks are available. Project designs, especially active designs, should use variation to allow for adaptive management. When designs include excavation or grading, they should provide appropriately heterogeneous topography. When designs include revegetation, they should create varying plant elevations and emergence levels. Such variations enable flexibility in case of extreme weather events and other unpredictable factors that can affect the project.

In summary, the Implementing Entity will design restoration and establishment projects that:

- Are based on foreseeable constraints and information derived from the baseline evaluation;
- Strive to meet project-specific goals, outcomes, and success criteria;
- Specify monitoring frequency and management protocols;
- Are passive, whenever possible;
- Address the water, substrate, and biota that compose the wetland or other water type;

- Utilize existing hydrological patterns, topography, soil, substrate, native vegetation, and/or local seed banks, whenever possible; and
- Create variation to allow for experimentation and adaptive management.

2.4 Implementation

The implementation plan must provide a timeline for the project implementation, and must describe all avoidance and minimization measures that the Implementing Entity will take during implementation of the project. These measures are described in detail in Chapter 7 Conservation Strategy of the SSHCP.

2.4.1 Timing

Implementation will occur either before or after the breeding and aestivation seasons of species present at the restoration or establishment site. The Implementing Entity will also time the implementation so that revegetation occurs during the appropriate growing season. If the planned implementation season arrives with unexpectedly poor conditions (e.g., drought, flood, etc.) the Implementing Entity will postpone project implementation until better conditions emerge, up to one calendar year or 18 months.

2.4.2 Avoidance and Minimization

Prior to entering the restoration or establishment site all boots, tools, truck tires, truck beds, and any other equipment should be washed and disinfected to limit the spread of invasive species and disease. If invasive species are already present at the re-establishment or establishment site prior to implementation, and the project design involves eradicating such species, the Implementing Entity will use mowing, hand weeding, and other natural methods to do so. Herbicides and pesticides will be avoided.

When the project design involves excavation or grading, the Implementing Entity will salvage appropriate native soils, substrate, and plant materials from the re-establishment or establishment site, whenever possible. Seeds with viable embryos should be collected by hand, with scissors, or with clippers, and stored under cool and dry conditions. Substrate should be harvested using a hammer or backhoe to loosen blocks that are at least 6 inches deep, and stored on greenhouse flats wrapped in damp fabric.

All tools should be removed from the site after implementation, except those needed for monitoring purposes.

2.5 Monitoring

A monitoring schedule will be developed as part of the project design process (see Section 2.3). Monitoring should occur with the highest frequency during and immediately after implementation. These surveys should include the same metrics and descriptions as the baseline evaluation.

Long-term monitoring should include an annual Biological Inspection, and more detailed quantitative and qualitative surveys every 5 years. The Biological Inspection will consist of one or more walk-through surveys that note:

- Hydrology;
- Vegetation composition;
- Presence and location of invasive species;
- Wildlife presence; and
- Condition of habitat features, including changes and/or pending needs.

Surveys should include photo documentation where useful. Summary reports of monitoring results should be submitted to the Implementing Agency by the end of each monitoring year.

The Monitoring Biologist (MB) is responsible for all near- and long-term monitoring of the re-establishment or establishment site. Ideally, the same MB will perform both the baseline evaluation (detailed in Section 2.2) and project monitoring for the duration of the monitoring period. However, a change of the MB can be made in consultation with the Implementing Agency, and with the Implementing Entity's approval at the time of change. The exiting MB will give a tour and introduction of the site to the entering MB.

Duties of the MB include, but are not limited to:

- Monitoring site function, hydrology, and erosion control;
- Monitoring water quality;
- An annual Biological Inspection of the site; collecting data and preparing reports based on this Inspection;
- Monitoring presence, vigor, location, and density of vegetation and biota;
- Evaluating the accumulation of thatch and recommending removal, when necessary;
- Evaluating the presence of newly introduced, non-native, or exotic plant species, and recommending removal, when necessary;

- Recommending allowable activities on the site, e.g. educational activities, tours, grazing, etc.; and
- Recommending remedial or corrective actions, to be implemented by the Implementing Entity.

2.6 Management

The Implementing Entity is responsible for the near- and long-term management and maintenance of the restoration or establishment site. Long-term management is necessary to ensure that the restoration or establishment project is viable as a wetland or other water habitat in perpetuity. The Implementing Entity's management duties will include, but not be limited to:

- Maintaining fencing and signage;
- Coordinating trash removal;
- Removing thatch and dead vegetative matter to reduce fire hazard;
- Removing and/or managing exotic and invasive plant species, when necessary;
- Coordinating grazing schedules, when applicable;
- Coordinating the annual Biological Inspection by the MB;
- Reviewing monitoring data and performing general inspections; and
- Implementing remedial or corrective action when necessary.

The Implementing Entity will coordinate with the MB to determine when and where remedial or corrective action is necessary and feasible.

APPENDIX D (Continued)

INTENTIONALLY LEFT BLANK

3 LITERATURE CITED

EPA (Environmental Protection Agency), 2000. *Principles for the Ecological Restoration of Aquatic Resources.* EPA841-F-00-003. Washington D.C.: Office of Water (4501F), EPA. http://www.epa.gov/owow/wetlands/restore/.

NRC (National Research Council). 2001. *Compensating for Wetland Losses under the Clean Water Act*. Washington D.C.: National Academy of Sciences.

NRC. 2005. *Wetlands: Characteristics and Boundaries*. Washington D.C.: National Academy of Sciences.

USACE and US EPA (U.S. Army Corps of Engineers and US Environmental Protection Agency). 2008. 33 CFR Parts 325 and 332 and 40 CFR Part 230 Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. April 10, 2008.

USACE. 2015. *Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines.* USACE, South Pacific Division.

APPENDIX D (Continued)

INTENTIONALLY LEFT BLANK

SCC NO. _____

AN ORDINANCE OF THE SACRAMENTO COUNTY CODE RELATING TO AQUATIC RESOURCES PROTECTION

The Board of Supervisors of the County of Sacramento, State of California, ordains as follows:

SECTION 1. Chapter 16.135, Sections 16.135.010 through 16.135.110, is added to Title 16 of the Sacramento County Code to read as follows:

16.135.010 Findings, Purpose and Intent.

A. The Board of Supervisors finds that due to urban and agricultural development only a fraction of the aquatic resources that historically dominated the SSHCP Plan Area landscape remains today.

B. The Board of Supervisors finds that a regional conservation approach is needed to protect existing aquatic resources within the South Sacramento Habitat Conservation Plan's (SSHCP's) Plan Area and to streamline the permitting processes for development and infrastructure projects in the Plan Area.

C. The Board of Supervisors recognizes that the avoidance, minimization and compensatory mitigation of aquatic resources provides several important functions and services, such as flood storage, wildlife habitat, mitigation of storm water and pollutants, filtration for drinking water, and prevention of storm damage to buildings and upland areas.

D. The Board of Supervisors wishes to avoid or minimize impacts of future activities on SSHCP Plan Area aquatic resources and to ensure "no-net-loss" of aquatic resources and aquatic functions by re-establishing or establishing aquatic resources within the Plan Area as compensatory mitigation when unavoidable impacts to aquatic resources occur.

E. The Board of Supervisors wishes to facilitate development consistent with the County General Plan and to ensure that there is enough mitigation available to accommodate aquatic resource mitigation requirements and to ensure that habitat mitigation remains economically feasible within the region.

F. The purpose and intent of this Chapter is to achieve no-net-loss of aquatic resource function and services and to enact efficient aquatic resource permitting consistent with the requirements of the federal Clean Water Act (Sections 404 and 401), California Fish and Game Code Section 1600 and the Porter-Cologne Water Quality Control Act (Porter-Cologne).

H. This Chapter regulates all aquatic resources within that portion of the unincorporated County that is south of U.S. Highway 50, east of the Sacramento River levee and County Road J11, west of the Sacramento County line with El Dorado and Amador Counties, and north of the Sacramento County line with San Joaquin County, as depicted in Figure 1, "Plan Area".

16.135.020 Definitions.

"Aquatic Resources" means wetland waters (i.e. vernal pools, swales, freshwater marsh, other seasonal wetlands, etc.) Non-wetland waters (i.e. ponds, lakes, streams, rivers, drainages, ditches, etc.), and riparian (i.e. mixed riparian scrub, mixed riparian woodland, etc.).

"Aquatic Resources Impact Permit" means a permit required for any activity permanently or temporarily impacting an Aquatic Resource.

"Avoidance" means avoiding the permanent and/or temporary impact altogether by not taking a certain action or parts of an action.

"Compensatory Mitigation" means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, of aquatic resources for the purposes of offsetting unavoidable adverse permanent and/or temporary impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

"Compensatory Mitigation Ratio" means the amount of Compensatory Mitigation that must be provided to offset an acre or fraction thereof of permanent and/or temporary impact.

"County" means the County of Sacramento.

"Director" means the Director of the Department of Community Development.

"Enhancement" means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

"Establishment" means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

"Habitat" means the place or environment where a plant or animal naturally lives and grows (a group of particular environmental conditions), and as defined in the South Sacramento Habitat Conservation Plan. Habitat may be occupied (i.e. individuals or a population of species are or have recently been present) or unoccupied.

"Impact" – See "Permanent Impact" and "Temporary Impact."

"Minimization" means to reduce permanent and/or temporary impacts by limiting the degree or magnitude of the action and its implementation.

"Open Water" means a permanent water impoundment that is mostly free from masses of underwater vegetation at very shallow depths.

"Permanent Impact" means the permanent loss of an Aquatic Resource resulting from the adverse effects of grading, filling, excavation, dredging, or changing of drainage of an Aquatic Resource.

"Plan Area" means that portion of the unincorporated County that is south of U.S. Highway 50, east of the Sacramento River levee and County Road J11, west of the Sacramento County line with El Dorado and Amador Counties, and north of the Sacramento County line with San Joaquin County, as depicted in Figure 1, "Plan Area".

"Re-establishment" means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

"Rehabilitation" means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

"Riparian" means a transitional area between terrestrial and aquatic ecosystems, which is distinguished by gradients in biophysical conditions, ecological processes, and biota, typically adjacent to perennial, intermittent and ephemeral streams, lakes, and estuarine-marine shorelines.

"Setback" means an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands and streams from disturbances associated with adjacent land uses.

"Stream" means a perennial, intermittent, or ephemeral course of water that has a bed and bank and with a definable ordinary high water mark.

"Temporary Impact" means the grading, filling, excavation, dredging, or changing of drainage of an Aquatic Resource where the Aquatic Resource is restored to pre-construction contours and elevations after construction, and revegetated, as appropriate.

"Vernal Pool" means a type of seasonal wetland habitat that is characterized by a specific set of physical parameters and a unique assemblage of highly specialized endemic plants and animals; a seasonal body of standing water that typically forms in the spring from direct precipitation, with occasional contributions from other sources, dries out completely in the hotter months of summer, and refills in the autumn; pools free of fish that provide important breeding habitat for many terrestrial or semi-aquatic species such as Branchiopods, frogs, and salamanders.

"Watershed" means a drainage basin that is defined by a 10-digit hydrologic unit code as defined by the Federal Standard for Delineation of Hydrologic Unit Boundaries.

"Wetland" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include freshwater marsh, vernal pools, swales and similar areas.

"Aquatic Resources Delineation" means identifying the amount and boundaries of Aquatic Resources, including wetlands, using U.S. Army Corps of Engineers (USACE) mapping standards and USACE minimum standards for delineations.

16.135.030 Applicability.

All proposed projects within the Plan Area that permanently and/or temporarily impact an Aquatic Resource shall require an Aquatic Resources Impact Permit from the County. No person, company, or agency shall permanently or temporarily impact Aquatic Resources as set forth in this Section except as consistent with this Chapter.

A. An Aquatic Resources Impact Permit must be obtained:

1. In conjunction with any County issued discretionary permit.

2. Before an activity is performed that impacts Aquatic Resources, if no construction or building permit is required.

B. Exemptions. In general, this Chapter requires permits for permanent and temporary impacts to aquatic resources. However, certain activities are exempt from

permit requirements. The following activities and associated uses shall be exempt from the provisions of this Chapter:

1. Exempt Maintenance Activities.

a. Maintenance of drainage ditches (does not include new construction of drainage ditches); construction and maintenance of irrigation ditches; maintenance of structures like dams, dikes and levees; and construction and maintenance of stock ponds or farm ponds.

b. Discharges associated with facilities that are appurtenant and functionally related to irrigation ditches are included in the exemption (e.g. siphons, pumps, headgates, wingwalls, weirs, diversion structures, etc.).

c. Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs in order to qualify for this exemption.

d. If a maintenance activity would involve any modifications to the original fill design, including the location of the fill, the type of material to be used, the amount of material used, etc., then the activity does not qualify for the maintenance exemption.

2. Exempt Farming, Ranching, and Mining Activities.

a. Established (ongoing) farming and ranching activities such as plowing, seeding, cultivating, minor drainage, and harvesting for the production of food, fiber, or upland soil and water conservation practices are exempt. This exemption pertains to "normal farming" and harvesting activities that are part of an established, ongoing farming operation. Examples of normal farming practices include but are not limited to planting different crops as part of an established rotation, introduction of a new cultivation technique such as discing between crop rows for weed control and discharges associated with ongoing rotations of rice. Activities that bring an Aquatic Resource into farm production where the Aquatic Resource has not previously been used for farming are not considered part of an established operation, and therefore are not exempted. An example includes the conversion of grazing land to cropland that results in impacts to Aquatic Resources.

b. Construction and maintenance of permanent and temporary farm roads or temporary mining roads.

Temporary roads must be constructed and maintained in accordance with best management practices to assure that flow and circulation patterns and chemical and biological characteristics of Aquatic Resources are not impaired and that the reach of the Aquatic Resources is not reduced, and that any adverse effect on the aquatic environment are minimized. These BMPs which must be applied to satisfy this provision shall include those detailed BMPs described in the State's approved program description pursuant to the requirements of 40 CFR 233.22(i)d.

i. Roads established within farming or mining operations shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming or mining operations, and local topographic and climatic conditions;

ii. Road fill shall be bridged, culverted or designed to prevent the restriction of expected flood flows;

iii. The fill shall be properly stabilized and maintained during and following construction to prevent erosion;

iv. Discharges shall be made in a manner that minimizes construction equipment in Aquatic Resources outside of the fill area;

v. Vegetative disturbance shall be kept to a minimum;

vi. Construction and maintenance of crossing shall not disrupt the migration or other movement of aquatic life;

vii. Borrow material shall be taken from upland sources where feasible;

viii. The discharge shall not take, or jeopardize the continued existence of, a threatened or endangered species, or adversely modify or destroy the critical habitat of such species;

ix. Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and Aquatic Resources shall be avoided;

x. The discharge shall not be located in the proximity of a public water supply intake;

xi. The discharge shall not occur in a component of the National Wild and Scenic River System;

xii. The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts; and

xiii. All temporary fills shall be removed in their entirety and the area restored to its original elevation.

3. Construction of temporary sedimentation basins.

a. This exemption applies to the construction of temporary sedimentation basins on a construction site which does not permanently impact Aquatic Resources.

b. Construction site means any site involving the erection of buildings, roads, and other discrete structures and the installation of support facilities necessary for construction and utilization of the structures. Also includes any other land areas which involve land-disturbing excavation activities, including quarrying and other mining areas, where an increase in the runoff of sediment is controlled through the use of temporary sedimentation basins.

C. Interpretation.

1. When there is a conflict between any provisions of this Chapter or any other regulations adopted by the County, that providing the most protection to aquatic resources shall apply.

2. If there is any question as to whether a proposed activity qualifies for an exemption, coordination with the County shall occur and results documented in writing.

3. Compliance with this Chapter does not constitute compliance with other federal, state and local regulations, and permit requirements (for example, Section 106 of the National Historic Preservation Act, USACE Section 404 permits, National Pollutant Discharge Elimination System (NPDES) permits, Section 401 Water Quality Certification, or Porter-Cologne Water Quality Control Act). The project proponent is responsible for complying with all requirements, apart from the provisions of this Chapter.

D. Recapture Provision.

1. Exemptions do not apply when impacts related to activities change the use of the Aquatic Resource and reduce the reach, or impair the flow or circulation of

Aquatic Resources. This "recapture" provision involves a two-part test that results in an activity being considered not exempt when both parts are met:

a. Does the activity represent a "new use" of the Aquatic Resource; and

b. Would the activity result in a "reduction in reach/impairment of flow or circulation" of Aquatic Resources?

c. Consequently, any impact that results in the destruction of the Aquatic Resource character of an area (e.g., it converts to uplands due to new or expanded drainage) is considered a change in the Aquatic Resource, and by definition, a reduction of their reach and is not exempt.

16.135.040 Aquatic Resource Impact Permits.

A. General.

1. An Aquatic Resource Impact Permit is required for any development activity that is not exempt pursuant to Section 16.135.030(B) and that permanently and/or temporarily impacts Aquatic Resources.

2. All Aquatic Resource Impact Permits require approval of a compensatory mitigation plan in accordance with the provisions of Section 16.135.040(J) unless the compensatory mitigation plan requirement is waived under the provisions of Section 16.135.040(J)(3).

B. Standards. Aquatic Resource Impact Permit applications shall comply with all state, local and federal laws, including those related to sediment control, pollution control, floodplain restrictions, storm water management, and on-site wastewater disposal.

C. Pre-Permit Consultation. Any person applying for an Aquatic Resource Impact Permit is encouraged, but not required, to meet with the Director during the earliest possible stages of project planning in order to discuss Aquatic Resource impact avoidance, minimization, compensation, and the required contents of a compensatory mitigation plan before significant commitments have been made to a particular project design. Pre-permit consultations and planning will help project proponents create projects which will be more quickly and easily processed.

D. Permit Applications. Applications for Aquatic Resource Impact Permits shall be made to the Director on forms furnished by the Director. Unless the Director waives one (1) or more of the following information requirements, applications shall include:

1. Aquatic Resources delineations and setback width designations pursuant to Sections 16.135.050 and 16.135.080;

2. A site plan for the proposed activity overlaid on an aerial photograph at a scale no smaller than one inch equals one hundred feet (1" = 100', a scaling ratio of 1:1200) showing the location, width, depth and length of all existing and proposed structures, roads, storm water facilities, sewage treatment, installations, stockpiling areas and borrow sites;

3. The exact sites and specifications for all development activities proposed within Aquatic Resources and Setbacks, including:

Timing of construction activity;

Type of equipment;

Type of fill material and cubic yards of each type of fill;

Type and location of permanent and/or temporary impacts to Aquatic Resources.

4. A compensatory mitigation plan meeting the requirements of Section 16.135.040(J).

E. Permit Processing. To the extent practicable and feasible, the processing of Aquatic Resource Impact Permits will be consolidated with other County permits or approvals which affect activities in Aquatic Resources, such as subdivision, grading, site plan, and building permit approval, so as to provide a timely and coordinated permit process.

F. Permit Issuance. The Director shall issue final approval of the Aquatic Resource Impact Permit authorizing commencement of the activity subject to the following conditions:

1. Submittal and approval of documentation for a project-scale assessment of the effects of a project on Aquatic Resources, including mapping (USACE-verified jurisdictional determination) and a description of the functions and services of the mapped areas' Aquatic Resources; and

2. Submittal and approval of on-site project alternatives information demonstrating efforts that first avoid, and then minimize permanent and temporary effects to Aquatic Resources and;

3. Submittal and approval of an alternative that minimizes permanent and temporary impacts to Aquatic Resources and associated functions and services to the greatest extent practicable, if a complete avoidance alternative is not practicable as determined by the Director, Documentation of this Determination of Environmentally Equivalent or Superior Alternative (DEESA) shall be recorded by the Director. See Section 16.135.60(A)(2) for DEESA procedure; and

4. Submittal and approval of a determination of compliance with SSHCP terms and conditions; and

5. If compensatory mitigation is required then the following conditions must also be met:

a. Either the submittal and approval of a permittee-responsible compensatory mitigation plan pursuant to Section 16.135.040(J); and

b. The recording of a conservation easement as required by Section 16.135.080(C)(2) and (4); and

c. The posting of financial assurance as required by Section 16.135.080(H); or

d. Proof of payment into an in-lieu fee program approved by the USACE and that contains the impact site within its service area; or

e. Proof of compensatory mitigation through payment into a conservation or mitigation bank approved by the USACE and that contains the impact site within its service area.

G. Permit Duration. The Aquatic Resource Impact Permit shall be valid for the period specified in the Aquatic Resource Impact Permit.

H. Aquatic Resource Impact Permit Financial Assurances.

1. Financial Assurance Estimates. The project proponent shall submit itemized cost estimates for the required financial assurances including cost estimates associated with performance assurance and maintenance assurance. The Director may adjust the estimates to ensure that adequate funds will be available to complete the specified compensatory mitigation upon forfeiture. In addition the cost estimates must include a contingency as follows:

a. Estimates for bonds shall be multiplied by one hundred fifty percent (150%);

b. All other estimates shall be multiplied by one hundred ten percent (110%).

2. Waiver of Financial Assurances. The Director may waive the requirement for one or both financial assurances if:

a. The project proponent demonstrates that it paid into an in-lieu fee program approved by the USACE that contains the impact site within its service area; or

b. The project proponent used a conservation or mitigation bank that is approved by the USACE and that contains the impact site within its service area.

3. Types of Financial Assurances. The Director shall accept the following forms of financial assurances:

a. An escrow account secured with an agreement approved by the Director;

b. A bond provided by a surety for estimates that exceed five thousand dollars ($5,000);

c. A deposit account with a financial institution secured with an agreement approved by the Director;

d. A letter of commitment from a public agency; or

e. Other forms of financial assurance determined to be acceptable by the Director.

4. Acceptance of Work and Release of Financial Assurances.

a. Release of Performance Assurance. Upon request, the Director shall release the performance assurance when the following conditions are met:

i. Completion of construction and planting specified in the approved compensatory mitigation plan;

ii. Submittal of an as-built report documenting changes to the compensatory mitigation plan (if any) that occurred during construction;

iii. Field inspection of the completed site(s); and

iv. Provision of the required maintenance assurance.

b. Release of Maintenance Assurance. Upon request, the Director shall release the maintenance assurance when the following conditions are met:

i. Completion of the specified monitoring and maintenance program;

ii. Submittal of a final monitoring report demonstrating that the goals and objectives of the compensatory mitigation plan have been met.

c. Incremental Release of Financial Assurances. The Director may release financial assurances incrementally only if specific milestones and associated costs are specified in the approved compensatory mitigation plan and the document legally establishing the financial assurance.

5. Forfeiture. If the aquatic resource impact permit holder fails to perform or maintain compensatory mitigation in accordance with the approved aquatic resource

impact permit, the Director may declare the corresponding financial assurance forfeit pursuant to the following process:

a. The Director shall, by registered mail, notify the aquatic resource impact permit holder/agent that is signatory to the financial assurance and the financial assurance holder, of non-performance with the terms of the approved aquatic resource impact permit;

b. The written notification shall cite a reasonable time for the aquatic resource impact permit holder, or legal successor, to either propose alternative compensatory mitigation or to comply with provisions of the aquatic resource impact permit and state the County's intent to forfeit the financial assurance should the required work not be completed in a timely manner.

c. Should the required work not be completed timely, the County shall declare the assurance forfeit.

d. Upon forfeiture of a financial assurance, the proceeds thereof shall be utilized either to correct the deficiencies which resulted in forfeiture or, if such correction is deemed by the Director to be impractical or ineffective, to enhance other aquatic resources in the same watershed or, if deemed impracticable to do so, contribute to an established cumulative effects fund for watershed-scale habitat and aquatic resource conservation.

I. Appeal Process. An Aquatic Resource Impact Permit decision may be appealed to the Board of Supervisors.

J. Aquatic Resource Impact Permit Compensatory Mitigation Plans.

1. Compensatory mitigation plans are required for activities that permanently and/or temporally impact Aquatic Resources. Content requirements for the Plans that are not applicable to a project may be waived by the Director upon request of the project proponent.

2. The compensatory mitigation plan consists of two (2) parts: baseline information for the site and a conceptual compensatory mitigation plan. If off-site aquatic resource compensatory mitigation is proposed, baseline information for both the project site and mitigation site is required.

a. Baseline information shall include:

i. Aquatic Resources delineation as described in Section 16.135.050;

ii. Description and maps of land cover types and vegetative conditions at the site;

iii. Description and maps of hydrological conditions at the site;

iv. Description of soil conditions at the site based on an on-site analysis and available soils information from online or published sources such as the Natural Resources Conservation Service's soils maps;

v. A topographic map of the site; and

vi. A functional assessment or condition of the existing aquatic resources.

b. The contents of the compensatory mitigation plan shall be consistent with the USACE Regional Compensatory Mitigation and Monitoring Guidelines for the South Pacific Division (2015), Appendix D of the ARP, and include:

i. Title page

ii. Contributor page;

iii. Distribution page;

iv. Table of Contents;

v. Brief description of proposed compensatory mitigation project and proposed source of compensatory mitigation;

vi. Determination of goals and objectives of the proposed project. Specific criteria shall be provided for evaluating whether or not the goals and objectives of the compensatory mitigation project are being met. Such criteria may include water quality standards, survival rates of planted vegetation, species abundance and diversity targets, habitat diversity indices, or other ecological, geological or hydrological criteria;

vii. A description of all permanent and temporary impacts (acreage and linear ft.) that require compensatory mitigation under this Chapter;

viii. Description of site selection criteria such as watershed overview, landscape setting and position, and site specific information, including consistency with the site selection guidance provided in the ARP (Appendix D);

ix. Other baseline information such as: map showing locations of permanent and/or temporary impact and compensatory mitigation sites; map showing proposed preserves and setbacks; delineation of Aquatic Resources; functional/condition assessment, if appropriate; species of concern (federal and/or state); cultural resources; existing and planned land uses within and surrounding the proposed compensatory mitigation sites(s); existing site topography/elevations; aerial photos, land uses, site changes (deep ripping, impoundments, channel straightening or realignment); interviews with adjacent landowners, ranchers, land managers regarding locations of seeps, observations of flood events, trespassing/vandalism, opportunities for education and outreach.

x. Written specifications for the compensatory mitigation project shall be provided. The specifications shall include: the proposed construction sequence, grading and excavation details, water and nutrient requirements for planting, specification of substrate stockpiling techniques, and planting instructions, as appropriate. These written specifications shall be accompanied by detailed site diagrams, scaled cross-sectional drawings, topographic maps showing slope percentage and final grade elevations, and any other drawings appropriate to show construction techniques or anticipated final outcome;

xi. Discussion and map of plant material to be planted and planting densities;

xii. Preliminary drainage plan identifying location of proposed drainage facilities including detention structures and water quality features (e.g., swales);

xiii. Discussion of water sources for all aquatic resources on the site;

xiv. Project schedule;

xv. A monitoring and management program to measure the success of the compensatory mitigation project.

(a) The compensatory mitigation project shall be monitored for a period necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. Compensatory mitigation projects are required to have a minimum monitoring period of five years. For aquatic resources with slow development rates (e.g. vernal pools and riparian habitats) a monitoring period of more than five (5) years is required. Monitoring periods may be extended if performance standards are not being met. Before determining success there should be at least two

consecutive annual monitoring reports where all the performance standards are met without human intervention (e.g., artificial irrigation).

(b) Monitoring shall be designed to measure the performance standards outlined in the compensatory mitigation plan.

(c) A monitoring protocol shall be included outlining how the monitoring data will be evaluated by agencies that are tracking the progress of the project.

(d) Monitoring reports shall be submitted annually, or on a pre-arranged alternate schedule, for the duration of monitoring period.

(e) Monitoring reports shall analyze the results of monitoring, documenting milestones, successes, problems, and recommendations for corrective and/or contingency actions to ensure success of the compensatory mitigation project.

xvi. A contingency plan that identifies potential courses of action, and any corrective measures to be taken when monitoring or evaluation indicates project performance standards are not being met.

xvii. A monitoring and management program to measure and maintain the long-term sustainability of the compensatory mitigation project in perpetuity. Monitoring and management programs shall be consistent with established practices of the SSHCP and ARP and information collected in a manner that allows for seamless integration into the SSHCP database.

3. The preparation of a compensatory mitigation plan is not required if all required compensatory mitigation is achieved through the use of:

a. A conservation or mitigation bank approved by the USACE that contains the impact site within its service area; or

b. An in-lieu fee program approved by the USACE that contains the impact site within its service area.

16.135.050 Aquatic Resources Delineation.

A. Aquatic Resources Delineation Standards.

1. In conjunction with the submittal of an application for a discretionary permit, the Director shall determine the probable existence of Aquatic Resources on the parcel involved in the development permit application. If Aquatic Resources are believed to exist on a parcel, project proponents for all projects subject to this Chapter must prepare a Verified Aquatic Resources Delineation. All Verified Aquatic Resources Delineations shall be performed in accordance with the minimum standards set forth by the Sacramento District USACE and State Water Quality Control Board at the time of the delineation. All Aquatic Resources Delineations shall be submitted to the Director. The Director will in turn submit the Aquatic Resources Delineation to the USACE for verification.

16.135.060 Avoidance, Minimization and Compensation Standards.

A. Avoidance, Minimization and Compensation. Documentation must demonstrate that the following hierarchy of avoidance and minimization has been considered as part of an Aquatic Resources Impact Permit:

1. Avoid permanent and temporary impacts to Aquatic Resources. The proposed project shall first avoid, and then minimize, permanent and temporary impacts to Aquatic Resources to the greatest extent practicable. Those permanent and/or

temporary impacts that are unavoidable shall be mitigated such that the lost functions and services are replaced as set forth under the DEESA described below.

2. Minimize permanent and/or temporary impacts to Aquatic Resources if complete avoidance is infeasible. The Director must find that the project proponent has limited the degree or magnitude of impact to Aquatic Resources by using a site design that follows DEESA. The DEESA shall include the following information to be supplied by the applicant and reviewed by the Director:

a. A defined project area boundary.

b. A detailed project description that demonstrates: 1) why an avoidance alternative is not practicable; and 2) that the project minimizes direct and indirect effects to Aquatic Resources to the greatest extent practicable. This description shall include information regarding any Aquatic Resources on site that are being avoided.

c. Amount (acres and linear feet (if applicable) and cubic yards) of unavoidable permanent and temporary impacts to Aquatic Resources associated with the project.

d. A detailed description of project design features and how the project complies with mitigation measures as described in Chapter 5 of the South Sacramento Habitat Conservation Plan that reduce permanent and/or temporary impacts, including but not limited to: impact minimization, on-site stream realignment, Best Management Practices, Low Impact Design and Avoidance and Minimization Measures.

e. A description and amount of proposed compensatory mitigation. Compensatory mitigation must conform to the minimum mitigation ratios required by Section 16.135.070.

f. An analysis that demonstrates that, although the proposed project would not completely avoid permanent and/or temporary impacts to Aquatic Resources within the area subject to this Chapter with proposed design and compensation measures, the project would be environmentally equivalent or superior to that which would occur under a complete avoidance alternative without these measures, based on one or more of the following factors:

i. Effects on designated Critical Habitat and Core Recovery Areas.

ii. Effects on the abundance of Aquatic Resources.

iii. Effects on listed species.

iv. Effects on the diversity of Aquatic Resources.

v. Effects on habitat connectivity and functions.

vi. Effects on the condition of Aquatic Resources.

g. Compensate for permanent and temporary impacts to Aquatic Resources that will occur, after efforts to avoid and minimize have been exhausted. The Director must find that:

i. Unavoidable permanent and temporary impacts are compensated in accordance with Section 16.135.070; and

ii. The required compensatory mitigation is monitored and remedial action is taken when necessary to ensure the success of mitigation activities.

16.135.070 Compensatory Mitigation Standards.

A. Compensatory mitigation for permanent and temporary impacts to Aquatic Resources is based on the following ratios:

Land Cover Type	Compensatory Mitigation Ratio (Re-Establishment/Establishment)
Vernal Pool	1:1
Swale	1:1
Stream/Creek (VPIH)	1:1
Seasonal wetland	1:1
Freshwater marsh	1:1
Open water	1:1
Riparian	1:1
Mine tailing riparian woodland	1:1

B. Compensatory Mitigation Prioritization. When considering options for successfully providing the required compensatory mitigation, the type and location options shall be considered in the order presented in the Department of the Army, Corps of Engineers' Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 33 C.F.R. Part 332 § 332.3, paragraphs (b)(2) through (b)(6). However the preference hierarchy may be overridden when the required compensatory mitigation involves: larger, more ecologically valuable parcels; is subject to more rigorous scientific and technical analysis, planning and implementation; involves advanced site identification and planning; and utilizes significant investment of financial resources, for sites located to successfully replace lost functions and services, taking into account such watershed-scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, trends in land use, ecological benefits, compatibility with adjacent land uses, and in general and when practicable to meet the aforementioned considerations, in the same watershed. Therefore, any ILF Program adopted by the County consistent with the SSHCP Conservation Strategy and the ARP and approved by the USACE can be the preferred option for successfully providing required compensatory mitigation.

C. Compensatory Mitigation. Allowable types of compensatory Aquatic Resource mitigation are listed below, in the general order of preference.

1. Re-establishment
2. Rehabilitation
3. Establishment (Creation)
4. Enhancement

16.135.080 Setback Standards.

A. Minimum Wetland and Stream Setback Standards.

1. Refer to Chapter 5 of the South Sacramento Habitat Conservation Plan for minimum wetland and stream setback standards, which may be amended from time to time.

B. Stream Setback Exemptions. The setback standards of this Chapter do not apply where there is:

1. An existing Drainage Master Plan that was adopted prior to adoption of this Chapter; or

2. An existing Specific, Master, or Community Plan that was adopted prior to adoption of this Chapter.

C. Land Use Requirements within Wetland or Stream Setbacks.

1. Any discretionary review of a proposed project must ensure that sufficient area exists outside of the Wetland or Stream Setback to accommodate primary and accessory structures, paved areas, septic systems, and other uses or activities that might adversely affect the functioning of the Wetland or stream.

2. A conservation easement shall be recorded in a form approved by the Director as adequate to protect and maintain the Aquatic Resources and setback area consistent with the provisions of this Chapter. Conservation easements will run with the land in perpetuity and be binding on the property owner and successors.

3. Any lands proposed for development that include all or a portion of a wetland or stream setback will, as a condition of any subdivision map, provide for vegetation or re-vegetation of any portions of the setback that are not vegetated at the time of the application or that were disturbed by prior land uses. Vegetation will include native or natural tree and plant species as deemed acceptable by the Director.

4. For building lots that exist as of the date of adoption of this Chapter, but for which a building permit or a preliminary site plan approval has not been obtained or is no longer valid, the required minimum front, side, and rear structural setbacks may extend into the wetland or stream setback, provided that an easement is recorded that prohibits clearing or construction in the wetland or stream setback.

5. A permanent physical demarcation along the upland boundary of the wetland or stream setback shall be installed and thereafter maintained. Such demarcation may consist of fencing or other prominent physical marking that does not impede flood flows and must be approved by the Director. Signs, approved by the Director, shall be posted at an interval of one (1) per one hundred (100) feet, indicating that the setback area is a protected area. Signs must be perpetually maintained at locations along the outer perimeter of the wetland or stream setback.

D. Allowable Uses Within Wetland and Stream Setbacks:

1. Refer to Chapter 5 of the South Sacramento Habitat Conservation Plan for allowable uses within stream and wetlands setbacks, which may be amended from time to time.

E. Wetland and Stream Setback Waivers. A waiver of wetland and stream setbacks may be granted by the Director under one of the following conditions:

1. A lot existing as of the date this Chapter is effective for which there is insufficient room outside the wetland or stream setback for uses permitted by the underlying zoning and for which there is no other reasonable or prudent alternative to placement in the setback, including obtaining variances from setback or other requirements that would allow conformance with the setback requirements.

2. An economic hardship whereby a project proponent demonstrates to the Director's satisfaction that the subject property is not capable of yielding an economic return as a result of unique circumstances specific to the subject property, as follows:

a. An economic hardship related to or arising from the characteristics of the property due to the particular physical surroundings, shape, or topographical conditions of the property involved, rather than the personal situations of the project proponent or the result of any action or inaction by the project proponent or the owner or predecessors in title.

b. The necessity of acquiring additional land to locate development outside the wetland or stream setback will not be considered an economic hardship unless the project proponent can demonstrate that there is no adjacent land that is reasonably available or could be obtained, used, expanded, or managed to fulfill the basic purpose of the proposed activity.

c. The proposed project will serve an essential public health and safety need, as demonstrated to the satisfaction of the Director.

3. A project proponent may submit a written request for a wetland or stream setback waiver to the Director. The written request must include specific reasons justifying the waiver and any other information necessary to evaluate the proposed waiver request. The Director may require an alternative analysis that clearly demonstrates that no other feasible alternatives exist and that minimal permanent and temporary impact would occur as a result of the project or development.

4. In granting a request for a wetland or stream setback waiver, the Director may require project design features including site design, landscape planting, fencing, signs, and water quality best management practices to reduce adverse permanent and temporary impacts on wetlands and streams and other sensitive resources.

F. Nonconforming Structures.

1. Legally existing but nonconforming structures and uses of land within wetland or stream setbacks may be continued. Encroachment into the wetland or stream setback will only be allowed where previous allowable (i.e., permitted or otherwise legal) development or disturbance exists. Existing impervious surfaces within the wetland or stream setback that resulted from previous allowable disturbances or developments shall not be expanded. If a legally existing but nonconforming use has been discontinued for a period of more than 90 days, it shall not thereafter be re-established, with the exception of agricultural uses that are following prescribed best management practices for crop rotation. However, resumption of agricultural uses must be strictly confined to the extent of disturbance existing at the time of adoption of this Chapter.

2. Activities that change the use of the Aquatic Resource and reduce the reach, or impair the flow or circulation of Aquatic Resources are required to obtain an Aquatic Resources Impact Permit. See Section 16.135.030(B)(3)(b).

16.135.090 Alternatives For Compliance.

A. All of the provisions of this Chapter can be met by complying with an approved permit that satisfies all state and federal Clean Water Act requirements and Porter-Cologne Water Quality Control Act requirements.

1. The Permit must provide coverage within the Plan Area that is applicable to this Chapter; and

2. The Permit must require compensatory mitigation ratios that are equal to or greater than the ratios presented in this Chapter 16.135.070(A).

16.135.100 Enforcement.

A. The County shall have jurisdiction to enjoin any activities in violation of this Chapter.

B. In the event of a violation of this Chapter, the County shall have the power to order restoration of Aquatic Resources. If the responsible person, entity, or agent does not complete such restoration within a reasonable time following the order, the County shall have the authority to restore the affected aquatic resources to their prior condition and the person, entity, or agent responsible for the violation shall be held liable to the County for the cost of restoration.

C. In addition to other remedies provided for elsewhere in this Chapter, the Director may suspend or revoke Aquatic Resource Impact Permit(s) issued in accordance with this Chapter and associated development permits if the project proponent or permittee has not complied with any or all of the conditions or limitations set forth in the Aquatic Resource Impact Permit, has exceeded the scope of work set forth in the Aquatic Resource Impact Permit, or has failed to undertake the project in the manner set forth in the Aquatic Resource Impact Permit.

D. In the event that a violation of this Chapter occurs, the County will notify the US Army Corps of Engineers, US Environmental Protection Agency, US Fish and Wildlife Service, the Regional Water Quality Control Board, and California Department of Fish and Wildlife. Notification will be in the form of a one-page form that describes the nature and extent of the violation, with an aerial photo depicting the location of the violation.

16.135.110 Severability.

The Board of Supervisors of the County of Sacramento declares that should any section, paragraph, sentence, or word of this Chapter be declared for any reason to be invalid, it is the intent of the Board of Supervisors that it would have passed all other portions of this Chapter, independent of the provision declared invalid.

SECTION 2. This ordinance was introduced and the title thereof read at the regular meeting of the Board of Supervisors on _____, and on _____, further reading was waived by the unanimous vote of the Supervisors present.

This ordinance shall take effect and be in full force on and after thirty (30) days from the date of its passage, and before the expiration of fifteen (15) days from the date of its passage it shall be published once with the names of the members of the Board of Supervisors voting for and against the same, said publication to be made in a newspaper of general circulation published in the County of Sacramento.

On a motion by Supervisor _____, seconded by Supervisor _____, the foregoing ordinance was passed and adopted by the Board of Supervisors of the County of Sacramento, State of California, this ___ day of _____ 2018, by the following vote:

AYES: Supervisors,

NOES: Supervisors,

ABSENT: Supervisors,

ABSTAIN: Supervisors,

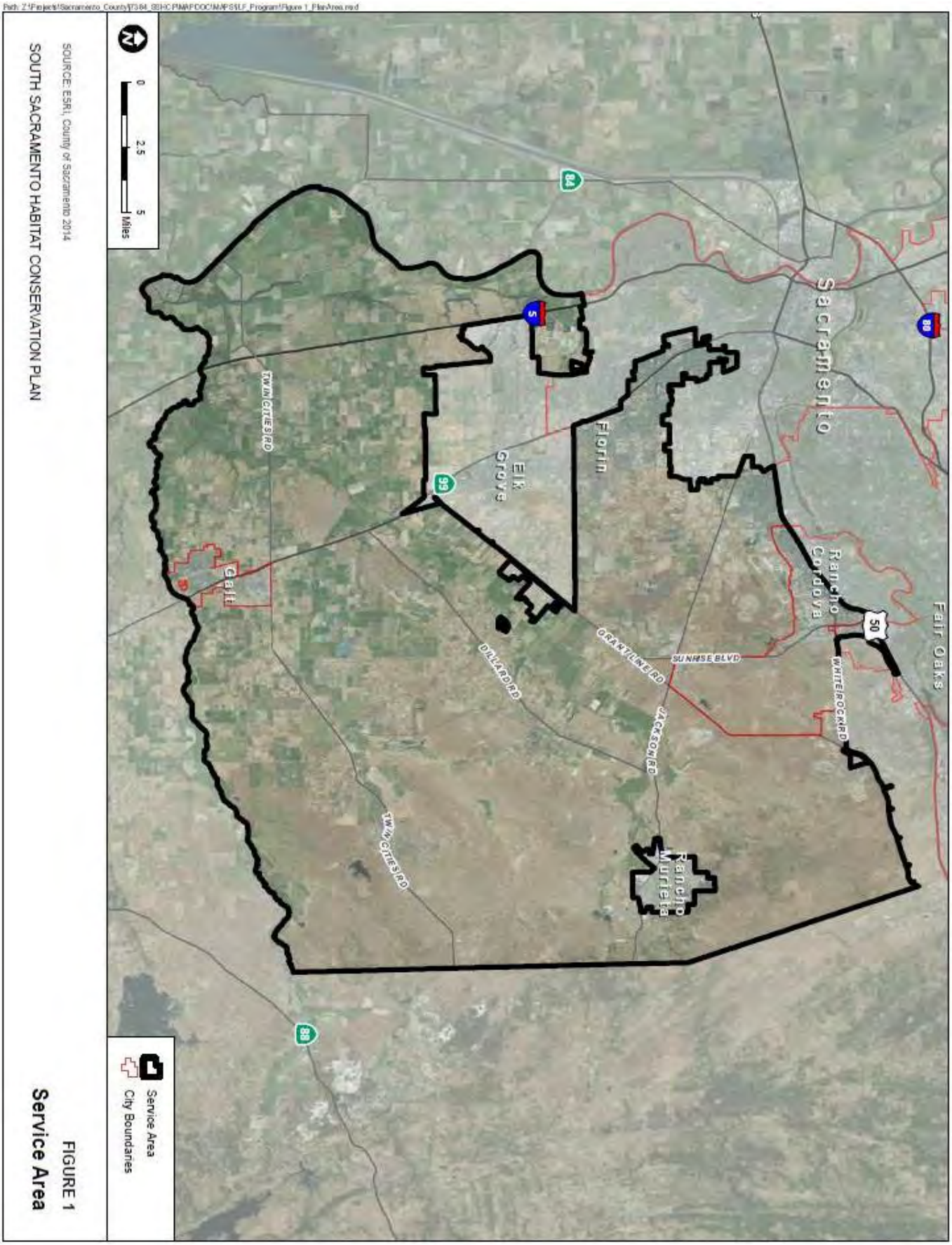
RECUSAL: Supervisors,
(PER POLITICAL REFORM ACT (§ 18702.5.))

_____
Chair of the Board of Supervisors
of Sacramento County, California

(SEAL)

ATTEST: _____
Clerk, Board of Supervisors

1048472


Path: Z:\Projects\Sacramento_County\73-84_SSHCP\MAPDOC\MAPS\ILF_Program\Figure 1_PlanArea.mxd
N
0
2.5
5
Miles
Sacramento
Fair Oaks
Rancho Cordova
Florin
Elk Grove
Galt
TWIN CITIES RD
GRANT LINE RD
SUNRISE BLVD
WHITE ROCK RD
JACKSON RD
DILLARD RD
Rancho Murieta
5
50
99
84
88
Service Area
City Boundaries
SOURCE: ESRI, County of Sacramento 2014
SOUTH SACRAMENTO HABITAT CONSERVATION PLAN
FIGURE 1
Service Area

Draft Report

South Sacramento Habitat Conservation Plan Nexus Study

The Economics of Land Use

Prepared for:

SSHCP Plan Partners

Prepared by:

Economic & Planning Systems, Inc.

April 5, 2018

Economic & Planning Systems, Inc.
One Kaiser Plaza, Suite 1410
Oakland, CA 94612-3604
510.841.9190 tel
510.740.2080 fax

Oakland
Sacramento
Denver
Los Angeles

www.epsys.com

EPS #161005

Table of Contents

1. INTRODUCTION AND MITIGATION FEE SCHEDULE 1
Legal Context for Fees 1
Mitigation Fee Schedule 2
2. NEXUS FINDINGS 4
3. SSHCP COST ANALYSIS 7
Cost Categories 7
Cost Summary 8
Cost Analysis Methodology 9
4. MITIGATION FEE CALCULATION 10
5. FEE SCHEDULE 12
Additional Detail on Mitigation Fee Schedule 12
Selected Implementation Issues 16

List of Figures

Figure 1 SSHCP Mitigation Fee Schedule (Per Gross Acre of Impact) 3
Figure 2 SSHCP Implementation Cost Summary 9
Figure 3 Program Costs, Impacted Acres, and Fee Estimates 11
Figure 4 SSHCP Mitigation Fee Schedule 13
Figure 5 SSHCP Mitigation Fee Schedule Detail 14

1. INTRODUCTION AND MITIGATION FEE SCHEDULE

The South Sacramento Habitat Conservation Plan (SSHCP or Plan) is a regional effort that will provide development and infrastructure projects with streamlined, predictable federal and state permitting processes while creating a Preserve System to protect habitat, open space, and agricultural lands. An approved SSHCP allows project proponents within the Plan Area to simplify and expedite the state and federal Endangered Species Act (ESA) permitting process. In addition to streamlining the ESA permitting processes, a separate but parallel multi-tiered permitting program has been developed to streamline Clean Water Act Section 404 and 401 permitting process and a Master Streambed Alternation Agreement will be prepared to address Section 1602 of the California Fish and Game Code.

The ESA requires that the Plan Permittees provide assurances that the SSHCP will be adequately funded. As a result, the SSHCP funding program is critical to the successful development, implementation, and viability of the SSHCP. The SSHCP includes an economic analysis that evaluates the cost to implement of the SSHCP. The total cost of implementing the SSHCP during the 50-year Permit Term is estimated at $766.9 million in 2015 dollar terms, an average of approximately $15.3 million per year. Funding for this Plan is derived entirely from development mitigation fees on the private development and public infrastructure (Covered Activities) seeking permits. In certain cases, direct project proponent contributions (e.g., land dedications) will be accepted in lieu of a portion of the mitigation fee. The SSHCP also is designed to provide the required mitigation under the Clean Water Act Section 404 and, as such, the SSHCP conservation activities and mitigation fees provide the necessary compensatory mitigation and in-lieu fees.

This Nexus Study provides the SSHCP development mitigation fee schedule (mitigation fees) and the nexus findings necessary to justify the establishment of new fees on development under the State of California's Mitigation Fee Act. The Nexus Study builds directly from the South Sacramento Habitat Conservation Plan (SSHCP) and, in particular, the technical analysis included in the SSHCP Economic Analysis and Funding Program (Chapter 12) and Appendix I (updated April 2018).

Legal Context for Fees

In California, impact fees such as mitigation fees fund public facilities necessary to mitigate impacts stemming from new development. In 1987, the California Legislature adopted the Mitigation Fee Act to provide a framework for the application and administration of such fees. Current prevailing practice among the majority of approved and permitted regional multi-species Habitat Conservation Plans (HCPs) is that any habitat mitigation fees are to be adopted by the relevant jurisdictions (cities and Counties) consistent with the Mitigation Fee Act.[1]

The Mitigation Fee Act, codified in California Government Code Sections 66000 to 66025, requires all public agencies to document five findings when establishing or increasing a fee as a

[1] For example, Western Riverside County Multiple Species Habitat Conservation Plan, Santa Clara Valley Habitat Plan, and the Coachella Valley Multiple Species Conservation Plan.

condition for new development. The Mitigation Fee Act defines public facilities as including "public improvements, public services and community amenities." (66000(d)). HCPs ensure that new development mitigates for its impacts under the ESA (and in some cases for its impact under the California Endangered Species Act, the Clean Water Act, and other associated environmental regulations).

Consistent with the interpretation applied to the majority of permitted and approved regional, multi-species HCPs in California, and based on guidance from Sacramento County legal counsel, this Study assumes that mitigation fees should fund the full range of mitigation costs associated with the SSHCP, as long as the costs have been appropriately estimated and the mitigation fees can meet the statutory requirements of the Mitigation Fee Act (make the appropriate nexus findings). The SSHCP Economic Analysis and Funding Program (SSHCP Chapter 12) analyzes the costs to implement the Plan, and based on the estimated costs, calculates mitigation fees. On payment of the appropriate mitigation fees, the SSHCP will then allow participating jurisdictions to incidentally "take" the plant and animal species identified in the SSHCP through the agencies' local land use planning and development review processes. These take authorizations would be granted in recognition of the mitigating effects of the coordinated preservation system planned by the SSHCP.

The SSHCP is a regional, multi-species HCP that is designed to mitigate for regional impacts. The SSHCP impact analysis estimates and analyzes the effects of the SSHCP Covered Activities on Covered Species and their habitats. The analysis presented in the SSHCP is programmatic to address all SSHCP Covered Activities that will be implemented within the SSHCP Plan Area over the proposed 50-year Permit Term. A stepwise process was used to estimate the level of "take" and impacts to the Covered Species, using removal or degradation of habitat as a proxy for take of individuals. The expected physical, chemical, and biological changes in the habitat provide the basis for assessing the effects on Covered Species.

Mitigation Fee Schedule

The mitigation fees developed in the SSHCP economic model and calibrated to cover the full set of SSHCP implementation costs are shown in Figure 1 below.[2] As shown, the mitigation fees are expressed per acre of impact, on a gross acre basis by land cover type. The "per acre" basis for the fees ensures that fees for any project are directly tied to its impacts. The differentiation of fees by land cover type provides varied fee levels associated with differential mitigation requirements, including the re-establishment/establishment mitigation costs associated with impacts to aquatic resources.

[2] More detail on the estimation of SSHCP implementation costs, the derivation of the mitigation fee schedule and its subcomponents, and fee implementation is provided in Sections 3, 4, and 5 of this Nexus Study. This includes implementation topics such as land dedication and mitigation fee adjustment over time.

Figure 1 SSHCP Mitigation Fee Schedule (Per Gross Acre of Impact)

Land Cover	Total Fee
Agriculture	$16,200
Valley Grassland	$17,700
Vernal Pool	$191,300
Blue Oak	$118,400
Riparian	$142,600
Mine Tailing Riparian Woodland	$142,900
Seasonal Wetland	$138,200
Freshwater Marsh	$139,100
Swale - Direct	$131,000
Swale - Indirect	$19,300
Streams/Creeks (VPIH)	$144,700
Open Water	$113,600
Streams/Creeks	$119,400

Note: Fees for indirect impacts are addressed in the detailed fee schedule presented in Section 5.

By way of example, a project that directly impacts 20 acres, including 19 acres of valley grassland and 1 acre of vernal pool, would have the follow mitigation fee cost:

- Valley Grassland: 19 acres x $17,700 = $336,300
- Vernal Pool: 1 acre x $191,300 = $191,300
- Total Mitigation Fees: $336,300 + $191,300 = $527,600

For projects involving impacts Vernal Pools and Streams/Creeks (VPIH), there may be indirect impacts for which a per-acre mitigation fee, shown in Figure 5 in Section 5 below, may also be due. The estimation of project impacts is the first step in the mitigation fee calculation, determined through the Permit Application Process described in Chapter 10 of the SSHCP.

Finally, the Plan Permittees responsible for collecting the mitigation fees may also add an additional cost to this mitigation fee schedule to cover the costs of collecting the fees from project proponents.

2. NEXUS FINDINGS

The Mitigation Fee Act (California Government Code Sections 66000 to 66025) requires all public agencies to document five findings when establishing or increasing a fee as a condition for new development. The Mitigation Fee Act defines public facilities as including "public improvements, public services and community amenities." (66000(d)). HCPs are specifically adopted to ensure that new development mitigates for its impacts under the federal Endangered Species Act (and in some cases for its impact under the California Endangered Species Act, the Clean Water Act, and other associated environmental regulations). As such, based on guidance from Sacramento County legal counsel, and consistent with the interpretation applied to the majority of permitted and approved regional, multi-species Habitat Conservation Plans in California, habitat mitigation fees are assumed to be able to fund the full mitigation costs associated with HCPs as long as the costs have been appropriately estimated and the mitigation fees can meet the statutory requirements of the Mitigation Fee Act.

The five statutory findings required for the establishment of a mitigation fee include (in summary format): (1) Purpose of Fee; (2) Use of Fee Revenues; (3) Relationship between Fee and New Development; (4) Relationship between Need for Fee and New Development; and, (5) Reasonable Relationship between Fee Level and New Development. Each of these findings for the SSHCP mitigation fee schedule is provided below.

Purpose of Fee

Identify the purpose of the fee. (66001(a)(1))

The purpose of the Development Fee is to cover the mitigation costs associated with new development in the Plan Area. Collectively, the development fees will provide the funding required to implement the SSHCP and, as a result, justify and maintain the incidental take permits for new private and public development in South Sacramento County under the federal Endangered Species Acts. The Federal Endangered Species Act specifically requires that the applicant for incidental take permit "ensure that adequate funding for the plan will be provided."

Use of Fee Revenues

Identify the use to which the fee is to be put. If the use is financing public facilities, the facilities shall be identified. That identification may, but need not, be made by reference to a capital improvement plan as specific in Section 65403 or 66002, may be made in applicable general or specific plan requirements, or may be made in other public documents that identify the public facilities for which the fee is charged. (66001(a)(2)).

The draft SSHCP is the public document that outlines the conservation actions required to be undertaken by plan participants (and the SSHCP Joint Powers Authority (JPA) as their agent) to obtain incidental take permits - associated with federal Endangered Species Act requirements - for new public and private development in South Sacramento County. Revenues from the mitigation fees will be used to fund the mitigation actions identified in the SSHCP. The revenue from the mitigation fees will be used to fund the necessary habitat acquisition, habitat re-establishment/establishment, habitat management and monitoring, and program administration

costs (see Section 3 below as well as Chapter 12 of the Draft SSHCP for more detail on the mitigation costs to be funded). This includes the costs associated with the establishment of the non-depleting endowment as well as the HCP Plan development costs. In addition, individual jurisdictions participating in the SSHCP and charging the mitigation fees have the option of charging an additional administration fee to cover the costs of collecting the fees.

Relationship

Determine how there is a reasonable relationship between the fee's use and the type of development project on which the fee is imposed. (66001(a)(3)).

The SSHCP mitigation fees will be used to cover the costs of mitigating for new development/infrastructure projects, both private and public, in the Plan Area. As such, the use of the fees is directly tied to new development and, in particular, to the impacts the new development has on federal endangered species and their habitat. The SSHCP development fee structure charges a per gross acre fee on new development based on the land cover(s) impacted. This ensures that the mitigation fees paid by any project are directly tied to their impact. The differentiation of fees by land cover also means the fee levels are tied to a project's habitat impacts and the different types and levels of mitigations required.

Need

Determine how there is a reasonable relationship between the need for the public facility and the type of development project on which the fee is imposed. (66001(a)(4)).

To meet the housing, economic development, infrastructure, and other goals of the participating jurisdictions/agencies, new development in the Plan Area will occur in South Sacramento County. New Development will impact land cover types and species discussed in the SSHCP which necessitates mitigation under the federal Endangered Species Act to conserve habitat pursuant to the SSHCP. The SSHCP has been developed to address this need and provide a streamlined, regional approach to obtaining these permits. The investments required under the SSHCP include land acquisition, habitat (re-) establishment, habitat management and monitoring, and program management.

Proportionality

Determine how there is a reasonable relationship between the amount of the fee and the cost of the public facility or portion of the public facility attributable to the development on which the fee is imposed. (66001(b)).

SSHCP implementation is required to provide streamlined incidental take permits for new private and public projects in the Plan Area impacting habitat. As a result, new development projects are fully responsible for the SSHCP implementation costs and the mitigation fee schedule is established to cover the full implementation cost of the SSHCP. Section 3 below summarizes the implementation cost estimates with more detail provided in Chapter 12 and Appendix I of the SSHCP (see Appendix A). Section 4 below outlines the derivation of the mitigation fee schedule so as to ensure the fees are calibrated to precisely cover the estimated implementation costs. Mitigation fees are charged on a per gross acre of impact basis to ensure that the aggregate fee due from any new development project is scaled proportionally to the size and habitat impacts of the project. Also, because development of different land cover types has different impacts and

different mitigation requirements, the mitigation fee schedule differentiates between different land cover types providing another direct link between impact and fee level.

3. SSHCP COST ANALYSIS

The federal Endangered Species Act (ESA) requires that the Plan Permittees provide assurances that the SSHCP will be adequately funded over the proposed 50-year Permit Term. The Biological Goals and Measurable Objectives of the SSHCP cannot be attained without adequate funding. The SSHCP funding program is critical to the successful development, implementation, and viability of the SSHCP. Estimating the full costs of the SSHCP is an essential step to demonstrate adequate funding to meet regulatory requirements.

Chapter 12 of the SSHCP presents the Economic Analysis and SSHCP Funding Program. The economic analysis evaluates the many costs associated with implementation of the SSHCP and identifies the funding mechanisms that will be used to pay for the SSHCP. In order to ensure sufficient funding, all costs associated with the Conservation Actions necessary to implement the SSHCP had to be identified. Because of the geographic scale of the Plan, the complexity of the Conservation Actions, and the long timeframe over which these actions will occur, the SSHCP costs are initial, planning-level estimates, needed to establish the Plan's mitigation fee schedule and to implement the Plan. A process of revising cost estimates and updating the mitigation fee schedule is required to ensure that the SSHCP's primary funding source - mitigation fees - are adjusted as costs fluctuate through time (e.g., due to real estate market cycles affecting land costs).

This Study summarizes the data considered and the implementation cost components estimated in determining the planning-level estimates of SSHCP implementation costs and associated funding needs. More detailed information on SSHCP implementation costs is provided in Chapter 12 and Appendix I of the SSHCP.

The SSHCP economic analysis and associated cost estimates reflect a wide range of program and cost factors, including but not limited to:

- Estimated acres of impact of future Covered Activities (SSHCP Chapter 6);
- Estimated costs of the SSHCP habitat preservation and implementing re-establishment/establishment requirements, costs of land by location of the proposed SSHCP Preserve System (SSHCP Chapter 7);
- Estimated costs of anticipated Preserve System management and monitoring activities (SSHCP Chapter 8);
- Staffing and overhead costs of the proposed SSHCP implementation structure (SSHCP Chapter 9); and
- Estimated costs of addressing any future changed circumstances (SSHCP Chapter 11).

Cost Categories

Estimated costs associated with implementing the SSHCP are organized into the following eight categories.

Land or Easement Acquisition for the Preserve System - Meeting the Plan's Biological Goals and Measurable Objectives for preservation of SSHCP land cover types requires acquisition of land or conservation easements on properties with suitable ecological characteristics.

Habitat Re-establishment/Establishment Activities in the Preserve System – The SSHCP includes habitat re-establishment/establishment requirements that are separate and distinct from preservation requirements, with costs that include but are not limited to site reconnaissance, soil testing, other site feasibility studies, engineering design, land acquisition, staking, earthwork, plant and seed procurement, planting/seeding, and installation of irrigation systems.

Habitat Management, Monitoring, and Adaptive Management in the Preserve System - All preserve lands acquired in fee title, and a small portion of lands acquired by easement, will be subject to active land management. Further, all Preserve lands acquired in fee title or by conservation easement will be monitored by the Implementing Entity or consultants that are hired to complete monitoring tasks, including analyzing and reporting on Covered Species.

Changed Circumstances – The SSHCP includes procedures and associated costs to deal with unforeseen events, including potential climate change effects on the Plan Area.

Agricultural Enhancement in the Preserve System – Landowners who engage in farming on lands included in the Preserve are eligible for monetary payments to fund site improvements, such as wells, fences, barns, drainage/irrigation systems; the demolition of onsite structures; and clearing land that does not impact wetland or riparian resources.

Plan Administration – Plan administration costs represent operating costs that will be incurred by the Implementing Entity, including staffing, supplies, facilities, equipment, outside professional services, and other miscellaneous expenses.

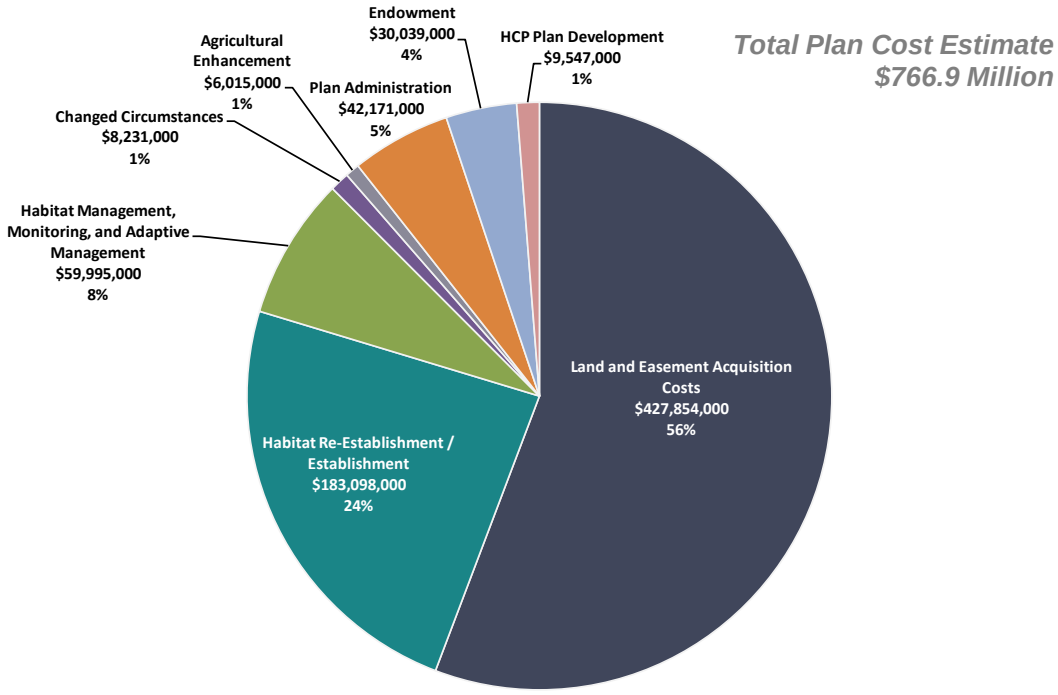
Endowment – The SSHCP includes a non-wasting endowment from which the real interest earned is sufficient to cover average annual post-permit costs, including management, monitoring, agricultural enhancement, and plan administration, as well as a legal defense fund.

SSHCP Plan Development – The development and preparation of the SSHCP documents entailed a significant amount of Permittee and consultant time and costs, which are included in the economic analysis.

Cost Summary

Including all cost categories, the SSHCP Implementation Cost estimate is $766.9 million, as shown in Figure 1, in 2015 dollar terms. The land and easement acquisition costs represent the majority of the costs (56 percent) and habitat re-establishment/establishment costs almost one-quarter of the costs (24 percent). The remaining costs consist of Habitat Management, Monitoring, and Adaptive Management, Plan Administration, Endowment, and the more modest cost categories of Changed Circumstances, Agricultural Enhancement, and HCP Plan Development.

Figure 2 SSHCP Implementation Cost Summary



South Sacramento Habitat Conservation Plan, Appendix I

Cost Analysis Methodology

The SSHCP cost analysis relies on a detailed financial spreadsheet model to track costs and funding requirements associated with SSHCP implementation (see SSHCP Appendix I). The model assesses SSHCP conservation requirements and generates a set of cost estimates, organized by SSHCP land cover type categories. Based on the anticipated cost to acquire necessary land and to implement the Plan, the model estimates funding requirements and the required level of the mitigation fees that will be imposed on Covered Activities to meet these funding requirements.

The preparation of the SSHCP economic analysis and funding program relied on a multi-step process to identify Plan costs and fee levels. The analysis commenced with review of a hypothetical "Preferred SSHCP Preserve System" that indicated the approximate location and SSHCP land cover type that could be acquired by the SSHCP. Based on the anticipated Preserve System, the economic analysis included a land valuation exercise to identify estimates of per-acre land costs, consistent with on the location and land cover type anticipated for acquisition. The economic analysis also included a review of cost assumptions for habitat re-establishment/establishment, management, monitoring, and other costs yielded additional cost estimates by SSHCP land cover type. Consistent with the Plan's Biological Goals and Measurable Objectives, costs were aggregated to identify the total funding needed for implementation of the SSHCP Preserve System. From this total cost estimate, considering the total acreage of anticipated impacts, the funding program identified appropriate per-acre impact fees.

4. MITIGATION FEE CALCULATION

The SSHCP employs a mitigation fee structure where covered projects and activities incur different mitigation fees based on the types and amounts of land cover/habitat impacted. The underlying principle for the differentiation in the mitigation fee schedule is that land preservation and conservation requirements, and therefore costs, vary by habitat type. One-time mitigation fees pay for the full cost of mitigating project effects on the Covered Species. Once paid, applicants do not need (for covered species impacts) to find their own mitigation to satisfy State and federal Endangered Species or Clean Water Act laws.

Applicants will be allowed to dedicate land in fee title or easements instead of paying SSHCP mitigation fees. If an applicant proposes to dedicate fee title or an easement and the Implementing Entity determines that a proposed land dedication is acceptable for incorporation into the Preserve System, then the "land purchase" component of the SSHCP development fee can be reduced. The remaining components of the SSHCP development fee will remain unchanged, as they are used to fund management and monitoring, Plan administration, and other key features of Plan implementation.

The fee schedule calculated by the economic analysis reflects the inclusion of five projects within the Urban Development Area (UDA) where hardline preserves/land dedications have been identified and are assumed as part of the SSHCP conservation strategy. These preserves are considered preapproved under the SSHCP and therefore do not require approval by the Implementing Entity other than to ensure that the preserve boundaries and other SSHCP requirements are consistent with the SSHCP. Each of these projects has been designed to include on-site preserves that are consistent with the SSHCP Conservation Strategy.

The SSCHP mitigation fee calculation assumes that hardline preserves will dedicate 1,850 acres of land that reduces the cost of the SSHCP. The fee calculation also assumes that an additional 1,673 acres of land within the UDA will be dedicated by project applicants. Mitigation fees that cover land acquisition costs reflect an adjustment for these land dedications. Mitigation fees that cover all other costs are calculated based on total impacts, including those partially mitigated by land dedications, since additional funding for management, monitoring, administration, and other costs will be required to fully satisfy the SSHCP activities on the dedicated land areas. Figure 3 illustrates total program costs, impact acres, and resulting fees, with land and other cost calculated separately.

Figure 3 Program Costs, Impacted Acres, and Fee Estimates

Land Cover Type	Program Costs			Total Impact Acres	Impact Acres Net of Land Dedication	Per-Acre Mitigation Fees		
	Land[1]	Other	Total			Land	Other	Total
	a	*b*	*c*	*d*	*e*	*f = a / e*	*g = b / d*	*h = f + g*
Agriculture	$126,520,380	$28,778,146	$155,298,526	9,696.0	9,553.3	$13,244	$2,968	$16,212
Valley Grassland	$244,195,721	$104,876,136	$349,071,857	22,014.0	18,871.7	$12,940	$4,764	$17,704
Vernal Pool - Direct	$7,867,727	$65,138,370	$73,006,097	389.0	329.8	$23,853	$167,451	$191,304
Vernal Pool - Indirect	$2,226,696	$890,047	$3,116,743	94.0	93.4	$23,853	$9,469	$33,322
Blue Oak	$765,389	$4,801,519	$5,566,908	47.0	47.0	$16,285	$102,160	$118,445
Riparian	$9,413,852	$43,782,248	$53,196,100	373.0	373.0	$25,238	$117,379	$142,617
Mine Tailing Riparian Woodland	$2,048,678	$29,098,366	$31,147,044	218.0	218.0	$9,398	$133,479	$142,876
Seasonal Wetland	$1,763,124	$12,686,073	$14,449,198	105.0	101.3	$17,401	$120,820	$138,220
Freshwater Marsh	$2,630,990	$14,764,975	$17,395,965	127.0	115.3	$22,828	$116,260	$139,088
Swale - Direct	$2,322,495	$27,277,881	$29,600,375	234.0	161.3	$14,399	$116,572	$130,972
Swale - Indirect	$633,575	$214,176	$847,751	44.0	44.0	$14,399	$4,868	$19,267
Streams/Creeks (VPIH) - Direct	$368,466	$2,445,745	$2,814,211	22.0	11.0	$33,569	$111,170	$144,739
Streams/Creeks (VPIH) - Indirect	$134,274	$21,240	$155,514	4.0	4.0	$33,569	$5,310	$38,879
Open Water	$2,245,488	$15,080,605	$17,326,092	155.0	137.4	$16,349	$97,294	$113,643
Streams/Creeks	$1,382,521	$12,573,115	$13,955,636	117.0	115.4	$11,978	$107,463	$119,441
Total	**$404,519,376**	**$362,428,642**	**$766,948,018**	**33,639.0**	**30,175.7**			

[1] Includes land costs assosicated with Preservation activities. Additional land acquisition costs for Re-Establishment/Establishment included under the Other cost category.

5. FEE SCHEDULE

This Section provides more detail on the components of the mitigation fee schedule shown in Figure 1 in Section 1. The additional detail indicates the additional components of the mitigation fee associated with aquatic resources (and establishment/ re-establishment in particular). It also indicates the portion of the mitigation fees for each land cover associated with land preservation to show the potential fee adjustment associated with appropriate land dedication. This Section also provides an overview of the land dedication option as well as the process for refining mitigation fees over time. More detail on these implementation issues is provided in the SSHCP and will be covered by the Mitigation Fee Ordinances.

Additional Detail on Mitigation Fee Schedule

As described in the preceding sections, the SSHCP employs a mitigation fee structure, where covered projects and activities incur different fees based on the types of habitat and amount of habitat impacted. The underlying principle for the development fee structure is that land preservation and conservation requirements, and therefore costs, vary by habitat type. For example, per-acre land costs will vary by land cover type depending on the need to mitigate the loss of land covers inside the UDA (Urban Development Area) where land is more expensive. Similarly, annual monitoring costs are assumed to differ by land cover, while land management costs apply to fee title acquisitions. Re-establishment/establishment mitigation requirements only apply to certain types of land covers.

The mitigation fees determined in the SSHCP economic model are shown below in Figure 4, consistent with their presentation in SSHCP Chapter 12 Table 12-5. Mitigation fees are shown by land cover, with the preservation component of the fee distinguished from the re-establishment/establishment fee.

Figure 5 and Figure 6 show additional detail on the components of the mitigation fee. This includes the "land fee" that covers the land mitigation costs, but also the components of the fee associated with non-land components, such as habitat management and monitoring, endowment, administration, and establishment/ re-establishment among others. As discussed in the next section, developers dedicating suitable habitat land would receive a credit against the land component of the mitigation fee if the land dedicated is appropriate and accepted by the SSHCP Implementing Entity (see Chapter 9 of the SSHCP).

Figure 4 SSHCP Mitigation Fee Schedule

Land Cover	Preservation Fee	Re-Establishment/ Establishment Fee	Total Fee
Agriculture	$16,212	$0	$16,212
Valley Grassland	$17,704	$0	$17,704
Vernal Pool - Direct	$33,322	$157,982	$191,304
Vernal Pool - Indirect	$33,322	$0	$33,322
Blue Oak	$21,049	$97,396	$118,445
Riparian	$34,477	$108,140	$142,617
Mine Tailing Riparian Woodland	$13,981	$128,896	$142,876
Seasonal Wetland	$22,189	$116,031	$138,220
Freshwater Marsh	$27,851	$111,236	$139,088
Swale - Direct	$19,267	$111,705	$130,972
Swale - Indirect	$19,267	$0	$19,267
Streams/Creeks (VPIH) - Direct	$38,879	$105,860	$144,739
Streams/Creeks (VPIH) - Indirect	$38,879	$0	$38,879
Open Water	$21,160	$92,483	$113,643
Streams/Creeks	$16,592	$102,849	$119,441

Figure 5 SSHCP Mitigation Fee Schedule Detail – Preservation Fees

Land Cover	Land Acquisition	Habitat Management and Monitoring	Changed Circumstances	Agricultural Enhancement	Plan Administration	Plan Development	Endowment Fee	Preservation Fee Total
Agriculture	$13,244	$695	$91	$204	$1,162	$263	$553	$16,212
Valley Grassland	$12,940	$1,973	$274	$161	$1,162	$263	$930	$17,704
Vernal Pool - Direct	$23,853	$3,873	$540	$341	$2,325	$526	$1,865	$33,322
Vernal Pool - Indirect	$23,853	$3,873	$540	$341	$2,325	$526	$1,865	$33,322
Blue Oak	$16,285	$1,973	$273	$162	$1,162	$263	$930	$21,049
Riparian	$25,238	$3,588	$511	$408	$2,325	$526	$1,881	$34,477
Mine Tailing Riparian Woodland	$9,398	$1,749	$251	$215	$1,162	$263	$943	$13,981
Seasonal Wetland	$17,401	$2,003	$277	$154	$1,162	$263	$929	$22,189
Freshwater Marsh	$22,828	$2,295	$306	$85	$1,162	$263	$913	$27,851
Swale - Direct	$14,399	$2,102	$286	$131	$1,162	$263	$923	$19,267
Swale - Indirect	$14,399	$2,102	$286	$131	$1,162	$263	$923	$19,267
Streams/Creeks (VPIH) - Direct	$33,569	$2,650	$341	$0	$1,162	$263	$893	$38,879
Streams/Creeks (VPIH) - Indirect	$33,569	$2,650	$341	$0	$1,162	$263	$893	$38,879
Open Water	$16,349	$2,032	$279	$148	$1,162	$263	$927	$21,160
Streams/Creeks	$11,978	$1,787	$255	$206	$1,162	$263	$941	$16,592

Figure 6 SSHCP Mitigation Fee Schedule Detail – Re-Establishment / Establishment Fees

Land Cover	Re-Est. / Est.	Land Acquisition	Habitat Management and Monitoring	Changed Circumstances	Plan Administration	Plan Development	Endowment Fee	Re-Est. / Est. Fee Total
Agriculture								$0
Valley Grassland								$0
Vernal Pool - Direct	$139,786	$13,058	$2,495	$326	$1,162	$263	$893	$157,982
Vernal Pool - Indirect								$0
Blue Oak	$79,200	$13,058	$2,495	$326	$1,162	$263	$893	$97,396
Riparian	$89,943	$13,058	$2,495	$326	$1,162	$263	$893	$108,140
Mine Tailing Riparian Woodland	$110,699	$13,058	$2,495	$326	$1,162	$263	$893	$128,896
Seasonal Wetland	$97,835	$13,058	$2,495	$326	$1,162	$263	$893	$116,031
Freshwater Marsh	$93,040	$13,058	$2,495	$326	$1,162	$263	$893	$111,236
Swale - Direct	$93,508	$13,058	$2,495	$326	$1,162	$263	$893	$111,705
Swale - Indirect								$0
Streams/Creeks (VPIH) - Direct	$87,664	$13,058	$2,495	$326	$1,162	$263	$893	$105,860
Streams/Creeks (VPIH) - Indirect								$0
Open Water	$74,287	$13,058	$2,495	$326	$1,162	$263	$893	$92,483
Streams/Creeks	$84,652	$13,058	$2,495	$326	$1,162	$263	$893	$102,849

AGENDA ITEM 11.1

7420

Selected Implementation Issues

Mitigation Fee implementation will be covered in more detail in the Mitigation Fee Ordinances. This section describes two fee implementation components, the land dedication option and the process for updating mitigation fees over time.

Land Dedication In Lieu of Development Fees

The implementation strategy outlined in Chapter 9 describes a land dedication process where project proponents can dedicate land towards satisfying their mitigation requirements and thereby reduce their development fees. When the dedication of land is accepted into the SSHCP Preserve System, mitigation fees will be adjusted by excluding the appropriate portion of the land acquisition component of the mitigation fee. It should be noted that the remaining components of the SSHCP mitigation fees (i.e., Re-establishment/Establishment, Endowment, and Other) will remain unchanged, as they are used to fund ongoing conservation activities that are required on all Preserve lands.

Mitigation Fee Adjustment Program

The ESA requires that the Plan Permittees provide assurances that the SSHCP will be adequately funded. As a result, the SSHCP funding program (mitigation fees) must ensure that the SSHCP remains viable in perpetuity. The mitigation fee schedule described in this Nexus Study (and in the SSHCP) is based on 2015 planning-level implementation cost estimates. Recognizing the fluctuations in implementation costs through time (e.g. land acquisition costs, re-establishment/ establishment costs etc.) due to real estate cycles and typical inflationary increases in costs, HCPs require a system for tracking implementation costs and adjusting mitigation fees as necessary. Similar to other regional, multi-species HCPs, the SSHCP includes automatic mitigation fee adjustments and periodic mitigation fee audits.

Automatic Adjustment of Development Fees to Account for Inflation

The proposed SSHCP development fees will be automatically adjusted annually for inflation. For purposes of development fee adjustments, the SSHCP development fees are organized into two categories: (1) land acquisition and (2) all other costs of implementing the SSHCP. These two categories are subject to differing rates of inflation. Therefore, an inflation index that is appropriate to each category has been selected.

The SSHCP cost analysis assumes that the cost of land acquisition is tied directly to real estate values in the Plan Area. All other costs are tied more generally to changes in the cost of labor/personnel, services, and goods and materials. Therefore, it is anticipated that different rates of inflation could apply to land acquisition and other costs over time and require different inflation indices.

For land acquisition costs, the index to adjust the land acquisition cost portion of development fees will be the annual Home Price Index for the Sacramento–Arden–Arcade–Roseville, California Metropolitan Statistical Area from the Office of Federal Housing Enterprise Oversight. This index is selected because it is a well-regarded public data source with relevant geographic coverage. The development fee adjustment index will be based on the change in the average annual Home Price Index (Quarter 1 through Quarter 4) for the prior calendar year. The "other costs" will be

indexed using the California Construction Cost Index (CCCI). The CCCI is the most applicable index as it tracks labor and materials costs that are relevant to other SSHCP costs.

Periodic Audit and Adjustment of SSHCP Development Fees

In addition to annual development fee adjustments, the SSHCP will conduct periodic comprehensive reviews of the SSHCP funding program and development fees to ensure that the development fees generated by Covered Activities are adequately covering Plan implementation costs. A comprehensive development fee audit will be completed at least every 3 years for the first 15 years of the Plan (i.e., years 3, 6, 9, 12, and 15) and at least every 5 years thereafter (i.e., years 20, 25, 30, 35, 40, and 45), where year 1 is the first full calendar year of SSHCP implementation. This minimum frequency of development fee audits was established to avoid cost-related uncertainties in early years of Plan implementation and to allow time to accumulate sufficient data to analyze the relationship between costs and development fee revenues. The audit process will include a detailed review of implementation costs and how actual costs compare to the cost assumptions in the original economic model (see Appendix I). Following completion of the independent development fee audits, SSHCP development fees may be adjusted to reflect refined cost estimates.

FINAL

IMPLEMENTING AGREEMENT

for the

HABITAT CONSERVATION PLAN

for

SOUTH SACRAMENTO COUNTY

January 2018

1.0 PARTIES

The Parties to this Implementing Agreement are the County of Sacramento, City of Galt, City of Rancho Cordova, Sacramento County Water Agency, the Southeast Connector Joint Powers Authority and the SSHCP Implementing Entity (collectively the "Plan Permittees"), and the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) (collectively the "Parties").

2.0 RECITALS AND PURPOSE

2.1 Recitals.

2.1.1 The Plan Area, and in particular the Preserve System, has been determined to provide, or potentially provide, habitat for the Covered Species as defined in Section 3.

2.1.2 The Plan Area is currently used for a variety of purposes including the potential for development. Plan Permittees are desirous of undertaking a number of activities, including public, residential, commercial and industrial development activities as summarized in Section 5 within the Plan Area in a manner that is designed to avoid or minimize adverse impacts to the Covered Species. Additionally, Plan Permittees wish to undertake actions that would be beneficial to and contribute to the conservation of the Covered Species.

2.1.3 Plan Permittees have developed a series of measures, described in the South Sacramento Habitat Conservation Plan ("SSHCP", "Plan" or "HCP"), to minimize and mitigate to the maximum extent practicable the effects of Take of Covered Species incidental to Plan Permittees' Covered Activities.

2.2 Purpose. The purpose of this Agreement is to clarify the provisions of the SSHCP and the processes the Parties intend to follow to ensure successful implementation of the SSHCP in accordance with the Permit and applicable law.

3.0 DEFINITIONS

The following terms as used in this Agreement will have the meanings set forth below. Additional terms and acronyms are contained in Appendix A of the SSHCP:

3.1 Terms defined in Endangered Species Act or Implementing Regulations. Terms used in this Agreement and specifically defined in the Endangered Species Act ("ESA") or in regulations adopted by the USFWS under the ESA have the same meaning as in the ESA and those implementing regulations, unless this Agreement expressly provides otherwise.

3.2 Certificate of Inclusion. means a document other than a Development Authorization, executed by a Plan Permittee and a third party that extends the incidental Take authorization granted to Plan Permittees to such third party for the purpose of carrying out a

Covered Activity in the Plan Area. Execution of a Certificate of Inclusion by the third party places such third Party under the legal control of that Plan Permittee for purposes of enforcing and implementing the Permit, including the SSHCP and this Agreement. A Certificate of Inclusion template is attached to this agreement as Exhibit "C".

3.3 Changed Circumstances. means as defined in the "No Surprises" rule at 50 C.F.R. Section 17.3, means changes in circumstances affecting a Covered Species or the Plan Area covered by the SSHCP that can reasonably be anticipated by the Parties and that can reasonably be planned for in the SSHCP (e.g. the listing of a new species, or a fire or other natural catastrophic event in areas prone to such event.) Changed Circumstances and the planned responses to those circumstances are described in Chapter 11 of the SSHCP. Changed Circumstances are not Unforeseen Circumstances.

3.4 Covered Activities. means certain activities carried out by Plan Permittees in the Plan Area that may result in incidental Take of Covered Species that is authorized under the Permit. Covered Activities means the activities analyzed in detail in Chapter 5 of the SSHCP provided that these activities are otherwise lawful.

3.5 Covered Entity. means the recipient of a Development Authorization or a Certificate of Inclusion issued pursuant to the governmental powers of Plan Permittees.

3.6 Covered Species. means those 28 species within the Plan Area, each of which the SSHCP addresses in a manner sufficient to meet all of the criteria for issuing an incidental Take permit under ESA § 10(a)(1)(B). These species are discussed in Appendix B of the HCP and listed in Exhibit "A" to this Agreement.

3.7 Development Authorization. means a permit, lease, license, contract or similar written authorization issued pursuant to the governmental powers of Plan Permittees, under which the recipient has the right to engage in a Covered Activity and against whom Plan Permittees have the legal authority and has committed to enforce applicable terms of the Permit, including the SSHCP and this Agreement.

3.8 Effective Date. means the date following execution of this Agreement by the Parties, on which the Permit is issued. Any Plan Permittees executing this Agreement after the Effective Date shall, upon execution, become a Party to this Agreement, with all rights and obligations of Parties defined herein, and this Agreement shall be enforceable between each later executing Plan Permittees and all prior signing Parties.

3.9 HCP, Plan or SSHCP. means the South Sacramento Habitat Conservation Plan prepared by Plan Permittees as depicted on Figure 1-1 attached to the SSHCP.

3.10 Land Use Authority Permittee. means the County of Sacramento, and the Cities of Galt and Rancho Cordova.

3.11 Listed Species. means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is listed as endangered or threatened under the ESA.

3.12 Permit. means the incidental take permit issued by the USFWS to Plan Permittees pursuant to Section 10(a)(1)(B) of the ESA for Take of the Covered Species incidental to Covered Activities within the Plan Area, as it may be amended from time to time.

3.13 Plan Area. means the area in which all conservation actions will be implemented and generally where the Plan Permittees have Take Authorization for Covered Species and species habitat resulting from Covered Activities.

3.14 Plan Permittees. means the County of Sacramento ("County"), City of Galt ("Galt"), City of Rancho Cordova ("Rancho Cordova"), Sacramento County Water Agency ("SCWA"), the Southeast Connector Joint Powers Authority ("JPA") and the SSHCP Implementing Entity.

3.15 SSHCP Implementing Entity. means joint powers authority formed by the County and Cities to provide primary policy direction for implementation of the SSHCP, as set forth in Chapter 9 of the SSHCP.

3.16 Take. means as defined in the ESA and implementing regulations means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any listed or unlisted animal Covered Species. Harm means an act that actually kills or injures a Covered Species, including an act that causes significant habitat modification or degradation where it actually kills or injures a Covered Species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Take of plant species is not prohibited under the ESA; however, the plant species identified in Chapter 1 of the HCP and in Exhibit A of this Agreement are listed on the Permit as Covered Species in recognition of the conservation measures provided for such species under the plan and receive No Surprises Assurances under the Permit. For purposes of determining any outstanding mitigation owed upon termination of the Permit under Section 6 herein, Take includes impacts to Covered plant species.

3.17 Unforeseen Circumstances. means as defined in the "No Surprises" rule at 50 C.F.R. section 17.3 means changes in circumstances affecting a Covered Species or geographic area covered by the SSHCP that could not reasonably have been anticipated by Plan Permittees and the USFWS at the time of the SSHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species as addressed in Chapter 11 of the HCP.

3.18 Unlisted Species. means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is not listed as endangered or threatened under the ESA.

3.19 Other Terms. means any other capitalized term not otherwise defined herein shall carry the same meaning and definition as that term is used and defined in the SSHCP.

4.0 INCORPORATION OF HCP

Subject to Section 15.11 herein, the SSHCP and each of its provisions are intended to be, and by this reference are, incorporated herein. Notwithstanding such incorporation, it is acknowledged by the Parties that the HCP was drafted by the Plan Permittees and submitted to USFWS in support of the application for the Permit. Characterizations, analyses, and representations in the HCP, and in particular, characterizations, analyses and representations in the HCP of Federal or State laws, regulations and policies, represent the views of the Plan Permittees and shall not control the administration of the Permit by USFWS in accordance with Federal and State laws, regulations and policies. In the event of any inconsistency between the HCP and this Agreement, the provisions of the Agreement control. Similarly, in the event of any inconsistency between the HCP or Agreement and the Permit, the Permit controls.

5.0 OBLIGATIONS OF THE PARTIES

5.1 Obligations of Plan Permittees. Plan Permittees will fully and faithfully implement the Take minimization, mitigation and other requirements of the HCP, this Agreement and the Permit.

5.1.1 Mitigation Obligations. Plan Permittees will implement and fulfill the obligations described in Chapters 5 [Covered Activities], 7 [Conservation Strategy], 8 [Monitoring and Management], 9 [Implementation], 10 [Permit Application Process] and 12 [HCP Funding Program] of the SSHCP.

5.1.2 Interim Obligations upon a Finding of Unforeseen Circumstances. If the USFWS makes a finding of Unforeseen Circumstances, during the period necessary to determine the nature and location of additional or modified mitigation, Plan Permittees will avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected Covered Species.

5.1.3 Duty to enforce. Plan Permittees shall undertake all necessary actions to enforce all applicable terms of the HCP, this Agreement and the Permit as to itself, and any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued over which Plan Permittees have committed to enforce the terms of the HCP, this Agreement and the Permit. Any substantial non-compliance by Plan Permittees, or any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued may be deemed by USFWS a violation of the Permit by Plan Permittees. In addition, any failure by Plan Permittees to enforce the applicable provisions of the HCP, this Agreement or the Permit against itself, or any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued may be deemed by USFWS a non-compliance by Plan Permittees with the HCP, this Agreement or the Permit and a violation of the Permit by

Plan Permittees. USFWS shall take into account all efforts undertaken by Plan Permittees to enforce the terms of the HCP, this Agreement and the Permit as to itself, any entity or individual for which a Development Authorization or Special Participating Entity approval has been issued and all actions taken by Plan Permittees to redress the effects of such non-compliance, particularly the enforcement efforts and redress actions specifically described in the HCP.

5.1.4 Changed Circumstances. Plan Permittees shall undertake all appropriate measures provided in Chapter 11 of the SSHCP to respond to Changed Circumstances.

5.1.5 Transfer of Preserve System. As set forth in more detail in Chapter 9, Plan Permittees may not transfer ownership or control, including fee title or a conservation easement, of any portion of the Preserve System, that is intended to stay within the Preserve System, to a third party, other than an agency of the Federal government, unless a conservation easement or equivalent legal protection, in a form approved by USFWS and which names USFWS as a third-party beneficiary, has been recorded. Nothing herein prohibits the sale of Preserve System land to a third party for non-conservation purposes if the USFWS and the SSHCP Implementing Entity find that the land is not supporting the Preserve System.

5.2 Obligations of the USFWS. Upon execution of this Agreement by each Party, and satisfaction of all other applicable legal requirements, the USFWS will issue Plan Permittees a permit under Section 10(a)(1)(B) of the ESA, authorizing incidental Take by Plan Permittees of each listed wildlife Covered Species resulting from Covered Activities in the Plan Area. The Permit will be conditioned on compliance with all terms and conditions of the Permit, including the HCP, this Agreement and applicable law.

5.2.1 Permit coverage. The Permit will identify all Covered Species. The Permit will take effect for listed Covered Species at the time the Permit is issued. Subject to compliance with all other terms of this Agreement, the Permit will take effect for an unlisted Covered Species upon the listing of such species. Any reference in this Agreement or in the HCP to incidental Take or Take of Covered Species shall, for the purpose of Covered plant Species include loss or impacts to Covered plant Species identified in the Permit.

5.2.2 "No surprises" assurances. Upon issuance of the Permit, Plan Permittees shall receive regulatory assurances pursuant to the "No Surprises" regulations at 50 C.F.R. 17.22(b) (5) and 17.32(b) (5). Pursuant to the "No Surprises" regulations, as long as Plan Permittees have complied with their obligations under the HCP, this Agreement, and the Permit, USFWS shall not require additional conservation and mitigation measures that involve the commitment of additional land, water, or financial compensation or additional restrictions on the use of land water or other natural resources otherwise available for development or use under the original terms of the HCP without the consent of Plan Permittees.

5.2.3 USFWS Cooperation and Assistance. USFWS shall cooperate and provide, to the extent appropriated funds are available for that purpose, technical assistance to the

Plan Permittees. Nothing in this Agreement shall require the USFWS to act in a manner contrary to the requirements of the Anti-Deficiency Act.

5.2.4 Assurances Regarding SSHCP. After opportunity for public review and comment, based on the best available current scientific and commercial data, the USFWS has found that the SSHCP, as implemented by this Agreement: 1) is consistent with and will complement other applicable conservation planning and regulatory programs and efforts addressing wildlife within the region, 2) minimizes and mitigates the potential significant adverse impacts of the Covered Activities on the Covered Species, 3) will ensure that the measures agreed upon by the Plan Permittees and the USFWS will be met, and 4) will be implemented. The USFWS shall not take a position inconsistent with the acknowledgments set forth in this section, including, without limitation, in the form of comments offered by the USFWS in the context of any CEQA or NEPA process associated with approvals for Covered Activities with regard to effects on Covered Species.

5.2.5 Take Authorization for Newly Regulated Covered Species; Savings Provision. Subject to compliance with all other terms of this Agreement, the Section 10(a) Permit will automatically become effective for each unlisted Covered Species upon the listing of such species as endangered or threatened under FESA. If it is judicially determined that the USFWS was not authorized to cause the Section 10(a) Permit to become effective automatically as to Covered Species as they become listed pursuant to FESA, the USFWS shall accept the minimization and mitigation measures in the SSHCP and this Agreement as the basis for an application for a Section 10(a) amendment or separate Section 10(a) Permits, Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712) ("MBTA") Permits, and/or other Take Authorizations. The USFWS shall use reasonable efforts to review and process the application expeditiously so as to ensure, provided the Permit amendment or application meets the requirements of the ESA and other applicable federal laws, that the Take Authorization is effective concurrently with the listing of the Covered Species under FESA. In issuing such Permits, amendments and/or Take Authorizations, and to the extent that such judicial determination creating the circumstances requiring such additional review and processing allows, the USFWS shall not request, impose, recommend or require further mitigation, conservation, compensation, enhancement or other protection for such Covered Species except as expressly provided in this Agreement.

5.2.6 Changes in the Environmental Laws. It is acknowledged and agreed by the USFWS that the Permittees are agreeing to perform substantial avoidance, minimization, mitigation, conservation and management measures as set forth in this Agreement. If a change in, or an addition to, any federal law governing or regulating the impacts of the Covered Activities on land, water or biological resources as they relate to Covered Species, including, but not limited to, ESA and NEPA, the USFWS shall give due consideration to the measures required under the SSHCP in applying the new laws and regulations to the Plan Permittees.

5.2.7 Section 7 Consultations. The USFWS will evaluate the direct, indirect, and cumulative effects of the Covered Activities in their internal ESA biological opinion issued in connection with the SSHCP and issuance of the Section 10(a) Permit. As a result, and to the maximum extent allowable, in any consultation under Section 7 of ESA subsequent to the Effective Date involving the Plan Permittee(s) or any entity or individual for which a Development Authorization or Special Participating Entity has been issued with regard to Covered Species and Covered Activities, the USFWS shall ensure that the ESA biological opinion issued in connection with the proposed project that is the subject of the consultation is consistent with the internal ESA biological opinion. Such project must be consistent with the terms and conditions of the SSHCP and this Agreement. Any reasonable and prudent measures included under the terms and conditions of an ESA biological opinion issued subsequent to the Effective Date with regard to the Covered Species and Covered Activities shall, to the maximum extent appropriate, be consistent with the implementation measures of the SSHCP and this Agreement. The USFWS shall not impose measures in excess of those that have been or will be required by the Plan Permittee(s) pursuant to the SSHCP and this Agreement. The USFWS shall process subsequent ESA consultations for Covered Activities in accordance with the process and time periods set forth in 50 Code of Federal Regulations, section 402.14. The Parties agree that this section does not create an independent cause of action.

5.2.8 Future Recovery Plans. Recovery plans under ESA delineate actions necessary to recover and protect federally listed species. These plans frequently include information, or may lead to the development of information, that can contribute to the development of an adaptive management program. However, recovery plans do not obligate any Plan Permittee, individual or entity to undertake specific tasks.

The Parties acknowledge that ESA recovery plans have no effect on the implementation of this SSHCP, except to the extent that they may contribute information to, or assist in achieving the goals of, the Plan's Adaptive Management provisions. Any recovery plan applicable to any Covered Species within the SSHCP Plan Area that is developed after the Effective Date shall:

A. Not require any additional land or financial compensation by Permittees;

B. Be finalized only after the USFWS has consulted with and requested input from the SSHCP Implementing Entity on the preparation of the recovery plan; and

C. Not in any way diminish the Take Authorization for Covered Species granted to Plan Permittees pursuant to the SSHCP, this Agreement, or the Section 10(a) Permit.

5.2.9 Migratory Bird Treaty Act. The Section 10(a) Permit shall constitute a Special Purpose Permit under 50 Code of Federal Regulations section 21.27, for the Take of

Covered Species Adequately Conserved listed under ESA and which are also listed under the MBTA, in the amount and/or number specified in the SSHCP, subject to the terms and conditions specified in the Section 10(a) Permit. Any such Take will not be in violation of the MBTA. The MBTA Special Purpose Permit will extend to Covered Species listed under ESA and also under the MBTA after the Effective Date of the Section 10(a) Permit. This Special Purpose Permit shall be valid for a period of three (3) years from its Effective Date, provided the Section 10(a) Permit remains in effect for such period. The Special Purpose Permit shall be renewed pursuant to the requirements of the MBTA, provided the Permittees remain in compliance with the terms of this Agreement and the Section 10(a) Permit. Each such renewal shall be valid for a period of three (3) years, provided that the Section 10(a) Permit remains in effect for such period.

6.0 TERM

6.1 Initial Term. This Agreement, the HCP, and the Permit will remain in effect for a period of fifty (50) years from the Effective Date of the original Permit. Notwithstanding the stated term, the Parties agree that preservation of the Preserve System shall be permanent.

6.2 Permit Renewal. Upon agreement of the Parties and in compliance with all applicable laws, the USFWS may extend the Permit beyond the initial term under the applicable regulations in force on the date of such extension. If the Plan Permittees desire to extend the Permit, they will so notify the USFWS at least four (4) months before the then-current term is scheduled to expire. Extension of the Permit constitutes extension of the SSHCP and this Agreement for the same amount of time, subject to any modifications agreed to by the Parties at the time of extension.

6.3 Surrender of the Permit. Any one or combination of Plan Permittees may withdraw from the Permit by surrendering the Permit to the USFWS in accordance with the regulations of the USFWS in force on the date of such surrender. (These regulations are currently codified at 50 CFR 17.22(b)(7) and 17.32(b)(7) and by their express terms apply in place of 50 CFR 13.26 to the extent of any conflict.

6.4 Procedure Applicable to Early Surrender of the Permit. If anyone or a combination of Plan Permittees elects to surrender the Permit before expiration of the full term, then in addition to surrendering the Permit, relevant Plan Permittees will provide a status report detailing the nature and amount of any incidental Take of the Covered Species, the minimization and mitigation measures provided for Take up through the date of early surrender, and the status of compliance with all other terms of the HCP. Within 90 days after receiving the surrendered Permit and a status report meeting the requirements of this paragraph, USFWS will use reasonable efforts to give written notice to the relevant Plan Permittees identifying all required outstanding mitigation and minimization measures.

6.5 Effect of Early Surrender. Upon the relevant Plan Permittee(s)' surrender of the Permit in accordance with Section 6.3, no further Take by relevant Plan Permittee(s) or any entity

or individual for which a Development Authorization has been issued by that Plan Permittee(s) shall be authorized under the terms of the Permit. Notwithstanding early surrender of the Permit, the relevant Plan Permittees shall implement each of the post-termination mitigation and minimization measures identified by USFWS in their written notice under Section 6.3, for any incidental Take of a Covered Species resulting from Covered Activities carried out in accordance with the Permit prior to the date of surrender, provided, however, that the post-termination mitigation and minimization measures identified by USFWS are subject to the voluntary dispute resolution procedure outlined in Section 14.2 herein. USFWS will only cancel the Permit upon determination that all applicable post-termination mitigation and minimization measures have been implemented. If prior to termination of the Permit, USFWS has approved the transfer of a portion of the Permit in accordance with all applicable statutory and regulatory requirements, then the transferred portion of the Permit shall remain in effect notwithstanding termination of the remaining portion.

7.0 SUSPENSION OR REVOCATION OF THE PERMIT

USFWS may suspend or revoke the Permit for cause in accordance with the laws and regulations in force at the time of such suspension or revocation. (The regulations governing permit suspension and revocation are currently codified at 50 CFR 13.27 (suspension) and 50 CFR 13.28, 17.22(b)(8) and 17.32(b)(8) (revocation). Suspension or revocation may apply to the entire Permit, or only to specified Covered Species, portions of the Plan Area or Covered Activities. Except where USFWS determines emergency action is necessary to avoid irreparable harm to a Covered Species, it will not suspend the Permit without first requesting the Plan Permittees to take appropriate remedial actions, if any such actions are available, and providing the Plan Permittees with written notice of the facts or conduct which may warrant the suspension, and an adequate and reasonable opportunity, including, where appropriate, use of the voluntary dispute resolution procedure outlined in Section 14.2, to demonstrate why suspension is not warranted.

7.1 Continuing Liability for Outstanding Mitigation. Notwithstanding revocation of the Permit, Plan Permittees affected by the suspension will remain liable for all incidental Take of Covered Species that occurred prior to revocation and shall fully implement all measures required under the HCP to minimize and mitigate for such Take. USFWS shall use their reasonable efforts to notify Plan Permittees in writing of all required outstanding minimization and mitigation measures within 90 days of permit revocation.

7.2 Other Rights and Authorities Not Affected. Nothing in this Section 7 prevents Plan Permittees from seeking review by a court of competent jurisdiction of any decision of the USFWS to revoke the Permit. Likewise, nothing in this Section affects or circumscribes the authority of USFWS to carry out their enforcement and other responsibilities under the ESA.

8.0 FUNDING

Plan Permittees warrant that they will expend SSHCP program funds as may be necessary to fulfill their obligations under the HCP. Plan Permittees will promptly notify the USFWS of

any material change in Plan Permittees' financial ability to fulfill its obligations. The funding program is set forth in detail in Chapter 12 of the SSHCP.

9.0 MONITORING AND REPORTING

9.1 Planned Periodic Reports. As described in the HCP, the SSHCP Implementing Entity will submit periodic reports describing their activities and results of the monitoring program provided for in the SSHCP. In accordance with Chapters 8 and 9 of the SSHCP, the SSHCP Implementing Entity will submit an annual report by April 1 of each year that describes for the reporting period the status of Covered Activities, the results of the required monitoring, any instances of noncompliance with the provisions of the HCP, actions taken to rectify the non-compliance, any problems under the HCP, and all other of the reporting requirements set forth in Chapters 8 and 9 of the SSHCP.

9.2 Other Reports. The SSHCP Implementing Entity, Plan Permittees, or both, as relevant, will provide, within 30 days of being requested by the USFWS if feasible, any additional information in their possession or control related to implementation of the SSHCP that is requested by the USFWS for the purpose of assessing whether the terms and conditions of the Permit, including the HCP, are being fully implemented.

9.3 Certification of Reports. All reports will include the following certification from a responsible company official who supervised or directed preparation of the report:

> I certify under penalty of law, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

9.4 Monitoring by USFWS. Plan Permittees acknowledge the necessity for USFWS to monitor compliance with the Permit and will cooperate fully in such monitoring. USFWS may conduct inspections and monitoring in connection with the Permit in accordance with its regulations. (See 50 C.F.R. § 13.21(e)(2))

10.0 CHANGED CIRCUMSTANCES

10.1 Plan Permittees-Initiated Response to Changed Circumstances. Plan Permittees will give notice to the USFWS after learning that any of the Changed Circumstances listed in Chapter 11 of the HCP have occurred. As soon as practicable thereafter, Plan Permittees will use best efforts to modify their activities in the manner described in Chapter 11 of the HCP, to the extent necessary to mitigate the effects of the Changed Circumstances on Covered Species, and will report to the USFWS on their actions. Plan Permittees will make such modifications without awaiting notice from the USFWS.

10.2 Service-Initiated Response to Changed Circumstances. If the USFWS determines that Changed Circumstances have occurred and that Plan Permittees have not responded in accordance with Chapter 11 of the HCP, the USFWS will so notify Plan Permittees and will direct Plan Permittees to make the required changes. Within 30 days after receiving such notice, Plan Permittees will make the required changes and report to the USFWS on their actions. If such actions are not feasible within this time frame, or if the Plan Permittees disagree with the direction from the USFWS, the SSHCP Implementing Entity will meet and confer with the USFWS. USFWS and the SSHCP Implementing Entity will use best efforts to develop a mutually agreeable action plan and schedule. Such changes are provided for in the HCP, and hence do not constitute Unforeseen Circumstances or require amendment of the Permit or HCP.

11.0 ADAPTIVE MANAGEMENT

11.1 Plan Permittees-Initiated Adaptive Management. Plan Permittees will implement the adaptive management provisions in Chapter 8 of the SSHCP, when changes in management practices are necessary to achieve the SSHCP's biological objectives, or to respond to monitoring results or new scientific information. Plan Permittees will make such changes without awaiting notice from the USFWS, and will report to the USFWS on any actions taken pursuant to this section.

11.2 Service-Initiated Adaptive Management. If the USFWS determines that one or more of the adaptive management provisions in the HCP have been triggered and that Plan Permittees have not changed their management practices in accordance with Chapter 8 of the SSHCP, the USFWS will so notify Plan Permittees and will direct Plan Permittees to make the required changes. Unless Plan Permittees invoke the voluntary dispute resolution procedure outlined in Section 14.2 to demonstrate why the required adaptive management changes are not warranted, Plan Permittees will make the required changes and report to the USFWS on their actions within 60 days after receiving such notice. Such changes are provided for in the HCP, and hence do not constitute Unforeseen Circumstances or require amendment of the Permit or HCP, except as provided in this section.

11.3 Reductions in Mitigation. Plan Permittees will not implement adaptive management changes that may result in less mitigation than provided for Covered Species under the original terms of the SSHCP, unless the USFWS first provides written approval. Plan Permittees may propose any such adaptive management changes by notice to the USFWS, specifying the adaptive management modifications proposed, the basis for them, including supporting data, and the anticipated effects on Covered Species, and other environmental impacts. Within 60 days of receiving such a notice, the USFWS will either approve the proposed adaptive management changes, approve them as modified by the USFWS, or notify Plan Permittees that the proposed changes constitute permit amendments that must be reviewed under Section 13.2 of this Agreement. If the USFWS has not responded within the 60 day period, the proposed adaptive management changes will be deemed approved.

11.4 No Increase in Take. This section does not authorize any modifications that would result in an increase in the amount and nature of Take, or increase the impacts of Take, on Covered Species beyond that analyzed under the original SSHCP and any amendments thereto. Any such modification must be reviewed as a permit amendment under Section 13.2 of this Agreement.

12.0 LAND TRANSACTIONS

12.1 Acquisition of Preserve System Lands. Land for the Preserve System will be acquired pursuant to Chapter 9 of the SSHCP.

12.2 Transfer of Preserve System Lands. Plan Permittees may not transfer ownership or control, including fee title or a conservation easement, of any portion of the Preserve System that is intended to stay within the Preserve System, to a third party, other than an agency of the Federal government, unless a conservation easement or equivalent legal protection, in a form approved by USFWS and which names USFWS as a third-party beneficiary, has been recorded pursuant to Section 5, above. Plan Permittees may transfer all or a portion of the Preserve System to an agency of the Federal government if, prior to the transfer, the USFWS determines in writing that the transfer will not compromise the effectiveness of the SSHCP based on adequate commitments by that agency regarding management of such land. Transfers of all or portions of the Preserve System under this section may be processed as minor modifications to the SSHCP in accordance with Section 13.1. Nothing herein prohibits the sale of Preserve System land to a third party for non-conservation purposes if the USFWS and the SSHCP Implementing Entity find that the land is not supporting the Preserve System.

13.0 MODIFICATIONS AND AMENDMENTS

13.1 Minor modifications.

13.1.1 Procedure. Either Plan Permittees or USFWS may propose minor modifications to the HCP or this Agreement by providing notice to all Parties. Such notice shall include a statement of the reason for the proposed modification and an analysis of its environmental effects, if any, including the effects of the proposed modification on operations under the SSHCP and on Covered Species. The other Parties will use reasonable efforts to respond to proposed modifications within 30 days of receipt of such notice. Proposed modifications will become effective upon the other Parties' written approval or shall be deemed approved by a Party if no response is received within 30 days of receipt of such notice. If USFWS determines that such modifications would result in operations under the SSHCP that are significantly different from those analyzed in connection with the SSHCP, adverse effects on the environment that are new or significantly different from those analyzed in connection with the SSHCP, or additional Take not analyzed in connection with the SSHCP, it may be processed as an amendment of the Permit in accordance with Section 13.2 of this Agreement. Parties may also institute the Dispute Resolution process set forth in Section 14.2 of this Agreement to resolve the objection.

13.1.2 Subject Matter of Minor Modifications. Subject to Section 13.1.1, Minor modifications to the HCP and Agreement processed pursuant to this subsection may include but are not limited to Chapter 9.10.2 of the SSHCP.

13.1.3 Other Proposed Changes to HCP or Agreement. Except for Administrative Revisions described in Chapter 9.10.1 of the SSHCP, any other proposed modifications to the SSHCP or Agreement will be processed as amendments of the Permit in accordance with Section 13.2 of this Agreement.

13.2 Amendment of the Permit. The Permit may be amended in accordance with all applicable legal requirements, including but not limited to the ESA, the National Environmental Policy Act, and the USFWS' permit regulations. In addition, the Party seeking to amend the Permit shall provide a statement of the reasons for the amendment and an analysis of its environmental effects, including its effects on operations under the HCP and on Covered Species. The Party seeking to amend the Permit shall follow the procedures outlined in Chapter 9 of the SSHCP.

13.3 Amendment of this Agreement. In addition to other approval requirements identified in this Section that may apply, this Agreement may only be amended consistent with the ESA and with the written consent of each Party.

14.0 ENFORCEMENT OF PERMIT AND DISPUTE RESOLUTION

14.1 General Authorities and Legal Rights. Nothing contained in this Agreement is intended to, or shall, limit the authority of the United States government to seek civil or criminal penalties or otherwise fulfill its enforcement and other responsibilities under the ESA or other applicable federal law. Nothing contained in this Agreement limits the rights of the Plan Permittees under applicable federal or state law to seek redress against the USFWS as otherwise permitted by law.

14.2 Dispute Resolution. The Parties recognize that disputes concerning implementation of, compliance with, or termination of the Permit, including the SSHCP and this Agreement may arise from time to time. The Parties will work together in good faith to resolve such disputes, and may use the informal dispute resolution procedures set forth in Section 14.2.1, or such other procedures upon which the Parties may adopt. However, if at any time, any Party determines that circumstances so warrant, it may seek any available administrative or judicial remedy without engaging in or waiting to complete informal dispute resolution.

14.2.1 Informal Dispute Resolution Process. Unless the Parties elect another dispute resolution process, or unless a Party has initiated administrative proceedings or suit in Federal court, the Parties may use the following process to attempt to resolve disputes:

(a) The USFWS will notify the Plan Permittees of the alleged non-compliance with, or violation of the Permit, including the HCP and this Agreement, the basis for

contending that the non-compliance or violation has occurred, and the remedies the USFWS proposes to correct the alleged non-compliance or violation. Where Plan Permittees allege that USFWS's alleged reasons for non-compliance or violation of the Permit, including HCP implementation, is inconsistent with the terms of the SSHCP, this Agreement and/or the Permit, Plan Permittees will notify USFWS of their objection, the basis for the objection and the manner in which Plan Permittees believe the SSHCP, Agreement and/or Permit should be interpreted and implemented.

(b) The notified Party will have 60 days, or such other time as may be agreed to by the Parties, to respond. During this time either Party may seek clarification of the information provided in the initial notice. The Parties will use reasonable efforts to provide any information then available that may be responsive to such inquiries.

(c) Within 30 days after such response is provided or is due, representatives from each Party will meet and negotiate in good faith toward a solution satisfactory to both Parties, or will establish a specific process and timetable to seek such a solution.

(d) If any issues cannot be resolved through such negotiations, the Parties may consider non-binding mediation and other alternative dispute resolution processes and, if a dispute resolution process is agreed upon, will make good faith efforts to resolve all remaining issues through that process.

15.0 MISCELLANEOUS PROVISIONS

15.1 No Partnership. Neither this Agreement nor the HCP shall make or be deemed to make any Party to this Agreement the agent for or the partner of any other Party.

15.2 Notices. Any notice permitted or required by this Agreement shall be in writing, delivered personally, or by overnight mail, to the persons listed below, or shall be deemed given five (5) days after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as follows, or at such other address as any Party may from time to time specify to the other Party in writing. Notices may be delivered by facsimile or other electronic means, provided that they are also delivered personally or by overnight or certified mail. Notices shall be transmitted so that they are received within the specified deadlines.

Deputy Manager
United States Fish and Wildlife Service
California/Nevada Operations Office
2800 Cottage Way, Room W-2606
Sacramento, California 95825
Telephone: 916-414-6464
Telefax: 916-414-6486

California Department of Fish and Wildlife Service
[Plan Permittees Address]
Telephone:
Telefax:

County of Sacramento
[Plan Permittees Address]
Telephone:
Telefax:

City of Galt
[Plan Permittees Address]
Telephone:
Telefax:

City of Rancho Cordova
[Plan Permittees Address]
Telephone:
Telefax:

Sacramento County Water Agency
[Plan Permittees Address]
Telephone:
Telefax:

Southeast Connector Joint Powers Authority
[Plan Permittees Address]
Telephone:
Telefax:

SSHCP Implementing Entity
[Plan Permittees Address]
Telephone:
Telefax:

15.3 Availability of Funds. Implementation of this Agreement and the HCP by the USFWS is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. The Parties acknowledge that the USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

15.4 Duplicate Originals. This Agreement may be executed in any number of duplicate originals. Each Party shall maintain in their records a complete original of this Agreement.

15.5 No Third-Party Beneficiaries. Without limiting the applicability of rights granted to the public pursuant to the ESA or other federal law, this Agreement shall not create any right or interest in the public, or any member thereof, as a third-Party beneficiary hereof, nor shall this Agreement be construed to authorize anyone to maintain a suit for personal injuries or damages or any other cause of action pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third parties shall remain as imposed under existing law.

15.6 Relationship to the ESA and Other Authorities. The terms of this Agreement shall be construed in accordance with the ESA and applicable federal law. Nothing in this Agreement is intended to limit or diminish the legal obligations and responsibilities of the USFWS as an agency of the federal government.

15.7 References to Regulations. Any reference in this Agreement, the HCP, or the Permit to any regulation or rule of the USFWS shall be deemed to be a reference to such regulation or rule in existence at the time an action is taken.

15.8 Applicable Laws. All activities undertaken pursuant to this Agreement, the HCP, or the Permit must be in compliance with all applicable state and federal laws and regulations.

15.9 Successors and Assigns. This Agreement shall be incorporated as a term and condition of the Permit. Assignment or other transfer of the Permit shall be governed by the USFWS' regulations in force at the time.

15.10 Permit Renewal. The Permit may be extended or renewed in accordance with all applicable laws and regulations in force at the time such action is initiated.

15.11 Agreement not an Enforceable Contract. Notwithstanding any language to the contrary in this Agreement, this Agreement is not intended to create, and shall not be construed to create an enforceable contract between the USFWS and Plan Permittees under the law with regard to the Permit or otherwise and none of the Parties to this Agreement shall be liable in damages to any other Party or any other third party or person for any performance or failure to perform any obligation identified in this Agreement. The sole purposes of this Agreement as between the USFWS and Plan Permittees are to clarify the provisions of the HCP and the processes the Parties intend to follow to ensure the successful implementation of the HCP in accordance with the Permit and applicable Federal law.

15.12 Compliance with the California Environmental Quality Act (CEQA). The Parties agree that the Plan provides extensive analysis and mitigation for the protection of Covered Species. For this reason, the Parties agree that compliance with the SSHCP constitutes full mitigation for impacts to Covered Species under the California Environmental Quality Act (CEQA) for Covered Activities. Nothing in this Section negates the requirement for full

compliance with CEQA for Covered Activities, as determined by the applicable Plan Permittee.

15.13 Annexation and Deannexation of Lands. Each of the Plan Permittees shall enforce the terms of the Plan, the Permit, and this Agreement as to all individuals or entities subject to its jurisdiction, including lands in the Plan Area annexed into the Plan Permittees' jurisdictions after the Effective Date of this Agreement provided the Minor Modification requirements of Section 13.1 of this Agreement have been met. Any land annexed into the Plan Area shall receive Take Authorization pursuant to the Permit provided the Minor Modification requirements of Section 13.1 of this Agreement have been met. If the Minor Modification requirements cannot be met, a Permit Amendment will be required.

In the event of the annexation or deannexation of any land within the Plan Area to another jurisdiction that is not a Plan Permittee, the Parties shall seek to enter into an agreement between the Plan Permittees, the Local Agency Formation Commission ("LAFCO"), the annexing or deannexing jurisdiction and the USFWS as part of the annexation process to ensure that any development of the annexed lands proceeds in accordance with the conservation goals of the SSHCP. If an agreement can be reached, that jurisdiction shall become a Plan Permittee after executing an addendum to this Agreement and complying with Section 9.10.3 of the SSHCP.. If an agreement cannot be reached, or if the SSHCP requirements are not imposed as a condition of annexation by LAFCO, then the annexed or deannexed land will not receive Take Authorization pursuant to the Permit, the SSHCP or this Agreement. Additionally, such annexation or deannexation may result in the revocation or suspension of the Permits pursuant to Section 7.0 of this Agreement. Parties within such annexed or deannexed land that qualify as Participating Special Entities may receive Take Authorization.

15.14 Incorporation of New Cities within SSHCP Boundaries. During the term of the SSHCP, and after the Effective Date, one or more new cities may be incorporated within the Plan Area. Such newly incorporated cities, upon execution of an Implementing Agreement with the USFWS substantially similar in form to this Agreement, shall receive Take Authorization pursuant to the Permit and all other rights and obligations granted by the Permit, the SSHCP and this Agreement. Incorporation of a new city within the Plan Area shall constitute a Minor Modification and shall be processed as such pursuant to Section 13.1 of this Agreement. In the event a newly incorporated city fails to participate in the SSHCP, the Permit may be revoked or suspended as set forth in Section 7.0 of this Agreement.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Implementing Agreement.

BY _____ Date _____

[insert USFWS official who will sign the permit]
Deputy Manager
United States Fish and Wildlife Service, Region 8
Sacramento, California

BY _____ Date _____

Deputy Director
Habitat Conservation Division
California Department of Fish and Wildlife
Sacramento, California

BY _____ Date_____

[Name], Chair]
County of Sacramento

BY _____ Date_____

[Name], Mayor
City of Galt

BY _____ Date_____

[Name], Mayor
City of Rancho Cordova

BY _____ Date_____

[Name], Chair
Sacramento County Water Agency

BY _____ Date_____

[Name], Chair
Southeast Connector Joint Powers Authority

BY _____ Date_____

[Name], Chair
SSHCP Implementing Entity

Exhibit A
Covered Species and Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
Invertebrates			
Lepidurus packardi Vernal pool tadpole shrimp	E*	—	—
Branchinecta lynchi Vernal pool fairy shrimp	T*	—	—
Branchinecta mesovallensis Mid-valley fairy shrimp	—	—	—
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	T	—	—
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	—	—	—
Amphibians			
Ambystoma californiense California tiger salamander, (Central Valley population)	T*	T	—
Spea hammondii Western spadefoot	—	CSC	—
Reptiles			
Actinemys marmorata Western pond turtle	—	CSC	—
Thamnophis gigas Giant gartersnake	T	T	—
Birds			
Accipiter cooperii Cooper's hawk	—	WL	—
Agelaius tricolor Tricolored blackbird	BCC	T (Emergency Listed)	—
Athene cunicularia hypugea Western burrowing owl	BCC	CSC	—
Buteo regalis Ferruginous hawk	BCC	—	—
Buteo swainsoni Swainson's hawk	BCC	T	—
Circus cyaneus Northern harrier	—	CSC	—
Elanus leucurus White-tailed kite	—	CFP	—
Grus canadensis tabida Greater sandhill crane	—	T; CFP	—
Lanius ludovicianus Loggerhead shrike	BCC	CSC	—
Mammals			
Lasiurus blossevillii Western red bat	—	CSC	—
Taxidea taxus American badger	—	CSC	—

Exhibit A
Covered Species and Listing Status

Scientific Name Common Name	Status		
	Federal	*State*	*CRPR*
	Plants		
Downingia pusilla Dwarf downingia	—	—	2.2
Gratiola heterosepala Boggs Lake hedge-hyssop	—	E	1B.2
Juncus leiospemus var. *ahartii* Ahart's dwarf rush	—	—	1B.2
Legenere limosa Legenere	—	—	1B.1
Navarretia myserii Pincushion navarretia	—	—	1B.1
Orcuttia tenuis Slender Orcutt grass	T*	E	1B.1
Orcuttia viscida Sacramento Orcutt grass	E*	E	1B.1
Sagittaria sanfordii Sanford's arrowhead	—	—	1B.2

Status Definitions

Federal:

E = Listed as endangered under the federal ESA
T = Listed as threatened under the federal ESA
* = Species has designated Critical Habitat located within the Plan Area.
— = No federal ESA listing
BCC = Bird of Conservation Concern, USFWS 2008.

State:

E = Listed as endangered under CESA
T = Listed as threatened under CESA
CFP = Fully protected under the California Fish and Game Code
CSC = Species of special concern in California
WL = Watch List
— = No state status

California Rare Plant Rank (CRPR)

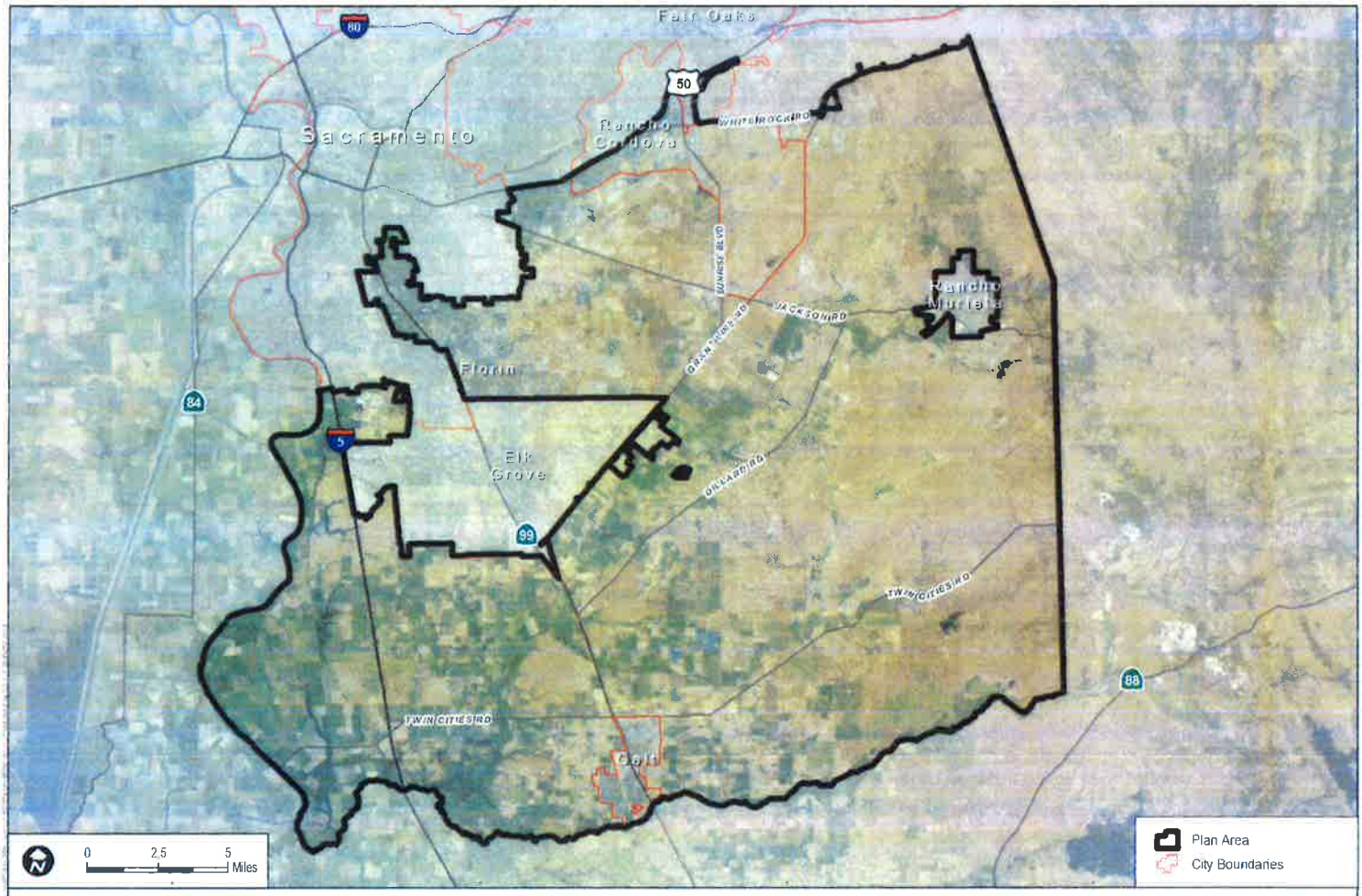
1B = Rare, threatened, or endangered in California and elsewhere
2 = Rare, threatened, or endangered in California but more common elsewhere

CRPR Threat Ranks

0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Exhibit B

Map of Plan Area



SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

FIGURE 1
Plan Area

Exhibit C

Certificate of Inclusion

City of Rancho Cordova

South Sacramento Habitat Conservation Plan

October 15, 2018

Action Items for Tonight

- Conduct a public hearing

- Adopt Resolution that
  - Accepts the certified SSHCP EIR/EIS
  - Adopts the CEQA Findings of Fact, and
  - Adopts the SSHCP
  - Adopts the Aquatic Resources Plan
  - Adopts the SSHCP Nexus Study

Action Items for Tonight - continued

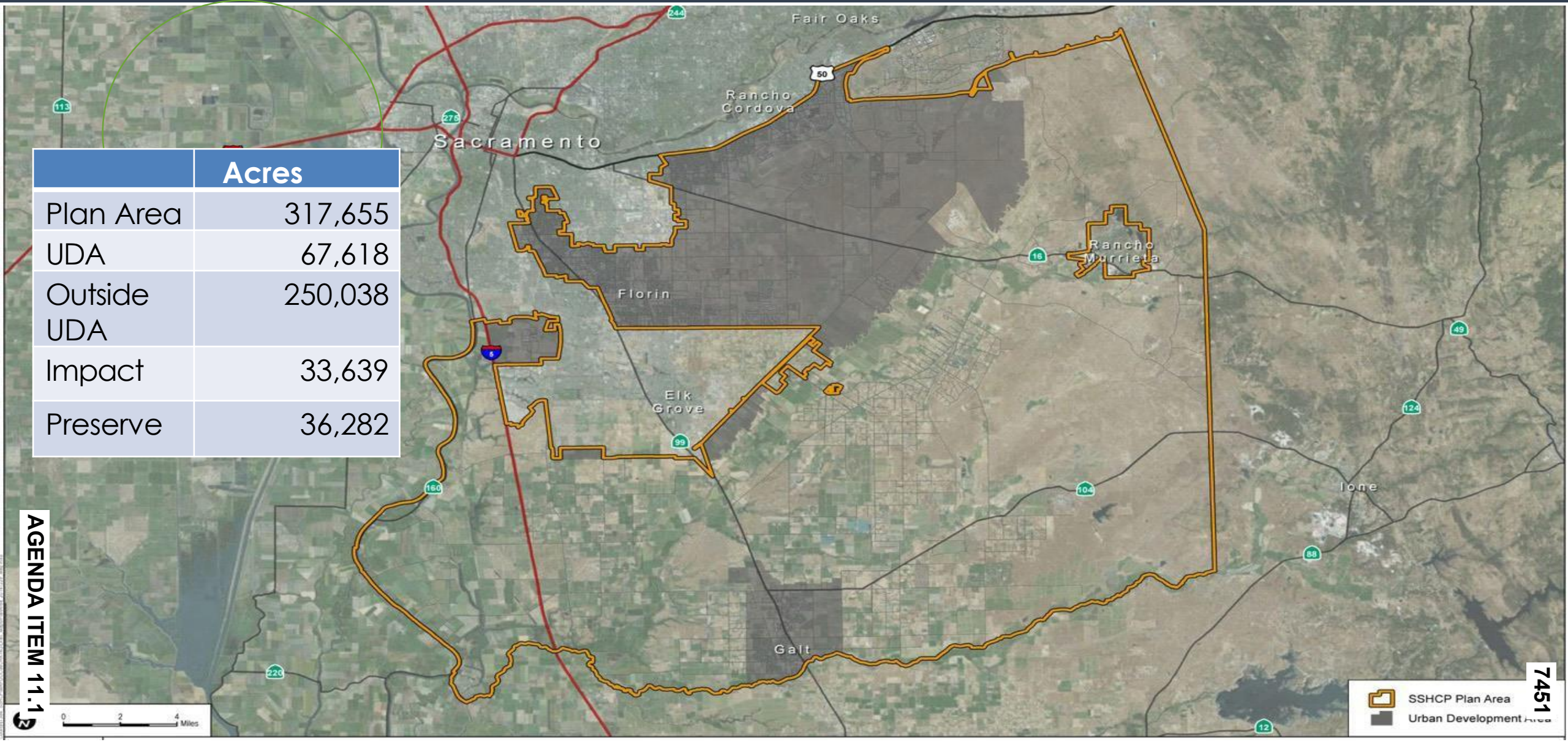
- Introduce and waive the first reading of the Aquatic Protection Ordinance
- Adopt the Implementing Resolution
  - Applicability of regulations and procedures for implementation of the SSHCP
  - Authorizes the City Manager to execute the Implementing Agreement
- Introduce and waive the first reading of the Mitigation Fee Ordinance

Benefits of Recommended Actions

- Simplifies and expedites federal and state permitting
- First-time integration of ESA and Section 404 permitting under existing federal regulations
- Implementation at the local level
- Creates a 36,282-acre interconnected preserve system, with1,000 acres of vernal pool habitat
- Provides greater certainty about mitigation requirements, timing and cost for project applicants

Plan Area

	Acres
Plan Area	317,655
UDA	67,618
Outside UDA	250,038
Impact	33,639
Preserve	36,282



SSHCP Components

Local Adoption Actions

- Accept Certified EIS/EIR
- CEQA Findings of Fact
- SSHCP
- Aquatic Resources Protection Program and Ordinance
- Implementing Resolution
- Nexus Study
- Fee ordinance
- Implementing Agreement

Federal and State Actions

- **Biological Opinion – USFWS**
- Records of Decision -- USACE & USFWS
- 50-year federal and state ESA permits
- USACE in-lieu fee program and CWA 404 permits/strategy
- Regional Water Board 401 certification
- Section106 Programmatic Agreement with USACE/SHPO

Final EIS/EIR Conclusions

- Environmentally Superior Alternative:
  50-year federal and state Endangered Species Act permits
- No significant unavoidable impacts
- No project mitigation measures
- Benefits to biological resources and aquatic resources are expected

Aquatic Resources Program/US Army Corp Permit Strategy

- Landscape-level watershed protection priority to save larger aquatic systems not isolated wetlands
- Streamlines permitting consistent with Clean Water Act Section 404 permits and 401 certifications, Calif. Fish and Game Code Section 1600 and the Porter-Cologne Water Quality Control Act
- Adds to the Plan framework of protection of natural communities and native plant and wildlife species, including protection of aquatic resources

Aquatic Resources Program Ordinance

- The purpose of the ARP Protection Ordinance is to establish a locally implemented permit process to administer the requirements set forth in the Aquatic Resources Program
- Includes procedures for review of applications for SSHCP covered activities that propose to impact aquatic resources
- The intent is to achieve no-net-loss of aquatic resource function and services



Implementing Agreement

Purpose and Intent:

- Implementing Agreements are recommended by USFWS for large-scale HCPs
- Ensure all parties understand their responsibilities under the SSHCP and the ESA and CESA Incidental Take Permits
- Specifies the responsibilities of each party, how the Plan Permittees will ensure that the SSHCP Conservation Strategy will be implemented, and how reporting and enforcement procedures will be implemented

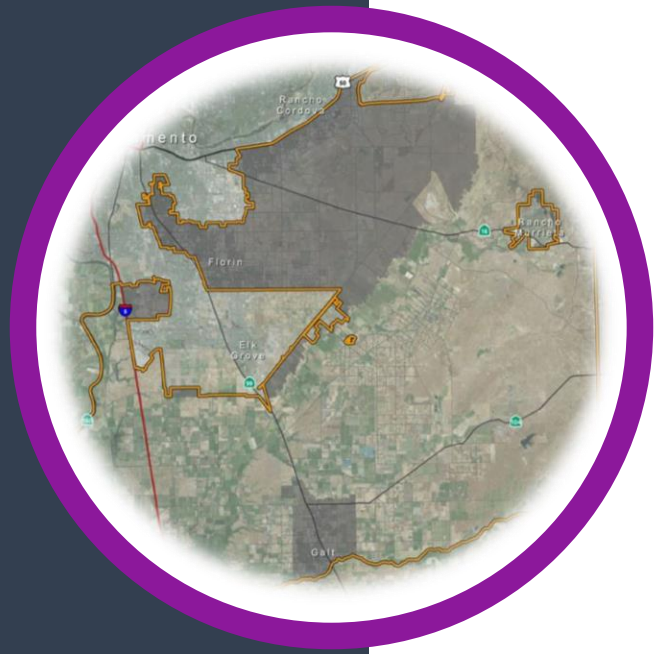
Nexus Study and Mitigation Fee Ordinance

- Combined land dedication and mitigation/in-lieu fees - calculated by impacts to "land cover" types
- Conforms to Mitigation Fee Act, nexus study and USACE in-lieu fee instrument
- Provides certainty and cost advantages vs. status quo
- The Mitigation Fee Ordinance provides the mechanism for the collection and disbursement of the SSHCP Mitigation Fees
- The Mitigation Fee amounts will be established separately by Resolution after approval of fees by the SSCA

Proposed Mitigation Fees (not for approval tonight)

	Per-Acre Mitigation Fees		
	LAND	OTHER	TOTAL
Agriculture	$13,244	$2,968	$16,212
Valley Grassland	$12,940	$4,764	$17,704
Vernal Pool - Direct	$23,853	$167,451	$191,304
Vernal Pool - Indirect	$23,853	$9,469	$33,322
Blue Oak	$16,285	$102,160	$118,445
Riparian	$25,238	$117,379	$142,617
Mine Tailing Riparian Woodland	$9,398	$133,479	$142,876
Seasonal Wetland	$17,401	$120,820	$138,220
Freshwater Marsh	$22,828	$116,260	$139,088
Swale – Direct	$14,399	$116,572	$130,972
Swale – Indirect	$14,399	$4,868	$19,267
Streams/Creeks (VPIH) - Direct	$33,569	$111,170	$144,739
Streams/Creeks (VPIH) - Indirect	$33,569	$5,310	$38,879
Open Water	$16,349	$97,294	$113,643
Streams/Creeks	$11,978	$107,463	$119,441

County Actions



- County Board hearing – September 11
- Certified the Final EIS/EIS for the SSHCP and adopted the CEQA Finding of Fact
- Adopted the SSHCP and took action on all the items necessary to implement the SSHCP

Next Steps



- Plan Partner approval hearings –Sept/Oct/Nov
  - September 28 – JPA Connector
  - October 15 - Rancho Cordova City Council
  - October 16 - City of Galt
  - October 29 – South Sacramento Conservation Agency
- Federal and State actions (Biological Opinion, Findings, Records of Decision) – November/December
- Federal and State permit issuance - December

Conclusion

Recommended actions given the following benefits:

- Simplifies and expedites federal and state permitting
- First-time integration of ESA and Sec. 404 permitting under existing federal regulations
- Implementation at the local level
- Creates an interconnected preserve system
- Provides landowner protections and no greater restrictions than under current easements
- Provides greater certainty about mitigation requirements, timing and cost for project applicants

Action Items for Tonight

- Conclude the public hearing

- Adopt Resolution (Exhibit A)that
  - Accepts the certified SSHCP EIR/EIS
  - Adopts the CEQA Findings of Fact, and
  - Adopts the SSHCP
  - Adopts the Aquatic Resources Plan
  - Adopts the SSHCP Nexus Study

Action Items for Tonight - continued

- Introduce the Aquatic Protection Ordinance (Exhibit B)
- Adopt the Implementing Resolution (Exhibit C)
  - States the applicability of regulations and procedures for implementation of the SSHCP
  - Authorizes the City Manager to execute the Implementing Agreement
- Introduce the Mitigation Fee Ordinance (Exhibit D)

THANK YOU

Questions

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: June Cowles, Senior Planner and
Nicholas Sosa, Assistant Planner

SUBJECT: **WOODSIDE HOMES DOUGLAS 98 SUBDIVISION MAJOR DESIGN REVIEW AND SPECIAL DEVELOPMENT PERMIT;**

PROJECT NO. DD9793	**SEQUOIA AT CYPRESS**
PROJECT NO. DD9794	**MAGNOLIA AT CYPRESS**
PROJECT NO. DD9795	**COTTONWOOD AT CYPRESS**
PROJECT NO. DD9796	**EUCALYPTUS AT CYPRESS**

PROPERTY OWNER:	**APPLICANT/DEVELOPER:**
Woodside Homes 111 Woodmere Road, Suite 190 Folsom, CA 95630	Woodside Homes 111 Woodmere Road, Suite 190 Folsom, CA 95630

PROJECT:	Applicant is requesting the following; • Special Development Permit request is to revise the building setbacks; • Major Design Review for the four neighborhoods that include 14 floor plans ranging from 1,655 to 2,947 square feet each with three proposed architectural styles.
FILE:	DD9793, DD9794, DD9795, and DD9796
LOCATION:	Located south of Douglas Road and west of Grant Line Road
ZONING:	Residential RD-10, RD-7, and Open Park Space
GENERAL PLAN:	Low and Medium Density Residential, and Open Space (LDR, MDR, OS)
APN:	067-0040-021 through 067-0040-025
PLANNER:	June Cowles, Senior Planner and Nicholas Sosa, Assistant Planner

RECOMMENDATION

That Council:

a) Determine the project Exempt per Section 15182, of the CEQA Guidelines; and
b) Adopt the Resolution for Douglas 98 Special Development Permit and Major Design Review

RESULT OF RECOMMENDED ACTION

Adoption of the above referenced Resolution would approve the Special Development Permit and Major Design Review to include 4 neighborhoods for 14 floor plans located within Douglas

98. Approval would allow the applicant to pursue necessary building permits for new construction.

BACKGROUND / PROJECT HISTORY

The Douglas 98 subdivision is located within the Sunridge Specific Plan which was approved in July 2002 by Sacramento County **Figure 1: Douglas 98 Site Location**. The Specific Plan area includes residential, commercial, office and open space throughout. Below is a chronological timeline of the revisions and entitlements for the Douglas 98 project;

Figure 1: Douglas 98 Site Location



2004 Sunridge Eastside Properties Specific Plan Amendment

The Sunridge Eastside Properties (Douglas 98, Douglas 103, Grantline 208, and Arista Del Sol) were modified from the original plan due to increasing the wetland preserve. The amendment included the following;

- Higher density zoning (RD-10).
- Central park, paseo design; connectivity to parks and neighborhood.
- Greater diversity of lot configuration for different housing products.

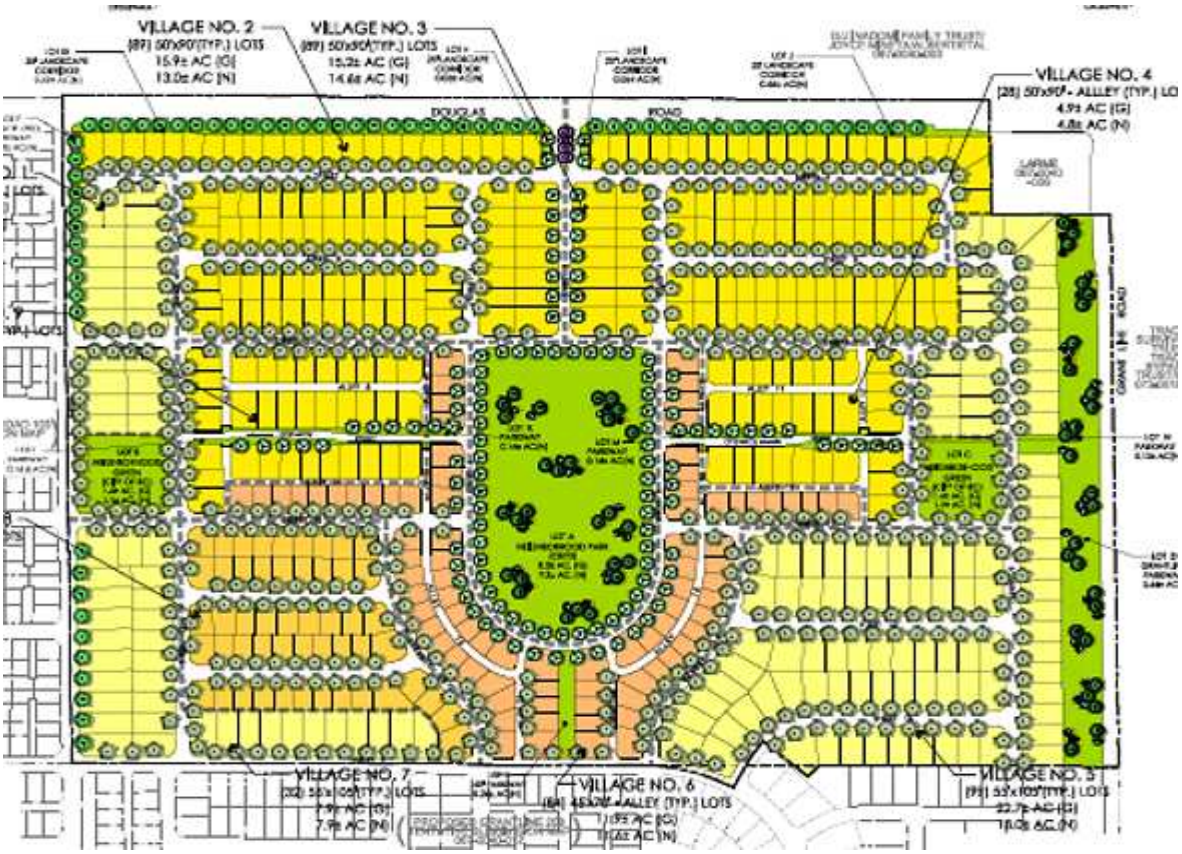
2013 Douglas 98 Rezone and Tentative Subdivision Map

In 2013, the tentative subdivision map was revised as follows;

- Eliminated the “zipper lots”
- Reduced the small park acreage and replaced with RD-5 and RD-7 zoning.

Overall, the project as modified retains many of the original concepts for providing internal and external connectivity with the roads, connections to the open space amenities thru enhanced walkways and paseos, and maintaining the central park. **Figure 2: 2013 Douglas 98 Rezone and Subdivision Map**.

Figure 2: 2013 Douglas 98 Rezone and Subdivision Map



EXISTING CONDITIONS:

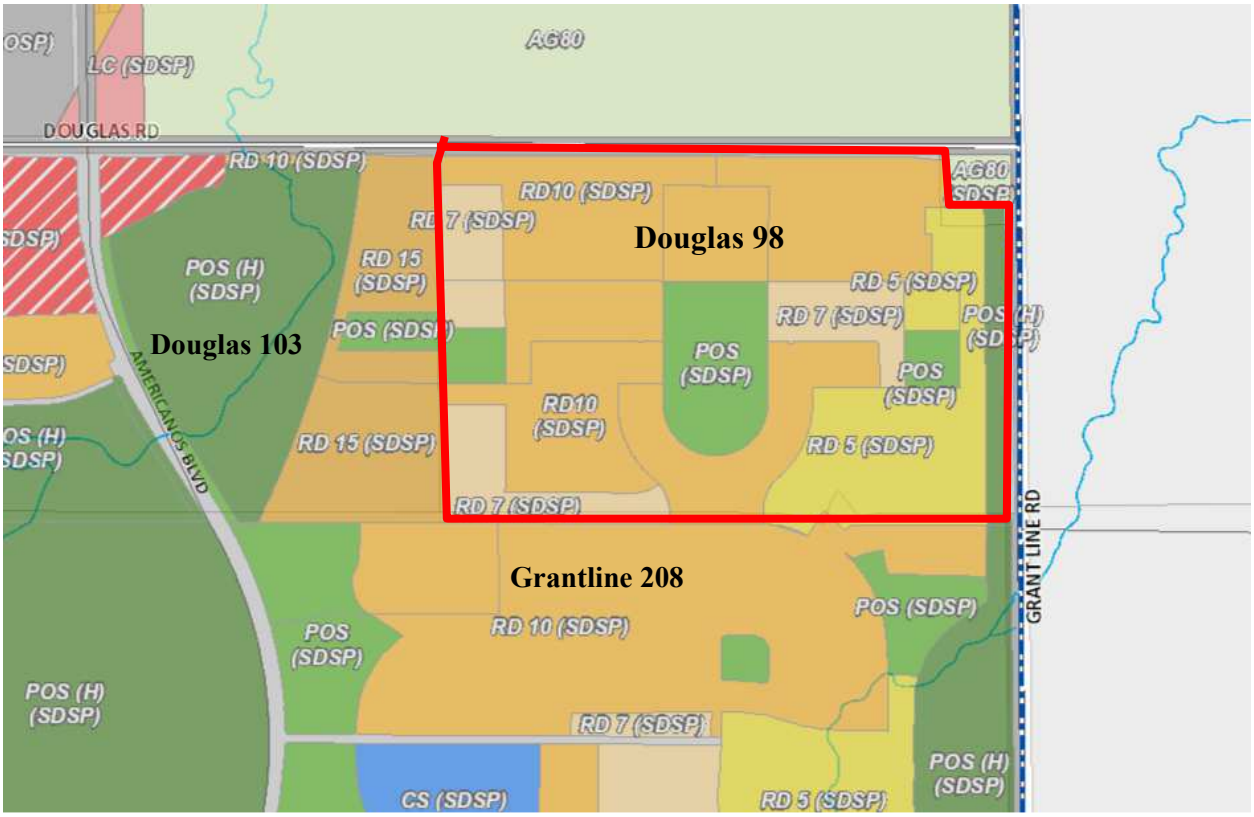
The Douglas 98 subdivision map was approved in 2013. Underground infrastructure is currently being installed on the site. Douglas Road is north of the site and is also undergoing construction with infrastructure and widening. To the west is the approved Douglas 103 subdivision, to the north is undeveloped Agricultural 80 zoned land, to the south is the approved Grantline 208 subdivision that is currently being graded, and to the east is Grant Line Road and County zoned land.

Surrounding Land Use:
The following Table provides the current use, General Plan/Community Plan, and zoning (**Table 1: Surrounding Designations and Existing Uses and Figure 3: Zoning Map)**

Table 1: Surrounding Designations and Existing Uses:

	Existing Land Use	General Plan and Community Plan Designations	Zoning (SRSP)
Subject Property	Graded Undeveloped Land	Medium Density Residential, Low Density, and Open Space	RD-10, RD-7, RD-5 and Park Open Space
North	Undeveloped Land	Grant Line West Planning Area	AG-80
East	Sacramento County Jurisdiction	Sacramento County General Agricultural 80 acres	AG-80
South	Graded Undeveloped Land	Medium Density Residential and Open Space	RD-10 and Park Open Space
West	Undeveloped Land	Medium Density Residential and Open Space	RD-15 and Park Open Space

Figure 3: Zoning Map



PROPOSED PROJECT:
The applicant, Woodside Homes, is proposing a Special Development Permit and Major Design Review for Cottonwood at Cypress, Magnolia at Cypress, Eucalyptus at Cypress, and Sequoia at Cypress within the Douglas 98 subdivision.

Special Development Permit

The Douglas 98 project is located within the Sunridge Specific Plan which was originally approved by Sacramento County prior to City incorporation. As such, provisions of the County of Sacramento Zoning Code are applicable in the review of subsequent actions on the Douglas 98 project.

Article 6 of the Sacramento County Zoning Code establishes procedures for Special Development Permits and includes the following statement:

"The purpose for which Special Development Permits may be issued is to encourage a creative and more efficient approach to the use of the land; to maximize the choice in the type of environment; to encourage more efficient allocation and maintenance of privately controlled common open space though the redistribution of overall density; to provide economy in housing opportunities; and to provide a means of greater creativity and flexibility in design than is provided under the strict application of the zone design standards …."

The applicant is requesting a Special Development Permit to vary from the Sunridge Specific Plan distance between buildings and building setbacks from property lines to accommodate the project. **Table 2: Proposed Special Development Permit**. The following matrix provides the existing requirements of the Specific Plan and the proposed for the Woodside Homes at Douglas 98.

Table 2: Proposed Special Development Permit

SETBACKS					
	Required per Sunridge Specific Plan	**Proposed 45x70 Alley Lots**	**Proposed 50x80 Conventional Front loading Lots**	**Proposed 50x90 Alley Lots**	**Proposed 50x90 Conventional Front loading Lots**
Front Setback (Building)	16'	10'	10'	10'	10'
Front Setback (Garage)	19'	5' (Alley)	19'	5' (Alley)	19'
Side Setback	5' / 4'	4' / 6'	5' / 3'	3' / 3'	5' / 3'
Side Setback (Corner Lot)	12.5'	10'	10'	10'	10'
Rear Setback	20% of the lot depth	5' to Garage 10' to Downstairs Living	10' Single Story 15' Two Story	5' to Garage 5' to Carriage Unit 10' to Downstairs Living	10' Single Story 15' Two Story
Sunridge Specific Plan condition; In no event shall the rear yard be less than 10 feet for one-story buildings and 15 feet for two-story and three-story buildings.					

Distance Between Buildings	9’	8’	6’	6’	6’
Lot Area	Various	3,150 SF	4,000 SF	4,500 SF	4,500 SF

Major Design Review:
The applicant is proposing four neighborhoods with a total of 14 floor plans and three elevations for each floor plan and three color schemes for each elevation**. See Attachment 2, 3, 4, and 5; Project Plans.**
ANALYSIS:

Special Development Permit:
As stated in the background/project history, Douglas 98 underwent several revisions to include additional smaller lots, additional park space and paseos due to the increased wetland area and the design charrette. RD10 zoning was implemented in 2004 which established the smaller lot size within Douglas 98 to include alley loaded lots. The applicant is requesting a Special Development Permit to reduce the setbacks as established in the Sunridge Specific Plan. The 2004 General Plan and Specific Plan Amendment included setbacks for the “zipper lots” and the alley-loaded/paseo lots. However, in 2013 the subdivision map was revised again to eliminate the “zipper lots” and some alley-loaded lots. The setbacks for the 2013 revised subdivision map were not applied. The applicant is requesting revised setbacks to accommodate the revised lot sizes that include the following;

- 45’ by 70’ Alley lots
- 50’ by 90’ Alley lots
- 50’ by 80’ Conventional Front-loading lots
- 50’ by 90’ Conventional Front-loading lots

The 2004 Amendments revised Douglas 98 subdivision from low density front loaded lots to an area that included internal and external connectivity with the roads, connections to the open space amenities thru enhanced walkways and paseos, a central park, and a greater diversity of housing product that included RD10 zoning district (higher density).

The requested setbacks are analyzed as follows;

<u>Proposed Front loading lot setbacks (Lot sizes; 50’ by 80’ and 50’ by 90’)</u>

- No revision to the Front-loading lots; Front yard setback to the garage (19 feet).
- Building living area front yard setback is reduced from 16 feet to 10 feet. The building area reduced setback provides “living area forward” and recessed garage area.
- Side yard setbacks for one side is maintained at 5 feet minimum.
- Rear yard setback is reduced to 10-feet for single story and 15 feet two-story buildings. The requested setbacks are consistent with the Sunridge Specific Plan condition relating to “in no case” statement.

<u>Proposed Alley loading lot setbacks (Lot sizes; 45’ by 70’ and 50’ by 90’)</u>

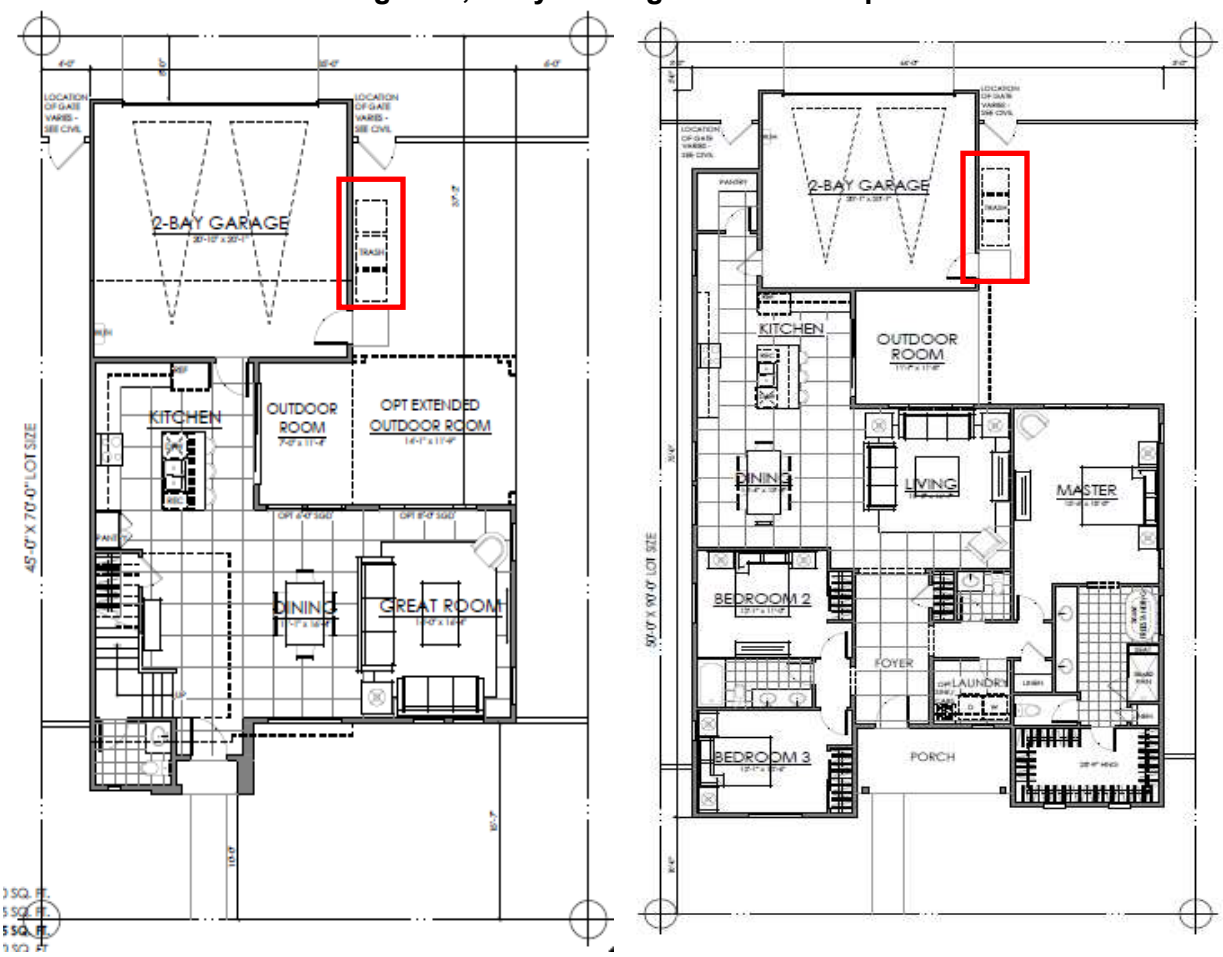
- Alley-loading lots setbacks are typically different from the front loading lot home product and provide a desired street front elevation. The Sunridge Development Design Standards states the following;

"Small lot residential units may use a variety of dwelling configurations, such as courtyard housing, wide shallow lots and carriage housing. In such configurations the general standards will apply, but can be varied to accommodate the characteristics of a specific dwelling unit type".

The Specific Plan anticipated that future lot configurations and housing products would require setback revisions and therefore included the above statement that setbacks could be varied to accommodate the dwelling unit type.

- Side yard setbacks are proposed at 3 feet minimum for one neighborhood alley-loading lot. The applicant has provided space within the rear fenced yard to contain the trash containers. In addition, the advantage to alley-loading lots is that the "service items" can be accessed from the alley and therefore, remove the necessity for side yard trash container space. **Figure 4: Alley-loading setback example**

Figure 4; Alley-loading setback example



The applicant request the Special Development Permit in order to revise setbacks to accommodate the approved subdivision lot sizes and to maintain the desired housing product diversity. The following evidence supports the Special Development Permit request:

A. **Finding:** That the proposed development will carry out the intent of the General Plan and the appropriate community plan.

Evidence: The proposed project is consistent with the General Plan/Sunridge Specific Plan land use designation of Medium and Low Residential Density; RD10 and RD7 zoning districts.

B. **Finding:** That the proposed development is of sufficient size and is designed so as to provide a desirable environment within its own boundaries.

Evidence: The approved Tentative Subdivision Map is of sufficient size that includes a RD10 and RD7 zoning districts that meets the minimum density requirement within its own boundaries. The requested revised setbacks accommodate the smaller lot sizes and diverse housing product within Douglas 98.

C. **Finding:** That the proposed development is compatible with existing and proposed land uses in the surrounding area.

Evidence: The proposed development is compatible with the existing and the approved adjacent Eastside property subdivision land uses and consistent with the General Plan and Sunridge Specific Plan in that they both allow for this type of development.

D. **Finding:** That any exceptions to, or deviation from, the use, density, requirements or design standards of the Land Use Zone in which the property is located, or of Title II of the Sacramento Code are justified by the design of the development or by the substantial energy savings proposed pursuant to Section 110-65(b). In case of the residential area, the rearrangement of dwellings and the mixing of dwelling types shall be justified by larger and more usable open spaces.

Evidence: The site is physically suitable for the proposed density of development. The 2004 General Plan Amendment included a shift from lower density conventional lots to higher density (RD10 zoning district), additional parks, paseos, open space, and diverse housing product. The overall residential density is 10 units per acre which is consistent with the zoning district that was implemented in the 2004 General Plan and Specific Plan Amendment for the Eastside properties.

E. **Finding:** That there is adequate assurance that all public improvements will be installed at the scheduled times, as required by Public Works.

Evidence: The project conditions of approval provide a time schedule for all public improvements as required by Public Works. In addition, infrastructure is currently being installed on site.

F. **Finding:** That there is adequate assurance that the development schedule will be met.

Evidence: Douglas 98 includes a Development Agreement that has an expiration time. The improvements for Douglas Road and Douglas 98 are currently being installed.

G. **Finding:** That the existing or proposed utility services are adequate for the uses and population densities proposed.

Evidence: The existing and proposed utilities are adequate for the uses and population density proposed.

DESIGN REVIEW:

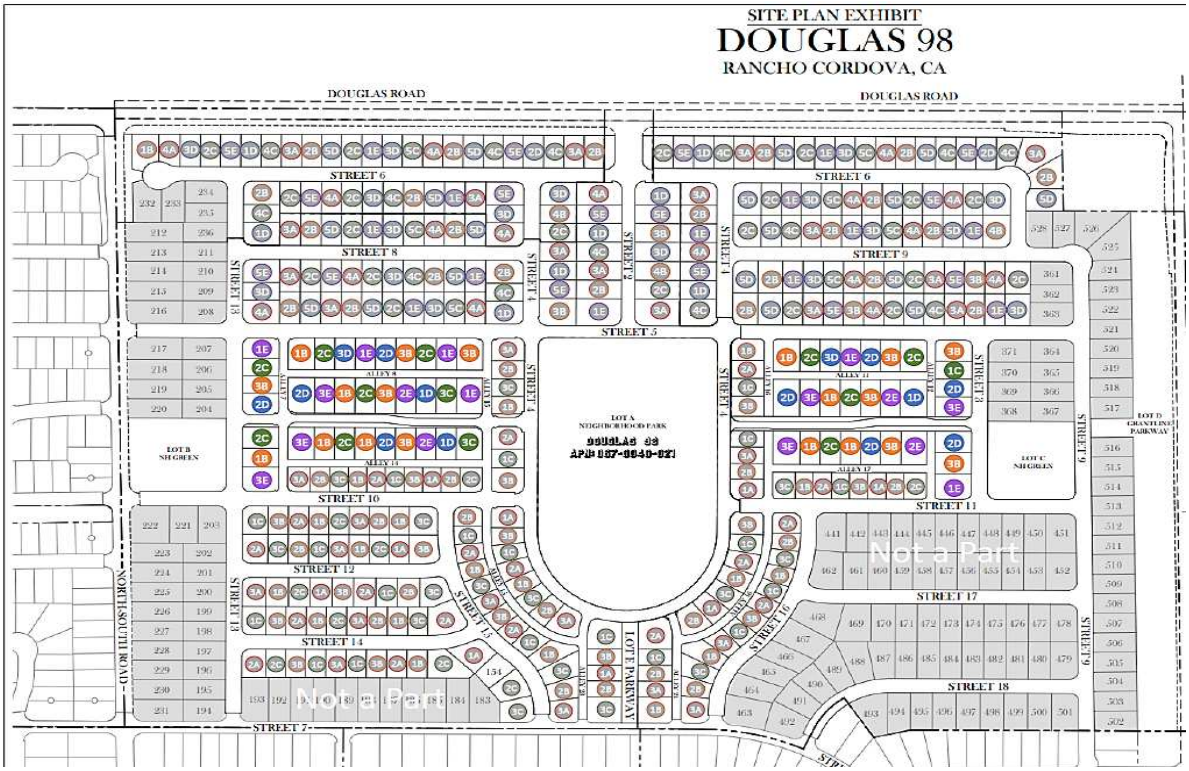
Major Design Review

The proposed project includes 14 floor plans with three architectural styles for each plan and, each with three color schemes (**See Project Plans Attachment 2 through 5 and below**). Color schemes include colors for body, fascia, trim/garage, and accent colors as well as picture samples of stone and roof materials. All front loading floorplans include the living space forward of the garage. Each of the four neighborhood provides different lot sizes with a variety of housing product; front loading product and alley loading product with one neighborhood that includes a detached garage with a breezeway and a carriage unit. Enhanced elevations that include additional shutters and siding, will be utilized for each floor plan that is to be located on a corner or that is visible from the public right of way. All floor plans include a two-car garage for off-street parking.

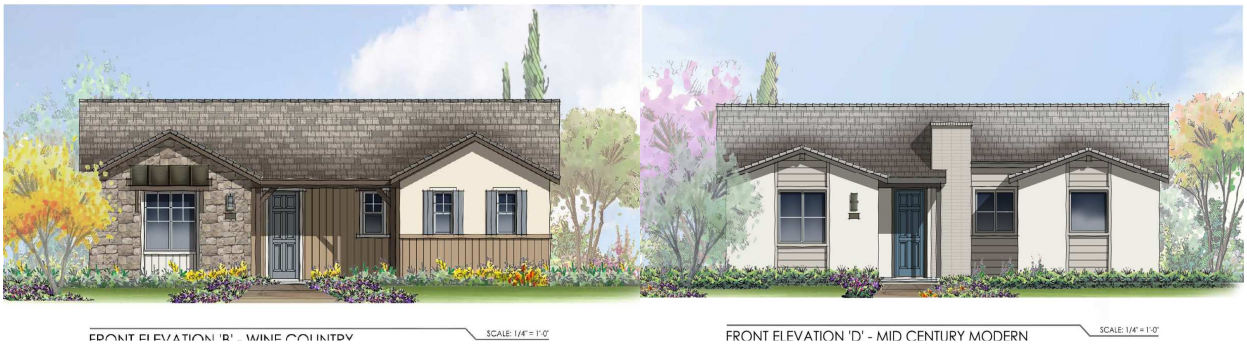
Sequoia at Cypress DD9793

The Sequoia neighborhood home plans are alley-loaded with a typical 50' by 90' lot size located in the highlighted lots and includes 3 floor plans each with 3 elevations as follows;

Pre-Plotting Exibit - Sequoia



Plan 1,991 (single-story) Elevation; Wine Country, Mid-Century Modern, Modern Farmhouse



FRONT ELEVATION 'B' - WINE COUNTRY SCALE: 1/4" = 1'-0"

FRONT ELEVATION 'D' - MID CENTURY MODERN SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'E' - MODERN FARMHOUSE SCALE: 1/4" = 1'-0"

Plan 2,337 (two-story) Elevation; Modern Prairie, Mid-Century Modern, Modern Farmhouse



FRONT ELEVATION 'C' - MODERN PRAIRIE SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'D' - MID CENTURY MODERN SCALE: 1/4" = 1'-0"



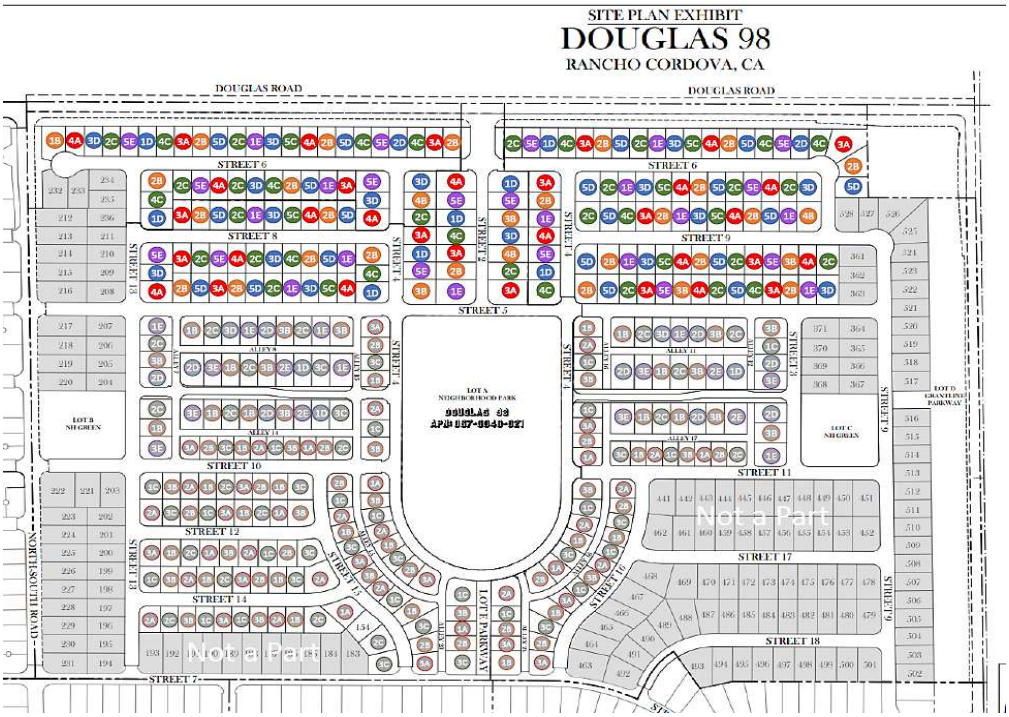
Plan 2,590 (two-story) Elevation; Wine Country, Modern Prairie, Modern Farmhouse





Magnolia at Cypress DD9794
The Magnolia neighborhood home plans are conventional front loading 50’ by 90’ lot size located in the highlighted lots and includes 5 floor plans as follows;

Pre Plotting Exhibit - Magnolia



Plan 1,869 (single-story) Elevation; Wine Country, Modern Prairie, Mid Century Modern







FRONT ELEVATION 'E' - MODERN FARMHOUSE

Plan 2,018 (single-story) Elevation; Wine Country, Modern Prairie, Mid Century Modern



FRONT ELEVATION 'B' - WINE COUNTRY



FRONT ELEVATION 'C' - MODERN PRAIRIE



FRONT ELEVATION 'D' - MID CENTURY MODERN

Plan 2,442 (two-story) Elevation; Modern Spanish, Wine Country, Mid Century Modern



FRONT ELEVATION 'A' - MODERN SPANISH



FRONT ELEVATION 'B' - WINE COUNTRY



FRONT ELEVATION 'D' - MID CENTURY MODERN

Plan 2,668 (two-story) Elevation; Modern Spanish, Wine Country, Modern Prairie



FRONT ELEVATION 'A' - MODERN SPANISH



FRONT ELEVATION 'B' - WINE COUNTRY



FRONT ELEVATION 'C' - MODERN PRAIRIE

Plan 2,947 (two-story) Elevation; Modern Prairie, Mid Century Modern, Modern Farmhouse


FRONT ELEVATION 'C' - MODERN PRAIRIE

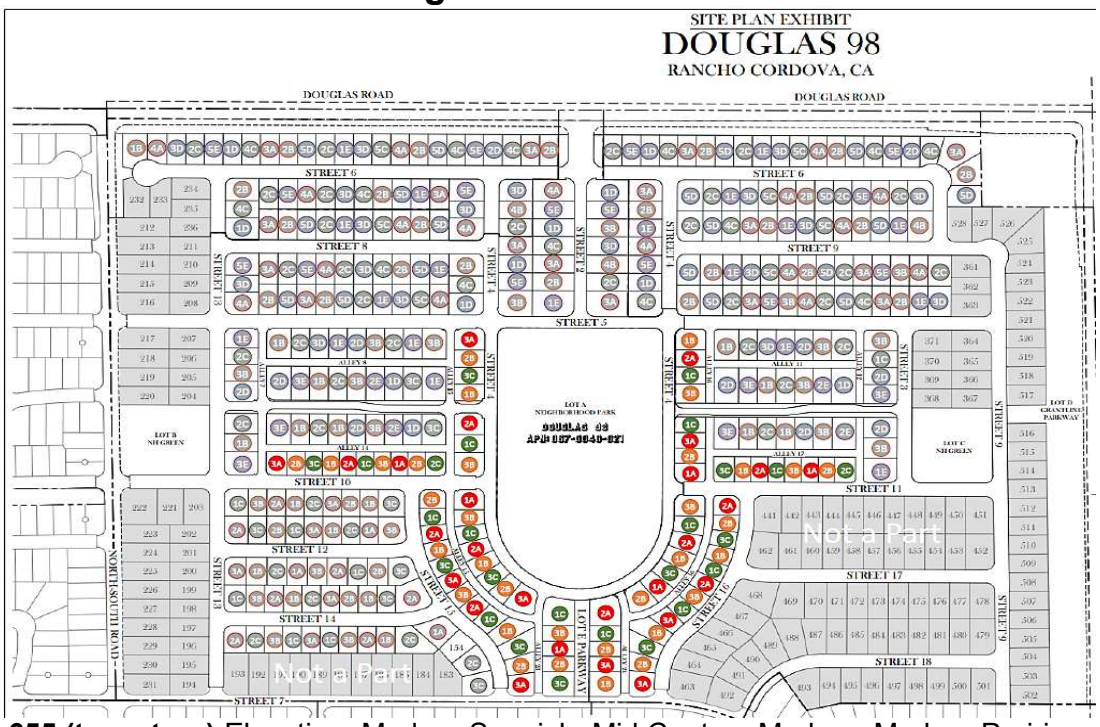

FRONT ELEVATION 'D' - MID CENTURY MODERN


FRONT ELEVATION 'E' - MODERN FARMHOUSE

Cottonwood at Cypress DD9795

The Cottonwood neighborhood home plans are alley-loading 45' by 70' lot size located in the highlighted lots and includes 3 floor plans as follows;

Pre-Plotting Exhibit – Cottonwood



Plan 1,655 (two-story) Elevation; Modern Spanish, Mid Century Modern, Modern Prairie



FRONT ELEVATION 'A' - MODERN SPANISH



FRONT ELEVATION 'B' - MID CENTURY MODERN



FRONT ELEVATION 'C' - MODERN PRAIRIE

Plan 1,726 (two-story) Elevation; Modern Spanish, Mid Century Modern, Modern Prairie



FRONT ELEVATION 'A' - MODERN SPANISH



FRONT ELEVATION 'B' - MID CENTURY MODERN



FRONT ELEVATION 'C' - MODERN PRAIRIE

Plan 1,922 (two-story) Elevation; Modern Spanish, Mid Century Modern, Modern Prairie



FRONT ELEVATION 'A' - MODERN SPANISH



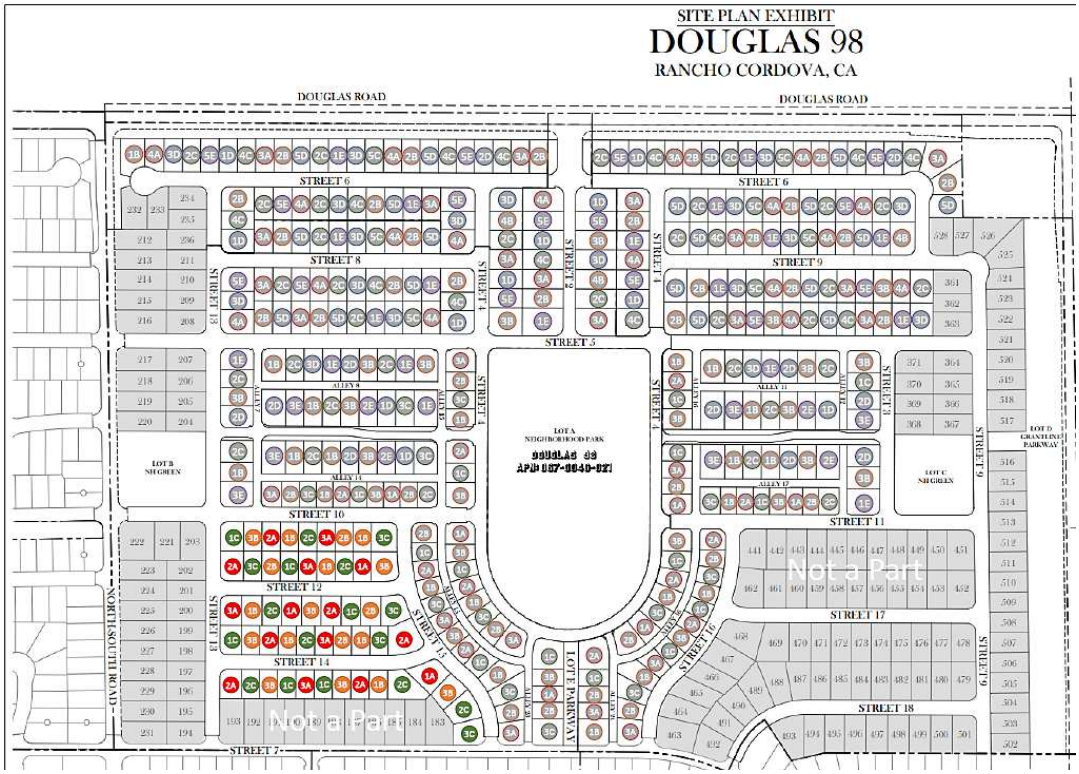
FRONT ELEVATION 'B' - MID CENTURY MODERN SCALE: 1/4" = 1'-0



FRONT ELEVATION 'C' - MODERN PRAIRIE

Eucalyptus at Cypress DD9796
The Eucalyptus neighborhood home plans are conventional front loading 50’ by 80’ lot size located in the highlighted lots and includes 3 floor plans as follows;

Pre-Plotting Exhibit - Eucalyptus



Plan 1,657 (Single-story) Elevation; Modern Spanish, Wine Country, Modern Prairie



FRONT ELEVATION 'A' - MODERN SPANISH SCALE: 1/4" = 1'-0"

FRONT ELEVATION 'B' - WINE COUNTRY SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE SCALE: 1/4" = 1'-0"

Plan 2,065 (Two-story) Elevation; Modern Spanish, Wine Country, Modern Prairie



FRONT ELEVATION 'A' - MODERN SPANISH SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY SCALE: 1/4" = 1'-0"



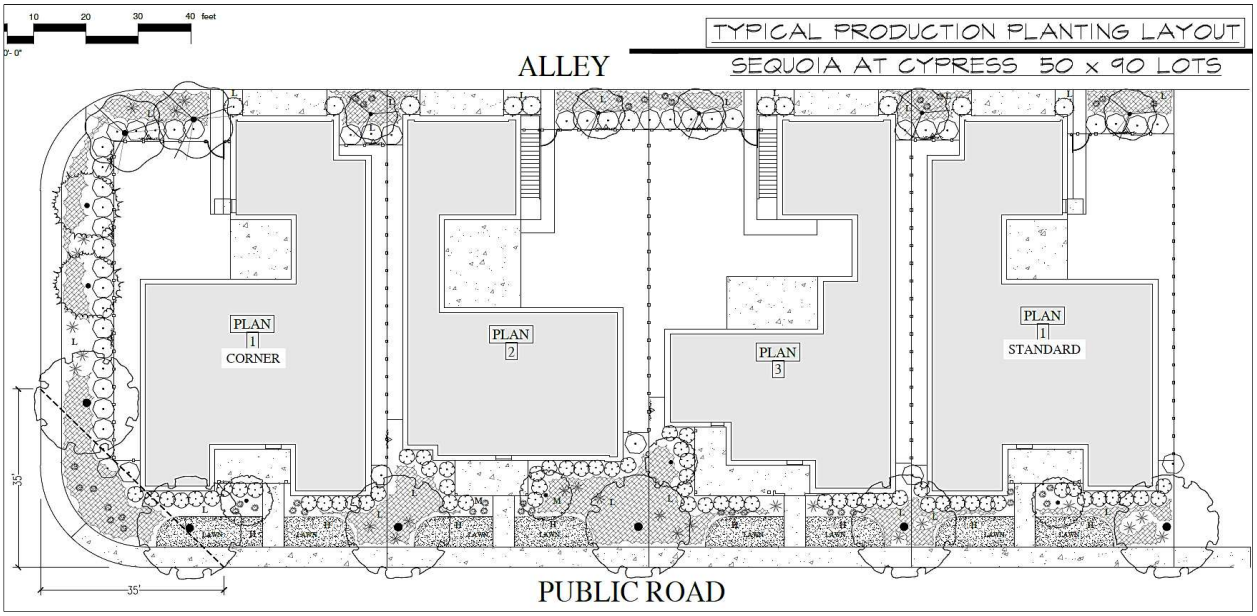
FRONT ELEVATION 'C' - MODERN PRAIRIE SCALE: 1/4" = 1'-0"

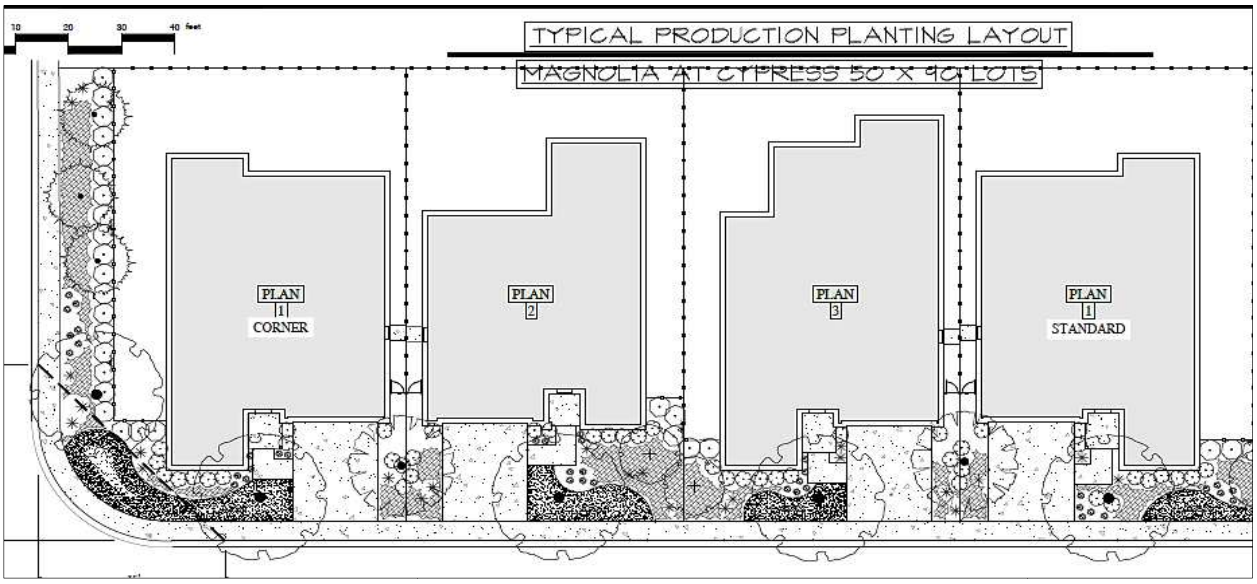
Plan 2,285 (Two-story) Elevation; Modern Spanish, Wine Country, Modern Prairie

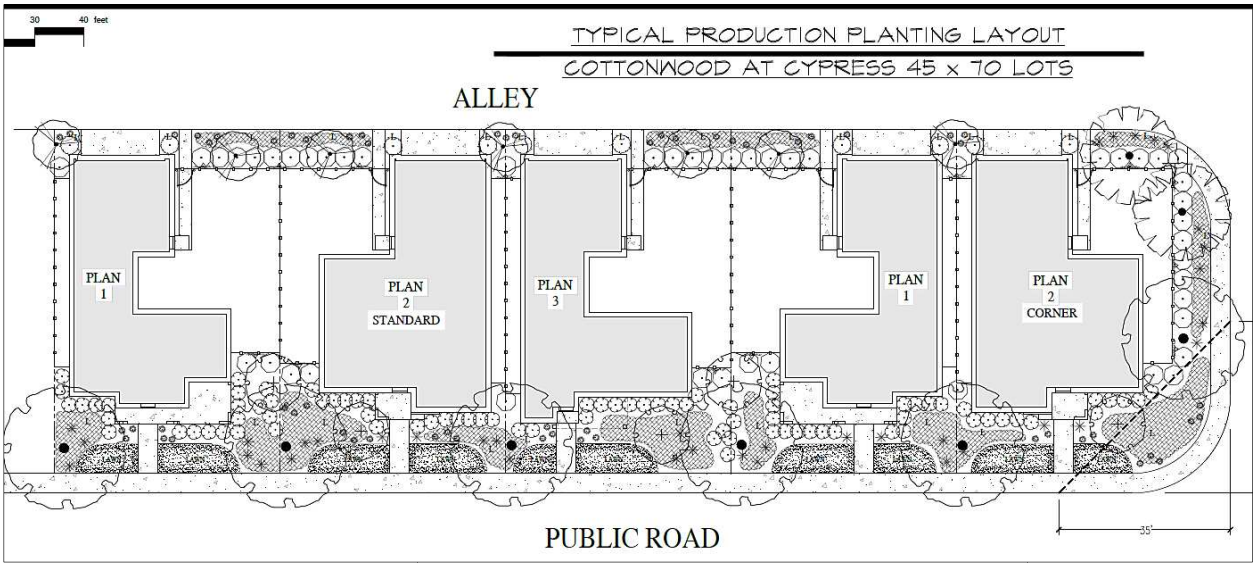


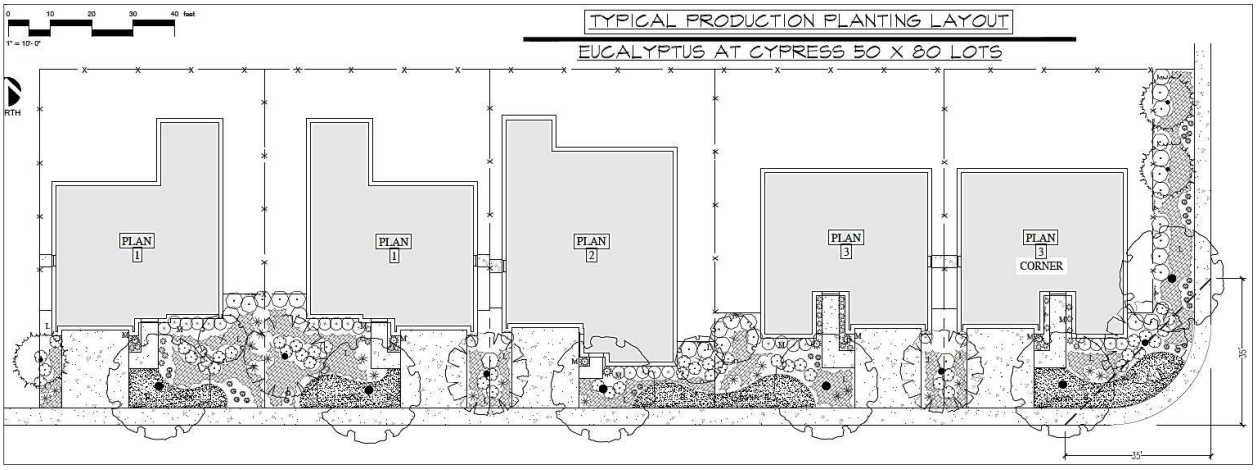
Landscape Design
The submitted typical landscape plan depicts a variation of drought tolerant trees, shrubs and a small area of drought tolerant grass and natural grasses. **Figure 5: Typical Landscape Plans.** The Model Water Efficient Landscape Ordinance (MWELO) states that new homes can only have lawns that do not exceed 25% of the total front, back and side yard square footage. This restriction is expected to reduce a home's expected water use by 20% or 12,000 gallons per year. The ordinance will not apply if the lawn is irrigated with grey water, which is recycled water from household use.

Figure 5: Typical Landscape Plans


TYPICAL PRODUCTION PLANTING LAYOUT
SEQUOIA AT CYPRESS 50 x 90 LOTS
ALLEY
PLAN 1 CORNER
PLAN 2
PLAN 3
PLAN 1 STANDARD
PUBLIC ROAD


TYPICAL PRODUCTION PLANTING LAYOUT
MAGNOLIA AT CYPRESS 50 X 90 LOTS
PLAN 1 CORNER
PLAN 2
PLAN 3
PLAN 1 STANDARD





A 3-foot wide concrete path will also be provided from the driveway to the garage man-door as well as a path from the driveway to the front door for all floor plans.

City Design Guidelines

The proposed house plans offer a clear architecture style with unique designs. The proposed project is consistent with the City Design Guidelines and Sunridge Specific Plan Design Guidelines as stated below;

- The design is visually interesting and establishes streetscape variety with the proposed single-story and two-story front loading product and alley loading product, 14 floor plans and 3 elevations per a plan.
- The mass, scale, and form of the homes enhance the public realm with the front yard porches and living spaces.
- The several different rooflines included in each plan and elevation ensure variation.
- Front loading homes include living space/porch forward of the garage.
- The proposed plans offer diversity of architecture and include a modern architectural style.
- To ensure variety and interest throughout the villages, a condition of approval has been added to state that no two identical floor plans and building elevations within a master

home plan series shall be located directly adjacent or across the street from one another.

- Enhanced elevations are provided for homes that are located on the corner lots or adjacent to street public right-of-ways.

DESIGN REVIEW FINDINGS & EVIDENCE

Approval of the Major Design Review, subject to the Design Review Package (**Attachment 2 through 5**) and the Conditions of Approval (**Attachment 6**) must provide sufficient evidence for the Findings required by Zoning Code Section 23.141.050. Findings and supportive evidence are shown below:

A. **Finding:** The proposed project is consistent with the objectives of the General Plan, complies with applicable zoning regulations, Specific Plan provisions, and special planning area provisions, and is consistent with the applicable Rancho Cordova Design Guidelines.

Evidence: The General Plan designation for the subdivision is Medium Density Residential (MDR), Low Density Residential (LDR), and Open Space (OS). The MDR zone is generally characterized by small lot single-family detached, single-family attached and small apartment complexes. The proposed single family project site is zoned RD-10 with lots, on average, less than 5,000 square feet consistent with the General Plan requirements. A few lots within the Cottonwood and Sequoia are within the Low Density Residential RD-7 district. The number of lots is consistent with the RD-7 zoning district. Therefore, the project is consistent with the Sunridge Specific Plan regarding density. The project follows all zoning regulations with the request of the Special Development Permit for the revised setbacks as well as the applicable Rancho Cordova Design Guidelines including height regulations and architectural detail requirements.

B. **Finding:** The proposed architecture, site design, and landscape are suitable for the purposes of the building and the site and will enhance the character of the neighborhood and community.

Evidence: Woodside Homes is presenting a design package which includes 14 different floor plans with three elevations per plan, for a total of 42 architectural configurations. Variations in colors and materials along with living spaces forward of the garage and alley loading lots will create a vibrant and welcoming streetscape that will provide a diverse house product. Conditions of Approval (**Attachment 6**) have been developed to alternate between sizes and architectural styles throughout the neighborhood to emphasize street variation.

C. **Finding:** The architecture, including the character, scale, and quality of the design, relationship with the site and other buildings, building materials, screening of exterior appurtenances, exterior lighting and signing, and similar elements establishes a clear design concept and is compatible with the character of existing or anticipated buildings on adjoining and nearby properties.

Evidence: The proposed architecture and landscaping are consistent with the Sunridge Specific Plan design standards and the City Design Guidelines. The applicant has provided 14 different floor plans to include front loading and alley loading house products. Floor plans ranging from 1,665 to 2,947 square feet in size. Similar to other home sizes within other areas of RD-10 zoning districts. A clear design concept is shown for each elevation and each design provides consistent characteristics of each

stated style. All elevations and architectural style palettes are included in the Design Review Package (**Attachment 2 through 5**).

D. **Finding:** The proposed project will not create conflicts with vehicular, bicycle, or pedestrian transportation modes of circulation.

Evidence: The subdivision map was approved prior to this Design Review action. Vehicular, bicycle, and pedestrian circulation were studied and accepted as part of that prior approval. This Design Review approval will not impede any of the approved transportation modes.

GENERAL PLAN CONSISTENCY:

The proposed site General Plan designation is Low and Medium Density Residential and Open Space. The MDR zone is generally characterized by small lot single-family detached, single family attached and small apartment complexes. The proposed project site is zoned RD-10 and a few lots zoned RD-7 Low Density Residential. The approved subdivision map is consistent with the MDR General Plan designation, with lots, on average, less than 5,000 square feet. The LDR designation is related to the RD-7 zoned lots. A few of the alley loading lots are included with the proposal. The approved subdivision lot density for this area is consistent with the LDR designation.

ENVIRONMENTAL

The proposed project has been analyzed as part of the Sunridge Specific Plan Environmental Impact Report (EIR) and the Mitigated Negative Declaration (MND) for the Eastside properties in compliance with the California Environmental Quality Act (CEQA). Mitigation measures relating to Douglas 98 are included in the SDCP/SRSP EIR and Sunridge East MND and are still applicable. Since the proposed residential project is in conformity with what was reviewed as part of the Specific Plan EIR and Eastside Properties MND, the project is then exempt under CEQA Exemption 15182, Residential Projects Pursuant to a Specific Plan.

RECOMMENDED MOTION

Staff recommends that the City Council find the project categorically exempt from further CEQA review and adopt the Resolution approving the Special Development Permit and Major Design Review for Douglas 98 subject to the findings and Conditions of Approval (Attachment 2 through 6).

ATTACHMENTS

1. Resolution
2. Exhibit A to the Resolution – Project Plans for Sequoia at Cypress
3. Exhibit B to the Resolution – Project Plans for Magnolia at Cypress
4. Exhibit C to the Resolution – Project Plans for Cottonwood at Cypress
5. Exhibit D to the Resolution – Project Plans for Eucalyptus at Cypress
6. Exhibit E to the Resolution – Conditions of Approval
7. 500’ Radius Map with Mailing Labels
8. PowerPoint Presentation

ATTACHMENT 1

CITY OF RANCHO CORDOVA

CITY COUNCIL RESOLUTION NO. XXX-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, APPROVING A SPECIAL DEVELOPMENT PERMIT AND DESIGN REVIEW FOR DOUGLAS 98 PROJECT NO. DD9793, DD9794, DD9795, AND DD9796

WHEREAS, Woodside Homes (hereinafter referred to as Applicant) filed an application with the City of Rancho Cordova for a Special Development Permit and Major Design Review approval for Douglas 98 with 14 new floor plans each with three architectural styles; and

WHEREAS, the City Council is the appropriate authority to hear and take action on this project; and

WHEREAS, the project site was previously analyzed as a part of the Sunridge Specific Plan Environmental Impact Report (EIR) and further analyzed within the Mitigated Negative Declaration for the Tentative Subdivision Maps for the Eastside Properties adopted by the City of Rancho Cordova, thereby satisfying the requirements for the California Environmental Quality Act (Resolution 16-2006); and

WHEREAS, the SDCP/SRSP was approved by the County of Sacramento ("County") in July 2002. The County also prepared and certified an Environmental Impact Report ("EIR") (State Clearinghouse Number 97022055) for the SDCP/SRSP. In July 2003, the City of Rancho Cordova incorporated an area that included the SDCP and SRSP. In response to litigation involving the SDCP/SRSP EIR, the City subsequently rescinded approval of the SDCP/SRSP, yet the court held that the SDCP/SRSP is still in effect for projects that were already vested through a development agreement, such as this one. The Court and City allowed projects with development agreements to develop consistent with the Specific Plan which utilized County standards. On November 7, 2012, the City certified a partially Revised EIR for the SDCP/SRSP, however, at that time the City determined to carry out the projects within the SDCP/SRSP area without re-approving the SDCP/SRSP; and

WHEREAS, the proposed residential project is in conformity with what was reviewed as part of the Specific Plan EIR and Eastside Properties Mitigated Negative Declaration, and therefore is exempt under CEQA exemption 15182, Residential Projects Pursuant to a Specific Plan; and

WHEREAS, the City Council of the City of Rancho Cordova has conducted a properly noticed public hearing pursuant to Government Code section 65090 and has duly considered all written and verbal testimony presented during the hearing.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA HEREBY RESOLVES AS FOLLOWS:

1. The CEQA exemption found in California Code of Regulation Title 14, section 15182 is an adequate exemption according to the Guidelines of the California Environmental Quality Act.

   A. **Finding**: The project site has been analyzed and is exempt per California Environmental Quality Act Guidelines Section 15182, "Residential Projects Pursuant to a Specific Plan."

ATTACHMENT 1

Evidence: The proposed residential project has been analyzed as part of the Sunridge Specific Plan Environmental Impact Report (State Clearinghouse Number 97022055) and the Mitigated Negative Declaration for the Eastside Properties. Since the proposed project is in conformity with what was reviewed as part of the Specific Plan EIR, the project is then exempt under CEQA Exemption 15182, "Residential Projects Pursuant to a Specific Plan."

2. To approve the Special Development Permit
   3. The applicant request the Special Development Permit in order to revise setbacks to accommodate the approved subdivision lot sizes and to maintain the desired housing product diversity. The following evidence supports the Special Development Permit request:

A. **Finding:** That the proposed development will carry out the intent of the General Plan and the appropriate community plan.

Evidence: The proposed project is consistent with the General Plan/Sunridge Specific Plan land use designation of Medium and Low Residential Density; RD10 and RD7 zoning districts.

B. **Finding***:* That the proposed development is of sufficient size and is designed so as to provide a desirable environment within its own boundaries.

Evidence: The approved Tentative Subdivision Map is of sufficient size that includes a RD10 and RD7 zoning districts that meets the minimum density requirement within its own boundaries. The requested revised setbacks accommodate the smaller lot sizes and diverse housing product within Douglas 98.

C. **Finding***:* That the proposed development is compatible with existing and proposed land uses in the surrounding area.

Evidence: The proposed development is compatible with the existing and the approved adjacent Eastside property subdivision land uses and consistent with the General Plan and Sunridge Specific Plan in that they both allow for this type of development.

.

D. **Finding***:* That any exceptions to, or deviation from, the use, density, requirements or design standards of the Land Use Zone in which the property is located, or of Title II of the Sacramento Code are justified by the design of the development or by the substantial energy savings proposed pursuant to Section 110-65(b). In case of the a residential area, the rearrangement of dwellings and the mixing of dwelling types shall be justified by larger and more usable open spaces. .

Evidence: The site is physically suitable for the proposed density of development. The 2004 General Plan Amendment included a shift from lower density conventional lots to higher density (RD10 zoning district), additional parks, paseos, open space, and diverse housing product. The overall residential density is 10 units per acre which is consistent with the zoning district that was implemented in the 2004 General Plan and Specific Plan Amendment for the Eastside properties.

E. **Finding***:* That there is adequate assurance that all public improvements will be installed at the scheduled times, as required by Public Works.

ATTACHMENT 1

Evidence: The project conditions of approval provide a time schedule for all public improvements as required by Public Works. In addition, infrastructure is currently being installed on site.

F. **Finding**: That there is adequate assurance that the development schedule will be met.

Evidence: Douglas 98 includes a Development Agreement that has an expiration time. The improvements for Douglas Road and Douglas 98 are currently being installed.

G. **Finding**: That the existing or proposed utility services are adequate for the uses and population densities proposed.

Evidence: The existing and proposed utilities are adequate for the uses and population density proposed.

4. To approve the Design Review, subject to the Major Design Review Package (**Attachment 2 through 5**) and the Conditions of Approval (**Attachment 6**) as modified; supported by the following Findings and Evidence, as required by Zoning Code Section 23.141.070:

A. **Finding**: The proposed project is consistent with the objectives of the General Plan, complies with applicable zoning regulations, Specific Plan provisions, and special planning area provisions, and is consistent with the applicable Rancho Cordova Design Guidelines.

Evidence: The General Plan designation for the subdivision is Medium Density Residential (MDR), Low Density Residential (LDR), and Open Space (OS). The MDR zone is generally characterized by small lot single-family detached, single-family attached and small apartment complexes. The proposed single family project site is zoned RD-10 with lots, on average, less than 5,000 square feet consistent with the General Plan requirements. A few lots within the Cottonwood and Sequoia are within the Low Density Residential RD-7 district. The number of lots is consistent with the RD-7 zoning district. Therefore, the project is consistent with the Sunridge Specific Plan regarding density. The project follows all zoning regulations with the request of the Special Development Permit for the revised setbacks as well as the applicable Rancho Cordova Design Guidelines including height regulations and architectural detail requirements.

B. **Finding:** The proposed architecture, site design, and landscape are suitable for the purposes of the building and the site and will enhance the character of the neighborhood and community.

Evidence: Woodside Homes is presenting a design package which includes 14 different floor plans with three elevations per plan, for a total of 42 architectural configurations. Variations in colors and materials along with living spaces forward of the garage and alley loading lots will create a vibrant and welcoming streetscape that will provide a diverse house product. Conditions of Approval (**Attachment 6**) have been developed to alternate between sizes and architectural styles throughout the neighborhood to emphasize street variation.

ATTACHMENT 1

C. **Finding**: The architecture, including the character, scale, and quality of the design, relationship with the site and other buildings, building materials, screening of exterior appurtenances, exterior lighting and signing, and similar elements establishes a clear design concept and is compatible with the character of existing or anticipated buildings on adjoining and nearby properties.

Evidence: The proposed architecture and landscaping are consistent with the Sunridge Specific Plan design standards and the City Design Guidelines. The applicant has provided 14 different floor plans to include front loading and alley loading house products. Floor plans ranging from 1,665 to 2,947 square feet in size. Similar to other home sizes within other areas of RD-10 zoning districts. A clear design concept is shown for each elevation and each design provides consistent characteristics of each stated style. All elevations and architectural style palettes are included in the Design Review Package (**Attachment 2 through 5**).

D. **Finding**: The proposed project will not create conflicts with vehicular, bicycle, or pedestrian transportation modes of circulation.

Evidence: The subdivision map was approved prior to this Design Review action. Vehicular, bicycle, and pedestrian circulation were studied and accepted as part of that prior approval. This Design Review approval will not impede any of the approved transportation modes.

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the 15th day of October, 2018 by the following vote:

AYES:

NOES:

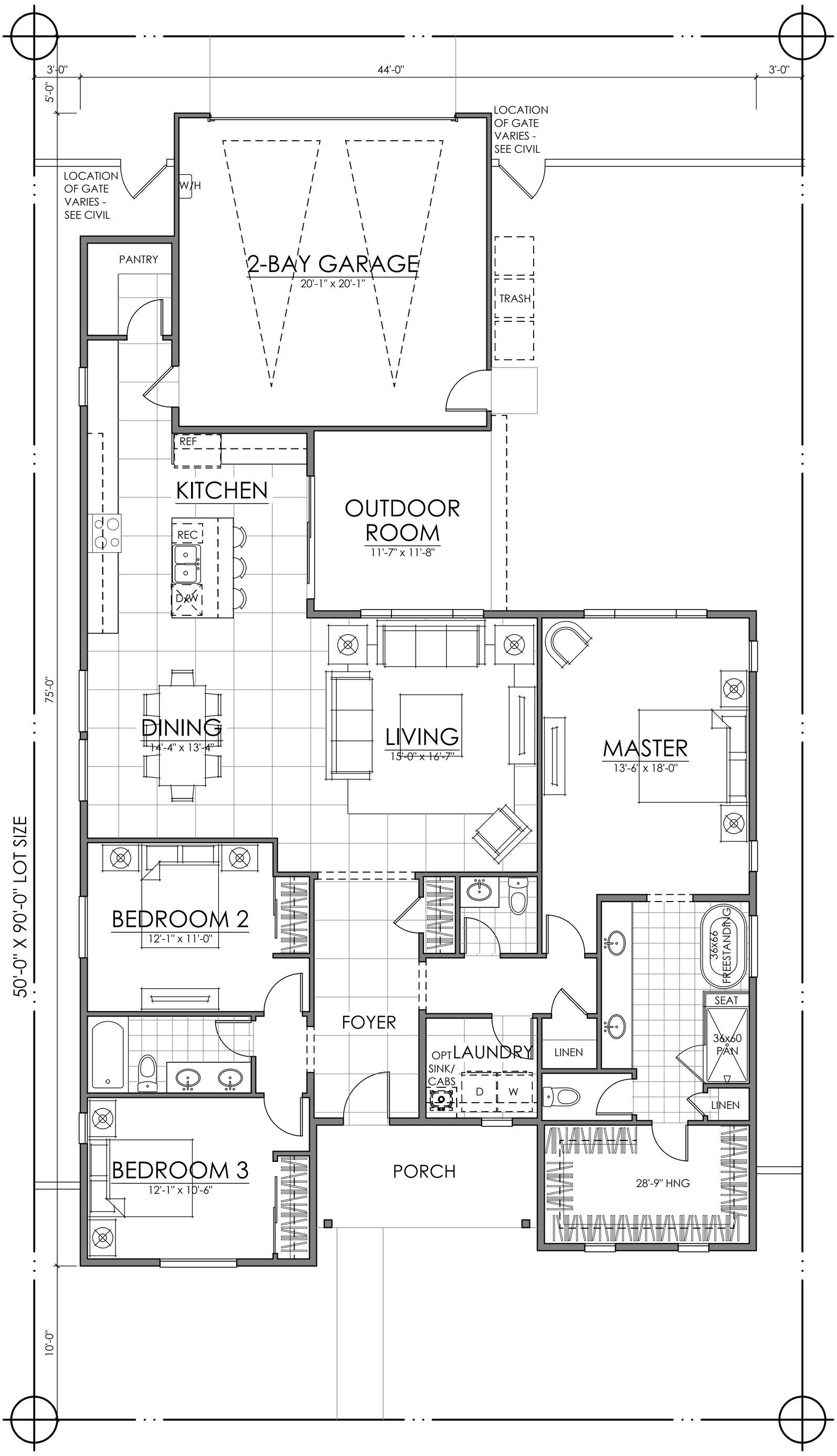
ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk



FIRST FLOOR	1991 SQ. FT.
TOTAL LIVING	**1991 SQ. FT.**

08.02.18

PLAN ONE | 1991 SQ. FT.

Woodside Homes®
BETTER BY DESIGN

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231

AGENDA ITEM 11.2

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'D' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'E' - MODERN FARMHOUSE

SCALE: 1/4" = 1'-0"

08.02.18

PLAN ONE | FRONT ELEVATIONS

Woodside Homes®
BETTER BY DESIGN

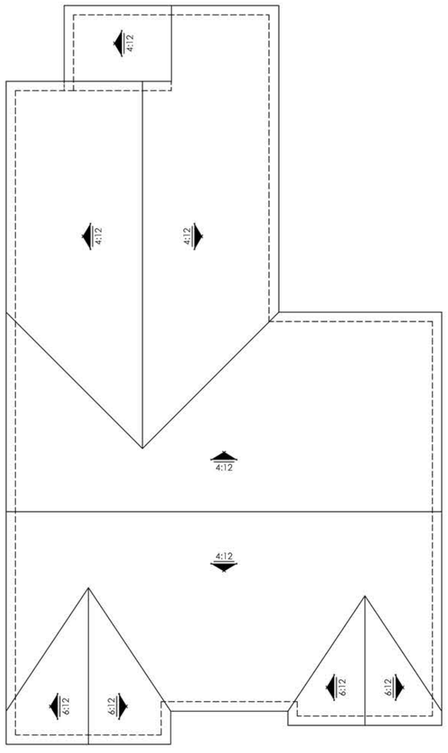
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231
: A
3919



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

3.02.18

PLAN ONE | ELEVATION B - WINE COUNTRY

SEQUOIA @ CYPRESS | 50x90

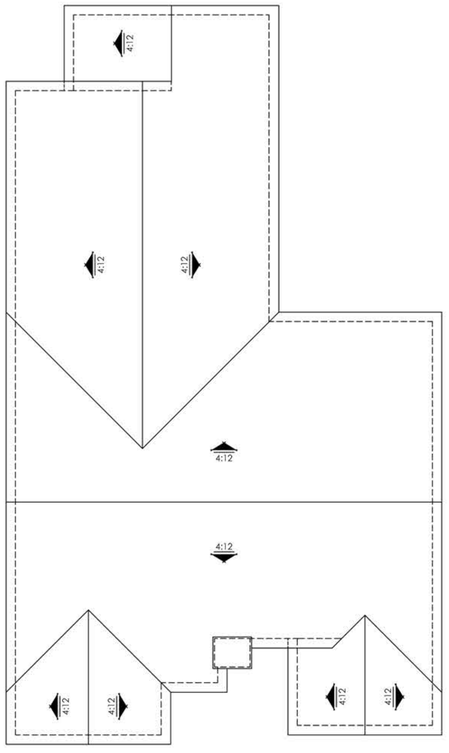
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

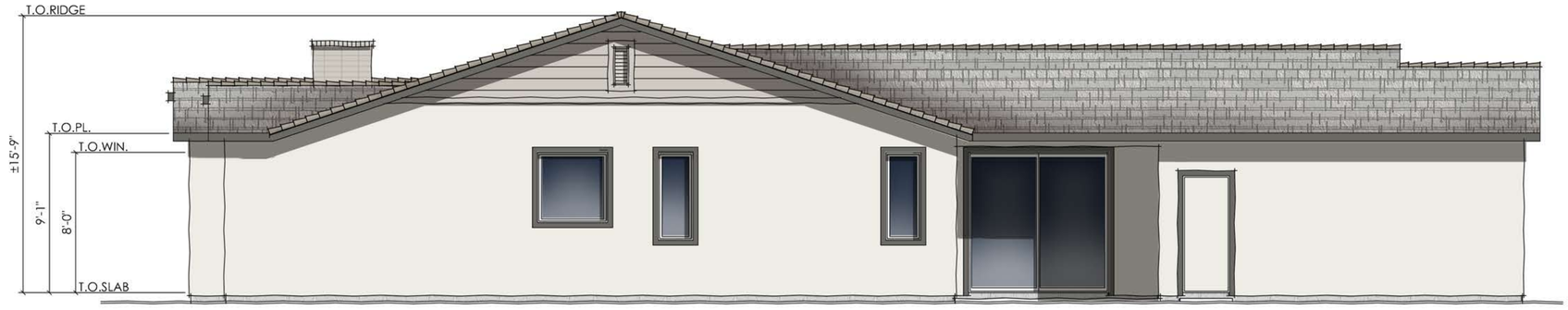
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN ONE | ELEVATION D - MID-CENTURY MODERN

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

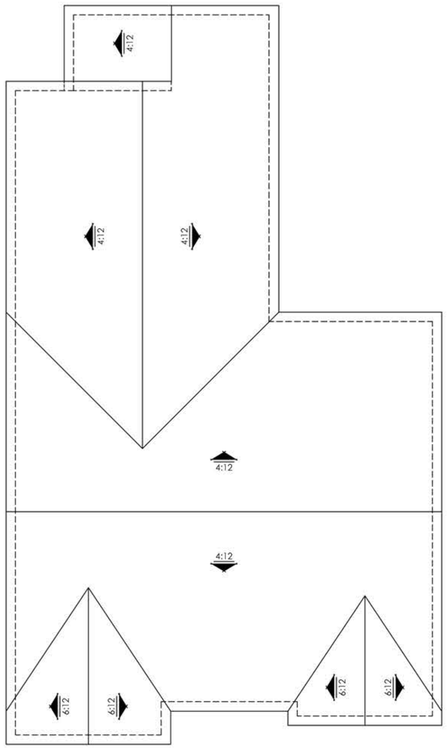
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

3.02.18

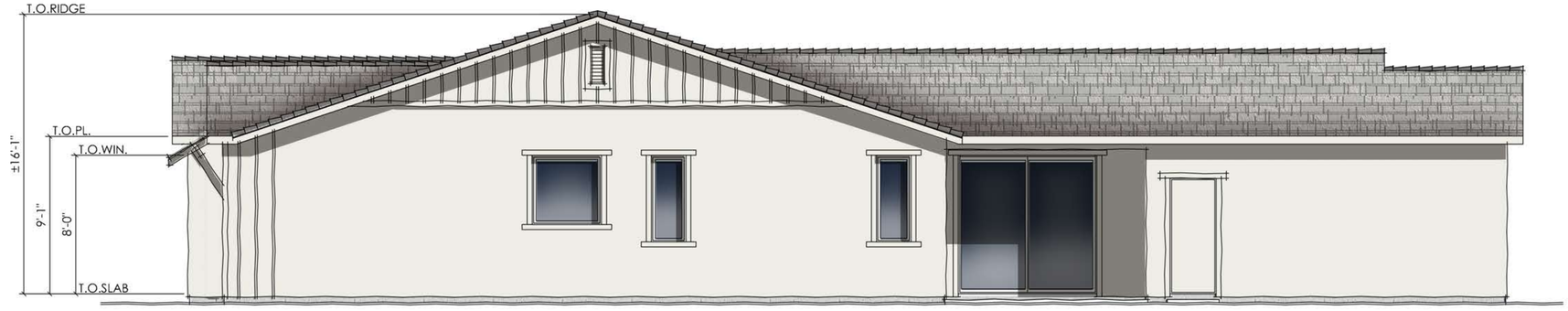
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN ONE | ELEVATION E - MODERN FARMHOUSE

3.02.18

SEQUOIA @ CYPRESS | 50x90

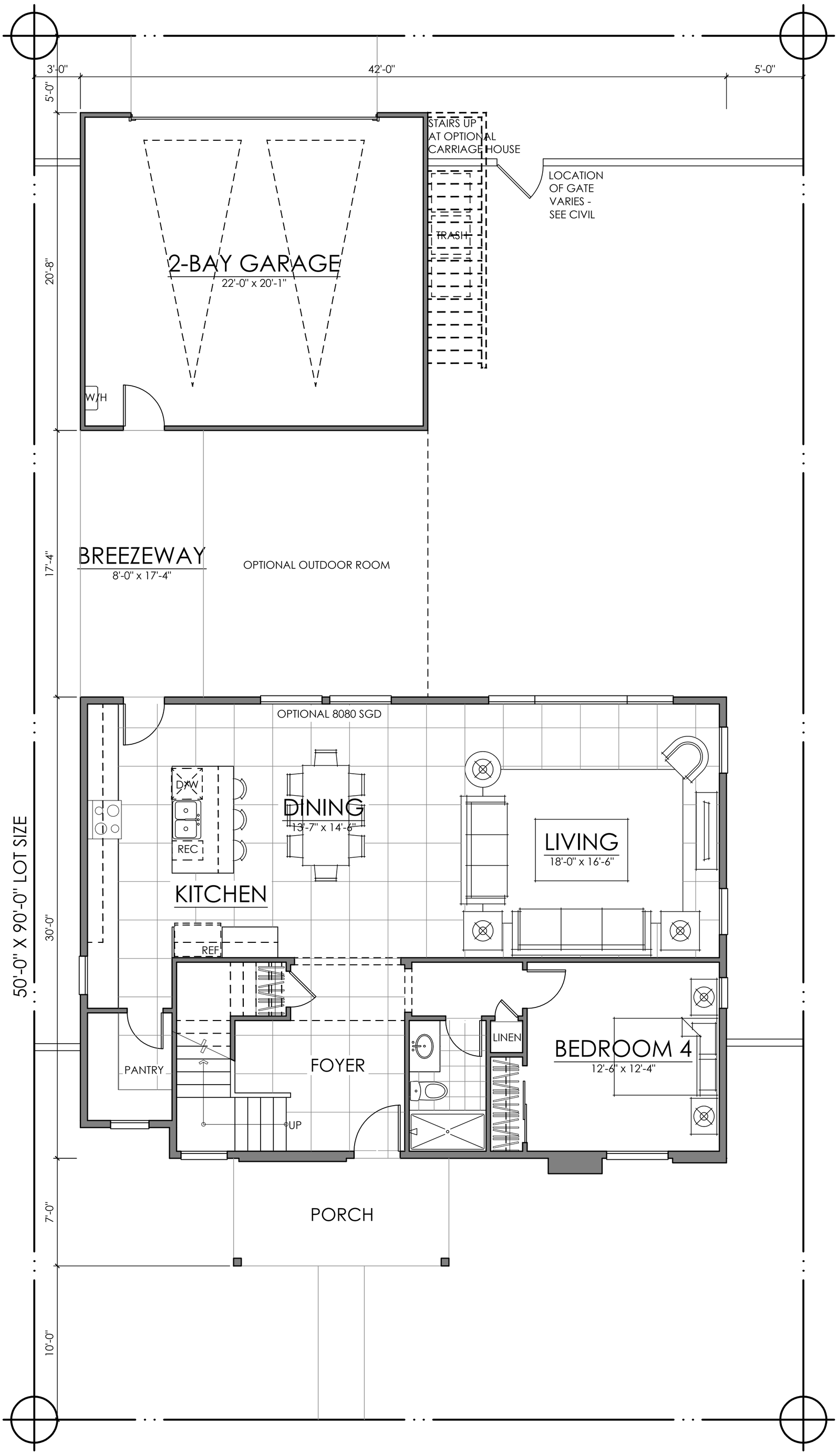
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



FIRST FLOOR	1248 SQ. FT.
SECOND FLOOR	1089 SQ. FT.
TOTAL LIVING	**2337 SQ. FT.**

08.02.18

PLAN TWO | 2337 SQ. FT.

Woodside Homes®
BETTER BY DESIGN

SEQUOIA @ CYPRESS | 50x90

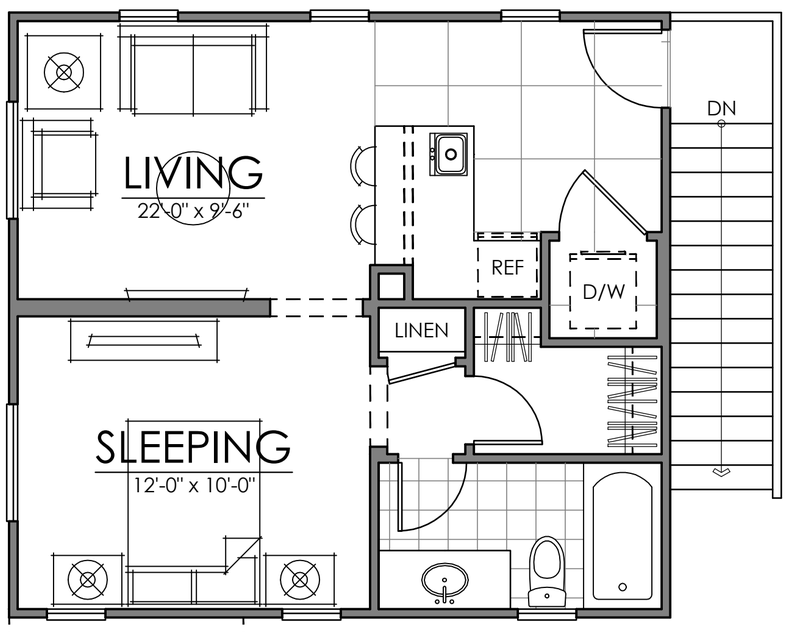
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

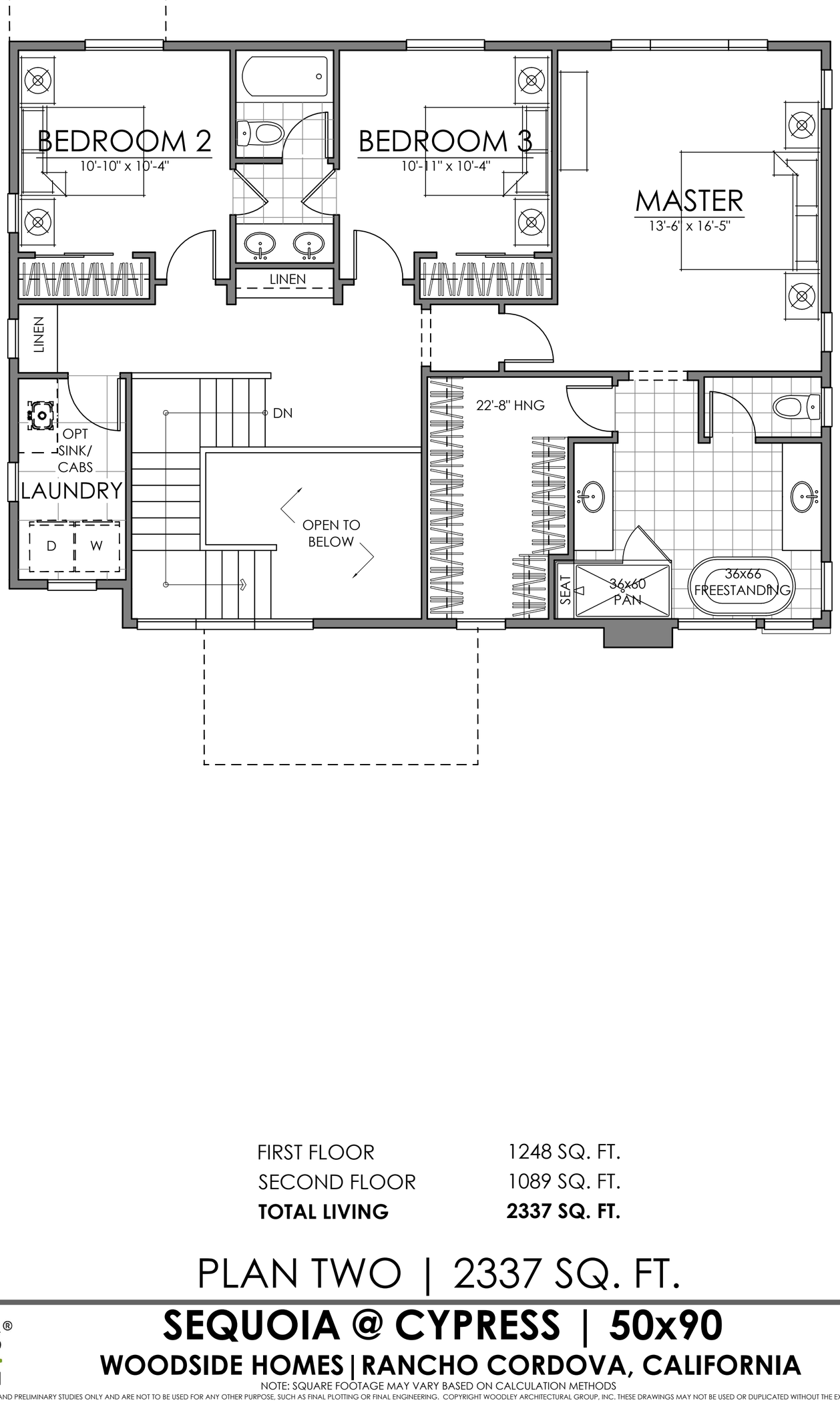
woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton. co 80120 / 303 683.7231

AGENDA ITEM 11.2

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



(OPTIONAL CARRIAGE HOUSE: +467 SQ. FT.)



FIRST FLOOR	1248 SQ. FT.
SECOND FLOOR	1089 SQ. FT.
TOTAL LIVING	**2337 SQ. FT.**

08.02.18

PLAN TWO | 2337 SQ. FT.

Woodside Homes®
BETTER BY DESIGN

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suite B
littleton. co 80120 / 303 683.7231



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'D' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'E' - MODERN FARMHOUSE

SCALE: 1/4" = 1'-0"

08.02.18

PLAN TWO | FRONT ELEVATIONS

Woodside Homes®
BETTER BY DESIGN

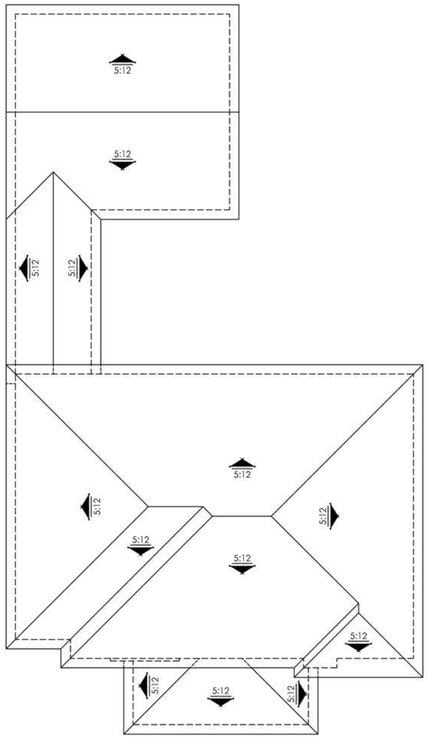
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

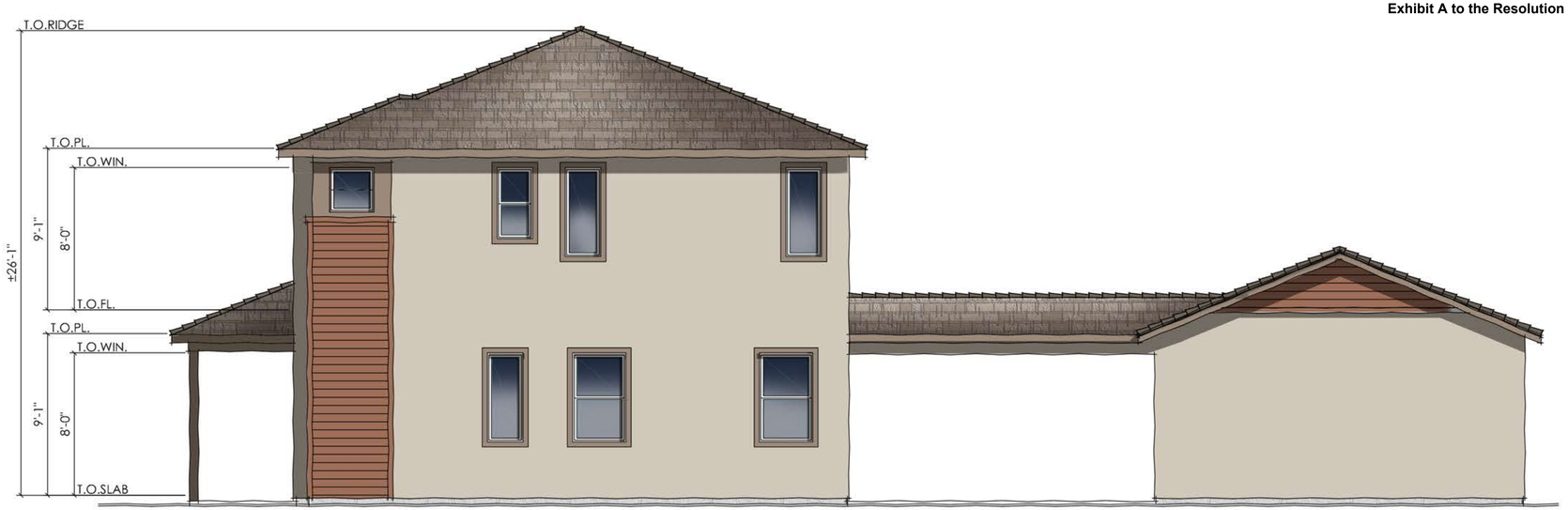
woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303.683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



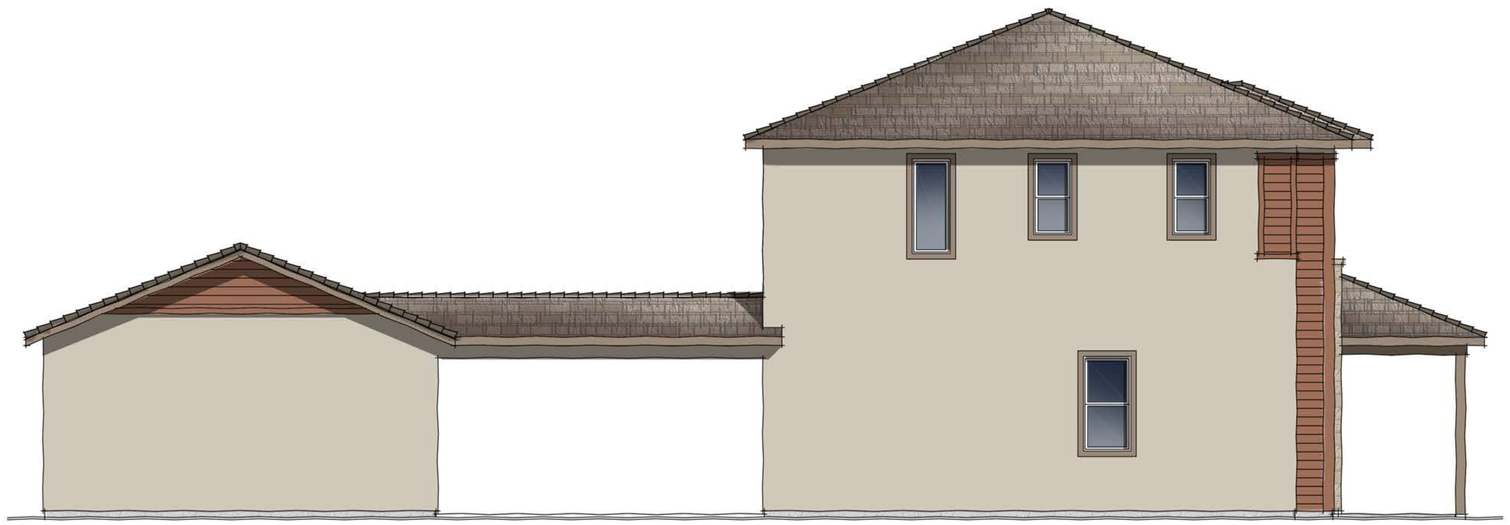
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION C - MODERN PRAIRIE

SEQUOIA @ CYPRESS | 50x90

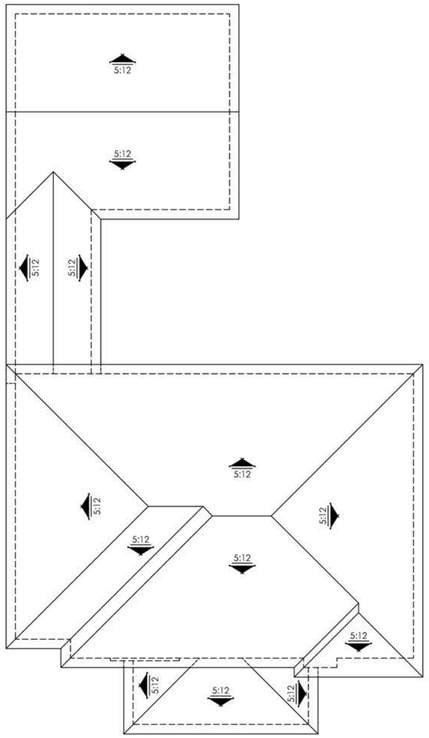
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



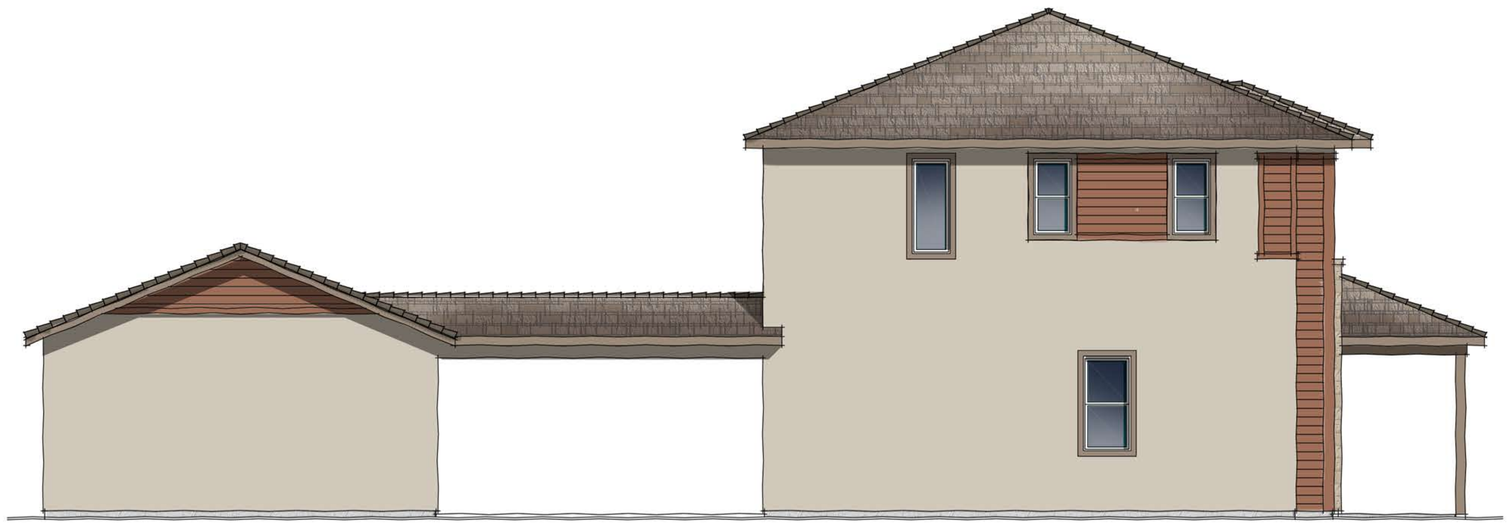
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION C ENHANCED - MODERN PRAIRIE

3.02.18

SEQUOIA @ CYPRESS | 50x90

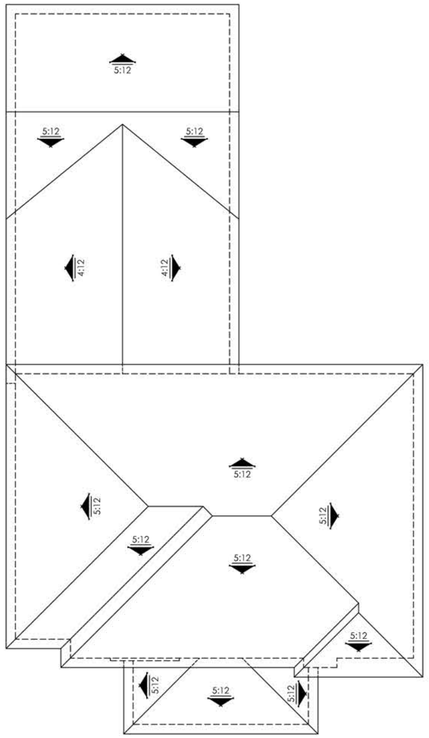
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION C OUTDOOR ROOM - MODERN PRAIRIE

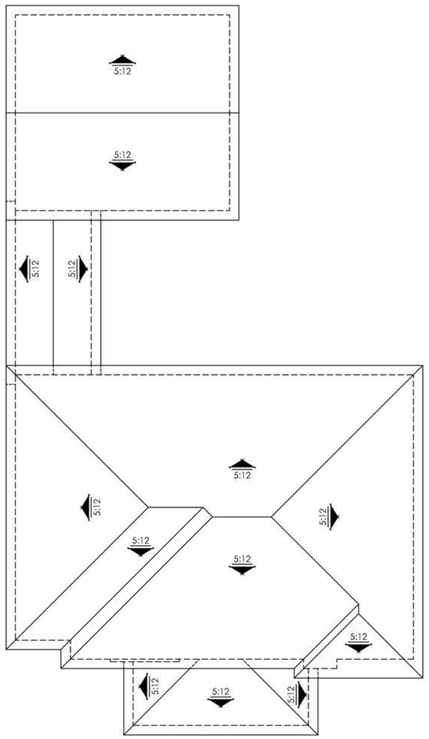
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



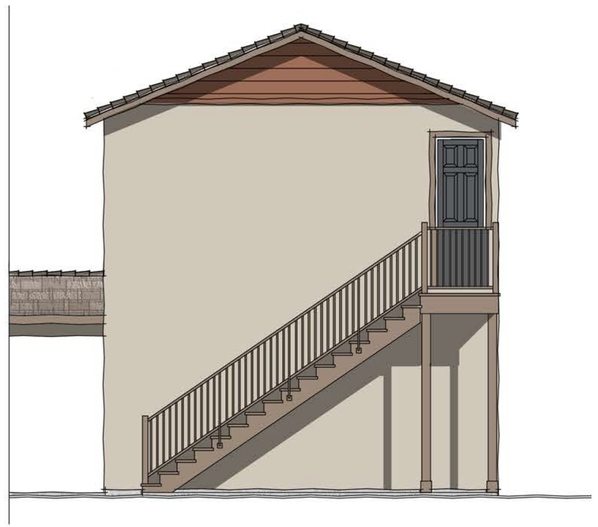
ROOF PLAN

SCALE: 1/8" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"



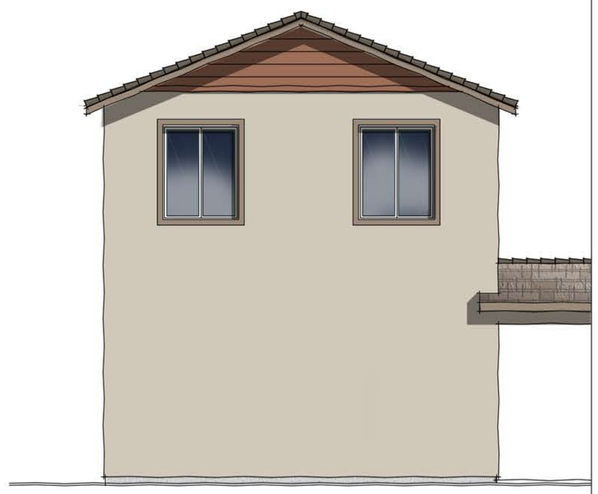
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION C CARRIAGE UNIT - MODERN PRAIRIE

SEQUOIA @ CYPRESS | 50x90

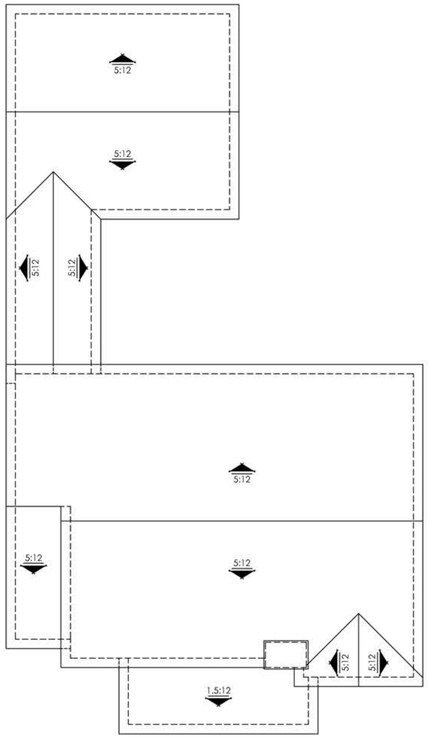
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION D - MID-CENTURY MODERN

SEQUOIA @ CYPRESS | 50x90

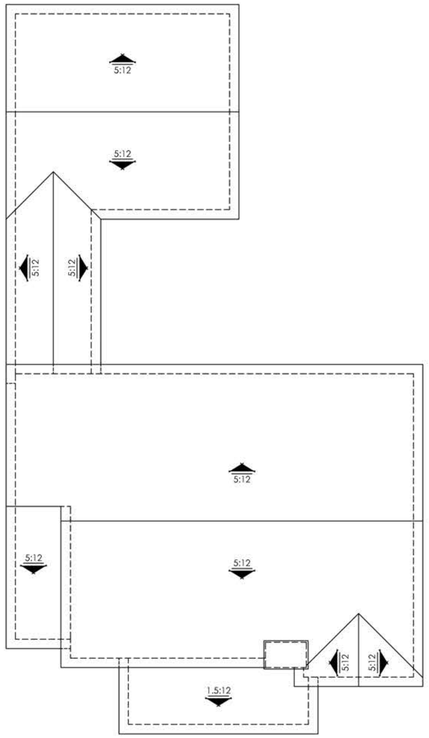
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION D ENHANCED - MID-CENTURY MODERN

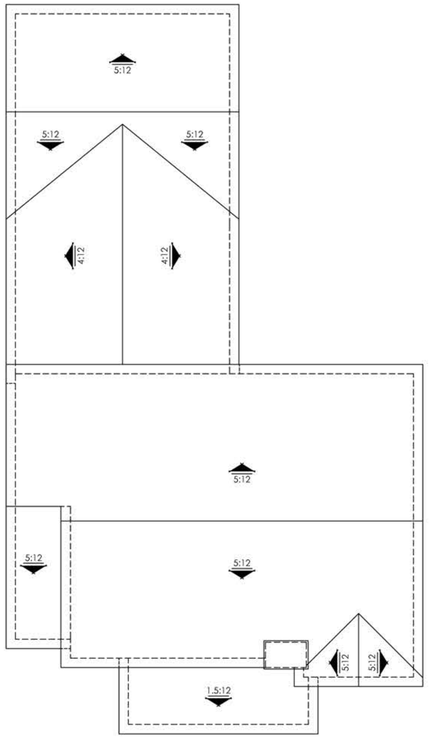
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION D OUTDOOR ROOM - MID-CENTURY MODERN

SEQUOIA @ CYPRESS | 50x90

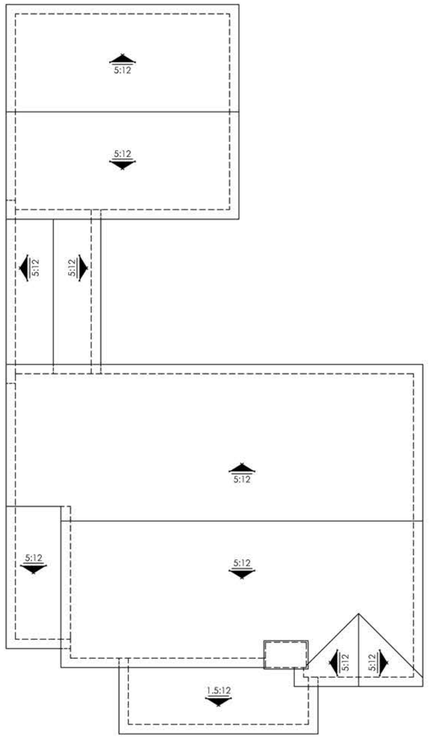
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.b717



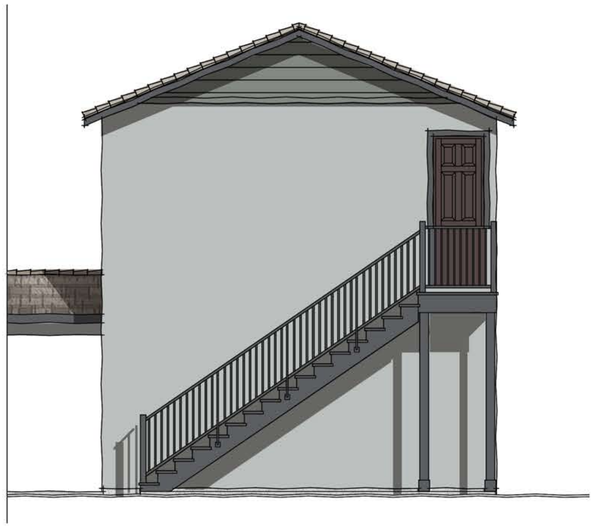
ROOF PLAN

SCALE: 1/8" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"



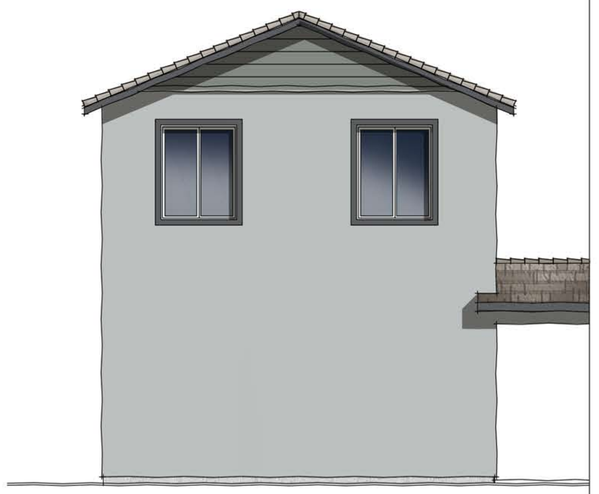
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION D CARRIAGE UNIT - MID-CENTURY MODERN

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

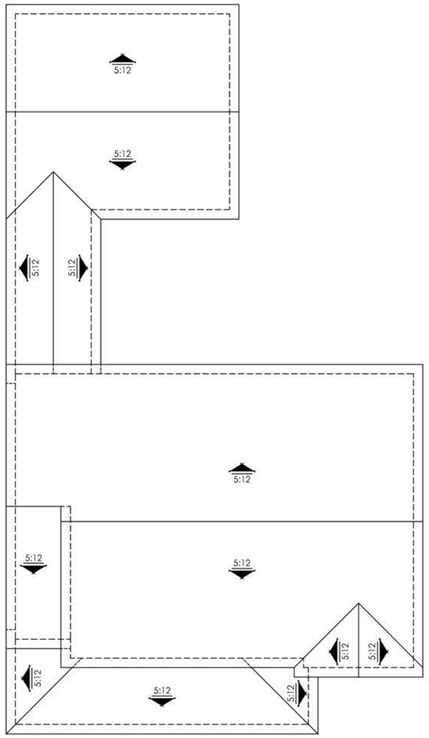
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

AGENDA ITEM 11.2

.02.18

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION E - MODERN FARMHOUSE

3.02.18

SEQUOIA @ CYPRESS | 50x90

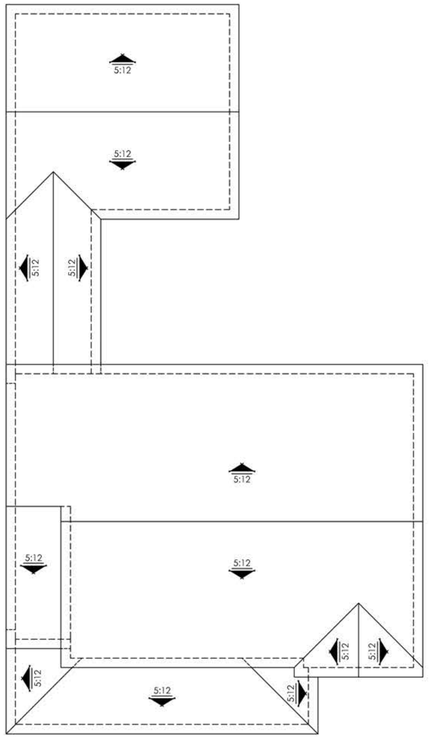
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION E ENHANCED - MODERN FARMHOUSE

3.02.18

AGENDA ITEM 11.2

Woodside Homes®
BETTER BY DESIGN

SEQUOIA @ CYPRESS | 50x90

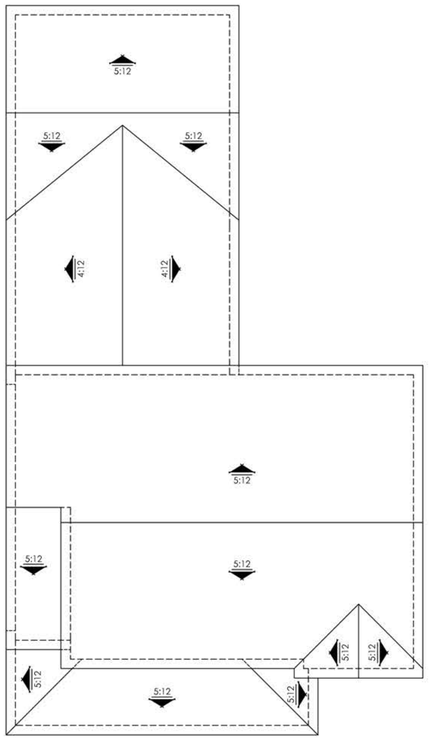
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717

7510



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION E OUTDOOR ROOM - MODERN FARMHOUSE

SEQUOIA @ CYPRESS | 50x90

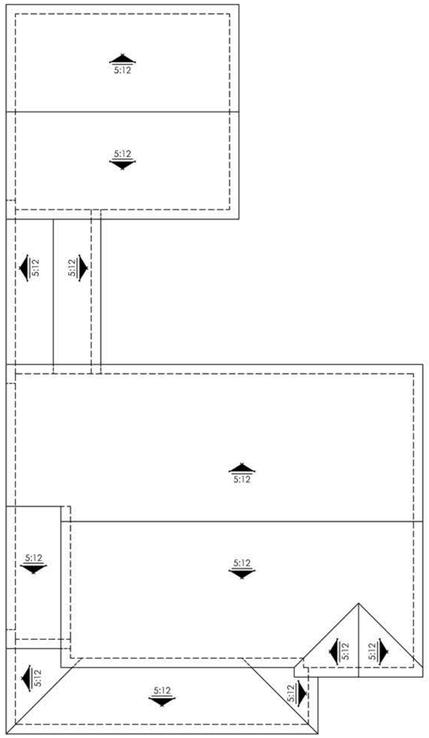
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION E CARRIAGE UNIT - MODERN FARMHOUSE

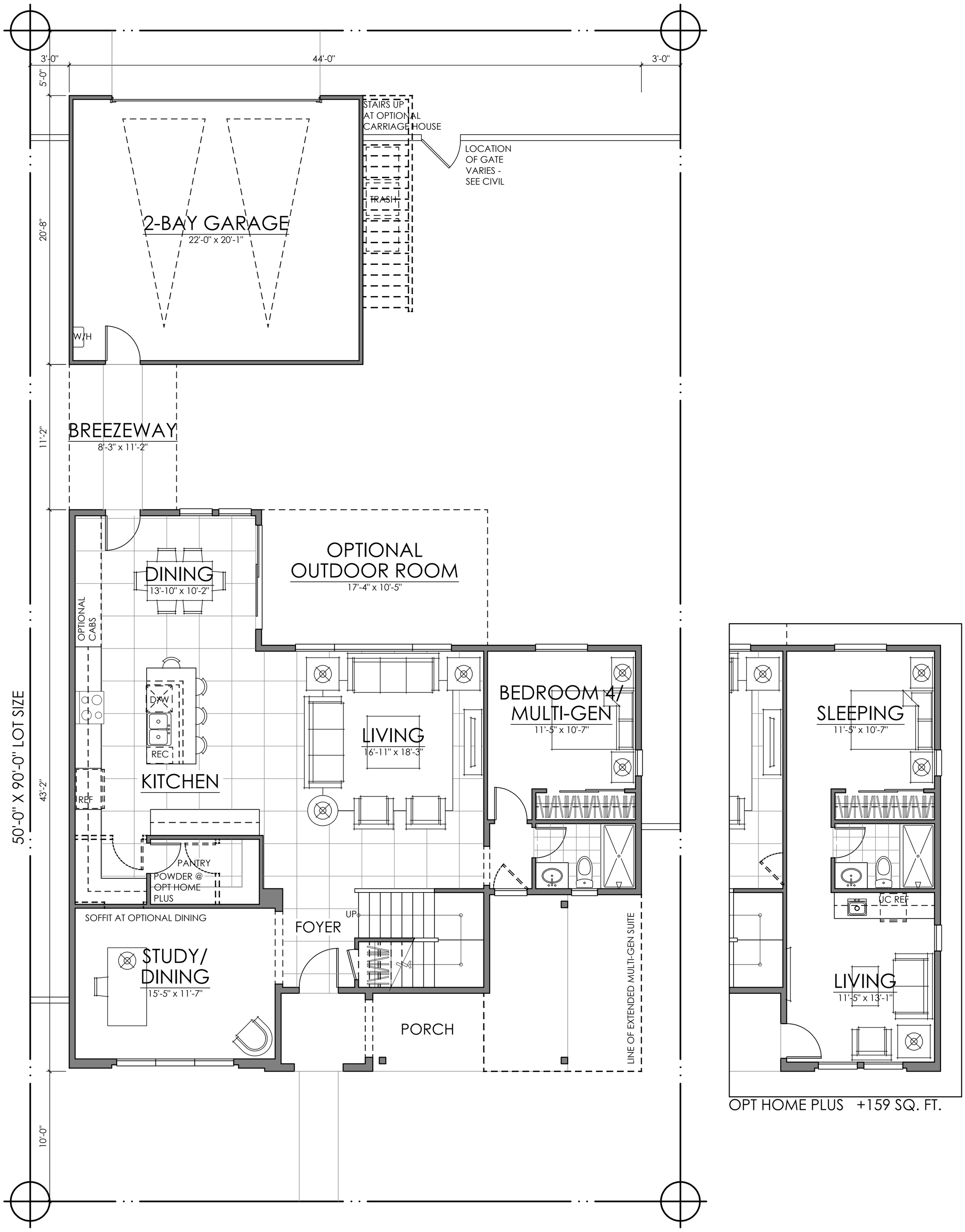
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



OPT HOME PLUS +159 SQ. FT.

FIRST FLOOR	1332 SQ. FT.
SECOND FLOOR	1258 SQ. FT.
TOTAL LIVING	**2590 SQ. FT.**

08.02.18

PLAN THREE | 2590 SQ. FT.

Woodside Homes®
BETTER BY DESIGN

SEQUOIA @ CYPRESS | 50x90

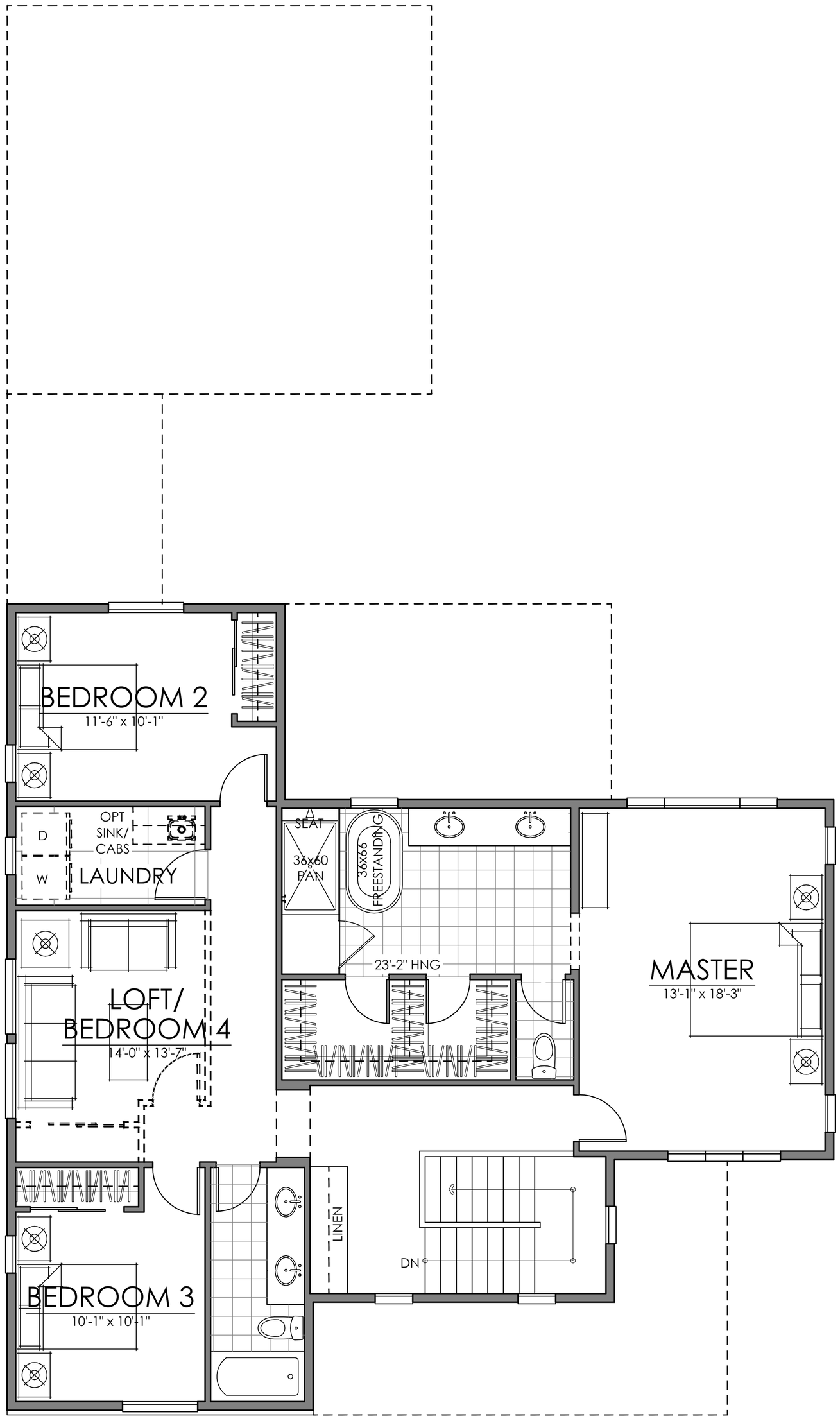
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

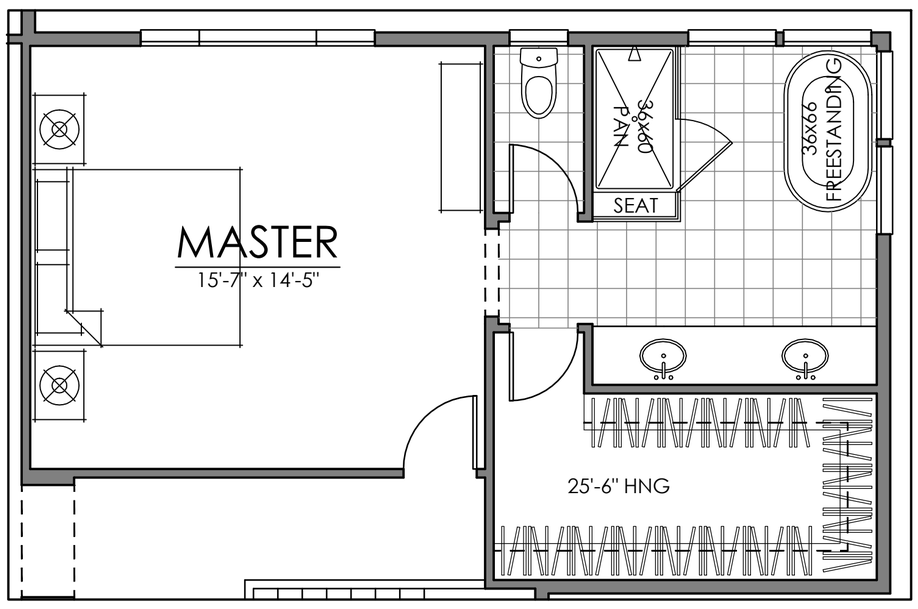
woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231

AGENDA ITEM 11.2 19

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.





ALTERNATE MASTER

FIRST FLOOR	1332 SQ. FT.
SECOND FLOOR	1258 SQ. FT.
TOTAL LIVING	**2590 SQ. FT.**

08.02.18

PLAN THREE | 2590 SQ. FT.

Woodside Homes®
BETTER BY DESIGN

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton. co 80120 / 303 683.7231



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'E' - MODERN FARMHOUSE

SCALE: 1/4" = 1'-0"

08.02.18

PLAN THREE | FRONT ELEVATIONS

Woodside Homes®
BETTER BY DESIGN

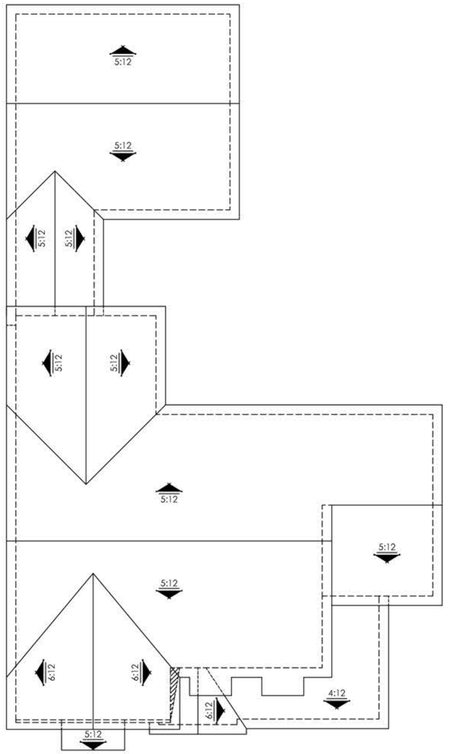
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303.683.7231



ROOF PLAN

SCALE: 1/8" = 1'-0"



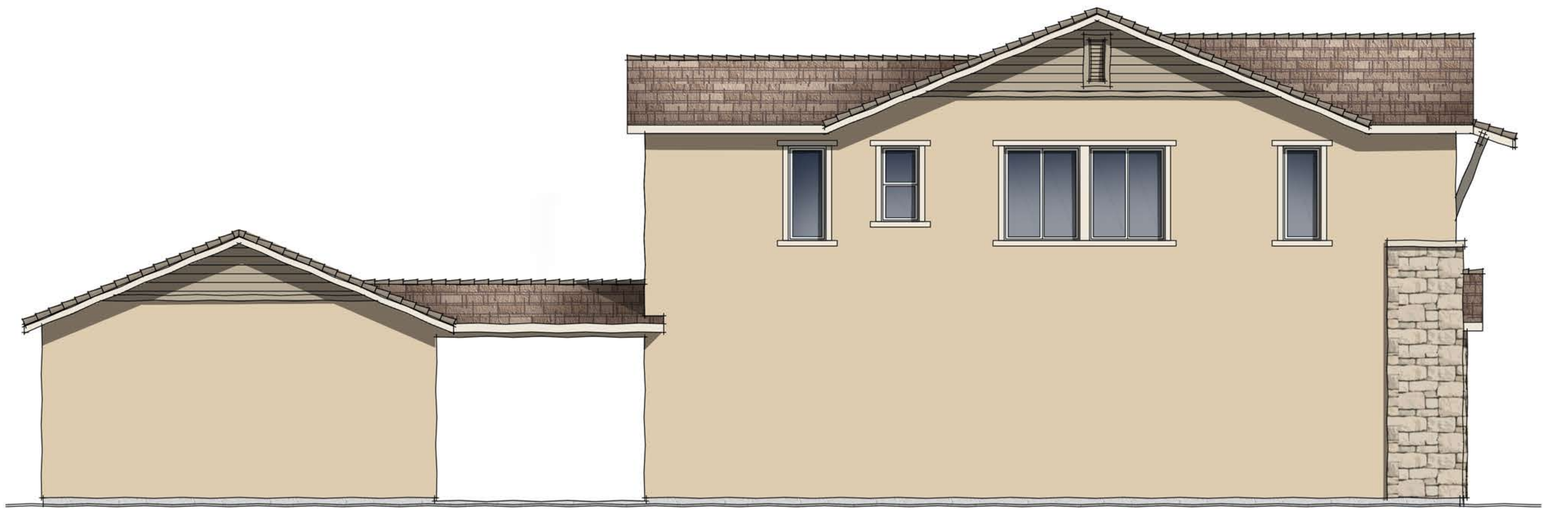
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B - WINE COUNTRY

SEQUOIA @ CYPRESS | 50x90

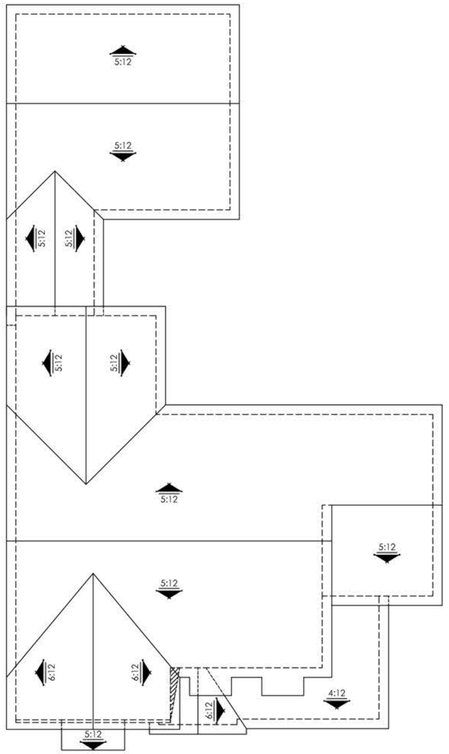
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B ENHANCED - WINE COUNTRY

.02.18

SEQUOIA @ CYPRESS | 50x90

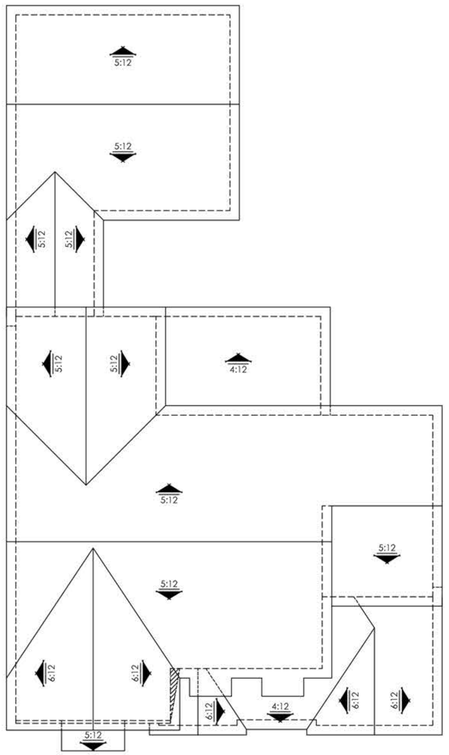
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.67



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B OUTDOOR ROOM - WINE COUNTRY

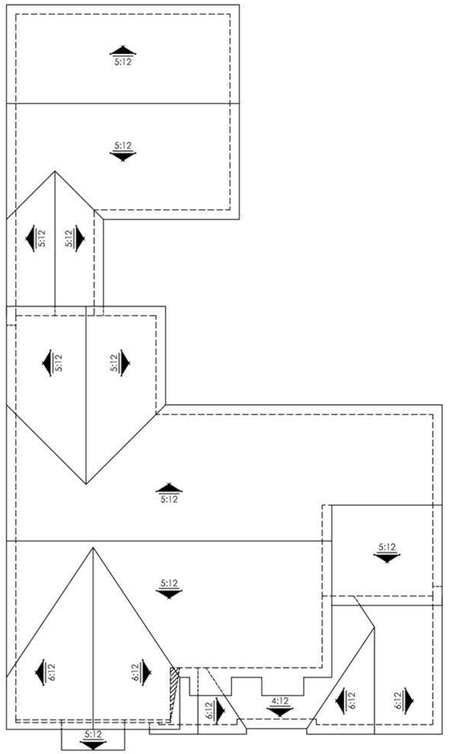
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.02.18

PLAN THREE | ELEVATION B MULTI-GEN SUITE - WINE COUNTRY

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

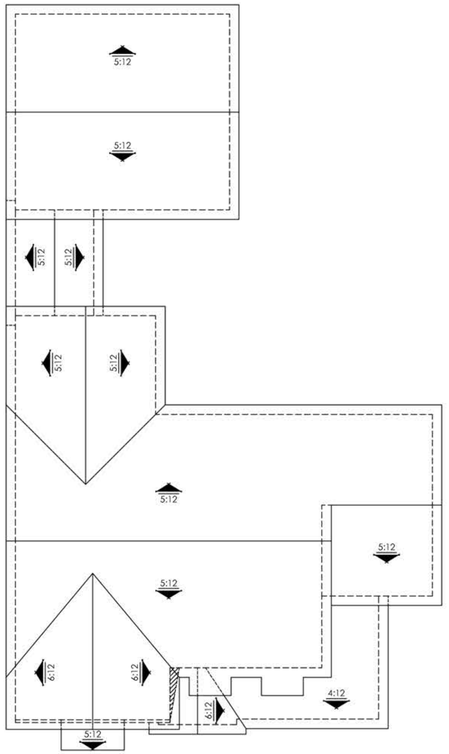
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. ©COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7519



ROOF PLAN

SCALE: 1/8" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"



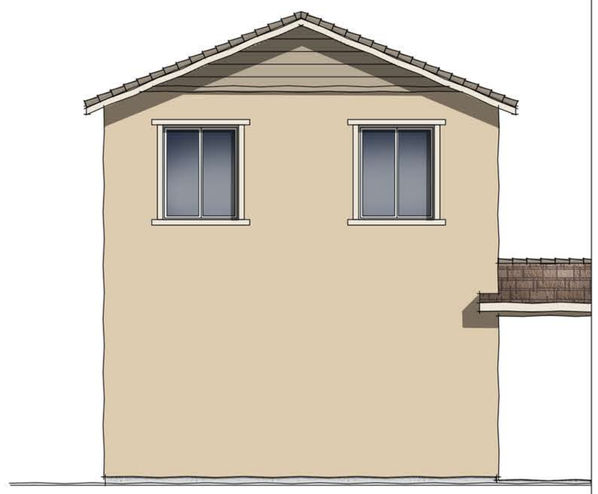
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B CARRIAGE UNIT - WINE COUNTRY

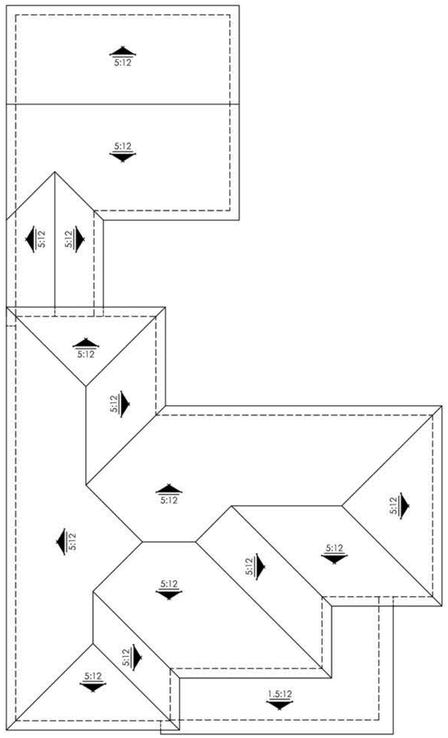
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION C - MODERN PRAIRIE

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

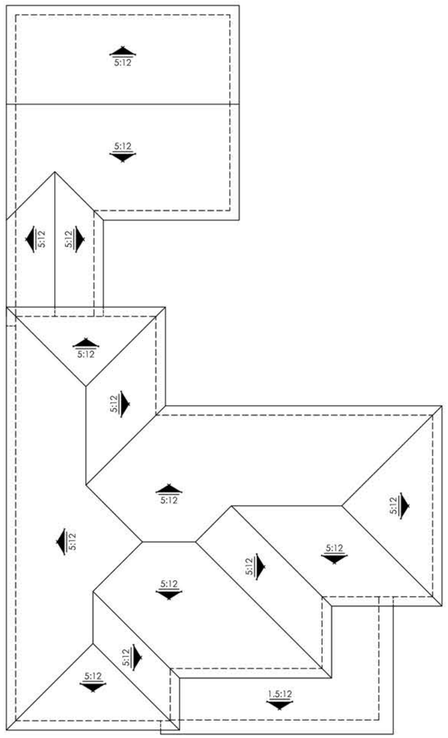
.02.18

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7521

AGENDA ITEM 11.2



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION C ENHANCED - MODERN PRAIRIE

3.02.18

Woodside Homes®
BETTER BY DESIGN

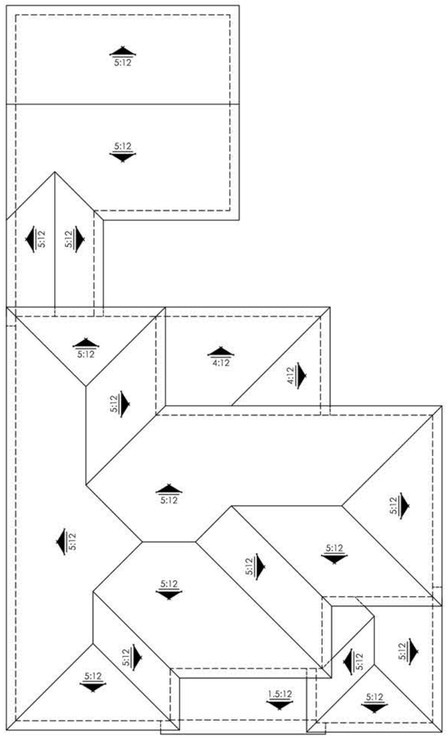
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION C OUTDOOR ROOM - MODERN PRAIRIE

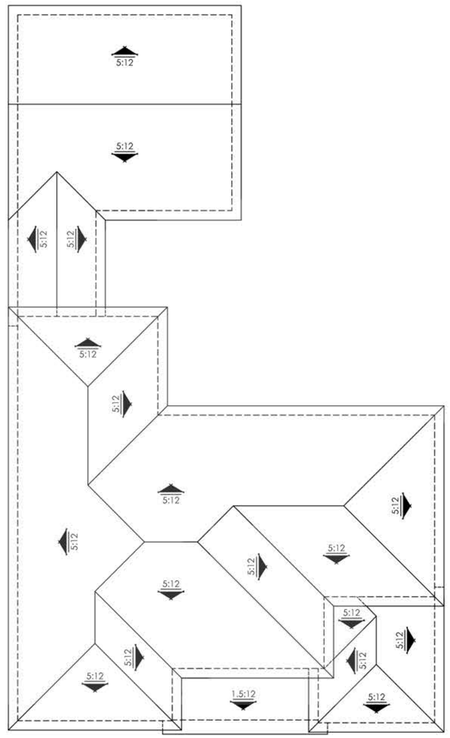
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION C MULTI-GEN SUITE - MODERN PRAIRIE

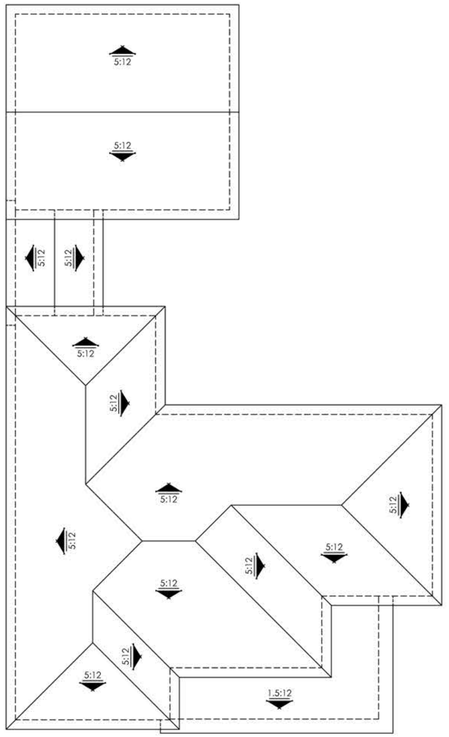
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

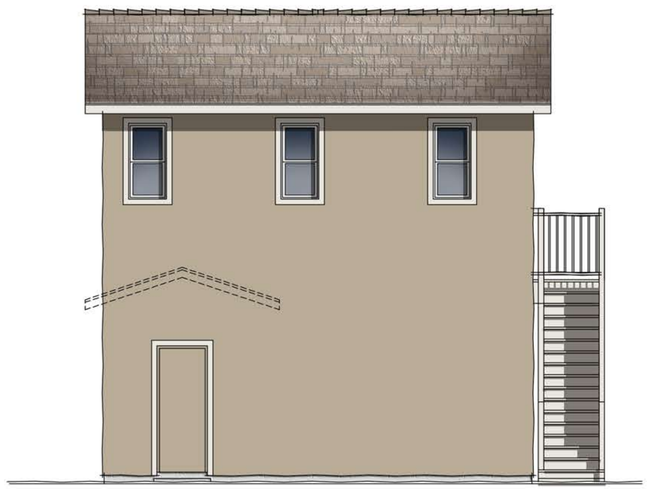
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION C CARRIAGE UNIT - MODERN PRAIRIE

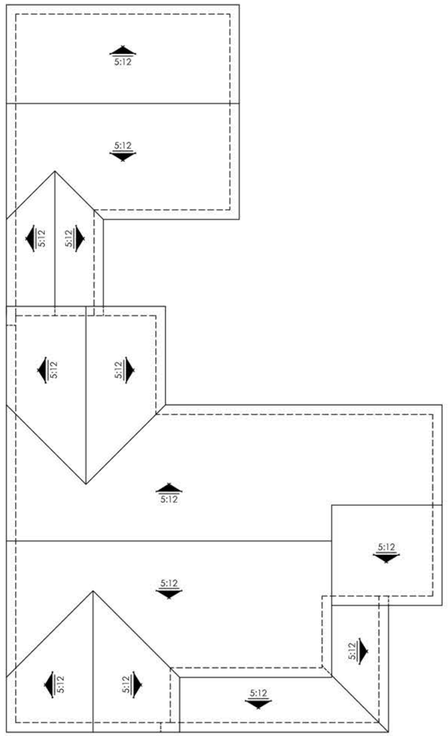
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



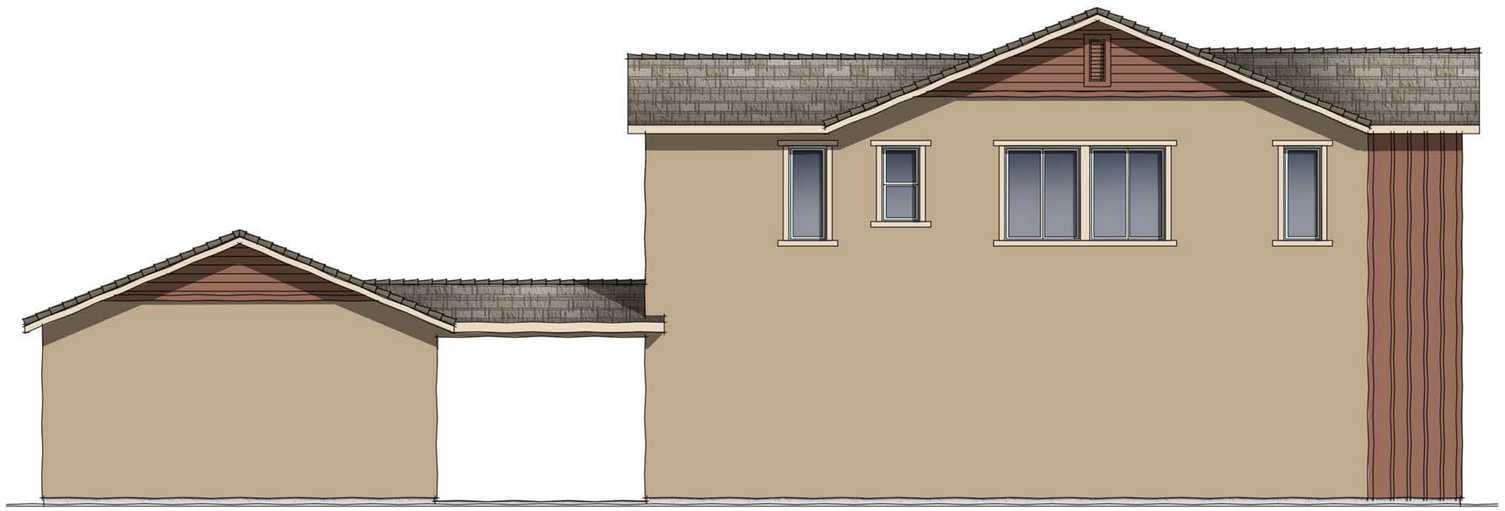
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION E - MODERN FARMHOUSE

3.02.18

Woodside Homes®
BETTER BY DESIGN

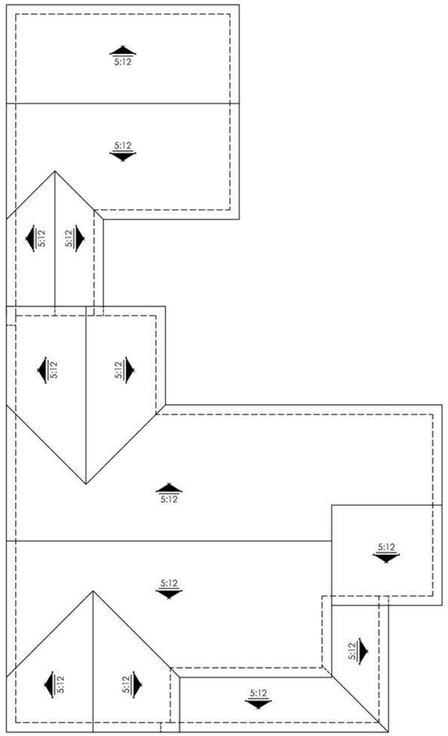
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.02.18

PLAN THREE | ELEVATION E ENHANCED - MODERN FARMHOUSE

SEQUOIA @ CYPRESS | 50x90

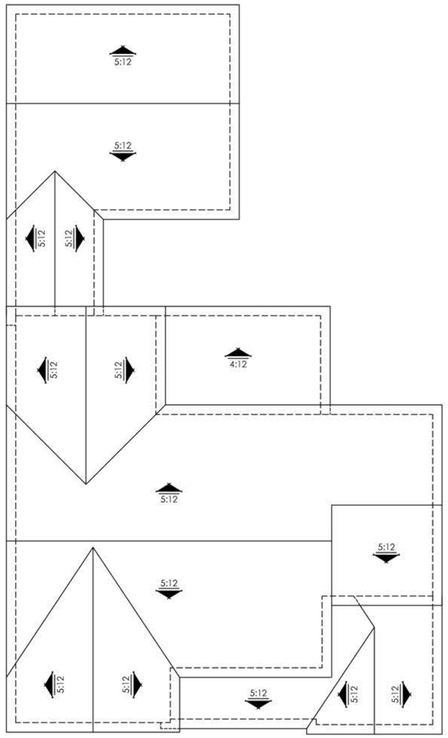
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION E OUTDOOR ROOM - MODERN FARMHOUSE

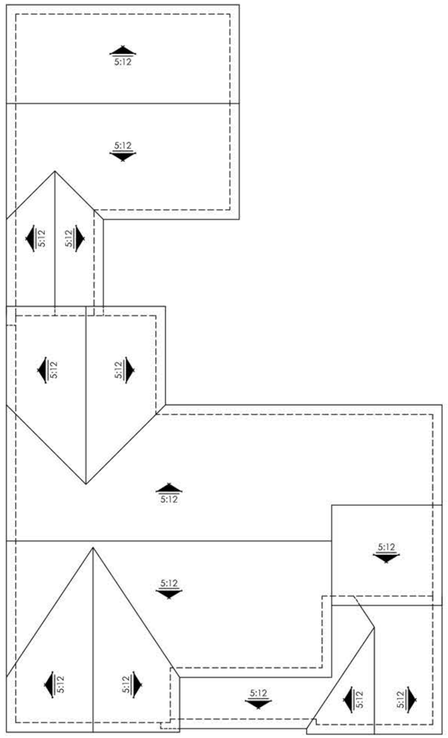
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"

FRONT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION E MULTI-GEN SUITE - MODERN FARMHOUSE

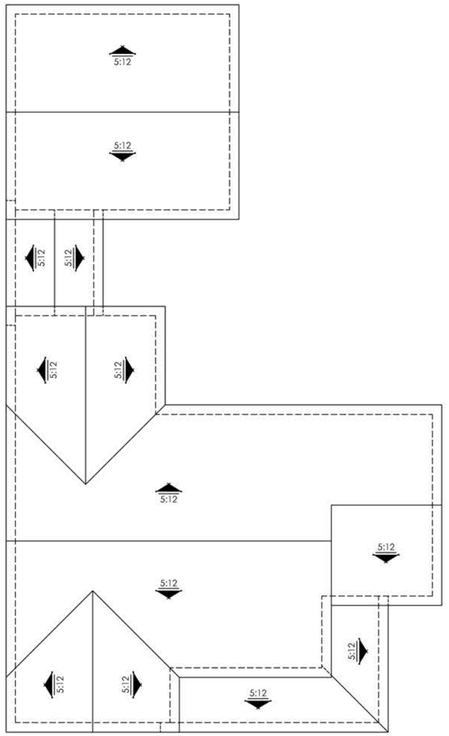
SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.67



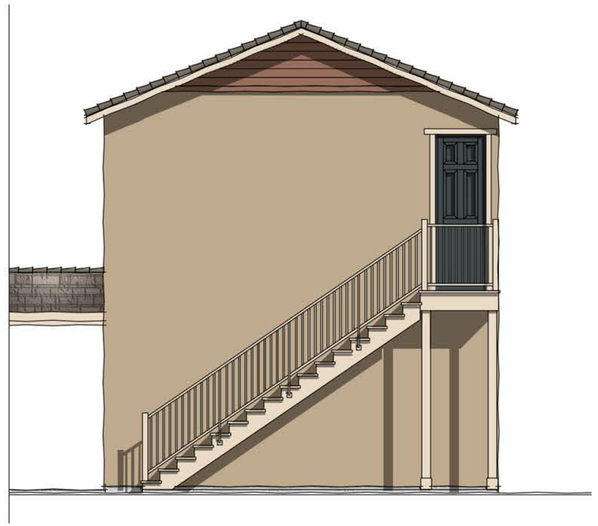
ROOF PLAN

SCALE: 1/8" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"



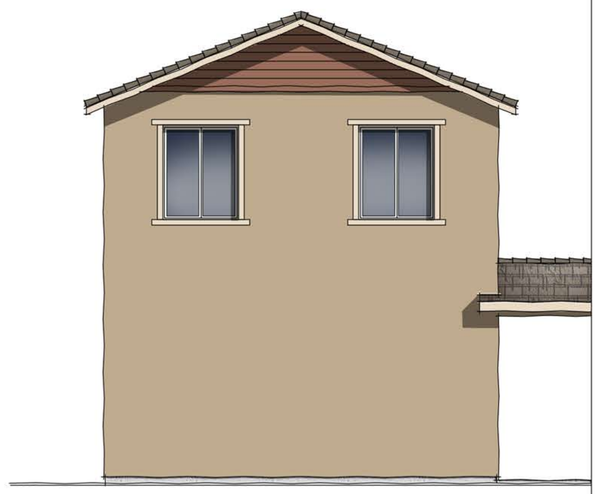
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION E CARRIAGE UNIT - MODERN FARMHOUSE

SEQUOIA @ CYPRESS | 50x90

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

AGENDA ITEM 11.2

.02.18

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717

woodleyarchitecturalgroup,inc.

ATTACHMENT 2
Exhibit A to the Resolution

Sequoia @ Cypress 50x90
Woodside Homes

Color Schemes
08.02.18

Woodside Homes
BETTER BY DESIGN

colorado 731 southpark drive suite b, littleton, colorado 80120 | (t) 303.683.7231 | (f) 303.683.2922
california 2943 pullman street suite a, santa ana, california 92705 | (t) 949

Sequoia @ Cypress | 5E.X.2 Alley
Elevation B
Wine Country
Scheme 4



Roof Tile

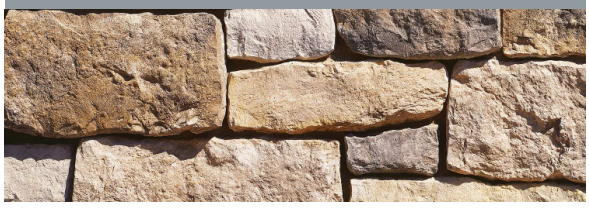
Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters



Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Sequoia @ Cypress | 5E.X1 Alley

ATTACHMENT 2
Exhibit A to the Resolution

Elevation B
Wine Country
Scheme 5



Roof Tile

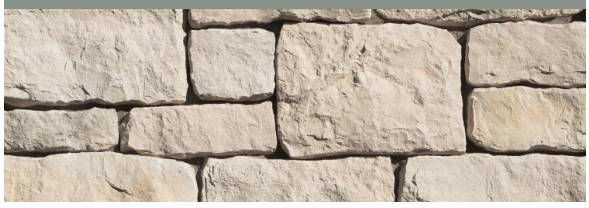
Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters



Stone Veneer

Woodside Homes
BETTER BY DESIGN

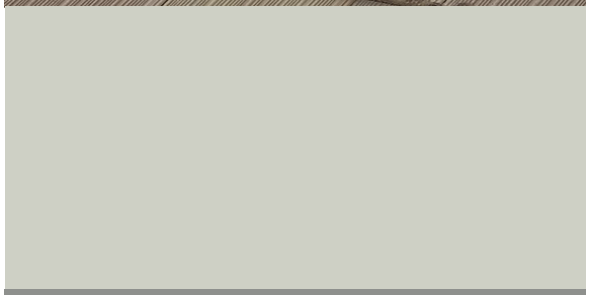
woodleyarchitecturalgroup,inc.

ATTACHMENT 2
Exhibit A to the Resolution

Sequoia @ Cypress | 5E.X.2 Alley
Elevation B
Wine Country
Scheme 6



Roof Tile



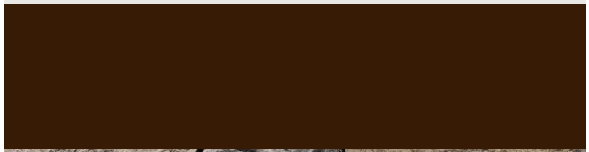
Stucco



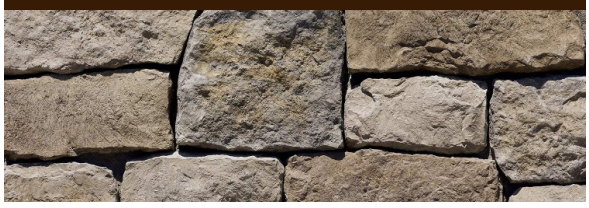
Siding

Trim

Fascia
& Garage Door



Entry Door
& Shutters

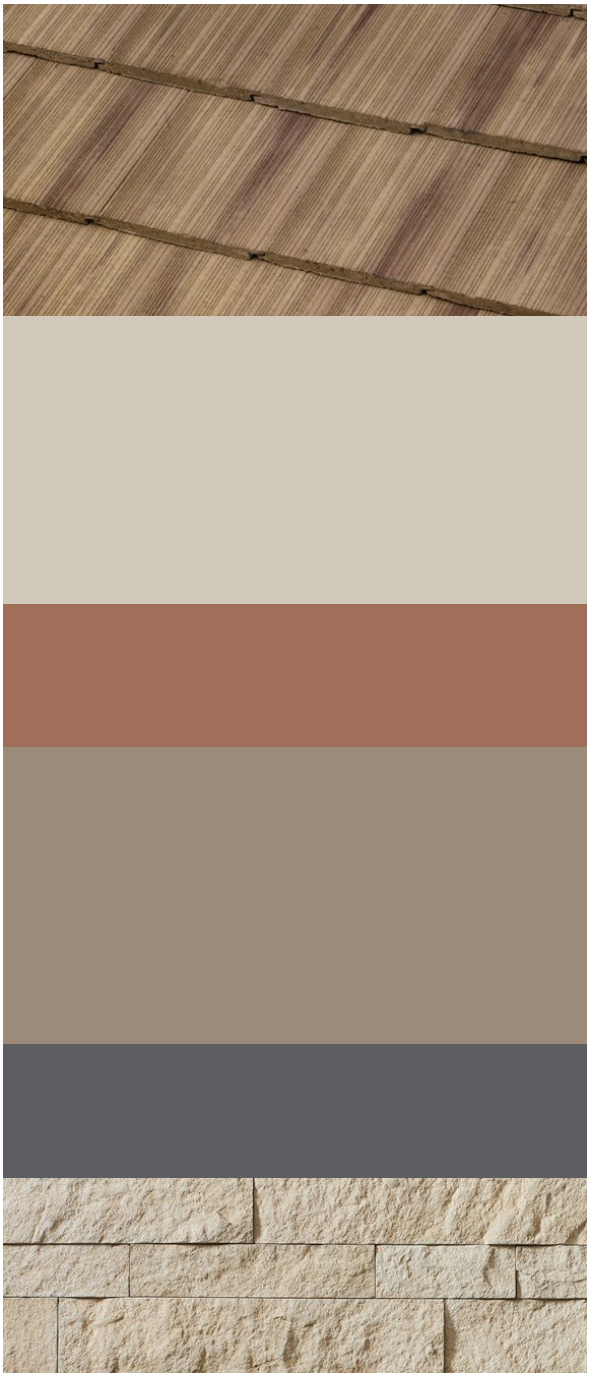


Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Sequoia @ Cypress | 45' x 94' Alley
Elevation C
Modern Prairie
Scheme 7



Roof Tile

Stucco

Lap Siding

Trim,Fascia
& Garage Door

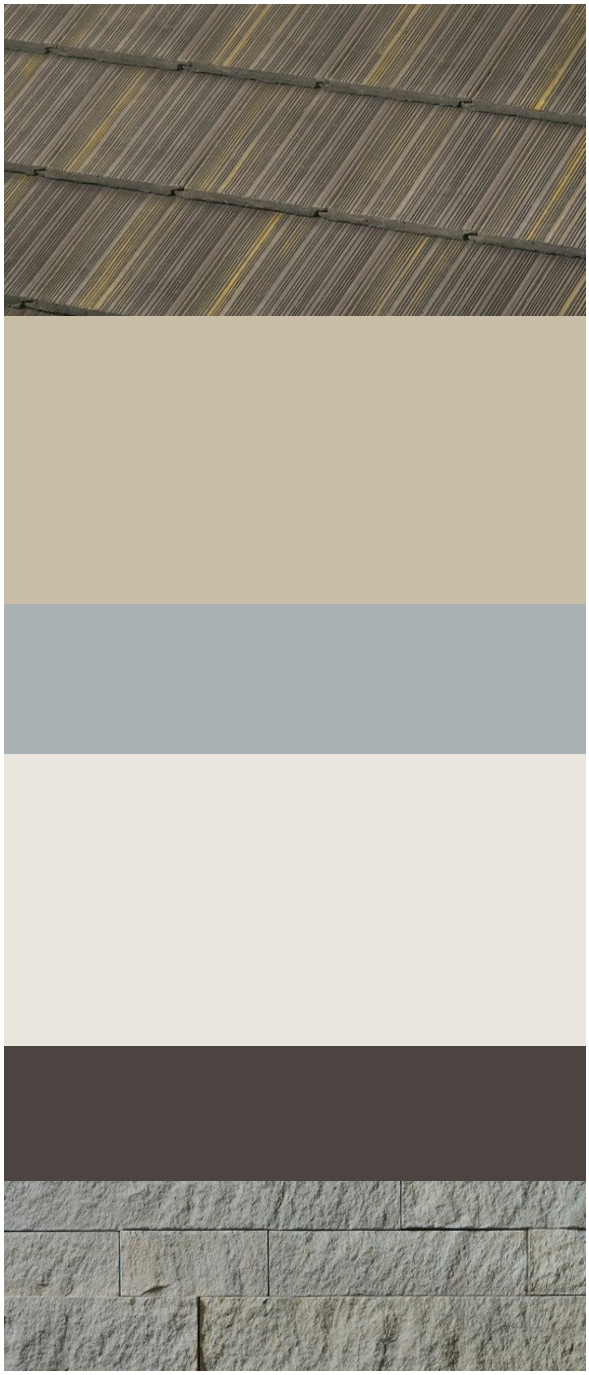
Entry Door
& Shutters

Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Sequoia @ Cypress | 45' x 94' Alley
ATTACHMENT 2
Exhibit A to the Resolution
Elevation C
Modern Prairie
Scheme 8



Roof Tile

Stucco

Lap Siding

Trim,Fascia
& Garage Door

Entry Door
& Shutters

Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Sequoia @ Cypress | 45'x94' Alley
Elevation C
Modern Prairie
Scheme 9



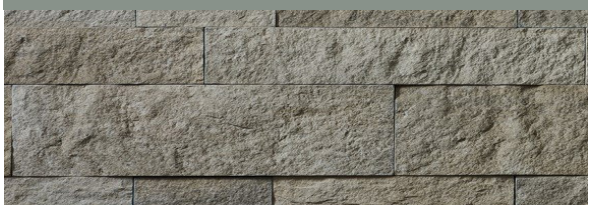
Roof Tile

Stucco

Lap Siding

Trim,Fascia
& Garage Door

Entry Door
& Shutters



Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Sequoia @ Cypress | 50' x 92' Alley
Exhibit A to the Resolution

ATTACHMENT 2
Elevation D
Mid Century Modern
Scheme 10



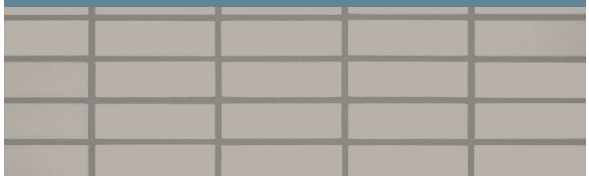
Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters



Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Sequoia @ Cypress | 50' x 92' Alley
ATTACHMENT 2
Exhibit A to the Resolution
Elevation D
Mid Century Modern
Scheme 11



Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters

Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 2
Exhibit A to the Resolution

Sequoia @ Cypress | 50 x 92 Alley
Elevation D
Mid Century Modern
Scheme 12



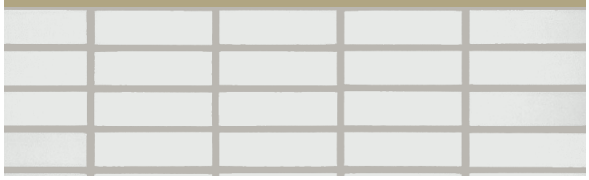
Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters



Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Sequoia @ Cypress | 30 290 Alley

ATTACHMENT 2

Exhibit A to the Resolution

Elevation E

Modern Farmhouse

Scheme 13



Roof Tile

Stucco

Siding

Trim,Fascia
& Garage Door

Entry Door

Shutters

Sequoia @ Cypress | 30290 Alley
Elevation E
Modern Farmhouse
Scheme 14



Roof Tile

Stucco

Siding

Trim,Fascia
& Garage Door

Entry Door

Shutters

Sequoia @ Cypress | 30290 Alley
Elevation E
Modern Farmhouse
Scheme 15



Roof Tile

Stucco

Siding

Trim,Fascia
& Garage Door

Entry Door

Shutters

ATTACHMENT 2
Exhibit A to the Resolution

Paint: PPG	Stone Grout: Orco	05.08.18- Original Date
Roof: Boral		08.02.18-Revisions per drc comments
Metal Roof: Taylor Metal Products		
Stone: El Dorado & Cultured Stone		

WINE COUNTRY ELEVATION B	**Scheme 4**	**Scheme 5**	**Scheme 6**
ROOF *SAXONY 900 SHAKE*	1FBCJ3181 SMOKEY TOPAZ BLEND	1FBCF3214 SHADOW BROWN	1FBCJ4070 SEA PEARL BLEND
STUCCO	15-09 ANTELOPE	12-26 ASSATEAGUE SAND	10 07 BAY OF FUNDY
SIDING	1100-2 ADOBE WHITE	14-27 TRUE KHAKI	1009-5 PHOENIX FOSSIL
TRIM	1006-1 GYPSUM	14-23 EDELWEISS	1010-1 PEGASUS
FASCIA | GARAGE DOOR	15-18 INTROSPECTIVE	14-23 EDELWEISS	1010-1 PEGASUS
ENTRY DOOR | SHUTTERS	1039-4 PACHYDERM	1033-5 GRAY HERON	15-24 FRENCH TOAST
METAL ROOF	WEATHERED COPPER	WEATHERED COPPER	WEATHERED COPPER
STONE (DRYSTACK) *EL DORADO STONE*	ROUGH CUT AUTUMN LEAF	ROUGH CUT CASA BLANCA	ROUGH CUT MOONLIGHT
TRIM @ STONE	1021-4 DIVERSION	1024-2 ANTIQUE WHITE	1023-4 DESERT DUNE

ATTACHMENT 2
Exhibit A to the Resolution

MODERN PRAIRIE ELEVATION C	**Scheme7**	**Scheme8**	**Scheme9**
ROOF *SAXONY 900 SHAKE*	1FBCF3293 CEDAR BLEND	1FBCF3233 BROWN BLEND	1FBCF3763 KOKOMO
STUCCO	1024-4 MOTH GRAY	14-26 HIDEAWAY	1021-2 SYNCHRONICITY
CEMENTITIOUS LAP SIDING	16-07 SOUTHERN WOOD	1039-3 MIRROR MIRROR	1007-5 LAZY AFTERNOON
TRIM	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1007-5 LAZY AFTERNOON
FASCIA | GARAGE DOOR	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1007-1 WILLOW SPRINGS
ENTRY DOOR	1011-6 GLAZED GRANITE	1002-7 PHANTOM MIST	10 29 DUSY AQUA
STONE GROUT	DRYSTACK	DRYSTACK	DRYSTACK
STONE: *Cultured Stone* *Pattern # HSP3507*	HEWN |FOUNDATION CULTURED STONE	HEWN | SPAN CULTURED STONE	HEWN | TALUS CULTURED STONE
TRIM AT STONE :	1097-4 DUSTY TRAIL	1007-4 HOT STONE	1023-4 DESERT DUNE

ATTACHMENT 2
Exhibit A to the Resolution

MID-CENTURY MODERN ELEVATION D	Scheme 10	Scheme 11	Scheme 12
ROOF *SAXONY SLATE 900*	1FACS5037 NATRUAL MARBLE	1FBCJ4070 SEA PEARL BLEND	1FACS1132 CHARCOAL BROWN BLEND
STUCCO	1006-1 GYPSUM	10_15 QUEST	1025-2 SILENT SMOKE
SIDING	1007-2 SWIRLING SMOKE	10 _19 FAVORITE FLANNEL	1007-5 LAZY AFTERNOON
TRIM | FASCIA	1009-6 ARMORY	1011-6 GLAZED GRANITE	1001-1 DELICATE WHITE
GARAGE DOOR	1009-6 ARMORY	1011-6 GLAZED GRANITE	1001-1 DELICATE WHITE
ENTRY DOOR & SHUTTERS	1152-5 GRANITE FALLS	1014-7 BLACK WALNUT	PPG11-29 GREEN GRAY MIST
PAINTED BRICK | NORMAN SIZED BRICK |STACK BOND PATTERN	1006-4 MERCURIAL	1020-1 ATRIUM WHITE	1025-1 COMMERCIAL WHITE

ATTACHMENT 2
Exhibit A to the Resolution

MODERN FARMHOUSE ELEVATION E	Scheme 13	Scheme 14	Scheme 15
ROOF *SAXONY 900 SHAKE*	1FBCF1430 CHARCOAL BLEND	1FBCJ4072 SAHARA QUARTZ BLEND	1FBCF1132 CHARCOAL BROWN BLEND
STUCCO	1020-1 ATRIUM WHITE	1033-3 SILENT STORM	1101-4 ROCKY CLIFFS
SIDING	1020-1 ATRIUM WHITE	PPG10-06 THUNDERBOLT	1071-6 PRAIRIE FIRE
TRIM|FASCIA | GARAGE DOOR	1020-1 ATRIUM WHITE	1001-1 DELICATE WHITE	12-13 CAMEL TAN
ENTRY DOOR	13-16 BLAZE	1011-6 GLAZED GRANITE	1012-7 BLACK FOREST
SHUTTERS	1011-7 ONYX	1011-6 GLAZED GRANITE	1012-7 BLACK FOREST
METAL ROOF	CHARCOAL GRAY	WEATHERED ZINC	VINTAGE

ATTACHMENT 2
Exhibit A to the Resolution

*All non-decorative items such as meter doors & non-decorative vents are to be painted the surrounding color.

*Paint breaks to be turned at inside corner unless otherwise indicated.

* Metal roof vents to be painted to match the darkest color from the roofing blend.

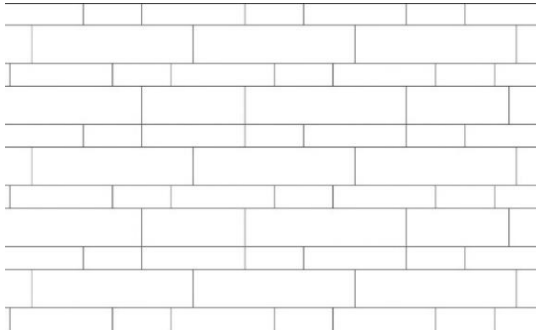
*Painted brick to be semi-gloss finish.

El Dorado & Cultured Stone: MELISSA ZEPEDA (949) 275-4533 or melissa.zepeda@boral.com

Boral Roof : Please Contact Michael Heard (949) 880.4153 or Michael.Heard@boral.com

Decorative Tile to be RockMill Tile & Stone : Please Contact Veronica Abbot Cell: 949.233.9133 or veronicaA@rockmillstone.com .

STONE PATTERN | HSP3507



STACK BOND PATTERN

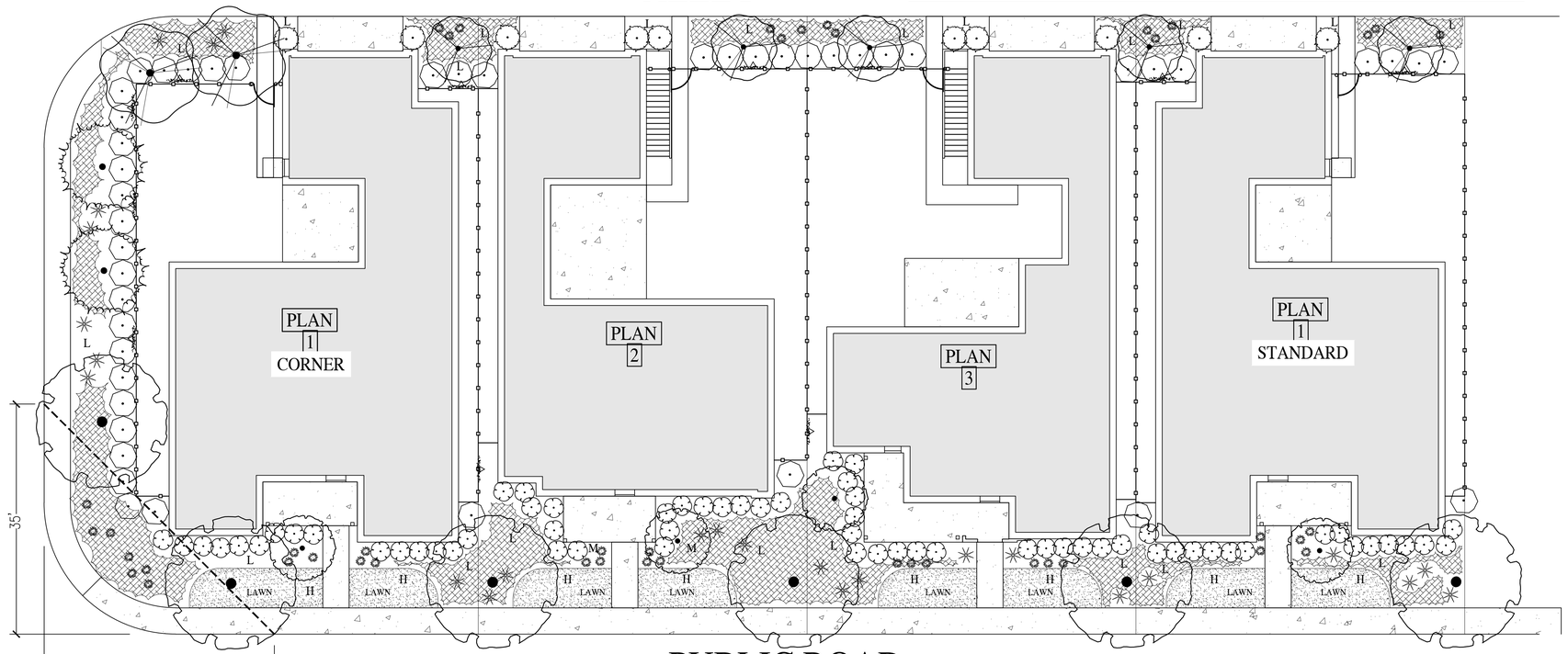


0 10 20 30 40 feet
1" = 10'- 0"

NORTH

TYPICAL PRODUCTION PLANTING LAYOUT

SEQUOIA AT CYPRESS 50 x 90 LOTS



WOODSIDE HOMES

DOUGLAS 98
SEQUOIA AT CYPRESS
TYPICAL PRODUCTION
LANDSCAPE DOCUMENTS

PACKAGE INCLUDES:

L-1. COVER PAGE - 10 SCALE PLANTING LAYOUT LEGEND/ NOTES

.-2. 10 SCALE IRRIGATION LAYOUT / NOTES

.-3. STANDARD INSTALLATION DETAILS

.-4. WATER USE CALCULATIONS

AGENDA ITEM 11.2

CONCEPT PLANT SCHEDULE

STREET TREES - MED WATER USE
Acer rubrum `Bowhall Red` / Red Maple — 15 gal
MED WATER
Koelreuteria paniculata / Golden Rain Tree — 15 gal
Pyrus calleryana `Bradford` / Bradford Flowering Pear — 15 gal
Tilia cordata `Greenspire` / Greenspire Littleleaf Linden — 15 gal

ACCENT TREES
Arbutus unedo / Strawberry Tree Shrub — 15 gal
Lagerstroemia indica `Tuscarora` / Crape Myrtle — 15 gal
Malus floribunda `Prairefire` / Flowering Crabapple — 15 gal

EVERGREEN-CONIFERS
Arbutus unedo / Strawberry Tree Multi-Trunk — 15 gal
Melaleuca quinquenervia / Cajeput Tree Multi-Trunk — 15 gal
Pinus eldarica / Afghan Pine — 15 gal

COURTYARD TREES - MED/ LOW WATER USE
Fagus sylvatica `Fastigiata` / European Beech — 15 gal
Laurus nobilis / Sweet Bay — 15 gal
Rhaphiolepis indica `Majestic Beauty` TM / Majestic Beauty Indian Hawthorne Standard — 15 gal

ALLEY TREES - MED/LOW WATER USE
Fagus sylvatica `Fastigiata` / European Beech — 15 gal
Prunus carolinana `Compacta` / Carolina Cherry — 15 gal
15gal standard

FOUNDATION SHRUBS LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush — 5 gal
Elaeagnus pungens / Thorny Eleagnus — 5 gal
Nandina domestica `Compacta` / Dwarf Heavenly Bamboo — 5 gal
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub — 5 gal
Rhaphiolepis umbellata / Yedda Hawthorn — 5 gal
Xylosma congestum `Compacta` / Compact Xylosma — 5 gal

MED SHRUBS - LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush — 5 gal
Cistus x purpureus / Orchid Rockrose — 5 gal
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub — 5 gal
Rhaphiolepis umbellata / Yedda Hawthorn — 5 gal
Rosmarinus officinalis `Blue Spires` / Rosemary — 5 gal

ACCENT PLANTS- LOW WATER USE
Hesperaloe parviflora / Red Yucca — 5 gal
Phormium tenax `Yellow Wave` / New Zealand Flax — 5 gal
Salvia leucantha / Mexican Bush Sage — 5 gal
Yucca filifera `Golden Sword` / Golden Sword Yucca — 5 gal

PERENNIALS LOW WATER USE
Bergenia cordifolia / Heartleaf Bergenia — 1 gal
Cistus salvifolius `Prostratus` / Sageleaf Rockrose — 1 gal
Coreopsis x `Moonbeam` /Moonbeam Coreopsis — 1 gal
Engeron karvinskianus / Fleabane — 1 gal
Heuchera sanguinea / Coral Bells — 1 gal
Heuchera x `Plum Pudding` / Coral Bells — 1 gal
Lavandula angustifolia `Munstead` / Munstead English Lavender — 1 gal
Moraea x `Lemon Drop` / Fortnight Lily — 1 gal
Pennisetum onentale `Karley Rose` / Karley Rose Fountain Grass — 1 gal
Salvia greggii `Hot Lips` / Autumn Sage — 1 gal
Teucrium fruticans / Bush Germander — 1 gal
Tulbaghia violacea `Variegata` / Striped Cape Garlic — 1 gal

VINES LOW WATER USE
Campsis radicans `Trumpet Creeper` / OrangeTrumpet Creeper — 1 gal
Clematis x lawsoniana `Henryi` / Clematis — 1 gal
Gelsemium sempervirens / Jessamine — 1 gal

ALLEY FOUNDATION SHRUBS
Grevillea x `Noellii` / Grevillea — 5 gal
Rosmarinus officinalis `Gonzai` / Rosemary — 5 gal

GROUND COVERS - LOW - MED WATER USE
Gazania x `Mitsuwa Yellow` / Yellow Gazania — 100% 1 gal 24" oc
Myoporum parvifolium `Putah Creek` / Putah Creek Myoporum — 100% 1 gal 36" oc
Vinca minor / Common Periwinkle — 100% 1 gal 24" oc

LAWN
Turf Sod / Drought Tolerant Fescue Blend — sod
MAX 25% LAWN ON INDIVIDUAL LOT TO MEET MAWA REQUIREMENTS.

PLANTING NOTES

1. CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT IN THE EVENT OF PLANT UNAVAILABILITY WITHIN TEN WORKING DAYS AFTER BID AWARDS. LANDSCAPE CONTRACTOR RESPONSIBLE FOR VERIFICATION OF PLANT QUANTIES ON LEGEND. NOTIFY L.A. IN EVENT OF DISCREPANCIES
2. VERIFY SITE CONDITIONS AS SHOWN ON THESE PLANS PRIOR TO SUBMITTING A PRICE QUOTATION BID OR COMMENCING CONSTRUCTION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT.
3. FINISHED GRADING PRIOR TO COMMENCING WORK THE LANDSCAPE CONTRACTOR SHALL INSPECT THE WORK OF OTHERS AND VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH GRADING AND SHALL INSPECT THE WORK OF OTHERS. VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR SURFACE DRAINAGE OF ALL PLANTING AREAS. FINISH GRADE SHALL BE A SMOOTH, EVEN AND UNIFORM PLANE WITH NO LOW SPOTS OR ABRUPT CHANGE OF SURFACE. FINISH GRADES IN SHRUB AND GROUNDCOVER AREAS SHALL BE 1 1/2" BELOW ADJACENT PAVING, CURBS AND HEADERS.
4. ADJUSTMENTS IN THE FIELD MAY BE REQUIRED TO ACCOMMODATE UTILITIES SUCH AS LIGHT FIXTURES, VAULT BOXES ABOVE GRADE, SIGNALS, ETC.
5. SOIL AMENDMENTS FOR BID PURPOSES ARE AS LISTED BELOW. ACTUAL SOIL PREP IS TO BE PERFORMED AS PER REQUIRED SOILS TEST RESULTS WITH TESTING DONE PRIOR TO BEGINNING PROJECT. INCORPORATE RECOMMENDED AMENDMENTS BY TILLING INTO THE TOP 6" OF SOIL.
   FERTILIZER 6-20-20 — 20 LBS/ 1000 SQ. FT.
   NITROGEN STABILIZED COMPOST — 4 YDS./1000 SQ. FT. *
6. APPLY PRE-EMERGENT HERBICIDE CHIPCO RONSTAR 'G' PER MANUFACTURES SPECIFICATIONS..
7. CONTRACTOR SHALL TEST ALL PLANTING PITS FOR DRAINAGE BY FILLING WITH WATER. ANY PLANTING PIT WHICH DOES NOT DRAIN COMPLETELY IN TWO HOURS OR LESS SHALL HAVE CORRECTIVE MEASURES IMPLEMENTED BY THE CONTRACTOR. CORRECTIVE MEASURES SHALL INCLUDE:
   A. DRILLING/AUGERING THROUGH IMPERMEABLE LAYERS TO A FAST DRAINING SOIL LAYER AND BACKFILLING WITH SAND, GRAVEL, OR OTHER APPROVED MATERIAL.
   B. INSTALLING DRAINAGE TUBING TO CARRY EXCESS WATER TO NEARBY OUTLET.
   C. METHODS AS DETERMINED IN THE FIELD BY THE OWNER.
8. PLANT TREES A MINIMUM OF 5 FEET FROM LIGHT STANDARDS, BELOW GRADE UTILITY VAULTS A MINIMUM OF 8 FEET FROM SIDES OF ABOVE GRADE UTILITY BOXES. TREES WITHIN 7' OF SIDEWALKS TO RECEIVE ROOT BARRIER UB-24 (INSTALL 5' IN BOTH DIRECTIONS OF TREE TRUNK.)
9. ALL SLOPES AT 2 TO 1 SHALL RECEIVE A LAYER OF JUTE MESH FABRIC STAPLED TO SLOPE.
10. ALL PLANTER AND GROUNDCOVER AREAS NOT RECEIVING JUTE NETTING SHALL RECEIVE A 3" BARK MULCH LAYER. *NO SHREDDED BARK ALLOWED.
11. EDGING ALONG LAWN AREAS IS TO BE A SHOVEL CUT EDGE.
12. GUARANTEE: ALL TREES AND SHRUBS SHALL BE GUARANTEED FOR A PERIOD OF THREE MONTHS. ALL GROUND COVER AND TURF SHALL BE GUARANTEED FOR A PERIOD OF NINETY(90) DAYS. MATERIAL THAT IS NOT HEALTHY SHALL BE REPLACED WITHIN THE GUARANTEE PERIOD. REPLACEMENT MATERIAL SHALL BE MADE TO THE SAME SPECIFICATION AS ORIGINAL MATERIALS.
13. ALL GROUND COVER AND BARK AREAS TO RECEIVE DEWITT WEED BARRIER PRO 5 OR EQUAL.

WELO STATEMENT:

'I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE LANDSCAPE DESIGN PLAN'

Steven L Crouch 6-11-18

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - SEQUOIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: 1"= 10'-0"
DRAWING NO.
6-11-18
L-1

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

7549

P.O.C. 1" GATE VALVE BY BUILDER. IRRIGATION DESIGN IS BASED ON A MINIMUM 1" SERVICE LINE, 5/8" METER, STATIC WATER PRESSURE OF 55 PSI AND MAX FLOW OF 8 G.P.M. *REMOTE CONTROL VALVES TO BE LOCATED BEHIND FENCING IN REAR YARDS. TYPICAL FOR EACH LOT.

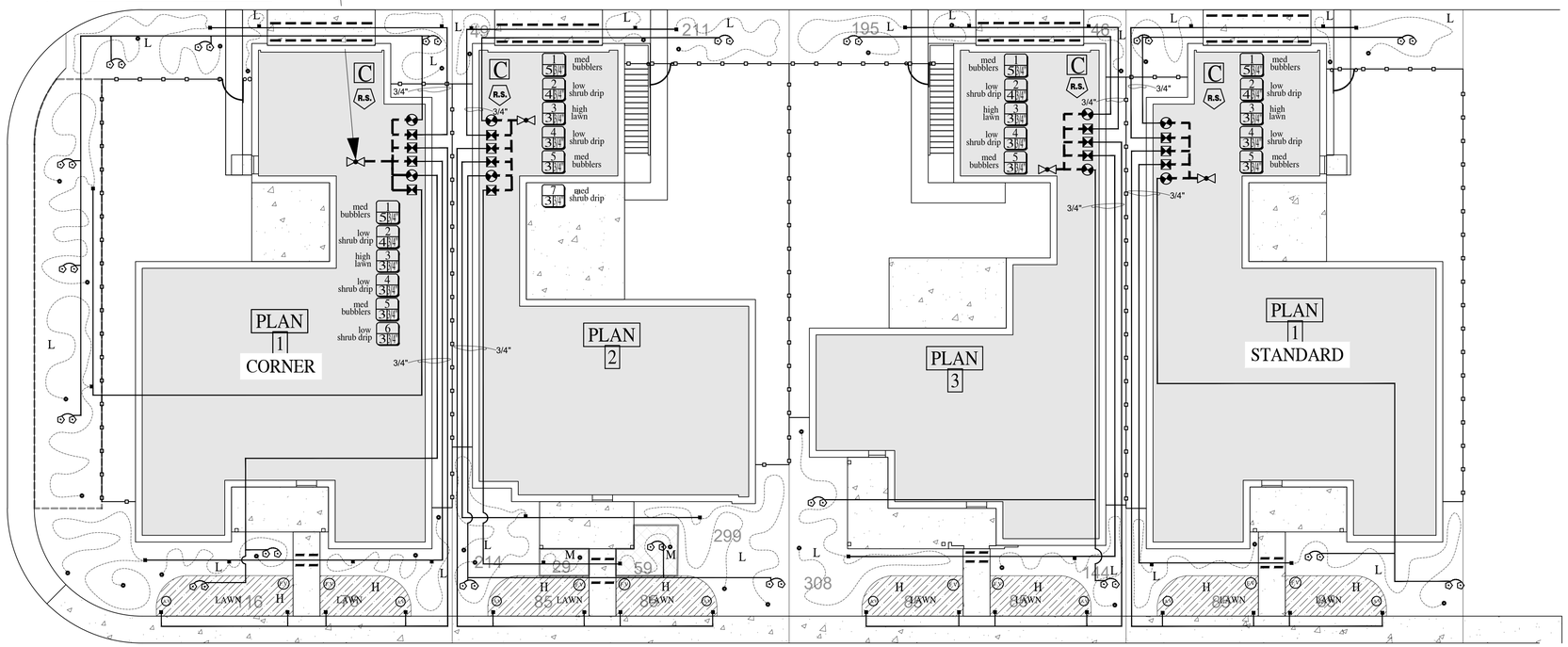
TYPICAL PRODUCTION IRRIGATION LAYOUT

SEQUOIA AT CYPRESS 50 x 90 LOTS

0 10 20 30 40 feet
1" = 10'- 0"

NORTH

ALLEY



PUBLIC ROAD

IRRIGATION EQUIPMENT TABLE

Symbol	Equipment	Description
	POINT OF CONNECTION. 1" GATE VALVE BY BUILDER.	
C	RAINBIRD ESP-TM2-8-120V- LNKWIFI	RAINBIRD 8 - STATION CONTROLLER
R.S.	RAINBIRD WR2-RFC.	RAINBIRD RAIN AND FREEZE SENSOR
	3/4 " Hardie Till automatic anti-siphon valve, & 3/4 " pr-20 Pressure Regulator & Y- filter	3/4" REMOTE CONTROL 'DRIP ZONE' VALVE W/ PRESSURE REGULATOR & SCREEN FILTER
	3/4 " Hardie Till automatic anti-siphon valve	3/4" REMOTE CONTROL VALVE
Irrigation Drip Table		
Symbol		
N.A.	Drip Emitters - Rainbird xeri-bug (xb-20PC), 2 - gal/hr emitters. 3 - per shrub Rainbird Micro-Spray, Xeri-Spray XS-360 Use as needed in annual beds.	RAINBIRD POINT SOURCE DRIP EMITTERS.
AV	RAINBIRD ARV050 & SEBTXB (BOX)	AIR RELIEF VALVE IN EMITTER BOX
FV	RAINBIRD MDCFCAP & SEBTXB (BOX)	FLUSH VALVE IN EMITTER BOX
	RAINBIRD MDCFCAP & SEB TXB (BOX)	REMOVABLE FLUSH CAP IN EMITTER BOX.
	RAINBIRD MDCFTBMPT	3/4" MALE PIPE THREAD P/C TO DRIP LINE ADAPTER.
	Rainbird. XFS-09-12 subsurface dripline w/copper shield, SPACE 12" BETWEEN ROWS IN LAWN *BURY DEPTH MIN 5" IN LAWNS 2" IN SHRUB AREAS, STAPLE MIN EVERY 5'.	INSTALL ONE (1) AIR VACUUM RELIEF VALVE IN A 6" ROUND EMITTER BOX AT THE HIGHEST POINT OF THE SYSTEM. INSTALL ONE (1) FLUSH VALVE IN A 6" ROUND VALVE BOX AT THE LOWEST POINT(S) OF THE SYSTEM
	Rainbird 1402 bubblers 5 GPM	DEEP WATERING TREE BUBBLER ASSEMBLY IN PERFORATED PIPE. TWO AT EACH TREE. INSTALL PER DETAIL.
Irrigation Pipe Table		
Symbol	Pipe	
	1/2" POLY DRIP TUBING.	
	1 1/4" Schedule 40 PVC Pipe	
	1120 Class 200 P.V.C. Pipe size as noted.	
	3" Sch 40 P.V.C. Sleeves as needed	

High Lawn — A (Water Use) / B (Controller station number) — Valve size — G.P.M. through valve. — Description

IRRIGATION NOTES

1. THIS DRAWING IS PARTIALLY DIAGRAMMATIC AND DOES NOT SHOW ALL OFFSETS AND FITTINGS REQUIRED FOR A COMPLETE SYSTEM. THE DESIGN INTENT IS FOR FULL COVERAGE OF PLANTINGS. NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCIES PRIOR TO TRENCHING.
2. COORDINATE PIPE, VALVE BOX AND HEAD LAYOUT WITH PLANTING PLAN. ADJUST THESE IRRIGATION COMPONENTS TO ACCOMMODATE SUBSEQUENT PLANTINGS
3. THIS SYSTEM IS DESIGNED TO OPERATE AT AN EXISTING STATIC PRESSURE OF 55-40 P.S.I. PRIOR TO COMMENCEMENT OF WORK, DETERMINE BY PRESSURE TEST, STATIC PRESSURE. CONTACT LANDSCAPE ARCHITECT FOR APPROVAL OF WATER PRESSURE PRIOR TO COMMENCING INSTALLATION OF IRRIGATION SYSTEM.
4. MAINLINE BACKFLOW PREVENTOR AND REMOTE CONTROL VALVES ARE LOCATED IN PAVED AREAS FOR GRAPHIC CLARITY ONLY. LOCATE ALL IRRIGATION EQUIPMENT IN ADJACENT PLANTER AREAS. PLACE BACKFLOW PREVENTOR IN SUCH A WAY AS TO BE CONCEALED BY SUBSEQUENT PLANTINGS, ON WALLS AND WALKS.
5. PRIOR TO CONSTRUCTION, CONTACT U.S.A. AT (811) TO VERIFY EXISTING UTILITIES.
6. ADJUST SPRAY COVERAGE OF HEADS TO PROVIDE PROPER COVERAGE AND TO PREVENT OVER SPRAY
7. PERFORM COVERAGE TEST PRIOR TO PLANTING.
8. CONFORM TO ALL APPLICABLE GOVERNING CODES.
9. PIPES UNDER WALKS, DRIVES AND STREETS ARE TO BE INSTALLED IN SLEEVING. SLEEVING UNDER STREETS SHALL BE SUPPLIED BY OWNER. SLEEVES UNDER WALKS AND DRIVES SHALL BE INSTALLED BY LANDSCAPE CONTRACTOR.
10. CONTROL WIRING SHALL BE #14 U.L. DIRECT BURIAL, OCCUPY THE SAME TRENCH, AND SHALL BE INSTALLED ALONG SIDE OR UNDER PRESSURE LINES. COMMON WIRE SHALL BE WHITE. TAPE WIRES TOGETHER AT TEN (10) FOOT INTERVALS. SPLICES SHALL BE MADE WITH WATERPROOF CONNECTORS.
11. ALL MATERIALS SHALL BE NEW AND IN PERFECT CONDITION. NO DEVIATIONS FROM THE SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF LANDSCAPE ARCHITECT.
12. MAINLINE SHALL BE SCH. 40 P.V.C. AT A MINIMUM DEPTH OF 24" BELOW FINISH GRADE. LATERAL PIPE SHALL BE CLASS 200 P.V.C. AT A MINIMUM DEPTH OF 12", AND DIRECT BURIAL CONTROL WIRE A MINIMUM DEPTH OF 24"
13. WHERE MORE THAN ONE PIPE IS INSTALLED IN A TRENCH, PLACE PIPE SIDE BY SIDE AT A MINIMUM OF 2" APART. WHERE SOIL CONDITIONS ARE ROCKY PLACE A 4" LAYER OF FINE MATERIAL ON BOTTOM OF TRENCH PRIOR TO INSTALLATION OF PIPE.
14. ALL VALVES SHALL BE ASVF SERIES. INSTALLED 12" ABOVE HIGHEST POINT OF DISCHARGE
15. 120 VOLT ELECTRICAL POWER OUTLET AT THE AUTOMATIC CONTROLLER LOCATION SHALL BE PROVIDED BY OTHERS. IT SHALL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO MAKE THE FINAL HOOK-UP AS DIRECTED BY MANUFACTURER FROM THE ELECTRICAL OUTLET TO THE AUTOMATIC CONTROLLER.
16. CONTRACTOR SHALL SET THE INITIAL PROGRAM FOR THE CONTROLLER AND SHALL PROVIDE OWNER WITH THE INSTRUCTION MANUAL AND DEMONSTRATE IT OPERATION TO OWNER. OWNER IS THEN RESPONSIBLE FOR RESETTING CLOCK ACCORDING TO SEASONAL/ENVIRONMENTAL CHANGES, AND DURING PLANT ESTABLISHMENT PERIOD.
17. THE IRRIGATION SYSTEM SHALL BE GUARANTEED FOR ALL MATERIALS AND WORKMANSHIP, INCLUDING SETTLEMENT OF TRENCHES FOR A PERIOD OF ONE YEAR.

* NOTE: REFER TO CIVIL SHEETS FOR GRADING, DRAINLINES & DRAINAGE PLANS.

IRRIGATION ZONE/ WATER USE DESIGNATION KEY.

H	*ALL LAWN
M	MED. WATER USE SHRUBS
L	LOW WATER USE SHRUBS *NO HATCH

WELO STATEMENT:

'I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE IRRIGATION DESIGN PLAN' 6-11-18

LICENSED LANDSCAPE ARCHITECT — STEVEN L. CROUCH — Lic. No. 2557 — Signature — 05-31-20 Renewal Date — 6-11-18 Date — STATE OF CALIFORNIA

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - SEQUOIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: 1"= 10'-0"
DRAWING NO.
6-11-18
L-2

AGENDA ITEM 11.2

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

ELECTROMECHANICAL CONTROLLER
MOUNTED TO BUILDING WALL.

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

REMOTE CONTROL VALVE WITH DRIP ASSEMBLY
PLASTIC COMBINATION ELECTRIC CONTROL VALVE/ATMOSPHERIC VACUUM BREAKER 12 INCHES ABOVE GRADE

① SUB-SURFACE/ON-SURFACE DRIPLINE: RAIN BIRD XFS-CV SERIES DRIPLINE (TYPICAL) NON-POTABLE: XFD-CVP DRIPLINE
② PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
③ OPERATION INDICATOR RAIN BIRD MODEL: OPEXHO
④ PVC EXHAUST HEADER
⑤ PVC SCH 40 TEE OR EL (TYPICAL)
⑥ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑦ FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFS-CV FLUSH POINT"
⑧ PERIMETER OF AREA
⑨ IRRIGATION CONTROL VALVE: RAIN BIRD ICZ DRIP CONTROL ZONE KIT INSTALLED IN VALVE BOX
⑩ PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
PVC SUPPLY HEADER
⑫ 6" SERIES TEC-LOOK® STAKES (TDS-050) REFER TO RAIN BIRD DESIGN GUIDE FOR PROPER SPACING
⑬

XFS-CV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Nominal Flow (gph)	Nominal Flow (gph)		
	0.6	0.9	0.6	0.9
20	160	135	208	173
30	200	225	402	337
40	350	248	468	418
50	500	281	573	477
60	434	309	637	525

NOTES:
1. FOR ALL XFS-CV AND POLY CONNECTIONS INSTALL XFF AND/OR XFD FITTINGS.
2. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
3. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
4. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

XFCV ON - SURFACE DRIPLINE
NTS

① PVC EXHAUST HEADER
② PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
③ PVC SCH 40 TEE OR EL (TYPICAL)
④ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑤ PERIMETER OF AREA
⑥ PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
⑦ RAIN BIRD XF SERIES DRIPLINE (TYPICAL) POTABLE: XFCV DRIPLINE
⑧ FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFCV FLUSH POINT"
⑨ PVC SCH 40 RISER PIPE

XFCV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Nominal Flow (gph)	Nominal Flow (gph)		
	0.6	0.9	0.6	0.9
20	160	135	208	173
30	200	225	402	337
40	350	248	468	418
50	500	281	573	477
60	434	309	637	525

NOTES:
1. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
2. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
3. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

XFCV ON - SURFACE DRIPLINE
NTS QUICK LAYOUT

① SINGLE-OUTLET BARB INLET X BARB OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER
② ½" POLYETHYLENE TUBING: RAIN BIRD XF SERIES TUBING OR RAIN BIRD XT-700 XERI-TUBE OR RAIN BIRD XBS BLACK STRIPE TUBING
③ FINISH GRADE

NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

XERI-BUG INTO 1/2 INCH TUBING
NTS

① DIFFUSER BUG CAP: RAIN BIRD DBC-025
② UNIVERSAL ¼" TUBING STAKE: RAIN BIRD TS-025
③ ¼" DISTRIBUTION TUBING: RAIN BIRD XQ TUBING (LENGTH AS REQUIRED)
④ TOP OF MULCH
⑤ SINGLE-OUTLET BARB INLET X BARB OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER
⑥ ½" POLYETHYLENE TUBING: RAIN BIRD XF SERIES TUBING OR RAIN BIRD XT-700 XERI-TUBE OR RAIN BIRD XBS BLACK STRIPE TUBING
⑦ FINISH GRADE

NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

XERI-BUG INTO 1/2 INCH TUBING
WITH 1/4" TUBING, STAKE AND BUG CAP
NTS

① FINISH GRADE
② SUBTERRANEAN EMITTER BOX: RAIN BIRD SEB 7XB
③ ¾" AIR RELIEF VALVE: RAIN BIRD ARV050 TO BE INSTALLED AT HIGH POINTS IN DRIP ZONE
④ PVC SCH 40 FEMALE ADAPTER
⑤ PVC SCH 80 RISER
⑥ BRICK (1 OF 2)
⑦ PVC HEADER PIPE
PVC SCH 40 TEE
3" MINIMUM DEPTH OF ¾" WASHED GRAVEL

XFS - SUB-SURFACE DRIPLINE
NTS 1/2" AIR RELIEF VALVE

XFS SUBSURFACE INSTALLATION
NO SCALE

NOTES
1. COMPACT SOIL AROUND BOX TO 90% MINIMUM COMPACTION.
2. PLACE DRAIN ROCK PRIOR TO INSTALLING VALVE BOX.
3. GATE VALVE AND FITTINGS SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
4. USE TEFLON TAPE ON ALL THREADED FITTINGS.
5. LOCATE VALVES IN SHRUB/GROUNDCOVER AREAS WHENEVER POSSIBLE.
6. LOOP EXTRA TRACER WIRE UP INSIDE BOX.

SHUT OFF VALVE
NTS

① MULCH
② FLUSH CAP FOR EASY FIT COMPRESSION FITTINGS; POTABLE:RAIN BIRD MDCFCAP
③ EASY FIT COUPLING: RAIN BIRD MDCFCOUP
④ SUBTERRANEAN EMITTER BOX: RAIN BIRD SEB 7XB
⑤ ¾" POLYETHYLENE TUBING: RAIN BIRD XF BLANK TUBING
⑥ FINISH GRADE
⑦ PVC EXHAUST HEADER
⑧ PVC SCH 40 TEE OR EL
⑨ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑩ ON-SURFACE DRIPLINE: RAIN BIRD XF SERIES DRIPLINE POTABLE: XFCV DRIPLINE
⑪ 3-INCH MINIMUM DEPTH OF ¾" WASHED GRAVEL
⑫ BRICK (1 OF 2)

NOTE:
1. ALLOW A MINIMUM OF 6-INCHES OF DRIPLINE TUBING IN VALVE BOX IN ORDER TO DIRECT FLUSHED WATER OUTSIDE VALVE BOX

FLUSH VALVE IN BOX
NTS

① FINISH GRADE/TOP OF MULCH
② ROOT WATERING SYSTEM WITH 3" X 24" PERFORATED STYRENE DRAIN PIPE AND 3" BLACK ATRIUM CAP. FILL PIPE WITH 1/2" TO 1" WASHED ROCK.
③ 1/2" (1.3 CM) SPIRAL BARB FITTING)
④ 1/2" (1.3 CM) SWING ASSEMBLY: RAIN BIRD SA-125050 OR
1/2" (1.3 CM) SWING PVC: RAIN BIRD SP SERIES WITH 1/2" (1.3 CM) MALE NPT x 0.490" BARB ELBOW: RAIN BIRD SWE-050
⑤ PVC SCH 40 TEE OR EL
⑥ PVC OR POLYETHYLENE LATERAL PIPE
⑦ OPTIONAL SOCK (ENG-SOCK) FOR SANDY SOILS
⑧ ROOT WATERING SYSTEM WITH 3" X 24" PERFORATED STYRENE DRAIN PIPE AND 3" BLACK ATRIUM CAP. FILL PIPE WITH 1/2" TO 1" WASHED ROCK.
⑨ PLANT ROOT BALL

NOTES:
1. POSITION 2-3 LINES (OR MORE) EVENLY SPACED AROUND PLANT. FOR NEW TREES PLACE NEAR ROOT BALL. FOR EXISTING TREES PLACE AT THE DRIPLINE BETWEEN CANOPY EDGE AND ROOT CRUNK.
2. INSTALL PRODUCT WITH TOP EVEN WITH GROUND SURFACE.
3. WHEN INSTALLING IN EXTREMELY HARD OR CLAY SOILS, ADD 3/4" (1.9 CM) GRAVEL UNDER AND AROUND THE UNIT TO ALLOW FASTER WATER INFILTRATION AND ROOT PENETRATION.
4. ONCE DRAIN PIPE HAS BEEN INSTALLED FILL THE BASKET WITH 1/2" TO 1" DRAIN ROCK.

ROOT WATERING SYSTEM
NTS INSTALLATION FOR TREES

TREE PLANTING DETAIL
NTS

NOTES
1. "S" REFERS TO PLANT SPACING, SEE PLANT TABLE ON CONSTRUCTION DOCUMENTS.

PLAN SECTION

GROUNDCOVER PLANTING
NOT TO SCALE

NOTES
1. AMENDMENT SHALL BE CONSISTENT WITH SOILS FERTILITY TEST.
2. PLANTING AREAS SHALL BE TREATED WITH PRE-EMERGENT PRIOR TO PLANTING TO PREVENT GERMINATION OF WEED SEEDS.
3. SCORE ROOT BALL IN VARIOUS LOCATIONS.

SHRUB PLANTING
NOT TO SCALE

LICENSED LANDSCAPE ARCHITECT
Steven K Crouch
Signature
05-31-18
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - SEQUOIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC # 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

DETAILS

SCALE: 1"= 10'-0"

DRAWING NO.

6-11-18

L-3

AGENDA ITEM 11.2

7551

Placer County

Project Information Sheet.

Date: 6-28-18
Project Applicant: WOODSIDE HOMES - MIKE KITCHELL
Project Address: Douglas 98 Sequoias
Total Landscape Area (Sq.Ft). 23005
Project Type New X___ Rehabilitated____ Private___

Water Supply Type: Potable _X__ Recycled___ Well___
Name of Water Supplier, if not served by private well:

Landscape Documentation Package:

- Water efficient Landscape Worksheets.
  - Hydrozone Information Table
  - Water Budget Calculations. Max Applied Water Allow. (MAWA)
  - Water Budget Calculations. Estimated Total Applied Water Use (MAWA)
- Soil Management Report
- Landscape Design Plan
- Irrigation Design Plan.
- Grading Design Plan * SEE CIVIL PLANS

Project Applicant. Telephone 916-608-9600 MIKE KITCHELL
Fax No. N.A.
Title Owner SAME Email www.woodsidehomes.com
City 111 Woodmere Rd, Su 150 State: Ca Zip: 95630
Property Owner: Same Telephone: Same
Fax No.
Title: Sr. project manager email:same

Company: same	Address:same
City:	State: Zip:
I agree to comply with the requirement of the	Water Efficient
Ordinance and submit a complete Landscape	Documentation Package.
(Applicant Signature)	(Date)

CERT OF COMP.

CERTIFICATE OF COMPLETION
THIS CERTIFICATE IS FILLED OUT BY THE PROJECT APPLICANT UPON COMPLETION OF THE LANDSCAPE PROJECT.

PART 1. PROJECT INFORMATION SHEET

DATE: 6-28-18
Project Name : DOUGLAS 98 SEQUOIAS
Name of Project Applicant: Telephone: 916-608-9600
MIKE KITCHELL

Owner: WOODSIDE HOMES Email: www.woodsidehome.com
Address: 111 Woodmere Rd. Su 150
City: Folsom State: Ca Zip: 95630

Project Address and Location: DOUGLA 98 SEQUOIAS City: RANCHO CORDOVA
State: CA Zip:
Property Owner or Designee:
Name: Same Telephone: Same
Title: Same Fax.
Company: SAME Email Address:
City: SAME Street: Same

Property owner:
I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule.

_____
Property owner Signature Date:

Please answer the questions below:
1. Date the Landscape Doc. Package was submitted to agency:_____
2. Date the Landscape Doc. Package was approved:_____
3. Date that copy of the Water Efficient Landscape Worksheet including the Water Budget calculation was submitted to the local water purveyor: _____

*Soils Test to be conducted at completion of finish grade / prior to plant installation.

*Updated irrigation schedule to be completed by irrigation auditor at completion of installation.

IRRIGATION ESTABLISHMENT SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 20 1	3 25 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	7 10 2	7 15 3	7 10 2	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

IRRIGATION MAINTENANCE SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 15 1	3 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	3 20 1	4 20 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 20 1	4 30 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - SEQUOIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: N.A.
DRAWING NO.
6-11-18
L-4

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (SEQUOIA PLAN 1 - CORNER)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS AL	MED	BUBBLERS		120		
2 - SHRUBS ALLEY	LOW	DRIP	370			
3- LAWN	HIGH	DRIP			193	
4 - SHRUBS FRONT	LOW	DRIP	489			
5- TREE BUBBLERS FR	MED	BUBBLERS		40		
6- SHRUBS SIDE	LOW	DRIP	621			
		TOTALS	1482	160	193	
		TOTAL SQ.FT.		=		1835

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
SEQUOIA PLAN 1 - CORNER

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .83 .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	.5	BUBBLERS	.81	.617	120	74.07	51.9	2383.96
2 - SHRUBS ALLEY	LOW	.2	DRIP	.81	.247	370	91.36	51.9	2839.12
3- LAWN	HIGH	.8	DRIP	.81	.988	193	190.62	51.9	6133.68
4 - SHRUBS FRONT	LOW	.2	DRIP	.81	.247	489	119.79	51.9	3855.41
5- TREE BUBBLERS FR	MED	.5	BUBBLERS	.81	.617	40	24.65	51.9	754.92
6- SHRUBS SIDE	LOW	.2	DRIP	.81	.247	621	154.81	51.9	4581.63
					TOTALS	1835	655.31	ETWU =	21086.52
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	.81	.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • (ETAF x LA) + ((1-ETAF) x SLA))) MAWA = 32475.6

IDENTIAL .55
I - RESIDENTIAL .45

NNUAL GALLONS REQUIRED = ETO x .62 x ETAF x AREA.
ION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F .62

NNUAL GALLONS ALLOWED) = (ETO)
ION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

ON EFFICIENCY
SPRAY .75
RIP .81

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (SEQUOIA PLAN 2)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS AL	MED	BUBBLERS		20		
2 - SHRUBS ALLEY	LOW	DRIP	261			
3- LAWN	HIGH	DRIP			150	
4 - SHRUBS FRONT	LOW	DRIP	300			
5- TREE BUBBLERS FR	MED	BUBBLERS		60		
7- SHRUBS FRONT	MED	DRIP	85			
		TOTALS	561	160	150.00	
		TOTAL SQ.FT.		=		900

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
SEQUOIA PLAN 2

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .83 .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	.5	BUBBLERS	.81	.617	20	12.35	51.9	397.26
2 - SHRUBS ALLEY	LOW	.2	DRIP	.81	.247	261	64.44	51.9	2073.65
3- LAWN	HIGH	.8	DRIP	.81	.988	150	161.50	51.9	5402.73
4 - SHRUBS FRONT	LOW	.2	DRIP	.81	.247	300	74.07	51.9	2383.96
5- TREE BUBBLERS FR	MED	.5	BUBBLERS	.81	.617	60	37.04	51.9	1191.78
7- SHRUBS FRONT	MED	.5	DRIP	.81	.617	85	54.94	51.9	1767.80
					TOTALS	900	410.74	ETWU =	13216.82
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	.81	.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • (ETAF x LA) + ((1-ETAF) x SLA))) MAWA = 15928.1

ETAF RESIDENTIAL .55
ETAF NON - RESIDENTIAL .45

ETWU (ANNUAL GALLONS REQUIRED = ETO x .62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F .62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
.75 FOR SPRAY .75
.81 FOR DRIP .81

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (SEQUOIA PLAN 3)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS AL	MED	BUBBLERS		20		
2 - SHRUBS ALLEY	LOW	DRIP	258			
3- LAWN	HIGH	DRIP			150	
4 - SHRUBS FRONT	LOW	DRIP	453			
5- TREE BUBBLERS FR	MED	BUBBLERS		40		
		TOTALS	711	60	150	
		TOTAL SQ.FT.		=		941

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
SEQUOIA PLAN 3

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .83 .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	.5	BUBBLERS	.81	.617	20	12.35	51.9	397.26
2 - SHRUBS ALLEY	LOW	.2	DRIP	.81	.247	258	63.70	51.9	2049.86
3- LAWN	HIGH	.8	DRIP	.81	.988	150	161.50	51.9	5402.73
4 - SHRUBS FRONT	LOW	.2	DRIP	.81	.247	453	111.85	51.9	3595.71
5- TREE BUBBLERS FR	MED	.5	BUBBLERS	.81	.617	40	24.65	51.9	754.92
					TOTALS	941	380.49	ETWU =	12243.53
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	.81	.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • (ETAF x LA) + ((1-ETAF) x SLA))) MAWA = 16653.7

ETAF RESIDENTIAL .55
ETAF NON - RESIDENTIAL .45

ETWU (ANNUAL GALLONS REQUIRED = ETO x .62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F .62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
.75 FOR SPRAY .75
.81 FOR DRIP .81

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (SEQUOIA PLAN 1)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS AL	MED	BUBBLERS		40		
2 - SHRUBS ALLEY	LOW	DRIP	270			
3- LAWN	HIGH	DRIP			150	
4 - SHRUBS FRONT	LOW	DRIP	369			
5- TREE BUBBLERS FR	MED	BUBBLERS		40		
		TOTALS	639	80	170	
		TOTAL SQ.FT.		=		889

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
SEQUOIA PLAN 1

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .83 .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	.5	BUBBLERS	.81	.617	40	24.65	51.9	754.92
2 - SHRUBS ALLEY	LOW	.2	DRIP	.81	.247	270	66.67	51.9	2145.29
3- LAWN	HIGH	.8	DRIP	.81	.988	150	161.50	51.9	5402.73
4 - SHRUBS FRONT	LOW	.2	DRIP	.81	.247	369	91.11	51.9	2731.71
5- TREE BUBBLERS FR	MED	.5	BUBBLERS	.81	.617	40	24.65	51.9	754.92
					TOTALS	889	339.06	ETWU =	12068.74
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	.81	.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • (ETAF x LA) + ((1-ETAF) x SLA))) MAWA = 15733.4

ETAF RESIDENTIAL .55
ETAF NON - RESIDENTIAL .45

ETWU (ANNUAL GALLONS REQUIRED = ETO x .62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F .62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
.75 FOR SPRAY .75
.81 FOR DRIP .81

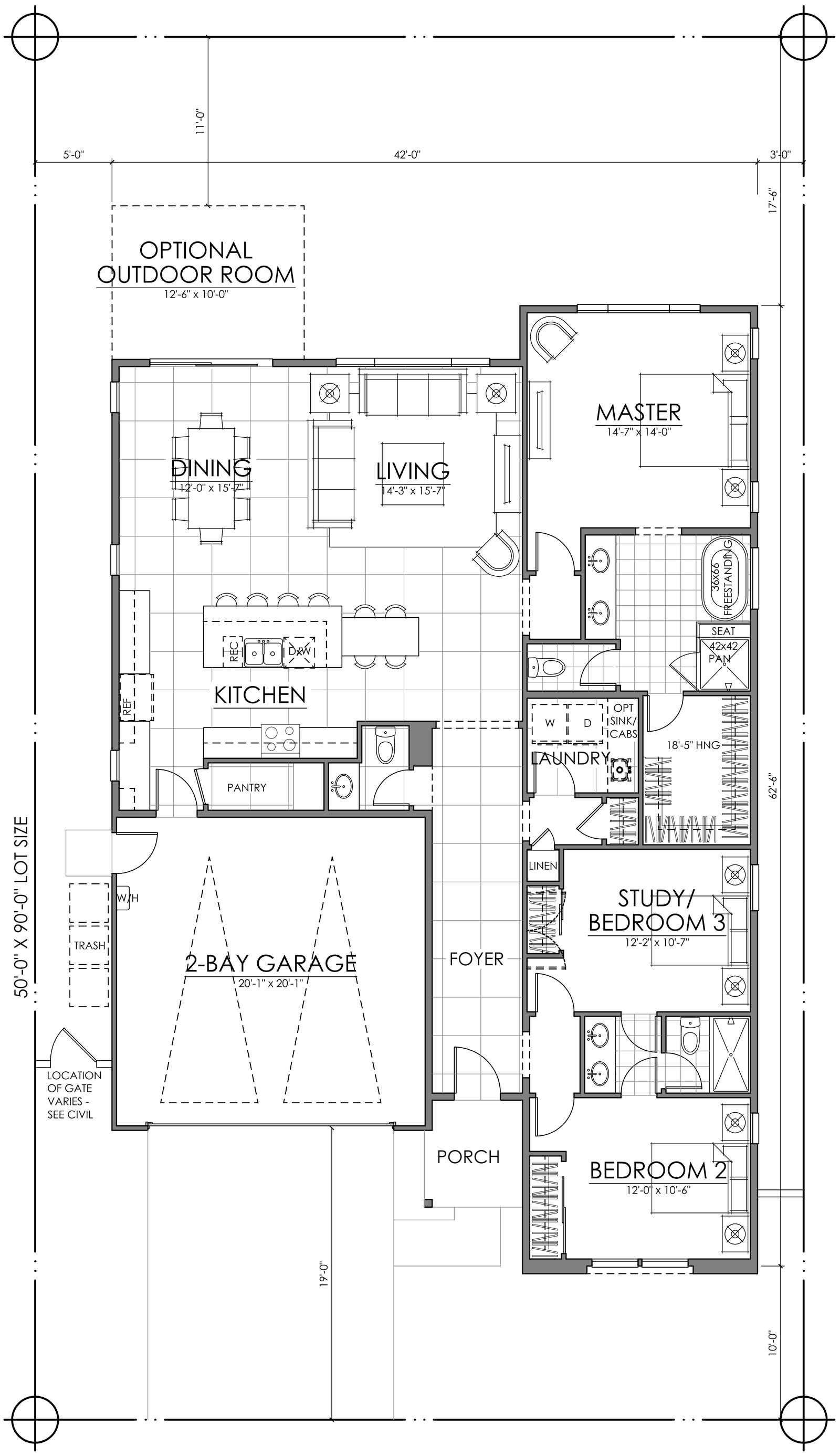
LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

AGENDA ITEM 11.2

WATER CONSERVATION WORKSHEETS.

CIT

7552



FIRST FLOOR	1869 SQ. FT.
TOTAL LIVING	**1869 SQ. FT.**

08.07.18

PLAN ONE | 1869 SQ. FT. | ELEVATION E

Woodside Homes®
BETTER BY DESIGN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231



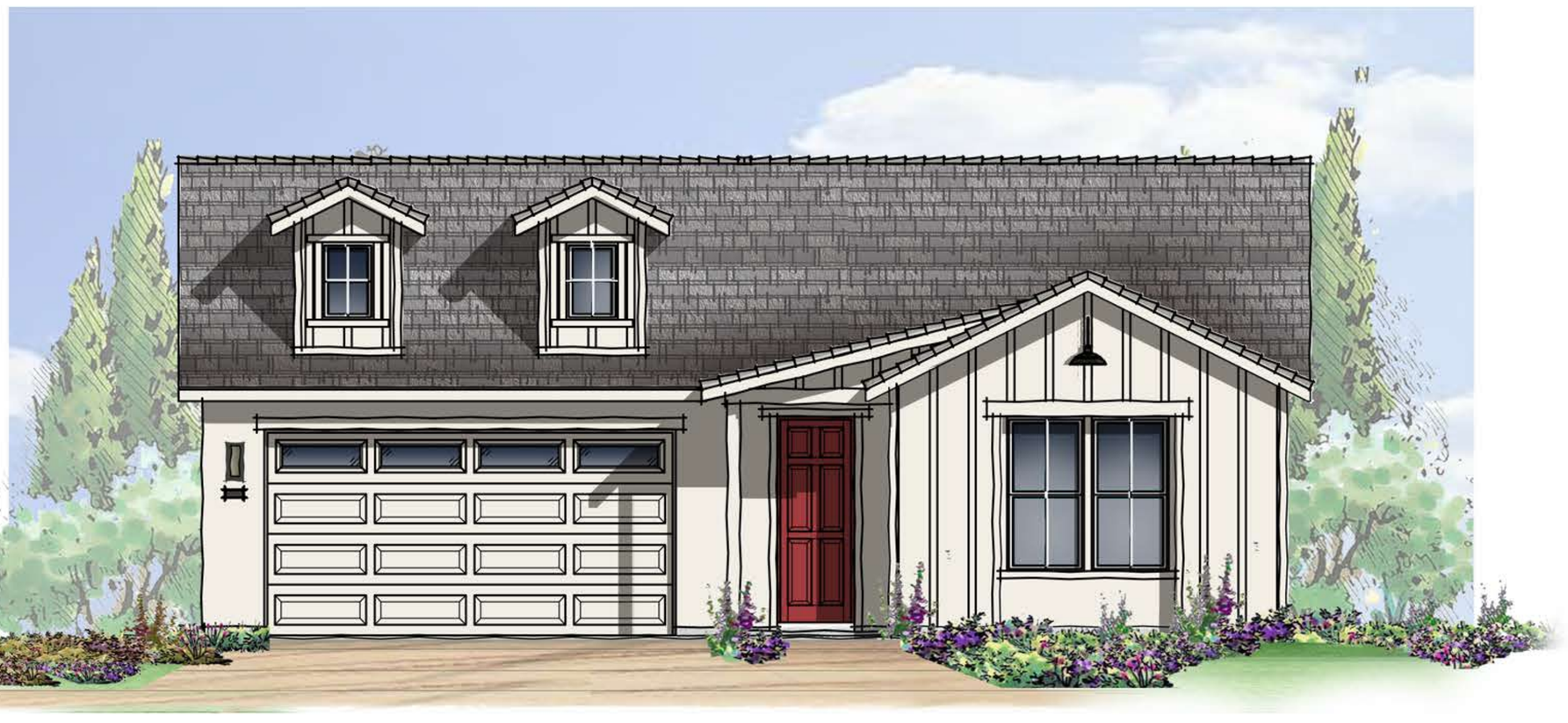
FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'D' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'E' - MODERN FARMHOUSE

SCALE: 1/4" = 1'-0"

08.07.18

PLAN ONE | FRONT ELEVATIONS

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

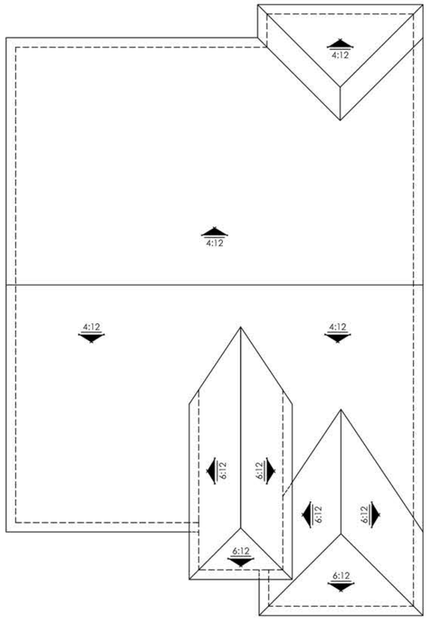
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN ONE | ELEVATION B - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

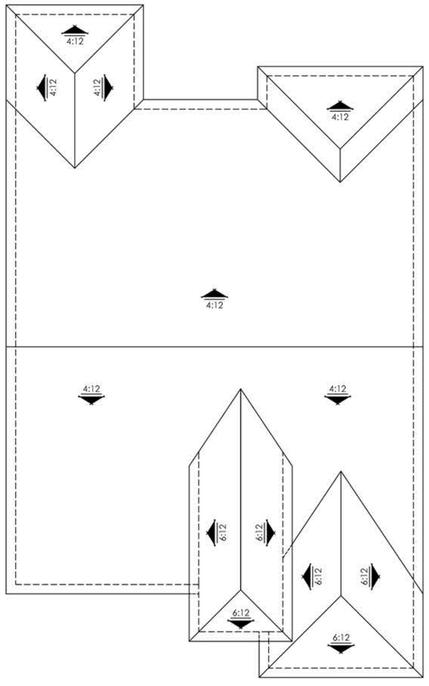
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN ONE | ELEVATION B OUTDOOR ROOM - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

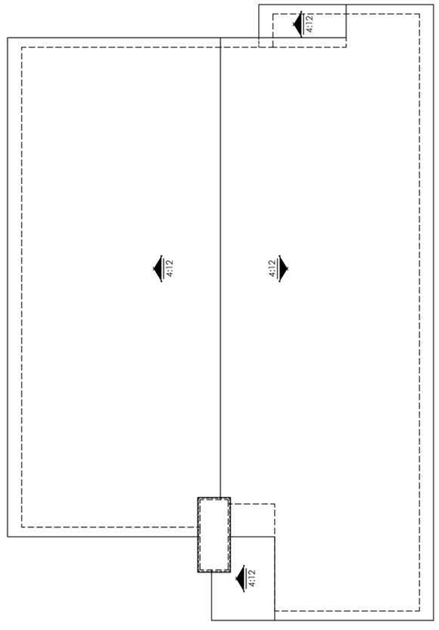
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7556



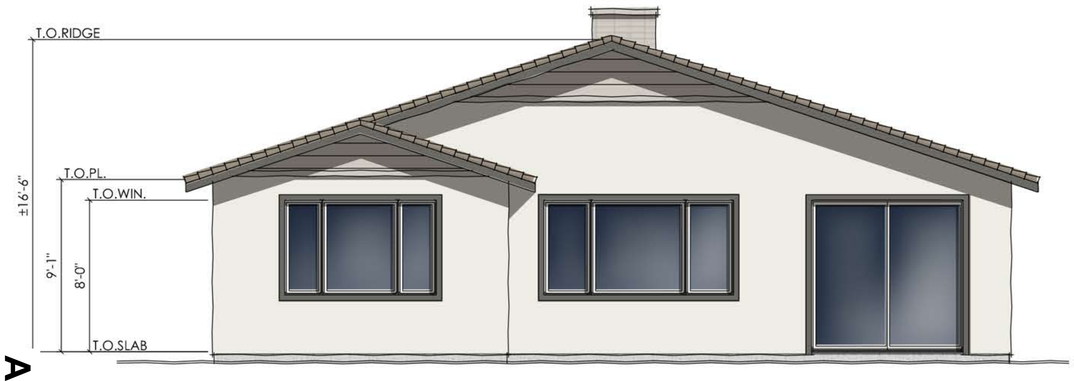
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

Woodside Homes®
BETTER BY DESIGN

PLAN ONE | ELEVATION D - MID CENTURY MODERN

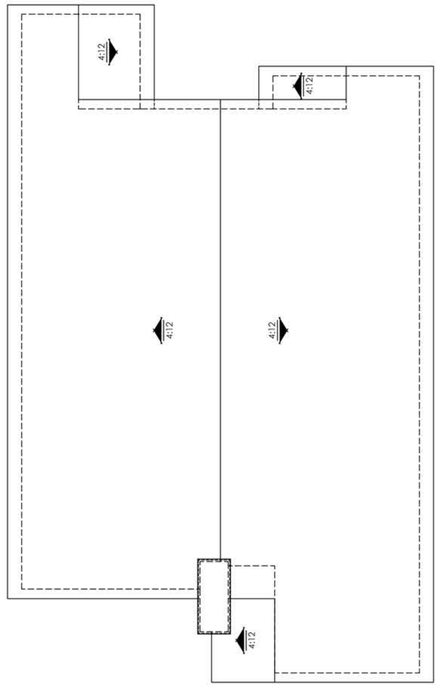
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



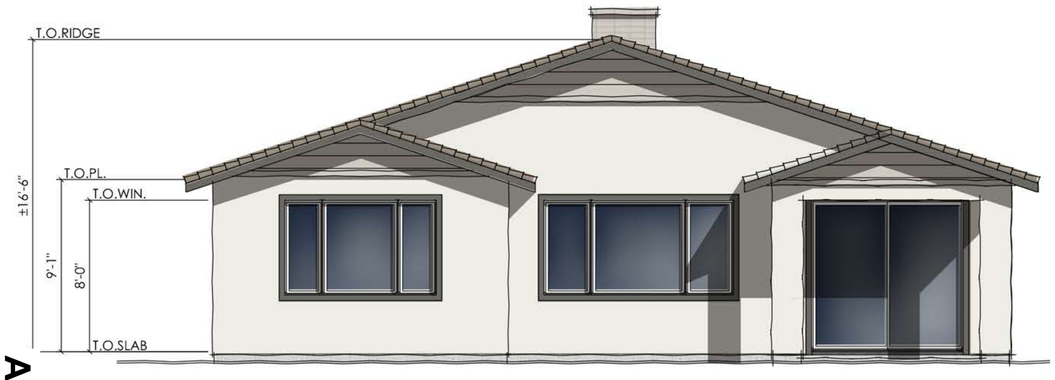
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN ONE | ELEVATION D OUTDOOR ROOM - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

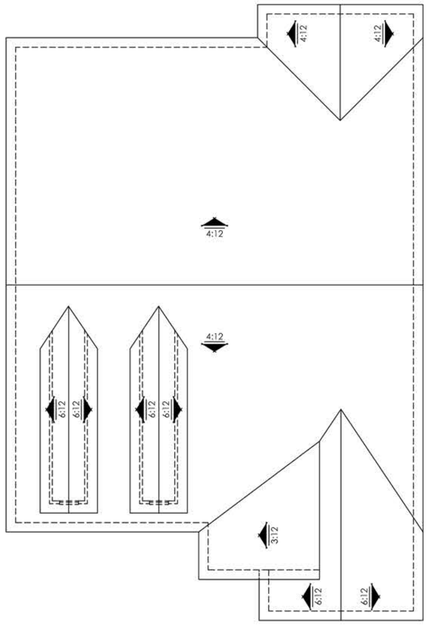
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

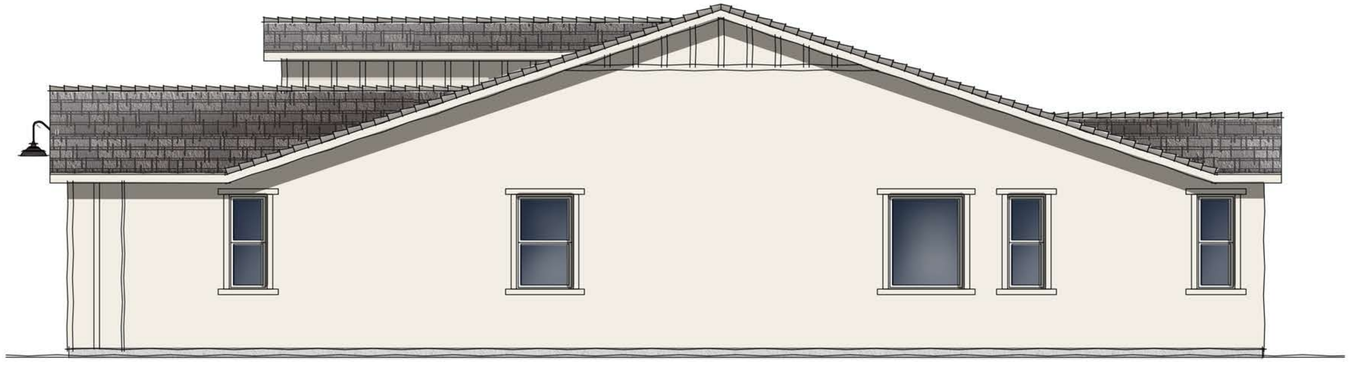
woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7558



ROOF PLAN

SCALE: 1/8" = 1'-0"



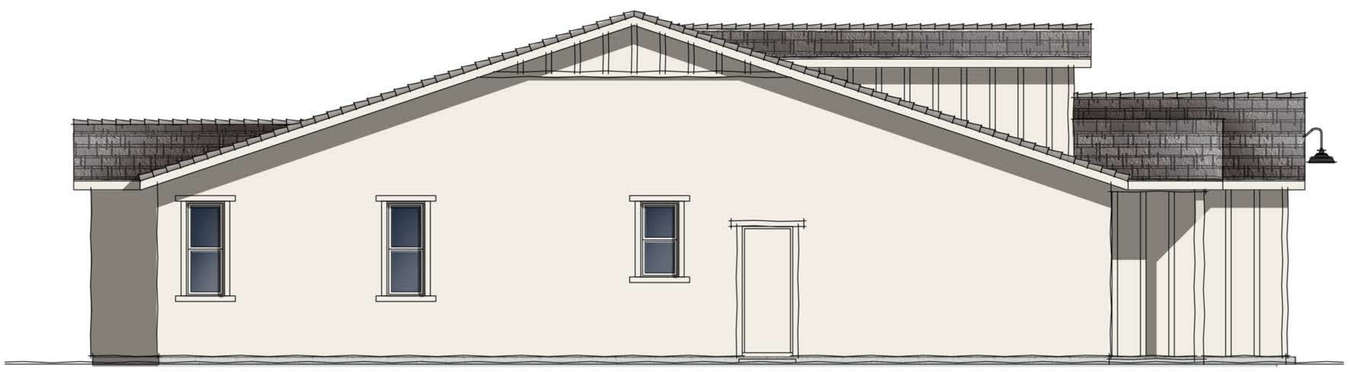
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN ONE | ELEVATION E - MODERN FARMHOUSE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

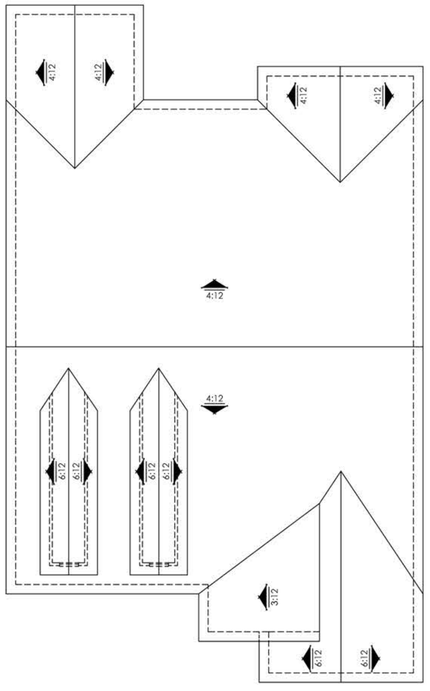
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

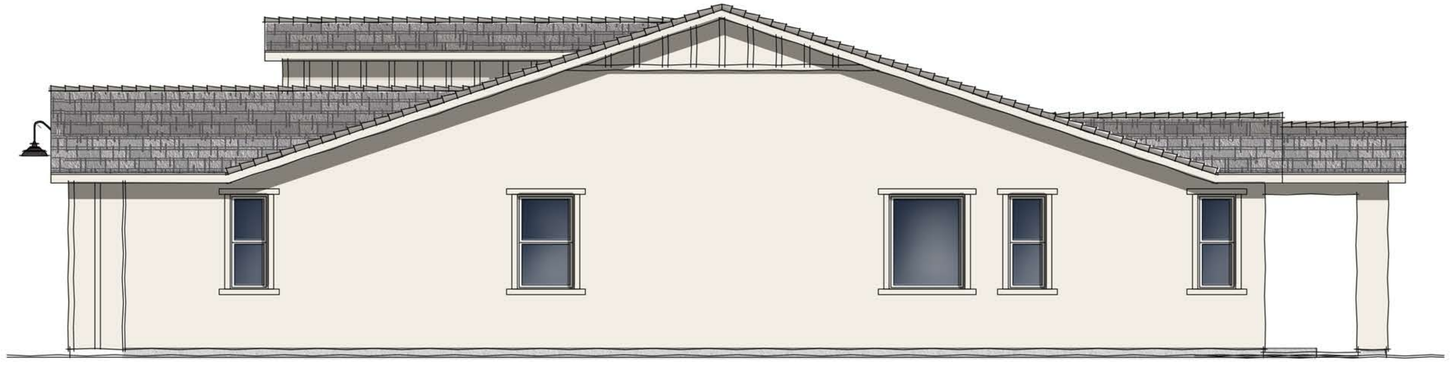
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN ONE | ELEVATION E OUTDOOR ROOM - MODERN FARMHOUSE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

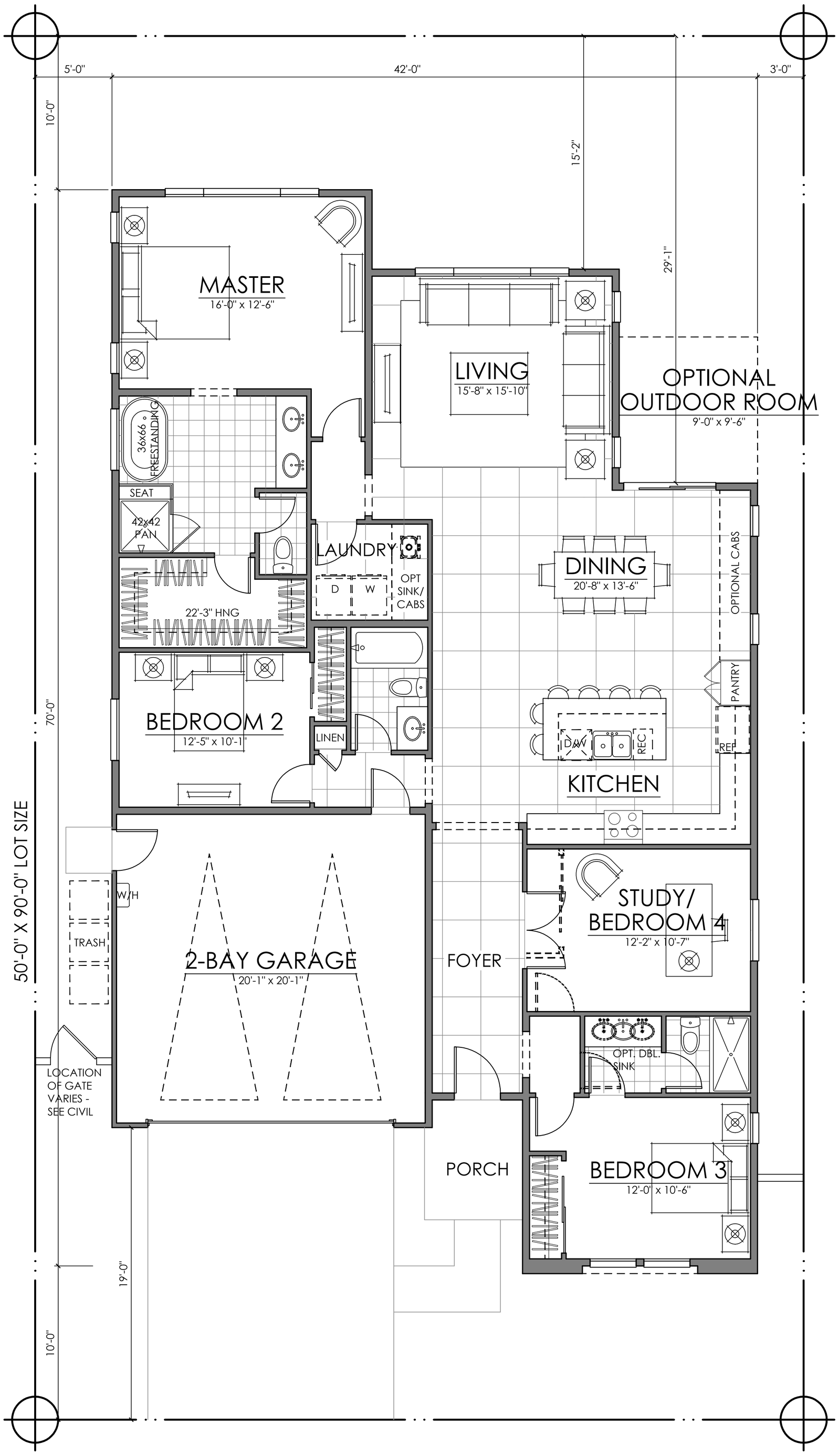
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



FIRST FLOOR	2018 SQ. FT.
TOTAL LIVING	**2018 SQ. FT.**

REAR YARD SQ. FT.	**812 SQ. FT.**
REQUIRED REAR YARD SQ. FT.	*800 SQ. FT.*
(16'-0" OVERALL AVERAGE)	*812 SQ. FT./50' LOT WIDTH*
	16'-3" AVERAGE

08.07.18

PLAN TWO | 2018 SQ. FT. | ELEVATION B

Woodside Homes®
BETTER BY DESIGN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'D' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"

08.07.18

PLAN TWO | FRONT ELEVATIONS

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

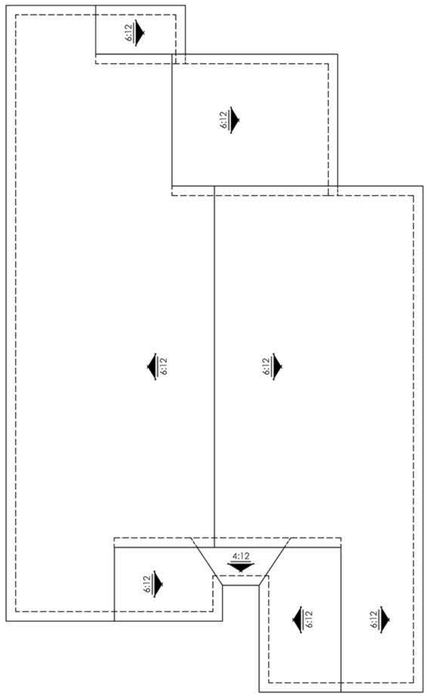
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



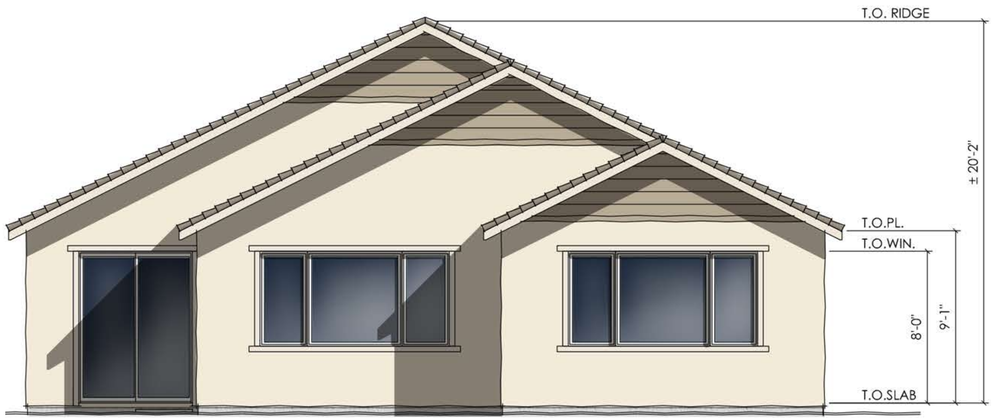
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN TWO | ELEVATION B - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

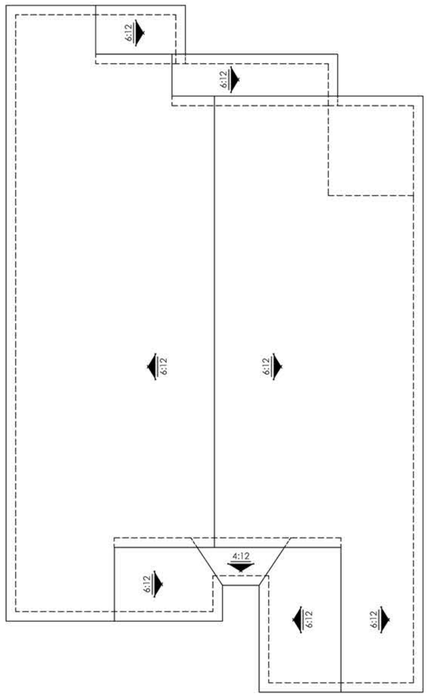
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7563



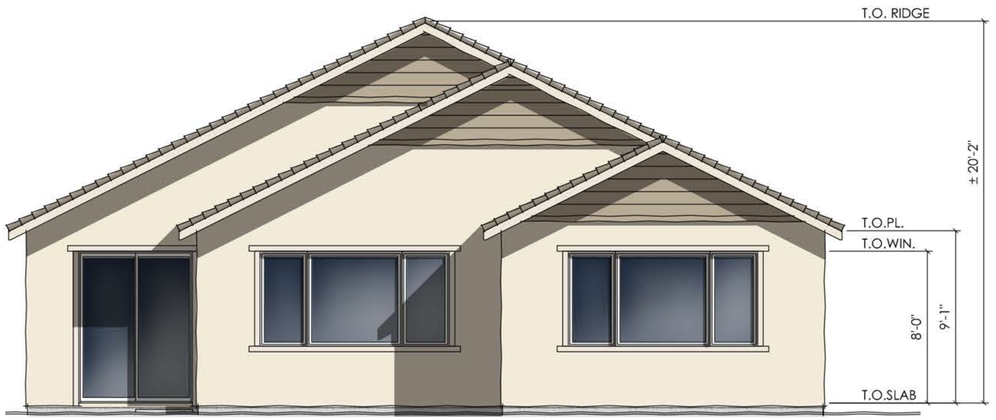
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN TWO | ELEVATION B OUTDOOR ROOM - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

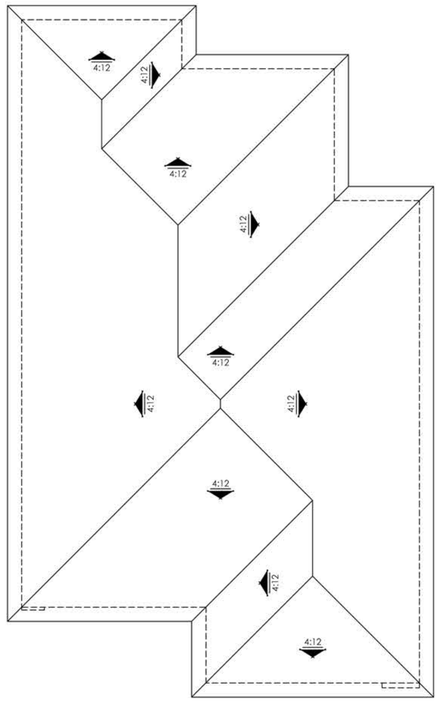
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7564



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN TWO | ELEVATION C - MODERN PRAIRIE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

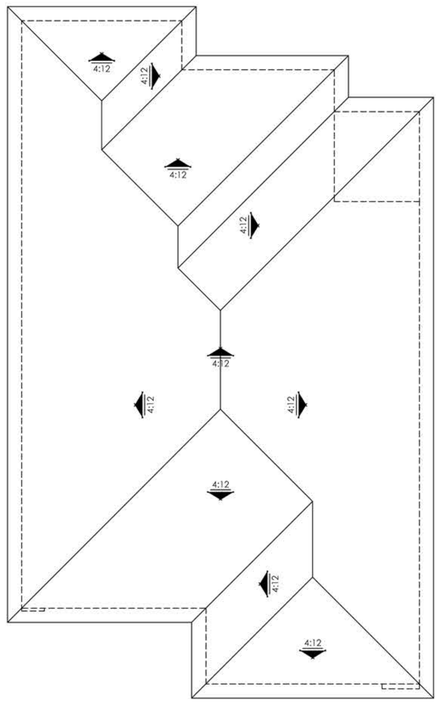
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN TWO | ELEVATION C OUTDOOR ROOM - MODERN PRAIRIE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

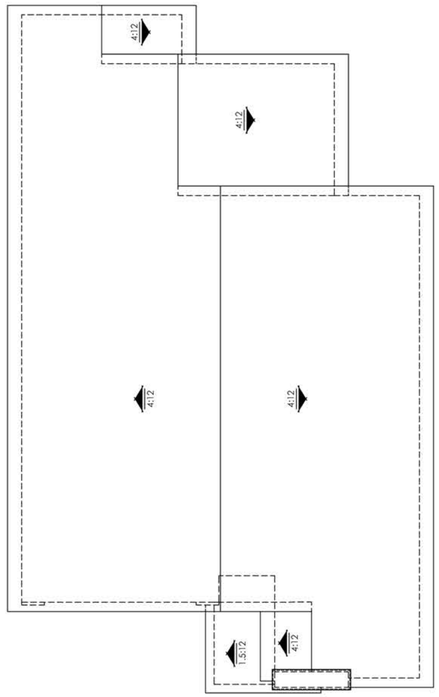
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN TWO | ELEVATION D - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

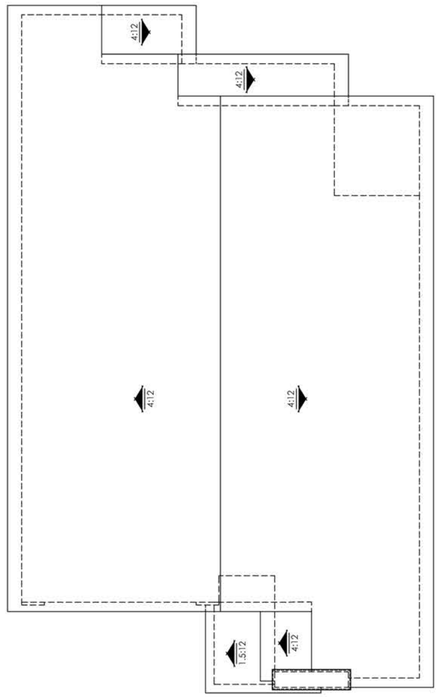
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN TWO | ELEVATION D OUTDOOR ROOM - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

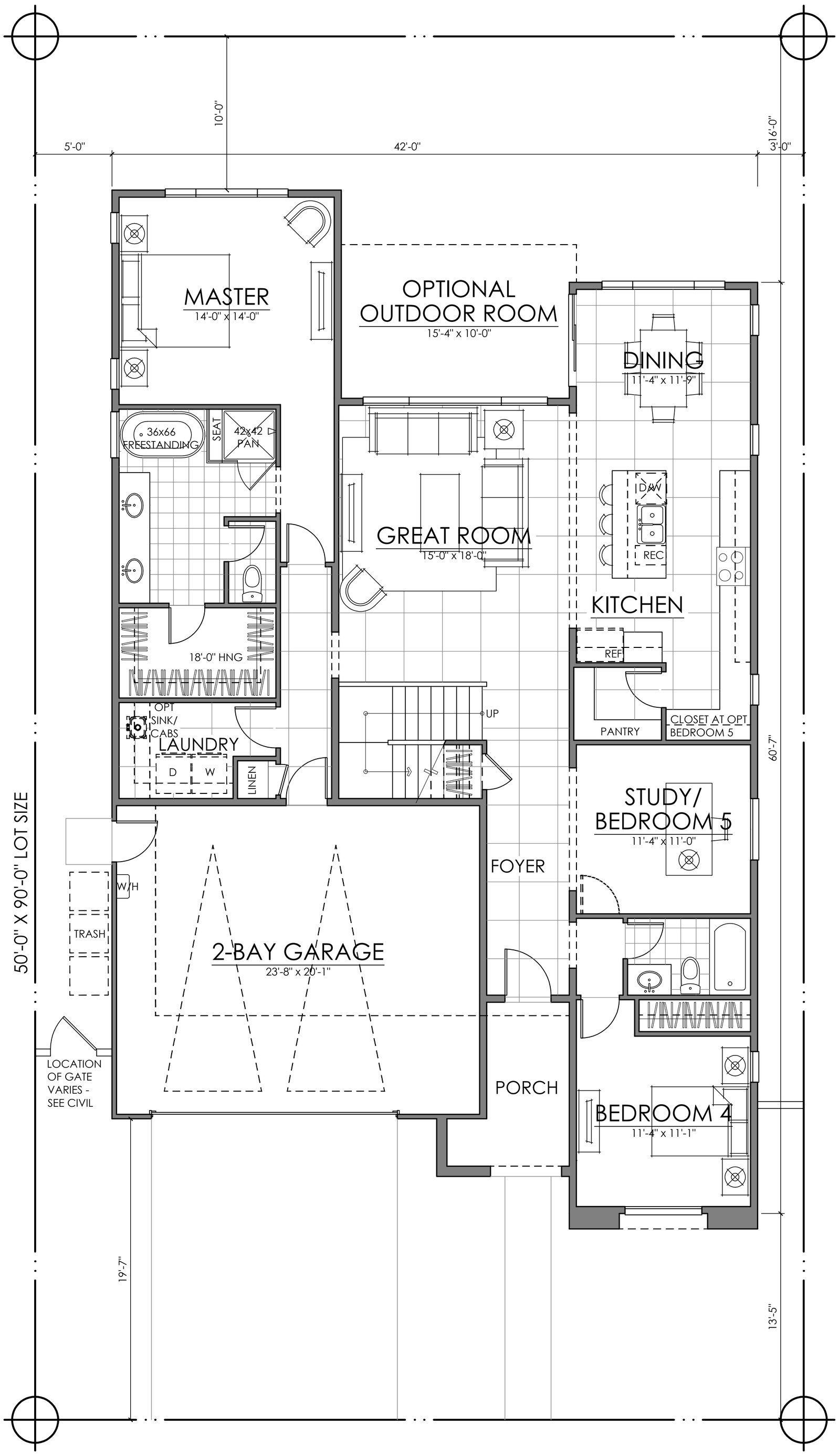
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7568



FIRST FLOOR	1807 SQ. FT.
SECOND FLOOR	635 SQ. FT.
TOTAL LIVING	**2442 SQ. FT.**

REAR YARD SQ. FT.	**827 SQ. FT.**
REQUIRED REAR YARD SQ. FT.	*800 SQ. FT.*
(16'-0" OVERALL AVERAGE)	*827 SQ. FT./50' LOT WIDTH*
	16'-6" AVERAGE

08.07.18

PLAN THREE | 2442 SQ. FT. | ELEVATION A

Woodside Homes®
BETTER BY DESIGN

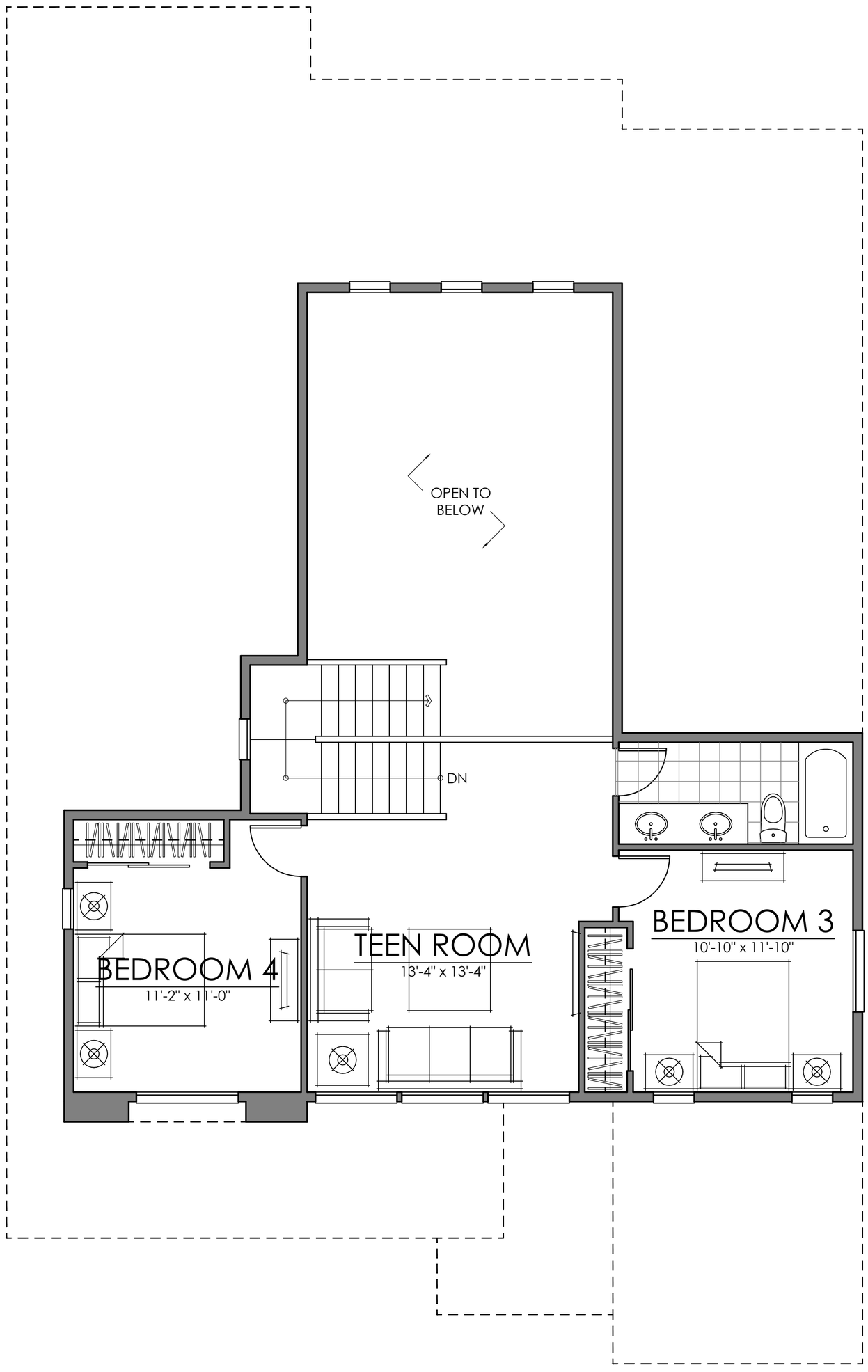
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231



FIRST FLOOR	1807 SQ. FT.
SECOND FLOOR	635 SQ. FT.
TOTAL LIVING	**2442 SQ. FT.**

08.07.18

PLAN THREE | 2442 SQ. FT. | ELEVATION A

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton. co 80120 / 303 683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



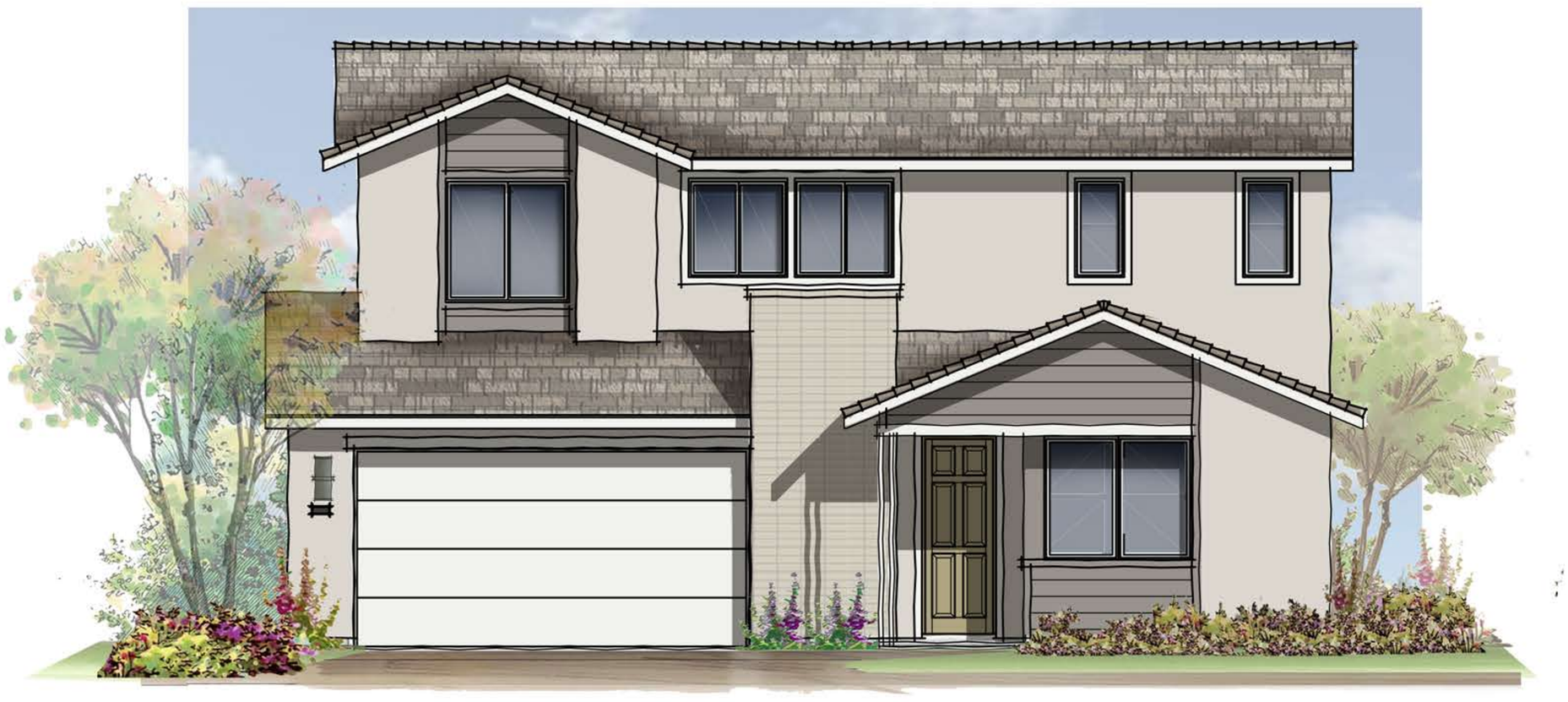
FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'D' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"

08.07.18

PLAN THREE | FRONT ELEVATIONS

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

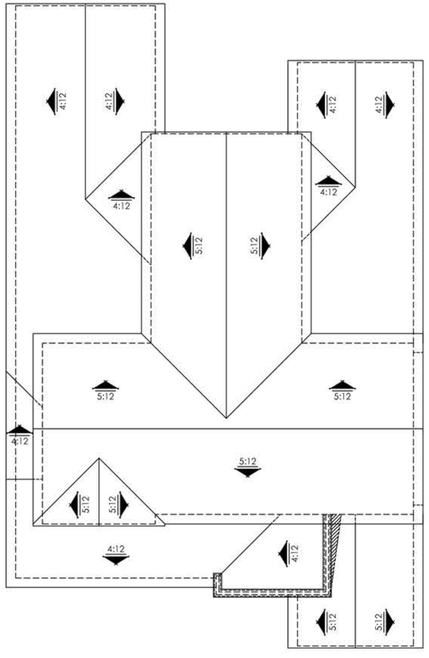
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

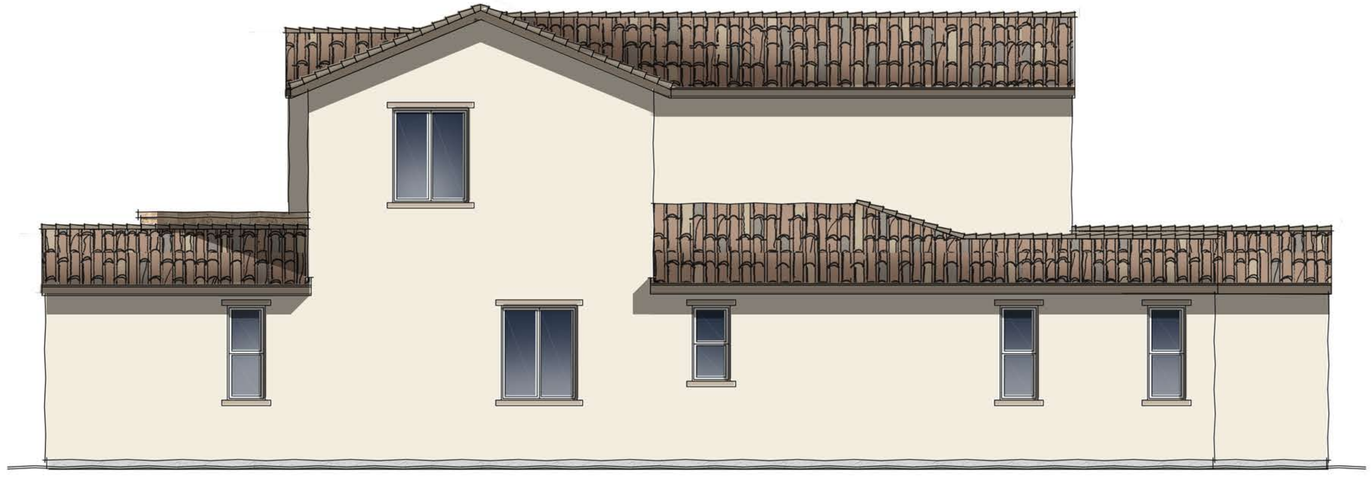
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231



ROOF PLAN

SCALE: 1/8" = 1'-0"



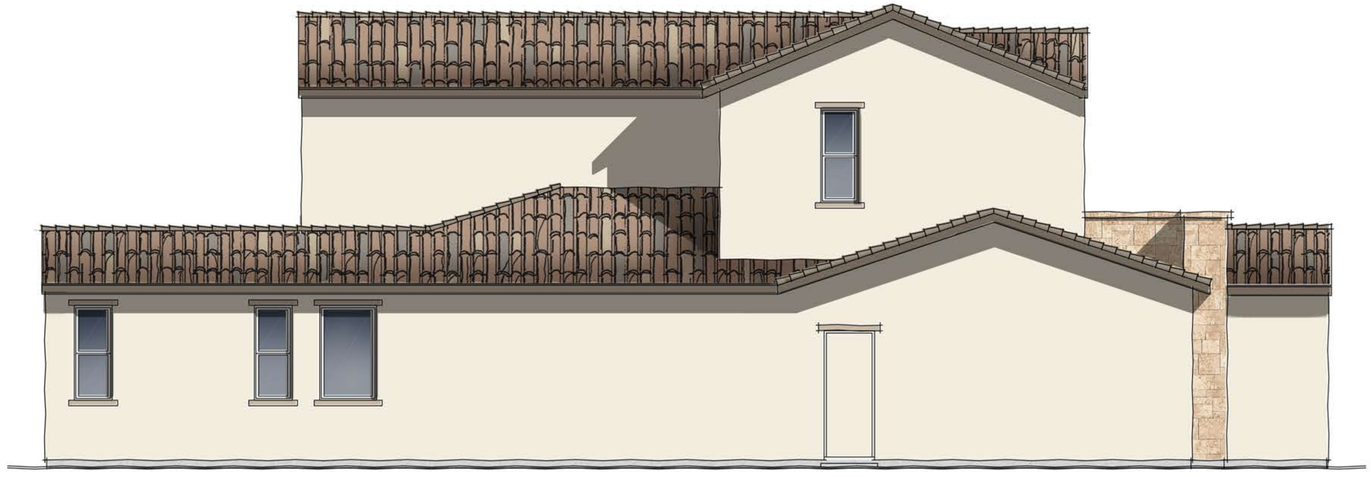
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN THREE | ELEVATION A - MODERN SPANISH

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

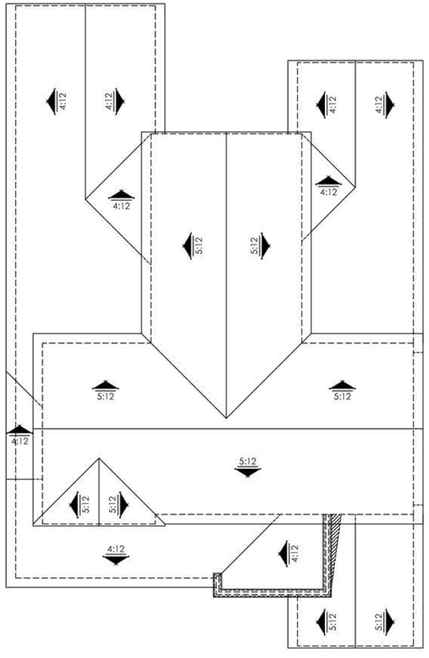
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



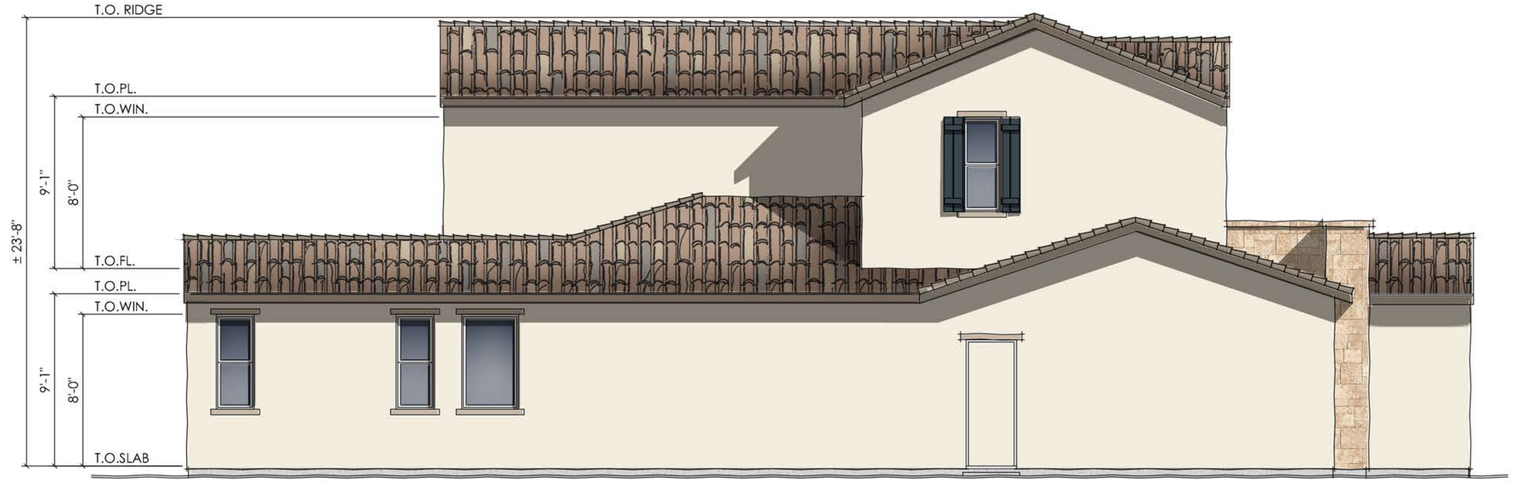
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN THREE | ELEVATION A ENHANCED - MODERN SPANISH

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

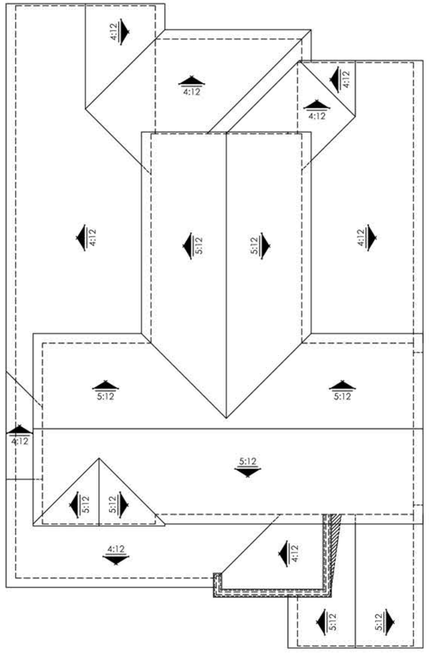
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

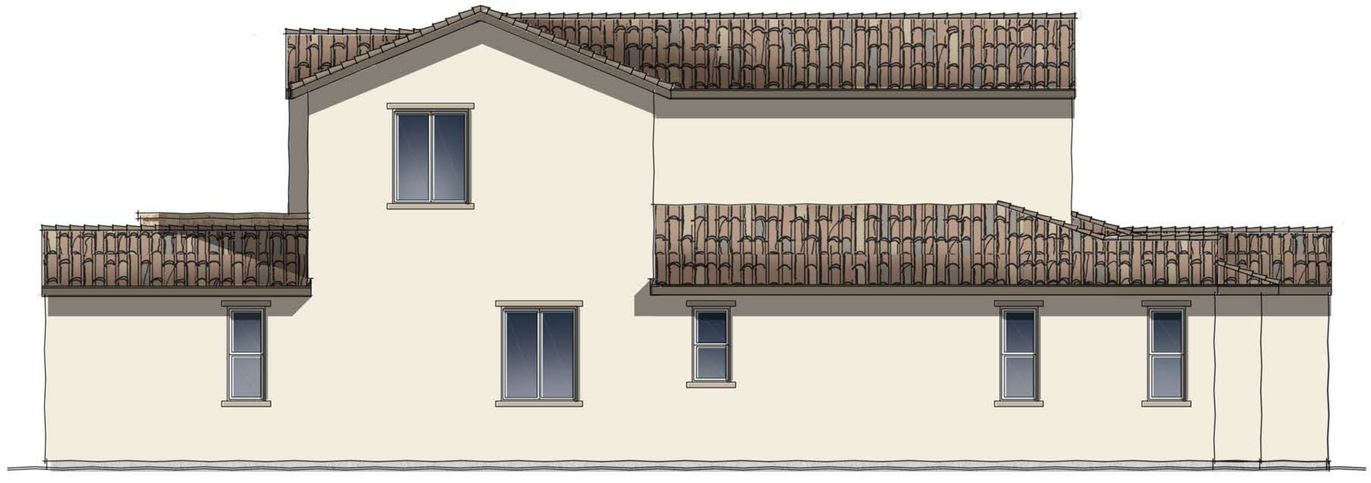
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



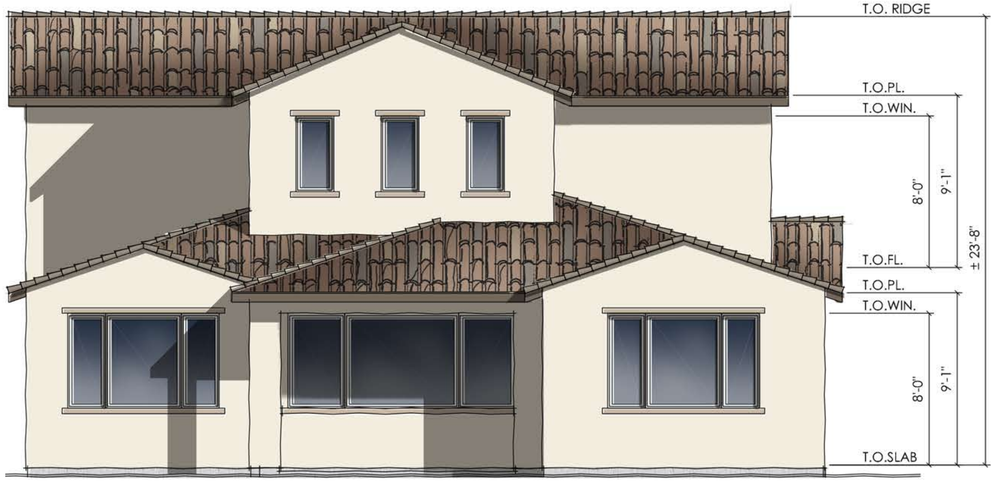
ROOF PLAN

SCALE: 1/8" = 1'-0"



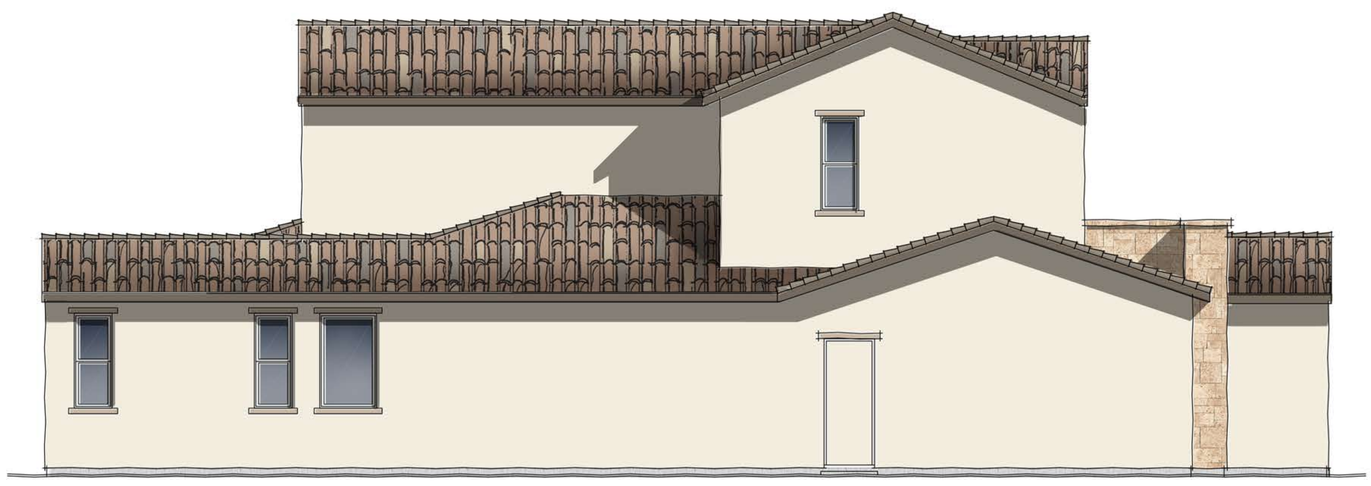
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN THREE | ELEVATION A OUTDOOR ROOM - MODERN SPANISH

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

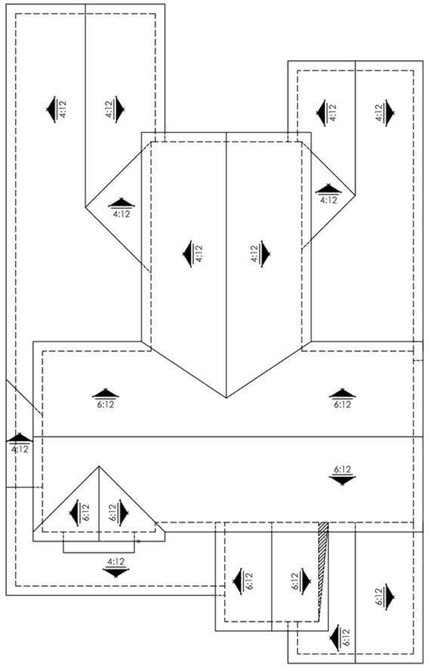
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7574



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN THREE | ELEVATION B - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

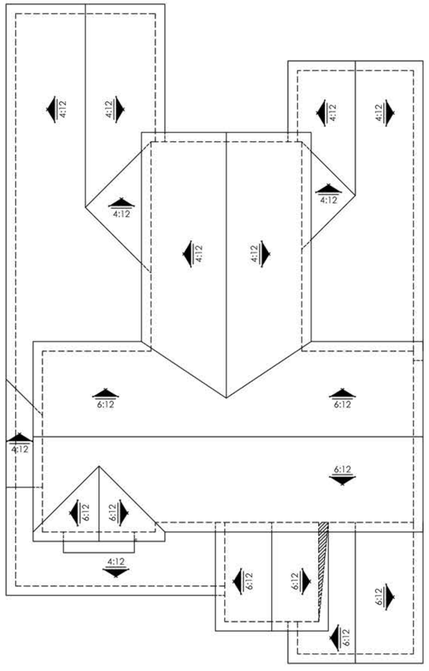
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B ENHANCED - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

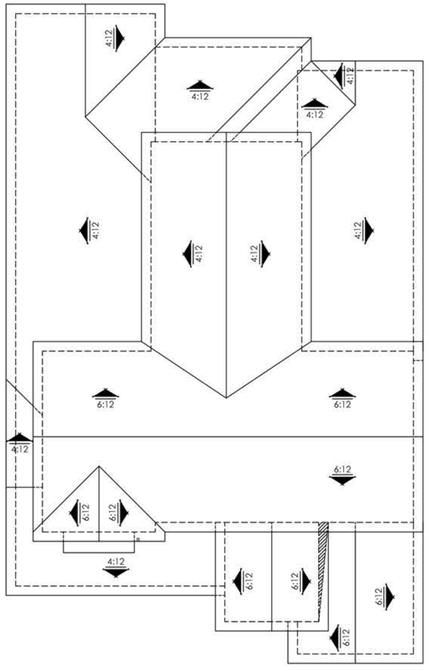
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

3.07.18

PLAN THREE | ELEVATION B OUTDOOR ROOM - WINE COUNTRY

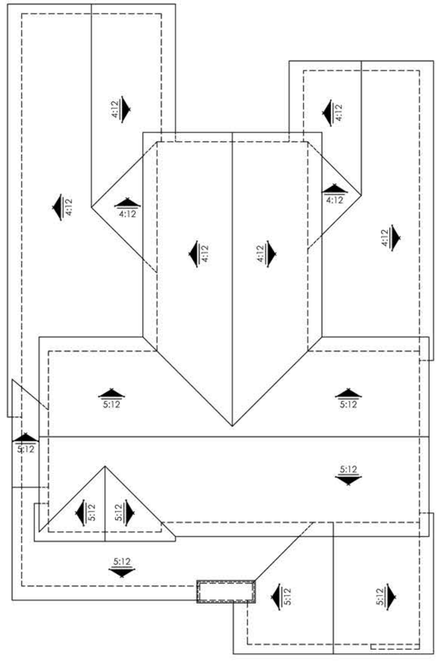
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

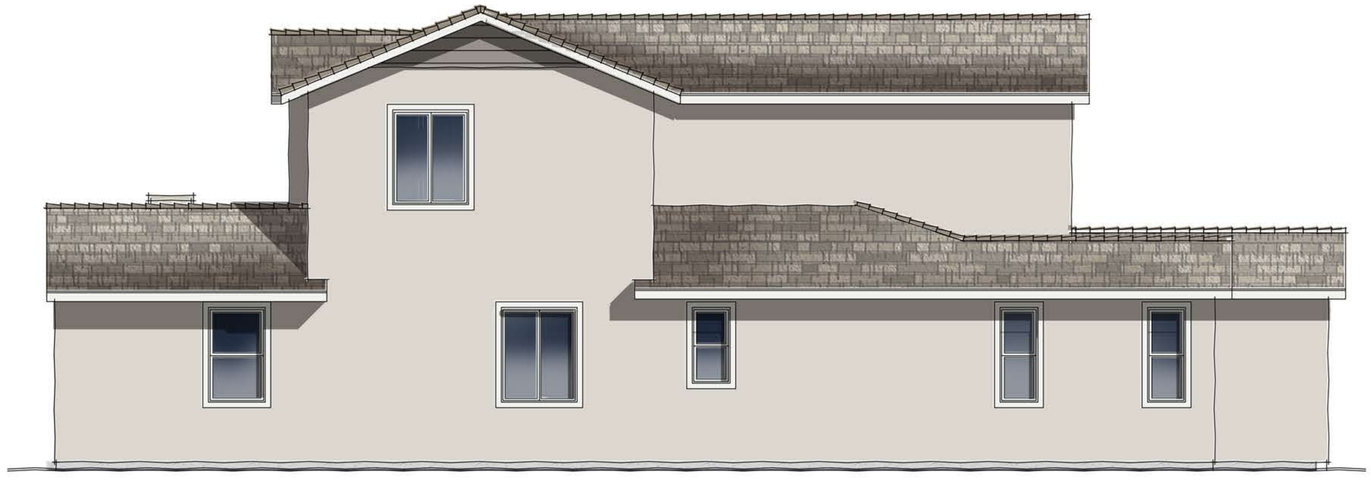
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



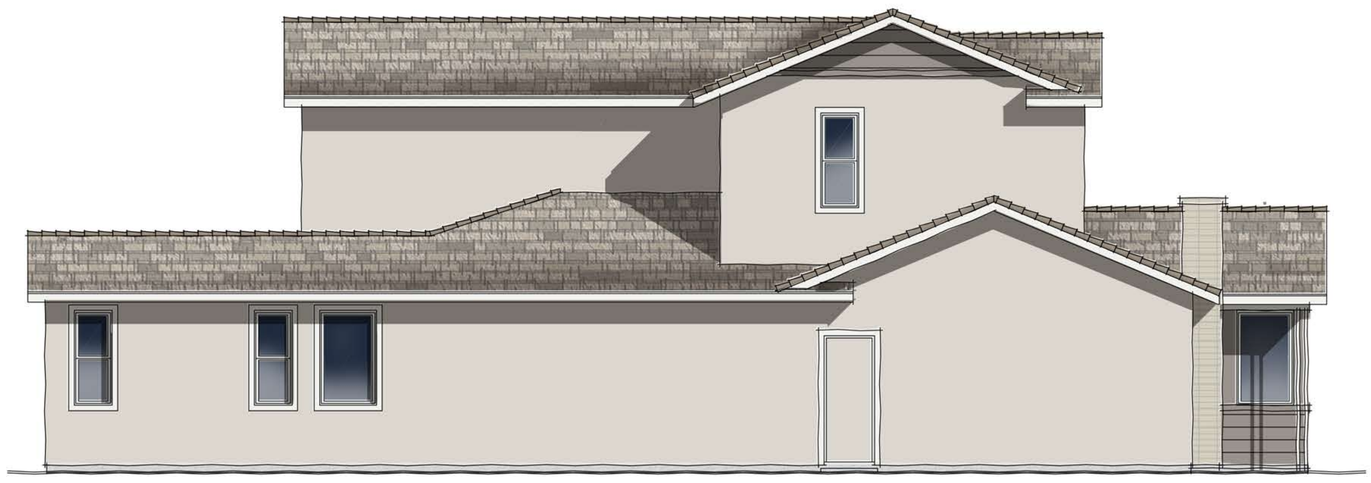
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

3.07.18

PLAN THREE | ELEVATION D - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

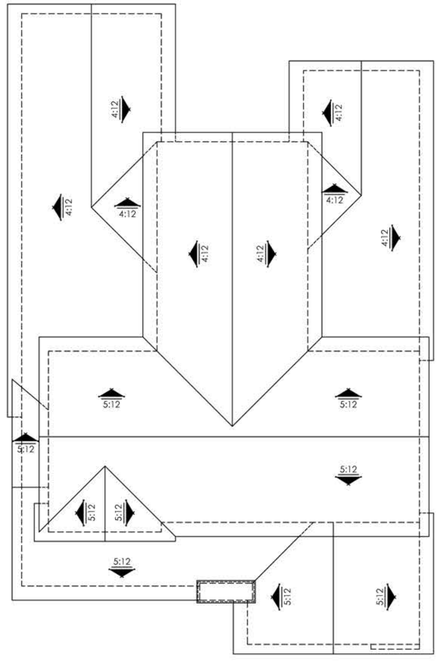
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

3.07.18

PLAN THREE | ELEVATION D ENHANCED - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

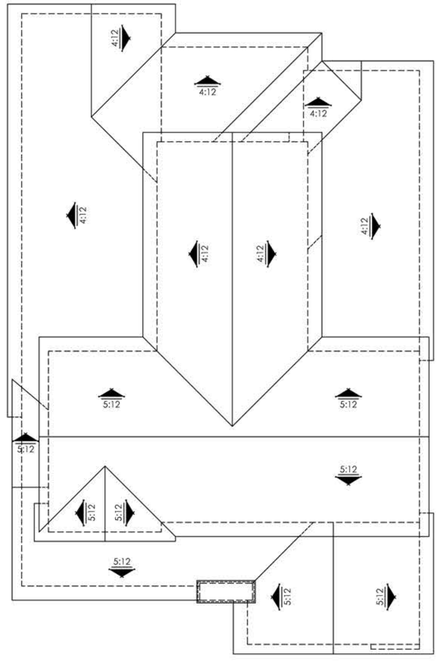
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

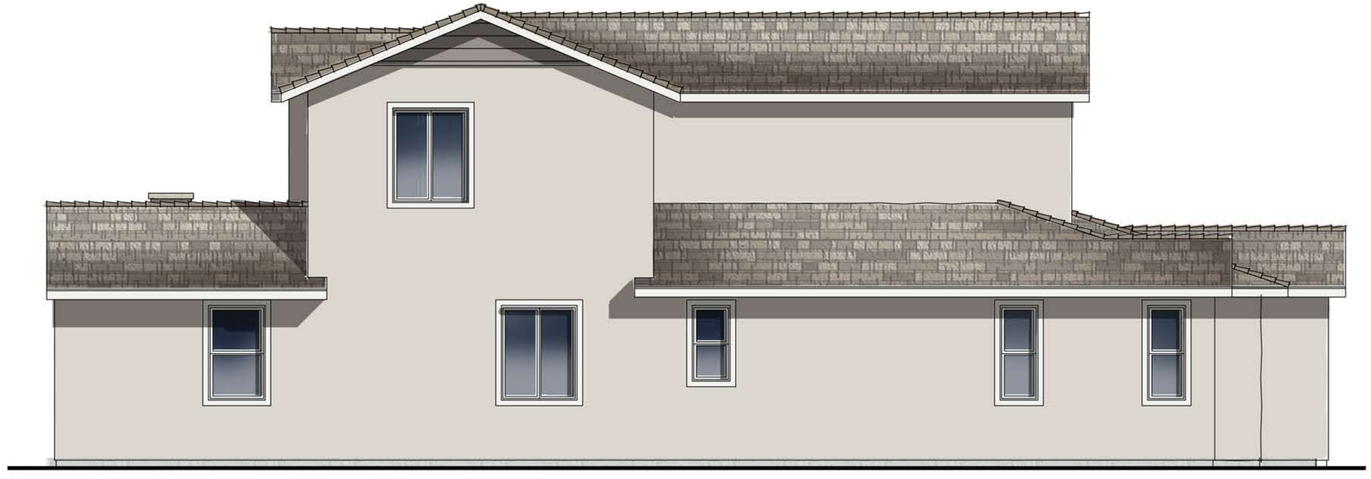
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



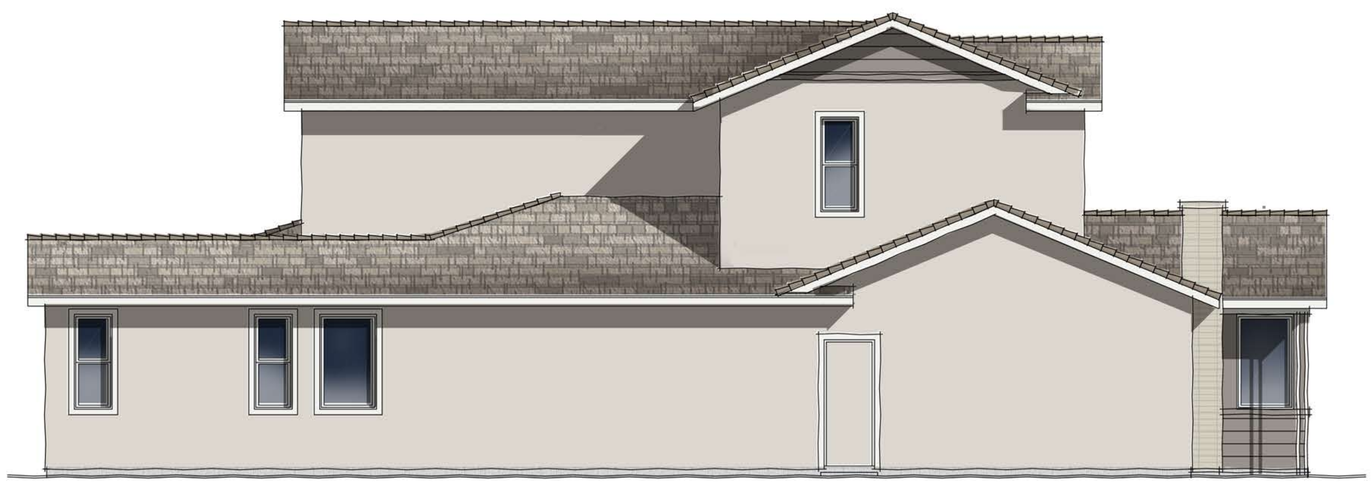
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

.07.18

PLAN THREE | ELEVATION D OUTDOOR ROOM - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

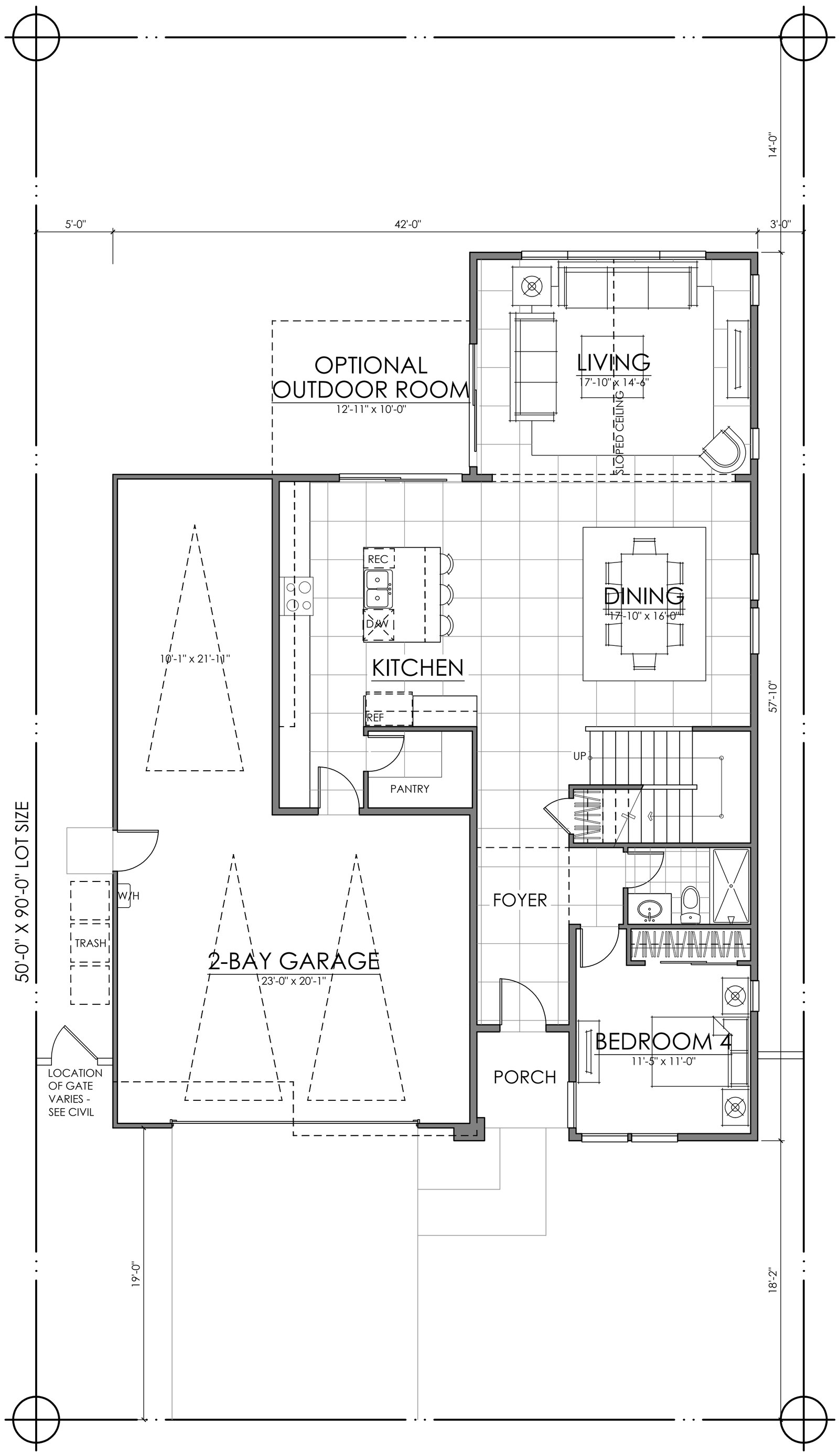
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



FIRST FLOOR	1324 SQ. FT.
SECOND FLOOR	1344 SQ. FT.
TOTAL LIVING	**2668 SQ. FT.**

08.07.18

PLAN FOUR | 2668 SQ. FT. | ELEVATION A

Woodside Homes®
BETTER BY DESIGN

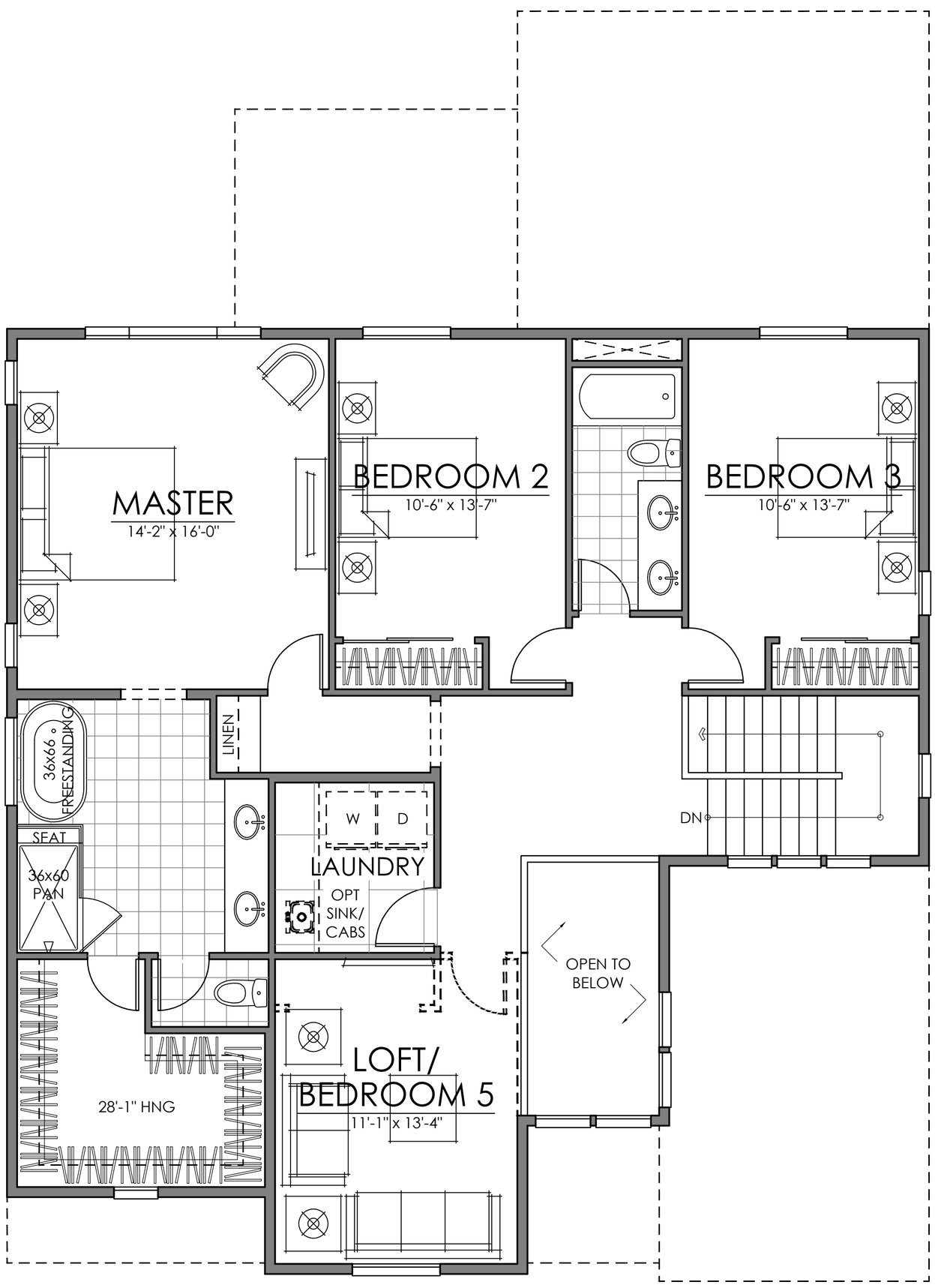
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231



FIRST FLOOR	1324 SQ. FT.
SECOND FLOOR	1344 SQ. FT.
TOTAL LIVING	**2668 SQ. FT.**

08.07.18

PLAN FOUR | 2668 SQ. FT. | ELEVATION A

Woodside Homes®
BETTER BY DESIGN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton. co 80120 / 303 683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"

08.07.18

PLAN FOUR | FRONT ELEVATIONS

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

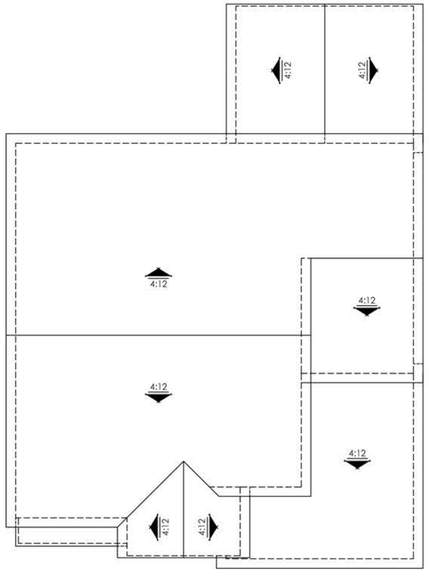
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

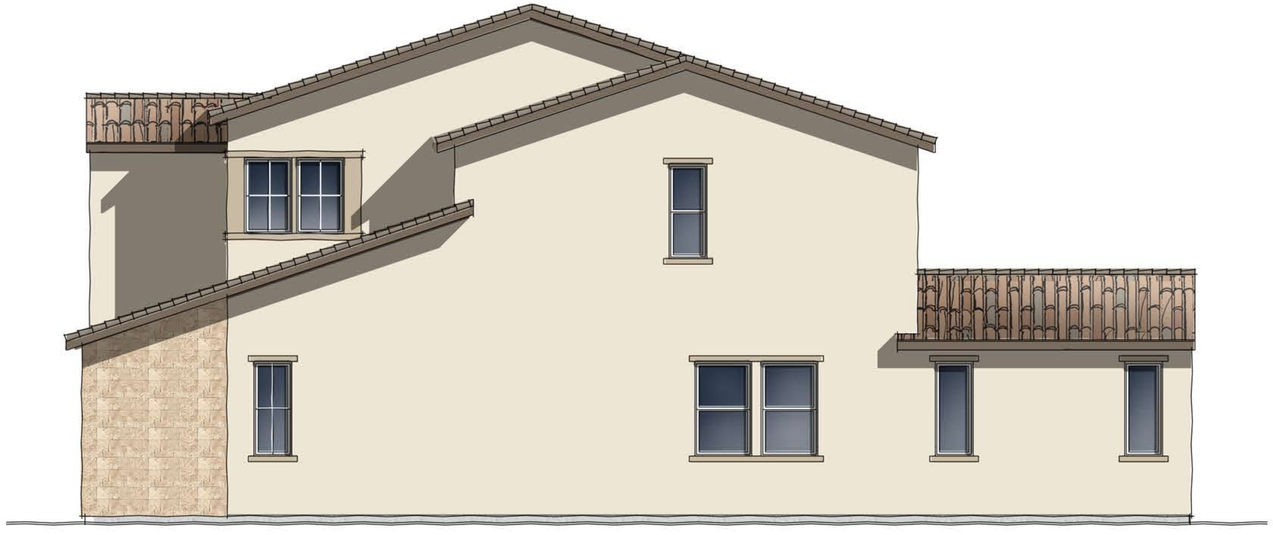
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231



ROOF PLAN

SCALE: 1/8" = 1'-0"



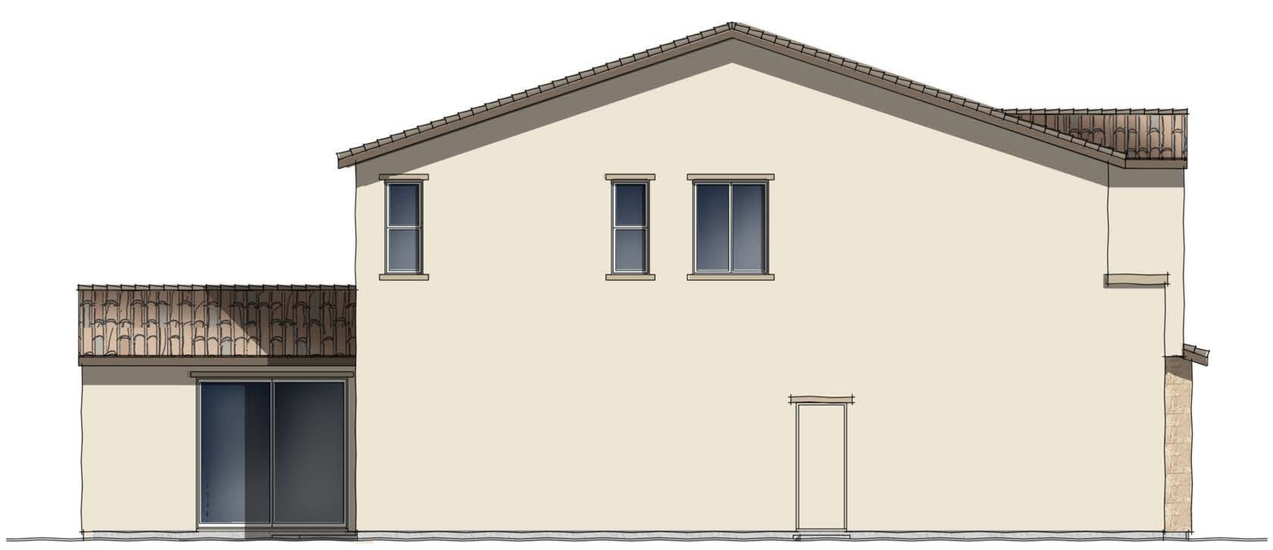
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FOUR | ELEVATION A - MODERN SPANISH

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

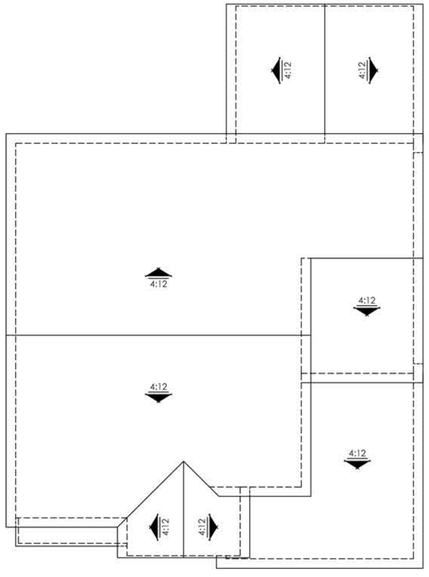
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

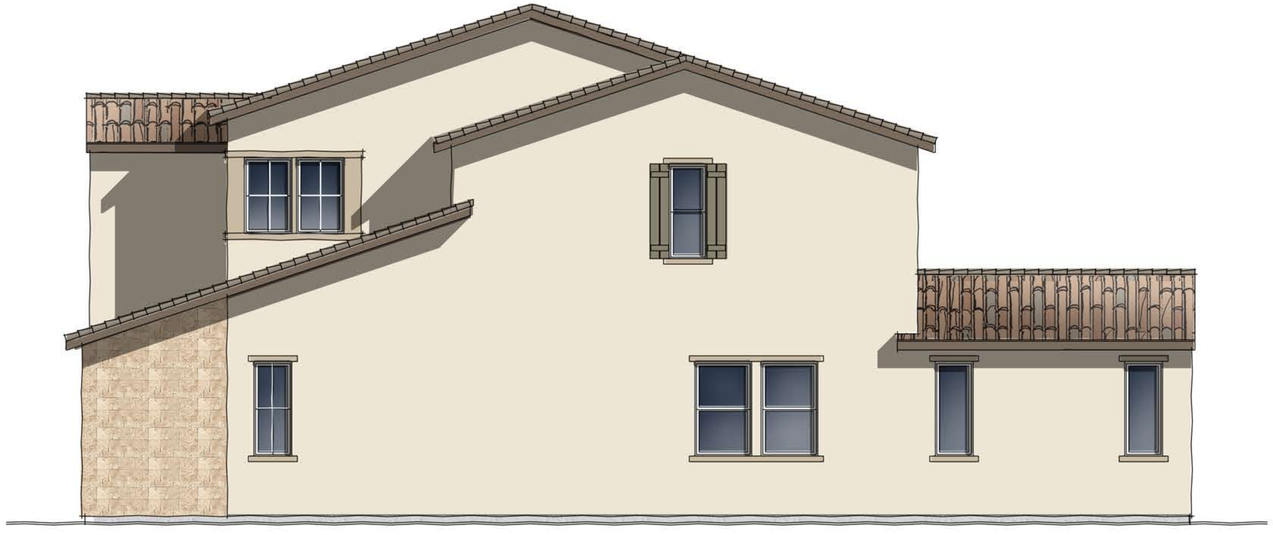
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



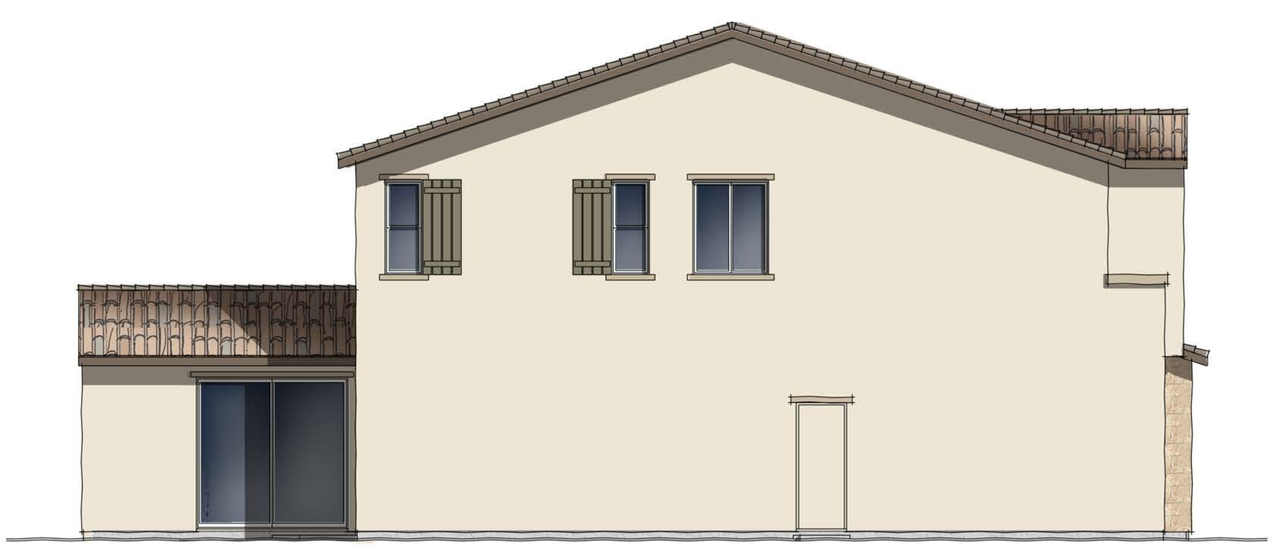
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FOUR | ELEVATION A ENHANCED - MODERN SPANISH

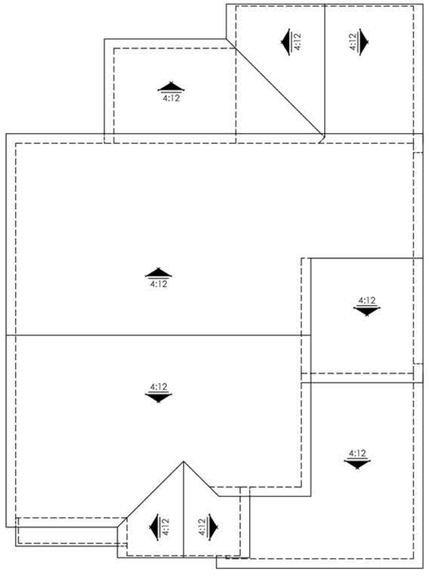
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

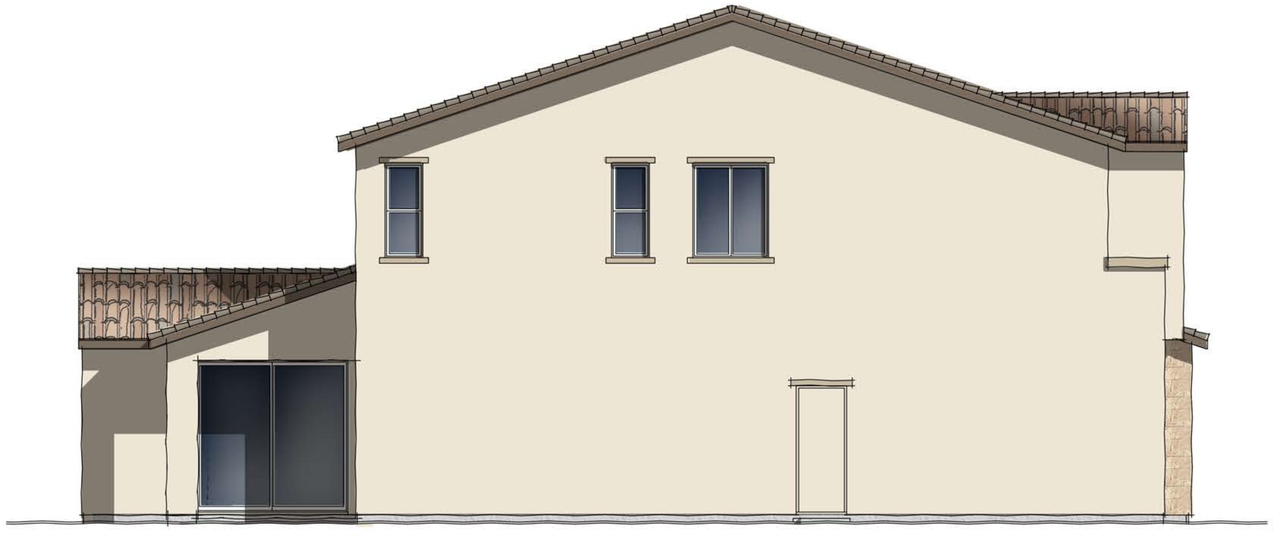
woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

3.07.18

PLAN FOUR | ELEVATION A OUTDOOR ROOM - MODERN SPANISH

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

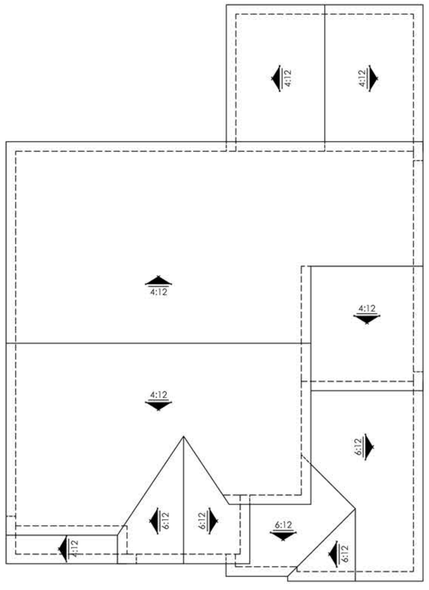
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN

SCALE: 1/8" = 1'-0"



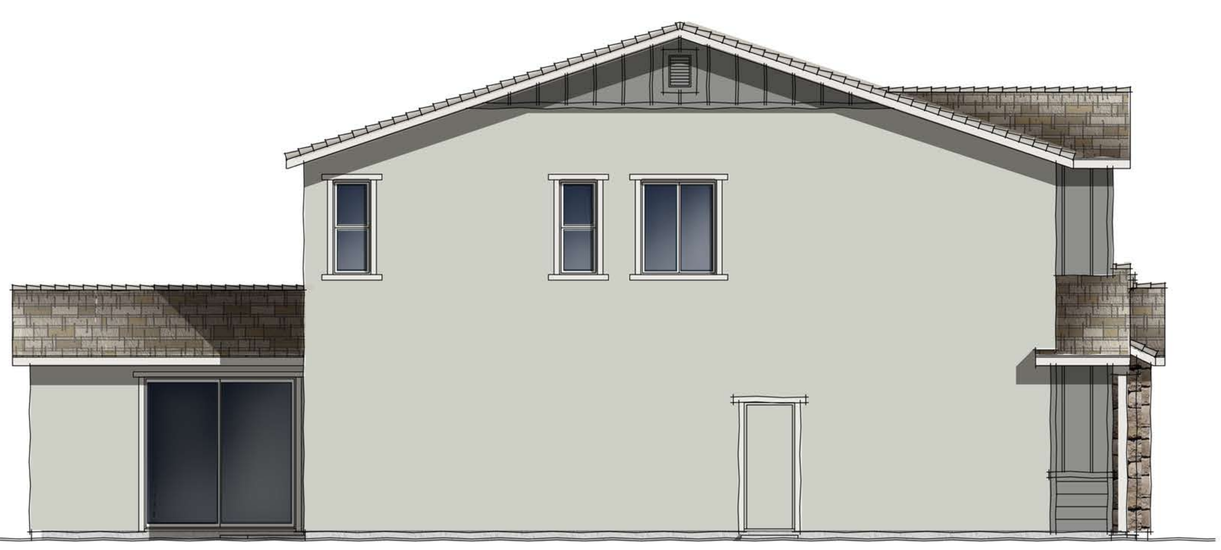
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FOUR | ELEVATION B - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

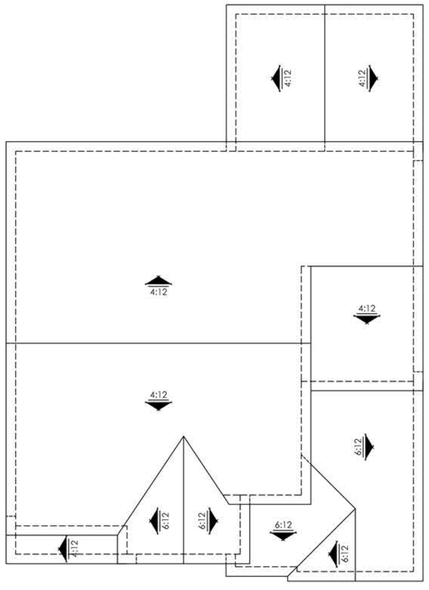
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FOUR | ELEVATION B ENHANCED - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

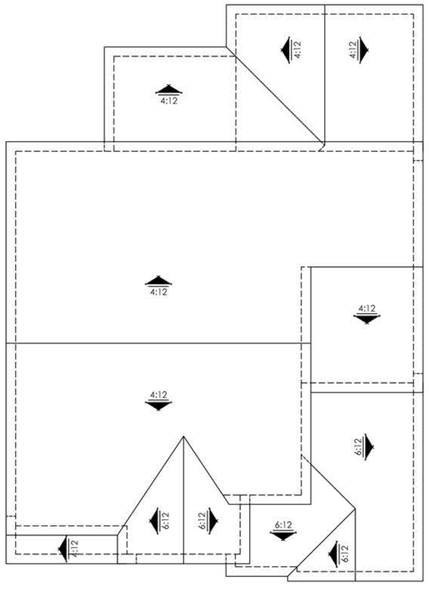
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7588



ROOF PLAN

SCALE: 1/8" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FOUR | ELEVATION B OUTDOOR ROOM - WINE COUNTRY

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

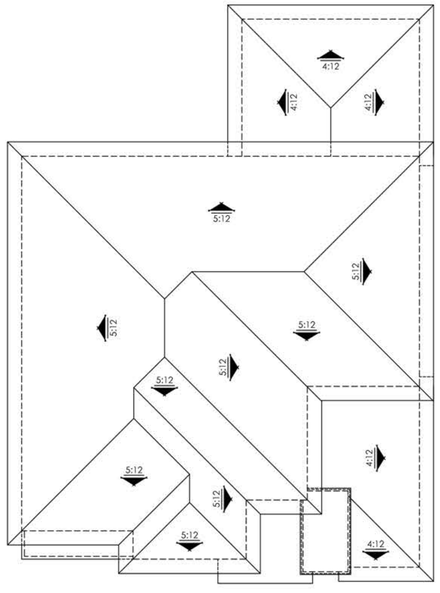
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



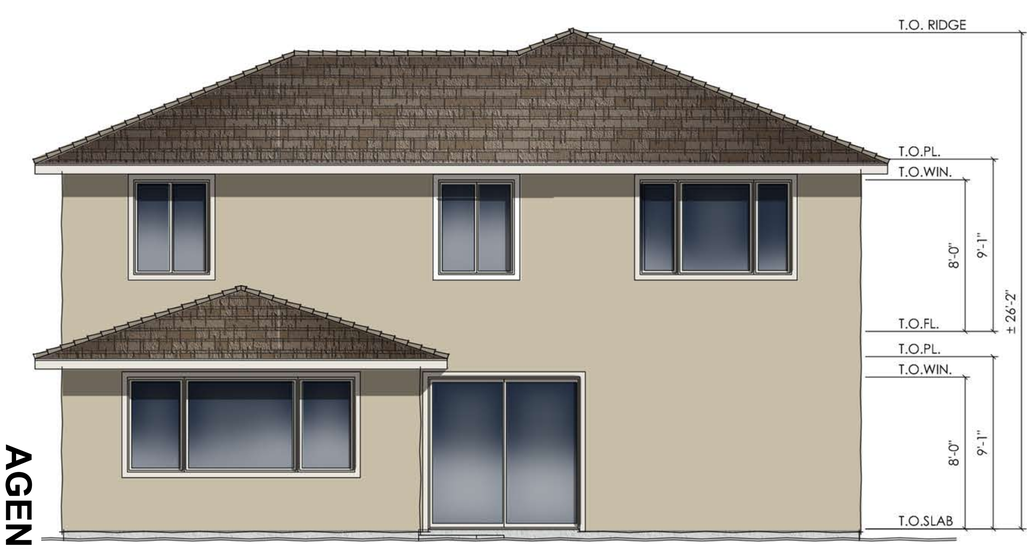
ROOF PLAN

SCALE: 1/8" = 1'-0"



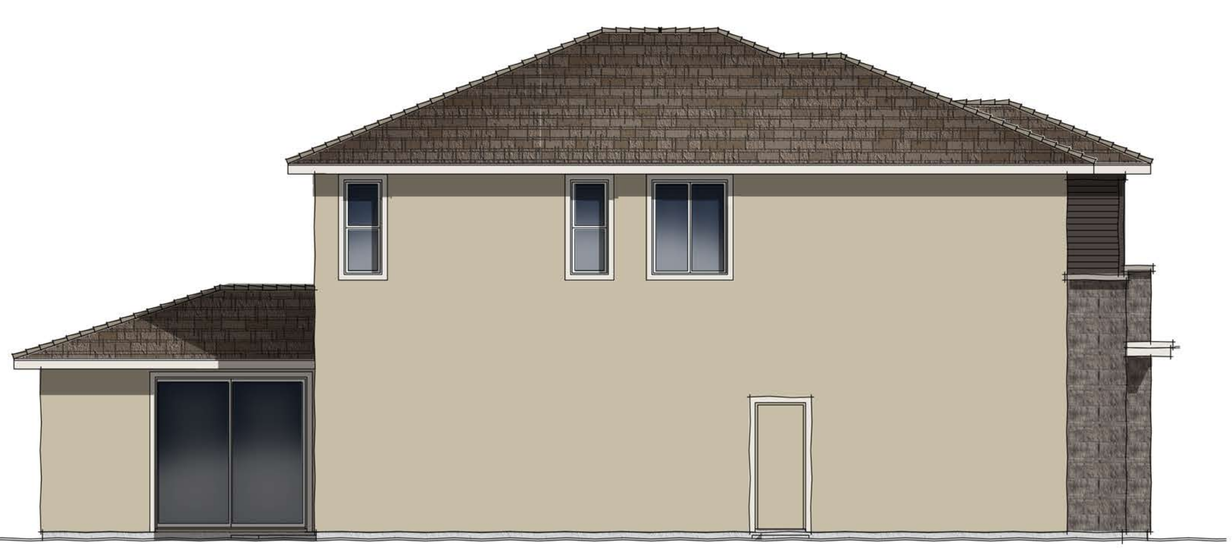
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FOUR | ELEVATION C - MODERN PRAIRIE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

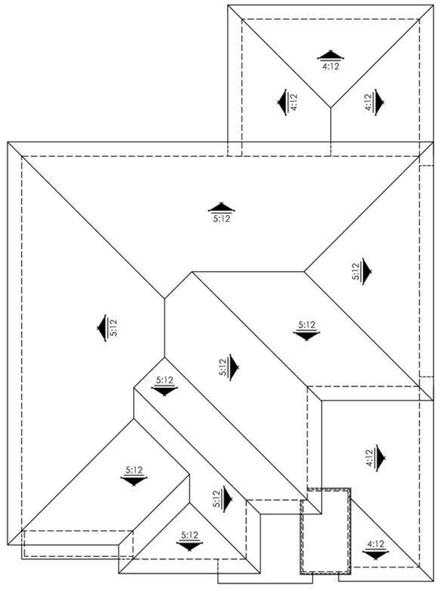
Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7590



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FOUR | ELEVATION C ENHANCED - MODERN PRAIRIE

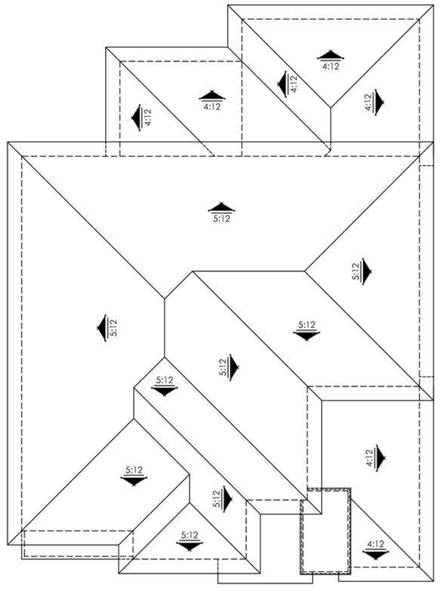
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN FOUR | ELEVATION C OUTDOOR ROOM - MODERN PRAIRIE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

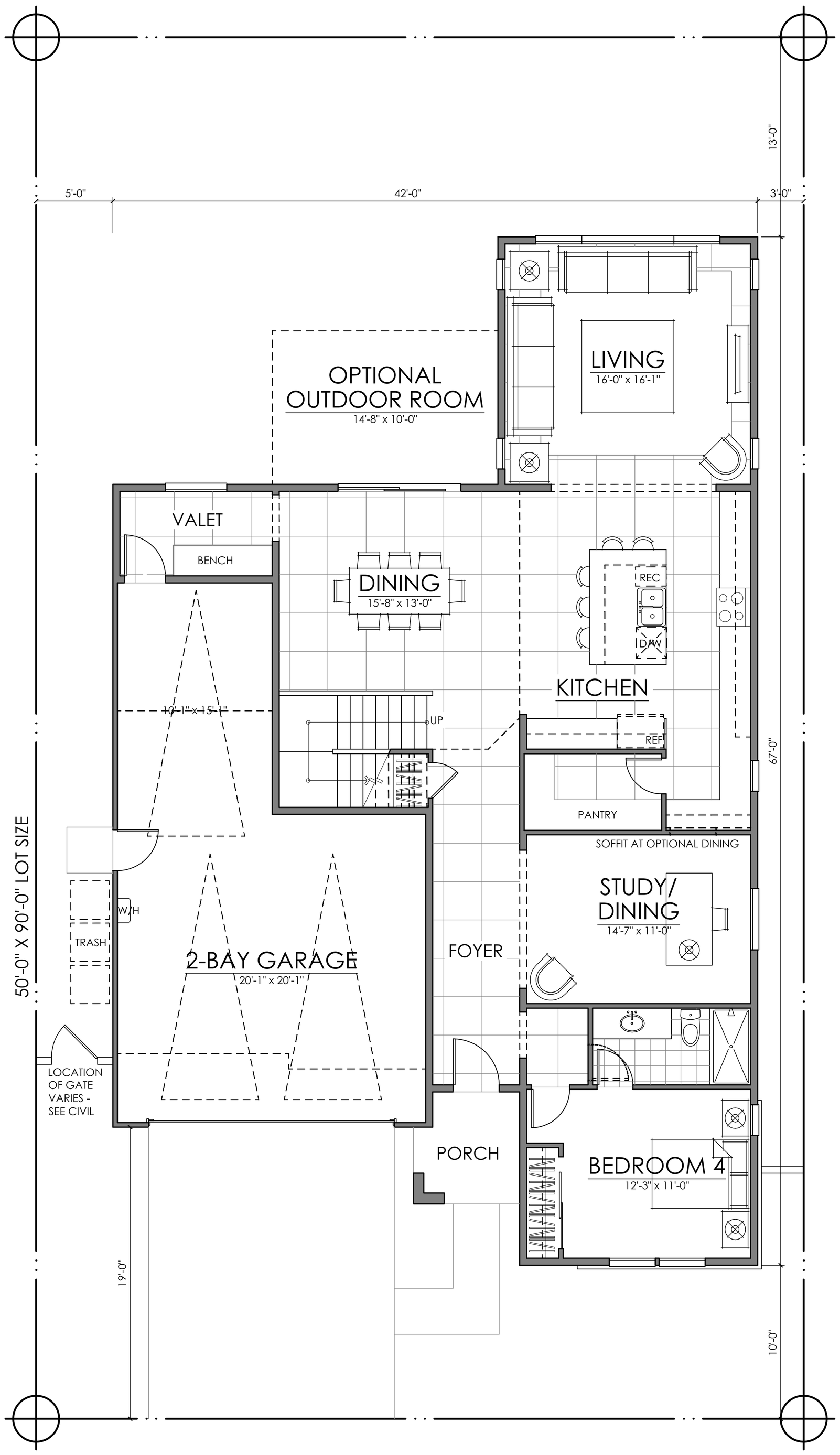
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



FIRST FLOOR	1585 SQ. FT.
SECOND FLOOR	1362 SQ. FT.
TOTAL LIVING	**2947 SQ. FT.**

08.07.18

PLAN FIVE | 2947 SQ. FT. | ELEVATION C

Woodside Homes®
BETTER BY DESIGN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

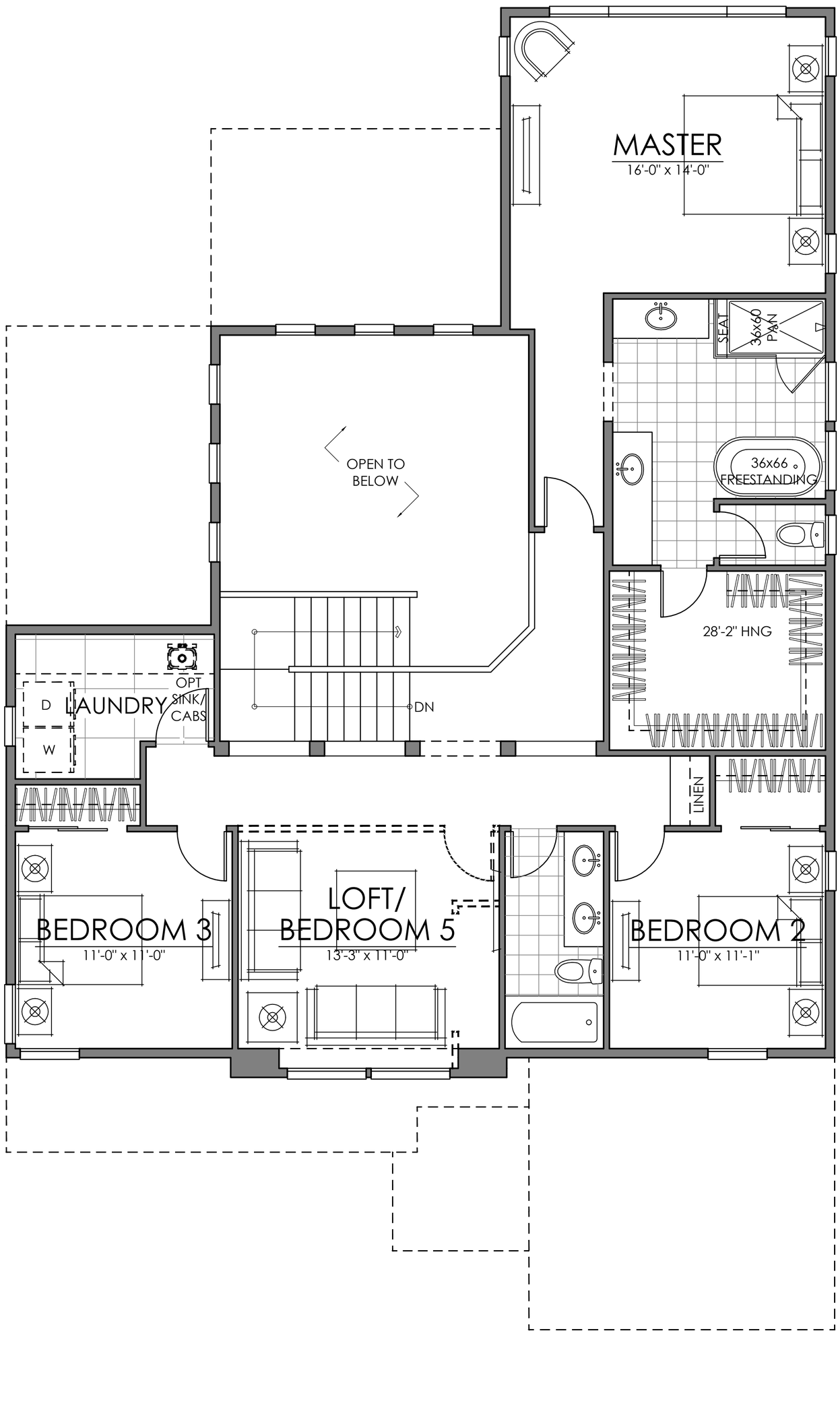
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton. co 80120 / 303 683.7231

AGENDA ITEM 11.2 19

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



FIRST FLOOR	1585 SQ. FT.
SECOND FLOOR	1362 SQ. FT.
TOTAL LIVING	**2947 SQ. FT.**

08.07.18

PLAN FIVE | 2947 SQ. FT. | ELEVATION C

Woodside Homes®
BETTER BY DESIGN

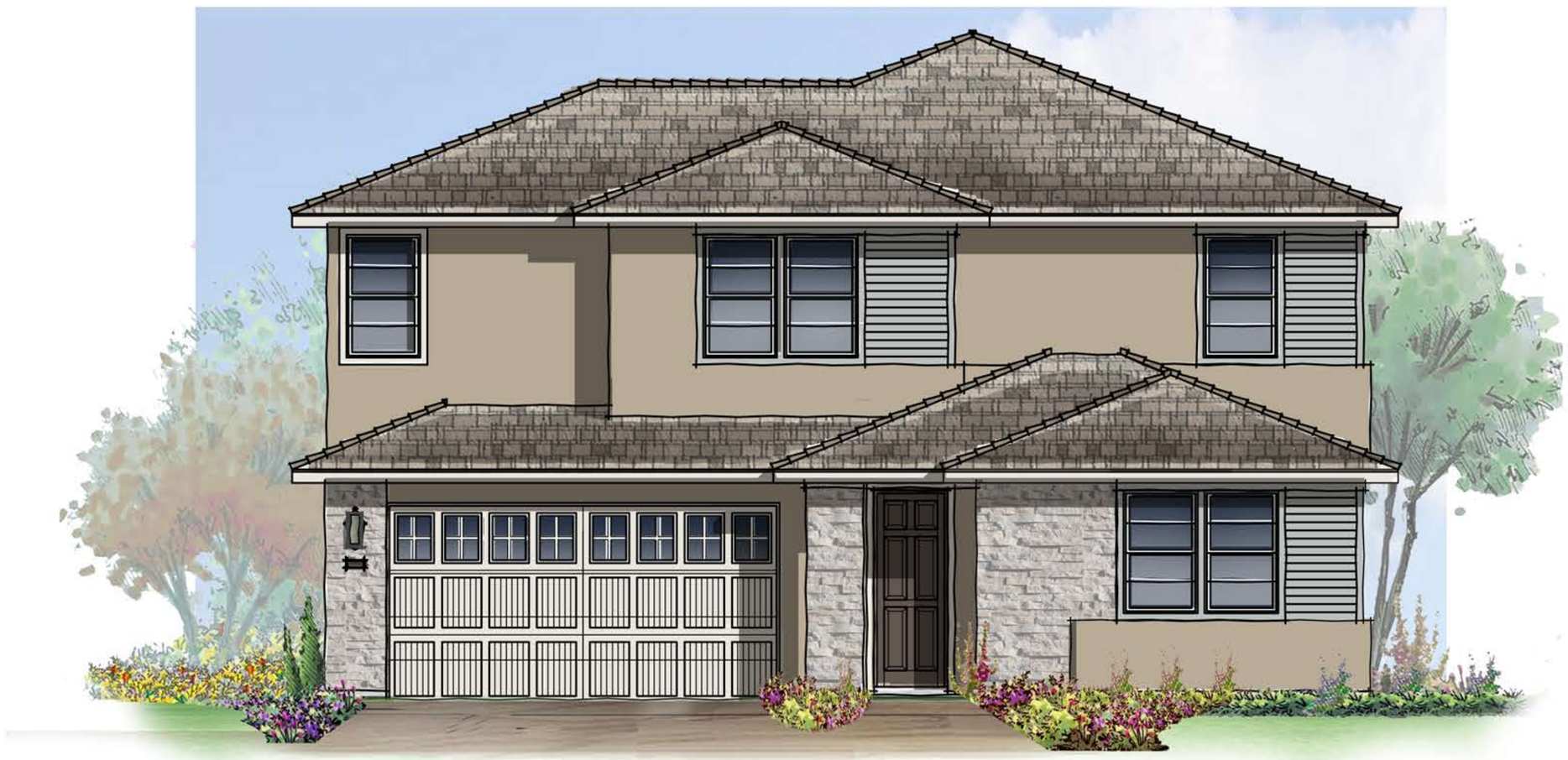
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton. co 80120 / 303 683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



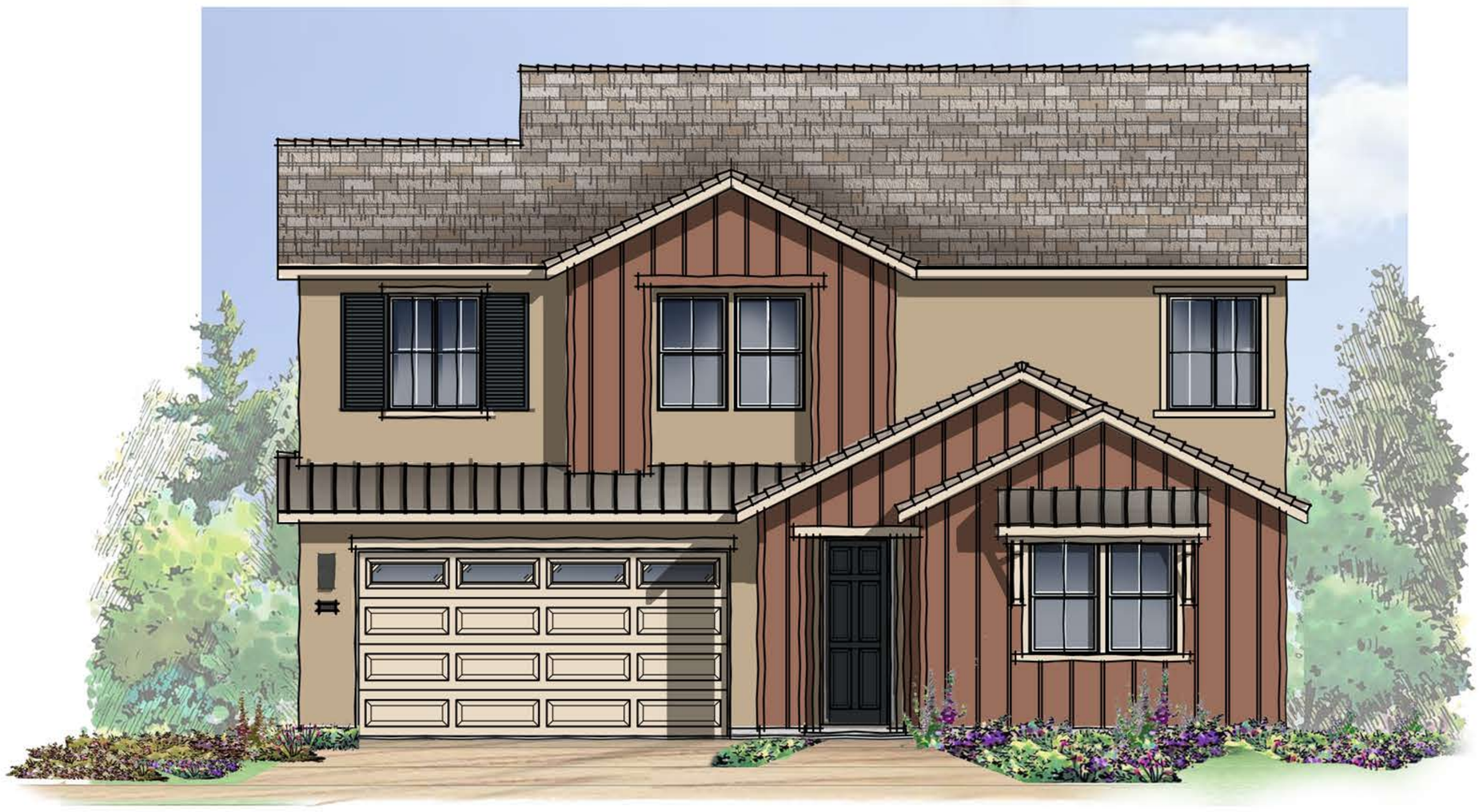
FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'D' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'E' - MODERN FARMHOUSE

SCALE: 1/4" = 1'-0"

08.07.18

PLAN FIVE | FRONT ELEVATIONS

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

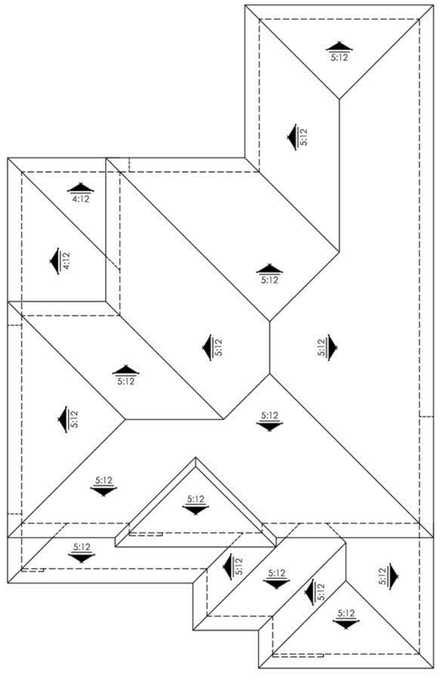
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes® BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



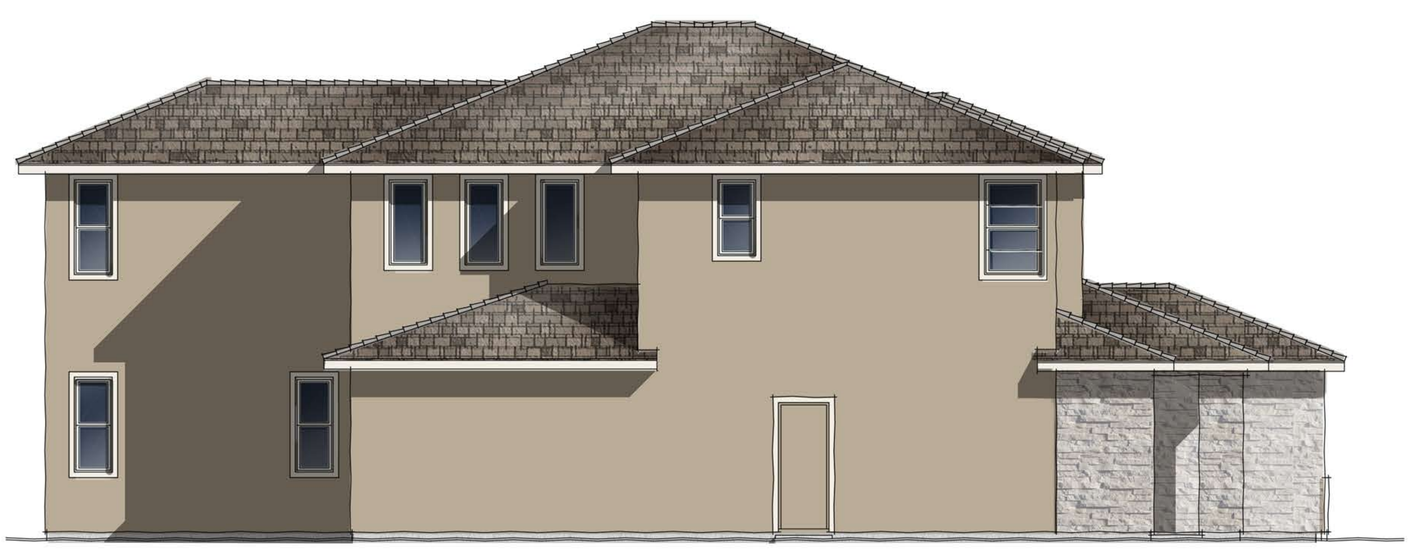
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FIVE | ELEVATION C - MODERN PRAIRIE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

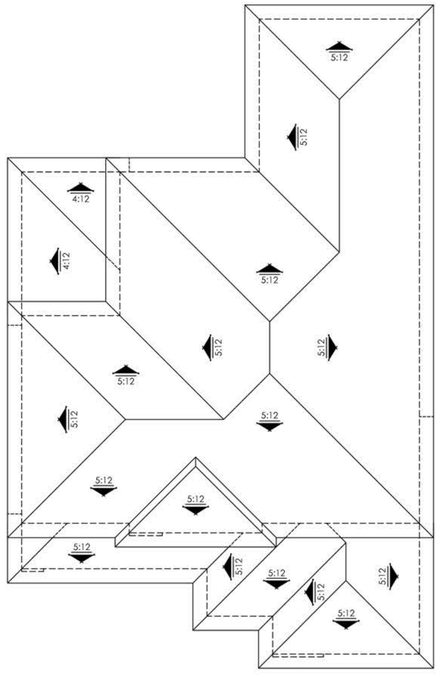
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

PLAN FIVE | ELEVATION C ENHANCED - MODERN PRAIRIE

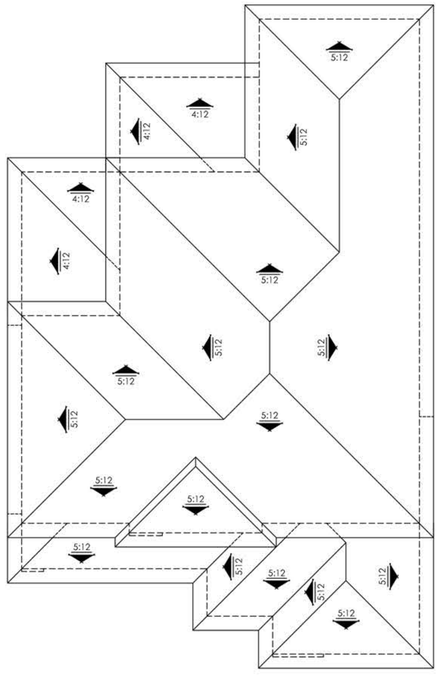
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

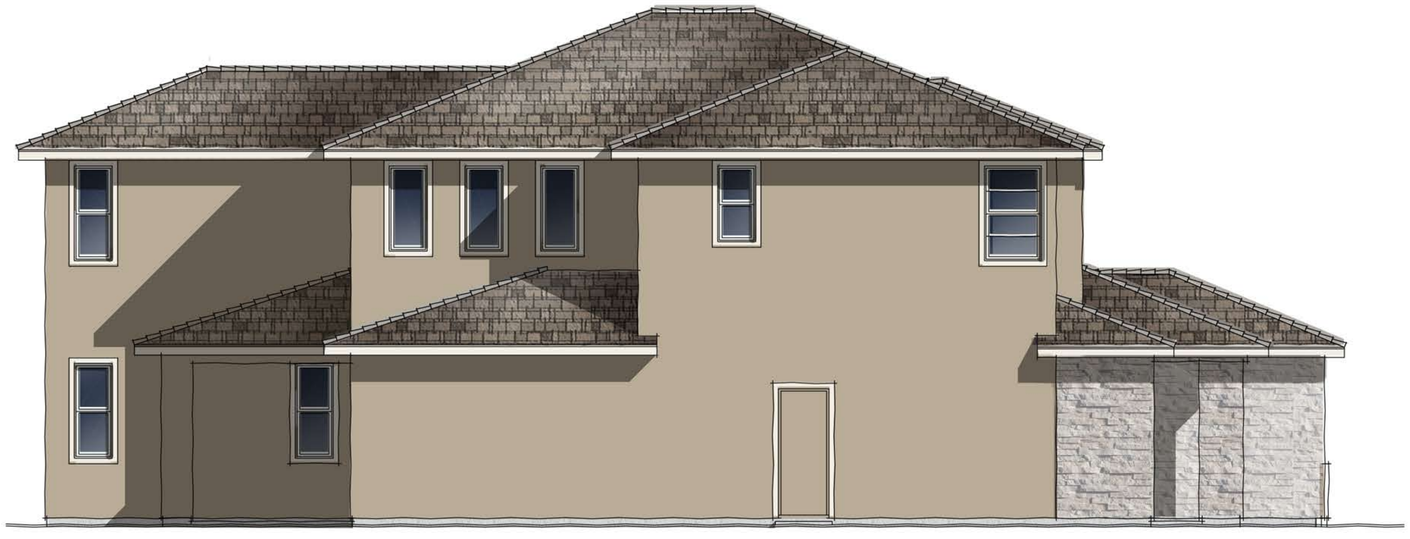
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

3.07.18

PLAN FIVE | ELEVATION C OUTDOOR ROOM - MODERN PRAIRIE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

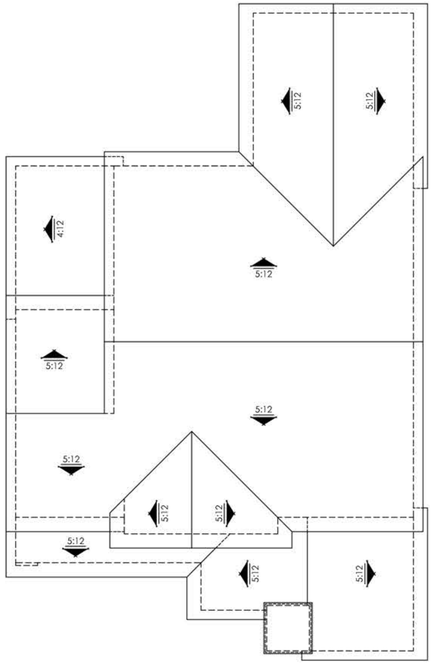
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

8.07.18

PLAN FIVE | ELEVATION D - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

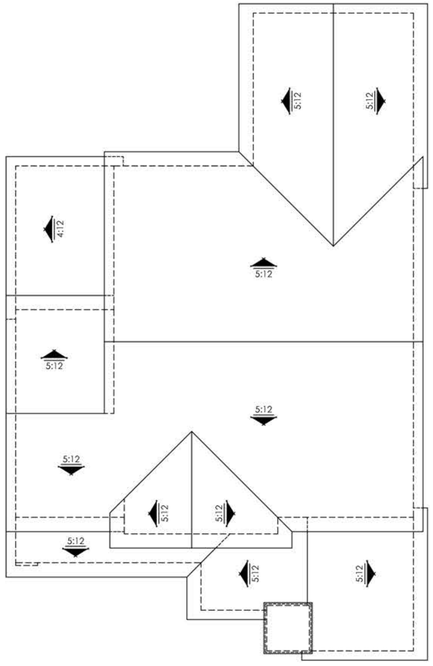
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

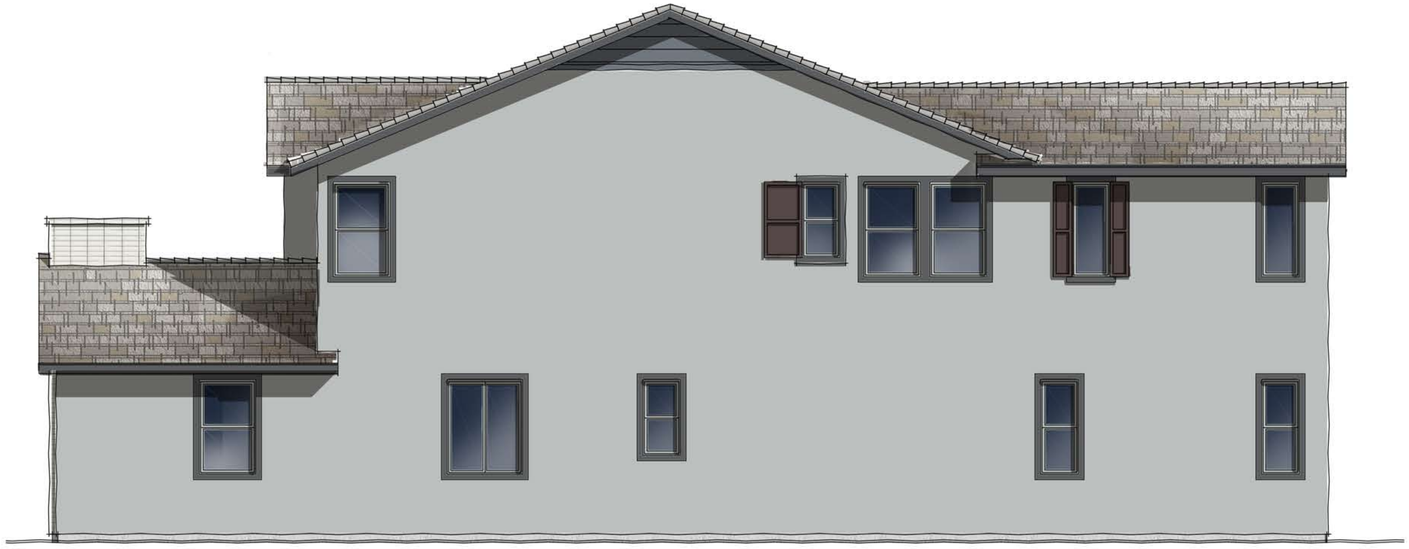
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

3.07.18

PLAN FIVE | ELEVATION D ENHANCED - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

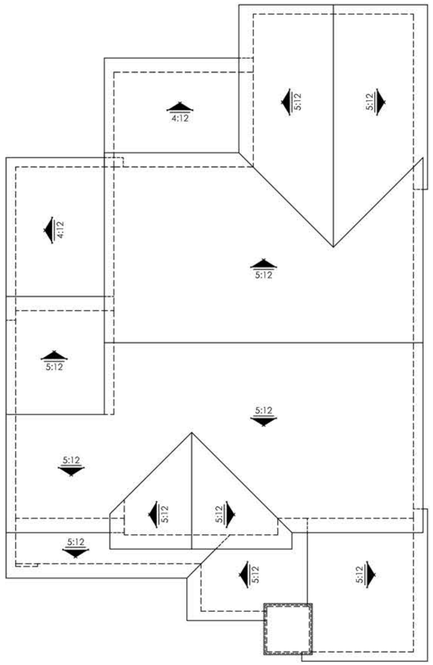
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7600

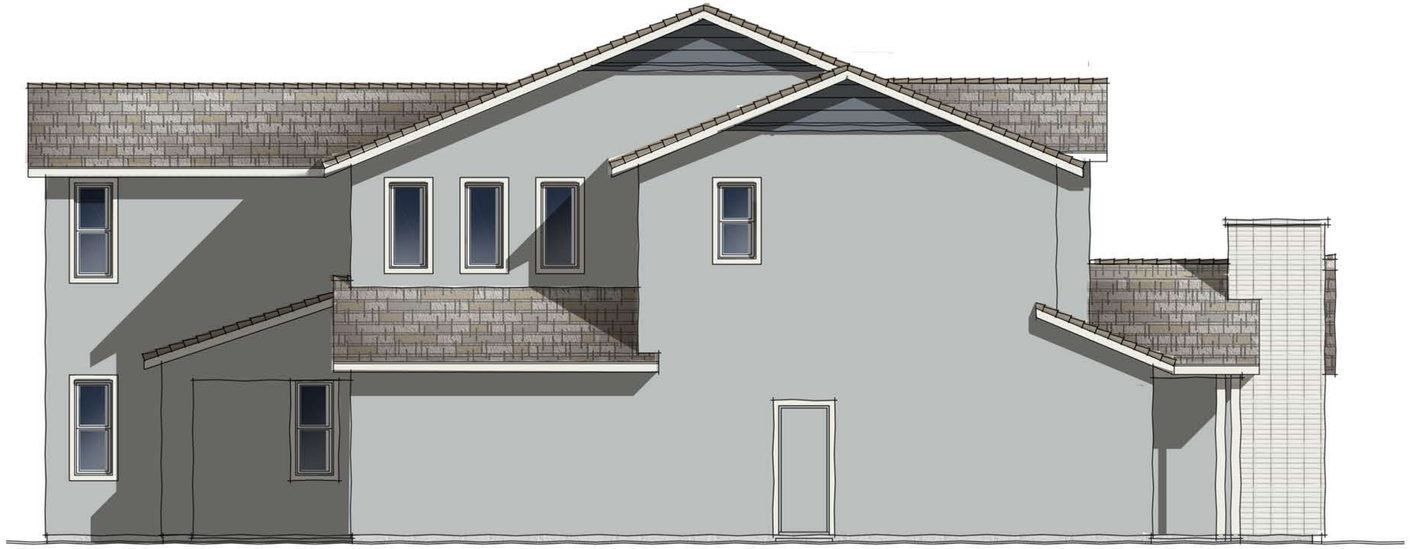
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

.07.18

PLAN FIVE | ELEVATION D OUTDOOR ROOM - MID CENTURY MODERN

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

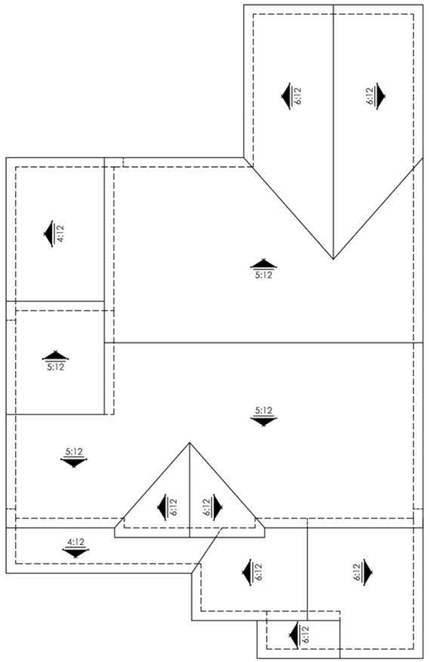
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. ©COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



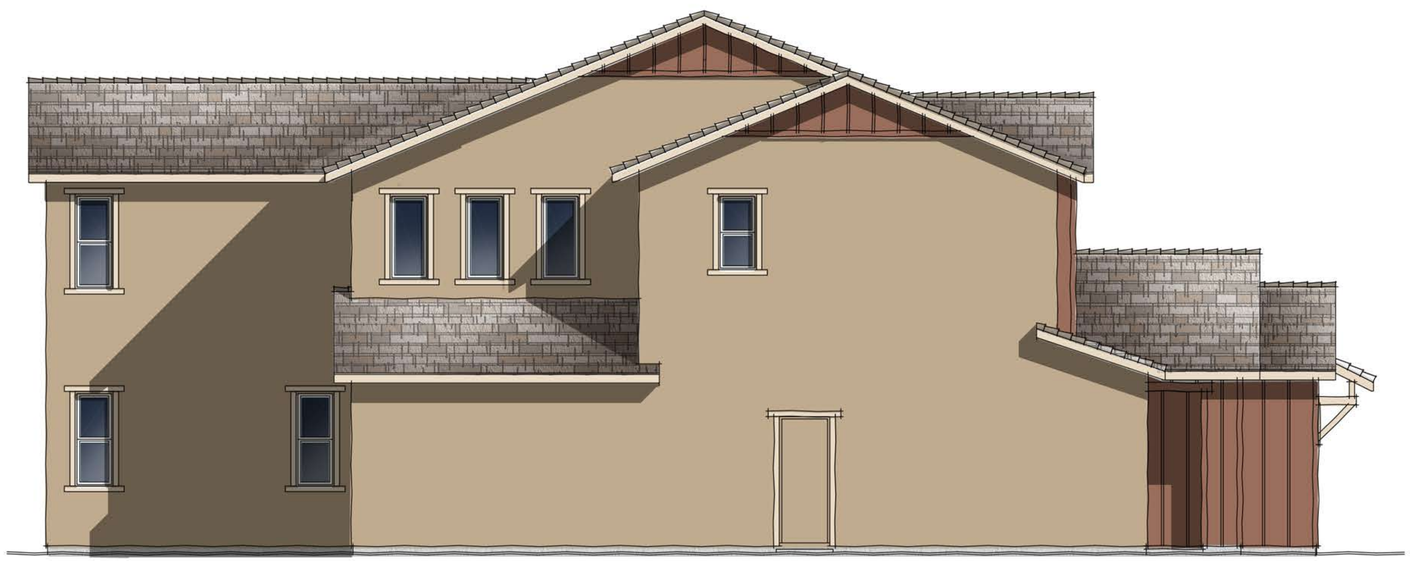
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

3.07.18

Woodside Homes®
BETTER BY DESIGN

PLAN FIVE | ELEVATION E - MODERN FARMHOUSE

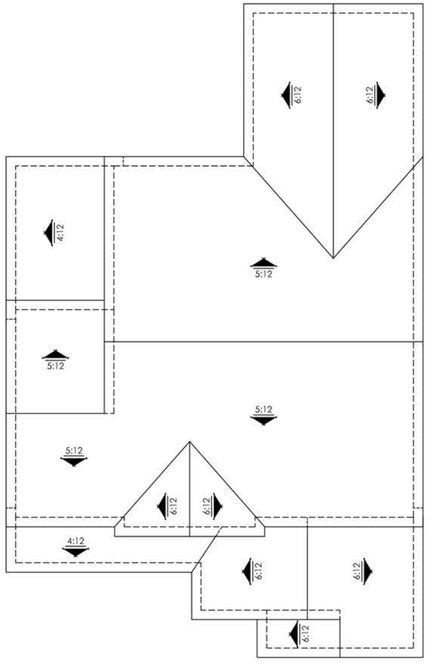
MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

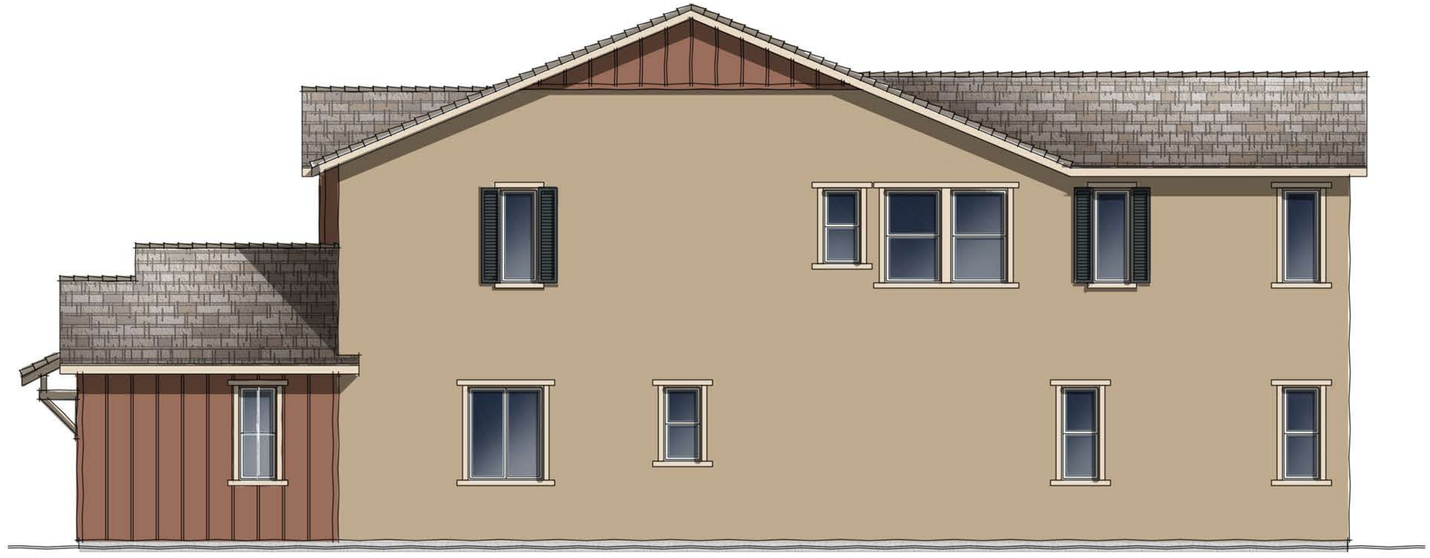
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



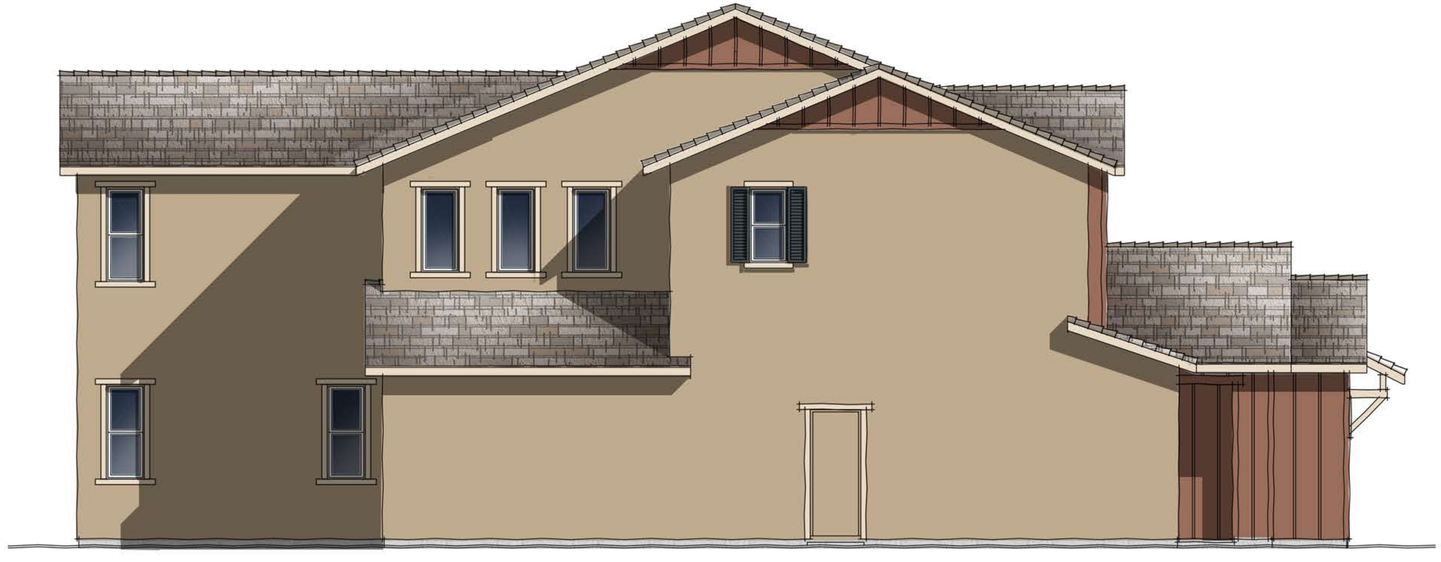
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

3.07.18

PLAN FIVE | ELEVATION E ENHANCED - MODERN FARMHOUSE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

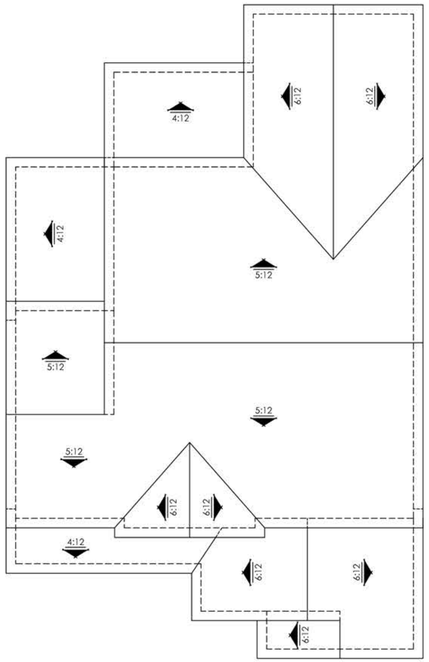
RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

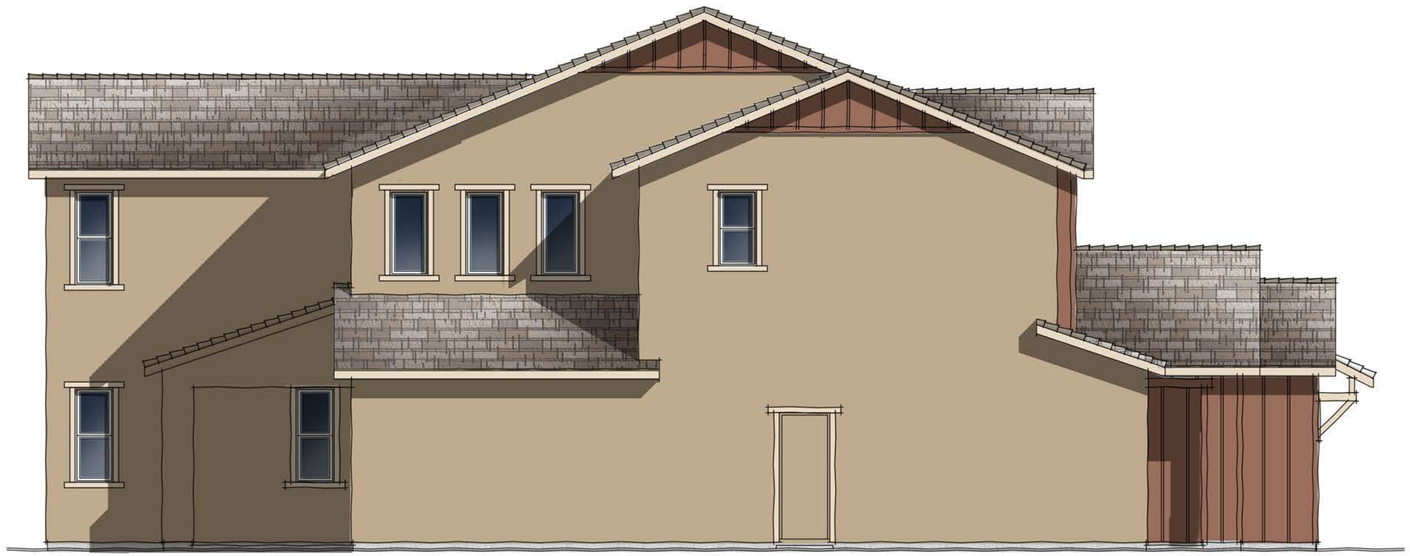
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN FIVE | ELEVATION E - MODERN FARMHOUSE

MAGNOLIA AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

Woodside Homes®
BETTER BY DESIGN

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

woodleyarchitecturalgroup,inc.

ATTACHMENT 3
Exhibit B to the Resolution

Magnolia at Cypress
Woodside Homes

Color Schemes
08.07.18

Woodside Homes
BETTER BY DESIGN

colorado 731 southpark drive suite b, littleton, colorado 80120 | (t) 303.683.7231 | (f) 303.683.2922
california 2943 pullman street suite a, santa ana, california 92705 | (t) 949

Magnolia @ Cypress | 50 x90
Elevation A
Modern Spanish
Scheme 1

ATTACHMENT 3
Exhibit B to the Resolution



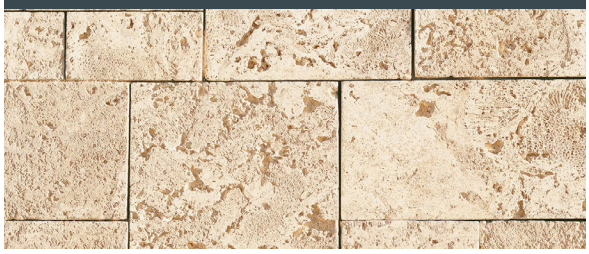
Roof Tile

Stucco

Trim

Fascia &
Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90
Elevation A
Modern Spanish
Scheme 2

ATTACHMENT 3
Exhibit B to the Resolution



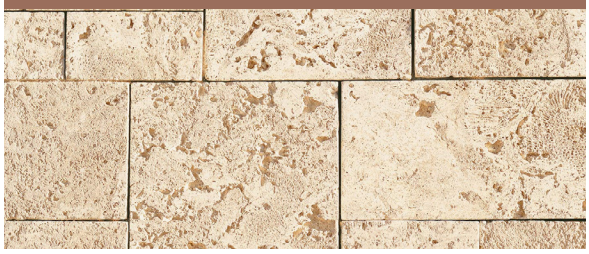
Roof Tile

Stucco

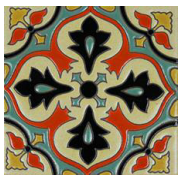
Trim

Fascia &
Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 3
Exhibit B to the Resolution

Magnolia @ Cypress | 50 x90
Elevation A
Modern Spanish
Scheme 3



Roof Tile

Stucco

Trim

Fascia &
Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90
Elevation B
Wine Country
Scheme 4

ATTACHMENT 3
Exhibit B to the Resolution



Roof Tile

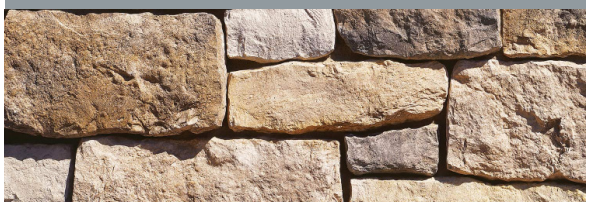
Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters



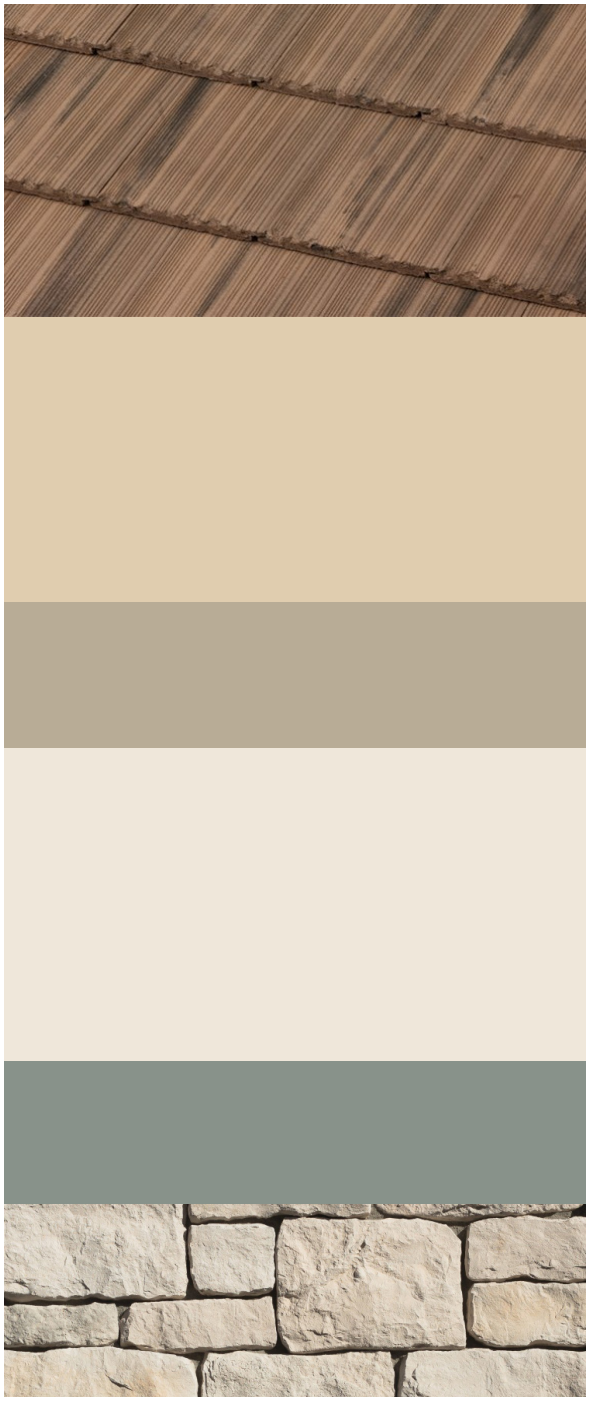
Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90
Elevation B
Wine Country
Scheme 5

ATTACHMENT 3
Exhibit B to the Resolution



Roof Tile

Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90
Elevation B
Wine Country
Scheme 6

ATTACHMENT 3
Exhibit B to the Resolution



Roof Tile

Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

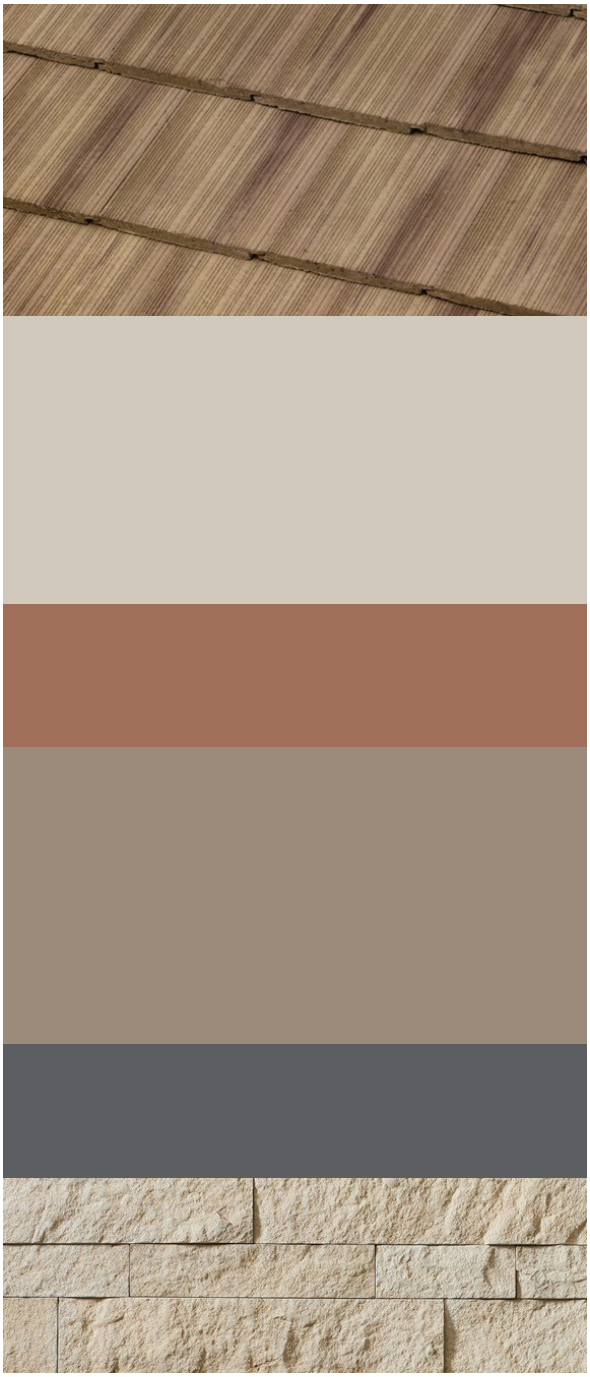
Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 3
Exhibit B to the Resolution

Magnolia @ Cypress | 50 x90
Elevation C
Modern Prairie
Scheme 7



Roof Tile

Stucco

Lap Siding

Trim,Fascia
& Garage Door

Entry Door
& Shutters

Stone

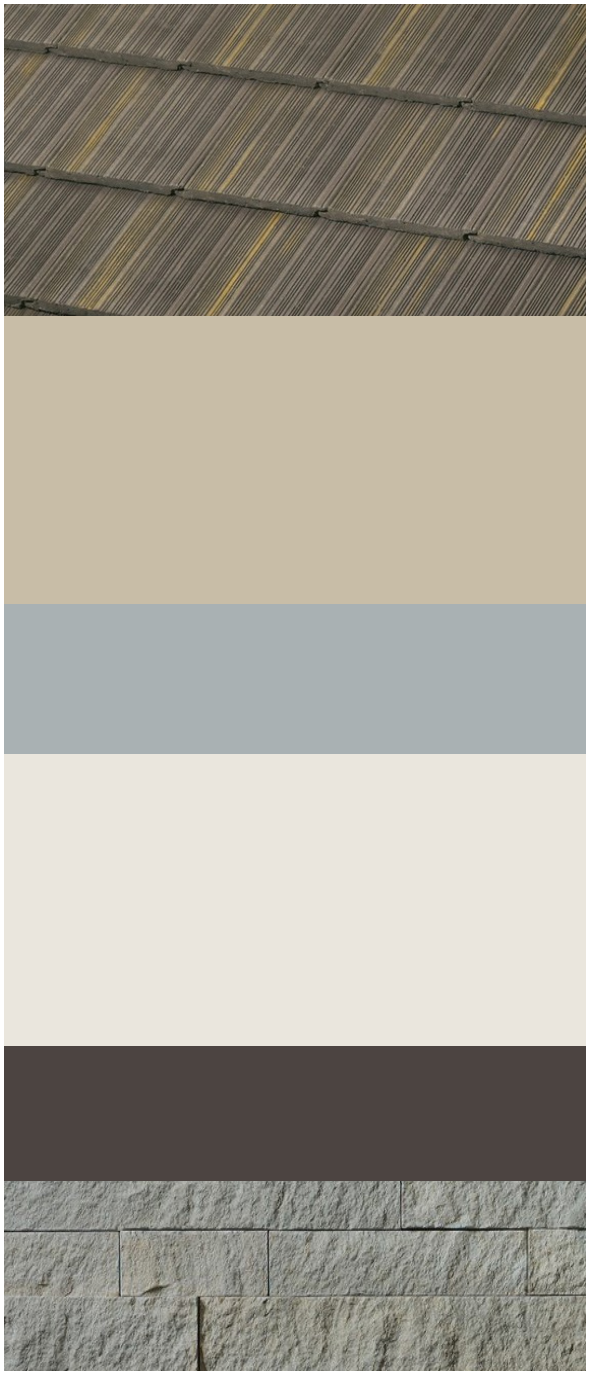
Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90

ATTACHMENT 3
Exhibit B to the Resolution

Elevation C
Modern Prairie
Scheme 8



Roof Tile

Stucco

Lap Siding

Trim,Fascia
& Garage Door

Entry Door
& Shutters

Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 3
Exhibit B to the Resolution

Magnolia @ Cypress | 50 x90
Elevation C
Modern Prairie
Scheme 9



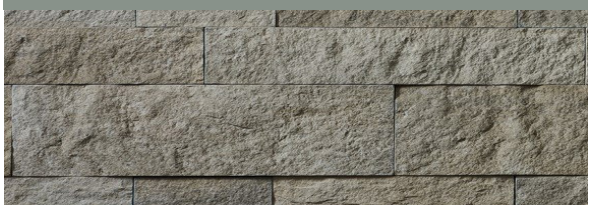
Roof Tile

Stucco

Lap Siding

Trim,Fascia
& Garage Door

Entry Door
& Shutters



Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90

ATTACHMENT 3
Exhibit B to the Resolution

Elevation D
Mid Century Modern
Scheme 10



Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters

Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90

ATTACHMENT 3
Exhibit B to the Resolution

Elevation D
Mid Century Modern
Scheme 11



Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters

Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90

ATTACHMENT 3
Exhibit B to the Resolution

Elevation D
Mid Century Modern
Scheme 12



Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters

Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90

ATTACHMENT 3
Exhibit B to the Resolution

Elevation E
Modern Farmhouse
Scheme 13



Roof Tile

Stucco

Siding

Trim,Fascia
& Garage Door

Entry Door

Shutters

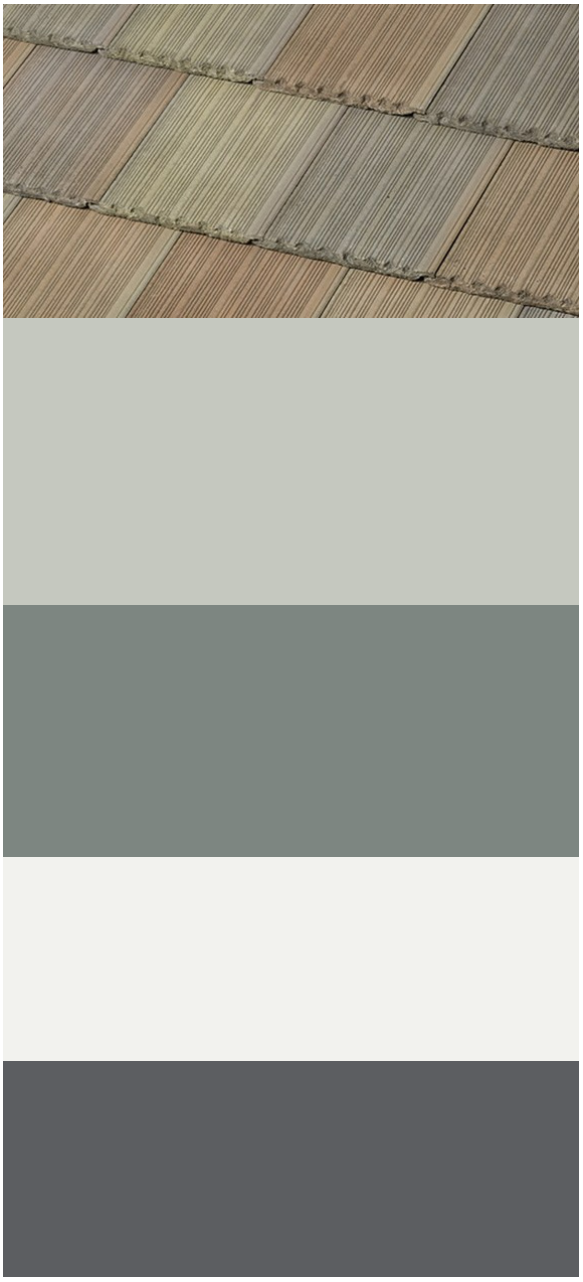
Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90

ATTACHMENT 3
Exhibit B to the Resolution

Elevation E
Modern Farmhouse
Scheme 14



Roof Tile

Stucco

Siding

Trim,Fascia
& Garage Door

Entry Door

Shutters

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Magnolia @ Cypress | 50 x90

ATTACHMENT 3
Exhibit B to the Resolution

Elevation E
Modern Farmhouse
Scheme 15



Roof Tile

Stucco

Siding

Trim,Fascia
& Garage Door

Entry Door

Shutters

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 3
Exhibit B to the Resolution

Paint: PPG	Stone Grout: Orco	05.08.18-Original Plans
Roof: Boral		07.11.18-Revisions per drc comments
Metal Roof: Taylor Metal Products		
Stone: El Dorado & Cultured Stone		

Modern Spanish **ELEVATION A**	**Scheme 1**	**Scheme 2**	**Scheme 3**
ROOF *BARCELONA 900*	1HBCS3270 TESORO BLEND	1HBCS0431 APPLE BARK	1HBCS6330 SALERNO CLAY
STUCCO	1092-1 QUEEN ANNE LACE	14-08 HORSERADISH	1096-1 INSTANT RELIEF
TRIM	14-14 SUMMER SUEDE	14-27 TRUE KHAKI	1097-4 DUSTY TRAIL
FASCIA | GARAGE DOOR	1022-6 GRANITE	1023-6 CLAM SHELL	1025-6 SLEEPING GIANT
ENTRY DOOR | SHUTTERS	1038-7 MIDNIGHT HOUR	1071-6 PRAIRIE FIRE	1031-5 SEAWEED WRAP
STONE: *El Dorado Stone*	PEARL WHITE *COASTAL REEF*	PEARL WHITE *COASTAL REEF*	SANIBEL *COASTAL REEF*
TRIM AT STONE :	1097-3 TOASTED ALMOND	1097-3 TOASTED ALMOND	1097-4 DUSTY TRAIL
DECORATIVE TILES	201A 	202A 	201B 

ATTACHMENT 3
Exhibit B to the Resolution

WINE COUNTRY ELEVATION B	Scheme 4	Scheme 5	Scheme 6
ROOF *SAXONY 900 SHAKE*	1FBCJ3181 SMOKEY TOPAZ BLEND	1FBCF3214 SHADOW BROWN	1FBCJ4070 SEA PEARL BLEND
STUCCO	1100-2 ADOBE WHITE	12-26 ASSATEAGUE SAND	10 07 BAY OF FUNDY
SIDING	15-09 ANTELOPE	14-27 TRUE KHAKI	1009-5 PHOENIX FOSSIL
TRIM	1006-1 GYPSUM	14-23 EDELWEISS	1010-1 PEGASUS
FASCIA | GARAGE DOOR	15-18 INTROSPECTIVE	14-23 EDELWEISS	1010-1 PEGASUS
ENTRY DOOR | SHUTTERS	1039-4 PACHYDERM	1033-5 GRAY HERON	15-24 FRENCH TOAST
METAL ROOF	WEATHERED COPPER	WEATHERED COPPER	WEATHERED COPPER
STONE (DRYSTACK) *EL DORADO STONE*	ROUGH CUT AUTUMN LEAF	ROUGH CUT CASA BLANCA	ROUGH CUT MOONLIGHT
TRIM @ STONE	1021-4 DIVERSION	1024-2 ANTIQUE WHITE	1023-4 DESERT DUNE

ATTACHMENT 3
Exhibit B to the Resolution

MODERN PRAIRIE ELEVATION C	**Scheme 7**	**Scheme 8**	**Scheme 9**
ROOF *SAXONY 900 SHAKE*	1FBCF3293 CEDAR BLEND	1FBCB3233 BROWN BLEND	1FBCF3763 KOKOMO
STUCCO	1024-4 MOTH GRAY	14-26 HIDEAWAY	1021-2 SYNCHRONICITY
CEMENTITIOUS LAP SIDING & CEMENTITIOUS TRIM	16-07 SOUTHERN WOOD	1002-7 MIRROR MIRROR	1007-5 LAZY AFTERNOON
STUCCO TRIM	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1007-5 LAZY AFTERNOON
FASCIA | GARAGE DOOR	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1007-1 WILLOW SPRINGS
ENTRY DOOR	1011-6 GLAZED GRANITE	1002-7 PHANTOM MIST	1033-5 GREY HERON
STONE GROUT	DRYSTACK	DRYSTACK	DRYSTACK
STONE: *Cultured Stone Pattern # HSP3507*	HEWN |FOUNDATION CULTURED STONE	HEWN | SPAN CULTURED STONE	HEWN | TALUS CULTURED STONE
TRIM AT STONE :	1097-4 DUSTY TRAIL	1007-4 HOT STONE	1023-4 DESERT DUNE

ATTACHMENT 3
Exhibit B to the Resolution

MID-CENTURY MODERN ELEVATION D	Scheme 10	Scheme 11	Scheme 12
ROOF *SAXONY SLATE 900*	1FACS5037 NATRUAL MARBLE	1FBCJ4070 SEA PEARL BLEND	1FACS1132 CHARCOAL BROWN BLEND
STUCCO	1006-1 GYPSUM	10_15 QUEST	1025-2 SILENT SMOKE
SIDING	1007-2 SWIRLING SMOKE	10 _19 FAVORITE FLANNEL	1007-5 LAZY AFTERNOON
TRIM | FASCIA	1009-6 ARMORY	1011-6 GLAZED GRANITE	1001-1 DELICATE WHITE
GARAGE DOOR	1009-6 ARMORY	1011-6 GLAZED GRANITE	1001-1 DELICATE WHITE
ENTRY DOOR & SHUTTERS	1152-5 GRANITE FALLS	1014-7 BLACK WALNUT	PPG11-29 GREEN GRAY MIST
PAINTED BRICK | NORMAN SIZED BRICK |STACK BOND PATTERN	1006-4 MERCURIAL	1020-1 ATRIUM WHITE	1025-1 COMMERCIAL WHITE

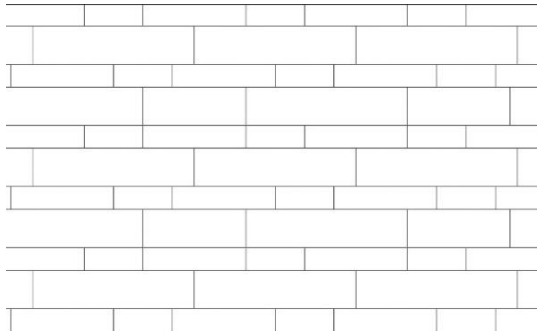
ATTACHMENT 3
Exhibit B to the Resolution

MODERN FARMHOUSE ELEVATION E	Scheme 13	Scheme 14	Scheme 15
ROOF *SAXONY 900 SHAKE*	1FBCF1430 CHARCOAL BLEND	1FBCJ4072 SAHARA QUARTZ BLEND	1FBCF1132 CHARCOAL BROWN BLEND
STUCCO	1020-1 ATRIUM WHITE	1033-3 SILENT STORM	1101-4 ROCKY CLIFFS
SIDING	1020-1 ATRIUM WHITE	PPG10-06 THUNDERBOLT	1071-6 PRAIRIE FIRE
TRIM|FASCIA | GARAGE DOOR	1020-1 ATRIUM WHITE	1001-1 DELICATE WHITE	12-13 CAMEL TAN
ENTRY DOOR	13-16 BLAZE	1011-6 GLAZED GRANITE	1012-7 BLACK FOREST
SHUTTERS	1011-7 ONYX	1011-6 GLAZED GRANITE	1012-7 BLACK FOREST
METAL ROOF	CHARCOAL GRAY	WEATHERED ZINC	VINTAGE

ATTACHMENT 3
Exhibit B to the Resolution

*All non-decorative items such as meter doors & non-decorative vents are to be painted the surrounding color.
*Paint breaks to be turned at inside corner unless otherwise indicated.
* Metal roof vents to be painted to match the darkest color from the roofing blend.
*Painted brick to be semi-gloss finish.
El Dorado & Cultured Stone: MELISSA ZEPEDA (949) 275-4533 or melissa.zepeda@boral.com
Boral Roof : Please Contact Michael Heard (949) 880.4153 or Michael.Heard@boral.com
Decorative Tile to be RockMill Tile & Stone : Please Contact Veronica Abbot Cell: 949.233.9133 or veronicaA@rockmillstone.com .

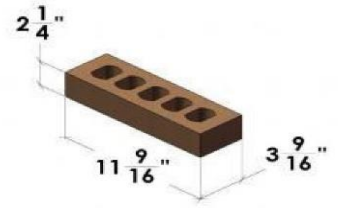
STONE PATTERN | HSP3507



STACK BOND PATTERN



NORMAN BRICK



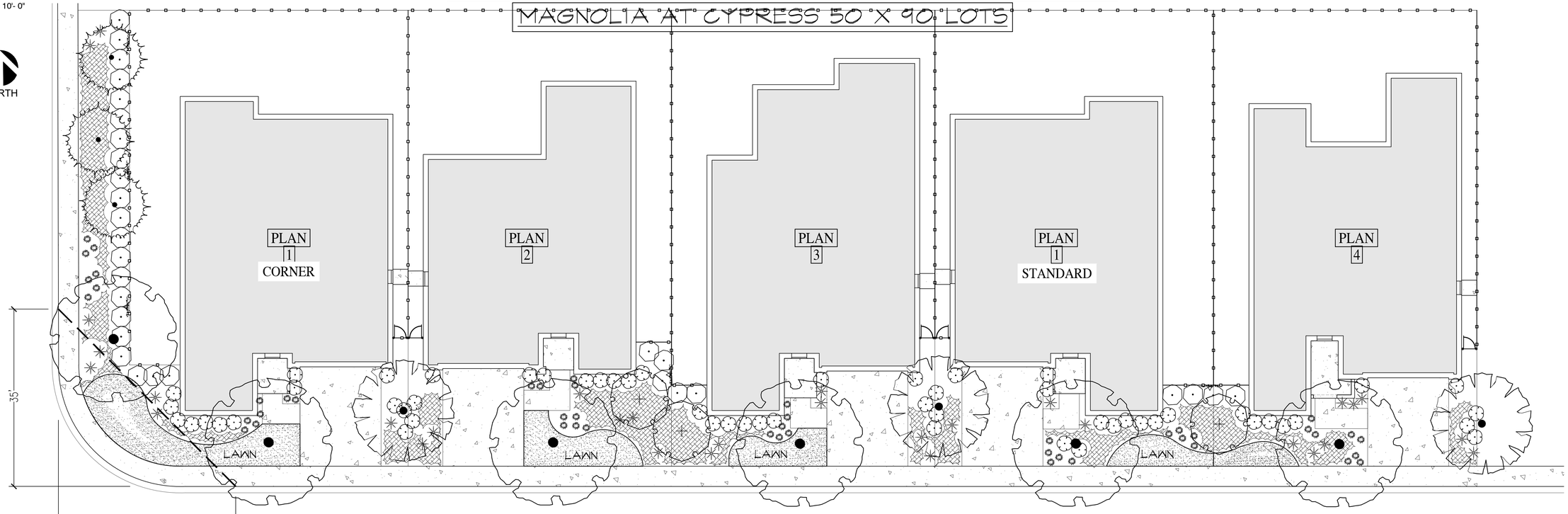
0 10 20 30 40 feet

1" = 10'- 0"

NORTH

TYPICAL PRODUCTION PLANTING LAYOUT

MAGNOLIA AT CYPRESS 50 X 90 LOTS



WOODSIDE HOMES

DOUGLAS 98
MAGNOLIA AT CYPRESS
TYPICAL PRODUCTION
LANDSCAPE DOCUMENTS

PACKAGE INCLUDES:

L-1. COVER PAGE - 10 SCALE PLANTING LAYOUT LEGEND/ NOTES

L-2. 10 SCALE IRRIGATION LAYOUT / NOTES

L-3. STANDARD INSTALLATION DETAILS

L-4. WATER USE CALCULATIONS

AGENDA ITEM 11.2

CONCEPT PLANT SCHEDULE

STREET TREES - MED WATER USE
Acer rubrum `Bowhall Red` / Red Maple
Koelreuteria paniculata / Golden Rain Tree
Pyrus calleryana `Bradford` / Bradford Flowering Pear
Tilia cordata `Greenspire` / Greenspire Littleleaf Linden

ACCENT TREES
Arbutus unedo / Strawberry Tree Shrub
Lagerstroemia indica `Tuscarora` / Crape Myrtle
Malus floribunda `Prairefire` / Flowering Crabapple

EVERGREEN-CONIFERS
Arbutus unedo / Strawberry Tree Multi-Trunk
Melaleuca quinquenervia / Cajeput Tree Multi-Trunk
Pinus eldarica / Afghan Pine

SMALL TREES
Acer palmatum / Japanese Maple
Magnolia grandiflora `St. Mary` / Southern Magnolia
Prunus carolimana / Carolina Laurel Cherry
Vitex agnus-castus / Chaste Tree

FOUNDATION SHRUBS LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush
Elaeagnus pungens / Thorny Eleagnus
Nandina domestica `Compacta` / Dwarf Heavenly Bamboo
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub
Rhapholepis umbellata / Yedda Hawthorn
Xylosma congestum `Compacta` / Compact Xylosma

MED SHRUBS - LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush
Cistus x purpureus / Orchid Rockrose
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub
Rhapholepis umbellata / Yedda Hawthorn
Rosmarinus officinalis `Blue Spires` / Rosemary

ACCENT PLANTS- LOW WATER USE
Hesperaloe parviflora / Red Yucca
Phormium tenax `Yellow Wave` / New Zealand Flax
Salvia leucantha / Mexican Bush Sage
Yucca filifera `Golden Sword` / Golden Sword Yucca

PERENNIALS LOW WATER USE
Bergenia cordifolia / Heartleaf Bergenia
Cistus salvifolius `Prostratus` / Sageleaf Rockrose
Coreopsis x `Moonbeam` / Moonbeam Coreopsis
Engeron karvinskianus / Fleabane
Heuchera sanguinea / Coral Bells
Heuchera x `Plum Pudding` / Coral Bells
Lavandula angustifolia `Munstead` / Munstead English Lavender
Moraea x `Lemon Drop` / Fortnight Lily
Pennisetum onentale `Karley Rose` / Karley Rose Fountain Grass
Salvia greggii `Hot Lips` / Autumn Sage
Teucrium fruticans / Bush Germander
Tulbaghia violacea `Vanegata` / Striped Cape Garlic

VINES LOW WATER USE
Campsis radicans `Trumpet Creeper` / OrangeTrumpet Creeper
Clematis x lawsoniana `Henryi` / Clematis
Gelsemium sempervirens / Jessamine

GROUND COVERS - LOW - MED WATER USE
Gazania x `Mitsuwa Yellow` / Yellow Gazania
Lantana montevidensis / Trailing Lantana
Myoporum parvifolium `Putah Creek` / Putah Creek Myoporum
Vinca minor / Common Periwinkle

LAWN
Turf Sod / Drought Tolerant Fescue Blend

* 25% max sod allowed in installation per lot.

WELO STATEMENT:
"I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE LANDSCAPE DESIGN PLAN" Steven L Crouch 6-11-18

PLANTING NOTES

1. CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT IN THE EVENT OF PLANT UNAVAILABILITY WITHIN TEN WORKING DAYS AFTER BID AWARDS. LANDSCAPE CONTRACTOR RESPONSIBLE FOR VERIFICATION OF PLANT QUANTIES ON LEGEND. NOTIFY L.A. IN EVENT OF DISCREPANCIES
2. VERIFY SITE CONDITIONS AS SHOWN ON THESE PLANS PRIOR TO SUBMITTING A PRICE QUOTATION BID OR COMMENCING CONSTRUCTION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT.
3. FINISHED GRADING PRIOR TO COMMENCING WORK THE LANDSCAPE CONTRACTOR SHALL INSPECT THE WORK OF OTHERS AND VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH GRADING AND SHALL INSPECT THE WORK OF OTHERS. VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR SURFACE DRAINAGE OF ALL PLANTING AREAS. FINISH GRADE SHALL BE A SMOOTH, EVEN AND UNIFORM PLANE WITH NO LON SPOTS OR ABRUPT CHANGE OF SURFACE. FINISH GRADES IN SHRUB AND GROUNDCOVER AREAS SHALL BE 1 1/2" BELOW ADJACENT PAVING, CURBS AND HEADERS.
4. ADJUSTMENTS IN THE FIELD MAY BE REQUIRED TO ACCOMMODATE UTILITIES SUCH AS LIGHT FIXTURES, VAULT BOXES ABOVE GRADE, SIGNALS, ETC.
5. SOIL AMENDMENTS FOR BID PURPOSES ARE AS LISTED BELOW.
   ACTUAL SOIL PREP IS TO BE PERFORMED AS PER REQUIRED SOILS TEST RESULTS WITH TESTING DONE PRIOR TO BEGINNING PROJECT. INCORPORATE RECOMMENDED AMENDMENTS BY TILLING INTO THE TOP 6" OF SOIL.
   FERTILIZER 6-20-20 — 20 LBS./ 1000 SQ. FT.
   NITROGEN STABILIZED COMPOST — 4 YDS./1000 SQ. FT. *
6. APPLY PRE-EMERGENT HERBICIDE CHIPCO RONSTAR 'G' PER MANUFACTURES SPECIFICATIONS..
7. CONTRACTOR SHALL TEST ALL PLANTING PITS FOR DRAINAGE BY FILLING WITH WATER. ANY PLANTING PIT WHICH DOES NOT DRAIN COMPLETELY IN TWO HOURS OR LESS SHALL HAVE CORRECTIVE MEASURES IMPLEMENTED BY THE CONTRACTOR. CORRECTIVE MEASURES SHALL INCLUDE:
   A. DRILLING/AUGERING THROUGH IMPERMEABLE LAYERS TO A FAST DRAINING SOIL LAYER AND BACKFILLING WITH SAND, GRAVEL, OR OTHER APPROVED MATERIAL.
   B. INSTALLING DRAINAGE TUBING TO CARRY EXCESS WATER TO NEARBY OUTLET.
   C. METHODS AS DETERMINED IN THE FIELD BY THE OWNER.
8. PLANT TREES A MINIMUM OF 5 FEET FROM LIGHT STANDARDS, BELOW GRADE UTILITY VAULTS A MINIMUM OF 8 FEET FROM SIDES OF ABOVE GRADE UTILITY BOXES. TREES WITHIN 7' OF SIDEWALKS TO RECEIVE ROOT BARRIER UB-24 (INSTALL 5' IN BOTH DIRECTIONS OF TREE TRUNK.)
9. ALL SLOPES AT 2 TO 1 SHALL RECEIVE A LAYER OF JUTE MESH FABRIC STAPLED TO SLOPE.
10. ALL PLANTER AND GROUNDCOVER AREAS NOT RECEIVING JUTE NETTING SHALL RECEIVE A 3" BARK MULCH LAYER. *NO SHREDDED BARK ALLOWED.
11. EDGING ALONG LAWN AREAS IS TO BE A SHOVEL CUT EDGE.
12. GUARANTEE: ALL TREES AND SHRUBS SHALL BE GUARANTEED FOR A PERIOD OF THREE MONTHS. ALL GROUND COVER AND TURF SHALL BE GUARANTEED FOR A PERIOD OF NINETY(90) DAYS. MATERIAL THAT IS NOT HEALTHY SHALL BE REPLACED WITHIN THE GUARANTEE PERIOD. REPLACEMENT MATERIAL SHALL BE MADE TO THE SAME SPECIFICATION AS ORIGINAL MATERIALS.
13. ALL GROUND COVER AND BARK AREAS TO RECEIVE DEWITT WEED BARRIER PRO 5 OR EQUAL.

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
Lic. No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - MAGNOLIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: 1"= 10'-0"
DRAWING NO.
6-11-18
L-1

CITY

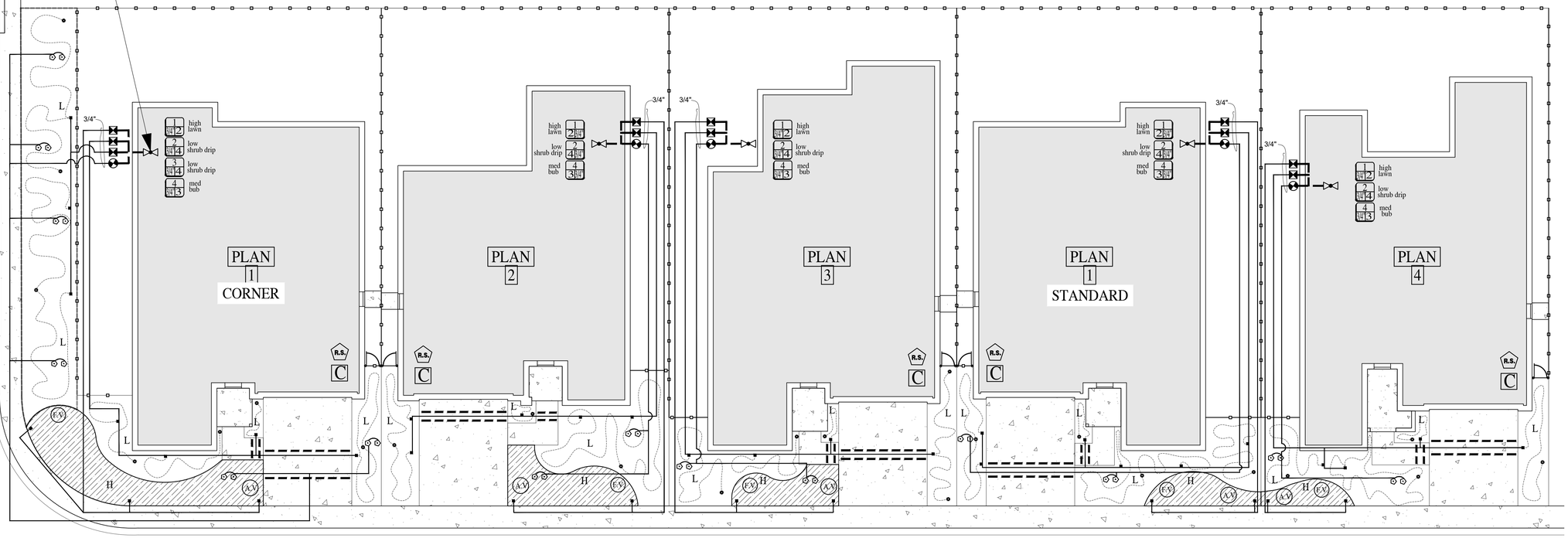
7627

TYPICAL PRODUCTION IRRIGATION LAYOUT

P.O.C. 1" GATE VALVE BY BUILDER. IRRIGATION DESIGN IS BASED ON A MINIMUM 1" SERVICE LINE, 5/8" METER, STATIC WATER PRESSURE OF 55 PSI AND MAX FLOW OF 8 G.P.M. *REMOTE CONTROL VALVES TO BE LOCATED BEHIND FENCING IN REAR YARDS. TYPICAL FOR EACH LOT.

0 10 20 30 40 feet
1" = 10'- 0"

NORTH



IRRIGATION EQUIPMENT TABLE

Symbol	Equipment	Description
	POINT OF CONNECTION. 1" GATE VALVE BY BUILDER.	
C	RAINBIRD ESP-TM2-8-I-120V- LNK/WIFI	RAINBIRD 8 - STATION CONTROLLER
R.S.	RAINBIRD WR2-RFC.	RAINBIRD RAIN AND FREEZE SENSOR
	3/4 " Hardie Till automatic anti-siphon valve, & 3/4 " pr20 Pressure Regulator & Y- filter	3/4" REMOTE CONTROL DRIP ZONE' VALVE W/ PRESSURE REGULATOR & SCREEN FILTER
	3/4 " Hardie Till automatic anti-siphon valve	3/4" REMOTE CONTROL VALVE
Irrigation Drip Table		
Symbol		
N.A.	Drip Emitters - Rainbird xeri-bug (xb-20PC), 2 - gal/hr emitters. 3 - per shrub Rainbird Micro-Spray. Xeri-Spray XS-360 Use as needed in annual beds.	RAINBIRD POINT SOURCE DRIP EMITTERS.
A.V.	RAINBIRD ARV050 & SEBTXB (BOX)	AIR RELIEF VALVE IN EMITTER BOX
F.V.	RAINBIRD MDCFCAP & SEBTXB (BOX)	FLUSH VALVE IN EMITTER BOX
	RAINBIRD MDCFCAP & SEB 7XB (BOX)	REMOVABLE FLUSH CAP IN EMITTER BOX.
	RAINBIRD MDCFTSMPT	3/4" MALE PIPE THREAD PVC TO DRIP LINE ADAPTER.
	Rainbird, XFS-09-12 subsurface dripline w/copper shield. SPACE 12" BETWEEN ROWS IN LAWN *BURY DEPTH MIN 5" IN LAWNS 2" IN SHRUB AREAS, STAPLE MIN EVERY 5'.	INSTALL ONE (1) AIR VACUUM RELIEF VALVE IN A 6" ROUND EMITTER BOX AT THE HIGHEST POINT OF THE SYSTEM. INSTALL ONE (1) FLUSH VALVE IN A 10" ROUND VALVE BOX AT THE LOWEST POINT(S) OF THE SYSTEM.
	Rainbird 1402 bubblers .5 GPM	DEEP WATERING TREE BUBBLER ASSEMBLY IN PERFORATED PIPE, TWO AT EACH TREE. INSTALL PER DETAIL.
Irrigation Pipe Table		
Symbol	Pipe	
	1/2" POLY DRIP TUBING.	
	1 1/4" Schedule 40 PVC Pipe	
	1120 Class 200 P.V.C. Pipe size as noted.	
	3" Sch 40 P.V.C. Sleeves as needed	

High Lawn — A (Water Use) / 1 (Controller station number) / 1" (Valve size) / G.P.M. through valve. / Description

IRRIGATION NOTES

1. THIS DRAWING IS PARTIALLY DIAGRAMMATIC AND DOES NOT SHOW ALL OFFSETS AND FITTINGS REQUIRED FOR A COMPLETE SYSTEM. THE DESIGN INTENT IS FOR FULL COVERAGE OF PLANTINGS. NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCIES PRIOR TO TRENCHING.
2. COORDINATE PIPE, VALVE BOX AND HEAD LAYOUT WITH PLANTING PLAN. ADJUST THESE IRRIGATION COMPONENTS TO ACCOMMODATE SUBSEQUENT PLANTINGS
3. THIS SYSTEM IS DESIGNED TO OPERATE AT AN EXISTING STATIC PRESSURE OF 35-40 P.S.I. PRIOR TO COMMENCEMENT OF WORK, DETERMINE BY PRESSURE TEST, STATIC PRESSURE. CONTACT LANDSCAPE ARCHITECT FOR APPROVAL OF WATER PRESSURE PRIOR TO COMMENCING INSTALLATION OF IRRIGATION SYSTEM.
4. MAINLINE, BACKFLOW PREVENTOR AND REMOTE CONTROL VALVES ARE LOCATED IN PAVED AREAS FOR GRAPHIC CLARITY ONLY. LOCATE ALL IRRIGATION EQUIPMENT IN ADJACENT PLANTER AREAS. PLACE BACKFLOW PREVENTOR IN SUCH A WAY AS TO BE CONCEALED BY SUBSEQUENT PLANTINGS. ON WALLS AND WALKS.
5. PRIOR TO CONSTRUCTION, CONTACT U.S.A. AT (811) TO VERIFY EXISTING UTILITIES.
6. ADJUST SPRAY COVERAGE OF HEADS TO PROVIDE PROPER COVERAGE AND TO PREVENT OVER SPRAY
7. PERFORM COVERAGE TEST PRIOR TO PLANTING.
8. CONFORM TO ALL APPLICABLE GOVERNING CODES.
9. PIPES UNDER WALKS, DRIVES AND STREETS ARE TO BE INSTALLED IN SLEEVING. SLEEVING UNDER STREETS SHALL BE SUPPLIED BY OWNER. SLEEVES UNDER WALKS AND DRIVES SHALL BE INSTALLED BY LANDSCAPE CONTRACTOR.
10. CONTROL WIRING SHALL BE #14 U.L. DIRECT BURIAL, OCCUPY THE SAME TRENCH, AND SHALL BE INSTALLED ALONG SIDE OR UNDER PRESSURE LINES. COMMON WIRE SHALL BE WHITE. TAPE WIRES TOGETHER AT TEN (10) FOOT INTERVALS. SPLICES SHALL BE MADE WITH WATERPROOF CONNECTORS.
11. ALL MATERIALS SHALL BE NEW AND IN PERFECT CONDITION. NO DEVIATIONS FROM THE SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF LANDSCAPE ARCHITECT.
12. MAINLINE SHALL BE SCH. 40 P.V.C. AT A MINIMUM DEPTH OF 24" BELOW FINISH GRADE. LATERAL PIPE SHALL BE CLASS 200 P.V.C. AT A MINIMUM DEPTH OF 12", AND DIRECT BURIAL CONTROL WIRE A MINIMUM DEPTH OF 24"
13. WHERE MORE THAN ONE PIPE IS INSTALLED IN A TRENCH, PLACE PIPE SIDE BY SIDE AT A MINIMUM OF 2" APART. WHERE SOIL CONDITIONS ARE ROCKY PLACE A 4" LAYER OF FINE MATERIAL ON BOTTOM OF TRENCH PRIOR TO INSTALLATION OF PIPE.
14. ALL VALVES SHALL BE ASVF SERIES. INSTALLED 12" ABOVE HIGHEST POINT OF DISCHARGE
15. 120 VOLT ELECTRICAL POWER OUTLET AT THE AUTOMATIC CONTROLLER LOCATION SHALL BE PROVIDED BY OTHERS. IT SHALL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO MAKE THE FINAL HOOK-UP AS DIRECTED BY MANUFACTURER FROM THE ELECTRICAL OUTLET TO THE AUTOMATIC CONTROLLER.
16. CONTRACTOR SHALL SET THE INITIAL PROGRAM FOR THE CONTROLLER AND SHALL PROVIDE OWNER WITH THE INSTRUCTION MANUAL AND DEMONSTRATE IT OPERATION TO OWNER. OWNER IS THEN RESPONSIBLE FOR RESETTING CLOCK ACCORDING TO SEASONAL/ENVIRONMENTAL CHANGES, AND DURING PLANT ESTABLISHMENT PERIOD.
17. THE IRRIGATION SYSTEM SHALL BE GUARANTEED FOR ALL MATERIALS AND WORKMANSHIP, INCLUDING SETTLEMENT OF TRENCHES FOR A PERIOD OF ONE YEAR.

* NOTE: REFER TO CIVIL SHEETS FOR GRADING, DRAINLINES & DRAINAGE PLANS.

IRRIGATION ZONE/ WATER USE DESIGNATION KEY.

H — *ALL LAWN

L — LOW WATER USE SHRUBS *NO HATCH

WELO STATEMENT:

'I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE IRRIGATION DESIGN PLAN' 6-11-18

LICENSED LANDSCAPE ARCHITECT — STEVEN L. CROUCH — LA No. 2557 — Signature — 05-31-20 Renewal Date — 6-11-18 Date — STATE OF CALIFORNIA

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - MAGNOLIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: 1"= 10'-0"

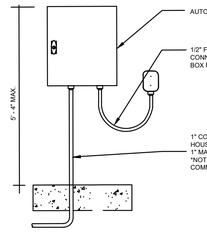
DRAWING NO.

6-11-18

L-2

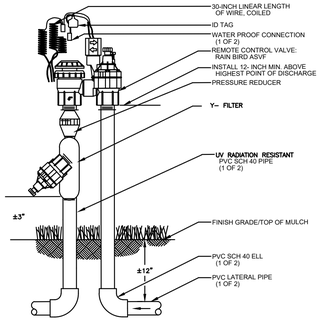
7628

AGENDA ITEM 11.2



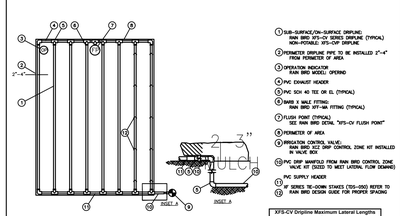
NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

ELECTROMECHANICAL CONTROLLER
MOUNTED TO BUILDING WALL.



NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

REMOTE CONTROL VALVE WITH DRIP ASSEMBLY
PLASTIC COMBINATION ELECTRIC CONTROL VALVE/ATMOSPHERIC VACUUM BREAKER 12 INCHES ABOVE GRADE

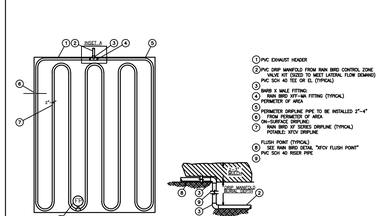


① SUB-SURFACE/ON-SURFACE DRIPLINE: RAIN BIRD XFS-CV SERIES DRIPLINE (TYPICAL) NON-POTABLE XFS-CVP DRIPLINE
② PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
③ OPERATION INDICATOR RAIN BIRD MODEL: OPERNO
④ PVC EXHAUST HEADER
⑤ PVC SCH 40 TEE OR EL (TYPICAL)
⑥ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑦ FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFS-CV FLUSH POINT"
⑧ PERIMETER OF AREA
⑨ IRRIGATION CONTROL VALVE: RAIN BIRD 3CZ DRIP CONTROL ZONE KIT INSTALLED IN VALVE BOX
⑩ PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
PVC SUPPLY HEADER
⑫ 6" SERIES TE-LOOM STAKES (TDS-050) REFER TO RAIN BIRD DESIGN GUIDE FOR PROPER SPACING

XFS-CV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Terminal Flow (gph)	Terminal Flow (gph)		
	0.6	0.9	0.6	0.9
20	190	136	258	213
30	259	225	402	337
40	350	248	498	418
50	400	281	573	477
60	434	309	637	525

NOTES:
1. FOR ALL XFS-CV AND POLY CONNECTIONS INSTALL XFF AND/OR XFD FITTINGS.
2. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
3. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
4. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

XFCV ON - SURFACE DRIPLINE
NTS

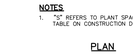


① PVC EXHAUST HEADER
② PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
③ PVC SCH 40 TEE OR EL (TYPICAL)
④ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑤ PERIMETER OF AREA
⑥ PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
⑦ BARB END OF SERIES DRIPLINE (TYPICAL) POTABLE: XFCV DRIPLINE
FLUSH POINT (TYPICAL)
⑧ SEE RAIN BIRD DETAIL "XFCV FLUSH POINT"
⑨ PVC SCH 40 RISER PIPE

XFCV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Terminal Flow (gph)	Terminal Flow (gph)		
	0.6	0.9	0.6	0.9
20	190	136	258	213
30	259	225	402	337
40	350	248	498	418
50	400	281	573	477
60	434	309	637	525

NOTES:
1. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
2. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
3. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

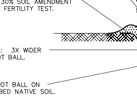
XFCV ON - SURFACE DRIPLINE
NTS QUICK LAYOUT



① SINGLE-OUTLET BARB INLET X BARB OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER
② ½" POLYETHYLENE TUBING: RAIN BIRD XF SERIES TUBING OR RAIN BIRD XT-700 XERI-TUBE OR RAIN BIRD XBS BLACK STRIPE TUBING
③ FINISH GRADE

NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

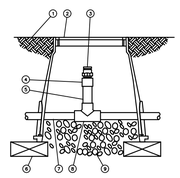
XERI-BUG INTO 1/2 INCH TUBING
NTS



① DIFFUSER BUG CAP: RAIN BIRD DBC-025
② UNIVERSAL ½" TUBING STAKE: RAIN BIRD TS-025
③ ½" DISTRIBUTION TUBING: RAIN BIRD XQ TUBING (LENGTH AS REQUIRED)
④ TOP OF MULCH
⑤ SINGLE-OUTLET BARB INLET X BARB OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER
⑥ ½" POLYETHYLENE TUBING: RAIN BIRD XF SERIES TUBING OR RAIN BIRD XT-700 XERI-TUBE OR RAIN BIRD XBS BLACK STRIPE TUBING
⑦ FINISH GRADE

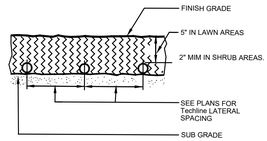
NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

XERI-BUG INTO 1/2 INCH TUBING
WITH 1/4" TUBING, STAKE AND BUG CAP
NTS

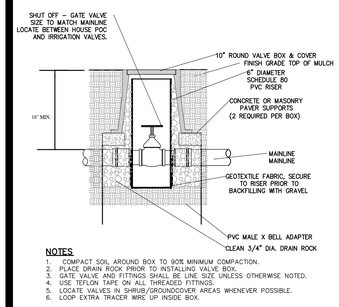


① FINISH GRADE
② SUBTERRANEAN EMITTER BOX: RAIN BIRD SEB 7XB
③ ¾" AIR RELIEF VALVE: RAIN BIRD ARV050 TO BE INSTALLED AT HIGH POINTS IN DRIP ZONE
④ PVC SCH 40 FEMALE ADAPTER
⑤ PVC SCH 80 RISER
⑥ BRICK (1 OF 2)
⑦ PVC HEADER PIPE
PVC SCH 40 TEE
3" MINIMUM DEPTH OF ¾" WASHED GRAVEL

XFS - SUB-SURFACE DRIPLINE
NTS 1/2" AIR RELIEF VALVE

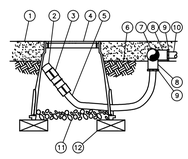


XFS SUBSURFACE
INSTALLATION NO SCALE



NOTES
1. COMPACT SOIL AROUND BOX TO 90% MINIMUM COMPACTION.
2. PLACE DRAIN ROCK PRIOR TO INSTALLING VALVE BOX.
3. GATE VALVE AND FITTINGS SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
4. USE TEFLON TAPE ON ALL THREADED FITTINGS.
5. LOCATE VALVES IN SHRUB/GROUNDCOVER AREAS WHENEVER POSSIBLE.
6. LOOP EXTRA TRACER WIRE UP INSIDE BOX.

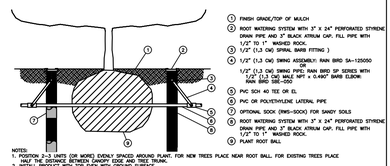
SHUT OFF VALVE
NTS



① MULCH
② FLUSH CAP FOR EASY FIT COMPRESSION FITTINGS: POTABLE:RAIN BIRD MDCFCAP
③ EASY FIT COUPLING: RAIN BIRD MDCFCOUP
④ SUBTERRANEAN EMITTER BOX: RAIN BIRD SEB 7XB
⑤ ¾" POLYETHYLENE TUBING: RAIN BIRD XF BLANK TUBING
⑥ FINISH GRADE
⑦ PVC EXHAUST HEADER
⑧ PVC SCH 40 TEE OR EL
⑨ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑩ ON-SURFACE DRIPLINE: RAIN BIRD XF SERIES DRIPLINE POTABLE: XFCV DRIPLINE
⑪ 3-INCH MINIMUM DEPTH OF ¾" WASHED GRAVEL
⑫ BRICK (1 OF 2)

NOTE:
1. ALLOW A MINIMUM OF 6-INCHES OF DRIPLINE TUBING IN VALVE BOX IN ORDER TO DIRECT FLUSHED WATER OUTSIDE VALVE BOX

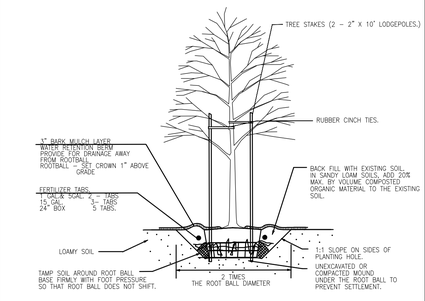
FLUSH VALVE IN BOX
NTS



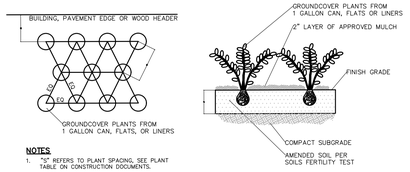
① FINISH GRADE/TOP OF MULCH
② ROOT WATERING SYSTEM WITH 3" X 24" PERFORATED STYRENE DRAIN PIPE AND 3" BLACK ATRIUM CAP. FILL PIPE WITH 1/2" TO 1" WASHED ROCK.
③ 1/2" (1.3 CM) SPIRAL BARB FITTING)
④ 1/2" (1.3 CM) SWING ASSEMBLY: RAIN BIRD SA-125050 OR
1/2" (1.3 CM) SWING PVC: RAIN BIRD SP SERIES WITH 1/2" (1.3 CM) MALE NPT x 0.490" BARB ELBOW: RAIN BIRD SWE-050
⑤ PVC SCH 40 TEE OR EL
⑥ PVC OR POLYETHYLENE LATERAL PIPE
⑦ OPTIONAL SOCK (ENS-SOCK) FOR SANDY SOILS
⑧ ROOT WATERING SYSTEM WITH 3" X 24" PERFORATED STYRENE DRAIN PIPE AND 3" BLACK ATRIUM CAP. FILL PIPE WITH 1/2" TO 1" WASHED ROCK.
⑨ PLANT ROOT BALL

NOTES:
1. POSITION 2-3 LINES (OR MORE) EVENLY SPACED AROUND PLANT. FOR NEW TREES PLACE NEAR ROOT BALL. FOR EXISTING TREES PLACE BETWEEN THE DISTANCE BETWEEN CANOPY EDGE AND ROOT CROWN.
2. INSTALL PRODUCT WITH TOP EVEN WITH GROUND SURFACE.
3. WHEN INSTALLING IN EXTREMELY HARD OR CLAY SOILS, ADD 3/4" (1.9 CM) GRAVEL UNDER AND AROUND THE UNIT TO ALLOW FASTER WATER INFILTRATION AND ROOT PENETRATION.
4. ONCE DRAIN PIPE HAS BEEN INSTALLED FILL THE BASKET WITH 1/2" TO 1" DRAIN ROCK.

ROOT WATERING SYSTEM
NTS INSTALLATION FOR TREES



TREE PLANTING DETAIL
NTS



NOTES
1. "S" REFERS TO PLANT SPACING, SEE PLANT TABLE ON CONSTRUCTION DOCUMENTS.

PLAN SECTION

GROUNDCOVER PLANTING
NOT TO SCALE

NOTES
1. AMENDMENT SHALL BE CONSISTENT WITH SOILS FERTILITY TEST.
2. PLANTING AREAS SHALL BE TREATED WITH PRE-EMERGENT PRIOR TO PLANTING TO PREVENT GERMINATION OF WEED SEEDS.
3. SCORE ROOT BALL IN VARIOUS LOCATIONS.

SHRUB PLANTING
NOT TO SCALE

LICENSED LANDSCAPE ARCHITECT
Steven L. Crouch
Signature
05-31-18
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

AGENDA ITEM 11.2

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - MAGNOLIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CLG
CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
LIC.# 2557
127 LINDA DRIVE
ROSEVILLE, CA 95678

DETAILS

SCALE: 1"= 10'-0"

DRAWING NO.

6-11-18

L-3

7629

Placer County

Project Information Sheet.

Date: 5-3-18
Project Applicant: WOODSIDE HOMES - MIKE KITCHELL
Project Address: DOUGLAS 98 MAGNOLIA
Project Assessors's Parcel Number/ Total Landscape Area (Sq.Ft). __15000_____
Project Type New X___ Rehabilitated____ Private____

Water Supply Type: Potable _X__ Recycled___ Well___
Name of Water Supplier, if not served by private well:

Landscape Documentation Package:

Water efficient Landscape Worksheets.
Hydrozone Information Table
Water Budget Calculations. Max Applied Water Allow. (MAWA)
Water Budget Calculations. Estimated Total Applied Water Use (MAWA)
Soil Management Report
Landscape Design Plan
Irrigation Design Plan.
Grading Design Plan * SEE CIVIL PLANS

Project Applicant. Telephone 916-608-9600 MIKE KITCHELL
Fax No. N.A.
Title Owner SAME Email www.woodsidehomes.com
City 111 Woodmere Rd, Su 150 State: Ca Zip: 95630
Property Owner: Same Telephone: Same
Fax No.
Title: Sr. project manager email:same

Company: same	Address:same
City:	State: Zip:
I agree to comply with the requirement of the Water Efficient	
Ordinance and submit a complete Landscape Documentation Package.	
(Applicant Signature)	(Date)

CERT OF COMP.

CERTIFICATE OF COMPLETION
THIS CERTIFICATE IS FILLED OUT BY THE PROJECT APPLICANT UPON COMPLETION OF THE LANDSCAPE PROJECT.

PART 1. PROJECT INFORMATION SHEET

DATE:6-28-18
Project Name : DOUGLAS 98 MAGNOLIA
Name of Project Applicant: Telephone: 916-608-9600
MIKE KITCHELL

Owner: WOODSIDE HOMES Email: www.woodsidehome.com
Address: 111 Woodmere Rd. Su 150
City: Folsom State: Ca Zip: 95630

Project Address and Location: DOUGLAS 98 MAGNOLIA
Street:LOTS City: RANCHO CORDOVA
State: CA Zip:

Property Owner or Designee:
Name: Same Telephone: Same
Title: Same Fax.
Company: SAME Email Address:
City: SAME Street: Same

Property owner:
I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule.

_____
Property owner Signature Date:

Please answer the questions below:
1. Date the Landscape Doc. Package was submitted to agency:_____
2. Date the Landscape Doc. Package was approved:_____
3. Date that copy of the Water Efficient Landscape Worksheet including the Water Budget calculation was submitted to the local water purveyor: _____

*Soils Test to be conducted at completion of finish grade / prior to plant installation.

*Updated irrigation schedule to be completed by irrigation auditor at completion of installation.

IRRIGATION ESTABLISHMENT SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 20 1	3 25 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	7 10 2	7 15 3	7 10 2	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

IRRIGATION MAINTENANCE SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 15 1	3 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	3 20 1	4 20 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 20 1	4 30 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (MAGNOLIA PLAN 4)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- LAWN	HIGH	DRIP			
2 - SHRUBS	LOW	DRIP	391	40	81
4- TREE BUBBLERS	MED	BUBBLERS			
TOTALS			391	40	0
TOTAL SQ.FT.		=	431		

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
MAGNOLIA PLAN 4

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- LAWN	HIGH	0.8	DRIP	0.81	0.988	81	80.28	51.9	1558.63
2 - SHRUBS	LOW	0.2	DRIP	0.81	0.247	391	98.02	51.9	3154.24
4- TREE BUBBLERS	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	794.92
					TOTALS	458	182.96	ETWU =	5887.38
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	0.81	0.24	0	0		
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) * (.62) * (ETAF x LA) + ((1-ETAF) x SLA)))								MAWA =	8813.55

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X 0.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR.

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
0.81 FOR DRIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (MAGNOLIA PLAN 1 CORNER)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- LAWN	HIGH	DRIP			337
2 - SHRUBS	LOW	DRIP	316		
3 - SHRUBS SIDE	LOW	DRIP	733		
4- TREE BUBBLERS	MED	BUBBLERS		120	
TOTALS			1049	120	0
TOTAL SQ.FT.		=	1169		

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
MAGNOLIA PLAN 1 CORNER

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- LAWN	HIGH	0.8	DRIP	0.81	0.988	337	332.84	51.9	10740.11
2 - SHRUBS	LOW	0.2	DRIP	0.81	0.247	316	78.09	51.9	2540.68
3 - SHRUBS SIDE	LOW	0.2	DRIP	0.81	0.247	733	180.99	51.9	5823.82
4- TREE BUBBLERS	MED	0.5	BUBBLERS	0.81	0.617	120	74.07	51.9	2383.56
					TOTALS	1506	665.33	ETWU =	21428.16
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	0.81	0.24	0	0		
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) * (.62) * (ETAF x LA) + ((1-ETAF) x SLA)))								MAWA =	26653

IDENTIAL 0.55
I - RESIDENTIAL 0.45

NNUAL GALLONS REQUIRED = ETO X 0.62 X ETAF X AREA.
ION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

NNUAL GALLONS ALLOWED) = (ETO)
ION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR.

ON EFFICIENCY
SPRAY 0.75
RIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (MAGNOLIA PLAN 2)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- LAWN	HIGH	DRIP			
2 - SHRUBS	LOW	DRIP	510	40	165
4- TREE BUBBLERS	MED	BUBBLERS			
TOTALS			510	40	0
TOTAL SQ.FT.		=	550		

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
MAGNOLIA PLAN 2

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- LAWN	HIGH	0.8	DRIP	0.81	0.988	165	166.51	51.9	8640.55
2 - SHRUBS	LOW	0.2	DRIP	0.81	0.247	510	125.53	51.9	4092.04
4- TREE BUBBLERS	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	794.92
					TOTALS	715	317.53	ETWU =	13217.51
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	0.81	0.24	0	0		
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) * (.62) * (ETAF x LA) + ((1-ETAF) x SLA)))								MAWA =	12724.8

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X 0.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR.

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
0.81 FOR DRIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A HYDROZONE INFORMATION TABLE (MAGNOLIA PLAN 3)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- LAWN	HIGH	DRIP			114
2 - SHRUBS	LOW	DRIP	351		
4- TREE BUBBLERS	MED	BUBBLERS		40	
TOTALS			351	40	0
TOTAL SQ.FT.		=	391		

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
MAGNOLIA PLAN 3

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- LAWN	HIGH	0.8	DRIP	0.81	0.988	114	112.59	51.9	3623.00
2 - SHRUBS	LOW	0.2	DRIP	0.81	0.247	351	88.15	51.9	2836.43
4- TREE BUBBLERS	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	794.92
					TOTALS	511	225.43	ETWU =	7253.35
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	0.81	0.24	0	0		
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) * (.62) * (ETAF x LA) + ((1-ETAF) x SLA)))								MAWA =	9043.63

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X 0.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR.

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
0.81 FOR DRIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (MAGNOLIA PLAN 1 STANDARD LOT)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- LAWN	HIGH	DRIP			52
2 - SHRUBS	LOW	DRIP	431		
4- TREE BUBBLERS	MED	BUBBLERS		40	
TOTALS			431	40	0
TOTAL SQ.FT.		=	471		

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
MAGNOLIA PLAN 1 STANDARD LOT

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- LAWN	HIGH	0.8	DRIP	0.81	0.988	52	50.86	51.9	2523.83
2 - SHRUBS	LOW	0.2	DRIP	0.81	0.247	431	106.42	51.9	3424.37
4- TREE BUBBLERS	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	794.92
					TOTALS	563	221.98	ETWU =	7142.12
SPECIAL LANDSCAPE AREAS									
S-1	HIGH		DRIP	0.81	0.24	0	0		
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) * (.62) * (ETAF x LA) + ((1-ETAF) x SLA)))								MAWA =	9363.92

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X 0.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR.

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
0.81 FOR DRIP 0.81

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

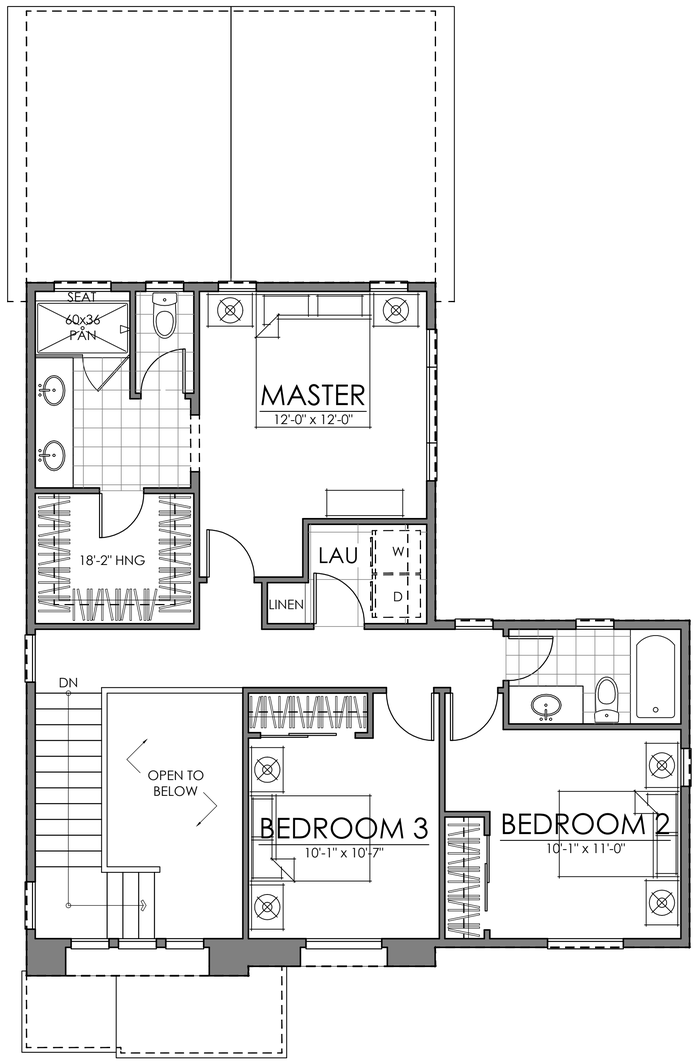
AGENDA ITEM 11.2

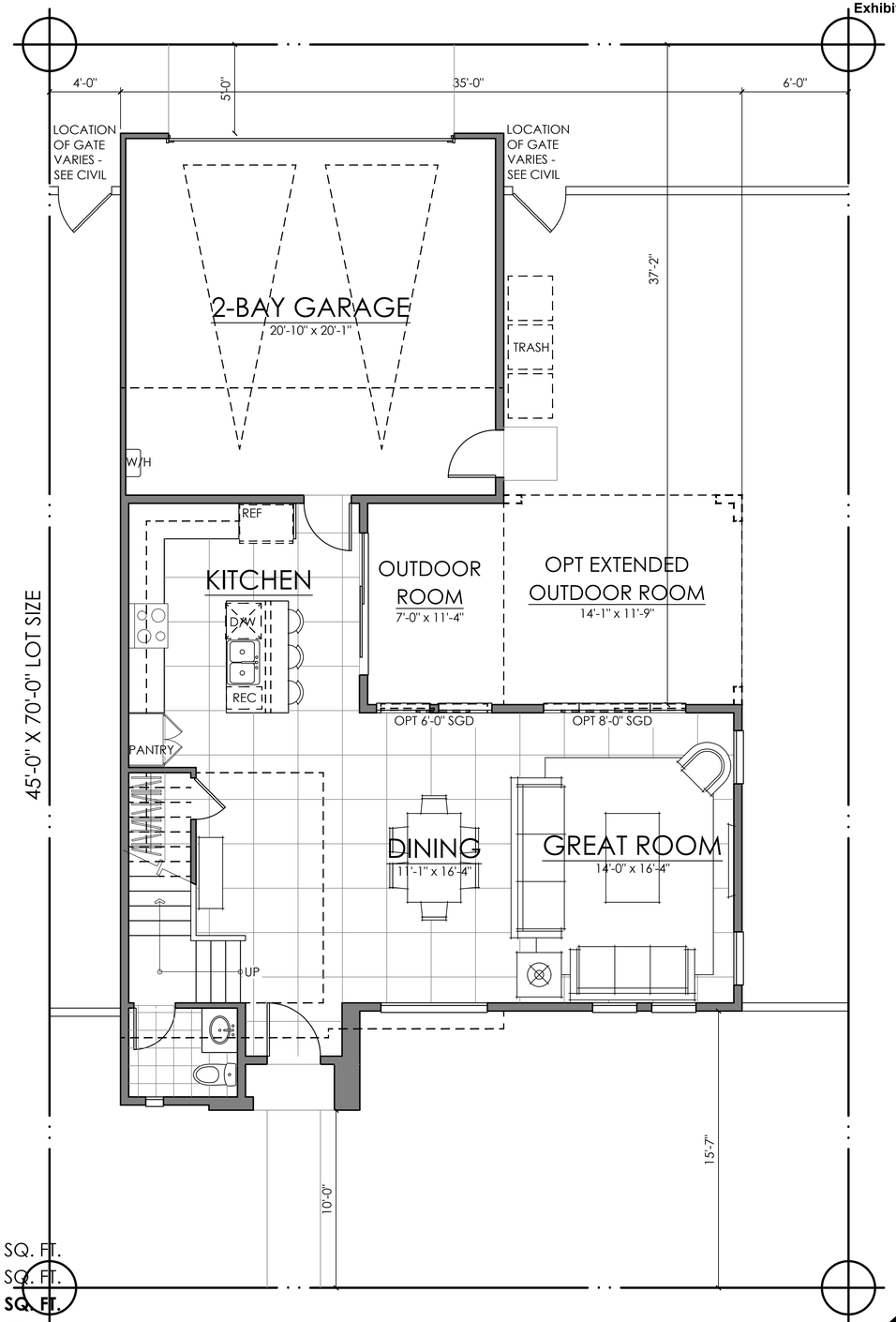
WATER CONSERVATION WORKSHEETS.

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - MAGNOLIA AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: N.A.
DRAWING NO.
6-11-18
L-4
7630





FIRST FLOOR	820 SQ. FT.
SECOND FLOOR	835 SQ. FT.
TOTAL LIVING	**1655 SQ. FT.**
TARGET	*1600 SQ. FT.*

PLAN ONE | 1655 SQ. FT.

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. sui
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suit
santa ana, ca 92705 / 949 553.0



FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"

07.10.18

PLAN ONE | FRONT ELEVATIONS

Woodside Homes®
BETTER BY DESIGN

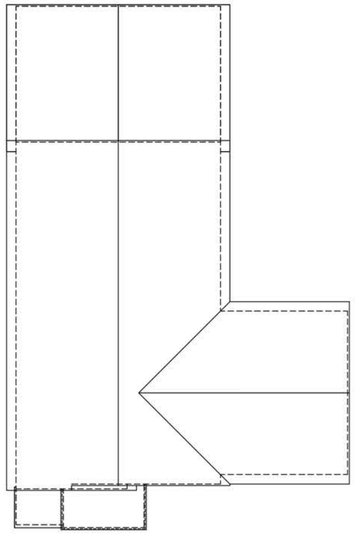
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303.683.7231



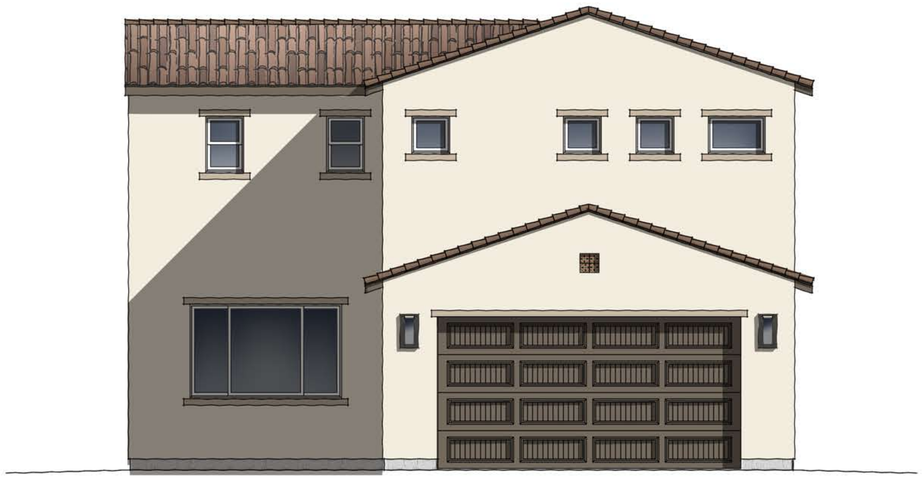
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.10.18

Woodside Homes®
BETTER BY DESIGN

PLAN ONE | ELEVATION A - MODERN SPANISH

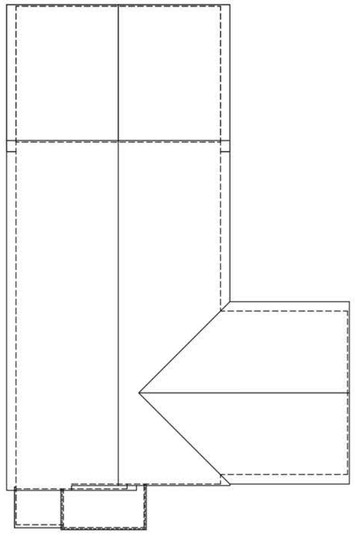
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



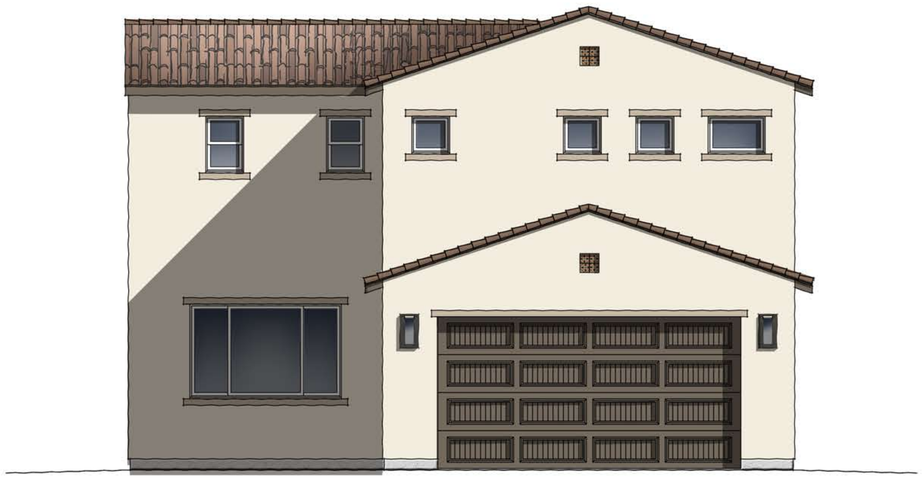
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.10.18

PLAN ONE | ELEVATION A - MODERN SPANISH | ENHANCED

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

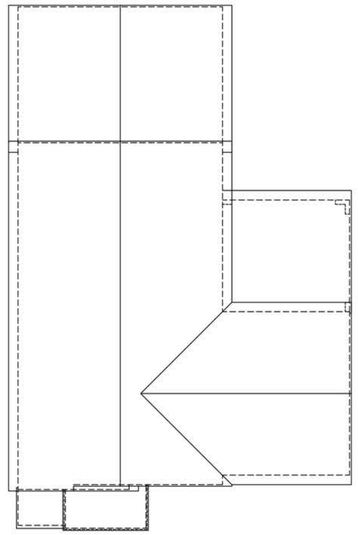
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



ROOF PLAN

SCALE: 1/8" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN ONE | ELEVATION A - MODERN SPANISH | OUTDOOR ROOM OPTION

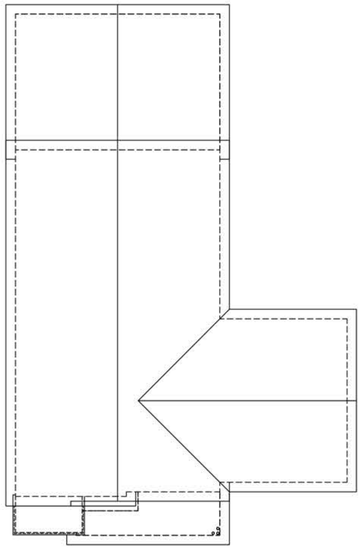
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



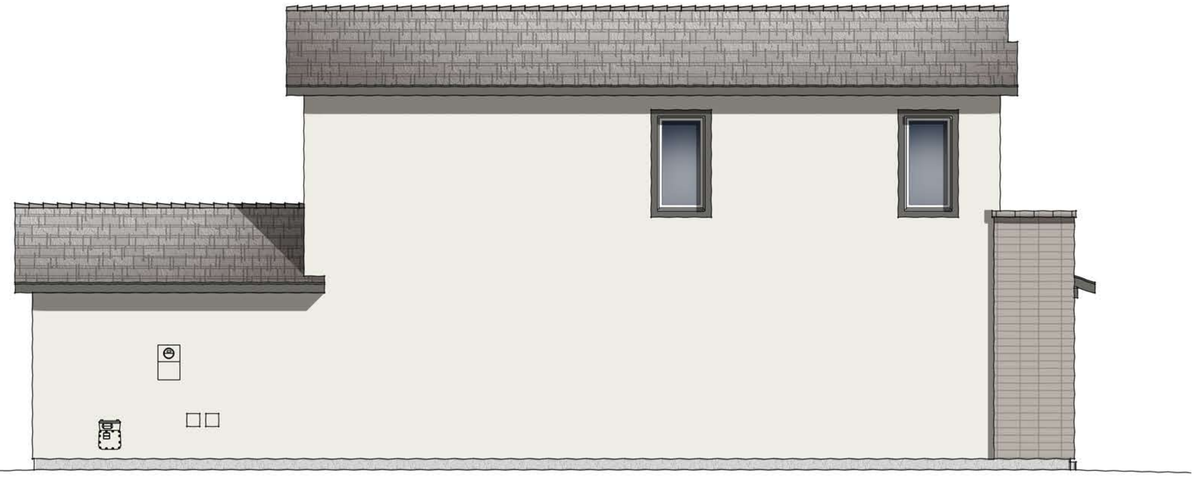
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.10.18

PLAN ONE | ELEVATION B - MID-CENTURY MODERN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

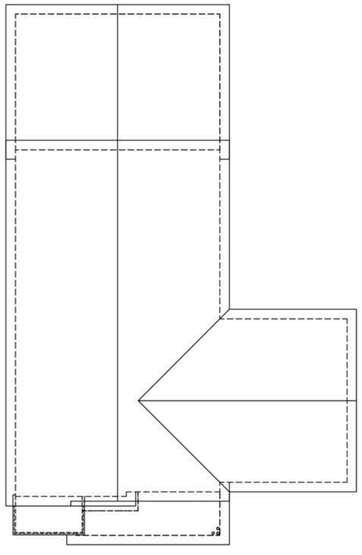
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.10.18

PLAN ONE | ELEVATION B - MID-CENTURY MODERN | ENHANCED

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

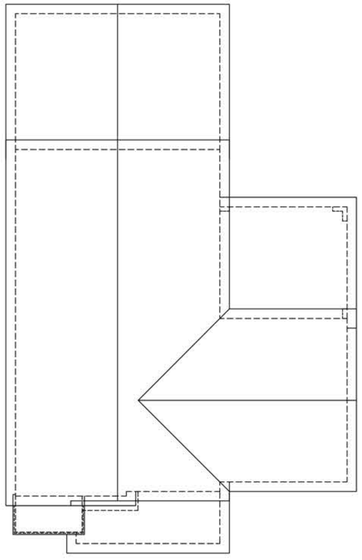
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN ONE | ELEVATION B - MID-CENTURY MODERN | OUTDOOR ROOM OPTION

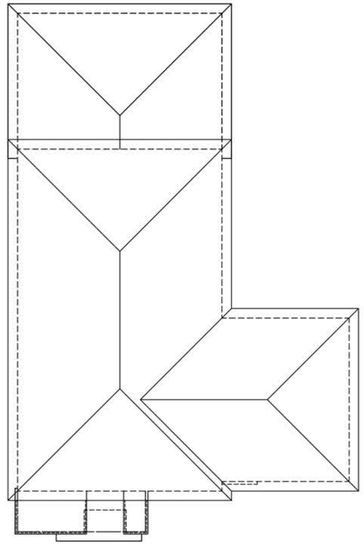
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



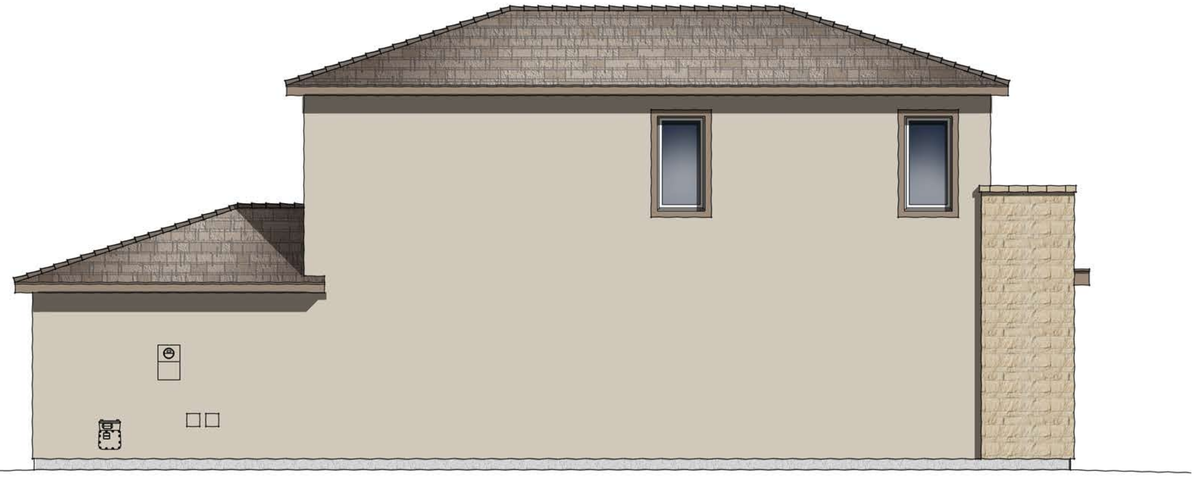
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.10.18

Woodside Homes®
BETTER BY DESIGN

PLAN ONE | ELEVATION C - MODERN PRAIRIE

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

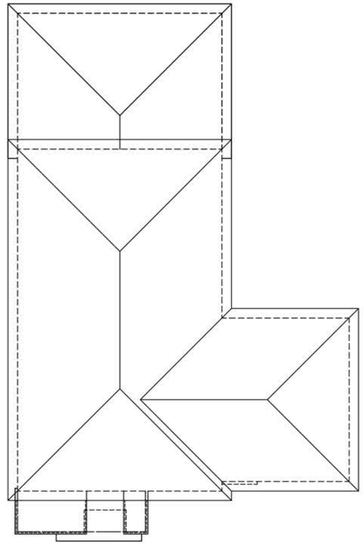
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717

7639



ROOF PLAN

SCALE: 1/8" = 1'-0"



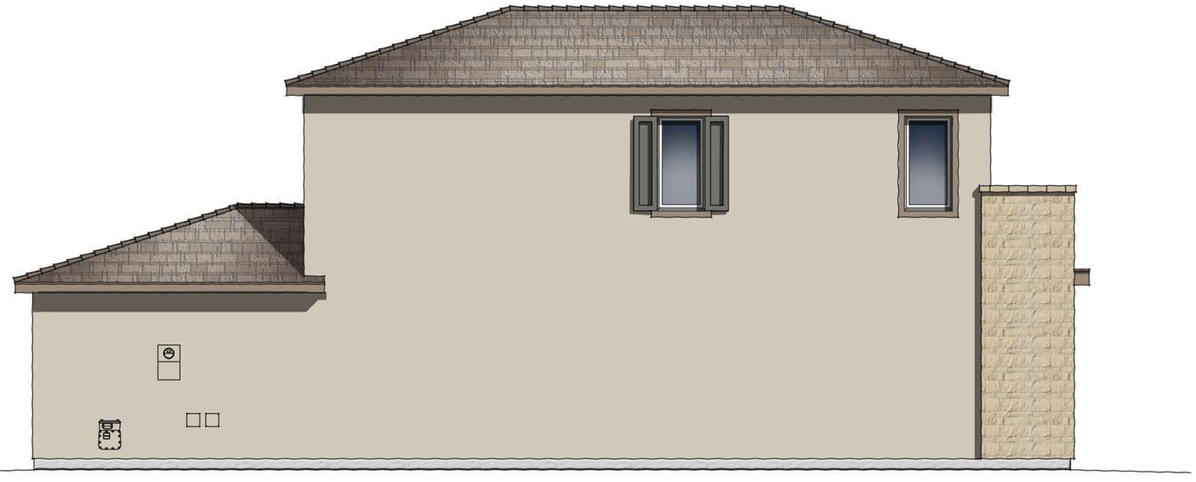
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.10.18

PLAN ONE | ELEVATION C - MODERN PRAIRIE | ENHANCED

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

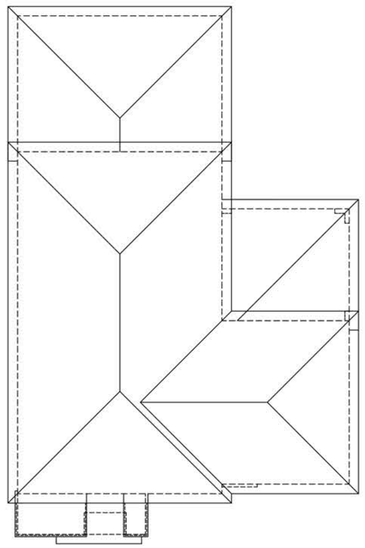
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

'.10.18

PLAN ONE | ELEVATION C - MODERN PRAIRIE | OUTDOOR ROOM OPTION

Woodside Homes®
BETTER BY DESIGN

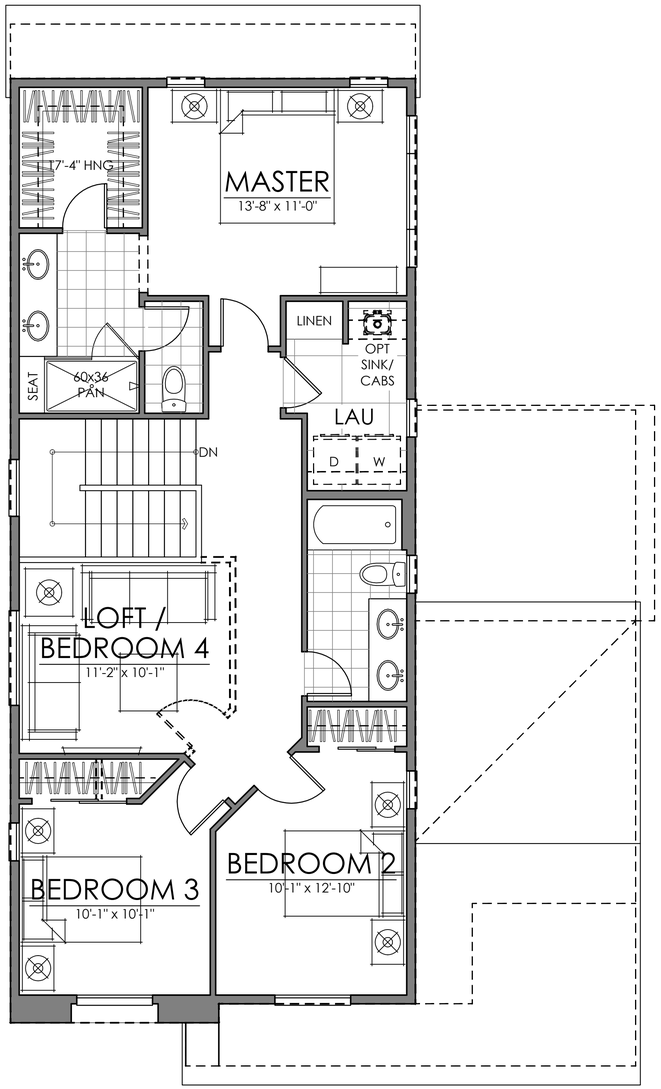
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

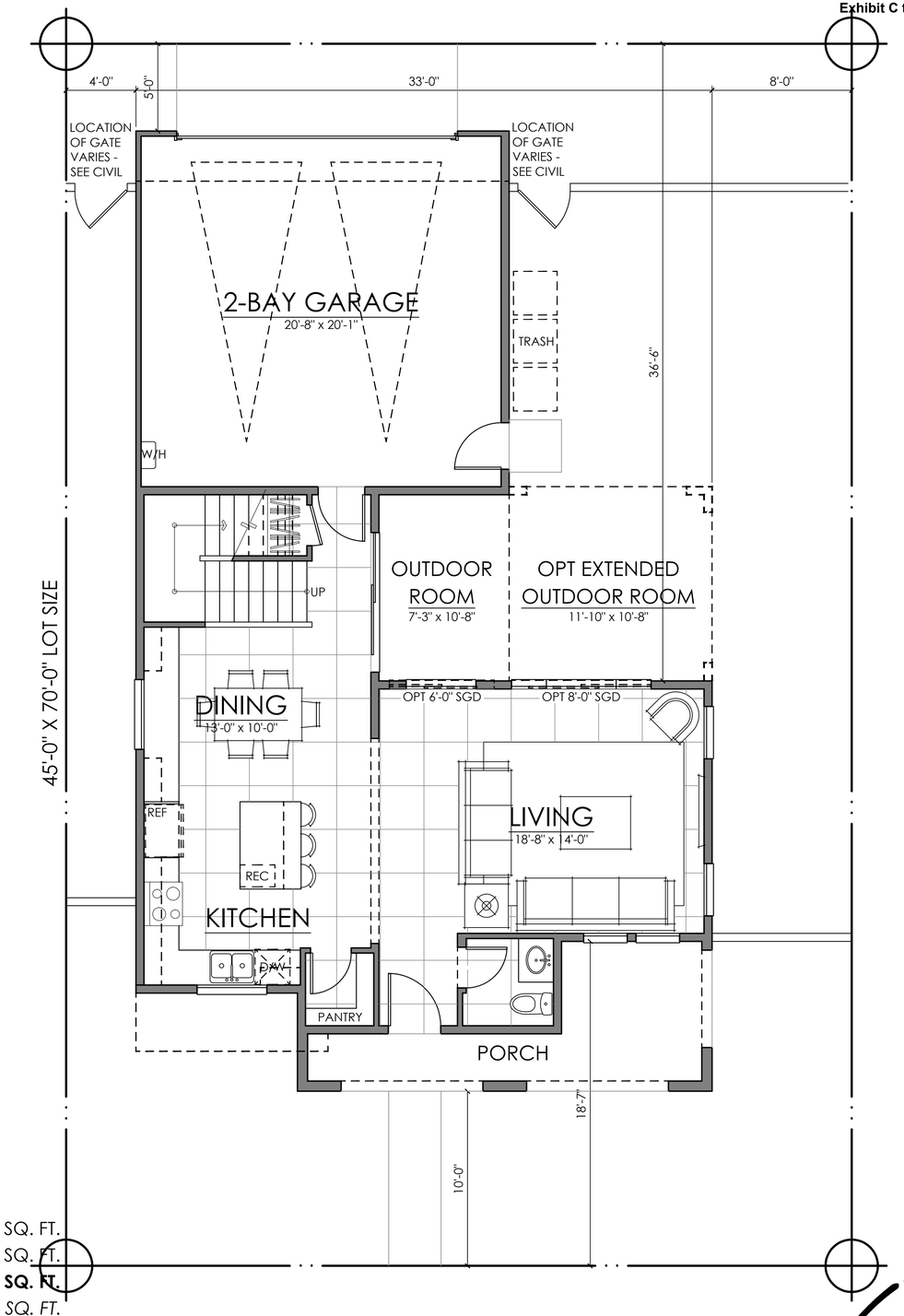
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717





FIRST FLOOR	754 SQ. FT.
SECOND FLOOR	972 SQ. FT.
TOTAL LIVING	**1726 SQ. FT.**
TARGET	*1650 SQ. FT.*

PLAN TWO | 1726 SQ. FT.

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. sui
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.0



FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"

07.10.18

PLAN TWO | FRONT ELEVATIONS

Woodside Homes®
BETTER BY DESIGN

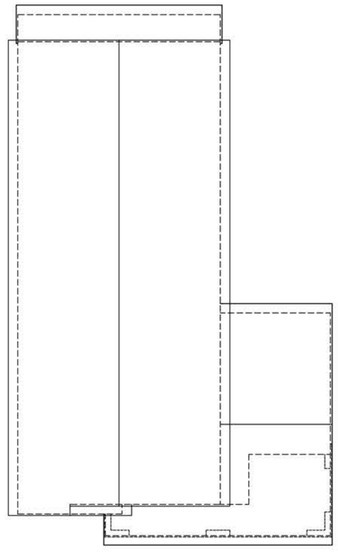
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303.683.7231

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



EAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

0.18

PLAN TWO | ELEVATION A - MODERN SPANISH

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

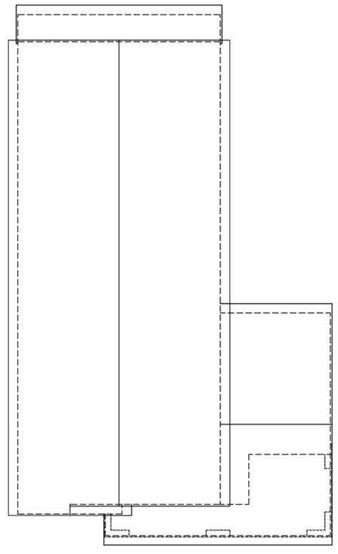
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite A
santa ana, ca 92705 / 949 553.8919



ROOF PLAN

SCALE: 1/8" = 1'-0"



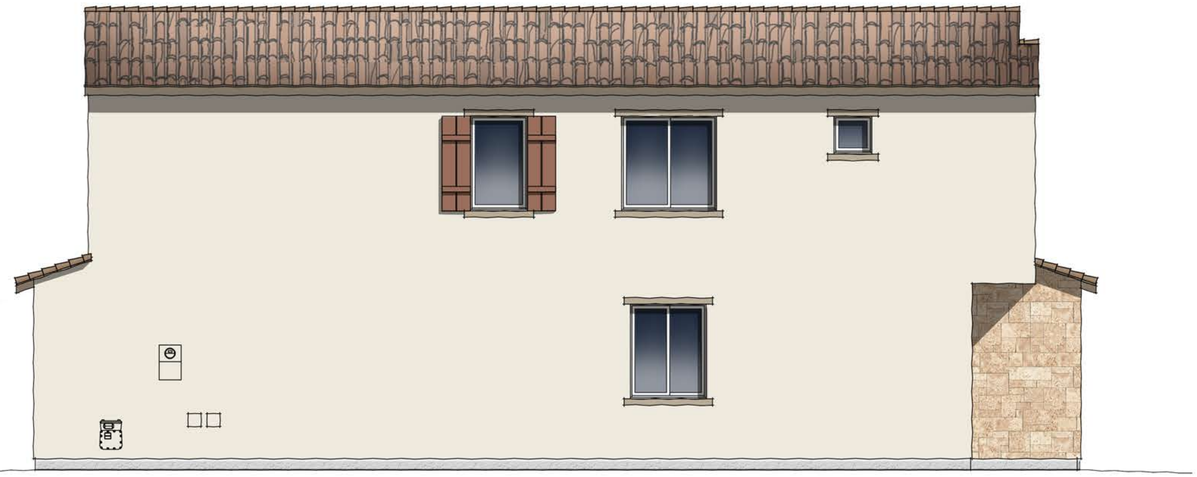
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



EAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

0.18

PLAN TWO | ELEVATION A - MODERN SPANISH | ENHANCED

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

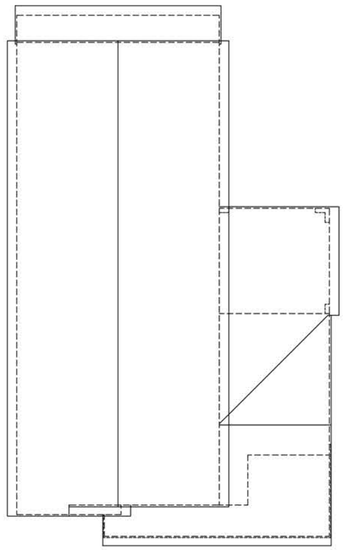
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite A
santa ana, ca 92705 / 949 553.8919



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



ROOF PLAN

SCALE: 1/8" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.10.18

PLAN TWO | ELEVATION A - MODERN SPANISH | OUTDOOR ROOM OPTION

Woodside Homes® BETTER BY DESIGN

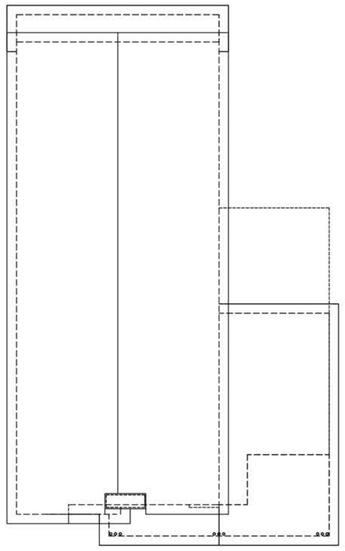
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



EAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

0.18

PLAN TWO | ELEVATION B - MID-CENTURY MODERN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

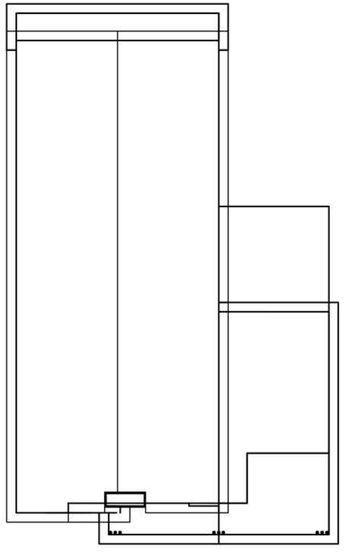
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite A
santa ana, ca 92705 / 949 553.8915



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.10.18

PLAN TWO | ELEVATION B - MID-CENTURY MODERN | ENHANCED

Woodside Homes
BETTER BY DESIGN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

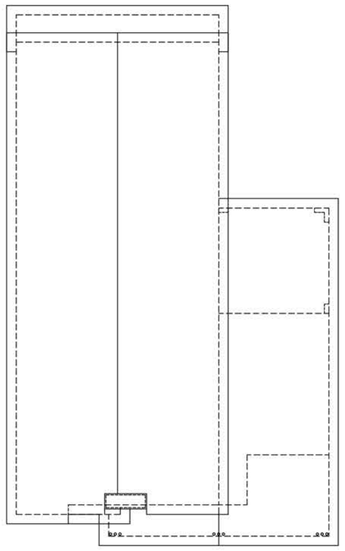
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



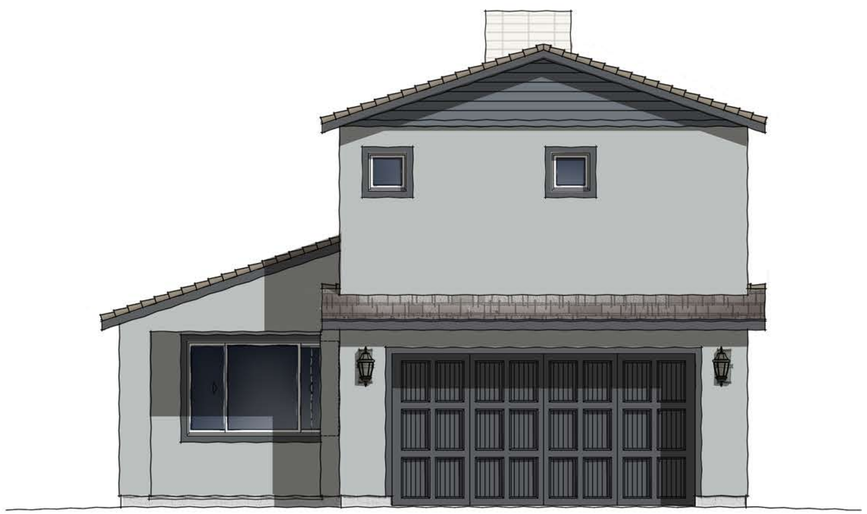
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



ROOF PLAN

SCALE: 1/8" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION B - MID-CENTURY MODERN | OUTDOOR ROOM OPTION

AGENDA ITEM 11.2
7.10.18

Woodside Homes® BETTER BY DESIGN

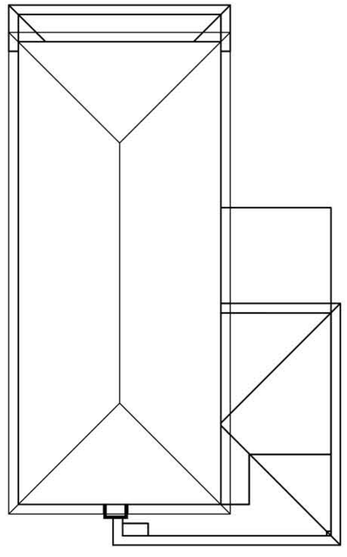
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



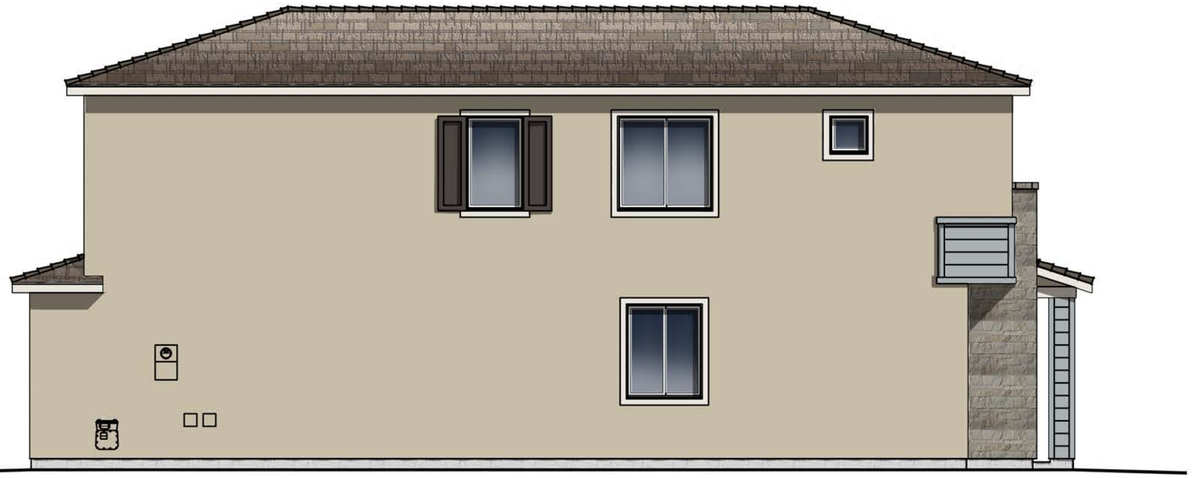
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.10.18

PLAN TWO | ELEVATION C - MODERN PRAIRIE | ENHANCED

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

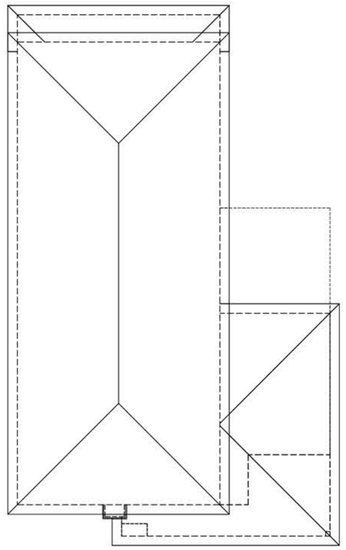
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



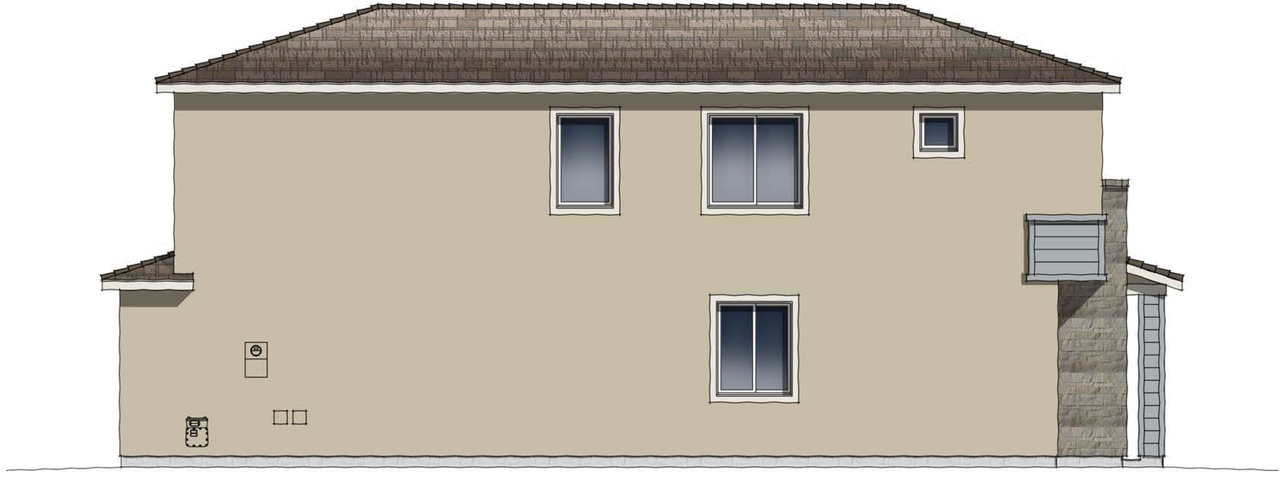
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION C - MODERN PRAIRIE

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC.; THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

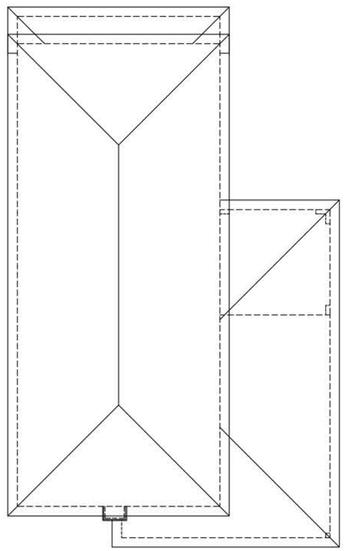
Woodside Homes® BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite / santa ana, ca 92705 / 949 553.89



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



ROOF PLAN

SCALE: 1/8" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION C - MODERN PRAIRIE | OUTDOOR ROOM OPTION

10.18

AGENDA ITEM 11.2

Woodside Homes®
BETTER BY DESIGN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

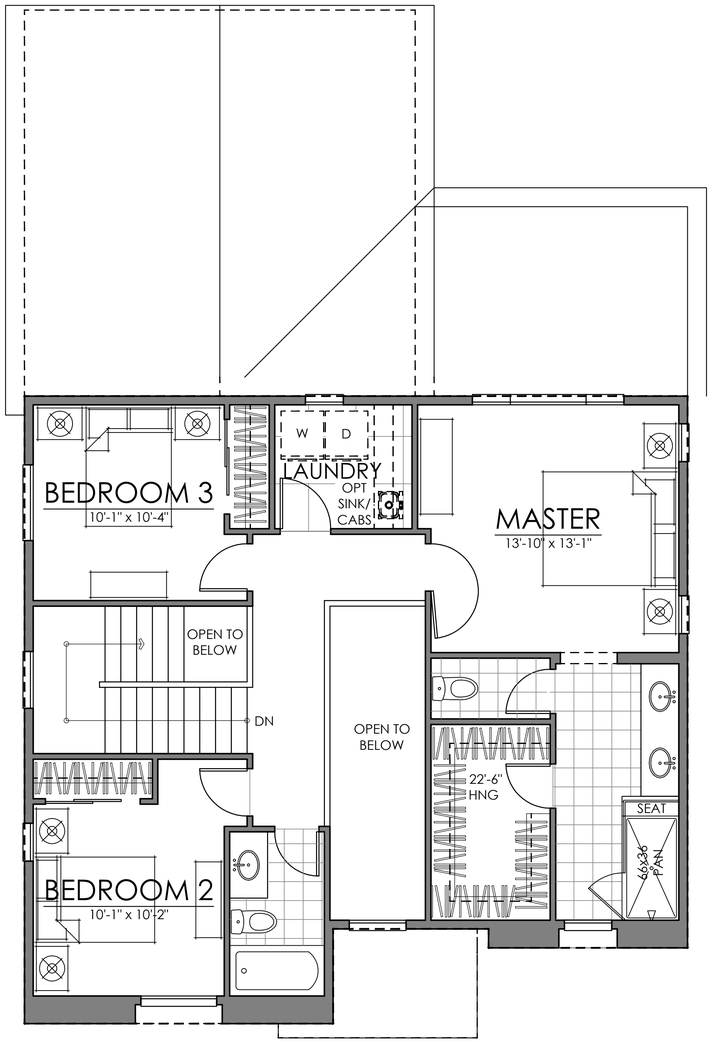
RANCHO CORDOVA, CALIFORNIA

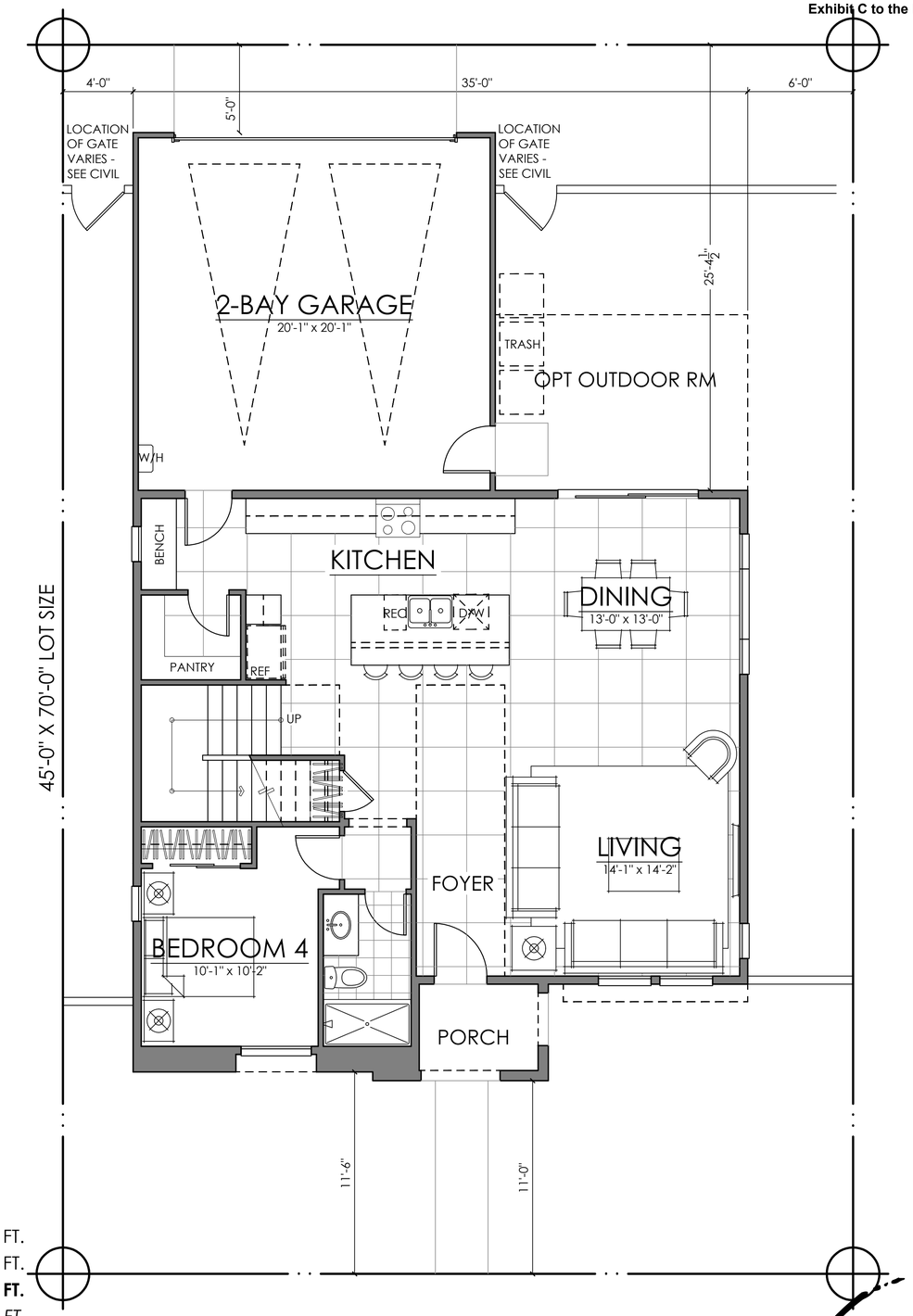
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite /
santa ana, ca 92705 / 949 553.89

7652





FIRST FLOOR	1050 SQ. FT.
SECOND FLOOR	872 SQ. FT.
TOTAL LIVING	**1922 SQ. FT.**
TARGET	*1900 SQ. FT.*

PLAN THREE | 1922 SQ. FT.

Woodside Homes®
BETTER BY DESIGN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. sui
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suit
santa ana, ca 92705 / 949 553.0



FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - MID CENTURY MODERN

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"

07.10.18

PLAN THREE | FRONT ELEVATIONS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303.683.7231

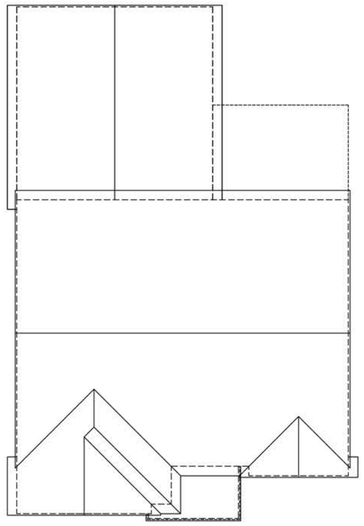
Woodside Homes® BETTER BY DESIGN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.10.18

PLAN THREE | ELEVATION A - MODERN SPANISH

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

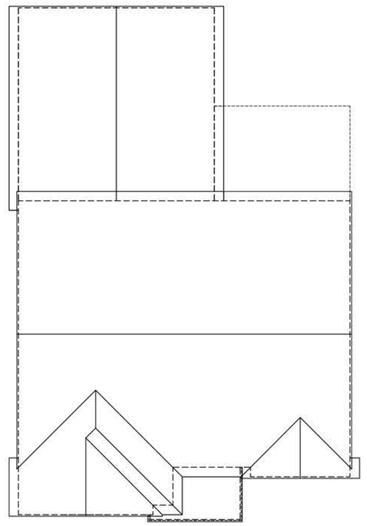
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.b717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION A - MODERN SPANISH | ENHANCED

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

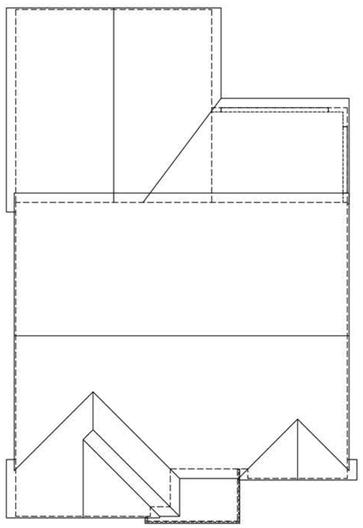
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes® BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite A
santa ana, ca 92705 / 949 553.89[illegible]



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION A - MODERN SPANISH | OUTDOOR ROOM OPTION

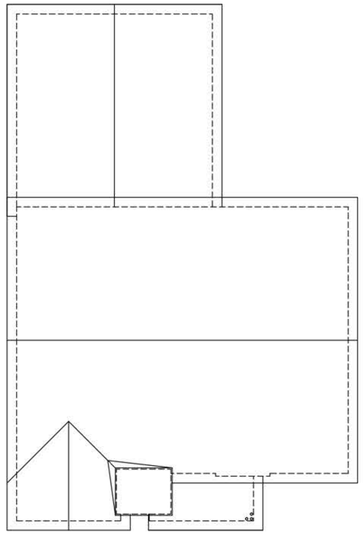
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.10.18

PLAN THREE | ELEVATION B - MID-CENTURY MODERN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

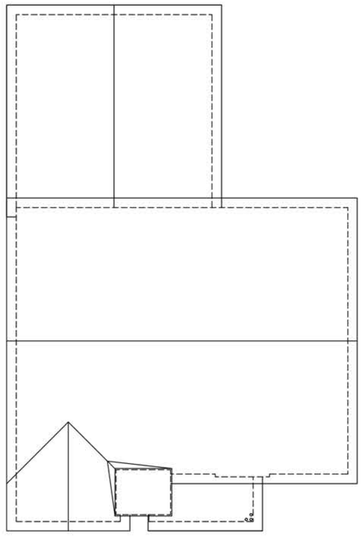
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.0



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.10.18

PLAN THREE | ELEVATION B - MID-CENTURY MODERN | ENHANCED

Woodside Homes® BETTER BY DESIGN

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

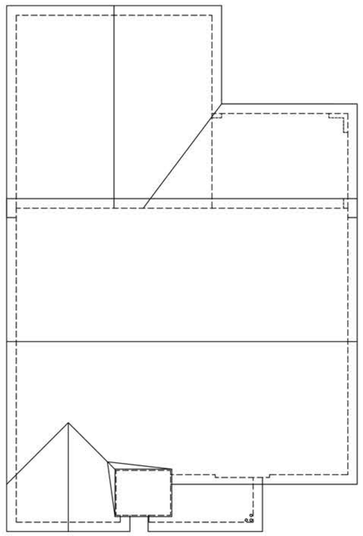
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.b717



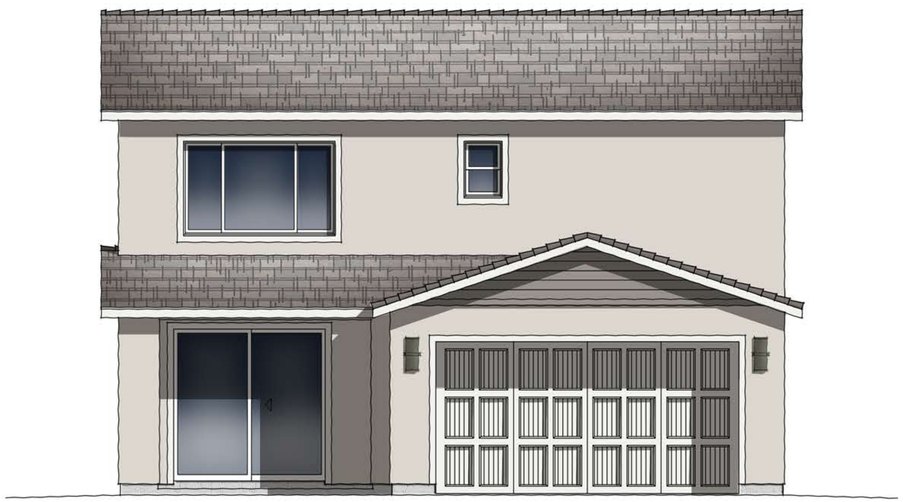
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



ROOF PLAN

SCALE: 1/8" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B - MID-CENTURY MODERN | OUTDOOR ROOM OPTION

Woodside Homes® BETTER BY DESIGN

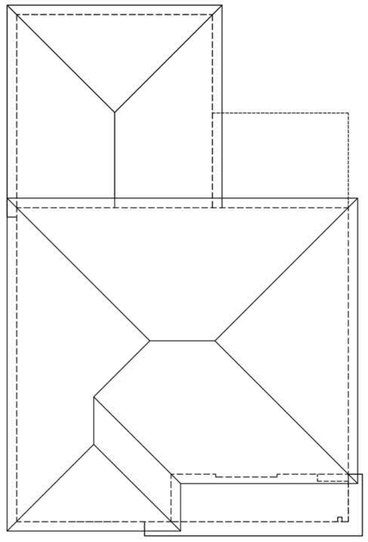
COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

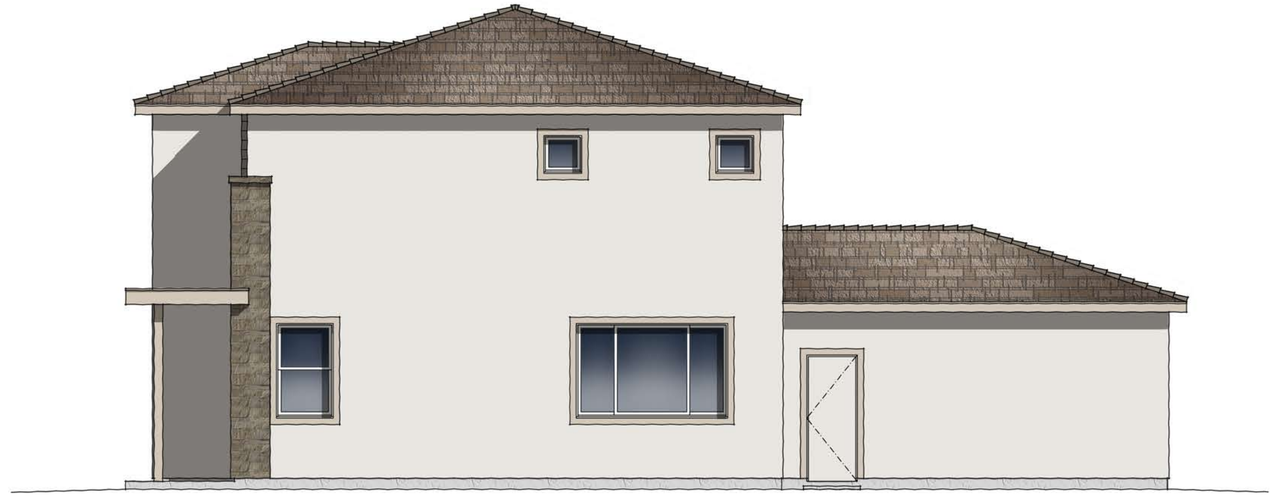
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717



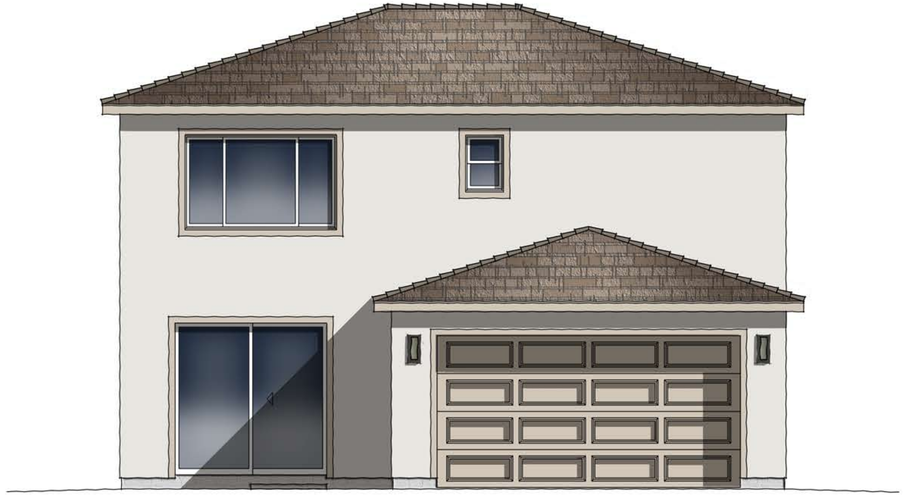
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

10.18

PLAN THREE | ELEVATION C - MODERN PRAIRIE

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

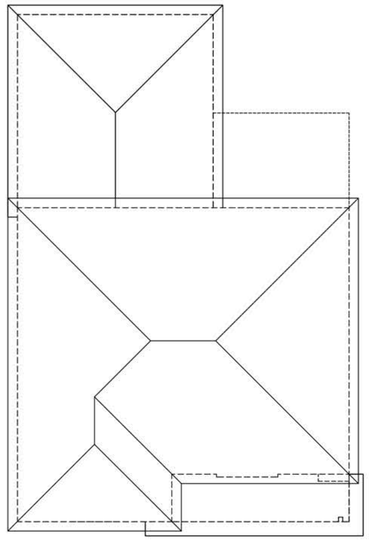
RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite A
santa ana, ca 92705 / 949 553.89



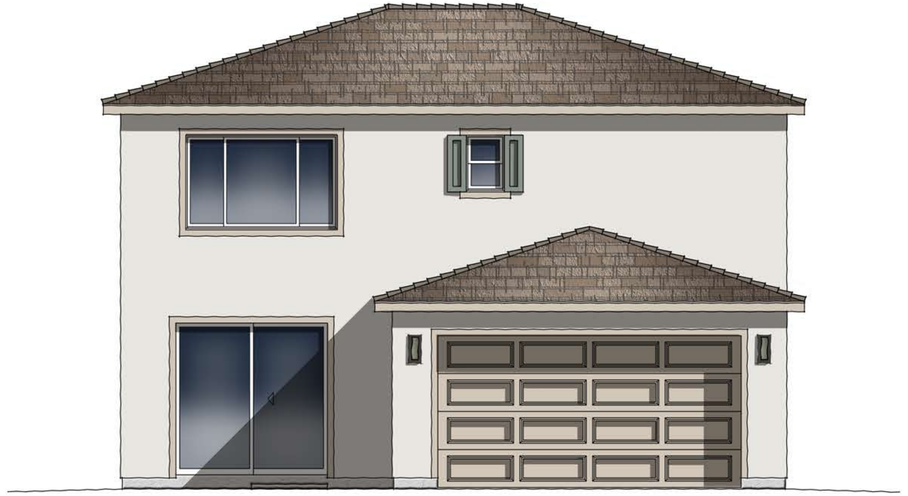
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

10.18

PLAN THREE | ELEVATION C - MODERN PRAIRIE | ENHANCED

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

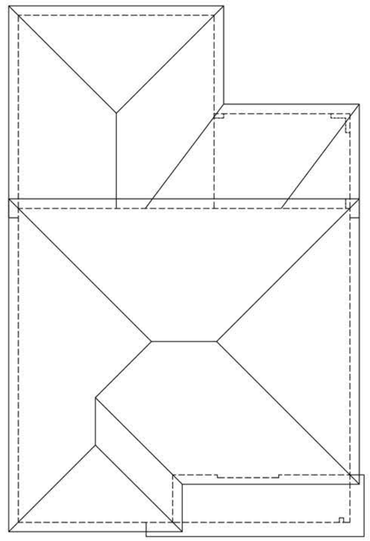
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

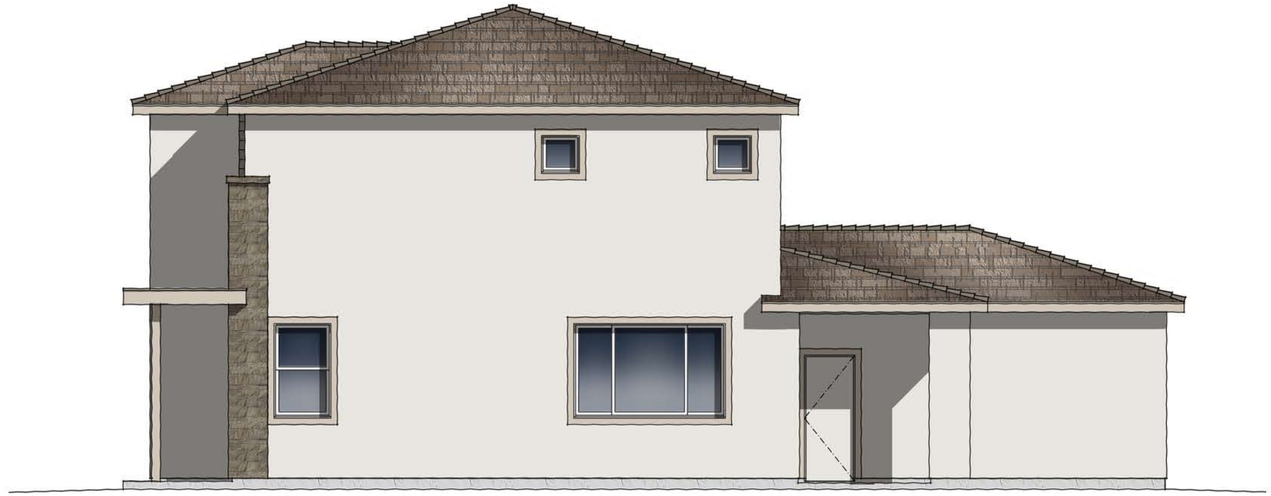
woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite A
santa ana, ca 92705 / 949 553.89

7662



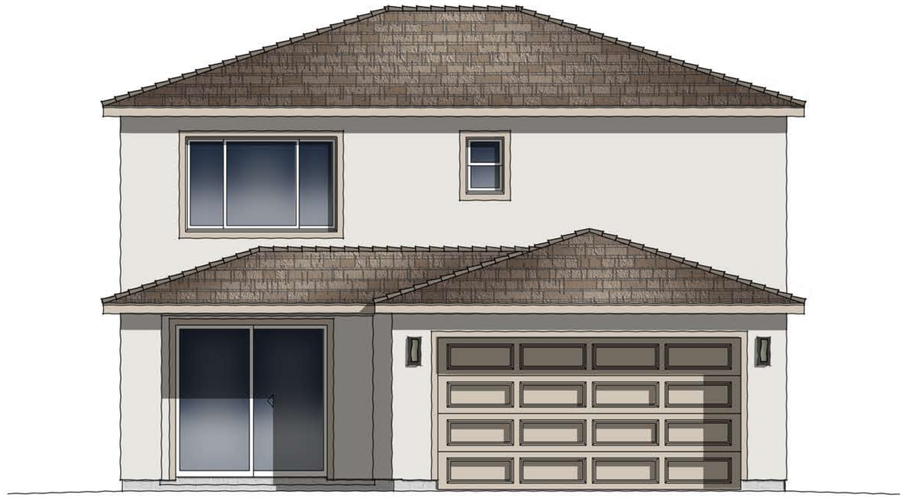
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION C - MODERN PRAIRIE | OUTDOOR ROOM OPTION

COTTONWOOD AT CYPRESS | WOODSIDE HOMES

RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8717

woodleyarchitecturalgroup,inc.

Cottonwood at Cypress
Woodside Homes

Color Schemes
07.10.18

Woodside Homes
BETTER BY DESIGN

colorado 731 southpark drive suite b, littleton, colorado 80120 | (t) 303.683.7231 | (f) 303.683.2922
california 2943 pullman street suite a, santa ana, california 92705 | (t) 949

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'

Elevation A
Modern Spanish
Scheme 1



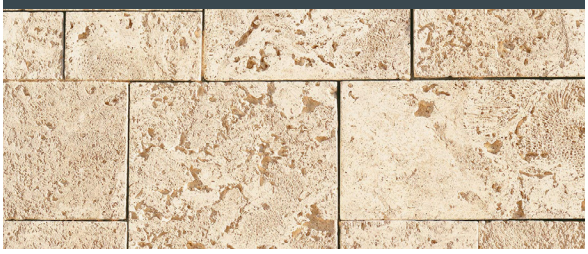
Roof Tile

Stucco

Trim

Fascia &
Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'

Elevation A
Modern Spanish
Scheme 2



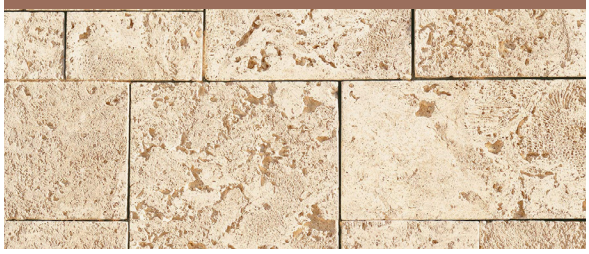
Roof Tile

Stucco

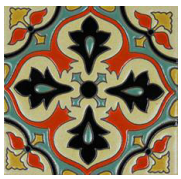
Trim

Fascia &
Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'
Elevation A
Modern Spanish
Scheme 3



Roof Tile

Stucco

Trim

Fascia &
Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

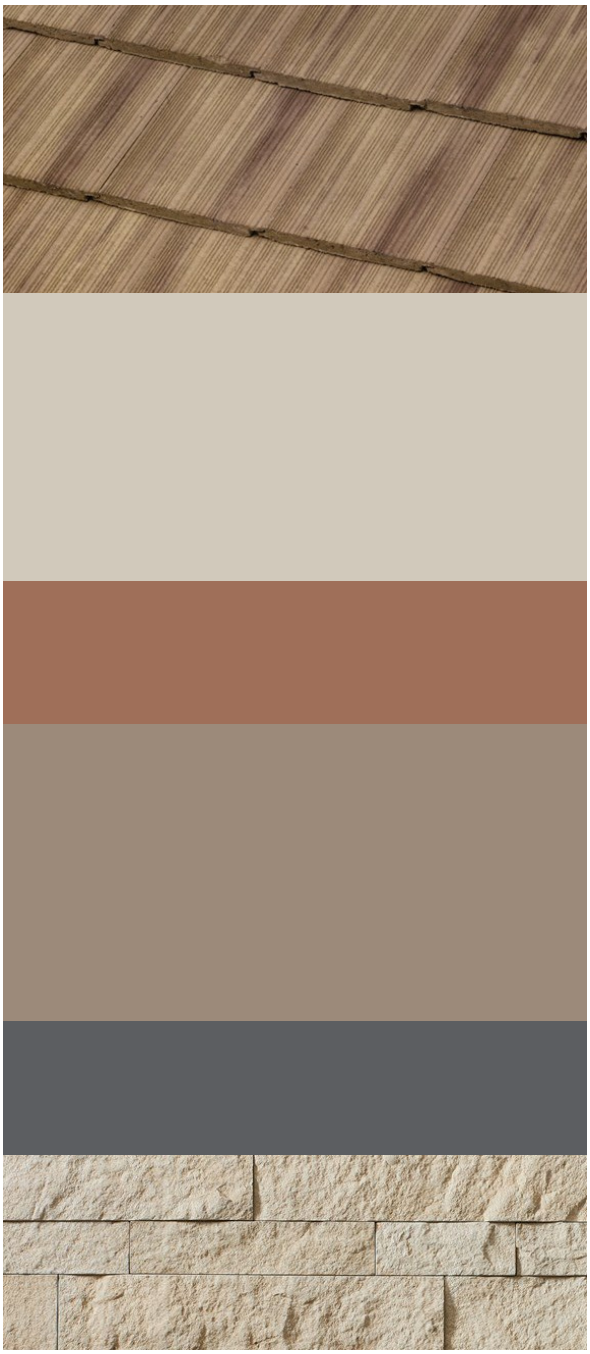
Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'

Elevation C
Modern Prairie
Scheme 7



Roof Tile

Stucco

Lap Siding
& Trim at Lap Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

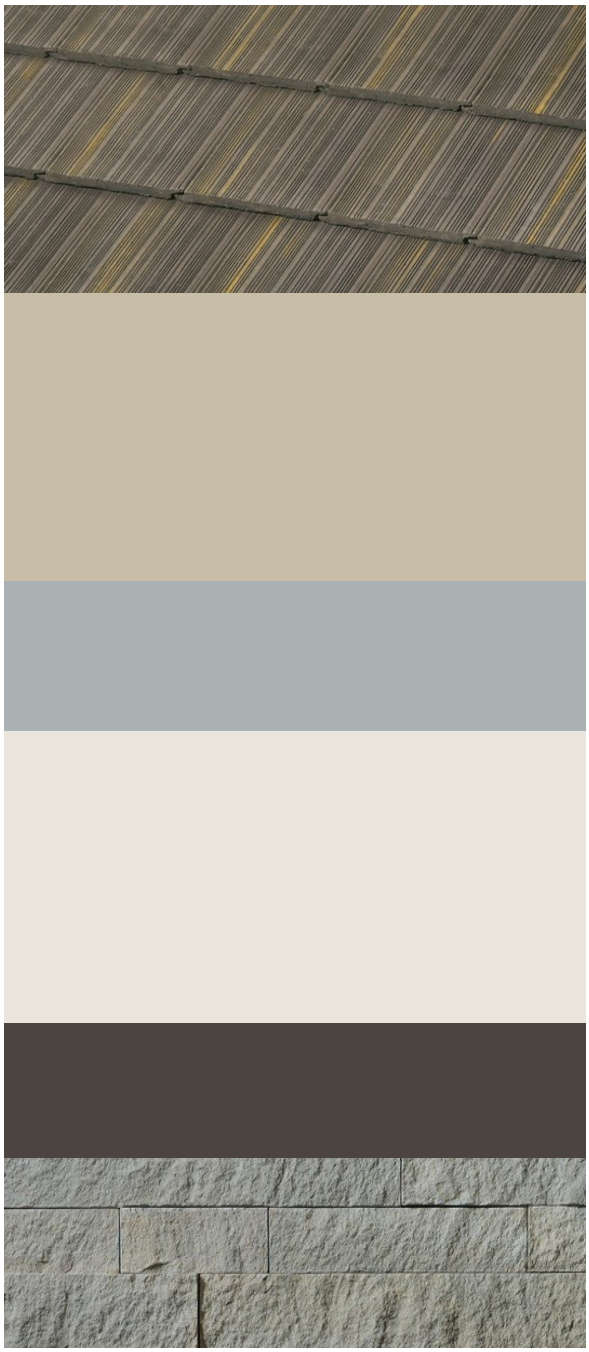
Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'
Elevation C
Modern Prairie
Scheme 8



Roof Tile

Stucco

Lap Siding
& Trim at Lap Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'
Elevation C
Modern Prairie
Scheme 9



Roof Tile

Stucco

Lap Siding
& Trim at Lap Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'

Elevation D
Mid-Century Modern
Scheme 10



Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters

Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'

Elevation D
Mid-Century Modern
Scheme 11



Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters

Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTACHMENT 4
Exhibit C to the Resolution

Cottonwood at Cypress 145'x70'

Elevation D
Mid-Century Modern
Scheme 12



Roof Tile

Stucco

Siding

Trim, Fascia
& Garage Door

Entry Door
& Shutters

Brick

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

Paint: PPG	Stone Grout: Orco	05.08.18- Original Date
Roof: Boral		07.11.18-Revisions per drc comments
Metal Roof: Taylor Metal Products		
Stone: El Dorado & Cultured Stone		

MODERN SPANISH ELEVATION A	**Scheme 1**	**Scheme 2**	**Scheme 3**
ROOF *BARCELONA 900*	1HBCS3270 TESORO BLEND	1HBCS0431 APPLE BARK	1HBCS6330 SALERNO CLAY
STUCCO	1092-1 QUEEN ANNE LACE	14-08 HORSERADISH	1096-1 INSTANT RELIEF
TRIM	14-14 SUMMER SUEDE	14-27 TRUE KHAKI	1097-4 DUSTY TRAIL
FASCIA | GARAGE DOOR	1022-6 GRANITE	1023-6 CLAM SHELL	1025-6 SLEEPING GIANT
ENTRY DOOR | SHUTTERS	1038-7 MIDNIGHT HOUR	1071-6 PRAIRIE FIRE	1031-5 SEAWEED WRAP
STONE: *El Dorado Stone*	PEARL WHITE *COASTAL REEF*	PEARL WHITE *COASTAL REEF*	SANIBEL *COASTAL REEF*
TRIM AT STONE :	1097-3 TOASTED ALMOND	1097-3 TOASTED ALMOND	1097-4 DUSTY TRAIL
DECORATIVE TILES	201A 	202A 	201B 

*All non-decorative items such as meter doors & non-decorative vents are to be painted the surrounding color.

*Paint breaks to be turned at inside corner unless otherwise indicated.

* Metal roof vents to be painted to match the darkest color from the roofing blend.

*Painted brick to be semi-gloss finish.

El Dorado & Cultured Stone: MELISSA ZEPEDA (949) 275-4533 or melissa.zepeda@boral.com

Boral Roof : Please Contact Michael Heard (949) 880.4153 or Michael.Heard@boral.com

Decorative Tile to be RockMill Tile & Stone : Please Contact Veronica Abbot Cell: 949.233.9133 or veronicaA@rockmillstone.com .

ATTACHMENT 4
Exhibit C to the Resolution

MODERN PRAIRIE ELEVATION C	Scheme 7	Scheme 8	Scheme 9
ROOF *SAXONY 900 SHAKE*	1FBCF3293 CEDAR BLEND	1FBCF3233 BROWN BLEND	1FBCF3763 KOKOMO
STUCCO	1024-4 MOTH GRAY	14-26 HIDEAWAY	1007-1 WILLOW SPRINGS
CEMENTITIOUS LAP SIDING & **CEMENTITIOUS TRIM**	16-07 SOUTHERN WOOD	1039-3 MIRROR MIRROR	1007-5 LAZY AFTERNOON
STUCCO TRIM	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1021-2 SYNCHRONICITY
FASCIA | GARAGE DOOR	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1021-2 SYNCHRONICITY
ENTRY DOOR **& SHUTTERS**	1011-6 GLAZED GRANITE	1002-7 PHANTOM MIST	1033-5 GRAY HERON
STONE GROUT	DRYSTACK	DRYSTACK	DRYSTACK
STONE: *Cultured Stone* *Pattern # HSP3507*	HEWN |FOUNDATION CULTURED STONE	HEWN | SPAN CULTURED STONE	HEWN | TALUS CULTURED STONE
TRIM AT STONE :	1097-4 DUSTY TRAIL	1007-4 HOT STONE	1023-4 DESERT DUNE

*All non-decorative items such as meter doors & non-decorative vents are to be painted the surrounding color.

*Paint breaks to be turned at inside corner unless otherwise indicated.

* Metal roof vents to be painted to match the darkest color from the roofing blend.

*Painted brick to be semi-gloss finish.

El Dorado & Cultured Stone: MELISSA ZEPEDA (949) 275-4533 or melissa.zepeda@boral.com

Boral Roof : Please Contact Michael Heard (949) 880.4153 or Michael.Heard@boral.com

Decorative Tile to be RockMill Tile & Stone : Please Contact Veronica Abbot Cell: 949.233.9133 or veronicaA@rockmillstone.com .

ATTACHMENT 4
Exhibit C to the Resolution

MID-CENTURY MODERN ELEVATION D	Scheme 10	Scheme 11	Scheme 12
ROOF *SAXONY SLATE 900*	1FACS5037 NATRUAL MARBLE	1FBCJ4070 SEA PEARL BLEND	1FACS1132 CHARCOAL BROWN BLEND
STUCCO	1006-1 GYPSUM	10_15 QUEST	1025-2 SILENT SMOKE
SIDING	1007-2 SWIRLING SMOKE	10 _19 FAVORITE FLANNEL	1007-5 LAZY AFTERNOON
TRIM | FASCIA	1009-6 ARMORY	1011-6 GLAZED GRANITE	1001-1 DELICATE WHITE
GARAGE DOOR	1009-6 ARMORY	1011-6 GLAZED GRANITE	1001-1 DELICATE WHITE
ENTRY DOOR & SHUTTERS	1152-5 GRANITE FALLS	1014-7 BLACK WALNUT	PPG11-29 GREEN GRAY MIST
PAINTED BRICK | NORMAN SIZED BRICK |STACK BOND PATTERN	1006-4 MERCURIAL	1020-1 ATRIUM WHITE	1025-1 COMMERCIAL WHITE

*All non-decorative items such as meter doors & non-decorative vents are to be painted the surrounding color.

*Paint breaks to be turned at inside corner unless otherwise indicated.

* Metal roof vents to be painted to match the darkest color from the roofing blend.

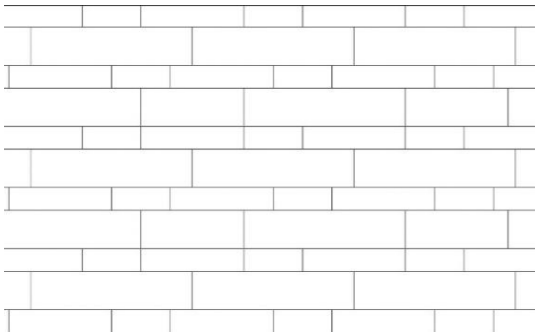
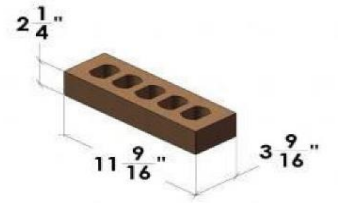
*Painted brick to be semi-gloss finish.

El Dorado & Cultured Stone: MELISSA ZEPEDA (949) 275-4533 or melissa.zepeda@boral.com

Boral Roof : Please Contact Michael Heard (949) 880.4153 or Michael.Heard@boral.com

Decorative Tile to be RockMill Tile & Stone : Please Contact Veronica Abbot Cell: 949.233.9133 or veronicaA@rockmillstone.com .

ATTACHMENT 4
Exhibit C to the Resolution

STONE PATTERN | HSP3507	STACK BOND PATTERN	NORMAN BRICK
		

*All non-decorative items such as meter doors & non-decorative vents are to be painted the surrounding color.

*Paint breaks to be turned at inside corner unless otherwise indicated.

* Metal roof vents to be painted to match the darkest color from the roofing blend.

*Painted brick to be semi-gloss finish.

El Dorado & Cultured Stone: MELISSA ZEPEDA (949) 275-4533 or melissa.zepeda@boral.com

Boral Roof : Please Contact Michael Heard (949) 880.4153 or Michael.Heard@boral.com

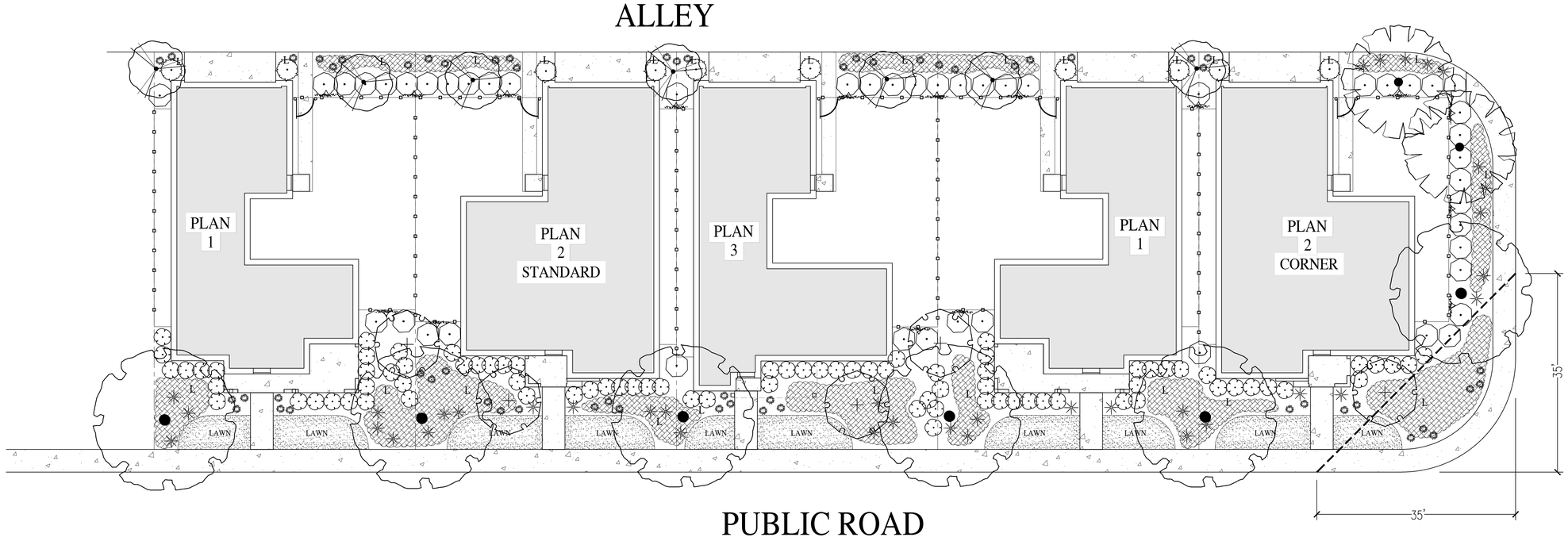
Decorative Tile to be RockMill Tile & Stone : Please Contact Veronica Abbot Cell: 949.233.9133 or veronicaA@rockmillstone.com .

0 10 20 30 40 feet
1" = 10'- 0"

NORTH

TYPICAL PRODUCTION PLANTING LAYOUT

COTTONWOOD AT CYPRESS 45 x 70 LOTS



WOODSIDE HOMES

DOUGLAS 98
COTTONWOOD AT CYPRESS
TYPICAL PRODUCTION
LANDSCAPE DOCUMENTS

PACKAGE INCLUDES:

L-1. COVER PAGE - 10 SCALE PLANTING LAYOUT LEGEND/ NOTES

L-2. 10 SCALE IRRIGATION LAYOUT / NOTES

L-3. STANDARD INSTALLATION DETAILS

L-4. WATER USE CALCULATIONS

AGENDA ITEM 11.2

CONCEPT PLANT SCHEDULE

STREET TREES - MED WATER USE
Acer rubrum `Bowhall Red` / Red Maple — 15 gal
MED WATER
Koelreuteria paniculata / Golden Rain Tree — 15 gal
Tilia cordata `Greenspire` / Greenspire Littleleaf Linden — 15 gal

ACCENT TREES
Arbutus unedo / Strawberry Tree Shrub — 15 gal
Lagerstroema indica `Tuscarora` / Crape Myrtle — 15 gal
Malus floribunda `Prairiefire` / Flowering Crabapple — 15 gal

SMALL TREES
Acer palmatum / Japanese Maple — 15 gal
Magnolia grandiflora `St. Mary` / Southern Magnolia — 15 gal
Prunus carolniana / Carolina Laurel Cherry — 15 gal
Rhaphiolepis indica `Majestic Beauty` TM / Majestic Beauty Indian Hawthorne Standard — 15 gal
Vitex agnus-castus / Chaste Tree — 15 gal

ALLEY TREES - LOW/MED WATER USE
Fagus sylvatica `Fastigiata` / European Beech — 15 gal
15 - GAL STANDARD
FOR CONTUNUITY - USE SAME TREE SPECIES IN INDIVIDUAL ALLEYS.
Prunus carolniana `Compacta` / Carolina Cherry — 15 gal
15 - GAL STANDARD
FOR CONTUNUITY - USE SAME TREE SPECIES IN INDIVIDUAL ALLEYS.

FOUNDATION SHRUBS LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush — 5 gal
Elaeagnus pungens / Thorny Eleagnus — 5 gal
Nandina domestica `Compacta` / Dwarf Heavenly Bamboo — 5 gal
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub — 5 gal
Rhaphiolepis umbellata / Yedda Hawthorn — 5 gal
Xylosma congestum `Compacta` / Compact Xylosma — 5 gal

MED SHRUBS - LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush — 5 gal
Cistus x purpureus / Orchid Rockrose — 5 gal
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub — 5 gal
Rhaphiolepis umbellata / Yedda Hawthorn — 5 gal
Rosmannus officinalis `Blue Spires` / Rosemary — 5 gal

ACCENT PLANTS- LOW WATER USE
Hesperaloe parviflora / Red Yucca — 5 gal
Phormium tenax `Yellow Wave` / New Zealand Flax — 5 gal
Salvia leucantha / Mexican Bush Sage — 5 gal
Yucca filifera `Golden Sword` / Golden Sword Yucca — 5 gal

PERENNIALS LOW WATER USE
Bergenia cordifolia / Heartleaf Bergenia — 1 gal
Cistus salvifolius `Prostratus` / Sageleaf Rockrose — 1 gal
Coreopsis x `Moonbeam` / Moonbeam Coreopsis — 1 gal
Engeron karvinskianus / Fleabane — 1 gal
Heuchera sanguinea / Coral Bells — 1 gal
Heuchera x `Plum Pudding` / Coral Bells — 1 gal
Lavandula angustifolia `Munstead` / Munstead English Lavender — 1 gal
Moraea x `Lemon Drop` / Fortnight Lily — 1 gal
Pennisetum orientale `Karley Rose` / Karley Rose Fountain Grass — 1 gal
Salvia greggii `Hot Lips` / Autumn Sage — 1 gal
Teucrium fruticans / Bush Germander — 1 gal
Tulbaghia violacea `Variegata` / Striped Cape Garlic — 1 gal

VINES LOW WATER USE
Campsis radicans `Trumpet Creeper` / OrangeTrumpet Creeper — 1 gal
Clematis x lawsoniana `Henryi` / Clematis — 1 gal
Gelsemium sempervirens / Jessamine — 1 gal

ALLEY FOUNDATION SHRUBS
Grevillea x `Noelli` / Grevillea — 5 gal
Rosmannus officinalis `Gorizia` / Rosemary — 5 gal

GROUND COVERS - LOW - MED WATER USE
Myoporum parvifolium `Putah Creek` / Putah Creek Myoporum — 100% 1 gal 36" oc
Vinca minor / Common Periwinkle — 100% 1 gal 24" oc

WELO STATEMENT:
"I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE LANDSCAPE DESIGN PLAN"
6-11-18

PLANTING NOTES

1. CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT IN THE EVENT OF PLANT UNAVAILABILITY WITHIN TEN WORKING DAYS AFTER BID AWARDS. LANDSCAPE CONTRACTOR RESPONSIBLE FOR VERIFICATION OF PLANT QUANTIES ON LEGEND. NOTIFY L.A. IN EVENT OF DISCREPANCIES
2. VERIFY SITE CONDITIONS AS SHOWN ON THESE PLANS PRIOR TO SUBMITTING A PRICE QUOTATION BID OR COMMENCING CONSTRUCTION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT.
3. FINISHED GRADING PRIOR TO COMMENCING WORK THE LANDSCAPE CONTRACTOR SHALL INSPECT THE WORK OF OTHERS AND VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH GRADING AND SHALL INSPECT THE WORK OF OTHERS, VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR SURFACE DRAINAGE OF ALL PLANTING AREAS. FINISH GRADE SHALL BE A SMOOTH, EVEN AND UNIFORM PLANE WITH NO LOW SPOTS OR ABRUPT CHANGE OF SURFACE. FINISH GRADES IN SHRUB AND GROUNDCOVER AREAS SHALL BE 1 1/2" BELOW ADJACENT PAVING, CURBS AND HEADERS.
4. ADJUSTMENTS IN THE FIELD MAY BE REQUIRED TO ACCOMMODATE UTILITIES SUCH AS LIGHT FIXTURES, VAULT BOXES ABOVE GRADE, SIGNALS, ETC.
5. SOIL AMENDMENTS FOR BID PURPOSES ARE AS LISTED BELOW. ACTUAL SOIL PREP IS TO BE PERFORMED AS PER REQUIRED SOILS TEST RESULTS WITH TESTING DONE PRIOR TO BEGINNING PROJECT. INCORPORATE RECOMMENDED AMENDMENTS BY TILLING INTO THE TOP 6" OF SOIL.
   FERTILIZER 6-20-20 — 20 LBS./ 1000 SQ. FT.
   NITROGEN STABILIZED COMPOST — 4 YDS./1000 SQ. FT. •
6. APPLY PRE-EMERGENT HERBICIDE CHIPCO RONSTAR 'G' PER MANUFACTURES SPECIFICATIONS..
7. CONTRACTOR SHALL TEST ALL PLANTING PITS FOR DRAINAGE BY FILLING WITH WATER. ANY PLANTING PIT WHICH DOES NOT DRAIN COMPLETELY IN TWO HOURS OR LESS SHALL HAVE CORRECTIVE MEASURES IMPLEMENTED BY THE CONTRACTOR. CORRECTIVE MEASURES SHALL INCLUDE:
   A. DRILLING/AUGERING THROUGH IMPERMEABLE LAYERS TO A FAST DRAINING SOIL LAYER AND BACKFILLING WITH SAND, GRAVEL, OR OTHER APPROVED MATERIAL.
   B. INSTALLING DRAINAGE TUBING TO CARRY EXCESS WATER TO NEARBY OUTLET.
   C. METHODS AS DETERMINED IN THE FIELD BY THE OWNER.
8. PLANT TREES A MINIMUM OF 5 FEET FROM LIGHT STANDARDS, BELOW GRADE UTILITY VAULTS A MINIMUM OF 8 FEET FROM SIDES OF ABOVE GRADE UTILITY BOXES. TREES WITHIN 'I' OF SIDEWALKS TO RECEIVE ROOT BARRIER UB-24 (INSTALL 5' IN BOTH DIRECTIONS OF TREE TRUNK.)
9. ALL SLOPES AT 2 TO 1 SHALL RECEIVE A LAYER OF JUTE MESH FABRIC STAPLED TO SLOPE.
10. ALL PLANTER AND GROUNDCOVER AREAS NOT RECEIVING JUTE NETTING SHALL RECEIVE A 3" BARK MULCH LAYER. *NO SHREDDED BARK ALLOWED.
11. EDGING ALONG LAWN AREAS IS TO BE A SHOVEL CUT EDGE.
12. GUARANTEE: ALL TREES AND SHRUBS SHALL BE GUARANTEED FOR A PERIOD OF THREE MONTHS. ALL GROUND COVER AND TURF SHALL BE GUARANTEED FOR A PERIOD OF NINETY(90) DAYS. MATERIAL THAT IS NOT HEALTHY SHALL BE REPLACED WITHIN THE GUARANTEE PERIOD. REPLACEMENT MATERIAL SHALL BE MADE TO THE SAME SPECIFICATION AS ORIGINAL MATERIALS.
13. ALL GROUND COVER AND BARK AREAS TO RECEIVE DENITT WEED BARRIER PRO 5 OR EQUAL.

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - COTTONWOOD AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: 1"= 10'-0"
DRAWING NO.
6-27-18
L-1

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

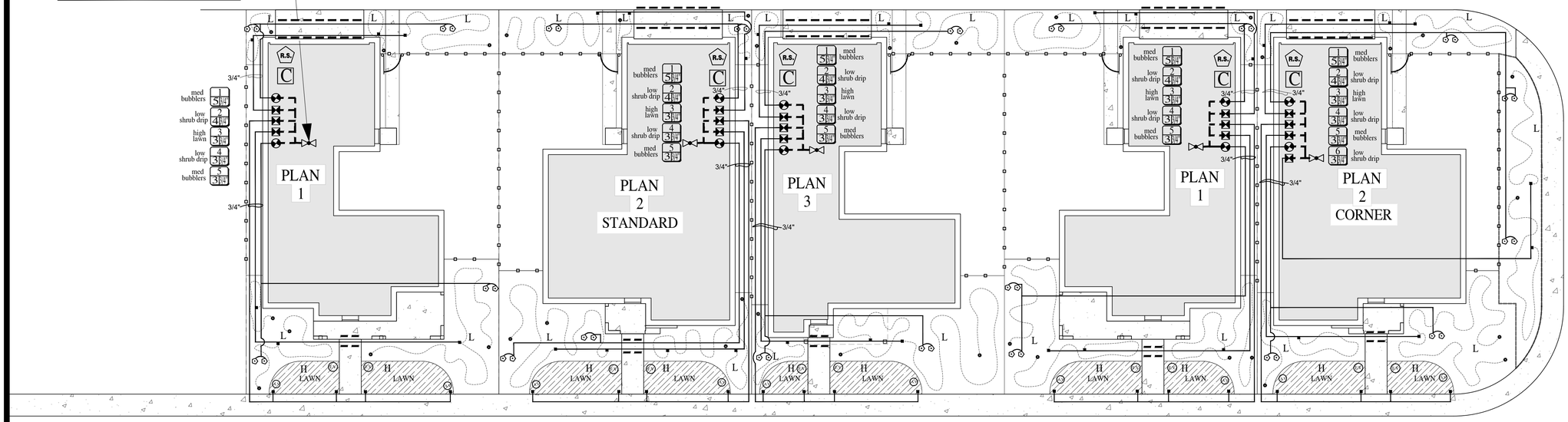
7678

P.O.C. 1" GATE VALVE BY BUILDER. IRRIGATION DESIGN IS BASED ON A MINIMUM 1" SERVICE LINE, 5/8" METER, STATIC WATER PRESSURE OF 55 PSI AND MAX FLOW OF 8 G.P.M. *REMOTE CONTROL VALVES TO BE LOCATED BEHIND FENCING IN REAR YARDS. TYPICAL FOR EACH LOT.

TYPICAL PRODUCTION IRRIGATION LAYOUT

0 10 20 30 40 feet
1" = 10'- 0"

NORTH



IRRIGATION EQUIPMENT TABLE

Symbol	Equipment	Description
	POINT OF CONNECTION. 1" GATE VALVE BY BUILDER.	
C	RAINBIRD ESP-TM2-8-120V- LNKWIFI	RAINBIRD 8 - STATION CONTROLLER
R.S.	RAINBIRD WR2-RFC.	RAINBIRD RAIN AND FREEZE SENSOR
	3/4 " Hardie Till automatic anti-siphon valve, & 3/4 " pr20 Pressure Regulator & Y- filter	3/4" REMOTE CONTROL DRIP ZONE' VALVE W/ PRESSURE REGULATOR & SCREEN FILTER
	3/4 " Hardie Till automatic anti-siphon valve	3/4" REMOTE CONTROL VALVE
Irrigation Drip Table		
Symbol		
N.A.	Drip Emitters - Rainbird xeri-bug (xb-20PC). 2 - gal/hr emitters. 3 - per shrub Rainbird Micro-Spray, Xeri-Spray XS-360 Use as needed in annual beds.	RAINBIRD POINT SOURCE DRIP EMITTERS.
V	RAINBIRD ARV050 & SEB1XB (BOX)	AIR RELIEF VALVE IN EMITTER BOX
V	RAINBIRD MDCFCAP & SEB1XB (BOX)	FLUSH VALVE IN EMITTER BOX
	RAINBIRD MDCFCAP & SEB 1XB (BOX)	REMOVABLE FLUSH CAP IN EMITTER BOX.
	RAINBIRD MDCF-1SMPT	3/4" MALE PIPE THREAD P/C TO DRIP LINE ADAPTER.
	Rainbird. XFS-09-12 subsurface dripline w/copper shield. SPACE 12" BETWEEN ROWS IN LAWN *BURY DEPTH MIN 5" IN LAWNS 2" IN SHRUB AREAS. STAPLE MIN EVERY 5'.	INSTALL ONE (1) AIR VACUUM RELIEF VALVE IN A 6" ROUND EMITTER BOX AT THE HIGHEST POINT OF THE SYSTEM. INSTALL ONE (1) FLUSH VALVE IN A 10" ROUND VALVE BOX AT THE LOWEST POINT(S) OF THE SYSTEM
	Rainbird 1402 bubblers .5 GPM	DEEP WATERING TREE BUBBLER ASSEMBLY IN PERFORATED PIPE, TWO AT EACH TREE. INSTALL PER DETAIL.
Irrigation Pipe Table		
Symbol	Pipe	
	1/2" POLY DRIP TUBING.	
	1 1/4" Schedule 40 PVC Pipe	
	120 Class 200 P.V.C. Pipe size as noted.	
	3" Sch 40 P.V.C. Sleeves as needed	
High Lawn A 3/4	Water Use Controller station number Valve size G.P.M. through valve. Description	

IRRIGATION NOTES

1. THIS DRAWING IS PARTIALLY DIAGRAMMATIC AND DOES NOT SHOW ALL OFFSETS AND FITTINGS REQUIRED FOR A COMPLETE SYSTEM. THE DESIGN INTENT IS FOR FULL COVERAGE OF PLANTINGS. NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCIES PRIOR TO TRENCHING.
2. COORDINATE PIPE, VALVE BOX AND HEAD LAYOUT WITH PLANTING PLAN. ADJUST THESE IRRIGATION COMPONENTS TO ACCOMMODATE SUBSEQUENT PLANTINGS
3. THIS SYSTEM IS DESIGNED TO OPERATE AT AN EXISTING STATIC PRESSURE OF 55-40 P.S.I. PRIOR TO COMMENCEMENT OF WORK, DETERMINE BY PRESSURE TEST, STATIC PRESSURE. CONTACT LANDSCAPE ARCHITECT FOR APPROVAL OF WATER PRESSURE PRIOR TO COMMENCING INSTALLATION OF IRRIGATION SYSTEM.
4. MAINLINE BACKFLOW PREVENTOR AND REMOTE CONTROL VALVES ARE LOCATED IN PAVED AREAS FOR GRAPHIC CLARITY ONLY. LOCATE ALL IRRIGATION EQUIPMENT IN ADJACENT PLANTER AREAS. PLACE BACKFLOW PREVENTOR IN SUCH A WAY AS TO BE CONCEALED BY SUBSEQUENT PLANTINGS, ON WALLS AND WALKS.
5. PRIOR TO CONSTRUCTION, CONTACT U.S.A. AT (811) TO VERIFY EXISTING UTILITIES.
6. ADJUST SPRAY COVERAGE OF HEADS TO PROVIDE PROPER COVERAGE AND TO PREVENT OVER SPRAY
7. PERFORM COVERAGE TEST PRIOR TO PLANTING.
8. CONFORM TO ALL APPLICABLE GOVERNING CODES.
9. PIPES UNDER WALKS, DRIVES AND STREETS ARE TO BE INSTALLED IN SLEEVING. SLEEVING UNDER STREETS SHALL BE SUPPLIED BY OWNER. SLEEVES UNDER WALKS AND DRIVES SHALL BE INSTALLED BY LANDSCAPE CONTRACTOR.
10. CONTROL WIRING SHALL BE #14 U.L. DIRECT BURIAL, OCCUPY THE SAME TRENCH, AND SHALL BE INSTALLED ALONG SIDE OR UNDER PRESSURE LINES. COMMON WIRE SHALL BE WHITE. TAPE WIRES TOGETHER AT TEN (10) FOOT INTERVALS. SPLICES SHALL BE MADE WITH WATERPROOF CONNECTORS.
11. ALL MATERIALS SHALL BE NEW AND IN PERFECT CONDITION. NO DEVIATIONS FROM THE SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF LANDSCAPE ARCHITECT.
12. MAINLINE SHALL BE SCH. 40 P.V.C. AT A MINIMUM DEPTH OF 24" BELOW FINISH GRADE. LATERAL PIPE SHALL BE CLASS 200 P.V.C. AT A MINIMUM DEPTH OF 12", AND DIRECT BURIAL CONTROL WIRE A MINIMUM DEPTH OF 24"
13. WHERE MORE THAN ONE PIPE IS INSTALLED IN A TRENCH, PLACE PIPE SIDE BY SIDE AT A MINIMUM OF 2" APART. WHERE SOIL CONDITIONS ARE ROCKY PLACE A 4" LAYER OF FINE MATERIAL ON BOTTOM OF TRENCH PRIOR TO INSTALLATION OF PIPE.
14. ALL VALVES SHALL BE ASVF SERIES. INSTALLED 12" ABOVE HIGHEST POINT OF DISCHARGE
15. 120 VOLT ELECTRICAL POWER OUTLET AT THE AUTOMATIC CONTROLLER LOCATION SHALL BE PROVIDED BY OTHERS. IT SHALL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO MAKE THE FINAL HOOK-UP AS DIRECTED BY MANUFACTURER FROM THE ELECTRICAL OUTLET TO THE AUTOMATIC CONTROLLER.
16. CONTRACTOR SHALL SET THE INITIAL PROGRAM FOR THE CONTROLLER AND SHALL PROVIDE OWNER WITH THE INSTRUCTION MANUAL AND DEMONSTRATE IT OPERATION TO OWNER. OWNER IS THEN RESPONSIBLE FOR RESETTING CLOCK ACCORDING TO SEASONAL/ENVIRONMENTAL CHANGES, AND DURING PLANT ESTABLISHMENT PERIOD.
17. THE IRRIGATION SYSTEM SHALL BE GUARANTEED FOR ALL MATERIALS AND WORKMANSHIP, INCLUDING SETTLEMENT OF TRENCHES FOR A PERIOD OF ONE YEAR.

* NOTE: REFER TO CIVIL SHEETS FOR GRADING, DRAINLINES & DRAINAGE PLANS.

IRRIGATION ZONE/ WATER USE DESIGNATION KEY.

H	*ALL LAWN
L	LOW WATER USE SHRUBS *NO HATCH

WELO STATEMENT:

'I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE IRRIGATION DESIGN PLAN' 6-11-18

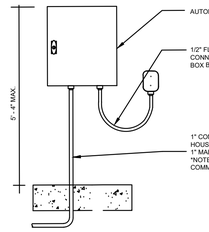
LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
Lic. No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - COTTONWOOD AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

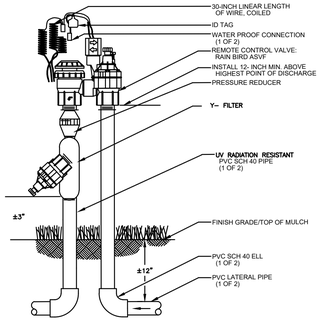
SCALE: 1"= 10'-0"
DRAWING NO.
6-27-18
L-2

AGENDA ITEM 11.2



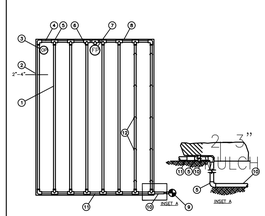
NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

ELECTROMECHANICAL CONTROLLER MOUNTED TO BUILDING WALL.



NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

REMOTE CONTROL VALVE WITH DRIP ASSEMBLY
PLASTIC COMBINATION ELECTRIC CONTROL VALVE/ATMOSPHERIC VACUUM BREAKER 12 INCHES ABOVE GRADE

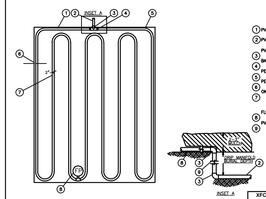


① SUB-SURFACE/ON-SURFACE DRIPLINE: RAIN BIRD XFS-CV SERIES DRIPLINE (TYPICAL) NON-POTABLE: XFD-CVP DRIPLINE
② PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
③ OPERATION INDICATOR RAIN BIRD MODEL: OPEMINI
④ PVC EXHAUST HEADER
⑤ PVC SCH 40 TEE OR EL (TYPICAL)
⑥ BARB X MALE FITTING: RAIN BIRD XFT-MA FITTING (TYPICAL)
⑦ FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFS-CV FLUSH POINT"
⑧ PERIMETER OF AREA
⑨ IRRIGATION CONTROL VALVE: RAIN BIRD ICZ DRIP CONTROL ZONE KIT INSTALLED IN VALVE BOX
⑩ PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
⑪ PVC SUPPLY HEADER
⑫ 6" SERIES TEC-LOOK® STAKES (TDS-050) REFER TO RAIN BIRD DESIGN GUIDE FOR PROPER SPACING

XFS-CV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Nominal Flow (gph)	Nominal Flow (gph)		
	0.6	0.9	0.6	0.9
20	190	135	258	213
30	259	225	402	337
40	350	248	498	418
50	402	281	573	477
60	434	309	637	525

NOTES:
1. FOR ALL XFS-CV AND POLY CONNECTIONS INSTALL XFF AND/OR XFD FITTINGS.
2. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
3. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
4. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

XFCV ON - SURFACE DRIPLINE
NTS

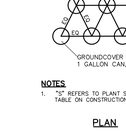


① PVC EXHAUST HEADER
② PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND) PVC SCH 40 TEE OR EL (TYPICAL)
③ BARB X MALE FITTING: RAIN BIRD XFT-MA FITTING (TYPICAL)
④ PERIMETER OF AREA
⑤ PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
⑥ FLUSH POINT (TYPICAL) *NOTE: USE ONLY NON-POTABLE: XFCV DRIPLINE
⑦ "END" END OF SERIES DRIPLINE (TYPICAL)
⑧ FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFCV FLUSH POINT"
⑨ PVC SCH 40 RISER PIPE

XFCV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Nominal Flow (gph)	Nominal Flow (gph)		
	0.6	0.9	0.6	0.9
20	190	135	258	213
30	259	225	402	337
40	350	248	498	418
50	402	281	573	477
60	434	309	637	525

NOTES:
1. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
2. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
3. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

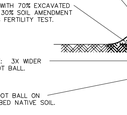
XFCV ON - SURFACE DRIPLINE
NTS — QUICK LAYOUT



① SINGLE-OUTLET BARB INLET X BARB OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER
② ½" POLYETHYLENE TUBING: RAIN BIRD XF SERIES TUBING OR RAIN BIRD XT-700 XERI-TUBE OR RAIN BIRD XBS BLACK STRIPE TUBING
③ FINISH GRADE

NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

XERI-BUG INTO 1/2 INCH TUBING
NTS



① DIFFUSER BUG CAP: RAIN BIRD DBC-025
② UNIVERSAL ¼" TUBING STAKE: RAIN BIRD TS-025
③ ¼" DISTRIBUTION TUBING: RAIN BIRD XQ TUBING (LENGTH AS REQUIRED)
④ TOP OF MULCH
⑤ SINGLE-OUTLET BARB INLET X BARB OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER
⑥ ½" POLYETHYLENE TUBING: RAIN BIRD XF SERIES TUBING OR RAIN BIRD XT-700 XERI-TUBE OR RAIN BIRD XBS BLACK STRIPE TUBING
⑦ FINISH GRADE

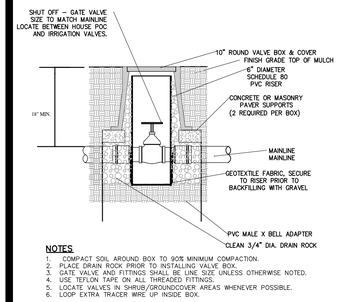
NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

XERI-BUG INTO 1/2 INCH TUBING WITH 1/4" TUBING, STAKE AND BUG CAP
NTS

① FINISH GRADE
② SUBTERRANEAN EMITTER BOX: RAIN BIRD SEB 7XB
③ ¾" AIR RELIEF VALVE: RAIN BIRD ARV050 TO BE INSTALLED AT HIGH POINTS IN DRIP ZONE
④ PVC SCH 40 FEMALE ADAPTER
⑤ PVC SCH 80 RISER
⑥ BRICK (1 OF 2)
⑦ PVC HEADER PIPE
PVC SCH 40 TEE
3" MINIMUM DEPTH OF ¾" WASHED GRAVEL

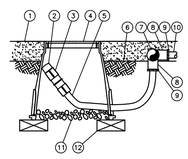
XFS - SUB-SURFACE DRIPLINE
NTS — 1/2" AIR RELIEF VALVE

XFS SUBSURFACE INSTALLATION
NO SCALE



NOTES
1. COMPACT SOIL AROUND BOX TO 90% MINIMUM COMPACTION.
2. PLACE DRAIN ROCK PRIOR TO INSTALLING VALVE BOX.
3. GATE VALVE AND FITTINGS SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
4. USE TEFLON TAPE ON ALL THREADED FITTINGS.
5. LOCATE VALVES IN SHRUB/GROUNDCOVER AREAS WHENEVER POSSIBLE.
6. LOOP EXTRA TRACER WIRE UP INSIDE BOX.

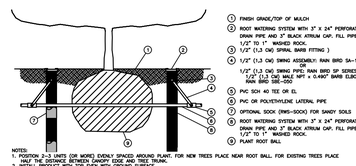
SHUT OFF VALVE
NTS



① MULCH
② FLUSH CAP FOR EASY FIT COMPRESSION FITTINGS; POTABLE:RAIN BIRD MDCFCAP
③ EASY FIT COUPLING: RAIN BIRD MDCFCOUP
④ SUBTERRANEAN EMITTER BOX: RAIN BIRD SEB 7XB
⑤ ¾" POLYETHYLENE TUBING: RAIN BIRD XF BLANK TUBING
⑥ FINISH GRADE
⑦ PVC EXHAUST HEADER
⑧ PVC SCH 40 TEE OR EL
⑨ BARB X MALE FITTING: RAIN BIRD XFT-MA FITTING (TYPICAL)
⑩ ON-SURFACE DRIPLINE: RAIN BIRD XF SERIES DRIPLINE POTABLE: XFCV DRIPLINE
⑪ 3-INCH MINIMUM DEPTH OF ¾" WASHED GRAVEL
⑫ BRICK (1 OF 2)

NOTE:
1. ALLOW A MINIMUM OF 6-INCHES OF DRIPLINE TUBING IN VALVE BOX IN ORDER TO DIRECT FLUSHED WATER OUTSIDE VALVE BOX

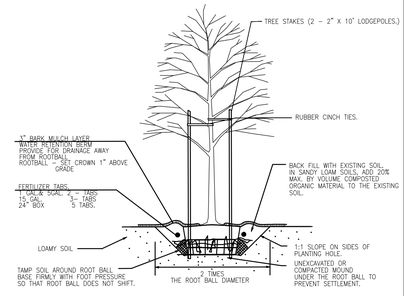
FLUSH VALVE IN BOX
NTS



① FINISH GRADE/TOP OF MULCH
② ROOT WATERING SYSTEM WITH 3" X 24" PERFORATED STYRENE DRAIN PIPE AND 3" BLACK ATRIUM CAP. FILL PIPE WITH 1/2" TO 1" WASHED ROCK.
③ 1/2" (1.3 CM) SPIRAL BARB FITTING)
④ 1/2" (1.3 CM) SWING ASSEMBLY: RAIN BIRD SA-125050 OR
1/2" (1.3 CM) SWING PVC: RAIN BIRD SP SERIES WITH 1/2" (1.3 CM) MALE NPT x 0.490" BARB ELBOW: RAIN BIRD SWE-050
⑤ PVC SCH 40 TEE OR EL
⑥ PVC OR POLYETHYLENE LATERAL PIPE
⑦ OPTIONAL SOCK (ENS-SOCK) FOR SANDY SOILS
⑧ ROOT WATERING SYSTEM WITH 3" X 24" PERFORATED STYRENE DRAIN PIPE AND 3" BLACK ATRIUM CAP. FILL PIPE WITH 1/2" TO 1" WASHED ROCK.
⑨ PLANT ROOT BALL

NOTES:
1. POSITION 2-3 LINES (OR MORE) EVENLY SPACED AROUND PLANT. FOR NEW TREES PLACE NEAR ROOT BALL. FOR EXISTING TREES PLACE AT THE DRIPLINE BETWEEN CANOPY EDGE AND ROOT CRUNK.
2. INSTALL PRODUCT WITH TOP EVEN WITH GROUND SURFACE.
3. WHEN INSTALLING IN EXTREMELY HARD OR CLAY SOILS, ADD 3/4" (1.9 CM) GRAVEL UNDER AND AROUND THE UNIT TO ALLOW FASTER WATER INFILTRATION AND ROOT PENETRATION.
4. ONCE DRAIN PIPE HAS BEEN INSTALLED FILL THE BASKET WITH 1/2" TO 1" DRAIN ROCK.

ROOT WATERING SYSTEM INSTALLATION FOR TREES
NTS



TREE PLANTING DETAIL
NTS

GROUNDCOVER PLANTING
NOT TO SCALE

NOTES
1. AMENDMENT SHALL BE CONSISTENT WITH SOILS FERTILITY TEST.
2. PLANTING AREAS SHALL BE TREATED WITH PRE-EMERGENT PRIOR TO PLANTING TO PREVENT GERMINATION OF WEED SEEDS.
3. SCORE ROOT BALL IN VARIOUS LOCATIONS.

SHRUB PLANTING
NOT TO SCALE

LICENSED LANDSCAPE ARCHITECT
Signature
05-31-18
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

AGENDA ITEM 11.2

TYPICAL PRODUCTION LANDSCAPE PLANS FOR DOUGLAS 98 - COTTONWOOD AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC # 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

DETAILS

SCALE: 1"= 10'-0"

DRAWING NO.

6-27-18

L-3

7680

Placer County

Project Information Sheet.

Date: 6-27-18 Project Applicant: WOODSIDE HOMES - MIKE KITCHELL
Project Address: DOUGLAS 98 COTTON WOOD ALLEY LOTS
Project Assessors's Parcel Number/
Total Landscape Area (Sq.Ft). __27000_____
Project Type New X___ Rehabilitated____ Private____

Water Supply Type: Potable _X__ Recycled___ Well___
Name of Water Supplier, if not served by private well:

Landscape Documentation Package:

- Water efficient Landscape Worksheets.
  - Hydrozone Information Table
  - Water Budget Calculations. Max Applied Water Allow. (MAWA)
  - Water Budget Calculations. Estimated Total Applied Water Use (MAWA)
- Soil Management Report
- Landscape Design Plan
- Irrigation Design Plan.
- Grading Design Plan * SEE CIVIL PLANS

Project Applicant. Telephone 916-608-9600 MIKE KITCHELL
Fax No. N.A.
Title Owner SAME Email www.woodsidehomes.com
City 111 Woodmere Rd, Su 150 State: Ca Zip: 95630
Property Owner: Same Telephone: Same
Fax No.
Title: Sr. project manager email:same

Company: same	Address:same
City:	State: Zip:
I agree to comply with the requirement of the	Water Efficient
Ordinance and submit a complete Landscape	Documentation Package.
(Applicant Signature)	(Date)

CERT OF COMP.

CERTIFICATE OF COMPLETION
THIS CERTIFICATE IS FILLED OUT BY THE PROJECT APPLICANT UPON COMPLETION OF THE LANDSCAPE PROJECT.

PART 1. PROJECT INFORMATION SHEET

DATE: 6-27-18 Project Name : DOUGLAS 98 COTTONWOOD
Name of Project Applicant: Telephone: 916-608-9600
MIKE KITCHELL

Owner: WOODSIDE HOMES Email: www.woodsidehome.com
Address: 111 Woodmere Rd. Su 150
City: Folsom State: Ca Zip: 95630

Project Address and Location: DOUGLAS 98 COTTONWOOD
Street: City: RANCHO CORDOVA
State: CA Zip:
Property Owner or Designee:
Name: Same Telephone: Same
Title: Same Fax.
Company: SAME Email Address:
City: SAME Street: Same

Property owner:
I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule.

_____
Property owner Signature Date:

Please answer the questions below:
1. Date the Landscape Doc. Package was submitted to agency:_____
2. Date the Landscape Doc. Package was approved:_____
3. Date that copy of the Water Efficient Landscape Worksheet including the Water Budget calculation was submitted to the local water purveyor: _____

*Soils Test to be conducted at completion of finish grade / prior to plant installation.

*Updated irrigation schedule to be completed by irrigation auditor at completion of installation.

IRRIGATION ESTABLISHMENT SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 20 1	3 25 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	7 10 2	7 15 3	7 10 2	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

IRRIGATION MAINTENANCE SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 15 1	3 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	3 20 1	4 20 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 20 1	4 30 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (COTTONWOOD PLAN 2 - CORNER)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- TREE BUBBLERS AL	MED	BUBBLERS		60	
2 - SHRUBS ALLEY	LOW	DRIP	2095		
3- LAWN	HIGH	DRIP			160
4 - SHRUBS FRONT	LOW	DRIP	4868		
5- TREE BUBBLERS FR	MED	BUBBLERS		40	
6- SHRUBS SIDE	LOW	DRIP	372		
		TOTALS	1069	40	160
		TOTAL SQ.FT.	=		1269

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
COTTONWOOD PLAN 2 - CORNER

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	0.5	BUBBLERS	0.81	0.617	60	37.04	51.9	1151.78
2 - SHRUBS ALLEY	LOW	0.2	DRIP	0.81	0.247	2095	517.48	51.9	16089.54
3- LAWN	HIGH	0.8	DRIP	0.81	0.988	160	158.07	51.9	8204.52
4 - SHRUBS FRONT	LOW	0.2	DRIP	0.81	0.247	4868	1201.75	51.9	38771.25
5- TREE BUBBLERS FR	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	764.92
6- SHRUBS SIDE	LOW	0.2	DRIP	0.81	0.247	372	91.89	51.9	2966.61
					TOTALS	1329	483.70	ETWU =	15564.62
SPECIAL LANDSCAPE AREAS									
5-1	HIGH		DRIP	0.81	0.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF x LA) + ((1-ETAF) x SLA)) MAWA = 23520.5

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO x 0.62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
.81 FOR DRIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (COTTONWOOD PLAN 1)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- TREE BUBBLERS AL	MED	BUBBLERS		20	
2 - SHRUBS ALLEY	LOW	DRIP	2095		
3- LAWN	HIGH	DRIP			164
4 - SHRUBS FRONT	LOW	DRIP	4561		
5- TREE BUBBLERS FR	MED	BUBBLERS		40	
		TOTALS	6656	60	164
		TOTAL SQ.FT.	=		6880

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
COTTONWOOD PLAN 1

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	0.5	BUBBLERS	0.81	0.617	20	12.35	51.9	351.26
2 - SHRUBS ALLEY	LOW	0.2	DRIP	0.81	0.247	2095	517.48	51.9	16089.54
3- LAWN	HIGH	0.8	DRIP	0.81	0.988	164	161.98	51.9	8409.02
4 - SHRUBS FRONT	LOW	0.2	DRIP	0.81	0.247	4561	1126.57	51.9	35031.14
5- TREE BUBBLERS FR	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	764.92
					TOTALS	923	311.60	ETWU =	11951.50
SPECIAL LANDSCAPE AREAS									
5-1	HIGH		DRIP	0.81	0.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF x LA) + ((1-ETAF) x SLA)) MAWA = 16335.2

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO x 0.62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
.81 FOR DRIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (COTTONWOOD PLAN 2)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- TREE BUBBLERS AL	MED	BUBBLERS		40	
2 - SHRUBS ALLEY	LOW	DRIP	212		
3- LAWN	HIGH	DRIP			182
4 - SHRUBS FRONT	LOW	DRIP	477		
5- TREE BUBBLERS FR	MED	BUBBLERS		40	
		TOTALS	689	40	182
		TOTAL SQ.FT.	=		911

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
COTTONWOOD PLAN 2

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	764.92
2 - SHRUBS ALLEY	LOW	0.2	DRIP	0.81	0.247	212	52.39	51.9	1624.38
3- LAWN	HIGH	0.8	DRIP	0.81	0.988	182	179.79	51.9	5784.09
4 - SHRUBS FRONT	LOW	0.2	DRIP	0.81	0.247	477	117.78	51.9	3789.89
5- TREE BUBBLERS FR	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	764.92
					TOTALS	951	399.26	ETWU =	12847.36
SPECIAL LANDSCAPE AREAS									
5-1	HIGH		DRIP	0.81	0.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF x LA) + ((1-ETAF) x SLA)) MAWA = 16839.7

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO x 0.62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
.81 FOR DRIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (COTTONWOOD PLAN 3)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- TREE BUBBLERS AL	MED	BUBBLERS		20	
2 - SHRUBS ALLEY	LOW	DRIP	2091		
3- LAWN	HIGH	DRIP			140
4 - SHRUBS FRONT	LOW	DRIP	924		
5- TREE BUBBLERS FR	MED	BUBBLERS		20	
		TOTALS	731	20	140
		TOTAL SQ.FT.	=		891

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
COTTONWOOD PLAN 3

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	0.5	BUBBLERS	0.81	0.617	20	12.35	51.9	351.26
2 - SHRUBS ALLEY	LOW	0.2	DRIP	0.81	0.247	2091	516.11	51.9	16044.66
3- LAWN	HIGH	0.8	DRIP	0.81	0.988	140	138.27	51.9	4449.30
4 - SHRUBS FRONT	LOW	0.2	DRIP	0.81	0.247	924	228.38	51.9	7103.28
5- TREE BUBBLERS FR	MED	0.5	BUBBLERS	0.81	0.617	20	12.35	51.9	351.26
					TOTALS	911	343.46	ETWU =	11051.75
SPECIAL LANDSCAPE AREAS									
5-1	HIGH		DRIP	0.81	0.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF x LA) + ((1-ETAF) x SLA)) MAWA = 16122.8

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO x 0.62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
.81 FOR DRIP 0.81

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION A. HYDROZONE INFORMATION TABLE (COTTONWOOD PLAN 1)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH
1- TREE BUBBLERS AL	MED	BUBBLERS		20	
2 - SHRUBS ALLEY	LOW	DRIP	2095		
3- LAWN	HIGH	DRIP			164
4 - SHRUBS FRONT	LOW	DRIP	4561		
5- TREE BUBBLERS FR	MED	BUBBLERS		40	
		TOTALS	6656	60	164
		TOTAL SQ.FT.	=		6880

WATER EFFICIENT LANDSCAPE WORKSHEET
SECTION B. WATER BUDGET CALCULATION
COTTONWOOD PLAN 1

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
REFERENCE EVAPOTRANSPIRATION (ETO) 51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO)	ESTIMATED TOTAL WATER USE (ETWU)
REGULAR LANDSCAPE AREA									
1- TREE BUBBLERS AL	MED	0.5	BUBBLERS	0.81	0.617	20	12.35	51.9	351.26
2 - SHRUBS ALLEY	LOW	0.2	DRIP	0.81	0.247	2095	517.48	51.9	16089.54
3- LAWN	HIGH	0.8	DRIP	0.81	0.988	164	161.98	51.9	8409.02
4 - SHRUBS FRONT	LOW	0.2	DRIP	0.81	0.247	4561	1126.57	51.9	35031.14
5- TREE BUBBLERS FR	MED	0.5	BUBBLERS	0.81	0.617	40	24.69	51.9	764.92
					TOTALS	923	311.60	ETWU =	11951.50
SPECIAL LANDSCAPE AREAS									
5-1	HIGH		DRIP	0.81	0.24	0	0		

*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF x LA) + ((1-ETAF) x SLA)) MAWA = 16335.2

ETAF RESIDENTIAL 0.55
ETAF NON - RESIDENTIAL 0.45

ETWU (ANNUAL GALLONS REQUIRED = ETO x 0.62 x ETAF x AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F 0.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
0.75 FOR SPRAY 0.75
.81 FOR DRIP 0.81

WATER CONSERVATION WORKSHEETS.

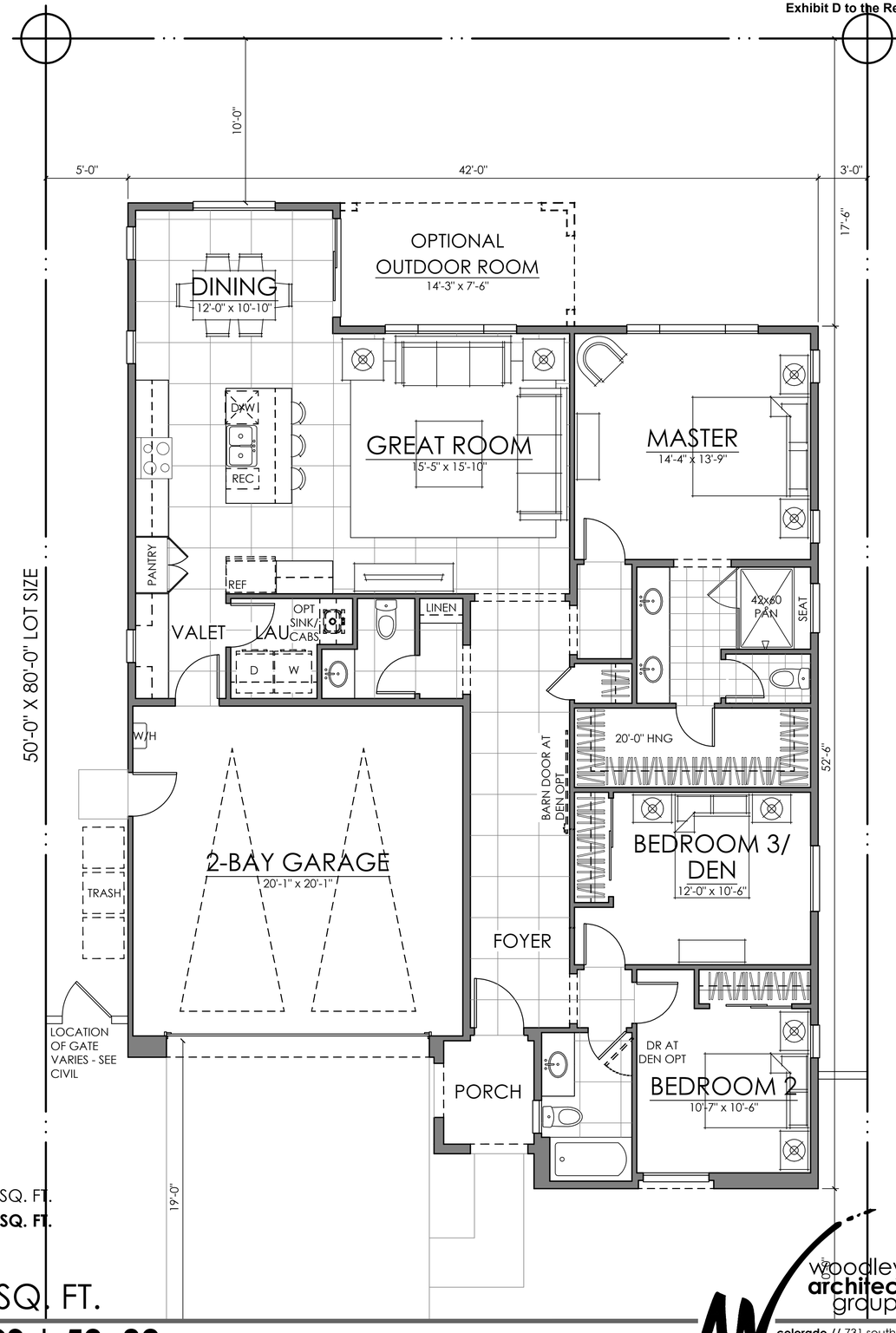
AGENDA ITEM 11.2

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - COTTONWOOD AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
LIC.# 2557
127 LINDA DRIVE
ROSEVILLE, CA 95678

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-1-18
Date
STATE OF CALIFORNIA

SCALE: N.A.
DRAWING NO.
6-27-18
L-4
7681



FIRST FLOOR	1657 SQ. FT.
TOTAL LIVING	**1657 SQ. FT.**

PLAN ONE | 1657 SQ. FT.

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. sui
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suit
santa ana, ca 92705 / 949 553.0



FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"

07.18.18

PLAN ONE | FRONT ELEVATIONS

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

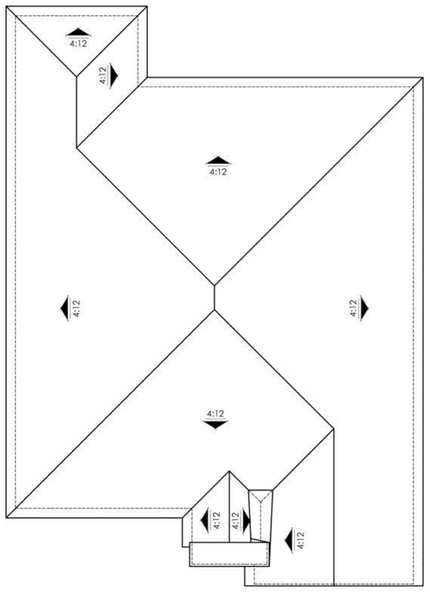
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231

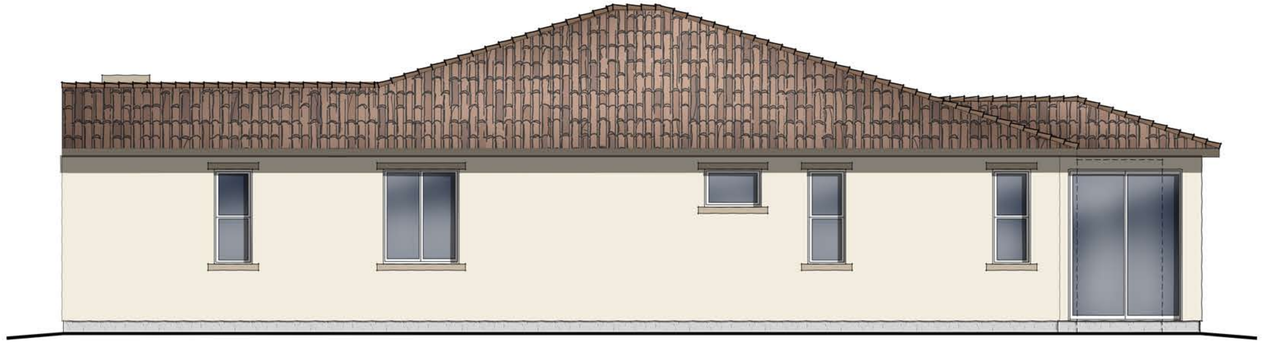
AGENDA ITEM 11.2 A 1919

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



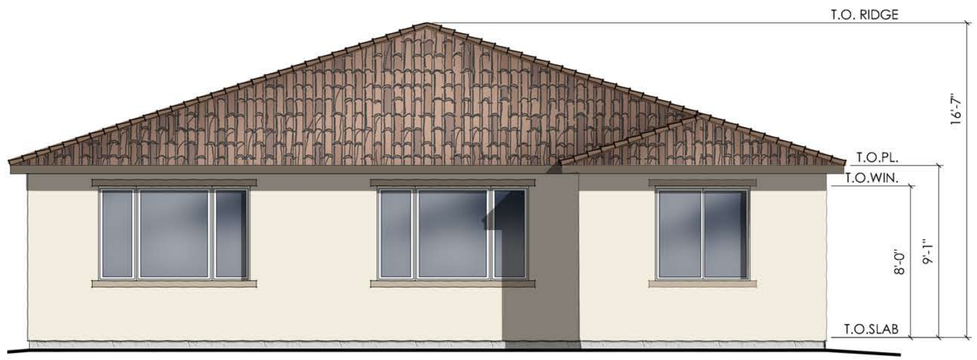
ROOF PLAN

SCALE: 1/8" = 1'-0"



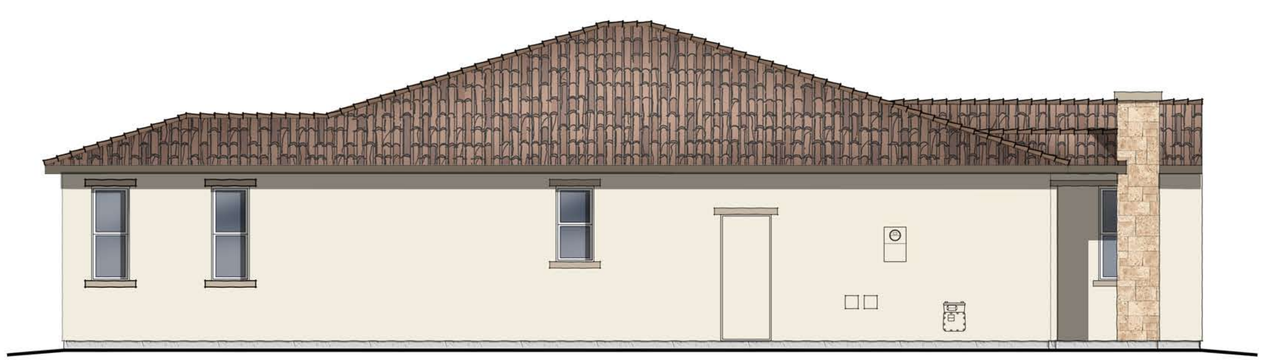
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



AR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.18.18

PLAN ONE | ELEVATION A - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

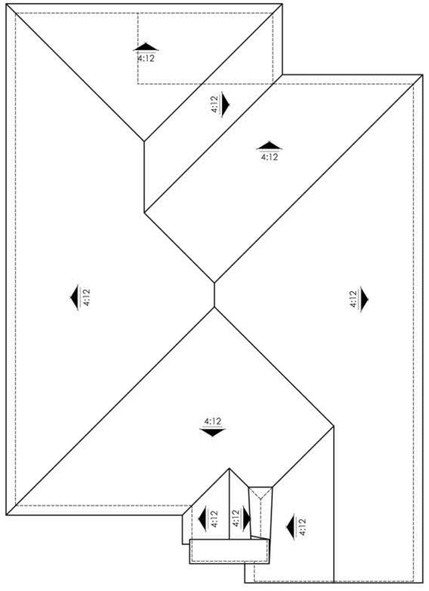
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

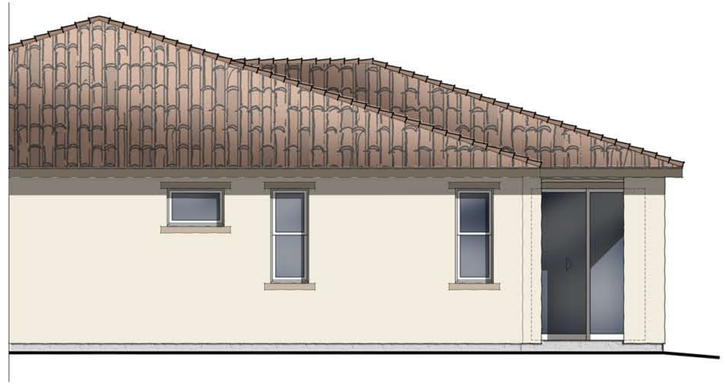
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



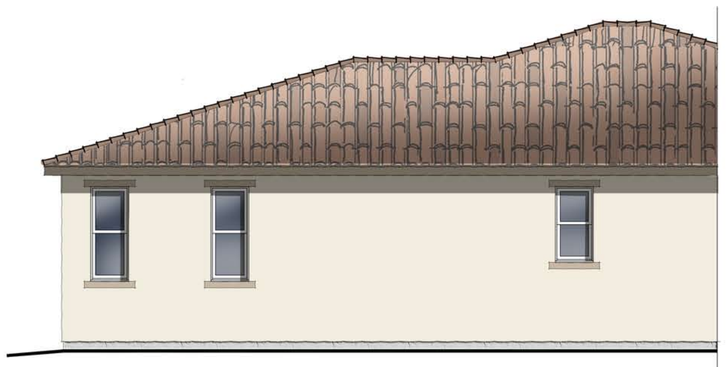
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.18.18

PLAN ONE | ELEVATION A ENHANCED - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

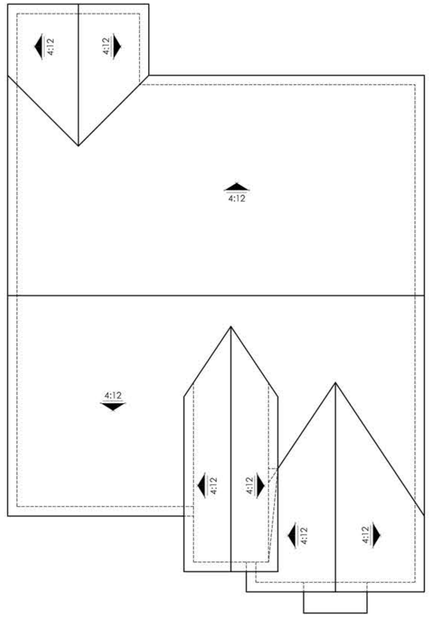
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



AR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.18.18

PLAN ONE | ELEVATION B - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

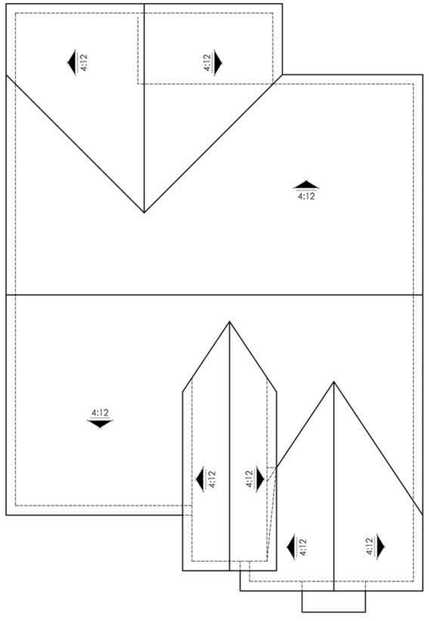
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

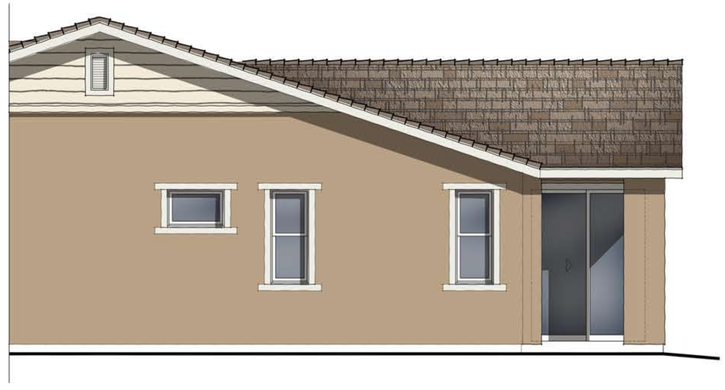
woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8

7686



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.18.18

PLAN ONE | ELEVATION B ENHANCED - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

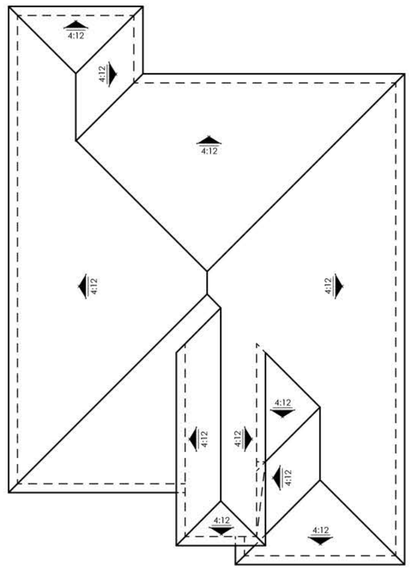
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



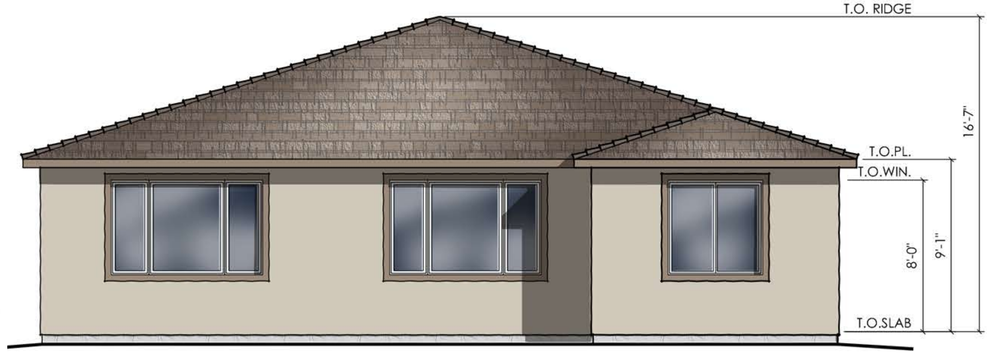
ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



EAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.18.18

PLAN ONE | ELEVATION C - MODERN PRAIRIE

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

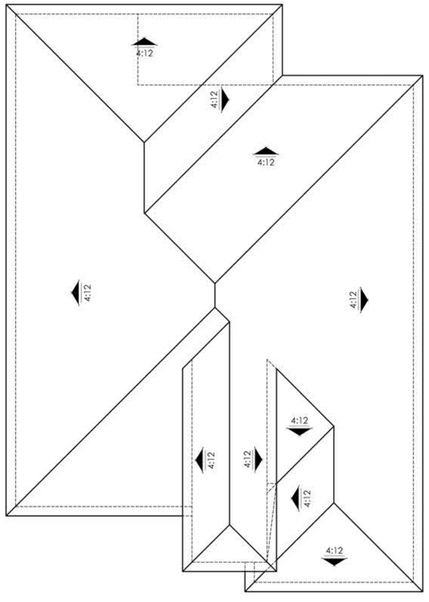
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

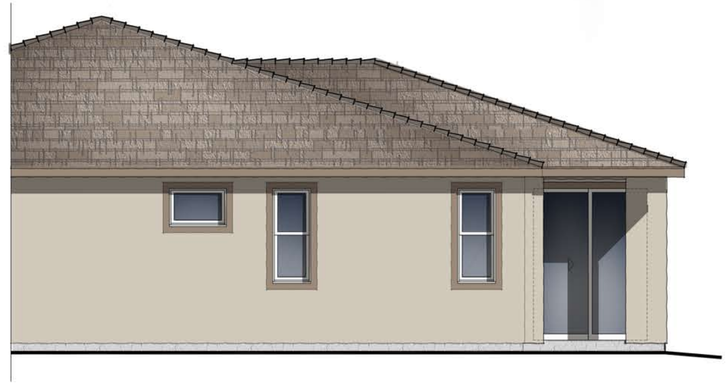
woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7688



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN ONE | ELEVATION C ENHANCED - MODERN PRAIRIE

Woodside Homes®
BETTER BY DESIGN

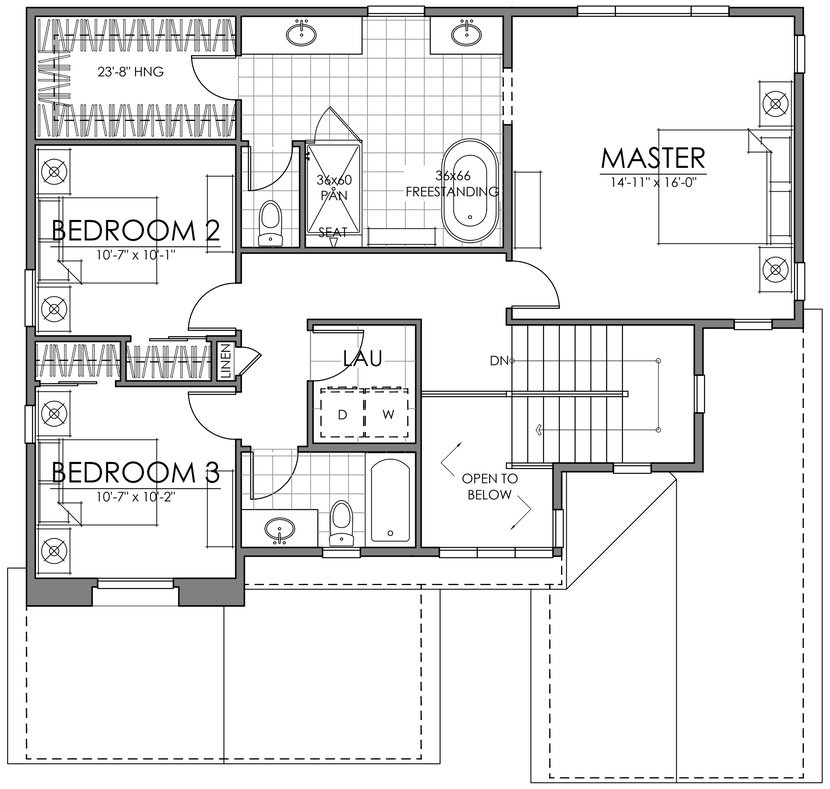
EUCALYPTUS @ CYPRESS | 50x80

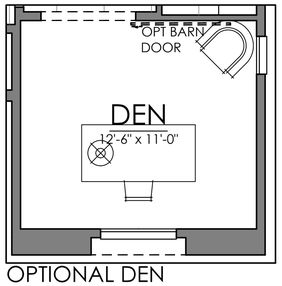
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

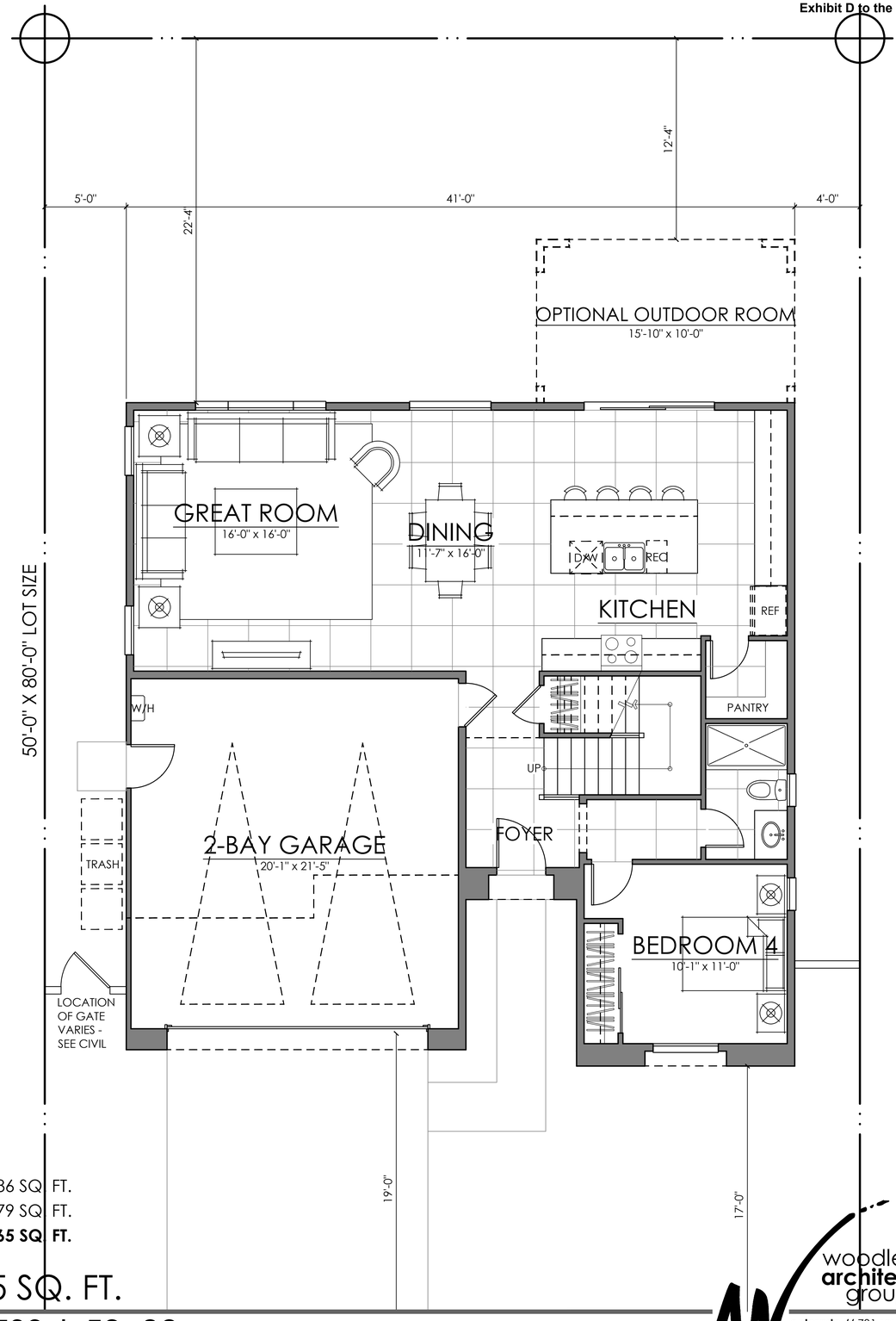
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8





OPTIONAL DEN



FIRST FLOOR	1086 SQ. FT.
SECOND FLOOR	979 SQ. FT.
TOTAL LIVING	**2065 SQ. FT.**

PLAN TWO | 2065 SQ. FT.

AGENDA ITEM 11.2

7.18.18

Woodside Homes®
BETTER BY DESIGN

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley
architectural
group,inc
colorado // 731 southpark dr. sui
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.0

7690



FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"

07.18.18

PLAN TWO | FRONT ELEVATIONS

Woodside Homes®
BETTER BY DESIGN

EUCALYPTUS @ CYPRESS | 50x80

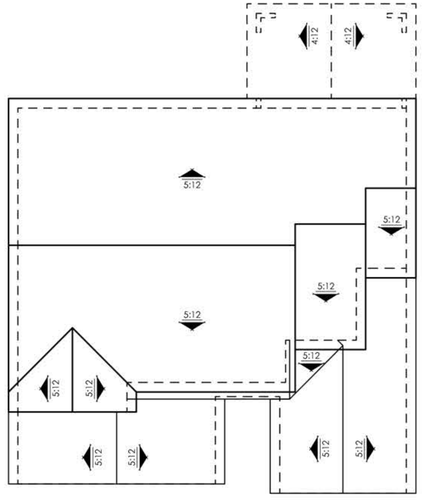
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303 683.7231

AGENDA ITEM 11.2 A 1919

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN SCALE: 1/8" = 1'-0"



RIGHT ELEVATION SCALE: 1/4" = 1'-0"



REAR ELEVATION SCALE: 1/4" = 1'-0"



LEFT ELEVATION SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION A - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

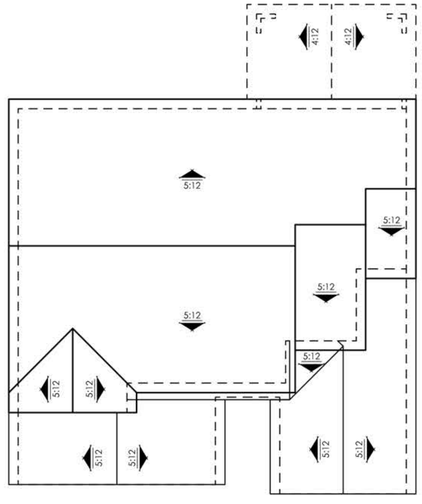
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

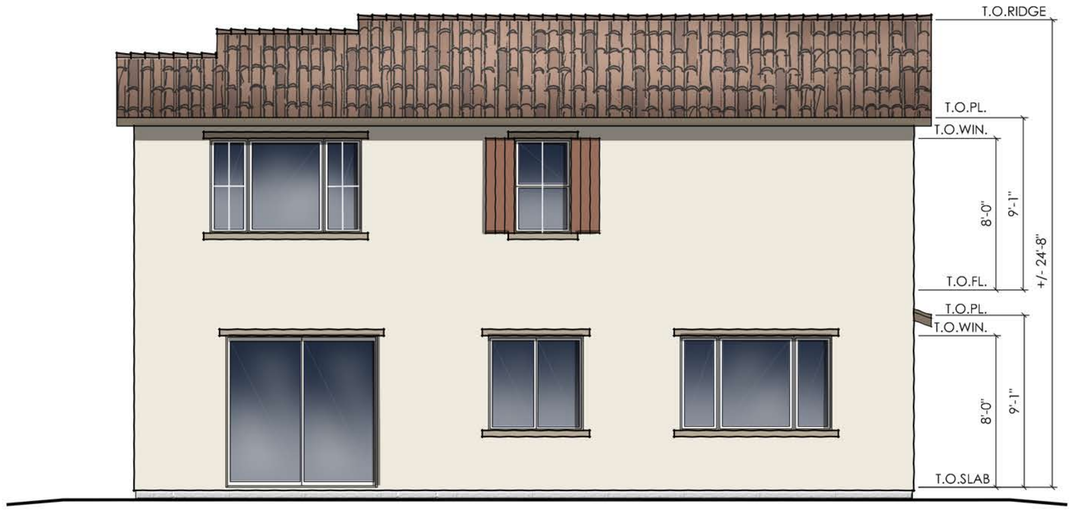
woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN SCALE: 1/8" = 1'-0"



RIGHT ELEVATION SCALE: 1/4" = 1'-0"



REAR ELEVATION SCALE: 1/4" = 1'-0"



LEFT ELEVATION SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION A ENHANCED - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

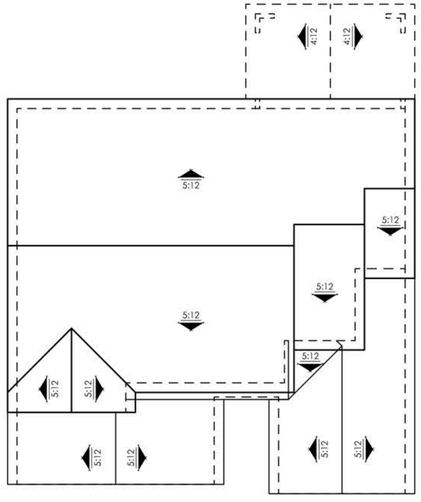
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

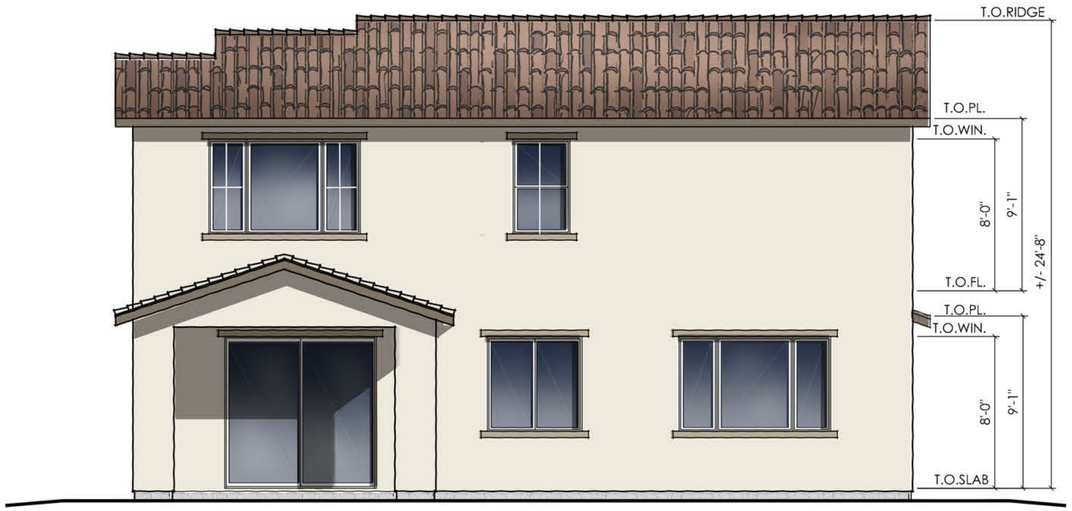
woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN SCALE: 1/8" = 1'-0"



RIGHT ELEVATION SCALE: 1/4" = 1'-0"



REAR ELEVATION SCALE: 1/4" = 1'-0"



LEFT ELEVATION SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION A OUTDOOR ROOM - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

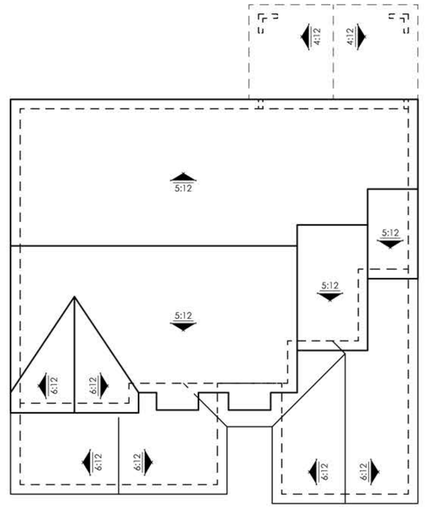
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

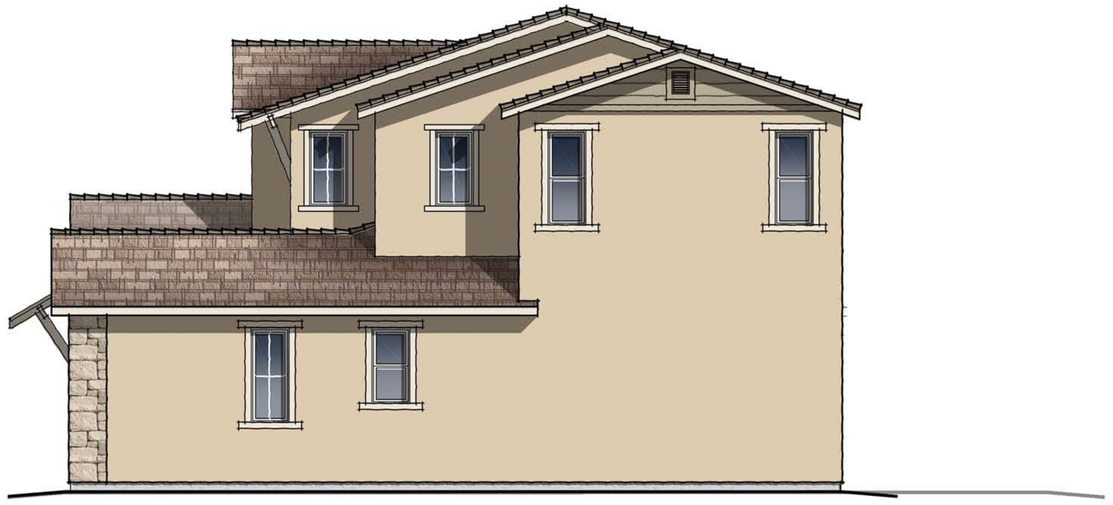
woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7694



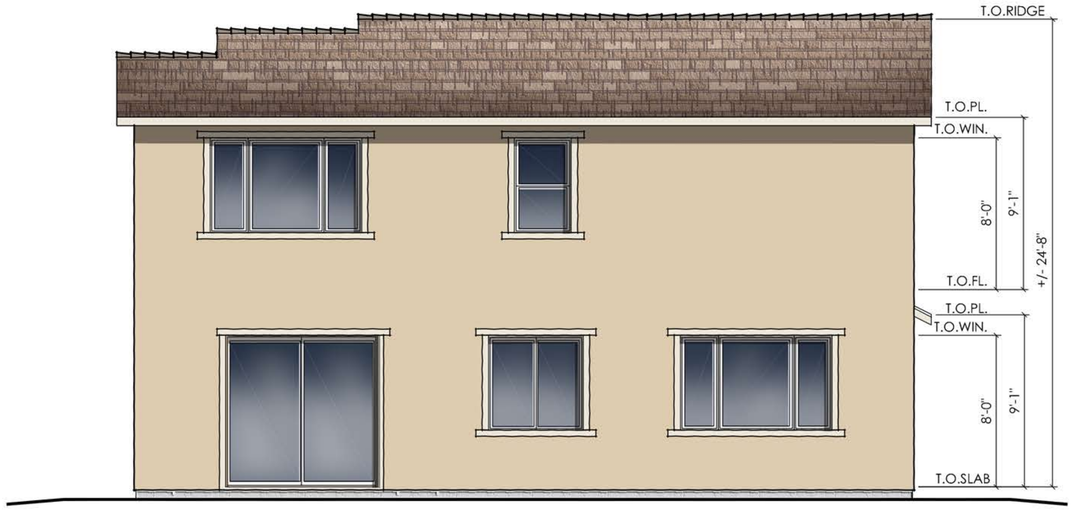
ROOF PLAN

SCALE: 1/8" = 1'-0"



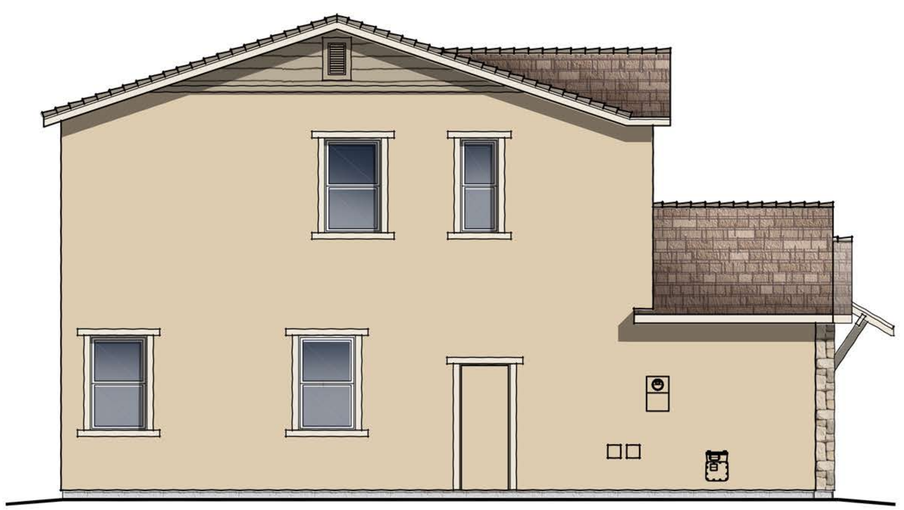
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION B - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

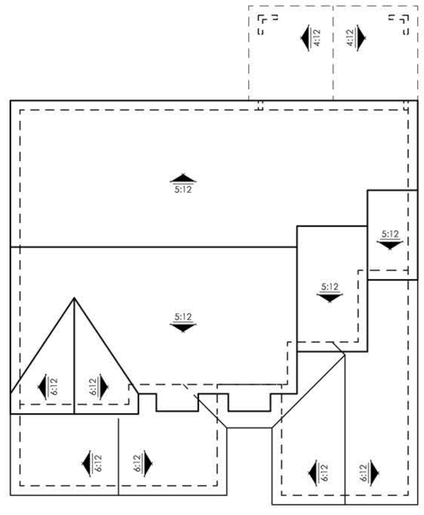
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

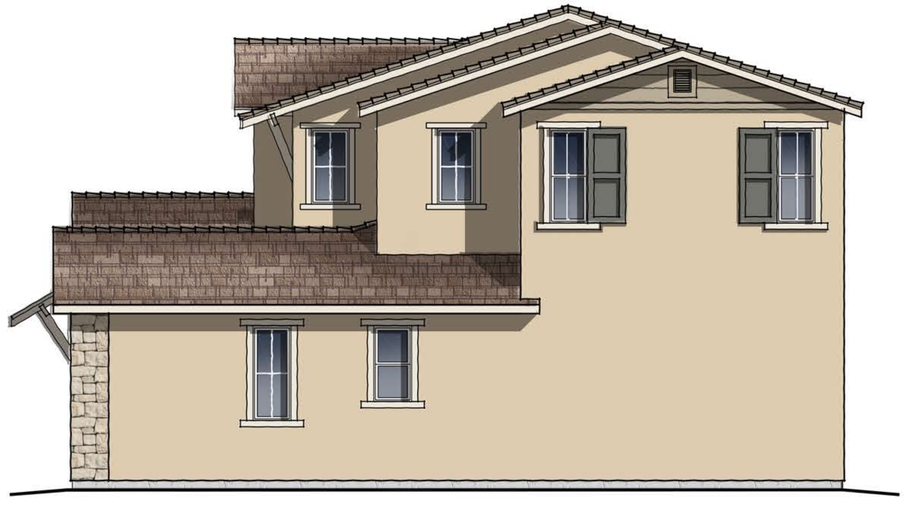
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN

SCALE: 1/8" = 1'-0"



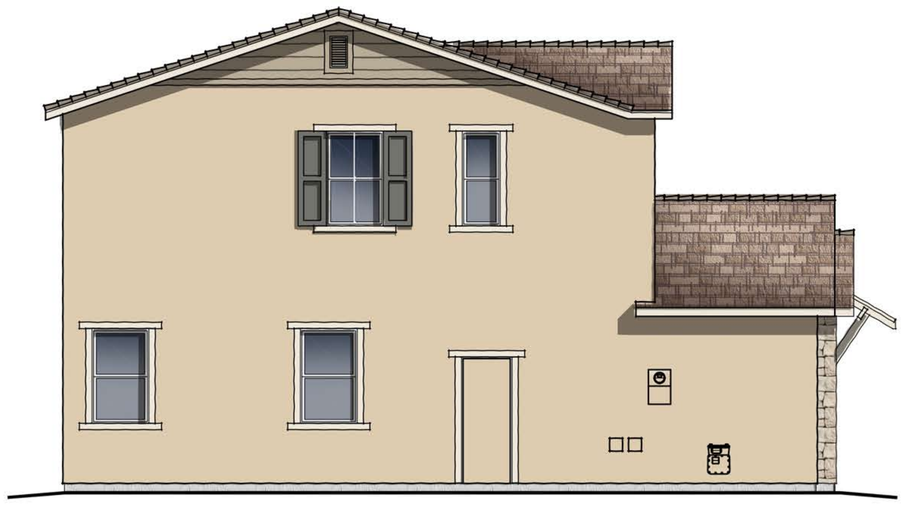
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.18.18

PLAN TWO | ELEVATION B ENHANCED - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

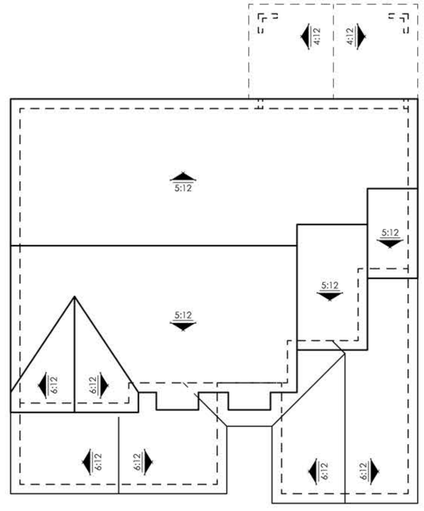
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

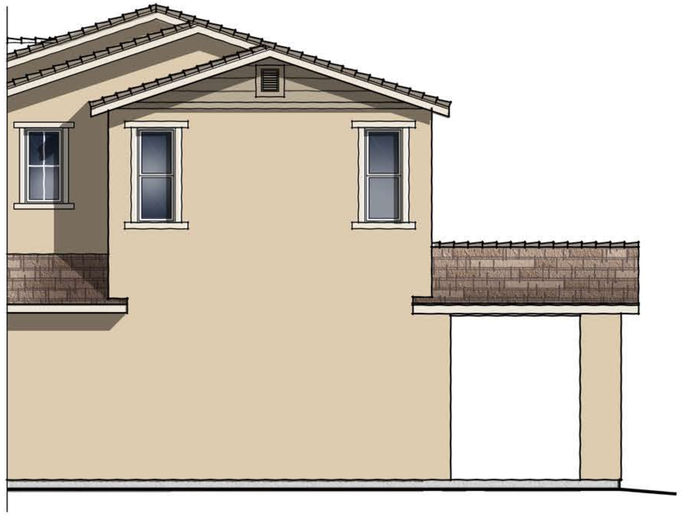
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

7696



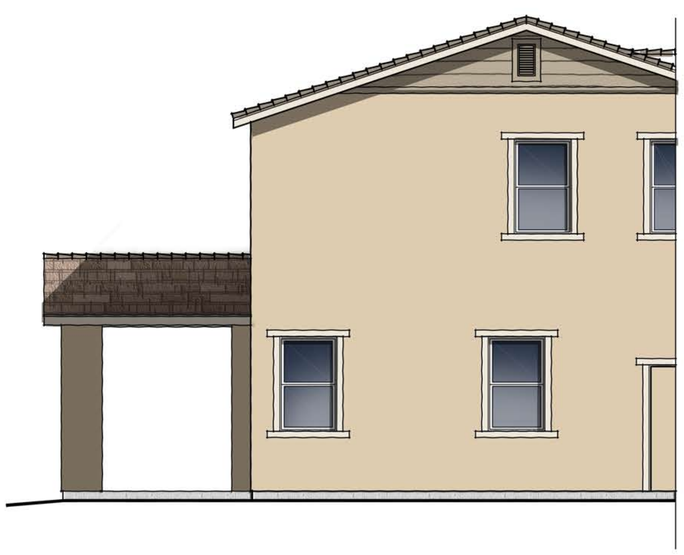
ROOF PLAN SCALE: 1/8" = 1'-0"



RIGHT ELEVATION SCALE: 1/4" = 1'-0"



REAR ELEVATION SCALE: 1/4" = 1'-0"



LEFT ELEVATION SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION B OUTDOOR ROOM - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

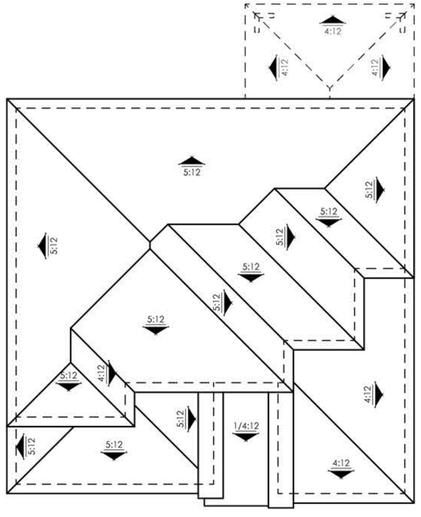
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

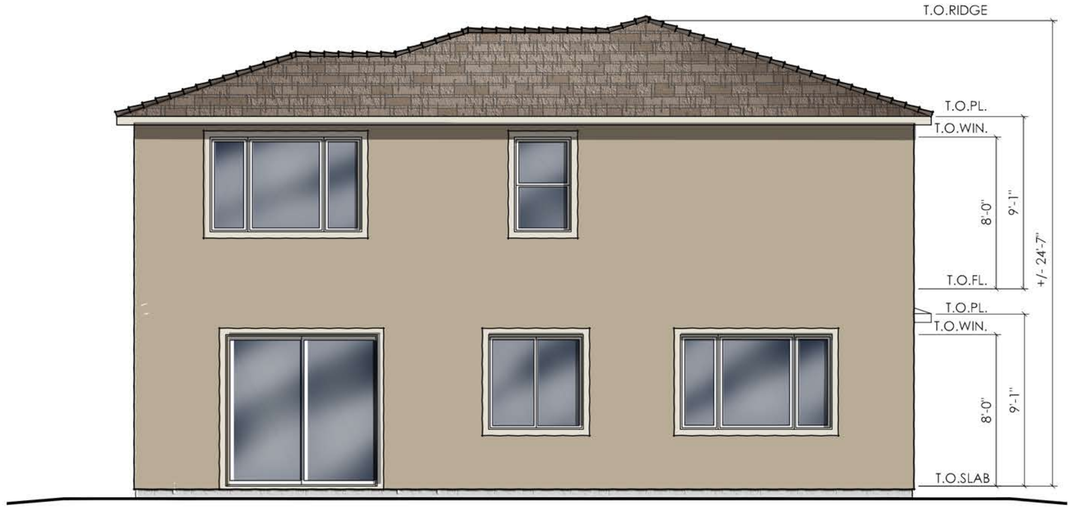
7697



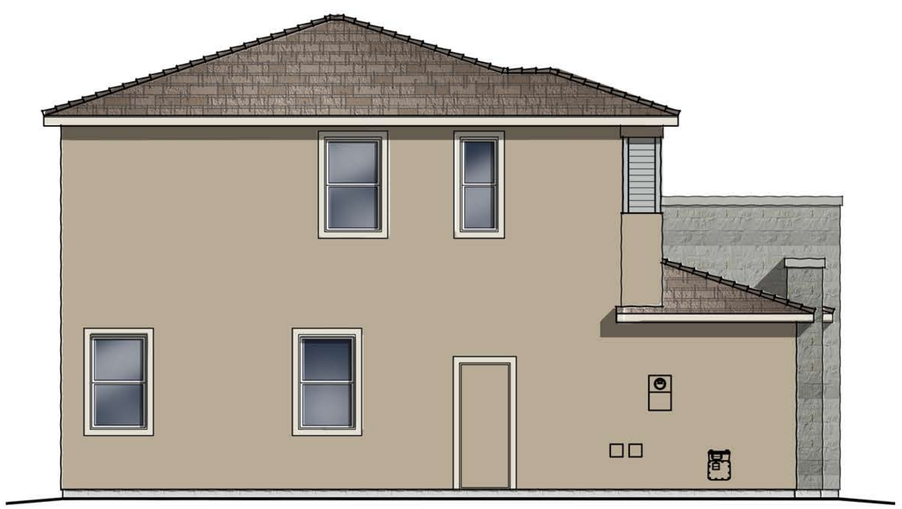
ROOF PLAN SCALE: 1/8" = 1'-0"



RIGHT ELEVATION SCALE: 1/4" = 1'-0"



REAR ELEVATION SCALE: 1/4" = 1'-0"



LEFT ELEVATION SCALE: 1/4" = 1'-0"

PLAN TWO | ELEVATION C - MODERN PRAIRIE

EUCALYPTUS @ CYPRESS | 50x80

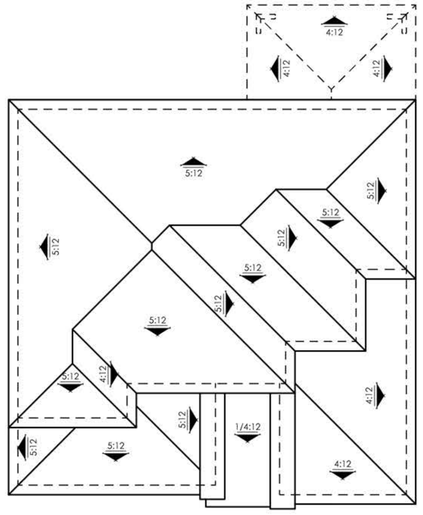
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.18.18

PLAN TWO | ELEVATION C ENHANCED - MODERN PRAIRIE

EUCALYPTUS @ CYPRESS | 50x80

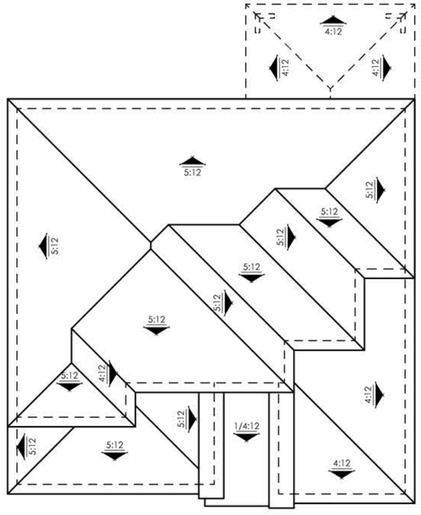
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

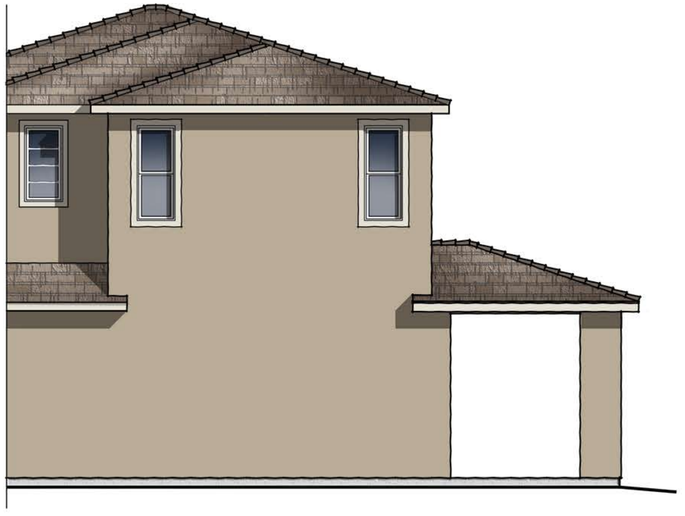
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.



ROOF PLAN

SCALE: 1/8" = 1'-0"



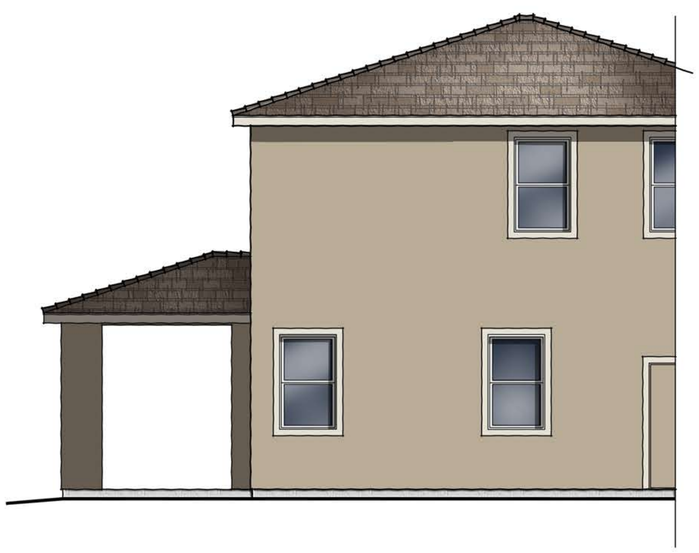
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

'.18.18

PLAN TWO | ELEVATION C OUTDOOR ROOM - MODERN PRAIRIE

EUCALYPTUS @ CYPRESS | 50x80

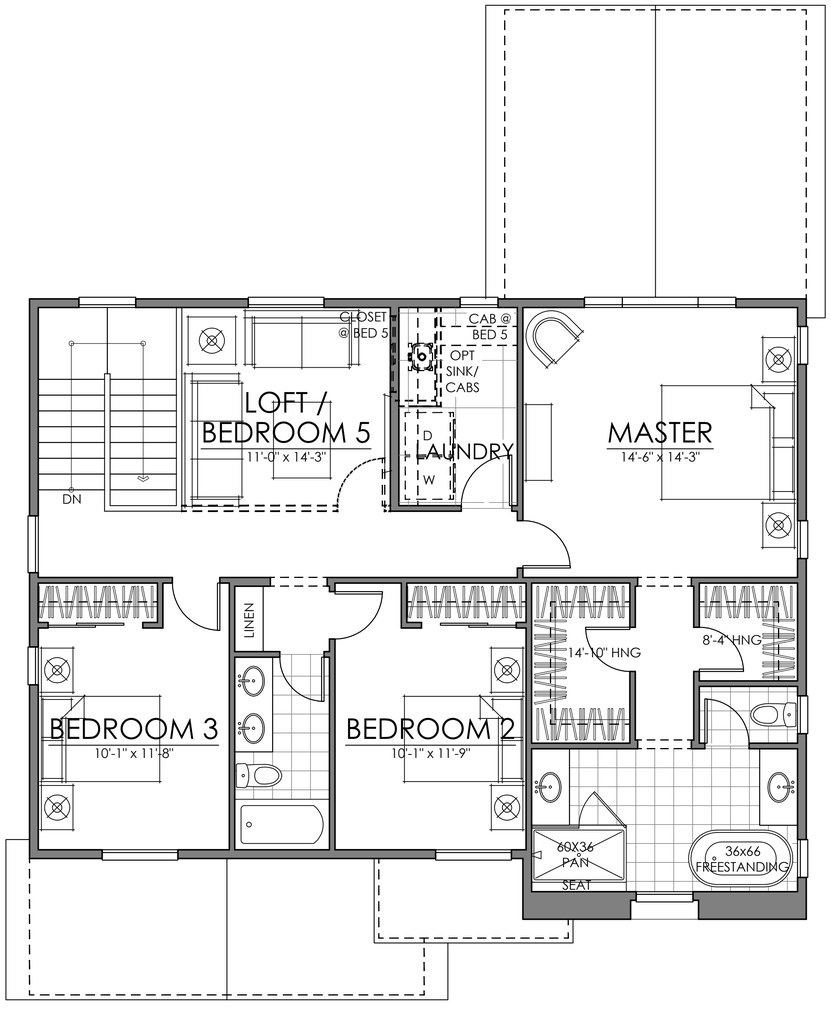
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

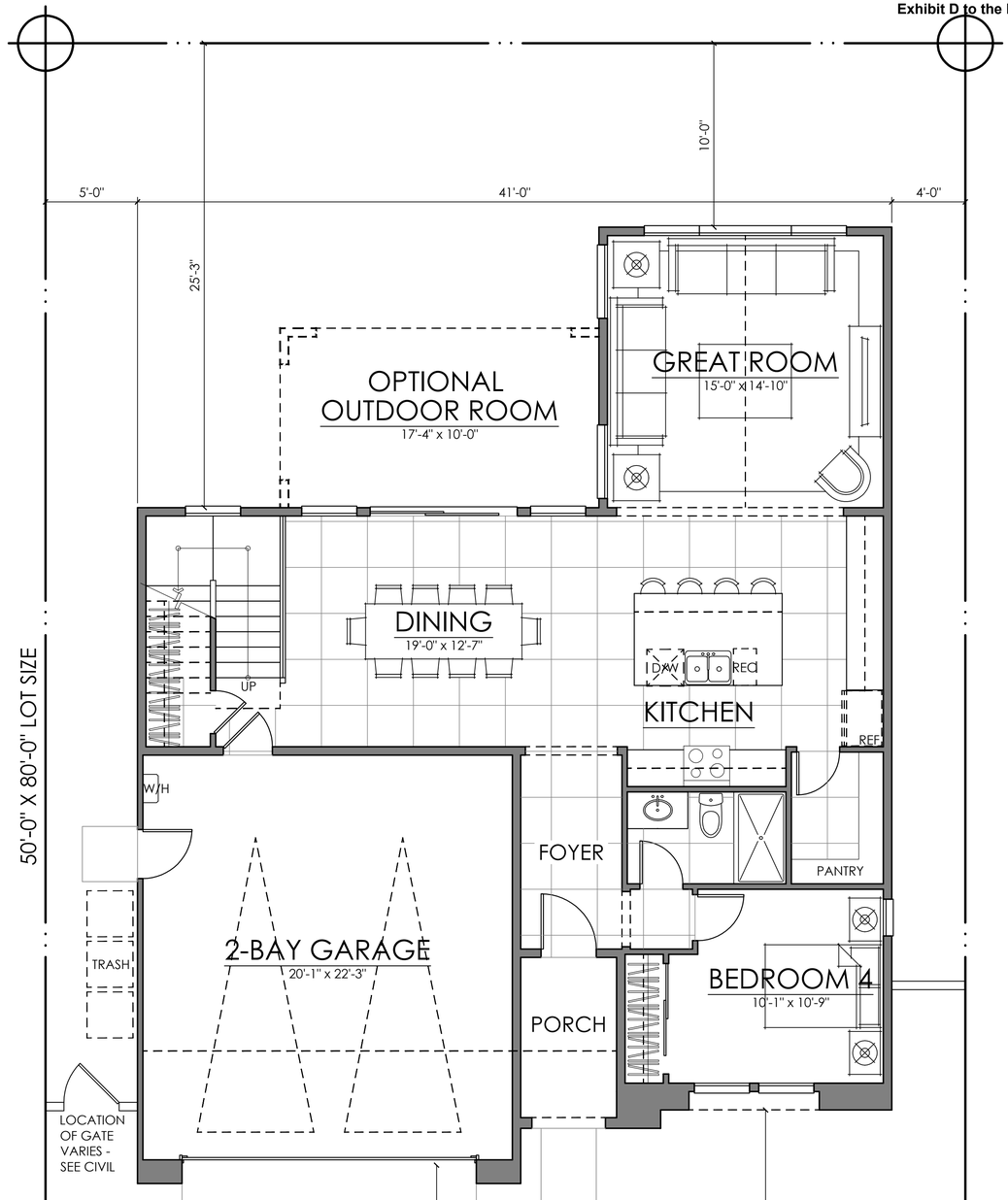
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.





FIRST FLOOR	1127 SQ. FT.
SECOND FLOOR	1158 SQ. FT.
TOTAL LIVING	**2285 SQ. FT.**

PLAN THREE | 2285 SQ. FT.

AGENDA ITEM 11.2

7.18.18

Woodside Homes®
BETTER BY DESIGN

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

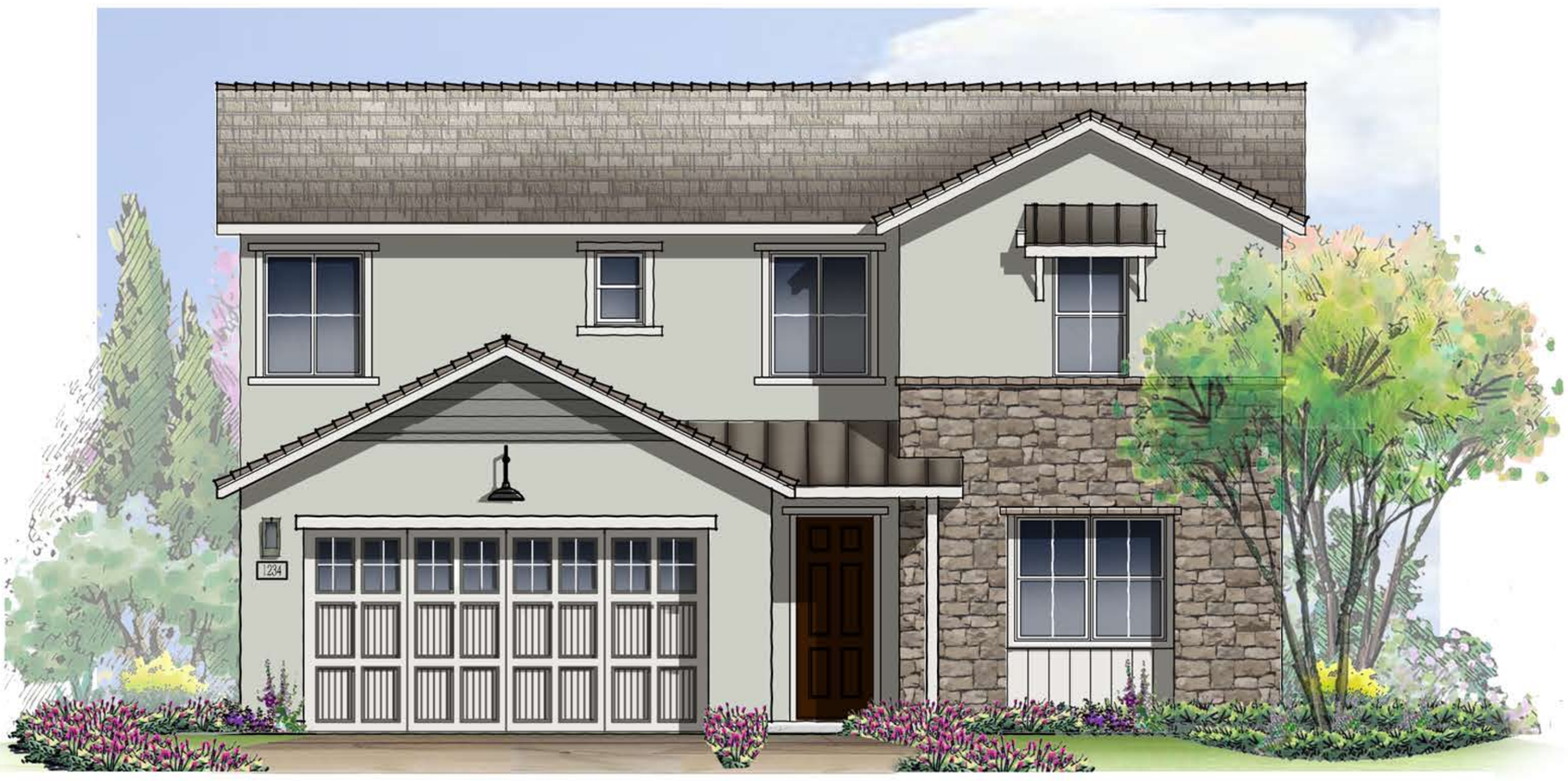
THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE, SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. sui
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.0



FRONT ELEVATION 'A' - MODERN SPANISH

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY

SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE

SCALE: 1/4" = 1'-0"

07.18.18

PLAN THREE | FRONT ELEVATIONS

Woodside Homes®
BETTER BY DESIGN

EUCALYPTUS @ CYPRESS | 50x80

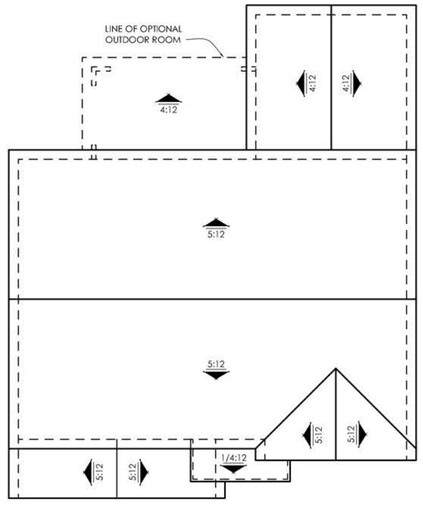
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

woodley architectural group,inc
colorado // 731 southpark dr. suite B
littleton, co 80120 / 303.683.7231

AGENDA ITEM 11.2

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.18.18

PLAN THREE | ELEVATION A - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

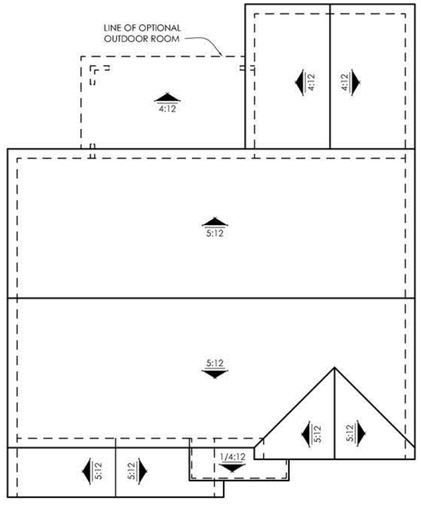
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8

7703



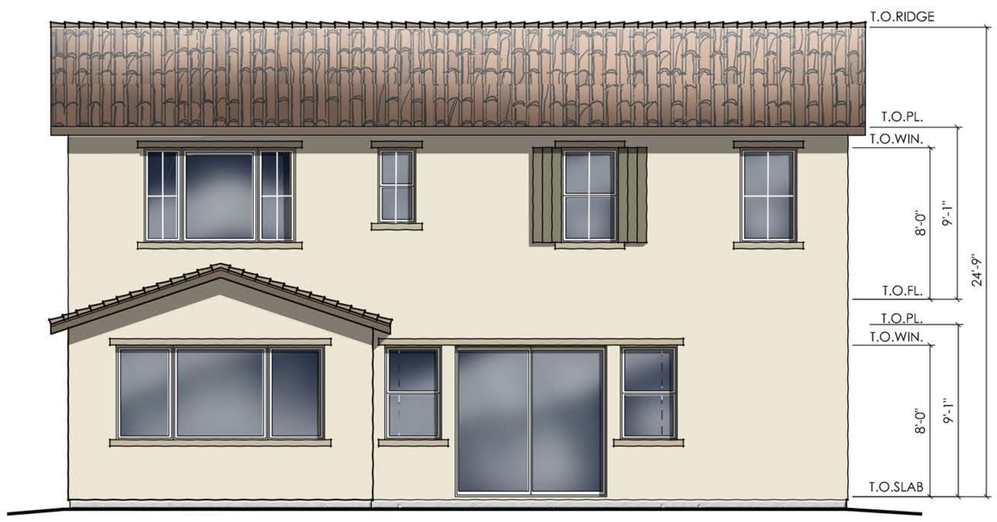
ROOF PLAN

SCALE: 1/8" = 1'-0"



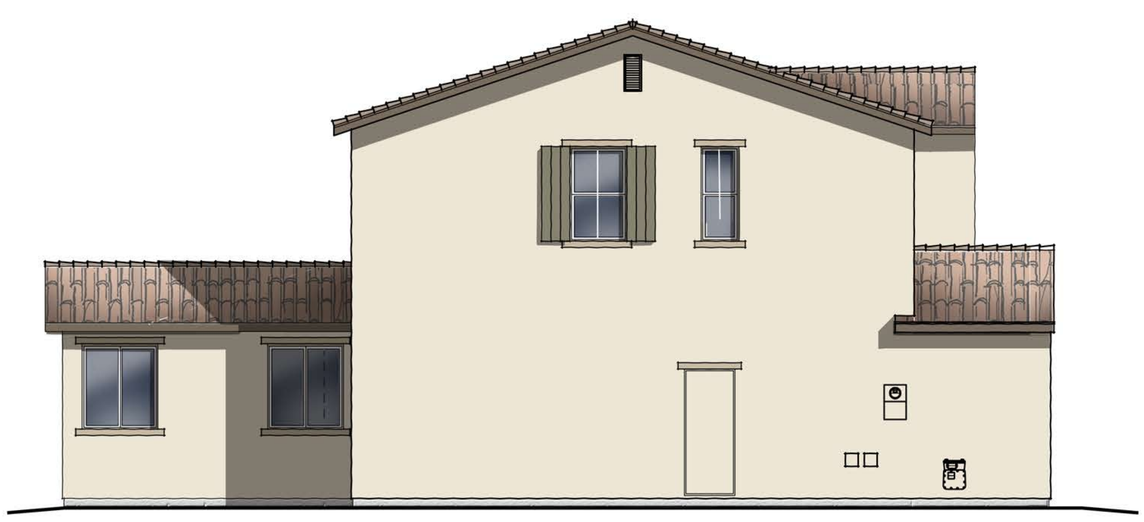
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.18.18

PLAN THREE | ELEVATION A ENHANCED - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

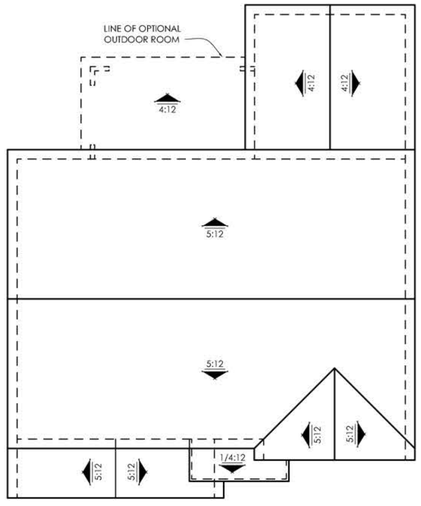
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN SCALE: 1/8" = 1'-0"



REAR ELEVATION SCALE: 1/4" = 1'-0"



LEFT ELEVATION SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION A OUTDOOR ROOM - MODERN SPANISH

EUCALYPTUS @ CYPRESS | 50x80

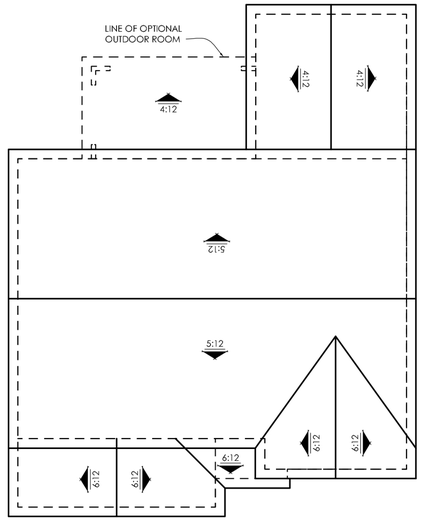
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN

SCALE: 1/8" = 1'-0"



RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.18.18

PLAN THREE | ELEVATION B - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

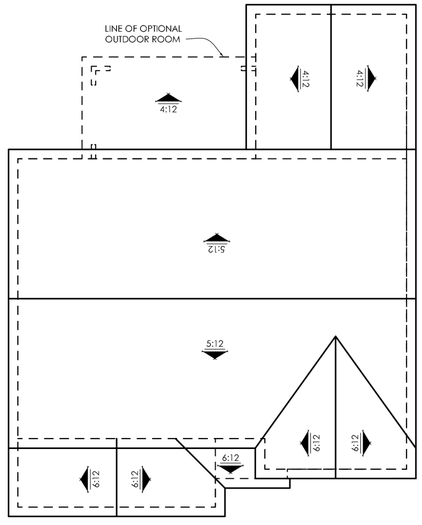
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN

SCALE: 1/8" = 1'-0"



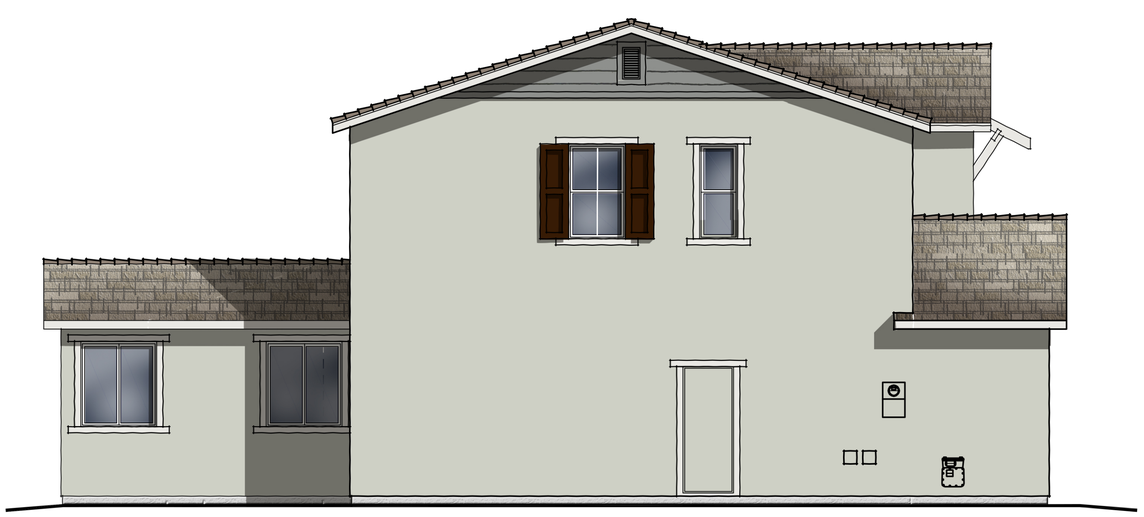
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B ENHANCED - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

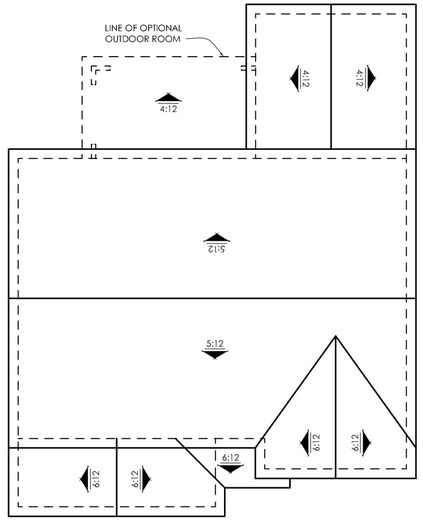
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



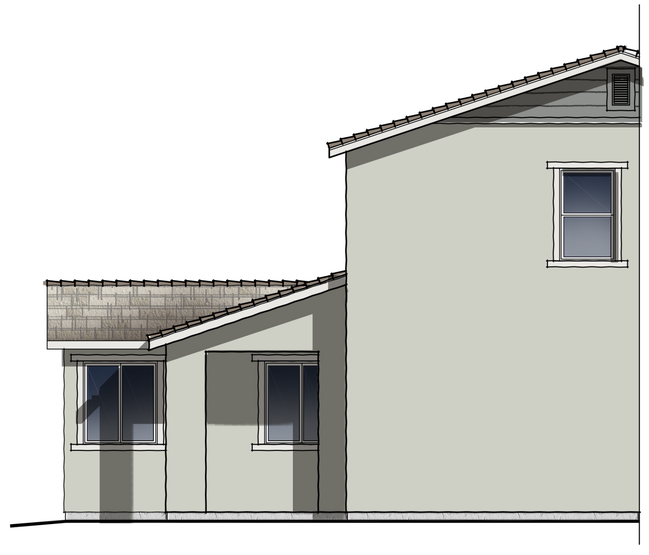
ROOF PLAN

SCALE: 1/8" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION B OUTDOOR ROOM - WINE COUNTRY

EUCALYPTUS @ CYPRESS | 50x80

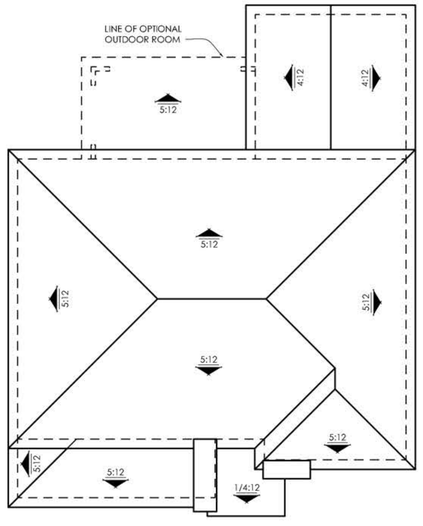
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

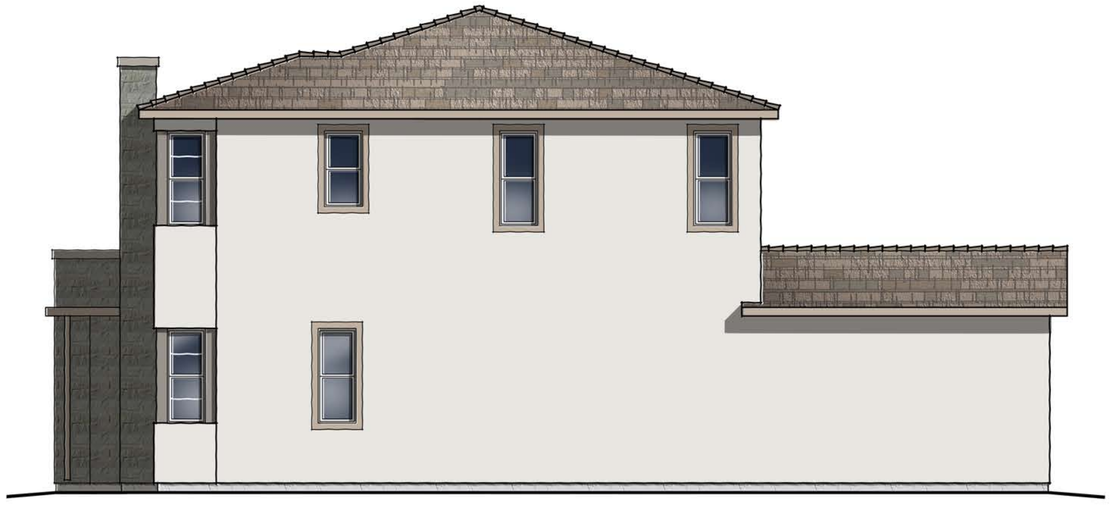
Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN

SCALE: 1/8" = 1'-0"



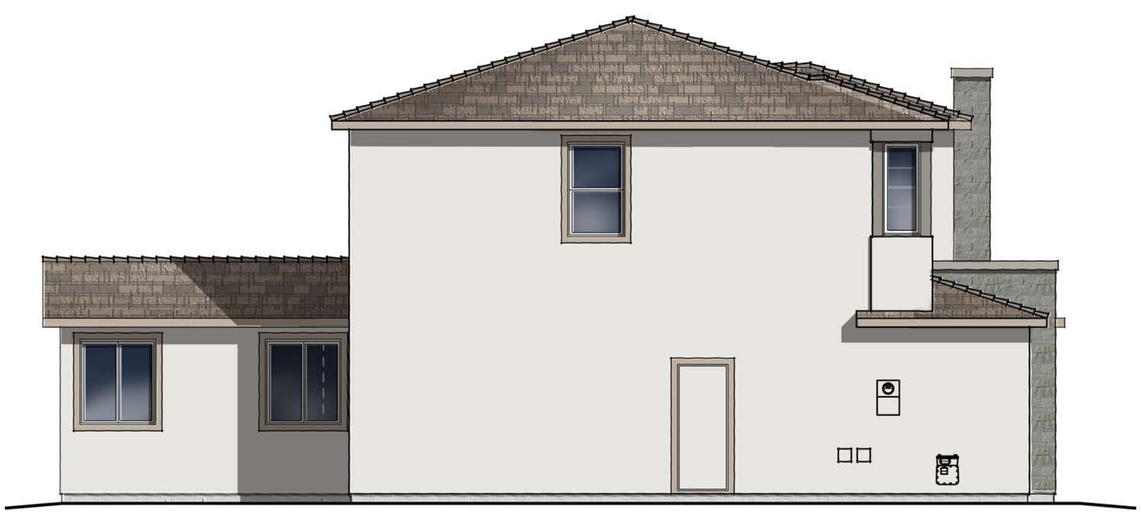
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

PLAN THREE | ELEVATION C - MODERN PRAIRIE

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

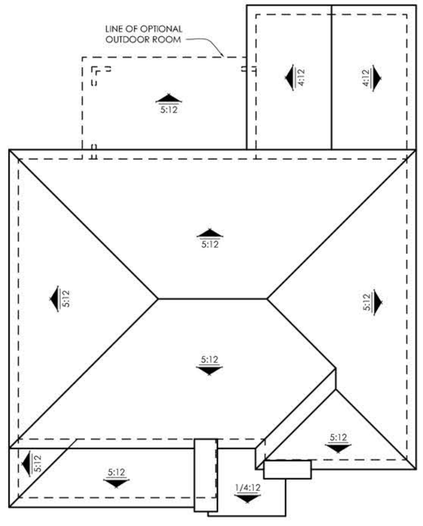
NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

.18.18

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



ROOF PLAN

SCALE: 1/8" = 1'-0"



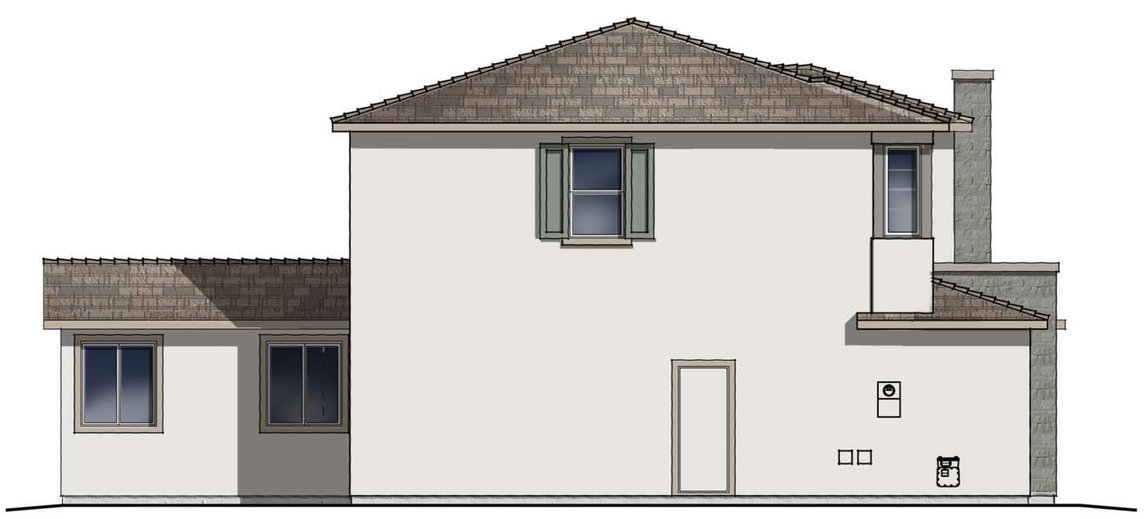
RIGHT ELEVATION

SCALE: 1/4" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

.18.18

PLAN THREE | ELEVATION C ENHANCED - MODERN PRAIRIE

EUCALYPTUS @ CYPRESS | 50x80

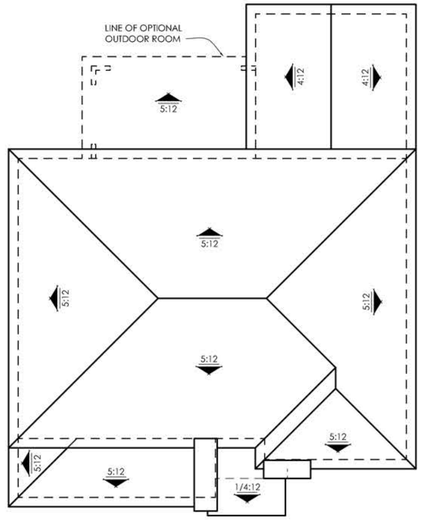
WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

Woodside Homes®
BETTER BY DESIGN

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

woodley architectural group,inc
colorado // 731 southpark dr. suite
littleton, co 80120 / 303 683.7231
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.8



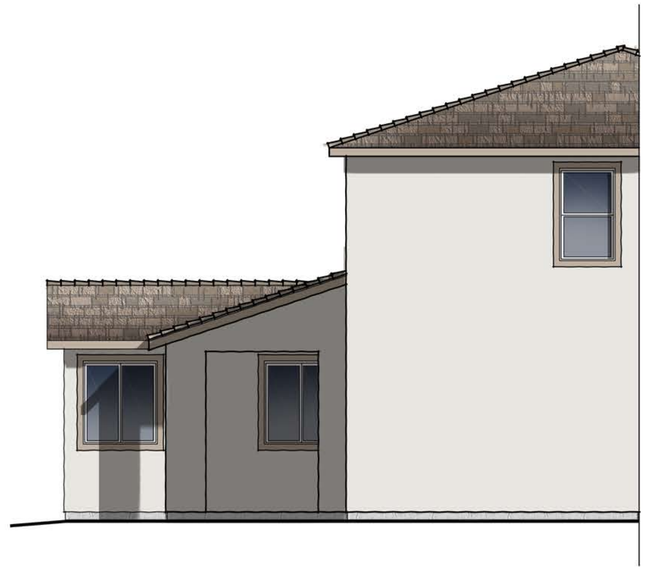
ROOF PLAN

SCALE: 1/8" = 1'-0"



REAR ELEVATION

SCALE: 1/4" = 1'-0"



LEFT ELEVATION

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.2

'.18.18

PLAN THREE | ELEVATION C OUTDOOR ROOM - MODERN PRAIRIE

EUCALYPTUS @ CYPRESS | 50x80

WOODSIDE HOMES | RANCHO CORDOVA, CALIFORNIA

NOTE: SQUARE FOOTAGE MAY VARY BASED ON CALCULATION METHODS

THESE DRAWINGS ARE INTENDED FOR DESIGN DEVELOPMENT AND PRELIMINARY STUDIES ONLY AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE. SUCH AS FINAL PLOTTING OR FINAL ENGINEERING. COPYRIGHT WOODLEY ARCHITECTURAL GROUP, INC. THESE DRAWINGS MAY NOT BE USED OR DUPLICATED WITHOUT THE EXPRESS WRITTEN PERMISSION OF WOODLEY ARCHITECTURAL GROUP, INC.

Woodside Homes®
BETTER BY DESIGN

woodley architectural group,inc
colorado // 731 southpark dr. suit
littleton, co 80120 / 303 683.723
california // 2943 pullman st. suite
santa ana, ca 92705 / 949 553.

Eucalyptus @ Cypress
50x80
Woodside Homes

Color Schemes
07.18.18

Woodside Homes
BETTER BY DESIGN

colorado 731 southpark drive suite b, littleton, colorado 80120 | (t) 303
california 2943 pullman street suite a, santa ana, california 92705 | (t) 949

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation A
Modern Spanish
Scheme 1



Roof Tile

Stucco

Trim

Fascia
& Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation A
Modern Spanish
Scheme 2



Roof Tile

Stucco

Trim

Fascia
& Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation A
Modern Spanish
Scheme 3



Roof Tile

Stucco

Trim

Fascia
& Garage Door

Entry Door
& Shutters



Stone Veneer



Decorative Tile

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation B
Wine Country
Scheme 4



Roof Tile

Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters



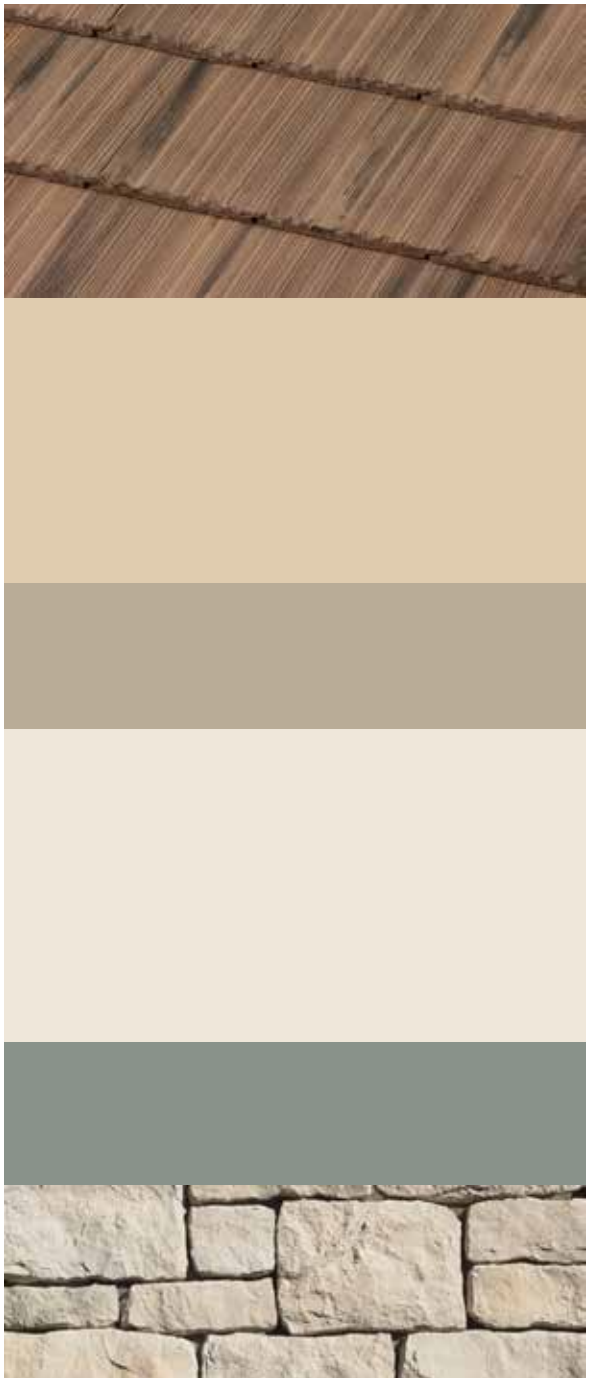
Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation B
Wine Country
Scheme 5



Roof Tile

Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation B
Wine Country
Scheme 6



Roof Tile

Stucco

Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

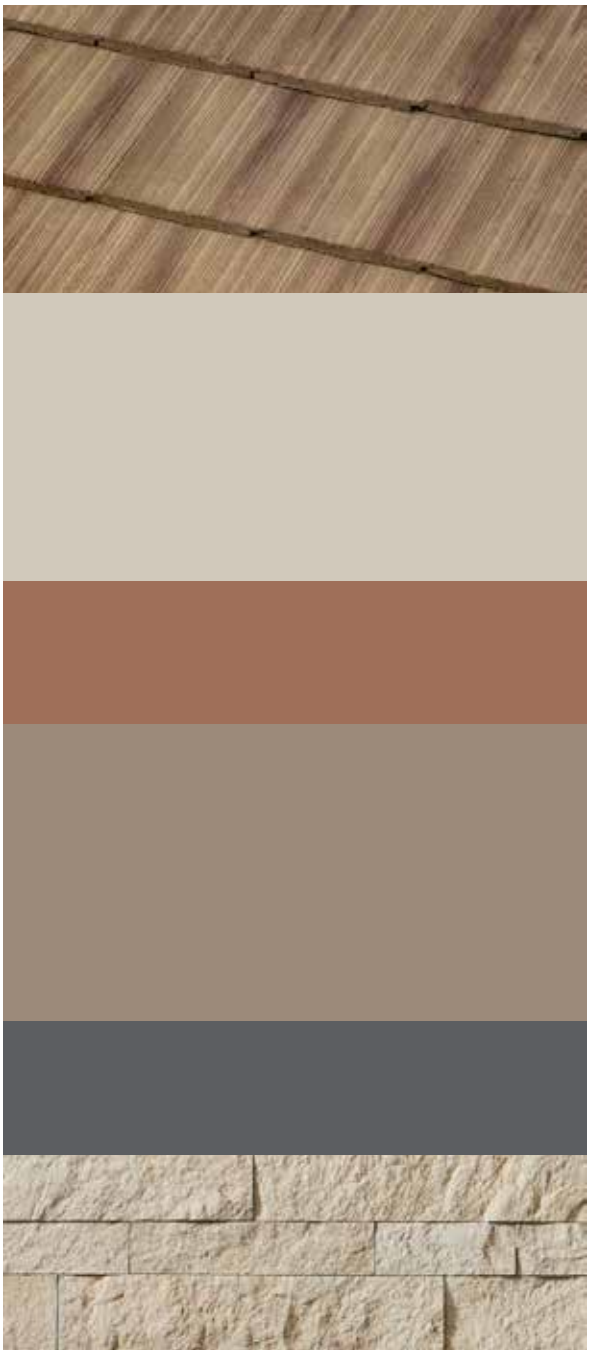
Stone Veneer

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation C
Modern Prairie
Scheme 7



Roof Tile

Stucco

Lap Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

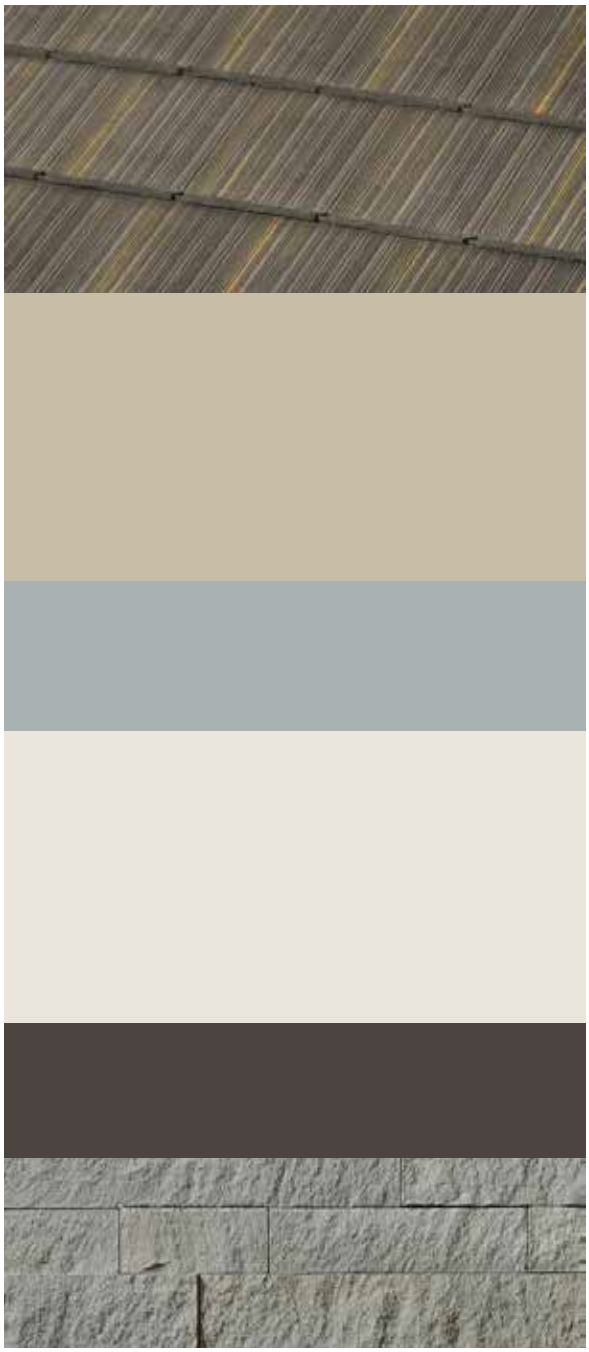
Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation C
Modern Prairie
Scheme 8



Roof Tile

Stucco

Lap Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

ATTAACHMENT 5
Exhibit D to the Resolution

Eucalyptus @ Cypress | 50 x80
Elevation C
Modern Prairie
Scheme 9



Roof Tile

Stucco

Lap Siding

Trim

Fascia
& Garage Door

Entry Door
& Shutters

Stone

Woodside Homes
BETTER BY DESIGN

woodleyarchitecturalgroup,inc.

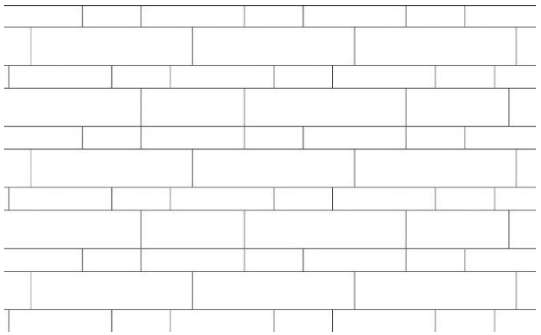
Paint: PPG	Stone Grout: Orco	05.08.18- Original Date
Roof: Boral		07.11.18-Revisions per drc comments
Metal Roof: Taylor Metal Products		
Stone: El Dorado & Cultured Stone		

Modern Spanish **ELEVATION A**	**Scheme 1**	**Scheme 2**	**Scheme 3**
ROOF *BARCELONA 900*	1HBCS3270 TESORO BLEND	1HBCS0431 APPLE BARK	1HBCS6330 SALERNO CLAY
STUCCO	1092-1 QUEEN ANNE LACE	14-08 HORSERADISH	1096-1 INSTANT RELIEF
TRIM	14-14 SUMMER SUEDE	14-27 TRUE KHAKI	1097-4 DUSTY TRAIL
FASCIA | GARAGE DOOR	1022-6 GRANITE	1023-6 CLAM SHELL	1025-6 SLEEPING GIANT
ENTRY DOOR | SHUTTERS	1038-7 MIDNIGHT HOUR	1071-6 PRAIRIE FIRE	1031-5 SEAWEED WRAP
STONE: *El Dorado Stone*	PEARL WHITE *COASTAL REEF*	PEARL WHITE *COASTAL REEF*	SANIBEL *COASTAL REEF*
TRIM AT STONE :	1097-3 TOASTED ALMOND	1097-3 TOASTED ALMOND	1097-4 DUSTY TRAIL
DECORATIVE TILES	201A 	202A 	201B 

WINE COUNTRY **ELEVATION B**	**Scheme 4**	**Scheme 5**	**Scheme 6**
ROOF *SAXONY 900 SHAKE*	1FBCJ3181 SMOKEY TOPAZ BLEND	1FBCF3214 SHADOW BROWN	1FBCJ4070 SEA PEARL BLEND
STUCCO	1100-2 ADOBE WHITE	12-26 ASSATEAGUE SAND	10 07 BAY OF FUNDY
SIDING	15-09 ANTELOPE	14-27 TRUE KHAKI	1009-5 PHOENIX FOSSIL
TRIM	1006-1 GYPSUM	14-23 EDELWEISS	1010-1 PEGASUS
FASCIA | GARAGE DOOR	15-18 INTROSPECTIVE	14-23 EDELWEISS	1010-1 PEGASUS
ENTRY DOOR | SHUTTERS	1039-4 PACHYDERM	1033-5 GRAY HERON	15-24 FRENCH TOAST
METAL ROOF	WEATHERED COPPER	WEATHERED COPPER	WEATHERED COPPER
STONE (DRYSTACK) *EL DORADO STONE*	ROUGH CUT AUTUMN LEAF	ROUGH CUT CASA BLANCA	ROUGH CUT MOONLIGHT
TRIM @ STONE	1021-4 DIVERSION	1024-2 ANTIQUE WHITE	1023-4 DESERT DUNE

MODERN PRAIRIE ELEVATION C	**Scheme 7**	**Scheme 8**	**Scheme 9**
ROOF *SAXONY 900 SHAKE*	1FBCF3293 CEDAR BLEND	1FBCB3233 BROWN BLEND	1FBCF3763 KOKOMO
STUCCO	1024-4 MOTH GRAY	14-26 HIDEAWAY	1021-2 SYNCHRONICITY
CEMENTITIOUS LAP SIDING	16-07 SOUTHERN WOOD	1039-3 MIRROR MIRROR	1007-5 LAZY AFTERNOON
TRIM	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1007-5 LAZY AFTERNOON
FASCIA | GARAGE DOOR	15-30 ROASTED CHESTNUT	14 -24 DOGWOOD BLOSSOM	1007-1 WILLOW SPRINGS
ENTRY DOOR | SHUTTERS	1011-6 GLAZED GRANITE	1002-7 PHANTOM MIST	1033-5 GREY HERON
STONE GROUT	DRYSTACK	DRYSTACK	DRYSTACK
STONE: *Cultured Stone* *Pattern # HSP3507*	HEWN |FOUNDATION CULTURED STONE	HEWN | SPAN CULTURED STONE	HEWN | TALUS CULTURED STONE
TRIM AT STONE :	1097-4 DUSTY TRAIL	1007-4 HOT STONE	1023-4 DESERT DUNE

STONE PATTERN | HSP3507



STACK BOND PATTERN



*All non-decorative items such as meter doors & non-decorative vents are to be painted the surrounding color.

*Paint breaks to be turned at inside corner unless otherwise indicated.

* Metal roof vents to be painted to match the darkest color from the roofing blend.

*Painted brick to be semi-gloss finish.

El Dorado & Cultured Stone: MELISSA ZEPEDA (949) 275-4533 or melissa.zepeda@boral.com

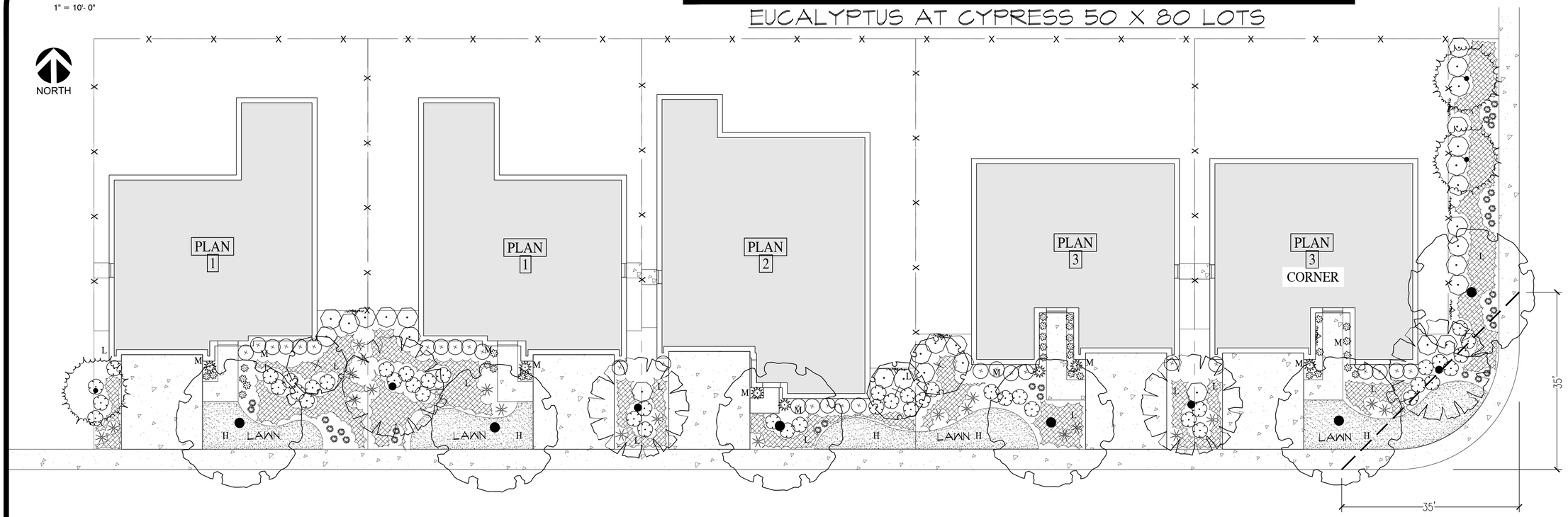
Boral Roof : Please Contact Michael Heard (949) 880.4153 or Michael.Heard@boral.com

Decorative Tile to be RockMill Tile & Stone : Please Contact Veronica Abbot Cell: 949.233.9133 or veronicaA@rockmillstone.com .

0 10 20 30 40 feet
1" = 10'- 0"

TYPICAL PRODUCTION PLANTING LAYOUT

EUCALYPTUS AT CYPRESS 50 X 80 LOTS



WOODSIDE HOMES

DOUGLAS 98
EUCALYPTUS AT CYPRESS
TYPICAL PRODUCTION
LANDSCAPE DOCUMENTS

PACKAGE INCLUDES:

L-1. COVER PAGE - 10 SCALE PLANTING LAYOUT LEGEND/ NOTES

.-2. 10 SCALE IRRIGATION LAYOUT / NOTES

.-3. STANDARD INSTALLATION DETAILS

.-4. WATER USE CALCULATIONS

AGENDA ITEM 11.2

CONCEPT PLANT SCHEDULE

STREET TREES - MED WATER USE
Acer rubrum `Bowhall Red` / Red Maple — 15 gal
MED WATER
Koelreuteria paniculata / Golden Rain Tree — 15 gal
Pyrus calleryana `Bradford` / Bradford Flowering Pear — 15 gal
Tilia cordata `Greenspire` / Greenspire Littleleaf Linden — 15 gal

ACCENT TREES
Arbutus unedo / Strawberry Tree Shrub — 15 gal
Lagerstroemia indica `Tuscarora` / Crape Myrtle — 15 gal
Malus floribunda `Prairefire` / Flowering Crabapple — 15 gal

EVERGREEN-CONIFERS
Arbutus unedo / Strawberry Tree Multi-Trunk — 15 gal
Metaleuca quinquenervia / Cajeput Tree Multi-Trunk — 15 gal
Pinus eldarica / Afghan Pine — 15 gal

SMALL TREES
Acer palmatum / Japanese Maple — 15 gal
Magnolia grandiflora `St. Mary` / Southern Magnolia — 15 gal
Prunus carolinana / Carolina Laurel Cherry — 15 gal
Vitex agnus-castus / Chaste Tree — 15 gal

FOUNDATION SHRUBS LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush — 5 gal
Elaeagnus pungens / Thorny Elaagnus — 5 gal
Nandina domestica `Compacta` / Dwarf Heavenly Bamboo — 5 gal
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub — 5 gal
Rhapholepis umbellata / Yedda Hawthorn — 5 gal
Xylosma congestum `Compacta` / Compact Xylosma — 5 gal

MED SHRUBS - LOW WATER USE
Callistemon citrinus `Little John` / Dwarf Bottle Brush — 5 gal
Cistus x purpureus / Orchid Rockrose — 5 gal
Polygala fruticosa `Petite Butterfly` / Sweet Pea Shrub — 5 gal
Rhapholepis umbellata / Yedda Hawthorn — 5 gal
Rosmarinus officinalis `Blue Spires` / Rosemary — 5 gal

MED SHRUBS - MED WATER USE
Azalea Southern Indica Hybrid `Formosa` / Formose Azalea — 5 gal
Berberis thunbergii `Crimson Pygmy` / Crimson Pygmy Barberry — 5 gal
Buxus microphylla japonica `Green Beauty` / Green Beauty Boxwood — 5 gal
Camellia sasanqua `Shishi-Gashira` / Camellia — 5 gal
Coleonema pulchrum / Pink Breath Of Heaven — 5 gal
Gardena jasminoides `Veitchii` / Veitch Jasmine — 5 gal
Nandina domestica `Gulf Stream` TM / Heavenly Bamboo — 5 gal
Pittosporum tobira `Turner`s Variegated Dwarf` / Variegated Dwarf Pittosporum — 5 gal
Rhapholepis indica `Ballerina` / Ballerina Indian Hawthorn — 5 gal
Rhododendron azalea / Azalea — 5 gal

ACCENT PLANTS- LOW WATER USE
Hesperaloe parviflora / Red Yucca — 5 gal
Phormium tenax `Yellow Wave` / New Zealand Flax — 5 gal
Salvia leucantha / Mexican Bush Sage — 5 gal
Yucca filifera `Golden Sword` / Golden Sword Yucca — 5 gal

ACCENT PLANTS - MED WATER USE
Coleonema pulchrum `Sunset Gold` / Golden Breath Of Heaven — 5 gal
Cuphea hyssopifolia / False Heather — 5 gal
Euryops pectinatus `Munchkin` / Dwarf Euryops — 5 gal

PERENNIALS LOW WATER USE
Bergenia cordifolia / Heartleaf Bergenia — 1 gal
Cistus salvifolius `Prostratus` / Sageleaf Rockrose — 1 gal
Coreopsis x `Moonbeam` / Moonbeam Coreopsis — 1 gal
Engeron karvinskianis / Fleabane — 1 gal
Heuchera sanguinea / Coral Bells — 1 gal
Heuchera x `Plum Pudding` / Coral Bells — 1 gal
Lavandula angustifolia `Munstead` / Munstead English Lavender — 1 gal
Moraea x `Lemon Drop` / Fortnight Lily — 1 gal
Pennisetum onentale `Karley Rose` / Karley Rose Fountain Grass — 1 gal
Salvia greggii `Hot Lips` / Autumn Sage — 1 gal
Teucrium fruticans / Bush Germander — 1 gal
Tulbaghia violacea `Variegata` / Striped Cape Garlic — 1 gal

PERENNIALS MED WATER USE
Felicia amelloides / Blue Marguerite — 1 gal
Lantana camara / Lantana — 1 gal
Linope gigantea / Giant Linope — 1 gal
Linope muscari / Lily Turf — 1 gal

VINES LOW WATER USE
Campsis radicans `Trumpet Creeper` / OrangeTrumpet Creeper — 1 gal
Clematis x lawsonaria `Henryi` / Clematis — 1 gal
Gelsemium sempervirens / Jessamine — 1 gal

GROUND COVERS - LOW - MED WATER USE
Gazania x `Mitsuwa Yellow` / Yellow Gazania — 100% 1 gal 12" oc
Myoporum parvifolium `Putah Creek` / Putah Creek Myoporum — 100% 1 gal 36" oc
Vinca minor / Common Periwinkle — 100% 1 gal 24" oc

LAWN
Turf Sod / Drought Tolerant Fescue Blend — sod
25% MAX SOD ALLOWED ON INDIVIDUAL LOT TO MEET MAWA REQUIREMENTS

WELO STATEMENT:

'I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE LANDSCAPE DESIGN PLAN'

Steven L Crouch 6-11-18

PLANTING NOTES

1. CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT IN THE EVENT OF PLANT UNAVAILABILITY WITHIN TEN WORKING DAYS AFTER BID AWARDS. LANDSCAPE CONTRACTOR RESPONSIBLE FOR VERIFICATION OF PLANT QUANTIES ON LEGEND. NOTIFY L.A. IN EVENT OF DISCREPANCIES
2. VERIFY SITE CONDITIONS AS SHOWN ON THESE PLANS PRIOR TO SUBMITTING A PRICE QUOTATION BID OR COMMENCING CONSTRUCTION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT.
3. FINISHED GRADING PRIOR TO COMMENCING WORK THE LANDSCAPE CONTRACTOR SHALL INSPECT THE WORK OF OTHERS AND VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH GRADING AND SHALL INSPECT THE WORK OF OTHERS, VERIFY THAT PRELIMINARY GRADING HAS BEEN ESTABLISHED. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR SURFACE DRAINAGE OF ALL PLANTING AREAS. FINISH GRADE SHALL BE A SMOOTH, EVEN AND UNIFORM PLANE WITH NO LOW SPOTS OR ABRUPT CHANGE OF SURFACE. FINISH GRADES IN SHRUB AND GROUNDCOVER AREAS SHALL BE 1 1/2" BELOW ADJACENT PAVING, CURBS AND HEADERS.
4. ADJUSTMENTS IN THE FIELD MAY BE REQUIRED TO ACCOMMODATE UTILITIES SUCH AS LIGHT FIXTURES, VAULT BOXES ABOVE GRADE, SIGNALS, ETC.
5. SOIL AMENDMENTS FOR BID PURPOSES ARE AS LISTED BELOW. ACTUAL SOIL PREP IS TO BE PERFORMED AS PER REQUIRED SOILS TEST RESULTS WITH TESTING DONE PRIOR TO BEGINNING PROJECT. INCORPORATE RECOMMENDED AMENDMENTS BY TILLING INTO THE TOP 6" OF SOIL.
   FERTILIZER 6-20-20 — 20 LBS/ 1000 SQ. FT.
   NITROGEN STABILIZED COMPOST — 4 YDS/1000 SQ. FT. *
6. APPLY PRE-EMERGENT HERBICIDE CHIPCO RONSTAR 'G' PER MANUFACTURES SPECIFICATIONS..
7. CONTRACTOR SHALL TEST ALL PLANTING PITS FOR DRAINAGE BY FILLING WITH WATER. ANY PLANTING PIT WHICH DOES NOT DRAIN COMPLETELY IN TWO HOURS OR LESS SHALL HAVE CORRECTIVE MEASURES IMPLEMENTED BY THE CONTRACTOR. CORRECTIVE MEASURES SHALL INCLUDE:
   A. DRILLING/AUGERING THROUGH IMPERMEABLE LAYERS TO A FAST DRAINING SOIL LAYER AND BACKFILLING WITH SAND, GRAVEL, OR OTHER APPROVED MATERIAL.
   B. INSTALLING DRAINAGE TUBING TO CARRY EXCESS WATER TO NEARBY OUTLET.
   C. METHODS AS DETERMINED IN THE FIELD BY THE OWNER.
8. PLANT TREES A MINIMUM OF 5 FEET FROM LIGHT STANDARDS, BELOW GRADE UTILITY VAULTS A MINIMUM OF 8 FEET FROM SIDES OF ABOVE GRADE UTILITY BOXES. TREES WITHIN 7' OF SIDEWALKS TO RECEIVE ROOT BARRIER UB-24 (INSTALL 5' IN BOTH DIRECTIONS OF TREE TRUNK.)
9. ALL SLOPES AT 2 TO 1 SHALL RECEIVE A LAYER OF JUTE MESH FABRIC STAPLED TO SLOPE.
10. ALL PLANTER AND GROUNDCOVER AREAS NOT RECEIVING JUTE NETTING SHALL RECEIVE A 3" BARK MULCH LAYER. *NO SHREDDED BARK ALLOWED.
11. EDGING ALONG LAWN AREAS IS TO BE A SHOVEL CUT EDGE.
12. GUARANTEE: ALL TREES AND SHRUBS SHALL BE GUARANTEED FOR A PERIOD OF THREE MONTHS. ALL GROUND COVER AND TURF SHALL BE GUARANTEED FOR A PERIOD OF NINETY(90) DAYS. MATERIAL THAT IS NOT HEALTHY SHALL BE REPLACED WITHIN THE GUARANTEE PERIOD. REPLACEMENT MATERIAL SHALL BE MADE TO THE SAME SPECIFICATION AS ORIGINAL MATERIALS.
13. ALL GROUND COVER AND BARK AREAS TO RECEIVE DEWITT WEED BARRIER PRO 5 OR EQUAL.

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - EUCALYPTUS AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: 1"= 10'-0"
DRAWING NO.
6-11-18
L-1

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

7726

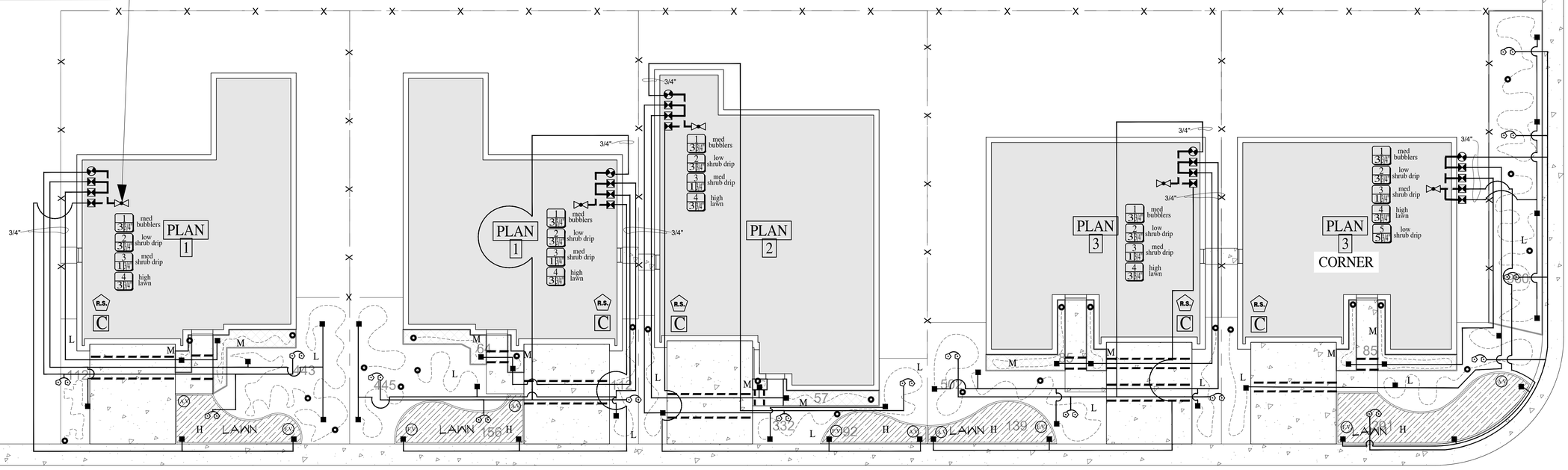
TYPICAL PRODUCTION IRRIGATION LAYOUT

EUCALYPTUS AT CYPRESS 50 X 80 LOTS

P.O.C. 1" GATE VALVE BY BUILDER. IRRIGATION DESIGN IS BASED ON A MINIMUM 1" SERVICE LINE, 5/8" METER, STATIC WATER PRESSURE OF 55 PSI AND MAX FLOW OF 8 G.P.M. *REMOTE CONTROL VALVES TO BE LOCATED BEHIND FENCING IN REAR YARDS. TYPICAL FOR EACH LOT.

0 10 20 30 40 feet
1" = 10'- 0"

NORTH



IRRIGATION EQUIPMENT TABLE

Symbol	Equipment	Description
	POINT OF CONNECTION. 1" GATE VALVE BY BUILDER.	
C	RAINBIRD ESP-TM2-8-120V- LNK WIFI	RAINBIRD 8 - STATION CONTROLLER
R.S.	RAINBIRD WR2-RFC.	RAINBIRD RAIN AND FREEZE SENSOR
	3/4 " Hardie Till automatic anti-siphon valve, & 3/4 " pr20 Pressure Regulator & Y- filter	3/4" REMOTE CONTROL 'DRIP ZONE' VALVE W/ PRESSURE REGULATOR & SCREEN FILTER
	3/4 " Hardie Till automatic anti-siphon valve	3/4" REMOTE CONTROL VALVE
Irrigation Drip Table		
Symbol		
N.A.	Drip Emitters - Rainbird xeri-bug (xb-20PC), 2 - gal/hr emitters. 3 - per shrub Rainbird Micro-Spray. Xeri-Spray XS-360 Use as needed in annual beds.	RAINBIRD POINT SOURCE DRIP EMITTERS.
AV	RAINBIRD ARV050 & SEBTXB (BOX)	AIR RELIEF VALVE IN EMITTER BOX
FV	RAINBIRD MDCFCAP & SEBTXB (BOX)	FLUSH VALVE IN EMITTER BOX
	RAINBIRD MDCFCAP & SEB 7XB (BOX)	REMOVABLE FLUSH CAP IN EMITTER BOX.
	RAINBIRD MDCFTSMPT	3/4" MALE PIPE THREAD PVC TO DRIP LINE ADAPTER.
	Rainbird, XFS-09-12 subsurface dripline w/copper shield, SPACE 12" BETWEEN ROWS IN LAWN *BURY DEPTH MIN 5" IN LAWNS 2" IN SHRUB AREAS, STAPLE MIN EVERY 5'.	INSTALL ONE (1) AIR VACUM RELIEF VALVE IN A 6" ROUND EMITTER BOX AT THE HIGHEST POINT OF THE SYSTEM. INSTALL ONE (1) FLUSH VALVE IN A 10" ROUND VALVE BOX AT THE LOWEST POINT(S) OF THE SYSTEM.
	Rainbird 1402 bubblers 5 GPM	DEEP WATERING TREE BUBBLER ASSEMBLY IN PERFORATED PIPE, TWO AT EACH TREE. INSTALL PER DETAIL.
Irrigation Pipe Table		
Symbol	Pipe	
	1/2" POLY DRIP TUBING.	
	1 1/4" Schedule 40 PVC Pipe	
	1120 Class 200 P.V.C. Pipe size as noted.	
	3" Sch 40 P.V.C. Sleeves as needed	
High Lawn A 1" H	Water Use Controller station number Valve size G.P.M. through valve. Description	

IRRIGATION NOTES

1. THIS DRAWING IS PARTIALLY DIAGRAMMATIC AND DOES NOT SHOW ALL OFFSETS AND FITTINGS REQUIRED FOR A COMPLETE SYSTEM. THE DESIGN INTENT IS FOR FULL COVERAGE OF PLANTINGS. NOTIFY LANDSCAPE ARCHITECT OF ANY DISCREPANCIES PRIOR TO TRENCHING.
2. COORDINATE PIPE, VALVE BOX AND HEAD LAYOUT WITH PLANTING PLAN. ADJUST THESE IRRIGATION COMPONENTS TO ACCOMMODATE SUBSEQUENT PLANTINGS
3. THIS SYSTEM IS DESIGNED TO OPERATE AT AN EXISTING STATIC PRESSURE OF 35-40 P.S.I.. PRIOR TO COMMENCEMENT OF WORK, DETERMINE BY PRESSURE TEST, STATIC PRESSURE. CONTACT LANDSCAPE ARCHITECT FOR APPROVAL OF WATER PRESSURE PRIOR TO COMMENCING INSTALLATION OF IRRIGATION SYSTEM.
4. MAINLINE, BACKFLOW PREVENTOR AND REMOTE CONTROL VALVES ARE LOCATED IN PAVED AREAS FOR GRAPHIC CLARITY ONLY. LOCATE ALL IRRIGATION EQUIPMENT IN ADJACENT PLANTER AREAS. PLACE BACKFLOW PREVENTOR IN SUCH A WAY AS TO BE CONCEALED BY SUBSEQUENT PLANTINGS. ON WALLS AND WALKS.
5. PRIOR TO CONSTRUCTION, CONTACT U.S.A. AT (811) TO VERIFY EXISTING UTILITIES.
6. ADJUST SPRAY COVERAGE OF HEADS TO PROVIDE PROPER COVERAGE AND TO PREVENT OVER SPRAY
7. PERFORM COVERAGE TEST PRIOR TO PLANTING.
8. CONFORM TO ALL APPLICABLE GOVERNING CODES.
9. PIPES UNDER WALKS, DRIVES AND STREETS ARE TO BE INSTALLED IN SLEEVING. SLEEVING UNDER STREETS SHALL BE SUPPLIED BY OWNER. SLEEVES UNDER WALKS AND DRIVES SHALL BE INSTALLED BY LANDSCAPE CONTRACTOR.
10. CONTROL WIRING SHALL BE #14 U.L. DIRECT BURIAL, OCCUPY THE SAME TRENCH, AND SHALL BE INSTALLED ALONG SIDE OR UNDER PRESSURE LINES. COMMON WIRE SHALL BE WHITE. TAPE WIRES TOGETHER AT TEN (10) FOOT INTERVALS. SPLICES SHALL BE MADE WITH WATERPROOF CONNECTORS.
11. ALL MATERIALS SHALL BE NEW AND IN PERFECT CONDITION. NO DEVIATIONS FROM THE SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF LANDSCAPE ARCHITECT.
12. MAINLINE SHALL BE SCH. 40 P.V.C. AT A MINIMUM DEPTH OF 24" BELOW FINISH GRADE. LATERAL PIPE SHALL BE CLASS 200 P.V.C. AT A MINIMUM DEPTH OF 12", AND DIRECT BURIAL CONTROL WIRE A MINIMUM DEPTH OF 24"
13. WHERE MORE THAN ONE PIPE IS INSTALLED IN A TRENCH, PLACE PIPE SIDE BY SIDE AT A MINIMUM OF 2" APART. WHERE SOIL CONDITIONS ARE ROCKY PLACE A 4" LAYER OF FINE MATERIAL ON BOTTOM OF TRENCH PRIOR TO INSTALLATION OF PIPE.
14. ALL VALVES SHALL BE ASVF SERIES. INSTALLED 12" ABOVE HIGHEST POINT OF DISCHARGE
15. 120 VOLT ELECTRICAL POWER OUTLET AT THE AUTOMATIC CONTROLLER LOCATION SHALL BE PROVIDED BY OTHERS. IT SHALL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO MAKE THE FINAL HOOK-UP AS DIRECTED BY MANUFACTURER FROM THE ELECTRICAL OUTLET TO THE AUTOMATIC CONTROLLER.
16. CONTRACTOR SHALL SET THE INITIAL PROGRAM FOR THE CONTROLLER AND SHALL PROVIDE OWNER WITH THE INSTRUCTION MANUAL AND DEMONSTRATE IT OPERATION TO OWNER. OWNER IS THEN RESPONSIBLE FOR RESETTING CLOCK ACCORDING TO SEASONAL ENVIRONMENTAL CHANGES, AND DURING PLANT ESTABLISHMENT PERIOD.
17. THE IRRIGATION SYSTEM SHALL BE GUARANTEED FOR ALL MATERIALS AND WORKMANSHIP, INCLUDING SETTLEMENT OF TRENCHES FOR A PERIOD OF ONE YEAR.

* NOTE: REFER TO CIVIL SHEETS FOR GRADING, DRAINLINES & DRAINAGE PLANS.

IRRIGATION ZONE/ WATER USE DESIGNATION KEY.	
H	*ALL LAWN
M	MED. WATER USE SHRUBS
L	LOW WATER USE SHRUBS *NO HATCH

WELO STATEMENT:

"I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE IRRIGATION DESIGN PLAN" 6-11-18

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - EUCALYPTUS AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: 1"= 10'-0"
DRAWING NO.
6-11-18
L-2

AGENDA ITEM 11.2

7727

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

ELECTROMECHANICAL CONTROLLER MOUNTED TO BUILDING WALL.

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.

REMOTE CONTROL VALVE WITH DRIP ASSEMBLY
PLASTIC COMBINATION ELECTRIC CONTROL VALVE/ATMOSPHERIC VACUUM BREAKER 12 INCHES ABOVE GRADE

① SUB-SURFACE/ON-SURFACE DRIPLINE: RAIN BIRD XFS-CV SERIES DRIPLINE (TYPICAL) NON-POTABLE: XFS-CVP DRIPLINE
② PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
③ OPERATION INDICATOR RAIN BIRD MODEL: OPEXHD
④ PVC EXHAUST HEADER
⑤ PVC SCH 40 TEE OR EL (TYPICAL)
⑥ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑦ FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFS-CV FLUSH POINT"
⑧ PERIMETER OF AREA
⑨ IRRIGATION CONTROL VALVE: RAIN BIRD 3CZ DRIP CONTROL ZONE KIT INSTALLED IN VALVE BOX
⑩ PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
⑪ PVC SUPPLY HEADER
⑫ 6" SERIES TEC-LOOK® STAKES (TDS-050) REFER TO RAIN BIRD DESIGN GUIDE FOR PROPER SPACING

XFS-CV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Nominal Flow (gph)	Nominal Flow (gph)		
	0.6	0.9	0.6	0.9
20	160	128	208	272
30	200	225	402	537
40	350	248	408	418
50	350	281	573	477
60	434	309	637	525

NOTES:
1. FOR ALL XFS-CV AND POLY CONNECTIONS INSTALL XFF AND/OR XFD FITTINGS.
2. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
3. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
4. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

XFCV ON - SURFACE DRIPLINE
NTS

① PVC EXHAUST HEADER
② PVC DRIP MANIFOLD FROM RAIN BIRD CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
③ PVC SCH 40 TEE OR EL (TYPICAL)
④ BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
⑤ PERIMETER OF AREA
⑥ PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
⑦ FLUSH POINT (TYPICAL) *POTABLE: XFCV DRIPLINE
⑧ "END" OF SERIES DRIPLINE (TYPICAL)
⑨ FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFCV FLUSH POINT"
⑩ PVC SCH 40 RISER PIPE

XFCV Dripline Maximum Lateral Lengths (Feet)				
	12" Spacing		18" Spacing	
Inlet Pressure psi	Nominal Flow (gph)	Nominal Flow (gph)		
	0.6	0.9	0.6	0.9
20	160	128	208	272
30	200	225	402	537
40	350	248	408	418
50	350	281	573	477
60	434	309	637	525

NOTES:
1. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
2. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
3. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

XFCV ON - SURFACE DRIPLINE
NTS — QUICK LAYOUT

NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

XERI-BUG INTO 1/2 INCH TUBING
NTS

NOTES:
1. USE RAIN BIRD XERIMAN TOOL XM-TOOL TO INSERT EMITTER DIRECTLY INTO ½" POLYETHYLENE TUBING.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPH XB-10PC 1.0 GPH XB-20PC 2.0 GPH

XERI-BUG INTO 1/2 INCH TUBING WITH 1/4" TUBING, STAKE AND BUG CAP
NTS

XFS - SUB-SURFACE DRIPLINE
NTS — 1/2" AIR RELIEF VALVE

XFS SUBSURFACE INSTALLATION
NO SCALE

NOTES
1. COMPACT SOIL AROUND BOX TO 90% MINIMUM COMPACTION.
2. PLACE DRAIN ROCK PRIOR TO INSTALLING VALVE BOX.
3. GATE VALVE AND FITTINGS SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
4. USE TEFLON TAPE ON ALL THREADED FITTINGS.
5. LOCATE VALVES IN SHRUB/GROUNDCOVER AREAS WHENEVER POSSIBLE.
6. LOOP EXTRA TRACER WIRE UP INSIDE BOX.

SHUT OFF VALVE
NTS

NOTE:
1. ALLOW A MINIMUM OF 6-INCHES OF DRIPLINE TUBING IN VALVE BOX IN ORDER TO DIRECT FLUSHED WATER OUTSIDE VALVE BOX.

FLUSH VALVE IN BOX
NTS

NOTES:
1. POSITION 2-3 LINES (OR MORE) EVENLY SPACED AROUND PLANT. FOR NEW TREES PLACE NEAR ROOT BALL. FOR EXISTING TREES PLACE AT THE DRIPLINE BETWEEN CANOPY EDGE AND ROOT CRUNK.
2. INSTALL PRODUCT WITH TOP EVEN WITH GROUND SURFACE.
3. WHEN INSTALLING IN EXTREMELY HARD OR CLAY SOILS, ADD 3/4" (1.9 CM) GRAVEL UNDER AND AROUND THE UNIT TO ALLOW FASTER WATER INFILTRATION AND ROOT PENETRATION.
4. ONCE DRAIN PIPE HAS BEEN INSTALLED FILL THE BASKET WITH 1/2" TO 1" DRAIN ROCK.

ROOT WATERING SYSTEM INSTALLATION FOR TREES
NTS

TREE PLANTING DETAIL
NTS

NOTES
1. "S" REFERS TO PLANT SPACING, SEE PLANT TABLE ON CONSTRUCTION DOCUMENTS.

PLAN SECTION

GROUNDCOVER PLANTING
NOT TO SCALE

NOTES
1. AMENDMENT SHALL BE CONSISTENT WITH SOILS FERTILITY TEST.
2. PLANTING AREAS SHALL BE TREATED WITH PRE-EMERGENT PRIOR TO PLANTING TO PREVENT GERMINATION OF WEED SEEDS.
3. SCORE ROOT BALL IN VARIOUS LOCATIONS.

SHRUB PLANTING
NOT TO SCALE

LICENSED LANDSCAPE ARCHITECT
Steven L Crouch
Signature
05-31-18
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

TYPICAL PRODUCTION LANDSCAPE PLANS FOR DOUGLAS 98 - EUCALYPTUS AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CLG
CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
LIC.# 2557
127 LINDA DRIVE
ROSEVILLE, CA 95678

DETAILS

SCALE: 1"= 10'-0"

DRAWING NO.

6-11-18

L-3

AGENDA ITEM 11.2

7728

Placer County

Project Information Sheet.

Date: 5-3-18
Project Applicant: WOODSIDE HOMES - MIKE KITCHELL
Project Address: DOUGLAS 98 EUCALYPTUS
Project Assessors's Parcel Number/ Total Landscape Area (Sq.Ft). __19000_____
Project Type New X___ Rehabilitated____ Private____

Water Supply Type: Potable _X__ Recycled___ Well___
Name of Water Supplier, if not served by private well:

Landscape Documentation Package:

Water efficient Landscape Worksheets.
Hydrozone Information Table
Water Budget Calculations. Max Applied Water Allow. (MAWA)
Water Budget Calculations. Estimated Total Applied Water Use (MAWA)
Soil Management Report
Landscape Design Plan
Irrigation Design Plan.
Grading Design Plan * SEE CIVIL PLANS

Project Applicant. Telephone 916-608-9600 MIKE KITCHELL
Fax No. N.A.
Title Owner SAME Email www.woodsidehomes.com
City 111 Woodmere Rd, Su 150 State: Ca Zip: 95630
Property Owner: Same Telephone: Same
Fax No.
Title: Sr. project manager email:same

Company: same	Address:same
City:	State: Zip:
I agree to comply with the requirement of the Water Efficient	
Ordinance and submit a complete Landscape Documentation Package.	
(Applicant Signature)	(Date)

CERT OF COMP.

CERTIFICATE OF COMPLETION
THIS CERTIFICATE IS FILLED OUT BY THE PROJECT APPLICANT UPON COMPLETION OF THE LANDSCAPE PROJECT.

PART 1. PROJECT INFORMATION SHEET

DATE: 6-28-18
Project Name : DOUGLAS 98 EUCALYPTUS
Name of Project Applicant: Telephone: 916-608-9600
MIKE KITCHELL

Owner: WOODSIDE HOMES Email: www.woodsidehome.com
Address: 111 Woodmere Rd. Su 150
City: Folsom State: Ca Zip: 95630

Project Address and Location: DOUGLAS 98 EUCALYPTUS
Street: City: RANCHO CORDOVA
State: CA Zip: 95678

Property Owner or Designee:
Name: Same Telephone: Same
Title: Same Fax.
Company: SAME Email Address:
City: SAME Street: Same

Property owner:
I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule.

_____
Property owner Signature Date:

Please answer the questions below:
1. Date the Landscape Doc. Package was submitted to agency:_____
2. Date the Landscape Doc. Package was approved:_____
3. Date that copy of the Water Efficient Landscape Worksheet including the Water Budget calculation was submitted to the local water purveyor: _____

*Soils Test to be conducted at completion of finish grade / prior to plant installation.

*Updated irrigation schedule to be completed by irrigation auditor at completion of installation.

IRRIGATION ESTABLISHMENT SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 20 1	3 25 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	7 10 2	7 15 3	7 10 2	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 25 1	4 35 1	3 25 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

IRRIGATION MAINTENANCE SCHEDULE

Station and Type.	Seasonal Run Times. Spring.	Sum.	Fall.	Wint.	
1 TREE BUBBLERS	3 15 1	3 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
2 FX. LAWN	3 20 1	4 20 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
3 DRIP LOW SHRUBS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
4 DRIP MED SHRUBS	3 20 1	4 30 1	3 20 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY
5 DRIP LOW SHRUBS ON CORNER LOTS	3 15 1	4 20 1	3 15 1	0 0 0	DAYS/WEEK ST. RUN TIME CYCLES/DAY

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (EUCALYPTUS PLAN 3- CORNER)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS	MED	BUBBLERS		60		
2 - SHRUBS	LOW	DRIP	366			
3 - SHRUBS	MED	DRIP		85		
4- LAWN	HIGH	DRIP			251	
5- SHRUBS SIDE	LOW	DRIP	594			
		TOTALS	960	185	291	
		TOTAL SQ.FT.		=		1436

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
EUCALYPTUS PLAN 3- CORNER

MAXIMUM APPLIED WATER ALLOWANCE (MAWA.)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO) 51.9	ESTIMATED TOTAL WATER USE (ETWU)=
REGULAR LANDSCAPE AREA.									
1- TREE BUBBLERS	MED	Ø.5	BUBBLERS	Ø.81	Ø.617	1ØØ	61.73	51.9	1586.34
2 - SHRUBS	LOW	Ø.2	DRIP	Ø.81	Ø.247	366	90.37	51.9	2501.94
3 - SHRUBS	MED	Ø.5	DRIP	Ø.81	Ø.617	85	52.47	51.9	1688.35
4- LAWN	HIGH	Ø.8	DRIP	Ø.81	Ø.988	251	281.41	51.9	9248.20
5- SHRUBS SIDE	LOW	Ø.2	DRIP	Ø.81	Ø.241	594	146.67	51.9	473Ø.44
						TOTALS	1436	638.64	ETWU = 20550.22
SPECAL LANDSCAPE AREAS									
S-1	HIGH	DRIP	Ø.81	Ø.24	Ø	Ø			
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF X LA) + ((1-ETAF) X SLA)))									MAWA = 25414.2

ETAF RESIDENTIAL Ø.55
ETAF NON - RESIDENTIAL Ø.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X Ø.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F Ø.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
Ø.75 FOR SPRAY Ø.75
.81 FOR DRIP Ø.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (EUCALYPTUS PLAN 1 LEFT)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS	MED	BUBBLERS		60		
2 - SHRUBS	LOW	DRIP	555			
3 - SHRUBS	MED	DRIP		84		
4- LAWN	HIGH	DRIP			138	
		TOTALS	555	144	138	
		TOTAL SQ.FT.		=		837

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
EUCALYPTUS PLAN 1 LEFT

MAXIMUM APPLIED WATER ALLOWANCE (MAWA.)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO) 51.9	ESTIMATED TOTAL WATER USE (ETWU)=
REGULAR LANDSCAPE AREA.									
1- TREE BUBBLERS	MED	Ø.5	BUBBLERS	Ø.81	Ø.617	60	37.04	51.9	1191.78
2 - SHRUBS	LOW	Ø.2	DRIP	Ø.81	Ø.247	555	137.04	51.9	4409.58
3 - SHRUBS	MED	Ø.5	DRIP	Ø.81	Ø.617	84	51.85	51.9	1668.45
4- LAWN	HIGH	Ø.8	DRIP	Ø.81	Ø.988	138	136.30	51.9	4385.74
						TOTALS	837	362.22	ETWU = 11655.59
LANDSCAPE AREAS									
	HIGH	DRIP	Ø.81	Ø.24	Ø	Ø			
(ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF X LA) + ((1-ETAF) X SLA)))									MAWA = 14813.1

IDENTIAL Ø.55
L - RESIDENTIAL Ø.45

NNUAL GALLONS REQUIRED = ETO X Ø.62 X ETAF X AREA.
SION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F Ø.62

ANNUAL GALLONS ALLOWED) = (ETO)
SION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

ION EFFICIENCY
SPRAY Ø.75
DRIP Ø.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (EUCALYPTUS PLAN 1 RIGHT)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS	MED	BUBBLERS		60		
2 - SHRUBS	LOW	DRIP	557			
3 - SHRUBS	MED	DRIP		64		
4- LAWN	HIGH	DRIP			156	
		TOTALS	557	124	156	
		TOTAL SQ.FT.		=		837

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
EUCALYPTUS PLAN 1 RIGHT

MAXIMUM APPLIED WATER ALLOWANCE (MAWA.)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO) 51.9	ESTIMATED TOTAL WATER USE (ETWU)=
REGULAR LANDSCAPE AREA.									
1- TREE BUBBLERS	MED	Ø.5	BUBBLERS	Ø.81	Ø.617	60	37.04	51.9	1191.78
2 - SHRUBS	LOW	Ø.2	DRIP	Ø.81	Ø.247	557	137.53	51.9	4429.41
3 - SHRUBS	MED	Ø.5	DRIP	Ø.81	Ø.617	64	39.51	51.9	1271.23
4- LAWN	HIGH	Ø.8	DRIP	Ø.81	Ø.988	156	154.09	51.9	4961.80
						TOTALS	837	368.15	ETWU = 11846.27
SPECAL LANDSCAPE AREAS									
S-1	HIGH	DRIP	Ø.81	Ø.24	Ø	Ø			
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF X LA) + ((1-ETAF) X SLA)))									MAWA = 14813.1

ETAF RESIDENTIAL Ø.55
ETAF NON - RESIDENTIAL Ø.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X Ø.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F Ø.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
Ø.75 FOR SPRAY Ø.75
.81 FOR DRIP Ø.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (EUCALYPTUS PLAN 2)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS	MED	BUBBLERS		40		
2 - SHRUBS	LOW	DRIP	332			
3 - SHRUBS	MED	DRIP		51		
4- LAWN	HIGH	DRIP			92	
		TOTALS	332	91	92	
		TOTAL SQ.FT.		=		521

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
EUCALYPTUS PLAN 2

MAXIMUM APPLIED WATER ALLOWANCE (MAWA.)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO) 51.9	ESTIMATED TOTAL WATER USE (ETWU)=
REGULAR LANDSCAPE AREA.									
1- TREE BUBBLERS	MED	Ø.5	BUBBLERS	Ø.81	Ø.617	40	24.69	51.9	754.52
2 - SHRUBS	LOW	Ø.2	DRIP	Ø.81	Ø.247	332	81.98	51.9	2637.80
3 - SHRUBS	MED	Ø.5	DRIP	Ø.81	Ø.617	51	31.19	51.9	1132.15
4- LAWN	HIGH	Ø.8	DRIP	Ø.81	Ø.988	92	90.86	51.9	2923.83
						TOTALS	521	232.72	ETWU = 7488.34
SPECAL LANDSCAPE AREAS									
S-1	HIGH	DRIP	Ø.81	Ø.24	Ø	Ø			
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF X LA) + ((1-ETAF) X SLA)))									MAWA = 9220.61

ETAF RESIDENTIAL Ø.55
ETAF NON - RESIDENTIAL Ø.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X Ø.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F Ø.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
Ø.75 FOR SPRAY Ø.75
.81 FOR DRIP Ø.81

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION A. HYDROZONE INFORMATION TABLE (EUCALYPTUS PLAN 3)

HYDROZONE/ VALVE #	WATER USE	IRRIGATION METHOD	LANDSCAPE AREA (SQ.FT) LOW	MED	HIGH	
1- TREE BUBBLERS	MED	BUBBLERS		60		
2 - SHRUBS	LOW	DRIP	502			
3 - SHRUBS	MED	DRIP		85		
4- LAWN	HIGH	DRIP			139	
		TOTALS	502	145	139	
		TOTAL SQ.FT.		=		786

WATER EFFICIENT LANDSCAPE WORKSHEET

SECTION B. WATER BUDGET CALCULATION
EUCALYPTUS PLAN 3

MAXIMUM APPLIED WATER ALLOWANCE (MAWA.)

REFERENCE EVAPOTRANSPIRATION (ETO)	51.9

HYDROZONE/ VALVE #	WATER USE	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE) .C.	ETAF METHOD (PF/IE)	LANDSCAPE AREA (SQ.FT)	ETAF X AREA	REFERENCE (ETO) 51.9	ESTIMATED TOTAL WATER USE (ETWU)=
REGULAR LANDSCAPE AREA.									
1- TREE BUBBLERS	MED	Ø.5	BUBBLERS	Ø.81	Ø.617	60	37.04	51.9	1191.78
2 - SHRUBS	LOW	Ø.2	DRIP	Ø.81	Ø.247	502	123.98	51.9	3988.48
3 - SHRUBS	MED	Ø.5	DRIP	Ø.81	Ø.617	85	52.47	51.9	1688.35
4- LAWN	HIGH	Ø.8	DRIP	Ø.81	Ø.988	139	137.28	51.9	4417.92
						TOTALS	786	350.74	ETWU = 11286.14
SPECAL LANDSCAPE AREAS									
S-1	HIGH	DRIP	Ø.81	Ø.24	Ø	Ø			
*MAWA = (ANNUAL GALLONS ALLOWED) = (ETO) • (.62) • ((ETAF X LA) + ((1-ETAF) X SLA)))									MAWA = 13910.5

ETAF RESIDENTIAL Ø.55
ETAF NON - RESIDENTIAL Ø.45

ETWU (ANNUAL GALLONS REQUIRED = ETO X Ø.62 X ETAF X AREA.
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE F Ø.62

MAWA (ANNUAL GALLONS ALLOWED) = (ETO)
CONVERSION FACTOR ACRE-INCHES PER YEAR TO GALLONS PER SQUARE FOOT PER YEAR

IRRIGATION EFFICIENCY
Ø.75 FOR SPRAY Ø.75
.81 FOR DRIP Ø.81

LICENSED LANDSCAPE ARCHITECT
STEVEN L. CROUCH
LA No. 2557
Signature
05-31-20
Renewal Date
6-11-18
Date
STATE OF CALIFORNIA

AGENDA ITEM 11.2

WATER CONSERVATION WORKSHEETS.

TYPICAL PRODUCTION LANDSCAPE PLANS FOR
DOUGLAS 98 - EUCALYPTUS AT CYPRESS
WOODSIDE HOMES
PLACER COUNTY, CALIFORNIA

CROUCH LANDSCAPE GROUP
LIC.# 2557
(916) 772-0901
127 LINDA DRIVE
ROSEVILLE, CA 95678

SCALE: N.A.
DRAWING NO.
6-11-18
L-4
CIT
7729

		Timing/ Implementation	Enforcement/ Monitoring	Verification (date and Signature)
1.	The project shall be constructed in substantial compliance with the approved Design Review Package (**Exhibit A through D**) for the all new floor plans, elevations, color and materials sample and preliminary landscape plans to be built within the Douglas 98 subdivision. Minor modifications may be approved by the Community Development Director at his discretion, and those changes shall be reported to the City Council.	On-Going	Planning	
2.	The Applicant shall hold harmless the City, its Council Members, officers, agents, employees, and representatives from liability for any award, damages, costs and fees incurred by the City and/or awarded to any plaintiff in an action challenging the validity of this permit or any environmental or other documentation related to approval of this permit. Applicant further agrees to provide a defense for the City in any such action.	On-Going	Planning	
3.	This permit is valid for a period of three (3) years from the date of City Council approval unless an extension is granted by the Community Development Director	On-Going	Planning	
4.	Applicant shall not carry a negative account balance with the City for the processing of the project. If a negative account balance occurs, it will be the developer's responsibility to pay the balance due, in order to avoid delays in the processing of future permits or recordation of maps. Please email the Finance Department at billings@cityofranchocordova.org for the status of your account with the City.	On-Going	Finance	
5.	Any necessary future SMUD facilities located on the Applicant's property shall require a dedicated SMUD easement. This will be determined prior to SMUD performing work on the Applicant's property.	On-Going	SMUD	
6.	In the event the Applicant requires the relocation or removal of existing SMUD facilities on or adjacent to the subject property, the Applicant shall coordinate with SMUD. The Applicant shall be responsible for the cost of relocation or removal.	On-Going	SMUD	

7.	SMUD reserves the right to use any portion of its easements on or adjacent to the subject property that it reasonably needs and shall not be responsible for any damages to the developed property within said easement that unreasonably interferes with those needs.	On-Going	SMUD	
8.	The Project shall comply with the Sunridge Specific Plan Emission Reduction Measures (ERMs), which the City adopted in April 2015 as an addendum to the environmental document for the Sunridge Specific Plan, under the California Environmental Quality Act (CEQA).	On-Going	SMAQMD	
	Prior to Approval of Improvement Plans			
9.	The project has an approved level 3 sewer study and proposed variations will require an addendum to the study. SASD shall require an addendum to the approved sewer study prior to recordation of the Final Map or submittal of improvement plans for plan check to SASD, whichever comes first.	Prior to Approval of Improvement Plans	SASD	
10.	To obtain sewer service, construction of SASD sewer infrastructure will be required. Any construction and/or modification to the public sewer system shall be required to the satisfaction of SASD. SASD Design Standards apply to any sewer construction and/or modification.	Prior to Approval of Improvement Plans	SASD	
11.	SASD requires each building on each lot with a sewage source to have a separate connection to the SASD's sewer system. If there is more than one building in any single parcel and the parcel is not proposed for split, then each building on that parcel shall have a separate connection to a private onsite sewer line or a separate connection to the SASD public sewer line.	Prior to Approval of Improvement Plans	SASD	
12.	All public sewer easements will be dedicated to SASD in a form approved by the District Engineer. All public sewer easements will be at least 20 feet in width and requires continuous access for installation and maintenance. SASD will only provide maintenance in public right-of-ways and SASD dedicated sewer easements.	Prior to Approval of Improvement Plans	SASD	

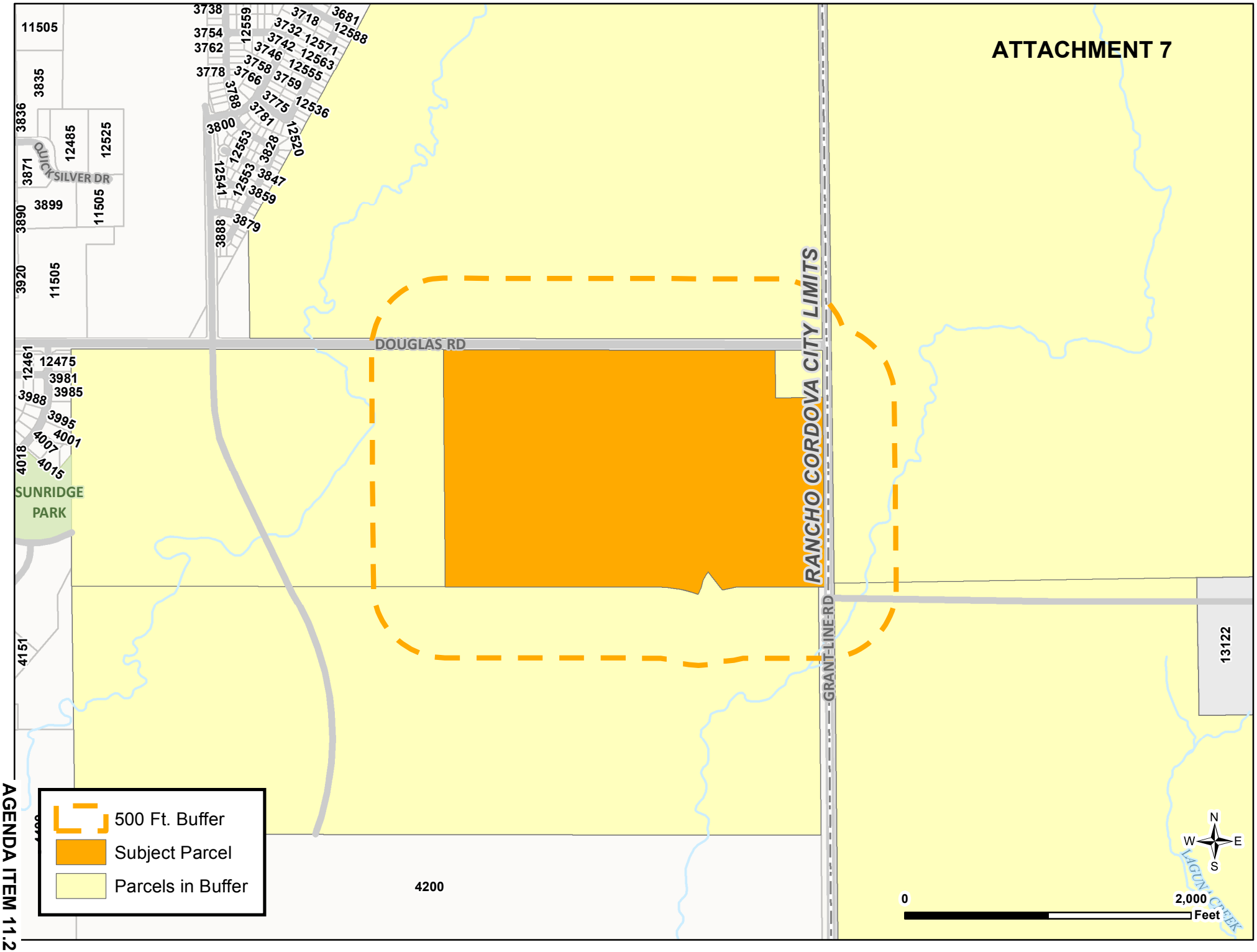
<table>
<tr><td></td><td colspan="4">Prior to Issuance of Building Permits</td></tr>
<tr><td>13.</td><td>Project shall comply with required setbacks as approved by the project's Special Development Permit. The required setbacks for the project are determined in correspondence with the projects typical lot size as shown in the table below.
<table>
<tr><th colspan="5">SETBACKS</th></tr>
<tr><th></th><th>45x70
Alley Lots</th><th>50x80
Conventional
Front loading
Lots</th><th>50x90
Alley Lots</th><th>50x90
Conventional
Front loading
Lots</th></tr>
<tr><td>Front Setback (Building)</td><td>10’</td><td>10’</td><td>10’</td><td>10’</td></tr>
<tr><td>Front Setback (Garage)</td><td>5’ (Alley)</td><td>19’</td><td>5’ (Alley)</td><td>19’</td></tr>
<tr><td>Side Setback</td><td>4’ / 6’</td><td>5’ / 3’</td><td>3’ / 3’</td><td>5’ / 3’</td></tr>
<tr><td>Side Setback (Corner Lot)</td><td>10’</td><td>10’</td><td>10’</td><td>10’</td></tr>
<tr><td>Rear Setback</td><td>5’ to Garage
10’ to Downstairs Living</td><td>10’ Single Story
15’ Two Story</td><td>5’ to Garage
5’ to Carriage Unit
10’ to Downstairs Living</td><td>10’ Single Story
15’ Two Story</td></tr>
<tr><td>Distance Between Buildings</td><td>8’</td><td>6’</td><td>6’</td><td>6’</td></tr>
<tr><td>Lot Area</td><td>3,150 SF</td><td>4,000 SF</td><td>4,500 SF</td><td>4,500 SF</td></tr>
</table></td><td>Prior to Building Permit</td><td>Planning</td><td></td></tr>
<tr><td>14.</td><td>The buildings shall be reviewed for architectural consistency with the approved plans by the Community Development Director or their designee.</td><td>Prior to Building Permit</td><td>Planning</td><td></td></tr>
<tr><td>15.</td><td>Submit final site landscaping and fence plans for review and approval by the Community Development Director or their designee.</td><td>Prior to Building Permit</td><td>Planning</td><td></td></tr>
</table>

16.	Each phase of the development may be pre-plotted and approved before the issuance of the permit for that phase. The following criteria will be used to ensure the project meets the adopted design guidelines: • Two of the same architectural styles or color schemes shall not be placed next to each other. • No two of the same floor plans may be placed next to each other, unless they have different elevations. • Any two-story home on a corner shall provide an enhanced side elevation on the side of the home facing the roadway, which shall include window trims, casings, shutters and other details found on the front elevation as shown in the Design Review Package. This condition shall also apply to two-story home rear elevations visible from the Public Right of Way (including Douglas Road and Grant Line Road). • The front yard setbacks for any two adjacent lots shall not be the same distance. A two foot offset shall be the minimum setback required to meet this condition where feasible. • Man doors are required in the garage to exit into the side yard. • Garage doors with windows shall be standard for all elevations on front loaded garages and shall not be considered an option/upgrade. Alley loaded homes are not required to have windows on garage doors.	Prior to Building Permit	Planning	
17.	Garage side yard on front loaded homes shall have a minimum 5' setback to accommodate trash receptacles and garage man door.	Prior to Building Permit	Planning	
18.	Structural setbacks less than 14-feet shall require the Applicant to conduct a pre-engineering meeting with all utilities to ensure property clearances are maintained.	Prior to Building Permit	SMUD	
19.	The Applicant shall not place any building foundations within 5-feet of any SMUD trench to maintain adequate trench integrity. The Applicant shall verify specific clearance requirements for other utilities (e.g., Gas, Telephone, etc.).	Prior to Building Permit	SMUD	

20.	The Applicant shall comply with SMUD siting requirements (e.g., panel size/location clearances from SMUD equipment, transformer location, and service conductors). Information regarding SMUD siting requirements can be found at https://www.smud.org/en/Business-Solutions-and-Rebates/Design-and-Construction-Services	Prior to Building Permit	SMUD	
21.	The Applicant shall provide separate SMUD service points to each parcel to the satisfaction of SMUD.	Prior to Building Permit	SMUD	
22.	The Applicant shall located, verify, and provide a drawing to SMUD identifying all electrical utility infrastructure for the existing structures. If necessary, any existing onsite electrical infrastructure that serves existing structures shall be relocated to the satisfaction of SMUD	Prior to Building Permit	SMUD	
23.	The Applicant shall dedicate a 12.5 foot public utility easement for overhead and/or underground facilities and appurtenances adjacent to all public street rights-of-ways.	Prior to Building Permit	SMUD	
24.	The Applicant shall dedicate any private drive, ingress and egress easement, (and 10-feet adjacent thereto) as a public utility easement for (overhead and) underground facilities and appurtenances. All access roads shall meet minimum SMUD requirements for access roads.	Prior to Building Permit	SMUD	
25.	The Applicant shall dedicate Lot E, the Landscape Corridors or the common area as a public utility easement for (overhead and) underground facilities and appurtenances, except for those areas where structures or pools are located.	Prior to Building Permit	SMUD	
26.	The Applicant shall dedicate a 25-foot easement for future 69 kV routes that will be required to connect the new substation into SMUD's Distribution System. Associated future overhead 69 kV will be installed along the south side of Douglas Road. If a 12.5 foot Public Utility Easement (PUE) is also required along these streets, the 12.5 foot PUE will be located directly adjacent to the street right-of-way, with the 20-foot 69 kV easement directly adjacent to the PUE.	Prior to Building Permit	SMUD	
27.	The Applicant shall dedicate any necessary PUE's on the final map to SMUD's satisfaction	Prior to Building Permit		

28.	In the event the City requires an Irrevocable Offer of Dedication (IOD) for future roadway improvements, the Applicant shall dedicate a 12.5 foot public utility easement (PUE) for overhead and/or underground facilities and appurtenances adjacent to the City's IOD.	Prior to Building Permit	SMUD	
29.	Applicant will include phasing of development and order of planned construction upon submitting a new service application to SMUD for the initial subdivision phase(s) and/or road improvement backbone project(s).	Prior to Building Permit	SMUD	
30.	Development should be phased to start adjacent to existing electrical infrastructure to minimize temporary overhead and/or underground electrical facilities	Prior to Building Permit	SMUD	
31.	Development phases submitted for new service should include all lots front streets	Prior to Building Permit	SMUD	
32.	SASD and Regional San will require additional sewer impact fee payments in accordance with each District's Ordinance. Fees are to be paid prior to the issuance of building permits. The applicant should contact Permit Services Unit at 916-876-6100 for sewer impact information.	Prior to Building Permit	SASD	
	Prior to Final Inspection			
33.	The final building finishes and the front and street side yard landscaping shall be inspected for consistency with approved Design Review plans. Inspection request will be required of the Planning Department, prior to final inspection by the Building Department.	Prior to Final Inspection	Planning	
34.	Concrete paths must connect man doors to driveways as shown on the submitted landscape plan and an additional 4'x10' concrete pad shall be installed by the developer for the storage of garbage receptacles behind the fence line.	Prior to Final Inspection	Planning	
35.	Each home must be equipped with adequate outdoor lighting as well as an illuminated address plate located on the front elevation.	Prior to Final Inspection	Planning	
36.	The Applicant shall dedicate and provide all-weather vehicular access for service vehicles that are up to 26,000 pounds. At a minimum: (a) the drivable surface shall be 20-feet wide; and (b) all SMUD underground equipment and	Prior to Final Inspection	SMUD	

	appurtenances shall be within 15-feet from the drivable surface			
37.	Landscaping should be of the type and situated in locations to maximize observation while providing the desired degree of aesthetics. Security planting materials are encouraged along fences and property liens and under vulnerable windows	Prior to Final Inspection	RCPD	
38.	There should be on-street and driveway lighting to allow for adequate visibility by residents, law enforcement, and passerby during nighttime hours	Prior to Final Inspection	RCPD	
39.	Model home will not be allowed to connect to public sewer prior to field acceptance of the infrastructure.	Prior to Final Inspection	SASD	


ATTACHMENT 7
DOUGLAS RD
RANCHO CORDOVA CITY LIMITS
GRANT LINE RD
QUICKSILVER DR
SUNRIDGE PARK
LAGUNA CREEK
11505
3835
3836
12485
12525
3871
3899
3890
3920
3738
3754
3762
3778
12559
3718
3681
12588
3732
12571
3742
12563
3746
12555
3758
3759
3766
3788
3775
12536
3781
3800
12520
3828
12553
12541
3847
3859
3879
3888
12461
12475
3981
3985
3988
3995
4001
4007
4015
4018
4151
4200
13122
500 Ft. Buffer
Subject Parcel
Parcels in Buffer
N
W
E
S
0
2,000
Feet

CURRENT RESIDENT
13019 GLORY LANE
RANCHO CORDOVA CA 95742

TRACY PETER/ROSE REINHEIMER GST EXEMPT TRUST/ETAL
1443 35TH AVE
SAN FRANCISCO CA 94122

LAL ARORA/ESHITA
353 E BONNEVILLE AVE 807
LAS VEGAS NV 89101

LARNE FAMILY TRUST/CHRIS KSIDAKIS
4560 OXBOW RIDGE PL
FAIR OAKS CA 95628

CORDOVA HILLS LLC
5241 ARNOLD AVE
MCCLELLAN CA 95652

DOUGLAS ROAD 105 LLC
7700 COLLEGE TOWN DR 201
SACRAMENTO CA 95826

MIZOGUCHI FAMILY REVOCABLE TRUST/ETAL
PO BOX 221274
SACRAMENTO CA 95822

ATTACHMENT 7

SACRAMENTO SANITATION DISTRICT
10060 GOETHE ROAD
SACRAMENTO CA 95827

SACRAMENTO REGIONAL COUNTY
SANITATION DISTRICT
10060 GOETHE ROAD
SACRAMENTO CA 95827

SACRAMENTO COUNTY WATER
AGENCY
10151 FLORIN ROAD
SACRAMENTO CA 95829

PG&E
2730 GATEWAY OAKS DRIVE
SACRAMENTO CA 95833

PG&E
343 SACRAMENTO STREET
AUBURN CA 95603

SMUD
6301 S STREET MS B304
SACRAMENTO CA 95817

SMUD
6301 S STREET MS B304
SACRAMENTO CA 95817

SMUD
6301 S STREET MS B404
SACRAMENTO CA 95817

SACRAMENTO METROPOLITAN FIRE
10545 ARMSTRONG AVE STE 310
MATHER CA 95655

ELK GROVE UNIFIED SCHOOL DISTRICT
9510 ELK GROVE-FLORIN RD
ELK GROVE CA 95624

SACRAMENTO COUNTY WATER
AGENCY
827 7TH STREET RM 301
SACRAMENTO CA 95814

CITY OF RANCHO CORDOVA
2729 PROSPECT PARK DR
RANCHO CORDOVA CA 95670

ATTACHMENT 8

Woodside Douglas 98

DD9793, DD9794, DD9795, DD9796

Rancho Cordova City Council

June Cowles, Senior Planner
Nicholas Sosa, Assistant Planner

October 15, 2018



AGENDA ITEM 11.2

a fresh take. RANCHO CORDOVA CALIFORNIA

Project Request

- Applicant is requesting a Special Development Permit to vary from the Sunridge Specific Plan required setbacks from property lines and required setbacks between buildings.
- Applicant is also requesting a Major Design Review for 4 neighborhoods (Sequoia, Magnolia, Cottonwood, and Eucalyptus) totaling 14 floor plans, each floorplan with a minimum of three elevations.

Douglas 98 Site Location



Douglas 98 History

2004 Sunridge Eastside Properties Specific Plan Amendment
The Sunridge Eastside Properties (Douglas 98, Douglas 103, Grantline 208, and Arista Del Sol) were modified from the original plan due to increasing the wetland preserve. The amendment included the following;

- Higher density zoning (RD-10).
- Central park, paseo design; connectivity to parks and neighborhood.
- Greater diversity of lot configuration for different housing products.

2013 Douglas 98 Rezone and Tentative Subdivision Map
In 2013, the tentative subdivision map was revised as follows;

- Eliminated the “zipper lots”
- Reduced the small park acreage and replaced with RD-5 and RD-7 zoning.

The project retains many of the original concepts for providing internal and external connectivity with the roads, connections to the open space amenities thru enhanced walkways and paseos, and maintaining the central park.

Douglas 98 Approved Subdivision Map



Special Development Permit

The Douglas 98 project is located within the Sunridge Specific Plan which was originally approved by Sacramento County prior to City incorporation. As such, provisions of the County of Sacramento Zoning Code are applicable in the review of subsequent actions on the Douglas 98 project.

Article 6 of the Sacramento County Zoning Code establishes procedures for Special Development Permits and includes the following statement:

> "The purpose for which Special Development Permits may be issued is to encourage a creative and more efficient approach to the use of the land; to maximize the choice in the type of environment; to encourage more efficient allocation and maintenance of privately controlled common open space though the redistribution of overall density ; to provide economy in housing opportunities; and to provide a means of greater creativity and flexibility in design than is provided under the strict application of the zone design standards …."

Requested Special Development Permit

Setbacks					
	Required per Sunridge Specific Plan	Proposed 45x70 Alley Lots	Proposed 50x80 Conventional Front loading Lots	Proposed 50x90 Alley Lots	Proposed 50x90 Conventional Front loading Lots
Front Setback (Building)	16’	10’	10’	10’	10’
Front Setback (Garage)	19’	5’ (Alley)	19’	5’ (Alley)	19’
Side Setback	5’ / 4’	4’ / 6’	5’ / 3’	3’ / 3’	5’ / 3’
Side Setback (Corner Lot)	12.5’	10’	10’	10’	10’
Rear Setback	20% of the lot depth	5’ to Garage 10’ to Downstairs Living	10’ Single Story 15’ Two Story	5’ to Garage 5’ to Carriage Unit 10’ to Downstairs Living	10’ Single Story 15’ Two Story
Sunridge Specific Plan condition; In no event shall the rear yard be less than 10 feet for one-story buildings and 15 feet for two-story and three-story buildings.					
Distance Between Buildings	9’	8’	6’	6’	6’
Lot Area	Various	3,150 SF	4,000 SF	4,500 SF	4,500 SF

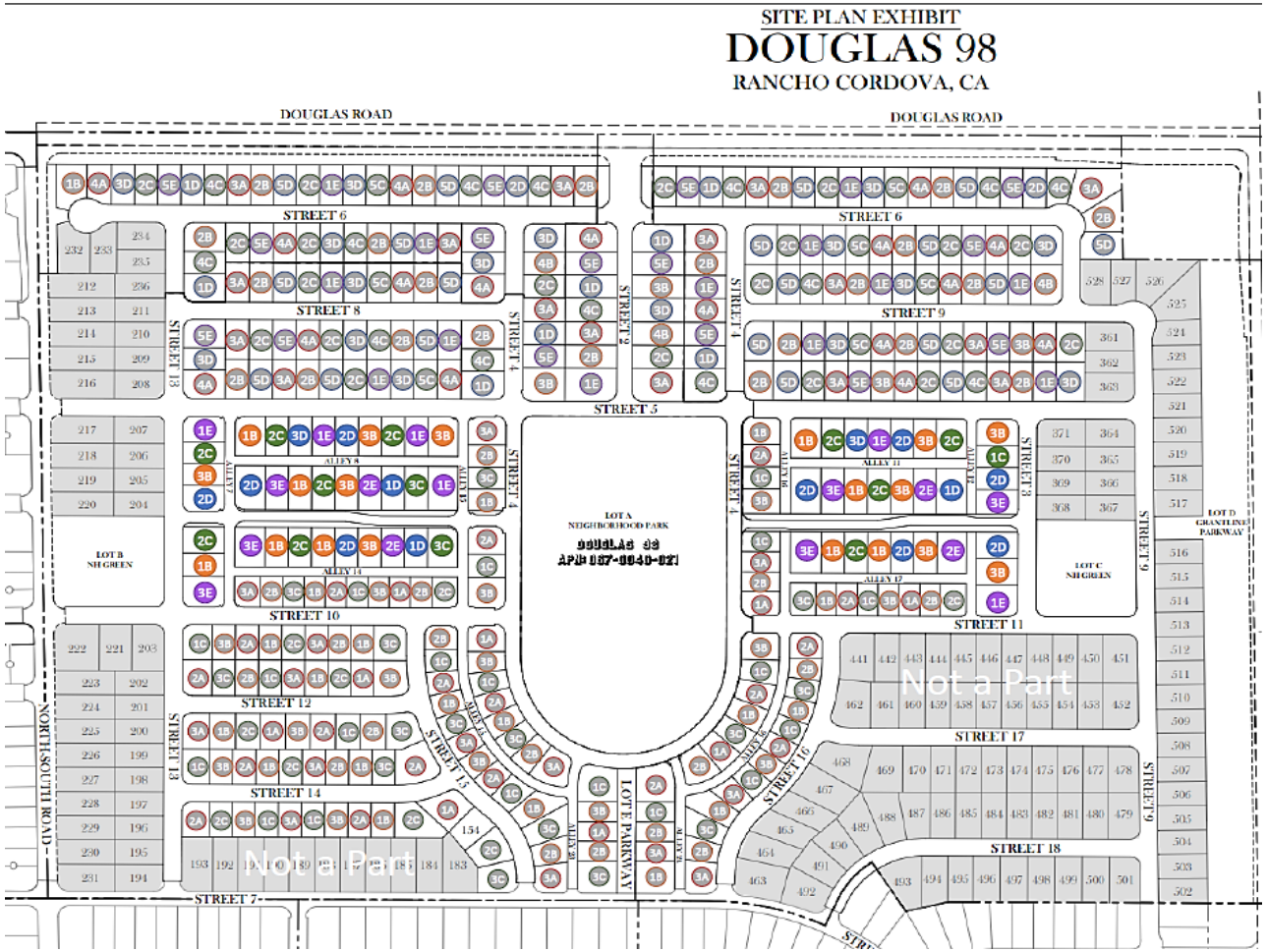
Major Design Review

- The Applicant is requesting a Major Design Review for four neighborhoods within the Douglas 98 subdivision.
- The neighborhoods are the following:
  - **Sequoia at Cypress** – 3 floor plans with 3 elevations
  - **Magnolia at Cypress** – 5 floor plans with 3 elevations
  - **Cottonwood at Cypress** – 3 floor plans with 3 elevations
  - **Eucalyptus at Cypress** – 3 floor plans with 3 elevations.
- In total the four neighborhoods will provide 14 floor plans with a variety of elevations and color palettes to create an interesting streetscape throughout Douglas 98.

Sequoia at Cypress (DD9793)

ATTACHMENT 8

- The Sequoia neighborhood consists of homes that are alley-loaded with a typical lot size of 50 feet in width by 90 feet in depth.
- This neighborhood has 3 floor plans with 3 elevations each.



Sequoia at Cypress (DD9793)

- **Example Elevations**



FRONT ELEVATION 'B' - WINE COUNTRY



FRONT ELEVATION 'E' - MODERN FARMHOUSE

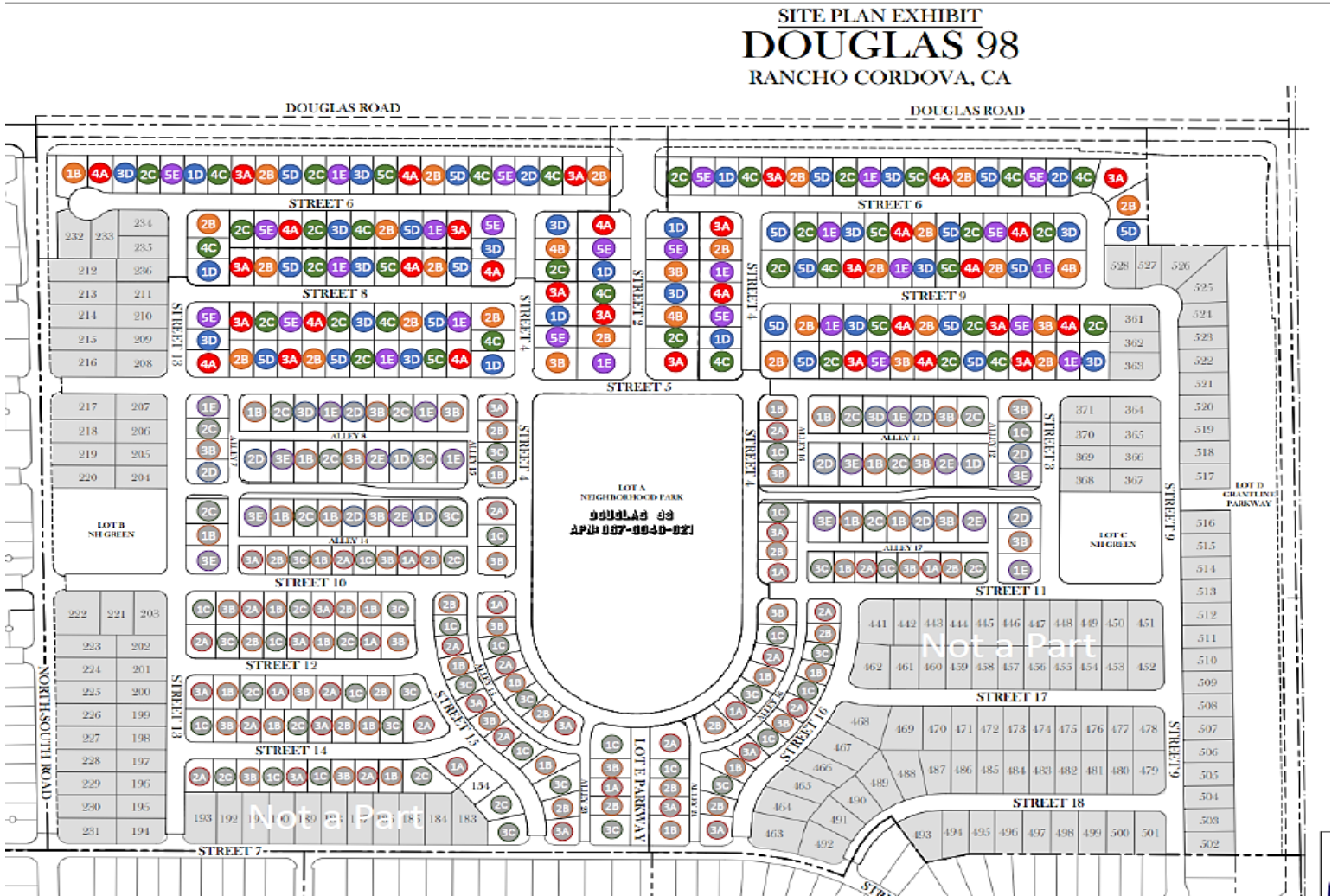


FRONT ELEVATION 'D' - MID CENTURY MODERN

Magnolia at Cypress (DD9794)

ATTACHMENT 8

- The Magnolia neighborhood consists of the conventional front loaded home with a typical lot size of 50 feet wide by 90 feet in depth.
- This area would consist of 5 floor plans each with 3 elevations



Magnolia at Cypress (DD9794)

- **Example Elevations**



FRONT ELEVATION 'D' - MID CENTURY MODERN



FRONT ELEVATION 'E' - MODERN FARMHOUSE



FRONT ELEVATION 'A' - MODERN SPANISH



FRONT ELEVATION 'B' - WINE COUNTRY

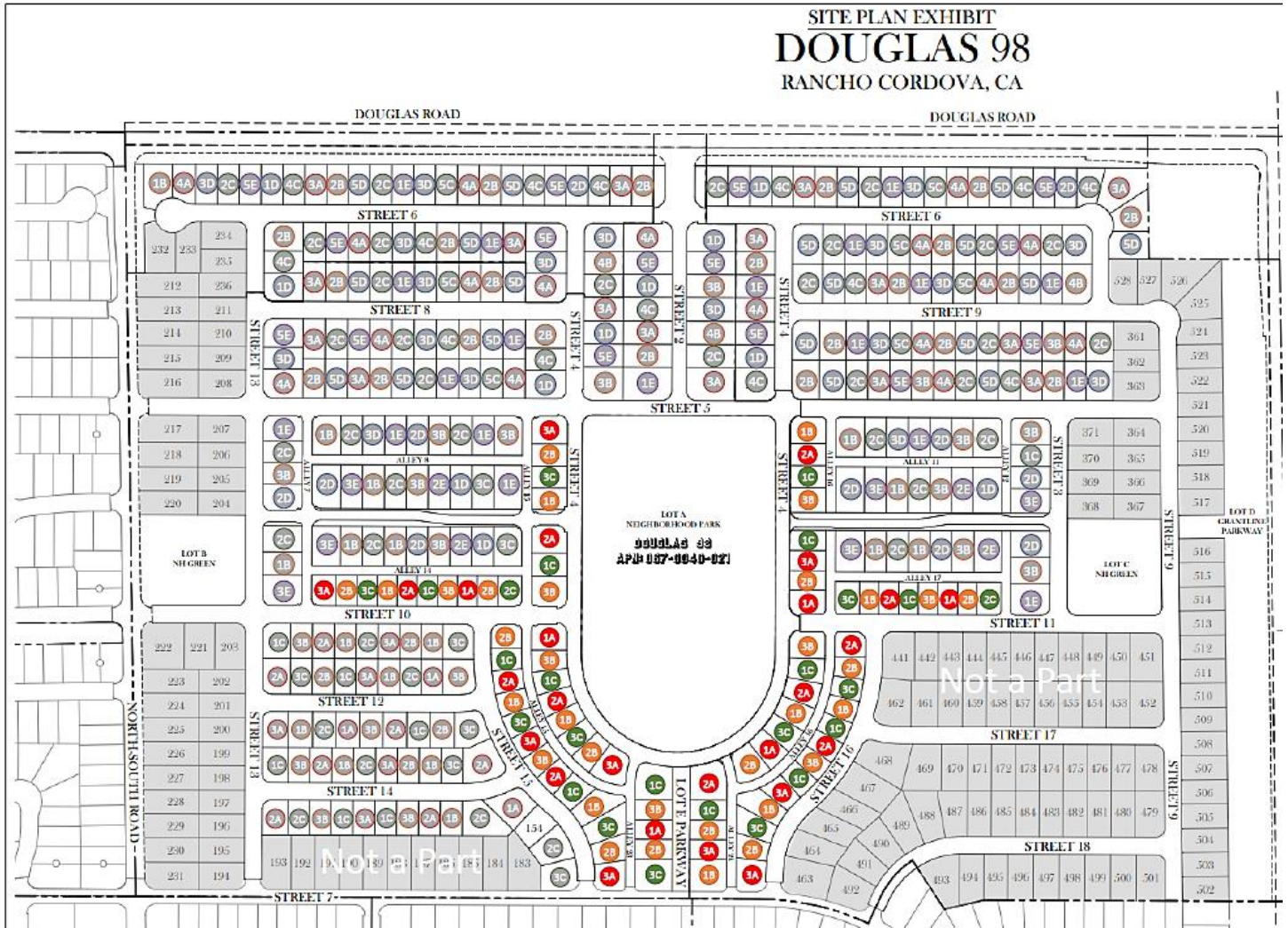


FRONT ELEVATION 'C' - MODERN PRAIRIE

Cottonwood at Cypress (DD9795)

ATTACHMENT 8

- The Cottonwood neighborhood consists of home plans that are alley-loaded on a typical lot size of 45 feet wide by 70 feet in depth.
- This area would consist of 3 floor plans each with 3 elevations



Cottonwood at Cypress (DD9795)

- Example Elevations



FRONT ELEVATION 'C' - MODERN PRAIRIE SCALE: 1/4" = 1'-0"



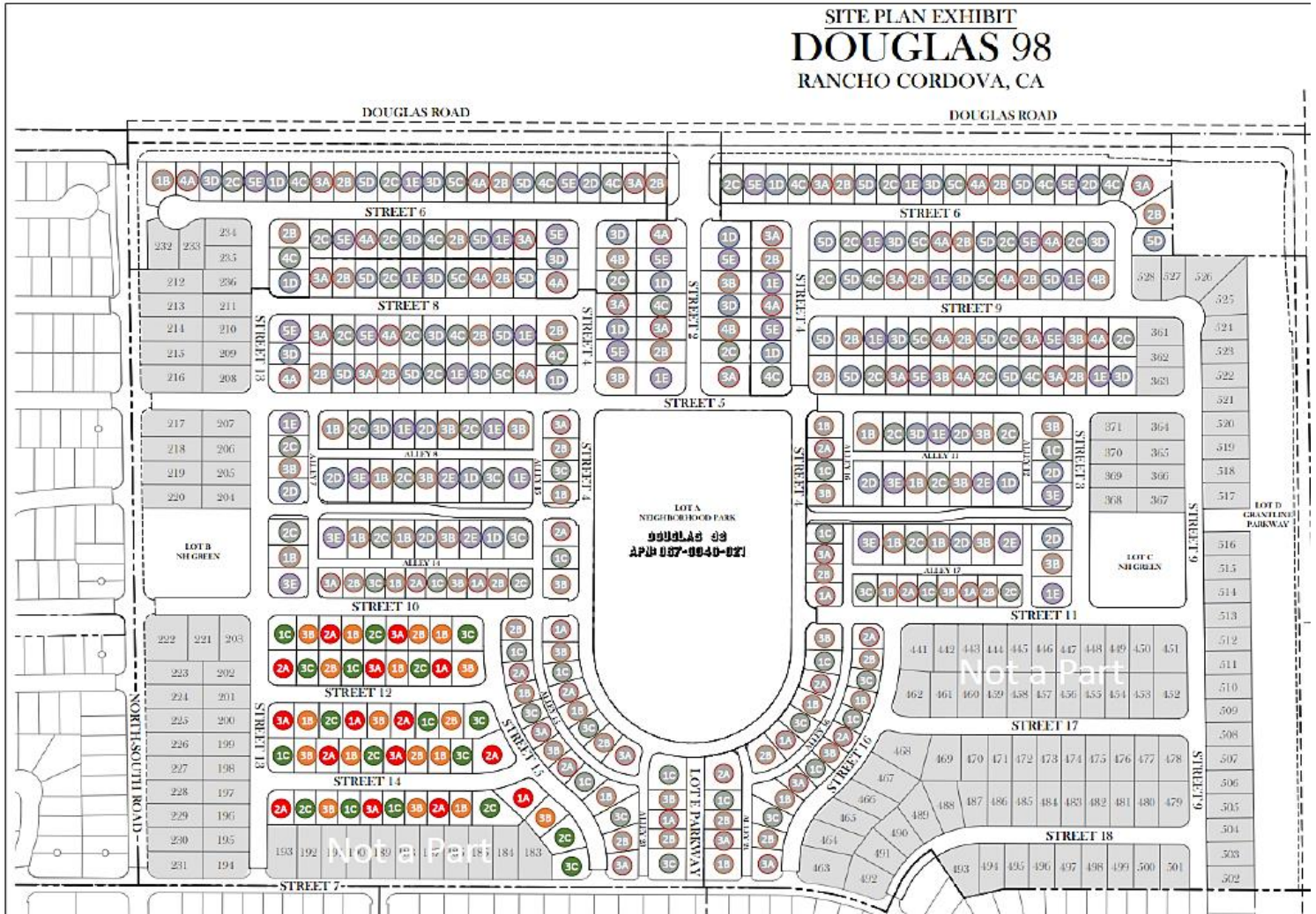
FRONT ELEVATION 'A' - MODERN SPANISH SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - MID CENTURY MODERN SCALE: 1/4" = 1'-0"

Eucalyptus at Cypress (DD9796) ATTACHMENT 8

- The Eucalyptus neighborhood consists of home plans that are the conventional front-loaded home and will have a a typical lot size of 50 feet wide by 80 feet in depth.
- This area would consist of 3 floor plans each with 3 elevations



Eucalyptus at Cypress (DD9796) ATTACHMENT 8

- Example Elevations



FRONT ELEVATION 'A' - MODERN SPANISH SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY SCALE: 1/4" = 1'-0"

Eucalyptus at Cypress (DD9796) ATTACHMENT 8

- Example Elevations



FRONT ELEVATION 'A' - MODERN SPANISH SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'C' - MODERN PRAIRIE SCALE: 1/4" = 1'-0"



FRONT ELEVATION 'B' - WINE COUNTRY SCALE: 1/4" = 1'-0"

Environmental

- The proposed project has been analyzed as part of the Sunridge Specific Plan Environmental Impact Report (EIR) and the Mitigated Negative Declaration (MND) for the Eastside Properties.
- The proposed residential project is in conformity with what was reviewed as part of the EIR and MND and therefore exempt under CEQA Exemption 15182, Residential Projects Pursuant to a Specific Plan

Recommended Motion

- Staff recommends that City Council find the project categorically exempt from further CEQA review and adopt the Resolution approving the Special Development Permit and Major Design Review for Douglas 98 (DD9793, DD9794, DD9795, and DD9796) subject to the findings, project plans and conditions of approval.

Questions???

MEMORANDUM

DATE: October 15, 2018

TO: Honorable Mayor and Council Members

FROM: Nicholas Sosa, Assistant Planner

SUBJECT: **MATHER FIELD CHEVRON AND CARWASH CONDITIONAL USE PERMIT, MINOR DESIGN REVIEW, AND LETTER OF PUBLIC CONVENIENCE AND NECESSITY; PREJCT NO. DD9734 – LOCATED AT 2931 MATHER FIELD ROAD**

PROPERTY OWNER:	**APPLICANT/DEVELOPER:**
Mather Field Chevron Iqbal Chohan 2931 Mather Field Road Rancho Cordova, CA 95670	K12 Architects, Inc. Steven C. Elser, RA 3090 Fite Circle, Suite 104 Sacramento, CA 95827

PROJECT:	The Applicant is applying for a Conditional Use Permit (CUP) and Minor Design Review for the reconstruction of a service station and the addition of a self-serve drive-thru carwash within the Folsom Boulevard Commercial Mixed Use Zone (FB-CMU). Applicant is also requesting a CUP for alcoholic beverage sales to sell off-site beer and wine. In addition to the CUP required for alcohol sales, per the requirements of the Alcoholic Beverage Control Department (ABC), the applicant is requesting a Letter of Public Convenience and Necessity (PCN) from the Council.
FILE:	DD9734
LOCATION:	2931 Mather Field Road
APN:	077-0030-004-0000
PLANNER:	Nicholas Sosa, Assistant Planner

RECOMMENDATION

1. Determine the Project Exempt per Sections 15183 and 15332 of the CEQA Guidelines;
2. Adopt Resolution for Minor Design Review and Conditional Use Permit (CUP) for a Service Station and Car Wash; and
3. Adopt a Resolution denying a CUP request for alcoholic beverage sales and contingent Letter of Public Convenience and Necessity (PCN).

RESULT OF RECOMMENDED ACTION

Adoption of the Resolution for the Minor Design Review and Conditional Use Permit for the Service Station would allow the applicant to submit for building permits to begin the demolition of the existing convenience store and allow for construction of a new convenience store with drive-thru self-serve carwash.

Denial of the CUP request for off-site sales of alcohol (beer and wine) would subsequently also deny the requested PCN and the applicant would not be able to receive a license from ABC. In order to deny the CUP request, Council must determine that the required findings under Rancho Cordova Municipal Code section 23.134.070 were not met.

PROJECT DESCRIPTION

The project site is zoned Commercial Mixed Use within the Folsom Boulevard Specific Plan (FB-CMU) and currently has an existing Chevron fuel station with an 8 fuel pump canopy and Extra Mile convenience store. The current site plan does not utilize the full buildable area of the property as approximately 50% of the property has remained undeveloped as a vacant lot (**See Figures 1 and 2**). The Applicant submitted for a Minor Design Review with the Planning Department for the demolition of the existing convenience store and the construction of a new 2,939 square foot convenience store with the addition of a 1,300 square foot drive-thru self-serve car wash. Staff was unable to locate any historical Conditional Use Permit (CUP) for the existing service station on site and therefore have included a CUP as part of this project to ensure that the service station has the required entitlements for the proposed use.

With the reconstruction of the convenience store the Applicant has also requested to expand their merchandise inventory to include off-site beer and wine sales at this location. Alcohol sales within the FB-CMU zoning designation requires the issuance of a CUP for off-site sales. Due to the high concentration of alcohol licenses and high crime in the area the Department of Alcoholic Beverage Control (ABC) has also required an approved Letter of Public Convenience and Necessity (PCN) by the local jurisdiction before their department can approve the Applicant's ABC application. As part of the review for the PCN, the project was sent to the Rancho Cordova Police Department (RCPD) for additional data regarding calls for service and crime analysis. This information is further discussed in the PCN analysis section of this report.

Figure 1: Project Site (Existing)



Figure 2: Street View (Existing)



REQUIRED PERMITS AND REGULATORY BASIS

A Minor Design Review is required per Section 23.140 for new construction of a non-residential building greater than 1,000 square feet. The design review will ensure compatibility with the surrounding area and implementation of all applicable development standards. A Conditional Use Permit is also required for a service station with drive-thru carwash within the FB-CMU zoning designation per Table 2-2 of the Folsom Boulevard Specific Plan.

The applicant has also requested a Conditional Use Permit for the off-site alcohol sales as required by Table 2-2 of the Folsom Boulevard Specific Plan. Due to the location of the site, as part of that CUP, the Applicant must obtain a Letter of Public Convenience and Necessity from the local jurisdiction prior to the issuance of their alcohol license by the Department of Alcoholic Beverage Control.

Permits Required after Approval:

- Building Permits
- Business License
- An ABC license would be required if applicant is granted the requested CUP and PCN.

ANALYSIS

General Plan:
The project site is located within the Folsom Boulevard Planning Area (FBPA) of the Rancho Cordova General Plan. The FBPA encourages mixed uses and high intensity development throughout Folsom Boulevard. The revitalization of commercial areas near Folsom Boulevard will serve as the catalyst for redevelopment of the corridor. The proposed demolition and reconstruction of the existing service station is a prime example of the redevelopment encouraged by the General Plan. The absorption of the neighboring vacant lot will expand the commercial development closer to the residential areas as well as provide a more visually appealing connection between Highway 50 and Folsom Boulevard.

Zoning Code/Folsom Boulevard Specific Plan:
The project site is located within a Commercial Mixed Use (CMU) zone within the Folsom Boulevard Specific Plan (FB-CMU). This zone includes a large variety of commercial uses, community service uses, and some industrial uses. The FB-CMU zoning is predominantly along Folsom Boulevard but does cover some key areas along Mather Field Road and Zinfandel Drive connecting Folsom Boulevard to Highway 50.

A service station is allowed with the issuance of a CUP and would continue to be an appropriate use at this location as the project site is located near the Mather Field off ramp from Highway 50. The use of alcoholic beverage sales is also allowed within the FB-CMU with the issuance of a CUP. The Applicant is requesting sales of beer and wine only.

Table 1: Surrounding Designations and Existing Uses

Location	Existing Use	General Plan Designation	Zoning Designation
North East Corner of Mather Field Road and Mill Station Road Intersection	Service Station	Folsom Boulevard Planning Area (FBPA)	Commercial Mixed Use within the Folsom Boulevard Specific Plan (FB-CMU)
North	Straw Hat Pizza	Folsom Boulevard Planning Area (FBPA)	Commercial Mixed Use within the Folsom Boulevard Specific Plan (FB-CMU)
East	Multi-Family Housing	Folsom Boulevard Planning Area (FBPA)	Residential Mixed Use within the Folsom Boulevard Specific Plan (FB-RMU)
South	Mills Station Road / VCA Veterinary Hospital	Folsom Boulevard Planning Area (FBPA)	Commercial Mixed Use within the Folsom Boulevard Specific Plan (FB-CMU)
West	Mather Field Road / Mill Station Park & Ride	Folsom Boulevard Planning Area (FBPA)	Office Industrial Mixed Use within the Folsom Boulevard Specific Plan (FB-OIMU)

Service Station Conditional Use Permit*:*
Although the site is already utilized as a service station, Staff was unable to locate a record of a previous permit at this location. Therefore, staff has included the Conditional Use Permit as part of the project to legitimize the use and provide record of its approval. A service station is allowable within the FB-CMU zoning designation with the approval of a Conditional Use Permit. Within the definition of service station provided by the Folsom Boulevard Specific Plan, the service station is allowed to include a convenience store and/or self-service car wash as part of their services. Review of the Conditional Use Permit is intended to ensure that the use is compatible with nearby uses and residential areas. The proposed service station will be a demolition and reconstruction of an existing service station already located on the corner of Mather Field Road and Mills Station Road. The service station will utilize the existing pumps and canopy already on site and will not be expanded as part of the site redevelopment.

Parking:
The overall service station is able to meet their on-site parking requirement for the fueling canopy as well as the convenience store. Parking requirements are shown in the table below. The 3 minimum spaces for the service station are counted within the 6 required for the convenience store. Total the overall service station requires 14 parking spaces. The project site provides adequate parking with a total of 15 spaces (7 standard parking plus 8 fueling positions).

Parking	Permitted/Required	Proposed
Convenience Store	3.6 spaces per 1,000 sf (6 spaces required)	Total required is 14 spaces.
Service Station	3 Spaces Min. + 2 per bay (8 spaces + 3 minimum included as part of 6 required for store)	Project site proposes 15 spaces

Acoustic Analysis:
Due to the proximity of the neighboring apartment complex the Applicant was required to conduct an initial noise analysis to determine whether the car wash equipment would exceed the allowable noise requirements between property lines (**See Attachment 6**). The analysis determined that existing ambient noise levels at the property line already exceed the allowable maximums within residential and that the addition of the car wash would not increase the existing noise levels so long as certain mitigated measures are taken. These measures are shown below and have been added as part of the Conditions of Approval.

- The car wash dryer used for the project should be the Mark VII, AquaDri E-20 or similar.
- A 6-8 foot tall concrete masonrywall shall be constructed at the property line shared with the adjacent residential receptors. The wall shall be located at the approximate location shown within the approved acoustic analysis (between the multi-family building and commercial buildings).
- The car wash blowers shall be set to run for a period no more than 60 seconds per car wash cycle.
- The car wash shall operate only during daytime hours (7:00AM to 10:00PM) hours.

Findings and Evidence:
Staff supports the proposed CUP for a service station at this location. In order to approve the requested entitlement, Zoning Code Section 23.134.070 states that specific findings must be approved. These findings and the corresponding evidence to support them are shown below.

a) Finding: The site size, dimensions, location, topography, and access are adequate for the needs of the proposed use, considering the proposed building mass, parking, traffic, noise, vibration, exhaust/ emissions, light, glare, erosion, odor, dust, visibility, safety, and aesthetic considerations.

   Evidence: The CUP will be for the service station use at 2931 Mather Field Drive. The project site is already utilized as a service station and provides adequate access, parking, and contains existing fuel tanks and an existing fuel canopy. A noise study was conducted to ensure that neighboring residences are not disturbed by the added car wash. The proposed use is adequate at this location.

b) Finding: The negative impacts of the proposed use on adjacent properties and on the public can be mitigated through application of other code standards or other reasonable conditions of approval.

Evidence: A service station is currently active on the property and has not provided any notable negative impacts to adjacent properties. With the addition of the self-serve car wash the project was required to complete a thorough noise analysis to ensure that the neighboring multi-family complex would not experience negative effects. Per the noise analysis recommendations, additional conditions of approval were added to mitigate any possible impacts. The Applicant will be required to follow all conditions of approval as well as all State requirements for operation of the service station.

c) Finding: All required public facilities have adequate capacity to serve the proposal.

Evidence: The project site already contains the underground fuel tanks and fuel pumps within the existing fuel canopy on site. The existing building will be removed and reconstructed with the addition of a car wash on site. The site does have adequate infrastructure access and utility capacity to serve the proposal.

d) Finding: The project meets the requirements of the Zoning Code including development standards, design guidelines, and special use provisions.

Evidence: The project meets the required setbacks and design guidelines for a commercial business located within a Commercial Mixed Use (CMU) zoning designation. With the new construction of the building, the landscaping will also be revitalized and brought into compliance with current Zoning Code regulations.

e) Finding: If structures and site plans are considered nonconforming, the elements of a project that are nonconforming have been brought into compliance with the zoning code, where feasible.

Evidence: The project site is currently an existing gas station. Staff was unable to locate an existing use permit for the service station use at this location. A service station with car wash is permitted with the issuance of a CUP and approval of the applicants request for a CUP will legitimize the use and allow the service station as well as bring other aspects of the site including landscaping, parking, and access into compliance with current Zoning Code regulations.

Minor Design Review:

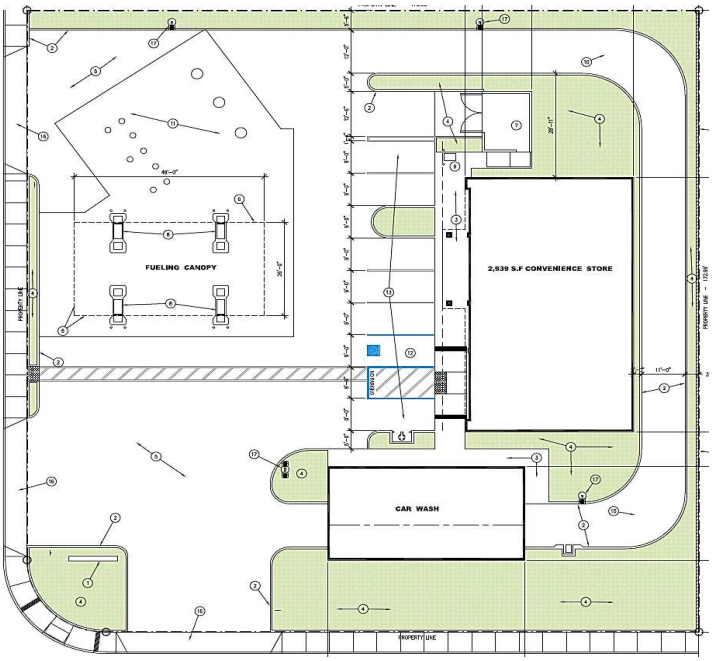
A Minor Design Review is required for any new construction of nonresidential buildings or structures equal to or greater than 1,000 square feet and less than 5,000 square feet. The proposed convenience store and additional car wash is a total of 4,239 square feet. The existing fuel canopy will remain the same and will not be expanding.

The project has been reviewed in accordance with the Design Guidelines sections pertaining to commercial development and in particular automobile dependent land uses. Since the site had already been developed as a gas station, the underground gas tanks and fuel pump locations are unable to be relocated and due to the location of the driveway entrances along Mather Field Road and along Mills Station Road, the building was not able to be moved closer to the Public Right of Way.

Lighting:
Adequate light has been proposed on site consistent with Zoning lighting standards and requirements for parking lots and commercial areas. All outdoor lighting including building attached lighting, will be constructed with full shielding and oriented to minimize light trespass outside of the project site. Lighting along the back of the building is proposed to be gooseneck lighting which will be pointed downwards and shielded to ensure lighting does not disturb the neighboring multi-family building.

Site Plan & Architecture:
The service station is located on the corner of Mather Field Road and Mills Station Road with the building frontage facing west toward the existing fuel canopy and Mather Field Road. The existing building will be demolished and the newly proposed building will be shifted east to occupy an existing vacant lot and incorporate the new drive-thru proposed for the car wash addition. The drive thru will run behind the proposed convenience store and exit on the South end of the property. The proposed architecture for the building includes stone veneer on the North, West, and South sides of the convenience store as well as cornices, gooseneck lighting and trellis features that break up blank walls on various elevations. The car wash also includes stone veneer surrounding the building with trellis features along Mills Station Road. (**See Figures 3, 4, and 5**)

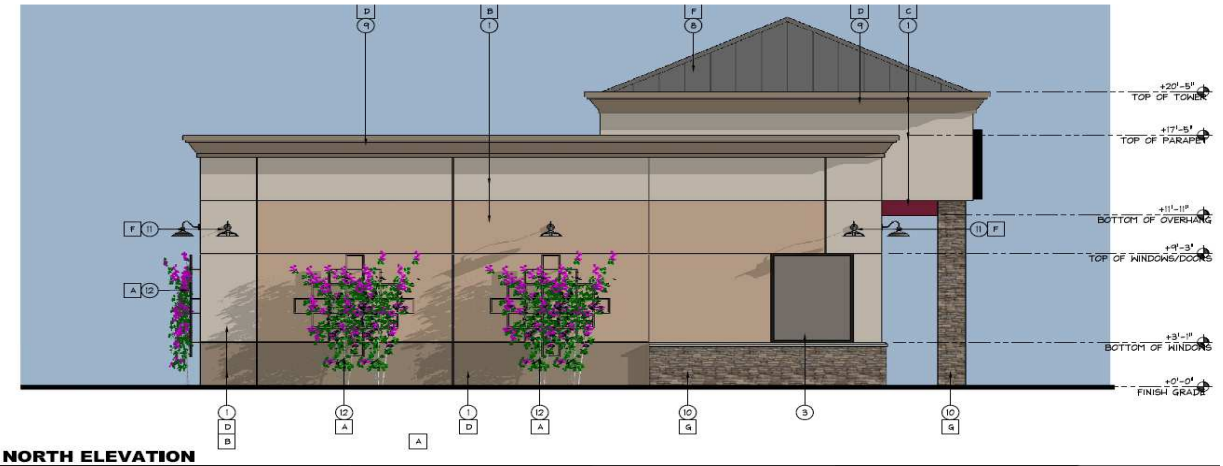
Figure 3 – Site Plan and Convenience Store Elevations





18 WEST ELEVATION

SCALE: 1/4" = 1'-0"



20 NORTH ELEVATION



18 EAST ELEVATION

SCALE: 1/4" = 1'-0"

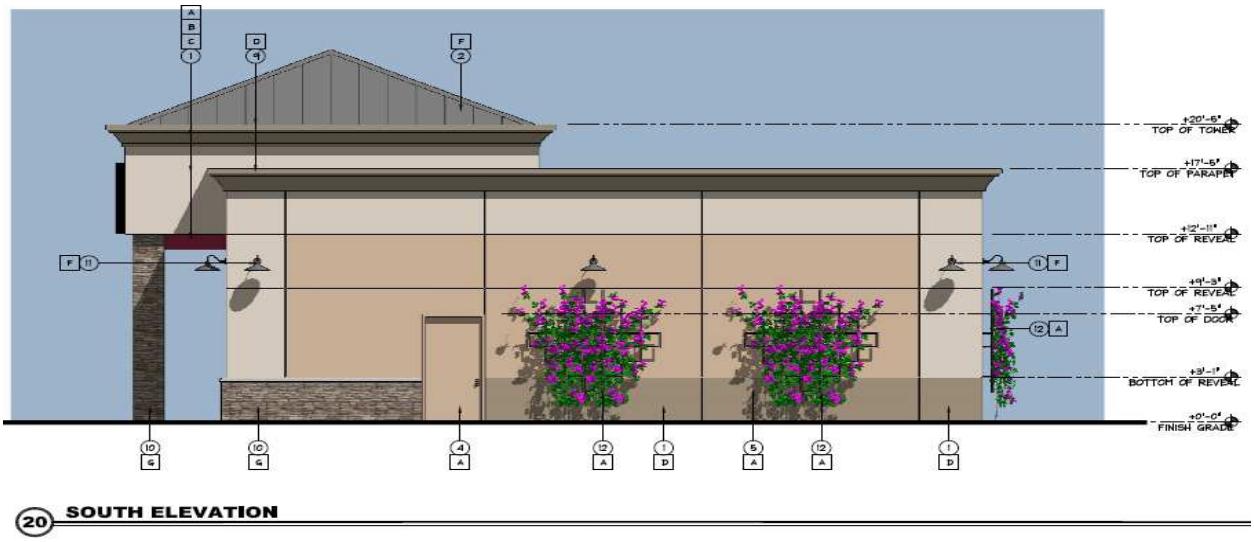
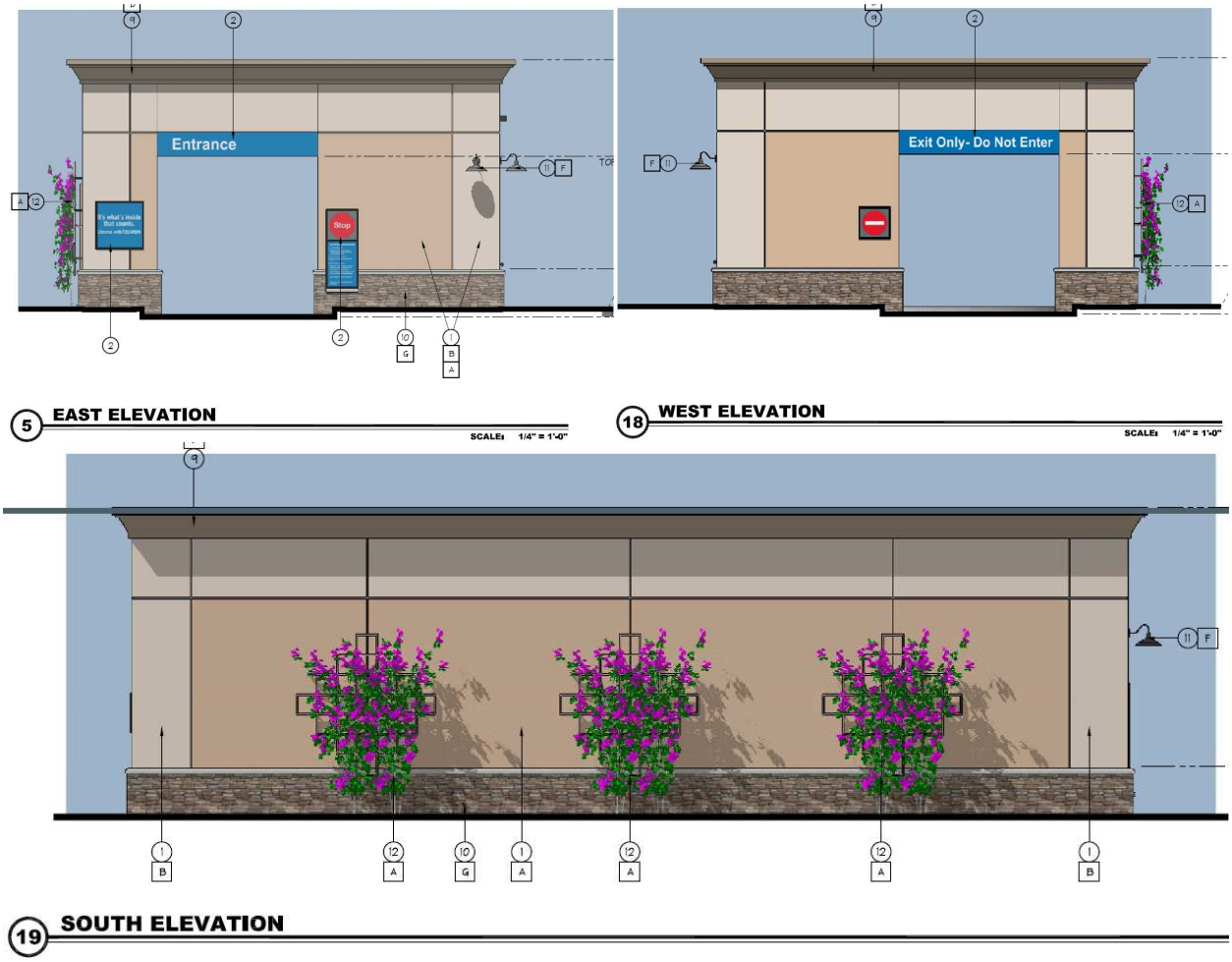


Figure 4 – Car Wash Elevations



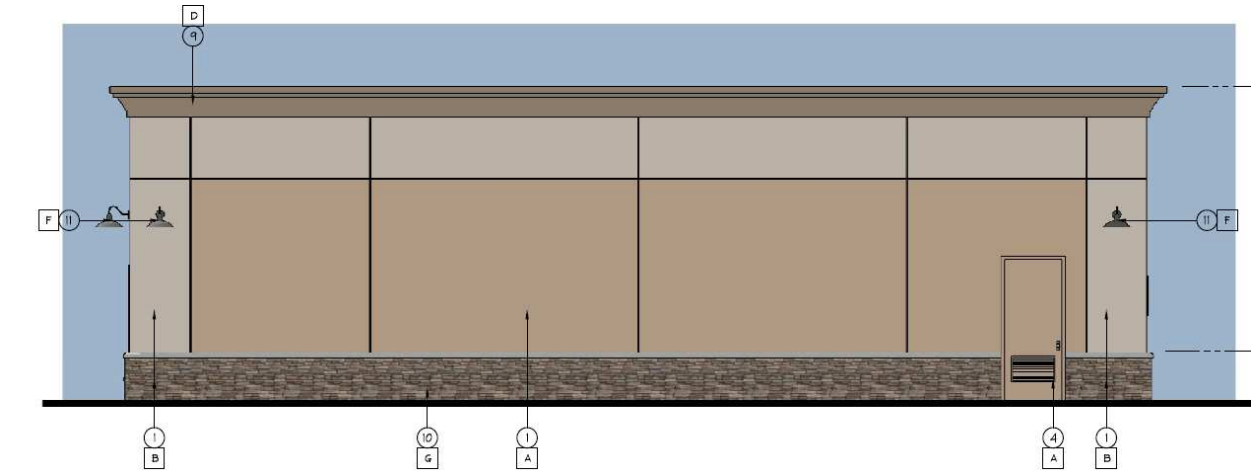


Figure 5 – Full Renderings

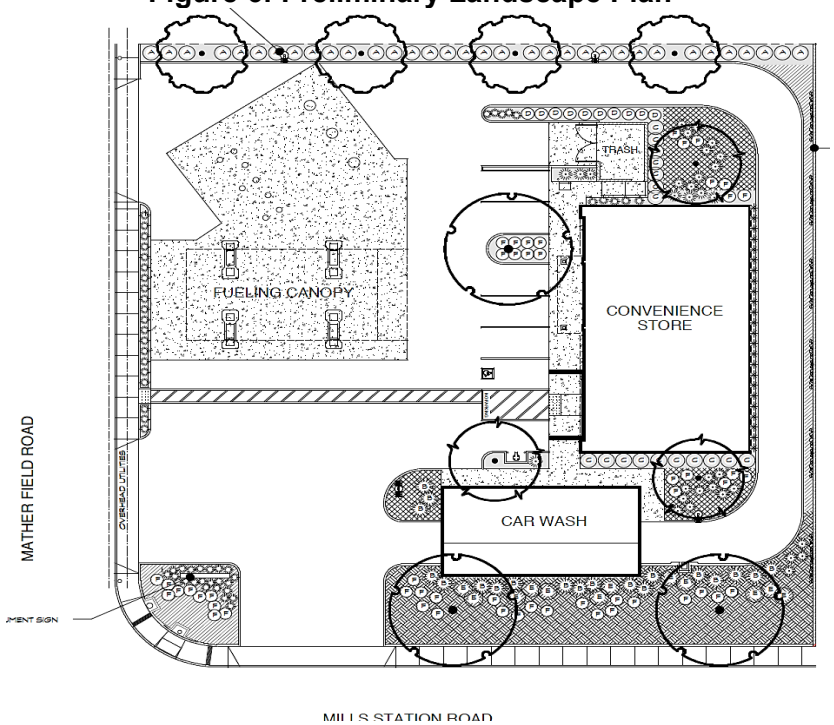






Landscaping:
The project includes a preliminary landscape plan showing landscaping along Mather Field Road as well as along Mills Station Road. The project will remove existing trees from the site including palm trees located along Mather Field Road, and replace all landscaping with new trees, shrubs and groundcover more suitable for the new design. The landscape plan includes additional shrubs and trees along Mills Station Road to soften the exterior of the car wash as well as provide screening from headlights facing Mills Station Road.

Figure 6: Preliminary Landscape Plan



Findings and Evidence:
Staff supports the proposed Minor Design Review for a service station with car wash at this location. In order to approve the requested entitlement, Zoning Code Section 23.140.070 states that specific findings must be approved. These findings and the corresponding evidence to support them are shown below.

1.) The project is consistent with all findings outlined in Chapter 23.140 of the Zoning Code, as follows:

A. Finding: The proposed project is consistent with the objectives of the General Plan, complies with applicable zoning regulations, Specific Plan provisions, and Special Planning Area provisions, and is consistent with the applicable Rancho Cordova Design Guidelines.

Evidence: The proposed project has been reviewed in full and found to be in compliance with all applicable provisions of the City's Zoning Code and General Plan. The new construction of the service station will be consistent with the objectives of the General Plan and Zoning Code to redevelop areas along Folsom Boulevard as main connections to Highway 50. The proposed reconstruction is consistent with the commercial buildings chapter of the City's Design Guidelines. The building will continue to have access to adequate on-site parking.

B. Finding: The proposed architecture, site design, and landscape are suitable for the purposes of the building and the site and will enhance the character of the neighborhood and community.

Evidence: The proposed reconstruction of the service station would utilize the existing access on Mather Field Road and Mill Station Road. The new site design will include the addition of a drive thru car wash however the pumps and canopy will remain in the same location. The reconstruction of the service station will revitalize the project site as well as develop an existing vacant lot prone to trespassing. Landscaping and irrigation will also be updated as part of this project.

C. Finding: The architecture, including the character, scale, and quality of the design, relationship with the site and other buildings, building materials, screening of exterior appurtenances, exterior lighting and signing, and similar elements establishes a clear design concept and is compatible with the character of existing or anticipated buildings on adjoining and nearby properties.

   Evidence: The existing building will be completely demolished and a new building will be constructed. The architecture and design of the proposed structure will include all necessary landscaping, lighting, and screening required by the Zoning Code and the new architecture will be compatible with neighboring buildings while also encouraging others to improve also. The proposal includes the addition of a car wash however the project has been conditioned with mitigation measures to minimize any possible noise impacts on nearby properties.

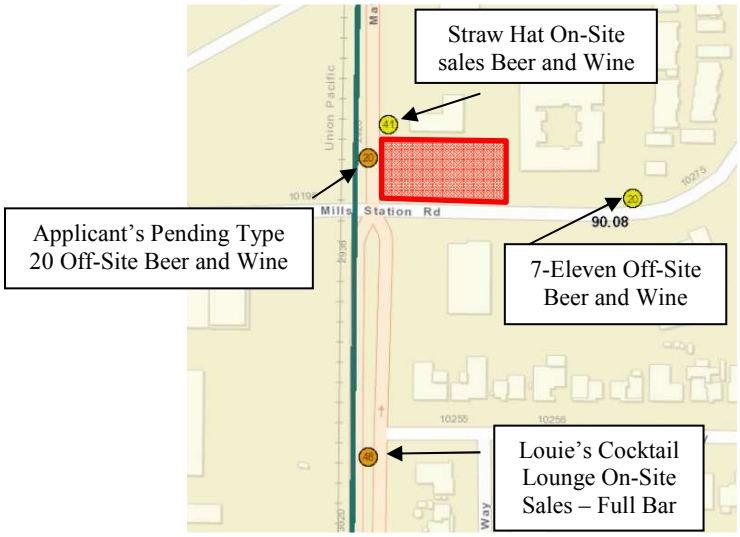
D. Finding: The proposed project will not create conflicts with vehicular, bicycle, or pedestrian transportation modes of circulation.

   Evidence: The proposed project will maintain existing accesses to Mather Field Road and Mill Station Road. The project will include the addition of a drive thru lane for the proposed car wash however this will not affect any modes of circulation as the site for the drive thru is currently a vacant lot. The project will include adequate parking and on-site circulation will improve with the proposed site plan.

Alcoholic Beverage Sales and PCN:
The existing service station does not have off-site alcohol sales however, once the facility has been demolished and reconstructed the Applicant has requested to add beer and wine to their inventory of products sold. Alcoholic Beverage Sales is permitted within the FB-CMU zoning designation with the approval of a Conditional Use Permit by the City Council.

Due to the higher than average crime and the concentration of alcohol permits in the area, the business is required by the Department of Alcoholic Beverages Control (ABC) to obtain approval by the local jurisdiction through a Letter of Public Convenience and Necessity (PCN) issued by Council. Rancho Cordova Municipal Code Chapter 4.60 regulates the issuance of "letters of public convenience" and outlines that the request must be routed to all applicable agencies and must be heard before City Council for a determination of approval. As part of the project review, Planning Staff reviewed other active ABC licenses within the same area and found that 2 on-site alcohol licenses and 1 existing off-site alcohol license are present within close vicinity to the site.

Figure 7 – ABC License Map



The Census Tract (90.08) which is bounded by Mather Field Road, Folsom Boulevard, Zinfandel Drive and Highway 50 & White Rock Road, does contain other active alcohol licenses however, the licenses shown in **Figure 7** are those within a 1,000 foot radius to the proposed gas station. Shown below in **Table 2** is a list of all alcohol licenses within the 90.08 census tract both on-site sale and off-site sale.

Table 2 – All alcohol license in census tract 90.08

	License Number	Status	License Type	Orig. Iss. Date	Expir. Date	Primary Owner	Business Name	Premises Addr.
1	212992	ACTIVE	20	04/15/1988	02/28/2019	TOOLEY OIL COMPANY		3050 ZINFANDEL DR RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
2	298487	ACTIVE	47	10/28/1994	09/30/2018	COURTYARD MANAGEMENT CORPORATION	COURTYARD BY MARRIOTT	10683 WHITE ROCK RD RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
3	418227	ACTIVE	47	11/01/2005	10/31/2018	CHIPOTLE MEXICAN GRILL INC	CHIPOTLE MEXICAN GRILL	2878 ZINFANDEL DR, STE A RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
4	437601	ACTIVE	20	12/14/2006	06/30/2019	7 ELEVEN INC	7 ELEVEN STORE 2235 14098A	10246 MILLS STATION RD RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
5	444091	SUREND	47	03/15/2007	02/28/2019	HORC INC	HOOTERS OF RANCHO CORDOVA	10750 OLSON DR RANCHO CORDOVA, CA 95670-5601 Census Tract: 0090.08
6	470033	ACTIVE	20	10/28/2008	09/30/2018	SUPERIOR GAS & CONVENIENCE STORE INC	ZINFANDEL AM PM	2896 ZINFANDEL DR RANCHO CORDOVA, CA 95670-5604 Census Tract: 0090.08
7	513910	ACTIVE	47	10/14/2011	09/30/2018	RAMOS & LECONA VENTURES LLC	CASA RAMOS MEXICAN RESTAURANT	10717 WHITE ROCK RD RANCHO CORDOVA, CA 95670-6031 Census Tract: 0090.08
8	552783	ACTIVE	20	04/20/2016	06/30/2019	99 CENTS ONLY STORES LLC	99¢ ONLY STORE #160	2868 ZINFANDEL DR RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
9	570238	ACTIVE	41	07/13/2016	06/30/2019	SHP MOMA, LLC	STRAW HAT PIZZA	2929 MATHER FIELD RD RANCHO CORDOVA, CA 95670-5417 Census Tract: 0090.08

In addition to the review of the concentration of alcohol licenses, Staff also worked with RCPD to review the total calls for service in the area to determine the amount of criminal activity near the project site. The Police Department provided our staff significant data that showed the total number of calls for service from January 1, 2017 to June 30, 2018 (**See attachment 5**). The data provided shows all calls for service within a ¼ mile of the property totaling 2,355 calls. The data further breaks that total number down to within a 500 foot radius of the property, and calls for service directly at the 2931 Mather Field Road address. It is important to note that only some types of crimes are shown on the table and that all calls for service may not be accounted for. The data provided is as follows:

Table 3 - Calls for service from Jan. 1, 2017 to June 30, 2018

Distance Radius	Total Calls for Service	Highlighted Types of Crimes Reported
Within ¼ Mile	**2,355** calls	**138** calls for Trespassing **119** calls for Suspicious Suspect(s) **24** calls for Aggravated Assault(s) **27** calls Drugs/Narcotics **9** calls for Commercial Burglary
Within 500 Feet	**159** calls	**73** calls for Trespassing **48** calls for Suspicious Subject(s) **38** calls for Disturbing the Peace
At 2931 Mather Field Road	**66** Calls	**15** calls for Trespassing in Progress **9** calls for Disturbing the Peace **8** calls for Suspicious Subject(s) **6** calls for Customer Disturbances

Findings and Evidence:
After review of the data provided by the Rancho Cordova Police Department and the provided Opposition Letter (**see Attachment 5**), Staff recommends denial of the requested Conditional Use Permit and contingent Letter of Public Convenience and Necessity. An additional off-site alcohol license at this location may only exacerbate the already high calls for service in the area and increase the concentration of alcohol licenses. In order to approve the requested entitlement, Zoning Code Section 23.134.070 states that specific findings and the evidence to support them must be found. Sufficient evidence to support all findings were not found. The findings and evidence are shown below:

a) Finding: The site size, dimensions, location, topography, and access are adequate for the needs of the proposed use, considering the proposed building mass, parking, traffic, noise, vibration, exhaust/ emissions, light, glare, erosion, odor, dust, visibility, safety, and aesthetic considerations.

   Evidence: The request is for the off-site sales of alcoholic beverages (beer & wine). The proposed use will not have any impact on the physical site of the project however utilizing the provided information by RCPD, the amount of calls for service provides a description of the high crime within the area. The addition of another off-

site alcohol sales within the vicinity likely would increase existing calls for service for the property which, according to RCPD's opposition letter, already includes trespassing, disturbing the peace, suspicious suspect(s), and customer disturbances.

b) Finding: The negative impacts of the proposed use on adjacent properties and on the public can be mitigated through application of other code standards or other reasonable conditions of approval.

Evidence: The negative impacts of the addition of another alcohol license in the area would not be able to be mitigated through reasonable conditions of approval. Any allowance of alcohol sales whether it be unrestricted or restricted through conditions of approval, has the potential to increase the already high volume of calls for service in the area. RCPD, based on data, and the Department of ABC have deemed the area over concentrated with alcohol licenses and RCPD and Staff does not recommend concentrating the area further.

c) Finding: All required public facilities have adequate capacity to serve the proposal.

Evidence: The project site has adequate capacity for the proposed service station. The addition of alcohol sales would not require any additional capacity on public facilities other than what is already required for a typical service station.

d) Finding: The project meets the requirements of the Zoning Code including development standards, design guidelines, and special use provisions.

Evidence: Alcohol sales is allowed within the Commercial Mixed Use zone of the Folsom Boulevard Specific Plan with the approval of a Conditional Use Permit (CUP). However, Chapter 4.60 of the Municipal Code requires that as part of the review of the application, the Chief of Police shall determine if there are existing criminal activity at the subject property and if these problems exist, then this information shall be reported and the Chief of Police shall object to a determination of public convenience. Therefore, per the statistics provided in the RCPD opposition letter, Staff is recommending denial of the request and without approval of the CUP, the Applicant is not meeting the requirements of the Zoning Code or Folsom Boulevard Specific Plan.

e) Finding: If structures and site plans are considered nonconforming, the elements of a project that are nonconforming have been brought into compliance with the zoning code, where feasible.

Evidence: The existing service station does not currently have alcoholic beverages as part of their inventory. In addition to the Applicant's request for a CUP for alcoholic beverage sales the applicant has also requested a second CUP for the proposed service station. All nonconforming elements are required to be brought into compliance through the second CUP.

FISCAL ANALYSIS OF PROJECT

City Staff anticipates that the proposed project will provide similar, if not more, sales tax revenue consistent with the revenue generated now by the existing service station. It is also anticipated

that the addition of the drive thru car wash will provide an additional source of sales tax revenue as a new service provided by the service station on site.

ENVIRONMENTAL

Staff has reviewed the proposed action and has identified that it qualifies for an exemption from CEQA pursuant to CEQA Guidelines Section 15183 (Consistency with a General Plan, Community Plan or Zoning for which an EIR was prepared). State CEQA Guidelines Section 15183 (Public Resources Code §21083.3), provides that projects that are consistent with a Community Plan, General Plan or Zoning for which an EIR has been certified "shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site." In addition, CEQA Guidelines Section 15332 exempts from further CEQA review those projects which: are consistent with the General Plan; are within city limits on a site no larger than five acres substantially surrounded by urban uses; are located on a site that has no value as habitat for rare or endangered species; would not result in significant adverse effects related to traffic, noise air quality or water quality; and are located on a site that can be adequately served by all required utilities and public services.

The proposed action involves demolition and replacement of an existing gas station and the operation of a new car wash on the project site, which could generate noise that affects nearby uses. However, a noise study was prepared for the project that demonstrate noise levels will not exceed City standards. The proposed project is located on an approximately 0.3-acre site in an urbanized area within the City of Rancho Cordova. The site is substantially surrounded by development to the north, south, east and west. The site does not represent habitat for rare or endangered species. Therefore the project site is not environmentally sensitive. All public utilities and services are available and no significant adverse effects related to traffic, noise, air quality, or water quality were identified during project review. Therefore, there are no effects peculiar to the Project or Property site or substantial new information that would result in new adverse impacts or more severe adverse impacts than discussed in the prior EIR. Therefore, the project is exempt and no further analysis is required.

RECOMMENDED MOTIONS

Staff recommends that Council adopt the requested Conditional Use Permit for the proposed service station with car wash and Minor Design Review for said station, subject to the findings, project plans (**Attachment 2**) and Conditions of Approval (**Attachment 3**). Staff recommends that the City Council find the project to be in compliance with the California Environmental Quality Act (CEQA) per the provided addendum pursuant to CEQA Guidelines.

Staff also recommends that Council deny the requested Conditional Use Permit and contingent Letter of Public Convenience and Necessity for the requested off-site alcohol sales (beer & wine) subject to the findings, information provided by RCPD and the Opposition Letter also provided by RCPD (**Attachment 5**).

ATTACHMENTS

1. Resolution for Conditional Use Permit for Service Station with car wash.
2. Exhibit A to the Resolution – Project Plans
3. Exhibit B to the Resolution – Conditions of Approval

4. Resolution for Conditional Use Permit and Letter of Public Convenience and Necessity for Denial of off-site alcohol sales (beer & wine),
5. Exhibit A to the Resolution – Letter of Opposition from RCPD
6. Acoustic Analysis for Car Wash
7. 500' Radius Map with Mailing Labels
8. Comment Letter issued November 21, 2017
9. PowerPoint Presentation

ATTACHMENT 1

CITY OF RANCHO CORDOVA

RESOLUTION NO. XXX-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA, STATE OF CALIFORNIA, APPROVING A REQUEST FOR A CONDITONAL USE PERMIT AND MINOR DESIGN REVIEW FOR THE MATHER FIELD CHEVRON SERVICE STATION PROJECT #DD9734

WHEREAS, on October 31, 2017, K12 Architects, Inc. (referred to as the applicant) filed a formal submittal to request a Minor Design Review for the reconstruction of an existing service station with the addition of a drive through car wash located within a Commercial Mixed Use zone within the Folsom Boulevard Specific Plan located at 2931 Mather Field Road, Assessor's Parcel Number: 077-0030-004-0000; and

WHEREAS, Staff was unable to located an existing Conditional Use Permit on the existing service station and the applicant is requesting a Conditional Use Permit now to obtain proper documentation for the existing business; and

WHEREAS, this project was reviewed by all applicable City departments and agencies for comments and conditions; and

WHEREAS, the City Council is the appropriate authority to hear and take action on this project; and

WHEREAS, the City Council of the City of Rancho Cordova has conducted a properly noticed public hearing pursuant to Government Code Section 65090 and has duly considered all written and verbal testimony presented during the hearing

NOW, THEREFORE, BE IT HEREBY RESOLVED THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA does authorize and adopt the Resolution __-2018 approving a Conditional Use Permit and Minor Design Review for the reconstruction of an existing service station (**Exhibit A**) at 2931 Mather Field Road, subject to the attached Conditions of Approval (**Exhibit B**), based on the following findings.

1.) CEQA Determination: City staff affirms the findings for the project is categorically exempt from further CEQA analysis by Section 15183 (Projects Consistent with a General Plan, Community Plan or Zoning) and 15332 (In-Fill Development Projects).

Evidence: Staff has reviewed the proposed action and has identified that it qualifies for an exemption from CEQA pursuant to CEQA Guidelines Section 15183 (Consistency with a General Plan, Community Plan or Zoning for which an EIR was prepared). State CEQA Guidelines Section 15183 (Public Resources Code §21083.3), provides that projects that are consistent with a Community Plan, General Plan or Zoning for which an EIR has been certified "shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site." In addition, CEQA Guidelines Section 15332 exempts from further CEQA review those projects which: are consistent with the General Plan; are within city limits on a site no larger than five acres substantially surrounded by urban uses; are located on a site that has no value as habitat for rare or endangered

species; would not result in significant adverse effects related to traffic, noise, air quality, or water quality; and are located on a site that can be adequately served by all required utilities and public services.

A. Approve the Conditional Use Permit subject to the Conditions of Approval herein, and subject to the findings as defined by Zoning Code sections 23.134.030 and evidence as follows:

1. Finding: The site size, dimensions, location, topography, and access are adequate for the needs of the proposed use, considering the proposed building mass, parking, traffic, noise, vibration, exhaust/ emissions, light, glare, erosion, odor, dust, visibility, safety, and aesthetic considerations.

   Evidence: The CUP will be for the service station use at 2931 Mather Field Drive. The project site is already utilized as a service station and provides adequate access, parking, and contains existing fuel tanks and an existing fuel canopy. A noise study was conducted to ensure that neighboring residences are not disturbed by the added carwash. The proposed use is adequate at this location.

2. Finding: The negative impacts of the proposed use on adjacent properties and on the public can be mitigated through application of other code standards or other reasonable conditions of approval.

   Evidence: A service station is currently active on the property and has not provided any notable negative impacts to adjacent properties. With the addition of the self-serve carwash the project was required to complete a thorough noise analysis to ensure that the neighboring multi-family complex would not experience negative effects. Per the noise analysis recommendations, additional conditions of approval were added to mitigate any possible impacts. The applicant will be required to follow all conditions of approval as well as all State requirements for operation of the service station.

3. Finding: All required public facilities have adequate capacity to serve the proposal.

   Evidence: The project site already contains the underground fuel tanks and fuel pumps within the existing fuel canopy on site. The existing building will be removed and reconstructed with the addition of a car wash on site. The site does have adequate infrastructure access and utility capacity to serve the proposal.

4. Finding: The project meets the requirements of the zoning code including development standards, design guidelines, and special use provisions.

   Evidence: The project meets the required setbacks and design guidelines for a commercial business located within a Commercial Mixed Use (CMU) zoning designation. With the new construction of the building, the landscaping will also be revitalized and brought into compliance with current Zoning Code regulations.

5. Finding: If structures and site plans are considered nonconforming, the elements of a project that are nonconforming have been brought into compliance with the zoning code, where feasible.

ATTACHMENT 1

Evidence: The project site is currently an existing gas station. Staff was unable to locate an existing use permit for the service station use at this location. A service station with car wash is permitted with the issuance of a CUP and approval of the applicants request for a CUP will legitimize the use and allow the service station as well as bring other aspects of the site including landscaping, parking, and access into compliance with current Zoning Code regulations.

B. Approve the Design Review permit subject to the Conditions of Approval herein, and subject to the findings as defined by Zoning Code sections 23.140.050 and evidence as follows:

1. Finding: The proposed project is consistent with the objectives of the General Plan, complies with applicable zoning regulations, Specific Plan provisions, and special planning area provisions, and is consistent with the applicable Rancho Cordova design guidelines.

   Evidence: The proposed project has been reviewed in full and found to be in compliance with all applicable provisions of the City's Zoning Code and General Plan. The new construction of the service station will be consistent with the objectives of the General Plan and Zoning Code to redevelop areas along Folsom Boulevard as main connections to Highway 50. The building will continue to have access to adequate on-site parking.

2. Finding: The proposed architecture, site design, and landscape are suitable for the purposes of the building and the site and will enhance the character of the neighborhood and community.

   Evidence: The proposed reconstruction of the service station would utilize the existing access on Mather Field Road and Mill Station Road. The new site design will include the addition of a drive thru car wash however the pumps and canopy will remain in the same location. The reconstruction of the service station will revitalize the project site as well as develop an existing vacant lot prone to trespassing. Landscaping and irrigation will also be updated as part of this project.

3. Finding: The architecture, including the character, scale, and quality of the design, relationship with the site and other buildings, building materials, screening of exterior appurtenances, exterior lighting and signing, and similar elements, establishes a clear design concept and is compatible with the character of existing or anticipated buildings on adjoining and nearby properties.

   Evidence: The existing building will be completely demolished and a new building will be constructed. The architecture and design of the proposed structure will include all necessary landscaping, lighting, and screening required by the Zoning Code and the new architecture will be compatible with neighboring buildings while also encouraging others to improve also. The proposal includes the addition of a car wash however the project has been conditioned with mitigation measures to minimize any possible noise impacts on nearby properties.

ATTACHMENT 1

4. Finding: The proposed project will not create conflicts with vehicular, bicycle, or pedestrian transportation modes of circulation.

   Evidence: The proposed project will maintain existing accesses to Mather Field Road and Mill Station Road. The project will include the addition of a drive thru lane for the proposed car wash however this will not affect any modes of circulation as the site for the drive thru is currently a vacant lot. The project will include adequate parking and on-site circulation will improve with the proposed site plan.

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the _____ 15th day of October, 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk



20 **EXISTING SITE PLAN**

SCALE: 1" = 20'-0"

SITE PLAN KEYNOTES

1. FUEL PRICING MONUMENT SIGN TO REMAIN
2. CONCRETE CURB TO REMAIN
3. DEMOLISH EXISTING CONCRETE WALK
4. EXISTING LANDSCAPING
5. A/C PAVING
6. LINE OF AUTO FUELING CANOPY OVERHANG
7. DEMOLISH TRASH ENCLOSURE
8. EXISTING MULTI-PRODUCT FUEL DISPENSERS TO REMAIN
9. AIR & WATER SERVICE TO BE RELOCATED
10. EDGE OF PAVEMENT
11. UNDERGROUND FUEL STORAGE TANKS TO REMAIN
12. EXISTING ACCESSIBLE VAN PARKING STALL
13. EXISTING 9'x19' PARKING STALLS
14. EXISTING UNDEVELOPED PROPERTY
15. EXISTING CHAIN LINK FENCING
16. DEMOLISH EXISTING CONCRETE CURB
17. EXISTING TREE TO BE REMOVED
18. MODIFY EXISTING CANOPY - REMOVE PORTION

VICINITY MAP



K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

OWNER APPROVED - DECEMBER 3, 2015

PROFESSIONAL SEALS:

STATE OF CALIFORNIA · STEVEN C. ELSER · C-29871 · JANUARY, 2019 · REGISTERED · LICENSED ARCHITECT

PROJECT NUMBER: 17-006 | PROJECT DATE: 03-23-2017

SHEET CONTENTS:

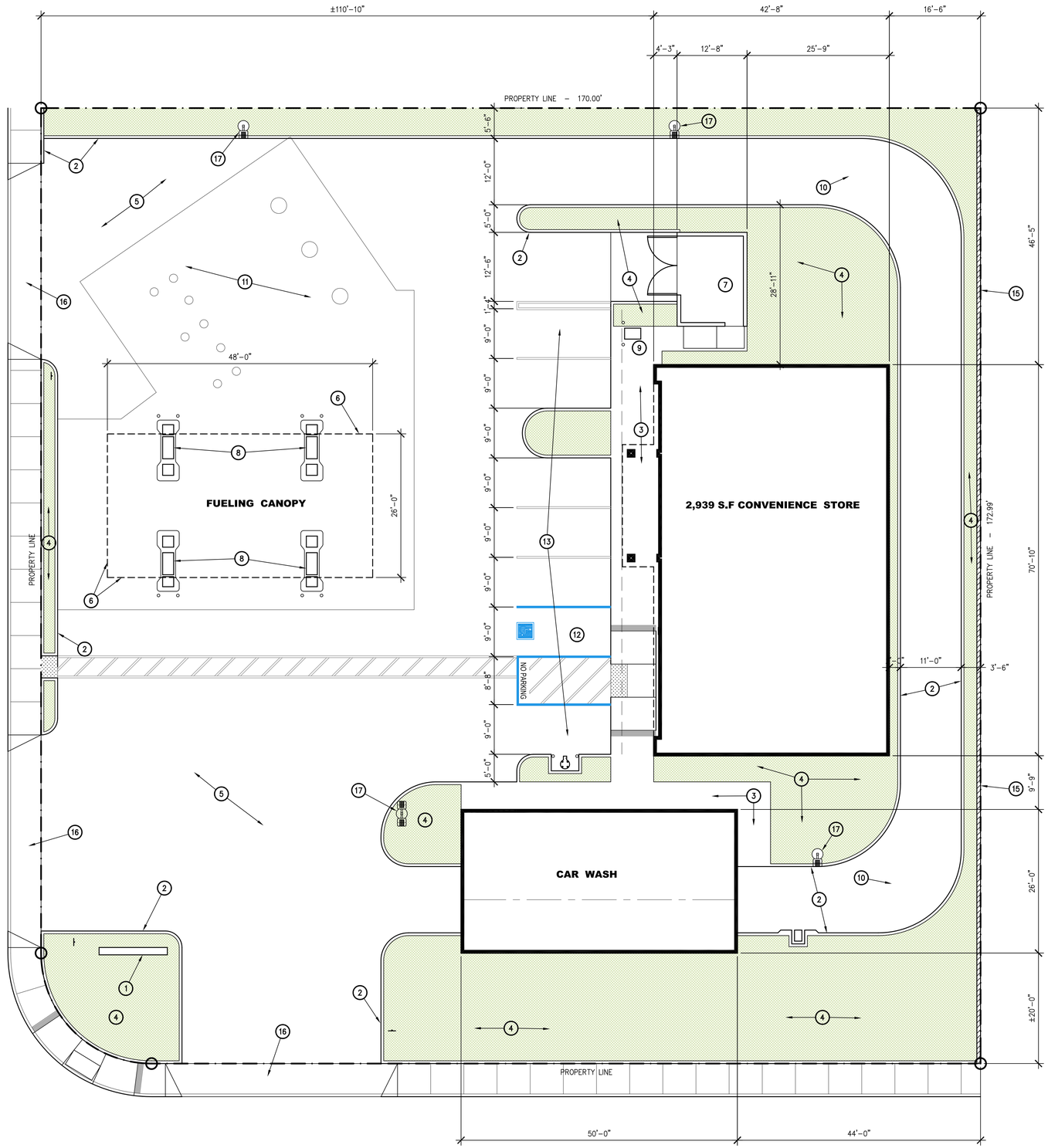
EXISTING SITE PLAN

SHEET NUMBER: **A101**

7784

AGENDA ITEM 11.3

ATTACHMENT 2
EXHIBIT A TO THE RESOLUTION



PROJECT DATA

ASSESSOR'S PARCEL NUMBER(S): 077-0030-004-0000

ZONING: CMU - COMMERCIAL MIXED USE
FOLSOM BLVD. SPECIFIC PLAN

PROJECT SITE AREA (GROSS): (±0.67 ACRES) ±29,274 S.F.

BUILDING DATA:

STRUCTURE	CBC OCCUP.	TYPE OF CONST.	AREA
RETAIL FACILITY BUILDING AREA(S):			
CONVENIENCE STORE	M	V B	2,939 S.F.
CAR WASH TUNNEL	B	II B	1,300 S.F.
(E) FUELING CANOPY	M	II B	1,248 S.F.

FLOOR TO AREA RATIO:

TOTAL AREA OF SITE:		29,274 S.F.
TOTAL AREA OF BLDGS:	(W/O CANOPY)	(14.4%) 4,239 S.F.
TOTAL AREA OF BLDGS:	(W/ CANOPY)	(18.7%) 5,473 S.F.

LANDSCAPING DATA:

TOTAL AREA OF LANDSCAPING:	5,487 S.F.
PERCENTAGE OF SITE LANDSCAPED:	18.7 %

PARKING DATA:

BUILDING AREA	PARKING RATIO	REQ'D.
CONVENIENCE STORE	(2.5:1,000 gross) 2.5 x 2.94	= 7.35
FUELING CANOPY	(Has 8 Fueling Positions)	= N/A
CAR WASH	228'-0" Lineal Feet of Queuing Lane Provided	
	TOTAL REQ'D PARKING	= 7.35

PARKING PROVIDED

REGULAR SPACES	= 6
ACCESSIBLE SPACES	= 1
VACUUM SPACES	= 1
FUELING POSITIONS	= 8
TOTAL =	(+8 FUELING POSITIONS) 8

SITE PLAN KEYNOTES

1. EXISTING FUEL PRICING MONUMENT SIGN
2. CONCRETE CURB
3. CONCRETE WALK
4. LANDSCAPING
5. A/C PAVING
6. LINE OF EXISTING AUTO FUELING CANOPY OVERHANG
7. TRASH ENCLOSURE
8. EXISTING MULTI-PRODUCT FUEL DISPENSERS
9. AIR & WATER SERVICE
10. CAR WASH ENTRY LANE = 228'-0" LF STACKING
11. EXISTING UNDERGROUND FUEL STORAGE TANKS
12. ACCESSIBLE VAN PARKING STALL
13. 9'x19' PARKING STALLS
14. ACCESS DOMES AT PEDESTRIAN CROSSING
15. NEW 6'-0" TALL MASONRY WALL
16. EXISTING DRIVEWAYS
17. NEW LED YARD LIGHTS

VICINITY MAP



20 **PROPOSED ARCHITECTURAL SITE PLAN**

SCALE: 1" = 10'-0"

AGENDA ITEM 11.3

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

OWNER APPROVED – DECEMBER 3, 2015

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. EGGER
C-29871
JANUARY, 2019
RENEWAL DATE
LICENSED ARCHITECT

PROJECT NUMBER: 17-006
PROJECT DATE: 03-23-2017

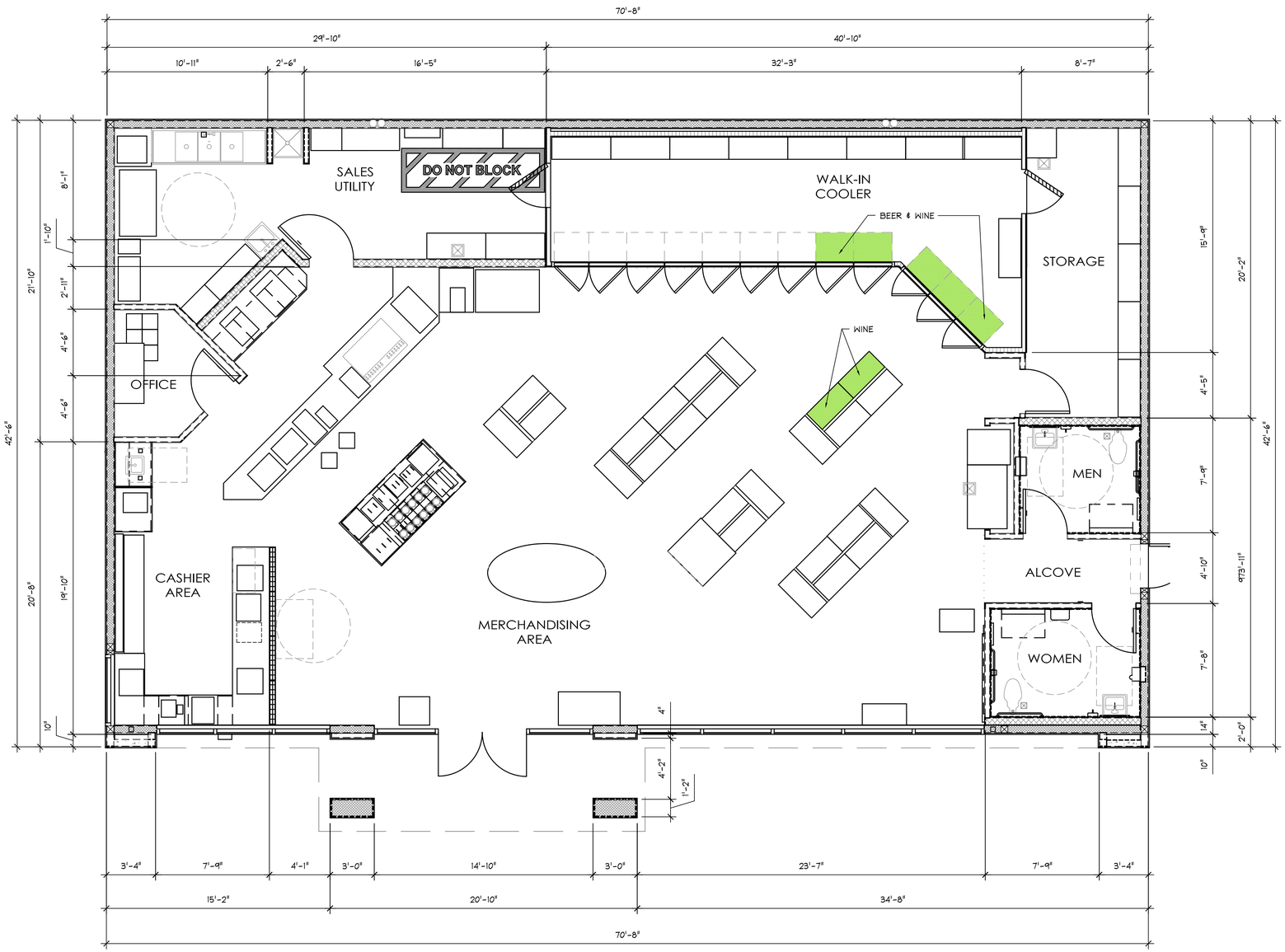
SHEET CONTENTS:

**PROPOSED
SITE PLAN #2**

SHEET NUMBER:

A102

7785



PROPOSED FLOOR PLAN

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.3

ATTACHMENT 2
EXHIBIT A TO THE RESOLUTION

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. ESSER
C-29871
LICENSED ARCHITECT
JANUARY, 2019
RENEWAL DATE

PROJECT NUMBER: 17-006
PROJECT DATE: 03-23-2017

SHEET CONTENTS:

PROPOSED FLOOR PLAN

SHEET NUMBER:

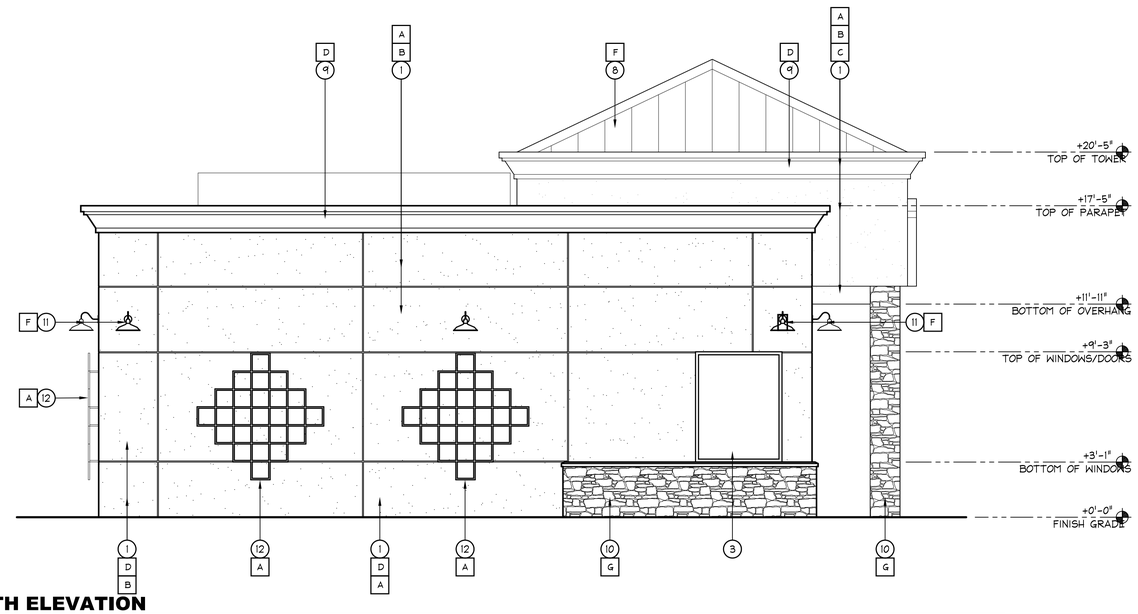
A201

7786



18 WEST ELEVATION

SCALE: 1/4" = 1'-0"



20 NORTH ELEVATION

SCALE: 1/4" = 1'-0"

KEY NOTES

1. 7/8" THREE COAT STUCCO SYSTEM OVER DUPONT TYVEK DRAINWRAP
2. SIGNANGE, BY OWNER
3. STOREFRONT WINDOW SYSTEM; DARK BRONZE ANODIZED, 2"x4.5" CENTER GLAZING SYSTEM; WITH 1" CLEAR DUAL GLAZING
4. HOLLOW CORE METAL DOOR
5. ROOF LADDER
6. ROOF TRIM
7. ACM PANEL
8. STANDING SEAM METAL ROOFING
9. FOAM PARAPET - PAINTED
10. STUCCO STONE OVER EXTERIOR CEMENT PLASTER OVER METAL LATH OVER DUPONT TYVEK DRAINWRAP
11. WALL LIGHT BY OWNER
12. VEGETATION SCREEN

COLOR LEGEND

- A CHEVRON COLOR "NUTMEG"
- B CHEVRON COLOR "CAFE AU LAIT"
- C CHEVRON COLOR "CHILLED WINE-R"
- D CHEVRON COLOR "MOCHA"
- E CHEVRON COLOR "WHITE"
- F CHEVRON COLOR "DARK GRAY"
- G CORONADO STONE "HONEY LEDGE"

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. EISER
C-29871
LICENSED ARCHITECT
JANUARY, 2019
RENEWAL DATE

PROJECT NUMBER: 17-006
PROJECT DATE: 03-23-2017

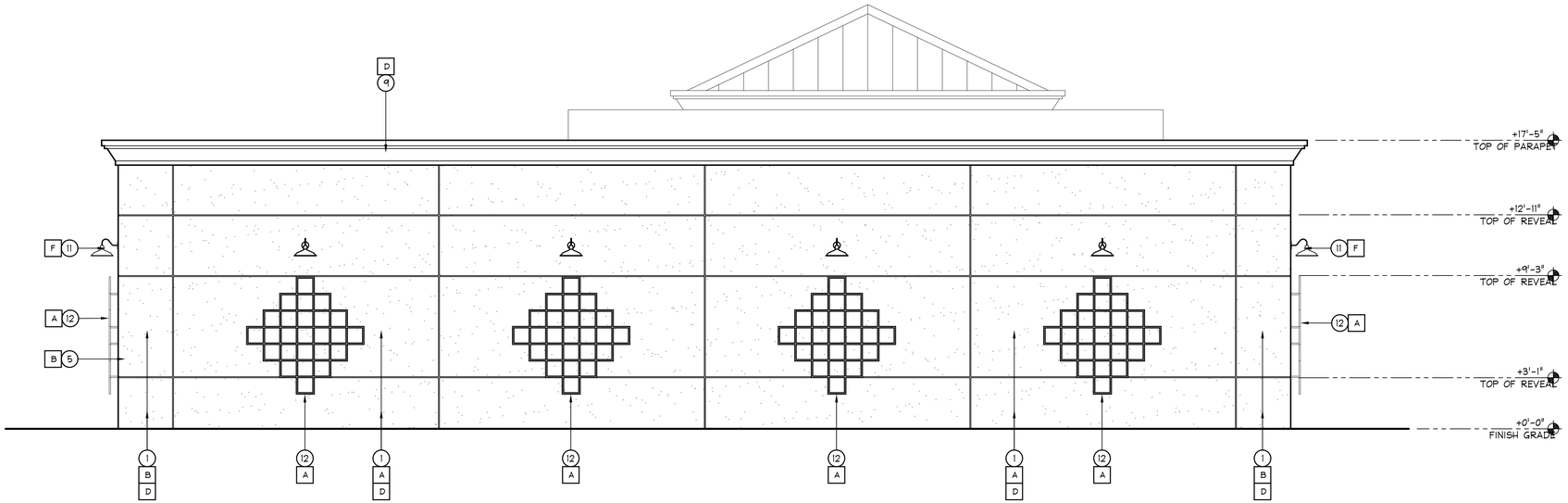
SHEET CONTENTS:

C-STORE EXTERIOR ELEVATIONS

SHEET NUMBER:

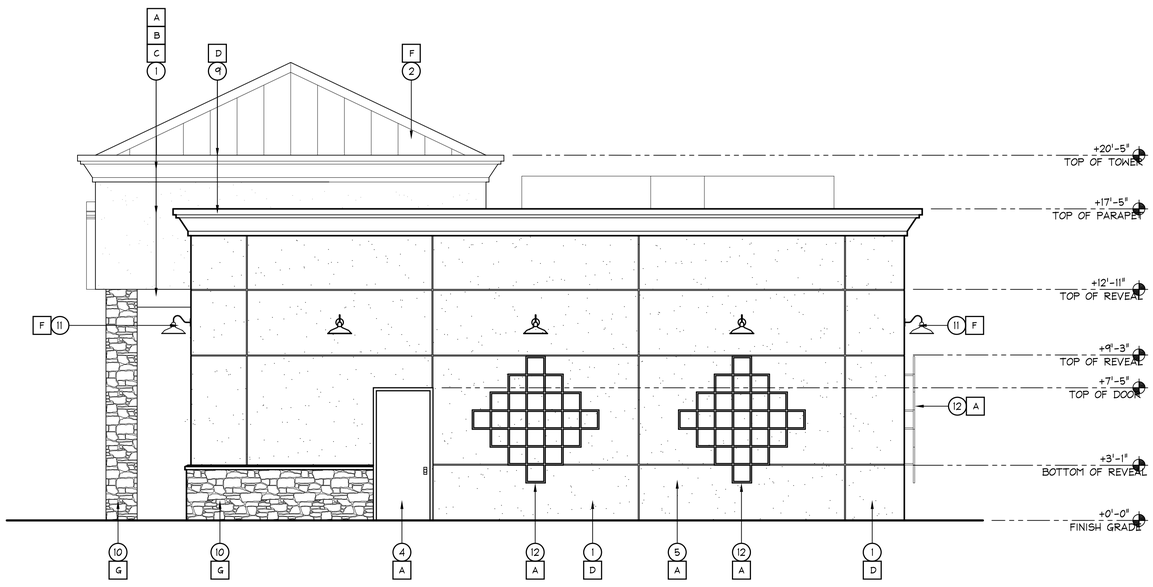
A301

7787



18 EAST ELEVATION

SCALE: 1/4" = 1'-0"



20 SOUTH ELEVATION

SCALE: 1/4" = 1'-0"

KEY NOTES

1. 7/8" THREE COAT STUCCO SYSTEM OVER DUPONT TYVEK DRAINWRAP
2. SIGNANGE, BY OWNER
3. STOREFRONT WINDOW SYSTEM; DARK BRONZE ANODIZED, 2"x4.5" CENTER GLAZING SYSTEM; WITH 1" CLEAR DUAL GLAZING
4. HOLLOW CORE METAL DOOR
5. ROOF LADDER
6. ROOF TRIM
7. ACM PANEL
8. STANDING SEAM METAL ROOFING
9. FOAM PARAPET - PAINTED
10. STUCCO STONE OVER EXTERIOR CEMENT PLASTER OVER METAL LATH OVER DUPONT TYVEK DRAINWRAP
11. WALL LIGHT BY OWNER
12. VEGETATION SCREEN

COLOR LEGEND

- A CHEVRON COLOR "NUTMEG"
- B CHEVRON COLOR "CAFE AU LAIT"
- C CHEVRON COLOR "CHILLED WINE-R"
- D CHEVRON COLOR "MOCHA"
- E CHEVRON COLOR "WHITE"
- F CHEVRON COLOR "DARK GRAY"
- G CORONADO STONE "HONEY LEDGE"

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. ELSER
C-29871
LICENSED ARCHITECT
JANUARY, 2019
RENEWAL DATE

PROJECT NUMBER: 17-006
PROJECT DATE: 03-23-2017

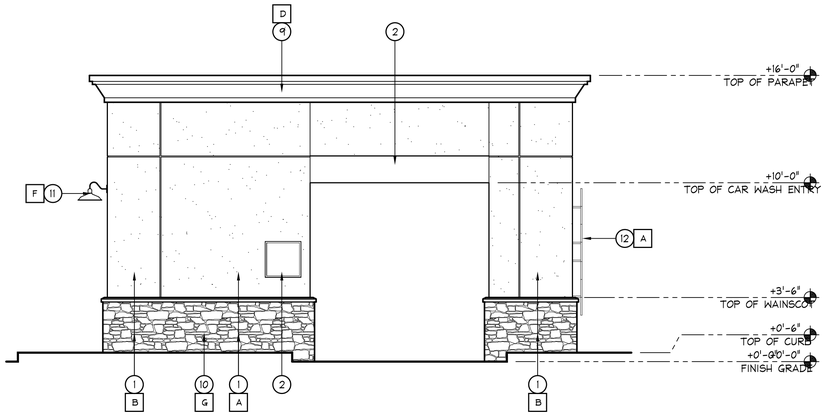
SHEET CONTENTS:

EXTERIOR ELEVATIONS

SHEET NUMBER: A302

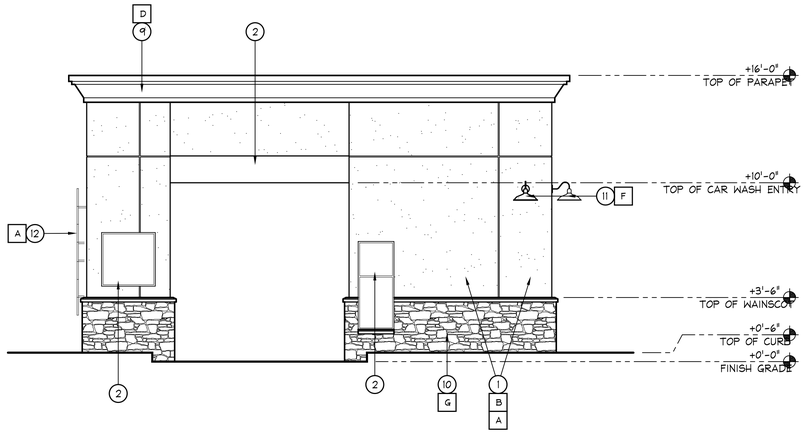
7788

AGENDA ITEM 11.3



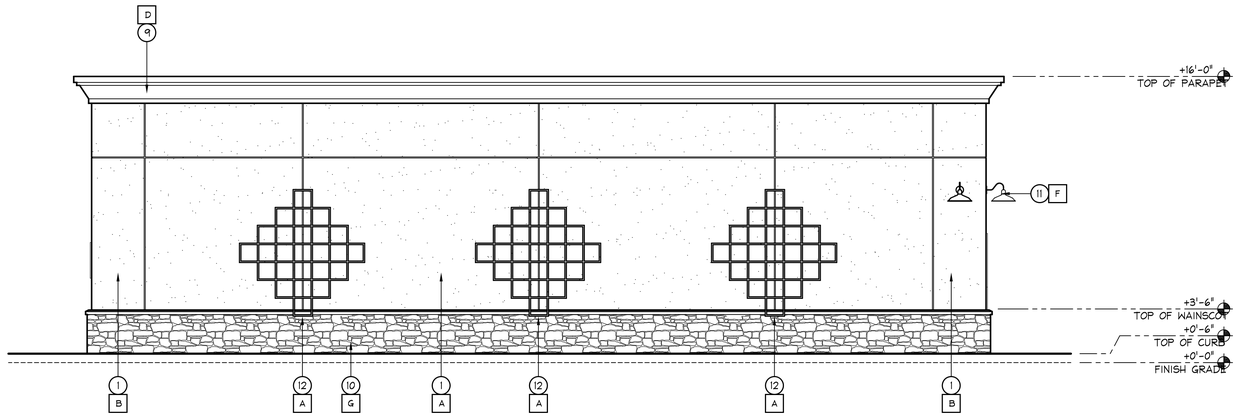
18 EAST ELEVATION

SCALE: 1/4" = 1'-0"



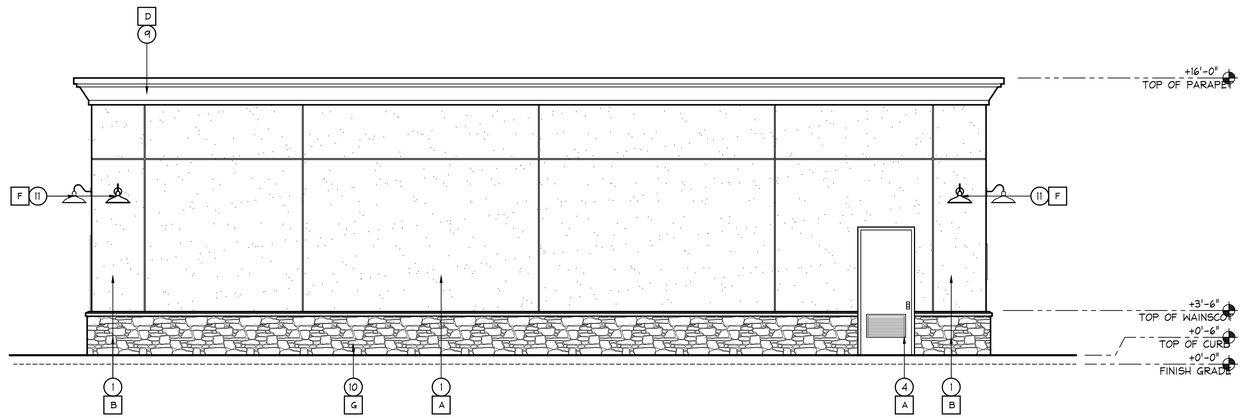
5 WEST ELEVATION

SCALE: 1/4" = 1'-0"



19 SOUTH ELEVATION

SCALE: 1/4" = 1'-0"



20 NORTH ELEVATION

SCALE: 1/4" = 1'-0"

KEY NOTES

1. 7/8" THREE COAT STUCCO SYSTEM OVER DUPONT TYVEK DRAINWRAP
2. SIGNANGE, BY OWNER
3. STOREFRONT WINDOW SYSTEM; DARK BRONZE ANODIZED, 2"x4.5" CENTER GLAZING SYSTEM; WITH 1" CLEAR DUAL GLAZING
4. HOLLOW CORE METAL DOOR
5. ROOF LADDER
6. ROOF TRIM
7. ACM PANEL
8. STANDING SEAM METAL ROOFING
9. FOAM PARAPET - PAINTED
10. STUCCO STONE OVER EXTERIOR CEMENT PLASTER OVER METAL LATH OVER DUPONT TYVEK DRAINWRAP
11. WALL LIGHT BY OWNER
12. VEGETATION SCREEN

COLOR LEGEND

- A CHEVRON COLOR "NUTMEG"
- B CHEVRON COLOR "CAFE AU LAIT"
- C CHEVRON COLOR "CHILLED WINE-R"
- D CHEVRON COLOR "MOCHA"
- E CHEVRON COLOR "WHITE"
- F CHEVRON COLOR "DARK GRAY"
- G CORONADO STONE "HONEY LEDGE"

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. EISER
C-29871
LICENSED ARCHITECT
JANUARY, 2019
RENEWAL DATE

PROJECT NUMBER: **17-006**
PROJECT DATE: **03-23-2017**

SHEET CONTENTS:

CAR WASH EXTERIOR ELEVATIONS

SHEET NUMBER:

A303

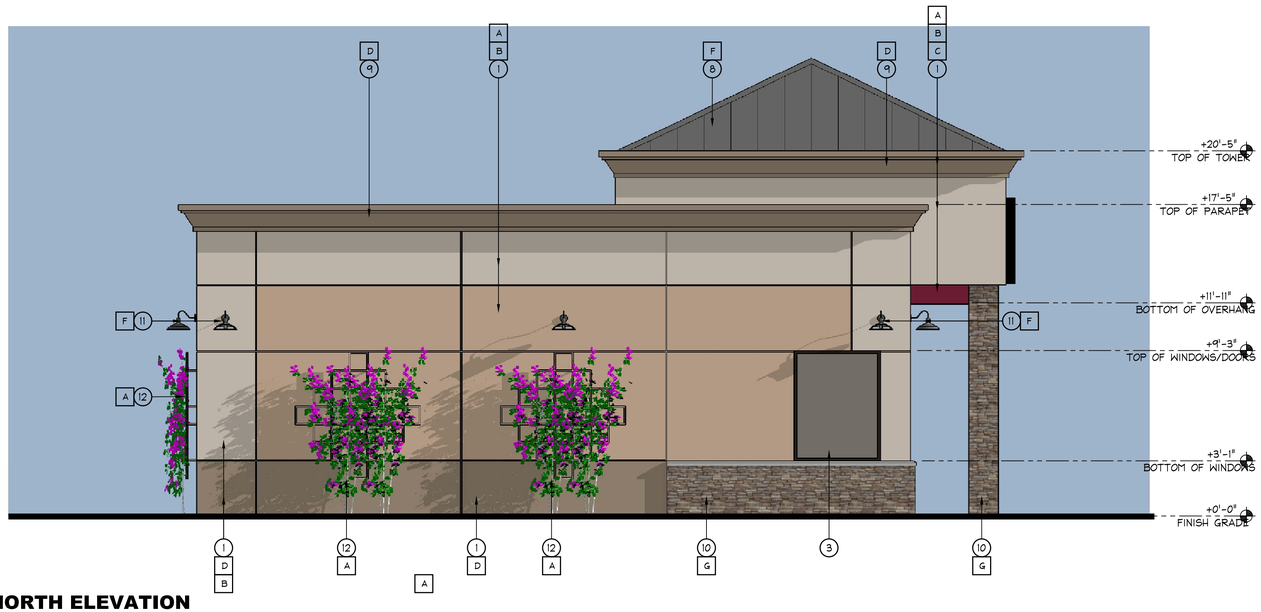
7789

AGENDA ITEM 11.3



18 WEST ELEVATION

SCALE: 1/4" = 1'-0"



20 NORTH ELEVATION

SCALE: 1/4" = 1'-0"

KEY NOTES

1. 7/8" THREE COAT STUCCO SYSTEM OVER DUPONT TYVEK DRAINWRAP
2. SIGNANGE, BY OWNER
3. STOREFRONT WINDOW SYSTEM; DARK BRONZE ANODIZED, 2"x4.5" CENTER GLAZING SYSTEM; WITH 1" CLEAR DUAL GLAZING
4. HOLLOW CORE METAL DOOR
5. ROOF LADDER
6. ROOF TRIM
7. ACM PANEL
8. STANDING SEAM METAL ROOFING
9. FOAM PARAPET - PAINTED
10. STUCCO STONE OVER EXTERIOR CEMENT PLASTER OVER METAL LATH OVER DUPONT TYVEK DRAINWRAP
11. WALL LIGHT BY OWNER
12. VEGETATION SCREEN

COLOR LEGEND

- A CHEVRON COLOR "NUTMEG"
- B CHEVRON COLOR "CAFE AU LAIT"
- C CHEVRON COLOR "CHILLED WINE-R"
- D CHEVRON COLOR "MOCHA"
- E CHEVRON COLOR "WHITE"
- F CHEVRON COLOR "DARK GRAY"
- G CORONADO STONE "HONEY LEDGE"

K12 Architects
K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:



PROJECT NUMBER: 17-006
PROJECT DATE: 03-23-2017

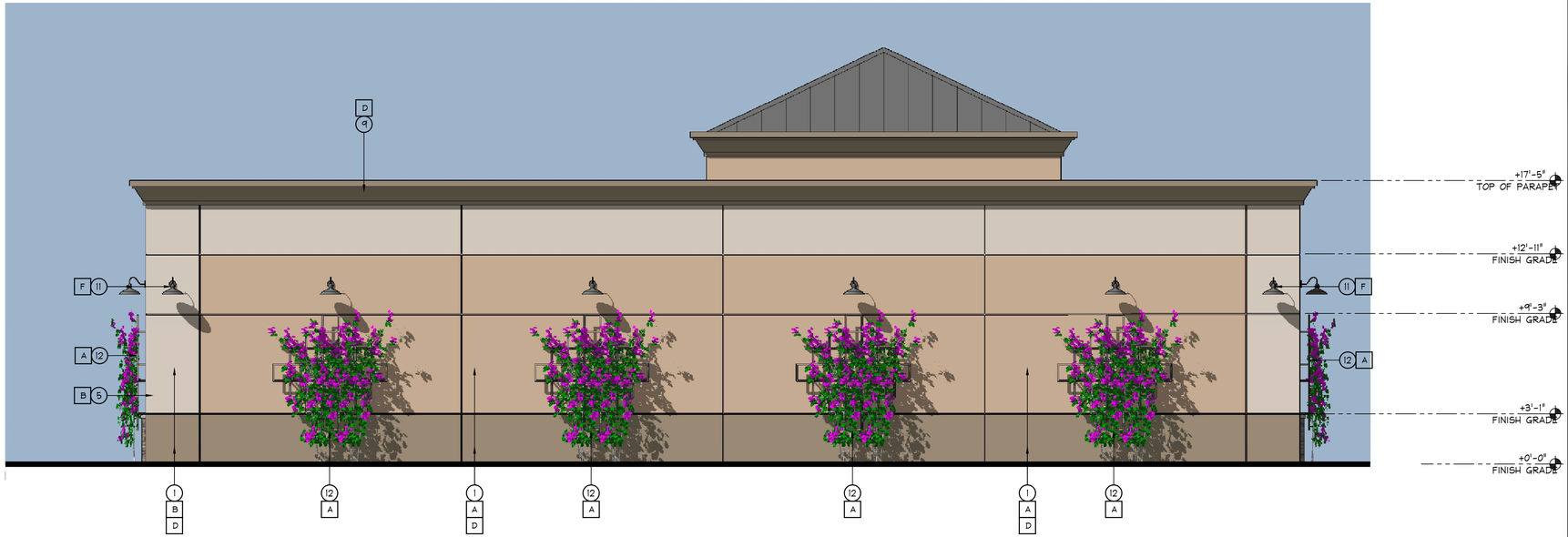
SHEET CONTENTS:

C-STORE COLOR EXTERIOR ELEVATIONS

SHEET NUMBER:

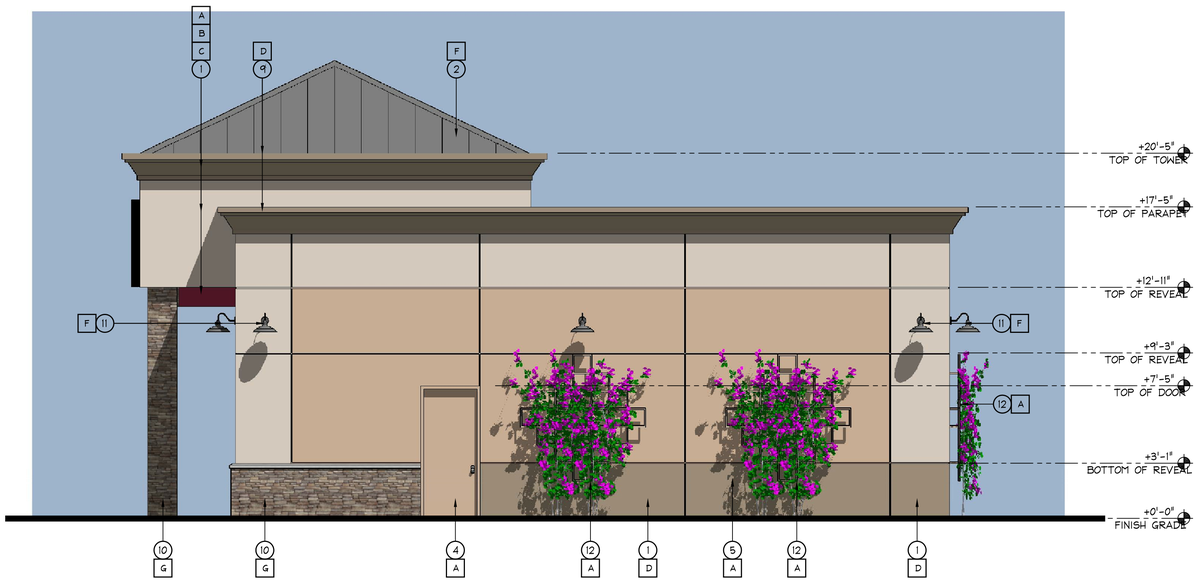
A304

7790



18 EAST ELEVATION

SCALE: 1/4" = 1'-0"



20 SOUTH ELEVATION

SCALE: 1/4" = 1'-0"

KEY NOTES

1. 7/8" THREE COAT STUCCO SYSTEM OVER DUPONT TYVEK DRAINWRAP
2. SIGNANGE, BY OWNER
3. STOREFRONT WINDOW SYSTEM; DARK BRONZE ANODIZED, 2"x4.5" CENTER GLAZING SYSTEM; WITH 1" CLEAR DUAL GLAZING
4. HOLLOW CORE METAL DOOR
5. ROOF LADDER
6. ROOF TRIM
7. ACM PANEL
8. STANDING SEAM METAL ROOFING
9. FOAM PARAPET - PAINTED
10. STUCCO STONE OVER EXTERIOR CEMENT PLASTER OVER METAL LATH OVER DUPONT TYVEK DRAINWRAP
11. WALL LIGHT BY OWNER
12. VEGETATION SCREEN

COLOR LEGEND

- A CHEVRON COLOR "NUTMEG"
- B CHEVRON COLOR "CAFE AU LAIT"
- C CHEVRON COLOR "CHILLED WINE-R"
- D CHEVRON COLOR "MOCHA"
- E CHEVRON COLOR "WHITE"
- F CHEVRON COLOR "DARK GRAY"
- G CORONADO STONE "HONEY LEDGE"

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. EISER
C-29871
LICENSED ARCHITECT
JANUARY, 2019
RENEWAL DATE

PROJECT NUMBER: **17-006**
PROJECT DATE: **03-23-2017**

SHEET CONTENTS:

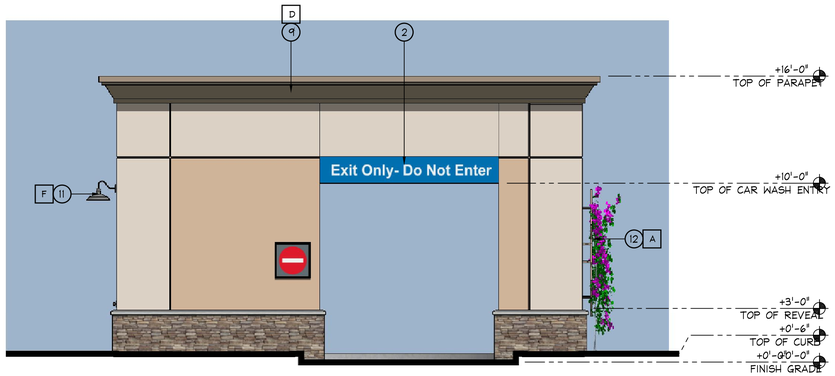
C-STORE COLOR EXTERIOR ELEVATIONS

SHEET NUMBER:

A305

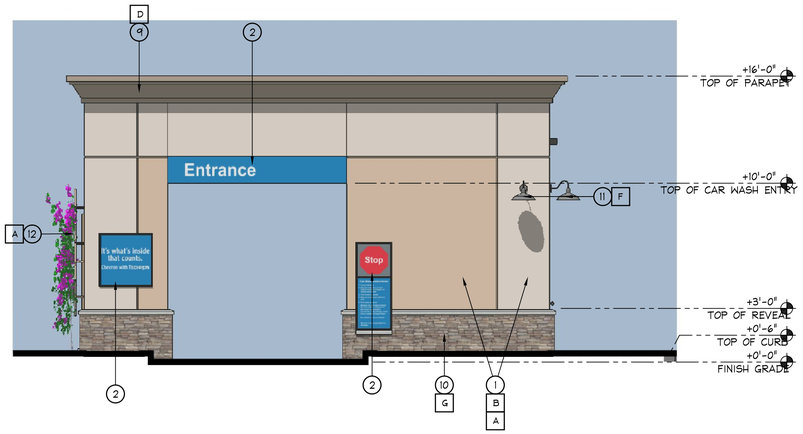
7791

AGENDA ITEM 11.3



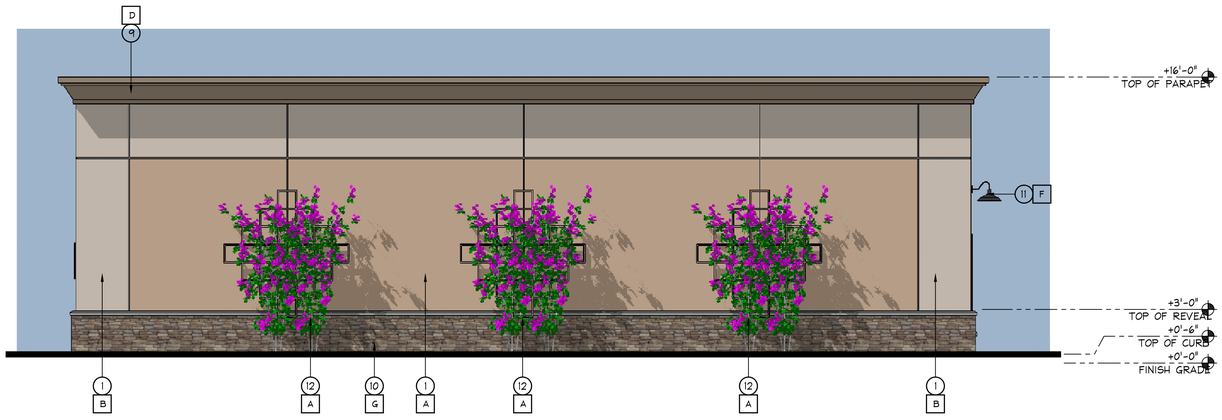
18 WEST ELEVATION

SCALE: 1/4" = 1'-0"



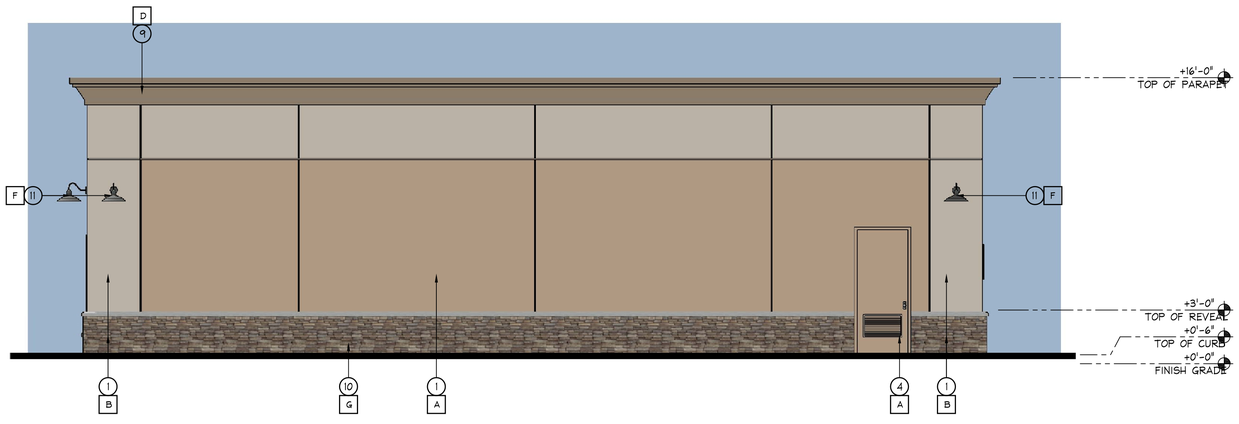
5 EAST ELEVATION

SCALE: 1/4" = 1'-0"



19 SOUTH ELEVATION

SCALE: 1/4" = 1'-0"



20 NORTH ELEVATION

SCALE: 1/4" = 1'-0"

KEY NOTES

1. 7/8" THREE COAT STUCCO SYSTEM OVER DUPONT TYVEK DRAINWRAP
2. SIGNANGE, BY OWNER
3. STOREFRONT WINDOW SYSTEM; DARK BRONZE ANODIZED, 2"x4.5" CENTER GLAZING SYSTEM; WITH 1" CLEAR DUAL GLAZING
4. HOLLOW CORE METAL DOOR
5. ROOF LADDER
6. ROOF TRIM
7. ACM PANEL
8. STANDING SEAM METAL ROOFING
9. FOAM PARAPET - PAINTED
10. STUCCO STONE OVER EXTERIOR CEMENT PLASTER OVER METAL LATH OVER DUPONT TYVEK DRAINWRAP
11. WALL LIGHT BY OWNER
12. VEGETATION SCREEN

COLOR LEGEND

- A CHEVRON COLOR "NUTMEG"
- B CHEVRON COLOR "CAFE AU LAIT"
- C CHEVRON COLOR "CHILLED WINE-R"
- D CHEVRON COLOR "MOCHA"
- E CHEVRON COLOR "WHITE"
- F CHEVRON COLOR "DARK GRAY"
- G CORONADO STONE "HONEY LEDGE"

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:



PROJECT NUMBER: 17-006
PROJECT DATE: 03-23-2017

SHEET CONTENTS:

CAR WASH COLOR EXTERIOR ELEVATIONS

SHEET NUMBER: **A306**

7792

AGENDA ITEM 11.3





20 **PERSPECTIVE VIEWS**

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.3

ATTACHMENT 2
EXHIBIT A TO THE RESOLUTION

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

2931 Mather Field Road
Rancho Cordova, California
95670

DEVELOPER:

Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670

REVISIONS:

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. ELSER
C-29871
LICENSED ARCHITECT
JANUARY, 2019
RENEWAL DATE

PROJECT NUMBER: **17-006**
PROJECT DATE: **03-23-2017**

SHEET CONTENTS:

PERSPECTIVE VIEWS

SHEET NUMBER:

A307

7793





20 PERSPECTIVE VIEWS

SCALE: 1/4" = 1'-0"

AGENDA ITEM 11.3

ATTACHMENT 2
EXHIBIT A TO THE RESOLUTION

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

DEVELOPER:

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS:

PROFESSIONAL SEALS:

STATE OF CALIFORNIA
STEVEN C. ELSER
C-29871
LICENSED ARCHITECT
JANUARY, 2019
RENEWAL DATE

PROJECT NUMBER: **17-006**
PROJECT DATE: **03-23-2017**

SHEET CONTENTS:

PERSPECTIVE VIEWS

SHEET NUMBER:

A308

7794

SOIL CONDITIONING:

1) SOIL TESTING:
THE LANDSCAPE INSTALLER SHALL TAKE A REPRESENTATIVE SAMPLE OF THE SOIL IN THE LANDSCAPE PLANTERS AND SUBMIT IT TO A CERTIFIED SOIL TESTING LABORATORY FOR ANALYSIS (SUNLAND ANALYTICAL LAB 916-852-8557 OR EQUAL). ALL SOIL SAMPLES SHOWING ADVERSE RATES OF COMPACTION SHALL RECEIVE MITIGATION RECOMMENDATIONS IN THE SOIL REPORT. THE SOILS REPORT MUST PROVIDE THE FOLLOWING INFORMATION:

- SOIL TEXTURE.
- CATION EXCHANGE CAPACITY.
- SOIL FERTILITY INCLUDING TESTS FOR NITROGEN, POTASSIUM, PHOSPHORUS, PH, ORGANIC MATTER AND SPECIFIC CONDUCTANCE (ELECTRICAL CONDUCTIVITY).
- SOIL PERMEABILITY RATE IN INCHES PER HOUR.
- RECOMMENDATIONS FOR AMENDMENTS TO THE PLANTING AREA SOIL

UPON RECEIPT OF THE SOILS REPORT FROM THE CONTRACTOR THE LANDSCAPE ARCHITECT SHALL PREPARE THE SOIL AMENDING SCHEDULE FOR THE OWNER. REFER TO SOIL CONDITIONING NOTES FOR BIDDING SOIL CONDITIONING.

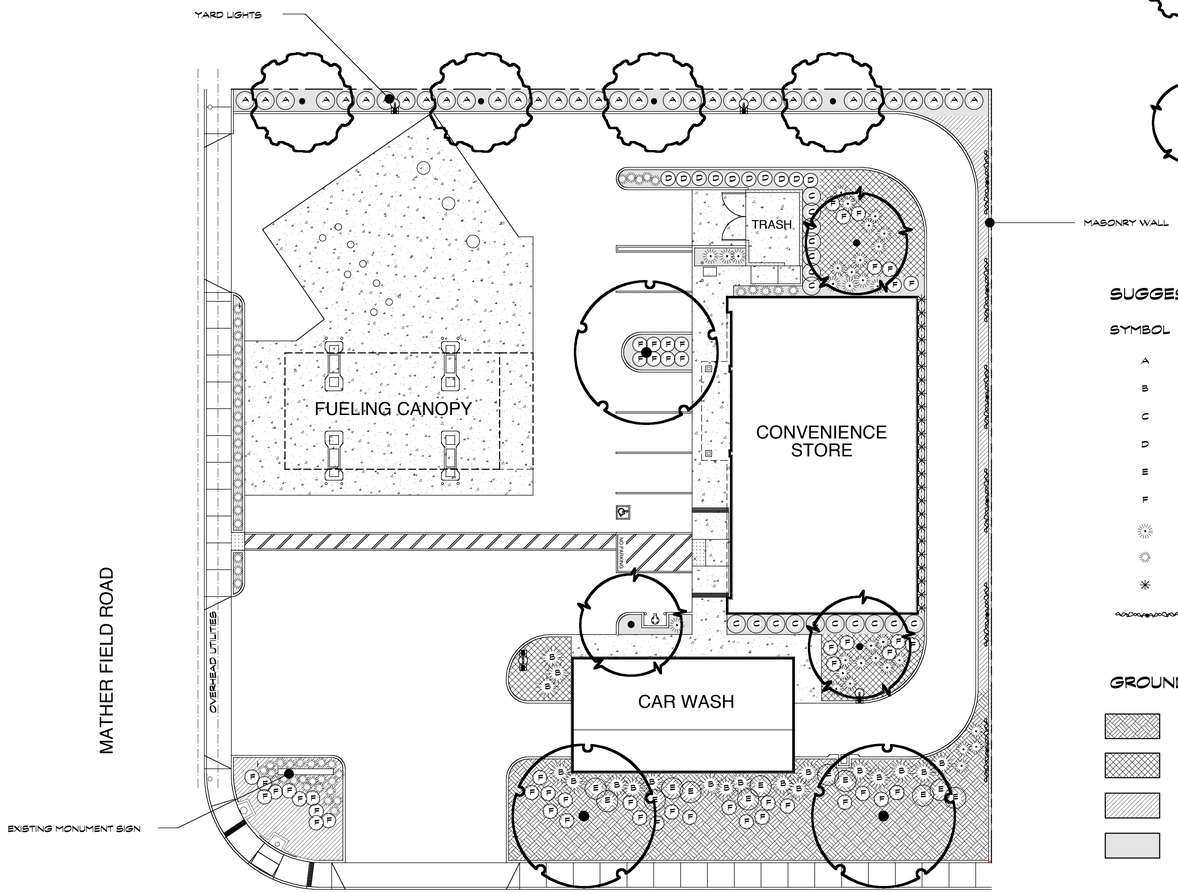
THE FOLLOWING IS FOR BIDDING PURPOSES ONLY AND COULD CHANGE FOLLOWING RECEIPT OF THE SOILS REPORT:
THE SOIL AMENDMENT SHALL BE NITRIFIED FIR OR REDWOOD SOIL CONDITIONER, 0-1/4", APPLY THE SOIL AMENDMENT TO ALL PLANTED AREAS AT THE RATE OF 4 CU.YDS. PER 1000 SQ.FT. BROADCAST BEST 6-20-20 XB FERTILIZER AT 15 LBS. PER 1000 SQ.FT. THE SOIL IN ALL LANDSCAPED AREAS SHALL BE THOROUGHLY ROTOTILLED OR HAND CULTIVATED TO A MINIMUM DEPTH OF 8"TO ASSURE COMPLETE INCORPORATION OF THE SOIL AMENDMENTS. ANY HARD PANS ENCOUNTERED SHALL BE RIPPED TO ALLOW THOROUGH TILLING OF THE SOIL.

2) ESTABLISH A SMOOTH, EVEN FINISH GRADE WHILE REMOVING ANY ROCKS OR DEBRIS LARGER THAN 1" DIA. MAINTAIN POSITIVE DRAINAGE FROM BUILDINGS TO CATCH BASINS OR CURBS WHILE AVOIDING LOW SPOTS. FOR MULCHED BEDS, MAINTAIN THE FINISH GRADE TO 2" BELOW SIDEWALKS AND CURBS.

3) A PRE-EMERGENCE HERBICIDE, (RONSTAR-G, SURFLAN OR EQUAL) SHALL BE APPLIED FOLLOWING THE MANUFACTURER'S DIRECTIONS TO ALL LANDSCAPE AREAS (EXCEPT SOD AREAS) PRIOR TO MULCHING.

4) ALL PLANTERS SHALL BE MULCHED TO A DEPTH OF 3" (COMPACTED) WITH SMALL 1/2"-3/4" DIA.WALK-ON FIR/ PINE BARK. KEEP BARK AWAY 3" FROM ALL ROOT CROWNS. FINE GORILLA HAIR OR SHREDDED REDWOOD BARK CAPABLE OF SUSTAINING A FLAME OR SMOLDERING IS NOT ACCEPTABLE. SUBMIT A SAMPLE OF THE SOIL AMENDMENT AND MULCH MATERIAL TO THE CITY OFFICIALS AS REQUIRED PRIOR TO DELIVERY.

5) REFER TO PLANTING DETAILS FOR INDIVIDUAL PLANT SOIL CONDITIONING.



SITE PLAN

SCALE: 1" = 16' - 0"

0 5' 10' 20' 30'

PLANT LIST

SYMBOL	DESCRIPTION	CONTAINER	QUANTITY	MATURE SIZE H X W	WUCOLS
	ULMUS PARVIFOLIA CHINESE EVERGREEN ELM	15 GAL.	4	35' X 25'	M
	LAURUS NOBILIS 'SARATOGA' SWEET BAY (TREE FORM)	15 GAL.	3	20' X 15'	L
	LAGERSTROEMIA 'NATCHEZ' WHITE CRAPE MYRTLE	15 GAL.	3	20' X 15'	L

SUGGESTED SHRUBS AND ACCENTS

SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	CONTAINER	WATER USE	SIZE
A	34	NERIUM OLEANDER 'DWARF RED'	DWARF RED OLEANDER	5 GAL.	L	4' X 4'
B	19	PHORMIUM TENAX 'AMAZING RED'	RED FLAX	5 GAL.	M	3' X 3'
C	17	ESCALLONIA 'TERRI'	DWARF ESCALLONIA	5 GAL.	M	3' X 3'
D	10	SALVIA MICROPHYLLA 'HOT LIPS'	RED SAGE	5 GAL.	L	2' X 2'
E	12	PLUMBAGO AURICULATA	BLUE CAPE PLUMBAGO	5 GAL.	M	3' X 3'
F	52	LANTANA 'WHITE'	WHITE LANTANA	1 GAL.	L	2' X 3'
	32	DIETES BICOLOR	AFRICAN IRIS	1 GAL.	L	3' X 2'
	53	AGAPANTHUS AFRICANUS 'BLUE'	LILY OF THE NILE	1 GAL.	L	2' X 2'
	24	TULBAGIA VIOLACEA	SOCIETY GARLIC	1 GAL.	L	1' X 1'
	6	PARTHENOCISUS TRICUSPIDATA	BOSTON IVY	5 GAL.	M	

GROUND COVERS

					AREA
30" O.C.	TEUCRIUM X LUCIDRYS	PROSTRATE GERMANDER	1 GAL.	L	2,315 SQFT
30" O.C.	NEPETA X FAASSENII 'SELECT BLUE'	CATMINT	1 GAL.	L	984 SQFT
36" O.C.	ERIGERON KARVINSKIANUS	FLEABANE	1 GAL.	L	793 SQFT
	OTHER MULCHED PLANTERS				1,800 SQFT
				TOTAL LANDSCAPED AREA:	5,893 SQFT

PARKING LOT SHADING

(10 YEAR)

TREE	DIA.	AREA FULL COVERAGE SQFT.	NUMBER	(100 %)	HALF COVERAGE NUMBER	(50 %)
LAGERSTROMIA	20.0 FT.	314	0	0	1	157
ULMUS	35.0 FT.	962	1	962	0	0

SUBTOTAL:	962 SQFT.	157 SQFT.
SHADE TOTAL:	1,119 SQFT.	
PARKING LOT AREA:	1,216 SQFT.	
PERCENTAGE COVERAGE:	92 %	

JAMES FERGUSON CLABAUGH
LANDSCAPE ARCHITECT
4556 SHAWN LANE
VACAVILLE, CA 95688
PHONE/ FAX: 707-449-3916

These drawings are the instrument of the service and shall not be used, in part or in whole, for any work not specifically contracted with James Clabaugh, Landscape Architect. Copyright 2018

LICENSED LANDSCAPE ARCHITECT
JAMES FERGUSON CLABAUGH
SIGNATURE
9/30/18
RENEWAL DATE
5/25/19
DATE
STATE OF CALIFORNIA

MATHER FIELD CHEVRON

2931 MATHER FIELD ROAD
RANCHO CORDOVA, CA

Scale	1" = 16'-0"	REVISIONS	
Date	5/25/18	No.	Date
Job No.			
Designed by	J.C.		
Drawn by	J.C.		

LANDSCAPE PLANTING PLAN

Sheet No.
L1
of 3

AGENDA ITEM 11.3

7795

MAXIMUM APPLIED WATER ALLOWANCE

MAWA = (ETo) (0.45) (LA) (0.62)

			ETo	ETAF	LA	
85,028	GAL/YEAR	=	51.9	0.45	5941	0.62

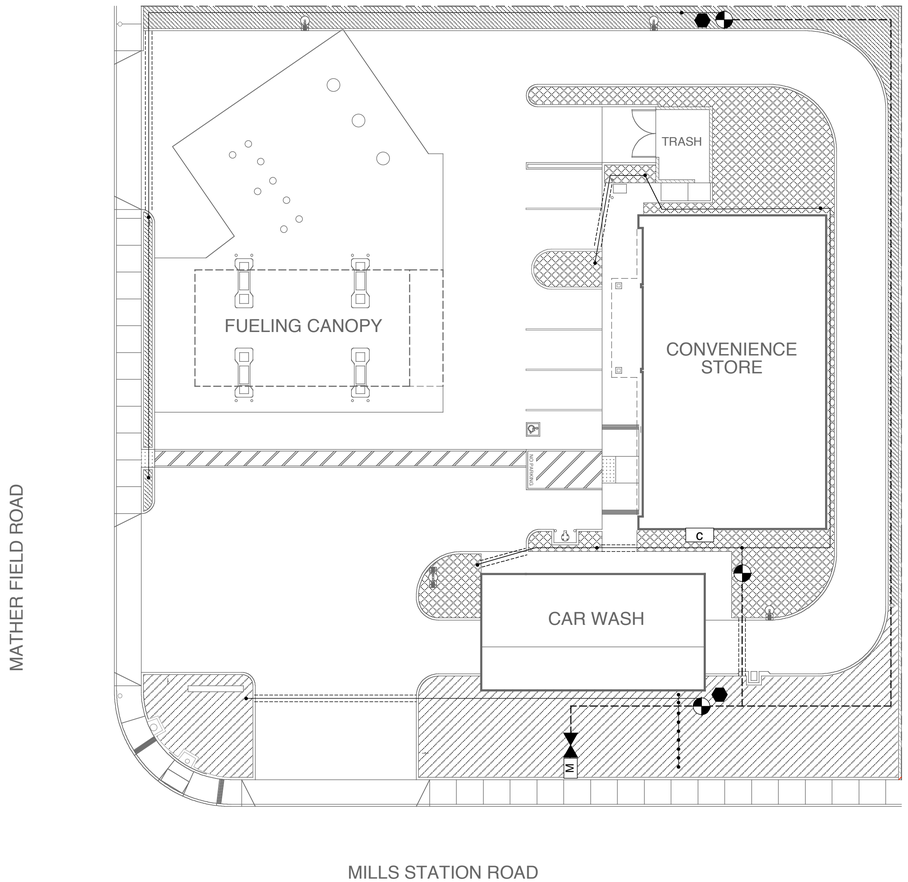
ESTIMATED TOTAL WATER USE

ETWU=ETo X 0.62 X ETAF X AREA

HYDROZONE #/ PLANTING DESCRIPTION	PF	IRRIGATION METHOD	IRRIGATION EFFICIENCY	ETAF (PF/IE)	LANDSCAPE AREA	ETo	ETAF X AREA	ETWU
1. TEUCRIUM, OTHER	0.4	DRIP	0.81	0.494	2315	51.9	1,143	36,736
2. NEPETA, OTHER	0.3	DRIP	0.81	0.37	954	51.9	364	11,727
3. ERIGERON, OTHER	0.4	DRIP	0.81	0.494	793	51.9	392	12,601
3. OTHERMULCHED PLANTERS	0.3	DRIP	0.81	0.37	1848	51.9	685	22,036
				TOTAL AREA:	5,241 SQFT		2,584 SQFT	

ETWU TOTAL: 83,150 GALS.

MAWA TOTAL: 85,100 GALS.



SITE PLAN

SCALE: 1" = 16' - 0"

0 5' 10' 20' 30'

IRRIGATION LEGEND

SYMBOL	DESCRIPTION
C	HUNTER X-CORE XC-4 4 STATION CONTROLLER, PLASTIC WALL MOUNTED W/ SOLAR SYNC WSS-SEN WIRELESS ET ADJUSTMENT SENSOR.
	1" FEBCO 825Y BACKFLOW DEVICE
	1" HUNTER ICV-101G VALVES W/ 1" SPIN FILTER/ 1" 30 PSI PRE SET PRESSURE REGULATOR (DRIP SYSTEMS)
	1" RAINBIRD 44NP QUICK COUPLER (PURPLE CAP)
	1 " SCH 40 PVC MAINLINE
	3" SCH 40 SLEEVES, MIN. 18" COVER
	INDICATES PVC LATERAL TO DRIP ADAPTERS. RUN PVC LATERALS TO ALL SEPARATE PLANTERS, INSTALL BARBED TYPE PVC TO DRIP ADAPTERS AS REQUIRED FOR DRIP TUBING, SEE DETAILS.
	CLASS 200 PVC LATERALS LINES : 1-9 GPM 3/4" PIPE 10-15 1" PIPE
	TYPICAL NETAFIM TLCV6-18 INLINE DRIP TUBING: 18" O.C. 0.6 GPH INSTALLED APPROX. 18" O.C, BURIED 2" BELOW FINISH GRADE (INDIVIDUAL DRIP LINES NOT SHOWN, FILL PATTERNS INDICATE SEPARATE DRIP ZONES)

IRRIGATION NOTES:

1) PROVIDE 100% COVERAGE OF ALL PLANTED AREAS USING NETAFIM INLINE DRIP LINE. THE PLAN IS DIAGRAMATIC IN NATURE, NOT ALL POSSIBLE PIPE OR FITTINGS CAN BE SHOWN. FINAL ROUTING OF PIPING SHALL BE DETERMINED IN THE FIELD. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS AT WWW.NETAFIMUSA.COM

2) SLEEVE ALL LINES UNDER PARKING LOTS AND DRIVEWAYS WITH PVC SCH 40 CHASES A MINIMUM OF TWO SIZES LARGER THAN LINE SIZE. INSTALL ALL SLEEVES UNDER ASPHALT 24" BELOW FINISH GRADE, COMPACT AS REQUIRED (CONSULT WITH THE GRADING CONTRACTOR). LOW VOLTAGE WIRING SHALL BE RUN IN CHASES OF PVC SCH 40 UNDER ALL DRIVEWAYS AND WALKS. COORDINATE THE PLACEMENT OF SLEEVES WITH OTHERS, (UNDERGROUND, CONCRETE, PLUMBING, ELECTRICAL AND GRADING).

3) THE MAINLINE AND CONTROL VALVES SHALL BE PRESSURE TESTED TO 100 PSI STATIC FOR A PERIOD OF ONE HOUR. PROVIDE ALL NECCESSARY PUMPS, PRESSURE GAUGES, ETC. TO ASSURE AN ACCURATE TEST. A LOSS OF MORE THAN 5 PSI DURING THE HOUR SHALL CONSTITUTE A FAILURE OF THE TEST, ANY LEAKAGES SHALL BE CORRECTED AND THE TEST REPEATED UNTIL THE MAINLINE CAN RETAIN THE REQUIRED PRESSURE. ALL LATERAL LINES AND MANIFOLDS SHALL BE CAPPED, OR PLUGGED OFF AND PLACED UNDER FULL STATIC PRESSURE AND VISUALLY CHECKED FOR ANY LEAKAGE WITH ANY NECCESSARY REPAIRS BEING MADE. DO NOT PLACE TEES OR ELLS UNDER PAVEMENT, SLEEVE IN STRAIGHT RUNS TO ALLOW FOR REPLACEMENT OF BROKEN LINES IF NECESSARY.

4) FILL, REPAIR AND RECOMPACT ANY SETTLING OF TRENCHES AND FILL LOW SPOTS THAT OCCUR AFTER INSTALLATION.

5) REPAIR ANY DAMAGE DONE TO OTHER UNDERGROUND UTILITIES AT NO COST TO THE OWNER. CONTACT UNDERGROUND SERVICE ALERT PRIOR TO WORK, 800-642-2444.

6) THE DEPTHS OF PIPING SHOWN ON THE DETAILS ARE EXPECTED TO BE FOLLOWED, HOWEVER IF INDIVIDUAL OBSTRUCTIONS ARE FOUND, (CONCRETE, ROCK, ETC.) THAT CANNOT EASILY BE REMOVED OR BYPASSED, THEN A RAISING OF PIPING DEPTHS MAY BE ALLOWED AT THAT POINT, FOLLOWING THE OWNERS APPROVAL.

7) SUBSTITUTIONS OF ANY MATERIALS SPECIFIED SHALL NOT BE ALLOWED UNLESS APPROVED IN WRITING BY THE OWNER. SUBSTITUTIONS NOT APPROVED COULD BE SUBJECT TO REMOVAL AND REPLACEMENT.

8) PROVIDE A SET OF 'AS-BUILT DRAWINGS LOCATING ALL VALVES, QUICK COUPLERS, MAINLINE AND WIRING ,(IF SEPARATE FROM MAINLINE.) PROVIDE 2 KEYS AND OPERATION MANUALS FOR THE CONTROLLER TO THE OWNER. NUMBER THE ZONES AS SHOWN ON THE AS-BUILTS PLAN IN THE CONTROLLER CHART.

9) NOTE THAT THIS PLAN IS DIAGRAMATIC, PLACE ALL VALVES AND LINES WITHIN SHRUB PLANTERS IF POSSIBLE. INSTALL THE VALVES AND QUICK COUPLERS NEAR CURBS OR SIDEWALKS FOR ACCESSABILITY.

1

JAMES FERGUSON CLABAUGH
LANDSCAPE ARCHITECT
4556 SHAWN LANE
VACAVILLE, CA 95688
PHONE/ FAX: 707-449-3916

These drawings are the instrument of the service and shall not be used, in part or in whole, for any work not specifically contracted with James Clabaugh, Landscape Architect. Copyright 2018

LICENSED LANDSCAPE ARCHITECT
JAMES FERGUSON CLABAUGH
SIGNATURE
9/30/18
RENEWAL DATE
5/25/18
DATE
STATE OF CALIFORNIA

MATHER FIELD CHEVRON

2931 MATHER FIELD ROAD
RANCHO CORDOVA, CA

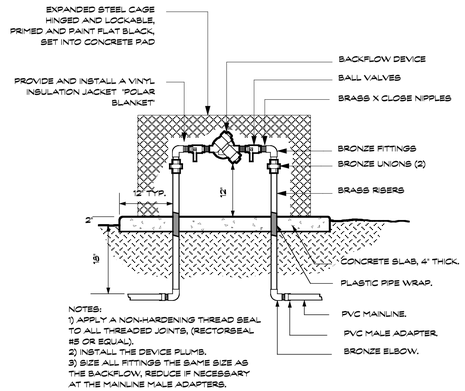
Scale	1" = 16'-0"	REVISIONS	
Date	5/25/18	No.	Date
Job No.			
Designed by	J.C.		
Drawn by	J.C.		

IRRIGATION PLAN

Sheet No.
L2
of 3

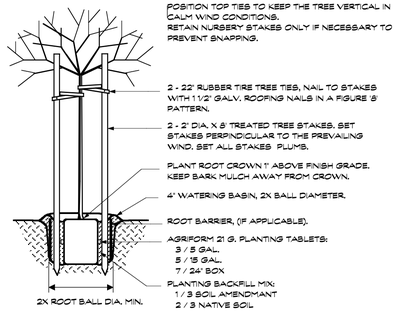
AGENDA ITEM 11.3

7796



NOTES:
1) APPLY A NON-HARDENING THREAD SEAL TO ALL THREADED JOINTS, (RECTORSEAL #5 OR EQUAL).
2) INSTALL THE DEVICE PLUMB.
3) SIZE ALL FITTINGS THE SAME SIZE AS THE BACKFLOW, REDUCE IF NECESSARY AT THE MAINLINE MALE ADAPTERS.

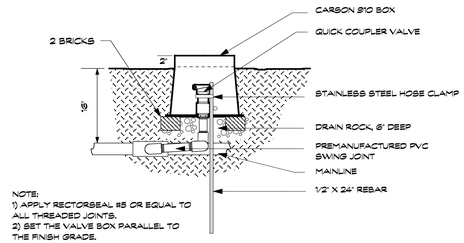
6 Backflow Device
Section 3/4" = 1' 0"



7 Tree Planting
Section 3/8" = 1' 0"

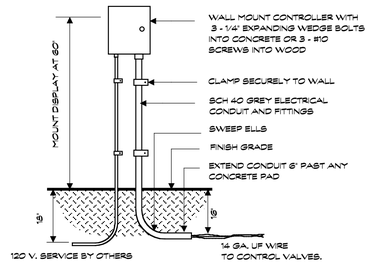
ALL TREES PLANTED WITHIN 8' OF ANY CURB, SIDEWALK OR PAVEMENT SHALL BE PLANTED IN ROOT CONTROL DEVICES.
USE DEEP ROOT #RB-18.2 PANELS OR EQUAL.

4 PANELS PER 15 GAL.
5 PANELS PER 24" BOX.



NOTE:
1) APPLY RECTORSEAL #5 OR EQUAL TO ALL THREADED JOINTS.
2) SET THE VALVE BOX PARALLEL TO THE FINISH GRADE.

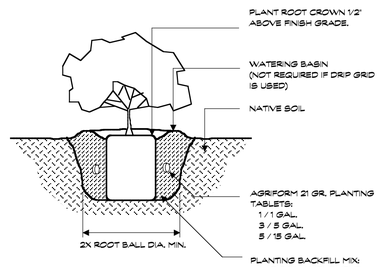
2 Quick Coupler
Section 1" = 1' 0"



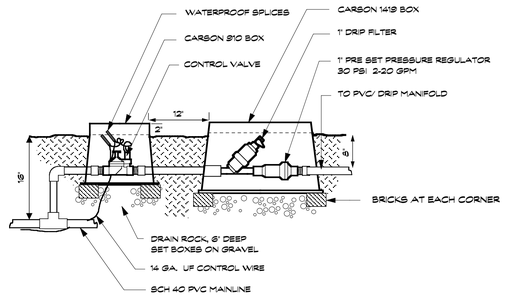
NOTE:
1) ALL WIRING TO COMPLY WITH ALL LOCAL ELECTRICAL CODES.

1 Controller
Section 1/2" = 1' 0"

KEEP BARK MULCH 3" AWAY FROM THE PLANT'S CROWN.

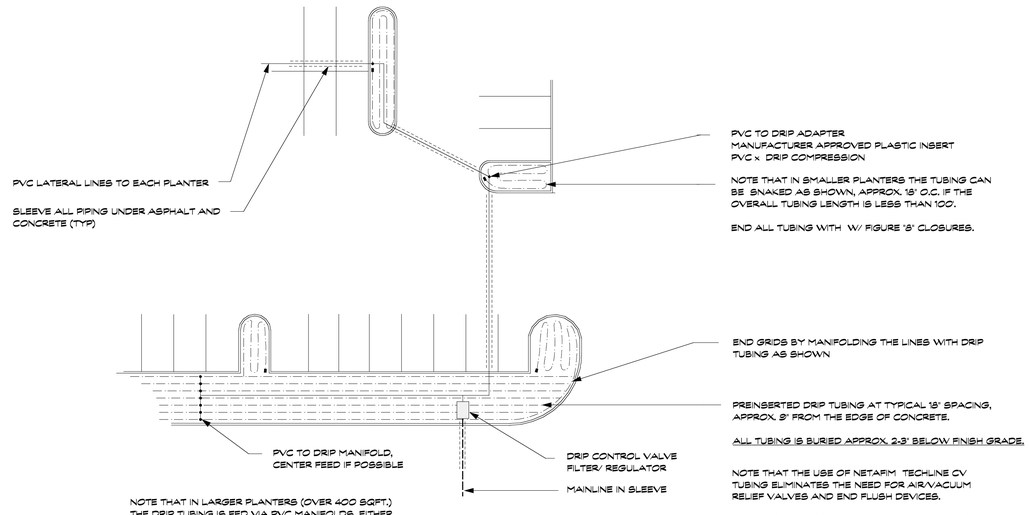


4 Shrub Planting
Section 3/4" = 1' 0"



NOTES:
1) SET VALVE BOXES 12" BACK AND PERPINDICULAR FROM CURBS OR SIDEWALKS.
2) SET BOXES PARRALLEL WITH FINISH GRADE.
3) USE JUS THE CONTROL VALVE SECTION FOR THE SPRAY SYSTEMS.

3 Drip Valve / Filter / Regulator
Section 1" = 1' 0"



5 Typical Inline Drip System Installation
Plan No Scale

GENERAL NOTES:

1) THE LANDSCAPE CONTRACTOR SHALL INSPECT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING SITE CONDITIONS PRIOR TO SUBMITTING HIS BID. THE SITE SHALL BE ROUGH GRADED TO PLUS OR MINUS 0.1' OF FINISH GRADE BY THE SITE GRADING CONTRACTOR (UNLESS AGREED UPON OTHERWISE), 2" BELOW CURBS AND SIDEWALKS, INCLUDING MOUNDING CONTOURS (IF APPLICABLE), FREE OF DEBRI. THE NATIVE ON SITE TOPSOIL MAY BE USED FOR FILLING THE PLANTERS IF IT IS FRIABLE, WELL DRAINED AND CAPABLE OF REASONABLE PLANT GROWTH. SLOPE ALL PLANTERS AT 2% MINIMUM FOR PROPER DRAINAGE. ANY AB ROCK, CONCRETE WASTE, OR LIME TREATED SOILS SHALL BE REMOVED FROM ALL PLANTERS PRIOR TO FILLING.

2) ALL WORK SHALL BE INSTALLED IN COMPLIANCE WITH ALL STATE AND LOCAL CODES AND ORDINANCES BY A LICENSED CONTRACTOR WHO SHALL OBTAIN AND PAY FOR ANY NECESSARY PERMITS PRIOR TO WORK. REFER TO THE LOCAL GOVERNMENT'S ORDINANCES REGARDING INSPECTIONS AND COMPLIANCE WITH WATER CONSERVATION REGULATIONS.

3) THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES, BUILDINGS AND UNDERGROUND UTILITIES DURING THE PERFORMANCE OF HIS WORK AND SHALL MAKE ANY NECESSARY REPAIRS AT NO COST TO THE OWNER. HE SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH OTHERS, (UNDERGROUND, CONCRETE, PLUMBING, ELECTRICAL AND GRADING). CONTACT UNDERGROUND SERVICE ALERT PRIOR TO WORK, 800-642-2444.

4) THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING UP HIS OWN DEBRIS AND LEAVING THE SITE IN A SAFE CONDITION DAILY, PROVIDING NECESSARY BARRACADES. UPON COMPLETION OF THE JOB HE SHALL RESPONSIBLE FOR FINAL CLEAN-UP OF HIS WORK AND DEBRI AND LEAVING IT A BROOM-CLEAN CONDITION.

5) REQUESTS FOR PLANT SUBSTITUTIONS SHALL BE MADE IN WRITING TO THE LANDSCAPE ARCHITECT PRIOR TO DELIVERY OF THE PLANTS. PLANT MATERIALS SHALL BE TOP QUALITY, UNDAMAGED, REPRESENTATIVE OF THE SPECIES, PROPERLY PRUNED IF NECESSARY, FREE OF DISEASE OR PESTS AND NOT ROOT BOUND. WATER UPON DELIVERY AND DAILY THERE AFTER UNTIL PLANTED.

6) PLANT NUMBERS SHOWN ARE FOR THE CONVENIENCE OF THE CONTRACTOR, HE SHALL BE RESPONSIBLE FOR ALL SYMBOLS SHOWN. AREAS SHOWN ARE FOR THE CONVENIENCE OF THE CONTRACTOR, VERIFY IN THE FIELD.

7) ANY NOXIOUS PERRENIAL WEEDS (BERMUDA GRASS, MORNING GLORY, ETC.) GROWING ON THE SITE AFTER ROUGH GRADING SHALL BE SPRAYED AND KILLED WITH ROUND-UP HERBICIDE . LEAVE UNDISTURBED FOR 5 DAYS BEFORE ANY WORK.

JAMES FERGUSON CLABAUGH
LANDSCAPE ARCHITECT
4556 SHAWN LANE
VACAVILLE, CA 95688
PHONE/ FAX: 707-449-3916

These drawings are the instrument of the service and shall not be used, in part or in whole, for any work not specifically contracted with James Clabaugh, Landscape Architect. Copyright 2017

LICENSED LANDSCAPE ARCHITECT
JAMES FERGUSON CLABAUGH
SIGNATURE 5/30/18
RENEWAL DATE 5/25/18
DATE
STATE OF CALIFORNIA

MATHER FIELD CHEVRON

2931 MATHER FIELD ROAD
RANCHO CORDOVA, CA

Scale		REVISIONS	
Date	5/25/18	No.	Date
Job No.			
Designed by	J.C.		
Drawn by	J.C.		

LANDSCAPE DETAILS

Sheet No.
L3
of 3

AGENDA ITEM 11.3

7797

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
General Conditions					
1.	The approved entitlement is for a Conditional Use Permit and Minor Design Review to allow for the demolition and reconstruction of a service station with a Commercial Mixed Use zone within the Folsom Boulevard Specific Plan (FB-CMU). The project will be located at 2931 Mather Field Road. The project as described in the City Council staff report dated October 15, 2018, is subject to the Conditions of Approval herein, for project number DD9734.	Project Description	On-Going	Planning	
2.	The Applicant/Property Owner shall hold harmless the City, its Council Members, officers, agents, employees, and representatives from liability for any award, damages, costs and fees incurred by the City and/or awarded to any plaintiff in an action challenging the validity of this permit or any environmental or other documentation related to approval of this permit. Applicant/Property Owner further agrees to provide a defense for the City in any such action.	General	On-Going	Planning	
3.	Any future alteration to the buildings, change in use, intensification of the site, or modification to the parking and landscaped area must be reviewed by the City to ensure compliance with all local, state, and federal regulations. Minor modifications that are found to be in substantial conformance with the approved plans such as colors, plant materials, or minor lot line adjustments, may be approved administratively. Major modifications shall be approved by the applicable decision making body.	General	On-Going	Planning/ Building /Public Works	
4.	The permit is valid for a period of three (3) years from the date of City Council approval unless an extension is granted by the Community Development Director.	General	On-Going	Planning	
5.	Applicant/Property Owner shall not carry a negative account balance with the City for the processing of the project. If a negative account balance occurs, it will be the Applicant/Property Owner's responsibility to pay the balance due, in order to avoid delays in the processing of future permits or recordation of maps. Please	General	On-Going	Finance	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
	email the Finance Department at billings@cityofranchocordova.org for the status of your account with the City.				
6.	Applicant/Property Owner shall be responsible for all damage to City streets associated with construction of the project and shall repair any damage as soon as possible.	General	On-Going	Public Works	
7.	Should any formal complaints be submitted in regards to the impacts of this facility, the operation will be reevaluated by the Planning Department. This re-evaluation may involve an amendment to the approved plans or scope, additional studies (noise, air quality, traffic), or the revocation of the permit. Only complaints in regards to violations to the Conditional Use Permit shall trigger re-evaluation.	Security	On-Going	Planning/ Police	
8.	All waste water used for car washing must be connected to the sanitary sewer unless it will be reused. In no case shall car wash water discharge to the storm system.	Waste Water	On-Going	Public Works	
9.	In the event the Applicant requires the relocation or removal of existing SMUD facilities on or adjacent to the subject property, the Applicant shall coordinate with SMUD. The Applicant shall be responsible for the cost of relocation or removal	Existing SMUD Facilities	On-Going	SMUD	
10.	SMUD reserves the right to use any portion of its easements on or adjacent to the subject property that it reasonably needs and shall not be responsible for any damages to the developed property within said easement that unreasonably interferes with those needs.	Easements	On-Going	SMUD	
11.	Any necessary future SMUD facilities located on the Applicant's property shall require a dedicate SMUD easement. This will be determined prior to SMUD performing work on the Applicant's property.	SMUD Easements	On-Going	SMUD	
12.	The car wash blowers shall be set to run for a period no more than 60 seconds per car wash cycle	Car Wash Cycle	On-Going	Planning	
13.	The car wash shall operate only during daytime hours (7:00AM to 10:00PM) hours	Car Wash Operating Hours	On-Going	Planning	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
Prior to Approval of Improvement Plans					
14.	Applicant shall photo-document the condition of adjacent streets, sidewalks and infrastructure to the satisfaction of the Public Works Department.	Sidewalks	Prior to approval of Improvement Plans	Public Works	
15.	Enter into a frontage agreement and bond for construction of public improvements per the approved Public Works plans to the satisfaction of the Public Works Department.	Frontage Agreement	Prior to Approval of Improvement Plans	Public Works	
16.	Show the design for a fire access roadway of not less than 20-feet of unobstructed width, 13-feet, 6-inches of vertical clearance, and turning radii of 25 feet inside and 50 feet outside dimension on the improvement plans. The access roadway shall extend to within 150 feet of all portions of the exterior walls of the first story of any proposed building. The use of turf-block or grass-crete or similar alternate road surfaces is not approved for installation in fire apparatus access roadways.	Fire Access	Prior to Approval of Improvement Plans	Sacramento Metro Fire	
17.	Show the design for an approved fire apparatus turnaround. Fire apparatus turnaround shall conform to Sacramento Metro Fire Districts Fire Prevention Standard #3. Fire access turn-around shall be located within 50 feet of the end of the access roadway.	Fire Apparatus Turnaround	Prior to Approval of Improvement Plans	Sacramento Metro Fire	
18.	Show on the plans how Fire Lanes will be marked. Fire Lane identification shall be provided along the required fire access roadway. Fire Lane identification shall be in accordance with the Sacramento Metro Fire Districts Fire Prevention Standard #3 and the California Vehicle Code. Vehicle parking is prohibited on any street less than 28 feet in width. Vehicle parking is permitted on both sides of streets 36 feet or more in width. Roadway widths shall be measured between the gutter-line or edge of pavement on opposite sides of the road. Identification of fire apparatus access roadways may be required on private roads.	Fire Lane Identification	Prior to Approval of Improvement Plans	Sacramento Metro Fire	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
19.	Provide a note on the plan that reads, "Fire access roadways shall be built to bear a minimum of 80,000 pounds and meet the Sacramento County Public Works Standards for roadways. A report, prepared by a registered geotechnical engineer, verifying the ability of the road to bear the required minimum weight, shall be submitted with any plan indicating construction of roadway. Verification of constructed roadway shall be provided by a registered geotechnical engineer prior to final of the project."	Roadway Standards	Prior to Approval of Improvement Plans	Sacramento Metro Fire	
20.	Show the location of the required fire hydrants for this project on the improvement plans. Approved fire hydrants capable of providing the required fire flow for the protection of any and all structures shall be located along the fire apparatus access roadway. The required fire hydrants shall be installed and operational prior to any construction (including foundations) or on-site storage of combustible materials. The minimum required fire flow for the protection of commercial developments is 1,500 gallons per minute (gpm) at a pressure of 20 pounds per square inch (psi) for a two-hour duration.	Fire Hydrants	Prior to Approval of Improvement Plans	Sacramento Metro Fire	
21.	SASD Design Standards require 6-inch service laterals for commercial services. Demolishing of the building will require replacing the existing 4-inch service lateral with a 6-inch sewer lateral	Sewer Later replacement	Prior to Approval of Improvement Plans	SASD	
22.	Any construction and/or modification to the public sewer system shall be required to the satisfaction of SASD. SASD Design Standards apply to any onsite and offsite sewer construction	Sewer System modification	Prior to Approval of Improvement Plans	SASD	
23.	All structural setbacks shall be a minimum of 14-feet from the edge of the roadway right-of-way. Structural setbacks less than 14-feet shall require the Applicant to conduct a pre-engineering meeting with all utilities to ensure proper clearances are maintained	Setbacks	Prior to Approval of Improvement Plans	SMUD	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
24.	The Applicant shall dedicate a 12.5 foot public utility easement for overhead and/or underground facilities and appurtenances adjacent to all public street rights-of-ways.	Utility Easement	Prior to Approval of Improvement Plans	SMUD	
25.	Customer's existing service is single-phase. Customer will need to submit a new service application to SMUD due to the expansion of the store and addition of the car wash requiring 3-phase service which will require locating a badmouthed transformer and underground infrastructure on-site. Easements will be required based on location of facilities.	3-phase service required	Prior to Approval of Improvement Plans	SMUD	
Prior to Issuance of Building Permits					
26.	Construction plans must include all windows and final architectural element details to be reviewed and approved by the Planning Department. This includes all building fixtures, exterior lighting, walkway lighting, parking lot lighting, and street lights on the Site, Utility, Landscape, and Building Plans, prior to the issuance of any permits. The height and style of fixtures shall be shown. Energy-saving fixtures shall be used and noted on the plans and all illumination shall be installed in a manner that is glare shielded and directed away from adjacent properties and right-of-ways.	Architectural	Prior to Issuance of Building Permits	Planning	
27.	Rooftop equipment (HVAC, meters, refrigeration equipment, plumbing lines, ductwork and transformers), shall not extend above the building parapet and shall be screened from view on all sides with materials architecturally compatible with the main structure. Screening details shall be shown on the Building Plans and submitted for review and approval by the Planning Department, prior to the issuance of Building Permits and installed prior to occupancy approval.	Architectural	Prior to Issuance of Building Permits	Planning	
28.	Ensure that no debris or construction scrap material is placed on any adjoining lot, open space area, or street, and that any such material stored on an adjoining site shall be completely removed and the site cleaned, prior to occupancy approval	Architectural	Prior to Issuance of Building Permits	Planning/ Building	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
29.	Utility areas, electrical and gas meters shall be architecturally screened from view.	Architectural	Prior to Issuance of Building Permits	Planning/ Building/Public Works	
30.	Trash Enclosures shall comply with the Zoning Code and Republic Services, Inc. standards regarding enclosure design, access requirements, and the number of required individual refuse receptacles based upon waste pickup schedules. Trash enclosures should try to incorporate the same architectural treatments, materials and colors as the main building in order to properly screen them from view.	Architectural	Prior to Issuance of Building Permits	Planning/ Building	
31.	A final landscape plan shall be submitted in conjunction with improvement plan and or building permit submittal and approved by the Planning and Public Works Departments prior to issuance of permits and/or any installation of landscape materials RCMC 23.716.020. All landscape strips, medians, etc. that contain trees shall be designed with continuous root barriers. The final landscape planting and irrigation plan shall be prepared by a registered licensed landscape architect and include the following items per RCMC 22.180.060: • Planting plan to scale that indicate slope • Irrigation Plan • Soils Test • Water Use Calculations • Irrigation Schedule	Landscaping	Prior to Issuance of Improvement Plan/ Building Permits/ Installation of new landscape material.	Planning/ Public Works	
32.	A final landscape and irrigation plan shall be submitted in conjunction with site improvement plans and reviewed and approved by the Community Development Director prior to issuance of building permits and/or any installation of landscape materials for projects as identified in RCMC 23.716.020 (Applicability). The final landscape planting and irrigation plan shall be prepared by a registered licensed landscape architect. Final plans would show exact locations and irrigation for trees, shrubs, and ground cover consistent with plants listed in RCMC	Landscaping	Prior to Issuance of Building Permits	Planning/ Public Works	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
	22.180.080.				
33.	Property Owner/Applicant shall participate in or provide a funding mechanism for maintenance services for the fair share of existing and all new public improvements associated with the project including, but not limited to, streets, bridges/culverts, traffic signals, traffic signs, striping and legends, ITS operations, street lights and safety lights, and public frontage and median landscape improvements. This may be accomplished through annexation to the City's Communities Facilities District No. 2008-1 (Street Lighting and Road Maintenance). All costs associated with the annexation shall be borne by the Property Owner/Applicant.	Maintenance Services Funding	Prior to Issuance of Building Permits	Public Works	
34.	Applicant shall complete improvement plans to the satisfaction of the Public Works Department. Improvement plans shall include, but shall not be limited to: • All onsite civil improvements. • Civil plan shall include an ADA access plan • Utility laterals • All facilities, including but not limited to, sidewalk, driveways, etc. shall be upgraded to meet current ADA requirements and City Standards. • Sidewalk on entire property frontage does not conform to ADA guidelines. Remove and replace all sidewalk and driveways per City Standard. Any obstructions to the sidewalk shall be relocated behind back of walk. • Public improvement plans shall clearly delineate all transitions to existing improvements. All improvements to be designed and constructed to the satisfaction of the Public Works Department.	Improvement Plans	Prior to Building Permit	Public Works	
35.	Install improvements per the approved Public Works plans and to the satisfaction of the Public Works Department.	Improvements	Prior to Building Permit	Public Works	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
36.	As-built reproducible grading and improvement plans (1 full size and 1 half size hard copy), as well as a compact disc containing said plans in AutoCAD and pdf format, and a GIS shape file, or equivalent to the satisfaction of the City Engineer shall be submitted and approved by the Public Works Department.	Improvement Plans	Prior to Building Permits	Public Works	
37.	The applicant shall meet the following: Civil Site Plans and Architectural Plans shall be submitted and approved prior to Final Building Permit being issued. If the building(s) require Fire Protection Systems, Fire Sprinkler and Fire Alarm plans shall be submitted prior to Final Building Permit being issued. Please note: The Sacramento Metro Fire District does not allow deferred submittals for Fire Sprinkler and/or Fire Alarm plans.	Civil Site Plans and Architectural Plans	Prior to Final Building Permit	Sacramento Metro Fire	
38.	SASD and Regional San may require additional sewer impact fee payments in accordance with each District's Ordinance. Fess are to be paid prior to issuance of building permits. The applicant should contact the Permit Services Unit at 916-876-6100.	Sewer Impact Fee	Prior to Final Building Permit	SASD	
39.	The Applicant shall not place any building foundations within 5-feet of any SMUD trench to maintain adequate trench integrity. The Applicant shall verify specific clearance requirements for other utilities (e.g., Gas, Telephone, etc.).	Clearance	Prior to Final Building Permit	SMUD	
40.	The Applicant shall comply with SMUD siting requirements (e.g., panel size/location, clearances from SMUD equipment, transformer location, and service conductors). Information regarding SMUD siting requirements can be found at: https://www.smud.org/en/Business-Solutions-and-Rebates/Design-and-Construction-Services	SMUD siting requirements	Prior to Final Building Permit	SMUD	
41.	The car wash dryer used for the project should be the Mark VII, AquaDri E-20 or similar.	Dryer	Prior to Building Permit	Planning	
42.	An 8 foot tall CMU wall should be constructed at the property line shared with the adjacent residential receptors. The wall should be located at the location shown within the attached Acoustic Analysis (between the multi-family building and commercial buildings)	CMU Wall	Prior to Building Permit	Planning	

		Category	Timing/ Implementation	Enforcement/ Monitoring	Verification (date & Signature)
Prior to Certificate of Occupancy					
43.	In the event of the encounter of subsurface materials suspected to be of an archaeological or paleontological nature or if any human remains are found, all grading and/or excavation shall cease, the find shall be left untouched, and the City Planning Department shall be immediately notified. This requirement shall be noted on the Grading and Building Plans, prior to issuance of permits. A qualified professional archaeologist certified by the Register of Professional Archaeologists or paleontologist with a degree(s) in paleontology or geology, to evaluate and make recommendations as to disposition, mitigation and/or salvage. The recommendation shall be implemented before work may proceed.	Construction	Prior to Final Inspection/ Occupancy	Planning/ Building	
44.	Designer shall certify that installed landscaping conforms to City water conservation landscape requirements	Water Efficiency	Prior to Final Building Inspection/ Occupancy	Public Works	
45.	Approved numbers or addresses shall be placed on all new or existing buildings in such a position as to be easily read from the street or road fronting the property. The minimum size of the numbers shall not be less than six (6) inches and shall be mounted immediately adjacent to a light source and shall also contrast with their background	Addressing	Prior to Final Occupancy	Sacramento Metro Fire	

ATTACHMENT 4

CITY OF RANCHO CORDOVA

RESOLUTION NO. ___-2018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA DENYING A REQUEST FOR A CONDITIONAL USE PERMIT WITH CONTINGENT LETTER OF PUBLIC CONVENIENCE AND NECESSITY FROM THE CITY OF RANCHO CORDOVA FOR THE MATHER FIELD CHEVRON GAS STATION PROJECT #DD9734

WHEREAS, on October 31, 2017, K12 Architects, Inc. (referred to as the applicant) filed a formal submittal to request a Conditional Use Permit (CUP) and Letter of Public Convenience and Necessity (PCN) for off-site alcohol sales (beer and wine) in conjunction with a CUP and Minor Design Review for a service station with car wash located within a Commercial Mixed Use zone within the Folsom Boulevard Specific Plan located at 2931 Mather Field Road, Assessor's Parcel Number: 077-0030-004-0000; and

WHEREAS, this project was reviewed by all applicable City departments and agencies, including the Rancho Cordova Police Department (RCPD), for comments and conditions; and

WHEREAS, on September 5, 2018, Staff received a formal letter of opposition from RCPD regarding the request for CUP and PCN for off-site alcoholic beverage sales; and

WHEREAS, the opposition letter included statistics regarding a high volume of calls for service and a high concentration of alcohol license within the proposed area and based upon this information Staff has recommended denial of the requested CUP and contingent PCN; and

WHEREAS, the City Council is the appropriate authority to hear and take action on this project; and

WHEREAS, the City Council of the City of Rancho Cordova conducted a properly noticed public hearing pursuant to Government Code section 65090 and has duly considered all written and verbal testimony presented during the hearing.

NOW, THEREFORE, BE IT HEREBY RESOLVED THE CITY COUNCIL OF THE CITY OF RANCHO CORDOVA does authorize and adopt Resolution No.___-2018 to deny the requested Conditional Use Permit and contingent Letter of Public Convenience and Necessity, based upon the statistical information provided in the attached letter of opposition from the Rancho Cordova Police Department (**Exhibit A**) based on the following findings.

1. Conditional Use Permit: In order to approve the requested entitlement, Zoning Code Section 23.134.030 states that specific findings and the evidence to support them must be found. Sufficient evidence to support all findings were not found. The findings and evidence are shown below:

    a) Finding: The site size, dimensions, location, topography, and access are adequate for the needs of the proposed use, considering the proposed building mass, parking, traffic, noise, vibration, exhaust/ emissions, light, glare, erosion, odor, dust, visibility, safety, and aesthetic considerations.

    Evidence: The request is for the off-site sales of alcoholic beverages (beer & wine). The proposed use will not have any impact on the physical site of the project

however utilizing the provided information by RCPD, the amount of calls for service provides a description of the high crime within the area, the addition of another off-site alcohol sales within the vicinity may likely would have negative impacts on the safety of the surrounding neighborhood.

b) Finding: The negative impacts of the proposed use on adjacent properties and on the public can be mitigated through application of other code standards or other reasonable conditions of approval.

Evidence: The negative impacts of the addition of another alcohol license in the area would not be able to be mitigated through reasonable conditions of approval. Any allowance of alcohol sales whether it be unrestricted or restricted through conditions of approval, has the potential to increase the already high volume of calls for service in the area. RCPD and the Department of ABC have deemed the area over concentrated with alcohol licenses and RCPD and Staff does not recommend concentrating the area further.

c) Finding: All required public facilities have adequate capacity to serve the proposal.

Evidence: The project site has adequate capacity for the proposed service station. The addition of alcohol sales would not require any additional capacity on public facilities other than what is already required for a typical service station.

d) Finding: The project meets the requirements of the zoning code including development standards, design guidelines, and special use provisions.

Evidence: Alcohol sales is allowed within the Commercial Mixed Use zone of the Folsom Boulevard Specific Plan with the approval of a Conditional Use Permit (CUP). However, Staff does not support the request and is recommending denial of the CUP and therefore would not meet the requirements of the Rancho Cordova Zoning Code and Folsom Boulevard Specific Plan.

e) Finding: If structures and site plans are considered nonconforming, the elements of a project that are nonconforming have been brought into compliance with the zoning code, where feasible.

Evidence: The existing service station does not currently have alcoholic beverages as part of their inventory. In addition to the applicant's request for a CUP for alcoholic beverage sales the applicant has also requested a second CUP for the proposed service station. All nonconforming elements are required to be brought into compliance through the second CUP.

Be it further resolved that if the City Council does not support the requested CUP entitlement required to allow off-site alcohol sales at 2931 Mather Field Road, then by virtue of the findings for the CUP, Council should not approve the applicant's request for a Public Convenience and Necessity (PCN).

PASSED AND ADOPTED by the City Council of the City of Rancho Cordova on the ___ day of _____, 2018 by the following vote:

AYES:

ATTACHMENT 4

NOES:

ABSENT:

ABSTAIN:

_____
Linda Budge, Mayor

ATTEST:

_____
Stacy Leitner, City Clerk

RANCHO CORDOVA POLICE DEPARTMENT

Chris Pittman
Chief of Police

2897 Kilgore Road
Rancho Cordova, California 95670
916.875.9600 – Main
916.875.8673 – Fax
www.RanchoCordovaPD.com

September 5, 2018

City of Rancho Cordova
Planning Department
2729 Prospect Park Dr.
Rancho Cordova, California 95670

SUBJECT: OPPOSITION TO TYPE 20 LICENSE FOR MATHER FIELD CHEVRON, 2931 MATHER FIELD ROAD, FILE #596759

Dear Mr. Sosa:

The Rancho Cordova Police Department opposes the issuance of a Letter of Public Convenience/Necessity related to the ABC type 20 license #596759, Mather Field Chevron, located at 2931 Mather Field Rd, Rancho Cordova, California 95670.

The applicant's premises is located in an area that is considered High Crime per Alcohol Beverage Control. It is located in an area that is Over-Concentrated. This is located in census tract 90.08 which allows for five (5) type 20/21 licenses but there are five (5) existing licenses. Five (5) of the existing licenses are type 20 licenses.

The Rancho Cordova Police Department, based on High Crime and Over-Concentration of the area where this premises is located, seeks to prohibit this applicant from acquiring a type 20 license.

In reviewing statistics, within ¼ mile of the applicant's premises within the last 18 months the Rancho Cordova Police Department statistics are as follows:

January 1, 2017 to June 30, 2018: Officers were dispatched to 2,355 calls for service. This includes:

138 calls for Trespassing
119 calls for suspicious suspect(s)
24 calls for Aggravated Assaults
27 calls for Drugs/Narcotics
9 calls for Commercial Burglary
Officers took a total of 246 reports

The following outlines the types of crimes reported during the same time periods listed above within a 500 foot radius:

73 calls for Trespassing
48 calls for Suspicious Subject(s)
38 calls for Disturbing the Peace

The following outlines the types of crimes reported during the same time periods listed above at the

2931 Mather Field Road address: Officers were dispatched to 66 calls for service, an average of 3.6 calls per month. This includes: 15 calls for Trespassing in Progress,
9 calls for Disturbing the Peace,
8 calls for Suspicious Subject(s) and
6 calls for Customer Disturbances.

This is also located directly across from the Mather Field Light Rail Station.

After discussion with the Sacramento County Sheriff's Department Gang Unit they concur with this opposition due to the premises being located in an area of high crime and the continued "nuisance type" of crimes that officers are responding to.

The Rancho Cordova Police Department **OBJECTS** to the issuance of this license due to:

- The premises is located in a crime reporting district that is "**HIGH CRIME.**"
- The 90.08 census tract is largely "**OVER CONCENTRATED**" and does not fit the criteria for PCN.
- The volume of calls for service in the area.

If you have any questions, please contact me at (916) 875-5852 or taldama@sacsheriff.com.

Sincerely,

CHRIS PITTMAN, CHIEF OF POLICE

Mather Field Chevron

City of Rancho Cordova, California

August 23, 2018

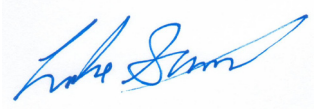
Project # 180301

Prepared for:

Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670

Prepared by:

Saxelby Acoustics



Luke Saxelby, INCE Bd. Cert.
Principal Consultant
Board Certified, Institute of Noise Control Engineering (INCE)

(916) 760-8821
www.SaxNoise.com | Luke@SaxNoise.com
915 Highland Pointe Drive, Suite 250
Roseville, CA 95678

INTRODUCTION

The Extra Mile Car Wash project is located at the southwest corner of the intersection of Mather Field Road and Mills Station Road in the City of Rancho Cordova, California. The project includes construction of an automated car wash facility at the existing Chevron gas station.

The City of Rancho Cordova has requested that an acoustical analysis be prepared to analyze potential noise impacts associated with the car wash operations. Therefore, this analysis will predict the noise generation associated with these uses and will seek to achieve compliance with the applicable City of Rancho Cordova Plan Noise Element goals and policies.

Figure 1 shows the project site plan. **Figure 2** shows an aerial photo of the project site.

ENVIRONMENTAL SETTING

BACKGROUND INFORMATION ON NOISE

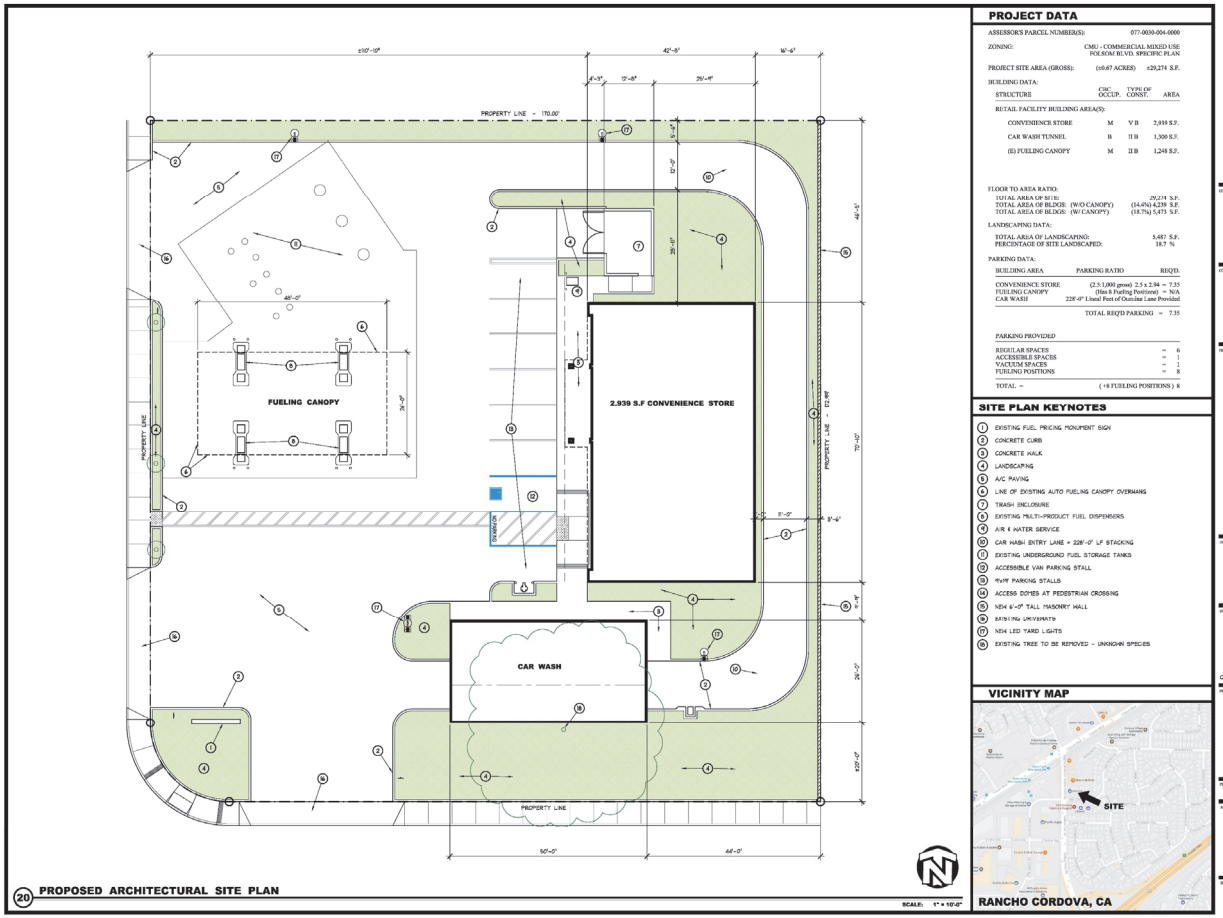
Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.



PROJECT DATA

ASSESSOR'S PARCEL NUMBER(S): 077-0030-004-0000

ZONING: CMU - COMMERCIAL MIXED USE FOLSOM BLVD. SPECIFIC PLAN

PROJECT SITE AREA (GROSS): (±0.67 ACRES) ±29,274 S.F.

BUILDING DATA:

STRUCTURE	OCC. OCCUP.	TYPE OF CONST.	AREA
RETAIL FACILITY BUILDING AREA(S):			
CONVENIENCE STORE	M	V B	2,939 S.F.
CAR WASH TUNNEL	B	II B	1,300 S.F.
(E) FUELING CANOPY	M	II B	1,248 S.F.

FLOOR TO AREA RATIO:

TOTAL AREA OF SITE: 29,274 S.F.
TOTAL AREA OF BLDGS: (W/O CANOPY) (14.45%) 4,239 S.F.
TOTAL AREA OF BLDGS: (W/ CANOPY) (18.7%) 5,473 S.F.

LANDSCAPING DATA:

TOTAL AREA OF LANDSCAPING: 5,487 S.F.
PERCENTAGE OF SITE LANDSCAPED: 18.7 %

PARKING DATA:

BUILDING AREA	PARKING RATIO	REQ'D.
CONVENIENCE STORE	(2.5/1,000 gross) 2.5 x 2.94 =	7.35
FUELING CANOPY	(Has 8 Fueling Positions) =	N/A
CAR WASH	228'-0" Lineal Feet of Queueline Lane Provided	
	TOTAL REQ'D PARKING =	7.35

PARKING PROVIDED

REGULAR SPACES	=	6
ACCESSIBLE SPACES	=	1
VACUUM SPACES	=	1
FUELING POSITIONS	=	8
TOTAL =	(+8 FUELING POSITIONS)	8

SITE PLAN KEYNOTES

1. EXISTING FUEL PRICING MONUMENT SIGN
2. CONCRETE CURB
3. CONCRETE WALK
4. LANDSCAPING
5. A/C PAVING
6. LINE OF EXISTING AUTO FUELING CANOPY OVERHANG
7. TRASH ENCLOSURE
8. EXISTING MULTI-PRODUCT FUEL DISPENSERS
9. AIR & WATER SERVICE
10. CAR WASH ENTRY LANE = 228'-0" LF STACKING
11. EXISTING UNDERGROUND FUEL STORAGE TANKS
12. ACCESSIBLE VAN PARKING STALL
13. 49ER PARKING STALLS
14. ACCESS DOMES AT PEDESTRIAN CROSSING
15. NEW 6'-0" TALL MASONRY WALL
16. EXISTING UNIVERSITY
17. NEW LED YARD LIGHTS
18. EXISTING TREE TO BE REMOVED - UNKNOWN SPECIES

VICINITY MAP

K12 Architects

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS:

CONTRACTOR:

PROJECT:

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

2931 Mather Field Road
Rancho Cordova, California
95670

DEVELOPER:

Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670

REVISIONS:

OWNER APPROVED - DECEMBER 3, 2016

PROFESSIONAL SEALS:

PROJECT NUMBER: 17-006
PROJECT DATE: 03-23-2017

SHEET CONTENTS:

PROPOSED SITE PLAN #2

SHEET NUMBER:

A102

Mather Field Chevron

City of Rancho Cordova, California

Figure 1

Project Site Plan

SAXELBY ACOUSTICS
Acoustics • Noise • Vibration



Mather Field Chevron

City of Rancho Cordova, California

Figure 2: Noise Measurement Site

Legend

Parcels

Project Site

Noise Measurement - Long Term

0 m 10 m 20 m 30 m

Projection: State Plane (California Zone 2) / NAD83 / feet
Rev. Date: 03/22/2018

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. **Appendix A** provides a summary of acoustical terms used in this report.

TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft.)	--100--	
Gas Lawn Mower at 1 m (3 ft.)	--90--	
Diesel Truck at 15 m (50 ft.), at 80 km/hr. (50 mph)	--80--	Food Blender at 1 m (3 ft.) Garbage Disposal at 1 m (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 m (10 ft.)
Commercial Area Heavy Traffic at 90 m (300 ft.)	--60--	Normal Speech at 1 m (3 ft.)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing
Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. September, 2013.		

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING AMBIENT NOISE LEVELS

The existing ambient noise environment in the project vicinity is primarily defined by traffic on the local roadways adjacent to the project site, including Mather Field Road and Mills Station Road.

To quantify the existing ambient noise environment on the project site, Saxelby Acoustics conducted a continuous noise measurement survey. The noise measurement location is shown on **Figure 2**. A summary of the noise level measurement survey results is provided in **Table 2**. **Appendix B** contains the complete results of the noise monitoring.

The sound level meter was programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories (LDL) Model 812 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a B&K Model 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

TABLE 2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Site	Location	Date	Average Measured Hourly Noise Levels, dBA						
				Daytime (7:00 am - 10:00 pm)			Nighttime (10:00 pm – 7:00 am)		
			L_{dn}	L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
Continuous 24-hour Noise Measurement Site									
LT-1	East boundary of site at MF residential	March 19-20 2018	63	59	56	78	57	50	77
Source: Saxelby Acoustics – 2018									

It should be noted that the noise levels at LT-1 are representative of first-floor noise levels. Second floor noise levels are typically 2-3 dB higher than first floor noise levels due to reduce ground attenuation at higher floors. Therefore, existing average daytime ambient noise levels at second floor elevations are estimated to be 61-62 dBA L_{eq}.

REGULATORY CONTEXT

FEDERAL

There are no federal regulations related to noise that apply to the Proposed Project.

STATE

There are no state regulations related to noise that apply to the Proposed Project.

LOCAL

City of Rancho Cordova General Plan

The City of Rancho Cordova Plan Noise Element establishes noise level criteria for both transportation and non-transportation noise sources. **Table 3** provides the noise level performance criteria for residential uses affected by non-transportation noise sources, such as car washes. These criteria are applied at the property lines of noise-sensitive land uses.

TABLE 3: CITY NOISE STANDARDS NOISE LEVEL PERFORMANCE STANDARDS FOR NEW PROJECTS AFFECTED BY OR INCLUDING NON- TRANSPORTATION NOISE SOURCES

Stationary Noise Sources	Noise Level Descriptor	Daytime Maximum (7 am - 10 pm)	Nighttime Maximum (10 pm - 7 am)
Typical	Hourly L_{eq}, dB	55	45
Tonal, impulsive, repetitive, or consist primarily of speech or music	Hourly L_{eq}, dB	50	40
The City may impose noise level standards which are more or less restrictive than those specified above based upon determination of existing low or high ambient noise levels. Source: City of Rancho Cordova General Plan Noise Element, Table N-1			

Based upon the footnote in Table 3, the City may apply an exterior noise level standard higher than 55 dB L_{eq} based upon determination of an existing high ambient noise level. In this case, it is reccommdned that the City's stanard be increased to 59 dBA L_{eq} to equal the existing daytime ambient noise level.

EVALUATION OF CAR WASH NOISE AT MULTI-FAMILY RESIDENTIAL RECEPTORS

The air blower dryers are considered to be the dominate noise source for this type of a car wash. Therefore, this analysis will examine the project-generated noise levels by evaluating the sound levels of the proposed dryer system.

The project applicant has indicated that the proposed carwash will include the use of AquaDri dryers. The manufacturer provided sound level data for these dryers. This analysis assumed use of the AquaDri, E-20 20 hp On-Board dryer system. Based upon the manufacture's information, the noise emissions from the proposed car wash dryers are expected to be 72 dB at a distance of 50 feet, from the exit end of the car wash and 71 dB at 50 feet from the entrance. These sound levels are based upon continuous operation. However, typically the dryers would operate no longer than 60 seconds per cycles with a maximum of approximately 13 cycles during a busy hour. Therefore, the dryers are predicted to operate for a maximum period of 13 minutes or 780 seconds in a busy hour. In order to calculate the hourly average (L_{eq}) sound level resulting from a peak hour of operation, the following equation can be used.

$$L_{eq} = SPL + 10 * (\log N_{eq}) - 35.6, \text{ dB where:}$$

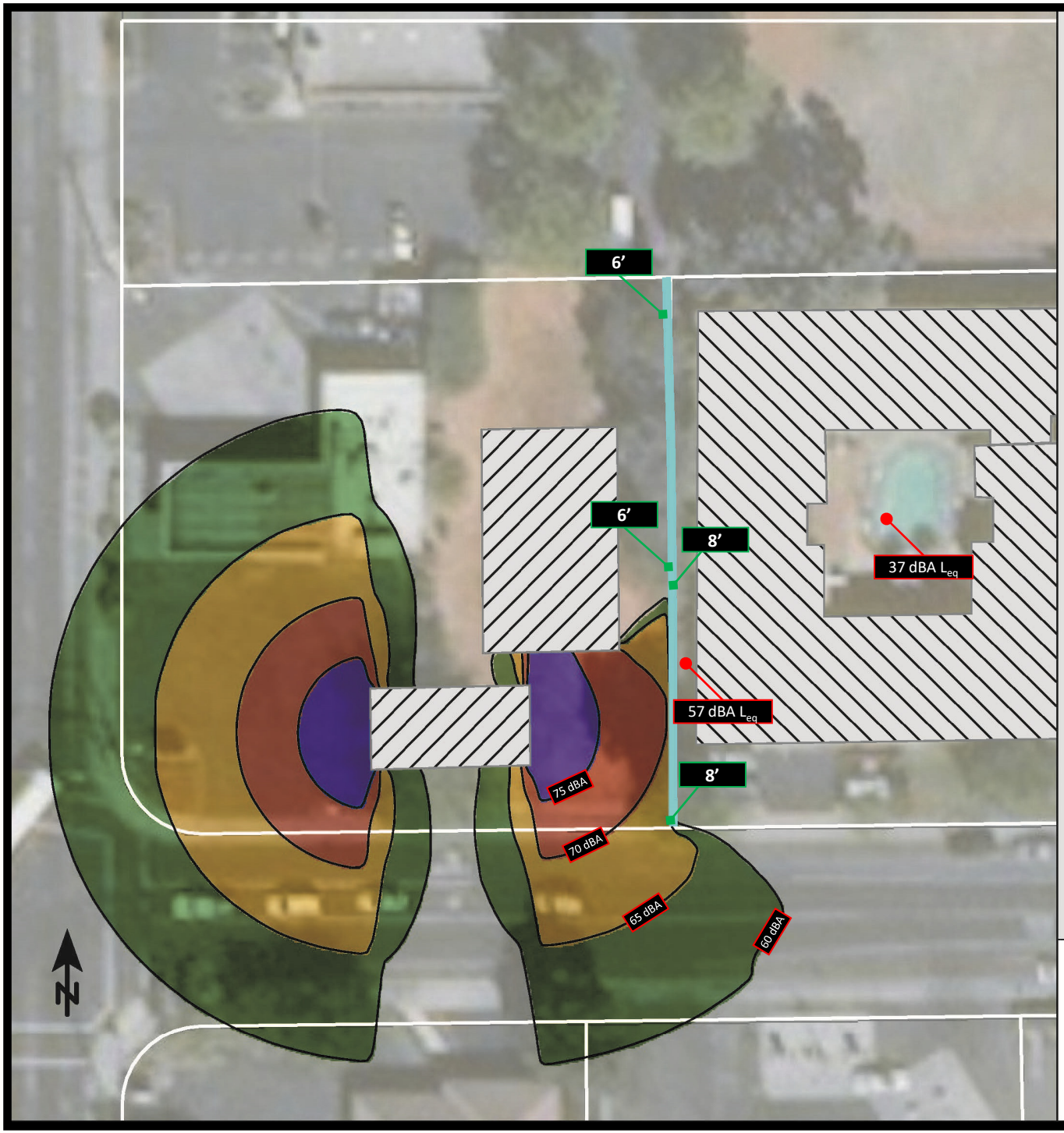
SPL is the steady sound pressure level of the dryers (72 dB or 71 dB), and 10 * (log Neq) is 10 times the logarithm of the number seconds per hour that the dryers could operate (780 s), and 35.6 is 10 times the logarithm of the number seconds in an hour.

Based upon this equation, the car wash is predicted to generate sound levels of 65.3 dB at a distance of 50 feet from the exit end of the car wash and 64.3 dB at a distance of 50 feet from the entrance of the car wash.

Saxelby Acoustics evaluated noise level associated with the proposed car wash tunnel using the SoundPLAN noise prediction model. Inputs to the model included sound power levels for the proposed car wash tunnel, existing and proposed buildings, terrain type, and locations of sensitive receptors. These predictions are made in accordance with International Organization for Standardization (ISO) standard 9613-2:1996 (Acoustics – Attenuation of sound during propagation outdoors). ISO 9613 is the most commonly used method for calculating exterior noise propagation.

The noise analysis indicates that property line noise levels would be 57 dBA L_{eq}, but would require the use of a 6-8 foot tall CMU wall located at the property line shared with the adjacent residential receptors. First floor noise levels at the closest residential uses are predicted to be 57 dBA L_{eq} during a peak hour of use, as shown by **Figure 3**. This noise level would be approximately 2 dBA less than existing average ambient noise levels.

It should be noted that the primary outdoor recreation area of the adjacent multi-family residential use is an outdoor courtyard with swimming pool located in the center of the property. At this location, car wash noise levels are predicted to be 37 dBA L_{eq}.



Mather Field Chevron Car Wash

City of Rancho Cordova, California

Figure 3

Predicted Project Noise Levels
(dBA, L_{eq})

Signs and symbols

Parcel Line

Wall

Area source

Levels in dB(A)

<= 60
60 - 65
65 - 70
70 - 75
> 75

Minimum Wall Height (ft.)

X’

1 : 546

0 2.5 5 10 15 20 m

SAXELBY ACOUSTICS
Acoustics • Noise • Vibration

Second floor noise levels at the windows and hallway of the adjacent multi-family residential uses are predicted to be up 60 dBA L_{eq}. This noise level would be approximately 1-2 dBA less than existing average ambient noise levels of 61-62 dBA L_{eq}. **Figure 4** shows the predicted car wash noise levels at the second floor level. It should be noted that the second floor noise contours receive a slight amount of shielding from the building opening. Therefore, they do not propagate as far as those shown on **Figure 3**. Intuitively this makes sense as you would not expect noise levels to be as high looking down on the car wash tunnel as you would looking straight down the center of the car wash tunnel.



Mather Field Chevron Car Wash

City of Rancho Cordova, California

Figure 4

Predicted Project Noise Levels – Second Floor Elevation
(dBA, L_{eq})

Signs and symbols

- Parcel Line
- Wall
- Area source

Levels in dB(A)

	<= 60
	60 - 65
	65 - 70
	70 - 75
	> 75

Minimum Wall Height (ft.)

X’

1 : 546

0 2.5 5 10 15 20 m

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

Conclusions

Operation of the proposed car wash is predicted to result in noise levels exceeding the City of Rancho Cordova 55 dBA L_{eq} daytime exterior noise level standards at the nearest residential uses. However, existing daytime noise levels at the property line were measured to average 59 dBA L_{eq}. Based upon the noise level standards shown in **Table 3**, the City may increase their standards based upon existing high ambient noise levels. In this case the project car wash noise would exceed the City's noise level standard by 2 dBA, but would be less than existing ambient noise also by 2 dBA. Additionally, car wash noise levels would be 37 dBA L_{eq} at the primary outdoor use area (swimming pool) of the adjacent multi-family residential use.

Second floor noise levels at the windows and hallway of the adjacent multi-family residential uses are predicted to be up to 60 dBA L_{eq}. This noise level would be approximately 1-2 dBA less than existing average ambient noise levels of 61-62 dBA L_{eq}.

Therefore, no additional noise control measures are recommended, assuming the following:

- The car wash dryer used for the project should be the Mark VII, AquaDri E-20
- A 6-8 foot tall CMU wall should be constructed at the property line shared with the adjacent residential receptors. The wall should be located at the approximate location shown on **Figure 3.**
- The car wash blowers should be set to run for a period no more than 60 seconds per car wash cycle.
- The car wash should operate only during daytime (7:00 am to 10:00 pm) hours.

Appendix A: Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
ASTC	Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.
DNL	See definition of Ldn.
IIC	Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
NIC	Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.
NNIC	Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
RT60	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

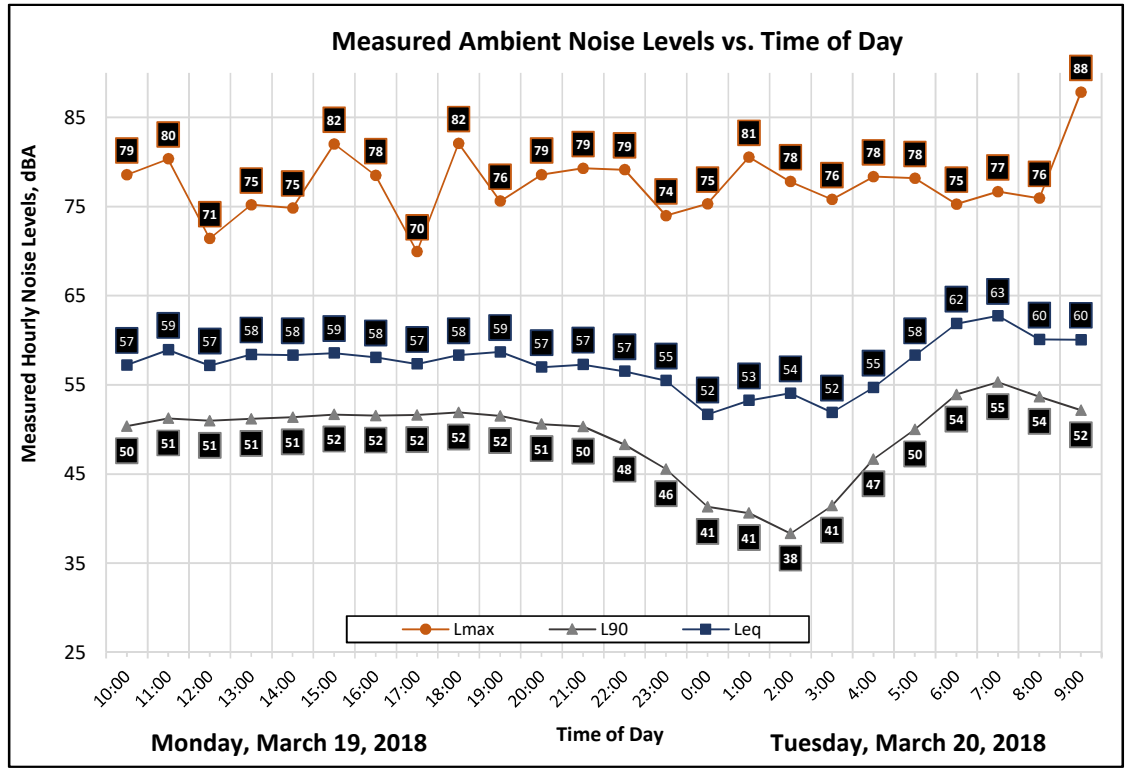
SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

Appendix B1 : Continuous Noise Monitoring Results

Site: LT-1
Project: Mather Field Chevron
Location: East property line at MF residential
Coordinates: 38.583914° -121.309077°
Meter: LDL 812-2
Calibrator: B&K 4230

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Monday, March 19, 2018	10:00	57	79	55	50
Monday, March 19, 2018	11:00	59	80	55	51
Monday, March 19, 2018	12:00	57	71	55	51
Monday, March 19, 2018	13:00	58	75	56	51
Monday, March 19, 2018	14:00	58	75	56	51
Monday, March 19, 2018	15:00	59	82	56	52
Monday, March 19, 2018	16:00	58	78	56	52
Monday, March 19, 2018	17:00	57	70	56	52
Monday, March 19, 2018	18:00	58	82	56	52
Monday, March 19, 2018	19:00	59	76	56	52
Monday, March 19, 2018	20:00	57	79	55	51
Monday, March 19, 2018	21:00	57	79	55	50
Monday, March 19, 2018	22:00	57	79	54	48
Monday, March 19, 2018	23:00	55	74	51	46
Tuesday, March 20, 2018	0:00	52	75	47	41
Tuesday, March 20, 2018	1:00	53	81	45	41
Tuesday, March 20, 2018	2:00	54	78	42	38
Tuesday, March 20, 2018	3:00	52	76	47	41
Tuesday, March 20, 2018	4:00	55	78	50	47
Tuesday, March 20, 2018	5:00	58	78	55	50
Tuesday, March 20, 2018	6:00	62	75	59	54
Tuesday, March 20, 2018	7:00	63	77	61	55
Tuesday, March 20, 2018	8:00	60	76	58	54
Tuesday, March 20, 2018	9:00	60	88	57	52

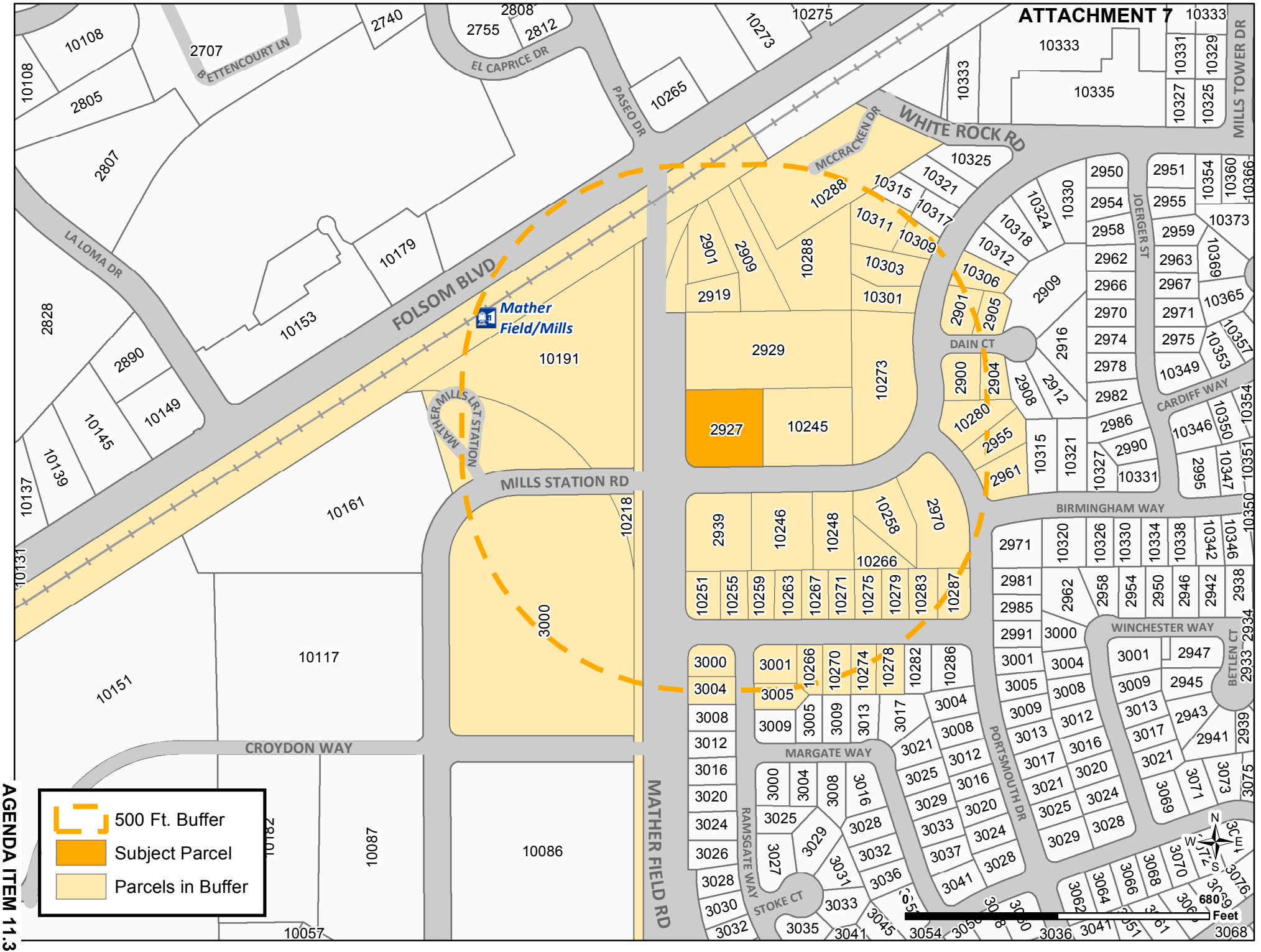
Statistics	Leq	Lmax	L50	L90
Day Average	59	78	56	52
Night Average	57	77	50	45
Day Low	57	70	55	50
Day High	63	88	61	55
Night Low	52	74	42	38
Night High	62	81	59	54
Ldn	63	Day %		74
CNEL	64	Night %		26





AGENDA ITEM 11.3

7826


ATTACHMENT 7
AGENDA ITEM 11.3
7827
FOLSOM BLVD
WHITE ROCK RD
MILLS STATION RD
MATHER FIELD RD
CROYDON WAY
MATHER-MILLS LRT STATION
Mather Field/Mills
LA LOMA DR
PASEO DR
EL CAPRICE DR
B ETTENCOURT LN
MCCRACKEN DR
MILLS TOWER DR
JOERGER ST
DAIN CT
CARDIFF WAY
BIRMINGHAM WAY
WINCHESTER WAY
BETLEN CT
PORTSMOUTH DR
MARGATE WAY
RAMSGATE WAY
STOKE CT
500 Ft. Buffer
Subject Parcel
Parcels in Buffer
680 Feet
N
W
E
S

ATTACHMENT 7

CHAUHAN GURVINDER K/SAMY S
10049 BOND RD
ELK GROVE CA 95624

CURRENT RESIDENT
10191 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10218 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 15
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 16
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 17
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 18
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 19
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 20
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 21
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 22
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 23
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 24
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 25
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 26
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 27
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10245 MILLS STATION RD APT 28
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10246 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 1
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 10
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 11
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 12
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 13
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 14
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 2
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 3
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 4
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 5
RANCHO CORDOVA CA 95670

ATTACHMENT 7

CURRENT RESIDENT
10247 MILLS STATION RD APT 6
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 7
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 8
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10247 MILLS STATION RD APT 9
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10248 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10248 MILLS STATION RD # A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10248 MILLS STATION RD # B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10248 MILLS STATION RD # C
RANCHO CORDOVA CA 95670

SOTELO ISIDRO A
10251 CROYDON WAY
RANCHO CORDOVA CA 95670

PENA KELLY/JOHNNY B
10255 CROYDON WAY
RANCHO CORDOVA CA 95670

STENT ALYCE
10257 MCCRACKEN DR
NIMBUS CA 95670

CURRENT RESIDENT
10257 MCCRACKEN DR UNIT A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10257 MCCRACKEN DR UNIT B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10258 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10259 CROYDON WAY
RANCHO CORDOVA CA 95670

MARTIN CLIFFORD W MARTIN SHARON A/ETAL
10259 MCCRACKEN DR
NIMBUS CA 95670

CURRENT RESIDENT
10260 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10261 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10262 MILLS STATION RD
RANCHO CORDOVA CA 95670

CHAVEZ FLOR M/OCTAVIO A LOYO H
10263 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10263 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10264 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10265 MCCRACKEN DR
RANCHO CORDOVA CA 95670

GONZALES MELISSA A
10266 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10266 MILLS STATION RD
RANCHO CORDOVA CA 95670

OLIVARES ZAIDA
10267 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10267 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10268 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10268 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10269 MCCRACKEN DR
RANCHO CORDOVA CA 95670

ATTACHMENT 7

CURRENT RESIDENT
10270 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10270 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10271 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10272 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10273 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10273 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10273 MILLS STATION RD APT 1
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10273 MILLS STATION RD APT 2
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10273 MILLS STATION RD APT 3
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10273 MILLS STATION RD APT 4
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10274 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10274 MCCRACKEN DR
RANCHO CORDOVA CA 95670

HOUDELETTE MONA LOUISE JR
10275 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10275 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10275 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10275 MILLS STATION RD APT 17
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10275 MILLS STATION RD APT 18
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10275 MILLS STATION RD APT 19
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10275 MILLS STATION RD APT 20
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10275 MILLS STATION RD APT 21
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10276 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10277 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10277 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10277 MILLS STATION RD APT 5
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10277 MILLS STATION RD APT 6
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10277 MILLS STATION RD APT 7
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10277 MILLS STATION RD APT 8
RANCHO CORDOVA CA 95670

HARRIS FRANCES A
10278 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10278 MCCRACKEN DR
RANCHO CORDOVA CA 95670

TYLER TYRESHA A
10279 CROYDON WAY
RANCHO CORDOVA CA 95670

ATTACHMENT 7

CURRENT RESIDENT
10279 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10279 MILLS STATION RD APT 13
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10279 MILLS STATION RD APT 14
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10279 MILLS STATION RD APT 15
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10279 MILLS STATION RD APT 16
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10280 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10280 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10280 MILLS STATION RD APT 1
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10280 MILLS STATION RD APT 2
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10280 MILLS STATION RD APT 3
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10280 MILLS STATION RD APT 4
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10281 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10281 MILLS STATION RD APT 10
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10281 MILLS STATION RD APT 11
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10281 MILLS STATION RD APT 12
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10281 MILLS STATION RD APT 9
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10282 MCCRACKEN DR
RANCHO CORDOVA CA 95670

WHITE PAMELA G
10283 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10283 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10284 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10285 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10285 MCCRACKEN DR UNIT B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10286 MCCRACKEN DR
RANCHO CORDOVA CA 95670

XIONG BEE/MAI TONG LOR/LENG XIONG
10287 CROYDON WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10287 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10288 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10289 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10290 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10291 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10292 MCCRACKEN DR
RANCHO CORDOVA CA 95670

ATTACHMENT 7

CURRENT RESIDENT
10293 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10294 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10295 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10296 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10297 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10298 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10299 MCCRACKEN DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10301 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10301 MILLS STATION RD # A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10301 MILLS STATION RD # B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10303 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10303 MILLS STATION RD # A307
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10303 MILLS STATION RD # B307
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10303 MILLS STATION RD # C307
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10303 MILLS STATION RD # D307
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10303 MILLS STATION RD APT A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10303 MILLS STATION RD APT B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10305 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10306 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10307 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10308 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10309 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10309 MILLS STATION RD # A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10309 MILLS STATION RD # B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10311 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10311 MILLS STATION RD # A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10311 MILLS STATION RD # B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10313 MILLS STATION RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10313 MILLS STATION RD # A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
10313 MILLS STATION RD # B
RANCHO CORDOVA CA 95670

ATTACHMENT 7

WENELL NATHAN
1069 GALSTON DR
FOLSOM CA 95630

IM CHAE BONG/CHONG NAM
110042 TINTA FINA DR
RANCHO CORDOVA CA 95670

WHAL PROPERTIES L P
11249 GOLD COUNTRY BLVD 170
GOLD RIVER CA 95670

URQUILLA JOSE
155 LUCY LN
RICHMOND CA 94801

THR CALIFORNIA LLC
1717 MAIN ST STE 2000
DALLAS TX 75201

ASPARAGUS MEADOWS LLC/W ORSER
RICHARD LIVING TRUST
2201 FRANCISCO DR STE 140 139
EL DORADO HILL CA 95762

GULFSTREAM PORTFOLIO
MANAGEMENT LLC
2210 CEMO CIR
GOLD RIVER CA 95670

GULFSTREAM PORTFOLIO
MANAGEMENT LLC
2210 CEMO CIR A
GOLD RIVER CA 95670

ROSELLA W BOYCE FAMILY TRUST
2241 ZINFANDEL DR
RANCHO CORDOVA CA 95670

SCHWARZ HEINZ JOERG
2393 HIGHLAND HILLS DR
EL DORADO HILL CA 95762

ASRES KAFFL LIVING TRUST
2422 CORUM CT
UNION CITY CA 94587

CITY OF RANCHO CORDOVA
2729 PROSPECT PARK DR
RANCHO CORDOVA CA 95670

MENDOZA LEONSO
2900 DAIN CT
RANCHO CORDOVA CA 95670

GOROBCHUK
TATYANA/ALEKSANDR/PAVEL
2901 DAIN CT
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2901 MATHER FIELD RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2901 MATHER FIELD RD # A
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2901 MATHER FIELD RD # B
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2901 MATHER FIELD RD # C
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2902 DAIN CT
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2903 DAIN CT
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2904 DAIN CT
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2905 DAIN CT
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2906 DAIN CT
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2907 DAIN CT
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2909 MATHER FIELD RD
RANCHO CORDOVA CA 95670

VALTIERRA MARTIN/MARIA
2919 MATHER FIELD RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2927 MATHER FIELD RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2929 MATHER FIELD RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2931 MATHER FIELD RD
RANCHO CORDOVA CA 95670

GATES VETERINARY PROPERTIES LLC
2939 MATHER FIELD RD
RANCHO CORDOVA CA 95670

ATTACHMENT 7

CURRENT RESIDENT
2955 PORTSMOUTH DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2955 PORTSMOUTH DR APT 1
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2955 PORTSMOUTH DR APT 2
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2955 PORTSMOUTH DR APT 3
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2955 PORTSMOUTH DR APT 4
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2961 PORTSMOUTH DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2961 PORTSMOUTH DR APT 1
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2961 PORTSMOUTH DR APT 2
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2961 PORTSMOUTH DR APT 3
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2961 PORTSMOUTH DR APT 4
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 1
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 2
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 3
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 4
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 5
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 6
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 7
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 8
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
2970 PORTSMOUTH DR APT 9
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
3000 MATHER FIELD RD
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
3000 RAMSGATE WAY
RANCHO CORDOVA CA 95670

INSCOE WINDY
3001 RAMSGATE WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
3004 RAMSGATE WAY
RANCHO CORDOVA CA 95670

CURRENT RESIDENT
3005 RAMSGATE WAY
RANCHO CORDOVA CA 95670

QUINTANILLA JESUS/ADINA
34 JEANETTE WAY
WATSONVILLE CA 95076

NIJJER HARJINDER S/HARNINDER K
4495 PACIFIC RIM WAY
SAN JOSE CA 95121

KHOLOD OKSANA
4940 WINDSOR VILLAGE LN
FAIR OAKS CA 95628

SEHHAT MOSTAFA/OLGA
5229 VALONIA ST
FAIR OAKS CA 95628

DICKSON LIVING TRUST
6233 COLE AVE
CARMICHAEL CA 95608

ATTACHMENT 7

SUSANNE GOLD 1992 REVOCABLE TRUST
7043 COPE RIDGE WAY
ROSEVILLE CA 95747

CASO VINCENT F/FIDELIZ S
711 S JUANITA AVE
REDONDO BEACH CA 90277

HOUSING AUTHORITY OF THE CITY OF SACRAMENTO
801 12TH ST
SACRAMENTO CA 95814

SIMPSON JOHN W JR/MARY O
8189 NIESSEN WAY
FAIR OAKS CA 95628

JAMEY L PUDGE REVOCABLE TRUST
9072 BREVARD DR
SACRAMENTO CA 95829

BERRY THOMAS Z JR/TONISE
94 OAKSTONE WAY
AMERICAN CANYO CA 94503

PANYCH IGOR/NATALYA/VASILIY
963 PATRICK CIR
FOLSOM CA 95630

UNITED STATES OF AMERICA
FOLSOM BLVD
SACRAMENTO CA 95816

BARQUE PROPERTIES INC
PO BOX 160007
SACRAMENTO CA 95816

SAC-PLCRVLE TRANSPORTATION CORR JOINT POWERS AUTHO
PO BOX 2110
SACRAMENTO CA 95812

GEORGE N II/DEBORAH S KEYSTON REV LIVING TRUST
PO BOX 4120
PORTLAND OR 97208

BADIE BAHRAM
PO BOX 661471
SACRAMENTO CA 95866

KWIK-CHEK REALTY CO INC
PO BOX 711
DALLAS TX 75221

ATTACHMENT 7

SACRAMENTO SANITATION DISTRICT
10060 GOETHE ROAD
SACRAMENTO CA 95827

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
10060 GOETHE ROAD
SACRAMENTO CA 95827

SACRAMENTO COUNTY WATER AGENCY
10151 FLORIN ROAD
SACRAMENTO CA 95829

PG&E
2730 GATEWAY OAKS DRIVE
SACRAMENTO CA 95833

PG&E
343 SACRAMENTO STREET
AUBURN CA 95603

SMUD
6301 S STREET MS B304
SACRAMENTO CA 95817

SMUD
6301 S STREET MS B304
SACRAMENTO CA 95817

SMUD
6301 S STREET MS B404
SACRAMENTO CA 95817

SACRAMENTO METROPOLITAN FIRE
10545 ARMSTRONG AVE STE 310
MATHER CA 95655

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT
1965 BIRKMONT DRIVE
RANCHO CORDOVA CA 95742

CAL AMERICAN WATER COMPANY
4701 BELOIT DRIVE
SACRAMENTO CA 95838

CITY OF RANCHO CORDOVA
2729 PROSPECT PARK DR
RANCHO CORDOVA CA 95670

a fresh take.
RANCHO CORDOVA
CALIFORNIA

PLANNING DEPARTMENT
2729 Prospect Park Drive | Rancho Cordova, CA 95670
Phone: (916) 851-8750 | Fax: (916) 851-8762

November 21, 2017

K12 Architects, Inc.
Steven C. Elser RA
3090 Fite Circle, Suite 104
Sacramento, CA 95827

Subject: Project No. DD9734 – Mather Field Chevron – Minor Design Review & Conditional Use Permit – Completeness Review

Dear Mr. Elser,

The City of Rancho Cordova Planning Department has received your application for a Minor Design Review and Conditional Use Permit for the Mather Field Chevron gas station located at 2931 Mather Field Road. After the project's initial review Staff has deemed the project *incomplete* due to the following below items.

All comments are separated by categories of General Items, Site Plan, and elevations (North, South, East, West). Please revise your items and resubmit plans with a corresponding response for each of the comments below.

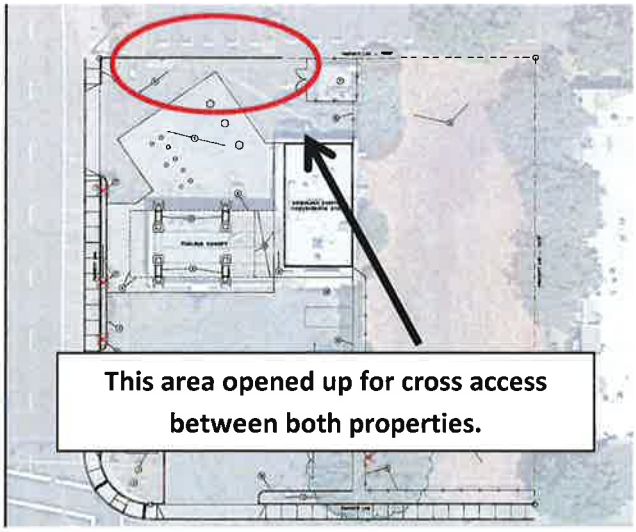
General Items:

1. *Project Description* – The application submittal needs a detailed project description that includes how the business will operate, hours of operation for both the convenience store and the carwash, and also why the gas station is being rebuilt with the addition of a carwash and why the property owner would like to now include the sale of Beer and Wine. This project description should provide some sort of a justification statement as to why the project is taking place.

2. *Noise Assessment*- the project will need to complete a noise Assessment analyzing the effects of the carwash upon neighboring residential homes. The new gas station and carwash is directly adjacent to the neighboring 2 story apartment homes and a noise study will need to be completed to show that there will not be any negative effects on the neighboring residents.

3. *Lighting* – What is the proposed height of the shown parking lot lights? Additional lighting will need to be added to the rear (east side) of the building along the car wash drive thru lane. Lighting will need to be shielded downward or some type of gooseneck lighting to ensure to not disrupt neighboring residents. Additional building lighting should also be added to all other elevations of both the convenience store and the carwash. This lighting should be shown on both the drawing and color elevations.

4. *Access* – Can an access agreement be created between Chevron and the adjacent Straw Hat Pizza? At the moment there is no access between the existing Chevron property and the neighboring Straw Hat Pizza parking lot. The proposed site plan shows the addition of a landscape planter between the two properties. Rather than add an additional barrier between the properties can access be opened up between them so that customers can go between the two sites? We are not requesting that the entire proposed planter be removed but simply a portion of it to allow access between the two properties.



5. *Bicycle Parking* – Bicycle parking is required for any project anticipated to generate visitor traffic. Bicycle racks must be within 100 feet of the main entrance and readily visible by passersby. There is a minimum of 1 rack with capacity for at minimum 2 bicycles.

6. *Conditional Use Permit* – The addition of Beer and Wine sales at this location would require the approval of a Conditional Use Permit (CUP) for alcoholic beverage sales. With the addition of the CUP to the project the item will now need to be placed on the Agenda for a City Council meeting to be presented in front of City Council. Staff would also require that an additional $5,000 be submitted to the Planning Department to accommodate the additional processing/review of the CUP.

7. *Alcohol License* – There is a possibility that applying for a Beer and Wine alcohol license will trigger the requirement for a Letter of Public Convenience and Necessity (PCN) for the Department of Alcoholic Beverages Control (ABC). Typically a Letter of PCN is required for areas that are considered higher than average crime areas or areas that are over-concentrated with existing alcoholic beverage licenses. Please speak to a representative at ABC or submit an application for a beer and wine license to conform that a PCN will be needed as part of this application.

8. *Floor Plan* – Since the project has included the addition of beer and wine sales the floor plan will need to show where beer and wine will be held within the store.

Building Elevations:

1. In reviewing the project plans showing the elevations it appears the elevations are mislabeled in terms of direction. The mislabeling is also shown in the elevations drawings for the car wash as well. If I understand correctly the elevations should be as follows.

Existing Elevations Label	***Correct Elevation Label***
North Elevation	Should be West Elevation
East Elevation	Should be North Elevation
South Elevation	Should be East Elevation
West Elevation	Should be South Elevation

In order to minimize confusion I will continue to use the existing elevation labels that are currently on the project plans when discussing design. However, the labels should be corrected as part of the resubmittal.

2. *Stone Veneer*- The stone work that is incorporated into the canopy should be incorporated into the façade of the building as well in order to ensure that a consistent design is portrayed throughout the project site. Stone work should be incorporated into both the convenience store façade as well as the façade of the carwash. Below is an example as well as additional examples shown in the cornice examples.

Stone Veneer Examples



3. *Pitched roof and Cornice* – The building and carwash should integrate some type of cornice feature in order to give the top of the parapet a more finished look. Also the main entrance of the convenience store should also have a pitched roof rather than a straight horizontal parapet in order to better emphasize the main entrance.

Pitched Roof Example



Cornice Examples



4. *Trellis Features* – The City of Rancho Cordova discourages against large blank exterior walls as they tend to serve as a canvas for vandalism and graffiti. In addition to the added lighting fixtures requested above, Staff would also request that the building include some kind of trellis feature with landscaping vine to added texture and design to the large blank walls as well as help deter future vandalism on site. See the below examples.

Trellis Feature Examples





Other Agency Comments:

Landscaping: There were comments regarding the landscaping on site. The consultant that we use did have some questions and changes for the submitted preliminary landscape plan. I've attached their comments to this comment letter as well. If you have any questions their contact information is on their comment letter.

Please provide a response to the above comments as well as revised items showing changes. If you have any questions please feel free to contact me.

Thank You,

Nicholas Sosa
Assistant Planner

CITY OF Rancho Cordova
Incorporated July 1, 2003

PLANNING DEPARTMENT
2729 Prospect Park Drive | Rancho Cordova, CA 95670
Phone: (916) 851-8750 | Fax: (916) 851-8762

DESIGN REVIEW LANDSCAPE PLAN CHECK
City of Rancho Cordova

November 27, 2017

Project: CE196_Mather Field Chevron Car Wash DR CUP DD9734 - Rancho Cordova, California
Reviewed by: Michael Engle, RCLA 4672
Approved by: June Cowles, Principal Planner
Comments to: Nick Sosa, Assistant Planner
City of Rancho Cordova
2729 Prospect Park Dr.
Rancho Cordova CA 95670
916-851-8713

A. **Documents upon which this review is based:**
Rancho Cordova Zoning Code and Design Guidelines

Water Efficiency Landscape Ordinance

Sunset Western Garden Book

B. **Submittal Review Items:**
Landscape Plans submitted by K12 Architects, dated 10/23/2017.

C. **Design Review Comments:**

1. Sheet A101.1 EXISTING SITE PLAN
   a. Key note #18 "Existing tree to be removed" is not shown on the plan. Is there an existing tree canopy to be modified?
   b. Have the trees that are scheduled to be removed been approved yet?

2. Sheet L102 PROPOSED SITE PLAN #2
   a. Key note #18 "Existing tree to be removed - unknown species" is missing for the three threes along the street.
   b. There are a couple of planters that are not called out. See plan comments for locations.

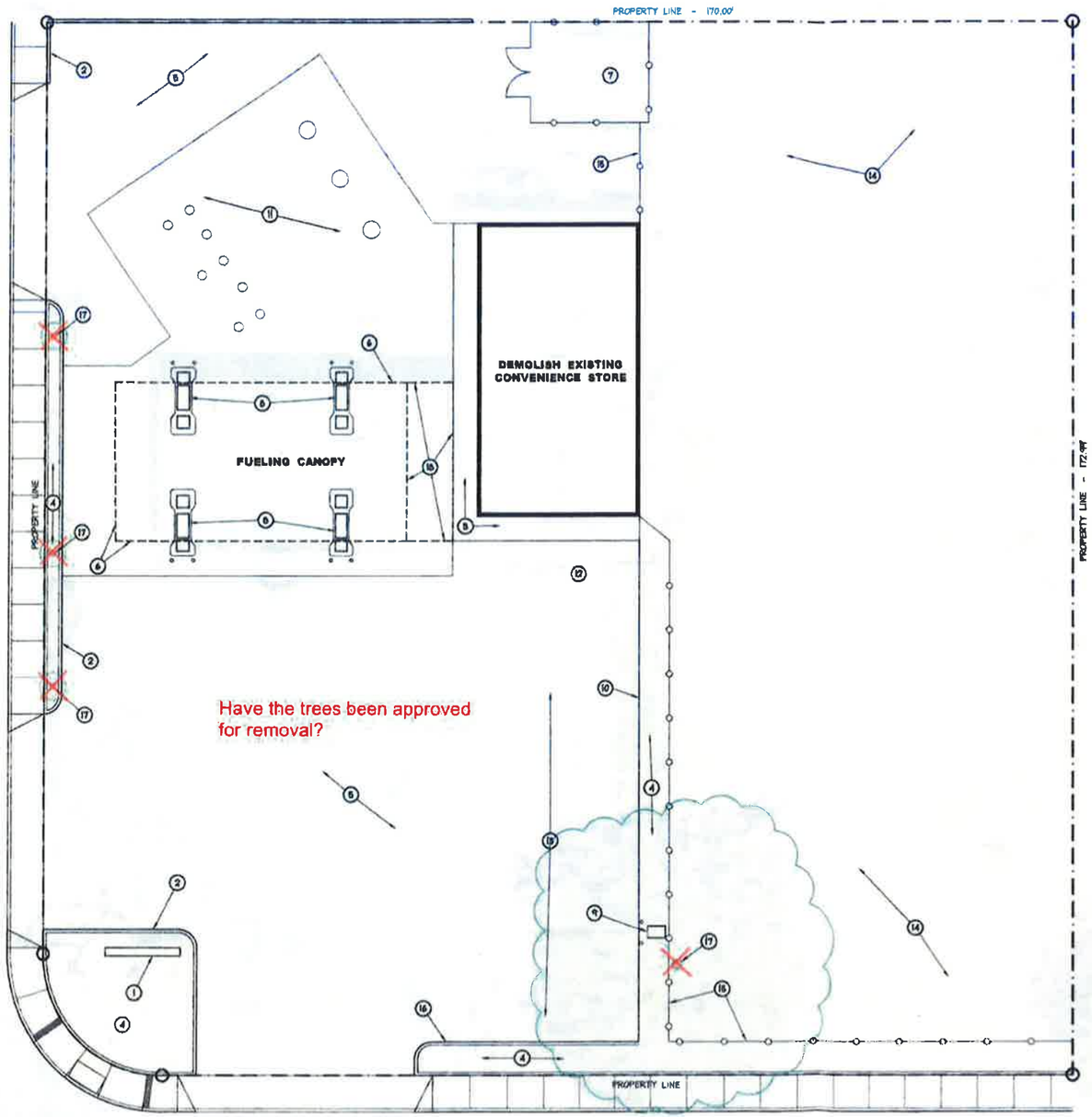
3. Sheet L1 PRELIMINARY LANDSCAPE PLAN
   a. Provide planting notes.
   b. Provide parking lot shade calcs.

CITY OF Rancho Cordova
Incorporated July 1, 2003

PLANNING DEPARTMENT
2729 Prospect Park Drive | Rancho Cordova, CA 95670
Phone: (916) 851-8750 | Fax: (916) 851-8762

c. Utility light poles need a 10' no tree buffer. See plan for location of conflict and relocate tree or light pole as needed.
d. Confirm hydrozones in the irrigation calcs that have medium water use plants are included in a medium water use hydrozone.
e. How tall is the existing sign in the south west corner? Will the proposed planting conflict with the sign text?
f. Provide mature sizes of all proposed trees and water uses.
g. Provide an irrigation plan with irrigation schedule.
h. Provide planting and irrigation construction details.

By performing this review and making the recommendations and/or comments herein, Cunningham Engineering shall not be acting in a manner so as to assume responsibility or liability, in whole or in part, for any aspect of the project Master Plans, proposed design requirements, design criteria, design calculations, construction methods, or the substance or contents of the Plan documents. The review and recommendations as provided herein are to be advisory only to the City of Rancho Cordova and to the Project Design Professionals.



20 EXISTING SITE PLAN

SCALE: 1" = 20'-0"

SITE PLAN KEYNOTES

1. FUEL PRICING MONUMENT SIGN TO REMAIN
2. CONCRETE CURB TO REMAIN
3. DEMOLISH EXISTING CONCRETE WALK
4. EXISTING LANDSCAPING
5. A/C PAVING
6. LINE OF AUTO FUELING CANOPY OVERHANG
7. DEMOLISH TRASH ENCLOSURE
8. EXISTING MULTI-PRODUCT FUEL DISPENSERS TO REMAIN
9. AIR & WATER SERVICE TO BE RELOCATED
10. EDGE OF PAVEMENT
11. UNDERGROUND FUEL STORAGE TANKS TO REMAIN
12. EXISTING ACCESSIBLE VAN PARKING STALL
13. EXISTING 9'x19' PARKING STALLS
14. EXISTING UNDEVELOPED PROPERTY
15. EXISTING CHAIN LINK FENCING
16. DEMOLISH EXISTING CONCRETE CURB
17. EXISTING TREE TO BE REMOVED
18. MODIFY EXISTING CANOPY - REMOVE PORTION

18 is not found on the plan.

VICINITY MAP



RECEIVED
OCT 31 2017
RANCHO CORDOVA
PLANNING

K12 Architects

K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

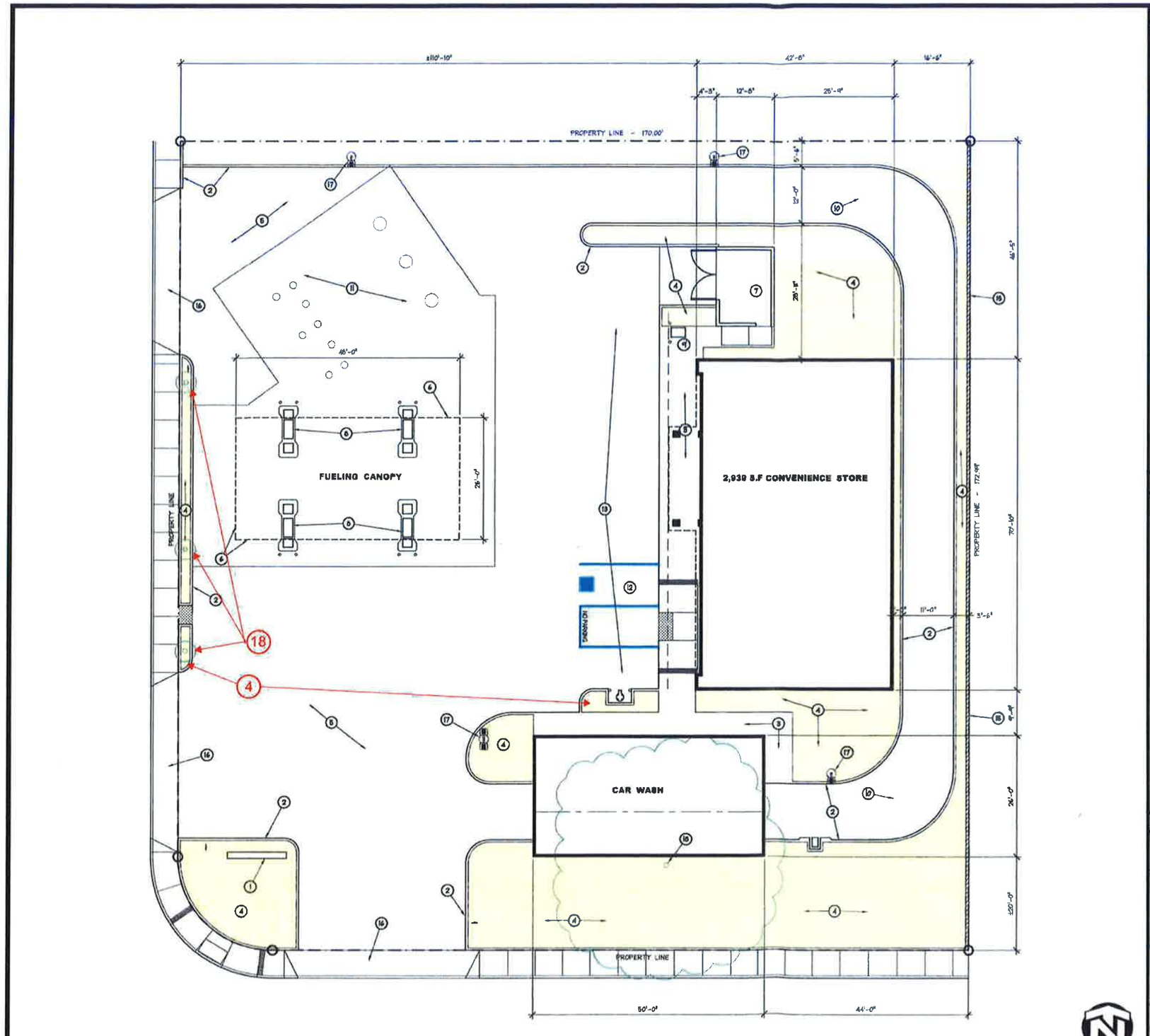
OWNER APPROVED - DECEMBER 5, 2016

STATE OF CALIFORNIA · STEVEN C. TERRY · C-29871 · LICENSED ARCHITECT

17-006 | 03-23-2017

EXISTING SITE PLAN

A101.1



20 **PROPOSED ARCHITECTURAL SITE PLAN**

PROJECT DATA

ASSESSOR'S PARCEL NUMBER(S): 077-0030-004-0000

ZONING: CMU - COMMERCIAL MIXED USE FOLSOM BLVD. SPECIFIC PLAN

PROJECT SITE AREA (GROSS): (40.67 ACRES) 429,274 S.F.

BUILDING DATA:

STRUCTURE	CBC OCCUP.	TYPE OF CONST.	AREA
RETAIL FACILITY BUILDING AREA(S):			
CONVENIENCE STORE	M	V B	2,939 S.F.
CAR WASH TUNNEL	B	II B	1,300 S.F.
(E) FUELING CANOPY	M	II B	1,748 S.F.

FLOOR TO AREA RATIO:

TOTAL AREA OF SITE:		29,274 S.F.
TOTAL AREA OF BLDGS	(W/O CANOPY)	(14.4%) 4,239 S.F.
TOTAL AREA OF BLDGS	(W/ CANOPY)	(18.7%) 5,473 S.F.

LANDSCAPING DATA:

TOTAL AREA OF LANDSCAPING:	5,487 S.F.
PERCENTAGE OF SITE LANDSCAPED:	18.7 %

PARKING DATA:

BUILDING AREA	PARKING RATIO	REQ'D.
CONVENIENCE STORE	(2.5:1,000 gross) 2.5 x 2.94 =	7.35
FUELING CANOPY	(Has 8 Fueling Positions) =	N/A
CAR WASH	228'-0" Lineal Feet of Queuing Lane Provided	
	TOTAL REQ'D PARKING =	7.35

PARKING PROVIDED

REGULAR SPACES	= 6
ACCESSIBLE SPACES	= 1
VACUUM SPACES	= 1
FUELING POSITIONS	= 8
TOTAL =	(+8 FUELING POSITIONS) 8

SITE PLAN KEYNOTES

1. EXISTING FUEL PRICING MONUMENT SIGN
2. CONCRETE CURB
3. CONCRETE WALK
4. LANDSCAPING
5. A/C PAVING
6. LINE OF EXISTING AUTO FUELING CANOPY OVERHANG
7. TRASH ENCLOSURE
8. EXISTING MULTI-PRODUCT FUEL DISPENSERS
9. AIR & WATER SERVICE
10. CAR WASH ENTRY LANE = 228'-0" LF STACKING
11. EXISTING UNDERGROUND FUEL STORAGE TANKS
12. ACCESSIBLE VAN PARKING STALL
13. 9'x19' PARKING STALLS
14. ACCESS DOMES AT PEDESTRIAN CROSSING
15. NEW 6'-0" TALL MASONRY WALL
16. EXISTING DRIVEWAYS
17. NEW LED YARD LIGHTS
18. EXISTING TREE TO BE REMOVED - UNKNOWN SPECIES

VICINITY MAP



K12 Architects
K12 Architects, Inc
3090 Fite Circle, #104
Sacramento, CA 95827
PH:(916) 455-6500 FAX:(916) 455-8100

CONSULTANTS

CONTRACTOR

OWNER:
MATHER FIELD CHEVRON

NEW CONVENIENCE STORE AND CAR WASH

**2931 Mather Field Road
Rancho Cordova, California
95670**

BY/DATE

**Mr. Iqbal Chohan
2931 Mather Field Road
Rancho Cordova, CA 95670**

REVISIONS

OWNER APPROVED - DECEMBER 5, 2016

REGISTERED ARCHITECT

PROJECT NUMBER: 17-006 | PROJECT DATE: 03-23-2017

SHEET CONTENTS:
**PROPOSED
SITE PLAN #2**

SHEET NUMBER:
A102

Parking lot shade calcs?

Planting notes?

MAXIMUM APPLIED WATER ALLOWANCE

MAWA = (ETo) (0.62) (LA) (0.62)

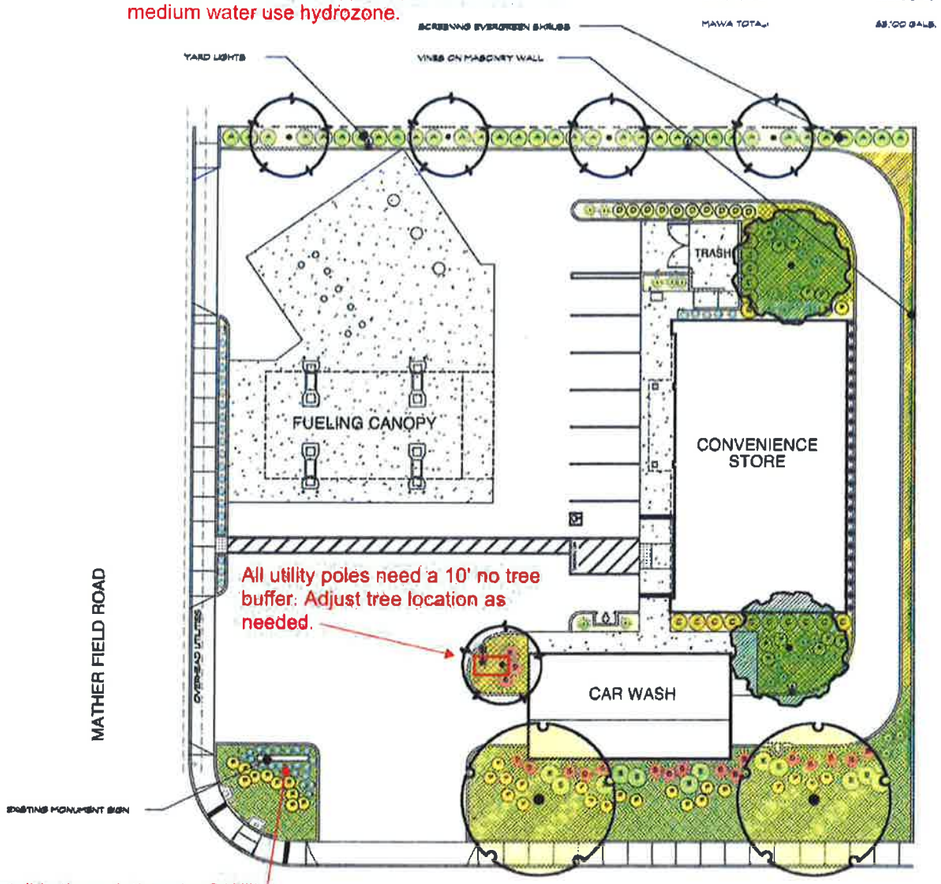
		ETo	ETAF	LA	
55,100	GAL/YEAR =	51.2	0.45	5577	0.62

ESTIMATED TOTAL WATER USE

ETWU=ETo X 0.62 X ETAF X AREA

HYDROZONE #/ PLANTING DESCRIPTION	PF	IRRIGATION METHOD	IRRIGATION EFFICIENCY	ETAF (PF/IE)	LANDSCAPE AREA	ETo	ETAF X AREA	ETWU
1. TEUCRIUM, OTHER	0.4	DRIP	0.81	0.494	2786	51.2	1,376	43,853
2. NEPETA, OTHER	0.3	DRIP	0.81	0.37	954	51.2	364	11,727
3. ERIGERON, OTHER	0.4	DRIP	0.81	0.494	342	51.2	169	5,438
3. OTHER MULCHED PLANTERS	0.3	DRIP	0.81	0.37	1788	51.2	661	21,273
				TOTAL AREA	5,877 SQFT		2,560 SQFT	
						ETWU TOTAL		82,386 GALS.
						MAWA TOTAL		85,100 GALS.

Confirm hydrozones in the irrigation calcs that have medium water use plants are included in a medium water use hydrozone.



SITE PLAN

SCALE: 1" = 16' - 0"

0 5' 10' 20' 30'

SUGGESTED PLANT LIST

SYMBOL	DESCRIPTION	SIZE	QUANTITY
	ACER RUBRUM 'OCTOBER GLORY' RED MAPLE	15 GAL.	2
	LAGUS NOBILIS 'SARATOGA' SWEET BAY (TREE FORM)	15 GAL.	3
	LAGERSTROEMIA X 'LOXI' PINK CRAPE MYRTLE	15 GAL.	5

Provide mature sizes of trees and water use.

SUGGESTED SHRUBS AND ACCENTS

SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	CONTAINER	WATER USE	SIZE
A	36	NERIUM OLEANDER 'DWARF RED'	DWARF RED OLEANDER	5 GAL.	L	4' X 4'
B	18	PHORMIUM TENAX 'AMAZING RED'	RED FLAX	5 GAL.	M	3' X 3'
C	17	ESCALLONIA 'TERRI'	DWARF ESCALLONIA	5 GAL.	M	3' X 3'
D	10	SALVIA MICROPHYLLA 'HOT LIPS'	RED SAGE	5 GAL.	L	2' X 2'
E	12	PLUMBAGO AURICULATA	BLUE CAPE PLUMBAGO	5 GAL.	M	3' X 3'
F	44	LANTANA 'WHITE'	WHITE LANTANA	1 GAL.	L	2' X 3'
G	33	DIETES BICOLOR	AFRICAN IRIS	1 GAL.	L	3' X 2'
H	48	AGAPANTHUS AFRICANUS 'BLUE'	LILY OF THE NILE	1 GAL.	L	2' X 2'
I	48	TULBAGHIA VIOLACEA	SOCIETY GARLIC	1 GAL.	L	1' X 1'
J	8	PARTHENOCISUS TRICUSPIDATA	BOSTON IVY	5 GAL.	M	

GROUND COVERS

						AREA
	30" O.C.	TEUCRIUM X LUCDYS	PROSTRATE GERMANDER	1 GAL.	L	2,786 SQFT
	30" O.C.	NEPETA X FAASSENII 'SELECT BLUE'	CATMINT	1 GAL.	L	954 SQFT
	36" O.C.	ERIGERON KARVINSKIANUS	FLEABANE	1 GAL.	L	342 SQFT
		3" THICK BROWN WALK-ON BARK MULCH				1,788 SQFT
					TOTAL LANDSCAPED AREA:	5,877 SQFT

NOTE THAT ALL PLANTERS ARE TO BE IRRIGATED BY AN AUTOMATIC, LOW VOLUME, INLINE DRIP SYSTEM BURIED BELOW GRADE. THE IRRIGATION CONTROLLER WILL BE AN ET WEATHER BASED TYPE.

ALL PLANTERS WILL BE MULCHED WITH AN APPROVED BARK PRODUCT.

THE LANDSCAPE AND IRRIGATION PLANS WILL COMPLY WITH AB 1881 WATER CONSERVATION IN LANDSCAPING ACT.

JAMES FERGUSON CLABAUGH
LANDSCAPE ARCHITECT
4546 SHAWN LANE
VACAVILLE, CA 95688
PHONE/ FAX: 707-449-3916

These drawings are the instrument of the person and shall not be used, in part or in whole, for any work not specifically contracted with James Clabaugh Landscape Architect. Copyright 2017

LICENSED LANDSCAPE ARCHITECT — JAMES FERGUSON CLABAUGH — 10-23-17 — STATE OF CALIFORNIA

MATHER FIELD CHEVRON

2931 MATHER FIELD ROAD
RANCHO CORDOVA, CA

			REVISIONS	
Scale	1" = 16'-0"			
Date	10/23/17	No	Date	
Job No.				
Designed by	J.C.			
Drawn by	J.C.			

PRELIMINARY LANDSCAPE PLAN

Sheet No
L1
of 1

Mather Field Chevron and Car Wash

Rancho Cordova City Council

Nicholas Sosa, Assistant Planner

October 15, 2018



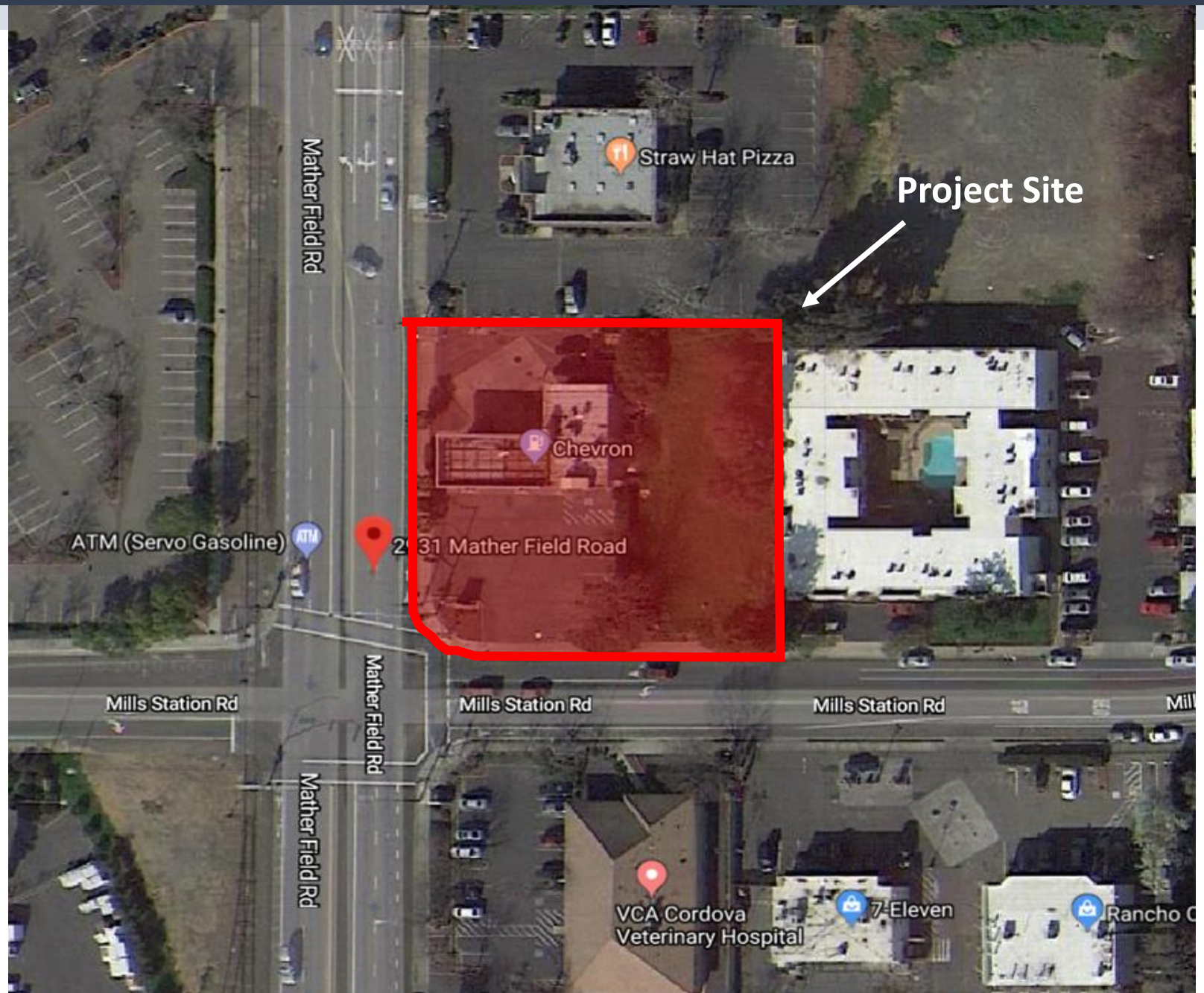
a fresh take. RANCHO CORDOVA CALIFORNIA

Project Request

- **Conditional Use Permit (CUP)** for the service station with added carwash as required by the Folsom Boulevard Specific Plan (FBSP) in a Commercial Mixed Use (CMU) zone.
- **Minor Design Review (MDR)** for the demolition and reconstruction of a 2,939 sf service station and added 1,300 sf car wash.
- **Conditional Use Permit (CUP)** for off-site alcohol sales (Beer and Wine) as required by the FBSP.
- **Letter of Public Convenience and Necessity (PCN)** as required by the Department of Alcoholic Beverage Control (ABC) and contingent upon approval of the requested CUP for alcohol sales.

Site Location

ATTACHMENT 9



AGENDA ITEM 11.3

7849

Existing Conditions

ATTACHMENT 9







AGENDA ITEM 11.3

Conditional Use Permit (Service Station)

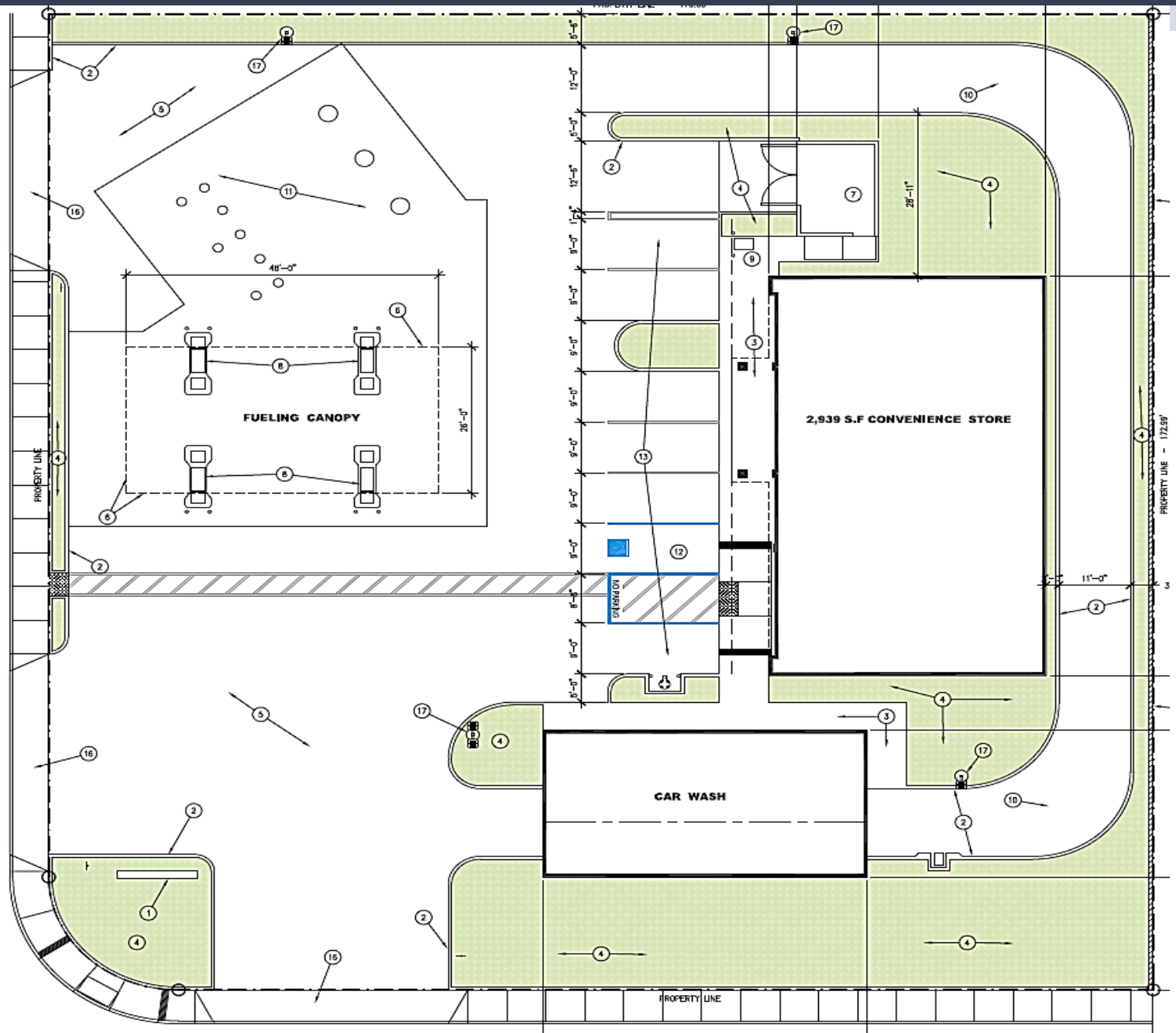
- A CUP is required for a Service Station within CMU zone of the FBSP.
- Although a Service Station is currently on site, Staff was unable to locate any historical entitlements permitting the Service Station
- Therefore, the Applicant is requesting a CUP to ensure the property contains the proper entitlements moving forward.
- The project will be held to all applicable standards and requirements for service stations as stated in Chapter 23.913.030.

Site Design

- The existing service station does not utilize the entire site at this time, the current building is proposed to be demolished and the site expanded to incorporate the neighboring empty lot.
- The existing fuel canopy will remain
- The Service Station will be adding a drive thru car wash to the property
- As recommended by the Acoustic Analysis provided for the project, an 8 foot concrete masonry wall will be constructed between the project property and the neighboring multi-family building to mitigate noise.

Site Plan

ATTACHMENT 9



AGENDA ITEM 11.3

Design

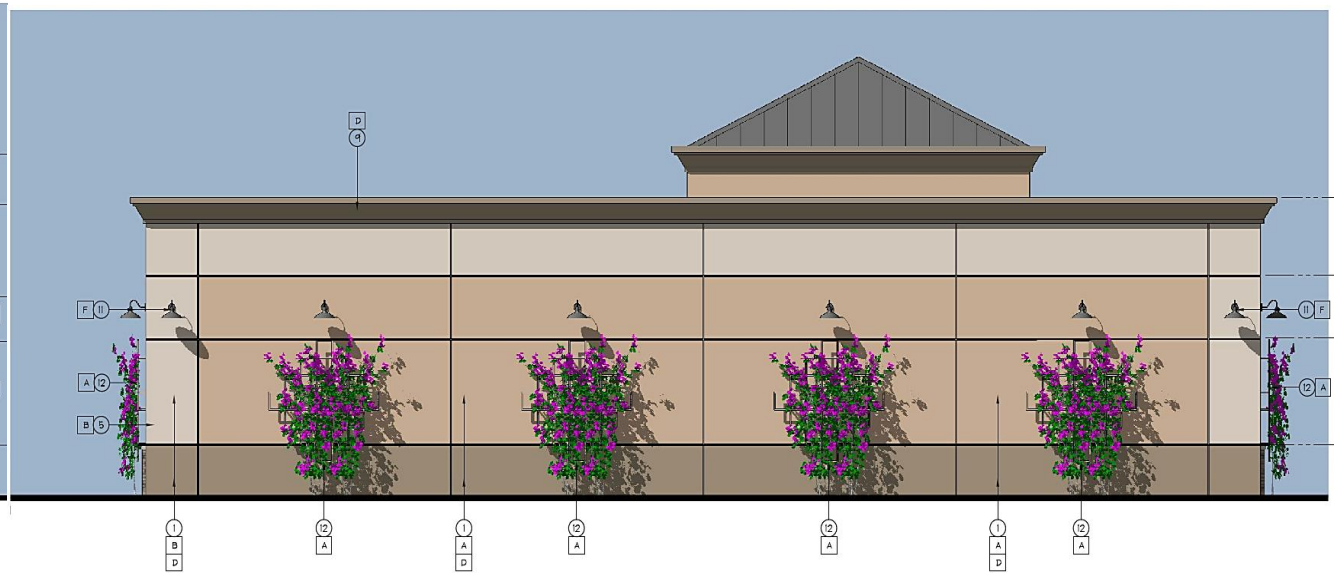
- The new service station will be 2,939 sqft and include a drive thru carwash (1,300 sf).
- The project will include new parking lot lighting and additional shielded lighting along the back of the building
- The reconstructed building will add stone veneer to both the convenience store and the car wash buildings.
- Trellis features are proposed on exterior wall elevations to soften the exterior. These features are required to be properly landscaped and maintained with proper irrigation.
- The existing fuel canopy will remain at its location.

Exterior Elevations

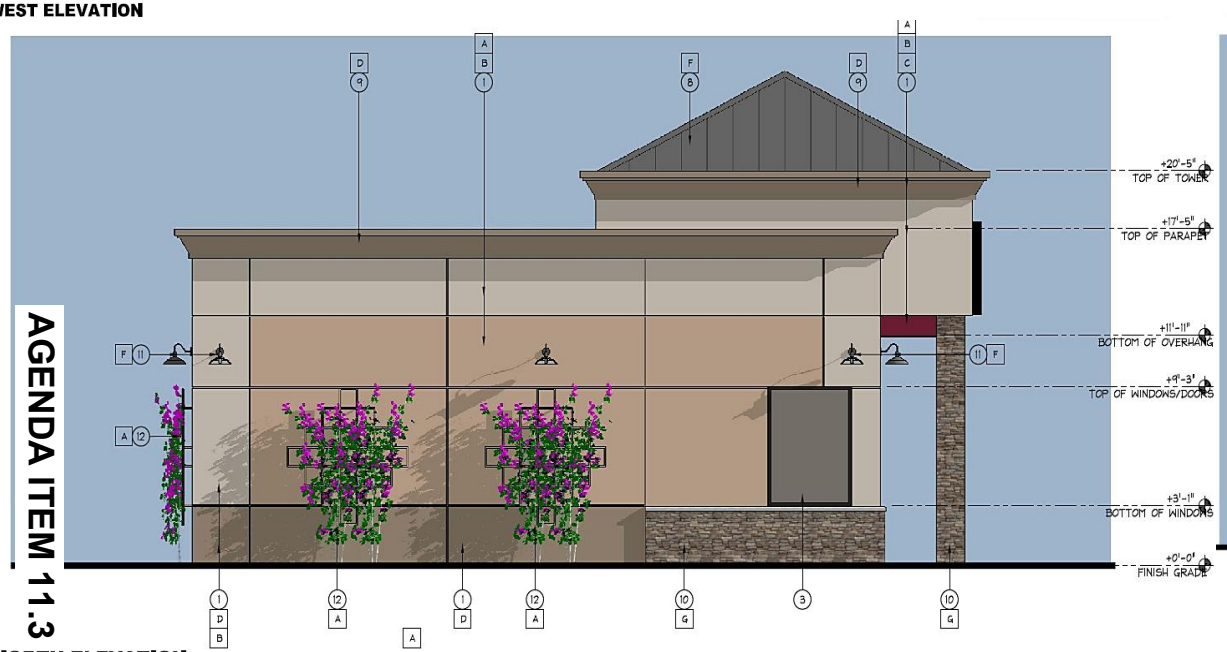
ATTACHMENT 9



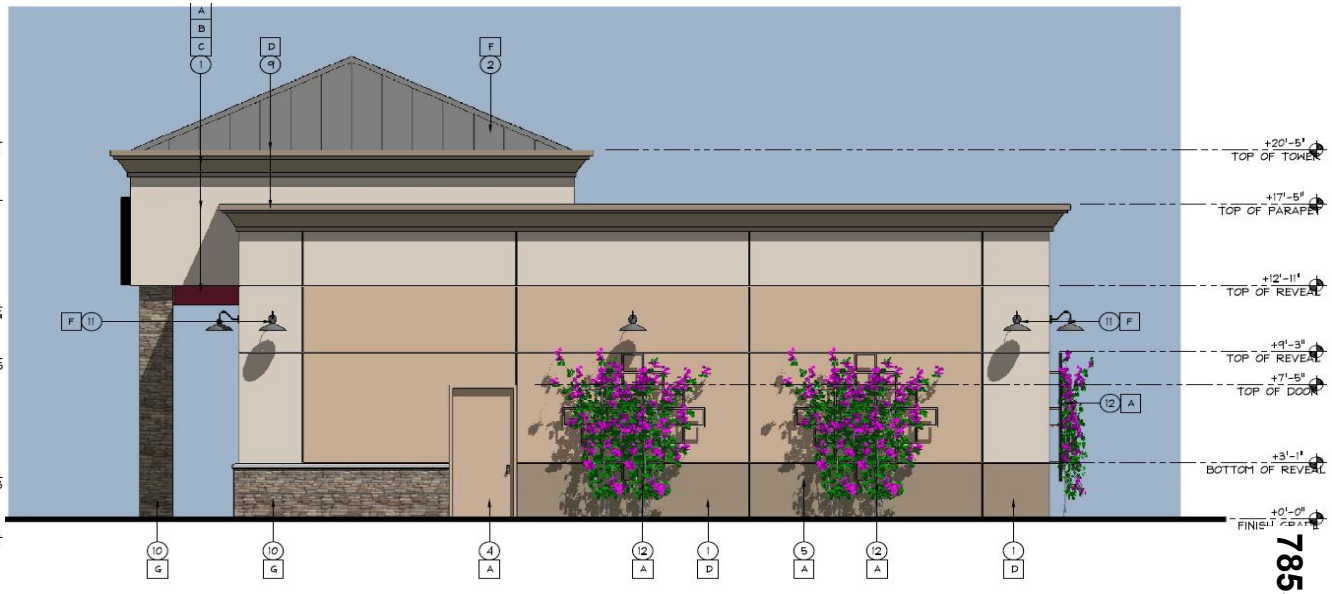
WEST ELEVATION



EAST ELEVATION



NORTH ELEVATION



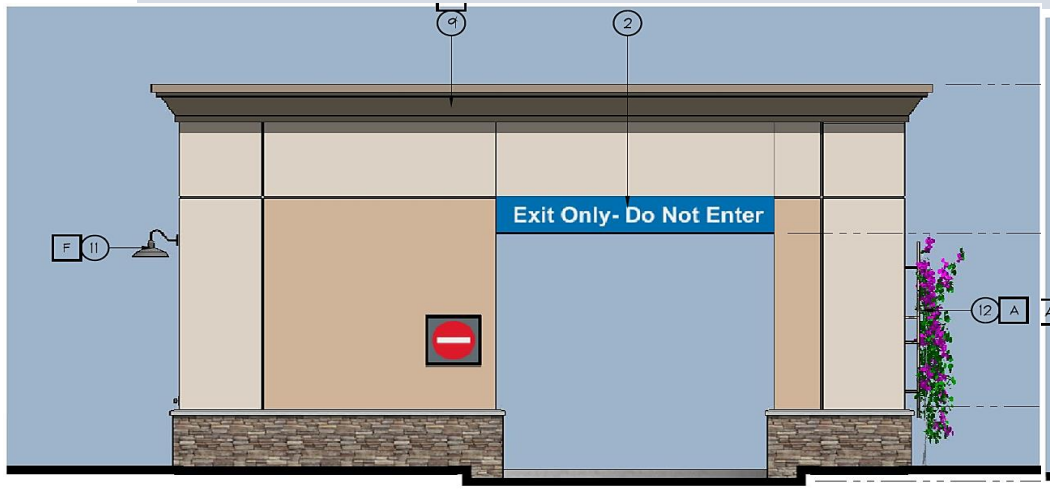
SOUTH ELEVATION

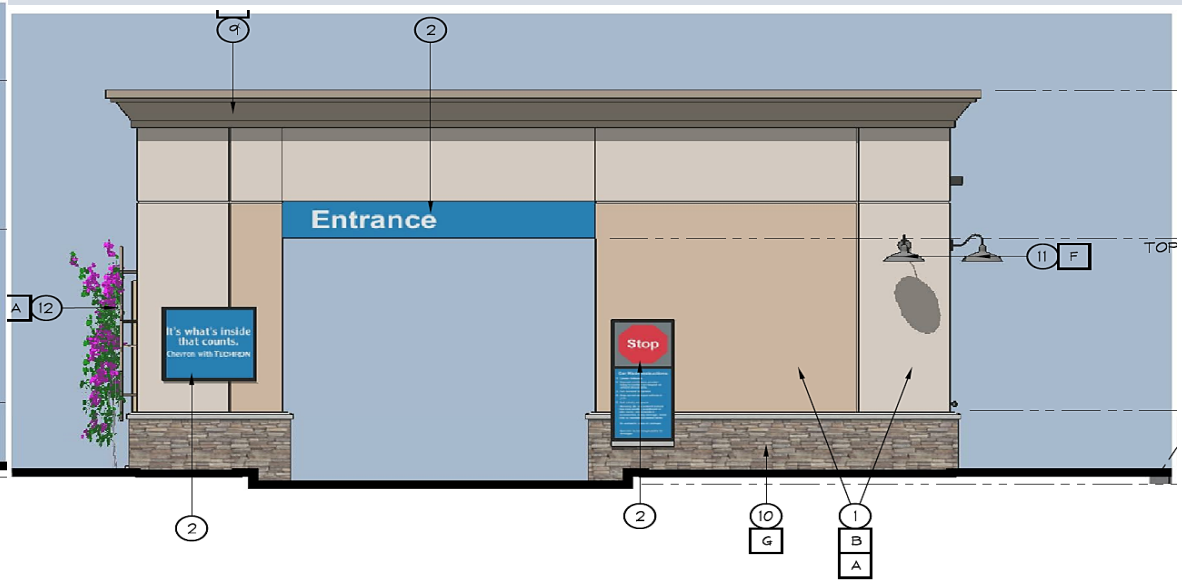
AGENDA ITEM 11.3

7855

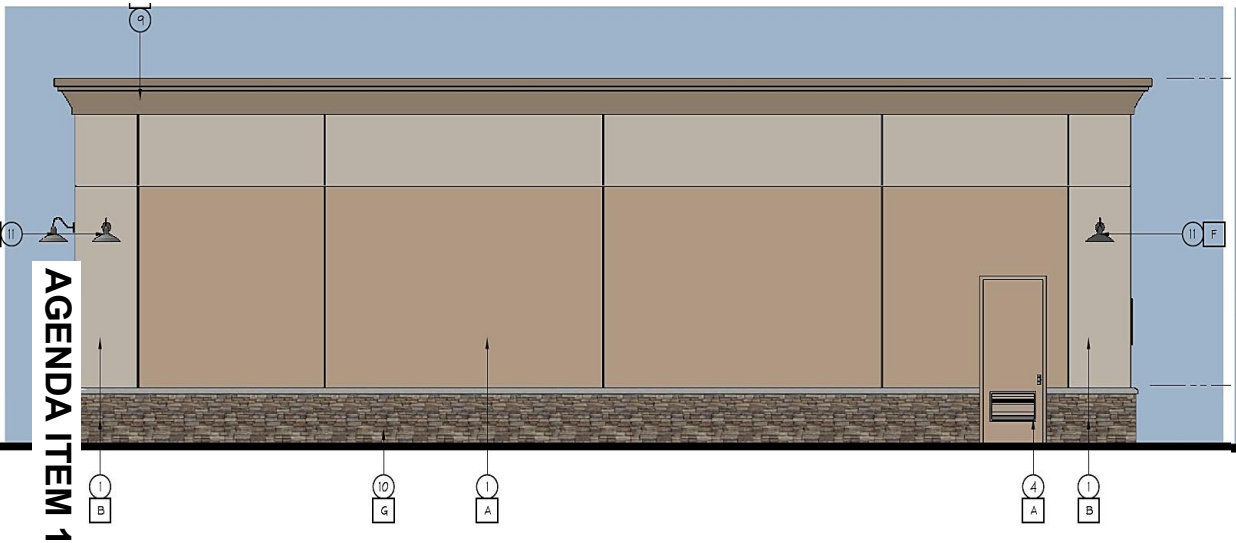
Exterior Elevations

ATTACHMENT 9

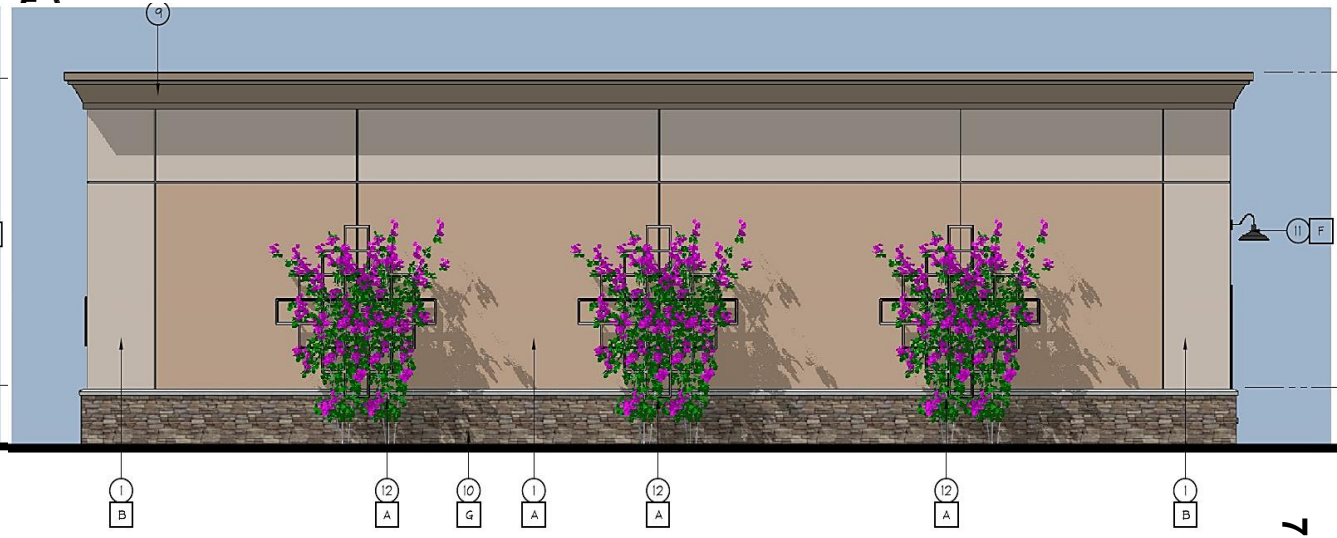




WEST ELEVATION



EAST ELEVATION



NO I ELEVATION

SOUTH ELEVATION

AGENDA ITEM 11.3

7856

Project Renderings

ATTACHMENT 9









AGENDA ITEM 11.3

7857

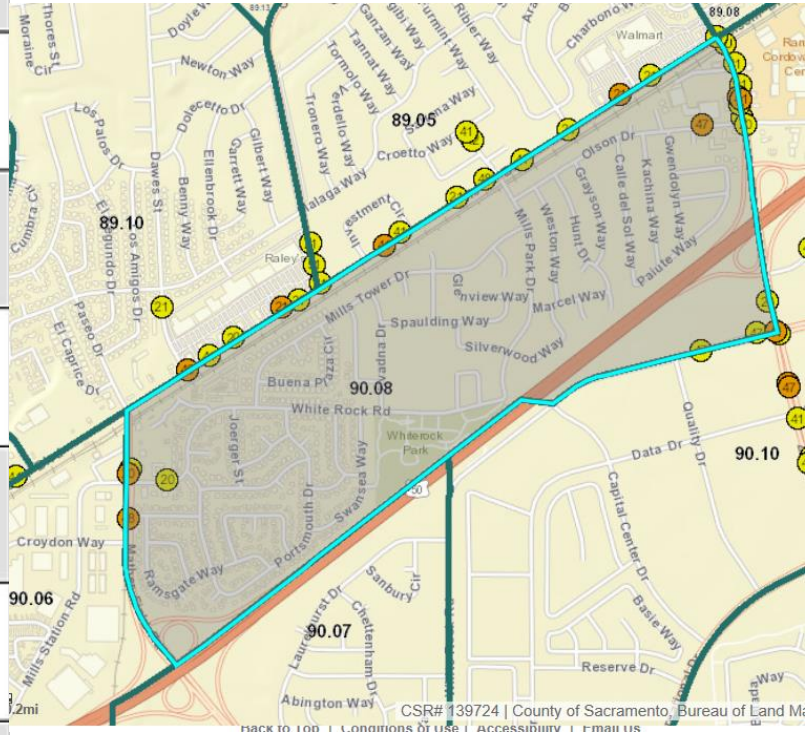
Conditional Use Permit (Beer and Wine)

- Applicant is also requesting a CUP for off-site alcohol sales (beer and wine) as required by the FBSP.
- Due to the higher than average crime in the area and the higher than average concentration of alcohol permits, the Department of Alcoholic Beverages Control (ABC) is requiring a Letter of Public Convenience and Necessity (PCN) from the City.
- PCN contingent upon approval of CUP
- Staff has obtained a list of licenses from the ABC website within the proposed census tract as well as within 1,000 feet of the property and has worked with the RCPD in reviewing the calls for service in the area within the past 18 months

Licenses in Census Tract 90.08 ATTACHMENT 9

	License Number	Status	License Type	Orig. Iss. Date	Expir. Date	Primary Owner	Business Name	Premises Addr.
1	212992	ACTIVE	20	04/15/1988	02/28/2019	TOOLEY OIL COMPANY		3050 ZINFANDEL DR RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
2	298487	ACTIVE	47	10/28/1994	09/30/2018	COURTYARD MANAGEMENT CORPORATION	COURTYARD BY MARRIOTT	10683 WHITE ROCK RD RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
3	418227	ACTIVE	47	11/01/2005	10/31/2018	CHIPOTLE MEXICAN GRILL INC	CHIPOTLE MEXICAN GRILL	2878 ZINFANDEL DR, STE A RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
4	437601	ACTIVE	20	12/14/2006	06/30/2019	7 ELEVEN INC	7 ELEVEN STORE 2235 14098A	10246 MILLS STATION RD RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
5	444091	SUREND	47	03/15/2007	02/28/2019	HORC INC	HOOTERS OF RANCHO CORDOVA	10750 OLSON DR RANCHO CORDOVA, CA 95670-5601 Census Tract: 0090.08
6	470033	ACTIVE	20	10/28/2008	09/30/2018	SUPERIOR GAS & CONVENIENCE STORE INC	ZINFANDEL AM PM	2896 ZINFANDEL DR RANCHO CORDOVA, CA 95670-5604 Census Tract: 0090.08
7	513910	ACTIVE	47	10/14/2011	09/30/2018	RAMOS & LECONA VENTURES LLC	CASA RAMOS MEXICAN RESTAURANT	10717 WHITE ROCK RD RANCHO CORDOVA, CA 95670-6031 Census Tract: 0090.08
	552783	ACTIVE	20	04/20/2016	06/30/2019	99 CENTS ONLY STORES LLC	99¢ ONLY STORE #160	2868 ZINFANDEL DR RANCHO CORDOVA, CA 95670 Census Tract: 0090.08
	570238	ACTIVE	41	07/13/2016	06/30/2019	SHP MOMA, LLC	STRAW HAT PIZZA	2929 MATHER FIELD RD RANCHO CORDOVA, CA 95670-5417 Census Tract: 0090.08

- The Census Tract (90.08) is bounded by Mather Field Road, Folsom Boulevard, Zinfandel Drive and Highway 50.

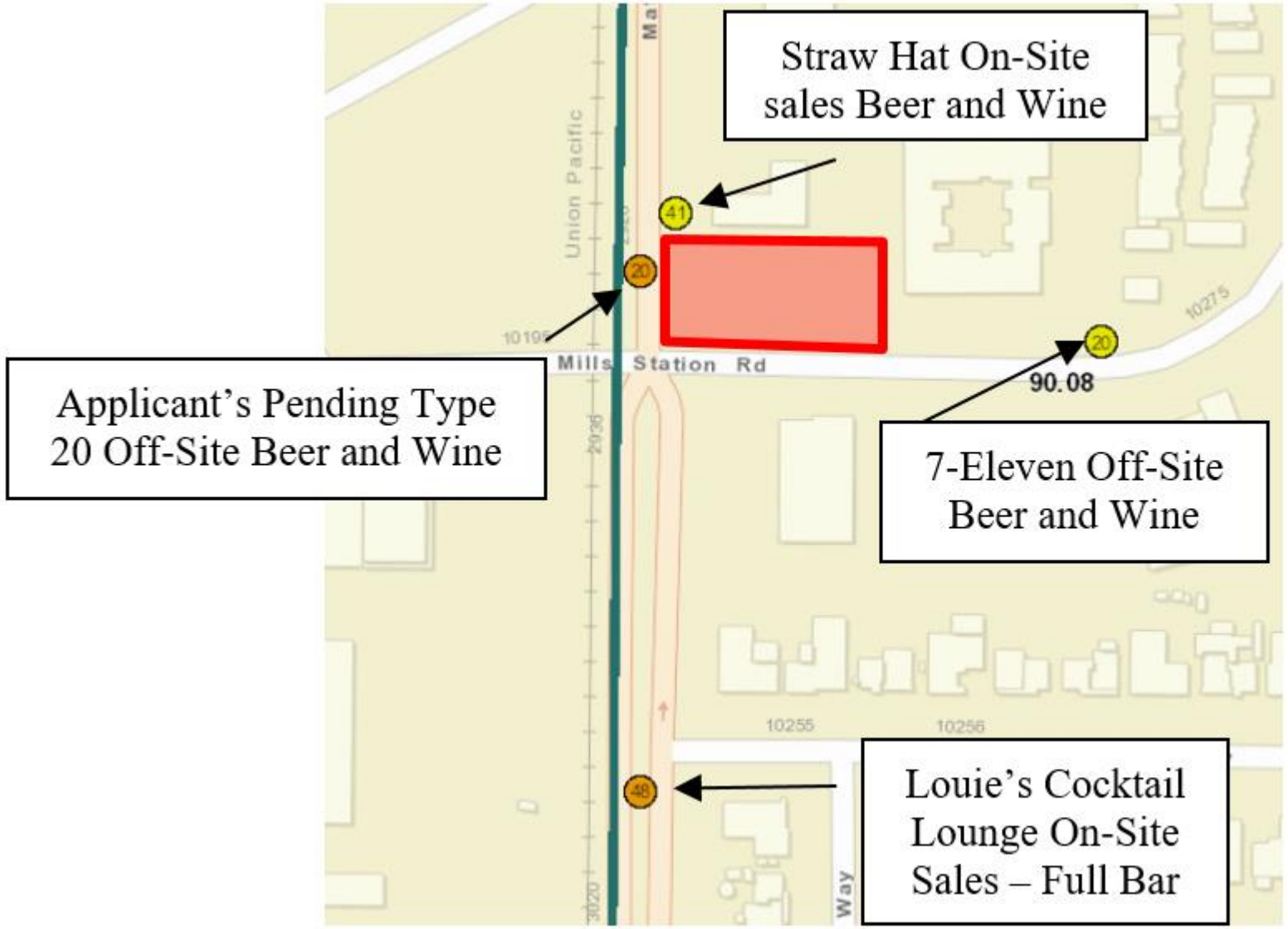


AGENDA ITEM 11.3

7859

Licenses within 1,000 feet

ATTACHMENT 9



Calls For Service

- **RCPD Calls for Service between January 1, 2017 and June 30, 2018 pulled from Letter of Opposition**

Distance Radius	Total Calls for Service	Highlighted Types of Crimes Reported
Within ¼ Mile	**2,355** calls	**138** calls for Trespassing **119** calls for Suspicious Suspect(s) **24** calls for Aggravated Assault(s) **27** calls Drugs/Narcotics **9** calls for Commercial Burglary
Within 500 Feet	**159** calls	**73** calls for Trespassing **48** calls for Suspicious Subject(s) **38** calls for Disturbing the Peace
At 2931 Mather Field Road	**66** Calls	**15** calls for Trespassing in Progress **9** calls for Disturbing the Peace **8** calls for Suspicious Subject(s) **6** calls for Customer Disturbances

Conditional Use Permit (Beer and Wine)

- The RCPD has submitted a letter to staff in opposition of the request for off-site alcohol sales (beer and wine).
- Due to the high volume of calls for service and higher than average concentration of alcohol permits within the area, Staff supports the Rancho Cordova Police Department's Letter of Opposition and is recommending denial of the requested CUP.
- Since the Letter of Public Convenience and Necessity (PCN) is contingent upon the approval of the CUP, Staff is also recommending denial of the PCN.

Environmental

- Staff has identified that the project is exempt from CEQA pursuant to CEQA Guidelines Section 15183 (Consistency with a General Plan, Community Plan, or Zoning for which an EIR was prepared).
- Staff has also identified that the project is exempt from CEQA pursuant to CEQA Guidelines Section 15332 In-Fill Development Projects as the site is less than five acres and substantially surrounded by urban uses.

Recommended Motions

- Staff recommends Council adopt the requested CUP and Minor Design Review for the proposed service station with additional drive thru car wash subject to the findings, project plans and Conditions of Approval.
- Staff recommends that the City Council find the project to be in compliance with CEQA per the provided CEQA exemptions (sections 15183 and 15332).
- Staff also recommends that Council Deny the requested CUP and contingent PCN for the requested off-site alcohol sales (beer and wine) subject to the findings and information provided by RCPD.

Questions???